RLV11,RL01,
RL02

RLV11,RL01 DISKLESS
CVRLACO

AH-B108C MC
FICHE 1 OF 1

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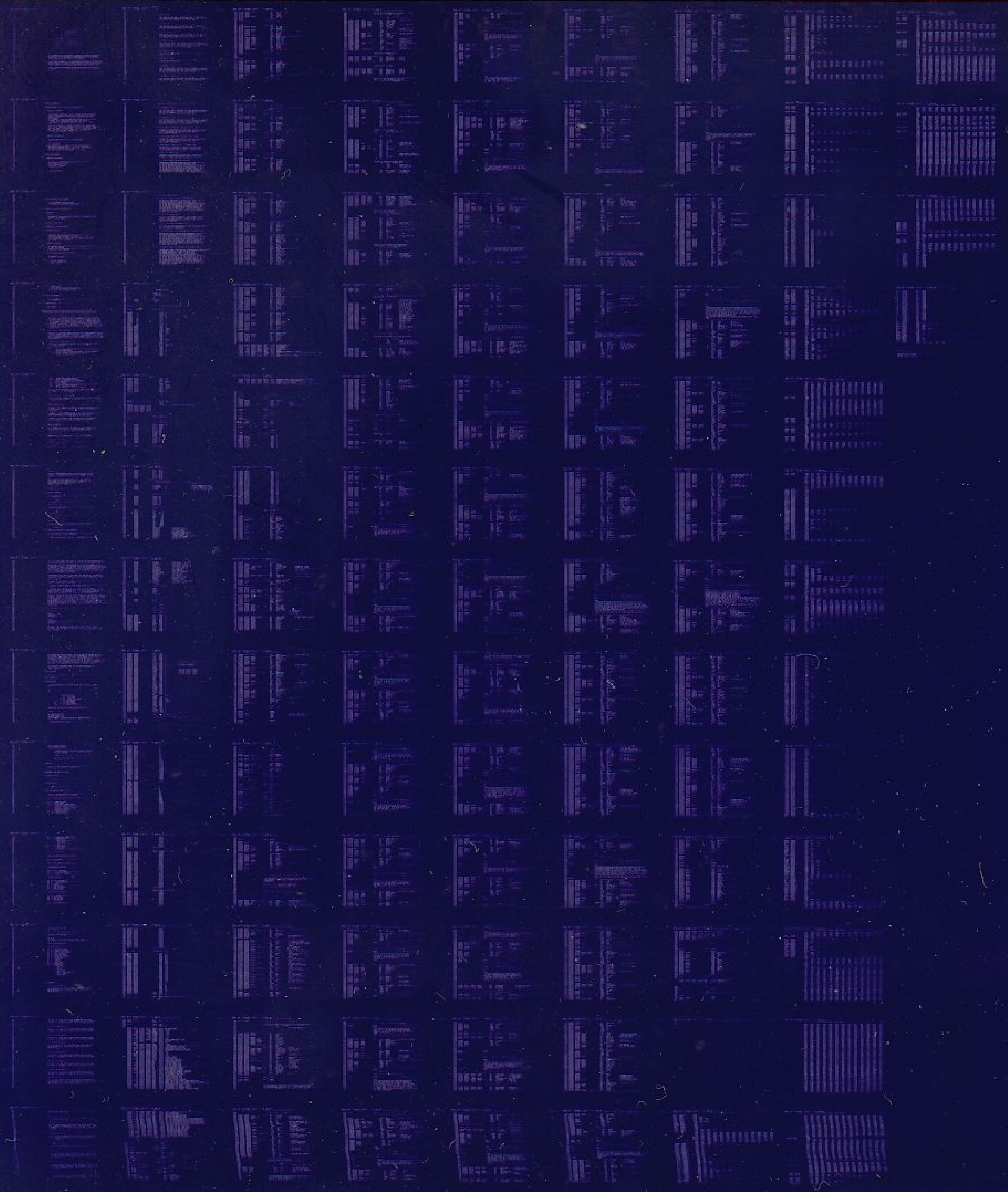

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                                                  IDENTIFICATION
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                                PRODUCT CODE:     AC-B107C-MC

                                PRODUCT NAME:     CVRLACO RLV11 RL01 DSKLS

                                PRODUCT DATE:     SEPTEMBER 1982

                                MAINTAINER:       DIAGNOSTIC ENGINEERING

                                AUTHOR:           W. HEAVEY






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1.0 GENERAL INFORMATION

1.1 PROGRAM ABSTRACT FOR THE RLV11 RL01 DISKLESS TEST

1.1.1 STRUCTURE OF PROGRAM

THE DIAGNOSTIC SUPERVISOR > REV C HAS BEEN RELEASED SEPARATED FROM THIS PROGRAM. ONE SHOULD REFER TO THE XXDP+/SUPP USERS MANUAL (AC-F348_-MC) FOR SUPERVISOR LOADING AND OPERATING INSTRUCTIONS.
THIS DIAGNOSTIC WITH THE SUPERVISOR OCCUPIES UP TO 14.5K WORDS OF MEMORY AND IS COMPATIBLE WITH BOTH XXDP+ AND ACT.
IT CAN BE RUN IN STANDALONE UNDER XXDP+ AND CAN BE CHAINED UNDER XXDP+,ACT AND RUN ON APT AND ACT ON APT.

WHEN THIS DIAGNOSTIC IS STARTED AT ADDRESS 200, CONTROL GOES FIRST TO THE SUPERVISOR PORTION, WHICH WILL ASK CERTAIN "HARD CORE" QUESTIONS ABOUT THE ENVIRONMENT. THEN IT WILL ENTER COMMAND MODE, INDICATED BY A PROMPT CHARACTER. AT COMMAND MODE THE OPERATOR MAY ENTER ANY OF SEVERAL COMMANDS AS DESCRIBED IN THE XXDP+/SUPR USERS MANUAL (AC-F348_-MC).

1.1.2 DIAGNOSTIC INFORMATION

THE RLV11 RL01 DISKLESS TEST IS A LSI-11(PDP-11) BASED PROGRAM THAT WILL TEST THE CONTROLLER.

RLV11 CONTROLLER

THE PROGRAM TESTS THE BASIC INTERFACE LOGIC,REGISTER MANIPULATION AND FUNCTIONALITY. THE RLV11 MAINTENANCE FUNCTION IS PERFORMED TO TEST THE CONTROLLER WRITE/READ DATA PATHS WITHOUT A DRIVE PRESENT.
THIS TEST WILL RUN WITH OR WITHOUT A DRIVE PRESENT.

1.2 SYSTEM REQUIREMENTS

1.2.1 HARDWARE REQUIREMENTS

PDP-11/LSI-11 PROCESSOR WITH 16K OR MORE OF CORE
CONSOLE DEVICE (LA30,LA36,VT50,ETC.)
RLV11 CONTROLLER(S) (1-8)
KW11P, KW11L (OPTIONAL)
LINEPRINTER(OPTIONAL)

1.2.2 SOFTWARE REQUIREMENTS

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1.3 RELATED DOCUMENTS AND STANDARDS
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        RL01 USERS MANUAL (EK-RL01-UG-PRE)
        CHQUSB XXDP+/SUPR USER MAN (AC-F348 -MC)
        FOR DIAGNOSTIC SUPERVISOR COMMAND INSTRUCTIONS.


1.4 DIAGNOSTIC HIERARCHY PREREQUISITES
    ----------------------------------

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


2.0 OPERATING INSTRUCTIONS
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2.1 LOADING AND STARTING PROCEDURES
    -------------------------------

2.1.1 LOADING PROCEDURES
      ------------------



        FOR LOADING AND OPERATING INSTRUCTIONS,PLEASE REFER TO
        CHQUSB XXDP+/SUPR USER MAN (AC-F348 -MC).
        ISSUE THE COMMAND "R CVRLAC". THE XXDP+ MONITOR WILL LOAD
        THE DIAGNOSTIC AND THE SUPERVISOR FILE HSAA??.SYS AND THEN
        GIVE CONTROL TO THE SUPERVISOR.

2.1.2 STARTING PROCEDURES
      -------------------

        THE PROGRAM STARTS AT LOCATION 200. USE STANDARD DEC PROCEDURES
        TO START THE PROGRAM.
        PLEASE REFER TO CHQUSB XXDP+/SUPR MAN (AC-F348_-MC) FOR
        SUPERVISOR STARTUP COMMANDS.

2.1.3 STEPS FOR QUICK AND SIMPLE EXECUTION
      ------------------------------------

        THE DIAGNOSTIC CAN BE EXECUTED STANDALONE WITHOUT READING THE REMAINDER OF THIS
        DOCUMENT AS FOLLOWS:

        A) LOAD THE DIAGNOSTIC
        B) START AT ADDRESS 200
        C) ANSWER THE HARDCORE QUESTIONS
        D) RECEIVE PROMPT
```

```
                E) ENTER STA<CR>
                F) ANSWER HARDWARE AND SOFTWARE QUESTIONS
                G) GET END OF PASS MESSAGES OR ERROR MESSAGES
                H) TO END EXECUTION, ENTER CONTROL/C



        2.2 SPECIAL ENVIRONMENTS
            --------------------

                THE ENVIRONMENTS THIS PROGRAM WILL RUN IN ARE XXDP+, XXDP+ CHAIN,
                ACT, SLIDE AND APT.

        2.3 PROGRAM OPTIONS
            ---------------

        2.3.1 START COMMAND
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        **********************************************************************
        STA(RT)/TESTS:<TEST-LIST>/PASS:<PASS-CNT>/FLAGS:<FLAG-LIST>/EOP:<INCR>
        **********************************************************************

        2.3.1.1 TESTS SWITCH  (/TESTS:<TEST-LIST>)

                <TEST-LIST> IS A SEQUENCE OF DECIMAL NUMBERS (1:2 ETC.) OR RANGES
                OF DECIMAL NUMBERS (1-5:8-10 ETC.) SEPARATED BY COLONS, SPECIFYING
                WHICH TESTS IT IS DESIRED BE EXECUTED.  THE TEST NUMBERS RANGE FROM
                1 TO THE LARGEST TEST NUMBER IN THE DIAGNOSTIC.  THEY MAY BE SPECIFIED
                IN ANY ORDER.  TESTS WILL BE EXECUTED IN NUMERICAL ORDER REGARDLESS
                OF ORDER OF SPECIFICATION.  THE DEFAULT IS TO EXECUTE ALL TESTS.  ON
                THIS AND ALL SWITCHES, THE ANGLE BRACKETS <> ARE PUNCTUATION USED IN THE
                DEFINITION ONLY, AND ARE NOT TO BE TYPED BY THE OPERATOR.  SEE EXAMPLE
                AT END OF 2.3.1.

        2.3.1.2 PASS SWITCH  (/PASS:<PASS-CNT>)

                <PASS-CNT> IS A DECIMAL NUMBER INDICATING THE DESIRED NUMBER OF PASSES.
                A PASS IS DEFINED AS THE EXECUTION OF THE FULL DIAGNOSTIC (ALL SELECTED TESTS)
                AGAINST ALL UNITS SUBMITTED.  THE DEFAULT IS NON-ENDING EXECUTION: IE,
                EXIT IS ACCOMPLISHED EITHER BY TYPING A CONTROL/C OR BY A HALT ON ERROR
                BEING ENCOUNTERED, IN WHICH CASE WE RETURN TO COMMAND MODE.  SEE EXAMPLE
                AT END OF 2.3.1.

        2.3.1.3 FLAGS SWITCH  (/FLAGS:<FLAG-LIST>)

                <FLAG-LIST> IS A SEQUENCE OF ELEMENTS OF THE FORM <FLAG>, <FLAG=1>,
                OR <FLAG=0>, SEPARATED BY COLONS,  WHERE <FLAG> HAS ONE OF
                THE FOLLOWING VALUES:

                  HOE     HALT ON ERROR, CAUSING COMMAN  MODE TO BE ENTERED WHEN AN
                          ERROR IS ENCOUNTERED
                  LOE     LOOP ON ERROR, CAUSING THE DIAGNOSTIC TO LOOP CONTINUOUSLY
                          WITHIN THE SMALLEST DEFINED BLOCK OF CODING (SEGMENT,
                          SUBTEST, OR TEST) CONTAINING THE ERROR
                  IER     INHIBIT ERROR REPORTING
```

```
          IBE     INHIBIT BASIC ERROR REPORTS
          IXE     INHIBIT EXTENDED ERROR REPORTS
          PRI     DIRECT ALL MESSAGES TO A LINE PRINTER
          PNT     PRINT NUMBER OF TEST BEING EXECUTED
          BOE     BELL ON ERROR
          UAM     RUN IN UNATTENDED MODE, BYPASSING MANUAL INTERVENTION TESTS
          ISR     INHIBIT STATISTICAL REPORTS
          IDR     INHIBIT DROPPING OF UNITS BY DIAGNOSTIC

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


2.3.1.4 END OF PASS SWITCH  (/EOP:<INCR>)

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


2.3.2   CONTROL CHARACTERS
        ------------------

        A CONTROL C (^C) ENTERED VIA THE CONSOLE DEVICE DURING THE EXECUTION
        OF A DIAGNOSTIC CAUSES A RETURN TO THE DIAGNOSTIC SUPERVISOR
        COMMAND MODE.

        A CONTROL Z (^Z) ENTERED WITHIN ONE OF THE THREE OPERATOR DIALOGS
        (HARDCORE,HARDWARE, OR SOFTWARE QUESTIONS) CAUSES TO DEFAULT
        VALUES TO BE TAKEN FOR THE REMAINDER OF THAT DIALOGUE.

        A CONTROL O (^O) ENTERED DURING THE EXECUTION OF A DIAGNOSTIC
        CAUSES ALL CONSOLE OUTPUT TO BE SUPPRESSED FOR THE REMAINDER
        OF THE DIAGNOSTIC OR UNTIL ANOTHER CONTROL O IS TYPED.


2.3.4 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.

        11/23 PROCESSOR (L) Y?

        ANSWER YES(Y) IF YOU HAVE AN 11/23 LSI-11 BUS PROCESSOR,
        ANSWER NO (N) IF YOU HAVE AN LSI-11(11/03L ETC.) PROCESSOR.

        BUS ADDRESS (O) 174400?

        ANSWER WITH THE BUS ADDRESS OF THE CONTROLLER.

        VECTOR (O) 330?

        ANSWER WITH THE INTERRUPT VECTOR OF THE CONTROLLER.
```

DRIVE (O) 0?

SINCE THIS PROGRAM RUNS WITHOUT A DRIVE,THIS QUESTION DOES NOT APPLY. THE HARDWARE QUESTION ON DRIVE NUMBER IS ASKED TO MAINTAIN COMPATIBILITY WITH THE RL11 PROGRAMS FOR CHAIN MODE.

WHEN TESTING MULTIPLE CONTROLLERS(0 TO 7),THE OPERATOR CAN RESPOND TO DRIVE NUMBER BY TYPING A NUMBER(0-7) FOR EACH CONTROLLER. THEN WHEN AN ERROR IS PRINTED,THE DRIVE NUMBER IN THE ERROR PRINTOUT WILL REFER TO THE NUMBER ASSIGNED THE CONTROLLER.

BR LEVEL(O) 5?

ANSWER WITH THE INTERRUPT PRIORITY OF THE CONTROLLER.

2.3.5 SOFTWARE PARAMETERS

THE FOLLOWING QUESTIONS ARE ASKED ON A START, RESTART OR CONTINUE IF THE QUESTION:

CHANGE SW?

IS ANSWERED YES(Y). THE QUESTIONS ARE:

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

AUTOSIZE (L) N?

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

ANSWER Y OR N

2.3.6 EXTENDED DISCUSSION OF P-TABLE DIALOGUE

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

AS SOON AS THE QUESTION "# UNITS?" IS ANSWERED (WITH THE NUMBER N, SAY) SPACE IN CORE IS ALLOCATED FOR N P-TABLES. ALL OF THE P-TABLES

```
ARE OF THE SAME FORMAT, AND THERE IS A ONE-TO ONE CORRESPONDENCE BETWEEN
THE HARDWARE PARAMETER QUESTIONS AND THE SLOTS IN THE P-TABLE FORMAT.

ON THE FIRST TRIP THRU THE QUESTIONS, ALL OF THE SLOTS IN ALL OF THE
P-TABLES ARE FILLED.  IF THE OPERATOR TYPES IN LESS THAN N EXPLICIT VALUES
IN RESPONSE TO A PARTICULAR QUESTION, THESE VALUES ARE PLACED IN THE P-TABLES
(ONE VALUE GOING INTO THE PROPER SLOT OF EACH P-TABLE BEGINNING WITH THE
FIRST P-TABLE) UNTIL THE STRING OF VALUES IS EXHAUSTED.  THE LAST VALUE
IN THE STRING BECOMES THE NEW DEFAULT AND IS USED THEN AND THERE TO FILL
THAT SLOT IN THE REMAINING P-TABLES.

ON SUBSEQUENT TRIPS THRU THE QUESTIONS, THE SAME PROCESS IS CARRIED OUT,
EXCEPT THAT THE EARLIEST P-TABLE NOT TO HAVE RECEIVED AN EXPLICIT VALUE
IN ANY OF ITS SLOTS NOW ASSUMES THE ROLE THAT TABLE NUMBER ONE PLAYED
IN THE FIRST TRIP.

THE SERIES OF QUESTIONS IS REISSUED UNTIL AT LEAST ONE QUESTION HAS RECEIVED
N EXPLICIT VALUES FROM THE OPERATOR.

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

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

NOW LET US SEE HOW WE COULD USE THESE CAPABILITIES TO CONSTRUCT A SET OF
P-TABLES.  ASSUME THAT WE HAVE 64 UNITS, AND THAT THERE ARE THREE HARDWARE
PARAMETERS FOR EACH (THREE SLOTS IN THE P-TABLE, THREE HARDWARE QUESTIONS
IN THE DIALOGUE).  LET THE DESIRED VALUE FOR THE FIRST PARAMETER
BE THE NUMBER 75 FOR ALL 64 TABLES.  LET THE DESIRED VALUE FOR THE SECOND
PARAMETER BE EQUAL TO THE UNIT NUMBER (1,2,3,...,64) EXCEPT FOR  UNIT
50, WHICH SHOULD RECEIVE THE VALUE 49.  LET THE DESIRED VALUE FOR THE THIRD
PARAMETER BE THE NUMBER 76 FOR THE FIRST 20 UNITS AND THE NUMBER 77 FOR THE
LAST 44 UNITS.

THE FOLLOWING DIALOGUE WOULD ACCOMPLISH THIS GOAL:

# UNITS (D)  ?  64

UNIT 1
<QUESTION 1> ? 75
<QUESTION 2> ? 1-20
<QUESTION 3> ? 76

UNIT 21
<QUESTION 1> ?
<QUESTION 2> ? 21-49,,51-64
<QUESTION 3> ? 77


THE FIRST TIME THE SERIES IS ASKED, SLOT ONE RECEIVES A 75 IN ALL
64 TABLES.  SLOT TWO RECEIVES THE VALUES 1,2,3,...,20 IN TABLES 1 THRU 20
AND A CONSTANT 20 IN TABLES 21 THRU 64.  SLOT THREE RECEIVES A CONSTANT 76
IN ALL 64 TABLES.
```

THE SECOND TIME THRU THE SERIES, TABLES 21 THRU THE END ARE GOING TO BE AFFECTED (NOTE THAT THIS PIECE OF INFORMATION IS PRINTED OUT FOR THE THE OPERATOR IN THE FORM "UNIT XX" AT THE BEGINNING OF EACH SERIES). QUESTION 1 IS RESPONDED TO BY A <CR>, SO SLOT ONE STAYS AT CONSTANT 75 IN TABLES 21 THRU 64, SINCE NO NEW EXLICIT VALUES ARE TYPED IN. SLOT TWO GETS THE VALUES 21,22,23,....,49 IN TABLES 21 THRU 49, AND GETS A 49 IN SLOT 50, AND GETS THE VALUES 51,52,53,....,64 IN TABLES 51 THRU 64. SLOT THREE GETS THE VALUE 77 IN TABLES 21 THRU 64.

THE DIALOGUE IS TERMINATED WHEN THE SOFTWARE RECOGNIZES THAT 64 EXPLICIT VALUES HAVE BEEN GIVEN FOR AT LEAST ONE QUESTION (NAMELY QUESTION 2).

2.4 EXECUTION TIMES

ONE PASS OF THE PROGRAM TAKES APPROXIMATELY < 30 SECONDS.

3.0 ERROR INFORMATION

3.1 ERROR REPORTING

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

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

WHERE:

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

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

EXAMPLE:

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

REGISTER DESCRIPTIONS CAN BE FOUND IN SECTION 5.0.
CS:CONTROL AND STATUS REGISTER

BA:BUS ADDRESS REGISTER
DA:DISK ADDRESS REGISTER
MP:MULTIPURPOSE REGISTER

NOTE: TO PREVENT EXTENSIVE PRINTOUTS ON BUFFER FAILURES USE THE "FLAG:IXE" (INHIBIT EXTENDED ERROR REPORTS) SUPERVISOR COMMAND.

EXAMPLE: DR>STA/FLAG:IXE OR DR>RES/FLAG:IXE

USE OF THIS FLAG WILL PRINT ONLY THE FIRST FAILURE ENCOUNTERED IN THE BUFFER.

3.2 ERROR HALTS

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

4.0 PERFORMANCE AND PROGRESS REPORTS

4.1 PERFORMANCE REPORTS

THIS PROGRAM WILL NOT GIVE ANY PERFORMANCE REPORTS.

4.2 PROGRESS REPORTS

THIS PROGRAM WILL NOT GIVE ANY PROGRESS REPORTS.

5.0 DEVICE INFORMATION TABLES

THE 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 EXISTENT 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)
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FOR READ/WRITE FUNCTIONS
------------------------

BIT 15 - MUST BE ZERO(0)
BIT 14-7 - CYLINDER ADDRESS FOR TRANSFER
BIT 6 - SURFACE FOR TRANSFER
BIT 5-0 - SECTOR FOR TRANSFER (0-47)

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

BIT 15 - MUST BE ZERO(0)
BIT 14-7 - DIFFERENCE TO NEW CYLINDER
BIT 6-5 - MUST BE ZERO(0)
BIT 4 - SURFACE
BIT 3 - MUST BE ZERO
BIT 2 - SEEK DIRECTION( 1 - IN / 0 - OUT )
BIT 1 - MUST BE ZERO
BIT 0 - MUST BE ONE(1)

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

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

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

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

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

                FOR READ AFTER MAINTENANCE FUNCTION
                -----------------------------------

                BIT 15-0
                FIRST RLMP:  CRC OF STARTING DISK ADDRESS VALUE+3
                SECOND RLMP: CRC OF CRC OF STARTING DISK ADDRESS VALUE+4

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

                HAS DRIVE STATUS

                BIT 15 - WRITE DATA ERROR
                BIT 14 - CURRENT HEAD ERROR(CHE)
                BIT 13 - WRITE LOCK STATUS(WL)
                BIT 12 - SEEK TIME OUT(SKTO)
                BIT 11 - SPIN ERROR(SPE)
                BIT 10 - WRITE GATE ERROR(WGE)
                BIT  9 - VOLUME CHECK(VC)
                BIT  8 - DRIVE SELECT ERROR(DSE)
                BIT  7 - RESERVED(0)
                BIT  6 - SURFACE
                BIT  5 - COVER OPEN
                BIT  4 - HEADS HOME
                BIT  3 - BRUSHES HOME
                BIT 2-0 -STATE BITS
                        0 - LOAD STATE
                        1 - SPIN UP
                        2 - BRUSH CYCLE
                        3 - LOAD HEADS
                        4 - SEEK - TRACK COUNTING
                        5 - SEEK - LINEAR MODE
                        6 - UNLOAD HEADS
                        7 - SPIN DOWN




        6.0 TEST SUMMARIES
            --------------

        TEST 1 - RLCS WRITE ADDRESSABILITY

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


        TEST 2 - RLBA WRITE ADDRESSABILITY

