IDENTIFICATION

PRODUCT CODE: MAINDEC-8E-D1FB-D

PRODUCT NAME: PDP-8E EXTENDED MEMORY
ADDRESS TEST (EA8E)

DATE: CREATED: JUNE 14, 1971

MAINTAINER: DIAGNOSTIC GROUP

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1.   ABSTRACT

The PDP-8E Extended Memory Address Test is designed to detect any location that cannot be uniquely addressed. This is performed by a series of four test routines which will test systems equipped with from 8K to 32K words of core memory. Automatic program relocation is provided in order to test all memory fields from each memory field. Teletype print-outs are provided for error identification, and the operator is given a degree of control over the program by various SR settings.

2.   REQUIREMENTS

2.1   Equipment

A PDP-8E computer equipped with a minimum of 8K words of core memory.

2.2   Storage

The program occupies core locations 0000 to 3777.

2.3   Preliminary Programs

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

3.   LOADING PROCEDURE

Load the program with the Binary Loader (BIN). The program may be loaded into any desired core stack by having BIN in that core stack.

4.   OPERATING PROCEDURE

4.1   Program and Operator Action

A. Set the SR to the INSTRUCTION FIELD and DATA FIELD of the
    stack which contains the program.

B. Press key EXTD ADDR LOAD.

C. Set the SR for desired starting address according to the
    following table.

ADDRESS	TEST EXECUTION
0200	Run all tests
0201	Run only test 1
0202	Run only test 2
0203	Run only test 3
0204	Run only test 4

D. Press keys ADDR LOAD, CLEAR, and CONT. A setup SR message will be
    printed.

E. Set the SR for desired operation according to the following
    table.

SWITCH	0 (down)	1 (up)
SR00	continue after error	halt after error
SR01	typeout errors	inhibit error typeouts
SR02	normal	TTY bell on error
SR03	relocate program	inhibit program relocation
SR04	normal	change stack limits
SR05	normal	halt after current test
SR06-08	starting stack limit (0-7)	
SR09-11	ending stack limit (0-7)	

F. Press key CONT.

4.2   Detailed SR Explanation

SR00-02 SR02, if set, will ring the TTY bell once for each error.
        SR00 and SR01 have no effect with SR02 set.

SR03   SR03 may be set or reset at any time and the program will
        act accordingly

SR04   SR04 allows the operator to change the stack limits as
        defined by SR06-11.

SR05   SR05 is normal halt for program

SR06-08 These switches define the starting stack limit (normally
        0).

SR09-11 These switches define the ending stack limit (normally 7)

4.3   Example of Selecting Stacks for Test

Example 1:   SR = 0007, 28K system

Stacks selected for testing are 6,5,4,3,2,1,0

Example 2:   SR = 0004, 28K System

Stacks selected for testing are 4,3,2,1,0

Example 3:   SR = 0022 28K System

Stacks selected for testing are 2
(No relocation will occur)

Example 4:   SR = 0041 28K System

Stacks selected for testing are 6,5,4,1,0

NOTE 1:   Stacks not in the system are automatically de-selected as is Example 1. Stack 7 is not present therefore not selected.

NOTE 2:   A single stack can be selected for testing providing the program is not in that stack as in Example 3.

NOTE 3:   Any stack or group of stacks can be by-passed as in Example 4. Stacks 2 and 3 are not selected, stack 7 is not present.

5.   ERRORS

The contents of a given memory test location should always be equal to its address or the complement of its address. If it is not, a test error will result. A relocation error will occur if the relocation comparison check fails.

5.1   Test Error Typeouts

For the first error encountered a header will be typed out followed by the pertinent data. For all subsequent errors, only the pertinent data will be typed. The format is as follows:

PR LOC ADDR   GOOD   BAD   TEST

PR LOC = the program address where the error JMS occurred. (Includes Field)

ADDR = the address of the location in error.   (Includes Field)

GOOD = what the data should be.

BAD = what the data is.

TEST = the test (1-4) running when the failure occurred.

5.2   Relocation Error Typeouts

All relocation errors are in the following format:

XXXXX' RELOCATION ERROR AT LOCATION_YYYYY

XXXXX = the program address where the error JMS occurred, (Includes Field)

YYYYY = the address of the location in error (Includes Field)

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

6.   RESTRICTIONS

6.1   Starting Restrictions

The program may be restarted at any time from location Ø2ØØ of the stack
the program is presently in.

6.2   Operating Restrictions

None

7.   EXECUTION TIME

The time to run all 4 tests in one core stack is approximately 1/2 second.
During program execution a 5 will be typed on the TTY approximately every
5 minutes of program run time. This allows the operator to determine
approximate run time before a failure occurred.

8.   SCOPE LOOPS

Two special scope loops have been provided in this program.

8.1   Scope Loop 1

This scope loop writes the value equal to the address specified by the SR
into the address specified by the SR. It then loops doing a write-read.

8.1   continued

The address being looped on can be changed simply by changing the
switch setting.

A.   Set the SR to the INSTRUCTION FIELD that the program is in and the
     DATA FIELD wanted to test.

B.   Press key EXTD ADDR LOAD.

C.   Set the SR.equal to 34ØØ.

D.   Press key ADDR LOAD.

E.   Set the SR equal to the address to test.

F.   Press keys CLEAR, and CONT.

8.2   Scope Loop 2

This scope loop is the same as Scope Loop 1 except that a group of
addresses may be specified. The starting address specified must be less
than the ending address specified.

A.   Set the SR to the INSTRUCTION FIELD that the program is in and the
     DATA FIELD wanted to test.

B.   Press key EXTD ADDR LOAD.

C.   Set the SR equal to 36ØØ.

D.   Press key ADDR LOAD

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

F.   Press keys CLEAR and CONT. A halt will occur at address 36Ø2.

G.   Set the SR equal to the last address of the group.

H.   Press key CONT.

NOTE:1: The address(s) specified will be looped unti stopped by the operator
         with key HALT. No error checking is done. To resume normal
         operation, restart program at address Ø2ØØ-Ø2Ø4 of the current
         instruction field.

9.   PROGRAM DESCRIPTION

9.1   General

The PDP-8E Extended Memory Address Test is intended for use with a
PDP-8E equipped with the extended memory option. A total of four tests
are executed by the program. (See 9.2 thru 9.5). Each test writes
a unique pattern into core memroy and the checks for error. The patterns
were chosen to aid the operator in the event of addressing errors.

The program automatically relocates itself to each memory field under
test to ensure that all fields may be correctly referenced from any
field. Fields not present in the system will automatically be de-selected
from testing. (See 9.6)

Control of the program is given to the operator by means of the SR.
The operator may halt after error, inhibit error printouts, substitute
TTY BELL for error indication, halt after test, change field test limits,
select all or any one of four tests, inhibit program relocation, and at
any time restart the program at location Ø2ØØ thru Ø2Ø4.

9.2   Test 1

Test 1 writes the value of each location into itself in the forward
direction. Then each location is read and checked in the forward
direction.

9.3   Test 2

Test 2 writes the complement value of each location into itself in the
forward direction. Then each location is read and checked in the forward
direction.

9.4   Test 3

Test 3 writes the value of each location into itself in the reverse
direction. Then each location is read and checked in the reverse
direction.

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9.5   <u>Test 4</u>

Test 4 writes the complement value of each location into itself in the reverse direction. Then each location is read and checked in the reverse direction.

9.6   <u>Program Relocation</u>

Program relocation is governed by the status of SR bit 3 or by the fact that only one stack is selected for testing. With SR bit 3 down (∅ position) program relocation occurs each time the test pattern and its complement have been completely tested in each selected stack. The program first relocates to the highest order 4K stack under test. The program keeps relocating to the next lower stack under test until it reaches the lowest order stack under test. The testing and relocation cycle is then repeated. The contents of the entire stack are relocated which enables any other information (RIM-BIN) to be carried with the program.

The program provides a degree of protection for itself by remembering all stacks where errors occur. 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 other selected stacks are faulty, program relocation will not take place.

During relocation a comparison check is made to insure no program loss.

