IDENTIFICATION

PRODUCT CODE: AC-F115B-MC

PRODUCT NAME: CZRLHB0 RL11/RLV11 CONTROLLER TEST 2

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MAINTAINER: DIAGNOSTIC ENGINEERING

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GENERAL INFORMATION

1.1 PROGRAM ABSTRACT

1.1.1 STRUCTURE OF PROGRAM

THIS DIAGNOSTIC IS COMPATIBLE WITH BOTH XXDP+ AND ACT. IT CAN BE RUN STANDALONE UNDER XXDP+, AND CAN BE CHAINED UNDER XXDP+, ACT AND APT IN ACT MODE (SEE 2.2 "CHAIN MODE OPERATION" FOR DETAILS OF CHAINING PROCEDURE). IT IS A SINGLE PROGRAM FROM THE STANDPOINT OF THE DIAGNOSTIC USER, WHICH AT RUN TIME IS APPENDED TO A COMMON FRONT-END PIECE OF SUPERVISOR SOFTWARE THROUGH WHICH THE DIAGNOSTIC PROGRAM INTERFACES TO THE ENVIRONMENT AS IT EXECUTES.

WHEN THIS DIAGNOSTIC IS STARTED, CONTROL GOES FIRST TO THE SUPERVISOR PORTION, WHICH WILL ASK CERTAIN "HARD CORE" QUESTIONS ABOUT THE ENVIRONMENT. THEN IT WILL ENTER COMMAND MODE, INDICATED BY A PROMPT CHARACTER (DR>). AT COMMAND MODE THE OPERATOR MAY ENTER ANY OF SEVERAL COMMANDS AS DESCRIBED IN 2.0 "OPERATING INSTRUCTIONS".

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

1.1.2 DIAGNOSTIC INFORMATION

THE RL11/RLV11 CONTROLLER TEST (PART 2) IS A PDP-11 (LSI-11) BASED PROGRAM THAT WILL TEST THE CONTROLLER. IT COMPLEMENTS PART 1 BY EXTENDING THE TEST COVERAGE TO INCLUDE WRITE DATA, READ DATA, WRITE CHECK AND READ DATA WITHOUT HEADER COMPARE. IT IS AIMED AT FULLY TESTING THE CONTROLLER IN THESE AREAS, BUT BY DEFAULT ALSO EXERCISES THE DRIVE.

1.2 SYSTEM REQUIREMENTS

1.2.1 HARDWARE REQUIREMENTS

* PDP-11/LSI-11 PROCESSOR WITH 16K OR MORE OF MEMORY
* CONSOLE DEVICE (LA30,LA36,VT50,ETC.)
* 1 OR 2 RL11/RLV11 CONTROLLER(S) WITH:

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

* KW11P OR KW11L CLOCK (REQUIRED TO PERFORM TEST 7)
* LINE PRINTER (OPTIONAL)

1.2.2 SOFTWARE REQUIREMENTS

CZRLHA RL11/RLV11 CTLR TEST 2
(FORMERLY CZRLBB)

1.3 RELATED DOCUMENTS AND STANDARDS

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

1.4 DIAGNOSTIC HIERARCHY PREREQUISITES

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

CVRLAB0	RLV11 RL01 DISKLESS TEST (RLV11 ONLY)
CZRLGB0	RL11/RLV11 RL01/02 CONTROLLER TEST (PART 1)

1.5 ASSUMPTIONS

THE HARDWARE OTHER THAN THE RL01/02 SUBSYSTEM IS ASSUMED TO WORK PROPERLY. FALSE ERRORS MAY BE REPORTED IF THE PROCESSOR, ETC., DO NOT FUNCTION PROPERLY.

2.0 OPERATING INSTRUCTIONS

2.1 HOW TO RUN THIS DIAGNOSTIC

2.1.1 THE FIVE STEPS OF EXECUTION

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

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

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

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

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

WHEN THIS DIAGNOSTIC IS STARTED THE FOLLOWING 5 STEPS WILL OCCUR:

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

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

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

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

THINGS TO NOTE HERE.

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

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

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

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

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

****
* STEP 2 *
****

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

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

****
* STEP 3 *
****

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

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

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

****
* STEP 4 *
****

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

****
* STEP 5 *
****

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

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

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

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

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

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

2.1.2 SAMPLE RUN-THROUGH

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

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

1. ISSUE ANOTHER "START" COMMAND (THUS GOING THRU ALL OF STEPS 1, 2, 3, 4, AND 5 AGAIN).
2. ISSUE A "RESTART" COMMAND (SAME AS START COMMAND EXCEPT THAT THE HARDWARE QUESTIONS ARE NOT ASKED).
3. ISSUE A "CONTINUE" COMMAND (EXECUTION WILL RESUME AT THE BEGINNING OF THE PARTICULAR HARDWARE TEST (MOST DIAGNOSTICS CONSIST OF A NUMBER OF THESE) THAT IT WAS IN WHEN THE ERROR HALT OCCURRED. 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 ON ERROR).

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 CZRLHB                               O
DRS LOADED                              D
DIAG. RUN-TIME SERVICES REV. D APR-79   D
CZRLH-B-0                               D
CZRLH TESTS WRITE DATA, READ DATA,      D
AND WRITE CHECK OPERATIONS
UNIT IS RL01, RL02                      D
DR>STA/PASS:1/FLAGS:HOE                 D,O

CHANGE HW (L) ? Y                       D,O

# UNITS (D) ? 2                         D,O

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

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

DROP ON ERROR LIMIT (L) N ?
COMPARE DATA ON DCK (L) N ?


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

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


**************************************************
AT THIS POINT THE DIAGNOSTIC IS LOOPING ON THE
ERROR WITHOUT PRINTING ANYTHING.  YOU CAN SCOPE
THE ERROR UNTIL YOU HAVE LOCATED IT, THEN ^C OUT
**************************************************
```

```
^C                                          0

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

CHANGE SW (L) ? N                           D,0

CZRLH EOP 1                                 D
^C

DR>RESTART/PASS:1                           D,0

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

2.2 CHAIN MODE OPERATION

CHAIN MODE OPERATION CONSISTS OF THE SEQUENTIAL EXECUTION OF PROGRAMS WITHOUT OPERATOR INTERVENTION. ONLY PROGRAMS THAT HAVE BEEN MODIFIED TO RUN IN CHAIN MODE CAN BE CHAINED. CHAINABLE PROGRAMS ARE IDENTIFIED IN THE DIRECTORY BY A BIC EXTENSION.

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

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

TO EXECUTE A CHAIN FILE THE USER TYPES:

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

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

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

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

2.3 DETAILS OF COMMANDS AND SYNTAX

2.3.1 TABLE OF COMMAND VA IDITY

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

	HOW ENTERED	LEGAL COMMANDS
1.	OPERATOR ENTERED RUN DIAG'	START PRINT DISPLAY FLAGS ZFLAGS EXIT
2.	DIAGNOSTIC HAS FINISHED ALL ITS REQUESTED PASSES	START RESTART PRINT DISPLAY FLAGS ZFLAGS EXIT
3.	OPERATOR INTERRUPTED THE DIAGNOSTIC WITH CTRL/C	START RESTART CONTINUE PRINT DISPLAY FLAGS ZFLAGS EXIT
4.	AN ERROR WAS ENCOUNTERED WITH THE HOE FLAG SET SET	START RESTART CONTINUE PROCEED PRINT DISPLAY FLAGS ZFLAGS EXIT

2.3.2 COMMAND SYNTAX

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

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

THE SWITCH ARGUMENTS ARE AS FOLLOWS:

"TEST-LIST" IS A SEQUENCE OF DECIMAL NUMBERS (1:2 ETC.) OR RANGES OF DECIMAL NUMBERS (1-5:8-10 ETC.) THAT SPECIFY THE TESTS TO BE EXECUTED. THE NUMBERS ARE SEPARATED BY COLONS. THE NUMBERS RANGE FROM 1 TO THE LARGEST TEST NUMBER IN THE DIAGNOSTIC. THEY MAY BE SPECIFIED IN ANY ORDER. TESTS WILL BE EXECUTED IN NUMERICAL ORDER REGARDLESS OF THE ORDER OF SPECIFICATION. THE DEFAULT IS TO EXECUTE ALL TESTS.

"PASS-CNT" IS A DECIMAL NUMBER INDICATING THE DESIRED NUMBER OF PASSES. A PASS IS DEFINED AS THE EXECUTION OF THE FULL DIAGNOSTIC (ALL SELECTED TESTS) AGAINST ALL UNITS SUBMITTED. THE DEFAULT IS NON-ENDING TEST EXECUTION. "FLAG-LIST" IS A SEQUENCE OF ELEMENTS OF THE FORM <FLAG>, <FLAG=1>, OR <FLAG=0>, SEPARATED BY COLONS, WHERE <FLAG> HAS ONE OF THE FOLLOWING VALUES:

HOE HALT ON ERROR, CAUSING COMMAND MODE TO BE ENTERED WHEN AN ERROR IS ENCOUNTERED

LOE LOOP ON ERROR, CAUSING THE DIAGNOSTIC TO LOOP CONTINUOUSLY WITHIN THE SMALLEST DEFINED BLOCK OF CODING (SEGMENT, SUBTEST, OR TEST) CONTAINING THE ERROR

IER INHIBIT ERROR REPORTING

IBE INHIBIT BASIC ERROR REPORTS

IXE INHIBIT EXTENDED ERROR REPORTS

PRI DIRECT ALL MESSAGES TO A LINE PRINTER

PNT PRINT NUMBER OF TEST BEING EXECUTED

BOE BELL ON ERROR

UAM RUN IN UNATTENDED MODE, BYPASSING MANUAL INTERVENTION TEST.

ISR INHIBIT STATISTICAL REPORTS

IDU INHIBIT DROPPING OF UNITS BY DIAGNOSTIC

ADR EXECUTE AUTODROP CODE

LOT LOOP ON TEST

EVL EVALUATE

THE FLAGS NAMED OR EQUATED TO 1 ARE SET, THOSE EQUATED TO 0 ARE CLEARED. A FLAG NOT SPECIFIED IS CLEARED. IF THE FLAGS SWITCH IS NOT GIVEN ALL FLAGS ARE CLEARED.

''EOP-INCR'' IS A DECIMAL NUMBER INDICATING HOW OFTEN (IN TERMS OF PASSES) IT IS DESIRED THAT THE END OF PASS MESSAGE BE PRINTED. THE DEFAULT IS AT THE END OF EVERY PASS.

****

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

****

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

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

THE SWITCH ARGUMENTS ARE AS IN THE START COMMAND EXCEPT:

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

2. ALL UNSPECIFIED FLAG SETTINGS ARE UNCHANGED.

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

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

THE SWITCH ARGUMENTS ARE AS IN THE START COMMAND EXCEPT:

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

2. UNSPECIFIED FLAG SETTINGS ARE UNCHANGED

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

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

****
EXIT
****

RETURN TO XXDP+ PROMPT MODE.

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

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

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

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

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

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

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

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

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

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

THE CURRENT SETTINGS OF ALL FLAGS ARE PRINTED.

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

ALL FLAGS ARE CLEARED.

2.4 EXTENDED P-TABLE DIALOGUE

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

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

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

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

NOW LET US SEE HOW WE COULD USE THESE CAPABILITIES TO CONSTRUCT A SET OF P-TABLES. ASSUME THAT WE HAVE 8 RL UNITS, AND THAT THERE ARE FIVE (5) HARDWARE PARAMETERS FOR EACH (5 SLOTS IN THE P-TABLE, 5 HARDWARE QUESTIONS IN THE DIALOGUE).

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

```
# UNITS (D) ? 8

UNIT 0
RL11 (L) Y ?
BUS ADDDRESS (O) 174400 ?
VECTOR (O) 160 ?
DRIVE TYPE = RL01 (L) Y ?
BR LEVEL (O) 5 ?
DRIVE (O) 0 ? 0-3

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

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 #4), AND THE "BR LEVEL" (QUESTION #5). THE ACTUAL UNIT NUMBERS OF THE RL01'S FOR QUESTION #6 WERE ASSIGNED 0 THRU 3 FOR THE FIRST 4 P-TABLE SLOTS.

THE SECOND TIME THRU THE P-TABLE QUESTIONS (FOR THE RL02 ASSIGNMENT ON THE SECOND CONTROLLER), THE FIRST QUESTION DEFAULTED TO "RL11" TYPE CONTROLLER. THE SECOND QUESTION WAS ANSWERED TO REFLECT THE CHANGE IN CSR ADDRESS FOR THE RL02 CONTROLLER (175400). THE SECOND CONTROLLER'S VECTOR WAS ALSO CHANGED TO 164 IN QUESTION #3. THE RL02 TEST UNIT NUMBERS WERE ASSIGNED VALUES 0 TO 3 IN QUESTION #4 AND THE DRIVE TYPE WAS SET FOR RL02'S FOR THE REMAINING 4 UNITS IN QUESTION #4. QUESTION #5 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 TYPE - RL01 (L) ?

ANSWER NO (N) IF DRIVE IS AN RL02

BP LEVEL (O) 5?

ANSWER WITH THE INTERRUPT PRIORITY OF THE CONTROLLER.

DRIVE (O) 0?

ANSWER WITH THE DRIVE(S) CONNECTED TO THE CONTROLLER.

2.6 SOFTWARE PARAMETERS

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

''CHANGE S.W. ?''

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

''DROP ON ERROR LIMIT (L) Y?''

TO ALLOW THE UNIT TO BE DROPPED ONCE A PREDETERMINED NUMBER OF ERRORS ARE ENCOUNTERED.

ANSWER Y OR N

''ERROR LIMIT (D) 10?''

NUMBER OF ERRORS ALLOWED BEFORE DROPPING UNIT.

ANSWER 1 TO 65K

''COMPARE DATA ON DCK (L) N?''

WHEN A DATA CHECK IS ENCOUNTERED AND DATA IS KNOWN, ALLOW AN INCORE COMPARISON OF DATA.

ANSWER Y OR N

''# OF WORDS IN ERROR REPORTED (D) 3? ''

NUMBER OF MISCOMPARES TO BE PRINTED ON CONSOLE DEVICE.

ANSWER 0 - 128

3.0 ERROR INFORMATION

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

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

WHERE:

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

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

EXAMPLE:

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

3.1 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 - WRITE FUNCTION

THIS TEST WILL VERIFY THAT THE WRITE FUNCTION WILL RESET CONTROLLER READY AND POST NO ERRORS.

TEST 2 - WRITE FUNCTION INTERRUPT

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

TEST 3 - PROPFR INCREMENT OF RLBA ON WRITE

THIS TEST WILL VERIFY THAT THE BUS ADDRESS REGISTER INCREMENTS PROPERLY ON A WRITE FUNCTION.

TEST 4 - PROPER INCREMENT OF RLDA ON WRITE
******

THIS TEST WILL VERIFY THAT THE DISK ADDRESS REGISTER INCREMENTS PROPERLY ON A WRITE FUNCTION.

TEST 5 - FORCE HEADER NOT FOUND WITH WRITE
******

THIS TEST WILL FORCE A HEADER NOT FOUND ERROR ON A WRITE. THE RLDA IS SET UP TO LOOK FOR SECTOR 40, A WRITE IS THEN ISSUED. THE HEADER NOT FOUND ERROR SHOULD THEN SET.

TEST 6 - FORCE HEADER NOT FOUND WITH WRITE INTERRUPT
******

THIS TEST WILL FORCE A HEADER NOT FOUND ERROR UNDER INTERRUPT CONTROL. HEADER NOT FOUND IS FORCED BY SETTIING SECTOR 40 OF RLDA AND ISSUING A WRITE.

TEST 7 - CHECK OPI TIME WITH HNF
******

(KW11-L OR KW11-P CLOCK IS REQUIRED TO PERFORM THIS TEST)

THIS TEST WILL TIME THE SETTING OF HNF (OPI) FROM ISSUANCE. THIS IS DONE BY ISSUING A WRITE TO SECTOR 40. THE TIME OF OPI SHOULD BE AROUND 200 MILLISECONDS.

TEST 8 - MULTIPLE SECTOR TRANSFER ON WRITE
******

THIS TEST THE ABILITY FOR THE WRITE FUNCTION TO WRITE MORE THAN ONE SECTOR. WE SET UP FOR A TWO SECTOR WRITE.

TEST 9 - CHECK DIRECTION OF WRITE NPR
******

THIS TEST WILL VERIFY THAT THE NPR DIRECTION OF A WRITE FUNCTION IS FROM MEMORY TO THE CONTROLLER. THIS IS DONE BY WRITING A PATTERN IN MEMORY AND ISSUING A WRITE, THEN CHECKING MEMORY TO VERIFY THAT IT DID NOT GET DISTURBED.

TEST 10 - CHECK FULL INCREMENT OF RLBA
****

THIS TEST WILL CHECK THAT THE RLBA CAN INCREMENT OF THE FULL 16 BIT RANGE. THIS IS DONE BY ISSUING A ONE WORD WRITE TO CHECK EACH BIT TOGGLE FROM 1-0 AND 0-1. THIS IS DONE FROM 0 TO 177776 REGARDLESS OF MEMORY SIZE.

TEST 11 - BA BIT 16 INCREMENT
****

THIS TEST WILL CHECK THAT BUS ADDRESS BIT 16 WILL SET WHEN THE RLBA IS 177776. AND THAT THE RLBA GOES TO 0.

TEST 12 - BA BIT 17 INCREMENT
****

THIS TEST WILL CHECK THAT BUS ADDRESS BIT 17 WILL SET WHEN BIT 16 AND THE RLBA ARE SET. THE RLBA AND BIT 16 ARE CHECKED TO GO TO ZERO.

TEST 14 - READ NPR INTEGRITY
****

THIS TEST WILL VERIFY THAT THE READ FUNCTION WILL NOT CAUSE A BUS TRAP THEREFORE VERIFYING THE NPR LOGIC BETWEEN THE CONTROLLER AND PROCESSOR.

TEST 13 - READ FUNCTION
****

THIS TEST WILL VERIFY THAT THE READ FUNCTION WILL RESET CONTROLLER READY AND POST NO ERRORS.

TEST 14 - READ FUNCTION INTERRUPT
****

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

TEST 15 - CHECK DIRECTION OF READ NPR
****

THIS TEST WILL VERIFY THAT THE NPR DIRECTION OF A READ FUNCTION IS FROM CONTROLLER TO THE MEMORY. THIS IS DONE BY WRITING A PATTERN IN MEMORY AND ISSUING A READ, THEN CHECKING MEMORY TO VERIFY THAT IT DID NOT GET DISTURBED.

TEST 16 - PROPER INCREMENT OF RLBA ON READ
****

THIS TEST WILL VERIFY THAT THE BUS ADDRESS REGISTER INCREMENTS PROPERLY ON A READ FUNCTION.

TEST 17 - PROPER INCREMENT OF RLDA ON READ
****

THIS TEST WILL VERIFY THAT THE DISK ADDRESS REGISTER INCREMENTS PROPERLY ON A READ FUNCTION.

TEST 18 - FORCE HEADER NOT FOUND WITH READ
****

THIS TEST WILL FORCE A HEADER NOT FOUND ERROR ON A READ. THE RLDA IS SET UP TO LOOK FOR SECTOR 40, A READ IS THEN ISSUED. THE HEADER NOT FOUND ERROR SHOULD THEN SET.

TEST 19 - FORCE HEADER NOT FOUND WITH READ INTERRUPT
****

THIS TEST WILL FORCE A HEADER NOT FOUND ERROR UNDER INTERRUPT CONTROL. HEADER NOT FOUND IS FORCED BY SETTING SECTOR 40 OF RLDA AND ISSUING A READ.

TEST 20 - CHECK HEADER COMPARE LOGIC
****

THIS TEST WILL EXTENSIVELY CHECK THE CYLINDER AND HEAD BITS OF THE HEADER WORD TO COMPARE CORRECTLY. THIS IS DONE BY WALKING AND GROWING 0'S AND 1'S THRU THE PROPER RLDA BITS AND ISSUING READ TO SEE IF ALL BIT POSITIONS CAN COMPARE.

TEST 21 - MULTIPLE SECTOR TRANSFER ON READ
****

THIS TEST THE ABILITY FOR THE READ FUNCTION TO WRITE MORE THAN ONE SECTOR. WE SET UP FOR A TWO SECTOR READ.

TEST 22 - FORCE HNF AT END OF TRACK
****

THIS TEST WILL CHECK THE ABILITY TO DETECT HEADER NOT FOUND AT THE END OF A TRACK. THIS DONE BY SETTING UP FOR A TWO SECTOR READ AT SECTOR 39.

TEST 23 - FORCE NON-EXISTENT MEMORY ERROR
****

THIS TEST WILL CHECK THAT THE NON-EXISTANT MEMORY ERROR (NXM) CAN SET. WE WILL ISSUE A READ TO THE MAXIMUM ADDRESS AND EXPECT A NXM ERROR. (THIS TEST WILL NOT BE DONE ON A 128K MACHINE.)

TEST 24 - FORCE NXM UNDER INTERRUPT
****

THIS TEST WILL ATTEMPT TO FORCE AN INTERRUPT VIA NXM. (THIS TEST WILL NOT BE DONE ONA 128K MACHINE.)

TEST 25 - CHECK READ WRITE LOOP
****

THIS TEST WILL WRITE A PATTERN TO SECTOR 0 AND TRY TO RECOVER IT WITH A WRITE.

TEST 26 - CHECK OF SILO LINES
****

THIS TEST WILL CHECK THAT WE CAN WRITE AND READ UNIQUE BIT PATTERNS VERIFY THAT THE LINES ON THE SILO ARE NOT STUCK OR TIED TOGETHER. THIS IS DONE WITH WALKING AND GROWING 0'S AND 1'S.

TEST 27 - CHECK THROUGHPUT OF SILO
****

THIS TEST WILL ATTEMPT TO CHECK THAT THE FALL THROUGH OF THE SILO IS WORKING CORRECTLY. WE WRITE A SECTOR OF 128 UNIQUE PATTERNS AND READ IT BACK CHECKING THAT EACH LOCATION IS UNIQUE AND CORRECT.

TEST 28 - CHECK ZERO FILL ON WRITE
****

THIS TEST WILL CHECK THE ABILITY OF THE CONTROLLER TO FILL THE REMAINING SECTOR WITH ZEROS ON A WRITE. WE WRITE A SECTOR WITH FROM 1 TO 127 WORDS, READ IT BACK AND VERIFY THAT THE NON WRITTEN WORDS ARE ZERO.

TEST 29 - CHECK SECTOR BITS ON HEADER COMPARE
****

THIS TEST WILL CHECK THAT THE SECTOR BITS CAN COMPARE CORRECTLY. THIS IS DONE BY WRITING THE SECTORS ADDRESS INTO THE SECTOR FOR A FULL TRACK. EACH SECTOR IS READ TO VERIFY THE SECTOR HAS THE CORRECT DATA, IF NOT THEN THE SECTOR BITS ARE NOT COMPARING CORRECTLY.

TEST 30 - WRITE CHECK NPR INTEGRITY
****

THIS TEST WILL CHECK THAT THE WRITE CHECK WILL FUNCTION WITHOUT CAUSING A BUS TRAP. TEST IS SET UP TO HANDLE BUS TRAPS.

TEST 31 - WRITE CHECK FUNCTION
****

THIS TEST WILL CHECK THAT A WRITE CHECK FUNCTION WILL COMPLETE WITH THE SPECIFIED TIME WITHOUT POSTING ERRORS.

TEST 32 - WRITE CHECK FUNCTION INTERRUPT
****

THIS TEST WILL CHECK THAT AN INTERRUPT CAN BE GENERATED FROM ISSUING A WRITE CHECK.

TEST 33 - PROPER INCREMENT OF RLBA ON WRITE CHECK
****

THIS TEST WILL CHECK THAT THE RLBA INCREMENTS PROPERLY DURING A WRITE CHECK.

TEST 34 - PROPER INCREMENT OF RLDA ON WRITE CHECK
****

THIS TEST WILL CHECK THAT THE RLDA INCREMENTS PROPERLY DURING A WRITE CHECK.

TEST 35 - MULTIPLE SECTOR WRITE CHECK
****

THIS TEST WILL CHECK THAT WE CAN WRITE CHECK MORE THAN ONE SECTOR AT A TIME.

TEST 36 - FORCE DCK WITH WRITE CHECK
****

THIS TEST WILL CHECK THAT WE CAN DETECT A DCK DURING A WRITE CHECK. THIS IS DONE BY MODIFYING MEMORY BETWEEN A WRITE AND A WRITE CHECK.

TEST 37 - FORCE DCK WITH WRITE CHECK INTERRUPT
****

THIS TEST WILL CHECK THAT A DCK DURING A WRITE CHECK WILL CAUSE AN INTERRUPT TO OCCUR.

TEST 38 - CHECK ZERO FILL ON WRITE WITH WRITE CHECK
****

THIS TEST WILL VERIFY THAT WE CAN SUCCESSFULLY WRITE CHECK ALL WORD COUNTS FROM 1 - 127.

TEST 39 - EXTENDED CHECK OF WRITE CHECK
****

THIS TEST WILL VERIFY THAT WE CAN WRITE CHECK SUCCESSFULLY ALL PATTERNS. PATTERNS USED ARE WALKING 1'S, 0'S, GROWING 1'S, 0'S.

TEST 40 - READ WITHOUT HEADER COMPARE
****

THIS TEST VERIFIES THAT THE FUNCTION READ WITHOUT HEADER COMPARE (7) RESETS THE CONTROLLER READY AND POSTS NO ERRORS. THE DISK ADDRESS IS SET TO ALL ONES.

TEST 41 - READ WITHOUT HEADER COMPARE INTERRUPT
****

THIS TEST WILL VERIFY THAT THE FUNCTION READ WITHOUT HEADER COMPARE (7) CAN GENERATE AN INTERRUPT ON COMPLETION.

TEST 42 - CHECK RD W/O HDR CMP READS
****

THIS TEST CHECKS THAT THE FUNCTION CAN ACTUALLY RECOVER DATA. WE WRITE A PATTERN IN MEMORY AND CHECK THAT THE FUNCTION CAN OVERLAY IT WITH DATA.

TEST 43 - CHECK RLBA INCREMENT WITH RD W/O HDR CMP
****

THIS TEST CHECKS THAT THE RLBA CAN INCREMENT PROPERLY ON THE FUNCTION.

TEST 44 - CHECK RLDA DOES INCREMENT
****

THIS TEST CHECKS THAT THE RLDA DOES INCREMENT WITH THE FUNCTION READ WITHOUT HEADER COMPARE.

a

```
                                .TITLE  CZRLHB0 RL11/RLV11 CTLR TST 2
                                .ENABLE AMA
                                .ENABLE ABS
                                .MCALL SVC
002000                          .=2000

                                .SBTTL  MACRO DEFINITIONS

                                .MACRO  CKERFG
                                        TST     ERFLG           ;ERROR IN HEADS HOME ROUTINE
                                        BEQ     123$            ;NO, THEN CONTINUE
                                        EXIT    TST             ;YES, EXIT TEST
                                123$:                           ;CONTINUE WITH TEST
                                .ENDM

                                .MACRO  WAITUS  ARG             ;MACRO MICRO-SEC WAIT
                                        MOV     ARG,XDELAY      ;SAVE ARGUMENT
                                        JSR     PC,TIME         ;CALL TIMING ROUTINE
                                .ENDM

                                .MACRO  WAITMS  ARG             ;MACRO MILLISEC WAIT
                                        MOV     ARG,YDELAY      ;SAVE ARGUMENT
                                        JSR     PC,XTIME        ;CALL TIMING ROUTINE
                                .ENDM


                                .NLIST  CND,MD,ME

002000                          SVC
000000                          SVCINS=0
000000                          SVCTAG=0


002000                                  POINTER BGNSW,BGNSFT,BGNDU

002000                          BGNMOD  MDHEDR

002000                                  HEADER  CZRLH,B,0,60,0
(4) 002000      103                     .ASCII /C/
(4) 002001      132                     .ASCII /Z/
(4) 002002      122                     .ASCII /R/
(4) 002003      114                     .ASCII /L/
(4) 002004      110                     .ASCII /H/
(6) 002005      000                     .BYTE   0
(6) 002006      000                     .BYTE   0
(5) 002007      000                     .BYTE   0
(4) 002010      102                     .ASCII  /B/
(4) 002011      060                     .ASCII  /0/
(4) 002012  000000                      .WORD   0
(4) 002014  000060                      .WORD   60
(4) 002016  033604                      .WORD   L$HARD
(4) 002020  033760                      .WORD   L$SOFT
(4) 002022  012416                      .WORD   L$HW
(4) 002024  012434                      .WORD   L$SW
```

```
    (4)  002026  034152                          .WORD   L$LAST
    (4)  002030  000000                          .WORD   0
    (4)  002032  000000                          .WORD   0
    (4)  002034  000000                          .WORD   0
    (4)  002036  000000                          .WORD   0
    (4)  002040  012450                          .WORD   L$DISPATCH
    (4)  002042  000000                          .WORD   0
    (4)  002044  000000                          .WORD   0
    (4)  002046  000000                          .WORD   0
    (4)  002050     003                          .BYTE   C$REVISION
    (3)  002051     003                          .BYTE   C$EDIT
    (4)  002052  000000                          .WORD   0
    (5)  002054  000000                          .WORD   0
    (4)  002056  000000                          .WORD   0
    (4)  002060  002220                          .WORD   L$DVTYP
    (4)  002062  000000                          .WORD   0
    (4)  002064  000000                          .WORD   0
    (4)  002066  000000                          .WORD   0
    (4)  002070  000000                          .WORD   0
    (4)  002072  013562                          .WORD   L$DU
    (4)  002074  000000                          .WORD   0
    (4)  002076  002122                          .WORD   L$DESC
    (4)  002100  104035                          EMT     E$LOAD
    (4)  002102  000000                          .WORD   0
    (4)  002104  012600                          .WORD   L$INIT
    (4)  002106  013466                          .WORD   L$CLEAN
    (4)  002110  013300                          .WORD   L$AUTO
    (4)  002112  012406                          .WORD   L$PROT
    (4)  002114  000000                          .WORD   0
    (4)  002116  000000                          .WORD   0
    (4)  002120  000000                          .WORD   0
     41
     42  002122                          ENDMOD
     43
     44  002122                                  DESCRIPT        <CZRLH TESTS WRITE DATA, READ DATA, AND WRITE CHECK OPERATIONS>
    (3)  002122  055103  046122  020110          .ASCIZ  /CZRLH TESTS WRITE DATA, READ DATA, AND WRITE CHECK OPERATIONS/
    (3)  002130  042524  052123  020123
    (3)  002136  051127  052111  020105
    (3)  002144  040504  040524  020054
    (3)  002152  042522  042101  042040
    (3)  002160  052101  026101  040440
    (3)  002166  042116  053440  044522
    (3)  002174  042524  041440  042510
    (3)  002202  045503  047440  042520
    (3)  002210  040522  044524  047117
    (3)  002216  000123
    (2)                                          .EVEN
     45
     46  002220                                  DEVTYP  <RL01,RL02>
    (3)  002220  046122  030460  051054          .ASCIZ  /RL01,RL02/
    (3)  002226  030114  000062
    (2)                                          .EVEN
     47
     48
     49
```

```
                        .SBTTL  GLOBAL EQUATES

002232                  BGNMOD  GLBEQAT
002232                          EQUALS
(1)                     ;
(1)                     ; BIT DIFINITIONS
(1)                     ;
(1)     100000          BIT15== 100000
(1)     040000          BIT14== 40000
(1)     020000          BIT13== 20000
(1)     010000          BIT12== 10000
(1)     004000          BIT11== 4000
(1)     002000          BIT10== 2000
(1)     001000          BIT09== 1000
(1)     000400          BIT08== 400
(1)     000200          BIT07== 200
(1)     000100          BIT06== 100
(1)     000040          BIT05== 40
(1)     000020          BIT04== 20
(1)     000010          BIT03== 10
(1)     000004          BIT02== 4
(1)     000002          BIT01== 2
(1)     000001          BIT00== 1
(1)                     ;
(1)     001000          BIT9==  BIT09
(1)     000400          BIT8==  BIT08
(1)     000200          BIT7==  BIT07
(1)     000100          BIT6==  BIT06
(1)     000040          BIT5==  BIT05
(1)     000020          BIT4==  BIT04
(1)     000010          BIT3==  BIT03
(1)     000004          BIT2==  BIT02
(1)     000002          BIT1==  BIT01
(1)     000001          BIT0==  BIT00
(1)                     ;
(1)                     ; EVENT FLAG DEFINITIONS
(1)                     ;   EF32:EF17 RESERVED FOR SUPERVISOR TO PROGRAM COMMUNICATION
(1)                     ;
(1)     000040          EF.START==      32.                     ; START COMMAND WAS ISSUED
(1)     000037          EF.RESTART==    31.                     ; RESTART COMMAND WAS ISSUED
(1)     000036          EF.CONTINUE==   30.                     ; CONTINUE COMMAND WAS ISSUED
(1)     000035          EF.NEW==        29.                     ; A NEW PASS HAS BEEN STARTED
(1)     000034          EF.PWR==        28.                     ; A POWER-FAIL/POWER-UP OCCURRED
(1)                     ;
(1)                     ;
(1)                     ; PRIORITY LEVEL DEFINITIONS
(1)                     ;
(1)     000340          PRI07== 340
(1)     000300          PRI06== 300
(1)     000240          PRI05== 240
(1)     000200          PRI04== 200
(1)     000140          PRI03== 140
(1)     000100          PRI02== 100
(1)     000040          PRI01== 40
(1)     000000          PRI00== 0
(1)                     ;
```

```
(1)                                 ;OPERATOR FLAG BITS
(1)                                 ;
(1)          000004                 EVL==        4
(1)          000010                 LOT==       10
(1)          000020                 ADR==       20
(1)          000040                 IDU==       40
(1)          000100                 ISR==      100
(1)          000200                 UAM==      200
(1)          000400                 BOE==      400
(1)          001000                 PNT==     1000
(1)          002000                 PRI==     2000
(1)          004000                 IXE==     4000
(1)          010000                 IBE==    10000
(1)          020000                 IER==    20000
(1)          040000                 LOE==    40000
(1)          100000                 HOE==   100000
 55          000001                 DRDY=BIT0                   ;DRIVE READY (RLCS)
 56          000100                 INTEN=BIT6                  ;INTERRUPT ENABLE (RLCS)
 57          100000                 ERR=BIT15                   ;RL11 ERROR (RLCS)
 58          040000                 DERR=BIT14                  ;RL01 DRIVE ERROR (RLCS)
 59          002000                 OPI=BIT10                   ;OPERATION INCOMPLETE (RLCS)
 60          000200                 CRDY=BIT7                   ;CONTROLLER READY (RLCS)
 61          000040                 BA17=BIT5                   ;EXTENDED ADDRESS BIT 17 (RLCS)
 62          000020                 BA16=BIT4                   ;EXTENDED ADDRESS BIT 16 (RLCS)
 63          020000                 NXM=BIT13                   ;NON-EXISTANT MEMORY (RLCS)
 64          000000                 DS0=0                       ;DRIVE SELECT 0 (RLCS)
 65          000400                 DS1=BIT8                    ;DRIVE SELECT 1 (RLCS)
 66          001000                 DS2=BIT9                    ;DRIVE SELECT 2 (RLCS)
 67          001400                 DS3=BIT8!BIT9               ;DRIVE SELECT 3 (RLCS)
 68          000000                 NOOP0=0                     ;FUNCTION-NOOP(0)
 69          000002                 WRCHK=BIT1                  ;WRITE CHECK FUNCTION
 70          000004                 GSTAT=BIT2                  ;GET STATUS FUNCTION
 71          000006                 SEEK=BIT2!BIT1              ;SEEK FUNCTION
 72          000010                 RDHDR=BIT3                  ;READ HEADER FUNCTION
 73          000012                 WRITE=BIT3!BIT1             ;WRITE DATA FUNCTION
 74          000014                 READ=BIT3!BIT2              ;READ DATA FUNCTION
 75          000016                 RDNHD=BIT3!BIT2!BIT1        ;READ W/O HEADER VERIFICATION
 76          000202                 GODRVR=BIT1!BIT7            ;CRDY AND DRDY
 77          000010                 DRST=BIT3                   ;DRIVE RESET (RLDA)
 78          000002                 GSBIT=BIT1                  ;GET STATUS BIT (RLDA)
 79          000001                 MK=BIT0                     ;MARKER BIT (RLDA)
 80          000004                 SIGN=BIT2                   ;SIGN BIT (RLDA)
 81          000100                 RHHS=BIT6                   ;HEAD SELECT IN READ HEADER
 82          000100                 STHS=BIT6                   ;HEAD SELECT IN STATUS BACK
 83          000020                 DAHS=BIT4                   ;HEAD SELECT IN SEEK
 84
 85                                 ;OFFSET FOR HARDWARE P-TABLE
 86
 87          000000                 CSR=0
 88          000002                 VECT=2
 89          000004                 PRIOR=4
 90          000006                 TYPDR=6
 91          000010                 DRBT=10
 92          000012                 CNT=12
 93
 94                                 ;OFFSET FOR SOFTWARE P-TABLE
```

```
 95
 96            000000                  DLT=0
 97            000002                  ELT=2
 98            000004                  SIZE=4
 99            000006                  DMPCK=6
100            000010                  DLMT=10
101            000012                  ANS=12
102
103   002232                           ENDMOD
104
105
106                                    .SBTTL  GLOBAL DATA
107
108   002232                           BGNMOD  GLBDAT
109
110   002232   000000                  T.DRIVE: .WORD  0
111   002234   000000                  CHECK:   .WORD  0
112   002236   000000                  T.CRC.   .WORD  0
113   002240   000000                  WHY:     .WORD  0
114   002242   000000                  CDCNT:   .WORD  0
115   002244   000004                  ERRVEC:  .WORD  4
116   002246   000000                  DRIVE:   .WORD  0
117   002250   000000                  UUT:     .WORD  0
118   002252   000000                  UNITST:  .WORD  0
119   002254   000000                  TRPFLG:  .WORD  0
120   002256   000000                  INTFLG:  .WORD  0              ;INTERRUPT OCCURANCE FLAG
121   002260   000000                  LDCSR:   .WORD  0              ;LOCATION TO FORM RLCS
122   002262   000077                  SECMSK:  .WORD  77             ;MASK OUT SECTOR
123   002264   120001                  XPOLY:   .WORD  120001         ;POLYNOMIAL FOR CRC 16
124   002266   000000                  BCCFBK:  .WORD  0              ;LOCATION USED BY 'SIMBCC'
125   002270   000000                  CALBCC:  .WORD  0              ;LOCATION USED BY 'SIMBCC'
126   002272   000000                  TMP0:    .WORD  0
127   002274   000000                  TMP1:    .WORD  0
128   002276   000000                  TMP2:    .WORD  0
129   002300   000000                  GDDAT:   .WORD  0
130   002302   000000                  BDDAT:   .WORD  0
131   002304   000000                  TEMP2:   .WORD  0              ;LOCATION USED BY 'SIMBCC'
132   002306   000000                  TEMP3:   .WORD  0              ;LOCATION USED BY 'SIMBCC'
133   002310   000000                  TEMP4:   .WORD  0              ;LOCATION USED BY 'SIMBCC'
134   002312   000000                  FIRST:   .WORD  0              ;FIRST SECTOR READ
135   002314   177700                  CYLMSK:  .WORD  177700         ;MASK CYLINDER AND HEAD SELECT
136   002316   000050                  MXSEC1:  .WORD  40.            ;MAX SECTOR ADDRESS +1
137   002320   000047                  MAXSEC:  .WORD  39.            ;MAX SECTOR ADDRESS
138   002322   000000                  DWORD:   .WORD  0              ;DIFFERENCE WORD (SEEK)
139   002324   177600                  MAXCYL:  .WORD  177600         ;MAXIMUM CYLINDER ADDRESS
140   002326   000000                  SVHD:    .WORD  0              ;SAVE CURRENT HEAD SELECT
141   002330   000000                  B.CS:    .WORD  0              ;CS - BEFORE OPERATION
142   002332   000000                  B.BA:    .WORD  0              ;BA - BEFORE OPERATION
143   002334   000000                  B.DA:    .WORD  0              ;DA - BEFORE OPERATION
144   002336   000000                  B.MP:    .WORD  0              ;MP - BEFORE OPERATION
145   002340   000000                  E.CS:    .WORD  0              ;CS - AT OCCURANCE OF ERROR
146   002342   000000                  E.BA:    .WORD  0              ;BA - AT OCCURANCE OF ERROR
147   002344   000000                  E.DA:    .WORD  0              ;DA - AT OCCURANCE OF ERROR
148   002346   000000                  E.MP:    .WORD  0              ;MP - AT OCCURANCE OF ERROR
149   002350   000000                  E.MP1:   .WORD  0
150   002352   000000                  E.MP2:   .WORD  0
```

```
                                RLCS:    .WORD   0
                                RLBA:    .WORD   0
                                RLDA:    .WORD   0
                                RLMP:    .WORD   0
                                BCSR:    .WORD   0              ;CSR FROM P-TABLE
                                BVEC:    .WORD   0              ;VECTOR FROM P-TABLE
                                BPRIOR:  .WORD   0              ;BR LEVEL FROM P-TABLE
                                FNDFNC:  .WORD   0
                                XMEM:    .WORD   0
                                TRYFNC:  .WORD   0              ;
                                ERFLG:   .WORD   0
                                LOPIMX:  .WORD   650.
                                LOPIMN:  .WORD   155.
                                UOPIMX:  .WORD   400.
                                UOPIMN:  .WORD   160.
                                OPIMN:   .WORD   0
                                OPIMX:   .WORD   0
                                PWRFLG:  .WORD   0
                                T.CNTLR:  .WORD  0
                                DERFLG:  .WORD   0
                                ERPOINT:  .WORD  0
                                ERCOUNT:  .BLKW  64.
                                XDELAY:  .WORD   0
                                YDELAY:  .WORD   0
                                TEMPO:   .WORD   0
                                TEMP:    .WORD   0
                                TIM.US:  .WORD   0
                                TAG:     .WORD   0
                                PCLKCS:  .WORD   0
                                PCSR:    .WORD   0
                                VEC:     .WORD   0
                                HZ:      .WORD   0
                                XITFLG:  .WORD   0
                                FIFTY:   .WORD   0
                                SIXTY:   .WORD   0
                                PCLOCK:  .WORD   0
                                NOTST:   .WORD   0
                                OPITIM:  .WORD   0
                                CLKFLD:  .WORD   0              ;CLOCK FIELD USED TO CHECK IF LSI-11 CLOCK
                                                                ;/IS "TICKING"


                                .SBTTL  LIST TO CHECK HEADER COMPARE LOGIC
                                HDRTAB:  .WORD   0              ;WALK 1
                                         .WORD   BIT0
                                         .WORD   BIT1
                                         .WORD   BIT2
                                         .WORD   BIT3
                                         .WORD   BIT4
                                         .WORD   BIT5
                                         .WORD   BIT6
                                         .WORD   BIT7
                                         .WORD   BIT8
                                         .WORD   BIT9
                                         .WORD   BIT10
                                         .WORD   BIT11
```

```
  207  002722  010000                        .WORD   BIT12
  208  002724  020000                        .WORD   BIT13
  209  002726  040000                        .WORD   BIT14
  210  002730  000003                        .WORD   3               ;GROW 1
  211  002732  000007                        .WORD   7
  212  002734  000017                        .WORD   17
  213  002736  000037                        .WORD   37
  214  002740  000137                        .WORD   137
  215  002742  000337                        .WORD   337
  216  002744  000737                        .WORD   737
  217  002746  001737                        .WORD   1737
  218  002750  003737                        .WORD   3737
  219  002752  007737                        .WORD   7737
  220  002754  017737                        .WORD   17737
  221  002756  037737                        .WORD   37737
  222  002760  077737                        .WORD   77737
  223  002762  077736                        .WORD   77736           ;GROW 0
  224  002764  077734                        .WORD   77734
  225  002766  077730                        .WORD   77730
  226  002770  077720                        .WORD   77720
  227  002772  077700                        .WORD   77700
  228  002774  077600                        .WORD   77600
  229  002776  077400                        .WORD   77400
  230  003000  077000                        .WORD   77000
  231  003002  076000                        .WORD   76000
  232  003004  074000                        .WORD   74000
  233  003006  070000                        .WORD   70000
  234  003010  060000                        .WORD   60000
  235  003012  040000                        .WORD   40000
  236  003014  077735                        .WORD   77735           ;WALK 0
  237  003016  077733                        .WORD   77733
  238  003020  077727                        .WORD   77727
  239  003022  077717                        .WORD   77717
  240  003024  077637                        .WORD   77637
  241  003026  077537                        .WORD   77537
  242  003030  077337                        .WORD   77337
  243  003032  076737                        .WORD   76737
  244  003034  075737                        .WORD   75737
  245  003036  073737                        .WORD   73737
  246  003040  067737                        .WORD   67737
  247  003042  057737                        .WORD   57737
  248  003044  037737                        .WORD   37737
  249  003046  000000              HDREND:   .WORD   0
  250  003050  000000              HTAB:     .WORD   0             ;WALK 1
  251  003052  000001                        .WORD   BIT0
  252  003054  000002                        .WORD   BIT1
  253  003056  000004                        .WORD   BIT2
  254  003060  000010                        .WORD   BIT3
  255  003062  000020                        .WORD   BIT4
  256  003064  000040                        .WORD   BIT5
  257  003066  000100                        .WORD   BIT6
  258  003070  000200                        .WORD   BIT7
  259  003072  000400                        .WORD   BIT8
  260  003074  001000                        .WORD   BIT9
  261  003076  002000                        .WORD   BIT10
  262  003100  004000                        .WORD   BIT11
```

```
  263  003102  010000                          .WORD   BIT12
  264  003104  020000                          .WORD   BIT13
  265  003106  040000                          .WORD   BIT14
  266  003110  100000                          .WORD   BIT15
  267  003112  000003                          .WORD   3               ;GROW 1
  268  003114  000007                          .WORD   7
  269  003116  000017                          .WORD   17
  270  003120  000037                          .WORD   37
  271  003122  000137                          .WORD   137
  272  003124  000337                          .WORD   337
  273  003126  000737                          .WORD   737
  274  003130  001737                          .WORD   1737
  275  003132  003737                          .WORD   3737
  276  003134  007737                          .WORD   7737
  277  003136  017737                          .WORD   17737
  278  003140  037737                          .WORD   37737
  279  003142  077737                          .WORD   77737
  280  003144  177737                          .WORD   177737
  281  003146  177736                          .WORD   177736          ;GROW 0
  282  003150  177734                          .WORD   177734
  283  003152  177730                          .WORD   177730
  284  003154  177720                          .WORD   177720
  285  003156  177700                          .WORD   177700
  286  003160  177600                          .WORD   177600
  287  003162  177400                          .WORD   177400
  288  003164  177000                          .WORD   177000
  289  003166  176000                          .WORD   176000
  290  003170  174000                          .WORD   174000
  291  003172  170000                          .WORD   170000
  292  003174  160000                          .WORD   160000
  293  003176  140000                          .WORD   140000
  294  003200  100000                          .WORD   100000
  295  003202  177735                          .WORD   177735          ;WALK 0
  296  003204  177733                          .WORD   177733
  297  003206  177727                          .WORD   177727
  298  003210  177717                          .WORD   177717
  299  003212  177637                          .WORD   177637
  300  003214  177537                          .WORD   177537
  301  003216  177337                          .WORD   177337
  302  003220  176737                          .WORD   176737
  303  003222  175737                          .WORD   175737
  304  003224  173737                          .WORD   173737
  305  003226  167737                          .WORD   167737
  306  003230  157737                          .WORD   157737
  307  003232  137737                          .WORD   137737
  308  003234  000000                  HEND:   .WORD   0
  309
  310
  311
  312  003236  000001  000002  000004  DATPAT: .WORD   1,2,4,10,20,40,100,200,400,1000,2000,4000,10000,20000,40000,100000
       003244  000010  000020  000040
       003252  000100  000200  000400
       003260  001000  002000  004000
       003266  010000  020000  040000
       003274  100000
  313  003276  177777  177776  177775          .WORD   177777,177776,177775,177773,177767,177757,177737,177677
```

