Program Number 06-156R04
Seq # 221
222
223

32-BIT MEMORY

TEST PROGRAM

Consists of:

Program Description	**06-156M95A15**
Program Listing	**06-156F01M91R04A13**
Program Listing	**06-156F02M91R04A13**
Program Listing	**06-156F03M91R04A13**

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32-BIT MEMORY TEST PROGRAM DESCRIPTION

1. GENERAL

Part 1 of the 32-Bit Memory Test is designed to detect any failures that cause a malfunction in memory between 0 and 8 k (X'2000'). Part 2 is designed to detect any failures that cause a malfunction in memory between 8 k and top of memory. Part 3 is designed to exercise each of the basic RX instruction formats throughout memory and ensure that a program can be loaded into and executed from every location in memory.

2. REQUIREMENTS

The following is a list of the minimum hardware requirements for this test:

- Processor - Model 7/32 or equivalent
- Minimum Memory - 16 kb
- Console Device
- Program Load Device

The following are the requirements for the machine under test:

- A console device must be present. (Refer to Appendix A.)
- The 32-Bit Memory Test assumes that the applicable processor test and console device test have been run without detecting a failure.

3. LOADING PROCEDURES

3.1 Multimedia Loading

Refer to 06-176M95 or 06-225M95 for instructions on multimedia loader operation. Each part of the test has a unique multimedia library sequence number and is loaded by specifying that sequence number.

3.2 Paper Tape Loading Procedures

- Manually enter the X'50' sequence shown below into memory.

LOCATION	CONTENTS
X'30'	X'0000'
X'32'	X'0000'
X'34'	X'0000'
X'36'	X'0050'
X'50'	X'D500'
X'52'	X'00CF'
X'54'	X'4300'
X'56'	X'0080'
X'78'	X'1399'

- Place the program tape in the paper tape reader.
- Execute at address X'30'.
- When the processor halts, observe the value displayed on the console display registers D1 and D2. If it is zero, loading is complete; otherwise, repeat the loading procedure. If there is no display, observe register 6; if it is not zero, repeat the loading procedure.

4. PROGRAM EXECUTION

4.1 Initial Execution

- Refer to Appendix A and set up the console device parameters if other than a CRT or Video Display Unit on the X'10'/X'11' PASLA type interface is desired.
- Address memory location X'2000' (F01) or X'A00' (F02 & F03).
- Start program execution. Observe that the following title is output to the list device:

  S32MTx 06-156F0xR04

  where x = the part (functional variation) number.

4.2 Brief Test Module Descriptions

Subtest 1 (F01 & F02)

This subtest is designed to march ones and zeros through the test area.

Subtest 2 (F01 & F02)

This subtest is the Memory Address Decode Minimal Test. It is designed to detect any addressing errors in an 8 k (F01) or 16 k (F02) module of memory (refer to Note 3 in Section 6.2, F02 Programming Notes).

Subtest 3 (F01 & F02)

This subtest is designed to test all the data lines and memory locations in the test area.

Subtest 4 (F01 & F02)

This subtest is the Worst Case Access Test. It is designed to detect any data coupling between fullwords in the test area.

Subtest 5 (F01 & F02)

This subtest is designed to test the memory for different worst case patterns.

Subtest 6 (F01 & F02)

This subtest is designed to test the refresh cycle and check addressing errors for the semiconductor memories (refer to Note 3 in Section 6.2, F02 Programming Notes).

Subtest 7 (F02)

This subtest is the Module Decode Test. It is designed to test for addressing errors among different 16 k blocks; i.e., it checks to ensure that when data is written into a 16 k block, it does not get written into any other 16 k block (refer to Note 3 in Section 6.2, F02 Programming Notes).

Subtest 8 (F02)

This subtest is designed to select a random memory location and write a random pattern into it.

Subtest 9 (F02)

This subtest is designed to write any pattern into the memory test area. It also makes measurements possible while a test pattern is being written into memory.

4.3 Normal Testing

4.3.1 F01

After the title is printed, the message, MAC PRESENT ? (Y OR N), is output. If the processor is equipped with a Memory Access Controller, depress the letter Y on the console device and program execution continues (refer to Section 6, Programming Notes). If the processor is not equipped with a Memory Access Controller, depress the letter N on the console device and program execution continues. When test execution continues, an asterisk (*) is output and the test is executed. Each of the subtests (1 through 6) is executed, and if no errors are detected, the message, NO ERROR, is printed. The test terminates and a Carriage Return (CR), Line Feed (LF) and an asterisk (*) are output to indicate the program is ready for operator input. The test may be repeated by depressing the (CR) key again.

4.3.2 F02

After the title is printed, a search for available memory is executed and the message, AVAILABLE MEMORY, is printed, followed by a list of memory in the system available to the user (refer to Appendix D), and the characters SUBTEST and * are printed. Sequential execution of Subtests 1 through 7 can be performed by depressing the numeric key ZERO (0). Each subtest may be executed individually by depressing the corresponding numeric key (1 through 9). If the subtest detects no errors, it prints the message NO ERROR.

4.3.3 F03

After the title is printed, a search for available memory is made, and the message, AVAILABLE MEMORY, is printed followed by a list of memory in the system available to the user (refer to Appendix C for expected results).

When the available memory list is complete (refer to Appendix B), an asterisk (*) is printed. The test can be executed by depressing the (CR) key on the console device. The program then relocates a short subroutine starting in the first available fullword in the test area and executes it. The subroutine is moved one fullword up in memory and executed from the new location. This continues until the subroutine is moved through the entire test area. Each time the subroutine is relocated, its starting address is written to the display panel. If no errors are detected, the message, NO ERROR, is printed followed by a Carriage Return (CR), Line Feed (LF), and an asterisk (*). The test can be repeated by depressing the (CR) key again.

4.4 Optional Testing

4.4.1 F01

The test may be run continuously by depressing the L key on the console device. When this is done, all messages (with the exception of error messages) are inhibited. To terminate continuous test execution, the Break key on the console device must be depressed.

In order to inhibit all printouts and run the test continuously, the console device can be turned off. When this is done, the program counts the total number of times the test is repeated in memory location labeled TOTAL. If an error is detected, the count in memory location labeled TOTALERR is incremented. The contents of TOTAL are continuously copied to the Display Panel (if equipped). Should the error count reach Y'FFFFFFFF', the processor halts with Y'FFFF' on the display. The console device should then be turned on and the RUN switch on the display depressed; TOTAL and TOTALERR are then printed. If the console device is turned on line before the processor halts, the current contents of TOTAL and TOTALERR are printed.

4.4.2 F02

Low and High Limits

The test area may be reduced by specifying a low and high limit. This is accomplished by depressing the Line Feed key on the console device after the characters SUBTEST and * are printed. When this is done, the characters LO= are printed; the user may then type in the hexadecimal lower limit of the test area. The entry must be terminated by the Carriage Return key. The last six hexadecimal digits entered prior to the Carriage Return are accepted as input. The input value is first compared with the top of the program. This is to ensure that the test does not write over the program. If the low value selected is less than X'2000, a question mark is output. Another value must be selected. The input value is then compared with the list of available memory. If the memory is available for testing, the value is accepted as the low limit. If the memory is not available for testing, the message, MEMORY NOT AVAILABLE, is printed and another value must be selected. When a low limit is accepted, the characters HI= are printed. The user may select the high limit of the test area in the same manner as described for the low limit. The high limit value is then compared to the low limit to ensure it is not less than that limit. If the value is less than the low limit, the message, LOW VALUE > HIGH VALUE, is printed. If the value is not less than the low limit, it is compared with the list of available memory. If the memory is available for testing, the value is accepted as the high limit. If the memory is not available for testing, the message, MEMORY NOT AVAILABLE, is printed and another high value must be selected. After the high and low limits have been established, an asterisk (*) is printed and normal test execution can be continued (refer to Section 6, Programming Notes).

Parity Memory

If the system is equipped with the parity option, the option can be tested by removing a memory module from the system, after the memory table has been established, and after executing the test. A parity error should be generated when the test reaches the nonexistent memory.

Continuous Testing

The test may be run continuously by depressing the L key on the console device and selecting Subtest 0. This causes Subtests 1 through 7 to be run continuously; i.e., after Subtest 7, the program performs Subtest 1. Individual subtests may be executed continuously by depressing the L key and the corresponding numeric key (1 through 7). When running continuously, all messages (with the exception of error messages) are inhibited. To terminate continuous test execution, the Break key on the console device must be depressed. In order to inhibit all the printouts and run the test continuously, the console device can be turned off. When this is done, the program counts the total number of times the test is repeated in memory location labeled TOTAL. If an error is detected, the count in memory location labeled TOTALERR is incremented, and the contents of TOTAL are continuously copied into the console panel display. Should the error count reach X'FFFFFFFF', the processor halts with X'FFFFFFFF' on the display. The console device should then be turned on and the RUN switch on the display depressed; TOTAL and TOTALERR are then printed. If the console device is turned on line before the processor halts, the current contents of TOTAL and TOTALERR are printed.

4.4.3 F03

Low and High Limits

The test area may be reduced by specifying a low and high limit. This is accomplished by depressing the Line Feed key on the console device after the asterisk (*) is printed. When this is done, the characters LO= are printed, and the user may select the lower address limit of the test area. The entry must be terminated by the Carriage Return key. The last six hexadecimal digits entered prior to the carriage return are accepted as input. The input value is first compared with the top of the program. This is to ensure that the test does not write over the program. If the low value selected is less than X'2000', a question mark is output. Another value must be selected. The input value is then compared with the list of available memory. If the memory is available for testing, the value is accepted as the low limit. If the memory is not available for testing, the message, MEMORY NOT AVAILABLE, is printed and another value must be selected. When a low limit is accepted, the characters HI= are printed. The user may select the high limit of the test area in the same manner as described for the low limit. The high limit value is then compared to the low limit plus X'124' to ensure that it is not less than the low limit plus the subroutine

size. If the value is less than the low limit plus X'124', the message, LOW VALUE + X'124'> HIGH VALUE, is printed. If the value is not less than the low limit plus X'124', it is compared with the list of available memory. If the memory is available for testing, the value is accepted as the high limit. If the memory is not available for testing, the message, MEMORY NOT AVAILABLE, is printed, and another high value must be selected. After the high and low limits have been established, an asterisk (*) is printed, and normal test execution can be continued.

Continuous Testing

The test may be run continuously by depressing the L key on the console device. When this is done, all messages (with the exception of error messages) are inhibited. To terminate continuous test execution, the Break key on the console device must be depressed.

In order to inhibit all the printouts and run the test continuously, the console device can be turned off. When this is done, the program counts the total number of times the test is repeated in memory location labeled TOTAL. If an error is detected, the count in memory location labeled TOTALERR is incremented. The contents of TOTAL are continuously copied into the console display panel. Should the error count reach X'FFFFFFFF', the processor halts with X'FFFFFFFF' on the display. The console device should then be turned on and the RUN (EXE) switch on the display depressed; TOTAL and TOTALERR are then printed. If the console device is turned on line before the processor halts, the current contents of TOTAL and TOTALERR are printed.

5. ERROR PROCEDURES

The following is a list of error procedures:

1. If an error is detected in the data read from a location in memory, the error message is printed in the following format:

```
        TT XXXXXX YYYYYYYY ZZZZZZZZ (F01 & F02)
(or)
        XXXXXX YYYYYYYY ZZZZZZZZ (F03)
```

where: TT = the subtest where the error occurred.

XXXXXX = the address under test.

YYYYYYYY = the correct data that was expected at location XXXXXX.

ZZZZZZZZ = the incorrect data read from location XXXXXX.

The error printout can be terminated at any time by depressing the Break key on the console device.

2. In Part 3 of the test, if an error is detected in an address calculated by an RX format in the relocated subroutine, the error message is printed in the following format:

XXXXXX 00YYYYYY 00ZZZZZZ

where: XXXXXX = the address that should have been calculated.

00YYYYYY and 00ZZZZZZ = the addresses calculated by the RX formats under test. (Note the first two digits are always 0 and should be ignored.)

In addition to the previous message, the message RXNN is printed upon completion of the subroutine. This message indicates the type of RX format error that has occurred. Refer to Appendix E for a definition of the NN value. The error printout can be terminated at any time by depressing the Break key on the console device.

3. If a machine malfunction or illegal instruction interrupt is generated (in F01 only), the results are unpredictable.

4. If a machine malfunction interrupt is generated due to a parity error in F02 or F03, the following printout results:

W TT XXXXXX YYYYYYYY ZZZZZZZZ (F02)

(or)

W XXXXXX YYYYYYYY ZZZZZZZZ (F03)

where: W = the condition code, CVGL, when the interrupt occurs. If bit 29 (V) is set, a data fetch parity error is detected. If bit 30 (G) is set, an instruction parity error is detected. In this case, YYYYYYYY and ZZZZZZZZ should be ignored.

TT = the subtest being executed at the time the interrupt occurred.

XXXXXX = the location where the interrupt occurred.

YYYYYYYY = the correct data that was expected at location XXXXXX.

ZZZZZZZZ = the data read from location XXXXXX.

Upon completion of the message, the processor is placed in the wait state.

If the console device is off when the interrupt is generated, X'AAAAAAAA' is written on the display and the processor is placed in the wait state.

To continue test execution, depress the RUN (EXE) switch on the display.

5. If a machine malfunction interrupt is generated due to a power fail or initialization, the following printout results in F02 or F03:

MACHINE MALFUNCTION X YYYYYY

where: X = the condition code, CVGL, when the interrupt occurs.

YYYYYY = the location at which the interrupt occurred (power down).

Upon completion of this message, the processor is placed in the wait state.

If the console device is off when the interrupt is generated, X'AAAAAAAA' is written on the display and the processor is placed in the wait state.

To continue test execution, depress the RUN (EXE) switch on the display.

6. If an illegal instruction interrupt is generated, the following printout results in F02 or F03:

ILLEGAL INSTRUCTION XXXXXXXX XXXXXXXX

where: XXXXXXXX XXXXXXXX = the PSW when the interrupt occurred (Loc & Status).

Upon completion of the message, the processor is placed in the wait state.

If the console device is off when the interrupt is generated, X'55555555' is written on the display and the processor is placed in the wait state.

To continue test execution, depress the RUN (EXE) switch on the display.

7. If a spurious external interrupt is generated, the following printout results in F02 or F03:

EXTINT XXX

where: XXX = the interrupting device address.

Upon completion of the message, the old PSW is loaded and test execution continues.

8. If a relocation and protection, arithmetic fault, system queue service, or supervisor call interrupt occurs, one of the following printouts results in F02 or F03:

```
MACINT
ARTFLT
SYSQUE
SVCINT
```

Upon completion of the message, the old PSW is loaded and test execution continues.

6. PROGRAMMING NOTES

6.1 F01

If the system is equipped with a Memory Access Controller that is not strapped for X'300', the location labeled MACADR must be changed to the appropriate value (X'500' or X'900') for which the MAC is strapped.

6.2 F02

The following is a list of programming notes:

1. The high and low values can be specified in any fullword increment down to one fullword.

2. All high and low values entered are forced to fullword boundaries.

3. Tests 2 and 6 check for errors in a 16 k block of memory. If high and low values have been entered, the memory is still checked in 16 k blocks starting with the 16 k block in which the low value lies, and ending with the 16 k block in which the high value lies.

4. The indicator lamps along the left edge of the display panel are continuously flashed during test execution to indicate that the test is functioning.

6.3 F03

The following is a list of programming notes:

1. The high and low values can be specified in any fullword increment down to 30 fullwords.

2. All high and low values specified will be forced to fullword boundaries.

APPENDIX A
USER DEVICE DEFINITION

ASCII INPUT/OUTPUT DEVICE SUPPORT

The R05 Executive (ETPE R05) of the program uses the concept of console I/O device and list device. The console I/O device is an interactive device which is capable of logging messages and accepting commands and other user input. When the Executive is accepting input from the user or sending messages to the user, the console device is used. When the test program is running, the list device is used for logging messages.

IO HALFWORD CONTROL OF I/C DEVICE SELECTION

The list device and console device are specified to the Executive by the contents of the halfword "IO" at ORIGIN1+X'10' (normally X'0A10'). The interpretation of this data is detailed in Table A-1. The Executive allows only the identifiers shown and changes illegal identifiers to X'01'.

TABLE A-1 INPUT/OUTPUT IDENTIFIERS

	0 7	8 15
IO	CONSOLE DEVICE IDENTIFIER	LIST DEVICE IDENTIFIER
	X'01' - CRT on PASLA/PALM or COMM MUX interface	X'01' - CRT on PASLA/PALM or COMM MUX interface
	X'02' - Device on current loop interface	X'02' - Device on current loop interface
	X'03' - Reserved - Changed to X'01'	X'03' - Line printer on line printer interface
	X'04' - Carousel on PASLA/ PALM or COMM MUX interface	X'04' - Carousel on PASLA/ PALM or COMM MUX interface
	X'05' - CRT on micro-I/O bus interface	X'05' - CRT on micro-I/O bus interface

I/O DEVICE ADDRESSES AND CHARACTERISTICS

The device types implied by the values contained in the IO halfword are described in the following paragraphs. For each of the devices, including device type X'03', termination of an output line results in a carriage return, line feed, and null character being output by the Executive (X'0D', X'0A', X'00').

Devices identified by X'01' are assumed to be on a full-duplex asynchronous RS-232-type interface with addresses X'010' and X'011' for read and write sides, respectively. Examples of such interfaces are PASLA, PALM, and COMM MUX. The Executive programs these devices for highest clock rate, seven data bits, two stop bits, and even parity. If the terminal is set up differently, location CRT2ND must be modified accordingly. Line break status is assumed to be indicated by framing-error status, with BUSY not active, and a zero character in the receive buffer. Off-line status is assumed to be X'0C' (BUSY+EXAMINE STATUS).

Devices identified by X'02' are assumed to be on a Teletype-compatible current loop interface with address X'002'. The Executive programs these devices for unblocked mode (echoplex). Line break status is assumed to be indicated by framing-error status. Off-line status is assumed to be X'01' (Device Unavailable). If this bit is set, other status bits are don't-cares.

The list device identified by X'03' is assumed to be a line printer on a line printer interface with address X'062'. Off-line status is assumed to be X'01' (Device Unavailable). If this bit is set, other status bits are don't-cares.

Devices indicated by X'04' are assumed to be attached as described for device type X'01', having the capability of transmitting DC4 and DC2 transmission pause and resume requests. An example of such a device is the Perkin-Elmer Carousel 300 terminal.

Devices indicated by X'05' are assumed to be on a micro-I/O bus interface with address X'0C0'. These devices are programmed for blocked mode (full-duplex). Line break is assumed to be indicated by framing-error status which is not testable if a character is in the interface read buffer. Off-line status is assumed to be X'01' (Device Unavailable). If this bit is set, other status bits are don't-cares.

The IO halfword, described above, controls which device identifiers are used when the program is started. The default data in this halfword is X'0101'. If this value does not indicate the desired type of I/O device, of the types supported, the data in the IO halfword may be modified before starting program execution.

If the default device addresses are not the addresses of the devices configured in the system, the table of device addresses found in the source program, adjacent to the IO halfword, may be modified. There are two halfword entries used for each type of device. The first is the read-side address, and the second is the write-side address. Both of these halfwords must be modified for any change required. If the device type has only one address (for example, a line printer), the device address must be placed in each of the two appropriate halfwords. The R05 Executive always uses the read-side address to test off-line status.

APPENDIX B
SAMPLE AVAILABLE MEMORY PRINTOUT

EXAMPLE 1 - Available Memory Printout for a total 48 kbytes of memory:

```
Available Memory
000000-00BFFF
```

EXAMPLE 2 - Available Memory Printout for 48 kbytes of memory and 64 k to 176 kbytes of memory:

```
Available Memory
000000-00BFFF
010000-02BFFF
```

EXAMPLE 3 - Available Memory Printout for 4 Mb of memory:

```
Available Memory
000000-3FFFFF
```

APPENDIX C
EXPECTED RESULTS

```
F01

S32MT1 06-156F01R04
MAC PRESENT ? (Y or N)
Y*
01
02
03
04
05
06
NO ERROR
*


F02

S32MT2 06-156F02R04
AVAILABLE MEMORY
00000-1FFFF    (128 kb)
SUBTEST *
1
01
NO ERROR
SUBTEST *
2
02
NO ERROR
SUBTEST *
 .
 .
 .
8
08
BREAK TERMINATION
SUBTEST *
9
09
BREAK TERMINATION
SUBTEST * (LF)
LO=
2000
HI=
5000
SUBTEST *
```

```
F03

S32MT3 06-156F03R04
AVAILABLE MEMORY
00000-1FFFF
*(CR)
NO ERROR
*(LF)
LO=
200C
HI=
8000
*(CR)
NO ERROR
*
```

APPENDIX D
AVAILABLE MEMORY SEARCH

The Available Memory Search is accomplished by writing data into the first addressable fullword for each 16 kb block of memory and then reading that location. If the data is read back correctly, a bit in the memory table is set. If the data is not read back correctly, the corresponding bit in the memory table is reset. Since a memory failure could cause invalid data to be returned, should any known block of memory be omitted from the available memory list, this memory may be tested by manually setting the corresponding bit in the memory table and executing the program at the location labeled RESTART2 (refer to 06-156F0xM91R04A13)**. The table is established such that each bit represents 16 kb of memory and each byte represents 64 kb of memory. Each byte is labeled with the address of the first 16 kb block it controls (i.e., KB00128, KB00255, KB00384, etc.) If the user does not wish to have the available memory list printed, the console device may be turned off and the processor halts when the memory table is established. The console device can then be turned on and the test continued by depressing the RUN (EXE) switch on the display panel.

** x = part (functional variation) number

APPENDIX E
ERROR TABLE FOR PART 3

RXNN

NN = 01 - RX1 format failed.

02 - RX2 format failed.

03 - RX2 format with positive D2 field failed.

04 - RX2 format with negative D2 field failed.

05 - RX3 format failed.

06 - RX1 and RX2 format failed.

07 - RX1 and RX2 with positive D2 field failed.

08 - RX1 and RX2 with negative D2 field failed.

09 - RX1 and RX3 format failed.

10 - RX3 and RX2 with positive D2 field failed.

11 - RX3 and RX2 with negative D2 field failed.

12 - Double indexed instructions failed.

13 - Double indexed instructions and RX1 format failed.

14 - Double indexed instructions and RX2 format failed.

15 - Double indexed instructions and RX2 format with positive D2 field failed.

16 - Double indexed instructions and RX2 format with negative D2 field failed.

17 - Single indexed instructions failed.

18 - RX3 single indexed and RX1 format failed.

19 - RX3 single indexed and RX2 format failed.

20 - RX3 single indexed and RX2 format with positive D2 field failed.

21 - RX3 single indexed and RX2 format with negative D2 field failed.

22 - RX3 single indexed format failed.

APPENDIX F
RELATED DOCUMENTS

The following is a list of documents related to the 32-Bit Memory Test:

Test Program Listings	06-156F01M91R04A13
	06-156F02M91R04A13
	06-156F03M91R04A13
Test Program Tapes	06-156F01M17R04
	06-156F02M17R04
	06-156F03M17R04

PROG= S32MT1 ASSEMBLED BY CAL 03-066R08-00 (32-BIT)

```
                        **06156104                                                  MT100010
                                CROSS                                               MT100020
                                WIDTH 120                                           MT100030
                                TARGT 32                                            MT100040
                                NORX3                                               MT100050
                                SQCHK                                               MT100060
                        S32MT1  PROG  32 BIT MEMORY TEST PART 1  06-156F01M91R04A13 MT100070
                                SQUEZ 9                                             MT100080
                        * * * * * * * * * * * * * * * * * * * * * * * * * * * *     MT100090
                        * COPYRIGHT  PERKIN-ELMER CORP.   JULY, 1975          *     MT100100
                        *                                                     *     MT100110
                        * REVISED        AUGUST, 1980                         *     MT100120
                        *                                                     *     MT100130
                        * PROGRAM USES BASIC MODEL 7/32 INSTRUCTION SET       *     MT100140
                        *                                                     *     MT100150
                        * SIX SUBTESTS ARE PROVIDED:                          *     MT100160
                        *                                                     *     MT100170
                        * SUBTEST 1 - MARCHES ONES AND ZEROS THROUGH THE TEST *     MT100180
                        *             AREA.                                   *     MT100190
                        *                                                     *     MT100200
                        * SUBTEST 2 - DETECTS ADDRESSING ERRORS IN A 8K MODULE*     MT100210
                        *             OF MEMORY.                              *     MT100220
                        *                                                     *     MT100230
                        * SUBTEST 3 - TESTS ALL DATA LINES AND MEMORY         *     MT100240
                        *             LOCATIONS IN THE TEST AREA.             *     MT100250
                        *                                                     *     MT100260
                        * SUBTEST 4 - DETECTS DATA COUPLING BETWEEN FULLWORDS *     MT100270
                        *             IN THE TEST AREA.                       *     MT100280
                        *                                                     *     MT100290
                        * SUBTEST 5 - TESTS MEMORY FOR DIFFERENT WORST CASE   *     MT100300
                        *             PATTERNS.                               *     MT100310
                        *                                                     *     MT100320
                        * SUBTEST 6 - TESTS THE REFRESH CYCLE AND CHECKS FOR  *     MT100330
                        *             ADDRESSING ERRORS IN SEMICONDUCTOR      *     MT100340
                        *             MEMORIES.                               *     MT100350
                        *                                                     *     MT100360
                        * HOW TO RUN THE TEST:                                *     MT100370
                        *  IF THE PROCESSOR IS EQUIPPED WITH A MEMORY ACCESS  *     MT100380
                        *  CONTROLLER DEPRESS THE RUN SWITCH ON THE           *     MT100390
                        *  DISPLAY PANEL.                                     *     MT100400
                        *                                                     *     MT100410
                        *  IF THE PROCESSOR IS "NOT" EQUIPPED WITH A MEMORY   *     MT100420
                        *  ACCESS CONTROLLER THE PROGRAM MUST BE EXECUTED     *     MT100430
                        *  FROM THE LOCATION LABELED "START".                 *     MT100440
                        *                                                     *     MT100450
                        *  AFTER THE PROGRAM IS EXECUTED TEST EXECUTION WILL  *     MT100460
                        *  BEGIN BY DEPRESSING THE CARRIAGE RETURN KEY ON THE *     MT100470
                        *  TELETYPE. EACH SUBTEST IS EXECUTED AND IF NO ERRORS*     MT100480
                        *  ARE DETECTED, THE MESSAGE "NO ERROR" WILL BE       *     MT100490
                        *  PRINTED ON THE CONSOLE DEVICE FOLLOWED BY A        *     MT100500
                        *  CARRIAGE RETURN, LINE FEED, AND AN ASTERISK. REFER *     MT100510
                        *  TO PROGRAM DESCRIPTION.                            *     MT100520
                        * * * * * * * * * * * * * * * * * * * * * * * * * * * *     MT100530
```

MEMORY LOADER

```
                0000 0000              55  R0        EQU   0                                                          MT100550
                0000 0001              56  R1        EQU   1                                                          MT100560
                0000 0002              57  R2        EQU   2                                                          MT100570
                0000 0003              58  R3        EQU   3                                                          MT100580
                0000 0004              59  R4        EQU   4                                                          MT100590
                0000 0005              60  R5        EQU   5                                                          MT100600
                0000 0006              61  R6        EQU   6                                                          MT100610
                0000 0007              62  R7        EQU   7                                                          MT100620
                0000 0008              63  R8        EQU   8                                                          MT100630
                0000 0009              64  R9        EQU   9                                                          MT100640
                0000 000A              65  R10       EQU   10                                                         MT100650
                0000 000B              66  R11       EQU   11                                                         MT100660
                0000 000C              67  R12       EQU   12                                                         MT100670
                0000 000D              68  R13       EQU   13                                                         MT100680
                0000 000E              69  R14       EQU   14                                                         MT100690
                0000 000F              70  R15       EQU   15                                                         MT100700
                0000 2B00              71  PSWSAVE   EQU   PSWSAVEA+X'100'&X'FF00'                                    MT100710
                0000 2B08              72  RSAVE     EQU   PSWSAVE+X'0008'                                            MT100720
                0000 0050              73  $BUFLEN   EQU   80                                                         MT100730
                                       74  *                                                                          MT100740
000000I                                75              ORG   X'80'                                                      MT100750
                                       76  *                                                                          MT100760
000080   2421                          77              LIS   R2,1                                                       MT100770
000082   2303                          78              BS    BOOT                                                       MT100780
000084   2B00                          79              DC    Z(PSWSAVE+X'FF'&X'FF00') S32/3200 PPF PSW SAVE PTR         MT100790
000086   2B08                          80              DC    Z(PSWSAVE+X'FF'&X'FF00'+8) S32/3200 PPF REGSAVE PTR        MT100800
000088   E610 2000                     81  BOOT      LDAI  R1,ORIGIN1          R1 = ADR( FIRST BYTE OF TEST PROG    MT100810
00008C   E630 2A84                     82            LDAI  R3,LNZB+1           R3 = ADR( LAST NON-ZERO BYTE )       MT100820
000090   4030 0022                     83            STH   R3,X'22'            S16 REGISTER SAVE POINTER            MT100830
000094   2731                          84            SIS   R3,1                                                     MT100840
000096   C860 00FF                     85  MN        LHI   R6,X'00FF'          R6 = CHKSUM BYTE = X'MN'             MT100850
00009A   D340 0078                     86            LB    R4,X'78'            INPUT DEV ADR                        MT100860
00009E   DE40 0079                     87            OC    R4,X'79'                                                 MT100870
0000A2   9D45                          88  LEADER    SSR   R4,R5                                                    MT100880
0000A4   2091                          89            BTBS  9,1                 DU,BSY                               MT100890
0000A6   9845                          90            RDR   R4,R5                                                    MT100900
0000A8   0855                          91            LDAR  R5,R5                                                    MT100910
0000AA   2234                          92            BZS   LEADER              IGNORE LEADER                        MT100920
0000AC   D251 0000                     93  LOADER    STB   R5,0(R1)            STORE 1ST NON-ZERO & SUBSEQUENT BY   MT100930
0000B0   D351 0000                     94            LB    R5,0(R1)            RELOAD DATA BYTE TO                  MT100940
0000B4   0765                          95            XAR   R6,R5               GENERATE CHKSUM                      MT100950
0000B6   9481                          96            EXBR  R8,R1                                                    MT100960
0000B8   9828                          97            WHR   R2,R8               DISPLAY MEMORY ADDRESS               MT100970
0000BA   9D45                          98            SSR   R4,R5                                                    MT100980
0000BC   2091                          99            BTBS  9,1                 DU,BSY                               MT100990
0000BE   9845                         100            RDR   R4,R5                                                    MT101000
0000C0   C113 00AC                    101            BXLE  R1,LOADER           LOAD TILL LAST BYTE                  MT101010
0000C4   9486                         102            EXBR  R8,R6                                                    MT101020
0000C6   9828                         103            WHR   R2,R8               FINAL CHKSUM                         MT101030
0000C8   2478                         104  LDWT      LIS   R7,8                                                     MT101040
0000CA   117C                         105            SLLS  R7,12               R7 = X'8000'                         MT101050
0000CC   9557                         106            EPSR  R5,R7               HALT PROCESSOR.                      MT101060
0000CE   2203                         107            BS    LDWT                                                     MT101070
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                                110  *                                                                    MT101100
0000D0                          111          ORG   X'2000'                                               MT101110
                                112  *                                                                    MT101120
002000  4300 2060               113  ORIGIN1  B     START1              BEGINNING                         MT101130
                                114  *                                                                    MT101140
                                115  *-------------------------------------------------------           MT101150
                                116  *  TEST CONSTANTS                                                  MT101160
                                117  *                                                                    MT101170
        0000 0006               118  $MAXIO   EQU   6                   > MAX VALID IDENTIFIER            MT101180
002004                          119          ORG   X'2010'                                                MT101190
002010  0101                    120  IO       DC    X'0101'             I/O DEVICE(S) IDENTIFIER          MT101200
                                121  *                                                                    MT101210
002012  0010                    122  PASLADR  DC    X'0010'             PALSA/PALM READ ADDRESS           MT101220
002014  0011                    123          DC    X'0011'             PASLA/PALM WRITE ADDRESS          MT101230
002016  0002                    124  CLIFADR  DC    X'0002'             CURRENT LOOP INTERFACE READ ADDRES MT101240
002018  0002                    125          DC    X'0002'             CURRENT LOOP INTERFACE WRITE ADDRE MT101250
00201A  0062                    126  LPADR    DC    X'0062'             DUMMY FOR LINE PRINTER            MT101260
00201C  0062                    127          DC    X'0062'             WRITE ADDRESS                     MT101270
00201E  0010                    128  C300ADR  DC    X'0010'             CAROUSEL/PASLA READ ADDRESS       MT101280
002020  0011                    129          DC    X'0011'             CAROUSEL/PASLA WRITE ADDRESS      MT101290
002022  00C0                    130  MICROBUS DC    X'00C0'             MICROBUS READ ADDRESS             MT101300
002024  00C0                    131          DC    X'00C0'             MICROBUS WRITE ADDRESS            MT101310
002026  0000                    132          DCX   0                   PROVISION FOR SPECIAL DEVICE (READ MT101320
002028  0000                    133          DCX   0                   ,WRITE ADDRESS                    MT101330
                                134  *                                                                    MT101340
                                135  * IO =   0101  FOR CRT ON PASLA                                     MT101350
                                136  *        0202  FOR TELETYPE, CAROUSEL 15/30                        MT101360
                                137  *        XX03  FOR LINE PRINTER                                    MT101370
                                138  *        0404  FOR CAROUSEL 300                                    MT101380
                                139  *        0505  FOR MICROBUS                                        MT101390
                                140  *                                                                    MT101400
                                141  *-------------------------------------------------------           MT101410
                                142  *  ETPE IO COMMANDS                                                MT101420
                                143  *                                                                    MT101430
002028  0000                    144  CONRADR  DCX   0                   CONSOLE DEVICE READ ADDRESS       MT101440
00202C  0000                    145  CONWADR  DCX   0                   CONSOLE DEVICE WRITE ADDRESS      MT101450
                                146  *                                                                    MT101460
00202E  0000                    147  CONRD    DCX   0                   CONSOLE READ/WRITE COMMANDS       MT101470
        0000 202F               148  CONWRT   EQU   CONRD+1                                              MT101480
002030  0000                    149  CON2ND   DCX   0                                                    MT101490
        0000 2031               150  CONENRD  EQU   CON2ND+1                                             MT101500
002032  0000                    151  CONCMD   DCX   0                   DUMMY HW AS POINTER               MT101510
002034  A1A3                    152  CRTRD    DCX   A1A3                FOR CRT                           MT101520
002036  EE61                    153  CRT2ND   DCX   EE61                                                 MT101530
002038  E4E8                    154  CLIFRD   DCX   E4E8                *   CURRENT LOOP INTERFACE   P3 3/80 MT101540
00203A  0064                    155  CLIF2ND  DCX   0064                .                            P3 3/80 MT101550
00203C  0080                    156  LPWRT    DCX   0080                *   LINE PRINTER                 MT101560
00203E  0000                    157          DCX   0                   DUMMY FOR LP                      MT101570
002040  A1A3                    158  CARRD    DCX   A1A3                *   CAROUSEL 300                  MT101580
002042  F061                    159  CAR2ND   DCX   F061                                                 MT101590
002044  8202                    160  MREADC   DCX   8202                *   MICROBUS                      MT101600
002046  0082                    161          DCX   0082                .                            P2 1/80 MT101610
                                162  *                                                                    MT101620
                                163  *-------------------------------------------------------           MT101630
002048  00                      164  CONRQ2S  DB    0                   CONSOLE REQUEST TO SEND CMD       MT101640
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002049  23                    165  CRTRQ2S  DB    X'23'              FOR CRT                                  MT101650
00204A  00                    166           DB    0                  DUMMY BYTE FOR CLI                       MT101660
00204B  00                    167           DB    0                  *   DUMMY BYTE FOR LP                    MT101670
00204C  23                    168  CARRQ2S  DB    X'23'              *   CAROUSEL 300                         MT101680
00204D  00                    169           DB    0                  *   DUMMY BYTE FOR MICROBUS              MT101690
00204E                        170           DB    *                  (ALIGN ON HW BOUNDRY)                    MT101700
00204E  0000                  171           DCX   0                  RESERVED                                 MT101710
002050  30F0                  172  PSW      DCX   30F0               PSW USED IN PROGRAM                      MT101720
002052  30F0                  173  PSW2     DCX   30F0               PSW USED IN EXEC                         MT101730
002054  70F0                  174  PSW3     DCX   70F0               PSW USED IN INTERRUPT TESTS              MT101740
002056  0000                  175           DCX   0                  RESERVED                                 MT101750
002058  0000                  176           DCX   0                  RESERVED                                 MT101760
00205A  7FFF                  177  $TIMVAL  DCX   7FFF               TIMEOUT CONSTANT                         MT101770
00205C  8800                  178  $CON     DCX   8800               BREAKPOINT INSTRUCTION                   MT101780
                              179  *-----------------------------                                            MT101790
                              180  *                                                                         MT101800
00205E  00                    181  SINK     DB    0                                                          MT101810
00205F  00                    182           DB    *                                                          MT101820
                              183  *                                                                         MT101830
        0030 2060             184  START1   EQU   *                                                          MT101840
                              185  * -------------------------------                                        MT101850
                              186  * SET UP FOR CONSOLE, LIST I/O DEVICES                                   MT101860
                              187  *                                                                         MT101870
002060  D310 2010             188  STCON    LB    R1,IO              GET I/O IDENTIFIERS                      MT101880
002064  D320 2011             189           LB    R2,IO+1                                                    MT101890
002068  2436                  190           LIS   R3,$MAXIO          IDENTIFIER CAN BE 1,2,3,4,5              MT101900
00206A  0513                  191           CLAR  R1,R3                                                      MT101910
00206C  2182                  192           BLS   $STC.1             BRANCH IF KB IDENTIFIER OK               MT101920
00206E  2411                  193           LIS   R1,1               ELSE FORCE CRT                           MT101930
002070  0523                  194  $STC.1   CLAR  R2,R3                                                      MT101940
002072  2182                  195           BLS   $STC.2             SAME TEST FOR LIST DEVICE                MT101950
002074  2421                  196           LIS   R2,1                                                       MT101960
002076  D210 2010             197  $STC.2   STB   R1,IO              REESTABLISH VALUES                       MT101970
00207A  D220 2011             198           STB   R2,IO+1                                                    MT101980
00207E  0362 2048             199           LB    R6,CONRQ2S(R2)                                             MT101990
002082  4060 29DA             200           STH   R6,$LSTPAS         SET PASLA FLAG (LIST DEVICE)             MT102000
002086  0866                  201           LDAR  R6,R6                                                      MT102010
002088  2336                  202           BZS   $STC.3             SKIP IF NOT PASLA                        MT102020
00208A  9122                  203           SLHLS R2,2                                                       MT102030
00208C  4802 2010             204           LH    R0,IO(R2)                                                  MT102040
002090  DE02 2032             205           OC    R0,CONCMD(R2)      ISSUE 2ND COMMAND (TO LIST DEVICE***     MT102050
                              206  *                                                                         MT102060
002094  D300 2010             207  $STC.3   LB    R0,IO              ESTABLISH KEYBOARD DEVICE (& IOSAVE)     MT102070
002098  D200 29DF             208           STB   R0,IOSAVE+1                                                MT102080
00209C  9310                  209           LBR   R1,R0              (R1) = 1,2,4,5 ; (R0 = KBIDENT)          MT102090
00209E  9112                  210           SLHLS R1,2               (R1)=4,8,16,20                           MT102100
0020A0  2712                  211           SIS   R1,2                                                       MT102110
0020A2  4831 2010             212           LH    R3,IO(R1)                                                  MT102120
0020A6  4030 202A             213           STH   R3,CONRADR         SET UP CONSOLE DEVICE READ ADDRESS       MT102130
0020AA  4831 2012             214           LH    R3,IO+2(R1)                                                MT102140
0020AE  4030 202C             215           STH   R3,CONWADR         SET UP CONSOLE WRITE ADDRESS             MT102150
0020B2  4821 2032             216           LH    R2,CONCMD(R1)                                              MT102160
0020B6  4020 202E             217           STH   R2,CONRD           SET UP R/W COMMANDS                      MT102170
0020BA  4821 2034             218           LH    R2,CONCMD+2(R1)                                            MT102180
0020BE  4020 2030             219           STH   R2,CON2ND          2ND CMD; ENABLE READ CMD                 MT102190
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0020C2  9310          220          LBR   R1,R0                                                    MT102200
0020C4  D341 2048     221          LB    R4,CONRQ2S(R1)                                           MT102210
0020C8  D240 2048     222          STB   R4,CONRQ2S       CONSOLE REQUEST TO SEND                 MT102220
0020CC  4040 29DC     223          STH   R4,$CONPAS       SET PASLA FLAG (CONSOLE)                MT102230
0020D0  0844          224          LDAR  R4,R4                                                    MT102240
0020D2  2333          225          BZS   $STC.4           SKIP 2ND OC IF NOT PASLA DEVICE         MT102250
0020D4  9422          226          EXBR  R2,R2                                                    MT102260
0020D6  9E32          227          OCR   R3,R2            ISSUE 2ND COMMAND (TO CONSOLE)          MT102270
0020D8  DE30 202E     228 $STC.4   OC    R3,CONRD        PUT CONSOLE IN READ MODE                MT102280
0020DC  9B32          229          RDR   R3,R2            READ A DUMMY CHARACTER (SET BUSY)       MT102290
0020DE  0844          230          LDAR  R4,R4            CONSOLE PASLA DEVICE ?                  MT102300
0020E0  2333          231          BZS   $STC.5           BRANCH: NO.                             MT102310
0020E2  DE30 2048     232          OC    R3,CONRQ2S       REQUEST TO SEND (KEEP ON-LINE)          MT102320
        0000 20E6     233 $STC.5   EQU   *                                                        MT102330
                      234 *                                                                      MT102340
                      235 *                                                                      MT102350
0020E6  C200 29C0     236 START2   LPSW  ENABLE                                                  MT102360
                      237 *                                                                      MT102370
0020EA  41F0 24F2     238 PRTTITLE BAL   R15,$PRINT                                              MT102380
0020EE  2956          239          DC    Z(CRLF)                                                 MT102390
0020F0  41F0 24F2     240          BAL   R15,$PRINT       PRINT TITLE                             MT102400
0020F4  28F2          241          DC    Z(TITLE)         START ADDRESS OF MESSAGE                MT102410
0020F6  2410          242 MACQ     LIS   R1,0                                                     MT102420
0020F8  D210 29F4     243          STB   R1,ERRFLG        ZERO ERROR FLAG                         MT102430
0020FC  41F0 24F2     244          BAL   R15,$PRINT       PRINT MAC MESSAGE              ***     MT102440
002100  2936          245          DC    Z(MACMSG)        STARTING ADDRESS OF MAC MESSAGE ****    MT102450
                      246 *                                                                      MT102460
002102  41F0 24F2     247          BAL   R15,$PRINT       PRINT AN ASTERISK                       MT102470
002106  2908          248          DC    Z(ASTERISK)                                             MT102480
002108  4140 26DC     249          BAL   R4,KBREAD                                                MT102490
00210C  41F0 2508     250          BAL   R15,GETCHR                                               MT102500
002110  41F0 24F2     251          BAL   R15,$PRINT                                               MT102510
002114  2956          252          DC    Z(CRLF)                                                 MT102520
                      253 *                                                                      MT102530
*002116 C540 0059     254          CLAI  R4,C'Y'          IS THE ANSWER YES ?             ****    MT102540
 00211A 4330 2140     255          BE    SETFLG           YES, BRANCH                     ****    MT102550
*00211E C540 004E     256          CLAI  R4,C'N'          IS THE ANSWER NO ?              ****    MT102560
*002122 2336          257          BE    REFLG            YES, BRANCH                     ****    MT102570
*002124 C540 0040     258          CLAI  R4,C'@'          IS IT "@" (HALT)?                       MT102580
 002128 4330 219A     259          BE    BRKOK            YES, BRANCH                             MT102590
*00212C 2305          260          B     CRLFQ            NO, BRANCH TO QUESTION          ****    MT102600
                      261 *                                                                      MT102610
                      262 *                                                                      MT102620
 00212E 2410          263 REFLG    LIS   R1,0                                                     MT102630
 002130 D210 29F7     264          STB   R1,MACFLG        RESET MAC FLAG                  ****    MT102640
*002134 2309          265          B     START            CONTINUE                        ****    MT102650
                      266 *                                                                      MT102660
                      267 *                                                                      MT102670
002136  41F0 24F2     268 CRLFQ    BAL   R15,$PRINT       PRINT CR, LF, & ?               ****    MT102680
00213A  2952          269          DC    Z(CRLFQMSG)                                             MT102690
00213C  4300 20F6     270          B     MACQ             BRANCH                          ****    MT102700
                      271 *                                                                      MT102710
                      272 *                                                                      MT102720
002140  2411          273 SETFLG   LIS   R1,1                                                     MT102730
002142  D210 29F7     274          STB   R1,MACFLG        SET MAC FLAG                            MT102740
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                                  275  *                                                                          MT102750
                                  276  *                                                                          MT102760
                0000 2146         277  START    EQU   *              START HERE FOR PROC W/O MAC                 MT102770
                                  278  *                                                                          MT102780
 002146   2410                    279           LIS   R1,0                                                       MT102790
 002148   5010 29F8               280           ST    R1,TOTAL                                                   MT102800
 00214C   5010 29FC               281           ST    R1,TOTALERR                                                MT102810
 002150   4300 21D6               282           B     GO                                                         MT102820
                0000 2154         283  OPTIN    EQU   *                                                          MT102830
 002154   2410                    284  PRTMSG   LIS   R1,0                                                       MT102840
 002156   4010 29E2               285           STH   R1,$WASDU            ZERO TTY FLAG                       MT102850
 00215A   0210 29F6               286           STB   R1,CONTFLG           ZERO CONTINUE FLAG                  MT102860
 00215E   41F0 24F2               287           BAL   R15,$PRINT                                               MT102870
 002162   2908                    288           DC    Z(ASTERISK)                                              MT102880
 002164   4810 29E2               289           LH    R1,$WASDU            DEVICE UNAVAILABLE?                 MT102890
 002168   2333                    290           BZS   PRTMSG1              NO, CONTINUE                        MT102900
 00216A   C200 29C8               291           LPSW  HALT                 YES, HALT                           MT102910
 00216E   5010 29F8               292  PRTMSG1  ST    R1,TOTAL             ZERO TOTAL COUNT                    MT102920
 002172   5010 29FC               293           ST    R1,TOTALERR          ZERO TOTAL ERROR COUNT              MT102930
 002176   4140 26DC               294  RDTTY2   BAL   R4,KBREAD             LOAD I/O KBREAD                     MT102940
 00217A   41F0 2508               295  SENSE1   BAL   R15,GETCHR            SENSE TTY STATUS                    MT102950
*00217E   C540 0040               296           CLAI  R4,C'@'              IS IT A "@" (HALT)?                 MT102960
*002182   233C                    297           BE    BRKOK                YES, BRANCH                 ****    MT102970
 002184   C540 004C               298           CLHI  R4,C'L'              IS IT AN 'L' (LOOP)?                MT102980
 002188   4230 21CE               299           BNE   CRCHK                IF NO BRANCH                        MT102990
 00218C   4300 21B2               300           B     CONTIN0              YES, BRANCH                 ****    MT103000
                                  301  *                                                                          MT103010
                                  302  *                                                                          MT103020
                                  303  *                                                                          MT103030
 002190   41F0 24F2               304  INPQUST  BAL   R15,$PRINT           PRINT " ?", CR, LF          ****    MT103040
 002194   2952                    305           DC    Z(CRLFQMSG)                                              MT103050
 002196   4300 2154               306           B     PRTMSG               RETURN TO INPUT MODE        ****    MT103060
                                  307  *                                                                          MT103070
                                  308  *                                                                          MT103080
 00219A   F870 0000 8000          309  BRKOK    LI    R7,Y'8000'                                               MT103090
 0021A0   5070 0030               310           ST    R7,X'30'                                                 MT103100
 0021A4   E670 2000               311           LA    R7,ORIGIN1                                               MT103110
 0021A8   5070 0034               312           ST    R7,X'34'                                                 MT103120
 0021AC   8800                    313           BRK                                                            MT103130
                                  314  *                                                                          MT103140
 0021AE   4300 2000               315           B     ORIGIN1              RETURN TO START OF THIS TEST ****   MT103150
                                  316  *                                                                          MT103160
 0021B2   41F0 24F2               317  CONTIN0  BAL   R15,$PRINT                                               MT103170
 0021B6   2956                    318           DC    Z(CRLF)                                                  MT103180
 0021B8   2471                    319           LIS   R7,1                                                     MT103190
 0021BA   D270 29F6               320           STB   R7,CONTFLG           SET CONTINUE FLAG                   MT103200
*0021BE   C810 0900               321  BEGIN    LI    R1,X'900'                                                MT103210
 0021C2   5010 29EC               322           ST    R1,TESTIMER                                              MT103220
 0021C6   5010 29F0               323           ST    R1,TESTMER                                               MT103230
 0021CA   4300 223C               324           B     SUB1                 BRANCH TO FIRST SUBTEST             MT103240
 0021CE   C540 000D               325  CRCHK    CLHI  R4,X'0D'             IS CHARACTER A CR ?                 MT103250
 0021D2   4230 2190               326           BNE   INPQUST              NO, READ ANOTHER CHARACTER          MT103260
 0021D6   2410                    327  GO       LIS   R1,0                                                     MT103270
 0021D8   0210 29F6               328           STB   R1,CONTFLG           ZERO CONTINUE FLAG                  MT103280
*0021DC   220F                    329           B     BEGIN                YES, EXECUTE TEST                   MT103290
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                                330  *                                                                          MT103300
                                331  *                                                                          MT103310
 0021DE   41F0 28C6             332  SUBCHK   BAL    R15,TESTMSG                                               MT103320
 0021E2   0310 29F4             333           LB     R1,ERRFLG                                                 MT103330
 0021E6   0811                  334           LR     R1,R1          IS ERROR FLAG SET ?                        MT103340
 0021E8   2138                  335           BNZS   TSTSEL         YES, CHECK FOR NEXT SUBTEST                MT103350
 0021EA   D310 29F6             336           LB     R1,CONTFLG     IS CONTINUE FLAG SET ?                     MT103360
 0021EE   0811                  337           LR     R1,R1                                                     MT103370
 0021F0   2134                  338           BNZS   TSTSEL         YES, CHECK FOR NEXT SUBTEST                MT103380
 0021F2   41F0 24F2             339           BAL    R15,$PRINT     NO, PRINT 'NO ERROR'                       MT103390
 0021F6   292C                  340           DC     Z(NOERR)       START ADDRESS OF MESSAGE                   MT103400
 0021F8   2410                  341  TSTSEL   LIS    R1,0           ZERO REGISTER R1                           MT103410
 0021FA   0210 29F4             342           STB    R1,ERRFLG      ZERO ERROR FLAG                            MT103420
 0021FE   2411                  343  SWTST    LIS    R1,1           LOAD R1 WITH DISPLAY PANEL ADRS            MT103430
 002200   5110 29F8             344           AM     R1,TOTAL       INCREMENT TOTAL COUNT                      MT103440
 002204   5870 29F8             345           L      R7,TOTAL                                                  MT103450
 002208   41E0 276E             346           BAL    R14,DISP       WRITE TOTAL ON DISPLAY                     MT103460
 00220C   41F0 269E             347  SENSE4   BAL    R15,ISTDU                                                 MT103470
 002210   4230 223C             348           BNZ    SUB1           BRANCH IF DU                               MT103480
 002214   D360 29F6             349           LB     R6,CONTFLG                                                MT103490
 002218   0866                  350           LR     R6,R6                                                     MT103500
 00221A   2333                  351           BZS    TTYCHK                                                    MT103510
 00221C   41F0 2614             352           BAL    R15,TSTBRK     BREAK TERMINATION?                         MT103520
 002220   4860 29E2             353  TTYCHK   LH     R6,$WASDU                                                 MT103530
 002224   4230 2708             354  PRTTOT   BNZ    $KEEP7                                                    MT103540
 002228   2470                  355  ZROMEM   LIS    R7,0           ZERO REGISTER R7                           MT103550
 00222A   41E0 27BE             356           BAL    R14,MEMWRT     ZERO MEMORY                                MT103560
 00222E   D360 29F6             357           LB     R6,CONTFLG                                                MT103570
 002232   4660 29E2             358           OH     R6,$WASDU                                                 MT103580
*002236   2133                  359           BNZ    SUB1                                                      MT103590
 002238   4300 2154             360           B      PRTMSG                                                    MT103600
```

TEST 1

```
                        362  * * * * * * * * * * * * * * * * * * * * * * * * * * * *                MT103620
                        363  *                                                       *                MT103630
                        364  *                    S U B T E S T  1                   *                MT103640
                        365  *                                                       *                MT103650
                        366  * PURPOSE:                                             *                MT103660
                        367  *  TO DETECT BASIC FAILURES THAT CAUSE MALFUNCTIONS    *                MT103670
                        368  *  IN MEMORY.                                          *                MT103680
                        369  *                                                       *                MT103690
                        370  * DESIGN SPECIFICATIONS:                              *                MT103700
                        371  *  ZEROS ARE WRITTEN INTO ALL AVAILABLE MEMORY FROM    *                MT103710
                        372  *  ZERO TO X'1FFC'. EACH FULLWORD IS READ,             *                MT103720
                        373  *  THE DATA READ IS CHECKED FOR ZEROS AND THEN         *                MT103730
                        374  *  ALL ONES ARE WRITTEN INTO THAT LOCATION. WHEN THIS  *                MT103740
                        375  *  PART OF THE SUBTEST IS COMPLETE EACH FULLWORD IN    *                MT103750
                        376  *  THE TEST AREA HAS ALL ONES WRITTEN INTO IT. NEXT    *                MT103760
                        377  *  EACH FULLWORD FROM X'1FFC' DOWN TO ZERO IS READ,    *                MT103770
                        378  *  THE DATA READ IS CHECKED FOR ALL ONES               *                MT103780
                        379  *  AND THEN ALL ZEROS ARE WRITTEN INTO THAT LOCATION.  *                MT103790
                        380  *  AT THE COMPLETION OF THIS PART OF THE SUBTEST, EACH *                MT103800
                        381  *  LOCATION IN THE TEST AREA HAS ALL ZEROS WRITTEN     *                MT103810
                        382  *  INTO IT. ALL ONES ARE THEN WRITTEN INTO MEMORY      *                MT103820
                        383  *  FROM ZERO TO X'1FFC'. EACH FULLWORD IS READ.        *                MT103830
                        384  *  THE DATA READ IS CHECKED FOR ONES AND THEN          *                MT103840
                        385  *  ALL ZEROS ARE WRITTEN INTO THAT LOCATION. WHEN THIS *                MT103850
                        386  *  PART OF THE SUBTEST IS COMPLETE EACH FULLWORD IN    *                MT103860
                        387  *  THE TEST AREA HAS ALL ZEROS WRITTEN INTO IT. NEXT   *                MT103870
                        388  *  EACH FULLWORD FROM X'1FFC' DOWN TO ZERO IS READ,    *                MT103880
                        389  *  THE DATA READ IS CHECKED FOR ALL                    *                MT103890
                        390  *  ZEROS AND THEN ALL ONES ARE WRITTEN INTO THAT       *                MT103900
                        391  *  LOCATION. AT THE COMPLETION OF THE SUBTEST, EACH    *                MT103910
                        392  *  LOCATION IN THE TEST AREA HAS ALL ONES WRITTEN      *                MT103920
                        393  *  INTO IT.                                           *                MT103930
                        394  *                                                       *                MT103940
                        395  * * * * * * * * * * * * * * * * * * * * * * * * * * * *                MT103950

00223C  2491            397  SUB1    LIS   R9,1                                                      MT103970
00223E  41E0 2702       398          BAL   R14,TSTNUM      PRINT TEST NUMBER                         MT103980
002242  2470            399          LIS   R7,0            ZERO REGISTER R7                          MT103990
002244  41E0 278E       400          BAL   R14,MEMWRT      WRITE ZERO IN ALL AVAILABLE MEMORY        MT104000
002248  2531            401          LCS   R3,1            LOAD REGISTER R3 WITH ALL ONES            MT104010
00224A  41E0 2872       402          BAL   R14,TOTOC       CHECK ALL MEMORY FROM 8K TO TOC           MT104020
00224E  2430            403          LIS   R3,0            ZERO REGISTER R3                          MT104030
002250  2571            404          LCS   R7,1            LOAD REGISTER R7 WITH ALL ONES            MT104040
002252  41E0 2894       405          BAL   R14,FRMTOC      CHECK ALL MEMORY FROM TOC TO 8K           MT104050
002256  41E0 278E       406          BAL   R14,MEMWRT      WRITE ONES IN ALL AVAILABLE MEMORY        MT104060
00225A  41E0 2872       407          BAL   R14,TOTOC       CHECK ALL MEMORY FROM 8K TO TOC           MT104070
00225E  2470            408          LIS   R7,0            ZERO REGISTER R7                          MT104080
002260  2531            409          LCS   R3,1            LOAD REGISTER R3 WITH ALL ONES            MT104090
002262  41E0 2894       410          BAL   R14,FRMTOC      CHECK ALL MEMORY FROM TOC TO 8K           MT104100
002266  41F0 2614       411          BAL   R15,TSTBRK                                                MT104110
*00226A                 412          B     SUB2            EXECUTE NEXT SUBTEST                      MT104120
```

TEST 2

```
                        414  * * * * * * * * * * * * * * * * * * * * * * * * * * * *  MT104140
                        415  *                                                       *  MT104150
                        416  *                    S U B T E S T  2                   *  MT104160
                        417  *                                                       *  MT104170
                        418  * PURPOSE:                                              *  MT104180
                        419  *  TO DETECT ANY ADDRESSING ERRORS IN AN 8K BLOCK OF   *  MT104190
                        420  *  MEMORY.                                             *  MT104200
                        421  *                                                       *  MT104210
                        422  * DESIGN SPECIFICATIONS:                               *  MT104220
                        423  *  THE TEST AREA CONSISTS OF A TOTAL OF 20 FULLWORDS   *  MT104230
                        424  *  THESE ARE:                                          *  MT104240
                        425  *  00008 00010 00020 00040 00080 00100 00200 00400     *  MT104250
                        426  *  0000C 00014 00024 00044 00084 00104 00204 00404     *  MT104260
                        427  *                                                       *  MT104270
                        428  *  00800 01000                                         *  MT104280
                        429  *  00804 01004                                         *  MT104290
                        430  *                                                       *  MT104300
                        431  *  UPON EXECUTION ZEROS ARE WRITTEN AS A BACKGROUND    *  MT104310
                        432  *  IN AVAILABLE MEMORY FROM ZERO TO X'1FFC'.           *  MT104320
                        433  *  TWO DATA PATTERNS (X'F0000F00' AND                  *  MT104330
                        434  *  X'00F0000F') ARE THEN WRITTEN INTO THE FIRST TWO    *  MT104340
                        435  *  FULLWORDS OF THE TEST AREA AND ALL THE OTHER        *  MT104350
                        436  *  FULLWORDS OF THE TEST AREA ARE READ AND CHECKED     *  MT104360
                        437  *  FOR THE BACKGROUND OF ZEROS. THEN ZEROS ARE         *  MT104370
                        438  *  RESTORED INTO THE FIRST TWO HALFWORDS. THIS IS      *  MT104380
                        439  *  REPEATED FOR EACH FULLWORD PREVIOUSLY               *  MT104390
                        440  *  SPECIFIED IN THE TEST AREA. AFTER THE TEST AREA     *  MT104400
                        441  *  HAS BEEN TESTED WITH A BACKGROUND OF ZEROS, A       *  MT104410
                        442  *  BACKGROUND OF ALL ONES IS WRITTEN AND THE TEST      *  MT104420
                        443  *  REPEATS.                                            *  MT104430
                        444  *                                                       *  MT104440
                        445  * * * * * * * * * * * * * * * * * * * * * * * * * * * *  MT104450

00226A  2492            447  SUB2     LIS   R9,2                                    MT104470
00226C  41E0 27D2       448           BAL   R14,TSTNUM        PRINT TEST NUMBER      MT104480
002270  2470            449           LIS   R7,0              ZERO REGISTER R7       MT104490
002272  41E0 278E       450  SUB2A    BAL   R14,MEMWRT        STORE CONTENTS OF R7 IN ALL AVAIL MEM  MT104500
002276  2420            451           LIS   R2,0                                     MT104510
002278  C852 0004       452  AGAIN    LHI   R5,4(R2)          ESTABLISH END ADDRESS  MT104520
00227C  0892            453           LR    R9,R2             ESTABLISH START ADDRESS MT104530
00227E  F860 F000 0F00  454           LI    R6,Y'F0000F00'    LOAD DATA PATTERN      MT104540
002284  F830 00F0 000F  455           LI    R3,Y'F0000F'      LOAD ALTERNATE DATA PATTERN  MT104550
00228A  24A4            456           LIS   R10,4             LOAD STARTING INDEX VALUE  MT104560
00228C  11A1            457  NEXT1    SLLS  R10,1             SHIFT INDEX LEFT ONE POSITION  MT104570
00228E  C4A0 0FFF       458           NHI   R10,X'FFF'        MASK OFF MOST SIGNIFICANT DIGIT  MT104580
002292  5069 4A00 0000  459           ST    R6,0(R9,R10)      STORE DATA PATTERNS IN MEMORY  MT104590
002298  5039 4A00 0004  460           ST    R3,4(R9,R10)                           MT104600
00229E  0842            461           LR    R4,R2             LOAD REGISTER R4 WITH BLOCK ADDRESS  MT104610
0022A0  5884 0000       462  LDNXT1   L     R8,0(R4)          LOAD R8 WITH CONTENTS OF MEMORY  MT104620
0022A4  0587            463           CLR   R8,R7             IS CONTENTS OF MEMORY = CONTENTS OFR7  MT104630
0022A6  4230 22DA       464           BNE   CHKADR            NO, CHECK MEMORY ADDRESS  MT104640
```

TEST 2

```
0022AA  2644                    465  LDNXT2  AIS   R4,4          YES, INCREMENT MEMORY ADDRESS                MT104650
*0022AC C542 2000               466          CLI   R4,8192(R2)   HAS ENTIRE BLOCK BEEN CHECKED ?            MT104660
 0022B0 2038                    467          BNES  LDNXT1        NO, CHECK NEXT LOCATION                      MT104670
 0022B2 5079 4A00 0000          468          ST    R7,0(R9,R10)  YES, RESTORE BACKGROUND TO TEST LOC         MT104680
 0022B8 5079 4A00 0004          469          ST    R7,4(R9,R10)                                               MT104690
 0022BE E609 4A00 0004          470          LA    R0,4(R9,R10)  LOAD LAST ADRS TESTED                        MT104700
 0022C4 0550                    471          CLR   R5,R0         HAVE ALL 40 LOCATIONS BEEN TESTED ?          MT104710
 0022C6 4230 228C               472          BNE   NEXT1         NO, STORE DATA IN NEXT TEST LOCATION         MT104720
 0022CA 41F0 2614               473          BAL   R15,TSTBRK                                                 MT104730
 0022CE 0877                    474          LR    R7,R7         HAS TEST RUN WITH BACKGROUND OF ONES         MT104740
 0022D0 4230 22F6               475          BNZ   SUB3         Y&S,EXECUTE NEXT SUBTEST                     MT104750
 0022D4 2571                    476          LCS   R7,1          NO, LOAD R7 WITH ALL ONES                    MT104760
 0022D6 4300 2272               477          B     SUB2A         REPEAT TEST WITH BACKGROUND OF ONES          MT104770
 0022DA E609 4A00 0000          478  CHKADR  LA    R0,0(R9,R10)                                               MT104780
 0022E0 0540                    479          CLR   R4,R0         IS THIS THE FIRST TEST LOCATION ?            MT104790
 0022E2 2338                    480          BES   LDNXT3        YES, CONTINUE TEST                           MT104800
 0022E4 E609 4A00 0004          481          LA    R0,4(R9,R10)                                               MT104810
 0022EA 0540                    482          CLR   R4,R0         NO, IS THIS THE SECOND TEST LOCATION         MT104820
 0022EC 2333                    483          BES   LDNXT3        YES, CONTINUE TEST                           MT104830
 0022EE 41F0 27F2               484          BAL   R15,ERROR     NO, PRINT ERROR                              MT104840
 0022F2 4300 22AA               485  LDNXT3  B     LDNXT2        CONTINUE TEST                                MT104850
```

