## IDENTIFICATION

| | |
|---|---|
| Product Code: | MAINDEC-08-D1EB-D |
| Product Name: | PDP-8, 8/I Extended Memory Checkerboard |
| Date Created: | May 1, 1968 |
| Maintainer: | Diagnostics Group |
| Author: | J. W. Richardson |

## 1. ABSTRACT

The PDP-8, 8/I Extended Memory Checkerboard diagnostic is designed to provide worst case half-select noise conditions in order to determine the operational status of core memory. Four data patterns, and their complements, are written and checked for error. The patterns provided will generate the worst case noise conditions for a PDP-8 or 8/I equipped with standard or specially purchased core stacks, and will test systems equipped with from 8K to 32K words of core memory. Automatic program relocation is provided in order to test all memory stacks from each stack.

Teletype print-outs are provided for error identification. Also, the operator is given a degree of control over the program by various SR settings. These are explained in detail in Section 8.2.

## 2. REQUIREMENTS

### 2.1 Equipment

A standard PDP-8 or 8/I equipped with at least 8K words of core memory.

### 2.2 Storage

The program occupies locations 0010 to 3334.

### 2.3 Preliminary Programs

The Binary Loader must be in memory. Also, all diagnostics for a basic 4K PDP-8 must have been previously run successfully.

## 3. LOADING PROCEDURE

a. Turn off the Teletype reader.

b. Set the SR to 7777.

c. Press LOAD ADDRESS; then START.

d. Place the Binary tape in Teletype reader and turn on the reader.

e. When the program has been loaded, stop the computer, turn off the reader, and remove the tape.

## 4. STARTING PROCEDURE

### 4.1 Starting Address

Start from address 200 to specify the amount of core memory to test; SR settings, and to receive a header sprint-out.

### 4.2 Restarting Address

Start from address 207 to change the test limits; SR settings, and to inhibit the header print-out.

### 4.3 Operator Action

Immediately after starting from address 200 or 207, the program will print TEST LIMITS. The operator must then specify, via the Teletype keyboard, the amount of core memory to test, followed by a carriage return.

The following rules govern the amount of memory to test:

a. Type two octal numbers, separating the numbers with a comma. The first number signifies the lowest order 4K stack to test; the second signifies the highest order.

b. The program expects the 4K stacks to be numbered sequentially starting with a stack 0.

c. If the highest order stack to test is typed as the first stack, the program will interchange the two values so as to make the second value the first to test.

d. After typing the second octal number, press the carriage return key to terminate the line.

e. The program will test the lowest and highest order 4K stack specified, plus every stack between, starting with the lowest specified.

f. Any single stack, or two or more sequential stacks may be specified.

g. The stack containing the program may be included when specifying two or more stacks. The stack containing the program will be tested after automatic program relocation takes place (see Section 5.3.1).

h. If a typing error is made, press the RUB-OUT key. TEST LIMITS will be printed again. All previous input is disregarded.

For the following examples assume the program to be located in stack 0, and the program has been started from address 200 or 207. The amount of core memory available is 32K.

Example A:

```
TEST LIMITS
0,7↵               (↵ denotes carriage return)
```

Example A indicates stacks 0, 1, 2, 3, 4, 5, 6 and 7 will be tested.

Example B:

```
TEST LIMITS
7,0↲
```

The program will perform exactly as Example A.

Example C:

```
TEST LIMITS
4,5↲
```

Only stacks 4 and 5 will be tested.

Example D:

```
TEST LIMITS
3,3↲
```

Stack 3 alone will be tested.

Example E:

```
TEST LIMITS
0,0 PROGRAM IS LOCATED IN FIELD 0
TEST LIMITS
0,1↲
```

Example E shows the message printed by the program when a single stack is selected which currently contains the program. TEST LIMITS is printed again, and the operator must then correct the test limits.

Operation of the program is unpredicatable if the amount of memory selected for testing exceeds the actual amount available, i.e., selecting 32K for testing on a PDP-8 or 8/I equipped with a maximum of 28K.

### 4.3.1 Setup SR

After the test limit is specified, the program will print SETUP SR. For normal program operation, the SR must be set to equal $0000_8$. Press the carriage return key after setting the SR to 0000. The program will then run until stopped by the operator. Normal program operation is defined as performing all four checkerboard patterns on all of available memory from every memory stack.

# 5. OPERATING PROCEDURE

## 5.1 Program and Operator Action

a. Load the program into stack 0 using the procedure described in Section 3.

b. Set the SR to 200; press LOAD ADDRESS, and then start.

c. The message TEST LIMITS will be printed. Specify the limits, via keyboard, as described in Section 4.3.

d. The message SETUP SR will be printed. Set the SR to $0000_8$, and press the carriage return key.

e. The program will perform all four tests on all of core memory specified, after which, automatic program relocation takes place.

## 5.2 Operational Switch Settings

Normal operation of the program requires the SR set to $0000_8$. Refer to Section 8.2, applications, for switch settings provided for trouble-shooting.

## 5.3 Subroutine Abstracts

### 5.3.1 Program Relocation

Program relocation is governed entirely by the amount of core memory selected for testing. Under certain conditions the program will not relocate at all, but will remain in the current 4K stack to perform the tests (see below). The program first relocates to the highest order 4K stack under test. From there it relocates to the next lower stack (after performing all four tests). The program keeps relocating to the next lower stack until it reaches the lowest order stack under test. The testing and relocation cycle is then repeated.

The contents of the entire 4K stack are relocated. This enables the RIM Loader, and any other information to be carried with the program.

The program provides a degree of protection for itself by recording the first error encountered in any stack. When a faulty stack is next in sequence to contain the program, the program will skip the faulty stack and relocate to the first lower order stack which is error-free. If all lower order stacks are faulty, program relocation will not take place. The tests will be run again from the current stack. Relocation will resume when an error-free stack is found.

Also, the program will not relocate if any of the conditions described below exist.

a. Only one 4K stack is selected for testing.

b. SR 9 is on a 1 to inhibit relocation (see Section 8.2.6).

The INSTRUCTION FIELD indicators will indicate the current stack containing the program.

### 5.3.2 The Checkerboard Patterns

Four test patterns, and their complements, are used to test memory. All memory stacks, except the one with the program, are tested with one pattern before the next test is executed.

Any one, or any combination, of the four tests may be run by placing one, or any combination, of SR 3, 4, 5, or 6 on a 1 after the message SETUP SR is printed. The test specified by the most significant switch on a 1 will be executed first. SR 3, 4, 5 and 6 all on a 0 will enable all tests to be run. SR 3= test 1; 4= test 2; 5= test 3; 6= test 4.

The following steps are performed by each of the four tests:

a. Write the pattern once in all stacks selected for testing; starting with the lowest order stack.

b. Select the lowest order stack and perform a read, complement data, write sequence once on each location, until all 4K has been complemented.

c. Repeat step b 31 more times. The stack will end up with the pattern originally loaded. No error checking has been performed as yet.

d. Read 4-word segments and complement each segment 4 times; then read each of the 4 words and check for error.

e. After checking the entire 4K stack for errors, repeat step d again. This time stall for a random period of time after reading and checking every $400_8$ word block. The maximum stall is 18.4 ms; the minimum is 3 μs.

f. Setup for the next sequential 4K stack and repeat steps b through f.

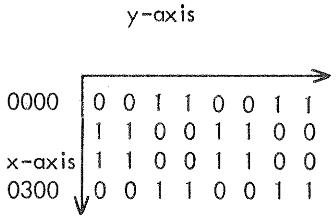
When all selected stacks have been checked the next test in sequence is executed, and steps a through f repeated. Program relocation takes place after the fourth test is executed in this manner.

The patterns generated by each test are shown below. The matrices represent portions of one bit plane.

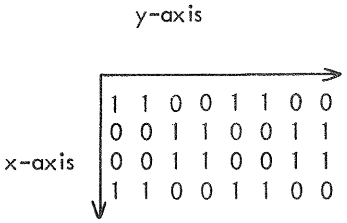
Test 1:

$$\begin{array}{l|cccccccc}
 & \multicolumn{8}{c}{\text{y-axis}} \\
0000 & 0 & 0 & 1 & 1 & 0 & 0 & 1 & 1 \\
\text{x-axis} & 0 & 0 & 1 & 1 & 0 & 0 & 1 & 1 \\
 & 1 & 1 & 0 & 0 & 1 & 1 & 0 & 0 \\
0300 & 1 & 1 & 0 & 0 & 1 & 1 & 0 & 0
\end{array}
\qquad
\begin{array}{l|cccccccc}
 & \multicolumn{8}{c}{\text{y-axis}} \\
 & 1 & 1 & 0 & 0 & 1 & 1 & 0 & 0 \\
\text{x-axis} & 1 & 1 & 0 & 0 & 1 & 1 & 0 & 0 \\
 & 0 & 0 & 1 & 1 & 0 & 0 & 1 & 1 \\
 & 0 & 0 & 1 & 1 & 0 & 0 & 1 & 1
\end{array}$$

Test 2:

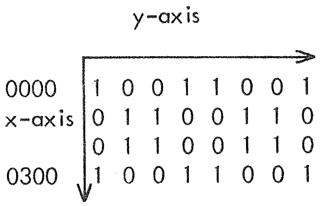


```
           y-axis
0000   | 0 0 1 1 0 0 1 1
       | 1 1 0 0 1 1 0 0
x-axis | 1 1 0 0 1 1 0 0
0300   | 0 0 1 1 0 0 1 1
```

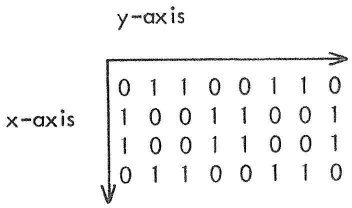


```
           y-axis
       | 1 1 0 0 1 1 0 0
       | 0 0 1 1 0 0 1 1
x-axis | 0 0 1 1 0 0 1 1
       | 1 1 0 0 1 1 0 0
```

Test 3:

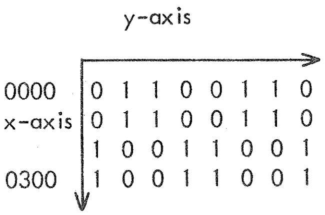


```
           y-axis
0000   | 1 0 0 1 1 0 0 1
x-axis | 0 1 1 0 0 1 1 0
       | 0 1 1 0 0 1 1 0
0300   | 1 0 0 1 1 0 0 1
```

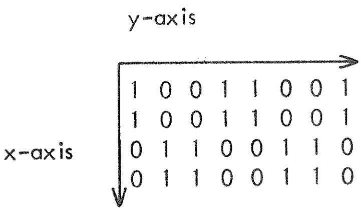


```
           y-axis
       | 0 1 1 0 0 1 1 0
x-axis | 1 0 0 1 1 0 0 1
       | 1 0 0 1 1 0 0 1
       | 0 1 1 0 0 1 1 0
```

Test 4:



```
           y-axis
0000   | 0 1 1 0 0 1 1 0
x-axis | 0 1 1 0 0 1 1 0
       | 1 0 0 1 1 0 0 1
0300   | 1 0 0 1 1 0 0 1
```



```
           y-axis
       | 1 0 0 1 1 0 0 1
       | 1 0 0 1 1 0 0 1
x-axis | 0 1 1 0 0 1 1 0
       | 0 1 1 0 0 1 1 0
```

## 6. ERRORS

Starting the program from address 200 will give a header print-out after the SR has been setup. The header identifies the information printed when a data error is found. The header appears as:

FIELD OCTAL ADR. GOOD BAD TEST

Where: FIELD = an octal number (0 to 7) indicating the 4K field containing the error.

OCTAL ADR. = the memory address which contains the incorrect data.

GOOD = what the data in octal, should have been. This will always equal 0000 or 7777.

BAD = the data as read. This will equal the good data except for one or more bits complemented.

TEST = the number (1 to 4) of the test which detected the error.

After each error print-out the program continues on with the next sequential memory location.

## 6.1 Error Halts and Description

Placing SR 0 on a 1 during an error print-out will cause a halt at location 2641.

Press CONTINUE to resume testing.

## 7. RESTRICTIONS

### 7.1 Starting Restrictions

Start from address 200 to indicate the amount of core memory to test; to setup the SR and to receive a header print-out.

Starting from 207 requires the same operator action, but no header will be printed.

### 7.2 Operating Restrictions

None

## 8. MISCELLANEOUS

### 8.1 Execution Time

The time required to perform all four tests on one 4K memory stack is approximately 26 seconds.

### 8.2 Applications

For operating convenience, and as an aid to trouble-shooting, the SR may be used to control the program. The switch assignments and their effect on the program are described below. Please note that it is important that the program should be halted before changing the test selection switches. These switches are not sensed by the program during testing.

Halting the program with SR 0 is preferred, rather than with the STOP key. Using the STOP key may result in a halt while the program is in the process of relocating, which is disasterous.

#### 8.2.1 Halt after Test or Error - SR 0

Placing SR 0 on a 1 at any time while the program is running will cause a halt after the current test is completed. The MB will equal 2461 in the current stack containing the program. Press CONTINUE to resume testing, or restart from 200 or 207 to enter new parameters.

Placing SR 0 on a 1 during an error type-out will also cause a halt at location 2461. Proceed exactly as described in the above paragraph.

8.2.2 Inhibit Error Print-out - SR 1

Placing SR 1 on a 1 causes all error print-outs to be inhibited. All other messages will not be inhibited. The program will continue to recognize errors, but will not print any information. SR 1 may be placed on a 1 or 0 while the program is running.

8.2.3 Bell on Error - SR 2

SR 2 on a 1 causes the program to ring the TTY BELL whenever an error is detected. This is convenient when testing with power supply margins. SR 2 has precedence over SR 1 if both should happen to be on a 1. SR 2 may be placed on a 1 or 0 while the program is running.

8.2.4 Test Selection SR 3 through 6

Any one, or any combination of tests may be executed by placing any one or any combination of SR 3 through 6 on a 1. Test selections may be made only when starting from 200 or 207. SR 3 specifies test 1; SR 4 test 2; SR 5 test 3; SR 6 test 4. The test specified by the most significant SR on a 1 will be executed first.

For most PDP-8s, SR 4 will provide the worst case pattern. For most PDP-8/Is, SR 5 will provide the worst case pattern.

If all four switches are on a 0, all four tests will be executed in order starting with test 1.

Program relocation is not effected, regardless of the SR settings.

