SERIES 16 19-197
MOS MEMORY TEST
PART 1

Consists of:

Test Program Description	06-202M95R01
Test Program Listing	06-202F01M96R01
Test Program Listing	06-202F02M96R01
Test Program Listing	06-202F03M96R01
Test Program Listing	06-202F04M96R01
Test Program Paper Tape	06-202F01M17R01
Test Program Paper Tape	06-202F02M17R01
Test Program Paper Tape	06-202F03M17R01
Test Program Paper Tape	06-202F04M17R01

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SERIES-16 19-197 MOS
MEMORY TEST PART 1 PROGRAM DESCRIPTION

1. SERIES-16 19-197 MOS MEMORY TEST PART 1 — 06-202R01

   1.1 Related Documents

Program Listings	06-202F01M96R01 06-202F02M96R01 06-202F03M96R01 06-202F04M96R01
Program Paper Tapes	06-202F01M17R01 06-202F02M17R01 06-202F03M17R01 06-202F04M17R01

   1.2 Test Programs to be Run Prior to Loading this test

Processor Test	06-106

   1.3 Other Applicable Tests

Common Teletype Basic Confidence Test	06-004
Common CRT Test	06-146
Common Line Printer Test	06-170
Common Carousel 300 Test	06-183
Common Current Loop Interface Test	06-184

2. PURPOSE OF TEST

   The Series-16 19-197 MOS MEMORY TEST PART 1 (06-202) verifies the operation of all 6/16 8KB MOS memories. 06-204 (PART 2) verifies the operation of all 6/16 16KB, 32KB, and 64KB MOS memories.

   2.1 The following test modules are available in F01 and F03.

      2.1.1 Test 0 (Memory Search Test)

      This test module lists the limits of memory under test.

      2.1.2 Test 1 (Bit Set - Reset Test)

      This test insures that all available memory bits can be set and reset at will.

2.1.3 Test 2 (Marching Pattern Test)

This test checks that three patterns can be written throughout memory and complemented.

2.1.4 Test 3 (0 and 1 Walk Test)

This test marches a 1 through a field of 0's and an 0 through a field of 1's. This test also checks the parity bit.

2.1.5 Test 4 (Double Operation Column Disturb Test)

This test module checks that a double column disturb will not cause an error in adjacent columns.

2.2 The following test modules are available in F02 and F04.

2.2.1 Test 0

2.2.2 Test 1 (Short Count Relocatable Hammer Disturb Test)

This test (short count) relocates a short program throughout memory and executes the program.

2.2.3 Test 2 (Diagonal Galpat Test)

This test runs a complete diagonal Galpat on each 4K of RAM.

2.2.4 Test 3 (Memory Hold Test)

This test checks the ability of the MOS memory refresh circuit to operate in the event of a power failure.

2.2.5 Test 4 (Long Count Relocatable Hammer Disturb Test)

This overnight (Long count) test checks each test location 65,000 times and checks background for soft failures.

3. MINIMUM HARDWARE REQUIRED

3.1 Processor

5/16 or 6/16 with battery back-up power supply.

3.2 Minimum MOS Memory

8KB (35-600)

3.3 Console Input Device (See Appendix 1)

Teletype or

CRT on Current Loop Interface or

CRT on PASLA/PALM or

Carousel 15, 30, 35, 300

3.4 List Device (See Appendix 1)

Teletype or

CRT on Current Loop Interface or

CRT on PASLA/PALM or

Line Printer or

Carousel 15, 30, 35, 300

3.5 Paper Tape Reader

Teletype or

Carousel 35 or

High Speed Paper Tape Reader

4. REQUIREMENTS OF MACHINE UNDER TEST

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

4. LOADING PROCEDURE

5.1 Test Tape Format

Absolute, non-zoned object tape (M17) with front end bootloader. The test program occupies approximatley 4K bytes of memory per section.

5.2 Normal Loading Procedure

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

Place the program tape in the paper tape reader.

Execut at address X'30'.

When the processor halts, observe the CHKSUM byte, displayed on the console display register D1. If it is zero, loading is complete. Otherwise, repeat this loading procedure.

5.3 Multi-Media Loading Procedure

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

5.4 Program Execution

Refer to Appendix 1 and set up the address for the console input device and the list device.

Address memory location X'100' for F01 or F02 or X'1000' for F03 or F04. Start program execution and observe that the following title is output to the list device:

S16 19-197 MOS MEMORY TEST PART 1 06-202F01 (or F02, F03, or F04)

6. OPERATING PROCEDURES

6.1 Normal Testing

To execute the default tests (Tests 0 through 4 of F01 or F03; or Tests 0,1, and 2 of F02 or F04) enter the following options from the console device (see Appendix 3).

Appendix 2 summarizes the command/option input format.

*TEST		CR	Selects the Default Tests (default 0-4 or 0-2)
*SCOPE	0	CR	Selects the Error Option (Default 0)
*DTAPAT	FFFF	CR	Selects the background data pattern (default X'FFFF' - F02 and F04 only)
RUN		CR	Starts the test sequence

The program executes Test 0 through Test 2 or 4 in the default test sequence. Appendix 4 summarizes expected results. Section 9 summarizes error messages and fault isolation procedures.

6.2 Extended Normal Testing

To execute Test 3 of F02 or F04, enter the following options from the console device (see Appendix 3). Appendix 2 summarizes the command/option input format.

*TEST	3	CR	Selects Test 3
*SCOPE	0	CR	Selects the Error Option
*RUN		CR	Starts the test sequence

The program now executes Test 0 and Test 3 in sequence. Appendix 4 summarizes expected results. Section 7 summarizes error messages and fault isolation procedures.

6.3 Optional Testing

The appropriate options should be changed (refer to the options table in Appendix 3) for the configuration under test. Overnight testing is allowed by turning the Console Off-Line while the test is running. When the console is returned to the On-Line condition, the program prints its statistics (total number of passes and total errors) when it reaches the end of a test module and after a delay provided to let CRT warm up. If the console is not returned to the On-Line condition before X'7FFF' passes are executed or X'7FFF' errors are detected, the processor halts and resumes execution only upon depressing RUN (or EXE).

Test 4 (F02 or F04)

To run the Long (overnight) Relocatable Hammer Disturb Test, use the following option entry sequence:

```
*TEST      4       CR
*SCOPE     0       CR
*DTAPAT  FFFF      CR
*RUN       CR
```

The addresses under test are printed out by Test 0. Test 4 increments the display for each location tested. Errors are printed on the list device and the specified SCOPE option dictates further action of the processor.

7. ERROR PROCEDURES

7.1 Error Recovery

If the program detects an error in any test, it executes the SCOPE option entered before the start of program execution.

7.2 Error Message and Fault Isolation

Appendix 5 summarizes Error Messages and is designed to guide the user through a systematic fault isolation procedure. Looping can be accomplished by entering the appropriate option (see Appendix 3).

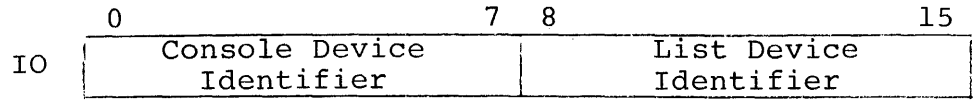
8. PROGRAMMING NOTES

To abort a test in progress or exit the testing sequence when CONTIN equals 1, the user must depress and hold the BREAK key on the console device for 5 seconds. The test terminates when the console device is enabled.

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:



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'	Micro I/O bus (or adapter).
X'00', X'06' - X'FF'	Reserved. Interpreted at X'02'.

List 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'	Line Printer (Data Printer or Centronics) on Line Printer Interface.
X'04'	Carousel 300 on PASLA/PALM Interface, strapped for FDX operation and highest baud rate.
X'05'	Micro I/O bus (or adapter).
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 different, the halfword labeled 'CLIFADR' (see the Program Listing) must be changed accordingly.
3. The Line Printer, if used, should be strapped for device address X'62'. If the address is different, the halfword labeled 'LPADR' (see the Program Listing) must be changed accordingly.
4. The Carousel 300, if used, should be strapped for device addresses X'10' and X'11', for Receive and Transmit sides, respectively. If the addresses are different, the halfword labeled 'C300ADR' (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 (←) or back space (Control-H) can be typed to delete the previous character; or a string of characters can be deleted by typing a left arrow (←) or back space (Control-H) for each character to be deleted.

APPENDIX 3

OPTION TABLE

OPTION	DEFAULT	TESTS	DESCRIPTION
DATA	FFFF	1	(F02 & F04) Data pattern used as background in relocatable hammer disturb test (4 Hex. characters)
SCOPE	0	ALL	Error handling procedure 0 = Print error data and skip to next test 1 = Print chip number(s) and skip to next test 2 = Print error data and continue test 3 = Print error data and halt 4 = Ignore error and continue test 5 = Print chip number(s) and error data and continue test
TEST	0,1,2,3,4	ALL	Test number (0 -4)
NOMSG	0	ALL	Message handling option 0 = Print all messages 1 = Print only error messages
CONTIN	0	ALL	Testing sequence option 0 = No effect on testing sequence 1 = Run all selected tests continuously (e.g., 0→4, 0→4, 0→4, etc.)
LOOP	0	ALL	Number of loops through each test (0-7FFF)
POUND	A	1	(F02 & F04) Number of times each location is checked in Test 1

NOTE

The limits of memory under test are fixed and cannot be changed.

APPENDIX 4

EXPECTED RESULT TABLE

S16 19-197 MOS MEMORY TEST PART 1 06-202F01 (or F03)

```
*TEST
*RUN

TEST 00
MEMORY UNDER TEST
1000-1FFF (or 0000-0FFF)
NO ERROR
TEST 01
NO ERROR
TEST 02
NO ERROR
TEST 03
NO ERROR
TEST 04
NO ERROR
END OF TEST
*
```

S16 19-197 MOS MEMORY TEST PART 1 06-202F02 (or F04)

```
*TEST
*RUN

TEST 00
MEMORY UNDER TEST
1000-1FFF (or 0000-0FFF)
NO ERROR
TEST 01
NO ERROR
TEST 02
NO ERROR
END OF TEST
*
```

```
*TEST 3 (F02 or F04)
*RUN

TEST 00
MEMORY UNDER TEST
1000-1FFF (or 0000-0FFF)
NO ERROR
TEST 03
POWER DOWN FOR 30 SEC
NO ERROR
END OF TEST
*
```

```
*TEST 4 (F02 or F04)
*RUN

TEST 00
MEMORY UNDER TEST
1000-1FFF (or 0000-0FFF)
NO ERROR
TEST 04
NO ERROR
END OF TEST
*
```

APPENDIX 5

EXPECTED ERROR PRINTOUT

If SCOPE = 0, 2, or 3

```
ERROR TTNN
LOC XXXX DATA EXP YYYY DATA READ ZZZZ
```

If SCOPE = 4, No error printout until end of test and then only the number of passes and the number of errors are printed.

If SCOPE = 1 or 5

```
ERROR TTNN
SUSPECTED BAD CHIP DEEE
LOC XXXX DATA EXP YYYY DATA READ ZZZZ
```

Where:
- TT = Test number
- NN = Error number
- D = Drive letter (A OR B)
- EEE = Chip number within drive area
- XXXX = Location of memory failure
- YYYY = Data written to location XXXX
- ZZZZ = Data read from location XXXX

APPENDIX 5 (Cont'd)

ERROR NUMBER	ERROR CONDITION	POSSIBLE EXPLANATION	SUGGESTED ACTION
TT01	Bit did not set in halfword when X'FFFF' was stored at LOC	1. Hard reset bit in Memory Chip. 2. "Soft" reset bit in Memory Chip 3. Timing problem	1. Manually write X'FFFF' to LOC and read LOC 2. Check timing 3. Replace Memory Chip
TT02	Bit did not reset in halfword when 0 was stored at LOC	1. Hard set bit in Memory Chip 2. Hard to reset bit in Memory Chip 3. Timing problem	See TT01
TT03	Bit Pattern was not written/read correctly	1. Hard bit failure (set or reset) 2. Hard to set or reset bit in Memory Chip (soft failure) 3. Timing problem 4. Double addressing	See TT01
TT04	Bit Pattern did not complement	1. Hard bit failure (set or reset) 2. Hard to set or reset bit in Memory Chip (soft failure) 3. Timing problem	See TT01
TT05	Complement bit pattern was disturbed while writing to another location	1. Double addressing 2. Timing problem 3. Hard to set or reset bit in Memory Chip (soft failure)	1. Check refresh circuitry. 2. Check memory chip address lines. 3. Replace memory chip.

ERROR NUMBER	ERROR CONDITION	POSSIBLE EXPLANATION	SUGGESTED ACTION
TT06	Original data pattern did not restore properly	See TT05	See TT05
TT07	Test Bit did not reset in halfword when a 0 was walked through a field of all 1's	1. Hard to reset bit in memory chip. 2. Timing problem	See TT01
TT08	Test Bit did not set in halfword when a 1 was walked through a field of all 0's	1. Hard to set bit in memory chip 2. Timing problem	See TT01
TT09	Original Background Pattern did not set after single disturb	1. Refresh problem 2. Double addressing 3. Bad memory chip	See TT05
TT0A	Complement Background Pattern did not set while doing a Double Disturb	See TT09	See TT05
TT0B	Complement Background Pattern did not set after a Single Disturb	See TT09	See TT05

ERROR NUMBER	ERROR CONDITION	POSSIBLE EXPLANATION	SUGGESTED ACTION
TT0C	Original Background Pattern did not reset while doing a Double Disturb	See TT09	See TT05
TT0D	Bit(s) failed to set or reset while doing a Location Pound	See TT04	See TT01
TT0E	Background cell was disturbed when a test Location was written	See TT05	See TT05
TT10	Test Cell failed to complement on a Diagonal Galpat	1. Timing problem 2. "Soft" memory chip failure	1. Check timing circuitry 2. Replace memory chip
TT11	Running Cell changed when Test Cell was written to on Diagonal Galpat	1. Refresh problem 2. Timing problem 3. "Soft" memory chip failure	1. Check refresh circuitry 2. Check timing circuitry 3. Replace memory chip
TT12	Parity Bit Error	1. Parity check failure 2. Refresh problem 3. Timing proglem 4. "Soft" memory chip failure	1. Check parity circuitry 2. Check refresh circuitry 3. Check timing circuitry 4. Replace memory chip
TT2N	Upon powering down Processor, Memory changed at LOC indicated and was detected on read pass "N"	1. P12 or P5S problem 2. Refresh problem 3. Memory chip fails to refresh in standby (burst mode)	1. Check P12 and P5S (W/WO AC power) 2. Check refresh circuitry 3. Replace memory chip

ERROR NUMBER	ERROR CONDITION	POSSIBLE EXPLANATION	SUGGESTED ACTION
TTF1	16-Bit Fixed Point Arith. Fault Interrupt (or 32-Bit Arith. Fault Interrupt)	Fixed-Point division by zero; Fixed-Point quotient overflow; Floating-Point division by zero; Floating-Point exponent overflow or underflow	Depress INIT. Restart program from beginning
TTF2	Illegal Instruction Interrupt	Program did not load properly; program destroyed	Reload program and start from beginning
TTF3	Machine Malfunction* Interrupt	Power fail/restore; Initialize; Memory malfunction; alignment wrong on Fullword operation	Machine will be halted. Depress RUN
TTF4	Unexpected device spurious interrupt	Device interrupt queued; RACK0/TACK0 problem	Depress INIT. Restart program from beginning Check back panel
TTF5	16-Bit Floating Point Divide Fault Interrupt. (32-Bit Relocation/Protect Interrupt)	16-Bit machine - see TTF1; MAC interrupt queued.	16-Bit machine - see TTF1. Store ZERO into MAC interrupt status register (X'342', X'542', or X'942'). Restart program from beginning.
TTF6	An External Interrupt into the wrong interrupt level has occurred.	"INTLEV" option incorrect; RACK0/TACK0 problem; Device attached at wrong interrupt level.	Check 'INTLEV' option. Check back panel. Depress INIT. Restart program from beginning.

*Condition Code given in PSW printed gives nature of machine malfunction.

PROG= MOSP11   ASSEMBLED BY CAL 03-066R05-00   (32-BIT)

```
                 CROSS                                                           MOS00010
                 TARGT 16                                                        MOS00020
                 WIDTH 120                                                       MOS00030
        MOSP11   PROG  S16 19-197 MOS MEMORY TEST PART 1  06-202F01M96R01A13 **  MOS00040
                 SQCHK                                                       *** MOS00050
        ******************************************************************** MOS00060
        *                                                                        MOS00070
        *        SERIES-16 19-197 MOS MEMORY TEST PART 1 - (F01-R01)         *** MOS00080
        *                                                                        MOS00090
        *        COPYRIGHT       INTERDATA, INC.         OCTOBER, 1976           MOS00100
        *                                                                        MOS00110
        *        REVISED         PRODUCT SUPPORT         MAY, 1978               MOS00120
        *        REVISION R01 CONTAINS 5/16 MICRO I/O BUS SUPPORT.               MOS00130
        *                                                                        MOS00140
        *        THIS PROGRAM TESTS THE UPPER HALF OF AN 8KB MOS MEMORY          MOS00150
        *        IN A 5/16 OR 6/16 INTERDATA PROCESSOR WITH A                    MOS00160
        *        BATTERY BACK-UP POWER SUPPLY (OPTIONAL).                        MOS00170
        *                                                                        MOS00180
        *        TEST 0                    MEMORY SEARCH TEST                    MOS00190
        *                                                                        MOS00200
        *        TEST 1                    BIT SET-RESET TEST                    MOS00210
        *                                                                        MOS00220
        *        TEST 2                    MARCHING PATTERN TEST                 MOS00230
        *                                                                        MOS00240
        *        TEST 3                    0 AND 1 WALK TEST                     MOS00250
        *                                                                        MOS00260
        *        TEST 4                    DOUBLE OPERATION COLUMN DISTURB TEST  MOS00270
        *                                                                        MOS00280
        *        THE DEFAULT TESTS ARE 0, 1, 2, 3, & 4.                          MOS00290
        *                                                                        MOS00300
        *        TEST 0 IS EXECUTED WHENEVER "RUN" IS ENTERED.                   MOS00310
        *                                                                        MOS00320
        ******************************************************************** MOS00330
```

BOOTSTRAP LOADER

```
      0000 0000           35 R0       EQU   0                                            MOS00350
      0000 0001           36 R1       EQU   1                                            MOS00360
      0000 0002           37 R2       EQU   2                                            MOS00370
      0000 0003           38 R3       EQU   3                                            MOS00380
      0000 0004           39 R4       EQU   4                                            MOS00390
      0000 0005           40 R5       EQU   5                                            MOS00400
      0000 0006           41 R6       EQU   6                                            MOS00410
      0000 0007           42 R7       EQU   7                                            MOS00420
      0000 0008           43 R8       EQU   8                                            MOS00430
      0000 0009           44 R9       EQU   9                                            MOS00440
      0000 000A           45 R10      EQU   10                                           MOS00450
      0000 000B           46 R11      EQU   11                                           MOS00460
      0000 000C           47 R12      EQU   12                                           MOS00470
      0000 000D           48 R13      EQU   13                                           MOS00480
      0000 000E           49 R14      EQU   14                                           MOS00490
      0000 000E           50 RET      EQU   14                                           MOS00500
      0000 000F           51 R15      EQU   15                                           MOS00510
      0000 000F           52 LINK     EQU   15                                           MOS00520
                          53 *                                                           MOS00530
                          54 *  BOOTLOADER WITH CHKSUM                                   MOS00540
                          55 *                                                           MOS00550
0000R                     56          ORG   X'80'                                        MOS00560
0080  2421                57          LIS   R2,1                                         MOS00570
0082  2303                58          BS    BOOT                                         MOS00580
0084  0060                59          DC    Z(PSWSAVE)     CURRENT PSW SAVE POINTER(32-BIT M/C)   MOS00590
0086  00A0                60          DC    Z(RSAVE)       REGISTER SAVE POINTER(32-BIT M/C)      MOS00600
0088  C810 0100           61 BOOT     LHI   R1,ORIGIN1     R1 = ADR(FIRST BYTE OF TEST PROGM)     MOS00610
008C  C830 0EE0           62          LHI   R3,LNZB+1                                    MOS00620
0090  4030 0022           63          STH   R3,X'22'       REGISTER SAVE POINTER(16-BIT M/C)      MOS00630
0094  2731                64          SIS   R3,1                                         MOS00640
0096  C860 00FF           65 MN       LHI   R6,X'00FF'     R6 = CHKSUM BYTE = X'MN'               MOS00650
009A  D340 0078           66          LB    R4,X'78'       GET INPUT DEV ADDRESS                  MOS00660
009E  DE40 0079           67          OC    R4,X'79'       PUT INPUT DEV IN READ MODE             MOS00670
00A2  9D45                68 LEADER   SSR   R4,R5          WAIT FOR DU & BUSY TO DROP             MOS00680
00A4  2091                69          BTBS  9,1            (DU OR BUSY SET - BRANCH)              MOS00690
00A6  9B45                70          RDR   R4,R5          READ A CHARACTER                       MOS00700
00A8  0855                71          LDAR  R5,R5          IS IT ZERO ?                           MOS00710
00AA  2234                72          BZS   LEADER         YES, IGNORE LEADER (BRANCH)            MOS00720
00AC  D251 0000           73 LOAD     STB   R5,0(R1)       STORE 1ST NON-ZERO & SUBSEQUENT BYTE   MOS00730
00B0  D351 0000           74          LB    R5,0(R1)       RELOAD DATA BYTE FROM MEMORY           MOS00740
00B4  0765                75          XAR   R6,R5          GENERATE CHKSUM                        MOS00750
00B6  9481                76          EXBR  R8,R1          EXCHANGE ADDRESS BYTES                 MOS00760
00B8  9828                77          WHR   R2,R8          DISPLAY MEMORY ADDRESS                 MOS00770
00BA  9D45                78          SSR   R4,R5          WAIT FOR DU & BUSY TO DROP             MOS00780
00BC  2091                79          BTBS  9,1            (DU OR BUSY - BRANCH)                  MOS00790
00BE  9B45                80          RDR   R4,R5          READ A CHARACTER                       MOS00800
00C0  C110 00AC           81          BXLE  R1,LOAD        LOAD TILL LAST BYTE                    MOS00810
00C4  9486                82          EXBR  R8,R6          EXCHANGE CHKSUM BYTES                  MOS00820
00C6  9828                83          WHR   R2,R8          DISPLAY FINAL CHKSUM                   MOS00830
00C8  2478                84 LDWT     LIS   R7,8                                         MOS00840
00CA  917C                85          SLHLS R7,12          R7 = X'8000'                           MOS00850
00CC  9557                86          EPSR  R5,R7          HALT PROCESSOR.                        MOS00860
00CE  2203                87          BS    LDWT                                         MOS00870
```

EXEC - ETPE R03-06 (16-BIT MODIFIED & STRIPPED)

```
00D0                   ORG    X'100'                                              MOS00890
0100   4300 011E   ORIGIN1  B      START2             START HERE FOR 16-BIT PROCESSOR          MOS00900
                   *                                                              MOS00910
                   *------------------------------                                MOS00920
                   *   TEST CONSTANTS                               *             MOS00930
                   *                                                              MOS00940
0104   30F0        PSW      DCX    30F0               PSW USED IN TEST MODULES                 MOS00950
0106   30F0        PSW2     DCX    30F0               PSW USED IN EXEC                         MOS00960
0108   0000        BRKVECT  DC     Z(0)               BREAK VECTOR ADDRESS                     MOS00970
010A   0000        IOSAVE   DCX    0                  I/O DEVICE SAVE LOCATION                 MOS00980
010C   0000        TEMP     DCX    0                  ETPE TEMPORARY STORRAGE LOCATION         MOS00990
010E   0000        PASFLG   DCX    0                  FLAG SET WHEN CONSOLE ON PASLA/PALM      MOS01000
                   *                                                              MOS01010
0110   0202        IO       DC     X'0202'            I/O DEVICE(S) IDENTIFIER                 MOS01020
0112   1011        PASLADR  DC     X'1011'            PASLA/PALM READ/WRITE ADDRESSES          MOS01030
0114   0202        CLIFADR  DC     X'0202'            CURRENT LOOP INTERFACE R/W ADDRESSES     MOS01040
0116   6262        LPADR    DC     X'6262'            LINE PRINTER ADDRESS                     MOS01050
0118   1011        C300ADR  DC     X'1011'            CAROUSEL 300/PASLA ADDRESSES             MOS01060
011A   C0C0        MICROBUS DC     X'C0C0'            MICROBUS ADDRESS                         MOS01070
011C   0000                 DCX    0                  PROVISION FOR SPECIAL DEVICE             MOS01080
                   *                                                              MOS01090
                   * IO =   0101  FOR CRT ON PASLA                                MOS01100
                   *        0202  FOR TELETYPE, CAROUSEL 15/30                    MOS01110
                   *        XX03  FOR LINE PRINTER                                MOS01120
                   *        0404  FOR CAROUSEL 300                                MOS01130
                   *        0505  FOR MICROBUS                                    MOS01140
                   *                                                              MOS01150
                   *------------------------------                                MOS01160
                   *                                                              MOS01170
011E   48E0 0106   START2   LH     R14,PSW2                                       MOS01180
0122   C8F0 012E            LHI    R15,START                                      MOS01190
0126   D0E0 0034            STM    R14,X'34'          II INT NEW PSW & NEW LOC        ***      MOS01200
012A   0000                 DCX    0                  TAKE AN ILLEGAL INSTRUCTION INT          MOS01210
012C   2200                 BS     *                  HALT IF II IS NOT TAKEN         ***      MOS01220
                   *                                                              MOS01230
                   *                                                              MOS01240
012E   D310 0110   START    LB     R1,IO              GET I/O IDENTIFIERS                      MOS01250
0132   D320 0111            LB     R2,IO+1                                        MOS01260
0136   2436                 LIS    R3,6               IDENTIFIER CAN BE 1,2,3,4,5              MOS01270
0138   0513                 CLAR   R1,R3              *                               ***      MOS01280
013A   2182                 BLS    IO.OK1             BRANCH IF KB IDENTIFIER OK               MOS01290
013C   2412                 LIS    R1,2               OTHERWISE FORCE IT TO BE TTY             MOS01300
013E   0523        IO.OK1   CLAR   R2,R3              *                               ***      MOS01310
0140   2182                 BLS    IO.OK2             SAME TEST FOR LIST DEVICE                MOS01320
0142   2422                 LIS    R2,2                                           MOS01330
0144   D210 0110   IO.OK2   STB    R1,IO              REESTABLISH VALUES                       MOS01340
0148   D220 0111            STB    R2,IO+1                                        MOS01350
014C   D362 08F4            LB     R6,CONRQ2S(R2)                                 MOS01360
0150   4060 08D8            STH    R6,PASFLG2         SET PASLA FLAG (LIST DEVICE)             MOS01370
0154   0866                 LDAR   R6,R6                                          MOS01380
0156   2336                 BZS    IO.OK3             SKIP IF NOT PASLA                        MOS01390
0158   9121                 SLHLS  R2,1                                           MOS01400
015A   D302 0111            LB     R0,IO+1(R2)                                    MOS01410
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015E  DE02 08E8      142            OC    R0,CON2ND(R2)      ISSUE 2ND COMMAND (LIST DEVICE)          MOS01420
                     143  *                                                                            MOS01430
0162  41F0 07EC      144  IO.OK3    BAL   LINK,SETKB          ESTABLISH KEYBOARD DEVICE                MOS01440
0166  9310           145            LBR   R1,R0              (R1) = 1,2,4,5                           MOS01450
0168  9111           146            SLHLS R1,1               (R1) = 2,4,6,A                           MOS01460
016A  4831 0110      147            LH    R3,IO(R1)                                                   MOS01470
016E  4030 08DA      148            STH   R3,CONADR          SET UP CONSOLE DEVICE ADDRESS            MOS01480
0172  4821 08DC      149            LH    R2,CONRD(R1)                                                MOS01490
0176  4020 08DC      150            STH   R2,CONRD           SET UP R/W COMMANDS                      MOS01500
017A  4821 08E8      151            LH    R2,CON2ND(R1)                                               MOS01510
017E  4020 08E8      152            STH   R2,CON2ND          2ND CMD; ENABLE READ CMD                 MOS01520
0182  9011           153            SRHLS R1,1                                                        MOS01530
0184  D341 08F4      154            LB    R4,CONRQ2S(R1)                                              MOS01540
0188  D240 08F4      155            STB   R4,CONRQ2S         CONSOLE REQUEST TO SEND                  MOS01550
018C  4040 010E      156            STH   R4,PASFLG          SET PASLA FLAG (CONSOLE)                 MOS01560
0190  9333           157            LBR   R3,R3              MASK CONSOLE DEVICE TO 8 BITS    ****    MOS01570
0192  0844           158            LDAR  R4,R4                                                       MOS01580
0194  2333           159            BZS   IO.OK4             SKIP SECOND OC IF NOT PASLA              MOS01590
0196  9422           160            EXBR  R2,R2                                                       MOS01600
0198  9E32           161            OCR   R3,R2              ISSUE 2ND COMMAND (CONSOLE)              MOS01610
019A  DE30 08DC      162  IO.OK4    OC    R3,CONRD           PUT CONSOLE IN READ MODE                 MOS01620
019E  9B3F           163            RDR   R3,R15             DUMMY READ (SET BUSY)                    MOS01630
                     164  *                                                                            MOS01640
01A0  41F0 082A      165            BAL   LINK,LCORE         SET UP LOW CORE                          MOS01650
01A4  2400           166            LIS   R0,0                                                        MOS01660
01A6  4000 0900      167            STH   R0,WASDU           RESET 'DEVICE UNAVAILABLE' FLAGS         MOS01670
01AA  4000 0902      168            STH   R0,WASDU1                                                   MOS01680
01AE  41F0 064E      169            BAL   LINK,CRLF          DO CR & LF                               MOS01690
01B2  C850 09E6      170            LHI   R5,TITLE                                                    MOS01700
01B6  41F0 05C6      171            BAL   R15,PRINT          PRINT TEST PROGRAM TITLE                 MOS01710
                     172  *--------------------------                                                 MOS01720
                     173  *  KEYBOARD INPUT ROUTINE                                                   MOS01730
                     174  *                                                                            MOS01740
01BA  C8F0 08A0      175  OPTIN     LHI   LINK,MM            *                                ***     MOS01750
01BE  40F0 003E      176            STH   LINK,X'3E'         RESTORE ETPE MM POINTER          ***     MOS01760
01C2  41F0 064E      177            BAL   LINK,CRLF          CR,LF TO LIST DEVICE                     MOS01770
01C6  4820 0106      178  OPTIN1    LH    R2,PSW2                                                     MOS01780
01CA  9512           179            EPSR  R1,R2              NO INT. REG SET 15                       MOS01790
01CC  41F0 07EC      180            BAL   LINK,SETKB         ESTABLISH CONSOLE                        MOS01800
01D0  D340 0976      181            LB    R4,AMSG            OUTPUT AN * TO INDICATE                  MOS01810
01D4  41F0 065C      182            BAL   LINK,OUTCHR        COMMAND MODE ESTABLISHED                 MOS01820
01D8  2541           183            LCS   R4,1               X'FF'                                    MOS01830
01DA  41F0 065C      184            BAL   LINK,OUTCHR                                                 MOS01840
01DE  C8C0 0718      185            LHI   R12,QUESTN         SET UP R12 FOR ERR ROUTINE               MOS01850
01E2  C800 2020      186            LHI   R0,X'2020'         BLANK OUT COMMAND BUFFER                 MOS01860
01E6  4000 0080      187            STH   R0,OPTBUF          WHICH WILL CONTAIN OPTION                MOS01870
01EA  4000 0082      188            STH   R0,OPTBUF+2        NAME                                     MOS01880
01EE  4000 0084      189            STH   R0,OPTBUF+4                                                 MOS01890
01F2  2410           190            LIS   R1,0               CLEAR OPTBUF INDEX                       MOS01900
01F4  41F0 06EA      191  RDCHR     BAL   R15,GETCHR         GET A CHAR IN R4                         MOS01910
01F8  C540 0060      192            CLHI  R4,X'60'           UPPER CASE ALPHA ?                       MOS01920
01FC  2183           193            BLS   RDCHAR0            BRANCH IF NO.                            MOS01930
01FE  CB40 0020      194            SHI   R4,X'20'           CONVERT TO LOWER CASE                    MOS01940
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0202  C540 0023      195 RDCHAR0  CLHI  R4,X'23'          IS IT HASH MARK ?                        MOS01950
0206  4330 01BA      196          BE    OPTIN                                                      MOS01960
020A  C540 005F      197          CLHI  R4,X'5F'          LEFT ARROW, UNDERLINE OR DELETE ?        MOS01970
020E  2334           198          BES   RDCHAR1           YES, BRANCH                              MOS01980
0210  C540 0008      199          CLHI  R4,X'08'          BACK SPACE ?                             MOS01990
0214  2139           200          BNES  RDCHR1           NO, BRANCH                               MOS02000
0216  2711           201 RDCHAR1  SIS   R1,1              YES, DECREMENT INDEX                     MOS02010
0218  021C           202          BMR   R12               ON BUFFER UNDERFLOW; PRINT '?'           MOS02020
021A  C800 0020      203          LHI   R0,X'20'                                                   MOS02030
021E  D201 0080      204          STB   R0,OPTBUF(R1)     BLANK OUT LAST CHARACTER                 MOS02040
0222  4300 01F4      205          B     RDCHR                                                      MOS02050
0226  C540 000D      206 RDCHR1   CLHI  R4,X'0D'          IS IT CR ?                               MOS02060
022A  233C           207          BES   LOOKUP            YES, TRY MATCH                           MOS02070
022C  C540 0020      208          CLHI  R4,X'20'          IS IT A BLANK?                           MOS02080
0230  2339           209          BES   LOOKUP            YES, TRY MATCH                           MOS02090
0232  C510 0006      210          CLHI  R1,6              7 CHARACTERS INPUT ?                     MOS02100
0236  038C           211          BNLR  R12               IF YES, ERROR                            MOS02110
0238  D241 0080      212          STB   R4,OPTBUF(R1)     STORE CURRENT BYTE                       MOS02120
023C  2611           213          AIS   R1,1              BUMP BUFFER INDEX                        MOS02130
023E  4300 01F4      214          B     RDCHR             READ NEXT CHARACTER                      MOS02140
                     215 *-------------------------------                                          MOS02150
                     216 *  OPTION MATCH ROUTINE                                                    MOS02160
                     217 *                                                                          MOS02170
0242  C810 0978      218 LOOKUP   LHI   R1,OPT            LOAD ADDRESS OF OPTION TABLE             MOS02180
0246  2430           219 LOOK1    LIS   R3,0              CLEAR BUFFER INDEX                 ***   MOS02190
0248  0861           220          LDAR  R6,R1             SET OPTION WORD INDEX                    MOS02200
024A  4856 0000      221 LOOK2    LH    R5,0(R6)          GET OPTION NAME (HW)                     MOS02210
024E  021C           222          BMR   R12               IF MINUS, THEN NO MATCH = ERROR          MOS02220
0250  4553 0080      223          CLH   R5,OPTBUF(R3)     COMPARE TO OPTBUF HW                     MOS02230
0254  2333           224          BES   LOOK3             EQUAL, BRANCH                            MOS02240
0256  261C           225          AIS   R1,12             NOT EQUAL, INCREMENT INDEX               MOS02250
0258  2209           226          BS    LOOK1             BRANCH                                   MOS02260
025A  2632           227 LOOK3    AIS   R3,2              TRY NEXT HW                              MOS02270
025C  2662           228          AIS   R6,2                                                       MOS02280
025E  C530 0006      229          CLHI  R3,6              3 MATCHING HW FOUND ?                    MOS02290
0262  208C           230          BLS   LOOK2             NO,BRANCH (CONTINUE LOOKING)             MOS02300
                     231 *                                                                          MOS02310
0264  C510 09C0      232          CLHI  R1,RUN            YES, RUN COMMAND ?                       MOS02320
0268  4330 02CE      233          BE    RUNIT             YES, BRANCH                              MOS02330
                     234 *-----------------------------                                           MOS02340
026C  C510 0978      235 LOOK4    CLHI  R1,TEST           NO, 'TEST' OPTION ?                      MOS02350
0270  4330 0298      236          BE    TESTOP            YES, BRANCH                              MOS02360
                     237 *                                                                          MOS02370
                     238 *  TO PROCESS COMMANDS OTHER THAN 'TEST', 'OPTION'.                 ***   MOS02380
                     239 *                                                                          MOS02390
0274  274D           240          SIS   R4,13             NO, OPTION FOLLOWED BY CR ?              MOS02400
0276  033C           241          BZR   R12               YES, ERROR                               MOS02410
0278  41E0 0562      242          BAL   R14,OPTVAL         GET OPTION VALUE IN R6                   MOS02420
027C  274D           243          SIS   R4,13             TERMINATED BY CR ?                       MOS02430
027E  023C           244          BNZR  R12               IF NO, BRANCH                            MOS02440
0280  48E1 0008      245          LH    R14,8(R1)         GET OPTION CHECK ROUTINE ADDRESS         MOS02450
0284  2332           246          BZS   LOOK5             IF NO ROUTINE ADDRESS, BRANCH            MOS02460
0286  01FE           247          BALR  R15,R14           LINK OPTION CHECK ROUTINE                MOS02470
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                   *                                          RETURN HERE                          ***   MOS02480
0288   4061 0006   LOOK5     STH   R6,6(R1)                   STORE OPTION VALUE                         MOS02490
028C   4300 01BA             B     OPTIN                      TO ACCEPT NEXT COMMAND                     MOS02500
                   *                                                                                     MOS02510
                   *---------------------------------                                                    MOS02520
                   *  TO CHECK THAT INPUT IS NOT > MAX VALUE (OPTION+10)                                 MOS02530
                   *                                                                                     MOS02540
0290   4561 000A   LEVELIN   CLH   R6,10(R1)                  IS R6 > MAX VALUE ?                        MOS02550
0294   022C                  BPR   R12                        YES, ERROR RETURN                          MOS02560
0296   030F                  BR    R15                        NO, RETURN TO LOOK5                        MOS02570
                   *                                                                                     MOS02580
                   *---------------------------------                                                    MOS02590
                   *  TEST OPTION PROCESS ROUTINE                                                        MOS02600
                   *                                                                                     MOS02610
0298   274D        TESTOP    SIS   R4,13                      'TEST' FOLLOWED BY (CR) ?                  MOS02620
029A   2137                  BNZS  TSTOP1                                                                MOS02630
029C   C800 F800             LHI   R0,DEFTESTS                YES, SET TEST OPTION TO              ***   MOS02640
02A0   4000 097E             STH   R0,TEST+6                  FIRST TEST WORD                            MOS02650
02A4   4300 01BA             B     OPTIN                      TO ACCEPT NEXT COMMAND                     MOS02660
                   *                                                                                     MOS02670
02A8   2454        TSTOP1    LIS   R5,MAXTST                  *                                    ***   MOS02680
02AA   2470                  LIS   R7,0                       TEST BIT ACCUMULATORS                      MOS02690
02AC   2480                  LIS   R8,0                                                                  MOS02700
02AE   41E0 0562   TSTOP2    BAL   R14,OPTVAL                 GET OPTION VALUE IN R6                     MOS02710
02B2   0556                  CLAR  R5,R6                                                                 MOS02720
02B4   028C                  BLR   R12                        ERROR: INVALID TEST NUMBER                 MOS02730
02B6   C830 8000             LHI   R3,X'8000'                 * (NORMALLY:  BAL  LINK,UNARY)       ***   MOS02740
02BA   CC36 0000             SRHL  R3,0(R6)                   *                                    ***   MOS02750
02BE   0673                  OAR   R7,R3                      SET CURRENT BIT                            MOS02760
02C0   274D        TSTOP4    SIS   R4,13                      TERMINATED BY CR ?                         MOS02770
02C2   4230 02AE             BNZ   TSTOP2                                                                MOS02780
02C6   4070 097E             STH   R7,TEST+6                  STORE VALID SELECTED TESTS                 MOS02790
02CA   4300 01BA             B     OPTIN                      TO ACCEPT NEXT COMMAND                     MOS02800
                   *-----------------------------                                                        MOS02810
                   *                                                                                     MOS02820
02CE   24F0        RUNIT     LIS   R15,0                                                                 MOS02830
02D0   40F0 0900             STH   R15,WASDU                  RESET DU FLAGS                             MOS02840
02D4   40F0 0902             STH   R15,WASDU1                                                            MOS02850
02D8   41F0 064E             BAL   LINK,CRLF                  DO CR & LF                                 MOS02860
                   *                                                                                     MOS02870
02DC   240F                  LIS   R0,15                      TO FIND HIGHEST SELECTED TEST  NO.         MOS02880
02DE   4810 097E             LH    R1,TEST+6                  CHECK FIRST TEST HW                        MOS02890
02E2   9011        KEEP2     SRLS  R1,1                                                                  MOS02900
02E4   2184                  BCS   FOUND1                     R0 = F-0 = TEST NUMBER                     MOS02910
02E6   2701                  SIS   R0,1                                                                  MOS02920
02E8   2213                  BNMS  KEEP2                      LOOP TILL TEST FOUND                       MOS02930
02EA   030C                  BR    R12                        TEST NOT SELECTED                          MOS02940
                   *                                                                                     MOS02950
02EC   4000 08FE   FOUND1    STH   R0,SELTST                  HIGHEST SELECTED TEST NUMBER         ***   MOS02960
02F0   4800 0110             LH    R0,IO                                                                 MOS02970
02F4   4000 010A             STH   R0,IOSAVE                  RESTORE USER'S I/O CHOICE                  MOS02980
02F8   41F0 064E             BAL   LINK,CRLF                                                             MOS02990
02FC   41F0 09D2             BAL   LINK,INIT                  LINK TO USER INITIALIZATION ROUTINE        MOS03000
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                         301  *                                                                    MOS03010
                         302  *  RESET TEST PARAMETERS                                            MOS03020
                         303  *                                                                    MOS03030
0300   2400              304  INITRET  LIS   R0,0              *                          ***      MOS03040
0302   4000 08FA         305           STH   R0,ISITERR       RESET ERROR FLAG                    MOS03050
0306   4000 0904         306           STH   R0,TOTAL         RESET TOTAL                         MOS03060
030A   4000 0906         307           STH   R0,TOTERR        RESET TOTERR                        MOS03070
030E   C810 3030         308           LHI   R1,C'00'                                             MOS03080
0312   4010 0928         309           STH   R1,MTESTNO       RESET THESE FLAGS TO C'00'          MOS03090
0316   4010 0932         310           STH   R1,ETESTNO                                           MOS03100
031A   4010 0934         311           STH   R1,ERRNO                                             MOS03110
031E   41F0 082A         312           BAL   LINK,LCORE       SET UP LOW CORE                     MOS03120
                         313  *                                                                    MOS03130
                         314  *  START SELECTION FROM TEST 0                                      MOS03140
                         315  *                                                                    MOS03150
0322   2400              316  KEEP3    LIS   R0,0              *                          ***      MOS03160
0324   4000 0908         317           STH   R0,BTESTNO       RESET BINARY TEST NUMBER            MOS03170
0328   4000 090C         318           STH   R0,NEXTST        RESET NEXT TEST NUMBER              MOS03180
                         319  *                                                                    MOS03190
                         320  *  TO FIND THE NEXT SELECTED TEST.                                  MOS03200
                         321  *                                                                    MOS03210
032C   4820 090C         322  KEEP4    LH    R2,NEXTST        GET NEXT TEST NUMBER                MOS03220
0330   C800 8000         323  KEEP41   LHI   R0,X'8000'       R0 = X'8000'               ***      MOS03230
0334   CC02 0000         324           SRHL  R0,0(R2)         R0 = NEXT TEST BIT                  MOS03240
0338   4400 097E         325  KEEP42   NH    R0,TEST+6        LOOK AT TEST HW 1                   MOS03250
033C   2133              326           BNZS  KEEP5                                                MOS03260
033E   2621              327  KEEP43   AIS   R2,1                                                 MOS03270
0340   2208              328           BS    KEEP41           LOOP FOR NEXT TEST NUMBER           MOS03280
0342   4020 0908         329  KEEP5    STH   R2,BTESTNO       CURRENT TEST NUMBER                 MOS03290
0346   0812              330           LDAR  R1,R2            R1 = TEST NUMBER IN BINARY          MOS03300
0348   2621              331           AIS   R2,1                                                 MOS03310
034A   4020 090C         332           STH   R2,NEXTST                                            MOS03320
034E   2402              333           LIS   R0,2             SET DIGITS TO PRINT = 2             MOS03330
0350   C820 0928         334           LHI   R2,MTESTNO       R2 = A(MTESTNO)                     MOS03340
0354   41F0 059E         335           BAL   LINK,HEXASC      STORE TEST NO. IN ASCII @ MTESTNO   MOS03350
0358   4820 0928         336           LH    R2,MTESTNO                                           MOS03360
035C   4020 0932         337           STH   R2,ETESTNO       STORE TEST NO. IN ASCII @ ETESTNO   MOS03370
0360   41F0 0732         338           BAL   LINK,TSTBRK      TEST BREAK                          MOS03380
0364   C850 0922         339           LHI   R5,TSTMSG                                            MOS03390
0368   41F0 05C6         340           BAL   LINK,PRINT       PRINT 'TEST NN'                     MOS03400
036C   2400              341           LIS   R0,0             *                          ***      MOS03410
036E   4000 08FC         342           STH   R0,NOERR         RESET ERROR FLAG                    MOS03420
0372   4000 090A         343           STH   R0,COUNT         RESET COUNT                         MOS03430
0376   4810 0104         344  KEEP6    LH    R1,PSW           ENABLE INTERRUPTS (30F0)   ***      MOS03440
037A   9501              345           EPSR  R0,R1                                                MOS03450
037C   4820 0908         346           LH    R2,BTESTNO       R2 = TEST NUMBER                    MOS03460
0380   9121              347           SLHLS R2,LADC                                              MOS03470
0382   4812 0A16         348           LDA   R1,TESTS(R2)                                         MOS03480
0386   0301              349           BR    R1               GO TO TEST MODULE                   MOS03490
                         350  *----------------------------                                       MOS03500
                         351  *                                                                    MOS03510
                         352  *  TEST MODULE END ROUTINE                                          MOS03520
                         353  *                                                                    MOS03530
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04C2  481F 0002      458          LH    R1,2(LINK)          GET 2ND PARAMETER ADDRESS              MOS04580
04C6  4811 0000      459          LH    R1,0(R1)            GET THE DATA                           MOS04590
04CA  9411           460          EXBR  R1,R1               EXCHANGE DATA BYTES                    MOS04600
04CC  9801           461          WHR   R0,R1               WRITE DATA TO THE DISPLAY PANEL        MOS04610
04CE  481F 0000      462          LH    R1,0(LINK)          GET 1ST PARAMETER ADDRESS              MOS04620
04D2  4811 0000      463          LH    R1,0(R1)            GET THE DATA                           MOS04630
04D6  9411           464          EXBR  R1,R1               EXCHANGE DATA BYTES                    MOS04640
04D8  9801           465          WHR   R0,R1               WRITE THE DATA TO THE DISPLAY PANEL    MOS04650
04DA  DE00 08D5      466          OC    R0,NORM             PUT DISPLAY PANEL IN NORMAL MODE       MOS04660
04DE  430F 0004      467          B     4(LINK)             RETURN                                 MOS04670
                     468  * ********************************                                       MOS04680
                     469  *  ERROR ROUTINES                 (OVERRIDE NOMSG OPTION)                MOS04690
                     470  *                                                                        MOS04700
04E2  D000 00E0      471  ERR     STM   R0,ERRSAVE          STORE REGISTERS                        MOS04710
04E6  4120 0500      472          BAL   R2,ERRCOM           RETURN IF LIST DEVICE IS ON            MOS04720
04EA  41E0 0534      473          BAL   RET,ERR1            PRINT 'ERROR TTNN'                     MOS04730
04EE  2400           474  ERRCOM2 LIS   R0,0                                                       MOS04740
04F0  4000 08FA      475          STH   R0,ISITERR          RESET ERROR FLAG                       MOS04750
04F4  4820 0104      476          LH    R2,PSW                                                     MOS04760
04F8  9502           477          EPSR  R0,R2               PSW = X'30F0'                          MOS04770
04FA  D100 00E0      478          LM    R0,ERRSAVE          RESTORE REGISTERS                      MOS04780
04FE  030F           479          BR    LINK                RETURN TO TEST                         MOS04790
                     480  *                                                                        MOS04800
                     481  *  ETPE COMMON ERROR ROUTINE                                      ***     MOS04810
                     482  *                                                                        MOS04820
0500  4020 0064      483  ERRCOM  STA   R2,COMRET           SAVE RETURN ADDRESS                ***     MOS04830
0504  4810 0106      484          LH    R1,PSW2                                                    MOS04840
0508  9501           485          EPSR  R0,R1               DISABLE INT. @ PROCESSOR LEVEL(30F0)   MOS04850
050A  41F0 07B6      486          BAL   LINK,TSTDU          GET LIST DEVICE DU BIT IN R1           MOS04860
050E  2138           487          BNZS  ERRCOM1             BRANCH IF OFF-LINE                     MOS04870
0510  4020 08FA      488          STH   R2,ISITERR          SET ERROR FLAGS                        MOS04880
0514  4020 08FC      489          STH   R2,NOERR                                                   MOS04890
0518  4820 0064      490          LDA   R2,COMRET           RESTORE RETURN ADDRESS             ***     MOS04900
051C  0302           491          BR    R2                  GO, PRINT ERROR MESSAGE                MOS04910
                     492  *                                                                        MOS04920
051E  4810 0906      493  ERRCOM1 LH    R1,TOTERR           LIST DEVICE IS OFF                     MOS04930
0522  2611           494          AIS   R1,1                                                       MOS04940
0524  4010 0906      495          STH   R1,TOTERR           INCREMENT TOTERR                       MOS04950
0528  C510 7FFF      496          CLHI  R1,X'7FFF'          TOTERR < MAX RETAINABLE ?              MOS04960
052C  4280 0452      497          BL    KEEP91              NO, ABORT CURRENT TEST & GOTO NEXT     MOS04970
0530  4300 0474      498          B     HALT9               YES, HALT PROCESSOR                    MOS04980
                     499  *----------------------------                                           MOS04990
                     500  * MESSAGE PRINT ROUTINES         (DO NOT OVERRIDE NOMSG OPTION)         MOS05000
                     501  *                                                                        MOS05010
                     502  *  TO PRINT 'ERROR TTNN'                                                 MOS05020
                     503  *                                                                        MOS05030
0534  C850 092C      504  ERR1    LHI   R5,ERRMSG           PRINT 'ERROR TTNN'                 ***     MOS05040
0538  41F0 05C6      505          BAL   LINK,PRINT          TT = TEST NO.; NN = ERROR NO.      ***     MOS05050
053C  030E           506          BR    RET                 RETURN                                 MOS05060
                     507  *                                                                        MOS05070
                     508  *  TO PRINT 'PSW PPPP  LOC LLLL'                                         MOS05080
                     509  *                                                                        MOS05090
053E  2404           510  ERRPL1  LIS   R0,4                SET UP DIGITS = 4                      MOS05100
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0540   4810 08D0             LH    R1,OPSW           R1 = OLD PSW
0544   C820 0956             LHI   R2,ASCIPSW        R2 = OPSW MESSAGE LOC
0548   41F0 059E             BAL   LINK,HEXASC       CONVERT IT TO ASCII
054C   4810 08D2             LH    R1,OLOC           R1= OLD LOC
0550   C820 0960             LHI   R2,ASCILOC        R2 = OLD LOC MESSAGE LOC
0554   41F0 059E             BAL   LINK,HEXASC       CONVERT IT TO ASCII
0558   C850 0952             LHI   R5,PSWMSG
055C   41F0 05C6             BAL   LINK,PRINT        PRINT 'PSW PPPP  LOC LLLL'
0560   030E                  BR    RET               RETURN
                   * *********************************
                   *  TO OBTAIN OPTION VALUE IN R6    (16 BITS, TARGT 16)
                   *
0562   2460        OPTVAL    LIS   R6,0              INITIALIZE ACCUMULATOR
0564   41F0 06EA             BAL   R15,GETCHR        GET A CHAR IN R4
0568   24FF        OPTVAL0   LIS   R15,15
056A   D44F 0912   OPTVAL1   CLB   R4,HEXTAB(R15)    SCAN TABLE FOR A CHARACTER MATCH
056E   2334                  BES   OPTVAL2           MATCH, BRANCH
0570   27F1                  SIS   R15,1             ELSE DECREMENT POINTER
0572   2214                  BNMS  OPTVAL1           IF POINTER IN RANGE, BRANCH
0574   030C                  BR    R12               ELSE ERROR; VALUE NOT IN TABLE
0576   9164        OPTVAL2   SLLS  R6,4              SHIFT LEFT 4
0578   066F                  OAR   R6,R15            OR IN CURRENT DIGIT
057A   41F0 06EA   OPTVAL3   BAL   R15,GETCHR        GET NEXT CHAR
057E   C540 005F             CLHI  R4,X'5F'          IS IT LEFT ARROW ?
0582   2334                  BES   OPTVAL5           YES, BRANCH
0584   C540 0008             CLHI  R4,X'08'          NO, IS IT BACK SPACE ?
0588   2133                  BNES  OPTVAL4           NO, BRANCH
058A   9064        OPTVAL5   SRLS  R6,4              YES, THROW AWAY LAST HEX ENTRY
058C   2209                  BS    OPTVAL3           BRANCH TO GET NEXT CHARACTER
058E   C540 000D   OPTVAL4   CLHI  R4,13             IS IT CR ?
0592   033E                  BER   R14               YES, EXIT (RETURN)
0594   C540 002C             CLHI  R4,X'2C'          NO, IS IT A COMMA ?
0598   4230 0568             BNE   OPTVAL0           NO, LOOP TO PROCESS NEXT INPUT
059C   030E                  BR    R14               YES, RETURN
                   *----------------------------------                    ***
                   *  TO CONVERT HEXADECIMAL DATA IN R1 TO ASCII CHAR & STORE @ 0(R2)
                   *
059E   D000 00A0   HEXASC    STM   R0,RSAVE          STORE REGISTERS
05A2   0830                  LDAR  R3,R0             R3 = NUMBER OF DIGITS OF CONVERSION
05A4   9132                  SLLS  R3,2
05A6   2734                  SIS   R3,4              R3 = 4(DIGITS)-4
05A8   0841        HEXASC1   LDAR  R4,R1             R4 = HEX DATA TO BE CONVERTED
05AA   CC43 0000             SRAL  R4,0(R3)
05AE   C440 000F             NHI   R4,15             R4 = SINGLE HEX DIGIT FOR CONVERSION
05B2   D344 0912             LB    R4,HEXTAB(R4)     GET THE ASCII CHARACTER
05B6   D242 0000             STB   R4,0(R2)          STORE ASCII CHAR IN DESTINATION BUFF
05BA   2621                  AIS   R2,1              BUMP BUFFER LOCATION
05BC   2734                  SIS   R3,4              DECREMENT DIGIT SHIFT VALUE
05BE   221B                  BNMS  HEXASC1           LOOP TILL ALL DIGITS ARE CONVERTED
05C0   D100 00A0             LM    R0,RSAVE          RESTORE REGISTERS
05C4   030F                  BR    LINK              RETURN
                   *----------------------------
                   *  TO PRINT THE ASCII MESSAGE
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                           564  *                                                                    MOS05640
05C6   D000 00A0           565  PRINT    STM   R0,RSAVE          STORE REGISTERS                     MOS05650
05CA   41F0 07B6           566           BAL   LINK,TSTDU        LIST DEVICE DU ?                    MOS05660
05CE   2337                567           BZS   P1                NO, BRANCH                          MOS05670
05D0   4010 0900           568           STH   R1,WASDU          YES, SET DU FLAGS                   MOS05680
05D4   4010 0902           569           STH   R1,WASDU1                                             MOS05690
05D8   4300 0644           570           B     PRINT5            EXIT                                MOS05700
05DC   4820 0900           571  P1       LH    R2,WASDU          WAS IT DU LAST PASS ?               MOS05710
05E0   4330 060E           572           BZ    P3                NO, BRANCH                          MOS05720
05E4   C810 0140           573           LHI   R1,X'140'         YES, LOAD DELAY CONSTANTS           MOS05730
05E8   C800 1000           574  P4       LHI   R0,X'1000'        INTO COUNTERS 1 & 2                 MOS05740
05EC   2701                575  P5       SIS   R0,1              DECREMENT COUNTER 1                 MOS05750
05EE   2031                576           BNZS  P5                WAIT TILL EXHAUSTED                 MOS05760
05F0   2711                577           SIS   R1,1              DECREMENT COUNTER 2                 MOS05770
05F2   2035                578           BNZS  P4                LOOP TILL TIMEOUT                   MOS05780
                           579  *                                20 SEC. FOR CRT WARMUP)             MOS05790
05F4   2440                580           LIS   R4,0                                                  MOS05800
05F6   4040 0900           581           STH   R4,WASDU          RESET PRESENT DU FLAG               MOS05810
05FA   2541                582           LCS   R4,1              CHARACTER = X'FF'                   MOS05820
05FC   4040 0902           583           STH   R4,WASDU1         SET WASDU1 FLAG                     MOS05830
0600   2434                584           LIS   R3,4                                                  MOS05840
0602   41F0 065C           585  P2       BAL   LINK,OUTCHR       OUTPUT DELETE CHARACTER             MOS05850
0606   2731                586           SIS   R3,1                                                  MOS05860
0608   2023                587           BPS   P2                BRANCH 4 TIMES                      MOS05870
060A   4300 0480           588           B     KEEP10            PRINT TOTAL, TOTERR                 MOS05880
060E   4800 09A2           589  P3       LH    R0,NOMSG+6        IS 'NOMSG' SET ?                    MOS05890
0612   2335                590           BZS   PRINT2            NO, PRINT ALL MESSAGES              MOS05900
0614   4800 08FA           591           LH    R0,ISITERR        IS 'ISITERR' SET ?                  MOS05910
0618   4330 0644           592           BZ    PRINT5            NO, NOT AN ERROR MSG. - EXIT        MOS05920
                           593  *                                                                    MOS05930
061C   D345 0000           594  PRINT2   LB    R4,0(R5)          GET A MESSAGE BYTE                  MOS05940
0620   41F0 065C           595           BAL   LINK,OUTCHR       OUTPUT IT                           MOS05950
0624   274D                596           SIS   R4,13             CR ?                                MOS05960
0626   2333                597           BZS   PRINT3            YES, MSG OVER - BRANCH              MOS05970
0628   2651                598           AIS   R5,1                                                  MOS05980
062A   2207                599           BS    PRINT2            NO, LOOP FOR NEXT CHAR              MOS05990
062C   244A                600  PRINT3   LIS   R4,10             LF                                  MOS06000
062E   D310 010B           601           LB    R1,IOSAVE+1       GET LIST DEV IDENTIFIER             MOS06010
0632   2713                602           SIS   R1,3              LINE PRINTER ?                      MOS06020
0634   2335                603           BZS   PRINT3A           BRANCH IF YES.                      MOS06030
0636   41F0 065C           604           BAL   LINK,OUTCHR       LF                                  MOS06040
063A   2541                605           LCS   R4,1              DEL                                 MOS06050
063C   2302                606           BS    PRINT3B                                               MOS06060
063E   2441                607  PRINT3A  LIS   R4,1              YES, OUTPUT X'01'                   MOS06070
0640   41F0 065C           608  PRINT3B  BAL   LINK,OUTCHR       TERMINAL CHARACTER                  MOS06080
0644   41F0 0732           609  PRINT5   BAL   LINK,TSTBRK                                           MOS06090
0648   D100 00A0           610           LM    R0,RSAVE          RESTORE REGISTERS                   MOS06100
064C   030F                611           BR    LINK              RETURN                              MOS06110
                           612  *--------------------------------                                    MOS06120
                           613  *  SMALL SUPPORT ROUTINES                                            MOS06130
                           614  *                                                                    MOS06140
                           615  *  TO OUTPUT CR,LF TO LIST DEVICE                                    MOS06150
                           616  *                                                                    MOS06160
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064E  D000 00A0        617  CRLF     STM   R0,RSAVE          STORE REGISTERS                          MOS06170
0652  244D              618           LIS   R4,13                                                     MOS06180
0654  41F0 065C        619           BAL   LINK,OUTCHR       OUTPUT CR                                MOS06190
0658  4300 062C        620           B     PRINT3            LINE FEED, RESTORE, RETURN               MOS06200
                       621  *-------------------------                                                MOS06210
                       622  *  TO OUTPUT A CHARACTER TO THE LIST DEVICE                               MOS06220
065C  40F0 090E        623  OUTCHR   STA   R15,OUT.SAV       SAVE RETURN ADDRESS                      MOS06230
0660  D300 010B        624           LB    R0,IOSAVE+1       GET USER'S LIST DEVICE NUMBER            MOS06240
0664  2704              625           SIS   R0,4                                                       MOS06250
0666  4230 06A4        626           BNZ   OUTCHR2           BRANCH IF NOT CAROUSEL                   MOS06260
066A  4000 006C        627           STH   R0,PAUSE          SET PAUSE FLAG                           MOS06270
066E  41F0 07B6        628  OTC.0    BAL   LINK,TSTDU        IS LIST DEVICE ON LINE ?                 MOS06280
0672  4230 06E0        629           BNZ   OUT0              NO, BRANCH                               MOS06290
0676  9D01              630           SSR   R0,R1            GET CAROUSEL STATUS                      MOS06300
0678  2386              631           BNCS  OTC.1             BRANCH IF CHAR. IS TO BE READ    ***     MOS06310
067A  4810 006C        632           LH    R1,PAUSE          PAUSED NOW ?                             MOS06320
067E  2038              633           BNZS  OTC.0             YES, LOOP                                MOS06330
0680  4300 06A4        634           B     OUTCHR2           NO, GO OUTPUT CHARACTER                  MOS06340
0684  9B01              635  OTC.1    RDR   R0,R1            GET CAROUSEL CHARACTER                   MOS06350
0686  C410 007F        636           NHI   R1,X'7F'          MASK OFF PARITY                          MOS06360
068A  CB10 0012        637           SHI   R1,X'12'          IS IT DC2 ?                              MOS06370
068E  2134              638           BNZS  OTC.3             NO, BRANCH                               MOS06380
0690  4010 006C        639           STH   R1,PAUSE          YES, RESET PAUSE FLAG                    MOS06390
0694  2308              640           BS    OUTCHR2           BRANCH                                   MOS06400
0696  2712              641  OTC.3    SIS   R1,2             IS IT DC4 ?                              MOS06410
0698  4230 066E        642           BNZ   OTC.0             NO, BRANCH                               MOS06420
069C  40F0 006C        643           STH   LINK,PAUSE       YES, RESET PAUSE FLAG                    MOS06430
06A0  4300 066E        644           B     OTC.0             GO WAIT FOR DC2                          MOS06440
                       645  *                                                                         MOS06450
06A4  4010 006C        646  OUTCHR2  STH   R1,PAUSE          RESET FLAG                               MOS06460
06A8  41F0 07B6        647           BAL   LINK,TSTDU        OFF-LINE ?                               MOS06470
06AC  4230 06E0        648           BNZ   OUT0              BRANCH IF OFF-LINE                       MOS06480
06B0  4110 0812        649           BAL   R1,SETUP          SET UP FOR OUTPUT                        MOS06490
06B4  9D01              650  OTC.4    SSR   R0,R1            WAIT FOR NOT BUSY                        MOS06500
06B6  4230 06E0        651           BTC   3,OUT0            BRANCH IF OFF-LINE                       MOS06510
06BA  C510 000C        652           CLHI  R1,12             PASLA OFFLINE ?                          MOS06520
06BE  4330 06E0        653           BE    OUT0              BRANCH: YES.                             MOS06530
06C2  C310 0008        654           THI   R1,8              BUSY ?                                   MOS06540
06C6  2039              655           BNZS  OTC.4             WAIT FOR NOT BUSY.                       MOS06550
06C8  9A04              656           WDR   R0,R4             OUTPUT DATA BYTE                         MOS06560
06CA  41F0 07B6        657  OTC.5    BAL   LINK,TSTDU        IS LIST DEVICE DU ?                      MOS06570
06CE  2139              658           BNZS  OUT0              YES, BRANCH (EXIT)                       MOS06580
06D0  D310 010B        659           LB    R1,IOSAVE+1       NO, GET USER'S LIST DEVICE NUMBER        MOS06590
06D4  9111              660           SLHLS R1,1              SHIFT FOR HW INDEXING                    MOS06600
06D6  D301 0111        661           LB    R0,IO+1(R1)       GET USER'S LIST DEVICE ADDRESS           MOS06610
06DA  9D01              662           SSR   R0,R1             GET THE STATUS                           MOS06620
06DC  2089              663           BTBS  8,OTC.5           WAIT FOR NOT BUSY.                       MOS06630
06DE  2303              664           BS    OUT1              BRANCH                                   MOS06640
06E0  4010 0900        665  OUT0     STH   R1,WASDU         SET PRESENT DU FLAG                      MOS06650
06E4  48F0 090E        666  OUT1     LDA   R15,OUT.SAV       RESTORE RETURN ADDRESS                   MOS06660
06E8  030F              667           BR    R15               RETURN                                   MOS06670
                       668  *-------------------------                                                MOS06680
                       669  *  TO GET A CHAR FROM KEYBOARD (IN REG R4)                                MOS06690
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                         670  *                                                                    MOS06700
06EA   4140 07FA         671  GETCHR   BAL   R4,KBREAD          PUT KB DEVICE IN READ MODE        MOS06710
06EE   0890              672           LDAR  R9,R0              SAVE CONSOLE DEVICE ADDRESS       MOS06720
06F0   9D04              673           SSR   R0,R4              GET THE STATUS                    MOS06730
06F2   2081              674           BTBS  8,1                IF BUSY, LOOP (POSSIBLE HANG)     MOS06740
06F4   9B04              675           RDR   R0,R4              READ A CHAR IN R4                 MOS06750
                         676  * TO ECHO RECEIVED CHARACTERS TO CONSOLE DEVICE IN FDX MODE          MOS06760
06F6   D400 011A         677  ECHO     CLB   R0,MICROBUS        IS IT MICROBUS ?                  MOS06770
06FA   233B              678           BES   ECHO1              YES, BRANCH                       MOS06780
06FC   D390 08DC         679           LB    R9,CONRD           NO, GET THE READ OC               MOS06790
0700   C590 00A1         680           CLHI  R9,X'A1'           CAROUSEL ?                        MOS06800
0704   2137              681           BNES  ECHRTN             NO, DO NOT ECHO (BRANCH)          MOS06810
0706   D390 08DB         682           LB    R9,CONADR+1        GET CONSOLE WRITE ADDRESS         MOS06820
070A   DD90 08D4         683           SS    R9,SINK            GET THE STATUS                    MOS06830
070E   2082              684           BTBS  8,2                WAIT FOR NOT BUSY (POSSIBLE HANG) MOS06840
0710   9A94              685  ECHO1    WDR   R9,R4              ECHO RECEIVED BYTE                MOS06850
0712   C440 007F         686  ECHRTN   NHI   R4,X'7F'           REMOVE PARITY BIT                 MOS06860
0716   030F              687           BR    LINK               RETURN                            MOS06870
                         688  *-----------------------------                                       MOS06880
                         689  *  TO OUTPUT '?' TO CONSOLE                                          MOS06890
                         690  *                                                                    MOS06900
0718   41F0 064E         691  QUESTN   BAL   LINK,CRLF          DO CR & LF                        MOS06910
071C   40F0 08FA         692           STH   LINK,ISITERR       FORCE PRINTING                    MOS06920
0720   C850 0974         693           LHI   R5,QMSG                                              MOS06930
0724   41F0 05C6         694           BAL   LINK,PRINT         PRINT '?'                         MOS06940
0728   2400              695           LIS   R0,0               *                           ***   MOS06950
072A   4000 08FA         696           STH   R0,ISITERR         RESET FORCED PRINTING FLAG        MOS06960
072E   4300 01C6         697           B     OPTIN1             BRANCH TO ACCEPT COMMAND INPUT    MOS06970
                         698  *-----------------------------                                       MOS06980
                         699  * IF BREAK KEY DEPRESSED, GO TO 'OPTIN' OR (BRKVECT); ELSE RETURN.   MOS06990
                         700  *    BUT IF "BREAK" & "CONTIN" = 1, GO TO ABORT1.                 ***   MOS07000
                         701  *                                                                    MOS07010
0732   D000 00C0         702  TSTBRK   STM   R0,RSAVE+32       STORE REGISTERS                   MOS07020
0736   40F0 0910         703           STA   LINK,BRK.SAV       SAVE RETURN ADDRESS               MOS07030
073A   D300 08DA         704           LB    R0,CONADR          GET KEYBOARD DEVICE ADDRESS       MOS07040
073E   9D01              705           SSR   R0,R1              GET KEYBOARD DEVICE STATUS        MOS07050
0740   4210 07A6         706           BTC   1,TSTBRK3          IF CLI DU, BRANCH                 MOS07060
0744   C510 000C         707           CLHI  R1,X'0C'           IS PASLA/PALM DU ?                MOS07070
0748   4330 07A6         708           BE    TSTBRK3            YES, BRANCH (EXIT)                MOS07080
074C   C310 0020         709           THI   R1,X'20'           NO, IS "BREAK" KEY DEPRESSED ?    MOS07090
0750   4330 07A6         710           BZ    TSTBRK3            NO, BRANCH (EXIT)                 MOS07100
0754   D320 0110         711           LB    R2,IO              YES, GET CONSOLE DEVICE POINTER   MOS07110
0758   C520 0005         712           CLHI  R2,5               IS IT MICROBUS ?                  MOS07120
075C   2139              713           BNES  TSTBRK4            NO, BRANCH                        MOS07130
075E   9B02              714  TSTBRK5  RDR   R0,R2              YES, READ THE CHARACTER           MOS07140
0760   9D01              715           SSR   R0,R1              GET THE DEVICE STATUS             MOS07150
0762   C310 0020         716           THI   R1,X'20'           STILL "BREAK" STATUS ?            MOS07160
0766   4230 075E         717           BNZ   TSTBRK5            YES, BRANCH (LOOP)                MOS07170
076A   4300 0792         718           B     TSTBRK2            NO, BRANCH (EXIT)                 MOS07180
076E   4820 010E         719  TSTBRK4  LH    R2,PASFLG          PASLA ?                           MOS07190
0772   233C              720           BZS   TSTBRK1            BRANCH IF NOT                     MOS07200
0774   C310 0008         721           THI   R1,8               ALREADY ACKNOWLEDGED ?            MOS07210
0778   4230 07A6         722           BNZ   TSTBRK3            BRANCH IF YES                     MOS07220
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077C  9B02            723          RDR   R0,R2             READ THE ASSEMBLED CHARACTER          MOS07230
077E  9D01            724          SSR   R0,R1             GET THE DEVICE STATUS                 MOS07240
0780  2281            725          BFBS  8,1               WAIT FOR BUSY TO SET                  MOS07250
0782  0822            726          LDAR  R2,R2             ZERO CHARACTER ?                      MOS07260
0784  4230 07A6       727          BNZ   TSTBRK3           NO, BRANCH: JUST FRAMING ERROR  ***   MOS07270
0788  2305            728          BS    TSTBRK2           YES, EXIT (W/"BREAK" STATUS)          MOS07280
078A  9D01            729  TSTBRK1 SSR   R0,R1            GET THE DEVICE STATUS                 MOS07290
078C  C310 0020       730          THI   R1,X'20'          "BREAK" STATUS ?                      MOS07300
0790  2033            731          BNZS  TSTBRK1           YES, WAIT FOR "BREAK" RELEASE         MOS07310
0792  48F0 0996       732  TSTBRK2 LH    R15,CONTIN+6      IS "CONTIN" SET ?               ***   MOS07320
0796  4230 040A       733          BNZ   ABORT1            YES, BRANCH TO ABORT1           ***   MOS07330
079A  48F0 0108       734          LH    R15,BRKVECT       NO, CHECK FOR SPECIAL ROUTINE   ***   MOS07340
079E  4330 01BA       735          BZ    OPTIN             BRK W/NO VECTOR: BRANCH TO EXEC.      MOS07350
07A2  40F0 0910       736          STH   R15,BRK.SAV       ELSE SET UP EXIT ADDRESS              MOS07360
07A6  2400            737  TSTBRK3 LIS   R0,0                                                   MOS07370
07A8  4000 0108       738          STH   R0,BRKVECT        DELETE VECTOR AFTER ONE SHOT          MOS07380
07AC  D100 00C0       739          LM    R0,RSAVE+32       RESTORE REGISTERS               ***   MOS07390
07B0  48F0 0910       740          LDA   LINK,BRK.SAV      RESTORE RETURN ADDRESS                MOS07400
07B4  030F            741          BR    LINK              RETURN TO PROGRAM                     MOS07410
                      742  *--------------------------------                                     MOS07420
                      743  * SEE IF LIST DEVICE OFF-LINE (R1, CC NON-ZERO IF OFF)                 MOS07430
                      744  *                                                                      MOS07440
07B6  2401            745  TSTDU   LIS   R0,1              LOAD CLI DU STATUS MASK               MOS07450
07B8  4810 08D8       746          LH    R1,PASFLG2        IS IT ON PASLA ?                      MOS07460
07BC  2333            747          BZS   $TSTDU0           NO, BRANCH                            MOS07470
07BE  C800 00FC       748          LHI   R0,X'FC'          YES, LOAD PASLA DU STATUS MASK        MOS07480
07C2  D310 010B       749  $TSTDU0 LB    R1,IOSAVE+1       GET LIST DEVICE IDENTIFIER            MOS07490
07C6  9111            750          SLHLS R1,1              (R1) = 2,4,6,8,A                      MOS07500
07C8  D311 0110       751          LB    R1,IO(R1)         GET LIST DEVICE ADDRESS               MOS07510
07CC  D210 08D4       752          STB   R1,SINK           SAVE THE LIST DEVICE ADDRESS          MOS07520
07D0  9D11            753          SSR   R1,R1             GET THE DEVICE STATUS                 MOS07530
07D2  0410            754          NAR   R1,R0             MASK IT OFF                           MOS07540
07D4  C310 0001       755          THI   R1,1              IS CLI DU ?                           MOS07550
07D8  2135            756          BNZS  $TSTDU2           YES, BRANCH                           MOS07560
07DA  C510 000C       757          CLHI  R1,X'0C'          NO, IS PASLA DU ?                     MOS07570
07DE  2332            758          BES   $TSTDU2           YES, BRANCH                           MOS07580
07E0  2511            759  $TSTDU1 LCS   R1,1              NO, SET UP R1 CC = 0                  MOS07590
07E2  D300 08D4       760  $TSTDU2 LB    R0,SINK           RESTORE LIST DEVICE ADDRESS           MOS07600
07E6  C710 FFFF       761          XHI   R1,-1             SET CC STATUS                         MOS07610
07EA  030F            762          BR    LINK              RETURN                                MOS07620
                      763  * --------------------------------                                    MOS07630
                      764  * TO DIRECT INPUT AND OUTPUT TO CONSOLE DEVICE                         MOS07640
                      765  *                                                                      MOS07650
07EC  D300 0110       766  SETKB   LB    R0,IO             GET KEYBOARD DEVICE POINTER           MOS07660
07F0  9410            767          EXBR  R1,R0             ISOLATE CONSOLE DEVICE POINTER        MOS07670
07F2  0610            768          OAR   R1,R0             COMBINE CONSOLE POINTERS              MOS07680
07F4  4010 010A       769          STH   R1,IOSAVE         SET KB DEVICE = LIST DEVICE           MOS07690
07F8  030F            770          BR    LINK              RETURN                                MOS07700
                      771  *--------------------------------                                     MOS07710
                      772  *  TO PUT KEYBOARD DEVICE IN READ MODE                                 MOS07720
                      773  *                                                                      MOS07730
07FA  D300 08DA       774  K`READ  LB    R0,CONADR         GET CONSOLE DEVICE ADDRESS            MOS07740
07FE  DE00 08DC       775          OC    R0,CONRD          PUT CONSOLE IN READ MODE              MOS07750
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EXEC - ETPE R03-06 (16-BIT MODIFIED & STRIPPED)

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0802   DB00 08D4        776          RD     R0,SINK              GET CONSOLE DEVICE STATUS                MOS07760
0806   4890 010E        777          LH     R9,PASFLG            IS IT PASLA ?                            MOS07770
080A   2333             778  TTYGET  BZS    KBXIT                NO, RETURN                               MOS07780
080C   DE00 08F4        779          OC     R0,CONRQ2S           YES, OC - RQ2S                           MOS07790
0810   0304             780  KBXIT   BR     R4                   RETURN                                   MOS07800
                        781  *---------------------------------                                           MOS07810
                        782  *  LIST DEVICE SET UP ROUTINE                                                MOS07820
                        783  *                                                                            MOS07830
0812   4010 0068        784  SETUP   STA    R1,SET.RTN           SAVE RETURN ADDRESS                      MOS07840
0816   D310 010B        785          LB     R1,IOSAVE+1          GET LIST DEVICE IDENTIFIER               MOS07850
081A   9111             786          SLHLS  R1,1                 SHIFT TO HW INDEX                        MOS07860
081C   D301 0111        787          LB     R0,IO+1(R1)          GET LIST DEVICE ADDRESS                  MOS07870
0820   DE01 08DD        788          OC     R0,CONWRT(R1)        OC COMMAND WRITE                         MOS07880
0824   4810 0068        789          LDA    R1,SET.RTN           RESTORE RETURN ADDRESS                   MOS07890
0828   0301             790          BR     R1                   RETURN                                   MOS07900
                        791  **********************************                                           MOS07910
                        792  *  LOW CORE SET UP ROUTINE                                                   MOS07920
                        793  *                                                                            MOS07930
082A   2410             794  LCORE   LIS    R1,0                 LOAD BXLE REGISTERS R1-R3                MOS07940
082C   2422             795          LIS    R2,2                                                          MOS07950
082E   C830 004E        796          LHI    R3,X'4E'                                                      MOS07960
0832   2400             797          LIS    R0,0                 LOAD DATA REGISTER                       MOS07970
0834   4001 0000        798  ZERO1   STH    R0,0(R1)             STORE ZERO                               MOS07980
0838   C110 0834        799          BXLE   R1,ZERO1             ZERO CORE FROM 0 THRU X'4F'              MOS07990
083C   C830 0870        800          LHI    R3,II                                                         MOS08000
0840   4030 0036        801          STH    R3,X'36'             SET ILL INSTR INT NEW PSW LOC            MOS08010
0844   C840 08A0        802          LHI    R4,MM                                                         MOS08020
0848   4040 003E        803          STH    R4,X'3E'             SET MACH. MALF. INT NEW PSW LOC          MOS08030
084C   C840 00A0        804          LHI    R4,RSAVE             *                                  ***   MOS08040
                        805  *                                                                            MOS08050
                        806  *  SET UP LOW CORE FOR 16 BIT MACHINE                                  ***   MOS08060
                        807  *                                                                            MOS08070
0850   4040 0022        808          STH    R4,X'22'             SET REGISTER SAVE POINTER                MOS08080
0854   030F             809          BR     LINK                 RETURN TO CALLER                   ***   MOS08090
                        810  *---------------------------------                                           MOS08100
                        811  *  SPURIOUS INTERRUPT HANDLERS                                               MOS08110
                        812  *                                                                            MOS08120
                        813  *                                                                            MOS08130
0856   D0E0 08D0        814  COMM    STM    R14,OPSW             STORE OLD PSW & OLD LOC            ***   MOS08140
                        815  *                                                                            MOS08150
085A   4800 0106        816  COMM1   LH     R0,PSW2                                                       MOS08160
085E   9520             817          EPSR   R2,R0                NO INIT, REG SET 15 (PSW=X'30F0')        MOS08170
0860   41F0 04E2        818          BAL    LINK,ERR             PRINT "ERROR XXFN"                       MOS08180
0864   40F0 08FA        819          STH    LINK,ISITERR         FORCE PRINT                              MOS08190
0868   41E0 053E        820          BAL    RET,ERRPL1           PRINT "PSW PPPP LOC LLLL"                MOS08200
086C   4300 01C6        821          B      OPTIN1               ENTER COMMAND MODE                       MOS08210
                        822  *                                                                            MOS08220
                        823  *                                                                            MOS08230
                        824  *  ILLEGAL INSTRUCTION INTERRUPT TRAP                                        MOS08240
                        825  *                                                                            MOS08250
0870   C820 08A0        826  II      LHI    R2,MM                *                                  ***   MOS08260
0874   4020 003E        827          STH    R2,X'3E'             RESTORE ETPE MM POINTER            ***   MOS08270
0878   C820 4632        828          LHI    R2,C'F2'                                                      MOS08280
```

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```
087C  4020 0934          829          STH   R2,ERRNO          SET ERROR NUMBER F2                    MOS08290
0880  D1E0 0030          830          LM    R14,X'30'         LOAD OLD PSW & OLD LOC           ***   MOS08300
0884  4300 0856          831  II32    B     COMM              BRANCH TO COMMON ERROR ROUTINE         MOS08310
                         832  *                                                                     MOS08320
                         833  *  MACHINE MALFUNCTION INTERRUPT TRAP                                 MOS08330
                         834  *                                                                     MOS08340
0888  95AA               835  MM0     EPSR  R10,R10           CAPTURE MM INT PSW               ***   MOS08350
088A  C820 08A0          836          LHI   R2,MM             *                                ***   MOS08360
088E  4020 003E          837          STH   R2,X'3E'          RESTORE ETPE MM POINTER          ***   MOS08370
0892  C4A0 000F          838          NHI   R10,X'000F'       MASK MM INT PSW                  ***   MOS08380
0896  08AA               839          LDAR  R10,R10           IS CC = 0 ?                      ***   MOS08390
0898  2137               840          BNZS  MM1               NO, BRANCH                       ***   MOS08400
089A  41F0 0D82          841          BAL   LINK,PARERR       YES, PRINT PARITY ERROR          ***   MOS08410
089E  2304               842          BS    MM1               BRANCH                           ***   MOS08420
                         843  *                                                                     MOS08430
                         844  *                                                                     MOS08440
08A0  95AA               845  MM      EPSR  R10,R10           CAPTURE MM INT PSW                     MOS08450
08A2  C4A0 000F          846          NHI   R10,X'000F'       MASK OFF THE CC                        MOS08460
08A6  C820 4633          847  MM1     LHI   R2,C'F3'                                                 MOS08470
08AA  4020 0934          848          STH   R2,ERRNO          SET ERROR NUMBER F3                    MOS08480
08AE  D1E0 0038          849          LM    R14,X'38'         LOAD OLD PSW & OLD LOC (16 BIT)  ***   MOS08490
                         850  *                                                                     MOS08500
08B2  C4E0 FFF0          851  MM32    NHI   R14,X'FFF0'       MASK OFF ALL BUT CC                    MOS08510
08B6  06EA               852          OAR   R14,R10           NOW CC = MALFUNCTION             ***   MOS08520
08B8  D0E0 08D0          853          STM   R14,OPSW          STORE OLD PSW & OLD LOC          ***   MOS08530
08BC  C810 7FFF          854          LHI   R1,X'7FFF'                                               MOS08540
08C0  2711               855  MM16    SIS   R1,1                                                     MOS08550
08C2  2021               856          BPS   MM16              (SHORT DELAY FOR MACHINE SETTELING)    MOS08560
08C4  C800 80F0          857          LHI   R0,X'80F0'        R0 = X'80F0'                     ***   MOS08570
08C8  9520               858          EPSR  R2,R0             HALT PROCESSOR                         MOS08580
                         859  *                                                                     MOS08590
                         860  *   WHEN EXE/RUN IS DEPRESSED, ERROR MSG IS PRINTED.                  MOS08600
                         861  *                                                                     MOS08610
08CA  4300 085A          862          B     COMM1             BRANCH TO COMMON ERROR ROUTINE         MOS08620
                         863  *-----------------------------------                                  MOS08630
                         864  *  ETPE CONSTANTS & TABLES                                            MOS08640
                         865  *                                                                     MOS08650
                         866  *                                                                     MOS08660
08D0                     867          ALIGN 4                                                        MOS08670
                         868  *-----------------------------------                            ***   MOS08680
08D0  0000               869  OPSW    DCX   0                 OLD PSW STORRAGE AREA                  MOS08690
08D2  0000               870  OLOC    DCX   0                                                        MOS08700
                         871  *-----------------------------------                                  MOS08710
08D4  00                 872  SINK    DB    0                 BIT BUCKET                             MOS08720
08D5  80                 873  NORM    DB    X'80'             DISPLAY PANEL 'NORMAL' MODE OC         MOS08730
08D6  40                 874  INCR    DB    X'40'             DISPLAY PANEL 'INCREMENTAL' MODE OC    MOS08740
08D7  00                 875          DB    *                 (ALIGN ON HALFWORD BOUNDRY)      ***   MOS08750
08D8  0000               876  PASFLG2 DCX   0                 SET WHEN LIST DEVICE ON PASLA          MOS08760
                         877  *-----------------------------------                                  MOS08770
                         878  *  ETPE IO COMMANDS                                                   MOS08780
                         879  *                                                                     MOS08790
08DA  0000               880  CONADR  DCX   0                 CONSOLE DEVICE ADDRESS                 MOS08800
                         881  *                                                                     MOS08810
```