For further understanding of how the tests are performed, refer to the listing.

```
                    /EXTENDED ADDRESS TEST FOR KM8-E EXTENDED MEMORY (VER A)
                    /COPYRIGHT 1971, DIGITAL EQUIPMENT CORPORATION, MAYNARD, MASS. 01754
                    /PROGRAMMER, VERNON FREY
                    /
                    /
                    /SW0=1            HALT AFTER ERROR
                    /SW1=1            INHIBIT ERROR TYPEOUT
                    /SW2=1            BELL ON ERROR (USEFUL FOR MAINTENENCE)
                    /SW3=1            INHIBIT PROGRAM RELOCATION
                    /SW4=1            CHANGE STACK LIMITS
                    /SW5=1            HALT AFTER CURRENT TEST
                    /SW6-SW8          STARTING STACK LIMIT (0-7)
                    /SW9-SW11         ENDING STACK LIMIT (0-7)
                    /
                    /
                    /
                    /PROGRAM STARTING ADDRESS
                    /0200             RUN ALL TESTS
                    /0201             RUN ONLY TEST 1
                    /0202             RUN ONLY TEST 2
                    /0203             RUN ONLY TEST 3
                    /0204             RUN ONLY TEST 4
                    /
                    /
                    /
                    /
                    /
                    /IOT COMMANDS FOR THE MC8-E EXTENDED MEMORY & INTERRUPT
                    /
          6004      GTF=6004          /GET INTERRUPT FLAGS
                    /AC0      LINK
                    /AC1      GREATER THAN FLAG
                    /AC2      INTERRUPT BUS
                    /AC3      INTERRUPT INHIBIT FLIP-FLOP
                    /AC4      INTERRUPT ON
                    /AC5      USER FLAG
                    /AC6-8    INSTRUCTION FIELD
                    /AC9-11   DATA FIELD
          6005      RTF=6005          /RESTORE INTERRUPT FLAGS
                    /AC0      LINK
                    /AC1      GREATER THAN FLAG
                    /1       INTERRUPT INHIBIT FLIP-FLOP
                    /1       INTERRUPT ON
                    /AC5      USER FLAG
                    /AC6-8    INSTRUCTION BUFFER
                    /AC9-11   DATA FIELD
          6201      CDF0=6201         /CHANGE TO DATA FIELD 0
          6211      CDF1=6211         /CHANGE TO DATA FIELD 1
          6221      CDF2=6221         /CHANGE TO DATA FIELD 2
          6231      CDF3=6231         /CHANGE TO DATA FIELD 3
          6241      CDF4=6241         /CHANGE TO DATA FIELD 4
          6251      CDF5=6251         /CHANGE TO DATA FIELD 5
          6261      CDF6=6261         /CHANGE TO DATA FIELD 6
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          6271      CDF7=6271         /CHANGE TO DATA FIELD 7
          6202      CIF0=6202         /CHANGE TO INSTRUCTION FIELD 0
          6212      CIF1=6212         /CHANGE TO INSTRUCTION FIELD 1
          6222      CIF2=6222         /CHANGE TO INSTRUCTION FIELD 2
          6232      CIF3=6232         /CHANGE TO INSTRUCTION FIELD 3
          6242      CIF4=6242         /CHANGE TO INSTRUCTION FIELD 4
          6252      CIF5=6252         /CHANGE TO INSTRUCTION FIELD 5
          6262      CIF6=6262         /CHANGE TO INSTRUCTION FIELD 6
          6272      CIF7=6272         /CHANGE TO INSTRUCTION FIELD 7
          6203      CBF0=6203         /CHANGE TO DATA AND INSTRUCTION FIELD 0
          6213      CBF1=6213         /CHANGE TO DATA AND INSTRUCTION FIELD 1
          6223      CBF2=6223         /CHANGE TO DATA AND INSTRUCTION FIELD 2
          6233      CBF3=6233         /CHANGE TO DATA AND INSTRUCTION FIELD 3
          6243      CBF4=6243         /CHANGE TO DATA AND INSTRUCTION FIELD 4
          6253      CBF5=6253         /CHANGE TO DATA AND INSTRUCTION FIELD 5
          6263      CBF6=6263         /CHANGE TO DATA AND INSTRUCTION FIELD 6
          6273      CBF7=6273         /CHANGE TO DATA AND INSTRUCTION FIELD 7
          6204      CINT=6204         /CLEAR USER INTERRUPT (TIME SHARE)
          6214      RDF=6214          /READ DATA FIELD INTO AC BITS 6-8
          6224      RIF=6224          /READ INSTRUCTION FIELD INTO AC BITS 6-8
          6234      RIB=6234          /READ INTERRUPT BUFFER
                    /AC6-8 INSTRUCTION FIELD IN USE BEFORE LAST
                    /       PROGRAM INTERRUPT.
                    /AC9-11 DATA FIELD IN USE BEFORE LAST
                    /       PROGRAM INTERRUPT.
          6244      RMF=6244          /RESTORE MEMORY FIELD
                    /INSTRUCTION FIELD LOADED FROM SAVE FIELD 0-2
                    /DATA FIELD LOADED FROM SAVE FIELD 3-5
          6254      SINT=6254         /SKIP ON USER INTERRUPT (TIME SHARE)
          6264      CUF=6264          /CLEAR USER FLAG (TIME SHARE)
          6274      SUF=6274          /SET USER FLAG (TIME SHARE)



          0020      *20
                    /
                    /CONSTANTS AND POINTERS
                    /
    0020  4000      SW0,     4000           /HALT AFTER ERROR
    0021  2000      SW1,     2000           /INHIBIT ERROR TYPEOUT
    0022  1000      SW2,     1000           /BELL ON ERROR
    0023  0400      SW3,     400            /INHIBIT PROGRAM RELOCATION
    0024  0200      SW4,     200            /CHANGE STACK LIMITS
    0025  0100      SW5,     100            /HALT AFTER CURRENT TEST
    0026  0070      SW68,    70             /STARTING STACK LIMIT (0-7)
    0027  0007      SW911,   7              /ENDING STACK LIMIT (0-7)
    0030  0000      STACK0,  0              /
    0031  0000      STACK1,  0              /
    0032  0000      STACK2,  0              /
    0033  0000      STACK3,  0              /STACKS CONTAIN 0 IF SELECTED FOR TESTING
    0034  0000      STACK4,  0              /
    0035  0000      STACK5,  0              /
    0036  0000      STACK6,  0              /
    0037  0000      STACK7,  0              /
    0040  0000      STK0,    0              /
```

```
0041  0000    STK1,    0              /
0042  0000    STK2,    0              /
0043  0000    STK3,    0              /0 IF RELOCATE
0044  0000    STK4,    0              /
0045  0000    STK5,    0              /
0046  0000    STK6,    0              /
0047  0000    STK7,    0              /
0050  0000    NORELO,  0              /PROG RELOCATION CONTROL (0=INH)
0051  1716    KABOVE,  ABOVE          /CONTROL UPPER STACKS NOT TESTED
0052  1725    KBELOW,  BELOW          /CONTROL LOWER STACKS NOT TESTED
0053  0000    HEAD1,   0              /ERROR HEADING CONTROL
0054  0000    INSAME,  0              /PROG IN SEL STACK
0055  0000    LEGAL0,  0              /LEGAL STACK SELECTION
0056  0000    RUNTST,  0              /6003=ALL, 0001=1, 0002=2, 2000=3, 4000=4
0057  0000    TESTAD,  0              /TEST ADDRESS COUNTER
0060  0000    KBINT,   0              /HIGHEST ACTUAL STACK IN SYSTEM
0061  0000    SSL,     0              /STARTING STACK LIMIT 00X0
0062  0000    ESL,     0              /ENDING STACK LIMIT 000X
0063  0000    STKPIN,  0              /STACK PROG IS IN 00X0
0064  0000    STKTST,  0              /STACK SEL FOR TEST 00X0
0065  0000    BDATA,   0              /BAD DATA
0066  0000    GDATA,   0              /GOOD DATA
0067  0000    MOVE,    0              /RELOCATION ADDRESS
0070  1736    KDOWN,   DOWN           /CONTROL LOWER STACKS TESTED
0071  0000    TEMP,    0              /INDIRECT ADDRESS TEMP STORAGE - CHEXM
0072  0000    COUNT,   0              /CHECKERBOARD ERROR COUNTER
0073  0000    ERRLOC,  0              /CODERR
0074  7777    M1,      -1             /CODERR - TEST 3 & 4
0075  7776    M2,      -2             /MESAGE - LEGAL
0076  7775    M3,      -3             /MESAGE
0077  7774    M4,      -4             /MESAGE - 4 WORDS
0100  7744    M34,     -34            /MESAGE
0101  0007    K7,      7              /CODERR - ERRC - STACKS
0102  0010    K10,     10             /CHEXN
0103  0020    K20,     20             /CHEXN
0104  0030    K30,     30             /CHEXN
0105  0040    K40,     40             /CHEXN
0106  0050    K50,     50             /CHEXN
0107  0060    K60,     60             /CHEXN
0110  0070    K70,     70             /CHEXN
0111  0077    K77,     77             /SIXTY - MESAGE
0112  0207    K207,    207            /MESAGE - CODERR
0113  0212    K212,    212            /MESAGE
0114  0215    K215,    215            /MESAGE
0115  0240    K240,    240            /TOSEL
0116  0245    K245,    245            /MESAGE
0117  0260    K260,    "0             /TOSEL - MAKE SEL 0-7
0120  0261    K261,    "1             /TOSEL
0121  0262    K262,    "2             /TOSEL
0122  0263    K263,    "3             /TOSEL
0123  0264    K264,    "4             /TOSEL
0124  0265    K265,    "5             /TOSEL
0125  0266    K266,    "6             /TOSEL
0126  0267    K267,    "7             /TOSEL
0127  0340    K340,    340            /MESAGE
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0130  0707    K707,    707            /SIXTY
0131  4060    K4060,   4060           /CODERR - ERRC
0132  6000    K6000,   6000           /LINK IS A 0 - PROG FIELD TYPEOUT
0133  6003    K6003,   6003           /ALL TESTS
0134  6060    K6060,   6060           /SIXTY
0135  6100    K6100,   6100           /TEST 1
0136  6200    K6200,   6200           /TEST 2
0137  6300    K6300,   6300           /TEST 3
0140  6400    K6400,   6400           /TEST 4
0141  6201    K6201,   6201           /CDF 0
0142  6203    K6203,   6203           /CBF 0
0143  2042    XTYPE,   TYPE           /TYPEOUT AC ROUTINE POINTER
0144  2050    XMESAG,  MESAGE         /TTY ROUTINE POINTER
0145  2400    XSIXTY,  SIXTY          /SIXTY ROUTINE POINTER
0146  2231    XCODER,  CODERR         /ERROR ROUTINE POINTER
0147  2210    XRETUR,  RETURN         /ERROR RETURN POINTER
0150  2242    XSTOP,   STOP           /STOP ROUTINE POINTER