8.2.5 Inhibit Program Relocation - SR 7

The program normally relocates automatically as indicated by the INSTRUCTION FIELD indicators. To retain the program in its current 4K field, place SR 7 on a 1 at any time. Changing SR 7 to a 0 will permit relocation to resume.

8.2.6 SR 8, 9 and 10 - Not Used

8.2.7 Change TEST LIMITS and SR - SR 11

Placing SR 11 on a 1 will cause the program to automatically restart from address 207. The TEST LIMITS and SR may then be changed. SR 11 is sensed only after all specified tests have been completed on all of memory under test.

### 8.2.8 Loop on Address

A subroutine is provided which may be used to continuously loop on a single location, or a group of consecutive locations. No error checking is performed. The routine performs a read, and immediately follows with a write, on each location. The loop time between two reads, or two writes, is approximately 22.5 µs.

Operating Procedure:

a. Set the INSTRUCTION FIELD switches to the current field, and the SR to 1700.

b. Set the DATA FIELD switches to equal the 4K field number to test.

c. Press LOAD ADDRESS.

d. Set the SR to equal the first address of the group.

e. Press START. A halt will occur at 1703. Set the SR to equal the last address of the group.

f. Press CONTINUE. The address(s) specified will be looped until stopped by the operator with STOP. SR 0 will not halt this routine.

To resume normal operation, restart the program from 200 or 207 of the current field.

## 9. PROGRAM DESCRIPTION

The PDP-8, 8/I Extended Memory Checkerboard diagnostic is designed to create worst case memory noise conditions on systems equipped with 8K to 32K words of memory. The program executes four checkerboard patterns, plus their complements, on each 4K memory field. In addition, the program automatically relocates from field to field in order to test all 4K fields from every 4K field. Under normal operation, the amount of core memory tested at one time is that specified by the operator minus the 4K field containing the program. A TTY keyboard input routine is provided to enable the operator to specify the exact number of 4K fields to be tested. A print-out is provided for each error detected by the program.

Further control of the program is given to the operator by means of the SR. The operator may halt the program, inhibit error print-outs, substitute the TTY BELL for error indication, halt after error print-out, select any one or a group of tests, inhibit program relocation, and create an automatic restart to change the amount of memory to test.

A small subroutine is provided which will continuously read and write any single, or a group of locations within any 4K field. The operator must specify the locations by means of the SR.

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```
                         /
                         /PDP-8, 8I, 8S EXTENDED MEMORY CHECKBOARD TEST.
                         /START AT 2ØØ, RESTART AT 211 TO SKIP HEADER.
                         /MIN. OF 8K OF CORE REQUIRED.
                         /
      ØØØ1               *1
                         /
ØØØ1  5ØØ1                    JMP .
ØØØ2  ØØØ2                    ØØØ2
ØØØ3  ØØØ3                    ØØØ3
                         /
      62Ø1               CDF=62Ø1
      62Ø2               CIF=62Ø2
      6214               RDF=6214
      6224               RIF=6224
ØØØ4  ØØØØ                    Ø
ØØØ5  ØØØØ                    Ø
ØØØ6  ØØØØ                    Ø
ØØØ7  ØØØØ                    Ø
ØØ1Ø  ØØØØ                    Ø
ØØ11  ØØØØ                    Ø
ØØ12  ØØØØ                    Ø
ØØ13  ØØØØ                    Ø
ØØ14  ØØØØ               DATFLD, Ø
ØØ15  ØØØØ               FLAGS,  Ø
ØØ16  ØØØØ               INSFLD, Ø
ØØ17  ØØØØ               FLOAD,  Ø
ØØ2Ø  ØØ22               ERTBL,  ERWRD
ØØ21  ØØ32               ENTBL,  ERWRD+1Ø
ØØ22  ØØ22               ERWRD,  .
ØØ23  76ØØ                       76ØØ
ØØ24  76ØØ                       76ØØ
ØØ25  76ØØ                       76ØØ
ØØ26  76ØØ                       76ØØ
ØØ27  76ØØ                       76ØØ
ØØ3Ø  76ØØ                       76ØØ
ØØ31  76ØØ                       76ØØ
ØØ32  76ØØ                       76ØØ
ØØ33  ØØØØ               MCWA,   Ø
ØØ34  ØØ1Ø               K1Ø,    1Ø
ØØ35  Ø74Ø               K74Ø,   74Ø
ØØ36  Ø4ØØ               K4ØØ,   4ØØ
ØØ37  Ø2ØØ               K2ØØ,   2ØØ
ØØ4Ø  Ø1ØØ               K1ØØ,   1ØØ
ØØ41  ØØ4Ø               K4Ø,    4Ø
ØØ42  ØØ2Ø               K2Ø,    2Ø
ØØ43  22Ø7               XLMTS,  SLMTS
ØØ44  Ø3ØØ               XTST1,  TST1
ØØ45  Ø4ØØ               XTST2,  TST2
ØØ46  Ø452               XTST3,  TST3
ØØ47  Ø6ØØ               XTST4,  TST4
ØØ5Ø  3ØØØ               XMOVE,  CMOVE
ØØ51  22ØØ               XSETU,  SETU1
ØØ52  Ø261               K261,   261
ØØ53  Ø262               K262,   262
```

```
ØØ54  Ø263              K263,   263
ØØ55  Ø264              K264,   264
ØØ56  776Ø              M2Ø,    776Ø
```

```
0057  7740          M40,    7740
0060  7774          M4,     7774
0061  7773          M5,     7773
0062  0000          TNUM,   0
0063  1607          XBANK,  CBANK
0064  0652          X0011,  W0011
0065  0667          X1100,  W1100
0066  0704          X0110,  W0110
0067  0721          X1001,  W1001
0070  1600          XKBNK,  CKBNK
0071  1624          XTBNK,  NXTBNK
0072  0000          COUNT,  0
0073  0000          FLCNT,  0
0074  0000          LOOP,   0
0075  0736          XRALL,  RDALL
0076  1037          XCHK1,  RCHK1
0077  1054          XCHK1C, RCHK1C
0100  1071          XCHK2,  RCHK2
0101  1106          XCHK2C, RCHK2C
0102  1123          XCHK3,  RCHK3
0103  1140          XCHK3C, RCHK3C
0104  1200          XCHK4,  RCHK4
0105  1217          XCHK4C, RCHK4C
0106  1056          TDM20,  TAD M20
0107  1057          TDM40,  TAD M40
0110  4515          JMS1,   JMS I XRD1
0111  4516          JMS2,   JMS I XRD2
0112  4517          JMS3,   JMS I XRD3
0113  4520          JMS4,   JMS I XRD4
0114  4552          JMS5,   JMS I XSALL
0115  1245          XRD1,   RD1
0116  1322          XRD2,   RD2
0117  1400          XRD3,   RD3
0120  1455          XRD4,   RD4
0121  2000          XRROR,  ERROR
0122  0000          MEMADR, 0
0123  0000          FIRST1, 0
0124  0000          LAST1,  0
0125  6201          KCDF,   6201
0126  6202          KCIF,   6202
0127  2641          XHLT,   HALT
0130  0213          XRTN,   RTN1
0131  1646          XFILD,  FIELD
0132  2146          XPRER,  PRERR
0133  0007          K7,     7
0134  0000          CHAR,   0
0135  2474          XHDR,   PHDR
0136  2146          XPERR,  PRERR
0137  2115          XPING,  SPING
```

```
0140  7764          M14,    7764
0141  7770          M10,    7770
0142  0260          K260,   260
0143  0215          K215,   215
0144  0377          K377,   377
0145  0370          K370,   370
0146  0277          K277,   277
0147  2154          XCRLF,  CRLF
0150  0001          K1,     1
0151  0000          NXLOC,  0
0152  2702          XSALL,  STALL
0153  0000          EXIT,   0
0154  2166          LASTX,  LAST
```

```
      Ø2ØØ              *2ØØ
Ø2ØØ  6ØØ2              BEGIN,  IOF             /PI OFF
Ø2Ø1  72ØØ                      CLA
Ø2Ø2  3Ø15                      DCA FLAGS               /CLEAR PROGRAM FLAGS
Ø2Ø3  6224                      RIF
Ø2Ø4  3Ø16                      DCA INSFLD
Ø2Ø5  4443                      JMS I XLMTS     /SETUP TEST LIMITS
Ø2Ø6  4677                      JMS I XSTSR     /SETUP SR
Ø2Ø7  4535                      JMS I XHDR      /PRINT HEADER
Ø21Ø  5213                      JMP RTN1
                        /
                        /RESTART HERE
                        /
Ø211  4443              RSTRT1, JMS I XLMTS     /SET TEST LIMITS
Ø212  4677                      JMS I XSTSR     /SETUP SR
Ø213  6224              RTN1,   RIF             /READ INSTRUCTION FIELD
Ø214  3Ø16                      DCA INSFLD      /CURRENT FIELD
Ø215  4531                      JMS I XFILD
Ø216  1141                      TAD M1Ø                 /-1Ø
Ø217  3Ø74                      DCA LOOP
Ø22Ø  76ØØ              ALAW,   76ØØ
Ø221  122Ø                      TAD ALAW
Ø222  2Ø22                      ISZ ERWRD
Ø223  3422                      DCA I ERWRD
Ø224  2Ø74                      ISZ LOOP
Ø225  522Ø                      JMP ALAW
Ø226  122Ø                      TAD ALAW
Ø227  3554                      DCA I LASTX
Ø23Ø  172Ø                      TAD ERTBL
Ø231  3Ø22                      DCA ERWRD
                        /
                        /EXAMINE SR
Ø232  1Ø33                      TAD MCWA
Ø233  ØØ35                      AND K74Ø                /MADK 3,4,5 AND 6
Ø234  744Ø                      SZA             /DO ALL IF Ø
Ø235  5241                      JMP EXAM1
Ø236  1Ø33                      TAD MCWA
Ø237  1Ø35                      TAD K74Ø                /SET ALL TEST BITS
Ø24Ø  3Ø33                      DCA MCWA                /SAVE
Ø241  72ØØ              EXAM1,  CLA
Ø242  1Ø33                      TAD MCWA
Ø243  ØØ36                      AND K4ØØ
Ø244  744Ø                      SZA             /TEST 1 IF NO SKIP
Ø245  5444                      JMP I XTST1
Ø246  72ØØ              EXAM2,  CLA
Ø247  1Ø33                      TAD MCWA
Ø25Ø  ØØ37                      AND K2ØØ
Ø251  744Ø                      SZA             /TEST 2 IF NO SKIP
Ø252  5445                      JMP I XTST2
Ø253  72ØØ              EXAM3,  CLA
Ø254  1Ø33                      TAD MCWA
Ø255  ØØ4Ø                      AND K1ØØ
Ø256  744Ø                      SZA             /TEST 3 IF NO SKIP
Ø257  5446                      JMP I XTST3
```

```
Ø26Ø  72ØØ              EXAM4,  CLA
Ø261  1Ø33                      TAD MCWA
Ø262  ØØ41                      AND K4Ø
Ø263  744Ø                      SZA             /TEST 4 IF NO SKIP
Ø264  5447                      JMP I XTST4
Ø265  4531                      JMS I XFILD     /RESTORE DATA FIELD
```

```
Ø266  76Ø4              LAS
Ø267  Ø15Ø              AND K1
Ø27Ø  744Ø              SZA             /CHECK SR 11
Ø271  5211              JMP RSTRT1
Ø272  76Ø4              LAS
Ø273  Ø242              AND K2Ø
Ø274  744Ø              SZA             /INHIBIT MOVE IF A 1
Ø275  5213              JMP RTN1
Ø276  545Ø              JMP I XMOVE             /GO RELOCATE
                    /
Ø277  2645          XSTSR,  SETSR
```

```
                        /
                        /TEST 1.  WRITE CHECKER PATTERN #1.
                        /
Ø3ØØ  4451              TST1,   JMS I XSETU     /SET DF TO 1ST FIELD
Ø3Ø1  72ØØ                      CLA
Ø3Ø2  1Ø52                      TAD K261
Ø3Ø3  3Ø62                      DCA TNUM                /TEST NUMBER
Ø3Ø4  7Ø4Ø                      CMA
Ø3Ø5  3Ø1Ø                      DCA 1Ø          /SET ADDRESS COUNT TO 7777
Ø3Ø6  4463                      JMS I XBANK     /SEE IF FIELD HAS PROGRAM
Ø3Ø7  741Ø                      SKP             /NO.  BEGIN WRITING
Ø31Ø  5322                      JMP EXT1                /DONE ALL.  NOW READ ALL
Ø311  1345                      TAD KXT1
Ø312  3153                      DCA EXIT
Ø313  4464                      JMS I XØØ11     /WRITE ØØ11
Ø314  4464                      JMS I XØØ11     /WRITE ØØ11 64 TIMES
Ø315  4465                      JMS I X11ØØ     /WRITE 11ØØ 128 TIMES
Ø316  4465                      JMS I X11ØØ
Ø317  5313                      JMP .-4         /KEEP WRITING
Ø32Ø  4471              XIT1,   JMS I XTBNK     /SETUP FOR NEXT FIELD
Ø321  53Ø4                      JMP TST1+4
                        /
Ø322  4476              EXT1,   JMS I XCHK1     /READ EACH FIELD AND CHECK
                                                /FOR ERRORS.
Ø323  5324                      JMP TST1C               /NOW WRITE COMPLEMENT
                        /
                        /WRITE COMPLEMENT OF PATTERN 1
                        /
Ø324  4451              TST1C,  JMS I XSETU     /SEE DF TO 1ST FIELD.
Ø325  724Ø                      CLA CMA
Ø326  3Ø1Ø                      DCA 1Ø          /SET ADDRESS COUNT TO 7777
Ø327  4463                      JMS I XBANK     /SEE IF FIELD HAS PROGRAM
Ø33Ø  741Ø                      SKP
Ø331  5343                      JMP EXT1C               /ALL DONE.  READ ALL
Ø332  1346                      TAD KXT1C
Ø333  3153                      DCA EXIT
Ø334  4465                      JMS I X11ØØ     /WRITE 11ØØ
Ø335  4465                      JMS I X11ØØ     /WRITE 11ØØ 16 TIMES
Ø336  4464                      JMS I XØØ11
Ø337  4464                      JMS I XØØ11     /WRITE ØØ11 128 TIMES
Ø34Ø  5334                      JMP .-4         /KEEP WRITING
Ø341  4471              XIT1C,  JMS I XTBNK     /SETUP FOR NEXT FIELD
Ø342  5325                      JMP TST1C+1
                        /
Ø343  4477              EXT1C,  JMS I XCHK1C    /READ EACH BANK AND CHECK
                                                /FOR ERRORS.
Ø344  5246                      JMP EXAM2               /SEE IF TEST 2 IS SELECTED
                        /
Ø345  Ø32Ø              KXT1,   XIT1
Ø346  Ø341              KXT1C,  XIT1C
```