```
        003304  177773  177767  177757
        003312  177737  177677
  314   003316  177577  177377  176777          .WORD   177577,177377,176777,175777,173777,167777,157777,137777
        003324  175777  173777  167777
        003332  157777  137777
  315   003336  077777  177774  177770          .WORD   77777,177774,177770,177760,177740,177700,177600,177400
        003344  177760  177740  177700
        003352  177600  177400
  316   003356  177000  176000  174000          .WORD   177000,176000,174000,170000,160000,140000,3,7,17,37,77
        003364  170000  160000  140000
        003372  000003  000007  000017
        003400  000037  000077
  317   003404  000177  000377  000777          .WORD   177,377,777,1777,3777,7777,17777,37777,0
        003412  001777  003777  007777
        003420  017777  037777  000000
  318
  319
  320
  321   003426  000400                  BUF:    256.                    ;BUFFER FOR READ/WRITE
  322
  323
  324   003430                          ENDMOD
  325
  326                                   .SBTTL  GLOBAL TEXT
  327
  328   003430                          BGNMOD  GLBTXT
  332   003430  051503  020072     000  ARLCS:  .ASCIZ  /CS: /
  333   003435     040  040502  020072  ARLBA:  .ASCIZ  / BA: /
  334   003443     040  040504  020072  ARLDA:  .ASCIZ  / DA: /
  335   003451     040  050115  020072  ARLMP:  .ASCIZ  / MP: /
  336   003457     102  043105  051117  BEREG:  .ASCIZ  /BEFORE COMMAND: /
  337   003500  044524  042515  047440  AFREG:  .ASCIZ  /TIME OF ERROR:  /
  338   003521     103  047117  051124  CRTIM:  .ASCIZ  /CONTROLLER TIMED OUT/
  339   003546  051104  053111  020105  DRTIM:  .ASCIZ  /DRIVE READY TIMED OUT/
  340   003574  042040  053122     000  DEMES:  .ASCIZ  / DRV/
  341   003601     040  054116  000115  NXMMES: .ASCIZ  / NXM/
  342   003606  047440  044520     000  OPIMES: .ASCIZ  / OPI/
  343   003613     040  041510  041522  HCRCMES:.ASCIZ  / HCRC/
  344   003621     040  047110  000106  HNFMES: .ASCIZ  / HNF/
  345   003626  042040  045503     000  DCKMES: .ASCIZ  / DCK/
  346   003633     040  046104  000124  DLTMES: .ASCIZ  / DLT/
  347   003640  000015                  LF:     .ASCIZ  <15>
  348   003642  005015     000          MSCRLF: .ASCIZ  <15><12>
  349   003645     040  047503  050115  COMP:   .ASCIZ  / COMP/
  350   003653     106  041522  020104  OPIERR: .ASCIZ  /FRCD OPI C'SED OTHER ERRS/
  351   003705     116  047517  020120  NOPMES: .ASCIZ  /NOOP OPR'TN-FLAG MODE/
  352   003733     116  047517  020120  NOPINT: .ASCIZ  /NOOP OPR'TN-INTR. MODE/
  353   003762  051127  052111  020105  WCKMES: .ASCIZ  /WRITE CHCK OPR'TN-FLAG MODE/
  354   004016  051127  052111  020105  WCKINT: .ASCIZ  /WRITE CHCK OPR'TN-INTR. MODE/
  355   004053     122  020104  042110  RHDMES: .ASCIZ  /RD HDR OPR'TN-FLAG MODE/
  356   004103     122  020104  042110  RHDINT: .ASCIZ  /RD HDR OP-INTR. MODE/
  357   004130  045523  047440  026520  SEKMES: .ASCIZ  /SK OP-FLAG MODE/
  358   004150  045523  047440  026520  SEKINT: .ASCIZ  /SK OP-INTR. MODE/
  359   004171     107  052105  051440  GSTMES: .ASCIZ  /GET STATUS OP-FLAG MODE/
  360   004221     107  052105  051440  GSTINT: .ASCIZ  /GET STATUS OP-INTR MODE/
  361   004251     122  020104  050117  RDDMES: .ASCIZ  /RD OP-FLAG MODE/
```

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  362  004271      122  020104  050117  RDDINT: .ASCIZ  /RD OP-INTR MODE/
  363  004311      127  052122  047440  WRTMES: .ASCIZ  /WRT OP-FLAG MODE/
  364  004332  051127  020124  050117  WRTINT: .ASCIZ  /WRT OP-INTR MODE/
  365  004353      122  020104  027527  RDNMES: .ASCIZ  %RD W/O HDR - FLG MODE%
  366  004401      122  020104  027527  RDNINT: .ASCIZ  %RD W/O HDR - INTR MODE%
  367  004430  040503  023516  020124  SKHOME: .ASCIZ  /CAN'T SK TO TRK 0/
  368  004452  051127  020124  047514  WRLOCK: .ASCIZ  /WRT LOCK ERR/
  369  004467      122  041514  020123  EM1:    .ASCIZ  /RLCS HAD FOLLOWING ERR(S):/
  370  004522  000170                  EM100:  .BLKB   120.
  371  004712  047516  044440  052116  EM4:    .ASCIZ  /NO INTRPT ON RD OP/
  372  004735      122  020104  050117  EM5:    .ASCIZ  /RD OP DID NOT WRT MEM/
  373  004763      122  041114  020101  EM6:    .ASCIZ  /RLBA DID NOT INCR DURING RD/
  374  005017      123  041505  051124  EM7:    .ASCIZ  /SECTR DID NOT INCR PROPERLY AFTER RD/
  375  005064  042110  020122  047516  EM10:   .ASCIZ  /HDR NOT FND COULD NOT BE FORCED/
  376  005124  051127  047117  020107  EM11:   .ASCIZ  /WRONG CYL ON SK/
  377  005144  042110  020122  047516  EM12:   .ASCIZ  /HDR NOT FND WOULD NOT SET/
  378  005176  051104  020126  042122  EM13:   .ASCIZ  /DRV RDY WOULD NOT SET/
  379  005224  051504  020113  042101  EM14:   .ASCIZ  /DSK ADDR INCORRECT AFTER MULTIPLE SCTR READ/
  380  005300  051104  020126  051105  EM16:   .ASCIZ  /DRV ERR ON WRT OP/
  381  005322  047516  044440  052116  EM17:   .ASCIZ  /NO INTRPT ON WRT OP/
  382  005346  046122  040502  042040  EM20:   .ASCIZ  /RLBA DID NOT INCR PROPERLY DURING WRT/
  383  005414  041523  051124  042040  EM21:   .ASCIZ  /SCTR DID NOT INCR PROPERLY AFTER WRT/
  384  005461      104  045523  040440  EM22:   .ASCIZ  /DSK ADDR (RLDA) INCORRECT AFT MUL'PLE SCTR WRT/
  385  005540  042110  020122  047516  EM23:   .ASCIZ  /HDR NOT FND COULD NOT BE FORCED AT END OF TRK/
  386  005616  054116  020115  042515  EM24:   .ASCIZ  /NXM MEM ERR COULD NOT BE FORCED/
  387  005656  040504  040524  041440  EM25:   .ASCIZ  %DATA CMP ERR - RD/WRT ERR%
  388  005710  051127  020124  050117  EM26:   .ASCIZ  /WRT OP MODIFIED MEM/
  389  005734  051105  020122  047117  EM27:   .ASCIZ  /ERR ON PARTIAL SCTR WRT - ZERO FILL CHCK/
  390  006005      122  041114  020101  EM30:   .ASCIZ  /RLBA DID NOT INCR PROPERLY/
  391  006040  040502  041040  052111  EM31:   .ASCIZ  /BA BIT 16 DID NOT SET ON INCR/
  392  006076  040502  041040  052111  EM32:   .ASCIZ  /BA BIT 17 SET ON BA16 INCR TST/
  393  006135      122  041114  020101  EM33:   .ASCIZ  /RLBA DID NOT INCR WITH BA16/
  394  006171      102  020101  044502  EM34:   .ASCIZ  /BA BIT 17 DID NOT SET ON INCR/
  395  006227      102  020101  044502  EM35:   .ASCIZ  /BA BIT 16 DID NOT CLR ON INCR/
  396  006265      122  041114  020101  EM36:   .ASCIZ  /RLBA DID NOT INCR WITH BA17/
  397  006321      122  040505  024104  EM40:   .ASCIZ  /READ(FUNCTION 7) DID NOT INTRPT/
  398  006361      122  024104  052506  EM41:   .ASCIZ  /RD(FUNCTION 7) ERR - BAD DATA/
  399  006417      122  020104  043050  EM42:   .ASCIZ  /RD (FUNCTION 7) ERR AT END OF TRK/
  400  006461      116  020117  047111  EM43:   .ASCIZ  /NO INTRPT WITH HDR NT FND FORCED/
  401  006522  047516  044440  052116  EM44:   .ASCIZ  /NO INTRPT WITH NXM FORCED/
  402  006554  051105  020122  047117  EM45:   .ASCIZ  %ERR ON BIT BANG OF SILO%
  403  006604  044523  047514  047440  EM47:   .ASCIZ  /SILO OP FAIL/
  404  006621      110  051104  041440  EM50:   .ASCIZ  /HDR CMP FAILURE - SECTOR/
  405  006652  042122  053440  047457  EM55:   .ASCIZ  ?RD W/O HDR CMP OP DID NOT WRT MEMORY?
  406  006717      122  041114  020101  EM53:   .ASCIZ  ?RLBA D'NT INCR DURING RD W/O HDR CMP?
  407  006764  046122  040504  042040  EM54:   .ASCIZ  ?RLDA DID NOT INCR AFTER RD W/O HDR CMP?
  408  007033      117  044520  052040  EM56:   .ASCIZ  /OPI TIMING ERR/
  409  007052  051127  020124  044103  EM57:   .ASCIZ  /WRT CHCK NPR CAUSED BUS TRAP/
  410  007107      127  052122  041440  EM60:   .ASCIZ  /WRT CHCK DID NOT INTRPT/
  411  007137      122  041114  020101  EM61:   .ASCIZ  /RLBA DID NOT INCR PROPERLY DURING WRCHK/
  412  007207      122  042114  020101  EM62:   .ASCIZ  /RLDA DID NOT INCR DURING WRCHK/
  413  007246  046122  040504  042040  EM63:   .ASCIZ  /RLDA DID NOT INCR AFT A MULT' SCTR WRT CHK/
  414  007321      127  052122  041440  EM64:   .ASCIZ  /WRT CHECK OF PARTIAL SCTR WRT FAIL/
  415  007364  040503  047116  052117  EM65:   .ASCIZ  /CANNOT FORCE DCK ON WRT CHCK/
  416  007421      103  047101  047516  EM66:   .ASCIZ  /CANNOT FORCE INTERRUPT WITH DCK ON WRCHK/
  417  007472  051127  020124  044103  EM70:   .ASCIZ  /WRT CHCK FAIL/
```

```
418
419                                     .EVEN
420
421
425
426
427  007510                             ENDMOD
428
429  007510                         BGNMOD  GLBERR
430
431                                     .SBTTL  GLOBAL ERRORS
432  007510                         BGNMSG  ERR0
433
434  007510  004737  010522                   JSR     PC,LINE1
435  007514  004737  010556                   JSR     PC,LINE2
436
437
438  007520  004537  014530                   JSR     R5,CKERLT               ;INCREMENT ERROR AND CHECK LIMIT
439
440  007524                             ENDMSG
(3)  007524                         L10000:
(3)  007524  104423                         TRAP    C$MSG
441
442  007526                         BGNMSG  ERR1
443
444  007526  004737  010522                   JSR     PC,LINE1
445
446
447  007532  004537  014530                   JSR     R5,CKERLT               ;INCREMENT ERROR AND CHECK LIMIT
448
449  007536                             ENDMSG
(3)  007536                         L10001:
(3)  007536  104423                         TRAP    C$MSG
450
451  007540                         BGNMSG  ERR2
452
453  007540  004737  010522                   JSR     PC,LINE1
454  007544                                  PRINTB  #FRMT4,GDDAT,BDDAT
(9)  007544  013746  002302                   MOV     BDDAT,-(SP)
(8)  007550  013746  002300                   MOV     GDDAT,-(SP)
(7)  007554  012746  011170                   MOV     #FRMT4,-(SP)
(6)  007560  012746  000003                   MOV     #3,-(SP)
(3)  007564  010600                         MOV     SP,R0
(4)  007566  104414                         TRAP    C$PNTB
(4)  007570  062706  000010                 ADD     #10,SP
455
456
457  007574  004537  014530                   JSR     R5,CKERLT               ;INCREMENT ERROR AND CHECK LIMIT
458
459  007600                             ENDMSG
(3)  007600                         L10002:
(3)  007600  104423                         TRAP    C$MSG
460
461  007602                         BGNMSG  ERR3
462
463  007602  004737  010522                   JSR     PC,LINE1
```

```
  464  007606  004737  010556                JSR     PC,LINE2
  465  007612                                PRINTB  #FRMT5,TMP0,BDDAT,GDDAT
 (10)  007612  013746  002300                MOV     GDDAT,-(SP)
 (9)   007616  013746  002302                MOV     BDDAT,-(SP)
 (8)   007622  013746  002272                MOV     TMP0,-(SP)
 (7)   007626  012746  011226                MOV     #FRMT5,-(SP)
 (6)   007632  012746  000004                MOV     #4,-(SP)
 (3)   007636  010600                       MOV     SP,R0
 (4)   007640  104414                       TRAP    C$PNTB
 (4)   007642  062706  000012                ADD     #12,SP
  466
  467
  468  007646  004537  014530                JSR     R5,CKERLT               ;INCREMENT ERROR AND CHECK LIMIT
  469
  470  007652                                ENDMSG
 (3)   007652                          L10003:
 (3)   007652  104423                       TRAP    C$MSG
  471
  472  007654                          BGNMSG  ERR4
  473
  474  007654  004737  010522                JSR     PC,LINE1
  475  007660  004737  010556                JSR     PC,LINE2
  476  007664                                PRINTB  #FRMT4,GDDAT,BDDAT
 (9)   007664  013746  002302                MOV     BDDAT,-(SP)
 (8)   007670  013746  002300                MOV     GDDAT,-(SP)
 (7)   007674  012746  011170                MOV     #FRMT4,-(SP)
 (6)   007700  012746  000003                MOV     #3,-(SP)
 (3)   007704  010600                       MOV     SP,R0
 (4)   007706  104414                       TRAP    C$PNTB
 (4)   007710  062706  000010                ADD     #10,SP
  477
  478
  479  007714  004537  014530                JSR     R5,CKERLT               ;INCREMENT ERROR AND CHECK LIMIT
  480
  481  007720                                ENDMSG
 (3)   007720                          L10004:
 (3)   007720  104423                       TRAP    C$MSG
  482
  483  007722                          BGNMSG  ERR5
  484
  485  007722  004737  010522                JSR     PC,LINE1
  486  007726                                PRINTB  #FRMT3,RESTMS
 (8)   007726  013746  015040                MOV     RESTMS,-(SP)
 (7)   007732  012746  011163                MOV     #FRMT3,-(SP)
 (6)   007736  012746  000002                MOV     #2,-(SP)
 (3)   007742  010600                       MOV     SP,R0
 (4)   007744  104414                       TRAP    C$PNTB
 (4)   007746  062706  000006                ADD     #6,SP
  487
  488
  489  007752  004537  014530                JSR     R5,CKERLT               ;INCREMENT ERROR AND CHECK LIMIT
  490
  491  007756                                ENDMSG
 (3)   007756                          L10005:
 (3)   007756  104423                       TRAP    C$MSG
  492
```

```
   493  007760                          BGNMSG  ERR6
   494
   495  007760  004737  010522                  JSR     PC,LINE1
   496  007764  004737  011000                  JSR     PC,LINE3
   497  007770  004737  010556                  JSR     PC,LINE2
   498
   499
   500  007774                                  PRINTB  #FRMT99
   (7)  007774  012746  012106                  MOV     #FRMT99,-(SP)
   (6)  010000  012746  000001                  MOV     #1,-(SP)
   (3)  010004  010600                          MOV     SP,R0
   (4)  010006  104414                          TRAP    C$PNTB
   (4)  010010  062706  000004                  ADD     #4,SP
   501  010014  004537  014530                  JSR     R5,CKERLT               ;INCREMENT ERROR AND CHECK LIMIT
   502
   503  010020                                  ENDMSG
   (3)  010020                          L10006:
   (3)  010020  104423                          TRAP    C$MSG
   504
   505  010022                          BGNMSG  ERR7
   506
   507
   508
   509  010022  004537  014530                  JSR     R5,CKERLT               ;INCREMENT ERROR AND CHECK LIMIT
   510
   511  010026                                  ENDMSG
   (3)  010026                          L10007:
   (3)  010026  104423                          TRAP    C$MSG
   512
   513
   514
   515  010030                          BGNMSG  ERR8
   516
   517  010030  004737  010522                  JSR     PC,LINE1
   518  010034  004737  010556                  JSR     PC,LINE2
   519  010040                                  PRINTB  #FRMT6,TMP1,GDDAT,BDDAT
   (10) 010040  013746  002302                  MOV     BDDAT,-(SP)
   (9)  010044  013746  002300                  MOV     GDDAT,-(SP)
   (8)  010050  013746  002274                  MOV     TMP1,-(SP)
   (7)  010054  012746  011277                  MOV     #FRMT6,-(SP)
   (6)  010060  012746  000004                  MOV     #4,-(SP)
   (3)  010064  010600                          MOV     SP,R0
   (4)  010066  104414                          TRAP    C$PNTB
   (4)  010070  062706  000012                  ADD     #12,SP
   520
   521
   522  01007.  004537  014530                  JSR     R5,CKERLT               ;INCREMENT ERROR AND CHECK LIMIT
   523
   524  010100                                  ENDMSG
   (3)  010100                          L10010:
   (3)  010100  104423                          TRAP    C$MSG
   525
   526  010102                          BGNMSG  ERR9
   527
   528  010102  004737  010522                  JSR     PC,LINE1
   529  010106  004737  010556                  JSR     PC,LINE2
```

```
530  010112                                          PRINTB  #FRMT4,TMP0,R2
(9)  010112  010246                                  MOV     R2,-(SP)
(8)  010114  013746  002272                          MOV     TMP0,-(SP)
(7)  010120  012746  011170                          MOV     #FRMT4,-(SP)
(6)  010124  012746  000003                          MOV     #3,-(SP)
(3)  010130  010600                                  MOV     SP,R0
(4)  010132  104414                                  TRAP    C$PNTB
(4)  010134  062706  000010                          ADD     #10,SP
531
532
533  010140  004537  014530                          JSR     R5,CKERLT               ;INCREMENT ERROR AND CHECK LIMIT
534
535  010144                                          ENDMSG
(3)  010144                                  L10011:
(3)  010144  104423                                  TRAP    C$MSG
536
537  010146                                  BGNMSG  ERR10
538
539  010146  004737  010522                          JSR     PC,LINE1
540  010152  004737  010556                          JSR     PC,LINE2
541  010156                                          PRINTB  #FRMT7,TMP1,GDDAT,BDDAT
(10) 010156  013746  002302                          MOV     BDDAT,-(SP)
(9)  010162  013746  002300                          MOV     GDDAT,-(SP)
(8)  010166  013746  002274                          MOV     TMP1,-(SP)
(7)  010172  012746  011354                          MOV     #FRMT7,-(SP)
(6)  010176  012746  000004                          MOV     #4,-(SP)
(3)  010202  010600                                  MOV     SP,R0
(4)  010204  104414                                  TRAP    C$PNTB
(4)  010206  062706  000012                          ADD     #12,SP
542
543
544  010212  004537  014530                          JSR     R5,CKERLT               ;INCREMENT ERROR AND CHECK LIMIT
545
546  010216                                          ENDMSG
(3)  010216                                  L10012:
(3)  010216  104423                                  TRAP    C$MSG
547
548  010220                                  BGNMSG  ERR11
549
550  010220  004737  010522                          JSR     PC,LINE1
551  010224  004737  010556                          JSR     PC,LINE2
552  010230                                          PRINTB  #FRMT8,TMP0,GDDAT,BDDAT
(10) 010230  013746  002302                          MOV     BDDAT,-(SP)
(9)  010234  013746  002300                          MOV     GDDAT,-(SP)
(8)  010240  013746  002272                          MOV     TMP0,-(SP)
(7)  010244  012746  011426                          MOV     #FRMT8,-(SP)
(6)  010250  012746  000004                          MOV     #4,-(SP)
(3)  010254  010600                                  MOV     SP,R0
(4)  010256  104414                                  TRAP    C$PNTB
(4)  010260  062706  000012                          ADD     #12,SP
553
554
555  010264  004537  014530                          JSR     R5,CKERLT               ;INCREMENT ERROR AND CHECK LIMIT
556
557  010270                                          ENDMSG
(3)  010270                                  L1001 :
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```
   (3)  010270  104423                    TRAP    C$MSG
   558
   559  010272                    BGNMSG  ERR12
   560
   561  010272  004737  010522            JSR     PC,LINE1
   562  010276  004737  010556            JSR     PC,LINE2
   563  010302                            PRINTB  #FRMT9,TMP1,R3,GDDAT,BDDAT
   (11) 010302  013746  002302            MOV     BDDAT,-(SP)
   (10) 010306  013746  002300            MOV     GDDAT,-(SP)
   (9)  010312  010346                    MOV     R3,-(SP)
   (8)  010314  013746  002274            MOV     TMP1,-(SP)
   (7)  010320  012746  011547            MOV     #FRMT9,-(SP)
   (6)  010324  012746  000005            MOV     #5,-(SP)
   (3)  010330  010600                    MOV     SP,R0
   (4)  010332  104414                    TRAP    C$PNTB
   (4)  010334  062706  000014            ADD     #14,SP
   564
   565
   566  010340  004537  014530            JSR     R5,CKERLT               ;INCREMENT ERROR AND CHECK LIMIT
   567
   568  010344                            ENDMSG
   (3)  010344                    L10014:
   (3)  010344  104423                    TRAP    C$MSG
   569
   570  010346                    BGNMSG  ERR13
   571
   572  010346  004737  010522            JSR     PC,LINE1
   573  010352                            PRINTB  #FRMT10,OPIMN,OPIMX,BDDAT
   (10) 010352  013746  002302            MOV     BDDAT,-(SP)
   (9)  010356  013746  002414            MOV     OPIMX,-(SP)
   (8)  010362  013746  002412            MOV     OPIMN,-(SP)
   (7)  010366  012746  011652            MOV     #FRMT10,-(SP)
   (6)  010372  012746  000004            MOV     #4,-(SP)
   (3)  010376  010600                    MOV     SP,R0
   (4)  010400  104414                    TRAP    C$PNTB
   (4)  010402  062706  000012            ADD     #12,SP
   574
   575
   576  010406  004537  014530            JSR     R5,CKERLT               ;INCREMENT ERROR AND CHECK LIMIT
   577
   578  010412                            ENDMSG
   (3)  010412                    L10015:
   (3)  010412  104423                    TRAP    C$MSG
   579
   580  010414                    BGNMSG  ERR14
   581
   582  010414  004737  010522            JSR     PC,LINE1
   583  010420  004737  010556            JSR     PC,LINE2
   584  010424                            PRINTB  #FRMT14,TMP1,#BUF
   (9)  010424  012746  003426            MOV     #BUF,-(SP)
   (8)  010430  013746  002274            MOV     TMP1,-(SP)
   (7)  010434  012746  011476            MOV     #FRMT14,-(SP)
   (6)  010440  012746  000003            MOV     #3,-(SP)
   (3)  010444  010600                    MOV     SP,R0
   (4)  010446  104414                    TRAP    C$PNTB
   (4)  010450  062706  000010            ADD     #10,SP
```

```
  585
  586
  587  010454  004537  014530                JSR     R5,CKERLT               ;INCREMENT ERROR AND CHECK LIMIT
  588
  589  010460                                ENDMSG
  (3)  010460                          L10016:
  (3)  010460  104423                        TRAP    C$MSG
  590
  591  010462                          BGNMSG  ERR15
  592
  593  010462  004737  010522                JSR     PC,LINE1
  594  010466  004737  010556                JSR     PC,LINE2
  595  010472                                PRINTB  #FRMT15,R2
  (8)  010472  010246                        MOV     R2,-(SP)
  (7)  010474  012746  012142                MOV     #FRMT15,-(SP)
  (6)  010500  012746  000002                MOV     #2,-(SP)
  (3)  010504  010600                        MOV     SP,R0
  (4)  010506  104414                        TRAP    C$PNTB
  (4)  010510  062706  000006                ADD     #6,SP
  596  010514  004537  014530                JSR     R5,CKERLT
  597
  598  010520                                ENDMSG
  (3)  010520                          L10017:
  (3)  010520  104423                        TRAP    C$MSG
  599
  600  010522                          LINE1:  PRINTB  #FRMT1,RLCS,<B,DRIVE+1>
  (9)  010522  005046                        CLR     -(SP)
  (9)  010524  153716  002247                BISB    DRIVE+1,(SP)
  (8)  010530  013746  002354                MOV     RLCS,-(SP)
  (7)  010534  012746  011052                MOV     #FRMT1,-(SP)
  (6)  010540  012746  000003                MOV     #3,-(SP)
  (3)  010544  010600                        MOV     SP,R0
  (4)  010546  104414                        TRAP    C$PNTB
  (4)  010550  062706  000010                ADD     #10,SP
  601  010554  000207                        RTS     PC
  602
  603  010556                          LINE2:  PRINTB  #FRMT2,#BEREG,#ARLCS,B.CS,#ARLBA,B.BA
  (12) 010556  013746  002332                MOV     B.BA,-(SP)
  (11) 010562  012746  003435                MOV     #ARLBA,-(SP)
  (10) 010566  013746  002330                MOV     B.CS,-(SP)
  (9)  010572  012746  003430                MOV     #ARLCS,-(SP)
  (8)  010576  012746  003457                MOV     #BEREG,-(SP)
  (7)  010602  012746  011102                MOV     #FRMT2,-(SP)
  (6)  010606  012746  000006                MOV     #6,-(SP)
  (3)  010612  010600                        MOV     SP,R0
  (4)  010614  104414                        TRAP    C$PNTB
  (4)  010616  062706  000016                ADD     #16,SP
  604  010622                                PRINTB  #FRMT2A,#ARLDA,B.DA,#ARLMP,B.MP
  (11) 010622  013746  002336                MOV     B.MP,-(SP)
  (10) 010626  012746  003451                MOV     #ARLMP,-(SP)
  (9)  010632  013746  002334                MOV     B.DA,-(SP)
  (8)  010636  012746  003443                MOV     #ARLDA,-(SP)
  (7)  010642  012746  011121                MOV     #FRMT2A,-(SP)
  (6)  010646  012746  000005                MOV     #5,-(SP)
  (3)  010652  010600                        MOV     SP,R0
  (4)  010654  104414                        TRAP    C$PNTB
```

```
   (4)  010656  062706  000014                    ADD     #14,SP
   605  010662                                    PRINTB  #FRMT2,#AFREG,#ARLCS,E.CS,#ARLBA,E.BA
   (12) 010662  013746  002342                    MOV     E.BA,-(SP)
   (11) 010666  012746  003435                    MOV     #ARLBA,-(SP)
   (10) 010672  013746  002340                    MOV     E.CS,-(SP)
   (9)  010676  012746  003430                    MOV     #ARLCS,-(SP)
   (8)  010702  012746  003500                    MOV     #AFREG,-(SP)
   (7)  010706  012746  011102                    MOV     #FRMT2,-(SP)
   (6)  010712  012746  000006                    MOV     #6,-(SP)
   (3)  010716  010600                            MOV     SP,R0
   (4)  010720  104414                            TRAP    C$PNTB
   (4)  010722  062706  000016                    ADD     #16,SP
   606  010726                                    PRINTB  #FRMT2B,#ARLDA,E.DA,#ARLMP,E.MP,E.MP1,E.MP2
   (13) 010726  013746  002352                    MOV     E.MP2,-(SP)
   (12) 010732  013746  002350                    MOV     E.MP1,-(SP)
   (11) 010736  013746  002346                    MOV     E.MP,-(SP)
   (10) 010742  012746  003451                    MOV     #ARLMP,-(SP)
   (9)  010746  013746  002344                    MOV     E.DA,-(SP)
   (8)  010752  012746  003443                    MOV     #ARLDA,-(SP)
   (7)  010756  012746  011134                    MOV     #FRMT2B,-(SP)
   (6)  010762  012746  000007                    MOV     #7,-(SP)
   (3)  010766  010600                            MOV     SP,R0
   (4)  010770  104414                            TRAP    C$PNTB
   (4)  010772  062706  000020                    ADD     #20,SP
   607  010776  000207                            RTS     PC
   608
   609  011000                            LINE3:  PRINTB  #FRMT3,#EM1
   (8)  011000  012746  004467                    MOV     #EM1,-(SP)
   (7)  011004  012746  011163                    MOV     #FRMT3,-(SP)
   (6)  011010  012746  000002                    MOV     #2,-(SP)
   (3)  011014  010600                            MOV     SP,R0
   (4)  011016  104414                            TRAP    C$PNTB
   (4)  011020  062706  000006                    ADD     #6,SP
   610  011024                                    PRINTB  #FRMT3,#EM100
   (8)  011024  012746  004522                    MOV     #EM100,-(SP)
   (7)  011030  012746  011163                    MOV     #FRMT3,-(SP)
   (6)  011034  012746  000002                    MOV     #2,-(SP)
   (3)  011040  010600                            MOV     SP,R0
   (4)  011042  104414                            TRAP    C$PNTB
   (4)  011044  062706  000006                    ADD     #6,SP
   611  011050  000207                            RTS     PC
   612
   613
   617
   618  011052  040445  047103  051124  FRMT1:   .ASCIZ  /%ACNTRLR: %06%A DRV %01/
   619  011102  047045  052045  052045  FRMT2:   .ASCIZ  /%N%T%T%06%T%06/
   620  011121     045  022524  033117  FRMT2A:  .ASCIZ  /%T%06%T%06/
   621  011134  052045  047445  022466  FRMT2B:  .ASCIZ  /%T%06%T%06%A %06%A %06/
   622  011163     045  022516  000124  FRMT3:   .ASCIZ  /%N%T/
   623  011170  047045  040445  054105  FRMT4:   .ASCIZ  /%N%AEXP'D: %06%A REC'D: %06%N/
   624  011226  047045  040445  040514  FRMT5:   .ASCIZ  /%N%ALAST: %06%A PRES: %06%A EXP'D: %06%N/
   625  011277     045  022516  041101  FRMT6:   .ASCIZ  /%N%ABUS ADR: %06%A EXP'D: %06%A REC'D: %06%N/
   626  011354  047045  040445  047527  FRMT7:   .ASCIZ  /%N%AWORD: %D3%A EXP'D: %06%A REC'D: %06%N/
   627  011426  047045  040445  040504  FRMT8:   .ASCIZ  /%N%ADA: %06%A REC'D: %06%A EXP'D: %06%N/
   628  011476  047045  040445  047527  FRMT14:  .ASCIZ  /%N%AWORDS WRITTEN: %D3%A BUS ADDR: %06%N/
   629  011547     045  022516  053501  FRMT9:   .ASCIZ  /%N%AWORDS WRITTEN: %D3%A BUS ADDR: %06%A EXP'D: %06%A REC'D: %06%N/
```

```
   630  011652  047045  040445  040522  FRMT10: .ASCII  /%N%ARANGE %D3%A - %D3%A  MILLISECONDS WAS %D6%N/
   631  011731     045  046501  054101          .ASCIZ  /%AMAX TIMEOUT OF PROGRAM IS 3 SECONDS%N/
   632  012001     045  022516  042501  FRMT11: .ASCIZ  /%N%AERR LIMIT EXCEEDED - DROPPED%N/
   633  012044  040445  051104  020126  FRMT98: .ASCII  /%ADRV DID NOT RCVR FROM POWER FAIL/
   634  012106  047045     000          FRMT99: .ASCIZ  /%N/
   635  012111     045  022516  022524  FRMT13: .ASCIZ  /%N%T%A - WILL NOT TEST%N/
   636  012142  047045  040445  040520  FRMT15: .ASCIZ  /%N%APATTERN WAS: %O6/
   637  012167     045  022516  042101  FRMT16: .ASCIZ  /%N%ADRIVE DROPPED - NO CONTROLLER%N/
   638  012233     045  022516  042101  FRMT17: .ASCIZ  /%N%ADRIVE DROPPED - DID NOT RESPOND WITH 'READY'%N/
   639  012316  047045  040445  042524  FRMT18: .ASCIZ  /%N%ATEST 7 CANNOT BE PERFORMED...CLOCK IS NOT AVAILABLE/
   640
   641                                  .EVEN
   642
   646
   647  012406                          ENDMOD
   648
   649                                  ;LOAD PROTECTION TABLE
   650  012406                          BGNPROT
   651  012406  000000                          .WORD    0              ;OFFSET OF CSR IN P-TABLE
   652  012410  177777                          .WORD   -1              ;NOT A MASS-BUS DRIVE
   653  012412  000010                          .WORD   10              ;OFFSET OF DRIVE IN P-TABLE
   654  012414                          ENDPROT
   655
   656  012414                          BGNMOD  HPTCODE
   657  012414                          BGNHW
(3)    012414  000006                          .WORD   L10021-L$HW/2
   658
   659  012416  174400                          .WORD   174400          ;CSR
   660  012420  000160                          .WORD   160             ;VECTOR
   661  012422  000240                          .WORD   240             ;PRIORITY
   662  012424  000001                          .WORD                   ;TYPE OF DRIVE RL01 OR RL02
   663  012426  000000                          .WORD   0               ;DRIVE (BITS 8,9,10)
   664  012430  000001                          .WORD   1               ;RL11=1 RLV11=0
   665
   666  012432                          ENDHW
(3)    012432                          L10021:
   667  012432                          ENDMOD
   668
   669  012432                          BGNMOD  SPTCODE
   670  012432                          BGNSW
(3)    012432  000005                          .WORD   L10022-L$SW/2
   671
   672  012434  000000                  DROP:   .WORD   0
   673  012436  000012                  MERLMT: .WORD   10.
   674  012440  000000                  T.DMP:  .WORD   0
   675  012442  000000                  T.LMT:  .WORD   0
   676  012444  000001                  T.ANS:  .WORD   1
   677
   678  012446                          ENDSW
(3)    012446                          L10022:
   679  012446                          ENDMOD
   680
   681  012446                          BGNMOD  DSPCODE
   682
   683  012446                          DISPATCH        44
(4)    012446  000054                          .WORD   44
```

```
(6)  012450  016242                    .WORD   T1
(6)  012452  016406                    .WORD   T2
(6)  012454  016536                    .WORD   T3
(6)  012456  016672                    .WORD   T4
(6)  012460  017024                    .WORD   T5
(6)  012462  017162                    .WORD   T6
(6)  012464  017360                    .WORD   T7
(6)  012466  020002                    .WORD   T8
(6)  012470  020172                    .WORD   T9
(6)  012472  020370                    .WORD   T10
(6)  012474  020542                    .WORD   T11
(6)  012476  020740                    .WORD   T12
(6)  012500  021140                    .WORD   T13
(6)  012502  021242                    .WORD   T14
(6)  012504  021366                    .WORD   T15
(6)  012506  021562                    .WORD   T16
(6)  012510  021716                    .WORD   T17
(6)  012512  022050                    .WORD   T18
(6)  012514  022170                    .WORD   T19
(6)  012516  022350                    .WORD   T20
(6)  012520  023162                    .WORD   T21
(6)  012522  023356                    .WORD   T22
(6)  012524  023522                    .WORD   T23
(6)  012526  023706                    .WORD   T24
(6)  012530  024072                    .WORD   T25
(6)  012532  024472                    .WORD   T26
(6)  012534  025114                    .WORD   T27
(6)  012536  025542                    .WORD   T28
(6)  012540  026222                    .WORD   T29
(6)  012542  026654                    .WORD   T30
(6)  012544  027270                    .WORD   T31
(6)  012546  027522                    .WORD   T32
(6)  012550  030012                    .WORD   T33
(6)  012552  030306                    .WORD   T34
(6)  012554  030600                    .WORD   T35
(6)  012556  031172                    .WORD   T36
(6)  012560  031472                    .WORD   T37
(6)  012562  032032                    .WORD   T38
(6)  012564  032344                    .WORD   T39
(6)  012566  032670                    .WORD   T40
(6)  012570  032760                    .WORD   T41
(6)  012572  033112                    .WORD   T42
(6)  012574  033310                    .WORD   T43
(6)  012576  033446                    .WORD   T44
684
685  012600                  ENDMOD
686
```

```
                                        .SBTTL  INITIALIZATION CODE
                                        BGNMOD  INITCODE
012600                                  BGNINIT
                                                SETPRI  #PRI07
(3) 012600  012700  000340                      MOV     #PRI07,R0
(3) 012604  104441                              TRAP    C$SPRI
012606                                          READEF  #EF.PWR
(3) 012606  012700  000034                      MOV     #EF.PWR,R0
(3) 012612  104447                              TRAP    C$REFG
012614                                          BNCOMPLETE      NOPWR
(2) 012614  103004                              BCC     NOPWR
012616  013737  002012  002416                  MOV     L$UNIT,PWRFLG
012624  000475                                  BR      CONT
012626                                  NOPWR:  READEF  #EF.RESTART
(3) 012626  012700  000037                      MOV     #EF.RESTART,R0
(3) 012632  104447                              TRAP    C$REFG
012634                                          BCOMPLETE       START1
(2) 012634  103404                              BCS     START1
012636                                          READEF  #EF.START
(3) 012636  012700  000040                      MOV     #EF.START,R0
(3) 012642  104447                              TRAP    C$REFG
012644                                          BNCOMPLETE      CONTINUET
(2) 012644  103010                              BCC     CONTINUET
012646  012700  002426              START1: MOV     #ERCOUNT,R0
012652  012701  000100                      MOV     #64.,R1
012656  005020                      1$:     CLR     (R0)+
012660  005301                              DEC     R1
012662  001375                              BNE     1$
012664  000407                              BR      START
012666                                  CONTINUE:       READEF  #EF.CONTINUE
(3) 012666  012700  000036                      MOV     #EF.CONTINUE,R0
(3) 012672  104447                              TRAP    C$REFG
012674                                          BCOMPLETE       CONT
(2) 012674  103451                              BCS     CONT
012676  005737  002250              NXT:    TST     UUT                     ;DONE WITH ALL UNITS
012702  001011                              BNE     XXX                     ;NO
012704  012737  177777  002252      START:  MOV     #-1,UNITST
012712  013737  002012  002250              MOV     L$UNIT,UUT
012720  012737  002424  002424              MOV     #ERCOUNT-2,ERPOINT
012726  005237  002252              XXX:    INC     UNITST
012732  062737  000002  002424              ADD     #2,ERPOINT
012740  005337  002250                      DEC     UUT
012744                                  REST:   GPHARD  UNITST,R0
(3) 012744  013700  002252                      MOV     UNITST,R0
(3) 012750  104442                              TRAP    C$GPHRD
012752                                          BCOMPLETE       2$
(2) 012752  103406                              BCS     2$
012754  005737  002416                      TST     PWRFLG
012760  001746                              BEQ     NXT
012762  005337  002416                      DEC     PWRFLG
012766  000743                              BR      NXT
012770  012037  002364              2$:     MOV     (R0)+,BCSR              ;GET BUS ADDRESS
012774  012037  002366                      MOV     (R0)+,BVEC              ;GET VECTOR
013000  012037  002370                      MOV     (R0)+,BPRIOR            ;GET PRIORITY
```

```
   727  013004  012037  002232                 MOV     (R0)+,T.DRIVE           ;GET TYPE OF DRIVE
   728  013010  012037  002246                 MOV     (R0)+,DRIVE             ;GET DRIVE
   729  013014  012037  002420                 MOV     (R0)+,T.CNTLR           ;GET CONTROLLER TYPE
   730  013020  013700  002364         CONT:   MOV     BCSR,R0                 ;CREATE REGISTERS
   731  013024  010037  002354                 MOV     R0,RLCS
   732  013030  062700  000002                 ADD     #2,R0
   733  013034  010037  002356                 MOV     R0,RLBA
   734  013040  062700  000002                 ADD     #2,R0
   735  013044  010037  002360                 MOV     R0,RLDA
   736  013050  062700  000002                 ADD     #2,R0
   737  013054  010037  002362                 MOV     R0,RLMP
   738  013060  005737  002416                 TST     PWRFLG                  ;POWER UP?
   739  013064  001452                         BEQ     END                     ;NO
   740  013066  012777  000200  167260         MOV     #200,@RLCS
   741  013074  053777  002246  167252         BIS     DRIVE,@RLCS
   742  013102  012701  000170                 MOV     #120.,R1                ;INITIALIZE WAIT COUNT
   743  013106                          3$:     WAITMS  #10.
   744  013120  032777  000001  167226         BIT     #1,@RLCS
   745  013126  001031                         BNE     END
   746  013130  005301                         DEC     R1
   747  013132  001365                         BNE     3$
   748  013134                                 PRINTF  #FRMT99
   (7)  013134  012746  012106                 MOV     #FRMT99,-(SP)
   (6)  013140  012746  000001                 MOV     #1,-(SP)
   (3)  013144  010600                         MOV     SP,R0
   (4)  013146  104417                         TRAP    C$PNTF
   (4)  013150  062706  000004                 ADD     #4,SP
   749  013154                                 PRINTF  #FRMT98
   (7)  013154  012746  012044                 MOV     #FRMT98,-(SP)
   (6)  013160  012746  000001                 MOV     #1,-(SP)
   (3)  013164  010600                         MOV     SP,R0
   (4)  013166  104417                         TRAP    C$PNTF
   (4)  013170  062706  000004                 ADD     #4,SP
   750  013174  004737  010522                 JSR     PC,LINE1
   751  013200                                 DODU    UNITST
   (3)  013200  013700  002252                 MOV     UNITST,R0
   (3)  013204  104451                         TRAP    C$DODU
   752  013206  000137  012676                 JMP     NXT
   753  013212  013737  002410  002412 END:    MOV     UOPIMN,OPIMN
   754  013220  013737  002406  002414         MOV     UOPIMX,OPIMX
   755  013226  005737  002420                 TST     T.CNTLR         ;RL11??
   756  013232  001006                         BNE     1$              ;YES, THEN KEEP LIMITS SET
   757  013234  013737  002404  002412         MOV     LOPIMN,OPIMN
   758  013242  013737  002402  002414         MOV     LOPIMX,OPIMX
   759  013250                          1$:     SETVEC  BVEC,#INTSRV,#340
   (7)  013250  012746  000340                 MOV     #340,-(SP)
   (6)  013254  012746  014466                 MOV     #INTSRV,-(SP)
   (5)  013260  013746  002366                 MOV     BVEC,-(SP)
   (4)  013264  012746  000003                 MOV     #3,-(SP)
   (3)  013270  104437                         TRAP    C$SVEC
   (2)  013272  062706  000010                 ADD     #10,SP
   760  013276                          ENDINIT
   (3)  013276                          L10023:
   (3)  013276  104411                         TRAP    C$INIT
   761  013300                          ENDMOD
   762
```

```
                                .SBTTL  AUTO DROP SECTION

013300                          BGNAUTO
013300  005037  002254                  CLR     TRPFLG          ;CLEAR TRAP FLAG
013304                                  SETVEC  ERRVEC,#TRPHAN,#340 ;SET UP TRAP VECTOR TO DETECT
(7) 013304  012746  000340              MOV     #340,-(SP)
(6) 013310  012746  015760              MOV     #TRPHAN,-(SP)
(5) 013314  013746  002244              MOV     ERRVEC,-(SP)
(4) 013320  012746  000003              MOV     #3,-(SP)
(3) 013324  104437                      TRAP    C$SVEC
(2) 013326  062706  000010              ADD     #10,SP
                                                                ;/NON-EXISTENT CONTROLLER
013332  005777  167016                  TST     @RLCS           ;ACCESS CONTROLLER
013336                                  CLRVEC  ERRVEC          ;RELEASE TRAP VECTOR
(3) 013336  013700  002244              MOV     ERRVEC,R0
(3) 013342  104436                      TRAP    C$CVEC
013344  005737  002254                  TST     TRPFLG          ;DID IT TRAP?
013350  001416                          BEQ     1$              ;NO - CHECK ITS DRIVE
013352                                  PRINTB  #FRMT16         ;ELSE, PRINT MSG. 'DRIVE DROPPED - NO CONTROLLER''
(7) 013352  012746  012167              MOV     #FRMT16,-(SP)
(6) 013356  012746  000001              MOV     #1,-(SP)
(3) 013362  010600                      MOV     SP,R0
(4) 013364  104414                      TRAP    C$PNTB
(4) 013366  062706  000004              ADD     #4,SP
013372  004737  010522                  JSR     PC,LINE1        ;PROVIDE DRIVE INFORMATION
013376                                  DODU    UNITST          ;DO DROP UNIT ON DRIVE
(3) 013376  013700  002252              MOV     UNITST,R0
(3) 013402  104451                      TRAP    C$DODU
013404  000427                          BR      2$              ;EXIT
013406  012777  000200  166740  1$:     MOV     #200,@RLCS      ;SET CONTROLLER READY
013414  053777  002246  166732          BIS     DRIVE,@RLCS     ;SELECT DRIVE
013422  032777  000001  166724          BIT     #1,@RLCS        ;IS DRIVE READY?
013430  001015                          BNE     2$              ;YES - EXIT
013432                                  PRINTB  #FRMT17         ;ELSE, PRINT MSG. 'DRIVE DROPPED - DID NOT
(7) 013432  012746  012233              MOV     #FRMT17,-(SP)
(6) 013436  012746  000001              MOV     #1,-(SP)
(3) 013442  010600                      MOV     SP,R0
(4) 013444  104414                      TRAP    C$PNTB
(4) 013446  062706  000004              ADD     #4,SP
                                                                ;/RESPOND WITH 'READY'''
013452  004737  010522                  JSR     PC,LINE1        ;PROVIDE DRIVE INFORMATION
013456                                  DODU    UNITST          ;DO DROP UNIT ON DRIVE
(3) 013456  013700  002252              MOV     UNITST,R0
(3) 013462  104451                      TRAP    C$DODU
013464                          2$:
013464                          ENDAUTO
(3) 013464                      L10024:
(3) 013464  104461                      TRAP    C$AUTO
```

```
  791
  792                                        .SBTTL  CLEANUP CODE SECTION
  793
  794  013466                                BGNMOD  CLNCODE
  795  013466                                BGNCLN
  796
  797  013466                                        SETVEC  ERRVEC,#TRPHAN,#340
(7)    013466  012746  000340                       MOV     #340,-(SP)
(6)    013472  012746  015760                       MOV     #TRPHAN,-(SP)
(5)    013476  013746  002244                       MOV     ERRVEC,-(SP)
(4)    013502  012746  000003                       MOV     #3,-(SP)
(3)    013506  104437                               TRAP    C$SVEC
(2)    013510  062706  000010                       ADD     #10,SP
  798  013514  032777  000200  166632  1$:          BIT     #CRDY,@RLCS
  799  013522  001774                               BEQ     1$
  800  013524  042777  000100  166622               BIC     #INTEN,@RLCS
  801  013532                                        CLRVEC  BVEC
(3)    013532  013700  002366                       MOV     BVEC,R0
(3)    013536  104436                               TRAP    C$CVEC
  802  013540  005737  002416                       TST     PWRFLG
  803  013544  001402                               BEQ     2$
  804  013546  005337  002416                       DEC     PWRFLG
  805  013552                                2$:     CLRVEC  ERRVEC
(3)    013552  013700  002244                       MOV     ERRVEC,R0
(3)    013556  104436                               TRAP    C$CVEC
  806
  807  013560                                ENDCLN
(3)    013560                                L10025:
(3)    013560  104412                               TRAP    C$CLEAN
  808  013562                                ENDMOD
  809
  821
```

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                                        .SBTTL  GLOBAL SUBROUTINES

013566                                  BGNMOD  GLBSUB

013566  012737  000160  002116  TIME:   MOV     #160,L$DLY              ;GET OUTER DELAY LOOP
013574  005237  002636                  INC     TIM.US                  ;US-WAIT ROUTINE INDICATOR
013600  005437  002626                  NEG     XDELAY                  ;GET NEGATIVE OF FACTOR
013604  005737  002420                  TST     T.CNTLR                 ;RL11?
013610  001420                          BEQ     2$                      ;BRANCH - IF NO
013612                          1$:     DELAY   #1.                     ;WAIT AT LEAST 100 US--
(2) 013612  012727  000001              MOV     ##1.,(PC)+
(2) 013616  000000                      .WORD   0
(2) 013620  013727  002116              MOV     L$DLY,(PC)+
(2) 013624  000000                      .WORD   0
(2) 013626  005367  177772              DEC     -6(PC)
(2) 013632  001375                      BNE     .-4
(2) 013634  005367  177756              DEC     -22(PC)
(2) 013640  001367                      BNE     .-20
013642  005237  002626                  INC     XDELAY                  ;WAIT FACTOR EXPIRED?
013646  002761                          BLT     1$                      ;BRANCH - IF NO
013650  000422                          BR      4$                      ;EXIT
013652  012737  000150  002116  2$:     MOV     #150,L$DLY              ;GET OUTER DELAY LOOP
013660                          3$:     DELAY   #1.                     ;WAIT WITH RESPECT TO FONZ BUS
(2) 013660  012727  000001              MOV     ##1.,(PC)+
(2) 013664  000000                      .WORD   0
(2) 013666  013727  002116              MOV     L$DLY,(PC)+
(2) 013672  000000                      .WORD   0
(2) 013674  005367  177772              DEC     -6(PC)
(2) 013700  001375                      BNE     .-4
(2) 013702  005367  177756              DEC     -22(PC)
(2) 013706  001367                      BNE     .-20
013710  005237  002626                  INC     XDELAY                  ;WAIT FACTOR EXPIRED?
013714  002761                          BLT     3$                      ;BRANCH - IF NO
013716  000207                  4$:     RTS     PC                      ;RETURN

013720  012737  000160  002116  XTIME:  MOV     #160,L$DLY              ;GET OUTER DELAY LOOP
013726  005037  002636                  CLR     TIM.US                  ;MS WAIT INDICATOR
013732  006337  002630                  ASL     YDELAY                  ;MULTIPLY BY FACTOR 4
013736  006337  002630                  ASL     YDELAY                  ; -------
013742  005437  002630                  NEG     YDELAY                  ;GET NEGATIVE OF RESULT
013746  005737  002420                  TST     T.CNTLR                 ;RL11?
013752  001023                          BNE     1$                      ;BRANCH - IF YES
013754  012737  000150  002116          MOV     #150,L$DLY              ;GET OUTER DELAY LOOP
013762                          2$:     DELAY   #20                     ;WAIT WITH RESPECT TO FONZ BUS
(2) 013762  012727  000020              MOV     ##20,(PC)+
(2) 013766  000000                      .WORD   0
(2) 013770  013727  002116              MOV     L$DLY,(PC)+
(2) 013774  000000                      .WORD   0
(2) 013776  005367  177772              DEC     -6(PC)
(2) 014002  001375                      BNE     .-4
(2) 014004  005367  177756              DEC     -22(PC)
(2) 014010  001367                      BNE     .-20
014012  005237  002630                  INC     YDELAY                  ;WAIT FACTOR EXPIRED?
014016  002761                          BLT     2$                      ;BRANCH - IF NO
```

```
855  014020  000417                    BR      3$                      ;GET TIME
856  014022                    1$:     DELAY   #10                     ;WAIT AT LEAST 25 MS
(2)  014022  012727  000010            MOV     ##10,(PC)+
(2)  014026  000000                    .WORD   0
(2)  014030  013727  002116            MOV     L$DLY,(PC)+
(2)  014034  000000                    .WORD   0
(2)  014036  005367  177772            DEC     -6(PC)
(2)  014042  001375                    BNE     .-4
(2)  014044  005367  177756            DEC     -22(PC)
(2)  014050  001367                    BNE     .-20
857  014052  005237  002630            INC     YDELAY                  ;WAIT FACTOR EXPIRED?
858  014056  002761                    BLT     1$                      ;BRANCH - IF NO
859  014060  000207            3$:     RTS     PC                      ;RETURN
860
861
862  014062  010146            SETCLK: MOV     R1,-(SP)                ;SAVE R1
863  014064                            CLOCK   P,PCLKCS                ;PROGRAMMABLE CLOCK AVAILABLE? - CSR=772540
(3)  014064  012700  000120            MOV     #'P,R0
(3)  014070  104462                    TRAP    C$CLCK
(3)  014072  010037  002642            MOV     R0,PCLKCS
864  014076                            BCOMPLETE       1$              ;BRANCH - IF YES
(2)  014076  103447                    BCS     1$
865  014100                            CLOCK   L,PCLKCS                ;LINE CLOCK AVAILABLE? - CSR=777546
(3)  014100  012700  000114            MOV     #'L,R0
(3)  014104  104462                    TRAP    C$CLCK
(3)  014106  010037  002642            MOV     R0,PCLKCS
866  014112                            BCOMPLETE       20$             ;BRANCH IF L-CLOCK
(2)  014112  103401                    BCS     20$
867  014114  000462                    BR      2$                      ;ELSE, INDICATE CLOCK IS NOT PRESENT
868  014116                    20$:    READBUS                         ;CHECK TYPE OF BUS
(3)  014116  104407                    TRAP    C$RDBU
869  014120                            BNCOMPLETE      1$              ;BRANCH IF NOT Q-BUS
(2)  014120  103036                    BCC     1$
870  014122  005037  002666            CLR     CLKFLD                  ;CLEAR CLOCK FIELD FOR STORING 'TICKS'
871  014126                            SETVEC  #100,#CLKTIK,#340       ;SET UP LSI-11 L-CLOCK INTERRUPT VECTOR
(7)  014126  012746  000340            MOV     #340,-(SP)
(6)  014132  012746  014522            MOV     #CLKTIK,-(SP)
(5)  014136  012746  000100            MOV     #100,-(SP)
(4)  014142  012746  000003            MOV     #3,-(SP)
(3)  014146  104437                    TRAP    C$SVEC
(2)  014150  062706  000010            ADD     #10,SP
872                                                                     ;/TO CHECK IF CLOCK IS 'TICKING'
873  014154                            SETPRI  #PRI05                  ;SET PRIORITY TO 5 TO ALLOW CLOCK INTERRUPTS
(3)  014154  012700  000240            MOV     #PRI05,R0
(3)  014160  104441                    TRAP    C$SPRI
874  014162                            WAITMS  #5                      ;PAUSE TO ALLOW CLOCK INTERRUPTS
875  014174                            SETPRI  #PRI07                  ;RESTORE PRIORITY TO 7 TO INHIBIT INTERRUPTS
(3)  014174  012700  000340            MOV     #PRI07,R0
(3)  014200  104441                    TRAP    C$SPRI
876  014202                            CLRVEC  #100                    ;CLEAR L-CLOCK INTERRUPT VECTOR
(3)  014202  012700  000100            MOV     #100,R0
(3)  014206  104436                    TRAP    C$CVEC
877  014210  005737  002666            TST     CLKFLD                  ;L-CLOCK 'TICKS'?
878  014214  001422                    BEQ     2$                      ;BRANCH IF NO 'TICKS'
879  014216  013701  002642    1$:     MOV     PCLKCS,R1               ;GET POINTER TO CLOCK CONTROL STATUS REGISTER
880  014222  011137  002644            MOV     (R1),PCSR               ;GET CLOCK CONTROL STATUS REGISTER
```

```
    014226 016137 000004 002646         MOV     4(R1),VEC           ;GET CLOCK VECTOR ADDRESS
    014234 016137 000006 002650         MOV     6(R1),HZ            ;GET CLOCK FREQUENCY
    014242 022737 000074 002650         CMP     #60.,HZ             ;60 HZ.?
    014250 001407                       BEQ     3$                  ;BRANCH - IF YES
    014252 022737 000062 002650         CMP     #50.,HZ             ;50 HZ.?
    014260 001420                       BEQ     4$                  ;BRANCH - IF YES
    014262 005237 002652         2$:    INC     XITFLG              ;SET EXIT FLAG
    014266 000475                       BR      8$                  ;EXIT
    014270 005737 002420         3$:    TST     T.CNTLR             ;RL11?
    014274 001404                       BEQ     9$                  ;BRANCH - IF NO
    014276 012737 000030 002664         MOV     #24.,OPITIM         ;SET OPIMX FOR 60 HZ CLOCK & RL11
    014304 000403                       BR      10$                 ;CONTINUE
    014306 012737 000047 002664  9$:    MOV     #39.,OPITIM         ;SET OPIMX FOR 60 HZ CLOCK & RLV11
    014314 005237 002656         10$:   INC     SIXTY               ;SET 60 HZ CLOCK INDICATOR
    014320 000414                       BR      5$                  ;CHECK CLOCK TYPE
    014322 005737 002420         4$:    TST     T.CNTLR             ;RL11?
    014326 001404                       BEQ     11$                 ;BRANCH - IF NO
    014330 012737 000024 002664         MOV     #20.,OPITIM         ;SET OPIMX FOR 50 HZ CLOCK & RL11
    014336 000403                       BR      12$                 ;CONTINUE
    014340 012737 000040 002664  11$:   MOV     #32.,OPITIM         ;SET OPIMX FOR 50 HZ CLOCK & RLV11
    014346 005237 002654         12$:   INC     FIFTY               ;SET 50 HZ. CLOCK INDICATOR
    014352 022737 000104 002646  5$:    CMP     #104,VEC            ;P-CLOCK?
    014360 001016                       BNE     6$                  ;BRANCH - IF NO
    014362 005237 002660                INC     PCLOCK              ;SET P-CLOCK INDICATOR
    014366                              SETVEC  VEC,#CLKINT,#340    ;SET CLOCK INTERRUPT SERVICE ROUTINE
(7) 014366 012746 000340                MOV     #340,-(SP)
(6) 014372 012746 014506                MOV     #CLKINT,-(SP)
(5) 014376 013746 002646                MOV     VEC,-(SP)
(4) 014402 012746 000003                MOV     #3,-(SP)
(3) 014406 104437                       TRAP    C$SVEC
(2) 014410 062706 000010                ADD     #10,SP
    014414 000422                       BR      8$                  ;EXIT
    014416 022737 000100 002646  6$:    CMP     #100,VEC            ;L-CLOCK?
    014424 001401                       BEQ     7$                  ;BRANCH - IF YES
    014426 000715                       BR      2$                  ;EXIT
    014430                       7$:    SETVEC  VEC,#CLKINT,#340    ;SET CLOCK INTERRUPT SERVICE ROUTINE
(7) 014430 012746 000340                MOV     #340,-(SP)
(6) 014434 012746 014506                MOV     #CLKINT,-(SP)
(5) 014440 013746 002646                MOV     VEC,-(SP)
(4) 014444 012746 000003                MOV     #3,-(SP)
(3) 014450 104437                       TRAP    C$SVEC
(2) 014452 062706 000010                ADD     #10,SP
    014456 005037 002660                CLR     PCLOCK              ;INIT P-CLOCK INDICATOR
    014462 012601                8$:    MOV     (SP)+,R1            ;RESTORE R1
    014464 000207                       RTS     PC                  ;RETURN


    014466                       BGNSRV
    014466                       INTSRV:

    014466 005237 002256                INC     INTFLG              ;SET INTERRUPT OCCURANCE FLAG

    014472                       ENDSRV
(3) 014472                       L10027:
(2) 014472 000002                       RTI
```