```

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


        TEST 3 - RLDA WRITE ADDRESSABILITY

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


        TEST 4 - RLMP WRITE ADDRESSABILITY

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

        TEST 5 - RLCS READ ADDRESSABILITY

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


        TEST 6 - RLBA READ ADDRESSABILITY

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


        TEST 7 - RLDA READ ADDRESSABILITY

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


        TEST 8 - RLMP READ ADDRESSABILITY

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

        TEST 9 - BUS RESET OF RLCS

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


        TEST 10 - BUS RESET OF RLBA

```

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


                TEST 11 - BUS RESET OF RLDA

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

                TEST 12 - READ WRITE OF RLCS

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


                TEST 13 - READ WRITE OF RLBA

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


                TEST 14 - READ WRITE OF RLDA

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


                TEST 15 - BIS OF RLCS

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


                TEST 16 - BIC OF RLCS

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


                TEST 17 - BIS OF RLBA

                        THIS TEST WILL USE THE 11 INSTRUCTION "BIS" TO SHOW THAT A
                        READ-MODIFY-WRITE SEQUENCE OF THE RLBA WORKS.  BITS 15-0 ARE
                        BIT SET USING GROWING AND WALKING 0'S AND 1'S.  BIT 0 CAN SET
                        ON A RLV11.
```

```


TEST 18 - BIC OF RLBA

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


TEST 19 - BIS OF RLDA

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


TEST 20 - BIC OF RLDA

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


TEST 21 - BUS RESET OF RLCS

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


TEST 22 - BUS RESET OF RLBA

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


TEST 23 - BUS RESET OF RLDA

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


TEST 24 - UNIQUENESS OF RLCS

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


TEST 25 - UNIQUENESS OF RLBA

        THIS TEST WILL VERIFY THAT WHEN THE RLBA (XXXXX2) IS ADDRESSED
        ONLY THAT REGISTER IS EFFECTED.  BOTH THE RLCS AND RLDA ARE
        WRITTEN WITH KNOWN DATA, THE RLBA IS WRITTEN, THEN THE RLCS
```

```
                          AND RLDA ARE VERIFIED THAT THEY DID NOT CHANGE.


                TEST 26 - UNIQUENESS OF RLDA

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


                TEST 27 - UNIQUENESS OF RLMP

                          THIS TEST WILL VERIFY THAT WHEN THE RLMP (XXXXX6) IS ADDRESSED
                          ONLY THAT REGISTER IS EFFECTED.  THE RLCS, RLBA AND RLDA ARE
                          WRITTEN WITH KNOW DATA,  THE RLMP IS WRITTEN, THEN THE RLCS,
                          RLBA AND RLDA ARE VERIFIED THAT THEY DID NOT CHANGE.


                TEST 28 - RLV11 MAINT. FORCED OPI TEST,LESS THAN 510 WORDS

                          PERFORM RLV11 MAINTENANCE FUNCTION 0 WITH LESS THAN 510 WORDS
                          TO FORCE OPI ERROR. THE TEST SHOULD FORCE COMPOSITE ERROR
                          (BIT 15),HEADER NOT FOUND(BIT 12) AND OPI(BIT 10).
                          DRIVE ERROR IS IGNORED.

                TEST 29 - RLV11 MAINT. FORCED OPI TEST,MORE THAN 511 WORDS

                          PERFORM RLV11 MAINTENANCE FUNCTION 0 WITH MORE THAN 511 WORDS
                          TO FORCE OPI ERROR. THE TEST SHOULD FORCE COMPOSITE ERROR
                          (BIT 15),HEADER NOT FOUND(BIT 12) AND OPI(BIT 10).
                          DRIVE ERROR IS IGNORED.

                TEST 30 - RLV11 MAINT. FORCED OPI TEST - INTERRUPT MODE

                          PERFORM TEST OF INTERRUPT BY ISSUING RLV11 MAINTENANCE
                          FUNCTION 0 WITH MORE THAN 511 WORDS TO FORCE OPI ERROR.
                          CHECK INTERRUPT OPERATION AND REPORT IF ERROR FOUND.

                TEST 31 - RLV11 OPI TIMEOUT TEST

                          PERFORM RLV11 MAINTENANCE FUNCTION 0 WITH INTERRUPT MODE.
                          FORCE OPI TIMEOUT BY SETTING WORD COUNT TO -512 WORDS.
                          MEASURE OPI TIMEOUT AND COMPARE TO MIN. AND MAX. LIMITS.

                TEST 32 - TEST RLV11 MAINT. FUNCTION -FLAG MODE

                          PERFORM RLV11 MAINTENANCE FUNCTION 0 (FLAG MODE) AND CHECK
                          DA AND BA REGISTERS FOR PROPER INCREMENT. CHECK
                          THE SERIAL WRITE/READ DATA PATHS BY READING OUT OF THE FIFO
                          VIA THE MP REGISTER THE CRC OF THE DA+3 AND THE CRC OF THE
                          CRC OF THE DA+4 AND COMPARING TO EXPECTED RESULTS. CHECK
                          THE TRANSFER OF 255 WORDS FROM BUF1 MEMORY THROUGH THE FIFO
                          INTO BUF2 MEMORY FOR PROPER DATA. CHECK THE PREVIOUSLY
                          WRITTEN DATA IN THE LAST WORD+1 OF BUF2 FOR A VALUE=123456
                          TO INSURE THAT THE DATA TRANSFER IN MAINTENANCE MODE WAS
                NOT MORE THAN 255 WORDS.

        TEST 33 - TEST RLV11 MAINT. FUNCTION -INTERRUPT MODE

                PERFORM RLV11 MAINTENANCE FUNCTION 0 (INT. MODE) AND CHECK
                DA AND BA REGISTERS FOR PROPER INCREMENT. CHECK
                THE SERIAL WRITE/READ DATA PATHS BY READING OUT OF THE FIFO
                VIA THE MP REGISTER THE CRC OF THE DA+3 AND THE CRC OF THE
                CRC OF THE DA+4 AND COMPARING TO EXPECTED RESULTS. CHECK
                THE TRANSFER OF 255 WORDS FROM BUF1 MEMORY THROUGH THE FIFO
                INTO BUF2 MEMORY FOR PROPER DATA. CHECK THE PREVIOUSLY
                WRITTEN DATA IN THE LAST WORD+1 OF BUF2 FOR A VALUE=123456
                TO INSURE THAT THE DATA TRANSFER IN MAINTENANCE MODE WAS
                NOT MORE THAN 255 WORDS.

        TEST 34 - RLV11 FIFO ADDRESS TEST

                TEST THAT FIFO OPERATES CORRECTLY. STORE ADDRESS PATTERN
                IN BUF1 (0-255) WHICH CONTAINS A UNIQUE PATTERN IN EACH
                LOCATION. PERFORM MAINTENANCE FUNCTION AND TEST BUF2 FOR
                PROPER FIFO ADDRESSING.

        TEST 35 - RLV11 FIFO ADDRESS COMPLEMENT TEST

                TEST THAT FIFO ADDRESSES CORRECTLY. STORE THE ADDRESS COMPLEMENT
                OF 0-255 INTO BUF1. PERFORM MAINTENANCE FUNCTION AND CHECK
                BUF2 FOR PROPER FIFO ADDRESSING.

        TEST 36 - TEST RLV11 MAINT. WITH COMPLEMENT DATA -INTERRUPT MODE

                PERFORM RLV11 MAINT. FUNCTION WITH COMPLEMENT DATA IN BUF1.
                CHECK DA AND BA REGISTERS FOR PROPER INCREMENT. CHECK
                THE SERIAL WRITE/READ DATA PATHS BY READING OUT OF THE FIFO
                VIA THE MP REGISTER THE CRC OF THE DA+3 AND THE CRC OF THE
                CRC OF THE DA+4 AND COMPARING TO EXPECTED RESULTS. CHECK
                THE TRANSFER OF 255 WORDS FROM BUF1 MEMORY THROUGH THE FIFO
                INTO BUF2 MEMORY FOR PROPER DATA. CHECK THE PREVIOUSLY
                WRITTEN DATA IN THE LAST WORD+1 OF BUF2 FOR A VALUE=123456
                TO INSURE THAT THE DATA TRANSFER IN MAINTENANCE MODE WAS
                NOT MORE THAN 255 WORDS.

        TEST 37 - TEST RLV11 MAINT. WITH RANDOM DATA -INTERRUPT MODE

                PERFORM RLV11 MAINT. FUNCTION WITH A RANDOM DATA PATTERN IN BUF1
                THE RANDOM PATTERN IS THE SAME FOR EACH CONTROLLER UNDER TEST.
                THE RANDOM PATTERN WILL CHANGE AT END OF PASS.
                THE RANDOM PATTERN WILL INIT AT START OR RESTART.
                CHECK DA AND BA REGISTERS FOR PROPER INCREMENT. CHECK
                THE SERIAL WRITE/READ DATA PATHS BY READING OUT OF THE FIFO
                VIA THE MP REGISTER THE CRC OF THE DA+3 AND THE CRC OF THE
                CRC OF THE DA+4 AND COMPARING TO EXPECTED RESULTS. CHECK
                THE TRANSFER OF 255 WORDS FROM BUF1 MEMORY THROUGH THE FIFO
                INTO BUF2 MEMORY FOR PROPER DATA. CHECK THE PREVIOUSLY
                WRITTEN DATA IN THE LAST WORD+1 OF BUF2 FOR A VALUE=123456
                TO INSURE THAT THE DATA TRANSFER IN MAINTENANCE MODE WAS
                NOT MORE THAN 255 WORDS.
```

```


                    7.0 PROGRAM LISTING
                        ---------------

                    &
                    .ENABLE AMA
                    .ENABLE ABS
                    .NLIST  ME,CND,MD

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


002000                      POINTER BGNSFT,BGNSW,BGNDU,BGNAU


002000              BGNMOD  MDHEDR

002000                      HEADER  CVRLA,C,0,30.,0,340
002000       103            .ASCII /C/
002001       126            .ASCII /V/
002002       122            .ASCII /R/
002003       114            .ASCII /L/
002004       101            .ASCII /A/
002005       000            .BYTE   0
002006       000            .BYTE   0
002007       000            .BYTE   0
002010       103            .ASCII  /C/
002011       060            .ASCII  /0/
002012    000000            .WORD   0
002014    000036            .WORD   30.
002016    027436            .WORD   L$HARD
002020    027574            .WORD   L$SOFT
002022    013574            .WORD   L$HW
002024    013610            .WORD   L$SW
002026    030520            .WORD   L$LAST
002030    000000            .WORD   0
002032    000000            .WORD   0
002034    000000            .WORD   0
002036    000000            .WORD   0
002040    013620            .WORD   L$DISPATCH
002042    000340            .WORD   340
002044    000000            .WORD   0
002046    000000            .WORD   0
002050       003            .BYTE   C$REVISION
002051       003            .BYTE   C$EDIT
002052    000000            .WORD   0
002054    000000            .WORD   0
002056    000000            .WORD   0
002060    002122            .WORD   L$DVTYP
002062    000000            .WORD   0
002064    000000            .WORD   0
002066    000000            .WORD   0
002070    014510            .WORD   L$AU
```

```
002072  014504                          .WORD   L$DU
002074  000000                          .WORD   0
002076  002130                          .WORD   L$DESC
002100  104035                          EMT     E$LOAD
002102  000000                          .WORD   0
002104  013732                          .WORD   L$INIT
002106  014442                          .WORD   L$CLEAN
002110  014440                          .WORD   L$AUTO
002112  014432                          .WORD   L$PROT
002114  000000                          .WORD   0
002116  000000                          .WORD   0
002120  000000                          .WORD   0

002122                                  ENDMOD




002122                                  DEVTYP  <RLV11>
002122  046122  030526  000061          .ASCIZ  /RLV11/
                                        .EVEN
002130                                  DESCRIPT       <CVRLACRLV11 RL01 DSKLESS DIAGNOSTIC>
002130  053103  046122  041501          .ASCIZ  /CVRLACRLV11 RL01 DSKLESS DIAGNOSTIC/
002136  046122  030526  020061
002144  046122  030460  042040
002152  045523  042514  051523
002160  042040  040511  047107
002166  051517  044524  000103
                                        .EVEN

                                .SBTTL  GLOBAL EQUATES
002174                          BGNMOD  GLBEQAT

002174                                  EQUALS
                                ;
                                ; BIT DIFINITIONS
                                ;
        100000                  BIT15== 100000
        040000                  BIT14== 40000
        020000                  BIT13== 20000
        010000                  BIT12== 10000
        004000                  BIT11== 4000
        002000                  BIT10== 2000
        001000                  BIT09== 1000
        000400                  BIT08== 400
        000200                  BIT07== 200
        000100                  BIT06== 100
        000040                  BIT05== 40
        000020                  BIT04== 20
        000010                  BIT03== 10
        000004                  BIT02== 4
        000002                  BIT01== 2
        000001                  BIT00== 1
                                ;
        001000                  BIT9==  BIT09
        000400                  BIT8==  BIT08
        000200          BIT7==  BIT07
        000100          BIT6==  BIT06
        000040          BIT5==  BIT05
        000020          BIT4==  BIT04
        000010          BIT3==  BIT03
        000004          BIT2==  BIT02
        000002          BIT1==  BIT01
        000001          BIT0==  BIT00
                        ;
                        ; EVENT FLAG DEFINITIONS
                        ;   EF32:EF17 RESERVED FOR SUPERVISOR TO PROGRAM COMMUNICATION
                        ;
        000040          EF.START==      32.                             ; START COMMAND WAS ISSUED
        000037          EF.RESTART==    31.                             ; RESTART COMMAND WAS ISSUED
        000036          EF.CONTINUE==   30.                             ; CONTINUE COMMAND WAS ISSUED
        000035          EF.NEW==        29.                             ; A NEW PASS HAS BEEN STARTED
        000034          EF.PWR==        28.                             ; A POWER-FAIL/POWER-UP OCCURRED
                        ;
                        ;
                        ; PRIORITY LEVEL DEFINITIONS
                        ;
        000340          PRI07== 340
        000300          PRI06== 300
        000240          PRI05== 240
        000200          PRI04== 200
        000140          PRI03== 140
        000100          PRI02== 100
        000040          PRI01== 40
        000000          PRI00== 0
                        ;
                        ;OPERATOR FLAG BITS
                        ;
        000004          EVL==        4
        000010          LOT==       10
        000020          ADR==       20
        000040          IDU==       40
        000100          ISR==      100
        000200          UAM==      200
        000400          BOE==      400
        001000          PNT==     1000
        002000          PRI==     2000
        004000          IXE==     4000
        010000          IBE==    10000
        020000          IER==    20000
        040000          LOE==    40000
        100000          HOE==   100000
        000001          DRDY=BIT0               ;DRIVE READY (RLCS)
        000100          INTEN=BIT6              ;INTERRUPT ENABLE (RLCS)
        100000          ERR=BIT15               ;RL11 ERROR (RLCS)
        040000          DERR=BIT14              ;RL01 DRIVE ERROR (RLCS)
        002000          OPI=BIT10               ;OPERATION INCOMPLETE (RLCS)
        000200          CRDY=BIT7               ;CONTROLLER READY (RLCS)
        000040          BA17=BIT5               ;EXTENDED ADDRESS BIT 17 (RLCS)
        000020          BA16=BIT4               ;EXTENDED ADDRESS BIT 16 (RLCS)
        020000          NXM=BIT13               ;NON-EXISTANT MEMORY (RLCS)
        000000          DS0=0                   ;DRIVE SELECT 0 (RLCS)
        000400          DS1=BIT8                ;DRIVE SELECT 1 (RLCS)
        001000          DS2=BIT9                ;DRIVE SELECT 2 (RLCS)
        001400          DS3=BIT8!BIT9           ;DRIVE SELECT 3 (RLCS)
        000000          MAINT=0                 ;MAINTENANCE FUNCTION-RLV11
        000002          WRCHK=BIT1              ;WRITE CHECK FUNCTION
        000004          GSTAT=BIT2              ;GET STATUS FUNCTION
        000006          SEEK=BIT2!BIT1          ;SEEK FUNCTION
        000010          RDHDR=BIT3              ;READ HEADER FUNCTION
        000012          WRITE=BIT3!BIT1         ;WRITE DATA FUNCTION
        000014          READ=BIT3!BIT2          ;READ DATA FUNCTION
        000202          GODRVR=BIT1!BIT7        ;CRDY AND DRDY
        000010          DRST=BIT3               ;DRIVE RESET (RLDA)
        000002          GSBIT=BIT1              ;GET STATUS BIT (RLDA)
        000001          MK=BIT0                 ;MARKER BIT (RLDA)
        000004          SIGN=BIT2               ;SIGN BIT (RLDA)
        000100          RHHS=BIT6               ;HEAD SELECT IN READ HEADER
        000100          STHS=BIT6               ;HEAD SELECT IN STATUS BACK
        000020          DAHS=BIT4               ;HEAD SELECT IN SEEK

                        ;OFFSET FOR HARDWARE P-TABLE

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

                        ;OFFSET FOR SOFTWARE P-TABLE

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

002174                          ENDMOD

                        .SBTTL  GLOBAL DATA

002174                  BGNMOD  GLBDAT

                        .SBTTL  GLOBAL DATA

002174  000000          UUT:    .WORD   0
002176  000000          UNITST: .WORD   0
002200  000000          RLCS:   .WORD   0
002202  000000          RLBA:   .WORD   0
002204  000000          RLDA:   .WORD   0
002206  000000          RLMP:   .WORD   0
002210  000000          BCSR:   .WORD   0
002212  000000          BPRIOR: .WORD   0
002214  000000          BVEC:   .WORD   0
002216  000000          DRIVE:  .WORD   0               ;DRIVE UNDER TEST
002220  000000          B.CS:   .WORD   0
002222  000000          B.BA:   .WORD   0
002224  000000          B.DA:   .WORD   0
002226  000000          B.MP:   .WORD   0
```

```
002230  000000          DERFLG: .WORD
002232  000000          E.CS:    .WORD   0
002234  000000          E.BA:    .WORD   0
002236  000000          E.DA:    .WORD   0
002240  000000          E.MP:    .WORD   0
002242  000000          E.MP1:   .WORD   0
002244  000000          PFLG:    .WORD   0               ;PROCESSOR TYPE  0=UNIBUS  1=Q-BUS
002246  000000          TRPFLG: .WORD    0
002250  000000          INTFLG: .WORD    0               ;INTERRUPT OCCURANCE FLAG
002252  000000          LDCSR:   .WORD   0               ;LOCATION TO FORM RLCS
002254  120001          XPOLY:   .WORD   120001
002256  000004          ERRVEC: .WORD    4
002260  000000          BCCFBK: .WORD    0               ;LOCATION USED BY "SIMBCC"
002262  000000          CALBCC: .WORD    0               ;LOCATION USED BY "SIMBCC"
002264  000000          TEMP2:   .WORD   0               ;LOCATION USED BY "SIMBCC"
002266  000000          TEMP3:   .WORD   0               ;LOCATION USED BY "SIMBCC"
002270  000000          TEMP4:   .WORD   0               ;LOCATION USED BY "SIMBCC"
002272  000000          TEMP5:   .WORD   0
002274  000000          TEMP1:   .WORD   0
002276  000000          TMP0:    .WORD   0
002300  000000          TMP1:    .WORD   0
002302  000000          TMP2:    .WORD   0
002304  000000          CHECK:   .WORD   0
002306  000000          GDDAT:   .WORD   0
002310  000000          BDDAT:   .WORD   0
002312  000000          GCRCPT: .WORD    0
002314  000000          GDCRCA: .WORD    0
002316  000000          GDCRCB: .WORD    0
002320  000000          GDDATP: .WORD    0
002322  000000          GDATMP: .WORD    0
002324  000000          MATFLG: .WORD    0
002326  000000          ERRLMT: .WORD    0
002330  000000          WHY:     .WORD   0               ;REASON FOR DROP IN AUTOSIZE
002332  000000          T.CNTLR:         .WORD   0
002334  000000          TMPFNC: .WORD    0
002336  000233          OPIMN:   .WORD   155.
002340  001212          OPIMX:   .WORD   650.
002342  176543          HINUM:   .WORD   176543
002344  123456          LONUM:   .WORD   123456
002346  000000          TEMLO:   .WORD   0
002350  000000          TEMHI:   .WORD   0
002352  000000          PATSAV: .WORD    0
002354  000000          DELCNT: .WORD    0
002356  000000          LFLG:    .WORD   0
002360  000000          SAVCNT: .WORD    0
002362  000000          ERPOINT: .WORD   0
002364  000100          ERCOUNT: .BLKW   64.             ;ERROR COUNTER FOR ALL UNITS

                        .SBTTL  PATTERNS FOR REGISTER R/W
                        ;
                        ;PATTERNS USED FOR LOADING/READING REGISTERS

002564  000000          BEGPAT: 0                        ;GROWING 1
002566  000001                  1
002570  000003                  3
002572  000007                  7
```

```
002574  000017                  17
002576  000037                  37
002600  000077                  77
002602  000177                  177
002604  000377                  377
002606  000777                  777
002610  001777                  1777
002612  003777                  3777
002614  007777                  7777
002616  017777                  17777
002620  037777                  37777
002622  077777                  77777
002624  177777                  177777
002626  177776                  177776                  ;GROWING 0
002630  177774                  177774
002632  177770                  177770
002634  177760                  177760
002636  177740                  177740
002640  177700                  177700
002642  177600                  177600
002644  177400                  177400
002646  177000                  177000
002650  176000                  176000
002652  174000                  174000
002654  170000                  170000
002656  160000                  160000
002660  140000                  140000
002662  100000                  100000

002664  000000                  000000
002666  000001                  1                       ;WALKING 1
002670  000002                  2
002672  000004                  4
002674  000010                  10
002676  000020                  20
002700  000040                  40
002702  000100                  100
002704  000200                  200
002706  000400                  400
002710  001000                  1000
002712  002000                  2000
002714  004000                  4000
002716  010000                  10000
002720  020000                  20000
002722  040000                  40000
002724  100000                  100000
002726  177777                  177777                  ;WALKING 0
002730  177776                  177776
002732  177775                  177775
002734  177773                  177773
002736  177767                  177767
002740  177757                  177757
002742  177737                  177737
002744  177677                  177677
002746  177577                  177577
002750  177377                  177377
```

```
 002752  176777                  176777
 002754  175777                  175777
 002756  173777                  173777
 002760  167777                  167777
 002762  157777                  157777
 002764  137777                  137777
 002766  077777                  077777
 002770  177777                  177777
 002772  000000          ENDPAT: 000000



                         .SBTTL  PATTERNS FOR MAINT. CRC TEST OF SERIAL DATA PATH
 002774  155552          PATCRC: 155552
 002776  133330                  133330
 003000  066663                  066663
 003002  125247                  125247
 003004  052522                  052522
 003006  177774                  177774
 003010  000374                  000374
 003012  022217                  022217
 003014  044441                  044441
 003016  166663                  166663
 003020  144441                  144441
 003022  033330                  033330
 003024  011106                  011106
 003026  070704                  070704
 003030  107065                  107065
 003032  111106                  111106
 003034  167353                  167353
 003036  156732                  156732
 003040  146311                  146311
 003042  135670                  135670
 003044  114626                  114626
 003046  104205                  104205
 003050  073564                  073564
 003052  063143                  063143
 003054  042101                  042101
 003056  031460                  031460
 003060  021037                  021037
 003062  010416                  010416
 003064  000000          CRCEND: 000000

                         ;DATA PATTERNS FOR MAINTENANCE TEST
 003066  155555          PATDAT: 155555
 003070  133333                  133333
 003072  066666                  066666
 003074  125252                  125252
 003076  052525                  052525
 003100  177777                  177777
 003102  000000                  000000
 003104  107070                  107070
 003106  070707                  070707
 003110  144444                  144444
 003112  033333                  033333
 003114  011111                  011111
 003116  022222                  022222
```

```
003120  044444                 044444
003122  111111                 111111
003124  166666                 166666
003126  010421                 010421
003130  021042                 021042
003132  031463                 031463
003134  042104                 042104
003136  063146                 063146
003140  073567                 073567
003142  104210                 104210
003144  114631                 114631
003146  135673                 135673
003150  146314                 146314
003152  156735                 156735
003154  167356                 167356
003156  000000         ENDDAT: 000000


                       ;PATTERNS FOR TEST OF RLCS

003160  000000         CSPAT:  .WORD   0               ;SHIFTING 1
003162  000002                 .WORD   BIT1
003164  000004                 .WORD   BIT2
003166  000010                 .WORD   BIT3
003170  000020                 .WORD   BIT4
003172  000040                 .WORD   BIT5
003174  000100                 .WORD   BIT6
003176  000400                 .WORD   BIT8
003200  001000                 .WORD   BIT9
003202  001576                 .WORD   1576            ;GROWING 0
003204  001574                 .WORD   1574
003206  001570                 .WORD   1570
003210  001560                 .WORD   1560
003212  001540                 .WORD   1540
003214  001500                 .WORD   1500
003216  001400                 .WORD   1400
003220  001576                 .WORD   1576            ;SHIFT 0
003222  001574                 .WORD   1574
003224  001566                 .WORD   1566
003226  001556                 .WORD   1556
003230  001536                 .WORD   1536
003232  001436                 .WORD   1436
003234  001136                 .WORD   1136
003236  000076                 .WORD   76
003240  000006                 .WORD   6               ;GROWING 1
003242  000016                 .WORD   16
003244  000036                 .WORD   36
003246  000076                 .WORD   76
003250  000176                 .WORD   176             ;
003252  000576                 .WORD   576
003254  001576                 .WORD   1576
003256  000000         CSEND:  .WORD   0
003260  000240         HDRBUF: .BLKW   160.

                       .SBTTL  BUFFERS FOR RLV11 MAINTENANCE FUNCTION
003760  000400         BUF1:   .BLKW   256.
```

```
004760  000400                              BUF2:     .BLKW   256.
005760                                      ENDMOD

005760                                      BGNMOD  GLBTXT
                                            .SBTTL  GLOBAL TEXT

005760  047516  041440  047117  NORES:  .ASCIZ  /NO CONTROLLER/
005776  047516  042040  044522  NODRY:  .ASCIZ  /NO DRIVE CONNECTED/
006021     040  051104  000126  DEMES:  .ASCIZ  / DRV/
006026  047040  046530     000  NXMMES: .ASCIZ  / NXM/
006033     040  050117  000111  OPIMES: .ASCIZ  / OPI/
006040  044040  051103  000103  HCRCMES:.ASCIZ  / HCRC/
006046  044040  043116     000  HNFMES: .ASCIZ  / HNF/
006053     040  041504  000113  DCKMES: .ASCIZ  / DCK/
006060  042040  052114     000  DLTMES: .ASCIZ  / DLT/
006065     105  050130  042047  EXPMES: .ASCIZ  /EXP'D: COMP HNF OPI  REC'D: /
006122  047516  042440  050130  NONMES: .ASCIZ  /NO EXPECTED ERRORS FOUND/
006153     015  000012          MSCRLF: .ASCIZ  <15><12>
006156  000015                  LF:     .ASCIZ  <15>
006160  041440  046517  000120  COMP:   .ASCIZ  / COMP/
006166  047506  041522  042105  OPIERR: .ASCIZ  /FORCED OPI(GET STATUS) CAUSED OTHER ERRORS/
006241     116  047517  020120  NOPMES: .ASCIZ  /NOOP OPERATION-FLAG MODE/
006272  047516  050117  047440  NOPINT: .ASCIZ  /NOOP OPERATION-INTR. MODE/
006324  040515  047111  042524  MATMES: .ASCIZ  /MAINTENANCE OPERATION-FLAG MODE/
006364  040515  047111  042524  MATINT: .ASCIZ  /MAINTENANCE OPERATION-INTERRUPT MODE/
006431     103  035123  000040  ARLCS:  .ASCIZ  /CS: /
006436  041040  035101  000040  ARLBA:  .ASCIZ  / BA: /
006444  042040  035101  000040  ARLDA:  .ASCIZ  / DA: /
006452  046440  035120  000040  ARLMP:  .ASCIZ  / MP: /
006460  042502  047506  042522  BEREG:  .ASCIZ  /BEFORE COMMAND: /
006501     124  046511  020105  AFREG:  .ASCIZ  /TIME OF ERROR:  /
006522  047503  052116  047522  CRTIM:  .ASCIZ  /CONTROLLER TIMED OUT/
006547     104  044522  042526  DRTIM:  .ASCIZ  /DRIVE READY TIMED OUT/
006575     103  047101  047040  EM1:    .ASCIZ  /CAN NOT ADDRESS RLCS/
006622  040503  020116  047516  EM2:    .ASCIZ  /CAN NOT ADDRESS RLBA/
006647     103  047101  047040  EM3:    .ASCIZ  /CAN NOT ADDRESS RLDA/
006674  040503  020116  047516  EM4:    .ASCIZ  /CAN NOT ADDRESS RLMP/
006721     122  041514  020123  EM5:    .ASCIZ  %RLCS READ/WRITE ERROR (BIT 0 DON'T CARE)%
006772  046122  040502  051040  EM6:    .ASCIZ  %RLBA READ/WRITE ERROR%
007020  046122  040504  051040  EM7:    .ASCIZ  %RLDA READ/WRITE ERROR%
007046  046122  040502  042440  EM10:   .ASCIZ  /RLBA ERROR AFTER MAINT. FUNCTION/
007107     117  044520  053440  EM11:   .ASCIZ  /OPI WOULD NOT GENERATE INTERRUPT/
007150  046122  040504  042440  EM12:   .ASCIZ  /RLDA ERROR AFTER MAINT. FUNCTION/
007211     116  020117  047111  EM13:   .ASCIZ  /NO INTERRUPT FROM NOOP(0)/
007243     116  047517  024120  EM14:   .ASCIZ  /NOOP(0) MODIFIED RLMP/
007271     116  047517  024120  EM15:   .ASCIZ  /NOOP(0) MODIFIED RLBA/
007317     116  047517  024120  EM16:   .ASCIZ  /NOOP(0) MODIFIED RLDA/
007345     111  052116  051105  EM17:   .ASCIZ  /INTERRUPT PRIORITY FAILURE/
007400  046122  050115  020072  EM20:   .ASCIZ  /RLMP: CRC OF DA+3 ERROR (SERIAL DATA PATH)/
007453     122  046514  035120  EM21:   .ASCIZ  /RLMP: CRC OF CRC OF DA+4 ERROR (SERIAL DATA PATH)/
007535     115  044501  052116  EM22:   .ASCIZ  %MAINT. FILL/EMPTY FIFO DMA DATA TRANSFER COMPARE ERROR%
007624  040515  047111  042524  EM23:   .ASCIZ  /MAINTENANCE LAST WORD+1 FAILURE/
007664  047516  044440  052116  EM24:   .ASCIZ  /NO INTERRUPT FROM MAINT. FUNCTION/
007726  040515  047111  042524  EM25:   .ASCIZ  /MAINTENANCE FIFO ADDRESS ERROR/
007765     115  044501  052116  EM26:   .ASCIZ  /MAINTENANCE FIFO ADDRESS COMPLEMENT ERROR/
010037     115  044501  052116  EM27:   .ASCIZ  /MAINT. FORCED OPI ERROR.LESS THAN 510 WORDS/
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     010113     115  044501  052116  EM30:   .ASCIZ  /MAINT. FORCED OPI ERROR,MORE THAN 511 WORDS/
     010167     117  044520  052040  EM31:   .ASCIZ  /OPI TIMING ERROR/
     010210  051127  052111  047111  EM44:   .ASCIZ  /WRITING RLMP MODIFIED RLCS/
     010243     127  044522  044524  EM45:   .ASCIZ  /WRITING RLMP MODIFIED RLBA/
     010276  051127  052111  047111  EM46:   .ASCIZ  /WRITING RLMP MODIFIED RLDA/
     010331     102  052111  051440  EM61:   .ASCIZ  /BIT SET INSTRUCTION ON RLCS YIELDED WRONG RESULT/
     010412  044502  020124  046103  EM62:   .ASCIZ  /BIT CLEAR INSTRUCTION ON RLCS YIELDED WRONG RESULT/
     010475     102  052111  051440  EM63:   .ASCIZ  /BIT SET INSTRUCTION ON RLBA YIELDED WRONG RESULT/
     010556  044502  020124  046103  EM64:   .ASCIZ  /BIT CLEAR INSTRUCTION ON RLBA YIELDED WRONG RESULT/
     010641     102  052111  051440  EM65:   .ASCIZ  /BIT SET INSTRUCTION ON RLDA YIELDED WRONG RESULT/
     010722  044502  020124  046103  EM66:   .ASCIZ  /BIT CLEAR INSTRUCTION ON RLDA YIELDED WRONG RESULT/
     011005     102  051525  051040  EM67:   .ASCIZ  /BUS RESET DID NOT CLEAR RLCS/
     011042  052502  020123  042522  EM70:   .ASCIZ  /BUS RESET DID NOT CLEAR RLBA/
     011077     102  051525  051040  EM71:   .ASCIZ  /BUS RESET DID NOT CLEAR RLDA/
     011134  051127  052111  047111  EM72:   .ASCIZ  /WRITING RLCS MODIFIED RLBA/
     011167     127  044522  044524  EM73:   .ASCIZ  /WRITING RLCS MODIFIED RLDA/
     011222  051127  052111  047111  EM74:   .ASCIZ  /WRITING RLBA MODIFED RLCS/
     011254  051127  052111  047111  EM75:   .ASCIZ  /WRITING RLBA MODIFED RLDA/
     011306  051127  052111  047111  EM76:   .ASCIZ  /WRITING RLDA MODIFIED RLCS/
     011341     127  044522  044524  EM77:   .ASCIZ  /WRITING RLDA MODIFIED RLBA/
     011374  046122  051503  041440  EM101:  .ASCIZ  /RLCS CONTAINED FOLLOWING ERROR(S):  /
     011441  000170                  EM102:  .BLKB   120.

             011632                  .EVEN

 (0) 011632                                  ENDMOD

                                     .SBTTL  GLOBAL ERRORS

     011632                          BGNMOD  GLBERR

     011632                          BGNMSG  ERR0

     011632  004737  012322                  JSR     PC,LINE1
     011636  004737  012356                  JSR     PC,LINE2

     011642  004537  014514                  JSR     R5,CKERLT       ;CHECK ERROR LIMIT
     011646                                  ENDMSG
     011646                          L10000:
     011646  104423                          TRAP    C$MSG

     011650                          BGNMSG  ERR1

     011650  004737  012322                  JSR     PC,LINE1

     011654  004537  014514                  JSR     R5,CKERLT       ;CHECK ERROR LIMIT
     011660                                  ENDMSG
     011660                          L10001:
     011660  104423                          TRAP    C$MSG
     011662                          BGNMSG  ERR2

     011662  004737  012322                  JSR     PC,LINE1
     011666                                  PRINTB  #FRMT4,GDDAT,BDDAT
     011666  013746  002310                  MOV     BDDAT,-(SP)
     011672  013746  002306                  MOV     GDDAT,-(SP)
     011676  012746  013014                  MOV     #FRMT4,-(SP)
```

```
011702  012746  000003                    MOV     #3,-(SP)
011706  010600                            MOV     SP,R0
011710  104414                            TRAP    C$PNTB
011712  062706  000010                    ADD     #10,SP
011716  004537  014514                    JSR     R5,CKERLT
011722                                    ENDMSG
011722                          L10002:
011722  104423                            TRAP    C$MSG


011724                          BGNMSG    ERR3
011724  004737  012322                    JSR     PC,LINE1
011730  004737  012356                    JSR     PC,LINE2
011734                                    PRINTB  #FRMT99
011734  012746  013135                    MOV     #FRMT99,-(SP)
011740  012746  000001                    MOV     #1,-(SP)
011744  010600                            MOV     SP,R0
011746  104414                            TRAP    C$PNTB
011750  062706  000004                    ADD     #4,SP
011754                                    PRINTB  #FRMT14,E.BA,E.DA,TMP0,GDDAT,BDDAT
011754  013746  002310                    MOV     BDDAT,-(SP)
011760  013746  002306                    MOV     GDDAT,-(SP)
011764  013746  002276                    MOV     TMP0,-(SP)
011770  013746  002236                    MOV     E.DA,-(SP)
011774  013746  002234                    MOV     E.BA,-(SP)
012000  012746  013477                    MOV     #FRMT14,-(SP)
012004  012746  000006                    MOV     #6,-(SP)
012010  010600                            MOV     SP,R0
012012  104414                            TRAP    C$PNTB
012014  062706  000016                    ADD     #16,SP
012020  004537  014514                    JSR     R5,CKERLT
012024                                    ENDMSG
012024                          L10003:
012024  104423                            TRAP    C$MSG



012026                          BGNMSG    ERR4

012026  004737  012322                    JSR     PC,LINE1
012032  004737  012356                    JSR     PC,LINE2
012036                                    PRINTB  #FRMT4,GDDAT,BDDAT
012036  013746  002310                    MOV     BDDAT,-(SP)
012042  013746  002306                    MOV     GDDAT,-(SP)
012046  012746  013014                    MOV     #FRMT4,-(SP)
012052  012746  000003                    MOV     #3,-(SP)
012056  010600                            MOV     SP,R0
012060  104414                            TRAP    C$PNTB
012062  062706  000010                    ADD     #10,SP

012066  004537  014514                    JSR     R5,CKERLT               ;CHECK ERROR LIMIT
012072                                    ENDMSG
012072                          L10004:
012072  104423                            TRAP    C$MSG

012074                          BGNMSG    ERR5
```

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012074  004737  012322                  JSR     PC,LINE1

012100  004537  014514                  JSR     R5,CKERLT       ;CHECK ERROR LIMIT
012104                                  ENDMSG
012104                          L10005:
012104  104423                          TRAP    C$MSG

012106                          BGNMSG  ERR6

012106  004737  012322                  JSR     PC,LINE1
012112  004737  012574                  JSR     PC,LINE3
012116  004737  012356                  JSR     PC,LINE2


012122                          1$:     PRINTB  #FRMT99
012122  012746  013135                  MOV     #FRMT99,-(SP)
012126  012746  000001                  MOV     #1,-(SP)
012132  010600                          MOV     SP,R0
012134  104414                          TRAP    C$PNTB
012136  062706  000004                  ADD     #4,SP
012142  004537  014514                  JSR     R5,CKERLT       ;CHECK ERROR LIMIT
012146                                  ENDMSG
012146                          L10006:
012146  104423                          TRAP    C$MSG

012150                          BGNMSG  ERR7

012150  004737  012322                  JSR     PC,LINE1
012154                                  PRINTB  #FRMT6,BDDAT
012154  013746  002310                  MOV     BDDAT,-(SP)
012160  012746  013211                  MOV     #FRMT6,-(SP)
012164  012746  000002                  MOV     #2,-(SP)
012170  010600                          MOV     SP,R0
012172  104414                          TRAP    C$PNTB
012174  062706  000006                  ADD     #6,SP

012200  004537  014514                  JSR     R5,CKERLT

012204                                  ENDMSG
012204                          L10007:
012204  104423                          TRAP    C$MSG

012206                          BGNMSG  ERR10
012206  004737  012322                  JSR     PC,LINE1
012212  004737  012356                  JSR     PC,LINE2
012216  004737  012646                  JSR     PC,LINE4
012222                                  PRINTB  #FRMT99
012222  012746  013135                  MOV     #FRMT99,-(SP)
012226  012746  000001                  MOV     #1,-(SP)
012232  010600                          MOV     SP,R0
012234  104414                          TRAP    C$PNTB
012236  062706  000004                  ADD     #4,SP
012242  004537  014514                  JSR     R5,CKERLT
012246                                  ENDMSG
012246                          L10010:
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```
012246  104423                          TRAP    C$MSG

012250                          BGNMSG  ERR11
012252  004737  012322                  JSR     PC,LINE1
012254  004737  012356                  JSR     PC,LINE2
012260                                  PRINTB  #FRMT10,OPIMN,OPIMX,BDDAT
012260  013746  002310                  MOV     BDDAT,-(SP)
012264  013746  002340                  MOV     OPIMX,-(SP)
012270  013746  002336                  MOV     OPIMN,-(SP)
012274  012746  013246                  MOV     #FRMT10,-(SP)
012300  012746  000004                  MOV     #4,-(SP)
012304  010600                          MOV     SP,R0
012306  104414                          TRAP    C$PNTB
012310  062706  000012                  ADD     #12,SP
012314  004537  014514                  JSR     R5,CKERLT
012320                                  ENDMSG
012320                          L10011:
012320  104423                          TRAP    C$MSG


012322                          LINE1:  PRINTB  #FRMT1,RLCS,<B,DRIVE+1>
012322  005046                          CLR     -(SP)
012324  153716  002217                  BISB    DRIVE+1,(SP)
012330  013746  002200                  MOV     RLCS,-(SP)
012334  012746  012674                  MOV     #FRMT1,-(SP)
012340  012746  000003                  MOV     #3,-(SP)
012344  010600                          MOV     SP,R0
012346  104414                          TRAP    C$PNTB
012350  062706  000010                  ADD     #10,SP
012354  000207                          RTS     PC

012356                          LINE2:  PRINTB  #FRMT2,#BEREG,#ARLCS,B.CS,#ARLBA,B.BA
012356  013746  002222                  MOV     B.BA,-(SP)
012362  012746  006436                  MOV     #ARLBA,-(SP)
012366  013746  002220                  MOV     B.CS,-(SP)
012372  012746  006431                  MOV     #ARLCS,-(SP)
012376  012746  006460                  MOV     #BEREG,-(SP)
012402  012746  012734                  MOV     #FRMT2,-(SP)
012406  012746  000006                  MOV     #6,-(SP)
012412  010600                          MOV     SP,R0
012414  104414                          TRAP    C$PNTB
012416  062706  000016                  ADD     #16,SP
012422                                  PRINTB  #FRMT2A,#ARLDA,B.DA,#ARLMP,B.MP
012422  013746  002226                  MOV     B.MP,-(SP)
012426  012746  006452                  MOV     #ARLMP,-(SP)
012432  013746  002224                  MOV     B.DA,-(SP)
012436  012746  006444                  MOV     #ARLDA,-(SP)
012442  012746  012753                  MOV     #FRMT2A,-(SP)
012446  012746  000005                  MOV     #5,-(SP)
012452  010600                          MOV     SP,R0
012454  104414                          TRAP    C$PNTB
012456  062706  000014                  ADD     #14,SP
012462                                  PRINTB  #FRMT2,#AFREG,#ARLCS,E.CS,#ARLBA,E.BA
012462  013746  002234                  MOV     E.BA,-(SP)
012466  012746  006436                  MOV     #ARLBA,-(SP)
012472  013746  002232                  MOV     E.CS,-(SP)
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012476  012746  006431                          MOV     #ARLCS,-(SP)
012502  012746  006501                          MOV     #AFREG,-(SP)
012506  012746  012734                          MOV     #FRMT2,-(SP)
012512  012746  000006                          MOV     #6,-(SP)
012516  010600                                  MOV     SP,R0
012520  104414                                  TRAP    C$PNTB
012522  062706  000016                          ADD     #16,SP
012526                                          PRINTB  #FRMT2B,#ARLDA,E.DA,#ARLMP,E.MP,E.MP1
012526  013746  002242                          MOV     E.MP1,-(SP)
012532  013746  002240                          MOV     E.MP,-(SP)
012536  012746  006452                          MOV     #ARLMP,-(SP)
012542  013746  002236                          MOV     E.DA,-(SP)
012546  012746  006444                          MOV     #ARLDA,-(SP)
012552  012746  012766                          MOV     #FRMT2B,-(SP)
012556  012746  000006                          MOV     #6,-(SP)
012562  010600                                  MOV     SP,R0
012564  104414                                  TRAP    C$PNTB
012566  062706  000016                          ADD     #16,SP
012572  000207                                  RTS     PC

012574                                  LINE3:  PRINTB  #FRMT3,#EM101
012574  012746  011374                          MOV     #EM101,-(SP)
012600  012746  013007                          MOV     #FRMT3,-(SP)
012604  012746  000002                          MOV     #2,-(SP)
012610  010600                                  MOV     SP,R0
012612  104414                                  TRAP    C$PNTB
012614  062706  000006                          ADD     #6,SP
012620                                          PRINTB  #FRMT3,#EM102
012620  012746  011441                          MOV     #EM102,-(SP)
012624  012746  013007                          MOV     #FRMT3,-(SP)
012630  012746  000002                          MOV     #2,-(SP)
012634  010600                                  MOV     SP,R0
012636  104414                                  TRAP    C$PNTB
012640  062706  000006                          ADD     #6,SP
012644  000207                                  RTS     PC

012646                                  LINE4:  PRINTB  #FRMT3,#EM102
012646  012746  011441                          MOV     #EM102,-(SP)
012652  012746  013007                          MOV     #FRMT3,-(SP)
012656  012746  000002                          MOV     #2,-(SP)
012662  010600                                  MOV     SP,R0
012664  104414                                  TRAP    C$PNTB
012666  062706  000006                          ADD     #6,SP
012672  000207                                  RTS     PC


)12674  040445  047503  052116  FRMT1:  .ASCIZ  /%ACONTROLLER: %06%A  DRIVE: %01/
012734  047045  052045  052045  FRMT2:  .ASCIZ  /%N%T%T%06%T%06/
012753     045  022524  033117  FRMT2A: .ASCIZ  /%T%06%T%06/
012766  052045  047445  022466  FRMT2B: .ASCIZ  /%T%06%T%06%A %06/
013007     045  022516  000124  FRMT3:  .ASCIZ  /%N%T/
013014  047045  040445  054105  FRMT4:  .ASCIZ  /%N%AEXP'D: %06%A REC'D: %06%N/
013052  047045  042045  022463  FRMT98: .ASCIZ  /%N%D3%A WORDS BAD OUT OF 255 WORDS TRANSFERRED%N%N/
013135     045  000116          FRMT99: .ASCIZ  /%N/
013140  047045  040445  040514  FRMT5:  .ASCIZ  /%N%ALAST: %06%A PRES: %06%A EXP'D: %06%N/
013211     045  022516  040501  FRMT6:  .ASCIZ  /%N%AAT PROCESSOR LEVEL %06%N/
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      013246  047045  040445  040522  FRMT10: .ASCIZ  /%N%ARANGE %D3%A - %D3%A  MILLISECONDS WAS %D6%N/
      013326  040445  051105  047522  FRMT11: .ASCIZ  /%AERROR LIMIT EXCEEDED-DROPPED%N/
      013367     045  022516  042101  FRMT12: .ASCIZ  /%N%ADRIVE DID NOT RECOVER FROM POWER FAILURE%N/
      013446  047045  052045  040445  FRMT13: .ASCIZ  /%N%T%A - WILL NOi TEST%N/
      013477     045  041101  035101  FRMT14: .ASCIZ  /%ABA: %06%A DA: %06%A ADDR: %06%A EXP'D: %06%A REC'D %06%N/

                                      .EVEN



1587
1588
1589  013572                                    ENDMOD
1590
1591  013572                          BGNMOD  HPTCODE
1592
1593  013572                          BGNHW
1594  013572  000005                          .WORD   L10012-L$HW/2
1595  013574  174400                          .WORD   174400          ;CSR
1596  013576  000160                          .WORD   160             ;VECTOR
1597  013600  000240                          .WORD   240             ;PRIORITY
1598  013602  000000                          .WORD   0               ;DRIVE (BITS 8,9,10)
1599  013604  000001                          .WORD   1               ;11/23 = 1, 1103L = 0
1600
1601  013606                          ENDHW
1602  013606                          L10012:
1603
1604  013606                                  ENDMOD
1605
1606  013606                          BGNMOD  SPTCODE
1607
1608  013606                          BGNSW
1609  013606  000003                          .WORD   L10013-L$SW/2
1610
1611  013610  000000                  DROP:   .WORD   0
1612  013612  000012                  MERLMT: .WORD   10.
1613  013614  000000                  T.SIZE: .WORD   0
1614
1615  013616                          ENDSW
1616  013616                          L10013:
1617
1618  013616                                  ENDMOD
1619
1620  013616                          BGNMOD  DSPCODE
1621
1622  013616                          DISPATCH        37
1623  013616  000045                          .WORD   37
1624  013620  017002                          .WORD   T1
1625  013622  017100                          .WORD   T2
1626  013624  017176                          .WORD   T3
1627  013626  017274                          .WORD   T4
1628  013630  017372                          .WORD   T5
1629  013632  017466                          .WORD   T6
1630  013634  017562                          .WORD   T7
1631  013636  017656                          .WORD   T8
1632  013640  017752                          .WORD   T9
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1633 013642 020062                        .WORD   T10
1634 013644 020134                        .WORD   T11
1635 013646 020172                        .WORD   T12
1636 013650 020312                        .WORD   T13
1637 013652 020414                        .WORD   T14
1638 013654 020502                        .WORD   T15
1639 013656 020626                        .WORD   T16
1640 013660 020752                        .WORD   T17
1641 013662 021056                        .WORD   T18
1642 013664 021156                        .WORD   T19
1643 013666 021246                        .WORD   T20
1644 013670 021346                        .WORD   T21
1645 013672 021456                        .WORD   T22
1646 013674 021530                        .WORD   T23
1647 013676 021566                        .WORD   T24
1648 013700 021712                        .WORD   T25
1649 013702 022052                        .WORD   T26
1650 013704 022212                        .WORD   T27
1651 013706 022416                        .WORD   T28
1652 013710 022526                        .WORD   T29
1653 013712 022636                        .WORD   T30
1654 013714 022772                        .WORD   T31
1655 013716 023324                        .WORD   T32
1656 013720 024136                        .WORD   T33
1657 013722 025014                        .WORD   T34
1658 013724 025362                        .WORD   T35
1659 013726 025734                        .WORD   T36
1660 013730 026612                        .WORD   T37
1661
1662 013732                               ENDMOD
1663
1664                              .SBTTL  INITIALIZATION CODE
1665 013732                       BGNMOD  INITCODE
1666
1667 013732                               BGNINIT
1668
1669 013732                               BRESET
1670 013732 104433                        TRAP    C$RESET
1671 013734                               READEF  #EF.PWR                 ;POWER UP?????
1672 013734 012700 000034                 MOV     #EF.PWR,R0
1673 013740 104447                        TRAP    C$REFG
1674 013742                               BCOMPLETE       CONT            ;BRANCH
1675 013742 103510                        BCS     CONT
1676 013744                       NOPWR:  READEF  #EF.RESTART             ;RESTART?
1677 013744 012700 000037                 MOV     #EF.RESTART,R0
1678 013750 104447                        TRAP    C$REFG
1679 013752                               BCOMPLETE START
1680 013752 103411                        BCS     START
1681 013754                               READEF  #EF.START               ;START?
1682 013754 012700 000040                 MOV     #EF.START,R0
1683 013760 104447                        TRAP    C$REFG
1684 013762                               BCOMPLETE       START
1685 013762 103405                        BCS     START
1686 013764                               READEF  #EF.NEW                 ;NEW PASS????
1687 013764 012700 000035                 MOV     #EF.NEW,R0
1688 013770 104447                        TRAP    C$REFG
```

```
013772                                  BCOMPLETE       START1          ;YES,THEN RE INIT
013772  103416                          BCS     START1
013774  000424                          BR      CONTINUE
013776  012737  176543  002342  START:  MOV     #176543,HINUM           ;RANDOM GEN. PRIME
014004  012737  123456  002344          MOV     #123456,LONUM           ;RANDOM GEN. PRIME
014012  012700  002364                  MOV     #ERCOUNT,R0             ;SETUP TO CLEAR ERROR COUNTERS
014016  012701  000100                  MOV     #64.,R1                 ;GET A COUNT
014022  005020                  1$:     CLR     (R0)+                   ;CLEAR A COUNTER
014024  005301                          DEC     R1
014026  001375                          BNE     1$                      ;LOOP TILL COUNTERS CLEARED
014030  013737  002344  002346  START1: MOV     LONUM,TEMLO
014036  013737  002342  002350          MOV     HINUM,TEMHI             ;NEW PRIMES AT END OF PASS
014044  000407                          BR      START2

014046                          CONTINUE:       READEF  #EF.CONTINUE    ;CONTINUE????
014046  C.2700  000036                  MOV     #EF.CONTINUE,R0
014052  104447                          TRAP    C$REFG
014054                                  BCOMPLETE       CONT
014054  103443                          BCS     CONT

014056  005737  002174          NXT:    TST     UUT                     ;DONE ALL UUT'S
014062  001011                          BNE     START3                  ;NO
014064  012737  177777  002176  START2: MOV     #-1,UNITST
014072  013737  002012  002174          MOV     L$UNIT,UUT
014100  012737  002362  002362          MOV     #ERCOUNT-2,ERPOINT      ;INIT THE UNIT ERROR COUNTER

014106  005237  002176          START3: INC     UNITST
014112  062737  000002  002362          ADD     #2,ERPOINT              ;POINT TO PROPER ERROR COUNTER LOCATION
014120  005337  002174                  DEC     UUT
014124                          REST:   GPHARD  UNITST,R0
014124  013700  002176                  MOV     UNITST,R0
014130  104442                          TRAP    C$GPHRD
014132                                  BNCOMPLETE      NXT
014132  103351                          BCC     NXT
014134  012037  002210          1$:     MOV     (R0)+,BCSR
014140  012037  002214                  MOV     (R0)+,BVEC
014144  012037  002212                  MOV     (R0)+,BPRIOR
014150  012037  002216                  MOV     (R0)+,DRIVE
014154  012037  002332                  MOV     (R0)+,T.CNTLR   ;GET CONTROLLER TYPE
014160  012037  002356                  MOV     (R0)+,LFLG      ;GET PROCESSOR
                                                                ;LFLG=1,11/23
                                                                ;LFLG=0,1103L ETC.

