IDENTIFICATION

PRODUCT CODE:	MAINDEC-08-D1EC-D
PRODUCT NAME:	PDP-8, 8/I EXTENDED MEMORY CHECKERBOARD
DATE CREATED:	NOVEMBER 1, 1971
MAINTAINER:	DIAGNOSTIC GROUP
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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:

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

Test 2:

```
               y-axis                                  y-axis

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

Test 3:

```
               y-axis                                  y-axis

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

Test 4:

```
               y-axis                                  y-axis

0000   | 0 1 1 0 0 1 1 0                      | 1 0 0 1 1 0 0 1
x-axis | 0 1 1 0 0 1 1 0                      | 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
0300   | 1 0 0 1 1 0 0 1                      | 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.

```
                               /
                               /PDP-8, 8I, 8S EXTENDED MEMORY CHECKBOARD TEST.
                               /COPYRIGHT 1971, DIGITAL EQUIPMENT CORP., MAYNARD, MASS.
                               /START AT 2ØØ, RESTART AT 211 TO SKIP HEADER.
                               /MIN. OF 8K OF CORE REQUIRED.
                               /
                        ØØØ1   *1
                               /
*      5000 ØØØ1  5ØØ1                 JMP .
*         0 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
       4535 ØØ1Ø  ØØØØ                 Ø
       4535 ØØ11  ØØØØ                 Ø
       2402 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
       0740 ØØ33  ØØØØ         MCWA,   Ø
            ØØ34  ØØ1Ø         K1Ø,    1Ø
*       140 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


        ØØ57  774Ø    M4Ø,    774Ø
        ØØ6Ø  7774    M4,     7774
        ØØ61  7773    M5,     7773
  0281  ØØ62  ØØØØ    TNUM,   Ø
        ØØ63  16Ø7    XBANK,  CBANK
        ØØ64  Ø652    XØØ11,  WØØ11
        ØØ65  Ø667    X11ØØ,  W11ØØ
        ØØ66  Ø7Ø4    XØ11Ø,  WØ11Ø
        ØØ67  Ø721    X1ØØ1,  W1ØØ1
        ØØ7Ø  16ØØ    XKBNK,  CKBNK
        ØØ71  1624    XTBNK,  NXTBNK
  7753  ØØ72  ØØØØ    COUNT,  Ø
  4536  ØØ73  ØØØØ    FLCNT,  Ø
        ØØ74  ØØØØ    LOOP,   Ø
        ØØ75  Ø736    XRALL,  RDALL
        ØØ76  1Ø37    XCHK1,  RCHK1
        ØØ77  1Ø54    XCHK1C, RCHK1C
        Ø1ØØ  1Ø71    XCHK2,  RCHK2
        Ø1Ø1  11Ø6    XCHK2C, RCHK2C
        Ø1Ø2  1123    XCHK3,  RCHK3
        Ø1Ø3  114Ø    XCHK3C, RCHK3C
        Ø1Ø4  12ØØ    XCHK4,  RCHK4
        Ø1Ø5  1217    XCHK4C, RCHK4C
        Ø1Ø6  1Ø56    TDM2Ø,  TAD M2Ø
        Ø1Ø7  1Ø57    TDM4Ø,  TAD M4Ø
        Ø11Ø  4515    JMS1,   JMS I XRD1
        Ø111  4516    JMS2,   JMS I XRD2
        Ø112  4517    JMS3,   JMS I XRD3
        Ø113  452Ø    JMS4,   JMS I XRD4
        Ø114  4552    JMS5,   JMS I XSALL
        Ø115  1245    XRD1,   RD1
        Ø116  1322    XRD2,   RD2
        Ø117  14ØØ    XRD3,   RD3
        Ø12Ø  1455    XRD4,   RD4
        Ø121  2ØØØ    XRROR,  ERROR
        Ø122  ØØØØ    MEMADR, Ø
        Ø123  ØØØØ    FIRST1, Ø
    10  Ø124  ØØØØ    LAST1,  Ø
        Ø125  62Ø1    KCDF,   62Ø1
        Ø126  62Ø2    KCIF,   62Ø2
        Ø127  2641    XHLT,   HALT
        Ø13Ø  Ø213    XRTN,   RTN1
        Ø131  1646    XFILD,  FEILD
        Ø132  2146    XPRER,  PRERR
        Ø133  ØØØ7    K7,     7
  0215  Ø134  ØØØØ    CHAR,   Ø
        Ø135  2474    XHDR,   PHDR
        Ø136  2146    XPERR,  PRERR
        Ø137  2115    XPING,  SPING
```

