MODEL 8/16E

EXTENDED MEMORY TEST

Consists of:

8-Bit Object Tape	06-221M17
Assembly Listing	06-221M96
Program Description	06-221A15
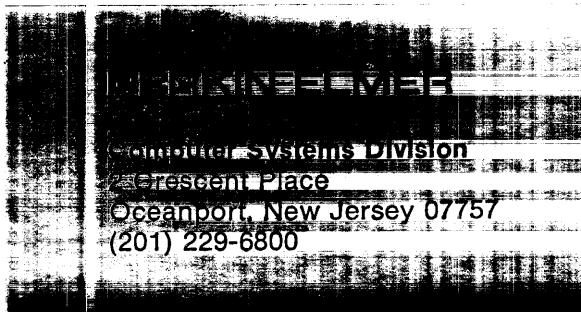
MODEL 8/16E EXTENDED MEMORY
TEST PROGRAM DESCRIPTION

1. RELATED ITEMS

1.1 Related Documents

Test Program Listing	06-221M91R00A13
Test Program Paper Tape	06-221M17R00

1.2 Related Test Programs

The following test programs are to be run prior to loading this test:

Model 8/16E Processor Test Part 1	06-211
Model 8/16E Processor Test Part 2	06-212

1.3 Other Applicable Tests

Common Teletype Basic Confidence Test	06-004
Common Current Loop Interface Test	06-184
Common CRT Test	06-146
Common Carousel 300 Test	06-183

2. PURPOSE OF TEST

The Model 8/16E Extended Memory Test verifies the operation of all available memory from address X'00080' up to a maximum address of X'3FFFE' (256KB). The test is divided into two parts. Part 1 tests memory locations from X'00080' through X'00FFE' – the first 4KB. The test program itself occupies the second 4KB starting at address X'01000'.

Part 2 of the program tests memory locations from LAST+2 through X'3FFFE'. The test program for Part 2 occupies memory locations X'00100' through X'010CD'.

2.1 A brief description of the subtests available in Part 1 follows.

TEST 0

The test area begins at X'00080' and ends at X'00FFE'. Each halfword in the test area is set equal to its address. Each halfword is then read back and tested.

TEST 1

The test area begins at X'00080' and ends at X'00FFE'. Each halfword in the test area is set equal to the one's complement of its address. Each halfword is then read back and tested.

TEST 2

The test area begins at X'00080' and ends at X'00FFE'. A data pattern
initially equal to X'8000' is stored in the first halfword. The data
pattern is rotated right one bit position and stored in the next se-
quential halfword. The pattern repeats itself through every 16 half-
word block in the test area. Each halfword is then read back and
tested.

TEST 3

The test area begins at X'00FFE' and ends at X'00080'. A data pattern
initially equal to X'FFFE' is stored in the last halfword. The data
pattern is rotated left one bit position and stored in the next lower
halfword. Working backwards toward location X'00080', the pattern re-
peats itself through every 16 halfword block in the test area. Each
halfword is then read back and tested.

TEST 4

The test area begins at X'00080' and ends at X'00FFE'. The test area
is initially set to all zeros. Then a halfword of X'FFFF' is stored
in the first halfword location and the second halfword is read and
tested for zeros. The process repeats for every pair of halfwords in
the test area so that on completion, every other halfword equals X'FFFF
Finally, starting back at X'00080', zeros are stored in the second half
word and the first halfword is read and tested for all ones. This con-
tinues for every halfword pair in the test area.

2.2 A brief description of the subtests available in Part 2 follows.

TEST 0

The test area equals the four consecutive halfwords beginning at ad-
dresses X'01100', X'01108', X'01110, X'01120', X'01140', X'01180',
X'01300', X'01500', and X'01900'. The test area is cleared, then a
data pattern is written to the first four halfwords. All other segment
are then tested for zero. The first four halfwords are reset to zero
and the pattern is moved to the second set of four halfwords.

TEST 1

The test area begins at LAST+2 and ends at X'01FFE'. A data pattern
initially equal to X'8000' is stored in the first halfword. The data
pattern is rotated right one bit position and stored in the next se-
quential halfword. The pattern repeats itself through every 16 half-
word block in the test area. Each halfword is then read back and teste
Finally, starting at the top of the test area and progressing towards
LAST+2. The one's complement of the rotating pattern is used as the
test data.

TEST 2

The test area begins at LAST+2 and ends at the last available half-
word address in memory. Each halfword in the test area is set equal
to the least significant 16 bits of its address. Each halfword is
then read back and tested. Next, starting at the top of the test
area and progressing towards LAST+2, each halfword is set equal to
the one's complement of its address. Each halfword is read back and
tested.

TEST 3

The test area begins at LAST+2 and ends at the last available half-
word address in memory. The entire test area is set to zeros. The
first halfword is read, tested for zeros, and then rewritten equal
to all ones. This repeats for each halfword in the test area so that
when finished, the test area contains all ones. Starting at the top
of the test area and progressing towards LAST+2, each halfword is read,
tested for all ones, then re-written with zeros.

TEST 4

The test area equals one halfword out of every 8KB block of memory
between LAST+2 and the top of memory. The first halfword is at
X'01400', the second is at X'03400', the third is at X'05400' . . .
etc. The test area is set to zero then one halfword is set equal
to all ones and the corresponding halfwords in all other 8KB blocks
are read and tested for zero.

TEST 5

The test area begins at an address specified by the user and ends at an
address also specified by the user. A data pattern specified by the
user is written to every halfword in the test area. The test repeats
continuously.

TEST 6

The test area begins at LAST+2 and ends at the last available half-
word address in memory. First the test area is set to all zeros.
All ones are written to the first halfword and the next sequential
halfword is read and tested for all zeros. This repeats for every
halfword in the test area so that on completion, the test area equals
all ones. Starting back at LAST+2, the second halfword is set to
zero and the first halfword is read and tested for all ones. The
first halfword is reset to all ones. This repeats through every half-
word in the test area until the test area again contains all zeros.
Finally, for every halfword in the test area, the halfword is read,
tested for zero, re-written with all ones, read back and tested for
all ones, then reset to zero.

3

TEST 7

The test area begins at LAST+2 and ends at the last available half-
word address in memory. Three passes are made through the test area.
On pass 1, the first halfword is set to X'5555', the second halfword
is set to X'AAAA', the third halfword is set to X'5555 . . . etc.
Every odd halfword is set to X'5555' and every even halfword is set
to X'AAAA'. Each halfword is read back and tested. On pass 2, the
data patterns used are X'0000' and X'FFFF'. On pass 3, the data pat-
terns used are X'C6C6' and X3939'.

TEST 8

The test area begins at LAST+2 and ends at the last available halfword
in memory. A subroutine is copied to memory beginning at the first
halfword location in the test area. The subroutine is executed 100
times then it is moved up one halfword location.

3.   MINIMUM HARDWARE REQUIRED

The following is a list of the minimum hardware required to run this
test:

    1.   Processor - Model 8/16E

    2.   Minimum Memory - 32KB of 750ns core or 1μs core

    3.   Console Input/Output device - Teletype, GDT, CRT or
         Carousel 15, 30, or 35 on a Current Loop interface
         or a CRT or Carousel 300 on a PASLA/PALM interface.
         (See Appendix 1.)

4.   REQUIREMENTS OF MACHINE UNDER TEST

This program assumes that the applicable programs indicated in Section
1.2 and 1.3 have been run without detecting an error.

5.   LOADING PROCEDURE

5.1   Test Tape Format

The 06-221M17 tape is an absolute, non-zoned memory image tape with a
front-end boot loader. Both parts of the test are on the same tape,
Part 1 first followed by Part 2. Each part occupies approximately 4KB.

5.2   Normal Loading Procedure

    1.   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'0294'	For TTY or Carousel 35
X'78'	X'0399'	For HSPTR
X'78'	X'1399'	For HSPTR/P

2. Place the program tape in the tape reader.

3. Execute at address X'30'.

4. When the Processor halts, observe the CHKSUM byte, dis-
   played on Processor Display indicator Dl. If it is zero,
   loading is complete; else, repeat the loading procedure.

5.3 Multi-Media Diagnostic Loading Procedure

To load this program from the INTERDATA Multi-Media Diagnostic Sys-
tem, refer to Publication Number 06-176A15.

5.4 Program Execution

After successfully loading Part 1, if the console device is a TTY,
GDT, CRT or Carousel 15, 30 or 35 on a current loop interface with
device number X'02', press EXEcute to begin Part 1. If the console
device is different, refer to Appendix 1 and set up the parameters
for the Console Input/Output device. Address location X'1000' and
execute. Note that the following title is output to the console
device:

    8/16E EXTENDED MEMORY TEST PART 1 06-221R00

6. OPERATING PROCEDURES

6.1 Normal Testing (Part 1)

After the title is printed, the program automatically sequences through
all four subtests, testing memory from X'00080' through X'00FFE'. On
completion, if no errors were detected, the message

    NO ERROR

5

is printed followed by a carriage return, line feed, and an asterisk (*) character. At this time, the operator can cause Part 1 to be repeated by depressing the carriage return (CR) Key on the console device. If the line feed (LF) Key is depressed, the program uses the standard X'50' sequence to load Part 2 of the test.

When the processor halts, observe the CHKSUM byte displayed on the Processor display indicator D1. If it is zero, loading is complete; else repeat the loading procedure as described in Section 5.

After successfully loading Part 2, if the console device is a TTY, GDT, CRT or Carousel 15, 30, or 35 on a current loop interface with device number X'02', press EXEcute to begin Part 2. If the console device is different, refer to Appendix 1 and set up the parameters for the Console Input/Output device. Address location X'0100' and execute. Note that the following title is output to the console device:

    8/16E EXTENDED MEMORY TEST PART 2   06-221R00

6.2   Normal Testing (Part 2)

After the title is printed, a search for available memory is performed. The program then prints the message:

    PROGRAM DETECTED MAXIMUM MEMORY XXXXX

where XXXXX equals the address in hexadecimal of the last halfword in memory.

After the maximum memory message, the program outputs an asterisk(*) to indicate that it is ready for operator input. To execute the default tests (Test 0 through 4 and Test 6 through 8), enter the followi: options from the console device. Appendix 2 summarizes the command/ option input format. Appendix 3 summarizes the possible options or commands.

    * TEST (CR)   Selects the default Tests
                          0,1,2,3,4,6,7,8

    * RUN (CR)   Starts the test sequence

The program executes Tests 0 through 4 and Tests 6 through 8 in the default sequence. Appendix 4 summarizes the expected results.

Test 5 is provided so that scope measurements can be made while a test pattern is repeatedly written through an area of memory. To execute Test 5, enter the following options from the console device:

```
* LOW XXXXX (CR)          Select Low memory address

* HIGH XXXXX (CR)         Select High memory address

* DATA XXXX (CR)          Select Data pattern

* TEST 5 (CR)             Select Test 5

* RUN (CR)                Start Execution
```

Test 5 continuously writes the selected data pattern to every halfword
location from the Low memory address to the High memory address. To
terminate Test 5, depress the Break Key on the console device.

Any or all Tests, other than Test 5, may be repeated a specified number
of times by using the LOOP option. For example:

```
* TEST 3,4,6 (CR)         Select Tests 3,4, and 6

* LOOP 1Ø (CR)            Run each test sixteen times (Hexadecimal
                                                           '10')
* RUN (CR)                Start the test sequence
```

Any single test can be run continuously by using the CONTINue option.
For example:

```
* LOOP 0 (CR)             Cancel LOOP option

* CONTIN 1 (CR)           Set CONTINue option = 1

* TEST 7 (CR)             Select Test 7

* RUN (CR)                Start test
```

The user must depress the Break Key on the console device to terminate
the test. The CONTINue option is then cancelled by:

```
* CONTIN Ø (CR)
```

6.3 Optional Testing

Overnight testing is allowed by turning the console device off-line
once the test sequence has been started. While the console device
is off-line, the program continuously executes all selected Tests.
A count of the number of times the entire test sequence is repeated
is maintained in memory location TOTAL. If an error is detected, the
tally in memory location TOTERR is incremented.

When the console device is turned back on line and the program reaches the end of the current Test, the total number of times the test sequence was repeated and the total number of errors that occurred are output to the console device. If, while the console device is offline, the total number of times the test was repeated or the error tally reaches X'FFFF', the test sequence is aborted and the Processor halts. To continue, put the console device on line and depress RUN.

6.4 Error Procedures

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

MEMORY	DATA	DATA
LOCATION	EXPECTED	OBSERVED
XXXXX	YYYY	ZZZZ

where XXXXX is the address of the halfword under test (In Part 1,
       only a 4 digit address is printed)
      YYYY is the data that was expected at XXXXX
      ZZZZ is the data actually read from XXXXX

                                NOTE

                    Some tests restore the correct
                    data after an error is detected.

If more than one location is failing, the header lines are not repeated. The new failing address, expected data, and actual data are printed in columnar form under the appropriate heading.

If a machine malfunction interrupt occurs, the following error message is output:

    MACHINE MALFUNCTION A BBBB CCCC DDDDD

where A   is the new Condition Code
      BBBB   is the Old PSW (Status portion)
      CCCC   is the Old PSW (Location Counter)
      DDDDD   is the memory location being tested

If an illegal instruction interrupt occurs, the following error message is output:

    ILLEGAL INSTRUCTION BBBB CCCC

where   BBBB   is the Old PSW (Status Portion)
        CCCC   is the Old PSW (Location Counter)

After a machine malfunction interrupt or an illegal instruction in-
terrupt, the Processor is halted. Press the RUN switch on the dis-
play to continue.

7. PROGRAMMING NOTES

    1. The PSW values used in this program can be modified by
        inserting the desired value in the location labeled PSW
        or PSW2.

    2. Although the program is titled 8/16E, it can be run on any
        INTERDATA 16-bit series processor with core memory. The
        program can be run on Processors equipped with MOS memory,
        but many potential errors with MOS memory may go un-detected.
        There are special test programs available that are designed
        specifically for MOS memory.

    3. When addressing memory locations beyond 64KB, the program
        assumes the 8/16E memory bank scheme. Consequently, it may
        not work on future extended memory processors.

APPENDIX 1

USER DEVICE DEFINITION

The halfword labeled 'IO' (see the Program Listing) has the default
value for Teletype, CRT, or Carousel 15/30/35 (all on Current Loop
Interface) as the input/output console device. If the setup is
different 'IO' must be changed as follows:

	0 7	8 15
IO	Console Device Identifier	Console Device Identifier
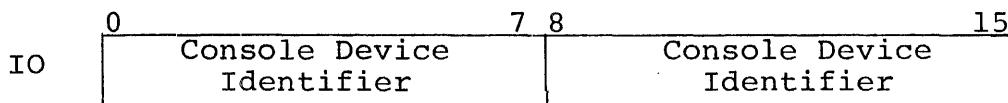
Console Device Identifier	Meaning
X'01'	GDT/CRT on PASLA/PALM interface, strapped for FDX operation and highest baud rate.
X'02'	TTY/GDT/CRT/Carousel 15/30/35 on Current Loop Interface
X'03'	Reserved. Interpreted as X'02'.
X'04'	Carousel 300 on PASLA/PALM Interface, strapped for FDX operation and highest baud rate.
X'05'	TTY/GDT/CRT/Carousel 15/30/35 on Micro I/O Bus Current Loop Interface
X'00', X'06' - X'FF'	Reserved. Interpreted as X'02'

1. The GDT (Graphic Display Terminal) or CRT, if used on PASLA/
    PALM interface, should be strapped for device addresses X'10'
    and X'11', for Receive and Transmit sides, respectively. If
    the addresses are different, then the halfword labeled 'PASLADR'
    (see the Program Listing) must be changed accordingly.

2. The Teletype or Current Loop Interface, if used, should be
    strapped for device address X'02'. If the address is dif-
    ferent, the halfword labeled 'CLIFADR' (see the Program
    Listing) must be changed accordingly.

3. The Carousel 300, if used, should be strapped for device ad-
    dresses X'10 and X'11', for Receive and Transmit sides, re-
    spectively. If the addresses are different, the halfword
    labeled 'C300ADR' (see the Program Listing) must be changed
    accordingly.

4. The console device on Micro I/O Bus, if used, should be strap-
    ped for device address X'C0'. If the address is different,
    the halfword labeled 'MICROIO' (see the program listing) must
    be changed accordingly.

APPENDIX 2

COMMAND/OPTION INPUT METHOD

An asterisk (*) is output to the console device to indicate that the program is waiting user input. All option names must be typed in from the console, followed by a space and the desired argument or arguments separated by commas. A carriage return (CR) must be typed to end every command/option input. An invalid command/option name or option value causes a question mark (?) followed by a carriage return (CR), line feed (LF), and an asterisk (*) to be output. If, during command/option entry, an error is made, it can be handled in two ways. The hash mark (#) can be typed to delete the entire line. This causes a carriage return (CR), line (LF), and an asterisk (*) to be output. The left arrow (←) can be typed to delete the previous character; or a string of characters can be deleted by typing a left arrow (←) for each character to be deleted.
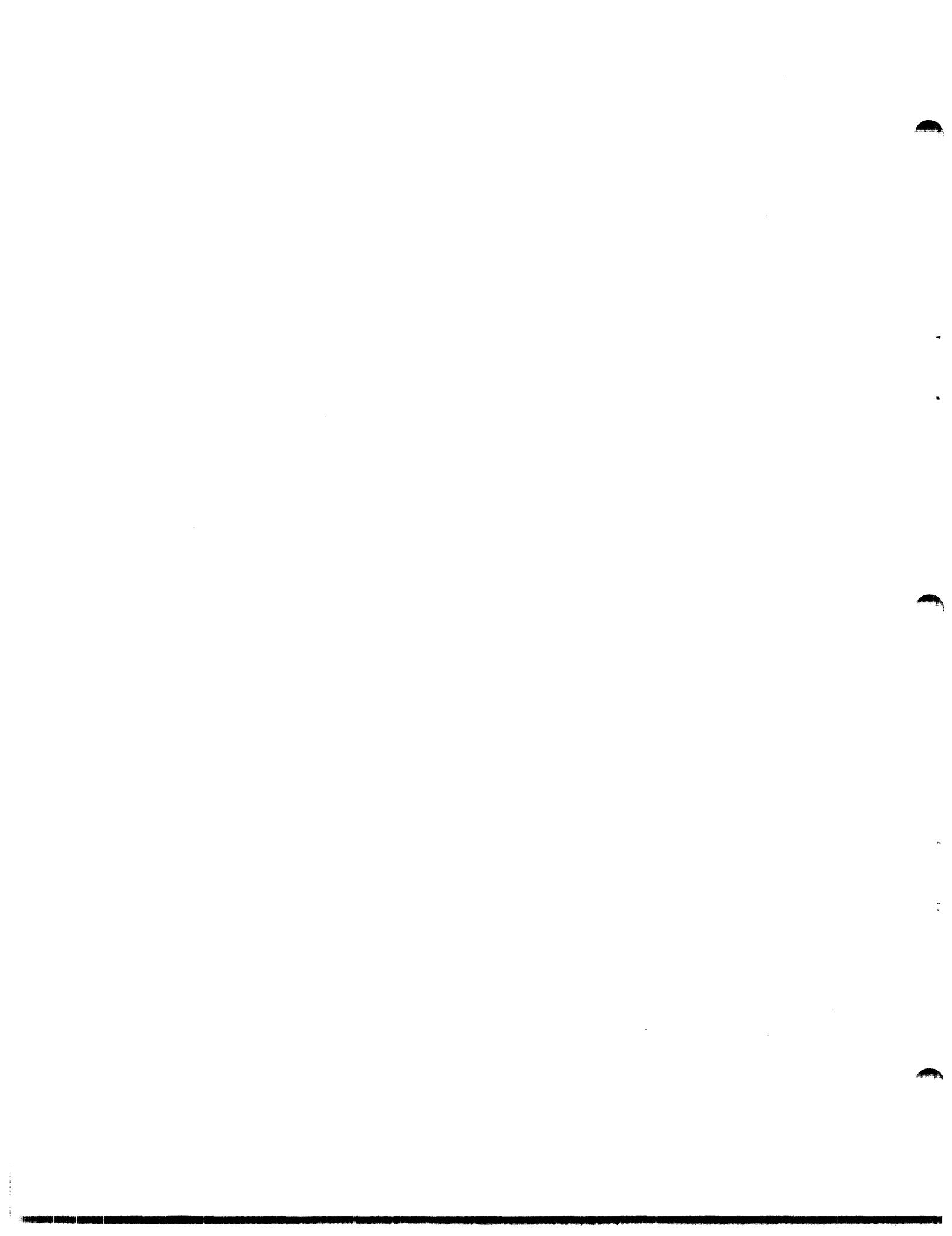
OPTION TABLE

OPTION	DEFAULT	TESTS	DESCRIPTION
TEST	Ø,1,2,3, 4,6,7,8		Select test or tests to be per- formed. Accept digits 0 through 8.
NOMSG	Ø	ALL	Message handling option 0 = Print all messages 1 = Print only error messages
LOOP	Ø	ALL	Specify number of times to repeat each test. Accept 0 through X'FFFF

CONTIN	Ø	ALL	Specify action at conclusion of
			last selected test.
			0 = Print "END OF TEST" message and
			    return to command input
			1 = Repeat all selected tests until
			    the BREAK key is depressed.

LOW	X'Ø2ØØØ'	5	Specify start address of scope loop test area. Accept LAST+2 through MAXMEN.
HIGH	MAXMEM	5	Specify end address of scope loop test area. Accept LAST+2 through MAXMEM.
DATA	X'A5A5'	5	Specify data pattern to continuously write into each halfword of the scope loop test area. Accept 0 through X'FFFF'.
RUN	-	ALL	Begin test sequence
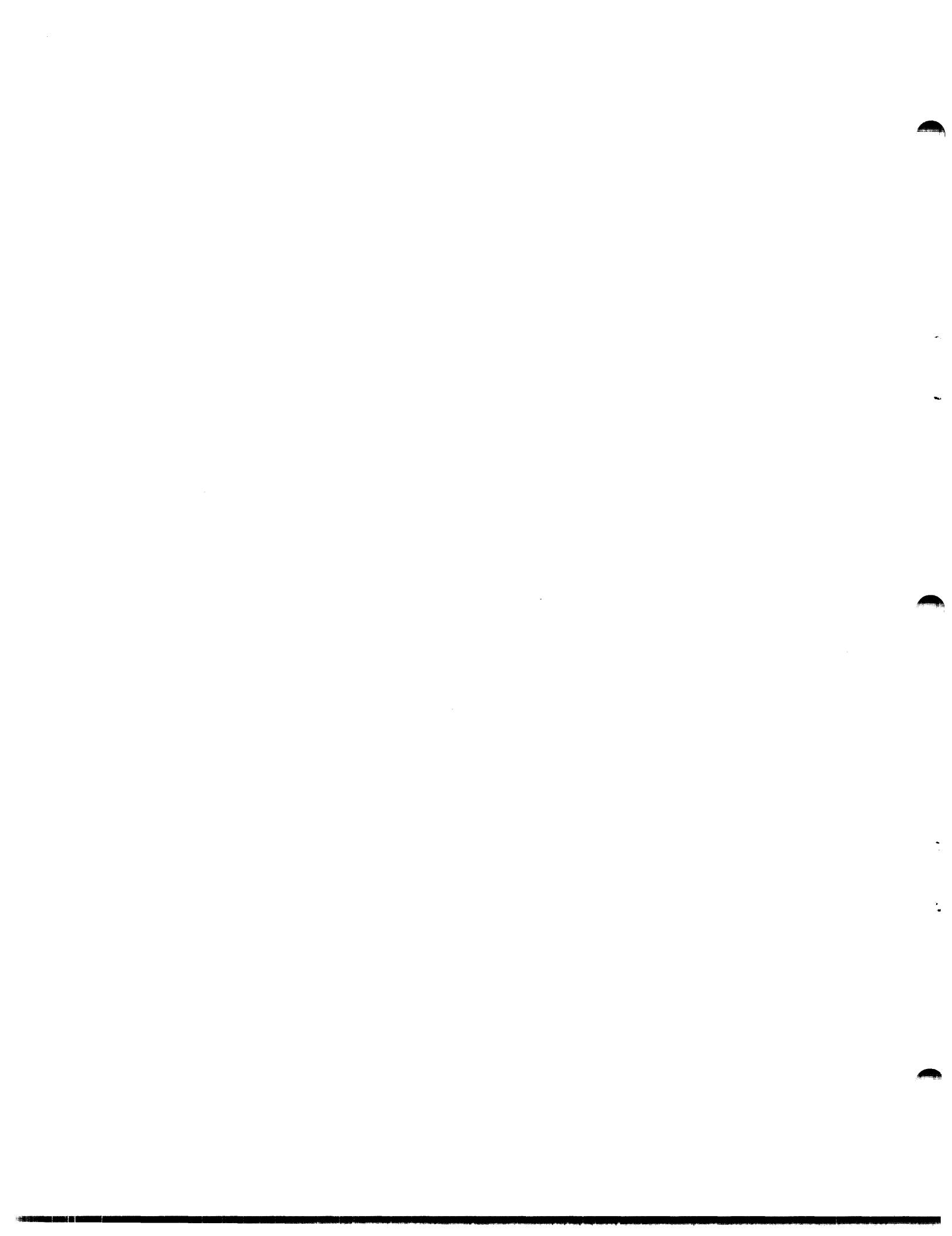
APPENDIX 4

EXPECTED RESULT TABLE

8/16E EXTENDED MEMORY TEST PART 1 06-221RØØ
NO ERROR
* (CR)
8/16E EXTENDED MEMORY TEST PART 1 06-221RØØ
NO ERROR
* (LF)
8/16E EXTENDED MEMORY TEST PART 2 06-221RØØ
PROGRAM DETECTED MAXIMUM MEMORY   3FFFE
*RUN (CR)

SUBTEST Ø NO ERROR
SUBTEST 1 NO ERROR
SUBTEST 2 NO ERROR
SUBTEST 3 NO ERROR
SUBTEST 4 NO ERROR
SUBTEST 6 NO ERROR
SUBTEST 7 NO ERROR
SUBTEST 8 NO ERROR
END OF TEST
* TEST 5 (CR)
* LOW 8ØØØ (CR)
* HIGH 8FFE (CR)
* DATA FFFF (CR)
* RUN (CR)

SUBTEST 5 (BRK)
*
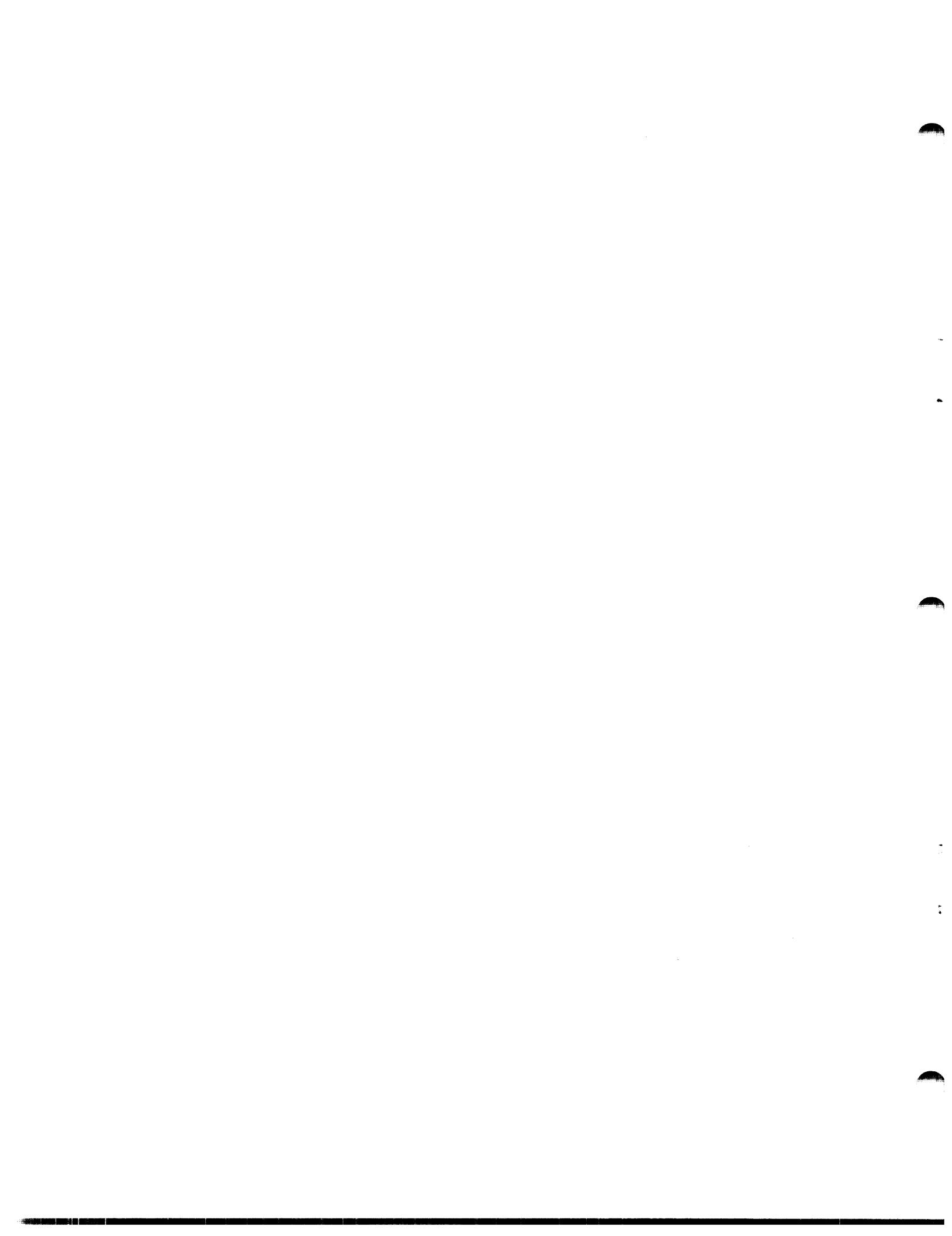
PROG= MT816E   ASSEMBLED BY CAL 03-066R04-01 (32-BIT)

```
                           1          SCRAT                                                    MTE00020
                           2          CROSS                                                    MTE00030
                           3          TARGT   16                                               MTE00040


                           5   * PART 1 IS DESIGNED TO TEST MEMORY LOCATIONS X'0080' THROUGH   MTE00060
                           6   * X'OFFE'.  THE TEST PROGRAM ITSELF RESIDES IN THE SECOND 4KB   MTE00070
                           7   * STARTING AT ADDRESS X'1000'.                                  MTE00080
                           8   *                                                               MTE00090
                           9   * PROGRAM IS LOADED USING THE STANDARD 50 SEQUENCE.             MTE00100
                          10   * AFTER LOADING, THE PROCESSOR HALTS.  IF THE CHECKSUM BYTE     MTE00110
                          11   * SHOWN ON THE LOW ORDER DISPLAY INDICATORS (D1) IS NOT ZERO,   MTE00120
                          12   * REPEAT THE LOADING PROCESS.                                   MTE00130
                          13   *                                                               MTE00140
                          14   * IF THE CONSOLE DEVICE IS A TTY,GDT,CRT OR CAROUSEL 15,30 OR 35 MTE00150
                          15   * ON A CURRENT LOOP INTERFACE.(DEVICE ADDRESS X'02'), PRESS "RUN". MTE00160
                          16   *                                                               MTE00170
                          17   * IF THE CONSOLE DEVICE IS NOT A TTY,GDT,CRT OR CAROUSEL 15,30 OR 35 MTE00180
                          18   * ON A CURRENT LOOP INTERFACE, THE HALFWORD LABELED "IO" MUST BE MTE00190
                          19   * MODIFIED.  AFTER ADJUSTING THE CONSOLE DEVICE IDENTIFIER AS SHOWN MTE00200
                          20   * BELOW, SELECT ADDRESS X'1000' AND BEGIN EXECUTION.            MTE00210
                          21   *                                                               MTE00220
                          22   * CONSOLE DEVICE IDENTIFIER:                                    MTE00230
                          23   *                                                               MTE00240
                          24   *        01    = GDT OR CRT ON PASLA/PALM (FDX, HIGHEST BAUD RATE) MTE00250
                          25   *        02    = TTY,GDT,CRT OR CAROUSEL 15,30 OR 35 ON CURRENT LOOP MTE00260
                          26   *        03    = RESERVED, INTERPRETED AS '02'                  MTE00270
                          27   *        04    = CAROUSEL 300 ON PASLA OR PALM (FDX, HIGHEST BAUD RATE) MTE00280
                          28   *        05    = TTY,GDT,CRT OR CAROUSEL 15,30 OR 35 ON MICRO I/O CLI MTE00290
                          29   *        00 AND 06:FF = RESERVED, INTERPRETED AS '02'           MTE00300
```