014164  013737  002346  002344  CONT:   MOV     TEMLO,LONUM             ;RESTORE RANDOM FOR NEXT UUT
014172  013737  002350  002342          MOV     TEMHI,HINUM             ;RESTORE PRIME FOR NEXT UUT
014200  013700  002210                  MOV     BCSR,R0
014204  010037  002200                  MOV     R0,RLCS
014210  062700  000002                  ADD     #2,R0
014214  010037  002202                  MOV     R0,RLBA
014220  062700  000002                  ADD     #2,R0
014224  010037  002204                  MOV     R0,RLDA
014230  062700  000002                  ADD     #2,R0
014234  010037  002206                  MOV     R0,RLMP
014240  005737  013614                  TST     T.SIZE                  ;DO WE WANT TO CHECK UNITS??
014244  001450                          BEQ     END                     ;NO

```

```
014246  005037  002246                   CLR      TRPFLG                    ;CLR OUT TRAP FLAG
014252                                   SETVEC   ERRVEC,#TRPHAN,#340       ;SETUP VECTOR TO CATCH NON-EXIST
014252  012746  000340                   MOV      #340,-(SP)
014256  012746  016636                   MOV      #TRPHAN,-(SP)
014262  013746  002256                   MOV      ERRVEC,-(SP)
014266  012746  000003                   MOV      #3,-(SP)
014272  104437                           TRAP     C$SVEC
014274  062706  000010                   ADD      #10,SP
014300  005777  165674                   TST      @RLCS                     ;ACCESS CONTROLLER
014304                                   CLRVEC   ERRVEC                    ;RELEASE VECTOR
014304  013700  002256                   MOV      ERRVEC,R0
014310  104436                           TRAP     C$CVEC
014312  005737  002246                   TST      TRPFLG                    ;DID IT TRAP
014316  001423                           BEQ      END
014320  012737  005760  002330           MOV      #NORES,WHY                ;SETUP ERR MESS
014326                          8$:      PRINTB   #FRMT13,WHY
014326  013746  002330                   MOV      WHY,-(SP)
014332  012746  013446                   MOV      #FRMT13,-(SP)
014336  012746  000002                   MOV      #2,-(SP)
014342  010600                           MOV      SP,R0
014344  104414                           TRAP     C$PNTB
014346  062706  000006                   ADD      #6,SP
014352  004737  012322          6$:      JSR      PC,LINE1                  ;GIVE DRIVE INFO
014356                                   DODU     UNITST                    ;TELL SUPERVISOR TO DROP IT
014356  013700  002176                   MOV      UNITST,R0
014362  104451                           TRAP     C$DODU
014364  000634                           BR       NXT                       ;TRY NEXT
014366                          END:     SETVEC   BVEC,#INTSRV,#340
014366  012746  000340                   MOV      #340,-(SP)
014372  012746  016644                   MOV      #INTSRV,-(SP)
014376  013746  002214                   MOV      BVEC,-(SP)
014402  012746  000003                   MOV      #3,-(SP)
014406  104437                           TRAP     C$SVEC
014410  062706  000010                   ADD      #10,SP
014414  005037  002244                   CLR      PFLG             ;CLR PROCESSOR FLAG
014420                                   READBUS                   ;Q-BUS
014420  104407                           TRAP     C$RDBU
014422                                   BNCOMPLETE        1$
014422  103002                           BCC      1$
014424  005237  002244                   INC      PFLG             ;NO, Q-BUS THEN
014430                          1$:
014430                                   ENDINIT
014430                          L10014:
014430  104411                           TRAP     C$, IT

014432                                   ENDMOD
014432                                   BGNPROT
014432  177777                           .WORD    -1               ;CSR OFFSET MAKE NOP
014434  177777                           .WORD    -1               ;MASS BUS OFFSET MAKE NOP
014436  177777                           .WORD    -1               ;DRIVE OFFSET MAKE NOP
014440                                   ENDPROT

014440                                   BGNAUTO
014440                                   ENDAUTO
014440                          L10016:
014440  104461                           TRAP     C$AUTO
```

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014442                          BGNMOD  CLNCODE

014442                                  BGNCLN

014442                                  SETPRI  #PRI00
014442  012700  000000                  MOV     #PRI00,R0
014446  104441                          TRAP    C$SPRI

014450  032777  000200  165522  1$:     BIT     #CRDY,@RLCS
014456  001774                          BEQ     1$

014460                                  SETPRI  #PRI07
014460  012700  000340                  MOV     #PRI07,R0
014464  104441                          TRAP    C$SPRI
014466  042777  000100  165504          BIC     #INTEN,@RLCS

014474                                  CLRVEC  BVEC
014474  013700  002214                  MOV     BVEC,R0
014500  104436                          TRAP    C$CVEC
014502                          2$:
014502                                  ENDCLN
014502                          L10017:
014502  104412                          TRAP    C$CLEAN

014504                                  ENDMOD



014504                          BGNMOD  DRPCODE

014504                                  BGNDU

014504  000240                          NOP

014506                                  ENDDU
014506                          L10020:
014506  104453                          TRAP    C$DU

014510                          ENDMOD

014510                          BGNMOD  ADDCODE

014510                                  BGNAU

014510  000240                          NOP

014512                                  ENDAU
014512                          L10021:
014512  104452                          TRAP    C$AU

014514                          ENDMOD


                                .SBTTL  GLOBAL SUBROUTINES
```

```

014514                                  BGNMOD  GLBSUB

014514                                  CKERLT: INLOOP
014514  104420                                  TRAP    C$INLP
014516                                          BCOMPLETE       99$
014516  103427                                  BCS     99$
014520  005737  013610                          TST     DROP            ;DROP ON ERROR LIMIT?
014524  001424                                  BEQ     99$             ;NO
014526  005277  165630                          INC     @ERPOINT        ;COUNT THE UNIT ERROR DETECTED
014532  027737  165624  013612                  CMP     @ERPOINT,MERLMT ;REACHED THE ERROR LIMIT?
014540  002416                                  BLT     99$             ;NO

014542                                          PRINTF  #FRMT11
014542  012746  013326                          MOV     #FRMT11,-(SP)
014546  012746  000001                          MOV     #1,-(SP)
014552  010600                                  MOV     SP,R0
014554  104417                                  TRAP    C$PNTF
014556  062706  000004                          ADD     #4,SP
014562  004737  012322                          JSR     PC,LINE1
014566                                          DODU    UNITST          ;DROP THE UNIT
014566  013700  002176                          MOV     UNITST,R0
014572  104451                                  TRAP    C$DODU
014574                                          DOCLN
014574  104444                                  TRAP    C$DCLN
014576                                  99$:
014576  000205                                  RTS     R5



                                        .SBTTL  ROUTINE TO CHECK FOR CONTROLLER ERRORS

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

014600  005037  002230                  CHERR:  CLR     DERFLG          ;CLEAR OUT DRIVE ERROR FLAG
014604  032737  176000  002232                  BIT     #176000,E.CS    ;ANY ERRORS SET
014612  001001                                  BNE     199$            ;IF YES, INVESTIGATE
014614  000205                                  RTS     R5              ;NO, EXIT
014616  023727  002334  000004  199$:   CMP     TMPFNC,#GSTAT   ;FUNCTION-NOP, RESET, GETSTATUS
014624  002401                                  BLT     98$             ;YES, GO CHECK IF ONLY DRIVE ERROR
```

```
014626  000414                          BR      1$              ;YES SERVICE ERROR
014630  023727  002334  000002  98$:    CMP     TMPFNC,#WRCHK
014636  001410                          BEQ     1$
014640  013700  002232                  MOV     E.CS,R0         ;GET E.CS
014644  042700  001777                  BIC     #1777,R0        ;
014650  022700  140000                  CMP     #140000,R0      ;DRIVE ERROR ALONE?
014654  001001                          BNE     1$              ;NO, GO SERVICE
014656  000205                  2$:     RTS     R5              ;YES, EXIT

014660  012701  011441          1$:     MOV     #EM102,R1       ;GET START OF STRING
014664  005737  002232                  TST     E.CS            ;IS COMPOSITE ERROR SET?(BETTER BE)
014670  100003                          BPL     99$             ;IT'S NOT SOMETHING IS WRONG
014672  004537  015502                  JSR     R5,FIX          ;YES, PUT "COMP" IN STRING
014676  006160                          COMP                    ;"COMP"
014700  032737  040000  002232  99$:    BIT     #DERR,E.CS      ;DRIVE ERROR SET?
014706  001405                          BEQ     3$              ;NO, CONTINUE
014710  005237  002230                  INC     DERFLG          ;SET DRV ERROR FLAG
014714  004537  015502                  JSR     R5,FIX          ;YES, PUT "DRV" INTO STRING
014720  006021                          DEMES                   ;"DRV"
014722  032737  020000  002232  3$:     BIT     #NXM,E.CS       ;NON-EXISTENT MEMORY ERROR?
014730  001403                          BEQ     4$              ;NO, CONTINUE
014732  004537  015502                  JSR     R5,FIX          ;YES, PUT "NXM" INTO STRING
014736  006026                          NXMMES                  ;"NXM"
014740  032737  002000  002232  4$:     BIT     #OPI,E.CS       ;IS OPI SET?
014746  001422                          BEQ     6$              ;NO, GO CHECK BITS 11 & 12
014750  004537  015502                  JSR     R5,FIX          ;PUT "OPI" INTO STRING
014754  006033                          OPIMES                  ;"OPI"
014756  032737  004000  002232          BIT     #BIT11,E.CS     ;HEADERCRC ERROR?
014764  001403                          BEQ     5$              ;NO, GO CHECK HEADER NOT FOUND
014766  004537  015502                  JSR     R5,FIX          ;GO PUT "HCRC" IN STRING
014772  006040                          HCRCMES                 ;"HCRC"
014774  032737  010000  002232  5$:     BIT     #BIT12,E.CS     ;HEADER NOT FOUND?
015002  001422                          BEQ     8$              ;NO, GO PUT "CRLF" IN STRING
015004  004537  015502                  JSR     R5,FIX          ;PUT "HNF" IN STRING
015010  006046                          HNFMES                  ;"HNF"
015012  000416                          BR      8$              ;PUT "CRLF" IN STRING
015014  032737  004000  002232  6$:     BIT     #BIT11,E.CS     ;DATA CRC ERROR?
015022  001403                          BEQ     7$              ;NO, GO CHECK DATA LATE
015024  004537  015502                  JSR     R5,FIX          ;PUT "DCK" IN STRING
015030  006053                          DCKMES                  ;"DCK"
015032  032737  010000  002232  7$:     BIT     #BIT12,E.CS     ;DATA LATE ERROR?
015040  001403                          BEQ     8$              ;NO, GO PUT IN "CRLF"
015042  004537  015502                  JSR     R5,FIX          ;PUT "DLT" IN STRING
015046  006060                          DLTMES                  ;"DLT"
015050  004537  015502          8$:     JSR     R5,FIX
015054  006153                          MSCRLF
015056  004537  015502                  JSR     R5,FIX
015062  000000                  RESTMS: .WORD   0               ;HEADER FROM TEST
015064  105011                          CLRB    (R1)            ;PUT TERMINATOR IN

015066                                  ERRDF   300.,LF,ERR6
015066  104455                          TRAP    C$ERDF
015070  000454                          .WORD   300
015072  006156                          .WORD   LF
015074  012106                          .WORD   ERR6

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```
015076  000205                                  RTS     R5              ;EXIT ROUTINE

                                ;*************************************************************
                                ;* ROUTINE TO LOAD RLCS WITH FUNCTION TO BE PERFORMED FOR RL11
                                ;*      CALL:   JSR     R5,LDFUNC
                                ;*              .WORD           ;BITS TO BE LOADED, FUNCTION
                                ;*                              ;AND INTR ENABLE ONLY
                                ;*
                                ;

015100  012537  002252          LDFUNC: MOV     (R5)+,LDCSR     ;GET BITS TO LOAD
015104  005737  002230                  TST     DERFLG
015110  001424                          BEQ     98$
015112  013746  002220                  MOV     B.CS,-(SP)
015116  012777  000013  165060          MOV     #13,@RLDA
015124  012737  000004  002220          MOV     #GSTAT,B.CS
015132  053737  002216  002220          BIS     DRIVE,B.CS
015140  013777  002220  165032          MOV     B.CS,@RLCS
015146  012637  002220                  MOV     (SP)+,B.CS
015152  032777  000200  165020  99$:    BIT     #200,@RLCS
015160  001774                          BEQ     99$
015162  010346                  98$:    MOV     R3,-(SP)        ;SAVE R3
015164  042737  177661  002252          BIC     #177661,LDCSR   ;CLEAR ALL BUT FUNC & INTR EN
015172  013737  002252  015316          MOV     LDCSR,FNDFNC    ;SAVE FUNCTION
015200  042737  000100  015316          BIC     #INTEN,FNDFNC   ;ONLY FUNCTION
015206  013737  015316  002334          MOV     FNDFNC,TMPFNC
015214  012703  015320                  MOV     #HDRLST,R3      ;GET HEADER LIST
015220  006237  015316                  ASR     FNDFNC          ;ALIGN TO RIGHT
015224  001404                          BEQ     2$
015226  022323                  1$:     CMP     (R3)+,(R3)+     ;BUMP R3 BY 4
015230  005337  015316                  DEC     FNDFNC          ;FOUND IT
015234  001374                          BNE     1$              ;NO,KEEP LOOKING
015236  032737  000100  002252  2$:     BIT     #INTEN,LDCSR    ;YES,DO WE WANT FLAG OR INTR
015244  001401                          BEQ     3$              ;FLAG BRANCH
015246  005723                          TST     (R3)+           ;INTR POINT TO THAT ONE
015250  011303                  3$:     MOV     (R3),R3         ;SET HEADER
015252  010337  015062                  MOV     R3,RESTMS       ;SET UP HEADER
015256  053737  002216  002252          BIS     DRIVE,LDCSR     ;SELECT DRIVE
015264  052737  000200  002252  4$:     BIS     #200,LDCSR      ;CONTROLLER READY
015272  013777  002252  164700          MOV     LDCSR,@RLCS
015300  004537  015660                  JSR     R5,BEFORE
015304  042777  000200  164666  5$:     BIC     #200,@RLCS
015312  012603                          MOV     (SP)+,R3        ;RESTORE R3
015314  000205                          RTS     R5              ;EXIT

015316  000000                  FNDFNC: .WORD   0

015320  006241                  HDRLST: NOPMES
015322  006272                          NOPINT


                                ;*************************************************************
                                ;THIS ROUTINE WILL CHECK RLV11 CSR FOR COMP,HNF AND OPI ERRORS
                                ;IN THE MAINTENANCE FORCED OPI TESTS. IT WILL MERGE THE ERROR PRINTOUT
                                ;WITH THE TEST ERROR MESSAGE. DRIVE ERRORS WILL BE IGNORED.
                                ;
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```
                                        ;       CALL    JSR     R5,CHKOPI
                                        ;
015324  010146                          CHKOPI: MOV     R1,-(SP)
015326  012701  112000                          MOV     #112000,R1      ;EXPECTED RESULTS
015332  005037  002324                          CLR     MATFLG          ;CLEAR ERROR FOUND FLAG
015336  043701  002232                          BIC     E.CS,R1         ;CHECK COMP,HNF,OPI
015342  005701                                  TST     R1
015344  001001                                  BNE     1$              ;EXPECTED ERRORS NOT SET
015346  000453                                  BR      6$              ;ALL EXPECTED ERRORS SET,EXIT
015350  012701  011441                  1$:     MOV     #EM102,R1       ;GET START OF TEXT STRING
015354  004537  015502                          JSR     R5,FIX          ;STORE MESSAGE
015360  006065                                  EXPMES                  ;EXPECTED
015362  032737  100000  002232                  BIT     #BIT15,E.CS     ;IS COMP SET?
015370  001405                                  BEQ     2$              ;NO,CONTINUE ERROR SEARCH
015372  005237  002324                          INC     MATFLG          ;YES,SET ERROR FOUND
015376  004537  015502                          JSR     R5,FIX          ;STORE COMP MESSAGE
015402  006160                                  COMP
015404  032737  010000  002232  2$:     BIT     #BIT12,E.CS     ;IS HNF SET?
015412  001405                                  BEQ     3$              ;NO,CONTINUE ERROR SEARCH
015414  005237  002324                          INC     MATFLG          ;YES,SET ERROR FOUND
015420  004537  015502                          JSR     R5,FIX          ;STORE HNF MESSAGE
015424  006046                                  HNFMES
015426  032737  002000  002232  3$:     BIT     #BIT10,E.CS     ;IS OPI SET?
015434  001405                                  BEQ     4$              ;NO,COMPLETE MESSAGE
015436  005237  002324                          INC     MATFLG          ;YES,SET ERROR FOUND
015442  004537  015502                          JSR     R5,FIX          ;STORE OPI MESSAGE
015446  006033                                  OPIMES
015450  005737  002324                  4$:     TST     MATFLG          ;CHECK IF EXPECTED ERRORS FOUND
015454  001003                                  BNE     5$
015456  004537  015502                          JSR     R5,FIX          ;STORE MESSAGE
015462  006122                                  NONMES                  ;NO EXPECTED ERRORS FOUND
015464  004537  015502                  5$:     JSR     R5,FIX
015470  006153                                  MSCRLF
015472  105011                                  CLRB    (R1)            ;STORE MESSAGE TERMINATOR
015474  005725                                  TST     (R5)+           ;RETURN TO PRINT ERROR
015476  012601                          6$:     MOV     (SP)+,R1
015500  000205                                  RTS     R5
                                        ;******************************************************************
                                        ;*ROUTINE TO MOVE ASCII STRINGS
                                        ;*USES REGISTERS R1 - WHERE STRING IS BEING BUILT
                                        ;*
                                        ;*      CALL    JSR     R5,FIX
                                        ;*              .WORD                   ;ADDRESS OF STRING TO MOVE

015502  012500                          FIX:    MOV     (R5)+,R0        ;GET ADDRESS AND MOVE RETURN
015504  112021                          1$:     MOVB    (R0)+,(R1)+     ;GET BYTE AND UPDATE
015506  001376                                  BNE     1$              ;WATCH 0 BYTE TERMINATOR
015510  105741                                  TSTB    -(R1)           ;BACK UP OVER ZERO BYTE
015512  000205                                  RTS     R5              ;EXIT


                                        ;******************************************************************
                                        ;RLV11 MAINTENANCE SUBROUTINE FOR CRC CALCULATIONS
                                        ;ROUTINE TO RETRIEVE PATTERN AND CALCULATE CRC OF PATTERN+3
                                        ;AND CRC OF CRC OF PATTERN+4.
                                        ;CRC OF PATTERN+3 WILL BE STORED IN "GDCRCA".
                                        ;CRC OF CRC OF PATTERN+4 WILL BE STORED IN "GDCRCB".
                                        ;PATTERN WILL BE STORED IN "GDDATA".
                                        ;
                                        ;       CALL    JSR     R5,CALCRC
                                        ;               .WORD           ;PATTERN IN DA

015514  012537  002312                  CALCRC: MOV     (R5)+,GCRCPT    ;STORE PATTERN
015520  013737  002312  002274                  MOV     GCRCPT,TEMP1
015526  113737  002274  002272                  MOVB    TEMP1,TEMP5
015534  062737  000003  002272                  ADD     #3.,TEMP5       ;ADD 3 TO PATTERN
015542  113737  002272  002274                  MOVB    TEMP5,TEMP1
015550  013737  002274  015564                  MOV     TEMP1,1$
015556  004537  016464                          JSR     R5,SIMBCC       ;CALCULATE EXPECTED CRC
015562  000020                                  16.                     ;DATA BITS
015564  000000                          1$:     .WORD   0               ;INITIAL PATTERN+3
015566  000000                                  .WORD   0
015570  013737  002262  002314                  MOV     CALBCC,GDCRCA   ;SAVE CRC OF PATTERN+3
015576  005237  002272                          INC     TEMP5           ;VALUE=PATTERN+4
015602  113737  002272  002274                  MOVB    TEMP5,TEMP1
015610  013737  002274  015624                  MOV     TEMP1,2$
015616  004537  016464                          JSR     R5,SIMBCC       ;CALCULATE EXPECTED CRC
015622  000020                                  16.                     ;DATA BITS
015624  000000                          2$:     .WORD   0               ;INITIAL PATTERN+4
015626  000000                                  .WORD   0               ;STARTING CRC=0
015630  013737  002262  015644                  MOV     CALBCC,3$       ;STORE CRC FOR NEXT CALL
015636  004537  016464                          JSR     R5,SIMBCC       ;CAL. CRC OF CRC OF DA+4
015642  000020                                  16.                     ;DATA BITS
015644  000000                          3$:     .WORD   0               ;CRC OF DA+4
015646  000000                                  .WORD   0               ;STARTING CRC=0
015650  013737  002262  002316                  MOV     CALBCC,GDCRCB   ;SAVE CRC OF CRC OF DA+4
015656  000205                                  RTS     R5

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

015660  017737  164314  002220          BEFORE: MOV     @RLCS,B.CS      ;READ CS
015666  017737  164310  002222                  MOV     @RLBA,B.BA      ;READ BA
015674  017737  164304  002224                  MOV     @RLDA,B.DA      ;READ DA
015702  017737  164300  002226                  MOV     @RLMP,B.MP      ;READ MP
015710  000205                                  RTS     R5


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

015712  017737  164262  002232          AFTER:  MOV     @RLCS,E.CS      ;READ CS
015720  017737  164256  002234                  MOV     @RLBA,E.BA      ;READ BA
015726  017737  164252  002236                  MOV     @RLDA,E.DA      ;READ DA
015734  017737  164246  002240                  MOV     @RLMP,E.MP      ;READ MP
015742  017737  164240  002242                  MOV     @RLMP,E.MP1     ;READ MP
015750  000205                                  RTS     R5

                                        ;ROUTINE TO SETUP BUFFERS FOR RLV11 MAINTENANCE FUNCTION
                                        ;BUF1 IS SET WITH 256 WORDS OF PATTERN
                                        ;BUF2 IS CLEARED BEFORE MAINTENANCE FUNCTION
                                        ;       CALL    JSR     R5,SETPAT
```

```
                                ;                 .WORD            ;PATTERN FOR BUFFER
                                ;
015752  010146                  SETPAT:   MOV     R1,-(SP)
015754  010246                            MOV     R2,-(SP)
015756  012537  002320                    MOV     (R5)+,GDDATP
015762  012701  003760                    MOV     #BUF1,R1         ;FIRST BUFFER START
015766  012702  000400                    MOV     #256.,R2
015772  013721  002320          1$:       MOV     GDDATP,(R1)+
015776  005302                            DEC     R2
016000  001374                            BNE     1$               ;STORE PATTERN IN 256 WORDS
016002  012701  004760                    MOV     #BUF2,R1         ;START OF SECOND BUFFER
016006  012702  000377                    MOV     #255.,R2
016012  005021                  2$:       CLR     (R1)+
016014  005302                            DEC     R2
016016  001375                            BNE     2$               ;CLEAR 255 WORDS OF SECOND BUFFER
016020  012721  123456                    MOV     #123456,(R1)+    ;STORE IN LAST BUFFER WORD
016024  012602                            MOV     (SP)+,R2
016026  012601                            MOV     (SP)+,R1
016030  000205                            RTS     R5

                                ;ROUTINE TO DELAY IN MSECS
                                ;LFLG = 1         DELAY MSECS FOR 11/23
                                ;LFLG = 0         DELAY MSECS FOR 1103L ETC.
                                ;
                                ;CALL
                                ;         JSR     R5,WDELAY
                                ;         40.                      ;40 MSECS
                                ;
016032  010146                  WDELAY:   MOV     R1,-(SP)
016034  010246                            MOV     R2,-(SP)
016036  012502                            MOV     (R5)+,R2         ;APPROX MSEC DELAY
016040  005737  002356                    TST     LFLG             ;CHECK PROCESSOR FLAG
016044  001004                            BNE     1$               ;BRANCH IF 11/23
016046  012737  000170  002354            MOV     #120.,DELCNT     ;LSI-11 APPROX 1 MSEC LOOP
016054  000403                            BR      2$
016056  012737  000454  002354  1$:       MOV     #300.,DELCNT     ;11/23 APPROX 1 MSEC LOOP
016064  013701  002354          2$:       MOV     DELCNT,R1
016070  005301                  3$:       DEC     R1               ;START LOOP
016072  001376                            BNE     3$
016074  005302                            DEC     R2               ;CHECK ON MSECS REQUESTED
016076  001372                            BNE     2$               ;BRANCH AND DO ANOTHER LOOP
016100  012602                            MOV     (SP)+,R2         ;SETUP FOR RETURN AFTER DELAY
016102  012601                            MOV     (SP)+,R1
016104  000205                            RTS     R5

                                ;ROUTINE TO LOAD RLCS WITH RLV11 MAINT. FUNCTION
                                ;EITHER FLAG DRIVEN OR INTERRUPT MODE.
                                ;         CALL    JSR     R5,LDFUN
016106  000000                                    .WORD            ;MAINT!INTEN
016110  000000                                    .WORD            ;WORD COUNT COMP.
016112  000000                                    .WORD            ;MAINTENANCE MESSAGE
                                ;
016114  012537  002252          LDFUN:    MOV     (R5)+,LDCSR      ;GET FUNCTION
016120  012577  164062                    MOV     (R5)+,@RLMP      ;LOAD WORD COUNT
016124  012537  015062                    MOV     (R5)+,RESTMS     ;GET MESSAGE
016130  005037  002334                    CLR     TMPFNC           ;CLEAR FUNCTION STORAGE
```

```
016134  012777  003760  164040          MOV     #BUF1,@RLBA         ;SET BA REGISTER
016142  013777  002312  164034          MOV     GCRCPT,@RLDA        ;LOAD DA REGISTER
016150  042737  177661  002252          BIC     #177661,LDCSR       ;CLEAR ALL BUT FUNC.+INT.
016156  053737  002216  002252          BIS     DRIVE,LDCSR         ;SELECT DRIVE
016164  052737  000200  002252          BIS     #200,LDCSR          ;CONTROLLER READY
016172  013777  002252  164000          MOV     LDCSR,@RLCS         ;LOAD CS REGISTER
016200  004537  015660                  JSR     R5,BEFORE           ;STORE REGISTERS BEFORE OPERATION
016204  042777  000200  163766          BIC     #200,@RLCS          ;CLEAR CONTROLLER READY
016212  000205                          RTS     R5                  ;RETURN


                                ;ROUTINE TO SETUP COMPLEMENT BUFFERS FOR RLV11 MAINTENANCE FUNCTION
                                ;BUF1 IS SET WITH PATTERN
                                ;BUF1+1 IS SET WITH COMPLEMENT OF PATTERN
                                ;       CALL    JSR     R5,SETCMP
                                ;               .WORD               ;PATTERN FOR BUFFER
                                ;
016214  010146                  SETCMP: MOV     R1,-(SP)
016216  010246                          MOV     R2,-(SP)
016220  012537  002320                  MOV     (R5)+,GDDATP
016224  012701  003760                  MOV     #BUF1,R1            ;FIRST BUFFER START
016230  012702  000400                  MOV     #256.,R2            ;BUFFER COUNT
016234  013737  002320  002322          MOV     GDDATP,GDATMP       ;STORE DATA PATTERN FOR BUF FILL
016242  013721  002322          1$:     MOV     GDATMP,(R1)+
016246  005137  002322                  COM     GDATMP              ;STORE COMP. IN NEXT BUF LOCATION
016252  005302                          DEC     R2
016254  001372                          BNE     1$                  ;CHECK FOR BUFFER END
016256  012701  004760                  MOV     #BUF2,R1            ;SETUP TO CLEAR BUF2
016262  012702  000377                  MOV     #255.,R2
016266  005021                  2$:     CLR     (R1)+
016270  005302                          DEC     R2
016272  001375                          BNE     2$                  ;CHECK FOR BUF2 END
016274  012721  123456                  MOV     #123456,(R1)+       ;STORE IN LAST BUFFER WORD
016300  012602                          MOV     (SP)+,R2
016302  012601                          MOV     (SP)+,R1
016304  000205                          RTS     R5


                                ;ROUTINE TO SETUP BUFFER WITH RANDOM NUMBERS FOR RLV11 MAINT. FUNCTION
                                ;SAME PATTERN IS USED FOR EACH CONTROLLER
                                ;END OF PASS WILL CHANGE RANDOM PATTERN PRIMES
                                ;       CALL    JSR     R5,SETRAN
                                ;
016306  010146                  SETRAN: MOV     R1,-(SP)
016310  010246                          MOV     R2,-(SP)
016312  012701  003760                  MOV     #BUF1,R1            ;FIRST BUFFER START
016316  012702  000400                  MOV     #256.,R2            ;BUFFER COUNT
016322  004537  016366          1$:     JSR     R5,RAND             ;GET RANDOM NUMBER
016326  013721  002344                  MOV     LONUM,(R1)+         ;STORE IN BUFFER
016332  005302                          DEC     R2                  ;CHECK FOR BUFFER END
016334  001372                          BNE     1$
016336  012701  004760                  MOV     #BUF2,R1            ;SETUP TO CLEAR BUF2
016342  012702  000377                  MOV     #255.,R2
016346  005021                  2$:     CLR     (R1)+
016350  005302                          DEC     R2
016352  001375                          BNE     2$                  ;CHECK FOR BUFFER END
```

```
016354  012721  123456                  MOV     #123456,(R1)+   ;STORE IN LAST BUFFER WORD
016360  012602                          MOV     (SP)+,R2
016362  012601                          MOV     (SP)+,R1
016364  000205                          RTS     R5


                                ;THIS ROUTINE IS A DOUBLE PRECISION PSEUDO RANDOM NUMBER GENERATOR
                                ;WITH A RANGE OF 0 TO 2(+33)-1.
                                ;CALL:
                                ;       JSR     R5,RAND         ;CALL THE ROUTINE
                                ;       RETURN                  ;RETURN HERE THE RANDOM NUMBER
                                ;                               ;WILL BE IN HINUM,LONUM
016366  010146                  RAND:   MOV     R1,-(SP)        ;PUSH R1 ON STACK
016370  010246                          MOV     R2,-(SP)        ;PUSH R2 ON STACK
016372  010346                          MOV     R3,-(SP)        ;PUSH R3 ON STACK
016374  013703  002344                  MOV     LONUM,R3        ;SET R3 WITH LOW
016400  013701  002342                  MOV     HINUM,R1        ;SET R1 WITH HIGH
016404  012702  177771                  MOV     #-7,R2          ;SET SHIFT COUNTER
016410  006303                  1$:     ASL     R3              ;SHIFT R3 LEFT AND
016412  006101                          ROL     R1              ;ROTATE CARRY INTO R1 AND
016414  005202                          INC     R2              ;CHECK FOR DONE
016416  001374                          BNE     1$              ;CONTINUE SHIFT LOOP
016420  063703  002344                  ADD     LONUM,R3        ;ADD NUMBER TO MAKE X 129
016424  005501                          ADC     R1              ;PROPOGATE CARRY
016426  063701  002342                  ADD     HINUM,R1        ;ADD NUMBER TO MAKE X 129
016432  062703  001057                  ADD     #1057,R3        ;ADD LOW CONSTANT
016436  005501                          ADC     R1              ;PROPOGATE CARRY
016440  062701  047401                  ADD     #47401,R1       ;ADD HIGH CONSTANT
016444  010337  002344                  MOV     R3,LONUM        ;SAVE R3
016450  010137  002342                  MOV     R1,HINUM        ;SAVE R1
016454  012603                          MOV     (SP)+,R3        ;POP STACK INTO R3
016456  012602                          MOV     (SP)+,R2        ;POP STACK INTO R2
016460  012601                          MOV     (SP)+,R1        ;POP STACK INTO R1
016462  000205                          RTS     R5              ;RETURN


                                .SBTTL  ROUTINE TO CALCULATE CRC

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

016464  010046                  SIMBCC: MOV     R0,-(SP)        ;SAVE R0
016466  010146                          MOV     R1,-(SP)        ;SAVE R1
016470  010246                          MOV     R2,-(SP)        ;SAVE R2
016472  012537  002264                  MOV     (R5)+,TEMP2     ;GET NUMBER OF BITS
016476  012537  002266                  MOV     (R5)+,TEMP3     ;GET DATA FOR CRC CALCULATION
016502  012537  002270                  MOV     (R5)+,TEMP4     ;GET STARTING CRC
016506  005037  002260          1$:     CLR     BCCFBK          ;
016512  013700  002270                  MOV     TEMP4,R0        ;GET PRESENT CRC
```

```
016516  006037  002266                    ROR     TEMP3            ;ROTATE NEW DATA
016522  005500                            ADC     R0               ;MERGE NEW WITH OLD
016524  032700  000001                    BIT     #1,R0            ;BIT 0 SET
016530  001402                            BEQ     2$               ;IF NOT CONTINUE
016532  005137  002260                    COM     BCCFBK           ;
016536  013700  002254          2$:       MOV     XPOLY,R0         ;GET CRC POLYNOMIAL (CRC-16)
016542  005100                            COM     R0               ;COMPLIMENT POLYNOMIAL
016544  040037  002260                    BIC     R0,BCCFBK
016550  000241                            CLC                      ;CLEAR CARRY
016552  006037  002270                    ROR     TEMP4
016556  013700  002260                    MOV     BCCFBK,R0
016562  013701  002270                    MOV     TEMP4,R1
016566  010102                            MOV     R1,R2
016570  040100                            BIC     R1,R0
016572  043702  002260                    BIC     BCCFBK,R2
016576  050200                            BIS     R2,R0
016600  043737  002254  002270            BIC     XPOLY,TEMP4
016606  050037  002270                    BIS     R0,TEMP4
016612  005337  002264                    DEC     TEMP2
016616  001333                            BNE     1$
016620  013737  002270  002262            MOV     TEMP4,CALBCC
016626  012602                            MOV     (SP)+,R2
016630  012601                            MOV     (SP)+,R1
016632  012600                            MOV     (SP)+,R0
016634  000205                            RTS     R5               ;RETURN



                                ;ROUTINE TO SET FLAG IF TRAP OCCURRED
                                ;"TRPHAN" IS IN LOCATION 4.


016636  005237  002246          TRPHAN: INC     TRPFLG           ;INDICATE TRAP
016642  000002                          RTI                      ;RETURN

016644                          BGNSRV

016644  005237  002250          INTSRV: INC     INTFLG           ;INDICATE INTERRUPT

016650                          ENDSRV
016650                          L10022:
016650  000002                          RTI

                                ;ROUTINE USED IN TIMING OPI
016652  005237  002250          TIMSRV: INC     INTFLG
016656  000002                          RTI


                                ;ROUTINE TO WAIT FOR DRIVE READY
016660  010146                  WTDRDY: MOV     R1,-(SP)         ;SAVE R1
016662  012701  000310                  MOV     #200.,R1         ;TIME OUT OF 200 MILLISECONDS
016666  032777  000001  163304  1$:     BIT     #DRDY,@RLCS      ;DRIVE READY?
016674  001011                          BNE     2$               ;YES, EXIT

016676  004537  016032                  JSR     R5,WDELAY        ;WAIT A WHILE
016702  000001                          1                        ;APPROX. A MILLISECOND
```

```
016704  005301                          DEC     R1              ;CHECK IF TIME UP
016706  001367                          BNE     1$              ;NO, GO CHECK DRIVE READY

016710                                  ERRDF   200.,DRTIM,ERR5 ;DRIVE READY DID NOT SET
016710  104455                          TRAP    C$ERDF
016712  000310                          .WORD   200
016714  006547                          .WORD   DRTIM
016716  012074                          .WORD   ERR5

016720  012601                  2$:     MOV     (SP)+,R1        ;RESTORE
016722  000205                          RTS     R5              ;EXIT

                                ;ROUTINE TO WAIT FOR CONTROLLER READY
016724  010146                  WTCRDY: MOV     R1,-(SP)        ;SAVE R1
016726  012701  001440                  MOV     #800.,R1        ;WAIT 800 MILLISECONDS
016732  032777  000200  163240  1$:     BIT     #CRDY,@RLCS     ;CONTROLLER READY
016740  001014                          BNE     2$              ;YES, EXIT
016742  004537  016032                  JSR     R5,WDELAY       ;WAIT A WHILE
016746  000001                          1                       ;APPROX A MILLISECOND
016750  005301                          DEC     R1              ;CHECK IF TIME UP
016752  001367                          BNE     1$              ;NO GO BACK

016754  004537  015712                  JSR     R5,AFTER        ;GET REGISTERS

016760                                  ERRDF   100.,CRTIM,ERR6 ;CONTROLLER TIMED OUT
016760  104455                          TRAP    C$ERDF
016762  000144                          .WORD   100
016764  006522                          .WORD   CRTIM
016766  012106                          .WORD   ERR6

016770  000402                          BR      3$              ;EXIT

016772  004537  015712          2$:     JSR     R5,AFTER        ;GET REGISTERS
016776  012601                  3$:     MOV     (SP)+,R1
017000  000205                          RTS     R5              ;EXIT



017002                                  ENDMOD




                                .SBTTL  **TEST 1** - RLCS WRITE ADDRESSABILITY

017002                          BGNTST                          ;****START OF TEST****
017002                          STARS
                                ;;****************************************************************
                                ;TEST TO SEE IF WE CAN ADDRESS THE CONTROL
                                ;AND STATUS REGISTER.  IF WE TRAP WE WILL REPORT
                                ;THE ERROR AND ABORT.  AFTER THIS TEST WE ONLY KNOW
                                ;THAT WE CAN ADDRESS THE REGISTER.
017002                          STARS
                                ;;****************************************************************


017002  005037  002246          1$:     CLR     TRPFLG          ;CLEAR TRAP OCCURANCE
```

```
017006                               2$:     SETVEC  ERRVEC,#TRPHAN,#340  ;SET TO CATCH TRAP
017006  012746  000340                       MOV     #340,-(SP)
017012  012746  016636                       MOV     #TRPHAN,-(SP)
017016  013746  002256                       MOV     ERRVEC,-(SP)
017022  012746  000003                       MOV     #3,-(SP)
017026  104437                               TRAP    C$SVEC
017030  062706  000010                       ADD     #10,SP

017034  012777  177777  163136               MOV     #177777,@RLCS    ;ADDRESS RLCS
017042                                       CLRVEC  ERRVEC           ;RELEASE TRAP VECTOR
017042  013700  002256                       MOV     ERRVEC,R0
017046  104436                               TRAP    C$CVEC
017050  005737  002246                       TST     TRPFLG           ;TRAP OCCURRED???
017054  001407                               BEQ     3$               ;NO, OKAY PROCEED
017056  013737  002200  002306               MOV     RLCS,GDDAT       ;SET UP ERROR DATA

017064                                       ERRSF   0,,EM1,ERR1      ;BUS TIMEOUT IN ADDRESSING RLCS
017064  104454                               TRAP    C$ERSF
017066  000000                               .WORD   0
017070  006575                               .WORD   EM1
017072  011650                               .WORD   ERR1
017074                               3$:     CKLOOP                   ;CHECK IF /FL:LOE IS SET
017074  104406                               TRAP    C$CLP1
017076                               ENDTST                           ;****END OF TEST****
017076                               L10023:
017076  104401                               TRAP    C$ETST



                                     .SBTTL  **TEST 2** - RLBA WRITE ADDRESSABILITY

017100                               BGNTST                           ;****START OF TEST****


017100                               STARS
                                     ;;**************************************************************
                                     ;TEST TO SEE IF WE CAN ADDRESS THE BUS ADDRESS
                                     ;REGISTER.  IF WE TRAP WE WILL REPORT THE ERROR
                                     ;AND ABORT.  AFTER THIS TEST WE ONLY KNOW THAT
                                     ;WE CAN ADDRESS THE REGISTER.
017100                               STARS
                                     ;;**************************************************************

017100  005037  002246               1$:     CLR     TRPFLG           ;CLEAR TRAP OCCURANCE
017104                               2$:     SETVEC  ERRVEC,#TRPHAN,#340  ;SET TO CATCH TRAP
017104  012746  000340                       MOV     #340,-(SP)
017110  012746  016636                       MOV     #TRPHAN,-(SP)
017114  013746  002256                       MOV     ERRVEC,-(SP)
017120  012746  000003                       MOV     #3,-(SP)
017124  104437                               TRAP    C$SVEC
017126  062706  000010                       ADD     #10,SP

017132  012777  177777  163042               MOV     #177777,@RLBA    ;ADDRESS RLBA
017140                                       CLRVEC  ERRVEC           ;RELEASE TRAP VECTOR
017140  013700  002256                       MOV     ERRVEC,R0
017144  104436                               TRAP    C$CVEC
017146  005737  002246                       TST     TRPFLG           ;TRAP OCCURRED???
```

```
017152  001407                                  BEQ     3$               ;NO, CONTINUE
017154  013737  002202  002306                  MOV     RLBA,GDDAT       ;SETUP ERROR DATA

017162                                          ERRSF   1,,EM2,ERR1      ;BUS TIMEOUT IN ADDRESSING RLBA
017162  104454                                  TRAP    C$ERSF
017164  000001                                  .WORD   1
017166  006622                                  .WORD   EM2
017170  011650                                  .WORD   ERR1
017172                          3$:             CKLOOP                   ;CHECK IF /FL:LOE IS SET
017172  104406                                  TRAP    C$CLP1
017174                          ENDTST                                   ;****END OF TEST****
017174                          L10024:
017174  104401                                  TRAP    C$ETST



                                .SBTTL  **TEST 3** - RLDA WRITE ADDRESSABILITY

017176                          BGNTST                                   ;****START OF TEST****
017176                          STARS
                                ;;************************************************************
                                ;TEST TO SEE IF WE CAN ADDRESS THE DISK ADDRESS
                                ;REGISTER IF WE TRAP WE WILL REPORT THE ERROR
                                ;AND ABORT.  AFTER THIS TEST WE ONLY KNOW THAT
                                ;WE CAN ADDRESS THE REGISTER.
017176                          STARS
                                ;;************************************************************



017176  005037  002246          1$:             CLR     TRPFLG           ;CLEAR TRAP OCCURANCE
017202                          2$:             SETVEC  ERRVEC,#TRPHAN,#340  ;SET TO CATCH TRAP
017202  012746  000340                          MOV     #340,-(SP)
017206  012746  016636                          MOV     #TRPHAN,-(SP)
017212  013746  002256                          MOV     ERRVEC,-(SP)
017216  012746  000003                          MOV     #3,-(SP)
017222  104437                                  TRAP    C$SVEC
017224  062706  000010                          ADD     #10,SP

017230  012777  177777  162746                  MOV     #177777,@RLDA    ;ADDRESS RLDA
017236                                          CLRVEC  ERRVEC           ;RELEASE TRAP VECTOR
017236  013700  002256                          MOV     ERRVEC,R0
017242  104436                                  TRAP    C$CVEC
017244  005737  002246                          TST     TRPFLG           ;TRAP OCCURRED???
017250  001407                                  BEQ     3$               ;NO, CONTINUE

017252  013737  002204  002306                  MOV     RLDA,GDDAT       ;SETUP ERROR INFO
017260                                          ERRSF   2,,EM3,ERR1      ;BUS TIMEOUT IN ADDRESSING RLDA
017260  104454                                  TRAP    C$ERSF
017262  000002                                  .WORD   2
017264  006647                                  .WORD   EM3
017266  011650                                  .WORD   ERR1
017270                          3$:             CKLOOP                   ;CHECK IF /FL:LOE IS SET
017270  104406                                  TRAP    C$CLP1
017272                          ENDTST                                   ;****END OF TEST****
017272                          L10025:
017272  104401                                  TRAP    C$ETST

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                                        .SBTTL  **TEST 4** - RLMP WRITE ADDRESSABILITY

017274                                  BGNTST                          ;****START OF TEST****
017274                                  STARS
                                        ;;***************************************************************
                                        ;TEST TO SEE IF WE CAN ADDRESS THE MULTIPURPOSE
                                        ;REGISTER.  IF WE TRAP WE WILL REPORT THE ERROR AND
                                        ;ABORT.  AFTER THIS TEST WE ONLY KNOW THAT WE CAN
                                        ;ADDRESS THE REGISTER.
017274                                  STARS
                                        ;;***************************************************************



017274  005037  002246                  1$:     CLR     TRPFLG          ;CLEAR TRAP OCCURANCE
017300                                  2$:     SETVEC  ERRVEC,#TRPHAN,#340  ;SET UP TO CATCH TRAP
017300  012746  000340                          MOV     #340,-(SP)
017304  012746  016636                          MOV     #TRPHAN,-(SP)
017310  013746  002256                          MOV     ERRVEC,-(SP)
017314  012746  000003                          MOV     #3,-(SP)
017320  104437                                  TRAP    C$SVEC
017322  062706  000010                          ADD     #10,SP

017326  012777  177777  162652                  MOV     #177777,@RLMP   ;ADDRESS RLMP
017334                                          CLRVEC  ERRVEC          ;RELEASE TRAP VECTOR
017334  013700  002256                          MOV     ERRVEC,R0
017340  104436                                  TRAP    C$CVEC
017342  005737  002246                          TST     TRPFLG          ;TRAP OCCURRED???
017346  001407                                  BEQ     3$              ;NO, CONTINUE
017350  013737  002206  002306                  MOV     RLMP,GDDAT      ;SET UP ERROR INFO

017356                                          ERRSF   3.,EM4,ERR1     ;BUS TIMEOUT IN ADDRESSING RLMP
017356  104454                                  TRAP    C$ERSF
017360  000003                                  .WORD   3
017362  006674                                  .WORD   EM4
017364  011650                                  .WORD   ERR1
017366                                  3$:     CKLOOP                  ;CHECK IF /FL:LOE IS SET
017366  104406                                  TRAP    C$CLP1
017370                                  ENDTST                          ;****END OF TEST****
017370                                  L10026:
017370  104401                                  TRAP    C$ETST

                                        .SBTTL  **TEST 5** - RLCS READ ADDRESSABILITY

017372                                  BGNTST                          ;****START OF TEST****
017372                                  STARS
                                        ;;***************************************************************
                                        ;TEST TO SEE IF WE CAN ADDRESS THE CONTROL
                                        ;AND STATUS REGISTER.  IF WE TRAP WE WILL REPORT
                                        ;THE ERROR AND ABORT.  AFTER THIS TEST WE ONLY KNOW
                                        ;THAT WE CAN ADDRESS THE REGISTER.
017372                                  STARS
                                        ;;***************************************************************


017372  005037  002246                  1$:     CLR     TRPFLG          ;CLEAR TRAP OCCURANCE
```

```
017376                          2$:     SETVEC  ERRVEC,#TRPHAN,#340  ;SET TO CATCH TRAP
017376  012746  000340                  MOV     #340,-(SP)
017402  012746  016636                  MOV     #TRPHAN,-(SP)
017406  013746  002256                  MOV     ERRVEC,-(SP)
017412  012746  000003                  MOV     #3,-(SP)
017416  104437                          TRAP    C$SVEC
017420  062706  000010                  ADD     #10,SP

017424  005777  162550                  TST     @RLCS           ;ADDRESS RLCS
017430                                  CLRVEC  ERRVEC          ;RELEASE TRAP VECTOR
017430  013700  002256                  MOV     ERRVEC,R0
017434  104436                          TRAP    C$CVEC
017436  005737  002246                  TST     TRPFLG          ;TRAP OCCURRED???
017442  001407                          BEQ     3$              ;NO, OKAY PROCEED
017444  013737  002200  002306          MOV     RLCS,GDDAT      ;SET UP ERROR DATA

017452                                  ERRSF   100.,EM1,ERR1   ;BUS TIMEOUT IN ADDRESSING RLCS
017452  104454                          TRAP    C$ERSF
017454  000144                          .WORD   100
017456  006575                          .WORD   EM1
017460  011650                          .WORD   ERR1
017462                          3$:     CKLOOP                  ;CHECK IF /FL:LOE IS SET
017462  104406                          TRAP    C$CLP1
017464                          ENDTST                          ;****END OF TEST****
017464                          L10027:
017464  104401                          TRAP    C$ETST



                                .SBTTL  **TEST 6** - RLBA READ ADDRESSABILITY

017466                          BGNTST                          ;****START OF TEST****


017466                          STARS
                                ;;************************************************************
                                ;TEST TO SEE IF WE CAN ADDRESS THE BUS ADDRESS
                                ;REGISTER.  IF WE TRAP WE WILL REPORT THE ERROR
                                ;AND ABORT.  AFTER THIS TEST WE ONLY KNOW THAT
                                ;WE CAN ADDRESS THE REGISTER.
017466                          STARS
                                ;;************************************************************

017466  005037  002246          1$:     CLR     TRPFLG          ;CLEAR TRAP OCCURANCE
017472                          2$:     SETVEC  ERRVEC,#TRPHAN,#340  ;SET TO CATCH TRAP
017472  012746  000340                  MOV     #340,-(SP)
017476  012746  016636                  MOV     #TRPHAN,-(SP)
017502  013746  002256                  MOV     ERRVEC,-(SP)
017506  012746  000003                  MOV     #3,-(SP)
017512  104437                          TRAP    C$SVEC
017514  062706  000010                  ADD     #10,SP

017520  005777  162456                  TST     @RLBA           ;ADDRESS RLBA
017524                                  CLRVEC  ERRVEC          ;RELEASE TRAP VECTOR
017524  013700  002256                  MOV     ERRVEC,R0
017530  104436                          TRAP    C$CVEC
017532  005737  002246                  TST     TRPFLG          ;TRAP OCCURRED???
```

```
017536  001407                                  BEQ     3$              ;NO, CONTINUE
017540  013737  002202  002306                  MOV     RLBA,GDDAT      ;SETUP ERROR DATA

017546                                          ERRSF   101.,EM2,ERR1   ;BUS TIMEOUT IN ADDRESSING RLBA
017546  104454                                  TRAP    C$ERSF
017550  000145                                  .WORD   101
017552  006622                                  .WORD   EM2
017554  011650                                  .WORD   ERR1
017556                                  3$:     CKLOOP                  ;CHECK IF /FL:LOE IS SET
017556  104406                                  TRAP    C$CLP1
017560                                  ENDTST                          ;****END OF TEST****
017560                                  L10030:
017560  104401                                  TRAP    C$ETST



                                        .SBTTL  **TEST 7** - RLDA READ ADDRESSABILITY

017562                                  BGNTST                          ;****START OF TEST****
017562                                  STARS
                                        ;;***************************************************************
                                        ;TEST TO SEE IF WE CAN ADDRESS THE DISK ADDRESS
                                        ;REGISTER IF WE TRAP WE WILL REPORT THE ERROR
                                        ;AND ABORT.  AFTER THIS TEST WE ONLY KNOW THAT
                                        ;WE CAN ADDRESS THE REGISTER.
017562                                  STARS
                                        ;;***************************************************************


017562  005037  002246                  1$:     CLR     TRPFLG          ;CLEAR TRAP OCCURANCE
017566                                  2$:     SETVEC  ERRVEC,#TRPHAN,#340  ;SET TO CATCH TRAP
017566  012746  000340                          MOV     #340,-(SP)
017572  012746  016636                          MOV     #TRPHAN,-(SP)
017576  013746  002256                          MOV     ERRVEC,-(SP)
017602  012746  000003                          MOV     #3,-(SP)
017606  104437                                  TRAP    C$SVEC
017610  062706  000010                          ADD     #10,SP

017614  005777  162364                          TST     @RLDA           ;ADDRESS RLDA
017620                                          CLRVEC  ERRVEC          ;RELEASE TRAP VECTOR
017620  013700  002256                          MOV     ERRVEC,R0
017624  104436                                  TRAP    C$CVEC
017626  005737  002246                          TST     TRPFLG          ;TRAP OCCURRED???
017632  001407                                  BEQ     3$              ;NO, CONTINUE

017634  013737  002204  002306                  MOV     RLDA,GDDAT      ;SETUP ERROR INFO
017642                                          ERRSF   102.,EM3,ERR1   ;BUS TIMEOUT IN ADDRESSING RLDA
017642  104454                                  TRAP    C$ERSF
017644  000146                                  .WORD   102
017646  006647                                  .WORD   EM3
017650  011650                                  .WORD   ERR1
017652                                  3$:     CKLOOP                  ;CHECK IF /FL:LOE IS SET
017652  104406                                  TRAP    C$CLP1
017654                                  ENDTST                          ;****END OF TEST****
017654                                  L10031:
017654  104401                                  TRAP    C$ETST