```
08DC  0000                    882  CONRD    DCX   0                    CONSOLE READ/WRITE COMMANDS            MOS08820
      0000 08DD               883  CONWRT   EQU   CONRD+1                                                    MOS08830
08DE  B1A3                    884  CRTRD    DCX   B1A3                 FOR CRT                                MOS08840
08E0  A4D8                    885  CLIFRD   DCX   A4D8                 *   CURRENT LOOP INTERFACE             MOS08850
08E2  0080                    886  LPWRT    DCX   0080                 *   LINE PRINTER                       MOS08860
08E4  A1A3                    887  CARRD    DCX   A1A3                 *   CAROUSEL 300                       MOS08870
08E6  8202                    888  MREADC   DCX   8202                 *   MICROBUS                           MOS08880
                              889  *                                                                           MOS08890
08E8  0000                    890  CON2ND   DCX   0                    2ND COMMAND; ENABLE READ COMMAND       MOS08900
      0000 08E9               891  CONENRD  EQU   CON2ND+1                                                    MOS08910
08EA  F871                    892  CRT2ND   DCX   F871                 FOR CRT                                MOS08920
08EC  0064                    893  CLIF2ND  DCX   0064                 *   CURRENT LOOP INTERFACE             MOS08930
08EE  0000                    894            DCX   0                    *   DUMMY HW FOR LP                    MOS08940
08F0  F061                    895  CAR2ND   DCX   F061                 *   CAROUSEL 300                       MOS08950
08F2  0000                    896            DCX   0                    *   DUMMY HW FOR MICROBUS              MOS08960
                              897  *                                                                           MOS08970
08F4  00                      898  CONRQ2S  DB    0                    CONSOLE REQUEST TO SEND CMD            MOS08980
08F5  33                      899  CRTRQ2S  DB    X'33'                FOR CRT                                MOS08990
08F6  00                      900            DB    0                    *   DUMMY BYTE FOR CLI                 MOS09000
08F7  00                      901            DB    0                    *   DUMMY BYTE FOR LP                  MOS09010
08F8  23                      902  CARRQ2S  DB    X'23'                *   CAROUSEL 300                       MOS09020
08F9  00                      903            DB    0                    *   DUMMY BYTE FOR MICROBUS            MOS09030
08FA                          904            DB    *                    (ALIGN ON HW BOUNDRY)                  MOS09040
                              905  *-----------------------------------                                        MOS09050
08FA  0000                    906  ISITERR  DCX   0                                                           MOS09060
08FC  0000                    907  NOERR    DCX   0                                                           MOS09070
08FE  0000                    908  SELTST   DCX   0                    HIGHEST SELECTED TEST NUMBER           MOS09080
0900  0000                    909  WASDU    DCX   0                    1 IF KEYBOARD DEVICE WAS OFF           MOS09090
0902  0000                    910  WASDU1   DCX   0                    NON-ZERO IF TOTAL,TOTERR TO PRINT      MOS09100
0904  0000                    911  TOTAL    DCX   0                    NO. OF TIMES THE SELECTED TESTS RUN    MOS09110
0906  0000                    912  TOTERR   DCX   0                    TOTAL ERRORS DETECTED WHILE DU         MOS09120
0908  0000                    913  BTESTNO  DCX   0                    CURRENT TEST NUMBER IN BINARY          MOS09130
090A  0000                    914  COUNT    DCX   0                                                           MOS09140
090C  0000                    915  NEXTST   DCX   0                    NEXT TEST NUMBER                       MOS09150
090E  0000                    916  OUT.SAV  DCX   0                    "OUTCHR" RETURN ADDRESS SAVE           MOS09160
0910  0000                    917  BRK.SAV  DCX   0                    "TSTBRK" RETURN ADDRESS SAVE           MOS09170
                              918  *                                                                           MOS09180
0912  3031 3233 3435 3637    919  HEXTAB   DB    C'0123456789ABCDEF'                                          MOS09190
091A  3839 4142 4344 4546
0922                          920            DB    *                    (ALIGN ON HW BOUNDRY)                  MOS09200
                              921  *-------------------------------                                           MOS09210
                              922  *  ETPE MESSAGES                                                          MOS09220
                              923  *                                                                           MOS09230
0922  5445 5354 2020 2A2A     924  TSTMSG   DC    C'TEST  **',X'0D00'                                          MOS09240
092A  0D00
      0000 0928               925  MTESTNO  EQU   TSTMSG+6              TEST NUMBER (IN ASCII)          ***   MOS09250
092C  4552 524F 5220 2A2A     926  ERRMSG   DC    C'ERROR ****',X'0D00'                                       MOS09260
0934  2A2A
0936  0D00
      0000 0932               927  ETESTNO  EQU   ERRMSG+6              STORED BY ETPE                  ***   MOS09270
      0000 0934               928  ERRNO    EQU   ERRMSG+8              STORE ERRNO AS CHAR CONSTANT    ***   MOS09280
0938  544F 5441 4C20 2020     929  TOTMSG   DC    C'TOTAL   TOTERR',X'0D00'                                   MOS09290
0940  544F 5445 5252
```

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```
0946   0D00
0948   4E4F 2045 5252 4F52   930  NOERMSG  DC    C'NO ERROR',X'0D00'                                  MOS09300
0950   0D00
0952   5053 5720 2A2A 2A2A   931  PSWMSG   DC    C'PSW ****  LOC ****',X'0D00'                       MOS09310
095A   2020 4C4F 4320 2A2A
0962   2A2A
0964   0D00
       0000 0956             932  ASCIPSW  EQU   PSWMSG+4            *                      ***   MOS09320
       0000 0960             933  ASCILOC  EQU   PSWMSG+14           *                      ***   MOS09330
0966   454E 4420 4F46 2054   934  EOTMSG   DC    C'END OF TEST',X'0D00'                               MOS09340
096E   4553 5420
0972   0D00
0974   3F0D                  935  QMSG     DC    X'3F0D'                                              MOS09350
0976   2A0D                  936  AMSG     DC    X'2A0D'                                              MOS09360
                             937  *-----------------------------                                     MOS09370
```

```
                          939  ********************************************************************************  MOS09390
                          940  *                                                                               MOS09400
                          941  *  OPTION/COMMAND TABLE                                                         MOS09410
                          942  *                                                                               MOS09420
0978  5445 5354 2020      943  TEST     DC    C'TEST  ',X'F800',X'0',X'0' *          0 TO 4                 MOS09430
097E  F800
0980  0000
0982  0000
      0000 0978           944  OPT      EQU   TEST                                                           MOS09440
                          945  *                                                                               MOS09450
0984  4C4F 4F50 2020      946  LOOP     DC    C'LOOP  ',X'0',Z(LEVELIN),X'7FFF' *     MAX=X'7FFF'            MOS09460
098A  0000
098C  0290
098E  7FFF
0990  434F 4E54 494E      947  CONTIN   DC    C'CONTIN',X'0',Z(LEVELIN),X'1' *        0 OR 1                 MOS09470
0996  0000
0998  0290
099A  0001
099C  4E4F 4D53 4720      948  NOMSG    DC    C'NOMSG ',X'0',Z(LEVELIN),X'1' *        0 OR 1                 MOS09480
09A2  0000
09A4  0290
09A6  0001
09A8  5343 4F50 4520      949  SCOPE    DC    C'SCOPE ',X'0',Z(LEVELIN),X'5' *        MAX = 5                MOS09490
09AE  0000
09B0  0290
09B2  0005
09B4  504F 554E 4420      950  POUND    DC    C'POUND ',X'A',X'0',X'0' *              1 TO FFFF              MOS09500
09BA  000A
09BC  0000
09BE  0000
                          951  *                                                                               MOS09510
                          952  ********************************************************************************  MOS09520
                          953  *                                                                               MOS09530
      0000 09C0           954  OPTEND   EQU   *                                                              MOS09540
                          955  *                                                                               MOS09550
09C0  5255 4E20 2020      956  RUN      DC    C'RUN   ',X'0',X'0',X'0'                                        MOS09560
09C6  0000
09C8  0000
09CA  0000
09CC  FFFF                957           DC    -1                                                            MOS09570
                          958  *                                                                               MOS09580
09CE  1000                959  LOLIM    DC    X'1000'            LOW LIMIT OF MEMORY UNDER TEST             MOS09590
09D0  1FFF                960  HILIM    DC    X'1FFF'            HIGH LIMIT OF MEMORY UNDER TEST            MOS09600
                          961  *                                                                               MOS09610
                          962  ********************************************************************************  MOS09620
                          963  *                                                                               MOS09630
09D2  48E0 097E           964  INIT     LH    R14,TEST+6                                                      MOS09640
09D6  C6E0 8000           965           OHI   R14,X'8000'        FORCE TEST 0                               MOS09650
09DA  40E0 097E           966           STH   R14,TEST+6         WHEN "RUN" IS ENTERED                      MOS09660
09DE  24E1                967           LIS   R14,1                                                         MOS09670
09E0  DEE0 08D5           968           OC    R14,NORM           PUT DISPLAY IN NORMAL MODE                 MOS09680
09E4  030F                969           BR    LINK               RETURN TO CALLER                           MOS09690
                          970  *                                                                               MOS09700
```

```
                          971  ************************************************************************   MOS09710
                          972  *                                                                        MOS09720
09E6  5331 3620 3139 2D31 973  TITLE    DC    C'S16 19-197 MOS MEMORY TEST PART 1 '                     MOS09730
09EE  3937 204D 4F53 204D
09F6  454D 4F52 5920 5445
09FE  5354 2050 4152 5420
0A06  3120
0A08  3036 2D32 3032 4630 974          DC    C'06-202F01R01'     *                              ***   MOS09740
0A10  3152 3031
0A14  0D0A                975          DC    X'0D0A'                                                   MOS09750
                          976  *                                                                        MOS09760
                          977  *                                                                        MOS09770
      0000 F800           978  DEFTESTS EQU   X'F800'            DEFINES TESTS 0,1,2,3,& 4      ***   MOS09780
                          979  *                                 AS DEFAULT TESTS                       MOS09790
                          980  *                                                                        MOS09800
      0000 0004           981  MAXTST   EQU   H'4'               DEFINES TESTS 0,1,2,3,& 4      ***   MOS09810
                          982  *                                 AS LEGAL TEST NUMBERS.                 MOS09820
                          983  *                                                                        MOS09830
                          984  *  TESTS TABLE                                                           MOS09840
                          985  *                                                                        MOS09850
0A16  0A20                986  TESTS    DC    A(TEST0)           MEMORY SEARCH TEST             ***   MOS09860
0A18  0A46                987           DC    A(TEST1)           BIT SET-RESET TEST                   MOS09870
0A1A  0AC0                988           DC    A(TEST2)           MARCHING PATTERN TEST                MOS09880
0A1C  0BB4                989           DC    A(TEST3)           0 & 1 WALK TEST                      MOS09890
0A1E  0C4C                990           DC    A(TEST4)           DOUBLE OPERATION COLUMN DISTURB TEST MOS09900
                          991  *                                                                        MOS09910
                          992  ************************************************************************   MOS09920
                          993  *        END   ETPE R03-06 (16-BIT MODIFIED & STRIPPED)                  MOS09930
```

TEST 0

```
                      *        TEST 0                      MEMORY SEARCH TEST                   MOS09950
                      *                                                                         MOS09960
                      *        PURPOSE:                                                         MOS09970
                      *              THIS UTILITY ENABLES THE USER TO LIST MEMORY               MOS09980
                      *              UNDER TEST.                                                MOS09990
                      *                                                                         MOS10000
                      *        ASSUMPTIONS:                                                     MOS10010
                      *              MEMORY ALLOWABLE IS 8K BYTES.                              MOS10020
                      *                                                                         MOS10030
                      *        DESIGN SPECIFICATIONS:                                           MOS10040
                      *              PRINT MEMORY LIMITS UNDER TEST.                            MOS10050
                      *                                                                         MOS10060
                      *        OPTIONS:                                                         MOS10070
                      *              NONE                                                       MOS10080
                      *                                                                         MOS10090
                      *        HOW TO RUN THE TEST:                                             MOS10100
                      *              ENTER "RUN" AND THE AVAILABLE MEMORY LOCATIONS WILL        MOS10110
                      *              BE PRINTED ON THE LIST DEVICE IN A CONTIGUIOUS BLOCK.      MOS10120

0A20  C850 0EC0       TEST0    LDAI  R5,ASMEMMSG           LOAD MESSAGE ADDRESS                 MOS10140
0A24  2404                     LIS   R0,4                  (CONVERT 4 DIGITS)                   MOS10150
0A26  4810 09CE                LH    R1,LOLIM              LOAD LOW LIMIT MEMORY UNDER TEST     MOS10160
0A2A  C820 0ED4                LDAI  R2,LOMSG              LOAD LOW LIMIT ASCII MESSAGE LOC.    MOS10170
0A2E  41F0 059E                BAL   LINK,HEXASC           PUT LOLIM IN MEMORY MESSAGE          MOS10180
0A32  4810 09D0                LH    R1,HILIM              LOAD HIGH LIMIT MEMORY UNDER TEST    MOS10190
0A36  C820 0ED9                LDAI  R2,HIMSG              LOAD HIGH LIMIT ASCII MESSAGE LOC.   MOS10200
0A3A  41F0 059E                BAL   LINK,HEXASC           PUT HILIM IN MEMORY MESSAGE          MOS10210
0A3E  41F0 05C6                BAL   LINK,PRINT            PRINT MEMORY MESSAGE                 MOS10220
0A42  4300 03AE                B     KEEP7                 CONTINUE WITH NEXT SELECTED TEST     MOS10230
                      *                                                                         MOS10240
                      ***********************************************************************   MOS10250
                      *        END   TEST 0                                                     MOS10260
```

TEST 1

```
                        1028  *       TEST 1                BIT SET - RESET TEST                          MOS10280
                        1029  *                                                                           MOS10290
                        1030  *       PURPOSE:                                                            MOS10300
                        1031  *            THIS TEST INSURES THAT ALL BITS IN THE AREA OF MEMORY           MOS10310
                        1032  *            BEING TESTED CAN BE BOTH SET AND RESET.                        MOS10320
                        1033  *                                                                           MOS10330
                        1034  *       ASSUMPTIONS:                                                        MOS10340
                        1035  *            8 KB MOS MEMORY                                                MOS10350
                        1036  *                                                                           MOS10360
                        1037  *       DESIGN SPECIFICATIONS:                                              MOS10370
                        1038  *            1. A WRITE AND THEN A READ IS EXECUTED TO ALL MEMORY           MOS10380
                        1039  *               WITHIN THE  LOLIM  AND  HILIM  LIMITS.                      MOS10390
                        1040  *            2. IF AN ERROR IS DETECTED, THE "SCOPE" OPTION                 MOS10400
                        1041  *               DICTATES HOW THE PROGRAM WILL REACT.                        MOS10410
                        1042  *                                                                           MOS10420
                        1043  *       OPTIONS:                                                            MOS10430
                        1044  *            SCOPE - ERROR OPTION MODE                                      MOS10440
                        1045  *                0 - PRINT ERROR DATA AND SKIP TO NEXT TEST                 MOS10450
                        1046  *                1 - PRINT BAD CHIP NUMBER(S) AND SKIP TO NEXT TEST         MOS10460
                        1047  *                2 - PRINT ERROR DATA AND CONTINUE TEST                     MOS10470
                        1048  *                3 - PRINT ERROR DATA AND HALT                              MOS10480
                        1049  *                4 - IGNORE ERROR                                           MOS10490
                        1050  *                5 - PRINT BAD CHIP NUMBER(S) AND CONTINUE TEST             MOS10500
                        1051  *                                                                           MOS10510
                        1052  *       HOW TO RUN THE TEST:                                                MOS10520
                        1053  *            1. ENTER THE "SCOPE" OPTION VIA THE CONSOLE DEVICE.            MOS10530
                        1054  *            2. ENTER "RUN" AND THE TEST WILL EXECUTE.                      MOS10540

0A46  4860 09CE         1056  TEST1     LH    R6,LOLIM          INITIALIZE MEMORY LIMITS (LOW)          MOS10560
0A4A  4880 09D0         1057            LH    R8,HILIM          *                        (HIGH)         MOS10570
0A4E  0896              1058            LDAR  R9,R6             SAVE LOLIM                              MOS10580
0A50  2472              1059            LIS   R7,2              LOAD BXLE INCREMENT VALUE (HW)          MOS10590
0A52  2411              1060            LIS   R1,1              LOAD DISPLAY ADDRESS                    MOS10600
0A54  2531              1061            LCS   R3,1              LOAD DATA PATTERN                       MOS10610
                        1062  *                                                                           MOS10620
0A56  4036 0000         1063  STORE11   STH   R3,0(R6)          STORE BACKGROUND OF ALL 1'S             MOS10630
0A5A  C160 0A56         1064            BXLE  R6,STORE11        FROM LOLIM TO HILIM                     MOS10640
0A5E  C840 3031         1065            LHI   R4,C'01'                                                  MOS10650
0A62  4040 0934         1066            STH   R4,ERRNO          SET ERRNO = C'01'                       MOS10660
0A66  0869              1067            LDAR  R6,R9             RESTORE LOLIM BXLE REGISTER             MOS10670
                        1068  *                                                                           MOS10680
0A68  94F6              1069  READ11    EXBR  R15,R6            REVERSE ADDRESS BYTES                   MOS10690
0A6A  981F              1070            WHR   R1,R15            DISPLAY ADDRESS UNDER TEST              MOS10700
0A6C  41F0 0AAC         1071            BAL   LINK,TSTBRKX      IF "BREAK" GO TO TSTEND ELSE RETURN     MOS10710
0A70  4846 0000         1072            LH    R4,0(R6)          LOAD DATA FROM LOC                      MOS10720
0A74  0543              1073            CLAR  R4,R3             IS DATA AT LOC. OK ?                    MOS10730
0A76  2333              1074            BES   RTN11            YES, BRANCH                             MOS10740
0A78  41F0 0D92         1075            BAL   LINK,ERROR        NO, ERROR                               MOS10750
0A7C  C160 0A68         1076  RTN11     BXLE  R6,READ11         CONTINUE UNTIL DONE                     MOS10760
0A80  0869              1077            LDAR  R6,R9             RESTORE LOLIM BXLE REGISTER             MOS10770
0A82  2430              1078            LIS   R3,0              LOAD NEW DATA VALUE                     MOS10780
```

TEST 1

```
                         1079  *                                                                      MOS10790
0A84   4036 0000         1080  STORE10  STH   R3,0(R6)          STORE BACKGROUND OF ALL 0'S          MOS10800
0A88   C160 0A84         1081           BXLE  R6,STORE10        FROM LOLIM TO HILIM                  MOS10810
0A8C   6110 0934         1082           AHM   R1,ERRNO          SET ERRNO = C'02'                    MOS10820
0A90   0869              1083           LDAR  R6,R9             RESTORE LOLIM BXLE REGISTER          MOS10830
                         1084  *                                                                      MOS10840
0A92   94F6              1085  READ10   EXBR  R15,R6            REVERSE ADDRESS BYTES                MOS10850
0A94   981F              1086           WHR   R1,R15            DISPLAY ADDRESS UNDER TEST           MOS10860
0A96   41F0 0AAC         1087           BAL   LINK,TSTBRKX      IF "BREAK" GO TO TSTEND ELSE RETURN  MOS10870
0A9A   4846 0000         1088           LH    R4,0(R6)          LOAD DATA FROM LOC                   MOS10880
0A9E   2333              1089           BZS   RTN10             IF DATA = 0, BRANCH (DATA OK)        MOS10890
0AA0   41F0 0D92         1090           BAL   LINK,ERROR        NO, ERROR                            MOS10900
0AA4   C160 0A92         1091  RTN10    BXLE  R6,READ10         CONTINUE UNTIL DONE                  MOS10910
                         1092  *                                                                      MOS10920
0AA8   4300 0388         1093           B     TSTEND            END OF TEST (RETURN TO EXEC)         MOS10930
                         1094  *                                                                      MOS10940
                         1095  *                                                                      MOS10950
                         1096  ************************************************************************MOS10960
                         1097  *                                                                      MOS10970
0AAC   40F0 00A0         1098  TSTBRKX  STH   LINK,RSAVE        SAVE RETURN ADDRESS                  MOS10980
0AB0   C8F0 0388         1099           LHI   LINK,TSTEND                                            MOS10990
0AB4   40F0 0108         1100           STH   LINK,BRKVECT      ESTABLISH BRKVECT ADDRESS (TSTEND)   MOS11000
0AB8   48F0 00A0         1101           LH    LINK,RSAVE        RESTORE RETURN ADDRESS               MOS11010
0ABC   4300 0732         1102           B     TSTBRK            GO TEST FOR BREAK                    MOS11020
                         1103  *                                                                      MOS11030
                         1104  ************************************************************************MOS11040
                         1105  *        END   TEST 1                                                  MOS11050
```

TEST 2

```
                *       TEST 2                    MARCHING PATTERN TEST              MOS11070
                *                                                                    MOS11080
                *       PURPOSE:                                                     MOS11090
                *             THIS TEST CHECKS THAT THREE DIFFERENT BASE PATTERNS    MOS11100
                *             CAN BE WRITTEN, COMPLEMENTED, AND MARCHED THROUGH THE  MOS11110
                *             AVAILABLE MEMORY WITHOUT ERROR.                        MOS11120
                *                                                                    MOS11130
                *       ASSUMPTIONS:                                                 MOS11140
                *             8KB MOS MEMORY                                         MOS11150
                *                                                                    MOS11160
                *       DESIGN SPECIFICATIONS:                                       MOS11170
                *             1. (IN ASCENDING ORDER) WRITE AND READ THE BASE PATTERN. MOS11180
                *             2. (IN DESCENDING ORDER) WRITE AND READ THE            MOS11190
                *                COMPLEMENT PATTERN.                                 MOS11200
                *                                                                    MOS11210
                *       OPTIONS:                                                     MOS11220
                *             SCOPE - ERROR OPTION MODE                              MOS11230
                *                 0 - PRINT ERROR DATA AND SKIP TO NEXT TEST         MOS11240
                *                 1 - PRINT BAD CHIP NUMBER(S) AND SKIP TO NEXT TEST MOS11250
                *                 2 - PRINT ERROR DATA AND CONTINUE TEST             MOS11260
                *                 3 - PRINT ERROR DATA AND HALT                      MOS11270
                *                 4 - IGNORE ERROR                                   MOS11280
                *                 5 - PRINT BAD CHIP NUMBER(S) AND CONTINUE TEST     MOS11290
                *                                                                    MOS11300
                *       HOW TO RUN THE TEST:                                         MOS11310
                *             1. ENTER THE "SCOPE" OPTION VIA THE CONSOLE DEVICE.    MOS11320
                *             2. ENTER "RUN" AND THE TEST WILL EXECUTE.              MOS11330

0AC0  2411           TEST2  LIS   R1,1          LOAD DISPLAY ADDRESS                 MOS11350
0AC2  C840 0888             LHI   R4,MM0                                             MOS11360
0AC6  4040 003E             STH   R4,X'3E'      SET NEW MM POINTER                   MOS11370
0ACA  24A0                  LIS   R10,0         LOAD DATA PATTERN REGISTER           MOS11380
0ACC  25B1                  LCS   R11,1                                              MOS11390
0ACE  24D0                  LIS   R13,0         W/BACKGROUND = 0'S                   MOS11400
0AD0  41E0 0AFE             BAL   R14,CHKLOC    DO A SINGLE DISTURB TEST (MIN-MAX)   MOS11410
                     *                                                               MOS11420
0AD4  25A1                  LCS   R10,1                                              MOS11430
0AD6  24B0                  LIS   R11,0         W/BACKGROUND = 1'S                   MOS11440
0AD8  41E0 0AFE             BAL   R14,CHKLOC    DO A SINGLE DISTURB TEST (MIN-MAX)   MOS11450
                     *                                                               MOS11460
0ADC  24D2                  LIS   R13,2         W/BACKGROUND = A'S                   MOS11470
0ADE  41E0 0AFE             BAL   R14,CHKLOC    DO A SINGLE DISTURB TEST (MIN-MAX)   MOS11480
                     *                                                               MOS11490
0AE2  24A0                  LIS   R10,0                                              MOS11500
0AE4  25B1                  LCS   R11,1         W/BACKGROUND = 5'S                   MOS11510
0AE6  41E0 0AFE             BAL   R14,CHKLOC    DO A SINGLE DISTURB TEST (MIN-MAX)   MOS11520
                     *                                                               MOS11530
0AEA  C8D0 0080             LHI   R13,X'80'     W/BACKGROUND = 64-0'S, 64-1'S, ETC   MOS11540
0AEE  41E0 0AFE             BAL   R14,CHKLOC    DO A SINGLE DISTURB TEST (MIN-MAX)   MOS11550
                     *                                                               MOS11560
0AF2  25A1                  LCS   R10,1                                              MOS11570
```

TEST 2

```
0AF4   24B0            1158           LIS   R11,0              W/BACKGROUND = 64-1'S, 64-0'S, ETC     MOS11580
0AF6   41E0 0AFE       1159           BAL   R14,CHKLOC         DO A SINGLE DISTURB TEST (MIN-MAX)     MOS11590
                       1160   *                                                                        MOS11600
0AFA   4300 0388       1161           B     TSTEND             END OF TEST (RETURN TO EXEC)           MOS11610
                       1162   *                                                                        MOS11620
                       1163   ************************************************************************ MOS11630
                       1164   *                                                                        MOS11640
0AFE   4860 09CE       1165   CHKLOC  LH    R6,LOLIM           INITIALIZE MEMORY LIMITS (HILIM)       MOS11650
0B02   4880 09D0       1166           LH    R8,HILIM           *                        (LOLIM)       MOS11660
0B06   2472            1167           LIS   R7,2               LOAD BXLE INCREMENT VALUE (HW)         MOS11670
                       1168   *                                                                        MOS11680
0B08   083A            1169   CHKLOC1 LDAR  R3,R10             GET PROPER BACKGROUND PATTERN          MOS11690
0B0A   C36D 0000       1170           THI   R6,0(R13)          IS DATA PATTERN CORRECT ?              MOS11700
0B0E   2332            1171           BZS   CHKLOC2            YES, BRANCH                            MOS11710
0B10   083B            1172           LDAR  R3,R11             NO, LOAD SECOND PATTERN                MOS11720
0B12   4036 0000       1173   CHKLOC2 STH   R3,0(R6)           STORE IT IN MEMORY                     MOS11730
0B16   C160 0B08       1174           BXLE  R6,CHKLOC1         FROM LOLIM TO HILIM                    MOS11740
0B1A   4860 09CE       1175           LH    R6,LOLIM           RESTORE LOLIM BXLE REGISTER            MOS11750
                       1176   *                                                                        MOS11760
0B1E   C840 3033       1177   CHKLOC3 LHI   R4,C'03'                                                  MOS11770
0B22   4040 0934       1178           STH   R4,ERRNO           SET ERRNO = C'03'                      MOS11780
0B26   94F6            1179           EXBR  R15,R6             REVERSE ADDRESS BYTES                  MOS11790
0B28   981F            1180           WHR   R1,R15             DISPLAY ADDRESS UNDER TEST             MOS11800
0B2A   41F0 0AAC       1181           BAL   LINK,TSTBRKX       IF "BREAK" GO TO TSTEND ELSE RETURN    MOS11810
0B2E   083A            1182           LDAR  R3,R10             GET APPROPRIATE BACKGROUND PATTERN     MOS11820
0B30   C36D 0000       1183           THI   R6,0(R13)          IS DATA PATTERN CORRECT ?              MOS11830
0B34   2332            1184           BZS   CHKLOC4            YES, BRANCH                            MOS11840
0B36   083B            1185           LDAR  R3,R11             NO, LOAD SECOND PATTERN                MOS11850
0B38   4846 0000       1186   CHKLOC4 LH    R4,0(R6)           GET DATA FROM LOC UNDER TEST           MOS11860
0B3C   0543            1187           CLAR  R4,R3              EQUAL ?                                MOS11870
0B3E   2333            1188           BES   CHKLOC5            YES, BRANCH                            MOS11880
0B40   41F0 0D92       1189           BAL   LINK,ERROR          NO, ERROR                              MOS11890
0B44   C730 FFFF       1190   CHKLOC5 XHI   R3,-1              COMPLEMENT DATA PATTERN (C.D.P.)       MOS11900
0B48   4036 0000       1191           STH   R3,0(R6)           STORE C.D.P. AT LOC                    MOS11910
0B4C   6110 0934       1192           AHM   R1,ERRNO           SET ERRNO = C'04'                      MOS11920
0B50   4846 0000       1193           LH    R4,0(R6)           GET DATA FROM LOC UNDER TEST           MOS11930
0B54   0543            1194           CLAR  R4,R3              DATA = C.D.P. ?                        MOS11940
0B56   2333            1195           BES   CHKLOC6            YES, BRANCH                            MOS11950
0B58   41F0 0D92       1196           BAL   LINK,ERROR          NO, ERROR                              MOS11960
0B5C   C160 0B1E       1197   CHKLOC6 BXLE  R6,CHKLOC3         CONTINUE UNTIL DONE(INCREMENTING)      MOS11970
0B60   4860 09D0       1198           LH    R6,HILIM           ESTABLISH HILIM BXLE REGISTER          MOS11980
0B64   C460 FFFE       1199           NHI   R6,-2              MASK TO 15 BITS (EVEN)                 MOS11990
0B68   4880 09CE       1200           LH    R8,LOLIM           ESTABLISH LOLIM BXH REGISTER           MOS12000
0B6C   2781            1201           SIS   R8,1               DECREMENT TO FORMAT FOR BXH            MOS12010
0B6E   2572            1202           LCS   R7,2               LOAD BXH DECREMENT VALUE               MOS12020
                       1203   *                                                                        MOS12030
0B70   083B            1204   CHKLOC7 LDAR  R3,R11             GET C.D.P. FOR LOC UNDER TEST          MOS12040
0B72   C36D 0000       1205           THI   R6,0(R13)          IS DATA PATTERN CORRECT ?              MOS12050
0B76   2332            1206           BZS   CHKLOC8            YES, BRANCH                            MOS12060
0B78   083A            1207           LDAR  R3,R10             NO, GET PATTERN 2                      MOS12070
0B7A   C840 3035       1208   CHKLOC8 LHI   R4,C'05'                                                  MOS12080
0B7E   4040 0934       1209           STH   R4,ERRNO           SET ERRNO = C'05'                      MOS12090
0B82   94F6            1210           EXBR  R15,R6             REVERSE ADDRESS BYTES                  MOS12100
```

TEST 2

```
0B84   981F            1211           WHR   R1,R15             DISPLAY ADDRESS UNDER TEST              MOS12110
0B86   41F0 0AAC       1212           BAL   LINK,TSTBRKX       IF "BREAK" GO TO TSTEND ELSE RETURN     MOS12120
0B8A   4846 0000       1213           LH    R4,0(R6)           GET DATA FROM LOC UNDER TEST            MOS12130
0B8E   0543            1214           CLAR  R4,R3              DATA = C.D.P. ?                         MOS12140
0B90   2333            1215           BES   CHKLOC9            YES, BRANCH                             MOS12150
0B92   41F0 0D92       1216           BAL   LINK,ERROR         NO, ERROR                               MOS12160
0B96   C730 FFFF       1217 CHKLOC9   XHI   R3,-1              COMPLEMENT C.D.P. (O.D.P.)              MOS12170
0B9A   4036 0000       1218           STH   R3,0(R6)           STORE O.D.P. AT LOC                     MOS12180
0B9E   6110 0934       1219           AHM   R1,ERRNO           ERRNO = C'06'                           MOS12190
0BA2   4846 0000       1220           LH    R4,0(R6)           GET DATA FROM LOC UNDER TEST            MOS12200
0BA6   0543            1221           CLAR  R4,R3              DATA = O.D.P. ?                         MOS12210
0BA8   2333            1222           BES   CHKLOC10           YES, BRANCH                             MOS12220
0BAA   41F0 0D92       1223           BAL   LINK,ERROR         NO, ERROR                               MOS12230
0BAE   C060 0B70       1224 CHKLOC10  BXH   R6,CHKLOC7         CONTINUE UNTIL DONE(DECREMENTING)       MOS12240
                       1225 *                                                                          MOS12250
0BB2   030E            1226           BR    R14                RETURN                                  MOS12260
                       1227 *                                                                          MOS12270
                       1228 ************************************************************************** MOS12280
                       1229 *         END   TEST 2                                                    MOS12290
```

TEST 3

```
                *        TEST 3                  0 & 1 WALK TEST                           MOS12310
                *                                                                          MOS12320
                *        PURPOSE:                                                          MOS12330
                *              THIS TEST WALKS A 0 THROUGH A FIELD OF 1'S AND A 1          MOS12340
                *              THROUGH A FIELD OF 0'S.                                     MOS12350
                *                                                                          MOS12360
                *        ASSUMPTIONS:                                                      MOS12370
                *              8KB MOS MEMORY                                              MOS12380
                *                                                                          MOS12390
                *        DESIGN SPECIFICATIONS:                                            MOS12400
                *              1. WITH A BACKGROUND OF ALL 1'S, A 0 IS WALKED THROUGH      MOS12410
                *                 EACH HALFWORD OF MEMORY. A READ AND COMPARE IS DONE      MOS12420
                *                 ON EACH LOCATION.                                        MOS12430
                *              2. WITH A BACKGROUND OF ALL 0'S, A 1 IS WALKED THROUGH      MOS12440
                *                 EACH HALFWORD OF MEMORY. A COMPARE IS DONE ON EACH       MOS12450
                *                 LOCATION.                                                MOS12460
                *                                                                          MOS12470
                *        OPTIONS:                                                          MOS12480
                *              SCOPE - ERROR OPTION MODE                                   MOS12490
                *                  0 - PRINT ERROR DATA AND SKIP TO NEXT TEST              MOS12500
                *                  1 - PRINT BAD CHIP NUMBER(S) AND SKIP TO NEXT TEST      MOS12510
                *                  2 - PRINT ERROR DATA AND CONTINUE TEST                  MOS12520
                *                  3 - PRINT ERROR DATA AND HALT                           MOS12530
                *                  4 - IGNORE ERROR                                        MOS12540
                *                  5 - PRINT BAD CHIP NUMBER(S) AND CONTINUE TEST          MOS12550
                *                                                                          MOS12560
                *        HOW TO RUN THE TEST:                                              MOS12570
                *              1. ENTER THE "SCOPE" OPTION VIA THE CONSOLE DEVICE.         MOS12580
                *              2. ENTER "RUN" AND THE TEST WILL EXECUTE.                   MOS12590

0BB4   2411             TEST3    LIS   R1,1                LOAD DISPLAY ADDRESS                   MOS12610
0BB6   4860 09CE                 LH    R6,LOLIM            INITIALIZE MEMORY LIMITS (LOLIM)       MOS12620
0BBA   4880 09D0                 LH    R8,HILIM            *                         (HILIM)      MOS12630
0BBE   0896                      LDAR  R9,R6               SAVE LOLIM                             MOS12640
0BC0   2472                      LIS   R7,2                LOAD BXLE INCREMENT VALUE (HW)         MOS12650
0BC2   C840 0888                 LHI   R4,MM0                                                     MOS12660
0BC6   4040 003E                 STH   R4,X'3E'            SET NEW MM POINTER                     MOS12670
0BCA   2531                      LCS   R3,1                LOAD DATA PATTERN (-1)                 MOS12680
                *                                                                                 MOS12690
0BCC   4036 0000        STORE31  STH   R3,0(R6)            STORE BACKGROUND OF ALL 1'S            MOS12700
0BD0   C160 0BCC                 BXLE  R6,STORE31          FROM LOLIM TO HILIM                    MOS12710
0BD4   0869                      LDAR  R6,R9               RESTORE LOLIM BXLE REGISTER            MOS12720
0BD6   C840 3037                 LHI   R4,C'07'                                                   MOS12730
0BDA   4040 0934                 STH   R4,ERRNO            SET ERRNO = C'07'                      MOS12740
                *                                                                                 MOS12750
0BDE   C8D0 0010        T3S1     LHI   R13,16              LOAD NO. OF BITS PER MEM. LOC. (HW)    MOS12760
0BE2   94F6                      EXBR  R15,R6              REVERSE ADDRESS BYTES                  MOS12770
0BE4   981F                      WHR   R1,R15              DISPLAY ADDRESS UNDER TEST             MOS12780
0BE6   41F0 0AAC                 BAL   LINK,TSTBRKX        IF "BREAK" GO TO TSTEND ELSE RETURN    MOS12790
0BEA   C8C0 8000                 LHI   R12,X'8000'         LOAD R12 (BIT 0 SET)                   MOS12800
0BEE   2531             T3S2     LCS   R3,1                SET ALL BITS IN R3                     MOS12810
```

TEST 3

```
0BF0   073C             1282           XAR   R3,R12            RESET A BIT (0-15) IN R3                MOS12820
0BF2   4036 0000        1283           STH   R3,0(R6)          STORE DATA AT LOC                       MOS12830
0BF6   4846 0000        1284           LH    R4,0(R6)          GET DATA FROM LOC                       MOS12840
0BFA   0543             1285           CLAR  R4,R3             DATA EQUAL ?                            MOS12850
0BFC   2333             1286           BES   T3S3              YES, BRANCH                             MOS12860
0BFE   41F0 0D92        1287           BAL   LINK,ERROR        NO, ERROR                               MOS12870
0C02   90C1             1288  T3S3     SRHLS R12,1             WALK 0 THRU HALFWORD OF 1'S             MOS12880
0C04   27D1             1289           SIS   R13,1             DONE W/THIS HALFWORD ?                  MOS12890
0C06   203C             1290           BNZS  T3S2              NO, BRANCH UNTIL FINISHED               MOS12900
0C08   C160 0BDE        1291           BXLE  R6,T3S1           CONTINUE UNTIL DONE (INCREMENTING)      MOS12910
0C0C   0869             1292           LDAR  R6,R9             RESTORE LOLIM BXLE REGISTER             MOS12920
0C0E   2430             1293           LIS   R3,0              LOAD DATA PATTERN (0)                   MOS12930
                        1294  *                                                                        MOS12940
0C10   4036 0000        1295  STORE30  STH   R3,0(R6)          STORE BACKGROUND OF ALL 0'S             MOS12950
0C14   C160 0C10        1296           BXLE  R6,STORE30        FROM LOLIM TO HILIM                     MOS12960
0C18   0869             1297           LDAR  R6,R9             RESTORE LOLIM BXLE REGISTER             MOS12970
0C1A   6110 0934        1298           AHM   R1,ERRNO          SET ERRNO = C'08'                       MOS12980
                        1299  *                                                                        MOS12990
0C1E   C8D0 0010        1300  T3S4     LHI   R13,16            LOAD NO. OF BITS PER MEM. LOC. (HW)     MOS13000
0C22   94F6             1301           EXBR  R15,R6            REVERSE ADDRESS BYTES                   MOS13010
0C24   981F             1302           WHR   R1,R15            DISPLAY ADDRESS UNDER TEST              MOS13020
0C26   41F0 0AAC        1303           BAL   LINK,TSTBRKX      IF "BREAK" GO TO TSTEND ELSE RETURN     MOS13030
0C2A   C830 8000        1304           LHI   R3,X'8000'        LOAD R3 (BIT 0 SET)                     MOS13040
                        1305  *                                                                        MOS13050
0C2E   4036 0000        1306  T3S5     STH   R3,0(R6)          STORE DATA AT LOC                       MOS13060
0C32   4846 0000        1307           LH    R4,0(R6)          GET DATA FROM LOC                       MOS13070
0C36   0543             1308           CLAR  R4,R3             DATA EQUAL ?                            MOS13080
0C38   2333             1309           BES   T3S6              YES, BRANCH                             MOS13090
0C3A   41F0 0D92        1310           BAL   LINK,ERROR        NO, ERROR                               MOS13100
0C3E   9031             1311  T3S6     SRHLS R3,1              WALK BIT THRU HALFWORD                  MOS13110
0C40   27D1             1312           SIS   R13,1             DONE W/THIS HALFWORD ?                  MOS13120
0C42   203A             1313           BNZS  T3S5              NO, BRANCH UNTIL FINISHED               MOS13130
0C44   C160 0C1E        1314           BXLE  R6,T3S4           CONTINUE UNTIL DONE (INCREMENTING)      MOS13140
                        1315  *                                                                        MOS13150
0C48   4300 0388        1316           B     TSTEND            END OF TEST (RETURN TO EXEC)            MOS13160
                        1317  ************************************************************************  MOS13170
                        1318  *        END   TEST 3                                                     MOS13180
```

TEST 4

```
                                1320  *        TEST 4                    DOUBLE OPERATION COLUMN DISTURB TEST   MOS13200
                                1321  *                                                                       MOS13210
                                1322  *        PURPOSE:                                                       MOS13220
                                1323  *             THIS TEST CHECKS THAT A DOUBLE OPERATION ON AN ADJACENT   MOS13230
                                1324  *             COLUMN DOES NOT DISTURB THE TEST COLUMN.                  MOS13240
                                1325  *                                                                       MOS13250
                                1326  *        ASSUMPTIONS:                                                   MOS13260
                                1327  *             8KB MOS MEMORY                                            MOS13270
                                1328  *                                                                       MOS13280
                                1329  *        DESIGN SPECIFICATIONS:                                         MOS13290
                                1330  *             1. WITH 6 DIFFERENT BACKROUND PATTERSN, A W-R-WC-         MOS13300
                                1331  *                RC-W-R-WC-RC SERIES IS EXECUTED AT EACH LOCATION.      MOS13310
                                1332  *             2. A COMPARE IS DONE UPON EACH READ OPERATION.            MOS13320
                                1333  *             3. A TEST (COMPARISON) OF THE REST OF MEMORY IS DONE      MOS13330
                                1334  *                AFTER EACH SERIES OF OPERATIONS.                       MOS13340
                                1335  *                                                                       MOS13350
                                1336  *        OPTIONS:                                                       MOS13360
                                1337  *             SCOPE - ERROR OPTION MODE                                 MOS13370
                                1338  *                 0 - PRINT ERROR DATA AND SKIP TO NEXT TEST            MOS13380
                                1339  *                 1 - PRINT BAD CHIP NUMBER(S) AND SKIP TO NEXT TEST    MOS13390
                                1340  *                 2 - PRINT ERROR DATA AND CONTINUE TEST                MOS13400
                                1341  *                 3 - PRINT ERROR DATA AND HALT                         MOS13410
                                1342  *                 4 - IGNORE ERROR                                      MOS13420
                                1343  *                 5 - PRINT BAD CHIP NUMBER(S) AND CONTINUE TEST        MOS13430
                                1344  *                                                                       MOS13440
                                1345  *        HOW TO RUN THE TEST                                            MOS13450
                                1346  *             1. ENTER THE "SCOPE" OPTION VIA THE CONSOLE DEVICE.       MOS13460
                                1347  *             2. ENTER "RUN" AND THE TEST WILL EXECUTE.                 MOS13470

0C4C  2411                      1349  TEST4    LIS   R1,1               LOAD DISPLAY ADDRESS                   MOS13490
0C4E  2591                      1350           LCS   R9,1               R9 = X'FFFF'                           MOS13500
0C50  24A0                      1351           LIS   R10,0              LOAD DATA REGISTERS                    MOS13510
0C52  25B1                      1352           LCS   R11,1                                                     MOS13520
0C54  24D0                      1353           LIS   R13,0              W/BACKGROUND = 0'S                     MOS13530
0C56  41E0 0C6C                 1354           BAL   R14,CHKCOL         DO A DOUBLE OPERATION COLUMN           MOS13540
                                1355  *                                 DISTURB AND COMPLEMENT TEST            MOS13550
0C5A  24D2                      1356           LIS   R13,2              W/BACKGROUND = 5'S                     MOS13560
0C5C  41E0 0C6C                 1357           BAL   R14,CHKCOL         DO A DOUBLE OPERATION COLUMN           MOS13570
                                1358  *                                 DISTURB AND COMPLEMENT TEST            MOS13580
0C60  C8D0 0080                 1359           LHI   R13,X'80'          W/BACKGROUND = 64-0'S, 64-1'S, ETC.    MOS13590
0C64  41E0 0C6C                 1360           BAL   R14,CHKCOL         DO A DOUBLE OPERATION COLUMN           MOS13600
                                1361  *                                 DISTURB AND COMPLEMENT TEST            MOS13610
0C68  4300 0388                 1362           B     TSTEND             END OF TEST (RETURN TO EXEC)           MOS13620
                                1363  *                                                                       MOS13630
                                1364  ***********************************************************************  MOS13640
                                1365  *                                                                       MOS13650
0C6C  4860 09CE                 1366  CHKCOL   LH    R6,LOLIM           INITIALIZE MEMORY LIMITS (LOLIM)       MOS13660
0C70  4880 09D0                 1367           LH    R8,HILIM           *                        (HILIM)       MOS13670
0C74  2472                      1368           LIS   R7,2               LOAD BXLE INCREMENTING VALUE (HW)      MOS13680
                                1369  *                                                                       MOS13690
0C76  083A                      1370  CHKCOL1  LDAR  R3,R10             GET PROPER BACKGROUND PATTERN          MOS13700
```

TEST 4

```
0C78  C36D 0000  1371          THI   R6,0(R13)       IS DATA PATTERN CORRECT ?                MOS13710
0C7C  2332       1372          BZS   CHKCOL2         YES, BRANCH                              MOS13720
0C7E  083B       1373          LDAR  R3,R11          NO, LOAD SECOND PATTERN                  MOS13730
0C80  4036 0000  1374  CHKCOL2 STH   R3,0(R6)        STORE BACKGROUND PATTERN                 MOS13740
0C84  C160 0C76  1375          BXLE  R6,CHKCOL1      TO ALL OF MEMORY UNDER TEST              MOS13750
0C88  4860 09CE  1376          LH    R6,LOLIM        RESTORE LOLIM BXLE REGISTER              MOS13760
                 1377  *                                                                      MOS13770
0C8C  C840 3033  1378  CHKCOL3 LHI   R4,C'03'                                                 MOS13780
0C90  4040 0934  1379          STH   R4,ERRNO        SET ERRNO = C'03'                        MOS13790
0C94  94F6       1380          EXBR  R15,R6          REVERSE ADDRESS BYTES                    MOS13800
0C96  981F       1381          WHR   R1,R15          DISPLAY ADDRESS UNDER TEST               MOS13810
0C98  41F0 0AAC  1382          BAL   LINK,TSTBRKX    IF "BREAK" GO TO TSTEND ELSE RETURN      MOS13820
0C9C  083A       1383          LDAR  R3,R10          GET ORIGINAL DATA PATTERN (O.D.P.)       MOS13830
0C9E  C36D 0000  1384          THI   R6,0(R13)       IS DATA PATTERN CORRECT ?                MOS13840
0CA2  2332       1385          BZS   CHKCOL4         YES, BRANCH                              MOS13850
0CA4  083B       1386          LDAR  R3,R11          NO, LOAD SECOND PATTERN                  MOS13860
0CA6  4846 0000  1387  CHKCOL4 LH    R4,0(R6)        GET DATA FROM LOC                        MOS13870
0CAA  0543       1388          CLAR  R4,R3           DATA EQUAL ?                             MOS13880
0CAC  2333       1389          BES   CHKCOL5         YES, BRANCH                              MOS13890
0CAE  41F0 0D92  1390          BAL   LINK,ERROR       NO, ERROR                                MOS13900
0CB2  0739       1391  CHKCOL5 XAR   R3,R9          COMPLEMENT DATA PATTERN (C.D.P.)         MOS13910
0CB4  4036 0000  1392          STH   R3,0(R6)        STORE C.D.P. AT LOC                      MOS13920
0CB8  6110 0934  1393          AHM   R1,ERRNO        SET ERRNO = C'04'                        MOS13930
0CBC  4846 0000  1394          LH    R4,0(R6)        GET DATA FROM LOC                        MOS13940
0CC0  0543       1395          CLAR  R4,R3           DATA EQUAL ?                             MOS13950
0CC2  2333       1396          BES   CHKCOL6         YES, BRANCH                              MOS13960
0CC4  41F0 0D92  1397          BAL   LINK,ERROR       NO, ERROR                                MOS13970
0CC8  0739       1398  CHKCOL6 XAR   R3,R9          COMPLEMENT C.D.P. (O.D.P.)               MOS13980
0CCA  4036 0000  1399          STH   R3,0(R6)        STORE O.D.P. AT LOC                      MOS13990
0CCE  C840 3039  1400          LHI   R4,C'09'                                                 MOS14000
0CD2  4040 0934  1401          STH   R4,ERRNO        SET ERRNO = C'09'                        MOS14010
0CD6  4846 0000  1402          LH    R4,0(R6)        GET DATA FROM LOC                        MOS14020
0CDA  0543       1403          CLAR  R4,R3           DATA EQUAL ?                             MOS14030
0CDC  2333       1404          BES   CHKCOL7         YES, BRANCH                              MOS14040
0CDE  41F0 0D92  1405          BAL   LINK,ERROR       NO, ERROR                                MOS14050
0CE2  0739       1406  CHKCOL7 XAR   R3,R9          COMPLEMENT O.D.P. (C.D.P.)               MOS14060
0CE4  4036 0000  1407          STH   R3,0(R6)        STORE C.D.P. AT LOC                      MOS14070
0CE8  C840 3041  1408          LHI   R4,C'0A'                                                 MOS14080
0CEC  4040 0934  1409          STH   R4,ERRNO        SET ERRNO = C'0A'                        MOS14090
0CF0  4846 0000  1410          LH    R4,0(R6)        GET DATA FROM LOC                        MOS14100
0CF4  0543       1411          CLAR  R4,R3           DATA EQUAL ?                             MOS14110
0CF6  2333       1412          BES   CHKCOL8         YES, BRANCH                              MOS14120
0CF8  41F0 0D92  1413          BAL   LINK,ERROR       NO, ERROR                                MOS14130
0CFC  C160 0C8C  1414  CHKCOL8 BXLE  R6,CHKCOL3      CONTINUE UNTIL DONE(INCREMENTING         MOS14140
0D00  4860 09D0  1415          LH    R6,HILIM        INITIALIZE MEMORY LIMITS                 MOS14150
0D04  C460 FFFE  1416          NHI   R6,-2           (HILIM MUST BE EVEN)                     MOS14160
0D08  4880 09CE  1417          LH    R8,LOLIM        LOAD LOLIM BXH REGISTER                  MOS14170
0D0C  2781       1418          SIS   R8,1            DECREMENT TO FORMAT FOR BXH              MOS14180
0D0E  2572       1419          LCS   R7,2            LOAD BXH DECREMENT VALUE (HW)            MOS14190
                 1420  *                                                                      MOS14200
0D10  083B       1421  CHKCOL9 LDAR  R3,R11          GET COMPLEMENT DATA PATTERN(C.D.P.)      MOS14210
0D12  C36D 0000  1422          THI   R6,0(R13)       IS DATA PATTERN CORRECT ?                MOS14220
0D16  2332       1423          BZS   CHKCOLA         YES, BRANCH                              MOS14230
```

TEST 4

```
0D18   083A             1424           LDAR  R3,R10             NO, LOAD SECOND PATTERN                    MOS14240
0D1A   C840 3035        1425  CHKCOLA  LHI   R4,C'05'                                                      MOS14250
0D1E   4040 0934        1426           STH   R4,ERRNO           SET ERRNO = C'05'                          MOS14260
0D22   94F6             1427           EXBR  R15,R6             REVERSE ADDRESS BYTES                      MOS14270
0D24   981F             1428           WHR   R1,R15             DISPLAY ADDRESS UNDER TEST                 MOS14280
0D26   41F0 0AAC        1429           BAL   LINK,TSTBRKX       IF "BREAK" GO TO TSTEND ELSE RETURN        MOS14290
0D2A   4846 0000        1430           LH    R4,0(R6)           GET DATA FROM LOC                          MOS14300
0D2E   0543             1431           CLAR  R4,R3              DATA EQUAL ?                               MOS14310
0D30   2333             1432           BES   CHKCOLB            YES, BRANCH                                MOS14320
0D32   41F0 0D92        1433           BAL   LINK,ERROR         NO, ERROR                                  MOS14330
0D36   0739             1434  CHKCOLB  XAR   R3,R9              COMPLEMENT C.D.P. (O.D.P.)                 MOS14340
0D38   4036 0000        1435           STH   R3,0(R6)           STORE O.D.P. AT LOC                        MOS14350
0D3C   6110 0934        1436           AHM   R1,ERRNO           SET ERRNNO = C'06'                         MOS14360
0D40   4846 0000        1437           LH    R4,0(R6)           GET DATA FROM LOC                          MOS14370
0D44   0543             1438           CLAR  R4,R3              DATA EQUAL ?                               MOS14380
0D46   2333             1439           BES   CHKCOLC            YES, BRANCH                                MOS14390
0D48   41F0 0D92        1440           BAL   LINK,ERROR         NO, ERROR                                  MOS14400
0D4C   0739             1441  CHKCOLC  XAR   R3,R9              COMPLEMENT O.D.P. (C.D.P.)                 MOS14410
0D4E   4036 0000        1442           STH   R3,0(R6)           STORE C.D.P. AT LOC                        MOS14420
0D52   C840 3042        1443           LHI   R4,C'0B'                                                      MOS14430
0D56   4040 0934        1444           STH   R4,ERRNO           SET ERRNO = C'0B'                          MOS14440
0D5A   4846 0000        1445           LH    R4,0(R6)           GET DATA FROM LOC                          MOS14450
0D5E   0543             1446           CLAR  R4,R3              DATA EQUAL ?                               MOS14460
0D60   2333             1447           BES   CHKCOLD            YES, BRANCH                                MOS14470
0D62   41F0 0D92        1448           BAL   LINK,ERROR         NO, ERROR                                  MOS14480
0D66   0739             1449  CHKCOLD  XAR   R3,R9              COMPLEMENT C.D.P. (O.D.P.)                 MOS14490
0D68   4036 0000        1450           STH   R3,0(R6)           STORE O.D.P. AT LOC                        MOS14500
0D6C   6110 0934        1451           AHM   R1,ERRNO           SET ERRNO = C'0C'                          MOS14510
0D70   4846 0000        1452           LH    R4,0(R6)           GET DATA FROM LOC                          MOS14520
0D74   0543             1453           CLAR  R4,R3              DATA EQUAL ?                               MOS14530
0D76   2333             1454           BES   CHKCOLE            YES, BRANCH                                MOS14540
0D78   41F0 0D92        1455           BAL   LINK,ERROR         NO, ERROR                                  MOS14550
0D7C   C060 0D10        1456  CHKCOLE  BXH   R6,CHKCOL9          CONTINUE UNTIL DONE(DECREMENTING)          MOS14560
                        1457  *                                                                           MOS14570
0D80   030E             1458           BR    R14                RETURN                                     MOS14580
                        1459  *                                                                           MOS14590
                        1460  ************************************************************************     MOS14600
                        1461  *        END   TEST 4                                                       MOS14610
```

COMMON ERROR ROUTINE

```
0D82  4040 010C  1463  PARERR   STH   R4,TEMP          SET UP TO PRINT PARITY ERROR          MOS14630
0D86  C840 3132  1464          LHI   R4,C'12'                                               MOS14640
0D8A  4040 0934  1465          STH   R4,ERRNO          SET ERRNO = C'12'                    MOS14650
0D8E  4840 010C  1466          LH    R4,TEMP                                                MOS14660
                 1467  *                                                                     MOS14670
                 1468  *  COMMON ERROR ROUTINE         CALL:  BAL   LINK,ERROR              MOS14680
                 1469  *                                                                     MOS14690
                 1470  *   R6= LOCATION OF ERROR    R3= DATA EXPECTED    R4= DATA READ     MOS14700
                 1471  *                                                                     MOS14710
                 1472  *                                                                     MOS14720
0D92  40F0 010C  1473  ERROR    STH   LINK,TEMP         SAVE RETURN ADDRESS          ***     MOS14730
0D96  41F0 04E2  1474          BAL   LINK,ERR          PRINT THE ERROR NUMBER               MOS14740
0D9A  25F1       1475          LCS   LINK,1                                                 MOS14750
0D9C  40F0 08FC  1476          STH   LINK,NOERR        SET ERROR FLAG FOR EXEC.             MOS14760
0DA0  48F0 09AE  1477          LH    LINK,SCOPE+6      GET "SCOPE" VALUE                    MOS14770
0DA4  27F1       1478          SIS   LINK,1            IS SCOPE = 1 ?                       MOS14780
0DA6  4330 0E1A  1479          BZ    PARTNO            YES, PRINT PART NUMBER.              MOS14790
0DAA  27F3       1480          SIS   LINK,3            IS SCOPE = 4 ?                       MOS14800
0DAC  4330 0E06  1481          BZ    ERORTN2           YES, RETURN (IGNORE ERROR)           MOS14810
0DB0  27F1       1482          SIS   LINK,1            IS SCOPE = 5 ?                       MOS14820
0DB2  4330 0E1A  1483          BZ    PARTNO            YES, PRINT PART NO. & CONTINUE       MOS14830
0DB6  2404       1484  ERROR1   LIS   R0,4            LOAD NO. OF DIGITS TO BE CONVERTED   MOS14840
0D38  0816       1485          LDAR  R1,R6             GET ADDRESS UNDER TEST               MOS14850
0DBA  C820 0E9C  1486          LDAI  R2,ADRMSG         LOAD ADDRESS ERROR MESSAGE LOCATION  MOS14860
0DBE  41F0 059E  1487          BAL   LINK,HEXASC       STORE LOCATION UNDER TEST IN MESSAGE MOS14870
0DC2  0813       1488          LDAR  R1,R3             GET EXPECTED DATA                    MOS14880
0DC4  C820 0EAA  1489          LDAI  R2,DTAEXP         LOAD EXPECTED DATA MESSAGE LOCATION  MOS14890
0DC8  41F0 059E  1490          BAL   LINK,HEXASC       STORE DATA EXPECTED IN MESSAGE       MOS14900
0DCC  0814       1491          LDAR  R1,R4             GET DATA READ                        MOS14910
0DCE  C820 0EBA  1492          LDAI  R2,DTARED         LOAD DATA READ MESSAGE LOCATION      MOS14920
0DD2  41F0 059E  1493          BAL   LINK,HEXASC       STORE DATA READ IN MESSAGE           MOS14930
0DD6  C850 0E98  1494  ERROR2   LDAI  R5,ERRORMSG      LOAD ERROR MESSAGE LOCATION          MOS14940
0DDA  4050 08FA  1495          STH   R5,ISITERR        SET ISITERR                          MOS14950
0DDE  41F0 05C6  1496          BAL   LINK,PRINT        PRINT THE ERROR DATA                 MOS14960
0DE2  2450       1497          LIS   R5,0                                                   MOS14970
0DE4  4050 08FA  1498          STH   R5,ISITERR        RESET ISITERR                        MOS14980
                 1499  *                                                                     MOS14990
0DE8  48F0 09AE  1500  ERORTN   LH    LINK,SCOPE+6      LOAD "SCOPE" VALUE                   MOS15000
0DEC  4330 0388  1501          BZ    TSTEND            IF SCOPE = 0,                        MOS15010
0DF0  27F1       1502          SIS   LINK,1            OR SCOPE = 1,                        MOS15020
0DF2  4330 0388  1503          BZ    TSTEND            GO TO NEXT TEST                      MOS15030
0DF6  27F2       1504          SIS   LINK,2            IS SCOPE = 3 ?                       MOS15040
0DF8  4330 040A  1505          BZ    ABORT1            YES, ABORT TESTING SEQUENCE          MOS15050
0DFC  D100 00E0  1506  ERORTN1  LM    R0,ERRSAVE        NO,RESTORE CALLING REGISTERS         MOS15060
0E00  48F0 010C  1507  ERROUT   LH    LINK,TEMP         RESTORE RETURN ADDRESS       ***     MOS15070
0E04  030F       1508          BR    LINK              RETURN                               MOS15080
                 1509  *                                                                     MOS15090
0E06  48F0 0906  1510  ERORTN2  LH    LINK,TOTERR       IF SCOPE = 4,                        MOS15100
0E0A  26F1       1511          AIS   LINK,1            INCREMENT THE ERROR COUNTER          MOS15110
0E0C  40F0 0906  1512          STH   LINK,TOTERR       STORE THE INCREMENTED ERROR COUNTER  MOS15120
0E10  C5F0 7FFF  1513          CLAI  LINK,X'7FFF'      TOTERR = MAXIMUM ?                   MOS15130
0E14  203C       1514          BNES  ERORTN1           NO, RETURN (BRANCH)                  MOS15140
0E16  4300 0474  1515          B     HALT9             YES, WAIT FOR PRINTOUT               MOS15150
```

COMMON ERROR ROUTINE

```
0E1A  0734          1517  PARTNO  XAR   R3,R4            DETERMINE BIT(S) THAT FAILED          MOS15170
0E1C  2410          1518          LIS   R1,0             INITIALIZE CHIP NUMBER                MOS15180
0E1E  C530 FFFF     1519          CLAI  R3,-1            DID ALL BITS FAIL ?                   MOS15190
0E22  2138          1520          BNES  CO3              NO, BRANCH                            MOS15200
0E24  C840 4646     1521          LDAI  R4,C'FF'                                               MOS15210
0E28  4040 0E94     1522          STH   R4,CHIPNO+2      YES, STORE 8KB ROW IDENTIFIER         MOS15220
0E2C  2430          1523          LIS   R3,0             LOAD CONTIN VALUE IN REG. R3          MOS15230
0E2E  4300 0E5E     1524          B     CO5              CONTINUE                              MOS15240
0E32  9131          1525  CO3     SLHLS R3,1             DECIPHER FAILING BIT NUMBER(S)        MOS15250
0E34  2185          1526          BCS   CO4              (00-09,10-16) - ON CARRY              MOS15260
0E36  2611          1527          AIS   R1,1             INCREMENT CHIP NUMBER                 MOS15270
0E38  C510 0010     1528          CLHI  R1,16            CHIP NUMBER = 16 ?                    MOS15280
0E3C  2085          1529          BLS   CO3              NO, BRANCH                            MOS15290
0E3E  C820 3030     1530  CO4     LHI   R2,C'00'         STORE CHIP NUMBER                     MOS15300
0E42  4020 0E94     1531          STH   R2,CHIPNO+2       IN ASCII                              MOS15310
0E46  0801          1532          LDAR  R0,R1            SAVE BIT NUMBER                       MOS15320
0E48  C510 000A     1533          CLHI  R1,10            BIT NUMBER > 10 ?                     MOS15330
0E4C  2186          1534          BLS   CO4.5            YES, BRANCH                           MOS15340
0E4E  C820 0100     1535          LHI   R2,X'100'        NO, CONVERT BIT NO. TO HIGH DECIMAL   MOS15350
0E52  6120 0E94     1536          AHM   R2,CHIPNO+2      STORE HIGH BIT NO. IN ERROR MESSAGE   MOS15360
0E56  271A          1537          SIS   R1,10            DECREMENT ERROR BIT POSITION BY 10    MOS15370
0E58  6110 0E94     1538  CO4.5   AHM   R1,CHIPNO+2      STORE LOW BIT NO. IN ERROR MESSAGE    MOS15380
0E5C  0810          1539          LDAR  R1,R0            RESTORE BIT NUMBER                    MOS15390
0E5E  C850 0E7E     1540  CO5     LDAI  R5,CHIPMSG       LOAD ERROR MESSAGE ADDRESS            MOS15400
0E62  4050 08FA     1541          STH   R5,ISITERR       FORCE PRINTING                        MOS15410
0E66  41F0 05C6     1542          BAL   LINK,PRINT       PRINT SUSPECTED CHIP NUMBER           MOS15420
0E6A  2450          1543          LIS   R5,0                                                   MOS15430
0E6C  4050 08FA     1544          STH   R5,ISITERR       RESET FORCED PRINTING FLAG            MOS15440
0E70  0833          1545          LDAR  R3,R3            HAVE ALL SUSPECT CHIPS BEEN PRINTED?  MOS15450
0E72  4230 0E32     1546          BNZ   CO3              NO, BRANCH                            MOS15460
0E76  D100 00E0     1547          LM    R0,ERRSAVE       YES, RESTORE REGISTERS                MOS15470
0E7A  4300 0DB6     1548          B     ERROR1           GO PRINT ERROR DATA                   MOS15480
                    1549  *                                                                    MOS15490
                    1550  ********************************************************************* MOS15500
                    1551  *       END   COMMON ERROR ROUTINE                                   MOS15510
```

CHKSUM FILE

```
                          1553  *                                                                    MOS15530
                          1554  *        TEST MESSAGES                                               MOS15540
                          1555  *                                                                    MOS15550
0E7E  5355 5350 4543 5445 1556  CHIPMSG  DC    C'SUSPECTED BAD CHIP  '                             MOS15560
0E86  4420 4241 4420 4348
0E8E  4950 2020
0E92  4130 2A2A           1557  CHIPNO   DC    C'A0**',X'0D0A'                                     MOS15570
0E96  0D0A
0E98  4C4F 4320           1558  ERRORMSG DC    C'LOC '                                             MOS15580
                          1559  *                                                                    MOS15590
0E9C  2A2A 2A2A 2044 4154 1560  ADRMSG   DC    C'**** DATA EXP '                                   MOS15600
0EA4  4120 4558 5020
0EAA  2A2A 2A2A 2020 4441 1561  DTAEXP   DC    C'****  DATA READ '                                 MOS15610
0EB2  5441 2052 4541 4420
0EBA  2A2A 2A2A           1562  DTARED   DC    C'****',X'0D0A'                                     MOS15620
0EBE  0D0A
0EC0  4D45 4D4F 5259 2055 1563  ASMEMMSG DC    C'MEMORY UNDER TEST ',X'8D0A'                       MOS15630
0EC8  4E44 4552 2054 4553
0ED0  5420
0ED2  8D0A
0ED4  3130 3030 2D31 4646 1564  LOMSG    DC    C'1000-1FFF ',X'0D0A'                              MOS15640
0EDC  4620
0EDE  0D0A
      0000 0ED9           1565  HIMSG    EQU   LOMSG+5            *                          ***   MOS15650
                          1566  *                                                                    MOS15660
                          1567  *                                                                    MOS15670
                          1568  ************************************************************************MOS15680
                          1569  *        END   TEST MESSAGE FILE                                     MOS15690
      0000 0EDF           1570  LNZB     EQU   *-1                                                  MOS15700
```

CHKSUM FILE

```
                        1572  *                                                                       MOS15720
                        1573  *        TEST PROGRAM STORAGE AREA                                      MOS15730
                        1574  *                                                                       MOS15740
                        1575  ************************************************************************ MOS15750
                        1576  *                                                                       MOS15760
                        1577  *                                    *                            ***  MOS15770
    0000 0060           1578  PSWSAVE  EQU   X'60'                PPF PSW SAVE AREA            ***  MOS15780
    0000 0064           1579  COMRET   EQU   X'64'                ERRCOM RETURN ADDRESS SAVE   ***  MOS15790
    0000 0068           1580  SET.RTN  EQU   X'68'                SETUP RETURN ADDRESS SAVE    ***  MOS15800
    0000 006C           1581  PAUSE    EQU   X'6C'                PAUSE FLAG FOR CAROUSEL      ***  MOS15810
                        1582  *                                                                       MOS15820
    0000 0080           1583  MOSSAVE  EQU   X'80'                SI6MMT REGISTER SAVE AREA         MOS15830
    0000 0080           1584  OPTBUF   EQU   MOSSAVE              OPTION INPUT BUFFER               MOS15840
    0000 00A0           1585  RSAVE    EQU   X'A0'                ETPE REGISTER SAVE AREA  (16 X 2)  MOS15850
    0000 00E0           1586  ERRSAVE  EQU   X'E0'                REGISTER SAVE FOR ERROR ROUTINES *** MOS15860
                        1587  *                                                                       MOS15870
                        1588  ************************************************************************ MOS15880
                        1589  *        END   TEST PROGRAM  06-202(F01R01)                        ***  MOS15890
```

CHKSUM/M17 PUNCHER

```
0EE0  2400           1591  $CHKSUM  LIS   R0,0              PUNCH M17 TAPE WITH CHECKSUM          MOS15910
0EE2  9510           1592           EPSR  R1,R0             SELECT REG. SET 0 & CLEAR PSW    ***  MOS15920
                     1593  *                                                                      MOS15930
0EE4  C810 0100      1594           LDAI  R1,ORIGIN1         LOAD START ADDRESS                    MOS15940
0EE8  2421           1595           LIS   R2,1               LOAD INCREMENT VALUE                  MOS15950
0EEA  C830 0EDF      1596           LDAI  R3,LNZB            LOAD FINAL ADDRESS                    MOS15960
0EEE  2440           1597           LIS   R4,0               INITIALIZE CHKSUM BYTE                MOS15970
                     1598  *                                                                      MOS15980
0EF0  D351 0000      1599  $GEN     LB    R5,0(R1)           LOAD A BYTE FROM MEMORY               MOS15990
0EF4  0745           1600           XAR   R4,R5              CALCULATE CHKSUM BYTE                 MOS16000
0EF6  C110 0EF0      1601           BXLE  R1,$GEN            REPEATE FROM ORIGIN1 TO LNZB          MOS16010
0EFA  D240 0099      1602           STB   R4,MN+3            SET CHKSUM BYTE IN BOOT LOADER        MOS16020
                     1603  *                                                                      MOS16030
0EFE  C810 0080      1604  $TAPE    LHI   R1,X'0080'         LOAD DISPLAY PANEL 'NORMAL' OC        MOS16040
0F02  9E21           1605           OCR   R2,R1              PUT DISPLAY PANEL IN NORMAL MODE      MOS16050
0F04  9444           1606           EXBR  R4,R4              REVERSE CHKSUM BYTES                  MOS16060
0F06  9824           1607           WHR   R2,R4              DISPLAY CHKSUM (TO D1)                MOS16070
0F08  9411           1608           EXBR  R1,R1              REVERSE 'NORM' OC TO 'WAIT' PSW       MOS16080
0F0A  9501           1609           EPSR  R0,R1              HALT PROCESSOR.                       MOS16090
                     1610  *                                                                      MOS16100
                     1611  ************************************************************************MOS16110
                     1612  *                                                                      MOS16120
0F0C  D360 007A      1613  $PUNCH   LB    R6,X'7A'           GET BOUTDV (PUNCH) ADDRESS.           MOS16130
0F10  DE60 007B      1614           OC    R6,X'7B'           START TAPE PUNCH                      MOS16140
0F14  9D60           1615           SSR   R6,R0              GET PUNCH STATUS                      MOS16150
0F16  2081           1616           BTBS  8,1                WAIT FOR BUSY TO DROP                 MOS16160
0F18  41F0 0F5A      1617           BAL   R15,$TAPL          PUNCH LEADER (256 CHARACTERS)         MOS16170
0F1C  9411           1618           EXBR  R1,R1              (R1) = X'0080'                        MOS16180
0F1E  C830 00CF      1619           LHI   R3,X'CF'           LOAD END OF LOADER ADDRESS            MOS16190
                     1620  *                                                                      MOS16200
0F22  DA61 0000      1621  $PNCH1   WD    R6,0(R1)           PUNCH BOOT LOADER                     MOS16210
0F26  9D60           1622           SSR   R6,R0              GET PUNCH STATUS                      MOS16220
0F28  2081           1623           BTBS  8,1                WAIT FOR BUSY TO DROP                 MOS16230
0F2A  C110 0F22      1624           BXLE  R1,$PNCH1          REPEATE X'80' TO X'CF'                MOS16240
0F2E  41F0 0F60      1625           BAL   R15,$TAPL1         PUNCH ONE-FOLD GAP.                   MOS16250
                     1626  *                                                                      MOS16260
0F32  D340 0099      1627           LB    R4,MN+3            GET CHECKSUM BYTE                     MOS16270
0F36  C810 0100      1628           LDAI  R1,ORIGIN1         LOAD STARTING ADDRESS                 MOS16280
0F3A  C830 0EDF      1629           LDAI  R3,LNZB            LOAD ENDING ADDRESS                   MOS16290
                     1630  *                                                                      MOS16300
                     1631  *                        PUNCH PROGRAM                                 MOS16310
0F3E  D351 0000      1632  $PNCH2   LB    R5,0(R1)           GET A PROGRAM BYTE                    MOS16320
0F42  0745           1633           XAR   R4,R5              GENERATE CHKSUM                       MOS16330
0F44  9A65           1634           WDR   R6,R5              PUNCH PROGRAM BYTE                    MOS16340
0F46  9401           1635           EXBR  R0,R1              REVERSE ADDRESS BYTES                 MOS16350
0F48  9820           1636           WHR   R2,R0              DISPLAY ADDRESS PUNCHED               MOS16360
0F4A  9D60           1637           SSR   R6,R0              GET PUNCH STATUS                      MOS16370
0F4C  2081           1638           BTBS  8,1                WAIT FOR BUSY TO DROP                 MOS16380
0F4E  C110 0F3E      1639           BXLE  R1,$PNCH2          REPEATE 'ORIGIN' TO 'LNZB'            MOS16390
0F52  41F0 0F5A      1640           BAL   R15,$TAPL          PUNCH TRAILER.                        MOS16400
0F56  4300 0EFE      1641           B     $TAPE              DISPLAY CHECKSUM, HALT PROCESSOR.     MOS16410
```

```
                        1643  *   CHKSUM/M17 PUNCHER (CONTINUED)                                  ***   MOS16430
                        1644  *                                                                           MOS16440
0F5A   C800 0100        1645  $TAPL     LHI   R0,256            LOAD VALUE TO PUNCH BLANK LEADER        MOS16450
0F5E   2303             1646            BS    $TAPLP           BRANCH                                  MOS16460
                        1647  *                                                                           MOS16470
0F60   C800 0080        1648  $TAPL1    LHI   R0,128            LOAD VALUE TO PUNCH 1-FOLD GAP    ***   MOS16480
                        1649  *                                                                           MOS16490
0F64   2701             1650  $TAPLP    SIS   R0,1              DECREMENT FRAME COUNTER                 MOS16500
0F66   032F             1651            BNPR  R15              RETURN IF FINISHED  (0)                 MOS16510
0F68   2430             1652            LIS   R3,0             LOAD A "BLANK" INTO DATA REGISTER       MOS16520
0F6A   9A63             1653            WDR   R6,R3            PUNCH BLANK FRAME                       MOS16530
0F6C   9D68             1654            SSR   R6,R8            GET PUNCH STATUS                        MOS16540
0F6E   2081             1655            BTBS  8,1              WAIT FOR BUSY TO DROP                   MOS16550
0F70   2206             1656            BS    $TAPLP           CONTINUE (BRANCH)                       MOS16560
                        1657  *                                                                           MOS16570
                        1658  ************************************************************************  MOS16580
0F72                    1659            END                                                             MOS16590
```

ASSEMBLED BY CAL 03-066R05-00 (32-BIT)

START OPTIONS: T=16,CROSS,ERLST,

NO CAL ERRORS
NO CAL WARNINGS
2 PASSES

```
$CHKSUM   0000 0EE0      1591*
$GEN      0000 0EF0      1599*  1601
$PNCH1    0000 0F22      1621*  1624
$PNCH2    0000 0F3E      1632*  1639
$PUNCH    0000 0F0C      1613*
$TAPE     0000 0EFE      1604*  1641
$TAPL     0000 0F5A      1617   1640   1645*
$TAPL1    0000 0F60      1625   1648*
$TAPLP    0000 0F64      1646   1650*  1656
$TSTDU0   0000 07C2       747    749*
$TSTDU1   0000 07E0       759*
$TSTDU2   0000 07E2       756    758    760*
ABORT     0000 03C8       375*
ABORT1    0000 040A       394*   733   1505
ABORT2    0000 0448       417*
ABORT3    0000 0412       387    397*
ABSTOP    0000 0F72
ADC       0000 0002
ADRMSG    0000 0E9C      1486   1560*
AMSG      0000 0976       181    936*
ASCILOC   0000 0960       515    933*
ASCIPSW   0000 0956       512    932*
ASMEMMSG  0000 0EC0      1014   1563*
BOOT      0000 0088        58     61*
BRK.SAV   0000 0910       703    736    740    917*
BRKVECT   0000 0108        97*   734    738   1100
BTESTNO   0000 0908       317    329    346    369    425    913*
C300ADR   0000 0118       106*
CAR2ND    0000 08F0       895*
CARRD     0000 08E4       887*
CARRQ2S   0000 08F8       902*
CHIPMSG   0000 0E7E      1540   1556*
CHIPNO    0000 0E92      1522   1531   1536   1538   1557*
CHKCOL    0000 0C6C      1354   1357   1360   1366*
CHKCOL1   0000 0C76      1370*  1375
CHKCOL2   0000 0C80      1372   1374*
CHKCOL3   0000 0C8C      1378*  1414
CHKCOL4   0000 0CA6      1385   1387*
CHKCOL5   0000 0CB2      1389   1391*
CHKCOL6   0000 0CC8      1396   1398*
CHKCOL7   0000 0CE2      1404   1406*
CHKCOL8   0000 0CFC      1412   1414*
CHKCOL9   0000 0D10      1421*  1456
CHKCOLA   0000 0D1A      1423   1425*
CHKCOLB   0000 0D36      1432   1434*
CHKCOLC   0000 0D4C      1439   1441*
CHKCOLD   0000 0D66      1447   1449*
```

				1639										
R10	0000	000A	45*	835	835	838	839	839	845	845	846	852	1138	1143	1150
			1157	1169	1182	1207	1351	1370	1383	1424					
R11	0000	000B	46*	1139	1144	1151	1158	1172	1185	1204	1352	1373	1386	1421	
R12	0000	000C	47*	185	202	211	222	241	244	256	273	294	530	1280	1282
			1288												
R13	0000	000D	48*	1140	1147	1154	1170	1183	1205	1276	1289	1300	1312	1353	1356
			1359	1371	1384	1422									
R14	0000	000E	49*	118	120	242	245	247	271	541	544	814	830	849	851
			852	853	964	965	966	967	968	1141	1145	1148	1152	1155	1159
			1226	1354	1357	1360	1458								
R15	0000	000F	51*	119	163	171	191	247	257	283	284	285	403	404	524
			525	526	528	532	533	623	666	667	732	734	736	1069	1070
			1085	1086	1179	1180	1210	1211	1277	1278	1301	1302	1380	1381	1427
			1428	1617	1625	1640	1651								
R2	0000	0002	37*	57	77	83	126	131	133	135	136	140	141	142	149
			150	151	152	160	160	161	178	179	322	324	327	329	330
			331	332	334	336	337	346	347	348	431	445	448	472	476
			477	483	488	489	490	491	512	515	556	557	571	711	712
			714	719	723	726	726	795	817	826	827	828	829	836	837
			847	848	858	1017	1020	1486	1489	1492	1530	1531	1535	1536	1595
			1605	1607	1636										
R3	0000	0003	38*	62	63	64	127	128	131	147	148	157	157	161	162
			163	219	223	227	229	274	275	276	549	550	551	553	558
			584	586	796	800	801	1061	1063	1073	1078	1080	1169	1172	1173
			1182	1185	1187	1190	1191	1194	1204	1207	1214	1217	1218	1221	1268
			1270	1281	1282	1283	1285	1293	1295	1304	1306	1308	1311	1370	1373
			1374	1383	1386	1388	1391	1392	1395	1398	1399	1403	1406	1407	1411
			1421	1424	1431	1434	1435	1438	1441	1442	1446	1449	1450	1453	1488
			1517	1519	1523	1525	1545	1545	1596	1619	1629	1652	1653		
R4	0000	0004	39*	66	67	68	70	78	80	154	155	156	158	158	181
			183	192	194	195	197	199	206	208	212	240	243	262	277
			526	534	536	540	542	552	553	554	555	555	556	580	581
			582	583	594	596	600	605	607	618	656	671	673	675	685
			686	780	802	803	804	808	1065	1066	1072	1073	1088	1136	1137
			1177	1178	1186	1187	1193	1194	1208	1209	1213	1214	1220	1221	1266
			1267	1273	1274	1284	1285	1307	1308	1378	1379	1387	1388	1394	1395
			1400	1401	1402	1403	1408	1409	1410	1411	1425	1426	1430	1431	1437
			1438	1443	1444	1445	1446	1452	1453	1463	1464	1465	1466	1491	1517
			1521	1522	1597	1600	1602	1606	1606	1607	1627	1633			
R5	0000	0005	40*	68	70	71	71	73	74	75	78	80	86	170	221
			223	268	272	339	367	400	401	440	441	450	504	517	594
			598	693	1014	1494	1495	1497	1498	1540	1541	1543	1544	1599	1600
			1632	1633	1634										
R6	0000	0006	41*	65	75	82	136	137	138	138	220	221	228	249	255
			272	275	523	531	532	538	1056	1058	1063	1064	1067	1069	1072
			1076	1077	1080	1081	1083	1085	1088	1091	1165	1170	1173	1174	1175
			1179	1183	1186	1191	1193	1197	1198	1199	1205	1210	1213	1218	1220
			1224	1262	1264	1270	1271	1272	1277	1283	1284	1291	1292	1295	1296
			1297	1301	1306	1307	1314	1366	1371	1374	1375	1376	1380	1384	1387
			1392	1394	1399	1402	1407	1410	1414	1415	1416	1422	1427	1430	1435
			1437	1442	1445	1450	1452	1456	1485	1613	1614	1615	1621	1622	1634
			1637	1653	1654										
R7	0000	0007	42*	84	85	86	269	276	279	1059	1167	1202	1265	1368	1419
R8	0000	0008	43*	76	77	82	83	270	1057	1166	1200	1201	1263	1367	1417

```
TSTMSG    0000 0922      339    924*   925
TSTOP1    0000 02A8      263    268*
TSTOP2    0000 02AE      271*   278
TSTOP4    0000 02C0      277*
TTYGET    0000 080A      778*
WASDU     0000 0900      167    284    415    438    568    571    581    665    909*
WASDU1    0000 0902      168    285    383    569    583    910*
ZERO1     0000 0834      798*   799
```

PROG= MOSP12   ASSEMBLED BY CAL 03-066R05-00   (32-BIT)

```
                 CROSS                                                                    MOS00010
                 TARGT 16                                                                 MOS00020
                 WIDTH 120                                                                MOS00030
        MOSP12   PROG  S16 19-197 MOS MEMORY TEST PART 1  06-202F02M96R01A13 **           MOS00040
                 SQCHK                                                                    MOS00050
        ************************************************************************         MOS00060
        *                                                                                 MOS00070
        *        SERIES-16 19-197 MOS MEMORY TEST PART 1 - (F02-R01)           ***        MOS00080
        *                                                                                 MOS00090
        *        COPYRIGHT       INTERDATA, INC.         OCTOBER, 1976                    MOS00100
        *                                                                                 MOS00110
        *        REVISED         PRODUCT SUPPORT         MAY, 1978             ***        MOS00120
        *        REVISION R01 CONTAINS 5/16 MICRO I/O BUS SUPPORT.                        MOS00130
        *                                                                                 MOS00140
        *        THIS PROGRAM TESTS THE UPPER HALF OF AN 8KB MOS MEMORY                   MOS00150
        *        IN A 5/16 OR 6/16 INTERDATA PROCESSOR WITH A                             MOS00160
        *        BATTERY BACK-UP POWER SUPPLY (OPTIONAL).                                 MOS00170
        *                                                                                 MOS00180
        *        TEST 0                    MEMORY SEARCH TEST                             MOS00190
        *                                                                                 MOS00200
        *        TEST 1                    SHORT COUNT RELOCATABLE                        MOS00210
        *                                  HAMMER DISTURB TEST                            MOS00220
        *                                                                                 MOS00230
        *        TEST 2                    DIAGONAL GALPAT TEST                           MOS00240
        *                                                                                 MOS00250
        *        TEST 3                    MEMORY HOLD TEST                               MOS00260
        *                                  (REQUIRES MANUAL INTERVENTION)                 MOS00270
        *                                                                                 MOS00280
        *        TEST 4                    LONG COUNT RELOCATABLE                         MOS00290
        *                                  HAMMER DISTURB TEST                            MOS00300
        *                                                                                 MOS00310
        *        THE DEFAULT TESTS ARE 0, 1, & 2.                                         MOS00320
        *                                                                                 MOS00330
        *        TEST 0 IS EXECUTED WHENEVER "RUN" IS ENTERED.                            MOS00340
        *                                                                                 MOS00350
        *        TEST 3 REQUIRES MANUAL INTERVENTION AND CANNOT BE                        MOS00360
        *        LOOPED ON WHILE THE PROCESSOR IS UNATTENDED.                             MOS00370
        *                                                                                 MOS00380
        *        TEST 4 IS AN OPTIONAL, LONG TERM (I.E.,OVERNIGHT) TEST.                  MOS00390
        *                                                                                 MOS00400
        ************************************************************************         MOS00410
```

BOOTSTRAP LOADER

```
         0000 0000             43  R0        EQU   0                                                MOS00430
         0000 0001             44  R1        EQU   1                                                MOS00440
         0000 0002             45  R2        EQU   2                                                MOS00450
         0000 0003             46  R3        EQU   3                                                MOS00460
         0000 0004             47  R4        EQU   4                                                MOS00470
         0000 0005             48  R5        EQU   5                                                MOS00480
         0000 0006             49  R6        EQU   6                                                MOS00490
         0000 0007             50  R7        EQU   7                                                MOS00500
         0000 0008             51  R8        EQU   8                                                MOS00510
         0000 0009             52  R9        EQU   9                                                MOS00520
         0000 000A             53  R10       EQU   10                                               MOS00530
         0000 000B             54  R11       EQU   11                                               MOS00540
         0000 000C             55  R12       EQU   12                                               MOS00550
         0000 000D             56  R13       EQU   13                                               MOS00560
         0000 000E             57  R14       EQU   14                                               MOS00570
         0000 000E             58  RET       EQU   14                                               MOS00580
         0000 000F             59  R15       EQU   15                                               MOS00590
         0000 000F             60  LINK      EQU   15                                               MOS00600
                               61  *                                                                MOS00610
                               62  *  BOOTLOADER WITH CHKSUM                                        MOS00620
                               63  *                                                                MOS00630
0000R                          64            ORG   X'80'                                            MOS00640
0080     2421                  65            LIS   R2,1                                             MOS00650
0082     2303                  66            BS    BOOT                                             MOS00660
0084     0060                  67            DC    Z(PSWSAVE)      CURRENT PSW SAVE POINTER(32-BIT M/C)   MOS00670
0086     00A0                  68            DC    Z(RSAVE)        REGISTER SAVE POINTER(32-BIT M/C)      MOS00680
0088     C810 0100             69  BOOT      LHI   R1,ORIGIN1      R1 = ADR(FIRST BYTE OF TEST PROGM)     MOS00690
008C     C830 1000             70            LHI   R3,LNZB+1                                        MOS00700
0090     4030 0022             71            STH   R3,X'22'        REGISTER SAVE POINTER(16-BIT M/C)      MOS00710
0094     2731                  72            SIS   R3,1                                             MOS00720
0096     C860 00FF             73  MN        LHI   R6,X'00FF'      R6 = CHKSUM BYTE = X'MN'               MOS00730
009A     D340 0078             74            LB    R4,X'78'        GET INPUT DEV ADR                      MOS00740
009E     DE40 0079             75            OC    R4,X'79'        PUT INPUT DEV IN READ MODE             MOS00750
00A2     9D45                  76  LEADER    SSR   R4,R5           WAIT FOR DU & BUSY TO DROP             MOS00760
00A4     2091                  77            BTBS  9,1             DU OR BUSY - BRANCH                    MOS00770
00A6     9B45                  78            RDR   R4,R5           READ A CHARACTER                       MOS00780
00A8     0855                  79            LDAR  R5,R5           IS IT ZERO ?                           MOS00790
00AA     2234                  80            BZS   LEADER          YES, IGNORE LEADER (BRANCH)            MOS00800
00AC     D251 0000             81  LOAD      STB   R5,0(R1)        STORE 1ST NON-ZERO & SUBSEQUENT BYTE   MOS00810
00B0     D351 0000             82            LB    R5,0(R1)        RELOAD DATA BYTE FROM MEMORY           MOS00820
00B4     0765                  83            XAR   R6,R5           GENERATE CHKSUM                        MOS00830
00B6     9481                  84            EXBR  R8,R1           EXCHANGE ADDRESS BYTES                 MOS00840
00B8     9828                  85            WHR   R2,R8           DISPLAY MEMORY ADDRESS                 MOS00850
00BA     9D45                  86            SSR   R4,R5           WAIT FOR DU & BUSY TO DROP             MOS00860
00BC     2091                  87            BTBS  9,1             DU OR BUSY - BRANCH                    MOS00870
00BE     9B45                  88            RDR   R4,R5           READ A CHARACTER                       MOS00880
00C0     C110 00AC             89            BXLE  R1,LOAD         LOAD TILL LAST BYTE                    MOS00890
00C4     9486                  90            EXBR  R8,R6           EXCHANGE CHKSUM BYTES                  MOS00900
00C6     9828                  91            WHR   R2,R8           DISPLAY FINAL CHKSUM                   MOS00910
00C8     2478                  92  LDWT      LIS   R7,8                                             MOS00920
00CA     917C                  93            SLHLS R7,12           R7 = X'8000'                           MOS00930
00CC     9557                  94            EPSR  R5,R7           HALT PROCESSOR.                        MOS00940
00CE     2203                  95            BS    LDWT                                             MOS00950
```

