DH11

DIAGNOSTIC

MD-11-DZDHM-B

EP-DZDHM-B-DL-A NOV 1976

FICHE 1 OF 2 MADE IN U.S

DH11

DIAGNOSTIC
MD-11-DZDHM-B

EP-DZDHM-B-DL-A

FICHE 2 OF 2

NOV 1976

digital

MADE IN USA

B01

.REM.

SEQ 0001

PRODUCT CODE: MAINDEC-11-DZDHM-B

PRODUCT NAME: DH11 DIAGNOSTIC

DATE: 21-SEPTEMBER-1976

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MAINTAINED BY: DIAGNOSTIC ENGINEERING

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1.0 GENERAL PROGRAM DESCRIPTION

1.1 PROGRAM PURPOSE

"MD-11-DZDHM" IS A COMPREHENSIVE DIAGNOSTIC TEST PROGRAM DESIGNED TO AID IN THE ACCEPTANCE TESTING, INSTALLATION CHECKOUT, AND CORRECTIVE MAINTENANCE OF THE DH11 16. LINE ASYNCHRONOUS SERIAL LINE MULTIPLEXOR. IT CONSISTS OF 44. LOGICALLY SEQUENCED DIAGNOSTIC TESTS DESIGNED TO TEST AND VERIFY THAT THE DH11 IS OPERATING IN ACCORDANCE WITH ITS DESIGN SPECIFICATIONS.

THE PROGRAM IS CONFIGURABLE BY THE AUTOSIZER OR BY CONSOLE DIALOGUE TO ENABLE IT TO AUTOMATICALLY TEST AND VERIFY ALL 16. LINES ON UP TO 16. CONTIGUOUS DH11'S (WITH NON-CONTIGUOUS/CONTIGUOUS VECTOR ASSIGNMENTS). INDIVIDUAL UNITS AND INDIVIDUAL LINES WITHIN A UNIT MAY BE SELECTED OR DESELECTED TO FACILITATE FAULT ISOLATION TO A PARTICULAR DH11 OR A FUNCTIONAL AREA OF LOGIC AFFECTING A PARTICULAR LINE WITHIN A UNIT. WHENEVER AN ERROR IS DETECTED A COMPREHENSIVE ERROR REPORT IS TYPED THAT ALLOWS THE USER TO ISOLATE THE FAULT TO A FUNCTIONAL AREA OF LOGIC. EXTENSIVE DOCUMENTATION IS PROVIDED TO PERMIT THE USER TO PROCEED FROM THE ERROR REPORT TO ADDITIONAL LOGIC CHECKS TO MAKE IN ORDER TO ISOLATE THE PROBLEM TO A REPLACEABLE UNIT.

IN ORDER TO FACILITATE INSTALLATION CHECKOUT, TESTS 101, AND 105 THROUGH 107 (TEST GROUP 1) OF THE DM11-BB MODEM CONTROL DIAGNOSTIC, DZDHK, HAVE BEEN INCLUDED IN THIS PROGRAM. IN THIS WAY ALL THE LEVEL CONVERTERS AND CABLES CAN BE CHECKED WITH JUST ONE PROGRAM USING THE H315 TURNAROUND CONNECTOR. HOWEVER, RUNNING THESE TESTS REQUIRE OPREATOR INTERVENTION (SR10=1) OTHERWISE, THE TESTS ARE BYPASSED. (REFER TO SECTION 6.3)

FO1

1.1.1 LOGIC TEST SUMMARY


```
T1      CHECK SSYN RESPONSE FROM ALL DH11 REGISTERS
T2      TEST THAT "MASTER CLR" CAN CLEAR THE "SCR","LPR","BKR",AND "SSR" REGS
T3      TEST "SCR" REG R/W BITS CAN SET/CLR (NORMAL MODE)
T4      TEST "SCR" REG. READ ONLY BITS (NORMAL MODE)
T5      TEST "SCR" REG. BITS THAT CAN BE SET/CLR IN MAINT. MODE
T6      TEST THAT ALL R/W BITS IN "LPR" CAN BE SET/CLR
T7      TEST THAT ALL R/W BITS IN "BKR" CAN BE SET/CLR
T10     TEST THAT ALL R/W BITS IN "SSR" CAN BE SET/CLR
T11     TEST THAT CLR/SET OF BIT "N" IN "LPR" DOES NOT CLEAR ANY OTHER BITS
T12     TEST THAT CLR/SET OF BIT "N" IN "BKR" DOES NOT CLEAR ANY OTHER BITS
T13     TEST THAT CLR/SET OF BIT "N" IN "SSR" DOES NOT CLEAR ANY OTHER BITS
T14     "CAR" MEMORY ADDRESSING TEST
T15     "BCR" MEMORY ADDRESSING TEST
T16     "CAR" REGISTER TEST - ALL 1'S / ALL 0'S - ALL LINES
T17     "BCR" REGISTER TEST - ALL 1'S / ALL 0'S - ALL LINES
T20     "CAR" MEMORY PATTERNS TEST / 0'S DISTURB
T21     "BCR" MEMORY PATTERNS TEST / 0'S DISTURB
T22     "CAR" MEMORY PATTERNS TEST / 1'S DISTURB
T23     "BCR" MEMORY PATTERNS TEST / 1'S DISTURB
T24     TEST THAT "CAR" MEMORY EXT BITS SET/CLR PROPERLY
T25     TEST INTR. ENAB. BITS - INTR. CONDITION DISABLED
T26     TEST CHAR. AVAIL. I.E.  WITH INTR. CONDITION ACTIVE
T27     TEST SILO OVFLW.  I.E.  WITH INTR. CONDITION ACTIVE
T30     TEST NON EX MEM I.E.  WITH INTR. CONDITION ACTIVE
T31     TEST XMITTR DONE I.E.  WITH INTR. CONDITION ACTIVE
T32     BASIC TRANSMITTER "NPR" LOGIC TEST 1
T33     TRANSMITTR NPR LOGIC TEST 2
T34     TEST THAT CHARACTER AVAILABLE CAN CAUSE RCVR INTERRUPT
T35     TEST THAT THE SILO STATUS REG COUNTS UP CORRECTLY
T36     TEST THAT SILO STATUS REGISTER DOWN COUNTS CORRECTLY
T37     TEST SILO ALARM LEVEL FOR  COUNTS 0,1,2,4,8,16, AND 32
T40     TRANSMITTER TIMING TEST - ALL SELECTED LINES - ALL SPEEDS
T41     RECEIVER TIMING TEST - ALL SELECTED LINES - ALL SPEEDS
T42     VERIFY STORAGE OVERFLOW - NON MAINT MODE - ALL SELECTED LINES
T43     BASIC DATA TEST - ALL SELECTED LINES/ALL CHAR LENGTHS
T44     SINGLE LINE DATA TEST - ALL SELECTED LINES
T45     BASIC PARITY LOGIC TEST - ALL SELECTED LINES - ODD PARITY
T46     MULTI-LINE PARITY DATA TEST - ALL SELECTED LINES
T47     AUTO ECHO TEST 1 - ALL SELECTED LINES
T50     AUTO ECHO TEST 2 - ALL SELECTED LINES
T51     AUTO ECHO TEST 3 - ALL SELECTED LINES
T52     BREAK BIT TEST - ALL SELECTED LINES
T53     HALF DUPLEX TEST - ALL SELECTED LINES
T54     VERIFY THAT OVERRUN CAN SET PROPERLY - ALL SELECTED LINES
T55     ABBREVIATED DM11-BB DIAGNOSTIC. (DZDHK T101)
T56     DM11-BB DIAGNOSTIC CONTINUED (DZDHK T105)
T57     DM11-BB DIAGNOSTIC CONTINUED (DZDHK T106)
T60     DM11-BB DIAGNOSTIC CONTINUED (DZDHK T107)
```

G01


```
         ********************************
000000:  *                              *
         *        VECTOR AREA           *
         *                              *
         ********************************
         *                              *
         *        STACK AREA            *
         *                              *
         ********************************
001100:  *                              *
         *        SYSMAC CONSTANTS      *
         *        AND VARIABLES         *
         *                              *
         ********************************
BEGIN:   *                              *
         *        START-UP CODE         *
         *                              *
         ********************************
START1:  *                              *
         *        START-UP CODE         *
         *                              *
         ********************************
TST1:    *                              *
         *        DH11 LOGIC TESTS      *
         *        TST1(8)-TST54(8)      *
         *                              *
         ********************************
$EOP:    *                              *
         *        STANDARD SYSMAC       *
         *        UTILITY ROUTINES      *
         *                              *
         ********************************
CKRST1:  *                              *
         *        COMMON DH11 UTILITIES *
         *                              *
         ********************************
DHADR:   *                              *
         *        DH11 PROGRAM CONSTANTS*
         *        AND VARIABLES         *
         *                              *
         ********************************
         *                              *
     *********                      *********
     * CONT. *                      * CONT. *
     *********                      *********
```

```
     *********          *********
     * CONT. *          * CONT. *
     *********          *********
        *                   *
        *********************
EM1:    *                   *
        *  SYSMAC ERROR MESSAGE  *
        *  BUFFERS               *
        *                   *
        *********************
TITLE:  *                   *
        *  DH11 MISCELLANEOUS    *
        *  MESSAGE BUFFERS       *
        *                   *
        *********************
RBUF:   *                   *
        *  TRANSMIT AND RECEIVE  *
        *  DATA BUFFERS          *
        *                   *
        *********************
```

1.2 SYSTEM REQUIREMENTS

1.2.1 HARDWARE REQUIREMENTS

A. ANY PDP11 COMPUTER SYSTEM WITH 12K OF CORE MEMORY AND A CONSOLE TERMINAL DEVICE (VT50,LA36 ETC)

NOTE: FOR PAPER TAPE SYSTEMS USING THE PDP11 ABSOLUTE LOADER, THE PROGRAM CAN LOAD AND RUN IN 8K OF CORE

B. A DH11 16. LINE ASYNCHRONOUS SERIAL LINE MULTIPLEXOR

C. TEST CONNECTORS AND MODULE (THE NO. OF EACH REQUIRED IS DETERMINED BY THE PARTICULAR TEST APPLICATION. REFER TO SECTION 6.3 FOR A COMPLETE DISCUSSION OF THE MAINTENANCE CONNECTORS)

1. H315 TEST CONNECTOR
2. H8611 TEST CONNECTOR
3. M974 TEST MODULE

1.2.2 SOFTWARE REQUIREMENTS

A. ACT11/APT11 THE PROGRAM CONTAINS THE REQUIRED ACT11/APT11 SOFTWARE HOOKS TO PROPERLY INTERFACE WITH THE ACT/APT SYSTEMS. THE PROGRAM CONTAINS AN AUTOSIZER AND CAN BE RUN IN QUICK VERIFY MODE USING "CHAINS".

B. XXDP THE PROGRAM MAY BE LOADED AND RUN FROM ANY "XXDP" MEDIUM PROVIDED THE SYSTEM HAS AT LEAST 12K OF CORE STORAGE.

1.3 RELATED DOCUMENTS AND STANDARDS

A. DH11-D ENGINEERING DRAWINGS
B. DH11 MANUAL EK-DH11-MM-002
C. PDP11 PERIPHERALS HANDBOOK
D. PDP11 PROCESSOR HANDBOOK
E. MD-11-DZQAC-C1 SYSMAC.SML
F. MD-11-DZQXA "XXDP" USER'S GUIDE
G. DIAGNOSTIC ENGINEERING STANDARDS AND CONVENTIONS
PROGRAMMING PRACTICES DOC NO. 175-003-009-00

1.4 DIAGNOSTIC HIERARCHY PREREQUISITES

MD-11-DZDHM ASSUMES THAT THE FOLLOWING DIAGNOSTICS HAVE BEEN RUN PRIOR TO ITS EXECUTION AND THAT NO ERRORS WERE DETECTED:

A. CPU/CORE MEMORY DIAGNOSTICS

1.5 FAILURE ASSUMPTIONS

MD-11-DZDHM ASSUMES THAT THE PROGRAM CAN BE LOADED INTO CORE AND STARTED. IT ALSO ASSUMES THE CPU/MEMORY HARDWARE IS FUNCTIONING ERROR FREE.

2.0 OPERATING INSTRUCTIONS

2.1 LOADING AND STARTING PROCEDURES

2.1.1 LOADING PROCEDURES

A. PAPER TAPE SYSTEMS

USE THE STANDARD PDP11 ABSOLUTE LOADER PROCEDURE FOR LOADING PAPER TAPES. AFTER LOADING THE PROGRAM MUST BE MANUALLY STARTED AS DESCRIBED IN SECTION 2.1.2.

B. "XXDP" SYSTEMS (REFER TO "XXDP" USER'S GUIDE MD-11-DZQXA)

1. MOUNT THE APPROPRIATE MEDIUM (DECTAPE,DISK ETC) CONTAINING THE "XXDP" MONITOR AND MD-11-DZDHM.
2. BOOT THE SYSTEM TO LOAD THE MONITOR
3. ONCE LOADED THE "XXDP" MONITOR PRINTS AN INTRODUCTORY MESSAGE AND RESPONDS WITH A ".".
4. TYPE: "DZDHMB" FOLLOWED BY EITHER A <CR> CARRIAGE RETURN OR AN "ALTMODE" TO LOAD THE PROGRAM.

   IF A <CR> WAS TYPED THE USER MUST MANUALLY START THE PROGRAM AFTER LOADING.

   IF THE "ALTMODE" TERMINATOR WAS USED THE PROGRAM WILL SELF START AFTER LOADING.

NOTE: WHENEVER THE DH11 CONFIGURATION IS CHANGED THE DIAGNOSTIC SHOULD BE RELOADED.

2.1.2 STARTING PROCEDURES

A. TO AUTOMATICALLY START THE PROGRAM USING THE AUTOSIZER
(START AT LOC 000200(8))

1. INSTALL THE REQUIRED TEST CONNECTORS FOR THE PARTICULAR TEST APPLICATION (REFER TO SECTION 6.3)
2. SET THE HALT/ENABLE SWITCH TO HALT
3. SET THE SR=000200(8)
4. DEPRESS LOAD ADDRESS
5. SET THE SR=000000 (WORST CASE TESTING)

   SET THE SR=000002 (TO TYPE THE DEVICE MAP)

   SET THE SR=004000 (QUICK PASS)

   SET THE SR=002000 (TO PERFORM AN ABBREVIATED DM11-BB TEST. REFER TO SECTIONS 1.1 AND 6.3)

   SET THE SR=000400 (HALT AFTER PARAMETER SET-UP)

6. SET THE HALT/ENABLE SWITCH TO ENABLE
7. DEPRESS START - THE PROGRAM WILL TEST ALL LINES ON ALL DH'S FOUND.

   NOTE: THE CSR REGISTER ADDRESS OF THE DM11-BB('S) IS LOADED ONLY FROM THE AUTOSIZER, HOWEVER, AFTER INITIAL LOAD, THE PROGRAM CAN BE STARTED AT 210(8) TO CHANGE SELECTION PARAMETERS AS DESCRIBED IN SECTION 2.1.2 D.

B. TO TYPE IN ALL REQUIRED PARAMETERS (START AT LOC 000200(8))

1. INSTALL THE REQUIRED TEST CONNECTORS FOR THE PARTICULAR TEST APPLICATION (REFER TO SECTION 6.3)
2. SET THE HALT/ENABLE SWITCH TO HALT
3. SET THE SR=000200(8)
4. DEPRESS LOAD ADDRESS
5. SET THE SR=000001 (FOR INPUT DIALOGUE)

   AFTER INPUT DIALOGUE BEGINS BUT PRIOR TO ACTUAL TESTING:
   SET THE SR=000000 (WORST CASE TESTING)

   SET THE SR=004000 (QUICK PASS)

   SET SR=000400 (HALT AFTER PARAMETER SET-UP)

6. SET THE HALT/ENABLE SWITCH TO ENABLE
7. DEPRESS START - THE PROGRAM TYPES THE TITLE AND THEN ASKS FOR THE NUMBER OF ADDRESSES BETWEEN VECTORS. TYPE EITHER 10(8) OR 20(8) DEPENDING UPON THE PARTICULAR CONFIGURATION TO BE TESTED:

   NOTES: IF THE DM11-BB VECTORS ARE INTERLEAVED WITH THE DH11 VECTORS (2040 FRONT END) THE DISPLACEMENT IS 20(8) ADDRESSES.

   FOR STANDARD DH11'S WITH CONTIGUOUS VECTORS THE DISPLACEMENT IS 10(8) ADDRESSES.

```
                    IF <CR> ONLY WAS TYPED, THE DEFAULT
                    WILL BE 20(8) ADDRESSES.

        8. THE PROGRAM WILL ASK FOR  THE DEVICE ADDRESS.
           TYPE IN THE ADDRESS (OCTAL) OF THE FIRST DH11
           IN THE SYSTEM FOLLOWED BY A <CR>.

                IF AN INVALID ADDRESS IS TYPED THE PROGRAM
                WILL TYPE AN ERROR MESSAGE AND ASK YOU TO
                TRY AGAIN.

        9. THE PROGRAM WILL ASK FOR THE VECTOR ADDRESS.
           TYPE IN RECEIVER VECTOR ADDRESS (OCTAL) OF
           THE FIRST DH11 FOLLOWED BY A <CR>.

                IF AN INVALID VECTOR ADDRESS IS TYPED THE
                PROGRAM WILL TYPE AN ERROR MESSAGE AND ASK
                YOU TO TRY AGAIN.

        10. NEXT THE PROGRAM WILL ASK FOR THE DEVICE SELECTION
            PARAMETER. TYPE IN AN OCTAL NO. ENCODED AS FOLLOWS:

                BIT00=1 TEST DH11 #00
                BIT01=1 TEST DH11 #01
                BIT02=0 DO NOT TEST DH11 #02
                   "
                   "
                BIT15=1 TEST DH11 #15

                EXAMPLES:

                177777<CR>      TEST ALL 16. DH11'S
                100000<CR>      TEST ONLY DH11 #17(8)
                000005<CR>      TEST DH11 #00 AND 02

                IF A <CR> ONLY IS TYPED THE PROGRAM WILL DEFAULT
                TO THE LAST TYPED IN DEVICE SELECT PARAMETER. IF
                THIS IS THE INITIAL LOAD IT WILL DEFAULT TO
                000003  (DH11 #00 AND 01)

        11. NEXT THE PROGRAM WILL ASK FOR THE LINE SELECTION
            PARAMETERS. TYPE AN ENCODED OCTAL NO. AS
            FOLLOWS:

                BIT00=1 TEST LINE #00
                BIT01=1 TEST LINE #01
                BIT02=0 DO NOT TEST LINE #02
                   "
                   "
                BIT15=1 TEST LINE #15

                EXAMPLES:

                177777<CR>      TEST ALL 16. LINES
                100000<CR>      TEST LINE 17(8) ONLY
                000005<CR>      TEST LINES 00 AND 02

                IF A <CR> RETURN ONLY IS TYPED THE PROGRAM WILL
                DEFAULT TO 16. LINES.
```

****
NOTE
****

IF MORE THAN ONE DH11 IS TESTED THE SAME COMBINATION OF LINES WILL BE TESTED ON ALL DH11'S SELECTED.

12. IF SR8=1, THE PROGRAM WILL HALT AND PRINT THE FOLLOWING MESSAGE:

    "DEPRESS CONTINUE TO START TESTING"

    AT THIS POINT SET UP THE DESIRED SWITCH REGISTER OPTIONS (REFER TO PARA 2.3.1) AND DEPRESS "CONTINUE" TO START THE TESTING.

    THE PURPOSE OF THIS HALT IS TO ALLOW THE USER TO DUMP THE PROGRAM AFTER SETTING UP THE CONFIGURATION PARAMETERS FOR HIS SYSTEM.

13. PROGRAM WILL BEGIN EXECUTION. REFER TO SECTIONS 2.4, 3.0, AND 4.0 FOR ERROR AND STATUS REPORTS.

C. DEFAULT PARAMETER START ** (START AT LOC 000204(8))

1. INSTALL THE REQUIRED TEST CONNECTORS FOR THE PARTICULAR TEST APPLICATION (REFER TO SECTION 6.3)
2. SET THE HALT/ENABLE SWITCH TO HALT
3. SET THE SR=000204(8)
4. DEPRESS LOAD ADDRESS
5. SET THE SR=000000 (WORST CASE TESTING)
6. SET THE HALT/ENABLE SWITCH TO ENABLE
7. DEPRESS START

** IF THIS IS THE INITIAL LOAD, THE DEFAULT PARAMETERS ASSUME TWO DH11'S WITH THE FOLLOWING ADDRESS ASSIGNMENTS

DH11 #0 DEVADR=760020, VECTOR=330, BR5
DH11 #1 DEVADR=760040, VECTOR=350, BR5

OTHERWISE, THE PROGRAM WILL DEFAULT TO THE PARAMETERS USED IN THE PREVIOUS EXECUTION.

8. PROGRAM EXECUTION BEGINS. REFER TO SECTIONS 2.4, 3.0, AND 4.0 FOR EXECUTION TIMES, ERROR REPORTS, AND PROGRESS REPORTS.

D. TO CHANGE DEVICE AND LINE SELECT PARAMETERS ONLY (START AT LOC 000210(8))

1. INSTALL THE REQUIRED TEST CONNECTORS FOR THE PARTICULAR TEST APPLICATION (REFER TO SECTION 6.3)
2. SET THE HALT/ENABLE SWITCH TO HALT
3. SET THE SR=000210(8)
4. DEPRESS LOAD ADDRESS
5. SET THE SR=000000 (WORST CASE TESTING)

```
    SET THE SR=004000 (QUICK PASS)

    SET THE SR=002000 (TO PERFORM AN ABBREVIATED DM11-BB TEST.
                       THIS ASSUMES THE AUTOSIZER WAS PREVIOUSLY
                       USED TO LOAD THE DM11-BB CSR ADDRESSES.)

    SET THE  SR=000400 (HALT AFTER PARAMETER SET-UP)

6.  SET THE HALT/ENABLE SWITCH TO ENABLE
7.  DEPRESS START - THE PROGRAM TYPES THE TITLE
    AND THEN  ASKS FOR DEVICE SELECTION PARAMETER.
    PROCEED AS IN (B-10) ABOVE.
9.  PROGRAM WILL ASK FOR LINE SELECTION PARAMETERS.
    PROCEED AS IN (B-11) ABOVE.
  NOTE: THE DEVICE SELECTION AND LINE SELECTION
  PARAMETERS APPLY TO BOTH THE DH11 AND THE DM11-BB,
  THAT IS, IF DH #7, LINE #3 IS CHOSEN THEN DM11-BB
  #7 LINE #3 WILL ALSO BE TESTED.
10. IF SR8=1, THE PROGRAM WILL HALT AND PRINT THE
    FOLLOWING MESSAGE:

        "DEPRESS CONTINUE TO START TESTING"

    AT THIS POINT SET UP THE DESIRED SWITCH REG-
    ISTER OPTIONS (REFER TO PARA 2.3.1) AND DEPRESS
    "CONTINUE" TO START THE TESTING.

    THE PURPOSE OF THIS HALT IS TO ALLOW THE USER TO
    DUMP THE PROGRAM AFTER SETTING UP THE CONFIGURATION
    PARAMETERS FOR HIS SYSTEM.

11. PROGRAM WILL BEGIN EXECUTION. REFER TO SECTIONS
    2.4, 3.0, AND 4.0 FOR EXECUTION TIMES  ERROR AND
    STATUS REPORTS.
```

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

2.2.1   ACT11/  WHEN UNDER CONTROL OF THE ACT11/APT11
        APT11   SYSTEMS THE PROGRAM MAY BE LOADED IN DUMP
                MODE AND CAN BE RUN AS PART OF A QUICK
                VERIFY CHAIN SINCE AN AUTOSIZER IS USED.

2.2.2   XXDP    THE PROGRAM MAY BE LOADED AND RUN FROM
                ANY "XXDP" MEDIUM PROVIDED THERE IS AT LEAST
                12K OF CORE. IT MAY BE RUN AS PART OF
                AN "XXDP" CHAIN.

2.2.3   SWITCHLESS FEATURE
        ------------------

                IF THE DIAGNOSTIC IS RUN ON A CPU WITHOUT A SWITCH
                REGISTER THEN A SOFTWARE SWITCH REGISTER IS USED WHICH ALLOWS
                THE USER THE SAME SWITCH OPTIONS AS THE HARDWARE SWITCH REGISTER.
                IF THE HARDWARE SWITCH REGISTER DOES NOT EXIST OR IF ONE DOES
                AND IT CONTAINS ALL ONES (177777) THEN THE SOFTWARE SWITCH
                REGISTER (LOC. 176) IS USED.

        CONTROL:

        THIS PROGRAM ALSO SUPPORTS THE DYNAMIC LOADING OF THE SOFTWARE SWITCH
        REGISTER (LOC. 176) FROM THE TTY. THIS CAN BE ACCOMPLISHED BY
        DOING THE FOLLOWING:

        1) TYPE CONTROL G <↑G>; THIS WILL ALLOW THE TTY TO ENTER DATA INTO
           LOC. 176 AT SELECTED POINTS WITHIN THE PROGRAM.

        2) THE MACHINE WILL THEN TYPE: SWR=XXXXXXNEW= (XXXXXX IS THE OCTAL CONTENTS
           OF THE SOFTWARE SWITCH REGISTER.)

        3) AFTER THE ''NEW='' HAS BEEN TYPED THEN THE OPERATOR CAN DO ONE
           OF THE FOLLOWING AT THE TTY:

             A) TYPE A NUMBER TO BE LOADED INTO LOC. 176 FOLLOWED BY A <CR>.
                (ONLY OCTAL NUMBERS WILL BE ACCEPTED AND ONLY 6 NUMBERS
                WILL BE ALLOWED)
                IF A <CR> IS THE FIRST KEY DEPRESSED THE SOFTWARE SWITCH
                REGISTER CONTENTS WILL NOT BE CHANGED.

             B) IF A CONTROL U <↑U> IS DEPRESSED THEN THE PROGRAM WILL DO A <CR>.
                RETYPE THE DESIRED NUMBER.
```

2.3 PROGRAM OPTIONS

2.3.1 CONSOLE SWITCH REGISTER

THE FOLLOWING TABLE ILLUSTRATES THE FUNCTIONS OF THE CONSOLE SWITCH REGISTER DURING PROGRAM START AND DURING DH TESTING:

SWITCH REGISTER	START	TESTING
15 = 1	-----	HALT ON ERROR (AFTER TYPING ERROR MESSAGE)
14 = 1	-----	LOOP CONTINUOUSLY ON CURRENT TEST.
13 = 1	-----	INHIBIT ERROR TYPOUTS.
11 = 1	-----	INHIBIT SUB-TEST ITERATIONS (QUICK PASS)
10 = 1	-----	PERFORM DM11-BB ABBREVIATED TESTS.
9 = 1	-----	LOCK ON HARD ERRORS
8 = 1	HALTS AFTER CONFIGURATION TO PERMIT DUMPING PRE-CONFIGURED COPIES OF THE PROGRAM.	SEARCH FOR AND LOCK ON TEST SELECTED BY CONTENTS OF SR <07:00>
<07:00>		CONTAINS TEST NUMBER TO SEARCH FOR WHEN SR 08 = 1
1 = 1	TYPES DEVICE MAP GENERATED BY THE AUTOSIZER.	-----
0 = 1	ALLOWS THE USER TO INPUT DH PARAMETERS MANUALLY. (INHIBITS THE AUTOSIZER)	-----

2.3.2 CORE MEMORY LOCATIONS

A. DH11 CONFIGURATION TABLES AND VARIABLES

WHEN THE AUTOSIZER OPTION IS USED, THIS PROGRAM CAN RUN NON-STANDARD DH11 CONFIGURATIONS (NON-CONTIGUOUS ADDRESSES). THE USER CAN ALSO PATCH IN HIS OWN ADDRESSES TO MATCH HIS CONFIGURATION AND THEN USE THE DEFAULT START TO RUN THE UPDATED PROGRAM. THE TABLES AND LOCATIONS TO MODIFY ARE DESCRIBED BELOW:

1. DHADTB: 16. WORD DEVICE ADDRESS TABLE

   THE USER CAN DEPOSIT THE ADDRESSES FOR HIS NON-STANDARD CONFIGURATION IN THIS TABLE. THE POSITION OF THE ENTRY IN THE TABLE CORRESPONDS DIRECTLY TO THE DEVICE NO. (IE DH11 #00 - WORD 00, DH11 #01 - WORD 01 ETC.)

2. DHVCTB: 16. WORD DEVICE VECTOR ADDRESS TABLE

   THE USER CAN DEPOSIT THE VECTOR ADDRESSES FOR HIS NON-STANDARD CONFIGURATION IN THIS TABLE. AGAIN THE POSITION IN THE TABLE CORRESPONDS DIRECTLY TO DEVICE NUMBER.

3. BRLVL: 16. WORD BR LEVEL TABLE

   THIS TABLE STORES THE BR LEVELS ASSUMED BY THE INTERRUPT SERVICE ROUTINES FOR EACH DH11. THE RCVR BR LEVEL IS STORED IN THE LOW BYTE AND THE XMITTER BR LEVEL IN THE HIGH BYTE. AGAIN THE POSITION IN THE TABLE CORRESPONDS DIRECTLY TO THE DH11 DEVICE NO.

4. DHSEL: DEVICE SELECTION PARAMETER

   THIS WORD MUST BE SET UP TO CORRESPOND TO THE DEFAULT CONFIGURATION DEFINED BY THE TABLE SET-UPS. REFER TO SECTION 2.1.2.(B10) FOR A DESCRIPTION OF ITS ENCODING.

5. LINSEL: LINE SELECTION PARAMETER

   THIS WORD IS PROGRAM LOADED AS A 177777(8) TO SPECIFY THAT ALL LINES (16.) ARE TO BE TESTED. IT MAY BE MODIFIED AT CONFIGURATION TIME TO SPECIFY ANY COMBINATION OF LINES TO TEST. REFER TO SECTION 2.1.3.(B11) FOR A DESCRIPTION OF ITS ENCODING.

   NOTE: ONCE THE PROGRAM IS STARTED IT IS TABLE DRIVEN AND USES "DHASEL", "LINSEL" AND THE CONTENTS OF THE THREE TABLES ABOVE TO DEFINE THE CONFIGURATION TO TEST.

   NOTE: IT IS RECOMMENDED THAT WHEN NON-STANDARD CONFIGURATIONS ARE ENCOUNTERED, THE DM11-BB MODEM CONTROL DIAGNOSTIC, DZDHK, SHOULD BE RUN, RATHER THAN ALTERING THE DM11-BB TABLES IN THIS PROGRAM.

E02

B. SUB-TEST ITERATION COUNT

THERE IS A LOCATION TAGGED "$MXCNT:" THAT DETERMINES HOW MANY TIMES EACH SUB-TEST IS REPEATED (SR11=0) IT IS PROGRAM LOADED TO 000010(8) BUT CAN BE CHANGED TO MODIFY THE ITERATION COUNT.

NOTE THAT MODIFYING THIS LOCATION WILL CHANGE THE PROGRAM EXECUTION TIME DEFINED IN PARA 2.4(B).

2.3.3 REGISTER USAGE

IN MOST OF THE TESTS THE GENERAL REGISTERS CONTAIN STANDARD INFORMATION AS SHOWN BELOW. ON PROGRAM HALTS THE REGISTERS CAN BE EXAMINED DIRECTLY TO DISPLAY THIS INFORMATION.

R0	TEST NUMBER IN OCTAL
R1	ADDRESS OF THE "SCR" REG (DEVICE ADDRESS)
R2	ADDRESS OF THE DH11 REGISTER BEING TESTED
R3	ACTUAL CONTENTS OF THE DH11 REG BEING TESTED
R4	WHAT THE CONTENTS OF THE DH11 REG BEING TESTED SHOULD HAVE BEEN
R5	GENERAL USE - REFER TO THE LISTING FOR ITS USE
R6	CONTENTS OF THE STACK POINTER
R7	CONTENTS OF THE PROGRAM COUNTER

2.4 EXECUTION TIMES

A. SR11 = 0 SUB-TEST ITERATIONS

WITH ONE DH11 SELECTED FOR TESTING 16. LINES ONE COMPLETE ERROR FREE PASS TAKES APPROXIMATELY 8 MINUTES.

B. SR11 = 1 INHIBIT ITERATIONS

WITH ONE DH11 SELECTED FOR TESTING 16. LINES ONE COMPLETE ERROR FREE PASS TAKES APPROXIMATELY ONE MINUTE

NOTE: THE ABOVE TIMES WERE DETERMINED WHEN THE PROGRAM WAS RUN ON A PDP-11/45 AND A PDP-11/40 CPU.

3.0 ERROR INFORMATION

3.1 ERROR REPORTING PROCEDURES

3.1.1 STANDARD SYSMAC.SML ERROR REPORTING CONVENTIONS

THE PROGRAM UTILIZES THE STANDARD PDP11 DIAGNOSTICS ERROR UTILITIES. THE TEST ROUTINE CALLS THESE UTILITIES USING AN "ERROR N" INSTRUCTION (CODED EMT) WHERE "N" IS THE NUMBER OF THE ERROR MESSAGE. THE UTILITY ROUTINE USES "N" TO ACCESS THE PROPER ERROR INFORMATION VIA THE ERROR TABLE DESCRIBED IN SECTION 3.1.2 BELOW. EACH MESSAGE RESULTS IN THREE LINES OF TYPEOUT AS FOLLOWS:

```
LINE 1  A BRIEF DESCRIPTION OF THE FAILING FUNCTION
LINE 2  LABELS TO IDENTIFY THE DATA TYPED ON LINE 3
LINE 3  THE ACTUAL ERROR DATA (UP TO 8 OCTAL OR DECIMAL NOS.)
```

EXAMPLE:

```
SYSTEM CONTROL REGISTER ERROR
 (PC)    (PS)    (SP)    TEST   DEVADR  REGADR   WAS     S/B
002720  000002  001074  000003  160020  160020  000000  000001
```

THE ERROR TABLE ITEMS SHOWN IN THE NEXT SECTION DESCRIBE ALL THE DH ERROR MESSAGES WITHIN MD-11-DZDHM AND ARE INTERPRETED AS FOLLOWS:

```
EM      ADDRESS OF THE MESSAGE FOR LINE 1
DH      ADDRESS OF THE DATA HEADER MESSAGE FOR LINE 2
DT      ADDRESS OF THE TABLE OF ADDRESSES THAT POINT
        TO THE DATA WORDS TO BE PRINTED
DF      ADDRESS THAT POINTS TO THE DATA DESCRIPTOR
        TABLE THAT DEFINES WETHER AN ITEM IS OCTAL OR DECIMAL.
        IF THIS ENTRY IS "0" ALL DATA WORDS ARE IN OCTAL.
```

SECTION 3.1.3 DEFINES THE MEANING OF THE MNEUMONICS USED IN THE VARIOUS DATA HEADERS.

THERE ARE ONLY TWO MESSAGES IN THE DM11-BB PORTION OF THIS PROGRAM:
ONE INFORMS THE USER THAT NO DM11-BB'S WERE FOUND BY THE AUTOSIZER AND THE PROGRAM THEN CONTINUES TESTING THE DH11'S.
THE OTHER INSTRUCTS THE USER TO RUN THE DM11-BB MODEM CONTROL DIAGNOSTIC, DZDHK, DUE TO AN ERROR. THE PROGRAM THEN HALTS.

3.1.2 ERROR MESSAGE TABLES


```
;ERROR TABLE ITEM FOR ERROR MESSAGE 1

        EM1             ;"DH11 REGISTER REFERENCE CAUSED TIMEOUT"
        DH1             ;" (PC)  (PS)  (SP)  TEST  DEVADR  REGADR "
        DT1             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2
        0               ;PRINT ALL OCTAL

;ERROR TABLE ITEM FOR ERROR MESSAGE 2

        EM2             ;"SYSTEM CONTROL REGISTER ERROR"
        DH2             ; (PC)  (PS)  (SP)  TEST  DEVADR  REGADR  WAS  S/B "
        DT2             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
        0               ;PRINT ALL OCTAL

;ERROR TABLE ITEM FOR ERROR MESSAGE 3

        EM3             ;"DH11 MASTER CLEAR FAILED TO CLR SPECIFIED REG"
        DH2             ;" (PC)  (PS)  (SP)  TEST  DEVADR  REGADR  WAS  S/B "
        DT2             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
        0               ;PRINT ALL OCTAL

;ERROR TABLE ITEM FOR ERROR MESSAGE 4

        EM4             ;"LINE PARAMETER REGISTER ERROR"
        DH2             ;" (PC)  (PS)  (SP)  TEST  DEVADR  REGADR  WAS  S/B "
        DT2             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
        0               ;PRINT ALL OCTAL

;ERROR TABLE ITEM FOR ERROR MESSAGE 5

        EM5             ;"BREAK CONTROL REGISTER ERROR"
        DH2             ;" (PC)  (PS)  (SP)  TEST  DEVADR  REGADR  WAS  S/B "
        DT2             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
        0               ;PRINT ALL OCTAL

;ERROR TABLE ITEM FOR ERROR MESSAGE 6

        EM6             ;"SILO STATUS REGISTER ERROR"
        DH2             ;" (PC)  (PS)  (SP)  TEST  DEVADR  REGADR  WAS  S/B "
        DT2             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
        0               ;PRINT ALL OCTAL

;ERROR TABLE ITEM FOR ERROR MESSAGE 7

        EM7             ;"CURRENT ADDRESS REGISTER ERROR - LINE #XX"
        DH2             ;" (PC)  (PS)  (SP)  TEST  DEVADR  REGADR  WAS  S/B "
        DT2             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
        0               ;PRINT ALL OCTAL
```

```
;ERROR TABLE ITEM FOR ERROR MESSAGE 10

        EM10            ;"BYTE COUNTER REGISTER ERROR - LINE #XX"
        DH2             ;" (PC)  (PS)  (SP)  TEST  DEVADR  REGADR  WAS  S/B "
        DT2             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
        0               ;PRINT ALL OCTAL

;ERROR TABLE ITEM FOR ERROR MESSAGE 11

        EM11            ;"UNEXPECTED DH11 RCVR INTERRUPT"
        DH2             ;" (PC)  (PS)  (SP)  TEST  DEVADR  REGADR  WAS  S/B "
        DT2             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
        0               ;PRINT ALL OCTAL

;ERROR TABLE ITEM FOR ERROR MESSAGE 12

        EM12            ;"UNEXPECTED DH11 XMITTR INTERRUPT"
        DH2             ;" (PC)  (PS)  (SP)  TEST  DEVADR  REGADR  WAS  S/B "
        DT2             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
        0               ;PRINT ALL OCTAL

;ERROR TABLE ITEM FOR ERROR MESSAGE 13

        EM13            ;"CHAR AVAILABLE FAILED TO GENERATE RCVR INTERRUPT"
        DH2             ;" (PC)  (PS)  (SP)  TEST  DEVADR  REGADR  WAS  S/B "
        DT2             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
        0               ;PRINT ALL OCTAL

;ERROR TABLE ITEM FOR ERROR MESSAGE 14

        EM14            ;"TRANSMITTER NPR LOGIC ERROR - LINE #  "
        DH2             ;" (PC)  (PS)  (SP)  TEST  DEVADR  REGADR  WAS  S/B "
        DT2             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
        0               ;PRINT ALL OCTAL

;ERROR TABLE ITEM FOR ERROR MESSAGE 15

        EM15            ;"XMITTR FAILED TO INTERRUPT - LINE #  "
        DH2             ;" (PC)  (PS)  (SP)  TEST  DEVADR  REGADR  WAS  S/B "
        DT2             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
        0               ;PRINT ALL OCTAL

;ERROR TABLE ITEM FOR ERROR MESSAGE 16

        EM16            ;"RCVR FAILED TO INTERRUPT"
        DH2             ;" (PC)  (PS)  (SP)  TEST  DEVADR  REGADR  WAS  S/B "
        DT2             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
        0               ;PRINT ALL OCTAL
```

```
;ERROR TABLE ITEM FOR ERROR MESSAGE 17

        EM17            ;"TRANSMITTER TIMING ERROR - LINE #  "
        DH6             ;" (PC)  (PS)  (SP)  TEST  DEVADR  SPEED   TIMEB   TIMEC"
        DT2             ;$ERRPC,$TMPO,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
        0               ;PRINT ALL OCTAL

;ERROR TABLE ITEM FOR ERROR MESSAGE 20

        EM20            ;RECEIVER TIMING ERROR - LINE #  "
        DH6             ;" (PC)  (PS)  (SP)  TEST  DEVADR  SPEED   TIMEB   TIMEC"
        DT2             ;$ERRPC,$TMPO,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
        0               ;PRINT ALL OCTAL

;ERROR TABLE ITEM FOR ERROR MESSAGE 21

        EM21            ;"RCVR FAILED TO INTERRUPT - LINE #  "
        DH2             ;" (PC)  (PS)  (SP)  TEST  DEVADR  REGADR  WAS  S/B "
        DT2             ;$ERRPC,$TMPO,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
        0               ;PRINT ALL OCTAL

;ERROR TABLE ITEM FOR ERROR MESSAGE 22

        EM22            ;"CHAR AVAIL FAILED TO SET ON TIME - LINE #  "
        DH2             ;" (PC)  (PS)  (SP)  TEST  DEVADR  REGADR  WAS  S/B "
        DT2             ;$ERRPC,$TMPO,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
        0               ;PRINT ALL OCTAL

;ERROR TABLE ITEM FOR ERROR MESSAGE 23

        EM23            ;"BASIC DATA TEST ERROR - LINE #  "
        DH7             ;" (PC)  (PS)  (SP)  TEST  DEVADR  CHRLNG  WAS  S/B "
        DT2             ;$ERRPC,$TMPO,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
        0               ;PRINT ALL OCTAL

;ERROR TABLE ITEM FOR ERROR MESSAGE 24

        EM24            ;"AUTO ECHO TEST ERROR - LINE #  "
        DH2             ;" (PC)  (PS)  (SP)  TEST  DEVADR  REGADR  WAS  S/B "
        DT2             ;$ERRPC,$TMPO,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
        0               ;PRINT ALL OCTAL

;ERROR TABLE ITEM FOR ERROR MESSAGE 25

        EM25            ;"BREAK BIT TEST ERROR - LINE #  "
        DH2             ;" (PC)  (PS)  (SP)  TEST  DEVADR  REGADR  WAS  S/B "
        DT2             ;$ERRPC,$TMPO,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
        0               ;PRINT ALL OCTAL
```

```
;ERROR TABLE ITEM FOR ERROR MESSAGE 26

        EM26            ;"HALF-DUPLEX TEST ERROR - LINE #  "
        DH2             ;" (PC)  (PS)  (SP)  TEST  DEVADR  REGADR  WAS  S/B "
        DT2             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
        0               ;PRINT ALL OCTAL

;ERROR TABLE ITEM FOR ERROR MESSAGE 27

        EM27            ;"UNEXPECTED BUS ERROR TRAP"
        DH3             ; (PC)  (PS)  (SP)  TEST  TRPPC  TRPPS
        DT3             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2
        0               ;PRINT ALL OCTAL

;ERROR TABLE ITEM FOR ERROR MESSAGE 30

        EM30            ;"UNEXPECTED RSVD INSTR TRAP"
        DH3             ; (PC)  (PS)  (SP)  TEST  TRPPC  TRPPS
        DT3             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2
        0               ;PRINT ALL OCTAL

;ERROR TABLE ITEM FOR ERROR MESSAGE 31

        EM31            ;"AUTO ECHO DATA COMPARE ERROR - LINE #  "
        DH4             ; (PC)   (PS)   (SP)    TEST   WASADR  SBADR   WAS    S/B "
        DT2             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
        0               ;PRINT ALL OCTAL

;ERROR TABLE ITEM FOR ERROR MESSAGE 32

        EM32            ;"AUTO ECHO TEST TIMEOUT - LINE #  "
        DH5             ;" (PC)  (LPRG)   TEST"""
        DT4             ;$ERRPC,$TMP0,$TMP2
        0               ;PRINT ALL OCTAL

;ERROR TABLE ITEM FOR ERROR MESSAGE 33

        EM33            ;"PARITY LOGIC TEST ERROR - LINE #  "
        DH2             ;" (PC)  (PS)  (SP)  TEST  DEVADR  REGADR  WAS  S/B"
        DT2             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
        0               ;PRINT ALL OCTAL

;ERROR TABLE ITEM FOR ERROR MESSAGE 34

        EM34            ;"MULTI-LINE PARITY DATA TEST ERROR - LINE #   - SUBTEST #  "
        DH4             ;" (PC)  (PS)  (SP)  TEST  WASADR  SBADR  WAS  S/B "
        DT2             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
        0               ;PRINT ALL OCTAL
```

```
;ERROR TABLE ITEM FOR ERROR MESSAGE 35

        EM35                ;"MULTI-LINE PARITY DATA TEST TIMEOUT"
        DH14                ;" (PC)  (LPRG)  LINACT "
        DT6                 ;"$ERRPC,$TMP0,$TMP3"
        0                   ;PRINT ALL OCTAL

;ERROR TABLE ITEM FOR ERROR MESSAGE 36

        EM36                ;CHAR AVAILABLE TIMEOUT"
        DH5                 ;" (PC)  (LPRG)   TEST"
        DT4                 ;$ERRPC,$TMP0,$TMP2
        0                   ;PRINT ALL OCTAL

;ERROR TABLE ITEM FOR ERROR MESSAGE 37

        EM37                ;"DATA COMPARE ERROR - LINE #  "
        DH4                 ;" (PC)  (PS)  (SP)  TEST  WASADR  SBADR  WAS  S/B "
        DT2                 ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
        0                   ;PRINT ALL OCTAL

;ERROR TABLE ITEM FOR ERROR MESSAGE 40

        EM40                ;"BUFFER ACTIVE REG ERROR - LINE #  "
        DH2                 ;" (PC)  (PS)  (SP)  TEST  DEVADR  REGADR  WAS  S/B "
        DT2                 ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
        0                   ;PRINT ALL OCTAL

;ERROR TABLE ITEM FOR ERROR MESSAGE 41

        EM41                ;"RCVR FALSE INTERRUPT"
        DH5                 ;" (PC)  (LPRG)   TEST"
        DT4                 ;$ERRPC,$TMP0,$TMP2
        0                   ;PRINT ALL OCTAL

;ERROR TABLE ITEM FOR ERROR MESSAGE 42

        EM42                ;"SILO OVERFLOW ERROR"
        DH5                 ;" (PC)  (LPRG)   TEST"
        DT4                 ;$ERRPC,$TMP0,$TMP2
        0                   ;PRINT ALL OCTAL

;ERROR TABLE ITEM FOR ERROR MESSAGE 43

        EM43                ;"SILO OVERFLOW FAILED TO GENERATE RCVR INTERRUPT"
        DH2                 ;" (PC)  (PS)  (SP)  TEST  DEVADR  REGADR  WAS  S/B "
        DT2                 ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
        0                   ;PRINT ALL OCTAL
```

```
;ERROR TABLE ITEM FOR ERROR MESSAGE 44

        EM44            ;"NON EX MEMORY FAILED TO GENERATE XMITTR INTERRUPT"
        DH2             ;" (PC)  (PS)  (SP)  TEST  DEVADR  REGADR  WAS  S/B "
        DT2             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
        0               ;PRINT ALL OCTAL

;ERROR TABLE ITEM FOR ERROR MESSAGE 45

        EM45            ;"XMIT DONE FAILED TO GENERATE XMITTR INTERRUPT"
        DH2             ;" (PC)  (PS)  (SP)  TEST  DEVADR  REGADR  WAS  S/B "
        DT2             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
        0               ;PRINT ALL OCTAL

;ERROR TABLE ITEM FOR ERROR MESSAGE 46

        EM46            ;"CURRENT ADDRESS MEMORY PATTERNS TEST ERROR - LINE #  "
        DH10            ;" (PC)   LINEWR  PATTRN   TEST   DEVADR  REGADR   WAS      S/B"
        DT5             ;$ERRPC,$TMP0,$TMP1,$REG0,$REG1,$REG2,$REG3,$REG4
        0               ;PRINT ALL OCTAL

;ERROR TABLE ITEM FOR ERROR MESSAGE 47

        EM47            ;"BYTE COUNT MEMORY PATTERNS TEST ERROR - LINE #  "
        DH10            ; (PC)   LINEWR  PATTRN   TEST   DEVADR  REGADR   WAS      S/B"
        DT5             ;$ERRPC,$TMP0,$TMP1,$REG0,$REG1,$REG2,$REG3,$REG4
        0               ;PRINT ALL OCTAL

;ERROR TABLE ITEM FOR ERROR MESSAGE 50

        EM50            ;"TEST TIMEOUT WAITING FOR XMIT DONE - LINE #  '
        DH2             ;" (PC)     (PS)     (SP)     TEST   DEVADR  REGADR   WAS      S/B"
        DT2             ;"$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4"
        0               ;PRINT ALL OCTAL

;ERROR TABLE ITEM FOR ERROR MESSAGE 51

        EM51            ;"NPR LOGIC TEST 2 ERROR"
        DH11            ;" (PC)   LINACT  LINCHK   TEST   DEVADR  REGADR   WAS      S/B"
        DT5             ;$ERRPC,$TMP0,$TMP1,$REG0,$REG1,$REG2,$REG3,$REG4"
        0               ;PRINT ALL OCTAL

;ERROR TABLE ITEM FOR ERROR MESSAGE 52

        EM52            ;"BASIC DATA COMPARE ERROR"
        DH2             ;" (PC)    (PS)     (SP)     TEST   DEVADR  REGADR   WAS      S/B"
        DT2             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4"
        0               ;PRINT ALL OCTAL
```

```
;ERROR TABLE ITEM FOR ERROR MESSAGE 53

        EM50            ;"TEST TIMEOUT WAITING FOR XMIT DONE - LINE #  "
        DH12            ;" (PC)    SPEED    (SP)    TEST   DEVADR  REGADR   WAS     S/B"
        DT2             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
        0               ;PRINT ALL OCTAL

;ERROR TABLE ITEM FOR ERROR MESSAGE 54

        EM22            ;"CHAR AVAIL FAILED TO SET ON TIME - LINE #  "
        DH12            ;" (PC)    SPEED    (SP)    TEST   DEVADR  REGADR   WAS     S/B"
        DT2             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
        0               ;PRINT ALL OCTAL

;ERROR TABLE ITEM FOR ERROR MESSAGE 55

        EM22            ;"CHAR AVAIL FAILED TO SET ON TIME - LINE #  "
        DH13            ;" (PC)    (PS)    (SP)    TEST   DEVADR  CHRLNG  SCRWAS  SCRS/B"
        DT2             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
        0               ;PRINT ALL OCTAL

;ERROR TABLE ITEM FOR ERROR MESSAGE 56

        EM56            ;"OVERRUN BIT FAILED TO SET - LINE #  "
        DH2             ; (PC)    (PS)    (SP)    TEST   DEVADR  REGADR   WAS     S/B"
        DT2             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
        0               ;PRINT ALL OCTAL

;ERROR TABLE ITEM FOR ERROR MESSAGE 57

        EM57            ;"STORAGE OVERFLOW BIT FAILED - LINE #  "
        DH2             ; (PC)    (PS)    (SP)    TEST   DEVADR  REGADR   WAS     S/B"
        DT2             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
        0               ;PRINT ALL OCTAL
```

3.1.3 DATA HEADER MNEUMONIC DEFINITIONS

ALL NUMBERS PRINTED AS ERROR DATA ARE IN OCTAL

(PC)	ADDRESS OF THE ERROR CALL (ERROR PC)
(PS)	CONTENTS OF THE PSW AT THE TIME OF THE ERROR
(SP)	CONTENTS OF THE STACK POINTER AT THE TIME OF THE ERROR
TEST	TEST NUMBER
DEVADR	DEVICE ADDRESS - 1ST ADDRESS IN THE SELECTED DH11
REGADR	ADDRESS OF THE DH11 REGISTER BEING TESTED
WAS	WHAT THE ACTUAL DATA READ WAS (DH11 REG OR CORE LOC.)
S/B	WHAT THE DATA READ SHOULD HAVE BEEN
SPEED	SPEED CODE IN THE "LPR" REG AT THE TIME OF THE ERROR REFER TO SECTION 5.2.3 FOR SPEED CODE TABLES
TIMEB	CONTENTS OF SOFTWARE COUNTER USED IN TIMING TESTS
TIMEC	CONTENTS OF SOFTWARE COUNTER USED IN TIMING TESTS NOTE:"TIMEB" SHOULD ALWAYS BE LESS THAN "TIMEC"
CHRLNG	CHARACTER LENGTH CODE IN THE "LPR" AT THE TIME OF THE ERROR 00=5 BITS, 01=6 BITS, 02=7 BITS, 03= 8 BITS
TRPPC	CONTENTS OF THE PC (R7) AT THE TIME OF A BUS ERROR OR RSVD INSTR TRAP.
TRPPS	CONTENTS OF THE PSW AT THE TIME OF A BUS ERROR OR RSVD INSTR TRAP.
(LPRG)	CONTENTS OF THE "LPR" REGISTER AT THE TIME OF THE ERROR
LINACT	FLAGS USED BY MULTI-LINE TESTS TO INDICATE LINES STILL ACTIVE
WASADR	CORE MEMORY ADDRESS OF THE "WAS" DATA (ACTUAL DATA READ)
SBADR	CORE MEMORY ADDRESS OF THE S/B DATA (GOOD DATA)
SCRWAS	CONTENTS OF THE "SCR" REGISTER
SCRS/B	WHAT THE CONTENTS OF THE "SCR" REGISTER SHOULD HAVE BEEN
LINCHK	LINE NO. BEING CHECKED DURING "CAR" AND "BCR" MEMORY TESTS
LINEWR	LINE NO. BEING WRITTEN INTO DURING "CAR" AND "BCR" MEMORY TESTS
PATTRN	TEST PATTERN BEING WRITTEN INTO EITHER THE "CAR" OR "BCR" MEMORIES

3.2 POWER FAIL PRINTOUT

IF A POWER FAILURE OCCURS WHILE THE PROGRAM IS RUNNING, THE FOLLOWING PRINTOUT OCCURS:

"POWER"

AFTER THE PRINTOUT THE PROGRAM WILL BE RESTARTED AUTOMATICALLY FROM THE BEGINNING. NO ATTEMPT IS MADE TO CONTINUE THE PROGRAM FROM THE POINT OF THE POWER FAIL INTERRUPTION.

3.3 ERROR HALTS

A. SYSMAC ERROR SERVICE ROUTINE HALT

WHEN SR15=1 A "HALT" IS EXECUTED IN THE SYSMAC ERROR UTILITY AFTER THE ERROR TYPEOUT. TO RESUME TESTING FROM THE POINT OF THE "HALT" SIMPLY DEPRESS CONTINUE.

B. POWER FAIL HALT

WHEN A POWER DOWN IS DETECTED, THE PROGRAM HALTS IN THE POWER FAIL UTILITY ROUTINE. IF FOR SOME REASON THE AUTO-START FEATURE FAILS TO RESTART THE PROGRAM, THE PROGRAM WILL "LOCK" ON THIS HALT IF CONTINUE IS DEPRESSED. IN THIS CASE THE PROGRAM MUST BE RESTARTED.

C. TRAP CATCHER HALTS

ALL INACTIVE VECTORS ARE SET UP WITH THE STANDARD PDF11 TRAP CATCHER AS DESCRIBED BELOW:

```
VN  / VN+2
VN+2/ HALT
```

IF A TRAP OR INTERRUPT OCCURS TO A VECTOR THAT HAS NOT BEEN SET UP BY THE TEST ROUTINE, A "HALT" OCCURS IN THE VECTOR AREA. THE ADDRESS DISPLAY INDICATES WHICH VECTOR THE PROGRAM TRAPPED TO AND THE LAST ENTRY PUSHED ON TO THE STACK INDICATES WHERE THE PROGRAM WAS WHEN THE TRAP OR INTERRUPT OCCURRED.

4.0 PERFORMANCE AND PROGRESS REPORTS

4.1 PERFORMANCE REPORTS

(NONE PROVIDED)

4.2 PROGRESS REPORTS

A. WHEN THE PROGRAM IS STARTED OR RESTARTED IT PRINTS THE TITLE MESSAGE:

"MAINDEC-11-DZDHM-"X" DH11 DIAGNOSTIC"

WHERE "X" IS THE REVISION LEVEL LETTER DESIGNATION.

B. WHEN THE PROGRAM BEGINS TESTING ON EACH DH11 IT TYPES THE FOLLOWING MESSAGE:

"TESTING DH11 #NN"

WHERE "NN" IS THE DEVICE NO. IN OCTAL (00-17)

C. WHEN THE PROGRAM COMPLETES A PASS (TESTED ALL SELECTED LINES ON ALL SELECTED DH11'S) IT TYPES:

"END PASS   #XXXXX"

WHERE "X" IS THE PASS COUNT IN DECIMAL.

D. WHEN THE PROGRAM IS IN THE CONFIGURATION DIALOGUE (START AT 200, OR 210) AND SR8 AND SR0=1, THE PROGRAM WILL HALT AFTER ACCEPTING THE INPUT PARAMETERS AND TYPE THE FOLLOWING MESSAGE:

"DEPRESS CONTINUE TO START TESTING"

THE PURPOSE OF THIS HALT IS TO ALLOW THE USER TO DUMP THE UPDATED PROGRAM ON THE LOAD MEDIUM FOR NON-STANDARD CONFIGURATIONS. (SEE SECTION 2.2.2 AND 2.3.2)

5.0 DH11 DEVICE INFORMATION

5.1 ADDRESS AND VECTOR ASSIGNMENTS

THE DH11 USES FLOATING ADDRESSES AND IS LOCATED AFTER DJ11'S IN THE FLOATING ADDRESS SPACE THAT BEGINS AT LOCATION 760010. BECAUSE THE DH11 HAS EIGHT REGISTERS, IT MUST BE ASSIGNED AN ADDRESS THAT IS A MULTIPLE OF 20 (OCTAL). ALL DH11'S IN A SYSTEM SHOULD HAVE CONSECUTIVE ADDRESSES.

EXAMPLE #1: A SYSTEM WITH NO DJ11'S BUT TWO DH11'S.

760 010 CANNOT USE FOR DH11'S BECAUSE NOT MULTIPLE OF 20.
760 020 FIRST DH11
760 040 SECOND DH11
760 060 DH11 GAP (INDICATES THAT THERE ARE NO MORE DH11'S).

EXAMPLE #2: A SYSTEM WITH ONE DJ11, TWO DH11'S:

760 010 FIRST DJ11
760 020 DJ11 GAP (INDICATES THAT THERE ARE NO MORE DJ11'S).
760 030 CANNOT USE FOR DH11'S BECAUSE NOT MULTIPLE OF 20.
760 040 FIRST DH11
760 060 SECOND DH11
760 100 DH11 GAP (INDICATES THAT THERE ARE NO MORE DH11'S).

THE DH11 VECTORS (2) FOLLOW THOSE OF THE DJ11 IN THE FLOATING VECTOR SPACE THAT STARTS AT ADDRESS 300. THE VECTORS STARTING AT 300 ARE USED IN THE FOLLOWING ORDER: DC11; KL11/DL11-A, B; DP11; DM11-A; DN11; DM11-BB; DR11-A; DR11-C; PA611 READERS; PA611 PUNCHES; DT11; DX11; DL11-C, D, E; DH11.

THE RECEIVER VECTOR IS THE LOWER NUMBERED VECTOR. THE PRIORITY OF THE RECEIVER AND TRANSMITTER INTERRUPTS ARE INDIVIDUALLY SELECTABLE BY MEANS OF TWO STANDARD PDP11 PRIORITY JUMPER PLUGS. BR LEVEL 5 IS STANDARD.

5.2 REGISTER DEFINITION

THE FOLLOWING SECTION DESCRIBES THE BIT ASSIGNMENTS WITHIN EACH REGISTER: BITS MARKED UNUSED AND WRITE ONLY ARE ALWAYS READ AS ZERO. ATTEMPTING TO WRITE INTO UNUSED OR READ ONLY BITS HAS NO EFFECT ON THOSE BITS. INIT REFERS TO THE INITIALIZE SIGNAL GENERATED BY THE PROCESSOR (E.G. UPON EXECUTION OF A RESET INSTRUCTION). TRANSMIT AND RECEIVE ARE WITH RESPECT TO THE DH11.

F03

5.2.1 THE SYSTEM CONTROL REGISTER - ADDRESS X00 SEQ 0031

THE SYSTEM CONTROL REGISTER IS A BYTE-ADDRESSABLE REGISTER. THE BIT ASSIGNMENT IS AS FOLLOWS:

BITS	DESCRIPTION
00-03	LINE SELECTION
	EACH OF THE 16 LINES SERVED BY THE DH11 HAS ITS OWN STORAGE FOR LINE PARAMETER INFORMATION, CURRENT ADDRESS, AND BYTE COUNT. THESE STORAGE LOCATIONS ARE LOADED BY THE PROGRAM VIA THE LINE PARAMETER REGISTER, CURRENT ADDRESS REGISTER, AND BYTE COUNT REGISTER, BUT THE HARDWARE MUST FIRST BE TOLD WHICH LINE IS TO HAVE ITS LINE PARAMETERS, CURRENT ADDRESS, OR BYTE COUNT CHANGED. THIS ROUTING IS ACCOMPLISHED BY SETTING THE LINE SELECTION BITS TO THE BINARY ADDRESS (0000-1111) OF THE DESIRED LINE. THESE BITS ARE READ/WRITE.
04, 05	MEMORY EXTENSION
	THE INFORMATION STORED IN THESE BITS BECOMES BITS 16 AND 17 RESPECTIVELY OF ANY CURRENT ADDRESS LOADED BY THE PROGRAM INTO THE CURRENT ADDRESS REGISTER. THESE BITS ARE READ/WRITE BUT, WHEN READ, REPRESENT ONLY THE STATUS OF BITS 4 AND 5 OF THE SYSTEM CONTROL REGISTER, NOT THE STATUS OF ADDRESS BITS 16 AND 17 OF THE SELECTED LINE. SEE THE SILO STATUS REGISTER FOR FURTHER INFORMATION. THIS ARRANGEMENT PERMITS INTERRUPT SERVICE ROUTINES TO SAVE THE CONTENTS OF THE SYSTEM CONTROL REGISTER ACCURATELY.
06	RECEIVER INTERRUPT ENABLE
	THIS BIT, WHEN SET, ENABLES RECEIVER INTERRUPTS (BIT 7)
07	RECEIVER INTERRUPT
	THIS BIT, WHEN SET, INDICATES THAT THE NUMBER OF CHARACTERS STORED IN THE SILO EXCEEDS THE "ALARM LEVEL" SPECIFIED BY THE LOW BYTE OF THE SILO STATUS REGISTER. THIS BIT IS READ ONLY, EXCEPT IN MAINTENANCE MODE, WHERE IT IS READ/WRITE. SETTING OF THIS BIT WILL GENERATE AN INTERRUPT REQUEST IF BIT 6 (ABOVE) IS ALSO SET.
08	CLEAR NON-EXISTENT MEMORY INTERRUPT
	THIS BIT, WHEN SET, CLEARS THE NON-EXISTENT MEMORY INTERRUPT FLIP-FLOP (BIT 10) AND CLEARS ITSELF. THIS BIT IS READ/WRITE.
09	MAINTENANCE
	THIS BIT, WHEN SET, PLACES THE DH11 IN MAINTENANCE MODE.
10	NON-EXISTENT MEMORY
	THIS BIT IS SET WHENEVER THE NPR HARDWARE PLACES THE ADDRESSES OF A MEMORY LOCATION ON THE UNIBUS AND NO SLAVE SYNC IS RECEIVED IN 20 S. THIS INDICATES THAT THE ADDRESSED LOCATION OR DEVICE DOES NOT EXIST. THIS BIT CAUSES AN INTERRUPT REQUEST IF SET WHILE TRANSMITTER AND NON-EXISTENT MEMORY INTERRUPT ENABLE IS SET. THIS BIT IS READ ONLY, EXCEPT IN MAINTENANCE MODE, WHERE IT IS READ/WRITE.
11	MASTER CLEAR
	THIS BIT, WHEN SET, GENERATES "INITIALIZE" WITHIN THE DH11, CLEARING THE SILO, THE UARTS, AND THE REGISTERS. THE EXACT BITS CLEARED ARE DISCUSSED IN THE SECTION ON INITIALIZATION. READ/WRITE.
12	STORAGE INTERRUPT ENABLE
	THIS BIT, WHEN SET, PERMITS THE SETTING OF BIT 14 TO GENERATE AN INTERRUPT REQUEST. THIS BIT IS READ/WRITE.

G03

13 TRANSMITTER AND NON-EX-MEM INTERRUPT ENABLE

SEQ 0032

THIS BIT, WHEN SET, PERMITS THE SETTING OF BIT 10 OR 15 TO GENERATE AN INTERRUPT REQUEST. THIS BIT IS READ/WRITE.

14 STORAGE INTERRUPT

THIS BIT IS SET WHEN THE RECEIVER SCANNER FINDS A RECEIVER HOLDING BUFFER WITH A CHARACTER IN IT, TRIES TO STORE THAT CHARACTER IN THE SILO, AND CANNOT DO SO BECAUSE OF A LACK OF SPACE. WHEN SET THIS BIT WILL CAUSE AN INTERRUPT REQUEST IF BIT 12 IS SET. THIS BIT IS READ ONLY, EXCEPT IN MAINTENANCE MODE, WHERE IT IS READ/WRITE.

15 TRANSMITTER INTERRUPT

THIS BIT IS SET WHEN THE DH11 CONCLUDES AN NPR CYCLE THAT INCREMENTED A BYTE COUNT TO ZERO, INDICATING THE LAST CHARACTER IN A MESSAGE BUFFER WAS LOADED INTO A UART TRANSMITTER HOLDING REGISTER. THIS BIT WILL CAUSE AN INTERRUPT REQUEST IF BIT 13 IS SET. THIS BIT IS READ/WRITE. (IT IS SET DURING AN NPR CYCLE.)

5.2.2 NEXT RECEIVED CHARACTER REGISTER ADDRESS X02

BITS	DESCRIPTION
00-07	NEXT RECEIVED CHARACTER THESE BITS CONTAIN THE NEXT RECEIVED CHARACTER, RIGHT JUSTIFIED. THE LEAST SIGNIFICANT BIT IS BIT 00.
08-11	LINE NUMBER THESE BITS INDICATE THE LINE NUMBER ON WHICH THE NEXT RECEIVED CHARACTER WAS RECEIVED. BIT 8 IS THE LEAST SIGNIFICANT BIT.
12	PARITY ERROR THIS BIT IS SET IF THE PARITY OF THE RECEIVED CHARACTER DOES NOT AGREE WITH THAT DESIGNATED FOR THAT LINE.
13	FRAMING ERROR THIS BIT IS SET IF THE RECEIVER SAMPLES A LINE FOR THE FIRST STOP BIT, AND FINDS THE LINE IN A SPACING CONDITION (LOGICAL 0). THIS CONDITION USUALLY INDICATES THE RECEPTION OF A BREAK.
14	DATA OVERRUN THIS BIT IS SET WHEN THE RECEIVED CHARACTER WAS PRECEDED BY A CHARACTER THAT WAS LOST DUE TO THE INABILITY OF THE RECEIVER SCANNER TO SERVICE THE UART RECEIVER HOLDING BUFFER. REFER TO THE SECTION ON PROGRAMMING FOR FURTHER DETAILS ON DOUBLE-BUFFERED RECEPTION.
15	VALID DATA PRESENT THIS BIT INDICATES THAT THE DATA PRESENTED IN BITS 14-00 IS VALID. IT PERMITS A CHARACTER HANDLING PROGRAM TO TAKE CHARACTERS FROM THE SILO UNTIL IT IS EMPTY. THIS IS DONE BY READING THIS REGISTER AND CHECKING BIT 15 UNTIL A WORD IS OBTAINED FOR WHICH BIT 15 IS A ZERO. THE ENTIRE NEXT RECEIVED CHARACTER REGISTER IS READ-ONLY AND IS ADDRESSABLE ONLY ON A WORD BASIS.

5.2.3 LINE PARAMETER REGISTER ADDRESS X04

THIS REGISTER SHOULD BE LOADED ONLY AFTER THE LINE SELECTION BITS OF THE SYSTEM CONTROL REGISTER HAVE BEEN SET TO SELECT THE LINE TO WHICH THESE PARAMETERS APPLY. THIS REGISTER IS WRITE ONLY.

BITS	DESCRIPTION
00-01	CHARACTER LENGTH

THESE BITS SHOULD BE SET AS SHOWN TO RECEIVE AND TRANSMIT CHARACTERS OF THE LENGTH (EXCLUDING PARITY) SHOWN:

BIT 01	00	
0	0	5 BIT
0	1	6 BIT
1	0	7 BIT
1	1	8 BIT

02 TWO STOP BITS

THIS BIT, WHEN SET, CONDITIONS A LINE TRANSMITTING WITH 6, 7, OR 8-BIT CODE TO TRANSMIT CHARACTERS HAVING TWO STOP MARKS. IF THE LINE IS TRANSMITTING 5-BIT CODE, ASSERTION OF THIS BIT CAUSES THE CHARACTERS TO BE TRANSMITTED WITH 1.5 STOP MARKS. IF THIS BIT IS NOT ASSERTED, 1 STOP MARK IS SENT.

03 NOT USED

04 PARITY ENABLED

IF THIS BIT IS SET, CHARACTERS TRANSMITTED ON THIS LINE WILL HAVE AN APPROPRIATE PARITY BIT AFFIXED, AND CHARACTERS RECEIVED ON THIS LINE WILL HAVE THEIR PARITY CHECKED.

05 ODD PARITY

IF THIS BIT AND BIT 4 ARE SET, CHARACTERS OF ODD PARITY WILL BE GENERATED ON THIS LINE AND INCOMING CHARACTERS WILL BE EXPECTED TO HAVE ODD PARITY. IF THIS BIT IS NOT SET, BUT BIT 4 IS SET, CHARACTERS OF EVEN PARITY WILL BE GENERATED ON THIS LINE AND INCOMING CHARACTERS WILL BE EXPECTED TO HAVE EVEN PARITY. IF BIT 4 IS NOT SET, THE SETTIN OF THIS BIT IS IMMATERIAL.

06-09 RECEIVER SPEED

THE STATE OF THESE BITS DETERMINES THE OPERATING SPEED FOR THIS LINE'S RECEIVER. THE SPEED TABLE BELOW IS APPLICABLE.

10-13 TRANSMITTER SPEED

THE STATE OF THESE BITS DETERMINES THE OPERATING SPEED FOR THIS LINE'S TRANSMITTER. THE SPEED TABLE ON THE NEXT PAGE IS APPLICABLE.

SPEED TABLE FOR RECEIVER AND TRANSMITTER SPEEDS:

BIT					
TRANSMITTER	13	12	11	10	
RECEIVER	9	8	7	6	
	--	--	--	--	
	0	0	0	0	ZERO BAUD
	0	0	0	1	50 BAUDS
	0	0	1	0	75 BAUDS
	0	0	1	1	110 BAUDS
	0	1	0	0	134.5 BAUDS
	0	1	0	1	150 BAUDS
	0	1	1	0	200 BAUDS
	0	1	1	1	300 BAUDS
	1	0	0	0	600 BAUDS
	1	0	0	1	1200 BAUDS
	1	0	1	0	1800 BAUDS
	1	0	1	1	2400 BAUDS
	1	1	0	0	4800 BAUDS
	1	1	0	1	9600 BAUDS
	1	1	1	0	EXTERNAL INPUT A
	1	1	1	1	EXTERNAL INPUT B

14 HALF DUPLEX/FULL DUPLEX

IF THIS BIT IS SET, THIS LINE WILL OPERATE IN HALF-DUPLEX MODE. IF NOT SET, THIS LINE WILL OPERATE IN FULL-DUPLEX MODE.

IN THIS APPLICATION HALF-DUPLEX MEANS THAT THE DH11 RECEIVER IS BLINDED DURING TRANSMISSION OF A CHARACTER.

15 AUTO-ECHO ENABLE

WHEN THIS BIT IS SET, CHARACTERS RECEIVED ON THIS LINE WILL BE HARDWARE ECHOED. SEE THE DISCUSSION OF AUTO-ECHO FOR FURTHER DETAILS.

5.2.4 CURRENT ADDRESS REGISTER ADDRESS X06

THIS REGISTER SHOULD BE LOADED ONLY AFTER THE SYSTEM CONTROL REGISTER (SCR) HAS HAD THE APPROPRIATE BITS SET TO SELECT THE DESIRED LINE NUMBER. WHEN THIS REGISTER IS LOADED, ADDRESS BITS 00-15 ARE TRANSFERRED INTO SEMICONDUCTOR MEMORIES IN THE DH11 FROM BITS 00-15 OF THIS REGISTER. ADDRESS BITS 16-17 ARE TRANSFERRED INTO SEMICONDUCTOR MEMORIES IN THE DH11 FROM BITS 4-5 OF THE SYSTEM CONTROL REGISTER.

INTERRUPTS MUST BE INHIBITED OR THE SCR SAVED BETWEEN THE SETTING OF THE SCR BITS 0-3 AND THE READ OR WRITE OF THE CURRENT ADDRESS REGISTER.

WHEN THIS REGISTER IS READ, IT WILL INDICATE THE CURRENT ADDRESS OF THE LINE SELECTED BY THE SYSTEM CONTROL REGISTER. BITS 16 AND 17 WILL APPEAR IN THE SILO STATUS REGISTER, BITS 6 AND 7.

5.2.5 BYTE COUNT REGISTER ADDRESS X10

IN THE SAME FASHION AS THE LINE PARAMETER AND CURRENT ADDRESS REGISTERS, THIS REGISTER SHOULD NOT BE LOADED OR READ WITHOUT FIRST SELECTING A LINE NUMBER BY MEANS OF THE LOWER-ORDER FOUR BITS OF THE SYSTEM CONTROL REGISTER. THIS REGISTER SHOULD BE LOADED WITH THE TWO'S COMPLEMENT OF THE NUMBER OF CHARACTERS (BYTES) TO BE TRANSMITTED ON THAT LINE. THE BYTE COUNT REGISTER IS READ/WRITE.

INTERRUPTS MUST BE INHIBITED OR THE SCR SAVED BETWEEN THE SETTING OF THE SCR BITS 0-3 AND THE READ OR WRITE OF THE BYTE COUNT REGISTER

5.2.6 BUFFER ACTIVE REGISTER (BAR) ADDRESS X12

THIS REGISTER CONTAINS ONE BIT FOR EACH LINE. THE BITS ARE INDIVIDUALLY SET USING BIS INSTRUCTIONS. SETTING A BIT INITIATES TRANSMISSION ON THE ASSOCIATED LINE. THE BIT IS CLEARED BY THE HARDWARE WHEN THE LAST CHARACTER TO BE TRANSMITTED IS LOADED INTO THE TRANSMITTER DATA HOLDING REGISTER OF THE UART FOR THIAT LINE. IT SHOULD BE NOTED THAT WHILE THE CLEARING OF A BAR DOES INDICATE THAT A MESSAGE MAY BE SENT, IT DOES NOT INDICATE THAT THE LAST CHARACTERS FROM THE PRECEDING MESSAGE HAVE BEEN COMPLETELY SENT. SPECIFICALLY, TWO MORE CHARACTERS WILL BE SENT AFTER THE BAR BIT CLEARS. THESE ARE THE LAST TWO CHARACTERS OF THE MESSAGE; ONE OF THEM WAS JUST STARTING WHEN THE BAR WAS CLEARED AND ONE WAS THAT FINAL CHARACTER THAT WAS LOADED INTO THE HOLDING REGISTER, THUS CLEARING THE BAR BIT. THIS EFFECT IS A NORMAL CONSEQUENCE OF DOUBLE-BUFFERED TRANSMISSION AND IS MENTIONED HERE FOR THE BENEFIT OF PROGRAMMERS WHO WANT TO WRITE PROGRAMS THAT CONTROL SUCH MODEM LEADS ARE REQUEST TO SEND. REQUEST TO SEND (RTS) SHOULD NOT BE DROPPED UNTIL AT LEAST TWO CHARACTER TIMES AFTER THE BAR BIT FOR A GIVEN LINE CLEARS.

THIS TIMING MAY BE EFFECTED BY SENDING TWO EXTRA (NULL) CHARACTERS IN A MESSAGE AND DROPPING RTS WHEN BAR CLEARS.

CLEARING A BAR BIT SHOULD NOT BE USED TO ABORT TRANSMISSION ON A LINE. RATHER, THE BYTE COUNT FOR THAT LINE SHOULD BE SET TO ZERO. THE BUFFER ACTIVE REGISTER BITS ARE READ/WRITE.

5.2.7 BREAK CONTROL REGISTER ADDRESS X14

THIS REGISTER CONTAINS ONE BIT FOR EACH LINE. SETTING A BIT IN THIS REGISTER WILL IMMEDIATELY GENERATE A BREAK CONDITION ON THE LINE CORRESPONDING TO THAT BIT NUMBER. CLEARING THE BIT WILL TERMINATE THE BREAK CONDITION. THE BREAK CONDITION MAY BE TIMED BY SENDING CHARACTERS DURING THE BREAK INTERVAL, SINCE THESE CHARACTERS WILL NEVER ACTUALLY REACH THE LINE. FURTHER COMMENTS CONCERNING THE TRANSMISSION OF BREAK SIGNALS MAY BE FOUND IN THE BREAK SIGNALS SECTION.

5.2.8 SILO STATUS REGISTER ADDRESS X16

THIS REGISTER IS ACTUALLY TWO BYTE-SIZED REGISTERS. THE BIT ASSIGNMENTS ARE:

BIT	DESCRIPTION
00-05	SILO ALARM LEVEL THE PROGRAM MAY LOAD AN INTEGRAL POWER OF 2 BETWEEN 0 AND 63 INTO THIS LOCATION (E.G., 0, 1, 2, 4, 8, 16, OR 32). WHEN THE NUMBER OF CHARACTERS STORED IN THE SILO EXCEEDS THAT NUMBER, AN INTERRUPT REQUEST (SYSTEM CONTROL REGISTER BIT 7) IS GENERATED, IF SYSTEM CONTROL REGISTER BIT 6 IS SET. THESE BITS ARE READ/WRITE.
06-07	READ EXTENDED MEMORY THESE BITS ARE READ ONLY AND CONTAIN THE A16 AND A17 BITS OF THE CURRENT LINE ADDRESS WHICH THE LINE SELECTION BITS OF THE SYSTEM CONTROL REGISTER ARE POINTING.
08-13	SILO FILL LEVEL THESE BITS ARE AN UP-DOWN COUNTER THAT INDICATES THE ACTUAL NUMBER OF CHARACTERS IN THE SILO. IT SHOULD BE NOTED THAT THERE ARE SIX BITS, HENCE NUMBERS BETWEEN 0 AND 63 CAN BE REPRESENTED. A FULL SILO HAS 64 ENTRIES AND THE FILL LEVEL APPEARS AS 00000, BUT ONE MAY EASILY TELL THE DIFFERENCE BETWEEN AN EMPTY SILO (00000) AND A FULL SILO (00000) BY CHECKING THE STORAGE OVERFLOW BIT (BIT 14 OF SYSTEM CONTROL). THESE BITS ARE READ ONLY.

5.3 DH11 FUNCTIONAL LOGIC PARTITIONING

THIS SECTION LISTS ALL OF THE PRINTS FOR ALL OF THE MODULES IN THE DH11 SUBSYSTEM. IT BRIEFLY SUMMARIZES THE FUNCTIONAL LOGIC DESCRIBED ON EACH PRINT. THIS INFORMATION MAY PROVE USEFUL FOR A MODULE OR CHIP REPLACEMENT GUIDE WHEN THE FUNCTTIONAL AREA OF LOGIC THAT IS FAULTY IS KNOWN TO BE INTERMITTENTLY FAILING.

M7277 CURRENT ADDR REG MEMORY AND ADDR SELECT

SH3: CONTROL STROBE MUX FOR THE "LPR" REGISTER

TRANSMITTER DATA MUX WITH AUTO-ECHO CONTROL LOGIC SELECTION

MSYN / SSYN TIMING CHAIN

DH11 MASTER CLEAR LOGIC

SH4: UNIBUS ADDRESS SELECTION LOGIC WITH JUMPERS

TRANSMITTER SCAN COUNTER WITH XMITTER STATUS MULTIPLEXOR (BAR N * TBMT N)

SH5: BYTE COUNT AND CURRENT ADDRESS MEMORY WRITE TIMING LOGIC

CURRENT ADDRESS MEMORY LOGIC BITS<17:08>

UNIBUS ADDRESS DRIVERS BITS <17:08>

SH6: BYTE COUNT AND CURRENT ADDRESS MEMORY ADDRESS SELECT MULTIPLEXOR

CURRENT ADDRESS MEMORY LOGIC FOR BITS <07:00>

UNIBUS ADDRESS DRIVERS FOR BITS <07:00>

TRANSMITTER EVEN/ODD BYTE DATA MULTIPLEXOR

M7279 FIFO BUFFER

SH1: INPUT DATA MULTIPLEXOR FOR SILO MEMORY

SH2: SILO MEMORY CHIPS (FOUR 64 X 4 CHIPS)

SILO MEMORY READ/WRITE TIMING LOGIC

"SSR" REGISTER BITS <13:08>

SILO ALARM LEVEL COMPARATOR

RECEIVED "DATA READY" STATUS FLAG

M7288 LINE PARAMETER CONTROL
****

SH3: CLOCK TIMING SIGNAL BUFFERS

SH4: TRANSMITTER CLOCK SELECTION MULTIPLEXORS LINES<03:00>

SH5: RECEIVER CLOCK SELECTION MULTIPLEXORS LINES <03:00>

AUTO ECHO AND HALF DUPLEX CONTROL LINES<03:00>

SH6: TRANSMITTER CLOCK SELECTION MULTIPLEXORS LINES<07:04>

SH7: RECEIVER CLOCK SELECTION MULTIPLEXORS LINES <07:04>

AUTO ECHO AND HALF DUPLEX CONTROL LINES <07:04>

SH8: TRANSMITTER CLOCK SELECTION MULTIPLEXORS LINES<11:08>

SH9: RECEIVER CLOCK SELECTION MULTIPLEXORS LINES <11:08>

AUTO ECHO AND HALF DUPLEX CONTROL LINES <11:08>

SH10: TRANSMITTER CLOCK SELECTION MULTIPLEXORS LINES<15:12>

SH11: RECEIVER CLOCK SELECTION MULTIPLEXORS LINES <15:12>

AUTO ECHO AND HALF DUPLEX CONTROL LINES <15:12>

M7280 #1 MULTIPLE UART CARD FOR LINES <0-7>
****

SH2: UART CHIPS BIT<1:0>

RECEIVER SCAN MULTIPLEXORS (CLR R DONE, STB RD, MASTER DA, AND MASTER OR)

SH3: UART CHIPS BIT<3:2>

SH4: UART CHIPS BIT<5:4>

RECEIVER SCAN MULTIPLEEXORS (MASTER FE AND MASTER PE)

SH5: UART CHIPS BIT<7:6>

TRANSMITTER SCAN MULTIPLEXOR

-12 VOLT DC REGULATOR

```
M7280 #2        MULTIPLE UART CARD FOR LINES <8-15>                                              SEQ 0040
**************************************************

        SH2:    UART CHIPS      BIT<9:8>
                RECEIVER SCAN MULTIPLEXORS (CLR R DONE, STB RD, MASTER DA, AND MASTER OR)
        SH3:    UART CHIPS      BIT<11:10>
        SH4:    UART CHIPS      BIT<13:12>
                RECEIVER SCAN MULTIPLEEXORS (MASTER FE AND MASTER PE)
        SH5:    UART CHIPS      BIT<15:14>
                TRANSMITTER SCAN MULTIPLEXOR
                -12 VOLT DC REGULATOR
M7289   SYSTEM CONTROL AND RCVR SCAN
************************************
SH3:    TRANSMITTER AND RECEIVER SCAN LOGIC
SH4:    TRANSMITTER AND RECEIVER SCAN TIMING
SH5:    HALF-DUPLEX CONTROL LOGIC
        UART DATA MULTIPLEXORS
SH6:    SYSTEM CONTROL REGISTER
M4540   DC11 - DH11 CLOCK
*************************
SH1:    CRYSTAL OSCILLATOR AND FREQUENCY DIVIDERS
M796    UNIBUS MASTER CONTROL
***************************
SH1:    NPR CONTROL LOGIC
M7281 #1        INTERRUPT CONTROL
*********************************
"A" SECTION:    RECEIVER INTERRUPT CONTROL LOGIC
"B" SECTION:    TRANSMITTER INTERRUPT CONTROL LOGIC
M7281 #2        NPR CONTROL
***************************
"A" SECTION:    USED TO GAIN CONTROL OF THE BUS FOR NPR XFERS
"B" SECTION:    (NOT USED)
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M7278 REGISTER AND BYTE CONTROL
****


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SH3:     CLEAR "BAR" REG MULTIPLEXOR

         BYTE COUNT MEMORY AND CONTROL - BITS<15:08>

         UNIBUS RECEIVERS          BIT<15:08>

SH4:     BYTE COUNT MEMORY AND CONTROL LOGIC      BIT<07:00>

         UNIBUS DATA RECEIVERS    BIT<07:00>

SH5 - SH8:        "BAR", "BCR", "LPR", AND "SSR" REGISTERS PLUS THE
                  DATA OUTPUT MUX AND UNIBUS DRIVERS FOR DATA LINES.

         SH5:     BIT<15:12>       SH7:     BIT<07:04>
         SH6:     BIT<11:08>       SH8:     BIT<03:00>
```

5.4 DH11 MODULE ALLOCATION CHART

VIEW FROM WIRING SIDE

ROW	SLOT 1	2	3	4	5	6	7	8	9
	M920	M7821	M7277	M7287	M7289	M7821	M7360	M7288	M920
	CABLE								CABLE
A	UNIBUS CONNECTOR (NOTE #3)	NPR CNTL	REG & BYTE CNT	CURRENT ADDRS & ADDRS	SYSTEM CNTL & RCV SCAN	INTR CNTL	PRIORITY SELECTOR (NOTE #9)	LINE PARAMETER CNTL	UNIBUS CONNECTOR (NOTES #1) & #2)
		M796				M405	M971		
							CABLE		
B		UNIBUS MASTER CNTL				EXTERNAL B CLOCK (NOTE #5)	DATA CABLE (NOTES #6 & #9)		
	M7247	M7247				M7280	M7280		M7279
C	* CONTROL MUX LINES 8-15 (NOTE #7)	* CONTROL MUX LINES 0-7 (NOTE #8)				MULTIPLE UART LINES 0-7	MULTIPLE UART LINES 8-15		FIFO BUFFER
D									
	M105	M7246							M405
E	* ADDRESS SELECTOR (NOTE #7)	* CONTROL SCAN (NOTES #4) & #8							EXTERNAL A CLOCK (NOTE #5)
	M7821								M4540
F	* INTR CNTL (NOTE #7)								DH11 DC11 CLOCK

FIGURE 2-4 DH11 MODULE UTILIZATION DIAGRAM
PAGE 2

E04

NOTES:

1. IF END OF BUS, REPLACE M920 WITH M930.
2. IF LAST UNIT IN BASIC BOX, REPLACE M920 WITH BC11A CABLE WHEN EXPANDING TO PERIPHERAL BOX.
3. IF FIRST UNIT IN EXPANDER BOX, REPLACE M920 WITH BC11A CABLE.
4. E02 MUST BE G727 GRANT CONTINUITY IF MODEM CONTROL MODULE SET IS NOT INSTALLED. * DENOTES DM11-BB MODEM CONTROL OPTION, WITH DH11-AA OR AC.
5. MODULE SLOTS PROVIDE FOR ADDITIONAL CLOCK RATES.
6. FOR DIAGNOSTIC CHECKOUT OF DH11-AA, AB, OR AC, REPLACES M971 WITH M974.
7. THIS SLOT CONTAINS MODEM CONTROL MODULE M7807 WITH DH11-AD.
8. THIS SLOT CONTAINS MODEM CONTROL MODULE M7808 WITH DH11-AD.
9. THIS SLOT CONTAINS EIA CONVERTER AND PRIORITY MODULE M5906 FOR DH11-AD OR AE.

6.0 MAINTENANCE PROCEDURES

6.1 INTRODUCTION

THIS SECTION DESCRIBES HOW TO USE MD-DZDHM AS A TROUBLESHOOTING TOOL. IT OUTLINES SOME PRELIMINARY CHECKS TO MAKE BEFORE STARTING DETAILED DEBUG PROCEDURES. IT ATTEMPTS TO PROVIDE THE USER WITH SUGGESTIONS FOR PROCEEDING FROM THE ERROR PRINTOUT TO DETAILED ISOLATION OF THE FAULT.

6.2 PRELIMINARY CHECKS

A. VISUAL INSPECTION

PERFORM A VISUAL INSPECTION OF THE DH11 SUBSYSTEM TO INSURE THAT:

1) ALL MODULES ARE INSTALLED IN THEIR PROPER SLOTS (REFER TO PARA 5.3) AND ARE PROPERLY SEATED.
2) THE CABLING IS CORRECT AND ALL CABLE CONNECTORS ARE FIRMLY SEATED.
3) THE REQUIRED MAINTENANCE CONNECTORS ARE PROPERLY INSTALLED. (REFER TO SECTION 6.3)

B. POWER CHECKS

USE A SCOPE TO CHECK THE FOLLOWING POWER SUPPLY AND CONTROL SIGNALS ON THE DH11 BACKPLANE:

+15 VDC	GRAY WIRE
-15 VDC	BLUE WIRE
+5 VDC	RED WIRE
AC LO	YELLOW WIRE
DC LO	PURPLE WIRE

NOTES: USE THE BLACK WIRE FOR GROUND REFERENCE

"AC LO" AND "DC LO" SHOULD BOTH BE "HIGH" - "LOW" GOING GLITCHES ON THESE LINES CAN CAUSE UNUSUAL AND SUBTLE SYMPTOMS.

6.3 MAINTENANCE CONNECTORS

MOST OF THE TESTS IN MD-DZDHM USE HARDWARE DIAGNOSTIC AIDS TO TURN THE DATA AROUND. THESE AIDS REQUIRE THAT THE USER INSTALL SPECIFIC JUMPERS OR MODULES BEFORE RUNNING THE PROGRAM. DEPENDENT UPON THE SPECIFIC DH11 CONFIGURATION AND THE TYPE OF TESTING DESIRED, CERTAIN MAINTENANCE AIDS MUST BE INSTALLED AS OUTLINED BELOW:

A. DH11-AA, AB, OR AC CONFIGURATIONS

1) TESTING LOGIC FOR ALL LINES WITHOUT DATA CABLES OR LEVEL CONVERTERS.

A. REMOVE THE DATA CABLE FROM SLOT B7 IN EACH
DH11 TO BE TESTED.
B. INSTALL AN M974 MAINT JUMPER MODULE INTO
SLOT B7 OF EACH DH11 TO BE TESTED.

2) TESTING ALL 16. LINE[illegible]NCLUDING DATA CABLES
WHICH CONNECT TO DISTRIBUTION PANEL. DOES NOT
TEST LEVEL CONVERTER CIRCUITS LOCATED IN DISTRIBUTION
PANEL.

A. INSTALL THE M974 MAINT JUMPER MODULE INTO SLOT B3
OF THE MULTIPLEXOR DISTRIBUTION PANEL FOR EACH
DH11 TO BE TESTED. ALL LEVEL CONVERTERS IN THE
DISTRIBUTION PANEL MUST BE REMOVED FOR THIS TEST.

3) TESTING ONE OR MORE SINGLE LINES INCLUDING EIA
LEVEL CONVERTERS AND DEVICE CABLES WHICH ARE
NOT TESTED IN 1 AND 2 ABOVE.

A. INSTALL AN H315 TEST CONNECTOR AT THE END OF THE
DEVICE CABLE FOR EACH LINE TO BE TESTED.

B. DH11-AD CONFIGURATION

1. TESTING ALL 16. LINES WITHOUT DATA CABLES

A. DISCONNECT THE DATA CABLES (2) FROM THE TWO
CONNECTORS ON THE M5906 MODULE (SLOT AB7 OF
THE DH11 BACKPLANE.

B. INSTALL TWO H8611 TEST CONNECTORS ON THE M5906
IN PLACE OF THE CABLES.

2. TESTING ONE OR MORE SINGLE LINES INCLUDING DATA CABLES

A. DISCONNECT THE DEVICE CABLE FROM THE DH11-AD
DISTRIBUTION PANEL FOR EACH LINE TO BE TESTED.

B. INSTALL AN H315 TEST CONNECTOR IN ITS PLACE
ON THE DH11-AD DISTRIBUTION PANEL.

NOTE: TO TEST THE DEVICE CABLE AS WELL, INSTALL
THE H315 TEST CONNECTOR AT THE END OF THE
DEVICE CABLE AND LEAVE THE DEVICE CABLE
CONNECTED TO THE DISTRIBUTION PANEL.
WHEN RUN IN THIS CONFIGURATION THE OPERATOR
CAN SET THE SR=002000, THEREBY ENABLING THE PROGRAM
TO PERFORM AN ABBREVIATED DM11-BB TEST. IN
THIS WAY ALL THE LEVEL CONVERTERS AND CABLES
CAN BE CHECKED WITH JUST ONE PROGRAM.

6.4 COMPLETE DH11 SUBSYSTEM CHECKOUT

COMPLETE DH11 SUB-SYSTEM VERIFICATION INVOLVES RUNNING THE FOLLOWING PROGRAMS IN THE SEQUENCE SUGGESTED:

A. MD-11-DZDHM DH11 DIAGNOSTIC

LOAD AND RUN THE BASIC DIAGNOSTIC CONFIGURED TO TEST ALL 16. LINES ON ALL DH11'S INSTALLED IN THE SYSTEM AND ALLOW IT TO COMPLETE AT LEAST TWO COMPLETE PASSES. (THE FIRST PASS IS A QUICK VERIFY WITHOUT SUB-TEST ITERATIONS AND THE SECOND PASS INCLUDES SUB-TEST ITERATIONS). IF ANY ERRORS ARE REPORTED, STOP HERE, AND REFER TO PARA 6.5 FOR SUBSEQUENT PROCEDURES.

B. MD-11-DZDHN DATA RELIABILITY TEST

LOAD AND RUN THE DATA RELIABILITY SUB-PROGRAM OF MD-11-DZDHN CONFIGURED TO TEST ALL 16. LINES ON ALL DH11'S INSTALLED IN THE SYSTEM AND ALLOW IT TO COMPLETE AT LEAST ONE PASS WITH SR07=0 (QUICK TEST MODE). IN THIS MODE ONE PASS TAKES APPROXIMATELY 5 MINUTES. IF ANY ERRORS ARE REPORTED, REFER TO THE DOCUMENTATION FOR MD-11-DZDHN FOR SUBSEQUENT PROCEDURES.

FOR MORE COMPLETE DATA RELIABILITY TESTING ,THE PROGRAM MAY BE RUN WITH SR07=1 (COMPLETE TEST) BUT THIS WILL REQUIRE A RUN TIME OF APPROX 15. MINUTES FOR EACH SELECTED LINE, SO IN MOST CASES IT IS ONLY USED FOR OVER-NIGHT RUNS.

C. SYSTEMS EXERCISER "DHAX" EXERCISER MODULE

WHERE "X" DESIGNATES THE REVISION LEVEL IN USE.

ASSUMING THAT BOTH THE DIAGNOSTIC AND THE DATA RELIABILITY INDICATE ERROR FREE PERFORMANCE, THE FINAL STEP IS TO RUN THE SYSTEM'S EXERCISER PROGRAM THAT INCLUDES A DH11 EXERCISER MODULE. THIS IS NECESSARY TO DETECT CERTAIN CLASSES OF BUS PROBLEMS THAT ONLY MANIFEST THEMSELVES WHEN THE DH11 IS RUN CONCURRENTLY WITH ALL THE OTHER DEVICES IN THE SYSTEM

IF ALL TESTS UP TO THIS POINT INDICATE ERROR FREE PERFORMANCE OF THE DH11, THE SUB-SYSTEM SHOULD BE CAPABLE OF RUNNING SYSTEM SOFTWARE. THERE ARE, HOWEVER, CERTAIN SUBTLE OR INTERMITTENT PROBLEMS THAT COULD STILL CAUSE THE DH11 SUB-SYSTEM TO FAIL IN THE OPERATING SYSTEM ENVIRONMENT. IN THESE RARE CASES, THE USER WILL HAVE TO USE THE SYMPTOMS GATHERED FROM THE FAILING MODE TO ISOLATE THE PROBLEM. ONCE A SYMPTOM IS RECOGNIZED, THE TWO OTHER PROGRAMS IN MD-DZDHN, THE ECHO TEST AND THE DATA PATTERNS/CABLE TESTS MAY PROVE USEFUL AS A TROUBLESHOOTING AID TO DUPLICATE THE PROBLEM FOR FAULT ISOLATION.

6.5 MAINTENANCE HEADER DESCRIPTION

EACH TEST IN THE LISTING IS PREFACED BY A STANDARD MAINTENANCE HEADER TO PROVIDE INFORMATION THAT WILL FACILITATE RAPID ISOLATION OF THE FAULT THAT CAUSED A PARTICULAR TEST TO FAIL. EACH HEADER HAS THE SAME FORMAT (SEE EXAMPLE BELOW) AS FOLLOWS:

TEST ABSTRACT: THIS IS A CAPSULE SUMMARY OF WHAT THE TEST IS DESIGNED TO TEST AND HOW IT OPERATES.

ERRORS: LISTS THE PARTICULAR ERROR CALLS INVOKED BY THE TEST WHEN A FAULT IS DETECTED. (REFER TO PARA 3.1.2 AND 3.1.3 FOR A DETAILED DESCRIPTION OF THE ERROR CALL INFORMATION)

SYNC: LISTS ONE OR MORE SIGNALS THAT MAY BE USED TO SYNCHRONIZE THE OSCILLOSCOPE WHEN AN ERROR LOOP IS ESTABLISHED (SR09=1). FOR (H) SIGNALS USE (-) SLOPE TO TRIGGER ON THE TRAILING EDGE OF THE SIGNAL AND FOR (L) SIGNALS USE (+) SLOPE TO TRIGGER ON THE TRAILING EDGE.

DEBUG: CONTAINS SUGGESTIONS OF THINGS TO CHECK AND WHERE POSSIBLE THE MOST PROBABLE MODULE IS GIVEN.

KEY LOGIC: CONTAINS A LIST OF LOGIC SIGNALS AND/OR LOGIC COMPONENTS WITH MODULE NAMES AND PRINT NUMBERS TO RELATE THE TEST ROUTINE FUNCTION TO THE FUNCTIONAL AREAS OF LOGIC WITHIN THE PRINTS. WHERE POSSIBLE SIGNAL PIN NOS. ARE LISTED.

EXAMPLE: MAINTENANCE HEADER FOR TEST 1
****

TEST ABSTRACT:
****

THIS TEST ATTEMPTS TO REFERENCE EACH OF THE EIGHT REGISTERS IN THE DH11 SELECTED FOR TEST USING ITS ASSIGNED UNIBUS ADDRESS. IF ANY ADDRESS FAILS TO RESPOND A BUS ERROR TRAP VECTORS THE TEST TO THE ERROR SET-UP AND CALL ROUTINE. AFTER THE ERROR IS TYPED THE TEST WILL TEST THE NEXT DH11 ADDRESS IN SEQUENCE UNTIL ALL EIGHT ARE TESTED.

ERRORS:
****

1.) [ERROR 1] REPORTS THAT THE REGISTER WHOSE ADDRESS IS IN R2 FAILED TO RESPOND WITH "SSYN" WHEN REFERENCED.

SYNC: (NONE)
*****

DEBUG:
******

1.) PROBLEM IS MOST LIKELY THE M7277 MODULE.
2.) IF ALL EIGHT REGISTERS FAIL TO RESPOND, MAKE SURE THAT YOU CONFIGURED THE PROGRAM PROPERLY BEFORE STARTING. IF YOU DID, CHECK THE SETTINGS OF THE ADDRESS SELECT JUMPERS ON THE M7277 MODULE.
3.) IF ONE OR MORE RESPONDED PROPERLY, SET UP AN ERROR SCOPE LOOP AND BACKTRACK THROUGH THE LOGIC STARTING WITH THE KEY LOGIC SIGNALS LISTED BELOW.

KEY LOGIC:
****

M7277	SH3	SSYN H	CE2
		DEVICE RESPONDING L	E72-6
	SH4	DEVICE SELECTED H	E09-11

↑

FLOW CHART
****

MD-11-DZDHM-B DH11 DIAGNOSTIC

****

TABLE OF CONTENTS
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TABLE OF CONTENTS
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TABLE OF CONTENTS
****

```
         ***********
         **START  **
         ***********
              I
      -----------------
     /  WAS PROGRAM    \YES     ***
    / STARTED AT 200(8) ------>*B*
   /                     \      ***
   -----------------------
              I NO
              I
      -----------------
     / WAS IT STARTED  \YES     ***
    /   AT 204(8) ?     ------>*A*
   /                     \      ***
   -----------------------
              I NO
              I
      -----------------
     / WAS IT STARTED  \YES     ***
    /    AT 210 ?       ------>*C*
   /                     \      ***
   -----------------------
              I NO
              I
       *****************
       * SCHOOL'S OUT  *
       *   UNDEFINED   *
       * RESULTS !!!!  *
       *****************
              I
```

```
                 ************
                 *BEGINA(01)*
                 ************
                      I
          ************************
          *  INIT PROGRAM VAR-   *
          *  IABLES AND SET UP   *
          *   SYSTEM VECTORS     *
          ************************
          START1      I
          ************************
          *  SET UP BUS ERROR    *
          *   AND RSVD INSTR     *
          *    TRAP VECTORS      *
          ************************
                      I
              ------------------
    YES      / HAS TITLE BEEN   \
   I------  /    TYPED ONCE ?    \
   I       /                      \
   I      ------------------------
   I                I NO
   I         ********************
   I        /   TYPE PROGRAM    /
   I       /  TITLE AND SET    /
   I      /       FLAG        /
   I      ********************
   ---------------->I
              ------------------
             /   WAS PROGRAM    \YES
            /STARTED AT 200(8) ?-----------I
           /                      \        I
          ------------------------         I
                    I NO                   I
                    I                      I
                    I                      V     INPARA(57)
                    I       **************************
                    I       **  GO ASK FOR VECTOR   **
                    I       **    DISPLACEMENT      **
                    I       **                      **
                    I       ************I*************
                    <-------------------
                    I
                    V
```

```
                      ************
                      *START2(01)*
                      ************
                            I
               ************************
               * SET UP POINTERS TO   *
               *  PARAMETER TABLES    *
               *  START WITH DH #00   *
               ************************
                            I
                      ************
                      *RESTRT    *
             ***      ************
             *D*            I
             ***   ************************
              I    * GENERATE DH11 DEV #  *
              ---> UPDATE TABLE POINT-    *
                   *        ERS           *
                   ************************
                            I
                  ------------------
                 /  IS THIS DH11    \YES
                /SELECTED FOR TEST ?-----I
               /                      \  I
               ------------------------  I
                          I NO           I
                  *****************      I
                  *   SHIFT DH11  *      I
                  * DEVICE SELECT *      I
                  *     MARKER    *      I
                  *****************      I
                          I              I
                          I          I----
                          I          V
                          I      ************
                          I      *RSTRTA(02)*
                          I      ************
                          I
                          V
                  ------------------
                 / TESTED FOR 16.   \NO     ***
                /    DEVICES YET ?   --->*D*
               /                      \     ***
               ------------------------
                          I YES
                      ************
                      *START2(01)*
                      ************
```

```
      ***                ***                 ***
      *A*                *B*                 *C*
      ***                ***                 ***
       I                  I                   I
****************  ****************  ****************
*              *  * SET VECTOR   *  * MOVE A 177777 *
*   CLEAR R0   *  * INPUT FLAG   *  *    INTO R0    *
*              *  *              *  *               *
****************  ****************  ****************
       I                  I                   I
       -------------------I--------------------
                          I
                          V
                    ************
                    *BEGINA(01)*
                    ************

                          ------------------
                    204  /   WHAT WAS       \210
               I--------/  START ADDRESS?    ----------I
               I       /                      \        I
               I      ------------------------         I
               V                I 200                  V
         ************      ************           ************
         *INPAR(02) *      *START2(01)*           *INPAR3(02)*
```