0151  2241    XADDER,  ADDER          /ADDRESS OF ERROR TYPEOUT POINTER
0152  0000    FIVE,    0              /FIVE MINUTE TIMER
0153  0000    MIN5,    0              /FIVE MINUTE CONTROL
0154  7100    MIN50,   -700           /ALL TESTS FIVE MIN
0155  3500    MIN51,   -4300          /TEST 1 FIVE MIN
0156  3500    MIN52,   -4300          /TEST 2 FIVE MIN
0157  6000    MIN53,   -2000          /TEST 3 FIVE MIN
0160  6000    MIN54,   -2000          /TEST 4 FIVE MIN

      0000    *0
0000  0000             0
0001  5001             JMP
0002  0002             2
0003  0003             3
      0200    *200
              /
              /KM8-E EXTENDED MEMORY ADDRESS TEST (EABE)
              /
0200  5777'   EXTAD,   JMP     RUN0    /ALL TESTS
0201  5776'            JMP     RUN1    /TEST 1
0202  5775'            JMP     RUN2    /TEST 2
0203  5774'            JMP     RUN3    /TEST 3
0204  5773'            JMP     RUN4    /TEST 4
0205  3056    EXTAD0,  DCA     RUNTST  /TEST CONTROL
0206  6002             IOF
0207  6224             RIF
0210  1141             TAD     K6201
0211  3212             DCA     .+1
0212  6201             CDF 0           /MAKE DATA FIELD=INST FIELD
0213  4772'            JMS     TITLE   /TYPEOUT PROGRAM TITLE
0214  4771'    CHEXA,  JMS     SETSW   /TYPEOUT TO SETUP SWITCHES
0215  7240             STA
0216  3050             DCA     NORELO  /CLEAR INH RELOCATION
0217  3057             DCA     TESTAD  /CLEAR TEST ADDR COUNTER
0220  7240             STA
0221  3053             DCA     HEAD1   /RESET ERROR HEADING
0222  1153             TAD     MIN5
0223  3152             DCA     FIVE    /SETUP COUNTER
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0224  4770'          JMS     DOWN+2      /CLEAR STACK SELECTION CONTROLS
0225  7604          LAS
0226  0026          AND     SW68
0227  3061          DCA     SSL         /STARTING STACK LIMIT
0230  7604          LAS
0231  0027          AND     SW911
0232  3062          DCA     ESL         /ENDING STACK LIMIT
0233  4767'          JMS     MSSL        /OBTAIN -SSL IN AC BITS 9-11
0234  1062          TAD     ESL
0235  7640          SZA CLA              /SKIP IF SSL EQUALS ESL
0236  5262          JMP     CHEXC       /CONTINUE CHECK
0237  6224          RIF                 /READ INSTRUCTION FIELD
0240  7041          CIA
0241  1061          TAD     SSL
0242  7650          SNA CLA
0243  5766'          JMP     PINF        /PROGRAM IS IN THE SELECTED FIELD
0244  3050          DCA     NORELO      /INHIBIT PROGRAM RELOCATION
0245  1365          TAD     (CHEXB
0246  3764'          DCA     ABOVE-1     /STORE RETURN ADDRESS
0247  1062          TAD     ESL
0250  1051          TAD     KABOVE
0251  3071          DCA     TEMP
0252  5471          JMP I   TEMP        /INCREMENT UPPER FIELDS NOT TESTED
0253  1353  CHEXB,  TAD     (CHEXE
0254  3762'          DCA     BELOW+1     /STORE RETURN ADDRESS
0255  1062          TAD     ESL
0256  7041          CIA
0257  1052          TAD     KBELOW
0260  3071          DCA     TEMP
0261  5471          JMP I   TEMP        /INCREMENT LOWER FIELDS NOT TESTED
0262  4767'  CHEXC,  JMS     MSSL        /OBTAIN -SSL IN AC BITS 9-11
0263  1062          TAD     ESL
0264  7710          SPA CLA
0265  5332          JMP     CHEXD       /STARTING FIELD IS GREATER THAN ENDING FIELD
0266  1361          TAD     (CHEXC1
0267  3764'          DCA     ABOVE-1     /STORE RETURN ADDRESS
0270  1062          TAD     ESL
0271  1051          TAD     KABOVE
0272  3071          DCA     TEMP
0273  5471          JMP I   TEMP        /INCREMENT UPPER FIELDS NOT TESTED
0274  1363  CHEXC1, TAD     (CHEXE
0275  3762'          DCA     BELOW+1     /STORE RETURN ADDRESS
0276  4767'          JMS     MSSL        /OBTAIN -SSL IN AC BITS 9-11
0277  1052          TAD     KBELOW
0300  3071          DCA     TEMP
0301  5471          JMP I   TEMP        /INCREMENT LOWER FIELDS NOT TESTED
0302  1360  CHEXD,  TAD     (CHEXD1
0303  3762'          DCA     BELOW+1     /STORE RETURN ADDRESS
0304  4767'          JMS     MSSL        /OBTAIN -SSL IN AC BITS 9-11
0305  1052          TAD     KBELOW
0306  3071          DCA     TEMP
0307  5471          JMP I   TEMP        /INCREMENT ALL LOWER FIELDS
0310  1363  CHEXD1, TAD     (CHEXE
0311  3770'          DCA     DOWN+2      /STORE RETURN ADDRESS
0312  1062          TAD     ESL
```

```
0313  7041          CIA
0314  1070          TAD     KDOWN
0315  3071          DCA     TEMP
0316  5471          JMP I   TEMP        /RESTORE LOWER FIELDS TESTED
0317  4757'  CHEXE,  JMS     HIGHST      /FIND SYSTEMS HIGHEST STACK
0320  1060          TAD     KBINT
0321  1117          TAD     K260
0322  3060          DCA     KBINT       /MAKE HIGHEST STACK 0-7 FOR TYPEOUT
0323  4756'          JMS     TSTSYS      /TYPEOUT # OF STACKS IN SYSTEM
0324  1355          TAD     (CHEXE2
0325  3764'          DCA     ABOVE-1     /STORE RETURN ADDRESS
0326  1060          TAD     KBINT
0327  0101          AND     K7
0330  1051          TAD     KABOVE
0331  3071          DCA     TEMP
0332  5471          JMP I   TEMP        /INCREMENT UPPER STACKS NOT IN SYSTEM
0355  1400
0356  3017
0357  2737
0360  0310
0361  1274
0362  1726
0363  0317
0364  1705
0365  3253
0366  2712
0367  1742
0370  1743
0371  2621
0372  2640
0373  1624
0374  1617
0375  1612
0376  1615
0377  1640
              PAGE
0400  4777'  CHEXE2, JMS     TOSEL       /TYPEOUT STACK TEST SELECTION
0401  4210          JMS     LEGAL
0402  1050          TAD     NORELO
0403  7650          SNA CLA
0404  5276          JMP     CHEXM
0405  4776'          JMS     CHKSW3      /CHECK PROG RELO SW
0406  5775'          JMP     CHEXO       /RELOCATE PROGRAM
0407  5327          JMP     CHEXN       /INHIBIT PROGRAM RELOCATION

        /
        /CHECK FOR LEGAL STACK SELECTION
        /
0410  0000  LEGAL,  0
0411  7300          CLA CLL
0412  3054          DCA     INSAME      /CLEAR SAME CONTROL
0413  1075          TAD     M2
0414  3055          DCA     LEGAL0      /SETUP LEGAL CONTROL
0415  3064          DCA     STKTST
```

```
          0416  1030          TAD     STACK0
          0417  4263          JMS     LEGALA
          0420  1102          TAD     K10
          0421  3064          DCA     STKTST
          0422  1031          TAD     STACK1
          0423  4263          JMS     LEGALA
          0424  1103          TAD     K20
          0425  3064          DCA     STKTST
          0426  1032          TAD     STACK2
          0427  4263          JMS     LEGALA
          0430  1104          TAD     K30
          0431  3064          DCA     STKTST
          0432  1033          TAD     STACK3
          0433  4263          JMS     LEGALA
          0434  1105          TAD     K40
          0435  3064          DCA     STKTST
          0436  1034          TAD     STACK4
          0437  4263          JMS     LEGALA
          0440  1106          TAD     K50
          0441  3064          DCA     STKTST
          0442  1035          TAD     STACK5
          0443  4263          JMS     LEGALA
          0444  1107          TAD     K60
          0445  3064          DCA     STKTST
          0446  1036          TAD     STACK6
          0447  4263          JMS     LEGALA
          0450  1110          TAD     K70
          0451  3064          DCA     STKTST
          0452  1037          TAD     STACK7
          0453  4263          JMS     LEGALA
          0454  2055          ISZ     LEGAL0
          0455  5774'         JMP     NOSTK           /NO STACK SELECTION
          0456  1054          TAD     INSAME
          0457  7640          SZA CLA
          0460  5773'         JMP     PINF            /PROG IN SELECTED FIELD
          0461  3050          DCA     NORELO          /ONLY 1 STACK SELECTED
          0462  5610          JMP I   LEGAL
                        /
                        /LEGAL STACK SELECTION SUBROUTINE
                        /
          0463  0000  LEGALA, 0
          0464  7640          SZA CLA
          0465  5663          JMP I   LEGALA          /NOT SELECTED
          0466  2055          ISZ     LEGAL0
          0467  7410          SKP
          0470  5610          JMP I   LEGAL
          0471  6224          RIF
          0472  3063          DCA     STKPIN
          0473  4772'         JMS     SAME            /PROG IN SEL STACK
          0474  2054          ISZ     INSAME          /YES
          0475  5663          JMP I   LEGALA
                        /
                        /NO PROGRAM RELOCATION AND TEST ONLY 1 STACK
                        /
```

```
          0476  6224  CHEXM,  RIF
          0477  3063          DCA     STKPIN          /STACK PROGRAM IS IN
          0500  1371          TAD     (STACK0-1
          0501  3017          DCA     17
          0502  3071          DCA     TEMP
          0503  1417  CHEXM1, TAD I   17              /FIND STACK SEL FOR TEST
          0504  7650          SNA CLA
          0505  5510          JMP     CHEXM2
          0506  2071          ISZ     TEMP
          0507  5303          JMP     CHEXM1
          0510  1071  CHEXM2, TAD     TEMP
          0511  7104          CLL RAL
          0512  7006          RTL
          0513  3064          DCA     STKTST          /STACK SEL FOR TEST
          0514  4770'         JMS     PNOREL          /TYPEOUT NO RELOCATION
          0515  4767' CHEXM3, JMS     TEST            /TEST THE SELECTED STACK
          0516  7604          LAS
          0517  0025          AND     SW5             /HALT AFTER TEST
          0520  7640          SZA CLA
          0521  7402          HLT
          0522  7604          LAS
          0523  0024          AND     SW4             /CHANGE STACK LIMITS?
          0524  7640          SZA CLA
          0525  5766'         JMP     CHEXA           /YES
          0526  5315          JMP     CHEXM3          /NO