GENERAL REGISTER ASSIGNMENTS

```
       0000 0000          31  R0       EQU     0            ASCII CHARACTER FOR I/O              MTE00320
       0000 0001          32  R1       EQU     1            PROGRAM ADDRESS                      MTE00330
       0000 0002          33  R2       EQU     2            CONSOLE DEVICE NUMBER                MTE00340
       0000 0003          34  R3       EQU     3            G.P. ACCUMULATOR                     MTE00350
       0000 0004          35  R4       EQU     4            MESSAGE START ADDRESS                MTE00360
       0000 0005          36  R5       EQU     5            STATE REGISTER                       MTE00370
       0000 0006          37  R6       EQU     6            HEX DIGIT FOR ERROR PRINT-OUT        MTE00380
       0000 0007          38  R7       EQU     7            HALFWORD FOR ERROR PRINT-OUT         MTE00390
       0000 0008          39  R8       EQU     8            OBSERVED MEMORY DATA                 MTE00400
       0000 0009          40  R9       EQU     9            EXPECTED MEMORY DATA                 MTE00410
       0000 000A          41  R10      EQU     10           DATA PATTERN REGISTER                MTE00420
       0000 000B          42  R11      EQU     11           DATA PATTERN REGISTER                MTE00430
       0000 000C          43  R12      EQU     12           MINOR LINK REGISTER                  MTE00440
       0000 000D          44  R13      EQU     13           MAJOR LINK REGISTER                  MTE00450
       0000 000E          45  R14      EQU     14                                                MTE00460
       0000 000F          46  R15      EQU     15           MEMORY ADDRESS                       MTE00470
                          47  *                                                                  MTE00480
                          48  *                                                                  MTE00490
                          49  * STATE REGISTER BIT DEFINITIONS                                   MTE00500
                          50  *                                                                  MTE00510
       0000 0001          51  WASDU    EQU     X'0001'      CONSOLE DU FLAG                      MTE00520
       0000 0002          52  WASDU1   EQU     X'0002'      AUXILIARY DU FLAG                    MTE00530
       0000 0004          53  MICROFLG EQU     X'0004'      MICRO I/O BUS FLAG                   MTE00540
       0000 0008          54  ERRFLG   EQU     X'0008'      ERROR FLAG                           MTE00550
       0000 0040          55  PAUSE    EQU     X'0040'      CAROUSEL 300 DC4/DC2 FLAG            MTE00560
       0000 0080          56  CAROUSEL EQU     X'0080'      CAROUSEL 300 FLAG                    MTE00570
       0000 0100          57  PASFLG   EQU     X'0100'      PASLA/PALM FLAG                      MTE00580
       0000 0200          58  PARITY   EQU     X'0200'      FIRST PARITY ERROR FLAG              MTE00590
```

BOOT LOADER

```
0000R                       60          ORG     X'0080'                                      MTE00610
0080    C810 1000           61          LHI     R1,ORIGIN1      START ADDRESS FOR LOAD       MTE00620
0084    2421                62          LIS     R2,1            INCREMENT VALUE              MTE00630
0086    C830 1649           63          LHI     R3,LNZB         ADDRESS OF LAST NON-ZERO BYTE MTE00640
008A    C860 00FF           64   MN     LHI     R6,X'FF'        CHECKSUM BYTE                MTE00650
008E    D340 0078           65          LB      R4,X'78'        BINARY INPUT DEVICE          MTE00660
0092    DE40 0079           66          OC      R4,X'79'        OUTPUT COMMAND READ          MTE00670
0096    9D45                67   LEADER SSR     R4,R5                                        MTE00680
0098    2091                68          BTBS    9,1                                          MTE00690
009A    9E45                69          RDR     R4,R5                                        MTE00700
009C    08E5                70          LDAR    R5,R5           TEST THE INPUT CHARACTER     MTE00710
009E    2234                71          BZS     LEADER          IGNORE LEADING ZERO BYTES    MTE00720
00A0    D2E1 0000           72   LOAD   STB     R5,0(R1)        STORE IN MEMORY              MTE00730
00A4    0765                73          XAR     R6,R5           GENERATE CHECKSUM            MTE00740
00A6    9A26                74          WDR     R2,R6                                        MTE00750
00A8    9D45                75          SSR     R4,R5                                        MTE00760
00AA    2091                76          BTBS    9,1                                          MTE00770
00AC    9B45                77          RDR     R4,R5           NEXT BYTE                    MTE00780
00AE    C110 00A0           78          BXLE    R1,LOAD         LOOP                         MTE00790
00B2    9826                79          WHR     R2,R6           DISPLAY FINAL CHECKSUM       MTE00800
00B4    C200 00B8           80   HALT3  LPSW    STARTX                                       MTE00810
00B8                        81          ALIGN   8                                            MTE00820
00B8    8000                82   STARTX DC      X'8000',ORIGIN1                              MTE00830
00BA    1000
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00BC                          84            CRG     X'1000'                                       MTE00850
1000    2309                  85  ORIGIN1   BS      START1                                        MTE00860
                              86  *                                                               MTE00870
                              87  *                                                               MTE00880
1002    3000                  88  PSW       DCX     3000            PSW USED IN TEST MODULES       MTE00890
1004    0000                  89  PSW2      DCX     0000            PSW USED IN EXEC               MTE00900
                              90  *                                                               MTE00910
                              91  *                                                               MTE00920
1006    0002                  92            DCX     0002                                          MTE00930
1008    0010                  93  PASLADR   DCX     0010            PASLA/PALM ADDRESS             MTE00940
100A    00C2                  94  CLIFADR   DCX     0002            CURRENT LOOP INTERFACE ADDRESS MTE00950
100C    0010                  95  C300ADR   DCX     0010            CAROUSEL 300 PASLA/PALM ADDRESS MTE00960
100E    00C0                  96  MICHCIO   DCX     00C0            ASCII CONSOLE ADDRESS          MTE00970
                              97  *                                                               MTE00980
1010    0202                  98  IO        DCX     0202            IO DEVICE IDENTIFIER           MTE00990
                              99  *                                                               MTE01000
                             100  *                                                               MTE01010
1012    D300 1010            101  START1    LB      R0,IO           GET CONSOLE IDENTIFIER         MTE01020
1016    0755                 102            XHR     R5,R5           CLEAR STATE REGISTER           MTE01030
1018    2701                 103            SIS     R0,1                                           MTE01040
101A    4330 105A            104            BZ      CRT             BRANCH IF PASLA/PALM           MTE01050
101E    2703                 105            SIS     R0,3                                           MTE01060
1020    4330 1044            106            BZ      C300            BRANCH IF CAROUSEL 300         MTE01070
1024    4210 1078            107            BM      TTY             BRANCH IF CURRENT LOOP INF.    MTE01080
1028    2701                 108            SIS     R0,1                                           MTE01090
102A    4230 1078            109            BNZ     TTY             DEFAULT TO TTY                 MTE01100
                             110  *                                 ELSE, MICRO I/O BUS           MTE01110
102E    C650 0004            111            OHI     R5,MICROFLG     SET MICRO I/O BUS FLAG         MTE01120
1032    4820 100E            112            LH      R2,MICROIO      PICK UP DEVICE NUMBER          MTE01130
1036    4810 163A            113            LH      R1,MICRORD      PICK UP COMMANDS               MTE01140
103A    0700                 114            XHR     R0,R0           NO SECOND COMMAND              MTE01150
103C    DE20 1638            115            OC      R2,MICRORST     ISSUE RESET COMMAND            MTE01160
1040    4300 1084            116            B       DEVSET                                         MTE01170
1044    4820 100C            117  C300      LH      R2,C300ADR      PICK UP DEVICE NUMBER          MTE01180
1048    4810 163C            118            LH      R1,CARRD        PICK UP COMMANDS               MTE01190
104C    4800 163E            119            LH      R0,CAR2ND       PASLA/PALM FORMAT COMMAND      MTE01200
1050    D340 1540            120            LB      R4,CARRQ2S                                     MTE01210
1054    C650 0080            121            OHI     R5,CAROUSEL     SET CAROUSEL 300 FLAG          MTE01220
1058    2309                 122            BS      CRT2                                           MTE01230
105A    4820 1008            123  CRT       LH      R2,PASLADR      PICK UP DEVICE NUMBER          MTE01240
105E    4810 1642            124            LH      R1,CRTRD        PICK UP COMMANDS               MTE01250
1062    4800 1644            125            LH      R0,CRT2ND       PASLA/PALM FORMAT COMMAND      MTE01260
1066    D340 1641            126            LB      R4,CRTRQ2S                                     MTE01270
106A    C650 0100            127  CRT2      OHI     R5,PASFLG       SET PASLA FLAG                 MTE01280
106E    9460                 128            EXBR    R6,R0                                          MTE01290
1070    9E26                 129            OCR     R2,R6           ISSUE FORMAT COMMAND           MTE01300
1072    D240 1636            130            STB     R4,CONRQ2S                                     MTE01310
1076    2307                 131            BS      DEVSET                                         MTE01320
1078    4820 100A            132  TTY       LH      R2,CLIFADR      PICK UP DEVICE NUMBER          MTE01330
107C    4810 1646            133            LH      R1,CLIFRD       PICK UP COMMANDS               MTE01340
1080    4800 1648            134            LH      R0,CLIF2ND                                     MTE01350
1084    4020 1630            135  DEVSET    STH     R2,CONADR       CONSOLE DEVICE ADDRESS         MTE01360
1088    4010 1632            136            STH     R1,CONRD        CONSOLE READ/WRITE COMMANDS    MTE01370
108C    4000 1634            137            STH     R0,CON2ND       FORMAT COMMAND (PASLA/PALM)    MTE01380
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1090   0733              139  EXECUTE  XHR    R3,R3                                                      MTE01400
1092   9503              140           EPSR   R0,R3        CLEAR PSW                                     MTE01410
1094   C840 1566         141           LHI    R4,TITLE1    TITLE START ADDRESS                           MTE01420
1098   41D0 1354         142           BAL    R13,MESSAGE  PRINT "S16 EXT. MEMORY TEST PART 1"           MTE01430
                         143  *                                                                          MTE01440
                         144  *                                                                          MTE01450
109C   0766              145           XHR    R6,R6                                                      MTE01460
109E   4060 0034         146           STH    R6,X'34'     NEW PSW, ILLEGAL INSTRUCTION                  MTE01470
10A2   4060 0036         147           STH    R6,X'36'                                                   MTE01480
10A6   C800 12BA         148           LHI    R0,PAREPR                                                  MTE01490
10AA   4000 003E         149           STH    R0,X'3E'                                                   MTE01500
10AE   C800 130C         150           LHI    R0,ILLEGL                                                  MTE01510
10B2   4000 0036         151           STH    R0,X'36'                                                   MTE01520
10B6   C450 FFFC         152  RUNIT    NHI    R5,-1-WASDU-WASDU1                                         MTE01530
10BA   0700              153           XHR    R0,R0                                                      MTE01540
10BC   4000 162A         154           STH    R0,TOTAL     CLEAR TOTAL                                   MTE01550
10C0   4000 162C         155           STH    R0,TOTERR                                                 MTE01560
10C4   4830 1002         156  STRITEST LH     R3,PSW                                                     MTE01570
10C8   9503              157           EPSR   R0,R3        SET PSW                                       MTE01580
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          *                              S U B T E S T   0

                                  159   * STORE ADDRESS AS DATA IN EACH HALFWORD FROM '0080' TO 'OFFE'     MTE01600
                                  160   *                                                                 MTE01610
10CA    C8F0 0080                 161   TEST0    LHI    R15,X'0080'                                        MTE01620
10CE    40FF 0000                 162   TEST0.01 STH    R15,0(R15)          STORE ADRS OF HW               MTE01630
10D2    26F2                      163            AIS    R15,2                                              MTE01640
10D4    C5F0 1000                 164            CLHI   R15,X'1000'                                        MTE01650
10D8    2085                      165            BLS    TEST0.01                                           MTE01660
                                  166   *                                                                 MTE01670
10DA    C8F0 0080                 167            LHI    R15,X'80'                                          MTE01680
10DE    089F                      168   TEST0.02 LHR    R9,R15              EXPECTED DATA                  MTE01690
10E0    488F 0000                 169            LH     R8,0(R15)           OBSERVED DATA                  MTE01700
10E4    0589                      170            CLHR   R8,R9               COMPARE                        MTE01710
10E6    2333                      171            BES    TEST0.03            SKIP IF ALIKE                  MTE01720
10E8    41D0 14B6                 172            BAL    R13,ERRMSG          ERROR IF DIFFERENT             MTE01730
10EC    26F2                      173   TEST0.03 AIS    R15,2               INCREMENT ADDRESS              MTE01740
10EE    C5F0 1000                 174            CLHI   R15,X'1000'                                        MTE01750
10F2    208A                      175            BLS    TEST0.02                                           MTE01760
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        *                              S U B T E S T    1

                                 177  * STORE COMPLEMENT OF ADDRESS AS DATA FROM '0080' TO 'OFFE'        MTE01780
                                 178  *                                                                  MTE01790
        10F4    C8F0 0080        179  TEST1    LHI     R15,X'80'                                          MTE01800
        10F8    25B1             180           LCS     R11,1                                              MTE01810
        10FA    089F             181  TEST1.01 LHR     R9,R15                                             MTE01820
        10FC    079B             182           XHR     R9,R11              R9 = ONES COMP OF ADDRESS      MTE01830
        10FE    409F 0000        183           STH     R9,0(R15)           STORE                          MTE01840
        1102    26F2             184           AIS     R15,2                                              MTE01850
        1104    C5F0 1000        185           CLHI    R15,X'1000'                                        MTE01860
        1108    2087             186           BLS     TEST1.01                                           MTE01870
                                 187  *                                                                   MTE01880
        110A    C8F0 0080        188           LHI     R15,X'80'                                          MTE01890
        110E    089F             189  TEST1.02 LHR     R9,R15                                             MTE01900
        1110    079B             190           XHR     R9,R11              R9 = EXPECTED DATA             MTE01910
        1112    482F 0000        191           LH      R8,0(R15)           R8 = OBSERVED DATA             MTE01920
        1116    0589             192           CLHR    R8,R9                                              MTE01930
        1118    2333             193           BES     TEST1.03            SKIP IF EQUAL                  MTE01940
        111A    41D0 14B6        194           BAL     R13,ERRMSG                                         MTE01950
        111E    26F2             195  TEST1.03 AIS     R15,2                                              MTE01960
        1120    C5F0 1000        196           CLHI    R15,X'1000'                                        MTE01970
        1124    208B             197           BLS     TEST1.02                                           MTE01980
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*                               S U B T E S T   2
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		199	* STORE X'8000',X'4000',X'2000'...,X'0002',X'0001' IN EACH		MTE02000
		200	* 16 HALFWORD BLOCK FROM X'0080' THROUGH X'0FFE'		MTE02010
		201	*		MTE02020
1126	C8F0 0080	202	TEST2 LHI R15,X'80'		MTE02030
112A	C890 8000	203	TEST2.01 LHI R9,X'8000'		MTE02040
112E	409F 0000	204	TEST2.02 STH R9,0(R15)	STORE DATA PATTERN	MTE02050
1132	26F2	205	AIS R15,2	INCREMENT ADDRESS	MTE02060
1134	C5F0 1000	206	CLHI R15,X'1000'		MTE02070
1138	2384	207	BNLS TEST2.03	FINISHED	MTE02080
113A	9091	208	SRLS R9,1	SHIFT PATTERN	MTE02090
113C	2239	209	BZS TEST2.01	RESET TO X'8000'	MTE02100
113E	2208	210	BS TEST2.02	STORE	MTE02110
		211	*		MTE02120
1140	C8F0 0080	212	TEST2.03 LHI R15,X'80'		MTE02130
1144	C890 8000	213	TEST2.04 LHI R9,X'8000'	R9 = DATA EXPECTED	MTE02140
1148	488F 0000	214	TEST2.05 LH R8,0(R15)	R8 = DATA OBSERVED	MTE02150
114C	0589	215	CLHR R8,R9		MTE02160
114E	2333	216	BES TEST2.06	SKIP IF EQUAL	MTE02170
1150	41D0 1486	217	BAL R13,ERRMSG		MTE02180
1154	26F2	218	TEST2.06 AIS R15,2	INCREMENT ADDRESS	MTE02190
1156	C5F0 1000	219	CLHI R15,X'1000'		MTE02200
115A	2384	220	BNLS TEST3	FINISHED	MTE02210
115C	9091	221	SRLS R9,1	SHIFT EXPECTED PATTERN	MTE02220
115E	223D	222	BZS TEST2.04	RESET TO X'8000'	MTE02230
1160	220C	223	BS TEST2.05	TEST NEXT	MTE02240

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*                              S U B T E S T   3
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                            225  * STORE X'7FFF',X'BFFF',X'DFFF'...X'FFFD',X'FFFE' IN EACH      MTE02260
                            226  * 16 HALFWORD BLOCK FROM X'0080' THROUGH X'0FFE'.              MTE02270
                            227  * SEQUENCE WILL BE FROM THE TOP DOWN.                          MTE02280
                            228  *                                                             MTE02290
     1162   C8F0 0FFE       229  TEST3     LHI   R15,X'0FFE'                                    MTE02300
     1166   25B1            230            LCS   R11,1            R11 = 'FFFF'                   MTE02310
     1168   24A1            231  TEST3.01  LIS   R10,1            R10 = TRUE VERSION OF DATA PATTERN  MTE02320
     116A   089A            232  TEST3.02  LHR   R9,R10           R9 = TRUE DATA                 MTE02330
     116C   079B            233            XHR   R9,R11           R9 = FALSE DATA                MTE02340
     116E   409F 0000       234            STH   R9,0(R15)        STORE                          MTE02350
     1172   27F2            235            SIS   R15,2            DECREMENT ADDRESS              MTE02360
     1174   C5F0 0080       236            CLHI  R15,X'80'                                       MTE02370
     1178   2184            237            BLS   TEST3.03         FINISHED                       MTE02380
     117A   0AAA            238            AHR   R10,R10          SHIFT PATTERN                  MTE02390
     117C   208A            239            BCS   TEST3.01         RESET TO '0001'                MTE02400
     117E   220A            240            BS    TEST3.02                                        MTE02410
                            241  *                                                             MTE02420
     1180   C8F0 0FFE       242  TEST3.03  LHI   R15,X'0FFE'                                    MTE02430
     1184   24A1            243  TEST3.04  LIS   R10,1            TRUE VERSION OF DATA PATTERN   MTE02440
     1186   089A            244  TEST3.05  LHR   R9,R10                                          MTE02450
     1188   079B            245            XHR   R9,R11           R9 = FALSE DATA                MTE02460
     118A   488F 0000       246            LH    R8,0(R15)        R8 = OBSERVED DATA             MTE02470
     118E   0589            247            CLHR  R8,R9                                           MTE02480
     1190   2333            248            BES   TEST3.06         SKIP IF EQUAL                  MTE02490
     1192   41D0 14B6       249            BAL   R13,ERRMSG                                      MTE02500
     1196   27F2            250  TEST3.06  SIS   R15,2            DECREMENT ADDRESS              MTE02510
     1198   C5F0 0080       251            CLHI  R15,X'80'                                       MTE02520
     119C   2184            252            BLS   TEST4            FINISHED                       MTE02530
     119E   0AAA            253            AHR   R10,R10          SHIFT PATTERN                  MTE02540
     11A0   208E            254            BCS   TEST3.04         RESET TO '0001'                MTE02550
     11A2   220E            255            BS    TEST3.05         TEST NEXT                      MTE02560
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                            *                              S U B T E S T   4

                                    257   * TEST MEMORY WITH ALTERNATE HALFWORDS OF ZEROS AND ONES         MTE02580
                                    258   *                                                                MTE02590
         11A4    C8F0 0080          259   TEST4     LHI    R15,X'80'                                        MTE02600
         11A8    0799               260             XHR    R9,R9                                            MTE02610
         11AA    409F 0000          261   TEST4.01  STH    R9,0(R15)           CLEAR THE TEST AREA          MTE02620
         11AE    26F2               262             AIS    R15,2                                            MTE02630
         11B0    C5F0 1000          263             CLHI   R15,X'1000'                                      MTE02640
         11B4    2085               264             BLS    TEST4.01                                         MTE02650
                                    265   *                                                                MTE02660
         1136    25B1               266             LCS    R11,1               R11 = 'FFFF'                 MTE02670
         11B8    C8F0 0080          267             LHI    R15,X'80'                                        MTE02680
         11BC    0799               268   TEST4.02  XHR    R9,R9                                            MTE02690
         11BE    488F 0000          269             LH     R8,0(R15)           READ ZEROS                   MTE02700
         11C2    2333               270             BZS    TEST4.03                                         MTE02710
         11C4    41D0 14B6          271             BAL    R13,ERRMSG                                       MTE02720
         11C8    40BF 0002          272   TEST4.03  STH    R11,2(R15)          WRITE ONES IN NEXT CELL      MTE02730
         11CC    26F4               273             AIS    R15,4                                            MTE02740
         11CE    C5F0 1000          274             CLHI   R15,X'1000'                                      MTE02750
         11D2    208B               275             BLS    TEST4.02                                         MTE02760
                                    276   *                                                                MTE02770
         11D4    C8F0 0080          277             LHI    R15,X'80'                                        MTE02780
         11D8    2591               278             LCS    R9,1                                             MTE02790
         11DA    07PB               279             XHR    R11,R11                                          MTE02800
         11DC    40BF 0000          280   TEST4.04  STH    R11,0(R15)          WRITE ZEROS                  MTE02810
         11E0    488F 0002          281             LH     R8,2(R15)           READ ONES                    MTE02820
         11E4    0589               282             CLHR   R8,R9                                            MTE02830
         11E6    2333               283             BES    TEST4.05                                         MTE02840
         11E8    41D0 14B6          284             BAL    R13,ERRMSG                                       MTE02850
         11EC    26F4               285   TEST4.05  AIS    R15,4                                            MTE02860
         11EE    C5F0 1000          286             CLHI   R15,X'1000'                                      MTE02870
         11F2    208B               287             BLS    TEST4.04                                         MTE02880
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11F4    4830 1004    289  TEST.END LH    R3,PSW2                                             MTE02900
11F8    95C3         290           EPSR  R0,R3                                               MTE02910
11FA    2401         291           LIS   R0,1                                                MTE02920
11FC    6100 162A    292           AHM   R0,TOTAL        INCREMENT TOTAL PASSES              MTE02930
1200    C350 0008    293           THI   R5,ERRFLG       ANY ERRORS ?                        MTE02940
1204    2135         294           BNZS  TEND01                                              MTE02950
1206    C840 159C    295           LHI   R4,NOER                                             MTE02960
120A    41D0 1354    296           BAL   R13,MESSAGE     PRINT MESSAGE "NO ERROR"            MTE02970
120E    41C0 1334    297  TEND01   BAL   R12,TSTDU       CHECK CONSOLE DU                    MTE02980
1212    4230 1258    298           BNZ   KEEP9           IF DU, DISPLAY TOTAL                MTE02990
1216    C350 0002    299           THI   R5,WASDU1       WAS IT EVER DU?                     MTE03000
121A    4230 1288    300           BNZ   KEEP92          YES, PRINT TOTAL, TOTERR            MTE03010
121E    41D0 1478    301  OPTIN    BAL   R13,CRLF                                            MTE03020
1222    C800 002A    302           LHI   R0,C'*'         OUTPUT AN ASTERISK TO               MTE03030
1226    41C0 13FC    303           BAL   R12,OUTCHR      INDICATE COMMAND MODE               MTE03040
122A    2501         304           LCS   R0,1                                                MTE03050
122C    41C0 13FC    305  RDCHAR   BAL   R12,OUTCHR      DELETE                              MTE03060
1230    41D0 1486    306           BAL   R13,GETCHR      GET A CHARACTER IN R0               MTE03070
1234    C500 000D    307           CLHI  R0,X'0D'        CARRIAGE RETURN?                    MTE03080
1238    4330 1012    308           BE    START1          REPEAT TEST IF YES                  MTE03090
123C    C500 000A    309           CLHI  R0,X'0A'        LINE FEED?                          MTE03100
1240    4230 122C    310           BNE   RDCHAR                                              MTE03110
1244    D1C0 1250    311           LM    R12,ALSEQUNC                                        MTE03120
1248    D0C0 0050    312           STM   R12,X'50'       SET UP AUTOLOAD SEQUENCE            MTE03130
124C    4300 0050    313           B     X'50'           LOAD MEMORY TEST PART 2             MTE03140
1250    D500         314  ALSEQUNC DCX   D500,00CF       AL   X'CF'                          MTE03150
1252    00CF
1254    4300         315           DCX   4300,0080       B    X'80'                          MTE03160
1256    0080
                     316  *                                                                  MTE03170
1258    C650 0001    317  KEEP9    OHI   R5,WASDU        SET DU FLAG                         MTE03180
125C    2401         318  KEEP91   LIS   R0,1            WRITE TOTAL & TOTERR TO DISPLAY     MTE03190
125E    DEC0 162E    319           OC    R0,INCRMNTL                                         MTE03200
1262    DAC0 162B    320           WD    R0,TOTAL+1                                          MTE03210
1266    DAC0 162A    321           WD    R0,TOTAL                                            MTE03220
126A    DA00 162D    322           WD    R0,TOTERR+1                                         MTE03230
126E    DAC0 162C    323           WD    R0,TOTERR                                           MTE03240
1272    DEC0 162F    324           OC    R0,NORMAL                                           MTE03250
1276    4810 162A    325           LH    R1,TOTAL                                            MTE03260
127A    C510 FFFF    326           CLHI  R1,X'FFFF'                                          MTE03270
127E    4280 10C4    327           BL    STRTTEST        LOOP THROU TEST SEQUENCE AGAIN      MTE03280
                     328  *                                                                  MTE03290
1282    C610 8000    329  HALT9    LHI   R1,X'8000'                                          MTE03300
1286    9501         330           EPSR  R0,R1           HALT                                MTE03310
                     331  *                                                                  MTE03320
1288    41C0 1334    332  KEEP92   BAL   R12,TSTDU                                           MTE03330
128C    2035         333           BNZS  HALT9           WAIT FOR CONSOLE ON LINE            MTE03340
128E    C450 FFFE    334  KEEP10   NHI   R5,-1-WASDU     CLEAR DU FLAG                       MTE03350
1292    41D0 1478    335           BAL   R13,CRLF                                            MTE03360
1296    4870 162A    336           LH    R7,TOTAL                                            MTE03370
129A    41D0 1526    337           BAL   R13,PRINTR7     PRINT XXXX                          MTE03380
129E    C840 1616    338           LHI   R4,TOTALMSG                                         MTE03390
12A2    41D0 1354    339           BAL   R13,MESSAGE     PRINT     TOTAL,                    MTE03400
12A6    4870 162C    340           LH    R7,TOTERR                                           MTE03410
12AA    41D0 1526    341           BAL   R13,PRINTR7     PRINT          YYYY                 MTE03420
12AE    C840 1620    342           LHI   R4,ERRORS                                           MTE03430
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12B2   41C0 1354           343          BAL    R13,MESSAGE         PRINT                    ERRORS          MTE03440
                           344   *                                 *      XXXX TOTAL,YYYY ERRORS           MTE03450
12B6   43C0 121E           345          B      OPTIN                                                        MTE03460
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SUBROUTINES

12BA	9566		347	PARERR	EPSR	R6,R6	CAPTURE CURRENT PSW	MTE03480
12BC	C350 0200		348		THI	R5,PARITY	IGNORE FIRST PARITY ERROR	MTE03490
12C0	2135		349		BNZS	PARERR1	REACT TO ALL OTHERS	MTE03500
12C2	C650 0200		350		OHI	R5,PARITY	SET FIRST PARITY ERROR FLAG	MTE03510
12C6	C200 0038		351		LPSW	X'38'	CONTINUE	MTE03520
12CA	41D0 1478		352	PARERR1	BAL	R13,CRLF		MTE03530
12CE	C840 15A8		353		LHI	R4,MALFMSG		MTE03540
12D2	41D0 1354		354		BAL	R13,MESSAGE	PRINT "MACHINE MALFUNCTION"	MTE03550
12D6	41C0 154A		355		BAL	R12,PRINTR6	PRINT CURRENT CONDITION CODE	MTE03560
12DA	C8C0 0020		356		LHI	R0,X'20'		MTE03570
12DE	41C0 13FC		357		BAL	R12,OUTCHR		MTE03580
12E2	4870 0038		358		LH	R7,X'38'		MTE03590
12E6	41D0 1526		359		BAL	R13,PRINTR7	OLD PSW	MTE03600
12EA	C800 0020		360		LHI	R0,X'20'		MTE03610
12EE	41C0 13FC		361		BAL	R12,OUTCHR		MTE03620
12F2	4870 003A		362		LH	R7,X'3A'		MTE03630
12F6	41D0 1526		363		BAL	R13,PRINTR7	OLD LOC	MTE03640
12FA	C800 0020		364		LHI	R0,X'20'		MTE03650
12FE	41C0 13FC		365		BAL	R12,OUTCHR		MTE03660
1302	087F		366		LHR	R7,R15	OUTPUT MEMORY ADDRESS	MTE03670
1304	41D0 1526		367		BAL	R13,PRINTR7		MTE03680
1308	4300 1282		368		B	HALT9		MTE03690
130C	41D0 1478		370	ILLEGL	BAL	R13,CRLF		MTE03710
1310	C840 15C0		371		LHI	R4,ILLMSG		MTE03720
1314	41D0 1354		372		BAL	R13,MESSAGE	PRINT "ILLEGAL INSTRUCTION"	MTE03730
1318	4870 0030		373		LH	R7,X'30'		MTE03740
131C	41D0 1526		374		BAL	R13,PRINTR7	OLD PSW	MTE03750
1320	C800 0020		375		LHI	R0,X'20'		MTE03760
1324	41C0 13FC		376		BAL	R12,OUTCHR		MTE03770
1328	4870 0032		377		LH	R7,X'32'		MTE03780
132C	41D0 1526		378		BAL	R13,PRINTR7		MTE03790
1330	4300 1282		379		B	HALT9		MTE03800

SUBROUTINES

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                              381  *          S U B R O U T I N E    T S T D U              MTE03820
                              382  *                                                        MTE03830
1334    C350 0100             383  TSTDU     THI     R5,PASFLG         PASLA?              MTE03840
1338    2338                  384            BZS     TESTDU1           SKIP IF NO          MTE03850
133A    9D23                  385            SSR     R2,R3                                 MTE03860
133C    C430 00FC             386            NHI     R3,X'FC'                              MTE03870
1340    273C                  387            SIS     R3,X'0C'          BUSY & EXAMINE      MTE03880
1342    2337                  388            BZS     SETDU             YES                 MTE03890
1344    0733                  389            XHR     R3,R3             CLEAR CC            MTE03900
1346    030C                  390            BR      R12               RETURN              MTE03910
1348    9D23                  391  TESTDU1   SSR     R2,R3                                 MTE03920
134A    C430 0001             392            NHI     R3,1                                  MTE03930
134E    030C                  393            BR      R12                                   MTE03940
1350    2431                  394  SETDU     LIS     R3,1              NON ZERO CC         MTE03950
1352    030C                  395            BR      R12                                   MTE03960
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SUBROUTINES

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                                  397  *      S U B R O U T I N E   M E S S A G E                      MTE03980
                                  398  *                                                              MTE03990
      1354    4820 1630           399  MESSAGE  LH    R2,CONADR                                        MTE04000
      1358    C3E0 0100           400           THI   R5,PASFLG          PASLA?                        MTE04010
      135C    2333               401           BZS   P4                                                MTE04020
      135E    DE20 1634           402           OC    R2,CON2ND          PASLA SET UP COMMAND          MTE04030
      1362    41C0 1334           403  P4       BAL   R12,TSTDU          TEST FOR DU STATUS            MTE04040
      1366    2334               404           BZS   P1                 SKIP IF NOT DU                MTE04050
      1368    C6E0 0001           405           OHI   R5,WASDU           SET DU FLAG                   MTE04060
      136C    030D               406           BR    R13                RETURN                        MTE04070
      136E    C3E0 0001           407  P1       THI   R5,WASDU           NOT DU NOW, WAS IT?           MTE04080
      1372    4330 1394           408           BZ    P3                 SKIP IF NO                    MTE04090
      1376    2531               409           LCS   R3,1               R3 = 'FFFF'                   MTE04100
      1378    2731               410           SIS   R3,1               DELAY FOR CRT WARM-UP         MTE04110
      137A    2031               411           BTBS  3,1                                              MTE04120
      137C    C4E0 FFFE          412           NHI   R5,-1-WASDU        CLEAR DU FLAG                 MTE04130
      1380    C6E0 0002          413           OHI   R5,WASDU1          SET DU ONCE FLAG              MTE04140
      1384    25C1               414           LCS   R0,1                                             MTE04150
      1386    2444               415           LIS   R4,4                                             MTE04160
      1388    41C0 13FC          416  P2       BAL   R12,OUTCHR         OUTPUT 4 DELETES              MTE04170
      138C    2741               417           SIS   R4,1                                             MTE04180
      138E    2023               418           BPS   P2                                               MTE04190
      1390    4300 128E          419           B     KEEP10             PRINT TOTAL, TOTERR           MTE04200
                                  420  *                                                              MTE04210
      1394    D304 0000          421  P3       LB    R0,0(R4)           PICK UP MESSAGE CHARACTER     MTE04220
      1398    41C0 13FC          422           BAL   R12,OUTCHR         OUTPUT IT                     MTE04230
      139C    2641               423           AIS   R4,1                                             MTE04240
      139E    C4C0 007F          424           NHI   R0,X'7F'                                         MTE04250
      13A2    C500 007F          425           CLHI  R0,X'7F'           DONE WHEN OUTPUT DELETE       MTE04260
      13A6    2039               426           BNES  P3                 EXIT THROUGH TSTBRK           MTE04270
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SUBROUTINES

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                              428  *        S U B R O U T I N E   T S T B R K                        MTE04290
                              429  *                                                                 MTE04300
13A8   4820 1630              430  TSTBRK   LH     R2,CONADR                                          MTE04310
13AC   DF20 1632              431           OC     R2,CONRD       SELECT READ MODE                    MTE04320
13B0   9D23                   432           SSR    R2,R3                                              MTE04330
13B2   C330 0020              433           THI    R3,X'20'       LINE BREAK STATUS?                  MTE04340
13B6   033D                   434           BZR    R13            EXIT IF NO                          MTE04350
13B8   C350 0004              435           THI    R5,MICROFLG    MICRO I/O BUS?                      MTE04360
13BC   233E                   436           BZS    TSTBRK2        SKIP IF NO                          MTE04370
13BE   C330 0008              437  TSTBRK0  THI    R3,8           BUSY ALSO SET?                      MTE04380
13C2   2134                   438           BNZS   TSTBRK1        SKIP IF YES                         MTE04390
13C4   9B20                   439           RDR    R2,R0          DUMMY READ                          MTE04400
13C6   9D23                   440           SSR    R2,R3                                              MTE04410
13C8   22E2                   441           BFBS   8,2            WAIT FOR BUSY TO SET                MTE04420
13CA   9D23                   442  TSTBRK1  SSR    R2,R3                                              MTE04430
13CC   C330 0020              443           THI    R3,X'20'                                           MTE04440
13D0   2039                   444           BNZS   TSTBRK0        LOOP UNTIL BREAK RESETS             MTE04450
13D2   9B20                   445           RDR    R2,R0                                              MTE04460
13D4   4300 13F8              446           B      TSTBRK4        TAKE BREAK EXIT                     MTE04470
13D8   C350 0100              447  TSTBRK2  THI    R5,PASFLG      PASLA?                              MTE04480
13DC   233A                   448           BZS    TSTBRK3        SKIP IF NO                          MTE04490
13DE   C330 0008              449           THI    R3,X'08'       BUSY ALSO SET?                      MTE04500
13E2   023D                   450           BNZR   R13            EXIT IF YES, BREAK ACKNOWLEGED      MTE04510
13E4   9B20                   451           RDR    R2,R0          READ THE CHARACTER                  MTE04520
13E6   9D23                   452           SSR    R2,R3                                              MTE04530
13E8   2281                   453           BFBS   8,1            WAIT FOR BUSY                       MTE04540
13EA   0800                   454           LHR    R0,R0                                              MTE04550
13EC   023D                   455           BNZR   R13            EXIT IF FRAMING ERROR               MTE04560
13EE   2305                   456           BS     TSTBRK4                                            MTE04570
13F0   9D23                   457  TSTBRK3  SSR    R2,R3                                              MTE04580
13F2   C330 0020              458           THI    R3,X'20'                                           MIE04590
13F6   2033                   459           BNZS   TSTBRK3        WAIT FOR BREAK TO RELEASE           MTE04600
13F8   4300 121E              460  TSTBRK4  B      OPTIN                                              MTE04610
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SUBROUTINES

			462	*	S U B R O U T I N E	O U T C H R		MTE04630
			463	*				MTE04640
13FC	40C0	1460	464	OUTCHR	STH	R12,OUT1+2	SAVE RETURN ADDRESS	MTE04650
1400	C350	0080	465		THI	R5,CAROUSEL	CAROUSEL 300?	MTE04660
1404	4330	1442	466		BZ	OUTCHR2	SKIP IF NO	MTE04670
1408	C450	FFBF	467		NHI	R5,-1-PAUSE	RESET FLAG	MTE04680
140C	41C0	1334	468	OTC.0	BAL	R12,TSTDU	ON LINE?	MTE04690
1410	4230	145A	469		BNZ	OUT0	SKIP IF NO	MTE04700
1414	9D23		470		SSR	R2,R3		MTE04710
1416	2386		471		BNCS	OTC.2	BRANCH IF NOT BUSY	MTE04720
1418	C350	0040	472	OTC.1	THI	R5,PAUSE		MTE04730
141C	2038		473		BNZS	OTC.0	IF FLAG SET, WAIT FOR DC2	MTE04740
141E	4300	1442	474		B	OUTCHR2	PRESS ON	MTE04750
1422	9B23		475	OTC.2	RDR	R2,R3	DC2,DC4	MTE04760
1424	C430	007F	476		NHI	R3,X'7F'		MTE04770
1428	CB30	0012	477		SHI	R3,X'12'	DC2?	MTE04780
142C	2134		478		BNZS	OTC.3	SKIP IF NO	MTE04790
142E	C450	FFBF	479		NHI	R5,-1-PAUSE	RE-SET FLAG	MTE04800
1432	23C8		480		BS	OUTCHR2		MTE04810
1434	2732		481	OTC.3	SIS	R3,2	DC4?	MTE04820
1436	4230	140C	482		BNZ	OTC.0	NO, KEEP LOOKING	MTE04830
143A	C650	0040	483		CHI	R5,PAUSE	SET FLAG	MTE04840
143E	4300	140C	484		B	OTC.0	LOOK FOR DC2	MTE04850
			485	*				MTE04860
1442	41C0	1334	486	OUTCHR2	BAL	R12,TSTDU		MTE04870
1446	213A		487		BNZS	OUT0	BRANCH IF DU	MTE04880
1448	C350	0100	488	SETUP	THI	R5,PASFLG	PASLA?	MTE04890
144C	2333		489		BZS	SETUP1	SKIP IF NO	MTE04900
144E	C620	0001	490		OHI	R2,1	SELECT XMIT ADDRESS	MTE04910
1452	DE20	1633	491	SETUP1	OC	R2,CONWRT	SELECT WRITE MODE	MTE04920
1456	9D23		492	OTC.4	SSR	R2,R3		MTE04930
1458	2315		493		BNMS	CONT02		MTE04940
145A	C650	0001	494	OUT0	OHI	R5,WASDU	SET DU FLAG	MTE04950
145E	4300	145E	495	OUT1	B	OUT1	RETURN	MTE04960
			496	*				MTE04970
1462	C530	000C	497	CONT02	CLHI	R3,12		MTE04980
1466	2236		498		BES	OUT0	PASLA DU	MTE04990
1468	C330	0008	499		THI	R3,8		MTE05000
146C	203B		500		BNZS	OTC.4	LOOP ON BUSY	MTE05010
146E	9A20		501		WDR	R2,R0	OUTPUT CHARACTER	MTE05020
1470	9D23		502	OTC.5	SSR	R2,R3		MTE05030
1472	203C		503		BNZS	OUT0	EXIT IF DU	MTE05040
1474	2082		504		BCS	OTC.5	WAIT FOR BUSY	MTE05050
1476	22CC		505		BS	OUT1	RETURN	MTE05060

SUBROUTINES

		507	*		S U B R O U T I N E C R L F		MTE05080
		508	*				MTE05090
1478	240D	509	CRLF	LIS	R0,X'0D'	CARRIAGE RETURN	MTE05100
147A	41C0 13FC	510		BAL	R12,OUTCHR		MTE05110
147E	240A	511		LIS	R0,X'0A'	LINE FEED	MTE05120
1480	41C0 13FC	512		BAL	R12,OUTCHR		MTE05130
1484	030D	513		BR	R13		MTE05140
		515	*		S U B R O U T I N E G E T C H R		MTE05160
		516	*				MTE05170
1486	4820 1630	517	GETCHR	LH	R2,CONADR	PICK UP DEVICE NUMBER	MTE05180
148A	DE20 1632	518		OC	R2,CONRD		MTE05190
148E	9B20	519		RDR	R2,R0	FORCE BUSY	MTE05200
1490	9D20	520		SSR	R2,R0		MTE05210
1492	021D	521		BTCR	1,R13	RETURN IF DU	MTE05220
1494	2082	522		BTBS	8,2	LOOP ON BUSY	MTE05230
1496	9B20	523		RDR	R2,R0		MTE05240
1498	C350 0004	524		THI	R5,MICROFLG	SEE IF MICRO I/O BUS	MTE05250
149C	2333	525		BZS	SENSET	SKIP IF NO	MTE05260
149E	9A20	526		WDR	R2,R0	ECHO	MTE05270
14A0	23C8	527		BS	SENSEX		MTE05280
14A2	C350 0080	528	SENSET	THI	R5,CAROUSEL	CAROUSEL 300?	MTE05290
14A6	2335	529		BZS	SENSEX	SKIP IF NO	MTE05300
14A8	2621	530		AIS	R2,1	ODD ADDRESS	MTE05310
14AA	9D23	531	SENSEM	SSR	R2,R3		MTE05320
14AC	2081	532		BCS	SENSEM		MTE05330
14AE	9A20	533		WDR	R2,R0		MTE05340
14B0	C400 007F	534	SENSEX	NHI	R0,X'7F'		MTE05350
14B4	030D	535		BR	R13		MTE05360

SUBROUTINES

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                              537  *          S U B R O U T I N E    E R R M S G                        MTE05380
                              538  *                                                                    MTE05390
14B6   4820 1630              539  ERRMSG   LH    R2,CONADR                                              MTE05400
14BA   C650 0008              540           CHI   R5,ERRFLG        SET ERROR FLAG                        MTE05410
14BE   41C0 1334              541           BAL   R12,TSTDU        TEST DU ON CONSOLE                    MTE05420
14C2   233B                   542           BZS   ERRMSG1          CONTINUE IF NO                        MTE05430
14C4   4800 162C              543           LH    R0,TOTERR                                              MTE05440
14C8   26C1                   544           AIS   R0,1             INCREMENT ERROR TALLY                 MTE05450
14CA   4000 162C              545           STH   R0,TOTERR                                              MTE05460
14CE   C500 FFFF              546           CLHI  R0,X'FFFF'                                             MTE05470
14D2   023D                   547           BNER  R13                                                   MTE05480
14D4   4300 1282              548           B     HALT9                                                 MTE05490
14D8   40D0 1524              549  ERRMSG1  STH   R13,RETURN       SAVE RETURN                           MTE05500
14DC   41D0 1478              550           BAL   R13,CRLF         CARRIAGE RETURN, LINE-FEED            MTE05510
14E0   4800 162C              551           LH    R0,TOTERR                                              MTE05520
14E4   2135                   552           BNZS  ERRMSG2          SKIP IF NOT FIRST ERROR               MTE05530
14E6   C840 15D8              553           LHI   R4,MEMORY                                              MTE05540
14EA   41D0 1354              554           BAL   R13,MESSAGE      OUTPUT TWO LINE MESSAGE:              MTE05550
                              555  *                               MEMORY    DATA       DATA            MTE05560
                              556  *                               LOCATION EXPECTED OBSERVED           MTE05570
                              557  *                                                                    MTE05580
14EE   24C1                   558  ERRMSG2  LIS   R0,1                                                   MTE05590
14F0   61C0 162C              559           AHM   R0,TOTERR        INCREMENT ERROR TALLY                 MTE05600
14F4   C800 0020              560           LHI   R0,X'20'                                               MTE05610
14F8   41C0 13FC              561           BAL   R12,OUTCHR       TWO SPACES                            MTE05620
14FC   41C0 13FC              562           BAL   R12,OUTCHR                                             MTE05630
1500   087F                   563           LHR   R7,R15                                                MTE05640
1502   41D0 1526              564           BAL   R13,PRINTR7      MEMORY LOCATION                       MTE05650
1506   C840 1612              565           LHI   R4,SPACE3                                              MTE05660
150A   41D0 1354              566           BAL   R13,MESSAGE      THREE SPACES                          MTE05670
150E   0879                   567           LHR   R7,R9                                                 MTE05680
1510   41D0 1526              568           BAL   R13,PRINTR7      DATA EXPECTED                         MTE05690
1514   C840 1610              569           LHI   R4,SPACE5                                              MTE05700
1518   41D0 1354              570           BAL   R13,MESSAGE      FIVE SPACES                           MTE05710
151C   0878                   571           LHR   R7,R8                                                 MTE05720
151E   41D0 1526              572           BAL   R13,PRINTR7      DATA OBSERVED                         MTE05730
1522   4300 1524              573           B     RETURN                                                MTE05740
       00C0 1524              574  RETURN   EQU   *-2                                                    MTE05750
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SUBROUTINES

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                            576  *      S U B R O U T I N E   P R I N T R 7            MTE05770
                            577  *                                                     MTE05780
1526   0766                 578  PRINTR7  XHR   R6,R6            R6,R7 = 32 BIT REGISTER MTE05790
1528   ED60 0004            579           SLL   R6,4             R6 = R7 0:3            MTE05800
152C   41C0 154A            580           BAL   R12,PRINTR6      PRINT IT              MTE05810
1530   ED60 0004            581           SLL   R6,4             R6 = R7 4:7           MTE05820
1534   41C0 154A            582           BAL   R12,PRINTR6      PRINT IT              MTE05830
1538   ED60 0004            583           SLL   R6,4             R6 = R7 8:11          MTE05840
153C   41C0 154A            584           BAL   R12,PRINTR6      PRINT IT              MTE05850
1540   ED60 0004            585           SLL   R6,4             R6 = R7 12:15         MTE05860
1544   41C0 154A            586           BAL   R12,PRINTR6      PRINT IT              MTE05870
1548   030D                 587           BR    R13                                   MTE05880


                            589  *      S U B R O U T I N E   P R I N T R 6            MTE05900
                            590  *                                                     MTE05910
154A   C460 000F            591  PRINTR6  NHI   R6,X'F'                                MTE05920
154E   D306 1556            592           LB    R0,ASCII(R6)                           MTE05930
1552   4300 13FC            593           B     OUTCHR           EXIT THROUGH OUTCHR   MTE05940
                            594  *                                                     MTE05950
1556   30313233            595  ASCII    DC    C'0123456789ABCDEF'                     MTE05960
       34353637
       38394142
       43444546
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MESSAGES AND BUFFERS