```
                          /
                          /TEST 2,  WRITE CHECKER PATTERN #2
                          /
      Ø42Ø                *4ØØ
                          /
Ø4ØØ  4451                TST2,   JMS I XSETU     /SET DF FOR 1ST FIELD
Ø4Ø1  72ØØ                        CLA
Ø4Ø2  1253                        TAD K262
Ø4Ø3  3262                        DCA TNUM                /TEST #
Ø4Ø4  724Ø                        CLA CMA
Ø4Ø5  3Ø1Ø                        DCA 1Ø          /SET ADDRESS COUNT TO 7777
Ø4Ø6  4463                        JMS I XBANK     /SEE IF FIELD HAS PROGRAM
Ø4Ø7  741Ø                        SKP             /NO.  BEGIN WRITING
Ø41Ø  5223                        JMP EXT2                /DONE ALL.  NOW READ ALL
Ø411  125Ø                        TAD KXT2
Ø412  3153                        DCA EXIT
Ø413  4464                        JMS I XØØ11     /WRITE ØØ11
Ø414  4465                        JMS I X11ØØ     /WRITE 11ØØ 128 TIMES
Ø415  4465                        JMS I X11ØØ
Ø416  4464                        JMS I XØØ11     /WRITE ØØ11 128 TIMES
Ø417  4464                        JMS I XØØ11
Ø42Ø  5214                        JMP .-4
Ø421  4471                XIT2,   JMS I XTBNK     /SETUP FOR NEXT FIELD
Ø422  52Ø4                        JMP TST2+4
```

```
0423  4500            EXT2,   JMS I XCHK2     /READ EACH FIELD AND CHECK
0424  5225                    JMP TST2C               /NOW WRITE COMPLEMENT
                      /
                      /WRITE COMPLEMENT OF PATTERN 2
                      /
0425  4451            TST2C,  JMS I XSETU     /SET OF FOR FIRST FIELD
0426  7240                    CLA CMA
0427  3010                    DCA 10          /SET ADR, COUNT TO 7777
0430  4463                    JMS I XBANK     /SEE IF FIELD HAS PROGRAM
0431  7410                    SKP             /WRITE
0432  5245                    JMP EXT2C               /GO READ
0433  1251                    TAD KXT2C
0434  3153                    DCA EXIT
0435  4465                    JMS I X1100     /WRITE 1100
0436  4464                    JMS I X0011     /WRITE 0011 128 TIMES
0437  4464                    JMS I X0011
0440  4465                    JMS I X1100
0441  4465                    JMS I X1100     /WRITE 1100 128 TIMES
0442  5236                    JMP .-4
0443  4471            XIT2C,  JMS I XTBNK     /SETUP FOR NEXT FIELD
0444  5226                    JMP TST2C+1
                      /
0445  4501            EXT2C,  JMS I XCHK2C    /READ EACH FIELD AND CHECK
0446  5647                    JMP I .+1               /SEE IF TEST 3 IS SELECTED
0447  0253                    EXAM3
                      /
0450  0421            KXT2,   XIT2
0451  0443            KXT2C,  XIT2C
```

```
                        /
                        /TEST 3,  WRITE CHECKER PATTERN #3
                        /
Ø452  4451              TST3,   JMS I XSETU     /SETUP FOR 1ST FIELD
Ø453  724Ø                      CLA
Ø454  1Ø54                      TAD K263
Ø455  3Ø62                      DCA TNUM                /TEST NUMBER
Ø456  724Ø                      CLA CMA
Ø457  3Ø1Ø                      DCA 1Ø          /SET ADR, COUNT TO 7777
Ø46Ø  4463                      JMS I XBANK     /SEE IF FIELD HAS PROGRAM
Ø461  741Ø                      SKP             /GO WRITE
Ø462  5275                      JMP EXT3                /GO READ
Ø463  1322                      TAD KXT3
Ø464  3153                      DCA EXIT
Ø465  4467                      JMS I X1ØØ1     /WRITE 1ØØ1
Ø466  4466                      JMS I XØ11Ø     /WRITE Ø11Ø 128 TIMES
Ø467  4466                      JMS I XØ11Ø
Ø47Ø  4467                      JMS I X1ØØ1     /WRITE 1ØØ1 128 TIMES
Ø471  4467                      JMS I X1ØØ1
Ø472  5266                      JMP .-4
Ø473  4471              XIT3,   JMS I XTBNK     /SETUP FOR NEXT FIELD
Ø474  5256                      JMP TST3+4
                        /
Ø475  45Ø2              EXT3,   JMS I XCHK3     /READ EACH FIELD AND CHECK
Ø476  5277                      JMP TST3C               /WRITE COMPLEMENT
                        /
                        /WRITE COMPLEMENT OF PATTERN 3
                        /
Ø477  4451              TST3C,  JMS I XSETU     /SETUP DF FOR 1ST FIELD
Ø5ØØ  724Ø                      CLA CMA
Ø5Ø1  3Ø1Ø                      DCA 1Ø          /SET ADR, COUNT TO 7777
Ø5Ø2  4463                      JMS I XBANK     /SEE IF FIELD HAS PROGRAM
Ø5Ø3  741Ø                      SKP             /WRITE
Ø5Ø4  5317                      JMP EXT3C               /READ ALL
Ø5Ø5  1323                      TAD KXT3C
Ø5Ø6  3153                      DCA EXIT
Ø5Ø7  4466                      JMS I XØ11Ø     /WRITE Ø11Ø
Ø51Ø  4467                      JMS I X1ØØ1     /WRITE 1ØØ1 128 TIMES
Ø511  4467                      JMS I X1ØØ1
Ø512  4466                      JMS I XØ11Ø     /WRITE Ø11Ø 128 TIMES
Ø513  4466                      JMS I XØ11Ø
Ø514  531Ø                      JMP .-4
Ø515  4471              XIT3C,  JMS I XTBNK     /SETUP FOR NEXT FIELD
Ø516  53ØØ                      JMP TST3C+1
                        /
Ø517  45Ø3              EXT3C,  JMS I XCHK3C    /READ EACH FIELD AND CHECK
Ø52Ø  5721                      JMP I .+1               /SEE IF TEST 4 IS SELECTED
Ø521  Ø26Ø                      EXAM4
                        /
Ø522  Ø473              KXT3,   XIT3
Ø523  Ø515              KXT3C,  XIT3C
```

```
                         /
                         /TEST 4,  WRITE PATTERN #4
                         /
        0600             *600
                         /
0600  4451               TST4,   JMS I XSETU     /SET DF FOR 1ST FIELD
0601  7200                       CLA
0602  1255                       TAD K264
0603  3262                       DCA TNUM                /TEST NUMBER
0604  7240                       CLA CMA
0605  3010                       DCA 10          /SET ADR, COUNT TO 7777
0606  4463                       JMS I XBANK     /SEE IF FIELD HAS PROGRAM
0607  7410                       SKP             /WRITE
0610  5223                       JMP EXT4                /GO READ
0611  1245                       TAD KXT4
0612  3153                       DCA EXIT
0613  4466                       JMS I X0110     /WRITE 0110
0614  4466                       JMS I X0110     /WRITE 0110 64 TIMES
0615  4467                       JMS I X1001     /WRITE 1001 128 TIMES
0616  4467                       JMS I X1001
0617  4466                       JMS I X0110
0620  5214                       JMP .-4
0621  4471               XIT4,   JMS I XTBNK     /SETUP FOR NEXT FIELD
0622  5204                       JMP TST4+4
                         /
0623  4504               EXT4,   JMS I XCHK4     /READ EACH FIELD AND CHECK
0624  5225                       JMP TST4C               /WRITE COMPLEMENT
                         /
                         /WRITE COMPLEMENT OF PATTERN 4
                         /
0625  4451               TST4C,  JMS I XSETU     /SET DF FOR FIRST
0626  7240                       CLA CMA
0627  3010                       DCA 10          /SET ADR, COUNT TO 7777
0630  4463                       JMS I XBANK     /SEE IF FIELD HAS PROGRAM
0631  7410                       SKP             /WRITE
0632  5247                       JMP EXT4C               /READ
0633  1246                       TAD KXT4C
0634  3153                       DCA EXIT
0635  4467                       JMS I X1001
0636  4467                       JMS I X1001     /WRITE 1001 64 TIMES
0637  4466                       JMS I X0110     /WRITE X0110 128 TIMES
0640  4466                       JMS I X0110
0641  4467                       JMS I X1001
0642  5236                       JMP .-4
0643  4471               XIT4C,  JMS I XTBNK     /SETUP FOR NEXT FIELD
0644  5226                       JMP TST4C+1
                         /
0645  0621               KXT4,   XIT4
0646  0643               KXT4C,  XIT4C
```

```
0647  4505         EXT4C,  JMS I XCHK4C     /READ EACH FIELD AND CHECK
0650  5651                 JMP I .+1        /SEE IF READY TO MOVE
0651  0265                 EXAM4+5
                   /
                   /ROUTINE TO WRITE 0011
                   /
0652  0000         W0011,  0
0653  1056                 TAD M20
0654  3072                 DCA COUNT
0655  3410                 DCA I 10                  /0
0656  3410                 DCA I 10                  /0
0657  7040                 CMA
0660  3410                 DCA I 10                  /1
0661  7040                 CMA
0662  3410                 DCA I 10                  /1
0663  2072                 ISZ COUNT                 /COUNT = -16 OR -32
0664  5255                 JMP W0011+3      /LOOP
0665  4470                 JMS I XKBNK      /SEE IF END OF FIELD
0666  5652                 JMP I W0011      /EXIT
                   /
                   /ROUTINE TO WRITE 1100
                   /
0667  0000         W1100,  0
0670  1056                 TAD M20
0671  3072                 DCA COUNT
0672  7040                 CMA
0673  3410                 DCA I 10                  /1
0674  7040                 CMA
0675  3410                 DCA I 10                  /1
0676  3410                 DCA I 10                  /0
0677  3410                 DCA I 10                  /0
0700  2072                 ISZ COUNT                 /-16 OR -32
0701  5272                 JMP W1100+3      /LOOP
0702  4470                 JMS I XKBNK      /SEE IF END OF FIELD
0703  5667                 JMP I W1100      /EXIT
                   /
                   /ROUTINE TO WRITE 0110
                   /
0704  0000         W0110,  0
0705  1056                 TAD M20
0706  3072                 DCA COUNT
0707  3410                 DCA I 10                  /0
0710  7040                 CMA
0711  3410                 DCA I 10                  /1
0712  7040                 CMA
0713  3410                 DCA I 10                  /1
0714  3410                 DCA I 10                  /0
0715  2072                 ISZ COUNT                 /-16 OR -32
0716  5307                 JMP W0110+3
0717  4470                 JMS I XKBNK      /SEE IIF END OF FIELD
0720  5704                 JMP I W0110      /EXIT
```

```
                        /
                        /ROUTINE TO WRITE 1ØØ1
                        /
Ø721  ØØØØ              W1ØØ1,  Ø
Ø722  1Ø56                      TAD M2Ø
Ø723  3Ø72                      DCA COUNT
Ø724  7Ø4Ø                      CMA
Ø725  341Ø                      DCA I 1Ø                /1
Ø726  341Ø                      DCA I 1Ø                /Ø
Ø727  341Ø                      DCA I 1Ø                /Ø
Ø73Ø  7Ø4Ø                      CMA
Ø731  341Ø                      DCA I 1Ø                /1
Ø732  2Ø72                      ISZ COUNT               /-16 TO -32
Ø733  5324                      JMP W1ØØ1+3     /LOOP
Ø734  447Ø                      JMS I XKRNK     /SEE IF END OF FIELD
Ø735  5721                      JMP I W1ØØ1     /EXIT
```

```
                        /
                        /ROUTINE TO READ ALL OF MEMORY 8 TIMES, COMPLEMENTING
                        /THE PATTERN EACH PASS.  NO ERROR CHECKING IS DONE.
                        /
0736  0000              RDALL,  0
0737  7200                      CLA
0740  1067                      TAD M40         /-32 DECIMAL
0741  3072                      DCA COUNT               /COUNTS PASSES THRU MEMORY
0742  7240                      CLA CMA
0743  3010                      DCA 10          /SET ADR, REGS, TO 777
0744  7040                      CMA
0745  3011                      DCA 11
0746  3073                      DCA FLCNT
0747  4463                      JMS I XBANK     /SEE IF FIELD HAS PROGRAM
0750  7410                      SKP             /READ
0751  5360                      JMP CDON1               /DONE
0752  7200                      CLA
0753  1410              RDLOP,  TAD I 10                /READ ONE
0754  7040                      CMA
0755  3411                      DCA I 11                /WRITE BACK
0756  2073                      ISZ FLCNT               /DONE 1 FIELD WHEN SKIP
0757  5353                      JMP RDLOP
0760  2072              CDON1,  ISZ COUNT               /DONE 32 PASSES WHEN SKIP
0761  5342                      JMP RDALL+4             /DO ANOTHER PASS
0762  5736                      JMP I RDALL     /EXIT
                        /
                        /READ AND CHECK FOR ERROR ROUTINE
                        /
      1000              *1000
                        /
1000  0000              RCHKA,  0
1001  4451                      JMS I XSETU     /SET DF TO 1ST FIELD
1002  4475                      JMS I XRALL     /READ ALL, DON'T CHECK
1003  3122                      DCA MEMADR      /SET ADR. COUN  TO 0
1004  4463                      JMS I XBANK     /SEE IF FIELD HAS PROGRAM
1005  7410                      SKP
1006  5600                      JMP I RCHKA
1007  1235                      TAD KRXT
1010  3153                      DCA EXIT
1011  0000              RLOPA,  0
1012  0000                      0               /WILL = JMS I XRD1, 2, 3, OR 4
1013  0000                      0
1014  0000                      0
1015  0000                      0
1016  7000                      NOP             /WILL = NOP OR JMS STALL
1017  5212                      JMP RLOPA+1
1020  1216              RXIT,   TAD .-2
1021  1236                      TAD K1K
1022  7640                      SZA CLA         /NOP IF 0
1023  5227                      JMP .+4
1024  1114                      TAD JMS5        /=JMS I XSALL
1025  3216                      DCA RXIT-2
1026  5203                      JMP RCHKA+3     /READ SLOW
1027  7000                      NOP
```