                        /
                        /NO PROGRAM RELOCATION BUT TEST ALL SELECTED STACKS
                        /
          0527  4770' CHEXN,  JMS     PNOREL          /TYPEOUT NO RELOCATION
          0530  4755' CHEXN0, JMS     CHEXN1          /TEST SEL'D STACKS
          0531  7604          LAS
          0532  0025          AND     SW5             /HALT AFTER TEST
          0533  7640          SZA CLA
          0534  7402          HLT
          0535  7604          LAS
          0536  0024          AND     SW4             /CHANGE STACK LIMITS?
          0537  7640          SZA CLA
          0540  5766'         JMP     CHEXA           /YES
          0541  4776'         JMS     CHKSW3          /NO
          0542  5775'         JMP     CHEXO           /RELOCATE
          0543  5530          JMP     CHEXN0          /CONTINUE

          0565  1613
          0566  1214
          0567  1200
          0570  2636
          0571  0027
          0572  1631
          0573  2712
          0574  2732
          0575  1030
          0576  1640
          0577  3074
```

```
              0600          PAGE
                        /
                        /TEST STACKS CONTROL
                        /
0600  0000     CHEXN1,  0
0601  7200              CLA
0602  6224              RIF
0603  3063              DCA     STKPIN      /STACK PROGRAM IS IN
0604  1037              TAD     STACK7
0605  7640              SZA CLA
0606  5222              JMP     CHEXN2
0607  1110              TAD     K70
0610  3064              DCA     STKTST      /STACK SEL FOR TEST
0611  3072              DCA     COUNT
0612  4777'             JMS     SAME        /PROG IN SEL STACK?
0613  5222              JMP     CHEXN2      /YES
0614  4776'             JMS     TEST        /NO - TEST THE SEL STACK
0615  1072              TAD     COUNT
0616  7640              SZA CLA
0617  2047              ISZ     STK7
0620  7410              SKP
0621  5217              JMP     .-2
0622  1036     CHEXN2,  TAD     STACK6
0623  7640              SZA CLA
0624  5240              JMP     CHEXN3
0625  1107              TAD     K60
0626  3064              DCA     STKTST      /STACK SEL FOR TEST
0627  3072              DCA     COUNT
0630  4777'             JMS     SAME        /PROG IN SEL STACK?
0631  5240              JMP     CHEXN3      /YES
0632  4776'             JMS     TEST        /NO - TEST THE SEL STACK
0633  1072              TAD     COUNT
0634  7640              SZA CLA
0635  2046              ISZ     STK6
0636  7410              SKP
0637  5235              JMP     .-2
0640  1035     CHEXN3,  TAD     STACK5
0641  7640              SZA CLA
0642  5256              JMP     CHEXN4
0643  1106              TAD     K50
0644  3064              DCA     STKTST      /STACK SEL FOR TEST
0645  3072              DCA     COUNT
0646  4777'             JMS     SAME        /PROG IN SEL STACK?
0647  5256              JMP     CHEXN4      /YES
0650  4776'             JMS     TEST        /NO - TEST THE SEL STACK
0651  1072              TAD     COUNT
0652  7640              SZA CLA
0653  2045              ISZ     STK5
0654  7410              SKP
0655  5253              JMP     .-2
0656  1034     CHEXN4,  TAD     STACK4
0657  7640              SZA CLA
0660  5274              JMP     CHEXN5
0661  1105              TAD     K40
0662  3064              DCA     STKTST      /STACK SEL FOR TEST
```

```
0663  3072              DCA     COUNT
0664  4777'             JMS     SAME        /PROG IN SEL STACK?
0665  5274              JMP     CHEXN5      /YES
0666  4776'             JMS     TEST        /NO - TEST THE SEL STACK
0667  1072              TAD     COUNT
0670  7640              SZA CLA
0671  2044              ISZ     STK4
0672  7410              SKP
0673  5271              JMP     .-2
0674  1033     CHEXN5,  TAD     STACK3
0675  7640              SZA CLA
0676  5312              JMP     CHEXN6
0677  1104              TAD     K30
0700  3064              DCA     STKTST      /STACK SEL FOR TEST
0701  3072              DCA     COUNT
0702  4777'             JMS     SAME        /PROG IN SEL STACK?
0703  5312              JMP     CHEXN6      /YES
0704  4776'             JMS     TEST        /NO - TEST THE SEL STACK
0705  1072              TAD     COUNT
0706  7640              SZA CLA
0707  2043              ISZ     STK3
0710  7410              SKP
0711  5307              JMP     .-2
0712  1032     CHEXN6,  TAD     STACK2
0713  7640              SZA CLA
0714  5330              JMP     CHEXN7
0715  1103              TAD     K20
0716  3064              DCA     STKTST      /STACK SEL FOR TEST
0717  3072              DCA     COUNT
0720  4777'             JMS     SAME        /PROG IN SEL STACK?
0721  5330              JMP     CHEXN7      /YES
0722  4776'             JMS     TEST        /NO - TEST THE SEL STACK
0723  1072              TAD     COUNT
0724  7640              SZA CLA
0725  2042              ISZ     STK2
0726  7410              SKP
0727  5325              JMP     .-2
0730  1031     CHEXN7,  TAD     STACK1
0731  7640              SZA CLA
0732  5346              JMP     CHEXN8
0733  1102              TAD     K10
0734  3064              DCA     STKTST      /STACK SEL FOR TEST
0735  3072              DCA     COUNT
0736  4777'             JMS     SAME        /PROG IN SEL STACK?
0737  5346              JMP     CHEXN8      /YES
0740  4776'             JMS     TEST        /NO - TEST THE SEL STACK
0741  1072              TAD     COUNT
0742  7640              SZA CLA
0743  2041              ISZ     STK1
0744  7410              SKP
0745  5343              JMP     .-2
0746  1030     CHEXN8,  TAD     STACK0
0747  7640              SZA CLA
0750  5361              JMP     CHEXN9
0751  3064              DCA     STKTST      /STACK SEL FOR TEST
```

```
0752  3072            DCA     COUNT
0753  4777'           JMS     SAME        /PROG IN SEL STACK?
0754  5361            JMP     CHEXN9      /YES
0755  4776'           JMS     TEST        /NO - TEST THE SEL STACK
0756  1072            TAD     COUNT
0757  7640            SZA CLA
0760  2040            ISZ     STKJ
0761  5600    CHEXN9, JMP I   CHEXN1
0762  5360            JMP     .-2

0776  1200
0777  1631
      1000            PAGE


      /
      /CHECK ALL SELECTED STACKS FROM EACH SELECTED STACK
      /
1000  4777'   CHEX0,  JMS     PREL        /TYPEOUT RELOCATION
1001  4776'           JMS     RESTK       /RESTORE STK(S)
1002  4775'           JMS     CHEXN1      /TEST FROM PRESENT STACK
1003  4774'           JMS     CHKSW3      /TEST FROM PRESENT STACK
1004  7410            SKP
1005  5773'           JMP     CHEXN
1006  6224    CHEX0A, RIF
1007  3063            DCA     STKPIN      /STACK PROGRAM IS IN
1010  1047            TAD     STK7
1011  7640            SZA CLA
1012  5224            JMP     CHEX00
1013  1110            TAD     K70
1014  3064            DCA     STKTST      /STACK SEL FOR MOVE TO
1015  4772'           JMS     SAME        /PROG IN MOVE STACK?
1016  7410            SKP                 /YES
1017  4771'           JMS     RELO        /NO - RELOCATE PROGRAM
1020  4775'           JMS     CHEXN1      /TEST ALL SEL STACKS
1021  4774'           JMS     CHKSW3
1022  7410            SKP
1023  5773'           JMP     CHEXN
1024  1046    CHEX00, TAD     STK6
1025  7640            SZA CLA
1026  5240            JMP     CHEX01
1027  1107            TAD     K60
1030  3064            DCA     STKTST      /STACK SEL FOR MOVE TO
1031  4772'           JMS     SAME        /PROG IN MOVE STACK?
1032  7410            SKP                 /YES
1033  4771'           JMS     RELO        /NO - RELOCATE PROGRAM
1034  4775'           JMS     CHEXN1      /TEST ALL SEL STACKS
1035  4774'           JMS     CHKSW3
1036  7410            SKP
1037  5773'           JMP     CHEXN
1040  1045    CHEX01, TAD     STK5
1041  7640            SZA CLA
1042  5254            JMP     CHEX02
1043  1116            TAD     K50
1044  3064            DCA     STKTST
```

```
1045  4772'           JMS     SAME
1046  7410            SKP
1047  4771'           JMS     RELO
1050  4775'           JMS     CHEXN1
1051  4774'           JMS     CHKSW3
1052  7410            SKP
1053  5773'           JMP     CHEXN
1054  1044    CHEX02, TAD     STK4
1055  7640            SZA CLA
1056  5270            JMP     CHEX03
1057  1115            TAD     K40
1060  3064            DCA     STKTST
1061  4772'           JMS     SAME
1062  7410            SKP
1063  4771'           JMS     RELO
1064  4775'           JMS     CHEXN1
1065  4774'           JMS     CHKSW3
1066  7410            SKP
1067  5773'           JMP     CHEXN
1070  1043    CHEX03, TAD     STK3
1071  7640            SZA CLA
1072  5304            JMP     CHEX04
1073  1114            TAD     K30
1074  3064            DCA     STKTST
1075  4772'           JMS     SAME
1076  7410            SKP
1077  4771'           JMS     RELO
1100  4775'           JMS     CHEXN1
1101  4774'           JMS     CHKSW3
1102  7410            SKP
1103  5773'           JMP     CHEXN
1104  1042    CHEX04, TAD     STK2
1105  7640            SZA CLA
1106  5320            JMP     CHEX05
1107  1103            TAD     K20
1110  3064            DCA     STKTST
1111  4772'           JMS     SAME
1112  7410            SKP
1113  4771'           JMS     RELO
1114  4775'           JMS     CHEXN1
1115  4774'           JMS     CHKSW3
1116  7410            SKP
1117  5773'           JMP     CHEXN
1120  1041    CHEX05, TAD     STK1
1121  7640            SZA CLA
1122  5334            JMP     CHEX06
1123  1102            TAD     K10
1124  3064            DCA     STKTST
1125  4772'           JMS     SAME
1126  7410            SKP
1127  4771'           JMS     RELO
1130  4775'           JMS     CHEXN1
1131  4774'           JMS     CHKSW3
1132  7410            SKP
1133  5773'           JMP     CHEXN
```