```
1566    0DCA                    597 TITLE1  DCX     0D0A,0000                                              MTE05980
1568    0000
156A    382F3136                598         DC      C'8/16 E EXTENDED MEMORY TEST PART 1  06-221R00'       MTE05990
        20452045
        5854454E
        44454420
        4D454D4F
        52592054
        45535420
        50415254
        20312020
        30362D32
        32315230
        3020
1598    0D0A                    599         DCX     0D0A,FFFF                                              MTE06000
159A    FFFF
159C    0000                    600 NOER    DC      X'0000',C'NO ERROR',X'FFFF'                            MTE06010
159E    4E4F2045
        52524F52
15A6    FFFF
15A8    0000                    601 MALFMSG DC      0,C'MACHINE MALFUNCTION ',X'FFFF'                      MTE06020
15AA    4D414348
        494E4520
        4D414C46
        55454354
        494F4520
15BE    FFFF
15C0    0000                    602 ILLMSG  DC      0,C'ILLEGAL INSTRUCTION ',X'FFFF'                      MTE06030
15C2    494C4C45
        47414C20
        494E5354
        52554354
        494F4520
15D6    FFFF
15D8    4D454D4F                603 MEMORY  DC      C'MEMORY    DATA     DATA',X'0D0A'                      MTE06040
        52592020
        20444154
        41202020
        20204441
        5441
15EE    0DCA
15F0    0000                    604         DC      X'0000'                                                MTE06050
15F2    4C4F4341                605         DC      C'LOCATION EXPECTED OBSERVED',X'0D0A',X'FFFF'           MTE06060
        54494F4E
        20455850
        45435445
        44204F42
        53455256
        4544
160C    0D0A
160E    FFFF
1610    2020                    606 SPACE5  DC      X'2020'                                                MTE06070
1612    2020                    607 SPACE3  DC      X'2020',X'20FF'                                        MTE06080
1614    20FF
```

MESSAGES AND BUFFERS

1616	20544F54	608	TOTALMSG	DC	C' TOTAL, ',X'FFFF'	MTE06090
	414C2C20					
161E	FFFF					
1620	20455252	609	ERRORS	DC	C' ERRORS ',X'FFFF'	MTE06100
	4F525320					
1628	FFFF					
162A	0000	610	TOTAL	DCX	0	MTE06110
162C	00C0	611	TOTERR	DCX	0	MTE06120
162E	40	612	INCRMNTL	DB	X'40'	MTE06130
162F	80	613	NORMAL	DB	X'80'	MTE06140
1630	0000	614	CONADR	DCX	0	MTE06150
1632	00	615	CONRD	DB	0	MTE06160
1633	00	616	CONWRT	DB	0	MTE06170
1634	0000	617	CON2ND	DC	0	MTE06180
1636	0000	618	CONRQ2S	DC	0	MTE06190
1638	0303	619	MICRORST	DCX	0303	MTE06200
163A	8222	620	MICRORD	DCX	8222	MTE06210
163C	A9AB	621	CARRD	DCX	A9AB	MTE06220
163E	F000	622	CAR2ND	DCX	F000	MTE06230
1640	23	623	CARRQ2S	DB	X'23'	MTE06240
1641	3B	624	CRTRQ2S	DB	X'3B'	MTE06250
1642	B9AB	625	CRTRD	DCX	B9AB	MTE06260
1644	F879	626	CRT2ND	DCX	F879	MTE06270
1646	A4D8	627	CLIFRD	DCX	A4D8	MTE06280
1648	0000	628	CLIF2ND	DCX	0000	MTE06290
	0000 1649	629	LNZB	EQU	*-1	MTE06300

CHKSUM/M17 PUNCHER

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164A    2400              631  SCHKSUM  LIS    R0,0              PUNCH M17 TAPE WITH CHECKSUM        MTE06320
164C    9510              632           EPSR   R1,R0             SELECT REG.SET 0                    MTE06330
                         633  *                                                                     MTE06340
164E    C810 1000         634           LDAI   R1,ORIGIN1        START                               MTE06350
1652    2421              635           LIS    R2,1              INCREMENT                           MTE06360
1654    C830 1649         636           LDAI   R3,LNZB           FINAL                               MTE06370
1658    2440              637           LIS    R4,0              CHECKSUM BYTE                       MTE06380
165A    D351 0000         638  SGEN     LB     R5,0(R1)                                              MTE06390
165E    0745              639           XAR    R4,R5                                                 MTE06400
1660    C110 165A         640           BXLE   R1,SGEN                                               MTE06410
1664    D240 008D         641           STB    R4,MN+3           CHECKSUM BYTE TO BOOT LOADER        MTE06420
                         642  *                                                                     MTE06430
1668    C810 0080         643  STAPE    LHI    R1,X'0080'                                            MTE06440
166C    9E21              644           OCR    R2,R1             DISPLAY : NORMAL MODE               MTE06450
166E    9444              645           EXBR   R4,R4                                                 MTE06460
1670    9824              646           WHR    R2,R4             CHECKSUM BYTE TO D1                 MTE06470
1672    9411              647           EXBR   R1,R1                                                 MTE06480
1674    9501              648           EPSR   R0,R1             HALT PROCESSOR.                     MTE06490


1676    D360 007A         650  SPUNCH   LB     R6,X'7A'          GET BOUTDV (PUNCH) ADDRESS.         MTE06510
167A    DE60 007B         651           OC     R6,X'7B'          START TAPE PUNCH                    MTE06520
167E    9D60              652           SSR    R6,R0                                                 MTE06530
1680    2081              653           BTBS   8,1                                                   MTE06540
1682    41F0 16C4         654           BAL    R15,STAPL         PUNCH LEADER                        MTE06550
1686    9411              655           EXBR   R1,R1             (R1) = X'0080'                      MTE06560
1688    C830 00CF         656           LHI    R3,X'CF'                                              MTE06570
168C    DA61 0000         657  SPNCH1   WD     R6,0(R1)          PUNCH BOOT LOADER                   MTE06580
1690    9D60              658           SSR    R6,R0                                                 MTE06590
1692    2081              659           BTBS   8,1                                                   MTE06600
1694    C110 168C         660           BXLE   R1,SPNCH1                                             MTE06610
1698    41F0 16CA         661           BAL    R15,STAPL1        PUNCH ONE-FOLD GAP.                 MTE06620
                         662  *                                                                     MTE06630
169C    D340 008D         663           LB     R4,MN+3           GET CHECKSUM BYTE                   MTE06640
16A0    C810 1000         664           LDAI   R1,ORIGIN1        (NORMALLY X'A00')                   MTE06650
16A4    C830 1649         665           LDAI   R3,LNZB                                               MTE06660
16A8    D351 0000         666  SPNCH2   LB     R5,0(R1)          PUNCH PROGRAM                       MTE06670
16AC    0745              667           XAR    R4,R5                                                 MTE06680
16AE    9A65              668           WDR    R6,R5                                                 MTE06690
16B0    9401              669           EXBR   R0,R1                                                 MTE06700
16B2    9820              670           WHR    R2,R0             DATA ADDRESS TO DISPLAY             MTE06710
16B4    9D60              671           SSR    R6,R0                                                 MTE06720
16B6    2081              672           BTBS   8,1                                                   MTE06730
16B8    C110 16A8         673           BXLE   R1,SPNCH2                                             MTE06740
16BC    41F0 16C4         674           BAL    R15,STAPL         PUNCH TRAILER.                      MTE06750
16C0    4300 1668         675           B      STAPE             DISPLAY CHECKSUM, HALT PROCESSOR    MTE06760


16C4    C800 0100         677  STAPL    LHI    R0,256            TO PUNCH BLANK LEADER               MTE06780
16C8    2303              678           BS     STAPLP                                               MTE06790
16CA    C800 0055         679  STAPL1   LHI    R0,85             TO PUNCH 1-FOLD GAP                 MTE06800
16CE    2701              680  STAPLP   SIS    R0,1                                                  MTE06810
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CHKSUM/M17 PUNCHER

16D0	032F		681	BNPR	R15	RETURN	MTE06820
16D2	2430		682	LIS	R3,0		MTE06830
16D4	9A63		683	WDR	R6,R3	PUNCH BLANK FRAME	MTE06840
16D6	9D68		684	SSR	R6,R8		MTE06850
16D8	2081		685	BTBS	8,1		MTE06860
16DA	2206		686	BS	STAPLP	CONTINUE.	MTE06870
16DC			687	END			MTE06880

CHKSUM/M17 PUNCHER

NO ERRORS   0 SQUEZ PASSES

CAL 04-01

SCHKSUM	164A				
SGEN	165A	640			
SPNCH1	168C	650			
SPNCH2	16A3	673			
SPUNCH	1676				
STAPE	1668	675			
STAPL	16C4	654	674		
STAPL1	16CA	661			
STAPLP	16CE	678	686		
ABSTOP	16DC				
ADC	0002				
ALSEQUNC	1250	311			
ASCII	1556	592			
C300	1C44	106			
C300ADR	100C	117			
CAR2ND	163E	119			
CAROUSEL	0080	524	528	465	
CARRD	163C	118			
CARRQ2S	1640	120			
CLIF2ND	1648				
CLIFADR	109A				
CLIFRD	1646				
CON2ND	1634				
CONADR	1630	539	539	517	539
CONRD	1632	518			
CONRQ2S	1636				
CONTO2	1462	493			
CONWRT	1633	491			
CRLF	1478	301	550	550	
CRT	105A	104			
CRT2	106A				
CRT2ND	1644				
CRTRD	1642				
CRTRQ2S	1641				
DEVSET	1084	116			
ERRFLG	0008	293	540		
ERRMSG	14B6	284			
ERRMSG1	14D8	542			
ERRMSG2	14EE	552			
ERRORS	1620				
EXECUTE	1090				
GETCHR	1486	306			
HALT3	00B4				
HALT9	1282	548	548		
ILLEGL	130C				
ILLMSG	15C0				
IMPTOP	0000R				
INCRMNTL	162E	319			
IO	1010	101			
KEEP10	128E				

CHKSUM/M17 PUNCHER

Symbol	Addr												
KEEP9	1258	298											
KEEP91	125C												
KEEP92	1288	300											
LADC	0001												
LEADER	0096	71											
LNZB	1649	63	636	665									
LOAD	00A0	78											
MALFMSG	15A8												
MEMORY	15D8	553											
MESSAGE	1354	554	566	570	296	554	566	570	554	566			
MICROFLG	0004	111	524	524									
MICROIC	100E	112											
MICRORD	163A	113											
MICRORST	1638	115											
MN	008A	641	663										
NOER	159C	295											
NORMAL	162F												
OPTIN	121E	460											
ORIGIN1	1000	61	82	634	664								
OTC.0	140C	473	482	484									
OTC.1	1418												
OTC.2	1422	471											
OTC.3	1434	478											
OTC.4	1456	500											
OTC.5	1470	504											
OUT0	145A	469	487	498	503								
OUT1	145E	464	495	505									
OUTCHR	13FC	303	305	561	562	593	510	512	561	562	593		
OUTCHR2	1442	466	474	480									
P1	136E												
P2	1388												
P3	1394												
P4	1362												
PARERR	12BA												
PARERR1	12CA												
PARITY	0200												
PASFLG	0100	488											
PASLADR	1008												
PAUSE	0040	467	472	479	483								
PRINTR6	154A	580	582	584	586	580							
PRINTR7	1526	564	568	572	564	568	572						
PSW	1002												
PSW2	1004	289											
PURETOP	0000R												
R0	0000	101	103	105	108	114	114	119	526	533	534	543	544	545
		546	551	558	559	560	592	631	632	648	652	658	669	670
		671	677	679	680	454	454	290	291	292	302	304	307	309
		318	319	320	321	322	323	526	533	534	543	544	545	546
		551	558	559	560	592	631	632	648	652	658	669	670	671
		677	679	680	454	454	501	509	511	519	520	523	526	533
R1	0001	61	72	78	113	118	632	634	638	640	643	644	647	647
		648	655	655	657	660	664	666	669	673	632	634	638	640
		643	644	647										
R10	000A												

CHKSUM/M17 PUNCHER

R11	000B	279	279	280									
R12	000C	297	303	305	311	312	541	561	562	530	582	584	586	464
		468	486	510	512	541	561	562	580	582	584	586	
R13	000D	535	547	549	550	554	564	566	568	570	572	587	455	284
		296	301	306	535	547	549	550	554	564	566	568	570	572
		537	455	513	521	535	547	549	550	554	564	566	568	570
		572	587										
R14	000E												
R15	000F	563	654	661	674	681	280	281	285	286	563	654	661	674
		681	563	654	661	674	681						
R2	0002	62	74	79	112	115	117	526	530	531	533	539	635	644
		646	670	457	470	526	530	531	533	539	635	644	646	670
		457	470	475	490	491	492	501	502	517	518	519	520	523
		526	530	531	533	539	635						
R3	0003	63	531	636	656	665	682	683	452	457	458	289	290	531
		636	656	665	682	683	452	457	458	470	475	476	477	481
		492	497	499	502	531	636	656	665	682	683		
R4	0004	55	66	67	69	75	77	120	553	565	569	637	639	641
		645	645	646	663	667	295	553	565	569	637	639	641	645
		645	646	663	667								
R5	0005	67	69	70	70	72	73	75	77	102	102	111	121	528
		540	638	639	666	667	668	465	467	293	299	317	528	540
		638	639	666	667	668	465	467	472	479	483	488	494	524
		528	540	638	639								
R6	0006	64	73	74	79	578	578	579	581	583	585	591	592	650
		651	652	657	658	668	671	683	684	578	578	579	531	583
		535	591	592									
R7	0007	563	567	571	563	567	571						
R8	0008	571	684	281	282	571	684	571	684				
R9	0009	567	282	567	567								
RDCHAR	122C	310											
RETURN	1524	549	573										
RUNIT	10B6												
SENSEM	14AA	532											
SENSET	14A2	525											
SENSEX	14B0	527	529										
SETDU	1350												
SETUP	1448												
SETUP1	1452	489											
SPACE3	1612	565											
SPACE5	1610	569											
START1	1012	85	308										
STARTX	00B8	30											
STRTTEST	10C4												
TENDO1	120E	294											
TEST.END	11F4												
TEST0	10CA												
TEST0.01	10CE												
TEST0.02	10DE												
TEST0.03	10FC												
TEST1	10F4												
TEST1.01	10FA												
TEST1.02	110F												
TEST1.03	111E												

CHKSUM/M17 PUNCHER

TEST2	1126								
TEST2.01	112A								
TEST2.02	112E								
TEST2.03	1140								
TEST2.04	1144								
TEST2.05	1148								
TEST2.06	1154								
TEST3	1162								
TEST3.01	1168								
TEST3.02	116A								
TEST3.03	1180								
TEST3.04	1184								
TEST3.05	1186								
TEST3.06	1196								
TEST4	11A4								
TEST4.01	11AA								
TEST4.02	11BC								
TEST4.03	11C8								
TEST4.04	11DC	287							
TEST4.05	11EC	283							
TESTDU1	1348								
TITLE1	1566								
TOTAL	162A	292	320	321					
TOTALMSG	1616								
TOTERR	162C	543	545	551	559	322	524	543	545
TSTBRK	13A8								
TSTBRK0	13BE								
TSTBRK1	13CA								
TSTBRK2	13D8								
TSTBRK3	13F0	459							
TSTBRK4	13F8	456							
TSTDU	1334	297	541	468	486	541			
TTY	1078	107	109						
WASDU	0001	317	494						
WASDU1	0002	299							

PROG= MT816E   ASSEMBLED BY CAL 03-066R04-01 (32-BIT)

```
1                SCRAT                                                      MTE00020
2                CROSS                                                      MTE00030
3                TARGT   16                                                 MTE00040