```
                                ;ROUTINE USED IN TIMING OPI
                                BGNSRV
014474                          TIMSRV:
014474  005237  002256                  INC     INTFLG                  ;SE' INTERRUPT INDICATOR FLAG
014500  005077  166140                  CLR     @PCSR                   ;DISABLE CLOCK
014504                          ENDSRV
(3) 014504                      L10030:
(2) 014504  000002                      RTI
014506                          BGNSRV
014506                          CLKINT:                                 ;CLOCK INTERRUPT SERVICE ROUTINE
014506  005337  002664                  DEC     OPITIM                  ;OPIMX EXPIRED?
014512  001002                          BNE     1$                      ;BRANCH - IF NO
014514  005077  166124                  CLR     @PCSR                   ;DISABLE CLOCK
014520                          1$:
014520                          ENDSRV
(3) 014520                      L10031:
(2) 014520  000002                      RTI
014522                          BGNSRV
014522                          CLKTIK:                                 ;L-CLOCK 'TICK'' CHECK ROUTINE FOR LSI-11
014522  005237  002666                  INC     CLKFLD                  ;INCREMENT CLOCK FIELD TO INDICATE THAT
                                                                        ;/CLOCK IS 'TICKING''
014526                          ENDSRV
(3) 014526                      L10032:
(2) 014526  000002                      RTI
014530                          CKERLT: INLOOP
(3) 014530  104420                      TRAP    C$INLP
014532                                  BCOMPLETE       99$
(2) 014532  103427                      BCS     99$
014534  005737  012434                  TST     DROP
014540  001424                          BEQ     99$
014542  005277  165656                  INC     @ERPOINT
014546  027737  165652  012436          CMP     @ERPOINT,MERLMT
014554  002416                          BLT     99$
014556                                  PRINTF  #FRMT11
(7) 014556  012746  012001              MOV     #FRMT11,-(SP)
(6) 014562  012746  000001              MOV     #1,-(SP)
(3) 014566  010600                      MOV     SP,R0
(4) 014570  104417                      TRAP    C$PNTF
(4) 014572  062706  000004              ADD     #4,SP
014576  004737  010522                  JSR     PC,LINE1
014602                                  DODU    UNITST  ;DROP THIS UNIT
(3) 014602  013700  002252              MOV     UNITST,R0
(3) 014606  104451                      TRAP    C$DODU
```

```
964  014610                          DOCLN
(3)  014610  104444                  TRAP    C$DCLN
965
966  014612                      99$:
967  014612  000205                  RTS     R5
968
```

```
                                        .SBTTL  ROUTINE TO CHECK FOR CONTROLLER ERRORS

                                        ;**************************************************************
                                        ;*THIS ROUTINE WILL CHECK RLCS FOR ERRORS AND PRINT THEM
                                        ;*ACCORDINGLY.  IT WILL MERGE THE ERROR PRINTOUT WITH THE TEST
                                        ;*ERROR MESSAGE.
                                        ;*
                                        ;*ROUTINE USES R0,R1 AND PICKS HEADER FROM R3
                                        ;*
                                        ;*      CALL    JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
                                        ;*
                                        ;*
                                        ;*

014614  005037  002236          CHERR:  CLR     T.CRC
014620  032737  176000  002340          BIT     #176000,E.CS    ;ANY ERROR BITS SET?
014626  001001                          BNE     2$              ;YES,FIND OUT WHICH
014630  000205                          RTS     R5              ;NO EXIT
014632  012701  004522          2$:     MOV     #EM100,R1       ;GET START OF STRING
014636  005737  002340                  TST     E.CS            ;IS COMPOSITE ERROR SET?(BETTER BE)
014642  100003                          BPL     99$             ;IT'S NOT SOMETHING IS WRONG
014644  004537  015352                  JSR     R5,FIX          ;YES, PUT ''COMP'' IN STRING
014650  003645                          COMP                    ;''COMP''
014652  032737  040000  002340  99$:    BIT     #DERR,E.CS      ;DRIVE ERROR SET?
014660  001405                          BEQ     3$              ;NO, CONTINUE
014662  005237  002422                  INC     DERFLG
014666  004537  015352                  JSR     R5,FIX          ;YES, PUT 'DRV'' INTO STRING
014672  003574                          DEMES                   ;'DRV''
014674  032737  020000  002340  3$:     BIT     #NXM,E.CS       ;NON-EXISTENT MEMORY ERROR?
014702  001403                          BEQ     4$              ;NO, CONTINUE
014704  004537  015352                  JSR     R5,FIX          ;YES, PUT 'NXM'' INTO STRING
014710  003601                          NXMMES                  ;'NXM''
014712  032737  002000  002340  4$:     BIT     #OPI,E.CS       ;IS OPI SET?
014720  001422                          BEQ     6$              ;NO, GO CHECK BITS 11 & 12
014722  004537  015352                  JSR     R5,FIX          ;PUT ''OPI'' INTO STRING
014726  003606                          OPIMES                  ;''OPI''
014730  032737  004000  002340          BIT     #BIT11,E.CS     ;HEADERCRC ERROR?
014736  001403                          BEQ     5$              ;NO, GO CHECK HEADER NOT FOUND
014740  004537  015352                  JSR     R5,FIX          ;GO PUT ''HCRC'' IN STRING
014744  003613                          HCRCMES                 ;''HCRC''
014746  032737  010000  002340  5$:     BIT     #BIT12,E.CS     ;HEADER NOT FOUND?
014754  001424                          BEQ     8$              ;NO, GO PUT ''CRLF'' IN STRING
014756  004537  015352                  JSR     R5,FIX          ;PUT ''HNF'' IN STRING
014762  003621                          HNFMES                  ;''HNF''
014764  000420                          BR      8$              ;PUT ''CRLF'' IN STRING
014766  032737  004000  002340  6$:     BIT     #BIT11,E.CS     ;DATA CRC ERROR?
014774  001405                          BEQ     7$              ;NO, GO CHECK DATA LATE
014776  005237  002236                  INC     T.CRC
015002  004537  015352                  JSR     R5,FIX          ;PUT ''DCK'' IN SIRING
015006  003626                          DCKMES                  ;''DCK''
015010  032737  010000  002340  7$.     BIT     #BIT12,E.CS     ;DATA LATE ERROR?
015016  001403                          BEQ     8$              ;NO, GO PUT IN ''CRLF''
015020  004537  015352                  JSR     R5,FIX          ;PUT ''DLT'' IN STRING
015024  003633                          DLTMES                  ;''DLT''
015026  004537  015352          8$:     JSR     R5,FIX          ;PUT ''CRLF'' INTO STRING
```

```
                                        MSCRLF                          ;''CRLF''
                                        JSR     R5,FIX                  ;MOVE HEADER
                                RESTMS: .WORD   0                       ;HEADER FROM TEST
                                        CLRB    (R1)                    ;PUT TERMINATOR IN
                                        ERRDF   300.,LF,ERR6
                                 (4)    TRAP    C$ERDF
                                 (5)    .WORD   300
                                 (5)    .WORD   LF
                                 (5)    .WORD   ERR6
                                        RTS     R5                      ;EXIT ROUTINE

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

                                LDFUNC: BIT     #BIT14,@RLCS            ;DRIVE ERROR SET
                                        BEQ     5$
                                        MOV     @RLDA,B.DA
                                        MOV     #13,@RLDA
                                        MOV     #200,B.CS
                                        BIS     DRIVE,B.CS
                                        MOV     B.CS,@RLCS
                                6$:     BIT     #200,@RLCS
                                        BEQ     6$
                                        MOV     B.DA,@RLDA
                                5$:     MOV     (R5)+,LDCSR             ;GET BITS TO LOAD
                                        MOV     R3,-(SP)                ;SAVE R3
                                        BIC     #177661,LDCSR           ;CLEAR ALL BUT FUNC & INTR EN
                                        MOV     LDCSR,FNDFNC            ;SAVE FUNCTION
                                        BIC     #INTEN,FNDFNC           ;ONLY FUNCTION
                                        MOV     #HDRLST,R3              ;GET HEADER LIST
                                        ASR     FNDFNC                  ;ALIGN TO LEFT
                                        BEQ     2$                      ;IF EQUAL TO ZERO, SET R3
                                1$:     CMP     (R3)+,(R3)+             ;BUMP R3 BY 4
                                        DEC     FNDFNC                  ;DEC FUNCTION
                                        BNE     1$                      ;FOUND IT? NO-GO BACK
                                2$:     BIT     #INTEN,LDCSR            ;YES, DO WE WANT FLAG OR INTR?
                                        BEQ     3$                      ;FLAG BRANCH
                                        TST     (R3)+                   ;INTR POINT TO THAT ONE
                                3$:     MOV     (R3),R3                 ;SET HEADER
                                        MOV     R3,RESTMS               ;SET UP HEADER
                                        MOV     R3,TRYFNC               ;SAVE HEADER FOR LATER
                                        BIS     XMEM,LDCSR              ;LOAD E.A. BITS
                                        CLR     XMEM                    ;CLEAR OUT THE BITS
                                        BIS     DRIVE,LDCSR             ;SELECT DRIVE
                                        BIS     #200,LDCSR
                                        MOV     LDCSR,@RLCS             ;LOAD FUNCTION
                                        JSR     R5,BEFORE               ;READ REGISTERS
                                4$:     BIC     #200,@RLCS              ;ISSUE COMMAND
                                        MOV     (SP)+,R3                ;RESTORE R3
                                        RTS     R5                      ;EXIT
```

```
1078
1079
1080  015312  003705                  HDRLST: NOPMES
1081  015314  003733                          NOPINT
1082  015316  003762                          WCKMES
1083  015320  004016                          WCKINT
1084  015322  004171                          GSTMES
1085  015324  004221                          GSTINT
1086  015326  004130                          SEKMES
1087  015330  004150                          SEKINT
1088  015332  004053                          RHDMES
1089  015334  004103                          RHDINT
1090  015336  004311                          WRTMES
1091  015340  004332                          WRTINT
1092  015342  004251                          RDDMES
1093  015344  004271                          RDDINT
1094  015346  004353                          RDNMES
1095  015350  004401                          RDNINT
1096
1097                                  ;*****************************************************************
1098                                  ;*ROUTINE TO MOVE ASCII STRINGS
1099                                  ;*USES REGISTERS R1 - WHERE STRING IS BEING BUILT
1100                                  ;*
1101                                  ;*      CALL    JSR     R5,FIX
1102                                  ;*              .WORD           ;ADDRESS OF STRING TO MOVE
1103
1104  015352  012504                  FIX:    MOV     (R5)+,R4        ;GET ADDRESS AND MOVE RETURN
1105  015354  112421                  1$:     MOVB    (R4)+,(R1)+     ;GET BYTE AND UPDATE
1106  015356  001376                          BNE     1$              ;WATCH 0 BYTE TERMINATOR
1107  015360  105741                          TSTB    -(R1)           ;BACK UP OVER ZERO BYTE
1108  015362  000205                          RTS     R5              ;EXIT
1109
1110
1111                                  ;ROUTINE TO READ REGISTERS PRIOR TO OPERATION
1112                                  ;CALL:  JSR R5,BEFORE
1113
1114  015364  017737  164764  002330  BEFORE: MOV     @RLCS,B.CS      ;READ CS
1115  015372  017737  164760  002332          MOV     @RLBA,B.BA      ;      BA
1116  015400  017737  164754  002334          MOV     @RLDA,B.DA      ;      DA
1117  015406  017737  164750  002336          MOV     @RLMP,B.MP      ;      MP
1118  015414  000205                          RTS     R5
1119
1120                                  ;ROUTINE TO READ REGISTERS AT TIME OF ERROR
1121                                  ;CALL:  JSR R5,AFTER
1122
1123  015416  017737  164732  002340  AFTER:  MOV     @RLCS,E.CS      ;READ CS
1124  015424  017737  164726  002342          MOV     @RLBA,E.BA      ;      BA
1125  015432  017737  164722  002344          MOV     @RLDA,E.DA      ;      DA
1126  015440  017737  164716  002346          MOV     @RLMP,E.MP      ;      MP
1127  015446  017737  164710  002350          MOV     @RLMP,E.MP1     ;      MP
1128  015454  017737  164702  002352          MOV     @RLMP,E.MP2     ;      MP
1129  015462  000205                          RTS     R5
1130
1131
1132  015464  010046                  SIMBCC: MOV     R0,-(SP)        ;SAVE R0
1133  015466  010146                          MOV     R1,-(SP)        ;SAVE R1
```

```
1134  015470  010246                        MOV     R2,-(SP)        ;SAVE R2
1135  015472  012537  002304                MOV     (R5)+,TEMP2     ;GET NUMBER OF BITS
1136  015476  012537  002306                MOV     (R5)+,TEMP3     ;GET DATA FOR CRC CALCULATION
1137  015502  012537  002310                MOV     (R5)+,TEMP4     ;GET STARTING CRC
1138  015506  005037  002266        1$:     CLR     BCCFBK          ;
1139  015512  013700  002310                MOV     TEMP4,R0        ;GET PRESENT CRC
1140  015516  006037  002306                ROR     TEMP3           ;ROTATE NEW DATA
1141  015522  005500                        ADC     R0              ;MERGE NEW WITH OLD
1142  015524  032700  000001                BIT     #1,R0           ;BIT 0 SET
1143  015530  001402                        BEQ     2$              ;IF NOT CONTINUE
1144  015532  005137  002266                COM     BCCFBK          ;
1145  015536  013700  002264        2$:     MOV     XPOLY,R0        ;GET CRC POLYNOMIAL (CRC-16)
1146  015542  005100                        COM     R0              ;COMPLEMENT POLYNOMIAL
1147  015544  040037  002266                BIC     R0,BCCFBK
1148  015550  000241                        CLC                     ;CLEAR CARRY
1149  015552  006037  002310                ROR     TEMP4
1150  015556  013700  002266                MOV     BCCFBK,R0
1151  015562  013701  002310                MOV     TEMP4,R1
1152  015566  010102                        MOV     R1,R2
1153  015570  040100                        BIC     R1,R0
1154  015572  043702  002266                BIC     BCCFBK,R2
1155  015576  050200                        BIS     R2,R0
1156  015600  043737  002264  002310        BIC     XPOLY,TEMP4
1157  015606  050037  002310                BIS     R0,TEMP4
1158  015612  005337  002304                DEC     TEMP2
1159  015616  001333                        BNE     1$
1160
1161  015620  013737  002310  002270        MOV     TEMP4,CALBCC
1162  015626  012602                        MOV     (SP)+,R2
1163  015630  012601                        MOV     (SP)+,R1
1164  015632  012600                        MOV     (SP)+,R0
1165  015634  000205                        RTS     R5              ;RETURN
1166
1167
1168                                ;ROUTINE TO WAIT FOR DRIVE READY
1169
1170
1171
1172
1173  015636  012701  000144        WTDRDY: MOV     #100.,R1
1174  015642  032777  000001  164504 1$:     BIT     #DRDY,@RLCS
1175  015650  001013                        BNE     2$
1176
1177  015652                                WAITUS  #20.
1178  015664  005301                        DEC     R1
1179  015666  001365                        BNE     1$
1180
1181  015670                                ERRDF   200.,DRTIM,ERR5
 (4)  015670  104455                        TRAP    C$ERDF
 (5)  015672  000310                        .WORD   200
 (5)  015674  003546                        .WORD   DRTIM
 (5)  015676  007722                        .WORD   ERR5
1182
1183  015700  000205                2$:     RTS     R5
1184
1185                                ;ROUTINE TO WAIT FOR CONTROLLER
```

```
1186
1187  015702  012701  00062C          WTCRDY: MOV     #400.,R1
1188  015706  032777  00020C  164440  1$:     BIT     #CRDY,@RLCS
1189  015714  001016                          BNE     2$
1190
1191  01571c                                  WAITUS  #20.
1192  01571?  005301                          DEC     R1
1193  015732  001365                          BNE     1$
1194  015734  004537  015416                  JSR     R5,AFTER
1195
1196  015740                                  ERRDF   100.,CRTIM,ERR5
 (4)  015740  104455                          TRAP    C$ERDF
 (5)  015742  000144                          .WORD   100
 (5)  015744  003521                          .WORD   CRTIM
 (5)  015746  007722                          .WORD   ERR5
1197  015750  000205                          RTS     R5
1198
1199  015752  004537  015416          2$:     JSR     R5,AFTER
1200  015756  000205                          RTS     R5
1201
1202
1203  015760  005237  002254          TRPHAN: INC     TRPFLG
1204  015764  000002                          RTI
1205
1206  015766                          HDHOME:
1207
1208  015766                                  BGNSEG                          ;%%START OF SEGMENT%%
 (3)  015766  104404                          TRAP    C$BSEG
1209                                  ;ISSUE DRIVE RESET
1210
1211  015770  012737  000001  002400          MOV     #1,ERFLG        ;SET ERROR FLAG
1212  015776  012777  000013  164354          MOV     #DRST!MK!GSBIT,@RLDA
1213  016004  004537  015056                  JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
1214  016010  000004                          GSTAT
1215  016012  004537  015702                  JSR     R5,WTCRDY
1216  016016                                  ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  016016  104410                          TRAP    C$ESCAPE
 (3)  016020  000216                          .WORD   10000$-.
1217  016022  004537  01 ,614                  JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
1218  016026                                  ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  016026  104410                          TRAP    C$ESCAPE
 (3)  016030  000206                          .WORD   10000$-.
1219
1220
1221  016032  004537  015056                  JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
1222  016036  000010                          RDHDR
1223  016040                                  ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  016040  104410                          TRAP    C$ESCAPE
 (3)  016042  000174                          .WORD   10000$-.
1224  016044  004537  015702                  JSR     R5,WTCRDY
1225  016050                                  ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  016050  104410                          TRAP    C$ESCAPE
 (3)  016052  000164                          .WORD   10000$-.
1226
1227  016054  004537  014614                  JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
1228  016060                                  ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
```

```
  (3)  016060  104410                          TRAP    C$ESCAPE
  (3)  016062  000154                          .WORD   10000$-.
1229
1230   016064  013737  002346  002272          MOV     E.MP,TMP0       ;GET HEADER
1231   016072  042737  000077  002272          BIC     #77,TMP0
1232   016100  001424                          BEQ     99$             ;SEEK IS NOT NECESSARY
1233   016102  042737  000100  002272          BIC     #100,TMP0
1234   016110  012777  000001  164242          MOV     #MK,@RLDA       ;SET TO SEEK
1235   016116  053777  002272  164234          BIS     TMP0,@RLDA      ;SET IN DIFFERENCE
1236
1237   016124  004537  015056                  JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
1238   016130  000006                          SEEK
1239   016132  004537  015702                  JSR     R5,WTCRDY
1240   016136                                  ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
  (3)  016136  104410                          TRAP    C$ESCAPE
  (3)  016140  000076                          .WORD   10000$-.
1241
1242   016142  004537  014614                  JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
1243   016146                                  ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
  (3)  016146  104410                          TRAP    C$ESCAPE
  (3)  016150  000066                          .WORD   10000$-.
1244
1245   016152  004537  015056          99$:    JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
1246   016156  000010                          RDHDR
1247   016160  004537  015702                  JSR     R5,WTCRDY
1248   016164                                  ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
  (3)  016164  104410                          TRAP    C$ESCAPE
  (3)  016166  000050                          .WORD   10000$-.
1249   016170  004537  014614                  JSR     R5,CHERR
1250   016174                                  ESCAPE  SEG
  (3)  016174  104410                          TRAP    C$ESCAPE
  (3)  016176  000040                          .WORD   10000$-.
1251
1252   016200  013737  002346  002272          MOV     E.MP,TMP0               ;GET HEADER
1253   016206  043737  002262  002272          BIC     SECMSK,TMP0             ;IGNORE SECTOR
1254   016214  001404                          BEQ     1$                      ;ON ZERO
1255
1256   016216                                  ERRDF   400.,SKHOME,ERR0        ;CAN'T SEEK TO TRACK 0
  (4)  016216  104455                          TRAP    C$ERDF
  (5)  016220  000620                          .WORD   400
  (5)  016222  004430                          .WORD   SKHOME
  (5)  016224  007510                          .WORD   ERR0
1257
1258   016226                          1$:     ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
  (3)  016226  104410                          TRAP    C$ESCAPE
  (3)  016230  000006                          .WORD   10000$-.
1259
1260   016232  005037  002400                  CLR     ERFLG           ;INDICATE SUCCESS BACK TO MAIN PROGRAM
1261
1262
1263   016236                                  ENDSEG                          ;%%END OF SEGMENT%%
  (3)  016236                          10000$:
  (3)  016236  104405                          TRAP    C$ESEG
1264
1265   016240  000207                          RTS     PC
1266
```

```
1267  016242                                ENDMOD
1268
1269
1270                                .SBTTL  **TEST 1** - WRITE FUNCTION
1271
1272  016242                        BGNTST                                  ;**START OF TEST**
1273
1274
1275
1276  016242                        STARS
 (2)                                ;;*********************************************************************
1277                                ;CHECK OF WRITE LOGIC UNDER FLAG MODE, WE WILL FIRST ISSUE A
1278                                ;READ HEADER SO THAT WE DON'T WRITE ON THE BAD SECTOR
1279                                ;FILE TRACK.  WE WILL WRITE A FULL SECTOR (128 WORDS) FROM
1280                                ;MEMORY (BUF).  WE CHECK THAT NO ERRORS OCCUR.  IF WE
1281                                ;HAVE A DRIVE ERROR WE WILL DO A "GET STATUS" TO SEE
1282                                ;IF WRITE PROTECT IS SET IF IT IS WE WILL ABORT THE
1283                                ;TEST.  AN ERROR ON THE WRITE WILL LOOP ON JUST THE
1284                                ;WRITE PORTION.  LOOP ON TEST WILL READ HEADER, SEEK (IF
1285                                ;NECESSARY) AND WRITE.
1286  016242                        STARS
 (2)                                ;;*********************************************************************
1287
1288
1289  016242  004737  015766                JSR     PC,HDHOME       ;HEADS OVER TRACK 0
1290  016246                                CKERFG                  ;HEADS GO HOME OKAY
 (4)  016254  104432                        TRAP    C$EXIT
 (4)  016256  000126                        .WORD   L10033-.
1291
1292  016260                                BGNSEG                          ;%%START OF SEGMENT%%
 (3)  016260  104404                        TRAP    C$BSEG
1293
1294  016262                        3$:
1295  016262  005077  164072               CLR     @RLDA           ;SET DISK ADDRESS
1296  016266  012777  177600  164066        MOV     #-128.,@RLMP    ;WORD COUNT
1297  016274  012777  003426  164054        MOV     #BUF,@RLBA      ;BUS ADDRESS
1298  016302  004537  015056               JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
1299  016306  000012                        WRITE                   ;WRITE
1300
1301  016310  004537  015702               JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY
1302  016314                                ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  016314  104410                        TRAP    C$ESCAPE
 (3)  016316  000064                        .WORD   10001$-.
1303
1304
1305  016320  032777  040000  164026        BIT     #DERR,@RLCS     ;DRIVE ERROR SET?
1306  016326  001425                        BEQ     4$              ;BRANCH IF NOT
1307
1308  016330  012777  000003  164022        MOV     #MK!GSBIT,@RLDA ;SET GET STATUS OF DRIVE
1309  016336  004537  015056               JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
1310  016342  000004                        GSTAT                   ;GET STATUS
1311  016344  004537  015702               JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY
1312  016350                                ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  016350  104410                        TRAP    C$ESCAPE
 (3)  016352  000030                        .WORD   10001$-.
1313
```

```
 1314  016354  013737  002346  002300          MOV     E.MP,GDDAT      ;READ DRIVE STATUS
 1315  016362  032737  020000  002300          BIT     #BIT13,GDDAT    ;WRITE LOCK ERROR?
 1316  016370  001404                          BEQ     4$              ;NO, BRANCH
 1317
 1318
 1319  016372                                  ERRSF   3.,WRLOCK,ERR0          ;WRITE LOCK ERROR
  (4)  016372  104454                          TRAP    C$ERSF
  (5)  016374  000003                          .WORD   3
  (5)  016376  004452                          .WORD   WRLOCK
  (5)  016400  007510                          .WORD   ERR0
 1320  016402                          4$:
 1321
 1322
 1323  016402                                  ENDSEG                          ;%%END OF SEGMENT%%
  (3)  016402                          10001$:
  (3)  016402  104405                          TRAP    C$ESEG
 1324  016404                          ENDTST                                  ;**END OF TEST**
  (3)  016404                          L10033:
  (3)  016404  104401                          TRAP    C$ETST
 1325
 1326                                  .SBTTL  **TEST 2** - WRITE FUNCTION INTERRUPT
 1327
 1328  016406                          BGNTST                                  ;**START OF TEST**
 1329
 1330  016406                          STARS
  (2)                                 ;;**********************************************************************
 1331                                 ;CHECK OF WRITE LOGIC UNDER INTERRUPT MODE, WE WILL ISSUE A
 1332                                 ;READ HEADER SO THAT WE DON'T WRITE ON THE BAD SECTOR FILE
 1333                                 ;TRACK.  WE WILL WRITE A FULL SECTOR (128 WORDS) FROM MEMORY (BUF).
 1334                                 ;WE CHECK THAT NO ERRORS OCCUR.  WE DO NOT CHECK RLDA OR RLBA
 1335                                 ;INCREMENT AT THIS TIME.
 1336  016406                          STARS
  (2)                                 ;;**********************************************************************
 1337
 1338
 1339  016406  004737  015766                  JSR     PC,HDHOME       ;HEADS OVER TRACK 0
 1340  016412                                  CKERFG                  ;HEADS GO HOME OKAY
  (4)  016420  104432                          TRAP    C$EXIT
  (4)  016422  000112                          .WORD   L10034-.
 1341
 1342  016424                                  BGNSEG                          ;%%START OF SEGMENT%%
  (3)  016424  104404                          TRAP    C$BSEG
 1343
 1344
 1345  016426  005037  002256                  CLR     INTFLG          ;CLEAR INTERRUPT OCCURANCE FLAG
 1346  016432  005077  163722                  CLR     @RLDA
 1347  016436  012777  177600  163716          MOV     #-128.,@RLMP    ;SET UP WORD COUNT
 1348  016444  012777  003426  163704          MOV     #BUF,@RLBA      ;SET UP BUS ADDRESS
 1349
 1350  016452                                  SETPRI  #PRI00          ;PRIORITY TO 0
  (3)  016452  012700  000000                  MOV     #PRI00,R0
  (3)  016456  104441                          TRAP    C$SPRI
 1351  016460  004537  015056                  JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
 1352  016464  000112                          WRITE!INTEN             ;WRITE UNDER INTERRUPT
 1353  016466  004537  015702                  JSR     R5,WTCRDY       ;WAIT FOR INTERRUPT
 1354  016472                                  ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
```

```
  (3)  016472  104410                        TRAP    C$ESCAPE
  (3)  016474  000036                        .WORD   10000$-.
1355
1356  016476                                 SETPRI  #PRI07          ;SET PRIORITY TO 7
  (3)  016476  012700  000340               MOV     #PRI07,R0
  (3)  016502  104441                        TRAP    C$SPRI
1357  016504  005737  002256                 TST     INTFLG          ;DID INTERRUPT OCCUR?
1358  016510  001004                         BNE     2$              ;YES-BRANCH NO-REPORT
1359
1360  016512                                 ERRDF   4.,EM17,ERR0    ;WRITE DID NOT INTERRUPT
  (4)  016512  104455                        TRAP    C$ERDF
  (5)  016514  000004                        .WORD   4
  (5)  016516  005322                        .WORD   EM17
  (5)  016520  007510                        .WORD   ERR0
1361  016522                           2$:   ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
  (3)  016522  104410                        TRAP    C$ESCAPE
  (3)  016524  000006                        .WORD   10000$-.
1362
1363  016526  004537  014614                 JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
1364
1365  016532                                 ENDSEG                          ;%%END OF SEGMENT%%
  (3)  016532                      10000$:
  (3)  016532  104405                        TRAP    C$ESEG
1366  016534                           ENDTST                                ;**END OF TEST**
  (3)  016534                      L10034:
  (3)  016534  104401                        TRAP    C$ETST
1367
1368                                     .SBTTL  **TEST 3** - PROPER INCREMENT OF RLBA ON WRITE
1369
1370  016536                             BGNTST                              ;**START OF TEST**
1371
1372
1373  016536                             STARS
  (2)                                      ;;*****************************************************************
1374                                       ;CHECK THAT THE RLBA WILL INCREMENT PROPERLY AFTER THE
1375                                       ;WRITE WAS FINISHED THE RLBA SHOULD BE 128 WORDS (256 BYTES)
1376                                       ;CREATER.  STARTING RLBA IS 'BUF', ENDING SHOULD BE 'BUF + 256.'
1377                                       ;WE WILL MONITOR ALL ERRORS AND REPORT THEM ACCORDINGLY
1378  016536                             STARS
  (2)                                      ;;*****************************************************************
1379
1380
1381  016536  004737  015766                 JSR     PC,HDHOME       ;HEADS OVER TRACK 0
1382  016542                                 CKERFG                  ;HEADS GO HOME OKAY
  (4)  016550  104432                        TRAP    C$EXIT
  (4)  016552  000116                        .WORD   L10035-.
1383
1384  016554                                 BGNSEG                          ;%%START OF SEGMENT%%
  (3)  016554  104404                        TRAP    C$BSEG
1385
1386  016556                           3$:
1387  016556  005077  163576                 CLR     @RLDA
1388  016562  012777  003426  163566         MOV     #BUF,@RLBA      ;SET UP BUS ADDRESS
1389  016570  012777  177600  163564         MOV     #-128.,@RLMP    ;WORD COUNT
1390  016576  012737  003426  002300         MOV     #BUF,GDDAT      ;FORM EXPECTED BUS ADDRESS
1391  016604  062737  000400  002300         ADD     #256.,GDDAT     ;AFTER WRITE
```

```
1392
1393  016612  004537  015056          JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
1394  016616  000012                  WRITE                   ;WRITE
1395  016620  004537  015702          JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY
1396  016624                          ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  016624  104410                  TRAP    C$ESCAPE
 (3)  016626  000040                  .WORD   10000$-.
1397
1398  016630  004537  014614          JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
1399  016634                          ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  016634  104410                  TRAP    C$ESCAPE
 (3)  016636  000030                  .WORD   10000$-.
1400  016640  017737  163512  002302  MOV     @RLBA,BDDAT     ;READ 'RLBA' FOR PRESENT ADDRESS
1401  016646  023737  002302  002300  CMP     BDDAT,GDDAT     ;DID 'BA' INCREMENT PROPERLY?
1402  016654  001404                  BEQ     2$              ;YES, CONTINUE
1403
1404  016656                          ERRDF   5.,EM20,ERR4    ;BA DID NOT INCREMENT
 (4)  016656  104455                  TRAP    C$ERDF
 (5)  016660  000005                  .WORD   5
 (5)  016662  005346                  .WORD   EM20
 (5)  016664  007654                  .WORD   ERR4
1405
1406  016666                  2$:
1407
1408  016666                          ENDSEG                          ;%%END OF SEGMENT%%
 (3)  016666                  10000$:
 (3)  016666  104405                  TRAP    C$ESEG
1409  016670                  ENDTST                          ;**END OF TEST**
 (3)  016670                  L10035:
 (3)  016670  104401                  TRAP    C$ETST
1410
1411                            .SBTTL  **TEST 4** - PROPER INCREMENT OF RLDA ON WRITE
1412
1413  016672                    BGNTST                                ;**START OF TEST**
1414
1415  016672                    STARS
 (2)                          ;;*****************************************************************
1416                          ;CHECK THAT THE SECTOR INCREMENTS AFTER THE WRITE WAS FINISHED.
1417                          ;WE RANDOMLY PICK A SECTOR (OTHER THAN LAST TRACK) AND ISSUE
1418                          ;A FULL SECTOR WRITE THE RLDA SHOULD REFLECT AN INCREMENT
1419                          ;OF THE SECOTR.  'GDDAT' WAS THE EXPECTED RLDA.
1420  016672                    STARS
 (2)                          ;;*****************************************************************
1421
1422
1423  016672  004737  015766          JSR     PC,HDHOME       ;HEADS OVER TRACK 0
1424  016676                          CKERFG                  ;HEADS GO HOME OKAY
 (4)  016704  104432                  TRAP    C$EXIT
 (4)  016706  000114                  .WORD   L10036-.
1425
1426  016710                          BGNSEG                          ;%%START OF SEGMENT%%
 (3)  016710  104404                  TRAP    C$BSEG
1427
1428  016712                  3$:
1429  016712  005037  002300          CLR     GDDAT
1430  016716  013777  002300  163434  MOV     GDDAT,@RLDA     ;SETUP DISK ADDRESS
```

```
 1431  016724  005237  002300                  INC     GDDAT           ;CREATE EXPECTED SECTOR
 1432  016730  012777  177600  163424          MOV     #-128.,@RLMP    ;WORD COUNT
 1433  016736  012777  003426  163412          MOV     #BUF,@RLBA      ;SETUP BUS ADDRESS
 1434
 1435  016744  004537  015056                  JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
 1436  016750  000012                          WRITE                   ;WRITE
 1437  016752  004537  015702                  JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY
 1438  016756                                  ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
  (3)  016756  104410                          TRAP    C$ESCAPE
  (3)  016760  000040                          .WORD   10000$-.
 1439
 1440  016762  004537  014614                  JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
 1441  016766                                  ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
  (3)  016766  104410                          TRAP    C$ESCAPE
  (3)  016770  000030                          .WORD   10000$-.
 1442
 1443  016772  013737  002344  002302          MOV     F.DA,BDDAT      ;READ DISK ADDRESS
 1444  017000  023737  002300  002302          CMP     GDDAT,BDDAT     ;DID SECTOR INCREMENT PROPERLY
 1445  017006  001404                          BEQ     2$              ;YES, BRANCH  NO, REPORT ERROR
 1446
 1447  017010                                  ERRDF   5.,EM21,ERR4    ;DA DID NOT INCREMENT
  (4)  017010  104455                          TRAP    C$ERDF
  (5)  017012  000006                          .WORD   6
  (5)  017014  005414                          .WORD   EM21
  (5)  017016  007654                          .WORD   ERR4
 1448
 1449  017020                          2$:
 1450
 1451  017020                                  ENDSEG                          ;%%END OF SEGMENT%%
  (3)  017020                          10000$:
  (3)  017020  104405                          TRAP    L$ESEG
 1452  017022                          ENDTST                          ;**END OF TEST**
  (3)  017022                          L10036:
  (3)  017022  104401                          TRAP    C$ETST
 1453
 1454                                  .SBTTL  **TEST 5** - FORCE HEADER NOT FOUND WITH WRITE
 1455
 1456  017024                          BGNTST                          ;**START OF TEST**
 1457
 1458  017024                          STARS
  (2)                                 ;;*****************************************************************
 1459                                 ;FORCE HEADER NOT FOUND ERROR TO OCCUR.  THIS IS DONE
 1460                                 ;BY SETTING SECTOR 40 OF THE RLDA AND ISSUING A
 1461                                 ;WRITE.  SECTOR 40 DOES NOT EXIST ON THE RL01 PACK
 1462                                 ;THEREFORE HDR NT FOUND SHOULD SET.
 1463  017024                          STARS
  (2)                                 ;;*****************************************************************
 1464
 1465  017024  004737  015766                  JSR     PC,HDHOME       ;HEADS OVER TRACK 0
 1466  017030                                  CKERFG                  ;HEADS GO HOME OKAY
  (4)  017036  104432                          TRAP    C$EXIT
  (4)  017040  000120                          .WORD   L10037-.
 1467
 1468  017042                                  BGNSEG                          ;%%START OF SEGMENT%%
  (3)  017042  104404                          TRAP    C$BSEG
 1469
```

```
1470
1471  017044  012777  000050  163306          MOV     #40.,@RLDA      ;INSURE NOT TO FIND HEADER BY
1472  017052  012777  003426  163276          MOV     #BUF,@RLBA      ;SETTING SECTOR 40 OF CYL. ADDR.
1473  017060  012777  177777  163274          MOV     #-1,@RLMP       ;WORD COUNT
1474
1475  017066  004537  015056                  JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
1476  017072  000012                          WRITE                   ;WRITE
1477  017074  004537  015702                  JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY
1478  017100                                  ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  017100  104410                          TRAP    C$ESCAPE
 (3)  017102  000054                          .WORD   10000$-.
1479
1480  017104  013737  002340  002272          MOV     E.CS,TMP0       ;GET RLCS
1481  017112  042737  001777  002272          BIC     #1777,TMP0      ;SAVE ERROR BITS
1482  017120  022737  112000  002272          CMP     #BIT15!BIT12.BIT10,TMP0  ;HDR NOT FOUND SET.
1483  017126  001402                          BEQ     1$              ;YES, CONTINUE
1484
1485  017130  004537  014614                  JSR     R5,CHERR
1486  017134                          1$:     CKLOOP
 (3)  017134  104406                          TRAP    C$CLP1
1487
1488  017136  022737  112000  002272          CMP     #BIT15!BIT12!BIT10,TMP0
1489  017144  001404                          BEQ     2$
1490  017146                                  ERRDF   23.,EM10,ERR0
 (4)  017146  104455                          TRAP    C$ERDF
 (5)  017150  000027                          .WORD   23
 (5)  017152  005064                          .WORD   EM10
 (5)  017154  007510                          .WORD   ERR0
1491                                                            ;WHEN FORCED
1492  017156                            2$:
1493
1494  017156                                  ENDSEG                          ;%%END OF SEGMENT%%
 (3)  017156                            10000$:
 (3)  017156  104405                          TRAP    C$ESEG
1495  017160                            ENDTST                                ;**END OF TEST**
 (3)  017160                            L10037:
 (3)  017160  104401                          TRAP    C$ETST
1496
1497                                    .SBTTL  **TEST 6** - FORCE HEADER NOT FOUND WITH WRITE INTERRUPT
1498
1499  017162                            BGNTST                                ;**START OF TEST**
1500
1501
1502  017162                            STARS
 (2)                                    ;;*****************************************************************
1503                                    ;TEST THAT HEADER NOT FOUND ERROR WILL GENERATE AN INTERRUPT
1504                                    ;ON OCCURRENCE.  HEADER NOT FOUND WILL BE FORCED BY SETTING
1505                                    ;SECTOR 40 OF RLDA AND ISSUEING A WRITE
1506  017162                            STARS
 (2)                                    ;;*****************************************************************
1507
1508
1509  017162  004737  015766                  JSR     PC,HDHOME       ;HEADS OVER TRACK 0
1510  017166                                  CKERFG                  ;HEADS GO HOME OKAY
 (4)  017174  104432                          TRAP    C$EXIT
 (4)  017176  000160                          .WORD   L10040-.
```

```
1511
1512  017200                                    BGNSEG                          ;%%START OF SEGMENT%%
 (3)  017200  104404                            TRAP    C$BSEG
1513
1514  017202                                    SETPRI  #PRI00
 (3)  017202  012700  000000                    MOV     #PRI00,R0
 (3)  017206  104441                            TRAP    C$SPRI
1515  017210  005037  002256                    CLR     INTFLG          ;CLEAR INTERRUPT OCCURANCE FLAG
1516  017214  012777  000050  163136            MOV     #40.,@RLDA      ;INSURE NOT TO FIND HEADER BY
1517  017222  012777  003426  163126            MOV     #BUF,@RLBA      ;SETTING SECTOR 40 OF CYL. ADDR.
1518  017230  012777  177777  163124            MOV     #-1,@RLMP       ;WORD COUNT
1519
1520  017236  004537  015056                    JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
1521  017242  000112                            WRITE!INTEN             ;WRITE
1522  017244  004537  015702                    JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY
1523  017250                                    CKLOOP
 (3)  017250  104406                            TRAP    C$CLP1
1524  017252                                    SETPRI  #PRI07
 (3)  017252  012700  000340                    MOV     #PRI07,R0
 (3)  017256  104441                            TRAP    C$SPRI
1525
1526  017260  005737  002256                    TST     INTFLG          ;DID INTERRUPT OCCUR
1527  017264  001004                            BNE     2$              ;YES OKAY
1528
1529  017266                                    ERRDF   24.,EM43,ERR0   ;NO INTERRUPT FROM OPI
 (4)  017266  104455                            TRAP    C$ERDF
 (5)  017270  000030                            .WORD   24
 (5)  017272  006461                            .WORD   EM43
 (5)  017274  007510                            .WORD   ERR0
1530
1531  017276                              2$:   ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  017276  104410                            TRAP    C$ESCAPE
 (3)  017300  000054                            .WORD   10000$-.
1532
1533
1534  017302  013737  002340  002272            MOV     E.CS,TMP0       ;GET RLCS
1535  017310  042737  001777  002272            BIC     #1777,TMP0      ;SAVE ERROR BITS
1536  017316  022737  112000  002272            CMP     #BIT15!BIT12!BIT10,TMP0  ;WDR NOT FOUND SET.
1537  017324  001402                            BEQ     1$              ;YES, CONTINUE
1538
1539  017326  004537  014614                    JSR     R5,CHERR
1540  017332                              1$:   CKLOOP
 (3)  017332  104406                            TRAP    C$CLP1
1541
1542  017334  022737  112000  002272            CMP     #BIT15!BIT12!BIT10,TMP0
1543  017342  001404                            BEQ     3$
1544  017344                                    ERRDF   25.,EM10,ERR0
 (4)  017344  104455                            TRAP    C$ERDF
 (5)  017346  000031                            .WORD   25
 (5)  017350  005064                            .WORD   EM10
 (5)  017352  007510                            .WORD   ERR0
1545                                                                      ;WHEN FORCED
1546  017354                              3$:
1547
1548  017354                                    ENDSEG                          ;%%END OF SEGMENT%%
 (3)  017354                              10000$:
```

```
  (3)  017354  104405                    TRAP    C$ESEG
1549   017356                  ENDTST                          ;**END OF TEST**
  (3)  017356                  L10040:
  (3)  017356  104401                    TRAP    C$ETST
1550
1551
1552
1553                           .SBTTL  **TEST 7** - CHECK OPI TIME WITH HDR NT FND
1554
1555   017360                  BGNTST                          ;**START OF TEST**
1556
1557   017360                  STARS
  (2)                          ;;*****************************************************************
1558                           ;CHECK OPI TIME IT SHOULD BE AROUND 200 MILLISECONDS (ON UNIBUS)
1559                           ;CHECK THIS BY TIMING OPI ON A FORCED HEADER NOT FOUND
1560                           ;ISSUE WRITE WITH SECTOR 40 SET IN THE DISK ADDRESS
1561   017360                  STARS
  (2)                          ;;*****************************************************************
1562
1563   017360  004737  014062          JSR     PC,SETCLK       ;CALL INITIALIZE CLOCK ROUTINE
1564   017364  005737  002652          TST     XITFLG          ;EXIT?
1565   017370  001412                  BEQ     1$              ;BRANCH - IF NO
1566   017372                          PRINTB  #FRMT18         ;ELSE, PRINT MSG. 'TEST 7 CANNOT BE PERFORMED...
  (7)  017372  012746  012316          MOV     #FRMT18,-(SP)
  (6)  017376  012746  000001          MOV     #1,-(SP)
  (3)  017402  010600                  MOV     SP,R0
  (4)  017404  104414                  TRAP    C$PNTB
  (4)  017406  062706  000004          ADD     #4,SP
1567                                                      ;/CLOCK IS NOT AVAILABLE''
1568   017412  000137  017764          JMP     8$              ;EXIT
1569   017416  004737  015766  1$:     JSR     PC,HDHOME       ;HEADS OVER TRACK 0
1570   017422                          CKERFG                  ;HEADS GO HOME OKAY
  (4)  017430  104432                  TRAP    C$EXIT
  (4)  017432  000346                  .WORD   L10041-.
1571
1572   017434                          BGNSEG                  ;%%START OF SEGMENT%%
  (3)  017434  104404                  TRAP    C$BSEG
1573
1574   017436                          CLRVEC  BVEC            ;CLEAR PRESENT INTERRUPT VECTOR
  (3)  017436  013700  002366          MOV     BVEC,R0
  (3)  017442  104436                  TRAP    C$CVEC
1575   017444                          SETVEC  BVEC,#TIMSRV,#340       ;SET INTR. VEC. WITH DISABLE CLOCK
  (7)  017444  012746  000340          MOV     #340,-(SP)
  (6)  017450  012746  014474          MOV     #TIMSRV,-(SP)
  (5)  017454  013746  002366          MOV     BVEC,-(SP)
  (4)  017460  012746  000003          MOV     #3,-(SP)
  (3)  017464  104437                  TRAP    C$SVEC
  (2)  017466  062706  000010          ADD     #10,SP
1576   017472                          SETPRI  #PRI00
  (3)  017472  012700  000000          MOV     #PRI00,R0
  (3)  017476  104441                  TRAP    C$SPRI
1577   017500  005037  002256          CLR     INTFLG          ;CLEAR INTERRUPT FLAG
1578   017504  012777  000050  162646  MOV     #40.,@RLDA      ;SET UP FOR HDR NT FND
1579   017512  012777  003426  162636  MOV     #BUF,@RLBA      ;BUS ADDRESS
1580   017520  012777  177777  162634  MOV     #-1,@RLMP       ;WORD COUNT
1581   017526  013737  002664  002302  MOV     OPITIM,BDDAT    ;GET OPIMX FOR WORST CASE
```

```
1582  017534  013701  002644                  MOV     PCSR,R1          ;GET CSR
1583  017540  005737  002660                  TST     PCLOCK           ;USING THE P-CLOCK?
1584  017544  001404                          BEQ     6$               ;BRANCH - IF NO
1585  017546  012711  000014                  MOV     #14,(R1)         ;SET P-CLOCK,  REPEAT-INT,LINE FREQ.
1586  017552  005061  000002                  CLR     2(R1)            ;INIT COUNT BUFFER REGISTER
1587  017556  004537  015056          6$:     JSR     R5,LDFUNC        ;LOAD THE FUNCTION IN THE NEXT WORD
1588  017562  000112                          WRITE.INTEN              ;WRITE UNDER INTERRUPT
1589  017564  013700  002664                  MOV     OPITIM,R0        ;GET OPIMX TO CALCULATE TIME EXPIRED
1590  017570  052711  000101                  BIS     #101,(R1)        ;ENABLE CLOCK
1591  017574  005737  002664          40$:    TST     OPITIM           ;COUNT EXPIRED?
1592  017600  001446                          BEQ     4$               ;BRANCH - IF YES
1593  017602  005737  002256                  TST     INTFLG           ;INTERRUPT OCCURED?
1594  017606  001772                          BEQ     40$              ;BRANCH - IF NO
1595  017610  005437  002664                  NEG     OPITIM           ;GET NEGATIVE OF FACTOR FOR SUBTRACTION
1596  017614  060037  002664                  ADD     R0,OPITIM        ;SUBTRACT PASSING TIME FROM ORIGINAL
1597  017620  013700  002664                  MOV     OPITIM,R0        ;GET TIME EXPIRED
1598  017624  005737  002656                  TST     SIXTY            ;60 HZ.?
1599  017630  001405                          BEQ     9$               ;BRANCH - IF NO
1600  017632  006300                          ASL     R0               ;MULTIPLY BY 16(10)
1601  017634  006300                          ASL     R0               ;FOR
1602  017636  006300                          ASL     R0               ;60 HZ.
1603  017640  006300                          ASL     R0               ;CASE
1604  017642  000410                          BR      2$               ;EXIT
1605  017644  006300                  9$:     ASL     R0               ;MULTIPLY BY 20(10)
1606  017646  006300                          ASL     R0               ;FOR
1607  017650  006300                          ASL     R0               ;THE
1608  017652  006300                          ASL     R0               ;50 HZ.
1609  017654  063700  002664                  ADD     OPITIM,R0        ;CASE
1610  017660  063700  002664                  ADD     OPITIM,R0        ;STOP HERE
1611
1612                                  ;CHECK THAT OPI TIME IS WITHIN LIMITS
1613
1614  017664  010037  002302          2$:     MOV     R0,BDDAT         ;SAVE EXPIRED TIME
1615  017670                                  SETPRI  #PRI07
 (3)  017670  012700  000340                  MOV     #PRI07,R0
 (3)  017674  104441                          TRAP    C$SPRI
1616  017676  023737  002414  002302          CMP     OPIMX,BDDAT      ;IS IT WITHIN LIMITS
1617  017704  002404                          BLT     4$               ;NO, REPORT ERROR
1618  017706  023737  002412  002302          CMP     OPIMN,BDDAT      ;WITHIN LIMITS
1619  017714  003404                          BLE     5$               ;YES
1620  017716                          4$:     ERRDF   974.,EM56,ERR13  ;OPI TIMING INCORRECT
 (4)  017716  104455                          TRAP    C$ERDF
 (5)  017720  001716                          .WORD   974
 (5)  017722  007033                          .WORD   EM56
 (5)  017724  010346                          .WORD   ERR13
1621  017726                          5$:     CLRVEC  BVEC             ;CLEAR PRESENT VECTOR
 (3)  017726  013700  002366                  MOV     BVEC,R0
 (3)  017732  104436                          TRAP    C$CVEC
1622  017734                                  SETVEC  BVEC,#INTSRV,#340        ;SET IN OLD VECTOR
 (7)  017734  012746  000340                  MOV     #340,-(SP)
 (6)  017740  012746  014466                  MOV     #INTSRV,-(SP)
 (5)  017744  013746  002366                  MOV     BVEC,-(SP)
 (4)  017750  012746  000003                  MOV     #3,-(SP)
 (3)  017754  104437                          TRAP    C$SVEC
 (2)  017756  062706  000010                  ADD     #10,SP
1623  017762                                  ENDSEG                   ;%%END OF SEGMENT%%
```

```
CZRLHB0 RL11/RLV11 CTLR TST 2   MACY11 30A(1052)  17-DEC-79  13:44  PAGE 1-43
CZRLHB.MAC    07-DEC-79 08:12          **TEST 7** - CHECK OPI TIME WITH HDR NT FND
                                       .
  (3)  017762                          10000$:
  (3)  017762  104405                          TRAP    C$ESEG
1624   017764  005037  002652          8$:     CLR     XITFLG          ;INIT EXIT FLAG
1625   01777C  005037  002656                  CLR     SIXTY           ;INIT 60 HZ. FLAG
1626   017774  005037  002660                  CLR     PCLOCK          ;INIT PCLOCK INDICATOR
1627
1628   020000                          ENDTST                          ;**END OF TEST**
  (3)  020000                          L10041:
  (3)  020000  104401                          TRAP    C$ETST
1629
1630
1631                                   .SBTTL  **TEST 8** - MULTIPLE SECTOR TRANSFER ON WRITE
1632
1633   020002                          BGNTST                                  ;**START OF TEST**
1634
1635   020002                          STARS
  (2)                                  ;;*****************************************************************
1636                                   ;CHECK FOR MULTIPLE SECTOR TRANSFER ON WRITE. THIS TEST CHECKS
1637                                   ;THAT TWO SECTORS CAN BE SUCCESSFULLY WRITTEN.  WE LOAD
1638                                   ;A WORD COUNT (  129 WORDS (ONE SECTOR + 1 WORD) STARTING AT
1639                                   ;SECTOR 0 THR    CTOR 37 AND VERIFY THAT THE RLDA DOES
1640                                   ;A DOUBLE INCREMENT EACH TIME.
1641   020002                          STARS
  (2)                                  ;;*****************************************************************
1642
1643
1644
1645   020002  004737  015766                  JSR     PC,HDHOME       ;HEADS OVER TRACK 0
1646   020006                          CKERFG                          ;HEADS GO HOME OKAY
  (4)  020014  104432                          TRAP    C$EXIT
  (4)  020016  000152                          .WORD   L10042-.
1647
1648   020020  005037  002272                  CLR     TMP0            ;CLEAR TEMP LOCATIONS
1649   020024  005037  002274                  CLR     TMP1
1650
1651   020030                          BGNSEG                                  ;%%START OF SEGMENT%%
  (3)  020030  104404                          TRAP    C$BSEG
1652
1653
1654   020032  013737  002274  002300  1$:     MOV     TMP1,GDDAT      ;GET CYLINDER
1655   020040  053737  002272  002300          BIS     TMP0,GDDAT      ;GET SECTOR
1656   020046  013777  002300  162304          MOV     GDDAT,@RLDA     ;SET DISK ADDRESS-SECTOR 0
1657   020054  062737  000002  002300          ADD     #2,GDDAT        ;SET EXPECTED + 2
1658   020062  012777  003426  162266          MOV     #BUF,@RLBA      ;SET BUS ADDRESS
1659   020070  012777  177577  162264          MOV     #-129.,@RLMP    ;WORD COUNT-SECTOR+1 WORD
1660
1661   020076  004537  015056                  JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
1662   020102  000012                          WRITE                   ;WRITE
1663   020104  004537  015702                  JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY?
1664   020110                                  ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
  (3)  020110  104410                          TRAP    C$ESCAPE
  (3)  020112  000054                          .WORD   10000$-.
1665
1666   020114  004537  014614                  JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
1667   020120                                  ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
  (3)  020120  104410                          TRAP    C$ESCAPE
```

```
  (3)  020122  000044                          .WORD   10000$-.
1668
1669  020124  013737  002344  002302          MOV     E.DA,BDDAT      ;READ DISK ADDRESS
1670  020132  023737  002302  002300          CMP     BDDAT,GDDAT     ;IS DISK ADDRESS CORRECT
1671  020140  001404                          BEQ     2$              ;YES, BRANCH  NO, REPORT ERROR
1672
1673  020142  .                               ERRDF   7.,EM22,ERR4    ;DISK ADDRESS NOT CORRECT
  (4)  020142  104455                         TRAP    C$ERDF
  (5)  020144  000007                         .WORD   7
  (5)  020146  005461                         .WORD   EM22
  (5)  020150  007654                         .WORD   ERR4
1674
1675  020152                          2$:
1676
1677  020152  005237  002272                  INC     TMP0            ;NEXT SECTOR
1678  020156  022737  000046  002272          CMP     #46,TMP0        ;AT END?
1679  020164  001322                          BNE     1$              ;NO, GO BACK
1680
1681  020166                                  ENDSEG                          ;%%END OF SEGMENT%%
  (3)  020166                          10000$:
  (3)  020166  104405                         TRAP    C$ESEG
1682  020170                          ENDTST                          ;**END OF TEST**
  (3)  020170                          L10042:
  (3)  020170  104401                         TRAP    C$ETST
1683
1684                                  .SBTTL  **TEST 9** - CHECK DIRECTION OF WRITE NPR
1685
1686  020172                          BGNTST                          ;**START OF TEST**
1687
1688  020172                          STARS
  (2)                                 ;;**************************************************************
1689                                  ;VERIFY THAT A WRITE IS WRITING NOT READING.  WE WRITE A
1690                                  ;KNOWN PATTERN IN 'BUF' (128 WORD), WE THEN ISSUE A WRITE.
1691                                  ;ONCE THE WRITE IS FINISHED WE CHECK THAT 'BUF' IS INTACT.
1692                                  ;THIS IS DONE TO PROVE THAT THE NPR IS GOING THE RIGHT
1693                                  ;WAY.
1694  020172                          STARS
  (2)                                 ;;**************************************************************
1695
1696
1697  020172  004737  015766                  JSR     PC,HDHOME       ;HEADS OVER TRACK 0
1698  020176                                  CKERFG                  ;HEADS GO HOME OKAY
  (4)  020204  104432                         TRAP    C$EXIT
  (4)  020206  000160                         .WORD   L10043-.
1699
1700  020210                                  BGNSEG                          ;%%START OF SEGMENT%%
  (3)  020210  104404                         TRAP    C$BSEG
1701
1702  020212                          2$:
1703  020212  012702  003426                  MOV     #BUF,R2         ;WRITE BUFFER FOR WRITE OPERATION
1704  020216  012701  000200                  MOV     #128.,R1        ;ONE SECTOR'S WORTH
1705  020222  012722  125252          3$:     MOV     #125252,(R2)+   ;WRITE BUFFER
1706  020226  005301                          DEC     R1              ;DONE?
1707  020230  001374                          BNE     3$              ;NO, GO BACK
1708
1709  020232  005077  162122                  CLR     @RLDA           ;LOAD DISK ADDRESS
```

```
1710  020236  012777  177600  162116          MOV     #-128.,@RLMP    ;WORD COUNT
1711  020244  012777  003426  162104          MOV     #BUF,@RLBA      ;BUS ADDRESS
1712  020252  004537  015056                  JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
1713  020256  000012                          WRITE                   ;WRITE SOME DATA
1714  020260  004537  015702                  JSR     R5,WTCRDY       ;WAIT FOR IT TO FINISH
1715  020264                                  ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  020264  104410                          TRAP    C$ESCAPE
 (3)  020266  000076                          .WORD   10000$-.
1716
1717  020270  004537  014614                  JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
1718  020274                                  ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  020274  104410                          TRAP    C$ESCAPE
 (3)  020276  000066                          .WORD   10000$-.
1719
1720  020300  012702  003426                  MOV     #BUF,R2         ;SET UP TO CHECK BUFFER
1721  020304  012701  000200                  MOV     #128.,R1        ;CHECK 128 WORDS
1722
1723  020310                                  BGNSEG                          ;%%START OF SEGMENT%%
 (3)  020310  104404                          TRAP    C$BSEG
1724
1725  020312  012737  125252  002300          MOV     #125252,GDDAT   ;DATA SHOULD BE 125252
1726  020320  011237  002302          4$:     MOV     (R2),BDDAT      ;LOAD DATA INTO BDDAT
1727  020324  023737  002300  002302          CMP     GDDAT,BDDAT     ;IS IT OKAY?
1728  020332  001406                          BEQ     5$              ;YES, CONTINUE
1729
1730  020334  010237  002274                  MOV     R2,TMP1 ;LOAD MEMORY LOCATION OF FAILURE
1731  020340                                  ERRDF   8.,EM26,ERR8
 (4)  020340  104455                          TRAP    C$ERDF
 (5)  020342  000010                          .WORD   8
 (5)  020344  005710                          .WORD   EM26
 (5)  020346  010030                          .WORD   ERR8
1732
1733  020350                          5$:     ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  020350  104410                          TRAP    C$ESCAPE
 (3)  020352  000010                          .WORD   10001$-.
1734  020354  005722                  6$:     TST     (R2)+           ;NEXT!
1735  020356  005301                          DEC     R1              ;DONE?
1736  020360  001357                          BNE     4$              ;NO, GO BACK
1737
1738  020362                                  ENDSEG                          ;%%END OF SEGMENT%%
 (3)  020362                          10001$:
 (3)  020362  104405                          TRAP    C$ESEG
1739  020364                                  ENDSEG                          ;%%END OF SEGMENT%%
 (3)  020364                          10000$:
 (3)  020364  104405                          TRAP    C$ESEG
1740  020366                          ENDTST                          ;**END OF TEST**
 (3)  020366                          L10043:
 (3)  020366  104401                          TRAP    C$ETST
1741
1742                                    .SBTTL  **TEST 10** - CHECK FULL RLBA INCREMENT
1743
1744  020370                            BGNTST                          ;**START OF TEST**
1745
1746  020370                            $TARS
 (2)                                    ;*****************************************************************
1747                                    ;TEST THAT THE RLBA WILL INCREMENT, WE DO NOT DO A FULL 16
```

```
                        **TEST 10** - CHECK FULL RLBA INCREMENT

                        ;BIT INCREMENT WE CHECK THAT EACH BIT WILL TOGGLE 0 TO 1
                        ;AND 1 TO 0.  WE DO CHECK ALL BITS EVEN IF ALL MEMORY
                        ;IS NOT AVAILABLE.  (WE IGNORE NON-EXISTANT MEMORY ERRORS).
                        ;WE USE THE SAME DISK ADDRESS (RANDOM) AND A 1 WORD TRANSFER.
                        STARS
                        ;;*****************************************************************

020370                  JSR     PC,HDHOME       ;HEADS OVER TRACK 0
020374                  CKERFG                  ;HEADS GO HOME OKAY
020402  104432          TRAP    C$EXIT
020404  000134          .WORD   L10044-.
                        .