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1134  1040   CHEX06,  TAD   STK0
1135  7640            SZA CLA
1136  5344            JMP   CHEX07
1137  3064            DCA   STKTST
1140  4772'           JMS   SAME
1141  7410            SKP
1142  4771'           JMS   RELO
1143  4775'           JMS   CHEXN1
1144  7604   CHEX07,  LAS
1145  0025            AND   SW5           /HALT AFTER TEST
1146  7640            SZA CLA
1147  7432            HLT
1150  7604            LAS
1151  0024            AND   SW4           /CHANGE STACK LIMITS?
1152  7640            SZA CLA
1153  5770'           JMP   CHEXA         /YES
1154  4774'           JMS   CHKSW3        /NO
1155  5246            JMP   CHEXOA        /RELOCATE THE PROGRAM
1156  5773'           JMP   CHEXN         /INHIBIT PROGRAM RELOCATION

1170  3214
1171  1646
1172  1631
1173  0527
1174  1640
1175  1630
1176  3051
1177  2672
      1200            PAGE

      /
      /RUN THE SELECTED TEST(S) ON THE SELECTED FIELD (STKTST)
      /
1200  0000   TEST,    0
1201  7300            CLA CLL
1202  1064            TAD   STKTST        /UPDATE CDF TEST DATA FIELDS
1203  1141            TAD   K6201
1204  3252            DCA   TDF1
1205  1252            TAD   TDF1
1206  3777'           DCA   TDF2
1207  1777'           TAD   TDF2
1210  3776'           DCA   TDF3
1211  1776'           TAD   TDF3
1212  3775'           DCA   TDF4
1213  3072            DCA   COUNT         /CLEAR ERROR COUNT
1214  1056            TAD   RUNTST
1215  7010            RAR
1216  7630            SZL CLA
1217  4290            JMS   TEST1         /EXECUTE TEST 1
1220  1056            TAD   RUNTST
1221  7012            RTR
1222  7630            SZL CLA
1223  4774'           JMS   TEST2         /EXECUTE TEST 2
1224  1056            TAD   RUNTST
```

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1225  7006            RTL
1226  7630            SZL CLA
1227  4773'           JMS   TEST3         /EXECUTE TEST 3
1230  1056            TAD   RUNTST
1231  7004            RAL
1232  7630            SZL CLA
1233  4772'           JMS   TEST4         /EXECUTE TEST 4
1234  7604            LAS
1235  0024            AND   SW4           /CHANGE STACK LIMITS?
1236  7640            SZA CLA
1237  5771'           JMP   CHEXA         /YES
1240  2152            ISZ   FIVE
1241  5600            JMP I TEST          /NOT 5 MINUTES YET
1242  1153            TAD   MIN5
1243  3152            DCA   FIVE          /RESTORE TIMER
1244  4544            JMS I XMESAG
1245  4543            4543
1246  6500            6500
1247  5600            JMP I TEST

      /TEST 1
      /
      /WRITE THE VALUE OF EACH LOCATION INTO ITSELF AND CHECK
      /
1250  0000   TEST1,   0
1251  3057            DCA   TESTAD        /CLEAR TEST ADDRESS COUNTER
1252  6201   TDF1,    CDF3          /CHANGE TO TEST DATA FIELD
1253  1057   TEST1A,  TAD   TESTAD
1254  3457            DCA I TESTAD        /WRITE MEMORY
1255  2057            ISZ   TESTAD
1256  5253            JMP   TEST1A        /4096 TIMES
1257  1057   TEST1B,  TAD   TESTAD        /READ AND CHECK
1260  7041            CIA
1261  1457            TAD I TESTAD
1262  7640            SZA CLA
1263  5273            JMP   ADDER1        /ADDRESS ERROR
1264  2057   ADDRT1,  ISZ   TESTAD
1265  5257            JMP   TEST1B        /CONTINUE READ AND CHECK
1266  1063            TAD   STKPIN
1267  1141            TAD   K6201
1270  3271            DCA   .+1
1271  6201            CDF0          /CHANGE TO PROGRAM DATA FIELD
1272  5650            JMP I TEST1         /DONE

1273  1057   ADDER1,  TAD   TESTAD
1274  3066            DCA   GDATA         /GOOD
1275  1457            TAD I TESTAD
1276  3065            DCA   BDATA         /BAD
1277  1063            TAD   STKPIN
1300  1141            TAD   K6201
1301  3302            DCA   .+1
1302  6201            CDF0          /CHANGE TO PROGRAM DATA FIELD
1303  4770'           JMS   ERR1          /ADDRESS ERROR TEST1
1304  1064            TAD   STKTST
```

```
        1305  1141          TAD    K6201
        1306  3307          DCA    .+1
        1307  6201          CDF0                    /CHANGE TO TEST DATA FIELD
        1310  5264          JMP    ADDRT1

        1370  2256
        1371  0214
        1372  1514
        1373  1443
        1374  1400
        1375  1516
        1376  1445
        1377  1402
              1400          PAGE


                            /TEST 2
                            /
                            /WRITE THE COMPLEMENT VALUE OF EACH LOCATION INTO ITSELF AND CHECK
                            /
        1400  0000   TEST2, 0
        1401  3057          DCA    TESTAD           /CLEAR TEST ADDRESS COUNTER
        1402  6201   TDF2,  CDF0                    /CHANGE TO TEST DATA FIELD
        1403  1057   TEST2A, TAD   TESTAD
        1404  7040          CMA
        1405  3457          DCA I  TESTAD           /WRITE MEMORY
        1406  2057          ISZ    TESTAD
        1407  5203          JMP    TEST2A           /4096 TIMES
        1410  1057   TEST2B, TAD   TESTAD           /READ AND CHECK
        1411  7001          IAC
        1412  1457          TAD I  TESTAD
        1413  7640          SZA CLA
        1414  5224          JMP    ADDER2           /ADDRESS ERROR
        1415  2057   ADDRT2, ISZ   TESTAD
        1416  5210          JMP    TEST2B           /CONTINUE READ AND CHECK
        1417  1063          TAD    STKPIN
        1420  1141          TAD    K6201
        1421  3222          DCA    .+1
        1422  6201          CDF0                    /CHANGE TO PROGRAM DATA FIELD
        1423  5600          JMP I  TEST2            /DONE

        1424  1057   ADDER2, TAD   TESTAD
        1425  7040          CMA
        1426  3066          DCA    GDATA            /GOOD
        1427  1457          TAD I  TESTAD
        1430  3065          DCA    BDATA            /BAD
        1431  1063          TAD    STKPIN
        1432  1141          TAD    K6201
        1433  3234          DCA    .+1
        1434  6201          CDF0                    /CHANGE TO PROGRAM DATA FIELD
        1435  4777'         JMS    ERR2             /ADDRESS ERROR TEST 2
        1436  1064          TAD    STKTST
        1437  1141          TAD    K6201
        1440  3241          DCA    .+1
        1441  6201          CDF0                    /CHANGE TO TEST DATA FIELD
```

```
        1442  5215          JMP    ADDRT2

                            /TEST 3
                            /
                            /WRITE THE VALUE OF EACH LOCATION INTO ITSELF AND CHECK BACKWARDS
                            /
        1443  0000   TEST3, 0
        1444  3057          DCA    TESTAD           /CLEAR TEST ADDRESS COUNTER
        1445  6201   TDF3,  CDF0                    /CHANGE TO TEST DATA FIELD
        1446  1057   TEST3A, TAD   TESTAD
        1447  1074          TAD    M1
        1450  3057          DCA    TESTAD
        1451  1057          TAD    TESTAD
        1452  3457          DCA I  TESTAD           /WRITE MEMORY
        1453  1057          TAD    TESTAD
        1454  7640          SZA CLA
        1455  5246          JMP    TEST3A           /4096 TIMES
        1456  1057   TEST3B, TAD   TESTAD
        1457  1074          TAD    M1
        1460  3057          DCA    TESTAD
        1461  1057          TAD    TESTAD           /READ AND CHECK
        1462  7041          CIA
        1463  1457          TAD I  TESTAD
        1464  7640          SZA CLA
        1465  5276          JMP    ADDER3           /ADDRESS ERROR
        1466  1057   ADDRT3, TAD   TESTAD
        1467  7640          SZA CLA
        1470  5256          JMP    TEST3B           /CONTINUE READ AND CHECK
        1471  1063          TAD    STKPIN
        1472  1141          TAD    K6201
        1473  3274          DCA    .+1
        1474  6201          CDF0                    /CHANGE TO PROGRAM DATA FIELD
        1475  5643          JMP I  TEST3            /DONE

        1476  1057   ADDER3, TAD   TESTAD
        1477  3066          DCA    GDATA            /GOOD
        1500  1457          TAD I  TESTAD
        1501  3065          DCA    BDATA            /BAD
        1502  1063          TAD    STKPIN
        1503  1141          TAD    K6201
        1504  3305          DCA    .+1
        1505  6201          CDF0                    /CHANGE TO PROGRAM DATA FIELD
        1506  4776'         JMS    ERR3             /ADDRESS ERROR TEST 3
        1507  1064          TAD    STKTST
        1510  1141          TAD    K6201
        1511  3312          DCA    .+1
        1512  6201          CDF0                    /CHANGE TO TEST DATA FIELD
        1513  5266          JMP    ADDRT3
                            /TEST 4
                            /
                            /WRITE THE COMPLEMENT VALUE OF EACH LOCATION INTO ITSELF
                            /AND CHECK BACKWARDS
                            /
        1514  1000   TEST4, 0
        1515  3057          DCA    TESTAD           /CLEAR TEST ADDRESS COUNTER
```

```
1516  6201   TDF4,   CDF0                    /CHANGE TO TEST DATA FIELD
1517  1057   TEST4A, TAD     TESTAD
1520  1074           TAD     M1
1521  3057           DCA     TESTAD
1522  1057           TAD     TESTAD
1523  7040           CMA
1524  3457           DCA I   TESTAD          /WRITE MEMORY
1525  1057           TAD     TESTAD
1526  7640           SZA CLA
1527  5517           JMP     TEST4A          /4096 TIMES
1530  1057   TEST4B, TAD     TESTAD
1531  1074           TAD     M1
1532  3057           DCA     TESTAD
1533  1057           TAD     TESTAD          /READ AND CHECK
1534  7001           IAC
1535  1457           TAD I   TESTAD
1536  7640           SZA CLA
1537  5550           JMP     ADDER4          /ADDRESS ERROR
1540  1057   ADDRT4, TAD     TESTAD
1541  7640           SZA CLA
1542  5530           JMP     TEST4B          /CONTINUE READ AND CHECK
1543  1063           TAD     STKPIN
1544  1141           TAD     K6201
1545  3346           DCA     .+1
1546  6201           CDF0                    /CHANGE TO PROGRAM DATA FIELD
1547  5714           JMP I   TEST4           /DONE

1550  1057   ADDER4, TAD     TESTAD
1551  7040           CMA
1552  3066           DCA     GDATA           /GOOD
1553  1457           TAD I   TESTAD
1554  3065           DCA     BDATA           /BAD
1555  1063           TAD     STKPIN
1556  1141           TAD     K6201
1557  3360           DCA     .+1
1560  6201           CDF0                    /CHANGE TO PROGRAM DATA FIELD
1561  4775'          JMS     ERR4            /ADDRESS ERROR TEST 4
1562  1064           TAD     STKTST
1563  1141           TAD     K6201
1564  3365           DCA     .+1
1565  6201           CDF0                    /CHANGE TO TEST DATA FIELD
1566  5340           JMP     ADDRT4

1575  2416
1576  2400
1577  2342
      1600           PAGE


             /
             /SETUP 5 MINUTE TIMER & TEST SELECTED TO RUN
             /
1600  7200   RUN0,   CLA                     /RUN ALL TESTS
1601  1154           TAD     MIN50
1602  3153           DCA     MIN5
```

```
1603  1133           TAD     K6003
1604  5777'          JMP     EXTAD0
1605  7200   RUN1,   CLA                     /RUN ONLY TEST 1
1606  1155           TAD     MIN51
1607  3153           DCA     MIN5
1610  7001           IAC
1611  5777'          JMP     EXTAD0
1612  7300   RUN2,   CLA CLL                 /RUN ONLY TEST 2
1613  1156           TAD     MIN52
1614  3153           DCA     MIN5
1615  7005           IAC RAL
1616  5777'          JMP     EXTAD0
1617  7200   RUN3,   CLA                     /RUN ONLY TEST 3
1620  1157           TAD     MIN53
1621  3153           DCA     MIN5
1622  7132           STL RTR
1623  5777'          JMP     EXTAD0
1624  7200   RUN4,   CLA                     /RUN ONLY TEST 4
1625  1160           TAD     MIN54
1626  3153           DCA     MIN5
1627  7130           STL RAR
1630  5777'          JMP     EXTAD0
             /
             /RETURN IF PROGRAM IS IN SELECTED STACK
             /RETURN+1 IF PROGRAM IS NOT IN SELECTED STACK
             /
1631  0000   SAME,   0
1632  1063           TAD     STKPIN
1633  7041           CIA
1634  1064           TAD     STKTST
1635  7640           SZA CLA
1636  2231           ISZ     SAME            /PROG NOT IN SEL STACK
1637  5631           JMP I   SAME
             /
             /CHECK PROGRAM RELOCATION SWITCH
             /RETURN IF RELOCATE, RETURN+1 IF INHIBIT RELOCATION
             /
1640  0000   CHKSW3, 0
1641  7604           LAS
1642  0023           AND     SW3
1643  7640           SZA CLA
1644  2240           ISZ     CHKSW3          /INHIBIT RELOCATION
1645  5640           JMP I   CHKSW3
             /
             /RELOCATE THE PROGRAM
             /
1646  0000   RELO,   0
1647  7200           CLA
1650  3072           DCA     COUNT           /CLEAR ERROR COUNTER
1651  3067           DCA     MOVE
1652  1141           TAD     K6201
1653  1063           TAD     STKPIN
1654  3265           DCA     RELO2
1655  1141           TAD     K6201
```

```
1656  1064          TAD     STKTST
1657  3267          DCA     RELO3
1660  1265          TAD     RELO2
1661  3272          DCA     RELO4
1662  1142          TAD     K6203
1663  1064          TAD     STKTST
1664  3303          DCA     RELO5
1665  6201   RELO2, CDF0                    /MOVE FROM DATA FIELD
1666  1467          TAD I   MOVE
1667  6201   RELO3, CDF0                    /MOVE TO DATA FIELD
1670  3467          DCA I   MOVE
1671  1467          TAD I   MOVE