5    * PROGRAM IS DESIGNED TO TEST ALL OF MEMORY FROM THE TOP OF THE        MTE00060
6    * TEST PROGRAM TO THE TOP OF AVAILABLE MEMORY.  THE HOST PROCESSOR     MTE00070
7    * IS ASSUMED TO BE A 7/16 OR EQUIVALENT WITH A MAXIMUM ADDRESSING      MTE00080
8    * CAPABILITY OF 256 KB (HEX '40000').  THE PROGRAM ALSO ASSUMES        MTE00090
9    * THAT ALL OF MEMORY IS CONTIGUOUS - NO HOLES IN MEMORY.              MTE00100
10   *                                                                      MTE00110
11   * DURING TESTING, ALL KNOWN WORST-CASE DATA PATTERNS ARE USED.         MTE00120
12   * EVERY AVAILABLE LOCATION IS TESTED AS A DATA SOURCE AND AS AN        MTE00130
13   * INSTRUCTION SOURCE.  THE LATTER IS ACCOMPLISHED BY RELOCATING        MTE00140
14   * A SUBROUTINE THROUGH EVERY HALFWORD AND THEN EXECUTING IT.           MTE00150
15   *                                                                      MTE00160
16   * PROGRAM IS LOADED USING THE STANDARD 50 SEQUENCE                     MTE00170
17   * AFTER LOADING, THE PROCESSOR HALTS.  IF THE CHECKSUM BYTE            MTE00180
18   * SHOWN ON THE LOW ORDER 16 DISPLAY INDICATORS IS NOT ZERO,           MTE00190
19   * REPEAT THE LOADING PROCESS.                                          MTE00200
20   *                                                                      MTE00210
21   * IF THE CONSOLE DEVICE IS A TTY,GDT,CRT OR CAROUSEL 15,30 OR 35       MTE00220
22   * ON A CURRENT LOOP INTERFACE (DEVICE ADDRESS X'02'), PRESS "RUN".     MTE00230
23   *                                                                      MTE00240
24   * IF THE CONSOLE DEVICE IS NOT A TTY,GDT,CRT OR CAROUSEL 15,30 OR 35 ON MTE00250
25   * A CURRENT LOOP INTERFACE, THE HALFWORD LABELED "IO" MUST BE MODIFIED MTE00260
26   *                                                                      MTE00270
27   * CONSOLE DEVICE IDENTIFIER:                                           MTE00280
28   *                                                                      MTE00290
29   *            01    = GDT OR CRT ON PASLA OR PALM (FDX, HIGHEST BAUD RATE) MTE00300
30   *            02    = TTY,GDT,CRT OR CAROUSEL 15,30 OR 35 ON CURRENT LOOP INF MTE00310
31   *            03    = RESERVED, INTERPRETED AS '02'                     MTE00320
32   *            04    = CAROUSEL 300 ON PASLA OR PALM (FDX, HIGHEST BAUD RATE) MTE00330
33   *            05     = TTY,GDT,CRT OR CAROUSEL 15,30 OR 35 ON MICRO I/O CLI MTE00340
34   *            00 AND 06:FF = RESERVED, INTERPRETED AS '02'              MTE00350
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GENERAL REGISTER ASSIGNMENTS

```
                        36  *                                                                           MTE00370
0000 0000               37  R0       EQU   0              ASCII CHARACTER FOR I/C                        MTE00380
0000 0001               38  R1       EQU   1              PROGRAM ADDRESS                                MTE00390
0000 0002               39  R2       EQU   2              CONSOLE DEVICE NUMBER                          MTE00400
0000 0003               40  R3       EQU   3              G.P. ACCUMULATOR                               MTE00410
0000 0004               41  R4       EQU   4              MESSAGE START ADDRESS                          MTE00420
0000 0005               42  R5       EQU   5              STATE REGISTER                                 MTE00430
0000 0006               43  R6       EQU   6              HEX DIGIT FOR ERROR PRINT-OUT                  MTE00440
0000 0007               44  R7       EQU   7              HALFWORD FOR ERROR PRINT                       MTE00450
0000 0008               45  R8       EQU   8              OBSERVED MEMORY DATA                           MTE00460
0000 0009               46  R9       EQU   9              EXPECTED MEMORY DATA                           MTE00470
0000 000A               47  R10      EQU   10             DATA PATTERN REGISTER                          MTE00480
0000 000B               48  R11      EQU   11             DATA PATTERN REGISTER                          MTE00490
0000 000C               49  R12      EQU   12             MINOR LINK REGISTER                            MTE00500
0000 000D               50  R13      EQU   13             MAJOR LINK REGISTER                            MTE00510
0000 000E               51  R14      EQU   14             MS MEMORY ADRS                                 MTE00520
0000 000F               52  R15      EQU   15             LS MEMORY ADRS                                 MTE00530
                        53  *                                                                           MTE00540
                        54  *                                                                           MTE00550
                        55  *                                                                           MTE00560
                        56  * STATE REGISTER BIT DEFINITIONS                                            MTE00570
                        57  *                                                                           MTE00580
0000 0001               58  WASDU    EQU   X'0001'        CONSOLE DU FLAG                                MTE00590
0000 0002               59  WASDU1   EQU   X'0002'        AUXILARY DU FLAG                               MTE00600
0000 0004               60  MICROFLG EQU   X'0004'        CONSOLE MICRO I/O BUS FLAG                     MTE00610
0000 0008               61  ERRFLG   EQU   X'0008'                                                       MTE00620
0000 0020               62  TSTFLG   EQU   X'0020'                                                       MTE00630
0000 0040               63  PAUSE    EQU   X'0040'                                                       MTE00640
0000 0080               64  CAROUSEL EQU   X'0080'        CAROUSEL 300 FLAG                              MTE00650
0000 0100               65  PASFLG   EQU   X'0100'        PASLA/PALM FLAG                                MTE00660
0000 0400               66  ISITERR  EQU   X'0400'        ERROR MESSAGE FLAG                             MTE00670
0000 0800               67  EXTMEM   EQU   X'0800'        MORE THAN 64KB                                 MTE00680
0000 1000               68  PARITY   EQU   X'1000'        FIRST PARITY ERROR FLAG                        MTE00690
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BOOT LOADER

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0000R                        70            ORG     X'80'                                                   MTE00710
0080    C810 0100            71            LHI     R1,ORIGIN1          START ADDRESS                        MTE00720
0084    2421                 72            LIS     R2,1                LOAD INCREMENT VALUE                 MTE00730
0086    C830 10C7            73            LHI     R3,LNZB             ADDRESS OF LAST NON-ZERO BYTE        MTE00740
008A    C860 00FF            74    MN      LHI     R6,X'FF'            CHECKSUM BYTE                        MTE00750
008E    D340 0078            75            LB      R4,X'78'            LOAD INPUT DEVICE ADRS               MTE00760
0092    DE40 0079            76            OC      R4,X'79'            ISSUE OUTPUT COMMAND                 MTE00770
0096    9D45                 77    STATUS1 SSR     R4,R5               SENSE STATUS OF INPUT DEVICE         MTE00780
0098    20D1                 78            BTBS    X'D',1              WAIT FOR ZERO STATUS                 MTE00790
009A    9B45                 79            RDR     R4,R5                                                    MTE00800
009C    0855                 80            LHR     R5,R5               TEST IF ZERO                         MTE00810
009E    2234                 81            BZS     STATUS1             YES, READ NEXT BYTE                  MTE00820
00A0    D251 0000            82    STOREBYT STB    R5,0(R1)            STORE BYTE IN MEMORY                 MTE00830
00A4    0765                 83            XHR     R6,R5               GENERATE CHECKSUM                    MTE00840
00A6    9A26                 84            WDR     R2,R6               WRITE DATA TO DISPLAY                MTE00850
00A8    9D45                 85    STAT1   SSR     R4,R5               SENSE STATUS OF INPUT DEVICE         MTE00860
00AA    20D1                 86            BTBS    X'D',1              WAIT FOR ZERO STATUS                 MTE00870
00AC    9B45                 87            RDR     R4,R5               NEXT BYTE                            MTE00880
00AE    C110 00A0            88            BXLE    R1,STOREBYT         REPEAT UNTIL ENTIRE PROG LOADED      MTE00890
00B2    9A26                 89            WDR     R2,R6               SHOW CHECKSUM                        MTE00900
00B4    C200 00B8            90            LPSW    LDWT                HALT                                 MTE00910
00B8                         91            ALIGN   8                                                       MTE00920
00B8    8000                 92    LDWT    DC      X'8000',ORIGIN1                                          MTE00930
00BA    01C0
```

00BC			94		ORG	X'0100'	MTE00950
0100	23C9		95	ORIGIN1	BS	START2	MTE00960
			96	*			MTE00970
			97	*			MTE00980
0102	3000		98	PSW	DCX	3000	PSW USED IN TEST MODULES	MTE00990
0104	0000		99	PSW2	DCX	0000	PSW USED IN EXEC	MTE01000
			100	*			MTE01010
			101	*			MTE01020
0106	0002		102		DCX	0002	MTE01030
0108	0010		103	PASLADR	DCX	0010	PASLA/PALM ADDRESS	MTE01040
010A	0002		104	CLIFADR	DCX	0002	CURRENT LOOP INTERFACE ADDRESS	MTE01050
010C	0010		105	C300ADR	DCX	0010	CAROUSEL 300 PASLA ADDRESS	MTE01060
010E	00C0		106	MICRCIO	DCX	00C0	ASCII CONSOLE ADDRESS	MTE01070
			107	*			MTE01080
0110	0202		108	IO	DCX	0202	IO DEVICE IDENTIFIER	MTE01090
			109	*			MTE01100
	0000 0008		110	MAXTST	EQU	8	MTE01110
			111	*			MTE01120
0112	D300 0110		112	START2	LB	R0,IO	MTE01130
0116	0755		113		XHR	R5,R5	CLEAR STATE REGISTER	MTE01140
0118	2701		114		SIS	R0,1	MTE01150
011A	4330 015A		115		BZ	CRT	BRANCH IF PASLA	MTE01160
011E	2703		116		SIS	R0,3	CAROUSEL 300?	MTE01170
0120	4330 0144		117		BZ	C300	BRANCH IF YES	MTE01180
0124	4210 0178		118		BM	TTY	BRANCH IF CURRENT LOOP INF.	MTE01190
0128	2701		119		SIS	R0,1	MICRO I/O ?	MTE01200
012A	4230 0178		120		BNZ	TTY	DEFAULT TO TTY	MTE01210
			121	*			ELSE, MICRO I/O BUS	MTE01220
012E	C650 0004		122		OHI	R5,MICROFLG	SET MICRO I/O BUS FLAG	MTE01230
0132	4820 010E		123		LH	R2,MICROIO	PICK UP DEVICE NUMBER	MTE01240
0136	4810 09FE		124		LH	R1,MICRORD	PICK UP COMMANDS	MTE01250
013A	0700		125		XHR	R0,R0	NO SECOND COMMAND	MTE01260
013C	DE20 09FD		126		OC	R2,MICRORST	ISSUE RESET COMMAND	MTE01270
0140	4300 0184		127		B	DEVSET	MTE01280
0144	4820 010C		128	C300	LH	R2,C300ADR	PICK UP DEVICE NUMBER	MTE01290
0148	4810 0A00		129		LH	R1,CARRD	PICK UP COMMANDS	MTE01300
014C	4800 0A02		130		LH	R0,CAR2ND	PASLA/PALM FORMAT COMMANDS	MTE01310
0150	D340 0A04		131		LB	R4,CARRQ2S	MTE01320
0154	C650 0080		132		OHI	R5,CAROUSEL	SET CAROUSEL 300 FLAG	MTE01330
0158	2309		133		BS	CRT2	MTE01340
015A	4820 0108		134	CRT	LH	R2,PASLADR	PICK UP DEVICE NUMBER	MTE01350
015E	4810 0A06		135		LH	R1,CRTRD	PICK UP COMMANDS	MTE01360
0162	48C0 0A08		136		LH	R0,CRT2ND	PASLA FORMAT COMMANDS	MTE01370
0166	D340 0A05		137		LB	R4,CRTRQ2S	MTE01380
016A	C650 0100		138	CRT2	OHI	R5,PASFLG	SET PASLA FLAG	MTE01390
016E	9460		139		EXBR	R6,R0	FORMAT COMMAND	MTE01400
0170	9E26		140		OCR	R2,R6	ISSUE	MTE01410
0172	D240 09FC		141		STB	R4,CONRQ2S	MTE01420
0176	2307		142		BS	DEVSET	MTE01430
0178	4820 010A		143	TTY	LH	R2,CLIFADR	PICK UP DEVICE NUMBER	MTE01440
017C	4810 0A0A		144		LH	R1,CLIFRD	PICK UP COMMANDS	MTE01450
0180	48C0 0A0C		145		LH	R0,CLIF2ND	MTE01460
0184	4020 09F6		146	DEVSET	STH	R2,CONADR	CONSOLE DEVICE ADDRESS	MTE01470
0188	4010 09F8		147		STH	R1,CONRD	CONSOLE READ/WRITE COMMANDS	MTE01480
018C	4000 09FA		148		STH	R0,CON2ND	FORMAT COMMAND (PASLA/PALM)	MTE01490

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0190    0733              150   EXECUTE   XHR    R3,R3                                                        MTE01510
0192    9503              151             EPSR   R0,R3                CLEAR PSW                               MTE01520
                         152   *                                                                             MTE01530
0194    C840 086C        153             LHI    R4,TITLE2            TITLE START ADDRESS                     MTE01540
0198    41D0 0572        154             BAL    R13,MESSAGE          PRINT "S16 EXTENDED MEMORY TEST"        MTE01550
  *                      155   *                                                                             MTE01560
                         156   *                                                                             MTE01570
019C    07EE              157             XHR    R14,R14                                                      MTE01580
019E    C8F0 2000        158             LHI    R15,X'2000'          R14,R15 = 8K MARK                       MTE01590
                         159   *                                     START ADDRESS FOR SEARCH                MTE01600
01A2    D0F0 0A1E        160             STM    R14,LOW+6            DEFAULT LOW LIMIT                       MTE01610
01A6    C8A0 5050        161             LHI    R10,X'5050'          DATA PATTERN IS X'5050'                 MTE01620
01AA    41D0 072C        162   FINDMAX   BAL    R13,ADRSET           SET UP ADDRESS                          MTE01630
01AE    40A1 0000        163             STH    R10,0(R1)            STORE PATTERN                           MTE01640
01B2    40D0 10C8        164             STH    R13,LAST                                                     MTE01650
01B6    45A1 0000        165             CLH    R10,0(R1)            READ BACK AND COMPARE                   MTE01660
                         166   *                                     IF READ BACK IS AT ALL DIFFERENT        MTE01670
                         167   *                                     FROM THE PATTERN, ASSUME TOP OF         MTE01680
01BA    4230 01FE        168             BNE    FOUNDT               MEMORY HAS BEEN FOUND                   MTE01690
01BE    CAF0 2000        169             AHI    R15,X'2000'          INCREMENT TEST ADRS BY 8K               MTE01700
01C2    228C             170             BNCS   FINDMAX                                                      MTE01710
01C4    40A0 FFFE        171             STH    R10,X'FFFE'          STORE PATTERN                           MTE01720
01C8    C880 0010        172             LHI    R8,X'10'                                                     MTE01730
01CC    9518             173             EPSR   R1,R8                CHANGE BANK SELECT BITS                 MTE01740
01CE    24E1             174             LIS    R14,1                                                        MTE01750
01D0    07FF             175             XHR    R15,R15              R14,R15 = 10000                         MTE01760
01D2    45A0 FFFE        176             CLH    R10,X'FFFE'          SEE IF SAME PATTERN                     MTE01770
01D6    4330 01FE        177             BE     FOUNDT               IF YES, TOP = 64KB                      MTE01780
01DA    C650 0800        178             OHI    R5,EXTMEM            SET EXTENDED MEMORY FLAG                MTE01790
01DE    41D0 072C        179   TOM2      BAL    R13,ADRSET           CONTINUE SEARCH FROM 10000              MTE01800
01E2    40A1 0000        180             STH    R10,0(R1)            STORE PATTERN                           MTE01810
01E6    40D0 10C8        181             STH    R13,LAST             CLEAR MEMORY DATA                       MTE01820
01EA    45A1 0000        182             CLH    R10,0(R1)            READ BACK AND COMPARE                   MTE01830
01EE    2138             183             BNES   FOUNDT               IF DIFFER, TOP FOUND                    MTE01840
01F0    CAF0 2000        184             AHI    R15,X'2000'          NEXT 8KB                                MTE01850
01F4    4EE0 09E4        185             ACH    R14,ZERO                                                     MTE01860
01F8    C5E0 0004        186             CLHI   R14,4                SEARCH LIMIT LESS THAN '40000'          MTE01870
01FC    208F             187             BLS    TOM2                                                         MTE01880
                         188   *                                                                             MTE01890
01FE    27F2             189   FOUNDT    SIS    R15,2                R14,R15 = ADDRESS OF LAST HALFWORD      MTE01900
0200    4FE0 09E4        190             SCH    R14,ZERO             IN MEMORY.   STORE RESULT AT MAXMEM     MTE01910
0204    D0F0 09E0        191             STM    R14,MAXMEM                                                   MTE01920
0208    D0E0 0A28        192             STM    R14,HIGH+6           DEFAULT HIGH LIMIT                      MTE01930
                         193   *                                                                             MTE01940
020C    C840 08A2        194             LHI    R4,PDMXMM            PRINT MESSAGE                           MTE01950
0210    41D0 0572        195             BAL    R13,MESSAGE                                                  MTE01960
0214    086E             196             LHR    R6,R14                                                       MTE01970
0216    41C0 0810        197             BAL    R12,PRINTR6                                                  MTE01980
021A    087F             198             LHR    R7,R15                                                       MTE01990
021C    41D0 07EC        199             BAL    R13,PRINTR7                                                  MTE02000
0220    C890 0A2C        200             LHI    R9,LOOP              LOOP THROUGH OPTION TABLE               MTE02010
0224    48A9 0000        201   DEF.OPT   LH     R10,0(R9)            TEST TABLE ENTRY                        MTE02020
0228    2117             202             BMS    OPTIN                DONE                                    MTE02030
022A    48A9 0008        203             LH     R10,8(R9)            PICK UP DEFAULT VALUE                   MTE02040
022E    40A9 0006        204             STH    R10,6(R9)            MAKE IT CURRENT                         MTE02050
0232    269A             205             AIS    R9,10                                                        MTE02060
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0234    2208              206         BS     DEF.OPT              LOOP                               MTE02070
                          207   *                                                                   MTE02080
                          208   *                                                                   MTE02090
0236    41D0 06A4         209   OPTIN   BAL    R13,CRLF                                              MTE02100
023A    C8C0 002A         210   OPTIN1  LHI    R0,C'*'              OUTPUT AN ASTERISK TO            MTE02110
023E    41C0 0628         211           BAL    R12,OUTCHR           INDICATE COMMAND MODE            MTE02120
0242    2501              212           LCS    R0,1                                                  MTE02130
0244    41C0 0628         213           BAL    R12,OUTCHR           DELETE                           MTE02140
                          214   *                                                                   MTE02150
                          215   *                                                                   MTE02160
0248    4860 0104         216   RENTRY  LH     R6,PSW2                                               MTE02170
024C    95C6              217           EPSR   R0,R6                CLEAR PSW                        MTE02180
024E    0766              218           XHR    R6,R6                                                 MTE02190
0250    4060 0034         219           STH    R6,X'34'             '00034'=NEW PSW, ILLEGAL INSTR   MTE02200
0254    4060 003C         220           STH    R6,X'3C'             '0003C'=NEW PSW, MACHINE MALFNCTN MTE02210
0258    C8C0 04CA         221           LHI    R0,PARERP                                             MTE02220
025C    4CC0 003E         222           STH    R0,X'3E'                                              MTE02230
0260    C800 0526         223           LHI    R0,ILLEGL                                             MTE02240
0264    4000 0036         224           STH    R0,X'36'                                              MTE02250
                          225   *                                                                   MTE02260
0268    C800 2020         226           LHI    R0,X'2020'           CLEAR COMMAND BUFFER             MTE02270
026C    4CC0 09F0         227           STH    R0,OPTBUF                                             MTE02280
0270    4000 09F2         228           STH    R0,OPTBUF+2                                           MTE02290
0274    4000 09F4         229           STH    R0,OPTBUF+4                                           MTE02300
0278    2480              230           LIS    R8,0                 OPTBUF INDEX                     MTE02310
027A    41D0 06B2         231   RDCHAR  BAL    R13,GETCHR           GET A CHARACTER IN R0            MTE02320
027E    C500 0060         232           CLHI   R0,X'60'             LOWER CASE ALPHA                 MTE02330
0282    2183              233           BLS    RDCHAR0              SKIP IF NO                       MTE02340
0284    CB00 0020         234           SHI    R0,X'20'             CONVERT TO UPPER CASE            MTE02350
0288    C5C0 0023         235   RDCHAR0 CLHI   R0,X'23'             IS IT #?                         MTE02360
028C    4330 0236         236           BE     OPTIN                CANCEL & RESTART EXEC            MTE02370
0290    C500 005F         237           CLHI   R0,X'5F'             LEFT ARROW?                      MTE02380
0294    213A              238           BNES   RDCHAR1              SKIP IF NO                       MTE02390
0296    2781              239           SIS    R8,1                 DECREMENT INDEX                  MTE02400
0298    4210 03B0         240           BM     QMARK                ERROR                           MTE02410
029C    C800 0020         241           LHI    R0,X'20'                                             MTE02420
02A0    D208 09F0         242           STB    R0,OPTBUF(R8)        BLANK OUT LAST CHARACTER         MTE02430
02A4    4300 027A         243           B      RDCHAR                                               MTE02440
02A8    C500 000D         244   RDCHAR1 CLHI   R0,X'0D'             CARRIGE RETURN?                  MTE02450
02AC    233D              245           BES    LOOKUP               TRY FOR A MATCH IF YES           MTE02460
02AE    C5C0 0020         246           CLHI   R0,X'20'             SPACE?                           MTE02470
02B2    233A              247           BES    LOOKUP                                               MTE02480
02B4    C580 0006         248           CLHI   R8,6                 SIX CHARACTERS ALREADY?          MTE02490
02B8    4380 03B0         249           BNL    QMARK                ERROR IF YES                     MTE02500
02BC    D208 09F0         250           STB    R0,OPTBUF(R8)        STORE CHARACTER                  MTE02510
02C0    2681              251           AIS    R8,1                 BUMP INDEX                       MTE02520
02C2    43C0 027A         252           B      RDCHAR               LOOP                            MTE02530
                          253   *                                                                   MTE02540
02C6    C890 0A0E         254   LOOKUP  LHI    R9,OPT               START OF OPTION TABLE            MTE02550
02CA    0788              255   LOOK1   XHR    R8,R8                OPTBUF INDEX                     MTE02560
02CC    08A9              256           LHR    R10,R9               OPTION WORD INDEX               MTE02570
02CE    481A 0000         257   LOOK2   LH     R1,0(R10)            HALFWORD FROM LOOK-UP TABLE      MTE02580
02D2    4210 03B0         258           BM     QMARK                ERROR                           MTE02590
02D6    4518 09F0         259           CLH    R1,OPTBUF(R8)        COMPARE TO HW FROM OPTBUF        MTE02600
02DA    2333              260           BES    LOOK3                MATCH...TRY ANOTHER HALFWORD     MTE02610
02DC    269A              261           AIS    R9,10                NO MATCH, TRY NEXT TABLE ENTRY   MTE02620
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02DE  220A           252          BS    LOOK1                                              MTE02630
02E0  2682           263 LOOK3    AIS   R8,2           TRY NEXT HALFWORD                   MTE02640
02E2  26A2           264          AIS   R10,2                                              MTE02650
02E4  C580 0006      265          CLHI  R8,6           MATCH 3 HALFWORDS?                  MTE02660
02E8  208D           266          BLS   LOOK2          LOOP IF NO                          MTE02670
                     267  *                                                                MTE02680
                     268  * COMMAND MATCH                                                  MTE02690
                     269  * R0 = COMMAND DELIMITER CHARACTER (SPACE OR CARRIAGE RETURN)    MTE02700
                     270  * R9 = START ADDRESS OF MATCHING COMMAND TABLE ENTRY             MTE02710
                     271  *                                                                MTE02720
02EA  C590 0A0E      272          CLHI  R9,RUN         RUN COMMAND?                        MTE02730
02EE  4330 0356      273          BE    RUNIT                                              MTE02740
02F2  C590 0A36      274 LOOK4    CLHI  R9,TEST        TEST COMMAND?                       MTE02750
02F6  4330 0324      275          BE    TESTOP                                             MTE02760
02FA  270D           276          SIS   R0,13          DELIMETER = CARRIAGE RETURN?        MTE02770
02FC  4330 03B0      277          BZ    QMARK          ERROR IF YES...HAS TO BE SPACE      MTE02780
0300  41D0 06E2      278          BAL   R13,OPTVAL     GET OPTION VALUE IN R14,R15         MTE02790
0304  270D           279          SIS   R0,13          TERMINATED BY CARRIAGE RETURN?      MTE02800
0306  4230 03B0      280          BNZ   QMARK          ERROR IF NO                         MTE02810
030A  40E9 0006      281          STH   R15,6(R9)      STORE LS 16 BITS                    MTE02820
030E  C590 0A18      282          CLHI  R9,LOW         LOW ADDRESS OPTION                  MTE02830
0312  2335           283          BES   LOOK4.1        STORE 32 BIT VALUE IF YES           MTE02840
0314  C590 0A22      284          CLHI  R9,HIGH        HIGH ADDRESS OPTION                 MTE02850
0318  4230 0236      285          BNE   OPTIN                                              MTE02860
031C  D0E9 0006      286 LOOK4.1  STM   R14,6(R9)      STORE 32 BIT VALUE                  MTE02870
0320  4300 0236      287          B     OPTIN          NEXT COMMAND                        MTE02880
                     288  *                                                                MTE02890
0324  270D           289 TESTOP   SIS   R0,13          CARRIAGE RETURN?                    MTE02900
0326  2137           290          BNZS  TESTOP1        SKIP IF NO                          MTE02910
0328  48F0 0A3E      291          LH    R15,DEFTESTS   IF CARRIAGE RETURN,                 MTE02920
032C  40F0 0A3C      292          STH   R15,TEST+6     SELECT DEFAULT TESTS                MTE02930
0330  4300 0236      293          B     OPTIN          NEXT COMMAND                        MTE02940
0334  0777           294          XHR   R7,R7          CLEAR BIT ACCUMULATOR               MTE02950
0336  41D0 06E2      295 TESTOP2  BAL   R13,OPTVAL     GET VALUE IN R14,R15                MTE02960
033A  C5F0 0009      296          CLHI  R15,MAXTST+1                                       MTE02970
033E  4380 03B0      297          BNL   QMARK          ERROR, INVALID TEST                 MTE02980
0342  0AFF           298          AHR   R15,R15        CONVERT TO HALFWORD INDEX           MTE02990
0344  48FF 09A0      299          LH    R15,BIT0(R15)  PICK UP BIT                         MTE03000
0348  067F           300          CHR   R7,R15         OR INTO BIT ACCUMULATOR             MTE03010
034A  270D           301          SIS   R0,13          CARRIAGE RETURN?                    MTE03020
034C  203B           302          BNZS  TESTOP2        LOOP IF NO                          MTE03030
034E  4070 0A3C      303          STH   R7,TEST+6      SAVE SELECTED TESTS                 MTE03040
0352  4300 0236      304          B     OPTIN          NEXT COMMAND                        MTE03050

0356  41D0 06A4      306 RUNIT    BAL   R13,CRLF                                           MTE03070
035A  C450 FBFC      307          NHI   R5,-1-WASDU-WASDU1-ISITERR                         MTE03080
035E  07C0           308          XHR   R0,R0                                              MTE03090
0360  4000 09E6      309          STH   R0,COUNT       CLEAR LOOP COUNT                    MTE03100
0364  4000 09E8      310          STH   R0,TOTAL       CLEAR TOTAL                         MTE03110
0368  4000 09EA      311          STH   R0,TOTERR                                          MTE03120
036C  4000 09EE      312 KEEP3    STH   R0,SUBTST                                          MTE03130
0000  0370           313 KEEP4    EQU   *                                                  MTE03140
0370  4810 09EE      314 SUBSEL   LH    R1,SUBTST      PICK UP SUBTEST NUMBER              MTE03150
0374  0A11           315          AHR   R1,R1                                              MTE03160
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0376   C450 FFD7      316              NHI    R5,-1-ERRFLG-TSTFLG                                MTE03170
037A   4801 09A0      317              LH     R0,BIT0(R1)                                        MTE03180
037E   4400 0A3C      318              NH     R0,TEST+6        TEST SELECTED?                    MTE03190
0382   4330 03D6      319              BZ     TEST.END         LEAVE IF NOT SELECTED             MTE03200
0386   41D0 05D4      320              BAL    R13,TSTBRK                                         MTE03210
038A   4830 0A32      321              LH     R3,LOOP+6        LOOK AT LOOP OPTION               MTE03220
038E   2334           322              BZS    KEEP5            SKIP IF NOT SPECIFIED             MTE03230
0390   4830 09E6      323              LH     R3,COUNT         TEST LOOP COUNTER                 MTE03240
0394   2133           324              BNZS   KEEP6            ON FIRST PASS, WHEN COUNT = 0     MTE03250
0396   41E0 082C      325   KEEP5      BAL    R14,TESTNUM      PRINT SUBTEST NUMBER              MTE03260
039A   4810 09EE      326   KEEP6      LH     R1,SUBTST                                          MTE03270
039E   0A11           327              AHR    R1,R1                                              MTE03280
03A0   4830 0102      328              LH     R3,PSW                                             MTE03290
03A4   95C3           329              EPSR   R0,R3            SET PSW                           MTE03300
03A6   4811 03C4      330              LH     R1,TESTADRS(R1)                                    MTE03310
03AA   C650 0020      331              OHI    R5,TSTFLG        SET TEST FLAG                     MTE03320
03AE   0301           332              BR     R1                                                 MTE03330
               333   *                                                                          .MTE03340
               334   *                                                                          MTE03350
03B0   C840 0928      335   QMARK      LHI    R4,QUEST                                           MTE03360
03B4   C650 0400      336       .      OHI    R5,ISITERR       FORCE PRINTING                    MTE03370
03B8   41D0 0572      337              BAL    R13,MESSAGE      PRINT QUESTION MARK               MTE03380
03BC   C450 FBFF      338              NHI    R5,-1-ISITERR                                      MTE03390
03C0   4300 0236      339              B      OPTIN                                             MTE03400
               340   *                                                                          MTE03410
               341   *                                                                          MTE03420
               342   *                                                                          MTE03430
03C4   0A60           343   TESTADRS DC      TEST0                                              MTE03440
03C6   0B36           344            DC      TEST1,TEST2,TEST3                                  MTE03450
03C8   0BD4
03CA   0C9C
03CC   0D3C           345            DC      TEST4,TEST5,TEST6                                  MTE03460
03CE   0DE6
03D0   0F46
03D2   0F64           346            DC      TEST7,TEST8                                        MTE03470
03D4   100E
               347   *                                                                          MTE03480
               348   *                                                                          MTE03490
03D6   4830 0104      349   TEST.END LH     R3,PSW2                                            MTE03500
03DA   9503           350            EPSR    R0,R3                                              MTE03510
03DC   C350 0020      351            THI     R5,TSTFLG        DID WE DO THIS SUBTEST            MTE03520
03E0   4330 040A      352            BZ      NEXTTEST         DO NEXT IF NO                     MTE03530
03E4   4800 09E6      353            LH      R0,COUNT                                           MTE03540
03E8   26C1           354            AIS     R0,1             INCREMENT LOOP COUNT              MTE03550
03EA   4000 09E6      355            STH     R0,COUNT                                           MTE03560
03EE   4500 0A32      356            CLH     R0,LOOP+6                                          MTE03570
03F2   2385           357            BNLS    KEEP7            GO ON TO NEXT TEST                MTE03580
03F4   41D0 05D4      358            BAL     R13,TSTBRK       TEST FOR LINE BREAK               MTE03590
03F8   43C0 0370      359            B       SUBSEL           IF NO, REPEAT SAME TEST           MTE03600
               360   *                                                                          MTE03610
               361   *                                                                          MTE03620
03FC   C350 0008      362   KEEP7    THI     R5,ERRFLG        ANY ERRORS?                       MTE03630
0400   2135           363            BNZS    NEXTTEST         NEXT TEST IF YES                  MTE03640
0402   C840 08D8      364            LHI     R4,NOER                                            MTE03650
0406   41D0 0572      365            BAL     R13,MESSAGE      PRINT MESSAGE "NO ERROR"          MTE03660
040A   2411           366   NEXTTEST LIS     R1,1                                               MTE03670
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040C  6110 09EE      367           AHM   R1,SUBTST      INCREMENT TO NEXT SUBTEST       MTE03680
0410  07C0           368           XHR   R0,R0                                          MTE03690
0412  4000 09E6      369           STH   R0,COUNT       CLEAR LOOP COUNTER              MTE03700
0416  4810 09EE      370  KEEP7.1  LH    R1,SUBTST      PICK UP NEXT SUBTEST NUMBER     MTE03710
041A  C510 0009      371           CLHI  R1,MAXTST+1    LAST TEST?                      MTE03720
041E  4280 0370      372           BL    SUBSEL         NO, SELECT NEXT TEST            MTE03730
0422  4000 09EE      373           STH   R0,SUBTST                                      MTE03740
               374  *                                                                  MTE03750
0426  41C0 0552      375  ABORT    BAL   R12,TSTDU      CHECK CONSOLE DU                MTE03760
042A  4230 045E      376           BNZ   KEEP9          IF DU, DISPLAY TOTAL            MTE03770
042E  C350 0002      377           THI   R5,WASDU1      WAS IT EVER DU ?                MTE03780
0432  4230 0494      378           BNZ   KEEP92         YES, PRINT TOTAL, TOTERR        MTE03790
0436  41D0 05D4      379           BAL   R13,TSTBRK     BACK TO CMDIN IF BREAK          MTE03800
043A  07C0           380           XHR   R0,R0                                          MTE03810
043C  4810 0A46      381           LH    R1,CONTIN+6    TEST IF CONTINUE OPTION         MTE03820
0440  4230 036C      382           BNZ   KEEP3          REPEAT ALL TESTS IF YES         MTE03830
0444  4810 0104      383  ABORT1   LH    R1,PSW2                                        MTE03840
0448  9501           384           EPSR  R0,R1                                          MTE03850
044A  C840 09E4      385           LHI   R4,EOTMSG                                      MTE03860
044E  41D0 0572      386           BAL   R13,MESSAGE    "END OF TEST"                   MTE03870
0452  4810 0A50      387           LH    R1,NOMSG+6     TEST NO MESSAGE OPTION          MTE03880
0456  4230 0494      388           BNZ   KEEP92                                         MTE03890
045A  4300 0236      389           B     OPTIN          BACK TO COMMAND MODE            MTE03900
045E  C650 0001      390  KEEP9    OHI   R5,WASDU       SET DU FLAG                     MTE03910
0462  2471           391           LIS   R7,1                                           MTE03920
0464  6170 09E8      392           AHM   R7,TOTAL       INCREMENT TOTAL PASSES          MTE03930
0468  2401           393  KEEP91   LIS   R0,1                                           MTE03940
046A  DEC0 09EC      394           OC    R0,INCRMNTL    CONSOLE IN INCREMENTAL MODE     MTE03950
046E  DA00 09E9      395           WD    R0,TOTAL+1     WRITE TOTAL TO DISPLAY          MTE03960
0472  DA00 09E8      396           WD    R0,TOTAL                                       MTE03970
0476  DA00 09EB      397           WD    R0,TOTERR+1                                    MTE03980
047A  DA00 09EA      398           WD    R0,TOTERR                                      MTE03990
047E  DEC0 09ED      399           OC    R0,NORMAL                                      MTE04000
0482  4810 09E8      400           LH    R1,TOTAL                                       MTE04010
0486  C510 FFFF      401           CLHI  R1,X'FFFF'                                     MTE04020
048A  4280 0370      402           BL    KEEP4                                          MTE04030
048E  C810 8000      403  HALT9    LHI   R1,X'8000'                                     MTE04040
0492  9501           404           EPSR  R0,R1                                          MTE04050
0494  41C0 0552      405  KEEP92   BAL   R12,TSTDU      CHECK CONSOLE DU                MTE04060
0498  2035           406           BNZS  HALT9                                          MTE04070
049A  C450 FFFE      407  KEEP10   NHI   R5,-1-WASDU    CLEAR DU FLAG                   MTE04080
049E  C650 0400      408           OHI   R5,ISITERR     FORCE PRINTING                  MTE04090
04A2  41D0 06A4      409           BAL   R13,CRLF                                       MTE04100
04A6  4870 09E8      410           LH    R7,TOTAL                                       MTE04110
04AA  41D0 07EC      411           BAL   R13,PRINTR7    PRINT XXXX                      MTE04120
04AE  C840 098C      412           LHI   R4,TOTALMSG                                    MTE04130
04B2  41D0 0572      413           BAL   R13,MESSAGE    PRINT      TOTAL,              MTE04140
04B6  4870 09EA      414           LH    R7,TOTERR                                      MTE04150
04BA  41D0 07EC      415           BAL   R13,PRINTR7    PRINT             YYYY          MTE04160
04BE  C840 0996      416           LHI   R4,ERRORS                                      MTE04170
04C2  41D0 0572      417           BAL   R13,MESSAGE    PRINT                 ERRORS    MTE04180
               418  *                                  *   XXXX TOTAL, YYYY ERRORS     MTE04190
04C6  4300 0236      419           B     OPTIN                                          MTE04200
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SUBROUTINES