020406  000037 002274          CLR     TMP1            ;CLEAR LOCATION

020412                  BGNSEG                          ;%%START OF SEGMENT%%
020412  104404          TRAP    C$BSEG

020414                  3$:
020414  012777  177777  161740      MOV     #-1,@RLMP       ;ONLY ONE (1) WORD
020422  005077  161732              CLR     @RLDA           ;LOAD DISK ADDRESS
020426  013777  002274  161722      MOV     TMP1,@RLBA      ;BUS ADDRESS

020434  004537  015056          JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
020440  000012                  WRITE
020442  004537  015702          JSR     R5,WTCRDY       ;WAIT FOR WRITE TO FINISH
020446                          ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
020446  104410                  TRAP    C$ESCAPE
020450  000066                  .WORD   10000$-.

020452  013737  002274  002300  4$:     MOV     TMP1,GDDAT      ;SET UP EXPECTED RLBA
020460  062737  000002  002300          ADD     #2,GDDAT        ;PREVIOUS RLBA+2
020466  013737  002342  002302          MOV     E.BA,BDDAT      ;READ RLBA
020474  023737  002300  002302          CMP     GDDAT,BDDAT     ;WAS IT UPDATED PROPERLY?
020502  001404                          BEQ     5$              ;YES, CONTINUE

020504                          ERRDF   9.,EM30,ERR4    ;BA INCREMENT ERROR
020504  104455                  TRAP    C$ERDF
020506  000011                  .WORD   9
020510  006005                  .WORD   EM30
020512  007654                  .WORD   ERR4
020514                  5$:     ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
020514  104410                  TRAP    C$ESCAPE
020516  000020                  .WORD   10000$-.

020520  006337  002274          ASL     TMP1            ;NEXT PATTERN TO TEST RLBA
020524  103404                  BCS     6$              ;DONE?
020526  052737  000002  002274  BIS     #BIT1,TMP1      ;NO, SET IN BIT 1
020534  000727                  BR      3$              ;GO CHECK NEXT.

020536                  6$:                             ;END TEST

020536                          ENDSEG                          ;%%END OF SEGMENT%%
020536                  10000$:
020536  104405                  TRAP    C$ESEG
```

```
                        **TEST 10** - CHECK FULL RLBA INCREMENT

1790  020540                        ENDTST                                  ;**END OF TEST**
 (3)  020540                        L10044:
 (3)  020540  104401                        TRAP    C$ETST
1791
1792                                .SBTTL  **TEST 11** - BA BIT 16 INCREMENT
1793
1794  020542                        BGNTST                                  ;**START OF TEST**
1795
1796  020542                        STARS
 (2)                                ;;*****************************************************************
1797                                ;CHECK THAT BA BIT 16 WILL INCREMENT.  WE WILL LOAD THE
1798                                ;RLBA WITH 177776 AND ISSUE A ONE WORD WRITE WE THEN
1799                                ;CHECK BA BIT 16 TO SET, BA 17 TO STAY A 0 AND THE RLBA
1800                                ;TO GO TO ZERO
1801  020542                        STARS
 (2)                                ;;*****************************************************************
1802
1803
1804  020542  004737  015766                JSR     PC,HDHOME       ;HEADS OVER TRACK 0
1805  020546                                CKERFG                  ;HEADS GO HOME OKAY
 (4)  020554  104432                        TRAP    C$EXIT
 (4)  020556  000160                        .WORD   L10045-.
1806
1807  020560                                BGNSEG                          ;%%START OF SEGMENT%%
 (3)  020560  104404                        TRAP    C$BSEG
1808
1809  020562                        2$:
1810  020562  012777  177776  161566        MOV     #177776,@RLBA   ;SET MAX BA TO INC. BA16
1811  020570  005037  002374                CLR     XMEM            ;WE DON'T WANT TO LOAD ANY EA
1812  020574  012777  177777  161560        MOV     #-1,@RLMP       ;ONE WORD TRANSFER
1813  020602  005077  161552                CLR     @RLDA
1814  020606  004537  015056                JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
1815  020612  000012                        WRITE
1816  020614  004537  015702                JSR     R5,WTRDY        ;WAIT FOR WRITE TO FINISH
1817  020620                                ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  020620  104410                        TRAP    C$ESCAPE
 (3)  020622  000112                        .WORD   10000$-.
1818  020624  032737  020000  002340        BIT     #NXM,E.CS       ;NON-EXISTANT MEMORY ERROR?
1819  020632  001002                        BNE     3$              ;YES, CONTINUE
1820
1821  020634  004537  014614                JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
1822  020640                        3$:     ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  020640  104410                        TRAP    C$ESCAPE
 (3)  020642  000072                        .WORD   10000$-.
1823
1824  020644  032737  000020  002340        BIT     #BA16,E.CS      ;DID BA16 SET?
1825  020652  001004                        BNE     4$              ;YES, CONTINUE
1826
1827  020654                                ERRDF   10.,EM31,ERR0   ;BA 16 DID NOT INCREMENT
 (4)  020654  104455                        TRAP    C$ERDF
 (5)  020656  000012                        .WORD   10
 (5)  020660  006040                        .WORD   EM31
 (5)  020662  007510                        .WORD   ERR0
1828
1829  020664                        4$:     CKLOOP
 (3)  020664  104406                        TRAP    C$CLP1
```

```
 1830
 1831  020666  032737  000040  002340          BIT     #BA17,E.CS      ;DID BA17 SET ALSO?
 1832  020674  001404                          BEQ     5$              ;NO, GOOD CONTINUE
 1833
 1834  020676                                  ERRDF   11.,EM32,ERR0   ;BA 17 GOT CARRIED AWAY
  (4)  020676  104455                          TRAP    C$ERDF
  (5)  020700  000013                          .WORD   11
  (5)  020702  006076                          .WORD   EM32
  (5)  020704  007510                          .WORD   ERR0
 1835
 1836  020706                          5$:     CKLOOP
  (3)  020706  104406                          TRAP    C$CLP1
 1837
 1838  020710  005037  002300                    CLR     GDDAT           ;CHECK THAT BA15-BA0 IS CLEAR
 1839  020714  013737  002342  002302          MOV     E.BA,BDDAT      ;READ BA
 1840  020722  001404                          BEQ     6$              ;IS BA ZERO?
 1841  020724                                  ERRDF   12.,EM33,ERR4   ;BA SHOULD BE ZERO
  (4)  020724  104455                          TRAP    C$ERDF
  (5)  020726  000014                          .WORD   12
  (5)  020730  006135                          .WORD   EM33
  (5)  020732  007654                          .WORD   ERR4
 1842
 1843  020734                          6$:                             ;
 1844
 1845  020734                                  ENDSEG                          ;%%END OF SEGMENT%%
  (3)  020734                          10000$:
  (3)  020734  104405                          TRAP    C$ESEG
 1846  020736                          ENDTST                          ;**END OF TEST**
  (3)  020736                          L10045:
  (3)  020736  104401                          TRAP    C$ETST
 1847
 1848                                  .SBTTL  **TEST 12** - BA BIT 17 INCREMENT
 1849
 1850  020740                          BGNTST                          ;**START OF TEST**
 1851
 1852  020740                          STARS
  (2)                                 ;;**********************************************************************
 1853                                 ;CHECK THAT BA BIT 17 WILL INCREMENT.  WE WILL LOAD THE
 1854                                 ;RLBA WITH 177776 AND BA 16 SET, WE WILLISSUE A ONE WORD
 1855                                 ;WRITE.  WE THEN CHECK BA17 TO SET, BA16 TO CLEAR AND
 1856                                 ;BA15 - BA0 TO CLEAR.
 1857  020740                          STARS
  (2)                                 ;;**********************************************************************
 1858
 1859  020740  004737  015766                  JSR     PC,HDHOME       ;HEADS OVER TRACK 0
 1860  020744                                  CKERFG                  ;HEADS GO HOME OKAY
  (4)  020752  104432                          TRAP    C$EXIT
  (4)  020754  000162                          .WORD   L10046-.
```

```
1862
1863  020756                                    BGNSEG                          ;%%START OF SEGMENT%%
 (3)  020756  104404                            TRAP    C$BSEG
1864
1865  020760                              2$:
1866  020760  012777  177776  161370          MOV     #177776,@RLBA   ;SET MAX BA TO INC. BA16
1867  020766  012737  000020  002374          MOV     #BA16,XMEM      ;SET BA16 IN RLCS
1868  020774  012777  177777  161360          MOV     #-1,@RLMP       ;ONE WORD TRANSFER
1869  021002  005077  161352                  CLR     @RLDA
1870  021006  004537  015056                  JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
1871  021012  000012                          WRITE
1872  021014  004537  015702                  JSR     R5,WTCRDY       ;WAIT FOR WRITE TO FINISH
1873  021020                                   ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  021020  104410                            TRAP    C$ESCAPE
 (3)  021022  000112                            .WORD   10000$-.
1874  021024  032737  020000  002340          BIT     #NXM,E.CS       ;NON-EXISTANT MEMORY ERROR?
1875  021032  001002                          BNE     3$              ;YES, CONTINUE
1876
1877  021034  004537  014614                  JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
1878  021040                              3$:  ESCAPE  SEG             ;CHFCK FOR FL:LOE, ELSE EXIT SEG
 (3)  021040  104410                            TRAP    C$ESCAPE
 (3)  021042  000072                            .WORD   10000$-.
1879
1880  021044  032737  000040  002340          BIT     #BA17,E.CS      ;DID BA17 SET?
1881  021052  001004                          BNE     4$              ;YES, CONTINUE
1882
1883  021054                                   ERRDF   13.,EM34,ERR0   ;BA 17 DID NOT SET
 (4)  021054  104455                            TRAP    C$ERDF
 (5)  021056  000015                            .WORD   13
 (5)  021060  006171                            .WORD   EM34
 (5)  021062  007510                            .WORD   ERR0
1884
1885  021064                              4$:  CKLOOP
 (3)  021064  104406                            TRAP    C$CLP1
1886
1887  021066  032737  000020  002340          BIT     #BA16,E.CS      ;DID BA16 SET ALSO?
1888  021074  001404                          BEQ     5$              ;NO, GOOD CONTINUE
1889
1890  021076                                   ERRDF   14.,EM35,ERR0   ;BA 16 DIDN'T KNOW WHEN TO QUIT.
 (4)  021076  104455                            TRAP    C$ERDF
 (5)  021100  000016                            .WORD   14
 (5)  021102  006227                            .WORD   EM35
 (5)  021104  007510                            .WORD   ERR0
1891  021106                              5$:  CKLOOP
 (3)  021106  104406                            TRAP    C$CLP1
1892
1893  021110  005037  002300                  CLR     GDDAT           ;CHECK THAT BA15-BA0 IS CLEAR
1894  021114  013737  002342  002302          MOV     E.BA,BDDAT      ;READ BA
1895  021122  001404                          BEQ     6$              ;IS BA ZERO?
1896  021124                                   ERRDF   15.,EM36,ERR4   ;BA SHOULD BE ZERO
 (4)  021124  104455                            TRAP    C$ERDF
 (5)  021126  000017                            .WORD   15
 (5)  021130  006265                            .WORD   EM36
 (5)  021132  007654                            .WORD   ERR4
1897
1898  021134                              6$:                          ;
```

```
1899
1900  021134                                ENDSEG                          ;%%END OF SEGMENT%%
 (3)  021134                          10000$:
 (3)  021134  104405                          TRAP    C$ESEG
1901  021136                          ENDTST                              ;**END OF TEST**
 (3)  021136                          L10046:
 (3)  021136  104401                          TRAP    C$ETST
1902
1903
1904                                  .SBTTL  **TEST 13** - READ FUNCTION
1905
1906  021140                          BGNTST                              ;**START OF TEST**
1907
1908  021140                          STARS
 (2)                                  ;;******************************************************************
1909                                  ;CHECK OF THE READ FUNCTION.  WE WILL FIRST DO A READ
1910                                  ;HEADER TO FIND OUT WHERE WE ARE AND THEN ISSUE
1911                                  ;A FULL SECTOR READ, WAIT FOR READY AND CHECK FOR
1912                                  ;ANY ERRORS
1913  021140                          STARS
 (2)                                  ;;******************************************************************
1914
1915
1916  021140  004737  015766                  JSR     PC,HDHOME       ;HEADS OVER TRACK 0
1917  021144                          CKERFG                          ;HEADS GO HOME OKAY
 (4)  021152  104432                          TRAP    C$EXIT
 (4)  021154  000064                          .WORD   L10047-.
1918
1919  021156                                  BGNSEG                          ;%%START OF SEGMENT%%
 (3)  021156  104404                          TRAP    C$BSEG
1920
1921  021160  012737  001750  002272          MOV     #1000.,TMP0
1922  021166  005077  161166          1$:     CLR     @RLDA           ;LOAD DISK ADDRESS
1923  021172  012777  177600  161162          MOV     #-128.,@RLMP    ;SET WORD LENGTH
1924  021200  012777  003426  161150          MOV     #BUF,@RLBA      ;SET BUS ADDRESS
1925
1926  021206  004537  015056                  JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
1927  021212  000014                          READ                    ;READ
1928  021214  004537  015702                  JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY
1929  021220                                  ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  021220  104410                          TRAP    C$ESCAPE
 (3)  021222  000014                          .WORD   10000$-.
1930
1931  021224  004537  014614                  JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
1932
1933  021230  005337  002272                  DEC     TMP0
1934  021234  001354                          BNE     1$
1935  021236                                  ENDSEG                          ;%%END OF SEGMENT%%
 (3)  021236                          10000$:
 (3)  021236  104405                          TRAP    C$ESEG
1936  021240                          ENDTST                              ;**END OF TEST**
 (3)  021240                          L10047:
 (3)  021240  104401                          TRAP    C$ETST
1937
1938                                  .SBTTL  **TEST 14** - READ FUNCTION INTERRUPT
1939
```

```
1940  021242                          BGNTST                                  ;**START OF TEST**
1941
1942  021242                          STARS
 (2)                                  ;;*****************************************************************
1943                                  ;CHECK OF THE READ FUNCTION UNDER INTERRUPT CONTROL, WE WILL
1944                                  ;ISSUE A READ HEADER TO GET POSITION AND THEN READ
1945                                  ;A FULL SECTOR WAITING FOR THE INTERRUPT.  CHECK FOR
1946                                  ;ERRORS ON INTERRUPT.
1947  021242                          STARS
 (2)                                  ;;*****************************************************************
1948
1949
1950  021242  004737  015766                  JSR     PC,HDHOME       ;HEADS OVER TRACK 0
1951  021246                          CKERFG                          ;HEADS GO HOME OKAY
 (4)  021254  104432                  TRAP    C$EXIT
 (4)  021256  000106                  .WORD   L10050-.
1952
1953  021260                          BGNSEG                                  ;%%START OF SEGMENT%%
 (3)  021260  104404                  TRAP    C$BSEG
1954
1955  021262  005037  002256          CLR     INTFLG          ;CLEAR INTERRUPT INDICATOR
1956  021266  005077  161066          CLR     @RLDA           ;SET DISK ADDRESS
1957  021272  012777  177600  161062  MOV     #-128.,@RLMP    ;SET UP WORD COUNT
1958  021300  012777  003426  161050  MOV     #BUF,@RLBA      ;SET UP BUS ADDRESS
1959
1960  021306                          SETPRI  #PRI00          ;PRIORITY TO 0
 (3)  021306  012700  000000          MOV     #PRI00,R0
 (3)  021312  104441                  TRAP    C$SPRI
1961  021314  004537  015056          JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
1962  021320  000114                  READ!INTEN              ;READ UNDER INTERRUPT
1963  021322  004537  015702          JSR     R5,WTCRDY       ;WAIT FOR INTERRUPT
1964  021326                          CKLOOP
 (3)  021326  104406                  TRAP    C$CLP1
1965  021330                          SETPRI  #PRI07          ;PRIORITY TO 7
 (3)  021330  012700  000340          MOV     #PRI07,R0
 (3)  021334  104441                  TRAP    C$SPRI
1966
1967  021336  005737  002256          TST     INTFLG          ;DID INTERRUPT OCCUR?
1968  021342  001004                  BNE     1$              ;YES-BRANCH NO-REPORT
1969
1970  021344                          ERRDF   19.,EM4,ERR0    ;READ DID NOT INTERRUPT
 (4)  021344  104455                  TRAP    C$ERDF
 (5)  021346  000023                  .WORD   19
 (5)  021350  004712                  .WORD   EM4
 (5)  021352  007510                  .WORD   ERR0
1971  021354                  1$:     CKLOOP                  ;CHECK FOR LOOP
 (3)  021354  104406                  TRAP    C$CLP1
1972
1973  021356  004537  014614          JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
1974
1975  021362                          ENDSEG                          ;%%END OF SEGMENT%%
 (3)  021362                  10000$:
 (3)  021362  104405                  TRAP    C$ESEG
1976  021364                  ENDTST                                  ;**END OF TEST**
 (3)  021364                  L10050:
 (3)  021364  104401                  TRAP    C$ETST
```

```
                                .SBTTL  **TEST 15** - CHECK READ NPR DIRECTION

021366                          BGNTST                                  ;**START OF TEST**

021366                          STARS
 (2)                            ;;*****************************************************************
                                ;CHECK THAT THE READ FUNCTION ACTUALLY READS (INTO MEMORY)
                                ;WE WILL WRITE A PATTERN INTO MEMORY AND THEN ISSUE
                                ;A READ TO OVERLAY THAT PATTERN.  AFTER THE READ
                                ;WE CHECK TO SEE IF THE WRITTEN PATTERN HAS CHANGED.
                                ;IF NOT WE ISSUE IT AGAIN AT THE SAME SECTION AFTER
                                ;HAVING MODIFIED OUR PATTERN IN MEMORY (SINCE THERE IS
                                ;ONE CHANCE THAT THE DISK COULD HAVE OUR PATTERN).  AFTER
                                ;THE SECOND READ WE CHECK THE BUFFER AGAIN.  IF IT'S
                                ;WO CHANGED WE REPORT AN ERROR
021366                          STARS
 (2)                            ;;*****************************************************************

021366  004737  015766          JSR     PC,HDHOME       ;HEADS OVER TRACK 0
021372                          CKERFG                  ;HEADS GO HOME OKAY
 (4)    021400  104432          TRAP    C$EXIT
 (4)    021402  000156          .WORD   L10051-.

021404                          BGNSEG                          ;%%START OF SEGMENT%%
 (3)    021404  104404          TRAP    C$BSEG

021406  012737  123456  002272  MOV     #123456,TMP0    ;SET PATTERN TO WRITE
021414  005037  002274          CLR     TMP1            ;CLEAR PASS INDICATOR
021420  012700  003426  1$:     MOV     #BUF,R0         ;SET UP BUFFER BEGINNING
021424  012701  000200          MOV     #128.,R1
021430  013720  002272  2$:     MOV     TMP0,(R0)+      ;WRITE BUFFER
021434  005301                  DEC     R1              ;DONE??
021436  001374                  BNE     2$              ;NO, GO BACK
021440  005077  160714          CLR     @RLDA           ;LOAD DISK ADDRESS
021444  012777  177600  160710  MOV     #-128.,@RLMP    ;SET WORD COUNT
021452  012777  003426  160676  MOV     #BUF,@RLBA      ;LOAD BUS ADDRESS
021460  012737  003426  002300  MOV     #BUF,GDDAT      ;FOR ERROR PRINT

021466  004537  015056          JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
021472  000014                  READ                    ;READ
021474  004537  015702          JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY
021500                          ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)    021500  104410          TRAP    C$ESCAPE
 (3)    021502  000054          .WORD   10000$-.

021504  004537  014614          JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
021510                          FSCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)    021510  104410          TRAP    C$ESCAPE
 (3)    021512  000044          .WORD   10000$-.

021514  012702  003426          MOV     #BUF,R2         ;SET TO START COMPARING DATA
021520  022237  002272  4$:     CMP     (R2)+,TMP0      ;DID DATA CHANGE?
021524  001014                  BNE     6$              ;YES, CHECK FOR END
                                ;
```

```
2024
2025                                                        ;DATA DIDN'T CHANGE, CHECK
2026  021526  005737  002274          TST     TMP1          ;IF 1ST OR 2ND TIME?
2027  021532  001005                  BNE     5$            ;2ND-REPORT 1ST-TRY AGAIN
2028
2029  021534  005237  002274          INC     TMP1          ;INC PASS COUNT
2030  021540  005137  002272          COM     TMP0          ;COMPLIMENT PATTERN
2031  021544  000725                  BR      1$            ;GO DO IT AGAIN
2032
2033  021546                    5$:     ERRDF   20.,EM5,ERR9  ;READ DID NOT MODIFY MEMORY
 (4)  021546  104455                  TRAP    C$ERDF
 (5)  021550  000024                  .WORD   20
 (5)  021552  004735                  .WORD   EM5
 (5)  021554  010102                  .WORD   ERR9
2034
2035  021556                    6$:
2036
2037  021556                          ENDSEG                ;%%END OF SEGMENT%%
 (3)  021556                    10000$:
 (3)  021556  104405                  TRAP    C$ESEG
2038  021560                    ENDTST                      ;**END OF TEST**
 (3)  021560                    L10051:
 (3)  021560  104401                  TRAP    C$ETST
2039
2040                            .SBTTL  **TEST 16** - PROPER INCREMENT OF RLBA ON READ
2041
2042  021562                    BGNTST                      ;**START OF TEST**
2043
2044  021562                    STARS
 (2)                            ;;*****************************************************************
2045                            ;CHECK THAT THE RLBA WILL INCREMENT WITH THE READ
2046                            ;THE RLBA SHOULD CONTAIN 'BUF +256.' AFTER A FULL SECTOR
2047                            ;READ.
2048  021562                    STARS
 (2)                            ;;*****************************************************************
2049
2050
2051  021562  004737  015766          JSR     PC,HDHOME     ;HEADS OVER TRACK 0
2052  021566                          CKERFG                ;HEADS GO HOME OKAY
 (4)  021574  104432                  TRAP    C$EXIT
 (4)  021576  000116                  .WORD   L10052-.
2053
2054  021600                          BGNSEG                ;%%START OF SEGMENT%%
 (3)  021600  104404                  TRAP    C$BSEG
2055
2056  021602  005077  160552          CLR     @RLDA         ;SET UP DISK ADDRESS
2057  021606  012777  003426  160542  MOV     #BUF,@RLBA    ;SET UP BUS ADDRESS
2058  021614  012777  177600  160540  MOV     #-128.,@RLMP  ;WORD COUNT
2059  021622  012737  003426  002300  MOV     #BUF,GDDAT    ;FORM EXPECTED BUS ADDRESS
2060  021630  062737  000400  002300  ADD     #256.,GDDAT   ;AFTER READ
2061
2062  021636  004537  015056          JSR     R5,LDFUNC             ;LOAD THE FUNCTION IN NEXT WORD
2063  021642  000014                  READ                  ;READ
2064  021644  004537  015702          JSR     R5,WTCRDY     ;WAIT FOR CONTROLLER READY
2065  021650                          ESCAPE  SEG           ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  021650  104410                  TRAP    C$ESCAPE
```

```
  (3)  021652  000040                          .WORD   10000$-.
2066
2067   021654  004537  014614                 JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
2068   021660                                  ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
  (3)  021660  104410                          TRAP    C$ESCAPE
  (3)  021662  000030                          .WORD   10000$-.
2069   021664  013737  002342  002302          MOV     E.BA,BDDAT      ;READ 'RLBA' FOR PRESENT ADDRESS
2070   021672  023737  002302  002300          CMP     BDDAT,GDDAT     ;DID 'BA' INCREMENT PROPERLY?
2071   021700  001404                          BEQ     1$              ;YES, CONTINUE
2072
2073   021702                                  ERRDF   21.,EM6,ERR4    ;BA DID NOT INCREMENT PROPERLY
  (4)  021702  104455                          TRAP    C$ERDF
  (5)  021704  000025                          .WORD   21
  (5)  021706  004763                          .WORD   EM6
  (5)  021710  007654                          .WORD   ERR4
2074
2075   021712                          1$:
2076
2077   021712                                  ENDSEG                          ;%%END OF SEGMENT%%
  (3)  021712                          10000$:
  (3)  021712  104405                          TRAP    C$ESEG
2078   021714                          ENDTST                                  ;**END OF TEST**
  (3)  021714                          L10052:
  (3)  021714  104401                          TRAP    C$ETST
2079
2080                                    .SBTTL  **TEST 17** - PROPER INCREMENT OF RLDA ON READ
2081
2082   021716                          BGNTST                                  ;**START OF TEST**
2083
2084   021716                          STARS
  (2)                                   ;;*****************************************************************
2085                                    ;CHECK THAT THE RLDA INCREMENTS BY ONE AFTER A
2086                                    ;FULL SECTOR READ, WE FIRST READ A HEADER TO FIND
2087                                    ;OUT WHERE WE ARE, THEN ISSUE A READ AFTER
2088                                    ;THE READ THE RLDA SHOULD BE RLDA (START) + 1
2089   021716                          STARS
  (2)                                   ;;*****************************************************************
2090
2091   021716  004737  015766                  JSR     PC,HDHOME       ;HEADS OVER TRACK 0
2092   021722                                  CKERFG                  ;HEADS GO HOME OKAY
  (4)  021730  104432                          TRAP    C$EXIT
  (4)  021732  000114                          .WORD   L10053-.
2093
2094   021734                                  BGNSEG                          ;%%START OF SEGMENT%%
  (3)  021734  104404                          TRAP    C$BSEG
2095
2096
2097   021736  005037  002300                  CLR     GDDAT
2098   021742  013777  002300  160410          MOV     GDDAT,@RLDA     ;SETUP DISK ADDRESS
2099   021750  005237  002300                  INC     GDDAT           ;CREATE EXPECTED SECTOR
2100   021754  012777  177600  160400          MOV     #-128.,@RLMP    ;WORD COUNT
2101   021762  012777  003426  160366          MOV     #BUF,@RLBA      ;SETUP BUS ADDRESS
2102
2103   021770  004537  015056                  JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
2104   021774  000014                          READ                    ;READ
2105   021776  004537  015702                  JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY
```

```
2106  022002                                ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  022002  104410                        TRAP    C$ESCAPE
 (3)  022004  000040                        .WORD   10000$-.
2107
2108  022006  004537  014614                JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
2109  022012                                ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  022012  104410                        TRAP    C$ESCAPE
 (3)  022014  000030                        .WORD   10000$-.
2110
2111  022016  013737  002344  002302        MOV     E.DA,BDDAT      ;READ DISK ADDRESS
2112  022024  023737  002300  002302        CMP     GDDAT,BDDAT     ;DID SECTOR INCREMENT PROPERLY
2113  022032  001404                        BEQ     1$              ;YES, BRANCH  NO, REPORT ERROR
2114
2115  022034                                ERRDF   22.,EM7,ERR4    ;DISK ADDRESS DID NOT INCREMENT
 (4)  022034  104455                        TRAP    C$ERDF
 (5)  022036  000026                        .WORD   22
 (5)  022040  005017                        .WORD   EM7
 (5)  022042  007654                        .WORD   ERR4
2116
2117  022044                          1$:
2118
2119  022044                                ENDSEG                          ;%%END OF SEGMENT%%
 (3)  022044                          10000$:
 (3)  022044  104405                        TRAP    C$ESEG
2120  022046                          ENDTST                                ;**END OF TEST**
 (3)  022046                          L10053:
 (3)  022046  104401                        TRAP    C$ETST
2121
2122                                  .SBTTL  **TEST 18** - FORCE HEADER NOT FOUND WITH READ
2123
2124  022050                          BGNTST                                ;**START OF TEST**
2125
2126  022050                          STARS
 (2)                                  ;;*****************************************************************
2127                                  ;FORCE HEADER NOT FOUND ERROR TO OCCUR.  THIS IS DONE
2128                                  ;BY SETTING SECTOR 40 OF THE RLDA AND ISSUING A
2129                                  ;READ.  SECTOR 40 DOES NOT EXIST ON THE RL01 PACK
2130                                  ;THEREFORE HDR NT FOUND SHOULD SET.
2131  022050                          STARS
 (2)                                  ;;*****************************************************************
2132
2133  022050  004737  015766                JSR     PC,HDHOME       ;HEADS OVER TRACK 0
2134  022054                                CKERFG                  ;HEADS GO HOME OKAY
 (4)  022062  104432                        TRAP    C$EXIT
 (4)  022064  000102                        .WORD   L10054-.
2135
2136  022066                                BGNSEG                          ;%%START OF SEGMENT%%
 (3)  022066  104404                        TRAP    C$BSEG
2137
2138
2139  022070  012777  000050  160262        MOV     #40.,@RLDA      ;INSURE NOT TO FIND HEADER BY
2140  022076  012777  003426  160252        MOV     #BUF,@RLBA      ;SETTING SECTOR 40 OF CYL. ADDR.
2141  022104  012777  177777  160250        MOV     #-1,@RLMP       ;WORD COUNT
2142
2143  022112  004537  015056                JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
2144  022116  000014                        READ                    ;READ
```

```
                        **TEST 18** - FORCE HEADER NOT FOUND WITH READ

2145  022120  004537  015702            JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY
2146  022124                            ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  022124  104410                    TRAP    C$ESCAPE
 (3)  022126  000036                    .WORD   10000$-.
2147
2148  022130  013737  002340  002272    MOV     E.CS,TMP0       ;GET RLCS
2149  022136  042737  001777  002272    BIC     #1777,TMP0      ;SAVE ERROR BITS
2150  022144  022737  112000  002272    CMP     #BIT15.BIT12.BIT10,TMP0  ;HDR NOT FOUND SET.
2151  022152  001404                    BEQ     1$              ;YES, CONTINUE
2152
2153  022154                            ERRDF   23.,EM10,ERR0   ;HEADER NOT FOUND WOULD NOT SET
 (4)  022154  104455                    TRAP    C$ERDF
 (5)  022156  000027                    .WORD   23
 (5)  022160  005064                    .WORD   EM10
 (5)  022162  007510                    .WORD   ERR0
2154
2155  022164                      1$:
2156                              ;
2157
2158  022164                            ENDSEG                          ;%%END OF SEGMENT%%
 (3)  022164                      10000$:
 (3)  022164  104405                    TRAP    C$ESEG
2159  022166                      ENDTST                                ;**END OF TEST**
 (3)  022166                      L10054:
 (3)  022166  104401                .    TRAP    C$ETST
2160
2161                              .SBTTL  **TEST 19** - FORCE HEADER NOT FOUND WITH READ INTERRUPT
2162
2163  022170                      BGNTST                                ;**START OF TEST**
2164
2165
2166  022170                      STARS
 (2)                              ;;*********************************************************************
2167                              ;TEST THAT HEADER NOT FOUND ERROR WILL GENERATE AN INTERRUPT
2168                              ;ON OCCURANCE.  HEADER NOT FOUND WILL BE FORCED BY SETTING
2169                              ;SECTOR 40 OF RLDA AND ISSUING A READ
2170  022170                      STARS
 (2)                              ;;************************** ************************************
2171
2172
2173  022170  004737  015766            JSR     PC,HDHOME       ;HEADS OVER TRACK 0
2174  022174                            CKERFG                  ;HEADS GO HOME OKAY
 (4)  022202  104432                    TRAP    C$EXIT
 (4)  022204  000142                    .WORD   L10055-.
2175
2176  022206                            BGNSEG                          ;%%START OF SEGMENT%%
 (3)  022206  104404                    TRAP    C$BSEG
2177
2178  022210                            SETPRI  #PRI00
 (3)  022210  012700  000000            MOV     #PRI00,R0
 (3)  022214  104441                    TRAP    C$SPRI
2179  022216  005037  002256            CLR     *NTFLG          ;CLEAR INTERRUPT OCCURANCE FLAG
2180  022222  012777  000050  160130    MOV     #40.,@RLDA      ;INSURE NOT TO FIND HEADER BY
2181  022230  012777  003426  160120    MOV     #BUF,@RLBA      ;SETTING SECTOR 40 OF CYL. ADDR.
2182  022236  012777  177777  160116    MOV     #-1,@RLMP       ;WORD COUNT
2183
```

```
2184  022244  004537  015056          JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
2185  022250  000114                  READ'INTEN                      ;READ
2186  022252  004537  015702          JSR     R5,WTCRDY               ;WAIT FOR CONTROLLER READY
2187  022256                          CKLOOP
 (3)  022256  104406                  TRAP    C$CLP1
2188  022260                          SETPRI  #PRI07
 (3)  022260  012700  000340          MOV     #PRI07,R0
 (3)  022264  104441                  TRAP    C$SPRI
2189
2190  022266  005737  002256          TST     INTFLG                  ;DID INTERRUPT OCCUR
2191  022272  001004                  BNE     2$                      ;YES
2192
2193  022274                          ERRDF   24.,EM43,ERR0           ;HNF DID NOT INTERRUPT
 (4)  022274  104455                  TRAP    C$ERDF
 (5)  022276  000030                  .WORD   24
 (5)  022300  006461                  .WORD   EM43
 (5)  022302  007510                  .WORD   ERR0
2194
2195  022304                  2$:     ESCAPE  SEG                     ;CHECK FOR FL:LOE, EL - EXIT SEG
 (3)  022304  104410                  TRAP    C$ESCAPE
 (3)  022306  000036                  .WORD   10000$-.
2196
2197
2198  022310  013737  002340  002272  MOV     E.CS,TMP0               ;GET RLCS
2199  022316  042737  001777  002272  BIC     #1777,TMP0              ;SAVE ERROR BITS
2200  022324  022737  112000  002272  CMP     #BIT15!BIT12!BIT10,TMP0 ;WDR NOT FOUND SET.
2201  022332  001404                  BEQ     1$                      ;YES, CONTINUE
2202
2203  022334                          ERRDF   25.,EM10,ERR0
 (4)  022334  104455                  TRAP    C$ERDF
 (5)  022336  000031                  .WORD   25
 (5)  022340  005064                  .WORD   EM10
 (5)  022342  007510                  .WORD   ERR0
2204                                                                    ;WHEN FORCED
2205  022344                  1$:
2206
2207  022344                          ENDSEG                          ;%%END OF SEGMENT%%
 (3)  022344                  10000$:
 (3)  022344  104405                  TRAP    C$ESEG
2208  022346                  ENDTST                                  ;**END OF TEST**
 (3)  022346                  L10055:
 (3)  022346  104401                  TRAP    C$ETST
2209
2210                            .SBTTL  **TEST 20** - CHECK HEADER COMPARE LOGIC
2211
2212  022350                    BGNTST                                ;**START OF TEST**
2213
2214  022350                    STARS
 (2)                            ;;*****************************************************************
2215                            ;CHECK THE HEADER COMPARE LOGIC WORKS.  UP TO THIS POINT WE
2216                            ;KNOW THAT THE LOGIC FUNCTIONS PROPERLY BUT NOW WE WILL
2217                            ;CHECK ALL THE BITS IN THE HEADER WORD.  FOUR PATTERNS
2218                            ;ARE USED A WALKING 1, GROWING 1, WALKING 0, GROWING 0.  A SEEK
2219                            ;IS ISSUED BEFORE EACH READ TO INSURE WE ARE ON THE PROPER
2220                            ;TRACK.  ONCE WE ARE ON THE RIGHT TRACKWE LOAD THE RLDA
2221                            ;AND ISSUE THE READ.  UPON COMPLETION WE WILL CHECK FOR ERRORS
```

```
                        ;WE THEN LOAD THE COMPLEMENT PATTERN INTO THE RLDA
                        ;EXPECTING A HEADER NOT FOUND TO SET
022350                  STARS
 (2)                    ;;*****************************************************************

022350 004737 015766            JSR     PC,HDHOME       ;HEADS OVER TRACK 0
022354                          CKERFG                  ;HEADS GO HOME OKAY
 (4)   022362 104432            TRAP    C$EXIT
 (4)   022364 000574            .WORD   L10056-.

022366                          BGNSEG                          ;%%START OF SEGMENT%%
 (3)   022366 104404            TRAP    C$BSEG

022370                          SETPRI  #PRI07          ;PRIORITY TO 7
 (3)   022370 012700 000340     MOV     #PRI07,R0
 (3)   022374 104441            TRAP    C$SPRI
022376 022737 000001 002232     CMP     #1,T.DRIVE      ;CHECK TYPE OF DRIVE (RL01 OR RL02)
022404 001003                   BNE     22$             ;RL02? THEN BRANCH
022406 012703 002670            MOV     #HDRTAB,R3      ;MOV ADDRESS OF BEG PATTERN TO R3
022412 000402                   BR      33$             ; THEN BRANCH
022414 012703 003050    22$:    MOV     #HTAB,R3        ;MOV ADDRESS OF BEG PATTERN TO R3
022420                  33$:    BGNSEG                          ;START OF SEGMENT
 (3)   022420 104404            TRAP    C$BSEG
022422                  1$:
022422 004537 015056            JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
022426 000010                   RDHDR                   ;READ HEADER
022430 004537 015702            JSR     R5,WTCRDY       ;WAIT FOR CONTROLLRE READY
022434                          ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)   022434 104410            TRAP    C$ESCAPE
 (3)   022436 000516            .WORD   10001$-.

022440 004537 014614            JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
022444                          ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)   022444 104410            TRAP    C$ESCAPE
 (3)   022446 000506            .WORD   10001$-.
022450 013737 002346 002274     MOV     E.MP,TMP1       ;READ AND SAVE HEADER

022456 042737 000177 002274     BIC     #177,TMP1       ;CLEAR OUT SECTOR AND H.S.
022464 012777 000001 157666     MOV     #1,@RLDA        ;SETUP MARKER FOR SEEK
022472 011337 002276            MOV     (R3),TMP2       ;GET HEADER PATTERN
022476 042737 000177 002276     BIC     #177,TMP2       ;CLEAR OUT SECTOR AND H.S.
022504 163737 002274 002276     SUB     TMP1,TMP2       ;CALCULATE DIFFERENCE TO SEEK
022512 103404                   BCS     2$              ;BRANCH FOR SEEK OUT
022514 052777 000004 157636     BIS     #SIGN,@RLDA     ;SEEK TOWARDS SPINDLE
022522 000402                   BR      3$              ;GO PUT IN DIFFERENCE WORD
022524 005437 002276    2$:     NEG     TMP2            ;WE HAVE TO NEGATE DIFFERENCE
022530 053777 002276 157622 3$: BIS     TMP2,@RLDA      ;SET IN DIFFERENCE WORD
022536 032713 000100            BIT     #RHHS,(R3)      ;DO WE WANT HEAD SELECT AS 0?
022542 001403                   BEQ     4$              ;YES, SKIP OVER SETTING H.S.
022544 052777 000020 157606     BIS     #DAHS,@RLDA     ;SET HEAD SELECT TO ONE
022552 004537 015056    4$:     JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
022556 000006                   SEEK                    ;SEEK

022560 004537 015702            JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY
```

```
 2267  022564                                    ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
  (3)  022564  104410                            TRAP    C$ESCAPE
  (3)  022566  000366                            .WORD   10001$-.
 2268
 2269  022570  004537  014614                    JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
 2270  022574                                    ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
  (3)  022574  104410                            TRAP    C$ESCAPE
  (3)  022576  000356                            .WORD   10001$-.
 2271
 2272  022600  004537  015636                    JSR     R5,WTDRDY       ;WAIT FOR DRIVE READY
 2273  022604                                    ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
  (3)  022604  104410                            TRAP    C$ESCAPE
  (3)  022606  000346                            .WORD   10001$-.
 2274  022610  004537  015056                    JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
 2275  022614  000010                            RDHDR                   ;READ HEADER (VERIFY SEEK)
 2276  022616  004537  015702                    JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY
 2277  022622                                    ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
  (3)  022622  104410                            TRAP    C$ESCAPE
  (3)  022624  000330                            .WORD   10001$-.
 2278
 2279  022626  004537  014614                    JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
 2280  022632                                    ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
  (3)  022632  104410                            TRAP    C$ESCAPE
  (3)  022634  000320                            .WORD   10001$-.
 2281
 2282  022636  013737  002346  002302            MOV     E.MP,BDDAT      ;READ HEADER
 2283  022644  043737  002262  002302            BIC     SECMSK,BDDAT    ;SAVE CYLINDER FOR COMPARE
 2284  022652  011337  002300                    MOV     (R3),GDDAT      ;GET EXPECTED HEADER
 2285  022656  043737  002262  002300            BIC     SECMSK,GDDAT    ;SAVE CYLINDER FOR COMPARE
 2286  022664  023737  002300  002302            CMP     GDDAT,BDDAT     ;SEEK END UP OKAY
 2287  022672  001404                            BEQ     5$              ;YES, CONTINUE
 2288
 2289  022674                                    ERRDF   27.,EM11,ERR4   ;SEEK INCORRECT
  (4)  022674  104455                            TRAP    C$ERDF
  (5)  022676  000033                            .WORD   27
  (5)  022700  005124                            .WORD   EM11
  (5)  022702  007654                            .WORD   ERR4
 2290
 2291  022704                            5$:     ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
  (3)  022704  104410                            TRAP    C$ESCAPE
  (3)  022706  000246                            .WORD   10001$-.
 2292
 2293  022710  011377  157444                    MOV     (R3),@RLDA      ;SET UP DISK ADDRESS
 2294  022714  042777  000077  157436            BIC     #77,@RLDA
 2295  022722  012777  177777  157432            MOV     #-1,@RLMP       ;WORD COUNT
 2296  022730  012777  003426  157420            MOV     #BUF,@RLBA      ;BUS ADDRESS
 2297
 2298  022736  004537  015056                    JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
 2299  022742  000014                            READ                    ;READ
 2300  022744  004537  015702                    JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY
 2301  022750                                    ESCAPE  SEG             ;CHECK FOR FL.LOE, ELSE EXIT SEG
  (3)  022750  104410                            TRAP    C$ESCAPE
  (3)  022752  000202                            .WORD   10001$-.
 2302
 2303  022754  004537  014614                    JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
 2304  022760                                    ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
```

```
  (3)  022760  104410                          TRAP    C$ESCAPE
  (3)  022762  000172                          .WORD   10001$-.
2305
2306   022764  011377  157370                 MOV     (R3),@RLDA      ;SET UP DISK ADDRESS AS
2307   022770  005177  157364                 COM     @RLDA           ;COMPLIMENT TO CAUSE HDR NT FND
2308   022774  012777  177777  157360         MOV     #-1,@RLMP       ;WORD COUNT
2309   023002  012777  003426  157346         MOV     #BUF,@RLBA      ;BUS ADDRESS
2310
2311   023010  004537  015056                 JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
2312   023014  000014                         READ                    ;READ
2313   023016  004537  015702                 JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY
2314   023022                                 ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
  (3)  023022  104410                          TRAP    C$ESCAPE
  (3)  023024  000130                          .WORD   10001$-.
2315   023026  013737  002340  002272         MOV     E.CS,TMP0       ;GET CS
2316   023034  042737  001777  002272         BIC     #1777,TMP0      ;SAVE ERROR BITS
2317   023042  022737  112000  002272         CMP     #BIT15.BIT12!BIT10,TMP0  ;DID HEADER NOT FOUND SET
2318   023050  001402                         BEQ     8$              ;YES, CONTINUE
2319   023052  004537  014614                 JSR     R5,CHERR
2320   023056                         8$:     CKLOOP
  (3)  023056  104406                          TRAP    C$CLP1
2321
2322   023060  022737  112000  002272         CMP     #BIT15!BIT12!BIT10,TMP0
2323   023066  001413                         BEQ     6$
2324
2325   023070  011337  002300                 MOV     (R3),GDDAT      ;SET UP DATA FOR ERROR
2326   023074  013737  002300  002302         MOV     GDDAT,BDDAT     ;PRINT OUT
2327   023102  005137  002302                 COM     BDDAT
2328
2329   023106                                 ERRDF   28.,EM12,ERR4   ;HDR NOT FOUND WOULD NOT SET
  (4)  023106  104455                          TRAP    C$ERDF
  (5)  023110  000034                          .WORD   28
  (5)  023112  005144                          .WORD   EM12
  (5)  023114  007654                          .WORD   ERR4
2330
2331   023116                         6$:     ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
  (3)  023116  104410                          TRAP    C$ESCAPE
  (3)  023120  000034                          .WORD   10001$-.
2332
2333   023122  005723                         TST     (R3)+           ;GET NEXT PATTERN
2334   023124  022737  000001  002232         CMP     #1,T.DRIVE      ;TYPE OF DRIVE RL01 OR RL02
2335   023132  001003                         BNE     60$             ;RL02 ? THEN BRANCH
2336   023134  020327  003046                 CMP     R3,#HDREND      ;CMP IT WITH #HDREND
2337   023140  000402                         BR      77$             ;THEN BRANCH
2338   023142  020327  003234         60$:    CMP     R3,#HEND        ;CMP IT WITH #HEND
2339   023146  001402                 77$:    BEQ     7$              ;YES,EXIT TEST
2340   023150  000137  022422                 JMP     1$              ;NO, GO BACK
2341
2342   023154                         7$:
2343   023154                                 ENDSEG                          ;%%END OF SEGMENT%%
  (3)  023154                         10001$:
  (3)  023154  104405                          TRAP    C$ESEG
2344
2345   023156                                 ENDSEG                          ;%%END OF SEGMENT%%
  (3)  023156                         10000$:
  (3)  023156  104405                          TRAP    C$ESEG
```

```
2346  023160                        ENDTST                                  ;**END OF TEST**
 (3)  023160                        L10056:
 (3)  023160  104401                        TRAP    C$ETST
2347
2348                                .SBTTL  **TEST 21** - CHECK MULTIPLE SECTORS ON READ
2349
2350  023162                        BGNTST                                  ;**START OF TEST**
2351
2352  023162                        STARS
 (2)                                ;;**********************************************************************
2353                                ;VERIFY THAT MULTIPLE SECTORS CAN BE READ, WE WILL CHECK
2354                                ;THAT THE RLDA INCREMENTS PROPERLY.
2355  023162                        STARS
 (2)                                ;;**********************************************************************
2356
2357
2358  023162  004737  015766                JSR     PC,HDHOME       ;HEADS OVER TRACK 0
2359  023166                                CKERFG                  ;HEADS GO HOME OKAY
 (4)  023174  104432                        TRAP    C$EXIT
 (4)  023176  000156                        .WORD   L10057-.
2360
2361
2362  023200  005037  002272                CLR     TMP0            ;CLEAR LOCATIONS
2363  023204  005037  002274                CLR     TMP1
2364
2365  023210                                BGNSEG                          ;%%START OF SEGMENT%%
 (3)  023210  104404                        TRAP    C$BSEG
2366
2367  023212                        1$:
2368  023212  013737  002274  002300        MOV     TMP1,GDDAT      ;GET CYLINDER
2369  023220  053737  002272  002300        BIS     TMP0,GDDAT      ;GET SECTOR
2370  023226  013777  002300  157124        MOV     GDDAT,@RLDA     ;SET DISK ADDRESS-SECTOR 0
2371  023234  062737  000002  002300        ADD     #2,GDDAT        ;SET EXPECTED + 2
2372  023242  012777  003426  157106        MOV     #BUF,@RLBA      ;SET BUS ADDRESS
2373  023250  012777  177577  157104        MOV     #-129.,@RLMP    ;WORD COUNT-SECTOR+1 WORD
2374
2375  023256  004537  015056                JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
2376  023262  000014                        READ                    ;READ
2377  023264  004537  015702                JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY?
2378  023270                                ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  023270  104410                        TRAP    C$ESCAPE
 (3)  023272  000060                        .WORD   10000$-.
2379
2380  023274  004537  014614                JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
2381  023300                                ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  023300  104410                        TRAP    C$ESCAPE
 (3)  023302  000050                        .WORD   10000$-.
2382
2383  023304  013737  002344  002302        MOV     E.DA,BDDAT      ;READ DISK ADDRESS
2384  023312  023737  002302  002300        CMP     BDDAT,GDDAT     ;IS DISK ADDRESS CORRECT
2385  023320  001404                        BEQ     2$              ;YES, BRANCH  NO, REPORT ERROR
2386
2387  023322                                ERRDF   29.,EM14,ERR4   ;DA DID NOT INCREMENT
 (4)  023322  104455                        TRAP    C$ERDF
 (5)  023324  000035                        .WORD   29
 (5)  023326  005224                        .WORD   EM14
```

```
(5)  023330  007654                              .WORD   ERR4

     023332                            2$:       ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
(3)  023332  104410                              TRAP    C$ESCAPE
(3)  023334  000016                              .WORD   10000$-.