```
     Ø14Ø  7764     M14,    7764
     Ø141  777Ø     M1Ø,    777Ø
     Ø142  Ø26Ø     K26Ø,   26Ø
     Ø143  Ø215     K215,   215
     Ø144  Ø377     K377,   377
     Ø145  Ø37Ø     K37Ø,   37Ø
     Ø146  Ø277     K277,   277
     Ø147  2154     XCRLF,  CRLF
     Ø15Ø  ØØØ1     K1,     1
     Ø151  ØØØØ     NXLOC,  Ø
     Ø152  27Ø2     XSALL,  STALL
0320 Ø153  ØØØØ     EXIT,   Ø
     Ø154  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  1Ø2Ø             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
```

255

```
        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  ØØ42             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
                /
        Ø4ØØ    *4ØØ
                /
  Ø4ØØ  4451    TST2,   JMS I XSETU     /SET DF FOR 1ST FIELD
  Ø4Ø1  72ØØ            CLA
  Ø4Ø2  1Ø53            TAD K262
  Ø4Ø3  3Ø62            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

Ø423  452Ø      EXT2,   JMS I XCHK2     /READ EACH FIELD AND CHECK
Ø424  5225              JMP TST2C               /NOW WRITE COMPLEMENT
                /
                /WRITE COMPLEMENT OF PATTERN 2
                /
Ø425  4451      TST2C,  JMS I XSETU     /SET DF FOR FIRST FIELD
Ø426  724Ø              CLA CMA
Ø427  3Ø1Ø              DCA 1Ø          /SET ADR, COUNT TO 7777
Ø43Ø  4463              JMS I XBANK     /SEE IF FIELD HAS PROGRAM
Ø431  741Ø              SKP             /WRITE
Ø432  5245              JMP EXT2C               /GO READ
Ø433  1251              TAD KXT2C
Ø434  3153              DCA EXIT
Ø435  4465              JMS I X11ØØ     /WRITE 11ØØ
Ø436  4464              JMS I XØØ11     /WRITE ØØ11 128 TIMES
Ø437  4464              JMS I XØØ11
Ø44Ø  4465              JMS I X11ØØ
Ø441  4465              JMS I X11ØØ     /WRITE 11ØØ 128 TIMES
Ø442  5236              JMP .-4
Ø443  4471      XIT2C,  JMS I XTBNK     /SETUP FOR NEXT FIELD
Ø444  5226              JMP TST2C+1
                /
Ø445  45Ø1      EXT2C,  JMS I XCHK2C    /READ EACH FIELD AND CHECK
Ø446  5647              JMP I .+1               /SEE IF TEST 3 IS SELECTED
Ø447  Ø253              EXAM3
                /
Ø45Ø  Ø421      KXT2,   XIT2
Ø451  Ø443      KXT2C,  XIT2C


                /
                /TEST 3.  WRITE CHECKER PATTERN #3
                /
Ø452  4451      TST3,   JMS I XSETU     /SETUP FOR 1ST FIELD
Ø453  72ØØ              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
                /
        Ø6ØØ    *6ØØ
                /
  Ø6ØØ  4451    TST4,   JMS I XSETU     /SET DF FOR 1ST FIELD
  Ø6Ø1  72ØØ            CLA
  Ø6Ø2  1Ø55            TAD K264
  Ø6Ø3  3Ø62            DCA TNUM                /TEST NUMBER
  Ø6Ø4  724Ø            CLA CMA
  Ø6Ø5  3Ø1Ø            DCA 1Ø          /SET ADR, COUNT TO 7777
  Ø6Ø6  4463            JMS I XBANK     /SEE IF FIELD HAS PROGRAM
  Ø6Ø7  741Ø            SKP             /WRITE
  Ø61Ø  5223            JMP EXT4                /GO READ
  Ø611  1245            TAD KXT4
  Ø612  3153            DCA EXIT
  Ø613  4466            JMS I XØ11Ø     /WRITE Ø11Ø
  Ø614  4466            JMS I XØ11Ø     /WRITE Ø11Ø 64 TIMES
  Ø615  4467            JMS I X1ØØ1     /WRITE 1ØØ1 128 TIMES
  Ø616  4467            JMS I X1ØØ1
  Ø617  4466            JMS I XØ11Ø
  Ø62Ø  5214            JMP .=4
  Ø621  4471    XIT4,   JMS I XTBNK     /SETUP FOR NEXT FIELD
```