04CA	9566		421	PARERR	EPSR	R6,R6	CAPTURE CURRENT PSW	MTE04220
04CC	C350 1000		422		THI	R5,PARITY	IGNORE FIRST PARITY ERROR	MTE04230
04D0	2135		423		BNZS	PARERR1	REACT TO ALL OTHERS	MTE04240
04D2	C650 1000		424		OHI	R5,PARITY	SET FIRST PARITY ERROR FLAG	MTE04250
04D6	C200 0038		425		LPSW	X'38'	RETURN	MTE04260
04DA	C650 0400		426	PARERR1	CHI	R5,ISITERR	FORCE PRINTING	MTE04270
04DE	41D0 06A4		427		BAL	R13,CRLF		MTE04280
04E2	C840 08F8		428		LHI	R4,MALFMSG		MTE04290
04E6	41D0 0572		429		BAL	R13,MESSAGE	PRINT "MACHINE MALFUNCTION"	MTE04300
04EA	41C0 0810		430		BAL	R12,PRINTR6	PRINT CURRENT CONDITION CODE	MTE04310
04EE	C800 0020		431		LHI	R0,X'20'		MTE04320
04F2	41C0 0628		432		BAL	R12,OUTCHR		MTE04330
04F6	4870 0038		433		LH	R7,X'38'		MTE04340
04FA	41D0 07EC		434		BAL	R13,PRINTR7	OLD PSW	MTE04350
04FE	C800 0020		435		LHI	R0,X'20'		MTE04360
0502	41C0 0628		436		BAL	R12,OUTCHR		MTE04370
0506	4870 003A		437		LH	R7,X'3A'		MTE04380
050A	41D0 07EC		438		BAL	R13,PRINTR7	OLD LOC	MTE04390
050E	C800 0020		439		LHI	R0,X'20'		MTE04400
0512	41C0 0628		440		BAL	R12,OUTCHR		MTE04410
0516	086E		441		LHR	R6,R14		MTE04420
0518	41C0 0810		442		BAL	R12,PRINTR6	OUTPUT PHYSICAL ADDRESS	MTE04430
051C	087F		443		LHR	R7,R15		MTE04440
051E	41D0 07EC		444		BAL	R13,PRINTR7		MTE04450
0522	4300 048E		445		B	HALT9		MTE04460
0526	C650 0400		447	ILLEGL	OHI	R5,ISITERR	FORCE PRINTING	MTE04480
052A	41D0 06A4		448		BAL	R13,CRLF		MTE04490
052E	C840 0910		449		LHI	R4,ILLMSG		MTE04500
0532	41D0 0572		450		BAL	R13,MESSAGE	PRINT "ILLEGAL INSTRUCTION"	MTE04510
0536	4870 0030		451		LH	R7,X'30'		MTE04520
053A	41D0 07EC		452		BAL	R13,PRINTR7	OLD PSW	MTE04530
053E	C800 0020		453		LHI	R0,X'20'		MTE04540
0542	41C0 0628		454		BAL	R12,OUTCHR		MTE04550
0546	4870 0032		455		LH	R7,X'32'		MTE04560
054A	41D0 07EC		456		BAL	R13,PRINTR7	OLD LOC	MTE04570
054E	4300 048E		457		B	HALT9		MTE04580

SUBROUTINES

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                          459  *         S U B R O U T I N E   T S T D U          MTE04600
                          460  *                                                 MTE04610
                          461  * TEST FOR DU STATUS ON CONSOLE DEVICE             MTE04620
                          462  *                                                 MTE04630
                          463  * CALLING SEQUENCE:      BAL  R12,TSTDU            MTE04640
                          464  *                                                 MTE04650
                          465  * REGISTERS USED: R12,R2,R3                        MTE04660
                          466  * SUBROUTINES USED: NONE                           MTE04670


0552  C350 0100           468  TSTDU    THI    R5,PASFLG       PASLA?            MTE04690
0556  2338                469           BZS    TESTDU1         SKIP IF NO        MTE04700
0558  9D23                470           SSR    R2,R3                             MTE04710
055A  C430 00FC           471           NHI    R3,X'FC'                          MTE04720
055E  273C                472           SIS    R3,X'0C'        BUSY & EXAMINE?   MTE04730
0560  2337                473           BZS    SETDU           YES               MTE04740
0562  0733                474           XHR    R3,R3           CLEAR CC          MTE04750
0564  030C                475           BR     R12             RETURN            MTE04760
0566  9D23                476  TESTDU1  SSR    R2,R3                             MTE04770
0568  C430 0001           477           NHI    R3,1                              MTE04780
056C  030C                478           BR     R12                               MTE04790
056E  2431                479  SETDU    LIS    R3,1            NON ZERO CC       MTE04800
0570  030C                480           BR     R12                               MTE04810
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SUBROUTINES

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                              482  *      S U B R O U T I N E   M E S S A G E                        MTE04830
                              483  *                                                                 MTE04840
                              484  * SUBROUTINE OUTPUTS MESSAGE TO TTY                               MTE04850
                              485  * (R4) IS MESSAGE START ADDRESS                                   MTE04860
                              486  * MESSAGE OUTPUT TERMINATES WHEN A X'FF' CHARACTER IS OUTPUT      MTE04870
                              487  *                                                                 MTE04880
                              488  * CALLING SEQUENCE:     LHI  R4,MESSAGE START ADDRESS             MTE04890
                              489  *                       BAL  R13,MESSAGE                          MTE04900
                              490  *                                                                 MTE04910
                              491  * REGISTERS USED: R13,R2,R12,R3,R0,R4                             MTE04920
                              492  * SUBROUTINES USED: TSTDU,OUTCHR                                  MTE04930


  0572   4820 09F6           494  MESSAGE  LH    R2,CONADR                                           MTE04950
  0576   C350 0100           495           THI   R5,PASFLG        IS IT A PASLA?                     MTE04960
  057A   2333               496           BZS   P4                                                   MTE04970
  057C   DE20 09FA           497           OC    R2,CON2ND        PASLA SET-UP COMMAND               MTE04980
  0580   41C0 0552           498  P4       BAL   R12,TSTDU        TEST FOR DU STATUS                 MTE04990
  0584   2334               499           BZS   P1               SKIP IF NOT DU                      MTE05000
  0586   C650 0001           500           OHI   R5,WASDU         SET DU FLAG                        MTE05010
  058A   030D               501           BR    R13              RETURN                             MTE05020
  058C   C350 0001           502  P1       THI   R5,WASDU         NOT DU NOW, WAS IT?                MTE05030
  0590   4330 05B4           503           BZ    P3               SKIP IF IT WASN'T                  MTE05040
  0594   C830 FFFF           504           LHI   R3,X'FFFF'                                          MTE05050
  0598   2731               505           SIS   R3,1             DELAY                              MTE05060
  059A   2031               506           BTBS  3,1                                                 MTE05070
  059C   C450 FFFE           507           NHI   R5,-1-WASDU      CLEAR FLAG                         MTE05080
  05A0   C650 0002           508           OHI   R5,WASDU1        SET WAS DU ONCE FLAG               MTE05090
  05A4   2501               509           LCS   R0,1             CHARACTER = 'FF'                   MTE05100
  05A6   2444               510           LIS   R4,4             COUNT OF FOUR                      MTE05110
  05A8   41C0 0628           511  P2       BAL   R12,OUTCHR       OUTPUT 4 DELETES                   MTE05120
  05AC   2741               512           SIS   R4,1                                                MTE05130
  05AE   2023               513           BPS   P2                                                  MTE05140
  05B0   4300 049A           514           B     KEEP10           PRINT TOTAL,TOTERR                MTE05150
  05B4   4830 0A50           515  P3       LH    R3,NOMSG+6       TEST NO MESSAGE OPTION             MTE05160
  05B8   2334               516           BZS   MESAGEL          PRINT ALL MESSAGES                 MTE05170
  05BA   C350 0400           517           THI   R5,ISITERR       TEST IF ERROR MESSAGE              MTE05180
  05BE   233B               518           BZS   TSTBRK           EXIT THROUGH TSTBRK                MTE05190
  05C0   D304 0000           519  MESAGEL  LB    R0,0(R4)         PICK UP MESSAGE CHARACTER          MTE05200
  05C4   41C0 0628           520           BAL   R12,OUTCHR       OUTPUT IT                          MTE05210
  05C8   2641               521           AIS   R4,1             INCREMENT INDEX                    MTE05220
  05CA   C4C0 007F           522           NHI   R0,X'7F'                                           MTE05230
  05CE   C500 007F           523           CLHI  R0,X'7F'         DONE WHEN OUTPUT DELETE CHARACTER  MTE05240
  05D2   2039               524           BNES  MESAGEL                                             MTE05250
                              525  *                             EXIT THROUGH TSTBRK                MTE05260
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SUBROUTINES

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                           527  *        S U B R O U T I N E   T S T B R K                        MTE05280
                           528  *                                                                 MTE05290
                           529  * CALLING SEQUENCE:      BAL  R13,TSTBRK                           MTE05300
                           530  *                                                                 MTE05310
                           531  * REGISTERS USED: R13,R2,R3                                        MTE05320
                           532  * SUBROUTINES USED: NONE                                           MTE05330


05D4   4820 09F6           534  TSTBRK   LH    R2,CONADR                                           MTE05350
05D8   DE20 09F8           535           CC    R2,CONRD      SELECT READ MODE                      MTE05360
05DC   9D23                536           SSR   R2,R3                                               MTE05370
05DE   C330 0020           537           THI   R3,X'20'      LINE BREAK STATUS?                    MTE05380
05E2   033D                538           BZR   R13           EXIT IF NO                            MTE05390
05E4   C350 0004           539           THI   R5,MICROFLG   MICRO I/O BUS?                        MTE05400
05E8   233E                540           BZS   TSTBRK2       SKIP IF NO                            MTE05410
05EA   C330 0008           541  TSTBRK0  THI   R3,8          BUSY ALSO SET?                        MTE05420
05EE   2134                542           BNZS  TSTBRK1       SKIP IF YES                           MTE05430
05F0   9B20                543           RDR   R2,R0         DUMMY READ                            MTE05440
05F2   9D23                544           SSR   R2,R3                                               MTE05450
05F4   2282                545           BFBS  8,2           WAIT FOR BUSY TO SET                  MTE05460
05F6   9D23                546  TSTBRK1  SSR   R2,R3                                               MTE05470
05F8   C330 0020           547           THI   R3,X'20'                                            MTE05480
05FC   2039                548           BNZS  TSTBRK0       LOOP UNTIL BREAK RESETS               MTE05490
05FE   9B20                549           RDR   R2,R0                                               MTE05500
0600   4300 0624           550           B     TSTBRK4       TAKE BREAK EXIT                       MTE05510
0604   C350 0100           551  TSTBRK2  THI   R5,PASFLG     PASLA?                                MTE05520
0608   233A                552           BZS   TSTBRK3       SKIP IF NO                            MTE05530
060A   C330 0008           553           THI   R3,X'08'      BUSY SET?                             MTE05540
060E   023D                554           BNZR  R13           EXIT IF YES, BREAK ACKNOWLEGED        MTE05550
0610   9B20                555           RDR   R2,R0         READ THE CHARACTER                    MTE05560
0612   9D23                556           SSR   R2,R3         WAIT TIL BUSY SETS                    MTE05570
0614   2281                557           BFBS  8,1                                                 MTE05580
0616   08C0                558           LHR   R0,R0         TEST CHARACTER                        MTE05590
0618   023D                559           BNZR  R13           EXIT IF FRAMING ERROR                 MTE05600
061A   2305                560           BS    TSTBRK4       ELSE, REAL BREAK                      MTE05610
061C   9D23                561  TSTBRK3  SSR   R2,R3         WAIT FOR BREAK RELEASE                MTE05620
061E   C330 0020           562           THI   R3,X'20'                                            MTE05630
0622   2033                563           BNZS  TSTBRK3                                             MTE05640
0624   43C0 0236           564  TSTBRK4  B     OPTIN                                               MTE05650
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SUBROUTINES

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                              566  *        S U B R O U T I N E   O U T C H R              MTE05670
                              567  *                                                       MTE05680
                              568  * SUBROUTINE OUTPUTS CHARACTER CONTAINED IN R0  TO THE TTY  MTE05690
                              569  *                                                       MTE05700
                              570  * CALLING SEQUENCE:      BAL  R12,OUTCHR                MTE05710
                              571  * REGISTERS USED: R12,R3,R2                             MTE05720
                              572  * SUBROUTINES USED: TSTDU                               MTE05730


0628    40C0 068C            574  OUTCHR   STH   R12,OUT1+2      SAVE RETURN ADDRESS       MTE05750
062C    C350 0080            575           THI   R5,CAROUSEL     CAROUSEL 300?             MTE05760
0630    4330 066E            576           BZ    OUTCHR2         SKIP IF NO TRANS PAUSE    MTE05770
0634    C450 FFBF            577           NHI   R5,-1-PAUSE     RESET FLAG       .        MTE05780
0638    41C0 0552            578  CTC.0    BAL   R12,TSTDU       ON LINE?                  MTE05790
063C    4230 0686            579           BNZ   OUT0            SKIP IF NO                MTE05800
0640    9D23                 580           SSR   R2,R3           CHARACTER TO READ?        MTE05810
0642    2386                 581           BNCS  OTC.2           BRANCH IF YES             MTE05820
0644    C350 0040            582  OTC.1    THI   R5,PAUSE        PAUSED NOW?               MTE05830
0648    2038                 583           BNZS  OTC.0           YES, WAIT FOR DC2         MTE05840
064A    43C0 066E            584           B     OUTCHR2         PRESS ON                  MTE05850
064E    9E23                 585  OTC.2    RDR   R2,R3           DC2,DC4                   MTE05860
0650    C430 007F            586           NHI   R3,X'7F'                                  MTE05870
0654    CB30 0012            587           SHI   R3,X'12'        DC2?                      MTE05880
0658    2134                 588           BNZS  OTC.3           SKIP IF NO                MTE05890
065A    C450 FFBF            589           NHI   R5,-1-PAUSE     YES, RE-SET FLAG          MTE05900
065E    23C8                 590           BS    OUTCHR2                                   MTE05910
0660    2732                 591  CTC.3    SIS   R3,2            DC4?                      MTE05920
0662    4230 0638            592           BNZ   OTC.0           NO, KEEP LOOKING          MTE05930
0666    C650 0040            593           OHI   R5,PAUSE        SET FLAG                  MTE05940
066A    43C0 0638            594           B     OTC.0                                     MTE05950
                             595  *                                                        MTE05960
066E    41C0 0552            596  OUTCHR2  BAL   R12,TSTDU                                 MTE05970
0672    213A                 597           BNZS  OUT0            LEAVE IF DU               MTE05980
0674    C350 0100            598  SETUP    THI   R5,PASFLG       PASLA?                    MTE05990
0678    2333                 599           BZS   SETUP1          SKIP IF NO                MTE06000
067A    C620 0001            600           OHI   R2,1            SELECT XMIT SIDE          MTE06010
067E    DE20 09F9            601  SETUP1   OC    R2,CONWRT       SELECT WRITE MODE         MTE06020
0682    9D23                 602  OTC.4    SSR   R2,R3                                     MTE06030
0684    2315                 603           BNMS  CONTO2          SKIP IF NOT DU            MTE06040
0686    C650 0001            604  OUT0     CHI   R5,WASDU        SET DU FLAG               MTE06050
068A    43C0 068A            605  OUT1     B     OUT1            RETURN                    MTE06060
                             606  *                                                        MTE06070
068E    C530 000C            607  CONTO2   CLHI  R3,12                                     MTE06080
0692    2236                 608           BES   OUT0                                      MTE06090
0694    C330 0008            609           THI   R3,8                                      MTE06100
0698    203B                 610           BNZS  OTC.4           LOOP ON BUSY              MTE06110
069A    9A20                 611           WDR   R2,R0                                     MTE06120
069C    9D23                 612  OTC.5    SSR   R2,R3                                     MTE06130
069E    203C                 613           BNZS  OUT0            EXIT                      MTE06140
06A0    2082                 614           BCS   OTC.5                                     MTE06150
06A2    22CC                 615           BS    OUT1            EXIT                      MTE06160
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SUBROUTINES

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                                    617  *           S U B R O U T I N E   C R L F                        MTE06180
                                    618  *                                                                MTE06190
                                    619  * OUTPUT CARRIAGE RETURN, LINE FEED SEQUENCE TO TTY              MTE06200
                                    620  *                                                                MTE06210
                                    621  * CALLING SEQUENCE:      BAL  R13,CRLF                            MTE06220
                                    622  *                                                                MTE06230
                                    623  * REGISTERS USED: R13,R12,R0                                      MTE06240
                                    624  * SUBROUTINES USED: OUTCHR                                        MTE06250


06A4  240D                          626  CRLF     LIS     R0,X'0D'           CARRIAGE RETURN              MTE06270
06A6  41C0 0628                     627           BAL     R12,OUTCHR                                      MTE06280
06AA  240A                          628           LIS     R0,X'0A'           LINE FEED                    MTE06290
06AC  41C0 0628                     629           BAL     R12,OUTCHR                                      MTE06300
06B0  030D                          630           PR      R13                                             MTE06310


                                    632  *           S U B R O U T I N E   G E T C H R                     MTE06330
                                    633  *                                                                MTE06340
                                    634  * READ CHARACTER FROM CONSOLE DEVICE                             MTE06350
                                    635  *                                                                MTE06360
                                    636  * CALLING SEQUENCE:      BAL  R13,GETCHR                          MTE06370
                                    637  *                                                                MTE06380
                                    638  * REGISTERS USED: R13,R2,R0,R3                                    MTE06390
                                    639  * SUBROUTINES USED: NONE                                         MTE06400


06B2  4820 09F6                     641  GETCHR   LH      R2,CONADR          PICK UP DEVICE NUMBER        MTE06420
06B6  DE20 09F8                     642           OC      R2,CONRD                                        MTE06430
06BA  9B20                          643           RDR     R2,R0              DUMMY READ                   MTE06440
06BC  9D20                          644           SSR     R2,R0                                           MTE06450
06BE  021D                          645           BTCR    1,R13              RETURN IF DU                 MTE06460
06C0  2082                          646           BTBS    8,2                LOOP ON BUSY                 MTE06470
06C2  9B20                          647           RDR     R2,R0                                           MTE06480
06C4  C350 0004                     648           THI     R5,MICROFLG        SEE IF MICRO I/O BUS         MTE06490
06C8  2333                          649           BZS     SENSET             SKIP IF NOT MICRO I/O BUS    MTE06500
06CA  9A20                          650           WDR     R2,R0                                           MTE06510
06CC  2308                          651           BS      SENSEX                                          MTE06520
                                    652  *                                                                MTE06530
06CE  C350 0080                     653  SENSET   THI     R5,CAROUSEL                                     MTE06540
06D2  2335                          654           BZS     SENSEX                                          MTE06550
06D4  2621                          655           AIS     R2,1               ODD ADDRESS                  MTE06560
06D6  9D23                          656  SENSEM   SSR     R2,R3                                           MTE06570
06D8  2081                          657           BCS     SENSEM             LOOP ON BUSY                 MTE06580
06DA  9A20                          658           WDR     R2,R0                                           MTE06590
                                    659  *                                                                MTE06600
06DC  C400 007F                     660  SENSEX   NHI     R0,X'7F'                                        MTE06610
06E0  03CD                          661           BR      R13                                             MTE06620
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SUBROUTINES

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                        663  *       S U B R O U T I N E   O P T V A L              MTE06640
                        664  *                                                      MTE06650
                        665  * CALLING SEQUENCE:      BAL   R13,OPTVAL              MTE06660
                        666  *                                                      MTE06670
                        667  * REGISTERS USED: R13,R14,R15,R0                        MTE06680
                        668  * SUBROUTINES USED: GETCHR                             MTE06690


06E2   07EE             670  OPTVAL    XHR   R14,R14      CLEAR ACCUMULATOR         MTE06710
06E4   07FF             671            XHR   R15,R15                                MTE06720
06E6   40D0 072A        672            STH   R13,OPTVALX+2                          MTE06730
06EA   41D0 06B2        673            BAL   R13,GETCHR   GET A CHARACTER IN R0     MTE06740
06EE   24DF             674  OPTVAL0   LIS   R13,15       INDEX                     MTE06750
06F0   D40D 081C        675  OPTVAL1   CLB   R0,ASCII(R13) COMPARE CHARACTER TO TABLE ENTRIES  MTE06760
06F4   2335             676            BES   OPTVAL1A     FOUND IT, R13=HEX VALUE   MTE06770
06F6   27D1             677            SIS   R13,1        BACK UP THRU TABLE        MTE06780
06F8   2284             678            BNLS  OPTVAL1      LOOP                      MTE06790
06FA   4300 03B0        679            B     QMARK        ERROR IF NOT A HEX CHARACTER  MTE06800
06FE   08CD             680  OPTVAL1A  LHR   R0,R13       VALUE TO R0               MTE06810
0700   C4C0 000F        681  OPTVAL2   NHI   R0,X'F'                                MTE06820
0704   EDE0 0004        682            SLL   R14,4        SHIFT ACCUMULATOR         MTE06830
0708   06F0             683            OHR   R15,R0       OR IN NEW DIGIT           MTE06840
070A   41D0 06B2        684  OPTVAL3   BAL   R13,GETCHR   GET ANOTHER CHARACTER     MTE06850
070E   C500 005F        685            CLHI  R0,X'5F'     LEFT ARROW?               MTE06860
0712   2134             686            BNES  OPTVAL4                                MTE06870
0714   ECE0 0004        687            SRL   R14,4        DELETE LAST CHARACTER     MTE06880
0718   2207             688            BS    OPTVAL3                                MTE06890
071A   C5C0 000D        689  OPTVAL4   CLHI  R0,X'0D'     CARRIAGE RETURN?          MTE06900
071E   2335             690            BES   OPTVALX      YES, EXIT                 MTE06910
0720   C500 002C        691            CLHI  R0,X'2C'     COMMA?                    MTE06920
0724   4230 06EE        692            BNE   OPTVAL0      LOOP                      MTE06930
0728   4300 0728        693  OPTVALX   B     OPTVALX      RETURN                    MTE06940
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SUBROUTINES

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                                   695 *        S U B R O U T I N E   A D R S E T                      MTE06960
                                   696 *                                                              MTE06970
                                   697 * REGISTER PAIR R14,R15 CONTAINS AN 18 BIT MAIN MEMORY ADDRESS. MTE06980
                                   698 * SUBROUTINE COPIES R15 INTO R1 THEN ADJUSTS R1 AND THE CURRENT MTE06990
                                   699 * PROGRAM STATUS WORD SO THAT THE ARGUMENT ADDRESS CAN BE ACCESSED MTE07000
                                   700 *                                                              MTE07010
                                   701 * CALLING SEQUENCE:      BAL  R13,ADRSET                        MTE07020
                                   702 *                                                              MTE07030
                                   703 * REGISTERS USED: R13,R12,R0,R1                                 MTE07040
                                   704 * SUBROUTINES USED: NONE                                        MTE07050


072C  95CC            706 ADRSET   EPSR   R12,R12       CAPTURE CURRENT PSW         MTE07070
072E  C4C0 FF0F       707          NHI    R12,X'FF0F'   RESET BANK SELECT BITS      MTE07080
0732  081F            708          LHR    R1,R15        LS 16 ADRS BITS TO R1       MTE07090
0734  C4E0 0003       709          NHI    R14,3         CLEAN UP R14                MTE07100
0738  233B            710          BZS    ADRSETX                                   MTE07110
073A  D30E 0752       711          LB     R0,XADRTAB(R14) TRANSLATE TO PSW BIT PATTERN MTE07120
073E  CA10 8000       712          AHI    R1,X'8000'    ADRS BIT 16 TO CARRY FLAG   MTE07130
0742  4EC0 09E4       713          ACH    R0,ZERO       ADJUST PSW BIT PATTERN      MTE07140
0746  C610 8000       714          OHI    R1,X'8000'    FORCE BIT 0 OF HW ADRS SET  MTE07150
074A  91C4            715          SLLS   R0,4          POSITION FIELD              MTE07160
074C  06C0            716          OHR    R12,R0        OR IN BITS                  MTE07170
074E  95CC            717 ADRSETX  EPSR   R0,R12        LOAD NEW PSW                MTE07180
0750  030D            718          BR     R13           RETURN TO CALL              MTE07190
                      719 *                                                        MTE07200
0752  00010305        720 XADRTAB  DB     0,1,3,5                                   MTE07210
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SUBROUTINES

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                                    722  *       S U B R O U T I N E   D I S P L A Y                      MTE07230
                                    723  *                                                               MTE07240
                                    724  * SUBROUTINE DISPLAYS CURRENT MEMORY ADDRESS                     MTE07250
                                    725  *                                                               MTE07260
                                    726  * CALLING SEQUENCE:      BAL  R13,DISPLAY                        MTE07270
                                    727  *                                                               MTE07280
                                    728  * REGISTERS USED: R13,PO                                         MTE07290
                                    729  * SUBROUTINES USED: NONE                                         MTE07300


0756   24C1                         731  DISPLAY  LIS   RO,1                                              MTE07320
0758   DE00 09EC                    732           OC    RO,INCRMNTL        DISPLAY IN INCREMENTAL MODE    MTE07330
075C   94FF                         733           EXBR  R15,R15                                           MTE07340
075E   98CF                         734           WHR   RO,R15             OUTPUT LS 16 ADDRESS BITS      MTE07350
0760   94FF                         735           EXBR  R15,R15                                           MTE07360
0762   9ACE                         736           WDR   RO,R14             OUTPUT MS ADDRESS BITS         MTE07370
0764   D8C0 09E4                    737           WH    RO,ZERO            OUTPUT TWO ZERO BYTES          MTE07380
0768   030D                         738           BR    R13                                              MTE07390


                                    740  *       S U B R O U T I N E   E R R M S G                        MTE07410
                                    741  *                                                               MTE07420
                                    742  * REGISTER PAIR R14,R15 CONTAINS THE FAILING MEMORY ADDRESS      MTE07430
                                    743  * REGISTER R9 CONTAINS THE DATA EXPECTED                         MTE07440
                                    744  * REGISTER R8 CONTAINS THE DATA OBSERVED                         MTE07450
                                    745  *                                                               MTE07460
                                    746  * CALLING SEQUENCE: BAL   R13,ERRMSG                             MTE07470
                                    747  *                                                               MTE07480
                                    748  * REGISTERS USED: R13,R12,R7,R4,R3,R2,RO                         MTE07490
                                    749  * SUBROUTINES USED: TSTDU,PRINTR7,MESSAGE,CRLF,OUTCHR            MTE07500