TEST 3

```
                                 * * * * * * * * * * * * * * * * * * * * * * * * * * * *                MT104870
                                 *                                                       *                MT104880
                                 *                     S U B T E S T  3                  *                MT104890
                                 *                                                       *                MT104900
                                 * PURPOSE:                                             *                MT104910
                                 *  TO TEST ALL DATA LINES AND MEMORY LOCATIONS FROM     *                MT104920
                                 *  ZERO TO X'1FFC'.                                     *                MT104930
                                 *                                                       *                MT104940
                                 * DESIGN SPECIFICATIONS:                                *                MT104950
                                 *  THE TEST PATTERNS 80004000, 20001000, 0800400,       *                MT104960
                                 *  02000100, 00800040, 00200010, 00080004, 00020001     *                MT104970
                                 *  ARE WRITTEN INTO MEMORY FROM ZERO TO X'1FFC'.        *                MT104980
                                 *  EACH FULLWORD IS READ AND CHECKED. THEN THE          *                MT104990
                                 *  COMPLEMENT OF THE TEST PATTERNS ARE WRITTEN INTO     *                MT105000
                                 *  MEMORY FROM X'1FFC' DOWN TO ZERO.                    *                MT105010
                                 *  EACH FULLWORD IS THEN READ AND CHECKED.              *                MT105020
                                 *                                                       *                MT105030
                                 * * * * * * * * * * * * * * * * * * * * * * * * * * * *                MT105040

 0022F6   2493                   SUB3    LIS   R9,3                                                      MT105060
 0022F8   41E0 27D2              BAL   R14,TSTNUM          PRINT TEST NUMBER                            MT105070
 0022FC   2470                   LIS   R7,0                ZERO REGISTER R7                             MT105080
 0022FE   41E0 27BE              BAL   R14,MEMWRT          WRITE ZERO IN ALL AVAILABLE MEMORY           MT105090
 002302   2420                   LIS   R2,0                                                             MT105100
 002304   F870 8000 4000         LI    R7,Y'80004000'      ESTABLISH DATA PATTERN                       MT105110
 00230A   0842                   LR    R4,R2               ESTABLISH STARTING ADDRESS                   MT105120
 00230C   5074 0000              STRP1 ST    R7,0(R4)        STORE CONTENTS OF R7 IN MEMORY               MT105130
 002310   2644                   AIS   R4,4                INCREMENT MEMORY ADDRESS                     MT105140
*002312   C542 2000              CLI   R4,Y'2000'(R2)      HAS 8K BLOCK BEEN FILLED ?                   MT105150
 002316   2334                   BES   BLK                 YES, CHECK FOR NEXT 8K BLOCK                 MT105160
 002318   EA70 0002              NXT1  RRL   R7,2          NO, ROTATE DATA PATTERN                      MT105170
 00231C   2208                   BS    STRP1               REPEAT UNTIL 8K BLOCK HAS BEEN FILLED        MT105180
 00231E   2420                   BLK   LIS   R2,0                                                       MT105190
 002320   F870 8000 4000         LI    R7,Y'80004000'      ESTABLISH DATA PATTERN                       MT105200
 002326   0842                   LR    R4,R2               ESTABLISH STARTING ADDRESS                   MT105210
 002328   5884 0000              LDP1  L     R8,0(R4)        LOAD CONTENTS OF MEMORY INTO R8              MT105220
 00232C   0578                   CLR   R7,R8               IS CONTENTS OF MEMORY EQUAL TO PATRN?        MT105230
 00232E   2333                   BES   CONT1               YES, CONTINUE WITH ROUTINE                   MT105240
 002330   41F0 27F2              BAL   R15,ERROR           NO, PRINT ERROR                              MT105250
 002334   2644                   CONT1 AIS   R4,4          INCREMENT MEMORY ADDRESS                     MT105260
*002336   C542 2000              CLI   R4,Y'2000'(R2)      HAS AN 8K BLOCK BEEN TESTED ?                MT105270
 00233A   2334                   BES   BLK2                YES, FIND NEXT AVAILABLE 8K BLOCK            MT105280
 00233C   EA70 0002              NXT2  RRL   R7,2          NO, ROTATE DATA PATTERN                      MT105290
 002340   220C                   BS    LDP1                REPEAT UNTIL 8K BLOCK HAS BEEN TESTED        MT105300
*002342   C820 1FFC              BLK2  LI    R2,Y'1FFC'                                                 MT105310
 002346   F870 FFF0 FFFE         LI    R7,Y'FFF0FFFE'      ESTABLISH DATA PATTERN                       MT105320
 00234C   0842                   LR    R4,R2               ESTABLISH STARTING ADDRESS                   MT105330
 00234E   5074 0000              STRP2 ST    R7,0(R4)        STORE CONTENTS OF R7 IN MEMORY               MT105340
 002352   2744                   SIS   R4,4                DECREMENT MEMORY ADDRESS                     MT105350
*002354   C542 E000              CLI   R4,-8192(R2)        HAS AN 8K BLOCK BEEN FILLED ?                MT105360
 002358   2334                   BES   MBLK                YES, CHECK FOR NEXT 8K BLOCK                 MT105370
```

TEST 3

```
 00235A   E870 0002            538  NXT3    RLL   R7,2                NO, ROTATE DATA PATTERN                          MT105380
 00235E   2208                 539           BS    STRP2               REPEAT UNTIL 8K BLOCK HAS BEEN FILLED            MT105390
*002360   C820 1FFC            540  MBLK    LI    R2,Y'1FFC'                                                           MT105400
 002364   F870 FFFD FFFE       541           LI    R7,Y'FFFDFFFE'      ESTABLISH DATA PATTERN                       MT105410
 00236A   0842                 542           LR    R4,R2               ESTABLISH STARTING ADDRESS                   MT105420
 00236C   5884 0000            543  LDP2    L     R8,0(R4)            LOAD CONTENTS OF MEMORY INTO R8              MT105430
 002370   0578                 544           CLR   R7,R8               IS CONTENTS OF MEMORY EQUAL TO PATTRN        MT105440
 002372   2333                 545           BES   CONT2               YES, CONTINUE WITH ROUTINE                   MT105450
 002374   41F0 27F2            546           BAL   R15,ERROR           NO, PRINT ERROR                              MT105460
 002378   2744                 547  CONT2   SIS   R4,4                DECREMENT MEMORY ADDRESS                     MT105470
 00237A   41F0 2614            548           BAL   R15,ISTBRK                                                       MT105480
*00237E   C542 E000            549           CLI   R4,-8192(R2)        HAS AN 8K BLOCK BEEN TESTED ?                MT105490
*002382   2334                 550           BE    SUB4                YES, EXECUTE NEXT SUBTEST                    MT105500
 002384   E870 0002            551  NXT4    RLL   R7,2                NO, ROTATE DATA PATTERN                      MT105510
*002388   220E                 552           B     LDP2                REPEAT UNTIL 8K BLOCK HAS BEEN TESTED        MT105520
```

TEST 4

```
                        554  * * * * * * * * * * * * * * * * * * * * * * * * * * * *          MT105540
                        555  *                                                       *          MT105550
                        556  *                    S U B T E S T  4                   *          MT105560
                        557  *                                                       *          MT105570
                        558  * PURPOSE:                                              *          MT105580
                        559  *  TO DETECT ANY DATA COUPLING BETWEEN FULLWORDS IN    *          MT105590
                        560  *  THE TEST AREA.                                      *          MT105600
                        561  *                                                       *          MT105610
                        562  * DESIGN SPECIFICATIONS:                               *          MT105620
                        563  *  ZEROS ARE WRITTEN INTO ALL AVAILABLE MEMORY FROM    *          MT105630
                        564  *  ZERO TO X'1FFC'. ZEROS ARE READ                     *          MT105640
                        565  *  FROM EACH LOCATION AND ONES ARE WRITTEN INTO        *          MT105650
                        566  *  LOCATIONS X'0002',X'0006',X'000A'...ETC. THEN THE   *          MT105660
                        567  *  DATA FROM LOCATIONS X'0002',X'0006',X'000A'...ETC.  *          MT105670
                        568  *  IS READ AND CHECKED FOR ONES AND LOCATIONS X'0000',*          MT105680
                        569  *  X'0004',X'0008',...ETC., ARE CHECKED FOR ZEROS.     *          MT105690
                        570  *                                                       *          MT105700
                        571  * * * * * * * * * * * * * * * * * * * * * * * * * * * *          MT105710

 00238A   2494          573  SUB4     LIS   R9,4                                              MT105730
 00238C   41E0 27D2     574           BAL   R14,TSTNUM        PRINT TEST NUMBER               MT105740
 002390   2470          575           LIS   R7,0              ZERO REGISTER R7                MT105750
 002392   41E0 278E     576           BAL   R14,MEMWRT        WRITE ZERO IN ALL AVAILABLE MEMORY  MT105760
 002396   F830 0000 FFFF 577          LI    R3,X'FFFF'        LOAD R3 WITH HALF ZEROS AND HALF ONES  MT105770
 00239C   41E0 2872     578           BAL   R14,TOTOC         CHECK ALL MEMORY FROM 8K TO TOC  MT105780
 0023A0   0873          579           LR    R7,R3             LOAD R7 WITH HALF ZEROS AND HALF ONES  MT105790
 0023A2   0733          580           XR    R3,R3             ZERO REGISTER R3                MT105800
 0023A4   41E0 2872     581           BAL   R14,TOTOC         CHECK ALL MEMORY FROM 8K TO TOC  MT105810
 0023A8   41F0 2614     582           BAL   R15,TSTBRK                                        MT105820
*0023AC                 583           B     SUB5              EXECUTE NEXT SUBTEST            MT105830
```

TEST 5

```
                                585  * * * * * * * * * * * * * * * * * * * * * * * * * * * * *  MT105850
                                586  *                                                         *  MT105860
                                587  *                  S U B T E S T  5                       *  MT105870
                                588  *                                                         *  MT105880
                                589  * PURPOSE:                                               *  MT105890
                                590  *  TO TEST MEMORY FOR DIFFERENT WORST CASE PATTERNS.     *  MT105900
                                591  *                                                         *  MT105910
                                592  * DESIGN SPECIFICATIONS:                                 *  MT105920
                                593  *  Y'55555555' IS WRITTEN INTO EACH FULLWORD OF THE      *  MT105930
                                594  *  TEST AREA. A FULLWORD IS READ AND CHECKED FOR         *  MT105940
                                595  *  Y'55555555'. THEN Y'AAAAAAAA' IS WRITTEN INTO THE     *  MT105950
                                596  *  FULLWORD. THE LOCATION IS THEN READ AND CHECKED       *  MT105960
                                597  *  FOR Y'AAAAAAAA'. FINALLY, Y'55555555' IS WRITTEN     *  MT105970
                                598  *  IN THE LOCATION AND THIS IS REPEATED FOR EACH         *  MT105980
                                599  *  FULLWORD IN THE TEST AREA. NEXT, Y'AAAAAAAA' IS       *  MT105990
                                600  *  WRITTEN INTO EACH FULLWORD OF THE TEST AREA AS A      *  MT106000
                                601  *  BACKGROUND AND THE TEST IS REPEATED.                  *  MT106010
                                602  *                                                         *  MT106020
                                603  * * * * * * * * * * * * * * * * * * * * * * * * * * * * *  MT106030

0023AC  2495                    605  SUB5    LIS   R9,5                                        MT106050
0023AE  41E0 27D2               606          BAL   R14,TSTNUM       PRINT TEST NUMB&R         MT106060
0023B2  F800 5555 5555          607          LI    R0,Y'55555555'   LOAD R0 WITH DATA PATTERN   MT106070
0023B8  F830 AAAA AAAA          608          LI    R3,Y'AAAAAAAA'   LOAD R3 WITH SECOND DATA PATTERN MT106080
0023BE  0870                    609  WRTPRN  LR    R7,R0                                       MT106090
0023C0  41E0 278E               610          BAL   R14,MEMWRT       WRITE PATTERN IN ALL AVAILABLE MEMORY MT106100
0023C4  2420                    611          LIS   R2,0                                        MT106110
0023C6  2454                    612          LIS   R5,4             ESTABLISH INCREMENT VALUE  MT106120
0023C8  C862 1FFC               613  LIMIT   LHI   R6,X'1FFC'(R2)   ESTABLISH END VALUE       MT106130
0023CC  0842                    614          LR    R4,R2            ESTABLISH STARTING ADDRESS MT106140
0023CE  5884 0000               615  LOAD    L     R8,0(R4)         LOAD CONTENTS OF MEMORY INTO R8 MT106150
0023D2  0578                    616          CLR   R7,R8            IS CONTENTS OF MEMORY EQUAL TO R7 ? MT106160
0023D4  2333                    617          BES   CONT3            YES, CONTINUE WITH ROUTINE MT106170
0023D6  41F0 27F2               618          BAL   R15,ERROR        NO, PRINT ERROR            MT106180
0023DA  0873                    619  CONT3   LR    R7,R3                                       MT106190
0023DC  5074 0000               620          ST    R7,0(R4)         STORE CONTENTS OF R7 IN MEMORY MT106200
0023E0  5884 0000               621          L     R8,0(R4)         LOAD CONTENTS OF MEMORY INTO R8 MT106210
0023E4  0587                    622          CLR   R8,R7            IS CONTENTS OF MEMORY EQUAL TO R7 ? MT106220
0023E6  2333                    623          BES   CONT4            YES, CONTINUE WITH ROUTINE MT106230
0023E8  41F0 27F2               624          BAL   R15,ERROR        NO. PRINT ERROR            MT106240
0023EC  0870                    625  CONT4   LR    R7,R0                                       MT106250
0023EE  5074 0000               626          ST    R7,0(R4)         STORE CONTENTS OF R7 IN MEMORY MT106260
0023F2  C140 23CE               627          BXLE  R4,LOAD          REPEAT UNTIL 8K BLOCK HAS BEEN TESTED MT106270
0023F6  41F0 2614               628          BAL   R15,TSTBRK                                  MT106280
0023FA  F570 5555 5555          629          CLI   R7,Y'55555555'   HAVE ALL PATTERNS BEEN TESTED ? MT106290
*002400 2139                    630          BNE   SUB6             YES, EXECUTE NEXT SUBTEST  MT106300
002402  F800 AAAA AAAA          631          LI    R0,Y'AAAAAAAA'   NO, EXCHANGE PATTERNS      MT106310
002408  F830 5555 5555          632          LI    R3,Y'55555555'                              MT106320
00240E  4300 23BE               633          B     WRTPRN           REPEAT TEST               MT106330
```

TEST 6

```
                                635  * * * * * * * * * * * * * * * * * * * * * * * * * * * *          MT106350
                                636  *                                                       *          MT106360
                                637  *                    S U B T E S T  6                   *          MT106370
                                638  *                                                       *          MT106380
                                639  * PURPOSE:                                             *          MT106390
                                640  *  TO TEST THE REFRESH CYCLE AND CHECK FOR ADDRESSING  *          MT106400
                                641  *  ERRORS IN THE SEMICONDUCTOR MEMORIES.               *          MT106410
                                642  *                                                       *          MT106420
                                643  * DESIGN SPECIFICATIONS:                               *          MT106430
                                644  *  A BACKGROUND OF ALL ZEROS IS WRITTEN INTO THE TEST  *          MT106440
                                645  *  AREA. SIXTEEN DIFFERENT DATA PATTERNS ARE WRITTEN   *          MT106450
                                646  *  INTO THE FIRST HALFWORD, READ BACK AND CHECKED.     *          MT106460
                                647  *  THESE PATTERNS ARE X'7FFF',X'BFFF',X'DFFF',         *          MT106470
                                648  *  X'EFFF',X'F7FF',X'FBFF',X'FDFF',X'FEFF',           *          MT106480
                                649  *  X'FF7F',X'FFBF',X'FFDF',X'FFEF',X'FFF7',           *          MT106490
                                650  *  X'FFFB',X'FFFD' AND X'FFFE' WHERE ONLY 1 OUT OF    *          MT106500
                                651  *  16 BITS IS ZERO AND ALL OTHER BITS ARE ONES. THEN   *          MT106510
                                652  *  ALL ONES ARE REWRITTEN INTO THE HALFWORD. THIS IS   *          MT106520
                                653  *  DONE FOR EACH HALFWORD IN THE TEST AREA. THE SAME   *          MT106530
                                654  *  TEST IS REPEATED WITH A BACKGROUND OF ZEROS AND     *          MT106540
                                655  *  DATA PATTERNS IN WHICH ONLY 1 BIT OUT OF THE 16     *          MT106550
                                656  *  BITS IS A ONE AND ALL OTHER BITS ARE ZERO. THESE    *          MT106560
                                657  *  PATTERNS ARE X'8000',X'4000',X'2000',X'1000',       *          MT106570
                                658  *  X'0800',X'0400',X'0200',X'0100',X'0080',           *          MT106580
                                659  *  X'0040',X'0020',X'0010',X'0008',X'0004',           *          MT106590
                                660  *  X'0002', AND X'0001'.                              *          MT106600
                                661  *  NEXT ZEROS ARE WRITTEN INTO LOCATION X'0000'.       *          MT106610
                                662  *  ONES ARE WRITTEN INTO ALL LOCATIONS WITH ADDRESSES  *          MT106620
                                663  *  X'0100' TO X'0FFE'. THE LOCATION X'0000' IS READ    *          MT106630
                                664  *  BACK AND CHECKED.                                  *          MT106640
                                665  *  THE NEXT PART OF THE SUBTEST CHECKS THE REFRESH     *          MT106650
                                666  *  CYCLE. EACH FULLWORD FROM ZERO TO X'1FFC' IS        *          MT106660
                                667  *  LOADED WITH ITS ADDRESS EXPANDED TO A              *          MT106670
                                668  *  FULLWORD BY PROPAGATING ITS MOST SIGNIFICANT DIGIT; *          MT106680
                                669  *  EX. LOCATION Y'12345' IS LOADED WITH Y'11112345'.   *          MT106690
                                670  *  A SOFTWARE DELAY IS EXECUTED TO ENABLE SEVERAL      *          MT106700
                                671  *  REFRESH CYCLES TO TAKE PLACE. EACH LOCATION IS      *          MT106710
                                672  *  THEN READ AND CHECKED.                             *          MT106720
                                673  *                                                       *          MT106730
                                674  * * * * * * * * * * * * * * * * * * * * * * * * * * * *          MT106740

002412  2496                  676  SUB6    LIS   R9,6                                              MT106760
002414  41E0 2702             677           BAL   R14,TSTNUM        PRINT TEST NUMBER               MT106770
002418  2470                  678           LIS   R7,0              ZERO REGISTER R7                MT106780
00241A  F890 0000 FFFF        679           LI    R9,X'FFFF'        LOAD WITH HALF ZEROS AND HALF ONES MT106790
002420  08A9                  680           LR    R10,R9            LOAD ALL ONES INTO REGISTER P10  MT106800
002422  2452                  681           LIS   R5,2              ESTABLISH INCREMENT VALUE       MT106810
002424  41E0 27BE             682  REP1     BAL   R14,MEMWRT        WRITE BACKGROUND INTO ALL AVAIL MEM MT106820
002428  2420                  683           LIS   R2,0                                              MT106830
00242A  C862 1FFC             684  LIM1     LHI   R6,X'1FFC'(R2)    ESTABLISH END VALUE             MT106840
00242E  0842                  685           LR    R4,R2             ESTABLISH STARTING ADDRESS      MT106850
```

TEST 6

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002430  5880 2980          686  LDATA   L     R11,DATA3       LOAD DATA PATTERN INTO R11                MT106860
002434  4084 0000          687  STORE1  STH   R11,0(R4)       STORE CONTENTS OF R11 INTO MEMORY         MT106870
002438  7384 0000          688          LHL   R8,0(R4)        LOAD R8 WITH CONTENTS OF MEMORY           MT106880
00243C  0878               689          LR    R7,R11          LOAD DATA PATTERN INTO R7                 MT106890
00243E  0479               690          NR    R7,R9           MASK OFF BITS 0 - 15                      MT106900
002440  0587               691          CLR   R8,R7           IS CONTENTS OF MEMORY EQUAL TO PATTRN     MT106910
002442  2333               692          BES   CONT5           YES, CONTINUE WITH TEST                   MT106920
002444  41F0 27F2          693          BAL   R15,ERROR       NO, PRINT ERROR                           MT106930
002448  4094 0000          694  CONT5   STH   R9,0(R4)        STORE ALL ONES IN MEMORY                  MT106940
00244C  1081               695          SRLS  R11,1           SHIFT DATA PATTERN                        MT106950
00244E  05BA               696          CLR   R11,R10         HAVE ALL PATTERNS BEEN WRITTEN            MT106960
*002450 203E               697          BNE   STORE1          NO, STORE NEXT PATTERN                    MT106970
002452  C140 2430          698          BXLE  R4,LDATA        YES, HAS 8K BLOCK BEEN TESTED ?           MT106980
002456  24A0               699          LIS   R10,0           ZERO REGISTER R10                         MT106990
002458  F8B0 0000 8000     700          LI    R11,X'8000'     LOAD R11 WITH DATA PATTERN                MT107000
00245E  5580 29B0          701          CL    R11,DATA3       HAVE BOTH PATTERNS BEEN TESTED ?          MT107010
002462  2335               702          BES   CONT6           YES, CONTINUE WITH TEST                   MT107020
002464  50B0 2980          703          ST    R11,DATA3       NO, STORE SECOND DATA PATTERN             MT107030
002468  4300 2424          704          B     REP1            REPEAT TEST                               MT107040
00246C  F8B0 FFFF 7FFF     705  CONT6   LI    R11,Y'FFFF7FFF' RESTORE ORIGINAL DATA PATTERN             MT107050
002472  5080 2980          706          ST    R11,DATA3                                                 MT107060
002476  2470               707          LIS   R7,0            ZERO REGISTER R7                          MT107070
002478  41E0 278E          708          BAL   R14,MEMWRT      WRITE ZERO IN ALL AVAILABLE MEMORY        MT107080
00247C  2420               709          LIS   R2,0                                                      MT107090
00247E  4072 0000          710  STR3    STH   R7,0(R2)        STORE ZERO IN MEMORY                      MT107100
002482  C840 0100          711          LHI   R4,X'100'       LOAD START INDEX VALUE                    MT107110
002486  2454               712          LIS   R5,4            LOAD INCREMENT VALUE                      MT107120
002488  C860 0FFC          713          LHI   R6,X'FFC'       ESTABLISH END VALUE                       MT107130
00248C  2531               714          LCS   R3,1            LOAD R3 WITH ALL ONES                     MT107140
00248E  5032 4400 0000     715  STR4    ST    R3,0(R2,R4)     LOAD ONES INTO MEMORY                     MT107150
002494  C140 248E          716          BXLE  R4,STR4         STORE DATA UNTIL LIMIT                    MT107160
002498  0842               717          LR    R4,R2           LOAD MEMORY ADRS UNDER TEST               MT107170
00249A  7382 0000          718          LHL   R8,0(R2)        HAS TEST LOCATION CHANGED ?               MT107180
00249E  2333               719          BZS   CONT11          NO, CONTINUE WITH TEST                    MT107190
0024A0  41F0 27F2          720          BAL   R15,ERROR       YES, PRINT ERROR                          MT107200
0024A4  E6E0 24C2          721  CONT11  LA    R14,STR5        ESTABLISH RETURN ADRS                     MT107210
0024A8  2420               722  ESTDATA LIS   R2,0                                                      MT107220
0024AA  0842               723  AGAIN2  LR    R4,R2           ESTABLISH START ADRS                      MT107230
0024AC  C862 1FFC          724          LHI   R6,X'1FFC'(R2)  ESTABLISH END VALUE                       MT107240
0024B0  0834               725  AGAIN3  LR    R3,R4           LOAD R3 WITH MEMORY ADRS                  MT107250
0024B2  0874               726          LR    R7,R4           LOAD R7 WITH MEMORY ADRS                  MT107260
0024B4  F430 00FF 0000     727          NI    R3,Y'FF0000'    MASK OFF ALL BUT MOST SIGNIF DIGITS       MT107270
0024BA  1134               728  SHIFT   SLLS  R3,4            SHIFT MSD ONE POSITION                    MT107280
0024BC  033E               729          BZR   R14             IF ZERO RETURN                            MT107290
0024BE  0A73               730          AR    R7,R3           IF NOT ZERO ADD VALUE TO MEMORY ADRS      MT107300
0024C0  2203               731          BS    SHIFT           SHIFT AGAIN                               MT107310
0024C2  5074 0000          732  STR5    ST    R7,0(R4)        STORE DATA IN MEMORY                      MT107320
0024C6  C140 2480          733          BXLE  R4,AGAIN3       REPEAT FOR ENTIRE 8K BLOCK                MT107330
0024CA  41F0 2888          734          BAL   R15,DELAY       DELAY FOR REFRESH CYCLES                  MT107340
0024CE  41F0 2614          735          BAL   R15,ISTBRK                                                MT107350
0024D2  41E0 24A8          736          BAL   R14,ESTDATA     ESTABLISH DATA TO BE READ                 MT107360
0024D6  5884 0000          737          L     R8,0(R4)        READ DATA FROM MEMORY                     MT107370
0024DA  0578               738          CLR   R7,R8           IS DATA READ = DATA STORED                MT107380
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TEST 6

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0024DC   2333          739          BES   CONT13           YES, CONTINUE TEST                MT107390
0024DE   41F0 27F2     740          BAL   R15,ERROR        NO, PRINT ERROR                   MT107400
0024E2   41F0 28C6     741  CONT13  BAL   R15,TESTMSG                                        MT107410
0024E6   C140 2480     742          BXLE  R4,AGAIN3        REPEAT FOR ENTIRE 8K BLOCK        MT107420
0024EA   41F0 2614     743          BAL   R15,TSTBRK                                         MT107430
0024EE   4300 21DE     744          B     SUBCHK           CHECK FOR NEXT SUBTEST            MT107440
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                                  746 * * * * * * * * * * * * * * * * * * * * * * * * * * * *                MT107460
                                  747 *                                                       *                MT107470
                                  748 *                     P R I N T                         *                MT107480
                                  749 *                                                       *                MT107490
                                  750 * THIS ROUTINE PRINTS MESSAGES ON THE CONSOLE DEVICE.  *                MT107500
                                  751 *                                                       *                MT107510
                                  752 * * * * * * * * * * * * * * * * * * * * * * * * * * * *                MT107520
0024F2  735F 0000                 753 $PRINT  LHL   R5,0(R15)                                                MT107530
0024F6  26F2                      754         AIS   R15,2                                                      MT107540
        0000 24F8                 755 PRINT   EQU   *               TO PRINT THE ASCII MESSAGE               MT107550
0024F8  D000 2808                 756 $P0     STM   R0,RSAVE        STORE REGISTERS                          MT107560
0024FC  2400                      757 $P1     LIS   R0,0                                                     MT107570
0024FE  4000 29E4                 758         STH   R0,$LINEPOS     RESET BUFFER                             MT107580
002502  41F0 269E                 759         BAL   R15,TSTDU       IS DEVICE UNAVAILABLE ?                  MT107590
002506  4230 2750                 760         BNZ   $RSAVRET        IF YES, RELOAD REGISTERS, RETURN.        MT107600
                                  761 *                                                                      MT107610
002508  4810 29E2                 762         LH    R1,$WASDU       WAS DEVICE EVER SEEN DU ?                MT107620
00250E  4230 26F8                 763         BNZ   HALT9           OUTPUT TOTAL, TOTERR.                    MT107630
                                  764 *                                                                      MT107640
                                  765 *                                                                      MT107650
002512  D345 0000                 766 $PRT.2  LB    R4,0(R5)        GET A MESSAGE BYTE                       MT107660
002516  41F0 2564                 767         BAL   R15,OUTCHR      OUTPUT IT                                MT107670
00251A  2740                      768         SIS   R4,X'0D'        CR ?                                     MT107680
00251C  233A                      769         BZS   $PRT.3          MSG OVER                                 MT107690
00251E  2651                      770         AIS   R5,1                                                     MT107700
002520  C350 0002                 771         THI   R5,2            TIME TO CHECK BREAK ?                    MT107710
002524  2239                      772         BZS   $PRT.2          BRANCH: NO.                              MT107720
002526  4050 29E6                 773         STH   R5,$PRTFLG      TO DEFER BREAK ACKNOWLEDGE               MT107730
00252A  41F0 2614                 774         BAL   R15,TSTBRK                                                MT107740
00252E  220E                      775         BS    $PRT.2          LOOP FOR NEXT CHAR                       MT107750
                                  776 *                                                                      MT107760
002530  244A                      777 $PRT.3  LIS   R4,X'0A'         LF                                       MT107770
002532  41F0 2564                 778         BAL   R15,OUTCHR      LF                                       MT107780
002536  2440                      779         LIS   R4,0            ASCII 'NUL'                              MT107790
002538  41F0 2564                 780         BAL   R15,OUTCHR      TERMINAL CHARACTER                       MT107800
00253C  41F0 2614                 781         BAL   R15,TSTBRK                                               MT107810
002540  4040 29E6                 782         STH   R4,$PRTFLG      RE-ENABLE BREAK ACKNOWLEDGE              MT107820
002544  48F0 29E8                 783         LH    R15,$BRKFLG                                              MT107830
002548  4040 29E8                 784         STH   R4,$BRKFLG      BREAK BEING ACKNOWLEDGED                 MT107840
00254C  4330 2750                 785         BZ    $RSAVRET        RESTORE REGISTERS, RETURN (R15)          MT107850
002550  40F0 29E0                 786         STH   R15,ISITERR     FORCE MESSAGE PRINT                      MT107860
*002554 C550 2971                 787         CLAI  R5,$BRKEND      PRINTING 'BRK TERM' MESSAGE ?            MT107870
002558  2334                      788         BES   $PRT.4          BRANCH: YES.                             MT107880
00255A  41F0 24F2                 789 $PRT.3A BAL   R15,$PRINT      'RECURSIVE' CALL              P2 1/80    MT107890
00255E  2958                      790         DC    Z(BRKMSG)       'BREAK TERMINATION'                      MT107900
002560  4300 20F6                 791 $PRT.4  B     MACQ            TO CMD PROCESSOR                         MT107910
                                  792 *-------------------------------                                       MT107920
                                  793 *  TO OUTPUT A CHARACTER TO THE LIST DEVICE                            MT107930
                                  794 *                                                                      MT107940
002564  50F0 29A8                 795 OUTCHR  STA   R15,OUT.SAV       SAVE RETURN ADDRESS                      MT107950
002568  D310 29DF                 796         LB    R1,IOSAVE+1                                              MT107960
00256C  2714                      797         SIS   R1,4                                                     MT107970
00256E  4230 259E                 798         BNZ   $OTC.4          BRANCH IF NOT CAROUSEL                   MT107980
002572  4010 29EA                 799 $OTC.0  STH   R1,$PAUSE       ZERO $PAUSE FLAG                         MT107990
002576  41F0 269E                 800 $OTC.1  BAL   R15,TSTDL        ON LINE ?                                MT108000
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00257A 4230 25D2          801          BNZ   $OTC.7          BRANCH: OFFLINE. EXIT.                    MT108010
00257E 9021               802          SSR   R2,R1           GET CAROUSEL STATUS                       MT108020
002580 2385               803          BFFS  8,$OTC.3        BRANCH IF CHAR. IS TO BE READ             MT108030
002582 4810 29EA          804 $OTC.2   LH    R1,$PAUSE       PAUSED NOW ?                              MT108040
002586 2038               805          BNZS  $OTC.1          YES, LOOP                                 MT108050
002588 230B               806          BS    $OTC.4          NO, GO OUTPUT CHARACTER                   MT108060
00258A 9B21               807 $OTC.3   RDR   R2,R1           GET CAROUSEL CHARACTER                    MT108070
00258C C410 007F          808          NHI   R1,X'7F'                                                  MT108080
002590 C510 0014          809          CLHI  R1,X'14'        DC4 ?                                     MT108090
002594 4330 2572          810          BE    $OTC.0          DC4. SET $PAUSE FLAG.                     MT108100
002598 CB10 0012          811          SHI   R1,X'12'        DC2 ?                                     MT108110
00259C 203D               812          BNZS  $OTC.2          BRANCH: NO. CHECK IF PAUSED NOW.          MT108120
                          813 *                                                                        MT108130
00259E 4010 29EA          814 $OTC.4   STH   R1,$PAUSE       RESET FLAG                                MT108140
0025A2 4110 2756          815          BAL   R1,$SETUP         SET UP FOR OUTPUT                       MT108150
0025A6 9001               816 $OTC.5   SSR   R0,R1           WAIT FOR NOT BUSY                         MT108160
0025A8 4230 25D2          817          BTC   3,$OTC.7        BRANCH IF OFF-LINE                        MT108170
0025AC C510 0048          818          CLHI  R1,X'48'        (NOT) CL2S OR PF ?          P4 4/80       MT108180
0025B0 4330 25D2          819          BE    $OTC.7          BRANCH: ASSUME OFF-LINE     P4 4/80       MT108190
0025B4 C410 00FC          820          NHI   R1,X'FC'                                                  MT108200
0025B8 C510 000C          821          CLHI  R1,X'0C'        HDX PASLA OFF-LINE ?                      MT108210
*0025BC 233B              822          BE    $OTC.7          BRANCH: YES.                P4 4/80       MT108220
0025BE 9014               823          SRHLS R1,4            BUSY ?                      P4 4/80       MT108230
0025C0 208D               824          BCS   $OTC.5          BRANCH: YES.                P4 4/80       MT108240
0025C2 9A04               825          WDR   R0,R4           OUTPUT DATA BYTE                          MT108250
0025C4 9D01               826 $OTC.6   SSR   R0,R1           WAIT FOR NOT BUSY                         MT108260
0025C6 2176               827          BTFS  7,$OTC.7        BRANCH IF OFF-LINE (PASLA HANGS)          MT108270
0025C8 C510 0048          828          CLHI  R1,X'48'        (NOT) CL2S OR PF ?          P4 4/80       MT108280
0025CC 2333               829          BES   $OTC.7          BRANCH: ASSUME OFF-LINE     P4 4/80       MT108290
0025CE 9014               830          SRHLS R1,4            BUSY ?                      P4 4/80       MT108300
0025D0 2086               831          BCS   $OTC.6          BRANCH: YES.                P4 4/80       MT108310
0025D2 58F0 29A8          832 $OTC.7   LDA   R15,OUT.SAV                                               MT108320
0025D6 030F               833          BR    R15             RETURN                                    MT108330

                          835 *                                                                        MT108350
                          836 *--------------------------------                                        MT108360
0025D8 9DC4               837 GETCHR   SSR   R0,R4                                                    MT108370
0025DA 2081               838          BTBS  8,1             IF BUSY, LOOP (POSSIBLE HANG)             MT108380
0025DC 9B04               839          RDR   R0,R4           READ A CHAR IN R4                         MT108390
0025DE D390 2010          840          LB    R9,IO           WHAT TYPE DEVICE ?          P1 10/79      MT108400
0025E2 2792               841          SIS   R9,2            TYPE 2 ?                    P1 10/79      MT108410
0025E4 2338               842          BZS   $RD.3A          BRANCH: YES. E-PLEX ON.     P1 10/79      MT108420
0025E6 4890 202C          843          LH    R9,CONWADR      GET WRITE ADDRESS                         MT108430
0025EA DE90 202F          844          OC    R9,CONWRT       TURN DEVICE AROUND                        MT108440
0025EE 9D93               845          SSR   R9,R3                                                    MT108450
0025F0 2081               846          BTBS  8,1             WAIT FOR BUSY NOT                         MT108460
0025F2 9A94               847          WDR   R9,R4           ECHO RECEIVED BYTE                        MT108470
          0000 25F4       848 $RD.3A   EQU   *               P1 10/79                                  MT108480
0025F4 C440 007F          849          NHI   R4,X'7F'        REMOVE PARITY BIT                         MT108490
0025F8 C540 0060          850          CLHI  R4,X'60'        UPPER-CASE CHARACTER ?                    MT108500
0025FC 2183               851          BLS   $RD.4           BRANCH: NO.                               MT108510
0025FE CB40 0020          852          SHI   R4,X'20'        CONVERT TO LOWER-CASE                     MT108520
002602 C540 0023          853 $RD.4    CLHI  R4,X'23'        HASH-MARK ?                               MT108530
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wanted PSW = F0
Didn't = F1


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002606  4330 2154          854          BE    OPTIN            BRANCH: YES. GO TO CMD PROC.          MT108540
00260A  C540 0018          855          CLHI  R4,X'18'         ASCII 'CANCEL' CHARACTER ?            MT108550
00260E  4330 2154          856          BE    OPTIN            BRANCH: YES.                          MT108560
002612  030F               857          BR    R15                                                    MT108570
                           858  *                                                                    MT108580
                           859  *-------------------------------------------------------------       MT108590
                           860  * IF BREAK KEY DEPRESSED, GO TO 'OPTIN' OR (BRKVECT); ELSE RETURN.  MT108600
                           861  *                                                                    MT108610
        0000 2614          862  TSTBRK  EQU   *                                                      MT108620
002614  D0E0 29A0          863          STM   R14,$TBRKSV      SAVE REGISTERS                        MT108630
002618  48F0 29E8          864          LH    R15,$BRKFLG      (R15) = 15 IF BRK ALREADY SEEN        MT108640
00261C  2337               865          BZS   $TSTB.2          BRANCH: YES.                          MT108650
                           866  *                                                                    MT108660
00261E  24F0               867  $TSTB.1 LIS   R15,0                                                 MT108670
002620  40F0 2938         868          STH   R15,BRKVECT      CANCEL BREAK VECTOR                   MT108680
002624  D1E0 29A0          869  $TSTB.1A LM   R14,$TBRKSV     RELOAD REGISTERS,                     MT108690
002628  030F               870          BR    R15              RETURN TO CALLER.                     MT108700
                           871  *                                                                    MT108710
00262A  48E0 202A          872  $TSTB.2 LH    R14,CONRADR      READ SIDE ADDRESS FOR TERMINAL        MT108720
00262E  D3F0 2010          873          LB    R15,I0           CONSOLE ID CODE                       MT108730
002632  C5F0 0002          874          CLHI  R15,2                                                  MT108740
002636  2333               875          BES   $TSTB.3          BRANCH: ITY                           MT108750
002638  C5F0 0005          876          CLHI  R15,5                                                  MT108760
00263C  4330 267A          877  $TSTB.3 BE    $TSTB.5          BRANCH: MICRO-I/O BUS                 MT108770
002640  9DEF               878          SSR   R14,R15                                                MT108780
002642  4280 261E          879          BTC   8,$TSTB.1        BRANCH: BSY = NO BRK                  MT108790
002646  C3F0 0020          880          THI   R15,X'20'                                              MT108800
00264A  4330 261E          881          BZ    $TSTB.1          BRANCH: NO FRERR = NO BRK             MT108810
00264E  9BEF               882          RDR   R14,R15                                                MT108820
002650  08FF               883          LDAR  R15,R15                                                MT108830
002652  4230 261E          884          BNZ   $TSTB.1          BRANCH: NONZERO CHAR = NO BRK         MT108840
                           885  *                                                                    MT108850
        0000 2656          886  $TSTB.4 EQU   *                IT IS BREAK                           MT108860
002656  24FF               887          LIS   R15,15                                                 MT108870
002658  40F0 29E8          888          STH   R15,$BRKFLG      SET FLAG                              MT108880
00265C  48F0 29E6          889          LH    R15,$PRTFLG      PRINTING NOW ?                        MT108890
002660  4230 2624          890          BNZ   $TSTB.1A         BRANCH: YES.                          MT108900
002664  24E0               891          LIS   R14,0                                                  MT108910
002666  48F0 29D8          892          LH    R15,BRKVECT      SPECIFIED VECTOR                      MT108920
00266A  40E0 29D8          893          STH   R14,BRKVECT      CANCEL VECTOR                         MT108930
00266E  023F               894          BNZR  R15              BUT TAKE IMMEDIATELY IF NON-ZERO.     MT108940
002670  25F1               895          LCS   R15,1            FORCE MESSAGE PRINT          P2 1/80  MT108950
002672  40F0 29E0          896          STH   R15,ISITERR      P2 1/80                               MT108960
002676  4300 255A          897          B     $PRT.3A          'BREAK TERMINATION'          P2 1/80  MT108970
                           898  *                                                                    MT108980
00267A  9DEF               899  $TSTB.5 SSR   R14,R15                                                MT108990
00267C  C3F0 0020          900          THI   R15,X'20'                                              MT109000
002680  2134               901          BNZS  $TSTB.6          BRANCH: BRK.                          MT109010
002682  9BEF               902          RDR   R14,R15          IF BRK QUEUED, SEE IT NEXT TIME.      MT109020
002684  4300 261E          903          B     $TSTB.1          BRANCH: NO FRERR = NO BRK             MT109030
002688  9BEF               904  $TSTB.6 RDR   R14,R15          READ BREAK CHAR                       MT109040
00268A  C8F0 8000          905          LHI   R15,X'8000'                                            MT109050
00268E  26F1               906  $TSTB.7 AIS   R15,1                                                  MT109060
002690  2031               907          BNZS  $TSTB.7                                                MT109070
002692  9DEF               908          SSR   R14,R15                                                MT109080
```

PSW = F1

R14,R15 → F8

```
002694   C3F0 0020          909          THI   R15,X'20'          BRK KEY STILL DOWN ?                    MT109090
002698   2038               910          BNZS  $TSTB.6            BRANCH: YES.                            MT109100
00269A   4300 2656          911          B     $TSTB.4            GO SERVICE BREAK                        MT109110
                            912  *-----------------------------                                           MT109120
                            913  * SEE IF CURRENT LIST DEVICE IS OFF-LINE (R1 & CC NON-ZERO IF OFF)       MT109130
                            914  *                                                                        MT109140
00269E   4800 29DC          915  TSTDU    LH    R0,$CONPAS                                                MT109150
0026A2   D310 29DF          916           LB    R1,IOSAVE+1        LIST DEVICE ID                         MT109160
0026A6   D410 2010          917           CLB   R1,IO              SAME AS CONSOLE DEVICE ?               MT109170
0026AA   2333               918           BES   $TSTDU.1           BRANCH: YES.                           MT109180
0026AC   4800 29DA          919           LH    R0,$LSTPAS         NON-ZERO IF LIST DEVICE ON PASLA.      MT109190
0026B0   1112               920  $TSTDU.1 SLLS  R1,2                                                      MT109200
0026E2   4821 200E          921           LH    R2,PASLADR-4(R1)   'READ SIDE' ADDRESS                   MT109210
0026B6   9D21               922           SSR   R2,R1              GET DEVICE STATUS                      MT109220
0026B8   211A               923           BTFS  1,$IS.DU                                                   MT109230
0026BA   0800               924           LDAR  R0,R0              DEVICE ON PASLA ?                      MT109240
0026BC   2336               925           BZS   $NOT.DU                                                    MT109250
0026BE   C410 00FC          926           NHI   R1,X'FC'                                                   MT109260
0026C2   C510 000C          927           CLHI  R1,X'0C'           PASLA DU IF BSY+EX SET HERE            MT109270
0026C6   2333               928           BES   $IS.DU             BRANCH: DU.                            MT109280
0026C8   2410               929  $NOT.DU  LIS   R1,0                                                      MT109290
0026CA   2302               930           BS    $DU.X                                                      MT109300
0026CC   2511               931  $IS.DU   LCS   R1,1                                                      MT109310
0026CE   4800 29E2          932  $DU.X    LH    R0,$WASDU          GET OLD FLAG                           MT109320
0026D2   0601               933           OAR   R0,R1                                                      MT109330
0026D4   4000 29E2          934           STH   R0,$WASDU          ACCUMULATE                             MT109340
0026D8   0811               935           LDAR  R1,R1              SET CC <> 0 IF DU                      MT109350
                            936  *                                 OR CC = 0 IF NOT DU                    MT109360
0026DA   030F               937           BR    R15                RETURN                                 MT109370
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                                939  *                                                                    MT109390
                                940  *--------------------------------------------------------------      MT109400
                                941  * TO PUT KEYBOARD DEVICE IN READ MODE                               MT109410
                                942  *                                                                    MT109420
0026DC   4800 202A              943  KBREAD   LH     R0,CONRADR                                          MT109430
0026E0   DE00 2022              944           OC     R0,CCNRD          OC CONSOLE - READ COMMAND        MT109440
0026E4   D800 205E              945           RD     R0,SINK           READ A DUMMY CHARACTER (SET BUSY)MT109450
0026E8   4890 29DC              946           LH     R9,$CONPAS        PASLA ?                          MT109460
0026EC   4200 26EC              947           NOP    *                 FOR SPECIAL KB DEVICE            MT109470
0026F0   2333                   948           BZS    $KBR.1            NO, BRANCH TO EXIT               MT109480
0026F2   DE00 2048              949           OC     R0,CONRQ2S        YES, OC (REQUEST TO SEND)        MT109490
0026F6   0304                   950  $KBR.1   BR     R4                RETURN                           MT109500
                                951  * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *      MT109510
         0000 26F8              952  HALT9    EQU    *                 STOP MACHINE FOR ERROR PRINT     MT109520
0026F8   41F0 269E              953           BAL    R15,TSTDU         CHECK IF LIST DEVICE OFF-LINE    MT109530
0026FC   2336                   954           BZS    $KEEP7            BRANCH: ON-LINE NOW.             MT109540
0026FE   C810 080F              955           LHI    R1,X'080F'                                         MT109550
002702   9114                   956           SLHLS  R1,4              R1 = X'80F0'                     MT109560
002704   9501                   957           EPSR   R0,R1             STOP PROCESSOR. WHEN 'EXE/RUN' DEPMT109570
002706   2207                   958           BS     HALT9             CHECK IF LIST DEVICE ON-LINE.    MT109580
                                959  *                                                                    MT109590
                                960  * LIST DEVICE WAS OFF-LINE. PRINT TOTAL, TOTERR                     MT109600
                                961  *                                                                    MT109610
         0000 2708              962  $KEEP7   EQU    *                                                  MT109620
002708   2400                   963           LIS    R0,0                                               MT109630
00270A   4000 29E2              964           STH    R0,$WASDU         RESET DU FLAG                    MT109640
00270E   41F0 24F2              965           BAL    R15,$PRINT                                         MT109650
002712   2972                   966           DC     Z(NULLMSG)        OUTPUT NULL STRING, CRLF         MT109660
002714   41F0 24F2              967           BAL    R15,$PRINT                                         MT109670
002718   2977                   968           DC     Z(TOTMSG)         'TOTAL   TOTERR'                MT109680
00271A   C840 2020              969           LHI    R4,C'  '          SPACES                           MT109690
00271E   4040 2A8C              970           STH    R4,$OUTBUF+8                                       MT109700
002722   C870 001C              971           LHI    R7,X'1C'                                           MT109710
002726   E6C0 2A84              972           LDAI   R12,$OUTBUF       DESTINATION                      MT109720
00272A   5890 29F8              973           L      R9,TOTAL                                           MT109730
00272E   41F0 2798              974           BAL    R15,CONVERT1      CONVERT TOTAL                    MT109740
002732   C870 001C              975           LHI    R7,X'1C'                                           MT109750
002736   5890 29FC              976           L      R9,TOTALERR                                        MT109760
00273A   26C3                   977           AIS    R12,3             DESTINATION                      MT109770
00273C   41F0 2798              978           BAL    R15,CONVERT1      CONVERT TOTERR                   MT109780
002740   249D                   979           LIS    R9,X'D'           CARRIAGE RETURN                  MT109790
002742   D290 2A97              980           STB    R9,$OUTBUF+19     TO TERMINATE MESSAGE.            MT109800
002746   41F0 24F2              981           BAL    R15,$PRINT        PRINT CONTENTS OF BUFFER:        MT109810
00274A   2A84                   982           DC     Z($OUTBUF)                                         MT109820
                                983  *                                TOTAL    TOTERR                  MT109830
                                984  *                                XXXX     YYYY                    MT109840
00274C   4300 2154              985           B      OPTIN             PRINT TITLE, ACCEPT COMMAND.     MT109850
                                986  *                                                                  MT109860
                                987  *--------------------------------------------------------------    MT109870
                                988  * ROUTINE RESTORES REGISTERS SAVED ON ENTRY TO CALLING ROUTINE      MT109880
                                989  * AND RETURNS BY R15                                               MT109890
                                990  *                                                                  MT109900
002750   D100 2808              991  $RSAVRET LM    R0,RSAVE                                           MT109910
002754   030F                   992           BR     R15               RETURN TO ORIGINAL CALLER        MT109920
                                993  ******* THIS IS WHERE TO IMPLEMENT STACK                           MT109930
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                                994  *                                                                    MT109940
                                995  *------------------------------                                     MT109950
                                996  *  LIST DEVICE SET UP ROUTINE                                       MT109960
                                997  *                                                                    MT109970
002756  5010 29AC               998  $SETUP   STA   R1,SET.RTN                                           MT109980
00275A  0310 29DF               999           LB    R1,ICSAVE+1        GET LIST DEVICE IDENTIFIER       MT109990
00275E  9112                   1000           SLHLS R1,2               HW INDEX                         MT110000
002760  4801 2010              1001           LH    R0,IC(R1)          GET LIST DEVICE WRITE ADDRESS    MT110010
002764  DE01 2031              1002           OC    R0,CONCMD-1(R1)                                     MT110020
002768  5810 29AC              1003           LDA   R1,SET.RTN                                          MT110030
00276C  0301                   1004           BR    R1                 RETURN                           MT110040

                               1006  * * * * * * * * * * * * * * * * * * * * * * * * * * * *            MT110060
                               1007  *                                                     *            MT110070
                               1008  *                     D I S P L A Y                   *            MT110080
                               1009  *                                                     *            MT110090
                               1010  * THIS ROUTINE WRITES TO THE DISPLAY PANEL (D1-D4)    *            MT110100
                               1011  * R7 = THE DATA TO BE WRITTEN.                        *            MT110110
                               1012  * R14 = THE RETURN ADDRESS.                           *            MT110120
                               1013  *                                                     *            MT110130
                               1014  * * * * * * * * * * * * * * * * * * * * * * * * * * *            MT110140
00276E  24D1                   1015  DISP     LIS   R13,1               LOAD R13 WITH DISPLAY ADRS       MT110150
002770  9D0C                   1016           SSR   R13,R12              GET DISPLAY STATUS               MT110160
*002772 C5C0 0004              1017           CLAI  R12,X'04'            IS IT DU ?                       MT110170
002776  233A                   1018           BES   DISPEXIT             YES, BRANCH (TO COMMON EXIT)  **** MT110180
                               1019  *                                                                   MT110190
002778  DED0 278C              1020           OC    R13,INCRMT           PUT DISPLAY IN INCREMENTAL MODE  MT110200
00277C  94C7                   1021           EXBR  R12,R7               LOAD CONTENTS OF R7 INTO R12 AND MT110210
00277E  98DC                   1022           WHR   R13,R12              WRITE VALUE ON DISPLAY PANEL     MT110220
002780  34C7                   1023           EXHR  R12,R7                                                MT110230
002782  94CC                   1024           EXBR  R12,R12                                               MT110240
002784  98DC                   1025           WHR   R13,R12                                               MT110250
002786  DED0 278D              1026           OC    R13,NORM             PUT DISPLAY IN NORMAL MODE       MT110260
00278A  030E                   1027  DISPEXIT BR    R14                RETURN TO SUBTEST             **** MT110270
00278C  40                     1028  INCRMT   DB    X'40'                                               MT110280
00278D  80                     1029  NORM     DB    X'80'                                               MT110290
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                                1031  * * * * * * * * * * * * * * * * * * * * * * * * * * * *          MT110310
                                1032  *                                                       *          MT110320
                                1033  *                    C O N V E R T                      *          MT110330
                                1034  *                                                       *          MT110340
                                1035  * THE ROUTINE CONVERTS HEX CHARACTERS TO ASCII AND      *          MT110350
                                1036  * STORES THEM IN MEMORY.                                *          MT110360
                                1037  * R7 = THE SHIFT INDEX (THE NUM OF  BITS IN THE HEX     *          MT110370
                                1038  *      CHARACTER MINUS 4).                              *          MT110380
                                1039  * R9 = THE HEX VALUE TO BE CONVERTED.                   *          MT110390
                                1040  * R12 = THE STARTING ADDRESS WHERE THE CHARACTER IS     *          MT110400
                                1041  *       TO BE STORED.                                   *          MT110410
                                1042  * R15 = THE RETURN ADDRESS.                             *          MT110420
                                1043  *                                                       *          MT110430
                                1044  * * * * * * * * * * * * * * * * * * * * * * * * * * * *          MT110440
00278E   737F 0000              1045  CONVERT  LHL   R7,0(R15)          LOAD SHIFT INDEX               MT110450
002792   73CF 0002              1046           LHL   R12,2(R15)         LOAD ADRS INDEX                MT110460
002796   26F4                   1047           AIS   R15,4                                             MT110470
002798   0869                   1048  CONVERT1 LR    R6,R9              LOAD VALUE TO BE CONVERTED     MT110480
00279A   EC67 0000              1049           SRL   R6,0(R7)           SHIFT DIGIT INTO PLACE         MT110490
00279E   C460 000F              1050           NHI   R6,X'F'            MASK OFF ALL BUT LEAST SIGNIF DIGIT MT110500
0027A2   C660 0030              1051           OHI   R6,X'30'           CONVERT TO ASCII               MT110510
0027A6   C560 003A              1052           CLHI  R6,X'3A'           IS CHARACTER A NUMBER          MT110520
0027AA   2182                   1053           BLS   CONT9              YES, CONTINUE ROUTINE          MT110530
*0027AC  2667                   1054           AHI   R6,7               NO, CONVERT TO ASCII LETTER    MT110540
0027AE   D26C 0000              1055  CONT9    STB   R6,0(R12)          STORE VALUE IN MESSAGE         MT110550
0027B2   0877                   1056           LR    R7,R7              IS CONVERSION COMPLETE         MT110560
0027B4   033F                   1057           BZR   R15                YES, RETURN TO SUBTEST         MT110570
0027B6   2774                   1058           SIS   R7,4               NO, DECREMENT SHIFT INDEX      MT110580
0027B8   26C1                   1059           AIS   R12,1              INCREMENT STORE INDEX          MT110590
0027BA   4300 2798              1060           B     CONVERT1           CONVERT NEXT HEX DIGIT         MT110600

                                1062  * * * * * * * * * * * * * * * * * * * * * * * * * * * *          MT110620
                                1063  *                                                       *          MT110630
                                1064  *                    M E M W R T                        *          MT110640
                                1065  *                                                       *          MT110650
                                1066  * THIS ROUTINE STORES THE CONTENTS OF R7 INTO ALL      *          MT110660
                                1067  * AVAILABLE MEMORY.                                     *          MT110670
                                1068  * R7 = THE VALUE TO BE STORED.                          *          MT110680
                                1069  * R14 = THE RETURN ADDRESS.                             *          MT110690
                                1070  *                                                       *          MT110700
                                1071  * * * * * * * * * * * * * * * * * * * * * * * * * * * *          MT110710
00278E   2420                   1072  MEMWRT   LIS   R2,0                                             MT110720
0027C0   2454                   1073           LIS   R5,4               ESTABLISH INCREMENT VALUE      MT110730
0027C2   C862 1FFC              1074  LDR      LHI   R6,X'1FFC'(R2)     ESTABLISH END VALUE            MT110740
0027C6   0842                   1075           LR    R4,R2              ESTABLISH STARTING ADDRESS     MT110750
0027C8   5074 0000              1076  STR      ST    R7,0(R4)           STORE CONTENTS OF R7 IN MEMORY MT110760
0027CC   C140 27C8              1077           BXLE  R4,STR             REPEAT UNTIL 8K BLOCK IS FILLED MT110770
0027D0   030E                   1078           BR    R14                RETURN ON REGISTER R14         MT110780
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                                1080  * * * * * * * * * * * * * * * * * * * * * * * * * * * *          MT110800
                                1081  *                                                       *          MT110810
                                1082  *                     T S T N U M                       *          MT110820
                                1083  *                                                       *          MT110830
                                1084  * THIS ROUTINE STORES THE CURRENT SUBTEST NUMBER IN     *          MT110840
                                1085  * THE ERROR MESSAGE AND ALSO PRINTS IT ON THE TTY.      *          MT110850
                                1086  * R14 = THE RETURN ADDRESS.                             *          MT110860
                                1087  *                                                       *          MT110870
                                1088  * * * * * * * * * * * * * * * * * * * * * * * * * * * *          MT110880
 0027D2   41F0 278E             1089  TSTNUM   BAL   R15,CONVERT        CONVERT TO ASCII CHARACTERS     MT110890
 0027D6   0004                  1090           DC    X'4'               SHIFT INDEX                     MT110900
 0027D8   2928                  1091           DC    Z(SUBNUM)          STORE INDEX                     MT110910
 0027DA   7390 2928             1092           LHL   R9,SUBNUM          LOAD ASCII VALUE OF SUBTEST NUMBER MT110920
 0027DE   4090 290C             1093           STH   R9,TT              STORE SUBTEST NUMBER IN ERROR MSG MT110930
 0027E2   D390 29F6             1094           LB    R9,CONTFLG         IS CONTINUE FLAG SET            MT110940
 0027E6   0899                  1095           LR    R9,R9                                              MT110950
 0027E8   023E                  1096           BNZR  R14                YES, RETURN TO SUBTEST          MT110960
 0027EA   41F0 24F2             1097           BAL   R15,$PRINT         NO, PRINT SUBTEST NUMBER        MT110970
 0027EE   2928                  1098           DC    Z(SUBNUM)          START ADRS OF MESSAGE           MT110980
 0027F0   030E                  1099           BR    R14                RETURN TO SUBTEST               MT110990


                                1101  * * * * * * * * * * * * * * * * * * * * * * * * * * * *          MT111010
                                1102  *                                                       *          MT111020
                                1103  *                       E R R O R                       *          MT111030
                                1104  *                                                       *          MT111040
                                1105  * THIS ROUTINE PRINTS THE FOLLOWING MESSAGE:          *          MT111050
                                1106  *                                                       *          MT111060
                                1107  * TT  XXXXXX  YYYYYYYY  ZZZZZZZZ                       *          MT111070
                                1108  *                                                       *          MT111080
                                1109  * TT = THE SUBTEST NUMBER THE ERROR OCCURED IN         *          MT111090
                                1110  * XXXXXX = THE ADDRESS OF THE LOCATION UNDER TEST      *          MT111100
                                1111  * YYYYYYYY = THE CORRECT DATA EXPECTED                 *          MT111110
                                1112  * ZZZZZZZZ = THE INCORRECT DATA READ                   *          MT111120
                                1113  *                                                       *          MT111130
                                1114  * R4 = MEMORY LOCATION UNDER TEST                      *          MT111140
                                1115  * R7 = EXPECTED DATA                                   *          MT111150
                                1116  * R8 = DATA READ                                       *          MT111160
                                1117  * R15 = THE RETURN ADDRESS                             *          MT111170
                                1118  *                                                       *          MT111180
                                1119  * * * * * * * * * * * * * * * * * * * * * * * * * * * *          MT111190
 0027F2   D000 2848             1120  ERROR    STM   R0,RSAVE+64        SAVE ALL REGISTERS              MT111200
 0027F6   D3F0 29F7             1121           LB    R15,MACFLG                                         MT111210
 0027FA   08FF                  1122           LR    R15,R15            IS MAC IN PROCESSOR ?           MT111220
*0027FC   233A                  1123           BZ    ERRSET             NO, SET ERROR FLAG              MT111230
 0027FE   48F0 29B8             1124           LH    R15,MACADR                                         MT111240
 002802   054F                  1125           CLR   R4,R15                                             MT111250
*002804   2186                  1126           BL    ERRSET                                             MT111260
 002806   CAF0 0100             1127           AHI   R15,X'100'                                         MT111270
 00280A   054F                  1128           CLR   R4,R15                                             MT111280
 00280C   4280 2860             1129           BL    RTN1                                               MT111290
 002810   24F1                  1130  ERRSET   LIS   R15,1                                             MT111300
 002812   D2F0 29F4             1131           STB   R15,ERRFLG         SET ERROR FLAG                  MT111310
 002816   48B0 202A             1132           LH    R11,CONRADR        LOAD TTY ADRS                   MT111320
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00281A  51F0 29FC        1133          AM    R15,TOTALERR      INCREMENT ERROR COUNT                        MT111330
00281E  238A             1134          BNCS  CONT7             CONTINUE UNTIL COUNT = X'FFFFFFFF'           MT111340
002820  908A             1135          SSR   R11,R10          IS TTY DU ?                                  MT111350
002822  2318             1136          BNMS  CONT7             NO, CONTINUE WITH ROUTINE                    MT111360
002824  2571             1137          LCS   R7,1                                                           MT111370
002826  5070 29FC        1138          ST    R7,TOTALERR                                                    MT111380
00282A  41E0 276E        1139          BAL   R14,DISP          YES, WRITE X'FFFFFFFF' ON DISPLAY            MT111390
00282E  C200 29D0        1140          LPSW  ERRHLT            HALT TEST EXECUTION                          MT111400
002832  908A             1141  CONT7   SSR   R11,R10                                                       MT111410
002834  4240 2866        1142          BO    BRKWAIT                                                        MT111420
002838  0894             1143          LR    R9,R4             LOAD ADRS WHERE ERROR OCCURED                MT111430
00283A  41F0 278E        1144          BAL   R15,CONVERT       CONVERT TO ASCII CHARACTERS                  MT111440
00283E  0014             1145          DC    X'14'             SHIFT INDEX                          ****    MT111450
002840  2910             1146          DC    Z(XXXXXX)         STORE INDEX                          ****    MT111460
002842  5890 2864        1147          L     R9,RSAVE+92       LOAD EXPECTED DATA                           MT111470
002846  41F0 278E        1148          BAL   R15,CONVERT       CONVERT TO ASCII CHARACTERS                  MT111480
00284A  001C             1149          DC    X'1C'             SHIFT INDEX                                  MT111490
00284C  2918             1150          DC    Z(YYYYYYYY)       STORE INDEX                                  MT111500
00284E  5890 2868        1151          L     R9,RSAVE+96       LOAD DATA READ                               MT111510
002852  41F0 278E        1152          BAL   R15,CONVERT       CONVERT TO ASCII CHARACTERS                  MT111520
002856  001C             1153          DC    X'1C'             SHIFT INDEX                                  MT111530
002858  2922             1154          DC    Z(ZZZZZZZZ)       STORE INDEX                                  MT111540
00285A  41F0 24F2        1155  RTN     BAL   R15,$PRINT        PRINT ERROR MESSAGE                          MT111550
00285E  290C             1156          DC    Z(TT)             START ADRS OF MESSAGE                        MT111560
002860  0100 2848        1157  RTN1    LM    R0,RSAVE+64       RESTORE ALL REGISTERS                        MT111570
002864  030F             1158          BR    R15               RETURN TO SUBTEST                            MT111580
002866  90BA             1159  BRKWAIT SSR   R11,R10                                                       MT111590
002868  2041             1160          BOS   BRKWAIT                                                        MT111600
00286A  0100 2848        1161          LM    R0,RSAVE+64                                                    MT111610
00286E  4300 21DE        1162          B     SUBCHK                                                         MT111620
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                                1164  * * * * * * * * * * * * * * * * * * * * * * * * * * * *                MT111640
                                1165  *                                                       *                MT111650
                                1166  *                        T O T O C                      *                MT111660
                                1167  *                                                       *                MT111670
                                1168  * THIS ROUTINE READS EVERY AVAILABLE MEMORY LOCATION   *                MT111680
                                1169  * FROM ZERO TO X'1FFC' AND COMPARES THE DATA           *                MT111690
                                1170  * READ TO AN ESTABLISHED VALUE CONTAINED IN R7. IT     *                MT111700
                                1171  * THEN STORES AN ALTERNATE VALUE, CONTAINED IN R3, IN  *                MT111710
                                1172  * EACH LOCATION READ.                                   *                MT111720
                                1173  * R3 = ALTERNATE DATA                                   *                MT111730
                                1174  * R7 = EXPECTED DATA                                    *                MT111740
                                1175  * R14 = RETURN ADDRESS                                  *                MT111750
                                1176  *                                                       *                MT111760
                                1177  * * * * * * * * * * * * * * * * * * * * * * * * * * * *                MT111770
002872  2420                  1178  TOTOC    LIS   R2,0                                                      MT111780
002874  2454                  1179           LIS   R5,4              ESTABLISH INCREMENT VALUE                MT111790
002876  C862 1FFC             1180  LDR1     LHI   R6,X'1FFC'(R2)    ESTABLISH END VALUE                      MT111800
00287A  0842                  1181           LR    R4,R2             ESTABLISH STARTING ADDRESS               MT111810
00287C  5884 0000             1182  LDR2     L     R8,0(R4)          LOAD CONTENTS OF MEMORY INTO R8          MT111820
002880  0578                  1183           CLR   R7,R8             IS CONTENTS OF MEMORY EQUAL TO R7 ?      MT111830
002882  2136                  1184           BNES  STR1A             YES, CONTINUE WITH ROUTINE               MT111840
002884  5034 0000             1185  STR1     ST    R3,0(R4)          STORE CONTENTS OF R3 IN MEMORY           MT111850
002888  C140 287C             1186           BXLE  R4,LDR2           REPEAT UNTIL 8K BLOCK HAS BEEN TESTED    MT111860
00288C  030E                  1187           BR    R14               RETURN ON REGISTER R14                   MT111870
                              1188  *                                                                        MT111880
00288E  41F0 27F2             1189  STR1A    BAL   R15,ERROR         PRINT ERROR                    ****      MT111890
002892  2207                  1190           BS    STR1              RETURN TO TEST                 ****      MT111900


                                1192  * * * * * * * * * * * * * * * * * * * * * * * * * * * *                MT111920
                                1193  *                                                       *                MT111930
                                1194  *                        F R M T O C                    *                MT111940
                                1195  *                                                       *                MT111950
                                1196  * THIS ROUTINE READS EVERY AVAILABLE MEMORY LOCATION   *                MT111960
                                1197  * FROM X'1FFC' TO ZERO AND COMPARES THE DATA           *                MT111970
                                1198  * READ TO AN ESTABLISHED VALUE CONTAINED IN R7. IT     *                MT111980
                                1199  * THEN STORES AN ALTERNATE VALUE, CONTAINED IN R3,     *                MT111990
                                1200  * IN EACH LOCATION READ.                                *                MT112000
                                1201  * R3 = ALTERNATE DATA.                                  *                MT112010
                                1202  * R7 = EXPECTED DATA                                    *                MT112020
                                1203  * R14 = RETURN ADDRESS.                                 *                MT112030
                                1204  *                                                       *                MT112040
                                1205  * * * * * * * * * * * * * * * * * * * * * * * * * * * *                MT112050
*002894  C820 1FFC             1206  FRMTOC   LI    R2,Y'1FFC'                                                MT112060
 002898  2554                  1207           LCS   R5,4              ESTABLISH DECREMENT VALUE                MT112070
 00289A  C862 E000             1208  LDR3     LHI   R6,-X'2000'(R2)   STABLISH END VALUE                       MT112080
 00289E  0842                  1209           LR    R4,R2             ESTABLISH STARTING ADDRESS               MT112090
 0028A0  5884 0000             1210  LDR4     L     R8,0(R4)          LOAD CONTENTS OF MEMORY INTO R8          MT112100
 0028A4  0587                  1211           CLAR  R8,R7             IS CONTENTS OF MEMORY EQUAL TO R8 ?**    MT112110
 0028A6  2136                  1212           BNES  STR2A             YES, CONTINUE WITH ROUTINE               MT112120
 0028A8  5034 0000             1213  STR2     ST    R3,0(R4)          STORE CONTENTS OF R3 IN  MEMORY          MT112130
 0028AC  C040 28A0             1214           BXH   R4,LDR4           REPEAT UNTIL 8K BLOCK HAS BEEN TESTED    MT112140
 0028B0  030E                  1215           BR    R14               RETURN ON REGISTER R14                   MT112150
                               1216  *                                                                        MT112160
```

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0028B2  41F0 27F2          1217  STR2A   BAL   R15,ERROR          PRINT ERROR                          ****  MT112170
0028B6  2207               1218          BS    STR2               RETURN TO TEST                       ****  MT112180
                           1219  *                                                                           MT112190
                           1220  *                                                                           MT112200
                           1221  *                                                                           MT112210
                           1222  *                                                                           MT112220
0028B8  2410               1223  DELAY   LIS   R1,0               ZERO REGISTER R1                         MT112230
0028BA  2421               1224          LIS   R2,1               LOAD INCREMENT VALUE                     MT112240
0028BC  5830 29B4          1225          L     R3,DELAYVAL        LOAD BXLE LIMIT                          MT112250
0028C0  C110 28C0          1226          BXLE  R1,*               DELAY                                    MT112260
0028C4  030F               1227          BR    R15                RETURN TO SUBTEST                        MT112270
                           1228  *-------------------------------------------------------                  MT112280
                           1229  *                                                                           MT112290
                           1230  * THIS SUBROUTINE PRINTS "TEST STILL RUNNING" MESSAGE ON                   MT112300
                           1231  * THE CONSOLE DEVICE. THIS IS HELPFUL WHEN A TEST TAKES                    MT112310
                           1232  * A LONG TIME TO COMPLETE.  RETURN ADDRESS IS R15.                         MT112320
                           1233  *                                                                           MT112330
          0000 28C6        1234  TESTMSG EQU   *                                                           MT112340
0028C6  5000 2A80          1235          ST    R0,R0SAVE          SAVE REGISTER R0                         MT112350
0028CA  5800 29EC          1236          L     R0,TESTIMER        LOAD START VALUE                         MT112360
0028CE  2701               1237          SIS   R0,1               DECREMENT                                MT112370
0028D0  5000 29EC          1238          ST    R0,TESTIMER        STORE NEW VALUE                          MT112380
*0028D4  213C              1239          BNZ   TMSG               RETURN IF NOT ZERO                       MT112390
0028D6  D000 2A00          1240          STM   R0,MOSSAVE         SAVE REGISTERS                           MT112400
0028DA  41F0 24F2          1241          BAL   R15,$PRINT         PRINT TEST RUNNING MESSAGE               MT112410
0028DE  2988               1242          DC    Z(TESTMESG)                                                 MT112420
0028E0  5800 29F0          1243          L     R0,TESTMER         RESTORE ORIGINAL VALUE                   MT112430
0028E4  5000 29EC          1244          ST    R0,TESTIMER                                                 MT112440
0028E8  D100 2A00          1245          LM    R0,MOSSAVE         RESTORE REGISTERS                        MT112450
0028EC  5800 2A80          1246  TMSG    L     R0,R0SAVE          RESTORE REGISTER R0                      MT112460
0028F0  030F               1247          BR    R15                RETURN                                   MT112470
```