```
          ************              ************                                   ************
          *RSTRTA(01)*              *INPAR(01) *                                   *INPAR3(01)*
          ************              ************                                   ************
               I                         I<--------------------                         I
    ***********************     *******************          I              *******************
    *SET UP CURRENT ADDR- *    / TYPE MESSAGE TO  /          I             / TYPE MESSAGE TO  /
    *ESS,VECTOR,AND PRIO- *   /  ASK FOR DEVICE  /           I            / ASK FOR DEVICE   /
    * RITY LEVEL FOR TEST *  /     ADDRESS      /            I           / SELECT PARAMETER /
    ***********************  *******************             I           *******************
               I     SUNUM(56)           I<------------                              I<-------------
  ************************       ----------------     I                     ----------------    I
  **  GO SET UP DEVICE  **      /   USER DONE    \NO  I  ******************   / USER DONE TYP- \NO I
  **  NUMBER IN MESSAGE **     / TYPING ADDRESS   \---I /  TYPE INVALID  /   / ING PARAMETER    \---I
  **                    **    /                    \   / DEVICE ADDRESS /   /                    \
  ************************    ----------------------  / ERROR MESSAGE  /    ----------------------
               I                         I YES         ******************              I YES
     ********************                I   CHKADR(58)        I               *****************
    /      PRINT:      /    ************************          I               * SET UP DEVICE *
   /"TESTING DH11 #XX"/     ** GO CHECK VALIDITY  **          I               *SELECTION PARA-*
  /                  /      **    OF ADDRESS      **          I               * METER "DHSEL" *
  ********************      **                    **          I               *****************
               I            ************************          I                        I
               I     LDTBF1(55)          I                    I               *******************
  ************************         ----------------           I              / TYPE MESSAGE TO  /
  ** GO SET UP XMITTER  **        /  VALID DEVICE  \NO        I             /ASK FOR LINE SEL- /
  **    DATA BUFFER     **       / ADDRESS FOR DH11 \---------I            / ECTION PARAMETER /
  **                    **      /                    \                     *******************
  ************************      ----------------------                                 I<-------------
               I                         I YES                                 ----------------    I
      *****************          *******************                          / USER DONE TYPING\NO I
      *  INIT SCOPE   *         / TYPE MESSAGE TO  /                         /    PARAMETER      \---I
      *  LOOP RETURN  *        / ASK FOR VECTOR   / <-------------------    /                     \
      *   ADDRESS     *       /     ADDRESS      /                     I    -----------------------
      *****************       *******************                      I               I YES
               I                         I<------------                I        ****************
         ************           ----------------      I  ******************    *  SET UP LINE  *
         *TST1(03)  *          /   USER DONE    \NO  I  /  TYPE INVALID  /     *SELECTION PARA-*
         ************         / TYPING ADDRESS   \---I / VECTOR ADDRESS /      *METER "LINSEL" *
                             /                    \     /               /       *****************
                             ----------------------    ******************               I
                                         I YES                  I               ----------------
                                         I   CHKVCT(58)        I              /                \NO
                            ************************           I             / HALT AFTER SETUP \---I
                            ** GO CHECK VALIDITY  **           I            /                    \  I
                            **    OF ADDRESS      **           I            ----------------------  I
                            **                    **           I                   I YES             I
                            ************************           I               ***********           I
                                         I                     I               **HALT   **           I
                                  ----------------             I               ***********           I
                                 /  VALID VECTOR  \NO          I                                     I
                                /     ADDRESS      \-----------I                    I                I
                               /                    \                              V                 I
                               ----------------------                         CONTINUE               I
                                         I YES                                DEPRESSED              V
                                   ************                                   I           ************
                                   *INPAR3(02)*                                   ----------->*START2(01)*
```

```
                                ************
                                *TST1(02)  *
                                ************
                                      I
                                *****************
                                *LOAD R2 AND R5 *
                                *WITH DHADR AND *
                                *ADD 16(8) TO R5*
                                *****************
                                      I
                                *****************
                                * SAVE TIMEOUT  *                              ***
                                * VECTOR ON THE *                              *A*
                                *     STACK     *                              ***
                                *****************                     3$        I    SUER1(55)
                                      I                              *************************
                                *****************                    **   GO SET UP ERROR    **
                                *SET UP TIMEOUT *                    **  INFORMATION TO BE   **
                                *VECTOR TO GO TO*                    **       PRINTED        **
                                *  3$: ON TRAP  *                    *************************
                                *****************                               I
                                1$    I                                 *****************
                                *****************                       *  RESET SP TO  *
                                *  SELECT NEXT  *                       *  CORRECT FOR  *
                       -------->* DH11 REGISTER *                       *     TRAP      *
                       I        *    ADDRESS    *                       *****************
                       I        *****************                               I     $ERROR(53)
                       I        2$    I                              *************************
                       I        *****************                    ** REPORT TIMEOUT TRAP **
                       I        *  ATTEMPT TO   *                    **AT SELECTED DH11 ADDR**
                       I        *ACCESS SELECTED*<-------------      **    EM1,DH1,DT1,0    **
                       I        *    ADDRESS    *             I      *************************
                       I        *****************             I                 I
                       I              I                       I          -----------------
                       I        -----------------             I   YES   / LOOP ON FAILING \
                       I       /  DID SELECTED   \YES    ***  I--------/     ADDRESS ?     \
                       I      /DH11 ADDRESS CAUSE \----->*A*          /      SR09=1         \
                       I     /   TIMEOUT TRAP ?    \     ***         -----------------------
                       I     -----------------------                            I NO
                       I              I NO<-------------------------------------
                       I        -----------------
                       I  NO   /   TESTED ALL    \
                       I------/  ADDRESSES FOR    \
                             /     THIS DH11       \
                             -----------------------
                                      I YES
                                *****************
                                *  RESTORE BUS  *
                                *TIMEOUT VECTOR *
                                *  FROM STACK   *
                                *****************
                                      I
                                 ************
                                 *$SCOPE(52)*
```

```
                    ************
                    *TST2      *
                    ************
                         I
                 ************************
                 *SET UP TABLE OF TEST *
                 * ADDRESSES FOR "SCR" *
                 *"LPR","BKR",AND"SSR" *
                 ************************
                         I
                   *****************                            ***
                   *               *                            *A*
                   * MAKE S/B = 0  *                            ***
                   *               *                             I    SUER2(55)
                   *****************                  **************************
                   1$        I                        **   GO SET UP ERROR    **
                   *****************                  ** INFORMATION TO BE    **
                   * LOAD R2 WITH  *                  **       PRINTED        **
     ------------->* TEST ADDRESS  *                  **************************
     I             *  FROM TABLE   *                             I    $ERROR(53)
     I             *****************                  **************************
     I                       I                        **    REPORT "MSTCLR"   **
     I             -----------------                  ** FAILED TO CLEAR REG  **
     I       YES  / TESTED ALL FOUR \                 **    EM3,DH2,DT2,0     **
     I   I-------/ TEST ADDRESSES ?  \                **************************
     I   V      /                     \                              I
     I ************  -----------------------             -------------------
     I *$SCOPE(52)*          I NO                   YES / LOOP ON FAILING   \
     I ************  2$      I<-------------------------/ ADDRESS SR09=1      \
     I             *****************                  /                       \
     I             * SET ALL WRITE *                  -------------------------
     I             * BITS AT TEST  *                             I NO
     I             *    ADDRESS    *                             I
     I             *****************                             I
     I                       I                                   I
     I             *****************                             I
     I             * SET "MSTCLR"  *                             I
     I             *BIT IN SCR REG *                             I
     I             *               *                             I
     I             *****************                             I
     I                       I                                   I
     I             -----------------                             I
     I            /  DID "MSTCLR"   \NO      ***                 I
     I           / CLEAR ALL BITS AT \----->*A*                  I
     I          /    TEST ADDRESS     \      ***                 I
     I          -------------------------                        I
     I                       I YES                               I
     I                       I                                   I
     I                       I                                   I
```

```
                                ************                                 ***                          ***
                                *TST3      *                                 *A*                          *B*
                                ************                                 ***                          ***
                                     I                                        I     SUER2(55)              I     SUER2(55)
                          ***********************                    ************************    ************************
                          * SET UP REGADR,ERROR *                    **SET UP ERROR INFORM-  **  **SET UP ERROR INFORM-  **
                          * LOOP RETURN,AND BIT *                    ** ATION TO BE PRINTED  **  ** ATION TO BE PRINTED  **
                          *MARKER TO SELECT BIT *                    **                      **  **                      **
                          ***********************                    ************************    ************************
                  ------------------->I  1$                                    I     $ERROR(53)            I     $ERROR(53)
                  I          -----------------                       ************************    ************************
                  I         /   IS THIS BIT    \YES                  **  REPORT "SCR" REG    **  **  REPORT "SCR" REG    **
                  I        / SELECTED FOR TEST  \-----               **     BIT FAILURE      **  **     BIT FAILURE      **
                  I  ***  /      (RGMSK1)        \    I              **                      **  **                      **
                  I  *C*  ------------------------    I              ************************    ************************
                  I  ***              I NO            I                          I                           I
                  I   I-------------->I  2$           I                  ------------------          ------------------
                  I            *****************      I    ***  NO      / LOOP ON FAILING  \  ***NO  / LOOP ON FAILING  \
                  I            *  SELECT NEXT  *      I    *C*<------- /  BIT ? SR09=1      \ *C*<--/   BIT ? SR09=1     \
                  I            * BIT POSITION  *      I    ***        /   EM2,DH2,DT2,0      \***  /    EM2,DH2,DT2,0      \
                  I            *  TO THE LEFT  *      I               ------------------------     ------------------------
                  I            *****************      I                          I YES                       I YES
                  I            3$             I       I                          I                           I
                  I             ----------------      I                          I                           I
                  I     YES    /  ANY BITS LEFT  \    I                          I                           I
                  I-----------/     TO TEST ?     \   I                          I                           I
                             /                     \  I                          I                           I
                             -----------------------  I                          I                           I
                                      I NO            I                          I                           I
                  I--------------------               I                          I                           I
                  V                                   V                          V                           I
               ************                I-------------------------------------------------------------------
               *$SCOPE(52)*                I
               ************                V
                               4$
                               *****************
                               * SET SELECTED  *
                               * BIT IN "SCR"  *
                               *               *
                               *****************
                                       I
                                ----------------
                               /  DID SELECTED  \NO        ***
                              / BIT SET PROPERLY \----->*A*
                             /                    \        ***
                             ----------------------
                                      I YES
                               *****************
                               * NOW CLEAR THE *
                               * SELECTED BIT  *
                               *               *
                               *****************
                                       I
                                ----------------
                  ***  YES     /  DID SELECTED  \NO        ***
                  *C*<-------/     BIT CLEAR     \----->*B*
                  ***       /     PROPERLY ?      \        ***
```

```
                      ************                              ***
                      *TST4      *                              *B*
                      ************                              ***
                           I                                     I    SUER2(55)
                 *************************             ***************************
                 * SET UP REGADR, AND    *             **   GO SET UP ERROR     **
                 *   BIT TEST MARKER     *             ** INFORMATION TO BE     **
                 *                       *             **       PRINTED         **
                 *************************             ***************************
      ------------------------>I                                 I
      I              1$        I                           *****************
      I              ------------------                    *   SET UP TO   *
      I            /  IS THIS A READ  \YES                 * LOOP BACK TO  *
      I           /   ONLY BIT ?       \----I              *  3$: ON EROR  *
      I          /                      \   I              *****************
      I  ***     --------------------------  I                   I   $ERROR(53)
      I  *A*----------------->I NO          I              ***************************
      I  ***         2$       I             I              **REPORT THE READ ONLY  **
      I              *****************      I              **     BIT GOT SET       **
      I              *SELECT NEXT BIT*      I              **    EM2,DH2,DT2,0      **
      I              *POSITION TO THE*      I              ***************************
      I              *      LEFT     *      I                        I
      I              *****************      I                 ------------------
      I                       I             I     ***   NO    /  LOOP ON THE     \
      I              ------------------     I     *A*<-------/   FAILING BIT      \
      I      YES   / ANY BITS LEFT TO\      I     ***       /                      \
      I-----------/      TEST ?       \     I              --------------------------
                 /                     \    I                        I YES
                 -------------------------  I                        I
                          I NO              I                        I
         I-------------------               I                        I
         V                                  V                        I
   ************                       I---------------------------------
   *$SCOPE(52)*                       I
   ************                       I
                     3$               V
                     *****************
                     *TRY TO SET THE *
                     * READ ONLY BIT *
                     *               *
                     *****************
                              I
                     ------------------
         ***  NO    /  DID THE READ    \
         *A*<------/  ONLY BIT SET ?    \
         ***      /                      \
                 --------------------------
                              I YES
                             ***
                             *B*
```

```
                 ************             ***                          ***
                 *TST5      *             *A*                          *C*
                 ************             ***                          ***
                      I               5$   I                            I   SUER2(55)
             ***********************  *****************        ************************
             *SET UP REGADR, ERROR *  * ENABLE MAINT  *        **   GO SET UP ERROR   **
             * LOOP RETURN, AND A  *  *MODE AND CLEAR *        **  INFORMATION TO BE  **
             *  BIT TEST MARKER    *  *   THE BIT     *        **      PRINTED        **
             ***********************  *****************        ************************
     --------------->I                     I                            I   $ERROR(53)
     I          1$   I              ---------------------      ************************
     I        -----------------    / DID THE BIT GET \NO       **  REPORT THE "SCR"   **
     I       /  CAN BIT BE SET \YES/    CLEARED ?     \-----I  **   REG BIT FAILURE   **
     I      / IN MAINT. MODE ?  \--I /                 \    I  **    EM2,DH2,DT2,0    **
     I     /                     \ I ---------------------  I  ************************
     I ***  ----------------------- I  ***     I YES         I                I
     I *B* ---------->I NO          I  *B*<----              I          ----------------
     I ***      2$    I             I  ***                   I  YES    / LOOP ON FAILING \
     I        ****************     I          I--------------  I------/       BIT ?       \
     I        *SELECT NEXT BIT*    I          V      SUER2(55)   I     /                     \
     I        *POSITION TO THE*    I  ************************   I     -----------------------
     I        *     LEFT      *    I  **SET UP ERROR INFORM- **  I              I NO
     I        ****************     I  ** ATION TO BE PRINTED **  I             ***
     I              I              I  **                     **  I             *B*
     I        ----------------     I  ************************   I             ***
     I  YES  / ANY BITS LEFT  \    I          I    $ERROR(53)    I
     I------/    TO TEST ?     \   I  ************************   I             ***
           /                    \  I  **  REPORT THE "SCR"   **  I             *D*
           ----------------------- I  **REGISTER BIT FAILURE **  I             ***
                    I NO           I  **    EM2,DH2,DT2,0    **  I              I   SUER2(55)
   I-----------------              I  ************************   I  ************************
   V               ***             I          I                  I  **   GO SET UP ERROR   **
 ************      *E*->I-----------V    ------------------      I  **  INFORMATION TO BE  **
 *$SCOPE(52)*  3$  ***  V          ↑ YES / LOOP ON FAILING \     I  **      PRINTED        **
 ************      ****I***********I------/     BIT ?        \   I  ************************
                   * ENABLE MAINT. *     /                    \  I            I   $ERROR(53)
                   * MODE AND SET  *     ----------------------  I  ************************
                   *    THE BIT    *           I NO              I  **  REPORT THE "SCR"   **
                   *****************          ***                I  **   REG BIT FAILURE   **
                           I                  *B*                I  **    EM2,DH2,DT2,0    **
                   -----------------          ***                I  ************************
                  /  DID SELECTED   \NO       ***                I             I
                 /  BIT GET SET IN   \------->*C*                I        ------------------
                /   MAINT. MODE ?     \       ***                I YES   / LOOP ON FAILING \
                -----------------------                          I<-----/       BIT ?       \
                4$        I YES                                  I     /                     \
                *****************                                V     -----------------------
                *DISABLE MAINT. *                               ***            I NO
                *MODE AND TRY TO*                               *E*           ***
                * CLEAR THE BIT *                               ***           *B*
                *****************                                             ***
                          I
                  -----------------
        ***  NO  /   DID THE BIT   \YES     ***
        *A*<----/ CLEAR WITH MAINT. \------>*D*
        ***    /  MODE TURNED OFF    \      ***
```

```
                    ************                                 ***                          ***
                    *TST6      *                                 *C*                          *B*
                    ************                                 ***                          ***
                         I                                        I    SUER2(55)               I    SUER2(55)
                 **********************                 ************************     ************************
                 *SET UP REGADR, ERROR *                **  GO SET UP INFORM-   **     **  GO SET UP INFORM-   **
                 * LOOP RETURN, AND A  *                ** ATION TO BE PRINTED **     ** ATION TO BE PRINTED **
                 *   BIT TEST MARKER   *                **                      **     **                      **
                 **********************                 ************************     ************************
       ------------------>I                                        I    $ERROR(53)             I    $ERROR(53)
       I           1$     I                             ************************     ************************
       I            ---------------                     **  REPORT "LPR" BIT    **     **  REPORT "LPR" BIT    **
       I           /   CAN BIT BE SET \YES              **    FAILED TO SET     **     **   FAILED TO CLEAR    **
       I          /    IN THE "LPR"    \-----I          **    EM4,DH2,DT2,0     **     **    EM4,DH2,DT2,0     **
       I         /                      \    I          ************************     ************************
       I ***     ------------------------    I                     I                            I
       I *A*------------------>I NO          I                -----------------           -----------------
       I ***       2$          I             I        YES    / LOOP ON FAILING \    YES  / LOOP ON FAILING \
       I           *****************         I<-------------/  BIT ? SR09 = 1   \ I------/  BIT ? SR09 = 1   \
       I           *  SELECT NEXT  *         I             /                     \I     /                     \
       I           * BIT POSITION  *         I             -----------------------I     -----------------------
       I           *  TO THE LEFT  *         I                     I NO           I             I NO
       I           *****************         I                     ***            I             ***
       I                   I                 I                     *D*            I             *A*
       I            ---------------          I                     ***            I             ***
       I   YES     /  ANY MORE BITS  \       I                                    I
       I----------/  LEFT TO TEST ?   \      I                                    I
                 /                     \     I                                    I
                 ------------------------    I                                    I
                          I NO               I                                    I
      I--------------------                  I                                    I
      V                   I------------------V------------------------------------I
 ************      3$     V
 *$SCOPE(52)*      *****************
 ************      *SET THE SELECT *
                   * ED BIT IN THE *
                   *   "LPR" REG   *
                   *****************
                           I
                    ---------------
                   /  DID SELECTED  \NO     ***
                  /   BIT SET OK ?   \---->*C*
                 /                    \     ***
       ***       ------------------------
       *D*------------------>I YES
       ***         4$        I
                   *****************
                   * NOW CLEAR THE *
                   * SELECTED BIT  *
                   *               *
                   *****************
                           I
                    ---------------
       ***  YES    /  DID SELECTED  \NO     ***
       *A*<----- /   BIT CLEAR OK    \---->*B*
       ***      /                     \     ***
```

J05


```
                    ************                                        ***                           ***
                    *TST7      *                                        *C*                           *B*
                    ************                                        ***                           ***
                         I                                               I    SUER2(55)                I    SUER2(55)
                 ************************                  **************************    **************************
                 * SET UP REGADR,ERROR  *                  ** GO SET UP INFORMAT- **    ** GO SET UP INFORMAT- **
                 * LOOP RETURN, AND A   *                  **  ION TO BE PRINTED  **    **  ION TO BE PRINTED  **
                 *   BIT TEST MARKER    *                  **                     **    **                     **
                 ************************                  **************************    **************************
 -------------------->I                                                  I    $ERROR(53)               I    $ERROR(53)
 I               1$   I                                    **************************    **************************
 I                 ----------------                        **   GO REPORT "BKR"   **    **   GO REPORT "BKR"   **
 I                /  CAN BIT BE SET \YES                   **  BIT FAILED TO SET  **    ** BIT FAILED TO CLEAR **
 I               /   IN THE "BKR"    \----I                **   EM5,DH2,DT2,0     **    **   EM5,DH2,DT2,0     **
 I              /                     \   I                **************************    **************************
 I   ***        ------------------------  I                              I                             I
 I   *A*-------------->I NO               I                         ----------------              ----------------
 I   ***        2$     I                  I      YES        /  LOOP ON THE     \     YES     /  LOOP ON THE     \
 I              *****************         I<---------------/  FAILING BIT ?     \   I-----/  FAILING BIT ?     \
 I              *SELECT THE NEXT*         I               /   SR09 = 1           \  I    /   SR09 =F 1         \
 I              * BIT POSITION  *         I               -------------------------  I    -------------------------
 I              *  TO THE LEFT  *         I                          I NO            I                I NO
 I              *****************         I                          ***             I                ***
 I                     I                  I                          *D*             I                *A*
 I                ----------------        I                          ***             I                ***
 I       YES     /  ANY MORE BITS \       I                                          I
 I--------------/  LEFT TO TEST ?  \      I                                          I
               /                    \     I                                          I
               ------------------------   I                                          I
    I------------------I NO               I                                          I
    I                                     V<------------------------------------------
    I                                     I
    V               3$                    I
 ************       *****************     I
 *$SCOPE(52)*       *SET THE SELECT-*     I
 ************       * ED "BKR" BIT  * <----
                    *               *
                    *****************
                           I
                    -----------------
                   /                 \NO       ***
                  /   DID IT SET OK?  \---->*C*
                 /                     \       ***
   ***          -------------------------
   *D*---------------->I YES
   ***          4$     I
                *****************
                * NOW CLEAR THE *
                *SELECTED "BKR" *
                *      BIT      *
                *****************
                       I
                -----------------
  ***  YES     /                 \NO       ***
  *A*<-------/  DID IT CLEAR OK   \---->*B*
  ***        /                      \      ***
```

```
                   ************                            ***                         ***
                   *TST10     *                            *C*                         *B*
                   ************                            ***                         ***
                        I                                   I                           I
               **********************          ************************    ************************
               *SET UP REGADR, ERROR *         ** GO SET UP INFORMAT- **    ** GO SET UP INFORMAT- **
               *  LOOP RETURN,AND A  *         **  ION TO BE PRINTED  **    **  ION TO BE PRINTED  **
               *   BIT TEST MARKER   *         **                     **    **                     **
               **********************          ************************    ************************
     --------------->I                                      I                           I
     I               I                         ************************    ************************
     I          ----------------                ** GO REPORT "SSR" BIT **    ** GO REPORT "SSR" BIT **
     I         /  CAN THIS "SSR" \YES          **    FAILED TO SET     **    **   FAILED TO CLEAR   **
     I        /   BIT BE SET ?    \----I       **    EM6,DH2,DT2,0     **    **    EM6,DH2,DT2,0    **
     I       /                     \   I       ************************    ************************
     I  ***   ---------------------    I                    I                           I
     I  *A*------------->I NO          I              ----------------            ----------------
     I  ***    ****************        I      YES   / LOOP ON FAILING \    YES  / LOOP ON FAILING \
     I         *SELECT THE NEXT*       I<----------/  BIT ? SR09=1     \  I-----/  BIT SR09=1      \
     I         *BIT POSITION TO*       I          /                     \ I    /                     \
     I         *   THE LEFT    *       I          ----------------------- I    -----------------------
     I         *****************       I                   I NO           I              I NO
     I                I                I                   ***            I              ***
     I          ---------------        I                   *D*            I              *A*
     I  YES    /  ANY BITS LEFT \      I                   ***            I              ***
     I--------/    TO TEST ?     \     I                                  I
             /                    \    I                                  I
             ----------------------    I                                  I
                      I NO             I                                  I
                      I                I                                  I
     I-----------------                I                                  I
     V                                 I                                  I
************           I---------------<----------------------------------
*$SCOPE(52)*           V
************     *****************
                 *SET THE SELECT-*
                 * ED "SSR" BIT  *
                 *               *
                 *****************
                        I
                 ----------------
                /               \NO    ***
               /  DID IT SET OK ? \---->*C*
              /                   \    ***
     ***      ---------------------
     *D* ------------->I YES
     ***         *****************
                 * NOW CLEAR THE *
                 *SELECTED "SSR" *
                 *     BIT       *
                 *****************
                        I
                 ----------------
     ***  YES   /                \NO    ***
     *A*<------/  DID IT CLEAR OK? \---->*B*
     ***      /                    \    ***
```

```
                                   ************                                ***                           ***
                                   *TST11     *                                *B*                           *C*
                                   ************                                ***                           ***
                                        I                                       I     SUER2(55)               I     SUER2(55)
                            ***********************                 *************************     *************************
                            * SET UP REGADR,ERROR *                 ** GO SET UP INFORMAT- **     ** GO SET UP INFORMAT- **
                            *  LOOP RETURN,AND A  *                 **  ION TO BE PRINTED  **     **  ION TO BE PRINTED  **
                            *   BIT TEST MARKER   *                 **                     **     **                     **
                            ***********************                 *************************     *************************
                    ------------------->I                               I     $ERROR(53)              I     $ERROR(53)
                    I          1$       I                           *************************     *************************
                    I         -------------------                   **   GO REPORT "LPR"   **     **   GO REPORT "LFR"   **
                    I         /  CAN THIS "LPR" \YES                **   REGISTER ERROR    **     **   REGISTER ERROR    **
                    I        /   BIT BE SET ?     \----I            **    EM6,DH2,DT2,0    **     **    EM6,DH2,DT2,0    **
                    I       /                      \   I            *************************     *************************
                    I ***   ------------------------   I                        I                             I
                    I *A*-------------->I NO           I                ------------------            ------------------
                    I ***      2$       I              I         YES   / LOOP ON FAILING \     YES   / LOOP ON FAILING \
                    I          *****************       I<-------------/   BIT ? SR09=1    \  I------/    BIT SR09=1    \
                    I          *SELECT NEXT BIT*       I             /                     \ I     /                     \
                    I          *POSITION TO THE*       I             ----------------------- I     ------------------------
                    I          *     LEFT      *       I                        I NO         I                I NO
                    I          *****************       I                       ***           I               ***
                    I                   I              I                       *A*           I               *A*
                    I         -------------------      I                       ***           I               ***
                    I   YES   /  ANY BITS LEFT  \      I                                     I
                    I--------/     TO TEST ?      \    I                                     I
                            /                      \   I                                     I
                            ------------------------   I                                     I
                   I--------------------I NO           I                                     I
                   I                                   I<-------------------------------------
                   V           3$                      I
               ************    *****************       I
               *$SCOPE(52)*    *  SET ALL R/W  *       I
               ************    * BITS IN "LPR" *<------V
                               *               *
                               *****************
                                        I
                               *****************
                               *NOW CLEAR SEL- *
                               * ECTED BIT IN  *
                               *   THE "LPR"   *                 I---------------
                               *****************                 I              I
                                        I                        I     -------------------
                              -------------------                I     / DID IT SET WITH-\NO    ***
                              /   DID IT CLEAR  \NO     ***      I    / OUT AFFECTING ANY \---->*C*
                             / WITHOUT ALTERING   \---->*B*      I   /      OTHER BIT      \    ***
                            /   ANY OTHER BIT ?    \    ***      I   -----------------------
                            ------------------------             I              I YES
                               4$       I YES                    I             ***
                               *****************                 I             *A*
                               *  NOW SET THE  *                 I             ***
                               *SELECTED BIT IN*                 I
                               *   THE "LPR"   *                 I
                               *****************                 I
```

MO5

MD-11-DZDHM-B DH11 DIAGNOSTIC   DECFLO VER 00.12 23-SEP-76 14:43 PAGE 12
TEST 12 TEST THAT CLR/SET OF BIT "N" IN "BKR" DOES NOT CLEAR ANY OTHER BITS   SEQ 0064

```
                                   *************                            ***                           ***
                                   *TST12      *                            *B*                           *C*
                                   *************                            ***                           ***
                                         I                                   I     SUER2(55)               I     SUER2(55)
                             ***********************              **************************    **************************
                             * SET UP REGADR,ERROR *              ** GO SET UP INFORMAT- **    ** GO SET UP INFORMAT- **
                             * LOOP RETURN, AND A  *              **  ION TO BE PRINTED   **    **  ION TO BE PRINTED   **
                             *   BIT TEST MARKER   *              **                      **    **                      **
                             ***********************              **************************    **************************
                   ---------------------->I                                  I     $ERROR(53)              I     $ERROR(53)
                   I            1$        I                       **************************    **************************
                   I             -----------------                **    GO REPORT "BKR"   **    **    GO REPORT "BKR"   **
                   I            /  CAN THIS "BKR"  \YES           **    REGISTER ERROR    **    **    REGISTER ERROR    **
                   I           /   BIT BE SET ?     \----I        **     EM5,DH2,DT2,0    **    **     EM5,DH2,DT2,0    **
                   I          /                      \   I        **************************    **************************
                   I     ***  ------------------------   I                   I                             I
                   I     *A*------------>I NO            I            -----------------------      -----------------------
                   I     ***     2$      I               I        YES   / LOOP ON FAILING \    YES  / LOOP ON FAILING \
                   I            *****************        I<------------/  BIT ? SR09=1     \  I-----/  BIT ? SR09=1     \
                   I            *SELECT NEXT BIT*        I            /                     \ I    /                     \
                   I            *POSITION TO THE*        I           ------------------------ I   ------------------------
                   I            *     LEFT      *        I                   I NO             I            I NO
                   I            *****************        I                   ***              I            ***
                   I                     I               I                   *A*              I            *A*
                   I             -----------------       I                   ***              I            ***
                   I      YES   /   ANY BITS LEFT  \     I                                    I
                   I-----------/    TO BE TESTED?   \    I                                    I
                   I          /                      \   I                                    I
                             ------------------------    I                                    I
                   I-------------------I NO              I                                    I
                   I                                     I<------------------------------------
                   V             3$                      I
              *************     *****************        I
              *$SCOPE(52)*      *   SET ALL R/W *        I
              *************     *   BITS IN THE *<--------
                                *     "BKR"     *
                                *****************
                                         I
                                *****************
                                * NOW CLEAR THE *
                                * SELECTED BIT  *
                                *               *
                                *****************                   ---------------I
                                         I                          I              V
                             -----------------                      I      ------------------
                            /  DID THE BIT    \NO        ***        I     / DID IT SET WITH-\NO      ***
                           /   CLEAR WITHOUT    \----->*B*          I    /  OUT DISTRUBING   \---->*C*
                          /AFFECTING OTHER BITS \      ***          I   /    OTHER BITS ?     \     ***
                          -----------------------                   I   -------------------------
                                4$        I YES                     I              I YES
                                *****************                   I              ***
                                *  NOW SET THE  *                   I              *A*
                                * SELECTED BIT  *                   I              ***
                                *     ONLY      *                   I
                                *****************                   I
```

```
                                   ************                            ***                            ***
                                   *TST13     *                            *B*                            *C*
                                   ************                            ***                            ***
                                        I                                   I     SUER2(55)                I     SUER2(55)
                             **********************               ************************       ************************
                             *SET UP REGADR, ERROR *              ** GO SET UP INFORMAT- **       **GO SET UP INFORMATION**
                             *  LOOP RETURN,AND A  *              **  ION TO BE PRINTED  **       **    TO BE PRINTED    **
                             *   BIT TEST MARKER   *              **                     **       **                     **
                             **********************               ************************       ************************
                  ---------------------->I                                  I     $ERROR(53)               I     $ERROR(53)
                  I             1$       I                        ************************       ************************
                  I             ----------------                  ** GO REPORT "SSR" REG **       ** GO REPORT "SSR" REG **
                  I            /  CAN THIS BIT  \YES              **        ERROR        **       **        ERROR        **
                  I           /     BE SET ?     \----I           **    EM6,DH2,DT2,0    **       **    EM6,DH2,DT2,0    **
                  I          /                    \   I           ************************       ************************
                  I    ***   ----------------------   I                     I                              I
                  I    *A*------------->I NO          I              -----------------              -----------------
                  I    ***      2$      I             I      YES    /     LOOP ON     \     YES    /     LOOP ON     \
                  I          *****************        <------------/  FAILING BIT ?    \  I------/  FAILING BIT ?    \
                  I          *SELECT NEXT BIT*        I           /      SR09=1         \ I     /      SR09=1         \
                  I          *POSITION TO THE*        I           -----------------------  I     -----------------------
                  I          *     LEFT      *        I                    I NO            I               I NO
                  I          *****************        I                    ***             I               ***
                  I                  I                I                    *A*             I               *A*
                  I          -----------------        I                    ***             I               ***
                  I    YES   /  ANY BITS LEFT  \      I                                    I
                  I---------/     TO TEST       \     I                                    I
                            /                    \    I                                    I
                            ----------------------    I                                    I
                  I-------------------I NO            I                                    I
                  I                                   I<------------------------------------
                  V             3$                    I
           ************    *****************          I
           *$SCOPE(52)*    *  SET ALL R/W  *          I
           ************    *  BITS IN THE  *<------
                           *     "SSR"     *
                           *****************
                                   I
                           *****************
                           * NOW CLEAR THE *
                           * SELECTED BIT  *
                           *     ONLY      *                    ----------------I
                           *****************                    I               V
                                   I                            I       ------------------
                            ------------------                  I      /                  \NO      ***
                           / DID THE SELECTED\NO      ***       I     /  DID BIT SET OK?   \----->*C*
                          / BIT CLEAR WITHOUT \---->*B*         I    /                      \      ***
                         /AFFECTING OTHER BITS \      ***       I    ------------------------
                         ------------------------               I               I YES
                            4$     I YES                        I
                           *****************                    I
                           *      NOW      *                    I
                           *  SET SELECTED *                    I
                           * BIT IN "SSR"  *                    I
                           *****************                    I
```

```
                         ************                                              ***
                         *TST14     *                                              *A*
                         ************                                              ***
                              I                                                     I     $UER2(55)
                  ***********************                               **************************
                  * SET UP REGADR, AND  *                               ** GO SET UP INFORMAT-  **
                  *  SAVE LINE SELECT   *                               **  ION TO BE PRINTED   **
                  * PARAMETER IN $TMP7  *                               **                      **
                  ***********************                               **************************
                              I                                                     I     $UNUM(56)
                       *****************                                **************************
                       *SET UP TO CHECK*                                **GO SET LINE NO. INTO  **
                       * ALL 16. LINES *                                **   ERROR MESSAGE      **
                       *               *                                **                      **
                       *****************                                **************************
                              I<---------------------------I                        I
                  1$          I                            I              *****************
                  ***********************                  I              * SET UP ERROR  *
                  *  LOAD "CAR" MEMORY  *         6$       I              *  LOOP RETURN  *
                  *  WITH ADDRESS TEST  *         *****************       *               *
                  *      PATTERN        *         *INIT TO RESTART*       *****************
                  ***********************         *  AT LINE 00   *                 I      $ERROR(53)
     ------------------------------->I            *   FOR SETUP   *     **************************
     I            3$                 I   $ELINE(60) *****************   **  GO REPORT "CAR"     **
     I            ************************                 I            ** ADDRESSING ERROR     **
     I            **GO SELECT A LINE NO. **                I            **   EM7,DH2,DT2,0      **
     I            **     TO CHECK        **                I            **************************
     I            **                     **                I                        I
     I            *************************                I               ---------------------
     I                        I                            I       YES   / LOOP ON ERROR ?  \
     I                  -------------------                I-----------/      SR09=1          \
     I       YES      / DONE CHECKING     \                            /                        \
     I    I---------/  ALL 16. LINES        \                          --------------------------
     I    I        /                          \                                     I NO
     I    I       ----------------------------                                      I
     I    I                   I NO                                                  I
     I    I           4$      I                                                     I
     I    V           *****************                                             I
     I  *****************  *READ "CAR" FOR *                                        I
     I  * RESTORE LINE  *  * SELECTED LINE *                                        I
     I  *SELECTION PARA-*  *               *                                        I
     I  *METER FM $TMP7 *  *****************                                        I
     I  *****************          I                                                I
     I          I           -------------------                                     I
     I    ************    / CORRECT PATTERN \NO      ***                            I
     I    *$SCOPE(52)*   / READ FROM SELECT- \----->*A*                             I
     I    ************  /     ED LINE ?       \      ***                            I
     I                 ------------------------                                     I
     I                             I YES                                            I
     I                  5$         I                                                I
     I                  *****************                                           I
     I                  *UPDATE EXPECTED*                                           I
     I                  * TEST PATTERN  *<------------------------------------------
     I                  * FOR NEXT LINE *
     I                  *****************
```

```
                         ************                                     ***
                         *TST15     *                                     *A*
                         ************                                     ***
                              I                                            I     SUER2(55)
                   *********************                        **********************
                   *  SET UP REGADR AND *                       **GO SET UP INFORMATION**
                   *SAVE THE LINE SELECT*                       **    TO BE PRINTED    **
                   * PARAMETER IN $TMP7 *                       **                     **
                   *********************                        **********************
                              I                                            I     SUNUM(56)
                      ***************                           **********************
                      *SET UP TO TEST *                         **  GO SET UP LINE NO  **
                      * ALL 16.LINES  *                         **  IN ERROR MESSAGE   **
                      *               *                         **                     **
                      ***************                           **********************
                   1$         I<---------------------------                I
                   *********************                  I         ***************
                   *   LOAD "BCR" WITH  *                 I         * SET UP ERROR  *
                   *  ADDRESS TEST      *       6$        I         * LOOP RETURN   *
                   *     PATTERN        *       ***************     *               *
                   *********************        *INIT TO RESTRT *   ***************
 ---------------------------------->I           *  AT LINE 00   *          I
 I                                  I    SELINE(60)             *   **********************
 I                 *********************        ***************     **GO REPORT "BCR" ADDR-**
 I                 ** GO SELECT A LINE **             I             **    ESSING ERROR     **
 I                 **   NO. TO CHECK   **             I             **   EM10,DH2,DT2,0    **
 I                 **                  **             I             **********************
 I                 *********************              I                    I
 I                            I                       I             -----------------
 I                    -----------------               I      YES   / LOOP ON ERROR?  \
 I              YES  /  DONE CHECKING  \              -----------/     SR09=1        \
 I       I----------/  ALL 16. LINES ?  \                        /                     \
 I       I         /                     \                      -----------------------
 I       V         -----------------------                                 I NO
 I   ***************          I NO                                         I
 I   * RESTORE LINE *   4$    I                                            I
 I   *SECTION PARAM- *  ***************                                    I
 I   * ETER FM $TMP7 *  *READ "BCR" FOR *                                  I
 I   ***************    * SELECTED LINE *                                  I
 I          I           *               *                                  I
 I     ************     ***************                                    I
 I     *$SCOPE(52)*             I                                          I
 I     ************     -----------------                                  I
 I                     / CORRECT PATTERN \NO        ***                    I
 I                    /      READ ?       \---->*A*                        I
 I                   /                     \        ***                    I
 I                   -----------------------                               I
 I                            I YES                                        I
 I                      5$    I                                            I
 I                      ***************                                    I
 I                      *UPDATE EXPECT- *                                  I
 I                      *ED TEST PATTERN*<----------------------------------
 I                      * FOR NXT LINE  *
 I                      ***************
```

```
                                  ************
                                  *TST16     *                                   ***                            ***
                                  ************                                   *A*                            *B*
                                        I                                        ***                            ***
                               *****************                                  I     SUER2(55)                I     SUER2(55)
                               *               *                   *************************      *************************
                               * SET UP REGADR *                   **GO SET UP INFORMATION**      **GO SET UP INFORMATION**
                               *               *                   **   TO BE PRINTED     **      **   TO BE PRINTED     **
                               *****************                   **                     **      **                     **
      -------------------------------->I<--------------------      *************************      *************************
      I                       1$       I       SELINE(60)   I                 I     $ERROR(53)               I     $ERROR(53)
      I                    *************************        I      *************************      *************************
      I                    **GO SELECT A LINE NO. **        I      **   GO REPORT "CAR"   **      **   GO REPORT "CAR"   **
      I                    **       TO TEST       **        I      **     DATA ERROR      **      **     DATA ERROR      **
      I                    **                     **        I      **                     **      **                     **
      I                    *************************        I      *************************      *************************
      I                                I                    I                 I                              I
      I                         ------------------          I            ----------------             ----------------
      I                YES  /     TESTED ALL      \         I ***YES    / LOOP ON FAILING \ ***YES   / LOOP ON FAILING \
      I           I---------/  SELECTED LINES?     \        I *C*<----/  LINE ? SR09=1    \*C*<----/  LINE ? SR09=1    \
      I           V        /                        \       I ***    /                     \***   /                     \
      I        ************ --------------------------      I      -----------------------      --------------------------
      I        *$SCOPE(52)*   2$       I NO                 I                 I NO                           I NO
      I        ************   *****************             I                 ***                            I
      I                 ***   *WRITE ALL ONES  *            I                 *D*                            I
      I                 *C*---->* INTO SELECTED *           I                 ***                            I
      I                 ***   *     "CAR"      *            I--------------------------------------------------
      I                       *****************
      I                                I
      I                       *****************
      I                       *READ BACK SEL- *
      I                       *  ECTED "CAR"  *
      I                       *               *
      I                       *****************
      I                                I
      I                       -----------------
      I                      /                 \NO     ***
      I                     /  WAS IT ALL ONES?  \----->*A*
      I                    /                       \    ***
      I                    -------------------------
      I                       3$       I YES
      I                       *****************
      I                 ***   * NOW CLEAR THE *
      I                 *D*--->*SELECTED "CAR" *
      I                 ***   *               *
      I                       *****************
      I                                I
      I                       *****************
      I                       * READ BACK THE *
      I                       *SELECTED "CAR" *
      I                       *               *
      I                       *****************
      I                                I
      I                       -----------------
      I                YES   /                 \NO     ***
      I---------------------/ WAS IT ALL ZEROS  \----->*B*
                           /         ?           \     ***
```

```
                         ************
                         *TST17     *                                ***                               ***
                         ************                                *A*                               *B*
                              I                                      ***                               ***
                      *****************                               I     SUER2(55)                   I     SUER2(55)
                      *               *                     *************************          *************************
                      * SET UP REGADR *                     **GO SET UP INFORMATION**          **GO SET UP INFORMATION**
                      *               *                     **    TO BE PRINTED    **          **    TO BE PRINTED    **
                      *****************                     **                     **          **                     **
 ----------------------------->I<-------------------         *************************          *************************
 I                    1$       I      SELINE(60)    I                 I     $ERROR(53)                  I     $ERROR(53)
 I                  ***********************         I       *************************          *************************
 I                  **GO SELECT A LINE NO. **       I       **  GO REPORT "BCR"    **          **  GO REPORT "BCR"    **
 I                  **       TO TEST       **       I       **     DATA ERROR      **          **     DATA ERROR      **
 I                  **                     **       I       **   EM10,DH2,DT2,0    **          **   EM10,DH2,DT2,0    **
 I                  ***********************         I       *************************          *************************
 I                             I                    I                 I                                 I
 I                      -----------------           I            -----------------                 -----------------
 I             YES     /   TESTED ALL    \          I *** YES   / LOOP ON FAILING \   ***YES     / LOOP ON FAILING \
 I         I---------/  SELECTED LINES?   \         I *C*<-----/  LINE ? SR09=1    \  *C*<----/   LINE ? SR09=1    \
 I         I        /                      \        I ***     /                     \ ***     /                     \
 I         V       -------------------------        I        -----------------------          -----------------------
 I   ************     2$        I NO                I                 I NO                              I NO
 I   *$SCOPE(52)*     *****************             I                ***                                I
 I   ************     *WRITE ALL ONES *             I                *D*                                I
 I            ***     * INTO SELECTED *             I                ***                                I
 I            *C*---->*     "BCR"     *             I                                                   I
 I            ***     *****************             I----------------------------------------------------
 I                            I
 I                    *****************
 I                    *   READ BACK   *
 I                    *SELECTED "BCR" *
 I                    *               *
 I                    *****************
 I                            I
 I                     -----------------
 I                    / WAS IT ALL ONES \NO        ***
 I                   /        ?          \------>*A*
 I                  /                     \        ***
 I                 -------------------------
 I                    3$      I YES
 I                    *****************
 I                    *WRITE ALL ZEROS*
 I            ***     * INTO SELECTED *
 I            *D*---->*     "BCR"     *
 I            ***     *****************
 I                            I
 I                    *****************
 I                    *   READ BACK   *
 I                    *SELECTED "BCR" *
 I                    *               *
 I                    *****************
 I                            I
 I                     -----------------
 I             YES    /                 \NO        ***
 I-------------------/ WAS IT ALL ZEROS  \------>*B*
                    /         ?           \        ***
```

```
                                 ************                                  ***
                                 *TST20     *                                  *A*
                                 ************                                  ***
                                       I                                4$      I
                               *****************                        *****************
                               * SET UP REGADR *                        * SELECT A LINE *
                               *AND POINTER TO *                        *   TO CHECK    *
                               *  DATA TABLE   *                        *               *
                               *****************                        *****************
           ---------------------------->I                               5$      I
           I                   1$       I                               -----------------
           I                   *****************                      / DOES LINE BEING \NO------------------I
           I                   *GET DATA PATT- *                     /  CHECKED CONTAIN  \                   V     SUER4(55)
           I                   *ERN AND UPDATE *                    /   CORRECT DATA ?    \       *************************
           I                   * TABLE POINTER *                   -------------------------      **GO SET UP INFORMATION**
           I                   *****************                        6$      I YES             **     TO BE PRINTED   **
           I                            I                               *****************         **                     **
           I                   ----------------                         *GENERATE ADDR- *         *************************
           I            YES   /  DONE ALL THREE \                       *  ESS OF NEXT  *<----               I     SUNUM(56)
           I      I----------/ PATTERNS (177777, \                      * LINE TO CHECK *    I    *************************
           I      I         / 125252 AND 052525)  \                     *****************    I    **GO SET UP LINE NO IN **
           I      V         ------------------------                            I            I    **    ERROR MESSAGE    **
           I  ************              I NO                            -----------------    I    **                     **
           I  *$SCOPE(52)*  11$         I        SELINE(60)      YES   /  DONE CHECKING  \   I    *************************
           I  ************  *************************      I----------/ ALL LOCATIONS IN  \  I               I
           I                ** GO SELECT A LINE NO **      I         /  THE "CAR" MEM ?    \ I       *****************
           I                **TO TEST WITH CURRENT **<-------       -------------------------I       * SET UP ERROR  *
           I                **  PATTERN IN $TMP1   **                       I NO             I       *  LOOP RETURN  *
           I                *************************                      ***               I       *               *
           I                            I                                  *A*               I       *****************
           I                   ----------------                            ***               I               I    $ERROR(53)
           I            YES   /    TESTED ALL    \                                           I    *************************
           I-----------------/   SELECTED LINES   \                                          I    **  GO REPORT "CAR"    **
                            / WITH THIS PATTERN ?  \                                         I    **     DATA ERROR      **
                            ------------------------                                         I    **   EM46,DH10,DT5,0   **
                                        I NO                                                 I    *************************
                               2$       I<-------------------------------------------        I               I
                               *****************                            I                I      -------------------
                               * CLEAR ALL 16. *                            I                I NO  / LOOP ON ERROR ?  \
                               * LOCATIONS IN  *                            I                I----/     SR09=1         \
                               * THE "CAR" MEM *                            I                    /                      \
                               *****************                            I                   ------------------------
                                        I                                   I                               I YES
                               *****************                            I                               I
                               *WRITE TEST PAT-*                            I-------------------------------
                               *TERN INTO SEL- *
                               *  ECTED "CAR"  *
                               *****************
                                        I
                               *****************
                               * INIT $TMP2 TO *
                               *START CHECKING *
                               *  AT LINE 00   *
                               *****************
                                        I
                                       ***
                                       *A*
```

```
                                  ************                             ***
                                  *TST21     *                             *A*
                                  ************                             ***
                                       I                                4$  I
                                *****************                       *****************
                                * SET UP REGADR *                       * SELECT A LINE *
                                *AND POINTER TO *                       *   TO CHECK    *
                                *  DATA TABLE   *                       *               *
                                *****************                       *****************
           ---------------------------->I                                       I
           I                    1$      I                                -----------------
           I                    *****************                       / DOES LINE BEING \NO
           I                    *GET DATA PATT- *                      /  CHECKED CONTAIN  \-------------------I
           I                    *ERN AND UPDATE *                     /   CORRECT DATA ?    \                  V       SUER4(55)
           I                    * TABLE POINTER *                     -----------------------        ************************
           I                    *****************                               I YES                **GO SET UP INFORMATION**
           I                            I                               6$      I                    **    TO BE PRINTED     **
           I                    -----------------                       *****************            **                      **
           I              YES  /  DONE ALL THREE \                      *GENERATE ADDR- *            ************************
           I       I----------/ PATTERNS (177777  \                     *  ESS OF NEXT  *<-----               I       SUNUM(56)
           I       V         /125252 AND 052525) ? \                    * LINE TO CHECK *      I     ************************
           I  ************   -----------------------                    *****************      I     **   GO SET UP LINE NO  **
           I  *$SCOPE(52)*          NO I<-------------------                    I              I     **      IN MESSAGE      **
           I  ************     11$     I        SELINE(60)   I          -----------------      I     **                      **
           I                 *************************       I   YES   /  DONE CHECKING  \     I     ************************
           I                 ** GO SELECT A LINE NO **       I--------/ ALL LOCATIONS IN  \    I                I
           I                 **TO TEST WITH CURRENT **               /  "BCR" MEMORY ?     \   I         *****************
           I                 **  PATTERN IN $TMP1   **               -----------------------   I         * SET UP ERROR  *
           I                 *************************                          I NO           I         *  LOOP RETURN  *
           I                           I                                       ***             I         *               *
           I                    -----------------                              *A*             I         *****************
           I             YES   /  TESTED ALL     \                             ***             I                I      $ERROR(53)
           I------------------/  SELECTED LINES   \                                            I     ************************
                             / WITH THIS PATTERN ? \                                           I     **   GO REPORT "BCR"    **
                             -----------------------                                           I     **     DATA ERROR       **
                                       I NO                                                    I     **   EM47,DH10,DT5,0    **
                              2$       I<---------------------------                           I     ************************
                              *****************            I                                   I                I
                              * CLEAR ALL 16. *            I                                   I          -----------------
                              * LOCATIONS IN  *            I                                   INO       / LOOP ON ERROR ? \
                              * THE "BCR" MEM *            I                                   I-----/      SR09=1       \
                              *****************            I                                            /                     \
                                      I                    I                                            -----------------------
                              *****************            I                                                    I YES
                              *WRITE TEST PATT*            I                                                    I
                              *ERN INTO SELECT*            I                                                    I
                              *   ED "BCR"    *            I-----------------------------------------------------
                              *****************
                                      I
                              *****************
                              * INIT $TMP2 TO *
                              *START CHECKING *
                              *  AT LINE 00   *
                              *****************
                                      I
                                     ***
                                     *A*
```

H06


```
                         ************                            ***                       ***
                         *TST22     *                            *A*                       *B*
                         ************                            ***                       ***
                              I                               6$  I                         I   SUER4(55)
                        *****************                  *****************       ***********************
                        * SET UP REGADR *                  * GENERATE NEXT *       **GO SET UP INFORMATION**
                        *AND 177777 TEST*                  * "CAR" ADDRESS *<----  **    TO BE PRINTED   **
                        * PATTERN IN R5 *                  *   TO CHECK    *    I  **                    **
                        *****************                  *****************    I  ***********************
                              I<-------------------               I             I           I   SUNUM(56)
                  1$          I      SELINE(60)    I      ----------------      I  ***********************
                    ************************       I  YES / CHECKED ALL 16. \   I  ** GO SET UP LINE NO. **
                    ** GO SELECT A LINE NO **      I-----/  "CAR" MEMORY     \  I  **  IN ERROR MESSAGE  **
                    **       TO TEST       **           /   LOCATIONS ?       \ I  **                    **
                    **                     **          ----------------------   I  ***********************
                    *************************                     I NO          I           I
                              I                                   I             I   *****************
                      -----------------                           I             I   * SET UP ERROR  *
               YES   /   TESTED ALL    \                          I             I   *  LOOP RETURN  *
           I--------/ SELECTED LINES ?  \                         I             I   *               *
           I       /                     \                        I             I   *****************
           V      -----------------------                         I             I           I   $ERROR(53)
     ************             I NO                                I             I  ***********************
     *$SCOPE(52)*     2$      I                                   I             I  **  GO REPORT "CAR"   **
     ************       *****************                         I             I  **     DATA ERROR     **
                        *WRITE ALL ONES *      ***                I             I  **  EM46,DH10,DTS,0   **
                        * INTO ALL 16.  *<-----*C*                I             I  ***********************
                        *"CAR" LOCATIONS*      ***                I             I           I
                        *****************                         I             I    -----------------
                              I                                   I             I NO /  LOOP ON ERROR  \
                        *****************                         I            <I---/     SR09=1        \
                        *ZERO THE SELECT*                         I                /                     \
                        *ED "CAR" LOCAT-*                         I               -----------------------
                        *      ION      *                         I                         I YES
                        *****************                         I                        ***
                              I                                   I                        *C*
                        *****************                         I                        ***
                        * INIT $TMP2 TO *                         I
                        *START CHECKING *                         I
                        *  AT LOC. 00   *                         I
                        *****************                         I
                              I<-----------------------------------
                      4$      I
                        *****************
                        *  READ BACK A  *
                        *"CAR" LOCATION *
                        *               *
                        *****************
                      5$      I
                        -----------------
                       / DID IT CONTAIN \NO     ***
                      / THE CORRECT DATA \----->*B*
                     /                    \     ***
                    ------------------------
                              I YES
                             ***
                             *A*
```

```
                     ************                                  ***                      ***
                     *TST23     *                                  *A*                      *B*
                     ************                                  ***                      ***
                          I                                    6$   I                        I    SUER4(55)
                  *****************                          *****************       ************************
                  * SET UP REGADR *                          * GENERATE NEXT *       **GO SET UP INFORMATION**
                  *AND 177777 TEST*                          * "BCR" ADDRESS *<----  **    TO BE PRINTED   **
                  * PATTERN IN R5 *                          *   TO CHECK    *    I  **                    **
                  *****************                          *****************    I  ************************
                          I<-------------------                      I            I           I    SUNUM(56)
               1$         I       SELINE(60)  I            -----------------      I  ************************
              ************************        I     YES   /   CHECKED ALL   \     I  ** GO SET UP LINE NO.  **
              **GO SELECT A LINE NO. **       I----------/    16. "BCR"      \    I  **  IN ERROR MESSAGE   **
              **       TO TEST       **                 /     LOCATIONS ?     \   I  **                    **
              **                     **                -------------------------  I  ************************
              ************************                        I NO                I           I
                          I                                   I                   I   *****************
                  -----------------                           I                   I   * SET UP ERROR  *
         YES    /   TESTED ALL      \                         I                   I   *  LOOP RETURN  *
       I-------/ SELECTED LINES ?    \                        I                   I   *               *
       I      /                       \                       I                   I   *****************
       V     -------------------------                        I                   I           I     $ERROR(53)
  ************     2$        I NO                             I                   I  ************************
  *$SCOPE(52)*    *****************                           I                   I  **  GO REPORT "BCR"   **
  ************    *WRITE ALL ONES *       ***                 I                   I  **     DATA ERROR     **
                  *INTO ALL "BCR" *<------*C*                 I                   I  **  EM47,DH10,DT5,0   **
                  *MEMORY LOCATION*       ***                 I                   I  ************************
                  *****************                           I                   I           I
                          I                                   I                   I    -----------------
                  *****************                           I                   I NO /  LOOP ON ERROR  \
                  *ZERO THE SELECT*                           I                   I---/     SR09=1        \
                  *   ED "BCR"    *                           I                      /                     \
                  *   LOCATION    *                           I                     -------------------------
                  *****************                           I                               I YES
                          I                                   I                              ***
                  *****************                           I                              *C*
                  * INIT $TMP2 TO *                           I                              ***
                  *START CHECKING *                           I
                  *   AT LOC 00   *                           I
                  *****************                           I
                          I                                   I
               4$         I<-----------------------------------
                  *****************
                  *  READ BACK A  *
                  *"BCR" LOCATION *
                  *               *
                  *****************
               5$         I
                  -----------------
                /  DID IT CONTAIN \NO       ***
               / THE CORRECT DATA  \        
              /                     \-----> *B*
             -------------------------      ***
                          I YES
                         ***
                         *A*
```

```
                       ************                                ***
                       *TST24     *                                *A*
                       ************                                ***
                            I                                       I
                    *****************                      *****************
                    * SET UP REGADR *                      * READ BACK THE *
                    *AND POINTER TO *                      * SELECTED LOC- *
                    *  DATA TABLE   *                      *    ATION.     *
                    *****************                      *****************
  ------------------------->I                              6$       I
  I                 1$      I                              -----------------
  I                 *****************                     /  EXT MEM BITS   \YES
  I                 *GET DATA PATT- *                    / CORRECT AT THIS   \------------------I
  I                 * ERNS FM TABLE *                   /     LOCATION        \                 V      SUER2(55)
  I                 *UPDATE POINTER *             ***   -----------------------     *************************
  I                 *****************             *B*--------------->I NO           **GO SET UP INFORMATION**
  I                         I                     ***      7$        I              **   TO BE PRINTED     **
  I                 -----------------                      *****************        **                     **
  I           YES  /  DONE ALL THREE \                     * GENERATE NEXT *        *************************
  I       I-------/ EXT MEM BIT PATT- \                    * "CAR" ADDRESS *                   I     SUNUM(56)
  I       I      /  ERNS -11,10,01 ?   \                   *   TO CHECK    *        *************************
  I       V      ----------------------                    *****************        ** GO SET UP LINE NO.  **
  I  ************           I NO               ***                  I               **  IN ERROR MESSAGE   **
  I  *$SCOPE(52)*   2$      I<-----------------*C*         ------------------       **                     **
  I  ************   *****************          ***        / CHECKED ALL 16.  \NO    *************************
  I                 * CLEAR EXT MEM *                    /   LOCATIONS IN     \----I           I
  I                 *BITS IN ALL 16.*                   /    "CAR" MEMORY      \   I    *****************
  I                 *"CAR" LOCATIONS*                   ------------------------   I    * SET UP ERROR  *
  I                 *****************                           I YES              I    *  LOOP RETURN  *
  I              4$         I       SELINE(60)                  I                  I    *               *
  I              ************************                       I                  I    *****************
  I              **GO SELECT A LINE NO. **                      I                  I            I      $ERROR(53)
  I              **       TO TEST       **<----------------------                  I    *************************
  I              **                     **                                         I    **  GO REPORT EXT MEM  **
  I              ************************                                          I    **BIT FAILURE IN "CAR" **
  I                         I                                                      I    **    EM7,DH2,DT2,0    **
  I                 -----------------                                              I    *************************
  I           YES  /   TESTED ALL    \                                             I               I
  I---------------/  SELECTED LINES   \                                            I      -----------------
                 / WITH THIS PATTERN?  \                                           I     / LOOP ON ERROR  \YES  ***
                 -----------------------                                           I    /     SR09=1       \--->*C*
                            I NO                                                   I   /                    \   ***
                    *****************                                              I   ----------------------
                    *  INIT $TMP4   *                                              I              I NO
                    *TO START CHECK-*                                              I             ***
                    *ING AT LOC. 00 *                                              I             *B*
                    *****************                                              I             ***
                    5$      I<-----------------------------------------------------
                    *****************
                    *SELECT A "CAR" *
                    *  LOCATION TO  *
                    *     CHECK     *
                    *****************
                            I
                           ***
                           *A*
```

```
                                      I-----------------
                   ************       I                I
                   *TST25     *       I                I
                   ************       I        ----------------
                        I             I       /                \YES
              ***********************  I      /  RCVR INTR ?     \-----------------I
              * SET UP ERROR RETURN *  I     /                    \                I
              *XMIT AND RCVR VECTORS*  I     ----------------------                I
              * AND BIT TEST MARKER *  I               I NO                        V
              ***********************  I       *****************          *****************
   -------------------->I              I       *SAVE ERROR PSW *          *SAVE ERROR PSW *
   I             ---------------       I       * GET WAS DATA  *          * GET WAS DATA  *
   I            /  IS THIS BIT AN \YES I       *  FROM "SCR"   *          *  FROM "SCR"   *
   I           / INTR. ENAB. BIT ? \-------I  I       *****************          *****************
   I          /  BIT 06,12, OR 13   \      I  I               I    SUER2A(55)             I    SUER2A(55)
   I  ***     ----------------------       I  I    ***********************     ***********************
   I  *A*--------------->I NO              I  I    **GO SET UP INFORMATION**     **GO SET UP INFORMATION**
   I  ***       *****************          I  I    **     TO BE PRINTED    **     **     TO BE PRINTED    **
   I            * SELECT BIT IN *          I  I    **                      **     **                      **
   I            * NEXT POSITION *          I  I    ***********************     ***********************
   I            *  TO THE LEFT  *          I  I               I    $ERROR(53)             I    $ERROR(53)
   I            *****************          I  I    ***********************     ***********************
   I                    I                  I  I    **   GO REPORT ERROR   **     **GO REPORT UNEXPECTED **
   I            ------------------         I  I    **UNEXPECTED XMIT INTR **     **    RCVR INTR ERROR   **
   I    NO     / TESTED ALL INTR \         I  I    **    EM12,DH2,DT2,0   **     **    EM11,DH2,DT2,0   **
   I---------/  ENAB BITS IN      \        I  I    ***********************     ***********************
            /    "SCR" REG.        \       I  I               I                           I
            ------------------------  *** I  I     ----------------               ----------------
I----------------------I YES          *B* I  I    /       $         \NO    NO  /  LOOP ON ERROR   \
I                                     *** I  I   /  LOOP ON ERROR ?  \--->I<---/     SR09=1         \
V                                      I  V  I  /     SR09=1          \   I   /                      \
***********************  *****************  I  I  I  I  ------------------------   I   ------------------------
*RESET SP, AND RESTORE*  * RESET SP AND  *  I  I  V  I           I YES            V            I YES
*TRAP CATCHER IN DH11 *  *LOCK OUT INTRS *<-------I  I          ***             ***           ***
*       VECTOR        *  *  CLEAR DH11   *           I          *B*             *A*           *B*
***********************  *****************           I          ***             ***           ***
          I                      I                   I
     ************        *****************           I
     *$SCOPE(52)*        * SET SELECTED  *           I
     ************        *  I.E. BIT IN  *           I
                         *   "SCR" REG   *           I
                         *****************           I
                                 I                   I
                         *****************           I
                         *               *           I
                         *  ALLOW INTRS  *           I
                         *               *           I
                         *****************           I
                                 I                   I
                         ------------------          I
                        /  DID AN INTER-   \YES      I
                       /   RUPT OCCUR ?     \<-------I
                      /                      \
                      ------------------------
                                 I NO
                                ***
                                *A*
```

```
                        ************
                        *TST26     *         -------------------------I
                        ************        I                         V
                             I              I                 -----------------
                   *************************I               / DID A XMIT INTR \YES
                   * SET UP ERROR RETURN *  I              /      OCCUR ?      \------------------I
                   *  AND XMIT AND RCVR  *  I             /                     \         2$      V
                   *       VECTORS       *  I             -----------------------         *****************
              ***  *************************I                     I NO                     *   SAVE PSW    *
              *A*-------------->I           I               *****************             * GET WAS DATA  *
              ***     1$        I           I               *   SAVE PSW    *             * DISABLE INTR  *
                      *****************     I               * GET WAS DATA  *             *****************
                      *RESET THE DH11 *     I               * DISABLE INTR  *                     I     SUER2A(55)
                      * RESET THE SP  *     I               *****************             *************************
                      *LOCK OUT INTRS.*     I                       I     SUER2A(55)      **GO SET UP INFORMATION**
                      *****************     I           *************************         **    TO BE PRINTED    **
                              I             I           **GO SET UP INFORMATION**         **                     **
                      *****************     I           **    TO BE PRINTED    **         *************************
                      * PRIME DH11 TO *     I           **                     **                 I     $ERROR(53)
                      *  CAUSE CHAR   *     I           *************************         *************************
                      *  AVAIL INTR   *     I                   I     $ERROR(53)          **GO REPORT UNEXPECTED **
                      *****************     I           *************************         **    XMITTER INTR.    **
                              I             I           **GO REPORT DATA AVAIL **         **   EM12,DH2,DT2,0    **
                      *****************     I           **     INTR FAILED     **         *************************
                      * CLEAR PSW TO  *     I           **   EM13,DH2,DT2,0    **                 I
                      *ALLOW INTERRUPT*     I           *************************           -----------------
                      *               *     I                       I                     / LOOP ON ERROR ? \NO    ***
                      *****************     I               -----------------            /      SR09=1       \--->*B*
                              I             I       NO    / LOOP ON ERROR ? \           /                     \    ***
                      -----------------     I    ***<-----/      SR09=1       \         -----------------------
                    / DID CHAR AVAIL \NO    I    *B*     /                     \                 I YES
                   / CAUSE RCVR INTR ? \----I    ***     -----------------------                 ***
                  /                     \                           I YES                        *A*
          ***     -----------------------                           ***                          ***
          *B----------------->I YES                                 *A*
          ***     3$          I                                     ***
                  *****************
                  * RESET SP AND  *
                  * RESTORE TRAP  *
                  *CATCHER IN VCTR*
                  *****************
                          I
                    *************
                    *$SCOPE(52)*
```

```
                  ************          -----------------------I
                  *TST27     *          I                      I
                  ************          I                      V
                       I                I
              ***********************   I              ----------------
              * SET UP ERROR RETURN *   I             /   DID A XMITTR   \YES
              *  AND XMIT AND RCVR  *   I            /    INTR OCCUR ?    \-------------------I
              *       VECTORS       *   I           /                      \          2$       V
     ***      ***********************   I           ------------------------          ****************
     *A*---------------->I              I                      I NO                   *   SAVE PSW   *
     ***        1$       I              I              ****************               * GET WAS DATA *
                ****************        I              *   SAVE PSW   *               * DISABLE INTRS *
                *  RESET DH11  *        I              * GET WAS DATA *               ****************
                * RESET THE SP *        I              * DISABLE INTR *                        I     SUER2A(55)
                *LOCK OUT INTRS*        I              ****************               ************************
                ****************        I                      I     SUER2A(55)       **GO SET UP INFORMATION**
                       I                I           ************************          **     TO BE PRINTED    **
                ****************        I           **GO SET UP INFORMATION**         **                      **
                * PRIME DH11 TO *       I           **     TO BE PRINTED    **        ************************
                *CAUSE SILO OVFL*       I           **                      **                 I      $ERROR(53)
                *   INTERRUPT   *       I           ************************          ************************
                ****************        I                      I      $ERROR(53)      **GO REPORT UNEXPECTED **
                       I                I           ************************          **      XMITTR INTR     **
                ****************        I           **GO REPORT SILO OVFLW **         **    EM12,DH2,DT2,0    **
                * CLEAR PSW TO  *       I           **     INTR FAILED      **        ************************
                *   ALL INTR.   *       I           **    EM43,DH2,DT2,0    **                 I
                *               *       I           ************************             ----------------
                ****************        I                      I                       / LOOP ON ERROR ? \NO     ***
                       I                I              ------------------             /      SR09=1       \--->*B*
                ----------------        I     *** NO   / LOOP ON ERROR ? \           /                     \     ***
               /  DID SILO OVER-  \NO   I     *B*<-----/     SR09=1       \          ----------------------
              /   FLOW CAUSE INTR  \----I     ***     /                     \                  I
             /                      \                 ------------------------                ***
   ***       ------------------------                          I YES                          *A*
   *B*----------------->I YES                                  I                              ***
   ***        3$        I                                     ***
              ****************                                *A*
              * RESET SP AND  *                               ***
              * RESTORE TRAP  *
              *CATCHER IN VCTR*
              ****************
                     I
                ************
                *$SCOPE(52)*
```

```
                                  ************
                                  *TST30     *          -----------------------I
                                  ************          I                      I
                                       I                I                      V
                            ***********************     I              ------------------
                            * SET UP ERROR RETURN *     I             /    DID A RCVR   \YES
                            *  AND XMIT AND RCVR  *     I            /   INTR OCCUR ?    \-------------------I
                            *       VECTORS       *     I           /                     \          2$      V
                       ***  ***********************     I           -----------------------          *****************
                       *A*------------>I                I                      I NO                  *   SAVE PSW    *
                       ***     1$      I                I              ***  ***********              * GET WAS DATA  *
                               *****************        I              *   SAVE PSW   *              * DISABLE INTRS *
                               *  RESET DH11   *        I              * GET WAS DATA *              *****************
                               *   RESET SP    *        I              * DISABLE INTR *                      I     SUER2A(55)
                               *LOCK OUT INTRS *        I              ****************          *************************
                               *****************        I                      I     SUER2A(55)  **GO SET UP INFORMATION**
                                       I                I          *************************     **   TO BE PRINTED     **
                               *****************        I          **GO SET UP INFORMATION**     **                     **
                               * PRIME DH11 TO *        I          **   TO BE PRINTED     **     *************************
                               * CAUSE NON-EX  *        I          **                     **                 I     $ERROR(53)
                               *  MEMORY INTR  *        I          *************************     *************************
                               *****************        I                      I     $ERROR(53)  **GO REPORT UNEXPECTED **
                                       I                I          *************************     **      RCVR INTR      **
                               *****************        I          **  GO REPORT NON-EX   **     **                     **
                               *   CLEAR PSW   *        I          **   MEM INTR FAILED   **     *************************
                               * TO ALLOW INTR *        I          **   EM44,DH2,DT2,0    **                 I
                               *               *        I          *************************         -----------------
                               *****************        I                      I                    / LOOP ON ERROR ? \NO    ***
                                       I                I              -----------------           /      SR09=1       \---->*B*
                               -----------------        I  ***  NO    / LOOP ON ERROR ? \         /                     \    ***
                              /  DID NON-EX MEM \NO     I  *B*<------/      SR09=1       \        -----------------------
                             /   INTR OCCUR ?    \------I  ***      /                     \                  I YES
                            /                     \                 -----------------------                  ***
                  ***       -----------------------                            I YES                         *A*
                  *B*----------------->I YES                                   I                             ***
                  ***          3$      I                                      ***
                               *****************                              *A*
                               * RESET SP AND  *                              ***
                               * RESTORE TRAP  *
                               *CATCHER IN VCTR*
                               *****************
                                       I
                                  ************
                                  *$SCOPE(52)*
```

```
              ************               --------------------------I
              *TST31     *              I                          I
              ************              I                          V
                   I                    I               ----------------
          *************************     I              /  DID A RCVR    \YES
          * SET UP ERROR RETURN *       I             /  INTR OCCUR ?    \--------------------I
          *  AND XMIT AND RCVR  *       I            /                    \            2$     V
          *       VECTOR        *       I           ------------------------          ****************
   ***    ***********************       I                     I NO                    *  SAVE PSW    *
   *A*-------------->I                  I             *****************               * GET WAS DATA *
   ***       1$      I                  I             *   SAVE PSW    *               * DISABLE INTR *
          *****************             I             * GET WAS DATA  *               ****************
          *   RESET DH11  *             I             * DISABLE INTRS *                      I      SUER2A(55)
          *   RESET SP    *             I             *****************           *************************
          *LOCK OUT INTRS *             I                     I      SUER2A(55)   **GO SET UP INFORMATION**
          *****************             I          *************************      **    TO BE PRINTED    **
                  I                     I          **GO SET UP INFORMATION**      **                     **
          *****************             I          **   TO BE PRINTED     **      *************************
          * PRIME DH11 TO *             I          **                     **             I      $ERROR(53)
          *CAUSE XMIT DONE*             I          *************************      *************************
          *   INTERRUPT   *             I                     I      $ERROR(53)   ** GO REPORT UNEXPECT  **
          *****************             I          *************************      **    ED RCVR INTR     **
                  I                     I          ** GO REPORT XMIT DONE **      **   EM11,DH2,DT2,0    **
          *****************             I          **     INTR FAILED     **      *************************
          * CLEAR PSW TO  *             I          **   EM45,DH2,DT2,0    **             I
          * ALLOW INTRS   *             I          *************************       ----------------
          *               *             I                     I                   / LOOP ON ERROR? \NO     ***
          *****************             I               ----------------         /    SR09=1        \---->B*
                  I                     I   *** NO     / LOOP ON ERROR  \       /                    \     ***
           ------------------           I   *B<-------/     SR09=1       \     ------------------------
          /  DID XMIT DONE   \NO        I   ***      /                    \             I YES
         /  CAUSE INTR TO     \---------I           ------------------------           ***
        /      OCCUR ?         \                              I YES                     *A*
***     ------------------------                              I                         ***
*B*--------------------I YES                                 ***
***        3$          I                                     *A*
          *****************                                  ***
          * RESET SP AND  *
          * RESTORE TRAP  *
          *CATCHER IN VCTR*
          *****************
                  I
            *************
            *$SCOPE(52)*
```

C07


```
           ************               ***                 NOTE:        ***
           *TST32     *               *B*                 COME HERE    *D*
           ************               ***                 ON XMIT      ***
                I              3$      I      TIMEIT(59)  INTERRUPT     I
      ***********************  ***********************              -----------------
      * SET UP ERROR RETURN *  **                   **            /  DID XMIT DONE   \NO
      *   AND XMIT VECTOR   *  **     CALL TIMER    **           /     GET SET OK     \ ---------------------I
      *                     *  **                   **          /                     \                      I
***   ***********************  ***********************         -------------------------                     V
*A*------------->I                      I                                I YES                       ************
***     1$       I      SELINE(60)   -----------------          5$       I                           *NPR1A(29) *
     ************************  NO   /   DID TIMEOUT    \               -----------------             ************
     **GO SELECT A LINE NO. **     / OCCUR BEFORE INTR  \           /  BUFFER ACTIVE   \NO
     **      TO TEST        **    /  ON SELECTED LINE    \         /  BIT CLEARED FOR   \ -------------------I
     **                     **   -------------------------        /   SELECTED LINE ?    \                   V
     ************************               I YES                -------------------------            ************
                I                ************************                I YES                       *NPR2A(29) *
         -----------------       *   SAVE ERROR PSW     *       6$       I                           ************
        /   TESTED ALL    \YES *** *   GET WAS DATA     *              -----------------
       /  SELECTED LINES   \--->D* *                    *           /   "CAR" REG FOR   \NO------------------I
      /         ?           \  *** ************************        /    SELECTED LINE    \                   V
***  -------------------------              I       SUER2A(55)    /   GOT INCREMENTED?    \            ************
*C*------------->I NO            ************************        -------------------------            *NPR3A(29) *
***     2$       I               **GO SET UP INFORMATION**                I YES                       ************
     ************************    **   TO BE PRINTED     **       7$       I
     *RESET SP, SET UP REG-*     **                     **              -----------------
     *ADR, SET UP S/B DATA *     ************************           /   "BCR" REG FOR   \NO------------------I
     *                     *                I       SUNUM(56)      /    SELECTED LINE    \             *****V******
     ***********************     ************************         /   GOT DECREMENTED ?   \            *NPR4A(29) *
                I      CLCABC(56) ** GO SET UP LINE NO.  **       -------------------------            ************
     ************************    **   IN ERROR MESSAGE   **                I YES
     **   GO CLEAR "CAR"    **   **                      **               ***
     ** AND "BCR" MEMORIES  **   **                      **               *A*
     **                     **   *************************                ***
     ************************                I      $ERROR(53)
                I                ************************
     ***********************     ** GO REPORT TIMEOUT   **
     * PRIME DH11 TO XMIT  *     **WAITING FOR XMIT DONE**
     *ONE CHAR ON SELECTED *     **    EM15,DH2,DT2,0    **
     * LINE - INTR ENABLED *     ************************
     ***********************                I
                I                    -----------------
         *****************          /                 \YES   ***                 ************       ************
         *  INIT TIMERS  *         /  LOOP ON ERROR ?  \---->*C*                 *NPR5A(29) *       *NPR6A(29) *
         *  "A" AND "B"  *   ***  /      SR09=1         \    ***                 ************       ************
         *               *   *D*  -------------------------                           I                  I
         *****************   ***             I NO                                    ***                ***
                I  8$         I             ***                                      *A*                *C*
               *** ***********************  *A*                                      ***                ***
               *B* * CLEAR DH11,RESTORE  *  ***
               *** * TRAP CATCHER IN VEC *
                   *   TOR AND CLR PSW   *
                   ***********************
                              I
                       *************
                       *$SCOPE(52)*
```

```
          ************                  ************                  ************                  ************
          *NPR1A(28) *                  *NPR2A(28) *                  *NPR3A(28) *                  *NPR4A(28) *
          ************                  ************                  ************                  ************
               I                             I                             I                             I
       *****************             *****************             *****************             *****************
       *SAVE ERROR PSW *             *SAVE ERROR PSW *             *SAVE ERROR PSW *             *SAVE ERROR PSW *
       * GET WAS DATA  *             * GET WAS DATA  *             * GET WAS DATA  *             * GET WAS DATA  *
       *               *             *               *             *               *             *               *
       *****************             *****************             *****************             *****************
               I       SUER2A(55)            I       SUER2A(55)            I       SUER2A(55)            I       SUER2A(55)
   *************************     *************************     *************************     *************************
   **GO SET UP INFORMATION**     **GO SET UP INFORMATION**     **GO SET UP INFORMATION**     **GO SET UP INFORMATION**
   **    TO BE PRINTED    **     **    TO BE PRINTED    **     **    TO BE PRINTED    **     **    TO BE PRINTED    **
   **                     **     **                     **     **                     **     **                     **
   *************************     *************************     *************************     *************************
               I       9$                    I       9$                    I       9$                    I       9$
   *************************     *************************     *************************     *************************
   ** CALL SUBR TO SET UP **     **CALL SUBRT TO SET UP **     ** CALL SUBR TO SET UP **     ** CALL SUBR TO SET UP **
   **     LINE NO.        **     **     LINE NO.        **     **     LINE NO.        **     **     LINE NO.        **
   **                     **     **                     **     **                     **     **                     **
   *************************     *************************     *************************     *************************
               I       $ERROR(53)            I       $ERROR(53)            I       $ERROR(53)            I       $ERROR(53)
   *************************     *************************     *************************     *************************
   ** GO REPORT XMIT DONE **     **   GO REPORT "BAR"   **     **   GO REPORT "CAR"   **     **   GO REPORT "BCR"   **
   **    FAILED TO SET    **     **      REG ERROR      **     **      REG ERROR      **     **      REG ERROR      **
   **   EM14,DH2,DT2,0    **     **   EM14,DH2,DT2,0    **     **   EM14,DH2,DT2,0    **     **   EM14,DH2,DT2,0    **
   *************************     *************************     *************************     *************************
               I                             I                             I                             I
      -----------------             -----------------             -----------------             -----------------
     /                 \YES  ***   /                 \YES  ***   /                 \YES  ***   /                 \YES  ***
    /  LOOP ON ERROR ?  \--->*E*  /  LOOP ON ERROR ?  \--->*E*  /  LOOP ON ERROR ?  \--->*E*  /  LOOP ON ERROR ?  \--->*E*
   /      SR09=1         \   *** /      SR09=1         \   *** /      SR09=1         \   *** /      SR09=1         \   ***
   -----------------------       -----------------------       -----------------------       -----------------------
               I NO                          I NO                          I NO                          I NO
               I<----------------------------I<----------------------------I<----------------------------I
          ************
          *NPR5A(28) *
          ************


              ***
              *E*                              9$                  SUNUM(56)
              ***                              *************************
               I                               ** GO SET UP LINE NO.  **
          ************                         **  IN ERROR MESSAGE   **
          *NPR6A(28) *                         **                     **
```

```
           ************
           *TST33     *
           ************
                I
      *****************
      * SET UP ERROR  *
      *  LOOP RETURN  *
      *               *
***   *****************
*A*------------>I
***  1$         I        SELINE(60)
  *************************
  **GO SELECT A LINE NO. **
  **       TO TEST       **
  **                     **
  *************************
                I
       -----------------
***YES   /   TESTED ALL    \
*D*<----/  SELECTED LINES   \
***    /         ?           \
  ***  -----------------------
  *C*------------>I NO
  ***   *****************
        * CLEAR OUT THE *
        *     DH11      *
        *               *
        *****************
                I     CLCABC(56)
  *************************
  **   GO CLEAR "BCR"    **
  ** AND "CAR" MEMORIES  **
  **                     **
  *************************
                I     LDBCR(56)
  *************************
  **  LOAD BYTE COUNT    **
  **  MEMORY WITH ALL    **
  **       ONES          **
  *************************
                I
   ************************
   *ACTIVATE DH11 TO XMIT*
   *   ONE BYTE ON THE   *
   *   SELECTED LINE     *
   ************************
                I
        *****************
        *  INIT TIMERS  *
        *  "A" AND "B"  *
        *               *
        *****************
                I
               ***
               *B*
               ***
```

```
                   ***
                   *B*
                   ***
       3$           I<-----------------
        ---------------------          I
       /   IS XMIT DONE     \       ***I
      /      SET YET ?       \--->*E*I
     /                        \    ***I
     --------------------------       I
                   I NO               I
                   I        TIMEIT(59) I
  *************************           I
  **                    **            I
  **     CALL TIMER     **            I
  **                    **            I
  *************************           I
                   I                  I
        ---------------------         I
       /  TIMEOUT WHILE      \NO      I
      / WAITING FOR XMIT      \-------I
     /       DONE ?            \
     ---------------------------
                   I YES
  ************************
  *   SAVE ERROR PSW     *
  *   SET UP WAS DATA    *
  *   SET UP S/B DATA    *
  ************************
                   I      SUER2A(55)
  *************************
  **GO SET UP INFORMATION**
  **    TO BE PRINTED    **
  **                     **
  *************************
                   I      SUNUM(56)
  *************************
  **   GO PUT LINE NO.   **
  **  IN ERROR MESSAGE   **
  **                     **
  *************************
                   I      $ERROR(53)
  *************************
  **  GO REPORT TIMEOUT  **
  **WAITING FOR XMIT DONE**
  **   EM50,DH12,DT2,0   **
  *************************
                   I
         ----------------
        /                \YES ***
       /  LOOP ON ERROR ?  \--->*C*
      /      SR09=1         \  ***
      -----------------------
                   I NO
                  ***
                  *A*
                  ***
```

```
               ***
               *E*
               ***
                I
       -----------------
      /  "BCR" FOR SEL-  \NO-------------------I
     /  ECTED LINE GOT    \             ^      V
    /    INCREMENTED ?     \            I  *****************
    -------------------------           I  *               *
                I YES                   I  * SET UP REGADR *
       -----------------                I  *               *
      /  "BCR" FOR UN-   \NO-----------I  *****************
     /  SELECTED LINES    \                    I       SUER4(55)
    /  NOT INCREMENTED     \        *************************
    -------------------------       **GO SET UP INFORMATION**
                I YES               **    TO BE PRINTED    **
       -----------------            **                     **
      /  "CAR" FOR SEL-  \NO--->I   *************************
     /  ECTED LINE GOT    \     I              I     $ERROR(53)
    /    INCREMENTED       \    I   *************************
    -------------------------   I   **   GO REPORT "BCR"   **
                I YES           I   **     REG ERROR       **
       -----------------        I   **   EM51,DH11,DT5,0   **
      /  "CAR" FOR ALL   \NO--->I   *************************
     /  OTHER LINES NOT   \     I              I
    /    INCREMENTED       \    I      ----------------
    -------------------------   I     /                \NO     ***
                I YES   I--------    /  LOOP ON ERROR ?  \---->*A*
               ***      I           /      SR09=1         \    ***
               *A*      V           -----------------------
               ***  *****************          I YES
                    *               *         ***
                    * SET UP REGADR *         *C*
                    *               *         ***
                    *****************
                            I    SUER4(55)
            *************************
            **GO SET UP INFORMATION**
            **    TO BE PRINTED    **
            **   EM51,DH11,DT5,0   **
            *************************
                            I    $ERROR(53)
            *************************
            **  GO REPORT "CAR"    **
            **     REG ERROR       **
            **                     **
            *************************
                            I
              ------------------
             /                  \NO     ***
            /  LOOP ON ERROR ?   ---> *A*
           /      SR09=1          \    ***
           ------------------------
                            I YES
                           ***
                           *C*
```

```
     ***
     *D*
     ***
      I
************
*$SCOPE(52)*
************
```

F07


```
                     ************
                     *TST34     *              ---------------I                    ----------------I                  -----------------I
                     ************              I              V                    I               V                  I                 V
                           I                   I     *****************             I     *****************            I     *****************
                 ****************              I     *SAVE ERROR PSW *             I     *SAVE ERROR PSW *            I     *SAVE ERROR PSW *
                 * SET UP ERROR *              I     *SET UP WAS DATA*             I     * SET UP REGADR *            I     * SET UP REGADR *
                 *RETURN AND RCVR*             I     *               *             I     *               *            I     *               *
                 *    VECTOR    *              I     *****************             I     *****************            I     *****************
         ***     ****************              I              I     SUER2A(55)     I               I     SUER2A(55)   I                 I     SUER2A(55)
         *B*------------>I                     I *************************         I*************************         I  *************************
         ***     1$      I                     I **GO SET UP INFORMATION**         I**GO SET UP INFORMATION**         I  **GO SET UP INFORMATION**
                 ****************              I **    TO BE PRINTED    **         I**    TO BE PRINTED    **         I  **    TO BE PRINTED    **
                 *LOCK OUT INTRS *             I **                     **         I**                     **         I  **                     **
                 * RESET SP AND  *             I *************************         I*************************         I  *************************
                 *  CLEAR DH11   *             I              I     $ERROR(53)     I               I     $ERROR(53)   I                 I     $ERROR(53)
                 ****************              I *************************         I*************************         I  *************************
                         I                     I **GO REPORT CHAR AVAIL **         I**   GO REPORT SILO    **         I  **   GO REPORT SILO    **
             ***********************           I **       TIMEOUT       **         I**     DATA ERROR      **         I  ** FILL COUNT ERROR    **
             * SET SILO MAINT TO   *           I **   EM13,DH2,DT2,0    **         I**   EM52,DH2,DT2,0    **         I  **    EM6,DH2,DT2,0    **
             * LOAD SILO AND ENAB  *           I *************************         I*************************         I  *************************
             *  CHAR AVAIL INTRS   *           I              I                    I               I                  I                 I
             ***********************           I     --------------------          I     --------------------         I     --------------------
                         I                     I    /                    \NO   ***I    /                    \NO  ***I    /                    \NO ***
                 ****************              I   /    LOOP ON ERROR     \--->*A*I   /    LOOP ON ERROR     \-->*A*I   /    LOOP ON ERROR     \->*A*
                 * CLEAR THE PSW *             I  /        SR09=1          \   ***I  /        SR09=1          \  ***I  /        SR09=1          \ ***
                 * TO ALLOW INTR *             I  --------------------------       I  --------------------------    I  --------------------------
                 *               *             I              I YES                I               I YES              I                 I YES
                 ****************              I              ***                  I               ***                I                 ***
                 2$      I                     I              *B*                  I               *B*                I                 *B*
              ---------------------            I              ***                  I               ***                I                 ***
             /   DID TIMEOUT      \YES         I                                   I                                  I
            / OCCUR WHILE WAIT-    \-----------I                                   I                                  I
           /    ING FOR INTR.       \                                              I                                  I
           --------------------------                                              I                                  I
                 3$      I NO                                                      I                                  I
              ---------------------                                                I                                  I
             / DID SILO CONTAIN   \NO                                              I                                  I
            /    TEST PATTERN      \-----------------------------------------------I                                  I
           /       125252 ?         \                                                                                 I
           --------------------------                                                                                 I
                 4$      I YES                                                                                        I
              ---------------------                                                                                   I
             /   DID SILO FILL    \NO                                                                                 I
            /     COUNT = 1?       \----------------------------------------------------------------------------------I
           /                        \
           --------------------------
                 5$      I YES
             ***********************
        ***  *  RESET SP,RESTORE   *
        *A*--->*TRAP CATCHER IN VECT-*
        ***  *    OR, CLR PSW      *
             ***********************
                         I
                     ************
                     *$SCOPE(52)*
```

```
             ************
             *TST35     *                     ***
             ************                     *B*
                  I                           ***
          *****************                    I
          * SET UP REGADR *        -----------------
          * INIT TO START *       /   TESTED ALL    \YES
          * WITH COUNT=1  *      / POSSIBLE COUNTS   \---------I
 ***      *****************     /     00 - 77 ?       \        I
 *A*--------------->I           ------------------------       V
 ***      1$        I<-----------------------------I NO   ************
          *****************                               *$SCOPE(52)*
          *CLEAR THE DH11 *                               ************
          * SAVE CURRENT  *
          *     COUNT     *
          *****************
----------------->I
I         2$      I
I         *****************
I         *SET SILO MAINT *
I         *  TO LOAD ONE  *
I         *CHAR INTO SILO *
I         *****************       ----------------------I
I                 I<--------------I   I                 I
I         3$      I               I   I                 V    SUER2(55)
I         -----------------       I   I       **************************
I        /  STALL TIMER    \NO    I   I       **GO SETUP INFORMATION **
I       / TIMED OUT YET ?   \-----I   I       **     TO BE PRINTED    **
I      /                     \        I       **                      **
I      ------------------------       I       **************************
I                 I YES               I                   I
I         *****************           I           *****************
I         *  CLEAR SILO   *           I           * SET UP ERROR  *
I         *MAINT. BIT AND *           I           *    RETURN     *
I         *COUNT CHARACTER*           I           *               *
I         *****************           I           *****************
I                 I                   I                   I     $ERROR(53)
I         -----------------           I       **************************
I  NO    /  LOADED CURRENT \          I       **   GO REPORT "SSR"    **
I-------/    COUNT YET ?    \         I       **      REG ERROR       **
       /                     \        I       **    EM6,DH2,DT2,0     **
       ------------------------       I       **************************
                  I YES               I                   I
          -----------------           I           -----------------
         /  FILL COUNT IN  \NO        I          /                 \YES  ***
        /  "SSR" SAME AS    \---------I         /   LOOP ON ERROR   \--->*A*
       / CURRENT COUNT ?     \                 /      SR09=1         \   ***
       ------------------------               ------------------------
          4$      I YES                                   I NO
          *****************                               I
          *   ADD +1 TO   *                               I
          * CURRENT COUNT *<------------------------------
          *               *
          *****************
                  I
                 ***
                 *B*
```

```
                       ************
                       *TST36     *
                       ************
                            I
                     *****************
                     * SET UP REGADR *
                     *AND INIT COUNT *
                     *     TO = 1    *
                     *****************
                     1$     I
                     *****************
                     *               *
      ------------>* CLEAR DH-11     *<---------------------------------------------
      I              *               *                                             I
      I              *****************                                             I
      I              3$     I                                                      I
      I              *****************                                             I
      I              *USE SILO MAINT *                                             I
      I              * TO FILL SILO  *                                             I
      I              *WITH 64. CHARS *                 --------------------I       I
      I              *****************                 I                   I       I
      I  ---------------------->I                      I                   V     SUER2(55)
      I  I           5$         I                      I      ****************************
      I  I           *****************                 I      **GO SET UP INFORMATION  **
      I  I           *  READ A CHAR  *                 I      **     TO BE PRINTED     **
      I  I           * FROM SILO AND *                 I      **                       **
      I  I           *   COUNT IT    *                 I      ****************************
      I  I           *****************                 I                   I
      I  I                  I                          I         *****************
      I  I           -----------------                 I         * SET UP ERROR  *
      I  I NO       /  READ NO. OF    \                I         *    RETURN     *
      I  I-------/   CHARS SPECIFIED   \               I         *               *
      I          /  BY CURRENT COUNT    \              I         *****************
      I         ------------------------               I                   I    $ERROR(53)
      I                     I YES                      I      ****************************
      I              -----------------                 I      **   GO REPORT "SSR"     **
      I             / FILL COUNT = TO \NO              I      **      REG ERROR        **
      I            / 64. MINUS NO. OF  \--------------I      **    EM6,DH2,DT2,0      **
      I           /     CHARS READ      \                     ****************************
      I          ------------------------                                  I
      I              6$     I YES                                  -----------------
      I              *****************                     NO      /                 \YES
      I              *   ADD ONE TO  *<----------------------------/ LOOP ON ERROR?   \--------I
      I              * CURRENT COUNT *                          /     SR09=1          \
      I              *               *                          ------------------------
      I              *****************
      I                     I
      I              -----------------
      I  NO         /                 \
      I--------/ TESTED ALL COUNTS     \
               /          ?             \
              ------------------------
                            I YES
                       ************
                       *$SCOPE(52)*
```

```
                                   ************
                                   *TST37     *                      ***                                      ***
                                   ************                      *B*                                      *A*
                                        I                            ***                                      ***
                                ***************** 6$      I                                        I
                                * SET UP REGADR *             *****************                        *****************
                                * INIT TO START *             *SET ALARM LEVEL*                        *               *
                                * WITH COUNT=00 *             * COUNT TO NEXT *                        *SAVE ERROR PSW *
                    ***         *****************             * POWER OF "2"  *                        *               *
                    *C*---------------->I                     *****************                        *****************
                    ***     1$          I                             I                                        I     5$
                            ***********************           -----------------                   *************************
                            * CLEAR THE DH11,SET   *         /    TESTED ALL   \YES               ** GO SETUP SOME ERROR **
                            *  ALARM LEVEL=COUNT   *        /   ALARM LEVELS    \----------I      **     INFORMATION     **
                            *                      *       /   0,1,2,4,8,16,32   \         V      **                     **
                            ***********************        -----------------------   ************ *************************
                                        I                             I NO           *$SCOPE(52)*              I    SUER2A(55)
                                *****************                     I              ************ *************************
                                *SET UP TO LOAD *                     I                           **GO SETUP INFORMATION **
                                * ONE MORE CHAR *<--------------------         ***                **    TO BE PRINTED    **
                                *THAN ALARM LVL *                              *D*                **                     **
                                *****************                              ***                *************************
                       ---------------->I                                       I                              I    $ERROR(53)
                       I       2$       I                               *****************         *************************
                       I        *****************                       *               *         **   GO REPORT "SSR"   **
                       I        *SET SILO MAINT *                       *SAVE ERROR PSW *         **      REG ERROR      **
                       I        *  TO LOAD ONE  *                       *               *         **   EM6,DH2,DT2,0     **
                       I        *CHAR INTO SILO *                       *****************         *************************
                       I        *****************                       I     5$                               I
                       I                I<--------------            *************************         ------------------
                       I       3$       I              I            **   GO SET UP SOME    **        /                 \NO    ***
                       I       -----------------       I            **  ERROR INFORMATION  **       /   LOOP ON ERROR   \---->*B*
                       I      /                 \NO    I            **                     **      /       SR09=1        \    ***
                       I     / STALL TIMER DONE  \----I            *************************      -----------------------
                       I    /                      \                            I     SUER2A(55)              I YES
                       I    -----------------------                *************************                 ***
                       I                I YES                       **GO SETUP INFORMATION **                 *C*
                       I       -----------------                    **    TO BE PRINTED    **                 ***
                       I      /                  \YES               **                     **
                       I     / CHAR AVAIL SET ?  \----------I       *************************
                       I    /                      \       ---------->I         I
                       I    -----------------------                  I          ---------------------------->-     $ERROR(53)
                       I                I NO                          I                           *************************
                       I        *****************                     V                           **   GO REPORT "SSR"   **
                       I        *COUNT ONE CHAR *            -----------------                    **      REG ERROR      **
                       I        *    LOADED     *            / SPECIFIED COUNT \NO  ***           **   EM6,DH2,DT2,0     **
                       I        *               *           /     LOADED ?     \--->*D*           *************************
                       I        *****************          /                     \  ***                       I
                       I                I                  -----------------------                    -----------------
                       I       -----------------                      I YES                          /                 \NO  ***
                       INO    /    LOADED THE     \                  ***   5$                       /   LOOP ON ERROR   \--->*B*
                       I-----/ SPECIFIED COUNT?  \                   *B*    *****************      /       SR09=1       \   ***
                            /                     \                  ***    *  SET UP WAS   *      -----------------------
                            -----------------------                         * AND S/B DATA  *                 I YES
                                        I YES                               *  AND RETURN   *                 ***
                                       ***                                  *****************                 *C*
                                       *A*                                                                    ***
```

```
                        ************             ---------------------I
                        *TST40     *             I                    V
                        ************             I           *****************
                             I                   I           *   READ TWO    *
                     *****************           I           *  WORDS FROM   *
                     * SET UP ERROR  *           I           *     SILO.     *
                     *LOOP RETURN TO *           I           *****************
                     *    GO TO 2$   *           I                    I
           ***       *****************           I           -----------------
           *A*--------------->I     SELINE(60)    I           / STORAGE OVER-   \NO----------------------------I
           ***     **************************     I          /   FLOW CLEAR    \                             V
                 **  GO SELECT A LINE    **      I         /         ?          \                    *****************
                 **    NO. TO TEST       **      I         ------------------------                   *   SAVE ERROR  *
                 **                      **      I                   I YES                         *  INFORMATION  *
                 **************************      I           -----------------                     *               *
                             I                   I           /     SILO FILL  \YES    ***          *****************
                      -----------------          I          /  COUNT=77(8)    \---->*A*                    I    SUER2A(55)
                    /     DONE ALL    \YES ***   I         /         ?          \               **************************
                   /  SELECTED LINES?  \-->*C*   I         ------------------------               **  GO SET UP INFORM-   **
                  /                     \  ***   I                   I NO                         **  ATION TO PRINT      **
           ***    ------------------------       I           *****************                    **                      **
           *B*--------------->I NO               I           *  SAVE ERROR   *                    **************************
           ***    ************************       I           *  INFORMATION  *                                 I    SUNUM(56)
                  *  CLEAR DH11-PRIME    *       I           *               *                    **************************
                  *  SELECTED LINE TO    *       I           *****************                    **   GO PUT LINE NO.    **
                  *   XMIT 65. CHARS     *       I                   I     SUER2A(55)             **    IN MESSAGE        **
                  ************************       I       **************************               **                      **
                             I                   I       **  GO SET UP INFORM-   **               **************************
                     *****************           I       **   ATION TO PRINT     **                        I    $ERROR(53)
                     *  INIT TIMERS  *           I       **                      **               **************************
                     *  "A" AND "B"  *           I       **************************               **   REPORT STORAGE     **
                     *               *           I                   I     SUNUM(56)              **   OVERFLOW ERROR     **
                     *****************           I       **************************               **   EM57,DH2,DT2,0     **
          ------------------->I                  I       **   GO PUT LINE NO.    **               **************************
          I           -----------------          I       **    IN MESSAGE        **                        I
          I         /   STORAGE OVER  \YES       I       **                      **                        I
          I        /     FLOW SET?     \---------I       **************************                        I
          I       /                      \                   I     $ERROR(53)                              I
          I       ------------------------               **************************           ************    I
          I                  I NO  TIMEIT(59)            **   REPORT STORAGE     **           *T40B(60)  *    I
          I      **************************  ************ **   OVERFLOW ERROR     **           ************    I
          I      **                      **  *T40A(60)  * **   EM57,DH2,DT2,0     **                I          I
          I      **      CALL TIMER      **  ************ **************************                I          I       ***
          I      **                      **      ↑             I<-----------------------------V-----------       *C*
          I      *******************V******      I             I                                                ***
          I           -----------------          I           -----------------                                   I
          I   NO    /                 \YES       I ***YES  /      LOOP ON      \NO       ***                     ************
          I--------/      TIMEOUT?     \---------I *B*<----/     THIS ERROR?     \----->*A*                    *$SCOPE(52)*
          I       /                      \           ***    /       SR09=1       \      ***                     ************
```

```
              ************
              *TST41     *                     ***                                            ***
              ************                     *C*                                            *D*
                   I                           ***                                            ***                    ***
           *****************                    I    TIMEIT(59)                      5$        I                      *E*
           * SET UP ERROR  *          *************************                       ------------------              ***
           *  LOOP RETURN  *          **                     **                      /  WAS THIS SPEED \YES            I
           *               *          **      CALL TIMER     **                     / FASTER THAN LAST  \------------->I
  ***      *****************          **                     **                    / ONE (TIMEB > TIMEC) \              I
  *A*------------->I                  *************************                    ------------------------      8$     V
  ***    1$        I      SELINE(60)                I                                         I NO            *****************
       *************************           ------------------                      7$         I               * CHANGE SPEED  *
       **  GO SELECT A LINE   **          /  DID TIMEOUT      \YES                 ************************   * MAKE "TIMEC"  *
       **     NO. TO TEST     **         /   OCCUR BEFORE      \ ----------I       *   SAVE ERROR PSW     *   * EQUAL "TIMEB" *
       **                     **        /     DONE SET ?        \          I       *  SET UP SPEED CODE   *   *****************
       *************************        ------------------------           V       *                      *           I
                  I                                 I NO      ************************* ************************         I
          ---------------------                     I         * SAVE ERROR PSW, SET   *           I      SUER2A(55)      I
         / DONE TESTING ALL\YES                     I         * UP SPEED CODE,WAS,    *   *************************      I
        / SELECTED LINES ?  \---------I             I         *     AND S/B DATA      *   **GO SETUP INFORMATION **      I
       /                     \        I             I         *************************   **     TO BE PRINTED   **      I
       -----------------------        I             I                     I     SUER2A(55) **                     **     I
                 I NO                 V             I        *************************    *************************      I
       ************************* ************       I        **GO SETUP INFORMATION **               I      SUNUM(56)    I
       *INIT TO START AT LOW-*  *$SCOPE(52)*        I        **     TO BE PRINTED   **    *************************      I
       *     EST SPEED       *  ************        I        **                     **    ** GO SET UP LINE NO.  **      I
       *  INIT "TIMEC" =-1   *                      I        *************************    **  IN ERROR MESSAGE   **      I
  ***  ************************                     I                     I      SUNUM(56) **                     **     I
  *B*------------->I                                I        *************************    *************************      I
  ***     2$       I                                I        ** GO SET UP LINE NO.  **               I      $ERROR(53)   I
           *****************                        I        **  IN ERROR MESSAGE   **    *************************      I
           *               *                        I        **                     **    **    REPORT TIMING    **      I
           *CLEAR THE DH11 *                        I        *************************    **        ERROR        **      I
           *               *                        I                     I     $ERROR(53) **   EM17,DH6,DT2,0    **     I
           *****************                        I        *************************    *************************      I
                   I                                I        **   REPORT TIMEOUT    **               I                   I
        ************************                    I        **        ERROR        **       -----------------           I
        *  ACTIVATE DH11 TO    *                    I        **    EM50,DH2,DT2,0   **      /                 \NO        I
        *   XMIT 3 CHARS ON    *                    I        *************************     / LOOP ON ERROR ?   \----I    I
        *    SELECTED LINE     *                    I                     I               /     SR09=1          \    I    I
        ************************                    I             -----------------       ----------------------     I    I
                   I                                I            /                 \YES   ***      I YES             I    I
           *****************                        I           /  LOOP ON ERROR    \---->*B*<-----------            I    I
           *               *                        I          /     SR09=1          \    ***                        I    I
           *  INIT TIMERS  *                        I          -----------------------                               I    I
           *  "A" AND "B"  *                        I                    I NO                                        I    I
           *****************                        I                    ***                                         I    I
                   I<-------------------------------                     *E*<----------------------------------------     I
          4$       I                                                     ***                                              I
           -----------------                                                                   I--------------------------
          /                 \YES  ***                                                          V
         /  XMIT DONE SET ?  \--->*D*                                                  -----------------
        /                     \   ***                                       ***NO     /   TESTED ALL    \YES   ***
        -----------------------                                             *B*<----/ SPEEDS ON SELECT- ----> *A*
                 I NO                                                       ***    /     ED LINE ?       \    ***
                 ***                                                              -----------------------
                 *C*
```