1672  6201   RELO4, CDF0                    /MOVE FROM DATA FIELD
1673  7041          CIA
1674  1467          TAD I   MOVE
1675  7640          SZA CLA
1676  4476'         JMS     ERRM            /MOVE ERROR
1677  2067          ISZ     MOVE
1700  5265          JMP     RELO2
1701  1072          TAD     COUNT
1702  7650          SNA CLA                 /SKIP IF MOVE ERROR
1703  6203   RELO5, CBF0                    /CHANGE TO NEW PROG FIELD
1704  5646          JMP I   RELO
             /
             /INCREMENT CONTROL OF UPPER STACKS NOT TESTED AND/OR
             /STACKS NOT IN THE SYSTEM
             /
1705  0000          0                       /RETURN ADDRESS
1706  2031   ABOVE, ISZ     STACK1
1707  2032          ISZ     STACK2
1710  2033          ISZ     STACK3
1711  2034          ISZ     STACK4
1712  2035          ISZ     STACK5
1713  2036          ISZ     STACK6
1714  2037          ISZ     STACK7
1715  5705          JMP I   ABOVE-1
             /
             /INCREMENT CONTROL OF LOWER STACKS NOT TESTED
             /
1716  2036          ISZ     STACK6
1717  2035          ISZ     STACK5
1720  2034          ISZ     STACK4
1721  2033          ISZ     STACK3
1722  2032          ISZ     STACK2
1723  2031          ISZ     STACK1
1724  2033          ISZ     STACK0
1725  5726   BELOW, JMP I   .+1
1726  0000          0
             /
             /CLEAR ALL STACKS OR STACKS TO BE TESTED
             /
1727  3037          DCA     STACK7
1730  3036          DCA     STACK6
1731  3035          DCA     STACK5
```

```
1732  3034          DCA     STACK4
1733  3033          DCA     STACK3
1734  3032          DCA     STACK2
1735  3031          DCA     STACK1
1736  3030   DOWN,  DCA     STACK0
1737  5740          JMP I   .+1
1740  0000          0                       /RETURN ADDRESS
1741  5327          JMP     .-12            /CLEAR ALL STACK SELECTION CONTROLS
             /
             /OBTAIN -SSL (MINUS STARTING STACK LIMIT)
             /
1742  0000   MSSL,  0
1743  1061          TAD     SSL
1744  7112          CLL RTR
1745  7010          RAR
1746  7041          CIA
1747  5742          JMP I   MSSL

1776  2434
1777  0205
             2000          PAGE


             /
             /CONVERT OCTAL NUMBERS FOR TYPEOUT
             /
2000  0000   SIXTY, 0
2001  7300          CLA CLL
2002  1630          TAD I   SIXTY           /GET ADDRESS OF OPERAND
2003  3237          DCA     SIXTY0
2004  2230          ISZ     SIXTY
2005  1630          TAD I   SIXTY           /GET STORAGE ADDRESS
2006  3240          DCA     SIXTY1
2007  2230          ISZ     SIXTY           /CORRECT RETURN ADDRESS
2010  1111          TAD     K77
2011  7040          CMA                     /AC=7700
2012  0637          AND I   SIXTY0          /AND OPERAND FIRST 2 DIGITS
2013  7112          CLL RTR
2014  7012          RTR
2015  7012          RTR                     /POSITION FIRST 2 DIGITS
2016  4224          JMS     CNV             /CONVERT DIGITS FOR TYPEOUT
2017  2240          ISZ     SIXTY1          /INCREMENT STORAGE ADDRESS
2020  1111          TAD     K77
2021  0637          AND I   SIXTY0          /AND OPERAND SECOND 2 DIGITS
2022  4224          JMS     CNV             /CONVERT DIGITS FOR TYPEOUT
2023  5600          JMP I   SIXTY
2024  0000   CNV,   0
2025  3241          DCA     SIXTY2          /SAVE DIGITS
2026  1241          TAD     SIXTY2
2027  7106          CLL RTL
2030  7004          RAL
2031  0130          AND     K707            /AND LEFT DIGIT
2032  1241          TAD     SIXTY2
2033  0130          AND     K707            /AND RIGHT DIGIT
2034  1134          TAD     K6060
2035  3640          DCA I   SIXTY1          /STORE CONVERTED DIGITS
```

```
2036 5624              JMP I    CNV

2037 3000    SIXTY0,   0                /ADDRESS OF OPERAND
2040 3000    SIXTY1,   0                /STORAGE ADDRESS
2041 3000    SIXTY2,   0                /TEMPORARY STORAGE

             /
             /TYPEOUT CHARACTER IN AC AND RETURN
             /
2042 0000    TYPE,     0
2043 6046              TLS               /TRANSMIT CHARACTER
2044 6041              TSF
2045 5244              JMP      .-1      /WAIT FOR FLAG
2046 7330              CLA CLL
2047 5642              JMP I    TYPE

             /
             /TELETYPE OUTPUT ROUTINE WITH BELL
             /
2050 0000    MESAGE,   0
2051 7240              STA
2052 1250              TAD      MESAGE   /FIRST WORD -1
2053 3010              DCA      10
2054 1410              TAD I    10
2055 3266              DCA      MSRGHT
2056 1266              TAD      MSRGHT
2057 7112              CLL RTR
2060 7012              RTR
2061 7012              RTR               /POSITION FIRST CHARACTER
2062 4267              JMS      TYPECH   /TYPEOUT FIRST CHARACTER
2063 1266              TAD      MSRGHT
2064 4267              JMS      TYPECH   /TYPEOUT SECOND CHARACTER
2065 5254              JMP      MESAGE+4 /CONTINUE TYPING
2066 0000    MSRGHT,   0
2067 0000    TYPECH,   0
2070 0111              AND      K77
2071 7450              SNA               /IS IT END OF MESSAGE?
2072 5410              JMP I    10       /RETURN TO PROGRAM
2073 1100              TAD      M34      /SUBTRACT 34
2074 7440              SZA
2075 5300              JMP      .+3
2076 1112              TAD      K207     /CODE IS BELL
2077 5320              JMP      MTP
2100 1077              TAD      M4       /SUBTRACT 4
2101 7500              SMA               /CODE LESS THAN 40?
2102 5305              JMP      .+3      /NO
2103 1127              TAD      K340     /YES, ADD 300, CODE IS ALPHA
2104 5320              JMP      MTP
2105 1076              TAD      M3       /SUBTRACT 3
2106 7440              SZA
2107 5312              JMP      .+3
2110 1113              TAD      K212     /CODE IS LINE FEED
2111 5320              JMP      MTP
2112 1075              TAD      M2       /SUBTRACT 2
2113 7440              SZA
```

```
2114 5317              JMP      .+3
2115 1114              TAD      K215     /CODE IS CR
2116 7410              SKP
2117 1116              TAD      K245     /ADD 200 TO OTHER CODES >40
2120 4242    MTP,      JMS      TYPE     /TYPEOUT CHARACTER IN AC
2121 5667              JMP I    TYPECH
     2200              PAGE

             /
             /ERROR ROUTINE (BELL ON ERROR HAS PRIORITY)
             /
2200 0000    RETURN,   0                /PROGRAM RETURN ADDRESS
2201 6002    CODERR,   IOF
2202 7604              LAS               /CHECK FOR BELL ON ERROR
2203 0022              AND      SW2
2204 7650              SNA CLA
2205 5211              JMP      .+4

2206 1112    RBELL,    TAD      K207     /BELL CODE
2207 4543              JMS I    XTYPE    /RING BELL
2210 5600              JMP I    RETURN
2211 7604              LAS               /CHECK FOR INHIBIT TYPEOUT
2212 0021              AND      SW1
2213 7640              SZA CLA
2214 5242              JMP      STOP     /INHIBIT TYPEOUT
2215 6224              RIF               /READ INST FIELD
2216 7012              RTR
2217 7010              RAR
2220 0101              AND      K7
2221 1131              TAD      K4060
2222 3233              DCA      ERROR0
2223 1200              TAD      RETURN
2224 1074              TAD      M1
2225 3073              DCA      ERRLOC
2226 4545              JMS I    XSIXTY
2227 0073              ERRLOC
2230 2234              ERROR1
2231 4544              JMS I    XMESAG   /TYPEOUT ERROR LOCATION
2232 4543              4543
2233 0000    ERROR0,   0                /FIELD
2234 0000    ERROR1,   0                /PROGRAM LOCATION OF ERROR JMS
2235 0000              0
2236 4040              4040
2237 0000              0000
2240 5641              JMP I    .+1      /TYPEOUT ERROR
2241 0000    ADDER,    0                /ADDRESS OF ERROR TYPEOUT
2242 7604    STOP,     LAS               /HALT AFTER ERROR
2243 0020              AND      SW0
2244 7650              SNA CLA
2245 5251              JMP      LIMIT    /INHIBIT ERROR HALT
2246 1200              TAD      RETURN
2247 1074              TAD      M1
2250 7402              HLT               /HALT WITH AC=ERROR LOC
2251 7604    LIMIT,    LAS
2252 0024              AND      SW4      /CHANGE STACK LIMITS?
```

```
                2253   7640          SZA CLA
                2254   5777'         JMP        CHEXA          /YES
                2255   5600          JMP I      RETURN         /NO


                       /
                       /ADDRESS ERROR TEST 1
                       /
                2256   0000   ERR1,  3
                2257   2072          ISZ        COUNT          /ADDRESS ERROR OCCURRED
                2260   7410          SKP
                2261   5257          JMP        .-2
                2262   7200          CLA
                2263   1256          TAD        ERR1
                2264   3547          DCA I      XRETUR         /STORE RETURN ADDRESS
                2265   1270          TAD        .+3
                2266   3551          DCA I      XADDER         /STORE ERROR TYPEOUT ADDRESS
                2267   7410          SKP
                2270   2307          PERR1
                2271   1135          TAD        K6100
                2272   3340          DCA        Z24            /TEST 1
                2273   7604   ERR1A, LAS
                2274   0022          AND        SW2            /BELL ON ERROR?
                2275   7640          SZA CLA
                2276   5206          JMP        RBELL          /YES
                2277   7604          LAS
                2300   0021          AND        SW1            /INHIBIT ERROR TYPEOUT?
                2301   7640          SZA CLA
                2302   5550          JMP I      XSTOP          /YES
                2303   2053          ISZ        HEAD1
                2304   7410          SKP
                2305   4776'         JMS        HEAD12         /TYPEOUT ERROR HEADING
                2306   5546          JMP I      XCODER         /GO TO ERROR ROUTINE

                2307   1064   PERR1, TAD        STKTST
                2310   7112          CLL RTR
                2311   7010          RAR
                2312   1131          TAD        K4060
                2313   3326          DCA        Z20            /FIELD OF ERROR
                2314   4545          JMS I      XSIXTY
                2315   0057          TESTAD
                2316   2327          Z21            /FAILING ADDRESS
                2317   4545          JMS I      XSIXTY
                2320   0066          GDATA
                2321   2332          Z22            /GOOD
                2322   4545          JMS I      XSIXTY
                2323   0065          BDATA
                2324   2335          Z23            /BAD
                2325   4544          JMS I      XMESAG
                2326   0000   Z20,   0
                2327   0000   Z21,   0
                2330   0000          0              /FAILING ADDRESS
                2331   4040          4040
                2332   0000   Z22,   0
                2333   0000          0              /GOOD
```

```
                2334   4040          4040
                2335   0000   Z23,   0
                2336   1040          0              /BAD
                2337   4040          4040
                2340   0000   Z24,   0              /TEST
                2341   5550          JMP I      XSTOP

                       /
                       /ADDRESS ERROR TEST 2
```

```
                        /
    2342  0030   ERR2,   0
    2343  2072           ISZ      COUNT          /ADDRESS ERROR OCCURRED
    2344  7410           SKP
    2345  5343           JMP      .-2
    2346  7200           CLA
    2347  1342           TAD      ERR2
    2350  3547           DCA I    XRETUR         /STORE RETURN ADDRESS
    2351  1354           TAD      .+3
    2352  3551           DCA I    XADDER         /STORE ERROR TYPEOUT ADDRESS
    2353  7410           SKP
    2354  2307           PERR1
    2355  1136           TAD      K6200
    2356  3540           DCA      Z24            /TEST 2
    2357  5273           JMP      ERR1A

    2376  2477
    2377  0214
          2400           PAGE

                        /
                        /ADDRESS ERROR TEST 3
                        /
    2400  0000   ERR3,   0
    2401  2072           ISZ      COUNT          /ADDRESS ERROR OCCURRED
    2402  7410           SKP
    2403  5201           JMP      .-2
    2404  7200           CLA
    2405  1200           TAD      ERR3
    2406  3547           DCA I    XRETUR         /STORE RETURN ADDRESS
    2407  1212           TAD      .+3
    2410  3551           DCA I    XADDER         /STORE ERROR TYPEOUT ADDRESS
    2411  7410           SKP
    2412  2307           PERR1
    2413  1137           TAD      K6300
    2414  3777'          DCA      Z24            /TEST 3
    2415  5776'          JMP      ERR1A

                        /
                        /ADDRESS ERROR TEST 4
                        /
    2416  0000   ERR4,   0
    2417  2072           ISZ      COUNT          /ADDRESS ERROR OCCURRED
    2420  7410           SKP
    2421  5217           JMP      .-2
    2422  7200           CLA
    2423  1216           TAD      ERR4
    2424  3547           DCA I    XRETUR         /STORE RETURN ADDRESS
    2425  1230           TAD      .+3
    2426  3551           DCA I    XADDER         /STORE ERROR TYPEOUT ADDRESS
    2427  7410           SKP
    2430  2307           PERR1
    2431  1140           TAD      K6400