076A   4820 09F6                    751  ERRMSG   LH    R2,CONADR                                         MTE07520
076E   C650 0408                    752           OHI   R5,ISITERR+ERRFLG  FORCE PRINTING, SET ERROR FLAG MTE07530
0772   41C0 0552                    753           BAL   R12,TSTDU          TEST DU ON CONSOLE             MTE07540
0776   233B                         754           BZS   ERRMSG1            CONTINUE IF NOT DU             MTE07550
0778   4800 09EA                    755           LH    RO,TOTERR                                         MTE07560
077C   2601                         756           AIS   RO,1                                             MTE07570
077E   4000 09EA                    757           STH   RO,TOTERR          INCREMENT ERROR TALLY          MTE07580
0782   C500 FFFF                    758           CLHI  RO,X'FFFF'         LIMIT 65K                      MTE07590
0786   023D                         759           BNER  R13                RETURN TO CALL                 MTE07600
0788   43C0 048E                    760           B     HALT9                                            MTE07610
                                    761  *                                                               MTE07620
078C   40D0 07EA                    762  ERRMSG1  STH   R13,RETURN         SAVE RETURN ADDRESS            MTE07630
0790   41D0 06A4                    763           BAL   R13,CRLF           CARRIAGE RETURN,LINE FEED      MTE07640
0794   4800 09EA                    764           LH    RO,TOTERR          SKIP PRINTING HEADER IF        MTE07650
0798   2135                         765           BNZS  ERRMSG2            THIS IS FIRST ERROR            MTE07660
079A   C840 092C                    766           LHI   R4,MEMORY                                         MTE07670
079E   41D0 0572                    767           BAL   R13,MESSAGE        OUTPUT TWO LINE MESSAGE:        MTE07680
                                    768  *                                 MEMORY    DATA     DATA        MTE07690
                                    769  *                                 LOCATION EXPECTED OBSERVED     MTE07700
```

SUBROUTINES

07A2	24C1		770	ERRMSG2	LIS	R0,1		MTE07710
07A4	6100 09EA		771		AHM	R0,TOTERR	INCREMENT ERROR TALLY	MTE07720
07A8	C800 0020		772		LHI	R0,X'20'	SPACE	MTE07730
07AC	C350 0800		773		THI	R5,EXTMEM	MORE THAN 64 KB ?	MTE07740
07B0	2333		774		BZS	NONEXT	SKIP IF NO	MTE07750
07B2	D3CE 081C		775		LB	R0,ASCII(R14)	MS DIGIT OF ADDRESS	MTE07760
07B6	41C0 0628		776	NONEXT	BAL	R12,OUTCHR		MTE07770
07BA	C800 0020		777		LHI	R0,X'20'	SPACE	MTE07780
07BE	41C0 0628		778		BAL	R12,OUTCHR		MTE07790
07C2	087F		779		LHR	R7,R15		MTE07800
07C4	41D0 07EC		780		BAL	R13,PRINTR7	PRINT REST OF ADDRESS	MTE07810
07C8	C840 0366		781		LHI	R4,SPACE3		MTE07820
07CC	41D0 0572		782		BAL	R13,MESSAGE	THREE SPACES	MTE07830
07D0	0879		783		LHR	R7,R9		MTE07840
07D2	41D0 07EC		784		BAL	R13,PRINTR7	PRINT DATA EXPECTED	MTE07850
07D6	C840 0964		785		LHI	R4,SPACE5		MTE07860
07DA	41D0 0572		786		BAL	R13,MESSAGE		MTE07870
07DE	0878		787		LHR	R7,R8		MTE07880
07E0	41D0 07EC		788		BAL	R13,PRINTR7	PRINT DATA OBSERVED	MTE07890
07E4	C450 F8FF		789		NHI	R5,-1-ISITERR		MTE07900
07E8	43C0 07EA		790		B	RETURN		MTE07910
	0000 07EA		791	RETURN	EQU	*-2		MTE07920

SUBROUTINES

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                              793  *       S U B R O U T I N E    P R I N T R 7            MTE07940
                              794  *                                                      MTE07950
                              795  * THE FOUR HEX DIGITS IN R7 ARE CONVERTED TO HEX        MTE07960
                              796  * AND OUTPUT TO THE CONSOLE DEVICE                      MTE07970
                              797  *                                                      MTE07980
                              798  * CALLING SEQUENCE:      BAL   R13,PRINTR7              MTE07990
                              799  *                                                      MTE08000
                              800  * REGISTERS USED: R13,R6,R7,R12                         MTE08010
                              801  * SUBROUTINES USED: PRINTR6                             MTE08020


07EC   0766                  803  PRINTR7  XHR    R6,R6        USING R6,R7 AS 32 BIT ACCUMULATOR   MTE08040
07EE   ED60 0004             804           SLL    R6,4         R6 = R7 BITS 0:3            MTE08050
07F2   41C0 0810             805           BAL    R12,PRINTR6  PRINT IT                    MTE08060
07F6   ED60 0004             806           SLL    R6,4         R7 BITS 4:7                 MTE08070
07FA   41C0 0810             807           BAL    R12,PRINTR6  PRINT IT                    MTE08080
07FE   ED60 0004             808           SLL    R6,4         R7 BITS 8:11                MTE08090
0802   41C0 0810             809           BAL    R12,PRINTR6  PRINT IT                    MTE08100
0805   ED60 0004             810           SLL    R6,4         R7 BITS 12:1K               MTE08110
080A   41C0 0810             811           BAL    R12,PRINTR6  PRINT IT                    MTE08120
080E   030D                  812           BR     R13          RETURN                      MTE08130


                              814  *       S U B R O U T I N E    P R I N T R 6            MTE08150
                              815  *                                                      MTE08160
                              816  * CONVERT THE LS 4 BITS OF R6 TO ASCII AND OUTPUT       MTE08170
                              817  *                                                      MTE08180
                              818  * CALLING SEQUENCE:      BAL   R12,PRINTR6              MTE08190
                              819  *                                                      MTE08200
                              820  * REGISTERS USED: R12,R6,R0                             MTE08210
                              821  * SUBROUTINES USED: OUTCHR                              MTE08220
                              822  *                                                      MTE08230
                              823  *                                                      MTE08240
0810   C460 000F             824  PRINTR6  NHI    R6,X'F'                                  MTE08250
C814   D3C6 081C             825           LB     R0,ASCII(R6)                             MTE08260
0818   4300 0628             826           B      OUTCHR       EXIT THROUGH OUTCHR         MTE08270
                              827  *                                                      MTE08280
081C   30313233              828  ASCII    DC     C'0123456789ABCDEF'                      MTE08290
       34353637
       38394142
       43444546
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SUBROUTINES

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                              830  *       S U B R O U T I N E    T E S T N U M              MTE08310
                              831  *                                                         MTE08320
                              832  * SUBROUTINE PRINTS TITLE OF NEXT SUBTEST TO PERFORM      MTE08330
                              833  *                                                         MTE08340
                              834  * CALLING SEQUENCE:      BAL  R14,TESTNUM                  MTE08350
                              835  *                                                         MTE08360
                              836  * REGISTERS USED: R14,R1,R4,R13                            MTE08370
                              837  * SUBROUTINES USED: MESSAGE                                MTE08380
                              838  *                                                         MTE08390
                              839  *                                                         MTE08400
  082C   4810 09EE            840  TESTNUM  LH    R1,SUBTST         PICK UP SUBTEST NUMBER    MTE08410
  0830   D311 081C            841           LB    R1,ASCII(R1)      CONVERT TO ASCII          MTE08420
  0834   D210 08D2            842           STB   R1,TT             STORE IN MESSAGE          MTE08430
  0838   C840 08C6            843           LHI   R4,SUBNUM                                   MTE08440
  093C   41D0 0572            844           BAL   R13,MESSAGE       PRINT "SUBTEST N"         MTE08450
  0840   030E                 845           BR    R14               RETURN                    MTE08460


                              847  *       S U B R O U T I N E    A D C H E C K              MTE08480
                              848  *                                                         MTE08490
  0842   08BE                 849  ADCHECK  LHR   R11,R14                                     MTE08500
  0844   08CF                 850           LHR   R12,R15                                     MTE08510
  0846   CEC0 10C8            851           SHI   R12,LAST          COMPARE TO PROGRAM TOP    MTE08520
  084A   4FB0 09E4            852           SCH   R11,ZERO                                    MTE08530
  084E   2127                 853           BPS   ADCHK01           OK IF OVER TOP OF PROGRAM MTE08540
  0850   C840 096A            854  ADCHK.ER LHI   R4,ADRSERR                                  MTE08550
  0854   41D0 0572            955           BAL   R13,MESSAGE       PRINT "ADDRESS ERROR"     MTE08560
  0858   4300 0236            856           B     OPTIN                                       MTE08570
  085C   48B0 09E0            857  ADCHK01  LH    R11,MAXMEM                                  MTE08580
  0860   48C0 09E2            858           LH    R12,MAXMEM+2                                MTE08590
  0864   0BCF                 859           SHR   R12,R15           COMPARE TO LAST AVAILABLE ADRS MTE08600
  0866   0FBE                 860           SCHR  R11,R14                                     MTE08610
  0868   C38D                 861           BNLR  R13               OK IF LESS OR EQUAL       MTE08620
  086A   22CD                 862           BS    ADCHK.ER          ERROR IF GREATER          MTE08630
```

MESSAGES AND BUFFERS

086C	0D0A		864	TITLE2	DCX	0D0A,0000	MTE08650
086E	00C0						
0870	382F3136		865		DC	C'8/16 E EXTENDED MEMORY TEST PART 2 06-221R00'	MTE08660
	20452045						
	58544454E						
	44454420						
	4D454D4F						
	52592054						
	45535420						
	50415254						
	20322020						
	30362D32						
	32315230						
	3020						
089E	0D0A		866		DCX	0D0A,FFFF	MTE08670
08A0	FFFF						
08A2	50524F47		867	PDMXMM	DC	C'PROGRAM DETECTED MAXIMUM MEMORY '	MTE08680
	52414D20						
	44455445						
	43544544						
	204D4158						
	494D554D						
	204D454D						
	4F525920						
	2020						
08C4	FFFF		868		DCX	FFFF	MTE08690
08C6	000D		869	SUBNUM	DC	X'000D',X'0A00',C'SUBTEST '	MTE08700
08C8	0AC0						
08CA	53554254						
	45535420						
08D2	0000		870	TT	DC	X'0000',X'2020',X'FFFF'	MTE08710
08D4	2020						
08D6	FFFF						
08D8	0000		871	NOER	DC	X'0000',C'NO ERROR',X'FFFF'	MTE08720
08DA	4E4F2045						
	52524F52						
08E2	FFFF						
08E4	0D0A		872	EOTMSG	DC	X'0D0A',X'0000',C'END OF TEST',X'0D0A',X'FFFF'	MTE08730
08E6	0000						
08E8	454E4420						
	4F462054						
	45535420						
08F4	0D0A						
08F6	FFFF						
08F8	0000		873	MALFMSG	DC	0,C'MACHINE MALFUNCTION ',X'FFFF'	MTE08740
08FA	4D414348						
	494E4520						
	4D414C46						
	554E4354						
	494F4E20						
090E	FFFF						
0910	0000		874	ILLMSG	DC	0,C'ILLEGAL INSTRUCTION ',X'FFFF'	MTE08750
0912	494C4C45						
	47414C20						

MESSAGES AND BUFFERS

```
        494E5354
        52554354
        494F4E20
0926    FFFF
0928    00203FFF        875  QUEST    DB    0,C' ?',X'FF'                                          MTE08760
092C    4D454D4F        876  MEMORY   DC    C'MEMORY   DATA    DATA',X'0D0A'                        MTE08770
        52592020
        20444154
        41202020
        20204441
        5441
0942    0DCA
0944    0000            877           DC    X'0000'                                                MTE08780
0946    4C4F4341        878           DC    C'LOCATION EXPECTED OBSERVED',X'0D0A',X'FFFF'           MTE08790
        54494F4E
        20455850
        45435445
        44204F42
        53455256
        4544
0960    0DCA
0962    FFFF
0964    2020            879  SPACE5   DC    X'2020'                                                MTE08800
0966    2020            880  SPACE3   DC    X'2020',X'20FF'                                         MTE08810
0968    20FF
096A    0DCA            881  ADRSERR  DC    X'0D0A',X'0000'                                         MTE08820
096C    0000
096E    41444452        882           DC    C'ADDRESS ERROR, CHECK OPTIONS'                        MTE08830
        45535320
        4552524F
        522C2043
        4845434B
        204F5054
        494F4E53
098A    FFFF            883           DC    X'FFFF'                                                 MTE08840
098C    20544F54        884  TOTALMSG DC    C' TOTAL, ',X'FFFF'                                     MTE08850
        414C2C20
0994    FFFF
0996    20455252        885  ERRORS   DC    C' ERRORS',X'FFFF'                                      MTE08860
        4F525320
099E    FFFF


09A0    8000            887  BIT0     DCX   8000,4000,2000,1000                                    MTE08880
09A2    4000
09A4    2000
09A6    1000
09A8    0800            888           DCX   800,400,200,100                                        MTE08890
09AA    0400
09AC    0200
09AE    0100
09B0    0080            889           DCX   80,40,20,10                                            MTE08900
09B2    0040
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MESSAGES AND BUFFERS

```
09B4    0020
09B6    0010
09B8    00C8        890         DCX     8,4,2,1                                                     MTE08910
09BA    00C4
09BC    00C2
09BE    0001