```
          ************
          *TST42     *                      ***                                   ***
          ************                      *C*                                   *D*              ***
                I                           ***                                   ***              *E*
       ****************                      I     TIMEIT(59)               5$     I               ***
       * SET UP ERROR *            ***************************             ---------------          I
       *  LOOP RETURN *            **                       **            / WAS THIS SPEED \YES     I
       *              *            **      CALL TIMER       **           / FASTER THAN LAST \------>I
 ***   ****************            **                       **          /  ONE (TIMEB>TIMEC) \      I
 *A*-------------->I               ***************************          ----------------------  8$  V
 ***    1$         I     SELINE(60)            I                               I NO           ****************
     **********************            ------------------             7$       I              * CHANGE SPEED *
     **  GO SELECT A LINE  **         /  DID TIMEOUT     \YES         *********************   * MAKE "TIMEC" *
     **     NO TO TEST     **        /   OCCUR BEFORE     \---------I *   SAVE ERROR PSW  *   * EQUAL "TIMEB"*
     **                    **       /   CHAR AVAIL SET     \        I *  SET UP SPEED CODE*   ****************
     **********************         ------------------------        V *                   *          I
               I                               I NO  ************************ *********************          I
         ----------------                      I     * SAVE ERROR PSW,SET   *          I   SUER2A(55)        I
        /  DONE TESTING  \YES                  I     * UP SPEED CODE, WAS   * ************************          I
       /  ALL SELECTED    \---------I          I     *    AND S/B DATA      * **GO SETUP INFORMATION **          I
      /     LINES ?        \        I          I     ************************ **   TO BE PRINTED     **          I
      ----------------------        V          I               I    SUER2A(55) **                    **          I
               I NO          ************      I     ************************ ************************          I
     ********************** *$SCOPE(52)*       I     **GO SETUP INFORMATION **         I    SUNUM(56)           I
     *INIT TO START AT LOW-* ************      I     **   TO BE PRINTED     ** ************************          I
     *      EST SPEED      *                   I     **                     ** ** GO SET UP LINE NO.  **          I
     *  INIT "TIMEC" = -1  *                   I     ************************ **  IN ERROR MESSAGE   **          I
 *** ***********************                   I               I    SUNUM(56)  **                    **          I
 *B*------------->I                            I     ************************ ************************          I
 ***    2$        I                            I     ** GO SET UP LINE NO.  **         I   $ERROR(53)           I
       ****************                        I     **  IN ERROR MESSAGE   ** ************************          I
       *              *                        I     **                     ** **   GO REPORT RCVR   **          I
       *CLEAR THE DH11 *                       I     ************************ **    TIMING ERROR    **          I
       *              *                        I               I   $ERROR(53)  **   EM20,DH6,DT2,0   **          I
       ****************                        I     ************************ ************************          I
              I                                I     **  GO REPORT TIMEOUT  **            I                     I
     **********************                    I     **  WAITING FOR DONE   **      ----------------            I
     *  ACTIVATE DH11 TO  *                    I     **   EM22,DH2,DT2,0    **     /                \NO         I
     *  XMIT AND RECEIVE  *                    I     ************************     /  LOOP ON ERROR ?  \----I     I
     *      ON CHAR       *                    I               I                 /     SR09=1         \    I     I
     **********************                    I        ----------------         ----------------------    I     I
              I                                I       /                \YES  ***          I YES           I     I
       ****************                        I      /  LOOP ON ERROR ? \--->*B*<------------             I     I
       *  INIT TIMERS *                        I     /     SR09=1         \   ***                           I     I
       *  "A" AND "B" *                        I     ----------------------                                I     I
       *              *                        I               I NO                                        I     I
       ****************                        I              ***<------------------------------------------     I
              I<--------------------------------              *E*                     I-------------------------
     4$       I                                               ***                     I
       ----------------                                                               V
      / CHAR AVAILABLE \YES   ***                                             ----------------
     /    SET YET ?     \---->*D*                                 ***NO      /  TESTED ALL    \YES   ***
    /                    \    ***                                 *B*<----/    SPEEDS ON       \---->*A*
    ----------------------                                        ***    / SELECTED LINES ?     \    ***
              I NO                                                       ------------------------
             ***
             *C*
```

```
              ************                     ***                                              ***
              *TST43     *                     *B*                                              *C*
              ************                     ***                                              ***
                   I                            I     TIMEIT(59)                                 I                     ***
           *****************          *************************                        -----------------              *E*
           * SET UP ERROR  *          **                     **                       /   WAS RECEIVED  \YES          ***
           *  LOOP RETURN  *          **   CALL THE TIMER    **                      /   DATA CORRECT    \------------->I
           *               *          **                     **                     /                     \             V
    ***    *****************          *************************                     ------------------------     ****************
    *A*------------>I                           I                                            I NO                * INCREMENT R2  *
    *** 1$          I     SELINE(60)     -----------------                                   I     SUER2(55)     *TO SELECT NEXT *
       *************************        /   CHAR AVAIL.   \YES                     *************************     *  CHAR LENGTH  *
       **  GO SELECT A LINE   **       /     TIMEOUT ?     \---------I             **GO SETUP INFORMATION **     *****************
       **       TO TEST       **      /                     \        I             **     TO BE PRINTED   **            I
       **                     **      -------------------------      V             **                     **            I
       *************************                I NO       *************************  *************************         I
                   I                            I          *   SAVE ERROR PSW    *               I     SUNUM(56)        I
           -----------------                    I          *   SET UP S/B DATA   *     *************************         I
          /  DONE TESTING   \YES                I          *    GET WAS DATA     *     ** GO SET UP LINE NO.  **        I
         /   ALL SELECTED    \---------I        I          ***********************     **  IN ERROR MESSAGE   **        I
        /       LINES ?       \        V        I                    I    SUER2A(55)   **                     **        I
        ------------------------  ************  I         *************************    *************************        I
                   I NO           *$SCOPE(52)*  I         **  SETUP INFORMATION  **              I     $ERROR(53)       I
        *************************  ************ I         **     TO BE PRINTED   **    *************************        I
        *  SET UP DATA TABLE    *               I         **                     **    **   GO REPORT DATA    **        I
        *POINTER - INIT R2 TO   *               I         *************************    **    COMPARE ERROR    **        I
        *  START WITH 5 BITS    *               I                    I     SUNUM(56)   **   EM23,DH7,DT2,0    **        I
        *************************               I         *************************    *************************        I
                   I                            I         ** GO SET UP LINE NO.  **              I                      I
        *************************               I         **  IN ERROR MESSAGE   **        -----------------            I
        * GET TEST CHAR FROM    *               I         **                     **       /                 \NO         I
        *  TABLE AND UPDATE     *               I         *************************      /   LOOP ON ERROR   \----I     I
        *    TABLE POINTER      *               I                    I     $ERROR(53)   /       SR09=1        \   I     I
  ***   *************************               I         *************************    ------------------------   I     I
  *D*-------------->I                           I         **    GO REPORT DATA   **              I YES            I     I
  ***   *************************               I         **    AVAIL TIMEOUT    **              I                I     I
        *ACTIVATE DH11 TO OUT-  *               I         **   EM22,DH2,DT2,0    **              I                I     I
        *  PUT TEST CHAR AT     *               I         *************************              I                I     I
        *                       *               I                    I                           I                I     I
        *************************               I            -----------------                   I                I     I
                   I                            I           /                 \YES    ***        I                I     I
           ****************                     I          /  LOOP ON ERROR ?  \----->*D*<-----------             I     I
           *  INIT TIMERS  *                    I         /      SR09=1         \     ***                         I     I
           *  "A" AND "B"  *                    I         ------------------------                                I     I
           *               *                    I                    I NO                                         I     I
           *****************                    I                   ***<------------------------------------------      I
                   I<---------------------------                    *E*                           I-------------------
                   I                                                ***                           V
           -----------------                                                              -----------------
          /  CHAR AVAILABLE \YES  ***                                        ***NO      /   TESTED ALL 4   \YES     ***
         /     SET YET ?     \--->*C*                                        *D*<----/  CHAR LENGTHS ON   \---->*A*
        /                     \   ***                                        ***    /      THIS LINE        \     ***
        ------------------------                                                    --------------------------
                   I NO
                  ***
                  *B*
```

```
                        ************
                        *TST44     *        -------------------------I
                        ************        I                        V
                             I              I             ************************
                     *****************      I             *   STORE SILO WORD    *
      ************   * SET UP ERROR  *      I             *    IN "RBUF" AND    *
      *SLD2(40)  *   *  LOOP RETURN  *      I             *  UPDATE POINTER      *
      ************   *  TO GO TO 2$  *      I             ************************
           I         *****************      I                        I
           ----------------->I     SELINE(60I                -----------------
                 *************************  I               /     RECEIVED    \NO     ***
                 **  GO SELECT A LINE   **  I              /    256. CHARS     \----->*A*
                 **      NO. TO TEST    **  I             /        YET ?        \     ***
                 **                     **  I             ------------------------
                 *************************  I                        I YES
                             I              I             ************************
                     -----------------      I             * SET UP POINTERS TO   *
      ************  /     DONE ALL    \YES  I   ***       * CHECK (TBUF)=(RBUF) *
      *SLD3(40)  * /  SELECTED LINES   \------->*B*       *                      *
      ************/          ?          \   I   ***       ************************
           I      -----------------------   I     ------------------>I<------------------------------------------------
           ----------------->I NO           I     I          -----------------                                        I
                  ***********************   I     I         /  DID XMIT CHAR  \NO                                     I
                  *  CLEAR DH11-PRIME   *   I     I        /   COMPARE WITH    \-------------------I                  I
                  *SELECTED LINE TO XMIT*   I     I       /      RCVD CHAR      \                  I                  I
                  *   BINARY PATTERN    *   I     I       -----------------------                  V    SUER2(55)     I
                  ***********************   I     I                  I YES             *************************      I
                             I              I     I          *****************         **  GO SET UP INFORM-  **      I
                     *****************      I     I          *     UPDATE    *         **   ATION TO PRINT    **      I
        ***          *  INIT TIMERS  *      I     I          *  POINTERS TO  *         **                     **      I
        *A*          *  "A" AND "B"  *      I     I          *   NEXT CHAR   *         *************************      I
        ***          *               *      I     I          *****************                     I    SUNUM(56)     I
         I           *****************      I     I                  I                 *************************      I
         +------------------>I              I     I          -----------------         **    GO PUT LINE NO.  **      I
         I           -----------------      I     I   NO    /     COMPARED    \        **     IN MESSAGE      **      I
         I          / CHAR AVAILABLE  \YES  I     I------- /    256. CHARS?    \       **                     **      I
         I         /     SET YET ?     \---->             /                     \      *************************      I
         I        /                     \                 -----------------------                  I    $ERROR(53)    I
         I        -----------------------                            I YES             *************************      I
         I                   I NO  TIMEIT(59)                  ************            **     REPORT DATA     **      I
         I       *************************                     *SLD1(40)  *            **    COMPARE ERROR    **      I
         I       **                     **                     ************            **   EM37,DH4,DT2,0    **      I
         I       **       CALL TIMER    **                                             *************************      I
         I       **                     **                         ***                             I                  I
         I       *************************                         *B*                             I                  I
         I                   I                                     ***                             I                  I
         I           -----------------                               I                             I                  I
         I    NO    /                 \YES  ************       ************                        -------------------I
         I---------/     TIMEOUT ?     \--->*T44X(60)  *       *$SCOPE(52)*
                  /                     \   ************       ************
```

```
                 ************
                 *SLD1(39)  *
                 ************
                      I
               ------------------
              /  CONTENTS OF    \NO
             /     "BAR"=0       \-------------------------------------------------------------I
            /                     \                                                            I
  ***      ------------------------                                                            I
  *A*----------------->I YES                                                                   I
  ***          ------------------                                                              I
              /  CONTENTS OF    \NO                                                            I
             /     "BCR"=0       \------------------------------------------I                  I
            /                     \                                         I                  I
  ***      ------------------------                                         I                  I
  *B*----------------->I YES                                                I                  I
  ***          ------------------                                           I                  I
              /  CONTENTS OF    \NO                                         I                  I
             / "CAR" CORRECT     \---------I                                I                  I
            /                     \        I                                I                  I
           ------------------------        I                                I                  I
                    I YES                  I                                I                  I
                 ************              V                                V                  V
                 *SLD2(39)  *      *****************                *****************   *****************
                 ************      *  SAVE ERROR   *                *  SAVE ERROR   *   *  SAVE ERROR   *
                                   *  INFORMATION  *                *  INFORMATION  *   *  INFORMATION  *
                                   *               *                *               *   *               *
                                   *****************                *****************   *****************
                                           I     SUER2A(55)                 I     SUER2A(55)      I     SUER2A(55)
                                *************************        *************************   *************************
                                **  GO SET UP INFORM-  **        **  GO SET UP INFORM-  **   **  GO SET UP INFORM-  **
                                **   ATION TO PRINT    **        **   ATION TO PRINT    **   **   ATION TO PRINT    **
                                **                     **        **                     **   **                     **
                                *************************        *************************   *************************
                                           I     SUNUM(56)                  I     SUNUM(56)       I     SUNUM(56)
                                *************************        *************************   *************************
                                **   GO PUT LINE NO.   **        **   GO PUT LINE NO.   **   **   GO PUT LINE NO.   **
                                **     IN MESSAGE      **        **     IN MESSAGE      **   **     IN MESSAGE      **
                                **                     **        **                     **   **                     **
                                *************************        *************************   *************************
                                           I     $ERROR(53)                 I     $ERROR(53)      I     $ERROR(53)
                                *************************        *************************   *************************
          ************          **   "CAR" REG ERROR   **        **   "BCR" REG ERROR   **   **   "BAR" REG ERROR   **
          *T44Y(60)  *          **    EM7,DH2,DT2      **        **   EM10,DH2,DT2,0    **   **   EM40,DH2,DT2,0    **
          ************          **                     **        **                     **   **                     **
               I                *************************        *************************   *************************
               ------------------------->I                                  I                          I
                                   -----------------                -----------------          -----------------
                       YES        /  LOCK ON THIS   \              /  LOCK ON THIS   \YES     /  LOCK ON THIS   \YES
                   I-----------/      ERROR          \            /      ERROR        \----I /      ERROR        \----I
                   V          /       SR09=1          \          /       SR09=1        \   I/       SR09=1        \   I
                 ************ -------------------------         -------------------------  -------------------------  V
                 *SLD3(39)  *            I NO                            I NO          V           I NO            V
                 ************       ************                         ***     ************      ***     ************
                                    *SLD2(39)  *                         *B*     *SLD3(39)  *      *A*     *SLD3(39)  *
```

```
           ************
           *TST45     *
           ************
                I
         *****************
         * SET UP ERROR  *
         *  LOOP RETURN  *
         *               *
***      *****************
*A*------------->I
***    1$        I        SELINE(60)
     ***********************
     **GO SELECT A LINE NO. **
     **       TO TEST       **
     **                     **
     ***********************
                I
        ----------------------
       / TESTED ALL SEL-  \YES
      /   ECTED LINES ?    \----------I
     /                      \         I
***  ------------------------         I
*D*------------->I NO                 V
***    2$        I               ************
     *********************** *$SCOPE(52)*
     *ACTIVATE DH11 TO XFER* ************
     * ONE CHAR WITH "ODD" *
     *   PARITY SELECTED   *
     ***********************
                I
         *****************
         *  INIT TIMERS  *
         *  "A" AND "B"  *
         *               *
         *****************
 --------------->I
 I      3$       I
 I       ----------------------
 I      /  CHAR AVAIL SET  \YES   ***
 I     /       YET ?        \--->*C*
 I    /                      \    ***
 I    ------------------------
 I               I NO  TIMEIT(59)
 I   ***********************
 I   **                   **
 I   **     CALL TIMER    **
 I   **                   **
 I   ***********************
 I               I
 I       ----------------------
 INO    /  CHAR AVAILABLE  \
 I-----/     TIMEOUT ?      \
      /                      \
      ------------------------
                I YES
               ***
               *B*
```

```
               ***
               *B*
               ***
                I
     ************************
     * SAVE ERROR PSW SET   *
     *UP WAS, S/B DATA AND  *
     *       REGADR         *
     ************************
                I     SUER2A(55)
     ************************
     **GO SETUP INFORMATION **
     **    TO BE PRINTED    **
     **                     **
     ************************
                I     SUNUM(56)
     ************************
     ** GO SET UP LINE NO.  **
     **  IN ERROR MESSAGE   **
     **                     **
     ************************
                I     $ERROR(53)
     ************************
     **   GO REPORT DATA    **
     **  AVAILABLE TIMEOUT  **
     **   EM22,DH2,DT2,0    **
     ************************
                I
        ----------------------
*** YES  /                  \
*D*<----/  LOOP ON ERROR?    \
***    /      SR09=1          \
       ------------------------
                I NO
               ***
               *A*
               ***
```

```
               ***
               *C*
               ***
         4$     I
        ----------------------
       /   CORRECT DATA   \YES      ***
      /     RECEIVED ?     \------>*A*
     /                      \       ***
     ------------------------
                I NO
     ************************
     *    SAVE ERROR PSW    *
     *    SET UP REGADR     *
     *                      *
     ************************
                I     SUER2A(55)
     ************************
     **GO SETUP INFORMATION **
     **    TO BE PRINTED    **
     **                     **
     ************************
                I     SUNUM(56)
     ************************
     ** GO SET UP LINE NO.  **
     **  IN ERROR MESSAGE   **
     **   EM33,DH2,DT2,0    **
     ************************
                I     $ERROR(53)
     ************************
     **  GO REPORT PARITY   **
     **     DATA ERROR      **
     **                     **
     ************************
                I
        ----------------------
*** YES  /                  \
*D*<----/  LOOP ON ERROR ?   \
***    /      SR09=1          \
       ------------------------
                I NO
               ***
               *A*
               ***
```

```
              ************                ***                            I---------------
              *TST46     *                *B*                            V              I
              ************                ***                                           I
                   I                       I                    -----------------       I                    ************
        ***********************   ***********************      /                 \NO    I                    *T46B(43)  *
        * SET UP ERROR RETURN *   *  ENABLE CHAR AVAIL   *    /RECEIVER INTERRUPT \----I                    ************
        *AND POINTER TO TABLE *   *INTERRUPTS AND ACTIV-*    /          ?           \                              I
        * OF TEST PARAMETERS  *   *    ATE ALL LINES    *   -----------------------                              ***
        ***********************   ***********************              I YES                                     *A*
                   I                       I                       ************                                  ***
           *****************       *****************               *T46A(43)  *
           * INIT TO START *       * CLEAR THE PSW *               ************
           * TESTING WITH  *       *TO ALLOW INTRS *
           *  SUB-TEST 00  *       *               *                                               ***
  ***      *****************       *****************                                               *C*
  *A*------------>I                        I                                                       ***
  ***     2$      I                *****************                                                I
           -----------------       *  INIT TIMERS  *                                   ***********************
***YES    /   DONE ALL 8.   \      *  "A" AND "B"  *                                   * RESET SP, CLEAR PSW *
*C*<-----/    SUBTESTS ?     \     *               *                                   *  AND RESTORE TRAP-  *
***     /                     \    *****************                                   *  CATCHER IN VECTOR  *
        -----------------------   ---------------->I                                   ***********************
                  I NO           I                 I                                               I
           *****************     I         -----------------                                 ************
           * SET UP STACK  *     I        /  ALL LINES DONE \YES-----------------I           *$SCOPE(52)*
           *  POINTER AND  *     I       /     XMITTING ?    \                   V           ************
           *    DEVADR     *     I      /                     \            *****************
           *****************     I      -----------------------            *  INIT TIMERS  *
                   I             I                 I NO                    *  "A" AND "B"  *
                   I             I                 I    TIMEIT(59)         *               *
        ***********************  I    ***********************     ***     *****************
        * RETRIEVE BYTE COUNT *  I    **                   **     *D*--------->I
        * AND LINE PARAMETERS *  I    **    CALL TIMER     **     ***          I
        *FM TABLE UPDATE PTR. *  I    **                   **            -----------------
        ***********************  I    ***********************           /                 \YES   ***
                   I             I                 I                   /   SILO EMPTY ?    \---->*A*
           *****************     I         -----------------          /                     \    ***
           * UPDATE SUBTST *     I NO     /                 \        -----------------------     -----------------
           * NO. AND CLEAR *     I-------/  TIMEOUT ERROR ?  \                 I NO             I      ********V********
           *   THE DH11    *            /                     \    ***********************     I      *               *
           *****************            -----------------------    **                   **     I      *CLEAR THE DH11 *
                   I      SUPPAR(57)               I YES            **    CALL TIMER     **     I      *               *
        ************************           *****************        **                   **     I      *****************
        ** GO SETUP PARAMETERS **          *               *        ***********************     I              I    $ERROR(53)
        ** FOR MULTI-LINE XFR  **          *CLEAR THE DH11 *                   I                I   ***********************
        **                     **          *               *            -----------------       I   **   GO REPORT THE   **
        *************************          *****************     NO    /                 \      I   **   TIMEOUT ERROR   **
                   I                               I     $ERROR(53) I--/  TIMEOUT ERROR ?  \     I   **       EM35        **
           *****************        ***********************        I  /                     \    I   ***********************
           *LOCK OUT INTRS *        **  GO REPORT TIMEOUT  **      I  -----------------------    I              I
           *  SET UP RCVR  *        **        ERROR        **      V            I YES            I             ***
           *    VECTOR     *        **        EM35         **     ***           I                I             *A*
           *****************        ***********************       *D*           -----------------I             ***
                   I                           I                  ***
                  ***                         ***
                  *B*                         *A*
                  ***
```

```
*T46A(42) *
    I
/ WAS CHAR AVAIL-  \NO  ---> CLEAR OUT THE DH11
   ABLE SET ?                 I   $ERROR(53)
    I YES                     ** REPORT RCVR FALSE **
                              **  INTERRUPT ERROR  **
***YES                        **  EM41,DH5,DT4,0   **
*B*<-----  SILO OVERFLOW ?    I
***                           *T46B(42) *
    I NO
* GET THE DATA   *
* FROM THE SILO  *
    I
*INDEX PARITY TABLE TO*
*  GET DATA FOR THIS  *
*        LINE         *
    I
/  WAS RECEIVED     \NO ---> * SAVE PSW   *
/ DATA SAME AS THE            * CLEAR DH11 *
   TABLE DATA ?                  I
    I YES                     * SAVE ERROR  *
* UPDATE TABLE DATA *         * INFORMATION *
*   FOR THIS LINE   *            I   SUER2A(55)
* CHECK FOR LINE DONE *       ** SET UP INFORMATION **
    I                         **   TO BE PRINTED    **
/ RECEIVED ALL   \YES            I   SUNUM(56)
/ CHARACTERS FOR  ----+       ** PUT LINE NO.    **
   THIS LINE ?        V       ** IN ERROR MSG    **
    I NO          * CLEAR LINE     *     I
    I             *ACTIVE BIT FOR  *     +---------> I SUNUM(56)
    I             *  THIS LINE     *     ** PUT SUB-TEST NO. **
    I-----------------I                  **  IN ERROR MSG    **
**RTI   **                                  I   $ERROR(53)
                                         ** REPORT PARITY DATA **
                                         **       ERROR        **
                                         **  EM34,DH4,DT2,0    **
                                            I
                                         *T46B(42) *

***
*B*
***
 I
* CLEAR OUT *
* THE DH11  *
 I   $ERROR(53)
** REPORT THE SILO **
** OVERFLOW ERROR  **
** EM42,DH5,DT4,0  **
 I
*T46B(42) *
```

NOTE   WHEN THE "RTI" IS EXECUTED
        ROUTINE RETURNS TO XMIT DONE

F08


```
                        ************                                          ***
                        *TST47     *                  -------------------I<-----*C*
                        ************                  I                  V      ***
                              I                       I          ----------------
                     *****************                I         /  CHAR AVAIL.   \YES
                     * SET UP ERROR  *                I        /    SET YET ?     \-----------------------------I
                     *  LOOP RETURN  *                I       /                    \                            V
                     *               *                I       ----------------------                  ----------------
                     *****************                I                  I NO  TIMEIT(59)            /                \YES
                              I                       I       *************************             /  DATA CORRECT    \-----I
                     *****************                I       **                     **            /        ?           \    I
                     *INIT A.E. DATA *                I       **     CALL TIMER      **            ----------------------    I
         ----------->*  FLAG TO USE  *                I       **                     **                     I NO             I
         I           *  "1'S" DATA   *                I       *************************            *****************         I
         I           *****************                I                  I                         *  SAVE ERROR   *         I
         I                    I                       I           ----------------                 *  INFORMATION  *         I
         I           *****************             NO I          /                \                *               *         I
         I           * RETRIEVE A.E. *                I<--------/   TEST TIMEOUT   \               *****************         I
         I           *  TEST DATA-   *                I        /       YET ?        \                       I    SUER2A(55)  I
         I           *  UPDATE PTR.  *                I        ----------------------          *************************     I
         I           *****************                I                  I YES                 **  GO SET UP INFORM-  **     I
         I                    I     SELINE(60)        I           *****************            ** ATION TO BE PRINTED **     I
         I       ************************             I           *  SAVE ERROR   *            **                     **     I
         I       **  GO SELECT A LINE  **             I           *  INFORMATION  *            *************************     I
         I       **     NO. TO TEST    **             I           *               *                    I       SUNUM(56)     I
         I       **                    **             I           *****************            *************************     I
         I       ************************             I                  I     SUER2A(55)      **   GO PUT LINE NO.   **     I
         I                    I                       I       *************************        **     IN MESSAGE      **     I
         I           -----------------                I       **  GO SET UP INFORM-  **        **                     **     I
         I          /   TESTED ALL    \YES ***        I       ** ATION TO BE PRINTED **        *************************     I
         I         /  SELECTED LINES   \-->*B*        I       **                     **                    I     $ERROR(53)  I
         I        /                     \  ***        I       *************************        *************************     I
         I ***    -----------------------             I                  I     SUNUM(56)       **  REPORT A.E. DATA   **     I
         I *A*------------->I NO                      I       *************************        **        ERROR        **     I
         I ***    ***********************             I       **   GO PUT LINE NO.   **        **   EM24,DH2,DT2,0    **     I
         I        * PRIME SELECTED LINE *             I       **     IN MESSAGE      **        *************************     I
         I        *  TO XMIT ONE CHAR   *             I       **                     **                   I                I
         I        *    IN A.E. MODE     *             I       *************************                   I                I
         I        ***********************             I                  I     $ERROR(53)                 I                I
         I                  I                         I       *************************                   I                I
         I           *****************                I       **  REPORT CHAR AVAIL  **                   I     I-----------
         I           *  INIT TIMERS  *                I       **       TIMEOUT       **                   I     I
         I           *  "A" AND "B"  *                I       **   EM24,DH2,DT2,0    **                   I     I
         I           *               *                I       *************************                   I     I
         I           *****************                I                  I<-------------------------------      I
         I                    I                       I           ----------------                              V
         I                    --------------------I  NO          / LOOP ON THIS   \YES   ***              -----------------
         I--------------------------------------------------------/     ERROR ?      \----->*A*    YES    /  RCVD 64. CHARS  \
                                                               /      SR09=1        \   ***   I---------/   ON THIS LINE     \
   ***                                                         ----------------------         V        /       YET ?          \
   *B*                                                                                 *****************   ---------------------
   *** NOTE:    THIS TEST REPEATED FOR                                                 * DISABLE AUTO  *           I NO
    I           BOTH ALL (1'S) AND ALL (0'S) TEST                                      *  ECHO MODE    *           ***
************    DATA - THEN EXITS TO NEXT TEST                                         *               *---------->*C*
*$SCOPE(52)*    VIA "SCOPE"                                                            *****************           ***
```

```
                       *************          -------------------------I
                       *TST50      *          I                        V
                       *************          I               -----------------
                             I                I              /   VALID DATA    \YES
                     *****************        I               READ FROM SILO    \-----------------------------I
    ************     * SET UP ERROR  *        I             /                    \                            V
    *AE4(46)   *     *  LOOP RETURN  *        I            -----------------------              ------------------
    ************     *TO GO TO "AE5" *        I                       I NO  TIMEIT(59)    YES   /    WAS CHAR      \
          I          *****************        I           *************************   I---------/ RECEIVED ON A.E.  \
          ------------------>I                I           **                     **   V        /    TEST LINE        \
                     *****************        I           **      CALL TIMER     **  ************ -----------------------
                     * RETRIEVE A.E. *        I           **                     **  *AE1(46)   *           I NO
                     *TEST DATA FROM *        I           *************************  ************    ----------------
                     *   A.E. TABLE  *        I                       I                       YES   /   BINARY COUNT   \
                     *****************        I               -----------------       I---------/ DATA CORRECT FOR   \
                             I     SELINE(60I       NO       /                 \      I        /  LINE RECEIVED?      \
                 *************************  I<-------------/   TEST TIMEOUT     \     V       -----------------------
                 **   GO SELECT A LINE   **   I            /        YET           \ ************           I NO
                 **    NUMBER TO TEST    **   I            -----------------------   *AE2(46)   *    ****************
                 **                      **   I                       I YES          ************    *  SAVE ERROR    *
                 *************************    I               ****************                       *  INFORMATION   *
                             I                I               *  SAVE ERROR  *                       *                *
                     -----------------        I               *  INFORMATION *                       ****************
              YES   /  DONE A.E. TEST  \      I               *              *                             I    SUER2A(55)
          I---------/   FOR ALL LINES   \     I               ****************                 *************************
          V        /     SELECTED ?      \    I                       I     SUNUM(56)          **  GO SET UP INFORM-  **
    ************  ------------------------    I           *************************            **  ATION TO PRINT     **
    *$SCOPE(52)*             I NO             I           **     GO PUT LINE     **            **                     **
    ************    ***********************   I           **   NO. IN MESSAGE    **            *************************
 ************       *  CLEAR DH11-PRIME   *   I           **                     **                    I    SUNUM(56)
 *AE5(45)    *--->*  SELECTED LINE TO    *   I           *************************            *************************
 ************       * XMIT ONE A.E. CHAR  *   I                      I     $ERROR(53)          **   GO PUT LINE NO.   **
      I             ***********************   I           *************************            **  IN ERROR MESSAGE   **
                             I                I           **   REPORT A.E. TEST   **            **                     **
                    ***********************   I           **       TIMEOUT        **            *************************
                    *PRIME ALL OTHER SEL- *   I           **   EM32,DH5,DT4,0     **                    I    $ERROR(53)
                    * ECTED LINES TO XMIT *   I           *************************            *************************
                    *   BINARY PATTERN    *   I                      I<-------------------     **  REPORT DATA ERROR  **
                    ***********************   I               -----------------      I        **   EM31,DH4,DT2,0    **
                             I                I        YES   /   LOOP ON THIS  \      I        **                     **
                    ***********************   I        I----/      ERROR        \     I        *************************
   ************     * ACTIVATE ALL LINES. *   I        I   /       SR09=1        \    I                  I
   *AE3(46)   *     * AND SET LINE ACTIVE *   I        I   ------------------------   I                  I
   ************     *       FLAGS.        *   I        I             I NO             I-------------------
         I          ***********************   I        V
         ------------------>I                 I    ************
                     *****************        I    *AE5(45)   *
                     *  INIT TIMERS  *        I    ************
                     *  "A" AND "B"  *        I
                     *               *        I
                     *****************        I
                             I                I
                             I                I
```

```
                         ************                                                     ************
                         *AE1(45)   *                                                     *AE2(45)   *
                         ************                                                     ************
                              I                                                                I
                     -----------------                                                 *****************
                    /  WAS A.E. DATA  \ ------------------------->I<-----------------I          *UPDATE EXPECT- *
                   /     CORRECT ?     \                           I                  I          *   ED BINARY   *
                  /                     \                          V                  I          *     DATA      *
                  -----------------------               -----------------              I          *****************
                              I NO              YES    /    ALL LINES    \            I                I
                     *****************      <--------/     INACTIVE ?     \           I          -----------------
                     * SET UP ERROR  *      I       /                      \          I         /   RECEIVED ALL   \NO
                     *  INFORMATION  *      I       -----------------------           I        /  256. CHARS ON    \-----I
                     *               *      I                  I NO                   I       /    THIS LINE ?      \     I
                     *****************      I          *****************              I       -----------------------     I
                              I     SUER2A(55)V         * TURN OFF A.E. *              I                I YES              I
                 *************************  ************ * FOR THIS LINE *              I       **********************     I
                 ** SET UP INFORMATION  **  *AE3(45)   * *               *              I       *    CLEAR LINE      *     I
                 **   TO BE PRINTED     **  ************ *****************              I       *  ACTIVE FLAG FOR   *     I
                 **                     **                     I                       I       *     THIS LINE      *     I
                 *************************              -----------------\NO            I       **********************     I
                              I     SUNUM(56)          /                  \             I-----------------I                I
                 *************************            /   SILO EMPTY ?     \                                               I
                 **   GO PUT LINE NO.   **           /                      \-------->I<-----------------------------------I
                 **  IN ERROR MESSAGE   **           -----------------------           I
                 **                     **                     I YES                   I
                 *************************                ************                 V
                              I     $ERROR(53)            *AE4(45)   *          ************
                 *************************                ************          *AE3(45)   *
                 **     REFORT A.E.     **                                      ************
                 **     DATA ERROR      **
                 **   EM31,DH4,DT2,0    **
                 *************************
                              I
                     -----------------
                    /      LOCK ON      \YES
                   /     THIS ERROR      \---------I
                  /       SR09=1          \        I
                  -------------------------        I
                              I NO                 I
                         ************              I
                         *AE4(45)   *              V
                         ************         ************
                                              *AE5(45)   *
```

```
                  ************                 -----------------------I
                  *TST51     *                 I                      V
                  ************                 I           -------------------
                       I                       I          /   CORRECT DATA    \NO---------------------------I
               *****************               I         /  FOR THIS LINE?     \                            V
               *  SET UP ERROR *               I        /                       \                  *****************
               *  LOOP RETURN  *               I        -------------------------                  *  SAVE ERROR   *
               *               *               I                      I YES                        *  INFORMATION  *
 ***           *****************               I           -------------------                     *               *
 *B*---------------->I                         I   *** NO /    AUTO ECHOED      \                   *****************
 ***           *****************               I   *A*<---/   64. CHARS ON      \                         I      SUER2A(55)
               *CLEAR THE SEL- *               I   ***   /     THIS LINE         \                 ***************************
               *  ECTED DH11   *               I        -------------------------                 **GO SET UP INFORMATION**
               *               *               I                      I YES                        **   TO BE PRINTED      **
               *****************               I            *****************                     **                       **
                       I                       I            * TURN OFF A.E. *                      ***************************
            **********************             I            * BIT FOR THIS  *                             I      SUNUM(56)
            *   SET UP XMIT ONE  *             I            *    LINE       *                      ***************************
            *CHAR IN A.E. MODE ON*             I            *****************                      **    GO PUT LINE NO.    **
            * ALL SELECTED LINES *             I                    I                              **     IN MESSAGE        **
            **********************             I            *****************                      **                       **
                       I                       I            *  CLEAR LINE   *                      ***************************
            **********************             I            *  ACTIVE FLAG  *                             I      $ERROR(53)
            *ACTIVATE ALL SELECT-*             I            * FOR THIS LINE *                      ***************************
            *  ED LINES-SET ACT- *             I            *****************                      **  REPORT AUTO ECHO     **
            *     IVE FLAGS      *             I                    I                              **     DATA ERROR        **
            **********************             I            -------------------                    **   EM31,DH4,DT2,0      **
                       I                       I           /    ALL LINES      \YES                ***************************
 ***           *****************               I          /     INACTIVE ?      \---------I                   I<-----------------
 *A*           *  INIT TIMERS  *               I         /                       \        I          ------------------         I
 ***           *  "A" AND "B"  *               I        -------------------------         I   NO    /   LOOP ON THIS   \        I
  I            *               *               I                      I NO                V<-------/      ERROR ?       \       I
  V            *****************               I                     ***             ************ /                      \      I
 ----------------->I                           I                     *A*             *$SCOPE(52)* ------------------------      I
  I           ------------------               I                     ***             ************            I YES              I
  I          /  CHAR AVAILABLE \YES            I                      I                                      ***                I
  I         /    SET YET ?      \--------------I    ------------------I                                      *B*                I
  I        /                     \                I                   V                                      ***                I
  I       ------------------------                I          *****************                                                  I
  I                    I NO  TIMEIT(59)           I          *  SAVE ERROR   *                                                  I
  I       ****************************            I          *  INFORMATION  *                                                  I
  I       **                        **            I          *               *                                                  I
  I       **       CALL TIMER       **            I          *****************                                                  I
  I       **                        **            I                   I       $ERROR(53)                                        I
  I       ****************************            I       ****************************                                          I
  I                    I                          I       ** REPORT DATA AVAIL-     **                                          I
  I           ------------------                  I       **    ABLE TIMEOUT        **                                          I
  I    NO    /                  \YES              I       **   EM36,DH5,DT4,0       **                                          I
  I---------/     TIMEOUT ?      \----------------I       ****************************                                          I
           /                      \                                   I                                                         I
          ------------------------                                    I
```

```
*TST52 *

SET UP ERROR RETURN TO GO TO "BRK5"

INIT R5 TO POINT TO BREAK TABLE DATA        <- *BRK4(49) *

GET TEST DATA FOR SELECTED LINE

SELINE(60)
GO SET UP LINE NO. TO TEST

DONE ALL SELECTED LINES ?   YES -> *$SCOPE(52)*
I NO
CLEAR THE SELECTED DH11     <- *BRK5(49) *

PRIME SELECTED LINE TO XMIT TWO "NULL" CHARS.

ACTIVATE THE SELECTED LINE

INIT TIMERS "A" AND "B"

HAVE WE RECEIVED TWO CHARS YET?   YES
I NO   TIMEIT(59)
CALL TIMER

TIMEOUT YET ?   NO
I YES
SAVE ERROR INFORMATION

SUER2A(55)
GO SET UP INFORMATION TO BE PRINTED

SUNUM(56)
GO PUT LINE NO. IN ERROR MESSAGE

$ERROR(53)
REPORT TIMEOUT AWAITING TWO NULLS EM25.

*BRK1(49) *

PRIME SELECTED LINE TO XMIT 256. CHARS SET THE "BREAK" BIT

ACTIVATE THE SELECTED LINE

INIT TIMERS "A" AND "B"

BUFFER ACTIVE BIT CLEARED YET ?   YES
I NO   TIMEIT(59)
CALL THE TIMER

TIMEOUT YET?   NO
I YES
*BRK2(49) *

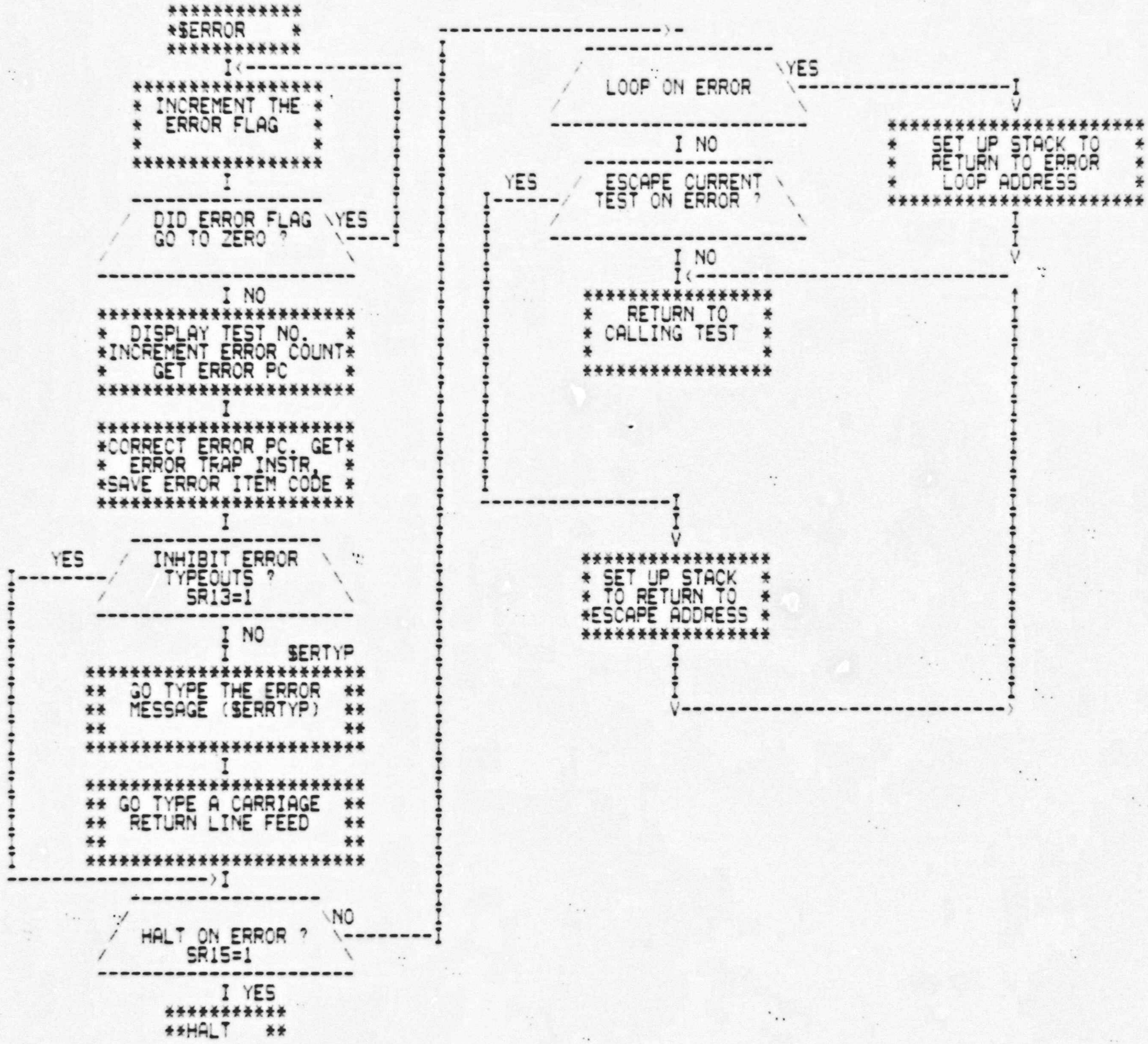
*BRK3(49) *
```

```
                 ************
                 *BRK3(48)  *
                 ************                                                         ************
                      I                                                               *BRK2(48)  *
              ------------------                                                      ************
             /  WAS ONLY ONE   \NO                                                         I
            /  CHARACTER RCVD?  \---------------------------I                       *****************
           /                     \                          V                       *  SAVE ERROR   *
           -----------------------                  *****************               *  INFORMATION  *
                      I YES                         *  SAVE ERROR   *               *               *
              ------------------                    *  INFORMATION  *               *****************
       YES   /     WAS IT A     \                   *               *                      I      SUER2A(55)
  I---------/    "BREAK" CHAR    \                  *****************               ************************
  I        /                      \                        I      SUER2A(55)        ** GO SET UP INFORM-  **
  V        ------------------------                 ************************        ** ATION TO BE PRINTED **
************          I NO                          ** GO SET UP INFORM-  **        **                    **
*BRK4(48)  *  *****************                     ** ATION TO BE PRINTED **       ************************
************  *  SAVE ERROR   *                     **                    **               I      SUNUM(56)
              *  INFORMATION  *                     ************************        ************************
              *               *                            I      SUNUM(56)         **   GO PUT LINE NO.  **
              *****************                     ************************        **  IN ERROR MESSAGE  **
                      I      SUER2A(55)             **   GO PUT LINE NO.  **        **                    **
           ************************                 **     IN MESSAGE     **        ************************
           ** GO SET UP INFORM-  **                 **                    **               I      $ERROR(53)
           ** ATION TO BE PRINTED **                ************************        ************************
           **                    **                        I      $ERROR(53)        **  REPORT TRANSMIT-  **
           ************************                 ************************        **    TER TIMEOUT     **
                      I      SUNUM(56)              **  REPORT MORE THAN  **        **   EM25,DH2,DT2,0   **
           ************************                 **   ONE CHAR RCVD    **        ************************
           **   GO PUT LINE NO.  **                 **   EM25,DH2,DT2,0   **               I
           **     IN MESSAGE     **                 ************************               I
           **                    **                        I                               I
           ************************                        I                               I
                      I      $ERROR(53)                    I                               I
           ************************                        I                               I
           **  REPORT INCORRECT  **                        I                               I
************ **   DATA RECEIVED    **                      I                               I
*BRK1(48)  * **   EM25,DH2,DT2,0   **                      I                               I
************ ************************                      V                               V
  I------------------>I<-----------------------------------------------------------------------
              ------------------
       NO    /   LOOP ON THIS   \
  I---------/      ERROR ?       \
  I        /       SR09=1         \
  I        ------------------------
  V                   I YES
************      ************
*BRK4(48)  *      *BRK5(48)  *
```

```
                        ************
                        *TST53     *                        --------------------I
                        ************                        I                   V
                              I                             I           -----------------
                     *****************                      I          / XMITTER FINISH-  \YES
                     * SET UP ERROR  *                      I         /   ED (BAR)=0      \--------------------I
                     *LOOP RETURN TO *                      I        /                     \                   I
                     *   GO TO "B"   *                      I        ------------------------                  V
          ***        *****************                      I                   I NO  TIMEIT(59)      -----------------
          *A*---------------->I    SELINE(60)               I       *************************        /  CHAR AVAILABLE \NO      ***
          ***    **************************                 I       **                     **       /            SET ?   \----->*A*
                 **  GO SELECT A LINE    **                 I       **      CALL TIMER     **      /   (RCVR BLINDED)      \     ***
                 **     NO. TO TEST      **                 I       **                     **      ------------------------
                 **                      **                 I       *************************                  I YES
                 **************************                 I                   I                     *****************
                              I                             I           ----------------              *  SAVE ERROR   *
                      -----------------                     I    NO    /  TRANSMITTER  \              *  INFORMATION  *
                     /    DONE ALL    \YES                  I<--------/    TIMEOUT ?      \           *               *
                    /  SELECTED LINES?  \----------I        I        /                     \          *****************
                  /                      \        V         I        ------------------------                  I     SUER2A(55)
          ***     ------------------------  ************    I                   I YES             **************************
          *B*---------------->I NO          *$SCOPE(52)*    I           *****************         **  GO SET UP INFORM-   **
          ***        *****************      ************    I           *  SAVE ERROR   *         **   ATION TO PRINT     **
                     *   CLEAR THE   *                      I           *  INFORMATION  *         **                      **
                     * SELECTED DH11 *                      I           *               *         **************************
                     *               *                      I           *****************                      I     SUNUM(56)
                     *****************                      I                   I     SUER2A(55)  **************************
                              I       CLCABC(56)            I       *************************     **    GO PUT LINE NO.   **
                 **************************                 I       ** GO SET UP INFORMAT- **     **   IN ERROR MESSAGE   **
                 ** GO CLEAR OUT "CAR"   **                 I       **  ION TO BE PRINTED  **     **                      **
                 ** AND "BCR" MEMORIES   **                 I       **                     **     **************************
                 **                      **                 I       *************************                  I     $ERROR(53)
                 **************************                 I                   I     SUNUM(56)   **************************
                              I                             I       *************************     ** REPORT HALF-DUPLEX   **
                  ************************                  I       ** GO PUT LINE NO. IN  **     **      TEST ERROR      **
                  * PRIME SELECTED DH11  *                  I       **    ERROR MESSAGE    **     **   EM26,DH2,DT2,0     **
                  * TO XMIT 265. CHARS   *                  I       **                     **     **************************
                  *    IN HALF-DUPLEX    *                  I       *************************                  I
                  ************************                  I                   I     $ERROR(53)               I
                              I                             I       *************************                  I
                     *****************                      I       ** REPORT TRANSMITTER  **                  I
                     * ACTIVATE SEL- *                      I       **    TIMEOUT ERROR    **                  I
                     *  ECTED LINE   *                      I       **   EM26,DH2,DT2,0    **                  I
                     *               *                      I       *************************                  I
                     *****************                      I                   I<------------------------------
                              I                             I           -----------------
                     *****************                      I*** NO    /   LOOP ON THIS  \
                     *  INIT TIMERS  *                      I*A* <----/     ERROR ?       \
                     *  "A" AND "B"  *                      I***     /      SR09=1         \
                     *               *                      I        ------------------------
                     *****************                      I                   I YES
                              I                             I                   ***
                              I                             I                   *B*
                              I                             I                   ***
```

```
              ************          -------------------------I                            ***
              *TST54     *         I                         V                            *C*
              ************         I          ***********************                     ***
                   I               I          *   READ 65. CHARS    *               *****************
           *****************       I          *    FROM THE SILO    *               *  SAVE ERROR   *
           * SET UP ERROR  *       I          *                     *               *  INFORMATION  *
           *LOOP RETURN TO *       I          ***********************               *               *
           *   GO TO "B"   *       I                     I                          *****************
  ***      *****************       I          ***********************                       I      SUER2A(55)
  *A*---------------->I    SELINE(60)          * CHECK THAT OVERRUN  *          ************************
  ***     ************************ I          * BIT SET PROPERLY ON *          ** GO SET UP THE ERROR **
          **  GO SET UP A LINE  ** I          *      65TH CHAR.     *          **     INFORMATION     **
          **    NO. TO TEST     ** I          ***********************          **                     **
          **                    ** I                     I                     ************************
          ************************ I            -----------------------                 I      SUNUM(56)
                   I               I  ***YES   /    OVERRUN BIT        \       ************************
            ----------------       I  *A*<----/ SET PROPERLY AND        \      **  GO SET UP LINE #   **
           / DONE ALL SEL-  \YES   I  ***    /   DATA CORRECT?           \     **  IN ERROR MESSAGE   **
          /  ECTED LINES ?   \---------->    -------------------------         **                     **
         /                    \  *****V****** I           I NO                 ************************
  ***     ------------------------  *ENDA(57)  * I    *****************                 I      $ERROR(53)
  *B*---------------->I NO         ************ I    *  SAVE ERROR   *         ************************
  ***     ************************ I           *  INFORMATION  *               **  REPORT XMIT DONE   **
          * PRIME SELECTED LINE  * I           *               *               **    TIMEOUT ERROR    **
          *  TO XMIT 68. CHARS   * I           *****************               **   EM50,DH2,DT2,0    **
          *   (FORCE OVERRUN)    * I                  I      SUER2A(55)        ************************
          ************************ I       ************************                     I
                   I               I       **GO SET UP INFORMATION**                    I
            *****************      I       **    TO BE PRINTED     **                   I
            *  INIT TIMERS  *      I       **                      **                   I
            *  "A" AND "B"  *      I       **************************                   I
            *               *      I              I      SUNUM(56)                      I
            *****************      I       **************************                   I
   ------------------->I           I       **   GO SET UP LINE #   **                   I
   I        ----------------       I       **   IN ERROR MESSAGE   **                   I
   I       /                \YES   I       **                      **                   I
   I      /  XMIT DONE YET?  \-----I       **************************                   I
   I     /                    \                   I      $ERROR(53)                     I
   I      ----------------------           **************************                   I
   I               I NO  TIMEIT(59)        **    REPORT OVERRUN    **                   I
   I      ************************         **      BIT FAILED      **                   I
   I      **                    **         **    EM56,DH2,DT2,0    **                   I
   I      **     CALL TIMER     **         **************************                   I
   I      **                    **                    I<--------------------------------
   I      ************************               -----------------
   I               I                  *** NO    /  LOOP ON THIS    \
   I        ----------------          *A*<-----/  ERROR SR09=1?     \
   I  NO   /   XMIT DONE    \YES   ***  ***   /                      \
   I------/  TIMEOUT ERROR?  \------->*C*     ------------------------
         /                    \      ***                I YES
          ----------------------                        ***
                                                        *B*
```

```
           ************                      ***                            ***
           *$SCOPE(03)*                      *D*                            *A*
           ************                      ***                            ***
                I                  $OVER      I                              I
      ***********************      ***********************          -----------------
      *INIT "LINE" PARAMETER*      *  DISPLAY TEST NO.   *     YES  /                 \
      * LOAD R1 WITH DEVADR *  --->*   SET UP STACK TO   *<--------/  [SR<7:0>=TSTNM>  \
      *  FOR SELECTED DH11  *  I   *       RETURN        *        /                     \
      ***********************  I   ***********************        -----------------------
                I              I              I                             I NO
        -----------------      I      -----------------                     ***
       / LOOP ON CURRENT \YES  I     /                 \YES                 *B*
      / LY SELECTED TEST  \----I    /  LOOP CONDITION?  \-----I             ***
     /       SR14=1        \       /                     \    I
      -----------------------      -----------------------    I
                I NO                          I NO            V
        -----------------            ************    ************
       /   LOOP ON TEST  \YES  ***   *TN+1      *    *TN        *
      /     SELECTED BY   \--->*A*   ************    ************
     /   SR<07:00> SR08=1  \   ***
***   -----------------------                        NOTES                   ---------------I
*B*------------>I NO                                                         I               I
***     -----------------                            TN = CURRENT TEST NO.   I               V
       /   HAS AN ERROR  \YES-----------------I      TN+1 = NEXT SEQ. TEST NO.I       -----------------
      /     OCCURRED ?    \                   V                              I      /                 \YES     ***
     /                     \          -----------------                      I     /    FIRST PASS ?   \----->*C*
      -----------------------   NO   /   MAX NO. OF    \                     I    /                     \      ***
                I NO<---------------/  ERRORS ALLOWED   \                    I     -----------------------
        -----------------          /      REACHED ?      \                   I              I NO
       / INHIBIT SUBTEST \NO       -----------------------                   I       *****************
      /    ITERATIONS     \----I              I YES                          I       *INCREMENT ITER-*
     /       SR11=1        \   I      -----------------                      I       * ATION COUNTER *
***   -----------------------  I     /                 \NO                   I       *               *
*C*------------>I YES          I    /  LOOP ON ERROR?   \---------I          I       *****************
***   *********************    I   /       SR09=1        \        I          I              I
      *  REINIT ITERATION *    I   -----------------------        I          I      -----------------
      * COUNT AND MAXIMUM *    I              I YES               V          I     / DONE SPECIFIED  \NO     ***
      *  ITERATION COUNT  *    I   ***************** ***********************  I    / NO. OF ITERATIONS \---->*D*
      *********************    I   * SET UP ERROR  * *CLEAR THE ERROR FLAG *  I   /         ?           \     ***
      $SVLAD    I              I   *RETURN ADDRESS * *AND THE NO. OF ITER- *  I    -----------------------
      *********************    I   *               * *   ATIONS TO MAKE    *  I              I YES
      * INCREMENT TEST NO. *   I   ***************** ***********************  I              ***
      * SAVE SCOPE LOOP AND *  I           I                  I              I              *C*
      * ERROR LOOP RETURNS *   I          ***                ***             I              ***
      *********************    I          *D*                *C*             I
                I              I          ***                ***             I
      *********************    I                                             I
      *CLEAR ESCAPE ADDRESS*   ----------------------------------------------I
      * AND SETUP $ERMAX TO *
      *   ALLOW ONE ERROR   *
      *********************
                I
               ***
               *D*
```


$ERROR
INCREMENT THE ERROR FLAG
DID ERROR FLAG GO TO ZERO ?
YES
NO
DISPLAY TEST NO. INCREMENT ERROR COUNT GET ERROR PC
CORRECT ERROR PC. GET ERROR TRAP INSTR. SAVE ERROR ITEM CODE
INHIBIT ERROR TYPEOUTS ? SR13=1
YES
NO
$ERTYP
GO TYPE THE ERROR MESSAGE ($ERRTYP)
GO TYPE A CARRIAGE RETURN LINE FEED
HALT ON ERROR ? SR15=1
NO
YES
HALT
LOOP ON ERROR
YES
NO
ESCAPE CURRENT TEST ON ERROR ?
YES
NO
SET UP STACK TO RETURN TO ERROR LOOP ADDRESS
RETURN TO CALLING TEST
SET UP STACK TO RETURN TO ESCAPE ADDRESS

```
      ************
      *SET LL    *
      ************
           I
   *****************
   * SET UP $TMP6  *
   * TO A 20(8) TO *
   *COUNT 16. LINES*
   *****************
           I
 ***********************
 *  INIT R2 TO INDEX   *
 *  READ BUFFER TEST   *
 *     DATA TABLE      *
 ***********************
           I
 ***********************
 *  INIT R3 TO SET UP  *
 *  VALID DATA BIT +   *
 *  LINE NO. IN TABLE  *
 ***********************
           I
 ***********************
 *  INIT R4 TO SET UP  *
 *  FOR INDEXING HIGH  *
 *    BYTE IN TABLE    *
 ***********************
           I
   *****************
   * INIT "SCR" TO *
   *   START WITH  *
   *     LINE 00   *
   *****************
           I<-------------- (NO)
 ***********************
 * LOAD "CAR","BCR",   *
 *   AND "LPR" REGS    *
 * FOR SELECTED LINE   *
 ***********************
           I
 ***********************
 * CLEAR LO BYTE TABLE *
 * ENTRY AND LOAD [R3] *
 *    INTO HI BYTE     *
 ***********************
           I
          ***
          *A*
          ***

          ***
          *A*
          ***
           I
 *************************
 *   INCREMENT (SCR)     *
 *  UPDATE R3,R2, AND    *
 *  R4 FOR NEXT ENTRY    *
 *************************
           I
 *************************
 *     COUNT $TMP6       *
 *   TO INDICATE THE     *
 *   NEXT LINE TO DO     *
 *************************
           I
    ------------------
NO /   HAVE WE SET    \
I- UP ALL 16. LINES    \
  /                     \
 -------------------------
           I YES
      ***********
      **RTS    **
      ***********

      ************
      *CHPS1     *
      ************
           I
 *************************
 * PUSH NEW PSW=000      *
 *   AND NEW PC=1$       *
 *    ON TO STACK        *
 *************************
           I
   *****************
   * DO AN RTI TO  *
   * LOAD NEW PSW  *
   *   GO TO 1$    *
   *****************
1$         I
   *****************
   *  DO RTS TO    *
   *   RETURN TO   *
   *    CALLER     *
   *****************
           I
      ***********
      **RTS    **

      ************
      *CHPS2     *
      ************
           I
   *****************
   * PUSH  PSW=340 *
   *  AND  PC=1$   *
   * ON THE STACK  *
   *****************
           I
   *****************
   * DO AN RTI TO  *
   * LOAD NEW PSW  *
   *   GO TO 1$    *
   *****************
1$         I
   *****************
   *  DO AN RTS    *
   * TO RETURN TO  *
   *    CALLER     *
   *****************
           I
      ***********
      **RTS    **
      ***********

      ************
      *SAPS      *
      ************
           I
   *****************
   * PUSH STACK TO *
   *  SAVE SPACE   *
   *  FOR SAVPSW   *
   *****************
           I
 ***********************
 * PUSH THE CURRENT    *
 *  CONTENTS OF THE    *
 *    TRAP VECTOR      *
 ***********************
           I
 ***********************
 * SET UP TRAP VECT-   *
 *  OR TO GO TO 1$     *
 *                     *
 ***********************
           I
   *****************
   *  DO A "TRAP"  *
   *  INSTRUCTION  *
   *               *
   *****************
1$         I
   *****************
   *SAVE PSW, PUSH *
   * 2$ ON STACK   *
   *    DO RTI     *
   *****************
2$         I
 ***********************
 * RESTORE TRAP VECTOR *
 * POP STACK (SAVPS)   *
 *     INTO $TMP0      *
 ***********************
           I
      ***********
      **RTS    **
      ***********
```

NOTE:I"CHPS1", "CHPS2", AND "SAPS" ARE CALLED WHENEVER
THE MAINLINE CODE HAS TO CLEAR THE PSW, LOCK OUT INTRS,
AND SAVE THE PSW RESPECTIVELY

THESE ROUTINES ARE REQUIRED FOR LSI11 COMPATIBILITY

```
      ************          ************               ************       ************      ************
      *LDTBF1    *          *SUER1     *               *SUER2     *       *SUER2A    *      *SUER3     *
      ************          ************               ************       ************      ************
           I                     I      SAPS(54)            I     SAPS(54)     I                 I
    ****************   ***********************   ***********************       I          *****************
    *  SET R1 TO   *   **     GO SAVE PSW   **   **     GO SAVE PSW   **        I          * SAVE R0,R1,R2 *
    * POINT TO XMIT*   **      IN $TMP0     **   **      IN $TMP0     **        I          *IN $REG<0,1,2> *
    *    BUFFER    *   **                   **   **                   **        I          *               *
    ****************   ***********************   ***********************       I          *****************
           I                     I                          I<-----------------                  I
    ****************      ****************           ****************                       ***********
    *  INIT R2=0   *      * SAVE TEST NO. *          * SAVE TEST NO. *                      **RTS    **
    *  AS A CHAR   *      *     IN R0     *          *     IN R0     *                      ***********
    *  GENERATOR   *      *               *          *               *
    ****************      ****************           ****************              ************
           I                     I                          I                      *SUER4     *
    ****************   *********************      ***********************          ************
    *LOAD [R2] INTO*   *  SAVE R0,R1,R2,R6  *      *SAVE R0,R1,R2,R3,R4, *               I
----->*  XMIT BUFFER *   *  IN $REG <0,1,2,6> *      *      AND R6 IN      *       *****************
I   *  UPDATE R1   *   *                    *      * $REG <0,1,2,3,4,6>  *       * SAVE LINE NO. *
I   ****************   *********************      ***********************       *    IN $TMP0   *
I          I                     I                          I                   *               *
I   ****************      ****************           ****************           *****************
I   *   GENERATE   *      *               *          *               *                   I
I   *   NEXT CHAR  *      * CORRECT $REG6 *          * CORRECT $REG6 *       **********************
I   *              *      *               *          *               *       * SAVE R0,R1,R2,R3,R4 *
I   ****************      ****************           ****************        * IN $REG<0,1,2,3,4>  *
I          I                     I                          I                *                     *
I    ----------------        ***********              ***********            **********************
I0  /  LOADED ALL    \       **RTS    **              **RTS    **                     I
I-----256.. COMBINATIONS \      ***********              ***********               ***********
   /                       \                                                     **RTS    **
  ------------------------                                                       ***********
           I YES
      ***********
      **RTS    **
```

```
       ************                  ************                  ************
       *SUNUM     *                  *CLCABC    *                  *LDBCR     *
       ************                  ************                  ************
            I                             I                             I
  **********************         *****************             *****************
  * SAVE REGS,RETRIEVE  *        *  INIT A LINE  *             *  INIT A LINE  *
  *  ADDRESSES OF NUM   *        *  COUNTER TO   *             *  COUNTER TO   *
  *   AND MSG BUFFER    *        *  START AT 00  *             *  STRT AT 00   *
  **********************         *****************             *****************
            I                             I                             I
     *****************           *****************             *****************
     *  GET NUMBER   *           *   SELECT A    *             *   SELECT A    *
     *  TO CONVERT   *           *  LINE IN THE  *<--------    *  LINE IN THE  *<--------
     *               *           *     "SCR"     *        I    *     "SCR"     *        I
     *****************           *****************        I    *****************        I
            I                             I               I             I               I
     *****************           *****************        I    *****************        I
     *  CONVERT AND  *           *  CLEAR "CAR"  *        I    *   LOAD THAT   *        I
     *   STORE MSD   *           *   AND "BCR"   *        I    * LINE'S "BCR"  *        I
     *               *           *  FOR SEL LINE *        I    * WITH A 177777 *        I
     *****************           *****************        I    *****************        I
            I                             I               I             I               I
     *****************           *****************        I    *****************        I
     *  CONVERT AND  *           *  UPDATE LINE  *        I    * GENERATE NEXT *        I
     *   STORE LSD   *           *    COUNTER    *        I    *   LINE NO.    *        I
     *               *           *               *        I    *               *        I
     *****************           *****************        I    *****************        I
            I                             I               I             I               I
     *****************           -----------------        I    -----------------        I
     *               *          /  CLEARED ALL    \NO     I   /                 \NO     I
     * RESTORE REGS  *         /   16. LINES YET   -------I  / DONE 16. LINES ?  -------I
     *               *        /                     \       /                     \
     *****************        -----------------------       -----------------------
            I                             I YES                         I YES
       ***********               *****************               ***********
       **RTS    **               *  INIT "SCR"   *               **RTS    **
       ***********               *   TO SELECT   *               ***********
                                 *    LINE 00    *
                                 *****************
                                          I
                                     ***********
                                     **RTS    **
```

```
        ************
        *SUPPAR    *
        ************
             I
**********************
*  INIT LINE COUNTER *
*  AND "SCR" TO      *
*  START AT LINE 00  *
**********************
             I
**********************
*  INIT R3 AND R4    *
*  TO LOAD TEST DATA *
*      TABLE         *
**********************
             I
**********************
*  LOAD "CAR","BCR", *
*  AND"LPR" FOR      *<------
*  SELECTED LINE     *      I
**********************      I
             I              I
     *****************      I
     * GENERATE NEW  *      I
     *   LINE NO.    *      I
     *               *      I
     *****************      I
             I              I
   ---------------------    I
  /  DONE SET UP       \NO  I
 /   FOR 16. LINES      -----I
/                        \
--------------------------
             I YES
**********************
*  SET UP MULTI-LINE *
*  PARITY TEST DATA  *
*       TABLE        *
**********************
             I
        ***********
        **RTS    **
        ***********
```

```
             ************
             *INPARA    *
             ************
                  I
        **********************
-----> /  ASK USER TO        /
I     /  TYPE IN VECTOR     /
I    /   DISPLACEMENT      /
I   **********************
I                 I
I         -----------------
I        /  DID HE TYPE     \YES
I       /  A <CR> ONLY ?     ------------I
I      /                      \          I
I      ------------------------          I
I                 I NO                   I
I         -----------------              I
I        /  DID HE TYPE     \YES         I
I       /   A "4" ?          -------I    I
I      /                      \     I    I
I      ------------------------     I    I
I                 I NO             ***   I
I         -----------------        *A*   I
I NO     /  DID HE TYPE     \      ***   I
I-------    A "10(8)" ?      \           I
       /                      \          I
       ------------------------          I
                  I YES                  I
        *****************                I
        * LOAD R0 WITH  *                I
        *   A 20(8)     *<---------------
        *               *
        *****************
                  I
                  I              ***
                  I              *A*
                  I              ***
                  I               I
                  I   **********************
                  I   *      LOAD R0       * ***
                  I   *    WITH A 10(8)    * *B*
                  I   *                    * ***
                  I   **********************  I
                  I<--------------I  ***********************
                  I                  *  CALL "$EOP" TO     *
           ***********               *  REPORT END OF      *
           **RTS    **               *      PASS           *
           ***********               ***********************
```

```
                 ************
                 *ENDA(51)  *
                 ************
                      I
                 ************
                 *$SCOPE(52)*
                 ************
               *****************
               * "NOP" SCOPE   *
               * CALL IN $EOP  *
               *   ROUTINE     *
               *****************
                      I
               *****************
               * GENERATE NEXT *
     --------->* DEVICE NO.    *
     I         *               *
     I         *****************
     I                I
     I     ***********************
     I     * UPDATE DEVICE PARA- *
     I     *METER TABLE POINTERS *
     I     *  SHIFT SELECT MASK  *
     I     ***********************
     I                I
     I        ------------------
     I       /  TESTED ALL       \YES
     I      /  POSSIBLE DH11'S    -----I
     I     /                       \   I
     I     -------------------------  ***
     I                I NO            *B*
     I        ------------------      ***
     I NO    /  IS THIS DH11     \
     I-------  SELECTED FOR TEST  \
           /                       \
           -------------------------
                      I YES
               *****************
               * CLEAR $TSTNM  *
               *  TO START AT  *
               *  TST 1 AGAIN  *
               *****************
                      I
                 ************
                 *RSTRTA(02)*
                 ************
```

```
          ************                                           ************
          *CHKADR    *                                           *CHKVCT    *
          ************                                           ************
               I                                                      I
      ----------------------                                 ----------------------
     / WAS DEVICE ADDR \NO                                  / WAS VECTOR ADDR \NO
    /   TYPED GREATER   \-------------I                    /   TYPED GREATER   \------------------I
   / THAN 160020(8) ?    \            I                   /    THAN 300(8)      \                 I
  -------------------------           I                  -------------------------                I
               I YES                  I                               I YES                       I
  1$           I                      I                  1$           I                           I
      ----------------------          I                      ----------------------               I
     /   WAS IT LESS    \NO           I                     /   WAS IT LESS    \NO                I
    / THAN 160420(8) ?   \----------->                     /  THAN 1000(8)      \---------------->
   /                      \           I                   /                      \                I
  -------------------------           I                  -------------------------                I
  2$           I YES                  I                               I YES                       I
      ----------------------          I                  2$           I                           I
     /  WAS IT A MULT-  \NO           I                      ----------------------               I
    /  IPLE OF 20(8) ?   \----------->                      /  WAS IT A MULT-  \NO                I
   /                      \           I                    /   IPLE OF 10(8)    \---------------->
  -------------------------   4$      V                   /                      \        4$      V
               I YES          *******************        -------------------------        *******************
  *****************          /   PRINT INVALID  /                     I YES              /   PRINT INVALID  /
  *MOVE RETURN PC *         / ADDRESS MESSAGE  /                      I                 /  VECTOR MESSAGE  /
  * AROUND ERROR  *        /                  /           *****************            /                  /
  *    BRANCH     *       *******************             *MOVE RETURN PC *           *******************
  *****************                   I                   * AROUND ERROR  *                   I
  3$           I                      I                   *    BRANCH     *                   I
  *********************               I                   *****************                   I
  *GENERATE AND LOAD 16.*             I                  3$           I                       I
  *  ENTRY DH11 DEVICE  *             I                  *********************                I
  *    ADDRESS TABLE    *             I                  * GENERATE AND LOAD  *               I
  *********************               I                  * 16.ENTRY DH11 VECT. *              I
               I<---------------------                   *    ADDRESS TABLE    *              I
               I                                         *********************                I
          ***********                                                 I<-----------------------
          **RTS    **                                                 I
          ***********                                            ***********
                                                                 **RTS    **
```

```
        ************                    ************                 ************
        *BUSER     *                    *RESERR    *                 *RESTRP    *
        ************                    ************                 ************
             I                               I                            I
     *****************               *****************           *****************
     * SAVE THE PSW  *               * SAVE THE PSW  *           *  GET CURRENT  *
     *  AND STACK    *               *  AND STACK    *           *VECTOR ADDRESS *
     *   POINTER     *               *   POINTER     *           *               *
     *****************               *****************           *****************
             I                               I                            I
  ***********************         ***********************      ***********************
  *  RETRIEVE AND SAVE  *         *  RETRIEVE AND SAVE  *      *  LOAD VECTOR (RCVR  *
  *"TRAPPC" AND "TRAPPS"*         *"TRAPPC" AND "TRAPPS"*      *   AND (XMIT) WITH   *
  *     FROM STACK      *         *     FROM STACK      *      *    TRAP CATCHER     *
  ***********************         ***********************      ***********************
             I                               I                            I
     *****************               *****************              ***********
     *INITIALIZE THE *               *  INITIALIZE   *              **RTS    **
     * STACK POINTER *               * STACK POINTER *              ***********
     *               *               *               *
     *****************               *****************              ************
             I      $ERROR(53)               I      $ERROR(53)      *TIMEIT    *
 *************************       *************************          ************
 **   REPORT THE BUS    **       **   REPORT THE RSVD   **               I
 **        ERROR        **       **     INSTR ERROR     **       *****************
 **  EM14,DH4,DT5,DF2   **       **  EM15,DH4,DT5,DF2   **       *   INCREMENT   *
 *************************       *************************       *   TIMER "B"   *
             I                               I                   *               *
     *****************               *****************           *****************
     *   RESET THE   *               *   RESET THE   *                    I
     *   WORLD AND   *               *   WORLD AND   *           -----------------
     *   CLEAR PSW   *               *   CLEAR PSW   *          /                 \NO------I
     *****************               *****************         /  TIMER "B" = 0    \       I
             I                               I                /                     \      I
        ************                    ************          -----------------------      I
        *REST1     *                    *REST1     *                  I YES                I
        ************                    ************           *****************           I
                                                               *   DECREMENT   *           I
                                                               *   TIMER "A"   *           I
                                                               *               *           I
                                                               *****************           I
                                                                      I                    I
                                                               -----------------           I
                                                  NO          /                 \          I
                                               I-------/  TIMER "A" = 0    \         I
                                               I             /                     \       I
                                               I             -----------------------       I
                                               I                     I YES                 I
                                               I            ***********************        I
                                               I            *   MOVE RETURN PC    *        I
                                               I            * AROUND LOOP BRANCH  *        I
                                               I            *   TO CAUSE ERROR    *        I
                                               I            ***********************        I
                                               ------------------->I<----------------------
                                                                ***********
                                                                **RTS    **
```

```
       ************
       *T40A(35)  *
       ************
            I     SAPS(54)
*************************
**                     **
**  GO SAVE ERROR PSW  **
**                     **
*************************
            I
    *****************
    *  SAVE ERROR   *
    *  INFORMATION  *
    *               *
    *****************
            I      SUER2A(55)
*************************
**  GO SET UP INFORM-  **
** ATION TO BE PRINTED **
**                     **
*************************
            I      SUNUM(56)
*************************
**   GO PUT LINE NO.   **
**    IN ERROR MSG     **
**                     **
*************************
            I      $ERROR(53)
*************************
**   REPORT STORAGE    **
**  OVERFLOW TIMEOUT   **
**   EM57,DH2,DT2,0    **
*************************
            I
       ************
       *T40B(35)  *
       ************
```

```
       ************
       *T44X(39)  *
       ************
            I     SAPS(54)
*************************
**                     **
**  GO SAVE ERROR PSW  **
**                     **
*************************
            I
    *****************
    *  SAVE ERROR   *
    *  INFORMATION  *
    *               *
    *****************
            I      SUER2A(55)
*************************
**  GO SET UP INFORM-  **
** ATION TO BE PRINTED **
**                     **
*************************
            I      SUNUM(56)
*************************
**   GO PUT LINE NO.   **
**    IN ERROR MSG     **
**                     **
*************************
            I      $ERROR(53)
*************************
**  REPORT CHAR AVAIL  **
**    TIMEOUT ERROR    **
**   EM22,DH2,DT2,0    **
*************************
            I
       ************
       *T44Y(40)  *
       ************
```

```
                       ************
                       *SELINE    *
                       ************
                             I
                    ------------------
             NO    /  1ST TIME THRU    \
             I------FOR CURRENT TEST ?  \
             I    /                      \
             I    ------------------------
             I               I YES
             I    ************************
             I    * SET ENTRY FLAG,INIT  *
             I    * MASK AND "LINE" TO   *
             I    * BEGIN WITH LINE 00   *
             I    ************************
             I               I
             I       *****************
             I       * GENERATE LINE *
             ------->* NO. IN "LINE" *<------
                     *               *      I
                     *****************      I
                             I              I
                     *****************      I
                     * SHIFT SELECT  *      I
                     *   TEST MASK   *      I
                     *               *      I
                     *****************      I
                             I              I
                     -----------------      I
             YES    / TESTED FOR ALL  \     I
        I----------/    16. LINES?     \    I
        I         /                     \   I
        I         -----------------------   I
        I                    I NO           I
        I            -----------------      I
        I           /  IS THIS LINE   \NO   I
        I          /   SELECTED FOR    ------
        I         /     TESTING ?       \
        I         -----------------------
        V                    I YES
*****************    *****************
* CLEAR LINE #  *    *  MOVE RETURN  *
*  AND ENTRY    *    *   PC AROUND   *
*     FLAG      *    *  EXIT BRANCH  *
*****************    *****************
        I                    I
        I            *****************
        I            *INIT LINE SEL. *
        ------------>* BITS IN "SCR" *
                     *               *
                     *****************
                             I
                        ***********
                        **RTS    **
```

AE1	45	46																
AE2	45	46																
AE3	45	46	46															
AE4	45	46	46															
AE5	45	45	46															
BEGINA	01	01																
BRK1	48	49																
BRK2	48	49																
BRK3	48	49																
BRK4	48	49	49															
BRK5	48	49																
BUSER	59																	
CHKADR	02	58																
CHKVCT	02	58																
CHPS1	54																	
CHPS2	54																	
CLCABC	28	30	50	56														
ENDA	51	57																
HALT	02	53																
INPAR	01	02																
INPAR3	01	02	02															
INPARA	01	57																
LDBCR	30	56																
LDTBF1	02	55																
NPR1A	28	29																
NPR2A	28	29																
NPR3A	28	29																
NPR4A	28	29																
NPR5A	28	29																
NPR6A	28	29																
RESERR	59																	
REST1	59	59																
RESTRP	59																	
RESTRT	01																	
RSTRTA	01	02	57															
RTI	43																	
RTS	54	54	54	54	55	55	55	55	55	56	56	56	57	57	58	58	59	59
	60																	
SAPS	54	55	55	60	60													
SELINE	14	15	16	17	18	19	20	21	22	28	30	35	36	37	38	39	41	44
	45	48	50	51	60													
SETALL	54																	
SLD1	39	40																
SLD2	39	40	40															
SLD3	39	40	40	40														
START	01#																	
START1	01																	
START2	01	01	01	02														
SUER1	03	55																
SUER2	04	05	05	06	07	07	07	08	08	09	09	11	11	12	12	13	13	14
	15	16	16	17	17	22	32	33	38	39	55							

K09

	23	24	24	25	25	26	26	27	27	28	29	29	29	29	30	31	31	31
	34	34	35	35	36	36	37	37	38	40	40	40	41	41	43	44	44	45
	46	47	48	49	49	49	50	50	51	51	55	60	60					
SUER3	55																	
SUER4	18	19	20	21	30	30	55											
SUNUM	02	14	15	18	19	20	21	22	28	29	30	35	35	36	36	37	37	38
	38	39	40	40	40	41	41	43	43	44	44	45	45	46	47	48	49	49
	49	50	50	51	51	56	60	60										
SUPPAR	42	57																
T40A	35	60																
T40B	35	60																
T44X	39	60																
T44Y	40	60																
T46A	42	43																
T46B	42	43	43	43														
TIMEIT	28	30	35	36	37	38	39	41	42	44	45	47	48	48	50	51	59	
TN	52	52																
TST1	02	03																
TST10	10																	
TST11	11																	
TST12	12																	
TST13	13																	
TST14	14																	
TST15	15																	
TST16	16																	
TST17	17																	
TST2	04																	
TST20	18																	
TST21	19																	
TST22	20																	
TST23	21																	
TST24	22																	
TST25	23																	
TST26	24																	
TST27	25																	
TST3	05																	
TST30	26																	
TST31	27																	
TST32	28																	
TST33	30																	
TST34	31																	
TST35	32																	
TST36	33																	
TST37	34																	
TST4	06																	
TST40	35																	
TST41	36																	
TST42	37																	
TST43	38																	
TST44	39																	
TST45	41																	
TST46	42																	

TST5	07																	
TST50	45																	
TST51	47																	
TST52	48																	
TST53	50																	
TST54	51																	
TST6	08																	
TST7	09																	
$ERROR	03	04	05	05	06	07	07	07	08	08	09	09	11	11	12	12	13	13
	14	16	16	17	17	18	19	20	21	22	23	23	24	24	25	25	26	26
	27	27	28	29	29	29	29	30	30	30	31	31	31	32	33	34	34	35
	35	36	36	37	37	38	38	39	40	40	40	41	41	42	42	43	43	43
	44	44	45	45	46	47	47	48	49	49	49	50	50	51	51	53	59	59
	60	60																
$ERTYP	53																	
$OVER	52																	
$SCOPE	03	04	05	06	07	08	09		11	12	13	14	15	16	17	18	19	20
	21	22	23	24	25	26	27	28	30	31	32	33	34	35	36	37	38	39
	41	42	44	45	47	48	50	52	57									
$SVLAD	52																	
1$	03	04	05	06	07	08	09	11	12	13	14	15	16	17	18	19	20	21
	22	24	25	26	27	28	30	31	32	33	34	36	37	38	41	54	54	54
	58	58																
11$	18	19																
2$	03	04	05	06	07	08	09	11	12	13	16	17	18	19	20	21	22	24
	25	26	27	28	31	32	34	36	37	41	42	54	58	58				
3$	03	05	06	07	08	09	11	12	13	14	16	17	24	25	26	27	28	30
	31	32	33	34	41	58	58											
4$	05	07	08	09	11	12	13	14	15	18	19	20	21	22	28	31	32	36
	37	41	58	58														
5$	07	14	15	18	20	21	22	28	31	33	34	34	34	36	37			
6$	14	15	18	19	20	21	22	28	33	34								
7$	22	28	36	37														
8$	28	36	37															

THIS IS A HISTORY FILE OF THE DEVELOPMENT OF MD-11-DZDHM

PRODUCT CODE: MD-11-DZDHM VERSION 000.000

PRODUCT NAME: DH11 DIAGNOSTIC

RELEASE DATE: JANUARY 1976

AUTHOR: ED CROWLEY

****

PRODUCT CODE: MD-11-DZDHM-B (REV B)

PRODUCT NAME: DH11 DIAGNOSTIC

RELEASE DATE: SEPTEMBER 1976

SUBMITTED BY: PAUL F. CANTIN

****

PROGRAM CHANGES:

1. A DH11/DM11-BB AUTOSIZER HAS BEEN BUILT AND INSERTED INTO THE PROGRAM TO MAKE IT CHAINABLE UNDER ACT AND APT. CODE WAS ALSO INSERTED TO LOAD AND RUN NON-CONTIGUOUS DH11 ADDRESSES WITHOUT OPERATOR INTERVENTION.

2. WHEN A DH11 REGISTER FAILS TO RESPOND DURING TEST 1, THE PROGRAM ENTERS AN ENDLESS LOOP CAUSING ERROR MESSAGE 1 TO BE PRINTED CONTINUOUSLY. CODE HAS BEEN CORRECTED.

3. PROGRAM UPDATED TO USE SWITCHLESS FEATURE IN SYSMAC REV.C1.

4. IN ORDER TO FACILITATE INSTALLATION CHECKOUT WHERE MODEM CONTROL IS INVOLVED, TESTS 101, 105, 106, AND 107 OF DZDHK HAVE BEEN INSERTED. THIS ALLOWS ALL THE LEVEL CONVERTERS AND CABLES TO BE CHECKED WITH JUST ONE PROGRAM USING THE H315 TURNAROUND CONNECTORS.

5. CODE HAS BEEN INSERTED TO INHIBIT FALSE ERROR REPORTING WHICH SOMETIMES OCCURS WHEN H315 TURNAROUND CONNECTORS ARE USED ON SOME LINES WHILE OTHER LINES REMAIN OPEN.

6. TEST 40 HAS BEEN RELOCATED BETWEEN TEST 42 AND TEST 43.

7. THE "HALT AFTER PARAMETER SETUP" OPTION SHOULD BE CONTROLLED BY A SWITCH OTHER THAN SR15. CODING HAS BEEN CHANGED TO SENSE SR08 FOR THIS OPTION.

DOCUMENT CHANGES:

1. FLOW CHARTS HAVE BEEN DELETED ALONG WITH SECTIONS 6.2D AND 6.5.

2. CHANGE "WORDS BETWEEN VECTORS (4(8) OR 10(8))" REFERENCES TO "ADDRESSES BETWEEN VECTORS (10(8) OR 20(8))", WITH APPROPRIATE CODING CHANGES.

3. PARAGRAPH ON SWITCHLESS FEATURE INSERTED.

4. AUTOSIZER STARTING PROCEDURE DESCRIBED.

5. CONSOLE SWITCH REGISTER OPRIONS TABLE INSERTED.

6. SEVERAL ADDITIONS TO SECTION 6.3 WERE MADE FOR CLARITY.

****

```
                                        .NLIST  CND,MD,MC
                                        .LIST   TOC,ME,SEQ,BIN
                165400                  $SWR=165400
                                        .MCALL  .HEADER,.$CMTAG,.SETUP,.$ERROR
                                        .MCALL  .SWRHI,.SWRLO,.$CATCH,.EQUATE,SETUP,.$EOP,GETSWR
                                        .MCALL  .$SCOPE,.$ERRTYP,.$TYPOCT,.$TYPDEC,.$TYPE,.$POWER,.$TRAP
                                        .MCALL  .$READ,.$RDOCT
                                        .MCALL  .$ACT11,.$APTHDR,.$APTBLS,.$APTYPE
                                        .ENABLE ABS
                                        .TITLE  MAINDEC-11-DZDHM-B
                                        ;*COPYRIGHT (C) 1976
                                        ;*DIGITAL EQUIPMENT CORP.
                                        ;*MAYNARD, MASS. 01754
                                        ;*
                                        ;*PROGRAM BY ED CROWLEY
                                        ;*
                                        ;*THIS PROGRAM WAS ASSEMBLED USING THE PDP-11 MAINDEC SYSMAC
                                        ;*PACKAGE (MAINDEC-11-DZQAC-C2), SEPT 14, 1976.
                                        ;*
                000001                  $TN=1
                                        .SBTTL  OPERATIONAL SWITCH SETTINGS
                                        ;*
                                        ;*      SWITCH                  USE
                                        ;*      ------          --------------------
                                        ;*        15            HALT ON ERROR
                                        ;*        14            LOOP ON TEST
                                        ;*        13            INHIBIT ERROR TYPEOUTS
                                        ;*        11            INHIBIT ITERATIONS
                                        ;*         9            LOOP ON ERROR
                                        ;*         8            LOOP ON TEST IN SWR<7:0>
                                        .SBTTL  TRAP CATCHER

                000000                          .=0
                                        ;*ALL UNUSED LOCATIONS FROM 4 - 776 CONTAIN A ".+2,HALT"
                                        ;*SEQUENCE TO CATCH ILLEGAL TRAPS AND INTERRUPTS
                                        ;*LOCATION 0 CONTAINS 0 TO CATCH IMPROPERLY LOADED VECTORS
                000174                          .=174
        000174  000000                  DISPREG: .WORD  0                       ;;SOFTWARE DISPLAY REGISTER
        000176  000000                  SWREG:   .WORD  0                       ;;SOFTWARE SWITCH REGISTER
                                        .SBTTL  STARTING ADDRESS(ES)
        000200  000137  026114                  JMP     @#INPARX                ;;JUMP TO STARTING ADDRESS OF PROGRAM
        000204  000137  002146                  JMP     @#BEGIN                 ;BEGIN EXECUTION WITH DEFAULT PARAMETERS
        000210  000137  026104                  JMP     @#INPARC                ;INPUT PARAMETERS - DEVICE SELECTION ONLY

                                        .SBTTL  ACT11 HOOKS

                                        ;;*************************************************************
                                        ;HOOKS REQUIRED BY ACT11
                000214                          $SVPC=.                         ;SAVE PC
                000046                          .=46
        000046  020712                          $ENDAD                          ;;1)SET LOC.46 TO ADDRESS OF $ENDAD IN .$EOP
                000052                          .=52
        000052  120000                          .WORD   120000                  ;;2)SET LOC.52 TO 120000
                000214                          .=$SVPC                         ;; RESTORE PC
                                        .SBTTL  APT PARAMETER BLOCK

```

```
                                ;;*******************************************************************
                                ;SET LOCATIONS 24 AND 44 AS REQUIRED FOR APT
                                ;;*******************************************************************
                000214                  .$X=.   ;;SAVE CURRENT LOCATION
                000024                  .=24    ;;SET POWER FAIL TO POINT TO START OF PROGRAM
        000024  000200                  200     ;;FOR APT START UP
                000044                  .=44    ;;POINT TO APT INDIRECT ADDRESS PNTR.
        000044  000214                  $APTHDR ;;POINT TO APT HEADER BLOCK
                000214                  .=.$X   ;;RESET LOCATION COUNTER
                                ;;*******************************************************************
                                ;SETUP APT PARAMETER BLOCK AS DEFINED IN THE APT-PDP11 DIAGNOSTIC
                                ;INTERFACE SPEC.

        000214                  $APTHD:
        000214  000000          $HIBTS: .WORD   0          ;;TWO HIGH BITS OF 18 BIT MAILBOX ADDR.
        000216  001232          $MBADR: .WORD   $MAIL      ;;ADDRESS OF APT MAILBOX (BITS 0-15)
        000220  000036          $TSTM:  .WORD   30.        ;;RUN TIM OF LONGEST TEST
        000222  000170          $PASTM: .WORD   120.       ;;RUN TIME IN SECS. OF 1ST PASS ON 1 UNIT (QUICK VERIFY)
        000224  000170          $UNITM: .WORD   120.       ;;ADDITIONAL RUN TIME (SECS) OF A PASS FOR EACH ADDITIONAL UNIT
        000226  000052                  .WORD   $ETEND-$MAIL/2 ;;LENGTH MAILBOX-ETABLE(WORDS)


                                .SBTTL  BASIC DEFINITIONS

                                ;*INITIAL ADDRESS OF THE STACK POINTER *** 1100 ***
                001100          STACK=  1100
                                .EQUIV  EMT,ERROR          ;;BASIC DEFINITION OF ERROR CALL
                                .EQUIV  IOT,SCOPE          ;;BASIC DEFINITION OF SCOPE CALL

                                ;*MISCELLANEOUS DEFINITIONS
                000011          HT=     11                 ;;CODE FOR HORIZONTAL TAB
                000012          LF=     12                 ;;CODE FOR LINE FEED
                000015          CR=     15                 ;;CODE FOR CARRIAGE RETURN
                000200          CRLF=   200                ;;CODE FOR CARRIAGE RETURN-LINE FEED
                177776          PS=     177776             ;;PROCESSOR STATUS WORD
                                .EQUIV  PS,PSW
                177774          STKLMT= 177774             ;;STACK LIMIT REGISTER
                177772          PIRQ=   177772             ;;PROGRAM INTERRUPT REQUEST REGISTER
                177570          DSWR=   177570             ;;HARDWARE SWITCH REGISTER
                177570          DDISP=  177570             ;;HARDWARE DISPLAY REGISTER

                                ;*GENERAL PURPOSE REGISTER DEFINITIONS
                000000          R0=     %0                 ;;GENERAL REGISTER
                000001          R1=     %1                 ;;GENERAL REGISTER
                000002          R2=     %2                 ;;GENERAL REGISTER
                000003          R3=     %3                 ;;GENERAL REGISTER
                000004          R4=     %4                 ;;GENERAL REGISTER
                000005          R5=     %5                 ;;GENERAL REGISTER
                000006          R6=     %6                 ;;GENERAL REGISTER
                000007          R7=     %7                 ;;GENERAL REGISTER
                000006          SP=     %6                 ;;STACK POINTER
                000007          PC=     %7                 ;;PROGRAM COUNTER

                                ;*PRIORITY LEVEL DEFINITIONS
                000000          PR0=    0                  ;;PRIORITY LEVEL 0
                000040          PR1=    40                 ;;PRIORITY LEVEL 1
```

```
        000100          PR2=    100             ;;PRIORITY LEVEL 2
        000140          PR3=    140             ;;PRIORITY LEVEL 3
        000200          PR4=    200             ;;PRIORITY LEVEL 4
        000240          PR5=    240             ;;PRIORITY LEVEL 5
        000300          PR6=    300             ;;PRIORITY LEVEL 6
        000340          PR7=    340             ;;PRIORITY LEVEL 7

                        ;*"SWITCH REGISTER" SWITCH DEFINITIONS
        100000          SW15=   100000
        040000          SW14=   40000
        020000          SW13=   20000
        010000          SW12=   10000
        004000          SW11=   4000
        002000          SW10=   2000
        001000          SW09=   1000
        000400          SW08=   400
        000200          SW07=   200
        000100          SW06=   100
        000040          SW05=   40
        000020          SW04=   20
        000010          SW03=   10
        000004          SW02=   4
        000002          SW01=   2
        000001          SW00=   1
                        .EQUIV  SW09,SW9
                        .EQUIV  SW08,SW8
                        .EQUIV  SW07,SW7
                        .EQUIV  SW06,SW6
                        .EQUIV  SW05,SW5
                        .EQUIV  SW04,SW4
                        .EQUIV  SW03,SW3
                        .EQUIV  SW02,SW2
                        .EQUIV  SW01,SW1
                        .EQUIV  SW00,SW0

                        ;*DATA BIT DEFINITIONS (BIT00 TO BIT15)
        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
                        .EQUIV  BIT09,BIT9
                        .EQUIV  BIT08,BIT8
                        .EQUIV  BIT07,BIT7
                        .EQUIV  BIT06,BIT6
```

```
                        .EQUIV  BIT05,BIT5
                        .EQUIV  BIT04,BIT4
                        .EQUIV  BIT03,BIT3
                        .EQUIV  BIT02,BIT2
                        .EQUIV  BIT01,BIT1
                        .EQUIV  BIT00,BIT0

                        ;*BASIC "CPU" TRAP VECTOR ADDRESSES
        000004          ERRVEC= 4               ;;TIME OUT AND OTHER ERRORS
        000010          RESVEC= 10              ;;RESERVED AND ILLEGAL INSTRUCTIONS
        000014          TBITVEC=14              ;;"T" BIT
        000014          TRTVEC= 14              ;;TRACE TRAP
        000014          BPTVEC= 14              ;;BREAKPOINT TRAP (BPT)
        000020          IOTVEC= 20              ;;INPUT/OUTPUT TRAP (IOT) **SCOPE**
        000024          PWRVEC= 24              ;;POWER FAIL
        000030          EMTVEC= 30              ;;EMULATOR TRAP (EMT) **ERROR**
        000034          TRAPVEC=34              ;;"TRAP" TRAP
        000060          TKVEC=  60              ;;TTY KEYBOARD VECTOR
        000064          TPVEC=  64              ;;TTY PRINTER VECTOR
        000240          PIRQVEC=240             ;;PROGRAM INTERRUPT REQUEST VECTOR
```

```
                                .SBTTL  COMMON TAGS

                                ;;*****************************************************************
                                ;*THIS TABLE CONTAINS VARIOUS COMMON STORAGE LOCATIONS
                                ;*USED IN THE PROGRAM.