```
 Ø622  52Ø4              JMP TST4+4
                 /
 Ø623  45Ø4      EXT4,   JMS I XCHK4     /READ EACH FIELD AND CHECK
 Ø624  5225              JMP TST4C               /WRITE COMPLEMENT
                 /
                 /WRITE COMPLEMENT OF PATTERN 4
                 /
 Ø625  4451      TST4C,  JMS I XSETU     /SET DF FOR FIRST
 Ø626  724Ø              CLA CMA
 Ø627  3Ø1Ø              DCA 1Ø          /SET ADR, COUNT TO 7777
 Ø63Ø  4463              JMS I XBANK     /SEE IF FIELD HAS PROGRAM
 Ø631  741Ø              SKP             /WRITE
 Ø632  5247              JMP EXT4C               /READ
 Ø633  1246              TAD KXT4C
 Ø634  3153              DCA EXIT
 Ø635  4467              JMS I X1ØØ1
 Ø636  4467              JMS I X1ØØ1     /WRITE 1ØØ1 64 TIMES
 Ø637  4466              JMS I XØ11Ø     /WRITE XØ11Ø 128 TIMES
 Ø64Ø  4466              JMS I XØ11Ø
 Ø641  4467              JMS I X1ØØ1
 Ø642  5236              JMP .-4
 Ø643  4471      XIT4C,  JMS I XTBNK     /SETUP FOR NEXT FIELD
 Ø644  5226              JMP TST4C+1
                 /
 Ø645  Ø621      KXT4,   XIT4
 Ø646  Ø643      KXT4C,  XIT4C

 Ø647  45Ø5      EXT4C,  JMS I XCHK4C    /READ EACH FIELD AND CHECK
 Ø65Ø  5651              JMP I .+1       /SEE IF READY TO MOVE
 Ø651  Ø265              EXAM4+5
                 /
                 /ROUTINE TO WRITE ØØ11
                 /
 Ø652  ØØØØ      WØØ11,  Ø
 Ø653  1Ø56              TAD M2Ø
 Ø654  3Ø72              DCA COUNT
 Ø655  341Ø              DCA I 1Ø                /Ø
 Ø656  341Ø              DCA I 1Ø                /Ø
 Ø657  7Ø4Ø              CMA
 Ø66Ø  341Ø              DCA I 1Ø                /1
 Ø661  7Ø4Ø              CMA
 Ø662  341Ø              DCA I 1Ø                /1
 Ø663  2Ø72              ISZ COUNT               /COUNT = -16 OR -32
 Ø664  5255              JMP WØØ11+3     /LOOP
 Ø665  447Ø              JMS I XKBNK     /SEE IF END OF FIELD
 Ø666  5652              JMP I WØØ11     /EXIT
                 /
                 /ROUTINE TO WRITE 11ØØ
                 /
 Ø667  ØØØØ      W11ØØ,  Ø
 Ø67Ø  1Ø56              TAD M2Ø
 Ø671  3Ø72              DCA COUNT
 Ø672  7Ø4Ø              CMA
 Ø673  341Ø              DCA I 1Ø                /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 1001
                /
0721  0000      W1001,  0
0722  1056              TAD M20
0723  3072              DCA COUNT
0724  7040              CMA
0725  3410              DCA I 10                /1
0726  3410              DCA I 10                /0
0727  3410              DCA I 10                /0
0730  7040              CMA
0731  3410              DCA I 10                /1
0732  2072              ISZ COUNT               /-16 TO -32
0733  5324              JMP W1001+3     /LOOP
0734  4470              JMS I XKBNK     /SEE IF END OF FIELD
0735  5721              JMP I W1001     /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  1057              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
```

```
   Ø745  3Ø11           DCA 11
   Ø746  3Ø73           DCA FLCNT
   Ø747  4463           JMS I XBANK     /SEE IF FIELD HAS PROGRAM
   Ø75Ø  741Ø           SKP             /READ
   Ø751  536Ø           JMP CDON1               /DONE
   Ø752  72ØØ           CLA
   Ø753  141Ø   RDLOP,  TAD I 1Ø                /READ ONE
   Ø754  7Ø4Ø           CMA
   Ø755  3411           DCA I 11                /WRITE BACK
   Ø756  2Ø73           ISZ FLCNT               /DONE 1 FIELD WHEN SKIP
   Ø757  5353           JMP RDLOP
   Ø76Ø  2Ø72   CDON1,  ISZ COUNT               /DONE 32 PASSES WHEN SKIP
   Ø761  5342           JMP RDALL+4             /DO ANOTHER PASS
   Ø762  5736           JMP I RDALL     /EXIT
                /
                /READ AND CHECK FOR ERROR ROUTINE
                /
         1ØØØ   *1ØØØ
                /
   1ØØØ  ØØØØ   RCHKA,  Ø
   1ØØ1  4451           JMS I XSETU     /SET DF TO 1ST FIELD
   1ØØ2  4475           JMS I XRALL     /READ ALL, DON'T CHECK
   1ØØ3  3122           DCA MEMADR      /SET ADR, COUN  TO Ø
   1ØØ4  4463           JMS I XBANK     /SEE IF FIELD HAS PROGRAM
   1ØØ5  741Ø           SKP
   1ØØ6  56ØØ           JMP I RCHKA
   1ØØ7  1235           TAD KRXT
   1Ø1Ø  3153           DCA EXIT
   1Ø11  ØØØØ   RLOPA,  Ø
   1Ø12  ØØØØ           Ø               /WILL = JMS I XRD1, 2, 3, OR 4
   1Ø13  ØØØØ           Ø
   1Ø14  ØØØØ           Ø
   1Ø15  ØØØØ           Ø
   1Ø16  7ØØØ           NOP             /WILL = NOP OR JMS STALL
   1Ø17  5212           JMP RLOPA+1
   1Ø2Ø  1216   RXIT,   TAD .-2
   1Ø21  1236           TAD K1K
   1Ø22  764Ø           SZA CLA         /NOP IF Ø
   1Ø23  5227           JMP .+4
   1Ø24  1114           TAD JMS5        /=JMS I XSALL
   1Ø25  3216           DCA RXIT-2
   1Ø26  52Ø3           JMP RCHKA+3     /READ SLOW
   1Ø27  7ØØØ           NOP
   1Ø3Ø  1227           TAD .-1
   1Ø31  3216           DCA RXIT-2
   1Ø32  4471           JMS I XTBNK     /SETUP FOR NEXT FIELD
   1Ø33  52Ø2           JMP RCHKA+2
   1Ø34  56ØØ           JMP I RCHKA     /EXIT
                /
   1Ø35  1Ø2Ø   KRXT,   RXIT
   1Ø36  1ØØØ   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
  112Ø  3215                    DCA RLOPA+4
  1121  42ØØ                    JMS RCHKA                     /GO READ
  1122  57Ø6              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
   123Ø  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  1ØØØ       XCHKA,  RCHKA
   1237  1Ø11       XLOPA,  RLOPA
   124Ø  1Ø12       XLOPB,  RLOPA+1
   1241  1Ø13       XLOPC,  RLOPA+2
   1242  1Ø14       XLOPD,  RLOPA+3
   1243  1Ø15       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
```