```
1030  1227                 TAD .-1
1031  3216                 DCA RXIT-2
1032  4471                 JMS I XTBNK      /SETUP FOR NEXT FIELD
1033  52Ø2                 JMP RCHKA+2
1034  5620                 JMP I RCHKA      /EXIT
                     /
1035  1020           KRXT,    RXIT
1036  1000           K1K,     1ØØØ
```

```
                        /
                        /SETUP ROUTINES FOR RCHKA
                        /
1Ø37  ØØØØ              RCHK1,  Ø
1Ø4Ø  111Ø                      TAD JMS1        /JMS1 = JMS I XRD1
1Ø41  3211                      DCA RLOPA
1Ø42  111Ø                      TAD JMS1                /JMS1 = JMS I XRD1
1Ø43  3212                      DCA RLOPA+1
1Ø44  1111                      TAD JMS2
1Ø45  3213                      DCA RLOPA+2
1Ø46  1111                      TAD JMS2
1Ø47  3214                      DCA RLOPA+3
1Ø5Ø  111Ø                      TAD JMS1
1Ø51  3215                      DCA RLOPA+4
1Ø52  42ØØ                      JMS RCHKA               /GO READ
1Ø53  5637                      JMP I RCHK1     /EXIT
                        /
1Ø54  ØØØØ              RCHK1C, Ø
1Ø55  1111                      TAD JMS2        /JMS2 = JMS I XRD2
1Ø56  3211                      DCA RLOPA
1Ø57  1111                      TAD JMS2
1Ø6Ø  3212                      DCA RLOPA+1
1Ø61  111Ø                      TAD JMS1
1Ø62  3213                      DCA RLOPA+2
1Ø63  111Ø                      TAD JMS1
1Ø64  3214                      DCA RLOPA+3
1Ø65  1111                      TAD JMS2
1Ø66  3215                      DCA RLOPA+4
1Ø67  42ØØ                      JMS RCHKA               /GO READ
1Ø7Ø  5654                      JMP I RCHK1C    /EXIT
                        /
1Ø71  ØØØØ              RCHK2,  Ø
1Ø72  111Ø                      TAD JMS1        /JMS1 = JMS I XRD1
1Ø73  3211                      DCA RLOPA
1Ø74  1111                      TAD JMS2                /JMS I XRD2
1Ø75  3212                      DCA RLOPA+1
1Ø76  1111                      TAD JMS2
1Ø77  3213                      DCA RLOPA+2
11ØØ  111Ø                      TAD JMS1                /JMS I XRD1
11Ø1  3214                      DCA RLOPA+3
11Ø2  111Ø                      TAD JMS1
11Ø3  3215                      DCA RLOPA+4
11Ø4  42ØØ                      JMS RCHKA               /GO READ
11Ø5  5671                      JMP I RCHK2     /EXIT
                        /
11Ø6  ØØØØ              RCHK2C, Ø
11Ø7  1111                      TAD JMS2
111Ø  3211                      DCA RLOPA
1111  111Ø                      TAD JMS1        /JMS I XRD1
1112  3212                      DCA RLOPA+1
1113  111Ø                      TAD JMS1
1114  3213                      DCA RLOPA+2
1115  1111                      TAD JMS2
1116  3214                      DCA RLOPA+3
```

```
1117  1111                TAD JMS2
1120  3215                DCA RLOPA+4
1121  4222                JMS RCHKA              /GO READ
1122  5706                JMP I RCHK2C    /EXIT
```

```
                        /
1123  ØØØØ              RCHK3,  Ø
1124  1113                      TAD JMS4        /JMS I XRD4
1125  3211                      DCA RLOPA
1126  1112                      TAD JMS3                  /JMS I XRD3
1127  3212                      DCA RLOPA+1
113Ø  1112                      TAD JMS3        /JMS I XRD3
1131  3213                      DCA RLOPA+2
1132  1113                      TAD JMS4                  /JMS I XRD4
1133  3214                      DCA RLOPA+3
1134  1113                      TAD JMS4
1135  3215                      DCA RLOPA+4
1136  42ØØ                      JMS RCHKA                 /GO READ
1137  5723                      JMP I RCHK3     /EXIT
                        /
114Ø  ØØØØ              RCHK3C, Ø
1141  1112                      TAD JMS3        /JMS I XRD3
1142  3211                      DCA RLOPA
1143  1113                      TAD JMS4                  /JMS I XRD4
1144  3212                      DCA RLOPA+1
1145  1113                      TAD JMS4
1146  3213                      DCA RLOPA+2
1147  1112                      TAD JMS3
115Ø  3214                      DCA RLOPA+3
1151  1112                      TAD JMS3
1152  3215                      DCA RLOPA+4
1153  42ØØ                      JMS RCHKA                 /GO READ
1154  574Ø                      JMP I RCHK3C    /EXIT
                        /
      12ØØ              *12ØØ
                        /
12ØØ  ØØØØ              RCHK4,  Ø
12Ø1  4531                      JMS I XFILD
12Ø2  1112                      TAD JMS3        /JMS I XRD3
12Ø3  3637                      DCA I XLOPA
12Ø4  1112                      TAD JMS3                  /JMS I XRD3
12Ø5  364Ø                      DCA I XLOPB
12Ø6  1113                      TAD JMS4
12Ø7  3641                      DCA I XLOPC
121Ø  1113                      TAD JMS4                  /JMS I XRD4
1211  3642                      DCA I XLOPD
1212  1112                      TAD JMS3
1213  3643                      DCA I XLOPE
1214  4644                      JMS I XCFL
1215  4636                      JMS I XCHKA               /GO READ
1216  56ØØ                      JMP I RCHK4     /EXIT
                        /
1217  ØØØØ              RCHK4C, Ø
122Ø  4531                      JMS I XFILD
1221  1113                      TAD JMS4        /JMS I XRD4
1222  3637                      DCA I XLOPA
1223  1113                      TAD JMS4
1224  364Ø                      DCA I XLOPB
1225  1112                      TAD JMS3
```

```
1226  3641             DCA I XLOPC
1227  1112             TAD JMS3
1230  3642             DCA I XLOPD
1231  1113             TAD JMS4
1232  3643             DCA I XLOPE
1233  4644             JMS I XCFL
1234  4636             JMS I XCHKA          /GO READ
1235  5617             JMP I RCHK4C    /EXIT

1236  1220   XCHKA,    RCHKA
1237  1711   XLOPA,    RLOPA
1240  1712   XLOPB,    RLOPA+1
1241  1713   XLOPC,    RLOPA+2
1242  1714   XLOPD,    RLOPA+3
1243  1715   XLOPE,    RLOPA+4
1244  1722   XCFL,     CFLD

             PAUSE
```

```
                        /8I-8S EXTENDED CHECKERBOARD - TAPE 2
                        /
                        /READ ROUTINES FOR ØØ11; 11ØØ; Ø11Ø AND 1ØØ1
                        /
1245  ØØØØ              RD1,    Ø
1246  1Ø56                      TAD M2Ø         /-16
1247  3Ø72                      DCA COUNT
125Ø  1Ø6Ø                      TAD M4          /-4
1251  3Ø73                      DCA FLCNT
1252  1141              CLOP1,  TAD M1Ø         /-8
1253  3Ø74                      DCA LOOP
1254  1522                      TAD I MEMADR
1255  7Ø4Ø                      CMA
1256  3522                      DCA I MEMADR
1257  2Ø74                      ISZ LOOP                  /COMPLEMENT 8 TIMES
126Ø  5254                      JMP .-4
1261  2Ø73                      ISZ FLCNT                 /DONE 4 ADRS. WHEN SKIP
1262  741Ø                      SKP
1263  5266                      JMP .+3
1264  2122                      ISZ MEMADR
1265  5252                      JMP CLOP1
                        /
1266  1122                      TAD MEMADR
1267  1Ø6Ø                      TAD M4          /SUBTRACT 4
127Ø  3Ø1Ø                      DCA 1Ø          /NOW USE AUTO-INDEX
1271  71ØØ                      CLL
1272  141Ø                      TAD I 1Ø
1273  744Ø                      SZA             /Ø
1274  4521                      JMS I XRROR     /PRINT ERROR
1275  71ØØ                      CLL
1276  141Ø                      TAD I 1Ø
1277  744Ø                      SZA             /Ø
13ØØ  4521                      JMS I XRROR     /PRINT ERROR
13Ø1  712Ø                      STL
13Ø2  141Ø                      TAD I 1Ø
13Ø3  7Ø4Ø                      CMA             /1
13Ø4  744Ø                      SZA
13Ø5  4521                      JMS I XRROR     /PRINT ERROR
13Ø6  712Ø                      STL
13Ø7  141Ø                      TAD I 1Ø
131Ø  7Ø4Ø                      CMA             /1
1311  744Ø                      SZA
1312  4521                      JMS I XRROR     /PRINT ERROR
1313  2Ø72                      ISZ COUNT
1314  532Ø                      JMP .+4
1315  447Ø                      JMS I XKBNK               /SEE IF END OF FIELD
1316  2122                      ISZ MEMADR
1317  5645                      JMP I RD1
                        /
132Ø  2122                      ISZ MEMADR      /KEEP READING
1321  525Ø                      JMP RD1+3
```

```
                        /
1322  ØØØØ              RD2,    Ø
1323  1Ø56                      TAD M2Ø         /-16
1324  3Ø72                      DCA COUNT
1325  1Ø6Ø                      TAD M4          /-4
1326  3Ø73                      DCA FLCNT

1327  1141              CLOP2,  TAD M1Ø         /-8
133Ø  3Ø74                      DCA LOOP
1331  1522                      TAD I MEMADR    /READ
1332  7Ø4Ø                      CMA
1333  3522                      DCA I MEMADR
1334  2Ø74                      ISZ LOOP                /COMPLEMENT 4 TIMES
1335  5331                      JMP .-4
1336  2Ø73                      ISZ FLCNT               /DONE 4 ADRS, WHEN SKIP
1337  741Ø                      SKP
134Ø  5343                      JMP .+3
1341  2122                      ISZ MEMADR      /INCREMENT ADDRESS
1342  5327                      JMP CLOP2
                        /
1343  1122                      TAD MEMADR
1344  1Ø6Ø                      TAD M4
1345  3Ø1Ø                      DCA 1Ø          /NOW USE AUTO-INDEX
1346  712Ø                      STL
1347  141Ø                      TAD I 1Ø
135Ø  7Ø4Ø                      CMA             /1
1351  744Ø                      SZA
1352  4521                      JMS I XRROR     /PRINT ERROR
1353  712Ø                      STL
1354  141Ø                      TAD I 1Ø
1355  7Ø4Ø                      CMA             /1
1356  744Ø                      SZA
1357  4521                      JMS I XRROR     /PRINT ERROR
136Ø  71ØØ                      CLL
1361  141Ø                      TAD I 1Ø
1362  744Ø                      SZA             /Ø
1363  4521                      JMS I XRROR     /PRINT ERROR
1364  71ØØ                      CLL
1365  141Ø                      TAD I 1Ø
1366  744Ø                      SZA             /Ø
1367  4521                      JMS I XRROR     /PRINT ERROR
137Ø  2Ø72                      ISZ COUNT
1371  5375                      JMP .+4
1372  447Ø                      JMS I XKBNK             /SEE IF END OF FIELD
1373  2122                      ISZ MEMADR
1374  5722                      JMP I RD2
                        /
1375  2122                      ISZ MEMADR              /KEEP READING
1376  5325                      JMP RD2+3
```

```
                        /
        14ØØ            *14ØØ
                        /
14ØØ  ØØØØ              RD3,    Ø
14Ø1  1Ø56                      TAD M2Ø                 /-16
14Ø2  3Ø72                      DCA COUNT
14Ø3  1Ø6Ø                      TAD M4          /-4
14Ø4  3Ø73                      DCA FLCNT
14Ø5  1141              CLOP3,  TAD M1Ø         /-8
14Ø6  3Ø74                      DCA LOOP
14Ø7  1522                      TAD I MEMADR    /READ
141Ø  7Ø4Ø                      CMA
1411  3522                      DCA I MEMADR
1412  2Ø74                      ISƵ LOOP                /COMPLEMENT 8 TIMES
1413  52Ø7                      JMP .-4
1414  2Ø73                      ISƵ FLCNT               /DONE 4 IF Ø
1415  741Ø                      SKP
1416  5221                      JMP .+3
1417  2122                      ISƵ MEMADR
142Ø  52Ø5                      JMP CLOP3               /DO NEXT
                        /
1421  1122                      TAD MEMADR
1422  1Ø6Ø                      TAD M4
1423  3Ø1Ø                      DCA 1Ø          /USE AUTO-INDEX
1424  71ØØ                      CLL
1425  141Ø                      TAD I 1Ø
1426  744Ø                      SƵA             /Ø
1427  4521                      JMS I XRROR     /PRINT ERROR
143Ø  712Ø                      STL
1431  141Ø                      TAD I 1Ø
1432  7Ø4Ø                      CMA             /1
1433  744Ø                      SƵA
1434  4521                      JMS I XRROR     /PRINT ERROR
1435  712Ø                      STL
1436  141Ø                      TAD I 1Ø
1437  7Ø4Ø                      CMA             /1
144Ø  744Ø                      SƵA
1441  4521                      JMS I XRROR     /PRINT ERROR
1442  71ØØ                      CLL
1443  141Ø                      TAD I 1Ø
1444  744Ø                      SƵA             /Ø
1445  4521                      JMS I XRROR     /PRINT ERROR
1446  2Ø72                      ISƵ COUNT
1447  5253                      JMP .+4
145Ø  447Ø                      JMS I XKBNK     /SEE IF END OF FIELD
1451  2122                      ISƵ MEMADR
1452  56ØØ                      JMP I RD3
                        /
1453  2122                      ISƵ MEMADR
1454  52Ø3                      JMP RD3+3
```