     023336  005237  002272                      INC     TMPO            ;NEXT SECTOR?
     023342  022737  000046  002272              CMP     #46,TMPO        ;DONE?
     023350  001320                              BNE     1$              ;NO, GO BACK


     023352                                      ENDSEG                            ;%%END OF SEGMENT%%
(3)  023352                            10000$:
(3)  023352  104405                              TRAP    C$ESEG
     023354                            ENDTST                                      ;**END OF TEST**
(3)  023354                            L10057:
(3)  023354  104401                              TRAP    C$ETST
     023356                            STARS
(2)                                    ;;*************************************************************
                                       ;CHECK THAT WE CAN FORCE A HEADER NOT FOUND AT THE
                                       ;END OF A TRACK DOING A MULTIPLE SECTOR READ.  WE
                                       ;SET UP TO READ TWO SECTORS STARTING AT SECTOR 39
                                       ;WE SHOULD TRANSFER 128 WORDS THEN ABORT WITH A
                                       ;HEADER NOT FOUND FOR SECTOR 40
     023356                            STARS
(2)                                    ;;*************************************************************



                                       .SBTTL  **TEST 22** - FORCE HDR NT FND AT END OF TRACK

     023356                            BGNTST                                      ;**START OF TEST**


     023356  004737  015766                      JSR     PC,HDHOME       ;HEADS OVER TRACK 0
     023362                                      CKERFG                  ;HEADS GO HOME OKAY
(4)  023370  104432                              TRAP    C$EXIT
(4)  023372  000126                              .WORD   L10060-.

     023374                                      BGNSEG                            ;%%START OF SEGMENT%%
(3)  023374  104404                              TRAP    C$BSEG

     023376  012737  000047  002300              MOV     #39.,GDDAT      ;CREATE LAST SECTOR
     023404  013777  002300  156746              MOV     GDDAT,@RLDA     ;LOAD DISK ADDRESS
     023412  012777  177577  156742              MOV     #-129.,@RLMP    ;WORD COUNT
     023420  012777  003426  156730              MOV     #BUF,@RLBA      ;BUS ADDRESS
     023426  004537  015056                      JSR     R5,LDFUNC                 ;LOAD THE FUNCTION IN NEXT WORD
     023432  000014                              READ                    ;READ
     023434  004537  015702                      JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY
     023440                                      ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
(3)  023440  104410                              TRAP    C$ESCAPE
(3)  023442  000054                              .WORD   10000$-.

     023444  013737  002340  002302              MOV     E.CS,BDDAT      ;READ CS
     023452  042737  001777  002302              BIC     #1777,BDDAT     ;SAVE ERROR BITS
     023460  022737  112000  002302              CMP     #112000,BDDAT   ;HDR NOT FOUND SET?
     023466  001402                              BEQ     4$              ;YES, CONTINUE
```

```
2430  023470  004537  014614                  JSR     R5,CHERR
2431  023474                          4$:     CKLOOP
 (3)  023474  104406                          TRAP    C$CLP1
2432
2433  023476  022737  112000  002302          CMP     #112000,BDDAT
2434  023504  001404                          BEQ     1$
2435
2436  023506                                  ERRDF   30.,EM23,ERR0   ;HEADER NOT FOUND DID NOT SET
 (4)  023506  104455                          TRAP    C$ERDF
 (5)  023510  000036                          .WORD   30
 (5)  023512  005540                          .WORD   EM23
 (5)  023514  007510                          .WORD   ERR0
2437
2438  023516                          1$:
2439
2440  023516                                  ENDSEG                          ;%%END OF SEGMENT%%
 (3)  023516                          10000$:
 (3)  023516  104405                          TRAP    C$ESEG
2441  023520                          ENDTST                                  ;**END OF TEST**
 (3)  023520                          L10060:
 (3)  023520  104401                          TRAP    C$ETST
2442
2443                                    .SBTTL  **TEST 23** - FORCE NON-EXISTENT MEMORY ERROR
2444
2445  023522                          BGNTST                                  ;**START OF TEST**
2446
2447  023522                          STARS
 (2)                                ;;**********************************************************************
2448                                ;CHECK FOR RLV-11
2449                                ; &
2450                                ;SIZE IF MEMORY >= 124K - IF TRUE DO NOT PERFORM TESTS 23 & 24
2451  023522                          STARS
 (2)                                ;;**********************************************************************
2452
2453  023522  005037  002662                  CLR     NOTST           ;INIT ABORT TEST
2454  023526  005737  002420                  TST     T.CNTLR         ;RLV11?
2455  023532  001013                          BNE     4$              ;BRANCH - IF NO
2456  023534  013700  002120                  MOV     L$HIMEM,R0      ;GET HIGHEST OCTAL MEMORY ADDRESS IN PAR FORMAT
2457  023540  006200                          ASR     R0              ;DIVIDE BY
2458  023542  006200                          ASR     R0              ;32(10),40(8)
2459  023544  006200                          ASR     R0              ;TO CONVERT TO
2460  023546  006200                          ASR     R0              ;1K(10)
2461  023550  006200                          ASR     R0              ;BLOCKS
2462  023552  005200                          INC     R0              ;TO INCLUDE LOCATION ZERO
2463  023554  022700  000174                  CMP     #124.,R0        ;MEMORY >= 124K.?
2464  023560  003447                          BLE     5$              ;BRANCH - IF YES
2465
2466
2467  023562                          STARS
 (2)                                ;;**********************************************************************
2468                                ;FORCE A NON-EXISTENT MEMORY ERROR,
2469                                ;WE SET THE RLBA TO EQUAL THE
2470                                ;LAST ADDRESS IN MEMORY AND ISSUE A READ.  THE
2471                                ;READ SHOULD ABORT AFTER ONE WORD TRANSFERRED
2472  023562                          STARS
 (2)                                ;;**********************************************************************
```

```
2473
2474
2475  023562  004737  015766          4$:     JSR     PC,HDHOME       ;HEADS OVER TRACK 0
2476  023566                                  CKERFG                  ;HEADS GO HOME OKAY
 (4)  023574  104432                          TRAP    C$EXIT
 (4)  023576  000106                          .WORD   L10061-.
2477
2478  023600                                  BGNSEG                  ;%%START OF SEGMENT%%
 (3)  023600  104404                          TRAP    C$BSEG
2479
2480  023602  012777  160000  156546          MOV     #160000,@RLBA   ;LEAD BA
2481  023610  012737  000060  002374          MOV     #BA16!BA17,XMEM ;SET EA BIT
2482  023616  005077  156536                  CLR     @RLDA           ;LOAD DISK AVAILABLE
2483  023622  012777  177600  156532          MOV     #-128.,@RLMP    ;WORD COUNT
2484  023630  004537  015056                  JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
2485  023634  000014                          READ                    ;READ
2486  023636  004537  015702                  JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER
2487  023642                                  ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  023642  104410                          TRAP    C$ESCAPE
 (3)  023644  000026                          .WORD   10000$-.
2488  023646  032737  020000  002340          BIT     #NXM,E.CS       ;DID NXM SET?
2489  023654  001004                          BNE     3$              ;YES, CONTINUE
2490  023656                                  ERRDF   31.,EM24,ERR0   ;NXM DID NOT SET
 (4)  023656  104455                          TRAP    C$ERDF
 (5)  023660  000037                          .WORD   31
 (5)  023662  005616                          .WORD   EM24
 (5)  023664  007510                          .WORD   ERR0
2491  023666                          3$:     ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  023666  104410                          TRAP    C$ESCAPE
 (3)  023670  000002                          .WORD   10000$-.
2492  023672                                  ENDSEG                  ;%%END OF SEGMENT%%
 (3)  023672                          10000$:
 (3)  023672  104405                          TRAP    C$ESEG
2493  023674                                  EXIT    TST
 (3)  023674  104432                          TRAP    C$EXIT
 (3)  023676  000006                          .WORD   L10061-.
2494  023700  005237  002662          5$:     INC     NOTST           ;ABORT TEST 24
2495
2496  023704                          ENDTST                          ;**END OF TEST**
 (3)  023704                          L10061:
 (3)  023704  104401                          TRAP    C$ETST
2497
2498                                  .SBTTL  **TEST 24** - FORCE NON-EXISTENT MEMORY ERROR INTERRUPT
2499
2500  023706                          BGNTST                          ;**START OF TEST**
2501  023706                          STARS
 (2)                                  ;;**********************************************************************
2502                                  ;CHECK THAT WE CAN FORCE AN INTERRUPT WITH A
2503                                  ;NON-EXISTENT MEMORY ERROR.
2504  023706                          STARS
 (2)                                  ;;**********************************************************************
2505
2506
2507  023706  005737  002662                  TST     NOTST           ;RLV-11 & MEMORY SIZE >= 124K.?
2508  023712  001066                          BNE     1$              ;BRANCH - IF YES
2509  023714  004737  015766                  JSR     PC,HDHOME       ;HEADS OVER TRACK 0
```

```
2510  023720                                    CKERFG                    ;HEADS GO HOME OKAY
 (4)  023726  104432                            TRAP    C$EXIT
 (4)  023730  000140                            .WORD   L10062-.
2511
2512  023732                                    BGNSEG                            ;%%START OF SEGMENT%%
 (3)  023732  104404                            TRAP    C$BSEG
2513
2514  023734  005037  002256                    CLR     INTFLG            ;CLEAR INTERRUPT OCCURANCE FLAG
2515  023740                                    SETPRI  #PRI00
 (3)  023740  012700  000000                    MOV     #PRI00,R0
 (3)  023744  104441                            TRAP    C$SPRI
2516  023746  012777  160000  156402            MOV     #160000,@RLBA     ;PRELOAD BA
2517  023754  012737  000060  002374            MOV     #BA16!BA17,XMEM   ;SET EA BITS
2518  023762  005077  156372                    CLR     @RLDA             ;LOAD DA
2519  023766  012777  177777  156366            MOV     #-1,@RLMP         ;WORD COUNT
2520  023774  004537  015056                    JSR     R5,LDFUNC         ;LOAD THE FUNCTION IN NEXT WORD
2521  024000  000114                            READ!INTEN                ;READ
2522  024002  004537  015702                    JSR     R5,WTCRDY         ;WAIT FOR CONTROLLER
2523  024006                                    SETPRI  #PRI07            ;PRIORITY TO 7
 (3)  024006  012700  000340                    MOV     #PRI07,R0
 (3)  024012  104441                            TRAP    C$SPRI
2524  024014                                    ESCAPE  SEG               ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  024014  104410                            TRAP    C$ESCAPE
 (3)  024016  000050                            .WORD   10000$-.
2525  024020  005737  002256                    TST     INTFLG            ;INTERRUPT OCCUR?
2526  024024  001004                            BNE     4$                ;YES OKAY
2527  024026                                    ERRDF   32.,EM44,ERR0     ;NO INTERRUPT W/NXM
 (4)  024026  104455                            TRAP    C$ERDF
 (5)  024030  000040                            .WORD   32
 (5)  024032  006522                            .WORD   EM44
 (5)  024034  007510                            .WORD   ERR0
2528  024036                              4$:   ESCAPE  SEG               ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  024036  104410                            TRAP    C$ESCAPE
 (3)  024040  000026                            .WORD   10000$-.
2529  024042  032737  020000  002340            BIT     #NXM,E.CS         ;DID NXM SET?
2530  024050  001004                            BNE     3$                ;YES, CONTINUE
2531  024052                                    ERRDF   33.,EM24,ERR0     ;NO NXM
 (4)  024052  104455                            TRAP    C$ERDF
 (5)  024054  000041                            .WORD   33
 (5)  024056  005616                            .WORD   EM24
 (5)  024060  007510                            .WORD   ERR0
2532  024062                              3$:   ESCAPE  SEG               ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  024062  104410                            TRAP    C$ESCAPE
 (3)  024064  000002                            .WORD   10000$-.
2533  024066                                    ENDSEG                    ;%%END OF SEGMENT%%
 (3)  024066                              10000$:
 (3)  024066  104405                            TRAP    C$ESEG
2534  024070                              1$:
2535
2536  024070                              ENDTST                          ;**END OF TEST**
 (3)  024070                              L10062:
 (3)  024070  104401                            TRAP    C$ETST
2537
2538                                      .SBTTL  **TEST 25** - CHECK READ WRITE LOOP
2539
2540
```

```
2541
2542
2543  024072                          BGNTST                                  ;**START OF TEST**
2544
2545  024072                          STARS
 (2)                                  ;;*****************************************************************
2546                                  ;VERIFY THAT THE WRITE ACTUALLY WRITES.  AT THIS
2547                                  ;TIME WE KNOW THAT THE WRITE FUNCTION GOES THRU
2548                                  ;THE MOTIONS BUT WE DON'T KNOW THAT THE DATA
2549                                  ;ACTUALLY GETS RECORDED ON THE PLATTER.
2550  024072                          STARS
 (2)                                  ;;*****************************************************************
2551
2552
2553  024072  004737  015766                  JSR     PC,HDHOME       ;HEADS OVER TRACK 0
2554  024076                          CKERFG                          ;HEADS GO HOME OKAY
 (4)  024104  104432                  TRAP    C$EXIT
 (4)  024106  000362                  .WORD   L10063-.
2555
2556  024110                          BGNSEG                                  ;%%START OF SEGMENT%%
 (3)  024110  104404                  TRAP    C$BSEG
2557
2558  024112  012700  003426                  MOV     #BUF,R0         ;SET UP WRITE BUFFER
2559  024116  012701  000200                  MOV     #128.,R1        ;128 WORDS/ONE SECTOR
2560  024122  012720  125252          3$.     MOV     #125252,(R0)+   ;WRITE PATTERN TO BUFFER
2561  024126  005301                  DEC     R1              ;DONE?
2562  024130  001374                  BNE     3$              ;NO, BRANCH BACK
2563  024132  005077  156222                  CLR     @RLDA           ;DISK ADDRESS
2564  024136  012777  177600  156216          MOV     #-128.,@RLMP    ;WORD COUNT
2565  024144  012777  003426  156204          MOV     #BUF,@RLBA      ;BUS ADDRESS
2566  024152  004537  015056                  JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
2567  024156  000012                  WRITE                           ;WRITE THE PATTERN
2568  024160  004537  015702                  JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY
2569  024164                          ESCAPE  SEG                     ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  024164  104410                  TRAP    C$ESCAPE
 (3)  024166  000300                  .WORD   10000$-.
2570
2571  024170  004537  014614                  JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
2572  024174                          ESCAPE  SEG                     ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  024174  104410                  TRAP    C$ESCAPE
 (3)  024176  000270                  .WORD   10000$-.
2573  024200                          BGNSEG                                  ;%%START OF SEGMENT%%
 (3)  024200  104404                  TRAP    C$BSEG
2574  024202  012700  003426                  MOV     #BUF,R0         ;CLEAR OUT BUFFER BEFORE
2575  024206  012701  000200                  MOV     #128.,R1        ;READING
2576  024212  005020          4$:     CLR     (R0)+           ;CLEAR BUFFER
2577  024214  005301                  DEC     R1              ;DONE?
2578  024216  001375                  BNE     4$              ;NO, BRANCH BACK
2579  024220  005077  156134                  CLR     @RLDA           ;LOAD DISK ADDRESS
2580  024224  012777  177600  156130          MOV     #-128.,@RLMP    ;WORD COUNT/ONE SECTION
2581  024232  012777  003426  156116          MOV     #BUF,@RLBA      ;LOAD BUS ADDRESS
2582  024240  004537  015056                  JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
2583  024244  000014                  READ                            ;GO READ
2584  024246  004537  015702                  JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY
2585  024252                          ESCAPE  SEG                     ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  024252  104410                  TRAP    C$ESCAPE
```

```
  (3)  024254  000210                          .WORD   10001$-.
2586
2587  024256  004537  014614                  JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
2588  024262  005737  002236                  TST     T.CRC           ;WAS ERROR A DCK??
2589  024266  001003                          BNE     8$              ;YES,SEE IF WE A DUMP
2590  024270                       10$:       ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
  (3)  024270  104410                          TRAP    C$ESCAPE
  (3)  024272  000172                          .WORD   10001$-.
2591  024274  000404                          BR      99$             ;SKIP AROUND
2592  024276  005737  012440          8$:     TST     T.DMP           ;DO WE STILL WANT TO CHECK IT
2593  024302  001772                          BEQ     10$             ;NO
2594  024304                                   CKLOOP                  ;YES, CHECK FOR LOOP FIRST
  (3)  024304  104406                          TRAP    C$CLP1
2595
2596  024306  005037  002242          99$:    CLR     CDCNT           ;CLEAR NUMBER WE'RE TO PRINT
2597  024312  005037  002234                  CLR     CHECK           ;ALLOW HEADER ON FIRST PRINT
2598  024316  012702  003426                  MOV     #BUF,R2         ;COMPARE BUFFER TO CHECK WRITE
2599  024322  012701  000200                  MOV     #128.,R1        ;128 WORDS
2600  024326  012737  125252  002300          MOV     #125252,GDDAT   ;SET UP EXPECTED
2601  024334  011237  002302          5$:     MOV     (R2),BDDAT      ;GET DATA
2602  024340  023737  002300  002302          CMP     GDDAT,BDDAT     ;IS DATA OKAY
2603  024346  001442                          BEQ     6$              ;YES, CONTINUE
2604  024350  010237  002274                  MOV     R2,TMP1         ;LOAD BAD MEM LOCATION
2605  024354  023737  002242  012442          CMP     CDCNT,T.LMT             ;CHECKED ENOUGH??
2606  024362  001002                          BNE     333$            ;NO
2607  024364                                   ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
  (3)  024364  104410                          TRAP    C$ESCAPE
  (3)  024366  000076                          .WORD   10001$-.
2608  024370  005237  002242          333$:   INC     CDCNT           ;ACCOUNT FOR IT
2609
2610  024374  005737  002234                  TST     CHECK           ;HEADER OR JUST DATA
2611  024400  001007                          BNE     9$              ;JUST DATA
2612  024402                                   ERRDF   34.,EM25,ERR8   ;BAD DATA
  (4)  024402  104455                          TRAP    C$ERDF
  (5)  024404  000042                          .WORD   34
  (5)  024406  005656                          .WORD   EM25
  (5)  024410  010030                          .WORD   ERR8
2613  024412  005237  002234                  INC     CHECK           ;ACCOUNT FOR PRINT OF HEADER
2614  024416  000416                          BR      6$
2615
2616  024420                           9$:     PRINTB  #FRMT6,TMP1,GDDAT,BDDAT
 (10)  024420  013746  002302                  MOV     BDDAT,-(SP)
  (9)  024424  013746  002300                  MOV     GDDAT,-(SP)
  (8)  024430  013746  002274                  MOV     TMP1,-(SP)
  (7)  024434  012746  011277                  MOV     #FRMT6,-(SP)
  (6)  024440  012746  000004                  MOV     #4,-(SP)
  (3)  024444  010600                          MOV     SP,R0
  (4)  024446  104414                          TRAP    C$PNTB
  (4)  024450  062706  000012                  ADD     #12,SP
2617
2618  024454                           6$:     CKLOOP
  (3)  024454  104406                          TRAP    C$CLP1
2619  024456  005722                  7$:     TST     (R2)+           ;BUMP BUFFER POINTER
2620  024460  005301                          DEC     R1              ;DONE?
2621  024462  001324                          BNE     5$              ;NO, GO BACK
2622  024464                                   ENDSEG                          ;%%END OF SEGMENT%%
```

```
                        **TEST 25** - CHECK READ WRITE LOOP

  (3)  024464                   10001$:
  (3)  024464  104405                   TRAP    C$ESEG
 2623  024466                   ENDSEG                                  ;%%END OF SEGMENT%%
  (3)  024466                   10000$:
  (3)  024466  104405                   TRAP    C$ESEG
 2624  024470                   ENDTST                                  ;**END OF TEST**
  (3)  024470                   L10063:
  (3)  024470  104401                   TRAP    C$ETST
 2625
 2626                           .SBTTL  **TEST 26** - CHECK SILO LINES
 2627
 2628  024472                   BGNTST                                  ;**START OF TEST**
 2629
 2630
 2631
 2632  024472                   STARS
  (2)                           ;;*****************************************************************
 2633                           ;TEST THAT LINES IN / TO SILO ARE GOOD, THAT IS THAT EACH LINE IS
 2634                           ;GOOD AND CAN BE AT EITHER A 1 OR A 0 STATE INDEPENDENTLY OF EACH
 2635                           ;OTHER BIT POSITION THIS IS DONE BY WRITING PATTERNS OF FLOATING 1,
 2636                           ;FLOATING 0, WALKING 0, WALKING 1
 2637  024472                   STARS
  (2)                           ;;*****************************************************************
 2638
 2639
 2640  024472  004737  015766           JSR     PC,HDHOME       ;HEADS OVER TRACK 0
 2641  024476                   CKERFG                          ;HEADS GO HOME OKAY
  (4)  024504  104432                   TRAP    C$EXIT
  (4)  024506  000404                   .WORD   L10064-.
 2642
 2643  024510  012703  003236           MOV     #DATPAT,R3
 2644
 2645
 2646  024514                   BGNSEG                                  ;%%START OF SEGMENT%%
  (3)  024514  104404                   TRAP    C$BSEG
 2647  024516  012700  003426   6$:     MOV     #BUF,R0         ;WRITE PATTERN INTO MEMORY
 2648  024522  012701  000200           MOV     #128.,R1        ;128 WORDS
 2649  024526  011320           2$:     MOV     (R3),(R0)+      ;WRITE THE PATTERN
 2650  024530  005301                   DEC     R1              ;DONE?
 2651  024532  001375                   BNE     2$              ;NO GO BACK
 2652
 2653  024534  012777  003426  155614   MOV     #BUF,@RLBA      ;SETUP TO WRITE PATTERN ONTO DISK
 2654  024542  005077  155612           CLR     @RLDA           ;LOAD DA
 2655  024546  012777  177600  155606   MOV     #-128.,@RLMP    ;WORD COUNT
 2656  024554  004537  015056           JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
 2657  024560  000012                   WRITE
 2658  024562  004537  015702           JSR     R5,WTCRDY
 2659  024566                   ESCAPE  SEG                     ;CHECK FOR FL:LOE, ELSE EXIT SEG
  (3)  024566  104410                   TRAP    C$ESCAPE
  (3)  024570  000320                   .WORD   10000$-.
 2660  024572  004537  014614           JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
 2661  024576                   ESCAPE  SEG                     ;CHECK FOR FL:LOE, ELSE EXIT SEG
  (3)  024576  10441C                   TRAP    C$ESCAPE
  (3)  024600  000310                   .WORD   10000$-.
 2662  024602                   BGNSEG                                  ;%%START OF SEGMENT%%
  (3)  024602  104404                   TRAP    C$BSEG
```

```
2663  024604  012700  003426              MOV     #BUF,R0         ;CLEAR MEMORY BEFORE READING IT BACK
2664  024610  012701  000200              MOV     #128.,R1        ;128 WORDS
2665  024614  005020              3$:     CLR     (R0)+           ;CLEAR
2666  024616  005301                      DEC     R1              ;EONE
2667  024620  001375                      BNE     3$              ;NO
2668
2669  024622  012777  003426  155526      MOV     #BUF,@RLBA      ;SETUP TO READ IT BACK
2670  024630  012777  177600  155524      MOV     #-128.,@RLMP    ;128 WORDS
2671  024636  005077  155516              CLR     @RLDA           ;SECTOR ZERO
2672  024642  004537  015056              JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
2673  024646  000014                      READ
2674  024650  004537  015702              JSR     R5,WTCRDY
2675  024654                              ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  024654  104410                      TRAP    C$ESCAPE
 (3)  024656  000224                      .WORD   10001$-.
2676  024660  004537  014614              JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
2677  024664  005737  002236              TST     T.CRC           ;WAS ERROR A DCK??
2678  024670  001003                      BNE     8$              ;YES,SEE IF WE A DUMP
2679  024672                      10$:     ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  024672  104410                      TRAP    C$ESCAPE
 (3)  024674  000206                      .WORD   10001$-.
2680  024676  000404                      BR      99$             ;SKIP AROUND
2681  024700  005737  012440      8$:     TST     T.DMP           ;DO WE STILL WANT TO CHECK IT
2682  024704  001772                      BEQ     10$             ;NO
2683  024706                              CKLOOP                  ;YES, CHECK FOR LOOP FIRST
 (3)  024706  104406                      TRAP    C$CLP1
2684
2685  024710  005037  002242      99$:    CLR     CDCNT           ;CLEAR NUMBER WE'RE TO PRINT
2686  024714  005037  002234              CLR     CHECK           ;ALLOW HEADER ON FIRST PRINT
2687  024720  011337  002300              MOV     (R3),GDDAT      ;COMPARE WHAT WE READ BACK
2688  024724  012737  003426  002276      MOV     #BUF,TMP2       ;BUFFER START
2689  024732  012737  000001  002274      MOV     #1,TMP1         ;START WITH FIRST
2690
2691  024740  017737  155332  002302  5$: MOV     @TMP2,BDDAT     ;GET DATA
2692  024746  023737  002300  002302      CMP     GDDAT,BDDAT     ;GOOD?
2693  024754  001440                      BEQ     4$              ;YES, BRANCH
2694
2695  024756  023737  002242  012442      CMP     CDCNT,T.LMT             ;CHECKED ENOUGH??
2696  024764  001002                      BNE     333$            ;NO
2697  024766                              ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  024766  104410                      TRAP    C$ESCAPE
 (3)  024770  000112                      .WORD   10001$-.
2698  024772  005237  002242      333$:   INC     CDCNT           ;ACCOUNT FOR IT
2699
2700  024776  005737  002234              TST     CHECK           ;HEADER OR JUST DATA
2701  025002  001007                      BNE     9$              ;JUST DATA
2702  025004                              ERRDF   35.,EM45,ERR10  ;BAD DATA BACK
 (4)  025004  104455                      TRAP    C$ERDF
 (5)  025006  000043                      .WORD   35
 (5)  025010  006554                      .WORD   EM45
 (5)  025012  010146                      .WORD   ERR10
2703
2704  025014  005237  002234              INC     CHECK           ;ACCOUNT FOR PRINT OF HEADER
2705  025020  000416                      BR      4$
2706
2707  025022                      9$:     PRINTB #FRMT7,TMP1,GDDAT,BDDAT
```

```
                        **TEST 26** - CHECK SILO LINES

  (10) 025022  013746  002302                   MOV     BDDAT,-(SP)
   (9) 025026  013746  002300                   MOV     GDDAT,-(SP)
   (8) 025032  013746  002274                   MOV     TMP1,-(SP)
   (7) 025036  012746  011354                   MOV     #FRMT7,-(SP)
   (6) 025042  012746  000004                   MOV     #4,-(SP)
   (3) 025046  010600                           MOV     SP,R0
   (4) 025050  104414                           TRAP    C$PNTB
   (4) 025052  062706  000012                   ADD     #12,SP
2708   025056                       4$:         CKLOOP
   (3) 025056  104406                           TRAP    C$CLP1
2709
2710   025060  062737  000002  002276           ADD     #2,TMP2         ;NEXT LOCATION
2711   025066  005237  002274                   INC     TMP1            ;NEXT WORD
2712   025072  023727  002274  000201           CMP     TMP1,#129.      ;DONE
2713   025100  001317                           BNE     5$              ;NO, GO BACK
2714
2715   025102                                   ENDSEG                          ;%%END OF SEGMENT%%
   (3) 025102                       10001$:
   (3) 025102  104405                           TRAP    C$ESEG
2716
2717   025104  005723                           TST     (R3)+           ;DONE ALL PATTERNS
2718   025106  001203                           BNE     6$              ;NO, GO BACK
2719
2720   025110                                   ENDSEG                          ;%%END OF SEGMENT%%
   (3) 025110                       10000$:
   (3) 025110  104405                           TRAP    C$ESEG
2721   025112                       ENDTST                              ;**END OF TEST**
   (3) 025112                       L10064:
   (3) 025112  104401                           TRAP    C$ETST
2722
2723                                .SBTTL  **TEST 27** - CHECK THROUGHPUT OF SILO
2724
2725   025114                       BGNTST                              ;**START OF TEST**
2726
2727
2728
2729   025114                       STARS
   (2)                              ;;*****************************************************************
2730                                ;TEST THAT THE SILO OPERATES CORRECTLY. WE WILL WRITE A PATTERN
2731                                ;THAT CONTAINS A UNIQUE PATTERN IN EACH LOCATION. WE EXPECT IT
2732                                ;BACK IN PROPER ORDER. WE DO A ONE SECTOR TRANSFER.
2733   025114                       STARS
   (2)                              ;;*****************************************************************
2734
2735
2736   025114  004737  015766                   JSR     PC,HDHOME       ;HEADS OVER TRACK 0
2737   025120                                   CKERFG                  ;HEADS GO HOME OKAY
   (4) 025126  104432                           TRAP    C$EXIT
   (4) 025130  000410                           .WORD   L10065-.
2738
2739   025132                                   BGNSEG                          ;%%START OF SEGMENT%%
   (3) 025132  104404                           TRAP    C$BSEG
2740
2741
2742   025134  012700  000001                   MOV     #1,R0           ;INITIAL 1
2743   025140  012701  000200                   MOV     #128.,R1        ;128 WORDS
```

```
2744  025144  012702  003426              MOV     #BUF,R2         ;BUFFER
2745  025150  010022                2$:   MOV     R0,(R2)+        ;WRITE A WORD
2746  025152  005200                      INC     R0              ;NEXT PATTERN (1-128)
2747  025154  005301                      DEC     R1              ;DONE
2748  025156  001374                      BNE     2$              ;NO
2749
2750  025160  012777  003426  155170      MOV     #BUF,@RLBA      ;SETUP TO WRITE
2751  025166  012777  177600  155166      MOV     #-128.,@RLMP    ;128 WORDS
2752  025174  005077  155160              CLR     @RLDA           ;DISK ADDRESS 0
2753  025200  004537  015056              JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
2754  025204  000012                      WRITE
2755  025206  004537  015702              JSR     R5,WTCRDY
2756  025212                              ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  025212  104410                      TRAP    C$ESCAPE
 (3)  025214  000322                      .WORD   10000$-.
2757
2758  025216  004537  014614              JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
2759  025222                              ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  025222  104410                      TRAP    C$ESCAPE
 (3)  025224  000312                      .WORD   10000$-.
2760  025226                              BGNSEG                  ;%%START OF SEGMENT%%
 (3)  025226  104404                      TRAP    C$BSEG
2761  025230  012700  003426              MOV     #BUF,R0         ;CLEAR BUFFER
2762  025234  012701  000200              MOV     #128.,R1        ;128 IN LENGTH
2763  025240  005020                3$:   CLR     (R0)+           ;CLEAR
2764  025242  005301                      DEC     R1              ;DOWN COUNT
2765  025244  001375                      BNE     3$              ;DONE?
2766
2767  025246  012777  003426  155102      MOV     #BUF,@RLBA      ;BUS ADDRESS
2768  025254  012777  177600  155100      MOV     #-128.,@RLMP    ;WORD COUNT
2769  025262  005077  155072              CLR     @RLDA           ;DISK ADDRESS
2770  025266  004537  015056              JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
2771  025272  000014                      READ
2772  025274  004537  015702              JSR     R5,WTCRDY
2773  025300                              ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  025300  104410                      TRAP    C$ESCAPE
 (3)  025302  000232                      .WORD   10001$-.
2774
2775  025304  004537  014614              JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
2776  025310  005737  002236              TST     T.CRC           ;WAS ERROR A DCK??
2777  025314  001003                      BNE     8$              ;YES,SEE IF WE A DUMP
2778  025316                        10$:  ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  025316  104410                      TRAP    C$ESCAPE
 (3)  025320  000214                      .WORD   10001$-.
2779  025322  000404                      BR      99$             ;SKIP AROUND
2780  025324  005737  012440        8$:   TST     T.DMP           ;DO WE STILL WANT TO CHECK IT
2781  025330  001772                      BEQ     10$             ;NO
2782  025332                              CKLOOP                  ;YES, CHECK FOR LOOP FIRST
 (3)  025332  104406                      TRAP    C$CLP1
2783
2784  025334  005037  002242        99$:  CLR     CDCNT           ;CLEAR NUMBER WE'RE TO PRINT
2785  025340  005037  002234              CLR     CHECK           ;ALLOW HEADER ON FIRST PRINT
2786  025344  012737  000001  002300      MOV     #1,GDDAT        ;START GOOD AT 1
2787  025352  012737  003426  002276      MOV     #BUF,TMP2       ;START OF BUFFER
2788  025360  012737  000001  002274      MOV     #1,TMP1         ;FIRST WORD
2789
```

```
 2790  025366  017737  154704  002302  4$:     MOV     @TMP2,BDDAT     ;GET WORD
 2791  025374  023737  002302  002300          CMP     BDDAT,GDDAT     ;CORRECT?
 2792  025402  001440                          BEQ     6$              ;YES
 2793
 2794  025404  023737  002242  012442          CMP     CDCNT,T.LMT             ;CHECKED ENOUGH??
 2795  025412  001002                          BNE     333$            ;NO
 2796  025414                                  ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
  (3)  025414  104410                          TRAP    C$ESCAPE
  (3)  025416  000116                          .WORD   10001$-.
 2797  025420  005237  002242          333$:   INC     CDCNT           ;ACCOUNT FOR IT
 2798
 2799  025424  005737  002234                  TST     CHECK           ;HEADER OR JUST DATA
 2800  025430  001007                          BNE     9$              ;JUST DATA
 2801  025432                                  ERRDF   36.,EM47,ERR10  ;BAD DATA
  (4)  025432  104455                          TRAP    C$ERDF
  (5)  025434  000044                          .WORD   36
  (5)  025436  006604                          .WORD   EM47
  (5)  025440  010146                          .WORD   ERR10
 2802  025442  005237  002234                  INC     CHECK           ;ACCOUNT FOR PRINT OF HEADER
 2803  025446  000416                          BR      6$
 2804
 2805  025450                          9$:     PRINTB  #FRMT7,TMP1,GDDAT,BDDAT
 (10)  025450  013746  002302                  MOV     BDDAT,-(SP)
  (9)  025454  013746  002300                  MOV     GDDAT,-(SP)
  (8)  025460  013746  002274                  MOV     TMP1,-(SP)
  (7)  025464  012746  011354                  MOV     #FRMT7,-(SP)
  (6)  025470  012746  000004                  MOV     #4,-(SP)
  (3)  025474  010600                          MOV     SP,R0
  (4)  025476  104414                          TRAP    C$PNTB
  (4)  025500  062706  000012                  ADD     #12,SP
 2806  025504                          6$:     CKLOOP
  (3)  025504  104406                          TRAP    C$CLP1
 2807
 2808  025506  062737  000002  002276          ADD     #2,TMP2         ;NEXT
 2809  025514  005237  002274                  INC     TMP1            ;NEXT
 2810  025520  005237  002300                  INC     GDDAT           ;NEXT
 2811  025524  023727  002274  000201          CMP     TMP1,#129.      ;DONE?
 2812  025532  001315                          BNE     4$
 2813
 2814  025534                                  ENDSEG                          ;%%END OF SEGMENT%%
  (3)  025534                          10001$:
  (3)  025534  104405                          TRAP    C$ESEG
 2815
 2816  025536                                  ENDSEG                          ;%%END OF SEGMENT%%
  (3)  025536                          10000$:
  (3)  025536  104405                          TRAP    C$ESEG
 2817  025540                          ENDTST                          ;**END OF TEST**
  (3)  025540                          L10065:
  (3)  025540  104401                          TRAP    C$ETST
```

```
                        **TEST 27** - CHECK THROUGHPUT OF SILO

2819
2820                    .SBTTL  **TEST 28** - CHECK ZERO FILL ON WRITE
2821
2822  025542            BGNTST                                  ;**START OF TEST**
2823
2824
2825
2826  025542            STARS
 (2)                    ;;*****************************************************************
2827                    ;WHEN WRITING PARTIAL SECTORS (LESS THAN 128 WORDS) THE
2828                    ;CONTROLLER WILL FILL IN THE REMAINING PORTION OF
2829                    ;THE SECTOR WITH ZERO WORDS.  CHECK THIS FEATURE
2830                    ;WITH WORD COUNTS FROM 1 TO 127
2831  025542            STARS
 (2)                    ;;*****************************************************************
2832
2833  025542  004737  015766            JSR     PC,HDHOME       ;HEADS OVER TRACK 0
2834  025546                            CKERFG                  ;HEADS GO HOME OKAY
 (4)  025554  104432                    TRAP    C$EXIT
 (4)  025556  000442                    .WORD   L10066-.
2835
2836  025560                            BGNSEG                          ;%%START OF SEGMENT%%
 (3)  025560  104404                    TRAP    C$BSEG
2837
2838  025562  012737  000001  002274    MOV     #1,TMP1         ;START WITH 1 WORD WRITE
2839  025570  012700  003426    35$:    MOV     #BUF,R0         ;WRITE BUFFER WITH 52525, WE'LL
2840  025574  012701  000200            MOV     #128.,R1        ;WRITE 128 WORDS ALL THOUGH WE'RE
2841  025600  012720  052525    3$:     MOV     #52525,(R0)+    ;ONLY GOING TO TRANSFER < 128
2842  025604  005301                    DEC     R1              ;DONE WITH BUFFER?
2843  025606  001374                    BNE     3$              ;NO, GO BACK
2844  025610  013700  002274    33$:    MOV     TMP1,R0         ;GET TRANSFER WORD COUNT
2845  025614  005400                    NEG     R0              ;NEGATE FOR RLMP
2846  025616  010077  154540            MOV     R0,@RLMP        ;STORE WORD COUNT AWAY
2847  025622  012777  003426  154526    MOV     #BUF,@RLBA      ;SET UP RLBA
2848  025630  005077  154524            CLR     @RLDA
2849  025634  004537  015056            JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
2850  025640  000012                    WRITE                   ;WRITE IT
2851  025642  004537  015702            JSR     R5,WTCRDY       ;WAIT FOR WRITE TO FINISH
2852  025646                            ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  025646  104410                    TRAP    C$ESCAPE
 (3)  025650  000346                    .WORD   10000$-.
2853
2854  025652  004537  014614            JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
2855  025656                            ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  025656  104410                    TRAP    C$ESCAPE
 (3)  025660  000336                    .WORD   10000$-.
2856  025662                            BGNSEG                          ;%%START OF SEGMENT%%
 (3)  025662  104404                    TRAP    C$BSEG
2857  025664  012700  003426            MOV     #BUF,R0         ;WE'RE GOING TO OVERLAY BUFFER BEFORE
2858  025670  012701  000200            MOV     #128.,R1        ;READING IT BACK.
2859  025674  012720  125252    18$:    MOV     #125252,(R0)+   ;OVERLAY IT WITH COMPLIMENT
2860  025700  005301                    DEC     R1              ;DONE?
2861  025702  001374                    BNE     18$             ;NO, KEEP GOING
2862  025704  012777  003426  154444    MOV     #BUF,@RLBA      ;SET UP TO READ
2863  025712  012777  177600  154442    MOV     #-128.,@RLMP    ;128 WORDS TO CHECK ZERO FILL
2864  025720  005077  154434            CLR     @RLDA           ;SECTOR
```

```
2865  025724  004537  015056            JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
2866  025730  000014                    READ
2867  025732  004537  015702            JSR     R5,WTCRDY       ;WAIT TIL WE FINISH THE READ
2868  025736                            ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  025736  104410                    TRAP    C$ESCAPE
 (3)  025740  000234                    .WORD   10001$-.
2869
2870  025742  004537  014614            JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
2871  025746  005737  002236            TST     T.CRC           ;WAS ERROR A DCK??
2872  025752  001003                    BNE     8$              ;YES,SEE IF WE A DUMP
2873  025754                    10$:    ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  025754  104410                    TRAP    C$ESCAPE
 (3)  025756  000216                    .WORD   10001$-.
2874  025760  000404                    BR      99$             ;SKIP AROUND
2875  025762  005737  012440    8$:     TST     T.DMP           ;DO WE STILL WANT TO CHECK IT
2876  025766  001772                    BEQ     10$             ;NO
2877  025770                            CKLOOP                  ;YES, CHECK FOR LOOP FIRST
 (3)  025770  104406                    TRAP    C$CLP1
2878  025772  005037  002242    99$:    CLR     CDCNT           ;CLEAR NUMBER WE'RE TO PRINT
2879  025776  005037  002234            CLR     CHECK           ;ALLOW HEADER ON FIRST PRINT
2880  026002  013702  002274            MOV     TMP1,R2         ;WORDS WRITTEN IN R2
2881  026006  012701  000200            MOV     #128.,R1        ;CHECK 128 WORDS
2882
2883  026012  012703  003426            MOV     #BUF,R3         ;SET UP BUFFER BEGINNING
2884  026016  005037  002276            CLR     TMP2            ;ZERO WORD COUNT
2885  026022  012737  052525  002300    MOV     #52525,GDDAT    ;SET UP EXPECTED
2886  026030  011337  002302    4$:     MOV     (R3),BDDAT      ;GET WORD
2887  026034  023737  002302  002300    CMP     BDDAT,GDDAT     ;IS WORD CORRECT?
2888  026042  001441                    BEQ     12$             ;YES, GO CHECK COUNTS AND REPEAT
2889
2890  026044  023737  002242  012442    CMP     CDCNT,T.LMT             ;CHECKED ENOUGH??
2891  026052  001002                    BNE     333$            ;NO
2892  026054                            ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  026054  104410                    TRAP    C$ESCAPE
 (3)  026056  000116                    .WORD   10001$-.
2893  026060  005237  002242    333$:   INC     CDCNT           ;ACCOUNT FOR IT
2894
2895  026064  005737  002234            TST     CHECK           ;HEADER OR JUST DATA
2896  026070  001007                    BNE     9$              ;JUST DATA
2897  026072                            ERRDF   37.,EM27,ERR12
 (4)  026072  104455                    TRAP    C$ERDF
 (5)  026074  000045                    .WORD   37
 (5)  026076  005734                    .WORD   EM27
 (5)  026100  010272                    .WORD   ERR12
2898  026102  005237  002234            INC     CHECK           ;ACCOUNT FOR PRINT OF HEADER
2899  026106  000417                    BR      12$
2900
2901  026110                    9$:     PRINTB  #FRMT9,TMP1,R3,GDDAT,BDDAT
 (11) 026110  013746  002302            MOV     BDDAT,-(SP)
 (10) 026114  013746  002300            MOV     GDDAT,-(SP)
 (9)  026120  010346                    MOV     R3,-(SP)
 (8)  026122  013746  002274            MOV     TMP1,-(SP)
 (7)  026126  012746  011547            MOV     #FRMT9,-(SP)
 (6)  026132  012746  000005            MOV     #5,-(SP)
 (3)  026136  010600                    MOV     SP,R0
 (4)  026140  104414                    TRAP    C$PNTB
```

```
  (4)  026142  062706  000014            ADD     #14,SP
2902   026146                    12$.    CKLOOP
  (3)  026146  104406                    TRAP    C$CLP1
2903   026150  005723              6$:   TST     (R3)+
2904   026152  005237  002276            INC     TMP2
2905   026156  005301                    DEC     R1              ;DONE ALL WORDS?
2906   026160  001405                    BEQ     7$              ;EXIT TEST
2907   026162  005302                    DEC     R2              ;DONE CHECKING NON-ZERO WORDS
2908   026164  003321                    BGT     4$              ;NO, BRANCH BACK
2909   026166  005037  002300            CLR     GDDAT           ;YES, SET EXP'D AS ZERO
2910   026172  000716                    BR      4$              ;BRANCH BACK
2911
2912   026174                    7$:                             ;EXIT TEST
2913   026174                    ENDSEG                                  ;%%END OF SEGMENT%%
  (3)  026174                    10001$:
  (3)  026174  104405                    TRAP    C$ESEG
2914
2915   026176  005237  002274            INC     TMP1
2916   026202  023727  002274  000200    CMP     TMP1,#128.
2917   026210  001402                    BEQ     34$
2918   026212  000137  025570            JMP     35$
2919   026216                    34$.
2920
2921   026216                    ENDSEG                                  ;%%END OF SEGMENT%%
  (3)  026216                    10000$:
  (3)  026216  104405                    TRAP    C$ESEG
2922   026220                    ENDTST                                  ;**END OF TEST**
  (3)  026220                    L10066:
  (3)  026220  104401                    TRAP    C$ETST
2923
2924                             .SBTTL  **TEST 29** - CHECK SECTOR BITS OF HEADER COMPARE
2925
2926   026222                    BGNTST                                  ;**START OF TEST**
2927
2928
2929   026222                    STARS
  (2)                            ;;*****************************************************************
2930                             ;TEST THAT ALL SECTOR BITS OF HEADER WORD CAN COMPARE
2931                             ;UNIQUELY.  WE TESTED THE HEADER COMPARE LOGIC EARLIER
2932                             ;BUT THAT WAS NOT AN EXTENSIVE TEST OF THE SECTOR BITS.
2933                             ;THE TEST PROCEDURE IS TO WRITE EACH SECTOR OF TRACK
2934                             ;0 WITH THE SECTOR ADDRESS, THEN GO BACK AND READ
2935                             ;EACH SECTOR.  IF ANY SECTOR HAS ANY DATA THEN THAT
2936                             ;WHICH WAS EXPECTED THEN WE HAVE AN ERROR
2937                             ;ERROR PRINT OUT WILL GIVE SECTOR, EXPECTED AND RECEIVED
2938   026222                    STARS
  (2)                            ;;*****************************************************************
2939
2940
2941   026222  004737  015766            JSR     PC,HDHOME       ;HEADS OVER TRACK 0
2942   026226                    CKERFG                          ;HEADS GO HOME OKAY
  (4)  026234  104432                    TRAP    C$EXIT
  (4)  026236  000414                    .WORD   L10067-.
2943
2944   026240                    BGNSEG                                  ;%%START OF SEGMENT%%
  (3)  026240  104404                    TRAP    C$BSEG
```

```
2945
2946  026242  005037  002272          1$:     CLR     TMP0            ;CLEAR
2947
2948  026246                                  BGNSEG                          ;%%START OF SEGMENT%%
 (3)  026246  104404                          TRAP    C$BSEG
2949
2950  026250  012702  003426          199$:   MOV     #BUF,R2         ;WRITE A PATTERN FOR THE WRITE
2951  026254  012701  000200                  MOV     #128.,R1        ;ONE SECTOR'S WORTH
2952  026260  013722  002272          2$:     MOV     TMP0,(R2)+      ;WRITE IT
2953  026264  005301                          DEC     R1              ;DONE,
2954  026266  001374                          BNE     2$              ;IF NOT, GO BACK
2955
2956  026270  012777  177600  154064        MOV     #-128.,@RLMP    ;ONE SECTOR WORD COUNT
2957  026276  012777  003426  154052        MOV     #BUF,@RLBA      ;WRITE FROM BUF
2958  026304  013777  002272  154046        MOV     TMP0,@RLDA      ;SECTOR
2959  026312  004537  015056                JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
2960  026316  000012                        WRITE
2961  026320  004537  015702                JSR     R5,WTCRDY       ;WAIT FOR WRITE TO FINISH
2962  026324                                  ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  026324  104410                          TRAP    C$ESCAPE
 (3)  026326  000320                          .WORD   10001$-.
2963  026330  005237  002272                INC     TMP0            ;NEXT SECTOR
2964  026334  023727  002272  000050        CMP     TMP0,#40.       ;ALL DONE?
2965  026342  001342                        BNE     199$            ;NO GO BACK
2966  026344  005037  002272                CLR     TMP0            ;CLEAR
2967
2968  026350                                  BGNSEG                          ;%%START OF SEGMENT%%
 (3)  026350  104404                          TRAP    C$BSEG
2969
2970  026352  012702  003426          98$:    MOV     #BUF,R2         ;CLEAR THE BUFFER FIRST
2971  026356  012701  000200                  MOV     #128.,R1        ;128 WORDS
2972  026362  005022                  3$:     CLR     (R2)+
2973  026364  005301                          DEC     R1
2974  026366  001375                          BNE     3$
2975
2976  026370  013777  002272  153762        MOV     TMP0,@RLDA      ;GET SECTOR
2977  026376  012777  003426  153752        MOV     #BUF,@RLBA      ;SETUP BUS ADDRESS
2978
2979  026404  012777  177600  153750        MOV     #-128.,@RLMP    ;READ A SECTOR
2980  026412  004537  015056                JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
2981  026416  000014                        READ
2982  026420  004537  015702                JSR     R5,WTCRDY
2983  026424                                  ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  026424  104410                          TRAP    C$ESCAPE
 (3)  026426  000216                          .WORD   10002$-.
2984
2985  026430  004537  014614                JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
2986  026434  005737  002236                TST     T.CRC           ;WAS ERROR A DCK??
2987  026440  001003                        BNE     8$              ;YES,SEE IF WE A DUMP
2988  026442                          10$:    ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  026442  104410                          TRAP    C$ESCAPE
 (3)  026444  000200                          .WORD   10002$-.
2989  026446  000404                        BR      99$             ;SKIP AROUND
2990  026450  005737  012440          8$:     TST     T.DMP           ;DO WE STILL WANT TO CHECK IT
2991  026454  001772                        BEQ     10$             ;NO
2992  026456                                  CKLOOP                  ;YES, CHECK FOR LOOP FIRST
```

```
  (3)  026456  104406                          TRAP    C$CLP1
2993
2994                                 ;CHECK NOW TO SEE IF WE READ THE RIGHT SECTOR
2995
2996  026460  005037  002242         99$:    CLR     CDCNT           ;CLEAR NUMBER WE'RE TO PRINT
2997  026464  005037  002234                 CLR     CHECK           ;ALLOW HEADER ON FIRST PRINT
2998  026470  013737  002272  002300         MOV     TMP0,GDDAT      ;EXPECTED DATA
2999  026476  012702  003426                 MOV     #BUF,R2         ;BUFFER
3000  026502  012701  000200                 MOV     #128.,R1        ;WORD COUNT
3001  026506  012237  002302         5$:     MOV     (R2)+,BDDAT     ;
3002  026512  023737  002302  002300         CMP     BDDAT,GDDAT
3003  026520  001440                         BEQ     6$
3004
3005  026522  023737  002242  012442         CMP     CDCNT,T.LMT             ;CHECKED ENOUGH??
3006  026530  001002                         BNE     333$            ;NO
3007  026532                                 ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
  (3)  026532  104410                        TRAP    C$ESCAPE
  (3)  026534  000110                        .WORD   10002$-.
3008  026536  005237  002242         333$:   INC     CDCNT           ;ACCOUNT FOR IT
3009
3010  026542  005737  002234                 TST     CHECK           ;HEADER OR JUST DATA
3011  026546  001007                         BNE     9$              ;JUST DATA
3012  026550                                 ERRDF   38.,EM50,ERR11  ;
  (4)  026550  104455                        TRAP    C$ERDF
  (5)  026552  000046                        .WORD   38
  (5)  026554  006621                        .WORD   EM50
  (5)  026556  010220                        .WORD   ERR11
3013  026560  005237  002234                 INC     CHECK           ;ACCOUNT FOR PRINT OF HEADER
3014  026564  000416                         BR      6$
3015
3016  026566                         9$:     PRINTB  #FRMT8,TMP0,GDDAT,BDDAT
 (10)  026566  013746  002302                MOV     BDDAT,-(SP)
  (9)  026572  013746  002300                MOV     GDDAT,-(SP)
  (8)  026576  013746  002272                MOV     TMP0,-(SP)
  (7)  026602  012746  011426                MOV     #FRMT8,-(SP)
  (6)  026606  012746  000004                MOV     #4,-(SP)
  (3)  026612  010600                        MOV     SP,R0
  (4)  026614  104414                        TRAP    C$PNTB
  (4)  026616  062706  000012                ADD     #12,SP
3017  026622                         6$:     CKLOOP
  (3)  026622  104406                        TRAP    C$CLP1
3018
3019  026624  005301                         DEC     R1              ;ALL OF SECTOR CHECKED?
3020  026626  001327                         BNE     5$              ;GO BACK IF NOT
3021  026630  005237  002272                 INC     TMP0            ;NEXT SECTOR
3022  026634  023727  002272  000050         CMP     TMP0,#40.       ;DONE?
3023  026642  001243                         BNE     98$             ;NO, GO BACK
3024
3025  026644                                 ENDSEG                          ;%%END OF SEGMENT%%
  (3)  026644                         10002$:
  (3)  026644  104405                        TRAP    C$ESEG
3026
3027  026646                                 ENDSEG                          ;%%END OF SEGMENT%%
  (3)  026646                         10001$:
  (3)  026646  104405                        TRAP    C$ESEG
3028  026650                                 ENDSEG                          ;%%END OF SEGMENT%%
```