```
    1301  7120              STL
    1302  1410              TAD I 10
    1303  7040              CMA                 /1
    1304  7440              SZA
    1305  4521              JMS I XRROR         /PRINT ERROR
    1306  7120              STL
    1307  1410              TAD I 10
    1310  7040              CMA                 /1
    1311  7440              SZA
    1312  4521              JMS I XRROR         /PRINT ERROR
    1313  2072              ISZ COUNT
    1314  5320              JMP .+4
    1315  4470              JMS I XKBNK                 /SEE IF END OF FIELD
    1316  2122              ISZ MEMADR
    1317  5645              JMP I RD1
                    /
    1320  2122              ISZ MEMADR          /KEEP READING
    1321  5250              JMP RD1+3


                    /
    1322  0000      RD2,    0
    1323  1056              TAD M20             /-16
    1324  3072              DCA COUNT
    1325  1060              TAD M4              /-4
    1326  3073              DCA FLCNT

    1327  1141      CLOP2,  TAD M10             /-8
    1330  3074              DCA LOOP
    1331  1522              TAD I MEMADR        /READ
    1332  7040              CMA
    1333  3522              DCA I MEMADR
    1334  2074              ISZ LOOP                    /COMPLEMENT 4 TIMES
    1335  5331              JMP .-4
    1336  2073              ISZ FLCNT                   /DONE 4 ADRS'. WHEN SKIP
    1337  7410              SKP
    1340  5343              JMP .+3
    1341  2122              ISZ MEMADR          /INCREMENT ADDRESS
    1342  5327              JMP CLOP2
                    /
    1343  1122              TAD MEMADR
    1344  1060              TAD M4
    1345  3010              DCA 10              /NOW USE AUTO-INDEX
    1346  7120              STL
    1347  1410              TAD I 10
    1350  7040              CMA                 /1
    1351  7440              SZA
    1352  4521              JMS I XRROR         /PRINT ERROR
    1353  7120              STL
    1354  1410              TAD I 10
    1355  7040              CMA                 /1
    1356  7440              SZA
    1357  4521              JMS I XRROR         /PRINT ERROR
    1360  7100              CLL
    1361  1410              TAD I 10
```

```
  1362  7440                    SZA             /0
  1363  4521                    JMS I XRROR     /PRINT ERROR
  1364  7100                    CLL
  1365  1410                    TAD I 10
  1366  7440                    SZA             /0
  1367  4521                    JMS I XRROR     /PRINT ERROR
  1370  2072                    ISZ COUNT
  1371  5375                    JMP .+4
  1372  4470                    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