                001100                  .=1100
        001100                  $CMTAG:                                 ;;START OF COMMON TAGS
        001100  000000                  .WORD   0
        001102     000          $TSTNM: .BYTE   0                       ;;CONTAINS THE TEST NUMBER
        001103     000          $ERFLG: .BYTE   0                       ;;CONTAINS ERROR FLAG
        001104  000000          $ICNT:  .WORD   0                       ;;CONTAINS SUBTEST ITERATION COUNT
        001106  000000          $LPADR: .WORD   0                       ;;CONTAINS SCOPE LOOP ADDRESS
        001110  000000          $LPERR: .WORD   0                       ;;CONTAINS SCOPE RETURN FOR ERRORS
        001112  000000          $ERTTL: .WORD   0                       ;;CONTAINS TOTAL ERRORS DETECTED
        001114     000          $ITEMB: .BYTE   0                       ;;CONTAINS ITEM CONTROL BYTE
        001115     001          $ERMAX: .BYTE   1                       ;;CONTAINS MAX. ERRORS PER TEST
        001116  000000          $ERRPC: .WORD   0                       ;;CONTAINS PC OF LAST ERROR INSTRUCTION
        001120  000000          $GDADR: .WORD   0                       ;;CONTAINS ADDRESS OF 'GOOD' DATA
        001122  000000          $BDADR: .WORD   0                       ;;CONTAINS ADDRESS OF 'BAD' DATA
        001124  000000          $GDDAT: .WORD   0                       ;;CONTAINS 'GOOD' DATA
        001126  000000          $BDDAT: .WORD   0                       ;;CONTAINS 'BAD' DATA
        001130  000000                  .WORD   0                       ;;RESERVED--NOT TO BE USED
        001132  000000                  .WORD   0
        001134     000          $AUTOB: .BYTE   0                       ;;AUTOMATIC MODE INDICATOR
        001135     000          $INTAG: .BYTE   0                       ;;INTERRUPT MODE INDICATOR
        001136  000000                  .WORD   0
        001140  177570          SWR:    .WORD   DSWR                    ;;ADDRESS OF SWITCH REGISTER
        001142  177570          DISPLAY: .WORD  DDISP                   ;;ADDRESS OF DISPLAY REGISTER
        001144  177560          $TKS:   177560                          ;;TTY KBD STATUS
        001146  177562          $TKB:   177562                          ;;TTY KBD BUFFER
        001150  177564          $TPS:   177564                          ;;TTY PRINTER STATUS REG. ADDRESS
        001152  177566          $TPB:   177566                          ;;TTY PRINTER BUFFER REG. ADDRESS
        001154     000          $NULL:  .BYTE   0                       ;;CONTAINS NULL CHARACTER FOR FILLS
        001155     002          $FILLS: .BYTE   2                       ;;CONTAINS # OF FILLER CHARACTERS REQUIRED
        001156     012          $FILLC: .BYTE   12                      ;;INSERT FILL CHARS. AFTER A "LINE FEED"
        001157     000          $TPFLG: .BYTE   0                       ;;"TERMINAL AVAILABLE" FLAG (BIT<07>=0=YES)
        001160  000000          $REGAD: .WORD   0                       ;;CONTAINS THE ADDRESS FROM
                                                                        ;;WHICH  ($REG0) WAS OBTAINED
        001162  000000          $REG0:  .WORD   0                       ;;CONTAINS (($REGAD)+0)
        001164  000000          $REG1:  .WORD   0                       ;;CONTAINS (($REGAD)+2)
        001166  000000          $REG2:  .WORD   0                       ;;CONTAINS (($REGAD)+4)
        001170  000000          $REG3:  .WORD   0                       ;;CONTAINS (($REGAD)+6)
        001172  000000          $REG4:  .WORD   0                       ;;CONTAINS (($REGAD)+10)
        001174  000000          $REG5:  .WORD   0                       ;;CONTAINS (($REGAD)+12)
        001176  000000          $REG6:  .WORD   0                       ;;CONTAINS (($REGAD)+14)
        001200  000000          $REG7:  .WORD   0                       ;;CONTAINS (($REGAD)+16)
        001202  000000          $TMP0:  .WORD   0                       ;;USER DEFINED
        001204  000000          $TMP1:  .WORD   0                       ;;USER DEFINED
        001206  000000          $TMP2:  .WORD   0                       ;;USER DEFINED
        001210  000000          $TMP3:  .WORD   0                       ;;USER DEFINED
        001212  000000          $TMP4:  .WORD   0                       ;;USER DEFINED
        001214  000000          $TMP5:  .WORD   0                       ;;USER DEFINED
        001216  000000          $TMP6:  .WORD   0                       ;;USER DEFINED
        001220  000000          $TMP7:  .WORD   0                       ;;USER DEFINED
        001222  000000          $TIMES: 0                               ;;MAX. NUMBER OF ITERATIONS
```

```
001224  000000          $ESCAPE:0                               ;;ESCAPE ON ERROR ADDRESS
001226     077          $QUES:  .ASCII  /?/                     ;;QUESTION MARK
001227     015          $CRLF:  .ASCII  <15>                    ;;CARRIAGE RETURN
001230  000012          $LF:    .ASCIZ  <12>                    ;;LINE FEED
                        ;;*****************************************************************
                        .SBTTL  APT MAILBOX-ETABLE

                        ;;*****************************************************************
                        .EVEN
001232                  $MAIL:                          ;;APT MAILBOX
001232  000000          $MSGTY: .WORD   AMSGTY          ;;MESSAGE TYPE CODE
001234  000000          $FATAL: .WORD   AFATAL          ;;FATAL ERROR NUMBER
001236  000000          $TESTN: .WORD   ATESTN          ;;TEST NUMBER
001240  000000          $PASS:  .WORD   APASS           ;;PASS COUNT
001242  000000          $DEVCT: .WORD   ADEVCT          ;;DEVICE COUNT
001244  000000          $UNIT:  .WORD   AUNIT           ;;I/O UNIT NUMBER
001246  000000          $MSGAD: .WORD   AMSGAD          ;;MESSAGE ADDRESS
001250  000000          $MSGLG: .WORD   AMSGLG          ;;MESSAGE LENGTH
001252                  $ETABLE:                        ;;APT ENVIRONMENT TABLE
001252     000          $ENV:   .BYTE   AENV            ;;ENVIRONMENT BYTE
001253     000          $ENVM:  .BYTE   AENVM           ;;ENVIRONMENT MODE BITS
001254  000000          $SWREG: .WORD   ASWREG          ;;APT SWITCH REGISTER
001256  000000          $USWR:  .WORD   AUSWR           ;;USER SWITCHES
001260  000000          $CPUOP: .WORD   ACPUOP          ;;CPU TYPE,OPTIONS
                        ;*                              BITS 15-11=CPU TYPE
                        ;*                                      11/04=01,11/05=02,11/20=03,11/40=04,11/45=05
                        ;*                                      11/70=06,PDQ=07,Q=10
                        ;*                              BIT 10=REAL TIME CLOCK
                        ;*                              BIT  9=FLOATING POINT PROCESSOR
                        ;*                              BIT  8=MEMORY MANAGEMENT
001262     000          $MAMS1: .BYTE   AMAMS1          ;;HIGH ADDRESS,M.S. BYTE
001263     000          $MTYP1: .BYTE   AMTYP1          ;;MEM. TYPE,BLK#1
                        ;*                              MEM.TYPE BYTE   --  (HIGH BYTE)
                        ;*                                      900 NSEC CORE=001
                        ;*                                      300 NSEC BIPOLAR=002
                        ;*                                      500 NSEC MOS=003
001264  000000          $MADR1: .WORD   AMADR1          ;;HIGH ADDRESS,BLK#1
                        ;*                              MEM.LAST ADDR.=3 BYTES,THIS WORD AND LOW OF "TYPE" ABOVE
001266     000          $MAMS2: .BYTE   AMAMS2          ;;HIGH ADDRESS,M.S. BYTE
001267     000          $MTYP2: .BYTE   AMTYP2          ;;MEM. TYPE,BLK#2
001270  000000          $MADR2: .WORD   AMADR2          ;;MEM.LAST ADDRESS,BLK#2
001272     000          $MAMS3: .BYTE   AMAMS3          ;;HIGH ADDRESS,M.S.BYTE
001273     000          $MTYP3: .BYTE   AMTYP3          ;;MEM. TYPE,BLK#3
001274  000000          $MADR3: .WORD   AMADR3          ;;MEM.LAST ADDRESS,BLK#3
001276     000          $MAMS4: .BYTE   AMAMS4          ;;HIGH ADDRESS,M.S.BYTE
001277     000          $MTYP4: .BYTE   AMTYP4          ;;MEM. TYPE,BLK#4
001300  000000          $MADR4: .WORD   AMADR4          ;;MEM.LAST ADDRESS,BLK#4
001302  000000          $VECT1: .WORD   AVECT1          ;;INTERRUPT VECTOR#1,BUS PRIORITY#1
001304  000000          $VECT2: .WORD   AVECT2          ;;INTERRUPT VECTOR#2BUS PRIORITY#2
001306  000000          $BASE:  .WORD   ABASE           ;;BASE ADDRESS OF EQUIPMENT UNDER TEST
001310  000000          $DEVM:  .WORD   ADEVM           ;;DEVICE MAP
001312  000000          $CDW1:  .WORD   ACDW1           ;;CONTROLLER DESCRIPTION WORD#1
001314  000000          $CDW2:  .WORD   ACDW2           ;;CONTROLLER DESCRIPTION WORD#2
001316  000000          $DDW0:  .WORD   ADDW0           ;;DEVICE DESCRIPTOR WORD#0
001320  000000          $DDW1:  .WORD   ADDW1           ;;DEVICE DESCRIPTOR WORD#1
001322  000000          $DDW2:  .WORD   ADDW2           ;;DEVICE DESCRIPTOR WORD#2
```

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001324 000000          $DDW3:  .WORD   ADDW3   ;;DEVICE DESCRIPTOR WORD#3
001326 000000          $DDW4:  .WORD   ADDW4   ;;DEVICE DESCRIPTOR WORD#4
001330 000000          $DDW5:  .WORD   ADDW5   ;;DEVICE DESCRIPTOR WORD#5
001332 000000          $DDW6:  .WORD   ADDW6   ;;DEVICE DESCRIPTOR WORD#6
001334 000000          $DDW7:  .WORD   ADDW7   ;;DEVICE DESCRIPTOR WORD#7
001336 000000          $DDW8:  .WORD   ADDW8   ;;DEVICE DESCRIPTOR WORD#8
001340 000000          $DDW9:  .WORD   ADDW9   ;;DEVICE DESCRIPTOR WORD#9
001342 000000          $DDW10: .WORD   ADDW10  ;;DEVICE DESCRIPTOR WORD#10
001344 000000          $DDW11: .WORD   ADDW11  ;;DEVICE DESCRIPTOR WORD#11
001346 000000          $DDW12: .WORD   ADDW12  ;;DEVICE DESCRIPTOR WORD#12
001350 000000          $DDW13: .WORD   ADDW13  ;;DEVICE DESCRIPTOR WORD#13
001352 000000          $DDW14: .WORD   ADDW14  ;;DEVICE DESCRIPTOR WORD#14
001354 000000          $DDW15: .WORD   ADDW15  ;;DEVICE DESCRIPTOR WORD#15


001356                 $ETEND:

```

```
                                .SBTTL  ERROR POINTER TABLE

                                ;*THIS TABLE CONTAINS THE INFORMATION FOR EACH ERROR THAT CAN OCCUR.
                                ;*THE INFORMATION IS OBTAINED BY USING THE INDEX NUMBER FOUND IN
                                ;*LOCATION $ITEMB. THIS NUMBER INDICATES WHICH ITEM IN THE TABLE IS PERTINENT.
                                ;*NOTE1:        IF $ITEMB IS 0 THE ONLY PERTINENT DATA IS ($ERRPC).
                                ;*NOTE2:        EACH ITEM IN THE TABLE CONTAINS 4 POINTERS EXPLAINED AS FOLLOWS:

                                ;*      EM              ;;POINTS TO THE ERROR MESSAGE
                                ;*      DH              ;;POINTS TO THE DATA HEADER
                                ;*      DT              ;;POINTS TO THE DATA
                                ;*      DF              ;;POINTS TO THE DATA FORMAT


001356                          $ERRTB:
                                ;ERROR TABLE ITEM FOR ERROR MESSAGE 1

001356  030250                          EM1             ;"DH11 REGISTER REFERENCE CAUSED TIMEOUT"
001360  030317                          DH1             ;" (PC)  (PS)  (SP)  TEST  DEVADR  REGADR "
001362  030376                          DT1             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2
001364  000000                          0               ;PRINT ALL OCTAL

                                ;ERROR TABLE ITEM FOR ERROR MESSAGE 2

001366  030414                          EM2             ;"SYSTEM CONTROL REGISTER ERROR"
001370  030452                          DH2             ;" (PC)  (PS)  (SP)  TEST  DEVADR  REGADR  WAS  S/B "
001372  030550                          DT2             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
001374  000000                          0               ;PRINT ALL OCTAL

                                ;ERROR TABLE ITEM FOR ERROR MESSAGE 3

001376  030572                          EM3             ;"DH11 MASTER CLEAR FAILED TO CLR SPECIFIED REG"
001400  030452                          DH2             ;" (PC)  (PS)  (SP)  TEST  DEVADR  REGADR  WAS  S/B "
001402  030550                          DT2             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
001404  000000                          0               ;PRINT ALL OCTAL

                                ;ERROR TABLE ITEM FOR ERROR MESSAGE 4

001406  030650                          EM4             ;"LINE PARAMETER REGISTER ERROR"
001410  030452                          DH2             ;" (PC)  (PS)  (SP)  TEST  DEVADR  REGADR  WAS  S/B "
001412  030550                          DT2             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
001414  000000                          0               ;PRINT ALL OCTAL

                                ;ERROR TABLE ITEM FOR ERROR MESSAGE 5

001416  030706                          EM5             ;"BREAK CONTROL REGISTER ERROR"
001420  030452                          DH2             ;" (PC)  (PS)  (SP)  TEST  DEVADR  REGADR  WAS  S/B "
001422  030550                          DT2             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
001424  000000                          0               ;PRINT ALL OCTAL

                                ;ERROR TABLE ITEM FOR ERROR MESSAGE 6

001426  030743                          EM6             ;"SILO STATUS REGISTER ERROR"
001430  030452                          DH2             ;" (PC)  (PS)  (SP)  TEST  DEVADR  REGADR  WAS  S/B "
001432  030550                          DT2             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
001434  000000                          0               ;PRINT ALL OCTAL
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                                        ;ERROR TABLE ITEM FOR ERROR MESSAGE 7

        001436  030776                          EM7             ;"CURRENT ADDRESS REGISTER ERROR - LINE #XX"
        001440  030452                          DH2             ;" (PC)  (PS)  (SP)  TEST  DEVADR  REGADR  WAS  S/B "
        001442  030550                          DT2             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
        001444  000000                          0               ;PRINT ALL OCTAL

                                        ;ERROR TABLE ITEM FOR ERROR MESSAGE 10

        001446  031050                          EM10            ;"BYTE COUNTER REGISTER ERROR - LINE #XX"
        001450  030452                          DH2             ;" (PC)  (PS)  (SP)  TEST  DEVADR  REGADR  WAS  S/B "
        001452  030550                          DT2             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
        001454  000000                          0               ;PRINT ALL OCTAL

                                        ;ERROR TABLE ITEM FOR ERROR MESSAGE 11

        001456  031117                          EM11            ;"UNEXPECTED DH11 RCVR INTERRUPT"
        001460  030452                          DH2             ;" (PC)  (PS)  (SP)  TEST  DEVADR  REGADR  WAS  S/B "
        001462  030550                          DT2             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
        001464  000000                          0               ;PRINT ALL OCTAL

                                        ;ERROR TABLE ITEM FOR ERROR MESSAGE 12

        001466  031156                          EM12            ;"UNEXPECTED DH11 XMITTR INTERRUPT"
        001470  030452                          DH2             ;" (PC)  (PS)  (SP)  TEST  DEVADR  REGADR  WAS  S/B "
        001472  030550                          DT2             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
        001474  000000                          0               ;PRINT ALL OCTAL

                                        ;ERROR TABLE ITEM FOR ERROR MESSAGE 13

        001476  031217                          EM13            ;"CHAR AVAILABLE FAILED TO GENERATE RCVR INTERRUPT"
        001500  030452                          DH2             ;" (PC)  (PS)  (SP)  TEST  DEVADR  REGADR  WAS  S/B "
        001502  030550                          DT2             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
        001504  000000                          0               ;PRINT ALL OCTAL

                                        ;ERROR TABLE ITEM FOR ERROR MESSAGE 14

        001506  031300                          EM14            ;"TRANSMITTER NPR LOGIC ERROR - LINE #  "
        001510  030452                          DH2             ;" (PC)  (PS)  (SP)  TEST  DEVADR  REGADR  WAS  S/B "
        001512  030550                          DT2             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
        001514  000000                          0               ;PRINT ALL OCTAL

                                        ;ERROR TABLE ITEM FOR ERROR MESSAGE 15

        001516  031347                          EM15            ;"XMITTR FAILED TO INTERRUPT - LINE #  "
        001520  030452                          DH2             ;" (PC)  (PS)  (SP)  TEST  DEVADR  REGADR  WAS  S/B "
        001522  030550                          DT2             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
        001524  000000                          0               ;PRINT ALL OCTAL

                                        ;ERROR TABLE ITEM FOR ERROR MESSAGE 16

        001526  031415                          EM16            ;"RCVR FAILED TO INTERRUPT"
        001530  030452                          DH2             ;" (PC)  (PS)  (SP)  TEST  DEVADR  REGADR  WAS  S/B "
        001532  030550                          DT2             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
        001534  000000                          0               ;PRINT ALL OCTAL
```

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                                        ;ERROR TABLE ITEM FOR ERROR MESSAGE 17

 001536  031446                                 EM17            ;"TRANSMITTER TIMING ERROR - LINE #  "
 001540  031512                                 DH6             ;" (PC)  (PS)  (SP)  TEST  DEVADR  SPEED   TIMEB   TIMEC"
 001542  030550                                 DT2             ;$ERRPC,$TMPO,$REG6,$REGO,$REG1,$REG2,$REG3,$REG4
 001544  000000                                 0               ;PRINT ALL OCTAL

                                        ;ERROR TABLE ITEM FOR ERROR MESSAGE 20

 001546  031610                                 EM20            ;RECEIVER TIMING ERROR - LINE #  "
 001550  031512                                 DH6             ;" (PC)  (PS)  (SP)  TEST  DEVADR  SPEED   TIMEB   TIMEC"
 001552  030550                                 DT2             ;$ERRPC,$TMPO,$REG6,$REGO,$REG1,$REG2,$REG3,$REG4
 001554  000000                                 0               ;PRINT ALL OCTAL

                                        ;ERROR TABLE ITEM FOR ERROR MESSAGE 21

 001556  031651                                 EM21            ;"RCVR FAILED TO INTERRUPT - LINE #  "
 001560  030452                                 DH2             ;" (PC)  (PS)  (SP)  TEST  DEVADR  REGADR  WAS  S/B "
 001562  030550                                 DT2             ;$ERRPC,$TMPO,$REG6,$REGO,$REG1,$REG2,$REG3,$REG4
 001564  000000                                 0               ;PRINT ALL OCTAL

                                        ;ERROR TABLE ITEM FOR ERROR MESSAGE 22

 001566  031715                                 EM22            ;"CHAR AVAIL FAILED TO SET ON TIME - LINE #  "
 001570  030452                                 DH2             ;" (PC)  (PS)  (SP)  TEST  DEVADR  REGADR  WAS  S/B "
 001572  030550                                 DT2             ;$ERRPC,$TMPO,$REG6,$REGO,$REG1,$REG2,$REG3,$REG4
 001574  000000                                 0               ;PRINT ALL OCTAL

                                        ;ERROR TABLE ITEM FOR ERROR MESSAGE 23

 001576  031771                                 EM23            ;"BASIC DATA TEST ERROR - LINE #  "
 001600  032032                                 DH7             ;" (PC)  (PS)  (SP)  TEST  DEVADR  CHRLNG  WAS  S/B "
 001602  030550                                 DT2             ;$ERRPC,$TMPO,$REG6,$REGO,$REG1,$REG2,$REG3,$REG4
 001604  000000                                 0               ;PRINT ALL OCTAL


                                        ;ERROR TABLE ITEM FOR ERROR MESSAGE 24

 001606  032127                                 EM24            ;"AUTO ECHO TEST ERROR - LINE #  "
 001610  030452                                 DH2             ;" (PC)  (PS)  (SP)  TEST  DEVADR  REGADR  WAS  S/B "
 001612  030550                                 DT2             ;$ERRPC,$TMPO,$REG6,$REGO,$REG1,$REG2,$REG3,$REG4
 001614  000000                                 0               ;PRINT ALL OCTAL

                                        ;ERROR TABLE ITEM FOR ERROR MESSAGE 25

 001616  032167                                 EM25            ;"BREAK BIT TEST ERROR - LINE #  "
 001620  030452                                 DH2             ;" (PC)  (PS)  (SP)  TEST  DEVADR  REGADR  WAS  S/B "
 001622  030550                                 DT2             ;$ERRPC,$TMPO,$REG6,$REGO,$REG1,$REG2,$REG3,$REG4
 001624  000000                                 0               ;PRINT ALL OCTAL

                                        ;ERROR TABLE ITEM FOR ERROR MESSAGE 26

 001626  032227                                 EM26            ;"HALF-DUPLEX TEST ERROR - LINE #  "
 001630  030452                                 DH2             ;" (PC)  (PS)  (SP)  TEST  DEVADR  REGADR  WAS  S/B "
 001632  030550                                 DT2             ;$ERRPC,$TMPO,$REG6,$REGO,$REG1,$REG2,$REG3,$REG4
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001634 000000                 0               ;PRINT ALL OCTAL

                       ;ERROR TABLE ITEM FOR ERROR MESSAGE 27

001636 032271                 EM27            ;"UNEXPECTED BUS ERROR TRAP"
001640 032323                 DH3             ; (PC)  (PS)  (SP)  TEST  TRPPC  TRPPS
001642 032402                 DT3             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2
001644 000000                 0               ;PRINT ALL OCTAL

                       ;ERROR TABLE ITEM FOR ERROR MESSAGE 30

001646 032420                 EM30            ;"UNEXPECTED RSVD INSTR TRAP"
001650 032323                 DH3             ; (PC)  (PS)  (SP)  TEST  TRPPC  TRPPS
001652 032402                 DT3             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2
001654 000000                 0               ;PRINT ALL OCTAL

                       ;ERROR TABLE ITEM FOR ERROR MESSAGE 31

001656 032453                 EM31            ;"AUTO ECHO DATA COMPARE ERROR - LINE #  "
001660 032523                 DH4             ; (PC)    (PS)    (SP)    TEST   WASADR  SBADR   WAS    S/B "
001662 030550                 DT2             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
001664 000000                 0               ;PRINT ALL OCTAL

                       ;ERROR TABLE ITEM FOR ERROR MESSAGE 32

001666 032620                 EM32            ;"AUTO ECHO TEST TIMEOUT - LINE #  "
001670 032662                 DH5             ;" (PC)  (LPRG)   TEST"
001672 032710                 DT4             ;$ERRPC,$TMP0,$TMP2
001674 000000                 0               ;PRINT ALL OCTAL


                       ;ERROR TABLE ITEM FOR ERROR MESSAGE 33

001676 032720                 EM33            ;"PARITY LOGIC TEST ERROR - LINE #  "
001700 030452                 DH2             ;" (PC)  (PS)  (SP)  TEST  DEVADR  REGADR  WAS  S/B"
001702 030550                 DT2             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
001704 000000                 0               ;PRINT ALL OCTAL

                       ;ERROR TABLE ITEM FOR ERROR MESSAGE 34

001706 032763                 EM34            ;"MULTI-LINE PARITY DATA TEST ERROR - LINE #   - SUBTEST #  "
001710 032523                 DH4             ;" (PC)  (PS)  (SP)  TEST  WASADR  SBADR  WAS  S/B "
001712 030550                 DT2             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
001714 000000                 0               ;PRINT ALL OCTAL

                       ;ERROR TABLE ITEM FOR ERROR MESSAGE 35

001716 033056                 EM35            ;"MULTI-LINE PARITY DATA TEST TIMEOUT"
001720 033122                 DH14            ;" (PC)  (LPRG)  LINACT "
001722 033152                 DT6             ;"$ERRPC,$TMP0,$TMP3"
001724 000000                 0               ;PRINT ALL OCTAL

                       ;ERROR TABLE ITEM FOR ERROR MESSAGE 36

001726 033162                 EM36            ;CHAR AVAILABLE TIMEOUT"
001730 032662                 DH5             ;" (PC)  (LPRG)   TEST"
```

```
001732  032710          DT4             ;$ERRPC,$TMP0,$TMP2
001734  000000          0               ;PRINT ALL OCTAL

                ;ERROR TABLE ITEM FOR ERROR MESSAGE 37

001736  033211          EM37            ;"DATA COMPARE ERROR - LINE #  "
001740  032523          DH4             ;" (PC)  (PS)  (SP)  TEST  WASADR  SBADR  WAS   S/B "
001742  030550          DT2             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
001744  000000          0               ;PRINT ALL OCTAL

                ;ERROR TABLE ITEM FOR ERROR MESSAGE 40

001746  033247          EM40            ;"BUFFER ACTIVE REG ERROR - LINE #  "
001750  030452          DH2             ;" (PC)  (PS)  (SP)  TEST  DEVADR  REGADR  WAS  S/B "
001752  030550          DT2             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
001754  000000          0               ;PRINT ALL OCTAL

                ;ERROR TABLE ITEM FOR ERROR MESSAGE 41

001756  033312          EM41            ;"RCVR FALSE INTERRUPT"
001760  032662          DH5             ;" (PC)  (LPRG)   TEST"
001762  032710          DT4             ;$ERRPC,$TMP0,$TMP2
001764  000000          0               ;PRINT ALL OCTAL

                ;ERROR TABLE ITEM FOR ERROR MESSAGE 42

001766  033337          EM42            ;"SILO OVERFLOW ERROR"
001770  032662          DH5             ;" (PC)  (LPRG)   TEST"
001772  032710          DT4             ;$ERRPC,$TMP0,$TMP2
001774  000000          0               ;PRINT ALL OCTAL

                ;ERROR TABLE ITEM FOR ERROR MESSAGE 43

001776  033363          EM43            ;"SILO OVERFLOW FAILED TO GENERATE RCVR INTERRUPT"
002000  030452          DH2             ;" (PC)  (PS)  (SP)  TEST  DEVADR  REGADR  WAS  S/B "
002002  030550          DT2             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
002004  000000          0               ;PRINT ALL OCTAL

                ;ERROR TABLE ITEM FOR ERROR MESSAGE 44

002006  033443          EM44            ;"NON EX MEMORY FAILED TO GENERATE XMITTR INTERRUPT"
002010  030452          DH2             ;" (PC)  (PS)  (SP)  TEST  DEVADR  REGADR  WAS  S/B "
002012  030550          DT2             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
002014  000000          0               ;PRINT ALL OCTAL

                ;ERROR TABLE ITEM FOR ERROR MESSAGE 45

002016  033525          EM45            ;"XMIT DONE FAILED TO GENERATE XMITTR INTERRUPT"
002020  030452          DH2             ;" (PC)  (PS)  (SP)  TEST  DEVADR  REGADR  WAS  S/B "
002022  030550          DT2             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
002024  000000          0               ;PRINT ALL OCTAL

                ;ERROR TABLE ITEM FOR ERROR MESSAGE 46

002026  033603          EM46            ;"CURRENT ADDRESS MEMORY PATTERNS TEST ERROR - LINE #  "
002030  033671          DH10            ;" (PC)   LINEWR  PATTRN   TEST   DEVADR  REGADR   WAS     S/B"
```

```
 002032  033766                          DT5             ;$ERRPC,$TMP0,$TMP1,$REG0,$REG1,$REG2,$REG3,$REG4
 002034  000000                          0               ;PRINT ALL OCTAL

                                 ;ERROR TABLE ITEM FOR ERROR MESSAGE 47

 002036  034010                          EM47            ;"BYTE COUNT MEMORY PATTERNS TEST ERROR - LINE #  "
 002040  033671                          DH10            ;" (PC)   LINEWR  PATTRN   TEST   DEVADR  REGADR   WAS      S/B"
 002042  033766                          DT5             ;$ERRPC,$TMP0,$TMP1,$REG0,$REG1,$REG2,$REG3,$REG4
 002044  000000                          0               ;PRINT ALL OCTAL

                                 ;ERROR TABLE ITEM FOR ERROR MESSAGE 50

 002046  034071                          EM50            ;"TEST TIMEOUT WAITING FOR XMIT DONE - LINE #  '
 002050  030452                          DH2             ;" (PC)    (PS)     (SP)     TEST   DEVADR  REGADR   WAS      S/B"
 002052  030550                          DT2             ;"$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4"
 002054  000000                          0               ;PRINT ALL OCTAL

                                 ;ERROR TABLE ITEM FOR ERROR MESSAGE 51

 002056  034147                          EM51            ;"NPR LOGIC TEST 2 ERROR"
 002060  034176                          DH11            ;" (PC)   LINACT  LINCHK   TEST   DEVADR  REGADR   WAS      S/B"
 002062  033766                          DT5             ;$ERRPC,$TMP0,$TMP1,$REG0,$REG1,$REG2,$REG3,$REG4"
 002064  000000                          0               ;PRINT ALL OCTAL

                                 ;ERROR TABLE ITEM FOR ERROR MESSAGE 52

 002066  034273                          EM52            ;"BASIC DATA COMPARE ERROR"
 002070  030452                          DH2             ;" (PC)    (PS)     (SP)     TEST   DEVADR  REGADR   WAS      S/B"
 002072  030550                          DT2             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4"
 002074  000000                          0               ;PRINT ALL OCTAL

                                 ;ERROR TABLE ITEM FOR ERROR MESSAGE 53

 002076  034071                          EM50            ;"TEST TIMEOUT WAITING FOR XMIT DONE - LINE #  "
 002100  034324                          DH12            ;" (PC)    SPEED    (SP)     TEST   DEVADR  REGADR   WAS      S/B"
 002102  030550                          DT2             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
 002104  000000                          0               ;PRINT ALL OCTAL

                                 ;ERROR TABLE ITEM FOR ERROR MESSAGE 54

 002106  031715                          EM22            ;"CHAR AVAIL FAILED TO SET ON TIME - LINE #  "
 002110  034324                          DH12            ;" (PC)    SPEED    (SP)     TEST   DEVADR  REGADR   WAS      S/B"
 002112  030550                          DT2             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
 002114  000000                          0               ;PRINT ALL OCTAL

                                 ;ERROR TABLE ITEM FOR ERROR MESSAGE 55

 002116  031715                          EM22            ;"CHAR AVAIL FAILED TO SET ON TIME - LINE #  "
 002120  034421                          DH13            ;" (PC)    (PS)     (SP)     TEST   DEVADR  CHRLNG  SCRWAS  SCRS/B
 002122  030550                          DT2             ;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4
 002124  000000                          0               ;PRINT ALL OCTAL

                                 ;ERROR TABLE ITEM FOR ERROR MESSAGE 56

 002126  034520                          EM56            ;"OVERRUN BIT FAILED TO SET - LINE #  "
 002130  030452                          DH2             ;" (PC)    (PS)     (SP)     TEST   DEVADR  REGADR   WAS      S/B"
```

```
002132	030550			DT2		;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4"
002134	000000			0		;PRINT ALL OCTAL

			;ERROR TABLE ITEM FOR ERROR MESSAGE 57

002136	034565			EM57		;"STORAGE OVERFLOW BIT FAILED - LINE #  "
002140	030452			DH2		;" (PC)   (PS)   (SP)   TEST  DEVADR  REGADR   WAS    S/B"
002142	030550			DT2		;$ERRPC,$TMP0,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4"
002144	000000			0		;PRINT ALL OCTAL
```

```
002146  005000                          BEGIN:  CLR     R0              ;INIT R0 TO INDICATE DEFAULT PARAMETERS
002150  005067  026062                  BEGINA: CLR     TITFLG          ;INIT TITLE MESSAGE FLAG
                                        .SBTTL  INITIALIZE THE COMMON TAGS
                                        ;;CLEAR THE COMMON TAGS ($CMTAG) AREA
002154  012706  001100                          MOV     #$CMTAG,R6      ;;FIRST LOCATION TO BE CLEARED
002160  005026                                  CLR     (R6)+           ;;CLEAR MEMORY LOCATION
002162  022706  001140                          CMP     #SWR,R6 ;;DONE?
002166  001374                                  BNE     .-6             ;;LOOP BACK IF NO
002170  012706  001100                          MOV     #STACK,SP       ;;SETUP THE STACK POINTER
                                        ;;INITIALIZE A FEW VECTORS
002174  012737  020746  000020                  MOV     #$SCOPE,@#IOTVEC ;;IOT VECTOR FOR SCOPE ROUTINE
002202  012737  000340  000022                  MOV     #340,@#IOTVEC+2 ;;LEVEL 7
002210  012737  021236  000030                  MOV     #$ERROR,@#EMTVEC ;;EMT VECTOR FOR ERROR ROUTINE
002216  012737  000340  000032                  MOV     #340,@#EMTVEC+2 ;;LEVEL 7
002224  012737  024022  000034                  MOV     #$TRAP,@#TRAPVEC ;;TRAP VECTOR FOR TRAP CALLS
002232  012737  000340  000036                  MOV     #340,@#TRAPVEC+2;LEVEL 7
002240  012737  024104  000024                  MOV     #$PWRDN,@#PWRVEC ;;POWER FAILURE VECTOR
002246  012737  000340  000026                  MOV     #340,@#PWRVEC+2 ;;LEVEL 7
002254  016767  016400  016370                  MOV     $ENDCT,$EOPCT   ;;SETUP END-OF-PROGRAM COUNTER
002262  005067  176734                          CLR     $TIMES          ;;INITIALIZE NUMBER OF ITERATIONS
002266  005067  176732                          CLR     $ESCAPE         ;;CLEAR THE ESCAPE ON ERROR ADDRESS
002272  112767  000001  176615                  MOVB    #1,$ERMAX       ;;ALLOW ONE ERROR PER TEST
002300  012767  002300  176600                  MOV     #.,$LPADR       ;;INITIALIZE THE LOOP ADDRESS FOR SCOPE
002306  012767  002306  176574                  MOV     #.,$LPERR       ;;SETUP THE ERROR LOOP ADDRESS
                                        ;;SIZE FOR A HARDWARE SWITCH REGISTER. IF NOT FOUND OR IT IS
                                        ;;EQUAL TO A "-1", SETUP FOR A SOFTWARE SWITCH REGISTER.
002314  013746  000004                          MOV     @#ERRVEC,-(SP)  ;;SAVE ERROR VECTOR
002320  012737  002354  000004                  MOV     #64$,@#ERRVEC   ;;SET UP ERROR VECTOR
002326  012767  177570  176604                  MOV     #DSWR,SWR       ;;SETUP FOR A HARDWARE SWICH REGISTER
002334  012767  177570  176600                  MOV     #DDISP,DISPLAY  ;;AND A HARDWARE DISPLAY REGISTER
002342  022777  177777  176570                  CMP     #-1,@SWR        ;;TRY TO REFERENCE HARDWARE SWR
002350  001012                                  BNE     66$             ;;BRANCH IF NO TIMEOUT TRAP OCCURRED
                                                                        ;;AND  THE HARDWARE SWR IS NOT = -1
002352  000403                                  BR      65$             ;;BRANCH IF NO TIMEOUT
002354  012716  002362                  64$:    MOV     #65$,(SP)       ;;SET UP FOR TRAP RETURN
002360  000002                                  RTI
002362  012767  000176  176550          65$:    MOV     #SWREG,SWR      ;;POINT TO SOFTWARE SWR
002370  012767  000174  176544                  MOV     #DISPREG,DISPLAY
002376  012637  000004                  66$:    MOV     (SP)+,@#ERRVEC  ;;RESTORE ERROR VECTOR

002402  005067  176632                          CLR     $PASS           ;;CLEAR PASS COUNT
002406  132767  000200  176637                  BITB    #APTSIZE,$ENVM  ;;TEST USER SIZE UNDER APT
002414  001403                                  BEQ     67$             ;;YES,USE NON-APT SWITCH
002416  012767  001254  176514                  MOV     #$SWREG,SWR     ;;NO,USE APT SWITCH REGISTER
002424                                  67$:
                                        .SBTTL  GET VALUE FOR SOFTWARE SWITCH REGISTER
002424  005737  000042                          TST     @#42            ;;ARE WE RUNNING UNDER XXDP/ACT?
002430  001012                                  BNE     68$             ;;BRANCH IF YES
002432  126727  176614  000001                  CMPB    $ENV,#1         ;;ARE WE RUNNING UNDER APT?
002440  001406                                  BEQ     68$             ;;BRANCH IF YES
002442  026727  176472  000176                  CMP     SWR,#SWREG      ;;SOFTWARE SWITCH REG SELECTED?
002450  001005                                  BNE     69$             ;;BRANCH IF NO
002452  104406                                  GTSWR                   ;;GET SOFT-SWR SETTINGS
002454  000403                                  BR      69$
002456  112767  000001  176450          68$:    MOVB    #1,$AUTOB       ;;SET AUTO-MODE INDICATOR
002464                                  69$:
```

```
002464	012767	026566	175312	START1: MOV	#BUSER,ERRVEC	;SET UP THE BUS ERROR VECTOR
002472	012767	000340	175306		MOV	#340,ERRVEC+2
002500	012767	026642	175302		MOV	#RESERR,RESVEC	;SET UP THE RSVD INSTR VECTOR
002506	012767	000340	175276		MOV	#340,RESVEC+2
002514	005767	025516			TST	TITFLG		;HAVE WE TYPED TITLE ONCE ?
002520	001012				BNE	1$		;BR IF YES
002522	104401				TYPE			;GO TYPE PROGRAM TITLE
002524	034634				TITLE
002526	005167	025504			COM	TITFLG		;SET FLAG - TYPE TITLE ONLY ONCE PER LOAD
002532	032777	000001	176400		BIT	#BIT0,@SWR	;DO WE WANT TO AUTOSIZE?
002540	001002				BNE	1$		;BRANCH IF NOT.
002542	004767	022330			JSR	PC,AUTOSZ	;GO AUTOSIZE.
002546	005767	025116		1$:	TST	VCFLG		;START AT 200 ??
002552	001413				BEQ	11$		;BR IF NOT
002554	032777	000001	176356		BIT	#BIT0,@SWR	;ARE PARAMETERS TO BE INPUT MANUALLY?
002562	001003				BNE	9$		;BRANCH IF YES.
002564	016700	025406			MOV	ADRVEC,R0	;OTHERWISE, GET ADDRESSES BETWEEN VECTORS FROM AUTOSIZER
002570	000402				BR	10$
002572	004767	023250		9$:	JSR	PC,INPARA	;GO ASK FOR PARAMETERS
002576	005067	025066		10$:	CLR	VCFLG		;RE INIT VECTOR FLAG
002602	005700			11$:	TST	R0		;USE DEFAULT PARAMETERS ?
002604	001407				BEQ	START2		;BR IF YES
002606	022700	177777			CMP	#-1,R0		;CHANGE DH SELECT PARAM ONLY ?
002612	001002				BNE	2$		;BR IF NOT
002614	000167	023376			JMP	INPAR3		;GO ASK FOR SELECT PARAM.
002620	000167	023302		2$:	JMP	INPAR		;GO ASK FOR ALL PARAMETERS

002624	012767	027566	025364	START2: MOV	#DHADTB-2,ADPTR	;GET POINTER TO ADDRESS TABLE
002632	012767	027626	025360		MOV	#DHVCTB-2,VCPTR	;GET POINTER TO VECTOR TABLE
002640	012767	027670	025354		MOV	#BRLVL-2,BRPTR	;GET POINTER TO BR LEVEL TABLE
002646	012767	177777	025334		MOV	#-1,DHNUM	;START WITH DH #00
002654	012767	000001	024314		MOV	#1,SELMSK	;SET UP DH11 BIT TEST MARKER

002662	005267	025322		RESTRT: INC	DHNUM		;GENERATE DH11 DEV NUMBER
002666	062767	000002	025322		ADD	#2,ADPTR	;UPDATE TABLE POINTERS
002674	062767	000002	025316		ADD	#2,VCPTR
002702	062767	000002	025312		ADD	#2,BRPTR
002710	036767	024262	024262		BIT	SELMSK,DHSEL	;TEST FOR SELECTED DH11
002716	001004				BNE	RSTRTA		;BR IF SELECTED FOR TEST
002720	006367	024252		REST1:	ASL	SELMSK		;SHIFT MARKER TO TEST NEXT DH11
002724	001737				BEQ	START2		;BR IF 16 TESTED - START OVER
002726	000755				BR	RESTRT		;GO TEST IF THIS ONE SELECTED
002730	017767	025262	024234	RSTRTA: MOV	@ADPTR,DHADR	;SET UP DH11 ADDRESS
002736	017767	025256	024230		MOV	@VCPTR,DHVCT	;SET UP THE DH11 VECTOR ENTRY
002744	017767	025252	025234		MOV	@BRPTR,DHRLVL	;GET BR LEVEL VALUES
002752	004567	021616			JSR	R5,SUNUM	;GO SET DH NUMBER IN THE MESSAGE BUFFER
002756	030210				DHNUM
002760	034724				TITLE2+20
002762	104401				TYPE			;GO PRINT "TESTING DH11 #XX"
002764	034704				TITLE2
002766	004767	021274			JSR	PC,LDTBF1	;GO LOAD XMITTR OUTPUT BUFFER WITH
							;BINARY COUNT PATTERN
002772	012767	002772	176106		MOV	#.,$LPADR	;INIT SCOPE LOOP RETURN
```

```
                                        ;;*****************************************************************
                                        ;*TEST 1         CHECK SSYN RESPONSE FROM ALL DH11 REGISTERS
                                        ;;*****************************************************************
003000  000004                          TST1:   SCOPE
                                        .REM    %
                                        TEST ABSTRACT:
                                        *****************

                                                THIS TEST ATTEMPTS TO REFERENCE EACH OF THE EIGHT REGISTERS
                                        IN THE DH11 SELECTED FOR TEST USING ITS ASSIGNED UNIBUS ADDRESS. IF
                                        ANY ADDRESS FAILS TO RESPOND A BUS ERROR TRAP VECTORS THE TEST TO THE
                                        ERROR SET-UP AND CALL ROUTINE. AFTER THE ERROR IS TYPED THE TEST WILL
                                        TEST THE NEXT DH11 ADDRESS IN SEQUENCE UNTIL ALL EIGHT ARE TESTED.

                                        ERRORS:
                                        *******

                                        1.) [ERROR  1] REPORTS THAT THE REGISTER WHOSE ADDRESS IS IN R2 FAILED
                                            TO RESPOND WITH "SSYN" WHEN REFERENCED.

                                        SYNC:           (NONE)
                                        *****

                                        DEBUG:
                                        ******

                                        1.) PROBLEM IS MOST LIKELY THE M7277 MODULE.
                                        2.) IF ALL EIGHT REGISTTERS FAIL TO RESPOND, MAKE SURE THAT YOU CONFIGURED
                                            THE PROGRAM PROPERLY BEFORE STARTING.  IF YOU DID, CHECK THE SETTINGS
                                            OF THE ADDRESS SELECT JUMPERS ON THE M7277 MODULE.
                                        3.) IF ONE OR MORE RESPONDED PROPERLY, SET UP AN ERROR SCOPE LOOP AND
                                            BACKTRACK THROUGH THE LOGIC STARTING WITH THE KEY LOGIC SIGNALS
                                            LISTED BELOW.

                                        KEY LOGIC:
                                        **********

                                                M7277   SH3     SSYN H                  CE2
                                                                DEVICE RESPONDING L     E72-6
                                                        SH4     DEVICE SELECTED H       E09-11
                                        %
003002  010102                                  MOV     R1,R2           ;COPY IT INTO R2
003004  010205                                  MOV     R2,R5           ;ALSO R5
003006  062705  000020                          ADD     #20,R5          ;R5 WILL TELL US WHEN WE'VE TESTED ALL 8
003012  016746  174766                          MOV     ERRVEC,-(SP)    ;SAVE BUS ERROR VECTOR
003016  012767  003044  174760                  MOV     #3$,ERRVEC      ;GO TO 3$ IF REG FAILS TO RESPOND
003024  162702  000002                          SUB     #2,R2           ;SO WE START WITH FIRST REG

003030  062702  000002                  1$:     ADD     #2,R2           ;POINT TO A DH11 REGISTER
003034  020205                                  CMP     R2,R5           ;TESTED ALL EIGHT ??
003036  001412                                  BEQ     4$              ;BR IF YES
003040  005712                          2$:     TST     (R2)            ;ACCESS DH11 REG ADDR
003042  000772                                  BR      1$              ;BR WHEN ALL 8 ARE DONE

003044  004767  021240                  3$:     JSR     PC,SUER1        ;GO SET UP ERROR INFO
003050  022626                                  CMP     (SP)+,(SP)+     ;FIX SP BECAUSE OF TRAP
```

```
003052  012767  003040  176030          MOV     #2$,$LPERR        ;SET UP ERROR LOOP RETURN
003060  104001                          ERROR   1                 ;DH11 REGISTER FAILED TO RESPOND TO MSYN

003062  000762                          BR      1$                ;GO TEST NEXT ONE
003064  012667  174714          4$:     MOV     (SP)+,ERRVEC      ;RESTORE BUS ERROR VECTOR
```

```
                                        ;;*****************************************************************
                                        ;*TEST 2          TEST THAT "MASTER CLR" CAN CLEAR THE "SCR","LPR","BKR",AND "SSR" REGS
                                        ;;*****************************************************************
        003070  000004                  TST2:   SCOPE
                                        .REM    %
                                        TEST ABSTRACT:
                                        **************

                                                THIS TEST SETS ALL WRITEABLE BITS IN THE TARGET REGISTER
                                        (SCR, LPR, BKR, AND SSR) THEN SETS BIT11 IN THE "SCR" (MASTER CLEAR)
                                        AND CHECKS THAT IT INDEED CLEARED ALL BITS IN THE TARGET REGISTER.
                                        IT PERFORMS THIS SEQUENCE FOR ALL TARGET REGISTERS.
                                        IF A REGISTER FAILS TO CLEAR PROPERLY, THE ERROR IS REPORTED, AND THEN
                                        THE ROUTINE TESTS THE NEXT REGISTER IN SEQUENCE.

                                        ERRORS:
                                        *******

                                        1.) [ERROR  3] REPORTS THAT THE REGISTER WHOSE ADDRESS IS IN R2 FAILED
                                            TO CLEAR WHEN MASTER CLEAR WAS ACTIVATED.

                                        SYNC:
                                        *****

                                                M7289   SH6     SCR 11 H (MASTER CLEAR)         FK2

                                        DEBUG:
                                        ******

                                        1.) IF THE ERROR REPORTS INDICATE THAT ALL REGISTERS ARE FAILING, ESTABLISH
                                            AN ERROR SCOPE LOOP AND PROCEED TO BACKTRACK THROUGH THE KEY LOGIC
                                            SIGNALS LISTED BELOW.
                                        2.) IF ONLY ONE REGISTER FAILS WITH ALL SET BITS -- THEN LET TESTS 03-10
                                            RUN -- THEY WILL PROBABLY GIVE BETTER ISOLATION. USE ONE OF THESE
                                            TESTS TO DEBUG THE FAULT.

                                        KEY LOGIC:
                                        **********

                                                M7277   SH3     INIT A L                FR2
                                                                INIT B L                FM2
                                                                INIT A H                EF2
                                                                INIT B H                FV2
                                                        SH4     LOAD SCR HIGH BYTE H    CP1

                                                M7289   SH6     SCR 11 H (MASTER CLEAR) FK2

                                                M7278   SH3     BUFF DATA 11 H          AA1

                                        %
        003072  012705  027210                  MOV     #MSTCLR,R5      ;GET POINTER TO ADDRESS TABLE
        003076  010125                          MOV     R1,(R5)+        ;SET UP THE TEST ADDRESS TABLE SO THAT
        003100  010125                          MOV     R1,(R5)+        ;IT CONTAINS THE ADDRESSES OF THE
        003102  010125                          MOV     R1,(R5)+        ;SCR,LPR,BKR, AND SSR REGISTERS
        003104  010125                          MOV     R1,(R5)+
        003106  062745  000016                  ADD     #SSR,-(R5)      ;GENERATE SSR ADDRESS
        003112  062745  000014                  ADD     #BKR,-(R5)      ;GENERATE BKR ADDRESS
```

```
003116  062745  000004                  ADD     #LPR,-(R5)          ;GENERATE LPR ADDRESS
003122  005745                          TST     -(R5)               ;POINT R5 TO FIRST ADDR ENTRY (SCR)
003124  005004                          CLR     R4                  ;RESULT S/B 000000 AFTER MASTER CLEAR

003126  012502                  1$:     MOV     (R5)+,R2            ;GET REG ADDRESS
003130  022705  027220                  CMP     #MSTCLR+10,R5       ;DONE ALL FOUR REGS ??
003134  001415                          BEQ     TST3                ;;BR IF YES
003136  012712  177777          2$:     MOV     #-1,(R2)            ;SET 1'S IN REGISTER
003142  052711  004000                  BIS     #BIT11,(R1)         ;ISSUE MASTER CLEAR
003146  011203                          MOV     (R2),R3             ;GET CONTENT OF REGISTER
003150  001766                          BEQ     1$                  ;;BR IF IT'S ALL ZEROES

003152  004767  021172                  JSR     PC,SUER2            ;GO SET UP ERROR INFO
003156  012767  003136  175724          MOV     #2$,$LPERR          ;SET UP ERROR LOOP RETURN
003164  104003                          ERROR   3                   ;MASTER CLR FAILED TO CLR SEL. REG.
003166  000757                          BR      1$                  ;GO TEST NEXT REGISTER
```

```
                                ;;*************************************************************
                                ;*TEST 3         TEST "SCR" REG R/W BITS CAN SET/CLR (NORMAL MODE)
                                ;;*************************************************************
003170  000004                  TST3:   SCOPE
                                .REM    %
                                TEST ABSTRACT:
                                **************

                                        THIS TEST VERIFIES THAT EACH R/W BIT IN THE "SCR" REGISTER
                                CAN BE INDIVIDUALLY SET AND CLEARED IN NORMAL MODE (MAINT BIT = 0)
                                A BIT MASK (RGMSK1:  131177) IS USED TO DEFINE THE R/W BITS ( ALL BUT
                                BITS 14, 11, 10, 8, AND 7). THE TEST IS REPEATED ELEVEN TIMES WITH A
                                DIFFERENT BIT SELECTED FOR EACH TEST. R5 CONTAINS THE BIT CURRENTLY
                                BEING TESTED. IF AN ERROR IS DETECTED, IT IS REPORTED AND THEN THE TEST
                                RESUMES WITH THE NEXT BIT IN SEQUENCE UNTIL ALL HAVE BEEN TESTED.

                                ERRORS:
                                *******

                                1.) [ERROR  2] IS CALLED TO REPORT A FAILURE TO SET PROPERLY AND
                                AGAIN TO REPORT A FAILURE TO CLEAR PROPERLY.

                                SYNC:
                                *****

                                1.) SET FAILURE       M7277   SH4     LOAD SSR LOW BYTE H      CR1

                                2.) CLR FAILURE       M7277   SH4     LOAD SSR HIGH BYTE H     CP2

                                DEBUG:
                                ******

                                1.) IF ALL BITS FAIL - SUSPECT THE "LOAD SCR" SIGNALS ON THE M7277 SH4.
                                2.) IF ONLY ONE OR TWO BITS FAIL - SUSPECT EITHER THE "SCR" REGISTER
                                    FLOPS ON THE M7289 SH6, THE BUS RECEIVERS ON THE M7278 SH3 AND SH4,
                                    OR THE MULTIPLEXORS AND BUS DRIVERS ON THE M7289 SH5-8.

                                KEY LOGIC:
                                **********

                                        M7278   SH3     BUFF DATA <15:08> H
                                                SH4     BUFF DATA <07:00> H

                                        M7277   SH4     LOAD SCR LOW BYTE H     CT2
                                                        LOAD SCR HIGH BYTE H    CP1
                                                        DATA TO BUS H           EN2
                                                        DATA SOURCE <A,B,C> H   DU1,DU2,DT2

                                        M7289   SH5     BUF DATA TO BUS B H     E05-12
                                                        BUS DATA <15:12> L
                                                SH6     BUS DATA <11:08> L
                                                        SCR <15:00> H
                                                SH7     BUF DATA TO BUS A H     E05-8
                                                        BUS DATA <07:04> L
                                                SH8     BUS DATA <03:00> L
                                %
```

```
003172  012767  003222  175710          MOV     #4$,$LPERR         ;SET UP ERROR LOOP RETURN
003200  010102                          MOV     R1,R2              ;GET REGISTER ADDRESS
003202  012705  000001                  MOV     #1,R5              ;SET UP TO START WITH BIT00

003206  030567  024340          1$:     BIT     R5,RGMSK1          ;SHALL WE TEST THIS BIT ?
003212  001003                          BNE     4$                 ;BR IF YES
003214  006305                  2$:     ASL     R5                 ;SHIFT TO TST NEXT BIT
003216                          3$:
003216  001430                          BEQ     TST4               ;;<BR IF DONE ALL R/W BITS>
003220  000772                          BR      1$                 ;GO TEST NEXT BIT

003222  010504                  4$:     MOV     R5,R4              ;RESULT S/B IN R4
003224  005012                          CLR     (R2)               ;INIT REG BEING TESTED
003226  112761  000000  000016          MOVB    #0,SSR(R1)         ;SCOPE SYNC
003234  010512                          MOV     R5,(R2)            ;SET THE BIT
003236  011203                          MOV     (R2),R3            ;GET THE WAS DATA
003240  020403                          CMP     R4,R3              ;RESULT = S/B DATA ??
003242  001403                          BEQ     5$                 ;BR IF YES

003244  004767  021100                  JSR     PC,SUER2           ;GO SET UP ERROR INFO
003250  104002                          ERROR   2                  ;SELECTED BIT FAILED TO SET IN SCR

003252  005004                  5$:     CLR     R4                 ;SET UP TO CLEAR THE BIT S/B=000000
003254  112761  000000  000017          MOVB    #0,SSR+1(R1)       ;SCOPE SYNC
003262  040512                          BIC     R5,(R2)            ;CLR THE SELECTED BIT
003264  011203                          MOV     (R2),R3            ;GET THE WAS DATA
003266  001403                          BEQ     6$                 ;BR IF IT CLEARED

003270  004767  021054                  JSR     PC,SUER2           ;GO SET UP THE ERROR INFO
003274  104002                          ERROR   2                  ;SELECTED BIT FAILED TO CLEAR IN SCR
003276  000746                  6$:     BR      2$                 ;GO SELECT NEXT BIT
```

```
                                        ;;***************************************************************
                                        ;*TEST 4         TEST "SCR" REG. READ ONLY BITS (NORMAL MODE)
                                        ;;***************************************************************
003300  000004                          TST4:   SCOPE
                                        .REM    %
                                        TEST ABSTRACT:
                                        **************

                                                THIS TEST VERIFIES THAT THE "SCR" REGISTER READ ONLY BITS CAN
                                        NOT BE SET OR CLEARED IN NORMAL MODE. A BIT MASK (RGMSK2:  046600)
                                        IS USED TO DEFINE THE READ ONLY BITSS (14,11,10,8, AND 7). THE TEST
                                        IS REPEATED FIVE TIMES, ONCE FOR EACH BIT TO BE TESTED, AND ANY
                                        ERRORS DETECTED ARE REPORTED. AFTER THE ERROR REPORT THE TEST RESUMES
                                        WITH THE NEXT BIT IN SEQUENCE UNTIL ALL BITS HAVE BEEN TESTED.

                                        ERRORS:
                                        *******

                                        1.) [ERROR  2] IS CALLED TO REPORT ANY READ ONLY BIT THAT FAILED
                                            TO RESPOND PROPERLY.

                                        SYNC:
                                        *****

                                                M7277   SH4     LOAD SSR LOW BYTE H     CR1

                                        DEBUG:
                                        ******

                                                SAME AS FOR TEST 03

                                        KEY LOGIC:
                                        **********

                                                SAME AS FOR TEST 03


                                        %
003302  010102                                  MOV     R1,R2           ;MAKE IT THE REG. ADDR ALSO
003304  012705  000001                          MOV     #1,R5           ;INIT BIT TEST MARKER
003310  030567  024240                  1$:     BIT     R5,RGMSK2       ;IS IT A READ ONLY BIT ??
003314  001003                                  BNE     3$              ;BR IF IT IS - GO TEST IT
003316  006305                          2$:     ASL     R5              ;SHIFT BIT MARKER
003320  001420                                  BEQ     TST5            ;;BR IF DONE ALL BITS
003322  000772                                  BR      1$              ;GO TEST THIS BIT

003324  005004                          3$:     CLR     R4              ;RESULT S/B = 000000
003326  005012                                  CLR     (R2)            ;INIT REG BEING TESTED
003330  112761  000000  000016                  MOVB    #0,SSR(R1)      ;SCOPE SYNC
003336  010512                                  MOV     R5,(R2)         ;ATTEMPT TO SET A READ ONLY BIT
003340  011203                                  MOV     (R2),R3         ;GET THE WAS DATA
003342  001765                                  BEQ     2$              ;BR IF THE BIT DIDN'T SET

003344  004767  021000                          JSR     PC,SUER2        ;GO SET UP ERROR INFO
003350  012767  003324  175532                  MOV     #3$,$LPERR      ;SET UP ERROR LOOP RETURN ADDR
003356  104002                                  ERROR   2               ;READ ONLY BIT SET IN "SCR"
003360  000756                                  BR      2$              ;CONTINUE WITH NEXT BIT
```

```
                        ;;*****************************************************************
                        ;*TEST 5        TEST "SCR" REG. BITS THAT CAN BE SET/CLR IN MAINT. MODE
                        ;;*****************************************************************
003362  000004          TST5:   SCOPE
                        .REM    %
                        TEST ABSTRACT:
                        ***************

                                THIS TEST VERIFIES THAT THE "SCR" REGISTER READ-ONLY BITS
                        (14, 10, AND 07) CAN BE SET/CLR IN MAINT. MODE (SCR09=1) ONLY.
                        A BIT MASK (RGMSK6:  042200) IS USED TO DEFINE THE BITS TO TEST.
                        THE TEST PERFORMS THE FOLLOWING SEQUENCE:

                                1. SELECT A BIT TO TEST
                                2. SET MAINT. MODE
                                3. SET THE BIT AND VERIFY THAT IT SET
                                4. CLEAR THE MAINT. MODE BIT
                                5. ATTEMPT TO CLEAR THE TEST BIT
                                6. TEST TO SEE THAT IT DID NOT CLEAR
                                7. SET MAINT. MODE
                                8. CLEAR THE TEST BIT AND VERIFY THAT IT CLEARED
                                9. REPEAT 1-7 UNTIL ALL BITS HAVE BEEN TESTED

                        ANY ERRORS DETECTED ARE REPORTED AND THE TEST RESUMES WITH THE NEXT
                        BIT IN SEQUENCE UNTIL ALL BITS HAVE BEEN TESTED.

                        ERRORS:
                        ********

                        1.) [ERROR  2] IS CALLED AT THREE DIFFERENT POINTS TO REPORT ONE OF
                            THE THREE POSSIBLE FAILURE MODES DESCRIBED IN 3, 6, AND 7 IN THE
                            ABSTRACT.

                        SYNC:
                        ******

                        1.) STEP 3 FAILURE TO SET WITH MAINT. MODE SET

                                M7277   SH4     LOAD SSR LOW BYTE H     CR1

                        2.) STEP 5 FAILURE TO REMAIN SET WITH MAINT MODE NOT SET

                                M7277   SH4     LOAD SSR HIGH BYTE H    CP2

                        3.) STEP 8 FAILURE TO CLEAR WITH MAINT. MODE SET

                                M7277   SH4     LOAD LPR H              EP2

                        DEBUG:
                        ******

                        1.) ASSUMING THE PREVIOUS TESTS RAN SUCCESSFULLY THE FAULT IS MOST
                            LIKELY THE M7289 MODULE.

                        KEY LOGIC:
                        **********
```

```
                                             SAME AS TEST 03 WITH THE FOLLOWING ADDITION

                                             M7289   SH4     74121 ONE-SHOTS E35-6, E23-6

003364  012767  003414  175516               MOV     #3$,$LPERR         ;SET UP THE ERROR LOOP RETURN
003372  010102                               MOV     R1,R2              ;MAKE IT REG ADDR TOO
003374  012705  000001                       MOV     #1,R5              ;INIT BIT TEST MARKER
003400  030567  024160               1$:     BIT     R5,RGMSK6          ;IS IT A READ ONLY BIT ??
003404  001003                               BNE     3$                 ;BR IF YES - TEST IT
003406  006305                       2$:     ASL     R5                 ;SHIFT THE BIT MARKER
003410  001457                               BEQ     TST6               ;;BR IF DONE ALL SELECTED BITS
003412  000772                               BR      1$                 ;GO TEST FOR THIS BIT

003414  010504                       3$:     MOV     R5,R4              ;SET UP S/B DATA
003416  052704  001000                       BIS     #BIT09,R4          ;PUT IN THE MAINT. BIT
003422  005012                               CLR     (R2)               ;INIT REG BEING TESTED
003424  052712  001000                       BIS     #BIT09,(R2)        ;TURN ON MAINT. MODE
003430  112761  000000  000016               MOVB    #0,SSR(R1)         ;SCOPE SYNC
003436  050512                               BIS     R5,(R2)            ;SET THE SELECTED BIT
003440  011203                               MOV     (R2),R3            ;GET THE WAS DATA
003442  020304                               CMP     R3,R4              ;DID SELECTED BIT GET SET ??
003444  001404                               BEQ     4$                 ;BR IF IT DID

003446  004767  020676                       JSR     PC,SUER2           ;GO SET UP ERROR INFO
003452  104002                               ERROR   2                  ;SELECTED BIT FAILED TO SET IN MAINT MODE
003454  000754                               BR      2$                 ;GO TEST NEXT BIT

003456  042712  001000               4$:     BIC     #BIT09,(R2)        ;TURN OFF MAINT. MODE
003462  042704  001000                       BIC     #BIT09,R4          ;CLR MAINT BIT IN S/B DATA
003466  112761  000000  000017               MOVB    #0,SSR+1(R1)       ;SCOPE SYNC
003474  040512                               BIC     R5,(R2)            ;ATTEMPT TO CLR SELECTED BIT
003476  011203                               MOV     (R2),R3            ;GET THE WAS DATA
003500  020304                               CMP     R3,R4              ;DID BIT GET CLEARED ??
003502  001404                               BEQ     5$                 ;BR IF IT DIDN'T

003504  004767  020640                       JSR     PC,SUER2           ;GO SET UP ERROR INFO
003510  104002                               ERROR   2                  ;SELECTED BIT GOT CLEARED WITH MAINT MODE OFF
003512  000735                               BR      2$                 ;GO TEST NEXT BIT

003514  012704  001000               5$:     MOV     #BIT09,R4          ;SET UP S/B DATA
003520  050412                               BIS     R4,(R2)            ;SET MAINT. MODE
003522  012761  000000  000004               MOV     #0,LPR(R1)         ;SCOPE SYNC
003530  040512                               BIC     R5,(R2)            ;NOW CLR SELECTED BIT
003532  011203                               MOV     (R2),R3            ;GET THE WAS DATA
003534  020304                               CMP     R3,R4              ;DID BIT GET CLEARED OK ??
003536  001723                               BEQ     2$                 ;BR IF YES

003540  004767  020604                       JSR     PC,SUER2           ;GO SET UP ERROR INFO
003544  104002                               ERROR   2                  ;FAILED TO CLR SELECTED BIT IN MAINT MODE
003546  000717                               BR      2$                 ;GO SELECT NEXT BIT FOR TEST
```

```
                                        ;;*******************************************************************
                                        ;*TEST 6         TEST THAT ALL R/W BITS IN "LPR" CAN BE SET/CLR
                                        ;;*******************************************************************
003550  000004                          TST6:   SCOPE
                                        .REM    %
                                        TEST ABSTRACT:
                                        ***************

                                                THIS TEST VERIFIES THAT ALL R/W BITS IN THE "LPR" REG-
                                        ISTER CAN BE SET AND CLEARED INDIVIDUALLY. A BIT MASK (RGMSK3:  177767)
                                        IS USED TO DEFINE THE BITS TO BE TESTED (ALL BUT BIT03). THE TEST
                                        SEQUENCE IS AS FOLLOWS:

                                                1. SELECT A BIT TO TEST
                                                2. SET THE BIT AND VERIFY IT SET
                                                3. CLEAR THE BIT AND VERIFY IT CLEARED
                                                4. REPEAT 1 THRU 3 UNTIL ALL BITS TESTED

                                        ANY ERRORS DETECTED ARE REPORTED AND AFTER THE ERROR, THE TEST
                                        RESUMES WITH THE NEXT BIT IN SEQUENCE.

                                        ERRORS:
                                        *******

                                        1.) [ERROR  4] IS CALLED TO REPORT BOTH FAIL TO SET AND FAIL TO
                                            CLEAR FAULTS.

                                        SYNC:
                                        *******

                                        1.) FAIL TO SET:        M7277   SH4     LOAD SSR LOW BYTE H     CR1
                                        2.) FAIL TO CLEAR:      M7277   SH4     LOAD SSR HIGH BYTE H    CP2

                                        DEBUG:
                                        ******

                                        1.) IF ALL BITS FAIL THE PROBLEM IS MOST LIKELY THE M7277 MODULE
                                            (LPR LOAD SIGNALS)
                                        2.) IF NOT THEN IT IS PROBABLY AN "LPR" REGISTER CHIP OR
                                            BAD OUTPUT DATA MUX CHIP, BOTH ON THE M7278 MODULE.

                                        KEY LOGIC:
                                        **********

                                                M7277   SH4     LOAD LPR H              EP2

                                                M7278   SH5     LPR <15:12> L   (E52)
                                                        SH6     LPR <11:08> L   (E37)
                                                        SH7     LPR <07:04> L   (E59)
                                                        SH8     LPR <03:00> L   (E61)
                                                        SH5,6,7,8       OUTPUT MUX CHIPS  (74151'S PIN 2)

                                        %
003552  012767  003606  175330                  MOV     #3$,$LPERR      ;SET UP THE ERROR LOOP RETURN
003560  010102                                  MOV     R1,R2           ;COPY IT IN R2
003562  062702  000004                          ADD     #LPR,R2         ;GENERATE REGADR IN R2
```

```
003566  012705  000001                  MOV     #1,R5           ;INIT BIT TEST MARKER
003572  030567  023760          1$:     BIT     R5,RGMSK3       ;TEST THIS BIT ??
003576  001003                          BNE     3$              ;BR IF YES
003600  006305                  2$:     ASL     R5              ;SHIFT THE MARKER
003602  001430                          BEQ     TST7            ;;BR IF DONE ALL BITS
003604  000772                          BR      1$              ;GO TEST NXT BIT

003606  010504                  3$:     MOV     R5,R4           ;SET UP S/B DATA
003610  005012                          CLR     (R2)            ;INIT REG BEING TESTED
003612  112761  000000  000016          MOVB    #0,SSR(R1)      ;SCOPE SYNC
003620  010512                          MOV     R5,(R2)         ;SET LPR BIT
003622  011203                          MOV     (R2),R3         ;GET THE WAS DATA
003624  020304                          CMP     R3,R4           ;DID IT SET
003626  001403                          BEQ     4$              ;BR IF IT SET PROPERLY

003630  004767  020514                  JSR     PC,SUER2        ;GO SET UP ERROR INFO
003634  104004                          ERROR   4               ;LPR BIT FAILED TO SET PROPERLY

003636  005004                  4$:     CLR     R4              ;GET READY TO CLEAR SELECTED BIT
003640  112761  000000  000017          MOVB    #0,SSR+1(R1)    ;SCOPE SYNC
003646  040512                          BIC     R5,(R2)         ;CLEAR THE BIT
003650  011203                          MOV     (R2),R3         ;GET THE WAS DATA
003652  001752                          BEQ     2$              ;BR IF BIT CLEARED PROPERLY

003654  004767  020470                  JSR     PC,SUER2        ;GO SET UP ERROR INFO
003660  104004                          ERROR   4               ;LPR BIT FAILED TO CLEAR PROPERLY
003662  000746                          BR      2$              ;GO SELECT NEXT BIT
```

```
                                        ;;*****************************************************************
                                        ;*TEST 7         TEST THAT ALL R/W BITS IN "BKR" CAN BE SET/CLR
                                        ;;*****************************************************************
003664  000004                          TST7:   SCOPE
                                        .REM    %
                                        TEST ABSTRACT:
                                        **************

                                                THIS TEST VERIFIES THAT ALL BITS IN THE BREAK CONTROL REGISTER
                                        CAN BE SET AND CLEARED INDIVIDUALLY. IT USES A BIT MASK (RGMSK4:  177777)
                                        TO DEFINE THE R/W BITS (ALL 16.). R5 ALWAYS CONTAINS THE BIT CURRENTLY
                                        SELECTED FOR TEST. THE TEST SEQUENCE IS AS FOLLOWS:

                                                1. SELECT A BIT TO TEST
                                                2. SET THE BIT AND VERIFY THAT IT SET PROPERLY
                                                3. CLEAR THE BIT AND VERIFY THAT IT CLEARED PROPERLY
                                                4. REPEAT 1 THRU 4 UNTIL ALL BITS HAVE BEEN TESTED.

                                        ANY ERROR DETECTED IS REPORTED AND THE TEST RESUMES WITH THE NEXT BIT
                                        IN SEQUENCE.

                                        ERRORS:
                                        ********

                                        1.) [ERROR  5] IS CALLED TO REPORT BOTH FAIL TO SET PROPERLY AND FAIL
                                            TO CLEAR PROPERLY FAULTS.

                                        SYNC:
                                        ******

                                        1.) FAIL TO SET:        M7277   SH4     LOAD SSR LOW BYTE H     CR1
                                        2.) FAIL TO CLR:        M7277   SH4     LOAD SSR HIGH BYTE H    CP2

                                        DEBUG:
                                        ******

                                        1.) THE ONLY DIFFERENCES IN THE DATA PATH HERE AND THAT FOT THE PREVIOUS
                                            TESTS ARE THE ACTUAL REGISTER CHIPS AND THE INPUT SELECTED ON THE
                                            OUTPUT DATA MULTIPLEXORS.

                                        2.) IF ALL BITS FAIL THE PROBLEM IS MOST LIKELY THE M7277.

                                        3.) IF ONLY ONE OR TWO FAIL THE PROBLEM IS MOST LIKELY THE M7278.

                                        KEY LOGIC:
                                        ***********

                                                M7277   SH4     LOAD BCR H                      FU1
                                                                DATA TO BUS H                   EN2
                                                                DATA SOURCE (A,B,C) H           DU1,DU2,DT2

                                                M7278   SH5 - SH8 74175 REGISTER CHIPS (E51,E38,E67,E60)
                                                        SH5 - SH8 74151'S MUX CHIPS INPUT PIN 13
                                        %
003666  012767  003722  175214                  MOV     #3$,$LPERR      ;SET UP THE ERROR LOOP RETURN
003674  010102                                  MOV     R1,R2           ;GENERATE "BKR" ADDRESS IN R2
```

```
003676  062702  000014                  ADD     #BKR,R2
003702  012705  000001                  MOV     #1,R5           ;INIT BIT TEST MARKER
003706  030567  023646          1$:     BIT     R5,RGMSK4       ;TEST THIS BIT ??
003712  001003                          BNE     3$              ;BR IF YES
003714  006305                  2$:     ASL     R5              ;SHIFT BIT MARKER
003716  001430                          BEQ     TST10           ;;BR IF ALL BITS TESTED
003720  000772                          BR      1$              ;GO TEST THE BIT

003722  010504                  3$:     MOV     R5,R4           ;SET UP S/B DATA
003724  005012                          CLR     (R2)            ;INIT REG BEING TESTED
003726  112761  000000  000016          MOVB    #0,SSR(R1)      ;SCOPE SYNC
003734  050512                          BIS     R5,(R2)         ;SET THE SELECTED BIT IN "BKR"
003736  011203                          MOV     (R2),R3         ;GET THE WAS DATA
003740  020304                          CMP     R3,R4           ;DID BIT SET OK
003742  001403                          BEQ     4$              ;BR IF YES

003744  004767  020400                  JSR     PC,SUER2        ;GO SET UP ERROR INFO
003750  104005                          ERROR   5               ;BKR BIT FAILED TO SET PROPERLY

003752  005004                  4$:     CLR     R4              ;SET UP S/B DATA
003754  112761  000000  000017          MOVB    #0,SSR+1(R1)    ;SCOPEE SYNC
003762  040512                          BIC     R5,(R2)         ;CLEAR BKR BIT
003764  011203                          MOV     (R2),R3         ;GET THE BKR WAS DATA
003766  001752                          BEQ     2$              ;BR IF BKR BIT CLEARED OK

003770  004767  020354                  JSR     PC,SUER2        ;GO SET UP ERROR INFO
003774  104005                          ERROR   5               ;BKR BIT FAILED TO CLR PROPERLY
003776  000746                          BR      2$              ;GO SELECT NEXT BIT
```

```
                                        ;;*************************************************************
                                        ;*TEST 10        TEST THAT ALL R/W BITS IN "SSR" CAN BE SET/CLR
                                        ;;*************************************************************
004000  000004                          TST10:  SCOPE
                                        .REM    %
                                        TEST ABSTRACT:
                                        **************

                                                THIS TEST VERIFIES THAT ALL R/W BITS IN THE SILO STATUS REGISTER
                                        (SSR) CAN BE SET AND CLEARED INDIVIDUALLY. IT USES A BIT MASK (RGMSK5:  100077)
                                        TO DEFINE THE R/W BITS (15,5,4,3,2,1, AND 0). R5 ALWAYS CONTAINS THE BIT
                                        CURRENTLY SELECTED FOR TEST. THE TEST SEQUENCE IS AS FOLLOWS:

                                                1. SELECT A BIT TO TEST
                                                2. SET THE BIT AND VERIFY THAT IT SET PROPERLY
                                                3. CLEAR THE BIT AND VERIFY THAT IT CLEARED PROPERLY
                                                4. REPEAT 1 THRU 3 UNTIL ALL BITS ARE TESTED

                                        ANY ERRORS DETECTED ARE REPORTED AND THEN THE TEST RESUMES WITH THE
                                        NEXT BIT IN SEQUENCE.

                                        ERRORS:
                                        ********

                                        1.) [ERROR  6] IS CALLED TO REPOORT BOTH FAIL TO SET PROPERLY AND
                                            FAIL TO CLEAR PROPERLY FAULTS.

                                        SYNC:
                                        *****

                                        1.) FAIL TO SET:  M7277 SH4     LOAD LPR H      EP2
                                        2.) FAIL TO CLR:  M7277 SH4     LOAD BCR H      FU1

                                        DEBUG:
                                        ******

                                        1.) THE ONLY DIFFERENCES BETWEEN THEE DATA PATHS USED BY THIS TEST AND
                                            THAT USED BY THE PREVIOUS TESTS ARE THE ACTUAL "SSR" REGISTER
                                            CHIPS AND THE INPUT PIN SELECTED ON THE OUTPUT DATA MULTIPLEXORS.
                                        2.) IF ALL BITS FAIL IT IS MOST LIKELY THE M7277
                                        3.) IF BITS <13:08> FAIL IT IS MOST LIKELY THE M7279
                                        4.) IF JUST ONE OR TWO BITS FAIL IT IS MOST LIKELY THE M7278

                                        KEY LOGIC:
                                        ***********

                                                M7277   SH4     LOAD SSR LOW BYTE H     CR1
                                                                LOAD SSR HIGH BYTE H    CP2
                                                                DATA TO BUS H           EN2
                                                                DATA SOURCE (A,B,C) H   DU1,DU2,DT2

                                                M7279   SH2     SSR <13:08> H  (E20 AND E24)

                                                M7278   SH5 - SH8       REGISTER CHIPS E53,E68, OR E69 (74175'S)
                                                                        OUTPUT MUX CHIPS - (74151'S  PIN 12)
                                        %
```

```
004002  012767  004036  175100          MOV     #3$,$LPERR      ;SET UP THE ERROR LOOP RETURN
004010  010102                          MOV     R1,R2           ;GENERATE "SSR" ADDRESS IN R2
004012  062702  000016                  ADD     #SSR,R2
004016  012705  000001                  MOV     #1,R5           ;INIT BIT TEST MARKER
004022  030567  023534          1$:     BIT     R5,RGMSK5       ;TEST THIS BIT ??
004026  001003                          BNE     3$              ;BR IF YES
004030  006305                  2$:     ASL     R5              ;SHIFT BIT MARKER
004032  001435                          BEQ     TST11           ;;BR IF ALL BITS TESTED
004034  000772                          BR      1$              ;GO TEST THE BIT

004036  010504                  3$:     MOV     R5,R4           ;SET UP S/B DATA
004040  005012                          CLR     (R2)            ;INIT REG BEING TESTED
004042  012761  000000  000004          MOV     #0,LPR(R1)      ;SCOPE SYNC
004050  050512                          BIS     R5,(R2)         ;SET THE SELECTED BIT IN "SSR"
004052  011203                          MOV     (R2),R3         ;GET THE WAS DATA
004054  042703  077700                  BIC     #77700,R3       ;CLEAR OUT DON'T CARE BITS
004060  020304                          CMP     R3,R4           ;DID BIT SET OK
004062  001403                          BEQ     4$              ;BR IF YES

004064  004767  020260                  JSR     PC,SUER2        ;GO SET UP ERROR INFO
004070  104006                          ERROR   6               ;SSR BIT FAILED TO SET PROPERLY

004072  005004                  4$:     CLR     R4              ;SET UP S/B DATA
004074  012761  000000  000014          MOV     #0,BKR(R1)      ;SCOPE SYNC
004102  040512                          BIC     R5,(R2)         ;CLEAR SSR BIT
004104  011203                          MOV     (R2),R3         ;GET THE SSR WAS DATA
004106  042703  077700                  BIC     #77700,R3       ;CLEAR JUNK BITS
004112  020304                          CMP     R3,R4           ;DID THE SSR BIT GET CLEARED ??
004114  001745                          BEQ     2$              ;BR IF SSR BIT CLEARED OK

004116  004767  020226                  JSR     PC,SUER2        ;GO SET UP ERROR INFO
004122  104006                          ERROR   6               ;SSR BIT FAILED TO CLR PROPERLY
004124  000741                          BR      2$              ;GO SELECT NEXT BIT
```

```
                                        ;;***************************************************************
                                        ;;*TEST 11        TEST THAT CLR/SET OF BIT "N" IN "LPR" DOES NOT CLEAR ANY OTHER BITS
                                        ;;***************************************************************
004126  000004                          TST11:  SCOPE
                                        .REM    %
                                        TEST ABSTRACT:
                                        ***************

                                                THIS TEST VERIFIES THAT SETTING AND CLEARING EACH R/W BIT IN
                                        THE "LPR" REGISTER DOES NOT DISTURB (CLEAR) ANY OTHER BIT IN THE REGISTER.
                                        A BIT MASK (RGMSK3:  177767) IS USED TO DEFINE THE R/W BITS (ALL BUT BIT 03).
                                        R5 ALWAYS CONTAINS THE BIT CURRENTLY SELECTED FOR TEST. THE TEST SEQUENCE
                                        IS AS FOLLOWS:

                                                1. SELECT A BIT TO TEST
                                                2. SET ALL THE WRITABLE BITS
                                                3. CLEAR THE SELECTED BIT - VERIFY IT CLEARED PROPERLY
                                                4. SET THE SELECTED BIT - VERIFY IT SET PROPERLY
                                                5. REPEAT 1 THRU 4 UNTIL ALL BITS ARE TESTED

                                        ANY ERRORS DETECTED ARE REPORTED AND THEN THE TEST RESUMES WITH THE
                                        NEXT BIT IN SEQUENCE .

                                        ERRORS:
                                        *******

                                        1.) [ERROR  4] IS CALLED TO REPORT BOTH FAIL TO CLEAR PROPERLY AND
                                            FAIL TO SET PROPERLY FAULTS.

                                        SYNC:
                                        *******

                                        1.) FAIL TO CLR:        M7277   LOAD SSR LOW BYTE H     CR1
                                        2.) FAIL TO SET:        M7277   LOAD SSR HIGH BYTE H    CP2

                                        DEBUG:
                                        ******

                                        1.) PROBLEMS DETECTED BY THIS TEST INDICATE ADJACENT BIT INTERFERENCE
                                            CAUSED BY CROSS TALK OR NOISE. PROBLEM IS MOST LIKELY THE M7278.

                                        KEY LOGIC:      (SAME AS FOR TEST 6)
                                        ***********
                                        %
004130  012767  004164  174752                  MOV     #3$,$LPERR      ;SET UP THE ERROR LOOP RETURN
004136  010102                                  MOV     R1,R2           ;SET UP THE REG ADDR
004140  062702  000004                          ADD     #LPR,R2
004144  012705  000001                          MOV     #1,R5           ;INIT BIT TEST MASK
004150  030567  023402                  1$:     BIT     R5,RGMSK3       ;TEST THIS BIT ??
004154  001003                                  BNE     3$              ;BR IF YES
004156  006305                          2$:     ASL     R5              ;SHIFT THE BIT TEST MASK
004160  001436                                  BEQ     TST12           ;;BR IF TESTED ALL BITS
004162  000772                                  BR      1$              ;GO TEST THIS BIT

004164  016704  023366                  3$:     MOV     RGMSK3,R4       ;SET UP S/B DATA
004170  005012                                  CLR     (R2)            ;INIT REG BEING TESTED
```

```
004172  112761  000000  000016          MOVB    #0,SSR(R1)          ;SCOPE SYNC
004200  040504                          BIC     R5,R4               ;CLR BIT "N"
004202  016712  023350                  MOV     RGMSK3,(R2)         ;SET ALL R/W BITS IN LPR
004206  040512                          BIC     R5,(R2)             ;CLEAR BIT "N" IN LPR
004210  011203                          MOV     (R2),R3             ;GET THE WAS DATA
004212  020304                          CMP     R3,R4               ;DID IT CLEAR OK ?
004214  001404                          BEQ     4$                  ;BR IF YES

004216  004767  020126                  JSR     PC,SUER2            ;GO SET UP ERROR INFO
004222  104004                          ERROR   4                   ;BIT "N" FAILED TO CLR PROPERLY
004224  000754                          BR      2$                  ;GO TEST NEXT BIT

004226  050504                  4$:     BIS     R5,R4               ;SET BIT "N" IN S/B DATA
004230  112761  000000  000017          MOVB    #0,SSR+1(R1)        ;SCOPE SYNC
004236  050512                          BIS     R5,(R2)             ;SET BIT "N" IN LPR
004240  011203                          MOV     (R2),R3             ;GET THE WAS DATA
004242  020304                          CMP     R3,R4               ;DID BIT "N" SET PROPERLY ?
004244  001744                          BEQ     2$                  ;BR IF YES

004246  004767  020076                  JSR     PC,SUER2            ;GO SET UP ERROR INFO
004252  104004                          ERROR   4                   ;BIT "N" FAILED TO SET PROPERLY
004254  000740                          BR      2$                  ;GO SELECT NEXT BIT
```

```
                                        ;;*************************************************************
                                        ;*TEST 12        TEST THAT CLR/SET OF BIT "N" IN "BKR" DOES NOT CLEAR ANY OTHER BITS
                                        ;;*************************************************************
004256  000004                          TST12:  SCOPE
                                        .REM    %
                                        TEST ABSTRACT:
                                        ***************

                                                THIS TEST VERIFIES THAT CLEARING AND SETTING EACH R/W
                                        BIT IN THE BREAK CONTROL REGISTER INDIVIDUALLY DOES NOT DISTURB ANY
                                        OF THE OTHER BITS. A BIT MASK (RGMSK4:  177777) IS USED TO DEFINE
                                        THE R/W BITS (ALL 16.). R5 ALWAYS CONTAINS THE BIT CURRENTLY SELECTED
                                        FOR TEST. THE TEST SEQUENCE IS AS FOLLOWS:

                                                1. SELECT A BIT TO TEST
                                                2. SET ALL WRITABLE BITS IN THE "BKR"
                                                3. CLEAR THE SELECTED BIT AND VERIFY THAT IT CLEARED PROPERLY
                                                4. SET THE SELECTED BIT AND VERIFY THAT IT SET PROPERLY
                                                5. REPEAT 1 THRU 4 UNTIL ALL BITS HAVE BEEN TESTED

                                        ANY ERROR DETECTED IS REORTRD AND THEN THE TEST RESUMES WITH THE
                                        NEXT BIT IN SEQUENCE.

                                        ERRORS:
                                        ********

                                        1.) [ERROR  5] IS CALLED TO REPORT BOTH CLEAR AND SET FAULTS.

                                        SYNC:
                                        *****

                                        1.) FAIL TO CLR:        M7277   SH4     LOAD SSR LOW BYTE H     CR1
                                        2.) FAIL TO SET:        M7277   SH4     LOAD SSR HIGH BYTE H    CP2

                                        DEBUG:
                                        ******

                                        1.) LIKE THE PREVIOUS TEST, FAILURES HERE INDICATE ADJACENT BIT
                                            INTERFERENCE CAUSED BY CROSS TALK OR NOISE. THE FAULT IS MOST
                                            LIKELY THE M7278 MODULE.

                                        KEY LOGIC:      (SAME AS FOR TEST 7)
                                        **********
                                        %
004260  012767  004314  174622                  MOV     #3$,$LPERR      ;SET UP THE ERROR LOOP RETURN
004266  010102                                  MOV     R1,R2           ;SET UP THE REG ADDR
004270  062702  000014                          ADD     #BKR,R2
004274  012705  000001                          MOV     #1,R5           ;INIT BIT TEST MASK
004300  030567  023254                  1$:     BIT     R5,RGMSK4       ;TEST THIS BIT ??
004304  001003                                  BNE     3$              ;BR IF YES
004306  006305                          2$:     ASL     R5              ;SHIFT THE BIT TEST MASK
004310  001436                                  BEQ     TST13           ;;BR IF TESTED ALL BITS
004312  000772                                  BR      1$              ;GO TEST THIS BIT

004314  016704  023240                  3$:     MOV     RGMSK4,R4       ;SET UP S/B DATA
004320  040504                                  BIC     R5,R4           ;CLR BIT "N"
```

```
004322  005012                          CLR     (R2)            ;INIT REG BEING TESTED
004324  016712  023230                  MOV     RGMSK4,(R2)     ;SET ALL R/W BITS IN BKR
004330  112761  000000  000016          MOVB    #0,SSR(R1)      ;SCOPE SYNC
004336  040512                          BIC     R5,(R2)         ;CLEAR BIT "N" IN BKR
004340  011203                          MOV     (R2),R3         ;GET THE WAS DATA
004342  020304                          CMP     R3,R4           ;DID IT CLEAR OK ?
004344  001404                          BEQ     4$              ;BR IF YES

004346  004767  017776                  JSR     PC,SUER2        ;GO SET UP ERROR INFO
004352  104005                          ERROR   5               ;BIT "N" FAILED TO CLR PROPERLY
004354  000754                          BR      2$              ;GO TEST NEXT BIT

004356  050504                  4$:     BIS     R5,R4           ;SET BIT "N" IN S/B DATA
004360  112761  000000  000017          MOVB    #0,SSR+1(R1)    ;SCOPE SYNC
004366  050512                          BIS     R5,(R2)         ;SET BIT "N" IN BKR
004370  011203                          MOV     (R2),R3         ;GET THE WAS DATA
004372  020304                          CMP     R3,R4           ;DID BIT "N" SET PROPERLY ?
004374  001744                          BEQ     2$              ;BR IF YES

004376  004767  017746                  JSR     PC,SUER2        ;GO SET UP ERROR INFO
004402  104005                          ERROR   5               ;BIT "N" FAILED TO SET PROPERLY
004404  000740                          BR      2$              ;GO SELECT NEXT BIT
```

```
                                        ;;*************************************************************
                                        ;*TEST 13        TEST THAT CLR/SET OF BIT "N" IN "SSR" DOES NOT CLEAR ANY OTHER BITS
                                        ;;*************************************************************
004406  000004                          TST13:  SCOPE
                                        .REM    %
                                        TEST ABSTRACT:
                                        ***************

                                                THIS TEST VERIFIES THAT CLEARING AND SETTING EACH R/W
                                        BIT IN THE SILO STATUS REGISTER INDIVIDUALLY DOES NOT DISTURB ANY
                                        OF THE OTHER BITS. A BIT MASK (RGMSK5:  100077) IS USED TO DEFINE
                                        THE R/W BITS (15,5,4,3,2,1, AND 0). R5 ALWAYS CONTAINS THE BIT CURRENTLY SELECTED
                                        FOR TEST. THE TEST SEQUENCE IS AS FOLLOWS:

                                                1. SELECT A BIT TO TEST
                                                2. SET ALL WRITABLE BITS IN THE "SSR"
                                                3. CLEAR THE SELECTED BIT AND VERIFY THAT IT CLEARED PROPERLY
                                                4. SET THE SELECTED BIT AND VERIFY THAT IT SET PROPERLY
                                                5. REPEAT 1 THRU 4 UNTIL ALL BITS HAVE BEEN TESTED

                                        ANY ERROR DETECTED IS REORTRD AND THEN THE TEST RESUMES WITH THE
                                        NEXT BIT IN SEQUENCE.

                                        ERRORS:
                                        ********

                                        1.) [ERROR  6] IS CALLED TO REPORT BOTH CLEAR AND SET FAULTS.

                                        SYNC:
                                        *****

                                        1.) FAIL TO CLR:        M7277   SH4     LOAD LPR H      EP2
                                        2.) FAIL TO SET:        M7277   SH4     LOAD BCR H      FU1

                                        DEBUG:
                                        ******

                                        1.) LIKE THE PREVIOUS TEST, FAILURES HERE INDICATE ADJACENT BIT
                                            INTERFERENCE CAUSED BY CROSS TALK OR NOISE. THE FAULT IS MOST
                                            LIKELY THE M7278 MODULE.

                                        KEY LOGIC:      (SAME AS FOR TEST 10)
                                        **********
                                        %
004410  012767  004444  174472                  MOV     #3$,$LPERR      ;SET UP THE ERROR LOOP RETURN
004416  010102                                  MOV     R1,R2           ;SET UP THE REG ADDR
004420  062702  000016                          ADD     #SSR,R2
004424  012705  000001                          MOV     #1,R5           ;INIT BIT TEST MASK
004430  030567  023126                  1$:     BIT     R5,RGMSK5       ;TEST THIS BIT ??
004434  001003                                  BNE     3$              ;BR IF YES
004436  006305                          2$:     ASL     R5              ;SHIFT THE BIT TEST MASK
004440  001442                                  BEQ     TST14           ;;BR IF TESTED ALL BITS
004442  000772                                  BR      1$              ;GO TEST THIS BIT

004444  016704  023112                  3$:     MOV     RGMSK5,R4       ;SET UP S/B DATA
004450  040504                                  BIC     R5,R4           ;CLR BIT "N"
```

```
004452  005012                          CLR     (R2)            ;INIT REG BEING TESTED
004454  016712  023102                  MOV     RGMSK5,(R2)     ;SET ALL R/W BITS IN SSR
004460  012761  000000  000004          MOV     #0,LPR(R1)      ;SCOPE SYNC
004466  040512                          BIC     R5,(R2)         ;CLEAR BIT "N" IN SSR
004470  011203                          MOV     (R2),R3         ;GET THE WAS DATA
004472  042703  077700                  BIC     #77700,R3       ;CLEAR JUNK BITS
004476  020304                          CMP     R3,R4           ;DID IT CLEAR OK ?
004500  001404                          BEQ     4$              ;BR IF YES

004502  004767  017642                  JSR     PC,SUER2        ;GO SET UP ERROR INFO
004506  104006                          ERROR   6               ;BIT "N" FAILED TO CLR PROPERLY
004510  000752                          BR      2$              ;GO TEST NEXT BIT

004512  050504                  4$:     BIS     R5,R4           ;SET BIT "N" IN S/B DATA
004514  012761  000000  000014          MOV     #0,BKR(R1)      ;SCOPE SYNC
004522  050512                          BIS     R5,(R2)         ;SET BIT "N" IN SSR
004524  011203                          MOV     (R2),R3         ;GET THE WAS DATA
004526  042703  077700                  BIC     #77700,R3       ;CLEAR JUNK BITS
004532  020304                          CMP     R3,R4           ;DID BIT "N" SET PROPERLY ?
004534  001740                          BEQ     2$              ;BR IF YES

004536  004767  017606                  JSR     PC,SUER2        ;GO SET UP ERROR INFO
004542  104006                          ERROR   6               ;BIT "N" FAILED TO SET PROPERLY
004544  000734                          BR      2$              ;GO SELECT NEXT BIT
```

```
                                ;;*****************************************************************
                                ;*TEST 14        "CAR" MEMORY ADDRESSING TEST
                                ;;*****************************************************************
 004546  000004                 TST14:  SCOPE
                                .REM    %
                                TEST ABSTRACT:
                                ***************

                                        THIS TEST VERIFIES THAT EACH LOCATION IN THE CURRENT ADDRESS
                                MEMORY CAN BE UNIQUELY ADDRESSED. IT WRITES THE PATTERN SHOWN BELOW
                                INTO THE MEMORY AND THEN READS BACK EACH LOCATION TO VERIFY THAT IT
                                WAS WRITTEN CORRECTLY. SINCE THE MEMORY LOGIC IS PARTITIONED INTO
                                FOUR 16 X 4 READ/WRITE MEMORY CHIPS, THE PATTERN RESULTS IN THE LINE
                                NUMBER (00 - 17(8)) BEING WRITTEN AS DATA INTO TO EACH LOCATION
                                (00 - 17(8)) IN EACH CHIP. THAT IS:  LOC00 = 00, LOC 01 = 01,
                                .......LOC 17 = 17.

                                        MEMORY PATTERN: LOCATION        CONTENTS        (BOTH OCTAL)

                                                        00              000000
                                                        01              010421
                                                        02              021042
                                                        03              031463
                                                        04              042104
                                                        05              052525
                                                        06              063146
                                                        07              073567
                                                        10              104210
                                                                11              114631
                                                        12              125252
                                                        13              135673
                                                        14              146314
                                                        15              156735
                                                        16              167356
                                                        17              177777

                                ANY ERRORS DETECTED ARE REPORTED AND THEN THE TEST RESUMES CHECKING
                                THEE NEXT LOCATION IN SEQUENCE UNTIL ALL 16. HAVE BEEN CHECKED.

                                        NOTE:   THIS TEST ALWAYS CHECKS ALL 16. LINES REGARDLESS
                                                OF HOW THE LINE SELECTION PARAMETER WAS INITIALLY
                                                SET UP.

                                ERRORS:
                                ********

                                1.) [ERROR  7] IS CALLED TO REPORT ANY LINES (LOCATIONS) THAT FAIL.
                                    THE FAILING LINE # IS INCLUDED AS PART OF THE ERROR HEADER MESSAGE.

                                SYNC:
                                ******

                                1.) WRITE SYNC: M7277   SH4     LOAD SSR LOW BYTE H     CR1
                                2.) READ SYNC:  M7277   SH4     LOAD SSR HIGH BYTE H    CP2
```

```
                                        DEBUG:
                                        ******

                                        1.) ANALYZE THE ERROR REPORTS CAREFULLY ASKING THE FOLLOWING QUESTIONS:

                                                A. DOES THE FAULT AFFECT ONLY ONE LINE ?
                                                B. DOES THE FAULT AFFECT ONLY ONE 4-BIT DATA GROUP ?
                                                   IE <15:12>, <11:08>, <07:04>, OR <03:00>
                                                C. DOES ANY DATA AT ALL APPEAR TO BE WRITTEN ?

                                        2.) IF "A" IS TRUE THEN SUSPECT AN ADDRESSING PROBLEM IN THE MEMORY
                                            ADDRESS MUX.

                                        3.) IF "B" IS TRUE THEN SUSPECT A DATA MUX, UP-COUNTER, MEMORY,
                                            OR INVERTER CHIP PROBLEM.

                                        4.) IF "C" IS TRUE SUSPECT A MEMORY WRITE TIMING PROBLEM.

                                        5.) IN MOST CASES THE FAULT IS MOST LIKELY THE M7277 OR M7278.

                                        KEY LOGIC:
                                        **********

                                                M7277   SH4     LOAD CA H                       E58-13
                                                                DATA TO BUS H                   EN2
                                                                DATA SOURCE (A,B,C)             DU1,DU2,DT2

                                                        SH5     MEMADD SOURCE SEL H             E55-8
                                                                CA MEM WRITE ENAB L             E50-1
                                                                BUF ADDRS TO BUS H              E33-1 (SHD BE LOW)
                                                                74157 MUX CHIPS E33,E27,E20 BITS<17:08>
                                                                74193 COUNTER CHIPS E19,E26,E32 BITS<17:08>
                                                                7489 MEMORY CHIPS E18,E25,E31 BITS<17:08>
                                                                7404 INVERTER CHIPS E30,E24,E17 BITS<17:08>

                                                        SH5     74157 MUX CHIP  E48
                                                                74157 DATA MUX CHIPS E13,E06 BITS<07:00>
                                                                74193 COUNTER CHIPS E12,E05 BITS<07:00>
                                                                7489 MEMORY CHIPS E11,E04 BITS<07:00>


                                                M7278   SH5 THRU SH8    74151 DATA MUX OUTPUT CHIPS (PIN 1 INPUT)
                                        %
 004550  010102                                 MOV     R1,R2                   ;COPY IT IN R2
 004552  062702  000006                         ADD     #CAR,R2                 ;SET UP REGADR IN R2
 004556  016767  022420  174434                 MOV     LINSEL,$TMP7            ;SAVE LINE SELECT PARAMETER
 004564  012767  177777  022410                 MOV     #-1,LINSEL              ;DO ALL LINES FOR THIS TEST
 004572  004767  017704                 1$:     JSR     PC,SELINE               ;GO SELECT A LINE NO.
 004576  000415                                 BR      3$                      ;;BR IF DONE ALL SELECTED LINES
 004600  105767  023406                         TSTB    LINE                    ;DOING LINE 00 ?
 004604  001001                                 BNE     2$                      ;BR IF NOT
 004606  005004                                 CLR     R4                      ;INIT TEST DATA

 004610  156711  023376                 2$:     BISB    LINE,(R1)               ;SELECT A LINE
 004614  112761  000000  000016                 MOVB    #0,SSR(R1)              ;SCOPE SYNC
 004622  010412                                 MOV     R4,(R2)                 ;LOAD THE CAR REG.
```

```
004624  062704  010421                          ADD     #10421,R4       ;GENERATE NEW DATA
004630  000760                                  BR      1$              ;GO DO NEXT LINE

004632  004767  017644                  3$:     JSR     PC,SELINE       ;GO SELECT A LINE NO.
004636  000434                                  BR      7$              ;;BR IF CHECKED ALL LINES
004640  105767  023346                          TSTB    LINE            ;DOING LINE 00 ?
004644  001001                                  BNE     4$              ;BR IF NOT
004646  005004                                  CLR     R4              ;INIT S/B DATA

004650  156711  023336                  4$:     BISB    LINE,(R1)       ;SELECT A LINE
004654  112761  000000  000017                  MOVB    #0,SSR+1(R1)    ;SCOPE SYNC
004662  011203                                  MOV     (R2),R3         ;GET CONTENTS OF CAR
004664  020304                                  CMP     R3,R4           ;WAS DATA OK ?
004666  001412                                  BEQ     5$              ;BR IF YES

004670  004767  017454                          JSR     PC,SUER2        ;GO SET UP ERROR INFO
004674  004567  017674                          JSR     R5,SUNUM        ;SET UP LINE NO. IN MSG BUFFER
004700  030212                                  LINE
004702  031045                                  EM7+47
004704  012767  004722  174176                  MOV     #6$,$LPERR      ;SET UP ERROR LOOP RETURN
004712  104007                                  ERROR   7               ;CAR ADDRESSING ERROR

004714  062704  010421                  5$:     ADD     #10421,R4       ;GENERATE NEW S/B DATA
004720  000744                                  BR      3$              ;GO CHECK NEXT LINE

004722  005067  023264                  6$:     CLR     LINE            ;RESTART AT LINE 00 IF LOOPING
004726  000721                                  BR      1$              ;GO RESTART

004730  016767  174264  022244          7$:     MOV     $TMP7,LINSEL    ;RESTORE LINE SELECT PARAMETER
```

```
                                   ;;*********************************************************************
                                   ;*TEST 15         "BCR" MEMORY ADDRESSING TEST
                                   ;;*********************************************************************
004736  000004                     TST15:  SCOPE
                                   .REM    %
                                   TEST ABSTRACT:
                                   ***************

                                           THIS TEST VERIFIES THAT EACH LOCATION IN THE BYTE COUNT
                                   MEMORY CAN BE UNIQUELY ADDRESSED. IT WRITES THE PATTERN SHOWN BELOW
                                   INTO THE MEMORY AND THEN READS BACK EACH LOCATION TO VERIFY THAT IT
                                   WAS WRITTEN CORRECTLY. SINCE THE MEMORY LOGIC IS PARTITIONED INTO
                                   FOUR 16 X 4 READ/WRITE MEMORY CHIPS, THE PATTERN RESULTS IN THE LINE
                                   NUMBER (00 - 17(8)) BEING WRITTEN AS DATA INTO TO EACH LOCATION
                                   (00 - 17(8)) IN EACH CHIP. THAT IS:  LOC00 = 00, LOC 01 = 01,
                                   .......LOC 17 = 17.


                                           MEMORY PATTERN: LOCATION          CONTENTS        (BOTH OCTAL)

                                                           00                000000
                                                           01                010421
                                                           02                021042
                                                           03                031463
                                                           04                042104
                                                           05                052525
                                                           06                063146
                                                           07                073567
                                                           10                104210
                                                           11                114631
                                                           12                125252
                                                           13                135673
                                                           14                146314
                                                           15                156735
                                                           16                167356
                                                           17                177777

                                   ANY ERRORS DETECTED ARE REPORTED AND THEN THE TEST RESUMES CHECKING
                                   THEE NEXT LOCATION IN SEQUENCE UNTIL ALL 16. HAVE BEEN CHECKED.

                                           NOTE:   THIS TEST ALWAYS CHECKS ALL 16. LINES REGARDLESS
                                                   OF HOW THE LINE SELECTION PARAMETER WAS INITIALLY
                                                   SET UP.

                                   ERRORS:
                                   ********

                                   1.) [ERROR  10] IS CALLED TO REPORT ANY LINES (LOCATIONS) THAT FAIL.
                                       THE FAILING LINE # IS INCLUDED AS PART OF THE ERROR HEADER MESSAGE.

                                   SYNC:
                                   ******

                                   1.) WRITE SYNC: M7277   SH4     LOAD SSR LOW BYTE H      CR1
                                   2.) READ SYNC:  M7277   SH4     LOAD SSR HIGH BYTE H     CP2
```

```
                                        DEBUG:
                                        ******

                                        1.) ANALYZE THE ERROR REPORTS CAREFULLY ASKING THE FOLLOWING QUESTIONS:

                                                A. DOES THE FAULT AFFECT ONLY ONE LINE ?
                                                B. DOES THE FAULT AFFECT ONLY ONE 4-BIT DATA GROUP ?
                                                   IE <15:12>, <11:08>, <07:04>, OR <03:00>
                                                C. DOES ANY DATA AT ALL APPEAR TO BE WRITTEN ?

                                        2.) IF "A" IS TRUE THEN SUSPECT AN ADDRESSING PROBLEM IN THE MEMORY
                                            ADDRESS MUX.

                                        3.) IF "B" IS TRUE THEN SUSPECT A DATA MUX, UP-COUNTER, MEMORY,
                                            OR INVERTER CHIP PROBLEM.

                                        4.) IF "C" IS TRUE SUSPECT A MEMORY WRITE TIMING PROBLEM.

                                        5.) IN MOST CASES THE FAULT IS MOST LIKELY THE M7277 OR M7278.

                                        KEY LOGIC:
                                        **********

                                                M7277   SH4     LOAD BC H               FU2
                                                                DATA TO BUS H           EN2
                                                                DATA SOURCE (A,B,C)     DU1,DU2,DT2

                                                        SH5     MEMADD SOURCE SEL H     E55-8
                                                                BC MEM WRITE ENAB L     E57-4
                                                                BUF ADDRS TO BUS H      E33-1 (SHD BE LOW)
                                                M7278   SH3     BITS<15:08>
                                                                74157 INPUT MUX CHIPS E18,E19
                                                                74193 UP COUNTER CHIPS E27,E26
                                                                7489 MEMORY CHIPS E33,E34
                                                                7404 INVERTER CHIPS E41,E42

                                                        SH4     BITS<07:00>
                                                                74157 INPUT MUX CHIPS E16,E17
                                                                74193 UP COUNTER CHIPS E24,E25
                                                                7489 MEMORY CHIPS E31,E32
                                                                7404 INVERTER CHIPS E39,E40

                                                        SH5 THRU SH8    74151 DATA MUX OUTPUT CHIPS (PIN 1 INPUT)

                                        %
 004740 010102                                  MOV     R1,R2                   ;COPY IT IN R2
 004742 062702 000010                           ADD     #BCR,R2                 ;SET UP REGADR IN R2
 004746 016767 022230 174244                    MOV     LINSEL,$TMP7            ;SAVE LINE SELECT PARAMETER
 004754 012767 177777 022220                    MOV     #-1,LINSEL              ;DO ALL LINES FOR THIS TEST
 004762 004767 017514                   1$:     JSR     PC,SELINE               ;GO SELECT A LINE NO.
 004766 000415                                  BR      3$                      ;;BR IF DONE ALL SELECTED LINES
 004770 105767 023216                           TSTB    LINE                    ;DOING LINE 00 ?
 004774 001001                                  BNE     2$                      ;BR IF NOT
 004776 005004                                  CLR     R4                      ;INIT TEST DATA

 005000 156711 023206                   2$:     BISB    LINE,(R1)               ;SELECT A LINE
 005004 112761 000000 000016                    MOVB    #0,SSR(R1)              ;SCOPE SYNC
```

```
005012  010412                            MOV     R4,(R2)          ;LOAD THE BCR REG.
005014  062704  010421                    ADD     #10421,R4        ;GENERATE NEW DATA
005020  000760                            BR      1$               ;GO DO NEXT LINE
005022  004767  017454            3$:     JSR     PC,SELINE        ;GO SELECT A LINE NO.
005026  000434                            BR      7$               ;;BR IF CHECKED ALL LINES
005030  105767  023156                    TSTB    LINE             ;DOING LINE 00 ?
005034  001001                            BNE     4$               ;BR IF NOT
005036  005004                            CLR     R4               ;INIT S/B DATA
005040  156711  023146            4$:     BISB    LINE,(R1)        ;SELECT A LINE
005044  112761  000000  000017            MOVB    #0,SSR+1(R1)     ;SCOPE SYNC
005052  011203                            MOV     (R2),R3          ;GET CONTENTS OF BCR
005054  020304                            CMP     R3,R4            ;WAS DATA OK ?
005056  001412                            BEQ     5$               ;BR IF YES
005060  004767  017264                    JSR     PC,SUER2         ;GO SET UP ERROR INFO
005064  004567  017504                    JSR     R5,SUNUM         ;GO SET UP LINE NO. IN MSG BUFFER
005070  030212                            LINE
005072  031114                            EM10+44
005074  012767  005112  174006            MOV     #6$,$LPERR       ;SET UP ERROR LOOP RETURN
005102  104010                            ERROR   10               ;BCR ADDRESSING ERROR
005104  062704  010421            5$:     ADD     #10421,R4        ;GENERATE NEW S/B DATA
005110  000744                            BR      3$               ;GO CHECK NEXT LINE
005112  005067  023074            6$:     CLR     LINE             ;RESTART AT LINE 00 IF LOOPING
005116  000721                            BR      1$               ;GO RESTART
005120  016767  174074  022054    7$:     MOV     $TMP7,LINSEL     ;RESTORE THE LINE SELECT PARAMETER
```

```
                                        ;;*******************************************************************
                                        ;*TEST 16        "CAR" REGISTER TEST - ALL 1'S / ALL 0'S - ALL LINES
                                        ;;*******************************************************************
005126  000004                          TST16:  SCOPE
                                        .REM    %
                                        TEST ABSTRACT:
                                        **************

                                                THIS TEST VERIFIES THE ABILITY TO SET AND CLEAR ALL BITS IN
                                        ALL THE SELECTED LOCATIONS (LINES) OF THE CURRENT ADDRESS MEMORY.
                                        IT USES THE CONFIGURATION PARAMETER (LINSEL:) TO DEFINE WHICH LINES TO
                                        TEST. THE TEST SEQUENCE IS AS FOLLOWS:

                                                1. SELECT A LINE # TO TEST
                                                2. LOAD THE SELECTED LOCATION WITH 177777
                                                3. READ IT BACK TO VERIFY ALL BITS SET
                                                4. LOAD THE SELECTED LOCATION WITH 000000
                                                5. READ IT BACK TO VERIFY ALL BITS CLEARED
                                                6. REPEAT STEPS 1 THRU 5 UNTIL ALL SELECTED LINES ARE TESTED.

                                        ALL ERRORS ARE REPORTED AND THEN THE TEST RESUMES WITH THE NEXT
                                        LINE # IN SEQUENCE AS DEFINED BY "LINSEL".

                                        ERRORS:
                                        ********

                                        1.) [ERROR  7] IS CALLED TO REPORT ALL DATA COMPARE ERRORS

                                        SYNC:
                                        *****

                                        1.) WRITE 1'S:  M7277   SH4     LOAD SSR LOW BYTE H     CR1

                                        2.) WRITE 0'S:  M7277   SH4     LOAD SSR HIGH BYTE H    CP2

                                        DEBUG:  (REFER TO TEST 14)
                                        ******

                                        KEY LOGIC:      (REFER TO TEST 14)
                                        **********


                                        %
005130  010102                                  MOV     R1,R2           ;COPY IT INTO R2
005132  062702  000006                          ADD     #CAR,R2         ;R2 GETS CAR ADDRESS
005136  004767  017340                  1$:     JSR     PC,SELINE       ;GO SELECT A LINE NO.
005142  000443                                  BR      TST17           ;;BR IF DONE ALL SELECTED LINES
005144  012704  177777                          MOV     #-1,R4          ;RESULT IN CAR S/B = 177777
005150  156711  023036                          BISB    LINE,(R1)       ;SELECT A LINE NO.
005154  004567  017414                          JSR     R5,SUNUM        ;GO SET UP LINE NO. IN MSG BUFFER
005160  030212                                  LINE
005162  031045                                  EM7+47

005164  112761  000000  000016          2$:     MOVB    #0,SSR(R1)      ;SCOPE SYNC
005172  010412                                  MOV     R4,(R2)         ;LOAD A CAR WITH ALL ONES
005174  011203                                  MOV     (R2),R3         ;GET THE WAS DATA FROM THE CAR
005176  020403                                  CMP     R4,R3           ;DID IT CONTAIN ALL ONES ??
```

```
005200  001406                          BEQ     3$              ;;BR IF ALL 1'S

005202  004767  017142                  JSR     PC,SUER2        ;GO SET UP ERROR INFO
005206  012767  005164  173674          MOV     #2$,$LPERR      ;SET UP ERROR LOOP RETURN
005214  104007                          ERROR   7               ;FAILED TO SET ALL 1'S IN SELECTED CAR

005216  005004                  3$:     CLR     R4              ;RESULT IN CAR S/B = 000000
005220  112761  000000  000017          MOVB    #0,SSR+1(R1)    ;SCOPE SYNC
005226  010412                          MOV     R4,(R2)         ;CLEAR SELECTED CAR
005230  011203                          MOV     (R2),R3         ;GET THE WAS DATA
005232  001741                          BEQ     1$              ;BR IF CAR GOT CLEARED

005234  004767  017110                  JSR     PC,SUER2        ;GO SET UP FOR ERROR CALL
005240  012767  005216  173642          MOV     #3$,$LPERR      ;SET UP ERROR LOOP RETURN
005246  104007                          ERROR   7               ;FAILED TO CLR ALL BITS IN SELECTED CAR
005250  000732                          BR      1$              ;GO TEST NEXT LINE
```

```
                                        ;;***************************************************************
                                        ;*TEST 17        "BCR" REGISTER TEST - ALL 1'S / ALL 0'S - ALL LINES
                                        ;;***************************************************************
005252  000004                          TST17:  SCOPE
                                        .REM    %
                                        TEST ABSTRACT:
                                        **************

                                                THIS TEST VERIFIES THE ABILITY TO SET AND CLEAR ALL BITS IN
                                        ALL THE SELECTED LOCATIONS (LINES) OF THE BYTE COUNT MEMORY.
                                        IT USES THE CONFIGURATION PARAMETER (LINSEL:) TO DEFINE WHICH LINES TO
                                        TEST. THE TEST SEQUENCE IS AS FOLLOWS:

                                                1. SELECT A LINE # TO TEST
                                                2. LOAD THE SELECTED LOCATION WITH 177777
                                                3. READ IT BACK TO VERIFY ALL BITS SET
                                                4. LOAD THE SELECTED LOCATION WITH 000000
                                                5. READ IT BACK TO VERIFY ALL BITS CLEARED
                                                6. REPEAT STEPS 1 THRU 5 UNTIL ALL SELECTED LINES ARE TESTED.

                                        ALL ERRORS ARE REPORTED AND THEN THE TEST RESUMES WITH THE NEXT
                                        LINE # IN SEQUENCE AS DEFINED BY "LINSEL".

                                        ERRORS:
                                        ********

                                        1.) [ERROR  10] IS CALLED TO REPORT ALL DATA COMPARE ERRORS

                                        SYNC:
                                        *****

                                        1.) WRITE 1'S:  M7277   SH4     LOAD SSR LOW BYTE H     CR1

                                        2.) WRITE 0'S:  M7277   SH4     LOAD SSR HIGH BYTE H    CP2

                                        DEBUG:  (REFER TO TEST 15)
                                        ******

                                        KEY LOGIC:      (REFER TO TEST 15)
                                        **********

                                        %
005254  010102                                  MOV     R1,R2           ;COPY IT INTO R2
005256  062702  000010                          ADD     #BCR,R2         ;R2 GETS BCR ADDRESS
005262  004767  017214                  1$:     JSR     PC,SELINE       ;GO SELECT A LINE NO.
005266  000443                                  BR      TST20           ;;BR IF DONE ALL SELECTED LINES
005270  012704  177777                          MOV     #-1,R4          ;RESULT IN BCR S/B = 177777
005274  156711  022712                          BISB    LINE,(R1)       ;SELECT A LINE NO.
005300  004567  017270                          JSR     R5,SUNUM        ;GO SET UP LINE NO. IN MSG BUFFER
005304  030212                                  LINE
005306  031114                                  EM10+44

005310  112761  000000  000016          2$:     MOVB    #0,SSR(R1)      ;SCOPE SYNC
005316  010412                                  MOV     R4,(R2)         ;LOAD A BCR WITH ALL ONES
005320  011203                                  MOV     (R2),R3         ;GET THE WAS DATA FROM THE BCR
005322  020403                                  CMP     R4,R3           ;DID IT CONTAIN ALL ONES ??
```

```
005324  001406                          BEQ     3$              ;;BR IF ALL 1'S

005326  004767  017016                  JSR     PC,SUER2        ;GO SET UP ERROR INFO
005332  012767  005310  173550          MOV     #2$,$LPERR      ;SET UP ERROR LOOP RETURN
005340  104010                          ERROR   10              ;FAILED TO SET ALL 1'S IN SELECTED BCR

005342  005004                  3$:     CLR     R4              ;RESULT IN BCR S/B = 000000
005344  112761  000000  000017          MOVB    #0,SSR+1(R1)    ;SCOPE SYNC
005352  010412                          MOV     R4,(R2)         ;CLEAR SELECTED BCR
005354  011203                          MOV     (R2),R3         ;GET THE WAS DATA
005356  001741                          BEQ     1$              ;BR IF BCR GOT CLEARED

005360  004767  016764                  JSR     PC,SUER2        ;GO SET UP FOR ERROR CALL
005364  012767  005342  173516          MOV     #3$,$LPERR      ;SET UP ERROR LOOP RETURN
005372  104010                          ERROR   10              ;FAILED TO CLR ALL BITS IN SELECTED BCR
005374  000732                          BR      1$              ;GO TEST NEXT LINE
```

```
                                        ;;*****************************************************************
                                        ;*TEST 20        "CAR" MEMORY PATTERNS TEST / 0'S DISTURB
                                        ;;*****************************************************************
005376  000004                          TST20:  SCOPE
                                        .REM    %
                                        TEST ABSTRACT:
                                        **************

                                                THIS TEST VERIFIES THAT WHEN A TEST PATTERN IS WRITTEN INTO
                                        LOCATION "N" OF THE "CAR" MEMORY, IT DOES NOT DISTURB ANY BITS IN
                                        ANY OTHER LOCATIONS. THERE ARE THREE TEST PATTERNS USED* (177777,
                                        125252, 052525) FOR EACH LOCATION SELECTED BY THE CONFIGURATION PAR-
                                        AMETER "LINSEL". THE TEST SEQUENCE IS AS FOLLOWS:

                                                1. SELECT A TEST PATTERN
                                                2. SELECT A LINE # TO TEST
                                                3. CLEAR ALL 16. LOCATIONS IN THE MEMORY
                                                4. WRITE THE TEST PATTERN INTO THE SELECTED LOCATION
                                                5. VERIFY THAT THE PATTERN WAS WRITTEN CORRECTLY AND THAT
                                                   NO OTHER LOCATIONS WERE DISTURBED.
                                                6. REPEAT 2 THRU 5 UNTIL ALL SELECTED LINES TESTED
                                                7. REPEAT 1 THRU 6 UNTIL ALL THREE PATTERNS TESTED

                                        ALL ERRORS ARE REPORTED AND THEN THE TEST RESUMES WITH CHECKING THE
                                        NEXT LINE IN SEQUENCE.