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                                1249  * * * * * * * * * * * * * * * * * * * * * * * * * * * * *                MT112490
                                1250  *                                                         *                MT112500
                                1251  *                   M E S S A G E S                       *                MT112510
                                1252  *                                                         *                MT112520
                                1253  * * * * * * * * * * * * * * * * * * * * * * * * * * * * *                MT112530
0028F2  5333 324D 5431 2030     1254  TITLE    DC    C'S32MT1 06-156F01R04'                                      MT112540
0028FA  362D 3135 3646 3031
002902  5230 3420
002906  0D0A                    1255           DC    X'0D0A'                                                     MT112550
                                1256  *                                                                         MT112560
                                1257  *                                                                         MT112570
002908  2A20                    1258  ASTERISK DC    C'* ',X'0D0A'                                               MT112580
00290A  0D0A
                                1259  *                                                                         MT112590
                                1260  *                                                                         MT112600
                                1261  * ERROR MESSAGE TT  XXXXXX  YYYYYYYY  ZZZZZZZZ                           MT112610
00290C                          1262           DB    *                                                           MT112620
00290C  0000 2020               1263  TT       DC    Y'2020'                                                     MT112630
002910  0000 0000               1264  XXXXXX   DC    Y'0'                                                        MT112640
002914  0000                    1265           DC    X'0'                                                        MT112650
002916  2020                    1266           DC    X'2020'                                                     MT112660
002918  0000 0000               1267  YYYYYYYY DC    Y'0'                                                        MT112670
00291C  0000 0000               1268           DC    Y'0'                                                        MT112680
002920  2020                    1269           DC    X'2020'                                                     MT112690
002922  0000 0000               1270  ZZZZZZZZ DC    Y'0'                                                        MT112700
002926  0000                    1271           DC    X'0'                                                        MT112710
002928  0000                    1272  SUBNUM   DC    X'0'                                                        MT112720
00292A  0D0A                    1273           DC    X'0D0A'                                                     MT112730
                                1274  *                                                                         MT112740
00292C  4E4F 2045 5252 4F52     1275  NOERR    DC    C'NO ERROR',X'0D0A'                                         MT112750
002934  0D0A
        0000 2935               1276  ERREND   EQU   *-1                                                        MT112760
                                1277  *                                                                         MT112770
002936  0000                    1278  MACMSG   DC    X'0',C'MAC PRESENT ? (Y OR N)',X'0D0A',X'0' ****            MT112780
002938  4D41 4320 5052 4553
002940  454E 5420 3F20 2859
002948  204F 5220 4E29
00294E  0D0A
002950  0000
        0000 2951               1279  MACEND   EQU   *-1                                                        MT112790
                                1280  *                                                                         MT112800
002952  0000                    1281  CRLFQMSG DC    X'0',C' ?'                                                  MT112810
002954  203F
002956  0D0A                    1282  CRLF     DC    X'0D0A'                                                     MT112820
        0000 2957               1283  CRLFQEND EQU   *-1                                                        MT112830
002958  FFFF FFFF FFFF FFFF     1284  BRKMSG   DB    -1,-1,-1,-1,-1,-1,-1,-1                                     MT112840
002960  4252 4541 4B20 5445     1285           DB    C'BREAK TERMINATION',X'0D'                                  MT112850
002968  524D 494E 4154 494F
002970  4E0D
        0000 2971               1286  $BRKEND  EQU   *-1                                                        MT112860
002972  FFFF FFFF 0D            1287  NULLMSG  DB    -1,-1,-1,-1,X'0D'                                           MT112870
002977  544F 5441 4C20 2020     1288  TOTMSG   DB    C'TOTAL     TOTERR',X'0D'                                   MT112880
00297F  2020 544F 5445 5252
002987  0D
                                1289  *                                                                         MT112890
```

```
002988  5445 5354 2053 5449  1290  TESTMES6 DC    C'TEST STILL RUNNING',X'0D0A'                    MT112900
002990  4C4C 2052 554E 4E49
002998  4E47
00299A  0D0A
                             1291  *                                                              MT112910
                             1292  * * * * * * * * * * * * * * * * * * * * * * * * * * * * *    MT112920
                             1293  *                                                         *    MT112930
                             1294  *              D A T A   C O N S T A N T S                *    MT112940
                             1295  *                                                         *    MT112950
                             1296  * * * * * * * * * * * * * * * * * * * * * * * * * * * * *    MT112960
                             1297  *                                                              MT112970
00299C  00                   1298           DB    0                                               MT112980
00299D  00                   1299           DB    *                                               MT112990
0029A0                       1300           ALIGN 4                                               MT113000
0029A0  0000 0000            1301  $TBRKSV  DCY   0,0                                           MT113010
0029A4  0000 0000
0029A8  0000 0000            1302  OUT.SAV  DCY   0                                             MT113020
0029AC  0000 0000            1303  SET.RTN  DCY   0                                             MT113030
0029B0  FFFF 7FFF            1304  DATA3    DC    Y'FFFF7FFF'                                     MT113040
0029B4  000F FFFF            1305  DELAYVAL DC    Y'FFFFF'                                        MT113050
0029B8  0300                 1306  MACADR   DC    X'300'                                          MT113060
0029C0                       1307           ALIGN 8                                               MT113070
0029C0  0000 00F0            1308  ENABLE   DC    Y'00F0',PRTTITLE                                MT113080
0029C4  0000 20EA
0029C8  0000 80F0            1309  HALT     DC    Y'80F0',SETFLG                                  MT113090
0029CC  0000 2140
0029D0  0000 80F0            1310  ERRHLT   DC    Y'80F0',PRTTOT                                  MT113100
0029D4  0000 2224
0029D8  0000                 1311  BRKVECT  DC    Z(0)                                            MT113110
                             1312  *                                                              MT113120
                             1313  *-------------------------------------------                   MT113130
0029DA  0000                 1314  $LSTPAS  DCX   0                                              MT113140
0029DC  0000                 1315  $CONPAS  DCX   0                                              MT113150
0029DE  0000                 1316  IOSAVE   DCX   0                                              MT113160
0029E0  0000                 1317  ISITERR  DCX   0                                              MT113170
0029E2  0000                 1318  $WASDU   DCX   0                                              MT113180
0029E4  0000                 1319  $LINEPOS DCX   0                                              MT113190
0029E6  0000                 1320  $PRTFLG  DCX   0                                              MT113200
0029E8  0000                 1321  $BRKFLG  DCX   0                                              MT113210
0029EA  0000                 1322  $PAUSE   DCX   0                                              MT113220
0029EC  0000 0000            1323  TESTIMER DCY   0                                             MT113230
0029F0  0000 0000            1324  TESTMER  DCY   0                                             MT113240
                             1325  *-------------------------------------------                   MT113250
                             1326  *                                                              MT113260
0029F4  00                   1327  ERRFLG   DB    0                                               MT113270
0029F5  00                   1328  TTYFLG   DB    0                                               MT113280
0029F6  00                   1329  CONTFLG  DB    0                                               MT113290
                             1330  *-------------------------------------------                   MT113300
0029F7  00                   1331  MACFLG   DB    0                                               MT113310
0029F8                       1332           ALIGN 4                                               MT113320
0029F8  0000 0000            1333  TOTAL    DC    0                                               MT113330
0029FC  0000 0000            1334  TOTALERR DC    0                                               MT113340
002A00                       1335           ALIGN 4                                               MT113350
002A00                       1336  MOSSAVE  DS    128                                             MT113360
002A80                       1337  R0SAVE   DS    4                                               MT113370
```

```
        0000 2A83           1338  LNZB      EQU   *-1                                  MT113380
002A84                      1339  $OUTBUF   DS    $BUFLEN                              MT113390
                            1340  *                                                  MT113400
002AD8                      1341            ALIGN 8                                    MT113410
002AD8                      1342  PSWSAVEA  DS    8                                    MT113420
002AE0                      1343  RSAVEA    DS    640                                  MT113430
002D60                      1344  $VALU1    DS    2                                    MT113440
```

CHKSUM/M17 PUNCHER

```
002D62  2400           1346  $CHKSUM  LIS   R0,0          PUNCH M17 TAPE WITH CHECKSUM      MT113460
002D64  9510           1347         EPSR  R1,R0           SELECT REG. SET 0 & CLEAR PSW     MT113470
                       1348  *                                                              MT113480
002D66  E610 2000      1349         LDAI  R1,ORIGIN1     LOAD START ADDRESS                MT113490
002D6A  2421           1350         LIS   R2,1           LOAD INCREMENT VALUE              MT113500
002D6C  E630 2A83      1351         LDAI  R3,LNZB        LOAD FINAL ADDRESS                MT113510
002D70  2440           1352         LIS   R4,0           INITIALIZE CHKSUM BYTE            MT113520
                       1353  *                                                              MT113530
002D72  D351 0000      1354  $GEN     LB    R5,0(R1)                                       MT113540
002D76  0745           1355         XAR   R4,R5          CALCULATE CHKSUM BYTE             MT113550
002D78  C110 2D72      1356         BXLE  R1,$GEN                                          MT113560
002D7C  D240 0099      1357         STB   R4,MN+3        CHECKSUM BYTE TO BOOT LOADER      MT113570
                       1358  *                                                              MT113580
002D80  C810 0080      1359  $TAPE    LHI   R1,X'0080'                                     MT113590
002D84  9411           1360         EXBR  R1,R1                                            MT113600
002D86  9501           1361         EPSR  R0,R1          HALT PROCESSOR                    MT113610
                       1362  *                                                              MT113620
                       1363  *---------------------------------                           MT113630
                       1364  *                                                              MT113640
002D88  D360 007A      1365  $PUNCH   LB    R6,X'7A'      GET BOUTDV (PUNCH) ADDRESS.       MT113650
002D8C  DE60 007B      1366         OC    R6,X'7B'      START TAPE PUNCH                  MT113660
002D90  9D60           1367         SSR   R6,R0                                            MT113670
002D92  2081           1368         BTBS  8,1                                              MT113680
002D94  41F0 2DD4      1369         BAL   R15,$TAPL      PUNCH LEADER                      MT113690
002D98  C810 0080      1370         LHI   R1,X'80'                                         MT113700
002D9C  C830 00CF      1371         LHI   R3,X'CF'                                         MT113710
                       1372  *                                                              MT113720
002DA0  DA61 0000      1373  $PNCH1   WD    R6,0(R1)      PUNCH BOOT LOADER                 MT113730
002DA4  9D60           1374         SSR   R6,R0                                            MT113740
002DA6  2081           1375         BTBS  8,1                                              MT113750
002DA8  C110 2DA0      1376         BXLE  R1,$PNCH1                                        MT113760
002DAC  41F0 2DDA      1377         BAL   R15,$TAPL1     PUNCH ONE-FOLD GAP.               MT113770
                       1378  *                                                              MT113780
002DB0  D340 0099      1379         LB    R4,MN+3        GET CHECKSUM BYTE                 MT113790
002DB4  E610 2000      1380         LDAI  R1,ORIGIN1     (NORMALLY X'A00')                 MT113800
002DB8  E630 2A83      1381         LDAI  R3,LNZB                                          MT113810
                       1382  *                                                              MT113820
002DBC  D351 0000      1383  $PNCH2   LB    R5,0(R1)      PUNCH PROGRAM                     MT113830
002DC0  0745           1384         XAR   R4,R5                                            MT113840
002DC2  9A65           1385         WDR   R6,R5                                            MT113850
002DC4  9D60           1386         SSR   R6,R0                                            MT113860
002DC6  2081           1387         BTBS  8,1                                              MT113870
002DC8  C110 2DBC      1388         BXLE  R1,$PNCH2                                        MT113880
002DCC  41F0 2DD4      1389         BAL   R15,$TAPL      PUNCH TRAILER.                    MT113890
002DD0  4300 2D80      1390         B     $TAPE          DISPLAY CHECKSUM, HALT PROCESSOR. MT113900
```

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                          1392  * CHKSUM/M17 PUNCHER        (CONT'D)                    MT113920

002DD4   C800 0100        1394  $TAPL     LHI   R0,256          TO PUNCH BLANK LEADER   MT113940
002DD8   2303             1395            BS    $TAPLP                                  MT113950
                          1396  *                                                       MT113960
002DDA   C800 0080        1397  $TAPL1    LHI   R0,128          TO PUNCH 1-FOLD GAP     MT113970
                          1398  *                                                       MT113980
002DDE   2701             1399  $TAPLP    SIS   R0,1                                    MT113990
002DE0   032F             1400            BNPR  R15             RETURN                  MT114000
002DE2   2430             1401            LIS   R3,0                                    MT114010
002DE4   9A63             1402            WDR   R6,R3           PUNCH BLANK FRAME       MT114020
002DE6   9D68             1403            SSR   R6,R8                                   MT114030
002DE8   2081             1404            BTBS  8,1                                     MT114040
002DEA   2206             1405            BS    $TAPLP          CONTINUE.               MT114050


002DEC                    1407            END                                           MT114070
```

ASSEMBLED BY CAL 03-066R08-00 (32-BIT)

START OPTIONS: T=32,ERLST

NO CAL ERRORS
NO CAL WARNINGS
6 PASSES

TABLE SPACE USED : 8K

```
$BRKENC   0000 2971    787   1286*
$BRKFLG   0000 29E8    783    784    864    888   1321*
$BUFLEN   0000 0050     73*  1339
$CHKSUM   0000 2D62   1346*
$CON      0000 205C    178*
$CONPAS   0000 29DC    223    915    946   1315*
$DU.X     0000 26CE    930    932*
$GEN      0000 2D72   1354*  1356
$IS.DU    0000 26CC    923    928    931*
$KBR.1    0000 26F6    948    950*
$KEEP7    0000 2708    354    954    962*
$LINEPOS  0000 29E4    758   1319*
$LSTPAS   0000 29DA    200    919   1314*
$MAXIC    0000 0006    118*   190
$NCT.DU   0000 26C8    925    929*
$OTC.0    0000 2572    799*   810
$OTC.1    0000 2576    800*   805
$OTC.2    0000 2582    804*   812
$OTC.3    0000 258A    803    807*
$OTC.4    0000 259E    798    806    814*
$OTC.5    0000 25A6    816*   824
$OTC.6    0000 25C4    826*   831
$OTC.7    0000 25D2    801    817    819    822    827    829    832*
$OUTBUF   0000 2A84    970    972    980    982   1339*
$P0       0000 24F8    756*
$P1       0000 24FC    757*
$PAUSE    0000 29EA    799    804    814   1322*
$PNCH1    0000 2DA0   1373*  1376
$PNCH2    0000 2DBC   1383*  1388
$PRINT    0000 24F2    238    240    244    247    251    268    287    304    317    339    753*   789    965
                       967    981   1097   1155   1241
$PRT.2    0000 2512    766*   772    775
$PRT.3    0000 2530    769    777*
$PRT.3A   0000 255A    789*   897
$PRT.4    0000 2560    788    791*
$PRTFLG   0000 29E6    773    782    889   1320*
$PUNCH    0000 2D88   1365*
$RD.3A    0000 25F4    842    848*
$RD.4     0000 2602    851    853*
$RSAVRET  0000 2750    760    785    991*
$SETUP    0000 2756    815    998*
$STC.1    0000 2070    192    194*
$STC.2    0000 2076    195    197*
$STC.3    0000 2094    202    207*
$STC.4    0000 20D8    225    228*
```

```
$STC.5      0000 20E6    231    233*
$TAPE       0000 2D80   1359*  1390
$TAPL       0000 2DD4   1369   1389   1394*
$TAPL1      0000 2DDA   1377   1397*
$TAPLP      0000 2DDE   1395   1399*  1405
$TBRKSV     0000 29A0    863    869   1301*
$TINVAL     0000 205A    177*
$TSTB.1     0000 261E    867*   879    881    884    903
$TSTB.1A    0000 2624    869*   890
$TSTB.2     0000 262A    865    872*
$TSTB.3     0000 263C    875    877*
$TSTB.4     0000 2656    886*   911
$TSTB.5     0000 267A    877    899*
$TSTB.6     0000 2688    901    904*   910
$TSTB.7     0000 268E    906*   907
$TSTDU.1    0000 26B0    918    920*
$VALU1      0000 2D60   1344*
$WASDU      0000 29E2    285    289    353    358    762    932    934    964   1318*
ABSTOP      0000 2DEC
ADC         0000 0004
AGAIN       0000 2278    452*
AGAIN2      0000 24AA    723*
AGAIN3      0000 24B0    725*   733    742
ASTERISK    0000 2908    248    288   1258*
BEGIN       0000 21BE    321*   329
BLK         0000 231E    516    519*
BLK2        0000 2342    528    531*
BOOT        0000 0088     78     81*
BRKMSG      0000 2958    790   1284*
BRKOK       0000 219A    259    297    309*
BRKVECT     0000 29D8    868    892    893   1311*
BRKWAIT     0000 2866   1142   1159*  1160
C300ADR     0000 201E    128*
CAR2ND      0000 2042    159*
CARRD       0000 2040    158*
CARRQ2S     0000 204C    168*
CHKADR      0000 22DA    464    478*
CLIF2ND     0000 203A    155*
CLIFADR     0000 2016    124*
CLIFRD      0000 2038    154*
CON2ND      0000 2030    149*   150    219
CONCMD      0000 2032    151*   205    216    218   1002
CONENRD     0000 2031    150*
CONRADR     0000 202A    144*   213    872    943   1132
CONRD       0000 202E    147*   148    217    228    944
CONRQ2S     0000 2048    164*   199    221    222    232    949
CONT1       0000 2334    524    526*
CONT11      0000 24A4    719    721*
CONT13      0000 24E2    739    741*
CONT2       0000 2378    545    547*
CONT3       0000 23DA    617    619*
CONT4       0000 23EC    623    625*
CONT5       0000 2448    692    694*
CONT6       0000 246C    702    705*
CONT7       0000 2832   1134   1136   1141*
```

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CONT9       0000 27AE       1053   1055*
CONTFLG     0000 29F6        286    320    328    336    349    357   1094   1329*
CONTINO     0000 21B2        300    317*
CONVERT     0000 278E       1045*  1089   1144   1148   1152
CONVERT1    0000 2798        974    978   1048*  1060
CONWADR     0000 202C        145*   215    843
CONWRT      0000 202F        148*   844
CRCHK       0000 21CE        299    325*
CRLF        0000 2956        239    252    318   1282*
CRLFQ       0000 2136        260    268*
CRLFQEND    0000 2957       1283*
CRLFQMSG    0000 2952        269    305   1281*
CRT2ND      0000 2036        153*
CRTRC       0000 2034        152*
CRTRQ2S     0000 2049        165*
DATA3       0000 29B0        686    701    703    706   1304*
DELAY       0000 28B8        734   1223*
DELAYVAL    0000 29B4       1225   1305*
DISP        0000 276E        346   1015*  1139
DISPEXIT    0000 278A       1018   1027*
ENABLE      0000 29C0        236   1308*
ERREND      0000 2935       1276*
ERRFLG      0000 29F4        243    333    342   1131   1327*
ERRHLT      0000 29D0       1140   1310*
ERROR       0000 27F2        484    525    546    618    624    693    720    740   1120*  1189   1217
ERRSET      0000 2810       1123   1126   1130*
ESTDATA     0000 24A8        722*   736
FRMTCC      0000 2894        405    410   1206*
GETCHR      0000 25D8        250    295    837*
GO          0000 21D6        282    327*
HALT        0000 29C8        291   1309*
HALT9       0000 26F8        763    952*   958
IMPTOP      0000 0000I      1407
INCRMT      0000 278C       1020   1028*
INPQUST     0000 2190        304*   326
IO          0000 2010        120*   188    189    197    198    204    207    212    214    840    873    917   1001
IOSAVE      0000 29DE        208    796    916    999   1316*
ISITERR     0000 29E0        786    896   1317*
KEREAD      0000 26DC        249    294    943*
LADC        0000 0002
LDATA       0000 2430        686*   698
LDNXT1      0000 22A0        462*   467
LDNXT2      0000 22AA        465*   485
LDNXT3      0000 22F2        480    483    485*
LDP1        0000 2328        522*   530
LDP2        0000 236C        543*   552
LDR         0000 27C2       1074*
LDR1        0000 2876       1180*
LDR2        0000 287C       1182*  1186
LDR3        0000 289A       1208*
LDR4        0000 28A0       1210*  1214
LDWT        0000 00C8        104*   107
LEADER      0000 00A2         88*    92
LIM1        0000 242A        684*
LIMIT       0000 23C8        613*
```

R10	0000 000A	65*	456	457	458	459	460	468	469	470	478	481	680	696
		699	1135	1141	1159									
R11	0000 000B	66*	686	687	689	695	696	700	701	703	705	706	1132	1135
		1141	1159											
R12	0000 000C	67*	972	977	1016	1017	1021	1022	1023	1024	1024	1025	1046	1055
		1059												
R13	0000 000D	68*	1015	1016	1020	1022	1025	1026						
R14	0000 000E	69*	346	356	398	400	402	405	406	407	410	448	450	507
		509	574	576	578	581	606	610	677	682	708	721	729	736
		863	869	872	878	882	891	893	899	902	904	908	1027	1078
		1096	1099	1139	1187	1215								
R15	0000 000F	70*	238	240	244	247	250	251	268	287	295	304	317	332
		339	347	352	411	473	484	525	546	548	582	618	624	628
		693	720	734	735	740	741	743	753	754	759	767	774	778
		780	781	783	786	789	795	800	832	833	857	864	867	868
		870	873	874	876	878	880	882	883	883	887	888	889	892
		894	895	896	899	900	902	904	905	906	908	909	937	953
		965	967	974	978	981	992	1045	1046	1047	1057	1089	1097	1121
		1122	1122	1124	1125	1127	1128	1130	1131	1133	1144	1148	1152	1155
		1158	1189	1217	1227	1241	1247	1369	1377	1389	1400			
R2	0000 0002	57*	77	97	103	189	194	196	198	199	203	204	205	216
		217	218	219	226	226	227	229	451	452	453	461	466	510
		512	515	519	521	527	531	533	536	540	542	545	611	613
		614	683	684	685	709	710	715	717	718	722	723	724	802
		807	921	922	1072	1074	1075	1178	1180	1181	1206	1208	1209	1224
		1350												
R3	0000 0003	58*	82	83	84	190	191	194	212	213	214	215	227	228
		229	232	401	403	409	455	460	577	579	580	580	608	619
		632	714	715	725	727	728	730	845	1185	1213	1225	1351	1371
		1381	1401	1402										
R4	0000 0004	59*	86	87	88	90	98	100	221	222	223	224	224	230
		230	249	254	256	258	294	296	298	325	461	462	465	466
		479	482	512	513	514	515	521	522	526	527	533	534	535
		536	542	543	547	549	614	615	620	621	626	627	685	687
		688	694	698	711	715	716	717	723	725	726	732	733	737
		742	766	768	777	779	782	784	825	837	839	847	849	850
		852	853	855	950	969	970	1075	1076	1077	1125	1128	1143	1181
		1182	1185	1186	1209	1210	1213	1214	1352	1355	1357	1379	1384	
R5	0000 0005	60*	88	90	91	91	93	94	95	98	100	106	452	471
		612	681	712	753	766	770	771	773	787	1073	1179	1207	1354
		1355	1383	1384	1385									
R6	0000 0006	61*	85	95	102	199	200	201	201	349	350	350	353	357
		358	454	459	613	684	713	724	1048	1049	1050	1051	1052	1054
		1055	1174	1180	1208	1365	1366	1367	1373	1374	1385	1386	1402	1403
R7	0000 0007	62*	104	105	106	309	310	311	312	319	320	345	355	399
		404	408	449	463	468	469	474	474	476	508	511	513	517
		520	523	529	532	534	538	541	544	551	575	579	609	616
		619	620	622	625	626	629	678	689	690	691	707	710	726
		730	732	738	971	975	1021	1023	1045	1049	1056	1056	1058	1076
		1137	1138	1183	1211									
R8	0000 0008	63*	96	97	102	103	462	463	522	523	543	544	615	616
		621	622	688	691	718	737	738	1182	1183	1210	1211	1403	
R9	0000 0009	64*	397	447	453	459	460	468	469	470	478	481	506	573
		605	676	679	680	690	694	840	841	843	844	845	847	946
		973	976	979	980	1048	1092	1093	1094	1095	1095	1143	1147	1151

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RDTTY2    0000 2176   294*
REFLG     0000 212E   257   263*
REP1      0000 2424   682*  704
RSAVE     0000 2B08    72*  756   991   1120  1147  1151  1157  1161
RSAVEA    0000 2AE0  1343*
RTN       0000 285A  1155*
RTN1      0000 2860  1129  1157*
SENSE1    0000 217A   295*
SENSE4    0000 220C   347*
SET.RTN   0000 29AC   998   1003  1303*
SETFLG    0000 2140   255   273*  1309
SHIFT     0000 248A   728*  731
SINK      0000 205E   181*  945
START     0000 2146   265   277*
START1    0000 2060   113   184*
START2    0000 20E6   236*
STCCN     0000 2060   188*
STORE1    0000 2434   687*  697
STR       0000 27C8  1076*  1077
STR1      0000 2884  1185*  1190
STR1A     0000 288E  1184   1189*
STR2      0000 28A8  1213*  1218
STR2A     0000 2882  1212   1217*
STR3      0000 247E   710*
STR4      0000 248E   715*  716
STR5      0000 24C2   721   732*
STRP1     0000 230C   513*  518
STRP2     0000 234E   534*  539
SUB1      0000 223C   324   348   359   397*
SUB2      0000 226A   412   447*
SUB2A     0000 2272   450*  477
SUB3      0000 22F6   475   506*
SUB4      0000 238A   550   573*
SUB5      0000 23AC   583   605*
SUB6      0000 2412   630   676*
SUBCHK    0000 21DE   332*  744   1162
SUBNUM    0000 2928  1091  1092  1098  1272*
SWTST     0000 21FE   343*
TESTIMER  0000 29EC   322   1236  1238  1244  1323*
TESTMER   0000 29F0   323   1243  1324*
TESTMESG  0000 2988  1242  1290*
TESTMSG   0000 28C6   332   741   1234*
TITLE     0000 28F2   241   1254*
TMSG      0000 28EC  1239  1246*
TOTAL     0000 29F8   280   292   344   345   972   1333*
TOTALERR  0000 29FC   281   293   976   1133  1138  1334*
TOTMSG    0000 2977   968   1288*
TOTOC     0000 2872   402   407   578   581   1178*
TSTBRK    0000 2614   352   411   473   548   582   628   735   743   774   781   962*
TSTDU     0000 269E   347   759   800   915*  953
TSTNUM    0000 27D2   398   448   507   574   606   677   1089*
TSTSEL    0000 21F8   335   338   341*
TT        0000 290C  1093  1156  1263*
TTYCHK    0000 2220   351   353*
TTYFLG    0000 29F5  1328*
```

WRTPRA	0000 238E	609*	633
XXXXXX	0000 2910	1146	1264*
YYYYYYYY	0000 2918	1150	1267*
ZROMEM	0000 2228	355*	
ZZZZZZZZ	0000 2922	1154	1270*

PROG= S32MT2 ASSEMBLED BY CAL 03-066R08-00 (32-BIT)

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                                1  **06156204                                                          MT200010
                                2          CROSS                                                     MT200020
                                3          WIDTH 120                                                 MT200030
                                4          TARGT 32                                                  MT200040
                                5          NORX3                                                     MT200050
                                6          SQCHK                                                     MT200060
                                7  S32MT2  PROG  32 BIT MEMORY TEST PART 2  06-156F02M91R04A13       MT200070
                                8          SQUEZ 9                                                   MT200080
                                9  * * * * * * * * * * * * * * * * * * * * * * * * * * * * *         MT200090
                               10  *                                                       *         MT200100
                               11  * COPYRIGHT  PERKIN-ELMER CORP.  JULY, 1975           *         MT200110
                               12  *                                                       *         MT200120
                               13  * REVISED      AUGUST, 1980                            *         MT200130
                               14  *                                                       *         MT200140
                               15  * PROGRAM USES BASIC MODEL 7/32 INSTRUCTION SET        *         MT200150
                               16  *                                                       *         MT200160
                               17  * * * * * * * * * * * * * * * * * * * * * * * * * * * *         MT200170
0000 0000                      18  R0        EQU   0                                                 MT200180
0000 0001                      19  R1        EQU   1                                                 MT200190
0000 0002                      20  R2        EQU   2                                                 MT200200
0000 0003                      21  R3        EQU   3                                                 MT200210
0000 0004                      22  R4        EQU   4                                                 MT200220
0000 0005                      23  R5        EQU   5                                                 MT200230
0000 0006                      24  R6        EQU   6                                                 MT200240
0000 0007                      25  R7        EQU   7                                                 MT200250
0000 0008                      26  R8        EQU   8                                                 MT200260
0000 0009                      27  R9        EQU   9                                                 MT200270
0000 000A                      28  R10       EQU   10                                                MT200280
0000 000B                      29  R11       EQU   11                                                MT200290
0000 000C                      30  R12       EQU   12                                                MT200300
0000 000D                      31  R13       EQU   13                                                MT200310
0000 000E                      32  R14       EQU   14                                                MT200320
0000 000F                      33  R15       EQU   15                                                MT200330
0000 000A                      34  WORK      EQU   10                                                MT200340
                               35  *                                                                 MT200350
0000 1D00                      36  PSWSAVE   EQU   PSWSAVEA+X'100'&X'FF00'                           MT200360
0000 1D08                      37  RSAVE     EQU   PSWSAVE+X'0008'                                   MT200370
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MEMORY LOADER

```
                                    39  *                                                                    MT200390
000000I                             40          ORG   X'80'                                                  MT200400
000080   2421                       41          LIS   R2,1                                                   MT200410
000082   2303                       42          BS    BOOT                                                   MT200420
000084   1D00                       43          DC    Z(PSWSAVE+X'FF'&X'FF00') S32/3200 PPF PSW SAVE PTR     MT200430
000086   1D08                       44          DC    Z(PSWSAVE+X'FF'&X'FF00'+8) S32/3200 PPF REGSAVE PTR    MT200440
000088   E610 0A00                  45  BOOT    LDAI  R1,ORIGIN1          R1 = ADR( FIRST BYTE OF TEST PROG  MT200450
00008C   E630 1BC0                 46          LDAI  R3,LNZB+1           R3 = ADR( LAST NON-ZERO BYTE )     MT200460
000090   4030 0022                  47          STH   R3,X'22'            S16 REGISTER SAVE POINTER          MT200470
000094   2731                       48          SIS   R3,1                                                   MT200480
000096   E660 00FF                  49  MN      LDAI  R6,X'00FF'          R6 = CHKSUM BYTE = X'MN'           MT200490
00009A   0340 0078                 50          LB    R4,X'78'            INPUT DEV ADR                      MT200500
00009E   0E40 0079                 51          OC    R4,X'79'                                                 MT200510
0000A2   9045                      52  LEADER  SSR   R4,R5                                                  MT200520
0000A4   2091                      53          BTBS  9,1                 DU,BSY                             MT200530
0000A6   9845                      54          RDR   R4,R5                                                  MT200540
0000A8   0855                      55          LDAR  R5,R5                                                  MT200550
0000AA   2234                      56          BZS   LEADER              IGNORE LEADER                      MT200560
0000AC   0251 0000                 57  LOADER  ST    R5,0(R1)            STORE 1ST NON-ZERO & SUBSEQUENT BY MT200570
0000B0   0351 0000                 58          LB    R5,0(R1)            RELOAD DATA BYTE TO                MT200580
0000B4   0765                      59          XAR   R6,R5               GENERATE CHKSUM                    MT200590
0000B6   9481                      60          EXBR  R8,R1                                                  MT200600
0000B8   9828                      61          WHR   R2,R8               DISPLAY MEMORY ADDRESS             MT200610
0000BA   9045                      62          SSR   R4,R5                                                  MT200620
0000BC   2091                      63          BTBS  9,1                 DU,BSY                             MT200630
0000BE   9845                      64          RDR   R4,R5                                                  MT200640
0000C0   C110 00AC                 65          BXLE  R1,LOADER           LOAD TILL LAST BYTE                MT200650
0000C4   9486                      66          EXBR  R8,R6                                                  MT200660
0000C6   9828                      67          WHR   R2,R8               FINAL CHKSUM                       MT200670
0000C8   2478                      68  LDWT    LIS   R7,8                                                   MT200680
0000CA   117C                      69          SLLS  R7,12               R7 = X'8000'                       MT200690
0000CC   9557                      70          EPSR  R5,R7               HALT PROCESSOR.                    MT200700
0000CE   2203                      71          BS    LDWT                                                   MT200710
                                    72  *                                                                    MT200720
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                                74  *                                                                       MT200740
000DD0                          75          ORG   X'A00'                                                    MT200750
                                76  *                                                                       MT200760
                                77  *                                                                       MT200770
000A00  4300 0A60               78  ORIGIN1 B     STCON             ENTRY AT THIS POINT WILL INTIALIZE     MT200780
                                79  *                               LOW CORE & ESTABLISH MEMORY TAB        MT200790
000A04                          80          ORG   X'A10'                                                    MT200800
                                81  *----------------------------                                         MT200810
                                82  *   TEST CONSTANTS                                                    MT200820
                                83  *                                                                       MT200830
        0000 0006               84  $MAXIO  EQU   6                 > MAX VALID IDENTIFIER                 MT200840
000A10  0101                    85  IO      DC    X'0101'           I/O DEVICE(S) IDENTIFIER               MT200850
                                86  *                                                                       MT200860
000A12  0010                    87  PASLADR DC    X'0010'           PALSA/PALM READ ADDRESS                MT200870
000A14  0011                    88          DC    X'0011'           PASLA/PALM WRITE ADDRESS               MT200880
000A16  0002                    89  CLIFADR DC    X'0002'           CURRENT LOOP INTERFACE READ ADDRES     MT200890
000A18  0002                    90          DC    X'0002'           CURRENT LOOP INTERFACE WRITE ADDRE     MT200900
000A1A  0062                    91  LPADR   DC    X'0062'           DUMMY FOR LINE PRINTER                 MT200910
000A1C  0062                    92          DC    X'0062'           WRITE ADDRESS                          MT200920
000A1E  0010                    93  C300ADR DC    X'0010'           CAROUSEL/PASLA READ ADDRESS            MT200930
000A20  0011                    94          DC    X'0011'           CAROUSEL/PASLA WRITE ADDRESS           MT200940
000A22  00C0                    95  MICROBUS DC   X'00C0'           MICROBUS READ ADDRESS                  MT200950
000A24  00C0                    96          DC    X'00C0'           MICROBUS WRITE ADDRESS                 MT200960
000A26  0000                    97          DCX   0                 PROVISION FOR SPECIAL DEVICE (READ     MT200970
000A28  0000                    98          DCX   0                 WRITE ADDRESS                          MT200980
                                99  *                                                                       MT200990
                               100  * IO =   0101  FOR CRT ON PASLA                                        MT201000
                               101  *        0202  FOR TELETYPE, CAROUSEL 15/30                           MT201010
                               102  *        XX03  FOR LINE PRINTER                                       MT201020
                               103  *        0404  FOR CAROUSEL 300                                       MT201030
                               104  *        0505  FOR MICROBUS                                           MT201040
                               105  *                                                                       MT201050
                               106  *-------------------------------------------------------              MT201060
                               107  *  ETPE IO COMMANDS                                                   MT201070
                               108  *                                                                       MT201080
000A2A  0000                   109  CONRADR DCX   0                 CONSOLE DEVICE READ ADDRESS            MT201090
000A2C  0000                   110  CONWADR DCX   0                 CONSOLE DEVICE WRITE ADDRESS           MT201100
                               111  *                                                                       MT201110
000A2E  0000                   112  CONRD   DCX   0                 CONSOLE READ/WRITE COMMANDS            MT201120
        0000 0A2F              113  CONWRT  EQU   CONRD+1                                                  MT201130
000A30  0000                   114  CON2ND  DCX   0                                                        MT201140
        0000 0A31              115  CONENRD EQU   CON2ND+1                                                 MT201150
000A32  0000                   116  CONCMD  DCX   0                 DUMMY HW AS POINTER                    MT201160
000A34  A1A3                   117  CRTRD   DCX   A1A3              FOR CRT                                MT201170
000A36  EE61                   118  CRT2ND  DCX   EE61                                                     MT201180
000A38  E4E8                   119  CLIFRD  DCX   E4E8              *   CURRENT LOOP INTERFACE   P3 3/80   MT201190
000A3A  0064                   120  CLIF2ND DCX   0064              .                            P3 3/80   MT201200
000A3C  0080                   121  LPWRT   DCX   0080              *   LINE PRINTER                       MT201210
000A3E  0030                   122          DCX   0                 DUMMY FOR LP                           MT201220
000A40  A1A3                   123  CARRD   DCX   A1A3              *   CAROUSEL 300                       MT201230
000A42  F061                   124  CAR2ND  DCX   F061                                                     MT201240
000A44  8202                   125  MREADC  DCX   8202              *   MICROBUS                           MT201250
000A46  0082                   126          DCX   0082              .                            P2 1/80   MT201260
                               127  *                                                                       MT201270
                               128  *-------------------------------------------------------              MT201280
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000A48  00                    129  CONRQ2S  DB    0                 CONSOLE REQUEST TO SEND CMD          MT201290
000A49  23                    130  CRTRQ2S  DB    X'23'             FOR CRT                              MT201300
000A4A  00                    131           DB    0                 DUMMY BYTE FOR CLI                   MT201310
000A4B  00                    132           DB    0                 *   DUMMY BYTE FOR LP                MT201320
000A4C  23                    133  CARRQ2S  DB    X'23'             *   CAROUSEL 300                     MT201330
000A4D  00                    134           DB    0                 *   DUMMY BYTE FOR MICROBUS          MT201340
000A4E                        135           DB    *                 (ALIGN ON HW BOUNDRY)                MT201350
000A4E  0000                  136           DCX   0                 RESERVED                             MT201360
000A50  30F0                  137  PSW      DCX   30F0              PSW USED IN PROGRAM                  MT201370
000A52  30F0                  138  PSW2     DCX   30F0              PSW USED IN EXEC                     MT201380
000A54  70F0                  139  PSW3     DCX   70F0              PSW USED IN INTERRUPT TESTS          MT201390
000A56  0000                  140           DCX   0                 RESERVED                             MT201400
000A58  0000                  141           DCX   0                 RESERVED                             MT201410
000A5A  7FFF                  142  $TIMVAL  DCX   7FFF              TIMEOUT CONSTANT                     MT201420
000A5C  8800                  143  $CON     DCX   8800              BREAKPOINT INSTRUCTION               MT201430
                              144  *-----------------------------                                        MT201440
                              145  *                                                                     MT201450
                              146  *                                                                     MT201460
                              147  *                                                                     MT201470
                              148  *                                                                     MT201480
                              149  *                                                                     MT201490
000A5E  00                    150  SINK     DB    0                                                      MT201500
000A5F  00                    151           DB    *                                                      MT201510
        0000 0050             152  $BUFLEN  EQU   80                                                     MT201520
                              153  *                                                                     MT201530
                              154  * -------------------------------                                     MT201540
                              155  * SET UP FOR CONSOLE, LIST I/O DEVICES                               MT201550
                              156  *                                                                     MT201560
000A60  D310 0A10             157  STCON    LB    R1,IO             GET I/O IDENTIFIERS                  MT201570
000A64  D320 0A11             158           LB    R2,IO+1                                                MT201580
000A68  2436                  159           LIS   R3,$MAXIO         IDENTIFIER CAN BE 1,2,3,4,5          MT201590
000A6A  0513                  160           CLAR  R1,R3                                                  MT201600
000A6C  2182                  161           BLS   $STC.1            BRANCH IF KB IDENTIFIER OK           MT201610
000A6E  2411                  162           LIS   R1,1              ELSE FORCE CRT                       MT201620
000A70  0523                  163  $STC.1   CLAR  R2,R3                                                  MT201630
000A72  2182                  164           BLS   $STC.2            SAME TEST FOR LIST DEVICE            MT201640
000A74  2421                  165           LIS   R2,1                                                   MT201650
000A76  D210 0A10             166  $STC.2   STB   R1,IO             REESTABLISH VALUES                   MT201660
000A7A  D220 0A11             167           STB   R2,IO+1                                                MT201670
000A7E  D362 0A48             168           LB    R6,CONRQ2S(R2)                                         MT201680
000A82  4060 1F3A             169           STH   R6,$LSTPAS        SET PASLA FLAG (LIST DEVICE)         MT201690
000A86  0866                  170           LDAR  R6,R6                                                  MT201700
000A88  2336                  171           BZS   $STC.3            SKIP IF NOT PASLA                    MT201710
000A8A  9122                  172           SLHLS R2,2                                                   MT201720
000A8C  4802 0A10             173           LH    R0,IO(R2)                                              MT201730
000A90  DE02 0A32             174           OC    R0,CONCMD(R2)     ISSUE 2ND COMMAND (TO LIST DEVICE*** MT201740
                              175  *                                                                     MT201750
000A94  D300 0A10             176  $STC.3   LB    R0,IO             ESTABLISH KEYBOARD DEVICE (& IOSAVE) MT201760
000A98  D200 1F47             177           STB   R0,IOSAVE+1                                            MT201770
000A9C  9310                  178           LBR   R1,R0             (R1) = 1,2,4,5 ; (R0 = KBIDENT)      MT201780
000A9E  9112                  179           SLHLS R1,2              (R1)=4,8,16,20                       MT201790
000AA0  2712                  180           SIS   R1,2                                                   MT201800
000AA2  4831 0A10             181           LH    R3,IO(R1)                                              MT201810
000AA6  4030 0A2A             182           STH   R3,CONRADR        SET UP CONSOLE DEVICE READ ADDRESS   MT201820
000AAA  4831 0A12             183           LH    R3,IO+2(R1)                                            MT201830
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000AAE  4030 0A2C          184           STH   R3,CONWADR        SET UP CONSOLE WRITE ADDRESS          MT201840
000AB2  4821 0A32          185           LH    R2,CONCMD(R1)                                          MT201850
000AB6  4020 0A2E          186           STH   R2,CONRD          SET UP R/W COMMANDS                   MT201860
000ABA  4821 0A34          187           LH    R2,CONCMD+2(R1)                                        MT201870
000ABE  4020 0A30          188           STH   R2,CON2ND         2ND CMD; ENABLE READ CMD              MT201880
000AC2  9310               189           LBR   R1,R0                                                  MT201890
000AC4  D341 0A48          190           LB    R4,CONRQ2S(R1)                                         MT201900
000AC8  D240 0A48          191           STB   R4,CONRQ2S        CONSOLE REQUEST TO SEND               MT201910
000ACC  4040 1F4A          192           STH   R4,$CONPAS        SET PASLA FLAG (CONSOLE)              MT201920
000AD0  0844               193           LDAR  R4,R4                                                  MT201930
000AD2  2333               194           BZS   $STC.4            SKIP 2ND OC IF NOT PASLA DEVICE       MT201940
000AD4  9422               195           EXBR  R2,R2                                                  MT201950
000AD6  9E32               196           OCR   R3,R2             ISSUE 2ND COMMAND (TO CONSOLE)        MT201960
000AD8  DE30 0A2E          197  $STC.4   OC    R3,CONRD         PUT CONSOLE IN READ MODE              MT201970
000ADC  9B32               198           RDR   R3,R2             READ A DUMMY CHARACTER (SET BUSY)     MT201980
000ADE  0844               199           LDAR  R4,R4             CONSOLE PASLA DEVICE ?                MT201990
000AE0  2333               200           BZS   $STC.5            BRANCH: NO.                           MT202000
000AE2  DE30 0A48          201           OC    R3,CONRQ2S        REQUEST TO SEND (KEEP ON-LINE)        MT202010
        0000 0AE6          202  $STC.5   EQU   *                                                      MT202020
                           203  *                                                                     MT202030
000AE6  C200 1B68          204  START2   LPSW  SET1                                                   MT202040
000AEA  2400               205  EXECUTE  LIS   R0,0                                                   MT202050
000AEC  5000 0000          206           ST    R0,0                                                   MT202060
000AF0  5000 0020          207           ST    R0,X'20'          MACHINE MALFUNCTION INTRPT.          MT202070
000AF4  5000 0024          208           ST    R0,X'24'          OLD PSW                              MT202080
000AF8  5000 0028          209           ST    R0,X'28'          RESERVED,MUST BE ZERO                MT202090
000AFC  5000 002C          210           ST    R0,X'2C'                                               MT202100
000B00  5000 0030          211           ST    R0,X'30'          ILLEG.INSTR.NEW PSW                  MT202110
000B04  E610 1732          212           LA    R1,ILGINT         NEW PSW LOC.                         MT202120
000B08  5010 0034          213           ST    R1,X'34'                                               MT202130
*000B0C C810 00F0          214           LDI   R1,X'F0'                                               MT202140
000B10  5010 0038          215           ST    R1,X'38'          MACHINE MALFUNCTION INTRPT.          MT202150
000B14  E610 0C72          216           LA    R1,CLEAR1         NEW PSW LOC.                         MT202160
000B18  5010 003C          217           ST    R1,X'3C'                                               MT202170
000B1C  5000 0040          218           ST    R0,X'40'          RESERVED,MUST BE ZERO                MT202180
000B20  5000 0044          219           ST    R0,X'44'                                               MT202190
000B24  5000 0048          220           ST    R0,X'48'          ARITH.FAULT NEW PSW                  MT202200
000B28  E610 1776          221           LA    R1,ARTFLT                                              MT202210
000B2C  5010 004C          222           ST    R1,X'4C'                                               MT202220
000B30  E610 1BC0          223           LA    R1,TABLE          SYSTEM QUEUE POINTER                 MT202230
000B34  5010 0080          224           ST    R1,X'80'                                               MT202240
000B38  E610 1D00          225           LA    R1,PSWSAVE        CURRENT PSW SAVE POINTER             MT202250
000B3C  4010 0084          226           STH   R1,X'84'                                               MT202260
000B40  E610 1D08          227           LA    R1,RSAVE          REG.SAV POINTER (SET 1)              MT202270
000B44  4010 0086          228           STH   R1,X'86'                                               MT202280
000B48  5000 0088          229           ST    R0,X'88'          SYS.0 SERVICE INTRPT. NEW PSW        MT202290
000B4C  E610 1782          230           LA    R1,SYS0                                                MT202300
000B50  5010 008C          231           ST    R1,X'8C'                                               MT202310
000B54  5000 0090          232           ST    R0,X'90'          MEMORY ACCESS CONTROLLER INTRPT.     MT202320
000B58  E610 175E          233           LA    R1,MACINT         NEW PSW                              MT202330
000B5C  5010 0094          234           ST    R1,X'94'                                               MT202340
000B60  5000 0098          235           ST    R0,X'98'          SVC INTRPT,NEW PSW                   MT202350
000B64  E640 176A          236           LA    R4,SVCERR                                              MT202360
*000B68 C810 009C          237           LDI   R1,X'9C'                                               MT202370
000B6C  2422               238           LIS   R2,2                                                   MT202380
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*000E6E   C830 00BA            239          LDI   R3,X'BA'                                          MT202390
 000B72   4041 0000            240  X9C     STH   R4,0(R1)                                         MT202400
 000B76   C110 0B72            241          BXLE  R1,X9C                                           MT202410
 000B7A   2424                 242          LIS   R2,4                                             MT202420
*000B7C   C830 00CC            243          LDI   R3,X'CC'                                         MT202430
 000B80   5001 0000            244  X8C     ST    R0,0(R1)          RESERVED,MUST BE ZERO          MT202440
 000B84   C110 0B80            245          BXLE  R1,X8C                                           MT202450
*000B88   C810 30F0            246          LDI   R1,Y'30FC'                                       MT202460
 000B8C   E620 17A0            247          LDAI  R2,ALIFLT                                        MT202470
 000B90   5010 00C8            248          ST    R1,X'C8'          SET ALIGNMENT FAULT PSW  ****  MT202480
 000B94   5020 00CC            249          ST    R2,X'CC'          SET ALIGNMENT FAULT VECTOR ****  MT202490
 000B98   E640 178E            250          LA    R4,EXTINT         EXTERNAL INTERRUPT SERVICE ROUTINE MT202500
*000B9C   C810 00D0            251          LDI   R1,X'D0'          LOAD START OF ISP TABLE        MT202510
 000BA0   2422                 252          LIS   R2,2                                             MT202520
*000BA2   C830 08CC            253          LDI   R3,X'8CC'         LOAD END OF ISP TABLE    ****  MT202530
 000BA6   4041 0000            254  XCC     STH   R4,0(R1)          INTERRUPT SERVICE TABLE        MT202540
 000BAA   C110 0BA6            255          BXLE  R1,XCC                                           MT202550
                               256  *                                                              MT202560
                               257  *                                                              MT202570
                               258  *                                                              MT202580
                               259  *                                                              MT202590
                               260  *                                                              MT202600
                               261  *                                                              MT202610
          0000 0BAE            262  RESTART1 EQU  *               ENTRY AT THIS POINT ESTABLISHES  MT202620
                               263  *                                MEMORY TABLE                  MT202630
                               264  *                                                              MT202640
                               265  *                                                              MT202650
 000BAE   41F0 12F8            266  PRTTITLE BAL  R15,*PRINT                                       MT202660
 000BB2   1AA6                 267          DC    Z(CRLFMSG)                                       MT202670
 000BB4   41F0 12F8            268          BAL   R15,$PRINT        PRINT TITLE                    MT202680
 000BB8   1920                 269          DC    Z(TITLE)          START ADDRESS OF MESSAGE      MT202690
                               270  *                                                              MT202700
                               271  *                                                              MT202710
                               272  *                                                              MT202720
 000BBA   41F0 12F8            273  TOCS    BAL   R15,$PRINT        PRINT AVAILABLE MEMORY MESSAGE MT202730
 000BBE   1936                 274          DC    Z(MEMSG)          START ADDRESS OF MESSAGE      MT202740
 000EC0   2400                 275          LIS   R0,0                                             MT202750
 000BC2   5000 0000            276          ST    R0,0                                             MT202760
 000BC6   4000 1892            277          STH   R0,FLAG                                          MT202770
 000BCA   4000 1894            278          STH   R0,WRAPFLG                                       MT202780
 000BCE   2410                 279          LIS   R1,0                                             MT202790
 000BD0   4001 1AD8            280  INIG    STH   R0,KB00128(R1)                                   MT202800
 000BD4   2612                 281          AIS   R1,2                                             MT202810
*000BD6   C510 0080            282          CLAI  R1,KBEND-KB00128  (COMPARE TO SIZE OF TABLE)  ****  MT202820
 000BDA   2085                 283          BLS   INIG                                             MT202830
*000BDC   C810 0080            284          LDI   R1,X'80'                                         MT202840
 000BE0   D210 1AD8            285          STB   R1,KB00128        SET FIRST 16K MAP BIT          MT202850
*000BE4   C810 4000            286          LDI   R1,X'4000'        LOAD START ADDRESS OF SEARCH   MT202860
 000BE8   0821                 287          LDAR  R2,R1             LOAD SEARCH INCREMENT VALUE    MT202870
 000BEA   E630 40FF C000       288          LDAI  R3,Y'FFC000'      YES, CHECK FOR WRAP AROUND     MT202880
 000BF0   2441                 289          LIS   R4,1              LOAD STARTING TABLE INDEX      MT202890
 000BF2   2450                 290          LIS   R5,0              ESTABLISH ADRS OF 1ST MEMORY LOC MT202900
 000BF4   5011 0000            291  REP     ST    R1,0(R1)          STORE DATA PATTERN             MT202910
 000BF8   5020 1BBC            292          ST    R2,WCROCHG        DUMMY STORE TO DESTROY MCR ****  MT202920
                               293  *                              (INVALIDATE MCR)           ****  MT202930
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000BFC  5871 0000          294          L     R7,0(R1)        LOAD DATA PATTERN FROM SEARCH LOC      MT202940
000C00  2491               295          LIS   R9,1                                             MT202950
000C02  0517               296          CLAR  R1,R7           IS DATA READ = DATA STORED ?     MT202960
000C04  2137               297          BNES  MEMLIST                                          MT202970
000C06  5870 0000          298          L     R7,0            WAS DATA STORED IN LOCATION ZERO? MT202980
000C0A  4330 0C46          299          BZ    SETBIT                                           MT202990
000C0E  4090 1B94          300 STFLG    STH   R9,WRAPFLG      SET FLAG IF WRAP AROUND OCCURED  MT203000
000C12  4090 1B92          301 MEMLIST  STH   R9,FLAG                                          MT203010
000C16  0894               302          LDAR  R9,R4           NO, WAS LAST BIT SET ?           MT203020
000C18  2791               303          SIS   R9,1                                           MT203030
000C1A  7490 1AD8          304          TBT   R9,KB00128                                     MT203040
000C1E  4330 0C58          305          BZ    NEXT            NO, ZERO NEXT BIT IN MEMORY TABLE MT203050
000C22  0895               306          LDAR  R9,R5           YES, LOAD START ADRS OF MEMORY SEG MT203060
000C24  41F0 146C          307          BAL   R15,CONVERT     CONVERT TO ASCII CHARACTERS      MT203070
000C28  0014               308          DC    X'14'           SHIFT INDEX                      MT203080
000C2A  1948               309          DC    Z(MEMSG1)       STORE INDEX                      MT203090
000C2C  0891               310          LDAR  R9,R1                                            MT203100
000C2E  2791               311          SIS   R9,1            ESTABLISH LAST ADRS OF MEMORY SEGMENT MT203110
000C30  41F0 146C          312          BAL   R15,CONVERT     CONVERT TO ASCII CHARACTERS      MT203120
000C34  0014               313          DC    X'14'           SHIFT INDEX                      MT203130
000C36  1951               314          DC    Z(ENDVAL)       STORE INDEX                      MT203140
000C38  41F0 12F8          315          BAL   R15,$PRINT      PRINT MEMORY SEGMENT ADDRESSES   MT203150
000C3C  1948               316          DC    Z(MEMSG1)       START ADRS OF MESSAGE            MT203160
000C3E  2793               317          SIS   R9,3                                             MT203170
000C40  5090 1B80          318          ST    R9,LAST                                          MT203180
000C44  230A               319          BS    NEXT            CHECK NEXT 8K OF MEMORY          MT203190
000C46  7540 1AD8          320 SETBIT   SBT   R4,KB00128      SET BIT IN MEMORY TABLE          MT203200
000C4A  7390 1B92          321          LHL   R9,FLAG                                          MT203210
000C4E  2335               322          BZS   NEXT                                             MT203220
000C50  0851               323          LDAR  R5,R1           LOAD START ADRS OF MEMORY SEGMENT MT203230
000C52  2490               324          LIS   R9,0                                             MT203240
000C54  4090 1B92          325          STH   R9,FLAG                                          MT203250
000C58  7390 1B94          326 NEXT     LHL   R9,WRAPFLG                                       MT203260
000C5C  2139               327          BNZS  ENABLE1                                          MT203270
000C5E  2641               328          AIS   R4,1            INCREMENT TABLE INDEX            MT203280
000C60  7640 1AD8          329          RBT   R4,KB00128      ZERO NEXT BIT IN MEMORY TABLE    MT203290
000C64  C110 0BF4          330          BXLE  R1,REP          REPEAT UNTIL ALL OF MEMORY IS CHECKED MT203300
000C68  2491               331          LIS   R9,1                                             MT203310
000C6A  4300 0C0E          332          B     STFLG                                            MT203320
                           333 *                                                               MT203330
                           334 *                                                               MT203340
        0000 0C6E          335 RESTART2 EQU   *               ENTRY AT THIS POINT WILL NOT     MT203350
                           336 *                                ESTABLISH MEMORY TABLE         MT203360
                           337 *                                                               MT203370
                           338 *                                                               MT203380
000C6E  C200 1B70          339 ENABLE1  LPSW  CLEAR                                           MT203390
*000C72 C810 2000          340 CLEAR1   LDI   R1,Y'2000'                                      MT203400
000C76  5010 1BA0          341          ST    R1,LOVAL                                        MT203410
000C7A  5810 1B80          342          L     R1,LAST                                         MT203420
000C7E  5010 1BA4          343          ST    R1,HIVAL                                        MT203430
000C82  E610 16CC          344 SETVAL   LA    R1,MALFTN                                       MT203440
000C86  5010 003C          345          ST    R1,X'3C'                                        MT203450
000C8A  C200 1B78          346          LPSW  ENABLE                                          MT203460
000C8E  2410               347 PRTMSG   LIS   R1,0                                           MT203470
000C90  D210 1B99          348          STB   R1,ERRFLG                                       MT203480
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000C94   D210 1F40            349          STB   R1,$WASDU        ZERO TTY FLAG                                  MT203490
000C98   D210 189C            350          STB   R1,CONTFLG       ZERO CONTINUE FLAG                             MT203500
000C9C   41F0 12F8            351          BAL   R15,$PRINT       PRINT *SUBTEST*                                MT203510
000CA0   19F0                 352          DC    Z(TSTMSG)        START ADDRESS OF MESSAGE                       MT203520
000CA2   0370 1F40            353          LB    R7,$WASDU                                                       MT203530
000CA6   0877                 354          LDAR  R7,R7            IS TTY FLAG SET ?                              MT203540
000CA8   2333                 355          BZS   PRTMSG1          NO, CONTINUE                                   MT203550
000CAA   C200 1880            356          LPSW  HALT             YES, HALT                                      MT203560
000CAE   5010 18B4            357  PRTMSG1 ST    R1,TOTAL         ZERO TOTAL COUNT                               MT203570
000CB2   5010 18B8            358          ST    R1,TOTALERR      ZERO TOTAL ERROR COUNT                         MT203580
000CB6   4140 13CE            359  RDAGN   BAL   R4,KBREAD        READ CHARACTER FROM CONSOLE                    MT203590
000CBA   41F0 13EA            360          BAL   R15,GETCHR                                                      MT203600
000CBE   C540 000A            361          CLHI  R4,X'CA'         COMPARE WITH LINE FEED                         MT203610
000CC2   4330 0DEA            362          BE    HILO             IF =, DO 'HILO' ROUTINE                        MT203620
000CC6   C540 004C            363          CLHI  R4,C'L'          COMPARE FOR CONTINUOUS TESTING                 MT203630
*000CCA  2336                 364          BE    CONT             IF =,  BRANCH                                  MT203640
000CCC   C540 0040            365          CLHI  R4,C'@'          COMPARE WITH "@" (HALT)                        MT203650
000CD0   4330 0D28            366          BE    BRKOK            IF =, BRANCH                                   MT203660
*000CD4  2306                 367          B     RDAGN1                                                          MT203670
000CD6   2441                 368  CONT    LIS   R4,1                                                            MT203680
000CD8   D240 189C            369          STB   R4,CONTFLG       IF =, SET FLAG                                 MT203690
000CDC   4300 0CB6            370          B     RDAGN                                                           MT203700
000CE0   F810 0001 5000       371  RDAGN1  LI    R1,Y'00015000'   SET VALUES FOR TEST STILL RUNNING MESSA       MT203710
000CE6   5010 1F5C            372          ST    R1,TESTIMER                                                     MT203720
000CEA   5010 1F60            373          ST    R1,TESTMER                                                      MT203730
000CEE   0874                 374          LR    R7,R4                                                           MT203740
000CF0   CB70 0030            375          SHI   R7,X'30'         CONVERT INPUT                                  MT203750
000CF4   4280 0D1E            376          BL    QUESTION                                                        MT203760
*000CF8  C570 000A            377          CLAI  R7,NUMTSTS       IS CHAR SELECTED VALID                         MT203770
000CFC   4380 0D1E            378          BNL   QUESTION         NO, READ TTY AGAIN FOR CR                      MT203780
000D00   D270 1898            379          STB   R7,SUBTST        YES, STORE TEST SELECTED                       MT203790
000D04   2410                 380  SELTST  LIS   R1,0                                                            MT203800
000D06   D210 1897            381          STB   R1,TSTFLG        ZERO TEST FLAG                                 MT203810
000D0A   41F0 12F8            382          BAL   R15,$PRINT       PRINT A "CR"                          ****     MT203820
000D0E   1AA6                 383          DC    Z(CRLFMSG)                                                      MT203830
000D10   0310 1898            384  SUBSEL  LB    R1,SUBTST        LOAD R1 WITH SUBTEST SELECTED                  MT203840
000D14   0851                 385          LR    R9,R1                                                           MT203850
000D16   1111                 386          SLLS  R1,1             GENERATE CORRECT INDEX VALUE                   MT203860
000D18   7301 0D3C            387          LHL   R0,SUB(R1)       LOAD ADRS OF SUBTEST                           MT203870
000D1C   0300                 388          BR    R0               BRANCH TO SUBTEST SELECTED                     MT203880
000D1E   41F0 12F8            389  QUESTION BAL   R15,$PRINT      ILLEGAL INPUT, PRINT "?"                       MT203890
000D22   1AA0                 390          DC    Z(QUMARK)                                                       MT203900
000D24   4300 0CB6            391          B     RDAGN                                                           MT203910
                              392  *                                                                            MT203920
000D28   F870 0000 8000       393  BRKOK   LI    R7,Y'8000'                                                      MT203930
000D2E   5070 0030            394          ST    R7,X'30'                                                        MT203940
000D32   E670 0A00            395          LA    R7,ORIGIN1                                                      MT203950
000D36   5070 0034            396          ST    R7,X'34'                                                        MT203960
000D3A   8800                 397          BRK                                                                   MT203970
                              398  *                                                                            MT203980
000D3C   0DD2                 399  SUB     DC    Z(SUB0)                                                         MT203990
000D3E   0E64                 400          DC    Z(SUB1)                                                         MT204000
000D40   0E90                 401          DC    Z(SUB2)                                                         MT204010
000D42   0F22                 402          DC    Z(SUB3)                                                         MT204020
000D44   0FF4                 403          DC    Z(SUB4)                                                         MT204030
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000D46  1014                 404           DC    Z(SUB5)                                                  MT204040
000D48  1082                 405           DC    Z(SUB6)                                                  MT204050
000D4A  11C0                 406           DC    Z(SUB7)                                                  MT204060
000D4C  1246                 407           DC    Z(SUB8)                                                  MT204070
000D4E  12A8                 408           DC    Z(SUB9)                                                  MT204080
                             409  *                                                                         MT204090
        0000 000A            410  NUMTSTS  EQU   *-SUB/2                                                  MT204100
                             411  *                                                                         MT204110
000D50                       412           DO    16-NUMTSTS                                                 MT204120
000D50  0DE0                 413           DC    Z(SUBQSTN)                                                 MT204130
000D52  0DE0                 413           DC    Z(SUBQSTN)
000D54  0DE0                 413           DC    Z(SUBQSTN)
000D56  0DE0                 413           DC    Z(SUBQSTN)
000D58  0DE0                 413           DC    Z(SUBQSTN)
000D5A  0DE0                 413           DC    Z(SUBQSTN)
                             414  *                                                                         MT204140
                             415  *                                                                         MT204150
                             416  *                                                                         MT204160
000D5C  41F0 18F4            417  SUBCHK   BAL   R15,TESTMSG                                               MT204170
000D60  D310 1B99            418           LB    R1,ERRFLG                                                  MT204180
000D64  0811                 419           LDAR  R1,R1                 IS ERROR FLAG SET ?                MT204190
000D66  2138                 420           BNZS  TSTSEL                YES, CHECK FOR NEXT SUBTEST        MT204200
000D68  D310 1B9C            421           LB    R1,CONTFLG            IS CONTINUE FLAG SET ?             MT204210
000D6C  0811                 422           LR    R1,R1                                                    MT204220
000D6E  2134                 423           BNZS  TSTSEL                YES, CHECK FOR NEXT SUBTEST        MT204230
000D70  41F0 12F8            424           BAL   R15,$PRINT            NO, PRINT 'NO ERROR'               MT204240
000D74  19FC                 425           DC    Z(NOERR)              START ADDRESS OF MESSAGE           MT204250
000D76  2410                 426  TSTSEL   LIS   R1,0                  ZERO REGISTER R1                   MT204260
000D78  D210 1B99            427           STB   R1,ERRFLG             ZERO ERROR FLAG                    MT204270
000D7C  41F0 1840            428           BAL   R15,TSTDU             IS DEVICE UNAVAILABLE ?            MT204280
*000D80  2135                429           BNZ   TSTSEL0               IF YES, RELOAD REGISTERS, RETURN.  MT204290
                             430  *                                                                         MT204300
000D82  4810 1F40            431           LH    R1,$WASDU             WAS DEVICE EVER SEEN DU ?          MT204310
000D86  4230 1884            432           BNZ   HALT9                 OUTPUT TOTAL, TOTERR.              MT204320
000D8A  D330 1B98            433  TSTSEL0  LB    R3,SUBTST             LOAD R3 WITH CURRENT SUBTEST       MT204330
000D8E  D310 1B97            434           LB    R1,TSTFLG             LOAD R1 WITH TEST FLAG             MT204340
000D92  0811                 435           LDAR  R1,R1                 IS TEST FLAG SET ?                 MT204350
000D94  233A                 436           BZS   SWTST                 NO, READ DISPLAY SWITCH            MT204360
000D96  2631                 437           AIS   R3,1                  YES, INCREMENT SUBTEST NUMBER      MT204370
*000D98  C530 0008           438           CLAI  R3,X'8'               HAVE ALL SUBTESTS BEEN RUN ?       MT204380
000D9C  2385                 439           BNLS  STOP                  YES, CHECK SWITCH 15               MT204390
000D9E  D230 1B98            440  STRBYT   STB   R3,SUBTST             NO, STORE SUBTEST TO BE EXECUTED NEXT MT204400
000DA2  4300 0D10            441           B     SUBSEL                SELECT ADDRESS OF SUBTEST          MT204410
000DA6  2431                 442  STOP     LIS   R3,1                  START WITH SUBTEST ONE             MT204420
000DA8  2411                 443  SWTST    LIS   R1,1                  LOAD R1 WITH DISPLAY PANEL ADRS    MT204430
000DAA  5110 1BB4            444           AM    R1,TOTAL              INCREMENT TOTAL COUNT              MT204440
000DAE  5870 1BB4            445           L     R7,TOTAL                                                 MT204450
000DB2  41E0 1426            446           BAL   R14,DISP              WRITE TOTAL ON DISPLAY             MT204460
000DB6  D320 1B9C            447           LB    R2,CONTFLG                                               MT204470
000DBA  0822                 448           LDAR  R2,R2                                                    MT204480
*000DBC  203F                449           BNZ   STRBYT                                                   MT204490
000DBE  41F0 1840            450  SENSE4   BAL   R15,TSTDU             SENSE TTY STATUS                   MT204500
000DC2  4230 0D9E            451           BNZ   STRBYT                BRANCH IF DU                       MT204510
000DC6  4860 1F40            452           LH    R6,$WASDU                                                MT204520
000DCA  4330 0C8E            453           BZ    PRTMSG                NO, PRINT 'SUBTEST'                MT204530
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000DCE  4300 1894          454          B     $KEEP7                                                    MT204540
                           455  *                                                                       MT204550
                           456  *                                                                       MT204560
000DD2  2411               457  SUBQ    LIS   R1,1          LOAD R1 WITH ONE                           MT204570
000DD4  D210 1897          458          STB   R1,TSTFLG      SET TEST FLAG TO RUN ALL TEST              MT204580
000DD8  D210 1898          459          STB   R1,SUBTST      START,WITH SUBTEST 1                       MT204590
000DDC  4300 0E64          460          B     SUB1                                                      MT204600
                           461  *                                                                       MT204610
                           462  *                                                                       MT204620
000DE0  41F0 12F8          463  SUBQSTN BAL   R15,$PRINT     PRINT " ? "                        ****   MT204630
000DE4  1AA0               464          DC    Z(QUMARK)                                                 MT204640
000DE6  4300 0C8E          465          B     PRTMSG         GO RETRY SUBTEST INPUT             ****   MT204650
                           466  *                                                                       MT204660
                           467  *                                                                       MT204670
000DEA  41F0 12F8          468  HILO    BAL   R15,$PRINT     PRINT "LO= "                               MT204680
000DEE  1980               469          DC    Z(LOMSG)       START ADDRESS OF MESSAGE                   MT204690
000DF0  4190 1682          470          BAL   R9,TTYLOOP     GET DATA FROM TTY                          MT204700
000DF4  0829               471          LR    R2,R8                                                     MT204710
000DF6  C520 2000          472          CLHI  R2,X'2000'     COMPARE INPUT WITH TOP OF PROGRAM          MT204720
*000DFA 2385               473          BNL   OK             IF LOWER PRINT "?" AND REQUEST ANOTHER     MT204730
000DFC  41F0 12F8          474          BAL   R15,$PRINT                                                 MT204740
000E00  1AA0               475          DC    Z(QUMARK)                                                 MT204750
*000E02 220C               476          B     HILO                                                      MT204760
000E04  102E               477  OK      SRLS  R2,14                                                     MT204770
000E06  7420 1AD8          478          TBT   R2,KB00128                                                MT204780
000E0A  2136               479          BNZS  LOW                                                       MT204790
000E0C  41F0 12F8          480          BAL   R15,$PRINT     PRINT "MEMORY NOT AVAILABLE"               MT204800
000E10  190A               481          DC    Z(MNAMSG)      START ADDRESS OF MESSAGE                   MT204810
000E12  4300 0DEA          482          B     HILO                                                      MT204820
000E16  5080 18A0          483  LOW     ST    R8,LOVAL                                                  MT204830
                           484  *                                                                       MT204840
000E1A  41F0 12F8          485  HILO1   BAL   R15,$PRINT     PRINT "HI= "                               MT204850
000E1E  19B6               486          DC    Z(HIMSG)       START ADDRESS OF MESSAGE                   MT204860
000E20  4190 1682          487          BAL   R9,TTYLOOP     GET DATA FROM TTY                          MT204870
000E24  5890 18A0          488          L     R9,LOVAL       LOAD R9 WITH THE LOW VALUE                 MT204880
000E28  0598               489          CLAR  R9,R8          IS HIGH VALUE GREATER THAN LOW VALUE?      MT204890
000E2A  2124               490          BPS   NOTLOW        NO, PRINT MESSAGE                          MT204900
000E2C  0828               491          LR    R2,R8                                                     MT204910
000E2E  102E               492          SRLS  R2,14                                                     MT204920
000E30  7420 1AD8          493          TBT   R2,KB00128                                                MT204930
*000E34 213A               494          BNZ   HIGH           YES, STORE SELECTED BLOCK IN HIVAL         MT204940
000E36  41F0 12F8          495          BAL   R15,$PRINT     PRINT "MEMORY NOT AVAILABLE "              MT204950
000E3A  190A               496          DC    Z(MNAMSG)      START ADDRESS OF MESSAGE                   MT204960
000E3C  2304               497          BS    BRN9A          SELECT NEW HIGH VALUE                      MT204970
                           498  *                                                                       MT204980
000E3E  41F0 12F8          499  NOTLOW  BAL   R15,$PRINT     PRINT "LOW VALUE>HIGH VALUE "              MT204990
000E42  19C2               500          DC    Z(NLMSG)       START ADDRESS OF MESSAGE                   MT205000
000E44  4300 0E1A          501  BRN9A   B     HILO1                                                     MT205010
                           502  *                                                                       MT205020
000E48  F480 00FF FFFC     503  HIGH    NAI   R8,Y'00FFFFFC'                                            MT205030
000E4E  5080 18A4          504          ST    R8,HIVAL                                                  MT205040
000E52  58A0 18A0          505          L     R10,LOVAL                                                 MT205050
000E56  F4A0 00FF FFFC     506          NAI   R10,Y'00FFFFFC'                                           MT205060
000E5C  50A0 18A0          507          ST    R10,LOVAL                                                 MT205070
000E60  4300 0C8E          508          B     PRTMSG                                                    MT205080
```