                        /
        1400            *1400
                        /
  1400  0000            RD3,    0
  1401  1056                    TAD M20                 /-16
  1402  3072                    DCA COUNT
  1403  1060                    TAD M4          /-4
  1404  3073                    DCA FLCNT
  1405  1141            CLOP3,  TAD M10         /-8
  1406  3074                    DCA LOOP
  1407  1522                    TAD I MEMADR    /READ
  1410  7040                    CMA
  1411  3522                    DCA I MEMADR
  1412  2074                    ISZ LOOP                /COMPLEMENT 8 TIMES
  1413  5207                    JMP .-4
  1414  2073                    ISZ FLCNT               /DONE 4 IF 0
  1415  7410                    SKP
  1416  5221                    JMP .+3
  1417  2122                    ISZ MEMADR
  1420  5205                    JMP CLOP3               /DO NEXT
                        /
  1421  1122                    TAD MEMADR
  1422  1060                    TAD M4
  1423  3010                    DCA 10          /USE AUTO-INDEX
  1424  7100                    CLL
  1425  1410                    TAD I 10
  1426  7440                    SZA             /0
  1427  4521                    JMS I XRROR     /PRINT ERROR
  1430  7120                    STL
  1431  1410                    TAD I 10
  1432  7040                    CMA             /1
  1433  7440                    SZA
  1434  4521                    JMS I XRROR     /PRINT ERROR
  1435  7120                    STL
  1436  1410                    TAD I 10
  1437  7040                    CMA             /1
  1440  7440                    SZA
  1441  4521                    JMS I XRROR     /PRINT ERROR
  1442  7100                    CLL
```

```
     1443  141Ø            TAD I 1Ø
     1444  744Ø            SZA               /Ø
     1445  4521            JMS I XRROR       /PRINT ERROR
     1446  2Ø72            ISZ COUNT
     1447  5253            JMP .+4
     145Ø  447Ø            JMS I XKBNK       /SEE IF END OF FIELD
     1451  2122            ISZ MEMADR
     1452  56ØØ            JMP I RD3
                    /
     1453  2122            ISZ MEMADR
     1454  52Ø3            JMP RD3+3


                    /
     1455  ØØØØ     RD4,   Ø
     1456  1Ø56            TAD M2Ø          /-16
     1457  3Ø72            DCA COUNT
     146Ø  1Ø6Ø            TAD M4           /-4
     1461  3Ø73            DCA FLCNT
     1462  1141     CLOP4, TAD M1Ø          /-8
     1463  3Ø74            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  1Ø6Ø            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
                  /
      1530  2122              ISZ MEMADR
      1531  5260              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  0000  NXTBNK, 0
      1625  7200          CLA
      1626  6214          RDF             /READ DATA FIELD
      1627  7041          CIA
      1630  1124          TAD LAST1               /C(LAST1) = LAST TO TEST
      1631  7640          SZA CLA         /ALL DONE IF 0
      1632  5235          JMP .+3
      1633  2224          ISZ NXTBNK
      1634  5242          JMP .+6                 /EXIT
      1635  6214          RDF
      1636  1034          TAD K10         /INCREMENT DATA FIELD
      1637  1125          TAD KCDF                /ADD .6201
      1640  3241          DCA .+1
6211  1641  6201          CDF 00          /CHANGE TO NEW DATA FIELD
                  /
```

```
                        /CHECK SWITCH REGISTER
        1642  7604                LAS
        1643  7712                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      FEILD,    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 FEILD


                        /
              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 UPPER 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      EREXT,  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      EPRNT,  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  1143              TAD M14           /-12 DECIMAL
    2Ø63  3Ø74              DCA LOOP
    2Ø64  4315              JMS SPING                   /SPACE 12
    2Ø65  1365              TAD OCADR                   /OCTAL ADR.
    2Ø66  3134              DCA CHAR                    /SAVE
    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      /DO 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
                /
```

```
2207  ØØØØ  SLMTS,  Z
2210  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               /YES 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  7041             CIA
 2276  1143             TAD K215
 2277  7450             SNA          /NOT A C.R, IF A SKIP
 2300  5607             JMP I SLMTS
 2301  4344             JMS QUERY              /PRINT QUESTION MARK
 2302  5211             JMP SLMTS+2  /START OVER
                /
 2303  0000     KEYIN,  0
 2304  6032             KCC
 2305  6031             KSF
 2306  5305             JMP .-1
 2307  6036             KRB
 2310  3134             DCA CHAR
 2311  1134             TAD CHAR
 2312  4536             JMS I XPERR
 2313  5703             JMP I KEYIN


                /
 2314  0000     LEGAL,  0
 2315  1134             TAD CHAR
 2316  7041             CIA
 2317  1144             TAD K377
 2320  7650             SNA CLA      /RUB-OUT IF 0
 2321  5211             JMP SLMTS+2
 2322  1134             TAD CHAR
 2323  0145             AND K370
 2324  7041             CIA
 2325  1142             TAD K260
 2326  7650             SNA CLA
 2327  5714             JMP I LEGAL
 2330  1134             TAD CHAR
 2331  7041             CIA
 2332  1353             TAD K254
 2333  7650             SNA CLA      /A COMMA IF 0
 2334  5714             JMP I LEGAL
 2335  1134             TAD CHAR
 2336  7041             CIA
 2337  1143             TAD K215
 2340  7650             SNA CLA      /A C.R, IF 0
 2341  5714             JMP I LEGAL
 2342  4344             JMS QUERY              /QUERY
 2343  5211             JMP SLMTS+2  /START OVER
                /
 2344  0000     QUERY,  0
 2345  4547             JMS I XCRLF
 2346  1146             TAD K277
 2347  4536             JMS I XPERR  /PRINT QUERY MARK
 2350  5744             JMP I QUERY
                /
 2351  2446     XTLIM,  TLIMT
 2352  2400     XLCAT,  LOCAT
 2353  0254     K254,   254
```

5211 /