EXEC - ETPE R03-06 (16-BIT MODIFIED & STRIPPED)

```
00D0                   ORG   X'100'                                          MOS00970
0100  4300 011C  ORIGIN1  B     START2          START HERE FOR 16-BIT PROCESSOR        MOS00980
                 *                                                            MOS00990
                 *----------------------------                                MOS01000
                 *    TEST CONSTANTS                         *                MOS01010
                 *                                                            MOS01020
0104  30F0       PSW      DCX   30F0            PSW USED IN TEST MODULES               MOS01030
0106  30F0       PSW2     DCX   30F0            PSW USED IN EXEC                       MOS01040
0108  0000       BRKVECT  DC    Z(0)            BREAK VECTOR ADDRESS                   MOS01050
010A  0000       IOSAVE   DCX   0               I/O DEVICE SAVE LOCATION               MOS01060
010C  0000       TEMP     DCX   0               ETPE TEMPORARY STORRAGE LOCATION       MOS01070
010E  0000       PASFLG   DCX   0               FLAG SET WHEN CONSOLE ON PASLA/PALM    MOS01080
                 *                                                            MOS01090
                 *                                                            MOS01100
                 *                                                            MOS01110
0110  0202       IO       DC    X'0202'         I/O DEVICE(S) IDENTIFIER               MOS01120
0112  1011       PASLADR  DC    X'1011'         PASLA/PALM READ/WRITE ADDRESSES        MOS01130
0114  0202       CLIFADR  DC    X'0202'         CURRENT LOOP INTERFACE R/W ADDRESSES   MOS01140
0116  6262       LPADR    DC    X'6262'         LINE PRINTER ADDRESS                   MOS01150
0118  1011       C300ADR  DC    X'1011'         CAROUSEL 300/PASLA ADDRESSES           MOS01160
011A  C0C0       MICROBUS DC    X'C0C0'         MICROBUS ADDRESS                       MOS01170
                 *                                                            MOS01180
                 * IO =   0101  FOR CRT ON PASLA                              MOS01190
                 *        0202  FOR TELETYPE, CAROUSEL 15/30                  MOS01200
                 *        XX03  FOR LINE PRINTER                              MOS01210
                 *        0404  FOR CAROUSEL 300                              MOS01220
                 *        0505  FOR MICROBUS                                  MOS01230
                 *                                                            MOS01240
                 *----------------------------                                MOS01250
                 *                                                            MOS01260
011C  48E0 0106  START2   LH    R14,PSW2        *                         ***  MOS01270
0120  C8F0 012C           LHI   R15,START       *                         ***  MOS01280
0124  D0E0 0034           STM   R14,X'34'       II INT NEW PSW            ***  MOS01290
0128  0000                DCX   0               TAKE AN ILLEGAL INSTRUCTION INT        MOS01300
012A  2200                BS    *               HALT IF II IS NOT TAKEN   ***  MOS01310
                 *                                                            MOS01320
                 *                                                            MOS01330
012C  D310 0110  START    LB    R1,IO           GET I/O IDENTIFIERS                    MOS01340
0130  D320 0111           LB    R2,IO+1                                       MOS01350
0134  2436                LIS   R3,6            IDENTIFIER CAN BE 1,2,3,4,5            MOS01360
0136  0513                CLAR  R1,R3                                         MOS01370
0138  2182                BLS   IO.OK1          BRANCH IF KB IDENTIFIER OK             MOS01380
013A  2412                LIS   R1,2            OTHERWISE FORCE IT TO BE TTY           MOS01390
013C  0523       IO.OK1   CLAR  R2,R3                                         MOS01400
013E  2182                BLS   IO.OK2          SAME TEST FOR LIST DEVICE              MOS01410
0140  2422                LIS   R2,2                                          MOS01420
0142  D210 0110  IO.OK2   STB   R1,IO           REESTABLISH VALUES                     MOS01430
0146  D220 0111           STB   R2,IO+1                                       MOS01440
014A  D362 088C           LB    R6,CONRQ2S(R2)                                MOS01450
014E  4060 0870           STH   R6,PASFLG2      SET PASLA FLAG (LIST DEVICE)           MOS01460
0152  0866                LDAR  R6,R6                                         MOS01470
0154  2336                BZS   IO.OK3          SKIP IF NOT PASLA                      MOS01480
0156  9121                SLHLS R2,1                                          MOS01490
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0158  D302 0111          150           LB    R0,IO+1(R2)                                          MOS01500
015C  DE02 0880          151           OC    R0,CON2ND(R2)      ISSUE 2ND COMMAND (LIST DEVICE)   MOS01510
                         152  *                                                                    MOS01520
0160  41F0 07AA          153  IO.OK3   BAL   LINK,SETKB        ESTABLISH KEYBOARD DEVICE         MOS01530
0164  9310              154           LBR   R1,R0              (R1) = 1,2,4,5                    MOS01540
0166  9111              155           SLHLS R1,1               (R1) = 2,4,6,A                    MOS01550
0168  4831 0110          156           LH    R3,IO(R1)                                            MOS01560
016C  4030 0872          157           STH   R3,CONADR          SET UP CONSOLE DEVICE ADDRESS     MOS01570
0170  4821 0874          158           LH    R2,CONRD(R1)                                         MOS01580
0174  4020 0874          159           STH   R2,CONRD           SET UP R/W COMMANDS               MOS01590
0178  4821 0880          160           LH    R2,CON2ND(R1)                                        MOS01600
017C  4020 0880          161           STH   R2,CON2ND          2ND CMD; ENABLE READ CMD          MOS01610
0180  9011              162           SRHLS R1,1                                                 MOS01620
0182  D341 088C          163           LB    R4,CONRQ2S(R1)                                       MOS01630
0186  D240 088C          164           STB   R4,CONRQ2S         CONSOLE REQUEST TO SEND           MOS01640
018A  4040 010E          165           STH   R4,PASFLG          SET PASLA FLAG (CONSOLE)          MOS01650
018E  9333              166           LBR   R3,R3              MASK CONSOLE DEVICE TO 8 BITS ****MOS01660
0190  0844              167           LDAR  R4,R4                                                MOS01670
0192  2333              168           BZS   IO.OK4             SKIP IF NOT PASLA                 MOS01680
0194  9422              169           EXBR  R2,R2                                                MOS01690
0196  9E32              170           OCR   R3,R2              ISSUE 2ND COMMAND (CONSOLE)       MOS01700
0198  DE30 0874          171  IO.OK4   OC    R3,CONRD          PUT CONSOLE IN READ MODE          MOS01710
019C  9B3F              172           RDR   R3,R15             DUMMY READ (SET BUSY)             MOS01720
                         173  *                                                                    MOS01730
019E  41F0 07B8          174           BAL   LINK,LCORE         SET UP LOW CORE                   MOS01740
01A2  2400              175           LIS   R0,0                                                 MOS01750
01A4  4000 0898          176           STH   R0,WASDU           RESET 'DEVICE UNAVAILABLE' FLAGS  MOS01760
01A8  4000 089A          177           STH   R0,WASDU1                                            MOS01770
01AC  41F0 05FC          178           BAL   LINK,CRLF          DO CR & LF                        MOS01780
01B0  C850 09A0          179           LHI   R5,TITLE                                             MOS01790
01B4  41F0 0574          180           BAL   R15,PRINT          PRINT TEST PROGRAM TITLE          MOS01800
                         181  *----------------------------                                       MOS01810
                         182  *  KEYBOARD INPUT ROUTINE                                           MOS01820
                         183  *                                                                    MOS01830
01B8  41F0 0976          184  OPTIN    BAL   LINK,MMRESTOR     RESTORE ETPE MM POINTER       *** MOS01840
01BC  41F0 05FC          185           BAL   LINK,CRLF          CR,LF TO LIST DEVICE              MOS01850
01C0  41F0 0980          186  OPTIN1   BAL   LINK,PSW2CHG      NO INT. REG SET 15            *** MOS01860
01C4  41F0 07AA          187           BAL   LINK,SETKB         ESTABLISH CONSOLE                 MOS01870
01C8  D340 090E          188           LB    R4,AMSG            OUTPUT AN * TO INDICATE           MOS01880
01CC  41F0 060A          189           BAL   LINK,OUTCHR        COMMAND MODE ESTABLISHED          MOS01890
01D0  2541              190           LCS   R4,1               X'FF'                             MOS01900
01D2  41F0 060A          191           BAL   LINK,OUTCHR                                          MOS01910
01D6  C8C0 06E2          192           LHI   R12,QUESTN         SET UP R12 FOR ERR ROUTINE        MOS01920
01DA  C8D0 2020          193           LHI   R13,X'2020'        BLANK OUT COMMAND BUFFER      *** MOS01930
01DE  08ED              194           LDAR  R14,R13            WHICH WILL CONTAIN OPTION      *** MOS01940
01E0  08FD              195           LDAR  R15,R13            NAME                          *** MOS01950
01E2  D0D0 0080          196           STM   R13,OPTBUF         *                             *** MOS01960
01E6  2410              197           LIS   R1,0               CLEAR OPTBUF INDEX                MOS01970
01E8  41F0 06A2          198  RDCHR    BAL   R15,GETCHR         GET A CHAR IN R4                  MOS01980
01EC  C540 0060          199           CLHI  R4,X'60'           UPPER CASE ALPHA ?                MOS01990
01F0  2183              200           BLS   RDCHAR0            BRANCH IF NO.                     MOS02000
01F2  CB40 0020          201           SHI   R4,X'20'           CONVERT TO LOWER CASE             MOS02010
01F6  C540 0023          202  RDCHAR0  CLHI  R4,X'23'           IS IT HASH MARK ?                 MOS02020
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01FA   4330 01B8          203           BE    OPTIN                                                  MOS02030
01FE   C540 005F          204           CLHI  R4,X'5F'          LEFT ARROW, UNDERLINE OR DELETE ?      MOS02040
0202   2334               205           BES   RDCHAR1           YES, BRANCH                            MOS02050
0204   C540 0008          206           CLHI  R4,X'08'          BACK SPACE ?                           MOS02060
0208   2139               207           BNES  RDCHR1            NO, BRANCH                             MOS02070
020A   2711               208 RDCHAR1   SIS   R1,1              YES, DECREMENT INDEX                   MOS02080
020C   021C               209           BMR   R12               ON BUFFER UNDERFLOW; PRINT '?'         MOS02090
020E   C800 0020          210           LHI   R0,X'20'                                                 MOS02100
0212   D201 0080          211           STB   R0,OPTBUF(R1)     BLANK OUT LAST CHARACTER               MOS02110
0216   4300 01E8          212           B     RDCHR             BRANCH                                 MOS02120
021A   C540 000D          213 RDCHR1    CLHI  R4,X'0D'          IS IT CR ?                             MOS02130
021E   233C               214           BES   LOOKUP            YES, TRY MATCH                         MOS02140
0220   C540 0020          215           CLHI  R4,X'20'          IS IT A BLANK?                         MOS02150
0224   2339               216           BES   LOOKUP            YES, TRY MATCH                         MOS02160
0226   C510 0006          217           CLHI  R1,6              7 CHARACTERS INPUT ?                   MOS02170
022A   038C               218           BNLR  R12               IF YES, ERROR                          MOS02180
022C   D241 0080          219           STB   R4,OPTBUF(R1)     STORE CURRENT BYTE                     MOS02190
0230   2611               220           AIS   R1,1              BUMP BUFFER INDEX                      MOS02200
0232   4300 01E8          221           B     RDCHR             READ NEXT CHARACTER                    MOS02210
                          222 *-------------------------------                                         MOS02220
                          223 *  OPTION MATCH ROUTINE                                                   MOS02230
                          224 *                                                                         MOS02240
0236   C810 0910          225 LOOKUP    LHI   R1,OPT            LOAD ADDRESS OF OPTION TABLE           MOS02250
023A   2430               226 LOOK1     LIS   R3,0              CLEAR BUFFER INDEX                     MOS02260
023C   0861               227           LDAR  R6,R1             SET OPTION WORD INDEX                  MOS02270
023E   4856 0000          228 LOOK2     LH    R5,0(R6)          GET OPTION NAME (HW)                   MOS02280
0242   021C               229           BMR   R12               IF MINUS, THEN NO MATCH = ERROR        MOS02290
0244   4553 0080          230           CLH   R5,OPTBUF(R3)     COMPARE TO OPTBUF HW                   MOS02300
0248   2333               231           BES   LOOK3            EQUAL, BRANCH                          MOS02310
024A   261C               232           AIS   R1,12             NOT EQUAL, INCREMENT INDEX             MOS02320
024C   2209               233           BS    LOOK1             BRANCH                                 MOS02330
024E   2632               234 LOOK3     AIS   R3,2              TRY NEXT HW                            MOS02340
0250   2662               235           AIS   R6,2                                                     MOS02350
0252   C530 0006          236           CLHI  R3,6              3 MATCHING HW FOUND ?                  MOS02360
0256   208C               237           BLS   LOOK2             NO, BRANCH (CONTINUE LOOKING)          MOS02370
                          238 *                                                                         MOS02380
0258   C510 0964          239           CLHI  R1,RUN            YES, RUN COMMAND ?                     MOS02390
025C   4330 02C2          240           BE    RUNIT             YES, BRANCH                            MOS02400
                          241 *-----------------------------                                          MOS02410
0260   C510 0910          242 LOOK4     CLHI  R1,TEST           'TEST' OPTION ?                        MOS02420
0264   4330 028C          243           BE    TESTOP                                                   MOS02430
                          244 *                                                                         MOS02440
                          245 *  TO PROCESS COMMANDS OTHER THAN 'TEST', 'OPTION'.                 ***   MOS02450
                          246 *                                                                         MOS02460
0268   274D               247           SIS   R4,13             NO, OPTION FOLLOWED BY CR ?            MOS02470
026A   033C               248           BZR   R12               YES, ERROR                             MOS02480
026C   41E0 0510          249           BAL   R14,OPTVAL        GET OPTION VALUE IN R6                 MOS02490
0270   274D               250           SIS   R4,13             TERMINATED BY CR ?                     MOS02500
0272   023C               251           BNZR  R12               IF NO, BRANCH (ERROR)                  MOS02510
0274   48E1 0008          252           LH    R14,8(R1)         GET OPTION CHECK ROUTINE ADDRESS       MOS02520
0278   2332               253           BZS   LOOK5             IF NO ROUTINE ADDRESS, BRANCH          MOS02530
027A   01FE               254           BALR  R15,R14           LINK OPTION CHECK ROUTINE              MOS02540
                          255 *                                 RETURN HERE                            MOS02550
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027C   4061 0006          256  LOOK5    STH   R6,6(R1)          STORE OPTION VALUE              ***  MOS02560
0280   4300 01B8          257           B     OPTIN             BRANCH TO ACCEPT NEXT COMMAND        MOS02570
                          258  *                                                                    MOS02580
                          259  *---------------------------------                                   MOS02590
                          260  *  TO CHECK THAT INPUT IS NOT > MAX VALUE (OPTION+10)                 MOS02600
                          261  *                                                                    MOS02610
0284   4561 000A          262  LEVELIN  CLH   R6,10(R1)         IS R6 > MAX VALUE ?                  MOS02620
0288   022C               263           BPR   R12               YES, ERROR RETURN                    MOS02630
028A   030F               264           BR    R15               NO, RETURN TO LOOK5                  MOS02640
                          265  *                                                                    MOS02650
                          266  *---------------------------------                                   MOS02660
                          267  *  TEST OPTION PROCESS ROUTINE                                       MOS02670
                          268  *                                                                    MOS02680
028C   274D               269  TESTOP   SIS   R4,13             'TEST' FOLLOWED BY (CR) ?            MOS02690
028E   2137               270           BNZS  TSTOP1                                                MOS02700
0290   C800 E000          271           LHI   R0,DEFTESTS       YES, SET TEST OPTION TO      ***     MOS02710
0294   4000 0916          272           STH   R0,TEST+6         FIRST TEST WORD                      MOS02720
0298   4300 01B8          273           B     OPTIN             TO ACCEPT NEXT COMMAND               MOS02730
                          274  *                                                                    MOS02740
029C   2454               275  TSTOP1   LIS   R5,MAXTST         *                            ***     MOS02750
029E   2470               276           LIS   R7,0              TEST BIT ACCUMULATORS                MOS02760
02A0   2480               277           LIS   R8,0                                                   MOS02770
02A2   41E0 0510          278  TSTOP2   BAL   R14,OPTVAL        GET OPTION VALUE IN R6               MOS02780
02A6   0556               279           CLAR  R5,R6                                                  MOS02790
02A8   028C               280           BLR   R12               ERROR: INVALID TEST NUMBER           MOS02800
02AA   C830 8000          281           LHI   R3,X'8000'        *   (NORMALLY  BAL R14,UNARY)  ***   MOS02810
02AE   CC36 0000          282           SRHL  R3,0(R6)          *                          ***       MOS02820
02B2   0673               283           OAR   R7,R3             SET CURRENT BIT                      MOS02830
02B4   274D               284  TSTOP4   SIS   R4,13            TERMINATED BY CR ?           ***     MOS02840
02B6   4230 02A2          285           BNZ   TSTOP2                                                 MOS02850
02BA   4070 0916          286           STH   R7,TEST+6         STORE VALID SELECTED TESTS           MOS02860
02BE   4300 01B8          287           B     OPTIN             TO ACCEPT NEXT COMMAND               MOS02870
                          288  *---------------------------                                         MOS02880
                          289  *                                                                    MOS02890
02C2   24F0               290  RUNIT    LIS   R15,0                                                 MOS02900
02C4   40F0 0898          291           STH   R15,WASDU         RESET DU FLAGS                       MOS02910
02C8   40F0 089A          292           STH   R15,WASDU1                                             MOS02920
02CC   41F0 05FC          293           BAL   LINK,CRLF         DO CR & LF                           MOS02930
                          294  *                                                                    MOS02940
02D0   240F               295           LIS   R0,15             TO FIND HIGHEST SELECTED TEST  NO.   MOS02950
02D2   4810 0916          296           LH    R1,TEST+6         CHECK FIRST TEST HW                  MOS02960
02D6   9011               297  KEEP2    SRLS  R1,1                                                   MOS02970
02D8   2184               298           BCS   FOUND1            R0 = F-0 = TEST NUMBER               MOS02980
02DA   2701               299           SIS   R0,1                                                   MOS02990
02DC   2213               300           BNMS  KEEP2             LOOP TILL TEST FOUND                 MOS03000
02DE   030C               301           BR    R12               TEST NOT SELECTED                    MOS03010
                          302  *                                                                    MOS03020
02E0   4000 0896          303  FOUND1   STH   R0,SELTST         HIGHEST SELECTED TEST NUMBER ***     MOS03030
02E4   4800 0110          304           LH    R0,IO                                                  MOS03040
02E8   4000 010A          305           STH   R0,IOSAVE         RESTORE USER'S I/O CHOICE            MOS03050
02EC   41F0 05FC          306           BAL   LINK,CRLF                                              MOS03060
                          307  *                                                            ***     MOS03070
02F0   48E0 0916          308  INIT     LH    R14,TEST+6                                             MOS03080
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02F4   C6E0 8000          309           OHI   R14,X'8000'        FORCE TEST 0                          MOS03090
02F8   40E0 0916          310           STH   R14,TEST+6         WHEN "RUN" IS ENTERED                 MOS03100
02FC   24E1               311           LIS   R14,1                                                    MOS03110
02FE   DEE0 086D          312           OC    R14,NORM           PUT DISPLAY IN NORMAL MODE            MOS03120
                          313  *                                                                       MOS03130
                          314  *  RESET TEST PARAMETERS                                                MOS03140
                          315  *                                                                       MOS03150
0302   2400               316  INITRET  LIS   R0,0                                                    MOS03160
0304   4000 0892          317           STH   R0,ISITERR         RESET ERROR FLAG                      MOS03170
0308   4000 089C          318           STH   R0,TOTAL           RESET TOTAL                           MOS03180
030C   4000 089E          319           STH   R0,TOTERR          RESET TOTERR                          MOS03190
0310   C810 3030          320           LHI   R1,C'00'                                                 MOS03200
0314   4010 08C0          321           STH   R1,MTESTNO         RESET THESE FLAGS TO C'00'            MOS03210
0318   4010 08CA          322           STH   R1,ETESTNO                                               MOS03220
031C   4010 08CC          323           STH   R1,ERRNO                                                 MOS03230
0320   41F0 07B8          324           BAL   LINK,LCORE         SET UP LOW CORE                       MOS03240
                          325  *                                                                       MOS03250
                          326  *  START SELECTION FROM TEST 0                                          MOS03260
                          327  *                                                                       MOS03270
0324   2400               328  KEEP3    LIS   R0,0                                                    MOS03280
0326   4000 08A0          329           STH   R0,BTESTNO         RESET BINARY TEST NUMBER              MOS03290
032A   4000 08A4          330           STH   R0,NEXTST          RESET NEXT TEST NUMBER                MOS03300
                          331  *                                                                       MOS03310
                          332  *  TO FIND THE NEXT SELECTED TEST.                                      MOS03320
                          333  *                                                                       MOS03330
032E   4820 08A4          334  KEEP4    LH    R2,NEXTST          GET NEXT TEST NUMBER                  MOS03340
0332   C800 8000          335  KEEP41   LHI   R0,X'8000'         R0 = X'8000'                  ***     MOS03350
0336   CC02 0000          336           SRHL  R0,0(R2)           R0 = NEXT TEST BIT                    MOS03360
033A   4400 0916          337  KEEP42   NH    R0,TEST+6          LOOK AT TEST HW 1             ***     MOS03370
033E   2133               338           BNZS  KEEP5                                                    MOS03380
0340   2621               339  KEEP43   AIS   R2,1                                                    MOS03390
0342   2208               340           BS    KEEP41             LOOP FOR NEXT TEST NUMBER             MOS03400
0344   4020 08A0          341  KEEP5    STH   R2,BTESTNO         CURRENT TEST NUMBER                   MOS03410
0348   0812               342           LDAR  R1,R2              R1 = TEST NUMBER IN BINARY            MOS03420
034A   2621               343           AIS   R2,1                                                     MOS03430
034C   4020 08A4          344           STH   R2,NEXTST                                                MOS03440
0350   2402               345           LIS   R0,2               SET DIGITS TO PRINT = 2               MOS03450
0352   C820 08C0          346           LHI   R2,MTESTNO         R2 = A(MTESTNO)                       MOS03460
0356   41F0 054C          347           BAL   LINK,HEXASC        STORE TEST NO. IN ASCII @ MTESTNO     MOS03470
035A   4820 08C0          348           LH    R2,MTESTNO                                               MOS03480
035E   4020 08CA          349           STH   R2,ETESTNO         STORE TEST NO. IN ASCII @ ETESTNO     MOS03490
0362   41F0 06F2          350           BAL   LINK,TSTBRK         TEST BREAK                            MOS03500
0366   C850 08BA          351           LHI   R5,TSTMSG                                                 MOS03510
036A   41F0 0574          352           BAL   LINK,PRINT         PRINT 'TEST NN'                       MOS03520
036E   2400               353           LIS   R0,0                                                     MOS03530
0370   4000 0894          354           STH   R0,NOERR           RESET ERROR FLAG                      MOS03540
0374   4000 08A2          355           STH   R0,COUNT           RESET COUNT                           MOS03550
0378   4810 0104          356  KEEP6    LH    R1,PSW             ENABLE INTERRUPTS (30F0)      ***     MOS03560
037C   9501               357           EPSR  R0,R1                                                    MOS03570
037E   4820 08A0          358           LH    R2,BTESTNO         R2 = TEST NUMBER                      MOS03580
0382   9121               359           SLHLS R2,LADC                                                  MOS03590
0384   4812 09D2          360           LDA   R1,TESTS(R2)                                             MOS03600
0388   0301               361           BR    R1                 GO TO TEST MODULE                     MOS03610
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                          362  *-----------------------------                                          MOS03620
                          363  *                                                                       MOS03630
                          364  *  TEST MODULE END ROUTINE                                              MOS03640
                          365  *                                                                       MOS03650
038A   41F0 0976          366  TSTEND   BAL   LINK,MMRESTOR      RESTORE ETPE MM POINTER          ***  MOS03660
038E   41F0 0980          367           BAL   LINK,PSW2CHG       DISABLE INT @ PROCESSOR LEVEL    ***  MOS03670
0392   4800 08A2          368           LH    R0,COUNT                                                  MOS03680
0396   2601               369           AIS   R0,1              INCREMENT COUNT                     MOS03690
0398   4000 08A2          370           STH   R0,COUNT                                                  MOS03700
039C   41F0 06F2          371           BAL   LINK,TSTBRK        IF BREAK GO TO OPTIN                MOS03710
03A0   4500 0922          372           CLH   R0,LOOP+6          IF COUNT > LOOP,                    MOS03720
03A4   2383               373           BNLS  KEEP7              GO TO NEXT TEST MODULE              MOS03730
03A6   4300 0378          374           B     KEEP6              OTHERWISE, REPEAT SAME TEST         MOS03740
03AA   4800 0894          375  KEEP7    LH    R0,NOERR           LOOK @ ERROR FLAG                   MOS03750
03AE   2135               376           BNZS  KEEP71                                                  MOS03760
03B0   C850 08E0          377           LHI   R5,NOERMSG                                              MOS03770
03B4   41F0 0574          378           BAL   LINK,PRINT         PRINT "NO ERROR"                    MOS03780
03B8   4810 08A0          379  KEEP71   LH    R1,BTESTNO         GET TEST NUMBER                     MOS03790
03BC   4510 0896          380           CLH   R1,SELTST          IS THE LAST SELECTED TEST DONE ?    MOS03800
03C0   4280 032E          381           BL    KEEP4              NO, GO SELECT NEXT TEST             MOS03810
                          382  *                                                                       MOS03820
                          383  *  ALL THE SELECTED TESTS ARE NOW RUN                                   MOS03830
                          384  *                                                                       MOS03840
03C4   41F0 0976          385  ABORT    BAL   LINK,MMRESTOR      RESTORE ETPE MM POINTER          ***  MOS03850
03C8   41F0 0980          386           BAL   LINK,PSW2CHG       PSW = X'30F0'                       MOS03860
03CC   41F0 04A2          387           BAL   LINK,DISPLAY       DISPLAY "TOTAL" & "TOTERR"          MOS03870
03D0   089C               388           DC    Z(TOTAL),Z(TOTERR) (IF DISPLAY PANEL EQUIPPED)         MOS03880
03D2   089E
03D4   41F0 0774          389           BAL   LINK,TSTDU         RETURN WITH R1 = DU BIT             MOS03890
03D8   4230 042A          390           BNZ   KEEP9              IF DU, DISPLAY TOTAL                MOS03900
03DC   4810 089A          391           LH    R1,WASDU1          WAS IT EVER ?                       MOS03910
03E0   4230 0464          392           BNZ   KEEP92             YES, PRINT TOTAL, TOTERR            MOS03920
03E4   41F0 06F2          393           BAL   LINK,TSTBRK                                             MOS03930
03E8   4810 092E          394           LH    R1,CONTIN+6        IF CONTIN = 1,                      MOS03940
03EC   233C               395           BZS   ABORT3             *                                ***  MOS03950
03EE   6110 089C          396           AHM   R1,TOTAL           INCREMENT TOTAL COUNTER          ***  MOS03960
03F2   4230 0324          397           BNZ   KEEP3              GO TO TEST 0 IF < MAX            ***  MOS03970
03F6   2511               398           LCS   R1,1               ELSE                             ***  MOS03980
03F8   6110 089C          399           AHM   R1,TOTAL           SET TOTAL TO MAX                 ***  MOS03990
03FC   4300 045E          400           B     HALT9              BRANCH TO PRINT TOTALS           ***  MOS04000
                          401  *                                                                       MOS04010
0400   41F0 0976          402  ABORT1   BAL   LINK,MMRESTOR      RESTORE ETPE MM POINTER          ***  MOS04020
                          403  *                                                                  ***  MOS04030
0404   41F0 0980          404  ABORT3   BAL   LINK,PSW2CHG       DISABLE INT @ PROCESSOR LEVEL    ***  MOS04040
0408   41F0 07AA          405           BAL   LINK,SETKB         KB DEVICE = LIST DEVICE             MOS04050
040C   C850 08FE          406           LHI   R5,EOTMSG                                               MOS04060
0410   41F0 0988          407           BAL   LINK,FPRINT        'END OF TEST'                    ***  MOS04070
                          408  *                                                                       MOS04080
0414   48F0 093A          409           LH    LINK,NOMSG+6       IS 'NOMSG' SET ?                 ***  MOS04090
0418   4230 0464          410           BNZ   KEEP92             YES, BRANCH                         MOS04100
041C   48F0 0946          411           LH    LINK,SCOPE+6       NO, IS 'SCOPE' = 4 ?             ***  MOS04110
0420   27F4               412           SIS   LINK,4                                                  MOS04120
0422   4330 0464          413           BZ    KEEP92             YES, BRANCH                         MOS04130
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0426   4300 01B8              B     OPTIN               NO, BRANCH                                MOS04140
                        *----------------------------------                                        MOS04150
                        *  ROUTINE INCREMENTS,DISPLAYS & CHECKS 'TOTAL'                            MOS04160
                        *                                                                          MOS04170
042A   4010 0898        KEEP9   STH   R1,WASDU            SET DU FLAGS                            MOS04180
042E   4010 089A                STH   R1,WASDU1                                                   MOS04190
                        *                                                                          MOS04200
0432   4810 089C        ABORT2  LH    R1,TOTAL            INCREMENT TOTAL                         MOS04210
0436   2611                     AIS   R1,1                                                        MOS04220
0438   4010 089C                STH   R1,TOTAL                                                    MOS04230
043C   41F0 04A2        KEEP91  BAL   LINK,DISPLAY        DISPLAY "TOTAL" & "TOTERR"              MOS04240
0440   089C                     DC    Z(TOTAL),Z(TOTERR)  (IF DISPLAY PANEL EQUIPPED)             MOS04250
0442   089E
0444   4810 089C                LH    R1,TOTAL                                                    MOS04260
0448   C510 7FFF                CLHI  R1,X'7FFF'          TOTAL < MAX RETAINABLE ?                MOS04270
044C   2389                     BNLS  HALT9                                                       MOS04280
044E   4800 08A0                LH    R0,BTESTNO          R0 = CURRENT TEST NUMBER                MOS04290
0452   4500 0896                CLH   R0,SELTST           IS IT LAST TEST ?                       MOS04300
0456   4280 032E                BL    KEEP4               NO, GO TO NEXT TEST                     MOS04310
045A   4300 0324                B     KEEP3               GO TO TEST 0                            MOS04320
                        *                                                                          MOS04330
045E   C810 80F0        HALT9   LHI   R1,X'80F0'          (R1) = X'80F0'                     ***  MOS04340
0462   9521                     EPSR  R2,R1               HALT PROCESSOR                          MOS04350
                        *                                                                          MOS04360
                        *  WHEN EXE/RUN IS PRESSED, PRINT TOTAL & TOTERR                           MOS04370
                        *                                                                          MOS04380
0464   41F0 0774        KEEP92  BAL   LINK,TSTDU          SEE IF LIST DEV IS ON                   MOS04390
0468   2035                     BNZS  HALT9               NO, HALT                                MOS04400
046A   2400             KEEP10  LIS   R0,0                                                        MOS04410
046C   4000 0898                STH   R0,WASDU            RESET PRESENT DU FLAG                   MOS04420
0470   41F0 05FC                BAL   LINK,CRLF           DO CR & LF                              MOS04430
0474   C850 08D0                LHI   R5,TOTMSG           LOAD TOTAL ERROR MESSAGE LOCATION       MOS04440
0478   41F0 0988                BAL   LINK,FPRINT         PRINT 'TOTAL   TOTERR'             ***  MOS04450
047C   2404                     LIS   R0,4                PRINT 4 HEX DIGITS EACH                 MOS04460
047E   4810 089C                LH    R1,TOTAL            GET "TOTAL"                             MOS04470
0482   C820 0FDC                LHI   R2,LOMSG                                                    MOS04480
0486   41F0 054C                BAL   LINK,HEXASC         PUT 'TOTAL' IN MSG                 ***  MOS04490
048A   4810 089E                LH    R1,TOTERR           GET "TOTERR"                            MOS04500
048E   C820 0FE1                LHI   R2,HIMSG                                                    MOS04510
0492   41F0 054C                BAL   LINK,HEXASC         PUT 'TOTERR' IN MSG                ***  MOS04520
0496   C850 0FDC                LHI   R5,LOMSG                                                    MOS04530
049A   41F0 0574                BAL   LINK,PRINT          PRINT THE VALUES IN HEX            ***  MOS04540
049E   4300 01B8                B     OPTIN               GO TO BEGINNING                         MOS04550
                        ***********************************                                        MOS04560
                        *   DISPLAY PANEL OUTPUT ROUTINE   (TIMEOUT IF NOT EQUIPPED)               MOS04570
                        *                                                                          MOS04580
04A2   2401             DISPLAY LIS   R0,1                LOAD DISPLAY PANEL ADDRESS              MOS04590
04A4   DE00 086E                OC    R0,INCR             PUT DISPLAY PANEL IN INCREM. MODE       MOS04600
04A8   481F 0002                LH    R1,2(LINK)          GET SECOND PARAMETER ADDRESS            MOS04610
04AC   4811 0000                LH    R1,0(R1)            GET THE DATA                            MOS04620
04B0   9511                     EPSR  R1,R1               EXCHANGE DATA BYTES                     MOS04630
04B2   9801                     WHR   R0,R1               WRITE DATA TO DISPLAY PANEL             MOS04640
04B4   481F 0000                LH    R1,0(LINK)          GET FIRST PARAMETER ADDRESS             MOS04650
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04B8   4811 0000                     LH    R1,0(R1)          GET THE D#ATA                            MOS04660
04BC   9511                          EPSR  R1,R1             EXCHANGE DATA BYTES                      MOS04670
04BE   9801                          WHR   R0,R1             WRITE DATA TO DISPLAY PANEL              MOS04680
04C0   DE00 086D                     OC    R0,NORM           PUT DISPLAY PANEL IN NORMAL MODE         MOS04690
04C4   430F 0004                     B     4(LINK)           RETURN                                   MOS04700
                         * **********************************                                         MOS04710
                         *  ERROR ROUTINES                   (OVERRIDE NOMSG OPTION)                  MOS04720
                         *                                                                            MOS04730
04C8   D000 00E0         ERR         STM   R0,ERRSAVE        STORE REGISTERS                          MOS04740
                         *                                                                      ***   MOS04750
04CC   41F0 0980         ERRCOM      BAL   LINK,PSW2CHG      DISABLE INT. @ PROC. LEVEL (30F0)***     MOS04760
04D0   41F0 0774                     BAL   LINK,TSTDU        GET LIST DEVICE DU BIT IN R1             MOS04770
04D4   4230 04FA                     BNZ   ERRCOM1           BRANCH IF OFF LINE                       MOS04780
04D8   4020 0892                     STH   R2,ISITERR        SET ERROR FLAGS                          MOS04790
04DC   4020 0894                     STH   R2,NOERR                                                   MOS04800
                         *                                                                            MOS04810
04E0   C850 08C4         ERR1        LHI   R5,ERRMSG         PRINT 'ERROR TTNN'                 ***   MOS04820
04E4   41F0 0574                     BAL   LINK,PRINT        TT = TEST NO.; NN = ERROR NO.      ***   MOS04830
04E8   2400              ERRCOM2     LIS   R0,0                                                       MOS04840
04EA   4000 0892                     STH   R0,ISITERR        RESET ERROR FLAG                         MOS04850
04EE   4820 0104                     LH    R2,PSW                                                     MOS04860
04F2   9502                          EPSR  R0,R2             PSW = X'30F0'                            MOS04870
04F4   D100 00E0                     LM    R0,ERRSAVE        RESTORE REGISTERS                        MOS04880
04F8   030F                          BR    LINK              RETURN TO TEST                           MOS04890
                         *                                                                            MOS04900
04FA   4810 089E         ERRCOM1     LH    R1,TOTERR         LIST DEVICE IS OFF                       MOS04910
04FE   2611                          AIS   R1,1              *                                        MOS04920
0500   4010 089E                     STH   R1,TOTERR         INCREMENT TOTERR                         MOS04930
0504   C510 7FFF                     CLHI  R1,X'7FFF'        *                                        MOS04940
0508   4280 043C                     BL    KEEP91            NO, ABORT CURRENT TEST & GOTO NEXT       MOS04950
050C   4300 045E                     B     HALT9             YES, HALT PROCESSOR                      MOS04960
                         * ***********************************                                        MOS04970
                         *  TO OBTAIN OPTION VALUE IN R6     (16 BITS, TARGT 16)                      MOS04980
                         *                                                                            MOS04990
0510   2460              OPTVAL      LIS   R6,0              INITIALIZE ACCUMULATOR                   MOS05000
0512   41F0 06A2                     BAL   R15,GETCHR        GET A CHAR IN R4                         MOS05010
0516   24FF              OPTVAL0     LIS   R15,15                                                     MOS05020
0518   D44F 08AA         OPTVAL1     CLB   R4,HEXTAB(R15)    SCAN TABLE FOR A CHARACTER MATCH         MOS05030
051C   2334                          BES   OPTVAL2           MATCH, BRANCH                            MOS05040
051E   27F1                          SIS   R15,1             OR DECREMENT POINTER                     MOS05050
0520   2214                          BNMS  OPTVAL1           IF POINTER IN RANGE, BRANCH              MOS05060
0522   030C                          BR    R12               ELSE, ERROR; VALUE NOT IN TABLE          MOS05070
0524   9164              OPTVAL2     SLLS  R6,4              SHIFT LEFT 4                             MOS05080
0526   066F                          OAR   R6,R15            OR IN CURRENT DIGIT                      MOS05090
0528   41F0 06A2         OPTVAL3     BAL   R15,GETCHR        GET NEXT CHAR                            MOS05100
052C   C540 005F                     CLHI  R4,X'5F'          IS IT LEFT ARROW ?                       MOS05110
0530   2334                          BES   OPTVAL5           YES, BRANCH                              MOS05120
0532   C540 0008                     CLHI  R4,X'08'          NO, IS IT BACK SPACE ?                   MOS05130
0536   2133                          BNES  OPTVAL4           NO, BRANCH                               MOS05140
0538   9064              OPTVAL5     SRLS  R6,4              YES, THROW AWAY LAST HEX ENTRY           MOS05150
053A   2209                          BS    OPTVAL3           BRANCH TO GET NEXT CHARACTER             MOS05160
053C   C540 000D         OPTVAL4     CLHI  R4,13             IS IT CR ?                               MOS05170
0540   033E                          BER   R14               YES, EXIT (RETURN)                       MOS05180
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0542  C540 002C      519          CLHI  R4,X'2C'          NO, IS IT COMMA ?                          MOS05190
0546  4230 0516      520          BNE   OPTVAL0          NO, LOOP TO PROCESS                        MOS05200
054A  030E           521          BR    R14              YES, RETURN                                MOS05210
                     522  *--------------------------------                                   ***   MOS05220
                     523  *  TO CONVERT HEXADECIMAL DATA IN R1 TO ASCII CHAR & STORE @ 0(R2)        MOS05230
                     524  *                                                                        MOS05240
054C  D000 00A0      525  HEXASC   STM   R0,RSAVE        STORE REGISTERS                            MOS05250
0550  0830           526           LDAR  R3,R0           R3 = NUMBER OF DIGITS                      MOS05260
0552  9132           527           SLLS  R3,2                                                       MOS05270
0554  2734           528           SIS   R3,4            R3 = 4(DIGITS)-4                           MOS05280
0556  0841           529  HEXASC1  LDAR  R4,R1           R4 = HEX DATA TO BE CONVERTED              MOS05290
0558  CC43 0000      530           SRAL  R4,0(R3)                                                   MOS05300
055C  C440 000F      531           NHI   R4,15           R4 = SINGLE HEX DIGIT FOR CONVERTION       MOS05310
0560  D344 08AA      532           LB    R4,HEXTAB(R4)   GET THE ASCII CHARACTER                    MOS05320
0564  D242 0000      533           STB   R4,0(R2)        STORE ASCII CHARACTER IN BUFFER            MOS05330
0568  2621           534           AIS   R2,1            BUMP BUFFER LOCATION POINTER               MOS05340
056A  2734           535           SIS   R3,4            DECREMENT DIGIT SHIFT REG. VALUE           MOS05350
056C  221B           536           BNMS  HEXASC1         LOOP TILL ALL DIGITS ARE CONVERTED         MOS05360
056E  D100 00A0      537           LM    R0,RSAVE        RESTORE REGISTERS                          MOS05370
0572  030F           538           BR    LINK            RETURN                                     MOS05380
                     539  *--------------------------------                                        MOS05390
                     540  *  TO PRINT THE ASCII MESSAGE                                            MOS05400
                     541  *                                                                        MOS05410
0574  D000 00A0      542  PRINT    STM   R0,RSAVE        STORE REGISTERS                            MOS05420
0578  41F0 0774      543           BAL   LINK,TSTDU      LIST DEVICE DU ?                           MOS05430
057C  2337           544           BZS   P1              NO, BRANCH                                 MOS05440
057E  4010 0898      545           STH   R1,WASDU        YES, SET DU FLAGS                          MOS05450
0582  4010 089A      546           STH   R1,WASDU1                                                  MOS05460
0586  4300 05F2      547           B     PRINT5          EXIT                                       MOS05470
058A  4820 0898      548  P1       LH    R2,WASDU        WAS IT DU LAST PASS ?                      MOS05480
058E  4330 05BC      549           BZ    P3              NO, BRANCH                                 MOS05490
0592  C810 0140      550           LHI   R1,X'140'       YES, LOAD DELAY CONSTANTS                  MOS05500
0596  C800 1000      551  P4       LHI   R0,X'1000'      INTO COUNTERS 1 & 2                        MOS05510
059A  2701           552  P5       SIS   R0,1            DECREMENT COUNTER 1                        MOS05520
059C  2031           553           BNZS  P5              WAIT TILL EXHAUSTED                        MOS05530
059E  2711           554           SIS   R1,1            DECREMENT COUNTER 2                        MOS05540
05A0  2035           555           BNZS  P4              LOOP TILL TIMEOUT                          MOS05550
                     556  *                             (20 SEC. FOR CRT WARM-UP)                  MOS05560
05A2  2440           557           LIS   R4,0                                                       MOS05570
05A4  4040 0898      558           STH   R4,WASDU        RESET PRESENT DU FLAG                      MOS05580
05A8  2541           559           LCS   R4,1            CHARACTER = X'FF'                          MOS05590
05AA  4040 089A      560           STH   R4,WASDU1       SET WASDU1 FLAG                            MOS05600
05AE  2434           561           LIS   R3,4                                                       MOS05610
05B0  41F0 060A      562  P2       BAL   LINK,OUTCHR     OUTPUT A DELETE CHARACTER                  MOS05620
05B4  2731           563           SIS   R3,1                                                       MOS05630
05B6  2023           564           BPS   P2              BRANCH 4 TIMES                             MOS05640
05B8  4300 046A      565           B     KEEP10          PRINT TOTAL, TOTERR                        MOS05650
05BC  4800 093A      566  P3       LH    R0,NOMSG+6      IS 'NOMSG' SET ?                           MOS05660
05C0  2335           567           BZS   PRINT2          NO, PRINT ALL MESSAGES                     MOS05670
05C2  4800 0892      568           LH    R0,ISITERR      IS 'ISITERR' SET ?                         MOS05680
05C6  4330 05F2      569           BZ    PRINT5          NO, NOT AN ERROR MSG.-EXIT                 MOS05690
                     570  *                                                                        MOS05700
05CA  D345 0000      571  PRINT2   LB    R4,0(R5)        GET A MESSAGE BYTE                         MOS05710
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05CE   41F0 060A          572            BAL   LINK,OUTCHR         OUTPUT IT                              MOS05720
05D2   274D               573            SIS   R4,13               CR ?                                   MOS05730
05D4   2333               574            BZS   PRINT3              YES, MSG OVER - BRANCH                 MOS05740
05D6   2651               575            AIS   R5,1                                                       MOS05750
05D8   2207               576            BS    PRINT2              NO, LOOP FOR NEXT CHARACTER            MOS05760
05DA   244A               577  PRINT3    LIS   R4,10               LF                                     MOS05770
05DC   D310 010B          578            LB    R1,IOSAVE+1         GET LIST DEV IDENTIFIER                MOS05780
05E0   2713               579            SIS   R1,3                LINE PRINTER ?                         MOS05790
05E2   2335               580            BZS   PRINT3A             BRANCH IF YES.                         MOS05800
05E4   41F0 060A          581            BAL   LINK,OUTCHR         LF                                     MOS05810
05E8   2541               582            LCS   R4,1                DEL                                    MOS05820
05EA   2302               583            BS    PRINT3B                                                    MOS05830
05EC   2441               584  PRINT3A   LIS   R4,1                YES, OUTPUT X'01'                      MOS05840
05EE   41F0 060A          585  PRINT3B   BAL   LINK,OUTCHR         TERMINAL CHARACTER                     MOS05850
05F2   41F0 06F2          586  PRINT5    BAL   LINK,TSTBRK                                                  MOS05860
05F6   D100 00A0          587            LM    R0,RSAVE            RESTORE REGISTERS                      MOS05870
05FA   030F               588            BR    LINK                RETURN                                 MOS05880
                          589  *--------------------------------                                          MOS05890
                          590  *  SMALL SUPPORT ROUTINES                                                  MOS05900
                          591  *                                                                          MOS05910
                          592  *  TO OUTPUT CR,LF TO LIST DEVICE                                          MOS05920
                          593  *                                                                          MOS05930
05FC   D000 00A0          594  CRLF      STM   R0,RSAVE            STORE REGISTERS                        MOS05940
0600   244D               595            LIS   R4,13                                                       MOS05950
0602   41F0 060A          596            BAL   LINK,OUTCHR         OUTPUT CR                              MOS05960
0606   4300 05DA          597            B     PRINT3              LINE FEED, RESTORE, RETURN             MOS05970
                          598  *--------------------------------                                          MOS05980
                          599  *  TO OUTPUT A CHARACTER TO THE LIST DEVICE                                 MOS05990
060A   40F0 08A6          600  OUTCHR    STA   R15,OUT.SAV         SAVE RETURN ADDRESS                    MOS06000
060E   D300 010B          601            LB    R0,IOSAVE+1         GET USER'S LIST DEVICE NUMBER          MOS06010
0612   2704               602            SIS   R0,4                                                       MOS06020
0614   4230 0652          603            BNZ   OUTCHR2             BRANCH IF NOT CAROUSEL                 MOS06030
0618   4000 006C          604            STH   R0,PAUSE            SET PAUSE FLAG                         MOS06040
061C   41F0 0774          605  OTC.0     BAL   LINK,TSTDU          LIST DEVICE ON LINE ?                  MOS06050
0620   4230 0698          606            BNZ   OUT0                NO, BRANCH                             MOS06060
0624   9D01               607            SSR   R0,R1               GET CAROUSEL STATUS                    MOS06070
0626   2386               608            BNCS  OTC.1               BRANCH IF CHAR. IS TO BE READ    ***   MOS06080
0628   4810 006C          609            LH    R1,PAUSE            PAUSED NOW ?                           MOS06090
062C   2038               610            BNZS  OTC.0               YES, LOOP                              MOS06100
062E   4300 0652          611            B     OUTCHR2             NO, GO OUTPUT CHARACTER                MOS06110
0632   9B01               612  OTC.1     RDR   R0,R1               GET CAROUSEL CHARACTER                 MOS06120
0634   C410 007F          613            NHI   R1,X'7F'            MASK OFF PARITY                        MOS06130
0638   CB10 0012          614            SHI   R1,X'12'            IS IT DC2 ?                            MOS06140
063C   2134               615            BNZS  OTC.3               NO, BRANCH                             MOS06150
063E   4010 006C          616            STH   R1,PAUSE            YES, RESET PAUSE FLAG                  MOS06160
0642   2308               617            BS    OUTCHR2             BRANCH                                 MOS06170
0644   2712               618  OTC.3     SIS   R1,2                IS IT DC4 ?                            MOS06180
0646   4230 061C          619            BNZ   OTC.0               NO, BRANCH                             MOS06190
064A   40F0 006C          620            STH   LINK,PAUSE          YES, RESET PAUSE FLAG                  MOS06200
064E   4300 061C          621            B     OTC.0               BRANCH                                 MOS06210
                          622  *                                                                          MOS06220
0652   4010 006C          623  OUTCHR2   STH   R1,PAUSE            RESET FLAG                             MOS06230
0656   41F0 0774          624            BAL   LINK,TSTDU          OFF-LINE ?                             MOS06240
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065A   4230 0698            BNZ   OUT0               BRANCH IF OFF-LINE                 MOS06250
                      *                                                                  MOS06260
065E   D310 010B      SETUP  LB    R1,IOSAVE+1        GET LIST DEVICE IDENTIFIER    ***  MOS06270
0662   9111                 SLHLS R1,1               HW INDEX                      ***  MOS06280
0664   D301 0111            LB    R0,IO+1(R1)        GET LIST DEVICE ADDRESS       ***  MOS06290
0668   DE01 0875            OC    R0,CONWRT(R1)      *                             ***  MOS06300
                      *                                                                  MOS06310
066C   9D01           OTC.4  SSR   R0,R1              WAIT FOR NOT BUSY                  MOS06320
066E   4230 0698            BTC   3,OUT0             BRANCH IF OFF-LINE                 MOS06330
0672   C510 000C            CLHI  R1,12              PASLA OFFLINE ?                    MOS06340
0676   4330 0698            BE    OUT0               BRANCH: YES.                       MOS06350
067A   C310 0008            THI   R1,8               BUSY ?                             MOS06360
067E   2039                 BNZS  OTC.4              WAIT FOR NOT BUSY.                 MOS06370
0680   9A04                 WDR   R0,R4              OUTPUT DATA BYTE                   MOS06380
0682   41F0 0774      OTC.5  BAL   LINK,TSTDU         LIST DEVICE DU ?                   MOS06390
0686   2139                 BNZS  OUT0               YES, BRANCH                        MOS06400
0688   D310 010B            LB    R1,IOSAVE+1        NO, GET USER'S LIST DEVICE NUMBER  MOS06410
068C   9111                 SLHLS R1,1               SHIFT IT FOR HW INDEXING           MOS06420
068E   D301 0111            LB    R0,IO+1(R1)        GET USER'S LIST DEV ADDRESS        MOS06430
0692   9D01                 SSR   R0,R1              GET THE STATUS                     MOS06440
0694   2089                 BTBS  8,OTC.5            WAIT FOR NOT BUSY.                 MOS06450
0696   2303                 BS    OUT1               BRANCH                             MOS06460
0698   4010 0898      OUT0   STH   R1,WASDU           SET PRESENT DU FLAG                MOS06470
069C   48F0 08A6      OUT1   LDA   R15,OUT.SAV        RESTORE RETURN ADDRESS             MOS06480
06A0   030F                 BR    R15                RETURN                             MOS06490
                      *----------------------------------                                MOS06500
                      *  TO GET A CHAR FROM KEYBOARD (IN REG R4)                         MOS06510
                      *                                                                  MOS06520
06A2   D300 0872      GETCHR LB    R0,CONADR          GET CONSOLE DEVICE ADDRESS    ***  MOS06530
       0000 06A2      KBREAD EQU   GETCHR             *                             ***  MOS06540
06A6   DE00 0874            OC    R0,CONRD           PUT CONSOLE IN READ MODE      ***  MOS06550
06AA   DB00 086C            RD    R0,SINK            SET BUSY FLAG                 ***  MOS06560
06AE   4890 010E            LH    R9,PASFLG          IS IT PASLA ?                 ***  MOS06570
06B2   2333           TTYGET BZS   KBXIT              NO, BRANCH                    ***  MOS06580
06B4   DE00 088C            OC    R0,CONRQ2S         YES, OC - RQ2S                ***  MOS06590
                      *                                                         ***  MOS06600
06B8   0890           KBXIT  LDAR  R9,R0              SAVE CONSOLE DEV ADDRESS      ***  MOS06610
06BA   9D04                 SSR   R0,R4              GET THE STATUS                     MOS06620
06BC   2081                 BTBS  8,1                IF BUSY, LOOP (POSSIBLE HANG) ****  MOS06630
06BE   9B04                 RDR   R0,R4              READ A CHAR IN R4                  MOS06640
                      * TO ECHO RECEIVED CHARACTERS TO CONSOLE DEVICE IN FDX MODE        MOS06650
06C0   D400 011A            CLB   R0,MICROBUS        IS IT MICROBUS ?                   MOS06660
06C4   233B                 BES   ECHO1              YES, BRANCH                        MOS06670
06C6   D390 0874            LB    R9,CONRD           NO, GET THE READ OC                MOS06680
06CA   C590 00A1            CLHI  R9,X'A1'           CAROUSEL ?                         MOS06690
06CE   2137                 BNES  ECHRTN             NO, DO NOT ECHO (BRANCH)           MOS06700
06D0   D390 0873            LB    R9,CONADR+1        GET CONSOLE WRITE ADDRESS          MOS06710
06D4   DD90 086C            SS    R9,SINK            GET THE STATUS                     MOS06720
06D8   2082                 BTBS  8,2                WAIT FOR NOT BUSY (POSSIBLE HANG)  MOS06730
06DA   9A94           ECHO1  WDR   R9,R4              ECHO RECEIVED BYTE                 MOS06740
06DC   C440 007F      ECHRTN NHI   R4,X'7F'           REMOVE PARITY BIT                  MOS06750
06E0   030F                 BR    LINK               RETURN                             MOS06760
                      *----------------------------------                                MOS06770
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                         678  *  TO OUTPUT '?' TO CONSOLE                                                    MOS06780
                         679  *                                                                             MOS06790
06E2   41F0 05FC         680  QUESTN   BAL   LINK,CRLF          DO CR & LF                                  MOS06800
06E6   C850 090C         681           LHI   R5,QMSG                                                        MOS06810
06EA   41F0 0988         682           BAL   LINK,FPRINT        PRINT '?'                             ***   MOS06820
06EE   4300 01C0         683           B     OPTIN1             TO ACCEPT COMMAND INPUT                     MOS06830
                         684  *-------------------------------                                             MOS06840
                         685  * IF BREAK KEY DEPRESSED, GO TO 'OPTIN' OR (BRKVECT); ELSE RETURN.           MOS06850
                         686  *    BUT IF "BREAK" & "CONTIN" = 1, GO TO ABORT1.                         ***   MOS06860
                         687  *                                                                             MOS06870
06F2   D000 00C0         688  TSTBRK   STM   R0,RSAVE+32       STORE REGISTERS                         ***   MOS06880
                         689  *                                                                         ***   MOS06890
06F6   40F0 08A8         690  TSTBRK6  STA   LINK,BRK.SAV      SAVE RETURN ADDRESS                     ***   MOS06900
06FA   D300 0872         691           LB    R0,CONADR          GET KEYBOARD DEVICE ADR                     MOS06910
06FE   9D01              692           SSR   R0,R1              GET KEYBOARD DEVICE STATUS                  MOS06920
0700   4210 0764         693           BTC   1,TSTBRK3          IF CLI DU, BRANCH                           MOS06930
0704   C510 000C         694           CLHI  R1,X'0C'           IS PASLA/PALM DU ?                          MOS06940
0708   4330 0764         695           BE    TSTBRK3            YES, BRANCH                                 MOS06950
070C   C310 0020         696           THI   R1,X'20'           NO, IS "BREAK" KEY DEPRESSED ?              MOS06960
0710   4330 0764         697           BZ    TSTBRK3            NO, EXIT (BRANCH)                           MOS06970
0714   D320 0110         698           LB    R2,IO              YES, GET CONSOLE DEVICE POINTER             MOS06980
0718   C520 0005         699           CLHI  R2,5               IS IT MICROBUS ?                            MOS06990
071C   2138              700           BNES  TSTBRK4            NO, BRANCH                                  MOS07000
071E   9B02              701  TSTBRK5  RDR   R0,R2              YES, READ THE CHARACTER                     MOS07010
0720   9D01              702           SSR   R0,R1              GET THE DEVICE STATUS                       MOS07020
0722   C310 0020         703           THI   R1,X'20'           STILL "BREAK" ?                             MOS07030
0726   2034              704           BNZS  TSTBRK5            YES, BRANCH (LOOP)                          MOS07040
0728   4300 0750         705           B     TSTBRK2            NO, BRANCH (EXIT)                           MOS07050
072C   4820 010E         706  TSTBRK4  LH    R2,PASFLG          PASLA ?                                     MOS07060
0730   233C              707           BZS   TSTBRK1            BRANCH IF NOT                               MOS07070
0732   C310 0008         708           THI   R1,8               ALREADY ACKNOWLEDGED ?                      MOS07080
0736   4230 0764         709           BNZ   TSTBRK3            BRANCH IF YES                               MOS07090
073A   9B02              710           RDR   R0,R2              READ THE CHARACTER                          MOS07100
073C   9D01              711           SSR   R0,R1              GET THE DEVICE STATUS                       MOS07110
073E   2281              712           BFBS  8,1                WAIT FOR BUSY TO SET                        MOS07120
0740   0822              713           LDAR  R2,R2              ZERO CHARACTER ?                            MOS07130
0742   4230 0764         714           BNZ   TSTBRK3            NO, BRANCH: JUST FRAMING ERROR          ***   MOS07140
0746   2305              715           BS    TSTBRK2            YES, EXIT -(W/BREAK)                        MOS07150
0748   9D01              716  TSTBRK1  SSR   R0,R1              GET THE DEVICE STATUS                       MOS07160
074A   C310 0020         717           THI   R1,X'20'           "BREAK" STATUS ?                            MOS07170
074E   2033              718           BNZS  TSTBRK1            NO, BRANCH (WAIT FOR BREAK RELEASE)*        MOS07180
0750   48F0 092E         719  TSTBRK2  LH    R15,CONTIN+6       YES, IS CONTIN SET ?                    ***   MOS07190
0754   4230 0400         720           BNZ   ABORT1             IF CONTIN SET, BRANCH TO ABORT1         ***   MOS07200
0758   48F0 0108         721           LH    R15,BRKVECT        NO, CHECK FOR SPECIAL ROUTINE               MOS07210
075C   4330 01B8         722           BZ    OPTIN              BRK W/NO VECTOR, BRANCH TO EXEC.            MOS07220
0760   40F0 08A8         723           STH   R15,BRK.SAV        SET UP EXIT ADDRESS                         MOS07230
0764   2400              724  TSTBRK3  LIS   R0,0                                                          MOS07240
0766   4000 0108         725           STH   R0,BRKVECT         DELETE VECTOR AFTER ONE SHOT                MOS07250
076A   D100 00C0         726           LM    R0,RSAVE+32        RESTORE REGISTERS                       ***   MOS07260
076E   48F0 08A8         727           LDA   LINK,BRK.SAV       RESTORE RETURN ADDRESS                      MOS07270
0772   030F              728           BR    LINK               RETURN TO PROGRAM                           MOS07280
                         729  *-------------------------------                                             MOS07290
                         730  * SEE IF LIST DEVICE OFF-LINE (R1, CC NON-ZERO IF OFF)                        MOS07300
```

```
                    *                                                  MOS07310
0774  2401          TSTDU    LIS   R0,1             LOAD CLI DU STATUS MASK         MOS07320
0776  4810 0870              LH    R1,PASFLG2       IS IT ON PASLA ?                MOS07330
077A  2333                   BZS   $TSTDU0          NO, BRANCH                      MOS07340
077C  C800 00FC              LHI   R0,X'FC'         YES, LOAD PASLA DU STATUS MASK  MOS07350
0780  D310 010B     $TSTDU0  LB    R1,IOSAVE+1      GET LIST DEVICE IDENTIFIER      MOS07360
0784  9111                   SLHLS R1,1             (R1) = 2,4,6,8,A                MOS07370
0786  D311 0110              LB    R1,IO(R1)        GET LIST DEVICE ADDRESS         MOS07380
078A  D210 086C              STB   R1,SINK          SAVE THE LIST DEVICE ADDRESS    MOS07390
078E  9D11                   SSR   R1,R1            GET THE DEVICE STATUS           MOS07400
0790  0410                   NAR   R1,R0            MASK IT OFF                     MOS07410
0792  C310 0001              THI   R1,1             IS CLI DU ?                     MOS07420
0796  2135                   BNZS  $TSTDU2          YES, BRANCH                     MOS07430
0798  C510 000C              CLHI  R1,X'0C'         NO, IS PASLA DU ?               MOS07440
079C  2332                   BES   $TSTDU2          YES, BRANCH                     MOS07450
079E  2511          $TSTDU1  LCS   R1,1             NO, SET UP R1 FOR CC = 0        MOS07460
07A0  D300 086C     $TSTDU2  LB    R0,SINK          RESTORE LIST DEVICE ADDRESS     MOS07470
07A4  C710 FFFF              XHI   R1,-1            SET CC STATUS                   MOS07480
07A8  030F                   BR    LINK             RETURN                          MOS07490
                    * --------------------------------                          MOS07500
                    * TO DIRECT INPUT AND OUTPUT TO CONSOLE DEVICE              MOS07510
                    *                                                          MOS07520
07AA  D300 0110     SETKB    LB    R0,IO            GET KEYBOARRD DEVICE POINTER    MOS07530
07AE  9410                   EXBR  R1,R0            ISOLATE CONSOLE LIST POINTER    MOS07540
07B0  0610                   OAR   R1,R0            COMBINE CONSOLE POINTERS        MOS07550
07B2  4010 010A              STH   R1,IOSAVE        SET KB DEVICE = LIST DEVICE     MOS07560
07B6  030F                   BR    LINK             RETURN                          MOS07570
                    *--------------------------------                          MOS07580
                    *  LOW CORE SET UP ROUTINE                                 MOS07590
                    *                                                          MOS07600
07B8  2410          LCORE    LIS   R1,0             SET UP BXLE REGISTERS           MOS07610
07BA  2422                   LIS   R2,2             R1 - R3                         MOS07620
07BC  C830 004E              LHI   R3,X'4E'                                         MOS07630
07C0  2400                   LIS   R0,0                                             MOS07640
07C2  4001 0000     ZERO1    STH   R0,0(R1)                                         MOS07650
07C6  C110 07C2              BXLE  R1,ZERO1         ZERO CORE FROM 0 THRU X'4F'     MOS07660
07CA  C830 07E4              LHI   R3,II                                            MOS07670
07CE  4030 0036              STH   R3,X'36'         SET ILL INST INT NEW PSW LOC    MOS07680
07D2  C840 083A              LHI   R4,MM                                            MOS07690
07D6  4040 003E              STH   R4,X'3E'         SET M. M. INT NEW PSW LOC       MOS07700
07DA  C840 00A0              LHI   R4,RSAVE         *                          ***  MOS07710
                    *                                                          MOS07720
                    *  SET UP LOW CORE FOR 16 BIT MACHINE                 ***  MOS07730
                    *                                                          MOS07740
07DE  4040 0022              STH   R4,X'22'         SET REGISTER SAVE POINTER       MOS07750
07E2  030F                   BR    LINK             *                          ***  MOS07760
                    *--------------------------------                          MOS07770
                    *  SPURIOUS INTERRUPT HANDLERS                             MOS07780
                    *                                                          MOS07790
                    *                                                          MOS07800
                    *  ILLEGAL INSTRUCTION INTERRUPT TRAP                      MOS07810
                    *                                                          MOS07820
07E4  41F0 0976     II       BAL   LINK,MMRESTOR    RESTORE ETPE MM POINTER    ***  MOS07830
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```
07E8  C820 4632          784          LHI   R2,C'F2'                                          MOS07840
07EC  4020 08CC          785          STH   R2,ERRNO          SET ERROR NUMBER F2               MOS07850
07F0  D1E0 0030          786          LM    R14,X'30'         LOAD OLD PSW & OLD LOC      ***   MOS07860
                         787  *                                                                 MOS07870
07F4  D0E0 0868          788  II32    STM   R14,OPSW          SAVE OLD PSW & OLD LOC      ***   MOS07880
      0000 07F4          789  COMM    EQU   II32              *                           ***   MOS07890
                         790  *                                                                 MOS07900
07F8  41F0 0980          791  COMM1   BAL   LINK,PSW2CHG       NO INT., REG SET 15         ***   MOS07910
07FC  41F0 04C8          792          BAL   LINK,ERR           PRINT 'ERROR XXFN'          ***   MOS07920
0800  2404              793  ERRPL1  LIS   R0,4               SET DIGITS = 4              ***   MOS07930
0802  4810 0868          794          LH    R1,OPSW           R1 = OLD PSW                ***   MOS07940
0806  C820 08EE          795          LHI   R2,ASCIPSW        R2 = OPSW MESSAGE LOCATION  ***   MOS07950
080A  41F0 054C          796          BAL   LINK,HEXASC       CONVERT IT TO ASCII         ***   MOS07960
080E  4810 086A          797          LH    R1,OLOC           R1 = OLD LOC.               ***   MOS07970
0812  C820 08F8          798          LHI   R2,ASCILOC        R2 = OLD LOC MESSAGE LOCATION ***   MOS07980
0816  41F0 054C          799          BAL   LINK,HEXASC       CONVERT IT TO ASCII         ***   MOS07990
081A  C850 08EA          800          LHI   R5,PSWMSG         *                           ***   MOS08000
081E  41F0 0988          801          BAL   LINK,FPRINT       PRINT 'PSW PPPP  LOC LLLL'  ***   MOS08010
                         802  *                                                           ***   MOS08020
0822  4300 01C0          803          B     OPTIN1            ENTER COMMAND MODE          ***   MOS08030
                         804  *                                                           ***   MOS08040
                         805  *                                                                 MOS08050
                         806  *  MACHINE MALFUNCTION INTERRUPT TRAP                             MOS08060
                         807  *                                                                 MOS08070
0826  95AA               808  MM0     EPSR  R10,R10           CAPTURE MM INT PSW          ***   MOS08080
0828  41F0 0976          809          BAL   LINK,MMRESTOR      RESTORE ETPE MM POINTER     ***   MOS08090
082C  C4A0 000F          810          NHI   R10,X'000F'        MASK MM INT PSW             ***   MOS08100
0830  08AA              811          LDAR  R10,R10           IS CC = 0 ?                 ***   MOS08110
0832  2137              812          BNZS  MM1               NO, BRANCH                  ***   MOS08120
0834  41F0 0EA0          813          BAL   LINK,PARERR       YES, PRINT PARITY ERROR     ***   MOS08130
0838  2304              814          BS    MM1               BRANCH                      ***   MOS08140
                         815  *                                                                 MOS08150
                         816  *                                                                 MOS08160
083A  95AA               817  MM      EPSR  R10,R10           CAPTURE MMINT PSW                 MOS08170
083C  C4A0 000F          818          NHI   R10,X'000F'                                        MOS08180
0840  C820 4633          819  MM1     LHI   R2,C'F3'                                          MOS08190
0844  4020 08CC          820          STH   R2,ERRNO          SET ERROR NUMBER F3               MOS08200
0848  D1E0 0038          821          LM    R14,X'38'         LOAD OLD PSW & OLD LOC (16 BIT) ***   MOS08210
084C  C4E0 FFF0          822  MM32    NHI   R14,X'FFF0'                                       MOS08220
0850  06EA              823          OAR   R14,R10           CC = MALFUNCTION            ***   MOS08230
0852  D0E0 0868          824          STM   R14,OPSW          STORE OLD PSW & OLD LOC (16 BIT) ***  MOS08240
0856  C810 7FFF          825          LHI   R1,X'7FFF'                                        MOS08250
085A  2711              826  MM16    SIS   R1,1                                              MOS08260
085C  2021              827          BPS   MM16              SHORT DELAY FOR PROCESSOR SETTELING   MOS08270
085E  C800 80F0          828          LHI   R0,X'80F0'        (R0) = X'80F0'              ***   MOS08280
0862  9520              829          EPSR  R2,R0             HALT PROCESSOR                    MOS08290
                         830  *                                                                 MOS08300
                         831  *   WHEN EXE/RUN IS DEPRESSED, ERROR MSG IS PRINTED.              MOS08310
                         832  *                                                                 MOS08320
0864  4300 07F8          833          B     COMM1                                             MOS08330
                         834  *---------------------------------                              MOS08340
                         835  *  ETPE CONSTANTS & TABLES                                       MOS08350
                         836  *                                                                 MOS08360
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```
                          *-----------------------------------                                        ***
0868   0000               OPSW      DCX   0                        OLD PSW STORRAGE AREA
086A   0000               OLOC      DCX   0
                          *-----------------------------------
086C   00                 SINK      DB    0                        BIT BUCKET
086D   80                 NORM      DB    X'80'                    DISPLAY PANEL 'NORMAL' MODE
086E   40                 INCR      DB    X'40'                    DISPLAY PANEL 'INCREMENTAL' MODE
086F   00                           DB    *                        (ALIGN ON HALFWORD BOUNDRY)         ***
0870   0000               PASFLG2   DCX   0                        SET WHEN LIST DEVICE ON PASLA
                          * ---------------------------------
                          *  ETPE IO COMMANDS
                          *
0872   0000               CONADR    DCX   0                        CONSOLE DEVICE ADDRESS
                          *
0874   0000               CONRD     DCX   0                        CONSOLE READ/WRITE COMMANDS
       0000 0875          CONWRT    EQU   CONRD+1
0876   B1A3               CRTRD     DCX   B1A3                     FOR CRT
0878   A4D8               CLIFRD    DCX   A4D8                     *   CURRENT LOOP INTERFACE
087A   0080               LPWRT     DCX   0080                     *   LINE PRINTER
087C   A1A3               CARRD     DCX   A1A3                     *   CAROUSEL 300
087E   8202               MREADC    DCX   8202                     *   MICROBUS
                          *
0880   0000               CON2ND    DCX   0                        2ND COMMAND; ENABLE READ COMMAND
       0000 0881          CONENRD   EQU   CON2ND+1
0882   F871               CRT2ND    DCX   F871                     FOR CRT
0884   0064               CLIF2ND   DCX   0064                     *   CURRENT LOOP INTERFACE
0886   0000                         DCX   0                        *   DUMMY HW FOR LP
0888   F061               CAR2ND    DCX   F061                     *   CAROUSEL 300
088A   0000                         DCX   0                        *   DUMMY HW FOR MICROBUS
                          *
088C   00                 CONRQ2S   DB    0                        CONSOLE REQUEST TO SEND CMD
088D   33                 CRTRQ2S   DB    X'33'                    FOR CRT
088E   00                           DB    0                        *   DUMMY BYTE FOR CLI
088F   00                           DB    0                        *   DUMMY BYTE FOR LP
0890   23                 CARRQ2S   DB    X'23'                    *   CAROUSEL 300
0891   00                           DB    0                        *   DUMMY BYTE FOR MICROBUS
0892                                DB    *                        (ALIGN ON HW BOUNDRY)
                          * --------------------
0892   0000               ISITERR   DCX   0
0894   0000               NOERR     DCX   0
0896   0000               SELTST    DCX   0                        HIGHEST SELECTED TEST NUMBER
0898   0000               WASDU     DCX   0                        1 IF KEYBOARD DEVICE WAS OFF
089A   0000               WASDU1    DCX   0                        NON-ZERO IF TOTAL,TOTERR TO PRINT
089C   0000               TOTAL     DCX   0                        NO. OF TIMES THE SELECTED TESTS RUN
089E   0000               TOTERR    DCX   0                        TOTAL ERRORS DETECTED WHILE DU
08A0   0000               BTESTNO   DCX   0                        CURRENT TEST NUMBER IN BINARY
08A2   0000               COUNT     DCX   0
08A4   0000               NEXTST    DCX   0                        NEXT TEST NUMBER
08A6   0000               OUT.SAV   DCX   0                        "OUTCHR" RETURN ADDRESS SAVE
08A8   0000               BRK.SAV   DCX   0                        "TSTBRK" RETURN ADDRESS SAVE
                          *
08AA   3031 3233 3435 3637  HEXTAB  DB    C'0123456789ABCDEF'
08B2   3839 4142 4344 4546
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                          889  *--------------------------------                                    MOS08890
                          890  *  ETPE MESSAGES                                                    MOS08900
                          891  *                                                                   MOS08910
08BA  5445 5354 2020 2A2A 892  TSTMSG   DC    C'TEST  **',X'0D00'                                  MOS08920
08C2  0D00
      0000 08C0           893  MTESTNO  EQU   TSTMSG+6           *                        ***     MOS08930
08C4  4552 524F 5220 2A2A 894  ERRMSG   DC    C'ERROR ****',X'0D00'                               MOS08940
08CC  2A2A
08CE  0D00
      0000 08CA           895  ETESTNO  EQU   ERRMSG+6           STORED BY ETPE           ***     MOS08950
      0000 08CC           896  ERRNO    EQU   ERRMSG+8           STORE ERRNO AS CHAR CONSTANT***  MOS08960
08D0  544F 5441 4C20 2020 897  TOTMSG   DC    C'TOTAL   TOTERR',X'0D00'                           MOS08970
08D8  544F 5445 5252
08DE  0D00
08E0  4E4F 2045 5252 4F52 898  NOERMSG  DC    C'NO ERROR',X'0D00'                                 MOS08980
08E8  0D00
08EA  5053 5720 2A2A 2A2A 899  PSWMSG   DC    C'PSW ****  LOC ****',X'0D00'                       MOS08990
08F2  2020 4C4F 4320 2A2A
08FA  2A2A
08FC  0D00
      0000 08EE           900  ASCIPSW  EQU   PSWMSG+4           *                        ***     MOS09000
      0000 08F8           901  ASCILOC  EQU   PSWMSG+14          *                        ***     MOS09010
08FE  454E 4420 4F46 2054 902  EOTMSG   DC    C'END OF TEST',X'0D00'                              MOS09020
0906  4553 5420
090A  0D00
090C  3F0D                903  QMSG     DC    X'3F0D'                                             MOS09030
090E  2A0D                904  AMSG     DC    X'2A0D'                                             MOS09040
                          905  *----------------------------                                      MOS09050
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                          907  ************************************************************************  MOS09070
                          908  *                                                                       MOS09080
                          909  *  OPTION/COMMAND TABLE                                                 MOS09090
                          910  *                                                                       MOS09100
0910  5445 5354 2020      911  TEST     DC    C'TEST  ',X'F800',X'0',X'0' *          0 TO 4           MOS09110
0916  F800
0918  0000
091A  0000
      0000 0910           912  OPT      EQU   TEST                                                    MOS09120
                          913  *                                                                       MOS09130
091C  4C4F 4F50 2020      914  LOOP     DC    C'LOOP  ',X'0',Z(LEVELIN),X'7FFF' *     MAX=X'7FFF'      MOS09140
0922  0000
0924  0284
0926  7FFF
0928  434F 4E54 494E      915  CONTIN   DC    C'CONTIN',X'0',Z(LEVELIN),X'1' *        0 OR 1           MOS09150
092E  0000
0930  0284
0932  0001
0934  4E4F 4D53 4720      916  NOMSG    DC    C'NOMSG ',X'0',Z(LEVELIN),X'1' *        0 OR 1           MOS09160
093A  0000
093C  0284
093E  0001
0940  5343 4F50 4520      917  SCOPE    DC    C'SCOPE ',X'0',Z(LEVELIN),X'5' *        MAX = 5          MOS09170
0946  0000
0948  0284
094A  0005
094C  504F 554E 4420      918  POUND    DC    C'POUND ',X'A',X'0',X'0' *              1 TO FFFF        MOS09180
0952  000A
0954  0000
0956  0000
0958  4441 5441 2020      919  DATA     DC    C'DATA  ',X'A',X'0',X'0' *              0 TO FFFF        MOS09190
095E  000A
0960  0000
0962  0000
                          920  *                                                                       MOS09200
                          921  ************************************************************************  MOS09210
                          922  *                                                                       MOS09220
      0000 0964           923  OPTEND   EQU   *                                                       MOS09230
                          924  *                                                                       MOS09240
0964  5255 4E20 2020      925  RUN      DC    C'RUN   ',X'0',X'0',X'0'                                 MOS09250
096A  0000
096C  0000
096E  0000
0970  FFFF                926           DC    -1                                                     MOS09260
                          927  *                                                                       MOS09270
0972  1000                928  LOLIM    DC    X'1000'           LOW LIMIT OF MEMORY UNDER TEST       MOS09280
0974  1FFF                929  HILIM    DC    X'1FFF'           HIGH LIMIT OF MEMORY UNDER TEST      MOS09290
                          930  *                                                                       MOS09300
                          931  ************************************************************************  MOS09310
                          932  *                                                                       MOS09320
0976  C810 083A           933  MMRESTOR LHI   R1,MM             GET THE MM SERVICE ROUTINE ADDR  ***  MOS09330
097A  4010 003E           934           STH   R1,X'3E'          RESET M. M. POINTER              ***  MOS09340
097E  030F                935           BR    LINK              RETURN                           ***  MOS09350
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                               936  *                                                                   ***  MOS09360
                               937  *----------------------------------                                 ***  MOS09370
                               938  *                                                                   ***  MOS09380
0980   4810 0106               939  PSW2CHG  LH    R1,PSW2             GET PSW2                          ***  MOS09390
0984   9501                    940           EPSR  R0,R1               SET PSW = X'30F0'                 ***  MOS09400
0986   030F                    941           BR    LINK                RETURN                            ***  MOS09410
                               942  *                                                                   ***  MOS09420
                               943  *----------------------------------                                 ***  MOS09430
                               944  *                                                                   ***  MOS09440
0988   40F0 0892               945  FPRINT   STH   LINK,ISITERR        FORCE PRINTING                    ***  MOS09450
098C   40F0 09D0               946           STH   LINK,TEMP2          SAVE RETURN ADDRESS               ***  MOS09460
0990   41F0 0574               947           BAL   LINK,PRINT          PRINT                             ***  MOS09470
0994   24F0                    948           LIS   LINK,0              *                                 ***  MOS09480
0996   40F0 0892               949           STH   LINK,ISITERR        RESET FORCED PRINTING FLAG        ***  MOS09490
099A   48F0 09D0               950           LH    LINK,TEMP2          RESTORE RETURN ADDRESS            ***  MOS09500
099E   030F                    951           BR    LINK                RETURN                            ***  MOS09510
                               952  *                                                                        MOS09520
                               953  *----------------------------------                                      MOS09530
                               954  *                                                                        MOS09540
09A0   5331 3620 3139 2D31     955  TITLE    DC    C'S16 19-197 MOS MEMORY TEST PART 1 '                     MOS09550
09A8   3937 204D 4F53 204D
09B0   454D 4F52 5920 5445
09B8   5354 2050 4152 5420
09C0   3120
09C2   3036 2D32 3032 4630     956           DC    C'06-202F02R01'     *                                 ***  MOS09560
09CA   3252 3031
09CE   0D0A                    957           DC    X'0D0A'                                                   MOS09570
                               958  *                                                                        MOS09580
                               959  *                                                                        MOS09590
09D0   0000                    960  TEMP2    DCX   0                   TEMP. RETURN ADDRES SAVE LOC.         MOS09600
       0000 E000               961  DEFTESTS EQU   X'E000'             DEFINES TESTS 0,1,& 2             ***  MOS09610
                               962  *                                  AS DEFAULT TESTS                      MOS09620
                               963  *                                                                        MOS09630
       0000 0004               964  MAXTST   EQU   H'4'                DEFINES TESTS 0,1,2,3,& 4         ***  MOS09640
                               965  *                                  AS LEGAL TEST NUMBERS.                MOS09650
                               966  *                                                                        MOS09660
                               967  *  TESTS TABLE                                                           MOS09670
                               968  *                                                                        MOS09680
09D2   09DC                    969  TESTS    DC    A(TEST0)            MEMORY SEARCH TEST                ***  MOS09690
09D4   0A0E                    970           DC    A(TEST1)            SHORT HAMMER DISTURB TEST             MOS09700
09D6   0B3C                    971           DC    A(TEST2)            DIAGONAL GALPAT TEST                  MOS09710
09D8   0C7A                    972           DC    A(TEST3)            MEMORY HOLD TEST                      MOS09720
09DA   0D4C                    973           DC    A(TEST4)            LONG HAMMER DISTURB TEST              MOS09730
                               974  *                                                                        MOS09740
                               975  ************************************************************************ MOS09750
                               976  *        END   ETPE R03-06 (16-BIT MODIFIED & STRIPPED)                  MOS09760
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                           978  *        TEST 0                   MEMORY SEARCH TEST                         MOS09780
                           979  *                                                                            MOS09790
                           980  *        PURPOSE:                                                            MOS09800
                           981  *              THIS UTILITY ENABLES THE USER TO LIST MEMORY                  MOS09810
                           982  *              UNDER TEST.                                                   MOS09820
                           983  *                                                                            MOS09830
                           984  *        ASSUMPTIONS:                                                        MOS09840
                           985  *              MEMORY ALLOWABLE IS 8K BYTES.                                 MOS09850
                           986  *                                                                            MOS09860
                           987  *        DESIGN SPECIFICATIONS:                                              MOS09870
                           988  *              PRINT MEMORY LIMITS UNDER TEST.                               MOS09880
                           989  *                                                                            MOS09890
                           990  *        OPTIONS:                                                            MOS09900
                           991  *              NONE                                                          MOS09910
                           992  *                                                                            MOS09920
                           993  *        HOW TO RUN THE TEST:                                                MOS09930
                           994  *              ENTER "RUN" AND THE AVAILABLE MEMORY LOCATIONS WILL           MOS09940
                           995  *              BE PRINTED ON THE LIST DEVICE IN A CONTIGUIOUS BLOCK.         MOS09950

09DC   C850 0FC8           997  TESTO   LDAI  R5,ASMEMMSG         LOAD MESSAGE ADDRESS                       MOS09970
09E0   2404                998          LIS   R0,4                                                           MOS09980
09E2   4810 0972           999          LH    R1,LOLIM                                                       MOS09990
09E6   41F0 054C          1000          BAL   LINK,HEXASC         PUT LOLIM IN MEMORY MESSAGE                MOS10000
09EA   0FDC               1001          DC    Z(LOMSG)                                                       MOS10010
09EC   4810 0974          1002          LH    R1,HILIM                                                       MOS10020
09F0   41F0 054C          1003          BAL   LINK,HEXASC         PUT HILIM IN MEMORY MESSAGE                MOS10030
09F4   0FE1               1004          DC    Z(HIMSG)                                                       MOS10040
09F6   41F0 0574          1005          BAL   LINK,PRINT          PRINT MEMORY MESSAGE                       MOS10050
09FA   4300 03AA          1006          B     KEEP7                                                          MOS10060
                          1007  *                                                                            MOS10070
                          1008  ***********************************************************************      MOS10080
                          1009  *                                                                            MOS10090
09FE   D000 00C0          1010  TSTBRKX STM   R0,RSAVE+32         *                                   ***    MOS10100
0A02   C810 038A          1011          LHI   R1,TSTEND           *                                   ***    MOS10110
0A06   4010 0108          1012          STH   R1,BRKVECT          ESTABLISH BRKVECT                   ***    MOS10120
0A0A   4300 06F6          1013          B     TSTBRK6             GO TEST FOR BREAK                   ***    MOS10130
                          1014  *                                                                            MOS10140
                          1015  ***********************************************************************      MOS10150
                          1016  *        END   TEST 0                                                        MOS10160
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                              1018  *        TEST 1                      SHORT COUNT RELOCATABLE             MOS10180
                              1019  *                                    HAMMER DISTURB TEST                 MOS10190
                              1020  *                                                                        MOS10200
                              1021  *        PURPOSE:                                                        MOS10210
                              1022  *              THIS TEST EXECUTES A SMALL, RELOCATABLE PROGRAM           MOS10220
                              1023  *              (16 HALFWORDS) THROUGHOUT MEMORY, LOOKING FOR "SOFT"      MOS10230
                              1024  *              FAILURES.                                                 MOS10240
                              1025  *                                                                        MOS10250
                              1026  *        ASSUMPTIONS:                                                    MOS10260
                              1027  *              8KB MOS MEMORY                                            MOS10270
                              1028  *                                                                        MOS10280
                              1029  *        DESIGN SPECIFICATIONS:                                          MOS10290
                              1030  *              1. THE TEST PROGRAM MUST USE 16 HALFWORDS HEAVILY,        MOS10300
                              1031  *                 DUE TO THE INTERNAL CHIP ADDRESSING SCHEME.            MOS10310
                              1032  *              2. THE TEST RUNS WITH A BACKGROUND PATTERN OF ALL 1'S     MOS10320
                              1033  *                 AND ALL 0'S.                                           MOS10330
                              1034  *              3. THE TEST LOOPS 10 TIMES(INTERNAL TO THE MODULE).       MOS10340
                              1035  *              4. THE ROUTINE (STLOOP) IS EXECUTED 10 TIMES. THE ENTIRE  MOS10350
                              1036  *                 ROUTINE IS THEN RELOCATED IN MEMORY AND EXECUTED 10    MOS10360
                              1037  *                 TIMES. "STLOOP" IS MOVED UP IN MEMORY UNTIL THE LAST   MOS10370
                              1038  *                 TEST HALFWORD IS IN THE LAST MEMORY HALFWORD.          MOS10380
                              1039  *                                                                        MOS10390
                              1040  *        OPTIONS:                                                        MOS10400
                              1041  *              POUND - NUMBER OF TIMES A'S & 5'S ARE POUNDED IN MEMORY   MOS10410
                              1042  *              SCOPE - ERROR OPTION MODE                                 MOS10420
                              1043  *                  0 - PRINT ERROR DATA AND SKIP TO NEXT TEST            MOS10430
                              1044  *                  1 - PRINT BAD CHIP NUMBER(S) AND SKIP TO NEXT TEST    MOS10440
                              1045  *                  2 - PRINT ERROR DATA AND CONTINUE TEST                MOS10450
                              1046  *                  3 - PRINT ERROR DATA AND HALT                         MOS10460
                              1047  *                  4 - IGNORE ERROR                                      MOS10470
                              1048  *                  5 - PRINT BAD CHIP NUMBER(S) AND CONTINUE TEST        MOS10480
                              1049  *                                                                        MOS10490
                              1050  *        HOW TO RUN THE TEST:                                            MOS10500
                              1051  *              1. ENTER THE "SCOPE" & "POUND" OPTIONS VIA THE CONSOLE    MOS10510
                              1052  *                 DEVICE.                                                MOS10520
                              1053  *              2. ENTER "RUN" AND THE TEST WILL EXECUTE.                 MOS10530


0A0E   4860 0972              1055  TEST1    LH    R6,LOLIM            INITIALIZE MEMORY LIMITS            MOS10550
0A12   4880 0974              1056           LH    R8,HILIM                                                MOS10560
0A16   2472                   1057           LIS   R7,2                                                    MOS10570
0A18   0806                   1058           LDAR  R0,R6               R0 = LOLIM                          MOS10580
0A1A   0898                   1059           LDAR  R9,R8               R9 = HILIM                          MOS10590
0A1C   2411                   1060           LIS   R1,1                LOAD DISPLAY ADDRESS                MOS10600
0A1E   C8A0 5555              1061           LHI   R10,X'5555'                                             MOS10610
0A22   C8B0 AAAA              1062           LHI   R11,X'AAAA'                                             MOS10620
0A26   C850 003E              1063           LHI   R5,ENDMOV5-STLOOP+2 LOAD TEST ADDRESS DIFFERENCE        MOS10630
0A2A   2521                   1064           LCS   R2,1                                                    MOS10640
                              1065  *                                                                      MOS10650
0A2C   4026 0000              1066  T5S1     STH   R2,0(R6)            STORE BACKGROUND OF ALL 1'S         MOS10660
0A30   C160 0A2C              1067           BXLE  R6,T5S1                                                 MOS10670
0A34   0860                   1068           LDAR  R6,R0               RESTORE R6 W/LOLIM                  MOS10680
```

TEST 1

```
0A36   0B85             1069             SAR   R8,R5              ESTABLISH HIGH LIMIT                    MOS10690
0A38   41E0 0A56        1070             BAL   R14,SFTSET         DO SHORT HAMMER DISTURB TEST            MOS10700
0A3C   0860             1071             LDAR  R6,R0              INITIALIZE MEMORY LIMITS                MOS10710
0A3E   0889             1072             LDAR  R8,R9              GET BG BXLE HILIM VALUE                 MOS10720
0A40   2420             1073             LIS   R2,0                                                       MOS10730
0A42   4026 0000        1074  T5S2       STH   R2,0(R6)           STORE BACKGROUND OF ALL 0'S             MOS10740
0A46   C160 0A42        1075             BXLE  R6,T5S2                                                    MOS10750
0A4A   0860             1076             LDAR  R6,R0              RESTORE R6 W/LOLIM                      MOS10760
0A4C   0B85             1077             SAR   R8,R5              ESTABLISH HIGH LIMIT                    MOS10770
0A4E   41E0 0A56        1078             BAL   R14,SFTSET         DO SHORT HAMMER DISTURB TEST            MOS10780
                        1079  *                                                                           MOS10790
0A52   4300 038A        1080             B     TSTEND             END OF TEST (RETURN TO EXEC)            MOS10800
                        1081  *-----------------------------------                                       MOS10810
0A56   48C0 0952        1082  SFTSET     LH    R12,POUND+6        LOAD EXECUTION COUNTER                  MOS10820
0A5A   94F6             1083             EXBR  R15,R6                                                     MOS10830
0A5C   981F             1084             WHR   R1,R15             DISPLAY ADDRESS UNDER TEST              MOS10840
0A5E   41F0 09FE        1085             BAL   LINK,TSTBRKX       IF "BREAK" GO TO TSTEND ELSE RETURN     MOS10850
0A62   D000 0080        1086             STM   R0,MOSSAVE         SAVE REGISTERS (0-F)                    MOS10860
0A66   0816             1087             LDAR  R1,R6                                                      MOS10870
0A68   D120 0AE0        1088             LM    R2,STLOOP          RELOCATE PROGRAM IN MEMORY              MOS10880
0A6C   D021 0002        1089             STM   R2,2(R1)                                                   MOS10890
0A70   D120 0AFC        1090             LM    R2,STLOOP+28                                               MOS10900
0A74   D021 001E        1091             STM   R2,30(R1)                                                  MOS10910
0A78   D1E0 0B18        1092             LM    R14,STLOOP+56                                              MOS10920
0A7C   D0E1 003A        1093             STM   R14,58(R1)                                                 MOS10930
0A80   D100 0080        1094             LM    R0,MOSSAVE         RESTORE REGISTERS (0-F)                 MOS10940
0A84   4060 010C        1095             STH   R6,TEMP            SAVE LOCATION UNDER TEST ADDRESS        MOS10950
0A88   41D6 0002        1096             BAL   R13,2(R6)          BRANCH TO "STLOOP"                      MOS10960
                        1097  *                                                                           MOS10970
                        1098  *          TEST BACKGROUND PATTERN                                          MOS10980
                        1099  *                                                                           MOS10990
0A8C   D000 0080        1100  BGTST      STM   R0,MOSSAVE         SAVE REGISTERS                          MOS11000
0A90   C840 3045        1101             LHI   R4,C'0E'                                                   MOS11010
0A94   4040 08CC        1102             STH   R4,ERRNO           ERRNO = C'0E'                           MOS11020
0A98   0832             1103             LDAR  R3,R2              LOAD BACKGROUND PATTERN                 MOS11030
0A9A   0886             1104             LDAR  R8,R6              LET END OF BG TEST = TC - PROG          MOS11040
0A9C   08C6             1105             LDAR  R12,R6             SAVE LOC UNDER TEST                     MOS11050
0A9E   0B85             1106             SAR   R8,R5              ESTABLISH START OF SUB-4                MOS11060
0AA0   0860             1107             LDAR  R6,R0              GET START OF BACKGROUND TEST AREA       MOS11070
0AA2   0568             1108             CLAR  R6,R8              IS LOLIM NOT < START OF SUB-2 ?         MOS11080
0AA4   2389             1109             BNLS  BGTST3             NO, BRANCH TO TEST HIGH MEMORY          MOS11090
0AA6   4846 0000        1110  BGTST1     LH    R4,0(R6)           GET DATA FROM BACKGROUND LOC            MOS11100
0AAA   0543             1111             CLAR  R4,R3              DATA EQUAL ?                            MOS11110
0AAC   2333             1112             BES   BGTST2             YES, BRANCH                        ***  MOS11120
0AAE   41F0 0EAE        1113             BAL   LINK,ERROR         NO, PRINT ERROR TTOE               ***  MOS11130
0AB2   C160 0AA6        1114  BGTST2     BXLE  R6,BGTST1          CONTINUE LOW BACKGROUND TESTING         MOS11140
                        1115  *                                                                           MOS11150
0AB6   086C             1116  BGTST3     LDAR  R6,R12             RESTORE LOC UNDER TEST                  MOS11160
0AB8   0A65             1117             AHR   R6,R5                                                      MOS11170
0ABA   2662             1118             AIS   R6,2               START AT LOC+2 AFTER SUB                MOS11180
0ABC   0889             1119             LDAR  R8,R9              GET END OF BACKGROUND TEST AREA         MOS11190
0ABE   0568             1120             CLAR  R6,R8              IS BG LOC < TEST LOC ?                  MOS11200
0AC0   2389             1121             BNLS  BGTST6             NO, BRANCH TO TEST NEXT LOC             MOS11210
```

TEST 1

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0AC2   4846 0000          1122  BGTST4   LH    R4,0(R6)          GET DATA FROM BG LOC                          MOS11220
0AC6   0543               1123           CLAR  R4,R3             DATA EQUAL ?                                  MOS11230
0AC8   2333               1124           BES   BGTST5            YES, BRANCH                          ***      MOS11240
0ACA   41F0 0EAE          1125           BAL   LINK,ERROR        NO, PRINT ERROR TT0E                 ***      MOS11250
0ACE   C160 0AC2          1126  BGTST5   BXLE  R6,BGTST4         CONTINUE HIGH BACKGROUND TESTING              MOS11260
                          1127  *                                                                             MOS11270
0AD2   D100 0080          1128  BGTST6   LM    R0,MOSSAVE        RESTORE REGISTERS                             MOS11280
0AD6   4026 0000          1129           STH   R2,0(R6)          RESTORE BACKGROUND PATTERN AT LOC             MOS11290
0ADA   C160 0A56          1130  BGTST7   BXLE  R6,SFTSET         CONTINUE UNTIL DONE (INCREMENTING)            MOS11300
0ADE   030E               1131           BR    R14                                                           MOS11310
                          1132  *-----------------------------------                                          MOS11320
                          1133  *       (R6)                                                                  MOS11330
0AE0   40A6 0000          1134  STLOOP   STH   R10,0(R6)         STORE FIRST DATA PATTERN AT TC                MOS11340
0AE4   45A6 0000          1135           CLH   R10,0(R6)         DATA EQUAL ?                                  MOS11350
0AE8   4230 0B1C          1136           BNE   FITERR1           NO,BRANCH TO ERROR                            MOS11360
0AEC   40B6 0000          1137           STH   R11,0(R6)         YES, STORE SECOND DATA PATTERN                MOS11370
0AF0   45B6 0000          1138           CLH   R11,0(R6)         DATA EQUAL?                                   MOS11380
0AF4   4230 0B20          1139           BNE   FITERR2           NO, BRANCH TO ERROR                           MOS11390
0AF8   0A65               1140           AAR   R6,R5             GO TO SECOND TC                               MOS11400
0AFA   40A6 0000          1141           STH   R10,0(R6)         STORE FIRST DATA PATTERN                      MOS11410
0AFE   45A6 0000          1142           CLH   R10,0(R6)         DATA EQUAL ?                                  MOS11420
0B02   4230 0B1C          1143           BNE   FITERR1           NO, BRANCH TO ERROR                           MOS11430
0B06   40B6 0000          1144           STH   R11,0(R6)         YES, STORE SECOND DATA PATTERN                MOS11440
0B0A   45B6 0000          1145           CLH   R11,0(R6)         DATA EQUAL ?                                  MOS11450
0B0E   4230 0B20          1146           BNE   FITERR2           NO, BRANCH TO ERROR                           MOS11460
0B12   0B65               1147           SHR   R6,R5             YES, RETURN TO FIRST TC                       MOS11470
0B14   27C1               1148           SIS   R12,1             DECREMENT POUND COUNTER                       MOS11480
0B16   4236 0002          1149           BNZ   2(R6)             CONTINUE IF NOT DONE                          MOS11490
0B1A   030D               1150           BR    R13               OTHERWISE RETURN                              MOS11500
       0000 0B1C          1151  ENDMOV5  EQU   *                 (R6)+62                                       MOS11510
                          1152  *-----------------------------------                                          MOS11520
0B1C   083A               1153  FITERR1  LDAR  R3,R10            LOAD EXPECTED DATA                            MOS11530
0B1E   2302               1154           BS    FITERR3           BRANCH                                        MOS11540
                          1155  *                                                                             MOS11550
0B20   083B               1156  FITERR2  LDAR  R3,R11            LOAD EXPECTED DATA                            MOS11560
                          1157  *                                                                             MOS11570
0B22   C840 3044          1158  FITERR3  LHI   R4,C'0D'                                                       MOS11580
0B26   4040 08CC          1159           STH   R4,ERRNO          ERRNO = C'0D'                                 MOS11590
0B2A   4846 0000          1160           LH    R4,0(R6)                                                        MOS11600
0B2E   41F0 0EAE          1161           BAL   LINK,ERROR        PRINT ERROR TT0D                              MOS11610
0B32   4560 010C          1162           CLH   R6,TEMP           IS LOC UNDER TEST TRUE ?                      MOS11620
0B36   033D               1163           BER   R13               YES, RETURN                                   MOS11630
0B38   0B65               1164           SAR   R6,R5             NO, CORRECT THE LOC                           MOS11640
0B3A   030D               1165           BR    R13               RETURN                                        MOS11650
                          1166  ********************************************************************************MOS11660
                          1167  *       END   TEST 1                                                          MOS11670
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                    *        TEST 2                      DIAGONAL GALPAT TEST                    MOS11690
                    *                                                                            MOS11700
                    *        PURPOSE:                                                            MOS11710
                    *              THE TEST RUNS A GALLOPING PATTERN ON ALL DIAGONALS OF          MOS11720
                    *              ONE HALF OF THE 4K RAM AND CHECKS THAT NO BACKGROUND           MOS11730
                    *              LOCATIONS HAVE CHANGED DURING THE DIAGONAL TEST.               MOS11740
                    *                                                                            MOS11750
                    *        ASSUMPTIONS:                                                        MOS11760
                    *              8KB MOS MEMORY                                                MOS11770
                    *                                                                            MOS11780
                    *        DESIGN SPECIFICATIONS:                                              MOS11790
                    *              1. THE TEST IS EXECUTED FOR EACH OF THE SIX BACKGROUND         MOS11800
                    *                 PATTERNS.                                                  MOS11810
                    *              2. AN ALTERNATE R-W-R-W-R-W-R-W-R(ETC) IS DONE TO A TEST       MOS11820
                    *                 CELL AND FOLLOWING CELLS ON THE DIAGONAL SUCESSIVELY.      MOS11830
                    *              3. THE TEST CELL IS MOVED ONE CELL UP THE DIAGONAL AND         MOS11840
                    *                 THE PROCEDURE IS REPEATED.                                 MOS11850
                    *              4. AFTER THE DIAGONAL IS COMPLETED, THE BACKROUND              MOS11860
                    *                 PATTERN IN THE REST OF THE 4K CHIP AS TESTED.              MOS11870
                    *              5. THE DIAGONAL IS THEN MOVED AND STEPS 2-4 ARE REPEATED       MOS11880
                    *                 UNTIL ALL DIAGONALS HAVE BEEN TRAVERSED.                   MOS11890
                    *                                                                            MOS11900
                    *        OPTIONS:                                                            MOS11910
                    *              SCOPE - ERROR OPTION MODE                                     MOS11920
                    *                  0 - PRINT ERROR DATA AND SKIP TO NEXT TEST                MOS11930
                    *                  1 - PRINT BAD CHIP NUMBER(S) AND SKIP TO NEXT TEST        MOS11940
                    *                  2 - PRINT ERROR DATA AND CONTINUE TEST                    MOS11950
                    *                  3 - PRINT ERROR DATA AND HALT                             MOS11960
                    *                  4 - IGNORE ERROR                                          MOS11970
                    *                  5 - PRINT BAD CHIP NUMBER(S) AND CONTINUE TEST            MOS11980
                    *                                                                            MOS11990
                    *        HOW TO RUN THE TEST:                                                MOS12000
                    *              1. ENTER THE "SCOPE" OPTION VIA THE CONSOLE DEVICE.           MOS12010
                    *              2. ENTER "RUN" AND THE TEST WILL EXECUTE.                     MOS12020
                    *                                                                            MOS12030
                    *     ***NOTE:     LOLIM MUST = X'1000' & HILIM MUST = X'1FFF'               MOS12040
                    *                  TO RUN THIS TEST MODULE.                                  MOS12050