SUBTEST 1

```
510  * * * * * * * * * * * * * * * * * * * * * * * * * * * * *  MT205100
511  *                                                         *  MT205110
512  *                     S U B T E S T  1                    *  MT205120
513  *                                                         *  MT205130
514  * PURPOSE:                                                *  MT205140
515  *  TO DETECT BASIC FAILURES THAT CAUSE MALFUNCTIONS       *  MT205150
516  *  IN MEMORY.                                             *  MT205160
517  *                                                         *  MT205170
518  * ASSUMPTIONS:                                            *  MT205180
519  *  THIS SUBTEST ASSUMES THAT PART 1 OF THE SERIES 32      *  MT205190
520  *  MEMORY TEST HAS RUN WITHOUT DETECTING A FAILURE.       *  MT205200
521  *                                                         *  MT205210
522  * DESIGN SPECIFICATIONS:                                  *  MT205220
523  *  ZEROS ARE WRITTEN INTO ALL AVAILABLE MEMORY FROM       *  MT205230
524  *  X'2000'(8K) TO THE TOP OF CORE. EACH FULLWORD IS       *  MT205240
525  *  READ, THE DATA READ IS CHECKED FOR ZEROS AND THEN      *  MT205250
526  *  ALL ONES ARE WRITTEN INTO THAT LOCATION. WHEN THIS     *  MT205260
527  *  PART OF THE SUBTEST IS COMPLETE EACH FULLWORD IN       *  MT205270
528  *  THE TEST AREA HAS ALL ONES WRITTEN INTO IT. NEXT       *  MT205280
529  *  EACH FULLWORD FROM THE TOP OF CORE DOWN TO X'2000'     *  MT205290
530  *  (8K) IS READ, THE DATA READ IS CHECKED FOR ALL         *  MT205300
531  *  ONES AND THEN ALL ZEROS ARE WRITTEN INTO THAT          *  MT205310
532  *  LOCATION. AT THE COMPLETION OF THIS PART OF THE        *  MT205320
533  *  SUBTEST, EACH LOCATION IN THE TEST AREA HAS ALL        *  MT205330
534  *  ZEROS WRITTEN INTO IT. ALL ONES ARE THEN WRITTEN       *  MT205340
535  *  INTO MEMORY FROM X'2000'(8K) TO THE TOP OF CORE.       *  MT205350
536  *  EACH FULLWORD IS READ, THE DATA READ IS CHECKED        *  MT205360
537  *  FOR ONES AND THEN ALL ZEROS ARE WRITTEN INTO THAT      *  MT205370
538  *  LOCATION. WHEN THIS PART OF THE SUBTEST IS             *  MT205380
539  *  COMPLETE EACH FULLWORD IN THE TEST AREA HAS ALL        *  MT205390
540  *  ZEROS WRITTEN INTO IT. NEXT EACH FULLWORD FROM THE     *  MT205400
541  *  TOP OF CORE DOWN TO X'2000'(8K) IS READ, THE DATA      *  MT205410
542  *  READ IS CHECKED FOR ALL ZEROS AND THEN ALL ONES        *  MT205420
543  *  ARE WRITTEN INTO THAT LOCATION. AT THE COMPLETION      *  MT205430
544  *  OF THE SUBTEST, EACH LOCATION IN THE TEST AREA HAS     *  MT205440
545  *  ALL ONES WRITTEN INTO IT.                              *  MT205450
546  *                                                         *  MT205460
547  * HOW TO RUN THE SUBTEST:                                 *  MT205470
548  *  THE SUBTEST MAY BE EXECUTED BY DEPRESSING THE          *  MT205480
549  *  NUMERIC KEY 1 ON THE CONSOLE DEVICE. THE SUBTEST       *  MT205490
550  *  IS THEN EXECUTED AND IF NO ERRORS ARE DETECTED         *  MT205500
551  *  THE MESSAGE "NO ERROR" WILL BE PRINTED ON THE          *  MT205510
552  *  CONSOLE FOLLOWED BY A CARRIAGE RETURN, LINE FEED,      *  MT205520
553  *  THE CHARACTERS "SUBTEST" AND "*". REFER TO             *  MT205530
554  *  PROGRAM DESCRIPTION.                                   *  MT205540
555  *                                                         *  MT205550
556  * * * * * * * * * * * * * * * * * * * * * * * * * * * * *  MT205560
```

SUBTEST 1

```
000E64   41E0 159A        558  SUB1   BAL   R14,TSTNUM      PRINT TEST NUMBER                          MT205580
000E68   2470             559         LIS   R7,0            ZERO REGISTER R7                           MT205590
000E6A   41E0 1578        560         BAL   R14,MEMWRT      WRITE ZERO IN ALL AVAILABLE MEMORY         MT205600
000E6E   2531             561         LCS   R3,1            LOAD REGISTER R3 WITH ALL ONES             MT205610
000E70   41E0 1628        562         BAL   R14,TOTOC       CHECK ALL MEMORY FROM 8K TO TOC            MT205620
000E74   2430             563         LIS   R3,0            ZERO REGISTER R3                           MT205630
000E76   2571             564         LCS   R7,1            LOAD REGISTER R7 WITH ALL ONES             MT205640
000E78   41E0 1654        565         BAL   R14,FRMTOC      CHECK ALL MEMORY FROM TOC TO 8K            MT205650
000E7C   41E0 1578        566         BAL   R14,MEMWRT      WRITE ONES IN ALL AVAILABLE MEMORY         MT205660
000E80   41E0 1628        567         BAL   R14,TOTOC       CHECK ALL MEMORY FROM 8K TO TOC            MT205670
000E84   2470             568         LIS   R7,0            ZERO REGISTER R7                           MT205680
000E86   2531             569         LCS   R3,1            LOAD REGISTER R3 WITH ALL ONES             MT205690
000E88   41E0 1654        570         BAL   R14,FRMTOC      CHECK ALL MEMORY FROM TOC TO 8K            MT205700
000E8C   4300 0D5C        571         B     SUBCHK          CHECK FOR NEXT SUBTEST                     MT205710
```

SUBTEST 2

```
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
*                                                         *
*                      S U B T E S T  2                   *
*                                                         *
* PURPOSE:                                                *
*  TO DETECT ANY ADDRESSING ERRORS IN A 16K BLOCK OF      *
*  MEMORY.                                                *
*                                                         *
* ASSUMPTIONS:                                            *
*  THIS SUBTEST ASSUMES THAT PART 1 OF THE SERIES 32      *
*  MEMORY TEST HAS RUN WITHOUT DETECTING A FAILURE.       *
*                                                         *
* DESIGN SPECIFICATIONS:                                  *
*  THE TEST AREA CONSISTS OF A TOTAL OF 20 FULLWORDS      *
*  IN EACH 8K BLOCK. THESE ARE:                           *
*  XX008 XX010 XX020 XX040 XX080 XX100 XX200 XX400        *
*  XX00C XX014 XX024 XX044 XX084 XX104 XX204 XX404        *
*                                                         *
*  XX800 XX000  XX = THE 16K BLOCK ADDRESS                *
*  XX804 XX004                                            *
*                                                         *
*  UPON EXECUTION ZEROS ARE WRITTEN AS A BACKGROUND       *
*  IN ALL AVAILABLE MEMORY FROM X'2000'(8K) TO THE        *
*  TOP OF CORE. TWO DATA PATTERNS (X'F0000F00' AND        *
*  X'00F0000F') ARE THEN WRITTEN INTO THE FIRST TWO       *
*  FULLWORDS OF THE TEST AREA AND ALL THE OTHER           *
*  FULLWORDS OF THE TEST AREA ARE READ AND CHECKED        *
*  FOR THE BACKGROUND OF ZEROS. THEN ZEROS ARE            *
*  RESTORED INTO THE FIRST TWO HALFWORDS. THIS IS         *
*  REPEATED FOR EACH OF THE FULLWORD PREVIOUSLY           *
*  SPECIFIED IN THE TEST AREA. AFTER THE TEST AREA        *
*  HAS BEEN TESTED WITH A BACKGROUND OF ZEROS, A          *
*  BACKGROUND OF ALL ONES IS WRITTEN AND THE TEST         *
*  REPEATS.                                               *
*                                                         *
* HOW TO RUN THE SUBTEST:                                 *
*  THE SUBTEST MAY BE EXECUTED BY DEPRESSING THE          *
*  NUMERIC KEY 2 ON THE CONSOLE DEVICE. THE SUBTEST       *
*  IS THEN EXECUTED AND IF NO ERRORS ARE DETECTED         *
*  THE MESSAGE "NO ERROR" WILL BE PRINTED ON THE          *
*  CONSOLE FOLLOWED BY A CARRIAGE RETURN, LINE FEED,      *
*  THE CHARACTERS "SUBTEST" AND "*". REFER TO             *
*  PROGRAM DESCRIPTION.                                   *
*                                                         *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
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MT205730 MT205740 MT205750 MT205760 MT205770 MT205780 MT205790 MT205800 MT205810 MT205820 MT205830 MT205840 MT205850 MT205860 MT205870 MT205880 MT205890 MT205900 MT205910 MT205920 MT205930 MT205940 MT205950 MT205960 MT205970 MT205980 MT205990 MT206000 MT206010 MT206020 MT206030 MT206040 MT206050 MT206060 MT206070 MT206080 MT206090 MT206100 MT206110 MT206120 MT206130 MT206140 MT206150 MT206160 MT206170

SUBTEST 2

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000E90   41E0 159A          619  SUB2     BAL   R14,TSTNUM        PRINT TEST NUMBER                          MT206190
000E94   2470               620           LIS   R7,0              ZERO REGISTER R7                           MT206200
000E96   41F0 1578          621  SUB2A    BAL   R14,MEMWRT       STORE CONTENTS OF R7 IN ALL AVAIL MEM      MT206210
000E9A   41F0 149C          622           BAL   R15,FWR1          FIND FIRST AVAILABLE 16K BLOCK             MT206220
000E9E   E652 0004          623  AGAIN    LOAI  R5,4(R2)          ESTABLISH END ADDRESS                      MT206230
000EA2   0892               624           LDAR  R9,R2             ESTABLISH START ADDRESS                    MT206240
000EA4   F860 F000 0F00     625           LDI   R6,Y'F0000F00'    LOAD DATA PATTERN                          MT206250
000EAA   F830 00F0 000F     626           LDI   R3,Y'00F0000F'    LOAD ALTERNATE DATA PATTERN                MT206260
000EB0   2484               627           LIS   R11,4             LOAD STARTING INDEX VALUE                  MT206270
000EB2   1181               628  NEXT1    SLLS  R11,1             SHIFT INDEX LEFT ONE POSITION              MT206280
*000EB4  C480 0FFF          629           NAI   R11,X'FFF'        MASK OFF MOST SIGNIFICANT DIGIT            MT206290
000EB8   5069 4800 0000     630           ST    R6,0(R9,R11)      STORE DATA PATTERNS IN MEMORY              MT206300
000EBE   5039 4800 0004     631           ST    R3,4(R9,R11)                                                 MT206310
000EC4   0842               632           LDAR  R4,R2             LOAD REGISTER R4 WITH BLOCK ADDRESS        MT206320
000EC6   5884 0000          633  LDNXT1   L     R8,0(R4)          LOAD R8 WITH CONTENTS OF MEMORY            MT206330
000ECA   0587               634           CLAR  R8,R7             IS CONTENTS OF MEMORY = CONTENTS OFR7      MT206340
000ECC   4230 0F06          635           BNE   CHKADR            NO, CHECK MEMORY ADDRESS                   MT206350
000ED0   2644               636  LDNXT2   AIS   R4,4              YES, INCREMENT MEMORY ADDRESS              MT206360
000ED2   054A               637           CLAR  R4,R10            HAS ENTIRE BLOCK BEEN CHECKED ?            MT206370
000ED4   2087               638           BLS   LDNXT1            NO, CHECK NEXT LOCATION                    MT206380
000ED6   5079 4800 0000     639           ST    R7,0(R9,R11)      YES, RESTORE BACKGROUND TO TEST LOC        MT206390
000EDC   5079 4800 0004     640           ST    R7,4(R9,R11)                                                 MT206400
000EE2   E609 4800 0004     641           LA    R0,4(R9,R11)      LOAD LAST ADRS TESTED                      MT206410
000EE8   0550               642           CLAR  R5,R0             HAVE ALL 40 LOCATIONS BEEN TESTED ?        MT206420
000EEA   4230 0EB2          643           BNE   NEXT1             NO, STORE DATA IN NEXT TEST LOCATION       MT206430
000EEE   4120 1440          644           BAL   R2,WRTFTN                                                    MT206440
000EF2   41F0 14B4          645           BAL   R15,FWR           YES, FIND NEXT AVAILABLE 8K BLOCK          MT206450
000EF6   4230 0E9E          646           BNZ   AGAIN             REPEAT TEST FOR NEXT BLOCK                 MT206460
000EFA   0877               647           LDAR  R7,R7             HAS TEST RUN WITH BACKGROUND OF ONES       MT206470
000EFC   4230 0D5C          648           BNZ   SUBCHK            YES, CHECK FOR NEXT SUBTEST                MT206480
000F00   2571               649           LCS   R7,1              NO, LOAD R7 WITH ALL ONES                  MT206490
000F02   4300 0E96          650           B     SUB2A             REPEAT TEST WITH BACKGROUND OF ONES        MT206500
000F06   E609 4800 0000     651  CHKADR   LA    R0,0(R9,R11)                                                 MT206510
000F0C   0540               652           CLAR  R4,R0             IS THIS THE FIRST TEST LOCATION ?          MT206520
000F0E   2338               653           BES   LDNXT3            YES, CONTINUE TEST                         MT206530
000F10   E609 4800 0004     654           LA    R0,4(R9,R11)                                                 MT206540
000F16   0540               655           CLAR  R4,R0             NO, IS THIS THE SECOND TEST LOCATION       MT206550
000F18   2333               656           BES   LDNXT3            YES, CONTINUE TEST                         MT206560
000F1A   41F0 15C0          657           BAL   R15,ERROR         NO, PRINT ERROR                            MT206570
000F1E   4300 0ED0          658  LDNXT3   B     LDNXT2           CONTINUE TEST                              MT206580
```

SUBTEST 3

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                    660  * * * * * * * * * * * * * * * * * * * * * * * * * * * *                MT206600
                    661  *                                                       *                MT206610
                    662  *                    S U B T E S T  3                   *                MT206620
                    663  *                                                       *                MT206630
                    664  * PURPOSE:                                             *                MT206640
                    665  *  TO TEST ALL DATA LINES AND MEMORY LOCATIONS FROM    *                MT206650
                    666  *  X'2000'(8K) TO THE TOP OF CORE.                     *                MT206660
                    667  *                                                       *                MT206670
                    668  * ASSUMPTIONS:                                         *                MT206680
                    669  *  THIS SUBTEST ASSUMES THAT PART 1 OF THE SERIES 32   *                MT206690
                    670  *  MEMORY TEST HAS RUN WITHOUT DETECTING A FAILURE.    *                MT206700
                    671  *                                                       *                MT206710
                    672  *  DESIGN SPECIFICATIONS:                             *                MT206720
                    673  *  THE TEST PATTERNS 80004000, 20001000, 0800400,     *                MT206730
                    674  *  02000100, 00800040, 00200010, 00080004, 00020001   *                MT206740
                    675  *  ARE WRITTEN INTO MEMORY FROM X'2000' TO THE TOP OF  *                MT206750
                    676  *  CORE. EACH FULLWORD IS READ AND CHECKED. THEN THE   *                MT206760
                    677  *  COMPLEMENT OF THE TEST PATTERNS ARE WRITTEN INTO    *                MT206770
                    678  *  MEMORY FROM THE TOP OF CORE DOWN TO X'2000'(8K).    *                MT206780
                    679  *  EACH FULLWORD IS THEN READ AND CHECKED.             *                MT206790
                    680  *                                                       *                MT206800
                    681  * HOW TO RUN THE SUBTEST:                             *                MT206810
                    682  *  THE SUBTEST MAY BE EXECUTED BY DEPRESSING THE      *                MT206820
                    683  *  NUMERIC KEY 3 ON THE CONSOLE DEVICE.  THE SUBTEST  *                MT206830
                    684  *  IS THEN EXECUTED AND IF NO ERRORS ARE DETECTED     *                MT206840
                    685  *  THE MESSAGE "NO ERROR" WILL BE PRINTED ON THE      *                MT206850
                    686  *  CONSOLE FOLLOWED BY A CARRIAGE RETURN, LINE FEED,  *                MT206860
                    687  *  THE CHARACTERS "SUBTEST" AND "*". REFER TO         *                MT206870
                    688  *  PROGRAM DESCRIPTION.                               *                MT206880
                    689  *                                                       *                MT206890
                    690  * * * * * * * * * * * * * * * * * * * * * * * * * * * *                MT206900

000F22  41E0 159A   692  SUB3   BAL   R14,TSTNUM        PRINT TEST NUMBER                        MT206920
000F26  2470        693         LIS   R7,0              ZERO REGISTER R7                         MT206930
000F28  41E0 1578   694         BAL   R14,MEMWRT        WRITE ZERO IN ALL AVAILABLE MEMORY       MT206940
000F2C  41F0 149C   695         BAL   R15,FWR1          FIND FIRST AVAILABLE 16K BLOCK           MT206950
000F30  F870 8000 4000 696      LDI   R7,Y'80004000'    ESTABLISH DATA PATTERN                   MT206960
000F36  0842        697         LDAR  R4,R2             ESTABLISH STARTING ADDRESS               MT206970
000F38  5074 0000   698  STRP1  ST    R7,0(R4)         STORE CONTENTS OF R7 IN MEMORY           MT206980
000F3C  2644        699         AIS   R4,4              INCREMENT MEMORY ADDRESS                 MT206990
000F3E  054A        700         CLAR  R4,WCRK           HAS 16K BLOCK BEEN FILLED ?     ****     MT207000
000F40  2386        701         BNLS  BLK               YES, CHECK FOR NEXT 16K BLOCK            MT207010
000F42  EA70 0002   702  NXT1   RRL   R7,2              NO, ROTATE DATA PATTERN                  MT207020
000F46  2207        703         BS    STRP1             REPEAT UNTIL 16K BLOCK HAS BEEN FILLED   MT207030
000F48  0842        704  LDR5   LDAR  R4,R2             ESTABLISH START ADRS OF BLOCK            MT207040
000F4A  2204        705         BS    NXT1                                                       MT207050
000F4C  4120 1440   706  BLK    BAL   R2,WRTFTN                                                  MT207060
000F50  41F0 1484   707         BAL   R15,FWR           FIND NEXT AVAILABLE 16K BLOCK            MT207070
*000F54 2036        708         BNZ   LDR5              FILL NEXT 16K BLOCK                      MT207080
000F56  41F0 149C   709         BAL   R15,FWR1          FIND FIRST AVAILABLE 16K BLOCK           MT207090
000F5A  F870 8000 4000 710      LDI   R7,Y'80004000'    ESTABLISH DATA PATTERN                   MT207100
000F60  0842        711         LDAR  R4,R2             ESTABLISH STARTING ADDRESS               MT207110
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SUBTEST 3

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000F62  5884 0000          712  LDP1    L     R8,0(R4)          LOAD CONTENTS OF MEMORY INTO R8          MT207120
000F66  0578               713          CLAR  R7,R8             IS CONTENTS OF MEMORY EQUAL TO PATRN?    MT207130
000F68  4230 0FE4          714          BNE   CONT1R            YES, CONTINUE WITH ROUTINE        ****   MT207140
000F6C  2644               715  CONT1   AIS   R4,4              INCREMENT MEMORY ADDRESS                 MT207150
000F6E  054A               716          CLAR  R4,WORK           HAS 16K BLOCK BEEN TESTED ?       ****   MT207160
000F70  2386               717          BNLS  BLK2              YES, FIND NEXT AVAILABLE 16K BLOCK       MT207170
000F72  EA70 0002          718  NXT2    RRL   R7,2               NO, ROTATE DATA PATTERN                  MT207180
000F76  220A               719          BS    LDP1              REPEAT UNTIL 16K BLOCK HAS BEEN TESTED   MT207190
000F78  0842               720  LDR6    LDAR  R4,R2             ESTABLISH START ADRS OF BLOCK            MT207200
000F7A  2204               721          BS    NXT2                                                       MT207210
000F7C  4120 1440          722  BLK2    BAL   R2,WRTFTN                                                  MT207220
000F80  41F0 14B4          723          BAL   R15,FWR           FIND NEXT ABAILABLE 16K BLOCK            MT207230
*000F84 2036               724          BNZ   LDR6              TEST NEXT 16K BLOCK                      MT207240
000F86  41F0 150E          725          BAL   R15,BKWR1         FIND LAST AVAILABLE 16K BLOCK            MT207250
000F8A  F870 FFFD FFFE     726          LDI   R7,Y'FFFDFFFE'    ESTABLISH DATA PATTERN                   MT207260
000F90  0842               727          LDAR  R4,R2             ESTABLISH STARTING ADDRESS               MT207270
000F92  5074 0000          728  STRP2   ST    R7,0(R4)          STORE CONTENTS OF R7 IN MEMORY           MT207280
000F96  2744               729          SIS   R4,4              DECREMENT MEMORY ADDRESS                 MT207290
000F98  054A               730          CLAR  R4,R10            AS AN 16K BLOCK BEEN FILLED ?     ****   MT207300
000F9A  2186               731          BLS   MBLK              YES, CHECK FOR NEXT 16K BLOCK            MT207310
000F9C  EB70 0002          732  NXT3    RLL   R7,2               NO, ROTATE DATA PATTERN                  MT207320
000FA0  2207               733          BS    STRP2             REPEAT UNTIL 16K BLOCK HAS BEEN FILLED   MT207330
000FA2  0842               734  LDR9    LDAR  R4,R2             ESTABLISH START ADRS OF BLOCK            MT207340
000FA4  2204               735          BS    NXT3                                                       MT207350
000FA6  4120 1440          736  MBLK    BAL   R2,WRTFTN                                                  MT207360
000FAA  41F0 1526          737          BAL   R15,BKWR          FIND NEXT AVAILABLE 16K BLOCK            MT207370
*000FAE 2235               738          BZ    LDR9              FILL NEXT BLOCK                          MT207380
000FB0  41F0 150E          739          BAL   R15,BKWR1         YES, FIND LAST AVAILABLE 16K BLOCK       MT207390
000FB4  F870 FFFD FFFE     740          LDI   R7,Y'FFFDFFFE'    ESTABLISH DATA PATTERN                   MT207400
000FBA  0842               741          LDAR  R4,R2             ESTABLISH STARTING ADDRESS               MT207410
000FBC  5884 0000          742  LDP2    L     R8,0(R4)          LOAD CONTENTS OF MEMORY INTO R8          MT207420
000FC0  0578               743          CLAR  R7,R8             IS CONTENTS OF MEMORY EQUAL TO PATTRN    MT207430
000FC2  4230 0FEC          744          BNE   CONT2R            YES, CONTINUE WITH ROUTINE        ****   MT207440
000FC6  2744               745  CONT2   SIS   R4,4              DECREMENT MEMORY ADDRESS                 MT207450
000FC8  054A               746          CLAR  R4,R10            AS AN 16K BLOCK BEEN TESTED ?     ****   MT207460
000FCA  2186               747          BLS   MBLK2             YES, FIND NEXT AVAILABLE 16K BLOCK       MT207470
000FCC  EB70 0002          748  NXT4    RLL   R7,2               NO, ROTATE DATA PATTERN                  MT207480
000FD0  220A               749          BS    LDP2              REPEAT UNTIL 16K BLOCK HAS BEEN TESTED   MT207490
000FD2  0842               750  LDR10   LDAR  R4,R2             ESTABLISH START ADRS OF BLOCK            MT207500
000FD4  2204               751          BS    NXT4                                                       MT207510
000FD6  4120 1440          752  MBLK2   BAL   R2,WRTFTN                                                  MT207520
000FDA  41F0 1526          753          BAL   R15,BKWR          FIND NEXT AVAILABLE 16K BLOCK            MT207530
*000FDE 2236               754          BZ    LDR10             TEST NEXT 16K BLOCK                      MT207540
000FE0  4300 0D5C          755          B     SUBCHK            CHECK FOR NEXT SUBTEST                   MT207550
                           756  *                                                                        MT207560
000FE4  41F0 15C0          757  CONT1R  BAL   R15,ERROR         PRINT ERROR                       ****   MT207570
000FE8  4300 0F6C          758          B     CONT1             RETURN                            ****   MT207580
                           759  *                                                                        MT207590
000FEC  41F0 15C0          760  CONT2R  BAL   R15,ERROR         PRINT ERROR                       ****   MT207600
000FF0  4300 0FC6          761          B     CONT2             RETURN                            ****   MT207610
```

SUBTEST 4

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                        763  * * * * * * * * * * * * * * * * * * * * * * * * * * * *                MT207630
                        764  *                                                       *                MT207640
                        765  *                    S U B T E S T  4                   *                MT207650
                        766  *                                                       *                MT207660
                        767  * PURPOSE:                                             *                MT207670
                        768  *                                                       *                MT207680
                        769  *  TO DETECT ANY DATA COUPLING BETWEEN FULLWORDS IN    *                MT207690
                        770  *  THE TEST AREA.                                      *                MT207700
                        771  *                                                       *                MT207710
                        772  * ASSUMPTIONS:                                        *                MT207720
                        773  *  THIS SUBTEST ASSUMES THAT PART 1 OF THE SERIES 32   *                MT207730
                        774  *  MEMORY TEST HAS RUN WITHOUT DETECTING A FAILURE.    *                MT207740
                        775  *                                                       *                MT207750
                        776  * DESIGN SPECIFICATIONS:                              *                MT207760
                        777  *  ZEROS ARE WRITTEN INTO ALL AVAILABLE MEMORY FROM    *                MT207770
                        778  *  X'2000'(8K) TO THE TOP OF CORE. ZEROS ARE READ      *                MT207780
                        779  *  FROM EACH LOCATION AND ONES ARE WRITTEN INTO        *                MT207790
                        780  *  LOCATIONS X'2002',X'2006',X'200A'...ETC. THEN THE   *                MT207800
                        781  *  DATA FROM LOCATIONS X'2002',X'2006',X'200A'...ETC.  *                MT207810
                        782  *  IS READ AND CHECKED FOR ONES AND LOCATIONS X'2000',*                MT207820
                        783  *  X'2004',X'2008'...ETC., ARE CHECKED FOR ZEROS.      *                MT207830
                        784  *                                                       *                MT207840
                        785  * HOW TO RUN THE SUBTEST:                             *                MT207850
                        786  *  THE SUBTEST MAY BE EXECUTED BY DEPRESSING THE      *                MT207860
                        787  *  NUMERIC KEY 4 ON THE CONSOLE DEVICE.  THE SUBTEST   *                MT207870
                        788  *  IS THEN EXECUTED AND IF NO ERRORS ARE DETECTED      *                MT207880
                        789  *  THE MESSAGE "NO ERROR" WILL BE PRINTED ON THE       *                MT207890
                        790  *  CONSOLE FOLLOWED BY A CARRIAGE RETURN, LINE FEED.   *                MT207900
                        791  *  THE CHARACTERS "SUBTEST" AND "*". REFER TO          *                MT207910
                        792  *  PROGRAM DESCRIPTION.                                *                MT207920
                        793  *                                                       *                MT207930
                        794  * * * * * * * * * * * * * * * * * * * * * * * * * * * *                MT207940

000FF4  41E0 159A       796  SUB4     BAL   R14,TSTNUM        PRINT TEST NUMBER                     MT207960
000FF8  2470            797           LIS   R7,0               ZERO REGISTER R7                      MT207970
000FFA  41E0 1578       798           BAL   R14,MEMWRT         WRITE ZERO IN ALL AVAILABLE MEMORY    MT207980
000FFE  F830 0000 FFFF  799           LDI   R3,Y'0000FFFF'     LOAD R3 WITH HALF ZEROS AND HALF ONES MT207990
001004  41E0 1628       800           BAL   R14,TOTOC          CHECK ALL MEMORY FROM 8K TO TOC       MT208000
001008  0873            801           LOAR  R7,R3              LOAD R7 WITH HALF ZEROS AND HALF ONES MT208010
00100A  2430            802           LIS   R3,0               ZERO REGISTER R3                      MT208020
00100C  41E0 1628       803           BAL   R14,TOTOC          CHECK ALL MEMORY FROM 8K TO TOC       MT208030
001010  4300 005C       804           B     SUBCHK             CHECK FOR NEXT SUBTEST                MT208040
```

SUBTEST 5

```
806  * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *  MT208060
807  *                                                               *  MT208070
808  *                        S U B T E S T  5                       *  MT208080
809  *                                                               *  MT208090
810  * PURPOSE:                                                      *  MT208100
811  *  TO TEST MEMORY FOR DIFFERENT WORST CASE PATTERNS.            *  MT208110
812  *                                                               *  MT208120
813  * ASSUMPTIONS:                                                  *  MT208130
814  *  THIS SUBTEST ASSUMES THAT PART 1 OF THE SERIES 32            *  MT208140
815  *  MEMORY TEST HAS RUN WITHOUT DETECTING A FAILURE.             *  MT208150
816  *                                                               *  MT208160
817  * DESIGN SPECIFICATIONS:                                        *  MT208170
818  *  Y'55555555' IS WRITTEN INTO EACH FULLWORD OF THE             *  MT208180
819  *  TEST AREA. A FULLWORD IS READ AND CHECKED FOR                *  MT208190
820  *  Y'55555555'. THEN Y'AAAAAAAA' IS WRITTEN INTO THE            *  MT208200
821  *  FULLWORD. THE LOCATION IS THEN READ AND CHECKED              *  MT208210
822  *  FOR Y'AAAAAAAA'. FINALLY, Y'55555555' IS WRITTEN             *  MT208220
823  *  IN THE LOCATION AND THIS IS REPEATED FOR EACH                *  MT208230
824  *  FULLWORD IN THE TEST AREA. NEXT, Y'AAAAAAAA' IS              *  MT208240
825  *  WRITTEN INTO EACH FULLWORD OF THE TEST AREA AS A             *  MT208250
826  *  BACKGROUND AND THE TEST IS REPEATED.                         *  MT208260
827  *                                                               *  MT208270
828  * HOW TO RUN THE SUBTEST:                                       *  MT208280
829  *  THE SUBTEST MAY BE EXECUTED BY DEPRESSING THE                *  MT208290
830  *  NUMERIC KEY 5 ON THE CONSOLE DEVICE.  THE TEST IS            *  MT208300
831  *  EXECUTED AND IF NO ERRORS ARE DETECTED THE MESSAGE           *  MT208310
832  *  "NO ERROR" IS PRINTED ON THE CONSOLE FOLLOWED BY             *  MT208320
833  *  A CARRIAGE RETURN, LINE FEED, THE CHARACTERS                 *  MT208330
834  *  "SUBTEST" AND "*". REFER TO PROGRAM DESCRIPTION.             *  MT208340
835  *                                                               *  MT208350
836  * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *  MT208360
```

SUBTEST 5

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001014  41E0 159A          838  SUB5    BAL   R14,TSTNUM          PRINT TEST NUMBER                          MT208380
001018  F800 5555 5555      839          LDI   R0,Y'55555555'      LOAD R0 WITH DATA PATTERN                  MT208390
00101E  F830 AAAA AAAA      840          LDI   R3,Y'AAAAAAAA'      LOAD R3 WITH SECOND DATA PATTERN           MT208400
001024  0870                841  WRTPRN  LDAR  R7,R0                                                      MT208410
001026  41E0 1578          842          BAL   R14,MEMWRT          WRITE PATTERN IN ALL AVAILABLE MEMORY      MT208420
00102A  41F0 149C          843          BAL   R15,FWR1            FIND FIRST AVAILABLE 16K BLOCK             MT208430
00102E  2454                844          LIS   R5,4                ESTABLISH INCREMENT VALUE                  MT208440
001030  086A                845  LIMIT   LDAR  R6,WORK             ESTABLISH END ADDRESS            ****      MT208450
001032  0842                846          LDAR  R4,R2               ESTABLISH STARTING ADDRESS                 MT208460
001034  5884 0000          847  LOAD    L     R8,0(R4)            LOAD CONTENTS OF MEMORY INTO R8            MT208470
001038  0578                848          CLAR  R7,R8               IS CONTENTS OF MEMORY EQUAL TO R7 ?        MT208480
00103A  2333                849          BES   CONT3               YES, CONTINUE WITH ROUTINE                 MT208490
00103C  41F0 15C0          850          BAL   R15,ERROR           NO, PRINT ERROR                            MT208500
001040  0873                851  CONT3   LDAR  R7,R3                                                      MT208510
001042  5074 0000          852          ST    R7,0(R4)            STORE CONTENTS OF R7 IN MEMORY             MT208520
001046  5884 0000          853          L     R8,0(R4)            LOAD CONTENTS OF MEMORY INTO R8            MT208530
00104A  0587                854          CLAR  R8,R7               IS CONTENTS OF MEMORY EQUAL TO R7 ?        MT208540
00104C  2333                855          BES   CONT4               YES, CONTINUE WITH ROUTINE                 MT208550
00104E  41F0 15C0          856          BAL   R15,ERROR           NO, PRINT ERROR                            MT208560
001052  0870                857  CONT4   LDAR  R7,R0                                                      MT208570
001054  5074 0000          858          ST    R7,0(R4)            STORE CONTENTS OF R7 IN MEMORY             MT208580
001058  C140 1034          859          BXLE  R4,LOAD             REPEAT UNTIL 16K BLOCK HAS BEEN TESTED     MT208590
00105C  4120 1440          860          BAL   R2,WRTFTN                                                    MT208600
001060  41F0 14B4          861          BAL   R15,FWR             FIND NEXT AVAILABLE 16K BLOCK              MT208610
001064  4230 1030          862          BNZ   LIMIT               TEST NEXT 16K BLOCK                        MT208620
001068  F570 5555 5555      863          CLAI  R7,Y'55555555'      HAVE ALL PATTERNS BEEN TESTED ?            MT208630
00106E  4230 0D5C          864          BNE   SUBCHK              YES, CHECK FOR NEXT SUBTEST                MT208640
001072  F800 AAAA AAAA      865          LDI   R0,Y'AAAAAAAA'      NO, EXCHANGE PATTERNS                      MT208650
001078  F830 5555 5555      866          LDI   R3,Y'55555555'                                                 MT208660
00107E  4300 1024          867          B     WRTPRN              REPEAT TEST                                MT208670
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SUBTEST 6

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*  * * * * * * * * * * * * * * * * * * * * * * * * * * * *
*                      S U B T E S T  6                    *
*                                                          *
* PURPOSE:                                                 *
*  TO TEST THE REFRESH CYCLE AND CHECK FOR ADDRESSING      *
*  ERRORS IN THE SEMICONDUCTOR MEMORIES.                   *
*                                                          *
* ASSUMPTIONS:                                             *
*  THIS SUBTEST ASSUMES THAT PART 1 OF THE SERIES 32       *
*  MEMORY TEST HAS RUN WITHOUT DETECTING A FAILURE.        *
*                                                          *
* DESIGN SPECIFICATIONS:                                   *
*  A BACKGROUND OF ALL ZEROS IS WRITTEN INTO THE TEST      *
*  AREA. SIXTEEN DIFFERENT DATA PATTERNS ARE WRITTEN       *
*  INTO THE FIRST HALFWORD, READ BACK AND CHECKED.         *
*  THESE PATTERNS ARE X'7FFF',X'BFFF',X'DFFF',             *
*  X'EFFF',X'F7FF',X'FBFF',X'FDFF',X'FEFF',                *
*  X'FF7F',X'FFBF',X'FFDF',X'FFEF',X'FFF7',                *
*  X'FFFB',X'FFFD' AND X'FFFE' WHERE ONLY 1 OUT OF         *
*  16 BITS IS ZERO AND ALL OTHER BITS ARE ONES. THEN       *
*  ALL ONES ARE REWRITTEN INTO THE HALFWORD. THIS IS       *
*  DONE FOR EACH HALFWORD IN THE TEST AREA. THE SAME       *
*  TEST IS REPEATED WITH A BACKGROUND OF ZEROS AND         *
*  DATA PATTERNS IN WHICH ONLY 1 BIT OUT OF THE 16         *
*  BITS IS A ONE AND ALL OTHER BITS ARE ZERO. THESE        *
*  PATTERNS ARE X'8000',X'4000',X'2000',X'1000',           *
*  X'0800',X'0400',X'0200',X'0100',X'0080',                *
*  X'0040',X'0020',X'0010',X'0008',X'0004',                *
*  X'0002', AND X'0001'.                                   *
*  NEXT ZEROS ARE WRITTEN INTO LOCATION X'2000'(8K).       *
*  ONES ARE WRITTEN INTO ALL LOCATIONS WITH ADDRESSES      *
*  X'2100',TO X'2FFE'. THE LOCATION X'2000' IS READ        *
*  BACK AND CHECKED. THIS IS THEN REPEATED FOR EACH        *
*  16K BLOCK IN THE TEST AREA.                             *
*  THE NEXT PART OF THE SUBTEST CHECKS THE REFRESH         *
*  CYCLE. EACH FULLWORD FROM X'2000'(8K) TO THE TOP        *
*  OF CORE IS LOADED WITH ITS ADDRESS EXPANDED TO A        *
*  FULLWORD BY PROPAGATING ITS MOST SIGNIFICANT DIGIT;     *
*  EX. LOCATION Y'12345' IS LOADED WITH Y'11112345'.       *
*  A SOFTWARE DELAY IS EXECUTED TO ENABLE SEVERAL          *
*  REFRESH CYCLES TO TAKE PLACE. EACH LOCATION IS          *
*  THEN READ AND CHECKED.                                  *
*                                                          *
* HOW TO RUN THE SUBTEST:                                  *
*  THE SUBTEST MAY BE EXECUTED BY DEPRESSING THE           *
*  NUMERIC KEY 6 ON THE CONSOLE DEVICE.  THE TEST IS       *
*  THEN STARTED. WHILE THE TEST IS RUNNING THE             *
*  "TEST STILL RUNNING" MESSAGE WILL BE PRINTED ON         *
*  THE CONSOLE. IF NO ERRORS ARE DETECTED THE MESSAGE      *
*  "NO ERROR" WILL BE PRINTED ON THE CONSOLE FOLLOWED      *
*  BY A CARRIAGE RETURN, LINE FEED, THE CHARACTERS         *
*  "SUBTEST" AND "*". REFER TO PROGRAM DESCRIPTION.        *
*                                                          *
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                                922  * * * * * * * * * * * * * * * * * * * * * * * * * * * * *   MT209220

 001082   41E0 1596             924  SUB6     BAL   R14,TSTNUM         PRINT TEST NUMBER                      MT209240
*001086   C810 6000             925           LI    R1,Y'6000'         LOAD TEST TIMER VALUE                  MT209250
 00108A   5010 1F5C             926           ST    R1,TESTIMER                                               MT209260
 00108E   5010 1F60             927           ST    R1,TESTMER                                                MT209270
 001092   F880 FFFF 7FFF        928           LI    R11,Y'FFFF7FFF'                                           MT209280
 001098   5080 185C             929           ST    R11,DATA3                                                 MT209290
 00109C   2470                  930           LIS   R7,0               ZERO REGISTER R7                       MT209300
 00109E   F890 0000 FFFF        931           LDI   R9,Y'0000FFFF'     LOAD WITH HALF ZEROS AND HALF ONES     MT209310
 0010A4   0809                  932           LDAR  R0,R9              LOAD ALL ONES INTO REGISTER R0         MT209320
 0010A6   2452                  933           LIS   R5,2               ESTABLISH INCREMENT VALUE              MT209330
 0010A8   41E0 1578             934  REP1     BAL   R14,MEMWRT         WRITE BACKGROUND INTO ALL AVAIL MEM    MT209340
 0010AC   41F0 149C             935           BAL   R15,FWR1           FIND FIRST AVAILABLE 16K BLOCK         MT209350
*0010B0   086A                  936  LIM1     LHI   R6,0(WORK)         ESTABLISH END VALUE                    MT209360
 0010B2   0200                  937           NOPR                     DUMMY LOC FOR TEST PATCHING ONLY       MT209370
 0010B4   0842                  938           LDAR  R4,R2              ESTABLISH STARTING ADDRESS             MT209380
 0010B6   5880 185C             939  LDATA    L     R11,DATA3          LOAD DATA PATTERN INTO R11             MT209390
 0010BA   40B4 0000             940  STORE1   STH   R11,0(R4)          STORE CONTENTS OF R11 INTO MEMORY      MT209400
 0010BE   7384 0000             941           LHL   R8,0(R4)           LOAD R8 WITH CONTENTS OF MEMORY        MT209410
 0010C2   087B                  942           LDAR  R7,R11             LOAD DATA PATTERN INTO R7              MT209420
 0010C4   0479                  943           NAR   R7,R9              MASK OFF BITS 0 - 15                   MT209430
 0010C6   0587                  944           CLAR  R8,R7              IS CONTENTS OF MEMORY EQUAL TO PATTRN  MT209440
 0010C8   4230 11A8             945           BNE   CONT5A             NO, BRANCH TO ERROR             ****   MT209450
                                946  *                                                                 ****   MT209460
 0010CC   4094 0000             947  CONT5    STH   R9,0(R4)           STORE ALL ONES IN MEMORY               MT209470
 0010D0   1081                  948           SRLS  R11,1              SHIFT DATA PATTERN                     MT209480
 0010D2   05B0                  949           CLAR  R11,R0             AVE ALL PATTERNS BEEN WRITTEN          MT209490
 0010D4   2030                  950           BNES  STORE1             NO, STORE NEXT PATTERN                 MT209500
 0010D6   C140 10B6             951           BXLE  R4,LDATA           YES, HAS 16K BLOCK BEEN TESTED ?       MT209510
 0010DA   4120 1440             952           BAL   R2,WRTFTN                                                 MT209520
 0010DE   41F0 14B4             953           BAL   R15,FWR            YES, FIND NEXT AVAILABLE 16K BLOCK     MT209530
 0010E2   4230 10B0             954           BNZ   LIM1               TEST NEXT 16K BLOCK                    MT209540
 0010E6   2400                  955           LIS   R0,0               ZERO REGISTER R0                       MT209550
 0010E8   F8B0 0000 8000        956           LDI   R11,Y'00008000'    LOAD R11 WITH DATA PATTERN      ****   MT209560
 0010EE   55B0 185C             957           CL    R11,DATA3          HAVE BOTH PATTERNS BEEN TESTED ?       MT209570
 0010F2   2335                  958           BES   CONT6              YES, CONTINUE WITH TEST                MT209580
 0010F4   50B0 185C             959           ST    R11,DATA3          NO, STORE SECOND DATA PATTERN          MT209590
 0010F8   4300 10A8             960           B     REP1               REPEAT TEST                            MT209600
 0010FC   F8B0 FFFF 7FFF        961  CONT6    LDI   R11,Y'FFFF7FFF'    RESTORE ORIGINAL DATA PATTERN          MT209610
 001102   50B0 185C             962           ST    R11,DATA3                                                 MT209620
 001106   2470                  963           LIS   R7,0               ZERO REGISTER R7                       MT209630
 001108   41E0 1578             964           BAL   R14,MEMWRT         WRITE ZERO IN ALL AVAILABLE MEMORY     MT209640
 00110C   41F0 149C             965           BAL   R15,FWR1           FIND FIRST AVAILABLE 16K BLOCK         MT209650
 001110   4072 0000             966  STR3     STH   R7,0(R2)           STORE ZERO IN MEMORY                   MT209660
 001114   41F0 18F4             967           BAL   R15,TESTMSG        PRINT TEST RUNNING MESSAGE             MT209670
 001118   E640 0100             968           LDAI  R4,X'100'          LOAD START INDEX VALUE                 MT209680
 00111C   2454                  969           LIS   R5,4               LOAD INCREMENT VALUE                   MT209690
 00111E   E660 0FFC             970           LDAI  R6,X'FFC'          ESTABLISH END VALUE                    MT209700
 001122   2531                  971           LCS   R3,1               LOAD R3 WITH ALL ONES                  MT209710
 001124   5032 4400 0000        972  STR4     ST    R3,0(R2,R4)        LOAD ONES INTO MEMORY                  MT209720
 00112A   C140 1124             973           BXLE  R4,STR4            STORE DATA UNTIL LIMIT                 MT209730
 00112E   0842                  974           LDAR  R4,R2              LOAD MEMORY ADRS UNDER TEST            MT209740
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SUBTEST 6

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001130  7382 0000          975          LHL   R8,0(R2)          HAS TEST LOCATION CHANGED ?              MT209750
001134  4230 11B0          976          BNZ   CONT11A           YES, GO TO ERROR ROUTINE        ****     MT209760
                           977  *                                                                        MT209770
001138  4120 1440          978  CONT11  BAL   R2,WRITETN                                                 MT209780
00113C  41F0 1484          979          BAL   R15,FWR           FIND NEXT AVAILABLE 16K BLOCK            MT209790
001140  4230 1110          980          BNZ   STR3              TEST NEXT 16K BLOCK                      MT209800
001144  E6E0 116E          981          LA    R14,STR5          ESTABLISH RETURN ADRS                    MT209810
*001148 C810 4000          982          LI    R1,Y'4000'        LOAD TEST TIMER VALUE                    MT209820
00114C  5010 1F60          983          ST    R1,TESTMER                                                 MT209830
001150  5010 1F5C          984          ST    R1,TESTIMER                                                MT209840
001154  41F0 149C          985  ESTDATA BAL   R15,FWR1          FIND FIRST AVAILABLE 16K BLOCK           MT209850
001158  0842               986  AGAIN2  LDAR  R4,R2             ESTABLISH START ADRS                     MT209860
00115A  09oA               987          LDAR  R6,WORK           ESTABLISH END VALUE             ****     MT209870
00115C  0834               988  AGAIN3  LDAR  R3,R4             LOAD R3 WITH MEMORY ADRS                 MT209880
00115E  0874               989          LDAR  R7,R4             LOAD R7 WITH MEMORY ADRS                 MT209890
                           990  *       NAI   R3,Y'C00F0000'    MASK OFF ALL BUT MOST SIGNIF DIGIT       MT209900
001160  F430 00FF 0000     991          NAI   R3,Y'00FF0000'    MASK MOST SIGNIF 2 DIGITS                MT209910
001166  1134               992  SHIFT   SLLS  R3,4              SHIFT MSD ONE POSITION                   MT209920
001168  033E               993          BZR   R14               IF ZERO RETURN                           MT209930
00116A  0A73               994          AAR   R7,R3             IF NOT ZERO ADD VALUE TO MEMORY ADRS     MT209940
00116C  2203               995          BS    SHIFT             SHIFT AGAIN                              MT209950
00116E  5074 0000          996  STR5    ST    R7,0(R4)          STORE DATA IN MEMORY                     MT209960
001172  C140 115C          997          BXLE  R4,AGAIN3         REPEAT FOR ENTIRE 16K BLOCK              MT209970
001176  4120 1440          998          BAL   R2,WRTFTN                                                  MT209980
00117A  41F0 1484          999          BAL   R15,FWR           FIND NEXT AVAILABLE 16K BLOCK            MT209990
00117E  4230 1158         1000          BNZ   AGAIN2            REPEAT FOR NEXT 16K BLOCK                MT210000
001182  41F0 168E         1001          BAL   R15,DELAY         DELAY FOR REFRESH CYCLES                 MT210010
001186  41E0 1154         1002          BAL   R14,ESTDATA       ESTABLISH DATA TO BE READ                MT210020
00118A  5884 0000         1003          L     R8,0(R4)          READ DATA FROM MEMORY                    MT210030
00118E  0578              1004          CLAR  R7,R8             IS DATA READ = DATA STORED               MT210040
001190  4230 11B8         1005          BNE   CONT13A           NO, GO TO ERROR ROUTINE         ****     MT210050
                          1006  *                                                                        MT210060
001194  C140 115C         1007  CONT13  BXLE  R4,AGAIN3         REPEAT FOR ENTIRE 16K BLOCK              MT210070
001198  4120 1440         1008          BAL   R2,WRTFTN                                                  MT210080
00119C  41F0 1484         1009          BAL   R15,FWR           FIND NEXT AVAILABLE 16K BLOCK            MT210090
0011A0  4230 1158         1010          BNZ   AGAIN2            REPEAT FOR NEXT 16K BLOCK                MT210100
0011A4  4300 0D5C         1011          B     SUBCHK            CHECK FOR NEXT SUBTEST                   MT210110
                          1012  *                                                                        MT210120
                          1013  *                                                                        MT210130
0011A8  41F0 15C0         1014  CONT5A  BAL   R15,ERROR         PRINT ERROR                     ****     MT210140
0011AC  4300 10CC         1015          B     CONT5             CONTINUE TEST                   ****     MT210150
                          1016  *                                                                        MT210160
                          1017  *                                                                        MT210170
0011B0  41F0 15C0         1018  CONT11A BAL   R15,ERROR         PRINT ERROR                     ****     MT210180
0011B4  4300 1138         1019          B     CONT11            CONTINUE TEST                   ****     MT210190
                          1020  *                                                                        MT210200
                          1021  *                                                                        MT210210
0011B8  41F0 15C0         1022  CONT13A BAL   R15,ERROR         PRINT ERROR                     ****     MT210220
0011BC  4300 1194         1023          B     CONT13            CONTINUE TEST                   ****     MT210230
```

SUBTEST 7

```
1025  * * * * * * * * * * * * * * * * * * * * * * * * * * * * *  MT210250
1026  *                                                         *  MT210260
1027  *                    S U B T E S T  7                     *  MT210270
1028  *                                                         *  MT210280
1029  * PURPOSE:                                                *  MT210290
1030  *  TO INSURE THAT WHEN DATA IS WRITTEN INTO A 16K         *  MT210300
1031  *  BLOCK, IT DOES NOT GET WRITTEN INTO ANY OTHER 16K      *  MT210310
1032  *  BLOCK.                                                 *  MT210320
1033  *                                                         *  MT210330
1034  * ASSUMPTIONS:                                            *  MT210340
1035  *  THIS SUBTEST ASSUMES THAT PART 1 OF THE SERIES 32      *  MT210350
1036  *  MEMORY TEST HAS RUN WITHOUT DETECTING A FAILURE.       *  MT210360
1037  *                                                         *  MT210370
1038  * DESIGN SPECIFICATION:                                   *  MT210380
1039  *  ZEROS ARE WRITTEN INTO ALL AVAILABLE MEMORY. TWO       *  MT210390
1040  *  FULLWORDS OF THE FIRST AVAILABLE 16K BLOCK ARE         *  MT210400
1041  *  WRITTEN WITH ALL ONES (LOC X'2400' + X'2404').         *  MT210410
1042  *  ALL OTHER FULLWORDS IN THE TEST AREA ARE CHECKED       *  MT210420
1043  *  FOR ZEROS. THEN ZEROS ARE REWRITTEN INTO THE FIRST     *  MT210430
1044  *  TWO FULLWORDS AND THIS IS REPEATED FOR EACH            *  MT210440
1045  *  AVAILABLE 16K BLOCK. NEXT ALL ONES ARE WRITTEN         *  MT210450
1046  *  INTO THE TEST AREA. THE TEST IS REPEATED BY            *  MT210460
1047  *  WRITING ZEROS INTO THE TWO FULLWORDS OF EACH 16K       *  MT210470
1048  *  BLOCK AND CHECKING THE OTHERS FOR ONES.                *  MT210480
1049  *                                                         *  MT210490
1050  * HOW TO RUN THE SUBTEST:                                 *  MT210500
1051  *  THE SUBTEST MAY BE EXECUTED BY DEPRESSING THE          *  MT210510
1052  *  NUMERIC KEY 7 ON THE CONSOLE DEVICE. THE SUBTEST       *  MT210520
1053  *  IS THEN EXECUTED AND IF NO ERRORS ARE DETECTED THE     *  MT210530
1054  *  MESSAGE "NO ERROR" WILL BE PRINTED ON THE CONSOLE      *  MT210540
1055  *  FOLLOWED BY A CARRIAGE RETURN, LINE FEED, THE          *  MT210550
1056  *  CHARACTERS "SUBTEST" AND "*". REFER TO PROGRAM         *  MT210560
1057  *  DESCRIPTION.                                           *  MT210570
1058  *                                                         *  MT210580
1059  * * * * * * * * * * * * * * * * * * * * * * * * * * * * *  MT210590
```

SUBTEST 7

```
0011C0   41E0 159A          1061  SUB7     BAL   R14,TSTNUM          PRINT TEST NUMBER                          MT210610
0011C4   2470               1062           LIS   R7,0                ZERO REGISTER R7                           MT210620
0011C6   2531               1063           LCS   R3,1                LOAD R3 WITH ALL ONES                      MT210630
0011C8   41E0 1578          1064  SUB7A    BAL   R14,MEMWRT          WRITE CONTENTS OF R3 IN AVAIL MEMORY       MT210640
0011CC   41E0 149C          1065           BAL   R15,FWR1            FIND FIRST AVAILABLE 16K BLOCK             MT210650
0011D0   5032 0400          1066  STORE2   ST    R3,X'400'(R2)       STORE CONTENTS OF R3 IN TWO FULLWORDS      MT210660
0011D4   5032 0404          1067           ST    R3,X'404'(R2)                                                 MT210670
0011D8   0892               1068           LDAR  R9,R2               SAVE REGISTER R2                           MT210680
0011DA   0801               1069           LDAR  R0,R1               SAVE REGISTER R1                           MT210690
0011DC   41E0 149C          1070           BAL   R15,FWR1            FIND FIRST AVAILABLE 16K BLOCK             MT210700
0011E0   2454               1071           LIS   R5,4                ESTABLISH INCREMENT VALUE                  MT210710
0011E2   086A               1072  LOR8     LR    R6,R10              ESTABLISH END VALUE              ****      MT210720
0011E4   0842               1073           LDAR  R4,R2               ESTABLISH START ADDRESS                    MT210730
0011E6   5884 0000          1074  LOR7     L     R8,0(R4)            LOAD CONTENTS OF MEMORY INTO R8            MT210740
0011EA   0587               1075           CLAR  R8,R7               DOES MEMORY CONTAIN CORRECT DATA ?         MT210750
0011EC   4230 122C          1076           BNE   ADRCHK              NO, CHECK FOR ALTERNATE DATA               MT210760
0011F0   C140 11E6          1077  BXLE     BXLE  R4,LOR7             YES, CHECK NEXT LOCATION                   MT210770
0011F4   0842               1078           LDAR  R4,R2                                                         MT210780
0011F6   4120 1440          1079           BAL   R2,WRTFTN                                                     MT210790
0011FA   0824               1080           LDAR  R2,R4                                                         MT210800
0011FC   41F0 1484          1081           BAL   R15,FWR             FIND NEXT AVAILABLE BLOCK                  MT210810
*001200  203F               1082           BNZ   LOR8                TEST NEXT AVAILABLE BLOCK                  MT210820
                            1083  *                                                                           MT210830
001202   5079 0400          1084           ST    R7,X'400'(R9)       RESTORE CORRECT DATA TO FULLWORD           MT210840
001206   5079 0404          1085           ST    R7,X'404'(R9)                                                 MT210850
00120A   0829               1086           LDAR  R2,R9               RESTORE REGISTER R2                        MT210860
00120C   0810               1087           LDAR  R1,R0                                                         MT210870
00120E   0842               1088           LDAR  R4,R2                                                         MT210880
001210   4120 1440          1089           BAL   R2,WRTFTN                                                     MT210890
001214   0824               1090           LDAR  R2,R4                                                         MT210900
001216   41F0 1484          1091           BAL   R15,FWR             FIND NEXT AVAILABLE BLOCK                  MT210910
00121A   4230 1100          1092           BNZ   STORE2              TEST NEXT BNZOCK                           MT210920
                            1093  *                                                                           MT210930
00121E   0877               1094           LDAR  R7,R7               HAVE BOTH PATTERNS BEEN USED ?             MT210940
001220   4230 005C          1095           BNZ   SUBCHK              YES, CHECK FOR NEXT SUBTEST                MT210950
001224   2430               1096           LIS   R3,0                NO, ZERO REGISTER R3                       MT210960
001226   2571               1097           LCS   R7,1                LOAD R7 WITH ALL ONES                      MT210970
001228   4300 11C8          1098           B     SUB7A               REPEAT TEST WITH BACKGROUND OF ONES        MT210980
                            1099  *                                                                           MT210990
00122C   08C4               1100  ADRCHK   LDAR  R12,R4              LOAD R12 WITH CURRENT MEMORY ADDR****      MT211000
*00122E  C5C9 0400          1101           CLAI  R12,X'400'(R9)      IS R12 EQUAL TO TEST LOCATION ?            MT211010
001232   4330 11F0          1102           BE    BXLE                YES,CONTINUE TEST                          MT211020
*001236  C5C9 0404          1103           CLAI  R12,X'404'(R9)      NO, IS R12 EQUAL TO SECOND TEST LOC ?      MT211030
00123A   4330 11F0          1104           BE    BXLE                NO, BRANCH (TO PRINT ERROR)                MT211040
                            1105  *                                                                           MT211050
                            1106  *                                                                           MT211060
00123E   41F0 15C0          1107  ERR7A    BAL   R15,ERROR           PRINT ERROR                      ****      MT211070
001242   4330 11F0          1108           B     BXLE                CONTINUE TEST                    ****      MT211080
```

SUBTEST 8

```
1110  * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *  MT211100
1111  *                                                               *  MT211110
1112  *                        S U B T E S T  8                       *  MT211120
1113  *                                                               *  MT211130
1114  * PURPOSE:                                                      *  MT211140
1115  *  TO SELECT RANDOM MEMORY LOCATION AND WRITE A                 *  MT211150
1116  *  RANDOM PATTERN INTO IT.                                      *  MT211160
1117  *                                                               *  MT211170
1118  * ASSUMPTIONS:                                                  *  MT211180
1119  *  THIS SUBTEST ASSUMES THAT PART 1 OF THE SERIES 32            *  MT211190
1120  *  MEMORY TEST HAS RUN WITHOUT DETECTING A FAILURE.             *  MT211200
1121  *                                                               *  MT211210
1122  * DESIGN SPECIFICATION:                                         *  MT211220
1123  *  A ROUTINE CALLED RANDOM IS USED TO GENERATE TWO              *  MT211230
1124  *  NUMBERS. THE FIRST NUMBER IS TAKEN AS THE ADDRESS            *  MT211240
1125  *  OF THE MEMORY LOCATION TO BE TESTED, IF IT FALLS             *  MT211250
1126  *  IN THE MEMORY TEST AREA. IF IT IS NOT IN THE TEST            *  MT211260
1127  *  AREA, THE ROUTINE RANDOM IS CALLED AGAIN AND                 *  MT211270
1128  *  ANOTHER NUMBER IS GENERATED. THE SECOND NUMBER IS            *  MT211280
1129  *  LOADED INTO THE MEMORY LOCATION SPECIFIED BY THE             *  MT211290
1130  *  FIRST NUMBER, READ BACK AND CHECKED.                         *  MT211300
1131  *                                                               *  MT211310
1132  * HOW TO RUN THE SUBTEST:                                       *  MT211320
1133  *  THE SUBTEST MAY BE EXECUTED BY DEPRESSING THE                *  MT211330
1134  *  NUMERIC KEY 8 ON THE CONSOLE DEVICE. THE SUBTEST             *  MT211340
1135  *  WILL BE EXECUTED AND THE DATA THAT IS STORED IN              *  MT211350
1136  *  EACH LOCATION WILL BE DISPLAYED ON THE DISPLAY               *  MT211360
1137  *  PANEL. THE SUBTEST WILL CONTINUUE TO EXECUTE UNTIL           *  MT211370
1138  *  THE BREAK KEY ON THE CONSOLE IS DEPRESSED. REFER             *  MT211380
1139  *  TO PROGRAM DESCRIPTION.                                      *  MT211390
1140  *                                                               *  MT211400
1141  * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *  MT211410
```

SUBTEST 8