                                        ERRORS:
                                        *******

                                        1.) [ERROR  46] IS CALLED TO REPORT ANY ERROR DETECTED. THE INFORM-
                                            ATION PRINTED INCLUDES THE LINE # WRITTEN, THE LINE # BEING CHECKED,
                                            AND THE PATTERN USED.

                                        SYNC*
                                        ******

                                        1.) WRITE LINE: M7277   SH4     LOAD SSR LOW BYTE H     CR1

                                        2.) READ CHECK: M7277   SH4     LOAD SSR HIGH BYTE H    CP2

                                        DEBUG:  (REFER TO TEST 14)
                                        ******

                                        KEY LOGIC:      (REFER TO TEST 14)
                                        **********
                                        %
005400  010102                                  MOV     R1,R2           ;SET UP REGADR
005402  062702  000006                          ADD     #CAR,R2
005406  012705  027220                          MOV     #PATRNA,R5      ;SET UP POINTER TO DATA PATTERNS
005412  012567  173566                  1$:     MOV     (R5)+,$TMP1     ;GET A DATA TEST PATTERN
005416  001472                                  BEQ     TST21           ;;BR IF DONE THREE PATTERNS
005420  004767  017056                  11$:    JSR     PC,SELINE       ;GO SELECT A LINE TO TEST
005424  000772                                  BR      1$              ;BR IF DONE ALL SELECTED LINES
005426  116767  022560  022560                  MOVB    LINE,LINEA      ;SAVE THE LINE NO. FOR ERROR LOOPING

005434  105067  173550                  2$:     CLRB    $TMP3           ;INIT LINE COUNTER
```

```
005440  116711  173544                  3$:     MOVB    $TMP3,(R1)              ;SELECT A LINE TO CLEAR
005444  005012                                  CLR     (R2)                    ;CLR CAR FOR THAT LINE
005446  105267  173536                          INCB    $TMP3                   ;GENERATE NEW LINE NO.
005452  126727  173532  000020                  CMPB    $TMP3,#20               ;DONE CLEARING ALL LINES ?
005460  001367                                  BNE     3$                      ;BR IF NOT

005462  116711  022526                          MOVB    LINEA,(R1)              ;SET LINE SELECT BITS
005466  112761  000000  000016                  MOVB    #0,SSR(R1)              ;SCOPE SYNC
005474  016712  173504                          MOV     $TMP1,(R2)              ;LOAD CAR WITH TEST PATTERN

005500  105067  173502                          CLRB    $TMP2                   ;INIT A LINE COUNTER
005504  016704  173474                  4$:     MOV     $TMP1,R4                ;SET UP S/B DATA
005510  116711  173472                          MOVB    $TMP2,(R1)              ;SET LINE SELECT IN SCR
005514  112761  000000  000017                  MOVB    #0,SSR+1(R1)            ;SCOPE SYNC
005522  011203                                  MOV     (R2),R3                 ;GET WAS DATA
005524  126767  173456  022460                  CMPB    $TMP2,LINE              ;IS THIS THE LINE WITH THE TEST PATTERN
005532  001401                                  BEQ     5$                      ;BR IF IT IS
005534  005004                                  CLR     R4                      ;MAKE S/B DATA = 000000
005536  020304                          5$:     CMP     R3,R4                   ;CORRECT DATA IN CAR ?
005540  001412                                  BEQ     6$                      ;BR IF YES

005542  004767  016670                          JSR     PC,SUER4                ;GO SET UP ERROR IN F0
005546  004567  017022                          JSR     R5,SUNUM                ;GO SET UP LINE NO. IN MSG BUFFER
005552  001206                                  $TMP2
005554  033666                                  EM46+63
005556  012767  005434  173324                  MOV     #2$,$LPERR              ;SET UP ERROR LOOP RETURN
005564  104046                                  ERROR   46                      ;INCORRECT DATA READ FROM CAR

005566  105267  173414                  6$:     INCB    $TMP2                   ;GENERATE NEXT LINE NO.
005572  122767  000020  173406                  CMPB    #20,$TMP2               ;DONE ALL LINES ?
005600  001707                                  BEQ     11$                     ;BR IF YES
005602  000740                                  BR      4$                      ;GO CHECK NEXT LINE
```

```
                                ;;*********************************************************************
                                ;*TEST 21        "BCR" MEMORY PATTERNS TEST / 0'S DISTURB
                                ;;*********************************************************************
005604  000004                  TST21:  SCOPE
                                .REM    %
                                TEST ABSTRACT:
                                ***************

                                        THIS TEST VERIFIES THAT WHEN A TEST PATTERN IS WRITTEN INTO
                                LOCATION "N" OF THE "BCR" MEMORY, IT DOES NOT DISTURB ANY BITS IN
                                ANY OTHER LOCATIONS. THERE ARE THREE TEST PATTERNS USED* (177777,
                                125252, 052525) FOR EACH LOCATION SELECTED BY THE CONFIGURATION PAR-
                                AMETER "LINSEL". THE TEST SEQUENCE IS AS FOLLOWS:

                                        1. SELECT A TEST PATTERN
                                        2. SELECT A LINE # TO TEST
                                        3. CLEAR ALL 16. LOCATIONS IN THE MEMORY
                                        4. WRITE THE TEST PATTERN INTO THE SELECTED LOCATION
                                        5. VERIFY THAT THE PATTERN WAS WRITTEN CORRECTLY AND THAT
                                           NO OTHER LOCATIONS WERE DISTURBED.
                                        6. REPEAT 2 THRU 5 UNTIL ALL SELECTED LINES TESTED
                                        7. REPEAT 1 THRU 6 UNTIL ALL THREE PATTERNS TESTED

                                ALL ERRORS ARE REPORTED AND THEN THE TEST RESUMES WITH CHECKING THE
                                NEXT LINE IN SEQUENCE.

                                ERRORS:
                                *******

                                1.) [ERROR  47] IS CALLED TO REPORT ANY ERROR DETECTED. THE INFORM-
                                    ATION PRINTED INCLUDES THE LINE # WRITTEN, THE LINE # BEING CHECKED,
                                    AND THE PATTERN USED.

                                SYNC*
                                ******

                                1.) WRITE LINE: M7277   SH4     LOAD SSR LOW BYTE H     CR1

                                2.) READ CHECK: M7277   SH4     LOAD SSR HIGH BYTE H    CP2

                                DEBUG:  (REFER TO TEST 15)
                                ******

                                KEY LOGIC:      (REFER TO TEST 15)
                                **********
                                %
005606  010102                          MOV     R1,R2           ;SET UP REGADR
005610  062702  000010                  ADD     #BCR,R2
005614  012705  027220                  MOV     #PATRNA,R5      ;SET UP POINTER TO DATA PATTERNS
005620  012567  173360          1$:     MOV     (R5)+,$TMP1     ;GET A DATA TEST PATTERN
005624  001472                          BEQ     TST22           ;;BR IF DONE THREE PATTERNS
005626  004767  016650          11$:    JSR     PC,SELINE       ;GO SELECT A LINE TO TEST
005632  000772                          BR      1$              ;BR IF SELECTED ALL LINES
005634  116767  022352  022352          MOVB    LINE,LINEA      ;SAVE THE LINE NO. FOR ERROR LOOP

005642  105067  173342          2$:     CLRB    $TMP3           ;INIT LINE COUNTER
```

```
005646  116711  173336            3$:     MOVB    $TMP3,(R1)         ;SELECT A LINE TO CLEAR
005652  005012                            CLR     (R2)               ;CLR BCR FOR THAT LINE
005654  105267  173330                    INCB    $TMP3              ;GENERATE NEW LINE NO.
005660  126727  173324  000020            CMPB    $TMP3,#20          ;DONE CLEARING ALL LINES ?
005666  001367                            BNE     3$                 ;BR IF NOT

005670  116711  022320                    MOVB    LINEA,(R1)         ;SET LINE SELECT BITS
005674  112761  000000  000016            MOVB    #0,SSR(R1)         ;SCOPE SYNC
005702  016712  173276                    MOV     $TMP1,(R2)         ;LOAD BCR WITH TEST PATTERN

005706  105067  173274                    CLRB    $TMP2              ;INIT A LINE COUNTER
005712  016704  173266            4$:     MOV     $TMP1,R4           ;SET UP S/B DATA
005716  116711  173264                    MOVB    $TMP2,(R1)         ;SELECT A LINE TO CHECK
005722  112761  000000  000017            MOVB    #0,SSR+1(R1)       ;SCOPE SYNC
005730  011203                            MOV     (R2),R3            ;GET WAS DATA
005732  126767  173250  022252            CMPB    $TMP2,LINE         ;IS THIS THE LINE WITH THE TEST PATTERN
005740  001401                            BEQ     5$                 ;BR IF IT IS
005742  005004                            CLR     R4                 ;MAKE S/B DATA = 000000
005744  020304                    5$:     CMP     R3,R4              ;CORRECT DATA IN BCR ?
005746  001412                            BEQ     6$                 ;BR IF YES

005750  004767  016462                    JSR     PC,SUER4           ;GO SET UP ERROR IN FO
005754  004567  016614                    JSR     R5,SUNUM           ;GO SET UP LINE NO.IN MSG BUFFER
005760  001206                            $TMP2
005762  034066                            EM47+56
005764  012767  005642  173116            MOV     #2$,$LPERR         ;SET UP ERROR LOOP RETURN
005772  104047                            ERROR   47                 ;INCORRECT DATA READ FROM BCR

005774  105267  173206            6$:     INCB    $TMP2              ;GENERATE NEXT LINE NO.
006000  122767  000020  173200            CMPB    #20,$TMP2          ;DONE ALL LINES ?
006006  001707                            BEQ     11$                ;BR IF YES
006010  000740                            BR      4$                 ;GO CHECK NEXT LINE
```

```
                                        ;;*************************************************************
                                        ;*TEST 22        "CAR" MEMORY PATTERNS TEST / 1'S DISTURB
                                        ;;*************************************************************
006012  000004                          TST22:  SCOPE
                                        .REM    %
                                        TEST ABSTRACT:
                                        ***************

                                                THIS TEST VERIFIES THAT WHEN ALL ZEROS ARE WRITTEN INTO LINE "N"
                                        IN THE "CAR" MEMORY, IT DOES NOT CLEAR ANY BITS IN ANY OTHER LOCATIONS.
                                        ONLY THE LINES SELECTED BY "LINSEL" ARE TESTED. THE TEST SEQUENCE IS
                                        AS FOLLOWS:

                                                1. SELECT A LINE TO TEST
                                                2. SET ALL ONES (177777) INTO ALL MEMORY LOCATIONS
                                                3. CLEAR THE SELECTED LINE
                                                4. VERIFY THAT ONLY THE SELECTED LINE WAS CLEARED
                                                   AND ALL OTHER LINES STILL CONTAIN 177777
                                                5. REPEAT STEPS 1 THRU 4 UNTIL ALL SELECTED LINES ARE TESTED

                                        ALL ERRORS ARE REPORTED AND THEN THE TEST RESUMES CHECKING THE NEXT
                                        LINE IN SEQUENCE.

                                        ERRORS:
                                        *******

                                        1.) [ERROR  46] IS CALLED TO REPORT ALL ERRORS. THE INFORMATION PRINTED
                                            INCLUDES THE LINE # WRITTEN, THE LINE # BEING CHECKED, AND THE
                                            PATTERN USED.

                                        SYNC:
                                        *****

                                        1.) WRITE LINE: M7277   SH4     LOAD SSR LOW BYTE H     CR1

                                        2.) CHECK LINE: M7277   SH4     LOAD SSR HIGH BYTE H    CP2

                                        DEBUG:  (REFER TO TEST 14)
                                        ******

                                        KEY LOGIC:      (REFER TO TEST 14)
                                        **********
                                        %
006014  010102                                  MOV     R1,R2           ;SET UP REGADR
006016  062702  000006                          ADD     #CAR,R2
006022  012705  177777                          MOV     #-1,R5          ;TEST PATERRN IN R5 = 177777
006026  010567  173152                          MOV     R5,$TMP1        ;SAVE FOR ERROR REPORTING
006032  004767  016444                  1$:     JSR     PC,SELINE       ;GO SELECT A LINE TO TEST
006036  000465                                  BR      TST23           ;;BR IF DONE ALL LINES
006040  116767  022146  022146                  MOVB    LINE,LINEA      ;SAVE THE LINE NO. FOR ERROR LOOP

006046  105067  173136                  2$:     CLRB    $TMP3           ;INIT LINE COUNTER
006052  116711  173132                  3$:     MOVB    $TMP3,(R1)      ;SELECT A LINE TO CLEAR
006056  010512                                  MOV     R5,(R2)         ;LOAD CAR WITH 177777
006060  105267  173124                          INCB    $TMP3           ;GENERATE NEW LINE NO.
006064  126727  173120  000020                  CMPB    $TMP3,#20       ;DONE SETTING ALL LINES TO 177777 ?
```

```
006072 001367                          BNE    3$              ;BR IF NOT
006074 116711 022114                   MOVB   LINEA,(R1)      ;SET LINE SELECT IN SCR
006100 112761 000000 000016            MOVB   #0,SSR(R1)      ;SCOPE SYNC
006106 005012                          CLR    (R2)            ;CLEAR THE CAR UNDER TEST
006110 105067 173072                   CLRB   $TMP2           ;INIT A LINE COUNTER
006114 005004                    4$:   CLR    R4              ;MAKE S/B DATA = 000000
006116 116711 173064                   MOVB   $TMP2,(R1)      ;SELECT A LINE TO CHECK
006122 112761 000000 000017            MOVB   #0,SSR+1(R1)    ;SCOPE SYNC
006130 011203                          MOV    (R2),R3         ;GET WAS DATA
006132 126767 173050 022052            CMPB   $TMP2,LINE      ;IS THIS THE LINE WITH THE TEST PATTERN
006140 001401                          BEQ    5$              ;BR IF IT IS
006142 010504                          MOV    R5,R4           ;MAKE S/B DATA = 177777
006144 020304                    5$:   CMP    R3,R4           ;CORRECT DATA IN CAR ?
006146 001412                          BEQ    6$              ;BR IF YES
006150 004767 016262                   JSR    PC,SUER4        ;GO SET UP ERROR IN FO
006154 004567 016414                   JSR    R5,SUNUM        ;GO SET UP LINE NO. IN MSG BUFFER
006160 001206                          $TMP2
006162 033666                          EM46+63
006164 012767 006046 172716            MOV    #2$,$LPERR      ;SET UP ERROR LOOP RETURN
006172 104046                          ERROR  46              ;INCORRECT DATA READ FROM CAR
006174 105267 173006             6$:   INCB   $TMP2           ;GENERATE NEXT LINE NO.
006200 122767 000020 173000            CMPB   #20,$TMP2       ;DONE ALL LINES ?
006206 001711                          BEQ    1$              ;BR IF YES
006210 000741                          BR     4$              ;GO CHECK NEXT LINE
```

```
                                ;;*************************************************************
                                ;*TEST 23        "BCR" MEMORY PATTERNS TEST / 1'S DISTURB
                                ;;*************************************************************
006212  000004                  TST23:  SCOPE
                                .REM    %
                                TEST ABSTRACT:
                                ***************

                                        THIS TEST VERIFIES THAT WHEN ALL ZEROS ARE WRITTEN INTO LINE "N"
                                IN THE "BCR" MEMORY, IT DOES NOT CLEAR ANY BITS IN ANY OTHER LOCATIONS.
                                ONLY THE LINES SELECTED BY "LINSEL" ARE TESTED. THE TEST SEQUENCE IS
                                AS FOLLOWS:

                                        1. SELECT A LINE TO TEST
                                        2. SET ALL ONES (177777) INTO ALL MEMORY LOCATIONS
                                        3. CLEAR THE SELECTED LINE
                                        4. VERIFY THAT ONLY THE SELECTED LINE WAS CLEARED
                                           AND ALL OTHER LINES STILL CONTAIN 177777
                                        5. REPEAT STEPS 1 THRU 4 UNTIL ALL SELECTED LINES ARE TESTED

                                ALL ERRORS ARE REPORTED AND THEN THE TEST RESUMES CHECKING THE NEXT
                                LINE IN SEQUENCE.

                                ERRORS:
                                *******

                                1.) [ERROR  47] IS CALLED TO REPORT ALL ERRORS. THE INFORMATION PRINTED
                                    INCLUDES THE LINE # WRITTEN, THE LINE # BEING CHECKED, AND THE
                                    PATTERN USED.

                                SYNC:
                                *****

                                1.) WRITE LINE: M7277   SH4    LOAD SSR LOW BYTE H     CR1

                                2.) CHECK LINE: M7277   SH4    LOAD SSR HIGH BYTE H    CP2

                                DEBUG:  (REFER TO TEST 15)
                                ******

                                KEY LOGIC:      (REFER TO TEST 15)
                                **********
                                %
006214  010102                          MOV     R1,R2           ;SET UP REGADR
006216  062702  000010                  ADD     #BCR,R2
006222  012705  177777                  MOV     #-1,R5          ;TEST PATERRN IN R5 = 177777
006226  010567  172752                  MOV     R5,$TMP1        ;SAVE IT FOR ERROR REPORTING
006232  004767  016244          1$:     JSR     PC,SELINE       ;GO SELECT A LINE TO TEST
006236  000465                          BR      TST24           ;;BR IF DONE ALL LINES
006240  116767  021746  021746          MOVB    LINE,LINEA      ;SAVE THE LINE NO.

006246  105067  172736          2$:     CLRB    $TMP3           ;INIT LINE COUNTER
006252  116711  172732          3$:     MOVB    $TMP3,(R1)      ;SELECT A LINE TO INIT
006256  010512                          MOV     R5,(R2)         ;LOAD BCR WITH 177777
006260  105267  172724                  INCB    $TMP3           ;GENERATE NEW LINE NO.
006264  126727  172720  000020          CMPB    $TMP3,#20       ;DONE SETTING ALL LINES TO 177777 ?
```

```
006272  001367                          BNE     3$              ;BR IF NOT

006274  116711  021714                  MOVB    LINEA,(R1)      ;SET LINE SELECT BITS
006300  112761  000000  000016          MOVB    #0,SSR(R1)      ;SCOPE SYNC
006306  005012                          CLR     (R2)            ;CLEAR THE BCR UNDER TEST

006310  105067  172672                  CLRB    $TMP2           ;INIT A LINE COUNTER
006314  005004                  4$:     CLR     R4              ;MAKE S/B DATA = 000000
006316  116711  172664                  MOVB    $TMP2,(R1)      ;SELECT A LINE TO CHECK
006322  112761  000000  000017          MOVB    #0,SSR+1(R1)    ;SCOPE SYNC
006330  011203                          MOV     (R2),R3         ;GET WAS DATA
006332  126767  172650  021652          CMPB    $TMP2,LINE      ;IS THIS THE LINE WITH THE TEST PATTERN
006340  001401                          BEQ     5$              ;BR IF IT IS
006342  010504                          MOV     R5,R4           ;MAKE S/B DATA = 177777
006344  020304                  5$:     CMP     R3,R4           ;CORRECT DATA IN BCR ?
006346  001412                          BEQ     6$              ;BR IF YES

006350  004767  016062                  JSR     PC,SUER4        ;GO SET UP ERROR IN FO
006354  004567  016214                  JSR     R5,SUNUM        ;GO SET UP LINE NO. IN MSG BUFFER
006360  001206                          $TMP2
006362  034066                          EM47+56
006364  012767  006246  172516          MOV     #2$,$LPERR      ;SET UP ERROR LOOP RETURN
006372  104047                          ERROR   47              ;INCORRECT DATA READ FROM BCR

006374  105267  172606          6$:     INCB    $TMP2           ;GENERATE NEXT LINE NO.
006400  122767  000020  172600          CMPB    #20,$TMP2       ;DONE ALL LINES ?
006406  001711                          BEQ     1$              ;BR IF YES
006410  000741                          BR      4$              ;GO CHECK NEXT LINE
```

```
                                ;;*************************************************************
                                ;*TEST 24        TEST THAT "CAR" MEMORY EXT BITS SET/CLR PROPERLY
                                ;;*************************************************************
006412  000004                  TST24:  SCOPE
                                .REM    %
                                TEST ABSTRACT:
                                **************

                                        THIS TEST VERIFIES THAT THE "EXT MEM" BITS (CAR<17:16> CAN
                                BE SET AND CLEARED IN ALL "CAR" MEMORY LOCATIONS. IT WRITES THE
                                BINARY TEST PATTERNS (11, 01, AND 10) INTO BITS<17:16> TO CHECK
                                EVERY MEMORY LOCATION. THE TEST SEQUENCE IS AS FOLLOWS:

                                        1. SELECT A TEST PATTERN TO USE
                                        2. CLEAR ALL 18 BITS IN ALL 16 LOCATIONS
                                        3. SELECT A LINE TO TEST
                                        4. WRITE THE TEST PATTERN INTO <17:16> OF THE
                                           SELECTED LOCATION
                                        5. READ CHECK ALL LOCATIONS TO VERIFY THAT ONLY THE
                                           SELECTED LOCATION CONTAINS THE PATTERN
                                        6. REPEAT STEPS 3 THRU 5 UNTIL ALL SELECTED LINES TESTED
                                        7. REPEAT STEPS 1 THRU 6 UNTIL ALL PATTERNS USED

                                ALL ERRORS ARE REPORTED AND THEN THE TEST RESUMES CHECKING THE NEXT
                                LINE IN SEQUENCE.

                                        NOTES:  1.) BITS<05:04> IN THE "SCR" ARE USED TO WRITE THE
                                                    EXT MEM BITS
                                                2.) BITS<07:06> IN THE "SSR" ARE USED TO CHECK BITS<17:16>

                                ERRORS:
                                *******

                                1.) [ERROR  7] IS CALLED TO REPORT ALL ERRORS

                                SYNC:
                                ******

                                1.) WRITE CAR:  M7277   SH4     LOAD LPR H      EP2

                                2.) READ CAR:   M7277   SH4     LOAD BCR H      FU2

                                DEBUG:
                                ******

                                1.) ASSUMING THAT THE PREVIOUS "CAR" MEMORY TESTS RAN ERROR FREE, THE
                                    PROBLEM IS EITHER THE M7277 OR THE M7278
                                2.) SET UP SCOPE ERROR LOOP AND START BACKTRACKING THROUGH THE LOGIC
                                    STARTING WITH THE KEY SIGNALS BELOW.

                                KEY LOGIC:
                                **********

                                        M7277   SH5     SCR05 H         CD2
                                                        SCR04 H         CE1
                                                        SSR07 H         CF1
```

```
                                                SSR06 H         CH1

                                M7278   SH7     74151 MUX CHIPS E66 AND E58 (INPUT PIN 12)

                                NOTE:   THER MAY BE A PRINT ERROR ON SH7 OF THE M7278. THE
                                        SIGNALS INTO THE MUX CHIPS E66 AND E58 COME FROM THE
                                        M7277 SH5 RATHER FROM M7279 SH3.

                          %
006414  010102                          MOV     R1,R2           ;SET UP REGADR
006416  062702  000016                  ADD     #SSR,R2
006422  012705  027230                  MOV     #PATRNB,R5      ;SET UP POINTER TO DATA PATTERNS
006426  012567  172552          1$:     MOV     (R5)+,$TMP1     ;GET THE PATTERNS
006432  012567  172550                  MOV     (R5)+,$TMP2
006436  001505                          BEQ     TST25           ;;BR IF DONE ALL PATTERNS

006440  105067  172544          2$:     CLRB    $TMP3           ;INIT A LINE COUNTER
006444  142711  000017          3$:     BICB    #17,(R1)        ;INIT LINE SELECT BITS IN "SCR"
006450  156711  172534                  BISB    $TMP3,(R1)      ;SELECT A LINE IN SCR
006454  142711  000060                  BICB    #60,(R1)        ;SO WE CLEAR ALL THE MEM EXT BITS
006460  005061  000006                  CLR     CAR(R1) ;CLEAR A CAR
006464  105267  172520                  INCB    $TMP3           ;GENERATE NXT LINE NO.
006470  122767  000020  172512          CMPB    #20,$TMP3       ;CLEARED THE WHOLE THING ?
006476  001362                          BNE     3$              ;BR IF NOT

006500  004767  015776          4$:     JSR     PC,SELINE       ;GO SELECT A LINE NO.
006504  000750                          BR      1$              ;BR IF DONE ALL LINES
006506  156711  021500                  BISB    LINE,(R1)       ;SET UP LINE SELECT BITS
006512  156711  172466                  BISB    $TMP1,(R1)      ;SET UP MEM EXT BIT PATTERN
006516  012761  000000  000004          MOV     #0,LPR(R1)      ;SCOPE SYNC
006524  012761  000000  000006          MOV     #0,CAR(R1)      ;WRITE EXT BITS IN THIS LOCATION

006532  105067  172454                  CLRB    $TMP4           ;INIT A LINE COUNTER
006536  016704  172444          5$:     MOV     $TMP2,R4        ;SET UP S/B DATA
006542  142711  000017                  BICB    #17,(R1)        ;INIT SELECT BITS IN "SCR"
006546  156711  172440                  BISB    $TMP4,(R1)      ;SET SELECT BITS IN SCR
006552  012761  000000  000014          MOV     #0,BKR(R1)      ;SCOPE SYNC
006560  016103  000006                  MOV     CAR(R1),R3      ;READ THE SELECTED "CAR"
006564  011203                          MOV     (R2),R3         ;GET THE WAS DATA
006566  042703  177477                  BIC     #177477,R3      ;CLEAR JUNK BITS
006572  126767  021414  172412          CMPB    LINE,$TMP4      ;LINE UNDER TEST ??
006600  001401                          BEQ     6$              ;BR IF YES
006602  005004                          CLR     R4              ;MAKE S/B DATA = 000000
006604  020304                  6$:     CMP     R3,R4           ;WERE MEM EXT BITS CORRECT ?
006606  001412                          BEQ     7$              ;BR IF YES

006610  004767  015534                  JSR     PC,SUER2        ;GO SET UP ERROR INFO
006614  004567  015754                  JSR     R5,SUNUM        ;GO SET LINE NO. IN MSG BUFFER
006620  001212                          $TMP4
006622  031045                          EM7+47
006624  012767  006440  172256          MOV     #2$,$LPERR      ;SET UP ERROR LOOP RETURN
006632  104007                          ERROR   7               ;MEM EXT BITS READ INCORRECTLY

006634  105267  172352          7$:     INCB    $TMP4           ;GENERATE NXT LINE NO.
006640  122767  000020  172344          CMPB    #20,$TMP4       ;DONE ALL LINES
006646  001674                          BEQ     2$              ;BR IF YES
```

```
 2536  006650  000732                    BR      5$              ;GO CHECK NEXT LINE
```

```
                                        ;;*****************************************************************
                                        ;*TEST 25        TEST INTR. ENAB. BITS - INTR. CONDITION DISABLED
                                        ;;*****************************************************************
006652  000004                          TST25:  SCOPE
                                        .REM    %
                                        TEST ABSTRACT:
                                        **************

                                                THIS TEST VERIFIES THAT NO TRANSMITTER OR RECEIVER INTERRUPT
                                        OCCURS WHEN THE ENABLE BIT IS SET WITH OUT THE INTERRUPTING CONDITION
                                        ACTIVE. A BIT MASK (INTMSK:  030100) IS UESED TO DEFINE THE I.E. BITS.
                                        IN THE "SCR" (BITS 13, 12, AND 06). THE TEST SEQUENCE IS AS
                                        FOLLOWS:

                                                1. SET UP THE XMIT AND RCVR VECTORS
                                                2. SELECT AN I.E. BIT TO TEST
                                                3. INIT THE SP AND LOCK OUT INTERRUPTS
                                                4. SET THE SELECTED BIT IN THE "SCR"
                                                5. CLEAR THE PSW TO ALLOW INTRS
                                                6. IF NO INTR:  REPEAT 2 THRU 5 UNTIL ALL BITS TESTED
                                                7. IF INTR:     REPORT ERROR AND CONTINUE WITH NEXT BIT TO TEST

                                        ALL ERRORS ARE REPORTED AND THEN THE TEST RESUMES WITH THE NEXT BIT
                                        IN SEQUENCE .

                                        ERRORS:
                                        *******

                                        1.) [ERROR  11] IS CALLED TO REPORT RCVR INTR FAULTS

                                        2.) [ERROR  12] IS CALLED TO REPORT XMITTR INTR FAULTS

                                        SYNC:   M7277   SH3     INIT A H        EF2
                                        *****

                                        DEBUG:
                                        ******

                                        1.) PROBLEM IS MOST LIKELY THE M7289 MODULE IF THIS IS THE
                                            FIRST TEST TO FAIL.
                                        2.) SET UP SCOPE ERROR LOOP AND BACKTRACK THROUGH THE LOGIC
                                            STARTING WITH THE KEY LOGIC BELOW.

                                        KEY LOGIC:
                                        ***********

                                                M7289   SH6     XMIT INT REQ H  FM1
                                                                RCV INT REQ H   DP1
                                        %
006654  012767  006732  172226                  MOV     #3$,$LPERR      ;SET UP THE ERROR LOOP RETURN
006662  010102                                  MOV     R1,R2           ;MAKE IT REGADR TOO
006664  016703  020304                          MOV     DHVCT,R3        ;GET FIRST VECTOR ADDRESS
006670  012723  006762                          MOV     #4$,(R3)+       ;GO TO 3$ IF RCVR INTRS
006674  116723  021306                          MOVB    DHRLVL,(R3)+
006700  105723                                  TSTB    (R3)+           ;UPDATE POINTER
006702  012723  007004                          MOV     #5$,(R3)+       ;GO TO 5$ IF XMITTR INTRS
```

```
006706  116713  021275          MOVB    DHTLVL,(R3)
006712  012705  000001          MOV     #1,R5           ;INIT BIT TEST MARKER
006716  030567  020644  1$:     BIT     R5,INTMSK       ;TEST THIS BIT ??
006722  001003                  BNE     3$              ;BR IF YES
006724  006305          2$:     ASL     R5              ;SHIFT THE MARKER
006726  001437                  BEQ     6$              ;BR IF TESTED ALL REQUIRED BITS
006730  000772                  BR      1$              ;GO TEST FOR THIS ONE

006732  012706  001100  3$:     MOV     #STACK,SP       ;RESET SP FOR ERROR LOOPING
006736  004767  020150          JSR     PC,CHPS2        ;GO LOCK OUT INTRS
006742  012711  004000          MOV     #BIT11,(R1)     ;CLEAR THE DH11 INTERFACE
006746  010504                  MOV     R5,R4           ;SET UP S/B DATA
006750  050511                  BIS     R5,(R1)         ;SET THE TEST I.E. BIT
006752  004767  020120          JSR     PC,CHPS1        ;GO CLEAR PSW
006756  000240                  NOP                     ;WAIT A BIT TO ALLOW INTR
006760  000761                  BR      2$              ;OK - GO DO NEXT I.E. BIT

006762  004767  020140  4$:     JSR     PC,SAPS         ;SAVE THE ERROR PSW
006766  011103                  MOV     (R1),R3         ;GET THE WAS DATA
006770  004767  015360          JSR     PC,SUER2A       ;GO SET UP ERROR INFO
006774  104011                  ERROR   11              ;DH11 RCVR SHOULD NOT HAVE INTERRUPTED
006776  012716  006724          MOV     #2$,(SP)        ;SET UP TO RETURN
007002  000002                  RTI                     ;RETURN TO TEST NEXT BIT

007004  004767  020116  5$:     JSR     PC,SAPS         ;SAVE THE ERROR PSW
007010  011103                  MOV     (R1),R3         ;GET THE WAS DATA
007012  004767  015336          JSR     PC,SUER2A       ;GO SET UP ERROR INFO
007016  104012                  ERROR   12              ;XMITTER SHOULD NOT HAVE INTERRUPTED
007020  012716  006724          MOV     #2$,(SP)        ;SET UP TO RETURN
007024  000002                  RTI                     ;RETURN TO TEST NEXT BIT

007026  012706  001100  6$:     MOV     #STACK,SP       ;RESET THE SP JUST IN CASE
007032  004767  017660          JSR     PC,RESTRP       ;GO RESTORE TRAP CATCHER IN VECTOR
```

```
                                        ;;*************************************************************
                                        ;*TEST 26        TEST CHAR. AVAIL. I.E.  WITH INTR. CONDITION ACTIVE
                                        ;;*************************************************************
 007036  000004                         TST26:  SCOPE
                                        .REM    %
                                        TEST ABSTRACT:
                                        ****************

                                                THIS TEST USES MAINT. MODE (SCR09=1) TO SET THE CHAR AVAIL
                                        BIT (SCR7) TO GENERATE A RCVR INTERRUPT THROUGH THE PROPER VECTOR.
                                        THE TEST SEQUENCE IS AS FOLLOWS:

                                                1. SET UP THE VECTORS
                                                2. ISSUE DH11 "MASTER CLR",RESET THE SP, AND LOCK OUT INTRS
                                                3. PRIMT THE DH11 TO GENERATE A RCVR INTR
                                                4. CLEAR THE PSW TO ALLOW INTRS
                                                5. REPORT NO RCVR INTR OR FALSE XMITTR INTR.

                                        ALL ERRORS ARE REPORTED AND THEN THE TEST RESETS THE VECTOR AND SP
                                        AND CONTINUES TO THE NEXT TEST IN THE PROGRAM.

                                        ERRORS:
                                        ********

                                        1.) [ERROR  13] IS CALLED TO REPORT RCVR INTR FAULTS
                                        2.) [ERROR  12] IS CALLED TO REPORT XMITTR INTR FAULTS

                                        SYNC:   M7277   SH3     INIT A H        EF2
                                        *****

                                        DEBUG:
                                        *******

                                        1.) IF NO RCVR INTR OCCURRED THE PROBLEM IS EITHER SECTION "A" OF THE
                                            M7821 OR THE M7289 - SH6.
                                        2.) IF A FALSE XMIT INTR OCCURRED THE PROBLEM IS MOST LIKELY THE
                                            M7821 GENERATING AN INCORRECT VECTOR ADDRESS.

                                        KEY LOGIC:
                                        **********

                                                M7289   SH6     E31-12

                                                M7821   SEC "A" BUS A BR L      U2
                                                                BUS SACK L      T2
                                                                BUS BG IN H     B1
                                                                "A" MASTER L    N1
                                                                VECTOR BIT 02 H D2

                                                NOTE:   REMEMBER THAT PROBLEMS IN THIS AREA COULD BE CAUSED
                                                        BY ANY DEVICE IN THE SYSTEM INCLUDING THE "CPU".
                                                        SYSTEM RE-CONFIGURATION TO ISOLATE THE FAULTY SUB-
                                                        SYSTEM MAY BE REQUIRED.
                                        %
 007040  012767  007076  172042                 MOV     #1$,$LPERR      ;SET UP THE ERROR LOOP RETURN
 007046  010102                                 MOV     R1,R2           ;MAKE IT REGADR TOO
```

```
007050  016703  020120          MOV     DHVCT,R3        ;GET FIRST VECTOR ADDR
007054  012723  007206          MOV     #3$,(R3)+       ;GO TO 3$ IF RCVR INTRS
007060  116723  021122          MOVB    DHRLVL,(R3)+
007064  105723                  TSTB    (R3)+           ;UPDATE POINTER
007066  012723  007162          MOV     #2$,(R3)+       ;GO TO 3$ ON XMITTR INTRS
007072  116713  021111          MOVB    DHTLVL,(R3)
007076  012711  004000  1$:     MOV     #BIT11,(R1)     ;CLR THE DH11
007102  012706  001100          MOV     #STACK,SP       ;RESET THE SP FOR ERROR LOOPS
007106  004767  020000          JSR     PC,CHPS2        ;GO LOCK OUT INTRS
007112  012711  001000          MOV     #BIT09,(R1)     ;SET MAINT MODE BIT
007116  052711  000100          BIS     #BIT06,(R1)     ;SET CHAR AVAILABLE I.E. BIT
007122  052711  000200          BIS     #BIT07,(R1)     ;SET THE CHAR AVAIL BIT TO FORCE INTR
007126  004767  017744          JSR     PC,CHPS1        ;GO CLEAR PSW
007132  000240                  NOP                     ;GIVE IT A LITTLE TIME

007134  004767  017766          JSR     PC,SAPS         ;SAVE THE ERROR PSW
007140  011103                  MOV     (R1),R3         ;GET THE WAS DATA
007142  005011                  CLR     (R1)            ;CLEAR OUT THE SCR
007144  005011                  CLR     (R1)
007146  012704  001300          MOV     #1300,R4        ;SET UP S/B DATA
007152  004767  015176          JSR     PC,SUER2A       ;GO SET UP ERROR INFO
007156  104013                  ERROR   13              ;TIMED OUT AWAITING CHAR AVAIL INTR
007160  000412                  BR      3$              ;GO EXIT TEST

007162  004767  017740  2$:     JSR     PC,SAPS         ;SAVE THE ERROR PSW
007166  011103                  MOV     (R1),R3         ;GET WAS DATA
007170  012704  001300          MOV     #1300,R4        ;SET UP S/B DATA
007174  005011                  CLR     (R1)            ;CLR OUT SCR REG
007176  005011                  CLR     (R1)
007200  004767  015150          JSR     PC,SUER2A       ;GO SET UP ERROR INFO
007204  104012                  ERROR   12              ;UNEXPECTED XMITTR INTR

007206  012706  001100  3$:     MOV     #STACK,SP       ;RESET THE SP
007212  004767  017500          JSR     PC,RESTRP       ;GO RESTORE TRAP CATCHER
```

```
                                        ;;*******************************************************************
                                        ;*TEST 27        TEST SILO OVFLW.  I.E.  WITH INTR. CONDITION ACTIVE
                                        ;;*******************************************************************
007216  000004                          TST27:  SCOPE
                                        .REM    %
                                        TEST ABSTRACT
                                        *************

                                                THIS TEST USES MAINT. MODE (SCR09=1) TO ENABLE SILO FULL
                                        INTERRUPT. THE TEST SEQUENCE IS AS FOLLOWS:

                                                1.  SET UP XMIT AND RCVR VECTORS
                                                2.  RESET THE DH11 AND S.P. - THE LOCK OUT INTRS.
                                                3.  PRIME DH11 TO GENERATE SILO FULL INTR. - ALLOW INTRS.
                                                4.  REPORT ERROR IF NO RCVR. INTR OCCURS OR
                                                    A FALSE XMIT INTR. DOES OCCUR
                                                5.  AFTER REPORTING ANY ERRORS DETECTED RESET
                                                    THE SP AND VECTORS THEN GO TO TEST 30

                                        ERRORS:
                                        *******

                                        1.  [ERROR 43] IS CALLED TO REPORT NO RCVR INTR OCCURRED
                                        2.  [ERROR 12] IS CALLED TO REPORT FALSE TRANSMITTER INTR.

                                        SYNC:   M7277   SH3     INIT A H        EF2
                                        *****

                                        DEBUG:
                                        ******

                                        1.  IF THE RECEIVER INTR FAILED TO INTERRUPT PROBLEM IS MOST LIKELY
                                            THE M7289 MODULE
                                        2.  IF A FALSE XMITTR INTR OCCURRED PROBLEM IS MOST LIKELY THE M7281 MODULE

                                        KEY LOGIC:
                                        **********

                                                M7289   SHG     E35,E50, OR E31
                                                                SCR 14 H (STORAGE) DS1

                                                M7821   "B" SECTION

                                        %
007220  012767  007256  171662                  MOV     #1$,$LPERR      ;SET UP THE ERROR LOOP RETURN
007226  010102                                  MOV     R1,R2           ;MAKE IT REGADR TOO
007230  016703  017740                          MOV     DHVCT,R3        ;GET FIRST VECTOR ADDR
007234  012723  007366                          MOV     #3$,(R3)+       ;GO TO 3$ IF RCVR INTRS
007240  116723  020742                          MOVB    DHRLVL,(R3)+
007244  105723                                  TSTB    (R3)+           ;UPDATE POINTER
007246  012723  007342                          MOV     #2$,(R3)+       ;GO TO 2$ ON XMITTR INTRS
007252  116713  020731                          MOVB    DHTLVL,(R3)
007256  012711  004000                  1$:     MOV     #BIT11,(R1)     ;CLR THE DH11
007262  012706  001100                          MOV     #STACK,SP       ;RESET THE SP FOR ERROR LOOPS
007266  004767  017620                          JSR     PC,CHPS2        ;GO LOCK OUT INTRS
007272  012711  001000                          MOV     #BIT09,(R1)     ;SET MAINT MODE BIT
```

```
007276  052711  040000                  BIS     #BIT14,(R1)     ;SET SILO OVFLW I.E. BIT
007302  052711  010000                  BIS     #BIT12,(R1)     ;SET THE SILO FULL BIT TO FORCE INTR
007306  004767  017564                  JSR     PC,CHPS1        ;GO CLEAR PSW
007312  000240                          NOP                     ;GIVE IT A LITTLE TIME

007314  004767  017606                  JSR     PC,SAPS         ;SAVE THE ERROR PSW
007320  011103                          MOV     (R1),R3         ;GET THE WAS DATA
007322  005011                          CLR     (R1)            ;CLEAR OUT THE SCR
007324  005011                          CLR     (R1)
007326  012704  051000                  MOV     #51000,R4       ;SET UP S/B DATA
007332  004767  015016                  JSR     PC,SUER2A       ;GO SET UP ERROR INFO
007336  104043                          ERROR   43              ;TIMED OUT AWAITING SILO OVFLW INTR
007340  000412                          BR      3$              ;GO EXIT TEST

007342  004767  017560          2$:     JSR     PC,SAPS         ;SAVE THE ERROR PSW
007346  011103                          MOV     (R1),R3         ;GET WAS DATA
007350  012704  051000                  MOV     #51000,R4       ;SET UP S/B DATA
007354  005011                          CLR     (R1)            ;CLR OUT SCR REG
007356  005011                          CLR     (R1)
007360  004767  014770                  JSR     PC,SUER2A       ;GO SET UP ERROR INFO
007364  104012                          ERROR   12              ;UNEXPECTED XMITTR INTR

007366  012706  001100          3$:     MOV     #STACK,SP       ;RESET THE SP
007372  004767  017320                  JSR     PC,RESTRP       ;GO RESTORE TRAP CATCHER
```

```
                                              ;;*  *******************************************************
                                              ;*TEST 30       TEST NON EX MEM I.E.  WITH INTR. CONDITION ACTIVE
                                              ;;*******************************************************
007376  000004                                TST30:  SCOPE
                                              .REM    %
                                              TEST ABSTRACT:
                                              **************

                                                      THIS TEST VERIFIES THAT THE NON-EX-MEM BIT (SCR10) CAN CAUSE A
                                              TRANSMITTER INTERRUPT VIA THE PROPER VECTOR. THE TEST SEQUENCE IS AS
                                              FOLLOWS:

                                                      1.  SET UP XMIT AND RCVR VECTORS
                                                      2.  CLEAR THE DH11, RESET SP, AND LOCK OUT INTRS
                                                      3.  PRIME DH11 TO GENERATE XMIT INTR IN MAINT. MODE
                                                      4.  ALLOW INTRS.
                                                      5.  REPORT ERROR IF NO XMIT INTR OCCURS OR IF
                                                          A FALSE RCVR INTR OCCURS
                                                      6.  REST SP AND VECTORS THEN GO TO TEST 31

                                              ERRORS:
                                              *******

                                              1.  [ERROR 44] IS CALLED IF NON-EX-MEM FAILS TO GENERATE XMIT INTR
                                              2.  [ERROR 11] IS CALLED IF FALSE RCVR INTR OCCURS

                                              SYNC:   M7277   SH3     INIT A H        EF2
                                              *****

                                              DEBUG:
                                              ******

                                              1.  IF THE NON-EX-MEM INTERRUPT FAILS TO OCCUR PROBLEM IS MOST LIKELY
                                                  THE M7289 MODULE
                                              2.  IF A FALSE RCVR INTR OCCURS PROBLEM IS MOST LIKELY THE M7289 OR
                                                  THE M7281 MODULES.

                                              KEY LOGIC:
                                              **********

                                                      M7289   SH6     SCR 10 H (NO EX MEM)    FL1
                                                                      E35, E41, OR E48

                                              %
007400  012767  007436  171502                        MOV     #1$,$LPERR      ;SET UP THE ERROR LOOP RETURN
007406  010102                                        MOV     R1,R2           ;MAKE IT REGADR TOO
007410  016703  017560                                MOV     DHVCT,R3        ;GET FIRST VECTOR ADDR
007414  012723  007522                                MOV     #2$,(R3)+       ;GO TO 2$ IF RCVR INTRS
007420  116723  020562                                MOVB    DHRLVL,(R3)+
007424  105723                                        TSTB    (R3)+           ;UPDATE POINTER
007426  012723  007546                                MOV     #3$,(R3)+       ;GO TO 3$ ON XMITTR INTRS
007432  116713  020551                                MOVB    DHTLVL,(R3)
007436  012711  004000                        1$:     MOV     #BIT11,(R1)     ;CLR THE DH11
007442  012706  001100                                MOV     #STACK,SP       ;RESET THE SP FOR ERROR LOOPS
007446  004767  017440                                JSR     PC,CHPS2        ;GO LOCK OUT INTRS
007452  012711  001000                                MOV     #BIT09,(R1)     ;SET MAINT MODE BIT
```

```
007456  052711  020000              BIS     #BIT13,(R1)     ;SET XMITTR I.E. BIT
007462  052711  002000              BIS     #BIT10,(R1)     ;SET THE NON EX MEM BIT TO FORCE INTR
007466  004767  017404              JSR     PC,CHPS1        ;GO CLEAR PSW
007472  000240                      NOP                     ;GIVE IT A LITTLE TIME

007474  004767  017426              JSR     PC,SAPS         ;SAVE THE ERROR PSW
007500  011103                      MOV     (R1),R3         ;GET THE WAS DATA
007502  005011                      CLR     (R1)            ;CLEAR OUT THE SCR
007504  005011                      CLR     (R1)
007506  012704  023000              MOV     #23000,R4       ;SET UP S/B DATA
007512  004767  014636              JSR     PC,SUER2A       ;GO SET UP ERROR INFO
007516  104044                      ERROR   44              ;TIMED OUT AWAITING NON EX MEM INTR
007520  000412                      BR      3$              ;GO EXIT TEST

007522  004767  017400      2$:     JSR     PC,SAPS         ;SAVE THE ERROR PSW
007526  011103                      MOV     (R1),R3         ;GET WAS DATA
007530  012704  023000              MOV     #23000,R4       ;SET UP S/B DATA
007534  005011                      CLR     (R1)            ;CLR OUT SCR REG
007536  005011                      CLR     (R1)
007540  004767  014610              JSR     PC,SUER2A       ;GO SET UP ERROR INFO
007544  104011                      ERROR   11              ;UNEXPECTED RCVR INTR

007546  012706  001100      3$:     MOV     #STACK,SP       ;RESET THE SP
007552  004767  017140              JSR     PC,RESTRP       ;GO RESTORE TRAP CATCHER
```

```
                                        ;;*************************************************************
                                        ;*TEST 31        TEST XMITTR DONE I.E.  WITH INTR. CONDITION ACTIVE
                                        ;;*************************************************************
007556  000004                          TST31:  SCOPE
                                        .REM    %
                                        TEST ABSTRACT:
                                        **************

                                                THIS TEST VERIFIES THAT XMIT DONE (SCR15) CAN BE SET IN MAINT.
                                        MODE TO CAUSE A XMITTR INTR VIA THE PROPER VECTOR. THE TEST SEQUENCE
                                        IS AS FOLLOWS:

                                                1.  SET UP XMIT AND RCVR VECTORS
                                                2.  CLEAR THE DH11, RESET SP, AND LOCK OUT INTRS
                                                3.  PRIME DH11 TO GENERATE "XMIT DONE" INTR
                                                4.  CLEAR PSW TO ALLOW INTRS
                                                5.  REPOT ERROR IF XMITTR FAILS TO INTR OR A
                                                    FALSE RCVR INTR OCCURS

                                        ERRORS:
                                        *******

                                        1.  [ERROR 45] IS CALLED TO REPORT "XMIT DONE" INTR FAILED TO OCCUR
                                        2.  [ERROR 11] IS CALLED TO REPORT FALSE RCVR INTRS

                                        SYNC:   M7277   SH3     INIT A H        EF2
                                        *****

                                        DEBUG:
                                        ******

                                        1.  IF NO XMIT INTR OCCURS PROBLEM IS MOST LIKELY THE M7289 MODULE
                                        2.  IF A FALSE RCVR INTR. OCCURS PROBLEM IS MOST LIKELY THE M7821 MODULE.


                                        KEY LOGIC:
                                        **********

                                                M7289   SH6     SCR 15 H (XMIT) FR2
                                                                E48, E50

                                        %
007560  012767  007616  171322                  MOV     #1$,$LPERR      ;SET UP THE ERROR LOOP RETURN
007566  010102                                  MOV     R1,R2           ;MAKE IT REGADR TOO
007570  016703  017400                          MOV     DHVCT,R3        ;GET FIRST VECTOR ADDR
007574  012723  007702                          MOV     #2$,(R3)+       ;GO TO 2$ IF RCVR INTRS
007600  116723  020402                          MOVB    DHRLVL,(R3)+
007604  105723                                  TSTB    (R3)+           ;UPDATE POINTER
007606  012723  007726                          MOV     #3$,(R3)+       ;GO TO 3$ ON XMITTR INTRS
007612  116713  020371                          MOVB    DHTLVL,(R3)
007616  012711  004000                  1$:     MOV     #BIT11,(R1)     ;CLR THE DH11
007622  012706  001100                          MOV     #STACK,SP       ;RESET THE SP FOR ERROR LOOPS
007626  004767  017260                          JSR     PC,CHPS2        ;GO LOCK OUT INTRS
007632  012711  001000                          MOV     #BIT09,(R1)     ;SET MAINT MODE BIT
007636  052711  020000                          BIS     #BIT13,(R1)     ;SET XMIT DONE I.E. BIT
007642  052711  100000                          BIS     #BIT15,(R1)     ;SET THE XMITTR DONE BIT TO FORCE INTR
```

```
007646  004767  017224                  JSR     PC,CHPS1        ;GO CLEAR PSW
007652  000240                          NOP                     ;GIVE IT A LITTLE TIME

007654  004767  017246                  JSR     PC,SAPS         ;SAVE THE ERROR PSW
007660  011103                          MOV     (R1),R3         ;GET THE WAS DATA
007662  005011                          CLR     (R1)            ;CLEAR OUT THE SCR
007664  005011                          CLR     (R1)
007666  012704  121000                  MOV     #121000,R4      ;SET UP S/B DATA
007672  004767  014456                  JSR     PC,SUER2A       ;GO SET UP ERROR INFO
007676  104045                          ERROR   45              ;TIMED OUT AWAITING XMIT DONE INTR
007700  000412                          BR      3$              ;GO EXIT TEST

007702  004767  017220          2$:     JSR     PC,SAPS         ;SAVE THE ERROR PSW
007706  011103                          MOV     (R1),R3         ;GET WAS DATA
007710  012704  121000                  MOV     #121000,R4      ;SET UP S/B DATA
007714  005011                          CLR     (R1)            ;CLR OUT SCR REG
007716  005011                          CLR     (R1)
007720  004767  014430                  JSR     PC,SUER2A       ;GO SET UP ERROR INFO
007724  104011                          ERROR   11              ;UNEXPECTED RCVR INTR

007726  012706  001100          3$:     MOV     #STACK,SP       ;RESET THE SP
007732  004767  016760                  JSR     PC,RESTRP       ;GO RESTORE TRAP CATCHER
```

```
                            ;;**************************************************************
                            ;*TEST 32        BASIC TRANSMITTER "NPR" LOGIC TEST 1
                            ;;**************************************************************
 007736  000004             TST32:  SCOPE
                            .REM    %
                            TEST ABSTRACT:
                            **************

                                    THIS TEST TRANSMITS A SINGLE BYTE FROM LOCATION 0 ON ALL SELECTED
                            LINES (AS SELECTED BY THE CONFIGURATION PARAMETER "LINSEL:") ONE AT A TIME.
                            THE TEST SEQUENCE IS AS FOLLOWS:

                                    1.  SET UP THE XMITTR VECTOR
                                    2.  SELECT A LINE # TO TEST
                                    3.  RESET THE SP
                                    4.  CLEAR ALL LOCATIONS IN "CAR" AND "BCR" MEMORIES
                                    5.  LOCK OUT INTRS AND CLEAR THE DH11
                                    6.  PRIME DH11 TO XMIT ONE CHAR FROM LOCATION 0
                                        [9600 BAUD, 5-BITS, 1 STOP BIT]
                                    7.  ACTIVATE SELECTED XMITTR AND ENABLE XMIT DONE INTR
                                    8.  CLEAR PSW TO ALLOW INTR.
                                    9.  ACTIVATE TIMER TO WAIT FOR XMIT DONE INTR
                                    10. IF TIMEOUT OCCURS REPORT ERROR AND RESTART AT STEP 2
                                    11. IF XMIT INTERRUPT OCCURS CHECK THE FOLLOWING CONDITIONS
                                        AND REPORT ANY ERRORS:

                                        A.  XMIT DONE (SCR15=1) SET
                                        B.  "BAR" BIT GOT CLEARED
                                        C.  "CAR" REGISTER GOT INCREMENTED TO +1
                                        D.  "BCR" REGISTER GO INCREMENTED TO 0

                                    12. REPEAT STEP 2 THRU 11 UNTIL ALL SELECTED LINES TESTED
                                    13. AFTER TESTING ALL LINES CLEAR THE DH11, RESET THE VECTOR
                                        CLEAR PSW, RESET SP, AND GO TO TEST 33.

                            ERRORS:
                            *******

                            1.  [ERROR 15] IS CALLED IF XMIT DONE FAILS TO INTR ON TIME
                            2.  [ERROR 14] IS CALLED IF XMIT DONE NOT SET
                            3.  [ERROR 14] IS CALLED IF "BAR" BIT FAILED TO CLEAR
                            4.  [ERROR 14] IS CALLED IF "CAR" NOT INCREMENTED PROPERLY
                            5.  [ERROR 14] IS CALLED IF "BCR" NOT INCREMENTED PROPERLY

                                ALL ERROR MESSAGE HEADERS INCLUDE THE LINE NO. OF THE FAILING
                                LINE.

                            SYNC:   M7277   SH3     INIT A H        EF2
                            *****
                                    (NOTE: USE SR09=1 TO LOCK ON FAILING LINE AND SR13=1 TO
                                     INHIBIT ERROR PRINTOUT TO MINIMIZE SCOPE LOOP.)

                            DEBUG:
                            ******

                            1.  IF ALL LINES FAIL TO INTERRUPT ON TIME, SUSPECT LOSS OF 9600 BAUD
```

```
                                        CLOCK SIGNAL OR BYTE COUNT DECODER ON M7278 SH3 (XMIT FINISHED PULSE L)
                                    2.  IF GROUP OF 8 LINES <15:08> OR <07:00> FAIL TO INTERRUPT ON TIME, SUSPECT
                                        THE BUFFERED CLOCK SIGNALS (TOP AND BOT) ON THE M7288 SH3
                                    3.  IF ONLY ONE LINE FAILS TO INTERRUPT ON TIME, SUSPECT LOSS OF CLOCK IN
                                        LINE MULTIPLEXORS M7288 SH4-SH11.
                                    4.  IF LINE INTERRUPTED OK BUT "SCR", "BAR", "CAR", OR "BCR" WAS INCORRECT
                                        REFER TO KEY LOGIC SIGNALS BELOW.


                                    KEY LOGIC:
                                    **********

                                    XMIT DONE FAILED TO SET:

                                            M7289   SH6     SCR15 H FR2
                                            M7278   SH3     XMIT FINISHED PULSE L   AR1

                                    "BAR" BIT FAILED TO CLEAR:

                                            M7278   SH3     CLR BAR <15:00> L
                                                    SH5     BAR <15:12> H   E54, E55 (7474)
                                                    SH6     BAR <11:08> H   E62, E63 (7474)
                                                    SH7     BAR <07:04> H   E70, E71 (7474)
                                                    SH8     BAR <03:00> H   E78, E79 (7474)

                                    "CAR" REG NOT INCREMENTED:

                                            M7277   SH6     END CYCLE PULSE DLY H   FL2
                                                    SH5 AND SH6 "CAR" MEMORY LOGIC
                                            M796            END CYCLE H P2

                                    "BCR" REG NOT INCREMENTED:

                                            M796    END CYCLE L     N2
                                            M7278   SH3 AND SH4 "BCR" MEMORY LOGIC

                                    %
 007740  012767  007774  171142             MOV     #2$,$LPERR          ;SET UP ERROR LOOP RETURN
 007746  016703  017222                     MOV     DHVCT,R3            ;GET THE FIRST VECTOR ADDRESS
 007752  062703  000004                     ADD     #4,R3               ;POINT TO XMITTR ENTRY
 007756  012723  010140                     MOV     #4$,(R3)+           ;GO TO 4$ ON XMITTR INTR
 007762  116713  020221                     MOVB    DHTLVL,(R3)
 007766  004767  014510             1$:     JSR     PC,SELINE           ;GO SELECT A LINE NO. TO TEST
 007772  000552                             BR      8$                  ;BR IF TESTED ALL SELECTED LINES

 007774  012706  001100             2$:     MOV     #STACK,SP           ;RESET SP FOR ERROR LOOPS
 010000  010102                             MOV     R1,R2               ;SET UP REGADR
 010002  012704  120000                     MOV     #120000,R4          ;SET UP S/B DATA
 010006  156704  020200                     BISB    LINE,R4
 010012  004767  014636                     JSR     PC,CLCABC           ;GO CLEAR CAR AND BCR MEMORIES
 010016  004767  017070                     JSR     PC,CHPS2            ;GO LOCK OUT INTRS
 010022  012711  004000                     MOV     #BIT11,(R1)         ;CLEAR THE DH11 INTERFACE
 010026  156711  020160                     BISB    LINE,(R1)           ;SELECT A LINE NO.
 010032  012761  177777  000010             MOV     #-1,BCR(R1)         ;SET BYTE COUNT TO -1
 010040  012761  033500  000004             MOV     #33500,LPR(R1)      ;SET UP LINE PARAMETERS
 010046  056761  017132  000012             BIS     LINMSK,BAR(R1)      ;ACTIVATE SELECTED LINE
```

```
010054  052711  020000                  BIS     #BIT13,(R1)     ;ENABLE INTERRUPT ON XMIT DONE
010060  004767  017012                  JSR     PC,CHPS1        ;GO CLEAR PSW

010064  012767  000001  020146          MOV     #1,TIMEA        ;INIT TIMER A
010072  005067  020144                  CLR     TIMEB           ;INIT IIMER B
010076  000240                  3$:     NOP                     ;DO NOTHING WAIT
010100  004767  016640                  JSR     PC,TIMEIT       ;CALL TIMER
010104  000774                          BR      3$              ;TIMER ROUTINE WILL MOVE RETURN PC AROUND
                                                                ;THIS BRANCH IF TIMEOUT OCCURS

010106  004767  017014                  JSR     PC,SAPS         ;SAVE THE ERROR PSW
010112  011103                          MOV     (R1),R3         ;GET THE WAS DATA
010114  042703  000200                  BIC     #BIT07,R3       ;WE'RE NOT INTERESTED IN THIS BIT
010120  004767  014230                  JSR     PC,SUER2A       ;GO SET UP ERROR INFO
010124  004567  014444                  JSR     R5,SUNUM        ;GO SET LINE NO. IN ERROR MSG
010130  030212                          LINE
010132  031412                          EM15+43
010134  104015                          ERROR   15              ;TIMEOUT WHILE AWAITING XMIT INTR
010136  000713                          BR      1$              ;GO TEST NEXT LINE

010140  005711                  4$:     TST     (R1)            ;DID XMIT DONE SET ??
010142  100411                          BMI     5$              ;BR IF YES

010144  004767  016756                  JSR     PC,SAPS         ;SAVE THE ERROR PSW
010150  011103                          MOV     (R1),R3         ;GET THE WAS DATA
010152  004767  014176                  JSR     PC,SUER2A       ;GO SET UP ERROR INFO
010156  004767  000174                  JSR     PC,9$           ;GO SET UP[ SOME ERROR STUFF
010162  104014                          ERROR   14              ;XMIT DONE FAILED TO SET
010164  000700                          BR      1$              ;GO TEST NEXT LINE

010166  016103  000012          5$:     MOV     BAR(R1),R3      ;GET WAS DATA FROM "BAR"
010172  001413                          BEQ     6$              ;BR IF BAR BIT GOT CLEARED

010174  004767  016726                  JSR     PC,SAPS         ;SAVE THE ERROR PSW
010200  062702  000012                  ADD     #BAR,R2         ;SET UP REGADR
010204  005004                          CLR     R4              ;SET UP S/B DATA
010206  004767  014142                  JSR     PC,SUER2A       ;GO SET UP ERROR INFO
010212  004767  000140                  JSR     PC,9$           ;GO SET UP SOME ERROR STUFF
010216  104014                          ERROR   14              ;BAR BIT FAILED TO CLEAR
010220  000662                          BR      1$              ;GO TEST NEXT LINE

010222  016103  000006          6$:     MOV     CAR(R1),R3      ;GET THE WAS DATA FROM CAR
010226  022703  000001                  CMP     #1,R3           ;DID IT GET INCREMENTED ?
010232  001414                          BEQ     7$              ;BR IF YES

010234  004767  016666                  JSR     PC,SAPS         ;SAVE THE ERROR PSW
010240  012704  000001                  MOV     #1,R4           ;SET UP S/B DATA
010244  062702  000006                  ADD     #CAR,R2         ;SET UP REGADR
010250  004767  014100                  JSR     PC,SUER2A       ;GO SET UP ERROR INFO
010254  004767  000076                  JSR     PC,9$           ;GO SET UP SOME ERROR STUFF
010260  104014                          ERROR   14              ;CAR REG NOT  INCREMENTED PROPERLY
010262  000641                          BR      1$              ;GO TEST NEXT LINE.

010264  016103  000010          7$:     MOV     BCR(R1),R3      ;GET WAS DATA FROM BCR
010270  001636                          BEQ     1$              ;BR IF BCR GOT INCREMENTED TO 000000

```

```
010272  004767  016630          JSR     PC,SAPS         ;SAVE THE ERROR PSW
010276  005004                  CLR     R4              ;SET UP S/B DATA
010300  062702  000010          ADD     #BCR,R2         ;SET UP REGADR
010304  004767  014044          JSR     PC,SUER2A       ;GO SET UP ERROR INFO
010310  004767  000042          JSR     PC,9$           ;GO SET UP SOME ERROR STUFF
010314  104014                  ERROR   14              ;BCR REG NOT INCREMENTED PROPERLY
010316  000623                  BR      1$              ;GO TEST NEXT LINE

010320  012711  004000  8$:     MOV     #BIT11,(R1)     ;CLEAR THE DH11
010324  016703  016644          MOV     DHVCT,R3        ;GET THE VECTOR ADDR
010330  062703  000004          ADD     #4,R3           ;POINT TO XMIT VECTOR
010334  010313                  MOV     R3,(R3)         ;RESTORE TRAP CATCHER
010336  062723  000002          ADD     #2,(R3)+
010342  005013                  CLR     (R3)
010344  004767  016526          JSR     PC,CHPS1        ;GO CLEAR PSW
010350  012706  001100          MOV     #STACK,SP       ;RESET THE STACK POINTER
010354  000405                  BR      TST33           ;;GO TO NEXT TEST

010356  004567  014212  9$:     JSR     R5,SUNUM        ;GO SET UP LINE NO. IN MSG.
010362  030212                  LINE
010364  031344                  EM14+44
010366  000207                  RTS     PC              ;RETURN TO REPORT ERROR
```

```
                                          ;;*************************************************************
                                          ;*TEST 33       TRANSMITTR NPR LOGIC TEST 2
                                          ;;*************************************************************
010370  000004                            TST33:  SCOPE
                                          .REM    %
                                          TEST ABSTRACT:
                                          **************

                                                  THIS TEST IS SIMILAR TO TEST 32 EXCEPT THAT ALL LOCATIONS IN THE "BCR"
                                          AND "CAR" MEMORIES ARE TESTED TO VERIFY THAT TRANSMISSION ON THE SELECTED
                                          LINE DID NOT DISTURB ANY UNSELECTED LOCATIONS IN THE MEMORIES. IF ALSO OPERATES
                                          IN "FLAG" MODE RATHER THAN USING INTERRUPTS. THE TEST SEQUENCE IS AS
                                          FOLLOWS:

                                                  1.  SELECT A LINE # TO TEST (AS DEFINED BY "LINSEL:")
                                                  2.  CLEAR BOTH THE "CAR" AND "BCR" MEMORIES
                                                  3.  LOAD THE "BCR" MEMORY WITH ALL ONES (BYTE COUNT = -1)
                                                  4.  ACTIVATE THE XMITTER ON THE SELECTED LINE
                                                  5.  ACTIVATE TIMER TO WAIT FOR "XMIT DONE"
                                                  6.  IF "XMIT DONE" FAILS TO SET ON TIME - REPORT ERROR AND
                                                      REPEAT 1 THRU 5 UNTIL ALL SELECTED LINES TESTED
                                                  7.  IF "XMIT DONE" SETS CHECK ALL LOCATIONS IN THE "BCR" MEMORY
                                                      REPORT ANY UNSELECTED LINES NOT CONTAINING -1 AND THE SELECTED
                                                      LINE IF IT DOES NOT CONTAIN 0
                                                  8.  CHECK ALL LOCATIONS IN THE "CAR" MEMORY AND REPORT ANY UNSELECTED
                                                      LOCATIONS NOT CONTAINING 0 AND THE SELECTED LINE IF IT DOES NOT
                                                      CONTAIN +1.
                                                  9.  REPEAT STEPS 1 THRU 8 UNTIL ALL SELECTED LINES TESTED.

                                          ERRORS:
                                          *******

                                          1.  [ERROR 50] CALLED IF XMIT DONE TIMEOUT ERROR DETECTED.
                                          2.  [ERROR 51] CALLED IF "BCR" MEMORY ERROR DETECTED
                                          3.  [ERROR 51] CALLED IF "CAR" MEMORY ERROR DETECTED

                                          SYNC:   M7277   SH3     INIT A H        EF2
                                          *****

                                          DEBUG:
                                          ******

                                          1.  ASSUMING TEST 32 RAN ERROR FREE THE PROBLEM IS MOST LIKELY THE:
                                                  M7278 MODULE IF "BCR" ERRORS
                                                  M7277 MODULE IF "CAR" ERRORS

                                          KEY LOGIC:      (SAME AS TEST 32)
                                          **********

                                          %
010372  012767  010406  170510                    MOV     #2$,$LPERR      ;SET UP ERROR LOOP RETURN
010400  004767  014076                    1$:     JSR     PC,SELINE       ;GO SELECT A LINE TO TEST
010404  000544                                    BR      TST34           ;;BR IF DONE ALL SELECTED LINES
010406  052711  004000                    2$:     BIS     #BIT11,(R1)     ;CLEAR THE DH11
010412  004767  014236                            JSR     PC,CLCABC       ;GO CLEAR "CAR" AND "BCR" MEMORIES
010416  004767  014274                            JSR     PC,LDBCR        ;GO LOAD "BCR" MEMORY WITH ALL ONES
```

```
010422  156711  017564                  BISB    LINE,(R1)           ;SELECT THE LINE
010426  012761  033500  000004          MOV     #33500,LPR(R1)      ;SET UP PARAMETERS
010434  016761  016544  000012          MOV     LINMSK,BAR(R1)      ;ACTIVATE XMIT ON SELECTED LINE

010442  012767  000001  017570          MOV     #1,TIMEA            ;INIT TIMER A
010450  005067  017566                  CLR     TIMEB               ;INIT TIMER B
010454  005711                  3$:     TST     (R1)                ;XMITTR DONE YET
010456  100423                          BMI     4$                  ;BR IF YES
010460  004767  016260                  JSR     PC,TIMEIT           ;CALL THE TIMER
010464  000773                          BR      3$                  ;TIMER ROUTINE WILL MOVE RETURN PC
                                                                    ;AROUND THIS BRANCH IF TIME OUT OCCURS

010466  004767  016434                  JSR     PC,SAPS             ;SAVE THE ERROR PSW
010472  011103                          MOV     (R1),R3             ;GET THE WAS DATA
010474  012704  100000                  MOV     #BIT15,R4           ;SET UP S/B DATA
010500  156704  017506                  BISB    LINE,R4
010504  010102                          MOV     R1,R2               ;MAKE REGADR = DEVADR
010506  004767  013642                  JSR     PC,SUER2A           ;GO SET UP ERROR INFO
010512  004567  014056                  JSR     R5,SUNUM            ;SET LINE NO. IN MSG
010516  030212                          LINE
010520  034144                          EM50+53
010522  104050                          ERROR   50                  ;TIMED OUT AWAITING XMIT DONE ON SEL LINE
010524  000725                          BR      1$                  ;GO TRY THE NEXT LINE

010526  005067  170466          4$:     CLR     $TMP7               ;INIT A LINE COUNTER
010532  116711  170462          5$:     MOVB    $TMP7,(R1)          ;SELECT LINE NO. IN "SCR"
010536  012704  177777                  MOV     #-1,R4              ;SET UP S/B DATA
010542  016103  000010                  MOV     BCR(R1),R3          ;GET THE WAS BYTE COUNT
010546  126767  017440  170444          CMPB    LINE,$TMP7          ;WAS THIS THE ACTIVE LINE ??
010554  001001                          BNE     6$                  ;BR IF NOT
010556  005004                          CLR     R4                  ;CHANGE S/B DATA TO 000000
010560  020304                  6$:     CMP     R3,R4               ;WAS BYTE COUNT CORRECT ??
010562  001416                          BEQ     7$                  ;BR IF YES

010564  005067  170412                  CLR     $TMP0               ;SAVE THE ACTIVE LINE NO.
010570  116767  017416  170404          MOVB    LINE,$TMP0
010576  016767  170416  170400          MOV     $TMP7,$TMP1         ;SAVE THE LINE NO. BEING CHECKED
010604  010102                          MOV     R1,R2               ;SET UP REGADR = BCR REG ADDR
010606  062702  000010                  ADD     #BCR,R2
010612  004767  013620                  JSR     PC,SUER4            ;GO SET UP ERROR INFO
010616  104051                          ERROR   51                  ;BYTE COUNT INCORRECT

010620  005004                  7$:     CLR     R4                  ;SET UP S/B DATA
010622  016103  000006                  MOV     CAR(R1),R3          ;GET THE WAS DATA
010626  126767  017360  170364          CMPB    LINE,$TMP7          ;IS THIS THE ACTIVE LINE
010634  001001                          BNE     8$                  ;BR IF NOT
010636  005204                          INC     R4                  ;BUMP THE CAR ADDRESS FOR ACTIVE LINE
010640  020304                  8$:     CMP     R3,R4               ;CAR CONTENTS CORRECT ??
010642  001416                          BEQ     9$                  ;BR IF YES

010644  005067  170332                  CLR     $TMP0               ;SET UP ACT LINE NO.
010650  116767  017336  170324          MOVB    LINE,$TMP0
010656  016767  170336  170320          MOV     $TMP7,$TMP1         ;SAVE THE LINE NO. BEING CHECKED
010664  010102                          MOV     R1,R2               ;SET UP REGADR
010666  062702  000006                  ADD     #CAR,R2
010672  004767  013540                  JSR     PC,SUER4            ;SET UP THE ERROR INFO
```

```
3256 010676 104051                          ERROR   51              ;CAR REG INCORRECT
3257
3258 010700 005267 170314           9$:     INC     $TMP7           ;GENERATE NEW LINE NO.
3259 010704 022767 000020 170306           CMP     #20,$TMP7       ;TESTED ALL LINES
3260 010712 001307                          BNE     5$              ;BR IF NOT
3261 010714 000631                          BR      1$              ;GO SELECT NEXT ACTIVE LINE
```

```
                                        ;;*************************************************************
                                        ;*TEST 34        TEST THAT CHARACTER AVAILABLE CAN CAUSE RCVR INTERRUPT
                                        ;;*************************************************************
 010716  000004                         TST34:  SCOPE
                                        .REM    %
                                        TEST ABSTRACT:
                                        **************

                                                THIS TEST VERIFIES THAT WHEN "CHAR AVAIL" (BIT07 IN "SCR") SETS
                                        AS A RESULT OF XMITTING AND RECEIVING ONE CHARACTER (USING SILO MAINT MODE)
                                        IT CAUSES A RCVR INTR VIA THE PROPER VECTOR. THE TEST SEQUENCE IS AS
                                        FOLLOWS:

                                                1.   SET UP THE RCVR VECTOR
                                                2.   LOCK OUT INTRS, RESET SP, AND CLEAR DH11
                                                3.   USE MAINT MODE TO LOAD A CHAR INTO THE SILO (DATA=125252)
                                                4.   CLEAR PSW TO ALLOW INTERRUPTS
                                                5.   ACTIVATE TIMER TO WAIT FOR INTR TO OCCUR
                                                6.   IF NO RCVR INTR OCCURS REPORT ERROR AND GO TO STEP 9
                                                7.   WHEN RCVR INTRS - CHECK SILO DATA FOR 125252 - IF NOT
                                                     CORRECT REPORT ERROR AND GO TO STEP 9
                                                8.   CHECK THAT SILO FILL LEVEL=1 - IF NOT REPORT ERROR
                                                9.   RESET SP, CLEAR PSW, RESET VECTOR, AND GO TO TEST 35

                                        ERRORS:
                                        *******

                                        1.   [ERROR 13] IS CALLED TO REPORT RCVR TIMEOUT ERROR
                                        2.   [ERROR 52] IS CALLED TO REPORT SILO DATA INCORRECT
                                        3.   [ERROR  6] IS CALLED TO REPORT INCORRECT SILO FILL COUNT

                                        SYNC:   M7277   SH3     INIT A H        EF2
                                        *****

                                        DEBUG:
                                        ******

                                        1.   IF NOT RCVR INTR OCCURS SUSPECT THE M7277, M7281, OR M7279 MODULES
                                        2.   IF SILO DATA OR FILL-ERRORS SUSPECT THE M7279 MODULE

                                        KEY LOGIC:
                                        **********

                                                M7279   SH1     SILO DATA MUX'S (74157'S)
                                                                SSR15 H         CR1

                                                        SH2     DATA READY L            DV1
                                                                NRC 15 H                DL1
                                                                SILO MEMORY             (E13,E17,E8,E3) [3341'S]
                                                                LOAD SILO L             DJ2
                                                                5.068 MHZ (CLOCK)       DN1
                                                                SSR <13:00> H           (E20,E24)

                                                M7289   SH6     RCV INT REQ H           DP1

                                                M7278   SH8     SSR <03:00> H
```

```
                                                SH7     SSR (07:00) H

                                        %

010720  012767  010742  170162          MOV     #1$,$LPERR      ;SET UP THE ERROR LOOP RETURN
010726  016703  016242                  MOV     DHVCT,R3        ;GET FIRST VECTOR ADDR
010732  012723  011026                  MOV     #3$,(R3)+       ;GO TO 3$ ON RCVR INTERRUPT
010736  116713  017244                  MOVB    DHRLVL,(R3)
010742  004767  016144          1$:     JSR     PC,CHPS2        ;GO LOCK OUT INTRS
010746  012706  001100                  MOV     #STACK,SP       ;RESET SP FOR ERROR LOOPS
010752  012711  004000                  MOV     #BIT11,(R1)     ;CLEAR THE DH11
010756  052761  100000  000016          BIS     #BIT15,SSR(R1)  ;SET SILO MAINT. BIT TO LOAD SILO
010764  012711  000100                  MOV     #BIT06,(R1)     ;ENABLE CHAR. AVAIL INTERRUPT
010770  004767  016102                  JSR     PC,CHPS1        ;GO CLEAR PSW
010774  012703  001000                  MOV     #1000,R3        ;INIT TIMER
011000  005303                  2$:     DEC     R3              ;DEC TIMER
011002  001376                          BNE     2$              ;BR IF NO TIMEOUT

011004  004767  016116                  JSR     PC,SAPS         ;SAVE THE ERROR PSW
011010  011103                          MOV     (R1),R3         ;GET THE WAS DATA
011012  012704  000300                  MOV     #300,R4         ;SET UP S/B DATA
011016  004767  013332                  JSR     PC,SUER2A       ;GO SET UP ERROR INFO
011022  104013                          ERROR   13              ;CHAR AVAIL FAILED TO SET ON TIME
011024  000436                          BR      5$              ;ESCAPE FROM THIS TEST - CATASTROPHIC ERROR

011026  016105  000016          3$:     MOV     SSR(R1),R5      ;SAVE THE SILO STATUS REG.
011032  016103  000002                  MOV     NRC(R1),R3      ;GET THE WAS DATA
011036  012704  125252                  MOV     #125252,R4      ;SET UP S/B DATA
011042  020304                          CMP     R3,R4           ;WAS = S/B = 125252 ??
011044  001410                          BEQ     4$              ;BR IF IT IS

011046  004767  016054                  JSR     PC,SAPS         ;SAVE THE ERROR PSW
011052  062702  000002                  ADD     #NRC,R2         ;SET  UP REGADR
011056  004767  013272                  JSR     PC,SUER2A       ;GO SET UP  ERROR INFO
011062  104052                          ERROR   52              ;DATA COMPARE ERROR
011064  000416                          BR      5$              ;GET OUT

011066  010503                  4$:     MOV     R5,R3           ;NOW GET THW SILO STATUS REG AGAIN
011070  042703  140377                  BIC     #140377,R3      ;CLR OUT JUNK
011074  012704  000400                  MOV     #400,R4         ;SET UP S/B DATA
011100  020304                          CMP     R3,R4           ;SSR CHAR COUNT = 1 ??
011102  001407                          BEQ     5$              ;BR IF IT IS

011104  004767  016016                  JSR     PC,SAPS         ;SAVE THE ERROR PSW
011110  062702  000016                  ADD     #SSR,R2         ;SET UP REGADR
011114  004767  013234                  JSR     PC,SUER2A       ;SET UP ERROR INFO
011120  104006                          ERROR   6               ;SSR COUNT NOT CORRECT

011122  012706  001100          5$:     MOV     #STACK,SP       ;RESET THE STACK POINTER
011126  004767  015744                  JSR     PC,CHPS1        ;GO CLEAR PSW
011132  005011                          CLR     (R1)            ;RESET I.E. BIT
011134  016703  016034                  MOV     DHVCT,R3        ;GET FIRST VECTOR ADDR
011140  010313                          MOV     R3,(R3)         ;RESTORE TRAP CATCHER
011142  062723  000002                  ADD     #2,(R3)+
011146  005013                          CLR     (R3)
```

```
                                    ;;*************************************************************
                                    ;*TEST 35       TEST THAT THE SILO STATUS REG COUNTS UP CORRECTLY
                                    ;;*************************************************************
011150  000004                      TST35:  SCOPE
                                    .REM    %
                                    TEST ABSTRACT:
                                    **************

                                            THIS TEST VERIFIES THAT THE SILO FILL LEVEL COUNTS UP CORRECTLY
                                    WHEN ALL COUNTS (0-77) ARE TESTED BY LOADING THE SILO USING
                                    MAINT MODE. THE TEST SEQUENCE IS AS FOLLOWS:

                                            1.  INIT "$TMP7" TO START WITH A COUNT=01
                                            2.  CLEAR THE DH11
                                            3.  LOAD THE SILO WITH 125252'S IN MAINT MODE
                                                UNTIL # OF WORDS INDICATED BY THE COUNT ARE LOADED
                                            4.  AFTER LOADING REQUIRED COUNT CHECK THAT FILL LEVEL
                                                BITS (SSR<13:08>) EQUAL COUNT - IF NOT REPORT ERROR
                                            5.  INCREMENT COUNT IN "$TMP7" AND REPEAT 1 THRU 4
                                                UNTIL ALL COUNTS (01-77) HAVE BEEN TESED

                                    ERRORS:
                                    *******

                                    1.  [ERROR 6] IS CALLED TO REPORT SILO FILL LEVEL ERRORS

                                    SYNC:   M7277   SH3     INIT A H        EF2
                                    *****

                                    DEBUG:
                                    ******

                                    1.  FAILURES IN THIS TEST MOST LIKELY INDICATE A BAD M7279 MODULE

                                    KEY LOGIC:
                                    **********

                                            M7279   SH2     SSR <13:08>
                                                            LOAD SILO L DJ2
                                                            5.068 MHZ (CLOCK) DN1
                                                            DATA READY L DV1

                                    %
011152  010102                              MOV     R1,R2           ;MAKE REGADR = SSR
011154  062702  000016                      ADD     #SSR,R2
011160  012767  000001  170032              MOV     #1,$TMP7        ;START WITH COUNT OF 1
011166  012711  004000              1$:     MOV     #BIT11,(R1)     ;CLEAR THE DH11
011172  016705  170022                      MOV     $TMP7,R5        ;SAVE CHARACTER COUNT BEING TESTED
011176  005004                              CLR     R4              ;INIT A CHAR COUNTER
011200  052712  100000              2$:     BIS     #BIT15,(R2)     ;SET THE SILO MAINT BIT
011204  012703  001000                      MOV     #1000,R3        ;INIT A TIMER
011210  005303                      3$:     DEC     R3              ;STALL TO ALLOW TIME TO LOAD SILO
011212  001376                              BNE     3$
011214  042712  100000                      BIC     #BIT15,(R2)     ;CLEAR SILO MAINT. BIT
011220  005204                              INC     R4              ;COUNT A CHAR LOADED
011222  005305                              DEC     R5              ;DECREMENT TEST COUNT
```

```
011224  001365                          BNE     2$              ;BR UNTIL WE'VE LOADED THE TEST COUNT

011226  011203                          MOV     (R2),R3         ;SET THE WAS COUNT
011230  042703  140377                  BIC     #140377,R3      ;CLR JUNK BITS
011234  000304                          SWAB    R4              ;SET UP S/B DATA
011236  020304                          CMP     R3,R4           ;TEST COUNT = SILO COUNTER ?
011240  001406                          BEQ     4$              ;BR IF YES

011242  004767  013102          JSR     PC,SUER2                ;GO SET UP ERROR INFO
011246  012767  011166  167634          MOV     #1$,$LPERR      ;SET UP ERROR LOOP RETURN
011254  104006                          ERROR   6               ;SSR FAILED TO UP-COUNT CORRECTLY

011256  005267  167736          4$:     INC     $TMP7           ;INCREMENT TO NEXT COUNT TO TEST
011262  022767  000100  167730          CMP     #100,$TMP7      ;MAXIMUM COUNT ??
011270  001336                          BNE     1$              ;BR IF NOT
```

```
                                   ;;*************************************************************
                                   ;*TEST 36        TEST THAT SILO STATUS REGISTER DOWN COUNTS CORRECTLY
                                   ;;*************************************************************
011272  000004                     TST36:  SCOPE
                                   .REM    %
                                   TEST ABSTRACT:
                                   **************

                                           THIS TEST VERIFIES THAT THE SILO FILL LEVEL COUNTS DOWN PROPERLY
                                   WHEN WORDS ARE READ FROM THE SILO. ALL COUNTS FROM 77-00 ARE
                                   TESTED. THE TEST SEQUENCE IS AS FOLLOWS:

                                           1.  INIT "$TMP7" TO START WITH A COUNT OF 1
                                           2.  CLEAR THE DH11 AND FILL SILO WITH 64. WORDS
                                           3.  READ THE NO. OF WORDS SPECIFIED BY COUNT
                                           4.  CHECK THAT FILL LEVEL=64. MINUS [COUNT] - REPORT ERRORS
                                           5.  INCREMENT "$TMP7" AND REPEAT 2 THRU 4 UNTIL ALL
                                               COUNTS TESTED.

                                   ERRORS:
                                   *******

                                   1.  [ERROR 6] IS CALLED TO REPORT SILO FILL LEVEL ERRORS

                                   SYNC:   M7277   SH3     INIT A H        EF2
                                   *****

                                   DEBUG:          (REFER TO TEST 35)
                                   ******

                                   KEY LOGIC:      (REFER TO TEST 35)
                                   **********

                                   %
011274  010102                             MOV     R1,R2           ;SET UP REGADR
011276  062702  000016                     ADD     #SSR,R2
011302  012767  000001  167710             MOV     #1,$TMP7        ;START WITH COUNT = 1
011310  012711  004000             1$:     MOV     #BIT11,(R1)     ;CLR THE DH11
011314  012705  000100                     MOV     #100,R5         ;TEST COUNT SHOULD BE 64(10) MINUS
011320  166705  167674                     SUB     $TMP7,R5        ;THE NO. OF CHARS READ
011324  012703  000100                     MOV     #100,R3         ;COUNTER USED TO FILL SILO
011330  012704  001000             2$:     MOV     #1000,R4        ;INIT TIMER
011334  052712  100000                     BIS     #BIT15,(R2)     ;SET SILO MAINT. BIT
011340  005304                     3$:     DEC     R4              ;STALL TO ALLOW SILO TO LOAD
011342  001376                             BNE     3$
011344  042712  100000                     BIC     #BIT15,(R2)     ;CLEAR THE SILO MAINT BIT
011350  005303                             DEC     R3              ;COUNT ONE CHAR LOADED
011352  001366                             BNE     2$              ;BR UNTIL ALL LOADED

011354  016703  167640                     MOV     $TMP7,R3        ;INIT COUNTER FOR READING SILO
011360  012704  001000             4$:     MOV     #1000,R4        ;INIT TIMER
011364  005761  000002                     TST     NRC(R1)         ;READ THE SILO
011370  005304                     5$:     DEC     R4              ;GIVE IT TIME TO SETTLE
011372  001376                             BNE     5$
011374  005303                             DEC     R3              ;COUNT ONE READ
011376  001370                             BNE     4$              ;BR UNTIL WE'VE READ TEST COUNT
```

```

011400  011203                          MOV     (R2),R3         ;GET THE WAS DATA
011402  042703  140377                  BIC     #140377,R3      ;CLR JUNK BITS
011406  010504                          MOV     R5,R4           ;SET UP S/B DATA
011410  000304                          SWAB    R4
011412  020304                          CMP     R3,R4           ;DID IT DOWN COUNT OK ??
011414  001406                          BEQ     6$              ;BR IF YES

011416  004767  012726                  JSR     PC,SUER2        ;GO SET UP ERROR INFO
011422  012767  011310  167460          MOV     #1$,$LPERR      ;SET UP ERROR LOOP RETURN
011430  104006                          ERROR   6               ;SILO STATUS REG. DOWN-COUNTED INCORRECTLY

011432  005267  167562          6$:     INC     $TMP7           ;UPDATE COUNT
011436  022767  000101  167554          CMP     #101,$TMP7      ;TESTED ALL COUNTS ??
011444  001321                          BNE     1$              ;BR IF NOT


```

```
                                        ;;*************************************************************
                                        ;*TEST 37        TEST SILO ALARM LEVEL FOR  COUNTS 0,1,2,4,8,16, AND 32
                                        ;;*************************************************************
 011446  000004                         TST37:  SCOPE
                                        .REM    %
                                        TEST ABSTRACT:
                                        **************

                                                THIS TEST VERIFIES THAT THE SILO ALARM LEVEL WORKS PROPERLY FOR
                                        INTEGRAL POWER OF 2 COUNTS (0, 1, 2, 4, 8, 16, AND 32). THE TEST SEQUENCE
                                        IS AS FOLLOWS:

                                                1.  INIT "$TMP7" TO START WITH ALARM LEVEL OF 000
                                                2.  CLEAR THE DH11 AND LOAD THEN SILO WITH THAT NO. OF WORDS
                                                    THAT IS ONE GREATER THAN THE ALARM LEVEL.
                                                3.  VERIFY THAT "DATA READY" DOES NOT SET UNTIL THE FILL
                                                    LEVEL EXCEEDS THE ALARM LEVEL.
                                                4.  REPORT ERRORS IF:
                                                    A.  "READY" SETS TOO SOON
                                                    B.  "READY" SETS TOO LATE
                                                5.  SHIFT "$TMP7" LEFT TO GENERATE NEXT POWER OF 2 LEVEL
                                                6.  REPEAT 2 THRU 5 UNTIL ALL 7 TEST LEVELS CHECKED

                                                NOTE:   FOR (A) ABOVE IF "READY" SETS JUST ONE WORK TOO
                                                        SOON IT IS ALLOWED BY ANYTHING GREATER RESULTS IN
                                                        AN ERROR MESSAGE.

                                        ERRORS:
                                        *******

                                        1.  [ERROR 6] IS CALLED TO REPORT BOTH TYPES OF ERRORS OUTLINED
                                            IN 4(A,B) ABOVE

                                        SYNC:   M7277   SH3     INIT A H        EF2
                                        *****

                                        DEBUG:
                                        ******

                                        1.  ERRORS IN THIS TEST ONLY INDICATE BAD COMPARATOR CHIP (E23 OR E19)
                                            ON THE M7279 - SH2

                                        KEY LOGIC:
                                        **********

                                                M7279   SH2     E19 - PIN 5 (COMPARATOR)
                                                ALSO SAME LOGIC AS TEST 35

                                        %
 011450  012767  011470  167432                 MOV     #1$,$LPERR      ;SET UP THE ERROR LOOP RETURN
 011456  010102                                 MOV     R1,R2           ;SET UP REGADR
 011460  062702  000016                         ADD     #SSR,R2
 011464  005067  167530                         CLR     $TMP7           ;START WITH LEVEL 00
 011470  012711  004000                 1$:     MOV     #BIT11,(R1)     ;CLEAR THE DH11
 011474  016705  167520                         MOV     $TMP7,R5        ;SAVE IT IN R5
 011500  010512                                 MOV     R5,(R2)         ;SET ALARM LEVEL IN SSR
```

```
011502  005205                           INC     R5              ;LOAD ONE MORE THAN FILL LEVEL
011504  052712  100000          2$:      BIS     #BIT15,(R2)     ;SET SILO MAINT. TO LOAD A CHAR
011510  012703  001000                   MOV     #1000,R3        ;INIT STALL TIMER
011514  005303                  3$:      DEC     R3              ;WAIT FOR SILO TO SETTLE
011516  001376                           BNE     3$              ;BR TIL R3 GOES TO 000000
011520  042712  100000                   BIC     #BIT15,(R2)     ;CLR THE SILO MAINT BIT
011524  005305                           DEC     R5              ;COUNT ONE LOADED
011526  105711                           TSTB    (R1)            ;CHAR AVAIL SET YET
011530  100412                           BMI     4$              ;BR IF IT IS
011532  005705                           TST     R5              ;SHOULD IT BE ??
011534  001363                           BNE     2$              ;BR IF NOT
011536  004767  015364                   JSR     PC,SAPS         ;SAVE THE ERROR PSW
011542  004767  000042                   JSR     PC,5$           ;GO SET UP S/B DATA
011546  004767  012602                   JSR     PC,SUER2A       ;GO SET UP ERROR INFO
011552  104006                           ERROR   6               ;SILO ALARM LEVEL FAILED AT SELECTED COUNT
011554  000426                           BR      6$              ;GO CHECK NEXT COUNT
011556  005705                  4$:      TST     R5              ;SHOULD IT HAVE BEEN SET (CHAR AVAIL)
011560  001424                           BEQ     6$              ;BR IF YES
011562  004767  015340                   JSR     PC,SAPS         ;SAVE THE ERROR PSW
011566  022705  000001                   CMP     #1,R5           ;IS IT OFF BY ONLY ONE ??
011572  001417                           BEQ     6$              ;BR IF YES - WE'LL ALLOW HIM THIS
011574  004767  000010                   JSR     PC,5$           ;GO SET UP S/B DATA
011600  004767  012550                   JSR     PC,SUER2A       ;GO SET UP ERROR INFO
011604  104006                           ERROR   6               ;SILO ALARM LEVEL FAILED
011606  000411                           BR      6$              ;GO CHECK NEXT COUNT
011610  011203                  5$:      MOV     (R2),R3         ;GET WAS DATA
011612  016704  167402                   MOV     $TMP7,R4        ;SET UP THE S/B DATA
011616  005204                           INC     R4
011620  000304                           SWAB    R4
011622  105004                           CLRB    R4
011624  156704  167370                   BISB    $TMP7,R4
011630  000207                           RTS     PC              ;RETURN TO SET UP AND REPORT ERROR
011632  005767  167362          6$:      TST     $TMP7           ;COUNT AT ZERO
011636  001002                           BNE     7$              ;BR IF NOT
011640  000261                           SEC                     ;SET THE "C" BIT
011642  000401                           BR      8$              ;GO SET UP COUNT
011644  000241                  7$:      CLC                     ;CLEAR THE "C" BIT
011646  006167  167346          8$:      ROL     $TMP7           ;SHIFT POWER OF TWO BIT
011652  032767  000100  167340           BIT     #BIT6,$TMP7     ;DONE ALL POWERS ??
011660  001703                           BEQ     1$              ;BR IF NOT
```

```
                                        ;;*************************************************************
                                        ;*TEST 40        TRANSMITTER TIMING TEST - ALL SELECTED LINES - ALL SPEEDS
                                        ;;*************************************************************
011662  000004                          TST40:  SCOPE
                                        .REM    %
                                        TEST ABSTRACT:
                                        **************

                                                THIS TEST PERFORMA A "RELATIVE" TIMING TEST FOR ALL BAUD RATES
                                        ON ALL SELECTED LINES. IT DOES NOT MEASURE ABSOLUTE TIMES BUT
                                        SIMPLY VERIFIES THAT EACH SUCCESSIVE SPEED FROM 50 TO 9600
                                        BAUD IS FASTER THAN THE PREVIOUS SPEED. THE TEST SEQUENCE IS AS
                                        FOLLOWS:

                                                1.  SELECT A LINE # TO TEST (AS DEFINED BY "LINSEL:")
                                                2.  INIT "$TMP7" TO START WITH 50 BAUD AND A RELATIVE
                                                    TIMER "TIMEC" TO -1 (177777)
                                                3.  CLEAR THE DH11 AND ACTIVATE SELECTED LINE TO TRANSMIT
                                                    THREE CHARS.
                                                4.  ACTIVATE TIMER TO UPDATE "TIMEB" THE LINE SPEED TIMER
                                                5.  IF "XMIT DONE" FAILS TO SET ON TIME - REPORT ERROR
                                                    AND REPEAT 3 THRU 4 UNTIL ALL SPEEDS CHECKED - THEN
                                                    REPEAT 1 THRU 5 UNTIL ALL LINES CHECKED
                                                6.  IF "XMIT DONE" SETS VERIFY [TIMEB] LESS THAN [TIMEC]
                                                    IF NOT REPORT ERROR - MAKE [TIMEC]=[TIMEB] AND
                                                    REPEAT 3 THRU 5 UNTIL ALL SPEEDS CHECKED
                                                7.  REPEAT 1 THRU 6 FOR ALL SELECTED LINES.

                                        ERRORS:
                                        *******

                                        1.  [ERROR 53] IS CALLED TO REPORT XMIT TIMEOUT ERRORS
                                        2.  [ERROR 17] IS CALLED TO REPORT TIMING ERRORS

                                        SYNC:   M7277   SH3     INIT A H        EF2
                                        *****

                                        DEBUG:
                                        ******

                                        1.  IF ALL LINES FAIL ON ALL SPEEDS SUSPECT THE CLOCK MODULE M4540
                                        2.  IF ALL LINES FAIL ON JUST ONE SPEED (THE SAME ONE) SUPECT EITHER THE
                                            CLOCK MODULE OR THE M7288 MODULE (TIMING SELECT MUXES)
                                        3.  IF JUST ONE LINE FAILS SUSPECT EITHER THE UART MODULE (M7280)
                                            EITHER FOR LINES <15:08> OR <07:00> OR THE M7288 MODULE

                                        KEY LOGIC:
                                        **********

                                                M4540   SH2             <9600:50> BAUD SIGNALS
                                                M7288   SH3             BOT AND TOP BUF CLOCK SIGNALS
                                                        SH4,6,8,OR 10   TX CLOCK NN L SIGNALS
                                                M7280   TBMT LINE "N" SIGNALS ON UART PIN 22
                                                        TX CLOCK LINE "N" SIGNALS ON UART PIN 40

                                        %
```

```
011664  012767  011714  167216          MOV     #2$,$LPERR      ;SET UP ERROR LOOP RETURN
011672  004767  012604          1$:     JSR     PC,SELINE       ;GO SELECT A LINE TO TEST
011676  000534                          BR      TST41           ;;BR IF TESTED ALL SELECTED LINES
011700  012767  002100  167312          MOV     #2100,$TMP7     ;INIT TI START WITH LOWEST SPEED
011706  012767  177777  016330          MOV     #-1,TIMEC       ;INIT RELATIVE TIME CHECKER
011714  012711  004000          2$:     MOV     #BIT11,(R1)     ;CLEAR THE DH11
011720  156711  016266          3$:     BISB    LINE,(R1)       ;SELECT IT IN THE SCR
011724  012761  177775  000010          MOV     #-3,BCR(R1)     ;SET BYTE COUNT TO XFER 3 CHARS
011732  005061  000006                  CLR     CAR(R1)         ;GET TEST DATA STARTING AT LOC. 0
011736  016761  167256  000004          MOV     $TMP7,LPR(R1)   ;SELECT A XMIT SPEED
011744  016761  015234  000012          MOV     LINMSK,BAR(R1)  ;ACTIVATE THE TRANSMITTER

011752  012767  000001  016260          MOV     #1,TIMEA        ;INIT TIMER A
011760  005067  016256                  CLR     TIMEB           ;INIT TIMER B
011764  005711                  4$:     TST     (R1)            ;XMITTR DONE SET YET ?
011766  100437                          BMI     5$              ;BR IF YES
011770  004767  014750                  JSR     PC,TIMEIT       ;CALL THE TIMER
011774  000773                          BR      4$              ;TIMER ROUTINE WILL MOVE RETURN PC
                                                                ;AROUND THIS BRANCH IF TIME OUT OCCURS

011776  016767  167216  167176          MOV     $TMP7,$TMP0     ;SAVE AND SET UP THE SPEED CODE
012004  000367  167172                  SWAB    $TMP0
012010  006267  167166                  ASR     $TMP0
012014  006267  167162                  ASR     $TMP0
012020  042767  177760  167154          BIC     #177760,$TMP0
012026  011103                          MOV     (R1),R3         ;GET THE WAS DATA
012030  042703  000200                  BIC     #BIT07,R3       ;CLEAR UNINTERESTING BITS
012034  010102                          MOV     R1,R2           ;MAKE REGADR = DEVADR
012036  012704  100000                  MOV     #BIT15,R4       ;SET UP S/B DATA
012042  156704  016144                  BISB    LINE,R4
012046  004767  012302                  JSR     PC,SUER2A       ;GO SET UP ERROR INFO
012052  004567  012516                  JSR     R5,SUNUM        ;GO SET LINE NO. IN MSG
012056  030212                          LINE
012060  034144                          EM50+53
012062  104053                          ERROR   53              ;TIMED OUT WAITING FOR XMIT DONE
012064  000426                          BR      8$              ;GO TEST NEXT SPEED

012066  016703  016150          5$:     MOV     TIMEB,R3        ;GET THE WAS COUNT
012072  016704  016146                  MOV     TIMEC,R4        ;GET LASTR CHECK COUNT
012076  020304                          CMP     R3,R4           ;COMPARE RELATIVE TIMES
012100  103420                          BLO     8$              ;BR IF THIS SPEED FASTER THAN LAST
                                                                ;SPEED TESTED

012102  004767  015020          7$:     JSR     PC,SAPS         ;SAVE THE ERROR PSW
012106  016702  167106                  MOV     $TMP7,R2        ;GET SPEED CODE AND RIGHT JUSTIFY
012112  000302                          SWAB    R2
012114  006202                          ASR     R2
012116  006202                          ASR     R2
012120  042702  177760                  BIC     #177760,R2      ;STRIP AWAY ALL JUNK
012124  004767  012224                  JSR     PC,SUER2A       ;GO SET UP ERROR INFO
012130  004567  012440                  JSR     R5,SUNUM        ;GO PUT LINE NO. IN MSG
012134  030212                          LINE
012136  031507                          EM17+41
012140  104017                          ERROR   17              ;TRANSMITTER SPEED INCORRECT

012142  016767  016074  016074  8$:     MOV     TIMEB,TIMEC     ;SET UP NEW CHECK TIMER COUNT
```

```
3732  012150  062767  002100  167042          ADD     #2100,$TMP7     ;GENERATE NEXT SPEED
3733  012156  022767  035600  167034          CMP     #35600,$TMP7    ;DONE ALL SPEEDS ?
3734  012164  001253                          BNE     2$              ;BR IF NOT
3735  012166  000641                          BR      1$              ;GO TEST NEXT LINE
3736
```

```
                                        ;;*************************************************************
                                        ;*TEST 41        RECEIVER TIMING TEST - ALL SELECTED LINES - ALL SPEEDS
                                        ;;*************************************************************
012170  000004                          TST41:  SCOPE
                                        .REM    %
                                        TEST ABSTRACT:
                                        **************

                                                THIS TEST ID IDENTICAL TO TEST 42 EXCEPT IT WAITS FOR "DATA READY"
                                        TO CHECK RECEIVER TIMING. THE SEQUENCE IS SIMILAR AND THE SAME TIMERS
                                        ARE USED FOR ERROR CHECKING.