    2432  3777'          DCA      Z24            /TEST 4
    2433  5776'          JMP      ERR1A
```

```
                        /
                        /RELOCATION MOVE ERROR OCCURRED
                        /
    2434  0000   ERRM,   0
    2435  2072           ISZ      COUNT          /RELO ERROR OCCURRED
    2436  7410           SKP
    2437  5235           JMP      .-2
    2440  7200           CLA
    2441  1234           TAD      ERRM
    2442  3547           DCA I    XRETUR         /STORE RETURN ADDRESS
    2443  1246           TAD      .+3
    2444  3551           DCA I    XADDER         /STORE ERROR TYPEOUT ADDRESS
    2445  5546           JMP I    XCODER
    2446  2447           PERRM

    2447  1064   PERRM,  TAD      STKTST
    2450  7112           CLL RTR
    2451  7010           RAR
    2452  1131           TAD      K4060
    2453  3270           DCA      Z10
    2454  4545           JMS I    XSIXTY
    2455  0067           MOVE
    2456  2471           Z11
    2457  4544           JMS I    XMESAG
    2460  2205           TEXT                    "RELO ERR AT "
    2461  1417
    2462  4005
    2463  2222
    2464  4001
    2465  2440
    2466  0000
    2467  4544           JMS I    XMESAG
    2470  0000   Z10,    0
    2471  0000   Z11,    0
    2472  0000           0
    2473  0000           0
    2474  7240           STA
    2475  3053           DCA      HEAD1
    2476  5550           JMP I    XSTOP

                        /
                        /TYPEOUT TEST 1 OR 2 ERROR HEADING
                        /
    2477  0000   HEAD12, 0
    2500  4544           JMS I    XMESAG
    2501  4543           TEXT     "X#PR LOC   ADDR   GOOD  BAD  TEST"
    2502  2022
    2503  4014
    2504  1703
    2505  4040
    2506  4031
    2507  0404
    2510  2240
    2511  4040
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2512   0717
2513   1704
2514   4040
2515   3201
2516   0440
2517   4024
2520   0523
2521   2400
2522   5677           JMP I   HEAD12

2576   2273
2577   2340
       2600           PAGE

                /
                /TYPEOUT PROGRAM TITLE
                /
2600   0030   TITLE,  0
2601   4544           JMS I   XMESAG
2602   4543           TEXT            "X##EA8-E EXT MEM ADDR TEST#"
2603   4335
2604   0170
2605   5505
2606   4005
2607   3024
2610   4015
2611   1515
2612   4001
2613   0404
2614   2240
2615   2435
2616   2324
2617   4300
2620   5600           JMP I   TITLE

                /
                /TYPEOUT TO SET SWITCHES
                /
2621   0000   SETSW,  0
2622   4544           JMS I   XMESAG
2623   4543           TEXT            "X#SETUP SR & CONT"
2624   2335
2625   2425
2626   2040
2627   2322
2630   4046
2631   4003
2632   1716
2633   2400
2634   7402           HLT                     /WAIT FOR SWITCH SETTING
2635   5621           JMP I   SETSW
                /
                /TYPEOUT 'NO PROGRAM RELOCATION WILL OCCUR'
                /
2636   0000   PNOREL, 0
```

```
2637   4544           JMS I   XMESAG
2640   4543           TEXT            "X#NO RELOCATION, PROG IN STACK "
2641   1617
2642   4022
2643   4514
2644   1703
2645   1124
2646   1117
2647   1654
2650   4020
2651   2217
2652   0740
2653   1116
2654   4023
2655   2431
2656   0313
2657   4010
2660   6224           RIF
2661   7106           CLL RTL
2662   7004           RAL
2663   1132           TAD     K6000
2664   3266           DCA     Z8
2665   4544           JMS I   XMESAG
2666   0030   Z8,     0
2667   7240           STA
2670   3053           DCA     HEAD1           /RESET ERROR HEADING
2671   5636           JMP I   PNOREL
                /
                /PROGRAM RELOCATION WILL OCCUR
                /
2672   0000   PREL,   0
2673   4544           JMS I   XMESAG
2674   4543           TEXT            "X#PROG WILL RELOCATE"
2675   2022
2676   1707
2677   4027
2700   1114
2701   1440
2702   2235
2703   1417
2704   0301
2705   2405
2706   0000
2707   7240           STA
2710   3053           DCA     HEAD1           /RESET ERROR HEADING
2711   5672           JMP I   PREL
                /
                /TYPEOUT 'PROGRAM IS IN SELECTED FIELD'
                /
2712   4544   PINF,   JMS I   XMESAG
2713   4543           TEXT            "X#PROGRAM IN SELECTED FIELD"
2714   2022
2715   1717
2716   2231
2717   1540
```

```
2720  1116
2721  4023
2722  3514
2723  1503
2724  2405
2725  0440
2726  0611
2727  3514
2730  0400
2731  5777'          JMP     CHEXA           /SETUP SWITCHES AGAIN
                /
                /TYPEOUT 'NONE' FOR NO LEGAL STACK SELECTION
                /
2732  4544   NOSTK,   JMS I   XMESAG
2733  1617          TEXT    "NONE"
2734  1605
2735  0000
2736  5777'          JMP     CHEXA


                /
                /FIND HIGHEST STACK NUMBER IN THIS SYSTEM
                /
2737  0000   HIGHST,  0
2740  7300          CLA CLL
2741  3060          DCA     KBINT           /CLEAR HIGH STACK COUNTER
2742  6211          CDF1
2743  4776'          JMS     CSS             /CHECK FOR FIELD 1
2744  6221          CDF2
2745  4776'          JMS     CSS             /CHECK FOR FIELD 2
2746  6231          CDF3
2747  4776'          JMS     CSS             /CHECK FOR FIELD 3
2750  6241          CDF4
2751  4776'          JMS     CSS             /CHECK FOR FIELD 4
2752  6251          CDF5
2753  4776'          JMS     CSS             /CHECK FOR FIELD 5
2754  6261          CDF6
2755  4776'          JMS     CSS             /CHECK FOR FIELD 6
2756  6271          CDF7
2757  4776'          JMS     CSS             /CHECK FOR FIELD 7
2760  5737   KHIGH,   JMP I   HIGHST
2776  3000
2777  0214
      3000          PAGE
                /
                /CHECK IF SELECTED STACK IS IN SYSTEM
                /
3000  0000   CSS,     0
3001  7300          CLA CLL
3002  6224          RIF
3003  1141          TAD     K6201
3004  3210          DCA     CSSB
3005  1074          TAD     H1
3006  3615          DCA I   CHECK
```

```
3007  1615          TAD I   CHECK
3010  6201   CSSB,    CDF     00              /PROGRAM DATA FIELD
3011  7650          SNA CLA                  /SKIP IF STACK IS IN SYSTEM
3012  5777'          JMP     KHIGH
3013  2060          ISZ     KBINT           /INCREMENT STACK COUNTER
3014  5600          JMP I   CSS

3015  3016   CHECK,   CHECK0
3016  0000   CHECK0,  0


                /
                /TYPEOUT NUMBER OF STACKS IN SYSTEM
                /
3017  0000   TSTSYS,  0
3020  4544          JMS I XMESAG
3021  4543          4543
3022  0000          0000
3023  1060          TAD     KBINT
3024  7001          IAC
3025  4543          JMS I   XTYPE           /TYPEOUT NUMBER
3026  4544          JMS I   XMESAG
3027  4023          TEXT        " STACKS IN THIS SYSTEM"
3030  2401
3031  0313
3032  2340
3033  1116
3034  4024
3035  1011
3036  2340
3037  2331
3040  2324
3041  0515
3042  0000
3043  5617          JMP I   TSTSYS


                /
                /TYPEOUT CHARACTER IN THE AC AND A SPACE
                /
3044  0000   TYPESP,  0
3045  4543          JMS I   XTYPE           /TYPEOUT CHAR IN AC
3046  1115          TAD     K240
3047  4543          JMS I   XTYPE           /TYPE A SPACE
3050  5644          JMP I   TYPESP
                /
                /RESTORE STACKS FOR RELOCATION
                /
3051  0000   RESTK,   0
3052  7200          CLA
3053  1030          TAD     STACK0
3054  3040          DCA     STK0
3055  1031          TAD     STACK1
3056  3041          DCA     STK1
3057  1032          TAD     STACK2
```

```
3060   3042          DCA    STK2
3061   1033          TAD    STACK3
3062   3043          DCA    STK3
3063   1034          TAD    STACK4
3064   3044          DCA    STK4
3065   1035          TAD    STACK5
3066   3045          DCA    STK5
3067   1036          TAD    STACK6
3070   3046          DCA    STK6
3071   1037          TAD    STACK7
3072   3047          DCA    STK7
3073   5651          JMP I  RESTK


              /
              /TYPEOUT STACKS SELECTED FOR TESTING
              /
3074   0000   TOSEL,  0
3075   4544          JMS I  XMESAG
3076   4543          TEXT           "%#STACKS SEL'D ARE "
3077   2324
3100   3103
3101   1323
3102   4023
3103   0514
3104   4704
3105   4001
3106   2205
3107   4000
3110   1037          TAD    STACK7
3111   7640          SZA CLA
3112   5315          JMP    .+3
3113   1126          TAD    K267
3114   4244          JMS    TYPESP      /STACK 7 IS SELECTED
3115   1036          TAD    STACK6
3116   7640          SZA CLA
3117   5322          JMP    .+3
3120   1125          TAD    K266
3121   4244          JMS    TYPESP      /STACK 6 IS SELECTED
3122   1035          TAD    STACK5
3123   7640          SZA CLA
3124   5327          JMP    .+3
3125   1124          TAD    K265
3126   4244          JMS    TYPESP      /STACK 5 IS SELECTED
3127   1034          TAD    STACK4
3130   7640          SZA CLA
3131   5334          JMP    .+3
3132   1123          TAD    K264
3133   4244          JMS    TYPESP      /STACK 4 IS SELECTED
3134   1033          TAD    STACK3
3135   7640          SZA CLA
3136   5341          JMP    .+3
3137   1122          TAD    K263
3140   4244          JMS    TYPESP      /STACK 3 IS SELECTED
3141   1032          TAD    STACK2
```

```
3142   7640          SZA CLA
3143   5346          JMP    .+3
3144   1121          TAD    K262
3145   4244          JMS    TYPESP      /STACK 2 IS SELECTED
3146   1031          TAD    STACK1
3147   7640          SZA CLA
3150   5353          JMP    .+3
3151   1120          TAD    K261
3152   4244          JMS    TYPESP      /STACK 1 IS SELECTED
3153   1030          TAD    STACK0
3154   7640          SZA CLA
3155   5360          JMP    .+3
3156   1117          TAD    K260
3157   4244          JMS    TYPESP      /STACK 0 IS SELECTED
3160   5674          JMP I  TOSEL


              /
              /TWO SPECIAL SCOPE LOOPS
              /
3177   2760
       3400   *3400
3400   7604   LOOP1,  LAS                /SWITCH ADDRESS
3401   3206          DCA    SWAD
3402   1206          TAD    SWAD
3403   3606          DCA I  SWAD
3404   1606          TAD I  SWAD
3405   5200          JMP    LOOP1

3406   0000   SWAD,   0

       3600   *3600
3600   7604   LOOP2,  LAS                /READ LOWER LIMIT
3601   3224          DCA    FIRST
3602   7402          HLT
3603   7604          LAS                /READ UPPER LIMIT
3604   3225          DCA    LAST
3605   1224   LOOP2A, TAD    FIRST
3606   3226          DCA    SWAD2
3607   1226   LOOP2B, TAD    SWAD2
3610   3626          DCA I  SWAD2
3611   1626          TAD I  SWAD2
3612   7200          CLA
3613   1226          TAD    SWAD2
3614   7041          CIA
3615   1225          TAD    LAST
3616   7650          SNA CLA
3617   5205          JMP    LOOP2A
3620   2226          ISZ    SWAD2
3621   5207          JMP    LOOP2B
3622   7402          HLT                /HALT RESULTED IN ILLEGAL LIMITS
3623   5200          JMP    LOOP2

3624   0000   FIRST,  0
```

```
3625   0000    LAST,   0
3626   0000    SWA00,  0

               $
```

```
0000   11110000  00100000  11111111  11111111  11111111  11111111  11111111  11111111
0100   11111111  11111111  11111111  11111111  11111111  11111111  10000000  00000000

0200   11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
0300   11111111  11111111  11111111  11100000  00000000  00000111  11111111  11111111

0400   11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
0500   11111111  11111111  11111111  11111111  11110000  00000000  00000111  11111111

0600   11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
0700   11111111  11111111  11111111  11111111  11111111  11111111  11100000  00000011

1000   11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1100   11111111  11111111  11111111  11111111  11111111  11111110  00000000  11111111

1200   11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1300   11111111  10000000  00000000  00000000  00000000  00000000  00000000  11111111

1400   11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1500   11111111  11111111  11111111  11111111  11111111  11111111  11111110  00000111

1600   11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1700   11111111  11111111  11111111  11111111  11111111  00000000  00000000  00000011

2000   11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2100   11111111  11111111  11000000  00000000  00000000  00000000  00000000  00000000

2200   11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2300   11111111  11111111  11111111  11111111  11111111  11111111  00000000  00000011

2400   11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2500   11111111  11111111  11100000  00000000  00000000  00000000  00000000  00000011

2600   11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2700   11111111  11111111  11111111  11111111  11111111  11111111  10000000  00000011

3000   11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
3100   11111111  11111111  11111111  11111111  11111111  11111111  10000000  00000001

3200
3300

3400   11111110  00000000  00000000  00000000  00000000  00000000  00000000  00000000
3500   00000000  00000000  00000000  00000000  00000000  00000000  00000000  00000000

3600   11111111  11111111  11111110  00000000  00000000  00000000  00000000  00000000
3700   00000000  00000000  00000000  00000000  00000000  00000000  00000000  00000000
```

```
4000
4100

4200
4300

4400
4500

4600
4700

5000
5100

5200
5300

5400
5500

5600
5700

6000
6100

6200
6300

6400
6500

6600
6700

7000
7100

7200
7300

7400
7500

7600
7700
```