```
                          /
                          /PRINT FIELD PROGRAM IS IN
                          /
             24ØØ         *24ØØ
                          /
      24ØØ   ØØØØ         LOCAT,  Ø
      24Ø1   72ØØ                 CLA
      24Ø2   1Ø16                 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,  .
2460  Ø324             324           /T
2461  Ø305             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  745Ø             SNA           /DONE IF Ø
2514  5317             JMP .+3
2515  4536             JMS I XPERR
2516  5312             JMP POCDR
                /
2517  1Ø61             TAD M5
252Ø  3Ø74             DCA LOOP
2521  4537             JMS I XPING   /SPACE 5
2522  1355             TAD GOOD
2523  3Ø12             DCA 12
2524  1412      PGOOD, TAD I 12                /PRINT GOOD
2525  745Ø             SNA           /DONE IF Ø
2526  5731             JMP I .+3
2527  4536             JMS I XPERR
253Ø  5324             JMP PGOOD
2531  26ØØ             BSPCE         /NEXT PAGE
                /
2532  2532      FILD,  .
2533  Ø3Ø6             3Ø6           /F
```

```
/
     2534  Ø311           311            /I
     2535  Ø3Ø5           3Ø5            /E
     2536  Ø314           314            /L
     2537  Ø3Ø4           3Ø4            /D
     254Ø  ØØØØ           Ø
                   /
     2541  2541    OTLDR, .
     2542  Ø317           317            /O
     2543  Ø3Ø3           3Ø3            /C
     2544  Ø324           324            /T
     2545  Ø3Ø1           3Ø1            /A
     2546  Ø314           314            /L
     2547  Ø24Ø           24Ø
     255Ø  Ø3Ø1           3Ø1            /A
     2551  Ø3Ø4           3Ø4            /D
     2552  Ø322           322            /R
     2553  Ø256           256                      /.
     2554  ØØØØ           Ø
                   /
     2555  2555    GOOD,  .
     2556  Ø3Ø7           3Ø7            /G
     2557  Ø317           317            /O
     256Ø  Ø317           317            /O
     2561  Ø3Ø4           3Ø4            /D
     2562  ØØØØ           Ø
                   /
     2563  5674    EXHDR, JMP I PHDR


                   /
           26ØØ    *26ØØ
                   /
     26ØØ  1Ø61    BSPCE, 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  1Ø14            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
                      /
3412 -  2741  1234    RANCON, 1234
     -  2742  2753    RANDEX, RANTBL+1Ø
2353 -  2743  4321    RANTBL, 4321
7150 -  2744  1416            1416
3415 -  2745  5363            5363
4112 -  2746  6Ø6Ø            6Ø6Ø
1007 -  2747  3Ø35            3Ø35
0624    275Ø  2572            2572
1271    2751  3237            3237
0246    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  1Ø2Ø            TAD ERTBL
  3ØØ3  3Ø22            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  3323      XSRCE,  SOURCE
        3124  33Ø7      XMVE,   MOVE
        3125  32ØØ      XTMV,   NXTMV
                        /


              32ØØ      *32ØØ
                        /
        32ØØ  76ØØ      NXTMV,  76ØØ
```

```
 3201  6224            RIF
 3202  3323            DCA SOURCE        /CURRENT FIELD
 3203  2022   CHNXT,   ISZ ERWRD                 /POINTER +1
 3204  12ØØ            TAD NXTMV
 3205  7Ø41            CIA
 3206  1422            TAD I ERWRD
 3207  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      MVBK,   TAD NXLOC
        33Ø3  3Ø16              DCA INSFLD
        33Ø4  6224              RIF
        33Ø5  3323              DCA SOURCE
        33Ø6  3Ø15              DCA FLAGS         /CLEAR BIT 11