0B3C   2411         TEST2    LIS   R1,1              LOAD DISPLAY ADDRESS                    MOS12070
0B3E   C820 0082             LHI   R2,X'82'          LOAD CELL INCREMENT VALUE               MOS12080
0B42   C890 007E             LHI   R9,X'7E'          LOAD TOP OF COLUMN MASK VALUE           MOS12090
0B46   C8C0 0FFE             LHI   R12,X'0FFE'       LOAD CHIP LIMIT MASK                    MOS12100
0B4A   24A0                  LIS   R10,0                                                     MOS12110
0B4C   25B1                  LCS   R11,1                                                     MOS12120
0B4E   24D0                  LIS   R13,0             W/BACKGROUND = 0'S                      MOS12130
0B50   41E0 0B7E             BAL   R14,TEST6ALL      DO DIAGONAL GALPAT TEST                 MOS12140
                    *                                                                        MOS12150
0B54   25A1                  LCS   R10,1                                                     MOS12160
0B56   24B0                  LIS   R11,0             W/BACKGROUND = 1'S                      MOS12170
0B58   41E0 0B7E             BAL   R14,TEST6ALL      DO DIAGONAL GALPAT TEST                 MOS12180
                    *                                                                        MOS12190
```

TEST 2

```
0B5C   24D2            1220           LIS   R13,2              W/BACKGROUND = A'S/CHIP                MOS12200
0B5E   41E0 0B7E       1221           BAL   R14,TEST6ALL       DO DIAGONAL GALPAT TEST                MOS12210
                       1222  *                                                                         MOS12220
0B62   24A0            1223           LIS   R10,0                                                      MOS12230
0B64   25B1            1224           LCS   R11,1              W/BACKGROUND = 5'S/CHIP                MOS12240
0B66   41E0 0B7E       1225           BAL   R14,TEST6ALL       DO DIAGONAL GALPAT TEST                MOS12250
                       1226  *                                                                         MOS12260
0B6A   C8D0 0080       1227           LHI   R13,X'80'          W/BACKGROUND = 64-0'S, 64-1'S, ETC..   MOS12270
0B6E   41E0 0B7E       1228           BAL   R14,TEST6ALL       DO DIAGONAL GALPAT TEST                MOS12280
                       1229  *                                                                         MOS12290
0B72   25A1            1230           LCS   R10,1                                                      MOS12300
0B74   24B0            1231           LIS   R11,0              W/BACKGROUND = 64-1'S, 64-0'S, ETC..   MOS12310
0B76   41E0 0B7E       1232           BAL   R14,TEST6ALL       DO DIAGONAL GALPAT TEST                MOS12320
                       1233  *                                                                         MOS12330
0B7A   4300 038A       1234           B     TSTEND             END OF TEST (RETURN TO EXEC)           MOS12340
                       1235  *                                                                         MOS12350
                       1236  ************************************************************************ MOS12360
                       1237  *                                                                         MOS12370
0B7E   4860 0972       1238  TEST6ALL LH    R6,LOLIM           LOAD AVAILABLE MEMORY LIMITS           MOS12380
0B82   4880 0974       1239           LH    R8,HILIM                                                  MOS12390
0B86   2472            1240           LIS   R7,2                                                       MOS12400
0B88   0856            1241           LDAR  R5,R6              INITIALIZE BIAS                        MOS12410
                       1242  *                                                                         MOS12420
0B8A   083A            1243  T6S1     LDAR  R3,R10             GET APPROPRIATE BACKGROUND PATTERN     MOS12430
0B8C   C36D 0000       1244           THI   R6,0(R13)                                                  MOS12440
0B90   2332            1245           BZS   T6S2                                                       MOS12450
0B92   083B            1246           LDAR  R3,R11                                                     MOS12460
0B94   4036 0000       1247  T6S2     STH   R3,0(R6)           STORE BACKGROUND PATTERN               MOS12470
0B98   C160 0B8A       1248           BXLE  R6,T6S1            TO ALL AVAILABLE MEMORY                MOS12480
                       1249  *                                                                         MOS12490
0B9C   2400            1250  T6S3     LIS   R0,0               R0 = X0                                MOS12500
0B9E   0880            1251  T6S4     LDAR  R8,R0              R8 = TEST CELL                         MOS12510
0BA0   0870            1252  T6S5     LDAR  R7,R0              R7 = RUNNING CELL                      MOS12520
0BA2   0578            1253  T6S6     CLAR  R7,R8              RUNNING CELL = TEST CELL ?             MOS12530
0BA4   4330 0BF2       1254           BE    INCRRC             YES, INCREMENT THE RUNNING CELL        MOS12540
0BA8   0865            1255           LDAR  R6,R5              R5 = BIAS                              MOS12550
0BAA   0A68            1256           AAR   R6,R8              R6 = TEST CELL                         MOS12560
0BAC   94F6            1257           EXBR  R15,R6                                                     MOS12570
0BAE   981F            1258           WHR   R1,R15             DISPLAY ADDRESS UNDER TEST             MOS12580
0BB0   083B            1259           LDAR  R3,R11             LOAD COMPLEMENT DATA PATTERN(C.D.P.)   MOS12590
0BB2   C36D 0000       1260           THI   R6,0(R13)                                                  MOS12600
0BB6   2332            1261           BZS   T6S7                                                       MOS12610
0BB8   083A            1262           LDAR  R3,R10                                                     MOS12620
0BBA   4036 0000       1263  T6S7     STH   R3,0(R6)           STORE C.D.P. AT TEST CELL LOC          MOS12630
0BBE   C840 3130       1264           LHI   R4,C'10'                                                   MOS12640
0BC2   4040 08CC       1265           STH   R4,ERRNO           ERRNO = C'10'                          MOS12650
0BC6   4846 0000       1266           LH    R4,0(R6)           GET TEST CELL DATA                     MOS12660
0BCA   0543            1267           CLAR  R4,R3              DATA EQUAL TO C.D.P. ?                 MOS12670
0BCC   4230 0C02       1268           BNE   T6ER10             NO, BRANCH - OTHERWISE                 MOS12680
0BD0   4036 0000       1269  T6S8     STH   R3,0(R6)           STORE C.D.P. AT TC LOC                 MOS12690
0BD4   0865            1270           LDAR  R6,R5              R5 = BIAS                              MOS12700
0BD6   0A67            1271           AAR   R6,R7              R6 = RUNNING CELL                      MOS12710
0BD8   6110 08CC       1272           AHM   R1,ERRNO           ERRNO = C'11'                          MOS12720
```

TEST 2

```
0BDC   083A             1273          LDAR  R3,R10          LOAD O.D.P. AT RUNNING CELL LOC          MOS12730
0BDE   C36D 0000        1274          THI   R6,0(R13)                                               MOS12740
0BE2   2332             1275          BZS   T6S9                                                   MOS12750
0BE4   083B             1276          LDAR  R3,R11                                                 MOS12760
0BE6   4846 0000        1277  T6S9    LH    R4,0(R6)          GET RUNNING CELL DATA                  MOS12770
0BEA   0543             1278          CLAR  R4,R3             RC DATA = BACKGROUND DATA ?            MOS12780
0BEC   213F             1279          BNES  T6ER11            NO, BRANCH - OTHERWISE                 MOS12790
0BEE   4036 0000        1280  T6S10   STH   R3,0(R6)          STORE O.D.P. AT RUNNING CELL LOC       MOS12800
                        1281  *                                                                      MOS12810
0BF2   0867             1282  INCRRC  LDAR  R6,R7             R6 = RUNNING CELL                      MOS12820
0BF4   0469             1283          NHR   R6,R9                                                    MOS12830
0BF6   0569             1284          CLAR  R6,R9             RUNNING CELL = TOP OF COLUMN ?         MOS12840
0BF8   233D             1285          BES   INCRTC            YES, INCREMENT THE TEST CELL           MOS12850
0BFA   0A72             1286          AHR   R7,R2             NO, INCREMENT RUNNING CELL (+X'82')    MOS12860
0BFC   047C             1287          NHR   R7,R12            STAY WITHIN CHIP (8KB)                 MOS12870
0BFE   4300 0BA2        1288          B     T6S6              CONTINUE TESTING                       MOS12880
                        1289  *                                                                      MOS12890
0C02   41F0 0EAE        1290  T6ER10  BAL   LINK,ERROR        PRINT ERROR TT10                       MOS12900
0C06   4300 0BD0        1291          B     T6S8              RETURN                                 MOS12910
                        1292  *                                                                      MOS12920
0C0A   41F0 0EAE        1293  T6ER11  BAL   LINK,ERROR        PRINT ERROR TT11                       MOS12930
0C0E   4300 0BEE        1294          B     T6S10             RETURN                                 MOS12940
                        1295  *                                                                      MOS12950
0C12   0865             1296  INCRTC  LDAR  R6,R5             R5 = BIAS                              MOS12960
0C14   0668             1297          OAR   R6,R8             R6 = TEST CELL                         MOS12970
0C16   083A             1298          LDAR  R3,R10            GET APPROPRIATE BACKGROUND PATTERN     MOS12980
0C18   C36D 0000        1299          THI   R6,0(R13)                                                MOS12990
0C1C   2332             1300          BZS   INCRTC1                                                  MOS13000
0C1E   083B             1301          LDAR  R3,R11                                                   MOS13010
0C20   4036 0000        1302  INCRTC1 STH   R3,0(R6)          RESTORE TEST CELL TO BACKGROUND PATRN  MOS13020
0C24   0469             1303          NHR   R6,R9                                                    MOS13030
0C26   0569             1304          CLAR  R6,R9             TEST CELL = TOP OF COLUMN ?            MOS13040
0C28   2335             1305          BES   INCRX0            YES, INCREMENT X0                      MOS13050
0C2A   0A82             1306          AHR   R8,R2             NO, INCREMENT TEST, CELL (+X'82')      MOS13060
0C2C   048C             1307          NHR   R8,R12            STAY WITHIN CHIP (8KB)                 MOS13070
0C2E   4300 0BA0        1308          B     T6S5              CONTINUE TEST                          MOS13080
                        1309  *                                                                      MOS13090
0C32   41F0 09FE        1310  INCRX0  BAL   LINK,TSTBRKX      IF "BREAK" GO TO TSTEND ELSE RETURN    MOS13100
0C36   D000 0080        1311  CKBG60  STM   R0,MOSSAVE        SAVE REGISTERS                         MOS13110
0C3A   0865             1312          LDAR  R6,R5             ESTABLISH LO OF 4K CHIP                MOS13120
0C3C   4880 0974        1313          LH    R8,HILIM          ESTABLISH HI OF 4K CHIP                MOS13130
0C40   2472             1314          LIS   R7,2              LOAD INCREMENT VALUE                   MOS13140
0C42   C840 3045        1315          LHI   R4,C'0E'                                                 MOS13150
0C46   4040 08CC        1316          STH   R4,ERRNO          ERRNO = C'0E'                          MOS13160
                        1317  *                                                                      MOS13170
0C4A   083A             1318  CKBG61  LDAR  R3,R10            GET APPROPRIATE BACKGROUND PATTERN     MOS13180
0C4C   C36D 0000        1319          THI   R6,0(R13)                                                MOS13190
0C50   2332             1320          BZS   CKBG62                                                   MOS13200
0C52   083B             1321          LDAR  R3,R11                                                   MOS13210
0C54   4846 0000        1322  CKBG62  LH    R4,0(R6)          LOAD BACKGROUND PATTERN                MOS13220
0C58   0543             1323          CLAR  R4,R3             DATA EQUAL ?                           MOS13230
0C5A   2134             1324          BNES  CKBG64            NO, BRANCH                             MOS13240
0C5C   C160 0C4A        1325  CKBG63  BXLE  R6,CKBG61        CONTINUE UNTIL DONE                    MOS13250
```

TEST 2

```
0C60   2304                1326           BS    CKBG65                                             MOS13260
                           1327  *                                                                 MOS13270
0C62   41F0 0EAE           1328  CKBG64   BAL   LINK,ERROR                                         MOS13280
0C66   2205                1329           BS    CKBG63                                             MOS13290
                           1330  *                                                                 MOS13300
0C68   D100 0080           1331  CKBG65   LM    RO,MOSSAVE          RESTORE REGISTERS              MOS13310
0C6C   CA00 0080           1332           AAI   RO,X'80'            INCREMENT XO                   MOS13320
0C70   C500 1000           1333           CLAI  RO,X'1000'          IS THIS THE LAST DIAGONAL ?    MOS13330
0C74   4280 0B9E           1334           BL    T6S4                NO, BRANCH                     MOS13340
                           1335  *                                                                 MOS13350
0C78   030E                1336  INCRBIAS BR    R14                 YES, RETURN                    MOS13360
                           1337  *                                                                 MOS13370
                           1338  ************************************************************************ MOS13380
                           1339  *        END   TEST 2                                             MOS13390
```

```
                  *         TEST 3                    MEMORY HOLD TEST                 MOS13410
                  *                                                                    MOS13420
                  *         PURPOSE                                                    MOS13430
                  *               THIS TEST CHECKS THE ABILITY OF THE MOS MEMORY REFRESH  MOS13440
                  *               CIRCUIT TO OPERATE IN THE EVENT OF A POWER FAILURE.  MOS13450
                  *                                                                    MOS13460
                  *         ASSUMPTIONS:                                               MOS13470
                  *               8KB MOS MEMORY & BATTERY BACK-UP POWER SUPPLY.       MOS13480
                  *                                  ****************************      MOS13490
                  *                                                                    MOS13500
                  *         DESIGN SPECIFICATIONS:                                     MOS13510
                  *               1. A BACKGROUND PATTERN IS WRITTEN TO ALL AVAILABLE  MOS13520
                  *                  MEMORY.                                           MOS13530
                  *               2. POWER IS REMOVED FOR 30 SECONDS(MINIMUM).         MOS13540
                  *               3. UPON RESTART, THE PROGRAM READS MEMORY 8 TIMES    MOS13550
                  *                  CHECKING FOR ERRORS.                              MOS13560
                  *                                                                    MOS13570
                  *         OPTIONS                                                    MOS13580
                  *               SCOPE - ERROR OPTION MODE                            MOS13590
                  *                     0 - PRINT ERROR DATA AND SKIP TO NEXT TEST     MOS13600
                  *                     1 - PRINT BAD CHIP NUMBER(S) AND SKIP TO NEXT TEST  MOS13610
                  *                     2 - PRINT ERROR DATA AND CONTINUE TEST         MOS13620
                  *                     3 - PRINT ERROR DATA AND HALT                  MOS13630
                  *                     4 - IGNORE ERROR                               MOS13640
                  *                     5 - PRINT BAD CHIP NUMBER(S) AND CONTINUE TEST  MOS13650
                  *                                                                    MOS13660
                  *         HOW TO RUN THE TEST:                                       MOS13670
                  *               1. ENTER THE "SCOPE" OPTION VIA THE CONSOLE DEVICE.  MOS13680
                  *               2. ENTER "RUN" AND THE TEST WILL EXECUTE.            MOS13690

0C7A   4860 0972    TEST3     LH    R6,LOLIM          INITIALIZE MEMORY LIMITS         MOS13710
0C7E   4880 0974              LH    R8,HILIM                                           MOS13720
0C82   2478                   LIS   R7,8                                               MOS13730
0C84   2491                   LIS   R9,1              LOAD DISPLAY ADDRESS             MOS13740
0C86   24A0                   LIS   R10,0             LOAD 4 DATA PATTERNS             MOS13750
0C88   25B1                   LCS   R11,1                                              MOS13760
0C8A   C8C0 AAAA              LHI   R12,X'AAAA'                                        MOS13770
0C8E   C8D0 5555              LHI   R13,X'5555'                                        MOS13780
                  *                                                                    MOS13790
0C92   40A6 0000    T7S1      STH   R10,0(R6)         STORE DATA PATTERNS              MOS13800
0C96   40B6 0002              STH   R11,2(R6)                                          MOS13810
0C9A   40C6 0004              STH   R12,4(R6)                                          MOS13820
0C9E   40D6 0006              STH   R13,6(R6)                                          MOS13830
0CA2   C160 0C92              BXLE  R6,T7S1           FROM LOLIM TO HILIM              MOS13840
0CA6   C850 0CCA              LHI   R5,T7MM1                                           MOS13850
0CAA   4050 003E              STH   R5,X'3E'          SET VECTOR FOR MM                MOS13860
                  *                                   ON POWER DOWN                    MOS13870
                  *                                                                    MOS13880
0CAE   C850 0FE8              LDAI  R5,T7MSG          UNCONDITIONALLY PRINT:           MOS13890
0CB2   41F0 0988    T7OUTMSG  BAL   LINK,FPRINT       "POWER DOWN PROC. FOR 30 SECONDS"***  MOS13900
0CB6   25E1                   LCS   R14,1             ESTABLISH WAIT COUNTERS          MOS13910
```

TEST 3

```
0CB8   C820 0080   T7S2   LHI   R2,128                                                  MOS13920
                   *                                                                    MOS13930
0CBC   2721        T7S3   SIS   R2,1                                                    MOS13940
0CBE   2031               BNZS  T7S3             WAIT 256* SF INSTRUCTION TIMES         MOS13950
0CC0   41F0 09FE          BAL   LINK,TSTBRKX     IF "BREAK" GO TO TSTEND ELSE RETURN    MOS13960
0CC4   27E1               SIS   R14,1                                                   MOS13970
0CC6   2037               BNZS  T7S2             WAIT 30 SECONDS FOR MM                 MOS13980
0CC8   220B               BS    T7OUTMSG         ON POWER DOWN                          MOS13990
                   *                                                                    MOS14000
                   ******************************************************************** MOS14010
                   *                                                                    MOS14020
0CCA   C8E0 0CD8   T7MM1  LHI   R14,T7MM2        SET VECTOR FOR MM                      MOS14030
0CCE   40E0 003E          STH   R14,X'3E'        ON POWER UP                            MOS14040
0CD2   C8E0 80F0          LHI   R14,X'80F0'                                             MOS14050
0CD6   954E               EPSR  R4,R14           WAIT FOR MM  (PSW = X'80F0')           MOS14060
                   *                                                                    MOS14070
                   ******************************************************************** MOS14080
                   *                                                                    MOS14090
0CD8   41F0 0980   T7MM2  BAL   LINK,PSW2CHG     PSW = X'30F0'                          MOS14100
0CDC   C840 0826          LHI   R4,MM0                                                  MOS14110
0CE0   4040 003E          STH   R4,X'3E'         SET NEW MM POINTER                     MOS14120
0CE4   24E8               LIS   R14,8            LOAD MEMORY CHECK COUNTER              MOS14130
0CE6   C840 3230          LHI   R4,C'20'                                                MOS14140
0CEA   4040 08CC          STH   R4,ERRNO         ERRNO = C'20'                          MOS14150
0CEE   2472               LIS   R7,2                                                    MOS14160
                   *                                                                    MOS14170
0CF0   4860 0972   T7S4   LH    R6,LOLIM                                                MOS14180
0CF4   6110 08CC          AHM   R1,ERRNO         INCREMENT ERRNO (21-28)                MOS14190
                   *                                                                    MOS14200
0CF8   94F6        T7S5   EXBR  LINK,R6                                                 MOS14210
0CFA   989F               WHR   R9,LINK          DISPLAY ADDRESS UNDER TEST             MOS14220
0CFC   083A               LDAR  R3,R10           GET FIRST DATA PATTERN                 MOS14230
0CFE   4846 0000          LH    R4,0(R6)         LOAD DATA FROM LOC                     MOS14240
0D02   0543               CLAR  R4,R3            DATA EQUAL ?                           MOS14250
0D04   2333               BES   T7S6             YES, BRANCH                            MOS14260
0D06   41F0 0EAE          BAL   LINK,ERROR       NO, ERROR                              MOS14270
0D0A   083B        T7S6   LDAR  R3,R11           GET SECOND DATA PATTERN                MOS14280
0D0C   2662               AIS   R6,2             INCREMENT LOC COUNTER                  MOS14290
0D0E   4846 0000          LH    R4,0(R6)         LOAD DATA FROM LOC                     MOS14300
0D12   0543               CLAR  R4,R3            DATA EQUAL ?                           MOS14310
0D14   2333               BES   T7S7             YES, BRANCH                            MOS14320
0D16   41F0 0EAE          BAL   LINK,ERROR       NO, ERROR                              MOS14330
0D1A   083C        T7S7   LDAR  R3,R12           GET THIRD DATA PATTERN                 MOS14340
0D1C   2662               AIS   R6,2             INCREMENT LOC COUNTER                  MOS14350
0D1E   4846 0000          LH    R4,0(R6)         LOAD DATA FROM LOC                     MOS14360
0D22   0543               CLAR  R4,R3            DATA EQUAL ?                           MOS14370
0D24   2333               BES   T7S8             YES, BRANCH                            MOS14380
0D26   41F0 0EAE          BAL   LINK,ERROR       NO, ERROR                              MOS14390
0D2A   083D        T7S8   LDAR  R3,R13           GET FOURTH DATA PATTERN                MOS14400
0D2C   2662               AIS   R6,2             INCREMENT LOC COUNTER                  MOS14410
0D2E   4846 0000          LH    R4,0(R6)         LOAD DATA FROM LOC                     MOS14420
0D32   0543               CLAR  R4,R3            DATA EQUAL ?                           MOS14430
0D34   2333               BES   T7S9             YES, BRANCH                            MOS14440
```

TEST 3

```
0D36   41F0 0EAE          1445          BAL   LINK,ERROR          NO, ERROR                                    MOS14450
0D3A   C160 0CF8          1446  T7S9    BXLE  R6,T7S5             CHECK LOLIM TO HILIM                         MOS14460
0D3E   41F0 09FE          1447          BAL   LINK,TSTBRKX        IF "BREAK" GO TO TSTEND ELSE RETURN          MOS14470
0D42   27E1               1448          SIS   R14,1               CHECKED MEMORY 8 TIMES ?                     MOS14480
0D44   4230 0CF0          1449          BNZ   T7S4                NO, REPEATE                                  MOS14490
0D48   4300 038A          1450          B     TSTEND              YES, END OF TEST(RETURN TO EXEC)             MOS14500
                          1451  *                                                                              MOS14510
                          1452  ********************************************************************************MOS14520
                          1453  *       END   TEST 3                                                           MOS14530
```

TEST 4

```
                                1455  *       TEST 4 (OPTIONAL TEST)    LONG COUNT RELOCATABLE                MOS14550
                                1456  *                                 HAMMER DISTURB TEST                   MOS14560
                                1457  *                                                                       MOS14570
                                1458  *       PURPOSE:                                                        MOS14580
                                1459  *            THE TEST EXERCISES THE MOS MEMORY IN AN ENVIRONMENT        MOS14590
                                1460  *            SIMILAR TO THAT OF AN OPERATING SYSTEM.                    MOS14600
                                1461  *                                                                       MOS14610
                                1462  *       ASSUMPTIONS:                                                    MOS14620
                                1463  *            8KB MOS MEMORY                                             MOS14630
                                1464  *                                                                       MOS14640
                                1465  *       DESIGN SPECIFICATIONS:                                          MOS14650
                                1466  *            THIS IS AN OVERNIGHT TEST DESIGNED TO POINT OUT            MOS14660
                                1467  *            POSSIBLE "SOFT" FAILURE LOCATIONS IN MOS MEMORY.           MOS14670
                                1468  *            (SIMILAR TO TEST 5)                                        MOS14680
                                1469  *                                                                       MOS14690
                                1470  *       OPTIONS:                                                        MOS14700
                                1471  *            DATA  - 16-BIT BACKGROUND DATA PATTERN                     MOS14710
                                1472  *            SCOPE - ERROR OPTION MODE                                  MOS14720
                                1473  *                0 - PRINT ERROR DATA AND SKIP TO NEXT TEST             MOS14730
                                1474  *                1 - PRINT BAD CHIP NUMBER(S) AND SKIP TO NEXT TEST     MOS14740
                                1475  *                2 - PRINT ERROR DATA AND CONTINUE TEST                 MOS14750
                                1476  *                3 - PRINT ERROR DATA AND HALT                          MOS14760
                                1477  *                4 - IGNORE ERROR                                       MOS14770
                                1478  *                5 - PRINT BAD CHIP NUMBER(S) AND CONTINUE TEST         MOS14780
                                1479  *                                                                       MOS14790
                                1480  *       HOW TO RUN THE TEST:                                            MOS14800
                                1481  *            1. ENTER THE "DATA" & "SCOPE" OPTIONS VIA THE CONSOLE      MOS14810
                                1482  *               DEVICE.                                                 MOS14820
                                1483  *            2. ENTER "RUN" AND THE TEST WILL EXECUTE.                  MOS14830

0D4C   4860 0972                1485  TEST4   LH    R6,LOLIM          INITIALIZE MEMORY LIMITS              MOS14850
0D50   4880 0974                1486          LH    R8,HILIM                                                MOS14860
0D54   2472                     1487          LIS   R7,2                                                    MOS14870
0D56   08A6                     1488          LDAR  R10,R6            R10 = LOLIM                           MOS14880
0D58   08B8                     1489          LDAR  R11,R8            R11 = HILIM                           MOS14890
0D5A   2411                     1490          LIS   R1,1              LOAD DISPLAY ADDRESS                  MOS14900
0D5C   4850 095E                1491          LH    R5,DATA+6         LOAD BACKGROUND DATA PATTERN          MOS14910
0D60   C820 0090                1492          LHI   R2,ENDMOV8-MOVPRG+2                                     MOS14920
                                1493  *                                                                       MOS14930
0D64   4056 0000                1494  T8SW    STH   R5,0(R6)          STORE BACKGROUND DATA PATTERN         MOS14940
0D68   C160 0D64                1495          BXLE  R6,T8SW           FROM LOLIM TO HILIM                   MOS14950
0D6C   086A                     1496          LDAR  R6,R10            RESTORE LOLIM                         MOS14960
0D6E   D000 0080                1497          STM   R0,MOSSAVE        SAVE REGISTERS (0-F)                  MOS14970
0D72   0816                     1498          LDAR  R1,R6                                                   MOS14980
0D74   D120 0E12                1499          LM    R2,MOVPRG         MOVE SUB INTO TEST AREA               MOS14990
0D78   D021 0002                1500          STM   R2,2(R1)                                                MOS15000
0D7C   D120 0E2E                1501          LM    R2,MOVPRG+28                                            MOS15010
0D80   D021 001E                1502          STM   R2,30(R1)                                               MOS15020
0D84   D120 0E4A                1503          LM    R2,MOVPRG+56                                            MOS15030
0D88   D021 003A                1504          STM   R2,58(R1)                                               MOS15040
0D8C   D120 0E66                1505          LM    R2,MOVPRG+84                                            MOS15050
```

TEST 4

```
0D90   D021 0056          1506          STM   R2,86(R1)                                                    MOS15060
0D94   D120 0E82          1507          LM    R2,MOVPRG+112                                                MOS15070
0D98   D021 0072          1508          STM   R2,114(R1)                                                   MOS15080
0D9C   D1F0 0E9E          1509          LM    R15,MOVPRG+140                                               MOS15090
0DA0   D0F1 008E          1510          STM   R15,142(R1)                                                  MOS15100
0DA4   D100 0080          1511          LM    R0,MOSSAVE          RESTORE REGISTERS                        MOS15110
0DA8   C840 0826          1512          LHI   R4,MM0                                                       MOS15120
0DAC   4040 003E          1513          STH   R4,X'3E'            SET NEW MM POINTER                       MOS15130
0DB0   0B82               1514          SAR   R8,R2                                                        MOS15140
0DB2   94F6               1515  T8SX    EXBR  R15,R6                                                       MOS15150
0DB4   981F               1516          WHR   R1,R15              DISPLAY ADDRESS UNDER TEST               MOS15160
0DB6   41F0 09FE          1517          BAL   LINK,TSTBRKX       IF "BREAK" GO TO OPTIN ELSE RETURN       MOS15170
0DBA   C840 3044          1518          LHI   R4,C'0D'                                                     MOS15180
0DBE   4040 08CC          1519          STH   R4,ERRNO            ERRNO = C'0D'                            MOS15190
0DC2   41E6 0002          1520          BAL   R14,2(R6)           BRANCH TO "MOVPRG"                       MOS15200
                          1521  *                                                                          MOS15210
0DC6   D000 0080          1522          STM   R0,MOSSAVE          SAVE REGISTERS (0-F)                     MOS15220
0DCA   0816               1523          LDAR  R1,R6                                                        MOS15230
0DCC   D121 0072          1524          LM    R2,ENDMOV8-MOVPRG-28(R1) RELOCATE SUB IN MEMORY(+2)          MOS15240
0DD0   D021 0074          1525          STM   R2,ENDMOV8-MOVPRG-26(R1)                                     MOS15250
0DD4   D121 0056          1526          LM    R2,ENDMOV8-MOVPRG-56(R1)                                     MOS15260
0DD8   D021 0058          1527          STM   R2,ENDMOV8-MOVPRG-54(R1)                                     MOS15270
0DDC   D121 003A          1528          LM    R2,ENDMOV8-MOVPRG-84(R1)                                     MOS15280
0DE0   D021 003C          1529          STM   R2,ENDMOV8-MOVPRG-82(R1)                                     MOS15290
0DE4   D121 001E          1530          LM    R2,ENDMOV8-MOVPRG-112(R1)                                    MOS15300
0DE8   D021 0020          1531          STM   R2,ENDMOV8-MOVPRG-110(R1)                                    MOS15310
0DEC   D121 0002          1532          LM    R2,ENDMOV8-MOVPRG-140(R1)                                    MOS15320
0DF0   D021 0004          1533          STM   R2,ENDMOV8-MOVPRG-138(R1)                                    MOS15330
0DF4   D1F1 0000          1534          LM    R15,0(R1)                                                    MOS15340
0DF8   D0F1 0002          1535          STM   R15,2(R1)                                                    MOS15350
0DFC   D100 0080          1536          LM    R0,MOSSAVE          RESTORE REGISTERS (0-F)                  MOS15360
0E00   4056 FFFE          1537          STH   R5,-2(R6)           RESTORE BACKGROUND AT OLD TEST LOC       MOS15370
0E04   088B               1538          LDAR  R8,R11                                                       MOS15380
0E06   0B82               1539          SAR   R8,R2                                                        MOS15390
0E08   0568               1540          CLAR  R6,R8               DONE ?                                   MOS15400
0E0A   4280 0DB2          1541          BL    T8SX                NO, BRANCH                               MOS15410
0E0E   4300 038A          1542          B     TSTEND              YES, END OF TEST(RETURN TO EXEC)         MOS15420
                          1543  *-----------------------------------                                       MOS15430
                          1544  *       (R6)                                                               MOS15440
0E12   2430               1545  MOVPRG  LIS   R3,0                INITIALIZE DATA PATTERN                  MOS15450
0E14   9D14               1546          SSR   R1,R4               EXERCISE BIT NO. 3 IN INSTR. STREAM      MOS15460
0E16   4036 0000          1547  MOVPRG1 STH   R3,0(R6)            STORE PATRN AT LOW TEST LOC              MOS15470
0E1A   4846 0000          1548          LH    R4,0(R6)            LOAD FROM LOW LOC                        MOS15480
0E1E   0543               1549          CLAR  R4,R3               EQUAL ?                                  MOS15490
0E20   2134               1550          BNES  MOVPRG21            NO, ERROR                                MOS15500
0E22   2731               1551  MOVPRG2 SIS   R3,1                YES, DECREMENT DATA PATTERN              MOS15510
0E24   2037               1552          BNZS  MOVPRG1             REPEATE TILL DONE                        MOS15520
0E26   2304               1553          BS    MOVPRG22                                                     MOS15530
0E28   41F0 0EAE          1554  MOVPRG21 BAL  LINK,ERROR          PRINT ERROR TTOD                         MOS15540
0E2C   2205               1555          BS    MOVPRG2                                                      MOS15550
                          1556  *                                                                          MOS15560
0E2E   084B               1557  MOVPRG22 LDAR R4,R11                                                       MOS15570
0E30   0B46               1558          SAR   R4,R6               GET SIZE OF TEST AREA                    MOS15580
```

TEST 4

```
0E32   0542            1559           CLAR  R4,R2            IS TEST AREA LARGE ENOUGH ?          MOS15590
0E34   218B            1560           BLS   MOVPRG26         NO, BRANCH                           MOS15600
0E36   0A62            1561           AHR   R6,R2            YES, INCREMENT TEST CELL             MOS15610
0E38   4036 0000       1562  MOVPRG15 STH   R3,0(R6)         STORE PATRN AT HIGH TEST LOC         MOS15620
0E3C   4846 0000       1563           LH    R4,0(R6)         LOAD FROM HIGH LOC                   MOS15630
0E40   0543            1564           CLAR  R4,R3            EQUAL ?                              MOS15640
0E42   2135            1565           BNES  MOVPRG27         NO, ERROR                            MOS15650
0E44   2731            1566  MOVPRG25 SIS   R3,1             YES, DECREMENT DATA PATTERN          MOS15660
0E46   2037            1567           BNZS  MOVPRG15         REPEAT TILL DONE                     MOS15670
0E48   0B62            1568           SAR   R6,R2            DECREMENT TEST CELL                  MOS15680
0E4A   2304            1569  MOVPRG26 BS    MOVPRG28                                             MOS15690
0E4C   41F0 0EAE       1570  MOVPRG27 BAL   LINK,ERROR       PRINT ERROR TTOD                     MOS15700
0E50   2206            1571           BS    MOVPRG25                                             MOS15710
                       1572  *                                                                   MOS15720
0E52   0886            1573  MOVPRG28 LDAR  R8,R6                                                MOS15730
0E54   08C6            1574           LDAR  R12,R6           SAVE TEST LOCATION COUNTER           MOS15740
0E56   0835            1575           LDAR  R3,R5            GET BACKGROUND DATA PATTERN          MOS15750
0E58   C840 3045       1576           LHI   R4,C'0E'                                              MOS15760
0E5C   4040 08CC       1577           STH   R4,ERRNO         ERRNO = C'0E'                        MOS15770
0E60   086A            1578           LDAR  R6,R10                                                MOS15780
0E62   0568            1579  MOVPRG29 CLAR  R6,R8            IS LOW BACKGROUND AREA PRESENT ?     MOS15790
0E64   233C            1580           BES   MOVPRG5          NO, BRANCH                           MOS15800
0E66   4846 0000       1581  MOVPRG3  LH    R4,0(R6)                                             MOS15810
0E6A   0543            1582           CLAR  R4,R3            IS LOW BACKGROUND PATTERN OK ?       MOS15820
0E6C   2135            1583           BNES  MOVPRG45                                              MOS15830
0E6E   2662            1584  MOVPRG4  AIS   R6,2             INCREMENT LOW LOCATION COUNTER       MOS15840
0E70   0568            1585           CLAR  R6,R8            FINISHED LOW BACKGROUND TESTING ?    MOS15850
0E72   2086            1586           BLS   MOVPRG3                                               MOS15860
0E74   2304            1587           BS    MOVPRG5                                               MOS15870
0E76   41F0 0EAE       1588  MOVPRG45 BAL   LINK,ERROR       PRINT ERROR TTOE                     MOS15880
0E7A   2206            1589           BS    MOVPRG4                                               MOS15890
                       1590  *                                                                   MOS15900
0E7C   0868            1591  MOVPRG5  LDAR  R6,R8            RESTORE LOC COUNTER                  MOS15910
0E7E   0A62            1592           AHR   R6,R2                                                 MOS15920
0E80   2662            1593           AIS   R6,2                                                  MOS15930
0E82   056B            1594  MOVPRG6  CLAR  R6,R11           LOC > HILIM ?                        MOS15940
0E84   238B            1595           BNLS  MOVPRG8          YES, DONE                            MOS15950
0E86   4846 0000       1596           LH    R4,0(R6)                                              MOS15960
0E8A   0543            1597           CLAR  R4,R3            NO, IS HI BACKGROUND PATTERN OK ?    MOS15970
0E8C   2134            1598           BNES  MOVPRG75                                              MOS15980
0E8E   2662            1599  MOVPRG7  AIS   R6,2             INCREMENT HI LOC                     MOS15990
0E90   2037            1600           BNZS  MOVPRG6          CONTINUE (BRANCH)                    MOS16000
0E92   2304            1601           BS    MOVPRG8                                               MOS16010
0E94   41F0 0EAE       1602  MOVPRG75 BAL   LINK,ERROR       PRINT ERROR TTOE                     MOS16020
0E98   2205            1603           BS    MOVPRG7                                               MOS16030
                       1604  *                                                                   MOS16040
0E9A   C86C 0002       1605  MOVPRG8  LHI   R6,2(R12)        INCREMENT LOCATION COUNTER           MOS16050
0E9E   030E            1606           BR    R14              RETURN                               MOS16060
       0000 0EA0       1607  ENDMOV8  EQU   *                (R6)+164                             MOS16070
                       1608  *--------------------------------                                   MOS16080
                       1609  *        END   TEST 4                                                MOS16090
```

COMMON ERROR ROUTINE

```
0EA0   40F0 010C        1611  PARERR   STH   LINK,TEMP          SET UP TO PRINT PARITY ERROR     ***  MOS16110
0EA4   C8F0 3132        1612           LHI   LINK,C'12'         *                                ***  MOS16120
0EA8   40F0 08CC        1613           STH   LINK,ERRNO         ERRNO = C'12'                    ***  MOS16130
0EAC   2303             1614           BS    ERROR3             *                                ***  MOS16140
                        1615  *                                                                       MOS16150
                        1616  *  COMMON ERROR ROUTINE           CALL:  BAL   LINK,ERROR               MOS16160
                        1617  *                                                                       MOS16170
                        1618  *   R6= LOCATION OF ERROR     R3= DATA EXPECTED     R4= DATA READ     MOS16180
                        1619  *                                                                       MOS16190
                        1620  *                                                                       MOS16200
0EAE   40F0 010C        1621  ERROR    STH   LINK,TEMP          SAVE RETURN ADDRESS              ***  MOS16210
                        1622  *                                                                       MOS16220
0EB2   41F0 04C8        1623  ERROR3   BAL   LINK,ERR           PRINT THE ERROR NUMBER                MOS16230
0EB6   25F1             1624           LCS   LINK,1                                                  MOS16240
0EB8   40F0 0894        1625           STH   LINK,NOERR         SET ERROR FLAG FOR EXEC.              MOS16250
0EBC   48F0 0946        1626           LH    LINK,SCOPE+6       GET "SCOPE" VALUE                     MOS16260
0EC0   27F1             1627           SIS   LINK,1             IS SCOPE = 1 ?                        MOS16270
0EC2   4330 0F2C        1628           BZ    PARTNO             YES, PRINT PART NUMBER.               MOS16280
0EC6   27F3             1629           SIS   LINK,3             IS SCOPE = 4 ?                        MOS16290
0EC8   4330 0F18        1630           BZ    ERORTN2            YES, RETURN                           MOS16300
0ECC   27F1             1631           SIS   LINK,1             IS SCOPE = 5 ?                        MOS16310
0ECE   4330 0F2C        1632           BZ    PARTNO             YES, PRINT PART NO. & CONTINUE        MOS16320
0ED2   2404             1633  ERROR1   LIS   R0,4               LOAD NO. OF DIGITS FOR CONVERSION     MOS16330
0ED4   0816             1634           LDAR  R1,R6              GET ADDRESS UNDER TEST                MOS16340
0ED6   C820 0FA4        1635           LDAI  R2,ADRMSG          LOAD ADDRESS ERROR MESSAGE LOCATION   MOS16350
0EDA   41F0 054C        1636           BAL   LINK,HEXASC        STORE LOCATION UNDER TEST             MOS16360
0EDE   0813             1637           LDAR  R1,R3              GET EXPECTED DATA                     MOS16370
0EE0   C820 0FB2        1638           LDAI  R2,DTAEXP          LOAD EXPECTED DATA MESSAGE LOCATION   MOS16380
0EE4   41F0 054C        1639           BAL   LINK,HEXASC        STORE DATA EXPECTED                   MOS16390
0EE8   0814             1640           LDAR  R1,R4              GET DATA READ                         MOS16400
0EEA   C820 0FC2        1641           LDAI  R2,DTARED          LOAD DATA READ MESSAGE LOCATION       MOS16410
0EEE   41F0 054C        1642           BAL   LINK,HEXASC        STORE DATA READ                       MOS16420
0EF2   C850 0FA0        1643  ERROR2   LDAI  R5,ERRORMSG        LOAD ERROR MESSAGE LOCATION           MOS16430
0EF6   41F0 0988        1644           BAL   LINK,FPRINT        PRINT THE ERROR DATA             ***  MOS16440
                        1645  *                                                                       MOS16450
0EFA   48F0 0946        1646  ERORTN   LH    LINK,SCOPE+6                                           MOS16460
0EFE   4330 038A        1647           BZ    TSTEND             IF SCOPE = 0                          MOS16470
0F02   27F1             1648           SIS   LINK,1             OR SCOPE = 1,                         MOS16480
0F04   4330 038A        1649           BZ    TSTEND             GO TO NEXT TEST                       MOS16490
0F08   27F2             1650           SIS   LINK,2             IS SCOPE = 3 ?                        MOS16500
0F0A   4330 0400        1651           BZ    ABORT1             YES, ABORT TESTING SEQUENCE           MOS16510
0F0E   D100 00E0        1652  ERORTN1  LM    R0,ERRSAVE         NO,RESTORE CALLING REGISTERS          MOS16520
0F12   48F0 010C        1653  ERROUT   LH    LINK,TEMP          RESTORE RETURN ADDRESS           ***  MOS16530
0F16   030F             1654           BR    LINK               RETURN                                MOS16540
                        1655  *                                                                       MOS16550
0F18   48F0 089E        1656  ERORTN2  LH    LINK,TOTERR        IF SCOPE = 4,                         MOS16560
0F1C   26F1             1657           AIS   LINK,1             INDEX THE ERROR COUNTER               MOS16570
0F1E   40F0 089E        1658           STH   LINK,TOTERR                                              MOS16580
0F22   C5F0 7FFF        1659           CLAI  LINK,X'7FFF'       TOTERR = MAXIMUM ?                    MOS16590
0F26   203C             1660           BNES  ERORTN1            NO, RETURN                            MOS16600
0F28   4300 045E        1661           B     HALT9              YES, WAIT FOR PRINTOUT                MOS16610
```

COMMON ERROR ROUTINE

```
0F2C  0734           1663  PARTNO  XAR   R3,R4          DETERMINE BIT(S) THAT FAILED          MOS16630
0F2E  2410           1664         LIS   R1,0           INITIALIZE CHIP NUMBER                MOS16640
0F30  C530 FFFF      1665         CLAI  R3,-1          DID ALL BITS FAIL ?                   MOS16650
0F34  2138           1666         BNES  CO3            NO, BRANCH                            MOS16660
0F36  C840 4646      1667         LDAI  R4,C'FF'                                             MOS16670
0F3A  4040 0F9C      1668         STH   R4,CHIPNO+2    YES, STORE 8KB ROW IDENTIFIER         MOS16680
0F3E  2430           1669         LIS   R3,0           LOAD CONTIN VALUE IN REG. R3          MOS16690
0F40  4300 0F70      1670         B     CO5            CONTINUE                              MOS16700
0F44  9131           1671  CO3    SLHLS R3,1           DECIPHER FAILING BIT NUMBER(S)        MOS16710
0F46  2185           1672         BCS   CO4            (00-09,10-16) - ON CARRY              MOS16720
0F48  2611           1673         AIS   R1,1           INCREMENT CHIP NUMBER                 MOS16730
0F4A  C510 0010      1674         CLHI  R1,16          CHIP NUMBER = 16 ?                    MOS16740
0F4E  2085           1675         BLS   CO3            NO, BRANCH                            MOS16750
0F50  C820 3030      1676  CO4    LHI   R2,C'00'        STORE CHIP NUMBER                     MOS16760
0F54  4020 0F9C      1677         STH   R2,CHIPNO+2    IN ASCII                              MOS16770
0F58  0801           1678         LDAR  R0,R1          SAVE BIT NUMBER                       MOS16780
0F5A  C510 000A      1679         CLHI  R1,10          BIT NUMBER > 10 ?                     MOS16790
0F5E  2186           1680         BLS   CO4.5          NO, BRANCH                            MOS16800
0F60  C820 0100      1681         LHI   R2,X'100'       CONVERT BIT NO. TO HIGH DECIMAL       MOS16810
0F64  6120 0F9C      1682         AHM   R2,CHIPNO+2     STORE HIGH BIT NO. IN ERROR MSG.      MOS16820
0F68  271A           1683         SIS   R1,10          DECREMENT ERROR BIT POSITION BY 10    MOS16830
0F6A  6110 0F9C      1684  CO4.5  AHM   R1,CHIPNO+2     STORE LOW BIT NO. IN ERROR MSG.       MOS16840
0F6E  0810           1685         LDAR  R1,R0          RESTORE BIT NUMBER                    MOS16850
0F70  C850 0F86      1686  CO5    LDAI  R5,CHIPMSG     LOAD ERROR MESSAGE ADDRESS            MOS16860
0F74  41F0 0988      1687         BAL   LINK,FPRINT    PRINT SUSPECTED CHIP NUMBER      ***  MOS16870
0F78  0833           1688         LDAR  R3,R3          HAVE ALL SUSPECT CHIPS BEEN PRINTED?  MOS16880
0F7A  4230 0F44      1689         BNZ   CO3            NO, BRANCH                            MOS16890
0F7E  D100 00E0      1690         LM    R0,ERRSAVE     YES, RESTORE REGISTERS                MOS16900
0F82  4300 0ED2      1691         B     ERROR1         GO PRINT ERROR DATA                   MOS16910
                     1692  *                                                                  MOS16920
                     1693  ********************************************************************** MOS16930
                     1694  *       END   COMMON ERROR ROUTINE                                   MOS16940
```

CHKSUM FILE

```
                                1696  *                                                                    MOS16960
                                1697  *        TEST MESSAGES                                               MOS16970
                                1698  *                                                                    MOS16980
0F86   5355 5350 4543 5445      1699  CHIPMSG  DC    C'SUSPECTED BAD CHIP  '                               MOS16990
0F8E   4420 4241 4420 4348
0F96   4950 2020
0F9A   4130 2A2A                1700  CHIPNO   DC    C'A0**',X'0D0A'                                      MOS17000
0F9E   0D0A
0FA0   4C4F 4320                1701  ERRORMSG DC    C'LOC '                                              MOS17010
                                1702  *                                                                    MOS17020
0FA4   2A2A 2A2A 2044 4154      1703  ADRMSG   DC    C'**** DATA EXP '                                    MOS17030
0FAC   4120 4558 5020
0FB2   2A2A 2A2A 2020 4441      1704  DTAEXP   DC    C'****  DATA READ '                                  MOS17040
0FBA   5441 2052 4541 4420
0FC2   2A2A 2A2A                1705  DTARED   DC    C'****',X'0D0A'                                      MOS17050
0FC6   0D0A
0FC8   4D45 4D4F 5259 2055      1706  ASMEMMSG DC    C'MEMORY UNDER TEST ',X'8D0A'                        MOS17060
0FD0   4E44 4552 2054 4553
0FD8   5420
0FDA   8D0A
0FDC   3130 3030 2D31 4646      1707  LOMSG    DC    C'1000-1FFF ',X'0D0A'                                MOS17070
0FE4   4620
0FE6   0D0A
       0000 0FE1                1708  HIMSG    EQU   LOMSG+5            *                          ***     MOS17080
                                1709  *                                                                    MOS17090
0FE8   504F 5745 5220 444F      1710  T7MSG    DC    C'POWER DOWN FOR 30 SEC.',X'0D0A'                    MOS17100
0FF0   574E 2046 4F52 2033
0FF8   3020 5345 432E
0FFE   0D0A
                                1711  *                                                                    MOS17110
                                1712  ************************************************************************ MOS17120
                                1713  *        END   TEST MESSAGE FILE                                     MOS17130
       0000 0FFF                1714  LNZB     EQU   *-1                                                   MOS17140
```

CHKSUM FILE

```
                     1716  *                                                                      MOS17160
                     1717  *        TEST PROGRAM STORAGE AREA                                     MOS17170
                     1718  *                                                                      MOS17180
                     1719  ************************************************************************MOS17190
                     1720  *                                                                      MOS17200
    0000 0060        1721  PSWSAVE  EQU   X'60'              PPF PSW SAVE AREA                   MOS17210
    0000 0064        1722  COMRET   EQU   X'64'              ERRCOM RETURN ADDRESS SAVE          MOS17220
    0000 0068        1723  SET.RTN  EQU   X'68'              SETUP RETURN ADDRESS SAVE           MOS17230
    0000 006C        1724  PAUSE    EQU   X'6C'              PAUSE FLAG FOR CAROUSEL             MOS17240
                     1725  *                                                                      MOS17250
    0000 0080        1726  MOSSAVE  EQU   X'80'              SI6MMT REGISTER SAVE AREA           MOS17260
    0000 0080        1727  OPTBUF   EQU   MOSSAVE            OPTION INPUT BUFFER                 MOS17270
    0000 00A0        1728  RSAVE    EQU   X'A0'              REGISTER SAVE AREA (ETPE)           MOS17280
    0000 00E0        1729  ERRSAVE  EQU   X'E0'              REGISTER SAVE FOR ERROR ROUTINES    MOS17290
                     1730  *                                                                      MOS17300
                     1731  ************************************************************************MOS17310
                     1732  *        END  TEST PROGRAM  06-202(F02R01)                        ***  MOS17320
```

CHKSUM/M17 PUNCHER

```
1000  2400            1734  $CHKSUM  LIS   R0,0              PUNCH M17 TAPE WITH CHECKSUM          MOS17340
1002  9510            1735           EPSR  R1,R0             SELECT REG. SET 0 & CLEAR PSW   ***   MOS17350
                      1736  *                                                                      MOS17360
1004  C810 0100       1737           LDAI  R1,ORIGIN1         LOAD START ADDRESS                    MOS17370
1008  2421            1738           LIS   R2,1               LOAD INCREMENT VALUE                  MOS17380
100A  C830 0FFF       1739           LDAI  R3,LNZB            LOAD FINAL ADDRESS                    MOS17390
100E  2440            1740           LIS   R4,0               INITIALIZE CHKSUM BYTE                MOS17400
                      1741  *                                                                      MOS17410
1010  D351 0000       1742  $GEN     LB    R5,0(R1)           LOAD A BYTE FROM MEMORY               MOS17420
1014  0745            1743           XAR   R4,R5              CALCULATE CHKSUM BYTE                 MOS17430
1016  C110 1010       1744           BXLE  R1,$GEN            REPEATE FROM ORIGIN1 TO LNZB          MOS17440
101A  D240 0099       1745           STB   R4,MN+3            SET CHKSUM BYTE IN BOOT LOADER        MOS17450
                      1746  *                                                                      MOS17460
101E  C810 0080       1747  $TAPE    LHI   R1,X'0080'         LOAD DISPLAY PANEL 'NORM' OC          MOS17470
1022  9E21            1748           OCR   R2,R1              PUT DISPLAY IN NORMAL MODE            MOS17480
1024  9444            1749           EXBR  R4,R4              REVERSE CHKSUM BYTES                  MOS17490
1026  9824            1750           WHR   R2,R4              DISPLAY CHKSUM BYTE (TO D1)           MOS17500
1028  9411            1751           EXBR  R1,R1              REVERSE 'NORM' OC TO 'WAIT' PSW       MOS17510
102A  9501            1752           EPSR  R0,R1              HALT PROCESSOR.                       MOS17520
                      1753  *                                                                      MOS17530
                      1754  ************************************************************************MOS17540
                      1755  *                                                                      MOS17550
102C  D360 007A       1756  $PUNCH   LB    R6,X'7A'           GET BOUTDV (PUNCH) ADDRESS.           MOS17560
1030  DE60 007B       1757           OC    R6,X'7B'           START TAPE PUNCH                      MOS17570
1034  9D60            1758           SSR   R6,R0              GET PUNCH STATUS                      MOS17580
1036  2081            1759           BTBS  8,1                WAIT FOR BUSY TO DROP                 MOS17590
1038  41F0 107A       1760           BAL   R15,$TAPL          PUNCH LEADER (256 CHARACTERS)         MOS17600
103C  9411            1761           EXBR  R1,R1              (R1) = X'0080'                        MOS17610
103E  C830 00CF       1762           LHI   R3,X'CF'           LOAD END OF LOADER ADDRESS            MOS17620
                      1763  *                                                                      MOS17630
1042  DA61 0000       1764  $PNCH1   WD    R6,0(R1)           PUNCH BOOT LOADER                     MOS17640
1046  9D60            1765           SSR   R6,R0              GET PUNCH STATUS                      MOS17650
1048  2081            1766           BTBS  8,1                WAIT FOR BUSY TO DROP                 MOS17660
104A  C110 1042       1767           BXLE  R1,$PNCH1          REPEATE X'80' TO X'CF'                MOS17670
104E  41F0 1080       1768           BAL   R15,$TAPL1         PUNCH ONE-FOLD GAP.                   MOS17680
                      1769  *                                                                      MOS17690
1052  D340 0099       1770           LB    R4,MN+3            GET CHECKSUM BYTE                     MOS17700
1056  C810 0100       1771           LDAI  R1,ORIGIN1         LOAD STARTING ADDRESS OF PROGRAM      MOS17710
105A  C830 0FFF       1772           LDAI  R3,LNZB            LOAD ENDING ADDRESS OF PROGRAM        MOS17720
                      1773  *                                                                      MOS17730
                      1774  *        PUNCH PROGRAM                                                 MOS17740
105E  D351 0000       1775  $PNCH2   LB    R5,0(R1)           GET A PROGRAM BYTE                    MOS17750
1062  0745            1776           XAR   R4,R5              GENERATE CHKSUM                       MOS17760
1064  9A65            1777           WDR   R6,R5              PUNCH PROGRAM BYTE                    MOS17770
1066  9401            1778           EXBR  R0,R1              EXCHANGE ADDRESS BYTES                MOS17780
1068  9820            1779           WHR   R2,R0              DISPLAY ADDRESS PUNCHED               MOS17790
106A  9D60            1780           SSR   R6,R0              GET PUNCH STATUS                      MOS17800
106C  2081            1781           BTBS  8,1                WAIT FOR BUSY TO DROP                 MOS17810
106E  C110 105E       1782           BXLE  R1,$PNCH2          REPEATE FROM 'ORIGIN1' TO 'LNZB'      MOS17820
1072  41F0 107A       1783           BAL   R15,$TAPL          PUNCH TRAILER.                        MOS17830
1076  4300 101E       1784           B     $TAPE              DISPLAY CHECKSUM, HALT PROCESSOR.     MOS17840
```

```
                        1786  *   CHKSUM M17 PUNCHER (CONTINUED)                                          MOS17860
                        1787  *                                                                           MOS17870
107A   C800 0100         1788  $TAPL    LHI   R0,256            LOAD VALUE TO PUNCH BLANK LEADER         MOS17880
107E   2303               1789           BS    $TAPLP           BRANCH                                   MOS17890
                        1790  *                                                                           MOS17900
1080   C800 0080         1791  $TAPL1   LHI   R0,128            LOAD VALUE TO PUNCH 1-FOLD GAP   ***     MOS17910
                        1792  *                                                                           MOS17920
1084   2701              1793  $TAPLP   SIS   R0,1              DECREMENT FRAME COUNTER                  MOS17930
1086   032F              1794           BNPR  R15                RETURN IF FINISHED (0)                   MOS17940
1088   2430              1795           LIS   R3,0               LOAD A "BLANK" INTO DATA REGISTER        MOS17950
108A   9A63              1796           WDR   R6,R3              PUNCH BLANK FRAME                        MOS17960
108C   9D68              1797           SSR   R6,R8              GET PUNCH STATUS                         MOS17970
108E   2081              1798           BTBS  8,1                WAIT FOR BUSY TO DROP                    MOS17980
1090   2206              1799           BS    $TAPLP             CONTINUE (BRANCH)                        MOS17990
                        1800  *                                                                           MOS18000
                        1801  ************************************************************************  MOS18010
1092                    1802           END                                                               MOS18020
```

ASSEMBLED BY CAL 03-066R05-00 (32-BIT)

START OPTIONS: T=16,CROSS,ERLST,

NO CAL ERRORS
NO CAL WARNINGS
2 PASSES

```
$CHKSUM   0000 1000   1734*
$GEN      0000 1010   1742*  1744
$PNCH1    0000 1042   1764*  1767
$PNCH2    0000 105E   1775*  1782
$PUNCH    0000 102C   1756*
$TAPE     0000 101E   1747*  1784
$TAPL     0000 107A   1760   1783   1788*
$TAPL1    0000 1080   1768   1791*
$TAPLP    0000 1084   1789   1793*  1799
$TSTDU0   0000 0780    734    736*
$TSTDU1   0000 079E    746*
$TSTDU2   0000 07A0    743    745    747*
ABORT     0000 03C4    385*
ABORT1    0000 0400    402*   720   1651
ABORT2    0000 0432    421*
ABORT3    0000 0404    395    404*
ABSTOP    0000 1092
ADC       0000 0002
ADRMSG    0000 0FA4   1635   1703*
AMSG      0000 090E    188    904*
ASCILOC   0000 08F8    798    901*
ASCIPSW   0000 08EE    795    900*
ASMEMMSG  0000 0FC8    997   1706*
BGTST     0000 0A8C   1100*
BGTST1    0000 0AA6   1110*  1114
BGTST2    0000 0AB2   1112   1114*
BGTST3    0000 0AB6   1109   1116*
BGTST4    0000 0AC2   1122*  1126
BGTST5    0000 0ACE   1124   1126*
BGTST6    0000 0AD2   1121   1128*
BGTST7    0000 0ADA   1130*
BOOT      0000 0088     66     69*
BRK.SAV   0000 08A8    690    723    727    886*
BRKVECT   0000 0108    105*   721    725   1012
BTESTNO   0000 08A0    329    341    358    379    429    882*
C300ADR   0000 0118    116*
CAR2ND    0000 0888    864*
CARRD     0000 087C    856*
CARRQ2S   0000 0890    871*
CHIPMSG   0000 0F86   1686   1699*
CHIPNO    0000 0F9A   1668   1677   1682   1684   1700*
CKBG60    0000 0C36   1311*
CKBG61    0000 0C4A   1318*  1325
CKBG62    0000 0C54   1320   1322*
CKBG63    0000 0C5C   1325*  1329
CKBG64    0000 0C62   1324   1328*
CKBG65    0000 0C68   1326   1331*
```

```
CLIF2ND   0000 0884    862*
CLIFADR   0000 0114    114*
CLIFRD    0000 0878    854*
CO3       0000 0F44   1666   1671*  1675   1689
CO4       0000 0F50   1672   1676*
CO4.5     0000 0F6A   1680   1684*
CO5       0000 0F70   1670   1686*
COMM      0000 07F4    789*
COMM1     0000 07F8    791*   833
COMRET    0000 0064   1722*
CON2ND    0000 0880    151    160    161    859*   860
CONADR    0000 0872    157    653    671    691    849*
CONENRD   0000 0881    860*
CONRD     0000 0874    158    159    171    655    668    851*   852
CONRQ2S   0000 088C    145    163    164    659    867*
CONTIN    0000 0928    394    719    915*
CONWRT    0000 0875    630    852*
COUNT     0000 08A2    355    368    370    883*
CRLF      0000 05FC    178    185    293    306    443    594*   680
CRT2ND    0000 0882    861*
CRTRD     0000 0876    853*
CRTRQ2S   0000 088D    868*
DATA      0000 0958    919*   1491
DEFTESTS  0000 E000    271    961*
DISPLAY   0000 04A2    387    424    459*
DTAEXP    0000 0FB2   1638   1704*
DTARED    0000 0FC2   1641   1705*
ECHO1     0000 06DA    667    674*
ECHRTN    0000 06DC    670    675*
ENDMOV5   0000 0B1C   1063   1151*
ENDMOV8   0000 0EA0   1492   1524   1525   1526   1527   1528   1529   1530   1531   1532   1533   1607*
EOTMSG    0000 08FE    406    902*
ERORTN    0000 0EFA   1646*
ERORTN1   0000 0F0E   1652*  1660
ERORTN2   0000 0F18   1630   1656*
ERR       0000 04C8    474*   792   1623
ERR1      0000 04E0    482*
ERRCOM    0000 04CC    476*
ERRCOM1   0000 04FA    478    491*
ERRCOM2   0000 04E8    484*
ERRMSG    0000 08C4    482    894*   895    896
ERRNO     0000 08CC    323    785    820    896*  1102   1159   1265   1272   1316   1415   1419   1519   1577
                      1613
ERROR     0000 0EAE   1113   1125   1161   1290   1293   1328   1427   1433   1439   1445   1554   1570   1588
                      1602   1621*
ERROR1    0000 0ED2   1633*  1691
ERROR2    0000 0EF2   1643*
ERROR3    0000 0EB2   1614   1623*
ERRORMSG  0000 0FA0   1643   1701*
ERROUT    0000 0F12   1653*
ERRPL1    0000 0800    793*
ERRSAVE   0000 00E0    474    488   1652   1690   1729*
ETESTNO   0000 08CA    322    349    895*
FITERR1   0000 0B1C   1136   1143   1153*
FITERR2   0000 0320   1139   1146   1156*
```

			526	537	542	551	552	566	568	587	594	601	602	604	607
			612	629	630	632	638	643	644	653	655	656	659	661	662
			664	666	688	691	692	701	702	710	711	716	724	725	726
			732	735	741	747	753	754	755	764	765	793	828	829	940
			998	1010	1058	1068	1071	1076	1086	1094	1100	1107	1128	1250	1251
			1252	1311	1331	1332	1333	1497	1511	1522	1536	1633	1652	1678	1685
			1690	1734	1735	1752	1758	1765	1778	1779	1780	1788	1791	1793	
R1	0000	0001	44*	69	81	82	84	89	134	137	139	143	154	155	156
			158	160	162	163	197	208	211	217	219	220	225	227	232
			239	242	252	256	262	296	297	320	321	322	323	342	356
			357	360	361	379	380	391	394	396	398	399	418	419	421
			422	423	426	427	434	435	447	450	461	462	462	463	463
			464	465	466	466	467	467	468	491	492	493	494	529	545
			546	550	554	578	579	607	609	612	613	614	616	618	623
			627	628	629	630	632	634	636	641	642	643	644	647	692
			694	696	702	703	708	711	716	717	733	736	737	738	738
			739	740	740	741	742	744	746	748	754	755	756	761	765
			766	794	797	825	826	933	934	939	940	999	1002	1011	1012
			1060	1084	1087	1089	1091	1093	1207	1258	1272	1419	1490	1498	1500
			1502	1504	1506	1508	1510	1516	1523	1524	1525	1526	1527	1528	1529
			1530	1531	1532	1533	1534	1535	1546	1634	1637	1640	1664	1673	1674
			1678	1679	1683	1684	1685	1735	1737	1742	1744	1747	1748	1751	1751
			1752	1761	1761	1764	1767	1771	1775	1778	1782				
R10	0000	000A	53*	808	808	810	811	811	817	817	818	823	1061	1134	1135
			1141	1142	1153	1211	1216	1223	1230	1243	1262	1273	1298	1318	1375
			1380	1423	1488	1496	1578								
R11	0000	000B	54*	1062	1137	1138	1144	1145	1156	1212	1217	1224	1231	1246	1259
			1276	1301	1321	1376	1381	1428	1489	1538	1557	1594			
R12	0000	000C	55*	192	209	218	229	248	251	263	280	301	507	1082	1105
			1116	1148	1210	1287	1307	1377	1382	1434	1574	1605			
R13	0000	000D	56*	193	194	195	196	1096	1150	1163	1165	1213	1220	1227	1244
			1260	1274	1299	1319	1378	1383	1440						
R14	0000	000E	57*	127	129	194	249	252	254	278	308	309	310	311	312
			518	521	786	788	821	822	823	824	1070	1078	1092	1093	1131
			1214	1218	1221	1225	1228	1232	1336	1391	1397	1403	1404	1405	1406
			1413	1448	1520	1606									
R15	0000	000F	59*	128	172	180	195	198	254	264	290	291	292	501	502
			503	505	509	510	600	648	649	719	721	723	1083	1084	1257
			1258	1509	1510	1515	1516	1534	1535	1760	1768	1783	1794		
R2	0000	0002	45*	65	85	91	135	140	142	144	145	149	150	151	158
			159	160	161	169	169	170	334	336	339	341	342	343	344
			346	348	349	358	359	360	435	448	451	479	480	486	487
			533	534	548	698	699	701	706	710	713	713	762	784	785
			795	798	819	820	829	1064	1066	1073	1074	1088	1089	1090	1091
			1103	1129	1208	1286	1306	1392	1394	1492	1499	1500	1501	1502	1503
			1504	1505	1506	1507	1508	1514	1524	1525	1526	1527	1528	1529	1530
			1531	1532	1533	1539	1559	1561	1568	1592	1635	1638	1641	1676	1677
			1681	1682	1738	1748	1750	1779							
R3	0000	0003	46*	70	71	72	136	137	140	156	157	166	166	170	171
			172	226	230	234	236	281	282	283	526	527	528	530	535
			561	563	763	767	768	1103	1111	1123	1153	1156	1243	1246	1247
			1259	1262	1263	1267	1269	1273	1276	1278	1280	1298	1301	1302	1318
			1321	1323	1423	1425	1428	1431	1434	1437	1440	1443	1545	1547	1549
			1551	1562	1564	1566	1575	1582	1597	1637	1663	1665	1669	1671	1688
			1688	1739	1762	1772	1795	1796							

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R4          0000 0004      47*   74    75    76    78    86    88   163   164   165   167   167   188
                          190   199   201   202   204   206   213   215   219   247   250   269   284
                          503   511   513   517   519   529   530   531   532   532   533   557   558
                          559   560   571   573   577   582   584   595   638   662   664   674   675
                          769   770   771   775  1101  1102  1110  1111  1122  1123  1158  1159  1160
                         1264  1265  1266  1267  1277  1278  1315  1316  1322  1323  1406  1411  1412
                         1414  1415  1424  1425  1430  1431  1436  1437  1442  1443  1512  1513  1518
                         1519  1546  1548  1549  1557  1558  1559  1563  1564  1576  1577  1581  1582
                         1596  1597  1640  1663  1667  1668  1740  1743  1745  1749  1749  1750  1770
                         1776
R5          0000 0005      48*   76    78    79    79    81    82    83    86    88    94   179   228
                          230   275   279   351   377   406   444   453   482   571   575   681   800
                          997  1063  1069  1077  1106  1117  1140  1147  1164  1241  1255  1270  1296
                         1312  1385  1386  1389  1491  1494  1537  1575  1643  1686  1742  1743  1775
                         1776  1777
R6          0000 0006      49*   73    83    90   145   146   147   147   227   228   235   256   262
                          279   282   500   508   509   515  1055  1058  1066  1067  1068  1071  1074
                         1075  1076  1083  1087  1095  1096  1104  1105  1107  1108  1110  1114  1116
                         1117  1118  1120  1122  1126  1129  1130  1134  1135  1137  1138  1140  1141
                         1142  1144  1145  1147  1149  1160  1162  1164  1238  1241  1244  1247  1248
                         1255  1256  1257  1260  1263  1266  1269  1270  1271  1274  1277  1280  1282
                         1283  1284  1296  1297  1299  1302  1303  1304  1312  1319  1322  1325  1371
                         1380  1381  1382  1383  1384  1418  1421  1424  1429  1430  1435  1436  1441
                         1442  1446  1485  1488  1494  1495  1496  1498  1515  1520  1523  1537  1540
                         1547  1548  1558  1561  1562  1563  1568  1573  1574  1578  1579  1581  1584
                         1585  1591  1592  1593  1594  1596  1599  1605  1634  1756  1757  1758  1764
                         1765  1777  1780  1796  1797
R7          0000 0007      50*   92    93    94   276   283   286  1057  1240  1252  1253  1271  1282
                         1286  1287  1314  1373  1416  1487
R8          0000 0008      51*   84    85    90    91   277  1056  1059  1069  1072  1077  1104  1106
                         1108  1119  1120  1239  1251  1253  1256  1297  1306  1307  1313  1372  1486
                         1489  1514  1538  1539  1540  1573  1579  1585  1591  1797
R9          0000 0009      52*  657   661   668   669   671   672   674  1059  1072  1119  1209  1283
                         1284  1303  1304  1374  1422
RDCHAR0     0000 01F6     200   202*
RDCHAR1     0000 020A     205   208*
RDCHR       0000 01E8     198*  212   221
RDCHR1      0000 021A     207   213*
RET         0000 000E      58*
RSAVE       0000 00A0      68   525   537   542   587   594   688   726   771  1010  1728*
RUN         0000 0964     239   925*
RUNIT       0000 02C2     240   290*
SCOPE       0000 0940     411   917*  1626  1646
SELTST      0000 0896     303   380   430   877*
SET.RTN     0000 0068    1723*
SETKB       0000 07AA     153   187   405   753*
SETUP       0000 065E     627*
SFTSET      0000 0A56    1070  1078  1082*  1130
SINK        0000 086C     656   672   739   747   841*
START       0000 012C     128   134*
START2      0000 011C      98   127*
STLOOP      0000 0AE0    1063  1088  1090  1092  1134*
T5S1        0000 0A2C    1066*  1067
T5S2        0000 0A42    1074*  1075
T6ER10      0000 0C02    1268  1290*
```

```
T6ER11      0000 0C0A       1279   1293*
T6S1        0000 0B8A       1243*  1248
T6S10       0000 0BEE       1280*  1294
T6S2        0000 0B94       1245   1247*
T6S3        0000 0B9C       1250*
T6S4        0000 0B9E       1251*  1334
T6S5        0000 0BA0       1252*  1308
T6S6        0000 0BA2       1253*  1288
T6S7        0000 0BBA       1261   1263*
T6S8        0000 0BD0       1269*  1291
T6S9        0000 0BE6       1275   1277*
T7MM1       0000 0CCA       1385   1403*
T7MM2       0000 0CD8       1403   1410*
T7MSG       0000 0FE8       1389   1710*
T7OUTMSG    0000 0CB2       1390*  1399
T7S1        0000 0C92       1380*  1384
T7S2        0000 0CB8       1392*  1398
T7S3        0000 0CBC       1394*  1395
T7S4        0000 0CF0       1418*  1449
T7S5        0000 0CF8       1421*  1446
T7S6        0000 0D0A       1426   1428*
T7S7        0000 0D1A       1432   1434*
T7S8        0000 0D2A       1438   1440*
T7S9        0000 0D3A       1444   1446*
T8SW        0000 0D64       1494*  1495
T8SX        0000 0DB2       1515*  1541
TEMP        0000 010C        107*  1095   1162   1611   1621   1653
TEMP2       0000 09D0        946    950    960*
TEST        0000 0910        242    272    286    296    308    310    337    911*   912
TEST0       0000 09DC        969    997*
TEST1       0000 0A0E        970    1055*
TEST2       0000 0B3C        971    1207*
TEST3       0000 0C7A        972    1371*
TEST4       0000 0D4C        973    1485*
TEST6ALL    0000 0B7E       1214   1218   1221   1225   1228   1232   1238*
TESTOP      0000 028C        243    269*
TESTS       0000 09D2        360    969*
TITLE       0000 09A0        179    955*
TOTAL       0000 089C        318    388    396    399    421    423    425    426    447    880*
TOTERR      0000 089E        319    388    425    450    491    493    881*   1656   1658
TOTMSG      0000 08D0        444    897*
TSTBRK      0000 06F2        350    371    393    586    688*
TSTBRK1     0000 0748        707    716*   718
TSTBRK2     0000 0750        705    715    719*
TSTBRK3     0000 0764        693    695    697    709    714    724*
TSTBRK4     0000 072C        700    706*
TSTBRK5     0000 071E        701*   704
TSTBRK6     0000 06F6        690*   1013
TSTBRKX     0000 09FE       1010*  1085   1310   1396   1447   1517
TSTDU       0000 0774        389    439    477    543    605    624    639    732*
TSTEND      0000 038A        366*   1011   1080   1234   1450   1542   1647   1649
TSTMSG      0000 08BA        351    892*   893
TSTOP1      0000 029C        270    275*
TSTOP2      0000 02A2        278*   285
TSTOP4      0000 02B4        284*
```

TTYGET	0000 06B2	658*								
WASDU	0000 0898	176	291	418	442	545	548	558	647	878*
WASDU1	0000 089A	177	292	391	419	546	560	879*		
ZERO1	0000 07C2	765*	766							

PROG= MOSP13   ASSEMBLED BY CAL 03-066R05-00   (32-BIT)

```
                 CROSS                                                                      MOS00010
                 TARGT 16                                                                   MOS00020
                 WIDTH 120                                                                  MOS00030
        MOSP13   PROG  S16 19-197 MOS MEMORY TEST PART 1  06-202F03M96R01A13 **             MOS00040
                 SQCHK                                                                      MOS00050
        ***********************************************************************             MOS00060
        *                                                                                   MOS00070
        *        SERIES-16 19-197 MOS MEMORY TEST PART 1 - (F03-R01)           ***          MOS00080
        *                                                                                   MOS00090
        *        COPYRIGHT       INTERDATA, INC.         OCTOBER, 1976                      MOS00100
        *                                                                                   MOS00110
        *        REVISED         PRODUCT SUPPORT         MAY, 1978             ***          MOS00120
        *        REVISION R01 CONTAINS 5/16 MICRO I/O BUS SUPPORT.                          MOS00130
        *                                                                                   MOS00140
        *        THIS PROGRAM TESTS THE UPPER HALF OF AN 8KB MOS MEMORY                     MOS00150
        *        IN A 5/16 OR 6/16 INTERDATA PROCESSOR WITH A                               MOS00160
        *        BATTERY BACK-UP POWER SUPPLY (OPTIONAL).                                   MOS00170
        *                                                                                   MOS00180
        *        TEST 0                    MEMORY SEARCH TEST                               MOS00190
        *                                                                                   MOS00200
        *        TEST 1                    BIT SET-RESET TEST                               MOS00210
        *                                                                                   MOS00220
        *        TEST 2                    MARCHING PATTERN TEST                            MOS00230
        *                                                                                   MOS00240
        *        TEST 3                    0 AND 1 WALK TEST                                MOS00250
        *                                                                                   MOS00260
        *        TEST 4                    DOUBLE OPERATION COLUMN DISTURB TEST             MOS00270
        *                                                                                   MOS00280
        *        THE DEFAULT TESTS ARE 0, 1, 2, 3, & 4.                                     MOS00290
        *                                                                                   MOS00300
        *        TEST 0 IS EXECUTED WHENEVER "RUN" IS ENTERED.                              MOS00310
        *                                                                                   MOS00320
        ***********************************************************************             MOS00330
```

BOOTSTRAP LOADER

```
        0000 0000        R0       EQU   0                                                   MOS00350
        0000 0001        R1       EQU   1                                                   MOS00360
        0000 0002        R2       EQU   2                                                   MOS00370
        0000 0003        R3       EQU   3                                                   MOS00380
        0000 0004        R4       EQU   4                                                   MOS00390
        0000 0005        R5       EQU   5                                                   MOS00400
        0000 0006        R6       EQU   6                                                   MOS00410
        0000 0007        R7       EQU   7                                                   MOS00420
        0000 0008        R8       EQU   8                                                   MOS00430
        0000 0009        R9       EQU   9                                                   MOS00440
        0000 000A        R10      EQU   10                                                  MOS00450
        0000 000B        R11      EQU   11                                                  MOS00460
        0000 000C        R12      EQU   12                                                  MOS00470
        0000 000D        R13      EQU   13                                                  MOS00480
        0000 000E        R14      EQU   14                                                  MOS00490
        0000 000E        RET      EQU   14                                                  MOS00500
        0000 000F        R15      EQU   15                                                  MOS00510
        0000 000F        LINK     EQU   15                                                  MOS00520
                         *                                                                  MOS00530
                         *  BOOTLOADER WITH CHKSUM                                          MOS00540
                         *                                                                  MOS00550
0000R                             ORG   X'80'                                               MOS00560
0080    2421                      LIS   R2,1                                                MOS00570
0082    2303                      BS    BOOT                                                MOS00580
0084    1E58                      DC    Z(PSWSAVE)       CURRENT PSW SAVE POINTER(32-BIT M/C)  MOS00590
0086    1E88                      DC    Z(RSAVE)         REGISTER SAVE POINTER(32-BIT M/C)     MOS00600
0088    C810 1000        BOOT     LHI   R1,ORIGIN1       R1 = ADR(FIRST BYTE OF TEST PROGM)    MOS00610
008C    C830 1E58                 LHI   R3,LNZB+1                                           MOS00620
0090    4030 0022                 STH   R3,X'22'         REGISTER SAVE POINTER(16-BIT M/C)     MOS00630
0094    2731                      SIS   R3,1                                                MOS00640
0096    C860 00FF        MN       LHI   R6,X'00FF'       R6 = CHKSUM BYTE = X'MN'              MOS00650
009A    D340 0078                 LB    R4,X'78'         INPUT DEV ADR                         MOS00660
009E    DE40 0079                 OC    R4,X'79'                                            MOS00670
00A2    9D45             LEADER   SSR   R4,R5                                               MOS00680
00A4    2091                      BTBS  9,1              DU,BSY                                MOS00690
00A6    9B45                      RDR   R4,R5                                               MOS00700
00A8    0855                      LDAR  R5,R5                                               MOS00710
00AA    2234                      BZS   LEADER           IGNORE LEADER                         MOS00720
00AC    D251 0000        LOAD     STB   R5,0(R1)         STORE 1ST NON-ZERO & SUBSEQUENT BYTE  MOS00730
00B0    D351 0000                 LB    R5,0(R1)         RELOAD DATA BYTE TO                   MOS00740
00B4    0765                      XAR   R6,R5            GENERATE CHKSUM                       MOS00750
00B6    9481                      EXBR  R8,R1                                               MOS00760
00B8    9828                      WHR   R2,R8            DISPLAY MEMORY ADDRESS                MOS00770
00BA    9D45                      SSR   R4,R5                                               MOS00780
00BC    2091                      BTBS  9,1              DU,BSY                                MOS00790
00BE    9B45                      RDR   R4,R5                                               MOS00800
00C0    C110 00AC                 BXLE  R1,LOAD          LOAD TILL LAST BYTE                   MOS00810
00C4    9486                      EXBR  R8,R6                                               MOS00820
00C6    9828                      WHR   R2,R8            FINAL CHKSUM                          MOS00830
00C8    2478             LDWT     LIS   R7,8                                                MOS00840
00CA    917C                      SLHLS R7,12            R7 = X'8000'                          MOS00850
00CC    9557                      EPSR  R5,R7            HALT PROCESSOR.                       MOS00860
00CE    2203                      BS    LDWT                                                MOS00870
```