```

```

                                        .SBTTL  **TEST 8** - RLMP READ ADDRESSABILITY

017656                                  BGNTST                          ;****START OF TEST****
017656                                  STARS
                                        ;;*************************************************************
                                        ;TEST TO SEE IF WE CAN ADDRESS THE MULTIPURPOSE
                                        ;REGISTER.  IF WE TRAP WE WILL REPORT THE ERROR AND
                                        ;ABORT.  AFTER THIS TEST WE ONLY KNOW THAT WE CAN
                                        ;ADDRESS THE REGISTER.
017656                                  STARS
                                        ;;*************************************************************


017656  005037  002246                  1$:     CLR     TRPFLG          ;CLEAR TRAP OCCURANCE
017662                                  2$:     SETVEC  ERRVEC,#TRPHAN,#340  ;SET UP TO CATCH TRAP
017662  012746  000340                          MOV     #340,-(SP)
017666  012746  016636                          MOV     #TRPHAN,-(SP)
017672  013746  002256                          MOV     ERRVEC,-(SP)
017676  012746  000003                          MOV     #3,-(SP)
017702  104437                                  TRAP    C$SVEC
017704  062706  000010                          ADD     #10,SP

017710  005777  162272                          TST     @RLMP           ;ADDRESS RLMP
017714                                          CLRVEC  ERRVEC          ;RELEASE TRAP VECTOR
017714  013700  002256                          MOV     ERRVEC,R0
017720  104436                                  TRAP    C$CVEC
017722  005737  002246                          TST     TRPFLG          ;TRAP OCCURRED???
017726  001407                                  BEQ     3$              ;NO, CONTINUE
017730  013737  002206  002306                  MOV     RLMP,GDDAT      ;SET UP ERROR INFO

017736                                          ERRSF   103.,EM4,ERR1   ;BUS TIMEOUT IN ADDRESSING RLMP
017736  104454                                  TRAP    C$ERSF
017740  000147                                  .WORD   103
017742  006674                                  .WORD   EM4
017744  011650                                  .WORD   ERR1
017746                                  3$:     CKLOOP                  ;CHECK IF /FL:LOE IS SET
017746  104406                                  TRAP    C$CLP1
017750                                  ENDTST                          ;****END OF TEST****
017750                                  L10032:
017750  104401                                  TRAP    C$ETST

                                        .SBTTL  **TEST 9** - BUS RESET OF RLCS

017752                                  BGNTST                          ;****START OF TEST****

017752                                  STARS
                                        ;;*************************************************************
                                        ;TEST THAT A BUS RESET WILL CLEAR THE PROPER BITS
                                        ;OF THE CONTROL AND STATUS REGISTER.  THOSE BITS ARE
                                        ;BITS 6-1,8,9,10,11,12,13,15.  BIT 15 WILL CLEAR ONLY
                                        ;IF BIT 14 (DRIVE ERROR IS NOT SET).  BIT 0 (DRIVE READY)
                                        ;IS A DON'T CARE.  IF AT THE START UP THIS TEST BIT
                                        ;14 (DRIVE ERROR) IS SET WE WILL INSIST IF IS THERE AFTER
                                        ;THE "RESET" ALONG WITH BIT 15 (COMPOSITE ERROR).  BITS
                                        ;15-10 ARE NOT WRITEABLE.
```

```
017752                          STARS
                                ;;**************************************************************


017752                                  SETPRI  #PRI07          ;PRIORITY TO SEVEN
017752  012700  000340                  MOV     #PRI07,R0
017756  104441                          TRAP    C$SPRI
017760  012777  000377  162212          MOV     #377,@RLCS      ;LOAD ALL RLCS LOADABLE BITS
017766  012737  000200  002306          MOV     #CRDY,GDDAT     ;SETUP EXPECTED
017774  032777  040000  162176          BIT     #DERR,@RLCS     ;DRIVE ERR SET?
020002  001403                          BEQ     1$              ;IF NOT DON'T EXPECT IT
020004  052737  140000  002306          BIS     #DERR!ERR,GDDAT  ;IT'S SET, INIT BETTER NOT CLR
020012  012700  000100          1$:     MOV     #100,R0         ;SET UP A WAIT LOOP
020016                                  BRESET                  ;BUS RESET
020016  104433                          TRAP    C$RESET
020020  005300                  2$:     DEC     R0              ;WAIT IN CASE OF DRIVE ERROR
020022  001376                          BNE     2$              ;
020024  017737  162150  002310          MOV     @RLCS,BDDAT     ;READ RLCS
020032  042737  000001  002310          BIC     #DRDY,BDDAT     ;CLEAR OUT DRDY - DON'T CARE
020040  023737  002310  002306          CMP     BDDAT,GDDAT     ;DID INIT WORK
020046  001404                          BEQ     3$              ;YES, BRANCH

020050                                  ERRDF   113.,EM67,ERR2  ;WRONG DATA IN RLCS
020050  104455                          TRAP    C$ERDF
020052  000161                          .WORD   113
020054  011005                          .WORD   EM67
020056  011662                          .WORD   ERR2
020060                          3$:
020060                          ENDTST                          ;****END OF TEST****
020060                          L10033:
020060  104401                          TRAP    C$ETST


                                .SBTTL  **TEST 10** - BUS RESET OF RLBA

020062                          BGNTST                          ;****START OF TEST****

020062                          STARS
                                ;;**************************************************************
                                ;TEST THAT A BUS RESET WILL CLEAR THE ENTIRE
                                ;BUS ADDRESS REGISTER.  THE BUS ADDRESS IS LOADED WITH 177776
                                ;AND IS EXPECTED TO BE ZERO AFTER THE RESET
020062                          STARS
                                ;;**************************************************************


020062  012777  177776  162112          MOV     #-2,@RLBA       ;SET BA TO ALL 1'S
020070  005737  002332                  TST     T.CNTLR         ;RL11?
020074  001403                          BEQ     2$              ;NO
020076  052777  000001  162076          BIS     #1,@RLBA
020104  005037  002306          2$:     CLR     GDDAT           ;CLEAR EXPECTED DATA
020110                                  BRESET                  ;ISSUE BUS INIT
020110  104433                          TRAP    C$RESET
020112  017737  162064  002310          MOV     @RLBA,BDDAT     ;READ RLBA
020120  001404                          BEQ     1$              ;IF CLEAR BRANCH

```

```
020122                                  ERRDF   114.,EM70,ERR2  ;WRONG DATA IN RLBA
020122  104455                          TRAP    C$ERDF
020124  000162                          .WORD   114
020126  011042                          .WORD   EM70
020130  011662                          .WORD   ERR2
020132                          1$:

020132                          ENDTST                          ;****END OF TEST****
020132                          L10034:
020132  104401                          TRAP    C$ETST


                                .SBTTL  **TEST 11** - BUS RESET OF RLDA

020134                          BGNTST                          ;****START OF TEST****

020134                          STARS
                                ;;**************************************************************
                                ;TEST THAT A BUS RESET WILL CLEAR THE ENTIRE
                                ;DISK ADDRESS REGISTER.  THE DISK ADDRESS IS LOADED WITH 177777
                                ;AND IS EXPECTED TO BE ZERO AFTER THE RESET.
020134                          STARS
                                ;;**************************************************************


020134  012777  177777  162042          MOV     #-1,@RLDA       ;SET DA TO ALL 1'S
020142  005037  002306                  CLR     GDDAT           ;CLEAR EXPECTED
020146                                  @RESET                  ;ISSUE BUS INIT
020146  104433                          TRAP    C$RESET
020150  017737  162030  002310          MOV     @RLDA,BDDAT     ;READ RLDA
020156  001404                          BEQ     1$              ;IF CLEAR BRANCH

020160                                  ERRDF   115.,EM71,ERR2  ;WRONG DATA IN RLDA
020160  104455                          TRAP    C$ERDF
020162  000163                          .WORD   115
020164  011077                          .WORD   EM71
020166  011662                          .WORD   ERR2
020170                          1$:

020170                          ENDTST                          ;****END OF TEST****
020170                          L10035:
020170  104401                          TRAP    C$ETST


                                .SBTTL  **TEST 12** - READ WRITE OF RLCS

020172                          BGNTST                          ;****START OF TEST****



020172                          STARS
                                ;;**************************************************************
                                ;TEST THAT WE CAN WRITE/READ BITS 8,9 AND BITS 6-1
                                ;OF THE CONTROL AND STATUS REGISTER.  BITS 15-10 AND 0
                                ;ARE DON'T CARE BITS AT THIS TIME AND BIT 7
                                ;(CONTROLLER READY) IS ALWAYS WRITTEN TO A ONE.
```

```
020172                                  STARS
                                        ;;***************************************************************


020172  012703  003160                          MOV     #CSPAT,R3          ;SET UP TABLE POINTER OF PATTERNS

020176                                  BGNSEG                             ;****START OF SEGMENT****
020176  104404                                  TRAP    C$BSEG

020200                                  CSTEST:
020200  011337  002306                          MOV     (R3),GDDAT         ;GET PATTERN INTO GDDAT
020204  052737  000200  002306                  BIS     #200,GDDAT         ;INSURE GO IS SET
020212  013777  002306  161760                  MOV     GDDAT,@RLCS        ;LOAD RLCS (CONTROL AND STATUS)
020220  032777  040000  161752                  BIT     #DERR,@RLCS        ;IF DRIVE ERROR PRESENT
020226  001403                                  BEQ     99$                ;THEN EXPECT DRIVE AND
020230  052737  140000  002306                  BIS     #ERR!DERR,GDDAT    ;COMPOSITE ERROR
020236  017737  161736  002310          99$:    MOV     @RLCS,BDDAT        ;READ RLCS BACK
020244  042737  000001  002310                  BIC     #DRDY,BDDAT        ;IGNORE DRIVE READY
020252  023737  002306  002310                  CMP     GDDAT,BDDAT        ;DID WE READ WHAT WE LOADED
020260  001404                                  BEQ     1$                 ;YES, THEN BRANCH

020262                                          ERRDF   4.,EM5,ERR2        ;WRONG DATA IN RLCS
020262  104455                                  TRAP    C$ERDF
020264  000004                                  .WORD   4
020266  006721                                  .WORD   EM5
020270  011662                                  .WORD   ERR2
020272                                  1$:     ESCAPE  SEG                ;IF /FL:LOE SET LOOP, ELSE EXIT SEG
020272  104410                                  TRAP    C$ESCAPE
020274  000012                                  .WORD   10000$-.


020276  005723                                  TST     (R3)+              ;BUMP FOR NEXT PATTERN
020300  020327  003256                          CMP     R3,#CSEND          ;CHECK FOR END
020304  001335                                  BNE     CSTEST             ;NOT END, LOAD NEXT PATTERN

020306                                  ENDSEG                             ;****END OF SEGMENT****
020306                                  10000$:
020306  104405                                  TRAP    C$ESEG
020310                                  ENDTST                             ;****END OF TEST****
020310                                  L10036:
020310  104401                                  TRAP    C$ETST



                                        .SBTTL  **TEST 13** - READ WRITE OF RLBA

020312                                  BGNTST                             ;****START OF TEST****

020312                                  STARS
                                        ;;***************************************************************
                                        ;TEST THAT WE CAN WRITE/READ BITS IS THRU 1 OF THE
                                        ;BUS ADDRESS REGISTER.  FOUR PATTERNS ARE USED: GROWING 1, SHIFTING 1,
                                        ;GROWING 0 AND SHIFTING 0.  BIT 0 IS ALSO LOADED BUT
                                        ;SHOULD ALWAYS COME BACK AS 0
020312                                  STARS
                                        ;;***************************************************************