                        /
                        /ROUTINE TO RELOCATE 4K FIELDS
                        /
        33Ø7  1125      MOVE,   TAD KCDF                  /62Ø1
        331Ø  1323              TAD SOURCE        /CURRENT FIELD
        3311  3323              DCA SOURCE        /SOURCE NOW = CDF N
        3312  1125              TAD KCDF                  /62Ø1
        3313  1Ø16              TAD INSFLD        /NEW FIELD
        3314  3327              DCA DESTN                 /DESTN NOW = CDF N
        3315  1323              TAD SOURCE
        3316  7Ø41              CIA
        3317  1327              TAD DESTN
        332Ø  765Ø              SNA CLA
        3321  553Ø              JMP I XRTN
        3322  3Ø74              DCA LOOP                  /4K COUNTER
        3323  ØØØØ      SOURCE, Ø                 /WILL = CDF N
        3324  1474              TAD I LOOP                /TAKE FROM HERE
        3325  3347              DCA SAVGD                 /SAVE INSTRUCTION
        3326  1347              TAD SAVGD                 /GET IT BACK
        3327  ØØØØ      DESTN,  Ø
        333Ø  3474              DCA I LOOP                /PUT IN HERE
        3331  1474              TAD I LOOP                /GET INFORMATION STORED
        3332  7Ø41              CIA
        3333  1347              TAD SAVGD                 /COMPARE TO THIS VALUE
        3334  765Ø              SNA CLA                   /WERE THEY THE SAME
        3335  534Ø              JMP .+3                   /YES CONTINUE
        3336  74Ø2              HLT                       /NO, RELOCATION ERROR
        3337  5323              JMP SOURCE                /TRY SAME AGAIN
        334Ø  2Ø74              ISZ LOOP                  /DONE 4K WHEN SKIP
        3341  5323              JMP SOURCE        /KEEP MOVING
        3342  1126              TAD KCIF                  /62Ø2
```

```
3343  1Ø16           TAD INSFLD      /NEW FIELD
3344  3345           DCA .+1
3345  62Ø2           CIF ØØ          /CHANGE TO NEW FIELD
3346  553Ø           JMP I XRTN      /EXIT TO RTN1 IN
                                     /NEW FIELD
3347  ØØØØ    SAVGD, Ø

                     $
```

```
0000  01111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
0100  11111111  11111111  11111111  11111111  11111111  11111000  00000000  00000000

0200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
0300  11111111  11111111  11111111  11111111  11111110  00000000  00000000  00000000

0400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
0500  11111111  11111111  11110000  00000000  00000000  00000000  00000000  00000000

0600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
0700  11111111  11111111  11111111  11111111  11111111  11111111  11100000  00000000


1000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1100  11111111  11111111  11111111  11111111  11111111  11111000  00000000  00000000

1200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1300  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111110

1400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1500  11111111  11111111  11111111  11000000  00000000  00000000  00000000  00000000

1600  11111111  11111111  11111111  11111111  11111111  11111111  00000000  00000000
1700  11111111  11111111  11111111  11000000  00000000  00000000  00000000  00000000


2000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2100  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11000000

2200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2300  11111111  11111111  11111111  11111111  11111111  11110000  00000000  00000000

2400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2500  11111111  11111111  11111111  11111111  11111111  11111111  11110000  00000000

2600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2700  11111111  11111111  11111111  11111111  11111111  11111110  00000000  00000000


3000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
3100  11111111  11111111  11111100  00000000  00000000  00000000  00000000  00000000

3200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
3300  11111111  11111111  11111111  11111111  11111111  00000000  00000000  00000000