```
 001246   41E0 159A          1143  SUB8     BAL   R14,TSTNUM          PRINT TEST NUMBER                          MT211430
*00124A   C840 1234          1144           LDI   R4,Y'00001234'      LOAD REG WITH START VALUE       ****       MT211440
*00124E   C870 5678          1145           LDI   R7,Y'00005678'                                                 MT211450
 001252   F860 0000 8888      1146           LDI   R6,Y'00008888'                                                 MT211460
*001258   C850 1111          1147           LDI   R5,Y'00001111'                                                 MT211470
 00125C   41F0 18F4          1148  RANDOM   BAL   R15,TESTMSG                                                    MT211480
 001260   41F0 1786          1149           BAL   R15,TSTBRK                                                     MT211490
 001264   0894               1150  LDR11    LDAR  R9,R4               STORE R4 TEMPORARILY                       MT211500
 001266   0837               1151           LDAR  R3,R7               STORE R7 TEMPORARILY                       MT211510
 001268   0A75               1152           AAR   R7,R5               GENERATE RANDOM NUMBERS IN R7 AND R9       MT211520
 00126A   2382               1153           BNOS  ADD                                                            MT211530
 00126C   2641               1154           AIS   R4,1                                                           MT211540
 00126E   0A46               1155  ADD      AAR   R4,R6                                                          MT211550
 001270   0853               1156           LDAR  R5,R3                                                          MT211560
 001272   0869               1157           LDAR  R6,R9                                                          MT211570
 001274   F440 00FF FFFC     1158           NAI   R4,Y'00FFFFFC'      FORCE CONTENTS OF R4 TO FULLWORD ***       MT211580
 00127A   C540 2000          1159           CLHI  R4,X'2000'                                                     MT211590
 00127E   4280 125C          1160           BL    RANDOM                                                         MT211600
 001282   0824               1161           LR    R2,R4                                                          MT211610
 001284   102E               1162           SRLS  R2,14                                                          MT211620
 001286   7420 1A08          1163           TBT   R2,X'00128'                                                    MT211630
 00128A   4330 125C          1164           BZ    RANDOM                                                         MT211640
 00128E   5074 0000          1165  ADRSOK   ST    R7,0(R4)            STORE CONTENTS OF R7 IN MEMORY             MT211650
 001292   41E0 1426          1166           BAL   R14,DISP             WRITE RANDOM NUMBER TO DISPLAY             MT211660
 001296   5884 0000          1167           L     R8,0(R4)            LOAD CONTENTS OF MEMORY INTO R8            MT211670
 00129A   0578               1168           CLAR  R7,R8               IS VALUE WRITTEN = VALUE READ ?            MT211680
 00129C   4330 125C          1169           BE    RANDOM              GENERATE ANOTHER NUMBER                    MT211690
 0012A0   41F0 15C0          1170  ERR8A    BAL   R15,ERROR            PRINT ERROR                     ****       MT211700
 0012A4   4330 125C          1171           B     RANDOM              CONTINUE TEST                   ****       MT211710
```

SUBTEST 9

```
1173  * * * * * * * * * * * * * * * * * * * * * * * * * * * * *          MT211730
1174  *                                                         *          MT211740
1175  *                      S U B T E S T  9                   *          MT211750
1176  *                                                         *          MT211760
1177  * PURPOSE:                                                *          MT211770
1178  *  TO MAKE MEASUREMENTS POSSIBLE WHILE A TEST PATTERN     *          MT211780
1179  *  IS BEING WRITTEN INTO MEMORY.                          *          MT211790
1180  *                                                         *          MT211800
1181  * ASSUMPTIONS:                                            *          MT211810
1182  *  THIS SUBTEST ASSUMES THAT PART 1 OF THE SERIES 32      *          MT211820
1183  *  MEMORY TEST HAS RUN WITHOUT DETECTING A FAILURE.       *          MT211830
1184  *                                                         *          MT211840
1185  * DESIGN SPECIFICATION:                                   *          MT211850
1186  *  A DATA PATTERN SELECTED BY THE USER IS CONTINUOUSLY    *          MT211860
1187  *  WRITTEN INTO MEMORY BETWEEN A LOW AND HIGH LIMIT       *          MT211870
1188  *  ALSO SELECTED BY THE USER.                             *          MT211880
1189  *                                                         *          MT211890
1190  * HOW TO RUN THE SUBTEST:                                 *          MT211900
1191  *  THE SUBTEST MAY BE EXECUTED BY DEPRESSING THE          *          MT211910
1192  *  NUMERIC KEY 9 ON THE CONSOLE DEVICE. THE CHAR-         *          MT211920
1193  *  ACTERS "FW=" ARE PRINTED AND THE USER MUST SELECT       *          MT211930
1194  *  THE DATA PATTERN TO BE WRITTEN INTO MEMORY BY          *          MT211940
1195  *  DEPRESSING ANY NUMERIC KEY 0 THROUGH 9 OR KEYS A,      *          MT211950
1196  *  B, C, D, E, OR F. THE DEPRESSION MUST BE               *          MT211960
1197  *  TERMINATED BY THE CARRIAGE RETURN KEY.  THE LAST       *          MT211970
1198  *  EIGHT KEYS ENTERED BEFORE THE CARRIAGE RETURN KEY      *          MT211980
1199  *  IS DEPRESSED ARE ACCEPTED AS INPUT. WHEN THE           *          MT211990
1200  *  CARRIAGE RETURN KEY IS DEPRESSED EXECUTION BEGINS      *          MT212000
1201  *  AND THE MEMORY LOCATION THAT THE DATA IS STORED IN     *          MT212010
1202  *  IS DISPLAYED ON THE DISPLAY PANEL. THIS SUBTEST        *          MT212020
1203  *  WILL CONTINUE TO EXECUTE UNTIL THE BREAK KEY ON        *          MT212030
1204  *  THE CONSOLE IS DEPRESSED. NOTE THAT THERE ARE NO       *          MT212040
1205  *  ERROR PRINTOUTS FOR THIS SUBTEST. REFER TO PROGRAM     *          MT212050
1206  *  DESCRIPTION.                                           *          MT212060
1207  *                                                         *          MT212070
1208  * * * * * * * * * * * * * * * * * * * * * * * * * * * * *          MT212080
```

SUBTEST 9

```
0012A8   41E0 159A        1210  SUB9     BAL   R14,TSTNUM        PRINT TEST NUMBER                    MT212100
0012AC   41F0 12F8        1211  SUB9A    BAL   R15,$PRINT        PRINT "FW= "                         MT212110
0012B0   19BC             1212          DC    Z(FWMSG)          START ADDRESS OF MESSAGE             MT212120
0012B2   4190 1682        1213          BAL   R9,TTYLOOP        GET DATA FROM TTY                    MT212130
0012B6   5080 19A8        1214          ST    R8,VALUE                                               MT212140
                          1215  *                                                                    MT212150
0012BA   41F0 149C        1216  BEGIN    BAL   R15,FWR1          FIND FIRST AVAILABLE 16K BLOCK       MT212160
                          1217  *                                                                    MT212170
0012BE   2484             1218  STLOAD   LIS   R8,4              ESTABLISH INCREMENT VALUE            MT212180
0012C0   5840 19A3        1219          L     R4,VALUE          LOAD DATA PATTERN                    MT212190
0012C4   5870 19AC        1220          L     R7,LOVAL          LOAD MINIMUM ADDRESS                 MT212200
0012C8   5850 19A4        1221          L     R5,HIVAL          LOAD MAXIMUM ADDRESS                 MT212210
0012CC   2302             1222          BS    FIRST             SKIP RESET FIRST TIME THROUGH        MT212220
0012CE   0872             1223  RESET    LDAR  R7,R2             LOAD STARTING ADDRESS                MT212230
                          1224  *                                                                    MT212240
0012D0   089A             1225  FIRST    LDAR  R9,WORK                                              MT212250
                          1226  *                                                                    MT212260
0012D2   5047 0000        1227  STRAGN   ST    R4,0(R7)          STORE DATA IN MEMORY                 MT212270
0012D6   41E0 1426        1228          BAL   R14,DISP          WRITE ADRS ON DISPLAY                MT212280
0012DA   41F0 1786        1229          BAL   R15,TSTBRK                                             MT212290
0012DE   0557             1230  COMPR1   CLAR  R5,R7             HAVE WE REACHED HIGH VALUE ?         MT212300
0012E0   4330 12BA        1231          BE    BEGIN             YES, BEGIN AGAIN                     MT212310
0012E4   41F0 18F4        1232          BAL   R15,TESTMSG                                            MT212320
0012E8   C170 12D2        1233          BXLE  R7,STRAGN         NO, STORE DATA IN MEMORY AGAIN       MT212330
0012EC   41F0 14B4        1234          BAL   R15,FWR           FIND NEXT AVAILABLE BLOCK            MT212340
0012F0   4230 12CE        1235          BNZ   RESET             RESET ADDRESS AND CONTINUE           MT212350
0012F4   4300 12BA        1236          B     BEGIN             RESTART TEST                         MT212360
```

SUBROUTINES

```
                        1238  * * * * * * * * * * * * * * * * * * * * * * * * * * * *          MT212380
                        1239  *                                                       *          MT212390
                        1240  *                       P R I N T                       *          MT212400
                        1241  *                                                       *          MT212410
                        1242  * THIS ROUTINE PRINTS MESSAGES ON THE CONSOLE DEVICE.  *          MT212420
                        1243  *                                                       *          MT212430
                        1244  * * * * * * * * * * * * * * * * * * * * * * * * * * * *          MT212440


0012F8  735F 0000       1247  $PRINT  LHL   R5,0(R15)                                          MT212470
0012FC  26F2            1248          AIS   R15,2                                             MT212480
        0000 12FE       1249  PRINT   EQU   *             TO PRINT THE ASCII MESSAGE          MT212490
0012FE  0000 1D08       1250  $P0      STM   R0,RSAVE      STORE REGISTERS                     MT212500
001302  2400            1251  $P1      LIS   R0,0                                              MT212510
001304  4000 1F3E       1252          STH   R0,$LINEPOS   RESET BUFFER                        MT212520
                        1253  *                                                               MT212530
                        1254  *                                                               MT212540
001308  D345 0000       1255  $PRT.2   LB    R4,0(R5)     GET A MESSAGE BYTE                  MT212550
00130C  41F0 135A       1256          BAL   R15,OUTCHR    OUTPUT IT                           MT212560
001310  274D            1257          SIS   R4,X'0D'      CR ?                                MT212570
001312  233A            1258          BZS   $PRT.3        MSG OVER                            MT212580
001314  2651            1259          AIS   R5,1                                              MT212590
001316  C350 0002       1260          THI   R5,2          TIME TO CHECK BREAK ?               MT212600
00131A  2239            1261          BZS   $PRT.2        BRANCH: NO.                         MT212610
00131C  4050 1F3C       1262          STH   R5,$PRTFLG    TO DEFER BREAK ACKNOWLEDGE          MT212620
001320  41F0 17B6       1263          BAL   R15,TSTBRK                                        MT212630
001324  220E            1264          BS    $PRT.2        LOOP FOR NEXT CHAR                  MT212640
                        1265  *                                                               MT212650
001326  244A            1266  $PRT.3   LIS   R4,X'0A'      LF                                  MT212660
001328  41F0 135A       1267          BAL   R15,OUTCHR    LF                                  MT212670
00132C  2440            1268          LIS   R4,0          ASCII 'NUL'                         MT212680
00132E  41F0 135A       1269          BAL   R15,OUTCHR    TERMINAL CHARACTER                  MT212690
001332  41F0 17B6       1270          BAL   R15,TSTBRK                                        MT212700
001336  4040 1F3C       1271          STH   R4,$PRTFLG    RE-ENABLE BREAK ACKNOWLEDGE         MT212710
00133A  48F0 1F44       1272          LH    R15,$BRKFLG                                       MT212720
00133E  4040 1F44       1273          STH   R4,$BRKFLG    BREAK BEING ACKNOWLEDGED            MT212730
001342  4330 187E       1274          BZ    $RSAVRET      RESTORE REGISTERS, RETURN (R15)     MT212740
001346  40F0 1F42       1275          STH   R15,ISITERR   FORCE MESSAGE PRINT                 MT212750
*00134A C550 1997       1276          CLAI  R5,$BRKEND    PRINTING 'BRK TERM' MESSAGE ?       MT212760
00134E  2334            1277          BES   $PRT.4        BRANCH: YES.                        MT212770
001350  41F0 12F8       1278  $PRT.3A  BAL   R15,$PRINT    'RECURSIVE' CALL          P2 1/80   MT212780
001354  197E            1279          DC    Z(BRKMSG)     'BREAK TERMINATION'                 MT212790
001356  4300 0C82       1280  $PRT.4   B     SETVAL        TO CMD PROCESSOR                    MT212800
                        1281  *---------------------------------                              MT212810
                        1282  *  TO OUTPUT A CHARACTER TO THE LIST DEVICE                     MT212820
                        1283  *                                                               MT212830
00135A  50F0 1F54       1284  OUTCHR   STA   R15,CUT.SAV   SAVE RETURN ADDRESS                 MT212840
00135E  D310 1F47       1285          LB    R1,IOSAVE+1                                       MT212850
001362  2714            1286          SIS   R1,4                                              MT212860
001364  4230 1394       1287          BNZ   $OTC.4        BRANCH IF NOT CARCUSEL              MT212870
001368  4010 1F48       1288  $OTC.0   STH   R1,$PAUSE     ZERO $PAUSE FLAG                    MT212880
```

SUBROUTINES

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00136C  41F0 1840        1289  $OTC.1   BAL   R15,TSTDU        ON LINE ?                                  MT212890
001370  4230 13C8        1290           BNZ   $OTC.7           BRANCH: OFFLINE. EXIT.                     MT212900
001374  9C21              1291           SSR   R2,R1            GET CAROUSEL STATUS                        MT212910
001376  2385              1292           BFFS  8,$OTC.3         BRANCH IF CHAR. IS TO BE READ              MT212920
001378  4810 1F48        1293  $OTC.2   LH    R1,$PAUSE        PAUSED NOW ?                               MT212930
00137C  2038              1294           BNZS  $OTC.1           YES, LOOP                                  MT212940
00137E  2308              1295           BS    $OTC.4           NO, GO OUTPUT CHARACTER                    MT212950
001380  9821              1296  $OTC.3   RDR   R2,R1            GET CAROUSEL CHARACTER                     MT212960
001382  C410 007F        1297           NHI   R1,X'7F'                                                     MT212970
001386  C510 0014        1298           CLHI  R1,X'14'         DC4 ?                                      MT212980
00138A  4330 1368        1299           BE    $OTC.0           DC4. SET $PAUSE FLAG.                      MT212990
00138E  C810 0012        1300           SHI   R1,X'12'         DC2 ?                                      MT213000
001392  2030              1301           BNZS  $OTC.2           BRANCH: NO. CHECK IF PAUSED NOW.           MT213010
                         1302  *                                                                          MT213020
001394  4010 1F48        1303  $OTC.4   STH   R1,$PAUSE        RESET FLAG                                 MT213030
001398  4110 180C        1304           BAL   R1,$SETUP        SET UP FOR OUTPUT                          MT213040
00139C  9001              1305  $OTC.5   SSR   R0,R1            WAIT FOR NOT BUSY                          MT213050
00139E  4230 13C8        1306           BTC   3,$OTC.7         BRANCH IF OFF-LINE                         MT213060
0013A2  C510 0048        1307           CLHI  R1,X'48'         (NOT) CL2S OR PF ?          P4 4/80        MT213070
0013A6  4330 13C8        1308           BE    $OTC.7           BRANCH: ASSUME OFF-LINE     P4 4/80        MT213080
0013AA  C410 00FC        1309           NHI   R1,X'FC'                                                     MT213090
0013AE  C510 000C        1310           CLHI  R1,X'0C'         HDX PASLA OFF-LINE ?                       MT213100
*0013B2  2334              1311           BE    $OTC.7           BRANCH: YES.                P4 4/80        MT213110
0013B4  9014              1312           SRHLS R1,4             BUSY ?                      P4 4/80        MT213120
0013B6  2080              1313           BCS   $OTC.5           BRANCH: YES.                P4 4/80        MT213130
0013B8  9A04              1314           WDR   R0,R4            OUTPUT DATA BYTE                           MT213140
0013BA  9001              1315  $OTC.6   SSR   R0,R1            WAIT FOR NOT BUSY                          MT213150
0013BC  2176              1316           BTFS  7,$OTC.7         BRANCH IF OFF-LINE (PASLA HANGS)           MT213160
0013BE  C510 0048        1317           CLHI  R1,X'48'         (NOT) CL2S OR PF ?          P4 4/80        MT213170
0013C2  2333              1318           BES   $OTC.7           BRANCH: ASSUME OFF-LINE     P4 4/80        MT213180
0013C4  9014              1319           SRHLS R1,4             BUSY ?                      P4 4/80        MT213190
0013C6  2086              1320           BCS   $OTC.6           BRANCH: YES.                P4 4/80        MT213200
0013C8  58F0 1F54        1321  $OTC.7   LDA   R15,CUT.SAV                                                  MT213210
0013CC  030F              1322           BR    R15              RETURN                                     MT213220
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                        1324  *-----------------------------                                          MT213240
                        1325  *  TO PUT KEYBOARD DEVICE IN READ MODE                                  MT213250
                        1326  *                                                                       MT213260
0013CE  4800 0A2A       1327  KBREAD   LH    R0,CONRADR                                              MT213270
0013D2  DE00 0A2E       1328           OC    R0,CONRD          OC CONSOLE - READ COMMAND             MT213280
0013D6  DB00 0A5E       1329           RD    R0,SINK           READ A DUMMY CHARACTER (SET BUSY)     MT213290
0013DA  4890 1F4A       1330           LH    R9,$CONPAS        PASLA ?                               MT213300
0013DE  4200 13DE       1331           NOP   *                 FOR SPECIAL KB DEVICE                 MT213310
0013E2  2333            1332           BZS   $KBR.1            NO, BRANCH TO EXIT                    MT213320
0013E4  DE00 0A48       1333           OC    R0,CONRQ2S        YES, OC (REQUEST TO SEND)             MT213330
0013E8  0304            1334  $KBR.1   BR    R4                RETURN                                MT213340
                        1335  *-------------------------------                                       MT213350
0013EA  9D04            1336  GETCHR   SSR   R0,R4                                                  MT213360
0013EC  2081            1337           BTBS  8,1               IF BUSY, LOOP (POSSIBLE HANG)         MT213370
0013EE  9B04            1338           RDR   R0,R4             READ A CHAR IN R4                     MT213380
0013F0  D390 0A10       1339           LB    R9,IO             WHAT TYPE DEVICE ?          P1 10/79  MT213390
0013F4  2792            1340           SIS   R9,2              TYPE 2 ?                    P1 10/79  MT213400
0013F6  2338            1341           BZS   $RD.3A            BRANCH: YES. E-PLEX ON.     P1 10/79  MT213410
0013F8  4890 0A2C       1342           LH    R9,CONWADR        GET WRITE ADDRESS                     MT213420
0013FC  DE90 0A2F       1343           OC    R9,CONWRT         TURN DEVICE AROUND                    MT213430
001400  9D93            1344           SSR   R9,R3                                                   MT213440
001402  2081            1345           BTBS  8,1               WAIT FOR BUSY NOT                     MT213450
001404  9A94            1346           WDR   R9,R4             ECHO RECEIVED BYTE                    MT213460
        0000 1406       1347  $RD.3A   EQU   *                 P1 10/79                              MT213470
001406  C440 007F       1348           NHI   R4,X'7F'          REMOVE PARITY BIT                     MT213480
00140A  C540 0060       1349           CLHI  R4,X'60'          UPPER-CASE CHARACTER ?                MT213490
00140E  2133            1350           BLS   $RD.4             BRANCH: NO.                           MT213500
001410  C840 0020       1351           SHI   R4,X'20'          CONVERT TO LOWER-CASE                 MT213510
001414  C540 0023       1352  $RD.4    CLHI  R4,X'23'          HASH-MARK ?                           MT213520
001418  4330 0C6E       1353           BE    RESTART2          BRANCH: YES. GO TO CMD PROC.          MT213530
00141C  C540 0018       1354           CLHI  R4,X'18'          ASCII 'CANCEL' CHARACTER ?            MT213540
001420  4330 0C6E       1355           BE    RESTART2          BRANCH: YES.                          MT213550
001424  030F            1356           BR    R15                                                     MT213560
                        1357  *                                                                       MT213570


                        1359  * * * * * * * * * * * * * * * * * * * * * * * * * * * *               MT213590
                        1360  *                                                     *                 MT213600
                        1361  *                    D I S P L A Y                    *                 MT213610
                        1362  *                                                     *                 MT213620
                        1363  * THIS ROUTINE WRITES TO THE DISPLAY PANEL (D1-D4)    *                 MT213630
                        1364  * R7 = THE DATA TO BE WRITTEN.                        *                 MT213640
                        1365  * R14 = THE RETURN ADDRESS.                          *                 MT213650
                        1366  *                                                     *                 MT213660
                        1367  * * * * * * * * * * * * * * * * * * * * * * * * * * * *               MT213670


001426  24D1            1369  DISP     LIS   R13,1             LOAD R13 WITH DISPLAY ADRS            MT213690
001428  DEC0 143E       1370           OC    R13,INCRMT        PUT DISPLAY IN INCREMENTAL MODE       MT213700
00142C  2148            1371           BOS   DISP1             FALSE SYNC BRANCH                     MT213710
00142E  94C7            1372           EXBR  R12,R7            WRITE VALUE ON DISPLAY PANEL          MT213720
001430  98DC            1373           WHR   R13,R12                                                 MT213730
001432  34C7            1374           EXHR  R12,R7                                                  MT213740
001434  94CC            1375           EXBR  R12,R12                                                 MT213750
001436  98DC            1376           WHR   R13,R12                                                 MT213760
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001438  0E30 143F          1377            OC    R13,NORM          PUT DISPLAY IN NORMAL MODE              MT213770
00143C  0305               1378  DISP1     BR    R14               RETURN TO SUBTEST              ****     MT213780
00143E  40                 1379  INCRMT    DB    X'40'                                                    MT213790
00143F  80                 1380  NORM      DB    X'80'                                                    MT213800
                           1381  *                                                                        MT213810
                           1382  *                                                                        MT213820
001440  2401               1383  WRTFTN    LIS   R13,1                                                    MT213830
001442  0D30 143E          1384            OC    R13,INCRMT                                               MT213840
001446  214C               1385            BOS   WRTFTN2                                                  MT213850
001448  2400               1386            LIS   R12,0                                                    MT213860
00144A  980C               1387            WHR   R13,R12                                                  MT213870
00144C  980C               1388            WHR   R13,R12                                                  MT213880
00144E  730C 1490          1389            LHL   R12,FTNWRT                                               MT213890
001452  980C               1390            WHR   R13,R12                                                  MT213900
001454  94CC               1391            EXBR  R12,R12                                                  MT213910
001456  40C0 1890          1392            STH   R12,FTNWRT                                               MT213920
00145A  0ED0 143F          1393            OC    R13,NORM                                                 MT213930
00145E  41F0 1786          1394  WRTFTN2   BAL   R15,TSTBRK                                               MT213940
001462  D300 1E9C          1395            LB    R13,CONTFLG                                              MT213950
001466  0800               1396            LOAR  R13,R13                                                  MT213960
001468  0332               1397            BZR   R2                                                       MT213970
00146A  0302               1398            BR    R2                                                       MT213980

                           1400  * * * * * * * * * * * * * * * * * * * * * * * * * * * *                  MT214000
                           1401  *                                                       *                MT214010
                           1402  *                   C O N V E R T                       *                MT214020
                           1403  *                                                       *                MT214030
                           1404  * THE ROUTINE CONVERTS HEX CHARACTERS TO ASCII AND     *                MT214040
                           1405  * STORES THEM IN MEMORY.                               *                MT214050
                           1406  * R7 = THE SHIFT INDEX (THE NUM OF  BITS IN THE HEX   *                MT214060
                           1407  *      CHARACTER MINUS 4).                            *                MT214070
                           1408  * R9 = THE HEX VALUE TO BE CONVERTED.                  *                MT214080
                           1409  * R12 = THE STARTING ADDRESS WHERE THE CHARACTER IS    *                MT214090
                           1410  *       TO BE STORED.                                  *                MT214100
                           1411  * R15 = THE RETURN ADDRESS.                           *                MT214110
                           1412  *                                                       *                MT214120
                           1413  * * * * * * * * * * * * * * * * * * * * * * * * * * * *                  MT214130

001466  737F 0000          1415  CONVERT   LHL   R7,0(R15)         LOAD SHIFT INDEX                        MT214150
001470  730F 0002          1416            LHL   R12,2(R15)        LOAD ADRS INDEX                         MT214160
001474  26F4               1417            AIS   R15,4                                                     MT214170
001476  0869               1418  CONVERT1  LR    R6,R9             LOAD VALUE TO BE CONVERTED              MT214180
001478  EC67 0000          1419            SRL   R6,0(R7)          SHIFT DIGIT INTO PLACE                  MT214190
*00147C  C460 000F          1420            NAI   R6,X'F'           MASK OFF ALL BUT LEAST SIGNIF DIGIT     MT214200
*001480  C660 0030          1421            OAI   R6,X'30'          CONVERT TO ASCII                        MT214210
*001484  C560 003A          1422            CLAI  R6,X'3A'          IS CHARACTER A NUMBER                   MT214220
 001488  2182               1423            BLS   CONT9             YES, CONTINUE ROUTINE                   MT214230
*00148A  2667               1424            AHI   R6,7              NO, CONVERT TO ASCII LETTER     ****     MT214240
 00148C  02EC 0000          1425  CONT9     STB   R6,0(R12)         STORE VALUE IN MESSAGE                  MT214250
001490  0877               1426            LOAR  R7,R7             IS CONVERSION COMPLETE                  MT214260
001492  033F               1427            BZR   R15               YES, RETURN TO SUBTEST                  MT214270
                           1428  *                                                                        MT214280
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001494  2774          1429          SIS   R7,4              NO, DECREMENT SHIFT INDEX              MT214290
001496  26C1          1430          AIS   R12,1             INCREMENT STORE INDEX                  MT214300
001498  4300 1476     1431          B     CONVERT1          CONVERT NEXT HEX DIGIT                 MT214310

                      1433  * * * * * * * * * * * * * * * * * * * * * * * * * * * *              MT214330
                      1434  *                                                     *              MT214340
                      1435  *                       F W R 1                       *              MT214350
                      1436  *                                                     *              MT214360
                      1437  * THIS ROUTINE SCANS THE AVAILABLE MEMORY TABLE FROM  *              MT214370
                      1438  * BOTTOM TO TOP (KB00128 TO KB16384) AND RETURNS ON   *        ****  MT214380
                      1439  * R15 EACH TIME IT ENCOUNTERS AN AVAILABLE 16K BLOCK  *        ****  MT214390
                      1440  * OF MEMORY. WHEN THE ENTIRE TABLE HAS BEEN CHECKED   *              MT214400
                      1441  * THE ROUTINE RETURNS ON R15.                        *              MT214410
                      1442  * R1 = TABLE INDEX VALUE                             *              MT214420
                      1443  * R2 = STARTING ADDRESS OF THE AVAILABLE 16K BLOCK    *              MT214430
                      1444  * R15 = THE RETURN ADDRESS.                          *              MT214440
                      1445  *                                                     *              MT214450
                      1446  * * * * * * * * * * * * * * * * * * * * * * * * * * * *              MT214460

00149C  2420          1448  FWR1  LIS   R2,0                ZERO REGISTER 2                        MT214480
00149E  0220 1B96     1449        STB   R2,LIMFLG           CLEAR FLAG                       ****  MT214490
0014A2  5820 1BA0     1450        L     R2,LOVAL                                                   MT214500
0014A6  C420 C000     1451        NHI   R2,X'C000'                                                 MT214510
0014AA  5020 1BAC     1452        ST    R2,BLKADR                                                  MT214520
0014AE  0812          1453        LR    R1,R2                                                      MT214530
0014B0  101E          1454        SRLS  R1,14                                                      MT214540
*0014B2 230C          1455        B     FW3                                                        MT214550
                      1456  *                                                                      MT214560
0014B4  D3A0 1B96     1457  FWR   LR    WORK,LIMFLG                                                MT214570
0014B8  08AA          1458        LDAR  WORK,WORK           IS LIMIT FLAG SET ?                    MT214580
0014BA  2333          1459        BZS   FW0                 YES, RETURN ON R15                     MT214590
0014BC  24A0          1460        LIS   WORK,0                                                     MT214600
0014BE  030F          1461        BR    R15                                                        MT214610
                      1462  *                                                                      MT214620
0014C0  5820 1BAC     1463  FW0   L     R2,BLKADR           LOAD LAST BLOCK ADDRESS                MT214630
0014C4  2611          1464  FW    AIS   R1,1                NO, INCREMENT INDEX REGISTER           MT214640
*0014C6 CA20 4000     1465        AAI   R2,Y'4000'          INCREMENT MEMORY BLOCK ADRS      ****  MT214650
0014CA  7410 1AD8     1466  FW3   TBT   R1,KB00128           IS MEMORY BLOCK IN SYSTEM ?            MT214660
0014CE  2235          1467        BZS   FW                  NO, CHECK NEXT BLOCK             ****  MT214670
*0014D0 C510 0400     1468        CLAI  R1,KBEND-KB00128*8  YES, HAS ALL AVAIL MEM BEEN CHK'D ?   MT214680
0014D4  033F          1469        BCR   R15                 YES, RETURN ON R15                     MT214690
                      1470  *                                                                      MT214700
0014D6  5020 1BAC     1471        ST    R2,BLKADR                                                  MT214710
                      1472  *                                                                      MT214720
0014DA  58A0 1BA0     1473  CHKLIM  L     WORK,LOVAL          LOAD LOW LIMIT                         MT214730
0014DE  05A2          1474        CLAR  WORK,R2             IS LOW LIMIT LESS THAN BLOCK ADRS ?    MT214740
*0014E0 218B          1475        BL    LOW2                YES, USE CURRENT BLOCK ADRS            MT214750
0014E2  F4A0 00FF C000 1476       NAI   WORK,Y'FFC000'      NO, MASK FOR 24 BIT ADRS               MT214760
0014E8  05A2          1477        CLAR  WORK,R2             IS ADRS IN CURRENT BLOCK ?             MT214770
0014EA  4230 14C4     1478        BNE   FW                  NO, CHECK NEXT BLOCK                   MT214780
0014EE  08A2          1479  LOW1  LDAR  WORK,R2                                                     MT214790
0014F0  5820 1BA0     1480        L     R2,LOVAL            LOAD LOW LIMIT                         MT214800
0014F4  2302          1481        BS    ADDBLK                                                     MT214810
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0014F6   08A2             1482  LOW2      LDAR  WORK,R2             LOAD CURRENT BLOCK ADRS                  MT214820
                          1483  *                                                                          MT214830
0014F8   C6A0 3FFC        1484  ADDBLK    OHI   WORK,Y'3FFC'        ADD BLOCK SIZE TO BLOCK ADRS             MT214840
                          1485  *                                                                          MT214850
0014FC   55A0 18A4        1486  ADDBLK2   CL    WORK,HIVAL          IS BLOCK END ADRS < HIGH LIMIT ?****     MT214860
001500   028F             1487        BLR   R15                 YES, RETURN                              MT214870
001502   24A1             1488        LIS   WORK,1              NO, SET LIMIT FLAG                       MT21488C
001504   0240 1096        1489        STB   WORK,LIMFLG                                                  MT214890
001508   58A0 18A4        1490        L     WORK,HIVAL          LOAD HIGH LIMIT                          MT214900
00150C   030F             1491        BR    R15                 RETURN                        ****       MT214910
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                                1493  * * * * * * * * * * * * * * * * * * * * * * * * * * * *          MT214930
                                1494  *                                                       *          MT214940
                                1495  *                        B K W R 1                      *          MT214950
                                1496  *                                                       *          MT214960
                                1497  * THIS ROUTINE SCANS THE AVAILABLE MEMORY TABLE FROM   *          MT214970
                                1498  * TOP TO BOTTOM (KB16384 TO KB00128) AND RETURNS ON     *          MT214980
                                1499  * R15 EACH TIME IT ENCOUNTERS AN AVAILABLE 16K BLOCK   *          MT214990
                                1500  * OF MEMORY. WHEN THE ENTIRE TABLE HAS BEEN CHECKED    *          MT215000
                                1501  * THE ROUTINE RETURNS ON R15.                          *          MT215010
                                1502  * R1 = THE TABLE INDEX VALUE.                          *          MT215020
                                1503  * R2 = THE STARTING ADDRESS OF THE AVAILABLE 16K BLOCK*          MT215030
                                1504  * R15 = THE RETURN ADDRESS                             *          MT215040
                                1505  *                                                       *          MT215050
                                1506  * * * * * * * * * * * * * * * * * * * * * * * * * * * *          MT215060

 00150E   5820 1BA4             1508  BKWR1    L      R2,HIVAL          START AT HIGH MEMORY LIMIT      MT215080
 001512   C420 C000             1509           NHI    R2,X'C000'                                        MT215090
 001516   5020 1BAC             1510           ST     R2,BLKADR         SET BLKADR = HIVAL              MT215100
 00151A   0812                  1511           LR     R1,R2                                             MT215110
 00151C   101E                  1512           SRLS   R1,14             SHIFT TO GET INITIAL R1 VALUE   MT215120
                                1513  *                                                                 MT215130
 00151E   24A0                  1514           LIS    R10,0             ZERO R10                        MT215140
 001520   D2A0 1B96             1515           STB    R10,LIMFLG        CLEAR LIMIT FLAG                MT215150
*001524   2308                  1516           B      BKWS                                              MT215160
                                1517  *                                                                 MT215170
 001526   03A0 1B96             1518  BKWR     LB     R10,LIMFLG                                        MT215180
 00152A   08AA                  1519           LDAR   R10,R10           IS LIMIT FLAG SET?              MT215190
 00152C   023F                  1520           BNZR   R15               YES, RETURN CC <> 0             MT215200
                                1521  *                                                                 MT215210
 00152E   5820 1BAC             1522           L      R2,BLKADR                                         MT215220
 001532   2711                  1523  BKW      SIS    R1,1              NO, DECREMENT INDEX REG         MT215230
 001534   021F                  1524           BMR    R15               IF NEG, RETURN CC <> 0          MT215240
*001536   CB20 4000             1525           SAI    R2,Y'4000'        DECREMENT BLKADR                MT215250
                                1526  *                                                                 MT215260
 00153A   7410 1AD8             1527  BKWS     TBT    R1,KB00128        IS MEMORY IN SYSTEM?            MT215270
 00153E   2236                  1528           BZS    BKW                                               MT215280
                                1529  *                                                                 MT215290
 001540   5020 1BAC             1530           ST     R2,BLKADR         CALCULATE LOVAL                 MT215300
 001544   08A2                  1531           LR     R10,R2                                            MT215310
 001546   C620 3FFC             1532           OHI    R2,X'3FFC'                                        MT215320
 00154A   5520 1BA4             1533           CL     R2,HIVAL                                          MT215330
 00154E   2183                  1534           BLS    BKWS1                                             MT215340
 001550   5820 1BA4             1535           L      R2,HIVAL                                          MT215350
 001554   C4A0 C000             1536  BKWS1    NHI    R10,X'C000'       R10 = R2 * X'C000'              MT215360
                                1537  *                                                                 MT215370
*001558   C5A0 2000             1538           CLI    R10,Y'2000'       IS LOVAL < Y'2000'              MT215380
 00155C   2383                  1539           BNLS   RETURN0           NO, RETURN                      MT215390
*00155E   C8A0 2000             1540           LDI    R10,Y'2000'       YES, SET LOVAL = Y'2000'        MT215400
 001562   55A0 1BA0             1541  RETURN0  CL     R10,LOVAL         IS R10 < LOVAL?                 MT215410
*001566   2126                  1542           BP     RETURN1           NO, RETURN                      MT215420
 001568   58A0 1BA0             1543           L      R10,LOVAL         YES, SET R10 = LOVAL            MT215430
                                1544  *                                                                 MT215440
 00156C   2411                  1545           LIS    R1,1                                              MT215450
 00156E   D210 1B96             1546           STB    R1,LIMFLG         SET LIMIT FLAG                  MT215460
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001572  C3A0 0001          1547  RETURN1  THI   R10,1                                        MT215470
001576  030F               1548           BR    R15                                          MT215480


                           1550  * * * * * * * * * * * * * * * * * * * * * * * * * * *      MT215500
                           1551  *                                                   *      MT215510
                           1552  *                    M E M W R T                    *      MT215520
                           1553  *                                                   *      MT215530
                           1554  * THIS ROUTINE STORES THE CONTENTS OF R7 INTO ALL    *      MT215540
                           1555  * AVAILABLE MEMORY.                                 *      MT215550
                           1556  * R7 = THE VALUE TO BE STORED.                      *      MT215560
                           1557  * R14 = THE RETURN ADDRESS.                         *      MT215570
                           1558  *                                                   *      MT215580
                           1559  * * * * * * * * * * * * * * * * * * * * * * * * * * *      MT215590

001578  41F0 149C          1561  MEMWRT   BAL   R15,FWR1          FIND FIRST AVAILABLE 16K BLOCK          MT215610
00157C  2454               1562           LIS   R5,4              ESTABLISH INCREMENT VALUE               MT215620
00157E  086A               1563  LOR      LR    R6,WORK           ESTABLISH END VALUE              ****   MT215630
001580  0842               1564           LOAR  R4,R2             ESTABLISH STARTING ADDRESS              MT215640
001582  5074 0000          1565  STR      ST    R7,0(R4)          STORE CONTENTS OF R7 IN MEMORY          MT215650
001586  41F0 19F4          1566           BAL   R15,TESTMSG       PRINT TEST STILL RUNNING MESSAGE        MT215660
00158A  C140 1582          1567           BXLE  R4,STR            REPEAT UNTIL 16K BLOCK IS FILLED        MT215670
00158E  4120 1440          1568           BAL   R2,WRTFIN                                                 MT215680
001592  41F0 1484          1569           BAL   R15,FWR                                                   MT215690
001596  203C               1570           BNZS  LOR                                                       MT215700
001598  030E               1571           BR    R14               RETURN ON REGISTER R14                  MT215710

                           1573  * * * * * * * * * * * * * * * * * * * * * * * * * * *      MT215730
                           1574  *                                                   *      MT215740
                           1575  *                    T S T N U M                    *      MT215750
                           1576  *                                                   *      MT215760
                           1577  * THIS ROUTINE STORES THE CURRENT SUBTEST NUMBER IN *      MT215770
                           1578  * THE ERROR MESSAGE AND ALSO PRINTS IT ON THE TTY.  *      MT215780
                           1579  * R14 = THE RETURN ADDRESS.                         *      MT215790
                           1580  *                                                   *      MT215800
                           1581  * * * * * * * * * * * * * * * * * * * * * * * * * * *      MT215810

00159A  0899               1583  TSTNUM   LR    R9,R9             CHECK FOR SUBTEST = 0                   MT215830
00159C  2132               1584           BNZS  TSTNUM1                                                   MT215840
00159E  2691               1585           AIS   R9,1              IF SUBTEST 0, FORCE OUTPUT TO 1         MT215850
0015A0  41F0 146C          1586  TSTNUM1  BAL   R15,CONVERT                                              MT215860
0015A4  0004               1587           DC    X'4'              SHIFT INDEX                           MT215870
0015A6  197A               1588           DC    Z(SUBNUM)         STORE INDEX                           MT215880
0015A8  7390 197A          1589           LHL   R9,SUBNUM         LOAD ASCII VALUE OF SUBTEST NUMBER    MT215890
0015AC  4090 195E          1590           STH   R9,TT             STORE SUBTEST NUMBER IN ERROR MSG     MT215900
0015B0  0390 189C          1591           LB    R9,CONTFLG        IS CONTINUE FLAG SET                  MT215910
0015B4  0899               1592           LOAR  R9,R9                                                     MT215920
0015B6  023E               1593           BNZR  R14               YES, RETURN TO SUBTEST                MT215930
0015B8  41F0 12F8          1594           BAL   R15,$PRINT        NO, PRINT SUBTEST NUMBER              MT215940
0015BC  197A               1595           DC    Z(SUBNUM)         START ADRS OF MESSAGE                 MT215950
0015BE  030E               1596  TSTNUMB  BR    R14               RETURN TO SUBTEST                     MT215960
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                                1598  * * * * * * * * * * * * * * * * * * * * * * * * * * * * *                 MT215980
                                1599  *                                                       *                 MT215990
                                1600  *                        E R R O R                      *                 MT216000
                                1601  *                                                       *                 MT216010
                                1602  * THIS ROUTINE PRINTS THE FOLLOWING MESSAGE:           *                 MT216020
                                1603  *                                                       *                 MT216030
                                1604  * W  TT  XXXXXX  YYYYYYYY  ZZZZZZZZ                     *                 MT216040
                                1605  *                                                       *                 MT216050
                                1606  * W = THE CONDITION CODE WHEN AN INTERRUPT OCCURS       *                 MT216060
                                1607  * TT = THE SUBTEST NUMBER THE ERROR OCCURED IN          *                 MT216070
                                1608  * XXXXXX = THE ADDRESS OF THE LOCATION UNDER TEST       *                 MT216080
                                1609  * YYYYYYYY = THE CORRECT DATA EXPECTED                  *                 MT216090
                                1610  * ZZZZZZZZ = THE INCORRECT DATA READ                    *                 MT216100
                                1611  *                                                       *                 MT216110
                                1612  * R4 = MEMORY LOCATION UNDER TEST                       *                 MT216120
                                1613  * R7 = EXPECTED DATA                                    *                 MT216130
                                1614  * R8 = DATA READ                                        *                 MT216140
                                1615  * R15 = THE RETURN ADDRESS                              *                 MT216150
                                1616  *                                                       *                 MT216160
                                1617  * * * * * * * * * * * * * * * * * * * * * * * * * * * * *                 MT216170

0015C0  0000 1D48               1619  ERROR     STM   R0,RSAVE+64       SAVE ALL REGISTERS                      MT216190
0015C4  E6C0 195E               1620            LA    R12,TT            LOAD START ADRS OF ERROR MESSAGE        MT216200
0015C8  40C0 1614               1621  ERROR1    STH   R12,RTN+4         STORE START ADRS IN DATA CONSTANT LOC   MT216210
0015CC  48B0 0A2A               1622            LH    R11,CONRADR       LOAD TTY ADRS                           MT216220
0015D0  24F1                    1623            LIS   R15,1                                                     MT216230
0015D2  D2F0 1899               1624            STB   R15,ERRFLG        SET ERROR FLAG                          MT216240
0015D6  51FJ 18B8               1625            AM    R15,TOTALERR      INCREMENT ERROR COUNT                   MT216250
0015DA  238A                    1626            BNCS  CONT7             CONTINUE UNTIL COUNT = X'FFFFFFFF'      MT216260
0015DC  98BA                    1627            SSR   R11,R10          IS TTY DU ?                             MT216270
0015DE  2318                    1628            BNMS  CONT7             NO, CONTINUE WITH ROUTINE               MT216280
0015E0  2571                    1629            LCS   R7,1                                                      MT216290
0015E2  5070 18B8               1630            ST    R7,TOTALERR                                               MT216300
0015E6  41E0 1426               1631            BAL   R14,DISP          YES, WRITE X'FFFFFFFF' ON DISPLAY       MT216310
0015EA  C200 1888               1632            LPSW  ERRHLT            HALT TEST EXECUTION                     MT216320
0015EE  0894                    1633  CONT7     LDAR  R9,R4             LOAD ADRS WHERE ERROR OCCURED           MT216330
0015F0  41F0 146C               1634            BAL   R15,CONVERT       CONVERT TO ASCII CHARACTERS             MT216340
0015F4  0014                    1635            DC    X'14'             SHIFT INDEX                    ****     MT216350
0015F6  1962                    1636            DC    Z(XXXXXX)         STORE INDEX                    ****     MT216360
0015F8  5890 1D64               1637            L     R9,RSAVE+92       LOAD EXPECTED DATA                      MT216370
0015FC  41F0 146C               1638            BAL   R15,CONVERT       CONVERT TO ASCII CHARACTERS             MT216380
001600  001C                    1639            DC    X'1C'             SHIFT INDEX                             MT216390
001602  196A                    1640            DC    Z(YYYYYYYY)       STORE INDEX                             MT216400
001604  5890 1D68               1641            L     R9,RSAVE+96       LOAD DATA READ                          MT216410
001608  41F0 146C               1642            BAL   R15,CONVERT       CONVERT TO ASCII CHARACTERS             MT216420
00160C  001C                    1643            DC    X'1C'             SHIFT INDEX                             MT216430
00160E  1974                    1644            DC    Z(ZZZZZZZZ)       STORE INDEX                             MT216440
001610  41F0 12F8               1645  RTN       BAL   R15,=PRINT        PRINT ERROR MESSAGE                     MT216450
001614  0000                    1646            DC    X'0'              START ADRS OF MESSAGE                   MT216460
001616  0100 1D48               1647            LM    R0,RSAVE+64       RESTORE ALL REGISTERS                   MT216470
00161A  030F                    1648            BR    R15               RETURN TO SUBTEST                       MT216480
                                1649  *                                                                         MT216490
00161C  98BA                    1650  BRKWAIT   SSR   R11,R10                                                   MT216500
00161E  2041                    1651            BOS   BRKWAIT                                                   MT216510
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001620  0100 1048          1652          LM    R0,RSAVE+64                                    MT216520
001624  4300 005C          1653          B     SUBCHK                                         MT216530


                           1655  * * * * * * * * * * * * * * * * * * * * * * * * * * * *      MT216550
                           1656  *                                                   *        MT216560
                           1657  *                       T O T O C                   *        MT216570
                           1658  *                                                   *        MT216580
                           1659  * THIS ROUTINE READS EVERY AVAILABLE MEMORY LOCATION *        MT216590
                           1660  * FROM 16K TO THE TOP OF CORE AND COMPARES THE DATA  *        MT216600
                           1661  * READ TO AN ESTABLISHED VALUE CONTAINED IN R7. IT   *        MT216610
                           1662  * THEN STORES AN ALTERNATE VALUE, CONTAINED IN R3, IN *       MT216620
                           1663  * EACH LOCATION READ.                               *        MT216630
                           1664  * R3 = ALTERNATE DATA                               *        MT216640
                           1665  * R7 = EXPECTED DATA                                *        MT216650
                           1666  * R14 = RETURN ADDRESS                              *        MT216660
                           1667  *                                                   *        MT216670
                           1668  * * * * * * * * * * * * * * * * * * * * * * * * * * * *      MT216680

001628  41F0 149C          1670  TOTOC   BAL   R15,FWR1        FIND FIRST AVAILABLE 16K BLOCK          MT216700
00162C  2454               1671          LIS   R5,4            ESTABLISH INCREMENT VALUE               MT216710
00162E  086A               1672  LOR1    LOAR  R6,WORK         ESTABLISH END VALUE              ****   MT216720
001630  0842               1673          LOAR  R4,R2           ESTABLISH STARTING ADDRESS              MT216730
001632  5884 0000          1674  LOR2    L     R8,0(R4)        LOAD CONTENTS OF MEMORY INTO R8         MT216740
001636  0578               1675          CLAR  R7,R8           IS CONTENTS OF MEMORY EQUAL TO R7 ?     MT216750
001638  213B               1676          BNES  STR1            YES, CONTINUE WITH ROUTINE              MT216760
00163A  5034 0000          1677  STR2    ST    R3,0(R4)        STORE CONTENTS OF R3 IN MEMORY          MT216770
00163E  C140 1632          1678          BXLE  R4,LOR2         REPEAT UNTIL 16K BLOCK HAS BEEN TESTED  MT216780
001642  4120 1440          1679          BAL   R2,WRTFTN                                               MT216790
001646  41F0 14B4          1680          BAL   R15,FWR         FIND NEXT AVAILABLE 16K BLOCK           MT216800
*00164A 203E               1681          BNZ   LOR1            CHECK NEXT 16K BLOCK                    MT216810
00164C  030E               1682          BR    R14             RETURN ON REGISTER R14                  MT216820
                           1683  *                                                                     MT216830
00164E  41F0 15C0          1684  STR1    BAL   R15,ERROR       LINK TO ERROR                    ****   MT216840
001652  220C               1685          BS    STR2            RETURN                           ****   MT216850


                           1687  * * * * * * * * * * * * * * * * * * * * * * * * * * * *      MT216870
                           1688  *                                                   *        MT216880
                           1689  *                     F R M T O C                   *        MT216890
                           1690  *                                                   *        MT216900
                           1691  * THIS ROUTINE READS EVERY AVAILABLE MEMORY LOCATION *        MT216910
                           1692  * FROM THE TOP OF CORE TO 8K AND COMPARES THE DATA   *        MT216920
                           1693  * READ TO AN ESTABLISHED VALUE CONTAINED IN R7. IT   *        MT216930
                           1694  * THEN STORES AN ALTERNATE VALUE, CONTAINED IN R3,   *        MT216940
                           1695  * IN EACH LOCATION READ.                            *        MT216950
                           1696  * R3 = ALTERNATE DATA.                              *        MT216960
                           1697  * R7 = EXPECTED DATA                                *        MT216970
                           1698  * R14 = RETURN ADDRESS.                             *        MT216980
                           1699  *                                                   *        MT216990
                           1700  * * * * * * * * * * * * * * * * * * * * * * * * * * * *      MT217000
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001654  41F0 150E          1702  FRMTOC   BAL   R15,BKWR1        FIND LAST AVAILABLE 16K BLOCK              MT217020
001658  2554               1703           LCS   R5,4             ESTABLISH DECREMENT VALUE                  MT217030
*00165A C86A FFFC          1704  LDR3     LDI   R6,-4(R1C)       ESTABLISH END VALUE                        MT217040
 00165E 0842               1705           LDAR  R4,R2            ESTABLISH STARTING ADDRESS                 MT217050
 001660 5884 0000          1706  LDR4     L     R8,0(R4)         LOAD CONTENTS OF MEMORY INTO R8            MT217060
 001664 0587               1707           CLAR  R8,R7            IS CONTENTS OF MEMORY EQUAL TO R8 ?        MT217070
 001666 213B               1708           BNES  STR7             NO, BRANCH                                 MT217080
 001668 5034 0000          1709  STR6     ST    R3,0(R4)         STORE CONTENTS OF R3 IN  MEMORY  ****      MT217090
 00166C C040 1660          1710           BXH   R4,LDR4          REPEAT UNTIL 16K BLOCK HAS BEEN TESTED     MT217100
 001670  4120 1440          1711           BAL   R2,WRTFTN                                                   MT217110
 001674  41F0 1526          1712           BAL   R15,BKWR         FIND NEXT AVAILABLE 16K BLOCK              MT217120
*001678  223F               1713           BZ    LDR3             CHECK NEXT 16K BLOCK                       MT217130
 00167A  030E               1714           BR    R14              RETURN ON REGISTER R14                     MT217140
                            1715  *                                                                         MT217150
 00167C  41F0 15C0          1716  STR7     BAL   R15,ERROR        NOT EQUAL, PRINT ERROR           ****      MT217160
 001680  220C               1717           BS    STR6             BRANCH                           ****      MT217170
                            1718  *                                                                         MT217180
                            1719  *                                                                         MT217190
 001682  2480               1720  TTYLOOP  LIS   R8,0             ZERO REGISTER R8                           MT217200
 001684  4090 1C1C          1721           STH   R9,R9SAVE                                                   MT217210
 001688  4140 13CE          1722           BAL   R4,KBREAD        READ CHARACTERS FROM CONSOLE               MT217220
 00168C  41F0 13EA          1723  RDTTY1   BAL   R15,GETCHR                                                 MT217230
 001690  C540 000D          1724           CLHI  R4,X'0D'         COMPARE WITH CARRIAGE RETURN               MT217240
*001694  233F               1725           BE    EXIT3                                                      MT217250
 001696  CB40 0030          1726           SHI   R4,X'30'         CONVERT ASCII TO HEX                       MT217260
*00169A  2087               1727           BL    RDTTY1                                                     MT217270
 00169C  C540 000A          1728           CLHI  R4,X'0A'                                                   MT217280
*0016A0  2185               1729           BL    OKHEX                                                      MT217290
 0016A2  2747               1730           SIS   R4,7                                                       MT217300
 0016A4  C540 0010          1731           CLHI  R4,X'10'                                                   MT217310
*0016A8  228E               1732           BNL   RDTTY1                                                     MT217320
 0016AA  1184               1733  OKHEX    SLLS  R8,4             SHIFT ADRS REGISTER                        MT217330
 0016AC  0A84               1734           AAR   R8,R4            ADD NEW DIGIT                              MT217340
 0016AE  4300 168C          1735           B     RDTTY1           GET ANOTHER CHARACTER                      MT217350
 001682  41F0 12F8          1736  EXIT3    BAL   R15,$PRINT                                                  MT217360
 001686  1AA6               1737           DC    Z(CRLFMSG)                                                 MT217370
 001688  4890 1C1C          1738           LH    R9,R9SAVE                                                  MT217380
 00168C  0309               1739           BR    R9                                                         MT217390
                            1740  *                                                                         MT217400
                            1741  *                                                                         MT217410
 00168E  2410               1742  DELAY    LIS   R1,0             ZERO REGISTER R1                           MT217420
 0016C0  2421               1743           LIS   R2,1             LOAD INCREMENT VALUE                       MT217430
 0016C2  5830 1B60          1744           L     R3,DELAYVAL      LOAD BXLE LIMIT                            MT217440
 0016C6  C110 16C6          1745           BXLE  R1,*             DELAY                                      MT217450
 0016CA  030F               1746           BR    R15              RETURN TO SUBTEST                          MT217460
                            1747  *                                                                         MT217470
                            1748  *                                                                         MT217480
                            1749  *                                                                         MT217490
 0016CC  D000 1D48          1750  MALFTN   STM   R0,RSAVE+64      SAVE ALL REGISTERS                         MT217500
 0016D0  9599               1751           EPSR  R9,R9            CAPTURE CURRENT CONDITION CODE             MT217510
 0016D2  43F0 1712          1752           BFC   X'F',MMALFTN                                                MT217520
 0016D6  24C1               1753           LIS   R12,1                                                      MT217530
 0016D8  04C9               1754           NAR   R12,R9                                                     MT217540
 0016DA  2335               1755           BZS   CONT17                                                     MT217550
 0016DC  5810 0024          1756           L     R1,X'24'                                                   MT217560
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0016E0  C200 1880          1757          LPSW  HALT                                                    MT217570
                           1758  *                                                                       MT217580
0016E4  41F0 146C          1759  CONT17  BAL   R15,CONVERT       CONVERT TO ASCII CHARACTERS           MT217590
0016E8  0000               1760          DC    X'0'              SHIFT INDEX                           MT217600
0016EA  195B               1761          DC    Z(W)              STORE INDEX                           MT217610
0016EC  5840 0024          1762          L     R4,X'24'          LOAD ADRS WHERE MALFTN OCCURED        MT217620
0016F0  E6C0 195B          1763          LA    R12,W             LOAD START ADRS OF ERROR MESSAGE      MT217630
0016F4  E6F0 1700          1764          LA    R15,CONT16        ESTABLISH RETURN ADRS                 MT217640
0016F8  50F0 1D84          1765          ST    R15,RSAVE+124                                           MT217650
0016FC  4300 15C8          1766          B     ERROR1            GO TO ERROR ROUTINE                   MT217660
                           1767  *                                                                       MT217670
001700  908A               1768  CONT16  SSR   R11,R10           IS TTY DU ?                           MT217680
001702  2316               1769          BNMS  CONT15            NO, LOAD NEW PSW                      MT217690
001704  F870 AAAA AAAA     1770          LDI   R7,Y'AAAAAAAA'                                          MT217700
00170A  41E0 1426          1771          BAL   R14,DISP          YES, WRITE X'AAAAAAAA' ON DISPLAY     MT217710
00170E  C200 1880          1772  CONT15  LPSW  HALT              LOAD NEW PSW AND HALT                 MT217720
                           1773  *                                                                       MT217730
001712  41F0 146C          1774  MMALFTN BAL   R15,CONVERT                                             MT217740
001716  0000               1775          DC    X'0'                                                    MT217750
001718  1A46               1776          DC    Z(CCADRS)                                               MT217760
00171A  0891               1777          LDAR  R9,R1                                                   MT217770
00171C  41F0 146C          1778          BAL   R15,CONVERT                                             MT217780
001720  0014               1779          DC    X'14'                                                   MT217790
001722  1A4A               1780          DC    Z(MMADRS)                                               MT217800
001724  41F0 12F8          1781          BAL   R15,$PRINT                                              MT217810
001728  1A30               1782          DC    Z(MACHMAL)                                              MT217820
00172A  0100 1D48          1783          LM    R0,RSAVE+64                                             MT217830
00172E  4300 1700          1784          B     CONT16                                                  MT217840
                           1785  *                                                                       MT217850
                           1786  *                                                                       MT217860
                           1787  *                                                                       MT217870
001732  089F               1788  ILGINT  LDAR  R9,R15            LOAD OLD PSW                          MT217880
001734  41F0 146C          1789          BAL   R15,CONVERT       CONVERT TO ASCII CHARACTERS           MT217890
001738  001C               1790          DC    X'1C'             SHIFT INDEX                           MT217900
00173A  1A26               1791          DC    Z(ADRS)           STORE INDEX                           MT217910
00173C  089E               1792          LDAR  R9,R14            LOAD LOC WHERE ILG INST OCCURED       MT217920
00173E  41F0 146C          1793          BAL   R15,CONVERT       CONVERT TO ASCII CHARACTERS           MT217930
001742  001C               1794          DC    X'1C'             SHIFT INDEX                           MT217940
001744  1A1C               1795          DC    Z(ADRS1)          STORE INDEX                           MT217950
001746  41F0 12F8          1796          BAL   R15,$PRINT        PRINT ILLEGAL INSTRUCTION MESSAGE     MT217960
00174A  1A06               1797          DC    Z(ILGMSG)         START ADRS OF MESSAGE                 MT217970
00174C  908A               1798          SSR   R11,R10           IS TTY OFF ?                          MT217980
00174E  2316               1799          BNMS  CONT14            NO, LOAD NEW PSW                      MT217990
001750  F870 5555 5555     1800          LDI   R7,Y'55555555'                                          MT218000
001756  41E0 1426          1801          BAL   R14,DISP          YES, WRITE X'55555555' ON DISPLAY     MT218010
00175A  C200 1880          1802  CONT14  LPSW  HALT              LOAS NEW PSW AND HALT                 MT218020
                           1803  *                                                                       MT218030
                           1804  *                                                                       MT218040
                           1805  *                                                                       MT218050
00175E  082E               1806  MACINT  LDAR  R2,R14            SAVE OLD PSW                          MT218060
001760  083F               1807          LDAR  R3,R15            SAVE OLD LOCATION COUNTER             MT218070
001762  41F0 12F8          1808          BAL   R15,$PRINT        PRINT 'MACINT'                        MT218080
001766  1A52               1809          DC    Z(MAC)            START ADRS OF MESSAGE                 MT218090
001768  1802               1810          LPSWR R2                LOAD OLD PSW & LOC COUNTER            MT218100
                           1811  *                                                                       MT218110
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                                1812  *                                                                    MT218120
                                1813  *                                                                    MT218130
00176A   082E                   1814  SVCERR   LDAR   R2,R14          SAVE OLD PSW                       MT218140
00176C   083F                   1815           LDAR   R3,R15          SAVE OLD LOCATION COUNTER          MT218150
00176E   41F0 12F8              1816           BAL    R15,$PRINT      PRINT 'SVCINT'                     MT218160
001772   1A5A                   1817           DC     Z(SVC)          START ADRS OF MESSAGE              MT218170
001774   1802                   1818           LPSWR  R2              LOAD OLD PSW & LOC COUNTER         MT218180
                                1819  *                                                                    MT218190
                                1820  *                                                                    MT218200
                                1821  *                                                                    MT218210
001776   082E                   1822  ARTFLT   LDAR   R2,R14          SAVE OLD PSW                       MT218220
001778   083F                   1823           LDAR   R3,R15          SAVE OLD LOCATION COUNTER          MT218230
00177A   41F0 12F8              1824           BAL    R15,$PRINT      PRINT 'ARTFLT'                     MT218240
00177E   1A62                   1825           DC     Z(ART)          START ADRS OF MESSAGE              MT218250
001780   1802                   1826           LPSWR  R2              LOAD OLD PSW & LOC COUNTER         MT218260
                                1827  *                                                                    MT218270
                                1828  *                                                                    MT218280
                                1829  *                                                                    MT218290
001782   082E                   1830  SYSQ     LDAR   R2,R14          SAVE OLD PSW                       MT218300
001784   083F                   1831           LDAR   R3,R15          SAVE OLD LOCATION COUNTER          MT218310
001786   41F0 12F8              1832           BAL    R15,$PRINT      PRINT 'SYSQUE'                     MT218320
00178A   1A6A                   1833           DC     Z(SYS)          START ADRS OF MESSAGE              MT218330
00178C   1802                   1834           LPSWR  R2              LOAD OLD PSW & LOC COUNTER         MT218340
                                1835  *                                                                    MT218350
                                1836  *                                                                    MT218360
                                1837  *                                                                    MT218370
00178E   0892                   1838  EXTINT   LDAR   R9,R2           LOAD INT DEVICE ADRS               MT218380
001790   41F0 146C              1839           BAL    R15,CONVERT     CONVERT TO ASCII CHARACTERS        MT218390
001794   0008                   1840           DC     X'8'            SHIFT INDEX                        MT218400
001796   1A7A                   1841           DC     Z(DEVADRS)      STORE INDEX                        MT218410
001798   41F0 12F8              1842           BAL    R15,$PRINT      PRINT 'EXTINT XXX'                 MT218420
00179C   1A72                   1843           DC     Z(EXT)          START ADRS OF MESSAGE              MT218430
00179E   1800                   1844           LPSWR  R0              LOAD OLD PSW & LOC COUNTER         MT218440

0017A0   082E                   1846  ALIFLT   LDAR   R2,R14          SAVE OLD PSW              ****     MT218460
0017A2   083F                   1847           LDAR   R3,R15          SAVE OLD LOC              ****     MT218470
0017A4   089F                   1848           LDAR   R9,R15          GET OLD LOC COUNTER       ****     MT218480
0017A6   41F0 146C              1849           BAL    R15,CONVERT                                       MT218490
0017AA   0014                   1850           DC     X'14'                                             MT218500
0017AC   1A96                   1851           DC     Z(ALIGNLOC)                                       MT218510
0017AE   41F0 12F8              1852           BAL    R15,$PRINT                                        MT218520
001782   1A80                   1853           DC     Z(ALIMSG)                                         MT218530
001784   1802                   1854           LPSWR  R2              RETURN                             MT218540
                                1855  *                                                                    MT218550
                                1856  *-----------------------------------------                         MT218560
                                1857  *                                                                    MT218570
                                1858  * IF BREAK KEY DEPRESSED, GO TO 'OPTIN' OR (BRKVECT); ELSE RETURN.  MT218580
                                1859  *                                                                    MT218590
         0000 17B6              1860  TSTBRK   EQU    *                                                   MT218600
0017B6   00E0 1F4C              1861           STM    R14,$TBRKSV     SAVE REGISTERS                     MT218610
0017BA   48F0 1F44              1862           LH     R15,$BRKFLG     (R15) = 15 IF IGNORING I/O         MT218620
0017BE   2337                   1863           BZS    $TSTB.2         BRANCH: YES.                       MT218630
                                1864  *                                                                    MT218640
0017C0   24F0                   1865  $TSTB.1  LIS    R15,0                                             MT218650
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0017C2  40F0 1F38        1866            STH   R15,$BRKVECT        CANCEL BREAK VECTOR                          MT218660
0017C6  01E0 1F4C        1867  $TSTB.1A  LM    R14,$TBRKSV         RELOAD REGISTERS,                            MT218670
0017CA  030F             1868            BR    R15                 RETURN TO CALLER.                            MT218680
                         1869  *                                                                                  MT218690
0017CC  48E0 CA2A        1870  $TSTB.2   LH    R14,CONRADR         READ SIDE ADDRESS FOR TERMINAL               MT218700
0017D0  D3F0 CA10        1871            LB    R15,IO              CONSOLE ID CODE                              MT218710
0017D4  C5F0 0002        1872            CLHI  R15,2                                                            MT218720
0017D8  2333             1873            BES   $TSTB.3             BRANCH: TTY                                  MT218730
0017DA  C5F0 0005        1874            CLHI  R15,5                                                            MT218740
0017DE  4330 181C        1875  $TSTB.3   BE    $TSTB.5             BRANCH: MICRO-I/O BUS                        MT218750
0017E2  9DEF             1876            SSR   R14,R15                                                         MT218760
0017E4  4280 17C0        1877            BTC   8,$TSTB.1           BRANCH: BSY = NO BRK                         MT218770
0017E8  C3F0 0020        1878            THI   R15,X'20'                                                        MT218780
0017EC  4330 17C0        1879            BZ    $TSTB.1             BRANCH: NO FRERR = NO BRK                    MT218790
0017F0  9BEF             1880            RDR   R14,R15                                                        MT218800
0017F2  08FF             1881            LDAR  R15,R15                                                        MT218810
0017F4  4230 17C0        1882            BNZ   $TSTB.1             BRANCH: NONZERO CHAR = NO BRK                MT218820
                         1883  *                                                                              MT218830
        0000 17F8        1884  $TSTB.4   EQU   *                   IT IS BREAK                                  MT218840
0017F8  24FF             1885            LIS   R15,15                                                         MT218850
0017FA  40F0 1F44        1886            STH   R15,$BRKFLG         SET FLAG                                     MT218860
0017FE  48F0 1F3C        1887            LH    R15,$PRTFLG         PRINTING NOW ?                               MT218870
001802  4230 17C6        1888            BNZ   $TSTB.1A            BRANCH: YES.                                 MT218880
001806  24E0             1889            LIS   R14,0                                                          MT218890
001808  48F0 1F38        1890            LH    R15,BRKVECT         SPECIFIED VECTOR                             MT218900
00180C  40E0 1F38        1891            STH   R14,BRKVECT         CANCEL VECTOR                                MT218910
001810  023F             1892            BNZR  R15                 BUT TAKE IMMEDIATELY IF NON-ZERO.            MT218920
001812  25F1             1893            LCS   R15,1               FORCE MESSAGE PRINT          P2 1/80         MT218930
001814  40F0 1F42        1894            STH   R15,ISITERR         P2 1/80                                      MT218940
001818  4300 1350        1895            B     $PRT.3A             'BREAK TERMINATION'          P2 1/80         MT218950
                         1896  *                                                                              MT218960
00181C  9DEF             1897  $TSTB.5   SSR   R14,R15                                                        MT218970
00181E  C3F0 0020        1898            THI   R15,X'20'                                                      MT218980
001822  2134             1899            BNZS  $TSTB.6             BRANCH: BRK.                               MT218990
001824  9BEF             1900            RDR   R14,R15             IF BRK QUEUED, SEE IT NEXT TIME.           MT219000
001826  4300 17C0        1901            B     $TSTB.1             BRANCH: NO FRERR = NO BRK                  MT219010
00182A  9BEF             1902  $TSTB.6   RDR   R14,R15             READ BREAK CHAR                            MT219020
00182C  C8F0 8000        1903            LHI   R15,X'8000'                                                    MT219030
001830  26F1             1904  $TSTB.7   AIS   R15,1                                                          MT219040
001832  2031             1905            BNZS  $TSTB.7                                                        MT219050
001834  9DEF             1906            SSR   R14,R15                                                        MT219060
001836  C3F0 0020        1907            THI   R15,X'20'           BRK KEY STILL DOWN ?                       MT219070
00183A  2038             1908            BNZS  $TSTB.6             BRANCH: YES.                               MT219080
00183C  4300 17F8        1909            B     $TSTB.4             GO SERVICE BREAK                           MT219090
                         1910  *-----------------------------                                                 MT219100
                         1911  * SEE IF CURRENT LIST DEVICE IS OFF-LINE (R1 & CC NON-ZERO IF OFF)             MT219110
                         1912  *                                                                              MT219120
001840  4800 1F4A        1913  TSTDU     LH    R0,$CONPAS                                                     MT219130
001844  D310 1F47        1914            LB    R1,ICSAVE+1         LIST DEVICE ID                             MT219140
001848  D410 0A10        1915            CLB   R1,IO               SAME AS CONSOLE DEVICE ?                   MT219150
00184C  2333             1916            BES   $TSTDU.1            BRANCH: YES.                               MT219160
00184E  4800 1F3A        1917            LH    R0,$LSTPAS          NON-ZERO IF LIST DEVICE ON PASLA.          MT219170
001852  1112             1918  $TSTDU.1  SLLS  R1,2                                                          MT219180
001854  4821 0A0E        1919            LH    R2,PASLADR-4(R1)    'READ SIDE' ADDRESS                        MT219190
001858  9D21             1920            SSR   R2,R1               GET DEVICE STATUS                          MT219200
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00185A  211A            1921          BTFS  1,$IS.DU                                  MT219210
00185C  0800            1922          LOAR  R0,R0             DEVICE ON PASLA ?         MT219220
00185E  2336            1923          BZS   $NOT.DU                                     MT219230
001860  C410 00FC       1924          NHI   R1,X'FC'                                    MT219240
001864  C510 000C       1925          CLHI  R1,X'0C'          PASLA DU IF BSY+EX SET HERE MT219250
001868  2333            1926          BES   $IS.DU            BRANCH: DU.               MT219260
00186A  2410            1927 $NOT.DU  LIS   R1,0                                        MT219270
00186C  2302            1928          BS    $DU.X                                       MT219280
00186E  2511            1929 $IS.DU   LCS   R1,1                                        MT219290
001870  4800 1F40       1930 $DU.X    LH    R0,$WASDU         GET OLD FLAG              MT219300
001874  0601            1931          OAR   R0,R1                                       MT219310
001876  4000 1F40       1932          STH   R0,$WASDU         ACCUMULATE                MT219320
00187A  0811            1933          LOAR  R1,R1             SET CC <> 0 IF DU         MT219330
                        1934 *                                OR CC = 0 IF NOT DU       MT219340
00187C  030F            1935          BR    R15               RETURN                    MT219350
                        1936 * ----------------------------                             MT219360
                        1937 * ROUTINE RESTORES REGISTERS SAVED ON ENTRY TO CALLING ROUTINE MT219370
                        1938 * AND RETURNS BY R15                                       MT219380
                        1939 *                                                          MT219390
00187E  D100 1008       1940 $RSAVRET LM    R0,RSAVE                                    MT219400
001882  030F            1941          BR    R15               RETURN TO ORIGINAL CALLER MT219410
                        1942 ******* THIS IS WHERE TO IMPLEMENT STACK                   MT219420
                        1943 *                                                          MT219430
                        1944 *---------------------------------------                  MT219440
        0000 1884       1945 HALT9    EQU   *                 STOP MACHINE FOR ERROR PRINT MT219450
001884  41F0 1840       1946          BAL   R15,TSTDU         CHECK IF LIST DEVICE OFF-LINE MT219460
001888  2336            1947          BZS   $KEEP7            BRANCH: ON-LINE NOW.      MT219470
00188A  C810 080F       1948          LHI   R1,X'080F'                                  MT219480
00188E  9114            1949          SLHLS R1,4              R1 = X'80F0'              MT219490
001890  9501            1950          EPSR  R0,R1             STOP PROCESSOR. WHEN 'EXE/RUN' DEP MT219500
001892  2207            1951          BS    HALT9             CHECK IF LIST DEVICE ON-LINE. MT219510
                        1952 *-------------------------------------                     MT219520
                        1953 * LIST DEVICE WAS OFF-LINE. PRINT TOTAL, TOTERR             MT219530
                        1954 *                                                          MT219540
        0000 1894       1955 $KEEP7   EQU   *                                           MT219550
001894  2400            1956          LIS   R0,0                                        MT219560
001896  4000 1F40       1957          STH   R0,$WASDU         RESET DU FLAG             MT219570
00189A  41F0 12F8       1958          BAL   R15,$PRINT                                  MT219580
00189E  1AAC            1959          DC    Z(NULLMSG)        OUTPUT NULL STRING, CRLF  MT219590
0018A0  41F0 12F8       1960          BAL   R15,$PRINT                                  MT219600
0018A4  1AB1            1961          DC    Z(TOTMSG)         'TOTAL   TOTERR'        MT219610
0018A6  C840 2020       1962          LHI   R4,C'  '          SPACES                    MT219620
0018AA  4040 1BD4       1963          STH   R4,$OUTBUF+8                                MT219630
0018AE  C870 001C       1964          LHI   R7,X'1C'                                    MT219640
0018B2  E6C0 1BCC       1965          LOAI  R12,$OUTBUF                                 MT219650
0018B6  5890 1BB4       1966          L     R9,TOTAL                                    MT219660
0018BA  41F0 1476       1967          BAL   R15,CONVERT1      CONVERT TOTAL             MT219670
0018BE  C870 001C       1968          LHI   R7,X'1C'                                    MT219680
0018C2  5890 1BB8       1969          L     R9,TOTALERR                                 MT219690
0018C6  26C3            1970          AIS   R12,3             DESTINATION               MT219700
0018C8  41F0 1476       1971          BAL   R15,CONVERT1      CONVERT TOTERR            MT219710
0018CC  249D            1972          LIS   R9,X'D'           CARRIAGE RETURN           MT219720
0018CE  D290 1BDF       1973          STB   R9,$OUTBUF+19     TO TERMINATE MESSAGE.     MT219730
0018D2  41F0 12F8       1974          BAL   R15,$PRINT        PRINT CONTENTS OF BUFFER: MT219740
0018D6  1BCC            1975          DC    Z($OUTBUF)                                  MT219750
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                                1976  *                                   TOTAL    TOTERR                    MT219760
                                1977  *                                   XXXX     YYYY                      MT219770
0018D8   4300 0C8E              1978          B     PRTMSG                PRINT TITLE, ACCEPT COMMAND.      MT219780
                                1979  *------------------------------                                       MT219790
                                1980  *  LIST DEVICE SET UP ROUTINE                                        MT219800
                                1981  *                                                                    MT219810
0018DC   5010 1F58              1982  $SETUP  STA   R1,SET.RTN                                             MT219820
0018E0   0310 1F47              1983          LB    R1,IOSAVE+1           GET LIST DEVICE IDENTIFIER        MT219830
0018E4   9112                   1984          SLHLS R1,2                  HW INDEX                          MT219840
0018E6   4801 0A10              1985          LH    R0,IO(R1)             GET LIST DEVICE WRITE ADDRESS     MT219850
0018EA   DE01 0A31              1986          OC    R0,CONCMD-1(R1)                                         MT219860
0018EE   5810 1F58              1987          LDA   R1,SET.RTN                                             MT219870
0018F2   0301                   1988          BR    R1                    RETURN                            MT219880

                                1990  *-------------------------------------------------                    MT219900
                                1991  *                                                                    MT219910
                                1992  * THIS SUBROUTINE PRINTS "TEST STILL RUNNING" MESSAGE ON             MT219920
                                1993  * THE CONSOLE DEVICE. THIS IS HELPFUL WHEN A TEST TAKES             MT219930
                                1994  * A LONG TIME TO COMPLETE.  RETURN ADDRESS IS R15.                   MT219940
                                1995  *                                                                    MT219950
         0000 18F4              1996  TESTMSG EQU   *                                                      MT219960
0018F4   5000 1F34              1997          ST    R0,R0SAVE             SAVE REGISTER R0                  MT219970
0018F8   5800 1F5C              1998          L     R0,TESTIMER           LOAD START VALUE                  MT219980
0018FC   2701                   1999          SIS   R0,1                  DECREMENT                         MT219990
0018FE   5000 1F5C              2000          ST    R0,TESTIMER           STORE NEW VALUE                   MT220000
*001902  213C                   2001          BNZ   TMSG                  RETURN IF NOT ZERO                MT220010
 001904  D000 1EB4              2002          STM   R0,MOSSAVE            SAVE REGISTERS                    MT220020
 001908  41F0 12F8              2003          BAL   R15,$PRINT            PRINT TEST RUNNING MESSAGE        MT220030
 00190C  1AC2                   2004          DC    Z(TESTMESG)                                             MT220040
 00190E  5800 1F60              2005          L     R0,TESTMER            RESTORE ORIGINAL VALUE            MT220050
 001912  5000 1F5C              2006          ST    R0,TESTIMER                                             MT220060
 001916  D100 1EB4              2007          LM    R0,MOSSAVE            RESTORE REGISTERS                 MT220070
 00191A  5800 1F34              2008  TMSG    L     R0,R0SAVE             RESTORE REGISTER R0               MT220080
 00191E  030F                   2009          BR    R15                   RETURN                            MT220090
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                                2011  * * * * * * * * * * * * * * * * * * * * * * * * * * * * *                MT220110
                                2012  *                                                       *                MT220120
                                2013  *                   M E S S A G E S                     *                MT220130
                                2014  *                                                       *                MT220140
                                2015  * * * * * * * * * * * * * * * * * * * * * * * * * * * * *                MT220150

001920  5333 324D 5432 2030   2017  TITLE    DC    C'S32MT2 06-156F02R04' ***                                  MT220170
001928  362D 3135 3646 3032
001930  5230 3420
001934  0D0A                  2018           DC    X'0D0A'                                                     MT220180
                              2019  *                                                                         MT220190
                              2020  *                                                                         MT220200
                              2021  *                                                                         MT220210
001936  4156 4149 4C41 424C 2022  MEMSG    DC    C'AVAILABLE MEMORY',X'0D0A'                                 MT220220
00193E  4520 4D45 4D4F 5259
001946  0D0A
001948  0000 0000             2023  MEMSG1   DC    0                                                           MT220230
00194C  0000                  2024           DC    X'0'                                                        MT220240
00194E  202D                  2025           DC    X'202D'             ****                                    MT220250
001950  20                    2026           DB    X'20'               ****                                    MT220260
001951  00                    2027  ENDVAL   DB    0                                                           MT220270
001952  0000                  2028           DC    X'0'                ****                                    MT220280
001954  0000                  2029           DC    X'0'                                                        MT220290
001956  0020                  2030           DC    X'0020'             ****                                    MT220300
001958  0D0A                  2031           DC    X'0D0A'                                                     MT220310
                              2032  *                                                                         MT220320
                              2033  *                                                                         MT220330
                              2034  *                                                                         MT220340
                              2035  * ERROR MESSAGE W  TT  XXXXXX  YYYYYYYY  ZZZZZZZZ                 ****    MT220350
00195A                        2036           DB    *                                                           MT220360
00195A  00                    2037           DB    0                                                           MT220370
00195B  00                    2038  W        DB    0                                                           MT220380
00195C  2020                  2039           DC    X'2020'                                                     MT220390
00195E  0000 2020             2040  TT       DC    Y'2020'                                                     MT220400
001962  0000 0000             2041  XXXXXX   DC    Y'0'                                                        MT220410
001966  0000                  2042           DC    X'0'                                                        MT220420
001968  2020                  2043           DC    X'2020'                                                     MT220430
00196A  0000 0000             2044  YYYYYYYY DC    Y'0'                                                        MT220440
00196E  0000 0000             2045           DC    Y'0'                                                        MT220450
001972  2020                  2046           DC    X'2020'                                                     MT220460
001974  0000 0000             2047  ZZZZZZZZ DC    Y'0'                                                        MT220470
001978  0000                  2048           DC    X'0'                                                        MT220480
00197A  0000                  2049  SUBNUM   DC    X'0'                                                        MT220490
00197C  0D0A                  2050           DC    X'0D0A'                                                     MT220500
                              2051  *                                                                         MT220510
00197E                        2052           DB    *                   DUMMY ALIGN FOLLOWING MESSAGES  ****    MT220520
                              2053  *                                                                         MT220530
                              2054  *                                                                         MT220540
00197E  FFFF FFFF FFFF FFFF 2055  BRKMSG   DB    -1,-1,-1,-1,-1,-1,-1,-1                                     MT220550
001986  4252 4541 4820 5445 2056           DB    C'BREAK TERMINATION',X'0D'                                  MT220560
00198E  524D 494E 4154 494F
001996  4E0D
        0000 1997             2057  $BRKEND  EQU   *-1                                                       MT220570
                              2058  *                                                                         MT220580
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                                2059  *                                                                  MT220590
                                2060  *                                                                  MT220600
001998                          2061          DB      *                                                  MT220610
001998  0000 0000               2062  TOTALMSG DC     0                                                  MT220620
00199C  0000 0000               2063          DC      0                                                  MT220630
0019A0  2054 4F54 414C 2020     2064          DC      C' TOTAL '                                         MT220640
0019A8  4552 524F 5253          2065          DC      C'ERRORS',X'0D0A'                                  MT220650
0019AE  0D0A
                                2066  *                                                                  MT220660
                                2067  *                                                                  MT220670
                                2068  *                                                                  MT220680
0019B0  4C4F 3D20               2069  LOMSG   DC      C'LO= '                                            MT220690
0019B4  0D0A                    2070          DC      X'0D0A'                                            MT220700
                                2071  *                                                                  MT220710
                                2072  *                                                                  MT220720
                                2073  *                                                                  MT220730
0019B6  4849 3D20               2074  HIMSG   DC      C'HI= '                                            MT220740
0019BA  0D0A                    2075          DC      X'0D0A'                                            MT220750
                                2076  *                                                                  MT220760
                                2077  *                                                                  MT220770
                                2078  *                                                                  MT220780
0019BC  4657 3D20               2079  FWMSG   DC      C'FW= '                                            MT220790
0019C0  0D0A                    2080          DC      X'0D0A'                                            MT220800
                                2081  *                                                                  MT220810
                                2082  *                                                                  MT220820
                                2083  *                                                                  MT220830
0019C2  4C4F 5720 5641 4C55     2084  NLMSG   DC      C'LOW VALUE > HIGH VALUE'                          MT220840
0019CA  4520 3E20 4849 4748
0019D2  2056 414C 5545
0019D8  0D0A                    2085          DC      X'0D0A'                                            MT220850
                                2086  *                                                                  MT220860
                                2087  *                                                                  MT220870
                                2088  *                                                                  MT220880
0019DA  4D45 4D4F 5259 204E     2089  MNAMSG  DC      C'MEMORY NOT AVAILABLE'                            MT220890
0019E2  4F54 2041 5641 494C
0019EA  4142 4C45
0019EE  0D0A                    2090          DC      X'0D0A'                                            MT220900
                                2091  *                                                                  MT220910
                                2092  *                                                                  MT220920
                                2093  *                                                                  MT220930
0019F0  5355 4254 4553 5420     2094  TSTMSG  DC      C'SUBTEST',C'*',X'0D0A'                            MT220940
0019F8  2A20
0019FA  0D0A
                                2095  *                                                                  MT220950
                                2096  *                                                                  MT220960
                                2097  *                                                                  MT220970
0019FC  4E4F 2045 5252 4F52     2098  NOERR   DC      C'NO ERROR',X'0D0A'                                MT220980
001A04  0D0A
                                2099  *                                                                  MT220990
                                2100  *                                                                  MT221000
                                2101  *                                                                  MT221010
001A06  494C 4C45 4741 4C20     2102  ILGMSG  DC      C'ILLEGAL INSTRUCTION'                             MT221020
001A0E  494E 5354 5255 4354
001A16  494F 4E20
001A1A  2020                    2103          DC      X'2020'                                            MT221030
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001A1C  0000 0000          2104  ADRS1    DC    0                                  MT221040
001A20  0000 0000          2105            DC    0                                  MT221050
001A24  2000               2106            DC    X'2000'                            MT221060
001A26  0000 0000          2107  ADRS     DC    0                                  MT221070
001A2A  0000 0000          2108            DC    0                                  MT221080
001A2E  000A               2109            DC    X'000A'                            MT221090
                           2110  *                                                  MT221100
                           2111  *                                                  MT221110
                           2112  *                                                  MT221120
001A30  4D41 4348 494E 4520 2113  MACHMAL  DC    C'MACHINE MALFUNCTION',X'2020'     MT221130
001A38  4D41 4C46 554E 4354
001A40  494F 4E20
001A44  2020
001A46  00                 2114  CCADRS   DB    0                                  MT221140
001A47  00                 2115            DB    *                ****              MT221150
001A48  2020               2116            DC    X'2020'                            MT221160
001A4A  0000 0000          2117  MMADRS   DC    0                                  MT221170
001A4E  0000               2118            DCX   0                                  MT221180
001A50  000A               2119            DC    X'000A'                            MT221190
                           2120  *                                                  MT221200
                           2121  *                                                  MT221210
                           2122  *                                                  MT221220
001A52                     2123            DB    *                                  MT221230
001A52  4D41 4349 4E54     2124  MAC      DC    C'MACINT'                          MT221240
001A58  000A               2125            DC    X'000A'                            MT221250
                           2126  *                                                  MT221260
                           2127  *                                                  MT221270
                           2128  *                                                  MT221280
001A5A  5356 4349 4E54     2129  SVC      DC    C'SVCINT'                          MT221290
001A60  000A               2130            DC    X'000A'                            MT221300
                           2131  *                                                  MT221310
                           2132  *                                                  MT221320
                           2133  *                                                  MT221330
001A62  4152 5446 4C54     2134  ART      DC    C'ARTFLT'                          MT221340
001A68  000A               2135            DC    X'000A'                            MT221350
                           2136  *                                                  MT221360
                           2137  *                                                  MT221370
                           2138  *                                                  MT221380
001A6A  5359 5351 5545     2139  SYS      DC    C'SYSQUE'                          MT221390
001A70  000A               2140            DC    X'000A'                            MT221400
                           2141  *                                                  MT221410
                           2142  *                                                  MT221420
                           2143  *                                                  MT221430
001A72  4558 5449 4E54 2020 2144  EXT      DC    C'EXTINT  '                        MT221440
001A7A  0000 0000          2145  DEVADRS  DC    0                                  MT221450
001A7E  000A               2146            DC    X'000A'                            MT221460
                           2147  *                                                  MT221470
                           2148  *                                                  MT221480
                           2149  *                                                  MT221490
001A80  0000               2150  ALIMSG   DC    X'0',C'ALIGNMENT FAULT AT  '       MT221500
001A82  414C 4947 4E4D 454E
001A8A  5420 4641 554C 5420
001A92  4154 2020
001A96  0000 0000          2151  ALIGNLOC DC    0,0,X'000A'                        MT221510
001A9A  0000 0000
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001A9E  0D0A
                                2152  *                                                                    MT221520
001AA0  0000                    2153  QUMARK   DC    X'0',C' ?',X'0D0A'                                   MT221530
001AA2  203F
001AA4  0D0A
                                2154  *                                                                    MT221540
001AA6  0000                    2155  CRLFMSG  DC    X'0',X'0D0A',X'0'   ****                          MT221550
001AA8  0D0A
001AAA  0000
001AAC  FFFF FFFF 0D            2156  NULLMSG  DB    -1,-1,-1,-1,X'0D'                                    MT221560
001AB1  544F 5441 4C20 2020     2157  TOTMSG   DB    C'TOTAL     TOTERR',X'0D'                            MT221570
001AB9  2020 544F 5445 5252
001AC1  0D
                                2158  *                                                                    MT221580
001AC2  5445 5354 2053 5449     2159  TESTMESG DC    C'TEST STILL RUNNING',X'0D0A'                        MT221590
001ACA  4C4C 2052 554E 4E49
001AD2  4E47
001AD4  0D0A
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                          2161  * * * * * * * * * * * * * * * * * * * * * * * * * * * *                MT221610
                          2162  *                                                       *                MT221620
                          2163  *              M E M O R Y   T A B L E                  *                MT221630
                          2164  *                                                       *                MT221640
                          2165  * * * * * * * * * * * * * * * * * * * * * * * * * * * *                MT221650

001AD8                    2167          ALIGN 4                                                          MT221670
001AD8  80                2168  KB00128 DB    X'80'          16-32-48-64-80-96-112-128-       ****     MT221680
001AD9  00                2169  KB00256 DB    0              144-160-176-192-208-224-240-256  ****     MT221690
001ADA  00                2170  KB00384 DB    0              272-288-304-320-336-352-368-384  ****     MT221700
001ADB  00                2171  KB00512 DB    0              400-416-432-448-464-480-496-512  ****     MT221710
001ADC  00                2172  KB00640 DB    0              528-544-560-576-592-608-624-640  ****     MT221720
001ADD  00                2173  KB00768 DB    0              656-672-688-704-720-736-752-768  ****     MT221730
001ADE  00                2174  KB00896 DB    0              784-800-816-832-848-864-880-896  ****     MT221740
001ADF  00                2175  KB01024 DB    0              912-928-944-960-976-992-1008-1024***     MT221750
001AE0  00                2176  KB01152 DB    0              1040-1056-1072-1088-1104-1120-1136-1152MT221760
001AE1  00                2177  KB01280 DB    0              1168-1184-1200-1216-1232-1248-1264-1280MT221770
001AE2  00                2178  KB01408 DB    0              1296-1312-1328-1344-1360-1376-1392-1408MT221780
001AE3  00                2179  KB01536 DB    0              1424-1440-1456-1472-1488-1504-1520-1536MT221790
001AE4  00                2180  KB01664 DB    0              1552-1568-1584-1600-1616-1632-1648-1664MT221800
001AE5  00                2181  KB01792 DB    0              1680-1696-1712-1728-1744-1760-1776-1792MT221810
001AE6  00                2182  KB01920 DB    0              1808-1824-1840-1856-1872-1888-1904-1920MT221820
001AE7  00                2183  KB02048 DB    0              1936-1952-1968-1984-2000-2016-2032-2048MT221830
001AE8  0000 0000         2184  KB02560 DC    Y'0'           2.5 MB                           ****     MT221840
001AEC  0000 0000         2185  KB03072 DC    Y'0'           3.0 MB                           ****     MT221850
001AF0  0000 0000         2186  KB03584 DC    Y'0'           3.5 MB                           ****     MT221860
001AF4  0000 0000         2187  KB04096 DC    Y'0'           4.0 MB                           ****     MT221870
001AF8  0000 0000         2188  KB04608 DC    Y'0'           4.5 MB                           ****     MT221880
001AFC  0000 0000         2189  KB05120 DC    Y'0'           5.0 MB                           ****     MT221890
001B00  0000 0000         2190  KB05632 DC    Y'0'           5.5 MB                           ****     MT221900
001B04  0000 0000         2191  KB06144 DC    Y'0'           6.0 MB                           ****     MT221910
001B08  0000 0000         2192  KB06656 DC    Y'0'           6.5 MB                           ****     MT221920
001B0C  0000 0000         2193  KB07168 DC    Y'0'           7.0 MB                           ****     MT221930
001B10  0000 0000         2194  KB07680 DC    Y'0'           7.5 MB                           ****     MT221940
001B14  0000 0000         2195  KB08192 DC    Y'0'           8.0 MB                           ****     MT221950
001B18  0000 0000         2196  KB08704 DC    Y'0'           8.5 MB                           ****     MT221960
001B1C  0000 0000         2197  KB09216 DC    Y'0'           9.0 MB                           ****     MT221970
001B20  0000 0000         2198  KB09728 DC    Y'0'           9.5 MB                           ****     MT221980
001B24  0000 0000         2199  KB10240 DC    Y'0'           10.0 MB                          ****     MT221990
001B28  0000 0000         2200  KB10752 DC    Y'0'           10.5 MB                          ****     MT222000
001B2C  0000 0000         2201  KB11264 DC    Y'0'           11.0 MB                          ****     MT222010
001B30  0000 0000         2202  KB11776 DC    Y'0'           11.5 MB                          ****     MT222020
001B34  0000 0000         2203  KB12288 DC    Y'0'           12.0 MB                          ****     MT222030
001B38  0000 0000         2204  KB12800 DC    Y'0'           12.5 MB                          ****     MT222040
001B3C  0000 0000         2205  KB13312 DC    Y'0'           13.0 MB                          ****     MT222050
001B40  0000 0000         2206  KB13824 DC    Y'0'           13.5 MB                          ****     MT222060
001B44  0000 0000         2207  KB14336 DC    Y'0'           14.0 MB                          ****     MT222070
001B48  0000 0000         2208  KB14848 DC    Y'0'           14.5 MB                          ****     MT222080
001B4C  0000 0000         2209  KB15360 DC    Y'0'           15.0 MB                          ****     MT222090
001B50  0000 0000         2210  KB15872 DC    Y'0'           15.5 MB                          ****     MT222100
001B54  0000 0000         2211  KB16384 DC    Y'0'           16.0 MB                          ****     MT222110
                          2212  *                                                               ****     MT222120
001B58  FF                2213  KBEND   DB    X'FF'                                                    MT222130
```