```
                      /
1455  ØØØØ            RD4,    Ø
1456  1Ø56                    TAD M2Ø         /-16
1457  3472                    DCA COUNT
146Ø  126Ø                    TAD M4          /-4
1461  3473                    DCA FLCNT
1462  1141            CLOP4,  TAD M1Ø         /-8
1463  3474                    DCA LOOP
1464  1522                    TAD I MEMADR
1465  7Ø4Ø                    CMA
1466  3522                    DCA I MEMADR
1467  2Ø74                    ISZ LOOP                  /COMPLEMENT 8 TIMES
147Ø  5264                    JMP .-4
1471  2Ø73                    ISZ FLCNT                 /DONE 4 ADRS, WHEN SKIP
1472  741Ø                    SKP
1473  5276                    JMP .+3
1474  2122                    ISZ MEMADR      /INCREMENT ADDRESS
1475  5262                    JMP CLOP4
1476  1122                    TAD MEMADR
1477  126Ø                    TAD M4
15ØØ  3Ø1Ø                    DCA 1Ø          /USE AUTO-INDEX
15Ø1  712Ø                    STL
15Ø2  141Ø                    TAD I 1Ø
15Ø3  7Ø4Ø                    CMA             /1
15Ø4  744Ø                    SZA
15Ø5  4521                    JMS I XRROR     /PRINT ERROR
15Ø6  71ØØ                    CLL
15Ø7  141Ø                    TAD I 1Ø
151Ø  744Ø                    SZA             /Ø
1511  4521                    JMS I XRROR     /PRINT ERROR
1512  71ØØ                    CLL
1513  141Ø                    TAD I 1Ø
1514  744Ø                    SZA             /Ø
1515  4521                    JMS I XRROR     /PRINT ERROR
1516  712Ø                    STL
1517  141Ø                    TAD I 1Ø
152Ø  7Ø4Ø                    CMA             /1
1521  744Ø                    SZA
1522  4521                    JMS I XRROR     /PRINT ERROR
1523  2Ø72                    ISZ COUNT
1524  533Ø                    JMP .+4
1525  447Ø                    JMS I XKBNK               /SEE IF END OF FIELD
1526  2122                    ISZ MEMADR
1527  5655                    JMP I RD4
                      /
153Ø  2122                    ISZ MEMADR
1531  526Ø                    JMP RD4+3
```

```
                        /
                        /ROUTINE TO CHECK FOR END OF FIELD
                        /
      1600              *1600
1600  0000              CKBNK,  0
1601  7200                      CLA
1602  1010                      TAD 10
1603  7040                      CMA
1604  7640                      SZA CLA
1605  5600                      JMP I CKBNK     /NOT DONE
1606  5553                      JMP I EXIT      /DONE
                        /
                        /ROUTINE TO SEE IF TESTED FIELD HAS PROGRAM
                        /
1607  0000              CBANK,  0
1610  6224                      RIF             /READ INST, FIELD
1611  3223                      DCA SAVIF               /SAVE
1612  6214                      RDF             /READ DATA FIELD
1613  7041                      CIA
1614  1223                      TAD SAVIF
1615  7640                      SZA CLA         /EQUAL IF AC=0
1616  5607                      JMP I CBANK     /DOESN'T HAVE PROGRAM
1617  4471                      JMS I XTBNK     /INCREMENT DATA FIELD
1620  5607                      JMP I CBANK     /TEST NEW FIELD
1621  2207                      ISZ CBANK               /DONE ALL CAUSE PROGRAM NOW
                                                /IN HIGHEST FIELD
1622  5607                      JMP I CBANK     /EXIT
1623  0000              SAVIF,  0
```

```
                       /
                       /ROUTINE TO SET DF FOR NEXT FIELD
                       /
1624  ØØØØ             NXTBNK, Ø
1625  72ØØ                     CLA
1626  6214                     RDF               /READ DATA FIELD
1627  7Ø41                     CIA
163Ø  1124                     TAD LAST1                 /C(LAST1) = LAST TO TEST
1631  764Ø                     SZA CLA           /ALL DONE IF Ø
1632  5235                     JMP .+3
1633  2224                     ISZ NXTBNK
1634  5242                     JMP .+6                   /EXIT
1635  6214                     RDF
1636  1Ø34                     TAD K1Ø           /INCREMENT DATA FIELD
1637  1125                     TAD KCDF                  /ADD ,62Ø1
164Ø  3241                     DCA .+1
1641  62Ø1                     CDF ØØ            /CHANGE TO NEW DATA FIELD
                       /
                       /CHECK SWITCH REGISTER
1642  76Ø4                     LAS
1643  771Ø                     SPA CLA           /CHEC HALT
1644  4527                     JMS I XHLT        /GO HALT, SRØ=1
1645  5624                     JMP I NXTBNK      /EXIT
                       /
                       /RESTORE DATA FIELD AND CHECK SR
                       /
1646  ØØØØ             FIELD,  Ø
1647  72ØØ                     CLA
165Ø  6214                     RDF
1651  3Ø14                     DCA DATFLD        /SAVE TESTED FIELD#
1652  6224                     RIF
1653  1125                     TAD KCDF
1654  3255                     DCA .+1
1655  62Ø1                     CDF ØØ            /MAKE DATA AND INST FIELD EQUAL
1656  72ØØ                     CLA
1657  5646                     JMP I FIELD
```

```
                              /
        17ØØ                  *17ØØ
                              /
                              /START HERE TO LOOP ON ADDRESS
                              /
17ØØ   72ØØ                            CLA
17Ø1   76Ø4                            LAS              /READ LOWER LIMIT
17Ø2   3123                            DCA FIRST1
17Ø3   74Ø2                            HLT              /NOW SETUP UPPFR LIMIT
17Ø4   76Ø4                            LAS
17Ø5   3124                            DCA LAST1
17Ø6   1123                   OVER,    TAD FIRST1
17Ø7   3122                            DCA MEMADR
171Ø   1522                   WRLOP,   TAD I MEMADR     /READ
1711   3522                            DCA I MEMADR     /WRITE
1712   1122                            TAD MEMADR
1713   7Ø41                            CIA
1714   1124                            TAD LAST1
1715   765Ø                            SNA CLA
1716   53Ø6                            JMP OVER
1717   2122                            ISZ MEMADR
172Ø   531Ø                            JMP WRLOP
1721   74Ø2                            HLT
                              /
1722   ØØØØ                   CFLD,    Ø
1723   72ØØ                            CLA
1724   1Ø14                            TAD DATFLD       /TEST FIELD
1725   1125                            TAD KCDF
1726   3327                            DCA .+1
1727   62Ø1                            CDF ØØ           /RESTORE TEST FIELD
173Ø   72ØØ                            CLA
1731   5722                            JMP I CFLD       /EXIT
```

```
                     /
                     /PRINT ERROR ROUTINE
                     /
      2ØØØ           *2ØØØ
2ØØØ  ØØØØ           ERROR,  Ø
2ØØ1  743Ø                   SZL                /READING 1'S IF LINK = 1
2ØØ2  7Ø4Ø                   CMA
2ØØ3  3363                   DCA BAD            /SAVE BAD DATA
2ØØ4  743Ø                   SZL
2ØØ5  7Ø4Ø                   CMA
2ØØ6  3364                   DCA GOOD                   /SAVE GOOD DATA
2ØØ7  1Ø1Ø                   TAD 1Ø
2Ø1Ø  3365                   DCA OCADR                  /OCTAL ADDRESS
2Ø11  4531                   JMS I XFILD        /RESTORE DATA FIELD
2Ø12  1Ø14                   TAD DATFLD         /DATA FIELD
2Ø13  7Ø41                   CIA
2Ø14  1366                   TAD LAST                   /LAST = FIELD WITH LAST ERROR
2Ø15  765Ø                   SNA CLA            /SAME IF Ø
2Ø16  5233                   JMP SW2            /DON'T STORE
2Ø17  1Ø14                   TAD DATFLD
2Ø2Ø  3366                   DCA LAST
2Ø21  1Ø22                   TAD ERWRD                  /TABLE POINTER
2Ø22  7Ø41                   CIA
2Ø23  1Ø21                   TAD ENTBL
2Ø24  764Ø                   SZA CLA            /END OF TABLE IF = Ø
2Ø25  523Ø                   JMP .+3
2Ø26  1Ø2Ø                   TAD ERTBL
2Ø27  3Ø22                   DCA ERWRD                  /RESTORE POINTER
2Ø3Ø  1Ø14                   TAD DATFLD
2Ø31  2Ø22                   ISZ ERWRD                  /INCREMENT POINTER
2Ø32  3422                   DCA I ERWRD        /STORE IN TABLE
                     /
2Ø33  76Ø4           SW2,    LAS
2Ø34  7ØØ6                   RTL
2Ø35  77ØØ                   SMA CLA            /SR2 ON A 1 = RING BELL
2Ø36  5242                   JMP SW1
2Ø37  1367                   TAD K2Ø7
2Ø4Ø  4346                   JMS PRERR                  /RING BELL
2Ø41  5311                   JMP SWØ
2Ø42  76Ø4           SW1,    LAS
2Ø43  7ØØ4                   RAL
2Ø44  77ØØ                   SMA CLA            /SR1 A 1 = NO PRINT
2Ø45  5254                   JMP EPRNT
2Ø46  1Ø14           ERFXT,  TAD DATFLD
2Ø47  1125                   TAD KCDF
2Ø5Ø  3251                   DCA .+1
2Ø51  62Ø1                   CDF ØØ             /SET TO TESTED FIELD
2Ø52  72ØØ                   CLA
2Ø53  56ØØ                   JMP I ERROR
```

```
                                /
2Ø54   4354                     ERPNT,  JMS CRLF                /CR,LF
2Ø55   1Ø14                             TAD DATFLD              /TEST NUMBER
2Ø56   7Ø12                             RTR
2Ø57   7Ø1Ø                             RAR
2Ø6Ø   1142                             TAD K26Ø
2Ø61   4346                             JMS PRERR               /PRINT
2Ø62   114Ø                             TAD M14         /-12 DECIMAL
2Ø63   3Ø74                             DCA LOOP
2Ø64   4315                             JMS SPING               /SPACE 12
2Ø65   1365                             TAD OCADR               /OCTAL ADR.
2Ø66   3134                             DCA CHAR                /SAVF
2Ø67   4326                             JMS PROCTL      /PRINT
2Ø7Ø   1141                             TAD M1Ø         /-8 DECIMAL
2Ø71   3Ø74                             DCA LOOP
2Ø72   4315                             JMS SPING               /SPACE  8
2Ø73   1364                             TAD GOOD
2Ø74   3134                             DCA CHAR
2Ø75   4326                             JMS PROCTL      /PRINT
2Ø76   1Ø61                             TAD M5          /-5
2Ø77   3Ø74                             DCA LOOP
21ØØ   4315                             JMS SPING               /SPACE 5
21Ø1   1363                             TAD BAD
21Ø2   3134                             DCA CHAR
21Ø3   4326                             JMS PROCTL      /PRINT
21Ø4   1Ø61                             TAD M5
21Ø5   3Ø74                             DCA LOOP
21Ø6   4315                             JMS SPING               /SPACE 5
21Ø7   1Ø62                             TAD TNUM                /TEST NUMBER
211Ø   4346                             JMS PRERR               /PRINT

                                /
2111   76Ø4                     SWØ,    LAS
2112   771Ø                             SPA CLA         /CH CK SRØ
2113   4527                             JMS I XHLT              /GO HALT
2114   5246                             JMP EREXT               /EXIT
                                /
                                /PRINT SPACES
                                /
2115   ØØØØ                     SPING,  Ø
2116   137Ø                             TAD K24Ø                /SPACE
2117   6Ø46                             TLS             /PRINT
212Ø   6Ø41                             TSF
2121   532Ø                             JMP .-1
2122   2Ø74                             ISZ LOOP
2123   5317                             JMP SPING+2
2124   72ØØ                             CLA
2125   5715                             JMP I SPING     /EXIT
```

```
                       /
                       /PRINT OCTAL
                       /
2126  ØØØØ             PROCTL, Ø
2127  1Ø6Ø                     TAD M4          /-4
213Ø  3Ø74                     DCA LOOP                /DIGIT COUNTER
2131  1134             POSITN, TAD CHAR
2132  71Ø4                     CLL RAL
2133  7ØØ6                     RTL
2134  3134                     DCA CHAR
2135  1134                     TAD CHAR
2136  7ØØ4                     RAL
2137  Ø133                     AND K7
214Ø  1142                     TAD K26Ø                /MAKE ASCII
2141  4346                     JMS PRERR               /PRINT ONE
2142  2Ø74                     ISZ LOOP
2143  5331                     JMP POSITN      /UO NEXT
2144  72ØØ                     CLA
2145  5726                     JMP I PROCTL    /EXIT
                       /
                       /PRINT A NUMBER
                       /
2146  ØØØØ             PRERR,  Ø
2147  6Ø46                     TLS
215Ø  6Ø41                     TSF
2151  535Ø                     JMP .-1
2152  72ØØ                     CLA
2153  5746                     JMP I PRERR     /EXIT
                       /
                       /CARRIAGE RETURN, LINE FEED
                       /
2154  ØØØØ             CRLF,   Ø
2155  72ØØ                     CLA
2156  1143                     TAD K215                /CR
2157  4346                     JMS PRERR
216Ø  1371                     TAD K212                /LF
2161  4346                     JMS PRERR
2162  5754                     JMP I CRLF
                       /
2163  ØØØØ             BAD,    Ø
2164  ØØØØ             GOOD,   Ø
2165  ØØØØ             OCADR,  Ø
2166  ØØØØ             LAST,   Ø
2167  Ø2Ø7             K2Ø7,   2Ø7
217Ø  Ø24Ø             K24Ø,   24Ø
2171  Ø212             K212,   212
```

```
                        /
       22ØØ             *22ØØ
                        /
                        /ROUTINE TO SET DF TO FIRST TEST FIELD
                        /
22ØØ  ØØØØ              SETU1,  Ø
22Ø1  72ØØ                      CLA
22Ø2  1123                      TAD FIRST1      /FIRST TO TEST
22Ø3  1125                      TAD KCDF
22Ø4  32Ø5                      DCA .+1