3400
3500

3600
3700
```

```
4ØØØ
41ØØ

42ØØ
43ØØ

44ØØ
45ØØ

46ØØ
47ØØ


5ØØØ
51ØØ

52ØØ
53ØØ

54ØØ
55ØØ

56ØØ
57ØØ


6ØØØ
61ØØ

62ØØ
63ØØ

64ØØ
65ØØ

66ØØ
67ØØ


7ØØØ
71ØØ

72ØØ
73ØØ

74ØØ
75ØØ

76ØØ
77ØØ
```

```
ALAW    2220        FLCNT   ØØ73        LEGAL   2314        RD4     1455
ALOK    2273        FLDN    2444        LOCAT   24ØØ        RDALL   Ø736
BAD     2163        FLOAD   ØØ17        LOOP    ØØ74        RDF     6214
BADD    2634        GENRAN  2716        M1Ø     Ø141        RDLOP   Ø753
BEGIN   32ØØ        GODD    2555        M14     Ø14Ø        RIF     6224
BSPCE   26ØØ        GOOD    2164        M2Ø     ØØ56        RLOPA   1Ø11
CBANK   16Ø7        HALT    2641        M4      ØØ6Ø        RSTRT1  Ø211
CDF     62Ø1        INSFLD  ØØ16        M4Ø     ØØ57        RTN1    Ø213
CDON1   276Ø        JMS1    Ø11Ø        M5      ØØ61        RXIT    1Ø2Ø
CFLD    1722        JMS2    Ø111        MCWA    ØØ33        SAVGD   3347
CHAR    Ø134        JMS3    Ø112        MEMADR  Ø122        SAVIF   1623
CHNXT   32Ø3        JMS4    Ø113        MOVE    33Ø7        SETSR   2645
CIF     62Ø2        JMS5    Ø114        MVBK    33Ø2        SETU1   22ØØ
CKBNK   16ØØ        K1      Ø15Ø        NXLOC   Ø151        SLMTS   22Ø7
CKERR   3Ø31        K1Ø     ØØ34        NXTBNK  1624        SOURCE  3323
CKNT    3242        K1ØØ    ØØ4Ø        NXTHI   3275        SPING   2115
CKNXT   3211        K177    2756        NXTMV   32ØØ        STALL   27Ø2
CLOP1   1252        K1K     1Ø36        OCADR   2165        STMV    311Ø
CLOP2   1327        K2Ø     ØØ42        OKAS    2256        STNX    3247
CLOP3   14Ø5        K2ØØ    ØØ37        OTLDR   2541        STNXT   3225
CLOP4   1462        K2Ø7    2167        OVER    17Ø6        STSR    267Ø
CMOVE   3ØØØ        K212    2171        PBAD    26Ø5        SUB1    3Ø66
CNXT    3Ø37        K215    Ø143        PFILD   25ØØ        SUB2    3255
COUNT   ØØ72        K24Ø    217Ø        PGOOD   2524        SWØ     2111
CRLF    2154        K254    2353        PHDR    2474        SW1     2Ø42
DATFLD  ØØ14        K26Ø    Ø142        PLIMT   2452        SW2     2Ø33
DESTN   3327        K261    ØØ52        PLOCT   2412        TBLRAN  2755
ENTBL   ØØ21        K262    ØØ53        POCDR   2512        TDM2Ø   Ø1Ø6
EPRNT   2Ø54        K263    ØØ54        POSITN  2131        TDM4Ø   Ø1Ø7
EQUAL   3Ø53        K264    ØØ55        PRERR   2146        TLIMT   2446
EREXT   2Ø46        K277    Ø146        PRGAM   2417        TNUM    ØØ62
ERROR   2ØØØ        K37Ø    Ø145        PROCTL  2126        TST1    Ø3ØØ
ERTBL   ØØ2Ø        K377    Ø144        PSTSR   2652        TST1C   Ø324
ERWRD   ØØ22        K4Ø     ØØ41        PTSTN   2617        TST2    Ø4ØØ
EXAM1   Ø241        K4ØØ    ØØ36        QUERY   2344        TST2C   Ø425
EXAM2   Ø246        K7      Ø133        RANCON  2741        TST3    Ø452
EXAM3   Ø253        K74Ø    ØØ35        RANDEX  2742        TST3C   Ø477
EXAM4   Ø26Ø        KCDF    Ø125        RANTAB  2754        TST4    Ø6ØØ
EXHDR   2563        KCIF    Ø126        RANTAD  2734        TST4C   Ø625
EXIT    Ø153        KEYIN   23Ø3        RANTBL  2743        TSTL    2457
EXT1    Ø322        KRXT    1Ø35        RCHK1   1Ø37        TSTN    2626
EXT1C   Ø343        KXT1    Ø345        RCHK1C  1Ø54        WØØ11   Ø652
EXT2    Ø423        KXT1C   Ø346        RCHK2   1Ø71        WØ11Ø   Ø7Ø4
EXT2C   Ø445        KXT2    Ø45Ø        RCHK2C  11Ø6        W1ØØ1   Ø721
EXT3    Ø475        KXT2C   Ø451        RCHK3   1123        W11ØØ   Ø667
EXT3C   Ø517        KXT3    Ø522        RCHK3C  114Ø        WRLOP   171Ø
EXT4    Ø623        KXT3C   Ø523        RCHK4   12ØØ        WTCR    266Ø
EXT4C   Ø647        KXT4    Ø645        RCHK4C  1217        XØØ11   ØØ64
FEILD   1646        KXT4C   Ø646        RCHKA   1ØØØ        XØ11Ø   ØØ66
FILD    2532        LAST    2166        RD1     1245        X1ØØ1   ØØ67
FIRST1  Ø123        LAST1   Ø124        RD2     1322        X11ØØ   ØØ65
FLAGS   ØØ15        LASTX   Ø154        RD3     14ØØ        XBANK   ØØ63
```

```
XCFL     1244          XTST3    ØØ46
XCHK1    ØØ76          XTST4    ØØ47
XCHK1C   ØØ77
XCHK2    Ø1ØØ
XCHK2C   Ø1Ø1
XCHK3    Ø1Ø2
XCHK3C   Ø1Ø3
XCHK4    Ø1Ø4
XCHK4C   Ø1Ø5
XCHKA    1236
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
```

```
ERRORS DETECTED: Ø

LINKS GENERATED: Ø

RUN-TIME:  13 SECONDS

2K CORE USED
```