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                                2215  * * * * * * * * * * * * * * * * * * * * * * * * * * * * *   MT222150
                                2216  *                                                         *   MT222160
                                2217  *              D A T A   C O N S T A N T S                *   MT222170
                                2218  *                                                         *   MT222180
                                2219  * * * * * * * * * * * * * * * * * * * * * * * * * * * * *   MT222190


001B59  00                    2221            DB    *                                           MT222210
001B5C                        2222            ALIGN 4                                           MT222220
001B5C  FFFF 7FFF             2223  DATA3     DC    Y'FFFF7FFF'                                 MT222230
001B60  000F FFFF             2224  DELAYVAL  DC    Y'FFFFF'                                    MT222240
001B68                        2225            ALIGN 8                                           MT222250
001E68  0000 00F0             2226  SET1      DC    Y'00F0',EXECUTE                             MT222260
001B6C  0000 CAEA
001E70  0000 20F0             2227  CLEAR     DC    Y'20F0',CLEAR1                              MT222270
001B74  0000 0C72
001B78  0000 20F0             2228  ENABLE    DC    Y'20F0',PRTMSG                              MT222280
001B7C  0000 0C8E
001B80  0000 A0F0             2229  HALT      DC    Y'A0F0',PRTMSG                              MT222290
001B84  0000 0C8E
001B88  0000 A0F0             2230  ERRHLT    DC    Y'A0F0',$KEEP7                              MT222300
001E8C  0000 1894
                              2231  *                                                         MT222310
                              2232  *                                                         MT222320
                              2233  *                                                         MT222330
001B90  00F0                  2234  FTNWRT    DC    X'F0'                                       MT222340
001B92  0000                  2235  FLAG      DC    X'0'                                        MT222350
001B94  0000                  2236  WRAPFLG   DC    X'0'                                        MT222360
001B96  00                    2237  LIMFLG    DB    0                                           MT222370
001B97  00                    2238  TSTFLG    DB    0                                           MT222380
001B98  00                    2239  SUBTST    DB    0                                           MT222390
001B99  00                    2240  ERRFLG    DB    0                                           MT222400
001B9C                        2241            ALIGN 4                                           MT222410
001B9C  00                    2242  CONTFLG   DB    0                                           MT222420
001BA0                        2243            ALIGN 4                                           MT222430
001BA0  0000 0000             2244  LOVAL     DC    0                                           MT222440
001BA4  0000 0000             2245  HIVAL     DC    0                                           MT222450
001BA8  0000 0000             2246  VALUE     DC    0                                           MT222460
001BAC  0000 0000             2247  BLKADR    DC    0                                           MT222470
001EE0  0000 0000             2248  LAST      DC    0                                           MT222480
001EE4  0000 0000             2249  TOTAL     DC    0                                           MT222490
001EE8  0000 0000             2250  TOTALERR  DC    0                                           MT222500
001EBC  0000 0000             2251  WORDCHG   DC    Y'0'          DUMMY FOR STORE TO DESTROY MDR  ****  MT222510
        0000 1EBF             2252  LNZB      EQU   *-1                                         MT222520
001EC0                        2253  TABLE     DS    12                                          MT222530
001ECC                        2254  $OUTBUF   DS    $BUFLEN                                     MT222540
001C1C                        2255            ALIGN 4                                           MT222550
001C1C                        2256  R9SAVE    DS    4                                           MT222560


001C20                        2258            ALIGN 8                                           MT222580
001C20                        2259  PSWSAVEA  DS    16                                          MT222590
001C30                        2260  RSAVEA    DS    640                                         MT222600
001EB0                        2261  $VALU1    DS    2                                           MT222610
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001EB4                          2262            ALIGN 4                                 MT222620
001EB4                          2263  MOSSAVE   DS    128                               MT222630
001F34                          2264  ROSAVE    DS    4                                 MT222640
                                2265  *                                                 MT222650
                                2266  *                                                 MT222660
                                2267  *                                                 MT222670
                                2268  *                                                 MT222680
001F38  0000                    2269  BRKVECT   DC    Z(0)                              MT222690
001F3A  0000                    2270  $LSTPAS   DCX   0                                 MT222700
001F3C  0000                    2271  $PRTFLG   DCX   0                                 MT222710
001F3E  0000                    2272  $LINEPOS  DCX   0                                 MT222720
001F40  0000                    2273  $WASDU    DCX   0                                 MT222730
001F42  0000                    2274  ISITERR   DCX   0                                 MT222740
001F44  0000                    2275  $BRKFLG   DCX   0                                 MT222750
001F46  0000                    2276  IOSAVE    DCX   0                                 MT222760
001F48  0000                    2277  $PAUSE    DCX   0                                 MT222770
001F4A  0000                    2278  $CONPAS   DCX   0                                 MT222780
001F4C                          2279            ALIGN 4                                 MT222790
001F4C  0000 0000               2280  $TBRKSV   DCY   0,0                               MT222800
001F50  0000 0000
001F54  0000 0000               2281  OUT.SAV   DCY   0                                 MT222810
001F58  0000 0000               2282  SET.RTN   DCY   0                                 MT222820
001F5C  0000 0000               2283  TESTIMER  DCY   0                                 MT222830
001F60  0000 0000               2284  TESTMER   DCY   0                                 MT222840
```

CHKSUM/M17 PUNCHER

```
001F64  9510          2286          EPSR  R1,R0              SELECT REG. SET 0 & CLEAR PSW          MT222860
                      2287  *                                                                       MT222870
001F66  E610 0A00     2288          LDAI  R1,ORIGIN1          LOAD START ADDRESS                     MT222880
001F6A  2421          2289          LIS   R2,1                LOAD INCREMENT VALUE                   MT222890
001F6C  E630 188F     2290          LDAI  R3,LNZB             LOAD FINAL ADDRESS                     MT222900
001F70  2440          2291          LIS   R4,0                INITIALIZE CHKSUM BYTE                 MT222910
                      2292  *                                                                       MT222920
001F72  0351 0000     2293  $GEN    LB    R5,0(R1)                                                  MT222930
001F76  0745          2294          XAR   R4,R5               CALCULATE CHKSUM BYTE                  MT222940
001F78  C110 1F72     2295          BXLE  R1,$GEN                                                   MT222950
001F7C  0240 0099     2296          STB   R4,MN+3             CHECKSUM BYTE TO BOOT LOADER           MT222960
                      2297  *                                                                       MT222970
001F80  C810 0080     2298  $TAPE   LHI   R1,X'0080'                                               MT222980
001F84  9411          2299          EXBR  R1,R1                                                     MT222990
001F86  9501          2300          EPSR  R0,R1               HALT PROCESSOR                         MT223000
                      2301  *                                                                       MT223010
                      2302  *---------------------------------                                     MT223020
                      2303  *                                                                       MT223030
001F88  0360 007A     2304  $PUNCH  LB    R6,X'7A'            GET BOUTDV (PUNCH) ADDRESS.            MT223040
001F8C  0E60 0078     2305          OC    R6,X'78'            START TAPE PUNCH                       MT223050
001F90  9060          2306          SSR   R6,R0                                                     MT223060
001F92  2081          2307          BTBS  8,1                                                       MT223070
001F94  41F0 1FD4     2308          BAL   R15,$TAPL           PUNCH LEADER                           MT223080
001F98  C810 0080     2309          LHI   R1,X'80'                                                  MT223090
001F9C  C830 00CF     2310          LHI   R3,X'CF'                                                  MT223100
                      2311  *                                                                       MT223110
001FA0  0A61 0000     2312  $PNCH1  WD    R6,0(R1)            PUNCH BOOT LOADER                      MT223120
001FA4  9060          2313          SSR   R6,R0                                                     MT223130
001FA6  2081          2314          BTBS  8,1                                                       MT223140
001FA8  C110 1FA0     2315          BXLE  R1,$PNCH1                                                 MT223150
001FAC  41F0 1FDA     2316          BAL   R15,$TAPL1          PUNCH ONE-FOLD GAP.                    MT223160
                      2317  *                                                                       MT223170
001FB0  0340 0099     2318          LB    R4,MN+3             GET CHECKSUM BYTE                      MT223180
001FB4  E610 0A00     2319          LDAI  R1,ORIGIN1          (NORMALLY X'A00')                      MT223190
001FB8  E630 188F     2320          LDAI  R3,LNZB                                                   MT223200
                      2321  *                                                                       MT223210
001FBC  0351 0000     2322  $PNCH2  LB    R5,0(R1)            PUNCH PROGRAM                          MT223220
001FC0  0745          2323          XAR   R4,R5                                                     MT223230
001FC2  9A65          2324          WDR   R6,R5                                                     MT223240
001FC4  9D60          2325          SSR   R6,R0                                                     MT223250
001FC6  2081          2326          BTBS  8,1                                                       MT223260
001FC8  C110 1FBC     2327          BXLE  R1,$PNCH2                                                 MT223270
001FCC  41F0 1FD4     2328          BAL   R15,$TAPL           PUNCH TRAILER.                         MT223280
001FD0  4300 1F80     2329          B     $TAPE               DISPLAY CHECKSUM, HALT PROCESSOR.      MT223290
```

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                        2331  * CHKSUM/M17 PUNCHER    (CONT'D)                                  MT223310

001FD4  C800 0100       2333  $TAPL     LHI   R0,256          TO PUNCH BLANK LEADER             MT223330
001FD8  2303            2334            BS    $TAPLP                                            MT223340
                        2335  *                                                                 MT223350
001FDA  C800 0080       2336  $TAPL1    LHI   R0,128          TO PUNCH 1-FOLD GAP               MT223360
                        2337  *                                                                 MT223370
001FDE  2701            2338  $TAPLP    SIS   R0,1                                              MT223380
001FE0  032F            2339            BNPR  R15             RETURN                            MT223390
001FE2  2430            2340            LIS   R3,0                                              MT223400
001FE4  9A63            2341            WDR   R6,R3           PUNCH BLANK FRAME                 MT223410
001FE6  9D68            2342            SSR   R6,R8                                             MT223420
001FE8  2081            2343            BTBS  8,1                                               MT223430
001FEA  2206            2344            BS    $TAPLP          CONTINUE.                         MT223440


001FEC                  2346            END                                                     MT223460
```

ASSEMBLED BY CAL 03-066R08-00 (32-BIT)

START OPTIONS: T=32,ERLST

NO CAL ERRORS
NO CAL WARNINGS
6 PASSES

TABLE SPACE USED : 12K

```
$BRKEND   0000 1997   1276  2057*
$BRKFLG   0000 1F44   1272  1273  1862  1886  2275*
$BUFLEN   0000 0050    152* 2254
$CON      0000 0A5C    143*
$CONPAS   0000 1F4A    192  1330  1913  2278*
$DU.X     0000 1870   1928  1930*
$GEN      0000 1F72   2293* 2295
$IS.DU    0000 186E   1921  1926  1929*
$KBR.1    0000 13E8   1332  1334*
$KEEP7    0000 1894    454  1947  1955* 2230
$LINEPOS  0000 1F3E   1252  2272*
$LSTPAS   0000 1F3A    169  1917  2270*
$MAXIO    0000 0006     84*  159
$NOT.DU   0000 186A   1923  1927*
$OTC.0    0000 1368   1288* 1299
$OTC.1    0000 136C   1289* 1294
$OTC.2    0000 1378   1293* 1301
$OTC.3    0000 1380   1292  1296*
$OTC.4    0000 1394   1287  1295  1303*
$OTC.5    0000 139C   1305* 1313
$OTC.6    0000 138A   1315* 1320
$OTC.7    0000 13C8   1290  1306  1308  1311  1316  1318  1321*
$OUTBUF   0000 18CC   1963  1965  1973  1975  2254*
$P0       0000 12FE   1250*
$P1       0000 1302   1251*
$PAUSE    0000 1F48   1288  1293  1303  2277*
$PNCH1    0000 1FA0   2312* 2315
$PNCH2    0000 1FBC   2322* 2327
$PRINT    0000 12F8    266   268   273   315   351   382   389   424   463   468   474   480   485
                       495   499  1211  1247* 1278  1594  1645  1736  1781  1796  1808  1816  1824
                      1832  1842  1852  1958  1960  1974  2003
$PRT.2    0000 1308   1255* 1261  1264
$PRT.3    0000 1326   1258  1266*
$PRT.3A   0000 1350   1278* 1895
$PRT.4    0000 1356   1277  1280*
$PRTFLG   0000 1F3C   1262  1271  1887  2271*
$PUNCH    0000 1F88   2304*
$RD.3A    0000 1406   1341  1347*
$RD.4     0000 1414   1350  1352*
$RSAVRET  0000 187E   1274  1940*
$SETUP    0000 18DC   1304  1982*
$STC.1    0000 0A70    161   163*
$STC.2    0000 0A76    164   166*
$STC.3    0000 0A94    171   176*
$STC.4    0000 0AC8    194   197*
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```
$STC.5      0000 0AE6    200    202*
$TAPE       0000 1F80   2298*  2329
$TAPL       0000 1FD4   2308   2328   2333*
$TAPL1      0000 1FDA   2316   2336*
$TAPLP      0000 1FDE   2334   2338*  2344
$TBRKSV     0000 1F4C   1861   1867   2280*
$TIMVAL     0000 0A5A    142*
$TSTB.1     0000 17C0   1865*  1877   1879   1882   1901
$TSTB.1A    0000 17C6   1867*  1888
$TSTB.2     0000 17CC   1863   1870*
$TSTB.3     0000 17DE   1873   1875*
$TSTB.4     0000 17F8   1884*  1909
$TSTB.5     0000 181C   1875   1897*
$TSTB.6     0000 182A   1899   1902*  1908
$TSTB.7     0000 1830   1904*  1905
$TSTCU.1    0000 1852   1916   1918*
$VALU1      0000 1E80   2261*
$WASDU      0000 1F40    349    353    431    452   1930   1932   1957   2273*
ABSTOP      0000 1FEC
ADC         0000 0004
ADD         0000 126E   1153   1155*
ADDBLK      0000 14F8   1481   1484*
ADDBLK2     0000 14FC   1486*
ADRCHK      0000 122C   1076   1100*
ADRS        0000 1A26   1791   2107*
ADRS1       0000 1A1C   1795   2104*
ADRSOK      0000 128E   1165*
AGAIN       0000 0E9E    623*   646
AGAIN2      0000 1158    986*  1000   1010
AGAIN3      0000 115C    988*   997   1007
ALIFLT      0000 17A0    247   1846*
ALIGNLOC    0000 1A96   1851   2151*
ALIMSG      0000 1A80   1853   2150*
ART         0000 1A62   1825   2134*
ARTFLT      0000 1776    221   1822*
BEGIN       0000 12BA   1216*  1231   1236
BKL         0000 1532   1523*  1528
BKWR        0000 1526    737    753   1518*  1712
BKWR1       0000 150E    725    739   1508*  1702
BKWS        0000 153A   1516   1527*
BKWS1       0000 1554   1534   1536*
BLK         0000 0F4C    701    706*
BLK2        0000 0F7C    717    722*
BLKADR      0000 18AC   1452   1463   1471   1510   1522   1530   2247*
BOOT        0000 0088     42     45*
BRKMSG      0000 197E   1279   2055*
BRKOK       0000 0D28    366    393*
BRKVECT     0000 1F38   1866   1890   1891   2269*
BRKWAIT     0000 161C   1650*  1651
BRN9A       0000 0E44    497    501*
BXLE        0000 11F0   1077*  1102   1104   1108
C300ACR     0000 0A1E     93*
CAR2ND      0000 0A42    124*
CARRD       0000 0A40    123*
CARRQ2S     0000 0A4C    133*
```

```
CCADRS    0000 1A46   1776  2114*
CHKADR    0000 0F06    635   651*
CHKLIM    0000 14DA   1473*
CLEAR     0000 1B70    339  2227*
CLEAR1    0000 0C72    216   340*  2227
CLIF2ND   0000 0A3A    120*
CLIFADR   0000 0A16     89*
CLIFRD    0000 0A38    119*
COMPR1    0000 120E   1230*
CON2ND    0000 0A30    114*   115   188
CONCMD    0000 0A32    116*   174   185   197  1986
CONENRD   0000 0A31    115*
CONRADR   0000 0A2A    109*   182  1327  1622  1870
CONRD     0000 0A2E    112*   113   186   197  1328
CONRQ2S   0000 0A48    129*   168   190   191   201  1333
CONT      0000 0CD6    364   368*
CONT1     0000 0F6C    715*   758
CONT11    0000 1138    978*  1019
CONT11A   0000 11B0    976  1018*
CONT13    0000 1194   1007*  1023
CONT13A   0000 11B8   1005  1022*
CONT14    0000 175A   1799  1802*
CONT15    0000 170E   1769  1772*
CONT16    0000 1700   1764  1768*  1784
CONT17    0000 16E4   1755  1759*
CONT1R    0000 0FE4    714   757*
CONT2     0000 0FC6    745*  761
CONT2R    0000 0FEC    744   760*
CONT3     0000 1040    849   851*
CONT4     0000 1052    855   857*
CONT5     0000 10CC    947*  1015
CONT5A    0000 11A8    945  1014*
CONT6     0000 10FC    958   961*
CONT7     0000 15EE   1626  1628  1633*
CONT9     0000 148C   1423  1425*
CONTFLG   0000 1B9C    353   369   421   447  1395  1591  2242*
CONVERT   0000 146C    307   312  1415*  1586  1634  1638  1642  1759  1774  1778  1789  1793  1839
                      1849
CONVERT1  0000 1476   1418*  1431  1967  1971
CONWADR   0000 0A2C    110*   184  1342
CONWRT    0000 0A2F    113*  1343
CRLFMSG   0000 1AA6    267   383  1737  2155*
CRT2ND    0000 0A36    118*
CRTRD     0000 0A34    117*
CRTRQ2S   0000 0A49    130*
DATA3     0000 185C    929   939   957   959   962  2223*
DELAY     0000 168E   1001  1742*
DELAYVAL  0000 1860   1744  2224*
DEVADRS   0000 1A7A   1841  2145*
DISP      0000 1426    446  1166  1228  1369*  1631  1771  1801
DISP1     0000 143C   1371  1378*
ENABLE    0000 1B78    346  2228*
ENABLE1   0000 0C6E    327   339*
ENDVAL    0000 1951    314  2027*
ERR7A     0000 123E   1107*
```

```
KB03584   0000 1AF0    2186*
KB04096   0000 1AF4    2187*
KB04608   0000 1AF8    2188*
KB05120   0000 1AFC    2189*
KB05632   0000 1B00    2190*
KB06144   0000 1B04    2191*
KB06656   0000 1B08    2192*
KB07168   0000 1B0C    2193*
KB07680   0000 1B10    2194*
KB08192   0000 1B14    2195*
KB08704   0000 1B18    2196*
KB09216   0000 1B1C    2197*
KB09728   0000 1B20    2198*
KB10240   0000 1B24    2199*
KB10752   0000 1B28    2200*
KB11264   0000 1B2C    2201*
KB11776   0000 1B30    2202*
KB12288   0000 1B34    2203*
KB12800   0000 1B38    2204*
KB13312   0000 1B3C    2205*
KB13824   0000 1B40    2206*
KB14336   0000 1B44    2207*
KB14848   0000 1B48    2208*
KB15360   0000 1B4C    2209*
KB15872   0000 1B50    2210*
KB16384   0000 1B54    2211*
KBEND     0000 1B58     282   1468   2213*
KBREAD    0000 13CE     359   1327*  1722
LADC      0000 0002
LAST      0000 1B80     318    342   2248*
LDATA     0000 10B6     939*   951
LDNXT1    0000 0EC6     633*   638
LDNXT2    0000 0ED0     636*   658
LDNXT3    0000 0F1E     653    656    658*
LDP1      0000 0F62     712*   719
LDP2      0000 0FBC     742*   749
LDR       0000 157E    1563*  1570
LDR1      0000 162E    1672*  1681
LDR10     0000 0FD2     750*   754
LDR11     0000 1264    1150*
LDR2      0000 1632    1674*  1678
LDR3      0000 165A    1704*  1713
LDR4      0000 1660    1706*  1710
LDR5      0000 0F48     704*   708
LDR6      0000 0F78     720*   724
LDR7      0000 11E6    1074*  1077
LDR8      0000 11E2    1072*  1082
LDR9      0000 0FA2     734*   738
LDWT      0000 00C8      68*    71
LEADER    0000 00A2      52*    56
LIM1      0000 10B0     936*   954
LIMFL6    0000 1B96    1449   1457   1489   1515   1518   1546   2237*
LIMIT     0000 1030     845*   862
LNZB      0000 1BBF      46   2252*  2290   2320
LOAD      0000 1034     847*   859
```

```
LOADER    0000 00AC    57*   65
LOMSG     0000 1980   469  2069*
LOVAL     0000 18A0   341   483   488   505   507  1220  1450  1473  1480  1541  1543  2244*
LOW       0000 0E16   479   483*
LOW1      0000 14EE  1479*
LOW2      0000 14F6  1475  1482*
LPADR     0000 0A1A    91*
LPWRT     0000 0A3C   121*
MAC       0000 1A52  1809  2124*
MACHMAL   0000 1A30  1782  2113*
MACINT    0000 175E   233  1806*
MALFTN    0000 16CC   344  1750*
MBLK      0000 0FA6   731   736*
MBLK2     0000 0FD6   747   752*
MEMLIST   0000 0C12   297   301*
MEMSG     0000 1936   274  2022*
MEMSG1    0000 1948   309   316  2023*
MEMWRT    0000 1578   560   566   621   694   798   842   934   964  1064  1561*
MICROBUS  0000 0A22    95*
MMADRS    0000 1A4A  1780  2117*
MMALFTN   0000 1712  1752  1774*
MN        0000 0096    49*  2296  2318
MNAMSG    0000 19DA   481   496  2089*
MOSSAVE   0000 1EB4  2002  2007  2263*
MREADC    0000 0A44   125*
NEXT      0000 0C58   305   319   322   326*
NEXT1     0000 0EB2   628*  643
NLMSG     0000 19C2   500  2084*
NOERR     0000 19FC   425  2098*
NORM      0000 143F  1377  1380*  1393
NOTLOW    0000 0E3E   490   499*
NULLMSG   0000 1AAC  1959  2156*
NUMTSTS   0000 000A   377   410*
NXT1      0000 0F42   702*  705
NXT2      0000 0F72   718*  721
NXT3      0000 0F9C   732*  735
NXT4      0000 0FCC   748*  751
OK        0000 0E04   473   477*
OKHEX     0000 16AA  1729  1733*
ORIGIN1   0000 0A00    45    78*   395  2288  2319
OUT.SAV   0000 1F54  1284  1321  2281*
OUTCHR    0000 135A  1256  1267  1269  1284*
PASLADR   0000 0A12    87*  1919
PRINT     0000 12FE  1249*
PRTMSG    0000 0C8E   347*   453   465   508  1978  2228  2229
PRTMSG1   0000 0CAE   355   357*
PRTTITLE  0000 0BAE   266*
PSW       0000 0A50   137*
PSW2      0000 0A52   138*
PSW3      0000 0A54   139*
PSWSAVE   0000 1D00    36*   37    43    44   225
PSWSAVEA  0000 1C20    36  2259*
PURETOP   0000 0000P 2346
QUESTION  0000 0D1E   376   378   389*
QUMARK    0000 1AA0   390   464   475  2153*
```

R0	0000 0000	18* 173 174 176 177 178 189 205 206 207 208 209 210
		211 218 219 220 229 232 235 244 275 276 277 278 280
		387 388 641 642 651 652 654 655 839 841 857 865 932
		949 955 1069 1087 1250 1251 1252 1305 1314 1315 1327 1328 1329
		1333 1336 1338 1619 1647 1652 1750 1783 1844 1913 1917 1922 1922
		1930 1931 1932 1940 1950 1956 1957 1985 1986 1997 1998 1999 2000
		2002 2005 2006 2007 2008 2286 2300 2306 2313 2325 2333 2336 2338
ROSAVE	0000 1F34	1997 2008 2264*
R1	0000 0001	19* 45 57 58 60 65 157 160 162 166 178 179 180
		181 183 185 187 189 190 212 213 214 215 216 217 221
		222 223 224 225 226 227 228 230 231 233 234 237 240
		241 244 245 246 248 251 254 255 279 280 281 282 284
		285 286 287 291 291 294 296 310 323 330 340 341 342
		343 344 345 347 348 349 350 357 358 371 372 373 380
		381 384 385 386 387 418 419 419 421 422 422 426 427
		431 434 435 435 443 444 457 458 459 925 926 927 982
		983 984 1069 1087 1285 1286 1288 1291 1293 1296 1297 1298 1300
		1303 1304 1305 1307 1309 1310 1312 1315 1317 1319 1453 1454 1464
		1466 1468 1511 1512 1523 1527 1545 1546 1742 1745 1756 1777 1914
		1915 1918 1919 1920 1924 1925 1927 1929 1931 1933 1933 1948 1949
		1950 1982 1983 1984 1985 1986 1987 1988 2286 2288 2293 2295 2298
		2299 2299 2300 2309 2312 2315 2319 2322 2327
R10	0000 000A	28* 505 506 507 637 730 746 1072 1514 1515 1518 1519 1519
		1531 1536 1538 1540 1541 1543 1547 1627 1650 1704 1768 1798
R11	0000 000B	29* 627 628 629 630 631 639 640 641 651 654 928 929
		939 940 942 948 949 956 957 959 961 962 1622 1627 1650
		1768 1798
R12	0000 000C	30* 1100 1101 1103 1372 1373 1374 1375 1375 1376 1386 1387 1388
		1389 1390 1391 1391 1392 1416 1425 1430 1620 1621 1753 1754 1763
		1965 1970
R13	0000 000D	31* 1369 1370 1373 1376 1377 1383 1384 1387 1388 1390 1393 1395
		1396 1396
R14	0000 000E	32* 446 558 560 562 565 566 567 570 619 621 692 694
		796 798 800 803 838 842 924 934 964 981 993 1002 1061
		1064 1143 1166 1210 1228 1378 1571 1593 1596 1631 1682 1714 1771
		1792 1801 1806 1814 1822 1830 1846 1861 1867 1870 1876 1880 1889
		1891 1897 1900 1902 1906
R15	0000 000F	33* 266 268 273 307 312 315 351 360 382 389 417 424
		428 450 463 468 474 480 485 495 499 622 645 657 695
		707 709 723 725 737 739 753 757 760 843 850 856 861
		935 953 965 967 975 985 999 1001 1009 1014 1018 1022 1065
		1070 1081 1091 1107 1148 1149 1170 1211 1216 1229 1232 1234 1247
		1248 1256 1263 1267 1269 1270 1272 1275 1278 1284 1289 1321 1322
		1356 1394 1415 1416 1417 1427 1461 1469 1487 1491 1520 1524 1548
		1561 1566 1569 1586 1594 1623 1624 1625 1634 1638 1642 1645 1648
		1670 1680 1684 1702 1712 1716 1723 1736 1746 1759 1764 1765 1774
		1778 1781 1788 1789 1793 1796 1807 1808 1815 1816 1823 1824 1831
		1832 1839 1842 1847 1848 1849 1852 1862 1865 1866 1868 1871 1872
		1874 1876 1878 1880 1881 1881 1885 1886 1887 1890 1892 1893 1894
		1897 1898 1900 1902 1903 1904 1906 1907 1935 1941 1946 1958 1960
		1967 1971 1974 2003 2005 2308 2316 2328 2339
R2	0000 0002	20* 41 61 67 158 163 165 167 168 172 173 174 185
		186 187 188 195 195 196 198 238 242 247 249 252 287
		292 447 448 448 471 472 477 478 491 492 493 623 624
		632 644 697 704 706 711 720 722 727 734 736 741 750

```
                          752   946   860   938   952   966   972   974   975   978   986   998  1008
                         1066  1067  1068  1073  1078  1079  1080  1086  1088  1089  1090  1161  1162
                         1163  1223  1291  1296  1397  1398  1448  1449  1450  1451  1452  1453  1463
                         1465  1471  1474  1477  1479  1480  1482  1508  1509  1510  1511  1522  1525
                         1530  1531  1532  1533  1535  1564  1568  1673  1679  1705  1711  1743  1806
                         1810  1814  1818  1822  1826  1830  1834  1838  1846  1854  1919  1920  2289
R3          0000 0003     21*   46    47    48   159   160   163   181   182   183   184   196   197
                          198   201   239   243   253   288   433   437   438   440   442   561   563
                          569   626   631   799   801   802   840   851   866   971   972   988   991
                          992   994  1063  1066  1067  1096  1151  1156  1344  1677  1709  1744  1807
                         1815  1823  1831  1847  2290  2310  2320  2340  2341
R4          0000 0004     22*   50    51    52    54    62    64   190   191   192   193   193   199
                          199   236   240   250   254   289   302   320   328   329   359   361   363
                          365   368   369   374   632   633   636   637   652   655   697   698   699
                          700   704   711   712   715   716   720   727   728   729   730   734   741
                          742   745   746   750   846   847   852   853   858   859   938   940   941
                          947   951   968   972   973   974   986   988   989   996   997  1003  1007
                         1073  1074  1077  1078  1080  1088  1090  1100  1144  1150  1154  1155  1158
                         1159  1161  1165  1167  1219  1227  1255  1257  1266  1268  1271  1273  1314
                         1334  1336  1338  1346  1348  1349  1351  1352  1354  1564  1565  1567  1633
                         1673  1674  1677  1678  1705  1706  1709  1710  1722  1724  1726  1728  1730
                         1731  1734  1762  1962  1963  2291  2294  2296  2318  2323
R5          0000 0005     23*   52    54    55    55    57    58    59    62    64    70   290   306
                          323   623   642   844   933   969  1071  1147  1152  1156  1221  1230  1247
                         1255  1259  1260  1262  1276  1562  1671  1703  2293  2294  2322  2323  2324
R6          0000 0006     24*   49    59    66   168   169   170   170   452   625   630   845   936
                          970   987  1072  1146  1155  1157  1418  1419  1420  1421  1422  1424  1425
                         1563  1672  1704  2304  2305  2306  2312  2313  2324  2325  2341  2342
R7          0000 0007     25*   68    69    70   294   296   298   353   354   354   374   375   377
                          379   393   394   395   396   445   559   564   568   620   634   639   640
                          647   647   649   693   696   698   702   710   713   718   726   728   732
                          740   743   748   797   801   841   848   851   852   854   857   858   863
                          930   942   943   944   963   966   989   994   996  1004  1062  1075  1084
                         1085  1094  1094  1097  1145  1151  1152  1165  1168  1220  1223  1227  1230
                         1233  1372  1374  1415  1415  1426  1426  1429  1565  1629  1630  1675  1707
                         1770  1800  1964  1968
R8          0000 0008     26*   60    61    66    67   471   483   489   491   503   504   633   634
                          712   713   742   743   847   848   853   854   941   944   975  1003  1004
                         1074  1075  1167  1168  1214  1218  1674  1675  1706  1707  1720  1733  1734
                         2342
R9          0000 0009     27*  295   300   301   302   303   304   306   310   311   317   318   321
                          324   325   326   331   385   470   487   488   489   624   630   631   639
                          640   641   651   654   931   932   943   947  1068  1084  1085  1086  1101
                         1103  1150  1157  1213  1225  1330  1339  1340  1342  1343  1344  1346  1418
                         1583  1583  1585  1589  1590  1591  1592  1592  1633  1637  1641  1721  1738
                         1739  1751  1751  1754  1777  1788  1792  1838  1848  1966  1969  1972  1973
R9SAVE      0000 1C1C     1721  1738  2256*
RANDOM      0000 125C     1148* 1160  1164  1169  1171
RDAGN       0000 0C86     359*  370   391
RDAGN1      0000 0CE0     367   371*
RDTTY1      0000 168C     1723* 1727  1732  1735
REP         0000 0BF4     291*  330
REP1        0000 10A8     934*  960
RESET       0000 12CE     1223* 1235
RESTART1    0000 0BAE     262*
```

```
SYS        0000 1A6A   1833  2139*
SYSQ       0000 1782    230  1830*
TABLE      0000 1BC0    223  2253*
TESTIMER   0000 1F5C    372   926   984  1998  2000  2006  2283*
TESTMER    0000 1F60    373   927   983  2005  2284*
TESTMESG   0000 1AC2   2004  2159*
TESTMSG    0000 18F4    417   967  1148  1232  1566  1996*
TITLE      0000 1920    269  2017*
TMSG       0000 191A   2001  2008*
TOCS       0000 0BBA    273*
TOTAL      0000 1BB4    357   444   445  1966  2249*
TOTALERR   0000 1BB8    358  1625  1630  1969  2250*
TOTALMSG   0000 1998   2062*
TOTMSG     0000 1AB1   1961  2157*
TOTOC      0000 1628    562   567   800   803  1670*
TSTBRK     0000 17B6   1149  1229  1263  1270  1394  1860*
TSTDU      0000 1840    428   450  1289  1913* 1946
TSTFLG     0000 1B97    381   434   458  2238*
TSTMSG     0000 19F0    352  2094*
TSTNUM     0000 159A    558   619   692   796   838   924  1061  1143  1210  1583*
TSTNUM1    0000 15A0   1584  1586*
TSTNUMB    0000 158E   1596*
TSTSEL     0000 0D76    420   423   426*
TSTSELO    0000 0D8A    429   433*
TT         0000 195E   1590  1620  2040*
TTYLOCP    0000 1682    470   487  1213  1720*
VALUE      0000 1BA8   1214  1219  2246*
W          0000 195B   1761  1763  2038*
WORDCHG    0000 1BBC    292  2251*
WORK       0000 000A     34*  700   716   845   936   987  1225  1457  1458  1458  1460  1473  1474
                        1476  1477  1479  1482  1484  1486  1488  1489  1490  1563  1672
WRAPFLG    0000 1B94    278   309   326  2236*
WRTFTN     0000 1440    644   706   722   736   752   860   952   978   998  1008  1079  1089  1383*
                        1568  1679  1711
WRTFTN2    0000 145E   1385  1394*
WRTPRN     0000 1024    841*  867
X9C        0000 0B72    240*  241
XBC        0000 0B80    244*  245
XCC        0000 0BA6    254*  255
XXXXXX     0000 1962   1636  2041*
YYYYYYYY   0000 196A   1640  2044*
ZZZZZZZZ   0000 1974   1644  2047*
```

PROG= S32MT3 ASSEMBLED BY CAL 03-066R08-00 (32-BIT)

```
                                                                                MT300010
                SCRAT                                                           MT300020
                CROSS                                                           MT300030
                WIDTH 120                                                       MT300040
                TARGT 32                                                        MT300050
                NORX3                                                           MT300060
                SQCHK                                                           MT300070
S32MT3  PROG  32 BIT MEMORY TEST PART 3  06-156F03M91R04A13                     MT300080
                SQUEZ 9                                                         MT300090
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * MT300100
*                                                                               MT300110
* COPYRIGHT PERKIN-ELMER CORP.    JULY, 1975                                    MT300120
*                                                                               MT300130
* REVISED          AUGUST, 1980                                                 MT300140
*                                                                               MT300150
* PROGRAM USES BASIC MODEL 7/32 INSTRUCTION SET                                 MT300160
*                                                                               MT300170
* PURPOSE:                                                                      MT300180
*  TO EXERCISE EACH OF THE RX INSTRUCTION FORMATS                               MT300190
*  THROUGHOUT MEMORY AND INSURE THAT A PROGRAM CAN BE                           MT300200
*  LOADED INTO AND EXECUTED FROM EVERY LOCATION IN                              MT300210
*  MEMORY.                                                                      MT300220
*                                                                               MT300230
* ASSUMPTIONS:                                                                  MT300240
*  THIS TEST ASSUMES THAT PARTS 1 AND 2 OF THE SERIES                           MT300250
*  32 MEMORY TEST HAVE RUN WITHOUT DETECTING A FAILURE                          MT300260
*                                                                               MT300270
* DESIGN SPECIFICATION:                                                         MT300280
*   A SUBROUTINE CONSISTING OF VARIOUS COMBINATIONS                             MT300290
*   OF RX FORMATS IS EXECUTED. THE SUBROUTINE IS MOVED                          MT300300
*   ONE FULLWORD UP IN MEMORY AND EXECUTED AGAIN. THIS                          MT300310
*   CONTINUES UNTIL THE SUBROUTINE IS MOVED THROUGH                             MT300320
*   THE ENTIRE TEST AREA.                                                       MT300330
*                                                                               MT300340
* HOW TO RUN THE TEST                                                           MT300350
*  THE TEST MAY BE EXECUTED BY DEPRESSING THE                                   MT300360
*  CARRIAGE RETURN KEY ON THE TELETYPE. THE TEST IS                             MT300370
*  THEN EXECUTED AND IF NO ERRORS ARE DETECTED THE                              MT300380
*  MESSAGE "NO ERROR" WILL BE PRINTED ON THE TTY                                MT300390
*  FOLLOWED BY A CARRIAGE RETURN, LINE FEED AND AN                              MT300400
*  ASTERISK. REFER TO PROGRAM DESCRIPTION.                                      MT300410
*                                                                               MT300420
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * MT300430
*                                                                               MT300440
```