```

```

020312  012703  002564                  MOV     #BEGPAT,R3      ;GET START OF PATTERN LIST
020316                          BGNSEG                          ;****START OF SEGMENT****
020316  104404                          TRAP    C$BSEG
020320                          BATEST:
020320  011337  002306                  MOV     (R3),GDDAT      ;GET PATTERN TO SEND
020324  005737  002332                  TST     T.CNTLR         ;RL11??
020330  001403                          BEQ     2$              ;NO,
020332  042737  000001  002306          BIC     #BIT0,GDDAT     ;KEEP RLBA EVEN (UNIBUS)
020340  013777  002306  161634  2$:     MOV     GDDAT,@RLBA     ;LOAD PATTERN TO BUS ADDRESS
020346  017737  161630  002310          MOV     @RLBA,BDDAT     ;READ IT BACK
020354  023737  002306  002310          CMP     GDDAT,BDDAT     ;IS IT CORRECT?
020362  001404                          BEQ     1$              ;IF SO, BRANCH

020364                                  ERRDF   5.,EM6,ERR2     ;DATA WRONG IN RLBA
020364  104455                          TRAP    C$ERDF
020366  000005                          .WORD   5
020370  006772                          .WORD   EM6
020372  011662                          .WORD   ERR2
020374                          1$:     ESCAPE  SEG
020374  104410                          TRAP    C$ESCAPE
020376  000012                          .WORD   10000$-.

020400  005723                          TST     (R3)+           ;BUMP FOR NEXT PATTERN
020402  020327  002772                  CMP     R3,#ENDPAT      ;CHECK FOR END
020406  001344                          BNE     BATEST          ;NOT END, BRANCH FOR NEXT

020410                          ENDSEG                          ;****END OF SEGMENT****
020410                          10000$:
020410  104405                          TRAP    C$ESEG
020412                          ENDTST                          ;****END OF TEST****
020412                          L10037:
020412  104401                          TRAP    C$ETST


                                .SBTTL  **TEST 14** - READ WRITE OF RLDA

020414                          BGNTST                          ;****START OF TEST****

020414                          STARS
                                ;;*************************************************************
                                ;TEST THAT WE CAN WRITE/READ THE DISK ADDRESS REGISTER
                                ;ALL BIT POSITIONS ARE WRITTEN USING FOUR PATTERNS:
                                ;GROWING 1, SHIFTING 1, GROWING 0 AND SHIFTING 0
020414                          STARS
                                ;;*************************************************************


020414  012703  002564                  MOV     #BEGPAT,R3      ;SET UP POINTER TO PATTERN LIST
020420                          BGNSEG                          ;****START OF SEGMENT****
020420  104404                          TRAP    C$BSEG
020422                          DATEST:
020422  011337  002306                  MOV     (R3),GDDAT      ;GET PATTERN
020426  013777  002306  161550          MOV     GDDAT,@RLDA     ;LOAD PATTERN IN DA

020434  017737  161544  002310          MOV     @RLDA,BDDAT     ;READ PATTERN BACK
```

```
020442 023737 002306 002310         CMP     GDDAT,BDDAT     ;IS IT CORRECT?
020450 001404                       BEQ     1$              ;BRANCH IF CORRECT

020452                              ERRDF   6.,EM7,ERR2     ;WRONG DATA IN RLDA
020452 104455                       TRAP    C$ERDF
020454 000006                       .WORD   6
020456 007020                       .WORD   EM7
020460 011662                       .WORD   ERR2
020462                      1$:     ESCAPE  SEG             ;IF /FL:LOE SET LOOP, ELSE EXIT SEG
020462 104410                       TRAP    C$ESCAPE
020464 000012                       .WORD   10000$-.


020466 005723                       TST     (R3)+           ;BUMP POINTER
020470 020327 002772                CMP     R3,#ENDPAT      ;AT END OF PATTERNS?
020474 001352                       BNE     DATEST          ;NO, BRANCH BACK

020476                      ENDSEG                          ;****END OF SEGMENT****
020476                      10000$:
020476 104405                       TRAP    C$ESEG
020500                      ENDTST                          ;****END OF TEST****
C20500                      L10040:
020500 104401                       TRAP    C$ETST


                            .SBTTL  **TEST 15** - BIS OF RLCS

020502                      BGNTST                          ;****START OF TEST****
020502                      STARS
                            ;;************************************************************
                            ;TEST THAT WE CAN USE THE "BIS" INSTRUCTION ON THE CONTROL
                            ;AND STATUS REGISTER.  BITS 8,9 AND 6-1 ARE TESTED TO
                            ;SET INDIVIDUALLY AS WELL AS COLLECTIVELY WITHOUT DESTROYING
                            ;ANY PREVIOUS DATA PATTERN
020502                      STARS
                            ;;************************************************************


020502 012703 003160                MOV     #CSPAT,R3       ;GET BEGINNING OF LIST
020506                      BGNSEG                          ;****START OF SEGMENT****
020506 104404                       TRAP    C$BSEG
020510                      1$:
020510 012777 000200 161462         MOV     #CRDY,@RLCS     ;INSURE GO IS THERE
020516 011337 002306                MOV     (R3),GDDAT      ;SET UP EXPECTED RLCS
020522 052737 000200 002306         BIS     #CRDY,GDDAT     ;IN GDDAT
020530 051377 161444                BIS     (R3),@RLCS      ;BIT SET PATTERN IN RLCS
020534 032777 040000 161436         BIT     #DERR,@RLCS     ;IF ERROR BIT SET THEN
020542 001403                       BEQ     99$             ;EXPECT IT ON THE READ
020544 052737 140000 002306         BIS     #ERR!DERR,GDDAT ;BACK
020552 017737 161422 002310 99$:    MOV     @RLCS,BDDAT     ;READ RLCS TO CHECK "BIS"
020560 042737 000001 002310         BIC     #DRDY,BDDAT     ;CLEAR OUT DRIVE READY
020566 023737 002310 002306         CMP     BDDAT,GDDAT     ;DID BIS WORK?
020574 001404                       BEQ     2$              ;BRANCH IF OKAY

020576                              ERRDF   7.,EM61,ERR2    ;WRONG DATA IN RLCS
020576 104455                       TRAP    C$ERDF
```

```
020600  000007                                .WORD   7
020602  010331                                .WORD   EM61
020604  011662                                .WORD   ERR2
020606                                2$:     ESCAPE  SEG             ;IF /FL:LOE SET LOOP, ELSE EXIT SEG
020606  104410                                TRAP    C$ESCAPE
020610  000012                                .WORD   10000$-.
                                                                      ;BIT OR CLEARED OTHER BIT

020612  005723                                TST     (R3)+           ;GET NEXT PATTERN
020614  022703  003256                        CMP     #CSEND,R3       ;AT END OF LIST
020620  001333                                BNE     1$              ;NO GO BACK FOR TEST OF
                                                                      ;NEXT PATTERN
020622                                ENDSEG                          ;****END OF SEGMENT****
020622                                10000$:
020622  104405                                TRAP    C$ESEG
020624                                ENDTST                          ;****END OF TEST****
020624                                L10041:
020624  104401                                TRAP    C$ETST


                                      .SBTTL  **TEST 16** - BIC OF RLCS

020626                                BGNTST                          ;****START OF TEST****

020626                                STARS
                                      ;;******************************************************************
                                      ;TEST THAT THE "BIC" INSTRUCTION WILL WORK ON THE
                                      ;CONTROL AND STATUS REGISTER.  BITS 8-9 AND 6-1 ARE
                                      ;TESTED.
020626                                STARS
                                      ;;******************************************************************


020626  012703  003160                        MOV     #CSPAT,R3       ;GET BEGINNING OF PATTERNS
020632                                BGNSEG                          ;****START OF SEGMENT****
020632  104404                                TRAP    C$BSEG
020634                                1$:
020634  012777  001776  161336                MOV     #1776,@RLCS     ;SET ALL SETTABLE BITS
020642  012737  001776  002306                MOV     #1776,GDDAT     ;SET UP EXPECT DATA IN
020650  041337  002306                        BIC     (R3),GDDAT      ;GDDAT
020654  041377  161320                        BIC     (R3),@RLCS      ;CLEAR BITS IN RLCS VIA "BIC"
020660  032777  040000  161312                BIT     #DERR,@RLCS     ;IF DRIVE ERROR BIT SET
020666  001403                                BEQ     99$             ;EXPECT IT SET WHEN WE
020670  052737  140000  002306                BIS     #ERR!DERR,GDDAT ;READ IT BACK
020676  017737  161276  002310        99$:    MOV     @RLCS,BDDAT     ;MOVE RLCS TO BDDAT FOR COMPARE
020704  042737  000001  002310                BIC     #DRDY,BDDAT     ;CLEAR DRIVE READY
020712  023737  002310  002306                CMP     BDDAT,GDDAT     ;DID "BIC" WORK PROPERLY
020720  001404                                BEQ     2$              ;BRANCH IF OKAY

020722                                        ERRDF   8.,EM62,ERR2    ;WRONG DATA IN RLCS
020722  104455                                TRAP    C$ERDF
020724  000010                                .WORD   8
020726  010412                                .WORD   EM62
020730  011662                                .WORD   ERR2
020732                                2$:     ESCAPE  SEG             ;IF /FL:LOE SET LOOP, ELSE EXIT SEG
020732  104410                                TRAP    C$ESCAPE
```

```
020734  000012                                  .WORD   10000$-.

020736  005723                                  TST     (R3)+           ;GET NEXT PATTERN
020740  020327  003256                          CMP     R3,#CSEND       ;AT END OF LIST
020744  001333                                  BNE     1$              ;NO, GO BACK WITH NEXT PATTERN
020746                                  ENDSEG                          ;****END OF SEGMENT****
020746                                  10000$:
020746  104405                                  TRAP    C$ESEG
020750                                  ENDTST                          ;****END OF TEST****
020750                                  L10042:
020750  104401                                  TRAP    C$ETST


                                        .SBTTL  **TEST 17** - BIS OF RLBA

020752                                  BGNTST                          ;****START OF TEST****

020752                                  STARS
                                        ;;*************************************************************
                                        ;TEST THAT THE "BIS" INSTRUCTION WILL WORK ON THE BUS
                                        ;ADDRESS REGISTER.  BITS 15-0 ARE LOADED, ONLY BITS 15-1
                                        ;ARE EXPECTED BACK.  FOUR PATTERNS ARE USED: GROWING 1, SHIFTING 1,
                                        ;GROWING 0, AND SHIFTING 0.
020752                                  STARS
                                        ;;*************************************************************



020752  012703  002564                          MOV     #BEGPAT,R3      ;GET START OF LIST
020756                                  BGNSEG                          ;****START OF SEGMENT****
020756  104404                                  TRAP    C$BSEG
020760                                  1$:
020760  005077  161216                          CLR     @RLBA           ;CLEAR "BA"
020764  011337  002306                          MOV     (R3),GDDAT      ;SET EXPECTED
020770  005737  002332                          TST     T.CNTLR         ;RL11
020774  001403                                  BEQ     3$              ;NO
020776  042737  000001  002306                  BIC     #1,GDDAT        ;BIT 0 CAN'T SET IN RLBA (UNIBUS)
021004  051377  161172                  3$:     BIS     (R3),@RLBA      ;BIS RLBA WITH PATTERN
021010  017737  161166  002310                  MOV     @RLBA,BDDAT     ;READ "BA"
021016  023737  002310  002306                  CMP     BDDAT,GDDAT     ;DID RLBA LOAD PROPERLY?
021024  001404                                  BEQ     2$              ;BRANCH IF YES

021026                                          ERRDF   9.,EM63,ERR2    ;WRONG DATA IN RLBA
021026  104455                                  TRAP    C$ERDF
021030  000011                                  .WORD   9
021032  010475                                  .WORD   EM63
021034  011662                                  .WORD   ERR2
021036                                  2$:     ESCAPE  SEG             ;IF /FL:LOE SET LOOP, ELSE EXIT SEG
021036  104410                                  TRAP    C$ESCAPE
021040  000012                                  .WORD   10000$-.

021042  005723                                  TST     (R3)+           ;GET NEXT PATTERN
021044  020327  002772                          CMP     R3,#ENDPAT      ;DID WE COMPLETE LIST
021050  001343                                  BNE     1$              ;NO, GO BACK FOR NEXT.
021052                                  ENDSEG                          ;****END OF SEGMENT****
021052                                  10000$:
021052  104405                                  TRAP    C$ESEG
```

```
021054                              FNDTST                          ;****END OF TEST****
021054                              L10043:
021054  104401                              TRAP    C$ETST


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

021056                              BGNTST                          ;****START OF TEST****

021056                              STARS
                                    ;;*************************************************************
                                    ;TEST THAT THE "BIC" INSTRUCTION WILL WORK ON THE BUS
                                    ;ADDRESS REGISTER.  BITS 15-1 ARE TESTED WITH 4 PATTERNS
                                    ;GROWING 1, SHIFTING 1, GROWING 0 AND SHIFTING 0.
021056                              STARS
                                    ;;*************************************************************


021056  012703  002564                      MOV     #BEGPAT,R3      ;GET START OF LIST
021062                              BGNSEG                          ;****START OF SEGMENT****
021062  104404                              TRAP    C$BSEG
021064                              1$:
021064  012777  177776  161110              MOV     #-2,@RLBA       ;SET RLBA TO ALL 1'S (BIT 0=0)
021072  012737  177776  002306              MOV     #-2,GDDAT       ;SET UP EXPECTED RESULTS
021100  041337  002306                      BIC     (R3),GDDAT      ;IN GDDAT
021104  041377  161072                      BIC     (R3),@RLBA      ;BIC RLBA
021110  017737  161066  002310              MOV     @RLBA,BDDAT     ;READ RLBA
021116  023737  002310  002306              CMP     BDDAT,GDDAT     ;BIC WORK OKAY?
021124  001404                              BEQ     2$              ;IF YES BRANCH

021126                                      ERRDF   10.,EM64,ERR2   ;WRONG DATA IN RLBA
021126  104455                              TRAP    C$ERDF
021130  000012                              .WORD   10
021132  010556                              .WORD   EM64
021134  011662                              .WORD   ERR2
021136                              2$:     ESCAPE  SEG             ;IF /FL:LOE SET LOOP, ELSE EXIT SEG
021136  104410                              TRAP    C$ESCAPE
021140  000012                              .WORD   10000$-.

021142  005723                              TST     (R3)+           ;GET NEXT PATTERN
021144  020327  002772                      CMP     R3,#ENDPAT      ;HAVE WE COMPLETED LIST
021150  001345                              BNE     1$              ;NO, GO BACK FOR NEXT
021152                              ENDSEG                          ;****END OF SEGMENT****
021152                              10000$:
021152  104405                              TRAP    C$ESEG
021154                              ENDTST                          ;****END OF TEST****
021154                              L10044:
021154  104401                              TRAP    C$ETST


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

021156                              BGNTST                          ;****START OF TEST****

021156                              STARS
                                    ;;*************************************************************
```

```
                                ;TEST THAT THE "BIS" INSTRUCTION WILL WORK ON THE DISK ADDRESS
                                ;REGISTER.  BITS 15-0 ARE TESTED WITH 4 PATTERNS, GROWING 1,
                                ;SHIFTING 1, GROWING 0, AND SHIFTING 0.
021156                          STARS
                                ;;************************************************************


021156  012703  002564                  MOV     #BEGPAT,R3      ;GET START OF LIST
021162                          BGNSEG                          ;****START OF SEGMENT****
021162  104404                          TRAP    C$BSEG
021164                          1$:
021164  005077  161014                  CLR     @RLDA           ;CLEAR "DA"
021170  011337  002306                  MOV     (R3),GDDAT      ;SET EXPECTED
021174  051377  161004                  BIS     (R3),@RLDA      ;BIS RLDA
021200  017737  161000  002310          MOV     @RLDA,BDDAT     ;READ RLDA
021206  023737  002310  002306          CMP     BDDAT,GDDAT     ;IS RLDA CORRECT
021214  001404                          BEQ     2$              ;IF OKAY BRANCH

021216                                  ERRDF   11.,EM65,ERR2   ;WRONG DATA IN RLDA
021216  104455                          TRAP    C$ERDF
021220  000013                          .WORD   11
021222  010641                          .WORD   EM65
021224  011662                          .WORD   ERR2
021226                          2$.     ESCAPE  SEG             ;IF /FL:LOE SET LOOP, ELSE EXIT SEG
021226  104410                          TRAP    C$ESCAPE
021230  000012                          .WORD   10000$-.

021232  005723                          TST     (R3)+           ;GET NEXT PATTERN
021234  020327  002772                  CMP     R3,#ENDPAT      ;HAVE WE FINISHED?
021240  001351                          BNE     1$              ;NO GO BACK
021242                          ENDSEG                          ;****END OF SEGMENT****
021242                          10000$:
021242  104405                          TRAP    C$ESEG
021244                          ENDTST                          ;****END OF TEST****
021244                          L10045:
021244  104401                          TRAP    C$ETST


                                .SBTTL  **TEST 20** - BIC OF RLDA

021246                          BGNTST                          ;****START OF TEST****

021246                          STARS
                                ;;************************************************************
                                ;TEST THAT THE "BIC" INSTRUCTION WORKS ON THE DISK
                                ;ADDRESS REGISTER.  ALL BITS ARE TESTED WITH FOUR
                                ;PATTERNS: GROWING 1, SHIFTING 1, GROWING 0 AND SHIFTING 0
021246                          STARS
                                ;;************************************************************


021246  012703  002564                  MOV     #BEGPAT,R3      ;GET START OF LIST
021252                          BGNSEG                          ;****START OF SEGMENT****
021252  104404                          TRAP    C$BSEG
021254                          1$:
021254  012777  177777  160722          MOV     #-1,@RLDA       ;SET RLDA TO ALL 1'S
```

```
021262  012737  177777  002306          MOV     #-1,GDDAT       ;SET EXPECTED DATA
021270  041337  002306                  BIC     (R3),GDDAT      ;SET EXPECTED DATA
021274  041377  160704                  BIC     (R3),@RLDA      ;"BIC" RLDA
021300  017737  160700  002310          MOV     @RLDA,BDDAT     ;READ RLDA
021306  023737  002306  002310          CMP     GDDAT,BDDAT     ;DID "BIC" WORK?
021314  001404                          BEQ     2$              ;IF IT DID BRANCH

021316                                  ERRDF   12.,EM66,ERR2   ;WRONG DATA IN RLDA
021316  104455                          TRAP    C$ERDF
021320  000014                          .WORD   12
021322  010722                          .WORD   EM66
021324  011662                          .WORD   ERR2
021326                          2$:     ESCAPE  SEG             ;IF /FL:LOE SET LOOP, ELSE EXIT SEG
021326  104410                          TRAP    C$ESCAPE
021330  000012                          .WORD   10000$-

021332  005723                          TST     (R3)+           ;GET NEXT PATTERN
021334  020327  002772                  CMP     R3,#ENDPAT      ;DONE?
021340  001345                          BNE     1$              ;NO GO BACK
021342                          ENDSEG                          ;****END OF SEGMENT****
021342                          10000$:
021342  104405                          TRAP    C$ESEG
021344                          ENDTST                          ;****END OF TEST****
021344                          L10046:
021344  104401                          TRAP    C$ETST


                                .SBTTL  **TEST 21** - BUS RESET OF RLCS

021346                          BGNTST                          ;****START OF TEST****

021346                          STARS
                                ;;****************************************************************
                                ;TEST THAT A BUS RESET WILL CLEAR THE PROPER BITS
                                ;OF THE CONTROL AND STATUS REGISTER.  THOSE BITS ARE
                                ;BITS 6-1,8,9,10,11,12,13,15.  BIT 15 WILL CLEAR ONLY
                                ;IF BIT 14 (DRIVE ERROR IS NOT SET).  BIT 0 (DRIVE READY)
                                ;IS A DON'T CARE.  IF AT THE START UP THIS TEST BIT
                                ;14 (DRIVE ERROR) IS SET WE WILL INSIST IF IS THERE AFTER
                                ;THE "RESET" ALONG WITH BIT 15 (COMPOSITE ERROR).  BITS
                                ;15-10 ARE NOT WRITEABLE.
021346                          STARS
                                ;;****************************************************************


021346                                  SETPRI  #PRI07          ;PRIORITY TO SEVEN
021346  012700  000340                  MOV     #PRI07,R0
021352  104441                          TRAP    C$SPRI
021354  012777  000377  160616          MOV     #377,@RLCS      ;LOAD ALL RLCS LOADABLE BITS
021362  012737  000200  002306          MOV     #CRDY,GDDAT     ;SETUP EXPECTED
021370  032777  040000  160602          BIT     #DERR,@RLCS     ;DRIVE ERR SET?
021376  001403                          BEQ     1$              ;IF NOT DON'T EXPECT IT
021400  052737  140000  002306          BIS     #DERR!ERR,GDDAT  ;IT'S SET, INIT BETTER NOT CLR
021406  012700  000100          1$:     MOV     #100,R0         ;SET UP A WAIT LOOP
021412                                  BRESET                  ;BUS RESET
021412  104433                          TRAP    C$RESET
```

```
021414  005300                          2$:     DEC     R0                      ;WAIT IN CASE OF DRIVE ERROR
021416  001376                                  BNE     2$                      ;
021420  017737  160554  002310                  MOV     @RLCS,BDDAT             ;READ RLCS
021426  042737  000001  002310                  BIC     #DRDY,BDDAT             ;CLEAR OUT DRDY - DON'T CARE
021434  023737  002310  002306                  CMP     BDDAT,GDDAT             ;DID INIT WORK
021442  001404                                  BEQ     3$                      ;YES, BRANCH

021444                                          ERRDF   13.,EM67,ERR2           ;WRONG DATA IN RLCS
021444  104455                                  TRAP    C$ERDF
021446  000015                                  .WORD   13
021450  011005                                  .WORD   EM67
021452  011662                                  .WORD   ERR2
021454                                  3$:
021454                                  ENDTST                                  ;****END OF TEST****
021454                                  L10047:
021454  104401                                  TRAP    C$ETST


                                        .SBTTL  **TEST 22** - BUS RESET OF RLBA

021456                                  BGNTST                                  ;****START OF TEST****

021456                                  STARS
                                        ;;*************************************************************
                                        ;TEST THAT A BUS RESET WILL CLEAR THE ENTIRE
                                        ;BUS ADDRESS REGISTER.  THE BUS ADDRESS IS LOADED WITH 177776
                                        ;AND IS EXPECTED TO BE ZERO AFTER THE RESET
021456                                  STARS
                                        ;;*************************************************************


021456  012777  177776  160516                  MOV     #-2,@RLBA               ;SET BA TO ALL 1'S
021464  005737  002332                          TST     T.CNTLR                 ;RL11??
021470  001403                                  BEQ     2$                      ;NO
021472  052777  000001  160502                  BIS     #1,@RLBA
021500  005037  002306                  2$:     CLR     GDDAT                   ;CLEAR EXPECTED DATA
021504                                          BRESET                          ;ISSUE BUS INIT
021504  104433                                  TRAP    C$RESET
021506  017737  160470  002310                  MOV     @RLBA,BDDAT             ;READ RLBA
021514  001404                                  BEQ     1$                      ;IF CLEAR BRANCH

021516                                          ERRDF   14.,EM70,ERR2           ;WRONG DATA IN RLBA
021516  104455                                  TRAP    C$ERDF
021520  000016                                  .WORD   14
021522  011042                                  .WORD   EM70
021524  011662                                  .WORD   ERR2
021526                                  1$:

021526                                  ENDTST                                  ;****END OF TEST****
021526                                  L10050:
021526  104401                                  TRAP    C$ETST


                                        .SBTTL  **TEST 23** - BUS RESET OF RLDA

021530                                  BGNTST                                  ;****START OF TEST****
```

```

021530                                  STARS
                                        ;;**************************************************************
                                        ;TEST THAT A BUS RESET WILL CLEAR THE ENTIRE
                                        ;DISK ADDRESS REGISTER.  THE DISK ADDRESS IS LOADED WITH 177777
                                        ;AND IS EXPECTED TO BE ZERO AFTER THE RESET.
021530                                  STARS
                                        ;;**************************************************************


021530  012777  177777  160446                  MOV     #-1,@RLDA               ;SET DA TO ALL 1'S
021536  005037  002306                          CLR     GDDAT                   ;CLEAR EXPECTED
021542                                          BRESET                          ;ISSUE BUS INIT
021542  104433                                  TRAP    C$RESET
021544  017737  160434  002310                  MOV     @RLDA,BDDAT             ;READ RLDA
021552  001404                                  BEQ     1$                      ;IF CLEAR BRANCH

021554                                          ERRDF   15.,EM71,ERR2           ;WRONG DATA IN RLDA
021554  104455                                  TRAP    C$ERDF
021556  000017                                  .WORD   15
021560  011077                                  .WORD   EM71
021562  011662                                  .WORD   ERR2
021564                                  1$:

021564                                  ENDTST                                  ;****END OF TEST****
021564                                  L10051:
021564  104401                                  TRAP    C$ETST


                                        .SBTTL  **TEST 24** - UNIQUENESS OF RLCS

021566                                  BGNTST                                  ;****START OF TEST****

021566                                  STARS
                                        ;;**************************************************************
                                        ;TEST THE UNIQUENESS OF THE CONTROL AND STATUS
                                        ;REGISTER.  THE RLBA AND RLDA ARE PRELOADED WITH
                                        ;177776 AND 177777 RESPECTIVELY.  THE RLCS IS THEN
                                        ;LOADED TO INSURE THAT NEITHER THE RLBA OR RLDA
                                        ;ARE MODIFIED BY THE WRITING OF THE RLCS.
021566                                  STARS
                                        ;;**************************************************************


021566  012737  000201  002252                  MOV     #DRDY!CRDY,LDCSR                ;SET DRIVE AND CONTROLLER READY
021574  012777  177776  160400                  MOV     #-2,@RLBA                       ;SET RLBA TO ALL 1'S
021602  012777  177777  160374                  MOV     #-1,@RLDA                       ;SET RLDA TO ALL 1'S
021610  013777  002252  160362                  MOV     LDCSR,@RLCS                     ;WRITE RLCS

                                        ;CHECK THAT RLBA REMAINED UNEFFECTED

021616  022777  177776  160356                  CMP     #-2,@RLBA               ;RLBA OKAY?
021624  001412                                  BEQ     1$                      ;YES, GO CHECK DA

021626  012737  177776  002306                  MOV     #-2,GDDAT               ;SET UP EXPECTED
021634  017737  160342  002310                  MOV     @RLBA,BDDAT             ;READ RLBA
```

```

021642                                          ERRDF   16.,EM72,ERR2   ;CS MODIFIED BA
021642  104455                                  TRAP    C$ERDF
021644  000020                                  .WORD   16
021646  011134                                  .WORD   EM72
021650  011662                                  .WORD   ERR2
021652                                  1$:     CKLOOP                  ;CHECK IF /FL:LOE IS SET
021652  104406                                  TRAP    C$CLP1

021654  022777  177777  160322                  CMP     #-1,@RLDA       ;RLDA OKAY?
021662  001412                                  BEQ     2$              ;YES, CONTINUE

021664  012737  177777  002306                  MOV     #-1,GDDAT       ;SET UP EXPECTED
021672  017737  160306  002310                  MOV     @RLDA,BDDAT     ;READ DA

021700                                          ERRDF   17.,EM73,ERR2   ;CS MODIFIED DA
021700  104455                                  TRAP    C$ERDF
021702  000021                                  .WORD   17
021704  011167                                  .WORD   EM73
021706  011662                                  .WORD   ERR2
021710                                  2$:


021710                                  ENDTST                          ;****END OF TEST****
021710                                  L10052:
021710  104401                                  TRAP    C$ETST


                                        .SBTTL  **TEST 25** - UNIQUENESS OF RLBA

021712                                  BGNTST                          ;****START OF TEST****
021712                                  STARS
                                        ;;*******************************************************************
                                        ;TEST THE UNIQUENESS OF THE BUS ADDRESS REGISTER.  THE
                                        ;RLCS AND RLDA ARE LOADED WITH XXX20X AND 177777
                                        ;RESPECTIVELY.  THE RLBA IS THEN WRITTEN TO INSURE
                                        ;THAT NEITHER THE RLCS OR RLDA ARE MODIFIED
                                        ;BY WRITING THE RLBA.
021712                                  STARS
                                        ;;*******************************************************************


021712  012737  000200  002306                  MOV     #CRDY,GDDAT     ;CONTROLLER READY
021720  032777  040000  160252                  BIT     #DERR,@RLCS     ;IF DRIVE ERROR IS
021726  001403                                  BEQ     99$             ;SET THEN EXPECT IT
021730  052737  140000  002306                  BIS     #ERR!DERR,GDDAT ;SET WHEN WE READ IT.
021736  013777  002306  160234          99$:    MOV     GDDAT,@RLCS     ;LOAD RLCS
021744  012777  177777  160232                  MOV     #-1,@RLDA       ;LOAD RLDA
021752  005077  160224                          CLR     @RLBA           ;CLEAR RLBA

                                        ;CHECK IF RLCS IS OKAY

021756  017737  160216  002310                  MOV     @RLCS,BDDAT     ;READ RLCS
021764  042737  000001  002310                  BIC     #DRDY,BDDAT     ;IGNORE DRIVE READY
021772  023737  002310  002306                  CMP     BDDAT,GDDAT     ;CS OK?
022000  001404                                  BEQ     1$              ;YES, GO CHECK DA
```

```

022002                                  ERRDF   18.,EM74,ERR2   ;BA MODIFIED CS
022002  104455                          TRAP    C$ERDF
022004  000022                          .WORD   18
022006  011222                          .WORD   EM74
022010  011662                          .WORD   ERR2
022012                          1$:     CKLOOP                  ;CHECK IF /FL:LOE IS SET
022012  104406                          TRAP    C$CLP1

022014  022777  177777  160162          CMP     #-1,@RLDA       ;IS RLDA OKAY?

022022  001412                          BEQ     2$              ;IF OKAY BRANCH

022024  012737  177777  002306          MOV     #-1,GDDAT       ;SET UP EXPECTED
022032  017737  160146  002310          MOV     @RLDA,BDDAT     ;READ RLDA

022040                                  ERRDF   19.,EM75,ERR2   ;BA MODIFIED DA
022040  104455                          TRAP    C$ERDF
022042  000023                          .WORD   19
022044  011254                          .WORD   EM75
022046  011662                          .WORD   ERR2
022050                          2$:
022050                          ENDTST                          ;****END OF TEST****
022050                          L10053:
022050  104401                          TRAP    C$ETST


                                .SBTTL  **TEST 26** - UNIQUENESS OF RLDA

022052                          BGNTST                          ;****START OF TEST****


022052                          STARS
                                ;;****************************************************************
                                ;TEST THE UNIQUENESS OF THE DISK ADDRESS REGISTER.  THE RLCS
                                ;AND RLBA ARE LOADED WITH XXX20X AND 177776
                                ;RESPECTIVELY.  THE RLDA IS THEN WRITTEN TO INSURE
                                ;THAT NEITHER THE RLCS OR THE RLBA ARE MODIFIED
                                ;BY WRITING THE RLDA.
022052                          STARS
                                ;;****************************************************************


022052  012737  000200  002306          MOV     #CRDY,GDDAT     ;CONTROLLER READY
022060  032777  040000  160112          BIT     #DERR,@RLCS     ;IF DRIVE ERROR SET
022066  001403                          BEQ     99$             ;THEN EXPECT IT LATER
022070  052737  140000  002306          BIS     #ERR!DERR,GDDAT
022076  013777  002306  160074  99$:    MOV     GDDAT,@RLCS     ;LOAD CS
022104  012777  177776  160070          MOV     #-2,@RLBA       ;LOAD BA WITH ALL 1'S
022112  005077  160066                  CLR     @RLDA           ;CLEAR RLDA

                                ;CHECK IF RLCS IS OKAY

022116  017737  160056  002310          MOV     @RLCS,BDDAT     ;READ RLCS
022124  042737  000001  002310          BIC     #DRDY,BDDAT     ;IGNORE DRIVE READY
022132  023737  002306  002310          CMP     GDDAT,BDDAT     ;RLCS OKAY?
```

```
022140  001404                                  BEQ     1$                      ;YES, THEN BRANCH

022142                                          ERRDF   20.,EM76,ERR2           ;DA MODIFIED CS
022142  104455                                  TRAP    C$ERDF
022144  000024                                  .WORD   20
022146  011306                                  .WORD   EM76
022150  011662                                  .WORD   ERR2
022152                                  1$:     CKLOOP                          ;CHECK IF /FL:LOE IS SET
022152  104406                                  TRAP    C$CLP1

022154  022777  177776  160020                  CMP     #-2,@RLBA               ;IS RLBA OKAY?
022162  001412                                  BEQ     2$                      ;BRANCH IF OKAY

022164  012737  177776  002306                  MOV     #-2,GDDAT               ;SET UP EXPECTED
022172  017737  160004  002310                  MOV     @RLBA,BDDAT             ;READ RLBA

022200                                          ERRDF   21.,EM77,ERR2           ;DA MODIFIED BA
022200  104455                                  TRAP    C$ERDF
022202  000025                                  .WORD   21
022204  011341                                  .WORD   EM77
022206  011662                                  .WORD   ERR2
022210                                  2$:


022210                                  ENDTST                                  ;****END OF TEST****
022210                                  L10054:
022210  104401                                  TRAP    C$ETST

                                        .SBTTL  **TEST 27** - UNIQUENESS OF RLMP

022212                                  BGNTST                                  ;****START OF TEST****


022212                                  STARS
                                        ;;*****************************************************************
                                        ;TEST THE UNIQUENESS OF THE MULTI-PURPOSE REGISTER
                                        ;WE WILL WRITE THE RLCS, RLBA, AND THE RLDA, THEN THE
                                        ;RLMP IS WRITTEN. WE THEN GO BACK AN VERIFY THE CONTENTS
                                        ;OF THE RLCS, RLBA, RLDA.
022212                                  STARS
                                        ;;*****************************************************************


022212  012737  000200  002306                  MOV     #CRDY,GDDAT             ;CONTROLLER READY
022220  032777  040000  157752                  BIT     #DERR,@RLCS             ;IF DRIVE ERROR SET
022226  001403                                  BEQ     99$                     ;THE EXPECT IT LATER
022230  052737  140000  002306                  BIS     #ERR!DERR,GDDAT
022236  013777  002306  157734          99$:    MOV     GDDAT,@RLCS             ;LOAD CS
022244  012777  177776  157730                  MOV     #-2,@RLBA               ;LOAD BA WITH ALL 1'S
022252  012777  177777  157724                  MOV     #-1,@RLDA               ;LOAD RLDA
022260  005077  157722                          CLR     @RLMP                   ;WRITE RLMP

                                        ;CHECK IF RLCS IS OKAY

022264  017737  157710  002310                  MOV     @RLCS,BDDAT             ;READ RLCS
022272  042737  000001  002310                  BIC     #DRDY,BDDAT             ;IGNORE DRIVE READY
```

```
022300  023737  002306  002310                  CMP     GDDAT,BDDAT     ;RLCS OKAY?
022306  001404                                  BEQ     1$              ;YES, THEN BRANCH

022310                                          ERRDF   22.,EM44,ERR2   ;MP MODIFIED CS
022310  104455                                  TRAP    C$ERDF
022312  000026                                  .WORD   22
022314  010210                                  .WORD   EM44
022316  011662                                  .WORD   ERR2
022320                                  1$:     CKLOOP                          ;CHECK IF /FL:LOE IS SET
022320  104406                                  TRAP    C$CLP1

022322  022777  177776  157652                  CMP     #-2,@RLBA       ;IS RLBA OKAY?
022330  001412                                  BEQ     2$              ;BRANCH IF OKAY

022332  012737  177776  002306                  MOV     #-2,GDDAT       ;SET UP EXPECTED
022340  017737  157636  002310                  MOV     @RLBA,BDDAT     ;READ RLBA

022346                                          ERRDF   23.,EM45,ERR2   ;MP MODIFIED BA
022346  104455                                  TRAP    C$ERDF
022350  000027                                  .WORD   23
022352  010243                                  .WORD   EM45
022354  011662                                  .WORD   ERR2
022356                                  2$:     CKLOOP                          ;CHECK IF /FL:LOE IS SET
022356  104406                                  TRAP    C$CLP1
022360  022777  177777  157616                  CMP     #-1,@RLDA       ;DISK ADDRESS OKAY
022366  001412                                  BEQ     3$              ;YES, CONTINUE

022370  017737  157610  002310                  MOV     @RLDA,BDDAT     ;SET UP BAD
022376  012737  177777  002306                  MOV     #-1,GDDAT       ;SET UP EXPECTED

022404                                          ERRDF   24.,EM46,ERR2   ;MP MODIFIED DA
022404  104455                                  TRAP    C$ERDF
022406  000030                                  .WORD   24
022410  010276                                  .WORD   EM46
022412  011662                                  .WORD   ERR2

022414                                  3$:


022414                                  ENDTST                                  ;****END OF TEST****
022414                                  L10055:
022414  104401                                  TRAP    C$ETST




                                        .SBTTL  **TEST 28** - RLV11 MAINT. FORCED OPI TEST,LESS THAN 510 WORDS

022416                                  BGNTST                                  ;****START OF TEST****

022416                                  STARS
                                        ;;*****************************************************************
                                        ;PERFORM RLV11 MAINTENANCE FUNCTION 0 WITH LESS THAN 510 WORDS
                                        ;TO FORCE OPI ERROR. THE TEST SHOULD FORCE COMPOSITE ERROR(BIT 15),
                                        ;HEADER NOT FOUND(BIT12) AND OPI(BIT 10). DRIVE ERROR IS IGNORED.
022416                                  STARS
```

```
                                ;;*****************************************************************
022416  005737  002332                  TST     T.CNTLR         ;RLV11?
022422  001040                          BNE     10$             ;NO,EXIT TEST
022424  012703  002774          1$:     MOV     #PATCRC,R3      ;GET CRC PATTERN TABLE
022430  012704  003066                  MOV     #PATDAT,R4      ;GET DATA PATTERN TABLE
022434  011337  022450                  MOV     (R3),2$         ;STORE CRC PATTERN
022440  011437  022456                  MOV     (R4),3$         ;STORE DATA PATTERN
022444  004537  015514                  JSR     R5,CALCRC       ;CALCULATE CRC BEFORE TEST
022450  000000                  2$:     .WORD   0
022452  004537  015752                  JSR     R5,SETPAT       ;SETUP PATTERN BEFORE TEST
022456  000000                  3$:     .WORD   0
022460                                  BGNSEG
022460  104404                          TRAP    C$BSEG
022462  004537  016114                  JSR     R5,LDFUN        ;PERFORM MAINT FUNCTION
022466  000000                          MAINT
022470  177271                          -507                    ;LESS THAN 510 WORDS
022472  006324                          MATMES                  ;MAINT. MESSAGE
022474  004537  016724                  JSR     R5,WTCRDY
022500                                  CKLOOP                  ;LOOP SWITCH
022500  104406                          TRAP    C$CLP1
022502  004537  015324                  JSR     R5,CHKOPI       ;CHECK FOR EXPECTED ERRORS
022506  000404                          BR      4$              ;EXPECTED ERRORS FOUND,EXIT TEST
022510                                  ERRDF   30.,EM27,ERR10
022510  104455                          TRAP    C$ERDF
022512  000036                          .WORD   30
022514  010037                          .WORD   EM27
022516  012206                          .WORD   ERR10
022520                          4$:     CKLOOP
022520  104406                          TRAP    C$CLP1
022522                                  ENDSEG
022522                          10000$:
022522  104405                          TRAP    C$ESEG
022524                          10$:

022524                          ENDTST
022524                          L10056:
022524  104401                          TRAP    C$ETST

                                .SBTTL  **TEST 29** - RLV11 MAINT. FORCED OPI TEST,MORE THAN 511 WORDS

022526                          BGNTST                          ;****START OF TEST****

022526                          STARS
                                ;;*****************************************************************
                                ;PERFORM RLV11 MAINTENANCE FUNCTION 0 WITH MORE THAN 511 WORDS
                                ;TO FORCE OPI ERROR. THE TEST SHOULD FORCE COMPOSITE ERROR(BIT 15),
                                ;HEADER NOT FOUND(BIT12) AND OPI(BIT 10). DRIVE ERROR IS IGNORED.
022526                          STARS
                                ;;*****************************************************************
022526  005737  002332                  TST     T.CNTLR         ;RLV11?
022532  001040                          BNE     10$             ;NO,EXIT TEST
022534  012703  002774          1$:     MOV     #PATCRC,R3      ;GET CRC PATTERN TABLE
022540  012704  003066                  MOV     #PATDAT,R4      ;GET DATA PATTERN TABLE
022544  011337  022560                  MOV     (R3),2$         ;STORE CRC PATTERN
022550  011437  022566                  MOV     (R4),3$         ;STORE DATA PATTERN
022554  004537  015514                  JSR     R5,CALCRC       ;CALCULATE CRC BEFORE TEST
```

```
022560  000000                  2$:     .WORD   0
022562  004537  015752                  JSR     R5,SETPAT       ;SETUP PATTERN BEFORE TEST
022566  000000                  3$:     .WORD   0
022570                                  BGNSEG
022570  104404                          TRAP    C$BSEG
022572  004537  016114                  JSR     R5,LDFUN        ;PERFORM MAINT FUNCTION
022576  000000                          MAINT
022600  177266                          -512                    ;MORE THAN 511 WORDS
022602  006324                          MATMES                  ;MAINT. MESSAGE
022604  004537  016724                  JSR     R5,WTCRDY
022610                                  CKLOOP                  ;LOOP SWITCH
022610  104406                          TRAP    C$CLP1
022612  004537  015324                  JSR     R5,CHKOPI       ;CHECK FOR EXPECTED ERRORS
022616  000404                          BR      4$              ;EXPECTED ERRORS FOUND,EXIT TEST
022620                                  ERRDF   31.,EM30,ERR10
022620  104455                          TRAP    C$ERDF
022622  000037                          .WORD   31
022624  010113                          .WORD   EM30
022626  012206                          .WORD   ERR10
022630                          4$:     CKLOOP
022630  104406                          TRAP    C$CLP1
022632                                  ENDSEG
022632                          10000$:
022632  104405                          TRAP    C$ESEG
022634                          10$:

022634                          ENDTST
022634                          L10057:
022634  104401                          TRAP    C$ETST

                                .SBTTL  **TEST 30** - RLV11 MAINT. FORCED OPI TEST - INTERRUPT MODE

022636                          BGNTST                          ;****START OF TEST****

022636                          STARS
                                ;;*************************************************************
                                ;PERFORM TEST OF INTERRUPT BY ISSUING RLV11 MAINTENANCE FUNCTION 0
                                ;WITH MORE THAN 511 WORDS TO FORCE OPI ERROR. CHECK INTERRUPT
                                ;OPERATION AND REPORT IF ERROR OCCURS.
022636                          STARS
                                ;;*************************************************************

022636  005737  002332                  TST     T.CNTLR         ;RLV11?
022642  001052                          BNE     10$             ;NO,EXIT TEST
022644  012703  002774          1$:     MOV     #PATCRC,R3      ;GET CRC PATTERN TABLE
022650  012704  003066                  MOV     #PATDAT,R4      ;GET DATA PATTERN TABLE
022654  011337  022670                  MOV     (R3),2$         ;STORE CRC PATTERN
022660  011437  022676                  MOV     (R4),3$         ;STORE DATA PATTERN
022664  004537  015514                  JSR     R5,CALCRC       ;CALCULATE CRC
022670  000000                  2$:     .WORD   0
022672  004537  015752                  JSR     R5,SETPAT       ;SETUP PATTERN
022676  000000                  3$:     .WORD   0
022700                                  BGNSEG
022700  104404                          TRAP    C$BSEG
022702                                  SETPRI  #PRI00          ;SET PRIORITY TO ZERO
022702  012700  000000                  MOV     #PRI00,R0
```

```
022706  104441                    TRAP    C$SPRI
022710  005037  002250            CLR     INTFLG          ;CLEAR INT. FLAG
022714  004537  016114            JSR     R5,LDFUN
022720  000100                    MAINT!INTEN             ;MAINT FUNCTION,INT DRIVEN
022722  177266                    -512                    ;MORE THAN 511 TO FORCE OPI ERROR
022724  006364                    MATINT
022726  004537  016724            JSR     R5,WTCRDY       ;WAIT FOR READY
022732                            CKLOOP
022732  104406                    TRAP    C$CLP1
022734                            SETPRI  #PRI07
022734  012700  000340            MOV     #PRI07,R0
022740  104441                    TRAP    C$SPRI
022742  005737  002250            TST     INTFLG          ;CHECK IF INTERRUPT OCCURRED
022746  001004                    BNE     4$
022750                            ERRDF   32.,EM24,ERRO
022750  104455                    TRAP    C$ERDF
022752  000040                    .WORD   32
022754  007664                    .WORD   EM24
022756  011632                    .WORD   ERRO
022760  005037  002250  4$:       CLR     INTFLG          ;CLEAR INT. FLAG
022764                            CKLOOP
022764  104406                    TRAP    C$CLP1
022766                            ENDSEG
022766                  10000$:
022766  104405                    TRAP    C$ESEG
022770                  10$:

022770                  ENDTST
022770                  L10060:
022770  104401                    TRAP    C$ETST


                        .SBTTL  **TEST 31** - RLV11 OPI TIMEOUT TEST

022772                  BGNTST                            ;START OF TEST

022772                  STARS
                        ;;****************************************************************
                        ;PERFORM RLV11 MAINTENANCE FUNCTION (0) WITH INTERRUPT MODE. FORCE
                        ;OPI TIMEOUT BY SETTING WORD COUNT TO -512 WORDS. MEASURE OPI TIMEOUT
                        ;AND COMPARE TO MIN. AND MAX. LIMITS.
022772                  STARS
                        ;;****************************************************************

022772  005737  002332            TST     T.CNTLR         ;RLV11?
022776  001402                    BEQ     1$              ;YES,PERFORM TEST
023000  000137  023322            JMP     10$             ;RL11,EXIT TEST
023004  012703  002774  1$:       MOV     #PATCRC,R3      ;GET CRC PATTERN TABLE
023010  012704  003066            MOV     #PATDAT,R4      ;GET DATA PATTERN TABLE
023014  011337  023030            MOV     (R3),2$         ;STORE CRC PATTERN
023020  011437  023036            MOV     (R4),3$         ;STORE DATA PATTERN
023024  004537  015514            JSR     R5,CALCRC       ;CALCULATE CRC BEFORE TEST
023030  000000          2$:       .WORD   0
023032  004537  015752            JSR     R5,SETPAT       ;SETUP PATTERN BEFORE TEST
023036  000000          3$:       .WORD   0
023040                            BGNSEG
```

```
023040  104404                          TRAP    C$BSEG
023042                                  CLRVEC  BVEC              ;CLEAR PRESENT INT. VECTOR
023042  013700  002214                  MOV     BVEC,R0
023046  104436                          TRAP    C$CVEC
023050                                  SETVEC  BVEC,#TIMSRV,#340
023050  012746  000340                  MOV     #340,-(SP)
023054  012746  016652                  MOV     #TIMSRV,-(SP)
023060  013746  002214                  MOV     BVEC,-(SP)
023064  012746  000003                  MOV     #3,-(SP)
023070  104437                          TRAP    C$SVEC
023072  062706  000010                  ADD     #10,SP
023076  013737  002340  002310          MOV     OPIMX,BDDAT       ;TAKE MAX LIMIT AND
023104  005002                          CLR     R2                ;DIVIDE BY 10
023106  162737  000012  002310  200$:   SUB     #10.,BDDAT        ;RESULT IN R2
023114  100402                          BMI     201$              ;DONE DIVIDE?
023116  005202                          INC     R2
023120  000772                          BR      200$              ;NEXT DIVIDE
023122                          201$:   SETPRI  #PRI00            ;SETUP FOR WAIT ABORT
023122  012700  000000                  MOV     #PRI00,R0
023126  104441                          TRAP    C$SPRI
023130  005037  002250                  CLR     INTFLG            ;CLEAR INTERRUPT FLAG
023134  005000                          CLR     R0                ;OPI COUNTER
023136  004537  016114                  JSR     R5,LDFUN          ;PERFORM MAINT. FUNCTION
023142  000100                          MAINT!INTEN               ;MAINT FUNCTION WITH INT.MODE
023144  177266                          -512                      ;WORD COUNT
023146  006364                          MATINT                    ;MAINT MESSAGE
023150  004537  016032          100$:   JSR     R5,WDELAY         ;DELAY
023154  000012                          10.                       ;APPROX 10 MSECS
023156  062700  000012                  ADD     #10.,R0           ;10 MSEC DELAY COUNTER
023162  005737  002250                  TST     INTFLG            ;TEST INTERRUPT FLAG
023166  001002                          BNE     110$              ;CHECK TIMER IF INTFLG = 1
023170  005302                          DEC     R2                ;DONE WITH MAX DELAY?
023172  001366                          BNE     100$              ;DO ANOTHER DELAY
023174  010037  002310          110$:   MOV     R0,BDDAT          ;STORE RESULT
023200  005737  002250                  TST     INTFLG            ;CHECK INT. FLG
023204  001004                          BNE     4$
023206                                  ERRDF   33.,EM24,ERRO     ;ERROR ON INTERRUPT
023206  104455                          TRAP    C$ERDF
023210  000041                          .WORD   33
023212  007664                          .WORD   EM24
023214  011632                          .WORD   ERRO
023216  005037  002250          4$:     CLR     INTFLG
023222                                  CKLOOP
023222  104406                          TRAP    C$CLP1

                                ;CHECK THAT OPI IS WITHIN LIMITS

023224                          7$:     SETPRI  #PRI07
023224  012700  000340                  MOV     #PRI07,R0
023230  104441                          TRAP    C$SPRI
023232  023737  002340  002310          CMP     OPIMX,BDDAT       ;IS OPI WITHIN LIMITS
023240  002404                          BLT     8$                ;NO,REPORT ERROR
023242  023737  002336  002310          CMP     OPIMN,BDDAT       ;WITHIN LIMITS?
023250  003404                          BLE     9$                ;YES
023252                          8$:     ERRDF   34.,EM31,ERR11    ;OPI TIMING INCORRECT
023252  104455                          TRAP    C$ERDF
```

```
023254  000042                                  .WORD   34
023256  010167                                  .WORD   EM31
023260  012250                                  .WORD   ERR11
023262                                  9$:     CKLOOP
023262  104406                                  TRAP    C$CLP1
023264                                          CLRVEC  BVEC            ;CLEAR PRESENT VECTOR AND RESET OLD
023264  013700  002214                          MOV     BVEC,R0
023270  104436                                  TRAP    C$CVEC
023272                                          SETVEC  BVEC,#!INTSRV,#340
023272  012746  000340                          MOV     #340,-(SP)
023276  012746  016644                          MOV     #INTSRV,-(SP)
023302  013746  002214                          MOV     BVEC,-(SP)
023306  012746  000003                          MOV     #3,-(SP)
023312  104437                                  TRAP    C$SVEC
023314  062706  000010                          ADD     #10,SP
023320                                          ENDSEG
023320                                  10000$:
023320  104405                                  TRAP    C$ESEG
023322                                  10$:

023322                                  ENDTST
023322                                  L10061:
023322  104401                                  TRAP    C$ETST



                                        .SBTTL  **TEST 32** - TEST RLV11 MAINT. FUNCTION - FLAG MODE

023324                                  BGNTST                                  ;****START OF TEST****

023324                                  STARS
                                        ;;*****************************************************************
                                        ;PERFORM RLV11 MAINTENANCE FUNCTION 0 IN FLAG MODE AND CHECK
                                        ;FOR PROPER INCREMENT OF THE DA AND BA REGISTERS. CHECK THE SERIAL
                                        ;WRITE/READ DATA PATHS BY READING OUT OF THE FIFO VIA THE MP REGISTER
                                        ;THE CRC OF DA+3 AND THE CRC OF CRC OF DA+4 AND COMPARING WITH EXPECTED
                                        ;RESULTS. CHECK THE TRANSFER OF 255 WORDS FROM BUF1 MEMORY THROUGH THE
                                        ;FIFO INTO BUF2 MEMORY FOR PROPER DATA.
                                        ;CHECK THE PREVIOUSLY WRITTEN DATA IN THE LAST WORD+1 OF BUF2 FOR
                                        ;A VALUE:123456 TO INSURE THAT THE TRANSFER WAS NOT MORE THAN 255 WORDS.
023324                                  STARS
                                        ;;*****************************************************************
023324  005737  002332                          TST     T.CNTLR         ;RLV11?
023330  001402                                  BEQ     100$            ;YES,RLV11
023332  000137  024134                          JMP     10$             ;NO,SKIP TEST
023336  012703  002774                  100$:   MOV     #PATCRC,R3      ;GET CRC PATTERN TABLE
023342  012737  003066  002352                  MOV     #PATDAT,PATSAV  ;GET DATA PATTERN TABLE
023350  011337  023366                  101$:   MOV     (R3),102$       ;STORE CRC PATTERN FOR CALCULATION
023354  017737  156772  023376                  MOV     @PATSAV,103$    ;STORE DATA PAT. FOR BUFFER FILL
023362  004537  015514                          JSR     R5,CALCRC       ;CALCULATE CRC BEFORE TEST
023366  000000                          102$:   .WORD   0               ;PATTERN FOR CRC TEST
023370                                          BGNSEG
023370  104404                                  TRAP    C$BSEG
023372  004537  015752                          JSR     R5,SETPAT       ;SETUP PATTERN IN BUFFER
023376  000000                          103$:   .WORD   0               ;BUFFER PATTERN
023400  004537  016114                          JSR     R5,LDFUN        ;PERFORM MAINT. FUNCTION
023404  000000                                  MAINT                   ;MAINT FUNCTION FLAG DRIVEN
```

```
023406  177001                                   -511.                      ;WORD COUNT
023410  006324                                   MATMES                     ;MESSAGE
023412  004537  016724                           JSR     R5,WTCRDY          ;WAIT FOR READY
023416                                           CKLOOP
023416  104406                                   TRAP    C$CLP1
023420  004537  014600                           JSR     R5,CHERR           ;CHECK CONTROLLER FOR ERRORS
023424                                           CKLOOP
023424  104406                                   TRAP    C$CLP1
023426  012737  005756  002306                   MOV     #BUF1+1776,GDDAT
023434  013737  002234  002310                   MOV     E.BA,BDDAT
023442  023737  002306  002310                   CMP     GDDAT,BDDAT        ;TEST BA REGISTER
023450  001404                                   BEQ     1$
023452                                           ERRDF   35.,EM10,ERR4      ;DATA WRONG IN BA REGISTER
023452  104455                                   TRAP    C$ERDF
023454  000043                                   .WORD   35
023456  007046                                   .WORD   EM10
023460  012026                                   .WORD   ERR4
023462                                   1$:     CKLOOP                     ;CHECK FOR LOOP MODE
023462  104406                                   TRAP    C$CLP1
023464  013737  002224  002306                   MOV     B.DA,GDDAT         ;GET BEFORE DA REGISTER
023472  013737  002236  002310                   MOV     E.DA,BDDAT
023500  005037  002274                           CLR     TEMP1
023504  113737  002224  002274                   MOVB    B.DA,TEMP1
023512  062737  000006  002274                   ADD     #6,TEMP1           ;+6 TO DA LOW BYTE
023520  113737  002274  002306                   MOVB    TEMP1,GDDAT        ;STORE LOW BYTE OF DA
023526  023737  002306  002310                   CMP     GDDAT,BDDAT
023534  001404                                   BEQ     2$
023536                                           ERRDF   36.,EM12,ERR4
023536  104455                                   TRAP    C$ERDF
023540  000044                                   .WORD   36
023542  007150                                   .WORD   EM12
023544  012026                                   .WORD   ERR4
023546                                   2$:     CKLOOP
023546  104406                                   TRAP    C$CLP1
023550  013737  002314  002306                   MOV     GDCRCA,GDDAT       ;GET CRC OF DA+3 VALUE
023556  013737  002240  002310                   MOV     E.MP,BDDAT         ;GET CONTROLLER CRC OF DA+3
023564  023737  002306  002310                   CMP     GDDAT,BDDAT
023572  001404                                   BEQ     3$
023574                                           ERRDF   37.,EM20,ERR4
023574  104455                                   TRAP    C$ERDF
023576  000045                                   .WORD   37
023600  007400                                   .WORD   EM20
023602  012026                                   .WORD   ERR4
023604                                   3$:     CKLOOP
023604  104406                                   TRAP    C$CLP1
023606  013737  002316  002306                   MOV     GDCRCB,GDDAT
023614  013737  002242  002310                   MOV     E.MP1,BDDAT
023622  023737  002306  002310                   CMP     GDDAT,BDDAT
023630  001404                                   BEQ     4$
023632                                           ERRDF   38.,EM21,ERR4
023632  104455                                   TRAP    C$ERDF
023634  000046                                   .WORD   38
023636  007453                                   .WORD   EM21
023640  012026                                   .WORD   ERR4
023642                                   4$:     CKLOOP
023642  104406                                   TRAP    C$CLP1
```

```
023644  005037  002360                  CLR     SAVCNT            ;CLEAR BAD WORD COUNTER
023650  005037  002304                  CLR     CHECK             ;CLEAR PRINT HEADER INDICATOR
023654  012704  003760                  MOV     #BUF1,R4          ,GOOD DATA STORED IN BUF1
023660  012702  004760                  MOV     #BUF2,R2          ;DATA BUFFER WRITTEN INTO BY MAINT.
023664  012701  000377                  MOV     #255.,R1
023670  011437  002306          5$:     MOV     (R4),GDDAT        ;EXPECTED DATA
023674  011237  002310                  MOV     (R2),BDDAT        ;GET DATA FROM BUFFER
023700  023737  002306  002310          CMP     GDDAT,BDDAT
023706  001440                          BEQ     7$                ;DATA COMPARE
023710  010237  002276                  MOV     R2,TMPO           ;DATA ERR-GET ADDRESS
023714  005237  002360                  INC     SAVCNT            ;INC BAD WORD COUNTER
023720  005737  002304                  TST     CHECK             ;CHECK IF FIRST TIME
023724  001007                          BNE     6$
023726                                  ERRDF   39.,EM22,ERR3
023726  104455                          TRAP    C$ERDF
023730  000047                          .WORD   39
023732  007535                          .WORD   EM22
023734  011724                          .WORD   ERR3
023736  005237  002304                  INC     CHECK             ;PRINT HEADER ONCE
023742  000422                          BR      7$
023744                          6$:     PRINTX  #FRMT14,E.BA,E.DA,TMPO,GDDAT,BDDAT
023744  013746  002310                  MOV     BDDAT,-(SP)
023750  013746  002306                  MOV     GDDAT,-(SP)
023754  013746  002276                  MOV     TMPO,-(SP)
023760  013746  002236                  MOV     E.DA,-(SP)
023764  013746  002234                  MOV     E.BA,-(SP)
023770  012746  013477                  MOV     #FRMT14,-(SP)
023774  012746  000006                  MOV     #6,-(SP)
024000  010600                          MOV     SP,R0
024002  104415                          TRAP    C$PNTX
024004  062706  000016                  ADD     #16,SP
024010                          7$:     CKLOOP
024010  104406                          TRAP    C$CLP1
024012  005722                          TST     (R2)+             ;INCREMENT BUFFER
024014  005724                          TST     (R4)+             ;INCREMENT BUFFER
024016  005301                          DEC     R1                ;FINISHED BUFFER?
024020  001323                          BNE     5$                ;RETURN FOR NEXT COMPARE
024022  005737  002304                  TST     CHECK             ;CHECK FOR ERROR HEADER FLAG
024026  001412                          BEQ     77$
024030                                  PRINTB  #FRMT98,SAVCNT    ;PRINT BAD WORD COUNT
024030  013746  002360                  MOV     SAVCNT,-(SP)
024034  012746  013052                  MOV     #FRMT98,-(SP)
024040  012746  000002                  MOV     #2,-(SP)
024044  010600                          MOV     SP,R0
024046  104414                          TRAP    C$PNTB
024050  062706  000006                  ADD     #6,SP
024054  012737  123456  002306  77$:    MOV     #123456,GDDAT     ;EXPECTED DATA IN LAST WORD+1
024062  011237  002310                  MOV     (R2),BDDAT        ;GET LAST WORD+1 FROM BUF2
024066  023737  002306  002310          CMP     GDDAT,BDDAT
024074  001404                          BEQ     8$
024076                                  ERRDF   40.,EM23,ERR4
024076  104455                          TRAP    C$ERDF
024100  000050                          .WORD   40
024102  007624                          .WORD   EM23
024104  012026                          .WORD   ERR4
024106                          8$:     CKLOOP
```

```
024106  104406                          TRAP    C$CLP1
024110                                  ENDSEG
024110                          10000$:
024110  104405                          TRAP    C$ESEG
024112  005723                          TST     (R3)+           ;INC CRC PATTERN
024114  062737  000002  002352          ADD     #2,PATSAV       ;UPDATE PATTERN TABLE
024122  020327  003064                  CMP     R3,#CRCEND      ;CHECK FOR END
024126  001402                          BEQ     10$             ;END OF TEST
024130  000137  023350                  JMP     101$            ;CONTINUE TEST

024134                          10$:

024134                          ENDTST
024134                          L10062:
024134  104401                          TRAP    C$ETST



                                .SBTTL  **TEST 33** - TEST RLV11 MAINT. FUNCTION -INTERRUPT MODE

024136                          BGNTST                          ;****START OF TEST****

024136                          STARS
                                ;;**************************************************************
                                ;PERFORM RLV11 MAINTENANCE FUNCTION 0 (INT. MODE) AND CHECK
                                ;FOR PROPER INCREMENT OF THE DA AND BA REGISTERS. CHECK THE SERIAL
                                ;WRITE/READ DATA PATHS BY READING OUT OF THE FIFO VIA THE MP REGISTER
                                ;THE CRC OF DA+3 AND THE CRC OF CRC OF DA+4 AND COMPARING WITH EXPECTED
                                ;RESULTS. CHECK THE TRANSFER OF 255 WORDS FROM BUF1 MEMORY THROUGH THE
                                ;FIFO INTO BUF2 MEMORY FOR PROPER DATA.
                                ;CHECK THE PREVIOUSLY WRITTEN DATA IN THE LAST WORD+1 OF BUF2 FOR
                                ;VALUE:123456 TO INSURE THAT THE TRANSFER WAS NOT MORE THAN 255 WORDS.
024136                          STARS
                                ;;**************************************************************
024136  005737  002332                  TST     T.CNTLR         ;RLV11?
024142  001402                          BEQ     100$            ;YES,RLV11
024144  000137  025012                  JMP     10$             ;NO,SKIP TEST
024150  012703  002774          100$:   MOV     #PATCRC,R3      ;GET CRC PATTERN
024154  012737  003066  002352          MOV     #PATDAT,PATSAV  ;GET DATA PATTERN
024162  011337  024200          101$:   MOV     (R3),102$
024166  017737  156160  024210          MOV     @PATSAV,103$
024174  004537  015514                  JSR     R5,CALCRC       ;CALCULATE CRC BEFORE TEST
024200  000000                  102$:   .WORD   0               ;PATTERN FOR CRC TEST
024202                                  BGNSEG
024202  104404                          TRAP    C$BSEG
024204  004537  015752                  JSR     R5,SETPAT       ;SETUP PATTERN IN BUFFER
024210  000000                  103$:   .WORD   0               ;BUFFER PATTERN
024212                                  SETPRI  #PRI00          ;SET PRIORITY TO ZERO
024212  012700  000000                  MOV     #PRI00,R0
024216  104441                          TRAP    C$SPRI
024220  005037  002250                  CLR     INTFLG          ;CLEAR INT. FLAG
024224  004537  016114                  JSR     R5,LDFUN        ;PERFORM MAINT. FUNCTION
024230  000100                          MAINT!INTEN             ;MAINT FUNCTION INT. DRIVEN
024232  177001                          -511.                   ;WORD COUNT
024234  006364                          MAT!INT                 ;MESSAGE
024236  004537  016724                  JSR     R5,WTCRDY       ;WAIT FOR READY
024242                                  CKLOOP
```

```
024242  104406                                  TRAP    C$CLP1
024244                                          SETPRI  #PRI07
024244  012700  000340                          MOV     #PRI07,R0
024250  104441                                  TRAP    C$SPRI
024252  005737  002250                          TST     INTFLG
024256  001004                                  BNE     104$
024260                                          ERRDF   41.,EM24,ERR0
024260  104455                                  TRAP    C$ERDF
024262  000051                                  .WORD   41
024264  007664                                  .WORD   EM24
024266  011632                                  .WORD   ERR0
024270  005037  002250                  104$:   CLR     INTFLG          ;CLEAR INT. FLAG
024274                                          CKLOOP
024274  104406                                  TRAP    C$CLP1
024276  004537  014600                          JSR     R5,CHERR        ;CHECK CONTROLLER FOR ERRORS
024302                                          CKLOOP
024302  104406                                  TRAP    C$CLP1
024304  012737  005756  002306                  MOV     #BUF1+1776,GDDAT
024312  013737  002234  002310                  MOV     E.BA,BDDAT
024320  023737  002306  002310                  CMP     GDDAT,BDDAT     ;TEST BA REGISTER
024326  001404                                  BEQ     1$
024330                                          ERRDF   42.,EM10,ERR4   ;DATA WRONG IN BA REGISTER
024330  104455                                  TRAP    C$ERDF
024332  000052                                  .WORD   42
024334  007046                                  .WORD   EM10
024336  012026                                  .WORD   ERR4
024340                                  1$:     CKLOOP                  ;CHECK FOR LOOP MODE
024340  104406                                  TRAP    C$CLP1
024342  013737  002224  002306                  MOV     B.DA,GDDAT      ;GET BEFORE DA REGISTER
024350  013737  002236  002310                  MOV     E.DA,BDDAT
024356  005037  002274                          CLR     TEMP1
024362  113737  002224  002274                  MOVB    B.DA,TEMP1
024370  062737  000006  002274                  ADD     #6,TEMP1        ;+6 TO DA LOW BYTE
024376  113737  002274  002306                  MOVB    TEMP1,GDDAT     ;STORE LOW BYTE OF DA
024404  023737  002306  002310                  CMP     GDDAT,BDDAT
024412  001404                                  BEQ     2$
024414                                          ERRDF   43.,EM12,ERR4
024414  104455                                  TRAP    C$ERDF
024416  000053                                  .WORD   43
024420  007150                                  .WOPD   EM12
024422  012026                                  .WORD   ERR4
024424                                  2$:     CKLOOP
024424  104406                                  TRAP    C$CLP1
024426  013737  002314  002306                  MOV     GDCRCA,GDDAT    ;GET CRC OF DA+3 VALUE
024434  013737  002240  002310                  MOV     E.MP,BDDAT      ;GET CONTROLLER CRC OF DA+3
024442  023737  002306  002310                  CMP     GDDAT,BDDAT
024450  001404                                  BEQ     3$
024452                                          ERRDF   44.,EM20,ERR4
024452  104455                                  TRAP    C$ERDF
024454  000054                                  .WORD   44
024456  007400                                  .WORD   EM20
024460  012026                                  .WORD   ERR4
024462                                  3$:     CKLOOP
024462  104406                                  TRAP    C$CLP1
024464  013737  002316  002306                  MOV     GDCRCB,GDDAT
024472  013737  002242  002310                  MOV     E.MP1,BDDAT
```

```
024500  023737  002306  002310          CMP     GDDAT,BDDAT
024506  001404                          BEQ     4$
024510                                  ERRDF   45.,EM21,ERR4
024510  104455                          TRAP    C$ERDF
024512  000055                          .WORD   45
024514  007453                          .WORD   EM21
024516  012026                          .WORD   ERR4
024520                          4$:     CKLOOP
024520  104406                          TRAP    C$CLP1
024522  005037  002360                  CLR     SAVCNT          ;CLEAR BAD WORD COUNTER
024526  005037  002304                  CLR     CHECK           ;CLEAR PRINT HEADER INDICATOR
024532  012704  003760                  MOV     #BUF1,R4        ;GOOD DATA BUFFER
024536  012702  004760                  MOV     #BUF2,R2        ;DATA BUFFER WRITTEN INTO BY MAINT.
024542  012701  000377                  MOV     #255.,R1
024546  011437  002306          5$:     MOV     (R4),GDDAT      ;EXPECTED DATA
024552  011237  002310                  MOV     (R2),BDDAT      ;GET DATA FROM BUFFER
024556  023737  002306  002310          CMP     GDDAT,BDDAT
024564  001440                          BEQ     7$              ;DATA COMPARE
024566  010237  002276                  MOV     R2,TMPO         ;DATA ERR-GET ADDRESS
024572  005237  002360                  INC     SAVCNT          ;INC. BAD WORD COUNT
024576  005737  002304                  TST     CHECK           ;CHECK IF FIRST TIME
024602  001007                          BNE     6$
024604                                  ERRDF   46.,EM22,ERR3
024604  104455                          TRAP    C$ERDF
024606  000056                          .WORD   46
024610  007535                          .WORD   EM22
024612  011724                          .WORD   ERR3
024614  005237  002304                  INC     CHECK           ;PRINT HEADER ONCE
024620  000422                          BR      7$
024622                          6$:     PRINTX  #FRMT14,E.BA,E.DA,TMPO,GDDAT,BDDAT
024622  013746  002310                  MOV     BDDAT,-(SP)
024626  013746  002306                  MOV     GDDAT,-(SP)
024632  013746  002276                  MOV     TMPO,-(SP)
024636  013746  002236                  MOV     E.DA,-(SP)
024642  013746  002234                  MOV     E.BA,-(SP)
024646  012746  013477                  MOV     #FRMT14,-(SP)
024652  012746  000006                  MOV     #6,-(SP)
024656  010600                          MOV     SP,RO
024660  104415                          TRAP    C$PNTX
024662  062706  000016                  ADD     #16,SP
024666                          7$:     CKLOOP
024666  104406                          TRAP    C$CLP1
024670  005722                          TST     (R2)+           ;INCREMENT BUFFER
024672  005724                          TST     (R4)+           ;INCREMENT BUFFER
024674  005301                          DEC     R1              ;FINISHED BUFFER?
024676  001323                          BNE     5$              ;RETURN FOR NEXT COMPARE
024700  005737  002304                  TST     CHECK           ;CHECK ERROR HEADER FLAG
024704  001412                          BEQ     77$
024706                                  PRINTB  #FRMT98,SAVCNT  ;PRINT BAD WORD COUNT
024706  013746  002360                  MOV     SAVCNT,-(SP)
024712  012746  013052                  MOV     #FRMT98,-(SP)
024716  012746  000002                  MOV     #2,-(SP)
024722  010600                          MOV     SP,RO
024724  104414                          TRAP    C$PNTB
024726  062706  000006                  ADD     #6,SP
024732  012737  123456  002306  77$:    MOV     #123456,GDDAT   ;EXPECTED DATA IN LAST WORD+1
```

```
024740  011237  002310                  MOV     (R2),BDDAT      ;GET LAST WORD+1 FROM BUF2
024744  023737  002306  002310          CMP     GDDAT,BDDAT
024752  001404                          BEQ     8$
024754                                  ERRDF   47.,EM23,ERR4
024754  104455                          TRAP    C$ERDF
024756  000057                          .WORD   47
024760  007624                          .WORD   EM23
024762  012026                          .WORD   ERR4
024764                          8$:     CKLOOP
024764  104406                          TRAP    C$CLP1
024766                                  ENDSEG
024766                          10000$:
024766  104405                          TRAP    C$ESEG
024770  005723                          TST     (R3)+           ;INC. CRC PATTERN
024772  062737  000002  002352          ADD     #2,PATSAV       ;UPDATE PATTERN TABLE
025000  020327  003064                  CMP     R3,#CRCEND      ;CHECK FOR END
025004  001402                          BEQ     10$             ;END OF TEST
025006  000137  024162                  JMP     101$            ;CONTINUE TEST

025012                          10$:

025012                          ENDTST
025012                          L10063:
025012  104401                          TRAP    C$ETST

                                .SBTTL  **TEST 34** - RLV11 FIFO ADDRESS TEST

025014                          BGNTST

025014                          STARS
                                ;;**************************************************************
                                ;TEST THAT FIFO OPERATES CORRECTLY.STORE ADDRESS PATTERN
                                ;IN BUF1 (0-255) THAT CONTAINS A UNIQUE PATTERN IN EACH LOCATION.
                                ;PERFORM MAINTENANCE FUNCTION AND TEST BUF2 FOR PROPER FIFO
                                ;ADDRESSING.
025014                          STARS
                                ;;**************************************************************
025014  005737  002332                  TST     T.CNTLR         ;RL11 OR RLV11
025020  001402                          BEQ     1$              ;RLV11;PERFORM TEST
025022  000137  025360                  JMP     10$             ;RL11;SKIP TEST
025026  005001                  1$:     CLR     R1
025030  012702  000400                  MOV     #256.,R2
025034  012703  003760                  MOV     #BUF1,R3        ;SETUP TO STORE PATTERN IN BUF1
025040  010123                  2$:     MOV     R1,(R3)+
025042  005201                          INC     R1              ;INC. PATTERN
025044  005302                          DEC     R2
025046  001374                          BNE     2$
025050  012702  000400                  MOV     #256.,R2        ;SETUP TO CLEAR BUF2
025054  012703  004760                  MOV     #BUF2,R3
025060  005023                  3$:     CLR     (R3)+
025062  005302                          DEC     R2
025064  001375                          BNE     3$
025066  005037  002250                  CLR     INTFLG          ;CLEAR INT. FLAG
025072                                  SETPRI  #PRI00
025072  012700  000000                  MOV     #PRI00,R0
025076  104441                          TRAP    C$SPRI
```

```
025100  004537  016114                   JSR     R5,LDFUN          ;LOAD FUNCTION
025104  000100                           MAINT!INTEN               ;MAINT. WITH INTERRUPT
025106  177001                           -511.                     ;WORD COUNT
025110  006364                           MATINT                    ;MAINT. MESSAGE
025112  004537  016724                   JSR     R5,WTCRDY         ;WAIT FOR READY
025116                                   CKLOOP
025116  104406                           TRAP    C$CLP1
025120                                   SETPRI  #PRI07
025120  012700  000340                   MOV     #PRI07,R0
025124  104441                           TRAP    C$SPRI
025126  005737  002250                   TST     INTFLG            ;CHECK FOR INTERRUPT
025132  001004                           BNE     4$
025134                                   ERRDF   48.,EM24,ERR0
025134  104455                           TRAP    C$ERDF
025136  000060                           .WORD   48
025140  007664                           .WORD   EM24
025142  011632                           .WORD   ERR0
025144  005037  002250           4$:     CLR     INTFLG
025150                                   CKLOOP
025150  104406                           TRAP    C$CLP1
025152  005037  002360                   CLR     SAVCNT            ;CLEAR BAD WORD COUNTER
025156  005037  002304                   CLR     CHECK             ;CLEAR ERROR HEADER FLAG
025162  005001                           CLR     R1
025164  012702  000377                   MOV     #255.,R2
025170  012703  004760                   MOV     #BUF2,R3
025174  010137  002306           5$:     MOV     R1,GDDAT          ;EXPECTED DATA
025200  011337  002310                   MOV     (R3),BDDAT        ;DATA IN BUFFER
025204  023737  002306  002310           CMP     GDDAT,BDDAT
025212  001440                           BEQ     7$
025214  010337  002276                   MOV     R3,TMP0           ;GET ADDRESS FOR PRINTOUT
025220  005237  002360                   INC     SAVCNT            ;INC. BAD WORD COUNTER
025224  005737  002304                   TST     CHECK             ;CHECK ERROR HEADER FLAG
025230  001007                           BNE     6$
025232                                   ERRDF   49.,EM25,ERR3
025232  104455                           TRAP    C$ERDF
025234  000061                           .WORD   49
025236  007726                           .WORD   EM25
025240  011724                           .WORD   ERR3
025242  005237  002304                   INC     CHECK
025246  000422                           BR      7$
025250                           6$:     PRINTX  #FRMT14,E.BA,E.DA,TMP0,GDDAT,BDDAT
025250  013746  002310                   MOV     BDDAT,-(SP)
025254  013746  002306                   MOV     GDDAT,-(SP)
025260  013746  002276                   MOV     TMP0,-(SP)
025264  013746  002236                   MOV     E.DA,-(SP)
025270  013746  002234                   MOV     E.BA,-(SP)
025274  012746  013477                   MOV     #FRMT14,-(SP)
025300  012746  000006                   MOV     #6,-(SP)
025304  010600                           MOV     SP,R0
025306  104415                           TRAP    C$PNTX
025310  062706  000016                   ADD     #16,SP
025314                           7$:     CKLOOP
025314  104406                           TRAP    C$CLP1
025316  005723                           TST     (R3)+
025320  005201                           INC     R1                ;UPDATE PATTERN EXPECTED
025322  005302                           DEC     R2
```

```
025324  001323                          BNE     5$
025326  005737  002304                  TST     CHECK                   ;CHECK ERROR FLAG
025332  001412                          BEQ     10$
025334                                  PRINTB  #FRMT98,SAVCNT          ;PRINT NUMBER OF BAD WORDS
025334  013746  002360                  MOV     SAVCNT,-(SP)
025340  012746  013052                  MOV     #FRMT98,-(SP)
025344  012746  000002                  MOV     #2,-(SP)
025350  010600                          MOV     SP,R0
025352  104414                          TRAP    C$PNTB
025354  062706  000006                  ADD     #6,SP

025360                          10$:

025360                          ENDTST
025360                          L10064:
025360  104401                          TRAP    C$ETST

                                .SBTTL  **TEST 35** - RLV11 FIFO ADDRESS COMPLEMENT TEST

025362                          BGNTST

025362                          STARS
                                ;;************************************************************
                                ;TEST THAT FIFO OPERATES CORRECTLY. STORE ADDRESS COMPLEMENT PAT.
                                ;IN BUF1 (0-255) THAT CONTAINS A UNIQUE PATTERN IN EACH LOCATION.
                                ;PERFORM MAINTENANCE FUNCTION AND TEST BUF2 FOR PROPER FIFO
                                ;ADDRESSING.
025362                          STARS
                                ;;************************************************************
025362  005737  002332                  TST     T.CNTLR                 ;RL11 OR RLV11
025366  001402                          BEQ     1$                      ;RLV11;PERFORM TEST
025370  000137  025732                  JMP     10$                     ;RL11;SKIP TEST
025374  012701  177777          1$:     MOV     #177777,R1
025400  012702  000400                  MOV     #256.,R2
025404  012703  003760                  MOV     #BUF1,R3                ;SETUP TO STORE PATTERN IN BUF1
025410  010123                  2$:     MOV     R1,(R3)+
025412  005301                          DEC     R1                      ;NEXT COMP. PATTERN
025414  005302                          DEC     R2
025416  001374                          BNE     2$
025420  012702  000400                  MOV     #256.,R2                ;SETUP TO CLEAR BUF2
025424  012703  004760                  MOV     #BUF2,R3
025430  005023                  3$:     CLR     (R3)+
025432  005302                          DEC     R2
025434  001375                          BNE     3$
025436  005037  002250                  CLR     INTFLG                  ;CLEAR INT. FLAG
025442                                  SETPRI  #PRI00
025442  012700  000000                  MOV     #PRI00,R0
025446  104441                          TRAP    C$SPRI
025450  004537  016114                  JSR     R5,LDFUN                ;LOAD FUNCTION
025454  000100                          MAINT!INTEN                     ;MAINT. WITH INTERRUPT
025456  177001                          -511.                           ;WORD COUNT
025460  006364                          MATINT                          ;MAINT. MESSAGE
025462  004537  016724                  JSR     R5,WTCRDY               ;WAIT FOR READY
025466                                  CKLOOP
025466  104406                          TRAP    C$CLP1
025470                                  SETPRI  #PRI07
```

```
025470 012700 000340                   MOV     #PRI07,R0
025474 104441                          TRAP    C$SPRI
025476 005737 002250                   TST     INTFLG          ;CHECK FOR INTERRUPT
025502 001004                          BNE     4$
025504                                 ERRDF   50.,EM24,ERR0
025504 104455                          TRAP    C$ERDF
025506 000062                          .WORD   50
025510 007664                          .WORD   EM24
025512 011632                          .WORD   ERR0
025514 005037 002250          4$:      CLR     INTFLG
025520                                 CKLOOP
025520 104406                          TRAP    C$CLP1
025522 005037 002360                   CLR     SAVCNT          ;CLEAR BAD WORD COUNTER
025526 005037 002304                   CLR     CHECK           ;CLEAR ERROR HEADER FLAG
025532 012701 177777                   MOV     #177777,R1
025536 012702 000377                   MOV     #255.,R2
025542 012703 004760                   MOV     #BUF2,R3
025546 010137 002306          5$:      MOV     R1,GDDAT        ;EXPECTED DATA
025552 011337 002310                   MOV     (R3),BDDAT      ;DATA IN BUFFER
025556 023737 002306 002310            CMP     GDDAT,BDDAT
025564 001440                          BEQ     7$
025566 010337 002276                   MOV     R3,TMP0         ;GET ADDRESS FOR PRINTOUT
025572 005237 002360                   INC     SAVCNT          ;INC. BAD WORD COUNTER
025576 005737 002304                   TST     CHECK           ;CHECK ERROR HEADER FLAG
025602 001007                          BNE     6$
025604                                 ERRDF   51.,EM26,ERR3
025604 104455                          TRAP    C$ERDF
025606 000063                          .WORD   51
025610 007765                          .WORD   EM26
025612 011724                          .WORD   ERR3
025614 005237 002304                   INC     CHECK
025620 000422                          BR      7$
025622                        6$:      PRINTX  #FRMT14,E.BA,E.DA,TMP0,GDDAT,BDDAT
025622 013746 002310                   MOV     BDDAT,-(SP)
025626 013746 002306                   MOV     GDDAT,-(SP)
025632 013746 002276                   MOV     TMP0,-(SP)
025636 013746 002236                   MOV     E.DA,-(SP)
025642 013746 002234                   MOV     E.BA,-(SP)
025646 012746 013477                   MOV     #FRMT14,-(SP)
025652 012746 000006                   MOV     #6,-(SP)
025656 010600                          MOV     SP,R0
025660 104415                          TRAP    C$PNTX
025662 062706 000016                   ADD     #16,SP
025666                        7$:      CKLOOP
025666 104406                          TRAP    C$CLP1
025670 005723                          TST     (R3)+
025672 005301                          DEC     R1              ;GET NEXT PATTERN
025674 005302                          DEC     R2
025676 001323                          BNE     5$
025700 005737 002304                   TST     CHECK           ;CHECK ERROR FLAG
025704 001412                          BEQ     10$
025706                                 PRINTB  #FRMT98,SAVCNT  ;PRINT NO. OF BAD WORDS
025706 013746 002360                   MOV     SAVCNT,-(SP)
025712 012746 013052                   MOV     #FRMT98,-(SP)
025716 012746 000002                   MOV     #2,-(SP)
025722 010600                          MOV     SP,R0
```

```
025724  104414                                   TRAP     C$PNTB
025726  062706  000006                           ADD      #6,SP

025732                                  10$:
025732                                  ENDTST
025732                                  L10065:
025732  104401                                   TRAP     C$ETST


                                        .SBTTL  **TEST 36** - TEST RLV11 MAINT. WITH COMPLEMENT DATA -INT. MODE

025734                                  BGNTST                             ;****START OF TEST****

025734                                  STARS
                                        ;;*************************************************************
                                        ;PERFORM RLV11 MAINT. FUNCTION WITH COMPLEMENT DATA PATTERNS IN BUF1
                                        ;CHECK FOR PROPER INCREMENT OF THE DA AND BA REGISTERS. CHECK THE SERIAL
                                        ;WRITE/READ DATA PATHS BY READING OUT OF THE FIFO VIA THE MP REGISTER
                                        ;THE CRC OF DA+3 AND THE CRC OF CRC OF DA+4 AND COMPARING WITH EXPECTED
                                        ;RESULTS. CHECK THE TRANSFER OF 255 WORDS FROM BUF1 MEMORY THROUGH THE
                                        ;FIFO INTO BUF2 MEMORY FOR PROPER DATA.
                                        ;CHECK THE PREVIOUSLY WRITTEN DATA IN THE LAST WORD+1 OF BUF2 FOR
                                        ;VALUE:123456 TO INSURE THAT THE TRANSFER WAS NOT MORE THAN 255 WORDS.
025734                                  STARS
                                        ;;*************************************************************
025734  005737  002332                           TST      T.CNTLR          ;RLV11?
025740  001402                                   BEQ      100$             ;YES,RLV11
025742  000137  026610                           JMP      10$              ;NO,SKIP TEST
025746  012703  002774                  100$:    MOV      #PATCRC,R3       ;GET CRC PATTERN
025752  012737  003066  002352                   MOV      #PATDAT,PATSAV   ;GET DATA PATTERN
025760  011337  025776                  101$:    MOV      (R3),102$
025764  017737  154362  026006                   MOV      @PATSAV,103$
025772  004537  015514                           JSR      R5,CALCRC        ;CALCULATE CRC BEFORE TEST
025776  000000                          102$:    .WORD    0                ;PATTERN FOR CRC TEST
026000                                           BGNSEG
026000  104404                                   TRAP     C$BSEG
026002  004537  016214                           JSR      R5,SETCMP        ;SETUP PATTERN IN BUFFER
026006  000000                          103$:    .WORD    0                ;BUFFER PATTERN
026010                                           SETPRI   #PRI00           ;SET PRIORITY TO ZERO
026010  012700  000000                           MOV      #PRI00,R0
026014  104441                                   TRAP     C$SPRI
026016  005037  002250                           CLR      INTFLG           ;CLEAR INT. FLAG
026022  004537  016114                           JSR      R5,LDFUN         ;PERFORM MAINT. FUNCTION
026026  000100                                   MAINT!INTEN               ;MAINT FUNCTION INT. DRIVEN
026030  177001                                   -511.                     ,WORD COUNT
026032  006364                                   MATINT                    ;MESSAGE
026034  004537  016724                           JSR      R5,WTCRDY        ;WAIT FOR READY
026040                                           CKLOOP
026040  104406                                   TRAP     C$CLP1
026042                                           SETPRI   #PRI07
026042  012700  000340                           MOV      #PRI07,R0
026046  104441                                   TRAP     C$SPRI
026050  005737  002250                           TST      INTFLG
026054  001004                                   BNE      104$
026056                                           ERRDF    52.,EM24,ERR0
026056  104455                                   TRAP     C$ERDF
```

```
026060  000064                                   .WORD   52
026062  007664                                   .WORD   EM24
026064  011632                                   .WORD   ERRO
026066  005037  002250                   104$:   CLR     INTFLG          ;CLEAR INT. FLAG
026072                                           CKLOOP
026072  104406                                   TRAP    C$CLP1
026074  004537  014600                           JSR     R5,CHERR        ;CHECK CONTROLLER FOR ERRORS
026100                                           CKLOOP
026100  104406                                   TRAP    C$CLP1
026102  012737  005756  002306                   MOV     #BUF1+1776,GDDAT
026110  013737  002234  002310                   MOV     E.BA,BDDAT
026116  023737  002306  002310                   CMP     GDDAT,BDDAT     ;TEST BA REGISTER
026124  001404                                   BEQ     1$
026126                                           ERRDF   53.,EM10,ERR4   ;DATA WRONG IN BA REGISTER
026126  104455                                   TRAP    C$ERDF
026130  000065                                   .WORD   53
026132  007046                                   .WORD   EM10
026134  012026                                   .WORD   ERR4
026136                                   1$:     CKLOOP                  ;CHECK FOR LOOP MODE
026136  104406                                   TRAP    C$CLP1
026140  013737  002224  002306                   MOV     B.DA,GDDAT      ;GET BEFORE DA REGISTER
026146  013737  002236  002310                   MOV     E.DA,BDDAT
026154  005037  002274                           CLR     TEMP1
026160  113737  002224  002274                   MOVB    B.DA,TEMP1
026166  062737  000006  002274                   ADD     #6,TEMP1        ;+6 TO DA LOW BYTE
026174  113737  002274  002306                   MOVB    TEMP1,GDDAT     ;STORE LOW BYTE OF DA
026202  023737  002306  002310                   CMP     GDDAT,BDDAT
026210  001404                                   BEQ     2$
026212                                           ERRDF   54.,EM12,ERR4
026212  104455                                   TRAP    C$ERDF
026214  000066                                   .WORD   54
026216  007150                                   .WORD   EM12
026220  012026                                   .WORD   ERR4
026222                                   2$:     CKLOOP
026222  104406                                   TRAP    C$CLP1
026224  013737  002314  002306                   MOV     GDCRCA,GDDAT    ;GET CRC OF DA+3 VALUE
026232  013737  002240  002310                   MOV     E.MP,BDDAT      ;GET CONTROLLER CRC OF DA+3
026240  023737  002306  002310                   CMP     GDDAT,BDDAT
026246  001404                                   BEQ     3$
026250                                           ERRDF   55.,EM20,ERR4
026250  104455                                   TRAP    C$ERDF
026252  000067                                   .WORD   55
026254  007400                                   .WORD   EM20
026256  012026                                   .WORD   ERR4
026260                                   3$:     CKLOOP
026260  104406                                   TRAP    C$CLP1
026262  013737  002316  002306                   MOV     GDCRCB,GDDAT
026270  013737  002242  002310                   MOV     E.MP1,BDDAT
026276  023737  002306  002310                   CMP     GDDAT,BDDAT
026304  001404                                   BEQ     4$
026306                                           ERRDF   56.,EM21,ERR4
026306  104455                                   TRAP    C$ERDF
026310  000070                                   .WORD   56
026312  007453                                   .WORD   EM21
026314  012026                                   .WORD   ERR4
026316                                   4$:     CKLOOP
```

```
026316  104406                          TRAP    C$CLP1
026320  005037  002360                  CLR     SAVCNT          ;CLEAR BAD WORD COUNTER
026324  005037  002304                  CLR     CHECK           ;CLEAR PRINT HEADER INDICATOR
026330  012704  003760                  MOV     #BUF1,R4        ;GOOD DATA BUFFER
026334  012702  004760                  MOV     #BUF2,R2        ;DATA BUFFER WRITTEN INTO BY MAINT.
026340  012701  000377                  MOV     #255.,R1
026344  011437  002306          5$:     MOV     (R4),GDDAT      ;EXPECTED DATA
026350  011237  002310                  MOV     (R2),BDDAT      ;GET DATA FROM BUFFER
026354  023737  002306  002310          CMP     GDDAT,BDDAT
026362  001440                          BEQ     7$              ;DATA COMPARE
026364  010237  002276                  MOV     R2,TMPO         ;DATA ERR-GET ADDRESS
026370  005237  002360                  INC     SAVCNT          ;INC. BAD WORD COUNTER
026374  005737  002304                  TST     CHECK           ;CHECK IF FIRST TIME
026400  001007                          BNE     6$
026402                                  ERRDF   57.,EM22,ERR3
026402  104455                          TRAP    C$ERDF
026404  000071                          .WORD   57
026406  007535                          .WORD   EM22
026410  011724                          .WORD   ERR3
026412  005237  002304                  INC     CHECK           ;PRINT HEADER ONCE
026416  000422                          BR      7$
026420                          6$:     PRINTX  #FRMT14,E.BA,E.DA,TMPO,GDDAT,BDDAT
026420  013746  002310                  MOV     BDDAT,-(SP)
026424  013746  002306                  MOV     GDDAT,-(SP)
026430  013746  002276                  MOV     TMPO,-(SP)
026434  013746  002236                  MOV     E.DA,-(SP)
026440  013746  002234                  MOV     E.BA,-(SP)
026444  012746  013477                  MOV     #FRMT14,-(SP)
026450  012746  000006                  MOV     #6,-(SP)
026454  010600                          MOV     SP,RO
026456  104415                          TRAP    C$PNTX
026460  062706  000016                  ADD     #16,SP
026464                          7$:     CKLOOP
026464  104406                          TRAP    C$CLP1
026466  005722                          TST     (R2)+           ;INCREMENT BUFFER
026470  005724                          TST     (R4)+           ;INCREMENT BUFFER
026472  005301                          DEC     R1              ;FINISHED BUFFER?
026474  001323                          BNE     5$              ;RETURN FOR NEXT COMPARE
026476  005737  002304                  TST     CHECK           ;CHECK ERROR FLAG
026502  001412                          BEQ     77$
026504                                  PRINTB  #FRMT98,SAVCNT  ;PRINT NO OF BAD WORDS
026504  013746  002360                  MOV     SAVCNT,-(SP)
026510  012746  013052                  MOV     #FRMT98,-(SP)
026514  012746  000002                  MOV     #2,-(SP)
026520  010600                          MOV     SP,RO
026522  104414                          TRAP    C$PNTB
026524  062706  000006                  ADD     #6,SP
026530  012737  123456  002306  77$:    MOV     #123456,GDDAT   ;EXPECTED DATA IN LAST WORD+1
026536  011237  002310                  MOV     (R2),BDDAT      ;GET LAST WORD+1 FROM BUF2
026542  023737  002306  002310          CMP     GDDAT,BDDAT
026550  001404                          BEQ     8$
026552                                  ERRDF   58.,EM23,ERR4
026552  104455                          TRAP    C$ERDF
026554  000072                          .WORD   58
026556  007624                          .WORD   EM23
026560  012026                          .WORD   ERR4
```

```
026562                              8$:      CKLOOP
026562  104406                               TRAP    C$CLP1
026564                                       ENDSEG
026564                              10000$:
026564  104405                               TRAP    C$ESEG
026566  005723                               TST     (R3)+           ;INC. CRC PATTERN
026570  062737  000002  002352               ADD     #2,PATSAV       ;UPDATE PATTERN TABLE
026576  020327  003064                       CMP     R3,#CRCEND      ;CHECK FOR END
026602  001402                               BEQ     10$             ;END OF TEST
026604  000137  025760                       JMP     101$            ;CONTINUE TEST

026610                              10$:
026610                              ENDTST
026610                              L10066:
026610  104401                               TRAP    C$ETST

                                    .SBTTL  **TEST 37** - TEST RLV11 MAINT. WITH RANDOM DATA -INT. MODE

026612                              BGNTST                                   ;****START OF TEST****

026612                              STARS
                                    ;;**************************************************************
                                    ;PERFORM RLV11 MAINT. FUNCTION WITH RANDOM DATA PATTERNS IN BUF1
                                    ;RANDOM PATTERN IS THE SAME FOR EACH CONTROLLER UNDER TEST.
                                    ;RANDOM PATTERN WILL CHANGE AT END OF PASS.
                                    ;RANDOM PATTERN WILL INIT AT START OR RESTART.
                                    ;CHECK FOR PROPER INCREMENT OF THE DA AND BA REGISTERS. CHECK THE SERIAL
                                    ;WRITE/READ DATA PATHS BY READING OUT OF THE FIFO VIA THE MP REGISTER
                                    ;THE CRC OF DA+3 AND THE CRC OF CRC OF DA+4 AND COMPARING WITH EXPECTED
                                    ;RESULTS. CHECK THE TRANSFER OF 255 WORDS FROM BUF1 MEMORY THROUGH THE
                                    ;FIFO INTO BUF2 MEMORY FOR PROPER DATA.
                                    ;CHECK THE PREVIOUSLY WRITTEN DATA IN THE LAST WORD+1 OF BUF2 FOR
                                    ;VALUE:123456 TO INSURE THAT THE TRANSFER WAS NOT MORE THAN 255 WORDS.
026612                              STARS
                                    ;;**************************************************************
026612  005737  002332                       TST     T.CNTLR         ;RLV11?
026616  001402                               BEQ     101$            ;YES,RLV11
026620  000137  027432                       JMP     10$             ;NO,SKIP TEST
026624  013737  002346  026644      101$:    MOV     TEMLO,102$      ;STARTING RANDOM PATTERN
026632  013737  002346  002344               MOV     TEMLO,LONUM     ;RESET RANDOM START
026640  004537  015514                       JSR     R5,CALCRC       ;CALCULATE CRC BEFORE TEST
026644  000000                      102$:    .WORD   0               ;PATTERN FOR CRC TEST
026646  004537  016306                       JSR     R5,SETRAN       ;SETUP RANDOM PATTERN IN BUFFER
026652                                       BGNSEG
026652  104404                               TRAP    C$BSEG
026654                                       SETPRI  #PRI00          ;SET PRIORITY TO ZERO
026654  012700  000000                       MOV     #PRI00,R0
026660  104441                               TRAP    C$SPRI
026662  005037  002250                       CLR     INTFLG          ;CLEAR INT. FLAG
026666  004537  016114                       JSR     R5,LDFUN        ;PERFORM MAINT. FUNCTION
026672  000100                               MAINT!INTEN             ;MAINT FUNCTION INT. DRIVEN
026674  177001                               -511.                   ;WORD COUNT
026676  006364                               MATINT                  ;MESSAGE
026700  004537  016724                       JSR     R5,WTCRDY       ;WAIT FOR READY
026704                                       CKLOOP
026704  104406                               TRAP    C$CLP1
```

```
026706                                  SETPRI  #PRI07
026706  012700  000340                  MOV     #PRI07,R0
026712  104441                          TRAP    C$SPRI
026714  005737  002250                  TST     INTFLG
026720  001004                          BNE     104$
026722                                  ERRDF   59.,EM24,ERR0
026722  104455                          TRAP    C$ERDF
026724  000073                          .WORD   59
026726  007664                          .WORD   EM24
026730  011632                          .WORD   ERR0
026732  005037  002250          104$:   CLR     INTFLG            ;CLEAR INT. FLAG
026736                                  CKLOOP
026736  104406                          TRAP    C$CLP1
026740  004537  014600                  JSR     R5,CHERR          ;CHECK CONTROLLER FOR ERRORS
026744                                  CKLOOP
026744  104406                          TRAP    C$CLP1
026746  012737  005756  002306          MOV     #BUF1+1776,GDDAT
026754  013737  002234  002310          MOV     E.BA,BDDAT
026762  023737  002306  002310          CMP     GDDAT,BDDAT       ;TEST BA REGISTER
026770  001404                          BEQ     1$
026772                                  ERRDF   60.,EM10,ERR4     ;DATA WRONG IN BA REGISTER
026772  104455                          TRAP    C$ERDF
026774  000074                          .WORD   60
026776  007046                          .WORD   EM10
027000  012026                          .WORD   ERR4
027002                          1$:     CKLOOP                    ;CHECK FOR LOOP MODE
027002  104406                          TRAP    C$CLP1
027004  013737  002224  002306          MOV     B.DA,GDDAT        ;GET BEFORE DA REGISTER
027012  013737  002236  002310          MOV     E.DA,BDDAT
027020  005037  002274                  CLR     TEMP1
027024  113737  002224  002274          MOVB    B.DA,TEMP1
027032  062737  000006  002274          ADD     #6,TEMP1          ;+6 TO DA LOW BYTE
027040  113737  002274  002306          MOVB    TEMP1,GDDAT       ;STORE LOW BYTE OF DA
027046  023737  002306  002310          CMP     GDDAT,BDDAT
027054  001404                          BEQ     2$
027056                                  ERRDF   61.,EM12,ERR4
027056  104455                          TRAP    C$ERDF
027060  000075                          .WORD   61
027062  007150                          .WORD   EM12
027064  012026                          .WORD   ERR4
027066                          2$:     CKLOOP
027066  104406                          TRAP    C$CLP1
027070  013737  002314  002306          MOV     GDCRCA,GDDAT      ;GET CRC OF DA+3 VALUE
027076  013737  002240  002310          MOV     E.MP,BDDAT        ;GET CONTROLLER CRC OF DA+3
027104  023737  002306  002310          CMP     GDDAT,BDDAT
027112  001404                          BEQ     3$
027114                                  ERRDF   62.,EM20,ERR4
027114  104455                          TRAP    C$ERDF
027116  000076                          .WORD   62
027120  007400                          .WORD   EM20
027122  012026                          .WORD   ERR4
027124                          3$:     CKLOOP
027124  104406                          TRAP    C$CLP1
027126  013737  002316  002306          MOV     GDCRCB,GDDAT
027134  013737  002242  002310          MOV     E.MP1,BDDAT
027142  023737  002306  002310          CMP     GDDAT,BDDAT
```

```
027150  001404                          BEQ     4$
027152                                  ERRDF   63.,EM21,ERR4
027152  104455                          TRAP    C$ERDF
027154  000077                          .WORD   63
027156  007453                          .WORD   EM21
027160  012026                          .WORD   ERR4
027162                          4$:     CKLOOP
027162  104406                          TRAP    C$CLP1
027164  005037  002360                  CLR     SAVCNT          ;CLEAR BAD WORD COUNTER
027170  005037  002304                  CLR     CHECK           ;CLEAR PRINT HEADER INDICATOR
027174  012703  003760                  MOV     #BUF1,R3        ;BUFFER WITH RANDOM NUMBERS
027200  012702  004760                  MOV     #BUF2,R2        ;DATA BUFFER WRITTEN INTO BY MAINT.
027204  012701  000377                  MOV     #255.,R1
027210  011337  002306          5$:     MOV     (R3),GDDAT      ;EXPECTED DATA
027214  011237  002310                  MOV     (R2),BDDAT      ;GET DATA FROM BUFFER
027220  023737  002306  002310          CMP     GDDAT,BDDAT
027226  001440                          BEQ     7$              ;DATA COMPARE
027230  010237  002276                  MOV     R2,TMPO         ;DATA ERR-GET ADDRESS
027234  005237  002360                  INC     SAVCNT          ;INC BAD WORD COUNT
027240  005737  002304                  TST     CHECK           ;CHECK IF FIRST TIME
027244  001007                          BNE     6$
027246                                  ERRDF   64.,EM22,ERR3
027246  104455                          TRAP    C$ERDF
027250  000100                          .WORD   64
027252  007535                          .WORD   EM22
027254  011724                          .WORD   ERR3
027256  005237  002304                  INC     CHECK           ;PRINT HEADER ONCE
027262  000422                          BR      7$
027264                          6$:     PRINTX  #FRMT14,E.BA,E.DA,TMPO,GDDAT,BDDAT
027264  013746  002310                  MOV     BDDAT,-(SP)
027270  013746  002306                  MOV     GDDAT,-(SP)
027274  013746  002276                  MOV     TMPO,-(SP)
027300  013746  002236                  MOV     E.DA,-(SP)
027304  013746  002234                  MOV     E.BA,-(SP)
027310  012746  013477                  MOV     #FRMT14,-(SP)
027314  012746  000006                  MOV     #6,-(SP)
027320  010600                          MOV     SP,R0
027322  104415                          TRAP    C$PNTX
027324  062706  000016                  ADD     #16,SP
027330                          7$:     CKLOOP
027330  104406                          TRAP    C$CLP1
027332  005722                          TST     (R2)+           ;INCREMENT BUFFER
027334  005723                          TST     (R3)+           ;INCREMENT GOOD BUFFER
027336  005301                          DEC     R1              ;FINISHED BUFFER?
027340  001323                          BNE     5$              ;RETURN FOR NEXT COMPARE
027342  005737  002304                  TST     CHECK           ;CHECK ERROR FLAG
027346  001412                          BEQ     77$
027350                                  PRINTB  #FRMT98,SAVCNT  ;PRINT NO. OF BAD WORDS
027350  013746  002360                  MOV     SAVCNT,-(SP)
027354  012746  013052                  MOV     #FRMT98,-(SP)
027360  012746  000002                  MOV     #2,-(SP)
027364  010600                          MOV     SP,R0
027366  104414                          TRAP    C$PNTB
027370  062706  000006                  ADD     #6,SP
027374  012737  123456  002306  77$:    MOV     #123456,GDDAT   ;EXPECTED DATA IN LAST WORD+1
027402  011237  002310                  MOV     (R2),BDDAT      ;GET LAST WORD+1 FROM BUF2
```

```
027406 023737 002306 002310            CMP     GDDAT,BDDAT
027414 001404                          BEQ     8$
027416                                 ERRDF   65.,EM23,ERR4
027416 104455                          TRAP    C$ERDF
027420 000101                          .WORD   65
027422 007624                          .WORD   EM23
027424 012026                          .WORD   ERR4
027426                         8$:     CKLOOP
027426 104406                          TRAP    C$CLP1
027430                                 ENDSEG
027430                         10000$:
027430 104405                          TRAP    C$ESEG

027432                         10$:
027432                         ENDTST
027432                         L10067:
027432 104401                          TRAP    C$ETST

027434                         BGNMOD  HRDPRM

027434                                 BGNHRD
027434 000025                          .WORD L10070-L$HARD/2

027436                                 GPRML   LTYPMS,LTYPE,1,YES
027436 005130                          .WORD   T$CODE
027440 027552                          .WORD   LTYPMS
027442 000001                          .WORD   1
027444                                 GPRMA   CSRMSG,CSR,0,160000,177776,YES
027444 000031                          .WORD   T$CODE
027446 027510                          .WORD   CSRMSG
027450 160000                          .WORD   T$LOLIM
027452 177776                          .WORD   T$HILIM
027454                                 GPRMA   VECMSG,VECT,0,0,776,YES
027454 001031                          .WORD   T$CODE
027456 027535                          .WORD   VECMSG
027460 000000                          .WORD   T$LOLIM
027462 000776                          .WORD   T$HILIM
027464                                 GPRMD   DRMSG,DRBT,0,03400,0,7,YES
027464 003032                          .WORD   T$CODE
027466 027544                          .WORD   DRMSG
027470 003400                          .WORD   03400
027472 000000                          .WORD   T$LOLIM
027474 000007                          .WORD   T$HILIM
027476                                 GPRMD   BRMSG,PRIOR,0,340,0,7,YES
027476 002032                          .WORD   T$CODE
027500 027524                          .WORD   BRMSG
027502 000340                          .WORD   340
027504 000000                          .WORD   T$LOLIM
027506 000007                          .WORD   T$HILIM

027510                                 ENDHRD
                                       .EVEN
027510                         L10070:

027510 052502 020123 042101    CSRMSG: .ASCIZ  /BUS ADDRESS/
027516 051104 051505 000123
```

```
027524 051102 046040 053105  BRMSG:  .ASCIZ  /BR LEVEL/
027532 046105    000
027535    126 041505 047524  VECMSG: .ASCIZ  /VECTOR/
027542 000122
027544 051104 053111 000105  DRMSG:  .ASCIZ  /DRIVE/
027552 030461 031057 020063  LTYPMS: .ASCIZ  \11/23 PROCESSOR\
027560 051120 041517 051505
027566 047523 000122
                             .EVEN

027572                               ENDMOD



027572                       BGNMOD  SFTPRM

027572                               BGNSFT
027572 000014                        .WORD L10071-L$SOFT/2
027574                               GPRML   DMSG,DLT,1,YES
027574 000130                        .WORD   T$CODE
027576 027624                        .WORD   DMSG
027600 000001                        .WORD   1
027602                               XFERF   1$
027602 006044                        .WORD   T$CODE
027604                               GPRMD   EMSG,ELT,0,177777,0,177777,YES
027604 001032                        .WORD   T$CODE
027606 027661                        .WORD   EMSG
027610 177777                        .WORD   177777
027612 000000                        .WORD   T$LOLIM
027614 177777                        .WORD   T$HILIM
027616                       1$:     GPRML   SMSG,SIZE,1,YES
027616 002130                        .WORD   T$CODE
027620 027650                        .WORD   SMSG
027622 000001                        .WORD   1
027624                               ENDSFT
                                     .EVEN
027624                       L10071:


027624 051104 050117 047440  DMSG:   .ASCIZ  /DROP ON ERROR LIMIT/
027650 052501 047524 044523  SMSG:   .ASCIZ  /AUTOSIZE/
027661    105 051122 051117  EMSG:   .ASCIZ  /ERROR LIMIT/


       027676                .EVEN

027676                               ENDMOD

       030514                .=30514
                             ;AREA RESERVED AS PATCH AREA FOR DIAGNOSTIC

030514                       LASTAD
                                     .EVEN
030514 000000                        .WORD   0
030516 000000                        .WORD   0
030520                       L$LAST::
 4876
 4877          000001                  .END
```

```
ADDCOD  014510 G        1844#
ADR   = 000020 G        1034#
AFREG   006501          1342#   1542
AFTER   015712          2126#   2383    2393
ARLBA   006436          1342#   1518    1539
ARLCS   006431          1342#   1520    1541
ARLDA   006444          1342#   1531    1553
ARLMP   006452          1342#   1529    1551
ASSEMB= 000010           898
BATEST  020320          2925#   2946
BA16  = 000020          1053#
BA17  = 000040          1052#
BCCFBK  002260          1124#   2303*   2309*   2312*   2315    2319
BCSR    002210          1104#   1723*   1734
BDDAT   002310          1136#   1370    1393    1415    1459    1491    2770*   2771*   2772    2806*   2838*   2881*   2882*
                        2883    2931*   2932    2976*   2977    3026*   3027*   3028    3077*   3078*   3079    3126*   3127
                        3171*   3172    3215*   3216    3260*   3261    3315*   3316*   3317    3351*   3383*   3424*   3438*
                        3477*   3478*   3479    3495*   3534*   3535*   3536    3551*   3591*   3592*   3593    3608*   3620*
                        3828*   3830*   3850*   3867    3869    3938*   3939    3949*   3954    3964*   3965    3975*   3976
                        3991*   3992    4006    4032*   4033    4115*   4116    4126*   4131    4141*   4142    4152*   4153
                        4168*   4169    4183    4209*   4210    4291*   4292    4306    4395*   4396    4410    4499*   4500
                        4510*   4515    4525*   4526    4536*   4537    4552*   4553    4567    4593*   4594    4674*   4675
                        4685*   4690    4700*   4701    4711*   4712    4727*   4728    4742    4768*   4769
BEFORE  015660          2009    2116#   2199
BEGPAT  002564          1164#   2922    2969    3116    3163    3208    3252
BEREG   006460          1342#   1521
BIT0  = 000001 G        1007#   1046    1069    2929
BIT00 = 000001 G         996#   1007
BIT01 = 000002 G         995#   1006
BIT02 = 000004 G         994#   1005
BIT03 = 000010 G         993#   1004
BIT04 = 000020 G         992#   1003
BIT05 = 000040 G         991#   1002
BIT06 = 000100 G         990#   1001
BIT07 = 000200 G         989#   1000
BIT08 = 000400 G         988#    999
BIT09 = 001000 G         987#    998
BIT1  = 000002 G        1006#   1060    1062    1064    1066    1068    1301
BIT10 = 002000 G         986#   1050    2047
BIT11 = 004000 G         985#   1940    1949
BIT12 = 010000 G         984#   1944    1953    2042
BIT13 = 020000 G         983#   1054
BIT14 = 040000 G         982#   1049
BIT15 = 100000 G         981#   1048    2037
BIT2  = 000004 G        1005#   1061    1062    1065    1070    1302
BIT3  = 000010 G        1004#   1063    1064    1065    1067    1303
BIT4  = 000020 G        1003#   1053    1073    1304
BIT5  = 000040 G        1002#   1052    1305
BIT6  = 000100 G        1001#   1047    1071    1072    1306
BIT7  = 000200 G        1000#   1051    1066
BIT8  = 000400 G         999#   1056    1058    1307
BIT9  = 001000 G         998#   1057    1058    1308
BOE   = 000400 G        1038#
BPRIOR  002212          1105#   1725*
BRMSG   027524          4814    4825#
BUF1    003760          1335#   2142    2193    2213    2238    3937    3987    4114    4164    4251    4355    4498    4548
```

```
                        4673     4723
BUF2     004760         1336#    2147     2220     2244     3988     4165     4257     4289     4361     4393     4549     4724
BVEC     002214         1106#    1724*    1775     1820     3819     3824     3879     3884
B.BA     002222         1109#    1517     2117*
B.CS     002220         1108#    1519     1982     1984*    1985*    1986     1987*    2116*
B.DA     002224         1110#    1530     2118*    3948     3951     4125     4128     4509     4512     4684     4687
B.MP     002226         1111#    1528     2119*
CALBCC   002262         1125#    2097     2105     2110     2325*
CALCRC   015514         2087#    3656     3704     3753     3812     3921     4081     4465     4641
CHECK    002304         1134#    3986*    3996     4003*    4022     4163*    4173     4180*    4199     4286*    4296     4303*    4322
                        4390*    4400     4407*    4426     4547*    4557     4564*    4583     4722*    4732     4739*    4758
CHERR    014600         1907#    3934     4111     4495     4670
CHKOPI   015324         2027#    3669     3717
CKERLT   014514         1353     1362     1377     1403     1423     1432     1450     1466     1482     1499     1860#
CLNCOD   014442 G       1804#
CNT    = 000010         1081#
COMP     006160         1342#    1926     2041
CONT     014164         1675     1707     1732#
CONTIN   014046         1691     1703#
CRCEND   003064         1264#    4047     4224     4608
CRDY   = 000200         1051#    1811     2376     2761     3019     3021     3306     3413     3467     3524     3580
CRTIM    006522         1342#    2388
CSEND    003256         1331#    2897     3042     3092
CSPAT    003160         1300#    2869     3015     3066
CSR    = 000000         1077#    4797
CSRMSG   027510         4798     4823#
CSTEST   020200         2874#    2898
C$AU   = 000052          898#    1851
C$AUTO = 000061          898#    1800
C$BRK  = 000022          898#
C$BSEG = 000004          898#    2872     2924     2971     3017     3068     3118     3165     3210     3254     3661     3709     3758
                        3817     3924     4084     4468     4645
C$BSUB = 000002          898#
C$CEFG = 000045          898#
C$CLCK = 000062          898#
C$CLEA = 000012          898#    1825
C$CLOS = 000035          898#
C$CLP1 = 000006          898#    2439     2482     2524     2566     2607     2650     2692     2734     3432     3488     3545     3602
                        3616     3668     3677     3716     3725     3769     3782     3860     3877     3933     3936     3947     3962
                        3973     3984     4017     4041     4097     4110     4113     4124     4139     4150     4161     4194     4218
                        4271     4284     4317     4375     4388     4421     4481     4494     4497     4508     4523     4534     4545
                        4578     4602     4656     4669     4672     4683     4698     4709     4720     4753     4777
C$CVEC = 000036          898#    1756     1821     2428     2471     2513     2555     2596     2639     2681     2723     3820     3880
C$DCLN = 000044          898#    1881
C$DODU = 000051          898#    1770     1879
C$DRPT = 000024          898#
C$DU   = 000053          898#    1839
C$EDIT = 000003          898#     935
C$ERDF = 000055          898#    1964     2365     2386     2776     2810     2842     2887     2936     2981     3032     3083     3131
                        3176     3220     3265     3321     3355     3387     3427     3441     3483     3498     3540     3554     3597
                        3611     3624     3672     3720     3776     3854     3872     3942     3957     3968     3979     3999     4036
                        4104     4119     4134     4145     4156     4176     4213     4278     4299     4382     4403     4488     4503
                        4518     4529     4540     4560     4597     4663     4678     4693     4704     4715     4735     4772
C$ERHR = 000056          898#
C$ERRO = 000060          898#
C$ERSF = 000054          898#    2434     2477     2519     2561     2602     2645     2687     2729
```

```
C$ERSO= 000057                898#
C$ESCA= 000010                898#     2892     2941     2986     3037     3088     3136     3181     3225     3270
C$ESEG= 000005                898#     2902     2950     2996     3047     3096     3144     3189     3233     3278     3680     3728     3785
                              3890     4044     4221     4605     4780
C$ESUB= 000003                898#
C$ETST= 000001                898#     2442     2485     2527     2569     2610     2653     2695     2737     2783     2818     2850     2905
                              2953     2999     3050     3099     3147     3192     3236     3281     3328     3363     3395     3450     3505
                              3563     3634     3685     3733     3790     3895     4055     4232     4336     4439     4615     4785
C$EXIT= 000032                898#
C$GETB= 000026                898#
C$GETW= 000027                898#
C$GMAN= 000043                898#
C$GPHR= 000042                898#     1720
C$GPLO= 000030                898#
C$GPRI= 000040                898#
C$INIT- 000011                898#     1788
C$INLP= 000020                898#     1861
C$MANI= 000050                898#
C$MEM = 000031                898#
C$MSG = 000023                898#     1356     1365     1380     1406     1426     1435     1453     1470     1485     1502
C$OPEN= 000034                898#
C$PNTB= 000014                898#     1375     1390     1401     1420     1448     1463     1480     1497     1512     1525     1535     1546
                              1557     1566     1573     1582     1765     4029     4206     4329     4433     4590     4765
C$PNTF= 000017                898#     1874
C$PNTS= 000016                898#
C$PNTX= 000015                898#     4014     4191     4314     4418     4575     4750
C$QIO = 000377                898#
C$RDBU= 000007                898#     1781
C$REFG= 000047                898#     1673     1678     1683     1688     1705
C$RESE= 000033                898#     1670     2767     2805     2837     3312     3350     3382
C$REVI= 000003                898#      934
C$RFLA= 000021                898#
C$RPT = 000025                898#
C$SEFG= 000046                898#
C$SPRI= 000041                898#     1809     1816     2759     3304     3761     3772     3836     3866     4089     4100     4264     4274
                              4368     4378     4473     4484     4648     4659
C$SVEC= 000037                898#     1751     1777     2422     2465     2507     2549     2590     2633     2675     2717     3826     3886
C$TPRI= 000013                898#
DAHS  = 000020               1073#
DATEST  020422               2972#     2992
DCKMES  006053               1342#     1952
DELCNT  002354               1154#     2170*    2172*    2173
DEMES   006021               1342#     1931
DERFLG  002230               1112#     1907*    1929*    1980
DERR  = 040000               1049#     1927     2762     2764     2878     2880     3023     3025     3074     3076     3307     3309     3468
                              3470     3525     3527     3581     3583
DIAGMC= 000000                898
DLT   = 000000               1086#     4844
DLTMES  006060               1342#     1956
DMSG    027624               4845      4863#
DRBT  = 000006               1080#     4807
DRDY  = 000001               1046#     2356     2771     2882     3027     3078     3316     3413     3478     3535     3592
DRIVE   002216               1107#     1507     1726*    1985     2006     2196
DRMSG   027544               4808      4829#
DROP    013610               1611#     1864
DRPCOD  014504 G             1832#
```

```
DRST   = 000010             1067#
DRTIM    006547             1342#    2367
DSPCOD   013616 G           1621#
DS0    = 000000             1055#
DS1    = 000400             1056#
DS2    = 001000             1057#
DS3    = 001400             1058#
EF.CON=  000036 G           1014#    1704
EF.NEW=  000035 G           1015#    1687
EF.PWR=  000034 G           1016#    1672
EF.RES=  000037 G           1013#    1677
EF.STA=  000040 G           1012#    1682
ELT    = 000002             1087#    4850
EMSG     027661             4851     4863#
EM1      006575             1342#    2436     2604
EM10     007046             1342#    3944     4121     4505     4680
EM101    011374             1342#    1562
EM102    011441             1342#    1569     1578     1922     2034
EM11     007107             1342#
EM12     007150             1342#    3959     4136     4520     4695
EM13     007211             1342#
EM14     007243             1342#
EM15     007271             1342#
EM16     007317             1342#
EM17     007345             1342#
EM2      006622             1342#    2479     2647
EM20     007400             1342#    3970     4147     4531     4706
EM21     007453             1342#    3981     4158     4542     4717
EM22     007535             1342#    4001     4178     4562     4737
EM23     007624             1342#    4038     4215     4599     4774
EM24     007664             1342#    3778     3856     4106     4280     4384     4490     4665
EM25     007726             1342#    4301
EM26     007765             1342#    4405
EM27     010037             1342#    3674
EM3      006647             1342#    2521     2689
EM30     010113             1342#    3722
EM31     010167             1342#    3874
EM4      006674             1342#    2563     2731
EM44     010210             1342#    3599
EM45     010243             1342#    3613
EM46     010276             1342#    3626
EM5      006721             1342#    2889
EM6      006772             1342#    2938
EM61     010331             1342#    3034
EM62     010412             1342#    3085
EM63     010475             1342#    3133
EM64     010556             1342#    3178
EM65     010641             1342#    3222
EM66     010722             1342#    3267
EM67     011005             1342#    2778     3323
EM7      007020             1342#    2983
EM70     011042             1342#    2812     3357
EM71     011077             1342#    2844     3389
EM72     011134             1342#    3429
EM73     011167             1342#    3443
EM74     011222             1342#    3485
```

```
EM75    011254          1342#   3500
EM76    011306          1342#   3542
EM77    011341          1342#   3556
END     014366          1743    1758    1772#
ENDDAT  003156          1295#
ENDPAT  002772          1232#   2945    2991    3140    3185    3229    3274
ERCOUN  002364          1158#   1694    1713
ERPOIN  002362          1157#   1713*   1716*   1866*   1867
ERR   = 100000          1048#   2764    2880    3025    3076    3309    3470    3527    3583
ERRLMT  002326          1143#
ERRVEC  002256          1123#   1749    1755    2420    2427    2463    2470    2505    2512    2547    2554    2588    2595
                        2631    2638    2673    2680    2715    2722
ERR0    011632 G        1349#   3779    3857    4107    4281    4385    4491    4666
ERR1    011650 G        1359#   2437    2480    2522    2564    2605    2648    2690    2732
ERR10   012206 G        1473#   3675    3723
ERR11   012250 G        1488#   3875
ERR2    011662 G        1367#   2779    2813    2845    2890    2939    2984    3035    3086    3134    3179    3223    3268
                        3324    3358    3390    3430    3444    3486    3501    3543    3557    3600    3614    3627
ERR3    011724 G        1384#   4002    4179    4302    4406    4563    4738
ERR4    012026 G        1411#   3945    3960    3971    3982    4039    4122    4137    4148    4159    4216    4506    4521
                        4532    4543    4600    4681    4696    4707    4718    4775
ERR5    012074 G        1429#   2368
ERR6    012106 G        1438#   1967    2389
ERR7    012150 G        1456#
EVL   = 000004 G        1032#
EXPMES  006065          1342#   2036
E$END = 002100           898#
E$LOAD= 000035           898#    947
E.BA    002234          1114#   1397    1538    2127*   3938    4010    4115    4187    4310    4414    4499    4571    4674
                        4746
E.CS    002232          1113#   1540    1908    1916    1923    1927    1932    1936    1940    1944    1949    1953    2030
                        2037    2042    2047    2126*
E.DA    002236          1115#   1396    1552    2128*   3949    4009    4126    4186    4309    4413    4510    4570    4685
                        4745
E.MP    002240          1116#   1550    2129*   3964    4141    4525    4700
E.MP1   002242          1117#   1549    2130*   3975    4152    4536    4711
FIX     015502          1925    1930    1934    1938    1942    1946    1951    1955    1957    1959    2035    2040    2045
                        2050    2054    2056    2069#
FNDFNC  015316          1992*   1993*   1994    1996*   1999*   2014#
FRMT1   012674          1509    1586#
FRMT10  013246          1494    1586#
FRMT11  013326          1586#   1871
FRMT12  013367          1586#
FRMT13  013446          1586#   1762
FRMT14  013477          1398    1586#   4011    4188    4311    4415    4572    4747
FRMT2   012734          1522    1543    1586#
FRMT2A  012753          1532    1586#
FRMT2B  012766          1554    1586#
FRMT3   013007          1563    1570    1579    1586#
FRMT4   013014          1372    1417    1586#
FRMT5   013140          1586#
FRMT6   013211          1460    1586#
FRMT98  013052          1586#   4026    4203    4326    4430    4587    4762
FRMT99  013135          1387    1445    1477    1586#
F$AU  = 000015           898#   1846    1850
F$AUTO= 000020           898#   1798    1799
```

```
F$BGN = 000040             898#    907     958     976    1091    1095    1338    1340    1343    1347    1349    1359    1367
                          1384    1411    1429    1438    1456    1473    1488    1590    1592    1605    1607    1619    1621
                          1663    1666    1668    1791    1792    1798    1804    1806    1828    1832    1834    1842    1844
                          1846    1854    1859    2341    2400    2406    2441    2448    2484    2491    2526    2533    2568
                          2574    2609    2616    2652    2659    2694    2701    2736    2742    2782    2789    2817    2824
                          2849    2856    2872    2892    2904    2911    2924    2941    2952    2959    2971    2986    2998
                          3005    3017    3037    3049    3056    3068    3088    3098    3105    3118    3136    3146    3153
                          3165    3181    3191    3198    3210    3225    3235    3242    3254    3270    3280    3287    3327
                          3334    3362    3369    3394    3401    3449    3456    3504    3511    3562    3568    3633    3642
                          3661    3684    3690    3709    3732    3738    3758    3789    3796    3817    3894    3901    3924
                          4054    4061    4084    4231    4237    4335    4341    4438    4445    4468    4614    4620    4645
                          4784    4788    4790    4836    4840    4842    4867
F$CLEA= 000007             898#   1806    1824
F$DU  = 000016             898#   1834    1838
F$END = 000041             898#    907     958     976    1091    1095    1338    1340    1343    1347    1357    1366    1381
                          1407    1427    1436    1454    1471    1486    1503    1590    1592    1605    1607    1619    1621
                          1663    1666    1789    1791    1801    1804    1826    1828    1832    1840    1842    1844    1852
                          1854    1859    2347    2400    2406    2441    2443    2448    2484    2486    2491    2526    2528
                          2533    2568    2570    2574    2609    2611    2616    2652    2654    2659    2694    2696    2701
                          2736    2738    2742    2782    2784    2789    2817    2819    2824    2849    2851    2856    2892
                          2903    2904    2906    2911    2941    2951    2952    2954    2959    2986    2997    2998    3000
                          3005    3037    3048    3049    3051    3056    3088    3097    3098    3100    3105    3136    3145
                          3146    3148    3153    3181    3190    3191    3193    3198    3225    3234    3235    3237    3242
                          3270    3279    3280    3282    3287    3327    3329    3334    3362    3364    3369    3394    3396
                          3401    3449    3451    3456    3504    3506    3511    3562    3564    3568    3633    3635    3642
                          3681    3684    3686    3690    3729    3732    3734    3738    3786    3789    3791    3796    3891
                          3894    3896    3901    4045    4054    4056    4061    4222    4231    4233    4237    4335    4337
                          4341    4438    4440    4445    4606    4614    4616    4620    4781    4784    4786    4788    4822
                          4836    4840    4862    4867
F$HARD= 000004             898#   4790    4820    4848
F$HW  = 000013             898#   1594    1602
F$INIT= 000006             898#   1668    1787
F$JMP = 000050             898#
F$MOD = 000000             898#    907     958     976    1091    1095    1338    1340    1343    1347    1590    1592    1605
                          1607    1619    1621    1663    1666    1791    1804    1828    1832    1842    1844    1854    1859
                          2400    4788    4836    4840    4867
F$MSG = 000011             898#   1349    1355    1359    1364    1367    1379    1384    1405    1411    1425    1429    1434
                          1438    1452    1456    1469    1473    1484    1488    1501
F$PROT= 000021             898#   1792    1796
F$PWR = 000017             898#
F$RPT = 000012             898#
F$SEG - 000003             898#   2872    2901    2924    2949    2971    2995    3017    3046    3068    3095    3118    3143
                          3165    3188    3210    3232    3254    3277    3661    3679    3709    3727    3758    3784    3817
                          3889    3924    4043    4084    4220    4468    4604    4645    4779
F$SOFT= 000005             898#   4842    4848    4860
F$SRV = 000010             898#   2341    2345
F$SUB = 000002             898#
F$SW  = 000014             898#   1609    1616
F$TEST= 000001             898#   2406    2441    2448    2484    2491    2526    2533    2568    2574    2609    2616    2652
                          2659    2694    2701    2736    2742    2782    2789    2817    2824    2849    2856    2904    2911
                          2952    2959    2998    3005    3049    3056    3098    3105    3146    3153    3191    3198    3235
                          3242    3280    3287    3327    3334    3362    3369    3394    3401    3449    3456    3504    3511
                          3562    3568    3633    3642    3684    3690    3732    3738    3789    3796    3894    3901    4054
                          4061    4231    4237    4335    4341    4438    4445    4614    4620    4784
GCRCPT  002312            1137#   2087*   2088    2194
GDATMP  002322            1141#   2215*   2216    2217*
```