                                        ERRORS:
                                        *******

                                        1.  [ERROR 54] IS CALLED TO REPORT RCVR TIMEOUT ERRORS
                                        2.  [ERROR 20] IS CALLED TO REPORT RCVR TIMING ERRORS

                                        SYNC:   M7277   SH3     INIT A H        EF2
                                        *****

                                        DEBUG:          (SAME AS TEST 42)
                                        ******

                                        KEY LOGIC:      (SAME AS TEST 42 PLUS)
                                        **********

                                                M7288   SH5,7,9,11      RX CLOCK NN L SIGNALS
                                                M7280   BUF DA LINE "N" UART PIN 19
                                                        RX CLOCK LINE "N" UART PIN 17

                                        %
012172  012767  012222  166710                  MOV     #2$,$LPERR      ;SET UP ERROR LOOP RETURN
012200  004767  012276                  1$:     JSR     PC,SELINE       ;GO SELECT A LINE TO TEST
012204  000532                                  BR      TST42           ;;BR IF TESTED ALL SELECTED LINES
012206  012767  002100  167004                  MOV     #2100,$TMP7     ;INIT TO START WITH LOWEST SPEED
012214  012767  177777  016022                  MOV     #-1,TIMEC       ;INIT RELATIVE TIME CHECKER
012222  012711  004000                  2$:     MOV     #BIT11,(R1)     ;CLEAR THE DH11
012226  156711  015760                  3$:     BISB    LINE,(R1)       ;SELECT IT IN THE SCR
012232  012761  177777  000010                  MOV     #-1,BCR(R1)     ;SET BYTE COUNT TO XFER 1 CHAR
012240  005061  000006                          CLR     CAR(R1)         ;GET TEST DATA STARTING AT LOC. 0
012244  016761  166750  000004                  MOV     $TMP7,LPR(R1)   ;SELECT A XMIT SPEED
012252  016761  014726  000012                  MOV     LINMSK,BAR(R1)  ;ACTIVATE THE TRANSMITTER

012260  012767  000001  015752                  MOV     #1,TIMEA        ;INIT TIMER A
012266  005067  015750                          CLR     TIMEB           ;INIT TIMER B
012272  105711                          4$:     TSTB    (R1)            ;RCVR DONE YET ??
012274  100435                                  BMI     5$              ;BR IF YES
012276  004767  014442                          JSR     PC,TIMEIT       ;CALL THE TIMER
012302  000773                                  BR      4$              ;TIMER ROUTINE WILL MOVE RETURN PC
                                                                        ;AROUND THIS BRANCH IF TIME OUT OCCURS

012304  016767  166710  166670                  MOV     $TMP7,$TMP0     ;SAVE AND SET UP THE SPEED CODE
012312  006367  166664                          ASL     $TMP0
012316  006367  166660                          ASL     $TMP0
012322  000367  166654                          SWAB    $TMP0
```

```
012326  042767  177760  166646          BIC     #177760,$TMPO
012334  011103                          MOV     (R1),R3                 ;GET THE WAS DATA
012336  010102                          MOV     R1,R2                   ;MAKE REGADR = DEVADR
012340  012704  100200                  MOV     #BIT15+BIT07,R4         ;SET UP S/B DATA
012344  156704  015642                  BISB    LINE,R4
012350  004767  012000                  JSR     PC,SUER2A               ;GO SET UP ERROR INFO
012354  004567  012214                  JSR     R5,SUNUM                ;GO SET LINE NO. IN MSG
012360  030212                          LINE
012362  031766                          EM22+51
012364  104054                          ERROR   54                      ;TIMED OUT WAITING FOR CHAR AVAIL
012366  000426                          BR      8$                      ;GO TEST NEXT SPEED

012370  016703  015646          5$:     MOV     TIMEB,R3                ;GET THE WAS COUNT
012374  016704  015644                  MOV     TIMEC,R4                ;GET THE CHECK COUNT
012400  020304                          CMP     R3,R4                   ;COMPARE RELATIVE TIMES
012402  103420                          BLO     8$                      ;BR IF TIME INDICATES THIS SPEED FASTER
                                                                        ;THAN LAST SPEED

012404  004767  014516          7$:     JSR     PC,SAPS                 ;SAVE THE ERROR PSW
012410  016702  166604                  MOV     $TMP7,R2                ;GET SPEED CODE AND RIGHT JUSTIFY
012414  006302                          ASL     R2
012416  006302                          ASL     R2
012420  000302                          SWAB    R2
012422  042702  177760                  BIC     #177760,R2              ;STRIP AWAY ALL JUNK
012426  004767  011722                  JSR     PC,SUER2A               ;GO SET UP ERROR INFO
012432  004567  012136                  JSR     R5,SUNUM                ;GO PUT LINE NO. IN MSG
012436  030212                          LINE
012440  031646                          EM20+36
012442  104020                          ERROR   20                      ;RECEIVER SPEED INCORRECT

012444  016767  015572  015572  8$:     MOV     TIMEB,TIMEC             ;SET UP NEW CHECK TIMER COUNT
012452  062767  002100  166540          ADD     #2100,$TMP7             ;GENERATE NEXT SPEED
012460  022767  035600  166532          CMP     #35600,$TMP7            ;DONE ALL SPEEDS ?
012466  001255                          BNE     2$                      ;BR IF NOT
012470  000643                          BR      1$                      ;GO TEST NEXT LINE
```

3829

```
                                        ;;***************************************************************
                                        ;*TEST 42        VERIFY STORAGE OVERFLOW - NON MAINT. MODE - ALL SELECTED LINES
                                        ;;***************************************************************
 012472  000004                         TST42:  SCOPE
                                        .REM    %
                                        TEST ABSTRACT:
                                        **************

                                                THIS TEST VERIFIES THAT THE STORAGE OVERFLOW BIT (SCR14) SETS
                                        AND CLEARS PROPERLY FOR ALL SELECTED LINES. THE TEST SEQUENCE IS AS
                                        FOLLOWS:

                                                1. SET UP THE ERROR RETURN
                                                2. SELECT A LINE NUMBER TO TEST - GO TO NEXT TEST IF ALL
                                                   SELECTED LINES HAVE BEEN TESTED.
                                                3. PRIME THE SELECTED LINE TO XMIT 65(10) CHARS.
                                                4. ACTIVATE THE SELECTED LINE AND WAIT FOR STORAGE OVERFLOW
                                                   TO SET (SCR14=1)
                                                5. IF SCR14 FAILS TO SET ON TIME - REPORT ERROR AND THEN
                                                   CONTINUE WITH THE NEXT LINE (STEP 2).
                                                6. IF IT SETS OK - READ THE "NRC" REG TWICE TO EMPTY TWO
                                                   WORDS FROM THE SILO.
                                                7. AFTER A BRIEF STALL, VERIFY THAT SCR14 HAS CLEARED -
                                                   IF NOT REPORT ERROR AND CONTINUE WITH NEXT LINE (STEP2)
                                                8. IF IT CLEARS OK, VERIFY THAT THE FILL COUNT (SSR<15:08>)
                                                   CONTAINS A 77(8) - IF NOT REPORT ERROR AND CONTINUE
                                                   WITH NEXT LINE  (STEP 2).
                                                9. REPEAT STEPS 2 THRU 8 UNTIL ALL SELECTED LINES HAVE BEEN
                                                   TESTED.

                                        ERRORS:
                                        *******

                                        1. [ERROR  57] IS CALLED TO REPORT ALL ERRORS DETECTED.


                                        SYNC:   M7277   SH3     INIT A  H       EF2
                                        *****

                                        DEBUG:
                                        ******

                                        1. PROBLEM IS MOST LIKELY ON THE M7289 MODULE (SH4) OR SOME
                                           SIGNAL FEEDING THIS LOGIC.

                                        KEY LOGIC:
                                        **********

                                                M7289   SH4     STORAGE OVERFLOW L      E43-12
                                                                READY IN PULSE H        E40-11
                                                                UC1 MASTER DA H         BH2
                                                                UC2 MASTER DA H         BD2

                                        %
 012474  012767  012510  166406                 MOV     #2$,$LPERR      ;SET UP ERROR RETURN
 012502  004767  011774                 1$:     JSR     PC,SELINE       ;GO SELECT A LINE NO. TO TEST
```

```
012506	000535				BR	TST43		;;BR IF DONE ALL SELECTED LINES
012510	012711	004000		2$:	MOV	#BIT11,(R1)	;CLEAR THE DH11
012514	010102				MOV	R1,R2		;MAKE REGADR = DEVADR
012516	116711	015470			MOVB	LINE,(R1)	;SELECT A LINE
012522	005061	000006			CLR	CAR(R1)		;SET UP CURRENT ADDRESS
012526	012761	177677	000010		MOV	#-65.,BCR(R1)	;SET UP BYTE COUNT
012534	012761	033500	000004		MOV	#33500,LPR(R1)	;SET UP LPR: 9600 BAUD,5 BIT CHARS
012542	016761	014436	000012		MOV	LINMSK,BAR(R1)	;ACTIVATE THE SELECTED LINE

012550	012767	000001	015462		MOV	#1,TIMEA	;INIT TIMERS
012556	005067	015460			CLR	TIMEB
012562	032711	040000		3$:	BIT	#BIT14,(R1)	;STOREGE OVERFLOW YET ??
012566	001024				BNE	4$		;BR IF YES YOU SHOULD GET IT
012570	004767	014150			JSR	PC,TIMEIT	;CALL TIMER
012574	000772				BR	3$		;BR IF NO TIME OUT

012576	004767	014324			JSR	PC,SAPS		;GO SAVE PSW
012602	012704	040000			MOV	#BIT14,R4	;SET UP S/B DATA
012606	156704	015400			BISB	LINE,R4
012612	011103				MOV	(R1),R3		;SET UP WAS DATA
012614	042703	137760			BIC	#137760,R3	;CLEAR UNINTERESTING BITS
012620	004767	011530			JSR	PC,SUER2A	;GO SET UP ERROR INFO
012624	004567	011744			JSR	R5,SUNUM	;PUT LINE NO. IN MESSAGE
012630	030212				LINE
012632	034631				EM57+44
012634	104057				ERROR	57		;STORAGE OVERFLOW FAILED TO SET
012636	000721				BR	1$		;GO TRY NEXT LINE

012640	016167	000002	166352	4$:	MOV	NRC(R1),$TMP7	;READ THE SILO
012646	016167	000002	166344		MOV	NRC(R1),$TMP7	;READ IT AGAIN
012654	012705	001000			MOV	#1000,R5	;INIT STALL COUNTER
012660	005305			41$:	DEC	R5		;COUNT TIMER
012662	001376				BNE	41$		;BR IF NO TIMEOUT
012664	032711	040000			BIT	#BIT14,(R1)	;DID OVERFLOW GO AW   ?
012670	001420				BEQ	5$		;BR IF YES

012672	004767	014230			JSR	PC,SAPS		;GO SAVE THE PSW
012676	005004				CLR	R4		;SET UP S/B DATA
012700	156704	015306			BISB	LINE,R4
012704	011103				MOV	(R1),R3		;SET UP WAS DATA
012706	042703	137760			BIC	#137760,R3	;CLEAR UNINTERESTING BITS
012712	004767	011436			JSR	PC,SUER2A	;GO SET UP ERROR INFO
012716	004567	011652			JSR	R5,SUNUM	;PUT LINE NO. IN MSG
012722	030212				LINE
012724	034631				EM57+44
012726	104057				ERROR	57		;STORAGE BIT FAILED TO CLEAR
012730	000664				BR	1$		;GO TRY NEXT LINE

012732	122761	000077	000017	5$:	CMPB	#77,SSR+1(R1)	;WAS IT REALLY 65. ??
012740	001660				BEQ	1$

012742	004767	014160			JSR	PC,SAPS		;GO SAVE PSW
012746	012704	037400			MOV	#37400,R4	;SET UP S/B DATA
012752	062702	000016			ADD	#SSR,R2		;SET UP REGADR
012756	016103	000016			MOV	SSR(R1),R3	;SAVE WAS DATA
012762	004767	011366			JSR	PC,SUER2A	;GO SET UP ERROR INFO
```

F01


```
3942  012766  004567  011602      JSR     R5,SUNUM        ;PUT LINE NO. IN MSG
3943  012772  030212              LINE
3944  012774  034631              EM57+44
3945  012776  104057              ERROR   57              ;READING SILO F  LED TO DEC SSR OR
3946                                                      ;STORAGE OVFL SE  9T WRONG COUNT
3947  013000  000640              BR      1$              ;GO TRY NEXT LINE
```

```
                                        ;;*****************************************************************
                                        ;*TEST 43        BASIC DATA TEST - ALL SELECTED LINES/ALL CHAR LENGTHS
                                        ;;*****************************************************************
 013002  000004                         TST43:  SCOPE
                                        .REM    %
                                        TEST ABSTRACT:
                                        **************

                                                THIS TEST VERIFIES THAT A SINGLE ALL ONES CHAR. CAN BE TRANS-
                                        MITTED AND RECEIVED ON ALL SELECTED LINES AT ALL FOUR CHAR LENGTHS
                                        (5, 6, 7, AND 8 BITS). THE TEST SEQUENCE IS AS FOLLOWS:

                                                1. SET UP THE ERROR LOOP RETURN
                                                2. SELECT A LINE NO. TO TEST - GO TO TEST 43 IF DONE ALL
                                                   SELECTED LINES.
                                                3. GET A TEST CHARACTER FROM THE DATA TABLE AND UPDATE THE
                                                   TABLE POINTER.
                                                4. CLEAR THE DH11
                                                5. PRIME THE SELECTED LINE TO XMIT ONE CHAR AT 9600 BAUD
                                                6. WAIT FOR "CHAR AVAIL" TO SET - IF TIMEOUT REPORT ERROR AND
                                                   RESTART AT STEP 8.
                                                7. IF NO TIMEOUT - CHECK DATA AND REPORT ANY ERRORS
                                                8. INCREMENT "SCR" REG TO CHANGE CHAR LENGTH - IF DONE
                                                   ALL FOUR GO TO STEP 2 - IF NOT THEN STEP 4.

                                        ERRORS:
                                        ******

                                        1. [ERROR  55] IS CALLED TO REPORT RCVR TIMEOUT.
                                        2. [ERROR  23] IS CALLED TO REPORT DATA COMPARE ERRORS

                                        SYNC:   M7277   SH3     INIT A H        EF2
                                        *****

                                        DEBUG:
                                        ******

                                        1. IF FAULT AFFECTS ONLY ONE LINE AT ALL CHAR LENGTHS, SUSPECT A
                                           BAD UART MODULE M7280.

                                        2. IF FAULT AFFECTS ONLY ONE BIT ON ALL LINES, SUSPECT THE
                                            THE M7279 MODULE.
                                        3. IF FAULT AFFECTS ONLY CERTAIN CHAR LENGTHS, SUSPECT EITHER THE M7278
                                           OR THE UART MODULE M7280.

                                        KEY LOGIC:
                                        **********

                                                M7280'S UART CHIPS PINS <12:05>

                                                M7279   SH1     E1,E2,E6, OR E7

                                                M7278   SH8     NB2 LPR 01 H    FH1
                                                                NB1 LPR 00 H    FH2
                                        %
 013004  012767  013032  166076                 MOV     #3$,$LPERR      ;SET UP ERROR LOOP RETURN
```

```
013012 004767 011464         1$:  JSR   PC,SELINE        ;GO SELECT A LINE TO TEST
013016 000511                     BR    TST44            ;;BR IF DONE ALL SELECTED LINES
013020 012705 030226              MOV   #TDATA2,R5       ;GET POINTER TO DATA TABLE
013024 005002                     CLR   R2               ;INIT R2 TO START AT CHAR LENGTH OF 5 BITS
013026 012567 166166         2$:  MOV   (R5)+,$TMP7      ;PUT TEST CHAR IN XMIT BUFFER
013032 012711 004000         3$:  MOV   #BIT11,(R1)      ;CLEAR THE DH11
013036 156711 015150              BISB  LINE,(R1)        ;SELECT THE LINE
013042 012761 177777 000010       MOV   #-1,BCR(R1)      ;SET BYTE COUNT TO -1
013050 012761 001220 000006       MOV   #$TMP7,CAR(R1)   ;SET CURRENT ADDRESS REG
013056 012761 033500 000004       MOV   #33500,LPR(R1)   ;SET BAUD RATE TO 9600
013064 050261 000004              BIS   R2,LPR(R1)       ;SELECT CHAR LENGTH
013070 156761 014110 000012       BISB  LINMSK,BAR(R1)   ;ACTIVATE THE SELECTED LINE

013076 012767 000001 015134       MOV   #1,TIMEA         ;INIT TIMER A
013104 005067 015132              CLR   TIMEB            ;INIT TIMER B
013110 105711                4$:  TSTB  (R1)             ;RCVR DONE YET ??
013112 100424                     BMI   5$               ;BR IF YES
013114 004767 013624              JSR   PC,TIMEIT        ;CALL THE TIMER
013120 000773                     BR    4$               ;TIMER ROUTINE WILL MOVE RETURN PC
                                                         ;AROUND THIS BRANCH IF TIME OUT OCCURS

013122 004767 014000              JSR   PC,SAPS          ;SAVE THE ERROR PSW
013126 011103                     MOV   (R1),R3          ;GET THE SCR
013130 042703 177560              BIC   #177560,R3       ;CLEAR UNINTERESTING BITS
013134 012704 000200              MOV   #200,R4          ;SET UP S/B DATA
013140 156704 015046              BISB  LINE,R4
013144 004767 011204              JSR   PC,SUER2A        ;GO SET UP ERROR INFO
013150 004567 011420              JSR   R5,SUNUM         ;GO SET LINE NO. IN MSG
013154 030212                     LINE
013156 031766                     EM22+51
013160 104055                     ERROR 55               ;CHAR AVAIL FAILED TO SET ON TIME
013162 000422                     BR    6$               ;GO TEST NEXT CHAR LENGTH

013164 016103 000002         5$:  MOV   NRC(R1),R3       ;GET THE WAS DATA
013170 012704 000200              MOV   #200,R4          ;SET UP THE S/B DATA IN R4
013174 156704 015012              BISB  LINE,R4
013200 000304                     SWAB  R4
013202 156704 166012              BISB  $TMP7,R4
013206 020304                     CMP   R3,R4            ;WAS THE RCVD DATA CORRECT ??
013210 001407                     BEQ   6$               ;BR IF YES

013212 004767 011132              JSR   PC,SUER2         ;GO SET UP THE ERROR INFO
013216 004567 011352              JSR   R5,SUNUM         ;GO PUT LINE NO. IN MSG
013222 030212                     LINE
013224 032027                     EM23+36
013226 104023                     ERROR 23               ;DATA COMPARE ERROR

013230 005202                6$:  INC   R2               ;DO NEXT CHAR LENGTH ON SELECTED LINE
013232 022702 000004              CMP   #4,R2            ;HAVE WE DONE ALL FOUR CHAR LENGTHS ??
013236 001273                     BNE   2$               ;BR IF NOT
013240 000664                     BR    1$               ;GO DO NEXT LINE
```

```
                                ;;*************************************************************
                                ;*TEST 44        SINGLE LINE DATA TEST - ALL SELECTED LINES
                                ;;*************************************************************
013242  000004                  TST44:  SCOPE
                                .REM    %
                                TEST ABSTRACT:
                                **************

                                        THIS TEST TRANSMITS AND RECEIVES A BINARY COUNT PATTERN
                                (000 - 377) ON ALL SELECTED LINES. THE TEST SEQUENCE IS AS
                                FOLLOWS:

                                        1. SET UP THE ERROR LOOP RETURN
                                        2. GO SELECT A LINE NO. TO TEST - IF DONE ALL SELECTED
                                           LINES THEN GO TO TEST 44.
                                        3. CLEAR THE DH11 AND PRIME THE SELECTED LINE TO XMIT
                                           TO XMIT 256. CHARS AT 9600. BAUD - 8 BIT CHARS.
                                        4. SET UP R5 TO POINT TO RCVR CORE BUFFER.
                                        5. ACTIVATE THE SELECTED XMITTER.
                                        6. WAIT FOR "CHAR AVAIL" TO SET BEFORE READING THE SILO.
                                           IF RCVR TIMEOUT REPORT ERROR AND RESTART AT STEP 2.
                                        7. IF NO TIMEOUT READ THE SILO AND STORE THE WORD IN THE RCVR
                                           CORE BUFFER - WHEN THE BUFFER IS FULL GO TO STEP8 IF NOT
                                           THEN GO TO STEP 6.
                                        8. COMPARE THE XMIT AND RCVR CORE IMAGE BUFFERS AND REPORT
                                           ALL DATA COMPARE ERRORS.
                                        9. CHECK THE "BAR", "BCR", AND "CAR" REGISTERS FOR CORRECT
                                           CONTENTS - REPORT ALL ERRORS.
                                        10.GO TO STEP 2

                                                NOTE:   THIS TEST USES THE MAINT. BIT (SCR09=1) TO
                                                        TURN THE DATA AROUND INSTEAD OF THE MAINT
                                                        CONNECTORS OR MODULE.

                                ERRORS:
                                *******

                                1. [ERROR  22] IS CALLED TO REPORT "DATA AVAIL" TIMEOUT
                                2. [ERROR  37] "        "       " DATA COMPARE ERRORS
                                3. [ERROR  40] "        "       " "BAR" REG NOT CLEARED
                                4. [ERROR  10] "        "       " "BCR" REG NOT ALL ZEROES
                                5. [ERROR   7] "        "       " "CAR" REG NOT UPDATED CORRECTLY

                                SYNC:   M7277   SH3     INIT A H        EF2
                                *****

                                DEBUG:
                                *******

                                1. IF THE FAULT AFFECTS ONE OR MORE LINES IN AN 8 LINE GROUP <15:08>
                                   OR <07:00>, SWAP THE M7280 MODULES. IF THE FAULT SHIFTS SO THAT
                                   THE ERROR INDICATES DIFFERENT LINES THE PROBLEM IS MOST LIKELY
                                   THE M7280 THE SYMPTOM SHIFTED TO.

                                2. IF THE FAULT GIVES DATA ERRORS BUT AFFECTS ONLY CERTAIN PATTERNS ON
                                   ONE LINE THE FAULT IS MOST LIKELY A "UART" CHIP.
```

```

                                      3. IF THE FAULT GIVES DATA ERRORS BUT AFFECTS ONLY CERTAIN PATTERNS
                                         ON ALL LINES SUSPECT THE DATA PATHS EXTERNAL TO, THE M7280 MODULES.

                                      4. IF THE FAULT CAUSES NO DATA ERRORS BUT GIVES "BAR", "BCR", OR "CAR" ERRORS
                                         SUSPECT THE M7278 OR M7277 MODULES RESPECTFULLY.

                                      KEY LOGIC        (REFER TO TEST 43)
                                      ***********

                                      %
013244  012767  013266  165636                MOV     #2$,$LPERR       ;SET UP ERROR LOOP RETURN
013252  004767  011224                1$:     JSR     PC,SELINE        ;GO SELECT A LINE TO TEST
013256  000401                                BR      11$              ;;BR IF ALL SELECTED LINES DONE
013260  000402                                BR      2$               ;GO TEST IT
013262  000167  000424                11$:    JMP     8$               ;EXIT TEST
013266  016701  013700                2$:     MOV     DHADR,R1         ;RESET DEVADR
013272  012711  004000                        MOV     #BIT11,(R1)      ;CLEAR THE DH11
013276  156711  014710                        BISB    LINE,(R1)        ;SET SELECT BITS IN SCR
013302  012761  037112  000006                MOV     #TBUF,CAR(R1)    ;SET UP BUS ADDRESS REG
013310  012761  177400  000010                MOV     #-400,BCR(R1)    ;SET UP BYTE COUNT
013316  012761  033503  000004                MOV     #33503,LPR(R1)   ;SET LINE PARAMETERS
013324  012705  036112                        MOV     #RBUF,R5         ;SET UP POINTER TO INPUT DATA BUFFER
013330  052711  001000                        BIS     #BIT09,(R1)      ;SET MAINT MODE BIT
013334  016761  013644  000012                MOV     LINMSK,BAR(R1)   ;ACTIVATE THE SELECTED LINE

013342  012767  000002  014670                MOV     #2,TIMEA         ;INIT TIMER A
013350  005067  014666                        CLR     TIMEB            ;INIT TIMER B
013354  105711                        3$:     TSTB    (R1)             ;RCVR DONE YET ??
013356  100425                                BMI     4$               ;BR IF YES
013360  004767  013360                        JSR     PC,TIMEIT        ;CALL THE TIMER
013364  000773                                BR      3$               ;TIMER ROUTINE WILL MOVE RETURN PC
                                                                       ;AROUND THIS BRANCH IF TIME OUT OCCURS

013366  004767  013534                        JSR     PC,SAPS          ;SAVE THE ERROR PSW
013372  010102                                MOV     R1,R2            ;SET UP REGADR
013374  011203                                MOV     (R2),R3          ;GET THE WAS DATA
013376  042703  176400                        BIC     #176400,R3       ;CLEAR JUNK BITS
013402  012704  001200                        MOV     #1200,R4         ;SET UP S/B DATA
013406  156704  014600                        BISB    LINE,R4
013412  004767  010736                        JSR     PC,SUER2A        ;GO SET UP ERROR INFO
013416  004567  011152                        JSR     R5,SUNUM         ;PUT LINE NO. IN MESSAGE
013422  030212                                LINE
013424  031766                                EM22+51
013426  104022                                ERROR   22               ;CHAR AVAIL TIMEOUT
013430  000710                                BR      1$               ;GO TRY NEXT LINE

013432  016125  000002                4$:     MOV     NRC(R1),(R5)+    ;SAVE THE RECEIVED DATA
013436  022705  037112                        CMP     #RBUF+1000,R5    ;INPUT BUFFER FULL ??
013442  001344                                BNE     3$               ;BR IF NOT

013444  012702  037112                        MOV     #TBUF,R2         ;SET UP POINTER TO OUTPUT BUFFER
013450  012701  036112                        MOV     #RBUF,R1         ;SET UP POINTER TO INPUT BUFFER
013454  111204                        5$:     MOVB    (R2),R4          ;SET UP S/B DATA IN R4
013456  042704  177400                        BIC     #177400,R4
013462  000304                                SWAB    R4
```

```
013464 156704 014522          BISB    LINE,R4
013470 152704 000200          BISB    #200,R4
013474 000304                 SWAB    R4
013476 011103                 MOV     (R1),R3              ;GET THE WAS DATA
013500 020304                 CMP     R3,R4                ;DATA CORRECT ??
013502 001407                 BEQ     6$                   ;BR IF YES

013504 004767 010640          JSR     PC,SUER2             ;GO SET UP ERROR INFO
013510 004567 011060          JSR     R5,SUNUM             ;PUT LINE NO. IN MESSAGE
013514 030212                 LINE
013516 033244                 EM37+33
013520 104037                 ERROR   37                   ;DATA COMPARE ERROR


013522 005202          6$:    INC     R2                   ;UPDATE DATA BUFFER POINTERS
013524 062701 000002          ADD     #2,R1                ;
013530 022701 037112          CMP     #RBUF+1000,R1        ;COMPARED ALL 256. CHARS ??
013534 001347                 BNE     5$                   ;BR IF NOT

013536 016701 013430          MOV     DHADR,R1             ;RESET DEVADR
013542 010102                 MOV     R1,R2                ;SET UP REGADR
013544 062702 000012          ADD     #BAR,R2
013550 005712                 TST     (R2)                 ;WAS THE "BAR" ALL ZEROES ??
013552 001413                 BEQ     7$                   ;BR IF YES

013554 004767 013346          JSR     PC,SAPS              ;SAVE THE ERROR PSW
013560 011203                 MOV     (R2),R3              ;GET THE WAS DATA
013562 005004                 CLR     R4                   ;SET UP S/B DATA
013564 004767 010564          JSR     PC,SUER2A            ;GO SET UP ERROR INFO
013570 004567 011000          JSR     R5,SUNUM             ;PUT LINE NO. IN MESSAGE
013574 030212                 LINE
013576 033307                 EM40+40
013600 104040                 ERROR   40                   ;"BAR" REG NOT ALL ZEROES

013602 010102          7$:    MOV     R1,R2                ;SET UP REGADR
013604 062702 000010          ADD     #BCR,R2
013610 005712                 TST     (R2)                 ;BYTE COUNT REG ALL ZEROES ?
013612 001413                 BEQ     71$                  ;;BR IF BYTE COUNT ZERO

013614 004767 013306          JSR     PC,SAPS              ;SAVE THE ERROR PSW
013620 011203                 MOV     (R2),R3              ;GET THE WAS DATA
013622 005004                 CLR     R4                   ;SET UP THE S/B DATA
013624 004767 010524          JSR     PC,SUER2A            ;GO SET UP ERROR INFO
013630 004567 010740          JSR     R5,SUNUM             ;PUT LINE NO. IN MESSAGE
013634 030212                 LINE
013636 031114                 EM10+44
013640 104010                 ERROR   10                   ;BYTE COUNT NOT ALL ZEROES

013642 010102          71$:   MOV     R1,R2                ;SET UP REGADR
013644 062702 000006          ADD     #CAR,R2
013650 022712 037512          CMP     #TBUF+400,(R2)       ;DID "CAR" INCREMENT PROPERLY ?
013654 001414                 BEQ     72$                  ;BR IF YES

013656 004767 013244          JSR     PC,SAPS              ;SAVE THE ERROR PSW
013662 011203                 MOV     (R2),R3              ;GET THE WAS DATA
013664 012704 037512          MOV     #TBUF+400,R4         ;SET UP S/B DATA
```

```
013670  004767  010460                  JSR     PC,SUER2A       ;GO SET UP ERROR INFO
013674  004567  010674                  JSR     R5,SUNUM        ;GO PUT LINE NO IN MESSAGE
013700  030212                          LINE
013702  031045                          EM7+47
013704  104007                          ERROR   7               ;"CAR" NOT UPDATED CORRECTLY

013706  000167  177340          72$:    JMP     1$              ;GO DO NEXT LINE

013712  000240                  8$:     NOP                     ;EXIT POINT
```

```
                                   ;;*************************************************************
                                   ;*TEST 45        BASIC PARITY LOGIC TEST - ALL SELECTED LINES - ODD PARITY
                                   ;;*************************************************************
 013714  000004                    TST45:  SCOPE
                                   .REM    %
                                   TEST ABSTRACT:
                                   ****************

                                           THIS TEST VERIFIES THE ODD PARITY FUNCTION FOR ALL SELECTED
                                   LINES USING THE "BREAK" FUNCTION TO FORCE PARITY ERRORS. REFER TO
                                   THE FLOW CHARTS IN THE PROGRAM DOCUMENTATION FOR TEST SEQUENCES.

                                   ERRORS:
                                   *******

                                   1. [ERROR  22] IS CALLED TO REPORT RCVR TIMEOUT
                                   2. [ERROR  33] IS CALLED TO REPORT DATA/PARITY ERRORS

                                   SYNC:    M7277    SH3     INIT A H         EF2
                                   *****

                                   DEBUG:
                                   ******

                                   1. IF FAULT AFFECTS ALL LINES SUSPECT THE M7278 MODULE.

                                   2. IF IT AFFECTS ONLY ONE LINE SUSPECT THE "UART" MODULE FOR THAT LINE.


                                   KEY LOGIC:
                                   **********

                                           M7278    SH7     PEN LPR04 L      FF2
                                                            PEV LPR05 L      FN1
                                   %
 013716  012767  013732  165164            MOV     #2$,$LPERR          ;SET UP ERROR LOOP RETURN
 013724  004767  010552            1$:     JSR     PC,SELINE           ;GO SELECT A LINE NO.
 013730  000506                            BR      TST46               ;;BR IF ALL SELECTED LINES DONE
 013732  012711  004000            2$:     MOV     #BIT11,(R1)         ;CLEAR OUT THE DH11
 013736  012704  000260                    MOV     #260,R4             ;SET UP THE S/B DATA IN R4
 013742  156704  014244                    BISB    LINE,R4
 013746  000304                            SWAB    R4
 013750  156711  014236                    BISB    LINE,(R1)           ;SET LINE NO. IN SCR
 013754  012767  000377  014242            MOV     #377,TDATA1         ;LOAD XMIT BUFFER WITH TEST CHARACTER
 013762  012761  073563  000004            MOV     #73563,LPR(R1)      ;SET UP THE LINE PARAMETERS
 013770  012761  177777  000010            MOV     #-1,BCR(R1)         ;LOAD THE BYTE COUNT REG
 013776  012761  030224  000006            MOV     #TDATA1,CAR(R1)     ;LOAD THE BUS ADDR REG
 014004  016761  013174  000014            MOV     LINMSK,BKR(R1)      ;SET BREAK BIT FOR SELECTED LINE
 014012  016761  013166  000012            MOV     LINMSK,BAR(R1)      ;ACTIVATE THE XMITTR

 014020  012767  000001  014212            MOV     #1,TIMEA            ;INIT TIMER A
 014026  005067  014210                    CLR     TIMEB               ;INIT TIMER B
 014032  105711                    3$:     TSTB    (R1)                ;RCVR DONE YET ??
 014034  100423                            BMI     4$                  ;BR IF YES
 014036  004767  012702                    JSR     PC,TIMEIT           ;CALL THE TIMER
 014042  000773                            BR      3$                  ;TIMER ROUTINE WILL MOVE RETURN PC
```

```
                                                                ;AROUND THIS BRANCH IF TIME OUT OCCURS

014044  004767  013056                  JSR     PC,SAPS         ;SAVE THE ERROR PSW
014050  011103                          MOV     (R1),R3         ;GET THE WAS DATA
014052  012704  100200                  MOV     #100200,R4      ;SET UP THE S/B DATA
014056  156704  014130                  BISB    LINE,R4
014062  010102                          MOV     R1,R2           ;SET UP REGADR
014064  004767  010264                  JSR     PC,SUER2A       ;GO SET UP ERROR INFO
014070  004567  010500                  JSR     R5,SUNUM        ;PUT LINE NO. IN MESSAGE
014074  030212                          LINE
014076  031766                          EM22+51
014100  104022                          ERROR   22              ;TIMED OUT WAITING FOR DATA AVAIL
014102  000710                          BR      1$              ;GO TEST NEXT LINE

014104  016103  000002          4$:     MOV     NRC(R1),R3      ;GET THE WAS DATA
014110  020304                          CMP     R3,R4           ;CORRECT DATA RECEIVED ??
014112  001704                          BEQ     1$              ;BR IF YES

014114  004767  013006                  JSR     PC,SAPS         ;SAVE THE ERROR PSW
014120  010102                          MOV     R1,R2           ;SET UP THE REGADR
014122  062702  000002                  ADD     #NRC,R2
014126  004767  010222                  JSR     PC,SUER2A       ;GO SET UP ERROR INFO
014132  004567  010436                  JSR     R5,SUNUM        ;PUT LINE NO. IN MESSAGE
014136  030212                          LINE
014140  032760                          EM33+40
014142  104033                          ERROR   33              ;INCORRECT DATA OR PARITY ERROR
014144  000667                          BR      1$              ;GO TEST NEXT LINE
```

```
                                                  ;;*****************************************************************
                                                  ;*TEST 46        MULTI-LINE PARITY DATA TEST - ALL SELECTED LINES
                                                  ;;*****************************************************************
        014146  000004                            TST46:  SCOPE
                                                  .REM    %
                                                  TEST ABSTRACT:
                                                  **************

                                                        THIS TEST VERIFIES ALL SELECTED LINES CAN TRANSMIT AND RECEIVE
                                                  A BINARY COUNT PATTERN WHEN RUN CONCURRENTLY. ALL CHAR LENGTHS (5, 6, 7,
                                                  AND 8 BITS) ARE TESTED WITH BOTH EVEN AND ODD PARITY CHECKING SPECIFIED.
                                                  THE TEST ACTUALLY INCLUDES EIGHT SUB-TESTS - THE PARAMETERS FOR EACH
                                                  SUB-TEST RETRIEVED FROM A TABLE TAGGED "PRTYTB:".  REFER TO THIS TABLE
                                                  TO DETERMINE THE TEST SEQUENCE.


                                                  ERRORS:
                                                  ********

                                                  1. [ERROR  41] IS CALLED TO REPORT FALSE RECEIVER INTRS.
                                                  2. [ERROR  42] IS CALLED TO REPORT SILO OVERFLOW ERRORS
                                                  3. [ERROR  34] IS CALLED TO REPORT PARITY/DATA ERRORS
                                                  4. [ERROR  35] IS CALLED TO REPORT TEST TIMEOUTS

                                                  SYNC:   (NONE)
                                                  *****

                                                  DEBUG:  (REFER TO TEST 45)
                                                  ******

                                                  KEY LOGIC:      (REFER TO TEST 45)
                                                  ***********

                                                  %
        014150  012767  014166  164732                    MOV     #1$,$LPERR      ;SET UP THE ERROR LOOP RETURN
        014156  012705  027254                            MOV     #PRTYTB+4,R5    ;SET UP POINTER TO TEST PARAMETERS
        014162  005067  165032                            CLR     $TMP7           ;START WITH SUB TEST #00
        014166  162705  000004                    1$:     SUB     #4,R5           ;RESET POINTER FOR ERROR LOOPS
        014172  005367  165022                            DEC     $TMP7           ;RESET SUB TEST # FOR ERROR LOOP
        014176  022705  027310                    2$:     CMP     #PRTYTB+40,R5   ;DONE ALL 8. SUB TESTS ??
        014202  001456                                    BEQ     21$             ;;BR IF YES
        014204  012706  001100                            MOV     #STACK,SP       ;RESET STACK POINTER FOR ERROR LOOPS
        014210  016701  012756                            MOV     DHADR,R1        ;RESET DEVADR FOR ERROR LOOPS
        014214  012567  164776                            MOV     (R5)+,$TMP6     ;GET THE BYTE COUNT PARAMETER
        014220  012567  164770                            MOV     (R5)+,$TMP5     ;GET THE LINE PARAMETERS
        014224  005267  164770                            INC     $TMP7           ;GENERATE NEW SUB-TEST NO.
        014230  012711  004000                            MOV     #BIT11,(R1)     ;CLEAR THE DH11
        014234  004767  010516                            JSR     PC,SUPPAR       ;GO SET UP PARAMETERS
        014240  016167  000004  164734                    MOV     LPR(R1),$TMP0   ;SAVE CURRENT LINE PARAMETERS
        014246  016767  012730  164734                    MOV     LINSEL,$TMP3    ;SAVE SELECTED LINES PARAMETER
        014254  004767  012632                            JSR     PC,CHPS2        ;GO LOCK OUT INTRS
        014260  016702  012710                            MOV     DHVCT,R2        ;SET UP THE VECTOR
        014264  012722  014356                            MOV     #3$,(R2)+       ;GO TO 3$ ON RCVR INTERRUPT
        014270  116712  013712                            MOVB    DHRLVL,(R2)
        014274  012711  000100                            MOV     #100,(R1)       ;ENABLE CHAR AVAIL INTERRUPTS
        014300  016767  012676  013142                    MOV     LINSEL,LINACT   ;FLAG ALL SELECTED LINES ACTIVE
```

```
014306	016761	012670	000012			MOV	LINSEL,BAR(R1)	;ACTIVATE ALL SELECTEDLINES
014314	116767	164562	164664			MOVB	$TSTNM,$TMP2	;SAVE THE TEST NO.
014322	042767	177400	164656			BIC	#177400,$TMP2
014330	004767	012542				JSR	PC,CHPS1	;GO CLEAR PSW
014334	000167	000232				JMP	7$		;GO WAIT FOR INTERRUPTS

014340	012706	001100			21$:	MOV	#STACK,SP	;RESTORE THE SP
014344	004767	012526				JSR	PC,CHPS1	;GO CLEAR PSW
014350	004767	012342				JSR	PC,RESTRP	;RESTORE TRAP CATCHER
014354	000554					BR	TST47		;;GO TO NEXT TEST

					;RECEIVER INTERRUPT SERVICE ROUTINE

014356	005067	164630			3$:	CLR	$TMP4
014362	105711					TSTB	(R1)		;CHAR AVAIL SET
014364	100404					BMI	4$		;BR IF YES

014366	012711	004000				MOV	#BIT11,(R1)	;CLEAR OUT THE DH11
014372	104041					ERROR	41		;RCVR FALSE INTERRUPT - CHAR AVAIL NOT SET
014374	000700					BR	2$		;GO TRY NEXT SUB TEST

014376	032711	040000			4$:	BIT	#BIT14,(R1)	;SILO OVERFLOW ??
014402	001404					BEQ	5$		;BR IF NOT

014404	012711	004000				MOV	#BIT11,(R1)	;CLEAR OUT THE DH11
014410	104042					ERROR	42		;SILO OVERFLOW ERROR
014412	000671					BR	2$		;GO TRY NEXT SUB TEST

014414	016103	000002			5$:	MOV	NRC(R1),R3	;GET THE WAS DATA
014420	010302					MOV	R3,R2		;EXTRACT AND SAVE LINE NO.
014422	000302					SWAB	R2
014424	042702	177760				BIC	#177760,R2
014430	006302					ASL	R2		;GENERATE TABLE OFFSETR
014432	005267	164554				INC	$TMP4
014436	022767	000101	164546			CMP	#101,$TMP4
014444	001744					BEQ	3$
014446	036267	030136	012526			BIT	$LNSEL(R2),LINSEL	;IS THIS ONE OF THE SELECTED LINES?
014454	001757					BEQ	5$		;IF NOT, THIS IS GARBAGE, SO CHECK NEXT SILO ENTRY.
014456	010267	164530				MOV	R2,$TMP4
014462	006267	164524				ASR	$TMP4
014466	026203	036112				CMP	RBUF(R2),R3	;CORRECT DATA RECEIVED ??
014472	001426					BEQ	6$		;BR IF YES

014474	004767	012426				JSR	PC,SAPS		;SAVE THE ERROR PSW
014500	012711	004000				MOV	#BIT11,(R1)	;CLEAR OUT THE DH11
014504	016204	036112				MOV	RBUF(R2),R4	;SET UP S/B DATA
014510	062701	000002				ADD	#NRC,R1		;SET UP WAS ADDRESS
014514	062702	036112				ADD	#RBUF,R2	;SET UP S/B ADDRESS
014520	004767	007630				JSR	PC,SUER2A	;GO SET UP ERROR INFO
014524	004567	010044				JSR	R5,SUNUM	;PUT LINE NO. IN MESSAGE
014530	001212					$TMP4
014532	033034					EM34+51
014534	004567	010034				JSR	R5,SUNUM	;PUT SUBTEST NO. IN MESSAGE
014540	001220					$TMP7
014542	033052					EM34+67
014544	104034					ERROR	34		;PARITY DATA COMPARE ERROR
```

```
014546  000613                          BR      2$              ;GO TRY NEXT SUBTEST
014550  105262  036112          6$:     INCB    RBUF(R2)        ;GENERATE NEW RCVD DATA
014554  005262  027452                  INC     MULPTB(R2)      ;COUNT ONE BYTES RECEIVED
014560  001003                          BNE     61$             ;BR IF NOT DONE
014562  046267  027410  012660          BIC     LINBIT(R2),LINACT ;FLAG THIS LINE DONE
014570  000002                  61$:    RTI                     ;RETURN TO WAIT ROUTINE
                                ;WAIT ROUTINE
014572  012767  000002  013440  7$:     MOV     #2,TIMEA        ;INIT TIMER A
014600  005067  013436                  CLR     TIMEB           ;INIT TIMER B
014604  005761  000012          8$:     TST     BAR(R1)         ;ALL LINES DONE XMITTING ??
014610  001413                          BEQ     9$              ;BR IF YES
014612  004767  012126                  JSR     PC,TIMEIT       ;CALL THE TIMER
014616  000772                          BR      8$              ;TIMER ROUTINE WILL MOVE RETURN PC
                                                                ;AROUND THIS BRANCH IF TIME OUT OCCURS
014620  016167  000012  164362          MOV     BAR(R1),$TMP3   ;SAVE THE ACTIVE LINES FLAG
014626  012711  004000                  MOV     #BIT11,(R1)     ;CLEAR OUT THE DH11
014632  104035                          ERROR   35              ;TIMED OUT WAITING FOR TRANSMITTERS TO FINISH
014634  000167  177336                  JMP     2$              ;GO TRY NEXT SUBTEST
014640  012767  000001  013372  9$:     MOV     #1,TIMEA        ;INIT TIMER A
014646  005067  013370                  CLR     TIMEB           ;INIT TIMER B
014652  005767  012572          10$:    TST     LINACT          ;ALL CHARS RECEIVED ?
014656  001411                          BEQ     11$             ;BR IF YES
014660  004767  012060                  JSR     PC,TIMEIT       ;CALL THE TIMER
014664  000772                          BR      10$             ;TIMER ROUTINE WILL MOVE RETURN PC
                                                                ;AROUND THIS BRANCH IF TIME OUT OCCURS
014666  016767  012556  164314          MOV     LINACT,$TMP3    ;SET UP ACTIVE LINE PARAMETER
014674  012711  004000                  MOV     #BIT11,(R1)     ;CLEAR OUT THE DH11
014700  104035                          ERROR   35              ;SILO EMPTY TIMEOUT
014702  000167  177270          11$:    JMP     2$              ;GO TRY NEXT SUB TEST
```

```
                                        ;;*************************************************************
                                        ;*TEST 47        AUTO ECHO TEST 1 - ALL SELECTED LINES
                                        ;;*************************************************************
        014706  000004                  TST47:  SCOPE
                                        .REM    %
                                        TEST ABSTRACT:
                                        **************

                                                THIS TEST VERIFIES THAT ALL SELECTED LINES CAN TURN AROUND
                                        A SINGLE TEST CHARACTER (377) AND (000) IN AUTO ECHO MODE. THE TEST SEQUENCE
                                        IS AS FOLLOWS:

                                                1. SET UP THE ERROR LOOP RETURN
                                                2. RETRIEVE THE AUTO-ECHO TEST DATA FROM "AETAB:" AND
                                                   UPDATE THE POINTER.
                                                3. GO SELECT A LINE NO. TO TEST - GO TO STEP 10 IF DONE
                                                   ALL SELECTED LINES.
                                                4. CLEAR THE "CAR" AND "BCR" MEMORIES.
                                                5. PRIME THE SELECTED LINE TO XMIT ONE CHAR WITH A.E. ENABLED.
                                                6. ACTIVATE THE SELECTED TRANSMITTER.
                                                7. WAIT FOR "CHAR AVAIL" - IF TIMEOUT REPORT ERROR AND RESTART
                                                   AT STEP 2.
                                                8. IF NO TIMEOUT - READ SILO AND COMPARE AUTO ECHO DATA RECEIVED
                                                   REPORT DATA COMPARE ERRORS AND RESTART AT STEP 2
                                                9. IF NO ERRORS REPEAT STEPS 7 AND 8 SIXTY-FOUR TIMES THEN TURN
                                                   OFF A.E. ENABLE AND READ LAST CHAR FROM SILO.. CHECK LAST
                                                   CHAR FOR DATA COMPARE ERRORS - REPORT ERRORS IF ANY - AND RE-
                                                   START AT STEP 2.
                                                10.CHANGE A.E. TABLE POINTER TO POINT TO "AETABO:" (0'S DATA)
                                                   AND REPEAT STEPS 2 THRU 9.

                                        ERRORS:
                                        ********

                                        1. [ERROR 24] IS CALLED TO REPORT ALL ERRORS

                                        SYNC:   M7277   SH4     LOAD BAR LB+HB L        CN2
                                        *****

                                        DEBUG:
                                        ******

                                        1. IF ALL LINES FAIL, SUSPECT EITHER THE M7277 OR M7289

                                        2. IF ONLY ONE LINE FAILS SUSPECT THE M7288

                                        3. LOOP ON THE FAILING LINE AND TRACK BACK THROUGH THE KEY LOGIC.

                                        KEY LOGIC:
                                        **********

                                                M7277   SH3     AE GO L         CS2
                                                                7402 "OR" GATE CHIPS E38 OR E41
                                                                74157 MUX CHIPS  E39 OR 342
                                                        SH4     E35 - PIN 2 STUCK LOW
```

```

                                            M7289   SH3     AE GO L         EK1
                                                            AE SCAN MUX  E22 PIN 10
                                                    SH4     SAMPLE STATUS H E21-12

                                            M7288   SH5, 7, 9, 11
                                                            AE ENABLE "NN" H CONTROL FLOPS
                                                            74174 CHIPS PIN 15

                                    %
014710  012767  014772  164172              MOV     #2$,$LPERR              ;SET UP ERROR LOOP RETURN
014716  005067  164266                      CLR     $TMP3                   ;INIT I/O DATA FLAG
014722  012711  004000                      MOV     #BIT11,(R1)             ;CLEAR THE DH11
014726  012705  027310                      MOV     #AETAB,R5               ;GET POINTER TO AUTO ECHO DATA TABLE
014732  005067  012250              7$:     CLR     LMSK1                   ;INIT BIT TEST MARKER
014736  000261                              SEC                             ;SET "C" BIT FOR MARKER
014740  000401                              BR      13$                     ;GO SHIFT MASK
014742  000241                      1$:     CLC                             ;INIT THE "C" BIT
014744  006167  012236              13$:    ROL     LMSK1                   ;SHIFT BIT MARKER
014750  001407                              BEQ     12$                     ;BR IF DONE ALL LINES
014752  012504                              MOV     (R5)+,R4                ;SET UP THE S/B DATA
014754  036767  012226  012220              BIT     LMSK1,LINSEL            ;TEST THIS LINE ?
014762  001767                              BEQ     1$                      ;BR IF NOT
014764  004767  007512              11$:    JSR     PC,SELINE               ;GO SELECT A LINE TO TEST
014770                              12$:
014770  000522                              BR      6$                      ;;BR IF ALL SELECTED LINES TESTED
014772  004767  007656              2$:     JSR     PC,CLCABC               ;GO CLEAR "CAR" AND "BCR" MEMORIES
014776  116711  013210                      MOVB    LINE,(R1)               ;SET SELECT BITS IN SCR REG
015002  012761  177777  000010              MOV     #-1,BCR(R1)             ;SET UP TO XFER ONE CHAR
015010  010561  000006                      MOV     R5,CAR(R1)              ;SET UP THE BUS ADDRESS REG
015014  162761  000002  000006              SUB     #2,CAR(R1)              ;CORRECT BUS ADDRESS
015022  012767  000100  164170              MOV     #100,$TMP7              ;COUNT 64 CHARS TO BE RECEIVED IN AUTO ECHO
015030  005067  164162                      CLR     $TMP6                   ;INIT CHAR COUNTER
015034  012761  133503  000004              MOV     #133503,LPR(R1)         ;SET UP LINE PARAMETER REG
015042  016761  012136  000012              MOV     LINMSK,BAR(R1)          ;ACTIVATE THE LINE

015050  012767  000002  013162              MOV     #2,TIMEA                ;INIT TIMER A
015056  005067  013160                      CLR     TIMEB                   ;INIT TIMERB
015062  105711                      3$:     TSTB    (R1)                    ;CHAR AVAIL SET ??
015064  100427                              BMI     4$                      ;BR IF YES
015066  004767  011652                      JSR     PC,TIMEIT               ;CALL THE TIMER
015072  000773                              BR      3$                      ;TIMER ROUTINE WILL MOVE RETURN PC
                                                                            ;AROUND THIS BRANCH IF TIME OUT OCCURS

015074  004767  012026                      JSR     PC,SAPS                 ;SAVE THE ERROR PSW
015100  005061  000004                      CLR     LPR(R1)                 ;TURN OFF AUTO ECHO MODE
015104  010102                              MOV     R1,R2                   ;MAKE REGADR = DEVADR
015106  011103                              MOV     (R1),R3                 ;GET THE WAS DATA
015110  042703  100000                      BIC     #BIT15,R3               ;CLEAR JUNK BIT
015114  012704  000200                      MOV     #200,R4                 ;SET UP S/B DATA
015120  156704  013066                      BISB    LINE,R4
015124  004767  007224                      JSR     PC,SUER2A               ;GO SET UP ERROR INFO
015130  004567  007440                      JSR     R5,SUNUM                ;GO SET LINE NO. IN MSG
015134  030212                              LINE
015136  032164                              EM24+35
015140  104024                              ERROR   24                      ;DATA AVAIL FAILED TO SET ON TIME
```

```
015142  000677                          BR      1$                  ;GO TRY NEXT LINE
015144  005267  164046          4$:     INC     $TMP6               ;COUNT ONE CHAR RECVD
015150  016103  000002                  MOV     NRC(R1),R3          ;GET THE WAS DATA
015154  020304                          CMP     R3,R4               ;WAS CHAR AUTO ECHOED CORRECTLY ?
015156  001417                          BEQ     5$                  ;BR IF YES
015160  004767  011742                  JSR     PC,SAPS             ;SAVE THE ERROR PSW
015164  005061  000004                  CLR     LPR(R1)             ;DISABLE AUTO ECHO
015170  010102                          MOV     R1,R2               ;SET UP REGADR
015172  062702  000002                  ADD     #NRC,R2
015176  004767  007152                  JSR     PC,SUER2A           ;GO SET UP ERROR INFO
015202  004567  007366                  JSR     R5,SUNUM            ;PUT LINE NO. IN ERROR MSG
015206  030212                          LINE
015210  032164                          EM24+35
015212  104024                          ERROR   24                  ;CHAR AUTO ECHOED INCORRECTLY
015214  000652                          BR      1$                  ;GO TRY NEXT LINE
015216  005367  163776          5$:     DEC     $TMP7               ;COUNT ONE CHAR READ OUT OF 64
015222  003317                          BGT     3$                  ;BR IF NOT LAST ONE
015224  100646                          BMI     1$                  ;;BR IF LAST ONE READ
015226  042761  100000  000004          BIC     #BIT15,LPR(R1)      ;DISABLE AUTO ECHO
015234  000712                          BR      3$                  ;GO READ LAST CHAR
015236  005167  163746          6$:     COM     $TMP3               ;TOGGLE 1/O FLAG
015242  001406                          BEQ     TST50               ;;BR IF DONE BOTH 1/O DATA
015244  005067  012742                  CLR     LINE                ;INIT LINE NO TO 00
015250  012705  027350                  MOV     #AETAB0,R5          ;SET POINTER TO 0'S TABLE
015254  000167  177452                  JMP     7$                  ;REPEAT TEST FOR ZERO PATTERNS
```

```
                                        ;;*****************************************************************
                                        ;*TEST 50        AUTO ECHO TEST 2 - ALL SELECTED LINES
                                        ;;*****************************************************************
015260  000004                          TST50:  SCOPE
                                        .REM    %
                                        TEST ABSTRACT:
                                        ***************

                                                THIS TEST IS SIMILAR TO TEST 47 EXCEPT ALL SELECTED LINES OTHER
                                        THAN THE A.E. TEST LINE ARE ACTIVELY TURNING AROUND A BINARY COUNT
                                        TEST PATTERN IN NON-AUTO ECHO MODE AND THE A.E. TEST LINE IS TESTED
                                        FOR ALL 1'S DATA ONLY.

                                        ERRORS:
                                        ********

                                        1. [ERROR  32] IS CALLED TO REPORT A.E. TEST TIMEOUTS
                                        2. [ERROR  31] IS CALLED TO REPORT ALL DATA COMPARE ERRORS

                                        SYNC:   M7277   SH4     LOAD BAR LB+HB L        CN2
                                        *****

                                        DEBUG:
                                        ******

                                                REFER TO TEST 47

                                        KEY LOGIC:
                                        **********

                                                REFER TO TEST 47

                                        %
015262  012767  015336  163620                  MOV     #2$,$LPERR      ;SET UP ERROR LOOP RETURN
015270  012705  027310                          MOV     #AETAB,R5       ;SET POINTER TO A.E. TEST DATA TABLE
015274  005067  011706                          CLR     LMSK1           ;INIT BIT TEST MASK
015300  000261                                  SEC                     ;GENERATER MARKER BIT IN "C"
015302  000401                                  BR      12$             ;GO SHIFT MASK
015304  000241                          1$:     CLC                     ;INIT THE "C" BIT
015306  006167  011674                  12$:    ROL     LMSK1           ;SHIFT TEST BIT
015312  001410                                  BEQ     11$             ;BR IF TESTED ALL LINES
015314  012567  163700                          MOV     (R5)+,$TMP7     ;GET THE A.E. TEST DATA FOR THIS LINE
015320  036767  011662  011654                  BIT     LMSK1,LINSEL    ;TEST THIS LINE ?
015326  001766                                  BEQ     1$              ;BR IF NOT
015330  004767  007146                          JSR     PC,SELINE       ;GO SELECT A LINE
015334                                  11$:
015334  000575                                  BR      TST51           ;;BR IF DONE ALL SELECTED LINES

015336  016701  011630                  2$:     MOV     DHADR,R1        ;RESET DEVADR IN CASE OF ERROR LOOP
015342  012711  004000                          MOV     #BIT11,(R1)     ;CLEAR OUT THE DH11
015346  004767  011414                          JSR     PC,SETALL       ;GO SET UP FOR BINARY COUNT XFER ON
                                                                        ;ALL LINES OTHER THAN THE SELECTED ONE
015352  156711  012634                          BISB    LINE,(R1)       ;SELECT THE LINE FOR A.E. TEST
015356  010561  000006                          MOV     R5,CAR(R1)      ;SET BUS ADDR TO XMIT TEST CHAR
015362  162761  000002  000006                  SUB     #2,CAR(R1)      ;CORRECT THE ADDRESS
015370  012761  177777  000010                  MOV     #-1,BCR(R1)     ;XMIT ONE CHAR ON THIS LINE
```

```
015376  012761  133503  000004          MOV     #133503,LPR(R1) ;DO IT AT 9600 BAUD/8 BITS
015404  116767  163472  163574          MOVB    $TSTNM,$TMP2    ;SAVE THE TEST NO.
015412  042767  177400  163566          BIC     #177400,$TMP2
015420  046767  011560  012022          BIC     LINMSK,LINACT   ;MAKE THIS LINE APPEAR INACTIVE
015426  016761  011550  000012          MOV     LINSEL,BAR(R1)  ;ACTIVATE ALL SELECTED TRANSMITTERS

015434  012767  000002  012576  21$:    MOV     #2,TIMEA        ;INIT TIMER A
015442  005067  012574                  CLR     TIMEB           ;INIT TIMER B
015446  016103  000002          3$:     MOV     NRC(R1),R3      ;GET THE WAS DATA
015452  100414                          BMI     4$              ;BR IF YES
015454  004767  011264                  JSR     PC,TIMEIT       ;CALL THE TIMER
015460  000772                          BR      3$              ;TIMER ROUTINE WILL MOVE RETURN PC
                                                                ;AROUND THIS BRANCH IF TIME OUT OCCURS

015462  016167  000004  163512          MOV     LPR(R1),$TMP0   ;SAVE THE CURRENT "LPR"
015470  004567  007100                  JSR     R5,SUNUM        ;PUT LINE NO. IN MESSAGE
015474  030212                          LINE
015476  032655                          EM32+35
015500  104032                          ERROR   32              ;AUTO ECHO TIMEOUT
015502  000700                          BR      1$              ;GO TRY NEXT LINE

015504  010304                  4$:     MOV     R3,R4           ;EXTRACT LINE NUMBER OF RCVD CHAR
015506  000304                          SWAB    R4
015510  042704  177760                  BIC     #177760,R4
015514  010402                          MOV     R4,R2           ;SAVE IT IN R2
015516  006302                          ASL     R2              ;GENERATE TABLE INDEX IN R2
015520  126704  012466                  CMPB    LINE,R4         ;IS THIS THE A.E. TEST LINE ??
015524  001432                          BEQ     5$              ;BRANCH IF YES.
015526  036267  030136  011446          BIT     $LNSEL(R2),LINSEL
015534  001737                          BEQ     21$

015536  026203  036112                  CMP     RBUF(R2),R3     ;RECVD DATA CORRECT ??
015542  001447                          BEQ     6$              ;BR IF IT WAS

015544  004767  011356                  JSR     PC,SAPS         ;SAVE THE ERROR PSW
015550  010467  163440                  MOV     R4,$TMP5        ;SAVE THE LINE NUMBER
015554  016204  036112                  MOV     RBUF(R2),R4     ;SET UP S/B DATA
015560  062702  036112                  ADD     #RBUF,R2        ;SET UP S/B ADDRESS
015564  012701  177703                  MOV     #177703,R1      ;SET UP THE WAS ADDRESS
015570  004767  006560                  JSR     PC,SUER2A       ;GO SET UP ERROR INFO
015574  004567  006774                  JSR     R5,SUNUM        ;PUT LINE NO. IN MESSAGE
015600  001214                          $TMP5
015602  032520                          EM31+45
015604  104031                          ERROR   31              ;NON-ECHO DATA COMPARE ERROR
015606  000167  177472                  JMP     1$              ;GO TRY NEXT LINE


015612  020367  163402          5$:     CMP     R3,$TMP7        ;CHAR ECHOED OK ??
015616  001427                          BEQ     7$              ;BR IF YES

015620  004767  011302                  JSR     PC,SAPS         ;SAVE THE ERROR PSW
015624  012702  001220                  MOV     #$TMP7,R2       ;SAVE THE S/B ADDRESS
015630  016704  163364                  MOV     $TMP7,R4        ;SAVE THE S/B DATA
015634  012701  177703                  MOV     #177703,R1      ;SAVE THE WAS ADDRESS
015640  004767  006510                  JSR     PC,SUER2A       ;GO SET UP ERROR INFO
015644  004567  006724                  JSR     R5,SUNUM        ;GO SET UP LINE NO. IN MESSAGE
```

```
4717  015650  030212                          LINE
4718  015652  032520                          EM31+45
4719  015654  104031                          ERROR   31              ;AUTO ECHO LINE DATA ERROR
4720  015656  000167  177422                  JMP     1$              ;GO TRY NEXT LINE
4721
4722  015662  105262  036112          6$:     INCB    RBUF(R2)        ;GENERATE NEXT EXPECTED DATA ON THIS LINE
4723  015666  001262                          BNE     21$             ;BR IF ITS NOT BACK TO 000
4724  015670  046267  027410  011552          BIC     LINBIT(R2),LINACT       ;INDICATE THIOS LINE DONE 256 BYTES
4725  015676  005767  011546          7$:     TST     LINACT          ;ALL LINES INACTIVE
4726  015702  001254                          BNE     21$             ;BR IF NOT
4727  015704  042761  100000  000004          BIC     #BIT15,LPR(R1)  ;TURN OFF THE A.E. BIT
4728  015712  105761  000017                  TSTB    SSR+1(R1)       ;SILO EMPTY ??
4729  015716  001002                          BNE     8$              ;BR IF NOT
4730  015720  000167  177360                  JMP     1$              ;GO TEST NEXT LINE
4731  015724  000167  177504          8$:     JMP     21$             ;GO EMPTY IT
```

```
                                        ;;*********************************************************************
                                        ;*TEST 51        AUTO ECHO TEST 3 - ALL SELECTED LINES
                                        ;;*********************************************************************
 015730  000004                         TST51:  SCOPE
                                        .REM    %
                                        TEST ABSTRACT:
                                        **************

                                                THIS TEST IS IDENTICAL TO TEST 47 EXCEPT ALL SELECTED LINES
                                        ARE ACTIVATED CONCURRENTLY RATHER THAN ONE AT A TIME AND ONLY
                                        THE ALL 1'S DATA IS USED.

                                        ERRORS:
                                        *******

                                        1. [ERROR  36] IS CALLED TO REPORT "DATA AVAIL" TIMEOUTS
                                        2. [ERROR  31] IS CALLED TO REPORT A.E. DATA ERRORS

                                        SYNC:   M7277   SH4 LOAD BAR LB+HB L    CN2
                                        *****

                                        DEBUG:
                                        ******

                                                REFER TO TEST 47

                                        KEY LOGIC:
                                        ***********

                                                REFER TO TEST 47

                                        %
 015732  012767  015740  163150                 MOV     #1$,$LPERR      ;SET UP THE ERROR LOOP RETURN
 015740  012711  004000                 1$:     MOV     #BIT11,(R1)     ;CLEAR OUT THE DH11
 015744  012705  000020                         MOV     #20,R5          ;INIT COUNTER TO SET UP 16. LINES
 015750  012702  027310                         MOV     #AETAB,R2       ;SET UP POINTER TO AUTO ECXHO TEST DATA
 015754  012703  036052                         MOV     #RCNT,R3        ;R3 POINTS TO TABLE OF CHAR COUNTERS
 015760  010261  000006                 2$:     MOV     R2,CAR(R1)      ;SET UP BUS ADDRESS REG
 015764  012761  177777  000010                 MOV     #-1,BCR(R1)     ;SET UP BYTE COUNT REG
 015772  012761  131403  000004                 MOV     #131403,LPR(R1) ;SET UP LINE PARAMETERS
 016000  005023                                 CLR     (R3)+           ;CLEAR A COUNTER
 016002  062702  000002                         ADD     #2,R2           ;UPDATE POINTERS
 016006  005211                                 INC     (R1)            ;SELECT NEXT LINE
 016010  005305                                 DEC     R5              ;COUNT ONE DONE
 016012  001362                                 BNE     2$              ;BR TILL 16. DONE
 016014  116767  163062  163164                 MOVB    $TSTNM,$TMP2    ;SAVE THE TEST NO.
 016022  042767  177400  163156                 BIC     #177400,$TMP2
 016030  016767  011146  011412                 MOV     LINSEL,LINACT   ;SET FLAG TO INDICATE ALL 16. ACTIVE
 016036  016761  011140  000012                 MOV     LINSEL,BAR(R1)  ;ACTIVATE ALL XMITTERS

 016044  012767  000002  012166                 MOV     #2,TIMEA        ;INIT TIMER A
 016052  005067  012164                         CLR     TIMEB           ;INIT TIMERB
 016056  005067  163130                 3$:     CLR     $TMP4
 016062  105711                                 TSTB    (R1)            ;CHAR AVAIL SET YET ?
 016064  100410                                 BMI     4$              ;BR IF YES
 016066  004767  010652                         JSR     PC,TIMEIT       ;CALL THE TIMER
```

```
016072 000771                         BR      3$                  ;TIMER ROUTINE WILL MOVE RETURN PC
                                                                  ;AROUND THIS BRANCH IF TIME OUT OCCURS

016074 016167 000004 163100           MOV     LPR(R1),$TMP0       ;SAVE THE "LPR" REG
016102 104036                         ERROR   36                  ;DATA AVAILABLE TIMEOUT
016104 000465                         BR      TST52               ;;EXIT TEST ON ERROR

016106 016103 000002           4$:    MOV     NRC(R1),R3          ;GET THE WAS DATA
016112 010302                         MOV     R3,R2               ;BUILD AND SAVE LINE NO.
016114 000302                         SWAB    R2
016116 042702 177760                  BIC     #177760,R2
016122 010267 163070                  MOV     R2,$TMP6            ;SAVE THE LINE NO.
016126 006302                         ASL     R2                  ;GENERATE TABLE OFFSET
016130 005267 163056                  INC     $TMP4
016134 022767 000101 163050           CMP     #101,$TMP4
016142 001745                         BEQ     3$
016144 036267 030136 011030           BIT     $LNSEL(R2),LINSEL   ;IS THIS ONE OF THE SELECTED LINES?
016152 001755                         BEQ     4$                  ;IF NOT, THIS IS GARBAGE, SO CHECK NEXT SILO ENTRY.
016154 005262 036052                  INC     RCNT(R2)            ;COUNT THE CHARACTER
016160 020362 027310                  CMP     R3,AETAB(R2)        ;IS THE DATA CORRECT ??
016164 001420                         BEQ     5$                  ;BR IF YES

016166 004767 010734                  JSR     PC,SAPS             ;SAVE THE ERROR PSW
016172 016204 027310                  MOV     AETAB(R2),R4        ;GET THE S/B DATA
016176 062702 027310                  ADD     #AETAB,R2           ;GENERATE S/B ADDRESS
016202 062701 000002                  ADD     #NRC,R1             ;GENERATE THE WAS ADDRESS
016206 004767 006142                  JSR     PC,SUER2A           ;GO SET UP ERROR INFO
016212 004567 006356                  JSR     R5,SUNUM            ;PUT LINE NO. IN MESSAGE
016216 001216                         $TMP6
016220 032520                         EM31+45
016222 104031                         ERROR   31                  ;DATA COMPARE ERROR
016224 000415                         BR      TST52               ;;EXIT TEST ON ERROR

016226 022762 000100 036052    5$:    CMP     #100,RCNT(R2)       ;DONE 64. CHARS ON THIS LINE ?
016234 001310                         BNE     3$                  ;BR IF NOT
016236 016711 162754                  MOV     $TMP6,(R1)          ;SELECT LINE IN SCR REG
016242 042761 100000 000004           BIC     #BIT15,LPR(R1)      ;TURN OFF A.E. BIT
016250 046267 027410 011172           BIC     LINBIT(R2),LINACT   ;ALL LINES INACTIVE ??
016256 001277                         BNE     3$                  ;BR IF NOT
```

```
                                ;;*************************************************************
                                ;*TEST 52        BREAK BIT TEST - ALL SELECTED LINES
                                ;;*************************************************************
 016260  000004                 TST52:  SCOPE
                                .REM    %
                                TEST ABSTRACT:
                                **************

                                        THIS TEST VERIFIES THAT THE "BREAK" FEATURE WORKS PROPERLY
                                FOR ALL SELECTED LINES. THE TEST SEQUENCE IS AS FOLLOWS:

                                        1. SET UP THE ERROR LOOP RETURN
                                        2. RETRIEVE THE CORRECT S/B DATA FROM THE "BREAK" DATA
                                           TABLE AND UPDATE THE POINTER.
                                        3. GO SELECT A LINE TO TEST - GO TO TEST 52 IF DONE ALL
                                           SELECTED LINES
                                        4. RESET THE DH11 AND CLEAR THE "CAR" AND "BCR" MEMORIES.
                                        5. PRIME SELECTED LINE TO OUTPUT TWO "NULL" CHARS TO CLEAR UART
                                        6. ACTIVATE THE SELECTED LINE
                                        7. WAIT FOR SILO TO RECEIVE TWO NULLS - IF TIMEOUT REPORT ERROR
                                           AND RESTART AT STEP 2
                                        8. IF NO TIMEOUT CLEAR THE SELECTED DH11 AND RESELECT LINE NO.
                                        9. PRIME SELECTED LINE TO OUT PUT 256. CHARS.
                                        10.SET THE SELECTED LINE'S BREAK BIT
                                        11.ACTIVATE THE SELECTED LINE
                                        12.WAIT FOR "BAR" REG TO CLEAR -F TIMEOUT REPORT ERROR AND
                                           RESTART AT STEP 2
                                        13.IF NO TIMEOUT VERIFY THAT THE SILO RECEIVED ONLY ONE CHAR-
                                           IF NOT REPORT ERROR AND RESTART AT STEP 2
                                        14.IF SILO RECEIVED ONLY ONE CHAR VERIFY THAT IT WAS A "BREAK"
                                           CHAR - IF NOT REPORT ERROR - AND RESTART AT STEP 2

                                ERRORS:
                                ********

                                1. [ERROR  25] IS CALLED TO REPORT ALL ERRORS

                                SYNC:   M7277   SH4     LOAD BCR H      FU1
                                *****

                                DEBUG:
                                *******

                                1. IF ALL LINES FAILED SUSPECT THAT THE M7277 IS NOT GENERATING THE
                                   BREAK CONTROL REG LOAD SIGNAL.

                                2. IF ONLY ONE LINE FAILS SUSPECT THE BREAK CONTROL LOGIC ON THE M7278

                                KEY SIGNALS:
                                ************

                                        M7277   SH4     LOAD BCR H      FU1

                                        M7278   SH5 THRU SH8

                                                        74175 REGISTER CHIPS E51, E38, E67, E60
```

```
                                                           7400 DRIVERS    E45, E46, E75, E76


016262  012767  016342  162620          MOV     #2$,$LPERR          ;SET UP ERROR LOOP RETURN
016270  012705  027512                  MOV     #BRKTAB,R5          ;SET UP POINTER TO BREAK DATA TABLE
016274  005067  010706                  CLR     LMSK1               ;INIT BIT TEST MASK
016300  000261                          SEC                         ;SET BIT MARKER IN "C"
016302  000401                          BR      12$                 ;GO SHIFT MASK
016304  000241                  1$:     CLC                         ;INIT THE "C" BIT
016306  006167  010674          12$:    ROL     LMSK1               ;SHIFT TEST MARKER
016312  001411                          BEQ     11$                 ;BR IF ALL LINES DONE
016314  012504                          MOV     (R5)+,R4            ;GET TEST DATA FOR THIS LINE
016316  036767  010664  010656          BIT     LMSK1,LINSEL        ;LINE SELECTED ?
016324  001767                          BEQ     1$                  ;BR IF NOT
016326  004767  006150                  JSR     PC,SELINE           ;GO SELECT A LINE TO TEST
016332  000401                          BR      11$                 ;;BR IF DONE ALL SELECTED LINES
016334  000402                          BR      2$                  ;GO TEST THE SELECTED LINE
016336  000167  000454          11$:    JMP     9$                  ;GO EXIT TEST
016342  012711  004000          2$:     MOV     #BIT11,(R1)         ;CLEAR THE DH11
016346  004767  006302                  JSR     PC,CLCABC           ;GO CLR THE "CAR" AND "BCR" MEMORIES
016352  116711  011634                  MOVB    LINE,(R1)           ;SELECT THE LINE

016356  012761  030246  000006          MOV     #TNULL,CAR(R1)      ;SET UP TO OUTPUT TWO NULL CHARS
016364  012761  177776  000010          MOV     #-2,BCR(R1)         ;SET BYTE COUNT TO 2
016372  012761  033503  000004          MOV     #33503,LPR(R1)      ;SET UP LINE PARAMETERS
016400  016761  010600  000012          MOV     LINMSK,BAR(R1)      ;ACTIVATE SELECTED LINE

016406  012767  000001  011624          MOV     #1,TIMEA            ;INIT TIMER A
016414  005067  011622                  CLR     TIMEB               ;INIT TIMER B
016420  122761  000002  000017  3$:     CMPB    #2,SSR+1(R1)        ;TWO CHARS RECEIVED ??
016426  001432                          BEQ     4$                  ;BR IF YES
016430  004767  010310                  JSR     PC,TIMEIT           ;CALL THE TIMER
016434  000771                          BR      3$                  ;TIMER ROUTINE WILL MOVE RETURN PC
                                                                    ;AROUND THIS BRANCH IF TIME OUT OCCURS

016436  004767  010464                  JSR     PC,SAPS             ;SAVE THE ERROR PSW
016442  010467  162536                  MOV     R4,$TMP1            ;SAVE S/B DATA
016446  010102                          MOV     R1,R2               ;SET UP REGADR
016450  062702  000016                  ADD     #SSR,R2
016454  011203                          MOV     (R2),R3             ;GET THE WAS DATA
016456  042703  100377                  BIC     #100377,R3          ;CLEAR JUNK
016462  012704  000002                  MOV     #2,R4               ;SET UP S/B DATA
016466  000304                          SWAB    R4
016470  004767  005660                  JSR     PC,SUER2A           ;GO SET UP ERROR INFO
016474  004567  006074                  JSR     R5,SUNUM            ;GO PUT LINE NO. IN MESSAGE
016500  030212                          LINE
016502  032223                          EM25+34
016504  016704  162474                  MOV     $TMP1,R4            ;RESTORE S/B DATA
016510  104025                          ERROR   25                  ;TIMED OUT WAITING FOR TWO NULLS
016512  000674                          BR      1$                  ;GO TRY NEXT LINE

016514  012711  004000          4$:     MOV     #BIT11,(R1)         ;CLEAR THE INTERFACE
016520  116711  011466                  MOVB    LINE,(R1)           ;SELECT THE LINE
016524  012761  037112  000006          MOV     #TBUF,CAR(R1)       ;SET UP BUS ADDRESS REG FOR XMITTR
016532  012761  177400  000010          MOV     #-400,BCR(R1)       ;SET BYTE COUNT TO XMIT 256(10) CHARS
016540  012761  033503  000004          MOV     #33503,LPR(R1)      ;SET UP LINE PARAMETERS
```

```
016546  016761  010432  000014          MOV     LINMSK,BKR(R1)  ;SET BREAK BIT FOR ACTIVE LINE
016554  016761  010424  000012          MOV     LINMSK,BAR(R1)  ;ACTIVATE THE SELECTED LINE

016562  012767  000005  011450          MOV     #5,TIMEA        ;INIT TIMER A
016570  005067  011446                  CLR     TIMEB           ;INIT TIMER B
016574  005761  000012          5$:     TST     BAR(R1)         ;BAR BIT CLEARED ??
016600  001426                          BEQ     6$              ;BR IFD YES
016602  004767  010136                  JSR     PC,TIMEIT       ;CALL THE TIMER
016606  000772                          BR      5$              ;TIMER ROUTINE WILL MOVE RETURN PC
                                                                ;AROUND THIS BRANCH IF TIME OUT OCCURS

016610  004767  010312                  JSR     PC,SAPS         ;SAVE THE ERROR PSW
016614  010467  162364                  MOV     R4,$TMP1        ;SAVE THE S/B DATA
016620  010102                          MOV     R1,R2           ;SET UP REGADR
016622  062702  000012                  ADD     #BAR,R2
016626  011203                          MOV     (R2),R3         ;GET THE WAS DATA
016630  005004                          CLR     R4              ;SET UP S/B DATA
016632  004767  005516                  JSR     PC,SUER2A       ;GO SET UP ERROR INFO
016636  004567  005732                  JSR     R5,SUNUM        ;PUT LINE NO IN MESSAGE
016642  030212                          LINE
016644  032223                          EM25+34
016646  016704  162332                  MOV     $TMP1,R4        ;RESTORE THE S/B DATA
016652  104025                          ERROR   25              ;BAR BIT FAILED TO CLEAR
016654  000613                          BR      1$              ;GO TRY NEXT LINE

016656  122761  000001  000017  6$:     CMPB    #1,SSR+1(R1)    ;ONE CHAR RECEIVED ?
016664  001430                          BEQ     7$              ;BR IF YES

016666  004767  010234                  JSR     PC,SAPS         ;SAVE THE ERROR PSW
016672  010467  162306                  MOV     R4,$TMP1        ;SAVE THE S/B DATA
016676  010102                          MOV     R1,R2           ;SET UP REGADR
016700  062702  000016                  ADD     #SSR,R2
016704  011203                          MOV     (R2),R3         ;GET THE WAS DATA
016706  042703  100377                  BIC     #100377,R3      ;CLEAR JUNK
016712  012704  000001                  MOV     #1,R4           ;SET UP S/B DATA
016716  000304                          SWAB    R4
016720  004767  005430                  JSR     PC,SUER2A       ;GO SET UP ERROR INFO
016724  004567  005644                  JSR     R5,SUNUM        ;GO PUT LINE NO. IN MESSAGE
016730  030212                          LINE
016732  032223                          EM25+34
016734  016704  162244                  MOV     $TMP1,R4        ;RESTORE THE S/B DATA
016740  104025                          ERROR   25              ;FAILED TO RECEIVE THE ONE CHAR
016742  000167  177336                  JMP     1$              ;GO TRY NEXT LINE


016746  016103  000002          7$:     MOV     NRC(R1),R3      ;GET THE WAS DATA
016752  020304                          CMP     R3,R4           ;WAS IT A BREAK CHAR ?
016754  001002                          BNE     8$              ;BR IF NOT CORRECT
016756  000167  177322                  JMP     1$              ;GO TEST NEXT LINE

016762  004767  010140          8$:     JSR     PC,SAPS         ;SAVE THE ERROR PSW
016766  010102                          MOV     R1,R2           ;SET UP REGADR
016770  062702  000002                  ADD     #NRC,R2
016774  004767  005354                  JSR     PC,SUER2A       ;GO SET UP ERROR INFO
017000  004567  005570                  JSR     R5,SUNUM        ;PUT LINE NO IN MESSAGE
017004  030212                          LINE
```

```
 4995 017006 032223                    EM25+34
 4996 017010 104025                    ERROR   25              ;INCORRECT DATA RECEIVED
 4997 017012 000167 177266             JMP     1$              ;GO TRY NEXT LINE
 4998 017016 000240             9$:    NOP                     ;EXIT THIS TEST
 4999
```

```
                                        ;;***************************************************************
                                        ;*TEST 53        HALF DUPLEX TEST - ALL SELECTED LINES
                                        ;;***************************************************************
017020  000004                          TST53:  SCOPE
                                        .REM    %
                                        TEST ABSTRACT:
                                        **************

                                                THIS TEST VERIFIES THAT THE RECEIVERS ON ALL SELECTED LINES ARE
                                        "BLINDED" WHEN THE HALF-DUPLEX MODE IS ENABLED. THE TEST
                                        SEQUENCE IS AS FOLLOWS:

                                                1. SET UP THE ERROR LOOP RETURN
                                                2. GO SELECT A LINE NO. TO TEST
                                                3. IF DONE ALL SELECTED LINES - GO TO TEST 53
                                                4. RESET THE DH11 AND CLEAR THE "CAR" AND "BCR" MEMORIES
                                                5. PRIME THE SELECTED DH11 TO XMIT 256. CHARS IN HALF-
                                                   DUPLEX MODE.
                                                6. ACTIVATE THE SELECTED LINE AND WAIT FOR THE "BAR" REG TO CLEAR
                                                7. IF TIMEOUT - REPORT ERROR AND GO TO STEP 2
                                                8. IF NO TIMEOUT VERIFY THE "CHAR AVAIL" DID NOT SET (RECEIVER
                                                   BLINDED) - IF ERROR REPORT IT AND GO TO STEP2 - IF NO ERROR
                                                    GO TO STEP 2

                                        ERRORS:
                                        *******

                                        1. [ERROR  26] IS CALLED TO REPORT ALL ERRORS

                                        SYNC:   M7277   SH3     INIT A H        EF2
                                        *****

                                        DEBUG:
                                        ******

                                        1. SUSPECT EITHER THE M7289 OR THE M7288 MODULES

                                        KEY LOGIC:
                                        **********

                                                M7289   SH5     HALF DUPLEX <15:00> H SIGNALS
                                                                END OF CHAR <15:00> SIGNALS

                                                M7288   SH5     HALF DUPLEX <03:00> H SIGNALS
                                                        SH7        "     "  <07:00> H SIGNALS
                                                        SH9        "     "  <11:08> H SIGNALS
                                                        SH11       "     "  <15:12> H SIGNALS

                                        %
017022  012767  017036  162060                  MOV     #2$,$LPERR      ;SET UP ERROR LOOP RETURN
017030  004767  005446                  1$:     JSR     PC,SELINE
017034  000477                                  BR      TST54           ;;BR IF ALL LINES TESTED
017036  012711  004000                  2$:     MOV     #BIT11,(R1)     ;CLEAR THE INTERFACE
017042  004767  005606                          JSR     PC,CLCABC       ;GO CLR THE "CAR" AND "BCR" MEMORIES
017046  156711  011140                          BISB    LINE,(R1)       ;SELECT THE LINE
017052  012761  037112  000006                  MOV     #TBUF,CAR(R1)   ;POINT TO XMIT BUFFER
```

```
5056  017060  012761  177400  000010          MOV     #-400,BCR(R1)    ;XMIT 256(10) CHARS
5057  017066  012761  073503  000004          MOV     #73503,LPR(R1)   ;SET UP THE LINE PARAMETERS
5058  017074  016761  010104  000012          MOV     LINMSK,BAR(R1)   ;ACTIVATE THE SELECTED LINE
5059
5060  017102  012767  000001  011130          MOV     #1,TIMEA         ;INIT TIME A
5061  017110  005067  011126                  CLR     TIMEB            ;INIT TIME B
5062  017114  005761  000012          3$:     TST     BAR(R1)          ;WAIT FOR XMITTR TO FINISH
5063  017120  001423                          BEQ     4$               ;BR IF XMITTR FINISHED
5064  017122  004767  007616                  JSR     PC,TIMEIT        ;CALL TIMER
5065  017126  000772                          BR      3$               ;TIMER WILL MOVE RETURN PC AROUND
5066                                                                   ;THIS BRANCH IF TIMEOUT OCCURS
5067
5068  017130  004767  007772                  JSR     PC,SAPS          ;SAVE THE ERROR PSW
5069  017134  016103  000012                  MOV     BAR(R1),R3       ;GET THE WAS DATA
5070  017140  010102                          MOV     R1,R2            ;SET UP REGADR
5071  017142  062702  000012                  ADD     #BAR,R2
5072  017146  005004                          CLR     R4               ;SET UP NEW S/B DATA
5073  017150  004767  005200                  JSR     PC,SUER2A        ;GO SET UP THE ERROR INFO
5074  017154  004567  005414                  JSR     R5,SUNUM         ;PUT LINE NO. IN MESSAGE
5075  017160  030212                          LINE
5076  017162  032266                          EM26+37
5077  017164  104026                          ERROR   26               ;BAR BIT FAILED TO CLEAR ON TIME
5078  017166  000720                          BR      1$               ;GO TRY NEXT LINE
5079
5080  017170  105711                  4$:     TSTB    (R1)             ;CHAR AVAIL SET ??
5081  017172  100316                          BPL     1$               ;BR IF NOT IT SHOULDN'T BE
5082
5083  017174  004767  007726                  JSR     PC,SAPS          ;SAVE THE ERROR PSW
5084  017200  010102                          MOV     R1,R2            ;SET UP REGADR
5085  017202  011103                          MOV     (R1),R3          ;GET WAS DATA
5086  017204  042703  100000                  BIC     #BIT15,R3        ;CLEAR JUNK BIT
5087  017210  116704  010776                  MOVB    LINE,R4          ;SET UP S/B DATA
5088  017214  004767  005134                  JSR     PC,SUER2A        ;GO SETUP ERROR INFO
5089  017220  004567  005350                  JSR     R5,SUNUM         ;PUT LINE NO. IN MSG
5090  017224  030212                          LINE
5091  017226  032266                          EM26+37
5092  017230  104026                          ERROR   26               ;HALF DUPLEX FAILED TO BLIND RECVR
5093  017232  000676                          BR      1$               ;GO SELECT NEXT LINE
```

```
                                        ;;*************************************************************
                                        ;*TEST 54        VERIFY THAT OVERRUN CAN SET PROPERLY - ALL SELECTED LINES
                                        ;;*************************************************************
017234  000004                          TST54:  SCOPE
                                        .REM    %
                                        TEST ABSTRACT:
                                        ***************

                                                THIS TEST VERIFIES THAT "OVERRUN" SETS PROPERLY FOR ALL LINES
                                        THAT ARE SELECTED FOR TEST WHEN THE OVERRUN CONDITION IS FORCED BY THE
                                        PROGRAM. THE TEST SEQUENCE IS AS FOLLOWS:

                                                1. SET UP THE ERROR LOOP RETURN
                                                2. SELECT A LINE NO. TO TEST - IF DONE ALL LINES GO TO
                                                   END OF PASS HANDLER.
                                                3. PRIME THE SELECTED LINE TO XMIT 68. CHARS
                                                4. ACTIVATE THE SELECTED LINE
                                                5. WAIT FOR "XMIT DONE" TO SET - IF TIMEOUT REPORT ERROR
                                                   AND RESTART AT STEP 2
                                                6. IF NO TIMEOUT READ 65. CHARS FROM THE SILO AND VERIFY THAT
                                                   "OVERRUN" IS SET ON THE LAST WORD READ
                                                7. IF NOT REPORT ERROR AND RESTART AT STEP 2

                                        ERRORS:
                                        ********

                                        1. [ERROR  50] IS CALLED TO REPORT "XMIT DONE " TIMEOUTS
                                        2. [ERROR  56] IS CALLEDT TO REPORT "OVERRUN" ERROR

                                        SYNC:   M7277   SH3     INIT A H        EF2
                                        *****

                                        DEBUG:
                                        ******

                                        1. IF FAULT APPEARS ON ONLY ONE LINE SUSPECT UART MODULE
                                           FOR THE APPROPRIATE LINE IN QUESTION.

                                        2. IF FAULT APPEARS ON ALL LINES SUSPECT THE M7279 MODULE

                                        KEY LOGIC:
                                        ***********

                                                M7279   SH1     MASTER OR H     E12-9
                                                        SH2     MEMORY CHIP (3341) E13-11

                                                M7280   SH2     UC1 OR 2 MASTER OR      EN2
                                                        SH2-5   UART PIN 15 (BUF OR LINE NN)

                                        %

017236  012767  017252  161644                  MOV     #2$,$LPERR      ;SET UP ERROR LOOP RETURN
017244  004767  005232                  1$:     JSR     PC,SELINE       ;GO SELECT A LINE # TO TEST
017250  000512                                  BR      TST55           ;;BR IF DONE ALL SELECTED LINES
017252  012711  004000                  2$:     MOV     #BIT11,(R1)     ;CLEAR OUT THE DH11
017256  116711  010730                          MOVB    LINE,(R1)       ;SELECT THE LINE TO TEST
```

```
017262  012761  037112  000006            MOV     #TBUF,CAR(R1)     ;SET UP CURRENT ADDRESS
017270  012761  177674  000010            MOV     #-68.,BCR(R1)     ;SET UP BYTE COUNT REG
017276  012761  033503  000004            MOV     #33503,LPR(R1)    ;DO IT AT 9600 BAUD - 8 BITS
017304  016761  007674  000012            MOV     LINMSK,BAR(R1)    ;ACTIVATE THE SELECTED LINE

017312  012767  000001  010720            MOV     #1,TIMEA          ;INIT TIMERS A AND B
017320  005067  010716                    CLR     TIMEB
017324  005711                    3$:     TST     (R1)              ;TRANSMITTER DONE ??
017326  100425                            BMI     4$                ;BR IF YES
017330  004767  007410                    JSR     PC,TIMEIT         ;CALL TIMER
017334  000773                            BR      3$                ;BR IF NO TIMEOUT

017336  004767  007564                    JSR     PC,SAPS           ;GO SAVE PSW
017342  011103                            MOV     (R1),R3           ;GET THE WAS DATA
017344  042703  077760                    BIC     #77760,R3         ;CLEAR UNINTERESTING BITS
017350  116704  010636                    MOVB    LINE,R4           ;SET UP S/B DATA
017354  052704  100000                    BIS     #BIT15,R4
017360  010102                            MOV     R1,R2             ;SET UP REGADR
017362  004767  004766                    JSR     PC,SUER2A         ;GO SET UP ERROR INFO
017366  004567  005202                    JSR     R5,SUNUM          ;PUT LINE NO. IN MESSAGE HEADER
017372  030212                            LINE
017374  034144                            EM50+53
017376  104050                            ERROR   50                ;REPORT XMIT DONE TIME OUT
017400  000721                            BR      1$                ;GO TRY NEXT LINE

017402  012767  000101  161574    4$:     MOV     #65.,$TMP1        ;SET UP TO READ 65. WORDS FROM SILO
017410  116704  010576                    MOVB    LINE,R4           ;SET UP S/B DATA
017414  000304                            SWAB    R4
017416  152704  000101                    BISB    #65.,R4
017422  052704  140000                    BIS     #BIT15+BIT14,R4   ;PUT IN OVERRUN AND VALID DATA BITS
017426  016103  000002            5$:     MOV     NRC(R1),R3        ;GET WAS DATA FROM SILO
017432  005367  161546                    DEC     $TMP1             ;COUNT ONE WORD READ
017436  001373                            BNE     5$                ;BR TIL 65. READ
017440  020304                            CMP     R3,R4             ;WAS DATA AND OVERRUN CORRECT ??
017442  001700                            BEQ     1$                ;BR IF YES TRY NEXT SELECTED LINE

017444  004767  007456                    JSR     PC,SAPS           ;GO SAVE PSW
017450  010102                            MOV     R1,R2             ;SET UP REGADR
017452  062702  000002                    ADD     #NRC,R2
017456  004767  004672                    JSR     PC,SUER2A         ;GO SET UP ERROR INFO
017462  004567  005106                    JSR     R5,SUNUM          ;GO PUT LINE NO. IN MSG HDR
017466  030212                            LINE
017470  034562                            EM56+42
017472  104056                            ERROR   56                ;OVERRUN OR DATA INCORRECT
017474  000663                            BR      1$                ;GO TEST NEXT SELECTED LINE
```

```
                                   ;;*************************************************************
                                   ;*TEST 55       ABBREVIATED DM11-BB MODEM CONTROL DIAGNOSTIC
                                   ;;*************************************************************
017476  000004                     TST55:  SCOPE
                                    .REM    %
                                   TEST ABSTRACT:
                                   ***************

                                           THE FOLLOWING 4 TESTS ARE EXTRACTED FROM DZDHK DIAGNOSTIC
                                   AND ARE INSERTED HERE SO THAT ALL LEVEL CONVERTERS AND CABLES CAN
                                   BE CHECKED WITH JUST ONE PROGRAM (RATHER THAN TWO) USING THE H315
                                   TURNAROUND CONNECTOR.

                                           THIS TEST VERIFIES THAT THE LINE ENABLE FUNCTION FLIP-FLOP
                                   CAN BE SET AND CLEARED FOR THE SELECTED LINE.

                                   ERRORS
                                   ******

                                           IF ANY ERRORS OCCUR IN THE FOLLOWING TESTS, THEN DZDHK,
                                   THE DM11-BB MODEM CONTROL DIAGNOSTIC SHOULD BE RUN IN
                                   ITS ENTIRETY FOR A MORE COMPLETE DM11-BB CHECKOUT.


                                   %

017500  032777  002000  161432             BIT     #BIT10,@SWR             ;CHECK DM11-BB?
017506  001002                             BNE     2$                      ;BRANCH IF YES.
017510  000167  001024                     JMP     ENDA                    ;OTHERWISE, GET OUT.
017514  012700  030034             2$:     MOV     #DMADRS,R0              ;R0 POINTS TO BEGINNING OF DM ADDRESS TABLE.
017520  016767  010464  161454             MOV     DHNUM,$TMP0
017526  006367  161450                     ASL     $TMP0                   ;DOUBLE TMP0
017532  066700  161444                     ADD     $TMP0,R0                ;CREATE AN OFFSET.
017536  011067  010436                     MOV     (R0),DHMCSR             ;MOVE THE DM ADDRESS INTO DHMCSR.
017542  016767  010432  010432             MOV     DHMCSR,DHMLSR
017550  062767  000002  010424             ADD     #2,DHMLSR               ;SAVE LINE STATUS REGISTER ADDRESS.
017556  005767  010416                     TST     DHMCSR                  ;IS THERE A DM11-BB HERE?
017562  001004                             BNE     DOIT11                  ;BRANCH IF YES.
017564  104401                             TYPE
017566  036025                             MSG5                            ;NO DM11-BB FOUND.
017570  000167  000744                     JMP     ENDA                    ;GET OUTTA HERE.
017574  004767  004702             DOIT11: JSR     PC,SELINE               ;GO SELECT A LINE.
017600  000470                             BR      TST56           ;;BR IF DONE ALL SELECTED LINES

017602  005077  010372             MUX11:  CLR     @DHMCSR                 ;CLEAR CONTROL STATUS REGISTER
017606  042767  000340  160162             BIC     #340,PS                 ;ENABLE INTERRUPTS
017614  116701  010372                     MOVB    LINE,R1
017620  012777  002000  010352     MUX11A: MOV     #CLRMUX,@DHMCSR
017626  012702  000020                     MOV     #16.,R2
017632  010177  010342                     MOV     R1,@DHMCSR              ;SELECT LINE TO BE TESTED
017636  012777  000001  010336             MOV     #LINENA,@DHMLSR         ;SET LINE ENABLE FUNCTION FLIP-FLOP
017644  005077  010330                     CLR     @DHMCSR
017650  005005                     MUX11B: CLR     R5
017652  017704  010324                     MOV     @DHMLSR,R4              ;READ LINE STATUS REGISTER
017656  117703  010316                     MOVB    @DHMCSR,R3              ;READ CONTROL STATUS REGISTER
017662  042703  177760                     BIC     #177760,R3              ;CLEAR UNWANTED BITS
```

```
017666  020103                          CMP     R1,R3                   ;IF LINE NUMBER=SELECTED LINE NUMBER,
017670  001002                          BNE     MUX11C                  ;EXCEPT LINE ENABLE FUNCTION FLIP FLOP
017672  012705  000001                  MOV     #LINENA,R5
                                                                        ;TO BE SET
017676  020504                  MUX11C: CMP     R5,R4                   ;COMPARE EXPECTED AND RECEIVED
017700  001403                          BEQ     MUX11D                  ;RESULTS
017702  104401                          TYPE
017704  035755                          MSG4                            ;ERROR
017706  000000                          HALT
017710  052777  000400  010262  MUX11D: BIS     #STEP,@DHMCSR           ;EXAMINE NEXT LINE
017716  005302                          DEC     R2
017720  001353                          BNE     MUX11B
017722  005005                          CLR     R5
017724  010177  010250          MUX11E: MOV     R1,@DHMCSR
017730  010103                          MOV     R1,R3                   ;SET LINE COUNTER TO SELECTED LINE
017732  005077  010244                  CLR     @DHMLSR                 ;CLEAR LINE ENABLE FLIP FLOP
017736  105227  000000                  INCB    #0                      ;DELAY FOR CABLE
017742  001375                          BNE     .-4                     ;DITTO
017744  017704  010232                  MOV     @DHMLSR,R4              ;READ LINE STATUS REGISTER
017750  005704                          TST     R4                      ;WAS LINE ENABLE FUNCTION FLIP FLOP
017752  001710                          BEQ     DOIT11                  ;CLEARED
017754  104401                          TYPE
017756  035755                          MSG4                            ;ERROR
017760  000000                          HALT
```

```
                                        ;;*****************************************************************
                                        ;*TEST 56        DM11-BB DIAGNOSTIC CONTINUED
                                        ;;*****************************************************************
 017762  000004                         TST56:  SCOPE
                                        .REM    %
                                        TEST ABSTRACT:
                                        ****************

                                                THIS TEST VERIFIES THAT CLEAR TO SEND AND CARRIER ARE SET
                                        IF  "LINE ENABLE" AND TERMINAL ARE SET FOR THE SELECTED LINE.

                                        ERRORS:
                                        ********

                                                IF ANY ERRORS OCCUR, RUN THE DM11-BB MODEM CONTROL DIAGNOSTIC,
                                         DZDHK.