MEMORY LOADER

```
                0000 0000              45  R0        EQU   0                                                    MT300450
                0000 0001              46  R1        EQU   1                                                    MT300460
                0000 0002              47  R2        EQU   2                                                    MT300470
                0000 0003              48  R3        EQU   3                                                    MT300480
                0000 0004              49  R4        EQU   4                                                    MT300490
                0000 0005              50  R5        EQU   5                                                    MT300500
                0000 0006              51  R6        EQU   6                                                    MT300510
                0000 0007              52  R7        EQU   7                                                    MT300520
                0000 0008              53  R8        EQU   8                                                    MT300530
                0000 0009              54  R9        EQU   9                                                    MT300540
                0000 000A              55  R10       EQU   10                                                   MT300550
                0000 000B              56  R11       EQU   11                                                   MT300560
                0000 000C              57  R12       EQU   12                                                   MT300570
                0000 000D              58  R13       EQU   13                                                   MT300580
                0000 000E              59  R14       EQU   14                                                   MT300590
                0000 000F              60  R15       EQU   15                                                   MT300600
                0000 000A              61  WORK      EQU   10                                                   MT300610
                                       62  *                                                                  MT300620
                0000 0000I             63  RELZERO   EQU   *                                                    MT300630
000000I                                64              ORG   X'80'                                              MT300640
                                       65  *                                                                  MT300650
000080  2480                           66  MEMLDR    LIS   R8,0                                               MT300660
000082  2303                           67              BS    INK                                                MT300670
000084  00F0                           68              DC    X'F0'                                              MT300680
000086  0100                           69              DC    X'100'                                             MT300690
000088  C810 0A00                      70  INK       LHI   R1,X'A00'     LOAD START ADRS OF PROG               MT300700
00008C  2421                           71              LIS   R2,1        LOAD INCREMENT VALUE                  MT300710
00008E  C830 18FF                      72              LHI   R3,QRT      LOAD END ADRS OF PROG                 MT300720
000092  D340 0078                      73              LB    R4,X'78'    LOAD INPUT DEVICE ADRS                MT300730
000096  DE40 0079                      74              OC    R4,X'79'    ISSUE OUTPUT COMMAND                  MT300740
00009A  9045                           75  STATUS    SSR   R4,R5       SENSE STATUS OF INPUT DEVICE          MT300750
00009C  2001                           76              BTBS  X'0',1      WAIT FOR ZERO STATUS                  MT300760
00009E  9846                           77              RDR   R4,R6       READ DATA BYTE                        MT300770
0000A0  0866                           78              LR    R6,R6       IS BYTE READ = ZERO ?                 MT300780
0000A2  2234                           79              BZS   STATUS      YES, READ NEXT BYTE                   MT300790
0000A4  D261 0000                      80  STBYTE    STB   R6,0(R1)     NO, STORE BYTE IN MEMORY              MT300800
0000A8  9C45                           81              SSR   R4,R5       SENSE STATUS OF INPUT DEVICE          MT300810
0000AA  20D1                           82              BTBS  X'D',1      WAIT FOR ZERO STATUS                  MT300820
0000AC  9471                           83              EXBR  R7,R1       READY LOC                             MT300830
0000AE  9827                           84              WHR   R2,R7       DISPLAY LOC                           MT300840
0000B0  D361 0000                      85              LB    R6,0(R1)    LOAD FROM LOC                         MT300850
0000B4  0786                           86              XR    R8,R6       COMPUTE CHKSUM                        MT300860
0000B6  9846                           87              RDR   R4,R6       READ NEXT DATA BYTE                   MT300870
0000B8  C110 00A4                      88              BXLE  R1,STBYTE   COMPLETE                              MT300880
0000BC  CB80 003B                      89              SHI   R8,X'3B'    IS CHKSUM OK ?                        MT300890
0000C0  2132                           90              BNZS  QSY         NO, BRANCH                            MT300900
0000C2  9828                           91  CHKOK     WHR   R2,R8       YES, ZERO DISPLAY                     MT300910
0000C4  C860 4078                      92  QSY       LHI   R6,X'4078'                                         MT300920
0000C8  9161                           93              SLHLS R6,1                                             MT300930
0000CA  9556                           94              EPSR  R5,R6       HALT PROCESSOR                        MT300940
0000CC  4300 0050                      95              B     X'50'                                            MT300950
                                       96  *                                                                  MT300960
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```
                                98  *                                                                                  MT300980
000DD0                          99          ORG   X'A00'                                                           MT300990
                               100  *                                                                                  MT301000
000A00   4300 0A4A             101  CRIGIN1 B     STCON                                                            MT301010
         0000 14FA             102  ERRLIST EQU   ERRTAB+2                                                         MT301020
000A04                         103          ORG   X'A10'                                                           MT301030
                               104  *-----------------------------                                                  MT301040
                               105  *   TEST CONSTANTS                                                           MT301050
                               106  *                                                                              MT301060
         0000 0006             107  $MAXIO  EQU   6                 > MAX VALID IDENTIFIER                       MT301070
000A10   0101                 108  IO      DC    X'0101'           I/O DEVICE(S) IDENTIFIER                     MT301080
                               109  *                                                                              MT301090
000A12   0010                 110  PASLADR DC    X'0010'           PALSA/PALM READ ADDRESS                      MT301100
000A14   0011                 111          DC    X'0011'           PASLA/PALM WRITE ADDRESS                     MT301110
000A16   0002                 112  CLIFADR DC    X'0002'           CURRENT LOOP INTERFACE READ ADDRES           MT301120
000A18   0002                 113          DC    X'0002'           CURRENT LOOP INTERFACE WRITE ADDRE           MT301130
000A1A   0062                 114  LPADR   DC    X'0062'           DUMMY FOR LINE PRINTER                       MT301140
000A1C   0062                 115          DC    X'0062'           WRITE ADDRESS                                MT301150
000A1E   0010                 116  C300ADR DC    X'0010'           CAROUSEL/PASLA READ ADDRESS                  MT301160
000A20   0011                 117          DC    X'0011'           CAROUSEL/PASLA WRITE ADDRESS                 MT301170
000A22   00C0                 118  MICROBUS DC   X'00C0'           MICROBUS READ ADDRESS                        MT301180
000A24   00C0                 119          DC    X'00C0'           MICROBUS WRITE ADDRESS                       MT301190
000A26   0000                 120          DCX   0                 PROVISION FOR SPECIAL DEVICE (READ           MT301200
000A28   0000                 121          DCX   0                 WRITE ADDRESS                                MT301210
                               122  *                                                                              MT301220
                               123  * IO =   0101  FOR CRT ON PASLA                                              MT301230
                               124  *        0202  FOR TELETYPE, CAROUSEL 15/30                                  MT301240
                               125  *        XX03  FOR LINE PRINTER                                              MT301250
                               126  *        0404  FOR CAROUSEL 300                                              MT301260
                               127  *        0505  FOR MICROBUS                                                  MT301270
                               128  *                                                                              MT301280
                               129  *-------------------------------------------------------------               MT301290
                               130  *  ETPE IO COMMANDS                                                         MT301300
                               131  *                                                                              MT301310
000A2A   0000                 132  CONRADR DCX   0                 CONSOLE DEVICE READ ADDRESS                  MT301320
000A2C   0000                 133  CONWADR DCX   0                 CONSOLE DEVICE WRITE ADDRESS                 MT301330
                               134  *                                                                              MT301340
000A2E   0000                 135  CONRD   DCX   0                 CONSOLE READ/WRITE COMMANDS                  MT301350
         0000 0A2F             136  CONWRT  EQU   CONRD+1                                                        MT301360
000A30   0000                 137  CON2ND  DCX   0                                                              MT301370
         0000 0A31             138  CONENRD EQU   CON2ND+1                                                       MT301380
000A32   0000                 139  CONCMD  DCX   0                 DUMMY HW AS POINTER                          MT301390
000A34   A1A3                 140  CRTRD   DCX   A1A3              FOR CRT                                      MT301400
000A36   EE61                 141  CRT2ND  DCX   EE61                                                           MT301410
000A38   E4E8                 142  CLIFRD  DCX   E4E8              *   CURRENT LOOP INTERFACE   P3 3/80         MT301420
000A3A   0064                 143  CLIF2ND DCX   0064              *                            P3 3/80         MT301430
000A3C   0080                 144  LPWRT   DCX   0080              *   LINE PRINTER                             MT301440
000A3E   0000                 145          DCX   0                 DUMMY FOR LP                                 MT301450
000A40   A1A3                 146  CARRD   DCX   A1A3              *   CAROUSEL 300                             MT301460
000A42   F061                 147  CAR2ND  DCX   F061                                                           MT301470
000A44   8202                 148  MREADC  DCX   8202              *   MICROBUS                                 MT301480
000A46   0082                 149          DCX   0082              *                            P2 1/80         MT301490
                               150  *                                                                              MT301500
                               151  *-------------------------------------------------------------               MT301510
00CA48   00                   152  SINK    DB    0                                                              MT301520
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000A49   00                    153          DB    *                                                    MT301530
         0000 0050              154  $BUFLEN EQU   80                                                   MT301540
                                155  * ------------------------------                                   MT301550
                                156  * SET UP FOR CONSOLE, LIST I/O DEVICES                            MT301560
                                157  *                                                                  MT301570
000A4A   D310 0A10              158  STCON    LB    R1,IO              GET I/O IDENTIFIERS              MT301580
000A4E   D320 0A11              159           LB    R2,IO+1                                             MT301590
000A52   2436                   160           LIS   R3,$MAXIC          IDENTIFIER CAN BE 1,2,3,4,5      MT301600
000A54   0513                   161           CLAR  R1,R3                                               MT301610
000A56   2182                   162           BLS   $STC.1             BRANCH IF KB IDENTIFIER OK       MT301620
000A58   2411                   163           LIS   R1,1               ELSE FORCE CRT                   MT301630
000A5A   0523                   164  $STC.1   CLAR  R2,R3                                               MT301640
000A5C   2182                   165           BLS   $STC.2             SAME TEST FOR LIST DEVICE        MT301650
000A5E   2421                   166           LIS   R2,1                                                MT301660
000A60   D210 0A10              167  $STC.2   STB   R1,IO              REESTABLISH VALUES               MT301670
000A64   D220 0A11              168           STB   R2,IO+1                                             MT301680
000A68   D362 15D4              169           LB    R6,CONRQ2S(R2)                                      MT301690
000A6C   4060 17CC              170           STH   R6,$LSTPAS         SET PASLA FLAG (LIST DEVICE)     MT301700
000A70   0866                   171           LDAR  R6,R6                                               MT301710
000A72   2336                   172           BZS   $STC.3             SKIP IF NOT PASLA                MT301720
000A74   9122                   173           SLHLS R2,2                                                MT301730
000A76   4802 0A10              174           LH    R0,IO(R2)                                           MT301740
000A7A   DE02 0A32              175           OC    R0,CONCMD(R2)      ISSUE 2ND COMMAND (TO LIST DEVICE*** MT301750
                                176  *                                                                  MT301760
000A7E   D300 0A10              177  $STC.3   LB    R0,IO              ESTABLISH KEYBOARD DEVICE (& IOSAVE) MT301770
000A82   D200 17CF              178           STB   R0,IOSAVE+1                                         MT301780
000A86   9310                   179           LBR   R1,R0              (R1) = 1,2,4,5 ; (R0 = KBIDENT)  MT301790
000A88   9112                   180           SLHLS R1,2               (R1)=4,8,16,20                   MT301800
000A8A   2712                   181           SIS   R1,2                                                MT301810
000A8C   4831 0A10              182           LH    R3,IO(R1)                                           MT301820
000A90   4030 0A2A              183           STH   R3,CONRADR         SET UP CONSOLE DEVICE READ ADDRESS MT301830
000A94   4831 0A12              184           LH    R3,IO+2(R1)                                         MT301840
000A98   4030 0A2C              185           STH   R3,CONWADR         SET UP CONSOLE WRITE ADDRESS     MT301850
000A9C   4821 0A32              186           LH    R2,CONCMD(R1)                                       MT301860
000AA0   4020 0A2E              187           STH   R2,CONRD           SET UP R/W COMMANDS              MT301870
000AA4   4821 0A34              188           LH    R2,CONCMD+2(R1)                                     MT301880
000AA8   4020 0A30              189           STH   R2,CON2ND          2ND CMD; ENABLE READ CMD         MT301890
000AAC   9310                   190           LBR   R1,R0                                               MT301900
000AAE   D341 15D4              191           LB    R4,CONRQ2S(R1)                                      MT301910
000AB2   D240 15D4              192           STB   R4,CONRQ2S         CONSOLE REQUEST TO SEND          MT301920
000AB6   4040 17D0              193           STH   R4,$CONPAS         SET PASLA FLAG (CONSOLE)         MT301930
000ABA   0844                   194           LDAR  R4,R4                                               MT301940
000ABC   2333                   195           BZS   $STC.4             SKIP 2ND OC IF NOT PASLA DEVICE  MT301950
000ABE   9422                   196           EXBR  R2,R2                                               MT301960
000AC0   9E32                   197           OCR   R3,R2              ISSUE 2ND COMMAND (TO CONSOLE)   MT301970
000AC2   DE30 0A2E              198  $STC.4   OC    R3,CONRD           PUT CONSOLE IN READ MODE         MT301980
000AC6   9B32                   199           ROR   R3,R2              READ A DUMMY CHARACTER (SET BUSY) MT301990
000AC8   0844                   200           LDAR  R4,R4              CONSOLE PASLA DEVICE ?           MT302000
000ACA   2333                   201           BZS   $STC.5             BRANCH: NO.                      MT302010
000ACC   DE30 15D4              202           OC    R3,CONRQ2S         REQUEST TO SEND (KEEP ON-LINE)   MT302020
         0000 0AD0              203  $STC.5   EQU   *                                                   MT302030
                                204  *                                                                  MT302040
                                205  *                                                                  MT302050
000AD0   C200 1678              206  START2   LPSW  SET1                                               MT302060
                                207  *                                                                  MT302070
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000AC4  0700                 208  EXECUTE  XR    R0,R0                                          MT302080
000AC6  5000 0000            209           ST    R0,0                                           MT302090
000ACA  5000 0020            210           ST    R0,X'20'    MACHINE MALFUNCTION INTRPT.        MT302100
000ACE  5000 0024            211           ST    R0,X'24'    OLD PSW                            MT302110
000AD2  5000 0028            212           ST    R0,X'28'    RESERVED,MUST BE ZERO              MT302120
000AD6  5000 002C            213           ST    R0,X'2C'                                       MT302130
000ADA  5000 0030            214           ST    R0,X'30'    ILLEG.INSTR.NEW PSW                MT302140
000ADE  E610 12BE            215           LA    R1,ILGINT   NEW PSW LOC.                       MT302150
000AE2  5010 0034            216           ST    R1,X'34'                                       MT302160
000AE6  C810 00F0            217           LHI   R1,X'F0'                                       MT302170
000AEA  5010 0038            218           ST    R1,X'38'    MACHINE MALFUNCTION INTRPT.        MT302180
000AEE  E610 0C42            219           LA    R1,CLEAR1   NEW PSW LOC.                       MT302190
000AF2  5010 003C            220           ST    R1,X'3C'                                       MT302200
000AF6  5000 0040            221           ST    R0,X'40'    RESERVED,MUST BE ZERO              MT302210
000AFA  5000 0044            222           ST    R0,X'44'                                       MT302220
000AFE  5000 0048            223           ST    R0,X'48'    ARITH.FAULT NEW PSW                MT302230
000B02  E610 1304            224           LA    R1,ARIFLT                                      MT302240
000B06  5010 004C            225           ST    R1,X'4C'                                       MT302250
000B0A  E610 1754            226           LA    R1,TABLE    SYSTEM QUEUE POINTER               MT302260
000B0E  5010 0080            227           ST    R1,X'80'                                       MT302270
000B12  E610 16C4            228           LA    R1,PSWSAVE  CURRENT PSW SAVE POINTER           MT302280
000B16  4010 0084            229           STH   R1,X'84'                                       MT302290
000B1A  E610 16D4            230           LA    R1,RSAVE    REG.SAV POINTER (SET 1)            MT302300
000B1E  4010 0086            231           STH   R1,X'86'                                       MT302310
000B22  5000 0088            232           ST    R0,X'88'    SYS.Q SERVICE INTRPT. NEW PSW      MT302320
000B26  E610 1310            233           LA    R1,SYSQ                                        MT302330
000B2A  5010 008C            234           ST    R1,X'8C'                                       MT302340
000B2E  5000 0090            235           ST    R0,X'90'    MEMORY ACCESS CONTROLLER INTRPT.   MT302350
000B32  E610 12EC            236           LA    R1,MACINT   NEW PSW                            MT302360
000B36  5010 0094            237           ST    R1,X'94'                                       MT302370
000B3A  5000 0098            238           ST    R0,X'98'    SVC INTRPT,NEW PSW                 MT302380
000B3E  E640 12F8            239           LA    R4,SVCERR                                      MT302390
000B42  C810 009C            240           LHI   R1,X'9C'                                       MT302400
000B46  2422                 241           LIS   R2,2                                           MT302410
000B48  C830 00BA            242           LHI   R3,X'BA'                                       MT302420
000B4C  4041 0000            243  X9C      STH   R4,0(R1)    SVC CALL,ERR.TRAP                  MT302430
000B50  C110 085C            244           BXLE  R1,X9C                                         MT302440
000B54  2424                 245           LIS   R2,4                                           MT302450
000B56  C830 00CC            246           LHI   R3,X'CC'                                       MT302460
000B5A  5001 0000            247  XBC      ST    R0,0(R1)    RESERVED,MUST BE ZERO              MT302470
000B5E  C110 085A            248           BXLE  R1,XBC                                         MT302480
000B62  E640 131C            249           LA    R4,EXTINT                                      MT302490
000B66  2422                 250           LIS   R2,2                                           MT302500
000B68  C830 02CC            251           LHI   R3,X'2CC'                                      MT302510
000B6C  4041 0000            252  XCC      STH   R4,0(R1)                                       MT302520
000B70  C110 087C            253           BXLE  R1,XCC                                         MT302530
                             254  *                                                            MT302540
                             255  *                                                            MT302550
        0000 0B84            256  RESTART1 EQU   *           ENTRY AT THIS POINT ESTABLISHES    MT302560
                             257  *                         MEMORY TABLE                       MT302570
                             258  *                                                            MT302580
                             259  *                                                            MT302590
000B74  41F0 00C2            260  PRTITLE  BAL   R15,$PRINT  PRINT 'S32MT3 06-156F03R02'        MT302600
000B78  135A                 261           DC    Z(TITLE)   START ADDRESS OF MESSAGE           MT302610
                             262  *                                                            MT302620
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                                263  *                                                                          MT302630
                                264  *                                                                          MT302640
000B8A  41F0 0DC2               265  TOCS     BAL   R15,$PRINT          PRINT AVAILABLE MEMORY MESSAGE        MT302650
000B8E  1374                    266           DC    Z(MEMSG)            START ADDRESS OF MESSAGE              MT302660
000B90  2400                    267           LIS   R0,0                                                      MT302670
000B92  5000 0000               268           ST    R0,0                                                      MT302680
000B96  4000 166C               269           STH   R0,FLAG                                                   MT302690
000B9A  4000 166E               270           STH   R0,WRAPFLG                                                MT302700
000B9E  2410                    271           LIS   R1,0                                                      MT302710
000BA0  4001 1550               272  INIG     STH   R0,KB00128(R1)                                            MT302720
000BA4  2612                    273           AIS   R1,2                                                      MT302730
*000BA6 C510 0080               274           CLAI  R1,KBEND-KB00128    (COMPARE TO SIZE OF TABLE)      ****  MT302740
000BAA  2085                    275           BLS   INIG                                                      MT302750
*000BAC C810 0080               276           LDI   R1,X'80'                                                  MT302760
000BB0  D210 1550               277           STB   R1,KB00128          SET FIRST 16K MAP BIT                 MT302770
*000BB4 C810 4000               278           LDI   R1,X'4000'          LOAD START ADDRESS OF SEARCH          MT302780
000BB8  0821                    279           LDAR  R2,R1               LOAD SEARCH INCREMENT VALUE           MT302790
000BBA  E630 40FF C000          280           LDAI  R3,Y'FFC000'        YES, CHECK FOR WRAP AROUND            MT302800
000BC0  2441                    281           LIS   R4,1                LOAD STARTING TABLE INDEX             MT302810
000BC2  2450                    282           LIS   R5,0                ESTABLISH ADRS OF 1ST MEMORY LOC      MT302820
000BC4  5011 0000               283  REP      ST    R1,0(R1)            STORE DATA PATTERN                    MT302830
000BC8  5020 1670               284           ST    R2,WORDCHG          DUMMY STORE TO DESTROY MDR      ****  MT302840
                                285  *                                  (INVALIDATE MDR)                ****  MT302850
000BCC  5871 0000               286           L     R7,0(R1)            LOAD DATA PATTERN FROM SEARCH LOC     MT302860
000BD0  2491                    287           LIS   R9,1                                                      MT302870
000BD2  0517                    288           CLAR  R1,R7               IS DATA READ = DATA STORED ?          MT302880
000BD4  2137                    289           BNES  MEMLIST                                                   MT302890
000BD6  5870 0000               290           L     R7,0                WAS DATA STORED IN LOCATION ZERO?     MT302900
000BDA  4330 0C16               291           BZ    SETBIT                                                    MT302910
000BDE  4090 166E               292  STFLG    STH   R9,WRAPFLG          SET FLAG IF WRAP AROUND OCCURED       MT302920
000BE2  4090 166C               293  MEMLIST  STH   R9,FLAG                                                   MT302930
000BE6  0894                    294           LDAR  R9,R4               NO. WAS LAST BIT SET ?                MT302940
000BE8  2791                    295           SIS   R9,1                                                      MT302950
000BEA  7490 1550               296           TBT   R9,KB00128                                                MT302960
000BEE  4330 0C28               297           BZ    NEXT                NO, ZERO NEXT BIT IN MEMORY TABLE     MT302970
000BF2  0895                    298           LDAR  R9,R5               YES, LOAD START ADRS OF MEMORY SEG    MT302980
000BF4  41F0 105A               299           BAL   R15,CONVERT         CONVERT TO ASCII CHARACTERS           MT302990
000BF8  0014                    300           DC    X'14'               SHIFT INDEX                           MT303000
000BFA  1386                    301           DC    Z(MEMSG1)           STORE INDEX                           MT303010
000BFC  0891                    302           LDAR  R9,R1                                                     MT303020
000BFE  2791                    303           SIS   R9,1                ESTABLISH LAST ADRS OF MEMORY SEGMENT MT303030
000C00  41F0 105A               304           BAL   R15,CONVERT         CONVERT TO ASCII CHARACTERS           MT303040
000C04  0014                    305           DC    X'14'               SHIFT INDEX                           MT303050
000C06  1390                    306           DC    Z(ENDVAL)           STORE INDEX                           MT303060
000C08  41F0 0DC2               307           BAL   R15,$PRINT          PRINT MEMORY SEGMENT ADDRESSES        MT303070
000C0C  1386                    308           DC    Z(MEMSG1)           START ADRS OF MESSAGE                 MT303080
000C0E  2793                    309           SIS   R9,3                                                      MT303090
000C10  5090 16B8               310           ST    R9,LAST                                                   MT303100
000C14  230A                    311           BS    NEXT                CHECK NEXT 8K OF MEMORY               MT303110
000C16  7540 1550               312  SETBIT   SBT   R4,KB00128          SET BIT IN MEMORY TABLE               MT303120
000C1A  7390 166C               313           LHL   R9,FLAG                                                   MT303130
000C1E  2335                    314           BZS   NEXT                                                      MT303140
000C20  0851                    315           LDAR  R5,R1               LOAD START ADRS OF MEMORY SEGMENT     MT303150
000C22  2490                    316           LIS   R9,0                                                      MT303160
000C24  4090 166C               317           STH   R9,FLAG                                                   MT303170
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000C28  7390 16BE          318  NEXT     LHL   R9,WRAPFLG                                          MT303180
000C2C  2139               319           BNZS  ENABLE1                                             MT303190
000C2E  2641               320           AIS   R4,1          INCREMENT TABLE INDEX                MT303200
000C30  7640 1550          321           RBT   R4,KB00128     ZERO NEXT BIT IN MEMORY TABLE        MT303210
000C34  C110 0BC4          322           BXLE  R1,REP         REPEAT UNTIL ALL OF MEMORY IS CHECKED MT303220
000C38  2491               323           LIS   R9,1                                                MT303230
000C3A  4300 08DE          324           B     STFLG                                               MT303240
                           325  *                                                                   MT303250
                           326  *                                                                   MT303260
                           327  *                                                                   MT303270
        0000 0C3E          328  RESTART2 EQU   *             ENTRY AT THIS POINT WILL NOT         MT303280
                           329  *                           ESTABLISH MEMORY TABLE               MT303290
                           330  *                                                                   MT303300
                           331  *                                                                   MT303310
000C3E  C200 1680          332  ENABLE1  LPSW  CLEAR                                               MT303320
*000C42  C810 2000          333  CLEAR1   LI    R1,Y'2000'                                          MT303330
000C46  5010 16A8          334           ST    R1,LOVAL                                            MT303340
000C4A  5810 1688          335           L     R1,LAST                                             MT303350
000C4E  5010 16AC          336           ST    R1,HIVAL                                            MT303360
000C52  E610 1256          337  SETVAL   LA    R1,MALFTN                                           MT303370
000C56  5010 003C          338           ST    R1,X'3C'                                            MT303380
000C5A  C200 1688          339           LPSW  ENABLE                                              MT303390
000C5E  0711               340  PRTMSG   XR    R1,R1                                               MT303400
000C60  D210 15D1          341           STB   R1,ERRFLG      ZERO ERROR FLAG                      MT303410
000C64  D210 1768          342           STB   R1,$WASDU      ZERO DU FLAG                         MT303420
000C68  D210 15D3          343           STB   R1,CONTFLG     ZERO CONTINUE FLAG                   MT303430
000C6C  41F0 0DC2          344           BAL   R15,$PRINT     PRINT AN "*"                         MT303440
000C70  1370               345           DC    Z(ASTERISK)    START ADRS OF MESSAGE                MT303450
000C72  D370 1768          346           LB    R7,$WASDU                                           MT303460
000C76  0877               347           LR    R7,R7          IS DU FLAG SET ?                     MT303470
000C78  2333               348           BZS   PRTMSG1                                             MT303480
000C7A  C200 1698          349           LPSW  HALT1          YES, HALT PROCESSOR                  MT303490
000C7E  5010 16BC          350  PRTMSG1  ST    R1,TOTAL       ZERO TOTAL COUNT                     MT303500
000C82  5010 16C0          351           ST    R1,TOTALERR    ZERO TOTAL ERROR COUNT               MT303510
000C86  4140 0EA8          352  RDAGN    BAL   R4,KBREAD                                           MT303520
000C8A  41F0 0EC4          353           BAL   R15,GETCHR     READ A CHARACTER                     MT303530
000C8E  C540 000A          354           CLHI  R4,X'0A'       COMPARE WITH LINE FEED               MT303540
000C92  4330 108A          355           BE    HILO           IF EQUAL, DO 'HILO' ROUTINE          MT303550
000C96  C540 000D          356           CLHI  R4,X'0D'       COMPARE WITH CARRIAGE RETURN         MT303560
000C9A  4330 0CC0          357           BE    LF                                                  MT303570
000C9E  C540 004C          358           CLHI  R4,C'L'        COMPARE FOR CONTINUOUS TESTING       MT303580
*000CA2  2336               359           BE    CONT                                                MT303590
000CA4  C540 0040          360           CLHI  R4,C'@'        COMPARE WITH "@" (HALT)              MT303600
000CA8  4330 0DAE          361           BE    BRKOK                                               MT303610
*000CAC  2305               362           B     QUESTION       IF HERE, ILLEGAL INPUT               MT303620
000CAE  2441               363  CONT     LIS   R4,1                                                MT303630
000CB0  D240 15D3          364           STB   R4,CONTFLG     IF =, SET FLAG FOR CONTINUOUS TESTING MT303640
000CB4  2306               365           BS    LF                                                  MT303650
000CB6  41F0 0DC2          366  QUESTION BAL   R15,$PRINT     ILLEGAL INPUT - PRINT "?"            MT303660
000CBA  1388               367           DC    Z(QUEST)                                            MT303670
000CBC  4300 0C86          368           B     RDAGN          READ ANOTHER CHARACTER               MT303680
000CC0  41F0 0DC2          369  LF       BAL   R15,$PRINT     PRINT A "LF" CHARACTER.              MT303690
000CC4  138C               370           DC    Z(CRLF)                                             MT303700
                           371  *                                                                   MT303710
                           372  *                                                                   MT303720
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000CC6  0711           373  LOOP   XR    R1,R1          ZERO REGISTER R1                          MT303730
000CC8  0722           374         XR    R2,R2          ZERO REGISTER R2                          MT303740
000CCA  5020 16B4      375         ST    R2,BLKADR                                                MT303750
000CCE  D220 1502      376         STB   R2,LIMFLG      CLEAR FLAG                                MT303760
000CD2  4020 1668      377         STH   R2,SAVE                                                  MT303770
000CD6  C890 0120      378         LHI   R9,X'120'      LOAD SUBROUTINE BYTE SIZE                 MT303780
000CDA  5010 1664      379         ST    R1,R1SAVE                                                MT303790
*000CDE  C810 1000      380         LI    R1,X'1000'                                               MT303800
000CE2  5010 15D8      381         ST    R1,TESTIMER                                              MT303810
000CE6  5010 15DC      382         ST    R1,TESTMER                                               MT303820
000CEA  5810 1664      383         L     R1,R1SAVE                                                MT303830
000CEE  4300 1148      384         B     FWRA                                                     MT303840
000CF2  0842           385  LOAD   LR    R4,R2          START ADRS OF CURRENT 8K BLOCK            MT303850
000CF4  0A49           386  ADD    AR    R4,R9          ADD SUBRTN SIZE TO CURRENT START SIZE     MT303860
000CF6  5540 16B0      387         CL    R4,VALUE                                                 MT303870
000CFA  2184           388         BLS   LOADSUB        YES, LOAD SUBRTN INTO MEMORY              MT303880
000CFC  2333           389         BES   LOADSUB                                                  MT303890
000CFE  4300 1148      390         B     FWRA                                                     MT303900
000D02  0777           391  LOADSUB XR    R7,R7          ZERO REGISTER R7                          MT303910
000D04  4070 166A      392         STH   R7,ERRWORD     ZERO RX FORMAT ERROR INDICATOR            MT303920
000D08  2484           393         LIS   R8,4           ESTABLISH INCREMENT VALUE                 MT303930
000D0A  0849           394         SR    R4,R9          EST CURRENT START ADRS OF SUBRTN          MT303940
000D0C  5867 17E0      395  LOAGN  L     R6,FINI+4(R7)  LOAD SUBROUTINE FROM PATTERN              MT303950
000D10  5064 4700 0000 396         ST    R6,0(R4,R7)    STORE SUBRTN IN MEMORY                    MT303960
000D16  C170 0D0C      397         BXLE  R7,LOAGN       REPEAT UNTIL ENTIRE SUBRTN IN MEMORY      MT303970
000D1A  0874           398         LR    R7,R4          LOAD START ADRS OF SUBRTN                 MT303980
000D1C  41E0 103E      399         BAL   R14,DISP       WRITE ADRS ON DISPLAY                     MT303990
000D20  0700           400         XR    R0,R0          ZERO ERROR WORD INDEX                     MT304000
000D22  E660 11B2      401         LA    R6,ERROR       LOAD ADRS OF ERROR ROUTINE                MT304010
*000D26  C834 00FE      402         LI    R3,Y'FE'(R4)   LOAD ADRS OF RXERR                        MT304020
*000D2A  C8B4 010E      403         LI    R11,Y'10E'(R4) LOAD ADRS OF ERRCHK                       MT304030
000D2E  08C4           404         LR    R12,R4         LOAD START ADRS OF SUBRTN                 MT304040
000D30  0AC9           405         AR    R12,R9         ADD SUBRTN BYTE SIZE                      MT304050
000D32  2402           406         LIS   R13,2                                                    MT304060
000D34  0755           407         XR    R5,R5          ZERO RX FORMAT ERROR FLAG                 MT304070
000D36  01A4           408         BALR  R10,R4         BRANCH TO SUBRTN                          MT304080
000D38  41E0 122E      409         BAL   R14,RXPRINT    CHECK FOR RX FAILURE                      MT304090
000D3C  2644           410         AIS   R4,4           INCREMENT SUBRTN START ADRS               MT304100
000D3E  41F0 132E      411         BAL   R15,TESTMSG    PRINT TEST STILL RUNNING MESSAGE          MT304110
000D42  D360 15D3      412         LB    R6,CONTFLG                                               MT304120
000D46  0866           413         LR    R6,R6                                                    MT304130
000D48  4330 0CF4      414         BZ    ADD                                                      MT304140
000D4C  41F0 0F00      415         BAL   R15,TSTBRK                                               MT304150
000D50  4300 0CF4      416         B     ADD                                                      MT304160
                       417  *                                                                     MT304170
                       418  *                                                                     MT304180
                       419  *                                                                     MT304190
000D54  2411           420  SWTST  LIS   R1,1           LOAD R1 WITH DISPLAY PANEL ADRS           MT304200
000D56  5110 16BC      421         AM    R1,TOTAL       INCREMENT TOTAL                           MT304210
000D5A  41F0 0F8A      422         BAL   R15,TSTDU      IS DEVICE UNAVAILABLE (OFF LINE)?         MT304220
000D5E  4230 0CC6      423         BNZ   LOOP                                                     MT304230
000D62  41F0 0F00      424         BAL   R15,TSTBRK                                               MT304240
000D66  D360 15D3      425  CONCHK LB    R6,CONTFLG     IS CONTINUE FLAG SET?                     MT304250
000D6A  0866           426         LR    R6,R6                                                    MT304260
000D6C  2338           427         BZS   CHKERR         NO, BRANCH                                MT304270
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000D6E  D360 1768          428          LB    R6,$WASDU      WAS DEVICE EVER UNAVAILABLE?      MT304280
000D72  0866               429          LR    R6,R6                                            MT304290
000D74  4230 0FDE          430          BNZ   $KEEP7         YES, PRINT TOTAL, TOTALERR        MT304300
000D78  4300 0CC6          431          B     LOOP           NO, LOOP                          MT304310
000D7C  5870 16BC          432  CHKERR  L     R7,TOTAL                                         MT304320
000D80  41E0 103E          433          BAL   R14,DISP       WRITE TOTAL ON DISPLAY            MT304330
000D84  D370 15D1          434          LB    R7,ERRFLG      NO, LOAD ERROR FLAG               MT304340
000D88  0877               435          LR    R7,R7          IS ERROR FLAG SET ?               MT304350
000D8A  2134               436          BNZS  ENDCHK         YES, SKIP NO ERROR MESSAGE        MT304360
000D8C  41F0 0CC2          437          BAL   R15,$PRINT     NO, PRINT NO ERROR                MT304370
000D90  13F0               438          DC    Z(NOERR)       START ADRS OF MESSAGE             MT304380
000D92  0777               439  ENDCHK  XR    R7,R7          ZERO REGISTER R7                  MT304390
000D94  D270 15D1          440          STB   R7,ERRFLG      ZERO ERROR FLAG                   MT304400
000D98  0766               441  ZROFLG  XR    R6,R6          ZERO REGISTER R6                  MT304410
000D9A  D260 1768          442          STB   R6,$WASDU      ZERO TTY FLAG                     MT304420
000D9E  5060 16BC          443  ZROCNT  ST    R6,TOTAL       ZERO TOTAL PASS COUNT             MT304430
000DA2  5060 16C0          444          ST    R6,TOTALERR    ZERO TOTAL ERROR COUNT            MT304440
000DA6  D260 15D3          445          STB   R6,CONTFLG                                       MT304450
000DAA  4300 0C5E          446          B     PRTMSG         PRINT AN '*'                      MT304460
                           447  *                                                              MT304470
000DAE  F870 0000 8000     448  BRKOK   LI    R7,Y'8000'                                       MT304480
000DB4  5070 0030          449          ST    R7,X'30'                                         MT304490
000DB8  E670 0A00          450          LA    R7,ORIGIN1                                       MT304500
000DBC  5070 0034          451          ST    R7,X'34'                                         MT304510
000DC0  8800               452          BRK                                                    MT304520
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                                454  * * * * * * * * * * * * * * * * * * * * * * * * * * * *          MT304540
                                455  *                                                       *          MT304550
                                456  *                        P R I N T                      *          MT304560
                                457  *                                                       *          MT304570
                                458  * THIS ROUTINE PRINTS MESSAGES ON THE CONSOLE DEVICE.  *          MT304580
                                459  *                                                       *          MT304590
                                460  * * * * * * * * * * * * * * * * * * * * * * * * * * * *          MT304600


000DC2  735F 0000               463  $PRINT   LHL   R5,0(R15)                                         MT304630
000DC6  26F2                    464           AIS   R15,2                                             MT304640
        0000 0DC8               465  PRINT    EQU   *                  TO PRINT THE ASCII MESSAGE     MT304650
000DC8  D000 16D4               466  $P0      STM   R0,RSAVE           STORE REGISTERS                MT304660
000DCC  2400                    467  $P1      LIS   R0,0                                              MT304670
000DCE  4000 1766               468           STH   R0,$LINEPOS        RESET BUFFER                   MT304680
000DD2  41F0 0F8A               469           BAL   R15,TSTDU          IS DEVICE UNAVAILABLE ?        MT304690
000DD6  4230 0FC8               470           BNZ   $RSAVRET           IF YES, RELOAD REGISTERS, RETURN.  MT304700
                                471  *                                                               MT304710
000DDA  4810 1768               472           LH    R1,$WASDU          WAS DEVICE EVER SEEN DU ?      MT304720
000DDE  4230 0FCE               473           BNZ   HALT9              OUTPUT TOTAL, TOTERR.          MT304730
                                474  *                                                               MT304740
                                475  *                                                               MT304750
000DE2  D345 0000               476  $PRT.2   LB    R4,0(R5)           GET A MESSAGE BYTE             MT304760
000DE6  41F0 0E34               477           BAL   R15,OUTCHR         OUTPUT IT                      MT304770
000DEA  274D                    478           SIS   R4,X'0D'           CR ?                           MT304780
000DEC  233A                    479           BZS   $PRT.3             MSG OVER                       MT304790
000DEE  2651                    480           AIS   R5,1                                              MT304800
000DF0  C350 0002               481           THI   R5,2               TIME TO CHECK BREAK ?          MT304810
000DF4  2239                    482           BZS   $PRT.2             BRANCH: NO.                    MT304820
000DF6  4050 176A               483           STH   R5,$PRTFLG         TO DEFER BREAK ACKNOWLEDGE     MT304830
000DFA  41F0 0F00               484           BAL   R15,TSTBRK                                        MT304840
000DFE  220E                    485           BS    $PRT.2             LOOP FOR NEXT CHAR             MT304850
                                486  *                                                               MT304860
000E00  244A                    487  $PRT.3   LIS   R4,X'0A'           LF                             MT304870
000E02  41F0 0E34               488           BAL   R15,OUTCHR         LF                             MT304880
000E06  2440                    489           LIS   R4,0               ASCII 'NUL'                    MT304890
000E08  41F0 0E34               490           BAL   R15,OUTCHR         TERMINAL CHARACTER             MT304900
000E0C  41F0 0F00               491           BAL   R15,TSTBRK                                        MT304910
000E10  4040 176A               492           STH   R4,$PRTFLG         RE-ENABLE BREAK ACKNOWLEDGE    MT304920
000E14  48F0 176C               493           LH    R15,$BRKFLG                                       MT304930
000E18  4040 176C               494           STH   R4,$BRKFLG         BREAK BEING ACKNOWLEDGED       MT304940
000E1C  4330 0FC8               495           BZ    $RSAVRET           RESTORE REGISTERS, RETURN (R15)  MT304950
000E20  40F0 176E               496           STH   R15,ISITERR        FORCE MESSAGE PRINT            MT304960
*000E24  C550 13EF              497           CLAI  R5,$BRKEND         PRINTING 'BRK TERM' MESSAGE ?  MT304970
000E28  2334                    498           BES   $PRT.4             BRANCH: YES.                   MT304980
000E2A  41F0 0DC2               499  $PRT.3A  BAL   R15,$PRINT         'RECURSIVE' CALL          P2 1/80  MT304990
000E2E  1336                    500           DC    Z(BRKMSG)          'BREAK TERMINATION'            MT305000
000E30  4300 0C52               501  $PRT.4   B     SETVAL             TO CMD PROCESSOR               MT305010
                                502  *---------------------------------                              MT305020
                                503  *  TO OUTPUT A CHARACTER TO THE LIST DEVICE                      MT305030
                                504  *                                                               MT305040
000E34  50F0 1778               505  OUTCHR   STA   R15,CUT.SAV        SAVE RETURN ADDRESS            MT305050
000E38  D310 17CF               506           LB    R1,ICSAVE+1                                       MT305060
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000E3C  2714           507           SIS   R1,4                                                    MT305070
000E3E  4230 0E6E      508           BNZ   $OTC.4          BRANCH IF NOT CAROUSEL                   MT305080
000E42  4010 1770      509 $OTC.3    STH   R1,$PAUSE       ZERO $PAUSE FLAG                         MT305090
000E46  41F0 0F8A      510 $OTC.1    BAL   R15,TSTDU        ON LINE ?                                MT305100
000E4A  4230 0EA2      511           BNZ   $OTC.7          BRANCH: OFFLINE. EXIT.                   MT305110
000E4E  9021           512           SSR   R2,R1           GET CAROUSEL STATUS                      MT305120
000E50  2385           513           BFFS  8,$OTC.3        BRANCH IF CHAR. IS TO BE READ            MT305130
000E52  4810 1770      514 $OTC.2    LH    R1,$PAUSE       PAUSED NOW ?                             MT305140
000E56  2038           515           BNZS  $OTC.1          YES, LOOP                                MT305150
000E58  2309           516           BS    $OTC.4          NO, GO OUTPUT CHARACTER                  MT305160
000E5A  9B21           517 $OTC.3    RDR   R2,R1           GET CAROUSEL CHARACTER                   MT305170
000E5C  C410 007F      518           NHI   R1,X'7F'                                                 MT305180
000E60  C510 0014      519           CLHI  R1,X'14'        DC4 ?                                    MT305190
000E64  4330 0E42      520           BE    $OTC.0          DC4. SET $PAUSE FLAG.                    MT305200
000E68  C810 0012      521           SHI   R1,X'12'        DC2 ?                                    MT305210
000E6C  203D           522           BNZS  $OTC.2          BRANCH: NO. CHECK IF PAUSED NOW.         MT305220
                       523 *                                                                        MT305230
000E6E  4010 1770      524 $OTC.4    STH   R1,$PAUSE       RESET FLAG                               MT305240
000E72  4110 1026      525           BAL   R1,$SETUP       SET UP FOR OUTPUT                        MT305250
000E76  9C01           526 $OTC.5    SSR   R0,R1           WAIT FOR NOT BUSY                        MT305260
000E78  4230 0EA2      527           BTC   3,$OTC.7        BRANCH IF OFF-LINE                       MT305270
000E7C  C510 0048      528           CLHI  R1,X'48'        (NOT) CL2S OR PF ?          P4 4/80      MT305280
000E80  4330 0EA2      529           BE    $OTC.7          BRANCH: ASSUME OFF-LINE     P4 4/80      MT305290
000E84  C410 00FC      530           NHI   R1,X'FC'                                                 MT305300
000E88  C510 000C      531           CLHI  R1,X'0C'        HDX PASLA OFF-LINE ?                     MT305310
*000E8C 2330           532           BE    $OTC.7          BRANCH: YES.                P4 4/80      MT305320
000E8E  9014           533           SRHLS R1,4            BUSY ?                      P4 4/80      MT305330
000E90  208D           534           BCS   $OTC.5          BRANCH: YES.                P4 4/80      MT305340
000E92  9A04           535           WDR   R0,R4           OUTPUT DATA BYTE                         MT305350
000E94  9D01           536 $OTC.6    SSR   R0,R1           WAIT FOR NOT BUSY                        MT305360
000E96  2176           537           BTFS  7,$OTC.7        BRANCH IF OFF-LINE (PASLA HANGS)         MT305370
000E98  C510 0048      538           CLHI  R1,X'48'        (NOT) CL2S OR PF ?          P4 4/80      MT305380
000E9C  2333           539           BES   $OTC.7          BRANCH: ASSUME OFF-LINE     P4 4/80      MT305390
000E9E  9014           540           SRHLS R1,4            BUSY ?                      P4 4/80      MT305400
000EA0  2086           541           BCS   $OTC.6          BRANCH: YES.                P4 4/80      MT305410
000EA2  58F0 1778      542 $OTC.7    LDA   R15,OUT.SAV                                               MT305420
000EA6  030F           543           BR    R15             RETURN                                   MT305430
                       544 *-------------------------------------                                   MT305440
                       545 *  TO PUT KEYBOARD DEVICE IN READ MODE                                   MT305450
                       546 *                                                                        MT305460
000EA8  4800 0A2A      547 KBREAD    LH    R0,CONRADR                                               MT305470
000EAC  DE00 0A2E      548           OC    R0,CONRD        OC CONSOLE - READ COMMAND                MT305480
000EB0  D800 0A48      549           RD    R0,SINK         READ A DUMMY CHARACTER (SET BUSY)        MT305490
000EB4  4890 17D0      550           LH    R9,$CONPAS      PASLA ?                                  MT305500
000EB8  4203 0EB8      551           NOP   *               FOR SPECIAL KB DEVICE                    MT305510
000EBC  2333           552           BZS   $KBR.1          NO, BRANCH TO EXIT                       MT305520
000EBE  DE00 15D4      553           OC    R0,CONRQ2S      YES, OC (REQUEST TO SEND)                MT305530
000EC2  0304           554 $KBR.1    BR    R4              RETURN                                   MT305540
                       555 *--------------------------------                                        MT305550
000EC4  9D04           556 GETCHR    SSR   R0,R4                                                    MT305560
000EC6  2081           557           BTBS  8,1             IF BUSY, LOOP (POSSIBLE HANG)            MT305570
000EC8  9B04           558           RDR   R0,R4           READ A CHAR IN R4                        MT305580
000ECA  D390 0A10      559           LB    R9,IC           WHAT TYPE DEVICE ?          P1 10/79     MT305590
000ECE  2792           560           SIS   R9,2            TYPE 2 ?                    P1 10/79     MT305600
000ED0  2338           561           BZS   $RD.3A          BRANCH: YES. E-PLEX ON.     P1 10/79     MT305610
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000EC2  4850 0A2C          562          LH    R9,CONWADR          GET WRITE ADDRESS                        MT305620
000EC6  DE90 0A2F          563          OC    R9,CONWRT           TURN DEVICE AROUND                       MT305630
000ECA  9D93               564          SSR   R9,R3                                                       MT305640
000ECC  2081               565          BTBS  8,1                 WAIT FOR BUSY NOT                        MT305650
000ECE  9A94               566          WDR   R9,R4               ECHO RECEIVED BYTE                       MT305660
        0000 0EE0          567 $RD.3A   EQU   *                   P1 10/79                                 MT305670
000EE0  C440 007F          568          NHI   R4,X'7F'            REMOVE PARITY BIT                        MT305680
000EE4  C540 0060          569          CLHI  R4,X'60'            UPPER-CASE CHARACTER ?                   MT305690
000EE8  2183               570          BLS   $RD.4               BRANCH: NO.                              MT305700
000EEA  C840 0020          571          SHI   R4,X'20'            CONVERT TO LOWER-CASE                    MT305710
000EEE  C540 0023          572 $RD.4    CLHI  R4,X'23'            HASH-MARK ?                              MT305720
000EF2  4330 0C5E          573          BE    PRTMSG              BRANCH: YES. GO TO CMD PROC.             MT305730
000EF6  C540 0018          574          CLHI  R4,X'18'            ASCII 'CANCEL' CHARACTER ?               MT305740
000EFA  4330 0C5E          575          BE    PRTMSG              BRANCH: YES.                             MT305750
000EFE  030F               576          BR    R15                                                        MT305760
                           577 *-------------------------------------                                    MT305770
                           578 *                                                                          MT305780
                           579 * IF BREAK KEY DEPRESSED, GO TO 'OPTIN' OR (BRKVECT); ELSE RETURN.        MT305790
                           580 *                                                                          MT305800
        0000 0F00          581 TSTBRK   EQU   *                                                        MT305810
000F00  D0E0 17D4          582          STM   R14,$TBRKSV         SAVE REGISTERS                           MT305820
000F04  48F0 176C          583          LH    R15,$BRKFLG         (R15) = 15 IF IGNORING I/O               MT305830
000F08  2337               584          BZS   $TSTB.2             BRANCH: YES.                             MT305840
                           585 *                                                                          MT305850
000F0A  24F0               586 $TSTB.1  LIS   R15,0                                                      MT305860
000F0C  40F0 1764          587          STH   R15,BRKVECT         CANCEL BREAK VECTOR                      MT305870
000F10  01E0 17D4          588 $TSTB.1A LM    R14,$TBRKSV         RELOAD REGISTERS,                        MT305880
000F14  030F               589          BR    R15                 RETURN TO CALLER.                        MT305890
                           590 *                                                                          MT305900
000F16  48E0 0A2A          591 $TSTB.2  LH    R14,CONRADR         READ SIDE ADDRESS FOR TERMINAL           MT305910
000F1A  D3F0 0A10          592          LB    R15,IC              CONSOLE ID CODE .                        MT305920
000F1E  C5F0 0002          593          CLHI  R15,2                                                        MT305930
000F22  2333               594          BES   $TSTB.3             BRANCH: TTY                              MT305940
000F24  C5F0 0005          595          CLHI  R15,5                                                        MT305950
000F28  4330 0F66          596 $TSTB.3  BE    $TSTB.5             BRANCH: MICRO-I/O BUS                    MT305960
000F2C  9DEF               597          SSR   R14,R15                                                      MT305970
000F2E  4280 0F0A          598          BTC   8,$TSTB.1           BRANCH: BSY = NO BRK                     MT305980
000F32  C3F0 0020          599          THI   R15,X'20'                                                    MT305990
000F36  4330 0F0A          600          BZ    $TSTB.1             BRANCH: NO FRERR = NO BRK                MT306000
000F3A  98EF               601          RDR   R14,R15                                                      MT306010
000F3C  08FF               602          LDAR  R15,R15                                                      MT306020
000F3E  4230 0F0A          603          BNZ   $TSTB.1             BRANCH: NONZERO CHAR = NO BRK            MT306030
                           604 *                                                                          MT306040
        0000 0F42          605 $TSTB.4  EQU   *                   IT IS BREAK                              MT306050
000F42  24FF               606          LIS   R15,15                                                       MT306060
000F44  40F0 176C          607          STH   R15,$BRKFLG         SET FLAG                                 MT306070
000F48  48F0 176A          608          LH    R15,$PRTFLG         PRINTING NOW ?                           MT306080
000F4C  4230 0F10          609          BNZ   $TSTB.1A            BRANCH: YES.                             MT306090
000F50  24E0               610          LIS   R14,0                                                        MT306100
000F52  48F0 1764          611          LH    R15,BRKVECT         SPECIFIED VECTOR                         MT306110
000F56  40E0 1764          612          STH   R14,BRKVECT         CANCEL VECTOR                            MT306120
000F5A  023F               613          BNZR  R15                 BUT TAKE IMMEDIATELY IF NON-ZERO.        MT306130
000F5C  25F1               614          LCS   R15,1               FORCE MESSAGE PRINT          P2 1/80     MT306140
000F5E  40F0 176E          615          STH   R15,ISITERR         P2 1/80                                  MT306150
000F62  4300 0D2A          616          B     $PRT.3A             'BREAK TERMINATION'          P2 1/80     MT306160
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                                617  *                                                                    MT306170
000F66  9DEF                    618  $TSTB.5  SSR   R14,R15                                              MT306180
000F68  C3F0 0020               619           THI   R15,X'20'                                            MT306190
000F6C  2134                    620           BNZS  $TSTB.6          BRANCH: BRK.                        MT306200
000F6E  9BEF                    621           RDR   R14,R15          IF BRK QUEUED, SEE IT NEXT TIME.    MT306210
000F70  4300 0F0A               622           B     $TSTB.1          BRANCH: NO FRERR = NO BRK           MT306220
000F74  9BEF                    623  $TSTB.6  RDR   R14,R15          READ BREAK CHAR                     MT306230
000F76  C8F0 8000               624           LHI   R15,X'8000'                                          MT306240
000F7A  26F1                    625  $TSTB.7  AIS   R15,1                                               MT306250
000F7C  2031                    626           BNZS  $TSTB.7                                              MT306260
000F7E  9DEF                    627           SSR   R14,R15                                              MT306270
000F80  C3F0 0020               628           THI   R15,X'20'          BRK KEY STILL DOWN ?              MT306280
000F84  2038                    629           BNZS  $TSTB.6          BRANCH: YES.                        MT306290
000F86  4300 0F42               630           B     $TSTB.4          GO SERVICE BREAK                    MT306300
                                631  *-----------------------------                                      MT306310
                                632  * SEE IF CURRENT LIST DEVICE IS OFF-LINE (R1 & CC NON-ZERO IF OFF)   MT306320
                                633  *                                                                    MT306330
000F8A  4800 17D0               634  TSTDU    LH    R0,$CONPAS                                          MT306340
000F8E  D310 17CF               635           LB    R1,IOSAVE+1      LIST DEVICE ID                     MT306350
000F92  D410 0A10               636           CLB   R1,IO            SAME AS CONSOLE DEVICE ?           MT306360
000F96  2333                    637           BES   $TSTDU.1         BRANCH: YES.                       MT306370
000F98  4800 17CC               638           LH    R0,$LSTPAS       NON-ZERO IF LIST DEVICE ON PASLA.  MT306380
000F9C  1112                    639  $TSTDU.1 SLLS  R1,2                                                MT306390
000F9E  4821 0A0E               640           LH    R2,PASLADR-4(R1) 'READ SIDE' ADDRESS                MT306400
000FA2  9D21                    641           SSR   R2,R1            GET DEVICE STATUS                  MT306410
000FA4  211A                    642           BTFS  1,$IS.DU                                             MT306420
000FA6  0800                    643           LOAR  R0,R0            DEVICE ON PASLA ?                  MT306430
000FA8  2336                    644           BZS   $NOT.DU                                              MT306440
000FAA  C410 00FC               645           NHI   R1,X'FC'                                             MT306450
000FAE  C510 000C               646           CLHI  R1,X'0C'         PASLA DU IF BSY+EX SET HERE         MT306460
000FB2  2333                    647           BES   $IS.DU           BRANCH: DU.                        MT306470
000FB4  2410                    648  $NOT.DU  LIS   R1,0                                                MT306480
000FB6  2302                    649           BS    $DU.X                                                MT306490
000FB8  2511                    650  $IS.DU   LCS   R1,1                                                MT306500
000FBA  4800 1768               651  $DU.X    LH    R0,$WASDU        GET OLD FLAG                       MT306510
000FBE  0601                    652           OAR   R0,R1                                                MT306520
000FC0  4000 1768               653           STH   R0,$WASDU        ACCUMULATE                         MT306530
000FC4  0811                    654           LOAR  R1,R1            SET CC <> 0 IF DU                  MT306540
                                655  *                               OR CC = 0 IF NOT DU                MT306550
000FC6  030F                    656           BR    R15              RETURN                             MT306560
                                657  * ---------------------------                                      MT306570
                                658  * ROUTINE RESTORES REGISTERS SAVED ON ENTRY TO CALLING ROUTINE       MT306580
                                659  * AND RETURNS BY R15                                                MT306590
                                660  *                                                                    MT306600
000FC8  0100 16D4               661  $RSAVRET LM    R0,RSAVE                                            MT306610
000FCC  030F                    662           BR    R15              RETURN TO ORIGINAL CALLER          MT306620
                                663  ******* THIS IS WHERE TO IMPLEMENT STACK                            MT306630
                                664  *                                                                    MT306640
                                665  *--------------------------------------                             MT306650
0000 0FCE                       666  HALT9    EQU   *                STOP MACHINE FOR ERROR PRINT        MT306660
000FCE  41F0 0F8A               667           BAL   R15,TSTDU        CHECK IF LIST DEVICE OFF-LINE       MT306670
000FD2  2336                    668           BZS   $KEEP7           BRANCH: ON-LINE NOW.                MT306680
000FD4  C810 080F               669           LHI   R1,X'080F'                                           MT306690
000FD8  9114                    670           SLHLS R1,4             R1 = X'80F0'                        MT306700
000FDA  9501                    671           EPSR  R0,R1            STOP PROCESSOR. WHEN 'EXE/RUN' DEP  MT306710
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000FDC  2207            672          BS    HALT9              CHECK IF LIST DEVICE ON-LINE.      MT306720
                        673  *-------------------------------                                      MT306730
                        674  * LIST DEVICE WAS OFF-LINE. PRINT TOTAL, TOTERR                       MT306740
                        675  *                                                                     MT306750
        0000 0FDE       676  $KEEP7   EQU   *                                                     MT306760
000FDE  2400            677          LIS   R0,0                                                   MT306770
000FE0  4000 1768       678          STH   R0,$WASDL          RESET DU FLAG                       MT306780
000FE4  41F0 0DC2       679          BAL   R15,$PRINT                                             MT306790
000FE8  14BE            680          DC    Z(NULLMSG)         OUTPUT NULL STRING, CRLF            MT306800
000FEA  41F0 0DC2       681          BAL   R15,$PRINT                                             MT306810
000FEE  1400            682          DC    Z(TOTMSG)          'TOTAL   TOTERR'                    MT306820
000FF0  C840 2020       683          LHI   R4,C'  '           SPACES                              MT306830
000FF4  4040 1784       684          STH   R4,$OUTBUF+8                                           MT306840
000FF8  C870 001C       685          LHI   R7,X'1C'                                               MT306850
000FFC  E6C0 177C       686          LDAI  R12,$OUTBUF                                            MT306860
001000  5890 16BC       687          L     R9,TOTAL                                               MT306870
001004  41F0 1064       688          BAL   R15,CONVERT1       CONVERT TOTAL                       MT306880
001008  C870 001C       689          LHI   R7,X'1C'                                               MT306890
00100C  5850 16C0       690          L     R9,TOTALERR                                            MT306900
001010  26C3            691          AIS   R12,3              DESTINATION                         MT306910
001012  41F0 1064       692          BAL   R15,CONVERT1       CONVERT TOTERR                      MT306920
001016  2490            693          LIS   R9,X'D'            CARRIAGE RETURN                     MT306930
001018  D290 178F       694          STB   R9,$OUTBUF+19      TO TERMINATE MESSAGE.               MT306940
00101C  41F0 0DC2       695          BAL   R15,$PRINT         PRINT CONTENTS OF BUFFER:           MT306950
001020  177C            696          DC    Z($OUTBUF)                                             MT306960
                        697  *                               TOTAL    TOTERR                     MT306970
                        698  *                               XXXX     YYYY                       MT306980
001022  4300 0C5E       699          B     PRTMSG             PRINT TITLE, ACCEPT COMMAND.        MT306990
                        700  *-----------------------------                                       MT307000
                        701  *  LIST DEVICE SET UP ROUTINE                                        MT307010
                        702  *                                                                     MT307020
001026  5010 1774       703  $SETUP   STA   R1,SET.RTN                                            MT307030
00102A  D310 17CF       704          LB    R1,IOSAVE+1        GET LIST DEVICE IDENTIFIER          MT307040
00102E  9112            705          SLHLS R1,2               HW INDEX                            MT307050
001030  4801 0A10       706          LH    R0,IO(R1)          GET LIST DEVICE WRITE ADDRESS       MT307060
001034  DE01 0A31       707          OC    R0,CONCMD-1(R1)                                        MT307070
001038  5810 1774       708          LDA   R1,SET.RTN                                             MT307080
00103C  0301            709          BR    R1                 RETURN                              MT307090


                        711  * * * * * * * * * * * * * * * * * * * * * * * * * * * *              MT307110
                        712  *                                                     *              MT307120
                        713  *                  D I S P L A Y                      *              MT307130
                        714  *                                                     *              MT307140
                        715  * THIS ROUTINE WRITES TO THE DISPLAY PANEL (D1-D4)    *              MT307150
                        716  * R7 = THE DATA TO BE WRITTEN.                       *              MT307160
                        717  * R14 = THE RETURN ADDRESS.                          *              MT307170
                        718  *                                                     *              MT307180
                        719  * * * * * * * * * * * * * * * * * * * * * * * * * * * *              MT307190
00103E  24D1            720  DISP     LIS   R13,1              LOAD R13 WITH DISPLAY ADRS          MT307200
001040  DED0 1059       721          OC    R13,INCRMT         PUT DISPLAY IN INCREMENTAL MODE     MT307210
001044  94C7            722          EXBR  R12,R7             WRITE VALUE ON DISPLAY PANEL        MT307220
001046  98DC            723          WHR   R13,R12                                                MT307230
001048  34C7            724          EXHR  R12,R7                                                 MT307240
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00104A  94CC            725          EXBR  R12,R12                                    MT307250
00104C  98DC            726          WHR   R13,R12                                    MT307260
00104E  DED0 1058       727          OC    R13,NORM          PUT DISPLAY IN NORMAL MODE MT307270
001052  41F0 0F00       728          BAL   R15,TSTBRK                                 MT307280
001056  030E            729          BR    R14               RETURN TO TEST           MT307290
001058  80              730  NORM    DB    X'80'                                      MT307300
001059  40              731  INCRMT  DB    X'40'                                      MT307310


                        733  * * * * * * * * * * * * * * * * * * * * * * * * * * * * MT307330
                        734  *                                                       * MT307340
                        735  *                   C O N V E R T                       * MT307350
                        736  *                                                       * MT307360
                        737  * THE ROUTINE CONVERTS HEX CHARACTERS TO ASCII AND     * MT307370
                        738  * STORES THE RESULTS IN MEMORY.                        * MT307380
                        739  * R7 = THE SHIFT INDEX (THE NUM OF  BITS IN THE HEX   * MT307390
                        740  *      CHARACTER MINUS 4).                              * MT307400
                        741  * R9 = THE HEX VALUE TO BE CONVERTED.                  * MT307410
                        742  * R12 = THE STARTING ADDRESS WHERE THE CHARACTER IS    * MT307420
                        743  *       TO BE STORED.                                   * MT307430
                        744  * R15 = THE RETURN ADDRESS.                           * MT307440
                        745  *                                                       * MT307450
                        746  * * * * * * * * * * * * * * * * * * * * * * * * * * * * MT307460
00105A  737F 0000       747  CONVERT LHL   R7,0(R15)          LOAD SHIFT INDEX         MT307470
00105E  73CF 0002       748          LHL   R12,2(R15)         LOAD ADRS INDEX          MT307480
001062  26F4            749          AIS   R15,4                                       MT307490
001064  0869            750  CONVERT1 LR    R6,R9             LOAD VALUE TO BE CONVERTED MT307500
001066  EC67 0000       751          SRL   R6,0(R7)           SHIFT DIGIT INTO PLACE   MT307510
00106A  C460 000F       752          NHI   R6,X'F'            MASK OFF ALL BUT LEAST SIGNIF DIGIT MT307520
00106E  C660 0030       753          OHI   R6,X'30'           CONVERT TO ASCII         MT307530
001072  C560 003A       754          CLHI  R6,X'3A'           IS CHARACTER A NUMBER    MT307540
001076  2182            755          BLS   CONT9              YES, CONTINUE ROUTINE    MT307550
*001078  2667           756          AHI   R6,7               NO, CONVERT TO ASCII LETTER MT307560
00107A  D26C 0000       757  CONT9   STB   R6,0(R12)          STORE VALUE IN MESSAGE   MT307570
00107E  0877            758          LR    R7,R7              IS CONVERSION COMPLETE ? MT307580
001080  033F            759          BZR   R15                YES, RETURN TO TEST      MT307590
001082  2774            760          SIS   R7,4               NO, DECREMENT SHIFT INDEX MT307600
001084  26C1            761          AIS   R12,1              INCREMENT ADRS INDEX     MT307610
001086  4300 1064       762          B     CONVERT1           CONVERT NEXT HEX DIGIT   MT307620
                        763  *-----------------------------------                    MT307630
                        764  *                                                       MT307640
                        765  * THIS ROUTINE ALLOWS SPECIFICATION OF HIGH AND LOW     MT307650
                        766  * MEMORY LIMITS                                         MT307660
                        767  *                                                       MT307670
00108A  41F0 0DC2       768  HILO    BAL   R15,$PRINT         PRINT "LO= "             MT307680
00108E  1458            769          DC    Z(LOMSG)           START ADDRESS OF MESSAGE MT307690
001090  4190 1108       770          BAL   R9,TTYLOOP         GET DATA FROM TTY        MT307700
001094  0828            771          LR    R2,R8                                       MT307710
001096  C520 2000       772          CLHI  R2,X'2000'         COMPARE WITH TOP OF PROGRAM MT307720
*00109A  2385           773          BNL   OK                                          MT307730
00109C  41F0 0DC2       774          BAL   R15,$PRINT         IF <, PRINT "?" AND      MT307740
0010A0  13B8            775          DC    Z(QUEST)           REQUEST ANOTHER INPUT    MT307750
*0010A2  220C           776          B     HILO               MT307760
0010A4  102E            777  OK      SRLS  R2,14              MT307770
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0010A6  7420 1550          778          TBT   R2,KB00128                                                MT307780
0010AA  2136               779          BNZS  LOW                                                       MT307790
0010AC  41F0 0DC2          780          BAL   R15,$PRINT        PRINT "MEMORY NOT AVAILABLE"            MT307800
0010B0  1486               781          DC    Z(MNAMSG)         START ADDRESS OF MESSAGE                MT307810
0010B2  4300 10BA          782          B     HILO              .                                       MT307820
0010B6  5080 16A8          783  LOW     ST    R8,LOVAL          .                                       MT307830
0010BA  41F0 0DC2          784  HILO1   BAL   R15,$PRINT        PRINT "HI= "                            MT307840
0010BE  145E               785          DC    Z(HIMSG)          START ADDRESS OF MESSAGE                MT307850
0010C0  4190 1108          786          BAL   R9,TTYLOOP        GET DATA FROM TTY                       MT307860
0010C4  5890 16A8          787          L     R9,LOVAL          LOAD R9 WITH THE LOW VALUE              MT307870
0010C8  CA90 0124          788          AHI   R9,X'124'         .                                       MT307880
0010CC  0598               789          CLR   R9,R8             IS HIGH VALUE   GREATER THAN LOW VALUE  MT307890
0010CE  212A               790          BPS   NOTLOW           NO, PRINT MESSAGE                       MT307900
0010D0  082B               791          LR    R2,R8             .                                       MT307910
0010D2  102E               792          SRLS  R2,14             .                                       MT307920
0010D4  7420 1550          793          TBT   R2,KB00128        .                                       MT307930
*0010D8 213A               794          BNZ   HIGH              .                                       MT307940
0010DA  41F0 0DC2          795          BAL   R15,$PRINT        PRINT "MEMORY NOT AVAILABLE"            MT307950
0010DE  1486               796          DC    Z(MNAMSG)         START ADDRESS OF MESSAGE                MT307960
0010E0  2304               797          BS    BRN9A             SELECT NEW HIGH VALUE                   MT307970
0010E2  41F0 0DC2          798  NOTLOW  BAL   R15,$PRINT        PRINT "LOW VALUE>HIGH VALUE"            MT307980
0010E6  1464               799          DC    Z(ALMSG)          START ADDRESS OF MESSAGE                MT307990
0010E8  4300 10BA          800  BRN9A   B     HILO1             .                                       MT308000
0010EC  F480 000F FFFC     801  HIGH    NI    R8,Y'FFFFC'       .                                       MT308010
0010F2  5080 16AC          802          ST    R8,HIVAL          .                                       MT308020
0010F6  58A0 16A8          803          L     R10,LOVAL         .                                       MT308030
0010FA  F4A0 000F FFFC     804          NI    R10,Y'FFFFC'      .                                       MT308040
001100  50A0 16A8          805          ST    R10,LOVAL         .                                       MT308050
001104  4300 0C5E          806          B     PRTMSG            .                                       MT308060
                           807  *                                                                       MT308070
                           808  *                                                                       MT308080
001108  2480               809  TTYLOOP LIS   R8,0              ZERO REGISTER 8                         MT308090
00110A  4090 1760          810          STH   R9,R9SAVE         .                                       MT308100
00110E  4140 0EA8          811  RDTTY1  BAL   R4,KBREAD         READ CHARACTER FROM TTY                 MT308110
001112  41F0 0EC4          812          BAL   R15,GETCHR        .                                       MT308120
001116  C540 000D          813          CLHI  R4,X'0D'          .                                       MT308130
00111A  4330 113C          814          BE    EXIT3             .                                       MT308140
00111E  CB40 0030          815          SHI   R4,X'30'          .                                       MT308150
*001122 208A               816          BL    RDTTY1            .                                       MT308160
001124  C540 000A          817          CLHI  R4,X'0A'          .                                       MT308170
*001128 2186               818          BL    OKHEX             .                                       MT308180
00112A  2747               819          SIS   R4,7              .                                       MT308190
00112C  C540 0010          820          CLHI  R4,X'10'          .                                       MT308200
001130  4380 110E          821          BNL   RDTTY1            .                                       MT308210
001134  1184               822  OKHEX   SLLS  R8,4              .                                       MT308220
001136  0A84               823          AAR   R8,R4             .                                       MT308230
001138  4390 110E          824          B     RDTTY1            .                                       MT308240
00113C  41F0 0DC2          825  EXIT3   BAL   R15,$PRINT        .                                       MT308250
001140  13BC               826          DC    Z(CRLF)           .                                       MT308260
001142  4890 1760          827          LH    R9,R9SAVE         .                                       MT308270
001146  0309               828          BR    R9                .                                       MT308280
                           829  *                                                                       MT308290
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                                831  *                                                                          MT308310
001148   D3A0 15D2              832  FWRA     LB     WORK,LIMFLG                                                MT308320
00114C   98AA                   833           LR     WORK,WORK          IS LIMIT FLAG SET ?                     MT308330
00114E   4230 0054              834           BNZ    SWTST                                                      MT308340
001152   5820 1684              835           L      R2,BLKADR                                                  MT308350
*001156  2134                   836           BNZ    FW1                                                        MT308360
001158   C820 2000              837           LHI    R2,X'2000'                                                 MT308370
*00115C  230D                   838           B      FW0                                                        MT308380
00115E   2611                   839  FW1      AIS    R1,1                                                       MT308390
001160   C420 C000              840           NHI    R2,X'C000'                                                 MT308400
001164   CA20 4000              841           AHI    R2,X'4000'         INCREMENT MEMORY BLOCK ADRS             MT308410
001168   7410 1550              842           TBT    R1,KB00128         IS MEMORY BLOCK IN SYSTEM ?             MT308420
00116C   2237                   843           BZS    FW1                NO, CHECK NEXT BLOCK                    MT308430
00116E   C510 0080              844           CLHI   R1,KBEND-KB00128   YES, ALL AVAIL MEM CHECKED?             MT308440
001172   4380 0D54              845           BNL    SWTST                                                      MT308450
001176   5020 16B4              846  FW0      ST     R2,BLKADR                                                  MT308460
00117A   5520 16A8              847           CL     R2,LOVAL                                                   MT308470
*00117E  2388                   848           BNL    ADDBLK                                                     MT308480
001180   58A0 16A8              849  CHKLIM   L      WORK,LCVAL         LOAD LOW LIMIT                          MT308490
001184   C4A0 C000              850           NHI    WORK,X'C000'                                               MT308500
001188   05A2                   851           CLR    WORK,R2            IS LOW LIMIT LESS THAN BLOCK ADRS ?     MT308510
*00118A  2183                   852           BL     LOW1               YES, USE CURRENT BLOCK ADRS             MT308520
00118C   4230 115E              853           BNE    FW1                NO, CHECK NEXT BLOCK                    MT308530
001190   5820 16A8              854  LOW1     L      R2,LOVAL           LOAD CURRENT BLOCK ADRS                 MT308540
001194   08A2                   855  ADDBLK   LR     WORK,R2                                                    MT308550
001196   C6A0 3FFC              856           OHI    WORK,X'3FFC'       ADD BLOCK SIZE TO BLOCK ADRS            MT308560
00119A   55A0 16AC              857           CL     WORK,HIVAL         IS BLOCK END ADRS < HIGH LIMIT ?        MT308570
00119E   2186                   858           BLS    CONTIG                                                     MT308580
0011A0   24A1                   859           LIS    WORK,1             NO, SET LIMIT FLAG                      MT308590
0011A2   D2A0 15D2              860           STB    WORK,LIMFLG                                                MT308600
0011A6   58A0 16AC              861           L      WORK,HIVAL         LOAD HIGH LIMIT                         MT308610
0011AA   50A0 16B0              862  CONTIG   ST     WORK,VALUE                                                 MT308620
0011AE   4300 0CF2              863           B      LOAD                                                       MT308630
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                                365  * * * * * * * * * * * * * * * * * * * * * * * * * * * * *  MT308650
                                366  *                                                         *  MT308660
                                367  *                        E R R O R                        *  MT308670
                                368  *                                                         *  MT308680
                                369  * THIS ROUTINE PRINTS THE FOLLOWING MESSAGE:             *  MT308690
                                370  *                                                         *  MT308700
                                371  * W  XXXXX  YYYYYYYY  ZZZZZZZZ                           *  MT308710
                                372  *                                                         *  MT308720
                                373  * W = THE CONDITION CODE WHEN AN INTERRUPT OCCURS        *  MT308730
                                374  * XXXXX = THE ADDRESS OF THE LOCATION UNDER TEST         *  MT308740
                                375  * YYYYYYYY = THE CORRECT DATA EXPECTED                   *  MT308750
                                376  * ZZZZZZZZ = THE INCORRECT DATA READ                     *  MT308760
                                377  *                                                         *  MT308770
                                378  * R4 = MEMORY LOCATION UNDER TEST                        *  MT308780
                                379  * R7 = EXPECTED DATA                                     *  MT308790
                                380  * R8 = DATA READ                                         *  MT308800
                                381  * R15 = THE RETURN ADDRESS                               *  MT308810
                                382  *                                                         *  MT308820
                                383  * * * * * * * * * * * * * * * * * * * * * * * * * * * * *  MT308830
001182                          384          DB    *                                            MT308840
001182  D000 1714               385  ERROR   STM   R0,RSAVE+64       SAVE ALL REGISTERS       MT308850
001186  0855                    386          LR    R5,R5              IS RX FORMAT ERROR FLAG SET  MT308860
001188  2333                    387          BZS   LOADRS             NO, SKIP SETTING BIT IN ERRWORD  MT308870
00118A  7500 166A               388          SBT   R0,ERRWORD         YES, SET BIT IN ERRWORD  MT308880
00116E  E6C0 139C               389  LOADRS  LA    R12,XXXXX          LOAD START ADRS OF ERROR MSG  MT308890
0011C2  E6D4 011E               390          LA    R13,X'11E'(R4)     LOAD ADDRESS OF STRLOC   MT308900
0011C6  40C0 1218               391  ERROR1  STH   R12,RTN+4         STORE START ADRS OF ERROR MSG  MT308910
0011CA  D3B0 0A2A               392          LB    R11,CONRADR        LOAD TTY ADRS            MT308920
0011CE  24F1                    393          LIS   R15,1                                       MT308930
0011D0  D2F0 15D1               394          STB   R15,ERRFLG         SET ERROR FLAG           MT308940
0011D4  51F0 16C0               395          AM    R15,TOTALERR       INCREMENT ERROR COUNT    MT308950
0011D8  238A                    396          BNCS  CONT7              CONTINUE IF COUNT LESS THAN FFFFFFFF  MT308960
0011DA  9DBA                    397          SSR   R11,R10             SENSE TTY STATUS         MT308970
0011DC  2318                    398          BNMS  CONT7              CONTINUE IF TTY IS ON    MT308980
0011DE  2571                    399          LCS   R7,1                                        MT308990
0011E0  5070 16C0               400          ST    R7,TOTALERR                                 MT309000
0011E4  41E0 103E               401          BAL   R14,DISP           WRITE FFFFFFFF ON DISPLAY  MT309010
0011E8  C200 1EA0               402          LPSW  ERRHALT            AND HALT                 MT309020
0011EC  9DBA                    403  CONT7   SSR   R11,R10                                     MT309030
0011EE  4240 1222               404          BO    BRKWAIT                                     MT309040
0011F2  089D                    405          LR    R9,R13             LOAD R9 WITH ADRS THAT FAILED  MT309050
0011F4  41F0 105A               406          BAL   R15,CONVERT        CONVERT TO ASCII CHARACTERS  MT309060
0011F8  0010                    407          DC    X'10'              SHIFT INDEX              MT309070
0011FA  139C                    408          DC    Z(XXXXX)           STORE INDEX              MT309080
0011FC  5890 1730               409          L     R9,RSAVE+92        LOAD R9 WITH EXPECTED DATA  MT309090
001200  41F0 105A               410          BAL   R15,CONVERT        CONVERT TO ASCII CHARACTERS  MT309100
001204  001C                    411          DC    X'1C'              SHIFT INDEX              MT309110
001206  13A4                    412          DC    Z(YYYYYYYY)        STORE INDEX              MT309120
001208  5890 1734               413          L     R9,RSAVE+96        LOAD R9 WITH DATA READ   MT309130
00120C  41F0 105A               414          BAL   R15,CONVERT        CONVERT TO ASCII CHARACTERS  MT309140
001210  001C                    415          DC    X'1C'              SHIFT INDEX              MT309150
001212  13AE                    416          DC    Z(ZZZZZZZZ)        STORE INDEX              MT309160
001214  41F0 3DC2               417  RTN     BAL   R15,$PRINT         PRINT ERROR MESSAGE      MT309170
001218  0000                    418          DC    X'0'               START ADRS OF MESSAGE    MT309180
00121A  13B7                    419          DC    Z(ENDMSG)          END ADRS OF MESSAGE      MT309190
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001210  D100 1714          920          LM    R0,RSAVE+64       RESTORE ALL REGISTERS                  MT309200
001220  030F               921          BR    R15               RETURN TO TEST                         MT309210
001222  908A               922 BRKWAIT  SSR   R11,R10                                                  MT309220
001224  2041               923          BOS   BRKWAIT                                                 MT309230
001226  D100 1714          924          LM    R0,RSAVE+64                                              MT309240
00122A  4300 0054          925          B     SWTST                                                    MT309250
                           926 *                                                                       MT309260
                           927 *                                                                       MT309270
                           928 *                                                                       MT309280
00122E  07AA               929 RXPRINT  XR    R10,R10           ZERO REGISTER R10                      MT309290
001230  2484               930          LIS   R11,4             LOAD BXLE INCREMENT VALUE              MT309300
001232  C8C0 0054          931          LHI   R12,X'54'         LOAD BXLE LIMIT                        MT309310
001236  7300 166A          932          LHL   R13,ERRWORD       LOAD ERROR WORD EST DURING TEST        MT309320
00123A  45CA 14F8          933 COMPARE  CLH   R13,ERRTAB(R10)    COMPARE ERROR WORD TO TABLE            MT309330
00123E  2334               934          BES   MATCH             BRANCH IF MATCH IS FOUND               MT309340
001240  C1A0 123A          935          BXLE  R10,COMPARE       REPEAT UNTIL ENTIRE TABLR CHECKED      MT309350
001244  030E               936          BR    R14               RETURN IF NO MATCH                     MT309360
001246  73CA 14FA          937 MATCH    LHL   R12,ERRLIST(R10)  LOAD R12 WITH ERROR NUMBER            MT309370
00124A  40C0 1454          938          STH   R12,ERRNUM        STORE ERROR NUMBER IN MESSAGE          MT309380
00124E  41F0 0DC2          939          BAL   R15,$PRINT        PRINT ERROR MESSAGE                    MT309390
001252  1452               940          DC    Z(RXMSG)          START ADRS OF MESSAGE                  MT309400
001254  030E               941          BR    R14               RETURN                                 MT309410
                           942 *                                                                       MT309420
                           943 *                                                                       MT309430
                           944 *                                                                       MT309440
001256  D000 1714          945 MALFTN   STM   R0,RSAVE+64        SAVE ALL REGISTERS                     MT309450
00125A  9599               946          EPSR  R9,R9             CAPTURE CURRENT CONDITION CODE         MT309460
00125C  43F0 129E          947          BFC   X'F',MMALFTN                                              MT309470
001260  24C1               948          LIS   R12,1                                                    MT309480
001262  04C9               949          NR    R12,R9                                                   MT309490
001264  2335               950          BZS   CONT17                                                   MT309500
001266  5810 0024          951          L     R1,X'24'                                                 MT309510
00126A  C200 1690          952          LPSW  HALT                                                     MT309520
00126E  41F0 105A          953 CONT17   BAL   R15,CONVERT         CONVERT TO ASCII CHARACTERS            MT309530
001272  0000               954          DC    X'0'              SHIFT INDEX                            MT309540
001274  1399               955          DC    Z(W)              STORE INDEX                            MT309550
001276  5840 0024          956          L     R4,X'24'          LOAD ADRS WHERE MALFTN OCCURED         MT309560
00127A  E6C0 1399          957          LA    R12,W             LOAD START ADRS OF ERROR MESSAGE       MT309570
00127E  E6F0 128A          958          LA    R15,CONT16        ESTABLISH RETURN ADRS                  MT309580
001282  50F0 1750          959          ST    R15,RSAVE+124                                            MT309590
001286  4300 11C6          960          B     ERROR1            GO TO ERROR ROUTINE                    MT309600
00128A  4880 1768          961 CONT16   LH    R11,$WASDU        IS TTY DU ?                            MT309610
00128E  2336               962          BZS   CONT15            NO. LOAD NEW PSW                       MT309620
001290  F870 AAAA AAAA     963          LI    R7,Y'AAAAAAAA'                                           MT309630
001296  41E0 103E          964          BAL   R14,DISP           YES, WRITE X'AAAAAAAA' ON DISPLAY      MT309640
00129A  C200 1690          965 CONT15   LPSW  HALT              LOAD NEW PSW AND HALT                  MT309650
00129E  41F0 105A          966 MMALFTN  BAL   R15,CONVERT                                              MT309660
0012A2  0000               967          DC    X'0'                                                     MT309670
0012A4  1482               968          DC    Z(CCADRS)                                                MT309680
0012A6  0891               969          LR    R9,R1                                                    MT309690
0012A8  41F0 105A          970          BAL   R15,CONVERT                                              MT309700
0012AC  0010               971          DC    X'10'                                                    MT309710
0012AE  1486               972          DC    Z(MMADRS)                                                MT309720
0012B0  41F0 0DC2          973          BAL   R15,$PRINT                                               MT309730
0012B4  149C               974          DC    Z(MACHMAL)                                               MT309740
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0012B6  0100 1714          975          LM    R0,R3SAVE+64                                    MT309750
0012BA  4300 128A          976          B     CONT16                                          MT309760
                           977  *                                                            MT309770
                           978  *                                                            MT309780
                           979  *                                                            MT309790
0012BE  089F               980  ILGINT  LR    R9,R15          LOAD DATA TO BE CONVERTED       MT309800
0012C0  41F0 105A          981          BAL   R15,CONVERT     CONVERT TO ASCII CHARACTERS     MT309810
0012C4  001C               982          DC    X'1C'                                           MT309820
0012C6  141A               983          DC    Z(ADRS)                                         MT309830
0012C8  089E               984          LR    R9,R14          LOAD DATA TO BE CONVERTED       MT309840
0012CA  41F0 105A          985          BAL   R15,CONVERT     CONVERT TO ASCII CHARACTERS     MT309850
0012CE  001C               986          DC    X'1C'                                           MT309860
0012D0  1410               987          DC    Z(ADRS1)                                        MT309870
0012D2  41F0 0DC2          988          BAL   R15,$PRINT      PRINT ILLEGAL INSTRUCTION MESSAGE MT309880
0012D6  13FA               989          DC    Z(ILGMSG)                                       MT309890
0012D8  48B0 1768          990          LH    R11,$WASDU      IS TTY OFF ?                    MT309900
0012DC  2336               991          BZS   CONT14          NO, LOAD NEW PSW                MT309910
0012DE  F870 5555 5555     992          LI    R7,Y'55555555'  YES, WRITE TO DISPLAY PANEL      MT309920
0012E4  41E0 103E          993          BAL   R14,DISP                                        MT309930
0012E8  C200 1690          994  CONT14  LPSW  HALT            LOAD NEW PSW AND HALT           MT309940
                           995  *                                                            MT309950
                           996  *                                                            MT309960
0012EC  082E               997  MACINT  LR    R2,R14                                          MT309970
0012EE  083F               998          LR    R3,R15                                          MT309980
0012F0  41F0 0DC2          999          BAL   R15,$PRINT                                      MT309990
0012F4  1424              1000          DC    Z(MAC)                                          MT310000
0012F6  1802              1001          LPSWR R2                                              MT310010
                          1002  *                                                            MT310020
                          1003  *                                                            MT310030
0012F8  082E              1004  SVCERR  LR    R2,R14                                          MT310040
0012FA  083F              1005          LR    R3,R15                                          MT310050
0012FC  41F0 0DC2         1006          BAL   R15,$PRINT                                      MT310060
001300  142C              1007          DC    Z(SVC)                                          MT310070
001302  1802              1008          LPSWR R2                                              MT310080
                          1009  *                                                            MT310090
                          1010  *                                                            MT310100
001304  082E              1011  ARTFLT  LR    R2,R14                                          MT310110
001306  083F              1012          LR    R3,R15                                          MT310120
001308  41F0 0DC2         1013          BAL   R15,$PRINT                                      MT310130
00130C  1434              1014          DC    Z(ART)                                          MT310140
00130E  1802              1015          LPSWR R2                                              MT310150
                          1016  *                                                            MT310160
                          1017  *                                                            MT310170
001310  082E              1018  SYSQ    LR    R2,R14                                          MT310180
001312  083F              1019          LR    R3,R15                                          MT310190
001314  41F0 0DC2         1020          BAL   R15,$PRINT                                      MT310200
001318  143C              1021          DC    Z(SYS)                                          MT310210
00131A  1802              1022          LPSWR R2                                              MT310220
                          1023  *                                                            MT310230
                          1024  *                                                            MT310240
00131C  0892              1025  EXTINT  LR    R9,R2                                           MT310250
00131E  41F0 105A         1026          BAL   R15,CONVERT                                     MT310260
001322  0008              1027          DC    X'8'                                            MT310270
001324  144C              1028          DC    Z(DEVADRS)                                      MT310280
001326  41F0 0DC2         1029          BAL   R15,$PRINT                                      MT310290
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00132A  1444                1030          DC    Z(EXT)                                          MT310300
00132C  1800                1031          LPSWR R0                                              MT310310
                            1032  *                                                             MT310320

                            1034  *-------------------------------------------------            MT310340
                            1035  *                                                             MT310350
                            1036  * THIS SUBROUTINE PRINTS "TEST STILL RUNNING" MESSAGE ON      MT310360
                            1037  * THE CONSOLE DEVICE. THIS IS HELPFUL WHEN A TEST TAKES      MT310370
                            1038  * A LONG TIME TO COMPLETE.  RETURN ADDRESS IS R15.           MT310380
                            1039  *                                                             MT310390
        0000 132E           1040  TESTMSG EQU   *                                               MT310400
00132E  5000 1660           1041          ST    R0,R0SAVE          SAVE REGISTER R0           MT310410
001332  5800 1508           1042          L     R0,TESTIMER        LOAD START VALUE           MT310420
001336  2701                1043          SIS   R0,1               DECREMENT                  MT310430
001338  5000 1508           1044          ST    R0,TESTIMER        STORE NEW VALUE            MT310440
*00133C 213C                1045          BNZ   TMSG               RETURN IF NOT ZERO         MT310450
00133E  D000 15E0           1046          STM   R0,MOSSAVE         SAVE REGISTERS             MT310460
001342  41F0 00C2           1047          BAL   R15,$PRINT         PRINT TEST RUNNING MESSAGE MT310470
001346  14E2                1048          DC    Z(TESTMESG)                                     MT310480
001348  5800 15DC           1049          L     R0,TESTMER         RESTORE ORIGINAL VALUE     MT310490
00134C  5000 1508           1050          ST    R0,TESTIMER                                   MT310500
001350  D100 15E0           1051          LM    R0,MOSSAVE         RESTORE REGISTERS          MT310510
001354  5800 1660           1052  TMSG    L     R0,R0SAVE          RESTORE REGISTER R0        MT310520
001358  030F                1053          BR    R15                RETURN                     MT310530
                            1054  *                                                             MT310540
                            1055  * * * * * * * * * * * * * * * * * * * * * * * *             MT310550
                            1056  *                                               *             MT310560
                            1057  *             M E S S A G E S                   *             MT310570
                            1058  *                                               *             MT310580
                            1059  * * * * * * * * * * * * * * * * * * * * * * * *             MT310590

00135A  5333 324D 5433 2030 1061  TITLE   DC    C'S32MT3 06-156F03R04',X'0D0A'                  MT310610
001362  362D 3135 3646 3033
00136A  5230 3420
00136E  0D0A
                            1062  *                                                             MT310620
                            1063  *                                                             MT310630
001370  2A20                1064  ASTERISK DC   C'* ',X'0D0A'                                   MT310640
001372  0D0A
                            1065  *                                                             MT310650
                            1066  *                                                             MT310660
001374  4156 4149 4C41 424C 1067  MEMSG   DC    C'AVAILABLE MEMORY',X'0D0A'                     MT310670
00137C  4520 4D45 4D4F 5259
001384  0DCA
001386  0000 0000           1068  MEMSG1  DC    0                                               MT310680
00138A  0000                1069          DC    X'0'                                            MT310690
00138C  20                  1070          DB    X'20'                                           MT310700
00138E  2D20                1071          DC    X'2D20'                                         MT310710
001390  0000 0000           1072  ENDVAL  DC    0                                               MT310720
001394  0000                1073          DC    X'0'                                            MT310730
001396  0D0A                1074          DC    X'0D0A'                                         MT310740
001398                      1075          DB    *                                               MT310750
                            1076  *                                                             MT310760
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                                1077  * ERROR MESSAGE W  XXXXX  YYYYYYYY  ZZZZZZZZ                    MT310770
                                1078  *                                                              MT310780
001398  00                    1079        DB    0                                                   MT310790
001399  00                    1080  W     DB    0                                                   MT310800
00139A  2020                  1081        DC    X'2020'                                             MT310810
00139C  0000 0000             1082  XXXXX DC    Y'0'                                                MT310820
0013A0  0000                  1083        DC    X'0'                                                MT310830
0013A2  2020                  1084        DC    X'2020'                                             MT310840
0013A4  0000 0000             1085  YYYYYYYY DC Y'0'                                                MT310850
0013A8  0000 0000             1086        DC    Y'0'                                                MT310860
0013AC  2020                  1087        DC    X'2020'                                             MT310870
0013AE  0000 0000             1088  ZZZZZZZZ DC Y'0'                                                MT310880
0013B2  0000                  1089        DC    X'0'                                                MT310890
0013B4  0000                  1090  SUBNUM  DC    X'0'                                              MT310900
0013B6  0D0A                  1091        DC    X'0D0A'                                             MT310910
        0000 13B7             1092  ENDMSG  EQU   *-1                                               MT310920
                              1093  *                                                               MT310930
                              1094  *                                                               MT310940
0013B8  3F0D                  1095  QUEST   DC    X'3F0D'           CR,LF,?,CR,LF                 MT310950
0013BA  0A                    1096        DB    X'0A'                                               MT310960
                              1097  *                                                               MT310970
                              1098  *                                                               MT310980
0013BC  0D0A                  1099  CRLF    DC    X'0D0A'                                           MT310990
                              1100  *                                                               MT311000
                              1101  *                                                               MT311010
0013BE                        1102        DB    *                                                   MT311020
0013BE  0000 0000             1103  TOTALMSG DC 0                                                   MT311030
0013C2  0000 0000             1104        DC    0                                                   MT311040
0013C6  2054 4F54 414C 2020   1105        DC    C' TOTAL '                                          MT311050
        0000 13CD             1106  TOTALEND EQU  *-1                                               MT311060
0013CE  4552 524F 5253        1107        DC    C'ERRORS',X'0D0A'                                   MT311070
0013D4  0D0A
                              1108  *                                                               MT311080
                              1109  *                                                               MT311090
0013D6  FFFF FFFF FFFF FFFF   1110  BRKMSG  DB    -1,-1,-1,-1,-1,-1,-1,-1                         MT311100
0013DE  4252 4541 4B20 5445   1111        DB    C'BREAK TERMINATION',X'0D'                          MT311110
0013E6  524D 494E 4154 494F
0013EE  4E0D
        0000 13EF             1112  $BRKEND EQU   *-1                                               MT311120
                              1113  *                                                               MT311130
                              1114  *                                                               MT311140
0013F0  4E4F 2045 5252 4F52   1115  NOERR   DC    C'NO ERROR',X'0D0A'                              MT311150
0013F8  0D0A
                              1116  *                                                               MT311160
                              1117  *                                                               MT311170
0013FA  494C 4C45 4741 4C20   1118  ILGMSG  DC    C'ILLEGAL INSTRUCTION'                          MT311180
001402  494E 5354 5255 4354
00140A  494F 4E20
00140E  2020                  1119        DC    X'2020'                                             MT311190
001410  0000 0000             1120  ADRS1   DC    0                                                 MT311200
001414  0000 0000             1121        DC    0                                                   MT311210
001418  2000                  1122        DC    X'2000'                                             MT311220
00141A  0000 0000             1123  ADRS    DC    0                                                 MT311230
00141E  0000 0000             1124        DC    0                                                   MT311240
001422  0D0A                  1125        DC    X'0D0A'                                             MT311250
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001424                          1126            DB    *                                                   MT311260
                                1127  *                                                                   MT311270
                                1128  *                                                                   MT311280
001424  4041 4349 4E54          1129  MAC       DC    C'MACINT'                                           MT311290
00142A  0D0A                    1130            DC    X'0D0A'                                             MT311300
                                1131  *                                                                   MT311310
                                1132  *                                                                   MT311320
00142C  5356 4349 4E54          1133  SVC       DC    C'SVCINT'                                           MT311330
001432  0D0A                    1134            DC    X'0D0A'                                             MT311340
                                1135  *                                                                   MT311350
                                1136  *                                                                   MT311360
001434  4152 5446 4C54          1137  ART       DC    C'ARTFLT'                                           MT311370
00143A  0D0A                    1138            DC    X'0D0A'                                             MT311380
                                1139  *                                                                   MT311390
                                1140  *                                                                   MT311400
00143C  5359 5351 5545          1141  SYS       DC    C'SYSQUE'                                           MT311410
001442  0D0A                    1142            DC    X'0D0A'                                             MT311420
                                1143  *                                                                   MT311430
                                1144  *                                                                   MT311440
001444  4558 5449 4E54 2020     1145  EXT       DC    C'EXTINT  '                                         MT311450
00144C  0000 0000               1146  DEVADRS   DC    0                                                   MT311460
001450  0D0A                    1147            DC    X'0D0A'                                             MT311470
                                1148  *                                                                   MT311480
                                1149  *                                                                   MT311490
001452                          1150            DB    *                                                   MT311500
001452  5258                    1151  RXMSG     DC    C'RX'                                               MT311510
001454  0000                    1152  ERRNUM    DC    X'0'                                                MT311520
001456  0D0A                    1153            DC    X'0D0A'                                             MT311530
                                1154  *                                                                   MT311540
                                1155  *                                                                   MT311550
001458  4C4F 3D20               1156  LOMSG     DC    C'LO= '                                             MT311560
00145C  0D0A                    1157            DC    X'0D0A'                                             MT311570
00145E  4849 3D20               1158  HIMSG     DC    C'HI= '                                             MT311580
001462  0D0A                    1159            DC    X'0D0A'                                             MT311590
001464  4C4F 5720 5641 4C55     1160  NLMSG     DC    C'LOW VALUE + X',Y'27313234',X'2720',C'> HIGH VALUE'  MT311600
00146C  4520 2B20 5820
001472  2731 3234
001476  2720
001478  3E20 4849 4748 2056
001480  414C 5545
001484  0D0A                    1161            DC    X'0D0A'                                             MT311610
001486  4D45 4D4F 5259 204E     1162  MNAMSG    DC    C'MEMORY NOT AVAILABLE'                             MT311620
00148E  4F54 2041 5641 494C
001496  4142 4C45
00149A  0D0A                    1163            DC    X'0D0A'                                             MT311630
00149C  4D41 4348 494E 4520     1164  MACHMAL   DC    C'MACHINE MALFUNCTION',X'2020'                      MT311640
0014A4  4D41 4C46 554E 4354
0014AC  494F 4E20
0014B0  2020
0014B2  00                      1165  CCADRS    DB    0                                                   MT311650
0014B4  2020                    1166            DC    X'2020'                                             MT311660
0014B6  0000 0000               1167  MMADRS    DC    0                                                   MT311670
0014BA  00                      1168            DB    0                                                   MT311680
0014BC  0D0A                    1169            DC    X'0D0A'                                             MT311690
                                1170  *                                                                   MT311700
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0014BE  FFFF FFFF          1171  NULLMSG  DC    -1,-1,-1,-1,X'0D0A'                                    MT311710
0014C2  FFFF FFFF
0014C6  FFFF FFFF
0014CA  FFFF FFFF
0014CE  0D0A
                           1172  *                                                                    MT311720
0014D0  544F 5441 4C20 2020 1173  TOTMSG   DC    C'TOTAL     TOTERR',X'0D'                            MT311730
0014D8  2020 544F 5445 5252
0014E0  0D
                           1174  *                                                                    MT311740
                           1175  *                                                                    MT311750
0014E2  5445 5354 2053 5449 1176  TESTMESG DC    C'TEST STILL RUNNING',X'0D0A'                        MT311760
0014EA  4C4C 2052 554E 4E49
0014F2  4E47
0014F4  0D0A
                           1177  *                                                                    MT311770
                           1178  *                                                                    MT311780
0014F8                     1179          ALIGN 4                                                      MT311790
0014F8  F000 3031          1180  ERRTAB   DC    Y'F0003031'        RX1                               MT311800
0014FC  CF80 3032          1181           DC    Y'CF803032'        RX2                               MT311810
001500  8E00 3033          1182           DC    Y'8E003033'        RX2 POS D2                        MT311820
001504  4380 3034          1183           DC    Y'43803034'        RX2 NEG D2                        MT311830
001508  3DC0 3035          1184           DC    Y'3DC03035'        RX3                               MT311840
00150C  FF80 3036          1185           DC    Y'FF803036'        RX1 & RX2                         MT311850
001510  FE00 3037          1186           DC    Y'FE003037'        RX1 & RX2 POS D2                  MT311860
001514  F380 3038          1187           DC    Y'F3803038'        RX1 & RX2 NEG D2                  MT311870
001518  FDC0 3039          1188           DC    Y'FDC03039'        RX1 & RX3                         MT311880
00151C  BFC0 3130          1189           DC    Y'BFC03130'        RX3 & RX2 POS D2                  MT311890
001520  7FC0 3131          1190           DC    Y'7FC03131'        RX3 & RX2 NEG D2                  MT311900
001524  14C0 3132          1191           DC    Y'14C03132'        DOUBLE INDEXED                    MT311910
001528  F4C0 3133          1192           DC    Y'F4C03133'        DOUBLE INDEXED & RX1              MT311920
00152C  DFC0 3134          1193           DC    Y'DFC03134'        DOUBLE INDEXED & RX2              MT311930
001530  9EC0 3135          1194           DC    Y'9EC03135'        DOUBLE INDEXED & RX2 POS D2       MT311940
001534  57C0 3136          1195           DC    Y'57C03136'        DOUBLE INDEXED & RX2 NEG D2       MT311950
001538  FBC0 3137          1196           DC    Y'FBC03137'        SINGLE INDEXED                    MT311960
00153C  F940 3138          1197           DC    Y'F9403138'        RX3 SINGLE INDEXED & RX1          MT311970
001540  EFC0 3139          1198           DC    Y'EFC03139'        RX3 SINGLE INDEXED & RX2          MT311980
001544  AF40 3230          1199           DC    Y'AF403230'        RX3 SINGLE INDEXED & RX2 POS D2   MT311990
001548  68C0 3231          1200           DC    Y'68C03231'        RX3 SINGLE INDEXED & RX2 NEG D2   MT312000
00154C  2940 3232          1201           DC    Y'29403232'        RX3 SINGLE INDEXED                MT312010
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                                1203  * * * * * * * * * * * * * * * * * * * * * * * * *                 MT312030
                                1204  *                                                 *                 MT312040
                                1205  *              M E M O R Y   T A B L E            *                 MT312050
                                1206  *                                                 *                 MT312060
                                1207  * * * * * * * * * * * * * * * * * * * * * * * * *                 MT312070

001550                          1209          ALIGN 4                                                     MT312090
001550  80                      1210  KB00128 DB    X'80'          16-32-48-64-80-96-112-128-      ****   MT312100
001551  00                      1211  KB00256 DB    0              144-160-176-192-208-224-240-256 ****   MT312110
001552  00                      1212  KB00384 DB    0              272-288-304-320-336-352-368-384 ****   MT312120
001553  00                      1213  KB00512 DB    0              400-416-432-448-464-480-496-512 ****   MT312130
001554  00                      1214  KB00640 DB    0              528-544-560-576-592-608-624-640 ****   MT312140
001555  00                      1215  KB00768 DB    0              656-672-688-704-720-736-752-768 ****   MT312150
001556  00                      1216  KB00896 DB    0              784-800-816-832-848-864-880-896 ****   MT312160
001557  00                      1217  KB01024 DB    0              912-928-944-960-976-992-1008-1024***   MT312170
001558  00                      1218  KB01152 DB    0              1040-1056-1072-1088-1104-1120-1136-1152MT312180
001559  00                      1219  KB01280 DB    0              1168-1184-1200-1216-1232-1248-1264-1280MT312190
00155A  00                      1220  KB01408 DB    0              1296-1312-1328-1344-1360-1376-1392-1408MT312200
00155B  00                      1221  KB01536 DB    0              1424-1440-1456-1472-1488-1504-1520-1536MT312210
00155C  00                      1222  KB01664 DB    0              1552-1568-1584-1600-1616-1632-1648-1664MT312220
00155D  00                      1223  KB01792 DB    0              1680-1696-1712-1728-1744-1760-1776-1792MT312230
00155E  00                      1224  KB01920 DB    0              1808-1824-1840-1856-1872-1888-1904-1920MT312240
00155F  00                      1225  KB02048 DB    0              1936-1952-1968-1984-2000-2016-2032-2048MT312250
001560  0000 0000               1226  KB02560 DC    Y'0'           2.5 MB                          ****   MT312260
001564  0000 0000               1227  KB03072 DC    Y'0'           3.0 MB                          ****   MT312270
001568  0000 0000               1228  KB03584 DC    Y'0'           3.5 MB                          ****   MT312280
00156C  0000 0000               1229  KB04096 DC    Y'0'           4.0 MB                          ****   MT312290
001570  0000 0000               1230  KB04608 DC    Y'0'           4.5 MB                          ****   MT312300
001574  0000 0000               1231  KB05120 DC    Y'0'           5.0 MB                          ****   MT312310
001578  0000 0000               1232  KB05632 DC    Y'0'           5.5 MB                          ****   MT312320
00157C  0000 0000               1233  KB06144 DC    Y'0'           6.0 MB                          ****   MT312330
001580  0000 0000               1234  KB06656 DC    Y'0'           6.5 MB                          ****   MT312340
001584  0000 0000               1235  KB07168 DC    Y'0'           7.0 MB                          ****   MT312350
001588  0000 0000               1236  KB07680 DC    Y'0'           7.5 MB                          ****   MT312360
00158C  0000 0000               1237  KB08192 DC    Y'0'           8.0 MB                          ****   MT312370
001590  0000 0000               1238  KB08704 DC    Y'0'           8.5 MB                          ****   MT312380
001594  0000 0000               1239  KB09216 DC    Y'0'           9.0 MB                          ****   MT312390
001598  0000 0000               1240  KB09728 DC    Y'0'           9.5 MB                          ****   MT312400
00159C  0000 0000               1241  KB10240 DC    Y'0'           10.0 MB                         ****   MT312410
0015A0  0000 0000               1242  KB10752 DC    Y'0'           10.5 MB                         ****   MT312420
0015A4  0000 0000               1243  KB11264 DC    Y'0'           11.0 MB                         ****   MT312430
0015A8  0000 0000               1244  KB11776 DC    Y'0'           11.5 MB                         ****   MT312440
0015AC  0000 0000               1245  KB12288 DC    Y'0'           12.0 MB                         ****   MT312450
0015B0  0000 0000               1246  KB12800 DC    Y'0'           12.5 MB                         ****   MT312460
0015B4  0000 0000               1247  KB13312 DC    Y'0'           13.0 MB                         ****   MT312470
0015B8  0000 0000               1248  KB13824 DC    Y'0'           13.5 MB                         ****   MT312480
0015BC  0000 0000               1249  KB14336 DC    Y'0'           14.0 MB                         ****   MT312490
0015C0  0000 0000               1250  KB14848 DC    Y'0'           14.5 MB                         ****   MT312500
0015C4  0000 0000               1251  KB15360 DC    Y'0'           15.0 MB                         ****   MT312510
0015C8  0000 0000               1252  KB15872 DC    Y'0'           15.5 MB                         ****   MT312520
0015CC  0000 0000               1253  KB16384 DC    Y'0'           16.0 MB                         ****   MT312530
                                1254  *                                                             ****   MT312540
0015D0  FF                      1255  KBEND   DB    X'FF'                                                 MT312550
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                                1257  * * * * * * * * * * * * * * * * * * * * * * * * * * * * *          MT312570
                                1258  *                                                           *          MT312580
                                1259  *                  D A T A   C O N S T A N T S              *          MT312590
                                1260  *                                                           *          MT312600
                                1261  * * * * * * * * * * * * * * * * * * * * * * * * * * * * *          MT312610
0015D1  00                      1262  ERRFLG   DB    0                                                     MT312620
0015D2  00                      1263  LIMFLG   DB    0                                                     MT312630
0015D3  00                      1264  CONTFLG  DB    0                                                     MT312640
0015D4  00                      1265  CONR02S  DB    0                                                     MT312650
0015D8  0000 0000               1266  TESTIMER DCY   0                                                     MT312660
0015DC  0000 0000               1267  TESTMER  DCY   0                                                     MT312670
0015E0                          1268           ALIGN 4                                                     MT312680
0015E0                          1269  MOSSAVE  DS    128                                                   MT312690
001660                          1270  R0SAVE   DS    4                                                     MT312700
001664                          1271  R1SAVE   DS    4                                                     MT312710
001668                          1272           ALIGN 4                                                     MT312720
001668  0000                    1273  SAVE     DC    X'0'                                                  MT312730
00166A  0000                    1274  ERRWORD  DC    X'0'                                                  MT312740
00166C  0000                    1275  FLAG     DC    X'0'                                                  MT312750
00166E  0000                    1276  WRAPFLG  DC    X'0'                                                  MT312760
001670  0000 0000               1277  WORDCHG  DC    Y'0'                                                  MT312770
001678                          1278           ALIGN 8                                                     MT312780
001678  0000 00F0               1279  SET1     DC    Y'00F0',EXECUTE                                       MT312790
00167C  0000 0AD4
001680  0000 20F0               1280  CLEAR    DC    Y'20F0',CLEAR1                                        MT312800
001684  0000 0C42
001688  0000 20F0               1281  ENABLE   DC    Y'20F0',PRTMSG                                        MT312810
00168C  0000 0C5E
001690  0000 A0F0               1282  HALT     DC    Y'A0F0',PRTMSG                                        MT312820
001694  0000 0C5E
001698  0000 A0F0               1283  HALT1    DC    Y'A0F0',ZROFLG                                        MT312830
00169C  0000 0D98
0016A0  0000 A0F0               1284  ERRHALT  DC    Y'A0F0',$KEEP7                                        MT312840
0016A4  0000 0FDE
                                1285  *                                                                   MT312850
                                1286  *                                                                   MT312860
0016A8                          1287           ALIGN 4                                                     MT312870
0016A8  0000 0000               1288  LOVAL    DC    0                                                     MT312880
0016AC  0000 0000               1289  HIVAL    DC    0                                                     MT312890
0016B0  0000 0000               1290  VALUE    DC    0                                                     MT312900
0016B4  0000 0000               1291  BLKADR   DC    0                                                     MT312910
0016B8  0000 0000               1292  LAST     DC    0                                                     MT312920
0016BC  0000 0000               1293  TOTAL    DC    0                                                     MT312930
0016C0  0000 0000               1294  TOTALERR DC    0                                                     MT312940
0016C4                          1295  PSWSAVE  DS    16                                                    MT312950
0016D4                          1296  RSAVE    DS    128                                                   MT312960
001754                          1297  TABLE    DS    12                                                    MT312970
001760                          1298  R9SAVE   DS    4                                                     MT312980
                                1299  *                                                                   MT312990
                                1300  *                                                                   MT313000
001764                          1301           ALIGN 4                                                     MT313010
001764  0000                    1302  BRKVECT  DC    Z(0)                                                  MT313020
001766  0000                    1303  $LINEPOS DCX   0                                                     MT313030
001768  0000                    1304  $WASDU   DCX   0                                                     MT313040
00176A  0000                    1305  $PRTFLG  DCX   0                                                     MT313050
```