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GDCRCA  002314          1138#   2097*   3963    4140    4524    4699
GDCRCB  002316          1139#   2110*   3974    4151    4535    4710
GDDAT   002306          1135#   1371    1394    1416    2431*   2474*   2517*   2558*   2599*   2642*   2685*   2726*   2761*
                        2764*   2772    2803*   2835*   2875*   2876*   2877    2880*   2883    2926*   2929*   2930    2932
                        2973*   2974    2977    3020*   3021*   3025*   3028    3071*   3072*   3076*   3079    3121*   3124*
                        3127    3168*   3169*   3172    3213*   3216    3257*   3258*   3261    3306*   3309*   3317    3348*
                        3380*   3423*   3437*   3467*   3470*   3471    3479    3494*   3524*   3527*   3528    3536    3550*
                        3580*   3583*   3584    3593    3607*   3621*   3937*   3939    3948*   3953*   3954    3963*   3965
                        3974*   3976    3990*   3992    4007    4031*   4033    4114*   4116    4125*   4.30*   4131    4140*
                        4142    4151*   4153    4167*   4169    4184    4208*   4210    4290*   4292    4307    4394*   4396
                        4411    4498*   4500    4509*   4514*   4515    4524*   4526    4535*   4537    4551*   4553    4568
                        4592*   4594    4673*   4675    4684*   4689*   4690    4699*   4701    4710*   4712    4726*   4728
                        4743    4767*   4769
GDDATP  002320          1140#   2141*   2144    2212*   2215
GLBDAT  002174 G        1095#
GLBEQA  002174 G         976#
GLBERR  011632 G        1347#
GLBSUB  014514 G        1859#
GLBTXT  005760 G        1340#
GODRVR= 000202          1066#
GSBIT = 000002          1068#
GSTAT = 000004          1061#   1911    1984
G$CNTO= 000200           898#
G$DELM= 000372           898#
G$DISP= 000003           898#
G$EXCP= 000400           898#
G$HILI= 000002           898#
G$LOLI= 000001           898#
G$NO  = 000000           898#
G$OFFS= 000400           898#   4793    4797    4802    4807    4813    4844    4850    4856
G$OFSI= 000376           898#   4793    4797    4802    4807    4813    4844    4850    4856
G$PRMA= 000001           898#   4797    4802
G$PRMD= 000002           898#   4807    4813    4850
G$PRML= 000000           898#   4793    4844    4856
G$RADA= 000140           898#
G$RADB= 000000           898#
G$RADD= 000040           898#
G$RADL= 000120           898#   4793    4844    4856
G$RADO= 000020           898#   4797    4802    4807    4813    4850
G$XFEP= 000004           898#   4848
G$YES = 000010           898#   4793    4797    4802    4807    4813    4844    4850    4856
HCRCME  006040          1342#   1943
HDRBUF  003260          1332#
HDRLST  015320          1995    2016#
HINUM   002342          1149#   1692*   1700    1733*   2265    2273    2278*
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LDFUNC  015100                 1979#
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LINE3   012574                 1440     1561#
LINE4   012646                 1475     1577#
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          3837   3854   3855   3856   3857   3858   3860   3861   3865   3866   3867   3872   3873
          3874   3875   3876   3877   3878   3879   3880   3881   3882   3883   3884   3885   3886
          3887   3888   3890   3891   3895   3896   3924   3925   3933   3934   3936   3937   3942
          3943   3944   3945   3946   3947   3948   3957   3958   3959   3960   3961   3962   3963
          3968   3969   3970   3971   3972   3973   3974   3979   3980   3981   3982   3983   3984
          3985   3999   4000   4001   4002   4003   4006   4007   4008   4009   4010   4011   4012
          4013   4014   4015   4016   4017   4018   4025   4026   4027   4028   4029   4030   4031
          4036   4037   4038   4039   4040   4041   4042   4044   4045   4055   4056   4084   4085
          4088   4089   4090   4097   4098   4099   4100   4101   4104   4105   4106   4107   4108
          4110   4111   4113   4114   4119   4120   4121   4122   4123   4124   4125   4134   4135
          4136   4137   4138   4139   4140   4145   4146   4147   4148   4149   4150   4151   4156
          4157   4158   4159   4160   4161   4162   4176   4177   4178   4179   4180   4183   4184
          4185   4186   4187   4188   4189   4190   4191   4192   4193   4194   4195   4202   4203
          4204   4205   4206   4207   4208   4213   4214   4215   4216   4217   4218   4219   4221
          4222   4232   4233   4263   4264   4265   4271   4272   4273   4274   4275   4278   4279
          4280   4281   4282   4284   4285   4299   4300   4301   4302   4303   4306   4307   4308
          4309   4310   4311   4312   4313   4314   4315   4316   4317   4318   4325   4326   4327
          4328   4329   4330   4331   4336   4337   4367   4368   4369   4375   4376   4377   4378
          4379   4382   4383   4384   4385   4386   4388   4389   4403   4404   4405   4406   4407
          4410   4411   4412   4413   4414   4415   4416   4417   4418   4419   4420   4421   4422
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                            4522     4523     4524     4529     4530     4531     4532     4533     4534     4535     4540     4541     4542
                            4543     4544     4545     4546     4560     4561     4562     4563     4564     4567     4568     4569     4570
                            4571     4572     4573     4574     4575     4576     4577     4578     4579     4586     4587     4588     4589
                            4590     4591     4592     4597     4598     4599     4600     4601     4602     4603     4605     4606     4615
                            4616     4645     4646     4647     4648     4649     4656     4657     4658     4659     4660     4663     4664
                            4665     4666     4667     4669     4670     4672     4673     4678     4679     4680     4681     4682     4683
                            4684     4693     4694     4695     4696     4697     4698     4699     4704     4705     4706     4707     4708
                            4709     4710     4715     4716     4717     4718     4719     4720     4721     4735     4736     4737     4738
                            4739     4742     4743     4744     4745     4746     4747     4748     4749     4750     4751     4752     4753
                            4754     4761     4762     4763     4764     4765     4766     4767     4772     4773     4774     4775     4776
                            4777     4778     4780     4781     4785     4786     4790     4791     4793     4794     4795     4796     4797
                            4798     4799     4800     4801     4802     4803     4804     4805     4806     4807     4808     4809     4810
                            4811     4812     4813     4814     4815     4816     4817     4818     4820     4821     4842     4843     4844
                            4845     4846     4847     4848     4849     4850     4851     4852     4853     4854     4855     4856     4857
                            4858     4859     4860     4861     4872     4873     4874     4875
SVCSUB= 177777               898#
SVCTAG= 000000               898#     899#    1355     1356     1364     1365     1379     1380     1405     1406     1425     1426     1434
                            1435     1452     1453     1469     1470     1484     1485     1501     1502     1602     1603     1616     1617
                            1787     1788     1799     1800     1824     1825     1838     1839     1850     1851     2345     2346     2407
                            2413     2441     2442     2451     2457     2484     2485     2492     2498     2526     2527     2534     2540
                            2568     2569     2575     2581     2609     2610     2619     2625     2652     2653     2660     2666     2694
                            2695     2702     2708     2736     2737     2744     2754     2782     2783     2791     2796     2817     2818
                            2826     2831     2849     2850     2860     2866     2901     2902     2904     2905     2913     2919     2949
                            2950     2952     2953     2961     2966     2995     2996     2998     2999     3006     3012     3046     3047
                            3049     3050     3058     3063     3095     3096     3098     3099     3107     3113     3143     3144     3146
                            3147     3155     3160     3188     3189     3191     3192     3200     3205     3232     3233     3235     3236
                            3244     3249     3277     3278     3280     3281     3289     3299     3327     3328     3336     3341     3362
                            3363     3371     3376     3394     3395     3403     3410     3449     3450     3457     3464     3504     3505
                            3514     3521     3562     3563     3571     3577     3633     3634     3644     3649     3679     3680     3684
                            3685     3692     3697     3727     3728     3732     3733     3740     3745     3784     3785     3789     3790
                            3798     3803     3889     3890     3894     3895     3903     3913     4043     4044     4054     4055     4063
                            4073     4220     4221     4231     4232     4239     4245     4335     4336     4343     4349     4438     4439
                            4447     4457     4604     4605     4614     4615     4622     4635     4779     4780     4784     4785     4821
                            4822     4861     4862
SVCTST= 177777               898#    2406     2448     2491     2533     2574     2616     2659     2701     2742     2789     2824     2856
                            2911     2959     3005     3056     3105     3153     3198     3242     3287     3334     3369     3401     3456
                            3511     3568     3642     3690     3738     3796     3901     4061     4237     4341     4445     4620
S$LSYM= 010000               898#    1356#    1365#    1380#    1406#    1426#    1435#    1453#    1470#    1485#    1502#    1603#    1617#
                            1788#    1800#    1825#    1839#    1851#    2346#    2442#    2485#    2527#    2569#    2610#    2653#    2695#
                            2737#    2783#    2818#    2850#    2872#    2905#    2924#    2953#    2971#    2999#    3017#    3050#    3068#
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                            3505#    3563#    3634#    3661#    3685#    3709#    3733#    3758#    3790#    3817#    3895#    3924#    4055#
                            4084#    4232#    4336#    4439#    4468#    4615#    4645#    4785#    4822#    4862#
TEMHI   002350              1152#    1700*    1733
TEMLO   002346              1151#    1699*    1732     4639     4640
TEMP1   002274              1130#    2088*    2089     2091*    2092     2099*    2100     3950*    3951*    3952*    3953     4127*    4128*
                            4129*    4130     4511*    4512*    4513*    4514     4686*    4687*    4688*    4689
TEMP2   002264              1126#    2300*    2323*
TEMP3   002266              1127#    2301*    2305*
TEMP4   002270              1128#    2302*    2304     2314*    2316     2321*    2322*    2325
TEMP5   002272              1129#    2089*    2090*    2091     2098*    2099
TIMSRV  016652              2349#    3823
TMPFNC  002334              1146#    1911     1914     1994*    2192*
```

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TMPO    002276          1131#   1395    3994*   4008    4171*   4185    4294*   4308    4398*   4412    4555*   4569    4730*
                        4744
TMP1    002300          1132#
TMP2    002302          1133#
TRPFLG  002246          1119#   1745*   175‾    2337*   2416*   2429    2459*   2472    2501*   2514    2543*   2556    2584*
                        2597    2627*   2640    2669*   2682    2711*   2724
TRPHAN  016636          1748    2337#   2419    2462    2504    2546    2587    2630    2672    2714
T$ARGC= 000002           909#    910#    911#    912#    913#    914#   1370#   1376    1387#   1391    1393#   1402    1415#
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                        1528#   1536    1538#   1547    1549#   1558    1562#   1567    1569#   1574    1578#   1583    1761#
                        1766    1871#   1875    4006#   4015    4025#   4030    4183#   4192    4202#   4207    4306#   4315
                        4325#   4330    4410#   4419    4429#   4434    4567#   4576    4586#   4591    4742#   4751    4761#
                        4766
T$CODE= 002130          4793#   4797#   4802#   4807#   4813#   4844#   4848#   4850#   4856#
T$ERRN= 000101           898#   1965#   2366#   2387#   2435#   2478#   2520#   2562#   2603#   2646#   2688#   2730#   2777#
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                        3388#   3428#   3442#   3484#   3499#   3541#   3555#   3598#   3612#   3625#   3673#   3721#   3777#
                        3855#   3873#   3943#   3958#   3969#   3980#   4000#   4037#   4105#   4120#   4135#   4146#   4157#
                        4177#   4214#   4279#   4300#   4383#   4404#   4489#   4504#   4519#   4530#   4541#   4561#   4598#
                        4664#   4679#   4694#   4705#   4716#   4736#   4773#
T$EXCP= 000000          4797#   4801    4802#   4806    4807#   4812    4813#   4818    4850#   4855
T$FLAG= 000040          2892#   2941#   2986#   3037#   3088#   3136#   3181#   3225#   3270#
T$GMAN= 000000           898#
T$HILI= 177777          4797#   4800    4802#   4805    4807#   4811    4813#   4817    4850#   4854
T$LAST= 000001           898#   4873#
T$LOLI= 000000          4797#   4799    4802#   4804    4807#   4810    4813#   4816    4850#   4853
T$LSYM= 010000           898#   1356    1365    1380    1406    1426    1435    1453    1470    1485    1502    1603    1617
                        1788    1800    1825    1839    1851    2346    2442    2485    2527    2569    2610    2653    2695
                        2737    2783    2818    2850    2905    2953    2999    3050    3099    3147    3192    3236    3281
                        3328    3363    3395    3450    3505    3563    3634    3685    3733    3790    3895    4055    4232
                        4336    4439    4615    4785    4822    4862
T$LTNO= 000045          4876#
T$NEST= 177777           898#    907#    958#    976#   1091#   1095#   1338#   1340#   1343#   1347#   1349#   1355#   1359#
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                        1473#   1484#   1488#   1501#   1590#   1592#   1594#   1602#   1605#   1607#   1609#   1616#   1619#
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                        1828#   1832#   1834#   1838#   1842#   1844#   1846#   1850#   1854#   1859#   2341#   2345#   2400#
                        2406#   2441#   2448#   2484#   249.#   2526#   2533#   2568#   2574#   2609#   2616#   2652#   2659#
                        2694#   2701#   2736#   2742#   2782#   2789#   2817#   2824#   2849#   2856#   2872#   2901#   2904#
                        2911#   2924#   2949#   2952#   2959#   2971#   2995#   2998#   3005#   3017#   3046#   3049#   3056#
                        3068#   3095#   3098#   3105#   3118#   3143#   3146#   3153#   3165#   3188#   3191#   3198#   3210#
                        3232#   3235#   3242#   3254#   3277#   3280#   3287#   3327#   3334#   3362#   3369#   3394#   3401#
                        3449#   3456#   3504#   3511#   3562#   3568#   3633#   3642#   3661#   3679#   3684#   3690#   3709#
                        3727#   3732#   3738#   3758#   3784#   3789#   3796#   3817#   3889#   3894#   3901#   3924#   '043#
                        4054#   4061#   4084#   4220#   4231#   4237#   4335#   4341#   4438#   4445#   4468#   4604#   4614#
                        4620#   4645#   4779#   4784#   4788#   4790#   4820#   4836#   4840#   4842#   4848    4860#   4867#
T$NSO = 000000           907#    958     976#   1091    1095#   1338    1340#   1343    1347#   1590    1592#   1605    1607#
                        1619    1621#   1663    1666#   1791    1792#   1796    1798#   1799    1804#   1828    1832#   1842
                        1844#   1854    1859#   2400    2406#   2441    2448#   2484    2491#   2526    2533#   2568    2574#
                        2609    2616#   2652    2659#   2694    2701#   2736    2742#   2782    2789#   2817    2824#   2849
                        2856#   2904    2911#   2952    2959#   2998    3005#   3049    3056#   3098    3105#   3146    3153#
                        3191    3198#   3235    3242#   3280    3287#   3327    3334#   3362    3369#   3394    3401#   3449
                        3456#   3504    3511#   3562    3568#   3633    3642#   3684    3690#   3732    3738#   3789    3796#
                        3894    3901#   4054    4061#   4231    4237#   4335    4341#   4438    4445#   4614    4620#   4784
                        4788#   4836    4840#   4867
T$NS1 - 000005          1349#   1355    1359#   1364    1367#   1379    1384#   1405    1411#   1425    1429#   1434    1438#
```