                                        %
 017764  005077  010212                 DOIT15: CLR     @DHMLSR                 ;CLEAR LINE STATUS REGISTER
 017770  004767  004506                         JSR     PC,SELINE               ;GO SELECT A LINE.
 017774  000467                                 BR      TST57           ;;BR IF DONE ALL SELECTED LINES
 017776  005077  010176                 MUX15:  CLR     @DHMCSR                 ;CLEAR CONTROL REGISTER
 020002  042767  000340  157766                 BIC     #340,PS                 ;ENABLE INTERRUPTS
 020010  116701  010176                         MOVB    LINE,R1
 020014  012702  000020                 MUX15A: MOV     #16.,R2                 ;16 LINES
 020020  010177  010154                         MOV     R1,@DHMCSR              ;SELECT A LINE
 020024  012777  000003  010150                 MOV     #LINENA+TRMRDY,@DHMLSR  ;SET LINE ENABLE +TRMRDY
 020032  005077  010142                         CLR     @DHMCSR                 ;CLEAR CONTROL REGISTER
 020036  005005                         MUX15B: CLR     R5                      ;CLEAR EXPECTED RESULT
 020040  017704  010136                         MOV     @DHMLSR,R4              ;READ LINE STATUS
 020044  117703  010130                         MOVB    @DHMCSR,R3              ;READ LINE NUMBER
 020050  042703  177760                         BIC     #177760,R3              ;CLEAR UNWANTED BITS
 020054  020103                                 CMP     R1,R3                   ;IF RECEIVED LINE=SELECTED LINE
 020056  001002                                 BNE     MUX15C                  ;EXPECT LINE ENABLE AND
 020060  012705  000143                         MOV     #LINENA+TRMRDY+CO+CS,R5
                                                                                ;CLEAR TO SEND AND CARRIER ARE SET
 020064  020405                         MUX15C: CMP     R4,R5                   ;COMPARE EXPECTED AND
 020066  001403                                 BEQ     MUX15D                  ;RECEIVED RESULTS
 020070  104401                                 TYPE
 020072  035755                                 MSG4                            ;ERROR.
 020074  000000                                 HALT
 020076  052777  000400  010074         MUX15D: BIS     #STEP,@DHMCSR           ;UPDATE LINE COUNTER
 020104  005302                                 DEC     R2                      ;CONTINUE IF ALL CHECKS
 020106  001353                                 BNE     MUX15B                  ;ARE NOT DONE FOR THIS LINE
 020110  012705  000001                         MOV     #LINENA,R5              ;EXPECT LINE ENABLE
 020114  010103                         MUX15E: MOV     R1,R3                   ;ON SELECTED LINE
 020116  010177  010056                         MOV     R1,@DHMCSR              ;SELECT LINE
 020122  042777  000002  010052                 BIC     #TRMRDY,@DHMLSR         ;CLEAR TERMINAL
 020130  105227  000000                         INCB    #0                      ;DELAY FOR CABLE
 020134  001375                                 BNE     .-4                     ;DITTO
 020136  017704  010040                         MOV     @DHMLSR,R4              ;READ LINE STATUS REGISTER
 020142  020504                                 CMP     R5,R4                   ;ONLY LINE ENABLE SHOULD BE
 020144  001707                                 BEQ     DOIT15                  ;SET ON THIS LINE
 020146  104401                                 TYPE
 020150  035755                                 MSG4                            ;ERROR.
 020152  000000                                 HALT
```

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5334
5335
```

```
                                        ;;*************************************************************
                                        ;*TEST 57        DM11-BB DIAGNOSTIC CONTINUED
                                        ;;*************************************************************
020154  000004                          TST57:  SCOPE
                                        .REM    %
                                        TEST ABSTRACT:
                                        *****************

                                                THIS TEST VERIFIES THAT RING IS SET IF "LINE ENABLE" AND
                                        REQUEST TO SEND ARE SET FOR THE SELECTED LINE.

                                        ERRORS:
                                        *********

                                                IF ANY ERRORS OCCUR, RUN THE DM11-BB MODEM CONTROL DIAGNOSTIC,
                                         DZDHK.

                                        %
020156  005077  010020                  DOIT16: CLR     @DHMLSR                 ;CLEAR LINE STATUS REGISTER
020162  004767  004314                          JSR     PC,SELINE               ;GO SELECT A LINE.
020166  000467                                  BR      TST60           ;;BR IF DONE ALL SELECTED LINES
020170  005077  010004                  MUX16:  CLR     @DHMCSR                 ;CLEAR CONTROL REGISTER
020174  042767  000340  157574                  BIC     #340,PS                 ;ENABLE INTERRUPTS
020202  116701  010004                          MOVB    LINE,R1
020206  012702  000020                  MUX16A: MOV     #16.,R2                 ;16 LINES
020212  010177  007762                          MOV     R1,@DHMCSR              ;SELECT A LINE
020216  012777  000005  007756                  MOV     #LINENA+RS,@DHMLSR      ;SET LINE ENABLE +RS
020224  005077  007750                          CLR     @DHMCSR                 ;CLEAR CONTROL REGISTER
020230  005005                          MUX16B: CLR     R5                      ;CLEAR EXPECTED RESULT
020232  017704  007744                          MOV     @DHMLSR,R4              ;READ LINE STATUS
020236  117703  007736                          MOVB    @DHMCSR,R3              ;READ LINE NUMBER
020242  042703  177760                          BIC     #177760,R3              ;CLEAR UNWANTED BITS
020246  020103                                  CMP     R1,R3                   ;IF RECEIVED LINE=SELECTED LINE
020250  001002                                  BNE     MUX16C                  ;EXPECT LINE ENABLE AND
020252  012705  000205                          MOV     #LINENA+RS+RING,R5
                                                                                ;RING IS SET
020256  020405                          MUX16C: CMP     R4,R5                   ;COMPARE EXPECTED AND
020260  001403                                  BEQ     MUX16D                  ;RECEIVED RESULTS
020262  104401                                  TYPE
020264  035755                                  MSG4                            ;ERROR
020266  000000                                  HALT
020270  052777  000400  007702          MUX16D: BIS     #STEP,@DHMCSR           ;UPDATE LINE COUNTER
020276  005302                                  DEC     R2                      ;CONTINUE IF ALL CHECKS
020300  001353                                  BNE     MUX16B                  ;ARE NOT DONE FOR THIS LINE
020302  012705  000001                          MOV     #LINENA,R5              ;EXPECT LINE ENABLE
020306  010103                          MUX16E: MOV     R1,R3                   ;ON SELECTED LINE
020310  010177  007664                          MOV     R1,@DHMCSR              ;SELECT LINE
020314  042777  000004  007660                  BIC     #RS,@DHMLSR             ;CLEAR REQUEST TO SEND
020322  105227  000000                          INCB    #0                      ;DELAY FOR CABLE
020326  001375                                  BNE     .-4                     ;DITTO
020330  017704  007646                          MOV     @DHMLSR,R4              ;READ LINE STATUS REGISTER
020334  020504                                  CMP     R5,R4                   ;ONLY LINE ENABLE SHOULD BE
020336  001707                                  BEQ     DOIT16                  ;SET ON THIS LINE
020340  104401                                  TYPE
020342  035755                                  MSG4                            ;ERROR
020344  000000                                  HALT
```

```
5392
5393
```

```
                                    ;;***********************************************************
                                    ;*TEST 60        DM11-BB DIAGNOSTIC CONTINUED
                                    ;;***********************************************************
020346  000004                      TST60:  SCOPE
                                    .REM    %
                                    TEST ABSTRACT:
                                    ***************

                                            THIS TEST VERIFIES THAT SECONDARY RECEIVE IS SET IF "LINE
                                    ENABLE" AND SECONDARY TRANSMIT ARE SET FOR THE SELECTED LINE.

                                    ERRORS:
                                    *********

                                            IF ANY ERRORS OCCUR, RUN THE DM11-BB MODEM CONTROL DIAGNOSTIC,
                                     DZDHK.

                                    %
020350  005077  007626              DOIT17: CLR     @DHMLSR                 ;CLEAR LINE STATUS REGISTER.
020354  004767  004122                      JSR     PC,SELINE                               ;GO SELECT A LINE.
020360  000467                              BR      ENDA
020362  005077  007612              MUX17:  CLR     @DHMCSR                         ;CLEAR CONTROL REGISTER
020366  042767  000340  157402              BIC     #340,PS                         ;ENABLE INTERRUPTS
020374  116701  007612                      MOVB    LINE,R1
020400  012702  000020              MUX17A: MOV     #16.,R2                         ;16 LINES
020404  010177  007570                      MOV     R1,@DHMCSR                      ;SELECT A LINE
020410  012777  000011  007564              MOV     #LINENA+SECTX,@DHMLSR           ;SET LINE ENABLE +SECTX
020416  005077  007556                      CLR     @DHMCSR                         ;CLEAR CONTROL REGISTER
020422  005005                      MUX17B: CLR     R5                              ;CLEAR EXPECTED RESULT
020424  017704  007552                      MOV     @DHMLSR,R4                      ;READ LINE STATUS
020430  117703  007544                      MOVB    @DHMCSR,R3                      ;READ LINE NUMBER
020434  042703  177760                      BIC     #177760,R3                      ;CLEAR UNWANTED BITS
020440  020103                              CMP     R1,R3                           ;IF RECEIVED LINE=SELECTED LINE
020442  001002                              BNE     MUX17C                          ;EXPECT LINE ENABLE AND
020444  012705  000031                      MOV     #LINENA+SECTX+SECRX,R5
                                                                                    ;SECONDARY RECEIVE IS SET
020450  020405                      MUX17C: CMP     R4,R5                           ;COMPARE EXPECTED AND
020452  001403                              BEQ     MUX17D                          ;RECEIVED RESULTS
020454  104401                              TYPE
020456  035755                              MSG4
020460  000000                              HALT
020462  052777  000400  007510      MUX17D: BIS     #STEP,@DHMCSR                   ;UPDATE LINE COUNTER
020470  005302                              DEC     R2                              ;CONTINUE IF ALL CHECKS
020472  001353                              BNE     MUX17B                          ;ARE NOT DONE FOR THIS LINE
020474  012705  000001                      MOV     #LINENA,R5                      ;EXPECT LINE ENABLE
020500  010103                      MUX17E: MOV     R1,R3                           ;ON SELECTED LINE
020502  010177  007472                      MOV     R1,@DHMCSR                      ;SELECT LINE
020506  042777  000010  007466              BIC     #SECTX,@DHMLSR                  ;CLEAR SECONDARY TRANSMIT
020514  105227  000000                      INCB    #0                              ;DELAY FOR CABLE
020520  001375                              BNE     .-4                             ;DITTO
020522  017704  007454                      MOV     @DHMLSR,R4                      ;READ LINE STATUS REGISTER
020526  020504                              CMP     R5,R4                           ;ONLY LINE ENABLE SHOULD BE
020530  001707                              BEQ     DOIT17                          ;SET ON THIS LINE
020532  104401                              TYPE
020534  035755                              MSG4
020536  000000                              HALT
```

```
020540  000004                          ENDA:   SCOPE
020542  012767  000240  000054                  MOV     #240,$EOP         ;NOP THE SCOPE AT THE BEGINNING OF EOP
020550  005267  007434                          INC     DHNUM             ;GENERATE NEW DH11 NUMBER
020554  062767  000002  007434                  ADD     #2,ADPTR          ;UPDATE THE TABLE POINTERS
020562  062767  000002  007430                  ADD     #2,VCPTR
020570  062767  000002  007424                  ADD     #2,BRPTR
020576  006367  006374                          ASL     SELMSK            ;SHIFT MARKER TO TEST NEXT DH11
020602  001410                                  BEQ     $EOP              ;BR IF TESTED ALL SELECTED DH11'S
020604  036767  006366  006366                  BIT     SELMSK,DHSEL      ;IS THIS DH11 SELECTED ?
020612  001752                                  BEQ     ENDA              ;BR IF NOT
020614  105067  160262                          CLRB    $TSTNM            ;INIT TEST NUMBER
020620  000167  162104                          JMP     RSTRTA            ;GO TEST THIS DH11
                                        .SBTTL  END OF PASS ROUTINE

                                        ;;*****************************************************************
                                        ;*INCREMENT THE PASS NUMBER ($PASS)
                                        ;*TYPE "END PASS #XXXXX" (WHERE XXXXX IS A DECIMAL NUMBER)
                                        ;*IF THERES A MONITOR GO TO IT
                                        ;*IF THERE ISN'T JUMP TO START2

020624                                  $EOP:
020624  000004                                  SCOPE
020626  005067  160250                          CLR     $TSTNM            ;;ZERO THE TEST NUMBER
020632  005067  160364                          CLR     $TIMES            ;;ZERO THE NUMBER OF ITERATIONS
020636  005267  160376                          INC     $PASS             ;;INCREMENT THE PASS NUMBER
020642  042767  100000  160370                  BIC     #100000,$PASS     ;;DON'T ALLOW A NEG. NUMBER
020650  005327                                  DEC     (PC)+             ;;LOOP?
020652  000001                          $EOPCT: .WORD   1
020654  003022                                  BGT     $DOAGN            ;;YES
020656  012737                                  MOV     (PC)+,@(PC)+      ;;RESTORE COUNTER
020660  000001                          $ENDCT: .WORD   1
020662  020652                                          $EOPCT
020664  104401  020731                          TYPE    ,$ENDMG           ;;TYPE "END PASS #"
020670  016746  160344                          MOV     $PASS,-(SP)       ;;SAVE $PASS FOR TYPEOUT
020674  104405                                  TYPDS                     ;;GO TYPE--DECIMAL ASCII WITH SIGN
020676  104401  020726                          TYPE    ,$ENULL           ;;TYPE A NULL CHARACTER
020702  013700  000042                  $GET42: MOV     @#42,R0           ;;GET MONITOR ADDRESS
020706  001405                                  BEQ     $DOAGN            ;;BRANCH IF NO MONITOR
020710  000005                                  RESET                     ;;CLEAR THE WORLD
020712  004710                          $ENDAD: JSR     PC,(R0)           ;;GO TO MONITOR
020714  000240                                  NOP                       ;;SAVE ROOM
020716  000240                                  NOP                       ;;FOR
020720  000240                                  NOP                       ;;ACT11
020722                                  $DOAGN:
020722  000137                                  JMP     @(PC)+            ;;RETURN
020724  002624                          $RTNAD: .WORD   START2
020726     377     377     000          $ENULL: .BYTE   -1,-1,0           ;;NULL CHARACTER STRING
020731     015  042412  042116          $ENDMG: .ASCIZ  <15><12>/END PASS #/
020736  050040  051501  020123
020744  000043

                                        .SBTTL  SCOPE HANDLER ROUTINE

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

```
                                        ;*THIS ROUTINE CONTROLS THE LOOPING OF SUBTESTS. IT WILL INCREMENT
                                        ;*AND LOAD THE TEST NUMBER($TSTNM) INTO THE DISPLAY REG.(DISPLAY<7:0>)
                                        ;*AND LOAD THE ERROR FLAG ($ERFLG) INTO DISPLAY<15:08>
                                        ;*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
                                        ;*SW14=1         LOOP ON TEST
                                        ;*SW11=1         INHIBIT ITERATIONS
                                        ;*SW09=1         LOOP ON ERROR
                                        ;*SW08=1         LOOP ON TEST IN SWR<7:0>
                                        ;*CALL
                                        ;*       SCOPE           ;;SCOPE=IOT

020746                                  $SCOPE:
020746  104407                                  CKSWR                   ;;TEST  FOR CHANGE IN SOFT-SWR
020750  005067  007236                          CLR     LINE            ;INIT THE LINE NO. TO ZERO
020754  016701  006212                          MOV     DHADR,R1        ;SET UP DEVADR IN R1
020760  032777  040000  160152  1$:     BIT     #BIT14,@SWR     ;;LOOP ON PRESENT TEST?
020766  001114                                  BNE     $OVER           ;;YES IF SW14=1
                                        ;#####START OF CODE FOR THE XOR TESTER#####
020770  000416                          $XTSTR: BR      6$              ;;IF RUNNING ON THE "XOR" TESTER CHANGE
                                                                        ;;THIS INSTRUCTION TO A "NOP" (NOP=240)
020772  013746  000004                          MOV     @#ERRVEC,-(SP)  ;;SAVE THE CONTENTS OF THE ERROR VECTOR
020776  012737  021016  000004                  MOV     #5$,@#ERRVEC    ;;SET FOR TIMEOUT
021004  005737  177060                          TST     @#177060        ;;TIME OUT ON XOR?
021010  012637  000004                          MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
021014  000463                                  BR      $SVLAD          ;;GO TO THE NEXT TEST
021016  022626                          5$:     CMP     (SP)+,(SP)+     ;;CLEAR THE STACK AFTER A TIME OUT
021020  012637  000004                          MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
021024  000423                                  BR      7$              ;;LOOP ON THE PRESENT TEST
021026                                  6$:;#####END OF CODE FOR THE XOR TESTER#####
021026  032777  000400  160104                  BIT     #BIT08,@SWR     ;;LOOP ON SPEC. TEST?
021034  001404                                  BEQ     2$              ;;BR IF NO
021036  127767  160076  160036                  CMPB    @SWR,$TSTNM     ;;ON THE RIGHT TEST?    SWR<7:0>
021044  001465                                  BEQ     $OVER           ;;BR IF YES
021046  105767  160031                  2$:     TSTB    $ERFLG          ;;HAS AN ERROR OCCURRED?
021052  001421                                  BEQ     3$              ;;BR IF NO
021054  126767  160035  160021                  CMPB    $ERMAX,$ERFLG   ;;MAX. ERRORS FOR THIS TEST OCCURRED?
021062  101015                                  BHI     3$              ;;BR IF NO
021064  032777  001000  160046                  BIT     #BIT09,@SWR     ;;LOOP ON ERROR?
021072  001404                                  BEQ     4$              ;;BR IF NO
021074  016767  160010  160004  7$:     MOV     $LPERR,$LPADR   ;;SET LOOP ADDRESS TO LAST SCOPE
021102  000446                                  BR      $OVER
021104  105067  157773                  4$:     CLRB    $ERFLG          ;;ZERO THE ERROR FLAG
021110  005067  160106                          CLR     $TIMES          ;;CLEAR THE NUMBER OF ITERATIONS TO MAKE
021114  000415                                  BR      1$              ;;ESCAPE TO THE NEXT TEST
021116  032777  004000  160014  3$:     BIT     #BIT11,@SWR     ;;INHIBIT ITERATIONS?
021124  001011                                  BNE     1$              ;;BR IF YES
021126  005767  160106                          TST     $PASS           ;;IF FIRST PASS OF PROGRAM
021132  001406                                  BEQ     1$              ;;      INHIBIT ITERATIONS
021134  005267  157744                          INC     $ICNT           ;;INCREMENT ITERATION COUNT
021140  026767  160056  157736                  CMP     $TIMES,$ICNT    ;;CHECK THE NUMBER OF ITERATIONS MADE
021146  002024                                  BGE     $OVER           ;;BR IF MORE ITERATION REQUIRED
021150  012767  000001  157726  1$:     MOV     #1,$ICNT        ;;REINITIALIZE THE ITERATION COUNTER
021156  016767  000052  160036                  MOV     $MXCNT,$TIMES   ;;SET NUMBER OF ITERATIONS TO DO
021164  105267  157712                  $SVLAD: INCB    $TSTNM          ;;COUNT TEST NUMBERS
021170  116767  157706  160040                  MOVB    $TSTNM,$TESTN   ;;SET TEST NUMBER IN APT MAILBOX
021176  011667  157704                          MOV     (SP),$LPADR     ;;SAVE SCOPE LOOP ADDRESS
```

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021202  011667  157702                          MOV     (SP),$LPERR        ;;SAVE ERROR LOOP ADDRESS
021206  005067  160012                          CLR     $ESCAPE            ;;CLEAR THE ESCAPE FROM ERROR ADDRESS
021212  112767  000001  157675                  MOVB    #1,$ERMAX          ;;ONLY ALLOW ONE(1) ERROR ON NEXT TEST
021220  016777  157656  157714  $OVER:          MOV     $TSTNM,@DISPLAY    ;;DISPLAY TEST NUMBER
021226  016716  157654                          MOV     $LPADR,(SP)        ;;FUDGE RETURN ADDRESS
021232  000002                                  RTI                        ;;FIXES PS
021234  000010                  $MXCNT: 10                                 ;;MAX. NUMBER OF ITERATIONS
                                .SBTTL  ERROR HANDLER ROUTINE

                                ;;*************************************************************
                                ;*THIS ROUTINE WILL INCREMENT THE ERROR FLAG AND THE ERROR COUNT,
                                ;*SAVE THE ERROR ITEM NUMBER AND THE ADDRESS OF THE ERROR CALL
                                ;*AND GO TO $ERRTYP ON ERROR
                                ;*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
                                ;*SW15=1         HALT ON ERROR
                                ;*SW13=1         INHIBIT ERROR TYPEOUTS
                                ;*SW09=1         LOOP ON ERROR
                                ;*CALL
                                ;*       ERROR   N       ;;ERROR=EMT AND N=ERROR ITEM NUMBER

021236                          $ERROR:
021236  104407                                  CKSWR                      ;;TEST FOR CHANGE IN SOFT-SWR
021240  105267  157637          7$:             INCB    $ERFLG             ;;SET THE ERROR FLAG
021244  001775                                  BEQ     7$                 ;;DON'T LET THE FLAG GO TO ZERO
021246  016777  157630  157666                  MOV     $TSTNM,@DISPLAY    ;;DISPLAY TEST NUMBER AND ERROR FLAG
021254  005267  157632                          INC     $ERTTL             ;;INC THE ERROR COUNT
021260  011667  157632                          MOV     (SP),$ERRPC        ;;GET ADDRESS OF ERROR INSTRUCTION
021264  162767  000002  157624                  SUB     #2,$ERRPC
021272  117767  157620  157614                  MOVB    @$ERRPC,$ITEMB     ;;STRIP AND SAVE THE ERROR ITEM CODE
021300  032777  020000  157632                  BIT     #BIT13,@SWR        ;;SKIP TYPEOUT IF SET
021306  001004                                  BNE     20$                ;;SKIP TYPEOUTS
021310  004767  000106                          JSR     PC,$ERRTYP         ;;GO TO USER ERROR ROUTINE
021314  104401  001227                          TYPE    ,$CRLF
021320                          20$:
021320  122767  000001  157724                  CMPB    #APTENV,$ENV       ;;RUNNING IN APT MODE
021326  001007                                  BNE     2$                 ;;NO,SKIP APT ERROR REPORT
021330  116767  157560  000004                  MOVB    $ITEMB,21$         ;;SET ITEM NUMBER AS ERROR NUMBER
021336  004767  001166                          JSR     PC,$ATY4           ;;REPORT FATAL ERROR TO APT
021342     000                  21$:            .BYTE   0
021343     000                                  .BYTE   0
021344  000777                  22$:            BR      22$                ;;APT ERROR LOOP
021346  005777  157566          2$:             TST     @SWR               ;;HALT ON ERROR
021352  100002                                  BPL     3$                 ;;SKIP IF CONTINUE
021354  000000                                  HALT                       ;;HALT ON ERROR!
021356  104407                                  CKSWR                      ;;TEST FOR CHANGE IN SOFT-SWR
021360  032777  001000  157552  3$:             BIT     #BIT09,@SWR        ;;LOOP ON ERROR SWITCH SET?
021366  001402                                  BEQ     4$                 ;;BR IF NO
021370  016716  157514                          MOV     $LPERR,(SP)        ;;FUDGE RETURN FOR LOOPING
021374  005767  157624          4$:             TST     $ESCAPE            ;;CHECK FOR AN ESCAPE ADDRESS
021400  001402                                  BEQ     5$                 ;;BR IF NONE
021402  016716  157616                          MOV     $ESCAPE,(SP)       ;;FUDGE RETURN ADDRESS FOR ESCAPE
021406                          5$:
021406  022737  020712  000042                  CMP     #$ENDAD,@#42       ;;ACT-11 AUTO-ACCEPT?
021414  001001                                  BNE     6$                 ;;BRANCH IF NO
021416  000000                                  HALT                       ;;YES
021420                          6$:
```

```
021420 000002                    RTI                             ;;RETURN
                         .SBTTL  ERROR MESSAGE TYPEOUT ROUTINE

                         ;;*************************************************************
                         ;*THIS ROUTINE USES THE "ITEM CONTROL BYTE" ($ITEMB) TO DETERMINE WHICH
                         ;*ERROR IS TO BE REPORTED. IT THEN OBTAINS, FROM THE "ERROR TABLE" ($ERRTB),
                         ;*AND REPORTS THE APPROPRIATE INFORMATION CONCERNING THE ERROR.

021422                   $ERRTYP:
021422 104401 001227             TYPE    ,$CRLF          ;;"CARRIAGE RETURN" & "LINE FEED"
021426 010046                    MOV     R0,-(SP)        ;;SAVE R0
021430 005000                    CLR     R0              ;;PICKUP THE ITEM INDEX
021432 153700 001114             BISB    @#$ITEMB,R0
021436 001004                    BNE     1$              ;;IF ITEM NUMBER IS ZERO, JUST
                                                         ;;TYPE THE PC OF THE ERROR
021440 016746 157452             MOV     $ERRPC,-(SP)    ;;SAVE $ERRPC FOR TYPEOUT
                                                         ;;ERROR ADDRESS
021444 104402                    TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
021446 000426                    BR      6$              ;;GET OUT
021450 005300            1$:     DEC     R0              ;;ADJUST THE INDEX SO THAT IT WILL
021452 006300                    ASL     R0              ;;      WORK FOR THE ERROR TABLE
021454 006300                    ASL     R0
021456 006300                    ASL     R0
021460 062700 001356             ADD     #$ERRTB,R0      ;;FORM TABLE POINTER
021464 012067 000004             MOV     (R0)+,2$        ;;PICKUP "ERROR MESSAGE" POINTER
021470 001404                    BEQ     3$              ;;SKIP TYPEOUT IF NO POINTER
021472 104401                    TYPE                    ;;TYPE THE "ERROR MESSAGE"
021474 000000            2$:     .WORD   0               ;;"ERROR MESSAGE" POINTER GOES HERE
021476 104401 001227             TYPE    ,$CRLF          ;;"CARRIAGE RETURN" & "LINE FEED"
021502 012067 000004     3$:     MOV     (R0)+,4$        ;;PICKUP "DATA HEADER" POINTER
021506 001404                    BEQ     5$              ;;SKIP TYPEOUT IF 0
021510 104401                    TYPE                    ;;TYPE THE "DATA HEADER"
021512 000000            4$:     .WORD   0               ;;"DATA HEADER" POINTER GOES HERE
021514 104401 001227             TYPE    ,$CRLF          ;;"CARRIAGE RETURN" & "LINE FEED"
021520 011000            5$:     MOV     (R0),R0         ;;PICKUP "DATA TABLE" POINTER
021522 001004                    BNE     7$              ;;GO TYPE THE DATA
021524 012600            6$:     MOV     (SP)+,R0        ;;RESTORE R0
021526 104401 001227             TYPE    ,$CRLF          ;;"CARRIAGE RETURN" & "LINE FEED"
021532 000207                    RTS     PC              ;;RETURN
021534                   7$:
021534 013046                    MOV     @(R0)+,-(SP)    ;;SAVE @(R0)+ FOR TYPEOUT
021536 104402                    TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
021540 005710                    TST     (R0)            ;;IS THERE ANOTHER NUMBER?
021542 001770                    BEQ     6$              ;;BR IF NO
021544 104401 021552             TYPE    ,8$             ;;TYPE TWO(2) SPACES
021550 000771                    BR      7$              ;;LOOP
021552 020040    000     8$:     .ASCIZ  /  /            ;;TWO(2) SPACES
       021556                    .EVEN
                         .SBTTL  BINARY TO OCTAL (ASCII) AND TYPE

                         ;;*************************************************************
                         ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 6-DIGIT
                         ;*OCTAL (ASCII) NUMBER AND TYPE IT.
                         ;*$TYPOS---ENTER HERE TO SETUP SUPPRESS ZEROS AND NUMBER OF DIGITS TO TYPE
                         ;*CALL:
                         ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
```

```
                                        ;*      TYPOS                           ;;CALL FOR TYPEOUT
                                        ;*      .BYTE   N                       ;;N=1 TO 6 FOR NUMBER OF DIGITS TO TYPE
                                        ;*      .BYTE   M                       ;;M=1 OR 0
                                        ;*                                              ;;1=TYPE LEADING ZEROS
                                        ;*                                              ;;0=SUPPRESS LEADING ZEROS
                                        ;*
                                        ;*$TYPON----ENTER HERE TO TYPE OUT WITH THE SAME PARAMETERS AS THE LAST
                                        ;*$TYPOS OR $TYPOC
                                        ;*CALL:
                                        ;*      MOV     NUM,-(SP)               ;;NUMBER TO BE TYPED
                                        ;*      TYPON                           ;;CALL FOR TYPEOUT
                                        ;*
                                        ;*$TYPOC---ENTER HERE FOR TYPEOUT OF A 16 BIT NUMBER
                                        ;*CALL:
                                        ;*      MOV     NUM,-(SP)               ;;NUMBER TO BE TYPED
                                        ;*      TYPOC                           ;;CALL FOR TYPEOUT

021556  017646  000000                  $TYPOS: MOV     @(SP),-(SP)             ;;PICKUP THE MODE
021562  116667  000001  000211                  MOVB    1(SP),$0FILL            ;;LOAD ZERO FILL SWITCH
021570  112667  000207                          MOVB    (SP)+,$OMODE+1          ;;NUMBER OF DIGITS TO TYPE
021574  062716  000002                          ADD     #2,(SP)                 ;;ADJUST RETURN ADDRESS
021600  000406                                  BR      $TYPON
021602  112767  000001  000171          $TYPOC: MOVB    #1,$0FILL               ;;SET THE ZERO FILL SWITCH
021610  112767  000006  000165                  MOVB    #6,$OMODE+1             ;;SET FOR SIX(6) DIGITS
021616  112767  000005  000154          $TYPON: MOVB    #5,$0CNT                ;;SET THE ITERATION COUNT
021624  010346                                  MOV     R3,-(SP)                ;;SAVE R3
021626  010446                                  MOV     R4,-(SP)                ;;SAVE R4
021630  010546                                  MOV     R5,-(SP)                ;;SAVE R5
021632  116704  000145                          MOVB    $OMODE+1,R4             ;;GET THE NUMBER OF DIGITS TO TYPE
021636  005404                                  NEG     R4
021640  062704  000006                          ADD     #6,R4                   ;;SUBTRACT IT FOR MAX. ALLOWED
021644  110467  000132                          MOVB    R4,$OMODE               ;;SAVE IT FOR USE
021650  116704  000125                          MOVB    $0FILL,R4               ;;GET THE ZERO FILL SWITCH
021654  016605  000012                          MOV     12(SP),R5               ;;PICKUP THE INPUT NUMBER
021660  005003                                  CLR     R3                      ;;CLEAR THE OUTPUT WORD
021662  006105                          1$:     ROL     R5                      ;;ROTATE MSB INTO "C"
021664  000404                                  BR      3$                      ;;GO DO MSB
021666  006105                          2$:     ROL     R5                      ;;FORM THIS DIGIT
021670  006105                                  ROL     R5
021672  006105                                  ROL     R5
021674  010503                                  MOV     R5,R3
021676  006103                          3$:     ROL     R3                      ;;GET LSB OF THIS DIGIT
021700  105367  000076                          DECB    $OMODE                  ;;TYPE THIS DIGIT?
021704  100016                                  BPL     7$                      ;;BR IF NO
021706  042703  177770                          BIC     #177770,R3              ;;GET RID OF JUNK
021712  001002                                  BNE     4$                      ;;TEST FOR 0
021714  005704                                  TST     R4                      ;;SUPPRESS THIS 0?
021716  001403                                  BEQ     5$                      ;;BR IF YES
021720  005204                          4$:     INC     R4                      ;;DON'T SUPPRESS ANYMORE 0'S
021722  052703  000060                          BIS     #'0,R3                  ;;MAKE THIS DIGIT ASCII
021726  052703  000040                  5$:     BIS     #' ,R3                  ;;MAKE ASCII IF NOT ALREADY
021732  110367  000040                          MOVB    R3,8$                   ;;SAVE FOR TYPING
021736  104401  021776                          TYPE    ,8$                     ;;GO TYPE THIS DIGIT
021742  105367  000032                  7$:     DECB    $0CNT                   ;;COUNT BY 1
021746  003347                                  BGT     2$                      ;;BR IF MORE TO DO
021750  002402                                  BLT     6$                      ;;BR IF DONE
```

```
021752  005204                          INC     R4              ;;INSURE LAST DIGIT ISN'T A BLANK
021754  000744                          BR      2$              ;;GO DO THE LAST DIGIT
021756  012605                  6$:     MOV     (SP)+,R5        ;;RESTORE R5
021760  012604                          MOV     (SP)+,R4        ;;RESTORE R4
021762  012603                          MOV     (SP)+,R3        ;;RESTORE R3
021764  016666  000002  000004          MOV     2(SP),4(SP)     ;;SET THE STACK FOR RETURNING
021772  012616                          MOV     (SP)+,(SP)
021774  000002                          RTI                     ;;RETURN
021776     000                  8$:     .BYTE   0               ;;STORAGE FOR ASCII DIGIT
021777     000                          .BYTE   0               ;;TERMINATOR FOR TYPE ROUTINE
022000     000                  $OCNT:  .BYTE   0               ;;OCTAL DIGIT COUNTER
022001     000                  $OFILL: .BYTE   0               ;;ZERO FILL SWITCH
022002  000000                  $OMODE: .WORD   0               ;;NUMBER OF DIGITS TO TYPE
                                .SBTTL  CONVERT BINARY TO DECIMAL AND TYPE ROUTINE

                                ;;*******************************************************************
                                ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 5-DIGIT
                                ;*SIGNED DECIMAL (ASCII) NUMBER AND TYPE IT. DEPENDING ON WHETHER THE
                                ;*NUMBER IS POSITIVE OR NEGATIVE A SPACE OR A MINUS SIGN WILL BE TYPED
                                ;*BEFORE THE FIRST DIGIT OF THE NUMBER. LEADING ZEROS WILL ALWAYS BE
                                ;*REPLACED WITH SPACES.
                                ;*CALL:
                                ;*      MOV     NUM,-(SP)       ;;PUT THE BINARY NUMBER ON THE STACK
                                ;*      TYPDS                   ;;GO TO THE ROUTINE

        022004                  $TYPDS:
022004  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
022006  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
022010  010246                          MOV     R2,-(SP)        ;;PUSH R2 ON STACK
022012  010346                          MOV     R3,-(SP)        ;;PUSH R3 ON STACK
022014  010546                          MOV     R5,-(SP)        ;;PUSH R5 ON STACK
022016  012746  020200                  MOV     #20200,-(SP)    ;;SET BLANK SWITCH AND SIGN
022022  016605  000020                  MOV     20(SP),R5       ;;GET THE INPUT NUMBER
022026  100004                          BPL     1$              ;;BR IF INPUT IS POS.
022030  005405                          NEG     R5              ;;MAKE THE BINARY NUMBER POS.
022032  112766  000055  000001          MOVB    #'-,1(SP)       ;;MAKE THE ASCII NUMBER NEG.
022040  005000                  1$:     CLR     R0              ;;ZERO THE CONSTANTS INDEX
022042  012703  022220                  MOV     #$DBLK,R3       ;;SETUP THE OUTPUT POINTER
022046  112723  000040                  MOVB    #' ,(R3)+       ;;SET THE FIRST CHARACTER TO A BLANK
022052  005002                  2$:     CLR     R2              ;;CLEAR THE BCD NUMBER
022054  016001  022210                  MOV     $DTBL(R0),R1    ;;GET THE CONSTANT
022060  160105                  3$:     SUB     R1,R5           ;;FORM THIS BCD DIGIT
022062  002402                          BLT     4$              ;;BR IF DONE
022064  005202                          INC     R2              ;;INCREASE THE BCD DIGIT BY 1
022066  000774                          BR      3$
022070  060105                  4$:     ADD     R1,R5           ;;ADD BACK THE CONSTANT
022072  005702                          TST     R2              ;;CHECK IF BCD DIGIT=0
022074  001002                          BNE     5$              ;;FALL THROUGH IF 0
022076  105716                          TSTB    (SP)            ;;STILL DOING LEADING 0'S?
022100  100407                          BMI     7$              ;;BR IF YES
022102  106316                  5$:     ASLB    (SP)            ;;MSD?
022104  103003                          BCC     6$              ;;BR IF NO
022106  116663  000001  177777          MOVB    1(SP),-1(R3)    ;;YES--SET THE SIGN
022114  052702  000060          6$:     BIS     #'0,R2          ;;MAKE THE BCD DIGIT ASCII
022120  052702  000040          7$:     BIS     #' ,R2          ;;MAKE IT A SPACE IF NOT ALREADY A DIGIT
022124  110223                          MOVB    R2,(R3)+        ;;PUT THIS CHARACTER IN THE OUTPUT BUFFER
```

```
022126  005720                          TST     (R0)+                   ;;JUST INCREMENTING
022130  020027  000010                  CMP     R0,#10                  ;;CHECK THE TABLE INDEX
022134  002746                          BLT     2$                      ;;GO DO THE NEXT DIGIT
022136  003002                          BGT     8$                      ;;GO TO EXIT
022140  010502                          MOV     R5,R2                   ;;GET THE LSD
022142  000764                          BR      6$                      ;;GO CHANGE TO ASCII
022144  105726                  8$:     TSTB    (SP)+                   ;;WAS THE LSD THE FIRST NON-ZERO?
022146  100003                          BPL     9$                      ;;BR IF NO
022150  116663  177777  177776          MOVB    -1(SP),-2(R3)           ;;YES--SET THE SIGN FOR TYPING
022156  105013                  9$:     CLRB    (R3)                    ;;SET THE TERMINATOR
022160  012605                          MOV     (SP)+,R5                ;;POP STACK INTO R5
022162  012603                          MOV     (SP)+,R3                ;;POP STACK INTO R3
022164  012602                          MOV     (SP)+,R2                ;;POP STACK INTO R2
022166  012601                          MOV     (SP)+,R1                ;;POP STACK INTO R1
022170  012600                          MOV     (SP)+,R0                ;;POP STACK INTO R0
022172  104401  022220                  TYPE    ,$DBLK                  ;;NOW TYPE THE NUMBER
022176  016666  000002  000004          MOV     2(SP),4(SP)             ;;ADJUST THE STACK
022204  012616                          MOV     (SP)+,(SP)
022206  000002                          RTI                             ;;RETURN TO USER
022210  023420                  $DTBL:  10000.
022212  001750                          1000.
022214  000144                          100.
022216  000012                          10.
022220  000004                  $DBLK:  .BLKW   4
                                .SBTTL  TYPE ROUTINE

                                ;;******************************************************************
                                ;*ROUTINE TO TYPE ASCIZ MESSAGE. MESSAGE MUST TERMINATE WITH A 0 BYTE.
                                ;*THE ROUTINE WILL INSERT A NUMBER OF NULL CHARACTERS AFTER A LINE FEED.
                                ;*NOTE1:         $NULL CONTAINS THE CHARACTER TO BE USED AS THE FILLER CHARACTER.
                                ;*NOTE2:         $FILLS CONTAINS THE NUMBER OF FILLER CHARACTERS REQUIRED.
                                ;*NOTE3:         $FILLC CONTAINS THE CHARACTER TO FILL AFTER.
                                ;*
                                ;*CALL:
                                ;*1) USING A TRAP INSTRUCTION
                                ;*      TYPE    ,MESADR                 ;;MESADR IS FIRST ADDRESS OF AN ASCIZ STRING
                                ;*OR
                                ;*      TYPE
                                ;*      MESADR
                                ;*

022230  105767  156723          $TYPE:  TSTB    $TPFLG                  ;;IS THERE A TERMINAL?
022234  100002                          BPL     1$                      ;;BR IF YES
022236  000000                          HALT                            ;;HALT HERE IF NO TERMINAL
022240  000430                          BR      3$                      ;;LEAVE
022242  010046                  1$:     MOV     R0,-(SP)                ;;SAVE R0
022244  017600  000002                  MOV     @2(SP),R0               ;;GET ADDRESS OF ASCIZ STRING
022250  122767  000001  156774          CMPB    #APTENV,$ENV            ;;RUNNING IN APT MODE
022256  001011                          BNE     62$                     ;;NO,GO CHECK FOR APT CONSOLE
022260  132767  000100  156765          BITB    #APTSPOOL,$ENVM         ;;SPOOL MESSAGE TO APT
022266  001405                          BEQ     62$                     ;;NO,GO CHECK FOR CONSOLE
022270  010067  000004                  MOV     R0,61$                  ;;SETUP MESSAGE ADDRESS FOR APT
022274  004767  000220                  JSR     PC,$ATY3                ;;SPOOL MESSAGE TO APT
022300  000000                  61$:    .WORD   0                       ;;MESSAGE ADDRESS
022302  132767  000040  156743  62$:    BITB    #APTCSUP,$ENVM          ;;APT CONSOLE SUPPRESSED
022310  001003                          BNE     60$                     ;;YES,SKIP TYPE OUT
```

```
022312 112046                   2$:     MOVB    (R0)+,-(SP)     ;;PUSH CHARACTER TO BE TYPED ONTO STACK
022314 001005                           BNE     4$              ;;BR IF IT ISN'T THE TERMINATOR
022316 005726                           TST     (SP)+           ;;IF TERMINATOR POP IT OFF THE STACK
022320 012600                   60$:    MOV     (SP)+,R0        ;;RESTORE R0
022322 062716 000002            3$:     ADD     #2,(SP)         ;;ADJUST RETURN PC
022326 000002                           RTI                     ;;RETURN
022330 122716 000011            4$:     CMPB    #HT,(SP)        ;;BRANCH IF <HT>
022334 001430                           BEQ     8$
022336 122716 000200                    CMPB    #CRLF,(SP)      ;;BRANCH IF NOT <CRLF>
022342 001006                           BNE     5$
022344 005726                           TST     (SP)+           ;;POP  <CR><LF> EQUIV
022346 104401                           TYPE                    ;;TYPE A CR AND LF
022350 001227                           $CRLF
022352 105067 000130                    CLRB    $CHARCNT        ;;CLEAR CHARACTER COUNT
022356 000755                           BR      2$              ;;GET NEXT CHARACTER
022360 004767 000056            5$:     JSR     PC,$TYPEC       ;;GO TYPE THIS CHARACTER
022364 126726 156566            6$:     CMPB    $FILLC,(SP)+    ;;IS IT TIME FOR FILLER CHARS.?
022370 001350                           BNE     2$              ;;IF NO GO GET NEXT CHAR.
022372 016746 156556                    MOV     $NULL,-(SP)     ;;GET # OF FILLER CHARS. NEEDED
                                                                ;;AND THE NULL CHAR.
022376 105366 000001            7$:     DECB    1(SP)           ;;DOES A NULL NEED TO BE TYPED?
022402 002770                           BLT     6$              ;;BR IF NO--GO POP THE NULL OFF OF STACK
022404 004767 000032                    JSR     PC,$TYPEC       ;;GO TYPE A NULL
022410 105367 000072                    DECB    $CHARCNT        ;;DO NOT COUNT AS A COUNT
022414 000770                           BR      7$              ;;LOOP

                                ;HORIZONTAL TAB PROCESSOR

022416 112716 000040            8$:     MOVB    #' ,(SP)        ;;REPLACE TAB WITH SPACE
022422 004767 000014            9$:     JSR     PC,$TYPEC       ;;TYPE A SPACE
022426 132767 000007 000052             BITB    #7,$CHARCNT     ;;BRANCH IF NOT AT
022434 001372                           BNE     9$              ;;TAB STOP
022436 005726                           TST     (SP)+           ;;POP SPACE OFF STACK
022440 000724                           BR      2$              ;;GET NEXT CHARACTER
022442 105777 156502            $TYPEC: TSTB    @$TPS           ;;WAIT UNTIL PRINTER IS READY
022446 100375                           BPL     $TYPEC
022450 116677 000002 156474             MOVB    2(SP),@$TPB     ;;LOAD CHAR TO BE TYPED INTO DATA REG.
022456 122766 000015 000002             CMPB    #CR,2(SP)       ;;IS CHARACTER A CARRIAGE RETURN?
022464 001003                           BNE     1$              ;;BRANCH IF NO
022466 105067 000014                    CLRB    $CHARCNT        ;;YES--CLEAR CHARACTER COUNT
022472 000406                           BR      $TYPEX          ;;EXIT
022474 122766 000012 000002     1$:     CMPB    #LF,2(SP)       ;;IS CHARACTER A LINE FEED?
022502 001402                           BEQ     $TYPEX          ;;BRANCH IF YES
022504 105227                           INCB    (PC)+           ;;COUNT THE CHARACTER
022506 000000                   $CHARCNT:.WORD  0               ;;CHARACTER COUNT STORAGE
022510 000207                   $TYPEX: RTS     PC

                                .SBTTL  APT COMMUNICATIONS ROUTINE

                                ;;*************************************************************
022512 112767 000001 000236     $ATY1:  MOVB    #1,$FFLG        ;;TO REPORT FATAL ERROR
022520 112767 000001 000226     $ATY3:  MOVB    #1,$MFLG        ;;TO TYPE A MESSAGE
022526 000403                           BR      $ATYC
022530 112767 000001 000220     $ATY4:  MOVB    #1,$FFLG        ;;TO ONLY REPORT FATAL ERROR
022536                          $ATYC:
022536 010046                           MOV     R0,-(SP)        ;;PUSH R0 ON STACK
```

```
022540  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
022542  105767  000206                  TSTB    $MFLG           ;;SHOULD TYPE A MESSAGE?
022546  001450                          BEQ     5$              ;;IF NOT:  BR
022550  122767  000001  156474          CMPB    #APTENV,$ENV    ;;OPERATING UNDER APT?
022556  001031                          BNE     3$              ;;IF NOT:  BR
022560  132767  000100  156465          BITB    #APTSPOOL,$ENVM ;;SHOULD SPOOL MESSAGES?
022566  001425                          BEQ     3$              ;;IF NOT:  BR
022570  017600  000004                  MOV     @4(SP),R0       ;;GET MESSAGE ADDR.
022574  062766  000002  000004          ADD     #2,4(SP)                ;;BUMP RETURN ADDR.
022602  005767  156424          1$:     TST     $MSGTYPE        ;;SEE IF DONE W/ LAST XMISSION?
022606  001375                          BNE     1$              ;;IF NOT:  WAIT
022610  010067  156432                  MOV     R0,$MSGAD       ;;PUT ADDR IN MAILBOX
022614  105720                  2$:     TSTB    (R0)+           ;;FIND END OF MESSAGE
022616  001376                          BNE     2$
022620  166700  156422                  SUB     $MSGAD,R0       ;;SUB START OF MESSAGE
022624  006200                          ASR     R0              ;;GET MESSAGE LNGTH IN WORDS
022626  010067  156416                  MOV     R0,$MSGLGT      ;;PUT LENGTH IN MAILBOX
022632  012767  000004  156372          MOV     #4,$MSGTYPE     ;;TELL APT TO TAKE MSG.
022640  000413                          BR      5$
022642  017667  000004  000016  3$:     MOV     @4(SP),4$       ;;PUT MSG ADDR IN JSR LINKAGE
022650  062766  000002  000004          ADD     #2,4(SP)                ;;BUMP RETURN ADDRESS
022656  016746  155114                  MOV     177776,-(SP)    ;;PUSH 177776 ON STACK
022662  004767  177342                  JSR     PC,$TYPE        ;;CALL TYPE MACRO
022666  000000                  4$:     .WORD   0
022670                          5$:
022670  105767  000062          10$:    TSTB    $FFLG           ;;SHOULD REPORT FATAL ERROR?
022674  001416                          BEQ     12$             ;;IF NOT:  BR
022676  005767  156350                  TST     $ENV            ;;RUNNING UNDER APT?
022702  001413                          BEQ     12$             ;;IF NOT:  BR
022704  005767  156322          11$:    TST     $MSGTYPE        ;;FINISHED LAST MESSAGE?
022710  001375                          BNE     11$             ;;IF NOT:  WAIT
022712  017667  000004  156314          MOV     @4(SP),$FATAL   ;;GET ERROR #
022720  062766  000002  000004          ADD     #2,4(SP)                ;;BUMP RETURN ADDR.
022726  005267  156300                  INC     $MSGTYPE        ;;TELL APT TO TAKE ERROR
022732  105067  000020          12$:    CLRB    $FFLG           ;;CLEAR FATAL FLAG
022736  105067  000013                  CLRB    $LFLG           ;;CLEAR LOG FLAG
022742  105067  000006                  CLRB    $MFLG           ;;CLEAR MESSAGE FLAG
022746  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
022750  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
022752  000207                          RTS     PC              ;;RETURN
022754     000                  $MFLG:  .BYTE   0               ;;MESSG. FLAG
022755     000                  $LFLG:  .BYTE   0               ;;LOG FLAG
022756     000                  $FFLG:  .BYTE   0               ;;FATAL FLAG
        022760                          .EVEN
        000200                  APTSIZE=200
        000001                  APTENV=001
        000100                  APTSPOOL=100
        000040                  APTCSUP=040
                                .SBTTL  TTY INPUT ROUTINE

                                ;;*****************************************************************
                                .ENABL  .LSB

                                ;;*****************************************************************
                                ;*SOFTWARE SWITCH REGISTER CHANGE ROUTINE.
                                ;*ROUTINE IS ENTERED FROM THE TRAP HANDLER, AND WILL
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                                        ;*SERVICE THE TEST FOR CHANGE IN SOFTWARE SWITCH REGISTER TRAP CALL
                                        ;*WHEN OPERATING IN TTY FLAG MODE.
022760  022767  000176  156152  $CKSWR: CMP     #SWREG,SWR              ;;IS THE SOFT-SWR SELECTED?
022766  001074                          BNE     15$                     ;;BRANCH IF NO
022770  105777  156150                  TSTB    @$TKS                   ;;CHAR THERE?
022774  100071                          BPL     15$                     ;;IF NO, DON'T WAIT AROUND
022776  117746  156144                  MOVB    @$TKB,-(SP)             ;;SAVE THE CHAR
023002  042716  177600                  BIC     #↑C177,(SP)             ;;STRIP-OFF THE ASCII
023006  022726  000007                  CMP     #7,(SP)+                ;;IS IT A CONTROL G?
023012  001062                          BNE     15$                     ;;NO, RETURN TO USER
023014  126727  156114  000001          CMPB    $AUTOB,#1               ;;ARE WE RUNNING IN AUTO-MODE?
023022  001456                          BEQ     15$                     ;;BRANCH IF YES

023024  104401  023633                  TYPE    ,$CNTLG                 ;;ECHO THE CONTROL-G (↑G)
023030  104401  023640          $GTSWR: TYPE    ,$MSWR                  ;;TYPE CURRENT CONTENTS
023034  016746  155136                  MOV     SWREG,-(SP)             ;;SAVE SWREG FOR TYPEOUT
023040  104402                          TYPOC                           ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
023042  104401  023651                  TYPE    ,$MNEW                  ;;PROMPT FOR NEW SWR
023046  005046                  19$:    CLR     -(SP)                   ;;CLEAR COUNTER
023050  005046                          CLR     -(SP)                   ;;THE NEW SWR
023052  105777  156066          7$:     TSTB    @$TKS                   ;;CHAR THERE?
023056  100375                          BPL     7$                      ;;IF NOT TRY AGAIN

023060  117746  156062                  MOVB    @$TKB,-(SP)             ;;PICK UP CHAR
023064  042716  177600                  BIC     #↑C177,(SP)             ;;MAKE IT 7-BIT ASCII

023070  021627  000025          9$:     CMP     (SP),#25                ;;IS IT A CONTROL-U?
023074  001005                          BNE     10$                     ;;BRANCH IF NOT
023076  104401  023626                  TYPE    ,$CNTLU                 ;;YES, ECHO CONTROL-U (↑U)
023102  062706  000006          20$:    ADD     #6,SP                   ;;IGNORE PREVIOUS INPUT
023106  000757                          BR      19$                     ;;LET'S TRY IT AGAIN

023110  021627  000015          10$:    CMP     (SP),#15                ;;IS IT A <CR>?
023114  001022                          BNE     16$                     ;;BRANCH IF NO
023116  005766  000004                  TST     4(SP)                   ;;YES, IS IT THE FIRST CHAR?
023122  001403                          BEQ     11$                     ;;BRANCH IF YES
023124  016677  000002  156006          MOV     2(SP),@SWR              ;;SAVE NEW SWR
023132  062706  000006          11$:    ADD     #6,SP                   ;;CLEAR UP STACK
023136  104401  001227          14$:    TYPE    ,$CRLF                  ;;ECHO <CR> AND <LF>
023142  126727  155767  000001          CMPB    $INTAG,#1               ;;RE-ENABLE TTY KBD INTERRUPTS?
023150  001003                          BNE     15$                     ;;BRANCH IF NOT
023152  012777  000100  155764          MOV     #100,@$TKS              ;;RE-ENABLE TTY KBD INTERRUPTS
023160  000002                  15$:    RTI                             ;;RETURN
023162  004767  177254          16$:    JSR     PC,$TYPEC               ;;ECHO CHAR
023166  021627  000060                  CMP     (SP),#60                ;;CHAR < 0?
023172  002420                          BLT     18$                     ;;BRANCH IF YES
023174  021627  000067                  CMP     (SP),#67                ;;CHAR > 7?
023200  003015                          BGT     18$                     ;;BRANCH IF YES
023202  042726  000060                  BIC     #60,(SP)+               ;;STRIP-OFF ASCII
023206  005766  000002                  TST     2(SP)                   ;;IS THIS THE FIRST CHAR
023212  001403                          BEQ     17$                     ;;BRANCH IF YES
023214  006316                          ASL     (SP)                    ;;NO, SHIFT PRESENT
023216  006316                          ASL     (SP)                    ;;   CHAR OVER TO MAKE
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023220  006316                          ASL     (SP)                    ;;  ROOM FOR NEW ONE.
023222  005266  000002          17$:    INC     2(SP)                   ;;KEEP COUNT OF CHAR
023226  056616  177776                  BIS     -2(SP),(SP)             ;;SET IN NEW CHAR
023232  000707                          BR      7$                      ;;GET THE NEXT ONE
023234  104401  001226          18$:    TYPE    ,$QUES                  ;;TYPE ?<CR><LF>
023240  000720                          BR      20$                     ;;SIMULATE CONTROL-U
                                .DSABL  LSB



                                ;;*************************************************************
                                ;*THIS ROUTINE WILL INPUT A SINGLE CHARACTER FROM THE TTY
                                ;*CALL:
                                ;*      RDCHR                           ;;INPUT A SINGLE CHARACTER FROM THE TTY
                                ;*      RETURN HERE                     ;;CHARACTER IS ON THE STACK
                                ;*                                      ;;WITH PARITY BIT STRIPPED OFF
                                ;

023242  011646                  $RDCHR: MOV     (SP),-(SP)              ;;PUSH DOWN THE PC
023244  016666  000004  000002          MOV     4(SP),2(SP)             ;;SAVE THE PS
023252  105777  155666          1$:     TSTB    @$TKS                   ;;WAIT FOR
023256  100375                          BPL     1$                      ;;A CHARACTER
023260  117766  155662  000004          MOVB    @$TKB,4(SP)             ;;READ THE TTY
023266  042766  177600  000004          BIC     #↑C<177>,4(SP)          ;;GET RID OF JUNK IF ANY
023274  026627  000004  000023          CMP     4(SP),#23               ;;IS IT A CONTROL-S?
023302  001013                          BNE     3$                      ;;BRANCH IF NO
023304  105777  155634          2$:     TSTB    @$TKS                   ;;WAIT FOR A CHARACTER
023310  100375                          BPL     2$                      ;;LOOP UNTIL ITS THERE
023312  117746  155630                  MOVB    @$TKB,-(SP)             ;;GET CHARACTER
023316  042716  177600                  BIC     #↑C177,(SP)             ;;MAKE IT 7-BIT ASCII
023322  022627  000021                  CMP     (SP)+,#21               ;;IS IT A CONTROL-Q?
023326  001366                          BNE     2$                      ;;IF NOT DISCARD IT
023330  000750                          BR      1$                      ;;YES, RESUME
023332  026627  000004  000140  3$:     CMP     4(SP),#140              ;;IS IT UPPER CASE?
023340  002407                          BLT     4$                      ;;BRANCH IF YES
023342  026627  000004  000175          CMP     4(SP),#175              ;;IS IT A SPECIAL CHAR?
023350  003003                          BGT     4$                      ;;BRANCH IF YES
023352  042766  000040  000004          BIC     #40,4(SP)               ;;MAKE IT UPPER CASE
023360  000002                  4$:     RTI                             ;;GO BACK TO USER
                                ;;*************************************************************
                                ;*THIS ROUTINE WILL INPUT A STRING FROM THE TTY
                                ;*CALL:
                                ;*      RDLIN                           ;;INPUT A STRING FROM THE TTY
                                ;*      RETURN HERE                     ;;ADDRESS OF FIRST CHARACTER WILL BE ON THE STACK
                                ;*                                      ;;TERMINATOR WILL BE A BYTE OF ALL 0'S

023362  010346                  $RDLIN: MOV     R3,-(SP)                ;;SAVE R3
023364  005046                          CLR     -(SP)                   ;;CLEAR THE RUBOUT KEY
023366  012703  023616          1$:     MOV     #$TTYIN,R3              ;;GET ADDRESS
023372  022703  023626          2$:     CMP     #$TTYIN+8.,R3           ;;BUFFER FULL?
023376  101456                          BLOS    4$                      ;;BR IF YES
023400  104410                          RDCHR                           ;;GO READ ONE CHARACTER FROM THE TTY
023402  112613                          MOVB    (SP)+,(R3)              ;;GET CHARACTER
023404  122713  000177          10$:    CMPB    #177,(R3)               ;;IS IT A RUBOUT
023410  001022                          BNE     5$                      ;;BR IF NO
023412  005716                          TST     (SP)                    ;;IS THIS THE FIRST RUBOUT?
023414  001007                          BNE     6$                      ;;BR IF NO
```

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023416 112767 000134 000170          MOVB    #'\,9$              ;;TYPE A BACK SLASH
023424 104401 023614                 TYPE    ,9$
023430 012716 177777                 MOV     #-1,(SP)            ;;SET THE RUBOUT KEY
023434 005303                 6$:    DEC     R3                  ;;BACKUP BY ONE
023436 020327 023616                 CMP     R3,#$TTYIN          ;;STACK EMPTY?
023442 103434                        BLO     4$                  ;;BR IF YES
023444 111367 000144                 MOVB    (R3),9$             ;;SETUP TO TYPEOUT THE DELETED CHAR.
023450 104401 023614                 TYPE    ,9$                 ;;GO TYPE
023454 000746                        BR      2$                  ;;GO READ ANOTHER CHAR.
023456 005716                 5$:    TST     (SP)                ;;RUBOUT KEY SET?
023460 001406                        BEQ     7$                  ;;BR IF NO
023462 112767 000134 000124          MOVB    #'\,9$              ;;TYPE A BACK SLASH
023470 104401 023614                 TYPE    ,9$
023474 005016                        CLR     (SP)                ;;CLEAR THE RUBOUT KEY
023476 122713 000025          7$:    CMPB    #25,(R3)            ;;IS CHARACTER A CTRL U?
023502 001003                        BNE     8$                  ;;BR IF NO
023504 104401 023626                 TYPE    ,$CNTLU             ;;TYPE A CONTROL "U"
023510 000726                        BR      1$                  ;;GO START OVER
023512 122713 000022          8$:    CMPB    #22,(R3)            ;;IS CHARACTER A "↑R"?
023516 001011                        BNE     3$                  ;;BRANCH IF NO
023520 105013                        CLRB    (R3)                ;;CLEAR THE CHARACTER
023522 104401 001227                 TYPE    ,$CRLF              ;;TYPE A "CR" & "LF"
023526 104401 023616                 TYPE    ,$TTYIN             ;;TYPE THE INPUT STRING
023532 000717                        BR      2$                  ;;GO PICKUP ANOTHER CHACTER
023534 104401 001226          4$:    TYPE    ,$QUES              ;;TYPE A '?'
023540 000712                        BR      1$                  ;;CLEAR THE BUFFER AND LOOP
023542 111367 000046          3$:    MOVB    (R3),9$             ;;ECHO THE CHARACTER
023546 104401 023614                 TYPE    ,9$
023552 122723 000015                 CMPB    #15,(R3)+           ;;CHECK FOR RETURN
023556 001305                        BNE     2$                  ;;LOOP IF NOT RETURN
023560 105063 177777                 CLRB    -1(R3)              ;;CLEAR RETURN (THE 15)
023564 104401 001230                 TYPE    ,$LF                ;;TYPE A LINE FEED
023570 005726                        TST     (SP)+               ;;CLEAN RUBOUT KEY FROM THE STACK
023572 012603                        MOV     (SP)+,R3            ;;RESTORE R3
023574 011646                        MOV     (SP),-(SP)          ;;ADJUST THE STACK AND PUT ADDRESS OF THE
023576 016666 000004 000002          MOV     4(SP),2(SP)         ;;      FIRST ASCII CHARACTER ON IT
023604 012766 023616 000004          MOV     #$TTYIN,4(SP)
023612 000002                        RTI                         ;;RETURN
023614    000                 9$:    .BYTE   0                   ;;STORAGE FOR ASCII CHAR. TO TYPE
023615    000                        .BYTE   0                   ;;TERMINATOR
023616 000010                 $TTYIN: .BLKB  8.                  ;;RESERVE 8 BYTES FOR TTY INPUT
023626 052536 005015    000   $CNTLU: .ASCIZ  /↑U/<15><12>        ;;CONTROL "U"
023633    136 006507 000012   $CNTLG: .ASCIZ  /↑G/<15><12>        ;;CONTROL "G"
023640 005015 053523 020122   $MSWR:  .ASCIZ  <15><12>/SWR = /
023646 020075    000
023651    040 047040 053505   $MNEW:  .ASCIZ  /  NEW = /
023656 036440 000040
                              .SBTTL  READ AN OCTAL NUMBER FROM THE TTY

                              ;;*******************************************************************
                              ;*THIS ROUTINE WILL READ AN OCTAL (ASCII) NUMBER FROM THE TTY AND
                              ;*CHANGE IT TO BINARY.
                              ;*THE INPUT CHARACTERS WILL BE CHECKED TO INSURED THEY ARE LEGAL
                              ;*OCTAL DIGITS. IF AN ILLEGAL CHARACTER IS READ A "?" WILL BE TYPED
                              ;*FOLLOWED BY A CARRIAGE RETURN-LINE FEED. THE COMPLETE NUMBER MUST
                              ;*THEN BE RETYPED. THE INPUT IS TERMINATED BY TYPING A CARRIAGE RETURN.
```

```
                                         ;*CALL:
                                         ;*          RDOCT                       ;;READ AN OCTAL NUMBER
                                         ;*          RETURN HERE                 ;;LOW ORDER BITS ARE ON TOP OF THE STACK
                                         ;*                                      ;;HIGH ORDER BITS ARE IN $HIOCT

023662  011646                           $RDOCT: MOV   (SP),-(SP)                ;;PROVIDE SPACE FOR THE
023664  016666  000004  000002                   MOV   4(SP),2(SP)               ;;INPUT NUMBER
023672  010046                                   MOV   R0,-(SP)                  ;;PUSH R0 ON STACK
023674  010146                                   MOV   R1,-(SP)                  ;;PUSH R1 ON STACK
023676  010246                                   MOV   R2,-(SP)                  ;;PUSH R2 ON STACK
023700  104411                           1$:     RDLIN                           ;;READ AN ASCIZ LINE
023702  012600                                   MOV   (SP)+,R0                  ;;GET ADDRESS OF 1ST CHARACTER
023704  010067  000100                           MOV   R0,5$                     ;;AND SAVE IT
023710  005001                                   CLR   R1                        ;;CLEAR DATA WORD
023712  005002                                   CLR   R2
023714  112046                           2$:     MOVB  (R0)+,-(SP)               ;;PICKUP THIS CHARACTER
023716  001420                                   BEQ   3$                        ;;IF ZERO GET OUT
023720  122716  000060                           CMPB  #'0,(SP)                  ;;MAKE SURE THIS CHARACTER
023724  003026                                   BGT   4$                        ;;IS AN OCTAL DIGIT
023726  122716  000067                           CMPB  #'7,(SP)
023732  002423                                   BLT   4$
023734  006301                                   ASL   R1                        ;;*2
023736  006102                                   ROL   R2
023740  006301                                   ASL   R1                        ;;*4
023742  006102                                   ROL   R2
023744  006301                                   ASL   R1                        ;;*8
023746  006102                                   ROL   R2
023750  042716  177770                           BIC   #↑C7,(SP)                 ;;STRIP THE ASCII JUNK
023754  062601                                   ADD   (SP)+,R1                  ;;ADD IN THIS DIGIT
023756  000756                                   BR    2$                        ;;LOOP
023760  005726                           3$:     TST   (SP)+                     ;;CLEAN TERMINATOR FROM STACK
023762  010166  000012                           MOV   R1,12(SP)                 ;;SAVE THE RESULT
023766  010267  000026                           MOV   R2,$HIOCT
023772  012602                                   MOV   (SP)+,R2                  ;;POP STACK INTO R2
023774  012601                                   MOV   (SP)+,R1                  ;;POP STACK INTO R1
023776  012600                                   MOV   (SP)+,R0                  ;;POP STACK INTO R0
024000  000002                                   RTI                             ;;RETURN
024002  005726                           4$:     TST   (SP)+                     ;;CLEAN PARTIAL FROM STACK
024004  105010                                   CLRB  (R0)                      ;;SET A TERMINATOR
024006  104401                                   TYPE                            ;;TYPE UP THRU THE BAD CHAR.
024010  000000                           5$:     .WORD 0
024012  104401  001226                           TYPE  ,$QUES                    ;;"?" "CR" & "LF"
024016  000730                                   BR    1$                        ;;TRY AGAIN
024020  000000                           $HIOCT: .WORD 0                         ;;HIGH ORDER BITS GO HERE
                                         .SBTTL  TRAP DECODER

                                         ;;*************************************************************
                                         ;*THIS ROUTINE WILL PICKUP THE LOWER BYTE OF THE "TRAP" INSTRUCTION
                                         ;*AND USE IT TO INDEX THROUGH THE TRAP TABLE FOR THE STARTING ADDRESS
                                         ;*OF THE DESIRED ROUTINE. THEN USING THE ADDRESS OBTAINED IT WILL
                                         ;*GO TO THAT ROUTINE.

024022  010046                           $TRAP:  MOV   R0,-(SP)                  ;;SAVE R0
024024  016600  000002                           MOV   2(SP),R0                  ;;GET TRAP ADDRESS
024030  005740                                   TST   -(R0)                     ;;BACKUP BY 2
024032  111000                                   MOVB  (R0),R0                   ;;GET RIGHT BYTE OF TRAP
```

```
 024034  006300                          ASL     R0                   ;;POSITION FOR INDEXING
 024036  016000  024056                  MOV     $TRPAD(R0),R0        ;;INDEX TO TABLE
 024042  000200                          RTS     R0                   ;;GO TO ROUTINE


                                ;;THIS IS USE TO HANDLE THE "GETPRI" MACRO

 024044  011646                 $TRAP2:  MOV     (SP),-(SP)           ;;MOVE THE PC DOWN
 024046  016666  000004  000002          MOV     4(SP),2(SP)          ;;MOVE THE PSW DOWN
 024054  000002                          RTI                          ;;RESTORE THE PSW

                                .SBTTL  TRAP TABLE

                                ;*THIS TABLE CONTAINS THE STARTING ADDRESSES OF THE ROUTINES CALLED
                                ;*BY THE "TRAP" INSTRUCTION.

                                ;        ROUTINE
                                ;        -------
 024056  024044                 $TRPAD:  .WORD   $TRAP2
 024060  022230                          $TYPE   ;;CALL=TYPE     TRAP+1(104401)  TTY TYPEOUT ROUTINE
 024062  021602                          $TYPOC  ;;CALL=TYPOC    TRAP+2(104402)  TYPE OCTAL NUMBER (WITH LEADING ZEROS)
 024064  021556                          $TYPOS  ;;CALL=TYPOS    TRAP+3(104403)  TYPE OCTAL NUMBER (NO LEADING ZEROS)
 024066  021616                          $TYPON  ;;CALL=TYPON    TRAP+4(104404)  TYPE OCTAL NUMBER (AS PER LAST CALL)
 024070  022004                          $TYPDS  ;;CALL=TYPDS    TRAP+5(104405)  TYPE DECIMAL NUMBER (WITH SIGN)

 024072  023030                          $GTSWR  ;;CALL=GTSWR    TRAP+6(104406)  GET SOFT-SWR SETTING

 024074  022760                          $CKSWR  ;;CALL=CKSWR    TRAP+7(104407)  TEST FOR CHANGE IN SOFT-SWR
 024076  023242                          $RDCHR  ;;CALL=RDCHR    TRAP+10(104410) TTY TYPEIN CHARACTER ROUTINE
 024100  023362                          $RDLIN  ;;CALL=RDLIN    TRAP+11(104411) TTY TYPEIN STRING ROUTINE
 024102  023662                          $RDOCT  ;;CALL=RDOCT    TRAP+12(104412) READ AN OCTAL NUMBER FROM TTY
                                .SBTTL  POWER DOWN AND UP ROUTINES

                                ;;****************************************************************
                                ;POWER DOWN ROUTINE
 024104  012737  024250  000024 $PWRDN:  MOV     #$ILLUP,@#PWRVEC     ;;SET FOR FAST UP
 024112  012737  000340  000026          MOV     #340,@#PWRVEC+2      ;;PRIO:7
 024120  010046                          MOV     R0,-(SP)             ;;PUSH R0 ON STACK
 024122  010146                          MOV     R1,-(SP)             ;;PUSH R1 ON STACK
 024124  010246                          MOV     R2,-(SP)             ;;PUSH R2 ON STACK
 024126  010346                          MOV     R3,-(SP)             ;;PUSH R3 ON STACK
 024130  010446                          MOV     R4,-(SP)             ;;PUSH R4 ON STACK
 024132  010546                          MOV     R5,-(SP)             ;;PUSH R5 ON STACK
 024134  017746  155000                  MOV     @SWR,-(SP)           ;;PUSH @SWR ON STACK
 024140  010667  000110                  MOV     SP,$SAVR6            ;;SAVE SP
 024144  012737  024156  000024          MOV     #$PWRUP,@#PWRVEC     ;;SET UP VECTOR
 024152  000000                          HALT
 024154  000776                          BR      .-2                  ;;HANG UP

                                ;;****************************************************************
                                ;POWER UP ROUTINE
 024156  012737  024250  000024 $PWRUP:  MOV     #$ILLUP,@#PWRVEC     ;;SET FOR FAST DOWN
 024164  016706  000064                  MOV     $SAVR6,SP            ;;GET SP
 024170  005067  000060                  CLR     $SAVR6               ;;WAIT LOOP FOR THE TTY
 024174  005267  000054         1$:      INC     $SAVR6               ;;WAIT FOR THE INC
 024200  001375                          BNE     1$                   ;;OF  WORD
```

```
6234  024202  012677  154732              MOV     (SP)+,@SWR          ;;POP STACK INTO @SWR
6235  024206  012605                      MOV     (SP)+,R5            ;;POP STACK INTO R5
6236  024210  012604                      MOV     (SP)+,R4            ;;POP STACK INTO R4
6237  024212  012603                      MOV     (SP)+,R3            ;;POP STACK INTO R3
6238  024214  012602                      MOV     (SP)+,R2            ;;POP STACK INTO R2
6239  024216  012601                      MOV     (SP)+,R1            ;;POP STACK INTO R1
6240  024220  012600                      MOV     (SP)+,R0            ;;POP STACK INTO R0
6241  024222  012737  024104  000024      MOV     #$PWRDN,@#PWRVEC    ;;SET UP THE POWER DOWN VECTOR
6242  024230  012737  000340  000026      MOV     #340,@#PWRVEC+2     ;;PRIO:7
6243  024236  104401                      TYPE                        ;REPORT THE POWER FAILURE
6244  024240  024256              $PWRMG: .WORD   $POWER              ;;POWER FAIL MESSAGE POINTER
6245  024242  012716                      MOV     (PC)+,(SP)          ;;RESTART AT RSTRTA
6246  024244  002730              $PWRAD: .WORD   RSTRTA              ;;RESTART ADDRESS
6247  024246  000002                      RTI
6248  024250  000000              $ILLUP: HALT                        ;;THE POWER UP SEQUENCE WAS STARTED
6249  024252  000776                      BR      .-2                 ;; BEFORE THE POWER DOWN WAS COMPLETE
6250  024254  000000              $SAVR6: 0                           ;;PUT THE SP HERE
6251  024256  005015  047520  042527  $POWER: .ASCIZ  <15><12>"POWER"
6252  024264  000122
6253                                      .EVEN
```

```
                                        ;;*******************************************************************
                                        ;COMMON DH11 SERVICE ROUTINES
                                        ;;*******************************************************************

                                        ;THIS ROUTINE IS CALLED DURING START UP TO LOAD THE XMITTER
                                        ;OUTPUT BUFFER WITH A BINARY COUNT TEST PATTERN

 024266  012701  037112                 LDTBF1: MOV     XTBUF,R1                ;POINT TO START OF BUFFER
 024272  005002                                 CLR     R2                      ;INIT DATA BYTE GENERATOR
 024274  110221                         1$:     MOVB    R2,(R1)+                ;LOAD ONE CHAR
 024276  005202                                 INC     R2                      ;GENERATE NEXT CHAR
 024300  022702  000400                         CMP     #400,R2                 ;LOADED 256(10) BYTES
 024304  001373                                 BNE     1$                      ;BR IF NOT
 024306  000207                                 RTS     PC                      ;RETURN TO START TESTING

                                        ;THIS ROUTINE SETS UP THE ERROR INFORMATION REQUIRED BY ANY TEST
                                        ;USING A "DH1" HEADER

 024310  004767  002612                 SUER1:  JSR     PC,SAPS                 ;SAVE THE ERROR PSW
 024314  116700  154562                         MOVB    $TSTNM,R0               ;SAVE THE TEST NO.
 024320  010067  154636                         MOV     R0,$REG0                ;SAVE THE TEST NO. FOR ERROR PRINT
 024324  010167  154634                         MOV     R1,$REG1                ;SAVE THE DH11 ADDR
 024330  010267  154632                         MOV     R2,$REG2                ;SAVE THE REG ADDRESS
 024334  010667  154636                         MOV     R6,$REG6                ;SAVE THE SP
 024340  062767  000002  154630                 ADD     #2,$REG6                ;CORRECT FOR CALLING JSR
 024346  000207                                 RTS     PC                      ;RETURN TO CALLING ROUTINE

                                        ;THIS ROUTINE IS CALLED BY THOSE TESTS USING A "DH2" HEADER TO
                                        ;SAVE THE ERROR INFORMATION IN "DT2"

 024350  004767  002552                 SUER2:  JSR     PC,SAPS                 ;SAVE THE ERROR PSW
 024354  116700  154522                 SUER2A: MOVB    $TSTNM,R0               ;GET THE TEST NO.
 024360  010067  154576                         MOV     R0,$REG0                ;SAVE THE REGISTERS-TEST#
 024364  010167  154574                         MOV     R1,$REG1                ;SAVE THE DH ADDRESS
 024370  010267  154572                         MOV     R2,$REG2                ;SAVE THE REGISTER ADDRESS
 024374  010367  154570                         MOV     R3,$REG3                ;SAVE THE WAS DATA
 024400  010467  154566                         MOV     R4,$REG4                ;SAVE THE S/B DATA
 024404  010667  154566                         MOV     R6,$REG6                ;SAVE THE STACK POINTER
 024410  062767  000002  154560                 ADD     #2,$REG6                ;CORRECT FOR CALLING JSR
 024416  000207                                 RTS     PC                      ;RETURN TO REPORT ERROR

                                        ;THIS ROUTINE IS CALLED TO SET UP ERROR INFORMATION FOR THE
                                        ;BUS ERROR AND RSVD INSTR ERROR ROUTINES

 024420  010067  154536                 SUER3:  MOV     R0,$REG0                ;SAVE THE REGS
 024424  010167  154534                         MOV     R1,$REG1
 024430  010267  154532                         MOV     R2,$REG2
 024434  000207                                 RTS     PC                      ;RETURN TO REPORT ERROR

                                        ;THIS ROUTINE IS CALLED TO SET UP ERROR INFORMATION FOR THE
                                        ;CAR/BCR MEMORY PATTERNS TESTS

 024436  005067  154540                 SUER4:  CLR     $TMP0                   ;SAVE THE LINE NO. WRITTEN
 024442  116767  003546  154532                 MOVB    LINEA,$TMP0
 024450  116700  154426                         MOVB    $TSTNM,R0               ;SAVE THE TEST NUMBER
 024454  010067  154502                         MOV     R0,$REG0                ;SAVE THE REGISTER INFORMATION
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024460	010167	154500			MOV	R1,$REG1
024464	010267	154476			MOV	R2,$REG2
024470	010367	154474			MOV	R3,$REG3
024474	010467	154472			MOV	R4,$REG4
024500	000207				RTS	PC			;RETURN TO PATTERNS TEST

					;THIS ROUTINE IS CALLED TO SELECT A NEW LINE NO. BASED ON THE
					;VALUE OF THE LINE SELECTION PARAMETER

						;CALLING SEQUENCE:

						;JSR	PC,SELINE		;CALL THE ROUTINE
						;BR	1$			;EXIT BRANCH-ROUTINE MOVES THE RETURN
											;PC AROUND THIS BR IF MORE LINES ARE
											;YET TO BE TESTED

024502	105767	003505			SELINE:	TSTB	LINE+1			;FIRST TIME THROUGH FOR ANY TEST ?
024506	001010					BNE	1$			;BR IF NOT
024510	105167	003477				COMB	LINE+1			;SET ENTRY FLAG
024514	012767	000001	002462		MOV	#1,LINMSK		;INIT SELECT TEST MASK TO TEST LINE 00
024522	105067	003464				CLRB	LINE			;START WITH LINE #00
024526	000405					BR	2$			;GO TEST FOR LINE #00
024530	105267	003456			1$:	INCB	LINE			;GENERATE NEW LINE NO.
024534	006367	002444				ASL	LINMSK			;SHIFT SELECT MASK TO TEST NXT LINE
024540	001407					BEQ	3$			;RETURN TO EXIT BRANCH - ALL LINES DONE
024542	036767	002436	002432	2$:	BIT	LINMSK,LINSEL		;IS THE LINE SELECTED FOR TEST ??
024550	001767					BEQ	1$			;BR IF NOT
024552	062716	000002				ADD	#2,(SP)			;MOVE RETURN PC AROUND EXIT BRANCH
024556	000402					BR	4$			;RETURN TO TEST SELECTED LINE
024560	005067	003426			3$:	CLR	LINE			;INIT ENTRY FLAG AND LINE NO. TO 000
024564	142777	000017	002400	4$:	BICB	#17,@DHADR		;INIT LINE SELECT BITS IN "SCR"
024572	000207					RTS	PC			;RETURN TO CALLING TEST

					;THIS ROUTINE IS CALLED TO CONVERT EITHER THE "DH" NUMBER OR THE
					;"LINE" NUMBER TO TWO ASCII CHARACTERS AND MOVE THEM INTO A
					;PARTICULAR MESSAGE BUFFER FOR ERROR REPORTING

						;CALLING SEQUENCE

						;JSR	R5,SUNUM		;CALL TO THIS ROUTINE
						;ADDR1				;ADDRESS OF THE NUMBER TO BE CONVERTED
						;ADDR2				;ADDRESS OF THE MSG BUFFER SLOT

024574					SUNUM:
024574	010046					MOV	R0,-(SP)		;;PUSH R0 ON STACK
024576	010146					MOV	R1,-(SP)		;;PUSH R1 ON STACK
024600	010246					MOV	R2,-(SP)		;;PUSH R2 ON STACK
024602	012500					MOV	(R5)+,R0		;GET ADDRESS OF NUMBER
024604	012501					MOV	(R5)+,R1		;GET MSG BUFFER ADDR
024606	111000					MOVB	(R0),R0			;GET NO. TO BE CONVERTED
024610	010002					MOV	R0,R2			;SAVE IT IN R2
024612	006202					ASR	R2			;SHIFT MSD TO LSD POSITION
024614	006202					ASR	R2
024616	006202					ASR	R2
024620	042702	177770				BIC	#177770,R2		;CLR JUNK BITS
024624	062702	000060				ADD	#60,R2			;MAKE IT ASCII
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024630  110221                          MOVB    R2,(R1)+                ;PUT IT IN MSG BUFFER
024632  042700  177770                  BIC     #177770,R0              ;CLR JUNK FROM LSD
024636  062700  000060                  ADD     #60,R0                  ;MAKE IT ASCII
024642  110011                          MOVB    R0,(R1)                 ;PUT LSD IN THE BUFFER
024644  012602                          MOV     (SP)+,R2                ;;POP STACK INTO R2
024646  012601                          MOV     (SP)+,R1                ;;POP STACK INTO R1
024650  012600                          MOV     (SP)+,R0                ;;POP STACK INTO R0
024652  000205                          RTS     R5                      ;RETURN TO CALLER

                                ;THIS ROUTINE IS CALLED TO CLEAR THE "CAR" AND "BCR" MEMORIES
                                ;IT ASSUMES THAT THE ADDRESS OF THE "SCR" IS IN R1

024654  005067  154340          CLCABC: CLR     $TMP7                   ;INIT A COUNTER
024660  116711  154334          1$:     MOVB    $TMP7,(R1)              ;SELECT A LINE
024664  005061  000006                  CLR     CAR(R1)                 ;CLEAR A CAR LOCATION
024670  005061  000010                  CLR     BCR(R1)                 ;CLEAR A BCR LOCATION
024674  005267  154320                  INC     $TMP7                   ;GENERATE NEW LINE NO.
024700  022767  000020  154312          CMP     #20,$TMP7               ;DONE ALL LINES ?
024706  001364                          BNE     1$                      ;BR IF NOT
024710  142711  000017                  BICB    #17,(R1)                ;SET "SCR" TO SELECT LINE 00
024714  000207                          RTS     PC                      ;RETURN TO CALLER

                                ;THIS ROUTINE IS CALLED TO LOAD THE "BCR" MEMORY WITH ALL ONES
                                ;IT ASSUMES THAT THE ADDRESS OF THE SCR IS IN R1

024716  005067  154276          LDBCR:  CLR     $TMP7                   ;INIT A COUNTER
024722  116711  154272          1$:     MOVB    $TMP7,(R1)              ;SELECT A LINE
024726  012761  177777  000010          MOV     #-1,BCR(R1)             ;LOAD BCR LOC. WITH 177777
024734  005267  154260                  INC     $TMP7                   ;GENERATE NEXT LINE NO.
024740  022767  000020  154252          CMP     #20,$TMP7               ;DONE ALL LINES ?
024746  001365                          BNE     1$                      ;BR IF NOT
024750  142711  000017                  BICB    #17,(R1)                ;SET "SCR" TO SELECT LINE 00
024754  000207                          RTS     PC                      ;RETURN TO CALLER

                                ;THIS ROUTINE CALLED TO SET UP FOR PARITY TESTS

024756  012767  000020  154226  SUPPAR: MOV     #20,$TMP4               ;SET UP FOR 16. LINES
024764  105011                          CLRB    (R1)                    ;INIT SCR TO START AT LINE 00
024766  005002                          CLR     R2                      ;INIT INDEX REGISTER FOR RBUF (EVEN)
024770  012703  000200                  MOV     #200,R3                 ;SET UP CONSTANT
024774  012704  000001                  MOV     #1,R4                   ;INIT INDEX REG FOR RBUF (ODD)
025000  012761  037112  000006  1$:     MOV     #TBUF,CAR(R1)           ;LOAD BUS ADDRESS REWG
025006  016761  154204  000010          MOV     $TMP6,BCR(R1)           ;LOAD BYTE COUNT REG
025014  016761  154174  000004          MOV     $TMP5,LPR(R1)           ;LOAD LINE PARAMETERS
025022  105062  036112                  CLRB    RBUF(R2)                ;INIT DATA BYTE IN RBUF TO START AT 000
025026  110364  036112                  MOVB    R3,RBUF(R4)             ;SET CONSTANT IN HIGH BYTE
025032  005211                          INC     (R1)                    ;SELECT NEXT LINE
025034  005203                          INC     R3                      ;GENERATE NEW CONSTANT
025036  062702  000002                  ADD     #2,R2                   ;UPDATE POINTERS TO RBUF (EVEN/ODD)
025042  062704  000002                  ADD     #2,R4
025046  005367  154140                  DEC     $TMP4                   ;COUNT ONE LINE SETUP
025052  001352                          BNE     1$                      ;BR TILL ALL 16. SET UP
025054  012704  027452                  MOV     #MULPTB,R4              ;SET UP TABLE POINTER
025060  016724  154132          2$:     MOV     $TMP6,(R4)+             ;SET UP BYTE COUNT ENTRY
025064  022704  027512                  CMP     #MULPTB+40,R4           ;SET UP ALL COUNTS ?
025070  001373                          BNE     2$                      ;BR IF NOT
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025072  105011                          CLRB    (R1)            ;INIT SCR TO SELECT LINE 00
025074  000207                          RTS     PC              ;RETURN TO PARITY TEST

                        ;THIS ROUTINE AUTOSIZES THE SYSTEM TO DETERMINE THE ADDRESSES AND
                        ;VECTORS OF THE DH11'S AND DM11-BB'S.

025076  010046                  AUTOSZ: MOV     R0,-(SP)
025100  005003                          CLR     R3
025102  012702  027732                  MOV     #DHADRS,R2      ;POINT TO BEGINNING OF TABLE
025106  005022                  25$:    CLR     (R2)+           ;CLEAR AUTOSIZER TABLES.
025110  005203                          INC     R3
025112  020327  000102                  CMP     R3,#102         ;HAVE WE CLEARED ALL ENTRIES?
025116  001373                          BNE     25$             ;BRANCH IF NOT.
025120  013746  000004                  MOV     @#4,-(SP)       ;SAVE TRAP VECTOR.
025124  012737  025232  000004          MOV     #4$,@#4         ;SETUP FOR NON-EXISTENT MEMORY TRAP.
025132  012703  030034                  MOV     #DMADRS,R3      ;SETUP DM ADDRESS TABLE POINTER.
025136  012702  027732                  MOV     #DHADRS,R2      ;SET UP DH ADDRESS TABLE POINTER.

025142  012701  160020                  MOV     #160020,R1      ;R1=FIRST ADDRESS TO BE TESTED.

025146  005711                  1$:     TST     (R1)            ;SEE IF ADDRESS IN R1 RESPONDS.
025150  005761  000016                  TST     16(R1)          ;CHECK TO SEE IF DEVICE IS MODULO 20.
025154  052711  004000                  BIS     #4000,(R1)      ;IF IT IS, CONTINUE
                                                                ;AND CHECK TO SEE
025160  052711  001000                  BIS     #1000,(R1)      ;IF THIS ADDRESS CONTAINS
025164  052711  002000                  BIS     #2000,(R1)      ;A DH-11.
025170  032711  003000                  BIT     #3000,(R1)      ;CHECK TO INSURE THESE BITS SET.
025174  001410                          BEQ     3$              ;IF NOT, BRANCH.
                                                                ;SET THE MAINTENANCE BIT, THE NON-
025176  052711  000400                  BIS     #400,(R1)       ;EXISTENT MEMORY BIT AND THE CLEAR
                                                                ;NON-EXISTENT MEMORY INTERRUPT BIT.
025202  032711  002400                  BIT     #2400,(R1)      ;IS THIS A DH-11? (BITS 8 AND 10 SHOULD
                                                                ;CLEAR IF THIS IS A DH11.)

025206  001003                          BNE     3$              ;IF NOT, CHECK TO SEE IF THIS IS A DM11-BB.
025210  042711  001000                  BIC     #1000,(R1)      ;CLEAR MAINTENANCE BIT.
025214  010122                          MOV     R1,(R2)+        ;SAVE THE ADDRESS IN THE DH ADR TABLE.


025216  020127  163760          3$:     CMP     R1,#163760      ;HAVE WE REACHED THE TOP OF THE FLOATING ADDRESSES.
025222  001406                          BEQ     5$              ;IF YES, GET OUT.
025224  062701  000020                  ADD     #20,R1          ;IF NOT, UPDATE ADDRESS AND
025230  000746                          BR      1$              ;GO CHECK IT.

025232  012716  025216          4$:     MOV     #3$,(SP)        ;IF DH ADDRESS DOES NOT RESPOND, GO TO 3$.
025236  000002                          RTI

                        ;TEST FOR DM11 BB ADDRESS

025240  012737  025272  000004  5$:     MOV     #6$,@#4         ;SETUP FOR NON-EXISTENT MEMORY TRAP.
025246  012701  170500                  MOV     #170500,R1      ;R1=FIRST ADDRESS TO BE TESTED.
025252  005711                  21$:    TST     (R1)            ;SEE IF ADDRESS RESPONDS.
025254  010123                          MOV     R1,(R3)+        ;IF IT DOES, THIS IS A DM11-BB,
                                                                ;SO SAVE THE ADDRESS.
025256  020127  170670          23$:    CMP     R1,#170670      ;HAVE WE REACHED THE TOP OF THE DM11 ADDRESSES?
025262  001406                          BEQ     22$             ;IF YES, GET OUT.
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025264 062701 000010                   ADD     #10,R1          ;IF NOT, UPDATE ADDRESS AND
025270 000770                          BR      21$             ;GO CHECK IT.
025272 012716 025256           6$:     MOV     #23$,(SP)       ;IF DM ADDRESS DOES NOT RESPOND, GO TO 23$.
025276 000002                          RTI
025300 012637 000004           22$:    MOV     (SP)+,@#4       ;RESTORE TRAP VECTOR.
025304 162702 027732                   SUB     #DHADRS,R2      ;HAVE WE FOUND ANY DH11'S AT ALL?
025310 001003                          BNE     7$              ;IF YES, BRANCH
025312 104401 035451                   TYPE    ,MSG1           ;NO DH11'S WERE FOUND.
025316 000000                          HALT
025320 006202                  7$:     ASR     R2              ;R2 NOW CONTAINS THE NUMBER
025322 005000                          CLR     R0              ;OF DH'S FOUND.
025324 006100                  8$:     ROL     R0              ;FILL R0 WITH 1'S
025326 005200                          INC     R0              ;CORRESPONDING TO
025330 005302                          DEC     R2              ;THE NUMBER OF DH'S
025332 005702                          TST     R2              ;FOUND.
025334 001373                          BNE     8$
025336 010067 002642                   MOV     R0,$DHSEL       ;$DHSEL CONTAINS THE DH SELECTION PARAMETER.
                                                               ;IE. ALL DH'S FOUND WILL BE TESTED.
                               ;FIND DH VECTOR:
025342 012702 027732                   MOV     #DHADRS,R2      ;SETUP POINTER TO BEGINNING OF DH
025346 012705 027774                   MOV     #DHVEC,R5       ;ADDRESS TABLE AND VECTOR TABLE.
025352 012737 000340 000022            MOV     #340,@#IOTVEC+2 ;SET IOT TRAP PRIORITY TO 7.
025360 012737 025470 000020            MOV     #12$,@#IOTVEC   ;SETUP IOT TRAP VECTOR.
025366 012703 000300                   MOV     #300,R3         ;START OF FLOATING VECTORS
025372 012704 000302                   MOV     #302,R4         ;PC OF IOT INSTR.
025376 010423                  9$:     MOV     R4,(R3)+        ;FILL VECTOR AREA WITH ADDRESS
                                                               ;OF NEXT INSTR (.+2)
025400 012724 000004                   MOV     #4,(R4)+        ;NEXT INSTRUCTION IS AN IOT TRAP.
025404 022324                          CMP     (R3)+,(R4)+     ;UPDATE R3+R4.
025406 020427 001000                   CMP     R4,#1000        ;HAVE WE REACHED TO TOP OF THE
                                                               ;VECTOR SPACE?
025412 101771                          BLOS    9$              ;IF NOT, REPEAT PROCESS.
025414 005712                  10$:    TST     (R2)            ;HAVE WE CHECK ALL DH'S?
025416 001441                          BEQ     13$             ;IF YES, GET OUT + CHECK FOR DM11 BB'S VECTORS.
025420 005067 152352                   CLR     PS              ;ZERO CPU PRIORITY.
025424 052772 001000 000000            BIS     #1000,@(R2)     ;SET MAINTENANCE BIT
025432 052772 000300 000000            BIS     #300,@(R2)      ;ATTEMPT TO CAUSE RECEIVER
                                                               ;INTERRUPT.
025440 005000                          CLR     R0
025442 005200                  11$:    INC     R0              ;WAIT...
025444 001376                          BNE     11$
025446 104401 035501                   TYPE    ,MSG2           ;ERROR MSG-NO DH RECEIVER INTERRUPT OCCURRED.
025452 052772 004000 000000            BIS     #4000,@(R2)     ;DO A MASTER CLEAR
025460 042772 001000 000000            BIC     #1000,@(R2)     ;CLEAR MAINTENANCE BIT
025466 000752                          BR      10$
025470 011601                  12$:    MOV     (SP),R1
025472 042701 000007                   BIC     #7,R1           ;CLEAR GARBAGE.
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025476  010125                          MOV     R1,(R5)+            ;SAVE VECTOR ADDRESS.
025500  022626                          CMP     (SP)+,(SP)+         ;POP STACK
025502  012716  025414                  MOV     #10$,(SP)           ;SETUP FOR RETURN.
025506  052772  004000  000000          BIS     #4000,@(R2)         ;DO A MASTER CLEAR
025514  042732  001000                  BIC     #1000,@(R2)+        ;CLEAR MAINTENANCE BIT.
025520  000002                          RTI

                                ;FIND DM11 BB VECTORS:

025522  012702  030034          13$:    MOV     #DMADRS,R2          ;SET POINTERS TO BEGINNING OF
025526  012705  030076                  MOV     #DMVEC,R5           ;ADR TABLE & VECTOR TABLE.
025532  012737  025614  000020          MOV     #16$,@#IOTVEC       ;SET IOT TRAP VECTOR.

025540  005712                  14$:    TST     (R2)                ;HAVE WE CHECKED ALL DM'S?
025542  001441                          BEQ     17$                 ;IF YES, GET OUT.
025544  005067  152226                  CLR     PS                  ;ZERO CPU PRIORITY
025550  052772  001000  000000          BIS     #1000,@(R2)         ;SET MAINTENANCE BIT.
025556  052772  000300  000000          BIS     #300,@(R2)          ;ATTEMPT TO CAUSE INTERRUPT.
025564  005000                          CLR     R0

025566  005200                  15$:    INC     R0                  ;WAIT....
025570  001376                          BNE     15$
025572  104401  035546                  TYPE    ,MSG3               ;ERROR MSG - NO DM11-BB INTERRUPT OCCURRED.
025576  052772  004000  000000          BIS     #4000,@(R2)         ;CLEAR BITS PREVIOUSLY SET.
025604  042772  001000  000000          BIC     #1000,@(R2)         ;CLEAR MAINTENANCE BIT.
025612  000752                          BR      14$

025614  011601                  16$:    MOV     (SP),R1
025616  162701  000004                  SUB     #4,R1               ;CALCULATE VECTOR ADDRESS.
025622  010125                          MOV     R1,(R5)+            ;SAVE VECTOR ADDRESS.
025624  022626                          CMP     (SP)+,(SP)+         ;POP STACK.
025626  012716  025540                  MOV     #14$,(SP)           ;SETUP FOR RETURN.
025632  052772  004000  000000          BIS     #4000,@(R2)         ;CLEAR BITS PREVIOUSLY SET.
025640  042732  001000                  BIC     #1000,@(R2)+        ;CLEAR MAINTENANCE BIT AND
                                                                    ;POINT TO NEXT DM11-BB ADDRESS.
025644  000002                          RTI

025646  012737  020746  000020  17$:    MOV     #$SCOPE,@#IOTVEC    ;RESTORE IOT VECTOR FOR SCOPE ROUTINE.
025654  012600                          MOV     (SP)+,R0            ;RESTORE R0.
025656  012703  000300                  MOV     #300,R3             ;START OF FLOATING VECTORS.
025662  012704  000302                  MOV     #302,R4

025666  010423                  18$:    MOV     R4,(R3)+            ;FILL VECTOR AREA WITH ADDRESS OF NEXT
                                                                    ;INSTRUCTION (.+2).
025670  012724  000000                  MOV     #0,(R4)+            ;NEXT INSTRUCTION IS A HALT.
025674  022324                          CMP     (R3)+,(R4)+         ;UPDATE R3 & R4.
025676  020427  001000                  CMP     R4,#1000            ;ARE WE DONE?
025702  101771                          BLOS    18$                 ;IF NOT, REPEAT UNTIL ADDRESSES
                                                                    ;377 TO 777 ARE DONE.
025704  013701  027774                  MOV     @#DHVEC,R1          ;LET R1 POINT TO 1ST DH VECTOR ADDRESS.
025710  005737  027776                  TST     @#DHVEC+2           ;IS THERE MORE THAN ONE VECTOR?
025714  001403                          BEQ     26$                 ;BRANCH IF NOT.
025716  163701  027776                  SUB     @#DHVEC+2,R1        ;DETERMINE NUMBER OF ADDRESSES
                                                                    ;BETWEEN DH VECTORS (10(8) OR 20(8)).
025722  005401                          NEG     R1                  ;MAKE R1 POSITIVE.
025724  010167  002246          26$:    MOV     R1,ADRVEC           ;SAVE THAT NUMBER.
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025730  032777  000002  153202           BIT     #BIT1,@SWR        ;SHOULD DEVICE MAP BE TYPED OUT?
025736  001442                           BEQ     20$               ;IF NOT, RETURN.
025740  104401                           TYPE                      ;TYPEOUT MAP OF DH & DM11-BB'S
025742  035613                           DEVMAP                    ;FOUND.
025744  012701  027732                   MOV     #DHADRS,R1        ;R1=BEGINNING OF DH ADDRESS TABLE.
025750  012702  027774                   MOV     #DHVEC,R2         ;R2=BEGINNING OF DH VECTOR TABLE.
025754  012703  030034                   MOV     #DMADRS,R3        ;R3=BEGINNING OF DM11-BB ADDRESS TABLE.
025760  012704  030076                   MOV     #DMVEC,R4         ;R4=BEGINNING OF DM11-BB VECTOR TABLE.

025764  012146                   19$:    MOV     (R1)+,-(SP)       ;MOVE DATA TO BE TYPED
025766  104403                           TYPOS                     ;TYPE DATA
025770     006                           .BYTE   6
025771     001                           .BYTE   1
025772  012246                           MOV     (R2)+,-(SP)       ;MOVE DATA TO BE TYPED
025774  104403                           TYPOS                     ;TYPE DATA
025776     005                           .BYTE   5
025777     000                           .BYTE   0
026000  104401  035607                   TYPE    ,SPACE
026004  012346                           MOV     (R3)+,-(SP)       ;MOVE DATA TO BE TYPED.
026006  104403                           TYPOS                     ;TYPE DATA.
026010     006                           .BYTE   6
026011     001                           .BYTE   1
026012  104401  035607                   TYPE    ,SPACE
026016  012446                           MOV     (R4)+,-(SP)       ;MOVE DATA TO BE TYPED.
026020  104403                           TYPOS                     ;TYPE DATA.
026022     005                           .BYTE   5
026023     000                           .BYTE   0
026024  104401                           TYPE                      ;TYPE A CARRIAGE RETURN & LINE FEED.
026026  001227                           $CRLF
026030  005711                           TST     (R1)              ;HAVE WE TYPED ALL DH ENTRIES?
026032  001354                           BNE     19$               ;IF NOT, DO IT AGAIN.
026034  005713                           TST     (R3)              ;HAVE WE TYPED ALL DM ENTRIES?
026036  001352                           BNE     19$               ;IF NOT - ONE MORE TIME.
026040  104401  001227                   TYPE    ,$CRLF
026044  000207                   20$:    RTS     PC                ;IF YES, GO BACK TO MAIN PROGRAM.

                                 ;THIS ROUTINE IS USED TO ACCEPT INPUT PARAMETERS FROM THE CONSOLE
                                 ;TELETYPE

026046  104401                   INPARA: TYPE
026050  035354                           VCWC                      ;"ASK FOR NO. ADDRESSES BETWEEN VECTORS"
026052  104412                           RDOCT                     ;READ OCTAL NO. FM TTY
026054  012600                           MOV     (SP)+,R0          ;GET THE NO. HE TYPED
026056  001407                           BEQ     3$                ;BR IF HE TYPED <CR>
026060  022700  000010                   CMP     #10,R0            ;10(8) ADDRESSES BETWEEN VECTORS ?
026064  001406                           BEQ     4$                ;BR IF YES
026066  022700  000020                   CMP     #20,R0            ;20(8) ADDRESSES BETWEEN VECTORS ??
026072  001403                           BEQ     4$                ;BR IF YES
026074  000764                           BR      INPARA            ;ASK ALL OVER AGAIN
026076  012700  000020           3$:     MOV     #20,R0            ;SET UP CONSTANT FOR 20(8) ADDRESSES
026102  000207                   4$:     RTS     PC                ;RETURN TO CALLER



026104  012700  177777           INPARC: MOV     #-1,R0            ;SET FLAG IN R0
026110  000167  154034                   JMP     BEGINA            ;GO ASK FOR SELECT PARAMETER
```

```
026114  012767  177777  001546  INPARX: MOV     #-1,VCFLG       ;SET SETUP FLAG
026122  000167  154022                  JMP     BEGINA          ;GO START UP

026126  013701  027732          INPAR:  MOV     @#DHADRS,R1     ;MOVE ADDRESS OF FIRST DH INTO R1.
026132  032777  000001  153000          BIT     #BIT0,@SWR      ;ARE PARAMETERS TO BE INPUT MANUALLY?
026140  001405                          BEQ     2$              ;BRANCH IF NOT.
026142  104401                  1$:     TYPE                    ;ASK FOR DEVICE ADDRESS
026144  034731                          INMSG1
026146  104412                          RDOCT                   ;READ IN WHAT IS TYPED
026150  012601                          MOV     (SP)+,R1        ;GET THE NO. HE TYPED
026152  001403                          BEQ     INPAR1          ;BR IF DEFAULT
026154  004767  000160          2$:     JSR     PC,CHKADR       ;GO CHECK VALIDITY OF THE ADDR
026160  000770                          BR      1$              ;ERROR BRANCH

026162  013701  027774          INPAR1: MOV     @#DHVEC,R1      ;MOVE FIRST DH VECTOR INTO R1.
026166  032777  000001  152744          BIT     #BIT0,@SWR      ;ARE PARAMETERS TO BE INPUT MANUALLY?
026174  001405                          BEQ     2$              ;BRANCH IF NOT.
026176  104401                  1$:     TYPE                    ;ASK FOR VECTOR ADDRESS
026200  034775                          INMSG2
026202  104412                          RDOCT                   ;READ IN WHAT HE TYPES
026204  012601                          MOV     (SP)+,R1        ;GET THE ADDRESS
026206  001403                          BEQ     INPAR3          ;BR IF DEFAULT
026210  004767  000240          2$:     JSR     PC,CHKVCT       ;GO CHECK VALIDITY OF VECTOR
026214  000770                          BR      1$              ;ERROR BRANCH

026216  013701  030204          INPAR3: MOV     @#$DHSEL,R1     ;MOVE DEVICE SELECTION PARAMETER INTO R1.
026222  005700                          TST     R0              ;DID WE START AT 210?
026224  100404                          BMI     2$              ;BRANCH IF YES.
026226  032777  000001  152704          BIT     #BIT0,@SWR      ;IS PARAMETER TO BE INPUT MANUALLY?
026234  001405                          BEQ     1$              ;BRANCH IF NOT.
026236  104401                  2$:     TYPE                    ;ASK FOR DEVICE SELECTION PARAMETER
026240  035044                          INMSG3
026242  104412                          RDOCT                   ;READ IN WHAT HE TYPES
026244  012601                          MOV     (SP)+,R1        ;GET THE SELECT PARAMETER
026246  001402                          BEQ     INPAR4          ;BR IF  DEFAULT
026250  010167  000724          1$:     MOV     R1,DHSEL        ;SET UP DH11 SELECTION PARAMETER

026254  005700                  INPAR4: TST     R0              ;DID WE START AT 210?
026256  100404                          BMI     3$              ;BRANCH IF YES.
026260  032777  000001  152652          BIT     #BIT0,@SWR      ;IS LINE SELECT PARAMETER TO BE INPUT MANUALLY?
026266  001410                          BEQ     1$              ;BRANCH IF NO.
026270  104401                  3$:     TYPE                    ;ASK FOR LINE SELECT PARAMETER
026272  035242                          INMSG6
026274  104412                          RDOCT                   ;GET WHAT HE TYPES
026276  012601                          MOV     (SP)+,R1        ;GET PARAMETER
026300  001403                          BEQ     1$              ;BR IF DEFAULT
026302  010167  000674                  MOV     R1,LINSEL       ;SET UP LINE SELECT PARAMETER
026306  000403                          BR      2$              ;CONTINUE
026310  012767  177777  000664  1$:     MOV     #-1,LINSEL      ;SET UP DEFAULT (ALL LINES)
026316  032777  000400  152614  2$:     BIT     #BIT8,@SWR      ;HALT AFTER SET UP ??
026324  001403                          BEQ     EXPAR           ;BR IF  NOT
026326  104401                          TYPE                    ;TYPE CONTINUE MESSAGE PRIOR TO HALTING
026330  035304                          INMSG7
026332  000000                          HALT                    ;DEPRESS CONTINUE TO RESUME TESTING
026334  000167  154264          EXPAR:  JMP     START2          ;GO START UP THE PROGRAM
```

```
026340	020127	160020		CHKADR:	CMP	R1,#160020	;IS ADDRESS ABOVE OR EQUAL TO LOW LIMIT
026344	002001				BGE	1$		;BR IF YES
026346	000437				BR	4$		;BR IF NOT
026350	020127	160420		1$:	CMP	R1,#160420	;IS IT BELOW THE HIGH LIMIT?
026354	002401				BLT	2$		;BR IF YES
026356	000433				BR	4$		;BR IF NOT
026360	032701	000017		2$:	BIT	#17,R1		;CORRECT BOUNDARY ?
026364	001030				BNE	4$		;BR IF NOT
026366	062716	000002			ADD	#2,(SP)		;MOVE RETURN PC AROUND ERROR BRANCH
026372	012702	027570			MOV	#DHADTB,R2	;POINT TO BEGIN OF ADDR TABLE
026376	032777	000001	152534		BIT	#BIT0,@SWR	;ARE WE AUTOSIZING?
026404	001011				BNE	3$		;BRANCH IF NOT.
026406	012703	027732			MOV	#DHADRS,R3	;POINT TO BEGINNING OF AUTOSIZER
							;DH ADDRESS TABLE.
026412	016704	001566			MOV	$DHSEL,R4
026416	012322			6$:	MOV	(R3)+,(R2)+	;MOVE CONTENTS OF AUTOSIZER DH TABLE
							;TO THE TABLE USED BY PROGRAM.
026420	006204				ASR	R4
026422	005704				TST	R4		;HAVE WE MOVED ALL TABLE ENTRIES?
026424	001374				BNE	6$		;BRANCH IF NOT--ONE MORE TIME.
026426	000411				BR	5$		;RETURN TO INPUT ROUTINES.
026430	010122			3$:	MOV	R1,(R2)+	;SETR UP A TABLE ENTRY
026432	062701	000020			ADD	#20,R1		;GENERATE NEXT DH11 ADDR
026436	022702	027630			CMP	#DHADTB+40,R2	;END OF TABLE ?
026442	001372				BNE	3$		;BR IF NOT
026444	000402				BR	5$		;RETURN TO INPUT ROUTINES
026446	104401			4$:	TYPE			;TELL HIM HE GOOFED
026450	035115				INMSG4
026452	000207			5$:	RTS	PC		;RETURN TO INPUT ROUTINES

026454	020127	000300		CHKVCT:	CMP	R1,#300		;IS ADDRESS ABOVE OR EQUAL TO LOW LIMIT
026460	002001				BGE	1$		;BR IF YES
026462	000436				BR	4$		;BR IF NOT
026464	020127	001000		1$:	CMP	R1,#1000	;IS IT BELOW THE HIGH LIMIT?
026470	002401				BLT	2$		;BR IF YES
026472	000432				BR	4$		;BR IF NOT
026474	032701	000007		2$:	BIT	#7,R1		;CORRECT BOUNDARY ?
026500	001027				BNE	4$		;BR IF NOT
026502	062716	000002			ADD	#2,(SP)		;MOVE RETURN PC AROUND ERROR BRANCH
026506	012702	027630			MOV	#DHVCTB,R2	;POINT TO BEGIN OF VECTOR TABLE
026512	032777	000001	152420		BIT	#BIT0,@SWR	;ARE WE AUTOSIZING?
026520	001011				BNE	3$		;BRANCH IF NOT.
026522	012703	027774			MOV	#DHVEC,R3	;POINT TO BEGINING OF AUTOSIZER
							;DH VECTOR TABLE.
026526	016704	001452			MOV	$DHSEL,R4
026532	012322			6$:	MOV	(R3)+,(R2)+	;MOVE CONTENTS OF AUTOSIZER VECTOR
							;TABLE TO TABLE USED BY PROGRAM.
026534	006204				ASR	R4
026536	005704				TST	R4		;HAVE WE MOVED ALL TABLE ENTRIES?
026540	001374				BNE	6$		;BRANCH IF NOT--ONE MORE TIME.
026542	000410				BR	5$		;RETURN TO INPUT ROUTINES.
026544	010122			3$:	MOV	R1,(R2)+	;SETR UP A TABLE ENTRY
026546	060001				ADD	R0,R1		;GENERATE NEXT DH11 ADDR
026550	022702	027670			CMP	#DHVCTB+40,R2	;END OF TABLE ?
```

```
026554  001373                          BNE     3$              ;BR IF NOT
026556  000402                          BR      5$              ;RETURN TO INPUT ROUTINES
026560  104401                  4$:     TYPE                    ;TELL HIM HE GOOFED
026562  035166                          INMSG5
026564  000207                  5$:     RTS     PC              ;RETURN TO INPUT ROUTINES

                                ;THESE TWO ROUTINES SERVICE UNEXPECTED BUS ERROR AND RSVD INSTR TRAPS

026566  012767  000340  152406  BUSER:  MOV     #340,$TMP0      ;SAVE THE PSW
026574  010667  152376                  MOV     SP,$REG6        ;SAVE THE SP
026600  012601                          MOV     (SP)+,R1        ;GET THE TRAP PC
026602  012602                          MOV     (SP)+,R2        ;GET THE TRAP PSW
026604  116700  152272                  MOVB    $TSTNM,R0       ;GET TEST NO.
026610  012706  001100                  MOV     #STACK,SP       ;RESET THE STACK POINTER
026614  004767  175600                  JSR     PC,SUER3        ;GO SET UP ERROR INFO
026620  012767  026630  152262          MOV     #1$,$LPERR      ;ALWAYS COME BACK TO 1$
026626  104027                          ERROR   27              ;UNEXPECTED BUS ERROR TRAP
026630  000005                  1$:     RESET                   ;PREPARE TO RESTART.
026632  004767  000240                  JSR     PC,CHPS1        ;GO CLEAR PSW
026636  000167  154056                  JMP     REST1           ;GO RESTART THE PROGRAM

026642  012767  000340  152332  RESERR: MOV     #340,$TMP0      ;SAVE THE PSW
026650  010667  152322                  MOV     SP,$REG6        ;SAVE THE SP
026654  012601                          MOV     (SP)+,R1        ;GET THE TRAP PC
026656  012602                          MOV     (SP)+,R2        ;GET THE TRAP PSW
026660  116700  152216                  MOVB    $TSTNM,R0       ;GET TEST NO.
026664  012706  001100                  MOV     #STACK,SP       ;RESET THE STACK POINTER
026670  004767  175524                  JSR     PC,SUER3        ;GO SET UP ERROR INFO
026674  012767  026704  152206          MOV     #1$,$LPERR      ;ALWAYS COME BACK TO 1$
026702  104030                          ERROR   30              ;UNEXPECTED RSVD INSTR ERROR TRAP
026704  000005                  1$:     RESET                   ;PREPARE TO RESTART
026706  004767  000164                  JSR     PC,CHPS1        ;GO CLEAR PSW
026712  000167  154002                  JMP     REST1           ;GO RESTART THE PROGRAM

                                ;THIS ROUTINE IS CALLED WHEN A TEST NEEDS TO RESTORE THE TRAP
                                ;CATCHER IN THE DH11 VECTOR

026716  016703  000252          RESTRP: MOV     DHVCT,R3        ;GET VECTOR ADDRESS
026722  010313                          MOV     R3,(R3)         ;RESTORE THE TRAP CATCHER
026724  062723  000002                  ADD     #2,(R3)+
026730  005023                          CLR     (R3)+
026732  010313                          MOV     R3,(R3)
026734  062723  000002                  ADD     #2,(R3)+
026740  005023                          CLR     (R3)+
026742  000207                          RTS     PC              ;RETURN TO CALLING TEST

                                ;THIS ROUTINE CALLED BY ANY TEST THAT NEEDS A TIMING WAIT LOOP
                                ;"TIMEA" IS INITIALIZED BY THE CALLING ROUTINE TO THE MINIMUM REQUIRED
                                ;VALUE AND "TIMEB" IS CLEARED TO 000000. IF A TIME OUT OCCURS THIS
                                ;ROUTINE WILL MOVE THE RETURN PC AROUND THE "LOOP" BRANCH BACK IN
                                ;THE ROUTINE THAT CALLED IT TO ALLOW REPORTING AN ERROR MESSAGE

026744  005267  001272          TIMEIT: INC     TIMEB           ;COUNT B
026750  001005                          BNE     1$              ;BR IF NOT ZERO
026752  005367  001262                  DEC     TIMEA           ;COUNT TIME A
026756  001002                          BNE     1$              ;BR IF NO TIMEOUT
```

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026760  062716  000002                      ADD     #2,(SP)            ;MOVE RETURN PC TO ALLOW ERROR REPORT
026764  000207                      1$:     RTS     PC                 ;RETURN TO THE CALLING TEST

                                    ;THIS ROUTINE CALLED BY THE AUTO ECHO TEST TO SET UP FOR TRANSFERRING
                                    ;A BINARY COUNT TEST PATTERN ON ALL LINES

026766  012767  000020  152222  SETALL: MOV     #20,$TMP6          ;SET UP SIXTEEN LINES
026774  005002                          CLR     R2                 ;INIT A TABLE INDEX REG
026776  012703  000200                  MOV     #200,R3            ;SET UP TO GENERATE HI BYTE OF EXPECTED DATA
027002  012704  000001                  MOV     #1,R4              ;SET UP INDEX REG TO ODD BYTES
027006  005011                          CLR     (R1)               ;START WITH LINE 00
027010  012761  037112  000006  1$:     MOV     #TBUF,CAR(R1)      ;SET UP BUS ADDR REG
027016  012761  177400  000010          MOV     #-400,BCR(R1)      ;SET UP BYTE COUNT REG
027024  012761  031403  000004          MOV     #31403,LPR(R1)     ;SET UP FOR 4800 BAUD/8 BIT CHARS
027032  105062  036112                  CLRB    RBUF(R2)           ;START WITH DATA CHAR OF 000
027036  110364  036112                  MOVB    R3,RBUF(R4)        ;SET UP HIGH BYTE OF EXPECTED DATA
027042  005211                          INC     (R1)               ;GEN NEW LINE NO. IN SCR
027044  005203                          INC     R3                 ;UPDATE THE POINTERS AND DATA
027046  062702  000002                  ADD     #2,R2
027052  062704  000002                  ADD     #2,R4
027056  005367  152134                  DEC     $TMP6              ;COUNT ONE LINE DONE
027062  001352                          BNE     1$                 ;BR TIL ALL 16 SET UP
027064  016767  000112  000356          MOV     LINSEL,LINACT      ;SET SOFTWARE FLAG FOR ALL LINES ACTIVE
027072  005011                          CLR     (R1)               ;PUT SCR REG BACK TO LINE 00
027074  000207                          RTS     PC                 ;RETURN TO AUTO ECHO TEST


                                    ;THIS ROUTINE IS CALLED TO SET PSW PRIORITY TO 000 IN ORDER
                                    ;TO BE LSI11 COMPATIBLE

027076  012746  000000          CHPS1:  MOV     #0,-(SP)           ;NEW PSW
027102  012746  027110                  MOV     #1$,-(SP)          ;NEW PC
027106  000002                          RTI                        ;CHANGE PSW
027110  000207                  1$:     RTS     PC                 ;RETURN TO CALLING TEST

                                    ;THIS ROUTINE DOES THE SAME THING EXCEPT IT SET THE PSW
                                    ;PRIORITY TO 340 (LEVEL 7 ) TO LOCK OUT INTRS

027112  012746  000340          CHPS2:  MOV     #340,-(SP)         ;NEW PSW
027116  012746  027124                  MOV     #1$,-(SP)          ;NEW PC
027122  000002                          RTI                        ;CHANGE THE PSW
027124  000207                  1$:     RTS     PC                 ;RETURN TO CALLING TEST

                                    ;THIS ROUTINE IS ALSO FOR LSI11 COMPATIBILITY AND IT IS CALLED
                                    ;TO SAVE THE PSW IN "$TMP0"

027126  005046                  SAPS:   CLR     -(SP)              ;TEMP STORAGE TO SAVE PSW
027130  016746  150700                  MOV     34,-(SP)           ;SAVE TRAP VECTOR POINTER
027134  012767  027144  150672          MOV     #1$,34             ;GO TO 1$ ON TRAP
027142  104400                          TRAP                       ;GO TO IT
027144  016666  000002  000006  1$:     MOV     2(SP),6(SP)        ;GET PSW SAVED
027152  012716  027160                  MOV     #2$,(SP)           ;GO TO 2$ ON RTI
027156  000002                          RTI
027160  012667  150650          2$:     MOV     (SP)+,34           ;RESTORE VECTOR
027164  012667  152012                  MOV     (SP)+,$TMP0        ;FINALLY SAVE PSW IN $TMP0
027170  000207                          RTS     PC
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                                ;;*****************************************************
                                ;ADDITIONAL PROGRAM CONSTANTS AND VARIABLES
                                ;;*****************************************************

         000002                         NRC=2           ;INDEX CONST. TO ACCESS NEXT RCVD CHAR REG
         000004                         LPR=4           ;INDEX CONST. TO ACCESS LINE PARAMETER REG.
         000006                         CAR=6           ;INDEX CONST. TO ACCESS CURRENT ADDRESS REG.
         000010                         BCR=10          ;INDEX CONST. TO ACCESS BYTE COUNT REG.
         000012                         BAR=12          ;INDEX CONST. TO ACCESS BUFFER ACTIVE REG.
         000014                         BKR=14          ;INDEX CONST. TO ACCESS BREAK CONTROL REG.
         000016                         SSR=16          ;INDEX CONST. TO ACCESS SILO STATUS REG.

 027172  000000                 DHADR:  0               ;HOLDS THE "SCR" ADDRESS OF THE DH11 UNDER TEST
 027174  000000                 DHVCT:  0               ;HOLDS THE 1ST VECTOR ADDRESS OF THE DH11 UNDER TEST
 027176  000000                 SELMSK: 0               ;BIT TST MARKER FOR SELECTING DH11'S
 027200  000003                 DHSEL:  3               ;SPECIFIES DH11'S SELECTED FOR TEST
 027202  177777                 LINSEL: 177777          ;SPECIFIES LINES TO TEST
 027204  000000                 LINMSK: 0               ;MARKER USED TO TEST FOR LINES TO TEST
 027206  000000                 LMSK1:  0               ;ALTERNATE MARKER TO SUPPORT THE
                                                        ;SELECT LINES FEATURE
 027210  000004                 MSTCLR: .BLKW   4       ;FOUR WORD ADDRESS TABLE USED BY THE TEST THAT
                                                        ;CHECKS OPERATION OF "MASTER CLR"

 027220  177777                 PATRNA: 177777          ;BIT PATTERNS USED WITH "CAR" AND "BCR" TESTS
 027222  125252                         125252
 027224  052525                         052525
 027226  000000                         000000          ;TABLE TERMINATOR

 027230  000060                 PATRNB: 60              ;BIT PATTERNS USED IN "CAR" MEM EXT BIT TEST
 027232  000300                         300
 027234  000020                         20
 027236  000100                         100
 027240  000040                         40
 027242  000200                         200
 027244  000000                         0               ;TABLE TERMINATOR
 027246  000000                         0               ;TABLE TERMINATOR

                                ;THIS TABLE STORES THE BYTE COUNT AND LINE PARAMETERS FOR THE
                                ;8 SUBTESTS IN THE MULTILINE PARITY/DATA TEST

 027250  177400                 PRTYTB: -400                    ;256 CHARS
 027252  027363                         27363                   ;2400 BAUD - ODD PARITY - 8 BITS
 027254  177400                         -400                    ;256 CHARS
 027256  027323                         27323                   ;2400 BAUD - EVEN PARITY - 8 BITS
 027260  177600                         -200                    ;128 CHARS
 027262  027362                         27362                   ;2400 BAUD - ODD PARITY - 7 BITS
 027264  177600                         -200                    ;128 CHARS
 027266  027322                         27322                   ;2400 BAUD - EVEN PARITY - 7 BITS
 027270  177700                         -100                    ;64 CHARS
 027272  027361                         27361                   ;2400 BAUD - ODD PARITY - 6 BITS
 027274  177700                         -100                    ;64 CHARS
 027276  027321                         27321                   ;2400 BAUD - EVEN PARITY - 6 BITS
 027300  177740                         -40                     ;32 CHARS
 027302  027360                         27360                   ;2400 BAUD - ODD PARITY - 5 BITS
 027304  177740                         -40                     ;32 CHARS
 027306  027320                         27320                   ;2400 BAUD - EVEN PARITY - 5 BITS
```

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                                        ;THIS 16 WORD TABLE CONTAINS THE TEST DATA USED BY THE AUTO ECHO
                                        ;TEST (ALL 1'S DATA TABLE)

 027310  100377                         AETAB:  100377          ;TEST DATA FOR LINE 00
 027312  100777                                 100777          ;TEST DATA FOR LINE 01
 027314  101377                                 101377
 027316  101777                                 101777
 027320  102377                                 102377
 027322  102777                                 102777
 027324  103377                                 103377
 027326  103777                                 103777
 027330  104377                                 104377
 027332  104777                                 104777
 027334  105377                                 105377
 027336  105777                                 105777
 027340  106377                                 106377
 027342  106777                                 106777
 027344  107377                                 107377
 027346  107777                                 107777          ;TEST DATA FOR LINE 17

                                        ;THIS 16 WORD TABLE CONTAINS THE TEST DATA USED BY THE AUTO ECHO
                                        ;TEST (ALL 0'S DATA TABLE)

 027350  100000                         AETAB0: 100000          ;TEST DATA FOR LINE 00
 027352  100400                                 100400          ;TEST DATA FOR LINE 01
 027354  101000                                 101000
 027356  101400                                 101400
 027360  102000                                 102000
 027362  102400                                 102400
 027364  103000                                 103000
 027366  103400                                 103400
 027370  104000                                 104000
 027372  104400                                 104400
 027374  105000                                 105000
 027376  105400                                 105400
 027400  106000                                 106000
 027402  106400                                 106400
 027404  107000                                 107000
 027406  107400                                 107400          ;TEST DATA FOR LINE 17

                                        ;THIS TABLE USED BY THE AUTO ECHO TEST 2 TO RESET ACTIVE BIT WHEN A
                                        ;LINE IS DONE

 027410  000001                         LINBIT: BIT00                   ;DEACTIVATE LINE 00
 027412  000002                                 BIT01                   ;DEACTIVATE LINE 01
 027414  000004                                 BIT02
 027416  000010                                 BIT03
 027420  000020                                 BIT04
 027422  000040                                 BIT05
 027424  000100                                 BIT06
 027426  000200                                 BIT07
 027430  000400                                 BIT08
 027432  001000                                 BIT09
 027434  002000                                 BIT10
 027436  004000                                 BIT11
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027440  010000                  BIT12
027442  020000                  BIT13
027444  040000                  BIT14
027446  100000                  BIT15                   ;DEACTIVATE LINE 17

027450  000000          LINACT: 0                       ;MAINTAINS STATUS OF ACTIVE LINES
                                                        ;DURING AUTO ECHO TEST 2


                        ;THIS TABLE CONTAINS 16. COUNTERS USED BYN THE MULTI-LINE
                        ;PARITY TEST TO KEEP TRACK OF TOTAL CHARS RECEIVED

027452  000020          MULPTB: .BLKW   16.             ;SIXTEEN WORD COUNTERS TABLE

                        ;THIS 16 WORD TABLE CONTAINS THE TEST DATA USED BY THE BREAK BIT
                        ;TEST

027512  120000          BRKTAB: 120000          ;TEST DATA FOR LINE 00
027514  120400                  120400          ;TEST DATA FOR LINE 01
027516  121000                  121000
027520  121400                  121400
027522  122000                  122000
027524  122400                  122400
027526  123000                  123000
027530  123400                  123400
027532  124000                  124000
027534  124400                  124400
027536  125000                  125000
027540  125400                  125400
027542  126000                  126000
027544  126400                  126400
027546  127000                  127000
027550  127400                  127400          ;TEST DATA FOR LINE 17

027552  131177          RGMSK1: 131177          ;MASK TO SPECIFY R/W BITS FOR NORMAL "SCR" REG TEST
027554  046600          RGMSK2: 46600           ;MASK TO SPECIFY READ ONLY BITS IN "SCR" FOR NORMAL MODE TEST
027556  177767          RGMSK3: 177767          ;MASK TO SPECIFY R/W BITS IN "LPR"
027560  177777          RGMSK4: 177777          ;MASK TO SPECIFY R/W BITS IN "BKR"
027562  100077          RGMSK5: 100077          ;MASK TO SPECIFY R/W BITS IN "SSR"
027564  042200          RGMSK6: 42200           ;MASK TO SPECIFY READ ONLY BITS IN "SCR" FOR MAINT. MODE TEST
027566  030100          INTMSK: 30100           ;MASK USED TO SELECT INTR BITS TO TEST

                        ;DH11 ADDRESS TABLE - THIS TABLE CONTAINS THE "SCR" ADDRESS FOR UP TO
                        ;SIXTEEN DH11'S

027570  160020          DHADTB: 160020          ;ADDRESS OF FIRST DH11
027572  160040                  160040          ;ADDRESS OF SECOND DH11
027574  160060                  160060
027576  160100                  160100
027600  160120                  160120
027602  160140                  160140
027604  160160                  160160
027606  160200                  160200
027610  160220                  160220
027612  160240                  160240
027614  160260                  160260
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027616  160300                  160300
027620  160320                  160320
027622  160340                  160340
027624  160360                  160360
027626  160400                  160400          ;ADDRESS OF THE LAST DH11

                        ;DH11 VECTOR TABLE - THIS TABLE CONTAINS THE VECTOR ADDRESSES FOR UP
                        ;TO SIXTEEN DH11'S

027630  000330          DHVCTB: 330             ;ADDRESS OF VECTOR FOR FIRST DH11
027632  000350                  350             ;ADDRESS OF VECTOR FOR SECOND DH11
027634  000370                  370
027636  000410                  410
027640  000430                  430
027642  000450                  450
027644  000470                  470
027646  000510                  510
027650  000530                  530
027652  000550                  550
027654  000570                  570
027656  000610                  610
027660  000630                  630
027662  000650                  650
027664  000670                  670
027666  000710                  710             ;ADDRESS OF VECTOR FOR LAST DH11

027670  000000          VCFLG:  0               ;VECTOR SET UP FLAGG


                        ;BR PRIORITY LEVEL TABLE - THIS TABLE CONTAINS THE PRIORITY LEVELS
                        ;FOR UP TO SIXTEEN DH11'S - THE RCVR LEVEL IS STORED IN THE LOW BYTE
                        ;AND THE XMTTR LEVEL IN THE HIGH BYTE

027672  120240          BRLVL:  120240          ;BRLEVELS FOR FIRST DH11
027674  120240                  120240          ;BR LEVELS FOR SECOND DH11
027676  120240                  120240
027700  120240                  120240
027702  120240                  120240
027704  120240                  120240
027706  120240                  120240
027710  120240                  120240
027712  120240                  120240
027714  120240                  120240
027716  120240                  120240
027720  120240                  120240
027722  120240                  120240
027724  120240                  120240
027726  120240                  120240
027730  120240                  120240          ;BR LEVELS FOR LAST DH11

                        ;THIS DH ADDRESS TABLE IS FILLED BY THE AUTOSIZER.