```
   (3)  026650                          10000$:
   (3)  026650  104405                          TRAP    C$ESEG
3029    026652                          ENDTST                                  ;**END OF TEST**
   (3)  026652                          L10067:
   (3)  026652  104401                          TRAP    C$ETST
3030
3031                                    .SBTTL  **TEST 30** - WRITE CHECK NPR INTEGRITY
3032
3033    026654                          BGNTST                                  ;**START OF TEST**
3034
3035    026654                          STARS
   (2)                                  ;;*********************************************************************
3036                                    ;CHECK THAT NPR WILL NOT INTERFERE WITH THE OPERATION OF THE
3037                                    ;UNIBUS. WE SET UP LOCATION 4 TO HANDLE THE TRAP IF IT HAPPENS.
3038    026654                          STARS
   (2)                                  ;;*********************************************************************
3039
3040
3041    026654  004737  015756                  JSR     PC,HDHOME       ;HEADS OVER TRACK 0
3042    026660                                  CKERFG                  ;HEADS GO HOME OKAY
   (4)  026666  104432                          TRAP    C$EXIT
   (4)  026670  000376                          .WORD   L10070-.
3043
3044    026672                                  BGNSEG                          ;%%START OF SEGMENT%%
   (3)  026672  104404                          TRAP    C$BSEG
3045
3046    026674  012700  003426                  MOV     #BUF,R0         ;SETUP AND WRITE
3047    026700  012701  000200                  MOV     #128.,R1        ;128 WORDS
3048    026704  012720  125252          299$:   MOV     #125252,(R0)+   ;WRITE
3049    026710  005301                          DEC     R1              ;DONE??
3050    026712  001374                          BNE     299$
3051
3052    026714  012777  003426  153434          MOV     #BUF,@RLBA      ;LOAD BUS ADDRESS
3053    026722  012777  177600  153432          MOV     #-128.,@RLMP    ;WORD COUNT
3054    026730  005077  153424                  CLR     @RLDA           ;CLEAR DISK ADDRESS
3055    026734  004537  015056                  JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
3056    026740  000012                          WRITE
3057    026742  004537  015702                  JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY
3058    026746                                  ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
   (3)  026746  104410                          TRAP    C$ESCAPE
   (3)  026750  000314                          .WORD   10000$-.
3059    026752  004537  014614                  JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
3060    026756                                  ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
   (3)  026756  104410                          TRAP    C$ESCAPE
   (3)  026760  000304                          .WORD   10000$-.
3061
3062
3063                                    ;VERIFY WRITE WITH READ BEFORE WRCHK
3064
3065    026762  005077  153372                  CLR     @RLDA
3066    026766  012777  003426  153362          MOV     #BUF,@RLBA
3067    026774  012777  177600  153360          MOV     #-128.,@RLMP
3068    027002  004537  015056                  JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
3069    027006  000014                          READ
3070    027010  004537  015702                  JSR     R5,WTCRDY
3071    027014                                  ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
```

```
  (3)  027014  104410                        TRAP    C$ESCAPE
  (3)  027016  000246                        .WORD   10000$-.
3072   027020  004537  014614                JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
3073   027024                                ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
  (3)  027024  104410                        TRAP    C$ESCAPE
  (3)  027026  000236                        .WORD   10000$-.
3074
3075   027030                                BGNSEG                          ;%%START OF SEGMENT%%
  (3)  027030  104404                        TRAP    C$BSEG
3076
3077   027032                          1$:   SETVEC  ERRVEC,#TRPHAN,#340     ;SET UP FOR TRAP
  (7)  027032  012746  000340                MOV     #340,-(SP)
  (6)  027036  012746  015760                MOV     #TRPHAN,-(SP)
  (5)  027042  013746  002244                MOV     ERRVEC,-(SP)
  (4)  027046  012746  000003                MOV     #3,-(SP)
  (3)  027052  104437                        TRAP    C$SVEC
  (2)  027054  062706  000010                ADD     #10,SP
3078   027060  005037  002254                CLR     TRPFLG                  ;CLEAR TRAP OCCURANCE
3079   027064  012777  003426  153264        MOV     #BUF,@RLBA              ;BUS ADDRESS
3080   027072  005077  153262                CLR     @RLDA                   ;LOAD DISK ADDRESS
3081   027076  012777  177600  153256        MOV     #-128.,@RLMP            ;WORD COUNT OF 128
3082   027104  005037  002300                CLR     GDDAT                   ;SET UP CSR TO LOAD
3083   027110  013737  002246  002300        MOV     DRIVE,GDDAT             ;SET IN DRIVE
3084   027116  052737  000002  002300        BIS     #WRCHK,GDDAT            ;SET IN FUNCTION
3085   027124  004537  015364                JSR     R5,BEFORE               ;LOAD FOR ERROR PRINTOUT
3086   027130  013737  002300  002330        MOV     GDDAT,B.CS              ;SET IN COMMAND
3087   027136  052737  000201  002330        BIS     #201,B.CS               ;LOAD CRDY
3088   027144  042737  002000  002330        BIC     #IPI,B.CS               ;CLEAR (BIT 10)
3089   027152  013777  002300  153174        MOV     GDDAT,@RLCS             ;ISSUE WRITE CHECK
3090   027160  012701  000144                MOV     #100.,R1                ;WAIT FOR CRDY
3091   027164  032777  000200  153162  5$:   BIT     #CRDY,@RLCS             ;NPR DONE
3092   027172  001015                        BNE     6$                      ;YES, 6$
3093   027174                                WAITUS  #20.                    ;WAIT A WHILE
3094   027206  005301                        DEC     R1                      ;A WHILE UP
3095   027210  001365                        BNE     5$                      ;NO, GO BACK
3096
3097   027212  004537  015416                JSR     R5,AFTER
3098   027216                                ERRDF   0.,CRTIM,ERR5           ;CONTROLLER TIMED OUT
  (4)  027216  104455                        TRAP    C$ERDF
  (5)  027220  000000                        .WORD   0
  (5)  027222  003521                        .WORD   CRTIM
  (5)  027224  007722                        .WORD   ERR5
3099   027226                          6$:   CLRVEC  ERRVEC                  ;CLEAR VECTOR
  (3)  027226  013700  002244                MOV     ERRVEC,R0
  (3)  027232  104436                        TRAP    C$CVEC
3100   027234                                ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
  (3)  027234  104410                        TRAP    C$ESCAPE
  (3)  027236  000024                        .WORD   10001$-.
3101
3102   027240  005737  002254                TST     TRPFLG                  ;DID TRAP OCCUR?
3103   027244  001406                        BEQ     7$                      ;NO
3104   027246  004537  015416                JSR     R5,AFTER
3105   027252                                ERRSF   1.,EM57,ERR0            ;TRAP ON WRITE
  (4)  027252  104454                        TRAP    C$ERSF
  (5)  027254  000001                        .WORD   1
  (5)  027256  007052                        .WORD   EM57
```

```
  (5)  027260  007510                        .WORD   ERR0
3106   027262                          7$:
3107
3108
3109   027262                                ENDSEG                          ;%%END OF SEGMENT%%
  (3)  027262                          10001$:
  (3)  027262  104405                        TRAP    C$ESEG
3110   027264                                ENDSEG                          ;%%END OF SEGMENT%%
  (3)  027264                          10000$:
  (3)  027264  104405                        TRAP    C$ESEG
3111
3112   027266                          ENDTST                                ;**END OF TEST**
  (3)  027266                          L10070:
  (3)  027266  104401                        TRAP    C$ETST
3113
3114                                   .SBTTL  **TEST 31** - WRITE CHECK FUNCTION
3115
3116   027270                          BGNTST                                ;**START OF TEST**
3117
3118   027270                          STARS
  (2)                                  ;;*****************************************************************
3119                                   ;CHECK OF WRITE CHECK LOGIC UNDER FLAG MODE
3120                                   ; WE WILL WRITE CHECK A FULL SECTOR (128 WORDS) FROM
3121                                   ;MEMORY (BUF).  WE CHECK THAT NO ERRORS OCCUR.
3122   027270                          STARS
  (2)                                  ;;*****************************************************************
3123
3124
3125   027270  004737  015766                JSR     PC,HDHOME       ;HEADS OVER TRACK 0
3126   027274                                CKERFG                  ;HEADS GO HOME OKAY
  (4)  027302  104432                        TRAP    C$EXIT
  (4)  027304  000214                        .WORD   L10071-.
3127
3128   027306                                BGNSEG                          ;%%START OF SEGMENT%%
  (3)  027306  104404                        TRAP    C$BSEG
3129
3130   027310  012700  003426                MOV     #BUF,R0         ;SETUP AND WRITE
3131   027314  012701  000200                MOV     #128.,R1        ;128 WORDS
3132   027320  012720  125252          299$: MOV     #125252,(R0)+   ;WRITE
3133   027324  005301                        DEC     R1              ;DONE??
3134   027326  001374                        BNE     299$
3135
3136   027330  012777  003426  153020        MOV     #BUF,@RLBA      ;LOAD BUS ADDRESS
3137   027336  012777  177600  153016        MOV     #-128.,@RLMP    ;WORD COUNT
3138   027344  005077  153010                CLR     @RLDA           ;CLEAR DISK ADDRESS
3139   027350  004537  015056                JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
3140   027354  000012                        WRITE
3141   027356  004537  015702                JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY
3142   027362                                ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
  (3)  027362  104410                        TRAP    C$ESCAPE
  (3)  027364  000132                        .WORD   10000$-.
3143   027366  004537  014614                JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
3144   027372                                ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
  (3)  027372  104410                        TRAP    C$ESCAPE
  (3)  027374  000122                        .WORD   10000$-.
3145   027376                                BGNSEG                          ;%%START OF SEGMENT%%
```

```
  (3)  027376  104404                          TRAP    C$BSEG
3146
3147                                   ;VERIFY WRITE WITH READ BEFORE WRCHK
3148
3149  027400  005077  152754                   CLR     @RLDA
3150  027404  012777  003426  152744           MOV     #BUF,@RLBA
3151  027412  012777  177600  152742           MOV     #-128.,@RLMP
3152  027420  004537  015056                   JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
3153  027424  000014                           READ
3154  027426  004537  015702                   JSR     R5,WTCRDY
3155  027432                                   ESCAPE  SEG                     ;CHECK FOR FL:LOE, ELSE EXIT SEG
  (3)  027432  104410                          TRAP    C$ESCAPE
  (3)  027434  000060                          .WORD   10001$-.
3156  027436  004537  014614                   JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
3157  027442                                   ESCAPE  SEG                     ;CHECK FOR FL:LOE, ELSE EXIT SEG
  (3)  027442  104410                          TRAP    C$ESCAPE
  (3)  027444  000050                          .WORD   10001$-.
3158
3159  027446                                   BGNSEG                          ;%%START OF SEGMENT%%
  (3)  027446  104404                          TRAP    C$BSEG
3160
3161  027450                                 3$:
3162  027450  005077  152704                   CLR     @RLDA
3163  027454  012777  177600  152700           MOV     #-128.,@RLMP            ;WORD COUNT
3164  027462  012777  003426  152666           MOV     #BUF,@RLBA              ;BUS ADDRESS
3165  027470  004537  015056                   JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
3166  027474  000002                           WRCHK                           ;WRITE CHECK
3167
3168  027476  004537  015702                   JSR     R5,WTCRDY               ;WAIT FOR CONTROLLER READY
3169  027502                                   ESCAPE  SEG                     ;CHECK FOR FL:LOE, ELSE EXIT SEG
  (3)  027502  104410                          TRAP    C$ESCAPE
  (3)  027504  000006                          .WORD   10002$-.
3170
3171
3172  027506  004537  014614                   JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
3173
3174  027512                                   ENDSEG                          ;%%END OF SEGMENT%%
  (3)  027512                              10002$:
  (3)  027512  104405                          TRAP    C$ESEG
3175  027514                                   ENDSEG                          ;%%END OF SEGMENT%%
  (3)  027514                              10001$:
  (3)  027514  104405                          TRAP    C$ESEG
3176  027516                                   ENDSEG                          ;%%END OF SEGMENT%%
  (3)  027516                              10000$:
  (3)  027516  104405                          TRAP    C$ESEG
3177  027520                                 ENDTST                            ;**END OF TEST**
  (3)  027520                              L10071:
  (3)  027520  104401                          TRAP    C$ETST
3178
3179                                   .SBTTL  **TEST 32** - WRITE CHECK FUNCTION INTERRUPT
3180
3181  027522                           BGNTST                                  ;**START OF TEST**
3182
3183  027522                           STARS
  (2)                                ;;*****************************************************************
3184                                 ;CHECK OF WRITE CHECK LOGIC UNDER INTERRUPT MODE
```

```
                        ;WE WILL WRITE CHECK A FULL SECTOR (128 WORDS) FROM MEMORY (BUF).
                        ;WE CHECK THAT NO ERRORS OCCUR.  WE DO NOT CHECK RLDA OR RLBA
                        ;INCREMENT AT THIS TIME.
027522                  STARS
 (2)                    ;;*****************************************************************

027522  004737  015766          JSR     PC,HDHOME       ;HEADS OVER TRACK 0
027526                          CKERFG                  ;HEADS GO HOME OKAY
 (4)    027534  104432          TRAP    C$EXIT
 (4)    027536  000252          .WORD   L10072-.

027540                          BGNSEG                          ;%%START OF SEGMENT%%
 (3)    027540  104404          TRAP    C$BSEG

027542  012700  003426          MOV     #BUF,R0         ;SETUP AND WRITE
027546  012701  000200          MOV     #128.,R1        ;128 WORDS
027552  012720  125252  299$:   MOV     #125252,(R0)+   ;WRITE
027556  005301                  DEC     R1              ;DONE??
027560  001374                  BNE     299$

027562  012777  003426  152566  MOV     #BUF,@RLBA      ;LOAD BUS ADDRESS
027570  012777  177600  152564  MOV     #-128.,@RLMP    ;WORD COUNT
027576  005077  152556          CLR     @RLDA           ;CLEAR DISK ADDRESS
027602  004537  015056          JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
027606  000012                  WRITE
027610  004537  015702          JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY
027614                          ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)    027614  104410          TRAP    C$ESCAPE
 (3)    027616  000170          .WORD   10000$-.
027620  004537  014614          JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
027624                          ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)    027624  104410          TRAP    C$ESCAPE
 (3)    027626  000160          .WORD   10000$-.
                        ;VERIFY WRITE WITH READ BEFORE WRCHK

027630  005077  152524          CLR     @RLDA
027634  012777  003426  152514  MOV     #BUF,@RLBA
027642  012777  177600  152512  MOV     #-128.,@RLMP
027650  004537  015056          JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
027654  000014                  READ
027656  004537  015702          JSR     R5,WTCRDY
027662                          ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)    027662  104410          TRAP    C$ESCAPE
 (3)    027664  000122          .WORD   10000$-.
027666  004537  014614          JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
027672                          ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)    027672  104410          TRAP    C$ESCAPE
 (3)    027674  000112          .WORD   10000$-.

027676                          BGNSEG                          ;%%START OF SEGMENT%%
 (3)    027676  104404          TRAP    C$BSEG


027700  005037  002256          CLR     INTFLG          ;CLEAR INTERRUPT OCCURANCE FLAG
027704  005077  152450          CLR     @RLDA
```

```
3228  027710  012777  177600  152444          MOV     #-128.,@RLMP    ;SET UP WORD COUNT
3229  027716  012777  003426  152432          MOV     #BUF,@RLBA      ;SET UP BUS ADDRESS
3230
3231  027724                                  SETPRI  #PRI00          ;PRIORITY TO 0
 (3)  027724  012700  000000                  MOV     #PRI00,R0
 (3)  027730  104441                          TRAP    C$SPRI
3232  027732  004537  015056                  JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
3233  027736  000102                          WRCHK.INTEN             ;WRITE CHECK UNDER INTERRUPT
3234  027740  004537  015702                  JSR     R5,WTCRDY       ;WAIT FOR INTERRUPT
3235  027744                                  ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  027744  104410                          TRAP    C$ESCAPE
 (3)  027746  000036                          .WORD   10001$-.
3236
3237  027750                                  SETPRI  #PRI07          ;SET PRIORITY TO 7
 (3)  027750  012700  000340                  MOV     #PRI07,R0
 (3)  027754  104441                          TRAP    C$SPRI
3238  027756  005737  002256                  TST     INTFLG          ;DID INTERRUPT OCCUR?
3239  027762  001004                          BNE     2$              ;YES-BRANCH NO-REPORT
3240
3241  027764                                  ERRDF   4.,EM60,ERR0    ;WRITE DID NOT INTERRUPT
 (4)  027764  104455                          TRAP    C$ERDF
 (5)  027766  000004                          .WORD   4
 (5)  027770  007107                          .WORD   EM60
 (5)  027772  007510                          .WORD   ERR0
3242  027774                          2$:     ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  027774  104410                          TRAP    C$ESCAPE
 (3)  027776  000006                          .WORD   10001$-.
3243
3244  030000  004537  014614                  JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
3245
3246  030004                                  ENDSEG                          ;%%END OF SEGMENT%%
 (3)  030004                          10001$:
 (3)  030004  104405                          TRAP    C$ESEG
3247  030006                                  ENDSEG                          ;%%END OF SEGMENT%%
 (3)  030006                          10000$:
 (3)  030006  104405                          TRAP    C$ESEG
3248  030010                          ENDTST                          ;**END OF TEST**
 (3)  030010                          L10072:
 (3)  030010  104401                          TRAP    C$ETST
3249
3250                                    .SBTTL  **TEST 33** - PROPER INCREMENT OF RLBA ON WRITE CHECK
3251
3252  030012                            BGNTST                          ;**START OF TEST**
3253
3254
3255  030012                            STARS
 (2)                                    ;;*****************************************************************
3256                                    ;CHECK THAT THE RLBA WILL INCREMENT PROPERLY AFTER THE
3257                                    ;WRITE CHECK WAS FINISHED THE RLBA SHOULD BE 128 WORDS (256 BYTES)
3258                                    ;GREATER.  STARTING RLBA IS 'BUF'', ENDING SHOULD BE 'BUF + 256.''
3259                                    ;WE WILL MONITOR ALL ERRORS AND REPORT THEM ACCORDINGLY
3260  030012                            STARS
 (2)                                    ;;*****************************************************************
3261
3262
3263  030012  004737  015766                  JSR     PC,HDHOME       ;HEADS OVER TRACK 0
```

```
3264  030016                                    CKERFG                          ;HEADS GO HOME OKAY
 (4)  030024  104432                            TRAP    C$EXIT
 (4)  030026  000256                            .WORD   L10073-.
3265
3266  030030                                    BGNSEG                                  ;%%START OF SEGMENT%%
 (3)  030030  104404                            TRAP    C$BSEG
3267
3268  030032  012700  003426                    MOV     #BUF,R0         ;SETUP AND WRITE
3269  030036  012701  000200                    MOV     #128.,R1        ;128 WORDS
3270  030042  012720  125252          299$:     MOV     #125252,(R0)+   ;WRITE
3271  030046  005301                            DEC     R1              ;DONE??
3272  030050  001374                            BNE     299$
3273
3274  030052  012777  003426  152276            MOV     #BUF,@RLBA      ;LOAD BUS ADDRESS
3275  030060  012777  177600  152274            MOV     #-128.,@RLMP    ;WORD COUNT
3276  030066  005077  152266                    CLR     @RLDA           ;CLEAR DISK ADDRESS
3277  030072  004537  015056                    JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
3278  030076  000012                            WRITE
3279  030100  004537  015702                    JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY
3280  030104                                    ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  030104  104410                            TRAP    C$ESCAPE
 (3)  030106  000174                            .WORD   10000$-.
3281  030110  004537  014614                    JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
3282  030114                                    ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  030114  104410                            TRAP    C$ESCAPE
 (3)  030116  000164                            .WORD   10000$-.
3283                                    ;VERIFY WRITE WITH READ BEFORE WRCHK
3284
3285  030120  005077  152234                    CLR     @RLDA
3286  030124  012777  003426  152224            MOV     #BUF,@RLBA
3287  030132  012777  177600  152222            MOV     #-128.,@RLMP
3288  030140  004537  015056                    JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
3289  030144  000014                            READ
3290  030146  004537  015702                    JSR     R5,WTCRDY
3291  030152                                    ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  030152  104410                            TRAP    C$ESCAPE
 (3)  030154  000126                            .WORD   10000$-.
3292  030156  004537  014614                    JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
3293  030162                                    ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  030162  104410                            TRAP    C$ESCAPE
 (3)  030164  000116                            .WORD   10000$-.
3294
3295  030166                                    BGNSEG                                  ;%%START OF SEGMENT%%
 (3)  030166  104404                            TRAP    C$BSEG
3296
3297  030170                            3$:
3298  030170  005077  152164                    CLR     @RLDA
3299  030174  012777  003426  152154            MOV     #BUF,@RLBA      ;SET UP BUS ADDRESS
3300  030202  012777  177600  152152            MOV     #-128.,@RLMP    ;WORD COUNT
3301  030210  012737  003426  002300            MOV     #BUF,GDDAT      ;FORM EXPECTED BUS ADDRESS
3302  030216  062737  000400  002300            ADD     #256.,GDDAT     ;AFTER WRITE
3303
3304  030224  004537  015056                    JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
3305  030230  000002                            WRCHK                   ;WRITE CHECK
3306  030232  004537  015702                    JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY
3307  030236                                    ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
```

```
 (3)  030236  104410                        TRAP    C$ESCAPE
 (3)  030240  000040                        .WORD   10001$-.
3308
3309  030242  004537  014614                JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
3310  030246                                ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  030246  104410                        TRAP    C$ESCAPE
 (3)  030250  000030                        .WORD   10001$-.
3311  030252  017737  152100  002302        MOV     @RLBA,BDDAT     ;READ 'RLBA' FOR PRESENT ADDRESS
3312  030260  023737  002302  002300        CMP     BDDAT,GDDAT     ;DID 'BA' INCREMENT PROPERLY?
3313  030266  001404                        BEQ     2$              ;YES, CONTINUE
3314
3315  030270                                ERRDF   5.,EM61,ERR4    ;BA DID NOT INCREMENT
 (4)  030270  104455                        TRAP    C$ERDF
 (5)  030272  000005                        .WORD   5
 (5)  030274  007137                        .WORD   EM61
 (5)  030276  007654                        .WORD   ERR4
3316
3317  030300                          2$:
3318
3319  030300                                ENDSEG                          ;%%END OF SEGMENT%%
 (3)  030300                          10001$:
 (3)  030300  10440E                        TRAP    C$ESEG
3320  030302                                ENDSEG                          ;%%END OF SEGMENT%%
 (3)  030302                          10000$:
 (3)  030302  104405                        TRAP    C$ESEG
3321  030304                          ENDTST                                ;**END OF TEST**
 (3)  030304                          L10073:
 (3)  030304  104401                        TRAP    C$ETST
3322
3323                                  .SBTTL  **TEST 34** - PROPER INCREMENT OF RLDA ON WRITE CHECK
3324
3325  030306                          BGNTST                                ;**START OF TEST**
3326
3327  030306                          STARS
 (2)                                  ;;*****************************************************************
3328                                  ;CHECK THAT THE SECTOR INCREMENTS AFTER THE WRITE CHECK WAS FINISHED.
3329                                  ;A FULL SECTOR WRITE CHECK THE RLDA SHOULD REFLECT AN INCREMENT
3330                                  ;OF THE SECOTR.  ''GDDAT'' WAS THE EXPECTED RLDA.
3331  030306                          STARS
 (2)                                  ;;*****************************************************************
3332
3333
3334  030306  004737  015766                JSR     PC,HDHOME       ;HEADS OVER TRACK 0
3335  030312                                CKERFG                  ;HEADS GO HOME OKAY
 (4)  030320  104432                        TRAP    C$EXIT
 (4)  030322  000254                        .WORD   L10074-.
3336
3337  030324                                BGNSEG                          ;%%START OF SEGMENT%%
 (3)  030324  104404                        TRAP    C$BSEG
3338
3339  030326  012700  003426                MOV     #BUF,R0         ;SETUP AND WRITE
3340  030332  012701  000200                MOV     #128.,R1        ;128 WORDS
3341  030336  012720  125252          299$: MOV     #125252,(R0)+   ;WRITE
3342  030342  005301                        DEC     R1              ;DONE??
3343  030344  001374                        BNE     299$
3344
```

```
3345  030346  012777  003426  152002          MOV     #BUF,@RLBA      ;LOAD BUS ADDRESS
3346  030354  012777  177600  152000          MOV     #-128.,@RLMP    ;WORD COUNT
3347  030362  005077  151772                  CLR     @RLDA           ;CLEAR DISK ADDRESS
3348  030366  004537  015056                  JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
3349  030372  000012                          WRITE
3350  030374  004537  015702                  JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY
3351  030400                                  ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  030400  104410                          TRAP    C$ESCAPE
 (3)  030402  000172                          .WORD   10000$-.
3352  030404  004537  014614                  JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
3353  030410                                  ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  030410  104410                          TRAP    C$ESCAPE
 (3)  030412  000162                          .WORD   10000$-.
3354                                    ;VERIFY WRITE WITH READ BEFORE WRCHK
3355
3356  030414  005077  151740                  CLR     @RLDA
3357  030420  012777  003426  151730          MOV     #BUF,@RLBA
3358  030426  012777  177600  151726          MOV     #-128.,@RLMP
3359  030434  004537  015056                  JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
3360  030440  000014                          READ
3361  030442  004537  015702                  JSR     R5,WTCRDY
3362  030446                                  ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  030446  104410                          TRAP    C$ESCAPE
 (3)  030450  000124                          .WORD   10000$-.
3363  030452  004537  014614                  JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
3364  030456                                  ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  030456  104410                          TRAP    C$ESCAPE
 (3)  030460  000114                          .WORD   10000$-.
3365
3366  030462                                  BGNSEG                          ;%%START OF SEGMENT%%
 (3)  030462  104404                          TRAP    C$BSEG
3367
3368  030464                            3$:
3369  030464  005037  002300                  CLR     GDDAT
3370  030470  013777  002300  151662          MOV     GDDAT,@RLDA     ;SETUP DISK ADDRESS
3371  030476  005237  002300                  INC     GDDAT           ;CREATE EXPECTED SECTOR
3372  030502  012777  177600  151652          MOV     #-128.,@RLMP    ;WORD COUNT
3373  030510  012777  003426  151640          MOV     #BUF,@RLBA      ;SETUP BUS ADDRESS
3374
3375  030516  004537  015056                  JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
3376  030522  000002                          WRCHK                   ;WRITE CHECK
3377  030524  004537  015702                  JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY
3378  030530                                  ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  030530  104410                          TRAP    C$ESCAPE
 (3)  030532  000040                          .WORD   10001$-.
3379
3380  030534  004537  014614                  JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
3381  030540                                  ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  030540  104410                          TRAP    C$ESCAPE
 (3)  030542  000030                          .WORD   10001$-.
3382
3383  030544  013737  002344  002302          MOV     E.DA,BDDAT      ;READ DISK ADDRESS
3384  030552  023737  002300  002302          CMP     GDDAT,BDDAT     ;DID SECTOR INCREMENT PROPERLY
3385  030560  001404                          BEQ     2$              ;YES, BRANCH  NO, REPORT ERROR
3386
3387  030562                                  ERRDF   6.,EM62,ERR4    ;DA DID NOT INCREMENT
```

```
  (4)  030562  104455                          TRAP    C$ERDF
  (5)  030564  000006                          .WORD   6
  (5)  030566  007207                          .WORD   EM62
  (5)  030570  007654                          .WORD   ERR4
3388
3389  030572                              2$:
3390
3391  030572                                   ENDSEG                          ;%%END OF SEGMENT%%
  (3)  030572                              10001$:
  (3)  030572  104405                          TRAP    C$ESEG
3392  030574                                   ENDSEG                          ;%%END OF SEGMENT%%
  (3)  030574                              10000$:
  (3)  030574  104405                          TRAP    C$ESEG
3393  030576                              ENDTST                               ;**END OF TEST**
  (3)  030576                              L10074:
  (3)  030576  104401                          TRAP    C$ETST
3394
3395
3396                                      .SBTTL  **TEST 35** - MULTIPLE SECTOR WRITE CHECK
3397
3398  030600                              BGNTST                               ;**START OF TEST**
3399
3400  030600                              STARS
  (2)                                     ;;*****************************************************************
3401                                      ;CHECK FOR MULTIPLE SECTOR WRITE CHECK. THIS TEST CHECKS
3402                                      ;THAT TWO SECTORS CAN BE SUCCESSFULLY CHECKED.  WE LOAD
3403                                      ;A WORD COUNT OF 129 WORDS (ONE SECTOR + 1 WORD) STARTING AT
3404                                      ;SECTOR 0 THRU SECTOR 37 AND VERIFY THAT THE RLDA DOES
3405                                      ;A DOUBLE INCREMENT EACH TIME.
3406  030600                              STARS
  (2)                                     ;;*****************************************************************
3407
3408
3409
3410  030600  004737  015766                   JSR     PC,HDHOME       ;HEADS OVER TRACK 0
3411  030604                                   CKERFG                  ;HEADS GO HOME OKAY
  (4)  030612  104432                          TRAP    C$EXIT
  (4)  030614  000354                          .WORD   L10075-.
3412
3413  030616                                   BGNSEG                          ;%%START OF SEGMENT%%
  (3)  030616  104404                          TRAP    C$BSEG
3414
3415  030620  012737  000000  002272           MOV     #0,TMP0
3416  030626  012737  000000  002274           MOV     #0,TMP1
3417  030634  012700  003426                   MOV     #BUF,R0         ;SETUP AND WRITE
3418  030640  012701  000201                   MOV     #129.,R1        ;129 WORDS
3419  030644  012720  125252              299$: MOV     #125252,(R0)+   ;WRITE
3420  030650  005301                           DEC     R1              ;DONE??
3421  030652  001374                           BNE     299$
3422
3423  030654  012777  003426  151474     1$:  MOV     #BUF,@RLBA      ;LOAD BUS ADDRESS
3424  030662  012777  177577  151472           MOV     #-129.,@RLMP    ;WORD COUNT
3425  030670  013737  002274  002300           MOV     TMP1,GDDAT
3426  030676  053737  002272  002300           BIS     TMP0,GDDAT
3427  030704  013777  002300  151446           MOV     GDDAT,@RLDA
3428  030712  004537  015056                   JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
```

```
3429  030716  000012                        WRITE
3430  030720  004537  015702                JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY
3431  030724                                ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  030724  104410                        TRAP    C$ESCAPE
 (3)  030726  000240                        .WORD   10000$-.
3432  030730  004537  014614                JSR     R5,CHERR                ;CHECK CNTLR FOR ERROPS
3433  030734                                ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  030734  104410                        TRAP    C$ESCAPE
 (3)  030736  000230                        .WORD   10000$-.
3434
3435                                ;VERIFY WRITE WITH READ BEFORE WRCHK
3436
3437  030740  013737  002274  002300        MOV     TMP1,GDDAT
3438  030746  053737  002272  002300        BIS     TMP0,GDDAT
3439  030754  013777  002300  151376        MOV     GDDAT,@RLDA
3440  030762  012777  003426  151366        MOV     #BUF,@RLBA
3441  030770  012777  177577  151364        MOV     #-129.,@RLMP
3442  030776  004537  015056                JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
3443  031002  000014                        READ
3444  031004  004537  015702                JSR     R5,WTCRDY
3445  031010                                ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  031010  104410                        TRAP    C$ESCAPE
 (3)  031012  000154                        .WORD   10000$-.
3446  031014  004537  014614                JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
3447  031020                                ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  031020  104410                        TRAP    C$ESCAPE
 (3)  031022  000144                        .WORD   10000$-.
3448
3449  031024                                BGNSEG                          ;%%START OF SEGMENT%%
 (3)  031024  104404                        TRAP    C$BSEG
3450
3451
3452  031026  013737  002274  002300        MOV     TMP1,GDDAT      ;GET CYLINDER
3453  031034  053737  002272  002300        BIS     TMP0,GDDAT      ;GET SECTOR
3454  031042  013777  002300  151310        MOV     GDDAT,@RLDA     ;SET DISK ADDRESS-SECTOR 0
3455  031050  062737  000002  002300        ADD     #2,GDDAT        ;SET EXPECTED + 2
3456  031056  012777  003426  151272        MOV     #BUF,@RLBA      ;SET BUS ADDRESS
3457  031064  012777  177577  151270        MOV     #-129.,@RLMP    ;WORD COUNT-SECTOR+1 WORD
3458
3459  031072  004537  015056                JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
3460  031076  000002                        WRCHK                   ;WRITE CHECK
3461  031100  004537  015702                JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY?
3462  031104                                ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  031104  104410                        TRAP    C$ESCAPE
 (3)  031106  000042                        .WORD   10001$-.
3463
3464  031110  004537  014614                JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
3465  031114                                ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  031114  104410                        TRAP    C$ESCAPE
 (3)  031116  000032                        .WORD   10001$-.
3466
3467  031120  013737  002344  002302        MOV     E.DA,BDDAT      ;READ DISK ADDRESS
3468  031126  023737  002302  002300        CMP     BDDAT,GDDAT     ;IS DISK ADDRESS CORRECT
3469  031134  001404                        BEQ     2$              ;YES, BRANCH  NO, REPORT ERROR
3470
3471  031136                                ERRDF   7.,EM63,ERR4    ;DISK ADDRESS NOT CORRECT
```

```
  (4)  031136  104455                          TRAP    C$ERDF
  (5)  031140  000007                          .WORD   7
  (5)  031142  007246                          .WORD   EM63
  (5)  031144  007654                          .WORD   ERR4
3472
3473  031146                          2$:      CKLOOP
  (3)  031146  104406                          TRAP    C$CLP1
3474
3475  031150                                   ENDSEG                          ;%%END OF SEGMENT%%
  (3)  031150                          10001$:
  (3)  031150  104405                          TRAP    C$ESEG
3476
3477  031152  005237  002272                  INC     TMP0            ;NEXT SECTOR
3478  031156  022737  000046  002272          CMP     #46,TMP0        ;AT END?
3479  031164  001233                          BNE     1$              ;NO, GO BACK
3480  031166                                   ENDSEG                          ;%%END OF SEGMENT%%
  (3)  031166                          10000$:
  (3)  031166  104405                          TRAP    C$ESEG
3481  031170                          ENDTST                                   ;**END OF TEST**
  (3)  031170                          L10075:
  (3)  031170  104401                          TRAP    C$ETST
3482                                     .SBTTL  **TEST 36** - FORCE DCK WITH WRITE CHECK
3483
3484  031172                          BGNTST                                   ;**START OF TEST**
3485
3486  031172                          STARS
  (2)                                    ;;*****************************************************************
3487                                     ;FORCE A DCK WITH WRITE CHECK. THIS IS DONE BY WRITING
3488                                     ;A SECTOR AND CHANGING A WORD IN MEMORY BEFORE WRITE CHECK
3489                                     ;IS ISSUED..
3490  031172                          STARS
  (2)                                    ;;*****************************************************************
3491
3492  031172  004737  015766                  JSR     PC,HDHOME       ;HEADS OVER TRACK 0
3493  031176                                   CKERFG                  ;HEADS GO HOME OKAY
  (4)  031204  104432                          TRAP    C$EXIT
  (4)  031206  000262                          .WORD   L10076-.
3494
3495  031210                                   BGNSEG                          ;%%START OF SEGMENT%%
  (3)  031210  104404                          TRAP    C$BSEG
3496
3497  031212  012700  003426                  MOV     #BUF,R0         ;SETUP AND WRITE
3498  031216  012701  000200                  MOV     #128.,R1        ;128 WORDS
3499  031222  012720  125252          299$:   MOV     #125252,(R0)+   ;WRITE
3500  031226  005301                          DEC     R1              ;DONE??
3501  031230  001374                          BNE     299$
3502
3503  031232  012777  003426  151116          MOV     #BUF,@RLBA      ;LOAD BUS ADDRESS
3504  031240  012777  177600  151114          MOV     #-128.,@RLMP    ;WORD COUNT
3505  031246  005077  151106                  CLR     @RLDA           ;CLEAR DISK ADDRESS
3506  031252  004537  015056                  JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
3507  031256  000012                          WRITE
3508  031260  004537  015702                  JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY
3509  031264                                   ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
  (3)  031264  104410                          TRAP    C$ESCAPE
  (3)  031266  000200                          .WORD   10000$-.
```

```
3510  031270  004537  014614            JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
3511  031274                            ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  031274  104410                    TRAP    C$ESCAPE
 (3)  031276  000170                    .WORD   10000$-.
3512                              ;VERIFY WRITE WITH READ BEFORE WRCHK
3513
3514  031300  005077  151054            CLR     @RLDA
3515  031304  012777  003426  151044    MOV     #BUF,@RLBA
3516  031312  012777  177600  151042    MOV     #-128.,@RLMP
3517  031320  004537  015056            JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
3518  031324  000014                    READ
3519  031326  004537  015702            JSR     R5,WTCRDY
3520  031332                            ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  031332  104410                    TRAP    C$ESCAPE
 (3)  031334  000132                    .WORD   10000$-.
3521  031336  004537  014614            JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
3522  031342                            ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  031342  104410                    TRAP    C$ESCAPE
 (3)  031344  000122                    .WORD   10000$-.
3523
3524  031346                            BGNSEG                          ;%%START OF SEGMENT%%
 (3)  031346  104404                    TRAP    C$BSFG
3525
3526
3527  031350  005037  003426            CLR     BUF
3528  031354  005077  151000            CLR     @RLDA
3529  031360  012777  003426  150770    MOV     #BUF,@RLBA      ;SETTING SECTOR 40 OF CYL. ADDR.
3530  031366  012777  177600  150766    MOV     #-128.,@RLMP    ;WORD COUNT
3531
3532  031374  004537  015056            JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
3533  031400  000002                    WRCHK                   ;WRITE CHECK
3534  031402  004537  015702            JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY
3535  031406                            ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  031406  104410                    TRAP    C$ESCAPE
 (3)  031410  000054                    .WORD   10001$-.
3536
3537  031412  013737  002340  002272    MOV     E.CS,TMP0       ;GET RLCS
3538  031420  042737  001777  002272    BIC     #1777,TMP0      ;SAVE ERROR BITS
3539  031426  022737  104000  002272    CMP     #BIT15!BIT11,TMP0  ;DCK SET.
3540  031434  001402                    BEQ     1$              ;YES, CONTINUE
3541  031436  004537  014614            JSR     R5,CHERR
3542  031442                      1$:   CKLOOP
 (3)  031442  104406                    TRAP    C$CLP1
3543
3544  031444  022737  104000  002272    CMP     #BIT15!BIT11,TMP0
3545  031452  001404                    BEQ     2$
3546
3547  031454                            ERRDF   23.,EM65,ERR0
 (4)  031454  104455                    TRAP    C$ERDF
 (5)  031456  000027                    .WORD   23
 (5)  031460  007364                    .WORD   EM65
 (5)  031462  007510                    .WORD   ERR0
3548                                                        ;WHEN FORCED
3549  031464                      2$:
3550
3551  031464                            ENDSEG                          ;%%END OF SEGMENT%%
```

```
                        **TEST 36** - FORCE DCK WITH WRITE CHECK

  (3) 031464                    10001$:
  (3) 031464  104405                    TRAP    C$ESEG
 3552 031466                    ENDSEG                          ;%%END OF SEGMENT%%
  (3) 031466                    10000$:
  (3) 031466  104405                    TRAP    C$ESEG
 3553 031470                    ENDTST                          ;**END OF TEST**
  (3) 031470                    L10076:
  (3) 031470  104401                    TRAP    C$ETST
 3554
 3555                           .SBTTL  **TEST 37** - FORCE DCK WITH WRITE CHECK INTERRUPT
 3556
 3557 031472                    BGNTST                          ;**START OF TEST**
 3558
 3559
 3560 031472                    STARS
  (2)                           ;;*****************************************************************
 3561                           ;FORCE A DCK IN INTERRUPT MODE
 3562 031472                    STARS
  (2)                           ;;*****************************************************************
 3563
 3564
 3565 031472  004737  015766            JSR     PC,HDHOME       ;HEADS OVER TRACK 0
 3566 031476                            CKERFG                  ;HEADS GO HOME OKAY
  (4) 031504  104432                    TRAP    C$EXIT
  (4) 031506  000322                    .WORD   L10077-.
 3567
 3568 031510                            BGNSEG                          ;%%START OF SEGMENT%%
  (3) 031510  104404                    TRAP    C$BSEG
 3569
 3570 031512  012700  003426            MOV     #BUF,R0         ;SETUP AND WRITE
 3571 031516  012701  000200            MOV     #128.,R1        ;128 WORDS
 3572 031522  012720  125252    299$:   MOV     #125252,(R0)+   ;WRITE
 3573 031526  005301                    DEC     R1              ;DONE??
 3574 031530  001374                    BNE     299$
 3575
 3576 031532  012777  003426  150616    MOV     #BUF,@RLBA      ;LOAD BUS ADDRESS
 3577 031540  012777  177600  150614    MOV     #-128.,@RLMP    ;WORD COUNT
 3578 031546  005077  150606            CLR     @RLDA           ;CLEAR DISK ADDRESS
 3579 031552  004537  015056            JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
 3580 031556  000012                    WRITE
 3581 031560  004537  015702            JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY
 3582 031564                            ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
  (3) 031564  104410                    TRAP    C$ESCAPE
  (3) 031566  000240                    .WORD   10000$-.
 3583 031570  004537  014614            JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
 3584 031574                            ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
  (3) 031574  104410                    TRAP    C$ESCAPE
  (3) 031576  000230                    .WORD   10000$-.
 3585                           ;VERIFY WRITE WITH READ BEFORE WRCHK
 3586
 3587 031600  005077  150554            CLR     @RLDA
 3588 031604  012777  003426  150544    MOV     #BUF,@RLBA
 3589 031612  012777  177600  150542    MOV     #-128.,@RLMP
 3590 031620  004537  015056            JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
 3591 031624  000014                    READ
 3592 031626  004537  015702            JSR     R5,WTCRDY
```

```
3593  031632                                    ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  031632  104410                            TRAP    C$ESCAPE
 (3)  031634  000172                            .WORD   10000$-.
3594  031636  004537  014614                    JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
3595  031642                                    ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  031642  104410                            TRAP    C$ESCAPE
 (3)  031644  000162                            .WORD   10000$-.
3596
3597  031646                                    BGNSEG                          ;%%START OF SEGMENT%%
 (3)  031646  104404                            TRAP    C$BSEG
3598
3599  031650                                    SETPRI  #PRI00
 (3)  031650  012700  000000                    MOV     #PRI00,R0
 (3)  031654  104441                            TRAP    C$SPRI
3600  031656  005037  002256                    CLR     INTFLG          ;CLEAR INTERRUPT OCCURANCE FLAG
3601  031662  005037  003426                    CLR     BUF
3602  031666  005077  150466                    CLR     @RLDA
3603  031672  012777  003426  150456            MOV     #BUF,@RLBA      ;SETTING SECTOR 40 OF CYL. ADDR.
3604  031700  012777  177600  150454            MOV     #-128.,@RLMP    ;WORD COUNT
3605
3606  031706  004537  015056                    JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
3607  031712  000102                            WRCHK!INTEN             ;WRITE CHECK
3608  031714  004537  015702                    JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY
3609  031720                                    CKLOOP
 (3)  031720  104406                            TRAP    C$CLP1
3610  031722                                    SETPRI  #PRI07
 (3)  031722  012700  000340                    MOV     #PRI07,R0
 (3)  031726  104441                            TRAP    C$SPRI
3611
3612  031730  005737  002256                    TST     INTFLG          ;DID INTERRUPT OCCUR
3613  031734  001004                            BNE     2$              ;YES OKAY
3614
3615  031736                                    ERRDF   24.,EM66,ERR0   ;NO INTERRUPT FROM DCK
 (4)  031736  104455                            TRAP    C$ERDF
 (5)  031740  000030                            .WORD   24
 (5)  031742  007421                            .WORD   EM66
 (5)  031744  007510                            .WORD   ERR0
3616
3617  031746                            2$:     ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  031746  104410                            TRAP    C$ESCAPE
 (3)  031750  000054                            .WORD   10001$-.
3618
3619
3620  031752  013737  002340  002272            MOV     E.CS,TMP0       ;GET RLCS
3621  031760  042737  001777  002272            BIC     #1777,TMP0      ;SAVE ERROR BITS
3622  031766  022737  104000  002272            CMP     #BIT15!BIT11,TMP0  ;DCK  SET.
3623  031774  001402                            BEQ     1$              ;YES, CONTINUE
3624
3625  031776  004537  014614                    JSR     R5,CHERR
3626  032002                            1$:     CKLOOP
 (3)  032002  104406                            TRAP    C$CLP1
3627
3628  032004  022737  104000  002272            CMP     #BIT15.BIT11,TMP0
3629  032012  001404                            BEQ     3$
3630  032014                                    ERRDF   25.,EM65,ERR0
 (4)  032014  104455                            TRAP    C$ERDF
```

```
                        **TEST 37** - FORCE DCK WITH WRITE CHECK INTERRUPT

  (5)  032016  000003                   .WORD   25
  (5)  032020  007364                   .WORD   EM65
  (5)  032022  007510                   .WORD   EPRO
3631                                                    ;WHEN FORCED
3632  032024                    3$:
3633
3634  032024                            ENDSEG                        ;%%END OF SEGMENT%%
  (3)  032024                   10001$:
  (3)  032024  104405                   TRAP    C$ESEG
3635  032026                            ENDSEG                        ;%%END OF SEGMENT%%
  (3)  032026                   10000$:
  (3)  032026  104405                   TRAP    C$ESEG
3636  032030                    ENDTST                                ;**END OF TEST**
  (3)  032030                   L10077:
  (3)  032030  104401                   TRAP    C$ETST
3637
3638
3639                            .SBTTL  **TEST 38** - CHECK ZERO FILL ON WRITE WITH WRITE CHECK
3640
3641  032032                    BGNTST                                ;**START OF TEST**
3642
3643
3644
3645  032032                    STARS
  (2)                           ;;*****************************************************************
3646                            ;WHEN WRITING PARTIAL SECTORS (LESS THAN 128 WORDS) THE
3647                            ;CONTROLLER WILL FILL IN THE REMAINING PORTION OF
3648                            ;THE SECTOR WITH ZERO WORDS.  CHECK THIS FEATURE CAN BE WRITE CHECKED
3649                            ;WITH WORD COUNTS FROM 1 TO 127
3650  032032                    STARS
  (2)                           ;;*****************************************************************
3651
3652  032032  004737  015766            JSR     PC,HDHOME       ;HEADS OVER TRACK 0
3653  032036                            CKERFG                  ;HEADS GO HOME OKAY
  (4)  032044  104432                   TRAP    C$EXIT
  (4)  032046  000274                   .WORD   L10100-.
3654
3655  032050                            BGNSEG                        ;%%START OF SEGMENT%%
  (3)  032050  104404                   TRAP    C$BSEG
3656
3657  032052  012737  000001  002274    MOV     #1,TMP1         ;START WITH 1 WORD WRITE
3658  032060  012700  003426    33$:     MOV     #BUF,R0         ;WRITE BUFFER WITH 52525, WE'LL
3659  032064  012701  000200            MOV     #128.,R1        ;WRITE 128 WORDS ALL THOUGH WE'RE
3660  032070  012720  052525    3$:     MOV     #52525,(R0)+    ;ONLY GOING TO TRANSFER < 128
3661  032074  005301                    DEC     R1              ;DONE WITH BUFFER?
3662  032076  001374                    BNE     3$              ;NO, GO BACK
3663  032100  013700  002274            MOV     TMP1,R0         ;GET TRANSFER WORD COUNT
3664  032104  005400                    NEG     R0              ;NEGATE FOR RLMP
3665  032106  010077  150250            MOV     R0,@RLMP        ;STORE WORD COUNT AWAY
3666  032112  012777  003426  150236    MOV     #BUF,@RLBA      ;SET UP RLBA
3667  032120  005077  150234            CLR     @RLDA
3668  032124  004537  015056            JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
3669  032130  000012                    WRITE                   ;WRITE IT
3670  032132  004577  015702            JSR     R5,WTCMDY       ;WAIT FOR WRITE TO FINISH
3671  032136                            ESCAPE  SEG             ;CHECK FOR FLAGGED, ELSE EXIT SEG
  (3)  032136  104410                   TRAP    C$ESCAPE
```

```
  (3)  032140  000200                          .WORD   10000$-.
3672
3673   032142  004537  014614                 JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
3674   032146                                  ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
  (3)  032146  104410                          TRAP    C$ESCAPE
  (3)  032150  000170                          .WORD   10000$-.
3675                                    ;VERIFY WRITE WITH READ BEFORE WRCHK
3676
3677   032152  005077  150202                 CLR     @RLDA
3678   032156  012777  003426  150172         MOV     #BUF,@RLBA
3679   032164  013700  002274                 MOV     TMP1,R0
3680   032170  005400                          NEG     R0
3681   032172  010077  150164                 MOV     R0,@RLMP
3682   032176  004537  015056                 JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
3683   032202  000014                          READ
3684   032204  004537  015702                 JSR     R5,WTCRDY
3685   032210                                  ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
  (3)  032210  104410                          TRAP    C$ESCAPE
  (3)  032212  000126                          .WORD   10000$-.
3686   032214  004537  014614                 JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
3687   032220                                  ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
  (3)  032220  104410                          TRAP    C$ESCAPE
  (3)  032222  000116                          .WORD   10000$-.
3688
3689   032224                                  BGNSEG                          ;%%START OF SEGMENT%%
  (3)  032224  104404                          TRAP    C$BSEG
3690   032226  012777  003426  150122         MOV     #BUF,@RLBA      ;SET UP TO READ
3691   032234  013700  002274                 MOV     TMP1,R0
3692   032240  005400                          NEG     R0
3693   032242  010077  150114                 MOV     R0,@RLMP
3694   032246  005077  150106                 CLR     @RLDA           ;SECTOR
3695   032252  004537  015056                 JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
3696   032256  000002                          WRCHK
3697   032260  004537  015702                 JSR     R5,WTCRDY       ;WAIT TIL WE FINISH THE WRCHK
3698   032264                                  ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
  (3)  032264  104410                          TRAP    C$ESCAPE
  (3)  032266  000034                          .WORD   10001$-.
3699
3700   032270  004537  014614                 JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
3701   032274  005737  002236                 TST     T.CRC           ;WAS ERROR A DCK??
3702   032300  001003                          BNE     8$              ;YES, GIVE MOR INFO
3703   032302                          10$:    ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
  (3)  032302  104410                          TRAP    C$ESCAPE
  (3)  032304  000016                          .WORD   10001$-.
3704   032306  000405                          BR      99$             ;SKIP AROUND
3705   032310                          8$:     CKLOOP                  ;YES, CHECK FOR LOOP FIRST
  (3)  032310  104406                          TRAP    C$CLP1
3706   032312                                  ERRDF   37.,EM64,ERR14
  (4)  032312  104455                          TRAP    C$ERDF
  (5)  032314  000045                          .WORD   37
  (5)  032316  007321                          .WORD   EM64
  (5)  032320  010414                          .WORD   ERR14
3707   032322                          99$:                            ;EXIT TEST
3708   032322                                  ENDSEG                          ;%%END OF SEGMENT%%
  (3)  032322                          10001$:
  (3)  032322  104405                          TRAP    C$ESEG
```

```
3709
3710  032324  005237  002274          INC     TMP1
3711  032330  023727  002274  000200  CMP     TMP1,#128.
3712  032336  001250                  BNE     33$
3713
3714  032340                          ENDSEG                          ;%%END OF SEGMENT%%
 (3)  032340                  10000$:
 (3)  032340  104405                  TRAP    C$ESEG
3715  032342                  ENDTST                                  ;**END OF TEST**
 (3)  032342                  L10100:
 (3)  032342  104401                  TRAP    C$ETST
3716
3717
3718                          .SBTTL  **TEST 39** - EXTENDED CHECK OF WRITE CHECK FUNCTION
3719
3720  032344                  BGNTST                                  ;**START OF TEST**
3721
3722  032344                  STARS
 (2)                          ;;*****************************************************************
3723                          ;CHECK OF WRITE CHECK LOGIC UNDER FLAG MODE
3724                          ;TEST IS DONE WITH ALL BIT PATTERNS
3725                          ; WE WILL WRITE CHECK A FULL SECTOR (128 WORDS) FROM
3726                          ;MEMORY (BUF).  WE CHECK THAT NO ERRORS OCCUR.
3727  032344                  STARS
 (2)                          ;;*****************************************************************
3728
3729
3730  032344  004737  015766          JSR     PC,HDHOME       ;HEADS OVER TRACK 0
3731  032350                          CKERFG                  ;HEADS GO HOME OKAY
 (4)  032356  104432                  TRAP    C$EXIT
 (4)  032360  000306                  .WORD   L10101-.
3732
3733  032362  022737  000001  002232  CMP     #1,T.DRIVE              ;CHECK TYPE OF DRIVE
3734  032370  001003                  BNE     22$                     ;NOT RL01 THEN BRANCH
3735  032372  012703  002670          MOV     #HDRTAB,R3              ;MOV #HDRTAB TO R3
3736  032376  000402                  BR      33$                     ;THEN BRANCH
3737  032400  012703  003050  22$:    MOV     #HTAB,R3                ;MOV #HTAB TO R3 (RL02)
3738
3739  032404                  33$:    BGNSEG                  ;START OF SEGMENT
 (3)  032404  104404                  TRAP    C$BSEG
3740
3741  032406  012700  003426  298$:   MOV     #BUF,R0         ;SETUP AND WRITE
3742  032412  012701  000200          MOV     #128.,R1        ;128 WORDS
3743  032416  011302                  MOV     (R3),R2         ;GET PATTERN
3744  032420  052702  100000          BIS     #BIT15,R2
3745  032424  010220  299$:   MOV     R2,(R0)+
3746  032426  005301                  DEC     R1              ;DONE??
3747  032430  001375                  BNE     299$
3748
3749  032432  012777  003426  147716  MOV     #BUF,@RLBA      ;LOAD BUS ADDRESS
3750  032440  012777  177600  147714  MOV     #-128.,@RLMP    ;WORD COUNT
3751  032446  005077  147706          CLR     @RLDA           ;CLEAR DISK ADDRESS
3752  032452  004537  015056          JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
3753  032456  000012                  WRITE
3754  032460  004537  015702          JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY
3755  032464                          ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
```