09C0    FFFE        892 DATA2   DCX     FFFE,FFFD,FFFB,FFF7                                          MTE08930
09C2    FFFD
09C4    FFFB
09C6    FFF7
09C8    FFEF        893         DCX     FFEF,FFDF,FFBF,FF7F                                          MTE08940
09CA    FFDF
09CC    FFBF
09CE    FF7F
09D0    FEFF        894         DCX     FEFF,FDFF,FBFF,F7FF                                          MTE08950
09D2    FDFF
09D4    FBFF
09D6    F7FF
09D8    EFFF        895         DCX     EFFF,DFFF,BFFF,7FFF                                          MTE08960
09DA    DFFF
09DC    BFFF
09DE    7FFF
                    896 *                                                                           MTE08970
                    897 *                                                                           MTE08980
09E0    0000        898 MAXMEM  DCX     0000,0000                                                   MTE08990
09E2    0000
09E4    0000        899 ZERO    DCX     0                                                           MTE09000
09E6    0000        900 COUNT   DCX     0                                                           MTE09010
09E8    0000        901 TOTAL   DCX     0                                                           MTE09020
09EA    0000        902 TOTERR  DCX     0                                                           MTE09030
09EC    40          903 INCRMNTL DB     X'40'                                                       MTE09040
09ED    80          904 NORMAL  DB      X'80'                                                       MTE09050
09EE    0000        905 SUBTST  DCX     0                                                           MTE09060
                    906 *                                                                           MTE09070
09F0                907 OPTBUF  DS      6                                                           MTE09080
09F6    0000        908 CONADR  DCX     0000            CONSOLE DEVICE ADRS                         MTE09090
09F8    00          909 CONRD   DB      0               CONSOLE COMMANDS                            MTE09100
09F9    00          910 CONWRT  DB      0                                                           MTE09110
09FA    00          911 CON2ND  DB      0                                                           MTE09120
09FB    00          912 CONENRD DB      0                                                           MTE09130
09FC    00          913 CONRQ2S DB      0                                                           MTE09140
09FD    03          914 MICRORST DB     03                                                          MTE09150
09FE    8222        915 MICRORD DCX     8222                                                        MTE09160
0A00    A9AB        916 CARRD   DCX     A9AB                                                        MTE09170
0A02    F069        917 CAR2ND  DCX     F069                                                        MTE09180
0A04    23          918 CARRQ2S DB      X'23'                                                       MTE09190
0A05    3B          919 CRTRQ2S DB      X'3B'                                                       MTE09200
0A06    B9AB        920 CRTRD   DCX     B9AB                                                        MTE09210
0A08    F879        921 CRT2ND  DCX     F879                                                        MTE09220
0A0A    A4D8        922 CLIFRD  DCX     A4D8                                                        MTE09230
0A0C    0064        923 CLIF2ND DCX     0064                                                        MTE09240
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MESSAGES AND BUFFERS

```
          0000 0A0E          924  OPT      EQU    *                                              MTE09250
OA0E      52554E20          925  RUN      DC     C'RUN  ',X'0000',X'0000'                       MTE09260
          2020
OA14      0000
OA16      0000
OA18      4C4F5720          926  LOW      DC     C'LOW  ',X'0000',X'0000'                       MTE09270
          2020
OA1E      0000
OA20      0000
OA22      48494748          927  HIGH     DC     C'HIGH ',X'0000',X'0000'                       MTE09280
          2020
OA28      0000
OA2A      0000
OA2C      4C4F4F50          928  LOOP     DC     C'LOOP ',X'0000',X'0000'                       MTE09290
          2020
OA32      0000
OA34      0000
OA36      54455354          929  TEST     DC     C'TEST ',X'0000',X'FB80'                       MTE09300
          2020
OA3C      0000
OA3E      FB80
OA40      434F4E54          930  CONTIN   DC     C'CONTIN',X'0000',X'0000'                      MTE09310
          494E
OA46      0000
OA48      0000
OA4A      4E4F4D53          931  NOMSG    DC     C'NOMSG ',X'0000',X'0000'                      MTE09320
          4720
OA50      0000
OA52      0000
OA54      44415441          932  DATA     DC     C'DATA  ',X'0000',X'A5A5'                      MTE09330
          2020
OA5A      0000
OA5C      A5A5
OA5E      FFFF              933           DC     X'FFFF'                                        MTE09340
          0000 0A3E         934  DEFTESTS EQU    TEST+8                                         MTE09350
```

```
*                                   S U B T E S T    0

                              936  * SUBTEST 0 IS A MINIMAL ADDRESS DECODE TEST              MTE09370
                              937  * TESTING THE 8KB SEGMENT ABOVE THE PROGRAM               MTE09380
                              938  * FOR MULTIPLE ADDRESSING ERRORS                          MTE09390
                              939  *                                                         MTE09400
                              940  *                                                         MTE09410
           0000 0A60          941  TEST0    EQU     *                                        MTE09420
   0A60    07EE               942           XHR     R14,R14                                  MTE09430
   0A62    C8F0 10CA          943           LHI     R15,LAST+2                               MTE09440
   0A66    C6F0 00FF          944           OHI     R15,X'FF'      NEXT HIGHER 256 BYTE BOUNDARY   MTE09450
   0A6A    26F1               945           AIS     R15,1                                    MTE09460
   0A6C    D0E0 10BC          946           STM     R14,STRTADRS   SAVE START ADDRESS        MTE09470
   0A70    0788               947           XHR     R8,R8                                    MTE09480
   0A72    24A8               948           LIS     R10,8          ADDRESS PATTERN           MTE09490
   0A74    41D0 072C          949           BAL     R13,ADRSET                               MTE09500
   0A78    41D0 0756          950  TEST0.01 BAL     R13,DISPLAY                              MTE09510
   0A7C    08B1               951           LHR     R11,R1         TEST AREA = 4 HALFWORDS EACH AT   MTE09520
   0A7E    06FA               952           OHR     R11,R10        01008,01010,01020,        MTE09530
   0A80    408B 0000          953           STH     R8,0(R11)      01040,01080,01100,        MTE09540
   0A84    408B 0002          954           STH     R8,2(R11)      01200,01400, AND 01800    MTE09550
   0A88    408B 0004          955           STH     R8,4(R11)                                MTE09560
   0A8C    408B 0006          956           STH     R8,6(R11)      4 HALFWORDS CLEARED       MTE09570
   0A90    0AAA               957           AHR     R10,R10                                  MTE09580
   0A92    C5A0 1000          958           CLHI    R10,X'1000'                              MTE09590
   0A96    208F               959           BLS     TEST0.01                                 MTE09600
                              960  *                                                         MTE09610
                              961  *                                                         MTE09620
   0A98    24A8               962           LIS     R10,8          R10 = WORKING OFF-SET     MTE09630
   0A9A    D1E0 10BC          963  TEST0.10 LM      R14,STRTADRS   PICK UP START ADDRESS     MTE09640
   0A9E    06FA               964           OHR     R15,R10        ADD OFF-SET               MTE09650
   0AA0    41D0 072C          965           BAL     R13,ADRSET     SET-UP ADDRESS IN PSW,R1  MTE09660
   0AA4    41D0 0756          966           BAL     R13,DISPLAY                              MTE09670
   0AA8    C880 F000          967           LHI     R8,X'F000'     R8 = 'F000'               MTE09680
   0AAC    4081 0000          968           STH     R8,0(R1)                                 MTE09690
   0AB0    9084               969           SRLS    R8,4           R8 = '0F00'               MTE09700
   0AB2    4081 0002          970           STH     R8,2(R1)                                 MTE09710
   0AB6    9084               971           SRLS    R8,4           R8 = '00F0'               MTE09720
   0AB8    4081 0004          972           STH     R8,4(R1)                                 MTE09730
   0ABC    9084               973           SRLS    R8,4           R8 = '000F'               MTE09740
   0ABE    4081 0006          974           STH     R8,6(R1)                                 MTE09750
                              975  *                        TEST AREA LOADED                 MTE09760
   0AC2    0799               976           XHR     R9,R9                                    MTE09770
   0AC4    24B8               977           LIS     R11,8          R11 =TEST OFF-SET         MTE09780
   0AC6    05AB               978  TEST0.20 CLHR    R10,R11                                  MTE09790
   0AC8    4330 0B04          979           BE      TEST0.24       SKIP IF SAME AS WORKING OFF-SET   MTE09800
   0ACC    D1E0 10BC          980           LM      R14,STRTADRS                             MTE09810
   0AD0    06FB               981           OHR     R15,R11                                  MTE09820
   0AD2    41D0 072C          982           BAL     R13,ADRSET                               MTE09830
   0AD6    4861 0000          983           LH      R8,0(R1)       TEST FIRST WORD           MTE09840
   0ADA    2333               984           BZS     TEST0.21                                 MTE09850
   0ADC    41D0 076A          985           BAL     R13,ERRMSG     R14,R15 = AREA START ADRS MTE09860
   0AE0    26F2               986  TEST0.21 AIS     R15,2                                    MTE09870
   0AE2    4861 0002          987           LH      R8,2(R1)       TEST SECOND WORD          MTE09880
   0AE6    2333               988           BZS     TEST0.22                                 MTE09890
   0AE8    41D0 076A          989           BAL     R13,ERRMSG                               MTE09900
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         *                          S U B T E S T   0

    0AEC   26F2              990   TEST0.22 AIS   R15,2                                        MTE09910
    0AEE   4881 0004         991            LH    R8,4(R1)         TEST THIRD WORD             MTE09920
    0AF2   2333              992            BZS   TEST0.23                                     MTE09930
    0AF4   41E0 076A         993            BAL   R13,ERRMSG                                   MTE09940
    0AF8   26F2              994   TEST0.23 AIS   R15,2                                        MTE09950
    0AFA   4881 0006         995            LH    R8,6(R1)         TEST FOURTH WORD            MTE09960
    0AFE   2333              996            BZS   TEST0.24                                     MTE09970
    0B00   41E0 076A         997            BAL   R13,ERRMSG                                   MTE09980
    0B04   0AEB              998   TEST0.24 AHR   R11,R11          SHIFT TEST OFF-SET          MTE09990
    0B06   C5E0 1000         999            CLHI  R11,X'1000'                                  MTE10000
    0B0A   4280 0AC6         1000           BL    TEST0.20         LOOP THRU OTHER SEGMENTS    MTE10010
                             1001  *                                                          MTE10020
                             1002  *                                                          MTE10030
    0B0E   D1E0 10BC         1003           LM    R14,STRTADRS                                 MTE10040
    0B12   06FA              1004           OHR   R15,R10          PLUS WORKING OFFSET         MTE10050
    0B14   41E0 072C         1005           BAL   R13,ADRSET                                   MTE10060
    0B18   4091 0000         1006           STH   R9,0(R1)         RESTORE BACKGROUND          MTE10070
    0B1C   4091 0002         1007           STH   R9,2(R1)                                     MTE10080
    0B20   4091 0004         1008           STH   R9,4(R1)                                     MTE10090
    0B24   4091 0006         1009           STH   R9,6(R1)                                     MTE10100
    0B28   0AAA              1010           AHR   R10,R10          SHIFT WORKING OFF-SET       MTE10110
    0B2A   C5A0 1000         1011           CLHI  R10,X'1000'      DONE?                       MTE10120
    0B2E   4280 0A9A         1012           BL    TEST0.10                                     MTE10130
    0B32   4300 03D6         1013           B     TEST.END                                     MTE10140
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                *                          S U B T E S T   1

                             1015  * SUBTEST 1 CHECKS MEMORY FROM LAST+2 THROUGH X'1FFE'        MTE10160
                             1016  * FOR MEMORY DATA INTEGRETY                                  MTE10170
                             1017  *                                                            MTE10180
                             1018  *                                                            MTE10190
         0000 0B36           1019  TEST1     EQU     *                                          MTE10200
0B36     07EE                1020            XHR     R14,R14                                    MTE10210
0B38     C8F0 10CA           1021            LHI     R15,LAST+2                                 MTE10220
0B3C     41D0 072C           1022            BAL     R13,ADRSET      R1 CONTAINS PROGRAM ADDRESS MTE10230
0B40     41D0 0756           1023            BAL     R13,DISPLAY                                MTE10240
0B44     C890 8000           1024  TEST1.01 LHI     R9,X'8000'       R9 = DATA PATTERN          MTE10250
0B48     4091 0000           1025  TEST1.02 STH     R9,0(R1)         STORE IT                   MTE10260
0B4C     2612                1026            AIS     R1,2            INCREMENT STORAGE ADDRESS   MTE10270
0B4E     C510 2000           1027            CLHI    R1,X'2000'      AT 8K YET?                  MTE10280
0B52     2334                1028            BES     TEST1.10        DONE                        MTE10290
0B54     9091                1029            SRLS    R9,1            SHIFT THE PATTERN           MTE10300
0B56     2239                1030            BZS     TEST1.01        RESTORE IF ZERO             MTE10310
0B58     2208                1031            BS      TEST1.02                                   MTE10320
                             1032  *                                                            MTE10330
0B5A     C890 8000           1033  TEST1.10 LHI     R9,X'8000'       R9 = DATA EXPECTED         MTE10340
0B5E     488F 0000           1034  TEST1.11 LH      R8,0(R15)        R8 = DATA OBSERVED         MTE10350
0B62     41D0 0756           1035            BAL     R13,DISPLAY                                MTE10360
0B66     0598                1036            CLHR    R9,R8                                      MTE10370
0B68     2333                1037            BES     TEST1.12                                   MTE10380
0B6A     41D0 076A           1038            BAL     R13,ERRMSG      R14,R15 = FAILURE ADDRESS  * MTE10390
0B6E     26F2                1039  TEST1.12 AIS     R15,2            INCREMENT TEST ADDRESS      MTE10400
0B70     C5F0 2000           1040            CLHI    R15,X'2000'                                MTE10410
0B74     2336                1041            BES     TEST1.20        DONE                        MTE10420
0B76     9091                1042            SRLS    R9,1            SHIFT PATTERN               MTE10430
0B78     4330 0B5A           1043            BZ      TEST1.10        RESET TO '8000' IF ZERO     MTE10440
0B7C     4300 0B5E           1044            B       TEST1.11                                   MTE10450
                             1045  *                                                            MTE10460
                             1046  *                                                            MTE10470
0B80     07EE                1047  TEST1.20 XHR     R14,R14                                     MTE10480
0B82     C8F0 1FFE           1048            LHI     R15,X'1FFE'                                MTE10490
0B86     41D0 072C           1049            BAL     R13,ADRSET                                 MTE10500
0B8A     07AA                1050  TEST1.21 XHR     R10,R10          LOAD MEMORY FROM 8K DOWN TO 4K MTE10510
0B8C     489A 09C0           1051  TEST1.22 LH      R9,DATA2(R10)    WITH A ZERO SHIFTED THROUGH A MTE10520
0B90     4091 0000           1052            STH     R9,0(R1)         FIELD OF ONES             MTE10530
0B94     2712                1053            SIS     R1,2            DECREMENT STORAGE ADDRESS   MTE10540
0B96     C510 10C8           1054            CLHI    R1,LAST         CHECK IF DONE               MTE10550
0B9A     2336                1055            BES     TEST1.30                                   MTE10560
0B9C     26A2                1056            AIS     R10,2           NEXT PATTERN                MTE10570
0B9E     C5A0 0020           1057            CLHI    R10,32                                     MTE10580
0BA2     223C                1058            BES     TEST1.21        RESET R10 TO REPEAT PATTERN MTE10590
0BA4     220C                1059            BS      TEST1.22                                   MTE10600
                             1060  *                                                            MTE10610
0BA6     07AA                1061  TEST1.30 XHR     R10,R10          NOW TEST IT                MTE10620
0BA8     488F 0000           1062  TEST1.31 LH      R8,0(R15)        R8 = DATA OBSERVED         MTE10630
0BAC     41D0 0756           1063            BAL     R13,DISPLAY                                MTE10640
0BB0     489A 09C0           1064            LH      R9,DATA2(R10)    R9 = DATA EXPECTED         MTE10650
0BB4     0589                1065            CLHR    R8,R9                                      MTE10660
0BB6     2333                1066            BES     TEST1.32                                   MTE10670
0BB8     41D0 076A           1067            BAL     R13,ERRMSG      R14,R15 = FAILING ADDRESS  * MTE10680
0BBC     27F2                1068  TEST1.32 SIS     R15,2            DECREMENT TEST ADDRESS      MTE10690
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       *                          S U B T E S T   1

  0BBE    C5F0 10C8           1069          CLHI    R15,LAST                                              MTE10700
  0BC2    4330 03D6           1070          BE      TEST.END      END OF SUBTEST 1                        MTE10710
  0BC6    26A2               1071          AIS     R10,2         NEXT PATTERN                            MTE10720
  0BC8    C5A0 0020           1072          CLHI    R10,32                                                MTE10730
  0BCC    4330 0BA6           1073          BE      TEST1.30      RESET R10 TO REPEAT PATTERN             MTE10740
  0BD0    4300 0BA8           1074          B       TEST1.31                                              MTE10750
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                *                             S U B T E S T   2

                                1076  * SUBTEST 2 TESTS ALL OF MEMORY FROM LAST+2 TO MAXMEM              MTE10770
                                1077  *                                                                 MTE10780
                                1078  *                                  ADDRESS AS DATA                MTE10790
            0000 0BD4            1079  TEST2     EQU     *                                               MTE10800
OBD4   07EE                      1080            XHR     R14,R14                                         MTE10810
OBD6   C8F0 10CA                 1081            LHI     R15,LAST+2        R14,R15 = STARTING ADDRESS     MTE10820
OBDA   41D0 072C                 1082  TEST2.01  BAL     R13,ADRSET                                      MTE10830
OBDE   41D0 0756                 1083            BAL     R13,DISPLAY                                     MTE10840
OBE2   4011 0000                 1084  TEST2.02  STH     R1,0(R1)          STORE ADDRESS AS DATA         MTE10850
OBE6   45E0 09E0                 1085            CLH     R14,MAXMEM                                       MTE10860
OBEA   2184                      1086            BLS     TEST2.03                                         MTE10870
OBEC   45F0 09E2                 1087            CLH     R15,MAXMEM+2                                     MTE10880
OBF0   2388                      1088            BNLS    TEST2.10          DONE LAST HALFWORD             MTE10890
OBF2   26F2                      1089  TEST2.03  AIS     R15,2             INCREMENT STORAGE ADDRESS      MTE10900
OBF4   4EE0 09E4                 1090            ACH     R14,ZERO                                         MTE10910
OBF8   2612                      1091            AIS     R1,2              INCREMENT PROGRAM ADDRESS      MTE10920
OBFA   228C                      1092            BNCS    TEST2.02          NO NEED TO ADJUST IF NO CARRY  MTE10930
OBFC   4300 0BDA                 1093            B       TEST2.01                                         MTE10940
                                1094  *                                                                 MTE10950
OC00   07EE                      1095  TEST2.10  XHR     R14,R14                                         MTE10960
OC02   C8F0 10CA                 1096            LHI     R15,LAST+2        R14,R15 = STARTING ADDRESS     MTE10970
OC06   41D0 072C                 1097  TEST2.11  BAL     R13,ADRSET                                      MTE10980
OC0A   0891                      1098  TEST2.12  LHR     R9,R1             R9 = DATA EXPECTED             MTE10990
OC0C   41D0 0756                 1099            BAL     R13,DISPLAY                                     MTE11000
OC10   4881 0000                 1100            LH      R8,0(R1)          R8 = DATA OBSERVED             MTE11010
OC14   0589                      1101            CLHR    R8,R9                                            MTE11020
OC16   2333                      1102            BES     TEST2.13                                         MTE11030
OC18   41D0 076A                 1103            BAL     R13,ERRMSG        R14,R15 = FAILING ADDRESS    * MTE11040
OC1C   45E0 09E0                 1104  TEST2.13  CLH     R14,MAXMEM        TEST IF DONE                   MTE11050
OC20   2184                      1105            BLS     TEST2.14                                         MTE11060
OC22   45F0 09E2                 1106            CLH     R15,MAXMEM+2                                     MTE11070
OC26   2389                      1107            BNLS    TEST2.20                                         MTE11080
OC28   26F2                      1108  TEST2.14  AIS     R15,2             INCREMENT TEST ADDRESS         MTE11090
OC2A   4EE0 09E4                 1109            ACH     R14,ZERO                                         MTE11100
OC2E   2612                      1110            AIS     R1,2              INCREMENT PROGRAM ADDRESS      MTE11110
OC30   4380 OC0A                 1111            BNC     TEST2.12          NO NEED TO ADJUST IF NO CARRY  MTE11120
OC34   4300 0C06                 1112            B       TEST2.11                                         MTE11130
                                1113  *                                  ADDRESS FALSE AS DATA          MTE11140
                                1114  *                                                                 MTE11150
OC38   D1E0 09E0                 1115  TEST2.20  LM      R14,MAXMEM        R14,R15 = STARTING ADDRESS     MTE11160
OC3C   41D0 072C                 1116  TEST2.21  BAL     R13,ADRSET        GOING FROM TOP OF MEMORY DOWN  MTE11170
OC40   41D0 0756                 1117            BAL     R13,DISPLAY                                     MTE11180
OC44   2581                      1118  TEST2.22  LCS     R8,1              R8 = 'FFFF'                    MTE11190
OC46   0781                      1119            XHR     R8,R1             R8 = ONES COMPLEMENT OF ADDRESS MTE11200
OC48   4081 0000                 1120            STH     R8,0(R1)          STORE ADDRESS FALSE AS DATA    MTE11210
OC4C   27F2                      1121            SIS     R15,2             DECREMENT TEST ADDRESS         MTE11220
OC4E   4FE0 09E4                 1122            SCH     R14,ZERO                                         MTE11230
OC52   C5F0 10C8                 1123            CLHI    R15,LAST          SEE IF DONE                    MTE11240
OC56   2133                      1124            BNES    TEST2.23                                         MTE11250
OC58   08EE                      1125            LHR     R14,R14                                          MTE11260
OC5A   2335                      1126            BZS     TEST2.30                                         MTE11270
OC5C   2712                      1127  TEST2.23  SIS     R1,2              DECREMENT PROGRAM ADDRESS      MTE11280
OC5E   201D                      1128            BMS     TEST2.22          NO NEED TO ADJUST IF BIT 0 SET MTE11290
OC60   4300 0C3C                 1129            B       TEST2.21                                         MTE11300
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                        *                       S U B T E S T   2

                                        1130  *                                                                     MTE11310
                                        1131  *                                                                     MTE11320
        0C64    D1E0 09E0               1132  TEST2.30 LM    R14,MAXMEM        NOW CHECK THE LOCATIONS               MTE11330
        0C68    41D0 072C               1133  TEST2.31 BAL   R13,ADRSET                                             MTE11340
        0C6C    2591                    1134  TEST2.32 LCS   R9,1             R9 = 'FFFF'                            MTE11350
        0C6E    41D0 0756               1135           BAL   R13,DISPLAY                                            MTE11360
        0C72    0791                    1136           XHR   R9,R1            R9 = DATA EXPECTED                     MTE11370
        0C74    4881 0000               1137           LH    R8,0(R1)         R8 = DATA OBSERVED                     MTE11380
        0C78    0589                    1138           CLHR  R8,R9                                                  MTE11390
        0C7A    2333                    1139           BES   TEST2.33         OK IF THE SAME                        MTE11400
        0C7C    41D0 076A               1140           BAL   R13,ERRMSG       R14,R15 = FAILING ADDRESS      *      MTE11410
        0C80    27F2                    1141  TEST2.33 SIS   R15,2            DECREMENT TEST ADDRESS                MTE11420
        0C82    4FE0 09E4               1142           SCH   R14,ZERO                                               MTE11430
        0C86    C5F0 10C8               1143           CLHI  R15,LAST         SEE IF DONE                           MTE11440
        0C8A    2134                    1144           BNES  TEST2.34                                               MTE11450
        0C8C    08EE                    1145           LHR   R14,R14                                                MTE11460
        0C8E    4330 03D6               1146           BZ    TEST.END         END OF SUBTEST 2               *      MTE11470
        0C92    2712                    1147  TEST2.34 SIS   R1,2             DECREMENT PROGRAM ADDRESS             MTE11480
        0C94    4210 0C6C               1148           BM    TEST2.32         NO NEED TO ADJUST IF BIT 0 SET        MTE11490
        0C98    4300 0C68               1149           B     TEST2.31                                               MTE11500
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     *                            S U B T E S T   3

                        1151  * SUBTEST 3 TESTS ALL OF MEMORY FROM LAST+2 TO MAXMEM              MTE11520
                        1152  *                                                                 MTE11530
                        1153  *                                 ONE THROUGH A FIELD OF ZEROS    MTE11540
          0000 0C9C     1154  TEST3     EQU     *                                               MTE11550
  0C9C    07EE          1155            XHR     R14,R14                                         MTE11560
  0C9E    C8F0 10CA     1156            LHI     R15,LAST+2        R14,R15 = STARTING ADDRESS     MTE11570
  0CA2    0788          1157            XHR     R8,R8                                           MTE11580
  0CA4    41D0 072C     1158  TEST3.01  BAL     R13,ADRSET                                      MTE11590
  0CA8    41D0 0756     1159            BAL     R13,DISPLAY                                     MTE11600
  0CAC    4081 0000     1160  TEST3.02  STH     R8,0(R1)          FILL ALL OF MEMORY WITH ZEROS MTE11610
  0CB0    45E0 09E0     1161            CLH     R14,MAXMEM                                      MTE11620
  0CB4    2184          1162            BLS     TEST3.03                                        MTE11630
  0CB6    45F0 09E2     1163            CLH     R15,MAXMEM+2                                    MTE11640
  0CBA    2387          1164            BNLS    TEST3.10                                        MTE11650
  0CBC    26F2          1165  TEST3.03  AIS     R15,2             INCREMENT STORAGE ADDRESS     MTE11660
  0CBE    0EE8          1166            ACHR    R14,R8                                          MTE11670
  0CC0    2612          1167            AIS     R1,2              INCREMENT PROGRAM ADDRESS     MTE11680
  0CC2    228B          1168            BNCS    TEST3.02          NO NEED TO ADJUST IF NO CARRY MTE11690
  0CC4    4300 0CA4     1169            B       TEST3.01                                        MTE11700
                        1170  *                                                                 MTE11710
                        1171  *                                                                 MTE11720
  0CC8    07EE          1172  TEST3.10  XHR     R14,R14                                         MTE11730
  0CCA    C8F0 10CA     1173            LHI     R15,LAST+2                                      MTE11740
  0CCE    0799          1174            XHR     R9,R9                                           MTE11750
  0CD0    25A1          1175            LCS     R10,1                                           MTE11760
  0CD2    41D0 072C     1176  TEST3.11  BAL     R13,ADRSET                                      MTE11770
  0CD6    41D0 0756     1177  TEST3.12  BAL     R13,DISPLAY                                     MTE11780
  0CDA    4881 0000     1178            LH      R8,0(R1)          READ ZEROS                    MTE11790
  0CDE    2333          1179            BZS     TEST3.13                                        MTE11800
  0CE0    41D0 076A     1180            BAL     R13,ERRMSG        R14,R15 = FAILING ADDRESS   * MTE11810
  0CE4    40A1 0000     1181  TEST3.13  STH     R10,0(R1)         RE-WRITE ALL ONES             MTE11820
  0CE8    45E0 09E0     1182            CLH     R14,MAXMEM                                      MTE11830
  0CEC    2184          1183            BLS     TEST3.14                                        MTE11840
  0CEE    45F0 09E2     1184            CLH     R15,MAXMEM+2      DONE?                          MTE11850
  0CF2    2388          1185            BNLS    TEST3.20                                        MTE11860
  0CF4    26F2          1186  TEST3.14  AIS     R15,2             INCREMENT TEST ADDRESS        MTE11870
  0CF6    0EF9          1187            ACHR    R14,R9                                          MTE11880
  0CF8    2612          1188            AIS     R1,2              INCREMENT PROGRAM ADDRESS     MTE11890
  0CFA    4380 0CD6     1189            BNC     TEST3.12          NO NEED TO ADJUST IF NO CARRY MTE11900
  0CFE    43C0 0CD2     1190            B       TEST3.11                                        MTE11910
                        1191  *                                                                 MTE11920
                        1192  *                                                                 MTE11930
  0D02    D1E0 09E0     1193  TEST3.20  LM      R14,MAXMEM        STARTING FROM TOP OF MEMORY   MTE11940
  0D06    07AA          1194            XHR     R10,R10                                         MTE11950
  0D08    2591          1195            LCS     R9,1                                            MTE11960
  0D0A    41D0 072C     1196  TEST3.21  BAL     R13,ADRSET                                      MTE11970
  0D0E    41D0 0756     1197  TEST3.22  BAL     R13,DISPLAY                                     MTE11980
  0D12    4881 0000     1198            LH      R8,0(R1)          READ ONES                     MTE11990
  0D16    0589          1199            CLHR    R8,R9                                           MTE12000
  0D18    2333          1200            BES     TEST3.23                                        MTE12010
  0D1A    41D0 076A     1201            BAL     R13,ERRMSG        R14,R15 = FAILING ADDRESS   * MTE12020
  0D1E    40A1 0000     1202  TEST3.23  STH     R10,0(R1)         RE-WRITE ALL ZEROS            MTE12030
  0D22    27F2          1203            SIS     R15,2             DECREMENT TEST ADDRESS        MTE12040
  0D24    0FEA          1204            SCHR    R14,R10                                         MTE12050
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          *                      S U B T E S T   3

0D26   C5F0 10C8       1205            CLHI    R15,LAST                                                              MTE12060
0D2A   2134            1206            BNES    TEST3.24                                                              MTE12070
0D2C   08EE            1207            LHR     R14,R14                                                               MTE12080
0D2E   4330 03D6       1208            BZ      TEST.END        END OF SUBTEST 3               *                      MTE12090
0D32   2712            1209   TEST3.24 SIS     R1,2            DECREMENT PROGRAM ADDRESS                             MTE12100
0D34   4210 0D0E       1210            BM      TEST3.22        NO NEED TO ADJUST IF BIT 0 SET                        MTE12110
0D38   43C0 0D0A       1211            B       TEST3.21                                                              MTE12120
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               *                           S U B T E S T   4

                                1213  * SUBTEST 4 IS THE MODULE DECODE EXERCISE                      MTE12140
                                1214  * IN ONE 8K BLOCK, ONE HALFWORD OF ONES IS WRITTEN            MTE12150
                                1215  * THE CORRESPONDING LOCATION IN ALL OTHER 8K BLOCKS           MTE12160
                                1216  * IS THEN TESTED FOR THE BACKGROUND PATTERN '0000'            MTE12170
                                1217  *                                                             MTE12180
                                1218  *                                                             MTE12190
          00C0 0D3C             1219  TEST4    EQU     *                                            MTE12200
  0D3C    07EE                  1220           XHR     R14,R14                                      MTE12210
  0D3E    C8F0 10CA             1221           LHI     R15,LAST+2        R14,R15 = STARTING ADDRESS MTE12220
  0D42    0788                  1222           XHR     R8,R8                                        MTE12230
  0D44    41D0 072C             1223  TEST4.01 BAL     R13,ADRSET                                   MTE12240
  0D48    41D0 0756             1224           BAL     R13,DISPLAY                                  MTE12250
  0D4C    4081 0000             1225  TEST4.02 STH     R8,0(R1)          CLEAR ALL OF MEMORY        MTE12260
  0D50    45F0 09E0             1226           CLH     R14,MAXMEM                                   MTE12270
  0D54    2184                  1227           BLS     TEST4.03                                     MTE12280
  0D56    45F0 09E2             1228           CLH     R15,MAXMEM+2                                 MTE12290
  0D5A    2387                  1229           BNLS    TEST4.10                                     MTE12300
  0D5C    26E2                  1230  TEST4.03 AIS     R15,2                                        MTE12310
  0D5E    0EE8                  1231           ACHR    R14,R8                                       MTE12320
  0D60    2612                  1232           AIS     R1,2                                         MTE12330
  0D62    228B                  1233           BNCS    TEST4.02                                     MTE12340
  0D64    4300 0D44             1234           B       TEST4.01                                     MTE12350
                                1235  *                                                             MTE12360
                                1236  *                                                             MTE12370
  0D68    07AA                  1237  TEST4.10 XHR     R10,R10           R10,R11=WORKING ADDRESS    MTE12380
  0D6A    C8B0 1400             1238           LHI     R11,X'1400'       STARTING AT 5K MARK        MTE12390
  0D6E    08FA                  1239  TEST4.20 LHR     R14,R10           COPY WORK ADRS TO R14,R15  MTE12400
  0D70    08FB                  1240           LHR     R15,R11                                      MTE12410
  0D72    41D0 072C             1241           BAL     R13,ADRSET                                   MTE12420
  0D76    41D0 0756             1242           BAL     R13,DISPLAY                                  MTE12430
  0D7A    2581                  1243           LCS     R8,1              R8 = 'FFFF'                MTE12440
  0D7C    4081 0000             1244           STH     R8,0(R1)          STORE 'FFFF' IN ONE CELL   MTE12450
                                1245  *                                                             MTE12460
  0D80    07EE                  1246  TEST4.30 XHR     R14,R14           NOW, STARTING AT 5K MARK   MTE12470
  0D82    C8F0 1400             1247           LHI     R15,X'1400'       TEST ALL OTHER BLOCKS FOR ZERO MTE12480
  0D86    41D0 0756             1248  TEST4.31 BAL     R13,DISPLAY                                  MTE12490
  0D8A    0799                  1249           XHR     R9,R9             R9 = DATA EXPECTED         MTE12500
  0D8C    05EA                  1250           CLHR    R14,R10                                      MTE12510
  0D8E    2134                  1251           BNES    TEST4.32                                     MTE12520
  0D90    05FB                  1252           CLHR    R15,R11           IF THIS BLOCK EQUALS THE WORKING MTE12530
  0D92    4330 0DA4             1253           BE      TEST4.40          BLOCK, SKIP TO ANOTHER ONE MTE12540
  0D96    41D0 072C             1254  TEST4.32 BAL     R13,ADRSET                                   MTE12550
  0D9A    4881 0000             1255           LH      R8,0(R1)          TEST FOR BACKGROUND OF ZERO MTE12560
  0D9E    2333                  1256           BZS     TEST4.40                                     MTE12570
  0DA0    41D0 076A             1257           BAL     R13,ERRMSG        R14,R15 = FAILING BLOCK      * MTE12580
                                1258  *                                                             MTE12590
                                1259  *                                                             MTE12600
  0DA4    CAF0 2000             1260  TEST4.40 AHI     R15,X'2000'       INCREMENT TO NEXT BLOCK    MTE12610
  0DA8    0EE9                  1261           ACHR    R14,R9                                       MTE12620
  0DAA    45F0 09E0             1262           CLH     R14,MAXMEM                                   MTE12630
  0DAE    4280 0D86             1263           BL      TEST4.31                                     MTE12640
  0DB2    2125                  1264           BPS     TEST4.41                                     MTE12650
  0DB4    45F0 09E2             1265           CLH     R15,MAXMEM+2                                 MTE12660
  0DB8    4280 0D86             1266           BL      TEST4.31                                     MTE12670
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*                         S U B T E S T   4

                          1267  *                                                        MTE12680
                          1268  *                                                        MTE12690
ODBC    08EA              1269  TEST4.41 LHR   R14,R10                                   MTE12700
ODBE    08FB              1270           LHR   R15,R11                                   MTE12710
ODC0    41D0 072C         1271           BAL   R13,ADRSET                                MTE12720
ODC4    4091 0000         1272           STH   R9,0(R1)         RESTORE BACKGROUND       MTE12730
                          1273  *                                                        MTE12740
ODC8    CAB0 2000         1274           AHI   R11,X'2000'      NEXT 8K BLOCK            MTE12750
ODCC    0EA9              1275           ACHR  R10,R9                                    MTE12760
ODCE    45A0 09E0         1276           CLH   R10,MAXMEM                               MTE12770
ODD2    4280 0D6E         1277           BL    TEST4.20                                  MTE12780
ODD6    4220 03D6         1278           BP    TEST.END         DONE                     MTE12790
ODDA    45B0 09E2         1279           CLH   R11,MAXMEM+2                             MTE12800
ODDE    4280 0D6E         1280           BL    TEST4.20                                  MTE12810
ODE2    4300 03D6         1281           B     TEST.END                                 MTE12820
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                                      S U B T E S T   5

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             0000 0DE6         1283  TEST5    EQU    *                                          MTE12840
                               1284  * SUBTEST 5 WRITES A SELECTED PATTERN INTO MEMORY          MTE12850
                               1285  *                                                          MTE12860
    0DE6    D1E0 0A1E          1286          LM     R14,LOW+6      PICK UP LOW MEMORY ADDRESS   MTE12870
    0DEA    41D0 0842          1287          BAL    R13,ADCHECK    CHECK LIMITS                 MTE12880
    0DEE    D1E0 0A28          1288          LM     R14,HIGH+5     PICK UP HIGH MEMORY ADDRESS  MTE12890
    0DF2    41D0 0842          1289          BAL    R13,ADCHECK    CHECK LIMITS                 MTE12900
    0DF6    4BF0 0A20          1290          SH     R15,LOW+8      COMPARE TO LOW ADDRESS       MTE12910
    0DFA    4FE0 0A1E          1291          SCH    R14,LOW+6                                   MTE12920
    0DFE    4280 0850          1292          BL     ADCHK.ER       ERROR IF LOW > HIGH          MTE12930
    0E02    4820 09F6          1293          LH     R2,CONADR                                   MTE12940
    0E06    DE20 09F8          1294          OC     R2,CONRD       CONSOLE IN READ MODE         MTE12950
    0E0A    07AA               1295          XHR    R10,R10                                     MTE12960
    0E0C    D1E0 0A1E          1296  TEST5.10 LM    R14,LOW+6      START ADDRESS                MTE12970
    0E10    4890 0A5A          1297          LH     R9,DATA+6      DATA PATTERN                 MTE12980
    0E14    41D0 072C          1298  TEST5.11 BAL   R13,ADRSET                                  MTE12990
    0E18    41D0 0756          1299  TEST5.12 BAL   R13,DISPLAY                                 MTE13000
    0E1C    4091 0000          1300          STH    R9,0(R1)       STORE PATTERN                MTE13010
    0E20    9D23               1301          SSR    R2,R3                                       MTE13020
    0E22    C330 0020          1302          THI    R3,X'20'       TEST FOR BREAK               MTE13030
    0E26    4230 05D4          1303          BNZ    TSTBRK                                      MTE13040
    0E2A    26F2               1304          AIS    R15,2          INCREMENT DISPLAY ADDRESS    MTE13050
    0E2C    0EEA               1305          ACHR   R14,R10                                     MTE13060
    0E2E    45E0 0A28          1306          CLH    R14,HIGH+6                                  MTE13070
    0E32    2185               1307          BLS    TEST5.20                                    MTE13080
    0E34    45E0 0A2A          1308          CLH    R15,HIGH+8                                  MTE13090
    0E38    4380 0E0C          1309          BNL    TEST5.10       REPEAT FROM LOW ADDRESS      MTE13100
    0E3C    2612               1310  TEST5.20 AIS   R1,2           INCREMENT PROGRAM ADDRESS    MTE13110
    0E3E    4380 0E18          1311          BNC    TEST5.12       NO ADJUST IF NO CARRY        MTE13120
    0E42    4300 0E14          1312          B      TEST5.11                                    MTE13130
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                                 *                       S U B T E S T   6

                                         1314  * SUBTEST 6 IS THE WORST CASE ACCESS TEST                             MTE13150
                                         1315  * MEMORY IS CLEARED.  ALL ONES ARE WRITTEN TO A HALFWORD             MTE13160
                                         1316  * AND THE NEXT SEQUENTIAL HALFWORD IS READ AND TESTED FOR            MTE13170
                                         1317  * ZEROS.  WITH MEMORY EQUAL TO ALL ONES, ZEROS ARE WRITTEN           MTE13180
                                         1318  * TO A HALFWORD AND THE NEXT SEQUENTIAL HALFWORD IS TESTED           MTE13190
                                         1319  * FOR ALL ONES.                                                      MTE13200
                                         1320  *                                                                    MTE13210
                                         1321  *                                                                    MTE13220
                    0000 0E46            1322  TEST6     EQU     *                                                  MTE13230
        0E46        07EE                 1323            XHR     R14,R14                                            MTE13240
        0E48        C8F0 10CA            1324            LHI     R15,LAST+2        R14,R15 = STARTING ADDRESS       MTE13250
        0E4C        0788                 1325            XHR     R8,R8                                              MTE13260
        0E4E        41D0 072C            1326  TEST6.01  BAL     R13,ADRSET                                         MTE13270
        0E52        41D0 0756            1327            BAL     R13,DISPLAY                                        MTE13280
        0E56        4081 0000            1328  TEST6.02  STH     R8,0(R1)          CLEAR ALL OF MEMORY              MTE13290
        0E5A        45F0 09E0            1329            CLH     R14,MAXMEM                                         MTE13300
        0E5E        2184                 1330            BLS     TEST6.03                                           MTE13310
        0E60        45F0 09E2            1331            CLH     R15,MAXMEM+2                                       MTE13320
        0E64        2387                 1332            BNLS    TEST6.04                                           MTE13330
        0E66        26F2                 1333  TEST6.03  AIS     R15,2                                              MTE13340
        0E68        0EF8                 1334            ACHR    R14,R8                                             MTE13350
        0E6A        2612                 1335            AIS     R1,2                                               MTE13360
        0E6C        228B                 1336            BNCS    TEST6.02                                           MTE13370
        0E6E        4300 0E4E            1337            B       TEST6.01                                           MTE13380
                                         1338  *                                                                    MTE13390
                                         1339  *                                                                    MTE13400
        0E72        07EE                 1340  TEST6.04  XHR     R14,R14                                            MTE13410
        0E74        C8F0 10CA            1341            LHI     R15,LAST+2        R14,R15 = STARTING ADDRESS       MTE13420
        0E78        0799                 1342            XHR     R9,R9                                              MTE13430
        0E7A        25A1                 1343            LCS     R10,1                                              MTE13440
        0E7C        41D0 072C            1344  TEST6.10  BAL     R13,ADRSET                                         MTE13450
        0E80        41D0 0756            1345  TEST6.11  BAL     R13,DISPLAY                                        MTE13460
        0E84        C510 FFFE            1346            CLHI    R1,X'FFFE'        SEE IF AT BOUNDARY               MTE13470
        0E88        233B                 1347            BES     TEST6.12          IF YES, JUST WRITE ONES          MTE13480
        0E8A        40A1 0000            1348            STH     R10,0(R1)         WRITE ONES                       MTE13490
        0E8E        4881 0002            1349            LH      R8,2(R1)          READ ZEROS                       MTE13500
        0E92        2338                 1350            BZS     TEST6.13          SKIP IF ZERO                     MTE13510
        0E94        26F2                 1351            AIS     R15,2             WORKING ADDRESS PLUS 2           MTE13520
        0E96        0EE9                 1352            ACHR    R14,R9                                             MTE13530
        0E98        41D0 076A            1353            BAL     R13,ERRMSG        R14,R15 = FAILING ADDRESS    *   MTE13540
        0E9C        2305                 1354            BS      TEST6.14                                           MTE13550
        0E9E        40A1 0000            1355  TEST6.12  STH     R10,0(R1)         WRITE ONES                       MTE13560
        0EA2        26F2                 1356  TEST6.13  AIS     R15,2             INCREMENT TEST ADDRESS           MTE13570
        0EA4        0EE9                 1357            ACHR    R14,R9                                             MTE13580
        0EA6        45F0 09E0            1358  TEST6.14  CLH     R14,MAXMEM        TEST IF ODNE                     MTE13590
        0EAA        2184                 1359            BLS     TEST6.15                                           MTE13600
        0EAC        45F0 09E2            1360            CLH     R15,MAXMEM+2                                       MTE13610
        0EB0        2386                 1361            BNLS    TEST6.20          DONE                             MTE13620
        0EB2        2612                 1362  TEST6.15  AIS     R1,2              INCREMENT PROGRAM ADDRESS        MTE13630
        0EB4        4280 0E7C            1363            BC      TEST6.10          RE-ADJUST IF CARRY               MTE13640
        0EB8        4300 0E80            1364            B       TEST6.11                                           MTE13650
                                         1365  *                                                                    MTE13660
                                         1366  *                                                                    MTE13670
        0EBC        07EE                 1367  TEST6.20  XHR     R14,R14                                            MTE13680
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         *                          S U B T E S T   6

OEBE   C8F0 10CA      1368           LHI    R15,LAST+2                                              MTE13690
OEC2   2591           1369           LCS    R9,1                                                    MTE13700
OEC4   07AA           1370           XHR    R10,R10                                                 MTE13710
OEC6   41D0 072C      1371  TEST6.21 BAL    R13,ADRSET                                              MTE13720
OECA   41D0 0756      1372           BAL    R13,DISPLAY                                             MTE13730
OECE   C510 FFFE      1373  TEST6.22 CLHI   R1,X'FFFE'         SEE IF AT BOUNDARY                   MTE13740
OED2   2333           1374           BES    TEST6.23           SKIP IF YES                          MTE13750
OED4   40A1 0002      1375           STH    R10,2(R1)          WRITE ZEROS TO LOC+2                 MTE13760
OED8   4881 0000      1376  TEST6.23 LH     R8,0(R1)           READ ONES FROM LOC                   MTE13770
OEDC   0589           1377           CLHR   R8,R9                                                   MTE13780
OEDE   2333           1378           BES    TEST6.24                                                MTE13790
OEE0   41D0 076A      1379           BAL    R13,ERRMSG         R14,R15 = FAILING ADDRESS    *       MTE13800
OEE4   40A1 0000      1380  TEST6.24 STH    R10,0(R1)          WRITE ZEROS IN TEST LOC              MTE13810
OEE8   C510 FFFF      1381           CLHI   R1,X'FFFF'         SEE IF AT BOUNDARY                   MTE13820
OEEC   2333           1382           BES    TEST6.25                                                MTE13830
OEEE   4091 0002      1383           STH    R9,2(R1)           LOC+2 RESET TO 'FFFF'                MTE13840
OEF2   26F2           1384  TEST6.25 AIS    R15,2              INCREMENT TEST ADDRESS               MTE13850
OEF4   0EFA           1385           ACHR   R14,R10                                                 MTE13860
OEF6   45E0 09E0      1386           CLH    R14,MAXMEM         TEST IF END OF MEMORY                MTE13870
OEFA   2184           1387           BLS    TEST6.26                                                MTE13880
OEFC   45F0 09E2      1388           CLH    R15,MAXMEM+2                                             MTE13890
OF00   2386           1389           BNLS   TEST6.30           DONE                                 MTE13900
OF02   2612           1390  TEST6.26 AIS    R1,2               INCREMENT PROGRAM ADDRESS            MTE13910
OF04   4280 OEC6      1391           BC     TEST6.21           ADJUST IF CARRY                      MTE13920
OF08   4300 OECE      1392           B      TEST6.22                                                MTE13930
                      1393  *                                                                       MTE13940
                      1394  * ALL OF MEMORY FROM LAST+2 UP IS CLEAR                                 MTE13950
                      1395  *                                                                       MTE13960
OF0C   07EE           1396  TEST6.30 XHR    R14,R14                                                 MTE13970
OF0E   C8F0 10CA      1397           LHI    R15,LAST+2                                              MTE13980
OF12   41D0 072C      1398  TEST6.31 BAL    R13,ADRSET                                              MTE13990
OF16   41D0 0756      1399           BAL    R13,DISPLAY                                             MTE14000
OF1A   0799           1400  TEST6.32 XHR    R9,R9              R9 = '0000'                          MTE14010
OF1C   25A1           1401           LCS    R10,1              R10 = 'FFFF'                         MTE14020
OF1E   4881 0000      1402           LH     R8,0(R1)           READ ZEROS                           MTE14030
OF22   D2A1 0000      1403           STB    R10,0(R1)          WRITE ONES <0:7>                     MTE14040
OF26   D2A1 0001      1404           STB    R10,1(R1)          WRITE ONES <8:15>                    MTE14050
OF2A   48A1 0000      1405           LH     R10,0(R1)          READ ONES                            MTE14060
OF2E   4091 0000      1406           STH    R9,0(R1)           WRITE ZEROS                          MTE14070
OF32   0888           1407           LHR    R8,R8              DID WE GET ZEROS FIRST TIME?         MTE14080
OF34   2333           1408           BZS    TEST6.33           OK IF YES                            MTE14090
OF36   41D0 076A      1409           BAL    R13,ERRMSG         R14,R15 = FAILING ADDRESS    *       MTE14100
OF3A   2591           1410  TEST6.33 LCS    R9,1               EXPECTING 'FFFF'                     MTE14110
OF3C   088A           1411           LHR    R8,R10             DID WE GET 'FFFF' ?                  MTE14120
OF3E   0589           1412           CLHR   R8,R9                                                   MTE14130
OF40   2333           1413           BES    TEST6.34           SKIP IF YES                          MTE14140
OF42   41D0 076A      1414           BAL    R13,ERRMSG         R14,R15 = FAILING ADDRESS    *       MTE14150
OF46   26F2           1415  TEST6.34 AIS    R15,2              NEXT HALFWORD                        MTE14160
OF48   0EFA           1416           ACHR   R14,R10                                                 MTE14170
OF4A   45E0 09E0      1417           CLH    R14,MAXMEM                                              MTE14180
OF4E   2185           1418           BLS    TEST6.35                                                MTE14190
OF50   45F0 09E2      1419           CLH    R15,MAXMEM+2                                             MTE14200
OF54   4380 03D6      1420           BNL    TEST.END                                                MTE14210
OF58   2612           1421  TEST6.35 AIS    R1,2               INCREMENT PROGRAM ADDRESS            MTE14220
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     *                          S U B T E S T   6

OF5A    4280 OF12              1422          BC     TEST6.31          ADJUST ADDRESS                              MTE14230
OF5E    4300 OF1A              1423          B      TEST6.32                                                     MTE14240
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*                              S U B T E S T    7

                        1425  * SUBTEST 7 LOADS WORST CASE PATTERNS INTO MEMORY              MTE14260
                        1426  *                                                              MTE14270
                        1427  * FIRST ALL LOCATIONS ARE LOADED WITH ALTERNATE                MTE14280
                        1428  * ONES AND ZEROS  I.E. 5555 THEN AAAA                          MTE14290
                        1429  *                                                              MTE14300
                        1430  *                                                              MTE14310
   0F62  0000           1431  DATAPAT DCX     0000                                           MTE14320
                        1432  *                                                              MTE14330
         0000 0F64      1433  TEST7   EQU     *                                              MTE14340
   0F64  C890 5555      1434          LHI     R9,X'5555'                                     MTE14350
   0F68  4090 0F62      1435  TEST7.0X STH    R9,DATAPAT       SAVE DATA PATTERN             MTE14360
   0F6C  07EE           1436          XHR     R14,R14                                        MTE14370
   0F6E  C8F0 10CA      1437          LHI     R15,LAST+2                                     MTE14380
   0F72  4890 0F62      1438          LH      R9,DATAPAT                                     MTE14390
   0F76  25A1           1439          LCS     R10,1                                          MTE14400
   0F78  41D0 072C      1440  TEST7.01 BAL    R13,ADRSET                                     MTE14410
   0F7C  41D0 0756      1441          BAL     R13,DISPLAY                                    MTE14420
   0F80  4091 0000      1442  TEST7.02 STH    R9,0(R1)         STORE PATTERN                 MTE14430
   0F84  079A           1443          XHR     R9,R10           COMPLEMENT FOR NEXT TIME      MTE14440
   0F86  26F2           1444          AIS     R15,2            INCREMENT ADDRESS             MTE14450
   0F88  4EE0 09E4      1445          ACH     R14,ZERO                                       MTE14460
   0F8C  45E0 09E0      1446          CLH     R14,MAXMEM       TEST IF DONE                  MTE14470
   0F90  2184           1447          BLS     TEST7.03                                       MTE14480
   0F92  45F0 09E2      1448          CLH     R15,MAXMEM+2                                   MTE14490
   0F96  2386           1449          BNLS    TEST7.10         DONE                          MTE14500
   0F98  2612           1450  TEST7.03 AIS    R1,2             INCREMENT PROGRAM ADDRESS     MTE14510
   0F9A  4280 0F78      1451          BC      TEST7.01         ADJUST IF CARRY               MTE14520
   0F9E  4300 0F80      1452          B       TEST7.02                                       MTE14530
                        1453  *                                                              MTE14540
                        1454  *                                                              MTE14550
   0FA2  4890 0F62      1455  TEST7.10 LH     R9,DATAPAT       FIRST PATTERN                 MTE14560
   0FA6  07EE           1456          XHR     R14,R14                                        MTE14570
   0FA8  C8F0 10CA      1457          LHI     R15,LAST+2                                     MTE14580
   0FAC  41D0 072C      1458  TEST7.11 BAL    R13,ADRSET                                     MTE14590
   0FB0  41D0 0756      1459          BAL     R13,DISPLAY                                    MTE14600
   0FB4  4881 0000      1460  TEST7.12 LH     R8,0(R1)         READ '5555'                   MTE14610
   0FB8  0589           1461          CLHR    R8,R9                                          MTE14620
   0FBA  2333           1462          BES     TEST7.13                                       MTE14630
   0FBC  41D0 076A      1463          BAL     R13,ERRMSG       R14,R15=FAILING ADDRESS    *  MTE14640
   0FC0  079A           1464  TEST7.13 XHR    R9,R10           COMPLEMENT PATTERN            MTE14650
   0FC2  4091 0000      1465          STH     R9,0(R1)         STORE IT                      MTE14660
   0FC6  4881 0000      1466          LH      R8,0(R1)         READ 'AAAA'                   MTE14670
   0FCA  0589           1467          CLHR    R8,R9                                          MTE14680
   0FCC  2333           1468          BES     TEST7.14                                       MTE14690
   0FCE  41D0 076A      1469          BAL     R13,ERRMSG       R14,R15=FAILING ADDRESS    *  MTE14700
   0FD2  079A           1470  TEST7.14 XHR    R9,R10           BACK TO ORIGINAL PATTERN      MTE14710
   0FD4  4091 0000      1471          STH     R9,0(R1)         RESTORE                       MTE14720
   0FD8  079A           1472          XHR     R9,R10           COMPLEMENT PATTERN FOR NEXT PASS MTE14730
   0FDA  26F2           1473          AIS     R15,2            INCREMENT ADDRESS             MTE14740
   0FDC  4EE0 09E4      1474          ACH     R14,ZERO                                       MTE14750
   0FE0  45E0 09E0      1475          CLH     R14,MAXMEM       TEST IF DONE                  MTE14760
   0FE4  2184           1476          BLS     TEST7.15                                       MTE14770
   0FE6  45F0 09E2      1477          CLH     R15,MAXMEM+2                                   MTE14780
   0FEA  2386           1478          BNLS    TEST7.20         DONE                          MTE14790
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 *                             S U B T E S T   7

OFEC   2612                1479  TEST7.15 AIS   R1,2              INCREMENT PROGRAM ADDRESS       MTE14800
OFEE   4280 OFAC           1480           BC    TEST7.11          ADJUST IF CARRY                 MTE14810
OFF2   4300 OFB4           1481           B     TEST7.12                                          MTE14820
                          1482  *                                                                MTE14830
                          1483  *                                                                MTE14840
                          1484  * FIRST PASS SET MEMORY TO '5555' 'AAAA','SSSS','AAAA',ETC.       MTE14850
                          1485  * ON SECOND PASS, USE '0000','FFFF','0000','FFFF',ETC.            MTE14860
                          1486  * ON LAST PASS, USE 'C6C6','3939','C6C6','3939',ETC.              MTE14870
                          1487  *                                                                MTE14880
                          1488  *                                                                MTE14890
OFF6   4890 0F62           1489  TEST7.20 LH    R9,DATAPAT        CHECK LAST PATTERN USED         MTE14900
OFFA   2336                1490           BZS   TEST7.21          WAS '0000','FFFF'               MTE14910
OFFC   4210 03D6           1491           BM    TEST.END          WAS 'C6C6','3939'               MTE14920
                          1492  *                                 WAS '5555','AAAA'               MTE14930
1000   0799                1493           XHR   R9,R9             USE '0000','FFFF'               MTE14940
1002   4300 0F68           1494           B     TEST7.0X                                          MTE14950
1006   C890 C6C6           1495  TEST7.21 LHI   R9,X'C6C6'        USE 'C6C6','3939'               MTE14960
100A   4300 0F68           1496           B     TEST7.0X                                          MTE14970
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                        *                        S U B T E S T   8

                                          1498  * EXECUTE A SUBROUTINE FROM EVERY AVAILABLE MEMORY LOCATION         MTE14990
                                          1499  *                                                                  MTE15000
              0000 100E                   1500  TEST8    EQU    *                                                   MTE15010
      100E    07EE                        1501           XHR    R14,R14                                            MTE15020
      1010    C8F0 10CA                    1502           LHI    R15,LAST+2       R14,R15 = START ADDRESS            MTE15030
      1014    D0E0 10BC                    1503  TEST8.10 STM    R14,STRTADRS     START ADDRESS OF SUBROUTINE        MTE15040
      1018    41D0 0756                    1504           BAL    R13,DISPLAY      DISPLAY THIS ADDRESS              MTE15050
      101C    0700                         1505           XHR    R0,R0                                              MTE15060
      101E    CAF0 001F                    1506           AHI    R15,SIZE-1                                         MTE15070
      1022    0EE0                         1507           ACHR   R14,R0                                             MTE15080
      1024    D0F0 10C0                    1508           STM    R14,ENDADRS      END ADDRESS OF SUBROUTINE          MTE15090
      1028    41D0 072C                    1509           BAL    R13,ADRSET       SET PSW & R1 FOR FINAL             MTE15100
      102C    95DD                         1510           EPSR   R13,R13          CAPTURE PSW                        MTE15110
      102E    C4D0 00F0                    1511           NHI    R13,X'00F0'      SAVE BANK SELECT BITS              MTE15120
      1032    40D0 10C4                    1512           STH    R13,SELECT                                         MTE15130
      1036    4010 10C6                    1513           STH    R1,ADDRESS       SAVE PROGRAM ADDRESS               MTE15140
      103A    D1E0 10BC                    1514           LM     R14,STRTADRS     PICK UP START ADDRESS              MTE15150
      103E    41D0 072C                    1515           BAL    R13,ADRSET       SET PSW & R1 FOR START             MTE15160
      1042    95DD                         1516           EPSR   R13,R13          CAPTURE PSW                        MTE15170
      1044    C4D0 00F0                    1517           NHI    R13,X'00F0'      ISOLATE BANK SELECT BITS           MTE15180
      1048    45D0 10C4                    1518           CLH    R13,SELECT       SEE IF SAME AS FOR END ADDRESS     MTE15190
      104C    4230 107A                    1519           BNE    TEST8.30         IF DIFFER, DON'T TRY TO EXECUTE    MTE15200
                                          1520  *                                 A SUBROUTINE ACROSS A BOUNDARY     MTE15210
      1050    08D1                         1521           LHR    R13,R1           IF BANK SELECT FIELDS ARE ALIKE    MTE15220
      1052    47D0 10C6                    1522           XH     R13,ADDRESS      CHECK BIT 0 OF THE PROGRAM         MTE15230
                                          1523  *                                 ADDRESSES.  THEY TOO MUST MATCH    MTE15240
                                          1524  *                                 BEFORE PROCEEDING.                MTE15250
      1056    4210 107A                    1525           BM     TEST8.30         NO TEST IF DIFFERENT               MTE15260
                                          1526  *                                                                   MTE15270
      105A    08C1                         1527           LHR    R12,R1           PROGRAM ADDRESS                    MTE15280
      105C    07DD                         1528           XHR    R13,R13                                            MTE15290
      105E    48BD 109C                    1529  TEST8.20 LH     R11,SBRTN(R13)                                     MTE15300
      1062    40BC 0000                    1530           STH    R11,0(R12)       MOVE SUBROUTINE INTO TEST AREA     MTE15310
      1066    26C2                         1531           AIS    R12,2                                              MTE15320
      1068    26D2                         1532           AIS    R13,2                                              MTE15330
      106A    C5D0 0020                    1533           CLHI   R13,SIZE                                           MTE15340
      106E    2088                         1534           BLS    TEST8.20                                           MTE15350
      1070    01D1                         1535           BALR   R13,R1           GO TO SUBROUTINE                   MTE15360
                                          1536  *                                                                   MTE15370
      1072    0899                         1537           LHR    R9,R9            IF R9=0, NO ERROR                  MTE15380
      1074    2333                         1538           BZS    TEST8.30                                           MTE15390
      1076    41D0 076A                    1539           BAL    R13,ERRMSG                                         MTE15400
      107A    48C0 10C0                    1540  TEST8.30 LH     R12,ENDADRS      PICK UP END ADDRESS                MTE15410
      107E    48D0 10C2                    1541           LH     R13,ENDADRS+2                                      MTE15420
      1082    07C0                         1542           XHR    R0,R0                                              MTE15430
      1084    26F2                         1543           AIS    R15,2            INCREMENT START ADDRESS            MTE15440
      1086    0EE0                         1544           ACHR   R14,R0                                             MTE15450
      1088    26D2                         1545           AIS    R13,2            INCREMENT END ADDRESS              MTE15460
      108A    0EC0                         1546           ACHR   R12,R0                                             MTE15470
      108C    4BD0 09E2                    1547           SH     R13,MAXMEM+2     COMPARE TO SEE IF ROOM LEFT        MTE15480
      1090    4FC0 09E0                    1548           SCH    R12,MAXMEM       FOR THE SUBROUTINE                 MTE15490
      1094    4280 1014                    1549           BL     TEST8.10         LOOP IF YES                        MTE15500
      1098    4300 03D6                    1550           B      TEST.END         ELSE, DONE WITH TEST               MTE15510
                                          1551  *                                                                   MTE15520
```