027732                  DHADRS:
027732  000000          .WORD   0
027734  000000          .WORD   0
027736  000000          .WORD   0
```

```
027740	000000		.WORD	0
027742	000000		.WORD	0
027744	000000		.WORD	0
027746	000000		.WORD	0
027750	000000		.WORD	0
027752	000000		.WORD	0
027754	000000		.WORD	0
027756	000000		.WORD	0
027760	000000		.WORD	0
027762	000000		.WORD	0
027764	000000		.WORD	0
027766	000000		.WORD	0
027770	000000		.WORD	0
027772	000000		.WORD	0

				;THIS DH VECTOR TABLE IS FILLED BY THE AUTOSIZER.

027774				DHVEC:
027774	000000		.WORD	0
027776	000000		.WORD	0
030000	000000		.WORD	0
030002	000000		.WORD	0
030004	000000		.WORD	0
030006	000000		.WORD	0
030010	000000		.WORD	0
030012	000000		.WORD	0
030014	000000		.WORD	0
030016	000000		.WORD	0
030020	000000		.WORD	0
030022	000000		.WORD	0
030024	000000		.WORD	0
030026	000000		.WORD	0
030030	000000		.WORD	0
030032	000000		.WORD	0

				;THIS DM ADDRESS TABLE IS FILLED BY THE AUTOSIZER.

030034				DMADRS:
030034	000000		.WORD	0
030036	000000		.WORD	0
030040	000000		.WORD	0
030042	000000		.WORD	0
030044	000000		.WORD	0
030046	000000		.WORD	0
030050	000000		.WORD	0
030052	000000		.WORD	0
030054	000000		.WORD	0
030056	000000		.WORD	0
030060	000000		.WORD	0
030062	000000		.WORD	0
030064	000000		.WORD	0
030066	000000		.WORD	0
030070	000000		.WORD	0
030072	000000		.WORD	0
030074	000000		.WORD	0
```

```
                                  ;THIS DM VECTOR TABLE IS FILLED BY THE AUTOSIZER.

        030076                    DMVEC:
        030076  000000            .WORD   0
        030100  000000            .WORD   0
        030102  000000            .WORD   0
        030104  000000            .WORD   0
        030106  000000            .WORD   0
        030110  000000            .WORD   0
        030112  000000            .WORD   0
        030114  000000            .WORD   0
        030116  000000            .WORD   0
        030120  000000            .WORD   0
        030122  000000            .WORD   0
        030124  000000            .WORD   0
        030126  000000            .WORD   0
        030130  000000            .WORD   0
        030132  000000            .WORD   0
        030134  000000            .WORD   0


        030136                    $LNSEL:
        030136  000001            .WORD   1
        030140  000002            .WORD   2
        030142  000004            .WORD   4
        030144  000010            .WORD   10
        030146  000020            .WORD   20
        030150  000040            .WORD   40
        030152  000100            .WORD   100
        030154  000200            .WORD   200
        030156  000400            .WORD   400
        030160  001000            .WORD   1000
        030162  002000            .WORD   2000
        030164  004000            .WORD   4000
        030166  010000            .WORD   10000
        030170  020000            .WORD   20000
        030172  040000            .WORD   40000
        030174  100000            .WORD   100000

        030176  000000            ADRVEC: 0               ;ADDRESSES BETWEEN VECTORS - FILLED BY THE AUTOSIZER
        030200  000000            DHMCSR: 0               ;DM11-BB CONTROL AND STATUS REGISTER.
        030202  000000            DHMLSR: 0               ;DM11-BB LINE STATUS REGISTER.
        030204  000000            $DHSEL: 0               ;DEVICE SELECT PARAMETER - FILLLED BY THE AUTOSIZER.
        030206     000            DHRLVL: .BYTE   0               ;BR LEVEL FOR RCVR
        030207     000            DHTLVL: .BYTE   0               ;BR LEVEL FOR XMITTER
        030210  000000            DHNUM:  0               ;CONTAINS NUMBER OF THE DH11 UNDER TEST
        030212  000000            LINE:   0               ;CONTINES NUMBER OF THE LINE UNDER TEST
        030214  000000            LINEA:  0               ;LOCATION TO SAVE LINE NUMBER
                                  ;ADDRESS POINTERS TO SET UP TABLES WHEN INPUTTING PARAMETERS

        030216  000000            ADPTR:  0                       ;POINTS TO ADDRESS TABLE
        030220  000000            VCPTR:  0                       ;POINTS TO VECTOR TABLE
        030222  000000            BRPTR:  0                       ;POINTS TO BR LEVEL TABLE
                                  ;THE FOLLOWING TEN CONSTANTS ARE USED BY THE DM11-BB PORTION OF THIS PROGRAM.
```

```
        000400          STEP=400
        000001          LINENA=1
        000002          TRMRDY=2
        000004          RS=4
        000010          SECTX=10
        000020          SECRX=20
        000040          CS=40
        000100          CO=100
        000200          RING=200
        002000          CLRMUX=2000

030224  000000          TDATA1: 0               ;DATA BUFFER FOR BASIC DATA TEST
030226  000037          TDATA2: 37              ;TEST DATA FOR FIVE BIT CHAR
030230  000077                  77              ;TEST DATA FOR SIX BIT CHAR
030232  000177                  177             ;TEST DATA FOR SEVEN BIT CHAR
030234  000377                  377             ;TEST DATA FOR EIGHT BIT CHAR
030236  000000          TITFLG: 0               ;FLAG TO ALLOW PRINTING TITLE ONLY ONCE
030240  000000          TIMEA:  0               ;GENERAL PURPOSE TIMERS
030242  000000          TIMEB:  0
030244  000000          TIMEC:  0               ;TIMER FOR TIMING TESTS
030246  000000          TNULL:  0               ;CONTAINS TWO NULL CHARS USED BY BREAK TEST
```

```
                                          ;;*************************************************************
                                          ;ERROR MESSAGE INFORMATION - MESSAGE BUFFERS AND POINTERS
                                          ;;*************************************************************

                                          ;INFORMATION FOR MESSAGE 1

030250  044104  030461  051040    EM1:    .ASCIZ  'DH11 REGISTER REFERENCE CAUSED TIMEOUT'
030256  043505  051511  042524
030264  020122  042522  042506
030272  042522  041516  020105
030300  040503  051525  042105
030306  052040  046511  047505
030314  052125     000
030317     040  050050  024503    DH1:    .ASCIZ  ' (PC)    (PS)    (SP)    TEST   DEVADR  REGADR'
030324  020040  020040  050050
030332  024523  020040  020040
030340  051450  024520  020040
030346  020040  042524  052123
030354  020040  042040  053105
030362  042101  020122  051040
030370  043505  042101  000122
                                  .EVEN
030376  001116  001202  001176    DT1:    .WORD   $ERRPC,$TMPO,$REG6,$REG0,$REG1,$REG2,0
030404  001162  001164  001166
030412  000000

                                  ;INFORMATION FOR MESSAGE 2

030414  054523  052123  046505    EM2:    .ASCIZ  'SYSTEM CONTROL REGISTER ERROR'
030422  041440  047117  051124
030430  046117  051040  043505
030436  051511  042524  020122
030444  051105  047522  000122
030452  024040  041520  020051    DH2:    .ASCIZ  ' (PC)    (PS)    (SP)    TEST   DEVADR  REGADR   WAS      S/B'
030460  020040  024040  051520
030466  020051  020040  024040
030474  050123  020051  020040
030502  052040  051505  020124
030510  020040  042504  040526
030516  051104  020040  042522
030524  040507  051104  020040
030532  053440  051501  020040
030540  020040  051440  041057
030546     000
        030550                    .EVEN
030550  001116  001202  001176    DT2:    .WORD   $ERRPC,$TMPO,$REG6,$REG0,$REG1,$REG2,$REG3,$REG4,0
030556  001162  001164  001166
030564  001170  001172  000000

                                  ;INFORMATION FOR MESSAGE 3

030572  044104  030461  046440    EM3:    .ASCIZ  'DH11 MASTER CLEAR FAILED TO CLR SPECIFIED REG'
030600  051501  042524  020122
030606  046103  040505  020122
030614  040506  046111  042105
030622  052040  020117  046103
```

```
030630 020122 050123 041505
030636 043111 042511 020104
030644 042522 000107

                                ;INFORMATION FOR MESSAGE 4

030650 044514 042516 050040     EM4:    .ASCIZ  'LINE PARAMETER REGISTER ERROR'
030656 051101 046501 052105
030664 051105 051040 043505
030672 051511 042524 020122
030700 051105 047522 000122

                                ;INFORMATION FOR MESSAGE 5

030706 051102 040505 020113     EM5:    .ASCIZ  'BREAK CONTROL REGISTER ERROR'
030714 047503 052116 047522
030722 020114 042522 044507
030730 052123 051105 042440
030736 051122 051117    000

                                ;INFORMATION FOR MESSAGE 6

030743    123 046111 020117     EM6:    .ASCIZ  'SILO STATUS REGISTER ERROR'
030750 052123 052101 051525
030756 051040 043505 051511
030764 042524 020122 051105
030772 047522 000122

                                ;INFORMATION FOR MESSAGE 7

030776 052503 051122 047105     EM7:    .ASCIZ  'CURRENT ADDRESS REGISTER ERROR - LINE #XX'
031004 020124 042101 051104
031012 051505 020123 042522
031020 044507 052123 051105
031026 042440 051122 051117
031034 026440 046040 047111
031042 020105 054043 000130

                                ;INFORMATION FOR MESSAGE 10

031050 054502 042524 041440     EM10:   .ASCIZ  'BYTE COUNTER REGISTER ERROR - LINE #XX'
031056 052517 052116 051105
031064 051040 043505 051511
031072 042524 020122 051105
031100 047522 020122 020055
031106 044514 042516 021440
031114 054130    000

                                ;INFORMATION FOR MESSAGE 11

031117    125 042516 050130     EM11:   .ASCIZ  'UNEXPECTED DH11 RCVR INTERRUPT'
031124 041505 042524 020104
031132 044104 030461 051040
031140 053103 020122 047111
031146 042524 051122 050125
031154 000124
```

```

                                        ;INFORMATION FOR MESSAGE 12

 031156  047125  054105  042520  EM12:   .ASCIZ  'UNEXPECTED DH11 XMITTR INTERRUPT'
 031164  052103  042105  042040
 031172  030510  020061  046530
 031200  052111  051124  044440
 031206  052116  051105  052522
 031214  052120     000

                                        ;INFORMATION FOR MESSAGE 13

 031217     103  040510  020122  EM13:   .ASCIZ  'CHAR AVAILABLE FAILED TO GENERATE RCVR INTERRUPT'
 031224  053101  044501  040514
 031232  046102  020105  040506
 031240  046111  042105  052040
 031246  020117  042507  042516
 031254  040522  042524  051040
 031262  053103  020122  047111
 031270  042524  051122  050125
 031276  000124

                                        ;INFORMATION FOR MESSAGE 14

 031300  051124  047101  046523  EM14:   .ASCIZ  'TRANSMITTER NPR LOGIC ERROR - LINE #  '
 031306  052111  042524  020122
 031314  050116  020122  047514
 031322  044507  020103  051105
 031330  047522  020122  020055
 031336  044514  042516  021440
 031344  020040     000

                                        ;INFORMATION FOR MESSAGE 15

 031347     130  044515  052124  EM15:   .ASCIZ  'XMITTR FAILED TO INTERRUPT - LINE #  '
 031354  020122  040506  046111
 031362  042105  052040  020117
 031370  047111  042524  051122
 031376  050125  020124  020055
 031404  044514  042516  021440
 031412  020040     000

                                        ;INFORMATION FOR MESSAGE 16

 031415     122  053103  020122  EM16:   .ASCIZ  'RCVR FAILED TO INTERRUPT'
 031422  040506  046111  042105
 031430  052040  020117  047111
 031436  042524  051122  050125
 031444  000124

                                        ;INFORMATION FOR MESSAGE 17

 031446  051124  047101  046523  EM17:   .ASCIZ  'TRANSMITTER TIMING ERROR - LINE #  '
 031454  052111  042524  020122
 031462  044524  044515  043516
 031470  042440  051122  051117
```

```
031476  026440  046040  047111
031504  020105  020043  000040
031512  024040  041520  020051   DH6:    .ASCIZ  ' (PC)    (PS)    (SP)    TEST   DEVADR  SPEED   TIMEB   TIMEC'
031520  020040  024040  051520
031526  020051  020040  024040
031534  050123  020051  020040
031542  052040  051505  020124
031550  020040  042504  040526
031556  051104  020040  050123
031564  042505  020104  020040
031572  044524  042515  020102
031600  020040  044524  042515
031606  000103


                                 ;INFORMATION FOR MESSAGE 20

031610  042522  042503  053111   EM20:   .ASCIZ  'RECEIVER TIMING ERROR - LINE #  '
031616  051105  052040  046511
031624  047111  020107  051105
031632  047522  020122  020055
031640  044514  042516  021440
031646  020040     000


                                 ;INFORMATION FOR MESSAGE 21

031651     122  053103  020122   EM21:   .ASCIZ  'RCVR FAILED TO INTERRUPT - LINE #  '
031656  040506  046111  042105
031664  052040  020117  047111
031672  042524  051122  050125
031700  020124  020055  044514
031706  042516  021440  020040
031714     000


                                 ;INFORMATION FOR MESSAGE 22

031715     103  040510  020122   EM22:   .ASCIZ  'CHAR AVAIL FAILED TO SET ON TIME - LINE #  '
031722  053101  044501  020114
031730  040506  046111  042105
031736  052040  020117  042523
031744  020124  047117  052040
031752  046511  020105  020055
031760  044514  042516  021440
031766  020040     000


                                 ;INFORMATION FOR MESSAGE 23

031771     102  051501  041511   EM23:   .ASCIZ  'BASIC DATA TEST ERROR - LINE #  '
031776  042040  052101  020101
032004  042524  052123  042440
032012  051122  051117  026440
032020  046040  047111  020105
032026  020043  000040
032032  024040  041520  020051   DH7:    .ASCIZ  ' (PC)    (PS)    (SP)    TEST   DEVADR  CHRLNG   WAS      S/B'
032040  020040  024040  051520
032046  020051  020040  024040
032054  050123  020051  020040
```

```
032062  052040  051505  020124
032070  020040  042504  040526
032076  051104  020040  044103
032104  046122  043516  020040
032112  053440  051501  020040
032120  020040  051440  041057
032126     000

                                ;INFORMATION FOR MESSAGE 24

032127     101  052125  020117  EM24:   .ASCIZ  'AUTO ECHO TEST ERROR - LINE #  '
032134  041505  047510  052040
032142  051505  020124  051105
032150  047522  020122  020055
032156  044514  042516  021440
032164  020040     000

                                ;INFORMATION FOR MESSAGE 25

032167     102  042522  045501  EM25:   .ASCIZ  'BREAK BIT TEST ERROR - LINE #  '
032174  041040  052111  052040
032202  051505  020124  051105
032210  047522  020122  020055
032216  044514  042516  021440
032224  020040     000

                                ;INFORMATION FOR MESSAGE 26

032227     110  046101  026506  EM26:   .ASCIZ  'HALF-DUPLEX TEST ERROR - LINE #  '
032234  052504  046120  054105
032242  052040  051505  020124
032250  051105  047522  020122
032256  020055  044514  042516
032264  021440  020040     000

                                ;INFORMATION FOR MESSAGE 27

032271     125  042516  050130  EM27:   .ASCIZ  'UNEXPECTED BUS ERROR TRAP'
032276  041505  042524  020104
032304  052502  020123  051105
032312  047522  020122  051124
032320  050101     000
032323     040  050050  024503  DH3:    .ASCIZ  ' (PC)    (PS)    (SP)    TEST   TRPPC   TRPPS '
032330  020040  020040  050050
032336  024523  020040  020040
032344  051450  024520  020040
032352  020040  042524  052123
032360  020040  052040  050122
032366  041520  020040  052040
032374  050122  051520  000040
                                .EVEN
032402  001116  001202  001176  DT3:    .WORD   $ERRPC,$TMPC,$REG6,$REG0,$REG1,$REG2,0
032410  001162  001164  001166
032416  000000

                                ;INFORMATION   FOR MESSAGE 30
```

```
 032420  047125  054105  042520  EM30:   .ASCIZ  'UNEXPECTED RSVD INSTR TRAP'
 032426  052103  042105  051040
 032434  053123  020104  047111
 032442  052123  020122  051124
 032450  050101     000

                                 ;INFORMATION FOR MESSAGE 31

 032453     101  052125  020117  EM31:   .ASCIZ  'AUTO ECHO DATA COMPARE ERROR - LINE #  '
 032460  041505  047510  042040
 032466  052101  020101  047503
 032474  050115  051101  020105
 032502  051105  047522  020122
 032510  020055  044514  042516
 032516  021440  020040     000
 032523     040  050050  024503  DH4:    .ASCIZ  ' (PC)    (PS)    (SP)    TEST   WASADR  SBADR    WAS     S/B'
 032530  020040  020040  050050
 032536  024523  020040  020040
 032544  051450  024520  020040
 032552  020040  042524  052123
 032560  020040  053440  051501
 032566  042101  020122  051440
 032574  040502  051104  020040
 032602  020040  040527  020123
 032610  020040  020040  027523
 032616  000102

                                 ;INFORMATION FOR MESSAGE 32

 032620  052501  047524  042440  EM32:   .ASCIZ  'AUTO ECHO TEST TIMEOUT - LINE #  '
 032626  044103  020117  042524
 032634  052123  052040  046511
 032642  047505  052125  026440
 032650  046040  047111  020105
 032656  020043  000040
 032662  024040  041520  020051  DH5:    .ASCIZ  ' (PC)   (LPRG)   TEST'
 032670  020040  046050  051120
 032676  024507  020040  052040
 032704  051505  000124
                                 .EVEN
 032710  001116  001202  001206  DT4:    .WORD   $ERRPC,$TMP0,$TMP2,0
 032716  000000

                                 ;INFORMATION FOR MESSAGE 33

 032720  040520  044522  054524  EM33:   .ASCIZ  'PARITY LOGIC TEST ERROR - LINE #  '
 032726  046040  043517  041511
 032734  052040  051505  020124
 032742  051105  047522  020122
 032750  020055  044514  042516
 032756  021440  020040     000

                                 ;INFORMATION FOR MESSAGE 34

 032763     115  046125  044524  EM34:   .ASCIZ  'MULTI-LINE PARITY DATA TEST ERROR - LINE #   - SUBTEST #  '
```

```
032770  046055  047111  020105
032776  040520  044522  054524
033004  042040  052101  020101
033012  042524  052123  042440
033020  051122  051117  026440
033026  046040  047111  020105
033034  020043  020040  020055
033042  052523  052102  051505
033050  020124  020043  000040

                                ;INFORMATION FOR MESSAGE 35

033056  052515  052114  026511  EM35:   .ASCIZ  'MULTI-LINE PARITY DATA TEST TIMEOUT'
033064  044514  042516  050040
033072  051101  052111  020131
033100  040504  040524  052040
033106  051505  020124  044524
033114  042515  052517  000124
033122  024040  041520  020051  DH14:   .ASCIZ  ' (PC)   (LPRG)  ACTLIN'
033130  020040  046050  051120
033136  024507  020040  041501
033144  046124  047111     000
        033152                  .EVEN
033152  001116  001202  001210  DT6:    .WORD   $ERRPC,$TMP0,$TMP3,0
033160  000000

                                ;INFORMATION FOR MESSAGE 36

033162  044103  051101  040440  EM36:   .ASCIZ  'CHAR AVAILABLE TIMEOUT'
033170  040526  046111  041101
033176  042514  052040  046511
033204  047505  052125     000

                                ;INFORMATION FOR MESSAGE 37

033211     104  052101  020101  EM37:   .ASCIZ  'DATA COMPARE ERROR - LINE #  '
033216  047503  050115  051101
033224  020105  051105  047522
033232  020122  020055  044514
033240  042516  021440  020040
033246     000

                                ;INFORMATION FOR MESSAGE 40

033247     102  043125  042506  EM40:   .ASCIZ  'BUFFER ACTIVE REG ERROR - LINE #  '
033254  020122  041501  044524
033262  042526  051040  043505
033270  042440  051122  051117
033276  026440  046040  047111
033304  020105  020043  000040

                                ;INFORMATION FOR MESSAGE 41

033312  041522  051126  043040  EM41:   .ASCIZ  'RCVR FALSE INTERRUPT'
033320  046101  042523  044440
033326  052116  051105  052522
```

```
 033334  052120     000

                                      ;INFORMATION FOR MESSAGE 42

 033337     123  046111  020117      EM42:   .ASCIZ  'SILO OVERFLOW ERROR'
 033344  053117  051105  046106
 033352  053517  042440  051122
 033360  051117     000

                                      ;INFORMATION FOR MESSAGE 43

 033363     123  046111  020117      EM43:   .ASCIZ  'SILO OVERFLOW FAILED TO GENERATE RCVR INTERRUPT'
 033370  053117  051105  046106
 033376  053517  043040  044501
 033404  042514  020104  047524
 033412  043440  047105  051105
 033420  052101  020105  041522
 033426  051126  044440  052116
 033434  051105  052522  052120
 033442     000

                                      ;INFORMATION FOR MESSAGE 44

 033443     116  047117  042440      EM44:   .ASCIZ  'NON EX MEMORY FAILED TO GENERATE XMITTR INTERRUPT'
 033450  020130  042515  047515
 033456  054522  043040  044501
 033464  042514  020104  047524
 033472  043440  047105  051105
 033500  052101  020105  046530
 033506  052111  051124  044440
 033514  052116  051105  052522
 033522  052120     000

                                      ;INFORMATION FOR MESSAGE 45

 033525     130  044515  020124      EM45:   .ASCIZ  'XMIT DONE FAILED TO GENERATE XMITTR INTERRUPT'
 033532  047504  042516  043040
 033540  044501  042514  020104
 033546  047524  043440  047105
 033554  051105  052101  020105
 033562  046530  052111  051124
 033570  044440  052116  051105
 033576  052522  052120     000

                                      ;INFORMATION FOR MESSAGE 46

 033603     103  051125  042522      EM46:   .ASCIZ  'CURRENT ADDRESS MEMORY PATTERNS TEST ERROR - LINE #  '
 033610  052116  040440  042104
 033616  042522  051523  046440
 033624  046505  051117  020131
 033632  040520  052124  051105
 033640  051516  052040  051505
 033646  020124  051105  047522
 033654  020122  020055  044514
 033662  042516  021440  020040
 033670     000
```

```
033671     040  050050  024503  DH10:   .ASCIZ  ' (PC)   LINEWR  PATTRN   TEST   DEVADR  REGADR   WAS     S/B'
033676  020040  046040  047111
033704  053505  020122  050040
033712  052101  051124  020116
033720  020040  042524  052123
033726  020040  042040  053105
033734  042101  020122  051040
033742  043505  042101  020122
033750  020040  040527  020123
033756  020040  020040  027523
033764  000102
                                .EVEN
033766  001116  001202  001204  DT5:    .WORD   $ERRPC,$TMP0,$TMP1,$REG0,$REG1,$REG2,$REG3,$REG4,0
033774  001162  001164  001166
034002  001170  001172  000000

                                ;INFORMATION FOR MESSAGE 47

034010  054502  042524  041440  EM47:   .ASCIZ  'BYTE COUNT MEMORY PATTERNS TEST ERROR - LINE #  '
034016  052517  052116  046440
034024  046505  051117  020131
034032  040520  052124  051105
034040  051516  052040  051505
034046  020124  051105  047522
034054  020122  020055  044514
034062  042516  021440  020040
034070     000

                                ;INFORMATION FOR MESSAGE 50

034071     124  051505  020124  EM50:   .ASCIZ  'TEST TIMEOUT WAITING FOR XMIT DONE - LINE #  '
034076  044524  042515  052517
034104  020124  040527  052111
034112  047111  020107  047506
034120  020122  046530  052111
034126  042040  047117  020105
034134  020055  044514  042516
034142  021440  020040     000

                                ;INFORMATION FOR MESSAGE 51

034147     116  051120  046040  EM51:   .ASCIZ  'NPR LOGIC TEST 2 ERROR'
034154  043517  041511  052040
034162  051505  020124  020062
034170  051105  047522  000122
034176  024040  041520  020051  DH11:   .ASCIZ  ' (PC)   LINACT  LINCHK   TEST   DEVADR  REGADR   WAS     S/B'
034204  020040  044514  040516
034212  052103  020040  044514
034220  041516  045510  020040
034226  052040  051505  020124
034234  020040  042504  040526
034242  051104  020040  042522
034250  040507  051104  020040
034256  053440  051501  020040
034264  020040  051440  041057
034272     000
```

```
                                        ;INFORMATION FOR MESSAGE 52

034273     102  051501  041511          EM52:   .ASCIZ  'BASIC DATA COMPARE ERROR'
034300  042040  05[illegible]01  020101
034306  047503  050115  051101
034314  020105  051105  047522
034322  000122

                                        ;INFORMATION FOR MESSAGE 53

034324  024040  041520  020051          DH12:   .ASCIZ  ' (PC)   SPEED   (SP)   TEST  DEVADR REGADR  WAS   S/B'
034332  020040  050123  042505
034340  020104  020040  024040
034346  050123  020051  020040
034354  052040  051505  020124
034362  020040  042504  040526
034370  051104  020040  042522
034376  040507  051104  020040
034404  053440  051501  020040
034412  020040  051440  041057
034420     000

                                        ;INFORMATION FOR MESSAGE 55

034421     040  050050  024503          DH13:   .ASCIZ  ' (PC)    (PS)    (SP)   TEST  DEVADR CHRLNG  SCRWAS  SCRS/B'
034426  020040  020040  050050
034434  024523  020040  020040
034442  051450  024520  020040
034450  020040  042524  052123
034456  020040  042040  053105
034464  042101  020122  041440
034472  051110  047114  020107
034500  051440  051103  040527
034506  020123  051440  051103
034514  027523  000102

                                        ;INFORMATIOPN FOR MESSAGE 56

034520  053117  051105  052522          EM56:   .ASCIZ  'OVERRUN BIT FAILED TO SET - LINE #  '
034526  020116  044502  020124
034534  040506  046111  042105
034542  052040  020117  042523
034550  020124  020055  044514
034556  042516  021440  020040
034564     000

                                        ;INFORMATION FOR MESSAGE 57

034565     123  047524  040522          EM57:   .ASCIZ  'STORAGE OVERFLOW BIT FAILED - LINE #  '
034572  042507  047440  042526
034600  043122  047514  020127
034606  044502  020124  040506
034614  046111  042105  026440
034622  046040  047111  020105
034630  020043  000040
                                        .EVEN
```

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                                                ;MISCELLANEOUS MESSAGES

034634  005015  040515  047111  TITLE:  .ASCIZ  <15><12>'MAINDEC-11-DZDHM-B  DH11 DIAGNOSTIC'<15><12>
034642  042504  026503  030461
034650  042055  042132  046510
034656  041055  020040  044104
034664  030461  042040  040511
034672  047107  051517  044524
034700  006503  000012
034704  005015  042524  052123  TITLE2: .ASCIZ  <15><12>'TESTING DH11 #  '<15><12>
034712  047111  020107  044104
034720  030461  021440  020040
034726  005015     000
034731     015  052012  050131  INMSG1: .ASCIZ  <15><12>'TYPE SCR ADDRESS FOR FIRST DH11'<15><12>
034736  020105  041523  020122
034744  042101  051104  051505
034752  020123  047506  020122
034760  044506  051522  020124
034766  044104  030461  005015
034774     000
034775     015  052012  050131  INMSG2: .ASCIZ  <15><12>'TYPE VECTOR ADDRESS FOR FIRST DH11'<15><12>
035002  020105  042526  052103
035010  051117  040440  042104
035016  042522  051523  043040
035024  051117  043040  051111
035032  052123  042040  030510
035040  006461  000012
035044  005015  054524  042520  INMSG3: .ASCIZ  <15><12>'TYPE DH11 DEVICE SELECTION PARAMETER'<15><12>
035052  042040  030510  020061
035060  042504  044526  042503
035066  051440  046105  041505
035074  044524  047117  050040
035102  051101  046501  052105
035110  051105  005015     000
035115     015  044412  053116  INMSG4: .ASCIZ  <15><12>'INVALID DH11 SCR ADDRESS - TRY AGAIN'<15><12>
035122  046101  042111  042040
035130  030510  020061  041523
035136  020122  042101  051104
035144  051505  020123  020055
035152  051124  020131  043501
035160  044501  006516  000012
035166  005015  047111  040526  INMSG5: .ASCIZ  <15><12>'INVALID DH11 VECTOR ADDRESS - TRY AGAIN'<15><12>
035174  044514  020104  044104
035202  030461  053040  041505
035210  047524  020122  042101
035216  051104  051505  020123
035224  020055  051124  020131
035232  043501  044501  006516
035240  000012
035242  005015  054524  042520  INMSG6: .ASCIZ  <15><12>'TYPE LINE SELECTION PARAMETER'<15><12>
035250  046040  047111  020105
035256  042523  042514  052103
035264  047511  020116  040520
035272  040522  042515  042524
035300  006522  000012
035304  005015  042504  051120  INMSG7: .ASCIZ  <15><12>'DEPRESS "CONTINUE" TO START TESTING'<15><12>
```

```
035312  051505  020123  041442
035320  047117  044524  052516
035326  021105  052040  020117
035334  052123  051101  020124
035342  042524  052123  047111
035350  006507  000012

035354  005015  054524  042520  VCWC:   .ASCIZ  <15><12>'TYPE NO. OF ADDRESSES (OCTAL) BETWEEN VECTORS (10 OR 20)'<15><1
035362  047040  027117  047440
035370  020106  042101  051104
035376  051505  042523  020123
035404  047450  052103  046101
035412  020051  042502  053524
035420  042505  020116  042526
035426  052103  051117  020123
035434  030450  020060  051117
035442  031040  024460  005015
035450     000
035451     116  020117  044104  MSG1:   .ASCIZ  /NO DH11'S WERE FOUND./<15><12>
035456  030461  051447  053440
035464  051105  020105  047506
035472  047125  027104  005015
035500     000
035501     116  020117  044104  MSG2:   .ASCIZ  'NO DH RECEIVER INTERRUPT OCCURRED.'<15><12>
035506  051040  041505  044505
035514  042526  020122  047111
035522  042524  051122  050125
035530  020124  041517  052503
035536  051122  042105  006456
035544  000012
035546  047516  042040  030515  MSG3:   .ASCIZ  'NO DM11-BB INTERRUPT OCCURRED.'<15><12>
035554  026461  041102  044440
035562  052116  051105  052522
035570  052120  047440  041503
035576  051125  042522  027104
035604  005015     000
035607     040  020040     000  SPACE:  .ASCIZ  '   '
035613     015  042012  030510  DEVMAP: .ASCII  <15><12>'DH11, DM11-BB DEVICE MAP:'<15><12>
035620  026061  042040  030515
035626  026461  041102  042040
035634  053105  041511  020105
035642  040515  035120  005015
035650  005015  044104  030461          .ASCII  <15><12>'DH11   DH11   DM11-BB   DM11-BB'
035656  020040  042040  030510
035664  020061  020040  046504
035672  030461  041055  020102
035700  020040  046504  030461
035706  041055     102
035711     015  040412  051104          .ASCIZ  <15><12>'ADRS   VECT    ADRS      VECT'<15><12><15><12>
035716  020123  020040  042526
035724  052103  020040  020040
035732  042101  051522  020040
035740  020040  020040  042526
035746  052103  005015  005015
035754     000
035755     015  042012  030515  MSG4:   .ASCIZ  <15><12>'DM11-BB ERROR, RUN DZDHK DIAGNOSTIC'<15><12>
```

```
036762  026461  041102  042440
035770  051122  051117  020054
035776  052522  020116  055104
036004  044104  020113  044504
036012  043501  047516  052123
036020  041511  005015     000
036025     015  047012  020117   MSG5:   .ASCIZ  <15><12>/NO DM11-BB FOUND/<15><12>
036032  046504  030461  041055
036040  020102  047506  047125
036046  006504  000012
                                 .EVEN
                                 ;SIXTEEN CHAR COUNTERS USED BY THE AUTO ECHO TEST #3

036052  000020                   RCNT:   .BLKW   16.

                                 ;256. WORD RECEIVER INPUT BUFFER

036112  000400                   RBUF:   .BLKW   256.


                                 ;256(10) BYTE TRANSMITTER OUTPUT DATA BUFFER

                                 .EVEN
037112  000400                   TBUF:   .BLKB   256.

        000001                   .END
```

```
ABASE = 000000      258     299
ACDW1 = 000000      258     301
ACDW2 = 000000      258     302
ACPUOP= 000000      258     273
ADDW0 = 000000      258     303
ADDW1 = 000000      258     304
ADDW10= 000000      258     313
ADDW11= 000000      258     314
ADDW12= 000000      258     315
ADDW13= 000000      258     316
ADDW14= 000000      258     317
ADDW15= 000000      258     318
ADDW2 = 000000      258     305
ADDW3 = 000000      258     306
ADDW4 = 000000      258     307
ADDW5 = 000000      258     308
ADDW6 = 000000      258     309
ADDW7 = 000000      258     310
ADDW8 = 000000      258     311
ADDW9 = 000000      258     312
ADEVCT= 000000      258     264
ADEVM = 000000      258     300
ADPTR   030216      752*    759*    767     5456*   7201#
ADRVEC  030176      741     6589*   7190#
AENV  = 000000      258     269
AENVM = 000000      258     270
AETAB   027310     4532    4639    4767    4807    4811    4812    6931#
AETABO  027350     4602    6951#
AFATAL= 000000      258     261
AMADR1= 000000      258     286
AMADR2= 000000      258     290
AMADR3= 000000      258     293
AMADR4= 000000      258     296
AMAMS1= 000000      258     280
AMAMS2= 000000      258     288
AMAMS3= 000000      258     291
AMAMS4= 000000      258     294
AMSGAD= 000000      258     266
AMSGLG= 000000      258     267
AMSGTY= 000000      258     260
AMTYP1= 000000      258     281
AMTYP2= 000000      258     289
AMTYP3= 000000      258     292
AMTYP4= 000000      258     295
APASS = 000000      258     263
APRIOR= 000000      258
APTCSU= 000040     5840    5945#
APTENV= 000001     5596    5833    5901    5943#
APTSIZ= 000200      710    5942#
APTSPO= 000100     5835    5903    5944#
ASWREG= 000000      258     271
ATESTN= 000000      258     262
AUNIT = 000000      258     265
AUSWR = 000000      258     272
AUTOSZ  025076      736    6428#
AVECT1= 000000      258     297
```

```
AVECT2= 000000     258     298
BAR    = 000012    3065*   3096    3100    3202*   3686*   3779*   3893*   4015*   4135*   4188    4280*   4371*   4439
                   4445    4553*   4665*   4780*   4908*   4940*   4944    4953    5058*   5062    5069    5071    5153*
                   6879#
BCR    = 000010    1895    2051    2215    23[illegible]   3063*   3119    3124    3227    3238    3683*   3776*   3891*   4011*
                   4131*   4202    4277*   4547*   4660*   4770*   4906*   4937*   5056*   5151*   6381*   6393*   6408*
                   6826*   6878#
BEGIN    002146      47    669#
BEGINA   002150    670#    6645    6648
BIT0   = 000001    179#     734     739    6651    6662    6675    6686    6714    6744
BIT00 = 000001     169#     179    6971
BIT01 = 000002     168#     178    6972
BIT02 = 000004     167#     177    6973
BIT03 = 000010     166#     176    6974
BIT04 = 000020     165#     175    6975
BIT05 = 000040     164#     174    6976
BIT06 = 000100     163#     173    2692    3330    6977
BIT07 = 000200     162#     172    2693    3078    3702    3796    6978
BIT08 = 000400     161#     171    5535    6979
BIT09 = 001000     160#     170    1125    1127    1136    1139    1150    2691    2771    2851    2929    4134    5543
                   5607    6980
BIT1   = 000002    178#    6590
BIT10 = 002000     159#    2853    5222    6981
BIT11 = 004000     158#     903    2603    2688    2768    2848    2926    3061    3130    3197    3328    3420    3483
                   3572    3681    3774    3887    4009    4128    4270    4361    4388    4395    4415    4446    4460
                   4531    4654    4765    4901    4934    5052    5148    5550    6982
BIT12 = 010000     157#    2773    6983
BIT13 = 020000     156#    2852    2930    3066    5591    6984
BIT14 = 040000     155#    2772    3897    3903    3919    4392    5179    5521    6985
BIT15 = 100000     154#    2931    3214    3329    3423    3427    3488    3491    3576    3580    3704    3796    4567
                   4596    4727    4824    5086    5166    5179    6986
BIT2   = 000004    177#
BIT3   = 000010    176#
BIT4   = 000020    175#
BIT5   = 000040    174#
BIT6   = 000100    173#    3618
BIT7   = 000200    172#
BIT8   = 000400    171#    6696
BIT9   = 001000    170#
BKR    = 000014    894     1300    1407*   1541    1643*   2516*   4279*   4939*   6880#
BPTVEC= 000014     186#
BRKTAB   027512    4887    7000#
BRLVL    027672    754     7072#
BRPTR    030222    754*     761*    769    5458*   7203#
BUSER    026566    725     6766#
CAR    = 000006    1753    1979    2127    2300    2500*   2510*   2517    3107    3113    3243    3254    3684*   3777*
                   3890*   4012*   4130*   4216    4278*   4548*   4549*   4658*   4659*   4769*   4905*   4936*   5055*
                   5150*   6380*   6407*   6825*   6877#
CHKADR   026340    6658    6704#
CHKVCT   026454    6669    6734#
CHPS1    027076    2606    2694    2774    2854    2932    3067    3136    3331    3367    4374    4378    6776    6789
                   6844#
CHPS2    027112    2602    2690    2770    2850    2928    3060    3326    4365    6852#
CKSWR = 104407     5518    5583    5606    6205#
CLCABC   024654    3059    3198    4545    4902    5053    6378#
CLRMUX= 002000     5243    7216#
```

L07


```
CO      = 000100        5312    7214#
CR      = 000015          94#   5879    5889
CRLF    = 000200          95#   5850    5889
CS      = 000040        5312    7213#
DDISP   = 177570         101#    222     698
DEVMAP    035613        6593    7884#
DHADR     027172         767*   4127    4186    4357    4653    5520    6340*   6883#
DHADRS    027732        6430    6438    6485    6501    6594    6650    6716    7091#
DHADTB    027570         752    6713    6727    7028#
DHMCSR    030200        5229*   5230    5232    5240*   5243*   5245*   5247*   5250    5261*   5265*   5299*   5303*   5305*
                        5308    5319*   5324*   5357*   5361*   5363*   5366    5377*   5382*   5415*   5419*   5421*   5424
                        5435*   5440*   7191#
DHMLSR    030202        5230*   5231*   5246*   5249    5267*   5270    5296*   5304*   5307    5325*   5328    5354*   5362*
                        5365    5383*   5386    5412*   5420*   5423    5441*   5444    7192#
DHNUM     030210         755*    758*    771    5226    5455*   7196#
DHRLVL    030206         769*   2590    2684    2764    2844    2922    3325    4368    7194#
DHSEL     027200         762    5461    6682*   6886#
DHTLVL    030207        2593    2687    2767    2847    2925    3051    7195#
DHVCT     027174         768*   2588    2682    2762    2842    2920    3048    3131    3323    3369    4366    6795    6884#
DHVCTB    027630         753    6743    6757    7048#
DHVEC     027774        6502    6583    6584    6586    6595    6661    6746    7112#
DH1       030317         341    7244#
DH10      033671         602     609    7679#
DH11      034176         623    7723#
DH12      034324         637     644    7745#
DH13      034421         651    7759#
DH14      033122         539    7585#
DH2       030452         348     355     362     369     376     383     390     397     404     411     418     425     432
                         453     460     475     482     489     525     560     581     588     595     616     630     658
                         665    7264#
DH3       032323         496     503    7497#
DH4       032523         510     532     553    7527#
DH5       032662         517     546     567     574    7547#
DH6       031512         439     446    7401#
DH7       032032         467    7451#
DISPLA    001142         222#    698*    706*   5565*   5586*
DISPRE    000174          43#    706
DMADRS    030034        5225    6437    6543    6596    7132#
DMVEC     030076        6544    6597    7153#
DOIT11    017574        5233    5237#   5272
DOIT15    017764        5296#   5330
DOIT16    020156        5354#   5388
DOIT17    020350        5412#   5446
DSWR    = 177570         100#    221     697
DT1       030376         342    7253#
DT2       030550         349     356     363     370     377     384     391     398     405     412     419     426     433
                         440     447     454     461     468     476     483     490     511     526     533     554     561
                         582     589     596     617     631     638     645     652     659     666    7276#
DT3       032402         497     504    7506#
DT4       032710         518     547     568     575    7552#
DT5       033766         603     610     624    7691#
DT6       033152         540    7590#
EMTVEC= 000030           189#    681*    682*
EM1       030250         340    7237#
EM10      031050         389    1925    2058    4212    7327#
EM11      031117         396    7337#
```

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EM12     031156        403    7346#
EM13     031217        410    7355#
EM14     031300        417    3142    7367#
EM15     031347        424    3082    7377#
EM16     031415        431    7387#
EM17     031446        438    3728    7395#
EM2      030414        347    7259#
EM20     031610        445    3820    7415#
EM21     031651        452    7424#
EM22     031715        459     643     650    3801    4033    4154    4298    7434#
EM23     031771        466    4048    7445#
EM24     032127        474    4573    4589    7465#
EM25     032167        481    4929    4959    4978    4995    7474#
EM26     032227        488    5076    5091    7483#
EM27     032271        495    7492#
EM3      030572        354    7282#
EM30     032420        502    7512#
EM31     032453        509    4703    4718    4817    7520#
EM32     032620        516    4678    7541#
EM33     032720        524    4312    7557#
EM34     032763        531    4422    4425    7566#
EM35     033056        538    7579#
EM36     033162        545    7595#
EM37     033211        552    4177    7602#
EM4      030650        361    7293#
EM40     033247        559    4198    7611#
EM41     033312        566    7620#
EM42     033337        573    7627#
EM43     033363        580    7634#
EM44     033443        587    7646#
EM45     033525        594    7658#
EM46     033603        601    2160    2332    7669#
EM47     034010        608    2248    2416    7697#
EM5      030706        368    7301#
EM50     034071        615     636    3220    3709    5171    7708#
EM51     034147        622    7719#
EM52     034273        629    7737#
EM56     034520        657    5192    7773#
EM57     034565        664    3910    3930    3944    7783#
EM6      030743        375    7309#
EM7      030776        382    1783    1986    2529    4226    7317#
ENDA     020540       5224    5236    5414    5453#   5462
ERRVEC=  000004        182#    695     696*    707*    725*    726*    822     823*    838*   5526    5527*   5529*   5532*
EXPAR    026334       6697    6701#
GNS    = ****** U       42    6197    6198    6199    6200    6201    6203    6205    6206    6207    6208
GTSWR  = 104406        721    6203#
HT     = 000011         92#   5848    5889
INMSG1   034731       6654    7804#
INMSG2   034775       6665    7811#
INMSG3   035044       6678    7818#
INMSG4   035115       6731    7825#
INMSG5   035166       6761    7832#
INMSG6   035242       6689    7840#
INMSG7   035304       6699    7846#
INPAR    026126        750    6650#
INPARA   026046        743    6629#   6638
```

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INPARC   026104       48     6644#
INPARX   026114       46     6647#
INPAR1   026162     6657     6661#
INPAR3   026216      749     6668     6672#
INPAR4   026254     6681     6684#
INTMSK   027566     2595     7023#
IOTVEC=  000020      187#     679*     680*    6503*    6504*    6545*    6571*
LDBCR    024716     3199     6391#
LDTBF1   024266      775     6261#
LF    =  000012       93#    5883     5889
LINACT   027450     4370*    4432*    4453     4459     4664*    4724*    4725     4779*    4825*    6836*    6988#
LINBIT   027410     4432     4724     4825     6971#
LINE     030212     1758     1762     1770     1774     1782     1790*    1900     1904     1912     1916     1924     1932*    1983
                    1985     2055     2057     2133     2151     2221     2239     2305     2323     2389     2407     2507     2520
                    3058     3062     3081     3141     3200     3215     3219     3228     3235     3244     3251     3682     3705
                    3708     3727     3775     3797     3800     3819     3889     3904     3909     3924     3929     3943     4010
                    4029     4032     4039     4047     4129     4150     4153     4167     4176     4197     4211     4225     4272
                    4274     4293     4297     4311     4546     4569     4572     4588     4601*    4657     4677     4687     4717
                    4903     4928     4935     4958     4977     4994     5054     5075     5087     5090     5149     5165     5170
                    5176     5191     5242     5301     5359     5417     5519*    6326     6328*    6330*    6332*    6339*    7197#
LINEA    030214     2133*    2142     2221*    2230     2305*    2314     2389*    2398     6307     7198#
LINENA=  000001     5246     5254     5304     5312     5322     5362     5370     5380     5420     5428     5438     7208#
LINMSK   027204     3065     3202     3686     3779     3893     4015     4135     4279     4280     4553     4664     4908     4939
                    4940     5058     5153     6329*    6333*    6335     6888#
LINSEL   027202     1754     1755*    1793*    1896     1897*    1935*    4364     4370     4371     4407     4540     4647     4665
                    4689     4779     4780     4804     4895     6335     6693*    6695*    6836     6887#
LMSK1    027206     4533*    4537*    4540     4640*    4644*    4647     4888*    4892*    4895     6889#
LPR   =  000004      895     1152*    1216     1396*    1463     1631*    2509*    3064*    3201*    3685*    3778*    3892*    4013*
                    4014*    4132*    4276*    4363     4552*    4564*    4583*    4596*    4661*    4675     4727*    4771*    4791
                    4824*    4907*    4938*    5057*    5152*    6409*    6827*    6876#
MSG1     035451     6487     7865#
MSG2     035501     6527     7870#
MSG3     035546     6556     7877#
MSG4     035755     5259     5274     5317     5332     5375     5390     5433     5448     7902#
MSG5     036025     5235     7909#
MSTCLR   027210      888      900     6891#
MULPTB   027452     4430*    6418     6420     6995#
MUX11    017602     5240#
MUX11A   017620     5243#
MUX11B   017650     5248#    5263
MUX11C   017676     5253     5256#
MUX11D   017710     5257     5261#
MUX11E   017724     5265#
MUX15    017776     5299#
MUX15A   020014     5302#
MUX15B   020036     5306#    5321
MUX15C   020064     5311     5314#
MUX15D   020076     5315     5319#
MUX15E   020114     5323#
MUX16    020170     5357#
MUX16A   020206     5360#
MUX16B   020230     5364#    5379
MUX16C   020256     5369     5372#
MUX16D   020270     5373     5377#
MUX16E   020306     5381#
MUX17    020362     5415#
```

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MUX17A   020400      5418#
MUX17B   020422      5422#   5437
MUX17C   020450      5427    5430#
MUX17D   020462      5431    5435#
MUX17E   020500      5439#
NRC    = 000002      3344    3350    3497    3914    3915    4037    4158    4302    4308    4399    4417    4578    4585
                     4669    4795    4813    4984    4991    5180    5188    6875#
PATRNA   027220      2128    2216    6894#
PATRNB   027230      2491    6899#
PC     =%000007       113#    736*    743*    775*    832*    907*    986*    995*   1050*   1134*   1146*   1158*   1232*
                     1241*   1316*   1325*   1403*   1414*   1481*   1492*   1559*   1570*   1638*   1650*   1756*   1768*
                     1780*   1898*   1910*   1922*   1980*   1994*   2004*   2052*   2066*   2076*   2131*   2157*   2219*
                     2245*   2303*   2329*   2387*   2413*   2505*   2526*   2602*   2606*   2610*   2612*   2617*   2619*
                     2625*   2690*   2694*   2697*   2702*   2706*   2711*   2715*   2770*   2774*   2777*   2782*   2786*
                     2791*   2795*   2850*   2854*   2857*   2862*   2866*   2871*   2875*   2928*   2932*   2935*   2940*
                     2944*   2949*   2953*   3052*   3059*   3060*   3067*   3072*   3076*   3079*   3089*   3091*   3092*
                     3099*   3102*   3103*   3111*   3114*   3115*   3122*   3125*   3126*   3136*   3143*   3195*   3198*
                     3199*   3208*   3212*   3217*   3239*   3255*   3326*   3331*   3336*   3339*   3349*   3351*   3361*
                     3363*   3367*   3438*   3510*   3587*   3588*   3589*   3596*   3599*   3600*   3610*   3677*   3692*
                     3706*   3719*   3725*   3770*   3785*   3798*   3811*   3817*   3885*   3899*   3902*   3907*   3922*
                     3927*   3937*   3941*   4004*   4021*   4025*   4030*   4045*   4123*   4141*   4145*   4151*   4174*
                     4192*   4195*   4206*   4209*   4220*   4223*   4268*   4286*   4290*   4295*   4306*   4309*   4362*
                     4365*   4374*   4378*   4379*   4414*   4419*   4441*   4455*   4542*   4545*   4559*   4563*   4570*
                     4582*   4596*   4649*   4655*   4671*   4695*   4700*   4711*   4715*   4787*   4810*   4814*   4897*
                     4902*   4914*   4918*   4926*   4946*   4950*   4956*   4967*   4975*   4989*   4992*   5050*   5053*
                     5064*   5068*   5073*   5083*   5088*   5146*   5159*   5162*   5168*   5186*   5189*   5237*   5297*
                     5355*   5413*   5479*   5482*   5492*   5497    5593*   5599*   5656*   5838*   5857*   5964*   5971*
                     5885*   5887*   5920*   5937*   6000*   6245    6267*   6272*   6279*   6284*   6293*   6301*   6314*
                     6341*   6386*   6398*   6423*   6624*   6640*   6658*   6669*   6732*   6762*   6772*   6776*   6785*
                     6789*   6802*   6815*   6838*   6847*   6855*   6869*
PIRQ   = 177772        99#
PIRQVE = 000240       193#
PRIYTB   027250      4350    4354    6911#
PR0    = 000000       116#
PR1    = 000040       117#
PR2    = 000100       118#
PR3    = 000140       119#
PR4    = 000200       120#
PR5    = 000240       121#
PR6    = 000300       122#
PR7    = 000340       123#
PS     = 177776        96#     97    5241*   5300*   5358*   5416*   6519*   6549*
PSW    = 177776        97#
PWRVEC = 000024       188#    685*    686*   6213*   6214*   6223*   6229*   6241*   6242*
RBUF     036112      4133    4159    4163    4183    4411    4416    4418    4429*   4692    4697    4698    4722*   6410*
                     6411*   6828*   6829*   7920#
RCNT     036052      4768    4806*   4821    7916#
RDCHR  = 104410      6060    6206#
RDLIN  = 104411      6132    6207#
RDOCT  = 104412      6208#   6631    6655    6666    6679    6690
RESERR   026642       727    6779#
RESTRP   026716      2625    2715    2795    2875    2953    4379    6795#
RESTRT   002662       758#    766
RESTI    002720       764#   6777    6790
RESVEC = 000010       183#    727*    728*
RGMSK1   027552       971    7017#
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RGMSK2  027554        1037   7018#
RGMSK3  027556        1218   1465   1471   1475   7019#
RGMSK4  027560        1302   1543   1549   1552   7020#
RGMSK5  027562        1388   1621   1627   1630   7021#
RGMSK6  027564        1118   7022#
RING  = 000200        5370   7215#
RS    = 000004        5362   5370   5383   7210#
RSTRTA  002730         763    767#  5464   6246
R0     =%000000        104#   669*   741*   745    747   5225*  5228*  5229   5489*  5492   5628   5629*  5630*
                      5637*  5638*  5639*  5640*  5641*  5642   5647   5652*  5654*  5658   5660   5756   5766*
                      5770   5786   5787   5800*  5831   5832*  5837   5842   5845*  5897   5905*  5909   5910
                      5912*  5913*  5914   5936*  6129   6133*  6134   6137   6157*  6160*  6174   6175*  6176
                      6177*  6178*  6179*  6180*  6215   6240*  6273*  6274   6285*  6286   6298   6308*  6309
                      6354   6357*  6359*  6360   6367*  6368*  6369   6372*  6428   6491*  6492*  6493*  6497
                      6523*  6525*  6552*  6554*  6572*  6632*  6634   6636   6639*  6644*  6673   6684   6756
                      6770*  6783*
R1     =%000001        105#   819    889    890    891    892    903*   968    980*   990*  1035   1045*  1116
                      1128*  1140*  1152*  1215   1226*  1236*  1299   1310*  1320*  1385   1396*  1407*  1462
                      1473*  1486*  1540   1553*  1564*  1618   1631*  1643*  1752   1762*  1763*  1774*  1775*
                      1894   1904*  1905*  1916*  1917*  1978   1983*  1988*  1999*  2050   2055*  2060*  2071*
                      2126   2136*  2142*  2143*  2148*  2149*  2214   2224*  2230*  2231*  2236*  2237*  2299
                      2308*  2314*  2315*  2320*  2321*  2383   2392*  2398*  2399*  2404*  2405*  2489   2497*
                      2498*  2499*  2500*  2507*  2508*  2509*  2510*  2514*  2515*  2516*  2517   2587   2603*
                      2605*  2611   2618   2681   2688*  2691*  2692*  2693*  2698   2699*  2700*  2707   2709*
                      2710*  2761   2768*  2771*  2772*  2773*  2778   2779*  2780*  2787   2789*  2790*  2841
                      2848*  2851*  2852*  2853*  2858   2859*  2860*  2867   2869*  2870*  2919   2926*  2929*
                      2930*  2931*  2936   2937*  2938*  2945   2947*  2948*  3056   3061*  3062*  3063*  3064*
                      3065*  3066*  3077   3086   3090   3096   3107   3119   3130*  3197*  3200*  3201*  3202*
                      3206   3213   3216   3225*  3227   3237   3243   3253   3328*  3329*  3330*  3337   3343
                      3344   3368*  3417   3420*  3480   3483*  3497   3569   3572*  3582   3681*  3682*  3683*
                      3684*  3685*  3686*  3690   3701   3703   3774*  3775*  3776*  3777*  3778*  3779*  3793
                      3794   3795   3887*  3888   3889*  3890*  3891*  3892*  3893*  3897   3905   3914   3915
                      3919   3925   3934   3940   4009*  4010*  4011*  4012*  4013*  4014*  4015*  4019   4026
                      4037   4127*  4128*  4129*  4130*  4131*  4132*  4134*  4135*  4139   4146   4158   4163*
                      4170   4182*  4183   4186*  4187   4201   4215   4270*  4274*  4276*  4277*  4278*  4279*
                      4280*  4284   4291   4294   4302   4307   4357*  4361*  4363   4369*  4371*  4385   4388*
                      4392   4395*  4399   4415*  4417*  4439   4445   4446*  4460*  4531*  4546*  4547*  4548*
                      4549*  4552*  4553*  4557   4564*  4565   4566   4578   4583*  4584   4596*  4653*  4654*
                      4657*  4658*  4659*  4660*  4661*  4665*  4669   4675   4699*  4714*  4727*  4728   4765*
                      4769*  4770*  4771*  4774*  4780*  4785   4791   4795   4813*  4823*  4824*  4901*  4903*
                      4905*  4906*  4907*  4908*  4912   4920   4934*  4935*  4936*  4937*  4938*  4939*  4940*
                      4944   4952   4964   4969   4984   4990   5052*  5054*  5055*  5056*  5057*  5058*  5062
                      5069   5070   5080   5084   5085   5148*  5149*  5150*  5151*  5152*  5153*  5157   5163
                      5167   5180   5187   5242*  5245   5252   5265   5266   5301*  5303   5310   5323   5324
                      5359*  5361   5368   5381   5382   5417*  5419   5426   5439   5440   5520*  5757   5770*
                      5771   5775   5799*  5898   5935*  6130   6135*  6143*  6145*  6147*  6150*  6153   6156*
                      6216   6239*  6261*  6263*  6275   6287   6299   6310   6355   6358*  6366*  6369*  6371*
                      6379*  6380*  6381*  6385*  6392*  6393*  6397*  6403*  6407*  6408*  6409*  6412*  6422*
                      6440*  6442   6443   6444*  6446*  6447*  6448   6451*  6453   6457*  6458   6461   6463*
                      6472*  6473   6474   6476   6478*  6532*  6533*  6534   6561*  6562*  6563   6583*  6586*
                      6588*  6589   6594*  6599   6619   6650*  6656*  6661*  6667*  6672*  6680*  6682   6691*
                      6693   6704   6707   6710   6725   6726*  6734   6737   6740   6755   6756*  6768*  6781*
                      6824*  6825*  6826*  6827*  6830*  6837*
R2     =%000002        106#   819*   820    824*   826*   827    829    899*   902*   904    968*   979*   981*
                       982    991*   992   1035*  1044*  1046*  1047   1116*  1126*  1127*  1129*  1130   1138*
                      1141*  1142   1151*  1153*  1154   1215*  1216*  1225*  1227*  1228   1237*  1238   1299*
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D08


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                        1300*  1309*  1311*  1312   1321*  1322   1385*  1386*  1395*  1397*  1398   1408*  1409
                        1462*  1463*  1472*  1475*  1476*  1477   1487*  1488   1540*  1541*  1551*  1552*  1554*
                        1555   1565*  1566   1618*  1619*  1629*  1630*  1632*  1633   1644*  1645   1752*  1753*
                        1764*  1776   1894*  1895*  1906*  1918   1978*  1979*  1989*  1990   2000*  2001   2050*
                        2051*  2061*  2062   2072*  2073   2126*  2127*  2137*  2144*  2150   2214*  2215*  2225*
                        2232*  2238   2299*  2300*  2309*  2316*  2322   2383*  2384*  2393*  2400*  2406   2489*
                        2490*  2518   2587*  2681*  2761*  2841*  2919*  3056*  3100*  3113*  3124*  3216*  3237*
                        3238*  3253*  3254*  3350*  3362*  3417*  3418*  3423*  3427*  3432   3480*  3481*  3488*
                        3491*  3503   3569*  3570*  3574*  3576*  3580*  3604   3703*  3720*  3721*  3722*  3723*
                        3724*  3795*  3812*  3813*  3814*  3815*  3816*  3888*  3939*  4007*  4014   4051*  4052
                        4146*  4147   4162*  4164   4181*  4187*  4188*  4189   4193   4201*  4202*  4203   4207
                        4215*  4216*  4217   4221   4294*  4307*  4308*  4366*  4367*  4368*  4400*  4401*  4402*
                        4403*  4407   4409   4411   4416   4418*  4429*  4430*  4432   4565*  4584*  4585*  4685*
                        4686*  4689   4692   4697   4698*  4712*  4722*  4724   4767*  4769   4773*  4796*  4797*
                        4798*  4799   4800*  4804   4806*  4807   4811   4812*  4821   4825   4920*  4921*  4922
                        4952*  4953*  4954   4969*  4970*  4971   4990*  4991*  5070*  5071*  5084*  5167*  5187*
                        5188*  5244*  5262*  5302*  5320*  5360*  5378*  5418*  5436*  5758   5769*  5773*  5776
                        5783*  5784*  5785   5790*  5798*  6131   6136*  6144*  6146*  6148*  6154   6155*  6217
                        6238*  6262*  6263   6264*  6265   6276   6288   6300   6311   6356   6360*  6361*  6362*
                        6363*  6364*  6365*  6366   6370*  6404*  6410*  6414*  6430*  6431*  6438*  6458*  6485*
                        6490*  6494*  6495   6501*  6516   6520*  6521*  6528*  6529*  6537*  6538*  6543*  6547
                        6550*  6551*  6557*  6558*  6566*  6567*  6595*  6603   6713*  6719*  6725*  6727   6743*
                        6749*  6755*  6757   6769*  6782*  6821*  6828*  6832*
R3      =%000003         107#   904*   982*   983    992*  1047*  1130*  1131   1142*  1143   1154*  1155   1228*
                        1229   1238*  1312*  1313   1322*  1398*  1399*  1400   1409*  1410*  1411   1477*  1478
                        1488*  1489   1555*  1556   1566*  1567   1633*  1634*  1635   1645*  1646*  1647   1776*
                        1777   1918*  1919   1990*  1991   2001*  2062*  2063   2073*  2150*  2154   2238*  2242
                        2322*  2326   2406*  2410   2517*  2518*  2519*  2523   2588*  2589*  2590*  2591   2592*
                        2593*  2611*  2618*  2682*  2683*  2684*  2685   2686*  2687*  2698*  2707*  2762*  2763*
                        2764*  2765   2766*  2767*  2778*  2787*  2842*  2843*  2844*  2845   2846*  2847*  2858*
                        2867*  2920*  2921*  2922*  2923   2924*  2925*  2936*  2945*  3048*  3049*  3050*  3051*
                        3077*  3078*  3090*  3096*  3107*  3108   3119*  3131*  3132*  3133*  3134*  3135*  3213*
                        3227*  3231   3243*  3247   3323*  3324*  3325*  3332*  3333*  3337*  3344*  3346   3355*
                        3356*  3358   3369*  3370*  3371*  3372*  3424*  3425*  3432*  3433*  3435   3486*  3492*
                        3495*  3500*  3503*  3504*  3507   3577*  3578*  3604*  3701*  3702*  3713*  3715   3794*
                        3805*  3807   3905*  3906*  3925*  3926*  3940*  4026*  4027*  4037*  4042   4147*  4148*
                        4170*  4171   4193*  4207*  4221*  4291*  4302*  4303   4399*  4400   4411   4566*  4567*
                        4578*  4579   4669*  4682   4692   4708   4768*  4772*  4795*  4796   4807   4922*  4923*
                        4954*  4971*  4972*  4984*  4985   5069*  5085*  5086*  5163*  5164*  5180*  5183   5250*
                        5251*  5252   5266*  5308*  5309*  5310   5323*  5366*  5367*  5368   5381*  5424*  5425*
                        5426   5439*  5699   5708*  5714*  5715*  5718*  5723*  5724*  5725   5734*  5759   5767*
                        5768*  5782*  5785*  5794*  5795*  5797*  6055   6057*  6058   6061*  6062   6069*  6070
                        6072   6080   6084   6086*  6092   6094   6096*  6099*  6218   6237*  6299   6312   6405*
                        6411   6413*  6429*  6432*  6433   6437*  6474*  6505*  6508*  6511   6573*  6576*  6579
                        6596*  6608   6621   6716*  6719   6746*  6749   6795*  6796*  6797*  6798*  6799*  6800*
                        6801*  6822*  6829   6831*
R4      =%000004         108#   897*   978*   983    989*  1043*  1124*  1125*  1131   1139*  1143   1150*  1151
                        1155   1224*  1229   1235*  1308*  1313   1319*  1394*  1400   1406*  1411   1471*  1474*
                        1478   1485*  1489   1549*  1550*  1556   1563*  1567   1627*  1628*  1635   1642*  1647
                        1760*  1764   1765*  1772*  1777   1787*  1902*  1906   1907*  1914*  1919   1929*  1982*
                        1989   1991   1998*  2000   2054*  2061   2063   2070*  2072   2147*  2153*  2154   2235*
                        2241*  2242   2319*  2325*  2326   2403*  2409*  2410   2513*  2522*  2523   2604*  2701*
                        2708*  2781*  2788*  2861*  2868*  2939*  2946*  3057*  3058*  3101*  3112*  3123*  3214*
                        3215*  3226*  3230*  3231   3242*  3246*  3247   3338*  3345*  3346   3357*  3358   3422*
                        3428*  3434*  3435   3487*  3489*  3496*  3498*  3505*  3506*  3507   3605*  3606*  3607*
                        3608*  3609*  3704*  3705*  3714*  3715   3796*  3797*  3806*  3807   3903*  3904*  3923*
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                     3924*  3938*  4028*  4029*  4038*  4039*  4040*  4041*  4042   4149*  4150*  4164*  4165*
                     4166*  4167*  4168*  4169*  4171   4194*  4208*  4222*  4271*  4272*  4273*  4292*  4293*
                     4303   4416*  4539*  4568*  4569*  4579   4682*  4683*  4684*  4685   4687   4696   4697*
                     4713*  4811*  4894*  4919   4924*  4925*  4930*  4951   4955*  4960*  4968   4973*  4974*
                     4979*  4985   5072*  5087*  5165*  5166*  5176*  5177*  5178*  5179*  5183   5249*  5256
                     5270*  5271   5307*  5314   5328*  5329   5365*  5372   5386*  5397   5423*  5430   5444*
                     5445   5700   5702*  5703*  5704*  5705   5706*  5720   5722*  5730*  5733*  6219   6236*
                     6290   6313   6406*  6411*  6415*  6418*  6419*  6420   6506*  6508   6510*  6511   6512
                     6574*  6576   6578*  6579   6580   6597*  6613   6718*  6721*  6722   6748*  6751*  6752
                     6823*  6829*  6833*
R5      =%000005      109#   770*   820*   821*   827    888*   889*   890*   891*   892*   893*   894*   895*
                      896    899    900    969*   971    973*   978    981    991   1036*  1037   1039*  1046
                     1117*  1118   1120*  1124   1129   1141   1153   1217*  1218   1220*  1224   1227   1237
                     1301*  1302   1304*  1308   1311   1321   1387*  1388   1390*  1394   1397   1408   1464*
                     1465   1467*  1474   1476   1485   1487   1542*  1543   1545*  1550   1554   1563   1565
                     1620*  1621   1623*  1628   1632   1642   1644   1781*  1923*  1984*  2056*  2128*  2129
                     2158*  2216*  2217   2246*  2301*  2302   2309   2325   2330*  2385*  2386   2393   2409
                     2414*  2491*  2492   2493   2527*  2594*  2595   2597*  2604   2605   3080*  3140*  3218*
                     3343*  3355   3421*  3429*  3484*  3485*  3505   3573*  3574   3575*  3581*  3584   3593
                     3597   3707*  3726*  3799*  3818*  3908*  3916*  3917*  3928*  3942*  4006*  4008   4031*
                     4046*  4133*  4152*  4158*  4159   4175*  4196*  4210*  4224*  4296*  4310*  4350*  4352*
                     4354   4358   4359   4420*  4423*  4532*  4539   4548   4571*  4587*  4602*  4639*  4646
                     4658   4676*  4701*  4716*  4766*  4775*  4815*  4887*  4894   4927*  4957*  4976*  4993*
                     5074*  5089*  5169*  5190*  5248*  5254*  5256   5264*  5306*  5312*  5314   5322*  5329
                     5364*  5370*  5372   5380*  5387   5422*  5428*  5430   5438*  5445   5701   5707*  5709*
                     5711*  5712*  5713*  5714   5732*  5760   5762*  5764*  5771*  5775*  5790   5796*  6220
                     6235*  6357   6358   6373*  6502*  6534*  6544*  6563*
R6      =%000006      110#   673*   674*   675   6277   6291
R7      =%000007      111#
SAPS     027126      2610   2617   2697   2706   2777   2786   2857   2866   2935   2944   3076   3089   3099
                     3111   3122   3212   3336   3349   3361   3587   3596   3719   3811   3902   3922   3937
                     4025   4145   4192   4206   4220   4290   4306   4414   4563   4582   4695   4711   4810
                     4918   4950   4967   4989   5068   5083   5162   5186   6272   6284   6860#
SECRX = 000020       5428   7212#
SECTX = 000010       5420   5428   5441   7211#
SELINE   024502      1756   1768   1898   1910   1980   2052   2131   2219   2303   2387   2505   3052   3195
                     3677   3770   3885   4004   4123   4268   4542   4649   4897   5050   5146   5237   5297
                     5355   5413   6326#
SELMSK   027176       756*   762    764*  5459*  5461   6885#
SETALL   026766      4655   6820#
SP      =%000006      112#   677*   695*   703*   707    822*   833    838   2601*  2614*  2621*  2624*  2689*
                     2714*  2769*  2794*  2849*  2874*  2927*  2952*  3055*  3137*  3327*  3366*  4356*  4377*
                     5486*  5526*  5529   5531   5532   5561   5562   5566*  5588   5609*  5612*  5628*  5633*
                     5654   5658*  5691*  5692   5693   5694*  5699*  5700*  5701*  5707   5732   5733   5734
                     5735*  5736*  5756*  5757*  5758*  5759*  5760*  5761*  5762   5765*  5778   5780*  5782
                     5792   5794   5796   5797   5798   5799   5800   5802*  5803*  5831*  5832   5842*  5844
                     5845   5846*  5848   5850   5852   5858   5860*  5862*  5870*  5874   5878   5879   5883
                     5897*  5898*  5905   5906*  5917   5918*  5919*  5929   5930*  5935   5936   5960*  5961*
                     5962   5969*  5972*  5973*  5977*  5978*  5982   5985*  5989   5991   5993   5994*  6001
                     6003   6005*  6006   6008*  6009*  6010*  6011*  6012*  6027*  6029*  6031*  6032*  6033
                     6037*  6038*  6039   6042   6044   6046*  6055*  6056*  6061   6064   6068*  6075   6079*
                     6098   6099   6100*  6101*  6102*  6127*  6128*  6129*  6130*  6131*  6133   6137*  6139
                     6141   6149*  6150   6152   6153*  6155   6156   6157   6159   6174*  6175   6185*  6186*
                     6215*  6216*  6217*  6218*  6219*  6220*  6221*  6222   6230*  6234   6235   6236   6237
                     6238   6239   6240   6245*  6337*  6354*  6355*  6356*  6370   6371   6372   6428*  6435*
                     6466*  6481*  6484   6532   6535   6536*  6561   6564   6565*  6572   6599*  6603*  6608*
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F08


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                          6613*   6632    6656    6667    6680    6691    6712*   6742*   6767    6768    6769    6771*   6780
                          6781    6782    6784*   6814*   6844*   6845*   6852*   6853*   6860*   6861*   6864*   6865*   6867
                          6868
SPACE    035607           6607    6612    7883#
SSR    = 000016            893     980*    990*   1045*   1128*   1140*   1226*   1236*   1310*   1320*   1386    1473*   1486*
                          1553*   1564*   1619    1763*   1775*   1905*   1917*   1988*   1999*   2060*   2071*   2143*   2149*
                          2231*   2237*   2315*   2321*   2399*   2405*   2490    3329*   3343    3362    3418    3481    3570
                          3934    3939    3940    4728    4912    4921    4964    4970    6881#
STACK  = 001100             87#    677    2601    2624    2689    2714    2769    2794    2849    2874    2927    2952    3055
                          3137    3327    3366    4356    4377    6771    6784
START1   002464            725#
START2   002624            746     752#    765    5498    6701
STEP   = 000400           5261    5319    5377    5435    7207#
STKLMT = 177774             98#
SUER1    024310            832    6272#
SUER2    024350            907     986     995    1050    1134    1146    1158    1232    1241    1316    1325    1403    1414
                          1481    1492    1559    1570    1638    1650    1780    1922    1994    2004    2066    2076    2526
                          3438    3510    4045    4174    6284#
SUER2A   024354           2612    2619    2702    2711    2782    2791    2862    2871    2940    2949    3079    3091    3102
                          3114    3125    3217    3339    3351    3363    3589    3600    3706    3725    3798    3817    3907
                          3927    3941    4030    4151    4195    4209    4223    4295    4309    4419    4570    4586    4700
                          4715    4814    4926    4956    4975    4992    5073    5088    5168    5189    6285#
SUER3    024420           6298#   6772    6785
SUER4    024436           2157    2245    2329    2413    3239    3255    6306#
SUNUM    024574            770    1781    1923    1984    2056    2158    2246    2330    2414    2527    3080    3140    3218
                          3707    3726    3799    3818    3908    3928    3942    4031    4046    4152    4175    4196    4210
                          4224    4296    4310    4420    4423    4571    4597    4676    4701    4716    4815    4927    4957
                          4976    4993    5074    5089    5169    5190    6353#
SUPPAR   024756           4362    6402#
SWR      001140            221#    675     697*    699     705*    712*    719     734     739    5222    5521    5535    5537
                          5543    5550    5591    5603    5607    5956    5993*   6221    6234*   6590    6651    6662    6675
                          6686    6696    6714    6744
SWREG    000176             44#    705     719    5956    5969
SW0    = 000001            151#
SW00   = 000001            141#    151
SW01   = 000002            140#    150
SW02   = 000004            139#    149
SW03   = 000010            138#    148
SW04   = 000020            137#    147
SW05   = 000040            136#    146
SW06   = 000100            135#    145
SW07   = 000200            134#    144
SW08   = 000400            133#    143
SW09   = 001000            132#    142
SW1    = 000002            150#
SW10   = 002000            131#
SW11   = 004000            130#
SW12   = 010000            129#
SW13   = 020000            128#
SW14   = 040000            127#
SW15   = 100000            126#
SW2    = 000004            149#
SW3    = 000010            148#
SW4    = 000020            147#
SW5    = 000040            146#
SW6    = 000100            145#
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SW7 =	000200	144#												
SW8 =	000400	143#												
SW9 =	001000	142#												
TBITVE=	000014	184#												
TBUF	037112	4130	4162	4217	4222	4936	5055	5150	6261	6407	6825	7926#		
TDATA1	030224	4275*	4278	7218#										
TDATA2	030226	4006	7219#											
TIMEA	030240	3069*	3204*	3688*	3781*	3895*	4017*	4137*	4282*	4437*	4451*	4555*	4667*	4782*
		4910*	4942*	5060*	5155*	6812*	7224#							
TIMEB	030242	3070*	3205*	3689*	3713	3731	3782*	3805	3823	3896*	4018*	4138*	4283*	4438*
		4452*	4556*	4668*	4783*	4911*	4943*	5061*	5156*	6810*	7225#			
TIMEC	030244	3680*	3714	3731*	3773*	3806	3823*	7226#						
TIMEIT	026744	3072	3208	3692	3785	3899	4021	4141	4286	4441	4455	4559	4671	4787
		4914	4946	5064	5159	6810#								
TITFLG	030236	670*	729	733*	7223#									
TITLE	034634	732	7793#											
TITLE2	034704	772	774	7800#										
TKVEC =	000060	191#												
TNULL	030246	4905	7227#											
TPVEC =	000064	192#												
TRAPVE=	000034	190#	683*	684*										
TRMRDY=	000002	5304	5312	5325	7209#									
TRTVEC=	000014	185#												
TST1	003000	781#												
TST10	004000	1305	1331#											
TST11	004126	1391	1420#											
TST12	004256	1468	1498#											
TST13	004406	1546	1576#											
TST14	004546	1624	1656#											
TST15	004736	1797#												
TST16	005126	1939#												
TST17	005252	1981	2011#											
TST2	003070	842#												
TST20	005376	2053	2083#											
TST21	005604	2130	2171#											
TST22	006012	2218	2259#											
TST23	006212	2304	2343#											
TST24	006412	2388	2427#											
TST25	006652	2494	2540#											
TST26	007036	2629#												
TST27	007216	2719#												
TST3	003170	901	914#											
TST30	007376	2799#												
TST31	007556	2879#												
TST32	007736	2957#												
TST33	010370	3138	3147#											
TST34	010716	3196	3265#											
TST35	011150	3377#												
TST36	011272	3449#												
TST37	011446	3522#												
TST4	003300	975	1001#											
TST40	011662	3623#												
TST41	012170	3678	3740#											
TST42	012472	3771	3833#											
TST43	013002	3886	3951#											
TST44	013242	4005	4058#											

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TST45    013714          4235#
TST46    014146          4269     4318#
TST47    014706          4380     4466#
TST5     003362          1040     1057#
TST50    015260          4600     4608#
TST51    015730          4651     4735#
TST52    016260          4793     4819     4830#
TST53    017020          5003#
TST54    017234          5051     5097#
TST55    017476          5147     5199#
TST56    017762          5238     5281#
TST57    020154          5298     5339#
TST6     003550          1121     1164#
TST60    020346          5356     5397#
TST7     003664          1221     1247#
TYPDS  = 104405          5487     6201#
TYPE   = 104401           731      773     5234     5258     5273     5316     5331     5374     5389     5432     5447     5485     5488
                         5594     5627     5644     5646     5649     5651     5655     5662     5726     5801     5853     5967     5968
                         5971     5984     5995     6014     6067     6073     6078     6082     6087     6098     6090     6093     6097
                         6161     6163     6197#    6243     6487     6527     6556     6592     6607     6612     6617     6623     6629
                         6653     6664     6677     6688     6698     6730     6760
TYPOC  = 104402          5635     5659     5970     6198#
TYPON  = 104404          6200#
TYPOS  = 104403          6199#    6600     6604     6609     6614
VCFLG    027670           737      744*    6647*    7065#
VCPTR    030220           753*     760*     768     5457*    7202#
VCWC     035354          6630     7854#
$APTHD   000214            69       75#
$ASTAT=  ****** U        5923     5938
$ATYC    022536          5894     5896#
$ATY1    022512          5892#
$ATY3    022520          5838     5893#
$ATY4    022530          5599     5895#
$AUTOB   001134           218#     723*    5964     6113
$BASE    001306           299#
$BDADR   001122           213#
$BDDAT   001126           215#
$CDW1    001312           301#
$CDW2    001314           302#
$CHARC   022506          5855*    5865*    5872     5881*    5886#
$CKSWR   022760          5956#    6205
$CMTAG   001100           201#     672      673      681      687      688      689
$CM1   = 000010           233#     234#     235#     236#     237#     238#     239#     240#     241#
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$CM3   = 000010           231#     233
$CM4   = 000010           241#     242#     243#     244#     245#     246#     247#     248#     249#
$CNTLG   023633          5967     6108#
$CNTLU   023626          5984     6082     6107#
$CPUOP   001260           273#
$CRLF    001227           252#    5594     5619     5627     5646     5651     5655     5854     5889     5995     6087     6107     6166
                         6618     6623
$DBLK    022220          5767     5801     5809#
$DDW0    001316           303#
$DDW1    001320           304#
$DDW10   001342           313#
$DDW11   001344           314#
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$DDW13   001350      316#
$DDW14   001352      317#
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$DDW3    001324      306#
$DDW4    001326      307#
$DDW5    001330      308#
$DDW6    001332      309#
$DDW7    001334      310#
$DDW8    001336      311#
$DDW9    001340      312#
$DEVCT   001242      264#
$DEVM    001310      300#
$DHSEL   030204     6497*   6672    6718    6748    7193#
$DOAGN   020722     5481    5490    5496#
$DTBL    022210     5770    5805#
$ENDAD   020712       56    5492#   5614
$ENDCT   020660      687    5483#
$ENDMG   020731     5485    5500#
$ENULL   020726     5488    5499#
$ENV     001252      269#    717    5596    5833    5901    5925
$ENVM    001253      270#    710    5835    5840    5903
$EOP     020624     5454*   5460    5473#
$EOPCT   020652      687*   5480#   5484
$ERFLG   001103      204#   5508    5539    5541    5547*   5569    5584*   5619
$ERMAX   001115      210#    690*   5541    5564*   5569
$ERROR   021236      681    5582#
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$ERRTB   001356      337#   5641
$ERRTY   021422     5593    5626#
$ERTTL   001112      208#   5587*   5619
$ESCAP   001224      250#    689*   5563*   5610    5612    5619
$ETABL   001252      268#
$ETEND   001356       81     321#
$FATAL   001234      261#   5929*
$FFLG    022756     5892*   5895*   5923    5932*   5940#
$FILLC   001156      229#   5858    5889
$FILLS   001155      228#   5889
$GDADR   001120      212#
$GDDAT   001124      214#
$GET42   020702     5489#
$GTSWR   023030     5968#   6203
$HD    = 000001       25      26
$HIBTS   000214       76#
$HIOCT   024020     6154*   6165#
$ICNT    001104      205#   5554*   5555    5557*   5568
$ILLUP   024250     6213    6229    6248#
$INTAG   001135      219#   5996    6113
$ITEMB   001114      209#   5590*   5598    5619    5630
$LF      001230      253#   5619    5889    6097    6107    6166
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$LNSEL   030136     4407    4689    4804    7172#
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$LPERR   001110      207#    692*    834*    908*    967*   1051*   1115*   1214*   1298*   1384*   1461*   1539*   1617*
                    1784*   1926*   1995*   2005*   2067*   2077*   2161*   2249*   2333*   2417*   2530*   2586*   2690*
```

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                           2760*  2840*  2918*  3047*  3194*  3322*  3439*  3511*  3568*  3676*  3769*  3884*  4003*
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                           6773*  6786*
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$MADR2   001270             290#
$MADR3   001274             293#
$MADR4   001300             296#
$MAIL    001232              77     81    259#   709    717   5560   5596   5833
$MAMS1   001262             280#
$MAMS2   001266             288#
$MAMS3   001272             291#
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$MBADR   000216              77#
$MFLG    022754            5893*  5899   5934*  5938#
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$MSGAD   001246             266#  5909*  5912
$MSGLG   001250             267#  5914*
$MSGTY   001232             260#  5907   5915*  5927   5931*
$MSWR    023640            5968   6109#
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$MTYP2   001267             289#
$MTYP3   001273             292#
$MTYP4   001277             295#
$MXCNT   021234            5558   5568#
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                           1936#  2008#  2080#  2168#  2256#  2340#  2424#  2537#  2626#  2716#  2796#  2876#  2954#
                           3144#  3262#  3374#  3446#  3519#  3620#  3737#  3830#  3948#  4055#  4232#  4315#  4463#
                           4605#  4732#  4827#  5000#  5094#  5196#  5278#  5336#  5394#
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$OMODE   022002            5693*  5697*  5702   5705*  5716*  5742#
$OVER    021220            5522   5538   5546   5556   5565#
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$PWRDN   024104             685   6213#  6241
$PWRMG   024240            6244#
$PWRUP   024156            6223   6229#
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$RDOCT   023662            6127#  6208
$RDSZ =  000010            6048#
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$REG4    001172             237#  6290*  6313*  7276   7691
$REG5    001174             238#
$REG6    001176             239#  6277*  6278*  6291*  6292*  6767*  6780*  7253   7276   7506
$REG7    001200             240#
$RTNAD   020724            5498#
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                     5583    5606    5614    5951    6113
$STUP = 177777        671#
$SVLAD  021164       5530    5559#
$SVPC = 000214         54#     59
$SWR  = 165400          8#     25      30      31      32      33      34      35     249     250     251     688     689
                      691     692     782     843     915    1002    1058    1165    1248    1332    1421    1499    1577
                     1657    1798    1940    2012    2084    2172    2260    2344    2428    2541    2630    2720    2900
                     2880    2958    3148    3266    3378    3450    3523    3624    3741    3834    3952    4059    4236
                     4319    4467    4609    4736    4831    5004    5098    5200    5282    5340    5398    5470    5476
                     5491    5497    5499    5509    5510    5511    5512    5513    5521    5533    5535    5536    5539
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$TKS    001144        223#   5949    5958    5974    5998*   6029    6035
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$TMP2   001206        243#   2146*   2148    2151    2159    2164*   2165    2234*   2236    2239    2247    2252*   2253
                     2318*   2320    2323    2331    2336*   2337    2402*   2404    2407    2415    2420*   2421    2493*
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$TMP3   001210        244#   2135*   2136    2138*   2139    2223*   2224    2226*   2227    2307*   2308    2310*   2311
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                     7590
$TMP4   001212        245#   2512*   2515    2520    2528    2533*   2534    4384*   4404*   4405    4409*   4410*   4421
                     4784*   4801*   4802    6402*   6416*
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                     3824*   3825    3914*   3915*   4008*   4012    4041    4351*   4353*   4360*   4424    4550*   4593*
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                     1468    1495    1499#   1546    1573    1577#   1624    1653    1657#   1794    1798#   1936    1940#
                     1981    2008    2012#   2053    2080    2084#   2130    2168    2172#   2218    2256    2260#   2304
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$TPFLG  001157        230#   5827    5889
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L08


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$TRAP2  024044          6185#   6196
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                        5619    6273    6285    6308    6770    6783
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$TYPDS  022004          5755#   6201
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$TYPEX  022510          5882    5884    5887#
$TYPOC  021602          5696#   6198
$TYPON  021616          5695    5698#   6200
$TYPOS  021556          5691#   6199
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$USWR   001256           272#
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$VECT2  001304           298#
$XTSTR  020770          5524#
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                         691     692     777    5269    5327    5385    5443    5499    5503    5568    5569    5619    5665#
                        5809#   5889    5941#   5949    6106#   6107    6113    6166    6225    6249    6891#   6995#   7275#
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.$ASTA= ****** U        5893    5896
.$X    = 000214           65#     70
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ENDCOM    194#
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         2418     2531    2613    2620    2703    2712    2783    2792    2863    2872    2941    2950    3083    3093    3104
         3116     3127    3221    3240    3256    3340    3352    3364    3440    3512    3590    3601    3710    3729    3802
         3821     3911    3931    3945    4034    4049    4155    4178    4199    4213    4227    4299    4313    4389    4396
         4426     4447    4461    4574    4590    4679    4704    4719    4792    4818    4931    4961    4980    4996    5077
         5092     5172    5193    6774    6787
ESCAPE    194#
GETPRI    194#
GETSWR     10#     194#    714
MHDRS0      1#    3834
MHDR1       1#     782
MHDR10      1#    1332
MHDR11      1#    1421
MHDR12      1#    1499
MHDR13      1#    1577
MHDR14      1#    1657
MHDR15      1#    1798
MHDR16      1#    1940
MHDR17      1#    2012
MHDR2       1#     843
MHDR20      1#    2084
MHDR21      1#    2172
MHDR22      1#    2260
MHDR23      1#    2344
MHDR24      1#    2428
MHDR25      1#    2541
MHDR26      1#    2630
MHDR27      1#    2720
MHDR3       1#     915
MHDR30      1#    2800
MHDR31      1#    2880
MHDR32      1#    2958
MHDR33      1#    3148
MHDR34      1#    3266
MHDR35      1#    3378
MHDR36      1#    3450
MHDR37      1#    3523
MHDR4       1#    1002
MHDR40      1#    3624
MHDR41      1#    3741
MHDR42      1#    3952
MHDR43      1#    4059
MHDR44      1#    4236
MHDR45      1#    4319
MHDR46      1#    4467
MHDR47      1#    4609
MHDR5       1#    1058
MHDR50      1#    4736
MHDR51      1#    4831
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MHDR54      1#    5200
MHDR6       1#    1165
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MHDR62       1#    5398
MHDR7        1#    1248
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          2008     2080    2168    2256    2340    2424    2537    2626    2716    2796    2876    2954    3144    3262    3374
          3446     3519    3620    3737    3830    3948    4055    4232    4315    4463    4605    4732    4827    5000    5094
          5196     5278    5336    5394
POP        194#    5796    5935    5936    6155    6234    6235    6370
PUSH       194#    5755    5896    5898    5919    6129    6215    6221    6353
REPORT     194#
SCOPE       89#     781     842     914    1001    1057    1164    1247    1331    1420    1498    1576    1656    1797    1939
          2011     2083    2171    2259    2343    2427    2540    2629    2719    2799    2879    2957    3147    3265    3377
          3449     3522    3623    3740    3833    3951    4058    4235    4318    4466    4608    4735    4830    5003    5097
          5199     5281    5339    5397    5453    5474
SETPRI     194#
SETTRA    6189#    6198    6199    6200    6201    6203    6205    6206    6207    6208
SETUP       10#     194#    671
SKIP       194#     901     905     974    1040    1121    1221    1305    1391    1468    1546    1624    1757    1769    1899
          1911     1981    1992    2053    2064    2130    2218    2304    2388    2494    3138    3196    3678    3771    3886
          4005     4124    4204    4269    4355    4380    4543    4595    4600    4650    4793    4819    4898    5051    5147
          5238     5298    5356
SLASH      194#
SPACE      194#
STARS       52       62      64      71     194#    196     254     257     778     780     839     841     911     913     998
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          1653     1655    1794    1796    1936    1938    2008    2010    2080    2082    2168    2170    2256    2258    2340
          2342     2424    2426    2537    2539    2626    2628    2716    2718    2796    2798    2876    2878    2954    2956
          3144     3146    3262    3264    3374    3376    3446    3448    3519    3521    3620    3622    3737    3739    3830
          3832     3948    3950    4055    4057    4232    4234    4315    4317    4463    4465    4605    4607    4732    4734
          4827     4829    5000    5002    5094    5096    5196    5198    5278    5280    5336    5338    5394    5396    5467
          5505     5571    5621    5668    5745    5812    5891    5948    5951    6019    6048    6115    6168    6211    6227
          6254     6256    6871    6873    7231    7233
SWRSU      194#     693#
TRMTRP    6189#
TYPBIN     194#
TYPDEC     194#    5486
TYPNAM     194#
TYPNUM     194#
TYPOCS     194#
TYPOCT     194#    5633    5657    5969
TYPTXT     194#
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$$CMTM     194#     241     242     243     244     245     246     247     248
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$$SET     6189#    6198    6199    6200    6201    6203    6205    6206    6207    6208
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.EQUAT      10#      84
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.SETUP      9#    671
.SWRHI     10#     26
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.$APTY     13#   5899
.$CATC     10#     36
.$CMTA      9#    194
.$EOP      10#   5465
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.$RDOC     12#   6113
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        6756  6797  6800  6814  6832  6833
ASL      764   973  1039  1120  1220  1304  1390  1467  1545  1623  2597  3790  3791  3813  3814
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        6333
ASLB    5780
ASR     3698  3699  3722  3723  4410  5913  6361  6362  6363  6490  6721  6751
BCC     5781
BEQ      711   718   738   746   765   828   901   905   975   984   993  1040  1048  1121  1132
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        1557  1568  1624  1636  1648  1778  1920  1992  2002  2064  2074  2130  2152  2155  2166
        2218  2240  2243  2254  2324  2327  2338  2408  2411  2422  2494  2521  2524  2535  2598
        3097  3109  3120  3232  3248  3347  3359  3436  3508  3594  3598  3619  3920  3935  4043
        4172  4190  4204  4218  4304  4355  4393  4406  4408  4412  4440  4454  4538  4541  4580
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        5063  5184  5257  5272  5315  5330  5373  5388  5431  5446  5460  5462  5490  5536  5538
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        5924  5926  5965  5992  6007  6076  6138  6334  6336  6449  6462  6477  6517  6548  6585
        6591  6633  6635  6637  6652  6657  6663  6668  6676  6681  6687  6692  6697
BGE     5556  6705  6735
BGT     4594  5481  5728  5789  6004  6045  6140
BHI     5542
BIC      991  1138  1139  1141  1153  1237  1321  1399  1408  1410  1474  1476  1550  1554  1628
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        4727  4778  4798  4824  4825  4923  4972  5086  5164  5241  5251  5300  5309  5325  5358
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        6367  6457  6529  6533  6538  6558  6567
BICB    2497  2499  2514  6340  6385  6397
BIS      903  1125  1127  1129  1151  1311  1397  1485  1487  1563  1565  1642  1644  2605  2692
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ERRORS DETECTED:  0
DEFAULT GLOBALS GENERATED:  0

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J09

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Spooler runtime 47 Seconds, 1380 KCS, 1505 disk reads, 4 disk writes, 319 pages
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