```
   (3)  032464  104410                        TRAP    C$ESCAPE
   (3)  032466  000176                        .WORD   10000$-.
 3756   032470  004537  014614                JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
 3757   032474                                 ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
   (3)  032474  104410                        TRAP    C$ESCAPE
   (3)  032476  000166                        .WORD   10000$-.
 3758   032500                                 BGNSEG                          ;%%START OF SEGMENT%%
   (3)  032500  104404                        TRAP    C$BSEG
 3759
 3760                              ;VERIFY WRITE WITH READ BEFORE WRCHK
 3761
 3762   032502  005077  147652                CLR     @RLDA
 3763   032506  012777  003426  147642        MOV     #BUF,@RLBA
 3764   032514  012777  177600  147640        MOV     #-128.,@RLMP
 3765   032522  004537  015056                JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
 3766   032526  000014                        READ
 3767   032530  004537  015702                JSR     R5,WTCRDY
 3768   032534                                 ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
   (3)  032534  104410                        TRAP    C$ESCAPE
   (3)  032536  000076                        .WORD   10001$-.
 3769   032540  004537  014614                JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
 3770   032544                                 ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
   (3)  032544  104410                        TRAP    C$ESCAPE
   (3)  032546  000066                        .WORD   10001$-.
 3771
 3772   032550                                 BGNSEG                          ;%%START OF SEGMENT%%
   (3)  032550  104404                        TRAP    C$BSEG
 3773
 3774   032552                              3$:
 3775   032552  005077  147602                CLR     @RLDA
 3776   032556  012777  177600  147576        MOV     #-128.,@RLMP    ;WORD COUNT
 3777   032564  012777  003426  147564        MOV     #BUF,@RLBA      ;BUS ADDRESS
 3778   032572  004537  015056                JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
 3779   032576  000002                        WRCHK                   ;WRITE CHECK
 3780
 3781   032600  004537  015702                JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY
 3782   032604                                 ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
   (3)  032604  104410                        TRAP    C$ESCAPE
   (3)  032606  000024                        .WORD   10002$-.
 3783
 3784
 3785   032610  004537  014614                JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
 3786   032614  005737  002236                TST     T.CRC
 3787   032620  001404                        BEQ     4$
 3788
 3789   032622                                 ERRHRD  410.,ERR15,EM70
   (4)  032622  104456                        TRAP    C$ERHRD
   (5)  032624  000632                        .WORD   410
   (5)  032626  010462                        .WORD   ERR15
   (5)  032630  007472                        .WORD   EM70
 3790
 3791   032632                              4$:
 3792
 3793
 3794   032632                                 ENDSEG                          ;%%END OF SEGMENT%%
   (3)  032632                              10002$:
```

```
  (3)  032632  104405                          TRAP    C$ESEG
3795   032634                                 ENDSEG                          ;%%END OF SEGMENT%%
  (3)  032634                          10001$:
  (3)  032634  104405                          TRAP    C$ESEG
3796
3797   032636  005723                          TST     (R3)+
3798   032640  022737  000001  002232          CMP     #1,T.DRIVE              ;RL01 OR RL02?
3799   032646  001003                          BNE     60$                     ;RL02? THEN BRANCH
3800   032650  020327  003046                  CMP     R3,#HDREND              ;LAST OF PATERN?
3801   032654  000402                          BR      77$
3802   032656  020327  003234          60$:    CMP     R3,#HEND                ;LAST OF PATTERN (RL02)
3803   032662  001251                  77$:    BNE     298$
3804
3805   032664                                 ENDSEG                          ;%%END OF SEGMENT%%
  (3)  032664                          10000$:
  (3)  032664  104405                          TRAP    C$ESEG
3806   032666                          ENDTST                                 ;**END OF TEST**
  (3)  032666                          L10101:
  (3)  032666  104401                          TRAP    C$ETST
3807                                   .SBTTL  **TEST 40** - READ WITHOUT HEADER COMPARE FUNCTION
3808
3809   032670                          STARS
  (2)                                  ;;**********************************************************************
3810                                   ;TEST THAT READ WITHOUT HEADER VERIFICATION WORKS.  THIS FUNCTION SHOULD
3811                                   ;READ AT THE NEXT SECTOR ENCOUNTERED.  SET THE RLDA TO 0
3812                                   ;AND ISSUE THE FUNCTION IN FLAG MODE.  UPON COMPLETION CHECK
3813                                   ;FOR ERRORS
3814   032670                          STARS
  (2)                                  ;;**********************************************************************
3815   032670                          BGNTST                                 ;**START OF TEST**
3816
3817
3818   032670  004737  015766                  JSR     PC,HDHOME       ;HEADS OVER TRACK 0
3819   032674                                   CKERFG                  ;HEADS GO HOME OKAY
  (4)  032702  104432                          TRAP    C$EXIT
  (4)  032704  000052                          .WORD   L10102-.
3820
3821   032706                                   BGNSEG                          ;%%START OF SEGMENT%%
  (3)  032706  104404                          TRAP    C$BSEG
3822
3823
3824   032710  012777  177600  147444          MOV     #-128.,@RLMP    ;SET UP WORD COUNT
3825   032716  012777  003426  147432          MOV     #BUF,@RLBA      ;SETUP BUS ADDRESS
3826   032724  012777  177777  147426          MOV     #-1,@RLDA       ;HEADER SHOULDN'T MATTER
3827   032732  004537  015056                  JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
3828   032736  000016                          RDNHD                   ;READ DATA WITHOUT HEADER VERIFY
3829   032740  004537  015702                  JSR     R5,WTCRDY       ;WAIT FOR IT TO FINISH
3830   032744                                   ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
  (3)  032744  104410                          TRAP    C$ESCAPE
  (3)  032746  000006                          .WORD   10000$-.
3831
3832   032750  004537  014614                  JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
3833
3834   032754                                   ENDSEG                          ;%%END OF SEGMENT%%
  (3)  032754                          10000$:
  (3)  032754  104405                          TRAP    C$ESEG
```

```
3835  032756                        ENDTST                          ;**END OF TEST**
 (3)  032756                        L10102:
 (3)  032756  104401                        TRAP    C$ETST
3836
3837                                .SBTTL  **TEST 41** - READ WITHOUT HEADER COMPARE FUNCTION INTERRUPT
3838
3839  032760                        BGNTST                          ;**START OF TEST**
3840
3841  032760                        STARS
 (2)                                ;;*****************************************************************
3842                                ;TEST THAT READ WITHOUT HEADER VERIFICATION WORKS IN
3843                                ;INTERRUPT MODE.
3844  032760                        STARS
 (2)                                ;;*****************************************************************
3845
3846  032760  004737  015766                JSR     PC,HDHOME       ;HEADS OVER TRACK 0
3847  032764                                CKERFG                  ;HEADS GO HOME OKAY
 (4)  032772  104432                        TRAP    C$EXIT
 (4)  032774  000114                        .WORD   L10103-.
3848
3849  032776                                BGNSEG                          ;%%START OF SEGMENT%%
 (3)  032776  104404                        TRAP    C$BSEG
3850
3851  033000  005037  002256                CLR     INTFLG  ;CLEAR INTERRUPT OCCURANCE FLAG
3852  033004  012777  177600  147350        MOV     #-128.,@RLMP    ;SET UP WORD COUNT FOR ONE SECTOR
3853  033012  012777  003426  147336        MOV     #BUF,@RLBA      ;SETUP BUFFER ADDRESS
3854  033020  012777  177777  147332        MOV     #-1,@RLDA       ;DISK ADDRESS IS A DON'T CARE
3855  033026                                SETPRI  #PRI00
 (3)  033026  012700  000000                MOV     #PRI00,R0
 (3)  033032  104441                        TRAP    C$SPRI
3856  033034  004537  015056                JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
3857  033040  000116                        RDNHD!INTEN             ;INTERRUPT ENABLED
3858  033042  004537  015702                JSR     R5,WTCRDY       ;WAIT FOR INTERRUPT
3859  033046                                SETPRI  #PRI07
 (3)  033046  012700  000340                MOV     #PRI07,R0
 (3)  033052  104441                        TRAP    C$SPRI
3860  033054                                ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  033054  104410                        TRAP    C$ESCAPE
 (3)  033056  000030                        .WORD   10000$-.
3861
3862  033060  005737  002256                TST     INTFLG          ;DID IT INTERRUPT
3863  033064  001004                        BNE     1$              ;IF INTERRUPT GO TO 1$
3864
3865  033066                                ERRDF   40.,EM40,ERR0   ;NO INTERRUPT
 (4)  033066  104455                        TRAP    C$ERDF
 (5)  033070  000050                        .WORD   40
 (5)  033072  006321                        .WORD   EM40
 (5)  033074  007510                        .WORD   ERR0
3866  033076                        1$:     ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  033076  104410                        TRAP    C$ESCAPE
 (3)  033100  000006                        .WORD   10000$-.
3867
3868  033102  004537  014614                JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
3869
3870  033106                                ENDSEG                          ;%%END OF SEGMENT%%
 (3)  033106                        10000$:
```

```
 (3)  033106  104405                    TRAP    C$ESEG
3871  033110                          ENDTST                          ;**END OF TEST**
 (3)  033110                          L10103:
 (3)  033110  104401                    TRAP    C$ETST
3872
3873                                    .SBTTL  **TEST 42** - CHECK RD W/O HDR CMP ACTUALLY READS
3874
3875  033112                          BGNTST                          ;**START OF TEST**
3876
3877  033112                          STARS
 (2)                                    ;;*****************************************************************
3878                                    ;CHECK THAT THE READ W/O HDR CMP FUNCTION ACTUALLY READS (INTO MEMORY)
3879                                    ;WE WILL WRITE A PATTERN INTO MEMORY AND THEN ISSUE
3880                                    ;A READ TO OVERLAY THAT PATTERN.  AFTER THE READ
3881                                    ;WE CHECK TO SEE IF THE WRITTEN PATTERN HAS CHANGED.
3882                                    ;IF NOT WE ISSUE IT AGAIN AT THE SAME SECTION AFTER
3883                                    ;HAVING MODIFIED OUR PATTERN IN MEMORY (SINCE THERE IS
3884                                    ;ONE CHANCE THAT THE DISK COULD HAVE OUR PATTERN).  AFTER
3885                                    ;THE SECOND READ WE CHECK THE BUFFER AGAIN.  IF IT'S
3886                                    ;NOT CHANGED WE REPORT AN ERROR
3887  033112                          STARS
 (2)                                    ;;*****************************************************************
3888
3889
3890  033112  004737  015766                JSR     PC,HDHOME       ;HEADS OVER TRACK 0
3891  033116                                CKERFG                  ;HEADS GO HOME OKAY
 (4)  033124  104432                    TRAP    C$EXIT
 (4)  033126  000160                    .WORD   L10104-.
3892
3893  033130                          BGNSEG                          ;%%START OF SEGMENT%%
 (3)  033130  104404                    TRAP    C$BSEG
3894
3895  033132  012737  024350  002272        MOV     #24350,TMP0     ;SET PATTERN TO WRITE
3896  033140  005037  002274                CLR     TMP1            ;CLEAR PASS INDICATOR
3897  033144  012700  003426        1$:     MOV     #BUF,R0         ;SET UP BUFFER BEGINNING
3898  033150  012701  000200                MOV     #128.,R1
3899  033154  013720  002272        2$:     MOV     TMP0,(R0)+      ;WRITE BUFFER
3900  033160  005301                        DEC     R1              ;DONE??
3901  033162  001374                        BNE     2$              ;NO, GO BACK
3902  033164  012777  000050  147166        MOV     #40.,@RLDA      ;LOAD DISK ADDRESS TO NONSENSE
3903  033172  012777  177600  147162        MOV     #-128.,@RLMP    ;SET WORD COUNT
3904  033200  012777  003426  147150        MOV     #BUF,@RLBA      ;LOAD BUS ADDRESS
3905  033206  012737  003426  002300        MOV     #BUF,GDDAT      ;FOR ERROR PRINT
3906
3907  033214  004537  015056                JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
3908  033220  000016                        RDNHD                   ;READ W/O HDR CMP
3909  033222  004537  015702                JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY
3910  033226                                ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  033226  104410                    TRAP    C$ESCAPE
 (3)  033230  000054                    .WORD   10000$-.
3911
3912  033232  004537  014614                JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
3913  033236                                ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  033236  104410                    TRAP    C$ESCAPE
 (3)  033240  000044                    .WORD   10000$-.
3914
```

```
3915  033242  012702  003426            MOV     #BUF,R2         ;SET TO START COMPARING DATA
3916  033246  022237  002272  4$:       CMP     (R2)+,TMP0      ;DID DATA CHANGE?
3917  033252  001014                    BNE     6$              ;YES, CHECK FOR END
3918                                                            ;
3919
3920                                                            ;DATA DIDN'T CHANGE, CHECK
3921  033254  005737  002274            TST     TMP1            ;IF 1ST OR 2ND TIME?
3922  033260  001005                    BNE     5$              ;2ND-REPORT 1ST-TRY AGAIN
3923
3924  033262  005237  002274            INC     TMP1            ;INC PASS COUNT
3925  033266  005137  002272            COM     TMP0            ;COMPLIMENT PATTERN
3926  033272  000724                    BR      1$              ;GO DO IT AGAIN
3927
3928  033274                    5$:     ERRDF   20.,EM55,ERR9
 (4)  033274  104455                    TRAP    C$ERDF
 (5)  033276  000024                    .WORD   20
 (5)  033300  006652                    .WORD   EM55
 (5)  033302  010102                    .WORD   ERR9
3929
3930  033304                    6$:
3931
3932  033304                    ENDSEG                          ;%%END OF SEGMENT%%
 (3)  033304                    10000$:
 (3)  033304  104405                    TRAP    C$ESEG
3933  033306                    ENDTST                          ;**END OF TEST**
 (3)  033306                    L10104:
 (3)  033306  104401                    TRAP    C$ETST
3934
3935                            .SBTTL  **TEST 43** - CHECK RLBA INCREMENT WITH RD W/O HDR CMP
3936
3937  033310                    BGNTST                          ;**START OF TEST**
3938
3939  033310                    STARS
 (2)                            ;;*****************************************************************
3940                            ;CHECK THAT THE RLBA WILL INCREMENT WITH THE READ W/O HDR CMP
3941                            ;THE RLBA SHOULD CONTAIN 'BUF +256.'' AFTER A FULL SECTOR
3942                            ;READ.
3943  033310                    STARS
 (2)                            ;;*****************************************************************
3944
3945
3946  033310  004737  015766            JSR     PC,HDHOME       ;HEADS OVER TRACK 0
3947  033314                            CKERFG                  ;HEADS GO HOME OKAY
 (4)  033322  104432                    TRAP    C$EXIT
 (4)  033324  000120                    .WORD   L10105-.
3948
3949  033326                            BGN$EG                          ;%%START OF SEGMENT%%
 (3)  033326  104404                    TRAP    C$BSEG
3950
3951  033330  012777  000050  147022    MOV     #40.,@RLDA
3952  033336  012777  003426  147012    MOV     #BUF,@RLBA      ;SET UP BUS ADDRESS
3953  033344  012777  177600  147010    MOV     #-128.,@RLMP    ;WORD COUNT
3954  033352  012737  003426  002300    MOV     #BUF,GDDAT      ;FORM EXPECTED BUS ADDRESS
3955  033360  062737  000400  002300    ADD     #256.,GDDAT     ;AFTER READ
3956
3957  033366  004537  015056            JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
```

```
3958  033372  000016                          RDNHD                   ;READ W/O HDR CMP
3959  033374  004537  015702                  JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY
3960  033400                                  ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  033400  104410                          TRAP    C$ESCAPE
 (3)  033402  000040                          .WORD   10000$-.
3961
3962  033404  004537  014614                  JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
3963  033410                                  ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  033410  104410                          TRAP    C$ESCAPE
 (3)  033412  000030                          .WORD   10000$-.
3964  033414  013737  002342  002302          MOV     E.BA,BDDAT      ;READ 'RLBA' FOR PRESENT ADDRESS
3965  033422  023737  002302  002300          CMP     BDDAT,GDDAT     ;DID 'BA' INCREMENT PROPERLY?
3966  033430  001404                          BEQ     1$              ;YES, CONTINUE
3967
3968  033432                                  ERRDF   21.,EM53,ERR4
 (4)  033432  104455                          TRAP    C$ERDF
 (5)  033434  000025                          .WORD   21
 (5)  033436  006717                          .WORD   EM53
 (5)  033440  007654                          .WORD   ERR4
3969
3970  033442                          1$:
3971
3972  033444                                  ENDSEG                          ;%%END OF SEGMENT%%
 (3)  033442                          10000$:
 (3)  033442  104405                          TRAP    C$ESEG
3973  033444                          ENDTST                                  ;**END OF TEST**
 (3)  033444                          L10105:
 (3)  033444  104401                          TRAP    C$ETST
3974
3975
3976
3977
3978
3979
3980
3981                                    .SBTTL  **TEST 44** - CHECK RLDA DOES INCREMENT WITH RD W/O HDR CMP
3982
3983  033446                            BGNTST                                ;**START OF TEST**
3984
3985  033446                            STARS
 (2)                                    ;;*****************************************************************
3986                                    ;CHECK THAT THE RLDA DOES INCREMENT BY ONE AFTER A
3987                                    ;FULL SECTOR READ W/O HDR CMP
3988                                    ;AFTER THE READ THE RLDA SHOULD STILL BE THE INITIAL RLDA + 1
3989  033446                            STARS
 (2)                                    ;;*****************************************************************
3990
3991  033446  004737  015766                  JSR     PC,HDHOME       ;HEADS OVER TRACK 0
3992  033452                                  CKERFG                  ;HEADS GO HOME OKAY
 (4)  033460  104432                          TRAP    C$EXIT
 (4)  033462  000116                          .WORD   L10106-.
3993
3994  033464                                  BGNSEG                          ;%%START OF SEGMENT%%
 (3)  033464  104404                          TRAP    C$BSEG
3995
3996
```

```
3997  033466  012737  000050  002300          MOV     #40.,GDDAT      ;DA TO NONSENSE
3998  033474  013777  002300  146656          MOV     GDDAT,@RLDA     ;SETUP DISK ADDRESS
3999  033502  005237  002300                  INC     GDDAT
4000  033506  012777  177600  146646          MOV     #-128.,@RLMP    ;WORD COUNT
4001  033514  012777  003426  146634          MOV     #BUF,@RLBA      ;SETUP BUS ADDRESS
4002
4003  033522  004537  015056                  JSR     R5,LDFUNC               ;LOAD THE FUNCTION IN NEXT WORD
4004  033526  000016                          RDNHD                   ;READ WITHOUT HEADER COMPARE
4005  033530  004537  015702                  JSR     R5,WTCRDY       ;WAIT FOR CONTROLLER READY
4006  033534                                  ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  033534  104410                          TRAP    C$ESCAPE
 (3)  033536  000040                          .WORD   10000$-.
4007
4008  033540  004537  014614                  JSR     R5,CHERR                ;CHECK CNTLR FOR ERRORS
4009  033544                                  ESCAPE  SEG             ;CHECK FOR FL:LOE, ELSE EXIT SEG
 (3)  033544  104410                          TRAP    C$ESCAPE
 (3)  033546  000030                          .WORD   10000$-.
4010
4011  033550  013737  002344  002302          MOV     E.DA,BDDAT      ;READ DISK ADDRESS
4012  033556  023737  002300  002302          CMP     GDDAT,BDDAT     ;DID SECTOR INCREMENT PROPERLY
4013  033564  001404                          BEQ     1$              ;YES, BRANCH  NO, REPORT ERROR
4014
4015  033566                                  ERRDF   22.,EM54,ERR4
 (4)  033566  104455                          TRAP    C$ERDF
 (5)  033570  000026                          .WORD   22
 (5)  033572  006764                          .WORD   EM54
 (5)  033574  007654                          .WORD   ERR4
4016
4017  033576                          1$:
4018
4019  033576                                  ENDSEG                          ;%%END OF SEGMENT%%
 (3)  033576                          10000$:
 (3)  033576  104405                          TRAP    C$ESEG
4020  033600                          ENDTST                          ;**END OF TEST**
 (3)  033600                          L10106:
 (3)  033600  104401                          TRAP    C$ETST
4021
4022
4023
4024
4025  033602                          BGNMOD  HRDPRM
4026
4027  033602                                  BGNHRD
 (3)  033602  000030                          .WORD L10107-L$HARD/2
4028
4029  033604                                  GPRML   CNTYPE,CNT,1,YES
 (4)  033604  005130                          .WORD   T$CODE
 (4)  033606  033664                          .WORD   CNTYPE
 (4)  033610  000001                          .WORD   1
4030  033612                                  GPRMA   CSRMSG,CSR,0,160000,177776,YES
 (4)  033612  000031                          .WORD   T$CODE
 (4)  033614  033671                          .WORD   CSRMSG
 (4)  033616  160000                          .WORD   T$LOLIM
 (4)  033620  177776                          .WORD   T$HILIM
4031  033622                                  GPRML   DRTYPE,TYPDR,1,YES
 (4)  033622  003130                          .WORD   T$CODE
```

```
  (4)  033624  033716                          .WORD   DRTYPE
  (4)  033626  000001                          .WORD   1
4032   033630                                 GPRMA   VECMSG,VECT,0,0,776,YES
  (4)  033630  001031                          .WORD   T$CODE
  (4)  033632  033740                          .WORD   VECMSG
  (4)  033634  000000                          .WORD   T$LOLIM
  (4)  033636  000776                          .WORD   T$HILIM
4033   033640                                 GPRMD   BRMSG,PRIOR,0,340,0,7,YES
  (4)  033640  002032                          .WORD   T$CODE
  (4)  033642  033705                          .WORD   BRMSG
  (4)  033644  000340                          .WORD   340
  (4)  033646  000000                          .WORD   T$LOLIM
  (4)  033650  000007                          .WORD   T$HILIM
4034   033652                                 GPRMD   DRMSG,DRBT,0,03400,0,7,YES
  (4)  033652  004032                          .WORD   T$CODE
  (4)  033654  033747                          .WORD   DRMSG
  (4)  033656  003400                          .WORD   03400
  (4)  033660  000000                          .WORD   T$LOLIM
  (4)  033662  000007                          .WORD   T$HILIM
4035
4036   033664                                 ENDHRD
  (2)                                         .EVEN
  (3)  033664                          L10107:
4037
4038   033664  046122  030461     000  CNTYPE: .ASCIZ  /RL11/
4039   033671     102  051525  040440  CSRMSG: .ASCIZ  /BUS ADDRESS/
       033676  042104  042522  051523
       033704     000
4040   033705     102  020122  042514  BRMSG:  .ASCIZ  /BR LEVEL/
       033712  042526  000114
4041   033716  051104  053111  020105  DRTYPE: .ASCIZ  /DRIVE TYPE = RL01/
       033724  054524  042520  036440
       033732  051040  030114  000061
4042   033740  042526  052103  051117  VECMSG: .ASCIZ  /VECTOR/
       033746     000
4043   033747     104  044522  042526  DRMSG:  .ASCIZ  /DRIVE/
       033754     000
4044           033756                   .EVEN
4045
4046   033756                                 ENDMOD
4047
4048
4049   033756                          BGNMOD  SFTPRM
4050
4051   033756                                 BGNSFT
  (3)  033756  000022                          .WORD L10110-L$SOFT/2
4052
4053   033760                                 GPRML   DMSG,DLT,1,YES
  (4)  033760  000130                          .WORD   T$CODE
  (4)  033762  034024                          .WORD   DMSG
  (4)  033764  000001                          .WORD   1
4054   033766                                 XFERF   1$
  (5)  033766  006044                          .WORD   T$CODE
4055   033770                                 GPRMD   EMSG,ELT,D,177777,0,177777,YES
  (4)  033770  001052                          .WORD   T$CODE
  (4)  033772  034131                          .WORD   EMSG
```

```
  (4)  033774  177777                          .WORD   177777
  (4)  033776  000000                          .WORD   T$LOLIM
  (4)  034000  177777                          .WORD   T$HILIM
4056   034002                          1$:     GPRML   CMSG,DMPCK,1,YES
  (4)  034002  003130                          .WORD   T$CODE
  (4)  034004  034050                          .WORD   CMSG
  (4)  034006  000001                          .WORD   1
4057   034010                                  XFERF   2$
  (5)  034010  006044                          .WORD   T$CODE
4058   034012                                  GPRMD   LMSG,DLMT,D,177777,1,128.,YES
  (4)  034012  004052                          .WORD   T$CODE
  (4)  034014  034074                          .WORD   LMSG
  (4)  034016  177777                          .WORD   177777
  (4)  034020  000001                          .WORD   T$LOLIM
  (4)  034022  000200                          .WORD   T$HILIM
4059   034024                          2$:
4060
4061
4062   034024                                  ENDSFT
  (2)                                          .EVEN
  (3)  034024                          L10110:
4063
4064   034024  051104  050117  047440  DMSG:   .ASCIZ  /DROP ON ERROR LIMIT/
       034032  020116  051105  047522
       034040  020122  044514  044515
       034046  000124
4065   034050  047503  050115  051101  CMSG:   .ASCIZ  /COMPARE DATA ON DCK/
       034056  020105  040504  040524
       034064  047440  020116  041504
       034072  000113
4066   034074  020043  043117  053440  LMSG:   .ASCIZ  /# OF WORDS IN ERROR REPORTED/
       034102  051117  051504  044440
       034110  020116  051105  047522
       034116  020122  042522  047520
       034124  052122  042105     000
4067   034131     105  051122  051117  EMSG:   .ASCIZ  /ERROR LIMIT/
       034136  046040  046511  052111
       034144     000
4068
4069   034145                                  ENDMOD
4070
4071
4072   034145                          LASTAD
  (2)          034146                          .EVEN
  (4)  034146  000000                          .WORD   0
  (4)  034150  000000                          .WORD   0
  (3)  034152                          L$LAST::
4073
4074           000001                          .END
```

```
ADR    = 000020 G      54#
AFREG    003500      337#  605
AFTER    015416     1123#  1194  1199  3097  3104
ANS    = 000012      101#
ARLBA    003435      333#  603  605
ARLCS    003430      332#  603  605
ARLDA    003443      334#  604  606
ARLMP    003451      335#  604  606
ASSEMB= 000010       31
BA16   = 000020       62#  1824  1867  1887  2481  2517
BA17   = 000040       61#  1831  1880  2481  2517
BCCFBK   002266      124#  1138*  1144*  1147*  1150  1154
BCSR     002364      155#  724*  730
BDDAT    002302      130#  454  465  476  519  541  552  563  573  1400*  1401  1443*  1444
                    1581*  1614*  1616  1618  1669*  1670  1726*  1727  1775*  1776  1839*  1894*  2069*
                    2070  2111*  2112  2282*  2283*  2286  2326*  2327*  2383*  2384  2426*  2427*  2428
                    2433  2601*  2602  2616  2691*  2692  2707  2790*  2791  2805  2886*  2887  2901
                    3001*  3002  3016  3311*  3312  3383*  3384  3467*  3468  3964*  3965  4011*  4012
BEFORE   015364     1073  1114#  3085
BEREG    003457      336#  603
BIT0   = 000001 G      54#  55  79  195  251
BIT00  = 000001 G      54#
BIT01  = 000002 G      54#
BIT02  = 000004 G      54#
BIT03  = 000010 G      54#
BIT04  = 000020 G      54#
BIT05  = 000040 G      54#
BIT06  = 000100 G      54#
BIT07  = 000200 G      54#
BIT08  = 000400 G      54#
BIT09  = 001000 G      54#
BIT1   = 000002 G      54#  69  71  73  75  76  78  196  252  1784
BIT10  = 002000 G      54#  59  205  261  1482  1488  1536  1542  2150  2200  2317  2322
BIT11  = 004000 G      54#  206  262  1007  1016  3539  3544  3622  3628
BIT12  = 010000 G      54#  207  263  1011  1021  1482  1488  1536  1542  2150  2200  2317  2322
BIT13  = 020000 G      54#  63  208  264  1315
BIT14  = 040000 G      54#  58  209  265  1041
BIT15  = 100000 G      54#  57  266  1482  1488  1536  1542  2150  2200  2317  2322  3539  3544
                    3622  3628  3744
BIT2   = 000004 G      54#  70  71  74  75  80  197  253
BIT3   = 000010 G      54#  72  73  74  75  77  198  254
BIT4   = 000020 G      54#  62  83  199  255
BIT5   = 000040 G      54#  61  200  256
BIT6   = 000100 G      54#  56  81  82  201  257
BIT7   = 000200 G      54#  60  76  202  258
BIT8   = 000400 G      54#  65  67  203  259
BIT9   = 001000 G      54#  66  67  204  260
BOE    = 000400 G      54#
BPRIOR   002370      157#  726*
BRMSG    033705     4033  4040#
BUF      003426      321#  584  1297  1348  1388  1390  1433  1472  1517  1579  1658  1703  1711
                    1720  1924  1958  2002  2009  2010  2020  2057  2059  2101  2140  2181  2296
                    2309  2372  2420  2558  2565  2574  2581  2598  2647  2653  2663  2669  2688
                    2744  2750  2761  2767  2787  2839  2847  2857  2862  2883  2950  2957  2970
                    2977  2999  3046  3052  3066  3079  3130  3136  3150  3164  3196  3202  3214
                    3229  3268  3274  3286  3299  3301  3339  3345  3357  3373  3417  3423  3440
```

```
                        3456  3497  3503  3515  3527* 3529  3570  3576  3588  3601* 3603  3658  3666
                        3678  3690  3741  3749  3763  3777  3825  3853  3897  3904  3905  3915  3952
                        3954  4001
BVEC    002366           156#  725*  759   801   1574  1575  1621  1622
B.BA    002332           142#  603   1115*
B.CS    002330           141#  603   1045* 1046* 1047  1114* 3086* 3087* 3088*
B.DA    002334           143#  604   1043* 1050  1116*
B.MP    002336           144#  604   1117*
CALBCC  002270           125#  1161*
CDCNT   002242           114#  2596* 2605  2608* 2685* 2695  2698* 2784* 2794  2797* 2878* 2890  2893*
                        2996* 3005  3008*
CHECK   002234           111#  2597* 2610  2613* 2686* 2700  2704* 2785* 2799  2802* 2879* 2895  2898*
                        2997* 3010  3013*
CHERR   014614           985#  1217  1227  1242  1249  1363  1398  1440  1485  1539  1666  1717  1821
                        1877  1931  1973  2017  2067  2108  2245  2269  2279  2303  2319  2380  2430
                        2571  2587  2660  2676  2758  2775  2854  2870  2985  3059  3072  3143  3156
                        3172  3209  3220  3244  3281  3292  3309  3352  3363  3380  3432  3446  3464
                        3510  3521  3541  3583  3594  3625  3673  3686  3700  3756  3769  3785  3832
                        3868  3912  3962  4008
CKERLT  014530           438   447   457   468   479   489   501   509   522   533   544   555   566
                         576   587   596   954#
CLKFLD  002666           189#  870*  877   948*
CLKINT  014506           905   910   935#
CLKTIK  014522           871   946#
CLNCOD  013466 G         794#
CMSG    034050          4056  4065#
CNT     000012 =          92#  4029
CNTYPE  033664          4029  4038#
COMP    003645           349#  993
CONT    013020           697   709   730#
CONTIN  012666           701   708#
CRDY    000200 =          60#  798   1188  3091
CRTIM   003521           338#  1196  3098
CSR     000000 =          87#  4030
CSRMSG  033671          4030  4039#
CYLMSK  002314           135#
C$AU    000052 =          31#
C$AUTO  000061 =          31#  787
C$BRK   000022 =          31#
C$BSEG  000004 =          31#  1208  1292  1342  1384  1426  1468  1512  1572  1651  1700  1723  1761
                        1807  1863  1919  1953  1998  2054  2094  2136  2176  2230  2238  2365  2415
                        2478  2512  2556  2573  2646  2662  2739  2760  2836  2856  2944  2948  2968
                        3044  3075  3128  3145  3159  3194  3223  3266  3295  3337  3366  3413  3449
                        3495  3524  3568  3597  3655  3689  3739  3758  3772  3821  3849  3893  3949
                        3994
C$BSUB  000002 -          31#
C$CEFG  000045 =          31#
C$CLCK  000062 =          31#  863   865
C$CLEA  000012 =          31#  807
C$CLOS  000035 =          31#
C$CLP1  000006 =          31#  1486  1523  1540  1829  1836  1885  1891  1964  1971  2187  2320  2431
                        2594  2618  2683  2708  2782  2806  2877  2902  2992  3017  3473  3542  3609
                        3626  3705
C$CVEC  000036 =          31#  771   801   805   876   1574  1621  3099
C$DCLN  000004 =          31#  964
C$DODU  000051 =          31#  751   776   785   963
```

```
C$DRPT= 000024          31#
C$DU  = 000053          31#  817
C$EDIT= 000003          31#   40
C$ERDF= 000055          31#  1030  1181  1196  1256  1360  1404  1447  1490  1529  1544  1620  1673
                        1731  1779  1827  1834  1841  1883  1890  1896  1970  2033  2073  2115  2153
                        2193  2203  2289  2329  2387  2436  2490  2527  2531  2612  2702  2801  2897
                        3012  3098  3241  3315  3387  3471  3547  3615  3630  3706  3865  3928  3968
                        4015
C$ERHR= 000056          31#  3789
C$ERRO= 000060          31#
C$ERSF= 000054          31#  1319  3105
C$ERSO= 000057          31#
C$ESCA= 000010          31#  1216  1218  1223  1225  1228  1240  1243  1248  1250  1258  1302  1312
                        1354  1361  1396  1399  1438  1441  1478  1531  1664  1667  1715  1718  1733
                        1771  1780  1817  1822  1873  1878  1929  2015  2018  2065  2068  2106  2109
                        2146  2195  2243  2246  2267  2270  2273  2277  2280  2291  2301  2304  2314
                        2331  2378  2381  2389  2424  2487  2491  2524  2528  2532  2569  2572  2585
                        2590  2607  2659  2661  2675  2679  2697  2756  2759  2773  2778  2796  2852
                        2855  2868  2873  2892  2962  2983  2988  3007  3058  3060  3071  3073  3100
                        3142  3144  3155  3157  3169  3208  3210  3219  3221  3235  3242  3280  3282
                        3291  3293  3307  3310  3351  3353  3362  3364  3378  3381  3431  3433  3445
                        3447  3462  3465  3509  3511  3520  3522  3535  3582  3584  3593  3595  3617
                        3671  3674  3685  3687  3698  3703  3755  3757  3768  3770  3782  3830  3860
                        3866  3910  3913  3960  3963  4006  4009
C$ESEG= 000005          31#  1263  1323  1365  1408  1451  1494  1543  1623  1681  1738  1739  1789
                        1845  1900  1935  1975  2037  2077  2119  2158  2207  2343  2345  2396  2440
                        2492  2533  2622  2623  2715  2720  2814  2816  2913  2921  3025  3027  3028
                        3109  3110  3174  3175  3176  3246  3247  3319  3320  3391  3392  3475  3480
                        3551  3552  3634  3635  3708  3714  3794  3795  3805  3834  3870  3932  3972
                        4019
C$ESUB= 000003          31#
C$ETST= 000001          31#  1324  1366  1409  1452  1495  1549  1628  1682  1740  1790  1846  1901
                        1936  1976  2038  2078  2120  2159  2208  2346  2397  2441  2496  2536  2624
                        2721  2817  2922  3029  3112  3177  3248  3321  3393  3481  3553  3636  3715
                        3806  3835  3871  3933  3973  4020
C$EXIT= 000032          31#  1290  1340  1382  1424  1466  1510  1570  1646  1698  1756  1805  1860
                        1917  1951  1996  2052  2092  2134  2174  2228  2359  2413  2476  2493  2510
                        2554  2641  2737  2834  2942  3042  3126  3192  3264  3335  3411  3493  3566
                        3653  3731  3819  3847  3891  3947  3992
C$GETB  000026          31#
C$GETW= 000027          31#
C$GMAN= 000043          31#
C$GPHR= 000042          31#  718
C$GPLO= 000030          31#
C$GPRI= 000040          31#
C$INIT= 000011          31#  760
C$INLP= 000020          31#  954
C$MANI= 000050          31#
C$MEM = 000031          31#
C$MSG = 000023          31#  440  449  459  470  481  491  503  511  524  535  546  557
                        568  578  589  598
C$OPEN= 000034          31#
C$PNTB= 000014          31#  454  465  476  486  500  519  530  541  552  563  573  584
                        595  600  603  604  605  606  609  610  774  782  1566  2616  2707
                        2805  2901  3016
C$PNTF  000017          31#  748  749  961
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C$PNTS= 000016            31#
C$PNTX= 000015            31#
C$QIO = 000377            31#
C$RDBU= 000007            31#   868
C$REFG= 000047            31#   694   698   700   708
C$RESE= 000033            31#
C$REVI= 000003            31#    40
C$RFLA= 000021            31#
C$RPT = 000025            31#
C$SEFG= 000046            31#
C$SPRI= 000041            31#   693   873   875  1350  1356  1514  1524  1576  1615  1960  1965  2178
                         2188  2232  2515  2523  3231  3237  3599  3610  3855  3859
C$SVEC= 000037            31#   759   768   797   871   905   910  1575  1622  3077
C$TPRI= 000013            31#
DAHS  = 000020            83#  2261
DATPAT  003236           312#  2643
DCKMES  003626           345#  1020
DEMES   003574           340#   998
DERFLG  002422           170#   996*
DERR  = 040000            58#   994  1305
DIAGMC= 000000            31
DLMT  = 000010           100#  4058
DLT   = 000000            96#  4053
DLTMES  003633           346#  1024
DMPCK = 000006            99#  4056
DMSG    034024          4053  4064#
DRBT  = 000010            91#  4034
DRDY  = 000001            55#  1174
DRIVE   002246           116#   600   728*  741   779  1046  1070  3083
DRMSG   033747          4034  4043#
DROP    012434           672#   956
DRPCOD  013562 G         812#
DRST  = 000010            77#  1212
DRTIM   003546           339#  1181
DRTYPE  033716          4031  4041#
DSPCOD  012446 G         681#
DS0   = 000000            64#
DS1   = 000400            65#
DS2   = 001000            66#
DS3   = 001400            67#
DWORD   002322           138#
EF.CON= 000036 G          54#   708
EF.NEW= 000035 G          54#
EF.PWR= 000034 G          54#   694
EF.RES= 000037 G          54#   698
EF.STA= 000040 G          54#   700
ELT   = 000002            97#  4055
EMSG    034131          4055  4067#
EM1     004467           369#   609
EM10    005064           375#  1490  1544  2153  2203
EM100   004522           370#   610   989
EM11    005124           376#  2289
EM12    005144           377#  2329
EM13    005176           378#
EM14    005224           379#  2387
EM16    005300           380#
```

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EM17    005322              381#  1360
EM20    005346              382#  1404
EM21    005414              383#  1447
EM22    005461              384#  1673
EM23    005540              385#  2436
EM24    005616              386#  2490  2531
EM25    005656              387#  2612
EM26    005710              388#  1731
EM27    005734              389#  2897
EM30    006005              390#  1779
EM31    006040              391#  1827
EM32    006076              392#  1834
EM33    006135              393#  1841
EM34    006171              394#  1883
EM35    006227              395#  1890
EM36    006265              396#  1896
EM4     004712              371#  1970
EM40    006321              397#  3865
EM41    006361              398#
EM42    006417              399#
EM43    006461              400#  1529  2193
EM44    006522              401#  2527
EM45    006554              402#  2702
EM47    006604              403#  2801
EM5     004735              372#  2033
EM50    006621              404#  3012
EM53    006717              406#  3968
EM54    006764              407#  4015
EM55    006652              405#  3928
EM56    007033              408#  1620
EM57    007052              409#  3105
EM6     004763              373#  2073
EM60    007107              410#  3241
EM61    007137              411#  3315
EM62    007207              412#  3387
FM63    007246              413#  3471
EM64    007321              414#  3706
EM65    007364              415#  3547  3630
EM66    007421              416#  3615
EM7     005017              374#  2115
FM70    007472              417#  3789
END     013212              739    745   753#
ERCOUN  002426              172#   702   714
ERFLG   002400              161#  1211*  1260*  1290  1340  1382  1424  1466  1510  1570  1646  1698  1756
                           1805  1860   1917   1951  1996  2052  2092  2134  2174  2228  2359  2413  2476
                           2510  2554   2641   2737  2834  2942  3042  3126  3192  3264  3335  3411  3493
                           3566  3653   3731   3819  3847  3891  3947  3992
ERPOIN  002424              171#   714*   716*   958*   959
ERR   = 100000               57#
ERRVEC  002244              115#   768    771    797   805  3077  3099
ERR0    007510 G            432#  1256   1319   1360  1490  1529  1544  1827  1834  1883  1890  1970  2153
                           2193  2203   2436   2490  2527  2531  3105  3241  3547  3615  3630  3865
ERR1    007526 G            442#
ERR10   010146 G            537#  2702   2801
ERR11   010220 G            548#  3012
ERR12   010272 G            559#  2897
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ERR13   010346 G      570#  1620
ERR14   010414 G      580#  3706
ERR15   010462 G      591#  3789
ERR2    007540 G      451#
ERR3    007602 G      461#
ERR4    007654 G      472#  1404  1447  1673  1779  1841  1896  2073  2115  2289  2329  2387  3315
                     3387  3471  3968  4015
ERR5    007722 G      483#  1181  1196  3098
ERR6    007760 G      493#  1030
ERR7    010022 G      505#
ERR8    010030 G      515#  1731  2612
ERR9    010102 G      526#  2033  3928
EVL   = 000004 G       54#
E$END = 002100         31#
E$LOAD= 000035         31#    40
E.BA    002342        146#   605  1124* 1775  1839  1894  2069  3964
E.CS    002340        145#   605   986   990   994   999  1003  1007  1011  1016  1021  1123*  1480
                     1534  1818  1824  1831  1874  1880  1887  2148  2198  2315  2426  2488  2529
                     3537  3620
E.DA    002344        147#   606  1125* 1443  1669  2111  2383  3383  3467  4011
E.MP    002346        148#   606  1126* 1230  1252  1314  2247  2282
E.MP1   002350        149#   606  1127*
E.MP2   002352        150#   606  1128*
FIFTY   002654        184#   901*
FIRST   002312        134#
FIX     015352        992    997  1001  1005  1009  1013  1019  1023  1025  1027  1104#
FNDFNC  002372        158#  1054* 1055* 1057* 1060*
FRMT1   011052        600    618#
FRMT10  011652        573    630#
FRMT11  012001        632#   961
FRMT13  012111        635#
FRMT14  012476        584    628#
FRMT15  012142        595    636#
FRMT16  012167        637#   774
FRMT17  012233        638#   782
FRMT18  012316        639#  1566
FRMT2   011102        603    605   619#
FRMT2A  011121        604    620#
FRMT2B  011134        606    621#
FRMT3   011163        486    609   610   622#
FRMT4   011170        454    476   530   623#
FRMT5   011226        465    624#
FRMT6   011277        519    625#  2616
FRMT7   011354        541    626#  2707  2805
FRMT8   011426        552    627#  3016
FRMT9   011547        563    629#  2901
FRMT98  012044        633#   749
FRMT99  012106        500    634#   748
F$AU  = 000015         31#
F$AUTO= 000020         31#   766   787
F$BGN = 000040         31#    38    42    53   103   108   324   328   427   429   432   442   451
                      461   472   483   493   505   515   526   537   548   559   570   580   591
                      647   650   656   667   669   679   681   685   691   692   761   766   794
                      795   808   812   813   818   826   916   926   934   945  1208  1216  1218
                     1223  1225  1228  1240  1243  1248  1250  1258  1267  1272  1290  1292  1302
                     1312  1324  1328  1340  1342  1354  1361  1366  1370  1382  1384  1396  1399
```

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                    1409  1413  1424  1426  1438  1441  1452  1456  1466  1468  1478  1495  1499
                    1510  1512  1531  1549  1555  1570  1572  1628  1633  1646  1651  1664  1667
                    1682  1686  1698  1700  1715  1718  1723  1733  1740  1744  1756  1761  1771
                    1780  1790  1794  1805  1807  1817  1822  1846  1850  1860  1863  1873  1878
                    1901  1906  1917  1919  1929  1936  1940  1951  1953  1976  1980  1996  1998
                    2015  2018  2038  2042  2052  2054  2065  2068  2078  2082  2092  2094  2106
                    2109  2120  2124  2134  2136  2146  2159  2163  2174  2176  2195  2208  2212
                    2228  2230  2238  2243  2246  2267  2270  2273  2277  2280  2291  2301  2304
                    2314  2331  2346  2350  2359  2365  2378  2381  2389  2397  2409  2413  2415
                    2424  2441  2445  2476  2478  2487  2491  2493  2496  2500  2510  2512  2524
                    2528  2532  2536  2543  2554  2556  2569  2572  2573  2585  2590  2607  2624
                    2628  2641  2646  2659  2661  2662  2675  2679  2697  2721  2725  2737  2739
                    2756  2759  2760  2773  2778  2796  2817  2822  2834  2836  2852  2855  2856
                    2868  2873  2892  2922  2926  2942  2944  2948  2962  2968  2983  2988  3007
                    3029  3033  3042  3044  3058  3060  3071  3073  3075  3100  3112  3116  3126
                    3128  3142  3144  3145  3155  3157  3159  3169  3177  3181  3192  3194  3208
                    3210  3219  3221  3223  3235  3242  3248  3252  3264  3266  3280  3282  3291
                    3293  3295  3307  3310  3321  3325  3335  3337  3351  3353  3362  3364  3366
                    3378  3381  3393  3398  3411  3413  3431  3433  3445  3447  3449  3462  3465
                    3481  3484  3493  3495  3509  3511  3520  3522  3524  3535  3553  3557  3566
                    3568  3582  3584  3593  3595  3597  3617  3636  3641  3653  3655  3671  3674
                    3685  3687  3689  3698  3703  3715  3720  3731  3739  3755  3757  3758  3768
                    3770  3772  3782  3806  3815  3819  3821  3830  3835  3839  3847  3849  3860
                    3866  3871  3875  3891  3893  3910  3913  3933  3937  3947  3949  3960  3963
                    3973  3983  3992  3994  4006  4009  4020  4025  4027  4046  4049  4051  4069
F$CLEA= 000007        31#   795   807
F$DU  = 000016        31#   813   817
F$END   000041        31#    38    42    53   103   108   324   328   427   429   440   449    59
                     470   481   491   503   511   524   535   546   557   568   578   589   598
                     647   656   667   669   679   681   685   691   760   761   787   794   807
                     808   812   817   818   826   921   932   942   951  1216  1218  1223  1225
                    1228  1240  1243  1248  1250  1258  1263  1267  1272  1290  1302  1312  1323
                    1324  1328  1340  1354  1361  1365  1366  1370  1382  1396  1399  1408  1409
                    1413  1424  1438  1441  1451  1452  1456  1466  1478  1494  1495  1499  1510
                    1531  1548  1549  1555  1570  1623  1628  1633  1646  1664  1667  1681  1682
                    1686  1698  1715  1718  1733  1739  1740  1744  1756  1771  1780  1789  1790
                    1794  1805  1817  1822  1845  1846  1850  1860  1873  1878  1900  1901  1906
                    1917  1929  1935  1936  1940  1951  1975  1976  1980  1996  2015  2018  2037
                    2038  2042  2052  2065  2068  2077  2078  2082  2092  2106  2109  2119  2120
                    2124  2134  2146  2158  2159  2163  2174  2195  2207  2208  2212  2228  2243
                    2246  2267  2270  2273  2277  2280  2291  2301  2304  2314  2331  2345  2346
                    2350  2359  2378  2381  2389  2396  2397  2409  2413  2424  2440  2441  2445
                    2476  2487  2491  2492  2493  2496  2500  2510  2524  2528  2532  2533  2536
                    2543  2554  2569  2572  2585  2590  2607  2623  2624  2628  2641  2659  2661
                    2675  2679  2697  2720  2721  2725  2737  2756  2759  2773  2778  2796  2816
                    2817  2822  2834  2852  2855  2868  2873  2892  2921  2922  2926  2942  2962
                    2983  2988  3007  3028  3029  3033  3042  3058  3060  3071  3073  3100  3110
                    3112  3116  3126  3142  3144  3155  3157  3169  3176  3177  3181  3192  3208
                    3210  3219  3221  3235  3242  3247  3248  3252  3264  3280  3282  3291  3293
                    3307  3310  3320  3321  3325  3335  3351  3353  3362  3364  3378  3381  3392
                    3393  3398  3411  3431  3433  3445  3447  3462  3465  3480  3481  3484  3493
                    3509  3511  3520  3522  3535  3552  3553  3557  3566  3582  3584  3593  3595
                    3617  3635  3636  3641  3653  3671  3674  3685  3687  3698  3703  3714  3715
                    3720  3731  3755  3757  3768  3770  3782  3805  3806  3815  3819  3830  3834
                    3835  3839  3847  3860  3866  3870  3871  3875  3891  3910  3913  3932  3933
                    3937  3947  3960  3963  3972  3973  3983  3992  4006  4009  4019  4020  4025
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                    4036    4046    4049    4062    4069
F$HARD= 000004       31#    4027    4036    4054    4057
F$HW  = 000013       31#     657     666
F$INIT= 000006       31#     692     760
F$JMP = 000050       31#    1290    1340    1382    1424    1466    1510    1570    1646    1698    1756    1805    1860
                    1917    1951    1996    2052    2092    2134    2174    2228    2359    2413    2476    2493    2510
                    2554    2641    2737    2834    2942    3042    3126    3192    3264    3335    3411    3493    3566
                    3653    3731    3819    3847    3891    3947    3992
F$MOD = 000000       31#      38      42      53     105     108     324     328     427     429     647     656     667
                     669     679     681     685     691     761     794     808     812     818     826    1267    4025
                    4046    4049    4069
F$MSG = 000011       31#     432     440     442     449     451     459     461     470     472     481     483     491
                     493     503     505     511     515     524     526     535     537     546     548     557     559
                     568     570     578     580     589     591     598
F$PROT= 000021       31#     650     654
F$PWR = 000017       31#
F$RPT = 000012       31#
F$SEG = 000003       31#    1208    1263    1292    1323    1342    1365    1384    1408    1426    1451    1468    1494
                    1512    1548    1572    1623    1651    1681    1700    1723    1738    1739    1761    1789    1807
                    1845    1863    1900    1919    1935    1953    1975    1998    2037    2054    2077    2094    2119
                    2136    2158    2176    2207    2230    2238    2343    2345    2365    2396    2415    2440    2478
                    2492    2512    2533    2556    2573    2622    2623    2646    2662    2715    2720    2739    2760
                    2814    2816    2836    2856    2913    2921    2944    2948    2968    3025    3027    3028    3044
                    3075    3109    3110    3128    3145    3159    3174    3175    3176    3194    3223    3246    3247
                    3266    3295    3319    3320    3337    3366    3391    3392    3413    3449    3475    3480    3495
                    3524    3551    3552    3568    3597    3634    3635    3655    3689    3708    3714    3739    3758
                    3772    3794    3795    3805    3821    3834    3849    3870    3893    3932    3949    3972    3994
                    4019
F$SOFT= 000005       31#    4051    4054    4057    4062
F$SRV = 000010       31#     916     921     926     932     934     942     945     951
F$SUB = 000002       31#
F$SW  = 000014       31#     670     678
F$TEST= 000001       31#    1272    1324    1       1366    1370    1409    1413    1452    1456    1495    1499    1549
                    1555    1628    1633    16      1686    1740    1744    1790    1794    1846    1850    1901    1906
                    1936    1940    1976    1980    2038    2042    2078    2082    2 20    2124    2159    2163    2208
                    2212    2346    2350    2397    2409    2441    2445    2496    2500    2536    2543    2624    2628
                    2721    2725    2817    2822    2922    2926    3029    3033    3112    3116    3177    3181    3248
                    3252    3321    3325    3393    3398    3481    3484    3553    3557    3636    3641    3715    3720
                    3806    3815    3835    3839    3871    3875    3933    3937    3973    3983    4020
GDDAT   002300       129#     454     465     476     519     541     552     563    1314*   1315    1390*   1391*   1401
                    1429*   1430    1431*   1444    1654*   1655*   1656    1657*   1670    1725*   1727    1773*   1774*
                    1776    1838*   1893*   2010*   2059*   2060*   2070    2097*   2098    2099*   2112    2284*   2285*
                    2286    2325*   2326    2368*   2369*   2370    2371*   2384    2417*   2418    2600*   2602    2616
                    2687*   2692    2707    2786*   2791    2805    2810*   2885*   2887    2901    2909*   2998*   3002
                    3016    3082*   3083*   3084*   3086    3089    3301*   3302*   3312    3369*   3370    3371*   3384
                    3425*   3426*   3427    3437*   3438*   3439    3452*   3453*   3454    3455*   3468    3905*   3954*
                    3955*   3965    3997*   3998    3999*   4012
GLBDAT  002232 G     108#
GLBEQA  002232 G      53#
GLBERR  007510 G     429#
GLBSUB  013566 G     826#
GLBTXT  003430 G     328#
GODRVR= 000202        76#
GSBIT = 000002        78#    1212    1308
GSTAT = 000004        70#    1214    1310
GSTINT  004221       360#    1085
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GSTMES  004171            359#  1084
G$CNTO= 000200             31#
G$DELM= 000372             31#   834    839    852    856
G$DISP= 000003             31#
G$EXCP= 000400             31#
G$HILI= 000002             31#
G$LOLI= 000001             31#
G$NO  = 000000             31#
G$OFFS= 000400             31#  4029   4030   4031   4032   4033   4034   4053   4055   4056   4058
G$OFSI= 000376             31#  4029   4030   4031   4032   4033   4034   4053   4055   4056   4058
G$PRMA= 000001             31#  4030   4032
G$PRMD= 000002             31#  4033   4034   4055   4058
G$PRML= 000000             31#  4029   4031   4053   4056
G$RADA= 000140             31#
G$RADB= 000000             31#
G$RADD= 000040             31#  4055   4058
G$RADL= 000120             31#  4029   4031   4053   4056
G$RADO= 000020             31#  4030   4032   4033   4034
G$XFER= 000004             31#  4054   4057
G$YES = 000010             31#  4029   4030   4031   4032   4033   4034   4053   4055   4056   4058
HCRCME  003613            343#  1010
HDHOME  015766           1206#  1289   1339   1381   1423   1465   1509   1569   1645   1697   1755   1804   1859
                         1916   1950   1995   2051   2091   2133   2173   2227   2358   2412   2475   2509   2553
                         2640   2736   2833   2941   3041   3125   3191   3263   3334   3410   3492   3565   3652
                         3730   3818   3846   3890   3946   3991
HDREND  003046            249#  2336   3800
HDRLST  015312           1056   1080#
HDRTAB  002670            194#  2235   3735
HEND    003234            308#  2338   3802
HNFMES  003621            344#  1014
HOE   = 100000 G           54#
HPTCOD  012414 G           656#
HRDPRM  033602 G          4025#
HTAB    003050            250#  2237   3737
HZ      002650            182#   882*   883    885
IBE   = 010000 G            54#
IDU   = 000040 G            54#
IER   = 020000 G            54#
INITCO  012600 G           691#
INTEN = 000100              56#   800   1055   1062   1352   1521   1588   1962   2185   2521   3233   3607   3857
INTFLG  002256             120#   919*   929*  1345*  1357  1515*  1526  1577*  1593  1955*  1967  2179*  2190
                          2514*  2525   3226*  3238   3600*  3612   3851*  3862
INTSRV  014466             759    917#  1622
ISR   = 000100 G            54#
IXE   = 004000 G            54#
I$AU  = 000041              31#
I$AUTO= 000041              31#   766#   787#
I$LLN = 000041              31#   795#   807#
I$DU  = 000041              31#   813#   817#
I$HRD = 000041            4027#  4036#
I$INIT= 000041              31#   692#   760#
I$MOD = 000041              31#    38#    42#    53#   103#   108#   324#   328#   427#   429#   647#   656#   667#
                           669#   679#   681#   685#   691#   761#   794#   808#   812#   818#   826#  1267#  4025#
                          4046#  4049#  4069#
I$MSG = 000041              31#   432#   440#   442#   449#   451#   459#   461#   470#   472#   481#   483#   491#
                           493#   503#   505#   511#   515#   524#   526#   535#   537#   546#   548#   557#   559#
```