22Ø5  62Ø1                      CDF ØØ          /CHANGE TO TEST FIELD
22Ø6  56ØØ                      JMP I SETU1     /EXIT
                        /
                        /ROUTINE TO ACCEPT TEST LIMITS FROM
                        /KEYBOARD INPUT
                        /
22Ø7  ØØØØ              SLMTS,  Ø
221Ø  4531                      JMS I XFILD
2211  4547                      JMS I XCRLF     /CR, LF
2212  4751                      JMS I XTLIM     /PRINT TEST LIMITS
2213  4547                      JMS I XCRLF     /CR, LF
2214  43Ø3                      JMS KEYIN               /GO ACCEPT INPUT
2215  4314                      JMS LEGAL               /SEE IF IT'S LEGAL
2216  1134                      TAD CHAR
2217  Ø133                      AND K7          /MASK AC 9-11
222Ø  71Ø4                      CLL RAL
2221  7ØØ6                      RTL             /POSITION TO AC 6-8
2222  3123                      DCA FIRST1      /FIRST TO TEST
2223  43Ø3                      JMS KEYIN               /WAIT FOR COMMA
2224  1134                      TAD CHAR                /GET INPUT
2225  7Ø41                      CIA
2226  1353                      TAD K254
2227  745Ø                      SNA             /OK IF Ø
223Ø  5233                      JMP .+3
2231  4344                      JMS QUERY               /PRINT QUESTION MARK
2232  5211                      JMP SLMTS+2
2233  43Ø3                      JMS KEYIN               /WAIT FOR 2ND
2234  4314                      JMS LEGAL               /SEE IF IT'S LEGAL
2235  1134                      TAD CHAR
2236  Ø133                      AND K7          /MASK AC 9-11
2237  71Ø4                      CLL RAL
224Ø  7ØØ6                      RTL             /POSITION TO AC 6-8
2241  3124                      DCA LAST1               /LAST TO TEST
2242  1123                      TAD FIRST1
2243  7Ø41                      CIA
2244  1124                      TAD LAST1
2245  75ØØ                      SMA             /1ST IS > LAST IF NEG
2246  5256                      JMP OKAS
2247  72ØØ                      CLA
```

```
225Ø  1123            TAD FIRST1
2251  3134            DCA CHAR
2252  1124            TAD LAST1
2253  3123            DCA FIRST1      /LAST NOW IS FIRST
2254  1134            TAD CHAR
2255  3124            DCA LAST1               /FIRST IS NOW LAST
2256  72ØØ     OKAS,  CLA
2257  1124            TAD LAST1
226Ø  7Ø41            CIA
2261  1123            TAD FIRST1      /SEE IF EQUAL
2262  744Ø            SZA             /YFS IF Ø
2263  5273            JMP ALOK
2264  1123            TAD FIRST1      /NOW SEE IF IT HAS PROGRAM
2265  7Ø41            CIA
2266  1Ø16            TAD INSFLD      /CURRENT FIELD
2267  764Ø            SZA CLA         /NO IF A 1
227Ø  5273            JMP ALOK
2271  4752            JMS I XLCAT             /PRINT PROGRAM LOCATION
2272  5211            JMP SLMTS+2     /AND START OVER
2273  43Ø3     ALOK,  JMS KEYIN               /WAIT FOR C,R,
2274  1134            TAD CHAR
2275  7Ø41            CIA
2276  1143            TAD K215
2277  745Ø            SNA             /NOT A C.R, IF A SKIP
23ØØ  56Ø7            JMP I SLMTS
23Ø1  4344            JMS QUERY               /PRINT QUESTION MARK
23Ø2  5211            JMP SLMTS+2     /START OVER
                /
23Ø3  ØØØØ     KEYIN, Ø
23Ø4  6Ø32            KCC
23Ø5  6Ø31            KSF
23Ø6  53Ø5            JMP .-1
23Ø7  6Ø36            KRB
231Ø  3134            DCA CHAR
2311  1134            TAD CHAR
2312  4536            JMS I XPERR
2313  57Ø3            JMP I KEYIN
```

```
                          /
2314  ØØØØ                LEGAL,  Ø
2315  1134                        TAD CHAR
2316  7Ø41                        CIA
2317  1144                        TAD K377
232Ø  765Ø                        SNA CLA          /RUB-OUT IF Ø
2321  5211                        JMP SLMTS+2
2322  1134                        TAD CHAR
2323  Ø145                        AND K37Ø
2324  7Ø41                        CIA
2325  1142                        TAD K26Ø
2326  765Ø                        SNA CLA
2327  5714                        JMP I LEGAL
233Ø  1134                        TAD CHAR
2331  7Ø41                        CIA
2332  1353                        TAD K254
2333  765Ø                        SNA CLA          /A COMMA IF Ø
2334  5714                        JMP I LEGAL
2335  1134                        TAD CHAR
2336  7Ø41                        CIA
2337  1143                        TAD K215
234Ø  765Ø                        SNA CLA          /A C,R, IF Ø
2341  5714                        JMP I LEGAL
2342  4344                        JMS QUERY                  /QUERY
2343  5211                        JMP SLMTS+2      /START OVER
                          /
2344  ØØØØ                QUERY,  Ø
2345  4547                        JMS I XCRLF
2346  1146                        TAD K277
2347  4536                        JMS I XPERR      /PRINT QUERY MARK
235Ø  5744                        JMP I QUERY
                          /
2351  2446                XTLIM,  TLIMT
2352  24ØØ                XLCAT,  LOCAT
2353  Ø254                K254,   254
```

```
                          /
                          /PRINT FIELD PROGRAM IS IN
                          /
       24ØØ               *24ØØ
                          /
24ØØ  ØØØØ                LOCAT,  Ø
24Ø1  72ØØ                        CLA
24Ø2  1216                        TAD INSFLD      /CURRENT FIELD
24Ø3  7Ø12                        RTR
24Ø4  7Ø1Ø                        RAR
24Ø5  Ø133                        AND K7
24Ø6  1142                        TAD K26Ø
24Ø7  3244                        DCA FLDN                /FLDN = PRGAM+25
241Ø  1217                        TAD PRGAM
2411  3Ø12                        DCA 12
2412  1412                PLOCT,  TAD I 12
2413  745Ø                        SNA             /DONE IF Ø
2414  56ØØ                        JMP I LOCAT     /EXIT
2415  4536                        JMS I XPERR     /PRINT
2416  5212                        JMP PLOCT
                          /
2417  2417                PRGAM,  .
242Ø  Ø32Ø                        32Ø             /P
2421  Ø322                        322             /R
2422  Ø317                        317             /O
2423  Ø3Ø7                        3Ø7             /G
2424  Ø322                        322             /R
2425  Ø3Ø1                        3Ø1             /A
2426  Ø315                        315             /M
2427  Ø24Ø                        24Ø             /
243Ø  Ø311                        311             /I
2431  Ø323                        323             /S
2432  Ø24Ø                        24Ø
2433  Ø311                        311             /I
2434  Ø316                        316             /N
2435  Ø24Ø                        24Ø             /
2436  Ø3Ø6                        3Ø6             /F
2437  Ø311                        311             /I
244Ø  Ø3Ø5                        3Ø5             /E
2441  Ø314                        314             /L
2442  Ø3Ø4                        3Ø4             /D
2443  Ø24Ø                        24Ø             /
2444  ØØØØ                FLDN,   Ø               /X
2445  ØØØØ                        Ø               /TERMINATOR
```

```
                        /
2446  ØØØØ              TLIMT,  Ø               /PRINT TEST LIMITS
2447  72ØØ                      CLA
245Ø  1257                      TAD TSTL
2451  3Ø12                      DCA 12
2452  1412              PLIMT,  TAD I 12
2453  745Ø                      SNA             /DONE IF Ø
2454  5646                      JMP I TLIMT             /DONE IF Ø
2455  4536                      JMS I XPERR
2456  5252                      JMP PLIMT
                        /
2457  2457              TSTL,   .
246Ø  Ø324                      324             /T
2461  Ø3Ø5                      3Ø5             /E
2462  Ø323                      323             /S
2463  Ø324                      324             /T
2464  Ø24Ø                      24Ø             /
2465  Ø314                      314             /L
2466  Ø311                      311             /I
2467  Ø315                      315             /M
247Ø  Ø311                      311             /I
2471  Ø324                      324             /T
2472  Ø323                      323             /S
2473  ØØØØ                      Ø               /TERMINATOR
                        /
                        /HEADER ROUTINE
                        /
2474  ØØØØ              PHDR,   Ø
2475  4547                      JMS I XCRLF     /CR, LF
2476  1332                      TAD FILD
2477  3Ø12                      DCA 12
25ØØ  1412              PFILD,  TAD I 12                /PRINT FIELD
25Ø1  745Ø                      SNA             /DONE IF Ø
25Ø2  53Ø5                      JMP .+3
25Ø3  4536                      JMS I XPERR
25Ø4  53ØØ                      JMP PFILD
25Ø5  1Ø61                      TAD M5
25Ø6  3Ø74                      DCA LOOP
25Ø7  4537                      JMS I XPING     /SPACE 5
251Ø  1341                      TAD OTLDR
2511  3Ø12                      DCA 12
```

```
2512  1412          POCDR,  TAD I 12                  /PRINT OCTAL ADR
2513  7450                  SNA               /DONE IF Ø
2514  5317                  JMP .+3
2515  4536                  JMS I XPERR
2516  5312                  JMP POCDR
                    /
2517  1061                  TAD M5
2520  3274                  DCA LOOP
2521  4537                  JMS I XPING       /SPACE 5
2522  1355                  TAD GOOD
2523  3012                  DCA 12
2524  1412          PGOOD,  TAD I 12                  /PRINT GOOD
2525  7450                  SNA               /DONE IF Ø
2526  5731                  JMP I .+3
2527  4536                  JMS I XPERR
2530  5324                  JMP PGOOD
2531  2600                  BSPCE             /NEXT PAGE
                    /
2532  2532          FILD,   .
2533  0306                  3Ø6               /F
2534  0311                  311               /I
2535  0305                  3Ø5               /E
2536  0314                  314               /L
2537  0304                  3Ø4               /D
2540  0000                  Ø
                    /
2541  2541          OTLDR,  .
2542  0317                  317               /O
2543  0303                  3Ø3               /C
2544  0324                  324               /T
2545  0301                  3Ø1               /A
2546  0314                  314               /L
2547  0240                  24Ø
2550  0301                  3Ø1               /A
2551  0304                  3Ø4               /D
2552  0322                  322               /R
2553  0256                  256                         /.
2554  0000                  Ø
                    /
2555  2555          GOOD,   .
2556  0307                  3Ø7               /G
2557  0317                  317               /O
2560  0317                  317               /O
2561  0304                  3Ø4               /D
2562  0000                  Ø
                    /
2563  5674          EXHDR,  JMP I PHDR
```

```
                          /
      26ØØ                *26ØØ
                          /
26ØØ  1Ø61                RSPCE,  TAD M5
26Ø1  3Ø74                        DCA LOOP
26Ø2  4537                        JMS I XPING      /SPACE 5
26Ø3  1234                        TAD BADD
26Ø4  3Ø12                        DCA 12
26Ø5  1412                PBAD,   TAD I 12                 /PRINT BAD
26Ø6  745Ø                        SNA              /DONE IF Ø
26Ø7  5212                        JMP .+3
261Ø  4536                        JMS I XPERR
2611  52Ø5                        JMP PBAD
2612  1Ø61                        TAD M5
2613  3Ø74                        DCA LOOP
2614  4537                        JMS I XPING              /SPACE 5
                          /
2615  1226                        TAD TSTN
2616  3Ø12                        DCA 12
2617  1412                PTSTN,  TAD I 12                 /PRINT TEST
262Ø  745Ø                        SNA                      /DONE IF Ø
2621  5224                        JMP .+3
2622  4536                        JMS I XPERR
2623  5217                        JMP PTSTN
2624  4547                        JMS I XCRLF              /CR, LF
2625  5644                        JMP I XPHDR              /EXIT
                          /

2626  2626                TSTN,   .
2627  Ø324                        324              /T
263Ø  Ø3Ø5                        3Ø5              /E
2631  Ø323                        323              /S
2632  Ø324                        324              /T
2633  ØØØØ                        Ø
                          /
2634  2634                BADD,   .
2635  Ø3Ø2                        3Ø2              /B
2636  Ø3Ø1                        3Ø1              /A
2637  Ø3Ø4                        3Ø4              /D
264Ø  ØØØØ                        Ø
                          /
2641  ØØØØ                HALT,   Ø
2642  74Ø2                        HLT
2643  5641                        JMP I HALT       /RESTART HERE OR RTRN1
                          /
2644  2563                XPHDR,  EXHDR
```

```
                         /
                         /
                         /WAIT HERE TO SETUP SR, TYPE CARRIAGE RETURN
                         /AFTER SETTING SR,
                         /
2645  ØØØØ               SETSR,  Ø
2646  4531                       JMS I XFILD      /RESTORE DATA FIELD
2647  4547                       JMS I XCRLF      /CR, LF
265Ø  127Ø                       TAD STSR
2651  3Ø12                       DCA 12
2652  1412               PSTSR,  TAD I 12              /PRINT SETUP SR
2653  745Ø                       SNA              /DONE IF Ø
2654  5257                       JMP .+3
2655  4536                       JMS I XPERR
2656  5252                       JMP PSTSR
2657  6Ø36                       KRB
266Ø  6Ø31               WTCR,   KSF
2661  5265                       JMP .+4
2662  6Ø36                       KRB
2663  4536                       JMS I XPERR
2664  5645                       JMP I SETSR
2665  76Ø4                       LAS
2666  3Ø33                       DCA MCWA
2667  526Ø                       JMP WTCR
                         /
267Ø  267Ø               STSR,   .
2671  Ø323                       323              /S
2672  Ø3Ø5                       3Ø5              /E
2673  Ø324                       324              /T
2674  Ø325                       325              /U
2675  Ø32Ø                       32Ø              /P
2676  Ø24Ø                       24Ø
2677  Ø323                       323              /S
27ØØ  Ø322                       322              /R
27Ø1  ØØØØ                       Ø
                         /
27Ø2  ØØØØ               STALL,  Ø
27Ø3  4531                       JMS I XFILD
27Ø4  4316                       JMS GENRAN       /GET ANOTHER
27Ø5  3Ø74                       DCA LOOP
27Ø6  2Ø74                       ISZ LOOP         /18.5 MS MAX.
27Ø7  53Ø6                       JMP .-1
271Ø  1214                       TAD DATFLD
2711  1125                       TAD KCDF
2712  3313                       DCA .+1
2713  62Ø1                       CDF ØØ           /RESTORE DATA FIELD
2714  72ØØ                       CLA
2715  57Ø2                       JMP I STALL      /EXIT
```