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                        2995     3017#    3046     3068#    3095     3118#    3143     3165#    3188     3210#    3232     3254#    3277
                        3661#    3679     3709#    3727     3758#    3784     3817#    3889     3924#    4043     4084#    4220     4468#
                        4604     4645#    4779     4790#    4820     4842#    4848     4860
T$PTNU= 000000           898#
T$SAVL= 177777           898#
T$SEGL= 177777           898#    2872#    2893     2901#    2903     2924#    2942     2949#    2951     2971#    2987     2995#    2997
                        3017#    3038     3046#    3048     3068#    3089     3095#    3097     3118#    3137     3143#    3145     3165#
                        3182     3188#    3190     3210#    3226     3232#    3234     3254#    3271     3277#    3279     3661#    3679#
                        3681     3709#    3727#    3729     3758#    3784#    3786     3817#    3889#    3891     3924#    4043#    4045
                        4084#    4220#    4222     4468#    4604#    4606     4645#    4779#    4781
T$SEKO= 010000          2872#    2893     2901     2924#    2942     2949     2971#    2987     2995     3017#    3038     3046     3068#
                        3089     3095     3118#    3137     3143     3165#    3182     3188     3210#    3226     3232     3254#    3271
                        3277     3661#    3679     3709#    3727     3758#    3784     3817#    3889     3924#    4043     4084#    4220
                        4468#    4604     4645#    4779
T$SUBN= 000000           898#    2406#    2448#    2491#    2533#    2574#    2616#    2659#    2701#    2742#    2789#    2824#    2856#
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T$TAGL= 177777           898#
T$TAGN= 010072           898#    1349#    1359#    1367#    1384#    1411#    1429#    1438#    1456#    1473#    1488#    1594#    1609#
                        1668#    1792#    1798#    1806#    1834#    1846#    2341#    2406#    2448#    2491#    2533#    2574#    2616#
                        2659#    2701#    2742#    2789#    2824#    2856#    2911#    2959#    3005#    3056#    3105#    3153#    3198#
                        3242#    3287#    3334#    3369#    3401#    3456#    3511#    3568#    3642#    3690#    3738#    3796#    3901#
                        4061#    4237#    4341#    4445#    4620#    4790#    4842#
T$TEMP= 000000           958#    1091#    1338#    1343#    1355#    1364#    1379#    1405#    1425#    1434#    1452#    1469#    1484#
                        1501#    1590#    1602#    1605#    1616#    1619#    1624#    1625#    1626#    1627#    1628#    1629#    1630#
                        1631#    1632#    1633#    1634#    1635#    1636#    1637#    1638#    1639#    1640#    1641#    1642#    1643#
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                        2526#    2534#    2540#    2568#    2575#    2581#    2609#    2619#    2625#    2652#    2660#    2666#    2694#
                        2702#    2708#    2736#    2744#    2754#    2782#    2791#    2796#    2817#    2826#    2831#    2849#    2860#
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                        3188#    3191#    3200#    3205#    3225#    3226#    3232#    3235#    3244#    3249#    3270#    3271#    3277#
                        3280#    3289#    3299#    3327#    3336#    3341#    3362#    3371#    3376#    3394#    3403#    3410#    3449#
                        3457#    3464#    3504#    3514#    3521#    3562#    3571#    3577#    3633#    3644#    3649#    3679#    3684#
                        3692#    3697#    3727#    3732#    3740#    3745#    3784#    3789#    3798#    3803#    3889#    3894#    3903#
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                        4447#    4457#    4604#    4614#    4622#    4635#    4779#    4784#    4793#    4797#    4802#    4807#    4813#
                        4820#    4836#    4844#    4850#    4856#    4860#    4867#
T$TEST= 000045           898#    2406#    2448#    2491#    2533#    2574#    2616#    2659#    2701#    2742#    2789#    2824#    2856#
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                        3511#    3568#    3642#    3690#    3738#    3796#    3901#    4061#    4237#    4341#    4445#    4620#    4876
T$TSTM= 177777           898#    1356     1365     1375     1380     1390     1401     1406     1420     1426     1435     1448     1453
                        1463     1470     1480     1485     1497     1502     1512     1525     1535     1546     1557     1566     1573
                        1582     1670     1673     1678     1683     1688     1705     1720     1751     1756     1765     1770     1777
                        1781     1788     1800     1809     1816     1821     1825     1839     1851     1861     1874     1879     1881
                        1964     2365     2386     2422     2428     2434     2439     2442     2465     2471     2477     2482     2485
                        2507     2513     2519     2524     2527     2549     2555     2561     2566     2569     2590     2596     2602
                        2607     2610     2633     2639     2645     2650     2653     2675     2681     2687     2692     2695     2717
                        2723     2729     2734     2737     2759     2767     2776     2783     2805     2810     2813     2837     2842
                        2850     2872     2887     2892     2902     2905     2924     2936     2941     2950     2953     2971     2981
                        2986     2996     2999     3017     3032     3037     3047     3050     3068     3083     3088     3096     3099
                        3118    3131    3136    3144    3147    3165    3176    3181    3189    3192    3210    3220    3225
                        3233    3236    3254    3265    3270    3278    3281    3304    3312    3321    3328    3350    3355
                        3363    3382    3387    3395    3427    3432    3441    3450    3483    3488    3498    3505    3540
                        3545    3554    3563    3597    3602    3611    3616    3624    3634    3661    3668    3672    3677
                        3680    3685    3709    3716    3720    3725    3728    3733    3758    3761    3769    3772    3776
                        3782    3785    3790    3817    3820    3826    3836    3854    3860    3866    3872    3877    3880
                        3886    3890    3895    3924    3933    3936    3942    3947    3957    3962    3968    3973    3979
                        3984    3999    4014    4017    4029    4036    4041    4044    4055    4084    4089    4097    4100
                        4104    4110    4113    4119    4124    4134    4139    4145    4150    4156    4161    4176    4191
                        4194    4206    4213    4218    4221    4232    4264    4271    4274    4278    4284    4299    4314
                        4317    4329    4336    4368    4375    4378    4382    4388    4403    4418    4421    4433    4439
                        4468    4473    4481    4484    4488    4494    4497    4503    4508    4518    4523    4529    4534
                        4540    4545    4560    4575    4578    4590    4597    4602    4605    4615    4645    4648    4656
                        4659    4663    4669    4672    4678    4683    4693    4698    4704    4709    4715    4720    4735
                        4750    4753    4765    4772    4777    4780    4785
T$TSTS= 000001           898#   2406#   2448#   2491#   2533#   2574#   2616#   2659#   2701#   2742#   2789#   2824#   2856#
                        2911#   2959#   3005#   3056#   3105#   3153#   3198#   3242#   3287#   3334#   3369#   3401#   3456#
                        3511#   3568#   3642#   3690#   3738#   3796#   3901#   4061#   4237#   4341#   4445#   4620#
T$$AU = 010021          1846#   1850
T$$AUT= 010016          1798#   1799
T$$CLE= 010017          1806#   1824
T$$DU = 010020          1834#   1838
T$$HAR= 010070          4790#   4821
T$$HW = 010012          1594#   1602
T$$INI= 010014          1668#   1787
T$$MSG= 010011          1349#   1355    1359#   1364    1367#   1379    1384#   1405    1411#   1425    1429#   1434    1438#
                        1452    1456#   1469    1473#   1484    1488#   1501
T$$PRO= 010015          1792#
T$$SEG= 010000          2872#   2892    2901#   2924#   2941    2949#   2971#   2986    2995#   3017#   3037    3046#   3068#
                        3088    3095#   3118#   3136    3143#   3165#   3181    3188#   3210#   3225    3232#   3254#   3270
                        3277#   3661#   3679#   3709#   3727#   3758#   3784#   3817#   3889#   3924#   4043#   4084#   4220#
                        4468#   4604#   4645#   4779#
T$$SOF= 010071          4842#   4861
T$$SRV= 010022          2341#   2345
T$$SW = 010013          1609#   1616
T$$TES= 010067          2406#   2441    2448#   2484    2491#   2526    2533#   2568    2574#   2609    2616#   2652    2659#
                        2694    2701#   2736    2742#   2782    2789#   2817    2824#   2849    2856#   2904    2911#   2952
                        2959#   2998    3005#   3049    3056#   3098    3105#   3146    3153#   3191    3198#   3235    3242#
                        3280    3287#   3327    3334#   3362    3369#   3394    3401#   3449    3456#   3504    3511#   3562
                        3568#   3633    3642#   3684    3690#   3732    3738#   3789    3796#   3894    3901#   4054    4061#
                        4231    4237#   4335    4341#   4438    4445#   4614    4620#   4784
T.CNTL  002332          1145#   1727*   2800    2927    3122    3345    3650    3698    3747    3805    3914    4074    4246
                        4350    4458    4636
T.SIZE  013614          1613#   1742
T1      017002 G        1624    2406#
T10     020062 G        1633    2789#
T11     020134 G        1634    2824#
T12     020172 G        1635    2856#
T13     020312 G        1636    2911#
T14     020414 G        1637    2959#
T15     020502 G        1638    3005#
T16     020626 G        1639    3056#
T17     020752 G        1640    3105#
T18     021056 G        1641    3153#
T19     021156 G        1642    3198#
T2      017100 G        1625    2448#
```