EXEC - ETPE R03-06 (16-BIT MODIFIED & STRIPPED)

```
00D0                      ORG    X'1000'                                                     MOS00890
1000   4300 101E  ORIGIN1 B      START2               START HERE FOR 16-BIT PROCESSOR        MOS00900
                  *                                                                          MOS00910
                  *-----------------------------                                             MOS00920
                  *   TEST CONSTANTS                                 *                       MOS00930
                  *                                                                          MOS00940
1004   30F0       PSW     DCX    30F0                 PSW USED IN TEST MODULES               MOS00950
1006   30F0       PSW2    DCX    30F0                 PSW USED IN EXEC                       MOS00960
1008   0000       BRKVECT DC     Z(0)                 BREAK VECTOR ADDRESS                   MOS00970
100A   0000       IOSAVE  DCX    0                    I/O DEVICE SAVE LOCATION               MOS00980
100C   0000       TEMP    DCX    0                    ETPE TEMPORARY STORRAGE LOCATION       MOS00990
100E   0000       PASFLG  DCX    0                    FLAG SET WHEN CONSOLE ON PASLA/PALM    MOS01000
                  *                                                                          MOS01010
1010   0202       IO      DC     X'0202'              I/O DEVICE(S) IDENTIFIER               MOS01020
1012   1011       PASLADR DC     X'1011'              PASLA/PALM READ/WRITE ADDRESSES        MOS01030
1014   0202       CLIFADR DC     X'0202'              CURRENT LOOP INTERFACE R/W ADDRESSES   MOS01040
1016   6262       LPADR   DC     X'6262'              LINE PRINTER ADDRESS                   MOS01050
1018   1011       C300ADR DC     X'1011'              CAROUSEL 300/PASLA ADDRESSES           MOS01060
101A   C0C0       MICROBUS DC    X'C0C0'              MICROBUS ADDRESS                       MOS01070
101C   0000               DCX    0                    PROVISION FOR SPECIAL DEVICE           MOS01080
                  *                                                                          MOS01090
                  * IO =  0101  FOR CRT ON PASLA                                             MOS01100
                  *       0202  FOR TELETYPE, CAROUSEL 15/30                                 MOS01110
                  *       XX03  FOR LINE PRINTER                                             MOS01120
                  *       0404  FOR CAROUSEL 300                                             MOS01130
                  *       0505  FOR MICROBUS                                                 MOS01140
                  *                                                                          MOS01150
                  *-----------------------------                                             MOS01160
                  *                                                                          MOS01170
101E   48E0 1006  START2  LH     R14,PSW2                                                    MOS01180
1022   C8F0 102E          LHI    R15,START                                                   MOS01190
1026   D0E0 0034          STM    R14,X'34'            II INT NEW PSW                  ***    MOS01200
102A   0000               DCX    0                    TAKE AN ILLEGAL INSTRUCTION INT        MOS01210
102C   2200               BS     *                    HALT IF II IS NOT TAKEN                MOS01220
                  *                                                                          MOS01230
                  *                                                                          MOS01240
102E   D310 1010  START   LB     R1,IO                GET I/O IDENTIFIERS                    MOS01250
1032   D320 1011          LB     R2,IO+1                                                     MOS01260
1036   2436               LIS    R3,6                 IDENTIFIER CAN BE 1,2,3,4,5            MOS01270
1038   0513               CLAR   R1,R3                                                       MOS01280
103A   2182               BLS    IO.OK1               BRANCH IF KB IDENTIFIER OK             MOS01290
103C   2412               LIS    R1,2                 OTHERWISE FORCE IT TO BE TTY           MOS01300
103E   0523       IO.OK1  CLAR   R2,R3                                                       MOS01310
1040   2182               BLS    IO.OK2               SAME TEST FOR LIST DEVICE              MOS01320
1042   2422               LIS    R2,2                                                        MOS01330
1044   D210 1010  IO.OK2  STB    R1,IO                REESTABLISH VALUES                     MOS01340
1048   D220 1011          STB    R2,IO+1                                                     MOS01350
104C   D362 17F0          LB     R6,CONRQ2S(R2)                                              MOS01360
1050   4060 17D4          STH    R6,PASFLG2           SET PASLA FLAG (LIST DEVICE)           MOS01370
1054   0866               LDAR   R6,R6                                                       MOS01380
1056   2336               BZS    IO.OK3               SKIP IF NOT PASLA                      MOS01390
1058   9121               SLHLS  R2,1                                                        MOS01400
105A   D302 1011          LB     R0,IO+1(R2)                                                 MOS01410
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105E   DE02 17E4          142           OC    R0,CON2ND(R2)       ISSUE 2ND COMMAND (LIST DEVICE)          MOS01420
                          143  *                                                                           MOS01430
1062   41F0 16E8          144  IO.OK3   BAL   LINK,SETKB          ESTABLISH KEYBOARD DEVICE                MOS01440
1066   9310               145           LBR   R1,R0              (R1) = 1,2,4,5                           MOS01450
1068   9111               146           SLHLS R1,1                (R1) = 2,4,6,A                           MOS01460
106A   4831 1010          147           LH    R3,IO(R1)                                                    MOS01470
106E   4030 17D6          148           STH   R3,CONADR           SET UP CONSOLE DEVICE ADDRESS            MOS01480
1072   4821 17D8          149           LH    R2,CONRD(R1)                                                 MOS01490
1076   4020 17D8          150           STH   R2,CONRD            SET UP R/W COMMANDS                      MOS01500
107A   4821 17E4          151           LH    R2,CON2ND(R1)                                                MOS01510
107E   4020 17E4          152           STH   R2,CON2ND           2ND CMD; ENABLE READ CMD                 MOS01520
1082   9011               153           SRHLS R1,1                                                         MOS01530
1084   D341 17F0          154           LB    R4,CONRQ2S(R1)                                               MOS0 540
1088   D240 17F0          155           STB   R4,CONRQ2S          CONSOLE REQUEST TO SEND                  MOS01550
108C   4040 100E          156           STH   R4,PASFLG           SET PASLA FLAG (CONSOLE)                 MOS01560
1090   9333               157           LBR   R3,R3               MASK CONSOLE DEVICE TO 8 BITS    ****    MOS01570
1092   0844               158           LDAR  R4,R4                                                        MOS01580
1094   2333               159           BZS   IO.OK4              SKIP IF NOT PASLA                        MOS01590
1096   9422               160           EXBR  R2,R2                                                        MOS01600
1098   9E32               161           OCR   R3,R2               ISSUE 2ND COMMAND (CONSOLE)              MOS01610
109A   DE30 17D8          162  IO.OK4   OC    R3,CONRD           PUT CONSOLE IN READ MODE                 MOS01620
109E   9B3F               163           RDR   R3,R15              DUMMY READ TO SET BUSY                   MOS01630
                          164  *                                                                           MOS01640
10A0   41F0 1726          165           BAL   LINK,LCORE          SET UP LOW CORE                          MOS01650
10A4   2400               166           LIS   R0,0                                                         MOS01660
10A6   4000 17FC          167           STH   R0,WASDU            RESET 'DEVICE UNAVAILABLE' FLAG          MOS01670
10AA   41F0 154A          168           BAL   LINK,CRLF           DO CR & LF                               MOS01680
10AE   C850 192C          169           LHI   R5,TITLE                                                     MOS01690
10B2   41F0 14C2          170           BAL   R15,PRINT           PRINT TEST PROGRAM TITLE                 MOS01700
                          171  *---------------------------                                               MOS01710
                          172  *  KEYBOARD INPUT ROUTINE                                                  MOS01720
                          173  *                                                                           MOS01730
10B6   C8F0 179C          174  OPTIN    LHI   LINK,MM             *                                ***     MOS01740
10BA   40F0 003E          175           STH   LINK,X'3E'          RESTORE ETPE MM POINTER          ***     MOS01750
10BE   41F0 154A          176           BAL   LINK,CRLF           CR,LF TO LIST DEVICE                     MOS01760
10C2   4820 1006          177  OPTIN1   LH    R2,PSW2                                                      MOS01770
10C6   9512               178           EPSR  R1,R2               NO INT. REG SET 15                       MOS01780
10C8   41F0 16E8          179           BAL   LINK,SETKB          ESTABLISH CONSOLE                        MOS01790
10CC   D340 1872          180           LB    R4,AMSG             OUTPUT AN * TO INDICATE                  MOS01800
10D0   41F0 1558          181           BAL   LINK,OUTCHR         COMMAND MODE ESTABLISHED                 MOS01810
10D4   2541               182           LCS   R4,1                X'FF'                                    MOS01820
10D6   41F0 1558          183           BAL   LINK,OUTCHR                                                  MOS01830
10DA   C8C0 1614          184           LHI   R12,QUESTN          SET UP R12 FOR ERR ROUTINE               MOS01840
10DE   C800 2020          185           LHI   R0,X'2020'          BLANK OUT COMMAND BUFFER                 MOS01850
10E2   4000 1E68          186           STH   R0,OPTBUF           WHICH WILL CONTAIN OPTION                MOS01860
10E6   4000 1E6A          187           STH   R0,OPTBUF+2         NAME                                     MOS01870
10EA   4000 1E6C          188           STH   R0,OPTBUF+4                                                  MOS01880
10EE   2410               189           LIS   R1,0                CLEAR OPTBUF INDEX                       MOS01890
10F0   41F0 15E6          190  RDCHR    BAL   R15,GETCHR          GET A CHAR IN R4                         MOS01900
10F4   C540 0060          191           CLHI  R4,X'60'            UPPER CASE ALPHA ?                       MOS01910
10F8   2183               192           BLS   RDCHAR0             BRANCH IF NO.                            MOS01920
10FA   CB40 0020          193           SHI   R4,X'20'            CONVERT TO LOWER CASE                    MOS01930
10FE   C540 0023          194  RDCHAR0  CLHI  R4,X'23'            IS IT HASH MARK ?                        MOS01940
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1102  4330 10B6      195           BE    OPTIN                                          MOS01950
1106  C540 005F      196           CLHI  R4,X'5F'          LEFT ARROW, UNDERLINE OR DELETE ?  MOS01960
110A  2334           197           BES   RDCHAR1           YES, BRANCH                    MOS01970
110C  C540 0008      198           CLHI  R4,X'08'          BACK SPACE ?                   MOS01980
1110  2139           199           BNES  RDCHR1            NO, BRANCH                     MOS01990
1112  2711           200 RDCHAR1   SIS   R1,1              YES, DECREMENT INDEX           MOS02000
1114  021C           201           BMR   R12               ON BUFFER UNDERFLOW; PRINT "?" MOS02010
1116  C800 0020      202           LHI   R0,X'20'                                         MOS02020
111A  D201 1E68      203           STB   R0,OPTBUF(R1)     BLANK OUT LAST CHARACTER       MOS02030
111E  4300 10F0      204           B     RDCHR                                            MOS02040
1122  C540 000D      205 RDCHR1    CLHI  R4,X'0D'          IS IT CR ?                     MOS02050
1126  233C           206           BES   LOOKUP            YES, TRY MATCH                 MOS02060
1128  C540 0020      207           CLHI  R4,X'20'          IS IT A BLANK?                 MOS02070
112C  2339           208           BES   LOOKUP            YES, TRY MATCH                 MOS02080
112E  C510 0006      209           CLHI  R1,6              7 CHARACTERS INPUT ?           MOS02090
1132  038C           210           BNLR  R12               IF YES, ERROR                  MOS02100
1134  D241 1E68      211           STB   R4,OPTBUF(R1)     STORE CURRENT BYTE             MOS02110
1138  2611           212           AIS   R1,1              BUMP BUFFER INDEX              MOS02120
113A  4300 10F0      213           B     RDCHR             READ NEXT CHARACTER            MOS02130
                     214 *---------------------------------                               MOS02140
                     215 *  OPTION MATCH ROUTINE                                          MOS02150
                     216 *                                                                MOS02160
113E  C810 1874      217 LOOKUP    LHI   R1,OPT            LOAD ADDRESS OF OPTION TABLE   MOS02170
1142  2430           218 LOOK1     LIS   R3,0              CLEAR BUFFER INDEX             MOS02180
1144  0861           219           LDAR  R6,R1             SET OPTION WORD INDEX          MOS02190
1146  4856 0000      220 LOOK2     LH    R5,0(R6)          GET OPTION NAME (HW)           MOS02200
114A  021C           221           BMR   R12               IF MINUS, THEN NO MATCH = ERROR MOS02210
114C  4553 1E68      222           CLH   R5,OPTBUF(R3)     COMPARE TO OPTBUF HW           MOS02220
1150  2333           223           BES   LOOK3             EQUAL, BRANCH                  MOS02230
1152  261C           224           AIS   R1,12             NOT EQUAL, INCREMENT INDEX     MOS02240
1154  2209           225           BS    LOOK1             BRANCH                         MOS02250
1156  2632           226 LOOK3     AIS   R3,2              TRY NEXT HW                    MOS02260
1158  2662           227           AIS   R6,2                                             MOS02270
115A  C530 0006      228           CLHI  R3,6              3 MATCHING HW FOUND ?          MOS02280
115E  208C           229           BLS   LOOK2             NO, BRANCH (CONTINUE LOOKING)  MOS02290
                     230 *                                                                MOS02300
1160  C510 18BC      231           CLHI  R1,RUN            YES, RUN COMMAND ?             MOS02310
1164  4330 11CA      232           BE    RUNIT             YES, BRANCH                    MOS02320
                     233 *----------------------------                                    MOS02330
1168  C510 1874      234 LOOK4     CLHI  R1,TEST           NO, 'TEST' OPTION ?            MOS02340
116C  4330 1194      235           BE    TESTOP            YES, BRANCH                    MOS02350
                     236 *                                                                MOS02360
                     237 *  TO PROCESS COMMANDS OTHER THAN 'TEST', 'OPTION'.          ***  MOS02370
                     238 *                                                                MOS02380
1170  274D           239           SIS   R4,13             NO, OPTION FOLLOWED BY CR ?    MOS02390
1172  033C           240           BZR   R12               YES, ERROR                     MOS02400
1174  41E0 145E      241           BAL   R14,OPTVAL        GET OPTION VALUE IN R6         MOS02410
1178  274D           242           SIS   R4,13             TERMINATED BY CR ?             MOS02420
117A  023C           243           BNZR  R12               IF NO, BRANCH                  MOS02430
117C  48E1 0008      244           LH    R14,8(R1)         GET OPTION CHECK ROUTINE ADDRESS MOS02440
1180  2332           245           BZS   LOOK5             IF NO ROUTINE ADDRESS, BRANCH  MOS02450
1182  01FE           246           BALR  R15,R14           LINK OPTION CHECK ROUTINE      MOS02460
                     247 *                                 RETURN HERE                    MOS02470
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1184  4061 0006        248  LOOK5    STH   R6,6(R1)          STORE OPTION VALUE                        MOS02480
1188  4300 10B6        249           B     OPTIN             TO ACCEPT NEXT COMMAND                    MOS02490
                       250  *                                                                          MOS02500
                       251  *---------------------------------                                        MOS02510
                       252  *  TO CHECK THAT INPUT IS NOT > MAX VALUE (OPTION+10)                      MOS02520
                       253  *                                                                          MOS02530
118C  4561 000A        254  LEVELIN  CLH   R6,10(R1)          IS R6 > MAX VALUE ?                       MOS02540
1190  022C             255           BPR   R12               YES, ERROR RETURN                         MOS02550
1192  030F             256           BR    R15               NO, RETURN TO LOOK5                       MOS02560
                       257  *                                                                          MOS02570
                       258  *---------------------------------                                        MOS02580
                       259  *  TEST OPTION PROCESS ROUTINE                                             MOS02590
                       260  *                                                                          MOS02600
1194  274D             261  TESTOP   SIS   R4,13             'TEST' FOLLOWED BY (CR) ?                 MOS02610
1196  2137             262           BNZS  TSTOP1                                                      MOS02620
1198  C800 F800        263           LHI   R0,DEFTESTS       YES, SET TEST OPTION TO          ***      MOS02630
119C  4000 187A        264           STH   R0,TEST+6         FIRST TEST WORD                           MOS02640
11A0  4300 10B6        265           B     OPTIN             TO ACCEPT NEXT COMMAND                    MOS02650
                       266  *                                                                          MOS02660
11A4  2454             267  TSTOP1   LIS   R5,MAXTST         *                                ***      MOS02670
11A6  2470             268           LIS   R7,0              TEST BIT ACCUMULATORS                     MOS02680
11A8  2480             269           LIS   R8,0                                                        MOS02690
11AA  41E0 145E        270  TSTOP2   BAL   R14,OPTVAL        GET OPTION VALUE IN R6                    MOS02700
11AE  0556             271           CLAR  R5,R6                                                       MOS02710
11B0  028C             272           BLR   R12               ERROR: INVALID TEST NUMBER                MOS02720
11B2  C830 8000        273           LHI   R3,X'8000'        * (NORMALLY:   BAL  R14,UNARY)   ***      MOS02730
11B6  CC36 0000        274           SRHL  R3,0(R6)          *                                ***      MOS02740
11BA  0673             275           OAR   R7,R3             SET CURRENT BIT                           MOS02750
11BC  274D             276  TSTOP4   SIS   R4,13             TERMINATED BY CR ?               ***      MOS02760
11BE  4230 11AA        277           BNZ   TSTOP2                                                      MOS02770
11C2  4070 187A        278           STH   R7,TEST+6         STORE VALID SELECTED TESTS                MOS02780
11C6  4300 10B6        279           B     OPTIN             TO ACCEPT NEXT COMMAND                    MOS02790
                       280  *-------------------------------                                          MOS02800
                       281  *                                                                          MOS02810
11CA  24F0             282  RUNIT    LIS   R15,0                                                      MOS02820
11CC  40F0 17FC        283           STH   R15,WASDU         RESET DU FLAGS                            MOS02830
11D0  40F0 17FE        284           STH   R15,WASDU1                                                  MOS02840
11D4  41F0 154A        285           BAL   LINK,CRLF         DO CR & LF                                MOS02850
                       286  *                                                                          MOS02860
11D8  240F             287           LIS   R0,15             TO FIND HIGHEST SELECTED TEST  NO.        MOS02870
11DA  4810 187A        288           LH    R1,TEST+6         CHECK FIRST TEST HW                       MOS02880
11DE  9011             289  KEEP2    SRLS  R1,1                                                        MOS02890
11E0  2184             290           BCS   FOUND1            R0 = F-0 = TEST NUMBER                    MOS02900
11E2  2701             291           SIS   R0,1                                                       MOS02910
11E4  2213             292           BNMS  KEEP2             LOOP TILL TEST FOUND                      MOS02920
11E6  030C             293           BR    R12               TEST NOT SELECTED                         MOS02930
                       294  *                                                                          MOS02940
11E8  4000 17FA        295  FOUND1   STH   R0,SELTST         HIGHEST SELECTED TEST NUMBER     ***      MOS02950
11EC  4800 1010        296           LH    R0,IO                                                       MOS02960
11F0  4000 100A        297           STH   R0,IOSAVE         RESTORE USER'S I/O CHOICE                 MOS02970
11F4  41F0 154A        298           BAL   LINK,CRLF                                                   MOS02980
11F8  41F0 18CE        299           BAL   LINK,INIT         LINK TO USER'S WRITTEN INIT ROUTINE       MOS02990
                       300  *                                                                          MOS03000
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                          301  *  RESET TEST PARAMETERS                                                    MOS03010
                          302  *                                                                           MOS03020
11FC   2400               303  INITRET  LIS   R0,0                                                       MOS03030
11FE   4000 17F6          304           STH   R0,ISITERR          RESET ERROR FLAG                       MOS03040
1202   4000 1800          305           STH   R0,TOTAL            RESET TOTAL                            MOS03050
1206   4000 1802          306           STH   R0,TOTERR           RESET TOTERR                           MOS03060
120A   C810 3030          307           LHI   R1,C'00'                                                   MOS03070
120E   4010 1824          308           STH   R1,MTESTNO          RESET THESE FLAGS TO C'00'             MOS03080
1212   4010 182E          309           STH   R1,ETESTNO                                                 MOS03090
1216   4010 1830          310           STH   R1,ERRNO                                                   MOS03100
121A   41F0 1726          311           BAL   LINK,LCORE          SET UP LOW CORE                        MOS03110
                          312  *                                                                           MOS03120
                          313  *  START SELECTION FROM TEST 0                                            MOS03130
                          314  *                                                                           MOS03140
121E   2400               315  KEEP3    LIS   R0,0                                                       MOS03150
1220   4000 1804          316           STH   R0,BTESTNO          RESET BINARY TEST NUMBER               MOS03160
1224   4000 1808          317           STH   R0,NEXTST           RESET NEXT TEST NUMBER                 MOS03170
                          318  *                                                                           MOS03180
                          319  *  TO FIND THE NEXT SELECTED TEST.                                        MOS03190
                          320  *                                                                           MOS03200
1228   4820 1808          321  KEEP4    LH    R2,NEXTST           GET NEXT TEST NUMBER                   MOS03210
122C   C800 8000          322  KEEP41   LHI   R0,X'8000'          R0 = X'8000'                    ***    MOS03220
1230   CC02 0000          323           SRHL  R0,0(R2)            R0 = NEXT TEST BIT                     MOS03230
1234   4400 187A          324  KEEP42   NH    R0,TEST+6           LOOK AT TEST HW 1               ***    MOS03240
1238   2133               325           BNZS  KEEP5                                                      MOS03250
123A   2621               326  KEEP43   AIS   R2,1                                                      MOS03260
123C   2208               327           BS    KEEP41              LOOP FOR NEXT TEST NUMBER              MOS03270
123E   4020 1804          328  KEEP5    STH   R2,BTESTNO          CURRENT TEST NUMBER                    MOS03280
1242   0812               329           LDAR  R1,R2               R1 = TEST NUMBER IN BINARY             MOS03290
1244   2621               330           AIS   R2,1                                                      MOS03300
1246   4020 1808          331           STH   R2,NEXTST                                                  MOS03310
124A   2402               332           LIS   R0,2                SET DIGITS TO PRINT = 2                MOS03320
124C   C820 1824          333           LHI   R2,MTESTNO          R2 = A(MTESTNO)                        MOS03330
1250   41F0 149A          334           BAL   LINK,HEXASC         STORE TEST NO. IN ASCII @ MTESTNO      MOS03340
1254   4820 1824          335           LH    R2,MTESTNO                                                 MOS03350
1258   4020 182E          336           STH   R2,ETESTNO          STORE TEST NO. IN ASCII @ ETESTNO      MOS03360
125C   41F0 162E          337           BAL   LINK,TSTBRK         TEST BREAK                             MOS03370
1260   C850 181E          338           LHI   R5,TSTMSG                                                  MOS03380
1264   41F0 14C2          339           BAL   LINK,PRINT          PRINT 'TEST NN'                        MOS03390
1268   2400               340           LIS   R0,0                                                       MOS03400
126A   4000 17F8          341           STH   R0,NOERR            RESET ERROR FLAG                       MOS03410
126E   4000 1806          342           STH   R0,COUNT            RESET COUNT                            MOS03420
1272   4810 1004          343  KEEP6    LH    R1,PSW              ENABLE INTERRUPTS (30F0)        ***    MOS03430
1276   9501               344           EPSR  R0,R1                                                      MOS03440
1278   4820 1804          345           LH    R2,BTESTNO          R2 = TEST NUMBER                       MOS03450
127C   9121               346           SLHLS R2,LADC                                                    MOS03460
127E   4812 195C          347           LDA   R1,TESTS(R2)                                               MOS03470
1282   0301               348           BR    R1                  GO TO TEST MODULE                      MOS03480
                          349  *----------------------------                                            MOS03490
                          350  *                                                                           MOS03500
                          351  *  TEST MODULE END ROUTINE                                                MOS03510
                          352  *                                                                           MOS03520
1284   C8F0 179C          353  TSTEND   LHI   LINK,MM             *                               ***    MOS03530
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1288  40F0 003E          354           STH   LINK,X'3E'          RESTORE ETPE MM POINTER          ***  MOS03540
128C  4810 1006          355           LH    R1,PSW2                                                MOS03550
1290  9501               356           EPSR  R0,R1               DISABLE INT @ PROCESSOR LEVEL         MOS03560
1292  4800 1806          357           LH    R0,COUNT                                               MOS03570
1296  2601               358           AIS   R0,1                INCREMENT COUNT                      MOS03580
1298  4000 1806          359           STH   R0,COUNT                                               MOS03590
129C  41F0 162E          360           BAL   LINK,TSTBRK         IF BREAK GO TO OPTIN                 MOS03600
12A0  4500 1886          361           CLH   R0,LOOP+6           IF COUNT > LOOP,                     MOS03610
12A4  2383               362           BNLS  KEEP7               GO TO NEXT TEST MODULE               MOS03620
12A6  4300 1272          363           B     KEEP6               OTHERWISE, REPEAT SAME TEST          MOS03630
12AA  4800 17F8          364  KEEP7    LH    R0,NOERR            LOOK @ ERROR FLAG                    MOS03640
12AE  2135               365           BNZS  KEEP71                                                 MOS03650
12B0  C850 1844          366           LHI   R5,NOERMSG                                             MOS03660
12B4  41F0 14C2          367           BAL   LINK,PRINT          PRINT "NO ERROR"                     MOS03670
12B8  4810 1804          368  KEEP71   LH    R1,BTESTNO          GET TEST NUMBER                      MOS03680
12BC  4510 17FA          369           CLH   R1,SELTST           IS THE LAST SELECTED TEST DONE ?     MOS03690
12C0  4280 1228          370           BL    KEEP4               NO, GO SELECT NEXT TEST              MOS03700
                         371  *                                                                       MOS03710
                         372  *  ALL THE SELECTED TESTS ARE NOW RUN                                   MOS03720
                         373  *                                                                       MOS03730
12C4  C8F0 179C          374  ABORT    LHI   LINK,MM             COME HERE TO ABORT TEST SEQUENCE.    MOS03740
12C8  40F0 003E          375           STH   LINK,X'3E'          RESTORE ETPE MM POINTER          ***  MOS03750
12CC  4810 1006          376           LH    R1,PSW2                                                MOS03760
12D0  9501               377           EPSR  R0,R1               PSW = X'30F0'                        MOS03770
12D2  41F0 13B8          378           BAL   LINK,DISPLAY        DISPLAY 'TOTAL' & 'TOTERR'           MOS03780
12D6  1800               379           DC    Z(TOTAL),Z(TOTERR)  (IF DISPLAY PANEL EQUIPPED)          MOS03790
12D8  1802
12DA  41F0 16B2          380           BAL   LINK,TSTDU          RETURN WITH R1 = DU BIT              MOS03800
12DE  4230 1340          381           BNZ   KEEP9               IF DU, DISPLAY TOTAL                 MOS03810
12E2  4810 17FE          382           LH    R1,WASDU1           WAS IT EVER ?                        MOS03820
12E6  4230 1376          383           BNZ   KEEP92              YES, PRINT TOTAL, TOTERR             MOS03830
12EA  41F0 162E          384           BAL   LINK,TSTBRK                                             MOS03840
12EE  4810 1892          385           LH    R1,CONTIN+6         IF CONTIN = 1,                       MOS03850
12F2  233E               386           BZS   ABORT3              *                                *** MOS03860
12F4  6110 1800          387           AHM   R1,TOTAL            INCREMENT TOTAL COUNTER          *** MOS03870
12F8  4230 121E          388           BNZ   KEEP3               IF COUNT NOT ZERO, GO TO TEST 0  *** MOS03880
12FC  2511               389           LCS   R1,1                OTHERWISE                        *** MOS03890
12FE  6110 1800          390           AHM   R1,TOTAL            SET COUNTER TO MAX                   MOS03900
1302  4300 1370          391           B     HALT9               AND HALT TO PRINT TOTALS             MOS03910
                         392  *                                                                       MOS03920
1306  C8F0 179C          393  ABORT1   LHI   LINK,MM             *                                *** MOS03930
130A  40F0 003E          394           STH   LINK,X'3E'          RESTORE ETPE MM POINTER          *** MOS03940
                         395  *                                                                   *** MOS03950
130E  4810 1006          396  ABORT3   LH    R1,PSW2             *                                *** MOS03960
1312  9501               397           EPSR  R0,R1               DISABLE INT @ PROCESSOR LEVEL    *** MOS03970
1314  41F0 16E8          398           BAL   LINK,SETKB          KB DEVICE = LIST DEVICE              MOS03980
1318  C850 1862          399           LHI   R5,EOTMSG                                              MOS03990
131C  4050 17F6          400           STH   R5,ISITERR          FORCE PRINTING                       MOS04000
1320  41F0 14C2          401           BAL   LINK,PRINT          'END OF TEST'                        MOS04010
1324  24F0               402           LIS   R15,0                                                  MOS04020
1326  40F0 17F6          403           STH   R15,ISITERR         RESET FORCED PRINTING FLAG           MOS04030
                         404  *                                                                       MOS04040
132A  48F0 189E          405           LH    LINK,NOMSG+6        IF NOMSG = 1,                    *** MOS04050
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132E  4230 1376   406          BNZ   KEEP92              BRANCH TO PRINT TOTALS                MOS04060
1332  48F0 18AA   407          LH    LINK,SCOPE+6        ELSE, IS SCOPE = 4 ?            ***   MOS04070
1336  27F4        408          SIS   LINK,4                                                    MOS04080
1338  4330 1376   409          BZ    KEEP92              YES, BRANCH TO PRINT TOTALS           MOS04090
133C  4300 10B6   410          B     OPTIN               NO, BRANCH TO START                   MOS04100
                  411  *-------------------------------                                        MOS04110
                  412  *  ROUTINE INCREMENTS,DISPLAYS & CHECKS 'TOTAL'                         MOS04120
                  413  *                                                                       MOS04130
1340  4010 17FC   414  KEEP9    STH   R1,WASDU            SET 'WASDU' FLAG                      MOS04140
                  415  *                                                                       MOS04150
1344  4810 1800   416  ABORT2   LH    R1,TOTAL            INCREMENT TOTAL                       MOS04160
1348  2611        417          AIS   R1,1                                                      MOS04170
134A  4010 1800   418          STH   R1,TOTAL                                                  MOS04180
134E  41F0 13B8   419  KEEP91   BAL   LINK,DISPLAY        DISPLAY "TOTAL" & "TOTERR"            MOS04190
1352  1800        420          DC    Z(TOTAL),Z(TOTERR)  (IF DISPLAY PANEL EQUIPPED)           MOS04200
1354  1802
1356  4810 1800   421          LH    R1,TOTAL                                                  MOS04210
135A  C510 7FFF   422          CLHI  R1,X'7FFF'          TOTAL < MAX RETAINABLE ?              MOS04220
135E  2389        423          BNLS  HALT9                                                     MOS04230
1360  4800 1804   424          LH    R0,BTESTNO          R0 = CURRENT TEST NUMBER              MOS04240
1364  4500 17FA   425          CLH   R0,SELTST           IS IT LAST TEST ?                     MOS04250
1368  4280 1228   426          BL    KEEP4               NO, GO TO NEXT TEST                   MOS04260
136C  4300 121E   427          B     KEEP3               GO TO TEST 0                          MOS04270
                  428  *                                                                       MOS04280
1370  C810 80F0   429  HALT9    LHI   R1,X'80F0'          (R1) = X'80F0'                  ***   MOS04290
1374  9521        430          EPSR  R2,R1               HALT PROCESSOR                        MOS04300
                  431  *                                                                       MOS04310
                  432  *  WHEN EXE/RUN IS PRESSED, PRINT TOTAL & TOTERR                        MOS04320
                  433  *                                                                       MOS04330
1376  41F0 16B2   434  KEEP92   BAL   LINK,TSTDU          SEE IF LIST DEV IS ON                 MOS04340
137A  2035        435          BNZS  HALT9               NO, HALT                              MOS04350
137C  2400        436  KEEP10   LIS   R0,0                                                     MOS04360
137E  4000 17FC   437          STH   R0,WASDU            RESET PRESENT DU FLAG                 MOS04370
1382  41F0 154A   438          BAL   LINK,CRLF           DO CR & LF                            MOS04380
1386  C850 1834   439          LHI   R5,TOTMSG                                                 MOS04390
138A  4050 17F6   440          STH   R5,ISITERR          FORCE PRINTING                        MOS04400
138E  41F0 14C2   441          BAL   LINK,PRINT          PRINT 'TOTAL   TOTERR'                MOS04410
1392  2404        442          LIS   R0,4                PRINT 4 HEX DIGITS                    MOS04420
1394  4810 1800   443          LH    R1,TOTAL            GET 'TOTAL'                           MOS04430
1398  C820 1E4C   444          LHI   R2,LOMSG                                                  MOS04440
139C  41F0 149A   445          BAL   LINK,HEXASC         PUT 'TOTAL' IN MSG              ***   MOS04450
13A0  4810 1802   446          LH    R1,TOTERR           GET 'TOTERR'                          MOS04460
13A4  C820 1E51   447          LHI   R2,HIMSG                                                  MOS04470
13A8  41F0 149A   448          BAL   LINK,HEXASC         PUT 'TOTERR' IN MSG             ***   MOS04480
13AC  C850 1E4C   449          LHI   R5,LOMSG                                                  MOS04490
13B0  41F0 14C2   450          BAL   LINK,PRINT          PRINT THE VALUES IN HEX         ***   MOS04500
13B4  4300 10B6   451          B     OPTIN               GO TO BEGINNING                       MOS04510
                  452  ********************************************                           MOS04520
                  453  *   DISPLAY PANEL OUTPUT ROUTINE   (TIMEOUT IF NOT EQUIPPED)           MOS04530
                  454  *                                                                       MOS04540
13B8  2401        455  DISPLAY  LIS   R0,1                LOAD DISPLAY PANEL ADDRESS            MOS04550
13BA  DE00 17D2   456          OC    R0,INCR             PUT DISPLAY PANEL IN INCREM. MODE     MOS04560
13BE  481F 0002   457          LH    R1,2(LINK)          GET 2ND PARAMETER ADDRESS             MOS04570
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13C2   4811 0000           LH    R1,0(R1)          GET THE DATA                                MOS04580
13C6   9411                EXBR  R1,R1             EXCHANGE DATA BYTES                         MOS04590
13C8   9801                WHR   R0,R1             WRITE DATA TO DISPLAY PANEL                 MOS04600
13CA   481F 0000           LH    R1,0(LINK)        GET 1ST PARAMETER ADDRESS                   MOS04610
13CE   4811 0000           LH    R1,0(R1)          GET THE DATA                                MOS04620
13D2   9411                EXBR  R1,R1             EXCHANGE DATA BYTES                         MOS04630
13D4   9801                WHR   R0,R1             WRITE DATA TO DISPLAY PANEL                 MOS04640
13D6   DE00 17D1           OC    R0,NORM           PUT DISPLAY PANEL IN NORMAL MODE            MOS04650
13DA   430F 0004           B     4(LINK)                                                       MOS04660
                    * ***********************************                                      MOS04670
                    *  ERROR ROUTINES                  (OVERRIDE NOMSG OPTION)                 MOS04680
                    *                                                                          MOS04690
13DE   D000 1EC8    ERR    STM   R0,ERRSAVE        STORE REGISTERS                             MOS04700
13E2   4120 13FC           BAL   R2,ERRCOM         RETURN IF LIST DEVICE IS ON                 MOS04710
13E6   41E0 1430           BAL   RET,ERR1          PRINT 'ERROR TTNN'                          MOS04720
13EA   2400         ERRCOM2 LIS  R0,0                                                          MOS04730
13EC   4000 17F6           STH   R0,ISITERR        RESET ERROR FLAG                            MOS04740
13F0   4820 1004           LH    R2,PSW                                                        MOS04750
13F4   9502                EPSR  R0,R2             PSW = X'30F0'                               MOS04760
13F6   D100 1EC8           LM    R0,ERRSAVE        RESTORE REGISTERS                           MOS04770
13FA   030F                BR    LINK              RETURN TO TEST                              MOS04780
                    *                                                                          MOS04790
                    *  ETPE COMMON ERROR ROUTINE                                               MOS04800
                    *                                                                          MOS04810
13FC   4020 1E5C    ERRCOM STA   R2,COMRET         SAVE RETURN ADDRESS                   ***   MOS04820
1400   4810 1006           LH    R1,PSW2                                                       MOS04830
1404   9501                EPSR  R0,R1             DISABLE INT. @ PROCESSOR LEVEL              MOS04840
1406   41F0 16B2           BAL   LINK,TSTDU        GET LIST DEVICE DU BIT IN R1                MOS04850
140A   2138                BNZS  ERRCOM1           BRANCH IF OFF-LINE                          MOS04860
140C   4020 17F6           STH   R2,ISITERR        SET ERROR FLAGS                             MOS04870
1410   4020 17F8           STH   R2,NOERR                                                      MOS04880
1414   4820 1E5C           LDA   R2,COMRET         RESTORE RETURN ADDRESS                ***   MOS04890
1418   0302                BR    R2                GO, PRINT ERROR MESSAGE                     MOS04900
                    *                                                                          MOS04910
141A   4810 1802    ERRCOM1 LH   R1,TOTERR         LIST DEVICE IS OFF                          MOS04920
141E   2611                AIS   R1,1                                                          MOS04930
1420   4010 1802           STH   R1,TOTERR         INCREMENT TOTERR                            MOS04940
1424   C510 7FFF           CLHI  R1,X'7FFF'        TOTERR < MAX RETAINABLE ?                   MOS04950
1428   4280 134E           BL    KEEP91            NO, ABORT CURRENT TEST & GOTO NEXT          MOS04960
142C   4300 1370           B     HALT9             YES, HALT PROCESSOR                         MOS04970
                    *-----------------------------                                             MOS04980
                    * MESSAGE PRINT ROUTINES           (DO NOT OVERRIDE NOMSG OPTION)          MOS04990
                    *                                                                          MOS05000
                    *  TO PRINT 'ERROR TTNN'                                                   MOS05010
                    *                                                                          MOS05020
1430   C850 1828    ERR1   LHI   R5,ERRMSG         PRINT 'ERROR TTNN'                    ***   MOS05030
1434   41F0 14C2           BAL   LINK,PRINT        TT = TEST NO.; NN = ERROR NO.         ***   MOS05040
1438   030E                BR    RET               RETURN                                      MOS05050
                    *                                                                          MOS05060
                    *  TO PRINT 'PSW PPPP  LOC LLLL'                                           MOS05070
                    *                                                                          MOS05080
143A   2404         ERRPL1 LIS   R0,4              SET UP DIGITS = 4                           MOS05090
143C   4810 17CC           LH    R1,OPSW           R1 = OLD PSW                                MOS05100
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1440  C820 1852          511           LHI   R2,ASCIPSW                                          MOS05110
1444  41F0 149A          512           BAL   LINK,HEXASC        CONVERT IT TO ASCII               MOS05120
1448  4810 17CE          513           LH    R1,OLOC            R1= OLD LOC                       MOS05130
144C  C820 185C          514           LHI   R2,ASCILOC                                          MOS05140
1450  41F0 149A          515           BAL   LINK,HEXASC        CONVERT IT TO ASCII               MOS05150
1454  C850 184E          516           LHI   R5,PSWMSG                                           MOS05160
1458  41F0 14C2          517           BAL   LINK,PRINT         PRINT 'PSW PPPP  LOC LLLL'        MOS05170
145C  030E               518           BR    RET                RETURN                            MOS05180
                         519  * ********************************                                  MOS05190
                         520  *  TO OBTAIN OPTION VALUE IN R6    (16 BITS, TARGT 16)              MOS05200
                         521  *                                                                    MOS05210
145E  2460               522  OPTVAL   LIS   R6,0               INITIALIZE ACCUMULATOR            MOS05220
1460  41F0 15E6          523           BAL   R15,GETCHR         GET A CHAR IN R4                  MOS05230
1464  24FF               524  OPTVAL0  LIS   R15,15                                              MOS05240
1466  D44F 180E          525  OPTVAL1  CLB   R4,HEXTAB(R15)     SCAN TABLE FOR CHARACTER MATCH    MOS05250
146A  2334               526           BES   OPTVAL2            MATCH, BRANCH                     MOS05260
146C  27F1               527           SIS   R15,1              OR DECREMENT POINTER              MOS05270
146E  2214               528           BNMS  OPTVAL1            IF POINTER IS IN RANGE, BRANCH    MOS05280
1470  030C               529           BR    R12                ELSE ERROR; VALUE NOT IN TABLE    MOS05290
1472  9164               530  OPTVAL2  SLLS  R6,4               SHIFT LEFT 4                      MOS05300
1474  066F               531           OAR   R6,R15             OR IN CURRENT DIGIT               MOS05310
1476  41F0 15E6          532  OPTVAL3  BAL   R15,GETCHR         GET NEXT CHAR                     MOS05320
147A  C540 005F          533           CLHI  R4,X'5F'           IS IT LEFT ARROW ?                MOS05330
147E  2334               534           BES   OPTVAL5            YES, BRANCH                       MOS05340
1480  C540 0008          535           CLHI  R4,X'08'           NO, IS IT BACK SPACE ?            MOS05350
1484  2133               536           BNES  OPTVAL4            NO, BRANCH                        MOS05360
1486  9064               537  OPTVAL5  SRLS  R6,4               YES, THROW AWAY LAST HEX ENTRY    MOS05370
1488  2209               538           BS    OPTVAL3            BRANCH TO GET NEXT CHARACTER      MOS05380
148A  C540 000D          539  OPTVAL4  CLHI  R4,13              IS IT CR ?                        MOS05390
148E  033E               540           BER   R14                YES, EXIT (RETURN)                MOS05400
1490  C540 002C          541           CLHI  R4,X'2C'           NO, IS IT COMMA ?                 MOS05410
1494  4230 1464          542           BNE   OPTVAL0            NO, LOOP TTO PROCESS              MOS05420
1498  030E               543           BR    R14                YES, RETURN                       MOS05430
                         544  *--------------------------------                              ***  MOS05440
                         545  *  TO CONVERT HEXADECIMAL DATA IN R1 TO ASCII CHAR & STORE @ 0(R2)   MOS05450
                         546  *                                                                    MOS05460
149A  D000 1E88          547  HEXASC   STM   R0,RSAVE           STORE REGISTERS                   MOS05470
149E  0830               548           LDAR  R3,R0              R3 = NUMBER OF DIGITS             MOS05480
14A0  9132               549           SLLS  R3,2                                                 MOS05490
14A2  2734               550           SIS   R3,4               R3 = 4(DIGITS)-4                  MOS05500
14A4  0841               551  HEXASC1  LDAR  R4,R1              R4 = HEX DATA TO BE CONVERTED     MOS05510
14A6  CC43 0000          552           SRAL  R4,0(R3)                                             MOS05520
14AA  C440 000F          553           NHI   R4,15              R4 = SINGLE HEX DIGIT FOR CONVERSION MOS05530
14AE  D344 180E          554           LB    R4,HEXTAB(R4)      GET THE ASCII CHARACTER           MOS05540
14B2  D242 0000          555           STB   R4,0(R2)           STORE ASCI CHAR IN DESTTINATION BUFF MOS05550
14B6  2621               556           AIS   R2,1               BUMP BUFFER LOCATION              MOS05560
14B8  2734               557           SIS   R3,4               DECREMENT DIGIT SHIFT VALUE       MOS05570
14BA  221B               558           BNMS  HEXASC1            LOOP TILL ALL DIGITS ARE CONVERTED MOS05580
14BC  D100 1E88          559           LM    R0,RSAVE           RESTORE REGISTERS                 MOS05590
14C0  030F               560           BR    LINK               RETURN                            MOS05600
                         561  *--------------------------------                                  MOS05610
                         562  *  TO PRINT THE ASCII MESSAGE                                       MOS05620
                         563  *                                                                    MOS05630
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14C2  D000 1E88          564  PRINT    STM   R0,RSAVE          STORE REGISTERS                    MOS05640
14C6  41F0 16B2          565           BAL   LINK,TSTDU        LIST DEVICE DU ?                   MOS05650
14CA  2337               566           BZS   P1               NO, BRANCH                         MOS05660
14CC  4010 17FC          567           STH   R1,WASDU          YES, SET DU FLAGS                  MOS05670
14D0  4010 17FE          568           STH   R1,WASDU1                                           MOS05680
14D4  4300 1540          569           B     PRINT5           EXIT                               MOS05690
14D8  4820 17FC          570  P1       LH    R2,WASDU         WAS IT DU LAST PASS ?              MOS05700
14DC  4330 150A          571           BZ    P3               NO, BRANCH                         MOS05710
14E0  C810 0140          572           LHI   R1,X'140'        YES, LOAD DELAY CONSTANTS          MOS05720
14E4  C800 1000          573  P4       LHI   R0,X'1000'       INTO COUNTERS 1 & 2                MOS05730
14E8  2701               574  P5       SIS   R0,1             DECREMENT COUNTER 1                MOS05740
14EA  2031               575           BNZS  P5               WAIT TILL EXHAUSTED                MOS05750
14EC  2711               576           SIS   R1,1             DECREMENT COUNTER 2                MOS05760
14EE  2035               577           BNZS  P4               LOOP TILL TIMEOUT                  MOS05770
                         578  *                               (20 SEC. FOR CRT WARM-UP)          MOS05780
14F0  2440               579           LIS   R4,0                                                MOS05790
14F2  4040 17FC          580           STH   R4,WASDU         RESET PRESENT DU FLAG              MOS05800
14F6  2541               581           LCS   R4,1             CHARACTER = X'FF'                  MOS05810
14F8  4040 17FE          582           STH   R4,WASDU1        SET WASDU1 FLAG                    MOS05820
14FC  2434               583           LIS   R3,4                                                MOS05830
14FE  41F0 1558          584  P2       BAL   LINK,OUTCHR      OUTPUT DELETE CHARACTER            MOS05840
1502  2731               585           SIS   R3,1                                                MOS05850
1504  2023               586           BPS   P2               BRANCH 4 TIMES                     MOS05860
1506  4300 137C          587           B     KEEP10           PRINT TOTAL, TOTERR                MOS05870
150A  4800 189E          588  P3       LH    R0,NOMSG+6       IS 'NOMSG' SET ?                   MOS05880
150E  2335               589           BZS   PRINT2           NO, PRINT ALL MESSAGES             MOS05890
1510  4800 17F6          590           LH    R0,ISITERR       IS 'ISITERR' SET ?                 MOS05900
1514  4330 1540          591           BZ    PRINT5           NO, NOT AN ERROR MSG. - EXIT       MOS05910
                         592  *                                                                  MOS05920
1518  D345 0000          593  PRINT2   LB    R4,0(R5)         GET A MESSAGE BYTE                 MOS05930
151C  41F0 1558          594           BAL   LINK,OUTCHR      OUTPUT IT                          MOS05940
1520  274D               595           SIS   R4,13            CR ?                               MOS05950
1522  2333               596           BZS   PRINT3           MSG OVER                           MOS05960
1524  2651               597           AIS   R5,1                                               MOS05970
1526  2207               598           BS    PRINT2           LOOP FOR NEXT CHAR                 MOS05980
1528  244A               599  PRINT3   LIS   R4,10            LF                                 MOS05990
152A  D310 100B          600           LB    R1,IOSAVE+1      GET LIST DEV IDENTIFIER            MOS06000
152E  2713               601           SIS   R1,3             LINE PRINTER ?                     MOS06010
1530  2335               602           BZS   PRINT3A          BRANCH IF YES.                     MOS06020
1532  41F0 1558          603           BAL   LINK,OUTCHR      LF                                 MOS06030
1536  2541               604           LCS   R4,1             DEL                                MOS06040
1538  2302               605           BS    PRINT3B                                             MOS06050
153A  2441               606  PRINT3A  LIS   R4,1             YES, OUTPUT X'01'                  MOS06060
153C  41F0 1558          607  PRINT3B  BAL   LINK,OUTCHR      TERMINAL CHARACTER                 MOS06070
1540  41F0 162E          608  PRINT5   BAL   LINK,TSTBRK                                         MOS06080
1544  D100 1E88          609           LM    R0,RSAVE         RESTORE REGISTERS                  MOS06090
1548  030F               610           BR    LINK             RETURN                             MOS06100
                         611  *--------------------------------                                  MOS06110
                         612  *  SMALL SUPPORT ROUTINES                                          MOS06120
                         613  *                                                                  MOS06130
                         614  *  TO OUTPUT CR,LF TO LIST DEVICE                                  MOS06140
                         615  *                                                                  MOS06150
154A  D000 1E88          616  CRLF     STM   R0,RSAVE         STORE REGISTERS                    MOS06160
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154E   244D              LIS   R4,13
1550   41F0 1558         BAL   LINK,OUTCHR         OUTPUT CR
1554   4300 1528         B     PRINT3              LINE FEED, RESTORE, RETURN
                  *-----------------------------
                  *  TO OUTPUT A CHARACTER TO THE LIST DEVICE
1558   40F0 180A  OUTCHR  STA   R15,OUT.SAV        SAVE RETURN ADDRESS
155C   D300 100B         LB    R0,IOSAVE+1         GET USER'S LIST DEVICE NUMBER
1560   2704              SIS   R0,4
1562   4230 15A0         BNZ   OUTCHR2             BRANCH IF NOT CAROUSEL
1566   4000 1E64         STH   R0,PAUSE            SET PAUSE FLAG
156A   41F0 16B2  OTC.0  BAL   LINK,TSTDU          LIST DEVICE ON LINE ?
156E   4230 15DC         BNZ   OUT0                NO, BRANCH
1572   9D01              SSR   R0,R1               GET CAROUSEL STATUS
1574   2386              BNCS  OTC.1               BRANCH IF CHAR. IS TO BE READ    ***
1576   4810 1E64         LH    R1,PAUSE            PAUSED NOW ?
157A   2038              BNZS  OTC.0               YES, LOOP
157C   4300 15A0         B     OUTCHR2             NO, GO OUTPUT CHARACTER
1580   9B01       OTC.1  RDR   R0,R1               GET CAROUSEL CHARACTER
1582   C410 007F         NHI   R1,X'7F'            MASK OFF PARITY
1586   CB10 0012         SHI   R1,X'12'            IS IT DC2 ?
158A   2134              BNZS  OTC.3               NO, BRANCH
158C   4010 1E64         STH   R1,PAUSE            YES, RESET PAUSE FLAG
1590   2308              BS    OUTCHR2             BRANCH
1592   2712       OTC.3  SIS   R1,2                IS IT DC4 ?
1594   4230 156A         BNZ   OTC.0               NO, BBRANCH
1598   40F0 1E64         STH   LINK,PAUSE          YES, SET PAUSE FLAG
159C   4300 156A         B     OTC.0               GO WAIT FOR DC2
                  *
15A0   4010 1E64  OUTCHR2 STH  R1,PAUSE            RESET FLAG
15A4   41F0 16B2         BAL   LINK,TSTDU          OFF-LINE ?
15A8   4230 15DC         BNZ   OUT0                BRANCH IF OFF-LINE
15AC   4110 170E         BAL   R1,SETUP            SET UP FOR OUTPUT
15B0   9D01       OTC.4  SSR   R0,R1               WAIT FOR NOT BUSY
15B2   4230 15DC         BTC   3,OUT0              BRANCH IF OFF-LINE
15B6   C510 000C         CLHI  R1,12               PASLA OFFLINE ?
15BA   4330 15DC         BE    OUT0                BRANCH: YES.
15BE   C310 0008         THI   R1,8                BUSY ?
15C2   2039              BNZS  OTC.4               WAIT FOR NOT BUSY.
15C4   9A04              WDR   R0,R4               OUTPUT DATA BYTE
15C6   41F0 16B2  OTC.5  BAL   LINK,TSTDU          LIST DEVICE DU ?
15CA   2139              BNZS  OUT0                YES, BRANCH
15CC   D310 100B         LB    R1,IOSAVE+1         NO, GET USER'S LIST DEVICE NUMBER
15D0   9111              SLHLS R1,1                SHIFT IT FOR HW INDEXING
15D2   D301 1011         LB    R0,IO+1(R1)         GET USER'S LISTT DEVICE ADDRESS
15D6   9D01              SSR   R0,R1               GET THE STATUS
15D8   2089              BTBS  8,OTC.5             WAIT FOR NOT BUSY.
15DA   2303              BS    OUT1                BRANCH
15DC   4010 17FC  OUT0   STH   R1,WASDU            SET PRESENT DU FLAG
15E0   48F0 180A  OUT1   LDA   R15,OUT.SAV         RESTORE RETURN ADDRESS
15E4   030F              BR    R15                 RETURN
                  *-----------------------------
                  *  TO GET A CHAR FROM KEYBOARD (IN REG R4)
                  *
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15E6  4140 16F6          670  GETCHR   BAL   R4,KBREAD          PUT KB DEVICE IN READ MODE              MOS06700
15EA  0890               671           LDAR  R9,R0              SAVE CONSOLE DEVICE ADDRESS             MOS06710
15EC  9D04               672           SSR   R0,R4              GET THE STATUS                          MOS06720
15EE  2081               673           BTBS  8,1                IF BUSY, LOOP (POSSIBLE HANG)   ****    MOS06730
15F0  9B04               674           RDR   R0,R4              READ A CHAR IN R4                       MOS06740
                         675  * TO ECHO RECEIVED CHARACTERS TO CONSOLE DEVICE IN FDX MODE                  MOS06750
15F2  D400 101A          676           CLB   R0,MICROBUS        IS IT MICROBUS ?                        MOS06760
15F6  233B               677           BES   ECHO1             YES, BRANCH                             MOS06770
15F8  D390 17D8          678           LB    R9,CONRD           NO, GET THE READ OC                     MOS06780
15FC  C590 00A1          679           CLHI  R9,X'A1'           CAROUSEL ?                              MOS06790
1600  2137               680           BNES  ECHRTN             NO, DO NOT ECHO (BRANCH)                MOS06800
1602  D390 17D7          681           LB    R9,CONADR+1        GET CONSOLE WRITE ADDRESS               MOS06810
1606  DD90 17D0          682           SS    R9,SINK            GET THE STATUS                          MOS06820
160A  2082               683           BTBS  8,2                WAIT FOR NOT BUSY (POSSIBLE HANG)       MOS06830
160C  9A94               684  ECHO1    WDR   R9,R4              ECHO RECEIVED BYTE                      MOS06840
160E  C440 007F          685  ECHRTN   NHI   R4,X'7F'           REMOVE PARITY BIT                       MOS06850
1612  030F               686           BR    LINK               RETURN                                  MOS06860
                         687  *----------------------------                                            MOS06870
                         688  *  TO OUTPUT '?' TO CONSOLE                                              MOS06880
                         689  *                                                                         MOS06890
1614  41F0 154A          690  QUESTN   BAL   LINK,CRLF          DO CR & LF                              MOS06900
1618  40F0 17F6          691           STH   LINK,ISITERR       FORCE PRINTING                          MOS06910
161C  C850 1870          692           LHI   R5,QMSG                                                    MOS06920
1620  41F0 14C2          693           BAL   LINK,PRINT         PRINT '?'                               MOS06930
1624  2400               694           LIS   R0,0                                                       MOS06940
1626  4000 17F6          695           STH   R0,ISITERR         RESET FORCED PRINTING FLAG              MOS06950
162A  4300 10C2          696           B     OPTIN1             TO ACCEPT COMMAND INPUT                 MOS06960
                         697  *----------------------------                                            MOS06970
                         698  * IF BREAK KEY DEPRESSED, GO TO 'OPTIN' OR (BRKVECT); ELSE RETURN.       MOS06980
                         699  *    BUT IF "BREAK" & "CONTIN" = 1, GO TO ABORT1.                  ***     MOS06990
                         700  *                                                                         MOS07000
162E  D000 1EA8          701  TSTBRK   STM   R0,RSAVE+32       STORE REGISTERS                 ***     MOS07010
1632  40F0 180C          702           STA   LINK,BRK.SAV       SAVE RETURN ADDRESS                     MOS07020
1636  D300 17D6          703           LB    R0,CONADR          GET KEYBOARD DEVICE ADR                 MOS07030
163A  9D01               704           SSR   R0,R1              GET KEYBOARD DEVICE STATUS              MOS07040
163C  4210 16A2          705           BTC   1,TSTBRK3          IF CLI DU, BRANCH                       MOS07050
1640  C510 000C          706           CLHI  R1,X'0C'           IS PASLA DU ?                           MOS07060
1644  4330 16A2          707           BE    TSTBRK3            YES, BRANCH                             MOS07070
1648  C310 0020          708           THI   R1,X'20'           NO, IS "BREAK" KEY PRESSED ?            MOS07080
164C  4330 16A2          709           BZ    TSTBRK3            NO, EXIT (BRANCH)                       MOS07090
1650  D320 1010          710           LB    R2,IO              YES, GET CONSOLE DEVICE POINTER         MOS07100
1654  C520 0005          711           CLHI  R2,5               IS IT MICROBUS ?                        MOS07110
1658  2139               712           BNES  TSTBRK4            NO, BRANCH                              MOS07120
165A  9B02               713  TSTBRK5  RDR   R0,R2              YES, READ THE CHARACTER                 MOS07130
165C  9D01               714           SSR   R0,R1              GETT THE DEVICE STATUS                  MOS07140
165E  C310 0020          715           THI   R1,X'20'           STILL "BREAK" ?                         MOS07150
1662  4230 165A          716           BNZ   TSTBRK5            YES, BRANCH                             MOS07160
1666  4300 168E          717           B     TSTBRK2            NO, BRANCH                              MOS07170
166A  4820 100E          718  TSTBRK4  LH    R2,PASFLG          PASLA ?                                 MOS07180
166E  233C               719           BZS   TSTBRK1            BRANCH IF NOT                           MOS07190
1670  C310 0008          720           THI   R1,8               ALREADY ACKNOWLEDGED ?                  MOS07200
1674  4230 16A2          721           BNZ   TSTBRK3            BRANCH IF YES                           MOS07210
1678  9B02               722           RDR   R0,R2              READ THE CHARACTER                      MOS07220
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167A  9D01                 SSR   R0,R1             GET THE DEVIE STATUS                    MOS07230
167C  2281                 BFBS  8,1               WAIT FOR BUSY TO SET                    MOS07240
167E  0822                 LDAR  R2,R2             ZERO CHARACTER ?                        MOS07250
1680  4230 16A2            BNZ   TSTBRK3           NO, BRANCH:  JUST FRAMING ERROR  ***    MOS07260
1684  2305                 BS    TSTBRK2           YES, EXIT (W/BREAK)                     MOS07270
1686  9D01       TSTBRK1   SSR   R0,R1             GET THE DEVICE STATUS                   MOS07280
1688  C310 0020            THI   R1,X'20'          BREAK STATUS ?                          MOS07290
168C  2033                 BNZS  TSTBRK1           NO, BRANCH (WAIT FOR BREAK RELEASE)*    MOS07300
168E  48F0 1892  TSTBRK2   LH    R15,CONTIN+6      YES, IS CONTIN SET ?             ***    MOS07310
1692  4230 1306            BNZ   ABORT1            IF CONTIN SET, BRANCH TO ABORT1  ***    MOS07320
1696  48F0 1008            LH    R15,BRKVECT       NO, CHECK FOR SPECIAL ROUTINE    ***    MOS07330
169A  4330 10B6            BZ    OPTIN             BRK W/NO VECTOR, BRANCH TO EXEC         MOS07340
169E  40F0 180C            STH   R15,BRK.SAV       SET U EXIT ADDRESS                      MOS07350
16A2  2400       TSTBRK3   LIS   R0,0                                                      MOS07360
16A4  4000 1008            STH   R0,BRKVECT        DELETE VECTOR AFTER ONE SHOT            MOS07370
16A8  D100 1EA8            LM    R0,RSAVE+32       RESTORE REGISTERS                ***    MOS07380
16AC  48F0 180C            LDA   LINK,BRK.SAV      RESTORE RETURN ADDRESS                  MOS07390
16B0  030F                 BR    LINK              RETURN TO PROGRAM                       MOS07400
                 *-----------------------------                                            MOS07410
                 * SEE IF LIST DEVICE OFF-LINE (R1, CC NON-ZERO IF OFF)                    MOS07420
                 *                                                                         MOS07430
16B2  2401       TSTDU     LIS   R0,1              LOAD CLI DU STATUS MASK                 MOS07440
16B4  4810 17D4            LH    R1,PASFLG2        IS IT ON PASLA ?                        MOS07450
16B8  2333                 BZS   $TSTDU0           NO, BRANCH                              MOS07460
16BA  C800 00FC            LHI   R0,X'FC'          YES, LOAD PASLA DU STATUS MASK          MOS07470
16BE  D310 100B  $TSTDU0   LB    R1,IOSAVE+1       GET LIST DEVICE IDENTIFIER              MOS07480
16C2  9111                 SLHLS R1,1              (R1) = 2,4,6,8,A                        MOS07490
16C4  D311 1010            LB    R1,IO(R1)         GET LIST DEVICE ADDRESS                 MOS07500
16C8  D210 17D0            STB   R1,SINK           SAVE THE LIST DEVICE ADDRESS            MOS07510
16CC  9D11                 SSR   R1,R1             GET THE DEVICE STATUS                   MOS07520
16CE  0410                 NAR   R1,R0             MASK IT OFF                             MOS07530
16D0  C310 0001            THI   R1,1              IS CLI DU ?                             MOS07540
16D4  2135                 BNZS  $TSTDU2           YES, BRANCH                             MOS07550
16D6  C510 000C            CLHI  R1,X'0C'          NO, IS PASLA DU ?                       MOS07560
16DA  2332                 BES   $TSTDU2                                                   MOS07570
16DC  2511       $TSTDU1   LCS   R1,1              NO, SET UP R1 FOR CC = 0                MOS07580
16DE  D300 17D0  $TSTDU2   LB    R0,SINK           RESTORE LIST DEVICE ADDRESS             MOS07590
16E2  C710 FFFF            XHI   R1,-1             SET CC STATUS                           MOS07600
16E6  030F                 BR    LINK              RETURN                                  MOS07610
                 * ---------------------------------                                       MOS07620
                 * TO DIRECT INPUT AND OUTPUT TO CONSOLE DEVICE                            MOS07630
                 *                                                                         MOS07640
16E8  D300 1010  SETKB     LB    R0,IO             GET KEYBOARD DEVICE POINTER             MOS07650
16EC  9410                 EXBR  R1,R0             ISOLATE CONSOLE LIST POINTER            MOS07660
16EE  0610                 OAR   R1,R0             COMBINE CONSOLE POINTERS                MOS07670
16F0  4010 100A            STH   R1,IOSAVE         SET KB DEVICE = LIST DEVICE             MOS07680
16F4  030F                 BR    LINK              RETURN                                  MOS07690
                 *-----------------------------                                            MOS07700
                 *  TO PUT KEYBOARD DEVICE IN READ MODE                                    MOS07710
                 *                                                                         MOS07720
16F6  D300 17D6  KBREAD    LB    R0,CONADR         GET CONSOLE DEVICE ADDRESS              MOS07730
16FA  DE00 17D8            OC    R0,CONRD          PUT CONSOLE IN READ MODE                MOS07740
16FE  DB00 17D0            RD    R0,SINK           GET CONSOLE DEVICE STATUS               MOS07750
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1702  4890 100E      776           LH    R9,PASFLG          IS IT PASLA ?                          MOS07760
1706  2333           777  TTYGET   BZS   KBXIT              NO, RETURN                             MOS07770
1708  DE00 17F0      778           OC    R0,CONRQ2S         YES, OC - RQ2S                         MOS07780
170C  0304           779  KBXIT    BR    R4                 RETURN                                 MOS07790
                     780  *-----------------------------                                            MOS07800
                     781  *  LIST DEVICE SET UP ROUTINE                                             MOS07810
                     782  *                                                                         MOS07820
170E  4010 1E60      783  SETUP    STA   R1,SET.RTN         SAVE RETURN ADDRESS                    MOS07830
1712  D310 100B      784           LB    R1,IOSAVE+1        GET LIST DEVICE IDENTIFIER             MOS07840
1716  9111           785           SLHLS R1,1               SHIFT TO HW INDEX                      MOS07850
1718  D301 1011      786           LB    R0,IO+1(R1)        GET LIST DEVICE ADDRESS                MOS07860
171C  DE01 17D9      787           OC    R0,CONWRT(R1)      OC COMMAND WRITE                       MOS07870
1720  4810 1E60      788           LDA   R1,SET.RTN         RESTORE RETURN ADDRESS                 MOS07880
1724  0301           789           BR    R1                 RETURN                                 MOS07890
                     790  * ***************************                                            MOS07900
                     791  *  LOW CORE SET UP ROUTINE                                                MOS07910
                     792  *                                                                         MOS07920
1726  2410           793  LCORE    LIS   R1,0               LOAD BXLE REGISTERS R1-R3              MOS07930
1728  2422           794           LIS   R2,2                                                       MOS07940
172A  C830 004E      795           LHI   R3,X'4E'                                                   MOS07950
172E  2400           796           LIS   R0,0               LOAD DATA REGISTERS                    MOS07960
1730  4001 0000      797  ZERO1    STH   R0,0(R1)           STORE ZERO                             MOS07970
1734  C110 1730      798           BXLE  R1,ZERO1           ZERO CORE FROM 0 THRU X'4F'            MOS07980
1738  C830 176C      799           LHI   R3,II                                                      MOS07990
173C  4030 0036      800           STH   R3,X'36'           SET ILL INST INT NEW PSW LOC           MOS08000
1740  C840 179C      801           LHI   R4,MM                                                      MOS08010
1744  4040 003E      802           STH   R4,X'3E'           SET M. M. INT NEW PSW LOC              MOS08020
1748  C840 1E88      803           LHI   R4,RSAVE           *                              ***     MOS08030
                     804  *                                                                         MOS08040
                     805  *  SET UP LOW CORE FOR 16 BIT MACHINE                                     ***  MOS08050
                     806  *                                                                         MOS08060
174C  4040 0022      807           STH   R4,X'22'           SET REG SAVE POINTER                   MOS08070
1750  030F           808           BR    LINK               RETURN TO CALLER               ***     MOS08080
                     809  *---------------------------------                                        MOS08090
                     810  *  SPURIOUS INTERRUPT HANDLERS                                            MOS08100
                     811  *                                                                         MOS08110
                     812  *                                                                         MOS08120
                     813  *                                                                         MOS08130
1752  D0E0 17CC      814  COMM     STM   R14,OPSW           STORE OLD PSW & OLD LOC        ***     MOS08140
                     815  *                                                                         MOS08150
1756  4800 1006      816  COMM1    LH    R0,PSW2                                                    MOS08160
175A  9520           817           EPSR  R2,R0              NO INT. , REG SET 15 (PSW = X'30F0')   MOS08170
175C  41F0 13DE      818           BAL   LINK,ERR           PRINT 'ERROR XXFN'                     MOS08180
1760  40F0 17F6      819           STH   LINK,ISITERR       FORCE PRINT                            MOS08190
1764  41E0 143A      820           BAL   RET,ERRPL1         PRINT 'PSW PPPP  LOC LLLL'             MOS08200
1768  4300 10C2      821           B     OPTIN1             ENTER COMMAND MODE                     MOS08210
                     822  *                                                                         MOS08220
                     823  *  ILLEGAL INSTRUCTION INTERRUPT TRAP                                     MOS08230
                     824  *                                                                         MOS08240
176C  C820 179C      825  II       LHI   R2,MM              *                              ***     MOS08250
1770  4020 003E      826           STH   R2,X'3E'           RESTORE ETPE MM POINTER        ***     MOS08260
1774  C820 4632      827           LHI   R2,C'F2'                                                   MOS08270
1778  4020 1830      828           STH   R2,ERRNO           SET ERROR NUMBER F2                    MOS08280
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177C   D1E0 0030          829          LM    R14,X'30'          LOAD OLD PSW & OLD LOC          ***  MOS08290
1780   4300 1752          830  II32    B     COMM               BRANCH TO COMMON ERROR ROUTINE       MOS08300
                          831  *                                                                     MOS08310
                          832  *  MACHINE MALFUNCTION INTERRUPT TRAP                                 MOS08320
                          833  *                                                                     MOS08330
1784   95AA               834  MM0     EPSR  R10,R10            CAPTURE MM INT PSW              ***  MOS08340
1786   C820 179C          835          LHI   R2,MM              *                               ***  MOS08350
178A   4020 003E          836          STH   R2,X'3E'           RESTORE ETPE MM POINTER         ***  MOS08360
178E   C4A0 000F          837          NHI   R10,X'000F'        *                               ***  MOS08370
1792   08AA               838          LDAR  R10,R10            IS CC = 0 ?                     ***  MOS08380
1794   2137               839          BNZS  MM1                NO, BRANCH                      ***  MOS08390
1796   41F0 1CFA          840          BAL   LINK,PARERR        YES, PRINT PARITY ERROR         ***  MOS08400
179A   2304               841          BS    MM1                *                               ***  MOS08410
                          842  *                                                                     MOS08420
                          843  *                                                                     MOS08430
179C   95AA               844  MM      EPSR  R10,R10            CAPTURE MMINT PSW                    MOS08440
179E   C4A0 000F          845          NHI   R10,X'000F'        MASK OFF THE CC                      MOS08450
17A2   C820 4633          846  MM1     LHI   R2,C'F3'                                               MOS08460
17A6   4020 1830          847          STH   R2,ERRNO           SET ERROR NUMBER F3                  MOS08470
17AA   D1E0 0038          848          LM    R14,X'38'          LOAD OLD PSW & OLD LOC (16 BIT) ***  MOS08480
17AE   C4E0 FFF0          849  MM32    NHI   R14,X'FFF0'                                            MOS08490
17B2   06EA               850          OAR   R14,R10            NOW CC = MALFUNCTION            ***  MOS08500
17B4   D0E0 17CC          851          STM   R14,OPSW           SAVE OLD PSW & OLD LOC.         ***  MOS08510
17B8   C810 7FFF          852          LHI   R1,X'7FFF'                                             MOS08520
17BC   2711               853  MM16    SIS   R1,1                                                  MOS08530
17BE   2021               854          BPS   MM16               SHORT DELAY FOR PROC. SETTELING      MOS08540
17C0   C800 80F0          855          LHI   R0,X'80F0'         R0 = X'80F0'                    ***  MOS08550
17C4   9520               856          EPSR  R2,R0              HALT PROCESSOR                       MOS08560
                          857  *                                                                     MOS08570
                          858  *   WHEN EXE/RUN IS DEPRESSED, ERROR MSG IS PRINTED.                  MOS08580
                          859  *                                                                     MOS08590
17C6   4300 1756          860          B     COMM1              BRANCH TO COMMON ERROR ROUTINE       MOS08600
                          861  *----------------------------------                                  MOS08610
                          862  *  ETPE CONSTANTS & TABLES                                            MOS08620
                          863  *                                                                     MOS08630
17CC                      864          ALIGN 4                                                      MOS08640
                          865  *----------------------------------                             ***  MOS08650
17CC   0000               866  OPSW    DCX   0                  OLD PSW STORRAGE AREA                MOS08660
17CE   0000               867  OLOC    DCX   0                                                      MOS08670
                          868  *----------------------------------                                  MOS08680
17D0   00                 869  SINK    DB    0                  BIT BUCKET                           MOS08690
17D1   80                 870  NORM    DB    X'80'                                                  MOS08700
17D2   40                 871  INCR    DB    X'40'                                                  MOS08710
17D3   00                 872          DB    *                  (ALIGN ON HALFWORD BOUNDRY)     ***  MOS08720
17D4   0000               873  PASFLG2 DCX   0                  SET WHEN LIST DEVICE ON PASLA        MOS08730
                          874  *----------------------------------                                  MOS08740
                          875  *  ETPE IO COMMANDS                                                   MOS08750
                          876  *                                                                     MOS08760
17D6   0000               877  CONADR  DCX   0                  CONSOLE DEVICE ADDRESS               MOS08770
                          878  *                                                                     MOS08780
17D8   0000               879  CONRD   DCX   0                  CONSOLE READ/WRITE COMMANDS          MOS08790
       0000 17D9          880  CONWRT  EQU   CONRD+1                                                 MOS08800
17DA   B1A3               881  CRTRD   DCX   B1A3               FOR CRT                              MOS08810
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17DC   A4D8                882  CLIFRD   DCX   A4D8              *   CURRENT LOOP INTERFACE            MOS08820
17DE   0080                883  LPWRT    DCX   0080              *   LINE PRINTER                      MOS08830
17E0   A1A3                884  CARRD    DCX   A1A3              *   CAROUSEL 300                      MOS08840
17E2   8202                885  MREADC   DCX   8202              *   MICROBUS                          MOS08850
                           886  *                                                                       MOS08860
17E4   0000                887  CON2ND   DCX   0                 2ND COMMAND; ENABLE READ COMMAND      MOS08870
       0000 17E5           888  CONENRD  EQU   CON2ND+1                                                 MOS08880
17E6   F871                889  CRT2ND   DCX   F871              FOR CRT                               MOS08890
17E8   0064                890  CLIF2ND  DCX   0064              *   CURRENT LOOP INTERFACE            MOS08900
17EA   0000                891           DCX   0                 *   DUMMY HW FOR LP                   MOS08910
17EC   F061                892  CAR2ND   DCX   F061              *   CAROUSEL 300                      MOS08920
17EE   0000                893           DCX   0                 *   DUMMY HW FOR MICROBUS             MOS08930
                           894  *                                                                       MOS08940
17F0   00                  895  CONRQ2S  DB    0                 CONSOLE REQUEST TO SEND CMD           MOS08950
17F1   33                  896  CRTRQ2S  DB    X'33'             FOR CRT                               MOS08960
17F2   00                  897           DB    0                 *   DUMMY BYTE FOR CLI                MOS08970
17F3   00                  898           DB    0                 *   DUMMY BYTE FOR LP                 MOS08980
17F4   23                  899  CARRQ2S  DB    X'23'             *   CAROUSEL 300                      MOS08990
17F5   00                  900           DB    0                 *   DUMMY BYTE FOR MICROBUS           MOS09000
17F6                       901           DB    *                                                       MOS09010
                           902  *-----------------------------------                                    MOS09020
17F6   0000                903  ISITERR  DCX   0                                                       MOS09030
17F8   0000                904  NOERR    DCX   0                                                       MOS09040
17FA   0000                905  SELTST   DCX   0                 HIGHEST SELECTED TEST NUMBER          MOS09050
17FC   0000                906  WASDU    DCX   0                 1 IF KEYBOARD DEVICE WAS OFF          MOS09060
17FE   0000                907  WASDU1   DCX   0                 NON-ZERO IF TOTAL,TOTERR TO PRINT     MOS09070
1800   0000                908  TOTAL    DCX   0                 NO. OF TIMES THE SELECTED TESTS RUN   MOS09080
1802   0000                909  TOTERR   DCX   0                 TOTAL ERRORS DETECTED WHILE DU        MOS09090
1804   0000                910  BTESTNO  DCX   0                 CURRENT TEST NUMBER IN BINARY         MOS09100
1806   0000                911  COUNT    DCX   0                                                       MOS09110
1808   0000                912  NEXTST   DCX   0                 NEXT TEST NUMBER                      MOS09120
180A   0000                913  OUT.SAV  DCX   0                 "OUTCHR" RETURN ADDRESS SAVE          MOS09130
180C   0000                914  BRK.SAV  DCX   0                 "TSTBRK" RETURN ADDRESS SAVE          MOS09140
                           915  *                                                                       MOS09150
180E   3031 3233 3435 3637 916  HEXTAB   DB    C'0123456789ABCDEF'                                     MOS09160
1816   3839 4142 4344 4546
                           917  *-----------------------------------                                    MOS09170
                           918  *  ETPE MESSAGES                                                        MOS09180
                           919  *                                                                       MOS09190
181E   5445 5354 2020 2A2A 920  TSTMSG   DC    C'TEST  **',X'0D00'                                     MOS09200
1826   0D00
       0000 1824           921  MTESTNO  EQU   TSTMSG+6           *                              ***   MOS09210
1828   4552 524F 5220 2A2A 922  ERRMSG   DC    C'ERROR ****',X'0D00'                                   MOS09220
1830   2A2A
1832   0D00
       0000 182E           923  ETESTNO  EQU   ERRMSG+6           STORED BY ETPE              ***       MOS09230
       0000 1830           924  ERRNO    EQU   ERRMSG+8           STORE ERRNO AS CHAR CONSTANT***       MOS09240
1834   544F 5441 4C20 2020 925  TOTMSG   DC    C'TOTAL   TOTERR',X'0D00'                               MOS09250
183C   544F 5445 5252
1842   0D00
1844   4E4F 2045 5252 4F52 926  NOERMSG  DC    C'NO ERROR',X'0D00'                                     MOS09260
184C   0D00
184E   5053 5720 2A2A 2A2A 927  PSWMSG   DC    C'PSW ****  LOC ****',X'0D00'                          MOS09270
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1856   2020 4C4F 4320 2A2A
185E   2A2A
1860   0D00
       0000 1852              928  ASCIPSW  EQU   PSWMSG+4             *                          ***   MOS09280
       0000 185C              929  ASCILOC  EQU   PSWMSG+14            *                          ***   MOS09290
1862   454E 4420 4F46 2054    930  EOTMSG   DC    C'END OF TEST',X'0D00'                                 MOS09300
186A   4553 5420
186E   0D00
1870   3F0D                   931  QMSG     DC    X'3F0D'                                                MOS09310
1872   2A0D                   932  AMSG     DC    X'2A0D'                                                MOS09320
                              933  *-----------------------------------                                   MOS09330
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                          935  ************************************************************************   MOS09350
                          936  *                                                                        MOS09360
                          937  *  OPTION/COMMAND TABLE                                                  MOS09370
                          938  *                                                                        MOS09380
1874  5445 5354 2020      939  TEST     DC    C'TEST  ',X'F800',X'0',X'0' *          0 TO 4           MOS09390
187A  F800
187C  0000
187E  0000
      0000 1874           940  OPT      EQU   TEST                                                     MOS09400
                          941  *                                                                        MOS09410
1880  4C4F 4F50 2020      942  LOOP     DC    C'LOOP  ',X'0',Z(LEVELIN),X'7FFF' *    MAX=X'7FFF'      MOS09420
1886  0000
1888  118C
188A  7FFF
188C  434F 4E54 494E      943  CONTIN   DC    C'CONTIN',X'0',Z(LEVELIN),X'1' *       0 OR 1           MOS09430
1892  0000
1894  118C
1896  0001
1898  4E4F 4D53 4720      944  NOMSG    DC    C'NOMSG ',X'0',Z(LEVELIN),X'1' *       0 OR 1           MOS09440
189E  0000
18A0  118C
18A2  0001
18A4  5343 4F50 4520      945  SCOPE    DC    C'SCOPE ',X'0',Z(LEVELIN),X'5' *       MAX = 5          MOS09450
18AA  0000
18AC  118C
18AE  0005
18B0  504F 554E 4420      946  POUND    DC    C'POUND ',X'A',X'0',X'0' *             1 TO FFFF        MOS09460
18B6  000A
18B8  0000
18BA  0000
                          947  *                                                                        MOS09470
                          948  ************************************************************************   MOS09480
                          949  *                                                                        MOS09490
      0000 18BC           950  OPTEND   EQU   *                                                        MOS09500
                          951  *                                                                        MOS09510
18BC  5255 4E20 2020      952  RUN      DC    C'RUN   ',X'0',X'0',X'0'                                  MOS09520
18C2  0000
18C4  0000
18C6  0000
18C8  FFFF                953           DC    -1                                                       MOS09530
                          954  *                                                                        MOS09540
18CA  0000                955  LOLIM    DC    X'0000'            LOW LIMIT OF MEMORY UNDER TEST        MOS09550
18CC  0FFF                956  HILIM    DC    X'0FFF'            HIGH LIMIT OF MEMORY UNDER TEST       MOS09560
                          957  *                                                                        MOS09570
                          958  ************************************************************************   MOS09580
                          959  *                                                                        MOS09590
18CE  48E0 187A           960  INIT     LH    R14,TEST+6                                               MOS09600
18D2  C6E0 8000           961           OHI   R14,X'8000'        FORCE TEST 0                          MOS09610
18D6  40E0 187A           962           STH   R14,TEST+6         WHEN "RUN" IS ENTERED                 MOS09620
18DA  24E1                963           LIS   R14,1                                                    MOS09630
18DC  DEE0 17D1           964           OC    R14,NORM           PUT DISPLAY IN NORMAL MODE            MOS09640
18E0  2531                965           LCS   R3,1               W/BG = 1'S,                           MOS09650
18E2  41D0 1904           966           BAL   R13,INIT1          TEST LOW CORE 0-3E                    MOS09660
```

EXEC - ETPE R03-06 (16-BIT MODIFIED & STRIPPED)

```
18E6   C830 AAAA           967          LHI   R3,X'AAAA'         W/BG = A'S,                             MOS09670
18EA   41D0 1904           968          BAL   R13,INIT1          TEST LOW CORE 0-3E                      MOS09680
18EE   C830 5555           969          LHI   R3,X'5555'         W/BG = 5'S,                             MOS09690
18F2   41D0 1904           970          BAL   R13,INIT1          TEST LOW CORE 0-3E                      MOS09700
18F6   2430                971          LIS   R3,0               W/BG = 0'S,                             MOS09710
18F8   41D0 1904           972          BAL   R13,INIT1          TEST LOW CORE 0-3E                      MOS09720
18FC   41F0 1726           973          BAL   LINK,LCORE         SET UP LOW CORE                         MOS09730
1900   4300 11FC           974          B     INITRET            RETURN TO CALLER (EXEC)            ***  MOS09740
                           975 *                                                                         MOS09750
                           976 *                                                                         MOS09760
1904   2460                977 INIT1    LIS   R6,0               INITIALIZE BXLE REGISTERS               MOS09770
1906   2472                978          LIS   R7,2               R6 - R8                                 MOS09780
1908   C880 003E           979          LHI   R8,X'3E'                                                   MOS09790
190C   4036 0000           980 INIT2    STH   R3,0(R6)           STORE SELECTED BACKGROUND PATTERN       MOS09800
1910   C160 190C           981          BXLE  R6,INIT2           @ 0-3E                                  MOS09810
1914   2460                982          LIS   R6,0                                                       MOS09820
1916   9426                983 INIT3    EXBR  R2,R6                                                      MOS09830
1918   9812                984          WHR   R1,R2              DISPLAY ADDRESS UNDER TEST              MOS09840
191A   4846 0000           985          LH    R4,0(R6)                                                   MOS09850
191E   0543                986          CLAR  R4,R3              DATA OK ?                               MOS09860
1920   2333                987          BES   INIT4              YES, BRANCH                             MOS09870
1922   41F0 1D0A           988          BAL   LINK,ERROR         NO, ERROR                               MOS09880
1926   C160 1916           989 INIT4    BXLE  R6,INIT3           CONTINUE UNTIL DONE                     MOS09890
192A   030D                990          BR    R13                RETURN TO INIT ROUTINE                  MOS09900
                           991 *                                                                         MOS09910
                           992 ************************************************************************* MOS09920
                           993 *                                                                         MOS09930
192C   5331 3620 3139 2D31 994 TITLE    DC    C'S16 19-197 MOS MEMORY TEST PART 1 '                      MOS09940
1934   3937 204D 4F53 204D
193C   454D 4F52 5920 5445
1944   5354 2050 4152 5420
194C   3120
194E   3036 2D32 3032 4630 995          DC    C'06-202F03R01'    *                                  ***  MOS09950
1956   3352 3031
195A   0D0A                996          DC    X'0D0A'                                                    MOS09960
                           997 *                                                                         MOS09970
                           998 *                                                                         MOS09980
       0000 F800           999 DEFTESTS EQU   X'F800'            DEFINES TESTS 0,1,2,3,& 4          ***  MOS09990
                          1000 *                                 AS DEFAULT TESTS                        MOS10000
                          1001 *                                                                         MOS10010
       0000 0004          1002 MAXTST   EQU   H'4'               DEFINES TESTS 0,1,2,3,& 4          ***  MOS10020
                          1003 *                                 AS LEGAL TEST NUMBERS.                  MOS10030
                          1004 *                                                                         MOS10040
                          1005 *  TESTS TABLE                                                            MOS10050
                          1006 *                                                                         MOS10060
195C   1966               1007 TESTS    DC    A(TEST0)           MEMORY SEARCH TEST                 ***  MOS10070
195E   198C               1008          DC    A(TEST1)           BIT SET-RESET TEST                      MOS10080
1960   1A18               1009          DC    A(TEST2)           MARCHING PATTERN TEST                   MOS10090
1962   1B1A               1010          DC    A(TEST3)           0 & 1 WALK TEST                         MOS10100
1964   1BB6               1011          DC    A(TEST4)           DOUBLE OPERATION COLUMN DISTURB TEST    MOS10110
                          1012 *                                                                         MOS10120
                          1013 ************************************************************************* MOS10130
                          1014 *        END   ETPE R03-06 (16-BIT MODIFIED & STRIPPED)                   MOS10140
```

TEST 0

```
                          1016  *        TEST 0                    MEMORY SEARCH TEST                    MOS10160
                          1017  *                                                                        MOS10170
                          1018  *        PURPOSE:                                                        MOS10180
                          1019  *             THIS UTILITY ENABLES THE USER TO LIST THE MEMORY           MOS10190
                          1020  *             UNDER TEST.                                                MOS10200
                          1021  *                                                                        MOS10210
                          1022  *        ASSUMPTIONS:                                                    MOS10220
                          1023  *             MEMORY ALLOWABLE IS 8K BYTES.                              MOS10230
                          1024  *                                                                        MOS10240
                          1025  *        DESIGN SPECIFICATIONS:                                          MOS10250
                          1026  *             PRINT MEMORY LIMITS UNDER TEST.                            MOS10260
                          1027  *                                                                        MOS10270
                          1028  *        OPTIONS:                                                        MOS10280
                          1029  *             NONE                                                       MOS10290
                          1030  *                                                                        MOS10300
                          1031  *        HOW TO RUN THE TEST:                                            MOS10310
                          1032  *             ENTER "RUN" AND THE AVAILABLE MEMORY LOCATIONS WILL        MOS10320
                          1033  *             BE PRINTED ON THE LIST DEVICE IN A CONTIGUIOUS BLOCK.      MOS10330

1966  C850 1E38           1035  TEST0  LDAI  R5,ASMEMMSG         LOAD MESSAGE ADDRESS                    MOS10350
196A  2404                1036         LIS   R0,4                CONVERT 4 DIGITS                        MOS10360
196C  4810 18CA           1037         LH    R1,LOLIM                                                    MOS10370
1970  C820 1E4C           1038         LDAI  R2,LOMSG                                                    MOS10380
1974  41F0 149A           1039         BAL   LINK,HEXASC         PUT LOLIM IN MEMORY MESSAGE             MOS10390
1978  4810 18CC           1040         LH    R1,HILIM                                                    MOS10400
197C  C820 1E51           1041         LDAI  R2,HIMSG                                                    MOS10410
1980  41F0 149A           1042         BAL   LINK,HEXASC         PUT HILIM IN MEMORY MESSAGE             MOS10420
1984  41F0 14C2           1043         BAL   LINK,PRINT          PRINT MEMORY MESSAGE                    MOS10430
1988  4300 12AA           1044         B     KEEP7                                                       MOS10440
                          1045  *                                                                        MOS10450
                          1046  *********************************************************************** MOS10460
                          1047  *        END   TEST 0                                                    MOS10470
```

TEST 1

```
                   *        TEST 1               BIT SET - RESET TEST                         MOS10490
                   *                                                                          MOS10500
                   *        PURPOSE:                                                          MOS10510
                   *              THIS TEST INSURES THAT ALL BITS IN THE AREA OF MEMORY       MOS10520
                   *              BEING TESTED CAN BE BOTH SET AND RESET.                     MOS10530
                   *                                                                          MOS10540
                   *        ASSUMPTIONS:                                                      MOS10550
                   *              8KB MOS MEMORY                                              MOS10560
                   *                                                                          MOS10570
                   *        DESIGN SPECIFICATIONS:                                            MOS10580
                   *              1. A WRITE AND THEN A READ IS EXECUTED TO ALL MEMORY        MOS10590
                   *                 WITHIN THE  LOLIM  AND  HILIM  LIMITS.                   MOS10600
                   *              2. IF AN ERROR IS DETECTED, THE "SCOPE" OPTION              MOS10610
                   *                 DICTATES HOW THE PROGRAM WILL REACT.                     MOS10620
                   *                                                                          MOS10630
                   *        OPTIONS:                                                          MOS10640
                   *              SCOPE - ERROR OPTION MODE                                   MOS10650
                   *                  0 - PRINT ERROR DATA AND SKIP TO NEXT TEST              MOS10660
                   *                  1 - PRINT BAD CHIP NUMBER(S) AND SKIP TO NEXT TEST      MOS10670
                   *                  2 - PRINT ERROR DATA AND CONTINUE TEST                  MOS10680
                   *                  3 - PRINT ERROR DATA AND HALT                           MOS10690
                   *                  4 - IGNORE ERROR                                        MOS10700
                   *                  5 - PRINT BAD CHIP NUMBER(S) AND CONTINUE TEST          MOS10710
                   *                                                                          MOS10720
                   *        HOW TO RUN THE TEST:                                              MOS10730
                   *              1. ENTER THE "SCOPE" OPTION VIA THE CONSOLE DEVICE.         MOS10740
                   *              2. ENTER "RUN" AND THE TEST WILL EXECUTE.                   MOS10750


198C  4860 18CA    TEST1    LH    R6,LOLIM          INITIALIZE MEMORY LIMITS              MOS10770
1990  4880 18CC             LH    R8,HILIM                                                MOS10780
1994  2472                  LIS   R7,2                                                    MOS10790
1996  41F0 1A0C             BAL   LINK,LOWCHK       CHECK IF LOC IS LOW & CORRECT         MOS10800
199A  0896                  LDAR  R9,R6             SAVE LOLIM                            MOS10810
199C  2411                  LIS   R1,1              LOAD DISPLAY ADDRESS                  MOS10820
199E  2531                  LCS   R3,1                                                    MOS10830
                   *                                                                      MOS10840
19A0  4036 0000    STORE11  STH   R3,0(R6)          STORE BACKGROUND OF ALL 1'S           MOS10850
19A4  C160 19A0             BXLE  R6,STORE11                                              MOS10860
19A8  C840 3031             LHI   R4,C'01'                                                MOS10870
19AC  4040 1830             STH   R4,ERRNO          ERRNO = C'01'                         MOS10880
19B0  0869                  LDAR  R6,R9             RESTORE LOLIM                         MOS10890
                   *                                                                      MOS10900
19B2  94F6         READ11   EXBR  R15,R6                                                  MOS10910
19B4  981F                  WHR   R1,R15            DISPLAY ADDRESS UNDER TEST            MOS10920
19B6  41F0 19F8             BAL   LINK,TSTBRKX      IF "BREAK" GO TO TSTEND ELSE RETURN   MOS10930
19BA  4846 0000             LH    R4,0(R6)          LOAD DATA FROM LOC                    MOS10940
19BE  0543                  CLAR  R4,R3             IS DATA AT LOC. OK ?                  MOS10950
19C0  2333                  BES   RTN11             YES, BRANCH                           MOS10960
19C2  41F0 1D0A             BAL   LINK,ERROR        NO, ERROR                             MOS10970
19C6  C160 19B2    RTN11    BXLE  R6,READ11         CONTINUE UNTIL DONE                   MOS10980
19CA  0869                  LDAR  R6,R9             RESTORE LOLIM                         MOS10990
```

TEST 1

```
19CC   2430              LIS   R3,0                                                                    MOS11000
                   *                                                                                   MOS11010
19CE   4036 0000  STORE10  STH   R3,0(R6)         STORE BACKGROUND OF ALL 0'S                          MOS11020
19D2   C160 19CE           BXLE  R6,STORE10                                                            MOS11030
19D6   6110 1830           AHM   R1,ERRNO         ERRNO = C'02'                                        MOS11040
19DA   0869                LDAR  R6,R9            RESTORE LOLIM                                        MOS11050
                   *                                                                                   MOS11060
19DC   94F6       READ10   EXBR  R15,R6                                                                MOS11070
19DE   981F                WHR   R1,R15           DISPLAY ADDRESS UNDER TEST                           MOS11080
19E0   41F0 19F8           BAL   LINK,TSTBRKX     IF "BREAK" GO TO TSTEND ELSE RETURN                  MOS11090
19E4   2336                BZS   RTN10                                                                 MOS11100
19E6   4846 0000           LH    R4,0(R6)         LOAD DATA FROM LOC                                   MOS11110
19EA   2333                BZS   RTN10            IF DATA = 0, BRANCH (DATA OK)                        MOS11120
19EC   41F0 1D0A           BAL   LINK,ERROR       NO, ERROR                                            MOS11130
19F0   C160 19DC  RTN10    BXLE  R6,READ10        CONTINUE UNTIL DONE                                  MOS11140
                   *                                                                                   MOS11150
19F4   4300 1284           B     TSTEND           END OF TEST (RETURN TO EXEC)                         MOS11160
                   *                                                                                   MOS11170
                   ****************************************************************************        MOS11180
                   *                                                                                   MOS11190
19F8   40F0 1E88  TSTBRKX  STH   LINK,RSAVE                                                            MOS11200
19FC   C8F0 1284           LHI   LINK,TSTEND                                                           MOS11210
1A00   40F0 1008           STH   LINK,BRKVECT     ESTABLISH BRKVECT                                    MOS11220
1A04   48F0 1E88           LH    LINK,RSAVE                                                            MOS11230
1A08   4300 162E           B     TSTBRK           GO TEST FOR BREAK                                    MOS11240
                   *                                                                                   MOS11250
                   ****************************************************************************        MOS11260
                   *                                                                                   MOS11270
1A0C   C360 0FC0  LOWCHK   THI   R6,X'0FC0'       IS LOC > X'3E' ?                                     MOS11280
1A10   023F                BNZR  LINK             YES, RETURN                                          MOS11290
1A12   C160 1A0C           BXLE  R6,LOWCHK        NO, INCREMENT LOC                                    MOS11300
1A16   030F                BR    LINK             RETURN                                               MOS11310
                   *                                                                                   MOS11320
                   ****************************************************************************        MOS11330
                   *       END   TEST 1                                                                MOS11340
```

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                         1136  *       TEST 2                      MARCHING PATTERN TEST                     MOS11360
                         1137  *                                                                             MOS11370
                         1138  *       PURPOSE:                                                              MOS11380
                         1139  *             THIS TEST CHECKS THAT THREE DIFFERENT BASE PATTERNS             MOS11390
                         1140  *             CAN BE WRITTEN, COMPLEMENTED, AND MARCHED THROUGH THE           MOS11400
                         1141  *             AVAILABLE MEMORY WITHOUT ERROR.                                 MOS11410
                         1142  *                                                                             MOS11420
                         1143  *       ASSUMPTIONS:                                                          MOS11430
                         1144  *             8KB MOS MEMORY                                                  MOS11440
                         1145  *                                                                             MOS11450
                         1146  *       DESIGN SPECIFICATIONS:                                                MOS11460
                         1147  *             1. (IN ASCENDING ORDER) WRITE AND READ THE BASE PATTERN.        MOS11470
                         1148  *             2. (IN DESCENDING ORDER) WRITE AND READ THE                     MOS11480
                         1149  *                COMPLEMENT PATTERN.                                          MOS11490
                         1150  *                                                                             MOS11500
                         1151  *       OPTIONS:                                                              MOS11510
                         1152  *             SCOPE - ERROR OPTION MODE                                       MOS11520
                         1153  *                 0 - PRINT ERROR DATA AND SKIP TO NEXT TEST                  MOS11530
                         1154  *                 1 - PRINT BAD CHIP NUMBER(S) AND SKIP TO NEXT TEST          MOS11540
                         1155  *                 2 - PRINT ERROR DATA AND CONTINUE TEST                      MOS11550
                         1156  *                 3 - PRINT ERROR DATA AND HALT                               MOS11560
                         1157  *                 4 - IGNORE ERROR                                            MOS11570
                         1158  *                 5 - PRINT BAD CHIP NUMBER(S) AND CONTINUE TEST              MOS11580
                         1159  *                                                                             MOS11590
                         1160  *       HOW TO RUN THE TEST:                                                  MOS11600
                         1161  *             1. ENTER THE "SCOPE" OPTION VIA THE CONSOLE DEVICE.             MOS11610
                         1162  *             2. ENTER "RUN" AND THE TEST WILL EXECUTE.                       MOS11620