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00176C  0000                1306  $BRKFLG  DCX   0                          MT313060
00176E  0000                1307  ISITERR  DCX   0                          MT313070
001770  0000                1308  $PAUSE   DCX   0                          MT313080
001774                      1309           ALIGN 4                          MT313090
001774  0000 0000           1310  SET.RTN  DCY   0                          MT313100
001778  0000 0000           1311  OUT.SAV  DCY   0                          MT313110
00177C                      1312  $OUTBUF  DS    $BUFLEN                    MT313120
                            1313  *                                        MT313130
0017CC  0000                1314  $LSTPAS  DCX   0                          MT313140
0017CE  0000                1315  IOSAVE   DCX   0                          MT313150
0017D0  0000                1316  $CONPAS  DCX   0                          MT313160
0017D4  0000 0000           1317  $TBRKSV  DCY   0,0                        MT313170
0017D8  0000 0000
        0000 17DC           1318  FINI     EQU   *                          MT313180
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SUBROUTINE

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                                1320  *                                                                    MT313200
                                1321  *                                REL LOADER BIASES SUB AT            MT313210
                                1322  *                                LOC + X'A00'.                       MT313220
0017DC                          1323          ORG   RELZERO+FINI-X'A00' OGR PRGM ON NEXT HALFWORD           MT313230
                                1324  *                                                                    MT313240
000DDCI  0000 0000              1325          DC    0                   LOAD AT FINI                       MT313250
000DE0I  E674 011C              1326  SUBRTN  LA    R7,284(R4)          RX1 FORMAT                         MT313260
000DE4I  E680 8114 =000EFCI     1327          LA    R8,STRLOC           RX2 FORMAT - POSITIVE D2 FIELD     MT313270
000DE8I  01E3                   1328          BALR  R14,R3              CHECK TO SEE IF ADDRESSES ARE EQUAL MT313280
000DEAI  2306                   1329          BS    LA2                 IF NOT EQUAL SKIP MEMORY TEST      MT313290
000DECI  5074 011C              1330          ST    R7,284(R4)          RX1 FORMAT                         MT313300
000DF0I  5880 8108 =000EFCI     1331          L     R8,STRLOC           RX2 FORMAT - POSITIVE D2 FIELD     MT313310
000DF4I  01EB                   1332          BALR  R14,R11             CHECK DATA READ = DATA STORED      MT313320
000DF6I  E674 011C              1333  LA2     LA    R7,284(R4)          RX1 FORMAT                         MT313330
000DFAI  E689 FFDE =000DDCI     1334          LA    R8,SUBRTN-4(R9)     RX2 FORMAT - NEGATIVE D2 FIELD     MT313340
000DFEI  01E3                   1335          BALR  R14,R3              CHECK TO SEE IF ADDRESS  ARE EQUAL MT313350
000E00I  2306                   1336          BS    LA3                 IF NOT EQUAL SKIP MEMORY TEST      MT313360
000E02I  5074 011C              1337          ST    R7,284(R4)          RX1 FORMAT                         MT313370
000E06I  5889 FFD2 =000DDCI     1338          L     R8,SUBRTN-4(R9)     RX2 FORMAT - NEGATIVE D2 FIELD     MT313380
000E0AI  01EB                   1339          BALR  R14,R11             CHECK DATA READ = DATA STORED      MT313390
000E0CI  E674 011C              1340  LA3     LA    R7,284(R4)          RX1 FORMAT                         MT313400
000E10I  E68C 40FF FFFC         1341          LA    R8,-4(R12)          RX3 FORMAT                         MT313410
000E16I  01E3                   1342          BALR  R14,R3              CHECK TO SEE IF ADDRESSES ARE EQUAL MT313420
000E18I  2307                   1343          BS    LA4                 IF NOT EQUAL SKIP MEMORY TEST      MT313430
000E1AI  5074 011C              1344          ST    R7,284(R4)          RX1 FORMAT                         MT313440
000E1EI  588C 40FF FFFC         1345          L     R8,-4(R12)          RX3 FORMAT                         MT313450
000E24I  01EB                   1346          BALR  R14,R11             CHECK DATA READ = DATA STORED      MT313460
000E26I  E674 011C              1347  LA4     LA    R7,284(R4)          RX1 FORMAT                         MT313470
000E2AI  E684 4D00 011A         1348          LA    R8,282(R4,R13)      RX3 FORMAT - DOUBLE INDEXED        MT313480
000E30I  01E3                   1349          BALR  R14,R3              CHECK TO SEE IF ADDRESSES ARE EQUAL MT313490
000E32I  2307                   1350          BS    LA5                 IF NOT EQUAL SKIP MEMORY TEST      MT313500
000E34I  5074 011C              1351          ST    R7,284(R4)          RX1 FORMAT                         MT313510
000E38I  5884 4D00 011A         1352          L     R8,282(R4,R13)      RX3 FORMAT - DOUBLE INDEXED        MT313520
000E3EI  01EB                   1353          BALR  R14,R11             CHECK DATA READ = DATA STORED      MT313530
000E40I  E670 80B8 =000EFCI     1354  LA5     LA    R7,STRLOC           RX2 FORMAT - POSITIVE D2 FIELD     MT313540
000E44I  E68C 40FF FFFC         1355          LA    R8,-4(R12)          RX3 FORMAT                         MT313550
000E4AI  01E3                   1356          BALR  R14,R3              CHECK TO SEE IF ADDRESSES ARE EQUAL MT313560
000E4CI  2307                   1357          BS    LA6                 IF NOT EQUAL SKIP MEMORY TEST      MT313570
000E4EI  5070 80AA =000EFCI     1358          ST    R7,STRLOC           RX2 FORMAT - POSITIVE D2 FIELD     MT313580
000E52I  588C 40FF FFFC         1359          L     R8,-4(R12)          RX3 FORMAT                         MT313590
000E58I  01EB                   1360          BALR  R14,R11             CHECK DATA READ = DATA STORED      MT313600
000E5AI  E670 809E =000EFCI     1361  LA6     LA    R7,STRLOC           RX2 FORMAT - POSITIVE D2 FIELD     MT313610
000E5EI  E684 4D00 011A         1362          LA    R8,282(R4,R13)      RX3 FORMAT - DOUBLE INDEXED        MT313620
000E64I  01E3                   1363          BALR  R14,R3              CHECK TO SEE IF ADDRESSES ARE EQUAL MT313630
000E66I  2307                   1364          BS    LA7                 IF NOT EQUAL SKIP MEMORY TEST      MT313640
000E68I  5070 8090 =000EFCI     1365          ST    R7,STRLOC           RX2 FORMAT - POSITIVE D2 FIELD     MT313650
000E6CI  5884 4D00 011A         1366          L     R8,282(R4,R13)      RX3 FORMAT - DOUBLE INDEXED        MT313660
000E72I  01EB                   1367          BALR  R14,R11             CHECK DATA READ = DATA STORED      MT313670
000E74I  E670 8084 =000EFCI     1368  LA7     LA    R7,STRLOC           RX2 FORMAT - POSITIVE D2 FIELD     MT313680
000E78I  E689 FF60 =000DDCI     1369          LA    R8,SUBRTN-4(R9)     RX2 FORMAT - NEGATIVE D2 FIELD     MT313690
000E7CI  01E3                   1370          BALR  R14,R3              CHECK TO SEE IF ADDRESSES ARE EQUAL MT313700
000E7EI  2306                   1371          BS    LA8                 IF NOT EQUAL SKIP MEMORY TEST      MT313710
000E80I  5070 8078 =000EFCI     1372          ST    R7,STRLOC           RX2 FORMAT - POSITIVE D2 FIELD     MT313720
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SUBROUTINE

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000E84I  5889 FF54 =000DDCI   1373           L      R8,SUBRTN-4(R9)     RX2 FORMAT - NEGATIVE D2 FIELD          MT313730
000E88I  01E8                 1374           BALR   R14,R11             CHECK DATA READ = DATA STORED           MT313740
000E8AI  E679 FF4E =000DDCI   1375  LA8      LA     R7,SUBRTN-4(R9)     RX2 FORMAT - NEGATIVE D2 FIELD          MT313750
000E8EI  E68C 40FF FFFC       1376           LA     R8,-4(R12)          RX3 FORMAT                              MT313760
000E94I  01E3                 1377           BALR   R14,R3              CHECK TO SEE IF ADDRESSES ARE EQUAL     MT313770
000E96I  2307                 1378           BS     LA9                 IF NOT EQUAL SKIP MEMORY TEST           MT313780
000E98I  5079 FF40 =000DDCI   1379           ST     R7,SUBRTN-4(R9)     RX2 FORMAT - NEGATIVE D2 FIELD          MT313790
000E9CI  588C 40FF FFFC       1380           L      R8,-4(R12)          RX3 FORMAT                              MT313800
000EA2I  01E8                 1381           BALR   R14,R11             CHECK DATA READ = DATA STORED           MT313810
000EA4I  E679 FF34 =000DDCI   1382  LA9      LA     R7,SUBRTN-4(R9)     RX2 FORMAT - NEGATIVE D2 FIELD          MT313820
000EA8I  E684 4D00 011A       1383           LA     R8,282(R4,R13)      RX3 FORMAT - DOUBLE INDEXED             MT313830
000EAEI  01E3                 1384           BALR   R14,R3              CHECK TO SEE IF ADDRESSES ARE EUQAL     MT313840
000EB0I  2307                 1385           BS     LA10                IF NOT EQUAL SKIP MEMORY TEST           MT313850
000EB2I  5079 FF26 =000DDCI   1386           ST     R7,SUBRTN-4(R9)     RX2 FORMAT - NEGATIVE D2 FIELD          MT313860
000EB6I  5884 4D00 011A       1387           L      R8,282(R4,R13)      RX3 FORMAT - DOUBLE INDEXED             MT313870
000EBCI  01E8                 1388           BALR   R14,R11             CHECK DATA READ = DATA STORED           MT313880
000EBEI  E67C 40FF FFFC       1389  LA10     LA     R7,-4(R12)          RX3 FORMAT                              MT313890
000EC4I  E684 4D00 011A       1390           LA     R8,282(R4,R13)      RX3 FORMAT - DOUBLE INDEXED             MT313900
000ECAI  01E3                 1391           BALR   R14,R3              CHECK TO SEE IF ADDRESSES ARE EQUAL     MT313910
000ECCI  030A                 1392           BR     R10                 IF NOT EQUAL RETURN TO MAIN PROGRAM     MT313920
000ECEI  507C 40FF FFFC       1393           ST     R7,-4(R12)          RX3 FORMAT                              MT313930
000ED4I  5884 4D00 011A       1394           L      R8,282(R4,R13)      RX3 FORMAT - DOUBLE INDEXED             MT313940
000EDAI  01E8                 1395           BALR   R14,R11             CHECK DATA READ = DATA STORED           MT313950
000EDCI  030A                 1396           BR     R10                 RETURN TO MAIN PROGRAM                  MT313960
000EDEI  0578                 1397  RXERR    CLR    R7,R8               ARE ADDRESSES EQUAL ?                   MT313970
000EE0I  2334                 1398           BES    ADD2                YES, INCREMENT RETURN ADRS              MT313980
000EE2I  2451                 1399           LIS    R5,1                NO, SET RX FORMAT ERROR FLAG            MT313990
000EE4I  01F6                 1400           BALR   R15,R6              PRINT ERROR MESSAGE                     MT314000
000EE6I  2302                 1401           BS     ADDINDEX            SKIP INCREMENTING RETURN ADRS           MT314010
000EE8I  26E2                 1402  ADD2     AIS    R14,2               INCREMENT RETURN ADRS                   MT314020
000EEAI  2601                 1403  ADDINDEX AIS    R0,1                INCREMENT ERRWORD INDEX                 MT314030
000EECI  2305                 1404           BS     CHNDATA             CHANGE DATA                             MT314040
000EEEI  0578                 1405  ERRCHK   CLR    R7,R8               IS DATA READ = DATA STORED ?            MT314050
000EF0I  2333                 1406           BES    CHNDATA             YES, CHANGE DATA                        MT314060
000EF2I  0755                 1407           XR     R5,R5               NO, RESET RX FORMAT ERROR FLAG          MT314070
000EF4I  01F6                 1408           BALR   R15,R6              PRINT ERROR MESSAGE                     MT314080
000EF6I  267F                 1409  CHNDATA  AIS    R7,15               CHANGE DATA PATTERN TO BE STORED        MT314090
000EF8I  3477                 1410           EXHR   R7,R7                                                       MT314100
000EFAI  030E                 1411           BR     R14                 RETURN TO CHECK NEXT FORMAT             MT314110
000EFCI                       1412           ALIGN  4                                                           MT314120
000EFCI  0000 0000            1413  STRLOC   DC     0                                                          MT314130
                              1414  *                                                                          MT314140
         0000 18FF            1415  QRT      EQU    *-SUBRTN+4+FINI-1                                          MT314150
                              1416  *                                                                          MT314160
```

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000F001I                    1418          END                                    MT314180
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ASSEMBLED BY CAL 03-066R08-00 (32-BIT)

START OPTIONS: T=32,ERLST

NO CAL ERRORS
NO CAL WARNINGS
5 PASSES

TABLE SPACE USED : 10K

$BRKEND	0000 13EF	497	1112*											
$BRKFLG	0000 176C	493	494	583	607	1306*								
$BUFLEN	0000 0050	154*	1312											
$CONPAS	0000 17D0	193	550	634	1316*									
$DU.X	0000 0FBA	649	651*											
$IS.DU	0000 0FB8	642	647	650*										
$KBR.1	0000 0EC2	552	554*											
$KEEP7	0000 0FDE	430	668	676*	1284									
$LINEPOS	0000 1766	468	1303*											
$LSTPAS	0000 17CC	170	638	1314*										
$MAXIC	0000 0006	107*	160											
$NOT.DU	0000 0FB4	644	648*											
$OTC.0	0000 0E42	509*	520											
$OTC.1	0000 0E46	510*	515											
$OTC.2	0000 0E52	514*	522											
$OTC.3	0000 0E5A	513	517*											
$OTC.4	0000 0E6E	508	516	524*										
$OTC.5	0000 0E76	526*	534											
$OTC.6	0000 0E94	536*	541											
$OTC.7	0000 0EA2	511	527	529	532	537	539	542*						
$OUTBUF	0000 177C	684	686	694	696	1312*								
$P0	0000 0DC8	466*												
$P1	0000 0DCC	467*												
$PAUSE	0000 1770	509	514	524	1308*									
$PRINT	0000 0DC2	260	265	307	344	366	369	437	463*	499	679	681	695	768
		774	780	784	795	798	825	917	939	973	988	999	1006	1013
		1020	1029	1047										
$PRT.2	0000 0DE2	476*	482	485										
$PRT.3	0000 0E00	479	487*											
$PRT.3A	0000 0E2A	495*	616											
$PRT.4	0000 0E30	498	501*											
$PRTFLG	0000 176A	483	492	608	1305*									
$RD.3A	0000 0EE0	561	567*											
$RD.4	0000 0EEE	570	572*											
$RSAVRET	0000 0FC8	470	495	661*										
$SETUP	0000 1026	525	703*											
$STC.1	0000 0A5A	162	164*											
$STC.2	0000 0A60	165	167*											
$STC.3	0000 0A7E	172	177*											
$STC.4	0000 0AC2	195	198*											
$STC.5	0000 0AD0	201	203*											
$TBRKSV	0000 17D4	582	583	1317*										
$TSTB.1	0000 0F0A	586*	598	600	603	622								
$TSTB.1A	0000 0F10	588*	609											
$TSTB.2	0000 0F16	584	591*											

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$TSTB.3   0000 0F28    594   596*
$TSTB.4   0000 0F42    605*  630
$TSTB.5   0000 0F66    596   618*
$TSTB.6   0000 0F74    620   623*  629
$TSTB.7   0000 0F7A    625*  626
$TSTDU.1  0000 0F9C    637   639*
$WASDU    0000 1768    342   346   428   442   472   651   653   678   961   990   1304*
ABSTOP    0000 17DC
ADC       0000 0004
ADD       0000 0CF4    386*  414   416
ADD2      0000 0EE8I  1398  1402*
ADDBLK    0000 1194    848   855*
ADDINDEX  0000 0EEAI  1401  1403*
ADRS      0000 141A    983  1123*
ADRS1     0000 1410    987  1120*
ART       0000 1434   1014  1137*
ARTFLT    0000 1304    224  1011*
ASTERISK  0000 1370    345  1064*
BLKADR    0000 16B4    375   835   846  1291*
BRKMSG    0000 13D6    500  1110*
BRKOK     0000 0DAE    361   448*
BRKVECT   0000 1764    587   611   612  1302*
BRKWAIT   0000 1222    904   922*  923
BRN9A     0000 10E8    797   800*
C300ADR   0000 0A1E    116*
CAR2ND    0000 0A42    147*
CARRD     0000 0A40    146*
CCADRS    0000 14B2    968  1165*
CHKERR    0000 0D7C    427   432*
CHKLIM    0000 1180    849*
CHKOK     0000 00C2     91*
CHNDATA   0000 0EF6I  1404  1406  1409*
CLEAR     0000 1680    332  1280*
CLEAR1    0000 0C42    219   333*  1280
CLIF2ND   0000 0A3A    143*
CLIFADR   0000 0A16    112*
CLIFRD    0000 0A38    142*
COMPARE   0000 123A    933*  935
CON2ND    0000 0A30    137*  138   189
CONCHK    0000 0D66    425*
CONCMD    0000 0A32    139*  175   186   188   707
CONENRD   0000 0A31    138*
CONRADR   0000 0A2A    132*  183   547   591   892
CONRD     0000 0A2E    135*  136   187   198   548
CONRQ2S   0000 15D4    189   191   192   202   553  1265*
CONT      0000 0CAE    359   363*
CONT14    0000 12E8    991   994*
CONT15    0000 129A    962   965*
CONT16    0000 128A    958   961*  976
CONT17    0000 126E    950   953*
CONT7     0000 11EC    896   898   903*
CONT9     0000 107A    755   757*
CONTFLG   0000 15D3    343   364   412   425   445  1264*
CONTIG    0000 11AA    858   862*
CONVERT   0000 105A    299   304   747*  906   910   914   953   966   970   981   985  1025
```

```
CONVERT1  0000 1064    688    692    750*   762
CONWADR   0000 0A2C    133*   185    562
CONWRT    0000 0A2F    136*   563
CRLF      0000 13BC    370    826    1099*
CRT2NC    0000 0A36    141*
CRTRD     0000 0A34    140*
DEVADRS   0000 144C    1028   1146*
DISP      0000 103E    399    433    720*   931    964    993
ENABLE    0000 1688    339    1281*
ENABLE1   0000 0C3E    319    332*
ENDCHK    0000 0D92    436    439*
ENDMSG    0000 1387    919    1092*
ENDVAL    0000 1390    306    1072*
ERRCHK    0000 0EEEI   1405*
ERRFLG    0000 15D1    341    434    440    894    1262*
ERRHALT   0000 16A0    902    1284*
ERRLIST   0000 14FA    102*   937
ERRNUM    0000 1454    938    1152*
ERROR     0000 1182    401    885*
ERROR1    0000 11C6    891*   960
ERRTAB    0000 14F8    102    933    1180*
ERRWORD   0000 166A    392    888    932    1274*
EXECUTE   0000 0AD4    208*   1279
EXIT3     0000 113C    814    825*
EXT       0000 1444    1030   1145*
EXTINT    0000 131C    249    1025*
FINI      0000 17DC    395    1318*  1323   1415
FLAG      0000 166C    269    293    313    317    1275*
FW0       0000 1176    838    846*
FW1       0000 115E    836    839*   843    853
FWRA      0000 1148    384    390    832*
GETCHR    0000 0EC4    353    556*   812
HALT      0000 1690    952    965    994    1282*
HALT1     0000 1698    349    1283*
HALT9     0000 0FCE    473    666*   672
HIGH      0000 10EC    794    801*
HILO      0000 108A    355    768*   776    782
HILO1     0000 10BA    784*   800
HIMSG     0000 145E    785    1158*
HIVAL     0000 16AC    336    802    857    861    1289*
ILGINT    0000 12BE    215    980*
ILGMSG    0000 13FA    989    1118*
IMPTOP    0000 0F00I   1418
INCRMT    0000 1059    721    731*
INIG      0000 0BA0    272*   275
INK       0000 0088    67     70*
IO        0000 0A10    108*   158    159    167    168    174    177    182    184    559    592    636    706
IOSAVE    0000 17CE    178    506    635    704    1315*
ISITERR   0000 176E    496    615    1307*
KB00128   0000 1550    272    274    277    296    312    321    778    793    842    844    1210*
KB00256   0000 1551    1211*
KB00384   0000 1552    1212*
KB00512   0000 1553    1213*
KB00640   0000 1554    1214*
KB00768   0000 1555    1215*
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KB00896   0000 1556      1216*
KB01024   0000 1557      1217*
KB01152   0000 1558      1218*
KB01280   0000 1559      1219*
KB01408   0000 155A      1220*
KB01536   0000 155B      1221*
KB01664   0000 155C      1222*
KB01792   0000 155D      1223*
KB01920   0000 155E      1224*
KB02048   0000 155F      1225*
KB02560   0000 1560      1226*
KB03072   0000 1564      1227*
KB03584   0000 1568      1228*
KB04096   0000 156C      1229*
KB04608   0000 1570      1230*
KB05120   0000 1574      1231*
KB05632   0000 1578      1232*
KB06144   0000 157C      1233*
KB06656   0000 1580      1234*
KB07168   0000 1584      1235*
KB07680   0000 1588      1236*
KB08192   0000 158C      1237*
KB08704   0000 1590      1238*
KB09216   0000 1594      1239*
KB09728   0000 1598      1240*
KB10240   0000 159C      1241*
KB10752   0000 15A0      1242*
KB11264   0000 15A4      1243*
KB11776   0000 15A8      1244*
KB12288   0000 15AC      1245*
KB12800   0000 15B0      1246*
KB13312   0000 15B4      1247*
KB13824   0000 15B8      1248*
KB14336   0000 15BC      1249*
KB14848   0000 15C0      1250*
KB15360   0000 15C4      1251*
KB15872   0000 15C8      1252*
KB16384   0000 15CC      1253*
KBEND     0000 1500       274    844   1255*
KBREAD    0000 0EA8       352    547*   811
LA10      0000 0EBEI     1385   1389*
LA2       0000 0DF6I     1329   1333*
LA3       0000 0E0CI     1336   1340*
LA4       0000 0E26I     1343   1347*
LA5       0000 0E40I     1350   1354*
LA6       0000 0E5AI     1357   1361*
LA7       0000 0E74I     1364   1368*
LA8       0000 0E8AI     1371   1375*
LA9       0000 0EA4I     1378   1382*
LACC      0000 0002
LAST      0000 1688       310    335   1292*
LDADRS    0000 11BE       887    889*
LDAGN     0000 0D0C       395*   397
LF        0000 0CC0       357    365    369*
LIMFLG    0000 15D2       376    832    860   1263*
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			225	226	227	228	229	230	231	233	234	236	237	240	243
			244	247	248	252	253	271	272	273	274	276	277	278	279
			283	283	286	288	302	315	322	333	334	335	336	337	338
			340	340	341	342	343	350	351	373	373	379	380	381	382
			383	420	421	472	506	507	509	512	514	517	518	519	521
			524	525	526	528	530	531	533	536	538	540	635	636	639
			640	641	645	646	648	650	652	654	654	669	670	671	703
			704	705	706	707	708	709	839	842	844	951	969		
R10	0000 000A		55*	408	803	804	805	897	903	922	929	929	933	935	937
			1392	1396											
R11	0000 000B		56*	403	892	897	903	922	930	961	990	1332	1339	1346	1353
			1360	1367	1374	1381	1388	1395							
R12	0000 000C		57*	404	405	686	691	722	723	724	725	725	726	748	757
			761	889	891	931	937	938	948	949	957	1341	1345	1355	1359
			1376	1380	1389	1393									
R13	0000 000D		58*	406	720	721	723	726	727	890	905	932	933	1348	1352
			1362	1366	1383	1387	1390	1394							
R14	0000 000E		59*	399	409	433	582	588	591	597	601	610	612	618	621
			623	627	729	901	936	941	964	984	993	997	1004	1011	1018
			1328	1332	1335	1339	1342	1346	1349	1353	1356	1360	1363	1367	1370
			1374	1377	1381	1384	1388	1391	1395	1402	1411				
R15	0000 000F		60*	260	265	299	304	307	344	353	366	369	411	415	422
			424	437	463	464	469	477	484	488	490	491	493	496	499
			505	510	542	543	576	583	586	587	589	592	593	595	597
			599	601	602	602	606	607	608	611	613	614	615	618	619
			621	623	624	625	627	628	656	662	667	679	681	688	692
			695	728	747	748	749	759	768	774	780	784	795	798	812
			825	893	894	895	906	910	914	917	921	939	953	958	959
			966	970	973	980	981	985	988	998	999	1005	1006	1012	1013
			1019	1020	1026	1029	1047	1053	1400	1408					
R1SAVE	0000 1664		379	383	1271*										
R2	0000 0002		47*	71	84	91	159	164	166	168	169	173	174	175	186
			187	188	189	196	196	197	199	241	245	250	279	284	374
			374	375	376	377	385	512	517	640	641	771	772	777	778
			791	792	793	835	837	840	841	846	847	851	854	855	997
			1001	1004	1008	1011	1015	1018	1022	1025					
R3	0000 0003		48*	72	160	161	164	182	183	184	185	197	198	199	202
			242	246	251	280	402	564	998	1005	1012	1019	1328	1335	1342
			1349	1356	1363	1370	1377	1384	1391						
R4	0000 0004		49*	73	74	75	77	81	87	191	192	193	194	194	200
			200	239	243	249	252	281	294	312	320	321	352	354	356
			358	360	363	364	385	386	387	394	396	398	402	403	404
			408	410	476	478	487	489	492	494	535	554	556	558	566
			568	569	571	572	574	683	684	811	813	815	817	819	820
			823	890	956	1326	1330	1333	1337	1340	1344	1347	1348	1351	1352
			1362	1366	1383	1387	1390	1394							
R5	0000 0005		50*	75	81	94	282	298	315	407	407	463	476	480	481
			483	497	886	886	1395	1407	1407						
R6	0000 0006		51*	77	78	78	80	85	86	87	92	93	94	169	170
			171	171	395	396	401	412	413	413	425	426	426	428	429
			429	441	441	442	443	444	445	750	751	752	753	754	756
			757	1400	1408										
R7	0000 0007		52*	83	84	286	288	290	346	347	347	391	391	392	395
			396	397	398	432	434	435	435	439	439	440	448	449	450
			451	685	689	722	724	747	751	758	758	760	899	900	963