```
2716  ØØØØ          GENRAN, Ø
2717  1354                  TAD RANTAB
272Ø  7Ø41                  CIA
2721  1342                  TAD RANDEX
2722  764Ø                  SZA CLA
2723  5333                  JMP RANTAD-1
2724  1355                  TAD TBLRAN
2725  3342                  DCA RANDEX
2726  1341                  TAD RANCON
2727  71Ø4                  CLL RAL
273Ø  743Ø                  SZL
2731  115Ø                  TAD K1
2732  3341                  DCA RANCON
2733  1742                  TAD I RANDEX
2734  1341          RANTAD, TAD RANCON
2735  3742                  DCA I RANDEX
2736  1742                  TAD I RANDEX
2737  2342                  ISZ RANDEX
274Ø  5716                  JMP I GENRAN
                    /
2741  1234          RANCON, 1234
2742  2753          RANDEX, RANTBL+1Ø
2743  4321          RANTBL, 4321
2744  1416                  1416
2745  5363                  5363
2746  6Ø6Ø                  6Ø6Ø
2747  3Ø35                  3Ø35
275Ø  2572                  2572
2751  3237                  3237
2752  Ø214                  Ø214
2753  ØØØØ                  Ø
2754  2753          RANTAB, .-1
2755  2743          TBLRAN, RANTBL
2756  Ø177          K177,   177
```

```
                          /
                          /ROUTINE TO DETERMINE FIELD FOR RELOCATION
                          /
      3ØØØ                *3ØØØ
                          /
3ØØØ  4531                CMOVE,  JMS I XFILD     /SET DF TO CURRENT FIELD
3ØØ1  76ØØ                        76ØØ
3ØØ2  122Ø                        TAD ERTBL
3ØØ3  3222                        DCA ERWRD               /SETUP ERROR TABLE POINTER
3ØØ4  1123                        TAD FIRST1              /FIRST TESTED FIELD
3ØØ5  7Ø41                        CIA
3ØØ6  1124                        TAD LAST1               /LAST TESTED FIELD
3ØØ7  765Ø                        SNA CLA         /DON'T MOVE IF EQUAL
3Ø1Ø  553Ø                        JMP I XRTN              /START OVER
3Ø11  1Ø15                        TAD FLAGS
3Ø12  7Ø1Ø                        RAR
3Ø13  743Ø                        SZL     /FIRST MOVE IF A SKIP
3Ø14  5725                        JMP I XTMV              /SETUP FOR NEXT MOVE
3Ø15  7ØØ1                        IAC                     /SET BIT 11
3Ø16  3Ø15                        DCA FLAGS

3Ø17  1124                        TAD LAST1               /LAST TO TEST = 1ST MOVE
3Ø2Ø  3Ø16                        DCA INSFLD      /NEW CURRENT FIELD
3Ø21  1Ø16                        TAD INSFLD
3Ø22  1141                        TAD M1Ø         /SUBTRACT 1 FROM NEW CURRENT
3Ø23  3151                        DCA NXLOC               /NXLOC=DOEST'N FOR NEXT TIME
3Ø24  6224                        RIF
3Ø25  7Ø41                        CIA
3Ø26  1Ø16                        TAD INSFLD
3Ø27  765Ø                        SNA CLA         /IS NEXT SAME AS CURRENT
3Ø3Ø  5266                        JMP SUB1                /YES, TRY NEXT LOWER FIELD
```

```
                        /
                        /CHECK FOR ERROR IN NEW FIELD
                        /
3Ø31  2Ø22              CKERR,  ISZ ERWRD               /POINTER+1
3Ø32  12Ø1                      TAD CMOVE+1
3Ø33  7Ø41                      CIA
3Ø34  1422                      TAD I ERWRD
3Ø35  765Ø                      SNA CLA         /NO ERRORS RECORDED IF Ø
3Ø36  531Ø                      JMP STMV                /INITIALIZE MOVE

3Ø37  1422              CNXT,   TAD I ERWRD
3Ø4Ø  7Ø41                      CIA
3Ø41  1Ø16                      TAD INSFLD
3Ø42  765Ø                      SNA CLA         /ERROR IN NEW FIELD IF Ø
3Ø43  5253                      JMP EQUAL
3Ø44  1Ø22                      TAD ERWRD
3Ø45  7Ø41                      CIA
3Ø46  1Ø21                      TAD ENTBL               /ENTBL=ERWRD+1Ø
3Ø47  765Ø                      SNA CLA         /TABLE DONE IF Ø
3Ø5Ø  531Ø                      JMP STMV                /INITIALIZE MOVE
3Ø51  2Ø22                      ISZ ERWRD               /POINTER+1
3Ø52  5237                      JMP CNXT
                        /
3Ø53  1422              EQUAL,  TAD I ERWRD     /GET ERROR FIELD
3Ø54  7Ø41                      CIA
3Ø55  1123                      TAD FIRST1
3Ø56  765Ø                      SNA CLA         /DON'T MOVE IF = TO FIRST
3Ø57  553Ø                      JMP I XRTN      /START OVER
3Ø6Ø  1422                      TAD I ERWRD
3Ø61  765Ø                      SNA CLA         /IS IT FIELD Ø?
3Ø62  5266                      JMP SUB1                /YES
3Ø63  1Ø16                      TAD INSFLD              /CURRENT NEXT
3Ø64  1141                      TAD M1Ø         /SUBTRACT 1 FROM DF
3Ø65  3151                      DCA NXLOC
                        /
3Ø66  1Ø2Ø              SUB1,   TAD ERTBL
3Ø67  3Ø22                      DCA ERWRD               /RESTORE TABLE POINTER
3Ø7Ø  1151                      TAD NXLOC
3Ø71  7Ø41                      CIA
3Ø72  1Ø16                      TAD INSFLD
3Ø73  765Ø                      SNA CLA         /NEXT = CURRENT NEXT IF Ø
3Ø74  5253                      JMP EQUAL
3Ø75  1151                      TAD NXLOC
3Ø76  3Ø16                      DCA INSFLD      /NEW CURRENT FIELD
3Ø77  1Ø16                      TAD INSFLD
31ØØ  7Ø41                      CIA
31Ø1  1123                      TAD FIRST1      /IS IT = LOWEST FIELD
31Ø2  765Ø                      SNA CLA
31Ø3  5231                      JMP CKERR               /YES
31Ø4  1Ø16                      TAD INSFLD      /CURRENT NEW FIELD
31Ø5  1141                      TAD M1Ø         /SUBTRACT 1 FROM DF
31Ø6  3151                      DCA NXLOC               /NEXT FIELD LOWER
```

```
31Ø7  5231                    JMP CKERR
```

```
                        /
311Ø  72ØØ              STMV,   CLA
3111  1Ø2Ø                      TAD ERTBL
3112  3Ø22                      DCA ERWRD               /RESTORE TABLE POINTER
3113  6224                      RIF
3114  3723                      DCA I XSRCE
3115  1723                      TAD I XSRCE
3116  7Ø41                      CIA
3117  1Ø16                      TAD INSFLD
312Ø  765Ø                      SNA CLA         /DON'T MOVE IF EQUAL
3121  553Ø                      JMP I XRTN      /START OVER
3122  5724                      JMP I XMVE      /GO MOVE
                        /
3123  3327              XSRCE,  SOURCE
3124  33Ø7              XMVE,   MOVE
3125  32ØØ              XTMV,   NXTMV
                        /
```

```
      32ØØ                 *32ØØ
                           /
32ØØ  76ØØ                 NXTMV,  76ØØ
32Ø1  6224                         RIF
32Ø2  3327                         DCA SOURCE      /CURRENT FIELD
32Ø3  2Ø22                 CHNXT,  ISZ ERWRD               /POINTER +1
32Ø4  12ØØ                         TAD NXTMV
32Ø5  7Ø41                         CIA
32Ø6  1422                         TAD I ERWRD
32Ø7  765Ø                         SNA CLA         /NO ERRORS RECORDED IF Ø
321Ø  5225                         JMP STNXT               /INITIALIZE MOVE
3211  1422                 CKNXT,  TAD I ERWRD
3212  7Ø41                         CIA
3213  1151                         TAD NXLOC
3214  765Ø                         SNA CLA         /ERROR IN NEW FIELD IF Ø
3215  5255                         JMP SUB2                /TRY NEXT LOWER FIELD
3216  1Ø22                         TAD ERWRD
3217  7Ø41                         CIA
322Ø  1Ø21                         TAD ENTBL
3221  765Ø                         SNA CLA         /DONE WITH TABLE IF Ø
3222  5225                         JMP STNXT               /INITIALIZE MOVE
3223  2Ø22                         ISZ ERWRD               /POINTER +1
3224  5211                         JMP CKNXT
                           /
3225  1Ø2Ø                 STNXT,  TAD ERTBL
3226  3Ø22                         DCA ERWRD               /RESTORE TABLE POINTER
3227  1151                         TAD NXLOC               /NEXT LOWER FIELD
323Ø  7Ø41                         CIA
3231  1Ø16                         TAD INSFLD
3232  765Ø                         SNA CLA         /NEXT=CURRENT IF Ø
3233  5242                         JMP CKNT
3234  1151                         TAD NXLOC
3235  7Ø41                         CIA
3236  1123                         TAD FIRST1
3237  764Ø                         SZA CLA         /NEXT = LOWEST IF Ø
324Ø  5247                         JMP STNX
3241  53Ø2                         JMP MVBK                /MOVE TO LOWEST TEST FIELD
3242  1151                 CKNT,   TAD NXLOC
3243  7Ø41                         CIA
3244  1123                         TAD FIRST1
3245  765Ø                         SNA CLA         /NEXT = LOWEST IF Ø
3246  5275                         JMP NXTHI               /SETUP TO MOVE TO HIGHEST
3247  1151                 STNX,   TAD NXLOC               /NEXT LOWER FIELD
325Ø  3Ø16                         DCA INSFLD      /IS NOW CURRENT FIELD
3251  1Ø16                         TAD INSFLD
3252  1141                         TAD M1Ø         /SUBTRACT 1 FROM NEW
3253  3151                         DCA NXLOC               /NEW NEXT LOWER FIELD
3254  53Ø7                         JMP MOVE                /GO MOVE
                           /
```

```
                        /
3255  1Ø2Ø              SUB2,   TAD ERTBL
3256  3Ø22                      DCA ERWRD                 /RESTORE TABLE POINTER
3257  1151                      TAD NXLOC                 /NEXT LOWER FIELD
326Ø  745Ø                      SNA               /=FIELD Ø IF Ø
3261  553Ø                      JMP I XRTN        /START OVER CAN'T MOVE
3262  1141                      TAD M1Ø           /SUBTRACT 1
3263  3151                      DCA NXLOC                 /NOW = 2 FIELDS LOWER
3264  1151                      TAD NXLOC
3265  7Ø41                      CIA
3266  1Ø16                      TAD INSFLD        /CURRENT FIELD
3267  764Ø                      SZA CLA           /ARE THEY EQUAL
327Ø  52Ø3                      JMP CHNXT                 /NO
3271  1151                      TAD NXLOC                 /YES
3272  745Ø                      SNA               /DOES IT = FIELD Ø
3273  52Ø3                      JMP CHNXT                 /YES
3274  5262                      JMP SUB2+5        /NO
                        /
3275  1124              NXTHI,  TAD LAST1                 /VERY LAST TO TEST
3276  3151                      DCA NXLOC                 /MAKE IT NEXT FIELD
3277  1124                      TAD LAST1
33ØØ  3Ø16                      DCA INSFLD
33Ø1  52Ø3                      JMP CHNXT
                        /
33Ø2  1151              MVRK,   TAD NXLOC
33Ø3  3Ø16                      DCA INSFLD
33Ø4  6224                      RIF
33Ø5  3327                      DCA SOURCE
33Ø6  3Ø15                      DCA FLAGS         /CLEAR BIT 11
```

```
                      /
                      /ROUTINE TO RELOCATE 4K FIELDS
                      /
33Ø7  1125            MOVE,   TAD KCDF               /62Ø1
331Ø  1327                    TAD SOURCE     /CURRENT FIELD
3311  3327                    DCA SOURCE     /SOURCE NOW = CDF N
3312  1125                    TAD KCDF               /62Ø1
3313  1Ø16                    TAD INSFLD     /NEW FIELD
3314  3331                    DCA DESTN              /DESTN NOW = CDF N
3315  1327                    TAD SOURCE
3316  7Ø41                    CIA
3317  1331                    TAD DESTN
332Ø  765Ø                    SNA CLA
3321  553Ø                    JMP I XRTN
3322  7Ø4Ø                    CMA
3323  3Ø1Ø                    DCA 1Ø         /SOURCE COUNT
3324  7Ø4Ø                    CMA
3325  3Ø11                    DCA 11         /DESTINATION COUNT
3326  3Ø74                    DCA LOOP               /4K COUNTER
3327  ØØØØ            SOURCE, Ø              /WILL = CDF N
333Ø  141Ø                    TAD I 1Ø               /TAKE FROM HERE
3331  ØØØØ            DESTN,  Ø
3332  3411                    DCA I 11               /PUT IN HERE
3333  2Ø74                    ISZ LOOP               /DONE 4K WHEN SKIP
3334  5327                    JMP SOURCE     /KEEP MOVING
3335  1126                    TAD KCIF               /62Ø2
3336  1Ø16                    TAD INSFLD     /NEW FIELD
3337  334Ø                    DCA .+1
334Ø  62Ø2                    CIF ØØ         /CHANGE TO NEW FIELD
3341  553Ø                    JMP I XRTN     /EXIT TO RTN1 IN
                                             /NEW FIELD
                                      $

THERE ARE NO ERRORS
```

```
SYMBOL TABLE

ALAW      Ø22Ø
ALOK      2273
BAD       2163
BADD      2634
BEGIN     Ø2ØØ
BSPCE     26ØØ
CBANK     16Ø7
CDF       62Ø1
CDON1     Ø76Ø
CFLD      1722
CHAR      Ø134
CHNXT     32Ø3
CIF       62Ø2
CKBNK     16ØØ
CKERR     3Ø31
CKNT      3242
CKNXT     3211
CLOP1     1252
CLOP2     1327
CLOP3     14Ø5
CLOP4     1462
CMOVE     3ØØØ
CNXT      3Ø37
COUNT     ØØ72
CRLF      2154
DAIFLD    ØØ14
DESTN     3331
ENTBL     ØØ21
EPRNT     2Ø54
EQUAL     3Ø53
EREXT     2Ø46
ERROR     2ØØØ
ERTBL     ØØ2Ø
ERWRD     ØØ22
EXAM1     Ø241
EXAM2     Ø246
EXAM3     Ø253
EXAM4     Ø26Ø
EXHDR     2563
EXIT      Ø153
EXT1      Ø322
EXT1C     Ø343
EXT2      Ø423
EXT2C     Ø445
EXT3      Ø475
EXT3C     Ø517
EXT4      Ø623
EXT4C     Ø647
FIFLD     1646
FILD      2532
FIRST1    Ø123
FLAGS     ØØ15
FLCNT     ØØ73
```