1A18   2411              1164  TEST2   LIS   R1,1                 LOAD DISPLAY ADDRESS                     MOS11640
1A1A   C840 1784         1165          LHI   R4,MMO                                                        MOS11650
1A1E   4040 003E         1166          STH   R4,X'3E'             SET NEW MM POINTER                       MOS11660
1A22   24A0              1167          LIS   R10,0                                                         MOS11670
1A24   25B1              1168          LCS   R11,1                                                         MOS11680
1A26   24D0              1169          LIS   R13,0                W/BACKGROUND = 0'S                       MOS11690
1A28   41E0 1A56         1170          BAL   R14,CHKLOC           DO A SINGLE DISTURB TEST (MIN-MAX)       MOS11700
                         1171  *                                                                             MOS11710
1A2C   25A1              1172          LCS   R10,1                                                         MOS11720
1A2E   24B0              1173          LIS   R11,0                W/BACKGROUND = 1'S                       MOS11730
1A30   41E0 1A56         1174          BAL   R14,CHKLOC           DO A SINGLE DISTURB TEST (MIN-MAX)       MOS11740
                         1175  *                                                                             MOS11750
1A34   24D2              1176          LIS   R13,2                W/BACKGROUND = A'S                       MOS11760
1A36   41E0 1A56         1177          BAL   R14,CHKLOC           DO A SINGLE DISTURB TEST (MIN-MAX)       MOS11770
                         1178  *                                                                             MOS11780
1A3A   24A0              1179          LIS   R10,0                                                         MOS11790
1A3C   25B1              1180          LCS   R11,1                W/BACKGROUND = 5'S                       MOS11800
1A3E   41E0 1A56         1181          BAL   R14,CHKLOC           DO A SINGLE DISTURB TEST (MIN-MAX)       MOS11810
                         1182  *                                                                             MOS11820
1A42   C8D0 0080         1183          LHI   R13,X'80'            W/BACKGROUND = 64-0'S, 64-1'S, ETC       MOS11830
1A46   41E0 1A56         1184          BAL   R14,CHKLOC           DO A SINGLE DISTURB TEST (MIN-MAX)       MOS11840
                         1185  *                                                                             MOS11850
1A4A   25A1              1186          LCS   R10,1                                                         MOS11860
```

TEST 2

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1A4C  24B0           1187           LIS   R11,0              W/BACKGROUND = 64-1'S, 64-0'S, ETC     MOS11870
1A4E  41E0 1A56      1188           BAL   R14,CHKLOC         DO A SINGLE DISTURB TEST (MIN-MAX)     MOS11880
                     1189  *                                                                        MOS11890
1A52  4300 1284      1190           B     TSTEND             END OF TEST (RETURN TO EXEC)           MOS11900
                     1191  *                                                                        MOS11910
                     1192  ************************************************************************ MOS11920
                     1193  *                                                                        MOS11930
1A56  4860 18CA      1194  CHKLOC   LH    R6,LOLIM           INITIALIZE MEMORY LIMITS               MOS11940
1A5A  4880 18CC      1195           LH    R8,HILIM                                                  MOS11950
1A5E  2472           1196           LIS   R7,2                                                      MOS11960
                     1197  *                                                                        MOS11970
1A60  41F0 1A0C      1198  CHKLOC1  BAL   LINK,LOWCHK        CHECK IF LOC IS LOW & CORRECT          MOS11980
1A64  083A           1199           LDAR  R3,R10             STORE APPROPRIATE BACKGROUND PATTERN   MOS11990
1A66  C36D 0000      1200           THI   R6,0(R13)                                                 MOS12000
1A6A  2332           1201           BZS   CHKLOC2                                                   MOS12010
1A6C  083B           1202           LDAR  R3,R11                                                    MOS12020
1A6E  4036 0000      1203  CHKLOC2  STH   R3,0(R6)           IN MEMORY                              MOS12030
1A72  C160 1A60      1204  CHKLOC25 BXLE  R6,CHKLOC1         FROM LOLIM TO HILIM                    MOS12040
1A76  4860 18CA      1205           LH    R6,LOLIM                                                  MOS12050
                     1206  *                                                                        MOS12060
1A7A  C840 3033      1207  CHKLOC3  LHI   R4,C'03'                                                 MOS12070
1A7E  4040 1830      1208           STH   R4,ERRNO           ERRNO = C'03'                          MOS12080
1A82  94F6           1209           EXBR  R15,R6                                                    MOS12090
1A84  981F           1210           WHR   R1,R15             DISPLAY ADDRESS UNDER TEST             MOS12100
1A86  41F0 19F8      1211           BAL   LINK,TSTBRKX       IF "BREAK" GO TO TSTEND ELSE RETURN    MOS12110
1A8A  41F0 1A0C      1212           BAL   LINK,LOWCHK        CHECK IF LOC IS LOW & CORRECT          MOS12120
1A8E  083A           1213           LDAR  R3,R10             GET APPROPRIATE BACKGROUND PATTERN     MOS12130
1A90  C36D 0000      1214           THI   R6,0(R13)                                                 MOS12140
1A94  2332           1215           BZS   CHKLOC4                                                   MOS12150
1A96  083B           1216           LDAR  R3,R11                                                    MOS12160
1A98  4846 0000      1217  CHKLOC4  LH    R4,0(R6)          GET DATA FROM LOC UNDER TEST           MOS12170
1A9C  0543           1218           CLAR  R4,R3              EQUAL ?                                MOS12180
1A9E  2333           1219           BES   CHKLOC5            YES, BRANCH                            MOS12190
1AA0  41F0 1D0A      1220           BAL   LINK,ERROR          NO, ERROR                              MOS12200
1AA4  C730 FFFF      1221  CHKLOC5  XHI   R3,-1              COMPLEMENT DATA PATTERN                MOS12210
1AA8  4036 0000      1222           STH   R3,0(R6)           STORE C.D.P. AT LOC                    MOS12220
1AAC  6110 1830      1223           AHM   R1,ERRNO           ERRNO = C'04'                          MOS12230
1AB0  4846 0000      1224           LH    R4,0(R6)           GET DATA FROM LOC UNDER TEST           MOS12240
1AB4  0543           1225           CLAR  R4,R3              DATA = C.D.P. ?                        MOS12250
1AB6  2333           1226           BES   CHKLOC6            YES, BRANCH                            MOS12260
1AB8  41F0 1D0A      1227           BAL   LINK,ERROR         NO, ERROR                              MOS12270
1ABC  C160 1A7A      1228  CHKLOC6  BXLE  R6,CHKLOC3         CONTINUE UNTIL DONE(INCREMENTING)      MOS12280
1AC0  4860 18CC      1229           LH    R6,HILIM           ESTABLISH MEMORY LIMITS                MOS12290
1AC4  C460 FFFE      1230           NHI   R6,-2                                                     MOS12300
1AC8  4880 18CA      1231           LH    R8,LOLIM                                                  MOS12310
1ACC  2572           1232           LCS   R7,2                                                      MOS12320
                     1233  *                                                                        MOS12330
1ACE  083B           1234  CHKLOC7  LDAR  R3,R11             GET C.D.P. FOR LOC UNDER TEST          MOS12340
1AD0  C36D 0000      1235           THI   R6,0(R13)                                                 MOS12350
1AD4  2332           1236           BZS   CHKLOC8                                                   MOS12360
1AD6  083A           1237           LDAR  R3,R10                                                    MOS12370
1AD8  C840 3035      1238  CHKLOC8  LHI   R4,C'05'                                                 MOS12380
1ADC  4040 1830      1239           STH   R4,ERRNO           ERRNO = C'05'                          MOS12390
```

TEST 2

```
1AE0   94F6            1240           EXBR  R15,R6                                                  MOS12400
1AE2   981F            1241           WHR   R1,R15              DISPLAY ADDRESS UNDER TEST           MOS12410
1AE4   41F0 19F8       1242           BAL   LINK,TSTBRKX        IF "BREAK" GO TO TSTEND ELSE RETURN  MOS12420
1AE8   C360 0FC0       1243           THI   R6,X'0FC0'                                               MOS12430
1AEC   4330 1B14       1244           BZ    CHKLOC10                                                 MOS12440
1AF0   4846 0000       1245           LH    R4,0(R6)            GET DATA FROM LOC UNDER TEST         MOS12450
1AF4   0543            1246           CLAR  R4,R3               DATA = C.D.P. ?                      MOS12460
1AF6   2333            1247           BES   CHKLOC9             YES, BRANCH                          MOS12470
1AF8   41F0 1D0A       1248           BAL   LINK,ERROR          NO, ERROR                            MOS12480
1AFC   C730 FFFF       1249  CHKLOC9  XHI   R3,-1               COMPLEMENT C.D.P. (O.D.P.)           MOS12490
1B00   4036 0000       1250           STH   R3,0(R6)            STORE PATTERN AT LOC                 MOS12500
1B04   6110 1830       1251           AHM   R1,ERRNO            ERRNO = C'06'                        MOS12510
1B08   4846 0000       1252           LH    R4,0(R6)            GET DATA FROM LOC UNDER TEST         MOS12520
1B0C   0543            1253           CLAR  R4,R3               DATA = O.D.P. ?                      MOS12530
1B0E   2333            1254           BES   CHKLOC10            YES, BRANCH                          MOS12540
1B10   41F0 1D0A       1255           BAL   LINK,ERROR          NO, ERROR                            MOS12550
1B14   C060 1ACE       1256  CHKLOC10 BXH   R6,CHKLOC7          CONTINUE UNTIL DONE(DECREMENTING)    MOS12560
                       1257  *                                                                       MOS12570
1B18   030E            1258           BR    R14                 RETURN                               MOS12580
                       1259  *                                                                       MOS12590
                       1260  ************************************************************************ MOS12600
                       1261  *        END   TEST 2                                                    MOS12610
```

```
                    *        TEST 3                      0 & 1 WALK TEST                       MOS12630
                    *                                                                          MOS12640
                    *        PURPOSE:                                                          MOS12650
                    *              THIS TEST WALKS A 0 THROUGH A FIELD OF 1'S AND A 1          MOS12660
                    *              THROUGH A FIELD OF 0'S.                                     MOS12670
                    *                                                                          MOS12680
                    *        ASSUMPTIONS:                                                      MOS12690
                    *              8KB MOS MEMORY                                              MOS12700
                    *                                                                          MOS12710
                    *        DESIGN SPECIFICATIONS:                                            MOS12720
                    *              1. WITH A BACKGROUND OF ALL 1'S, A 0 IS WALKED THROUGH      MOS12730
                    *                 EACH HALFWORD OF MEMORY. A READ AND COMPARE IS DONE      MOS12740
                    *                 ON EACH LOCATION.                                        MOS12750
                    *              2. WITH A BACKGROUND OF ALL 0'S, A 1 IS WALKED THROUGH      MOS12760
                    *                 EACH HALFWORD OF MEMORY. A COMPARE IS DONE ON EACH       MOS12770
                    *                 LOCATION.                                                MOS12780
                    *                                                                          MOS12790
                    *        OPTIONS:                                                          MOS12800
                    *              SCOPE - ERROR OPTION MODE                                   MOS12810
                    *                  0 - PRINT ERROR DATA AND SKIP TO NEXT TEST              MOS12820
                    *                  1 - PRINT BAD CHIP NUMBER(S) AND SKIP TO NEXT TEST      MOS12830
                    *                  2 - PRINT ERROR DATA AND CONTINUE TEST                  MOS12840
                    *                  3 - PRINT ERROR DATA AND HALT                           MOS12850
                    *                  4 - IGNORE ERROR                                        MOS12860
                    *                  5 - PRINT BAD CHIP NUMBER(S) AND CONTINUE TEST          MOS12870
                    *                                                                          MOS12880
                    *        HOW TO RUN THE TEST:                                              MOS12890
                    *              1. ENTER THE "SCOPE" OPTION VIA THE CONSOLE DEVICE.         MOS12900
                    *              2. ENTER "RUN" AND THE TEST WILL EXECUTE.                   MOS12910

1B1A  2411          TEST3    LIS   R1,1              LOAD DISPLAY ADDRESS                      MOS12930
1B1C  4860 18CA              LH    R6,LOLIM          INITIALIZE MEMORY LIMITS                  MOS12940
1B20  4880 18CC              LH    R8,HILIM                                                    MOS12950
1B24  2472                   LIS   R7,2                                                        MOS12960
1B26  41F0 1A0C              BAL   LINK,LOWCHK       CHECK IF LOC IS LOW & CORRECT             MOS12970
1B2A  0896                   LDAR  R9,R6             SAVE LOLIM                                MOS12980
1B2C  C840 1784              LHI   R4,MM0                                                      MOS12990
1B30  4040 003E              STH   R4,X'3E'          SET NEW MM POINTER                        MOS13000
1B34  2531                   LCS   R3,1                                                        MOS13010
                    *                                                                          MOS13020
1B36  4036 0000     STORE31  STH   R3,0(R6)          STORE BACKGROUND OF ALL 1'S               MOS13030
1B3A  C160 1B36     T3S0     BXLE  R6,STORE31                                                  MOS13040
1B3E  0869                   LDAR  R6,R9             RESTORE LOLIM                             MOS13050
1B40  C840 3037              LHI   R4,C'07'                                                    MOS13060
1B44  4040 1830              STH   R4,ERRNO          ERRNO = C'07'                             MOS13070
                    *                                                                          MOS13080
1B48  C8D0 0010     T3S1     LHI   R13,16                                                      MOS13090
1B4C  94F6                   EXBR  R15,R6                                                      MOS13100
1B4E  981F                   WHR   R1,R15            DISPLAY ADDRESS UNDER TEST                MOS13110
1B50  41F0 19F8              BAL   LINK,TSTBRKX      IF "BREAK" GO TO TSTEND ELSE RETURN       MOS13120
1B54  C8C0 8000              LHI   R12,X'8000'       LOAD R12 (BIT 0 SET)                      MOS13130
```

TEST 3

```
1B58  2531           1314  T3S2     LCS   R3,1              SET ALL BITS IN R3                          MOS13140
1B5A  073C           1315           XAR   R3,R12            RESET A BIT (0-15) IN R3                    MOS13150
1B5C  4036 0000      1316           STH   R3,0(R6)          STORE DATA AT LOC                           MOS13160
1B60  4846 0000      1317           LH    R4,0(R6)          GET DATA FROM LOC                           MOS13170
1B64  0543           1318           CLAR  R4,R3             DATA EQUAL ?                                MOS13180
1B66  2333           1319           BES   T3S3              YES, BRANCH                                 MOS13190
1B68  41F0 1D0A      1320           BAL   LINK,ERROR        NO, ERROR                                   MOS13200
1B6C  90C1           1321  T3S3     SRHLS R12,1             WALK 0 THRU HALFWORD OF 1'S                 MOS13210
1B6E  27D1           1322           SIS   R13,1             DONE W/THIS HALFWORD ?                      MOS13220
1B70  203C           1323           BNZS  T3S2              NO, BRANCH UNTIL FINISHED                   MOS13230
1B72  C160 1B48      1324  T3S3.4   BXLE  R6,T3S1           CONTINUE UNTIL DONE(INCREMENTING)           MOS13240
1B76  0869           1325           LDAR  R6,R9             RESTORE LOLIM                               MOS13250
1B78  2430           1326           LIS   R3,0                                                          MOS13260
                     1327  *                                                                            MOS13270
1B7A  4036 0000      1328  STORE30  STH   R3,0(R6)          STORE BACKGROUND OF ALL 0'S                 MOS13280
1B7E  C160 1B7A      1329  T3S3.6   BXLE  R6,STORE30                                                    MOS13290
1B82  0869           1330           LDAR  R6,R9             RESTORE LOLIM                               MOS13300
1B84  6110 1830      1331           AHM   R1,ERRNO          ERRNO = C'08'                               MOS13310
                     1332  *                                                                            MOS13320
1B88  C8D0 0010      1333  T3S4     LHI   R13,16                                                        MOS13330
1B8C  94F6           1334           EXBR  R15,R6                                                        MOS13340
1B8E  981F           1335           WHR   R1,R15            DISPLAY ADDRESS UNDER TEST                  MOS13350
1B90  41F0 19F8      1336           BAL   LINK,TSTBRKX      IF "BREAK" GO TO TSTEND ELSE RETURN         MOS13360
1B94  C830 8000      1337           LHI   R3,X'8000'        LOAD R3 (BIT 0 SET)                         MOS13370
                     1338  *                                                                            MOS13380
1B98  4036 0000      1339  T3S5     STH   R3,0(R6)          STORE DATA AT LOC                           MOS13390
1B9C  4846 0000      1340           LH    R4,0(R6)          GET DATA FROM LOC                           MOS13400
1BA0  0543           1341           CLAR  R4,R3             DATA EQUAL ?                                MOS13410
1BA2  2333           1342           BES   T3S6              YES, BRANCH                                 MOS13420
1BA4  41F0 1D0A      1343           BAL   LINK,ERROR        NO, ERROR                                   MOS13430
1BA8  9031           1344  T3S6     SRHLS R3,1              WALK BIT THRU HALFWORD                      MOS13440
1BAA  27D1           1345           SIS   R13,1             DONE W/THIS HALFWORD ?                      MOS13450
1BAC  203A           1346           BNZS  T3S5              NO, BRANCH UNTIL FINISHED                   MOS13460
1BAE  C160 1B88      1347  T3S7     BXLE  R6,T3S4           CONTINUE UNTIL DONE (INCREMENTING)          MOS13470
                     1348  *                                                                            MOS13480
1BB2  4300 1284      1349           B     TSTEND            END OF TEST (RETURN TO EXEC)                MOS13490
                     1350  ************************************************************************    MOS13500
                     1351  *        END   TEST 3                                                        MOS13510
```

TEST 4

```
                        1353  *        TEST 4                    DOUBLE OPERATION COLUMN DISTURB TEST   MOS13530
                        1354  *                                                                         MOS13540
                        1355  *        PURPOSE:                                                       MOS13550
                        1356  *              THIS TEST CHECKS THAT A DOUBLE OPERATION ON AN ADJACENT   MOS13560
                        1357  *              COLUMN DOES NOT DISTURB THE TEST COLUMN.                 MOS13570
                        1358  *                                                                       MOS13580
                        1359  *        ASSUMPTIONS:                                                   MOS13590
                        1360  *              8KB MOS MEMORY                                           MOS13600
                        1361  *                                                                       MOS13610
                        1362  *        DESIGN SPECIFICATIONS:                                         MOS13620
                        1363  *              1. WITH 6 DIFFERENT BACKROUND PATTERSN, A W-R-WC-         MOS13630
                        1364  *                 RC-W-R-WC-RC SERIES IS EXECUTED AT EACH LOCATION.     MOS13640
                        1365  *              2. A COMPARE IS DONE UPON EACH READ OPERATION.            MOS13650
                        1366  *              3. A TEST (COMPARISON) OF THE REST OF MEMORY IS DONE      MOS13660
                        1367  *                 AFTER EACH SERIES OF OPERATIONS.                       MOS13670
                        1368  *                                                                       MOS13680
                        1369  *        OPTIONS:                                                       MOS13690
                        1370  *              SCOPE - ERROR OPTION MODE                                MOS13700
                        1371  *                  0 - PRINT ERROR DATA AND SKIP TO NEXT TEST           MOS13710
                        1372  *                  1 - PRINT BAD CHIP NUMBER(S) AND SKIP TO NEXT TEST   MOS13720
                        1373  *                  2 - PRINT ERROR DATA AND CONTINUE TEST               MOS13730
                        1374  *                  3 - PRINT ERROR DATA AND HALT                        MOS13740
                        1375  *                  4 - IGNORE ERROR                                     MOS13750
                        1376  *                  5 - PRINT BAD CHIP NUMBER(S) AND CONTINUE TEST       MOS13760
                        1377  *                                                                       MOS13770
                        1378  *        HOW TO RUN THE TEST                                            MOS13780
                        1379  *              1. ENTER THE "SCOPE" OPTION VIA THE CONSOLE DEVICE.       MOS13790
                        1380  *              2. ENTER "RUN" AND THE TEST WILL EXECUTE.                 MOS13800


1BB6  2411            1382  TEST4    LIS   R1,1              LOAD DISPLAY ADDRESS                   MOS13820
1BB8  2591            1383           LCS   R9,1              R9 = X'FFFF'                           MOS13830
1BBA  24A0            1384           LIS   R10,0                                                    MOS13840
1BBC  25B1            1385           LCS   R11,1                                                    MOS13850
1BBE  24D0            1386           LIS   R13,0             W/BACKGROUND = 0'S                     MOS13860
1BC0  41E0 1BD6       1387           BAL   R14,CHKCOL        DO A DOUBLE OPERATION COLUMN           MOS13870
                      1388  *                                DISTURB AND COMPLEMENT TEST            MOS13880
1BC4  24D2            1389           LIS   R13,2             W/BACKGROUND = 5'S                     MOS13890
1BC6  41E0 1BD6       1390           BAL   R14,CHKCOL        DO A DOUBLE OPERATION COLUMN           MOS13900
                      1391  *                                DISTURB AND COMPLEMENT TEST            MOS13910
1BCA  C8D0 0080       1392           LHI   R13,X'80'         W/BACKGROUND = 64-0'S, 64-1'S, ETC.    MOS13920
1BCE  41E0 1BD6       1393           BAL   R14,CHKCOL        DO A DOUBLE OPERATION COLUMN           MOS13930
                      1394  *                                DISTURB AND COMPLEMENT TEST            MOS13940
1BD2  4300 1284       1395           B     TSTEND            END OF TEST (RETURN TO EXEC)           MOS13950
                      1396  *                                                                       MOS13960
                      1397  ************************************************************************ MOS13970
                      1398  *                                                                       MOS13980
1BD6  4860 18CA       1399  CHKCOL   LH    R6,LOLIM          INITIALIZE MEMORY LIMITS               MOS13990
1BDA  4880 18CC       1400           LH    R8,HILIM                                                 MOS14000
1BDE  2472            1401           LIS   R7,2                                                     MOS14010
                      1402  *                                                                       MOS14020
1BE0  41F0 1A0C       1403  CHKCOL1  BAL   LINK,LOWCHK       CHECK IF LOC IS LOW & CORRECT          MOS14030
```

TEST 4

```
1BE4  083A           1404          LDAR  R3,R10          GET PROPER BACKGROUND PATTERN          MOS14040
1BE6  C36D 0000      1405          THI   R6,0(R13)                                             MOS14050
1BEA  2332           1406          BZS   CHKCOL2                                               MOS14060
1BEC  083B           1407          LDAR  R3,R11                                                MOS14070
1BEE  4036 0000      1408  CHKCOL2 STH   R3,0(R6)        STORE BACKGROUND PATTERN              MOS14080
1BF2  C160 1BE0      1409  CHKCOL25 BXLE R6,CHKCOL1      TO ALL OF MEMORY UNDER TEST           MOS14090
1BF6  4860 18CA      1410          LH    R6,LOLIM                                              MOS14100
                     1411  *                                                                   MOS14110
1BFA  C840 3033      1412  CHKCOL3 LHI   R4,C'03'                                            MOS14120
1BFE  4040 1830      1413          STH   R4,ERRNO        ERRNO = C'03'                         MOS14130
1C02  94F6           1414          EXBR  R15,R6                                                MOS14140
1C04  981F           1415          WHR   R1,R15          DISPLAY ADDRESS UNDER TEST            MOS14150
1C06  41F0 19F8      1416          BAL   LINK,TSTBRKX    IF "BREAK" GO TO TSTEND ELSE RETURN   MOS14160
1C0A  41F0 1A0C      1417          BAL   LINK,LOWCHK     CHECK IF LOC IS LOW & CORRECT         MOS14170
1C0E  083A           1418          LDAR  R3,R10          GET ORIGINAL DATA PATTERN (O.D.P.)    MOS14180
1C10  C36D 0000      1419          THI   R6,0(R13)                                             MOS14190
1C14  2332           1420          BZS   CHKCOL4                                               MOS14200
1C16  083B           1421          LDAR  R3,R11                                                MOS14210
1C18  4846 0000      1422  CHKCOL4 LH    R4,0(R6)        GET DATA FROM LOC                     MOS14220
1C1C  0543           1423          CLAR  R4,R3           DATA EQUAL ?                          MOS14230
1C1E  2333           1424          BES   CHKCOL5         YES, BRANCH                           MOS14240
1C20  41F0 1D0A      1425          BAL   LINK,ERROR        NO, ERROR                           MOS14250
1C24  0739           1426  CHKCOL5 XAR   R3,R9           COMPLEMENT DATA PATTERN (C.D.P.)      MOS14260
1C26  4036 0000      1427          STH   R3,0(R6)        STORE C.D.P. AT LOC                   MOS14270
1C2A  6110 1830      1428          AHM   R1,ERRNO        ERRNO = C'04'                         MOS14280
1C2E  4846 0000      1429          LH    R4,0(R6)        GET DATA FROM LOC                     MOS14290
1C32  0543           1430          CLAR  R4,R3           DATA EQUAL ?                          MOS14300
1C34  2333           1431          BES   CHKCOL6         YES, BRANCH                           MOS14310
1C36  41F0 1D0A      1432          BAL   LINK,ERROR        NO, ERROR                           MOS14320
1C3A  0739           1433  CHKCOL6 XAR   R3,R9           COMPLEMENT C.D.P. (O.D.P.)            MOS14330
1C3C  4036 0000      1434          STH   R3,0(R6)        STORE O.D.P. AT LOC                   MOS14340
1C40  C840 3039      1435          LHI   R4,C'09'                                            MOS14350
1C44  4040 1830      1436          STH   R4,ERRNO        ERRNO = C'09'                         MOS14360
1C48  4846 0000      1437          LH    R4,0(R6)        GET DATA FROM LOC                     MOS14370
1C4C  0543           1438          CLAR  R4,R3           DATA EQUAL ?                          MOS14380
1C4E  2333           1439          BES   CHKCOL7         YES, BRANCH                           MOS14390
1C50  41F0 1D0A      1440          BAL   LINK,ERROR        NO, ERROR                           MOS14400
1C54  0739           1441  CHKCOL7 XAR   R3,R9           COMPLEMENT O.D.P. (C.D.P.)            MOS14410
1C56  4036 0000      1442          STH   R3,0(R6)        STORE C.D.P. AT LOC                   MOS14420
1C5A  C840 3041      1443          LHI   R4,C'0A'                                            MOS14430
1C5E  4040 1830      1444          STH   R4,ERRNO        ERRNO = C'0A'                         MOS14440
1C62  4846 0000      1445          LH    R4,0(R6)        GET DATA FROM LOC                     MOS14450
1C66  0543           1446          CLAR  R4,R3           DATA EQUAL ?                          MOS14460
1C68  2333           1447          BES   CHKCOL8         YES, BRANCH                           MOS14470
1C6A  41F0 1D0A      1448          BAL   LINK,ERROR        NO, ERROR                           MOS14480
1C6E  C160 1BFA      1449  CHKCOL8 BXLE  R6,CHKCOL3      CONTINUE UNTIL DONE(INCREMENTING      MOS14490
1C72  4860 18CC      1450          LH    R6,HILIM        INITIALIZE MEMORY LIMITS              MOS14500
1C76  C460 FFFE      1451          NHI   R6,-2           (HILIM MUST BE EVEN)                  MOS14510
1C7A  4880 18CA      1452          LH    R8,LOLIM                                              MOS14520
1C7E  2572           1453          LCS   R7,2                                                  MOS14530
                     1454  *                                                                   MOS14540
1C80  083B           1455  CHKCOL9 LDAR  R3,R11          GET COMPLEMENT DATA PATTERN(C.D.P.)    MOS14550
1C82  C36D 0000      1456          THI   R6,0(R13)                                             MOS14560
```

TEST 4

```
1C86  2332           1457          BZS   CHKCOLA                                                  MOS14570
1C88  083A           1458          LDAR  R3,R10                                                   MOS14580
1C8A  C840 3035      1459  CHKCOLA LHI   R4,C'05'                                                MOS14590
1C8E  4040 1830      1460          STH   R4,ERRNO          ERRNO = C'05'                          MOS14600
1C92  94F6           1461          EXBR  R15,R6                                                   MOS14610
1C94  981F           1462          WHR   R1,R15            DISPLAY ADDRESS UNDER TEST             MOS14620
1C96  41F0 19F8      1463          BAL   LINK,TSTBRKX      IF "BREAK" GO TO TSTEND ELSE RETURN    MOS14630
1C9A  C360 0FC0      1464          THI   R6,X'0FC0'                                               MOS14640
1C9E  4330 1CF4      1465          BZ    CHKCOLE                                                  MOS14650
1CA2  4846 0000      1466          LH    R4,0(R6)          GET DATA FROM LOC                      MOS14660
1CA6  0543           1467          CLAR  R4,R3             DATA EQUAL ?                           MOS14670
1CA8  2333           1468          BES   CHKCOLB           YES, BRANCH                            MOS14680
1CAA  41F0 1D0A      1469          BAL   LINK,ERROR        NO, ERROR                              MOS14690
1CAE  0739           1470  CHKCOLB XAR   R3,R9            COMPLEMENT C.D.P. (O.D.P.)             MOS14700
1CB0  4036 0000      1471          STH   R3,0(R6)          STORE O.D.P. AT LOC                    MOS14710
1CB4  6110 1830      1472          AHM   R1,ERRNO          ERRNO = C'06'                          MOS14720
1CB8  4846 0000      1473          LH    R4,0(R6)          GET DATA FROM LOC                      MOS14730
1CBC  0543           1474          CLAR  R4,R3             DATA EQUAL ?                           MOS14740
1CBE  2333           1475          BES   CHKCOLC           YES, BRANCH                            MOS14750
1CC0  41F0 1D0A      1476          BAL   LINK,ERROR        NO, ERROR                              MOS14760
1CC4  0739           1477  CHKCOLC XAR   R3,R9            COMPLEMENT O.D.P. (C.D.P.)             MOS14770
1CC6  4036 0000      1478          STH   R3,0(R6)          STORE C.D.P. AT LOC                    MOS14780
1CCA  C840 3042      1479          LHI   R4,C'0B'                                                 MOS14790
1CCE  4040 1830      1480          STH   R4,ERRNO          ERRNO = C'0B'                          MOS14800
1CD2  4846 0000      1481          LH    R4,0(R6)          GET DATA FROM LOC                      MOS14810
1CD6  0543           1482          CLAR  R4,R3             DATA EQUAL ?                           MOS14820
1CD8  2333           1483          BES   CHKCOLD           YES, BRANCH                            MOS14830
1CDA  41F0 1D0A      1484          BAL   LINK,ERROR        NO, ERROR                              MOS14840
1CDE  0739           1485  CHKCOLD XAR   R3,R9            COMPLEMENT C.D.P. (O.D.P.)             MOS14850
1CE0  4036 0000      1486          STH   R3,0(R6)          STORE O.D.P. AT LOC                    MOS14860
1CE4  6110 1830      1487          AHM   R1,ERRNO          ERRNO = C'0C'                          MOS14870
1CE8  4846 0000      1488          LH    R4,0(R6)          GET DATA FROM LOC                      MOS14880
1CEC  0543           1489          CLAR  R4,R3             DATA EQUAL ?                           MOS14890
1CEE  2333           1490          BES   CHKCOLE           YES, BRANCH                            MOS14900
1CF0  41F0 1D0A      1491          BAL   LINK,ERROR        NO, ERROR                              MOS14910
1CF4  C060 1C80      1492  CHKCOLE BXH   R6,CHKCOL9        CONTINUE UNTIL DONE(DECREMENTING)      MOS14920
                     1493  *                                                                      MOS14930
1CF8  030E           1494          BR    R14               RETURN                                 MOS14940
                     1495  *                                                                      MOS14950
                     1496  ************************************************************************MOS14960
                     1497  *       END   TEST 4                                                   MOS14970
```

COMMON ERROR ROUTINE

```
1CFA  4040 100C          1499  PARERR   STH   R4,TEMP          SET UP TO PRINT PARITY ERROR                MOS14990
1CFE  C840 3132          1500           LHI   R4,C'12'                                                     MOS15000
1D02  4040 1800          1501           STH   R4,TOTAL         SETT ERRNO = C'12'                          MOS15010
1D06  4840 100C          1502           LH    R4,TEMP                                                      MOS15020
                         1503  *                                                                           MOS15030
                         1504  *  COMMON ERROR ROUTINE         CALL:  BAL   LINK,ERROR                     MOS15040
                         1505  *                                                                           MOS15050
                         1506  *   R6= LOCATION OF ERROR    R3= DATA EXPECTED     R4= DATA READ          MOS15060
                         1507  *                                                                           MOS15070
                         1508  *                                                                           MOS15080
1D0A  40F0 100C          1509  ERROR    STH   LINK,TEMP          SAVE RETURN ADDRESS              ***    MOS15090
1D0E  41F0 13DE          1510           BAL   LINK,ERR           PRINT THE ERROR NUMBER                      MOS15100
1D12  25F1               1511           LCS   LINK,1                                                       MOS15110
1D14  40F0 17F8          1512           STH   LINK,NOERR         SET ERROR FLAG FOR EXEC.                    MOS15120
1D18  48F0 18AA          1513           LH    LINK,SCOPE+6       GET "SCOPE" VALUE                           MOS15130
1D1C  27F1               1514           SIS   LINK,1             IS SCOPE = 1 ?                              MOS15140
1D1E  4330 1D92          1515           BZ    PARTNO             YES, PRINT PART NUMBER.                     MOS15150
1D22  27F3               1516           SIS   LINK,3             IS SCOPE = 4 ?                              MOS15160
1D24  4330 1D7E          1517           BZ    ERORTN2            YES, RETURN (IGNORE)                        MOS15170
1D28  27F1               1518           SIS   LINK,1             IS SCOPE = 5 ?                              MOS15180
1D2A  4330 1D92          1519           BZ    PARTNO             YES, PRINT PART NO. & CONTINUE              MOS15190
1D2E  2404               1520  ERROR1   LIS   R0,4               LOAD DIGITS O BE CONVERTED                  MOS15200
1D30  0816               1521           LDAR  R1,R6              GET ADDRESS UNDER TEST                      MOS15210
1D32  C820 1E14          1522           LDAI  R2,ADRMSG          LOAD ADDRESS ERROR MESSAGE LOCATION         MOS15220
1D36  41F0 149A          1523           BAL   LINK,HEXASC        STORE LOCATION UNDER TEST IN MESSAGE        MOS15230
1D3A  0813               1524           LDAR  R1,R3              GET EXPECED DATA                            MOS15240
1D3C  C820 1E22          1525           LDAI  R2,DTAEXP          LOAD EXPECTTED DATA MESSAGE LOCATION        MOS15250
1D40  41F0 149A          1526           BAL   LINK,HEXASC        STORE DATA EXPECTED IN MESSAGE              MOS15260
1D44  0814               1527           LDAR  R1,R4              GET DATA READ                               MOS15270
1D46  C820 1E32          1528           LDAI  R2,DTARED          LOAD DATA READ MESSAGE LOCATION             MOS15280
1D4A  41F0 149A          1529           BAL   LINK,HEXASC        STORE DATA READ IN MESSAGE                  MOS15290
1D4E  C850 1E10          1530  ERROR2   LDAI  R5,ERRORMSG        LOAD ERROR MESSAGE LOCATION                 MOS15300
1D52  4050 17F6          1531           STH   R5,ISITERR         FORCE PRINTING                              MOS15310
1D56  41F0 14C2          1532           BAL   LINK,PRINT         PRINT THE ERROR DATA                        MOS15320
1D5A  2450               1533           LIS   R5,0                                                         MOS15330
1D5C  4050 17F6          1534           STH   R5,ISITERR         RESET FORCED PRINTING FLAG                  MOS15340
                         1535  *                                                                           MOS15350
1D60  48F0 18AA          1536  ERORTN   LH    LINK,SCOPE+6       LOAD "SCOPE" VALUE                          MOS15360
1D64  4330 1284          1537           BZ    TSTEND             IF SCOPE = 0                                MOS15370
1D68  27F1               1538           SIS   LINK,1             OR SCOPE = 1,                               MOS15380
1D6A  4330 1284          1539           BZ    TSTEND             GO TO NEXT TEST                             MOS15390
1D6E  27F2               1540           SIS   LINK,2             IS SCOPE = 3 ?                              MOS15400
1D70  4330 1306          1541           BZ    ABORT1             YES, ABORT TESTING SEQUENCE                 MOS15410
1D74  D100 1EC8          1542  ERORTN1  LM    R0,ERRSAVE         NO,RESTORE CALLING REGISTERS                MOS15420
1D78  48F0 100C          1543  ERROUT   LH    LINK,TEMP          RESTORE RETURN ADDRESS           ***    MOS15430
1D7C  030F               1544           BR    LINK               RETURN                                      MOS15440
                         1545  *                                                                           MOS15450
1D7E  48F0 1802          1546  ERORTN2  LH    LINK,TOTERR        IF SCOPE = 4                                MOS15460
1D82  26F1               1547           AIS   LINK,1             INCREMENT THE ERROR COUNTER                 MOS15470
1D84  40F0 1802          1548           STH   LINK,TOTERR        STORE THE INCREMENTED ERROR COUNTER         MOS15480
1D88  C5F0 7FFF          1549           CLAI  LINK,X'7FFF'       TOTERR = MAXIMUM ?                          MOS15490
1D8C  203C               1550           BNES  ERORTN1            NO, RETURN                                  MOS15500
1D8E  4300 1370          1551           B     HALT9              YES, WAIT FOR PRINTOUT                      MOS15510
```

COMMON ERROR ROUTINE

```
1D92  0734           1553  PARTNO  XAR   R3,R4          DETERMINE BIT(S) THAT FAILED          MOS15530
1D94  2410           1554          LIS   R1,0           INITIALIZE CHIP NUMBER                MOS15540
1D96  C530 FFFF      1555          CLAI  R3,-1          DID ALL BITS FAIL ?                   MOS15550
1D9A  2138           1556          BNES  CO3            NO, BRANCH                            MOS15560
1D9C  C840 4646      1557          LDAI  R4,C'FF'                                             MOS15570
1DA0  4040 1E0C      1558          STH   R4,CHIPNO+2    YES, STORE 8KB ROW IDENTIFIER         MOS15580
1DA4  2430           1559          LIS   R3,0           LOAD CONTIN VALUE IN ERR DATA REG R3  MOS15590
1DA6  4300 1DD6      1560          B     CO5            CONTINUE                              MOS15600
1DAA  9131           1561  CO3     SLHLS R3,1           DECIPHER FAILING BIT NUMBER(S)        MOS15610
1DAC  2185           1562          BCS   CO4            (00-09,10-16)                         MOS15620
1DAE  2611           1563          AIS   R1,1                                                 MOS15630
1DB0  C510 0010      1564          CLHI  R1,16          CHIP NUMBER = 16 ?                    MOS15640
1DB4  2085           1565          BLS   CO3            NO, BRANCH                            MOS15650
1DB6  C820 3030      1566  CO4     LHI   R2,C'00'       STORE CHIP NUMBER                     MOS15660
1DBA  4020 1E0C      1567          STH   R2,CHIPNO+2    IN ASCII                              MOS15670
1DBE  0801           1568          LDAR  R0,R1          SAVE BIT NUMBER                       MOS15680
1DC0  C510 000A      1569          CLHI  R1,10                                                MOS15690
1DC4  2186           1570          BLS   CO4.5                                                MOS15700
1DC6  C820 0100      1571          LHI   R2,X'100'      CONVERT BIT NO. TO DECIMAL & STORE    MOS15710
1DCA  6120 1E0C      1572          AHM   R2,CHIPNO+2                                          MOS15720
1DCE  271A           1573          SIS   R1,10                                                MOS15730
1DD0  6110 1E0C      1574  CO4.5   AHM   R1,CHIPNO+2                                         MOS15740
1DD4  0810           1575          LDAR  R1,R0          RESTORE BIT NUMBER                    MOS15750
1DD6  C850 1DF6      1576  CO5     LDAI  R5,CHIPMSG                                           MOS15760
1DDA  4050 17F6      1577          STH   R5,ISITERR     FORCE PRINTING                        MOS15770
1DDE  41F0 14C2      1578          BAL   LINK,PRINT     PRINT SUSPECTED CHIP NUMBER           MOS15780
1DE2  2450           1579          LIS   R5,0                                                 MOS15790
1DE4  4050 17F6      1580          STH   R5,ISITERR     RESET FORCED PRINTING FLAG            MOS15800
1DE8  0833           1581          LDAR  R3,R3          HAVE ALL SUSPECT CHIPS BEEN PRINTED?  MOS15810
1DEA  4230 1DAA      1582          BNZ   CO3            NO, BRANCH                            MOS15820
1DEE  D100 1EC8      1583          LM    R0,ERRSAVE     YES, RESTORE REGISTERS                MOS15830
1DF2  4300 1D2E      1584          B     ERROR1         GO PRINT ERROR DATA                   MOS15840
                     1585  *                                                                   MOS15850
                     1586  ********************************************************************* MOS15860
                     1587  *       END   COMMON ERROR ROUTINE                                   MOS15870
```

CHKSUM FILE

```
                          1589  *                                                                    MOS15890
                          1590  *         TEST MESSAGES                                              MOS15900
                          1591  *                                                                    MOS15910
1DF6   5355 5350 4543 5445  1592  CHIPMSG  DC    C'SUSPECTED BAD CHIP  '                          MOS15920
1DFE   4420 4241 4420 4348
1E06   4950 2020
1E0A   4130 2A2A            1593  CHIPNO   DC    C'A0**',X'0D0A'                                  MOS15930
1E0E   0D0A
1E10   4C4F 4320            1594  ERRORMSG DC    C'LOC '                                          MOS15940
                          1595  *                                                                    MOS15950
1E14   2A2A 2A2A 2044 4154  1596  ADRMSG   DC    C'**** DATA EXP '                                MOS15960
1E1C   4120 4558 5020
1E22   2A2A 2A2A 2020 4441  1597  DTAEXP   DC    C'****  DATA READ '                             MOS15970
1E2A   5441 2052 4541 4420
1E32   2A2A 2A2A            1598  DTARED   DC    C'****',X'0D0A'                                  MOS15980
1E36   0D0A
1E38   4D45 4D4F 5259 2055  1599  ASMEMMSG DC    C'MEMORY UNDER TEST ',X'8D0A'                    MOS15990
1E40   4E44 4552 2054 4553
1E48   5420
1E4A   8D0A
1E4C   3030 3030 2D30 4646  1600  LOMSG    DC    C'0000-0FFF ',X'0D0A'                           MOS16000
1E54   4620
1E56   0D0A
       0000 1E51            1601  HIMSG    EQU   LOMSG+5            *                        ***   MOS16010
                          1602  *                                                                    MOS16020
                          1603  *                                                                    MOS16030
                          1604  ************************************************************************MOS16040
                          1605  *         END   TEST MESSAGE FILE                                    MOS16050
       0000 1E57            1606  LNZB     EQU   *-1                                                MOS16060
```

CHKSUM FILE

```
                        1608  *                                                                          MOS16080
                        1609  *        TEST PROGRAM STORAGE AREA                                         MOS16090
                        1610  *                                                                          MOS16100
                        1611  ***************************************************************************MOS16110
                        1612  *                                                                          MOS16120
1E58                    1613            ALIGN 4                                                          MOS16130
1E58                    1614  PSWSAVE   DS    4                 PPF PSW SAVE AREA                      MOS16140
1E5C                    1615  COMRET    DS    4                 ERRCOM RETURN ADDRESS SAVE             MOS16150
1E60                    1616  SET.RTN   DS    4                 SETUP RETURN ADDRESS SAVE              MOS16160
1E64                    1617  PAUSE     DS    4                 PAUSE FLAG FOR CAROUSEL                MOS16170
                        1618  *                                                                          MOS16180
1E68                    1619  MOSSAVE   DS    32                SI6MMT REGISTER SAVE AREA              MOS16190
      0000 1E68         1620  OPTBUF    EQU   MOSSAVE           OPTION INPUT BUFFER                    MOS16200
1E88                    1621  RSAVE     DS    64                REGISTER SAVE AREA (ETPE) 16 BIT       MOS16210
1EC8                    1622  ERRSAVE   DS    32                REGISTER SAVE FOR ERROR ROUTINES       MOS16220
                        1623  *                                                                          MOS16230
                        1624  ***************************************************************************MOS16240
                        1625  *        END   TEST PROGRAM  06-202(F01R01)                          ***   MOS16250
```

CHKSUM/M17 PUNCHER

```
1EE8  2400            1627  $CHKSUM  LIS   R0,0             PUNCH M17 TAPE WITH CHECKSUM          MOS16270
1EEA  9510            1628           EPSR  R1,R0            SELECT REG. SET 0 & CLEAR PSW   ***   MOS16280
                      1629  *                                                                      MOS16290
1EEC  C810 1000       1630           LDAI  R1,ORIGIN1        LOAD START ADDRESS                    MOS16300
1EF0  2421            1631           LIS   R2,1              LOAD INCREMENT VALUE                  MOS16310
1EF2  C830 1E57       1632           LDAI  R3,LNZB           LOAD FINAL ADDRESS                    MOS16320
1EF6  2440            1633           LIS   R4,0              INITIALIZE CHKSUM BYTE                MOS16330
                      1634  *                                                                      MOS16340
1EF8  D351 0000       1635  $GEN     LB    R5,0(R1)                                                MOS16350
1EFC  0745            1636           XAR   R4,R5             CALCULATE CHKSUM BYTE                 MOS16360
1EFE  C110 1EF8       1637           BXLE  R1,$GEN                                                 MOS16370
1F02  D240 0099       1638           STB   R4,MN+3           CHECKSUM BYTE TO BOOT LOADER          MOS16380
                      1639  *                                                                      MOS16390
1F06  C810 0080       1640  $TAPE    LHI   R1,X'0080'                                              MOS16400
1F0A  9E21            1641           OCR   R2,R1             DISPLAY IN NORMAL MODE                MOS16410
1F0C  9444            1642           EXBR  R4,R4                                                   MOS16420
1F0E  9824            1643           WHR   R2,R4             DISPLAY CHKSUM BYTE (TO D1)           MOS16430
1F10  9411            1644           EXBR  R1,R1                                                   MOS16440
1F12  9501            1645           EPSR  R0,R1             HALT PROCESSOR.                       MOS16450
                      1646  *                                                                      MOS16460
                      1647  ************************************************************************MOS16470
                      1648  *                                                                      MOS16480
1F14  D360 007A       1649  $PUNCH   LB    R6,X'7A'          GET BOUTDV (PUNCH) ADDRESS.           MOS16490
1F18  DE60 007B       1650           OC    R6,X'7B'          START TAPE PUNCH                      MOS16500
1F1C  9D60            1651           SSR   R6,R0                                                   MOS16510
1F1E  2081            1652           BTBS  8,1                                                     MOS16520
1F20  41F0 1F62       1653           BAL   R15,STAPL         PUNCH LEADER (256 CHARACTERS)         MOS16530
1F24  9411            1654           EXBR  R1,R1             (R1) = X'0080'                        MOS16540
1F26  C830 00CF       1655           LHI   R3,X'CF'                                                MOS16550
                      1656  *                                                                      MOS16560
1F2A  DA61 0000       1657  $PNCH1   WD    R6,0(R1)          PUNCH BOOT LOADER                     MOS16570
1F2E  9D60            1658           SSR   R6,R0                                                   MOS16580
1F30  2081            1659           BTBS  8,1                                                     MOS16590
1F32  C110 1F2A       1660           BXLE  R1,$PNCH1                                               MOS16600
1F36  41F0 1F68       1661           BAL   R15,STAPL1        PUNCH ONE-FOLD GAP.                   MOS16610
                      1662  *                                                                      MOS16620
1F3A  D340 0099       1663           LB    R4,MN+3           GET CHECKSUM BYTE                     MOS16630
1F3E  C810 1000       1664           LDAI  R1,ORIGIN1        (NORMALLY X'A00')                     MOS16640
1F42  C830 1E57       1665           LDAI  R3,LNZB                                                 MOS16650
                      1666  *                                                                      MOS16660
1F46  D351 0000       1667  $PNCH2   LB    R5,0(R1)          PUNCH PROGRAM                         MOS16670
1F4A  0745            1668           XAR   R4,R5             (ORIGIN1 TO LNZB)                     MOS16680
1F4C  9A65            1669           WDR   R6,R5                                                   MOS16690
1F4E  9401            1670           EXBR  R0,R1                                                   MOS16700
1F50  9820            1671           WHR   R2,R0             DISPLAY ADDRESS PUNCHED               MOS16710
1F52  9D60            1672           SSR   R6,R0                                                   MOS16720
1F54  2081            1673           BTBS  8,1                                                     MOS16730
1F56  C110 1F46       1674           BXLE  R1,$PNCH2                                               MOS16740
1F5A  41F0 1F62       1675           BAL   R15,STAPL         PUNCH TRAILER.                        MOS16750
1F5E  4300 1F06       1676           B     STAPE             DISPLAY CHECKSUM, HALT PROCESSOR.     MOS16760
```

```
                         1678  *   CHKSUM/M17 PUNCHER (CONTINUED)                                  ***   MOS16780
                         1679  *                                                                          MOS16790
1F62   C800 0100         1680  $TAPL     LHI   R0,256            TO PUNCH BLANK LEADER                 MOS16800
1F66   2303              1681            BS    $TAPLP                                                  MOS16810
                         1682  *                                                                         MOS16820
1F68   C800 0080         1683  $TAPL1    LHI   R0,128            TO PUNCH 1-FOLD GAP           ***     MOS16830
                         1684  *                                                                         MOS16840
1F6C   2701              1685  $TAPLP    SIS   R0,1                                                    MOS16850
1F6E   032F              1686            BNPR  R15               RETURN                                MOS16860
1F70   2430              1687            LIS   R3,0                                                    MOS16870
1F72   9A63              1688            WDR   R6,R3             PUNCH BLANK FRAME                     MOS16880
1F74   9D68              1689            SSR   R6,R8                                                   MOS16890
1F76   2081              1690            BTBS  8,1                                                     MOS16900
1F78   2206              1691            BS    $TAPLP            CONTINUE.                             MOS16910
                         1692  *                                                                         MOS16920
                         1693  ************************************************************************  MOS16930
1F7A                     1694            END                                                           MOS16940
```

ASSEMBLED BY CAL 03-066R05-00 (32-BIT)

START OPTIONS: T=16,CROSS,ERLST,

NO CAL ERRORS
NO CAL WARNINGS
2 PASSES

```
$CHKSUM    0000 1EE8      1627*
$GEN       0000 1EF8      1635*  1637
$PNCH1     0000 1F2A      1657*  1660
$PNCH2     0000 1F46      1667*  1674
$PUNCH     0000 1F14      1649*
$TAPE      0000 1F06      1640*  1676
$TAPL      0000 1F62      1653   1675   1680*
$TAPL1     0000 1F68      1661   1683*
$TAPLP     0000 1F6C      1681   1685*  1691
$TSTDU0    0000 16BE       746    748*
$TSTDU1    0000 16DC       758*
$TSTDU2    0000 16DE       755    757    759*
ABORT      0000 12C4       374*
ABORT1     0000 1306       393*   732   1541
ABORT2     0000 1344       416*
ABORT3     0000 130E       386    396*
ABSTOP     0000 1F7A
ADC        0000 0002
ADRMSG     0000 1E14      1522   1596*
AMSG       0000 1872       180    932*
ASCILOC    0000 185C       514    929*
ASCIPSW    0000 1852       511    928*
ASMEMMSG   0000 1E38      1035   1599*
BOOT       0000 0088        58     61*
BRK.SAV    0000 180C       702    735    739    914*
BRKVECT    0000 1008        97*   733    737   1122
BTESTNO    0000 1804       316    328    345    368    424    910*
C300ADR    0000 1018       106*
CAR2ND     0000 17EC       892*
CARRD      0000 17E0       884*
CARRQ2S    0000 17F4       899*
CHIPMSG    0000 1DF6      1576   1592*
CHIPNO     0000 1E0A      1558   1567   1572   1574   1593*
CHKCOL     0000 1BD6      1387   1390   1393   1399*
CHKCOL1    0000 1BE0      1403*  1409
CHKCOL2    0000 1BEE      1406   1408*
CHKCOL25   0000 1BF2      1409*
CHKCOL3    0000 1BFA      1412*  1449
CHKCOL4    0000 1C18      1420   1422*
CHKCOL5    0000 1C24      1424   1426*
CHKCOL6    0000 1C3A      1431   1433*
CHKCOL7    0000 1C54      1439   1441*
CHKCOL8    0000 1C6E      1447   1449*
CHKCOL9    0000 1C80      1455*  1492
CHKCOLA    0000 1C8A      1457   1459*
CHKCOLB    0000 1CAE      1468   1470*
CHKCOLC    0000 1CC4      1475   1477*
```

```
CHKCOLD   0000 1CDE    1483   1485*
CHKCOLE   0000 1CF4    1465   1490   1492*
CHKLOC    0000 1A56    1170   1174   1177   1181   1184   1188   1194*
CHKLOC1   0000 1A60    1198*  1204
CHKLOC10  0000 1B14    1244   1254   1256*
CHKLOC2   0000 1A6E    1201   1203*
CHKLOC25  0000 1A72    1204*
CHKLOC3   0000 1A7A    1207*  1228
CHKLOC4   0000 1A98    1215   1217*
CHKLOC5   0000 1AA4    1219   1221*
CHKLOC6   0000 1ABC    1226   1228*
CHKLOC7   0000 1ACE    1234*  1256
CHKLOC8   0000 1AD8    1236   1238*
CHKLOC9   0000 1AFC    1247   1249*
CLIF2ND   0000 17E8     890*
CLIFADR   0000 1014     104*
CLIFRD    0000 17DC     882*
CO3       0000 1DAA    1556   1561*  1565   1582
CO4       0000 1DB6    1562   1566*
CO4.5     0000 1DD0    1570   1574*
CO5       0000 1DD6    1560   1576*
COMM      0000 1752     814*   830
COMM1     0000 1756     816*   860
COMRET    0000 1E5C     482    489   1615*
CON2ND    0000 17E4     142    151    152    887*   888
CONADR    0000 17D6     148    681    703    773    877*
CONENRD   0000 17E5     888*
CONRD     0000 17D8     149    150    162    678    774    879*   880
CONRQ2S   0000 17F0     136    154    155    778    895*
CONTIN    0000 188C     385    731    943*
CONWRT    0000 17D9     787    880*
COUNT     0000 1806     342    357    359    911*
CRLF      0000 154A     168    176    285    298    438    616*   690
CRT2ND    0000 17E6     889*
CRTRD     0000 17DA     881*
CRTRQ2S   0000 17F1     896*
DEFTESTS  0000 F800     263    999*
DISPLAY   0000 13B8     378    419    455*
DTAEXP    0000 1E22    1525   1597*
DTARED    0000 1E32    1528   1598*
ECHO1     0000 160C     677    684*
ECHRTN    0000 160E     680    685*
EOTMSG    0000 1862     399    930*
ERORTN    0000 1D60    1536*
ERORTN1   0000 1D74    1542*  1550
ERORTN2   0000 1D7E    1517   1546*
ERR       0000 13DE     470*   818   1510
ERR1      0000 1430     472    503*
ERRCOM    0000 13FC     471    482*
ERRCOM1   0000 141A     486    492*
ERRCOM2   0000 13EA     473*
ERRMSG    0000 1828     503    922*   923    924
ERRNO     0000 1830     310    828    847    924*  1088   1104   1208   1223   1239   1251   1307   1331   1413
                       1428   1436   1444   1460   1472   1480   1487
ERROR     0000 1D0A     988   1097   1113   1220   1227   1248   1255   1320   1343   1425   1432   1440   1448
```

```
                                1469   1476   1484   1491   1509*
ERROR1          0000 1D2E       1520*  1584
ERROR2          0000 1D4E       1530*
ERRORMSG        0000 1E10       1530   1594*
ERROUT          0000 1D78       1543*
ERRPL1          0000 143A        509*   820
ERRSAVE         0000 1EC8        470    477   1542   1583   1622*
ETESTNO         0000 182E        309    336    923*
FOUND1          0000 11E8        290    295*
GETCHR          0000 15E6        190    523    532    670*
HALT9           0000 1370        391    423    429*   435    497    1551
HEXASC          0000 149A        334    445    448    512    515    547*  1039   1042   1523   1526   1529
HEXASC1         0000 14A4        551*   558
HEXTAB          0000 180E        525    554    916*
HILIM           0000 18CC        956*  1040   1078   1195   1229   1295   1400   1450
HIMSG           0000 1E51        447   1041   1601*
II              0000 176C        799    825*
II32            0000 1780        830*
IMPTOP          0000 0000R
INCR            0000 17D2        456    871*
INIT            0000 18CE        299    960*
INIT1           0000 1904        966    968    970    972    977*
INIT2           0000 190C        980*   981
INIT3           0000 1916        983*   989
INIT4           0000 1926        987    989*
INITRET         0000 11FC        303*   974
IO              0000 1010        102*   125    126    134    135    141    147    296    660    710    750    765    786
IO.OK1          0000 103E        129    131*
IO.OK2          0000 1044        132    134*
IO.OK3          0000 1062        139    144*
IO.OK4          0000 109A        159    162*
IOSAVE          0000 100A         98*   297    600    623    658    748    768    784
ISITERR         0000 17F6        304    400    403    440    474    487    590    691    695    819    903*  1531   1534
                                1577   1580
KBREAD          0000 16F6        670    773*
KBXIT           0000 170C        777    779*
KEEP10          0000 137C        436*   587
KEEP2           0000 11DE        289*   292
KEEP3           0000 121E        315*   388    427
KEEP4           0000 1228        321*   370    426
KEEP41          0000 122C        322*   327
KEEP42          0000 1234        324*
KEEP43          0000 123A        326*
KEEP5           0000 123E        325    328*
KEEP6           0000 1272        343*   363
KEEP7           0000 12AA        362    364*  1044
KEEP71          0000 12B8        365    368*
KEEP9           0000 1340        381    414*
KEEP91          0000 134E        419*   496
KEEP92          0000 1376        383    406    409    434*
LADC            0000 0001        346
LCORE           0000 1726        165    311    793*   973
LDWT            0000 00C8         84*    87
LEADER          0000 00A2         68*    72
LEVELIN         0000 118C        254*   941    943    944    945
```

			653	658	659	660	661	664	704	706	708	714	715	720	723
			728	729	745	748	749	750	750	751	752	752	753	754	756
			758	760	766	767	768	783	784	785	786	787	788	789	793
			797	798	852	853	984	1037	1040	1082	1092	1104	1108	1164	1210
			1223	1241	1251	1293	1311	1331	1335	1382	1415	1428	1462	1472	1487
			1521	1524	1527	1554	1563	1564	1568	1569	1573	1574	1575	1628	1630
			1635	1637	1640	1641	1644	1644	1645	1654	1654	1657	1660	1664	1667
			1670	1674											
R10	0000 000A		45*	834	834	837	838	838	844	844	845	850	1167	1172	1179
			1186	1199	1213	1237	1384	1404	1418	1458					
R11	0000 000B		46*	1168	1173	1180	1187	1202	1216	1234	1385	1407	1421	1455	
R12	0000 000C		47*	184	201	210	221	240	243	255	272	293	529	1313	1315
			1321												
R13	0000 000D		48*	966	968	970	972	990	1169	1176	1183	1200	1214	1235	1309
			1322	1333	1345	1386	1389	1392	1405	1419	1456				
R14	0000 000E		49*	118	120	241	244	246	270	540	543	814	829	848	849
			850	851	960	961	962	963	964	1170	1174	1177	1181	1184	1188
			1258	1387	1390	1393	1494								
R15	0000 000F		51*	119	163	170	190	246	256	282	283	284	402	403	523
			524	525	527	531	532	622	665	666	731	733	735	1091	1092
			1107	1108	1209	1210	1240	1241	1310	1311	1334	1335	1414	1415	1461
			1462	1653	1661	1675	1686								
R2	0000 0002		37*	57	77	83	126	131	133	135	136	140	141	142	149
			150	151	152	160	160	161	177	178	321	323	326	328	329
			330	331	333	335	336	345	346	347	430	444	447	471	475
			476	482	487	488	489	490	511	514	555	556	570	710	711
			713	718	722	725	725	794	817	825	826	827	828	835	836
			846	847	856	983	984	1038	1041	1522	1525	1528	1566	1567	1571
			1572	1631	1641	1643	1671								
R3	0000 0003		38*	62	63	64	127	128	131	147	148	157	157	161	162
			163	218	222	226	228	273	274	275	548	549	550	552	557
			583	585	795	799	800	965	967	969	971	980	986	1083	1085
			1095	1100	1102	1199	1202	1203	1213	1216	1218	1221	1222	1225	1234
			1237	1246	1249	1250	1253	1301	1303	1314	1315	1316	1318	1326	1328
			1337	1339	1341	1344	1404	1407	1408	1418	1421	1423	1426	1427	1430
			1433	1434	1438	1441	1442	1446	1455	1458	1467	1470	1471	1474	1477
			1478	1482	1485	1486	1489	1524	1553	1555	1559	1561	1581	1581	1632
			1655	1665	1687	1688									
R4	0000 0004		39*	66	67	68	70	78	80	154	155	156	158	158	180
			182	191	193	194	196	198	205	207	211	239	242	261	276
			525	533	535	539	541	551	552	553	554	554	555	579	580
			581	582	593	595	599	604	606	617	655	670	672	674	684
			685	779	801	802	803	807	985	986	1087	1088	1094	1095	1111
			1165	1166	1207	1208	1217	1218	1224	1225	1238	1239	1245	1246	1252
			1253	1299	1300	1306	1307	1317	1318	1340	1341	1412	1413	1422	1423
			1429	1430	1435	1436	1437	1438	1443	1444	1445	1446	1459	1460	1466
			1467	1473	1474	1479	1480	1481	1482	1488	1489	1499	1500	1501	1502
			1527	1553	1557	1558	1633	1636	1638	1642	1642	1643	1663	1668	
R5	0000 0005		40*	68	70	71	71	73	74	75	78	80	86	169	220
			222	267	271	338	366	399	400	439	440	449	503	516	593
			597	692	1035	1530	1531	1533	1534	1576	1577	1579	1580	1635	1636
			1667	1668	1669										
R6	0000 0006		41*	65	75	82	136	137	138	138	219	220	227	248	254
			271	274	522	530	531	537	977	980	981	982	983	985	989
			1077	1081	1085	1086	1089	1091	1094	1098	1099	1102	1103	1105	1107

TESTS	0000	195C	347	1007*								
TITLE	0000	192C	169	994*								
TOTAL	0000	1800	305	379	387	390	416	418	420	421	443	908* 1501
TOTERR	0000	1802	306	379	420	446	492	494	909*	1546	1548	
TOTMSG	0000	1834	439	925*								
TSTBRK	0000	162E	337	360	384	608	701*	1124				
TSTBRK1	0000	1686	719	728*	730							
TSTBRK2	0000	168E	717	727	731*							
TSTBRK3	0000	16A2	705	707	709	721	726	736*				
TSTBRK4	0000	166A	712	718*								
TSTBRK5	0000	165A	713*	716								
TSTBRKX	0000	19F8	1093	1109	1120*	1211	1242	1312	1436	1416	1463	
TSTDU	0000	16B2	380	434	485	565	627	646	656	744*		
TSTEND	0000	1284	353*	1116	1121	1190	1349	1395	1537	1539		
TSTMSG	0000	181E	338	920*	921							
TSTOP1	0000	11A4	262	267*								
TSTOP2	0000	11AA	270*	277								
TSTOP4	0000	11BC	276*									
TTYGET	0000	1706	777*									
WASDU	0000	17FC	167	283	414	437	567	570	580	664	906*	
WASDU1	0000	17FE	284	382	568	582	907*					
ZERO1	0000	1730	797*	798								

PROG= MOSP14 ASSEMBLED BY CAL 03-066R05-00 (32-BIT)

```
                        CROSS                                                          MOS00010
                        TARGT 16                                                       MOS00020
                        WIDTH 120                                                      MOS00030
MOSP14                  PROG  S16 19-197 MOS MEMORY TEST PART 1  06-202F04M96R01A13 ** MOS00040
                        SQCHK                                                          MOS00050
*********************************************************************************** MOS00060
*                                                                                     MOS00070
*       SERIES-16 19-197 MOS MEMORY TEST PART 1 - (F04-R01)                    ***   MOS00080
*                                                                                     MOS00090
*       COPYRIGHT       INTERDATA, INC.          OCTOBER, 1976                        MOS00100
*                                                                                     MOS00110
*       REVISED         PRODUCT SUPPORT          MAY, 1978                    ***   MOS00120
*       REVISION R01 CONTAINS 5/16 MICRO I/O BUS SUPPORT.                    ***   MOS00130
*                                                                                     MOS00140
*       THIS PROGRAM TESTS THE UPPER HALF OF AN 8KB MOS MEMORY                        MOS00150
*       IN A 5/16 OR 6/16 INTERDATA PROCESSOR WITH A                                  MOS00160
*       BATTERY BACK-UP POWER SUPPLY (OPTIONAL).                                      MOS00170
*                                                                                     MOS00180
*       TEST 0                      MEMORY SEARCH TEST                                MOS00190
*                                                                                     MOS00200
*       TEST 1                      SHORT COUNT RELOCATABLE                           MOS00210
*                                   HAMMER DISTURB TEST                               MOS00220
*                                                                                     MOS00230
*       TEST 2                      DIAGONAL GALPAT TESTT                             MOS00240
*                                                                                     MOS00250
*       TEST 3                      MEMORY HOLD TEST                                  MOS00260
*                                   (REQUIRES MANUAL INTERVENTION)                    MOS00270
*                                                                                     MOS00280
*       TEST 4                      LONG COUNT RELOCATABLE                            MOS00290
*                                   HAMMER DISTURB TEST                               MOS00300
*                                                                                     MOS00310
*       THE DEFAULT TESTS ARE 0, 1, & 2.                                              MOS00320
*                                                                                     MOS00330
*       TEST 0 IS EXECUTED WHENEVER "RUN" IS ENTERED.                                 MOS00340
*                                                                                     MOS00350
*       TEST 3 REQUIRES MANUAL INTERVENTION AND CANNOT BE                             MOS00360
*       LOOPED ON WHILE THE PROCESSOR IS UNATTENDED.                                  MOS00370
*                                                                                     MOS00380
*       TEST 4 IS AN OPTIONAL, LONG (I.E., OVERNIGHT) TEST.                           MOS00390
*                                                                                     MOS00400
*********************************************************************************** MOS00410
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BOOTSTRAP LOADER

```
       0000 0000           43  R0       EQU   0                                                     MOS00430
       0000 0001           44  R1       EQU   1                                                     MOS00440
       0000 0002           45  R2       EQU   2                                                     MOS00450
       0000 0003           46  R3       EQU   3                                                     MOS00460
       0000 0004           47  R4       EQU   4                                                     MOS00470
       0000 0005           48  R5       EQU   5                                                     MOS00480
       0000 0006           49  R6       EQU   6                                                     MOS00490
       0000 0007           50  R7       EQU   7                                                     MOS00500
       0000 0008           51  R8       EQU   8                                                     MOS00510
       0000 0009           52  R9       EQU   9                                                     MOS00520
       0000 000A           53  R10      EQU   10                                                    MOS00530
       0000 000B           54  R11      EQU   11                                                    MOS00540
       0000 000C           55  R12      EQU   12                                                    MOS00550
       0000 000D           56  R13      EQU   13                                                    MOS00560
       0000 000E           57  R14      EQU   14                                                    MOS00570
       0000 000E           58  RET      EQU   14                                                    MOS00580
       0000 000F           59  R15      EQU   15                                                    MOS00590
       0000 000F           60  LINK     EQU   15                                                    MOS00600
                           61  *                                                                    MOS00610
                           62  *  BOOTLOADER WITH CHKSUM                                            MOS00620
                           63  *                                                                    MOS00630
0080R                      64           ORG   X'80'                                                 MOS00640
0080   2421                65           LIS   R2,1                                                  MOS00650
0082   2303                66           BS    BOOT                                                  MOS00660
0084   1F74                67           DC    Z(PSWSAVE)       CURRENT PSW SAVE POINTER(32-BIT M/C)    MOS00670
0086   1F88                68           DC    Z(RSAVE)         REGISTER SAVE POINTER(32-BIT M/C)       MOS00680
0088   C810 1000           69  BOOT     LHI   R1,ORIGIN1       R1 = ADR(FIRST BYTE OF TEST PROGM)      MOS00690
008C   C830 1F74           70           LHI   R3,LNZB+1        R3 = ADR (LAST NON-ZERO BYTE)    ***    MOS00700
0090   4030 0022           71           STH   R3,X'22'         REGISTER SAVE POINTER(16-BIT M/C)       MOS00710
0094   2731                72           SIS   R3,1                                                  MOS00720
0096   C860 00FF           73  MN       LHI   R6,X'00FF'       R6 = CHKSUM BYTE = X'MN'         ***    MOS00730
009A   D340 0078           74           LB    R4,X'78'         GET INPUT DEV ADR                       MOS00740
009E   DE40 0079           75           OC    R4,X'79'         PUT INPUT DEV IN READ MODE              MOS00750
00A2   9D45                76  LEADER   SSR   R4,R5            WAIT FOR DU & BUSY TO DROP              MOS00760
00A4   2091                77           BTBS  9,1              (DU OR BUSY SET - BRANCH)               MOS00770
00A6   9B45                78           RDR   R4,R5            READ A CHARACTER                        MOS00780
00A8   0855                79           LDAR  R5,R5            IS IT ZERO ?                            MOS00790
00AA   2234                80           BES   LEADER           YES, IGNORE LEADER (BRANCH)             MOS00800
00AC   D251 0000           81  LOAD     STB   R5,0(R1)         STORE 1ST NON-ZERO & SUBSEQUENT BYTE    MOS00810
00B0   D351 0000           82           LB    R5,0(R1)         RELOAD DATA BYTE FROM MEMORY            MOS00820
00B4   0765                83           XHR   R6,R5            GENERATE CHKSUM                         MOS00830
00B6   9481                84           EXBR  R8,R1            EXCHANGE ADDRESS BYTES                  MOS00840
00B8   9828                85           WHR   R2,R8            DISPLAY MEMORY ADDRESS                  MOS00850
00BA   9D45                86           SSR   R4,R5            WAIT FOR DU & BUSY TO DROP              MOS00860
00BC   2091                87           BTBS  9,1              (DU OR BUSY SET - BRANCH)               MOS00870
00BE   9B45                88           RDR   R4,R5            READ A CHARACTER                        MOS00880
00C0   C110 00AC           89           BXLE  R1,LOAD          LOAD TILL LAST BYTE                     MOS00890
00C4   9486                90           EXBR  R8,R6            EXCHANGE CHKSUM BYTES                   MOS00900
00C6   9828                91           WHR   R2,R8            DISPLAY FINAL CHKSUM                    MOS00910
00C8   2478                92  LDWT     LIS   R7,8                                                  MOS00920
00CA   917C                93           SLHLS R7,12            R7 = X'8000'                            MOS00930
00CC   9557                94           EPSR  R5,R7            HALT PROCESSOR.                         MOS00940
00CE   2203                95           BS    LDWT                                                  MOS00950
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EXEC - ETPE R03-06 (16-BIT STRIPPED & MODIFIED)

```
00D0                     ORG   X'1000'           *                                ***  MOS00970
1000  230E      ORIGIN1  BS    START2            START HERE FOR 16-BIT PROCESSOR  ***  MOS00980
                *                                                                      MOS00990
                *-----------------------------                                         MOS01000
                *   TEST CONSTANTS                                 *                   MOS01010
                *                                                                      MOS01020
1002  30F0      PSW      DCX   30F0              PSW USED IN TEST MODULES              MOS01030
1004  30F0      PSW2     DCX   30F0              PSW USED IN EXEC                      MOS01040
1006  0000      BRKVECT  DC    Z(0)              BREAK VECTOR ADDRESS                  MOS01050
1008  0000      IOSAVE   DCX   0                 I/O DEVICE SAVE LOCATION              MOS01060
100A  0000      TEMP     DCX   0                 ETPE TEMPORARY STORRAGE LOCATION      MOS01070
100C  0000      PASFLG   DCX   0                 FLAG SET WHEN CONSOLE ON PASLA/PALM   MOS01080
100E  0000      PASFLG2  DCX   0                 SET WHEN LIST DEVICE ON PASLA    ***  MOS01090
                *                                                                      MOS01100
1010  0202      IO       DC    X'0202'           I/O DEVICE(S) IDENTIFIER              MOS01110
1012  1011      PASLADR  DC    X'1011'           PASLA/PALM READ/WRITE ADDRESSES       MOS01120
1014  0202      CLIFADR  DC    X'0202'           CURRENT LOOP INTERFACE R/W ADDRESSES  MOS01130
1016  6262      LPADR    DC    X'6262'           LINE PRINTER ADDRESS                  MOS01140
1018  1011      C300ADR  DC    X'1011'           CAROUSEL 300/PASLA ADDRESSES          MOS01150
101A  COCO      MICROBUS DC    X'COCO'           MICROBUS ADDRESS                      MOS01160
                *                                                                      MOS01170
                * IO =   0101  FOR CRT ON PASLA                                        MOS01180
                *        0202  FOR TELETYPE, CAROUSEL 15/30                            MOS01190
                *        XX03  FOR LINE PRINTER                                        MOS01200
                *        0404  FOR CAROUSEL 300                                        MOS01210
                *        0505  FOR MICROBUS                                            MOS01220
                *                                                                      MOS01230
                *-----------------------------                                         MOS01240
                *                                                                      MOS01250
101C  48E0 1004 START2   LH    R14,PSW2          *                                ***  MOS01260
1020  C8F0 102C          LHI   R15,START         *                                ***  MOS01270
1024  D0E0 0034          STM   R14,X'34'         STORE II INT NEW PSW & NEW LOC        MOS01280
1028  0000               DCX   0                 TAKE AN ILLEGAL INSTRUCTION INT       MOS01290
102A  2200               BS    *                 HALT IF II IS NOT TAKEN          ***  MOS01300
                *                                                                      MOS01310
                *                                                                      MOS01320
102C  D310 1010 START    LB    R1,IO             GET I/O IDENTIFIERS                   MOS01330
1030  D320 1011          LB    R2,IO+1                                                 MOS01340
1034  2436               LIS   R3,6              IDENTIFIER CAN BE 1,2,3,4,5           MOS01350
1036  0513               CLAR  R1,R3                                                   MOS01360
1038  2182               BLS   IO.OK1            BRANCH IF KB IDENTIFIER OK            MOS01370
103A  2412               LIS   R1,2              OTHERWISE FORCE IT TO BE TTY          MOS01380
103C  0523      IO.OK1   CLAR  R2,R3                                                   MOS01390
103E  2182               BLS   IO.OK2            SAME TEST FOR LIST DEVICE             MOS01400
1040  2422               LIS   R2,2                                                    MOS01410
1042  D210 1010 IO.OK2   STB   R1,IO             REESTABLISH VALUES                    MOS01420
1046  D220 1011          STB   R2,IO+1                                                 MOS01430
104A  D362 17F6          LB    R6,CONRQ2S(R2)                                          MOS01440
104E  4060 100E          STH   R6,PASFLG2        SET PASLA FLAG (LIST DEVICE)          MOS01450
1052  0866               LDAR  R6,R6                                                   MOS01460
1054  2336               BZS   IO.OK3            SKIP IF NOT PASLA                     MOS01470
1056  9121               SLHLS R2,1                                                    MOS01480
1058  D302 1011          LB    R0,IO+1(R2)                                             MOS01490
```

EXEC - ETPE R03-06 (16-BIT STRIPPED & MODIFIED)

```
105C  DE02 17EA          150           OC    R0,CON2ND(R2)       ISSUE 2ND COMMAND (LIST DEVICE)  ***  MOS01500
                         151  *                                                                        MOS01510
1060  41F0 1706          152  IO.OK3   BAL   LINK,SETKB          ESTABLISH KEYBOARD DEVICE             MOS01520
1064  9310               153           LBR   R1,R0              (R1) = 1,2,4,5                        MOS01530
1066  9111               154           SLHLS R1,1                (R1) = 2,4,6,A                        MOS01540
1068  4831 1010          155           LH    R3,IO(R1)                                                 MOS01550
106C  4030 17DC          156           STH   R3,CONADR           SET UP CONSOLE DEVICE ADDRESS         MOS01560
1070  4821 17DE          157           LH    R2,CONRD(R1)                                              MOS01570
1074  4020 17DE          158           STH   R2,CONRD            SET UP R/W COMMANDS                   MOS01580
1078  4821 17EA          159           LH    R2,CON2ND(R1)                                             MOS01590
107C  4020 17EA          160           STH   R2,CON2ND           2ND CMD; ENABLE READ CMD              MOS01600
1080  9011               161           SRHLS R1,1                                                      MOS01610
1082  D341 17F6          162           LB    R4,CONRQ2S(R1)                                            MOS01620
1086  D240 17F6          163           STB   R4,CONRQ2S          CONSOLE REQUEST TO SEND               MOS01630
108A  4040 100C          164           STH   R4,PASFLG           SET PASLA FLAG (CONSOLE)              MOS01640
108E  9333               165           LBR   R3,R3               MASK CONSOLE DEVICE TO 8 ITS    ****  MOS01650
1090  0844               166           LDAR  R4,R4                                                     MOS01660
1092  2333               167           BZS   IO.OK4              SKIP 2ND OC IF NOT PASLA        ***   MOS01670
1094  9422               168           EXBR  R2,R2                                                     MOS01680
1096  9E32               169           OCR   R3,R2               ISSUE 2ND COMMAND (CONSOLE)           MOS01690
1098  DE30 17DE          170  IO.OK4   OC    R3,CONRD            PUT CONSOLE IN READ MODE              MOS01700
109C  9B3F               171           RDR   R3,R15              READ A DUMMY CHARACTER (SET BUSY)     MOS01710
                         172  *                                                                        MOS01720
109E  41F0 1714          173           BAL   LINK,LCORE          SET UP LOW CORE                       MOS01730
10A2  2400               174           LIS   R0,0                                                      MOS01740
10A4  4000 1806          175           STH   R0,WASDU            RESET 'DEVICE UNAVAILABLE' FLAGS      MOS01750
10A8  4000 1808          176           STH   R0,WASDU1                                                 MOS01760
10AC  41F0 154E          177           BAL   LINK,CRLF           DO CR & LF                            MOS01770
10B0  C850 18EA          178           LHI   R5,TITLE                                                  MOS01780
10B4  41F0 14C6          179           BAL   R15,PRINT           PRINT TEST PROGRAM TITLE              MOS01790
                         180  *----------------------------                                            MOS01800
                         181  *  KEYBOARD INPUT ROUTINE                                                MOS01810
                         182  *                                                                        MOS01820
10B8  41F0 17C4          183  OPTIN    BAL   LINK,MMRESET        RESTORE ETPE MM POINTER         ***   MOS01830
10BC  41F0 154E          184           BAL   LINK,CRLF           CR,LF TO LIST DEVICE                  MOS01840
10C0  41F0 17CE          185  OPTIN1   BAL   LINK,EPSWR2         NO INT. REG SET 15              ***   MOS01850
10C4  41F0 1706          186           BAL   LINK,SETKB          ESTABLISH CONSOLE                     MOS01860
10C8  D340 1882          187           LB    R4,AMSG             OUTPUT AN * TO INDICATE               MOS01870
10CC  41F0 155C          188           BAL   LINK,OUTCHR         COMMAND MODE ESTABLISHED              MOS01880
10D0  2541               189           LCS   R4,1                X'FF'                                 MOS01890
10D2  41F0 155C          190           BAL   LINK,OUTCHR                                               MOS01900
10D6  C8C0 1634          191           LHI   R12,QUESTN          SET UP R12 FOR ERR ROUTINE            MOS01910
10DA  C800 2020          192           LHI   R0,X'2020'          BLANK OUT COMMAND BUFFER              MOS01920
10DE  4000 1F78          193           STH   R0,OPTBUF           WHICH WILL CONTAIN OPTION             MOS01930
10E2  4000 1F7A          194           STH   R0,OPTBUF+2         NAME                                  MOS01940
10E6  4000 1F7C          195           STH   R0,OPTBUF+4                                               MOS01950
10EA  2410               196           LIS   R1,0                CLEAR OPTBUF INDEX                    MOS01960
10EC  41F0 15F4          197  RDCHR    BAL   R15,GETCHR          GET A CHAR IN R4                      MOS01970
10F0  C540 0060          198           CLHI  R4,X'60'            UPPER CASE ALPHA ?                    MOS01980
10F4  2183               199           BLS   RDCHAR0             BRANCH IF NO.                         MOS01990
10F6  CB40 0020          200           SHI   R4,X'20'            CONVERT TO LOWER CASE                 MOS02000
10FA  C540 0023          201  RDCHAR0  CLHI  R4,X'23'            IS IT HASH MARK ?                     MOS02010
10FE  4330 10B8          202           BE    OPTIN               YES, BRANCH                           MOS02020
```