```
T20       021246 G          1643      3242#
T21       021346 G          1644      3287#
T22       021456 G          1645      3334#
T23       021530 G          1646      3369#
T24       021566 G          1647      3401#
T25       021712 G          1648      3456#
T26       022052 G          1649      3511#
T27       022212 G          1650      3568#
T28       022416 G          1651      3642#
T29       022526 G          1652      3690#
T3        017176 G          1626      2491#
T30       022636 G          1653      3738#
T31       022772 G          1654      3796#
T32       023324 G          1655      3901#
T33       024136 G          1656      4061#
T34       025014 G          1657      4237#
T35       025362 G          1658      4341#
T36       025734 G          1659      4445#
T37       026612 G          1660      4620#
T4        017274 G          1627      2533#
T5        017372 G          1628      2574#
T6        017466 G          1629      2616#
T7        017562 G          1630      2659#
T8        017656 G          1631      2701#
T9        017752 G          1632      2742#
UAM     = 000200 G          1037#
UNITST    002176            1099#     1711*     1715*     1719      1769      1878
UUT       002174            1098#     1709      1712*     1717*
VECMSG    027535            4803      4827#
VECT    = 000002            1078#     4802
WDELAY    016032            2165#     2359      2378      3843
WHY       002330            1144#     1759*     1761
WRCHK   = 000002            1060#     1914
WRITE   = 000012            1064#
WTCRDY    016724            2374#     3666      3714      3767      3931      4095      4269      4373      4479      4654
WTDRDY    016660            2354#
XPOLY     002254            1122#     2310      2321
X$ALWA= 000000               898#
X$FALS= 000040               898#     4848
X$OFFS= 000400               898#     4848
X$TRUE= 000020               898#
.       = 030520             900#     1158#     1332#     1335#     1336#     1342#     2893      2942      2987      3038      3089      3137      3182
                            3226      3271      4848      4864#     4868#

. ABS.  030520      000

 ERRORS DETECTED:  0

 CVRLAC,CVRLAC/CRF:SYM/NL:TOC/SOL=CVRLAC/ML,CVRLAC.P11
 RUN-TIME: 30 30 2 SECONDS
 RUN-TIME RATIO: 124/62=1.9
 CORE USED:  18K  (36 PAGES)
```