```
SYMBOL TABLE

FLDN      2444
FLOAD     Ø017
GENRAN    2716
GOOD      2555
GOOD      2164
HALT      2641
INSFLD    ØØ16
JMS1      Ø11Ø
JMS2      Ø111
JMS3      Ø112
JMS4      Ø113
JMS5      Ø114
KCDF      Ø125
KCIF      Ø126
KEYIN     23Ø3
KRXT      1Ø35
KXT1      Ø345
KXT1C     Ø346
KXT2      Ø45Ø
KXT2C     Ø451
KXT3      Ø522
KXT3C     Ø523
KXT4      Ø645
KXT4C     Ø646
K1        Ø15Ø
K1K       1Ø36
K1Ø       ØØ34
K1ØØ      ØØ4Ø
K177      2756
K2Ø       ØØ42
K2ØØ      ØØ37
K2Ø7      2167
K212      2171
K215      Ø143
K24Ø      217Ø
K254      2353
K26Ø      Ø142
K261      ØØ52
K262      ØØ53
K263      ØØ54
K264      ØØ55
K277      Ø146
K37Ø      Ø145
K377      Ø144
K4Ø       ØØ41
K4ØØ      ØØ36
K7        Ø133
K74Ø      ØØ35
LAST      2166
LASTX     Ø154
LAST1     Ø124
LEGAL     2314
LOCAT     24Ø2
```

```
SYMBOL TABLE

LOOP      ØØ74
MCWA      Ø233
MEMADR    Ø122
MOVE      33Ø7
MVBK      33Ø2
M1Ø       Ø141
M14       Ø14Ø
M2Ø       ØØ56
M4        ØØ6Ø
M4Ø       ØØ57
M5        ØØ61
NXLOC     Ø151
NXTBNK    1624
NXTHI     3275
NXTMV     32ØØ
OCADR     2165
OKAS      2256
OTLDR     2541
OVFR      17Ø6
PBAD      26Ø5
PFILD     25ØØ
PGOOD     2524
PHDR      2474
PLIMT     2452
PLOCT     2412
POCDR     2512
POSITN    2131
PRERR     2146
PRGAM     2417
PROCTL    2126
PSTSR     2652
PTSTN     2617
QUERY     2344
RANCON    2741
RANDEX    2742
RANTAB    2754
RANTAD    2734
RANTBL    2743
RCHKA     1ØØØ
RCHK1     1237
RCHK1C    1Ø54
RCHK2     1Ø71
RCHK2C    11Ø6
RCHK3     1123
RCHK3C    114Ø
RCHK4     122Ø
RCHK4C    1217
RDALL     Ø736
RDF       6214
RDLOP     Ø753
RD1       1245
RD2       1322
RD3       142Ø
```

```
SYMBOL TABLE

RD4         1455
RIF         6224
RLOPA       1Ø11
RSTRT1      Ø211
RTN1        Ø213
RXIT        1Ø2Ø
SAVIF       1623
SETSW       2645
SETU1       22ØØ
SLMTS       22Ø7
SOURCE      3327
SPING       2115
STALL       27Ø2
STMV        311Ø
STNX        3247
STNXT       3225
STSR        267Ø
SUR1        3Ø66
SUR2        3255
SWØ         2111
SW1         2Ø42
SW2         2Ø33
TBLRAN      2755
TDM2Ø       Ø1Ø6
TDM4Ø       Ø1Ø7
TLIMT       2446
TNUM        ØØ62
TSTL        2457
TSTN        2626
TST1        Ø3ØØ
TST1C       Ø324
TST2        Ø4ØØ
TST2C       Ø425
TST3        Ø452
TST3C       Ø477
TST4        Ø6ØØ
TST4C       Ø625
WRLOP       171Ø
WTCR        266Ø
WØØ11       Ø652
WØ11Ø       Ø7Ø4
W1ØØ1       Ø721
W11ØØ       Ø667
XBANK       ØØ63
XCFL        1244
XCHKA       1236
XCHK1       ØØ76
XCHK1C      ØØ77
XCHK2       Ø1ØØ
XCHK2C      Ø1Ø1
XCHK3       Ø1Ø2
XCHK3C      Ø1Ø3
XCHK4       Ø1Ø4
```

```
SYMBOL TABLE

XCHK4C    Ø1Ø5
XCRLF     Ø147
XFILD     Ø131
XHDR      Ø135
XHLT      Ø127
XIT1      Ø32Ø
XIT1C     Ø341
XIT2      Ø421
XIT2C     Ø443
XIT3      Ø473
XIT3C     Ø515
XIT4      Ø621
XIT4C     Ø643
XKBNK     ØØ7Ø
XLCAT     2352
XLMTS     ØØ43
XLOPA     1237
XLOPB     124Ø
XLOPC     1241
XLOPD     1242
XLOPE     1243
XMOVE     ØØ5Ø
XMVE      3124
XPERR     Ø136
XPHDR     2644
XPING     Ø137
XPRER     Ø132
XRALL     ØØ75
XRD1      Ø115
XRD2      Ø116
XRD3      Ø117
XRD4      Ø12Ø
XRROR     Ø121
XRTN      Ø13Ø
XSALL     Ø152
XSETU     ØØ51
XSRCE     3123
XSTSR     Ø277
XTBNK     ØØ71
XTLIM     2351
XTMV      3125
XTST1     ØØ44
XTST2     ØØ45
XTST3     ØØ46
XTST4     ØØ47
XØØ11     ØØ64
XØ11Ø     ØØ66
X1ØØ1     ØØ67
X11ØØ     ØØ65
```

```
SYMBOL TABLE

DATFLD    ØØ14
FLAGS     ØØ15
INSFLD    ØØ16
FLOAD     ØØ17
ERTBL     ØØ2Ø
ENTBL     ØØ21
ERWRD     ØØ22
MCWA      ØØ33
K1Ø       ØØ34
K74Ø      ØØ35
K4ØØ      ØØ36
K2ØØ      ØØ37
K1ØØ      ØØ4Ø
K4Ø       ØØ41
K2Ø       ØØ42
XLMTS     ØØ43
XTST1     ØØ44
XTST2     ØØ45
XTST3     ØØ46
XTST4     ØØ47
XMOVE     ØØ5Ø
XSETU     ØØ51
K261      ØØ52
K262      ØØ53
K263      ØØ54
K264      ØØ55
M2Ø       ØØ56
M4Ø       ØØ57
M4        ØØ6Ø
M5        ØØ61
INUM      ØØ62
XBANK     ØØ63
XØØ11     ØØ64
X11ØØ     ØØ65
XØ11Ø     ØØ66
X1ØØ1     ØØ67
XKBNK     ØØ7Ø
XTBNK     ØØ71
COUNT     ØØ72
FLCNT     ØØ73
LOOP      ØØ74
XRALL     ØØ75
XCHK1     ØØ76
XCHK1C    ØØ77
XCHK2     Ø1ØØ
XCHK2C    Ø1Ø1
XCHK3     Ø1Ø2
XCHK3C    Ø1Ø3
XCHK4     Ø1Ø4
XCHK4C    Ø1Ø5
TDM2Ø     Ø1Ø6
TDM4Ø     Ø1Ø7
JMS1      Ø11Ø
```

```
SYMBOL TABLE

JMS2      Ø111
JMS3      Ø112
JMS4      Ø113
JMS5      Ø114
XRD1      Ø115
XRD2      Ø116
XRD3      Ø117
XRD4      Ø12Ø
XRROR     Ø121
MEMADR    Ø122
FIRST1    Ø123
LAST1     Ø124
KCDF      Ø125
KCIF      Ø126
XHLT      Ø127
XRTN      Ø13Ø
XFILD     Ø131
XPRER     Ø132
K7        Ø133
CHAR      Ø134
XHDR      Ø135
XPERR     Ø136
XPING     Ø137
M14       Ø14Ø
M1Ø       Ø141
K26Ø      Ø142
K215      Ø143
K377      Ø144
K37Ø      Ø145
K277      Ø146
XCRLF     Ø147
K1        Ø15Ø
NXLOC     Ø151
XSALL     Ø152
EXIT      Ø153
LASTX     Ø154
BEGIN     Ø2ØØ
RSTRT1    Ø211
RTN1      Ø213
ALAW      Ø22Ø
EXAM1     Ø241
EXAM2     Ø246
EXAM3     Ø253
EXAM4     Ø26Ø
XSTSR     Ø277
TST1      Ø3ØØ
XIT1      Ø32Ø
EXT1      Ø322
TST1C     Ø324
XIT1C     Ø341
EXT1C     Ø343
KXT1      Ø345
KXT1C     Ø346
```

```
SYMBOL TABLE

TST2      Ø42Ø
XIT2      Ø421
EXT2      Ø423
TST2C     Ø425
XIT2C     Ø443
EXT2C     Ø445
KXT2      Ø45Ø
KXT2C     Ø451
TST3      Ø452
XIT3      Ø473
EXT3      Ø475
TST3C     Ø477
XIT3C     Ø515
EXT3C     Ø517
KXT3      Ø522
KXT3C     Ø523
TST4      Ø6ØØ
XIT4      Ø621
EXT4      Ø623
TST4C     Ø625
XIT4C     Ø643
KXT4      Ø645
KXT4C     Ø646
EXT4C     Ø647
WØØ11     Ø652
W11ØØ     Ø667
WØ11Ø     Ø7Ø4
W1ØØ1     Ø721
RDALL     Ø736
RDLOP     Ø753
CDON1     Ø76Ø
RCHKA     1ØØØ
RLOPA     1Ø11
RXIT      1Ø2Ø
KRXT      1Ø35
K1K       1Ø36
RCHK1     1Ø37
RCHK1C    1Ø54
RCHK2     1Ø71
RCHK2C    11Ø6
RCHK3     1123
RCHK3C    114Ø
RCHK4     12ØØ
RCHK4C    1217
XCHKA     1236
XLOPA     1237
XLOPB     124Ø
XLOPC     1241
XLOPD     1242
XLOPE     1243
XCFL      1244
RD1       1245
CLOP1     1252
```

```
SYMBOL TABLE

RD2        1322
CLOP2      1327
RD3        14ØØ
CLOP3      14Ø5
RD4        1455
CLOP4      1462
CKBNK      16ØØ
CBANK      16Ø7
SAVIF      1623
NXTBNK     1624
FIFLD      1646
OVER       17Ø6
WRLOP      171Ø
CFLD       1722
ERROR      2ØØØ
SW2        2Ø33
SW1        2Ø42
ERFXT      2Ø46
EPRNT      2Ø54
SWØ        2111
SPING      2115
PROCTL     2126
POSITN     2131
PRFRR      2146
CRLF       2154
BAD        2163
GOOD       2164
OCADR      2165
LAST       2166
K2Ø7       2167
K24Ø       217Ø
K212       2171
SETU1      22ØØ
SLMTS      22Ø7
OKAS       2256
ALOK       2273
KEYIN      23Ø3
LEGAL      2314
QUERY      2344
XTLIM      2351
XLCAT      2352
K254       2353
LOCAT      24ØØ
PLOCT      2412
PRGAM      2417
FLDN       2444
TLIMT      2446
PLIMT      2452
TSTL       2457
PHDR       2474
PFILD      25ØØ
POCDR      2512
PGOOD      2524
```

```
SYMBOL TABLE

FILD      2532
OTLDR     2541
GOOD      2555
EXHDR     2563
BSPCE     26ØØ
PBAD      26Ø5
PTSTN     2617
TSTN      2626
BADD      2634
HALT      2641
XPHDR     2644
SETSR     2645
PSTSR     2652
WTCR      266Ø
STSR      267Ø
STALL     27Ø2
GENRAN    2716
RANTAD    2734
RANCON    2741
RANDEX    2742
RANTBL    2743
RANTAB    2754
TBLRAN    2755
K177      2756
CMOVE     3ØØØ
CKERR     3Ø31
CNXT      3Ø37
EQUAL     3Ø53
SUB1      3Ø66
STMV      311Ø
XSRCE     3123
XMVE      3124
XTMV      3125
NXTMV     32ØØ
CHNXT     32Ø3
CKNXT     3211
STNXT     3225
CKNT      3242
STNX      3247
SUB2      3255
NXTHI     3275
MVBK      33Ø2
MOVE      33Ø7
SOURCE    3327
DESTN     3331
CDF       62Ø1
CIF       62Ø2
RDF       6214
RIF       6224
```

# MAINDEC EVALUATION REQUEST

After sufficient familiarization with the operation and documentation of this MAINDEC, please indicate your assessment of the following areas and return this form to Digital Equipment Corporation.

IDENTIFICATION: MAINDEC NO.____________ Program Title____________________

USAGE: Used by: Field Service □ Production □ Other____________________ □

Frequency of Usage: Daily □ Weekly □ Monthly □

SUGGESTIONS FOR IMPROVEMENT

1. Are the program loading and operating instructions: clear ? □, incomplete ? □, difficult to follow ? □

2. Do the error reports and program documentation provide sufficient diagnostic information. in all cases ? □, in most cases ? □, in very few cases ? □. Suggestions for improvement:

________________________________________

________________________________________

________________________________________

3. Is the program effective in isolating malfunctions: in all cases ? □, in most cases ? □, in very few cases ? □. Would additional Scope loops or Switch Register control be helpful ?_____ Suggestions for improvement:

________________________________________

________________________________________

________________________________________

4. Does the program ever fail to detect malfunctions exposed by other software ?__________ Were Margins used ?__________ Please describe malfunction in detail:

________________________________________

________________________________________

________________________________________

5. Does the program ever report non-existant malfunctions ?__________ Please indicate erroneous report and any pertinent operating conditions:

________________________________________

6. Does this MAINDEC ever expose malfunctions in the Central Processor or other peripheral units not detected by the appropriate MAINDEC ?__________ Please describe malfunction and MAINDEC(S) used:

________________________________________

7. Does the document provide a general understanding of the functional programming requirements of the system ? Good □, Fair □, None □. Would a general description of programming requirements increase the effectiveness of this MAINDEC ?__________

Remarks:

________________________________________

________________________________________

________________________________________

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