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        *                              S U B T E S T   8

109C    08C1                 1552 SBRTN    LHR    R12,R1         R12 = ENTRY PROGRAM ADDRESS      MTE15530
109E    CAC0 000A            1553          AHI    R12,SBRTNX-SBRTN  ADDRESS OF SBRTNX FOR LOOP    MTE15540
10A2    C890 0064            1554          LHI    R9,100         R9 = LOOP COUNT                  MTE15550
10A6    4091 001E            1555 SBRTNX   STH    R9,30(R1)      STORE COUNT AT SBRTNY           MTE15560
10AA    4881 001E            1556          LH     R8,30(R1)      PICK IT UP                      MTE15570
10AE    0589                 1557          CLHR   R8,R9          COMPARE                         MTE15580
10B0    023D                 1558          BNER   R13            ERROR EXIT, R8 NON ZERO         MTE15590
10B2    2791                 1559          SIS    R9,1           DECREMENT COUNT                 MTE15600
10B4    23C1                 1560          BS     *+2                                            MTE15610
10B6    023C                 1561          BNZR   R12            IF NOT ZERO, LOOP THROUGH R12   MTE15620
10B8    030D                 1562          BR     R13            NORMAL EXIT, R9 = 0             MTE15630
10BA    0000                 1563 SBRTNY   DC     0                                             MTE15640
        0000 0020            1564 SIZE     EQU    *-SBRTN                                        MTE15650
                             1565 *                                                             MTE15660
                             1566 *                                                             MTE15670
10BC    0000                 1567 STRTADRS DCX    0,0                                           MTE15680
10BE    0000
10C0    0000                 1568 ENDADRS  DCX    0,0                                           MTE15690
10C2    0000
10C4    0000                 1569 SELECT   DCX    0                                             MTE15700
10C6    0000                 1570 ADDRESS  DCX    0                                             MTE15710
        0000 10C8            1571 LAST     EQU    *                                             MTE15720
        0000 10C7            1572 LNZB     EQU    *-1                                           MTE15730
```

CHKSUM/M17 PUNCHER

```
10C8    2400              1574  $CHKSUM  LIS    R0,0             PUNCH M17 TAPE WITH CHECKSUM      MTE15750
10CA    9510              1575           EPSR   R1,R0            SELECT REG.SET 0                  MTE15760
                          1576  *                                                                 MTE15770
10CC    C810 0100         1577           LDAI   R1,ORIGIN1       START                             MTE15780
10D0    2421              1578           LIS    R2,1             INCREMENT                         MTE15790
10D2    C830 10C7         1579           LDAI   R3,LNZB          FINAL                             MTE15800
10D6    2440              1580           LIS    R4,0             CHECKSUM BYTE                     MTE15810
10D8    D351 0000         1581  $GEN     LB     R5,0(R1)                                           MTE15820
10DC    0745              1582           XAR    R4,R5                                              MTE15830
10DE    C110 10D8         1583           BXLE   R1,$GEN                                            MTE15840
10E2    D240 008D         1584           STB    R4,MN+3          CHECKSUM BYTE TO BOOT LOADER      MTE15850
                          1585  *                                                                 MTE15860
10E6    C810 0080         1586  $TAPE    LHI    R1,X'0080'                                         MTE15870
10EA    9E21              1587           OCR    R2,R1            DISPLAY : NORMAL MODE             MTE15880
10EC    9444              1588           EXBR   R4,R4                                              MTE15890
10EE    9824              1589           WHR    R2,R4            CHECKSUM BYTE TO D1               MTE15900
10F0    9411              1590           EXBR   R1,R1                                              MTE15910
10F2    9501              1591           EPSR   R0,R1            HALT PROCESSOR.                   MTE15920


10F4    D360 007A         1593  $PUNCH   LB     R6,X'7A'         GET BOUTDV (PUNCH) ADDRESS.       MTE15940
10F8    DE60 007B         1594           OC     R6,X'7B'         START TAPE PUNCH                  MTE15950
10FC    9D60              1595           SSR    R6,R0                                              MTE15960
10FE    2081              1596           BTBS   8,1                                                MTE15970
1100    41E0 1142         1597           BAL    R15,STAPL        PUNCH LEADER                      MTE15980
1104    9411              1598           EXBR   R1,R1            (R1) = X'0080'                    MTE15990
1106    C830 00CF         1599           LHI    R3,X'CF'                                           MTE16000
110A    DA61 0000         1600  $PNCH1   WD     R6,0(R1)         PUNCH BOOT LOADER                 MTE16010
110E    9D60              1601           SSR    R6,R0                                              MTE16020
1110    2081              1602           BTBS   8,1                                                MTE16030
1112    C110 110A         1603           BXLE   R1,$PNCH1                                          MTE16040
1116    41E0 1148         1604           BAL    R15,STAPL1       PUNCH ONE-FOLD GAP.               MTE16050
                          1605  *                                                                 MTE16060
111A    D340 008D         1606           LB     R4,MN+3          GET CHECKSUM BYTE                 MTE16070
111E    C810 0100         1607           LDAI   R1,ORIGIN1       (NORMALLY X'A00')                 MTE16080
1122    C830 10C7         1608           LDAI   R3,LNZB                                            MTE16090
1126    D351 0000         1609  $PNCH2   LB     R5,0(R1)         PUNCH PROGRAM                     MTE16100
112A    0745              1610           XAR    R4,R5                                              MTE16110
112C    9A65              1611           WDR    R6,R5                                              MTE16120
112E    9401              1612           EXBR   R0,R1                                              MTE16130
1130    9820              1613           WHR    R2,R0            DATA ADDRESS TO DISPLAY           MTE16140
1132    9D60              1614           SSR    R6,R0                                              MTE16150
1134    2081              1615           BTBS   8,1                                                MTE16160
1136    C110 1126         1616           BXLE   R1,$PNCH2                                          MTE16170
113A    41E0 1142         1617           BAL    R15,STAPL        PUNCH TRAILER.                    MTE16180
113E    4300 10E6         1618           B      $TAPE            DISPLAY CHECKSUM, HALT PROCESSOR  MTE16190


1142    C800 0100         1620  STAPL    LHI    R0,256           TO PUNCH BLANK LEADER             MTE16210
1146    2303              1621           BS     STAPLP                                             MTE16220
1148    C800 0055         1622  STAPL1   LHI    R0,85            TO PUNCH 1-FOLD GAP               MTE16230
114C    2701              1623  STAPLP   SIS    R0,1                                               MTE16240
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114E	032F	1624	BNPR	R15	RETURN	MTE16250
1150	2430	1625	LIS	R3,0		MTE16260
1152	9A63	1626	WDR	R6,R3	PUNCH BLANK FRAME	MTE16270
1154	9D68	1627	SSR	R6,R8		MTE16280
1156	2081	1628	BTBS	8,1		MTE16290
1158	22C6	1629	BS	STAPLP	CONTINUE.	MTE16300
115A		1630	END			MTE16310

CHKSUM/M17 PUNCHER

NO ERRORS   0 SQUEZ PASSES

CAL 04-01

Symbol	Addr													
$CHKSUM	10C8													
$GEN	10D8	1583												
$PNCH1	110A	1603												
$PNCH2	1126	1616												
$PUNCH	10F4													
$TAPE	10E6	1618												
$TAPL	1142	1597	1617											
$TAPL1	1148	1604												
$TAPLP	114C	1621	1629											
ABORT	0426													
ABORT1	0444													
ABSTOP	115A													
ADC	0002													
ADCHECK	0842													
ADCHK.ER	0850													
ADCHK01	085C													
ADDRESS	10C6	1513	1522											
ADRSERR	096A													
ADRSET	072C	1458	1509	1515	1458	1509	1515	1458	1509	1515	1458	1509	1515	1005
		1022	1049	1458	1509	1515	1223	1241	1458	1509	1515	1398	1440	1458
		1509	1515											
ADRSETX	074E	710												
ASCII	081C													
BIT0	09A0	299												
C300	0144	117												
C300ADR	010C	128												
CAR2ND	0A02	130												
CAROUSEL	0080	1443												
CARRD	0A00	129												
CARRQ2S	0A04	131												
CLIF2ND	0A0C													
CLIFADR	010A													
CLIFRD	0A0A													
CON2ND	09FA	497												
CONADR	09F6	494	751											
CONENRD	09FB													
CONRD	09F8													
CONRQ2S	09FC													
CONTO2	068E													
CONTIN	0A40													
CONWRT	09F9													
COUNT	09E6	309												
CRLF	06A4	306	448	763										
CRT	015A	115												
CRT2	016A													
CRT2ND	0A08													
CRTRD	0A06													
CRTRQ2S	0A05													
DATA	0A54													
DATA2	09C0	1051												

CHKSUM/M17 PUNCHER

```
DATAPAT     0F62            1435  1438  1455  1489
DEF.OPT     0224
DEFTESTS    0A3E             291
DEVSET      0184             127
DISPLAY     0756            1459  1504  1023  1035  1459  1504  1197  1224  1242  1459  1504  1399      1441
                           1459  1504
ENDADRS     10C0            1508  1540  1541
EOTMSG      08E4
ERRFLG      0008             752
ERRMSG      076A            1463  1469  1539  1038  1463  1469  1539  1201  1463  1469  1539  1409      1414
                           1463  1469  1539
ERRMSG1     079C             754
ERRMSG2     07A2             765
ERRORS      0996
EXECUTE     0190
EXTMEM      0800
FINDMAX     01AA
FOUNDT      01FE
GETCHR      06B2
HALT9       048E             445   457   760
HIGH        0A22             234
ILLEGL      0526
ILLMSG      0910             449
IMPTOP      0000R
INCRMNTL    03EC             732
IO          0110             112
ISITERR     0400             307   447   752
KEEP10      049A
KEEP3       036C
KEEP4       0370
KEEP5       0396
KEEP6       039A
KEEP7       03FC
KEEP7.1     0416
KEEP9       045E
KEEP91      0468
KEEP92      0494
LADC        0001
LAST        10C8            1457  1502  1457  1502  1457  1502  1457  1502  1021  1443  1457  1502      1205
                           1221  1457  1502  1397  1437  1457  1502
LDWT        00B8              90
LNZB        10C7              73  1579  1579
LOOK1       02CA
LOOK2       02CE
LOOK3       02E0
LOOK4       02F2
LOOK4.1     031C             283
LOOKUP      02C6
LOOP        0A2C
LOW         0A18             282
MALFMSG     08F8
MAXMEM      0930            1446  1448  1475  1477  1547  1548  1446  1448  1475  1477  1547  1548      1446
                           1448  1475  1477  1547  1548  1446  1448  1475  1477  1547  1548  1446      1448
                           1475  1477  1547  1548  1226  1228  1446  1448
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MAXTST	0008	296			
MEMORY	092C	1443			
MESAGEL	05C0				
MESSAGE	0572	450			
MICROFLG	0004	122			
MICROIO	010E	123			
MICRORD	09FE	124			
MICRORST	09FD	126			
MN	008A	1584	1606		
NEXTTEST	040A				
NOER	08D8				
NOMSG	0A4A				
NONEXT	07B6				
NORMAL	09ED				
OPT	0A0E				
OPTBUF	09F0				
OPTIN	0236	285	287	293	304
OPTIN1	023A				
OPTVAL	06E2	278	295		
OPTVAL0	06EE	692			
OPTVAL1	06F0				
OPTVAL1A	06FE				
OPTVAL2	0700				
OPTVAL3	070A				
OPTVAL4	071A				
OPTVALX	0728	690	693		
ORIGIN1	0100	71	92	1577	1577
OTC.0	0638				
OTC.1	0644				
OTC.2	064E				
OTC.3	0660				
OTC.4	0682				
OTC.5	069C				
OUT0	0686				
OUT1	068A				
OUTCHR	0628	436	440	454	
OUTCHR2	066E				
P1	058C	499			
P2	05A8				
P3	05B4				
P4	0580	496			
PARERR	04CA				
PARERR1	04DA				
PARITY	1000				
PASFLG	0100	468	495		
PASLADR	0108				
PAUSE	0040				
PDMXMM	08A2				
PRINTR6	0810	442			
PRINTR7	07EC	438	444	452	456
PSW	0102				
PSW2	0104				
PURETOP	0000R				
QMARK	03B0	277	280	297	

CHKSUM/M17 PUNCHER

```
QUEST      0928
R0         0000      112    114    116    119    125    125    130   1505   1505   1507   1542   1542   1544
                    1546   1574   1575   1591    276    279    289    301    308    308    309    310    311
                     312   1505   1505   1507   1542   1542   1544   1546   1574   1575   1591    439    453
                    1505   1505   1507   1542   1542   1544   1546   1574   1575   1591    689    691    711
                     713    715    716    717    731    732    734    736    737    755    756    757    758
                     764   1505   1505   1507   1542   1542   1544   1546   1574   1575   1591   1505   1505
                    1507   1542   1542   1544   1546   1574   1575   1591   1505   1505   1507   1542   1542
                    1544   1546   1574   1575   1591   1505   1505   1507   1542   1542   1544   1546   1574
                    1575   1591   1595   1601   1612   1613   1614   1620   1622   1623
R1         0001       71     82     88    124    129   1450   1460   1465   1466   1471   1479   1513   1521
                    1527   1535   1552   1555   1556   1575   1577   1581   1583   1586   1587   1590   1590
                     314    315   1443   1450   1460   1465   1466   1471   1479   1513   1521   1527   1535
                    1552   1555   1556   1575   1577   1581   1583   1586   1587   1590   1590   1450   1460
                    1465   1466   1471   1479   1513   1521   1527   1535   1552   1555   1556   1575   1577
                    1581   1583   1586   1587   1590   1590    708    712    714   1450   1460   1465   1466
                    1471   1479   1513   1521   1527   1535   1552   1555   1556   1575   1577   1591   1583
                    1586   1587   1590   1590   1006   1007   1008   1009   1025   1026   1027   1052   1053
                    1054   1450   1460   1465   1466   1471   1479   1513   1521   1527   1535   1552   1555
                    1556   1575   1577   1581   1583   1586   1587   1590   1590   1198   1202   1209   1225
                    1232   1244   1450   1460   1465   1466   1471   1479   1513   1521   1527
R10        000A     1443   1464   1470   1472   1443   1464   1470   1472   1443   1464   1470   1472   1443
                    1464   1470   1472   1004   1010   1010   1011   1050   1050   1051   1443   1464   1470
                    1472   1202   1204   1237   1237   1239   1443   1464   1470   1472   1401   1403   1404
                    1405   1411   1416   1439   1443   1464   1470   1472
R11        000B     1529   1530   1529   1530   1238   1240   1529   1530   1529   1530
R12        000C     1527   1530   1531   1540   1546   1548   1552   1553   1561   1527   1530   1531   1540
                    1546   1548   1552   1553   1561    440    442    454    475    478    480    498   1527
                    1530   1531   1540   1546   1548   1552   1553   1561    706    706    707    716    717
                     753   1527   1530   1531   1540   1546   1548   1552
R13        000D     1458   1459   1463   1469   1504   1509   1510   1510   1511   1512   1515   1516   1516
                    1517   1518   1521   1522   1528   1528   1529   1532   1533   1535   1539   1541   1545
                    1547   1558   1562    278    295    306   1458   1459   1463   1469   1504   1509   1510
                    1510   1511   1512   1515   1516   1516   1517   1518   1521   1522   1528   1528   1529
                    1532   1533   1535   1539   1541   1545   1547   1558   1562    438    444    448    450
                     452    456   1443   1458   1459   1463   1469   1504   1509   1510   1510   1511   1512
                    1515   1516   1516   1517   1518   1521   1522   1528   1528   1529   1532   1533   1535
                    1539   1541   1545   1547   1558   1562    718    738    759    762    763   1458   1459
                    1463   1469   1504   1509   1510   1510   1511   1512   1515   1516   1516   1517   1518
                    1521   1522   1528   1528   1529   1532   1533   1535   1539   1541   1545   1547   1558
                    1562   1005   1022   1023   1035   1038   1049   1458   1459   1463   1469   1504   1509
                    1510   1510   1511   1512   1515   1516   1516   1517
R14        000E     1445   1446   1456   1456   1474   1475   1501   1501   1503   1507   1508   1514   1544
                     286   1445   1446   1456   1456   1474   1475   1501   1501   1503   1507   1508   1514
                    1544    441   1445   1446   1456   1456   1474   1475   1501   1501   1503   1507   1508
                    1514   1544    709    711    736   1445   1446   1456   1456   1474   1475   1501   1501
                    1503   1507   1508   1514   1544   1020   1020   1047   1047   1445   1446   1456   1456
                    1474   1475   1501   1501   1503   1507   1508   1514   1544   1204   1207   1207   1220
                    1220   1226   1231   1239   1246   1246   1445   1446   1456   1456   1474   1475   1501
                    1501   1503   1507   1508   1514   1544   1396   1396   1416   1417   1436   1436   1445
                    1446   1456   1456   1474   1475   1501   1501
R15        000F     1444   1448   1457   1473   1477   1502   1506   1543    281    291    292    296    298
                     298    299    299    300   1444   1448   1457   1473   1477   1502   1506   1543    443
                    1444   1448   1457   1473   1477   1502   1506   1543    708    733    733    734    735
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		735	1444	1448	1457	1473	1477	1502	1506	1543	1021	1034	1039	1040
		1048	1444	1448	1457	1473	1477	1502	1506	1543	1203	1205	1221	1228
		1230	1240	1247	1444	1448	1457	1473	1477	1502	1506	1543	1397	1415
		1419	1437	1444	1448	1457	1473	1477	1502	1506	1543	1597	1604	1617
		1624												
R2	0002	72	84	89	123	126	128	1578	1587	1589	1578	1587	1589	470
		476	494	497	1578	1587	1589	751	1578	1587	1589	1578	1587	1589
		1578	1587	1589	1578	1587	1589	1613						
R3	0003	73	1579	1579	470	471	472	474	474	476	477	479	1579	1579
		1579	1579	1579	1599	1608	1625	1626						
R4	0004	75	76	77	79	85	87	131	1580	1582	1584	1588	1588	1589
		1580	1582	1584	1588	1588	1589	449	1580	1582	1584	1588	1588	1589
		766	1580	1582	1584	1588	1589	1580	1582					
R5	0005	77	79	80	80	82	83	85	87	113	113	122	132	1581
		1582	307	1581	1582	447	468	495	500	1581	1582	752	1581	1582
		1581	1582	1581	1582	1581	1582	1609	1610	1611				
R6	0006	74	83	84	89	441	1593	1594	1595	1600	1601	1611	1614	1626
		1627												
R7	0007	294	294	300	303	437	443	451	455					
R8	0008	1460	1461	1466	1467	1556	1557	1460	1461	1466	1467	1556	1557	1460
		1461	1466	1467	1556	1557	1460	1461	1466	1467	1556	1557	1034	1036
		1460	1461	1466	1467	1556	1557	1198	1199	1222	1222	1225	1231	1243
		1244	1460	1461	1466	1467	1556	1557	1402	1407	1407	1411	1412	1460
		1461	1466	1467	1556	1557	1627							
R9	0009	1455	1461	1464	1465	1467	1470	1471	1472	1489	1493	1493	1495	1537
		1537	1554	1555	1557	1559	281	282	284	286	1455	1461	1464	1465
		1467	1470	1471	1472	1489	1493	1493	1495	1537	1537	1554	1555	1557
		1559	1455	1461	1464	1465	1467	1470	1471	1472	1489	1493	1493	1495
		1537	1537	1554	1555	1557	1559	1455	1461	1464	1465	1467	1470	1471
		1472	1489	1493	1493	1495	1537	1537	1554	1555	1557	1559	1006	1007
		1008	1009	1024	1025	1029								
RDCHAR	027A													
RDCHAR0	0288													
RDCHAR1	02A8													
RENTRY	0248													
RETURN	07EA	762												
RUN	0A0E													
RUNIT	0356													
SBRTN	109C	1529	1553	1564										
SBRTNX	10A6	1553												
SBRTNY	10BA													
SELECT	10C4	1512	1518											
SENSEM	06D6													
SENSET	06CE													
SENSEX	06DC													
SETDU	056E	473												
SETUP	0674													
SETUP1	067E													
SIZE	0020	1506	1533											
SPACE3	0966													
SPACE5	0964													
START2	0112	95												
STAT1	00A8													
STATUS1	0096	81												

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STOREBYT	00A0		88							
STRTADRS	10BC		1503	1514	1503	1514	1503	1514		
SUBNUM	08C6									
SUBSEL	0370									
SUBTST	09EE		312	314						
TEST	0A36		292	303						
TEST.END	03D6		1491	1550	1491	1550	1491	1550	1013	1491	1550	1208
TEST0	0A60									
TEST0.01	0A78									
TEST0.10	0A9A		1012							
TEST0.20	0AC6									
TEST0.21	0AE0									
TEST0.22	0AEC									
TEST0.23	0AF8									
TEST0.24	0B04									
TEST1	0B36									
TEST1.01	0B44		1030							
TEST1.02	0B48		1031							
TEST1.10	0B5A		1028	1043						
TEST1.11	0B5E		1044							
TEST1.12	0B6E		1037							
TEST1.20	0B80		1041							
TEST1.21	0B8A									
TEST1.22	0B8C									
TEST1.30	0BA6									
TEST1.31	0BA8									
TEST1.32	0BBC									
TEST2	0BD4									
TEST2.01	0BDA									
TEST2.02	0BE2									
TEST2.03	0BF2									
TEST2.10	0C00									
TEST2.11	0C06									
TEST2.12	0C0A									
TEST2.13	0C1C									
TEST2.14	0C28									
TEST2.20	0C38									
TEST2.21	0C3C									
TEST2.22	0C44									
TEST2.23	0C5C									
TEST2.30	0C64									
TEST2.31	0C68									
TEST2.32	0C6C									
TEST2.33	0C80									
TEST2.34	0C92									
TEST3	0C9C									
TEST3.01	0CA4									
TEST3.02	0CAC									
TEST3.03	0CBC									
TEST3.10	0CC8									
TEST3.11	0CD2									
TEST3.12	0CD6									
TEST3.13	0CE4									
TEST3.14	0CF4									

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TEST3.20	0D02		
TEST3.21	0D0A	1211	
TEST3.22	0D0E	1210	
TEST3.23	0D1E	1200	
TEST3.24	0D32	1206	
TEST4	0D3C		
TEST4.01	0D44	1234	
TEST4.02	0D4C	1233	
TEST4.03	0D5C	1227	
TEST4.10	0D68	1229	
TEST4.20	0D6E		
TEST4.30	0D80		
TEST4.31	0D86		
TEST4.32	0D96		
TEST4.40	0DA4		
TEST4.41	0DBC		
TEST5	0DE6		
TEST5.10	0E0C		
TEST5.11	0E14		
TEST5.12	0E18		
TEST5.20	0E3C		
TEST6	0E46		
TEST6.01	0E4E		
TEST6.02	0E56		
TEST6.03	0E66		
TEST6.04	0E72		
TEST6.10	0E7C		
TEST6.11	0E80		
TEST6.12	0E9E		
TEST6.13	0EA2		
TEST6.14	0EA6		
TEST6.15	0EB2		
TEST6.20	0EBC		
TEST6.21	0EC6		
TEST6.22	0ECE	1392	
TEST6.23	0ED8		
TEST6.24	0EE4		
TEST6.25	0EF2		
TEST6.26	0F02		
TEST6.30	0F0C		
TEST6.31	0F12	1422	
TEST6.32	0F1A	1423	
TEST6.33	0F3A	1408	
TEST6.34	0F46	1413	
TEST6.35	0F58	1418	
TEST7	0F64		
TEST7.01	0F78	1451	
TEST7.02	0F80	1452	
TEST7.03	0F98	1447	
TEST7.0X	0F68	1494	1496
TEST7.10	0FA2	1449	
TEST7.11	0FAC	1480	
TEST7.12	0FB4	1481	
TEST7.13	0FC0	1462	

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TEST7.14	0FD2	1468										
TEST7.15	0FEC	1476										
TEST7.20	0FF6	1478										
TEST7.21	1006	1490										
TEST8	100E											
TEST8.10	1014	1549										
TEST8.20	105E	1534										
TEST8.30	107A	1519	1525	1538								
TESTADRS	03C4											
TESTDU1	0566	469										
TESTNUM	082C											
TESTOP	0324	275										
TESTOP1	0334	290										
TESTOP2	0336	302										
TITLE2	086C											
TOM2	01DE											
TOTAL	09E8	310										
TOTALMSG	098C											
TOTERR	09EA	311	755	757	764							
TSTBRK	05D4											
TSTBRK0	05EA											
TSTBRK1	05F6											
TSTBRK2	0604											
TSTBRK3	061C											
TSTBRK4	0624											
TSTDU	0552	498	753									
TSTFLG	0020											
TT	08D2											
TTY	0178	118	120									
WASDU	0001	307	500									
WASDU1	0002	307										
XADRTAB	0752	711										
ZERO	09E4	1445	1474	1445	1474	1445	1474	713	737	1445	1474	1445