```
                    568#  570#  578#  580#  589#  591#  598#
I$PROT= 000040       31#  650#
I$PTAB= 000041       31#
I$PWR = 000041       31#
I$RPT = 000041       31#
I$SEG   000041       31# 1208# 1216  1218  1223  1225  1228  1240  1243  1248  1250  1258  1263#
                   1272  1292# 1302  1312  1323# 1328  1342# 1354  1361  1365# 1370  1384# 1396
                   1399  1408# 1413  1426# 1438  1441  1451# 1456  1468# 1478  1494# 1499  1512#
                   1531  1548# 1555  1572# 1623# 1633  1651# 1664  1667  1681# 1686  1700# 1715
                   1718  1723# 1733  1739# 1744  1761# 1771  1780  1789# 1794  1807# 1817  1822
                   1845# 1850  1863# 1873  1878  1900# 1906  1919# 1929  1935# 1940  1953# 1975#
                   1980  1998# 2015  2018  2037# 2042  2054# 2065  2068  2077# 2082  2094# 2106
                   2109  2119# 2124  2136# 2146  2158# 2163  2176# 2195  2207# 2212  2230# 2238#
                   2243  2246  2267  2270  2273  2277  2280  2291  2301  2304  2314  2331  2345#
                   2350  2365# 2378  2381  2389  2396# 2409  2415# 2424  2440# 2445  2478# 2487
                   2491  2492# 2500  2512# 2524  2528  2532  2533# 2543  2556# 2569  2572  2573#
                   2585  2590  2607  2623# 2628  2646# 2659  2661  2662# 2675  2679  2697  2720#
                   2725  2739# 2756  2759  2760# 2773  2778  2796  2816# 2822  2836# 2852  2855
                   2856# 2868  2873  2892  2921# 2926  2944# 2948# 2962  2968# 2983  2988  3007
                   3028# 3033  3044# 3058  3060  3071  3073  3075# 3100  3110# 3116  3128# 3142
                   3144  3145# 3155  3157  3159# 3169  3176# 3181  3194# 3208  3210  3219  3221
                   3223# 3235  3242  3247# 3252  3266# 3280  3282  3291  3293  3295# 3307  3310
                   3320# 3325  3337# 3351  3353  3362  3364  3366# 3378  3381  3392# 3398  3415#
                   3431  3433  3445  3447  3449# 3462  3465  3480# 3484  3495# 3509  3511  3520
                   3522  3524# 3535  3552# 3557  3568# 3582  3584  3593  3595  3597# 3617  3635#
                   3641  3655# 3671  3674  3685  3687  3689# 3698  3703  3714# 3720  3739# 3755
                   3757  3758# 3768  3770  3772# 3782  3805# 3815  3821# 3830  3834# 3839  3849#
                   3860  3866  3870# 3875  3893# 3910  3913  3932# 3937  3949# 3960  3963  3972#
                   3983  3994# 4006  4009  4019#
I$SETU= 000041       31#
I$SFT = 000041     4051# 4062#
I$SRV = 000041       31#  916#  921#  926#  932#  934#  942#  945#  951#
I$SUB = 000041       31#  1272  1328  1370  1413  1456  1499  1555  1633  1686  1744  1794  1850
                   1906  1940  1980  2042  2082  2124  2163  2212  2350  2409  2445  2500  2543
                   2628  2725  2822  2926  3033  3116  3181  3252  3325  3398  3484  3557  3641
                   3720  3815  3839  3875  3937  3983
I$TST = 000041       31# 1272# 1290  1324# 1328# 1340  1366# 1370# 1382  1409# 1413# 1424  1452#
                   1456# 1466  1495# 1499# 1510  1549# 1555# 1570  1628# 1633# 1646  1682# 1686#
                   1698  1740# 1744# 1756  1790# 1794# 1805  1846# 1850# 1860  1901# 1906# 1917
                   1936# 1940# 1951  1976# 1980# 1996  2038# 2042# 2052  2078# 2082# 2092  2120#
                   2124# 2134  2159# 2163# 2174  2208# 2212# 2228  2346# 2350# 2359  2397# 2409#
                   2413  2441# 2445# 2476  2493  2496# 2500# 2510  2536# 2543# 2554  2624# 2628#
                   2641  2721# 2725# 2737  2817# 2822# 2834  2922# 2926# 2942  3029# 3033# 3042
                   3112# 3116# 3126  3177# 3181# 3192  3248# 3252# 3264  3321# 3325# 3335  3393#
                   3398# 3411  3481# 3484# 3493  3553# 3557# 3566  3636# 3641# 3653  3715# 3720#
                   3731  3806# 3815# 3819  3835# 3839# 3847  3871# 3875# 3891  3933# 3937# 3947
                   3973# 3983# 3992  4020#
JSJMP = 000167       31#
LDCSR   002260      121# 1051* 1053* 1054  1062  1068* 1070* 1071* 1072
LDFUNC  015056     1041# 1213  1221  1237  1245  1298  1309  1351  1393  1435  1475  1520  1587
                   1661  1712  1768  1814  1870  1926  1961  2012  2062  2103  2143  2184  2240
                   2262  2274  2298  2311  2375  2421  2484  2520  2566  2582  2656  2672  2753
                   2770  2849  2865  2959  2980  3055  3068  3139  3152  3165  3205  3216  3232
                   3277  3288  3304  3348  3359  3375  3428  3442  3459  3506  3517  3532  3579
                   3590  3606  3668  3682  3695  3752  3765  3778  3827  3856  3907  3957  4003
L?      003640     347# 1030
```

```
LINE1   010522              434    444    453    463    474    485    495    517    528    539    550    561    572
                            582    593    600#   750    775    784    962
LINE2   010556              435    464    475    497    518    529    540    551    562    583    594    603#
LINE3   011000              496    609#
LMSG    034074             4058   4066#
LOE   = 040000 G             54#
LOPIMN  002404              163#   757
LOPIMX  002402              162#   758
LOT   = 000010 G             54#
L$ACP   002110 G             40#
L$APT   002036 G             40#
L$AUT   002070 G             40#
L$AUTO  013300 G             40     766#
L$CCP   002106 G             40#
L$CLEA  013466 G             40     795#
L$CO    002032 G             40#
L$DEPO  002011 G             40#
L$DESC  002122 G             40      44#
L$DESP  002076 G             40#
L$DEVP  002060 G             40#
L$DISP  012450 G             40     683#
L$DLY   002116 G             40#    829*   834    838*   839    844*   851*   852    856
L$DTP   002040 G             40#
L$DTYP  002034 G             40#
L$DU    013562 G             40     813#
L$DUT   002072 G             40#
L$DVTY  002220 G             40      46#
L$EF    002052 G             40#
L$ENVI  002044 G             40#
L$ETP   002102 G             40#
L$EXP1  002046 G             40#
L$EXP4  002064 G             40#
L$EXP5  002066 G             40#
L$HARD  033604 G             40    4027#
L$HIME  002120 G             40#   2456
L$HPCP  002016 G             40#
L$HPTP  002022 G             40#
L$HW    012416 G             40     657#
L$ICP   002104 G             40#
L$INIT  012600 G             40     692#
L$LADP  002026 G             40#
L$LAST  034152 G             40    4072#
L$LOAD  002100 G             40#
L$LUN   002074 G             40#
L$MREV  002050 G             40#
L$NAME  002000 G             40#
L$PRIO  002042 G             40#
L$PROT  012406 G             40     650#
L$PRT   002112 G             40#
L$REPP  002062 G             40#
L$REV   002010 G             40#
L$SOFT  033760 G             40    4051#
L$SPC   002056 G             40#
L$SPCP  002020 G             40#
L$SPTP  002024 G             40#
L$STA   002030 G             40#
```

```
L$SW    012434 G            40     670#
L$TEST  002114 G            40#
L$TIML  002014 G            40#
L$UNIT  002012 G            40#    696     713
L10000  007524              440#
L10001  007536              449#
L10002  007600              459#
L10003  007652              470#
L10004  007720              481#
L10005  007756              491#
L10006  010020              503#
L10007  010026              511#
L10010  010100              524#
L10011  010144              535#
L10012  010216              546#
L10013  010270              557#
L10014  010344              568#
L10015  010412              578#
L10016  010460              589#
L10017  010520              598#
L10021  012432              657    666#
L10022  012446              670    678#
L10023  013276              760#
L10024  013464              787#
L10025  013560              807#
L10026  013564              817#
L10027  014472              921#
L10030  014504              932#
L10031  014520              942#
L10032  014526              951#
L10033  016404             1290   1324#
L10034  016534             1340   1366#
L10035  016670             1382   1409#
L10036  017022             1424   1452#
L10037  017160             1466   1495#
L10040  017356             1510   1549#
L1004'  020000             1570   1628#
L10042  020170             1646   1682#
L10043  020366             1698   1740#
L10044  020540             1756   1790#
L10045  020736             1805   1846#
L10046  021136             1860   1901#
L10047  021240             1917   1936#
L10050  021364             1951   1976#
L10051  021560             1996   2038#
L10052  021714             2052   2078#
L10053  022046             2092   2120#
L10054  022166             2134   2159#
L10055  022346             2174   2208#
L10056  023160             2228   2346#
L10057  023354             2359   2397#
L10060  023520             2413   2441#
L10061  023704             2476   2493    2496#
L10062  024070             2510   2536#
L10063  024470             2554   2624#
L10064  025112             2641   2721#
```

```
L10065  025540            2737   2817#
L10066  026220            2834   2922#
L10067  026652            2942   3029#
L10070  027266            3042   3112#
L10071  027520            3126   3177#
L10072  030010            3192   3248#
L10073  030304            3264   3321#
L10074  030576            3335   3393#
L10075  031170            3411   3481#
L10076  031470            3493   3553#
L10077  032030            3566   3636#
L10100  032342            3653   3715#
L10101  032666            3731   3806#
L10102  032756            3819   3835#
L10103  033110            3857   3871#
L10104  033306            3921   3933#
L10105  033444            3947   3973#
L10106  033600            3992   4020#
L10107  033664            4027   4036#
L10110  034024            4051   4062#
MAXCYL  002324             139#
MAXSEC  002320             137#
MDHEDR  002000 G            38#
MERLMT  012436             673#   959
MK    = 000001              79#  1212    1234    1308
MSCRLF  003642             348#  1026
MXSEC1  002316             136#
NOOPO = 000000              68#
NOPINT  003733             352#  1081
NOPMES  003705             351#  1080
NOPWR   012626             695    698#
NOTST   002662             187#  2453*  2494*  2507
NXM   = 020000              63#   999   1818    1874    2488    2529
NXMMES  003601             341#  1002
NXT     012676             710#   721    723     752
OPI     002000              59#  1003   3088
OPIERR  003653             350#
OPIMES  003606             342#  1006
OPIMN   002412             166#   573    753*   757*   1618
OPIMX   002414             167#   573    754*   758*   1616
OPITIM  002664             188#   891*   893*   898*    900*   937*   1581   1589   1591   1595*  1596*  1597   1609
                          1610
O$APTS= 000000              31#    40
O$AU    000000              31#    40
O$BGNR= 000000              31#    40
O$BGNS= 000001              31#    36#    40
O$DU  = 000001              31#    36#    40
O$ERRT= 000000              31#    40
O$GNSW= 000001              31#    36#    40
O$POIN= 000001              31#    36#    40
O$SETU= 000000              31#    40    4072
PCLKCS  002642             179#   863*   865*   879
PCLOCK  002660             186#   904*   911*  1583   1626*
PCSR    002644             180#   880*   930*   939*  1582
PNT   = 001000 G            54#
PRI   - 002000 G            54#
```

```
PRIOR = 000004            89#  4033
PRI00 = 000000 G          54#  1350  1514  1576  1960  2178  2515  3231  3599  3855
PRI01 = 000040 G          54#
PRI02 = 000100 G          54#
PRI03 = 000140 G          54#
PRI04 = 000200 G          54#
PRI05 = 000240 G          54#   873
PRI06 = 000300 G          54#
PRI07 = 000340 G          54#   693   875  1356  1524  1615  1965  2188  2232  2523  3237  3610  3859
PWRFLG  002416           168#   696*  720   722*  738   802   804*
RDDINT  004271           362#  1093
RDDMES  004251           361#  1092
RDHDR = 000010            72#  1222  1246  2241  2275
RDNHD = 000016            75#  3828  3857  3908  3958  4004
RDNINT  004401           366#  1095
RDNMES  004353           365#  1094
READ  = 000014            74#  1927  1962  2013  2063  2104  2144  2185  2299  2312  2376  2422  2485
                        2521   2583  2673  2771  2866  2981  3069  3153  3217  3289  3360  3443  3518
                        3591   3683  3766
REST    012744           718#
RESTMS  015040           486   1028#  1066*
RHDINT  004103           356#  1089
RHDMES  004053           355#  1088
RHHS  - 000100            81#  2259
RLBA    002356           152#   733*  1115  1124  1297*  1348*  1388*  1400  1433*  1472*  1517*  1579*  1658*
                        1711*  1766*  1810*  1866*  1924*  1958*  2009*  2057*  2101*  2140*  2181*  2253*  2309*
                        2372*  2420*  2480*  2516*  2565*  2581*  2653*  2669*  2750*  2767*  2847*  2862*  2957*
                        2977*  3052*  3066*  3079*  3136*  3150*  3164*  3202*  3214*  3229*  3274*  3286*  3299*
                        3311   3345*  3357*  3373*  3423*  3440*  3456*  3503*  3515*  3529*  3576*  3588*  3603*
                        3666*  3678*  3690*  3749*  3763*  3777*  3825*  3853*  3904*  3952*  4001*
RLCS    002354           151#   600   731*  740*  741*  744   770   778*  779*  780   798   800*  1041
                        1047*  1048  1072*  1074*  1114  1123  1174  1188  1305  3089*  3091
RLDA    002360           153#   735*  1043  1044*  1050*  1116  1125  1212*  1234*  1235*  1295*  1308*  1346*
                        1387*  1430*  1471*  1516*  1578*  1656*  1709*  1765*  1813*  1869*  1922*  1956*  2007*
                        2056*  2098*  2139*  2180*  2250*  2255*  2258*  2261*  2293*  2294*  2306*  2307*  2370*
                        2418*  2482*  2518*  2563*  2579*  2654*  2671*  2752*  2769*  2848*  2864*  2958*  2976*
                        3054*  3065*  3080*  3138*  3149*  3162*  3204*  3213*  3227*  3276*  3285*  3298*  3347*
                        3356*  3370*  3427*  3439*  3454*  3505*  3514*  3528*  3578*  3587*  3602*  3667*  3677*
                        3694*  3751*  3762*  3775*  3826*  3854*  3902*  3951*  3998*
RLMP    002362           154#   737*  1117  1126  1127  1128  1296*  1347*  1389*  1432*  1473*  1518*  1580*
                        1659*  1710*  1764*  1812*  1868*  1923*  1957*  2008*  2058*  2100*  2141*  2182*  2295*
                        2308*  2373*  2419*  2483*  2519*  2564*  2580*  2655*  2670*  2751*  2768*  2846*  2863*
                        2956*  2979*  3053*  3067*  3081*  3137*  3151*  3163*  3203*  3215*  3228*  3275*  3287*
                        3300*  3346*  3358*  3372*  3424*  3441*  3457*  3504*  3516*  3530*  3577*  3589*  3604*
                        3665*  3681*  3693*  3750*  3764*  3776*  3824*  3852*  3903*  3953*  4000*
SECMSK  002262           122#  1253  2283  2285
SEEK  = 000006            71#  1238  2263
SEKINT  004150           358#  1087
SEKMES  004130           357#  1086
SETCLK  014062           862#  1563
SFTPRM  033756 G        4049#
SIGN  = 000004            80#  2255
SIMBCC  015464          1132#
SIXTY   002656           185#   894*  1598  1625*
SIZE  = 000004            98#
SKHOME  004430           367#  1256
```

```
SPTCOD  012432 G    669#
START   012704      707     712#
START1  012646      699     702#
STHS  = 000100       82#
SVCGBL= 000000       31#     38      40      44      46      53     108     328     429     432     442     451     461
                    472     483     493     505     515     526     537     548     559     570     580     591     650
                    656     657     669     670     68'     683     691     692     766     794     795     812     813
                    826     4025    4027    4049    4051    4072#
SVCINS= 000000       31#     32#     40      44      46     440     449     454     459     465     470     476     481
                    486     491     500     503     511     519     524     530     535     541     546     552     557
                    563     568     573     578     584     589     595     598     600     603     604     605     606
                    609     610     657     670     683     693     694     695     698     699     700     701     708
                    709     718     719     748     749     751     759     760     768     771     774     776     782
                    785     787     797     801     805     807     817     834     839     852     856     86?     864
                    865     866     868     869     871     873     875     876     905     910     921     932     942
                    951     954     955     961     963     964    1030    1181    1196    1208    1216    1218    1223
                   1225    1228    1240    1243    1248    1250    1256    1258    1263    1290    1292    1302    1312
                   1319    1323    1324    1340    1342    1350    1354    1356    1360    1361    1365    1366    1382
                   1384    1396    1399    1404    1408    1409    1424    1426    1438    1441    1447    1451    1452
                   1466    1468    1478    1486    1490    1494    1495    1510    1512    1514    1523    1524    1529
                   1531    1540    1544    1548    1549    1566    1570    1572    1574    1575    1576    1615    1620
                   1621    1622    1623    1628    1646    1651    1664    1667    1673    1681    1682    1698    1700
                   1715    1718    1723    1731    1733    1738    1739    1740    1756    1761    1771    1779    1780
                   1789    1790    1805    1807    1817    1822    1827    1829    1834    1836    1841    1845    1846
                   1860    1863    1873    1878    1883    1885    1890    1891    1896    1900    1901    1917    1919
                   1929    1935    1936    1951    1953    1960    1964    1965    1970    1971    1975    1976    1996
                   1998    2015    2018    2033    2037    2038    2052    2054    2065    2068    2073    2077    2078
                   2092    2094    2106    2109    2115    2119    2120    2134    2136    2146    2153    2158    2159
                   2174    2176    2178    2187    2188    2193    2195    2203    2207    2208    2228    2230    2232
                   2238    2243    2246    2267    2270    2273    2277    2280    2289    2291    2301    2304    2314
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                   2536    2554    2556    2569    2572    2573    2585    2590    2594    2607    2612    2616    2618
                   2622    2623    2624    2641    2646    2659    2661    2662    2675    2679    2683    2697    2702
                   2707    2708    2715    2720    2721    2737    2739    2756    2759    2760    2773    2778    2782
                   2796    2801    2805    2806    2814    2816    2817    2834    2836    2852    2855    2856    2868
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                   2968    2983    2988    2992    3007    3012    3016    3017    3025    3027    3028    3029    3042
                   3044    3058    3060    3071    3073    3075    3077    3098    3099    3100    3105    3109    3110
                   3112    3126    3128    3142    3144    3145    3155    3157    3159    3169    3174    3175    3176
                   3177    3192    3194    3208    3210    3219    3221    3223    3231    3235    3237    3241    3242
                   3246    3247    3248    3264    3266    3280    3282    3291    3293    3295    3307    3310    3315
                   3319    3320    3321    3335    3337    3351    3353    3362    3364    3366    3378    3381    3387
                   3391    3392    3393    3411    3413    3431    3433    3445    3447    3449    3462    3465    3471
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                   3547    3551    3552    3553    3566    3568    3582    3584    3593    3595    3597    3599    3609
                   3610    3615    3617    3626    3630    3634    3635    3636    3653    3655    3671    3674    3685
                   3687    3689    3698    3703    3705    3706    3708    3714    3715    3731    3739    3755    3757
                   3758    3768    3770    3772    3782    3789    3794    3795    3805    3806    3819    3821    3830
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                   3910    3913    3928    3932    3933    3947    3949    3960    3963    3968    3972    3973    3992
                   3994    4006    4009    4015    4019    4020    4027    4029    4030    4031    4032    4033    4034
                   4036    4051    4053    4054    4055    4056    4057    4058    4062    4072
SVCSUB= 177777       31#
SVCTAG= 000000       31#     33#     440     449     459     470     481     491     503     511     524     535     546
```

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                    557   568   578   589   598   666   678   760   787   807   817   921   932
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                   1408  1409  1415  1420  1451  1452  1458  1463  1494  1495  1502  1506  1548
                   1549  1557  1561  1623  1628  1635  1641  1681  1682  1688  1694  1738  1739
                   1740  1746  1752  1789  1790  1796  1801  1845  1846  1852  1857  1900  1901
                   1908  1913  1935  1936  1942  1947  1975  1976  1982  1992  2037  2038  2044
                   2048  2077  2078  2084  2089  2119  2120  2126  2131  2158  2159  2166  2170
                   2207  2208  2214  2224  2343  2345  2346  2352  2355  2396  2397  2398  2404
                   2440  2441  2447  2451  2467  2472  2492  2496  2501  2504  2533  2536  2545
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                   2817  2826  2831  2913  2921  2922  2929  2938  3025  3027  3028  3029  3035
                   3038  3109  3110  3112  3118  3122  3174  3175  3176  3177  3183  3188  3246
                   3247  3248  3255  3260  3319  3320  3321  3327  3331  3391  3392  3393  3400
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                   3636  3645  3650  3708  3714  3715  3722  3727  3794  3795  3805  3806  3809
                   3814  3834  3835  3841  3844  3870  3871  3877  3887  3932  3933  3939  3943
                   3972  3973  3985  3989  4019  4020  4036  4062
SVCTST= 177777      31#  1272  1328  1370  1413  1456  1499  1555  1633  1686  1744  1794  1850
                   1906  1940  1980  2042  2082  2124  2163  2212  2350  2409  2445  2500  2543
                   2628  2725  2822  2926  3033  3116  3181  3252  3325  3398  3484  3557  3641
                   3720  3815  3839  3875  3937  3983
SVHD    002326     140#
S$LSYM- 010000      31#   440#  449#  459#  470#  481#  491#  503#  511#  524#  535#  546#  557#
                    568#  578#  589#  598#  666#  678#  760#  787#  807#  817#  921#  932#  942#
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                   3893#  3933#  3949#  3973#  3994#  4020#  4036#  4062#
TAG     002640     178#
TEMP    002634     176#
TEMP0   002632     175#
TEMP2   002304     131#  1135*  1158*
TEMP3   002306     132#  1136*  1140*
TEMP4   002310     133#  1137*  1139   1149*  1151   1156*  1157*  1161
TIME    013566     829#  1177   1191   3093
TIMSRV  014474     927#  1575
TIM.US  002636     177#   830*   845*
TMP0    002272     126#   465    530    552   1230*  1231*  1233*  1235  1252*  1253*  1480*  1481*  1482
                   1488  1534*  1535*  1536  1542  1648*  1655  1677*  1678  1921*  1933*  2000*  2004
                   2021  2030*  2148*  2149*  2150  2198*  2199*  2200  2315*  2316*  2317  2322  2362*
                   2369  2391*  2392  2946*  2952  2958  2963*  2964  2966*  2976  2998  3016  3021*
                   3022  3415*  3426  3438  3453  3477*  3478  3537*  3538*  3539  3544  3620*  3621*
                   3622  3628  3895*  3899  3916  3925*
TMP1    002274     127#   519    541    563   584  1649*  1654  1730*  1759*  1766  1773  1782*  1784*
                   2001*  2026  2029*  2247*  2249*  2253  2363*  2368  2604*  2616  2689*  2707  2711*
                   2712  2788*  2805  2809*  2811  2838*  2844  2880  2901  2915*  2916  3416*  3425
                   3437  3452  3657*  3663  3679  3691  3710*  3711  3896*  3921  3924*
TMP2    002276     128#  2251*  2252*  2253*  2257*  2258  2688*  2691  2710*  2787*  2790  2808*  2884*
                   2904*
TRPFLG  002254     119#   767*   772  1203*  3078*  3102
TRPHAN  015760     768    797   1203#  3077
```

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TRYFNC  002376   160#  1067#
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                 595#   600#   603#   604#   605#   606#   609#   610#   748#   749#   774#   782#   961#
                1566#  2616#  2707#  2805#  2901#  3016#
T$CODE= 004052  4029#  4030#  4031#  4032#  4033#  4034#  4053#  4054#  4055#  4056#  4057#  4058#
T$ERRN- 000026    31#  1030#  1181#  1196#  1256#  1319#  1360#  1404#  1447#  1490#  1529#  1544#  1620#
                1673#  1731#  1779#  1827#  1834#  1841#  1883#  1890#  1896#  1970#  2033#  2073#  2115#
                2153#  2193#  2203#  2289#  2329#  2387#  2436#  2490#  2527#  2531#  2612#  2702#  2801#
                2897#  3012#  3098#  3105#  3241#  3315#  3387#  3471#  3547#  3615#  3630#  3706#  3789#
                3865#  3928#  3968#  4015#
T$EXCP- 000000  4030#  4032#  4033#  4034#  4055#  4058#
T$FLAG= 000040  1216#  1218#  1223#  1225#  1228#  1240#  1243#  1248#  1250#  1258#  1290#  1302#  1312#
                1340#  1354#  1361#  1382#  1396#  1399#  1424#  1438#  1441#  1466#  1478#  1510#  1531#
                1570#  1646#  1664#  1667#  1698#  1715#  1718#  1733#  1756#  1771#  1780#  1805#  1817#
                1822#  1860#  1873#  1878#  1917#  1929#  1951#  1996#  2015#  2018#  2052#  2065#  2068#
                2092#  2106#  2109#  2134#  2146#  2174#  2195#  2228#  2243#  2246#  2267#  2270#  2273#
                2277#  2280#  2291#  2301#  2304#  2314#  2331#  2359#  2378#  2381#  2389#  2413#  2424#
                2476#  2487#  2491#  2493#  2510#  2524#  2528#  2532#  2554#  2569#  2572#  2585#  2590#
                2607#  2641#  2659#  2661#  2675#  2679#  2697#  2737#  2756#  2759#  2773#  2778#  2796#
                2834#  2852#  2855#  2868#  2873#  2892#  2942#  2962#  2983#  2988#  3007#  3042#  3058#
                3060#  3071#  3073#  3100#  3126#  3142#  3144#  3155#  3157#  3169#  3192#  3208#  3210#
                3219#  3221#  3235#  3242#  3264#  3280#  3282#  3291#  3293#  3307#  3310#  3335#  3351#
                3353#  3362#  3364#  3378#  3381#  3411#  3431#  3433#  3445#  3447#  3462#  3465#  3493#
                3509#  3511#  3520#  3522#  3535#  3566#  3582#  3584#  3593#  3595#  3617#  3653#  3671#
                3674#  3685#  3687#  3698#  3703#  3731#  3755#  3757#  3768#  3770#  3782#  3819#  3830#
                3847#  3860#  3866#  3891#  3910#  3913#  3947#  3960#  3963#  3992#  4006#  4009#
T$GMAN- 000000    31#
T$HILI- 000200  4030#  4032#  4033#  4034#  4055#  4058#
T$LAST= 000001    31#  4072#
T$LOLI- 000001  4030#  4032#  4033#  4034#  4055#  4058#
T$LSYM= 010000    31#   440   449   459   470   481   491   503   511   524   535   546   557
                 568   578   589   598   666   678   760   787   807   817   921   932   942
                 951  1324  1366  1409  1452  1495  1549  1628  1682  1740  1790  1846  1901
                1936  1976  2038  2078  2120  2159  2208  2346  2397  2441  2496  2536  2624
                2721  2817  2922  3029  3112  3177  3248  3321  3393  3481  3553  3636  3715
                3806  3835  3871  3933  3973  4020  4036  4062
T$LTNO= 000054  4072#
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                 589#   591#   598#   647#   650#   654#   656#   657#   666#   667#   669#   670#   678#
                 679#   681#   685#   691#   692#   760#   761#   766#   787#   794#   795#   807#   808#
                 812#   813#   817#   818#   826#   916#   921#   926#   932#   934#   942#   945#   951#
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                1408#  1409#  1413#  1426#  1451#  1452#  1456#  1468#  1494#  1495#  1499#  1512#  1548#
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                1739#  1740#  1744#  1761#  1789#  1790#  1794#  1807#  1845#  1846#  1850#  1863#  1900#
                1901#  1906#  1919#  1935#  1936#  1940#  1953#  1975#  1976#  1980#  1998#  2037#  2038#
                2042#  2054#  2077#  2078#  2082#  2094#  2119#  2120#  2124#  2136#  2158#  2159#  2163#
                2176#  2207#  2208#  2212#  2230#  2238#  2343#  2345#  2346#  2350#  2365#  2396#  2397#
                2409#  2415#  2440#  2441#  2445#  2478#  2492#  2496#  2500#  2512#  2533#  2536#  2543#
                2556#  2573#  2622#  2623#  2624#  2628#  2646#  2662#  2715#  2720#  2721#  2725#  2739#
                2760#  2814#  2816#  2817#  2822#  2836#  2856#  2913#  2921#  2922#  2926#  2944#  2948#
                2968#  3025#  3027#  3028#  3029#  3033#  3044#  3075#  3109#  3110#  3112#  3116#  3128#
                3145#  3159#  3174#  3175#  3176#  3177#  3181#  3194#  3223#  3246#  3247#  3248#  3252#
```

```
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                    4036#  4046#  4049#  4051#  4054   4057   4062#  4069#
T$NS0   000000        38#    42     53#   103    108#   324    328#   427    429#   647    650#   654    656#
                     667    669#   679    681#   685    691#   761    766#   787    794#   808    812#   818
                     826#  1267   1272#  1324   1328#  1366   1370#  1409   1413#  1452   1456#  1495   1499#
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                    1906#  1936   1940#  1976   1980#  2038   2042#  2078   2082#  2120   2124#  2159   2163#
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                    3248   3252#  3321   3325#  3393   3398#  3481   3484#  3553   3557#  3636   3641#  3715
                    3720#  3806   3815#  3835   3839#  3871   3875#  3933   3937#  3973   3983#  4020   4025#
                    4046   4049#  4069
T$NS1 - 000005       432#   440    442#   449    451#   459    461#   470    472#   481    483#   491    493#
                     503    505#   511    515#   524    526#   535    537#   546    548#   557    559#   568
                     570#   578    580#   589    591#   598    657#   666    670#   678    692#   760    795#
                     807    813#   817    916#   921    926#   932    934#   942    945#   951   1208#  1263
                    1292#  1323   1342#  1365   1384#  1408   1426#  1451   1468#  1494   1512#  1548   1572#
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                    1953#  1975   1998#  2037   2054#  2077   2094#  2119   2136#  2158   2176#  2207   2230#
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                    2739#  2816   2836#  2921   2944#  3028   3044#  3110   3128#  3176   3194#  3247   3266#
                    3320   3337#  3392   3413#  3480   3495#  3552   3568#  3635   3655#  3714   3739#  3805
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                    4054   4057   4062
T$NS2   000003      1723#  1738   2238#  2343   2573#  2622   2662#  2715   2760#  2814   2856#  2913   2948#
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                    3524#  3551   3597#  3634   3689#  3708   3758#  3795
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T$PTNU= 000000        31#
T$SAVL- 177777        31#
T$SEGL  177777        31#  1208#  1216   1218   1223   1225   1228   1240   1243   1248   1250   1258   1263#
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                    2679   2697   2715#  2720#  2739#  2756   2759   2760#  2773   2778   2796   2814#  2816#
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                    3593   3595   3597#  3617   3634#  3635#  3655#  3671   3674   3685   3687   3689#  3698
                    3703   3708#  3714#  3739#  3755   3757   3758#  3768   3770   3772#  3782   3794#  3795#
                    3805#  3821#  3830   3834#  3849#  3860   3866   3870#  3893#  3910   3913   3932#  3949#
                    3960   3963   3972#  3994#  4006   4009   4019#
```

```
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                1302   1312   1323   1342#  1354   1361   1365   1384#  1396   1399   1408   1426#  1438
                1441   1451   1468#  1478   1494   1512#  1531   1548   1572#  1623   1651#  1664   1667
                1681   1700#  1715   1718   1739   1761#  1771   1780   1789   1807#  1817   1822   1845
                1863#  1873   1878   1900   1919#  1929   1935   1953#  1975   1998#  2015   2018   2037
                2054#  2065   2068   2077   2094#  2106   2109   2119   2136#  2146   2158   2176#  2195
                2207   2230#  2345   2365#  2378   2381   2389   2396   2415#  2424   2440   2478#  2487
                2491   2492   2512#  2524   2528   2532   2533   2556#  2569   2572   2623   2646#  2659
                2661   2720   2739#  2756   2759   2816   2836#  2852   2855   2921   2944#  3028   3044#
                3058   3060   3071   3073   3110   3128#  3142   3144   3176   3194#  3208   3210   3219
                3221   3247   3266#  3280   3282   3291   3293   3320   3337#  3351   3353   3362   3364
                3392   3413#  3431   3433   3445   3447   3480   3495#  3509   3511   3520   3522   3552
                3568#  3582   3584   3593   3595   3635   3655#  3671   3674   3685   3687   3714   3739#
                3755   3757   3805   3821#  3830   3834   3849#  3860   3866   3870   3893#  3910   3913
                3932   3949#  3960   3963   3972   3994#  4006   4009   4019
T$SEK1= 010001  1723#  1733   1738   2238#  2243   2246   2267   2270   2273   2277   2280   2291   2301
                2304   2314   2331   2343   2573#  2585   2590   2607   2622   2662#  2675   2679   2697
                2715   2760#  2773   2778   2796   2814   2856#  2868   2873   2892   2913   2948#  2962
                3027   3075#  3100   3109   3145#  3155   3157   3175   3223#  3235   3242   3246   3295#
                3307   3310   3319   3366#  3378   3381   3391   3449#  3462   3465   3475   3524#  3535
                3551   3597#  3617   3634   3689#  3698   3703   3708   3758#  3768   3770   3795
T$SEK2= 010002  2968#  2983   2988   3007   3025   3159#  3169   3174   3772#  3782   3794
T$SUBN= 000000    31#  1272#  1328#  1370#  1413#  1456#  1499#  1555#  1633#  1686#  1744#  1794#  1850#
                1906#  1940#  1980#  2042#  2082#  2124#  2163#  2212#  2350#  2409#  2445#  2500#  2543#
                2628#  2725#  2822#  2926#  3033#  3116#  3181#  3252#  3325#  3398#  3484#  3557#  3641#
                3720#  3815#  3839#  3875#  3937#  3983#
T$TAGL= 177777    31#
T$TAGN= 010111    31#   432#   442#   451#   461#   472#   483#   493#   505#   515#   526#   537#   548#
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                934#   945#  1272#  1328#  1370#  1413#  1456#  1499#  1555#  1633#  1686#  1744#  1794#
                1850#  1906#  1940#  1980#  2042#  2082#  2124#  2163#  2212#  2350#  2409#  2445#  2500#
                2543#  2628#  2725#  2822#  2926#  3033#  3116#  3181#  3252#  3325#  3398#  3484#  3557#
                3641#  3720#  3815#  3839#  3875#  3937#  3983#  4027#  4051#
T$TEMP= 000000    42#   103#   324#   427#   440#   449#   459#   470#   481#   491#   503#   511#   524#
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                683#   685#   760#   761#   787#   807#   808#   817#   818#   921#   932#   942#   951#
                1216#  1218#  1223#  1225#  1228#  1240#  1243#  1248#  1250#  1258#  1263#  1267#  1276#
                1286#  1290#  1302#  1312#  1323#  1324#  1330#  1336#  1340#  1354#  1361#  1365#  1366#
                1373#  1378#  1382#  1396#  1399#  1408#  1409#  1415#  1420#  1424#  1438#  1441#  1451#
                1452#  1458#  1463#  1466#  1478#  1494#  1495#  1502#  1506#  1510#  1531#  1548#  1549#
                1557#  1561#  1570#  1623#  1628#  1635#  1641#  1646#  1664#  1667#  1681#  1682#  1688#
                1694#  1698#  1715#  1718#  1733#  1738#  1739#  1740#  1746#  1752#  1756#  1771#  1780#
                1789#  1790#  1796#  1801#  1805#  1817#  1822#  1845#  1846#  1852#  1857#  1860#  1873#
                1878#  1900#  1901#  1908#  1913#  1917#  1929#  1935#  1936#  1942#  1947#  1951#  1975#
                1976#  1982#  1992#  1996#  2015#  2018#  2037#  2038#  2044#  2048#  2052#  2065#  2068#
                2077#  2078#  2084#  2089#  2092#  2106#  2109#  2119#  2120#  2126#  2131#  2134#  2146#
                2158#  2159#  2166#  2170#  2174#  2195#  2207#  2208#  2214#  2224#  2228#  2243#  2246#
                2267#  2270#  2273#  2277#  2280#  2291#  2301#  2304#  2314#  2331#  2343#  2345#  2346#
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                2826#  2831#  2834#  2852#  2855#  2868#  2873#  2892#  2913#  2921#  2922#  2929#  2938#
                2942#  2962#  2983#  2988#  3007#  3025#  3027#  3028#  3029#  3035#  3038#  3042#  3058#
                3060#  3071#  3073#  3100#  3109#  3110#  3112#  3118#  3122#  3126#  3142#  3144#  3155#
```

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	3235#	3242#	3246#	3247#	3248#	3255#	3260#	3264#	3280#	3282#	3291#	3293#	3307#
	3310#	3319#	3320#	3321#	3327#	3331#	3335#	3351#	3353#	3362#	3364#	3378#	3381#
	3391#	3392#	3393#	3400#	3406#	3411#	3431#	3433#	3445#	3447#	3462#	3465#	3475#
	3480#	3481#	3486#	3490#	3493#	3509#	3511#	3520#	3522#	3535#	3551#	3552#	3553#
	3560#	3562#	3566#	3582#	3584#	3593#	3595#	3617#	3634#	3635#	3636#	3645#	3650#
	3653#	3671#	3674#	3685#	3687#	3698#	3703#	3708#	3714#	3715#	3722#	3727#	3731#
	3755#	3757#	3768#	3770#	3782#	3794#	3795#	3805#	3806#	3809#	3814#	3819#	3830#
	3834#	3835#	3841#	3844#	3847#	3860#	3866#	3870#	3871#	3877#	3887#	3891#	3910#
	3913#	3932#	3933#	3939#	3943#	3947#	3960#	3963#	3972#	3973#	3985#	3989#	3992#
	4006#	4009#	4019#	4020#	4029#	4030#	4031#	4032#	4033#	4034#	4036#	4046#	4053#
	4055#	4056#	4058#	4062#	4069#								
TSTEST= 000054	31#	1272#	1328#	1370#	1413#	1456#	1499#	1555#	1633#	1686#	1744#	1794#	1850#
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	2628#	2725#	2822#	2926#	3033#	3116#	3181#	3252#	3325#	3398#	3484#	3557#	3641#
	3720#	3815#	3839#	3875#	3937#	3983#	4072						
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	511	519	524	530	535	541	546	552	557	563	568	573	578
	584	589	595	598	600	603	604	605	606	609	610	693	694
	698	700	708	718	748	749	751	759	760	768	771	774	776
	782	785	787	797	801	805	807	817	863	865	868	871	873
	875	876	905	910	954	961	963	964	1030	1181	1196	1208	1216
	1218	1223	1225	1228	1240	1243	1248	1250	1256	1258	1263	1290	1292
	1302	1312	1319	1323	1324	1340	1342	1350	1354	1356	1360	1361	1365
	1366	1382	1384	1396	1399	1404	1408	1409	1424	1426	1438	1441	1447
	1451	1452	1466	1468	1478	1486	1490	1494	1495	1510	1512	1514	1523
	1524	1529	1531	1540	1544	1548	1549	1566	1570	1572	1574	1575	1576
	1615	1620	1621	1622	1623	1628	1646	1651	1664	1667	1673	1681	1682
	1698	1700	1715	1718	1723	1731	1733	1738	1739	1740	1756	1761	1771
	1779	1780	1789	1790	1805	1807	1817	1822	1827	1829	1834	1836	1841
	1845	1846	1860	1863	1873	1878	1883	1885	1890	1891	1896	1900	1901
	1917	1919	1929	1935	1936	1951	1953	1960	1964	1965	1970	1971	1975
	1976	1996	1998	2015	2018	2033	2037	2038	2052	2054	2065	2068	2073
	2077	2078	2092	2094	2106	2109	2115	2119	2120	2134	2136	2146	2153
	2158	2159	2174	2176	2178	2187	2188	2193	2195	2203	2207	2208	2228
	2230	2232	2238	2243	2246	2267	2270	2273	2277	2280	2289	2291	2301
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	2389	2396	2397	2413	2415	2424	2431	2436	2440	2441	2476	2478	2487
	2490	2491	2492	2493	2496	2510	2512	2515	2523	2524	2527	2528	2531
	2532	2533	2536	2554	2556	2569	2572	2573	2585	2590	2594	2607	2612
	2616	2618	2622	2623	2624	2641	2646	2659	2661	2662	2675	2679	2683
	2697	2702	2707	2708	2715	2720	2721	2737	2739	2756	2759	2760	2773
	2778	2782	2796	2801	2805	2806	2814	2816	2817	2834	2836	2852	2855
	2856	2868	2873	2877	2892	2897	2901	2902	2913	2921	2922	2942	2944
	2948	2962	2968	2983	2988	2992	3007	3012	3016	3017	3025	3027	3028
	3029	3042	3044	3058	3060	3071	3073	3075	3077	3098	3099	3100	3105
	3109	3110	3112	3126	3128	3142	3144	3145	3155	3157	3159	3169	3174
	3175	3176	3177	3192	3194	3208	3210	3219	3221	3223	3231	3235	3237
	3241	3242	3246	3247	3248	3264	3266	3280	3282	3291	3293	3295	3307
	3310	3315	3319	3320	3321	3335	3337	3351	3355	3362	3364	3366	3378
	3381	3387	3391	3392	3393	3411	3413	3431	3433	3445	3447	3449	3462
	3465	3471	3473	3475	3480	3481	3493	3495	3509	3511	3520	3522	3524
	3535	3542	3547	3551	3552	3553	3566	3568	3582	3584	3593	3595	3597
	3599	3609	3610	3615	3617	3626	3630	3634	3635	3636	3653	3655	3671
	3674	3685	3687	3689	3698	3703	3705	3706	3708	3714	3715	3731	3739
	3755	3757	3758	3768	3770	3772	3782	3789	3794	3795	3805	3806	3819

```
                    :
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                         3891  3893  3910  3913  3928  3932  3933  3947  3949  3960  3963  3968  3972
                         3973  3992  3994  4006  4009  4015  4019  4020
T$TSTS= 000001             31#  1272#  1328#  1370#  1413#  1456#  1499#  1555#  1633#  1686#  1744#  1794#  1850#
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                         2628#  2725#  2822#  2926#  3033#  3116#  3181#  3252#  3325#  3398#  3484#  3557#  3641#
                         3720#  3815#  3839#  3875#  3937#  3983#
T$$AUT= 010024           766#   787
T$$CLE= 010025           795#   807
T$$DU = 010026           813#   817
T$$HAR= 010107          4027#  4036
T$$HW = 010021           657#   666
T$$INI= 010023           692#   760
T$$MSG= 010017           432#   440   442#   449   451#   459   461#   470   472#   481   483#   491   493#
                         503    505#  511   515#  524   526#  535   537#  546   548#  557   559#  568
                         570#   578   580#  589   591#  598
T$$PRO= 010020           650#
T$$SEG= 010000          1208#  1216  1218  1223  1225  1228  1240  1243  1248  1250  1258  1263#  1292#
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                        1441   1451#  1468#  1478  1494#  1512#  1531  1548#  1572#  1623#  1651#  1664  1667
                        1681#  1700#  1715  1718  1723#  1733  1738#  1739#  1761#  1771  1780  1789#  1807#
                        1817   1822  1845#  1863#  1873  1878  1900#  1919#  1929  1935#  1953#  1975#  1998#
                        2015   2018  2037#  2054#  2065  2068  2077#  2094#  2106  2109  2119#  2136#  2146
                        2158#  2176#  2195  2207#  2230#  2238#  2243  2246  2267  2270  2273  2277  2280
                        2291   2301  2304  2314  2331  2343#  2345#  2365#  2378  2381  2389  2396#  2415#
                        2424   2440#  2478#  2487  2491  2492#  2512#  2524  2528  2532  2533#  2556#  2569
                        2572   2573#  2585  2590  2607  2622#  2623#  2646#  2659  2661  2662#  2675  2679
                        2697   2715#  2720#  2739#  2756  2759  2760#  2773  2778  2796  2814#  2816#  2836#
                        2852   2855  2856#  2868  2873  2892  2913#  2921#  2944#  2948#  2962  2968#  2983
                        2998   3007  3025#  3027#  3028#  3044#  3058  3060  3071  3073  3075#  3100  3109#
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                        3208   3210  3219  3221  3223#  3235  3242  3246#  3247#  3266#  3280  3282  3291
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                        3595   3597#  3617  3634#  3635#  3655#  3671  3674  3685  3687  3689#  3698  3703
                        3708#  3714#  3739#  3755  3757  3758#  3768  3770  3772#  3782  3794#  3795#  3805#
                        3821#  3830  3834#  3849#  3860  3866  3870#  3893#  3910  3913  3932#  3949#  3960
                        3963   3972#  3994#  4006  4009  4019#
T$$SOF= 010110          4051#  4062
T$$SRV= 010032           916#   921   926#   932   934#   942   945#   951
T$$SW = 010022           670#   678
T$$TES= 010106          1272#  1290  1324  1328#  1340  1366  1370#  1382  1409  1413#  1424  1452  1456#
                        1466   1495  1499#  1510  1549  1555#  1570  1628  1633#  1646  1682  1686#  1698
                        1740   1744#  1756  1790  1794#  1805  1846  1850#  1860  1901  1906#  1917  1936
                        1940#  1951  1976  1980#  1996  2038  2042#  2052  2078  2082#  2092  2120  2124#
                        2134   2159  2163#  2174  2208  2212#  2228  2346  2350#  2359  2397  2409#  2413
                        2441   2445#  2476  2493  2496  2500#  2510  2536  2543#  2554  2624  2628#  2641
                        2721   2725#  2737  2817  2822#  2834  2922  2926#  2942  3029  3033#  3042  3112
                        3116#  3126  3177  3181#  3192  3248  3252#  3264  3321  3325#  3335  3393  3398#
                        3411   3481  3484#  3493  3553  3557#  3566  3636  3641#  3653  3715  3720#  3731
                        3806   3815#  3819  3835  3839#  3847  3871  3875#  3891  3933  3937#  3947  3973
                        3983#  3992  4020
T.ANS   012444           676#
T.CNTL  002420           169#   729*  755   832   849   889   896  2454
T.CRC   002236           112#   985*  1018*  2588  2677  2776  2871  2986  3701  3786
```

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T.DMP   012440            674#   2592    2681    2780    2875    2990
T.DRIV  002232            110#    727*   2233    2334    3733    3798
T.LMT   012442            675#   2605    2695    2794    2890    3005
T1      016242 G          683    1272#
T10     020370 G          683    1744#
T11     020542 G          683    1794#
T12     020740 G          683    1850#
T13     021140 G          683    1906#
T14     021242 G          683    1940#
T15     021366 G          683    1980#
T16     021562 G          683    2042#
T17     021716 G          683    2082#
T18     022050 G          683    2124#
T19     022170 G          683    2163#
T2      016406 G          683    1328#
T20     022350 G          683    2212#
T21     023162 G          683    2350#
T22     023356 G          683    2409#
T23     023522 G          683    2445#
T24     023706 G          683    2500#
T25     024072 G          683    2543#
T26     024472 G          683    2628#
T27     025114 G          683    2725#
T28     025542 G          683    2822#
T29     026222 G          683    2926#
T3      016536 G          683    1370#
T30     026654 G          683    3033#
T31     027270 G          683    3116#
T32     027522 G          683    3181#
T33     030012 G          683    3252#
T34     030306 G          683    3325#
T35     030600 G          683    3398#
T36     031172 G          683    3484#
T37     031472 G          683    3557#
T38     032032 G          683    3641#
T39     032344 G          683    3720#
T4      016672 G          683    1413#
T40     032670 G          683    3815#
T41     032760 G          683    3839#
T42     033112 G          683    3875#
T43     033310 G          683    3937#
T44     033446 G          683    3983#
T5      017024 G          683    1456#
T6      017162 G          683    1499#
T7      017360 G          683    1555#
T8      020002 G          683    1633#
T9      020172 G          683    1686#
UAM   = 000200 G           54#
UNITST  002252            118#    712*   715*    718     751     776     785     963
UOPIMN  002410            165#    753
UOPIMX  002406            164#    754
UUT     002250            117#    710    713*    717*
VEC     002646            181#    881*   902     905     907     910
VECMSG  033740           4032    4042#
VECT    000002             88#   4032
WCKINT  004016            354#   1083
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X$FALS= 000040           31#  4054  4057
X$OFFS= 000400           31#  4054  4057
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M$HNAP 40#

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2015# 2018# 2033 2037# 2038# 2052# 2054# 2065# 2068# 2073 2077# 2078# 2092# 2094# 2106#
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M$[illegible] AB 440# 449# 454# 459# 465# 470# 476# 481# 486# 491# 500# 503# 511# 519# 524#
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	1919#	1929#	1935#	1936#	1951#	1953#	1960#	1964#	1965#	1970#	1971#	1975#	1976#	1996#	1998#
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	2193#	2195#	2203#	2207#	2208#	2228#	2230#	2232#	2238#	2243#	2246#	2267#	2270#	2273#	2277#
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            2922#  2942#  2944#  2948#  2962#  2968#  2983#  2988#  2992#  3007#  3012#  3016#  3017#  3025#  3027#
            3028#  3029#  3042#  3044#  3058#  3060#  3071#  3073#  3075#  3077#  3098#  3099#  3100#  3105#  3109#
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M$WORD        40#   683#  1030#  1181#  1196#  1256#  1290#  1319#  1340#  1360#  1382#  1404#  1424#  1447#  1466#
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            1841#  1860#  1883#  1890#  1896#  1917#  1951#  1970#  1996#  2033#  2052#  2073#  2092#  2115#  2134#
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            4032#  4033#  4034#  4053#  4054#  4055#  4056#  4057#  4058#  4072
M$XFER      4054#  4057#
POINTE        36
PRINTB       454    465    476    486    500    519    530    541    552    563    573    584    595    600    603
             604    605    606    609    610    774    782   1566   2616   2707   2805   2901   3016
PRINTF       748    749    961
READBU       868
READEF       694    698    700    708
SETPRI       693    873    875   1350   1356   1514   1524   1576   1615   1960   1965   2178   2188   2232   2515
            2523   3231   3237   3599   3610   3855   3859
SETVEC       759    768    797    871    905    910   1575   1622   3077
STARS       1276   1286   1330   1336   1373   1378   1415   1420   1458   1463   1502   1506   1557   1561   1635
            1641   1688   1694   1746   1752   1796   1801   1852   1857   1908   1913   1942   1947   1982   1992
            2044   2048   2084   2089   2126   2131   2166   2170   2214   2224   2352   2355   2398   2404   2447
            2451   2467   2472   2501   2504   2545   2550   2632   2637   2729   2733   2826   2831   2929   2938
            3035   3038   3118   3122   3183   3188   3255   3260   3327   3331   3400   3406   3486   3490   3560
            3562   3645   3650   3722   3727   3809   3814   3841   3844   3877   3887   3939   3943   3985   3989
SVC            5#    31
WAITMS        22#   743    874
WAITUS        17#  1177   1191   3093
XFER        1290#  1340#  1382#  1424#  1466#  1510#  1570#  1646#  1698#  1756#  1805#  1860#  1917#  1951#  1996#
            2052#  2092#  2134#  2174#  2228#  2359#  2413#  2476#  2493#  2510#  2554#  2641#  2737#  2834#  2942#
            3042#  3126#  3192#  3264#  3335#  3411#  3493#  3566#  3653#  3731#  3819#  3847#  3891#  3947#  3992#
XFERF       4054   4057


. ABS.  034152     000

 ERRORS DETECTED:  0

 ,CZRLHB.LST/CRF=SVC33/ML,CZRLHB.MAC
 RUN-TIME: 153 156 21 SECONDS
 RUN-TIME RATIO: 503/332=1.5
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CORE USED: 20K (39 PAGES)