EXEC - ETPE R03-06 (16-BIT STRIPPED & MODIFIED)

```
1102  C540 005F          203           CLHI  R4,X'5F'          LEFT ARROW, UNDERLINE OR DELETE ?      MOS02030
1106  2334               204           BES   RDCHAR1           YES, BRANCH                            MOS02040
1108  C540 0008          205           CLHI  R4,X'08'          BACK SPACE ?                           MOS02050
110C  2139               206           BNES  RDCHR1            NO, BRANCH                             MOS02060
110E  2711               207 RDCHAR1   SIS   R1,1              YES, DECREMENT INDEX                   MOS02070
1110  021C               208           BMR   R12               ON BUFFER UNDERFLOW; PRINT '?'         MOS02080
1112  C800 0020          209           LHI   R0,X'20'                                                 MOS02090
1116  D201 1F78          210           STB   R0,OPTBUF(R1)     BLANK OUT LAST CHARACTER               MOS02100
111A  4300 10EC          211           B     RDCHR                                                    MOS02110
111E  C540 000D          212 RDCHR1    CLHI  R4,X'0D'          IS IT CR ?                             MOS02120
1122  233C               213           BES   LOOKUP            YES, TRY MATCH                         MOS02130
1124  C540 0020          214           CLHI  R4,X'20'          IS IT A BLANK?                         MOS02140
1128  2339               215           BES   LOOKUP            YES, TRY MATCH                         MOS02150
112A  C510 0006          216           CLHI  R1,6              7 CHARACTERS INPUT ?                   MOS02160
112E  038C               217           BNLR  R12               IF YES, ERROR                          MOS02170
1130  D241 1F78          218           STB   R4,OPTBUF(R1)     STORE CURRENT BYTE                     MOS02180
1134  2611               219           AIS   R1,1              BUMP BUFFER INDEX                      MOS02190
1136  4300 10EC          220           B     RDCHR             READ NEXT CHARACTER                    MOS02200
                         221 *---------------------------------                                       MOS02210
                         222 *  OPTION MATCH ROUTINE                                                  MOS02220
                         223 *                                                                        MOS02230
113A  C810 1884          224 LOOKUP    LHI   R1,OPT            LOAD ADDRESS OF OPTION TABLE           MOS02240
113E  2430               225 LOOK1     LIS   R3,0              CLEAR BUFFER INDEX                     MOS02250
1140  0861               226           LDAR  R6,R1             SET OPTION WORD INDEX                  MOS02260
1142  4856 0000          227 LOOK2     LH    R5,0(R6)          GET OPTION NAME (HW)                   MOS02270
1146  021C               228           BMR   R12               IF MINUS, THEN NO MATCH = ERROR        MOS02280
1148  4553 1F78          229           CLH   R5,OPTBUF(R3)     COMPARE TO OPTBUF HW                   MOS02290
114C  2333               230           BES   LOOK3             EQUAL, BRANCH                          MOS02300
114E  261C               231           AIS   R1,12             NOT EQUAL, INCREMENT INDEX             MOS02310
1150  2209               232           BS    LOOK1             BRANCH                                 MOS02320
1152  2632               233 LOOK3     AIS   R3,2              TRY NEXT HW                            MOS02330
1154  2662               234           AIS   R6,2                                                     MOS02340
1156  C530 0006          235           CLHI  R3,6              3 MATCHING HW FOUND ?                  MOS02350
115A  208C               236           BLS   LOOK2             NO, BRANCH (CONTINUE LOOKING)          MOS02360
                         237 *                                                                        MOS02370
115C  C510 18D8          238           CLHI  R1,RUN            YES, RUN COMMAND ?                     MOS02380
1160  4330 11C4          239           BE    RUNIT             YES, BRANCH                            MOS02390
                         240 *---------------------------                                             MOS02400
1164  C510 1884          241 LOOK4     CLHI  R1,TEST           NO, 'TEST' OPTION ?                    MOS02410
1168  4330 1190          242           BE    TESTOP            YES, BRANCH                            MOS02420
                         243 *                                                                        MOS02430
                         244 *  TO PROCESS COMMANDS OTHER THAN 'TEST', 'OPTION'.                  ***  MOS02440
                         245 *                                                                        MOS02450
116C  274D               246           SIS   R4,13             NO, OPTION FOLLOWED BY CR ?            MOS02460
116E  033C               247           BZR   R12               YES, ERROR                             MOS02470
1170  41E0 145C          248           BAL   R14,OPTVAL        GET OPTION VALUE IN R6                 MOS02480
1174  274D               249           SIS   R4,13             TERMINATED BY CR ?                     MOS02490
1176  023C               250           BNZR  R12               IF NO, BRANCH                          MOS02500
1178  48E1 0008          251           LH    R14,8(R1)         GET OPTION CHECK ROUTINE ADDRESS       MOS02510
117C  2332               252           BZS   LOOK5             IF NO ROUTINE ADDRESS, BRANCH          MOS02520
117E  01FE               253           BALR  R15,R14           LINK OPTION CHECK ROUTINE              MOS02530
                         254 *                                 RETURN HERE                       ***  MOS02540
1180  4061 0006          255 LOOK5     STH   R6,6(R1)          STORE OPTION VALUE                     MOS02550
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1184  4300 10B8          256          B     OPTIN              TO ACCEPT NEXT COMMAND                MOS02560
                         257  *                                                                      MOS02570
                         258  *---------------------------------                                    MOS02580
                         259  *  TO CHECK THAT INPUT IS NOT > MAX VALUE (OPTION+10)                  MOS02590
                         260  *                                                                      MOS02600
1188  4561 000A          261  LEVELIN  CLH   R6,10(R1)          IS R6 > MAX VALUE ?                   MOS02610
118C  022C               262           BPR   R12                YES, ERROR RETURN                     MOS02620
118E  030F               263           BR    R15                NO, RETURN TO LOOK5                   MOS02630
                         264  *                                                                      MOS02640
                         265  *---------------------------------                                    MOS02650
                         266  *  TEST OPTION PROCESS ROUTINE                                         MOS02660
                         267  *                                                                      MOS02670
1190  274D               268  TESTOP   SIS   R4,13             'TEST' FOLLOWED BY (CR) ?             MOS02680
1192  2137               269           BNZS  TSTOP1                                                  MOS02690
1194  C800 E000          270           LHI   R0,DEFTESTS        YES, SET TEST OPTION TO          ***  MOS02700
1198  4000 188A          271           STH   R0,TEST+6          FIRST TEST WORD                       MOS02710
119C  4300 10B8          272           B     OPTIN              TO ACCEPT NEXT COMMAND                MOS02720
                         273  *                                                                      MOS02730
11A0  2454               274  TSTOP1   LIS   R5,MAXTST          *                                ***  MOS02740
11A2  2470               275           LIS   R7,0               RESET TEST BIT ACCUMULATORS           MOS02750
11A4  2480               276           LIS   R8,0                                                     MOS02760
11A6  41E0 145C          277  TSTOP2   BAL   R14,OPTVAL         GET OPTION VALUE IN R6                MOS02770
11AA  0556               278           CLAR  R5,R6                                                    MOS02780
11AC  028C               279           BLR   R12                ERROR: INVALID TEST NUMBER            MOS02790
11AE  C830 8000          280           LHI   R3,X'8000'         *  (NORMALLY = BAL  R14,UNARY)   ***  MOS02800
11B2  CC36 0000          281           SRHL  R3,0(R6)           *  (TO GET UNARY OPERAND IN R3)  ***  MOS02810
11B6  0673               282           OAR   R7,R3              SET CURRENT BIT                       MOS02820
11B8  274D               283  TSTOP4   SIS   R4,13             TERMINATED BY CR ?                ***  MOS02830
11BA  203A               284           BNZS  TSTOP2             *                                 ***  MOS02840
11BC  4070 188A          285           STH   R7,TEST+6          STORE VALID SELECTED TESTS            MOS02850
11C0  4300 10B8          286           B     OPTIN              TO ACCEPT NEXT COMMAND                MOS02860
                         287  *-----------------------------                                        MOS02870
                         288  *                                                                      MOS02880
11C4  24F0               289  RUNIT    LIS   R15,0                                                  MOS02890
11C6  40F0 1806          290           STH   R15,WASDU          RESET DU FLAGS                        MOS02900
11CA  40F0 1808          291           STH   R15,WASDU1                                               MOS02910
11CE  41F0 154E          292           BAL   LINK,CRLF          DO CR & LF                            MOS02920
                         293  *                                                                      MOS02930
11D2  240F               294           LIS   R0,15              TO FIND HIGHEST SELECTED TEST  NO.    MOS02940
11D4  4810 188A          295           LH    R1,TEST+6          CHECK FIRST TEST HW                   MOS02950
11D8  9011               296  KEEP2    SRLS  R1,1                                                     MOS02960
11DA  2184               297           BCS   FOUND2             R0 = F-0 = TEST NUMBER            ***  MOS02970
11DC  2701               298           SIS   R0,1                                                     MOS02980
11DE  2213               299           BNMS  KEEP2              LOOP TILL TEST FOUND                  MOS02990
11E0  030C               300           BR    R12                TEST NOT SELECTED                     MOS03000
                         301  *                                                                      MOS03010
11E2  4000 1804          302  FOUND2   STH   R0,SELTST          HIGHEST SELECTED TEST NUMBER      ***  MOS03020
11E6  4800 1010          303           LH    R0,IO                                                    MOS03030
11EA  4000 1008          304           STH   R0,IOSAVE          RESTORE USER'S I/O CHOICE             MOS03040
11EE  41F0 154E          305           BAL   LINK,CRLF                                                MOS03050
                         306  *                                                                      MOS03060
                         307  *          RESET TEST PARAMETERS                                       MOS03070
                         308  *                                                                      MOS03080
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11F2  48E0 188A          309  INIT     LH    R14,TEST+6                                          MOS03090
11F6  C6E0 8000          310           OHI   R14,X'8000'       FORCE TEST 0                      MOS03100
11FA  40E0 188A          311           STH   R14,TEST+6        WHEN "RUN" IS EDTERED             MOS03110
11FE  2411               312           LIS   R1,1                                                MOS03120
1200  DE10 17FD          313           OC    R1,NORM           PUT DISPLAY IN NORMAL MODE        MOS03130
1204  08EF               314           LDAR  R14,R15           *                                 MOS03140
1206  2531               315           LCS   R3,1              WITH PATTERN OF X'FFFF'           MOS03150
1208  41D0 12AC          316           BAL   R13,INIT1         TEST LOW CORE 0-3F                MOS03160
120C  C830 AAAA          317           LHI   R3,X'AAAA'        (WITH PATTERN OF X'AAAA')         MOS03170
1210  41D0 12AC          318           BAL   R13,INIT1         *                                 MOS03180
1214  C830 5555          319           LHI   R3,X'5555'        (WITH PATTERN OF X'5555')         MOS03190
1218  41D0 12AC          320           BAL   R13,INIT1         *                                 MOS03200
121C  2430               321           LIS   R3,0              (WITH PATTERN OF X'0000')         MOS03210
121E  41D0 12AC          322           BAL   R13,INIT1         *                                 MOS03220
1222  41F0 1714          323           BAL   LINK,LCORE        RESTORE LOW CORE                  MOS03230
                         324  *                                                                   MOS03240
                         325  *                                                                   MOS03250
1226  2400               326  INITRET  LIS   R0,0              RETURN HERE FROM INIT             MOS03260
1228  4000 1800          327           STH   R0,ISITERR        RESET ERROR FLAG                  MOS03270
122C  4000 180A          328           STH   R0,TOTAL          RESET TOTAL                       MOS03280
1230  4000 180C          329           STH   R0,TOTERR         RESET TOTERR                      MOS03290
1234  C810 3030          330           LHI   R1,C'00'          *                           ***   MOS03300
1238  4010 1834          331           STH   R1,MTESTNO        RESET THESE FLAGS TO C'00'        MOS03310
123C  4010 183E          332           STH   R1,ETESTNO                                          MOS03320
1240  4010 1840          333           STH   R1,ERRNO                                            MOS03330
1244  41F0 1714          334           BAL   LINK,LCORE        SET UP LOW CORE                   MOS03340
                         335  *                                                                   MOS03350
                         336  *  START SELECTION FROM TEST 0                                     MOS03360
                         337  *                                                                   MOS03370
1248  2400               338  KEEP3    LIS   R0,0                                                MOS03380
124A  4000 180E          339           STH   R0,BTESTNO        RESET BINARY TEST NUMBER          MOS03390
124E  4000 1812          340           STH   R0,NEXTST         RESET NEXT TEST NUMBER            MOS03400
                         341  *                                                                   MOS03410
                         342  *  TO FIND THE NEXT SELECTED TEST.                                 MOS03420
                         343  *                                                                   MOS03430
1252  4820 1812          344  KEEP4    LH    R2,NEXTST         GET NEXT TEST NUMBER              MOS03440
1256  C800 8000          345  KEEP41   LHI   R0,X'8000'        R0 = X'8000'                ***   MOS03450
125A  CC02 0000          346           SRHL  R0,0(R2)          R0 = NEXT TEST BIT                MOS03460
125E  4400 188A          347  KEEP42   NH    R0,TEST+6         LOOK AT TEST HW 1           ***   MOS03470
1262  2133               348           BNZS  KEEP5                                               MOS03480
1264  2621               349  KEEP43   AIS   R2,1              *                           ***   MOS03490
1266  2208               350           BS    KEEP41            LOOP FOR NEXT TEST NUMBER   ***   MOS03500
1268  4020 180E          351  KEEP5    STH   R2,BTESTNO        CURRENT TEST NUMBER         ***   MOS03510
126C  0812               352           LDAR  R1,R2             R1 = TEST NUMBER IN BINARY  ***   MOS03520
126E  2621               353           AIS   R2,1                                                MOS03530
1270  4020 1812          354           STH   R2,NEXTST                                           MOS03540
1274  2402               355           LIS   R0,2              SET DIGITS TO PRINT = 2           MOS03550
1276  41F0 1498          356           BAL   LINK,HEXASC       STORE TEST NO. IN ASCII @ MTESTNO***  MOS03560
127A  1834               357           DC    Z(MTESTNO)        *                           ***   MOS03570
127C  4820 1834          358           LH    R2,MTESTNO                                          MOS03580
1280  4020 183E          359           STH   R2,ETESTNO        STORE TEST NO. IN ASCII @ ETESTNO***  MOS03590
1284  41F0 164E          360           BAL   LINK,TSTBRK       TEST BREAK                        MOS03600
1288  C850 182E          361           LHI   R5,TSTMSG                                           MOS03610
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128C  41F0 14C6          362          BAL   LINK,PRINT          PRINT 'TEST NN'                          MOS03620
1290  2400               363          LIS   R0,0                                                       MOS03630
1292  4000 1802          364          STH   R0,NOERR            RESET ERROR FLAG                       MOS03640
1296  4000 1810          365          STH   R0,COUNT            RESET COUNT                            MOS03650
129A  4810 1002          366  KEEP6   LH    R1,PSW              ENABLE INTERRUPTS (30F0)         ***   MOS03660
129E  9501               367          EPSR  R0,R1                                                      MOS03670
12A0  4820 180E          368          LH    R2,BTESTNO          R2 = TEST NUUMBER                      MOS03680
12A4  9121               369          SLHLS R2,LADC                                                    MOS03690
12A6  4812 191A          370          LH    R1,TESTS(R2)        *                                ***   MOS03700
12AA  0301               371          BR    R1                  GO TO TEST MODULE                      MOS03710
                         372  ************************************                                        MOS03720
                         373  *                                                                          MOS03730
12AC  2460               374  INIT1   LIS   R6,0                INITIALIZE BXLE REGISTERS        ***   MOS03740
12AE  2472               375          LIS   R7,2                R6 - R8                          ***   MOS03750
12B0  C880 003E          376          LHI   R8,X'3E'            *                                ***   MOS03760
12B4  4036 0000          377  INIT2   STH   R3,0(R6)            STORE SELECTED DATA PATTERN      ***   MOS03770
12B8  C160 12B4          378          BXLE  R6,INIT2            @ 0-3E                           ***   MOS03780
12BC  2460               379          LIS   R6,0                RESTORE STARTING REGISTER        ***   MOS03790
12BE  9426               380  INIT3   EXBR  R2,R6              EXCHANGE ADDRESS BYTES           ***   MOS03800
12C0  9812               381          WHR   R1,R2               DISPLAY ADDRESS UNDER TEST       ***   MOS03810
12C2  4150 1CA2          382          BAL   R5,T7SUB1          CHECK THE DATA PATTERN           ***   MOS03820
12C6  C160 12BE          383  INIT4   BXLE  R6,INIT3           CONTINUE UNTIL DONE              ***   MOS03830
12CA  030D               384          BR    R13                 RETURN TO INIT ROUTINE           ***   MOS03840
                         385  *                                                                    ***   MOS03850
                         386  ************************************                                ***   MOS03860
                         387  *                                                                          MOS03870
                         388  *  TEST MODULE END ROUTINE                                                 MOS03880
                         389  *                                                                          MOS03890
12CC  41F0 17C4          390  TSTEND  BAL   LINK,MMRESET        RESTORE ETPE MM POINTER          ***   MOS03900
12D0  41F0 17CE          391          BAL   LINK,EPSWR2         DISABLE INT @ PROCESSOR LEVEL    ***   MOS03910
12D4  4800 1810          392          LH    R0,COUNT                                                   MOS03920
12D8  2601               393          AIS   R0,1                INCREMENT COUNT                        MOS03930
12DA  4000 1810          394          STH   R0,COUNT                                                   MOS03940
12DE  41F0 164E          395          BAL   LINK,TSTBRK         IF BREAK GO TO OPTIN                   MOS03950
12E2  4500 1896          396          CLH   R0,LOOP+6           IF COUNT > LOOP,                       MOS03960
12E6  2383               397          BNLS  KEEP7               GO TO NEXT TEST MODULE                 MOS03970
12E8  4300 129A          398          B     KEEP6               OTHERWISE, REPEAT SAME TEST            MOS03980
12EC  4800 1802          399  KEEP7   LH    R0,NOERR            LOOK @ ERROR FLAG                      MOS03990
12F0  2135               400          BNZS  KEEP71                                                     MOS04000
12F2  C850 1854          401          LHI   R5,NOERMSG                                                 MOS04010
12F6  41F0 14C6          402          BAL   LINK,PRINT          PRINT "NO ERROR"                       MOS04020
12FA  4810 180E          403  KEEP71  LH    R1,BTESTNO          GET TEST NUMBER                  ***   MOS04030
12FE  4510 1804          404          CLH   R1,SELTST           IS THE LAST SELECTED TEST DONE ?       MOS04040
1302  4280 1252          405          BL    KEEP4               NO, GO SELECT NEXT TEST                MOS04050
                         406  *                                                                          MOS04060
                         407  *  ALL THE SELECTED TESTS ARE NOW RUN                                      MOS04070
                         408  *                                                                          MOS04080
1306  41F0 17C4          409  ABORT   BAL   LINK,MMRESET        COME HERE TO ABORT TEST SEQUENCE.***   MOS04090
                         410  *                                 RESTORE ETPE MM POINTER          ***   MOS04100
130A  41F0 17CE          411          BAL   LINK,EPSWR2         PSW = X'30F0'                    ***   MOS04110
130E  41F0 13EE          412          BAL   LINK,DISPLAY        DISPLAY "TOTAL" & "TOTERR"             MOS04120
1312  180A               413          DC    Z(TOTAL),Z(TOTERR)  (IF DISPLAY PANEL EQUIPPED)            MOS04130
1314  180C
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1316  41F0 16D0          414           BAL   LINK,TSTDU          RETURN WITH R1 = DU BIT                MOS04140
131A  4230 1376          415           BNZ   KEEP9              IF DU, DISPLAY TOTAL                   MOS04150
131E  4810 1808          416           LH    R1,WASDU1          WAS IT EVER ?                          MOS04160
1322  4230 13B0          417           BNZ   KEEP92             YES, PRINT TOTAL, TOTERR               MOS04170
1326  41F0 164E          418           BAL   LINK,TSTBRK                                              MOS04180
132A  4810 18A2          419           LH    R1,CONTIN+6        IF CONTIN = 0,                         MOS04190
132E  233C               420           BZS   ABORT3             BRANCH TO ABORT TESTING          ***   MOS04200
1330  6110 180A          421           AHM   R1,TOTAL           INCREMENT TOTAL COUNTER          ***   MOS04210
1334  4230 1248          422           BNZ   KEEP3              IF TOTAL NOT 0, GO TO TEST 0     ***   MOS04220
1338  2511               423           LCS   R1,1               OTHERWISE                        ***   MOS04230
133A  6110 180A          424           AHM   R1,TOTAL           SET COUNT TO MAX                 ***   MOS04240
133E  4300 13AA          425           B     HALT9              HALT TO PRINT TOTALS             ***   MOS04250
                         426  *                                                                        MOS04260
1342  41F0 17C4          427  ABORT1   BAL   LINK,MMRESET       RESTORE ETPE MM POINTER          ***   MOS04270
                         428  *                                                                        MOS04280
1346  41F0 17CE          429  ABORT3   BAL   LINK,EPSWR2        DISABLE INT @ PROCESSOR LEVEL    ***   MOS04290
134A  41F0 1706          430           BAL   LINK,SETKB         KB DEVICE = LIST DEVICE                MOS04300
134E  C850 1872          431           LHI   R5,EOTMSG                                               MOS04310
1352  4050 1800          432           STH   R5,ISITERR         FORCE PRINTTING                  ***   MOS04320
1356  41F0 14C6          433           BAL   LINK,PRINT         'END OF TEST'                          MOS04330
135A  24F0               434           LIS   R15,0                                                    MOS04340
135C  40F0 1800          435           STH   R15,ISITERR        RESET FORCED PRINTING FLAG       ***   MOS04350
                         436  *                                                                        MOS04360
1360  48F0 18AE          437           LH    LINK,NOMSG+6       IF "NOMSG" = 1,                  ***   MOS04370
1364  4230 13B0          438           BNZ   KEEP92             BRANCH TO PRINT "TOTAL" & "TOTERR"     MOS04380
1368  48F0 18BA          439           LH    LINK,SCOPE+6       *                                ***   MOS04390
136C  27F4               440           SIS   LINK,4             IF "SCOPE" = 4,                        MOS04400
136E  4330 13B0          441           BZ    KEEP92             BRANCH TO PRINT "TOTAL" & "TOTERR"     MOS04410
1372  4300 10B8          442           B     OPTIN              OTHERWISE RETURN TO OPTIN              MOS04420
                         443  *---------------------------------                                       MOS04430
                         444  *  ROUTINE INCREMENTS,DISPLAYS & CHECKS 'TOTAL'                          MOS04440
                         445  *                                                                        MOS04450
1376  4010 1806          446  KEEP9    STH   R1,WASDU           SET DU FLAGS                           MOS04460
137A  4010 1808          447           STH   R1,WASDU1                                                MOS04470
                         448  *                                                                        MOS04480
137E  4810 180A          449  ABORT2   LH    R1,TOTAL           INCREMENT TOTAL                        MOS04490
1382  2611               450           AIS   R1,1                                                     MOS04500
1384  4010 180A          451           STH   R1,TOTAL                                                 MOS04510
1388  41F0 13EE          452  KEEP91   BAL   LINK,DISPLAY       DISPLLAY "TOTAL" & "TOTERR"            MOS04520
138C  180A               453           DC    Z(TOTAL),Z(TOTERR) (IF DISPLAY PANEL EQUIPPED)            MOS04530
138E  180C
1390  4810 180A          454           LH    R1,TOTAL                                                 MOS04540
1394  C510 7FFF          455           CLHI  R1,X'7FFF'         TOTAL < MAX RETAINABLE ?               MOS04550
1398  2389               456           BNLS  HALT9              NO, BRANCH                             MOS04560
139A  4800 180E          457           LH    R0,BTESTNO         R0 = CURRENT TEST NUMBER         ***   MOS04570
139E  4500 1804          458           CLH   R0,SELTST          IS IT LAST TEST ?                      MOS04580
13A2  4280 1252          459           BL    KEEP4              NO, GO TO NEXT TEST                    MOS04590
13A6  4300 1248          460           B     KEEP3              GO TO TEST 0                           MOS04600
                         461  *                                                                        MOS04610
13AA  C810 80F0          462  HALT9    LHI   R1,X'80F0'         (R1) = X'80F0'                   ***   MOS04620
13AE  9521               463           EPSR  R2,R1              HALT PROCESSOR                         MOS04630
                         464  *                                                                        MOS04640
                         465  *  WHEN EXE/RUN IS PRESSED, PRINT TOTAL & TOTERR                         MOS04650
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                          466  *                                                                          MOS04660
13B0   41F0 16D0          467  KEEP92    BAL   LINK,TSTDU          SEE IF LIST DEV IS ON                 MOS04670
13B4   2035               468            BNZS  HALT9               NO, HALT                              MOS04680
13B6   2400               469  KEEP10    LIS   R0,0                                                     MOS04690
13B8   4000 1806          470            STH   R0,WASDU            RESET PRESENT DU FLAG                 MOS04700
13BC   41F0 154E          471            BAL   LINK,CRLF           DO CR & LF                            MOS04710
13C0   C850 1844          472            LHI   R5,TOTMSG           LOAD TOTAL ERROR MESSAGE LOC.         MOS04720
13C4   4050 1800          473            STH   R5,ISITERR          FORCE PRINTING                        MOS04730
13C8   41F0 14C6          474            BAL   LINK,PRINT          PRINT 'TOTAL   TOTERR'                MOS04740
13CC   2404               475            LIS   R0,4                PRINT 4 HEX DIGITS EACH               MOS04750
13CE   4810 180A          476            LH    R1,TOTAL            GET "TOTAL"                           MOS04760
13D2   41F0 1498          477            BAL   LINK,HEXASC         PUT 'TOTAL' IN MSG              ***   MOS04770
13D6   1F50               478            DC    Z(LOMSG)            *                               ***   MOS04780
13D8   4810 180C          479            LH    R1,TOTERR           GET "TOTERR"                          MOS04790
13DC   41F0 1498          480            BAL   LINK,HEXASC         PUT 'TOTERR' IN MSG             ***   MOS04800
13E0   1F55               481            DC    Z(HIMSG)            *                               ***   MOS04810
13E2   C850 1F50          482            LHI   R5,LOMSG                                                  MOS04820
13E6   41F0 14C6          483            BAL   LINK,PRINT          PRINT THE VALUES IN HEX         ***   MOS04830
13EA   4300 10B8          484            B     OPTIN               GO TO BEGINNING                       MOS04840
                          485  ************************************                                        MOS04850
                          486  *   DISPLAY PANEL OUTPUT ROUTINE   (TIMEOUT IF NOT EQUIPPED)               MOS04860
                          487  *                                                                          MOS04870
13EE   2401               488  DISPLAY   LIS   R0,1                GET DISPLAY PANEL ADDRESS             MOS04880
13F0   DE00 17FE          489            OC    R0,INCR             PUT PANEL IN INCREMENTAL MODE         MOS04890
13F4   481F 0002          490            LH    R1,2(LINK)          GET 2ND PARAMETER                     MOS04900
13F8   4811 0000          491            LH    R1,0(R1)            GET DATA                              MOS04910
13FC   9411               492            EXBR  R1,R1               EXCHANGE DATA BYTES                   MOS04920
13FE   9801               493            WHR   R0,R1               WRITE DATA TO DISPLAY PANEL           MOS04930
1400   481F 0000          494            LH    R1,0(LINK)          GET 1ST PARAMETER                     MOS04940
1404   4811 0000          495            LH    R1,0(R1)            GET DATA                              MOS04950
1408   9411               496            EXBR  R1,R1               EXCHANGE DATA BYTES                   MOS04960
140A   9801               497            WHR   R0,R1               WRITE DATA TO DISPLAY PANEL           MOS04970
140C   DE00 17FD          498            OC    R0,NORM             PUT PANEL IN NORMAL MODE              MOS04980
1410   430F 0004          499            B     4(LINK)             RETURN                                MOS04990
                          500  *                                                                          MOS05000
                          501  ************************************                                        MOS05010
                          502  *  ERROR ROUTINES                   (OVERRIDE NOMSG OPTION)                MOS05020
                          503  *                                                                          MOS05030
1414   D000 1F98          504  ERR       STM   R0,ERRSAVE          STORE REGISTERS                       MOS05040
1418   41F0 17CE          505  ERRCOM    BAL   LINK,EPSWR2         DISABLE INT. @ PROCESSOR LEVEL  ***   MOS05050
141C   41F0 16D0          506            BAL   LINK,TSTDU           GET LIST DEVICE DU BIT IN R1    ***   MOS05060
1420   4230 1446          507            BNZ   ERRCOM1             BRANCH IF OFF-LINE              ***   MOS05070
1424   4020 1800          508            STH   R2,ISITERR          SET ERROR FLAG                  ***   MOS05080
1428   4020 1802          509            STH   R2,NOERR            *                               ***   MOS05090
142C   C850 1838          510  ERR1      LHI   R5,ERRMSG           *                               ***   MOS05100
1430   41F0 14C6          511            BAL   LINK,PRINT          PRINT 'ERROR TTNN'              ***   MOS05110
                          512  *                                   TT = TEST NO.; NN = ERROR NO.   ***   MOS05120
1434   2400               513  ERRCOM2   LIS   R0,0                                                     MOS05130
1436   4000 1800          514            STH   R0,ISITERR          RESET ERROR FLAG                      MOS05140
143A   4820 1002          515            LH    R2,PSW                                                    MOS05150
143E   9502               516            EPSR  R0,R2               PSW = X'30F0'                         MOS05160
1440   D100 1F98          517            LM    R0,ERRSAVE          RESTORE REGISTERS                     MOS05170
1444   030F               518            BR    LINK                RETURN TO TEST                        MOS05180
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                          519  *                                                                    MOS05190
                          520  *                                                                    MOS05200
1446   4810 180C          521  ERRCOM1  LH     R1,TOTERR          LIST DEVICE IS OFF                MOS05210
144A   2611               522           AIS    R1,1                                                 MOS05220
144C   4010 180C          523           STH    R1,TOTERR          INCREMENT TOTERR                  MOS05230
1450   C510 7FFF          524           CLHI   R1,X'7FFF'         TOTERR < MAX RETAINABLE ?         MOS05240
1454   4280 1388          525           BL     KEEP91             NO, ABORT CURRENT TEST & GOTO NEXT MOS05250
1458   4300 13AA          526           B      HALT9              YES, HALT PROCESSOR               MOS05260
                          527  ************************************                                 MOS05270
                          528  *  TO OBTAIN OPTION VALUE IN R6    (16 BITS, TARGT 16)               MOS05280
                          529  *                                                                    MOS05290
145C   2460               530  OPTVAL   LIS    R6,0               INITIALIZE ACCUMULATOR            MOS05300
145E   41F0 15F4          531           BAL    R15,GETCHR         GET A CHAR IN R4                  MOS05310
1462   24FF               532  OPTVAL0  LIS    R15,15                                               MOS05320
1464   D44F 181E          533  OPTVAL1  CLB    R4,HEXTAB(R15)     SCAN TABLE FOR A CHARACTER MATCH  MOS05330
1468   2334               534           BES    OPTVAL2            MATCH, BRANCH                     MOS05340
146A   27F1               535           SIS    R15,1              ELSE DECREMENT POINTER            MOS05350
146C   2214               536           BNMS   OPTVAL1            IF POINTER IN RANGE, BRANCH       MOS05360
146E   030C               537           BR     R12                ELSE ERROR; VALUE NOT IN TABLE.   MOS05370
1470   9164               538  OPTVAL2  SLLS   R6,4               SHIFT LEFT 4                      MOS05380
1472   066F               539           OAR    R6,R15             OR IN CURRENT DIGIT               MOS05390
1474   41F0 15F4          540  OPTVAL3  BAL    R15,GETCHR         GET NEXT CHAR                     MOS05400
1478   C540 005F          541           CLHI   R4,X'5F'           IS IT LEFT ARROW ?                MOS05410
147C   2334               542           BES    OPTVAL5            YES, BRANCH                       MOS05420
147E   C540 0008          543           CLHI   R4,X'08'           NO, IS IT BACK SPACE ?            MOS05430
1482   2133               544           BNES   OPTVAL4            NO, BRANCH                        MOS05440
1484   9064               545  OPTVAL5  SRLS   R6,4               YES, THROW AWAY LAST HEX ENTRY     MOS05450
1486   2209               546           BS     OPTVAL3            BRANCH TO GET NEXT CHARACTER      MOS05460
1488   C540 000D          547  OPTVAL4  CLHI   R4,13              IS IT CR ?                        MOS05470
148C   033E               548           BER    R14                YES, EXIT (RETURN)                MOS05480
148E   C540 002C          549           CLHI   R4,X'2C'           NO, IS IT A COMMA ?               MOS05490
1492   4230 1462          550           BNE    OPTVAL0            NO, LOOP TO PROCESS NEXT INPUT    MOS05500
1496   030E               551           BR     R14                YES, REETURN                      MOS05510
                          552  *-----------------------------------                          ***     MOS05520
                          553  *  TO CONVERT HEXADECIMAL DATA IN R1 TO ASCII CHAR & STORE @ 0(LINK)***  MOS05530
                          554  *                                                                    MOS05540
1498   D000 1FB8          555  HEXASC   STM    R0,RSAVE           STORE REGISTERS                   MOS05550
149C   482F 0000          556           LH     R2,0(LINK)         GET DESTINATION LOC           ***  MOS05560
14A0   0830               557           LDAR   R3,R0              R3 = NUMBER OF DIGITS OF CONVERSION MOS05570
14A2   9132               558           SLLS   R3,2                                                 MOS05580
14A4   2734               559           SIS    R3,4               R3 = 4(DIGITS)-4                  MOS05590
14A6   0841               560  HEXASC1  LDAR   R4,R1              R4 = HEX DATA                     MOS05600
14A8   CC43 0000          561           SRAL   R4,0(R3)                                             MOS05610
14AC   C440 000F          562           NHI    R4,15              R4 = SINGLE HEX DIGIT FOR CONVERSION MOS05620
14B0   D344 181E          563           LB     R4,HEXTAB(R4)      GET THE ASCII CHARACTER           MOS05630
14B4   D242 0000          564           STB    R4,0(R2)           STORE ASCII CHAR IN DESTINATION BUFF MOS05640
14B8   2621               565           AIS    R2,1               BUMP BUFFER LOCATION              MOS05650
14BA   2734               566           SIS    R3,4               DECREMENT DIGIT SHIFT VALUE       MOS05660
14BC   221B               567           BNMS   HEXASC1            LOOP TILL ALL DIGITS ARE CONVERTED MOS05670
14BE   D100 1FB8          568           LM     R0,RSAVE           RESTORE REGISTERS                 MOS05680
14C2   430F 0002          569           B      2(LINK)            RETURN                        ***  MOS05690
                          570  *-----------------------------                                      MOS05700
                          571  *  TO PRINT THE ASCII MESSAGE                                       MOS05710
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                          572  *                                                                    MOS05720
14C6   D000 1FB8          573  PRINT    STM   R0,RSAVE          STORE REGISTERS                    MOS05730
14CA   41F0 16D0          574           BAL   LINK,TSTDU         LIST DEVICE DU ?                   MOS05740
14CE   2337               575           BZS   P1                NO, BRANCH                         MOS05750
14D0   4010 1806          576           STH   R1,WASDU          YES, SET DU FLAGS                  MOS05760
14D4   4010 1808          577           STH   R1,WASDU1         *                            ***   MOS05770
14D8   4300 1544          578           B     PRINT5            EXIT                               MOS05780
14DC   4820 1806          579  P1       LH    R2,WASDU          WAS IT DU LAST PASS ?              MOS05790
14E0   4330 150E          580           BZ    P3                NO, BRANCH                         MOS05800
14E4   C810 0140          581           LHI   R1,X'140'         YES, LOAD DELAY CONSTANT           MOS05810
14E8   C800 1000          582  P4       LHI   R0,X'1000'        INTO COUNTERS 1 & 2                MOS05820
14EC   2701               583  P5       SIS   R0,1              DECREMENT COUNTER 1                MOS05830
14EE   2031               584           BNZS  P5                WAIT TILL EXHAUSTED                MOS05840
14F0   2711               585           SIS   R1,1              DECREMENT COUNTER 2                MOS05850
14F2   2035               586           BNZS  P4                LOOP TILL TIMEOUT                  MOS05860
                          587  *                                (20 SEC. FOR CRT WARM-UP)          MOS05870
14F4   2440               588           LIS   R4,0                                                 MOS05880
14F6   4040 1806          589           STH   R4,WASDU          RESET PRESENT DU FLAG              MOS05890
14FA   2541               590           LCS   R4,1              CHARACTER = X'FF'                  MOS05900
14FC   4040 1808          591           STH   R4,WASDU1         SET WASDU1 FLAG                    MOS05910
1500   2434               592           LIS   R3,4                                                 MOS05920
1502   41F0 155C          593  P2       BAL   LINK,OUTCHR       OUTPUT DELETE CHARACTER            MOS05930
1506   2731               594           SIS   R3,1                                                 MOS05940
1508   2023               595           BPS   P2                BRANCH 4 TIMES                     MOS05950
150A   4300 13B6          596           B     KEEP10            PRINT TOTAL, TOTERR                MOS05960
150E   4800 18AE          597  P3       LH    R0,NOMSG+6        IS 'NOMSG' SET ?                   MOS05970
1512   2335               598           BZS   PRINT2            NO, PRINT ALL MESSAGES             MOS05980
1514   4800 1800          599           LH    R0,ISITERR        IS FORCED PRINTING FLAG SET ?      MOS05990
1518   4330 1544          600           BZ    PRINT5            NO, NOT AN ERROR MSG. - EXIT       MOS06000
                          601  *                                                                    MOS06010
151C   D345 0000          602  PRINT2   LB    R4,0(R5)          GET A MESSAGE BYTE                 MOS06020
1520   41F0 155C          603           BAL   LINK,OUTCHR       OUTPUT IT                          MOS06030
1524   274D               604           SIS   R4,13             CR ?                               MOS06040
1526   2333               605           BZS   PRINT3            YES, MESSAGE OVER - BRANCH         MOS06050
1528   2651               606           AIS   R5,1                                                 MOS06060
152A   2207               607           BS    PRINT2            NO, LOOP FOR NEXT CHAR             MOS06070
152C   244A               608  PRINT3   LIS   R4,10             LF                                 MOS06080
152E   D310 1009          609           LB    R1,IOSAVE+1       GET LIST DEV IDENTIFIER            MOS06090
1532   2713               610           SIS   R1,3              LINE PRINTER ?                     MOS06100
1534   2335               611           BZS   PRINT3A           BRANCH IF YES.                     MOS06110
1536   41F0 155C          612           BAL   LINK,OUTCHR       LF                                 MOS06120
153A   2541               613           LCS   R4,1              DEL                                MOS06130
153C   2302               614           BS    PRINT3B                                              MOS06140
153E   2441               615  PRINT3A  LIS   R4,1              YES, OUTPUT X'01'                  MOS06150
1540   41F0 155C          616  PRINT3B  BAL   LINK,OUTCHR       TERMINAL CHARACTER                 MOS06160
1544   41F0 164E          617  PRINT5   BAL   LINK,TSTBRK                                          MOS06170
1548   D100 1FB8          618           LM    R0,RSAVE          RESTORE REGISTERS                  MOS06180
154C   030F               619           BR    LINK              RETURN                             MOS06190
                          620  *--------------------------------                                   MOS06200
                          621  *  SMALL SUPPORT ROUTINES                                           MOS06210
                          622  *                                                                    MOS06220
                          623  *  TO OUTPUT CR,LF TO LIST DEVICE                                   MOS06230
                          624  *                                                                    MOS06240
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154E  D000 1FB8          625  CRLF     STM   R0,RSAVE          STORE REGISTERS                          MOS06250
1552  244D               626           LIS   R4,13                                                     MOS06260
1554  41F0 155C          627           BAL   LINK,OUTCHR       OUTPUT CR                                MOS06270
1558  4300 152C          628           B     PRINT3            LINE FEED, RESTORE, RETURN               MOS06280
                         629  *-----------------------------                                           MOS06290
                         630  *  TO OUTPUT A CHARACTER TO THE LIST DEVICE                              MOS06300
155C  40F0 1818          631  OUTCHR   STH   R15,OUT.SAV       SAVE RETURN ADDRESS                      MOS06310
1560  D300 1009          632           LB    R0,IOSAVE+1       GET USER' LIST DEVICE NUMBER             MOS06320
1564  2704               633           SIS   R0,4                                                     MOS06330
1566  4230 15A4          634           BNZ   OUTCHR2           BRANCH IF NOT CAROUSEL                   MOS06340
156A  4000 1814          635           STH   R0,PAUSE          SET PAUSE                                MOS06350
156E  41F0 16D0          636  OTC.0    BAL   LINK,TSTDU        IS LIST DEVICE ON LINE ?                 MOS06360
1572  4230 15EA          637           BNZ   OUT0             NO, BRANCH                               MOS06370
1576  9D01               638           SSR   R0,R1             GET CAROUSEL STATUS                      MOS06380
1578  2386               639           BNCS  OTC.1             BRANCH IF CHAR. IS TO BE READ    ***     MOS06390
157A  4810 1814          640           LH    R1,PAUSE          PAUSED NOW ?                             MOS06400
157E  2038               641           BNZS  OTC.0             YES, LOOP                                MOS06410
1580  4300 15A4          642           B     OUTCHR2           NO, GO OUTPUT CHARACTER                  MOS06420
1584  9B01               643  OTC.1    RDR   R0,R1             GET CAROUSEL CHARACTER                   MOS06430
1586  C410 007F          644           NHI   R1,X'7F'          MASK OFF PARITY                          MOS06440
158A  CB10 0012          645           SHI   R1,X'12'          IS IT DC2 ?                              MOS06450
158E  2134               646           BNZS  OTC.3             NO, BRANCH                               MOS06460
1590  4010 1814          647           STH   R1,PAUSE          YES, RESET PAUSE FLAG                    MOS06470
1594  2308               648           BS    OUTCHR2           BRANCH                                   MOS06480
1596  2712               649  OTC.3    SIS   R1,2              IS IT DC4 ?                              MOS06490
1598  4230 156E          650           BNZ   OTC.0             NO, BRANCH                               MOS06500
159C  40F0 1814          651           STH   LINK,PAUSE        YES, RESET PAUSE FLAG                    MOS06510
15A0  4300 156E          652           B     OTC.0             GO WAIT FOR DC2                          MOS06520
                         653  *                                                                        MOS06530
15A4  4010 1814          654  OUTCHR2  STH   R1,PAUSE          RESET FLAG                               MOS06540
15A8  41F0 16D0          655           BAL   LINK,TSTDU        OFF-LINE ?                               MOS06550
15AC  4230 15EA          656           BNZ   OUT0             BRANCH IF OFF-LINE                       MOS06560
15B0  D310 1009          657  SETUP    LB    R1,IOSAVE+1       GET LIST DEVICE IDENTIFIER       ***     MOS06570
15B4  9111               658           SLHLS R1,1              HW INDEX                         ***     MOS06580
15B6  D301 1011          659           LB    R0,IO+1(R1)       GET LIST DEVICE ADDRESS          ***     MOS06590
15BA  DE01 17DF          660           OC    R0,CONWRT(R1)     OC COMMAND-WRITE                 ***     MOS06600
15BE  9D01               661  OTC.4    SSR   R0,R1             WAIT FOR NOT BUSY                        MOS06610
15C0  4230 15EA          662           BTC   3,OUT0            BRANCH IF OFF-LINE                       MOS06620
15C4  C510 000C          663           CLHI  R1,12             PASLA OFFLINE ?                          MOS06630
15C8  4330 15EA          664           BE    OUT0              BRANCH: YES.                             MOS06640
15CC  C310 0008          665           THI   R1,8              BUSY ?                                   MOS06650
15D0  2039               666           BNZS  OTC.4             WAIT FOR NOT BUSY.                       MOS06660
15D2  9A04               667           WDR   R0,R4             OUTPUT DATA BYTE                         MOS06670
15D4  41F0 16D0          668  OTC.5    BAL   LINK,TSTDU        IS LIST DEVICE DU ?                      MOS06680
15D8  2139               669           BNZS  OUT0              YES, BRANCH (EXIT)                       MOS06690
15DA  D310 1009          670           LB    R1,IOSAVE+1       NO, GET USER'S LIST DEVICE NUMBER        MOS06700
15DE  9111               671           SLHLS R1,1              SHIFT FOR HW INDEXING                    MOS06710
15E0  D301 1011          672           LB    R0,IO+1(R1)       GET USER'S CONSOLE LIST DEVICE ADDR      MOS06720
15E4  9D01               673           SSR   R0,R1             GET THE DEVICE STATUS                    MOS06730
15E6  2089               674           BTBS  8,OTC.5           WAIT FOR NOT BUSY.                       MOS06740
15E8  2303               675           BS    OUT1              BRANCH                                   MOS06750
15EA  4010 1806          676  OUT0     STH   R1,WASDU          SET PRESENT DU FLAG                      MOS06760
15EE  48F0 1818          677  OUT1     LH    R15,OUT.SAV       RESTORE RETURN ADDRESS                   MOS06770
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15F2  030F                     BR    R15              RETURN                                  MOS06780
                        *---------------------------                                          MOS06790
                        *  TO GET A CHAR FROM KEYBOARD (IN REG R4)                            MOS06800
                        *                                                                     MOS06810
15F4  D300 17DC         GETCHR LB    R0,CONADR        (PUT KB DEVICE IN READ MODE)      ***   MOS06820
      0000 15F4         KBREAD EQU   GETCHR           *                                 ***   MOS06830
15F8  DE00 17DE                OC    R0,CONRD         OC CONSOLE-READ                   ***   MOS06840
15FC  DB00 17FC                RD    R0,SINK          SET BUSY                          ***   MOS06850
1600  4890 100C                LH    R9,PASFLG        PASLA ?                           ***   MOS06860
1604  2333              TTYGET BZS   KBXIT            NO, BRANCH                        ***   MOS06870
1606  DE00 17F6                OC    R0,CONRQ2S       YES, OC REQUEST-TO-SEND           ***   MOS06880
160A  0890              KBXIT  LDAR  R9,R0            SAVE CONSOLE DEVICE ADDRESS       ***   MOS06890
160C  9D04                     SSR   R0,R4            GET THE DEVICE STATUS             ***   MOS06900
160E  2081                     BTBS  8,1              IF BUSY, LOOP (POSSIBLE HANG)     ***   MOS06910
1610  9B04                     RDR   R0,R4            READ A CHAR IN R4                       MOS06920
                        * TO ECHO RECEIVED CHARACTERS TO CONSOLE DEVICE IN FDX MODE           MOS06930
1612  D400 101A         ECHO   CLB   R0,MICROBUS      IS IT MICROBUS ?                        MOS06940
1616  233B                     BES   ECHO1            YES, BRANCH                             MOS06950
1618  D390 17DE                LB    R9,CONRD         NO, GET THE READ OC                     MOS06960
161C  C590 00A1                CLHI  R9,X'A1'         CAROUSEL ?                              MOS06970
1620  2137                     BNES  ECHRTN           NO, DO NOT ECHO (BRANCH)                MOS06980
1622  D390 17DD                LB    R9,CONADR+1      GET CONSOLE WRITE ADDRESS               MOS06990
1626  DD90 17FC                SS    R9,SINK          GET THE DEVICE STATUS                   MOS07000
162A  2082                     BTBS  8,2              WAIT FOR NOT BUSY (POSSIBLE HANG)       MOS07010
162C  9A94              ECHO1  WDR   R9,R4            ECHO RECEIVED BYTE                      MOS07020
162E  C440 007F         ECHRTN NHI   R4,X'7F'         REMOVE PARITY BIT                       MOS07030
1632  030F                     BR    LINK             RETURN                                  MOS07040
                        *---------------------------                                          MOS07050
                        *  TO OUTPUT '?' TO CONSOLE                                           MOS07060
                        *                                                                     MOS07070
1634  41F0 154E         QUESTN BAL   LINK,CRLF        DO CR & LF                              MOS07080
1638  40F0 1800                STH   LINK,ISITERR     FORCE PRINTING                          MOS07090
163C  C850 1880                LHI   R5,QMSG                                                  MOS07100
1640  41F0 14C6                BAL   LINK,PRINT       PRINT '?'                               MOS07110
1644  2400                     LIS   R0,0                                                     MOS07120
1646  4000 1800                STH   R0,ISITERR       RESET FORCED PRINTING FLAG              MOS07130
164A  4300 10C0                B     OPTIN1           BRANCH TO ACCEPT COMMAND INPUT          MOS07140
                        *---------------------------                                          MOS07150
                        * IF BREAK KEY DEPRESSED, GO TO 'OPTIN' OR (BRKVECT); ELSE RETURN.    MOS07160
                        *    BUT IF "BREAK" & "CONTIN" = 1, GO TO ABORT1.               ***   MOS07170
                        *                                                                     MOS07180
164E  D000 1FD8         TSTBRK STM   R0,RSAVE+32      STORE REGISTERS                   ***   MOS07190
1652  40F0 181A                STH   LINK,BRK.SAV     SAVE RETURN ADDRESS                     MOS07200
1656  D300 17DC                LB    R0,CONADR        GET KEYBOARD DEVICE ADDRESS             MOS07210
165A  9D01                     SSR   R0,R1            GET KEYBOARD DEVICE STATUS              MOS07220
165C  4210 16C0                BTC   1,TSTBRK3        IF CLI OR MICROBUS DU, BRANCH           MOS07230
1660  C510 000C                CLHI  R1,X'0C'         IS PASLA/PALM DU ?                      MOS07240
1664  4330 16C0                BE    TSTBRK3          YES, BRANCH (EXIT)                      MOS07250
1668  C310 0020                THI   R1,X'20'         NO, IS 'BREAK' KEY DEPRESSED ?          MOS07260
166C  4330 16C0                BZ    TSTBRK3          NO, BRANCH (EXIT)                       MOS07270
1670  D320 1010                LB    R2,IO            YES, GET CONSOLE DEVICE POINTER         MOS07280
1674  C520 0005                CLHI  R2,5             IS IT MICROBUS ?                        MOS07290
1678  2138                     BNES  TSTBRK4          NO, BRANCH                              MOS07300
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167A  9B02           731 TSTBRK5  RDR   R0,R2            YES, READ THE CHARACTER                MOS07310
167C  9D01           732          SSR   R0,R1            GET THE DEVICE STATUS                  MOS07320
167E  C310 0020      733          THI   R1,X'20'         STILL "BREAK" STATUS ?                 MOS07330
1682  2034           734          BNZS  TSTBRK5          YES, BRANCH (LOOP)                ***  MOS07340
1684  4300 16AC      735          B     TSTBRK2          NO, BRANCH (EXIT)                      MOS07350
1688  4820 100C      736 TSTBRK4  LH    R2,PASFLG        PASLA ?                                MOS07360
168C  233C           737          BZS   TSTBRK1          BRANCH IF NOT                          MOS07370
168E  C310 0008      738          THI   R1,8             ALREADY ACKNOWLEDGED ?                 MOS07380
1692  4230 16C0      739          BNZ   TSTBRK3          BRANCH IF YES                          MOS07390
1696  9B02           740          RDR   R0,R2            READ THE ASSEMBLED CHARACTER           MOS07400
1698  9D01           741          SSR   R0,R1            GET THE DEVICE STATUS                  MOS07410
169A  2281           742          BFBS  8,1              WAIT FOR BUSY TO SET                   MOS07420
169C  0822           743          LDAR  R2,R2            ZERO CHARACTER ?                       MOS07430
169E  4230 16C0      744          BNZ   TSTBRK3          NO, BRANCH: JUST FRAMING ERROR    ***  MOS07440
16A2  2305           745          BS    TSTBRK2          YES, EXIT (WITH "BREAK" STATUS)        MOS07450
16A4  9D01           746 TSTBRK1  SSR   R0,R1            GET THE DEVICE STATUS                  MOS07460
16A6  C310 0020      747          THI   R1,X'20'         "BREAK" STATUS ?                       MOS07470
16AA  2033           748          BNZS  TSTBRK1          YES, WAIT FOR BREAK KEY RELEASE   ***  MOS07480
16AC  48F0 18A2      749 TSTBRK2  LH    R15,CONTIN+6     IS 'CONTIN' SET ?                 ***  MOS07490
16B0  4230 1342      750          BNZ   ABORT1           YES, BRANCH TO ABORT1             ***  MOS07500
16B4  48F0 1006      751          LH    R15,BRKVECT      NO, CHECK FOR SPECIAL ROUTINE     ***  MOS07510
16B8  4330 10B8      752          BZ    OPTIN            BRK W/NO VECTOR: BRANCH TO EXEC        MOS07520
16BC  40F0 181A      753          STH   R15,BRK.SAV      ELSE SET UP EXIT ADDRESS               MOS07530
16C0  2400           754 TSTBRK3  LIS   R0,0                                                     MOS07540
16C2  4000 1006      755          STH   R0,BRKVECT       DELETE VECTOR AFTER ONE SHOT           MOS07550
16C6  D100 1FD8      756          LM    R0,RSAVE+32      RESTORE REGISTERS                 ***  MOS07560
16CA  48F0 181A      757          LH    LINK,BRK.SAV     RESTORE RETURN ADDRESS                 MOS07570
16CE  030F           758          BR    LINK             RETURN TO PROGRAM                      MOS07580
                     759 *----------------------------                                          MOS07590
                     760 * SEE IF LIST DEVICE OFF-LINE (R1, CC NON-ZERO IF OFF)                  MOS07600
                     761 *                                                                      MOS07610
16D0  2401           762 TSTDU    LIS   R0,1             LOAD CLI DU MASK                       MOS07620
16D2  4810 100C      763          LH    R1,PASFLG        PASLA DEVICE ?                         MOS07630
16D6  2333           764          BZS   $TSTDU0          NO, BRANCH                             MOS07640
16D8  C800 00FC      765          LHI   R0,X'FC'         YES, LOAD PASLA DU STATUS MASK         MOS07650
16DC  D310 1009      766 $TSTDU0  LB    R1,IOSAVE+1      GET LIST DEVICE IDENTIFIER             MOS07660
16E0  9111           767          SLHLS R1,1             (R1) = 2,4,6,8,A                       MOS07670
16E2  D311 1010      768          LB    R1,IO(R1)        GET LIST DEVICE ADDRESS                MOS07680
16E6  D210 17FC      769          STB   R1,SINK          SAVE LIST DEVICE ADDRESS               MOS07690
16EA  9D11           770          SSR   R1,R1            GET THE DEVICE STATUS                  MOS07700
16EC  0410           771          NAR   R1,R0            MASK IT OFF                            MOS07710
16EE  C310 0001      772          THI   R1,1             IS CLI DU ?                            MOS07720
16F2  2135           773          BNZS  $TSTDU2          YES, BRANCH                            MOS07730
16F4  C510 000C      774          CLHI  R1,X'0C'         NO, IS PASLA DU ?                      MOS07740
16F8  2332           775          BES   $TSTDU2          YES, BRANCH                            MOS07750
16FA  2511           776 $TSTDU1  LCS   R1,1             NO, FORCE R1 FOR RETURN CC = 0         MOS07760
16FC  D300 17FC      777 $TSTDU2  LB    R0,SINK          RESTORE LIST DEVICE ADDRESS            MOS07770
1700  C710 FFFF      778          XHI   R1,-1            SET CONDITION CODE                     MOS07780
1704  030F           779          BR    LINK             RETURN                                 MOS07790
                     780 * --------------------------------                                     MOS07800
                     781 * TO DIRECT INPUT AND OUTPUT TO CONSOLE DEVICE                         MOS07810
                     782 *                                                                      MOS07820
1706  D300 1010      783 SETKB    LB    R0,IO            GET KEYBOARD DEVICE                    MOS07830
```

EXEC - ETPE R03-06 (16-BIT STRIPPED & MODIFIED)

```
170A  9410           784          EXBR  R1,R0              ISOLATE CONSOLE DEVICE POINTER          MOS07840
170C  0610           785          OAR   R1,R0              COMBINE CONSOLE POINTERS                MOS07850
170E  4010 1008      786          STH   R1,IOSAVE          SET KB DEVICE = LIST DEVICE             MOS07860
1712  030F           787          BR    LINK               RETURN                                  MOS07870
                     788  *---------------------------------                                  ***  MOS07880
                     789  *  LOW CORE SET UP ROUTINE                                              MOS07890
                     790  *                                                                       MOS07900
1714  2410           791  LCORE   LIS   R1,0               SET UP BXLE REGISTERS R1-R3             MOS07910
1716  2422           792          LIS   R2,2                                                      MOS07920
1718  C830 004E      793          LHI   R3,X'4E'                                                  MOS07930
171C  2400           794          LIS   R0,0               LOAD DATA REGISTER                     MOS07940
171E  4001 0000      795  ZERO1   STH   R0,0(R1)           STORE ZERO                             MOS07950
1722  C110 171E      796          BXLE  R1,ZERO1           ZERO CORE FROM 0 THRU X'4F'            MOS07960
1726  C830 1740      797          LHI   R3,II                                                     MOS07970
172A  4030 0036      798          STH   R3,X'36'           SET ILL INST INT NEW PSW LOC           MOS07980
172E  C840 1796      799          LHI   R4,MM                                                     MOS07990
1732  4040 003E      800          STH   R4,X'3E'           SET M.M. INT NEW PSW LOC               MOS08000
1736  C840 1FB8      801          LHI   R4,RSAVE           *                                  ***  MOS08010
                     802  *                                                                       MOS08020
                     803  *  SET UP LOW CORE FOR 16 BIT MACHINE                                ***  MOS08030
                     804  *                                                                       MOS08040
173A  4040 0022      805          STH   R4,X'22'           SET REGISTER SAVE POINTER              MOS08050
173E  030F           806          BR    LINK               RETURN TO CALLER                   ***  MOS08060
                     807  *---------------------------------                                      MOS08070
                     808  *  SPURIOUS INTERRUPT HANDLERS                                          MOS08080
                     809  *                                                                       MOS08090
                     810  *  ILLEGAL INSTRUCTION INTERRUPT TRAP                                ***  MOS08100
                     811  *                                                                       MOS08110
1740  41F0 17C4      812  II      BAL   LINK,MMRESET       RESTORE ETPE MM POINTER            ***  MOS08120
1744  C820 4632      813          LHI   R2,C'F2'           *                                  ***  MOS08130
1748  4020 1840      814          STH   R2,ERRNO           SET ERRNO = F2                     ***  MOS08140
174C  D1E0 0030      815          LM    R14,X'30'          LOAD OLD PSW & OLD LOC             ***  MOS08150
                     816  *                                                                       MOS08160
1750  D0E0 17D8      817  COMM    STM   R14,OPSW           STORE OLD PSW & OLD LOC            ***  MOS08170
                     818  *                                                                       MOS08180
1754  41F0 17CE      819  COMM1   BAL   LINK,EPSWR2        NO INT. , REG SET 15 (PSW=X'30F0')     MOS08190
1758  41F0 1414      820          BAL   LINK,ERR           PRINT 'ERROR XXFN'                     MOS08200
175C  40F0 1800      821          STH   LINK,ISITERR       FORCE PRINT                            MOS08210
                     822  *                                                                  ***  MOS08220
1760  2404           823  ERRPL1  LIS   R0,4               SET UP DIGITS = 4                  ***  MOS08230
1762  4810 17D8      824          LH    R1,OPSW            R1 = OLD PSW                       ***  MOS08240
1766  41F0 1498      825          BAL   LINK,HEXASC        CONVERT IT TO ASCII                ***  MOS08250
176A  1862           826          DC    Z(ASCIPSW)         *                                  ***  MOS08260
176C  4810 17DA      827          LH    R1,OLOC            R1 = OLD LOC                       ***  MOS08270
1770  41F0 1498      828          BAL   LINK,HEXASC        CONVERT IT TO ASCII                ***  MOS08280
1774  186C           829          DC    Z(ASCILOC)         *                                  ***  MOS08290
1776  C850 185E      830          LHI   R5,PSWMSG          *                                  ***  MOS08300
177A  41F0 14C6      831          BAL   LINK,PRINT         PRINT 'PSW PPPP  LOC LLLL'         ***  MOS08310
                     832  *                                                                  ***  MOS08320
177E  4300 10C0      833          B     OPTIN1             ENTER COMMAND MODE                     MOS08330
                     834  *                                                                       MOS08340
                     835  *                                                                       MOS08350
                     836  *  MACHINE MALFUNCTION INTERRUPT TRAP                                   MOS08360
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EXEC - ETPE R03-06 (16-BIT STRIPPED & MODIFIED)

```
                   *                                                              MOS08370
1782  95AA         MM0      EPSR  R10,R10        CAPTURE MM INT PSW          ***  MOS08380
1784  41F0 17C4             BAL   LINK,MMRESET   RESTORE ETPE MM POINTER     ***  MOS08390
1788  C4A0 000F             NHI   R10,X'000F'    MASK MM INT PSW             ***  MOS08400
178C  08AA                  LDAR  R10,R10        IS CC = 0 ?                 ***  MOS08410
178E  2137                  BNZS  MM1            NO, BRANCH                  ***  MOS08420
1790  41F0 1E08             BAL   LINK,PARERR    YES, PRINT PARITY ERROR     ***  MOS08430
1794  2304                  BS    MM1            BRANCH                      ***  MOS08440
                   *                                                              MOS08450
                   *                                                              MOS08460
1796  95AA         MM       EPSR  R10,R10        CAPTURE MMINT PSW                MOS08470
1798  C4A0 000F             NHI   R10,X'000F'    MASK OFF THE CC                  MOS08480
179C  C820 4633    MM1      LHI   R2,C'F3'                                        MOS08490
17A0  4020 1840             STH   R2,ERRNO       SET ERROR NUMBER = F3       ***  MOS08500
17A4  D1E0 0038             LM    R14,X'38'      LOAD OLD PSW & OLD LOC (16 BIT) ***  MOS08510
17A8  C4E0 FFF0    MM32     NHI   R14,X'FFF0'    MASK OFF ALL BUT CC              MOS08520
17AC  06EA                  OAR   R14,R10        NOW CC = MALFUNCTION        ***  MOS08530
17AE  D0E0 17D8             STM   R14,OPSW       STORE OLD PSW & OLD LOC     ***  MOS08540
17B2  C810 7FFF             LHI   R1,X'7FFF'                                      MOS08550
17B6  2711         MM16     SIS   R1,1           TIMEOUT                          MOS08560
17B8  2021                  BPS   MM16           (SHORT DELAY FOR MACHINE SETTELING) MOS08570
17BA  C800 80F0             LHI   R0,X'80F0'     R0 = X'80F0'                ***  MOS08580
17BE  9520                  EPSR  R2,R0          HALT PROCESSOR                   MOS08590
                   *                                                              MOS08600
                   *   WHEN EXE/RUN IS DEPRESSED, ERROR MSG IS PRINTED.           MOS08610
                   *                                                              MOS08620
17C0  4300 1754             B     COMM1                                           MOS08630
                   *-----------------------------------                           MOS08640
17C4  C810 1796    MMRESET  LHI   R1,MM          GET ETPE MM POINTER         ***  MOS08650
17C8  4010 003E             STH   R1,X'3E'       STORE AT POINTER VECTOR LOC ***  MOS08660
17CC  030F                  BR    LINK           RETURN                      ***  MOS08670
                   *-----------------------------------                           MOS08680
17CE  4820 1004    EPSWR2   LH    R2,PSW2        GET PSW2                    ***  MOS08690
17D2  9502                  EPSR  R0,R2          PSW = X'30F0'               ***  MOS08700
17D4  030F                  BR    LINK           RETURN                      ***  MOS08710
                   *-----------------------------------                           MOS08720
                   *  ETPE CONSTANTS & TABLES                                     MOS08730
                   *                                                              MOS08740
17D8                        ALIGN 4                                               MOS08750
                   *-----------------------------------                      ***  MOS08760
17D8  0000         OPSW     DCX   0              OLD PSW STORRAGE AREA            MOS08770
17DA  0000         OLOC     DCX   0                                               MOS08780
                   *-----------------------------------                      ***  MOS08790
                   *  ETPE IO COMMANDS                                            MOS08800
                   *                                                              MOS08810
17DC  0000         CONADR   DCX   0              CONSOLE DEVICE ADDRESS           MOS08820
                   *                                                              MOS08830
17DE  0000         CONRD    DCX   0              CONSOLE READ/WRITE COMMANDS      MOS08840
      0000 17DF    CONWRT   EQU   CONRD+1                                         MOS08850
17E0  B1A3         CRTRD    DCX   B1A3           FOR CRT                          MOS08860
17E2  A4D8         CLIFRD   DCX   A4D8           *   CURRENT LOOP INTERFACE       MOS08870
17E4  0080         LPWRT    DCX   0080           *   LINE PRINTER                 MOS08880
17E6  A1A3         CARRD    DCX   A1A3           *   CAROUSEL 300                 MOS08890
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17E8    8202                   890  MREADC   DCX   8202                *   MICROBUS                                MOS08900
                               891  *                                                                              MOS08910
17EA    0000                   892  CON2ND   DCX   0                   2ND COMMAND; ENABLE READ COMMAND           MOS08920
        0000 17EB              893  CONENRD  EQU   CON2ND+1                                                        MOS08930
17EC    F871                   894  CRT2ND   DCX   F871                FOR CRT                                     MOS08940
17EE    0064                   895  CLIF2ND  DCX   0064                *   CURRENT LOOP INTERFACE                  MOS08950
17F0    0000                   896           DCX   0                   *   DUMMY HW FOR LP                         MOS08960
17F2    F061                   897  CAR2ND   DCX   F061                *   CAROUSEL 300                            MOS08970
17F4    0000                   898           DCX   0                   *   DUMMY HW FOR MICROBUS                   MOS08980
                               899  *                                                                              MOS08990
17F6    00                     900  CONRQ2S  DB    0                   CONSOLE REQUEST TO SEND CMD                 MOS09000
17F7    33                     901  CRTRQ2S  DB    X'33'               FOR CRT                                     MOS09010
17F8    00                     902           DB    0                   *   DUMMY BYTE FOR CLI                      MOS09020
17F9    00                     903           DB    0                   *   DUMMY BYTE FOR LP                       MOS09030
17FA    23                     904  CARRQ2S  DB    X'23'               *   CAROUSEL 300                            MOS09040
17FB    00                     905           DB    0                   *   DUMMY BYTE FOR MICROBUS                 MOS09050
                               906  *                                                                      ***     MOS09060
17FC    00                     907  SINK     DB    0                   BIT BUCKET                          ***     MOS09070
17FD    80                     908  NORM     DB    X'80'               *                                   ***     MOS09080
17FE    40                     909  INCR     DB    X'40'               *                                   ***     MOS09090
17FF    00                     910           DB    *                   (ALIGN ON HALFWORD BOUNDRY)         ***     MOS09100
                               911  *----------------------------------                                            MOS09110
1800    0000                   912  ISITERR  DCX   0                                                               MOS09120
1802    0000                   913  NOERR    DCX   0                                                               MOS09130
1804    0000                   914  SELTST   DCX   0                   HIGHEST SELECTED TEST NUMBER                MOS09140
1806    0000                   915  WASDU    DCX   0                   1 IF KEYBOARD DEVICE WAS OFF                MOS09150
1808    0000                   916  WASDU1   DCX   0                   NON-ZERO IF TOTAL,TOTERR TO PRINT           MOS09160
180A    0000                   917  TOTAL    DCX   0                   NO. OF TIMES THE SELECTED TESTS RUN         MOS09170
180C    0000                   918  TOTERR   DCX   0                   TOTAL ERRORS DETECTED WHILE DU              MOS09180
180E    0000                   919  BTESTNO  DCX   0                   CURRENT TEST NUMBER IN BINARY               MOS09190
1810    0000                   920  COUNT    DCX   0                                                               MOS09200
1812    0000                   921  NEXTST   DCX   0                   NEXT TEST NUMBER                            MOS09210
1814    0000                   922  PAUSE    DCX   0                                                               MOS09220
                               923  *----------------------------------                                            MOS09230
1816    0000                   924  COMRET   DCX   0                                                               MOS09240
1818    0000                   925  OUT.SAV  DCX   0                   "OUTCHR" RETURN ADDRESS SAVE                MOS09250
181A    0000                   926  BRK.SAV  DCX   0                   "TSTBRK" RETURN ADDRESS SAVE                MOS09260
181C    0000                   927  SET.RTN  DCX   0                                                               MOS09270
181E    3031 3233 3435 3637    928  HEXTAB   DB    C'0123456789ABCDEF'                                             MOS09280
1826    3839 4142 4344 4546
182E                           929           DB    *                   (ALIGN ON HALFWORD BOUNDRY)         ***     MOS09290
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                             931  *--------------------------------                                  ***   MOS09310
                             932  *  ETPE MESSAGES                                                          MOS09320
                             933  *                                                                         MOS09330
182E  5445 5354 2020 2A2A    934  TSTMSG   DC    C'TEST  **',X'0D00'                                        MOS09340
1836  0D00
      0000 1834              935  MTESTNO  EQU   TSTMSG+6           *                              ***   MOS09350
1838  4552 524F 5220 2A2A    936  ERRMSG   DC    C'ERROR ****',X'0D00'                                      MOS09360
1840  2A2A
1842  0D00
      0000 183E              937  ETESTNO  EQU   ERRMSG+6           *    STORED BY ETPE            ***   MOS09370
      0000 1840              938  ERRNO    EQU   ERRMSG+8           *    STORE ERRNO AS CHAR CONSTANT***   MOS09380
1844  544F 5441 4C20 2020    939  TOTMSG   DC    C'TOTAL   TOTERR',X'0D00'                                  MOS09390
184C  544F 5445 5252
1852  0D00
1854  4E4F 2045 5252 4F52    940  NOERMSG  DC    C'NO ERROR',X'0D00'                                        MOS09400
185C  0D00
185E  5053 5720 2A2A 2A2A    941  PSWMSG   DC    C'PSW ****  LOC ****',X'0D00'                              MOS09410
1866  2020 4C4F 4320 2A2A
186E  2A2A
1870  0D00
      0000 1862              942  ASCIPSW  EQU   PSWMSG+4           *                              ***   MOS09420
      0000 186C              943  ASCILOC  EQU   PSWMSG+14          *                              ***   MOS09430
1872  454E 4420 4F46 2054    944  EOTMSG   DC    C'END OF TEST',X'0D00'                                     MOS09440
187A  4553 5420
187E  0D00
1880  3F0D                   945  QMSG     DC    X'3F0D'                                                    MOS09450
1882  2A0D                   946  AMSG     DC    X'2A0D'                                                    MOS09460
                             947  *-----------------------------                                            MOS09470
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                                949  ********************************************************************  MOS09490
                                950  *                                                                     MOS09500
                                951  *  OPTION/COMMAND TABLE                                               MOS09510
                                952  *                                                                     MOS09520
1884   5445 5354 2020           953  TEST     DC    C'TEST  ',X'F800',X'0',X'0' *          0 TO 4         MOS09530
188A   F800
188C   0000
188E   0000
       0000 1884                954  OPT      EQU   TEST                                                   MOS09540
                                955  *                                                                     MOS09550
1890   4C4F 4F50 2020           956  LOOP     DC    C'LOOP  ',X'0',Z(LEVELIN),X'7FFF' *    MAX=X'7FFF'    MOS09560
1896   0000
1898   1188
189A   7FFF
189C   434F 4E54 494E           957  CONTIN   DC    C'CONTIN',X'0',Z(LEVELIN),X'1' *       0 OR 1         MOS09570
18A2   0000
18A4   1188
18A6   0001
18A8   4E4F 4D53 4720           958  NOMSG    DC    C'NOMSG ',X'0',Z(LEVELIN),X'1' *       0 OR 1         MOS09580
18AE   0C00
18B0   1188
18B2   0001
18B4   5343 4F50 4520           959  SCOPE    DC    C'SCOPE ',X'0',Z(LEVELIN),X'5' *       MAX = 5        MOS09590
18BA   0000
18BC   1188
18BE   0005
18C0   504F 554E 4420           960  POUND    DC    C'POUND ',X'A',X'0',X'0' *             1 TO FFFF      MOS09600
18C6   000A
18C8   0000
18CA   0000
18CC   4441 5441 2020           961  DATA     DC    C'DATA  ',X'FFFF',X'0',X'0' *          0 TO FFFF      MOS09610
18D2   FFFF
18D4   0000
18D6   0000
                                962  *                                                                     MOS09620
                                963  ********************************************************************  MOS09630
                                964  *                                                                     MOS09640
       0000 18D8                965  OPTEND   EQU   *                                                      MOS09650
                                966  *                                                                     MOS09660
18D8   5255 4E20 2020           967  RUN      DC    C'RUN   ',X'0',X'0',X'0'                               MOS09670
18DE   0000
18E0   0000
18E2   0000
18E4   FFFF                     968           DC    -1                                                     MOS09680
                                969  *                                                                     MOS09690
18E6   0000                     970  LOLIM    DC    X'0000'             LOW LIMIT OF MEMORY UNDER TEST     MOS09700
18E8   0FFF                     971  HILIM    DC    X'0FFF'             HIGH LIMIT OF MEMORY UNDER TEST    MOS09710
                                972  *                                                                     MOS09720
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                          974  *                                                                     MOS09740
18EA   5331 3620 3139 2D31  975  TITLE    DC    C'S16 19-197 MOS MEMORY TEST PART 1 '                MOS09750
18F2   3937 204D 4F53 204D
18FA   454D 4F52 5920 5445
1902   5354 2050 4152 5420
190A   3120
190C   3036 2D32 3032 4630  976           DC    C'06-202F04R01'      *                        ***    MOS09760
1914   3452 3031
1918   0D0A                 977           DC    X'0D0A'                                              MOS09770
                          978  *                                                                     MOS09780
                          979  *                                                                     MOS09790
       0000 E000            980  DEFTESTS EQU   X'E000'             DEFINES TESTS 0,1,& 2       ***    MOS09800
                          981  *                                  AS DEFAULT TESTS                   MOS09810
                          982  *                                                                     MOS09820
       0000 0004            983  MAXTST   EQU   H'4'                DEFINES TESTS 0,1,2,3,& 4   ***    MOS09830
                          984  *                                  AS LEGAL TEST NUMBERS.             MOS09840
                          985  *                                                                     MOS09850
                          986  *  TESTS TABLE                                                        MOS09860
                          987  *                                                                     MOS09870
191A                        988           DB    *                   (ALIGN ON HALFWORD BOUNDRY)  ***   MOS09880
191A   1924                 989  TESTS    DC    A(TEST0)            MEMORY SEARCH TEST           ***   MOS09890
191C   1966                 990           DC    A(TEST1)            SHORT HAMMER DISTURB TEST          MOS09900
191E   1AA0                 991           DC    A(TEST2)            DIAGONAL GALPAT TEST               MOS09910
1920   1BE2                 992           DC    A(TEST3)            MEMORY HOLD TEST                   MOS09920
1922   1CB0                 993           DC    A(TEST4)            LONG HAMMER DISTURB TEST           MOS09930
                          994  *                                                                     MOS09940
                          995  ********************************************************************* MOS09950
                          996  *          END   ETPE R03-06 (16-BIT STRIPPED & MODIFIED)             MOS09960
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EXEC - ETPE R03-06 (16-BIT STRIPPED & MODIFIED)

```
                          998  *        TEST 0 MEMORY SEARCH TEST                                          MOS09980
                          999  *                                                                           MOS09990
                         1000  *        PURPOSE:                                                           MOS10000
                         1001  *              THIS UTILITY ENABLES THE USER TO LIST THE MEMORY              MOS10010
                         1002  *              UNDER TEST.                                                  MOS10020
                         1003  *                                                                           MOS10030
                         1004  *        ASSUMPTIONS:                                                       MOS10040
                         1005  *              MEMORY ALLOWABLE IS 8K BYTES.                                MOS10050
                         1006  *                                                                           MOS10060
                         1007  *        DESIGN SPECIFICATIONS:                                             MOS10070
                         1008  *              PRINT MEMORY LIMITS UNDER TEST.                              MOS10080
                         1009  *                                                                           MOS10090
                         1010  *        OPTIONS:                                                           MOS10100
                         1011  *              NONE                                                         MOS10110
                         1012  *                                                                           MOS10120
                         1013  *        HOW TO RUN THE TEST:                                               MOS10130
                         1014  *              ENTER "RUN" AND THE AVAILABLE MEMORY LOCATIONS WILL           MOS10140
                         1015  *              BE PRINTED ON THE LIST DEVICE IN A CONTIGUIOUS BLOCK.        MOS10150


1924   C850 1F3C         1017  TEST0    LDAI  R5,ASMEMMSG        LOAD MESSAGE ADDRESS                     MOS10170
1928   2404              1018           LIS   R0,4               LOAD NUMBER DIGITS PER CONVERSION        MOS10180
192A   4810 18E6         1019           LH    R1,LOLIM           GET LOW LIMIT ADDRESS                    MOS10190
192E   41F0 1498         1020           BAL   LINK,HEXASC        PUT LOLIM IN MEMORY MESSAGE              MOS10200
1932   1F50              1021           DC    Z(LOMSG)                                                    MOS10210
1934   4810 18E8         1022           LH    R1,HILIM           GET HIGH LIMIT ADDRESS                   MOS10220
1938   41F0 1498         1023           BAL   LINK,HEXASC        PUT HILIM IN MEMORY MESSAGE              MOS10230
193C   1F55              1024           DC    Z(HIMSG)                                                    MOS10240
193E   41F0 14C6         1025           BAL   LINK,PRINT         PRINT MEMORY MESSAGE                     MOS10250
1942   4300 12EC         1026           B     KEEP7                                                       MOS10260
                         1027  *                                                                          MOS10270
                         1028  ***************************************************************************MOS10280
                         1029  *                                                                          MOS10290
1946   40F0 1FB8         1030  TSTBRKX  STH   LINK,RSAVE         SAVE RETURN ADDRESS              ***     MOS10300
194A   C8F0 12CC         1031           LHI   LINK,TSTEND                                                 MOS10310
194E   40F0 1006         1032           STH   LINK,BRKVECT       ESTABLISH BRKVECT                        MOS10320
1952   48F0 1FB8         1033           LH    LINK,RSAVE         RESTORE RETURN ADDRESS                   MOS10330
1956   4300 164E         1034           B     TSTBRK             GO TEST FOR BREAK                        MOS10340
                         1035  *                                                                          MOS10350
                         1036  ***************************************************************************MOS10360
                         1037  *                                                                          MOS10370
195A   C360 0FC0         1038  LOWCHK   THI   R6,X'0FC0'         IS LOC > X'3E' ?                         MOS10380
195E   023F              1039           BNZR  LINK               YES, RETURN                              MOS10390
1960   C160 195A         1040           BXLE  R6,LOWCHK          NO, INCREMENT LOC                        MOS10400
1964   030F              1041           BR    LINK               RETURN                                   MOS10410
                         1042  *                                                                          MOS10420
                         1043  ***************************************************************************MOS10430
                         1044  *        END   TEST 0                                                       MOS10440
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TEST 1

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                        *        TEST 1                       SHORT COUNT RELOCATABLE              MOS10460
                        *                                     HAMMER DISTURB TEST                  MOS10470
                        *                                                                          MOS10480
                        *        PURPOSE:                                                          MOS10490
                        *              THIS TEST EXECUTES A SMALL, RELOCATABLE PROGRAM             MOS10500
                        *              (16 HALFWORDS) THROUGHOUT MEMORY, LOOKING FOR "SOFT"        MOS10510
                        *              FAILURES.                                                   MOS10520
                        *                                                                          MOS10530
                        *        ASSUMPTIONS:                                                      MOS10540
                        *              8KB MOS MEMORY                                              MOS10550
                        *                                                                          MOS10560
                        *        DESIGN SPECIFICATIONS:                                            MOS10570
                        *              1. THE TEST PROGRAM MUST USE 16 HALFWORDS HEAVILY,          MOS10580
                        *                 DUE TO THE INTERNAL CHIP ADDRESSING SCHEME.              MOS10590
                        *              2. THE TEST RUNS WITH A BACKGROUND PATTERN OF ALL 1'S       MOS10600
                        *                 AND ALL 0'S.                                             MOS10610
                        *              3. THE TEST LOOPS 10 TIMES(INTERNAL TO THE MODULE).         MOS10620
                        *              4. THE ROUTINE (STLOOP) IS EXECUTED 10 TIMES. THE ENTIRE    MOS10630
                        *                 ROUTINE IS THEN RELOCATED IN MEMORY AND EXECUTED 10      MOS10640
                        *                 TIMES. "STLOOP" IS MOVED UP IN MEMORY UNTIL THE LAST     MOS10650
                        *                 TEST HALFWORD IS IN THE LAST MEMORY HALFWORD.            MOS10660
                        *                                                                          MOS10670
                        *        OPTIONS:                                                          MOS10680
                        *              POUND - NUMBER OF TIMES A'S & 5'S ARE POUNDED IN MEMORY     MOS10690
                        *              SCOPE - ERROR OPTION MODE                                   MOS10700
                        *                   0 - PRINT ERROR DATA AND SKIP TO NEXT TEST             MOS10710
                        *                   1 - PRINT BAD CHIP NUMBER(S) AND SKIP TO NEXT TEST     MOS10720
                        *                   2 - PRINT ERROR DATA AND CONTINUE TEST                 MOS10730
                        *                   3 - PRINT ERROR DATA AND HALT                          MOS10740
                        *                   4 - IGNORE ERROR                                       MOS10750
                        *                   5 - PRINT BAD CHIP NUMBER(S) AND CONTINUE TEST         MOS10760
                        *                                                                          MOS10770
                        *        HOW TO RUN THE TEST:                                              MOS10780
                        *              1. ENTER THE "SCOPE" & "POUND" OPTIONS VIA THE CONSOLE      MOS10790
                        *                 DEVICE.                                                  MOS10800
                        *              2. ENTER "RUN" AND THE TEST WILL EXECUTE.                   MOS10810

1966  4860 18E6         TEST1    LH    R6,LOLIM               INITIALIZE MEMORY LIMITS (LOW)       MOS10830
196A  4880 18E8                  LH    R8,HILIM               *                        (HIGH)      MOS10840
196E  2472                       LIS   R7,2                   LOAD BXLE INCREMENT VALUE (HW)       MOS10850
1970  41F0 195A                  BAL   LINK,LOWCHK            CHECK IF LOC IS LOW & CORRECT        MOS10860
1974  0806                       LDAR  R0,R6                  R0 = LOLIM (SAVE)                    MOS10870
1976  0898                       LDAR  R9,R8                  R9 = HILIM (SAVE)                    MOS10880
1978  2411                       LIS   R1,1                   LOAD DISPLAY ADDRESS                 MOS10890
197A  C8A0 5555                  LHI   R10,X'5555'            LOAD DATA REGISTERS                  MOS10900
197E  C8B0 AAAA                  LHI   R11,X'AAAA'                                                 MOS10910
1982  C850 003E                  LHI   R5,ENDMOV5-STLOOP+2    LOAD TEST ADDRESS DIFFERENCE         MOS10920
1986  2521                       LCS   R2,1                   LOAD BACKGROUND DATA PATTERN         MOS10930
1988  4026 0000         T5S1     STH   R2,0(R6)               STORE BACKGROUND OF ALL 1'S          MOS10940
198C  C160 1988         T5S1.5   BXLE  R6,T5S1                REPEATE FROM LOLIM TO HILIM          MOS10950
1990  0860                       LDAR  R6,R0                  RESTORE R6 W/LOLIM                   MOS10960
```

TEST 1

```
1992   0B85            1097           SHR   R8,R5            ESTABLISH HIGH LIMIT                  MOS10970
1994   41E0 19B2       1098           BAL   R14,SFTSET       DO SHORT HAMMER DISTURB TEST          MOS10980
                       1099  *                                                                     MOS10990
1998   0860            1100           LDAR  R6,R0            INITIALIZE MEMORY LIMITS              MOS11000
199A   0889            1101           LDAR  R8,R9            GET BG BXLE HILIM VALUE               MOS11010
199C   2420            1102           LIS   R2,0             LOAD BACKGROUND DATA PATTERN          MOS11020
199E   4026 0000       1103  T5S2     STH   R2,0(R6)         STORE BACKGROUND OF ALL 0'S           MOS11030
19A2   C160 199E       1104  T5S2.5   BXLE  R6,T5S2          REPEATE FROM LOLIM TO HILIM           MOS11040
19A6   0860            1105           LDAR  R6,R0            RESTORE R6 W/LOLIM                    MOS11050
19A8   0B85            1106           SHR   R8,R5            ESTABLISH HIGH LIMIT                  MOS11060
19AA   41E0 19B2       1107           BAL   R14,SFTSET       DO SHORT HAMMER DISTURB TEST          MOS11070
19AE   4300 12CC       1108           B     TSTEND           END OF TEST (RETURN TO EXEC)          MOS11080
                       1109  ****************************************************************************** MOS11090
                       1110  *                                                                     MOS11100
19B2   48C0 18C6       1111  SFTSET   LH    R12,POUND+6      LOAD EXECUTION COUNTER                MOS11110
19B6   94F6            1112           EXBR  R15,R6           REVERSE ADDRESS BYTES                 MOS11120
19B8   981F            1113           WHR   R1,R15           DISPLAY ADDRESS UNDER TEST            MOS11130
19BA   41F0 1946       1114           BAL   LINK,TSTBRKX     IF "BREAK" GO TO TSTEND ELSE RETURN   MOS11140
19BE   D000 1F78       1115           STM   R0,MOSSAVE       SAVE REGISTERS (0-F)                  MOS11150
19C2   0816            1116           LDAR  R1,R6            LOAD INDEX REGISTER                   MOS11160
19C4   D120 1A44       1117           LM    R2,STLOOP        RELOCATE PROGRAM IN MEMORY            MOS11170
19C8   D021 0002       1118           STM   R2,2(R1)                                               MOS11180
19CC   D120 1A60       1119           LM    R2,STLOOP+28                                           MOS11190
19D0   D021 001E       1120           STM   R2,30(R1)                                              MOS11200
19D4   D1E0 1A7C       1121           LM    R14,STLOOP+56                                          MOS11210
19D8   D0E1 003A       1122           STM   R14,58(R1)                                             MOS11220
19DC   D100 1F78       1123           LM    R0,MOSSAVE       RESTORE REGISTERS (0-F)               MOS11230
19E0   4060 100A       1124           STH   R6,TEMP          SAVE LOC UNDER TEST                   MOS11240
19E4   41D6 0002       1125           BAL   R13,2(R6)        BRANCH TO "STLOOP"                    MOS11250
                       1126  *                                                                     MOS11260
                       1127  *        TEST BACKGROUND PATTERN                                      MOS11270
                       1128  *                                                                     MOS11280
19E8   D000 1F78       1129  BGTST    STM   R0,MOSSAVE       SAVE REGISTERS (0-F)                  MOS11290
19EC   C840 3045       1130           LHI   R4,C'0E'                                               MOS11300
19F0   4040 1840       1131           STH   R4,ERRNO         SET ERRNO = C'0E'               ***   MOS11310
19F4   0832            1132           LDAR  R3,R2            LOAD BACKGROUND PATTERN               MOS11320
19F6   0886            1133           LDAR  R8,R6            GET LOCATION UNDER TEST               MOS11330
19F8   08C6            1134           LDAR  R12,R6           SAVE LOC UNDER TEST                   MOS11340
19FA   0B85            1135           SAR   R8,R5            ESTABLISH START OF SUB-4              MOS11350
19FC   0860            1136           LDAR  R6,R0            GET START OF BACKGROUND TEST AREA     MOS11360
19FE   0568            1137           CLAR  R6,R8            IS LOLIM < START OF SUB-2 ?     ***   MOS11370
1A00   238B            1138           BNLS  BGTST3           NO, BRANCH TO TEST HIGH MEMORY        MOS11380
1A02   4846 0000       1139  BGTST1   LH    R4,0(R6)         GET DATA FROM BACKGROUND LOC          MOS11390
1A06   0543            1140           CLAR  R4,R3            DATA EQUAL ?                          MOS11400
1A08   2134            1141           BNES  BGTST2.5         NO, BRANCH - ERROR                    MOS11410
1A0A   C160 1A02       1142  BGTST2   BXLE  R6,BGTST1        YES, CONTINUE LOW BACKGROUND TESTING  MOS11420
1A0E   2304            1143           BS    BGTST3           BRANCH                                MOS11430
                       1144  *                                                                     MOS11440
1A10   41F0 1E18       1145  BGTST2.5 BAL   LINK,ERROR       PRINT ERROR TTOE                      MOS11450
1A14   2205            1146           BS    BGTST2           BRANCH                                MOS11460
                       1147  *                                                                     MOS11470
1A16   086C            1148  BGTST3   LDAR  R6,R12           RESTORE LOC UNDER TEST                MOS11480
1A18   0A65            1149           AHR   R6,R5            ADD LENGTH OF SUB                     MOS11490
```

TEST 1

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1A1A  2662            1150           AIS   R6,2              START AT LOC+2 AFTER SUB                MOS11500
1A1C  0889            1151           LDAR  R8,R9             GET END OF BACKGROUND TEST AREA         MOS11510
1A1E  0568            1152           CLAR  R6,R8             IS BG LOC < TEST LOC ?                  MOS11520
1A20  238B            1153           BNLS  BGTST6            NO, BRANCH TO TEST NEXT LOC             MOS11530
1A22  4846 0000       1154  BGTST4   LH    R4,0(R6)          GET DATA FROM BG LOC                    MOS11540
1A26  0543            1155           CLAR  R4,R3             DATA EQUAL ?                            MOS11550
1A28  2134            1156           BNES  BGTST5.5          NO, ERROR                               MOS11560
1A2A  C160 1A22       1157  BGTST5   BXLE  R6,BGTST4         YES, CONTINUE HI BACKGROUND TESTING     MOS11570
1A2E  2304            1158           BS    BGTST6            BRANCH                                  MOS11580
                      1159  *                                                                        MOS11590
1A30  41F0 1E18       1160  BGTST5.5 BAL   LINK,ERROR        PRINT ERROR TTOE                        MOS11600
1A34  2205            1161           BS    BGTST5            BRANCH                                  MOS11610
                      1162  *                                                                        MOS11620
1A36  D100 1F78       1163  BGTST6   LM    R0,MOSSAVE        RESTORE REGISTERS (0-F)                 MOS11630
1A3A  4026 0000       1164           STH   R2,0(R6)          RESTORE BACKGROUND PATTERN AT LOC       MOS11640
1A3E  C160 19B2       1165  BGTST7   BXLE  R6,SFTSET         CONTINUE UNTIL DONE (INCREMENTING)      MOS11650
1A42  030E            1166           BR    R14               RETURN                                  MOS11660
                      1167  ********************************************************************    MOS11670
                      1168  *       (R6)                                                             MOS11680
1A44  40A6 0000       1169  STLOOP   STH   R10,0(R6)         STORE FIRST DATA PATTERN                MOS11690
1A48  45A6 0000       1170           CLH   R10,0(R6)         DATA EQUAL ?                            MOS11700
1A4C  4230 1A80       1171           BNE   FITERR1           NO,BRANCH TO ERROR                      MOS11710
1A50  40B6 0000       1172           STH   R11,0(R6)         YES, STORE SECOND DATA PATTERN          MOS11720
1A54  45B6 0000       1173           CLH   R11,0(R6)         DATA EQUAL?                             MOS11730
1A58  4230 1A84       1174           BNE   FITERR2           NO, BRANCH TO ERROR                     MOS11740
1A5C  0A65            1175           AAR   R6,R5             GO TO SECOND TC                         MOS11750
1A5E  40A6 0000       1176           STH   R10,0(R6)         STORE FIRST DATA PATTERN                MOS11760
1A62  45A6 0000       1177           CLH   R10,0(R6)         DATA EQUQL ?                            MOS11770
1A66  4230 1A80       1178           BNE   FITERR1           NO, BRANCH TO ERROR                     MOS11780
1A6A  40B6 0000       1179           STH   R11,0(R6)         YES, STORE SECOND DATA PATTERN          MOS11790
1A6E  45B6 0000       1180           CLH   R11,0(R6)         DATA EQUAL ?                            MOS11800
1A72  4230 1A84       1181           BNE   FITERR2           NO, BRANCH TO ERROR                     MOS11810
1A76  0B65            1182           SHR   R6,R5             YES, RETURN TO FIRST TC                 MOS11820
1A78  27C1            1183           SIS   R12,1            DECREMENT POUND COUNTER                 MOS11830
1A7A  4236 0002       1184           BNZ   2(R6)             CONTINUE IF NOT DONE                    MOS11840
1A7E  030D            1185           BR    R13               OTHERWISE RETURN                        MOS11850
      0000 1A80       1186  ENDMOV5  EQU   *                 (R6)+62                                 MOS11860
                      1187  ********************************************************************    MOS11870
1A80  083A            1188  FITERR1  LDAR  R3,R10            LOAD EXPECTED DATA                      MOS11880
1A82  2302            1189           BS    FITERR3           BRANCH                                  MOS11890
                      1190  *                                                                        MOS11900
1A84  083B            1191  FITERR2  LDAR  R3,R11            LOAD EXPECTED DATA              ***     MOS11910
                      1192  *                                                                        MOS11920
1A86  C840 3044       1193  FITERR3  LHI   R4,C'0D'                                                  MOS11930
1A8A  4040 1840       1194           STH   R4,ERRNO          SET ERRNO = C'0D'                       MOS11940
1A8E  4846 0000       1195           LH    R4,0(R6)          GET DATA READ                           MOS11950
1A92  41F0 1E18       1196           BAL   LINK,ERROR        PRINT ERROR TTOD                        MOS11960
1A96  4560 100A       1197           CLH   R6,TEMP           IS LOC UNDER TEST TRUE ?                MOS11970
1A9A  033D            1198           BER   R13               YES, RETURN                             MOS11980
1A9C  0B65            1199           SAR   R6,R5             NO, CORRECT THE LOC                     MOS11990
1A9E  030D            1200           BR    R13               RETURN                                  MOS12000
                      1201  ********************************************************************    MOS12010
                      1202  *       END   TEST 1                                                     MOS12020
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                        *       TEST 2                  DIAGONAL GALPAT TEST                      MOS12040
                        *                                                                         MOS12050
                        *       PURPOSE:                                                          MOS12060
                        *             THE TEST RUNS A GALLOPING PATTERN ON ALL DIAGONALS OF       MOS12070
                        *             ONE-HALF OF THE 4K RAM AND CHECKS THAT NO BACKGROUND        MOS12080
                        *             LOCATIONS HAVE CHANGED DURING THE DIAGONAL TEST.            MOS12090
                        *                                                                         MOS12100
                        *       ASSUMPTIONS:                                                      MOS12110
                        *             8KB MOS MEMORY                                              MOS12120
                        *                                                                         MOS12130
                        *       DESIGN SPECIFICATIONS:                                            MOS12140
                        *             1. THE TEST IS EXECUTED FOR EACH OF THE SIX BACKGROUND      MOS12150
                        *                PATTERNS.                                                MOS12160
                        *             2. AN ALTERNATE R-W-R-W-R-W-R-W-R(ETC) IS DONE TO A TEST    MOS12170
                        *                CELL AND FOLLOWING CELLS ON THE DIAGONAL SUCESSIVELY.    MOS12180
                        *             3. THE TEST CELL IS MOVED ONE CELL UP THE DIAGONAL AND      MOS12190
                        *                THE PROCEDURE IS REPEATED.                               MOS12200
                        *             4. AFTER THE DIAGONAL IS COMPLETED, THE BACKROUND           MOS12210
                        *                PATTERN IN THE REST OF THE 4K CHIP AS TESTED.            MOS12220
                        *             5. THE DIAGONAL IS THEN MOVED AND STEPS 2-4 ARE REPEATED    MOS12230
                        *                UNTIL ALL DIAGONALS HAVE BEEN TRAVERSED.                 MOS12240
                        *                                                                         MOS12250
                        *       OPTIONS:                                                          MOS12260
                        *             SCOPE - ERROR OPTION MODE                                   MOS12270
                        *                 0 - PRINT ERROR DATA AND SKIP TO NEXT TEST              MOS12280
                        *                 1 - PRINT BAD CHIP NUMBER(S) AND SKIP TO NEXT TEST      MOS12290
                        *                 2 - PRINT ERROR DATA AND CONTINUE TEST                  MOS12300
                        *                 3 - PRINT ERROR DATA AND HALT                           MOS12310
                        *                 4 - IGNORE ERROR                                        MOS12320
                        *                 5 - PRINT BAD CHIP NUMBER(S) AND CONTINUE TEST          MOS12330
                        *                                                                         MOS12340
                        *       HOW TO RUN THE TEST:                                              MOS12350
                        *             1. ENTER THE "SCOPE" OPTION VIA THE CONSOLE DEVICE.         MOS12360
                        *             2. ENTER "RUN" AND THE TEST WILL EXECUTE.                   MOS12370
                        *                                                                         MOS12380
                        *    ***NOTE:     LOLIM MUST = X'0000' & HILIM MUST = X'0FFF'             MOS12390
                        *                 TO RUN THIS TEST MODULE.  DO NOT MANUALLY CHANGE !!!    MOS12400

1AA0   2411                    TEST2    LIS   R1,1            LOAD DISPLAY ADDRESS                MOS12420
1AA2   C820 0082                        LHI   R2,X'82'        LOAD CELL INCREMENT VALUE           MOS12430
1AA6   C890 007E                        LHI   R9,X'7E'        LOAD TOP OF COLUMN MASK VALUE       MOS12440
1AAA   C8C0 0FFE                        LHI   R12,X'0FFE'     LOAD CHIP LIMIT MASK                MOS12450
1AAE   24A0                             LIS   R10,0                                               MOS12460
1AB0   25B1                             LCS   R11,1                                               MOS12470
1AB2   24D0                             LIS   R13,0           W/BACKGROUND = 0'S            ***   MOS12480
1AB4   41E0 1AE2                        BAL   R14,TEST6ALL    DO DIAGONAL GALPAT TEST             MOS12490
                        *                                                                         MOS12500
1AB8   25A1                             LCS   R10,1                                               MOS12510
1ABA   24B0                             LIS   R11,0           WITH BACKGROUND = 1'S               MOS12520
1ABC   41E0 1AE2                        BAL   R14,TEST6ALL    DO DIAGONAL GALPAT TEST             MOS12530
                        *                                                                         MOS12540
```

TEST 2

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1AC0   24D2           1255           LIS   R13,2              W/BACKGROUND = A'S/CHIP                MOS12550
1AC2   41E0 1AE2      1256           BAL   R14,TEST6ALL        DO DIAGONAL GALPAT TEST                MOS12560
                      1257  *                                                                          MOS12570
1AC6   24A0           1258           LIS   R10,0                                                       MOS12580
1AC8   25B1           1259           LCS   R11,1              W/BACKGROUND = 5'S/CHIP                MOS12590
1ACA   41E0 1AE2      1260           BAL   R14,TEST6ALL        DO DIAGONAL GALPAT TEST                MOS12600
                      1261  *                                                                          MOS12610
1ACE   C8D0 0080      1262           LHI   R13,X'80'          W/BACKGROUND = 64-0'S, 64-1'S, ETC..   MOS12620
1AD2   41E0 1AE2      1263           BAL   R14,TEST6ALL        DO DIAGONAL GALPAT TEST                MOS12630
                      1264  *                                                                          MOS12640
1AD6   25A1           1265           LCS   R10,1                                                       MOS12650
1AD8   24B0           1266           LIS   R11,0              W/BACKGROUND = 64-1'S, 64-0'S, ETC..   MOS12660
1ADA   41E0 1AE2      1267           BAL   R14,TEST6ALL        DO DIAGONAL GALPAT TEST                MOS12670
                      1268  *                                                                          MOS12680
1ADE   4300 12CC      1269           B     TSTEND             END OF TEST (RETURN TO EXEC)           MOS12690
                      1270  *                                                                          MOS12700
                      1271  ************************************************************************  MOS12710
                      1272  *                                                                          MOS12720
1AE2   4860 18E6      1273  TEST6ALL LH    R6,LOLIM           LOAD AVAILABLE MEMORY LIMITS (LOW)     MOS12730
1AE6   4880 18E8      1274           LH    R8,HILIM           *                            (HIGH)    MOS12740
1AEA   2472           1275           LIS   R7,2               LOAD BXLE INCREMENTING VALUE (HW)      MOS12750
                      1276  *                                                                          MOS12760
1AEC   41F0 195A      1277  T6S1     BAL   LINK,LOWCHK        CHECK IF LOC IS LOW & CORRECT          MOS12770
1AF0   083A           1278           LDAR  R3,R10             GET FIRST BACKGROUND PATTERN           MOS12780
1AF2   C36D 0000      1279           THI   R6,0(R13)          CORRECT PATTERN ?                      MOS12790
1AF6   2332           1280           BZS   T6S2               YES, BRANCH                            MOS12800
1AF8   083B           1281           LDAR  R3,R11             NO, LOAD SECOND PATTTERN               MOS12810
1AFA   4036 0000      1282  T6S2     STH   R3,0(R6)           STORE BACKGROUND PATTERN               MOS12820
1AFE   C160 1AEC      1283  T6S2.5   BXLE  R6,T6S1            TO ALL MEMORY (LOLIM-HILIM)            MOS12830
                      1284  *                                                                          MOS12840
1B02   2400           1285  T6S3     LIS   R0,0               R0 = X0                                MOS12850
1B04   0880           1286  T6S4     LDAR  R8,R0              R8 = TEST CELL                         MOS12860
1B06   0870           1287  T6S5     LDAR  R7,R0              R7 = RUNNING CELL                      MOS12870
1B08   C380 0FC0      1288  T6S6     THI   R8,X'0FC0'         TEST CELL VALID ?                      MOS12880
1B0C   4330 1B8A      1289           BZ    INCRTC2            NO, BRANCH TO INCREMENT TC             MOS12890
1B10   C370 0FC0      1290           THI   R7,X'0FC0'         RUNNING CELL VALID ?                   MOS12900
1B14   4330 1B6A      1291           BZ    INCRRC             NO, BRANCH TO INCREMENT RC             MOS12910
1B18   0578           1292           CLAR  R7,R8              RUNNING CELL = TEST CALL ?             MOS12920
1B1A   4330 1B6A      1293           BE    INCRRC             YES, INCREMENT THE RUNNING CELL        MOS12930
1B1E   0868           1294           LDAR  R6,R8              R6 = TEST CELL                         MOS12940
1B20   94F6           1295           EXBR  R15,R6             REVERSE ADDRESS BYTES                  MOS12950
1B22   981F           1296           WHR   R1,R15             DISPLAY ADDRESS UNDER TEST             MOS12960
1B24   083B           1297           LDAR  R3,R11             LOAD COMPLEMENT DATA PATTERN(C.D.P.)   MOS12970
1B26   C36D 0000      1298           THI   R6,0(R13)          CORRECT PATTERN ?                      MOS12980
1B2A   2332           1299           BZS   T6S7               YES, BRANCH                            MOS12990
1B2C   083A           1300           LDAR  R3,R10             NO, LOAD C.D.P.                        MOS13000
1B2E   4036 0000      1301  T6S7     STH   R3,0(R6)           STORE C.D.P. AT TEST CELL LOC          MOS13010
1B32   C840 3130      1302           LHI   R4,C'10'                                                    MOS13020
1B36   4040 1840      1303           STH   R4,ERRNO           SET ERRNO = C'10'                      MOS13030
1B3A   4846 0000      1304           LH    R4,0(R6)           CHECK C.D.P. AT TC LOC                 MOS13040
1B3E   0543           1305           CLAR  R4,R3              IS DATA CORRECT ?                      MOS13050
1B40   2333           1306           BES   T6S8               YES, BRANCH                      ***   MOS13060
1B42   41F0 1E18      1307           BAL   LINK,ERROR         NO, ERROR                        ***   MOS13070
```

TEST 2

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1B46  4036 0000        1308  T6S8     STH   R3,0(R6)          STORE C.D.P. AT TC LOC                    MOS13080
1B4A  0867             1309           LDAR  R6,R7             R6 = RUNNING CELL                         MOS13090
1B4C  6110 1840        1310           AHM   R1,ERRNO          SET ERRNO = C'11'                  ***    MOS13100
1B50  083A             1311           LDAR  R3,R10            LOAD O.D.P. AT RUNNING CELL LOC           MOS13110
1B52  C36D 0000        1312           THI   R6,0(R13)         IS O.D.P. CORRECT ?                       MOS13120
1B56  2332             1313           BZS   T6S9              YES, BRANCH                               MOS13130
1B58  083B             1314           LDAR  R3,R11            NO, LOAD O.D.P.                           MOS13140
1B5A  4846 0000        1315  T6S9     LH    R4,0(R6)          CHECK RUNNING CELL LOC                    MOS13150
1B5E  0543             1316           CLAR  R4,R3             IS DATA CORRECT ?                         MOS13160
1B60  2333             1317           BES   T6S10             YES, BRANCH                        ***    MOS13170
1B62  41F0 1E18        1318           BAL   LINK,ERROR       NO, ERROR                          ***    MOS13180
                       1319  *                                                                          MOS13190
1B66  4036 0000        1320  T6S10    STH   R3,0(R6)          STORE O.D.P. AT RUNNING CELL LOC          MOS13200
                       1321  *                                                                          MOS13210
1B6A  0867             1322  INCRRC   LDAR  R6,R7             R6 = RUNNING CELL                         MOS13220
1B6C  0469             1323           NHR   R6,R9             MASK LOC. WITH T.O.C. LOC.                MOS13230
1B6E  0569             1324           CLAR  R6,R9             RUNNING CELL = TOP OF COLUMN ?            MOS13240
1B70  2335             1325           BES   INCRTC            YES, INCREMENT THE TEST CELL              MOS13250
1B72  0A72             1326           AHR   R7,R2             NO, INCREMENT RUNNING CELL (+X'82')       MOS13260
1B74  047C             1327           NHR   R7,R12            MASK TO STAY WITHIN CHIP (8KB)            MOS13270
1B76  4300 1B08        1328           B     T6S6              CONTINUE TESTING                          MOS13280
                       1329  *                                                                          MOS13290
                       1330  *                                                                          MOS13300
1B7A  0868             1331  INCRTC   LDAR  R6,R8             R6 = TEST CELL                            MOS13310
1B7C  083A             1332           LDAR  R3,R10            GET FIRST BACKGROUND PATTERN              MOS13320
1B7E  C36D 0000        1333           THI   R6,0(R13)         PATTERN CORRECT ?                         MOS13330
1B82  2332             1334           BZS   INCRTC1           YES, BRANCH                               MOS13340
1B84  083B             1335           LDAR  R3,R11            NO, LOAD SECOND BACKGROUND PATTERN        MOS13350
1B86  4036 0000        1336  INCRTC1  STH   R3,0(R6)          RESTORE TEST CELL TO BACKGROUND PATR      MOS13360
1B8A  0868             1337  INCRTC2  LDAR  R6,R8             R6 = TEST CEL LOC.                        MOS13370
1B8C  0469             1338           NHR   R6,R9             MASK LOC. WITH T.O.C. LOC.                MOS13380
1B8E  0569             1339           CLAR  R6,R9             TEST CELL = TOP OF COLUMN ?               MOS13390
1B90  2335             1340           BES   INCRX0            YES, INCREMENT X0                         MOS13400
1B92  0A82             1341           AHR   R8,R2             NO, INCREMENT TEST CELL (+X'82')          MOS13410
1B94  048C             1342           NHR   R8,R12            STAY WITHIN CHIP (8KB)                    MOS13420
1B96  4300 1B06        1343           B     T6S5              CONTINUE TEST                             MOS13430
                       1344  *                                                                          MOS13440
1B9A  41F0 1946        1345  INCRX0   BAL   LINK,TSTBRKX      IF "BREAK" GO TO TSTEND ELSE RETURN       MOS13450
1B9E  D000 1F78        1346  CKBG60   STM   R0,MOSSAVE        SAVE REGISTERS (0-F)                      MOS13460
1BA2  2460             1347           LIS   R6,0              LOAD LOLIM (FORCED TO 0)                  MOS13470
1BA4  4880 18E8        1348           LH    R8,HILIM          STAY WITHIN CHIP (8KB)                    MOS13480
1BA8  2472             1349           LIS   R7,2              LOAD INCREMENT VALUE                      MOS13490
1BAA  C840 3045        1350           LHI   R4,C'0E'                                                    MOS13500
1BAE  4040 1840        1351           STH   R4,ERRNO          SET ERRNO = C'0E'                  ***    MOS13510
                       1352  *                                                                          MOS13520
1BB2  41F0 195A        1353  CKBG61   BAL   LINK,LOWCHK       CHECK IF LOC IS LOW & CORRECT             MOS13530
1BB6  083A             1354           LDAR  R3,R10            GET FIRST BACKGROUND PATTERN              MOS13540
1BB8  C36D 0000        1355           THI   R6,0(R13)         PATTERN CORRECT ?                         MOS13550
1BBC  2332             1356           BZS   CKBG62            YES, BRANCH                               MOS13560
1BBE  083B             1357           LDAR  R3,R11            NO, GET SECOND BACKGROUND PATTERN         MOS13570
1BC0  4846 0000        1358  CKBG62   LH    R4,0(R6)          CHECK BACKGROUND PATTERN           ***    MOS13580
1BC4  0543             1359           CLAR  R4,R3             IS DATA CORRECT ?                  ***    MOS13590
1BC6  2333             1360           BES   CKBG63             YES, BRANCH                        ***    MOS13600
```

TEST 2

```
1BC8   41F0 1E18          1361           BAL   LINK,ERROR          NO, ERROR                          ***   MOS13610
                          1362   *                                                                          MOS13620
1BCC   C160 1BB2          1363   CKBG63  BXLE  R6,CKBG61           CONTINUE UNTIL DONE                      MOS13630
                          1364   *                                                                          MOS13640
1BD0   D100 1F78          1365   CKBG65  LM    R0,MOSSAVE          RESTORE REGISTERS (0-F)                  MOS13650
1BD4   CA00 0080          1366           AAI   R0,X'80'            INCREMENT X0                             MOS13660
1BD8   C500 1000          1367           CLAI  R0,X'1000'          WAS THIS THE LAST DIAGONAL ?             MOS13670
1BDC   4280 1B04          1368           BL    T6S4                NO, BRANCH                               MOS13680
1BE0   030E               1369           BR    R14                 YES, RETURN                              MOS13690
                          1370   *                                                                          MOS13700
                          1371   ************************************************************************   MOS13710
                          1372   *       END   TEST 2                                                       MOS13720
```

```
                     *        TEST 3                       MEMORY HOLD TEST                 MOS13740
                     *                                                                      MOS13750
                     *        PURPOSE                                                       MOS13760
                     *              THIS TEST CHECKS THE ABILITY OF THE MOS MEMORY REFRESH  MOS13770
                     *              CIRCUIT TO OPERATE IN THE EVENT OF A POWER FAILURE.     MOS13780
                     *                                                                      MOS13790
                     *        ASSUMPTIONS:                                                  MOS13800
                     *              8KB MOS MEMORY & BATTERY BACK-UP POWER SUPPLY.          MOS13810
                     *                                 *****************************        MOS13820
                     *                                                                      MOS13830
                     *        DESIGN SPECIFICATIONS:                                        MOS13840
                     *              1. A BACKGROUND PATTERN IS WRITTEN TO ALL AVAILABLE     MOS13850
                     *                 MEMORY.                                              MOS13860
                     *              2. POWER IS REMOVED FOR 30 SECONDS(MINIMUM).            MOS13870
                     *              3. UPON RESTART, THE PROGRAM READS MEMORY 8 TIMES       MOS13880
                     *                 CHECKING FOR ERRORS.                                 MOS13890
                     *                                                                      MOS13900
                     *        OPTIONS                                                       MOS13910
                     *              SCOPE - ERROR OPTION MODE                               MOS13920
                     *                  0 - PRINT ERROR DATA AND SKIP TO NEXT TEST          MOS13930
                     *                  1 - PRINT BAD CHIP NUMBER(S) AND SKIP TO NEXT TEST  MOS13940
                     *                  2 - PRINT ERROR DATA AND CONTINUE TEST              MOS13950
                     *                  3 - PRINT ERROR DATA AND HALT                       MOS13960
                     *                  4 - IGNORE ERROR                                    MOS13970
                     *                  5 - PRINT BAD CHIP NUMBER(S) AND CONTINUE TEST      MOS13980
                     *                                                                      MOS13990
                     *        HOW TO RUN THE TEST:                                          MOS14000
                     *              1. ENTER THE "SCOPE" OPTION VIA THE CONSOLE DEVICE.     MOS14010
                     *              2. ENTER "RUN" AND THE TEST WILL EXECUTE.               MOS14020

1BE2  4860 18E6      TEST3    LH    R6,LOLIM           INITIALIZE MEMORY LIMITS (LOW)       MOS14040
1BE6  4880 18E8               LH    R8,HILIM           *                       (HIGH)       MOS14050
1BEA  2788                    SIS   R8,8                                                    MOS14060
1BEC  2478                    LIS   R7,8               LOAD BXLE INCREMENT VALUE (DFW)      MOS14070
1BEE  2411                    LIS   R1,1               LOAD DISPLAY ADDRESS                 MOS14080
1BF0  24A0                    LIS   R10,0              LOAD 4 DATA PATTERNS                 MOS14090
1BF2  25B1                    LCS   R11,1                                                   MOS14100
1BF4  C8C0 AAAA               LHI   R12,X'AAAA'                                             MOS14110
1BF8  C8D0 5555               LHI   R13,X'5555'                                             MOS14120
                     *                                                                      MOS14130
1BFC  41F0 195A      T7S1     BAL   LINK,LOWCHK        CHECK IF LOC IS LOW & CORRECT        MOS14140
1C00  40A6 0000               STH   R10,0(R6)                                               MOS14150
1C04  40B6 0002               STH   R11,2(R6)                                               MOS14160
1C08  40C6 0004               STH   R12,4(R6)                                               MOS14170
1C0C  40D6 0006               STH   R13,6(R6)          STORE DATA PATTERNS                  MOS14180
1C10  C160 1BFC      T7S1.5   BXLE  R6,T7S1            FROM LOLIM TO HILIM                  MOS14190
1C14  C850 1C40               LHI   R5,T7MM1                                                MOS14200
1C18  4050 003E               STH   R5,X'3E'           SET VECTOR FOR MM                    MOS14210
                     *                                 ON POWER DOWN                        MOS14220
                     *                                                                      MOS14230
1C1C  C850 1F5C               LHI   R5,T7MSG           UNCONDITIONALLY PRINT:               MOS14240
```

TEST 3

```
1C20  4050 1800          1425  T7OUTMSG STH   R5,ISITERR          FORCE PRINTING                                  MOS14250
1C24  41F0 14C6          1426           BAL   LINK,PRINT          "POWER DOWN PROC. FOR 30 SECONDS"               MOS14260
1C28  40A0 1800          1427           STH   R10,ISITERR         RESET FORCED PRINTING FLAG                      MOS14270
1C2C  25E1               1428           LCS   R14,1               ESTABLISH WAIT COUNTERS                         MOS14280
1C2E  C820 0080          1429  T7S2     LHI   R2,128                                                              MOS14290
                         1430  *                                                                                 MOS14300
1C32  2721               1431  T7S3     SIS   R2,1                DECREMENT COUNTER                               MOS14310
1C34  2031               1432           BNZS  T7S3                WAIT 256* SF INSTRUCTION TIMES                  MOS14320
1C36  41F0 1946          1433           BAL   LINK,TSTBRKX        IF "BREAK" GO TO TSTEND ELSE RETURN             MOS14330
1C3A  27E1               1434           SIS   R14,1               WAIT 30 SECONDS FOR MM                          MOS14340
1C3C  2037               1435           BNZS  T7S2                ON POWER DOWN                                   MOS14350
1C3E  220F               1436           BS    T7OUTMSG            BRANCH                                          MOS14360
                         1437  *                                                                                 MOS14370
                         1438  ********************************************************************************  MOS14380
                         1439  *                                                                                 MOS14390
1C40  C8E0 1C4E          1440  T7MM1    LHI   R14,T7MM2           SET VECTOR FOR MM                               MOS14400
1C44  40E0 003E          1441           STH   R14,X'3E'           ON POWER UP                                     MOS14410
1C48  C8E0 80F0          1442           LHI   R14,X'80F0'                                                         MOS14420
1C4C  954E               1443           EPSR  R4,R14              WAIT FOR MM INT  (PSW = X'80F0')                MOS14430
                         1444  *                                                                                 MOS14440
                         1445  ********************************************************************************  MOS14450
                         1446  *                                                                                 MOS14460
1C4E  41F0 17CE          1447  T7MM2    BAL   LINK,EPSWR2         PSW = X'30F0'                          ***     MOS14470
1C52  C840 1782          1448           LHI   R4,MM0                                                              MOS14480
1C56  4040 003E          1449           STH   R4,X'3E'            SET NEW MM POINTER                              MOS14490
1C5A  24E8               1450           LIS   R14,8               LOAD MEMORY CHECK COUNTER                       MOS14500
1C5C  C840 3230          1451           LHI   R4,C'20'                                                            MOS14510
1C60  4040 1840          1452           STH   R4,ERRNO            SET ERRNO = C'20'                      ***     MOS14520
1C64  2472               1453           LIS   R7,2                                                                MOS14530
                         1454  *                                                                                 MOS14540
1C66  4860 18E6          1455  T7S4     LH    R6,LOLIM            INITIALIZE LOW MEMORY LIMIT                     MOS14550
1C6A  6110 1840          1456           AHM   R1,ERRNO            INCREMENT ERRNO (21-28)                         MOS14560
                         1457  *                                                                                 MOS14570
1C6E  94F6               1458  T7S5     EXBR  LINK,R6             EXCHANGE ADDRESS BYTES                          MOS14580
1C70  981F               1459           WHR   R1,LINK             DISPLAY ADDRESS UNDER TEST                      MOS14590
1C72  41F0 195A          1460           BAL   LINK,LOWCHK         CHECK IF LOC IS LOW & CORRECT                   MOS14600
1C76  083A               1461           LDAR  R3,R10              GET FIRST DATA PATTERN                          MOS14610
1C78  4150 1CA2          1462           BAL   R5,T7SUB1           CHECK LOC FOR ERROR                    ***     MOS14620
1C7C  083B               1463  T7S6     LDAR  R3,R11              GET SECOND DATA PATTERN                         MOS14630
1C7E  4150 1CA0          1464           BAL   R5,T7SUB            CHECK LOC FOR ERROR                    ***     MOS14640
1C82  083C               1465  T7S7     LDAR  R3,R12              GET THIRD DATA PATTERN                          MOS14650
1C84  4150 1CA0          1466           BAL   R5,T7SUB            CHECK LOC FOR ERROR                    ***     MOS14660
1C88  083D               1467  T7S8     LDAR  R3,R13              GET FOURTH DATA PATTERN                         MOS14670
1C8A  4150 1CA0          1468           BAL   R5,T7SUB            CHECK LOC FOR ERROR                    ***     MOS14680
1C8E  C160 1C6E          1469  T7S9     BXLE  R6,T7S5             CHECK LOLIM TO HILIM                            MOS14690
1C92  41F0 1946          1470           BAL   LINK,TSTBRKX        IF "BREAK" GO TO TSTEND ELSE RETURN             MOS14700
1C96  27E1               1471           SIS   R14,1               CHECKED MEMORY 8 TIMES ?                        MOS14710
1C98  4230 1C66          1472           BNZ   T7S4                NO, REPEATE                                     MOS14720
1C9C  4300 12CC          1473           B     TSTEND              YES, END OF TEST(RETURN TO EXEC)                MOS14730
                         1474  *                                                                                 MOS14740
```

TEST 3

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                         1476  ********************************************************************************  MOS14760
1CA0    2662             1477  T7SUB    AIS    R6,2                 INCREMENT LOC COUNTER              ***   MOS14770
                         1478  *                                                                         ***   MOS14780
1CA2    4846 0000        1479  T7SUB1   LH     R4,0(R6)             LOAD DATA FROM LOC                 ***   MOS14790
1CA6    0543             1480           CLAR   R4,R3                IS DATA CORRECT ?                  ***   MOS14800
1CA8    2333             1481           BES    T7OK                 YES, BRANCH                        ***   MOS14810
1CAA    41F0 1E18        1482           BAL    LINK,ERROR           NO, ERROR                          ***   MOS14820
1CAE    0305             1483  T7OK     BR     R5                   RETURN                             ***   MOS14830
                         1484  ********************************************************************************  MOS14840
                         1485  *        END    TEST 3                                                         MOS14850
```

TEST 4

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                        1487  *       TEST 4 (OPTIONAL TEST)    LONG COUNT RELOCATABLE                MOS14870
                        1488  *                                 HAMMER DISTURB TEST                   MOS14880
                        1489  *                                                                       MOS14890
                        1490  *       PURPOSE:                                                        MOS14900
                        1491  *            THE TEST EXERCISES THE MOS MEMORY IN AN ENVIRONMENT        MOS14910
                        1492  *            SIMILAR TO THAT OF AN OPERATING SYSTEM.                    MOS14920
                        1493  *                                                                       MOS14930
                        1494  *       ASSUMPTIONS:                                                    MOS14940
                        1495  *            8KB MOS MEMORY                                             MOS14950
                        1496  *                                                                       MOS14960
                        1497  *       DESIGN SPECIFICATIONS:                                          MOS14970
                        1498  *            THIS IS AN OVERNIGHT TEST DESIGNED TO POINT OUT            MOS14980
                        1499  *            POSSIBLE "SOFT" FAILURE LOCATIONS IN MOS MEMORY.           MOS14990
                        1500  *            (SIMILAR TO TEST 5)                                        MOS15000
                        1501  *                                                                       MOS15010
                        1502  *       OPTIONS:                                                        MOS15020
                        1503  *            DATA  - 16-BIT BACKGROUND DATA PATTERN                     MOS15030
                        1504  *            SCOPE - ERROR OPTION MODE                                  MOS15040
                        1505  *                0 - PRINT ERROR DATA AND SKIP TO NEXT TEST             MOS15050
                        1506  *                1 - PRINT BAD CHIP NUMBER(S) AND SKIP TO NEXT TEST     MOS15060
                        1507  *                2 - PRINT ERROR DATA AND CONTINUE TEST                 MOS15070
                        1508  *                3 - PRINT ERROR DATA AND HALT                          MOS15080
                        1509  *                4 - IGNORE ERROR                                       MOS15090
                        1510  *                5 - PRINT BAD CHIP NUMBER(S) AND CONTINUE TEST         MOS15100
                        1511  *                                                                       MOS15110
                        1512  *       HOW TO RUN THE TEST:                                            MOS15120
                        1513  *            1. ENTER THE "DATA" & "SCOPE" OPTIONS VIA THE CONSOLE      MOS15130
                        1514  *               DEVICE.                                                 MOS15140
                        1515  *            2. ENTER "RUN" AND THE TEST WILL EXECUTE.                  MOS15150

1CB0  4860 18E6         1517  TEST4   LH    R6,LOLIM          INITIALIZE MEMORY LIMITS (LOW)        MOS15170
1CB4  4880 18E8         1518          LH    R8,HILIM          *                        (HIGH)       MOS15180
1CB8  2472              1519          LIS   R7,2              LOAD BXLE INCREMENT VALUE (HW)        MOS15190
1CBA  41F0 195A         1520          BAL   LINK,LOWCHK       CHECK IF LOC IS LOW & CORRECT         MOS15200
1CBE  08A6              1521          LDAR  R10,R6            R10 = LOLIM (SAVE)                    MOS15210
1CC0  08B8              1522          LDAR  R11,R8            R11 = HILIM (SAVE)                    MOS15220
1CC2  2411              1523          LIS   R1,1              LOAD DISPLAY ADDRESS                  MOS15230
1CC4  4850 18D2         1524          LH    R5,DATA+6         LOAD BACKGROUND DATA PATTERN          MOS15240
1CC8  C820 0090         1525          LHI   R2,ENDMOV8-MOVPRG+2 LOAD LENGTH OF SUBROUTINE           MOS15250
                        1526  *                                                                       MOS15260
1CCC  4056 0000         1527  T8SW    STH   R5,0(R6)          STORE BACKGROUND DATA PATTERN         MOS15270
1CD0  C160 1CCC         1528          BXLE  R6,T8SW           FROM LOLIM TO HILIM                   MOS15280
1CD4  086A              1529          LDAR  R6,R10            RESTORE LOLIM                         MOS15290
                        1530  *                                                                       MOS15300
1CD6  D000 1F78         1531          STM   R0,MOSSAVE        SAVE REGISTERS (0-F)                  MOS15310
1CDA  0816              1532          LDAR  R1,R6             LOAD INDEX REGISTER                   MOS15320
1CDC  D120 1D7A         1533          LM    R2,MOVPRG         MOVE SUB INTO TEST AREA               MOS15330
1CE0  D021 0002         1534          STM   R2,2(R1)                                                  MOS15340
1CE4  D120 1D96         1535          LM    R2,MOVPRG+28                                              MOS15350
1CE8  D021 001E         1536          STM   R2,30(R1)                                                 MOS15360
1CEC  D120 1DB2         1537          LM    R2,MOVPRG+56                                              MOS15370
```

TEST 4

```
1CF0   D021 003A          1538           STM   R2,58(R1)                                                  MOS15380
1CF4   D120 1DCE          1539           LM    R2,MOVPRG+84                                               MOS15390
1CF8   D021 0056          1540           STM   R2,86(R1)                                                  MOS15400
1CFC   D120 1DEA          1541           LM    R2,MOVPRG+112                                              MOS15410
1D00   D021 0072          1542           STM   R2,114(R1)                                                 MOS15420
1D04   D1F0 1E06          1543           LM    R15,MOVPRG+140                                             MOS15430
1D08   D0F1 008E          1544           STM   R15,142(R1)                                                MOS15440
1D0C   D100 1F78          1545           LM    R0,MOSSAVE          RESTORE REGISTERS                      MOS15450
1D10   C840 1782          1546           LHI   R4,MMO                                                     MOS15460
1D14   4040 003E          1547           STH   R4,X'3E'            SET NEW MM POINTER                     MOS15470
1D18   0B82               1548           SAR   R8,R2               SET HIGH LIMIT = SUB - SUB LENGTH      MOS15480
                          1549  *                                                                          MOS15490
1D1A   94F6               1550  T8SX     EXBR  R15,R6              EXCHANGE ADDRESS BYTES                 MOS15500
1D1C   981F               1551           WHR   R1,R15              DISPLAY ADDRESS UNDER TEST             MOS15510
1D1E   41F0 1946          1552           BAL   LINK,TSTBRKX        IF "BREAK" GO TO OPTIN ELSE RETURN     MOS15520
1D22   C840 3044          1553           LHI   R4,C'0D'                                                   MOS15530
1D26   4040 1840          1554           STH   R4,ERRNO            SET ERRNO = C'0D'              ***     MOS15540
1D2A   41E6 0002          1555           BAL   R14,2(R6)           BRANCH TO "MOVPRG"                     MOS15550
                          1556  *                                                                          MOS15560
1D2E   D000 1F78          1557           STM   R0,MOSSAVE          SAVE REGISTERS (0-F)                   MOS15570
1D32   0816               1558           LDAR  R1,R6               LOAD INDEX REGISTER                    MOS15580
1D34   D121 0072          1559           LM    R2,ENDMOV8-MOVPRG-28(R1) RELOCATE SUB IN MEMORY(+2)        MOS15590
1D38   D021 0074          1560           STM   R2,ENDMOV8-MOVPRG-26(R1)                                   MOS15600
1D3C   D121 0056          1561           LM    R2,ENDMOV8-MOVPRG-56(R1)                                   MOS15610
1D40   D021 0058          1562           STM   R2,ENDMOV8-MOVPRG-54(R1)                                   MOS15620
1D44   D121 003A          1563           LM    R2,ENDMOV8-MOVPRG-84(R1)                                   MOS15630
1D48   D021 003C          1564           STM   R2,ENDMOV8-MOVPRG-82(R1)                                   MOS15640
1D4C   D121 001E          1565           LM    R2,ENDMOV8-MOVPRG-112(R1)                                  MOS15650
1D50   D021 0020          1566           STM   R2,ENDMOV8-MOVPRG-110(R1)                                  MOS15660
1D54   D121 0002          1567           LM    R2,ENDMOV8-MOVPRG-140(R1)                                  MOS15670
1D58   D021 0004          1568           STM   R2,ENDMOV8-MOVPRG-138(R1)                                  MOS15680
1D5C   D1F1 0000          1569           LM    R15,0(R1)                                                  MOS15690
1D60   D0F1 0002          1570           STM   R15,2(R1)                                                  MOS15700
1D64   D100 1F78          1571           LM    R0,MOSSAVE          RESTORE REGISTERS (0-F)                MOS15710
                          1572  *                                                                          MOS15720
1D68   4056 FFFE          1573           STH   R5,-2(R6)           RESTORE BACKGROUND AT OLD TEST LOC     MOS15730
1D6C   088B               1574           LDAR  R8,R11              RESTORE HILIM                          MOS15740
1D6E   0B82               1575           SAR   R8,R2               SUBTRACT LENGTH OF SUB                 MOS15750
1D70   0568               1576           CLAR  R6,R8               DONE ?                                 MOS15760
1D72   4280 1D1A          1577           BL    T8SX                NO, BRANCH                             MOS15770
1D76   4300 12CC          1578           B     TSTEND              YES, END OF TEST(RETURN TO EXEC)       MOS15780
                          1579  *                                                                          MOS15790
                          1580  ************************************************************************  MOS15800
                          1581  *       (R6)                                                               MOS15810
1D7A   2430               1582  MOVPRG   LIS   R3,0                INITIALIZE DATA PATTERN                MOS15820
1D7C   9D14               1583           SSR   R1,R4               EXERCISE BIT NO.3 IN INSTR. STREAM *   MOS15830
                          1584  *                                                                          MOS15840
1D7E   4036 0000          1585  MOVPRG1  STH   R3,0(R6)            STORE PATRN AT LOW TEST LOC            MOS15850
1D82   4846 0000          1586           LH    R4,0(R6)            LOAD FROM LOW LOC                      MOS15860
1D86   0543               1587           CLAR  R4,R3               DATA EQUAL ?                           MOS15870
1D88   2134               1588           BNES  MOVPRG21            NO, ERROR                              MOS15880
1D8A   2731               1589  MOVPRG2  SIS   R3,1                YES, DECREMENT DATA PATTERN            MOS15890
1D8C   2037               1590           BNZS  MOVPRG1             REPEATE TILL DONE                      MOS15900
```

TEST 4

```
1D8E   2304                       BS    MOVPRG22        BRANCH                                  MOS15910
                        *                                                                       MOS15920
1D90   41F0 1E18        MOVPRG21 BAL   LINK,ERROR      PRINT ERROR TTOD                        MOS15930
1D94   2205                       BS    MOVPRG2         BRANCH                                  MOS15940
                        *                                                                       MOS15950
1D96   084B             MOVPRG22 LDAR  R4,R11          GET HILIM                               MOS15960
1D98   0B46                       SAR   R4,R6           SUBTRACT LOLIM                          MOS15970
1D9A   0542                       CLAR  R4,R2           IS TEST AREA LARGE ENOUGH ?             MOS15980
1D9C   218B                       BLS   MOVPRG26        NO, BRANCH                              MOS15990
1D9E   0A62                       AHR   R6,R2           YES, INCREMENT TEST CELL                MOS16000
1DA0   4036 0000        MOVPRG15 STH   R3,0(R6)        STORE PATRN AT HIGH TEST LOC            MOS16010
1DA4   4846 0000                  LH    R4,0(R6)        LOAD FROM HIGH LOC                      MOS16020
1DA8   0543                       CLAR  R4,R3           EQUAL ?                                 MOS16030
1DAA   2135                       BNES  MOVPRG27        NO, ERROR                               MOS16040
1DAC   2731             MOVPRG25 SIS   R3,1            YES, DECREMENT DATA PATTERN             MOS16050
1DAE   2037                       BNZS  MOVPRG15        REPEAT TILL DONE                        MOS16060
1DB0   0B62                       SAR   R6,R2           DECREMENT TEST CELL                     MOS16070
1DB2   2304             MOVPRG26 BS    MOVPRG28        BRANCH                                  MOS16080
                        *                                                                       MOS16090
1DB4   41F0 1E18        MOVPRG27 BAL   LINK,ERROR      PRINT ERROR TTOD                        MOS16100
1DB8   2206                       BS    MOVPRG25        BRANCH                                  MOS16110
                        *                                                                       MOS16120
1DBA   0886             MOVPRG28 LDAR  R8,R6           GET TEST CELL ADDRESS                   MOS16130
1DBC   08C6                       LDAR  R12,R6          SAVE TEST LOCATION COUNTER              MOS16140
1DBE   0835                       LDAR  R3,R5           GET BACKGROUND DATA PATTERN             MOS16150
1DC0   C840 3045                  LHI   R4,C'0E'                                                MOS16160
1DC4   4040 1840                  STH   R4,ERRNO        SET ERRNO = C'0E'               ***     MOS16170
1DC8   086A                       LDAR  R6,R10          GET LOLIM                               MOS16180
1DCA   0568             MOVPRG29 CLAR  R6,R8           IS LOW BACKGROUND AREA PRESENT ?        MOS16190
1DCC   233C                       BES   MOVPRG5         NO, BRANCH                              MOS16200
1DCE   4846 0000        MOVPRG3  LH    R4,0(R6)        GET BACKGROUND DATA                     MOS16210
1DD2   0543                       CLAR  R4,R3           IS LOW BACKGROUND PATTERN OK ?          MOS16220
1DD4   2135                       BNES  MOVPRG45        NO, ERROR                               MOS16230
1DD6   2662             MOVPRG4  AIS   R6,2            INCREMENT LOW LOCATION COUNTER          MOS16240
1DD8   0568                       CLAR  R6,R8           FINISHED LOW BACKGROUND TESTING ?       MOS16250
1DDA   2086                       BLS   MOVPRG3         NO, REPEATE TIL DONE                    MOS16260
1DDC   2304                       BS    MOVPRG5         BRANCH                                  MOS16270
                        *                                                                       MOS16280
1DDE   41F0 1E18        MOVPRG45 BAL   LINK,ERROR      PRINT ERROR TTOE                        MOS16290
1DE2   2206                       BS    MOVPRG4         BRANCH                                  MOS16300
                        *                                                                       MOS16310
1DE4   0868             MOVPRG5  LDAR  R6,R8           RESTORE LOC COUNTER                     MOS16320
1DE6   0A62                       AHR   R6,R2           ADD LENGTTH OF SUB                      MOS16330
1DE8   2662                       AIS   R6,2            + 2                                     MOS16340
1DEA   056B             MOVPRG6  CLAR  R6,R11          LOC > HILIM ?                           MOS16350
1DEC   238B                       BNLS  MOVPRG8         YES, DONE (BRANCH)                      MOS16360
1DEE   4846 0000                  LH    R4,0(R6)        NO, GET BACKGROUND DATA                 MOS16370
1DF2   0543                       CLAR  R4,R3           NO, IS HI BACKGROUND PATTERN OK ?       MOS16380
1DF4   2134                       BNES  MOVPRG75        NO, ERROR                               MOS16390
1DF6   2662             MOVPRG7  AIS   R6,2            INCREMENT HI LOC                        MOS16400
1DF8   2037                       BNZS  MOVPRG6         REPEATE TILL DONE                       MOS16410
1DFA   2304                       BS    MOVPRG8         BRANCH                                  MOS16420
                        *                                                                       MOS16430
```

TEST 4

```
1DFC   41F0 1E18          1644  MOVPRG75 BAL   LINK,ERROR          PRINT ERROR TTOE                    MOS16440
1E00   2205               1645           BS    MOVPRG7            BRANCH                              MOS16450
                          1646  *                                                                      MOS16460
1E02   C86C 0002          1647  MOVPRG8  LHI   R6,2(R12)          INCREMENT LOCATION COUNTER          MOS16470
1E06   030E               1648           BR    R14                RETURN                              MOS16480
       0000 1E08          1649  ENDMOV8  EQU   *                  (R6)+164                            MOS16490
                          1650  *                                                                      MOS16500
                          1651  ************************************************************************MOS16510
                          1652  *        END   TEST 4                                                  MOS16520
```

COMMON ERROR ROUTINE

```
1E08  4040 100A          1654  PARERR   STH   R4,TEMP          SET UP TO PRINT PARITY ERROR     ***  MOS16540
1E0C  C840 3132          1655           LHI   R4,C'12'         *                                ***  MOS16550
1E10  4040 1840          1656           STH   R4,ERRNO         SET ERRNO = C'12'                ***  MOS16560
1E14  4840 100A          1657           LH    R4,TEMP          *                                ***  MOS16570
                         1658  *                                                                    MOS16580
                         1659  *  COMMON ERROR ROUTINE         CALL:  BAL   LINK,ERROR               MOS16590
                         1660  *                                                                    MOS16600
                         1661  *   R6= LOCATION OF ERROR    R3= DATA EXPECTED    R4= DATA READ     MOS16610
                         1662  *                                                                    MOS16620
                         1663  *                                                                    MOS16630
1E18  D000 1F78          1664  ERROR    STM   R0,MOSSAVE        SAVE RETURN ADDRESS              ***  MOS16640
1E1C  41F0 1414          1665           BAL   LINK,ERR         PRINT THE ERROR NUMBER                MOS16650
1E20  25F1               1666           LCS   LINK,1                                                 MOS16660
1E22  40F0 1802          1667           STH   LINK,NOERR       SET ERROR FLAG FOR EXEC.              MOS16670
1E26  48F0 18BA          1668           LH    LINK,SCOPE+6     GET "SCOPE" VALUE                     MOS16680
1E2A  27F1               1669           SIS   LINK,1           IS SCOPE = 1 ?                        MOS16690
1E2C  4330 1E96          1670           BZ    PARTNO           YES, PRINT PART NUMBER.               MOS16700
1E30  27F3               1671           SIS   LINK,3           IS SCOPE = 4 ?                        MOS16710
1E32  4330 1E82          1672           BZ    ERORTN2          YES, RETURN (IGNORE ERROR)            MOS16720
1E36  27F1               1673           SIS   LINK,1           IS SCOPE = 5 ?                        MOS16730
1E38  4330 1E96          1674           BZ    PARTNO           YES, PRINT PART NO. & CONTINUE        MOS16740
1E3C  2404               1675  ERROR1   LIS   R0,4             LOAD NO. OF DIGITS FOR CONVERSION     MOS16750
1E3E  0816               1676           LDAR  R1,R6            GET ADDRESS UNDER TEST                MOS16760
1E40  41F0 1498          1677           BAL   LINK,HEXASC      STORE LOCATION UNDER TEST IN MESSAGE  MOS16770
1E44  1F18               1678           DC    Z(ADRMSG)        *                                ***  MOS16780
1E46  0813               1679           LDAR  R1,R3            GET EXPECTED DATA                     MOS16790
1E48  41F0 1498          1680           BAL   LINK,HEXASC      STORE DATA EXPECTED IN MESSAGE        MOS16800
1E4C  1F26               1681           DC    Z(DTAEXP)        *                                ***  MOS16810
1E4E  0814               1682           LDAR  R1,R4            GET DATA READ                         MOS16820
1E50  41F0 1498          1683           BAL   LINK,HEXASC      STORE DATA READ IN MESSAGE            MOS16830
1E54  1F36               1684           DC    Z(DTARED)        *                                ***  MOS16840
1E56  C850 1F14          1685  ERROR2   LDAI  R5,ERRORMSG      LOAD ERROR MESSAGE LOCATION           MOS16850
1E5A  4050 1800          1686           STH   R5,ISITERR       FORCE PRINTING                        MOS16860
1E5E  41F0 14C6          1687           BAL   LINK,PRINT       PRINT THE ERROR DATA                  MOS16870
1E62  2450               1688           LIS   R5,0                                                   MOS16880
1E64  4050 1800          1689           STH   R5,ISITERR       RESET FORCED PRINTING FLAG            MOS16890
                         1690  *                                                                    MOS16900
1E68  48F0 18BA          1691  ERORTN   LH    LINK,SCOPE+6     LOAD "SCOPE" VALUE                    MOS16910
1E6C  4330 12CC          1692           BZ    TSTEND           IF SCOPE = 0,                         MOS16920
1E70  27F1               1693           SIS   LINK,1           OR SCOPE = 1,                         MOS16930
1E72  4330 12CC          1694           BZ    TSTEND           GO TO NEXT TEST                       MOS16940
1E76  27F2               1695           SIS   LINK,2           IS SCOPE = 3 ?                        MOS16950
1E78  4330 1342          1696           BZ    ABORT1           YES, ABORT TESTING SEQUENCE           MOS16960
1E7C  D100 1F78          1697  ERORTN1  LM    R0,MOSSAVE       NO,RESTORE CALLING REGISTERS          MOS16970
1E80  030F               1698           BR    LINK             RETURN                                MOS16980
                         1699  *                                                                    MOS16990
1E82  48F0 180C          1700  ERORTN2  LH    LINK,TOTERR      IF SCOPE = 4,                         MOS17000
1E86  26F1               1701           AIS   LINK,1           INDEX THE ERROR COUNTER               MOS17010
1E88  40F0 180C          1702           STH   LINK,TOTERR      STORE THE INCREMENTED ERROR COUNTER   MOS17020
1E8C  C5F0 7FFF          1703           CLAI  LINK,X'7FFF'     TOTERR = MAXIMUM ?                    MOS17030
1E90  203A               1704           BNES  ERORTN1          NO, RETURN (BRANCH)                   MOS17040
1E92  4300 13AA          1705           B     HALT9            YES, WAIT FOR PRINTOUT                MOS17050
```

COMMON ERROR ROUTINE

```
1E96  0734           1707  PARTNO  XAR   R3,R4          DETERMINE BIT(S) THAT FAILED          MOS17070
1E98  2410           1708          LIS   R1,0           INITIALIZE CHIP NUMBER                MOS17080
1E9A  C530 FFFF      1709          CLAI  R3,-1          DID ALL BITS FAIL ?                   MOS17090
1E9E  2138           1710          BNES  CO3            NO, BRANCH                            MOS17100
1EA0  C840 4646      1711          LDAI  R4,C'FF'                                             MOS17110
1EA4  4040 1F10      1712          STH   R4,CHIPNO+2    YES, STORE 8KB ROW IDENTIFIER         MOS17120
1EA8  2430           1713          LIS   R3,0           LOAD CONTIN VALUE IN REG. R3          MOS17130
1EAA  4300 1EDA      1714          B     CO5            CONTINUE                              MOS17140
1EAE  9131           1715  CO3     SLHLS R3,1           DECIPHER FAILING BIT NUMBER(S)        MOS17150
1EB0  2185           1716          BCS   CO4            (00-09,10-16) - ON CARRY              MOS17160
1EB2  2611           1717          AIS   R1,1           INCREMENT CHIP NUMBER                 MOS17170
1EB4  C510 0010      1718          CLHI  R1,16          CHIP NUMBER = 16 ?                    MOS17180
1EB8  2085           1719          BLS   CO3            NO, BRANCH                            MOS17190
1EBA  C820 3030      1720  CO4     LHI   R2,C'00'       STORE CHIP NUMBER                     MOS17200
1EBE  4020 1F10      1721          STH   R2,CHIPNO+2     IN ASCII                              MOS17210
1EC2  0801           1722          LDAR  R0,R1          SAVE BIT NUMBER                       MOS17220
1EC4  C510 000A      1723          CLHI  R1,10          BIT NUMBER > 10 ?                     MOS17230
1EC8  2186           1724          BLS   CO4.5          YES, BRANCH                           MOS17240
1ECA  C820 0100      1725          LHI   R2,X'100'      NO, CONVERT BIT NO. TO HIGH DECIMAL   MOS17250
1ECE  6120 1F10      1726          AHM   R2,CHIPNO+2    STORE HIGH BIT NO. IN ERROR MESSAGE   MOS17260
1ED2  271A           1727          SIS   R1,10          DECREMENT ERROR BIT POSITION BY 10    MOS17270
1ED4  6110 1F10      1728  CO4.5   AHM   R1,CHIPNO+2    STORE LOW BIT NO. IN ERROR MESSAGE    MOS17280
1ED8  0810           1729          LDAR  R1,R0          RESTORE BIT NUMBER                    MOS17290
1EDA  C850 1EFA      1730  CO5     LDAI  R5,CHIPMSG     LOAD ERROR MESSAGE ADDRESS            MOS17300
1EDE  4050 1800      1731          STH   R5,ISITERR     FORCE PRINTING                        MOS17310
1EE2  41F0 14C6      1732          BAL   LINK,PRINT     PRINT SUSPECTED CHIP NUMBER           MOS17320
1EE6  2450           1733          LIS   R5,0                                                 MOS17330
1EE8  4050 1800      1734          STH   R5,ISITERR     RESET FORCED PRINTING FLAG            MOS17340
1EEC  0833           1735          LDAR  R3,R3          HAVE ALL SUSPECT CHIPS BEEN PRINTED?  MOS17350
1EEE  4230 1EAE      1736          BNZ   CO3            NO, BRANCH                            MOS17360
1EF2  D100 1F78      1737          LM    R0,MOSSAVE     YES, RESTORE REGISTERS                MOS17370
1EF6  4300 1E3C      1738          B     ERROR1         GO PRINT ERROR DATA                   MOS17380
                     1739  *                                                                   MOS17390
                     1740  ************************************************************************ MOS17400
                     1741  *       END   COMMON ERROR ROUTINE                                  MOS17410
```

CHKSUM FILE

```
                                1743  *                                                                    MOS17430
                                1744  *        TEST MESSAGES                                               MOS17440
                                1745  *                                                                    MOS17450
1EFA  5355 5350 4543 5445       1746  CHIPMSG  DC    C'SUSPECTED BAD CHIP  '                               MOS17460
1F02  4420 4241 4420 4348
1F0A  4950 2020
1F0E  4130 2A2A                 1747  CHIPNO   DC    C'A0**',X'0D0A'                                       MOS17470
1F12  0D0A
1F14  4C4F 4320                 1748  ERRORMSG DC    C'LOC '                                               MOS17480
                                1749  *                                                                    MOS17490
1F18  2A2A 2A2A 2044 4154       1750  ADRMSG   DC    C'**** DATA EXP '                                     MOS17500
1F20  4120 4558 5020
1F26  2A2A 2A2A 2020 4441       1751  DTAEXP   DC    C'****  DATA READ '                                  MOS17510
1F2E  5441 2052 4541 4420
1F36  2A2A 2A2A                 1752  DTARED   DC    C'****',X'0D0A'                                       MOS17520
1F3A  0D0A
1F3C  4D45 4D4F 5259 2055       1753  ASMEMMSG DC    C'MEMORY UNDER TEST ',X'8D0A'                         MOS17530
1F44  4E44 4552 2054 4553
1F4C  5420
1F4E  8D0A
1F50  3130 3030 2D31 4646       1754  LOMSG    DC    C'1000-1FFF ',X'0D0A'                                 MOS17540
1F58  4620
1F5A  0D0A
      0000 1F55                 1755  HIMSG    EQU   LOMSG+5             *                          ***   MOS17550
                                1756  *                                                                    MOS17560
1F5C  504F 5745 5220 444F       1757  T7MSG    DC    C'POWER DOWN FOR 30 SEC.',X'0D0A'                     MOS17570
1F64  574E 2046 4F52 2033
1F6C  3020 5345 432E
1F72  0D0A
                                1758  *                                                                    MOS17580
                                1759  ********************************************************************** MOS17590
                                1760  *        END   TEST MESSAGE FILE                                     MOS17600
      0000 1F73                 1761  LNZB     EQU   *-1                                                   MOS17610
```

```
                         1763  *        TEST PROGRAM STORAGE AREA                                          MOS17630
                         1764  *                                                                           MOS17640
                         1765  ************************************************************************** MOS17650
                         1766  *                                                                           MOS17660
1F74                     1767  PSWSAVE  DS    4                  PPF PSW SAVE AREA                       MOS17670
                         1768  *                                                                           MOS17680
1F78                     1769  MOSSAVE  DS    32                 SI6MMT REGISTER SAVE AREA               MOS17690
      0000 1F78          1770  OPTBUF   EQU   MOSSAVE            OPTION INPUT BUFFER                     MOS17700
1F98                     1771  ERRSAVE  DS    32                 REGISTER SAVE FOR ERROR ROUTINES ***    MOS17710
1FB8                     1772  RSAVE    DS    32                 REGISTER SAVE AREA (ETPE) 16 BIT        MOS17720
                         1773  *                                                                           MOS17730
                         1774  ************************************************************************** MOS17740
                         1775  *        END   TEST PROGRAM  06-202(F01R01)                          ***    MOS17750
```

CHKSUM/M17 PUNCHER

```
1FD8  2400           1777  $CHKSUM  LIS   R0,0              PUNCH M17 TAPE WITH CHECKSUM          MOS17770
1FDA  9510           1778           EPSR  R1,R0             SELECT REG. SET 0 & CLEAR PSW   ***   MOS17780
                     1779  *                                                                      MOS17790
1FDC  C810 1000      1780           LDAI  R1,ORIGIN1         LOAD START ADDRESS                    MOS17800
1FE0  2421           1781           LIS   R2,1               LOAD INCREMENT VALUE                  MOS17810
1FE2  C830 1F73      1782           LDAI  R3,LNZB            LOAD FINAL ADDRESS                    MOS17820
1FE6  2440           1783           LIS   R4,0               INITIALIZE CHKSUM BYTE                MOS17830
                     1784  *                                                                      MOS17840
1FE8  D351 0000      1785  $GEN     LB    R5,0(R1)           LOAD A BYTE FROM MEMORY               MOS17850
1FEC  0745           1786           XAR   R4,R5              CALCULATE CHKSUM BYTE                 MOS17860
1FEE  C110 1FE8      1787           BXLE  R1,$GEN            REPEATE FROM ORIGIN1 TO LNZB          MOS17870
1FF2  D240 0099      1788           STB   R4,MN+3            SET CHKSUM BYTE IN BOOT LOADER        MOS17880
                     1789  *                                                                      MOS17890
1FF6  C810 0080      1790  $TAPE    LHI   R1,X'0080'         LOAD DISPLAY PANEL 'NORM' OC          MOS17900
1FFA  9E21           1791           OCR   R2,R1              PUT DISPLAY PANEL IN NORMAL MODE      MOS17910
1FFC  9444           1792           EXBR  R4,R4              REVERSE CHKSUM BYTES                  MOS17920
1FFE  9824           1793           WHR   R2,R4              DISPLAY CHKSUM BYTE (TO D1)           MOS17930
2000  9411           1794           EXBR  R1,R1              REVERSE 'NORM' OC TO 'WAIT' PSW       MOS17940
2002  9501           1795           EPSR  R0,R1              HALT PROCESSOR.                       MOS17950
                     1796  *                                                                      MOS17960
                     1797  ************************************************************************MOS17970
                     1798  *                                                                      MOS17980
2004  D360 007A      1799  $PUNCH   LB    R6,X'7A'           GET BOUTDV (PUNCH) ADDRESS.           MOS17990
2008  DE60 007B      1800           OC    R6,X'7B'           START TAPE PUNCH                      MOS18000
200C  9D60           1801           SSR   R6,R0              GET PUNCH STATUS                      MOS18010
200E  2081           1802           BTBS  8,1                WAIT FOR BUSY TO DROP                 MOS18020
2010  41F0 2052      1803           BAL   R15,$TAPL          PUNCH LEADER (256 CHARACTERS)         MOS18030
2014  9411           1804           EXBR  R1,R1              (R1) = X'0080'                        MOS18040
2016  C830 00CF      1805           LHI   R3,X'CF'           LOAD END OF LOADER ADDRESS            MOS18050
                     1806  *                                                                      MOS18060
201A  DA61 0000      1807  $PNCH1   WD    R6,0(R1)           PUNCH BOOT LOADER                     MOS18070
201E  9D60           1808           SSR   R6,R0              GET PUNCH STAUS                       MOS18080
2020  2081           1809           BTBS  8,1                WAIT FOR BUSY TO DROP                 MOS18090
2022  C110 201A      1810           BXLE  R1,$PNCH1          REPEATE X'80' TO X'CF'                MOS18100
2026  41F0 2058      1811           BAL   R15,$TAPL1         PUNCH ONE-FOLD GAP.                   MOS18110
                     1812  *                                                                      MOS18120
202A  D340 0099      1813           LB    R4,MN+3            GET CHECKSUM BYTE                     MOS18130
202E  C810 1000      1814           LDAI  R1,ORIGIN1         LOAD STARTING ADDRESS                 MOS18140
2032  C830 1F73      1815           LDAI  R3,LNZB            LOAD ENDING ADDRESS                   MOS18150
                     1816  *                                                                      MOS18160
                     1817  *                        PUNCH MAIN PROGRAM                            MOS18170
2036  D351 0000      1818  $PNCH2   LB    R5,0(R1)           GET A PROGRAM BYTE                    MOS18180
203A  0745           1819           XAR   R4,R5              GENERATE CHKSUM                       MOS18190
203C  9A65           1820           WDR   R6,R5              PUNCH PROGRAM BYTE                    MOS18200
203E  9401           1821           EXBR  R0,R1              REVERSE ADDRESS BYTES                 MOS18210
2040  9820           1822           WHR   R2,R0              DISPLAY ADDRESS PUNCHED               MOS18220
2042  9D60           1823           SSR   R6,R0              GET PUNCH STATUS                      MOS18230
2044  2081           1824           BTBS  8,1                WAIT FOR BUSY TO DROP                 MOS18240
2046  C110 2036      1825           BXLE  R1,$PNCH2          REPEATE 'ORIGIN1' TO 'LNZB'           MOS18250
204A  41F0 2052      1826           BAL   R15,$TAPL          PUNCH TRAILER.                        MOS18260
204E  4300 1FF6      1827           B     $TAPE              DISPLAY CHECKSUM, HALT PROCESSOR.     MOS18270
```

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                         1829  *   CHKSUM/M17 PUNCHER (CONTINUED)                                  ***   MOS18290
                         1830  *                                                                         MOS18300
2052   C800 0100         1831  $TAPL    LHI   R0,256            LOAD VALUE TO PUNCH BLANK LEADER       MOS18310
2056   2303              1832           BS    $TAPLP            BRANCH                                 MOS18320
                         1833  *                                                                         MOS18330
2058   C800 0080         1834  $TAPL1   LHI   R0,128            LOAD VALUE TO PUNCH 1-FOLD GAP    ***  MOS18340
                         1835  *                                                                         MOS18350
205C   2701              1836  $TAPLP   SIS   R0,1              DECREMENT FRAME COUNTER                MOS18360
205E   032F              1837           BNPR  R15                RETURN IF FINISHED (0)                 MOS18370
2060   2430              1838           LIS   R3,0               LOAD A "BLANK"                         MOS18380
2062   9A63              1839           WDR   R6,R3              PUNCH BLANK FRAME                      MOS18390
2064   9D68              1840           SSR   R6,R8              GET PUNCH STATUS                       MOS18400
2066   2081              1841           BTBS  8,1                WAIT FOR BUSY TO DROP                  MOS18410
2068   2206              1842           BS    $TAPLP             BRANCH                                 MOS18420
                         1843  *                                                                         MOS18430
                         1844  ************************************************************************  MOS18440
206A                     1845           END                                                             MOS18450
```

ASSEMBLED BY CAL 03-066R05-00 (32-BIT)

START OPTIONS: T=16,CROSS,ERLST,

NO CAL ERRORS
NO CAL WARNINGS
2 PASSES

```
$CHKSUM   0000 1FD8      1777*
$GEN      0000 1FE8      1785*  1787
$PNCH1    0000 201A      1807*  1810
$PNCH2    0000 2036      1818*  1825
$PUNCH    0000 2004      1799*
$TAPE     0000 1FF6      1790*  1827
$TAPL     0000 2052      1803   1826   1831*
$TAPL1    0000 2058      1811   1834*
$TAPLP    0000 205C      1832   1836*  1842
$TSTDU0   0000 16DC       764    766*
$TSTDU1   0000 16FA       776*
$TSTDU2   0000 16FC       773    775    777*
ABORT     0000 1306       409*
ABORT1    0000 1342       427*   750   1696
ABORT2    0000 137E       449*
ABORT3    0000 1346       420    429*
ABSTOP    0000 206A
ADC       0000 0002
ADRMSG    0000 1F18      1678   1750*
AMSG      0000 1882       187    946*
ASCILOC   0000 186C       829    943*
ASCIPSW   0000 1862       826    942*
ASMEMMSG  0000 1F3C      1017   1753*
BGTST     0000 19E8      1129*
BGTST1    0000 1A02      1139*  1142
BGTST2    0000 1A0A      1142*  1146
BGTST2.5  0000 1A10      1141   1145*
BGTST3    0000 1A16      1138   1143   1148*
BGTST4    0000 1A22      1154*  1157
BGTST5    0000 1A2A      1157*  1161
BGTST5.5  0000 1A30      1156   1160*
BGTST6    0000 1A36      1153   1158   1163*
BGTST7    0000 1A3E      1165*
BOOT      0000 0088        66     69*
BRK.SAV   0000 181A       720    753    757    926*
BRKVECT   0000 1006       105*   751    755   1032
BTESTNO   0000 180E       339    351    368    403    457    919*
C300ADR   0000 1018       115*
CAR2ND    0000 17F2       897*
CARRD     0000 17E6       889*
CARRQ2S   0000 17FA       904*
CHIPMSG   0000 1EFA      1730   1746*
CHIPNO    0000 1F0E      1712   1721   1726   1728   1747*
CKBG60    0000 1B9E      1346*
CKBG61    0000 1BB2      1353*  1363
CKBG62    0000 1BC0      1356   1358*
CKBG63    0000 1BCC      1360   1363*
```

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CKBG65    0000 1BD0      1365*
CLIF2ND   0000 17EE       895*
CLIFADR   0000 1014       113*
CLIFRD    0000 17E2       887*
CO3       0000 1EAE      1710   1715*  1719   1736
CO4       0000 1EBA      1716   1720*
CO4.5     0000 1ED4      1724   1728*
CO5       0000 1EDA      1714   1730*
COMM      0000 1750       817*
COMM1     0000 1754       819*   863
COMRET    0000 1816       924*
CON2ND    0000 17EA       150    159    160    892*   893
CONADR    0000 17DC       156    682    699    721    882*
CONENRD   0000 17EB       893*
CONRD     0000 17DE       157    158    170    684    696    884*   885
CONRQ2S   0000 17F6       144    162    163    688    900*
CONTIN    0000 189C       419    749    957*
CONWRT    0000 17DF       660    885*
COUNT     0000 1810       365    392    394    920*
CRLF      0000 154E       177    184    292    305    471    625*   708
CRT2ND    0000 17EC       894*
CRTRD     0000 17E0       886*
CRTRQ2S   0000 17F7       901*
DATA      0000 18CC       961*   1524
DEFTESTS  0000 E000       270    980*
DISPLAY   0000 13EE       412    452    488*
DTAEXP    0000 1F26      1681   1751*
DTARED    0000 1F36      1684   1752*
ECHO      0000 1612       694*
ECHO1     0000 162C       695    702*
ECHRTN    0000 162E       698    703*
ENDMOV5   0000 1A80      1092   1186*
ENDMOV8   0000 1E08      1525   1559   1560   1561   1562   1563   1564   1565   1566   1567   1568   1649*
EOTMSG    0000 1872       431    944*
EPSWR2    0000 17CE       185    391    411    429    505    819    869*   1447
ERORTN    0000 1E68      1691*
ERORTN1   0000 1E7C      1697*  1704
ERORTN2   0000 1E82      1672   1700*
ERR       0000 1414       504*   820    1665
ERR1      0000 142C       510*
ERRCOM    0000 1418       505*
ERRCOM1   0000 1446       507    521*
ERRCOM2   0000 1434       513*
ERRMSG    0000 1838       510    936*   937    938
ERRNO     0000 1840       333    814    850    938*   1131   1194   1303   1310   1351   1452   1456   1554   1617
                          1656
ERROR     0000 1E18      1145   1160   1196   1307   1318   1361   1482   1593   1610   1629   1644   1664*
ERROR1    0000 1E3C      1675*  1738
ERROR2    0000 1E56      1685*
ERRORMSG  0000 1F14      1685   1748*
ERRPL1    0000 1760       823*
ERRSAVE   0000 1F98       504    517    1771*
ETESTNO   0000 183E       332    359    937*
FITERR1   0000 1A80      1171   1178   1188*
FITERR2   0000 1A84      1174   1181   1191*
```

```
NEXTST    0000 1812    340   344   354   921*
NOERMSG   0000 1854    401   940*
NOERR     0000 1802    364   399   509   913*  1667
NOMSG     0000 18A8    437   597   958*
NORM      0000 17FD    313   498   908*
OLOC      0000 17DA    827   878*
OPSW      0000 17D8    817   824   854   877*
OPT       0000 1884    224   954*
OPTBUF    0000 1F78    193   194   195   210   218   229   1770*
OPTEND    0000 18D8    965*
OPTIN     0000 10B8    183*  202   256   272   286   442   484   752
OPTIN1    0000 10C0    185*  714   833
OPTVAL    0000 145C    248   277   530*
OPTVAL0   0000 1462    532*  550
OPTVAL1   0000 1464    533*  536
OPTVAL2   0000 1470    534   538*
OPTVAL3   0000 1474    540*  546
OPTVAL4   0000 1488    544   547*
OPTVAL5   0000 1484    542   545*
ORIGIN1   0000 1000     69    98*  1780  1814
OTC.0     0000 156E    636*  641   650   652
OTC.1     0000 1584    639   643*
OTC.3     0000 1596    646   649*
OTC.4     0000 15BE    661*  666
OTC.5     0000 15D4    668*  674
OUT.SAV   0000 1818    631   677   925*
OUT0      0000 15EA    637   656   662   664   669   676*
OUT1      0000 15EE    675   677*
OUTCHR    0000 155C    188   190   593   603   612   616   627   631*
OUTCHR2   0000 15A4    634   642   648   654*
P1        0000 14DC    575   579*
P2        0000 1502    593*  595
P3        0000 150E    580   597*
P4        0000 14E8    582*  586
P5        0000 14EC    583*  584
PARERR    0000 1E08    843   1654*
PARTNO    0000 1E96   1670   1674  1707*
PASFLG    0000 100C    108*  164   686   736   763
PASFLG2   0000 100E    109*  145
PASLADR   0000 1012    112*
PAUSE     0000 1814    635   640   647   651   654   922*
POUND     0000 18C0    960*  1111
PRINT     0000 14C6    179   362   402   433   474   483   511   573*  711   831   1025  1426  1687
                      1732
PRINT2    0000 151C    598   602*  607
PRINT3    0000 152C    605   608*  628
PRINT3A   0000 153E    611   615*
PRINT3B   0000 1540    614   616*
PRINT5    0000 1544    578   600   617*
PSW       0000 1002    103*  366   515
PSW2      0000 1004    104*  126   869
PSWMSG    0000 185E    830   941*  942   943
PSWSAVE   0000 1F74     67  1767*
PURETOP   0000 0000R
QMSG      0000 1880    710   945*
```

QUESTN	0000 1634	191	708*											
R0	0000 0000	43*	149	150	153	174	175	176	192	193	194	195	209	210
		270	271	294	298	302	303	304	326	327	328	329	338	339
		340	345	346	347	355	363	364	365	367	392	393	394	396
		399	457	458	469	470	475	488	489	493	497	498	504	513
		514	516	517	555	557	568	573	582	583	597	599	618	625
		632	633	635	638	643	659	660	661	667	672	673	682	684
		685	688	689	690	692	694	712	713	719	721	722	731	732
		740	741	746	754	755	756	762	765	771	777	783	784	785
		794	795	823	858	859	870	1018	1087	1096	1100	1105	1115	1123
		1129	1136	1163	1285	1286	1287	1346	1365	1366	1367	1531	1545	1557
		1571	1664	1675	1697	1722	1729	1737	1777	1778	1795	1801	1808	1821
		1822	1823	1831	1834	1836								
R1	0000 0001	44*	69	81	82	84	89	133	136	138	142	153	154	155
		157	159	161	162	196	207	210	216	218	219	224	226	231
		238	241	251	255	261	295	296	312	313	330	331	332	333
		352	366	367	370	371	381	403	404	416	419	421	423	424
		446	447	449	450	451	454	455	462	463	476	479	490	491
		491	492	492	493	494	495	495	496	496	497	521	522	523
		524	560	576	577	581	585	609	610	638	640	643	644	645
		647	649	654	657	658	659	660	661	663	665	670	671	672
		673	676	722	724	726	732	733	738	741	746	747	763	766
		767	768	768	769	770	770	771	772	774	776	778	784	785
		786	791	795	796	824	827	855	856	865	866	1019	1022	1089
		1113	1116	1118	1120	1122	1242	1296	1310	1408	1456	1459	1523	1532
		1534	1536	1538	1540	1542	1544	1551	1558	1559	1560	1561	1562	1563
		1564	1565	1566	1567	1568	1569	1570	1583	1676	1679	1682	1708	1717
		1718	1722	1723	1727	1728	1729	1778	1780	1785	1787	1790	1791	1794
		1794	1795	1804	1804	1807	1810	1814	1818	1821	1825			
R10	0000 000A	53*	838	838	840	841	841	847	847	848	853	1090	1169	1170
		1176	1177	1188	1246	1251	1258	1265	1278	1300	1311	1332	1354	1409
		1415	1427	1461	1521	1529	1618							
R11	0000 000B	54*	1091	1172	1173	1179	1180	1191	1247	1252	1259	1266	1281	1297
		1314	1335	1357	1410	1416	1463	1522	1574	1596	1635			
R12	0000 000C	55*	191	208	217	228	247	250	262	279	300	537	1111	1134
		1148	1183	1245	1327	1342	1411	1417	1465	1614	1647			
R13	0000 000D	56*	316	318	320	322	384	1125	1185	1198	1200	1248	1255	1262
		1279	1298	1312	1333	1355	1412	1418	1467					
R14	0000 000E	57*	126	128	248	251	253	277	309	310	311	314	548	551
		815	817	851	852	853	854	1098	1107	1121	1122	1166	1249	1253
		1256	1260	1263	1267	1369	1428	1434	1440	1441	1442	1443	1450	1471
		1555	1648											
R15	0000 000F	59*	127	171	179	197	253	263	289	290	291	314	434	435
		531	532	533	535	539	540	631	677	678	749	751	753	1112
		1113	1295	1296	1543	1544	1550	1551	1569	1570	1803	1811	1826	1837
R2	0000 0002	45*	65	85	91	134	139	141	143	144	148	149	150	157
		158	159	160	168	168	169	344	346	349	351	352	353	354
		358	359	368	369	370	380	381	463	508	509	515	516	556
		564	565	579	728	729	731	736	740	743	743	792	813	814
		849	850	859	869	870	1093	1094	1102	1103	1117	1118	1119	1120
		1132	1164	1243	1326	1341	1429	1431	1525	1533	1534	1535	1536	1537
		1538	1539	1540	1541	1542	1548	1559	1560	1561	1562	1563	1564	1565
		1566	1567	1568	1575	1598	1600	1607	1633	1720	1721	1725	1726	1781
		1791	1793	1822										
R3	0000 0003	46*	70	71	72	135	136	139	155	156	165	165	169	170

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                                171   225   229   233   235   280   281   282   315   317   319   321   377
                                557   558   559   561   566   592   594   793   797   798  1132  1140  1155
                               1188  1191  1278  1281  1282  1297  1300  1301  1305  1308  1311  1314  1316
                               1320  1332  1335  1336  1354  1357  1359  1461  1463  1465  1467  1480  1582
                               1585  1587  1589  1601  1603  1605  1615  1622  1638  1679  1707  1709  1713
                               1715  1735  1735  1782  1805  1815  1838  1839
R4              0000 0004       47*   74    75    76    78    86    88   162   163   164   166   166   187
                                189   198   200   201   203   205   212   214   218   246   249   268   283
                                533   541   543   547   549   560   561   562   563   563   564   588   589
                                590   591   602   604   608   613   615   626   667   690   692   702   703
                                799   800   801   805  1130  1131  1139  1140  1154  1155  1193  1194  1195
                               1302  1303  1304  1305  1315  1316  1350  1351  1358  1359  1443  1448  1449
                               1451  1452  1479  1480  1546  1547  1553  1554  1583  1586  1587  1596  1597
                               1598  1602  1603  1616  1617  1621  1622  1637  1638  1654  1655  1656  1657
                               1682  1707  1711  1712  1783  1786  1788  1792  1792  1793  1813  1819
R5              0000 0005       48*   76    78    79    79    81    82    83    86    88    94   178   227
                                229   274   278   361   382   401   431   432   472   473   482   510   602
                                606   710   830  1017  1092  1097  1106  1135  1149  1175  1182  1199  1420
                               1421  1424  1425  1462  1464  1466  1468  1483  1524  1527  1573  1615  1685
                               1686  1688  1689  1730  1731  1733  1734  1785  1786  1818  1819  1820
R6              0000 0006       49*   73    83    90   144   145   146   146   226   227   234   255   261
                                278   281   374   377   378   379   380   383   530   538   539   545  1038
                               1040  1083  1087  1094  1095  1096  1100  1103  1104  1105  1112  1116  1124
                               1125  1133  1134  1136  1137  1139  1142  1148  1149  1150  1152  1154  1157
                               1164  1165  1169  1170  1172  1173  1175  1176  1177  1179  1180  1182  1184
                               1195  1197  1199  1273  1279  1282  1283  1294  1295  1298  1301  1304  1308
                               1309  1312  1315  1320  1322  1323  1324  1331  1333  1336  1337  1338  1339
                               1347  1355  1358  1363  1404  1415  1416  1417  1418  1419  1455  1458  1469
                               1477  1479  1517  1521  1527  1528  1529  1532  1550  1555  1558  1573  1576
                               1585  1586  1597  1600  1601  1602  1607  1613  1614  1618  1619  1621  1624
                               1625  1632  1633  1634  1635  1637  1640  1647  1676  1799  1800  1801  1807
                               1808  1820  1823  1839  1840
R7              0000 0007       50*   92    93    94   275   282   285   375  1085  1275  1287  1290  1292
                               1309  1322  1326  1327  1349  1407  1453  1519
R8              0000 0008       51*   84    85    90    91   276   376  1084  1088  1097  1101  1106  1133
                               1135  1137  1151  1152  1274  1286  1288  1292  1294  1331  1337  1341  1342
                               1348  1405  1406  1518  1522  1548  1574  1575  1576  1613  1619  1625  1632
                               1840
R9              0000 0009       52*  686   689   696   697   699   700   702  1088  1101  1151  1244  1323
                               1324  1338  1339
RDCHAR0         0000 10FA      199   201*
RDCHAR1         0000 110E      204   207*
RDCHR           0000 10EC      197*  211   220
RDCHR1          0000 111E      206   212*
RET             0000 000E       58*
RSAVE           0000 1FB8       68   555   568   573   618   625   719   756   801  1030  1033  1772*
RUN             0000 18D8      238   967*
RUNIT           0000 11C4      239   289*
SCOPE           0000 18B4      439   959*  1668  1691
SELTST          0000 1804      302   404   458   914*
SET.RTN         0000 181C      927*
SETKB           0000 1706      152   186   430   783*
SETUP           0000 15B0      657*
SFTSET          0000 19B2     1098  1107  1111*  1165
SINK            0000 17FC      685   700   769   777   907*
```

```
START      0000 102C    127   133*
START2     0000 101C     98   126*
STLOOP     0000 1A44   1092  1117  1119  1121  1169*
T5S1       0000 1988   1094* 1095
T5S1.5     0000 198C   1095*
T5S2       0000 199E   1103* 1104
T5S2.5     0000 19A2   1104*
T6S1       0000 1AEC   1277* 1283
T6S10      0000 1B66   1317  1320*
T6S2       0000 1AFA   1280  1282*
T6S2.5     0000 1AFE   1283*
T6S3       0000 1B02   1285*
T6S4       0000 1B04   1286* 1368
T6S5       0000 1B06   1287* 1343
T6S6       0000 1B08   1288* 1328
T6S7       0000 1B2E   1299  1301*
T6S8       0000 1B46   1306  1308*
T6S9       0000 1B5A   1313  1315*
T7MM1      0000 1C40   1420  1440*
T7MM2      0000 1C4E   1440  1447*
T7MSG      0000 1F5C   1424  1757*
T7OK       0000 1CAE   1481  1483*
T7OUTMSG   0000 1C20   1425* 1436
T7S1       0000 1BFC   1414* 1419
T7S1.5     0000 1C10   1419*
T7S2       0000 1C2E   1429* 1435
T7S3       0000 1C32   1431* 1432
T7S4       0000 1C66   1455* 1472
T7S5       0000 1C6E   1458* 1469
T7S6       0000 1C7C   1463*
T7S7       0000 1C82   1465*
T7S8       0000 1C88   1467*
T7S9       0000 1C8E   1469*
T7SUB      0000 1CA0   1464  1466  1468  1477*
T7SUB1     0000 1CA2    382  1462  1479*
T8SW       0000 1CCC   1527* 1528
T8SX       0000 1D1A   1550* 1577
TEMP       0000 100A    107* 1124  1197  1654  1657
TEST       0000 1884    241   271   285   295   309   311   347   953*  954
TEST0      0000 1924    989  1017*
TEST1      0000 1966    990  1083*
TEST2      0000 1AA0    991  1242*
TEST3      0000 1BE2    992  1404*
TEST4      0000 1CB0    993  1517*
TEST6ALL   0000 1AE2   1249  1253  1256  1260  1263  1267  1273*
TESTOP     0000 1190    242   268*
TESTS      0000 191A    370   989*
TITLE      0000 18EA    178   975*
TOTAL      0000 180A    328   413   421   424   449   451   453   454   476   917*
TOTERR     0000 180C    329   413   453   479   521   523   918*  1700  1702
TOTMSG     0000 1844    472   939*
TSTBRK     0000 164E    360   395   418   617   719*  1034
TSTBRK1    0000 16A4    737   746*  748
TSTBRK2    0000 16AC    735   745   749*
TSTBRK3    0000 16C0    723   725   727   739   744   754*
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TSTBRK4	0000	1688	730	736*							
TSTBRK5	0000	167A	731*	734							
TSTBRKX	0000	1946	1030*	1114	1345	1433	1470	1552			
TSTDU	0000	16D0	414	467	506	574	636	655	668	762*	
TSTEND	0000	12CC	390*	1031	1108	1269	1473	1578	1692	1694	
TSTMSG	0000	182E	361	934*	935						
TSTOP1	0000	11A0	269	274*							
TSTOP2	0000	11A6	277*	284							
TSTOP4	0000	11B8	283*								
TTYGET	0000	1604	687*								
WASDU	0000	1806	175	290	446	470	576	579	589	676	915*
WASDU1	0000	1808	176	291	416	447	577	591	916*		
ZERO1	0000	171E	795*	796							

```
                        301  *                                                                          MOS03010
                        302  *  RESET TEST PARAMETERS                                                  MOS03020
                        303  *                                                                          MOS03030
0300   2400             304  INITRET  LIS   R0,0              *                              ***      MOS03040
0302   4000 08FA        305           STH   R0,ISITERR        RESET ERROR FLAG                        MOS03050
0306   4000 0904        306           STH   R0,TOTAL          RESET TOTAL                             MOS03060
030A   4000 0906        307           STH   R0,TOTERR         RESET TOTERR                            MOS03070
030E   C810 3030        308           LHI   R1,C'00'                                                  MOS03080
0312   4010 0928        309           STH   R1,MTESTNO        RESET THESE FLAGS TO C'00'              MOS03090
0316   4010 0932        310           STH   R1,ETESTNO                                                MOS03100
031A   4010 0934        311           STH   R1,ERRNO                                                  MOS03110
031E   41F0 082A        312           BAL   LINK,LCORE        SET UP LOW CORE                         MOS03120
                        313  *                                                                          MOS03130
                        314  *  START SELECTION FROM TEST 0                                           MOS03140
                        315  *                                                                          MOS03150
0322   2400             316  KEEP3    LIS   R0,0              *                              ***      MOS03160
0324   4000 0908        317           STH   R0,BTESTNO        RESET BINARY TEST NUMBER                MOS03170
0328   4000 090C        318           STH   R0,NEXTST         RESET NEXT TEST NUMBER                  MOS03180
                        319  *                                                                          MOS03190
                        320  *  TO FIND THE NEXT SELECTED TEST.                                       MOS03200
                        321  *                                                                          MOS03210
032C   4820 090C        322  KEEP4    LH    R2,NEXTST         GET NEXT TEST NUMBER                    MOS03220
0330   C800 8000        323  KEEP41   LHI   R0,X'8000'        R0 = X'8000'                   ***      MOS03230
0334   CC02 0000        324           SRHL  R0,0(R2)          R0 = NEXT TEST BIT                      MOS03240
0338   4400 097E        325  KEEP42   NH    R0,TEST+6         LOOK AT TEST HW 1                       MOS03250
033C   2133             326           BNZS  KEEP5                                                     MOS03260
033E   2621             327  KEEP43   AIS   R2,1                                                     MOS03270
0340   2208             328           BS    KEEP41            LOOP FOR NEXT TEST NUMBER               MOS03280
0342   4020 0908        329  KEEP5    STH   R2,BTESTNO        CURRENT TEST NUMBER                     MOS03290
0346   0812             330           LDAR  R1,R2             R1 = TEST NUMBER IN BINARY              MOS03300
0348   2621             331           AIS   R2,1                                                      MOS03310
034A   4020 090C        332           STH   R2,NEXTST                                                 MOS03320
034E   2402             333           LIS   R0,2              SET DIGITS TO PRINT = 2                 MOS03330
0350   C820 0928        334           LHI   R2,MTESTNO        R2 = A(MTESTNO)                         MOS03340
0354   41F0 059E        335           BAL   LINK,HEXASC       STORE TEST NO. IN ASCII @ MTESTNO       MOS03350
0358   4820 0928        336           LH    R2,MTESTNO                                                MOS03360
035C   4020 0932        337           STH   R2,ETESTNO        STORE TEST NO. IN ASCII @ ETESTNO       MOS03370
0360   41F0 0732        338           BAL   LINK,TSTBRK       TEST BREAK                              MOS03380
0364   C850 0922        339           LHI   R5,TSTMSG                                                 MOS03390
0368   41F0 05C6        340           BAL   LINK,PRINT        PRINT 'TEST NN'                         MOS03400
036C   2400             341           LIS   R0,0              *                              ***      MOS03410
036E   4000 08FC        342           STH   R0,NOERR          RESET ERROR FLAG                        MOS03420
0372   4000 090A        343           STH   R0,COUNT          RESET COUNT                             MOS03430
0376   4810 0104        344  KEEP6    LH    R1,PSW            ENABLE INTERRUPTS (30F0)       ***      MOS03440
037A   9501             345           EPSR  R0,R1                                                     MOS03450
037C   4820 0908        346           LH    R2,BTESTNO        R2 = TEST NUMBER                        MOS03460
0380   9121             347           SLHLS R2,LADC                                                   MOS03470
0382   4812 0A16        348           LDA   R1,TESTS(R2)                                              MOS03480
0386   0301             349           BR    R1                GO TO TEST MODULE                       MOS03490
                        350  *----------------------------                                            MOS03500
                        351  *                                                                          MOS03510
                        352  *  TEST MODULE END ROUTINE                                               MOS03520
                        353  *                                                                          MOS03530
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0388   C8F0 08A0          354  TSTEND   LHI   LINK,MM          *                                  ***   MOS03540
038C   40F0 003E          355           STH   LINK,X'3E'       RESTORE ETPE MM POINTER            ***   MOS03550
0390   4810 0106          356           LH    R1,PSW2                                                   MOS03560
0394   9501               357           EPSR  R0,R1            DISABLE INT @ PROCESSOR LEVEL            MOS03570
0396   4800 090A          358           LH    R0,COUNT                                                  MOS03580
039A   2601               359           AIS   R0,1             INCREMENT COUNT                          MOS03590
039C   4000 090A          360           STH   R0,COUNT                                                  MOS03600
03A0   41F0 0732          361           BAL   LINK,TSTBRK      IF BREAK GO TO OPTIN                     MOS03610
03A4   4500 098A          362           CLH   R0,LOOP+6        IF COUNT > LOOP,                         MOS03620
03A8   2383               363           BNLS  KEEP7            GO TO NEXT TEST MODULE                   MOS03630
03AA   4300 0376          364           B     KEEP6            OTHERWISE, REPEAT SAME TEST              MOS03640
03AE   4800 08FC          365  KEEP7    LH    R0,NOERR         LOOK @ ERROR FLAG                        MOS03650
03B2   2135               366           BNZS  KEEP71                                                    MOS03660
03B4   C850 0948          367           LHI   R5,NOERMSG                                                MOS03670
03B8   41F0 05C6          368           BAL   LINK,PRINT       PRINT "NO ERROR"                         MOS03680
03BC   4810 0908          369  KEEP71   LH    R1,BTESTNO       GET TEST NUMBER                          MOS03690
03C0   4510 08FE          370           CLH   R1,SELTST        IS THE LAST SELECTED TEST DONE ?         MOS03700
03C4   4280 032C          371           BL    KEEP4            NO, GO SELECT NEXT TEST                  MOS03710
                          372  *                                                                        MOS03720
                          373  *  ALL THE SELECTED TESTS ARE NOW RUN                                    MOS03730
                          374  *                                                                        MOS03740
03C8   C8F0 08A0          375  ABORT    LHI   LINK,MM          COME HERE TO ABORT TEST SEQUENCE ***     MOS03750
03CC   40F0 003E          376           STH   LINK,X'3E'       RESTORE ETPE MM POINTER            ***   MOS03760
03D0   4810 0106          377           LH    R1,PSW2                                                   MOS03770
03D4   9501               378           EPSR  R0,R1            PSW = X'30F0'                            MOS03780
03D6   41F0 04BC          379           BAL   LINK,DISPLAY     DISPLAY "TOTAL" & "TOTERR"               MOS03790
03DA   0904               380           DC    Z(TOTAL),Z(TOTERR) (IF DISPLAY PANEL EQUIPPED)            MOS03800
03DC   0906
03DE   41F0 07B6          381           BAL   LINK,TSTDU       RETURN WITH R1 = DU BIT                  MOS03810
03E2   4230 0444          382           BNZ   KEEP9            IF DU, DISPLAY TOTAL                     MOS03820
03E6   4810 0902          383           LH    R1,WASDU1        WAS IT EVER ?                            MOS03830
03EA   4230 047A          384           BNZ   KEEP92           YES, PRINT TOTAL, TOTERR                 MOS03840
03EE   41F0 0732          385           BAL   LINK,TSTBRK                                               MOS03850
03F2   4810 0996          386           LH    R1,CONTIN+6      IF CONTIN = 0,                           MOS03860
03F6   233E               387           BZS   ABORT3           BRANCH TO ABORT TESTING            ***   MOS03870
03F8   6110 0904          388           AHM   R1,TOTAL         INCREMENT TOTAL COUNTER            ***   MOS03880
03FC   4230 0322          389           BNZ   KEEP3            IF COUNT NOT ZERO, GO TO TEST 0          MOS03890
0400   2511               390           LCS   R1,1             OTHERWISE,                         ***   MOS03900
0402   6110 0904          391           AHM   R1,TOTAL         SET COUNT TO MAX                   ***   MOS03910
0406   4300 0474          392           B     HALT9            AND HALT TO PRINT TOTALS           ***   MOS03920
                          393  *                                                                        MOS03930
040A   C8F0 08A0          394  ABORT1   LHI   LINK,MM          *                                  ***   MOS03940
040E   40F0 003E          395           STH   LINK,X'3E'       RESTORE ETPE MM POINTER            ***   MOS03950
                          396  *                                                                  ***   MOS03960
0412   4810 0106          397  ABORT3   LH    R1,PSW2          *                                  ***   MOS03970
0416   9501               398           EPSR  R0,R1            DISABLE INT @ PROCESSOR LEVEL      ***   MOS03980
0418   41F0 07EC          399           BAL   LINK,SETKB       KB DEVICE = LIST DEVICE                  MOS03990
041C   C850 0966          400           LHI   R5,EOTMSG                                                 MOS04000
0420   4050 08FA          401           STH   R5,ISITERR       FORCE PRINTING                           MOS04010
0424   41F0 05C6          402           BAL   LINK,PRINT       'END OF TEST'                            MOS04020
0428   24F0               403           LIS   R15,0                                                     MOS04030
042A   40F0 08FA          404           STH   R15,ISITERR      RESET FORCE PRINTING FLAG                MOS04040
                          405  *                                                                        MOS04050
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042E  48F0 09A2      406          LH    LINK,NOMSG+6       IF NOMSG = 1,                    ***  MOS04060
0432  4230 047A      407          BNZ   KEEP92             BRANCH TO PRINT TOTAL & TOTERR        MOS04070
0436  48F0 09AE      408          LH    LINK,SCOPE+6       IF SCOPE = 4,                    ***  MOS04080
043A  27F4           409          SIS   LINK,4             BRANCH TO PRINT TOTAL & TOTERR        MOS04090
043C  4330 047A      410          BZ    KEEP92                                                 MOS04100
0440  4300 01BA      411          B     OPTIN              OTHERWISE RETURN TO OPTIN        ***  MOS04110
                     412  *-------------------------------                                      MOS04120
                     413  *  ROUTINE INCREMENTS,DISPLAYS & CHECKS 'TOTAL'                       MOS04130
                     414  *                                                                     MOS04140
0444  4010 0900      415  KEEP9    STH   R1,WASDU           SET 'WASDU' FLAG                     MOS04150
                     416  *                                                                     MOS04160
0448  4810 0904      417  ABORT2   LH    R1,TOTAL           INCREMENT TOTAL                      MOS04170
044C  2611           418          AIS   R1,1                                                   MOS04180
044E  4010 0904      419          STH   R1,TOTAL                                               MOS04190
0452  41F0 04BC      420  KEEP91   BAL   LINK,DISPLAY       DISPLAY "TOTAL" & "TOTERR"           MOS04200
0456  0904           421          DC    Z(TOTAL),Z(TOTERR) (IF DISPLAY PANEL EQUIPPED)          MOS04210
0458  0906
045A  4810 0904      422          LH    R1,TOTAL                                               MOS04220
045E  C510 7FFF      423          CLHI  R1,X'7FFF'         TOTAL < MAX RETAINABLE ?             MOS04230
0462  2389           424          BNLS  HALT9              NO, BRANCH                           MOS04240
0464  4800 0908      425          LH    R0,BTESTNO         R0 = CURRENT TEST NUMBER             MOS04250
0468  4500 08FE      426          CLH   R0,SELTST          IS IT LAST TEST ?                    MOS04260
046C  4280 032C      427          BL    KEEP4              NO, GO TO NEXT TEST                  MOS04270
0470  4300 0322      428          B     KEEP3              GO TO TEST 0                         MOS04280
                     429  *                                                                     MOS04290
0474  C810 80F0      430  HALT9    LHI   R1,X'80F0'        R1 = X'80F0'                     ***  MOS04300
0478  9521           431          EPSR  R2,R1              HALT PROCESSOR                       MOS04310
                     432  *                                                                     MOS04320
                     433  *  WHEN EXE/RUN IS PRESSED, PRINT TOTAL & TOTERR                      MOS04330
                     434  *                                                                     MOS04340
047A  41F0 07B6      435  KEEP92   BAL   LINK,TSTDU         SEE IF LIST DEV IS ON                MOS04350
047E  2035           436          BNZS  HALT9              NO, HALT                             MOS04360
0480  2400           437  KEEP10   LIS   R0,0                                                  MOS04370
0482  4000 0900      438          STH   R0,WASDU           RESET PRESENT DU FLAG                MOS04380
0486  41F0 064E      439          BAL   LINK,CRLF          DO CR & LF                           MOS04390
048A  C850 0938      440          LHI   R5,TOTMSG          LOAD TOTAL ERROR MESSAGE LOCATION    MOS04400
048E  4050 08FA      441          STH   R5,ISITERR         FORCE PRINTING                       MOS04410
0492  41F0 05C6      442          BAL   LINK,PRINT         PRINT 'TOTAL   TOTERR'               MOS04420
0496  2404           443          LIS   R0,4               PRINT 4 HEX DIGITS EACH              MOS04430
0498  4810 0904      444          LH    R1,TOTAL           GET "TOTAL"                          MOS04440
049C  C820 0ED4      445          LHI   R2,LOMSG                                               MOS04450
04A0  41F0 059E      446          BAL   LINK,HEXASC        PUT "TOTAL" IN MSG               ***  MOS04460
04A4  4810 0906      447          LH    R1,TOTERR          GET "TOTERR"                         MOS04470
04A8  C820 0ED9      448          LHI   R2,HIMSG                                               MOS04480
04AC  41F0 059E      449          BAL   LINK,HEXASC        PUT "TOTERR" IN MSG              ***  MOS04490
04B0  C850 0ED4      450          LHI   R5,LOMSG                                               MOS04500
04B4  41F0 05C6      451          BAL   LINK,PRINT         PRINT THE VALUES IN HEX          ***  MOS04510
04B8  4300 01BA      452          B     OPTIN              GO TO BEGINNING                      MOS04520
                     453  ************************************                                 MOS04530
                     454  *  DISPLAY PANEL OUTPUT ROUTIBNE   (TIMEOUT IF NOT EQUIPPED)          MOS04540
                     455  *                                                                     MOS04550
04BC  2401           456  DISPLAY  LIS   R0,1               LOAD DISPLAY PANEL ADDRESS           MOS04560
04BE  DE00 08D6      457          OC    R0,INCR            PUT DISPLAY PANEL IN INCREM MODE     MOS04570
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04C2  481F 0002      458           LH    R1,2(LINK)          GET 2ND PARAMETER ADDRESS                MOS04580
04C6  4811 0000      459           LH    R1,0(R1)            GET THE DATA                             MOS04590
04CA  9411           460           EXBR  R1,R1               EXCHANGE DATA BYTES                      MOS04600
04CC  9801           461           WHR   R0,R1               WRITE DATA TO THE DISPLAY PANEL          MOS04610
04CE  481F 0000      462           LH    R1,0(LINK)          GET 1ST PARAMETER ADDRESS                MOS04620
04D2  4811 0000      463           LH    R1,0(R1)            GET THE DATA                             MOS04630
04D6  9411           464           EXBR  R1,R1               EXCHANGE DATA BYTES                      MOS04640
04D8  9801           465           WHR   R0,R1               WRITE THE DATA TO THE DISPLAY PANEL      MOS04650
04DA  DE00 08D5      466           OC    R0,NORM             PUT DISPLAY PANEL IN NORMAL MODE         MOS04660
04DE  430F 0004      467           B     4(LINK)             RETURN                                   MOS04670
                     468  * ********************************                                          MOS04680
                     469  *  ERROR ROUTINES                   (OVERRIDE NOMSG OPTION)                  MOS04690
                     470  *                                                                            MOS04700
04E2  D000 00E0      471  ERR      STM   R0,ERRSAVE          STORE REGISTERS                          MOS04710
04E6  4120 0500      472           BAL   R2,ERRCOM           RETURN IF LIST DEVICE IS ON              MOS04720
04EA  41E0 0534      473           BAL   RET,ERR1            PRINT 'ERROR TTNN'                       MOS04730
04EE  2400           474  ERRCOM2  LIS   R0,0                                                         MOS04740
04F0  4000 08FA      475           STH   R0,ISITERR          RESET ERROR FLAG                         MOS04750
04F4  4820 0104      476           LH    R2,PSW                                                      MOS04760
04F8  9502           477           EPSR  R0,R2               PSW = X'30F0'                            MOS04770
04FA  D100 00E0      478           LM    R0,ERRSAVE          RESTORE REGISTERS                        MOS04780
04FE  030F           479           BR    LINK                RETURN TO TEST                           MOS04790
                     480  *                                                                            MOS04800
                     481  *  ETPE COMMON ERROR ROUTINE                                          ***     MOS04810
                     482  *                                                                            MOS04820
0500  4020 0064      483  ERRCOM   STA   R2,COMRET           SAVE RETURN ADDRESS                ***     MOS04830
0504  4810 0106      484           LH    R1,PSW2                                                     MOS04840
0508  9501           485           EPSR  R0,R1               DISABLE INT. @ PROCESSOR LEVEL(30F0)     MOS04850
050A  41F0 07B6      486           BAL   LINK,TSTDU          GET LIST DEVICE DU BIT IN R1             MOS04860
050E  2138           487           BNZS  ERRCOM1             BRANCH IF OFF-LINE                       MOS04870
0510  4020 08FA      488           STH   R2,ISITERR          SET ERROR FLAGS                          MOS04880
0514  4020 08FC      489           STH   R2,NOERR                                                     MOS04890
0518  4820 0064      490           LDA   R2,COMRET           RESTORE RETURN ADDRESS             ***     MOS04900
051C  0302           491           BR    R2                  GO, PRINT ERROR MESSAGE                  MOS04910
                     492  *                                                                            MOS04920
051E  4810 0906      493  ERRCOM1  LH    R1,TOTERR           LIST DEVICE IS OFF                       MOS04930
0522  2611           494           AIS   R1,1                                                         MOS04940
0524  4010 0906      495           STH   R1,TOTERR           INCREMENT TOTERR                         MOS04950
0528  C510 7FFF      496           CLHI  R1,X'7FFF'          TOTERR < MAX RETAINABLE ?                MOS04960
052C  4280 0452      497           BL    KEEP91              NO, ABORT CURRENT TEST & GOTO NEXT       MOS04970
0530  4300 0474      498           B     HALT9               YES, HALT PROCESSOR                      MOS04980
                     499  *----------------------------                                              MOS04990
                     500  * MESSAGE PRINT ROUTINES          (DO NOT OVERRIDE NOMSG OPTION)           MOS05000
                     501  *                                                                            MOS05010
                     502  *  TO PRINT 'ERROR TTNN'                                                   MOS05020
                     503  *                                                                            MOS05030
0534  C850 092C      504  ERR1     LHI   R5,ERRMSG           PRINT 'ERROR TTNN'                 ***     MOS05040
0538  41F0 05C6      505           BAL   LINK,PRINT          TT = TEST NO.; NN = ERROR NO.      ***     MOS05050
053C  030E           506           BR    RET                 RETURN                                   MOS05060
                     507  *                                                                            MOS05070
                     508  *  TO PRINT 'PSW PPPP  LOC LLLL'                                           MOS05080
                     509  *                                                                            MOS05090
053E  2404           510  ERRPL1   LIS   R0,4                SET UP DIGITS = 4                        MOS05100
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