ABOVE	1736	CHEXN9	0761	K215	0114	MIN51	0155
ADDER	2241	CHEXO	1000	K240	0115	MIN52	0156
ADDER1	1273	CHEXO0	1024	K245	0116	MIN53	0157
ADDER2	1424	CHEXO1	1040	K260	0117	MIN54	0160
ADDER3	1476	CHEXO2	1054	K261	0120	MOVE	0067
ADDER4	1550	CHEXO3	1070	K262	0121	MSRGHT	2066
ADDRT1	1264	CHEXO4	1104	K263	0122	MSSL	1742
ADDRT2	1415	CHEXO5	1120	K264	0123	MTP	2120
ADDRT3	1466	CHEXO6	1134	K265	0124	NORELO	0050
ADDRT4	1540	CHEXO7	1144	K266	0125	NOSTK	2732
BDATA	0065	CHEXOA	1006	K267	0126	PERR1	2307
BELOW	1725	CHKSW3	1643	K30	0104	PERRM	2447
CBF0	6203	CIF0	6202	K340	0127	PINF	2712
CBF1	6213	CIF1	6212	K40	0105	PNOREL	2636
CBF2	6223	CIF2	6222	K4060	0131	PREL	2672
CBF3	6233	CIF3	6232	K50	0106	RBELL	2296
CBF4	6243	CIF4	6242	K60	0107	RDF	6214
CBF5	6253	CIF5	6252	K6000	0132	RELO	1646
CBF6	6263	CIF6	6262	K6003	0133	RELO2	1665
CBF7	6273	CIF7	6272	K6060	0134	RELC3	1667
CDF0	6211	CINT	6204	K6100	0135	RELO4	1672
CDF1	6211	CNV	2024	K6200	0136	RELO5	1733
CDF2	6221	CODERR	2201	K6201	0141	RESTK	3051
CDF3	6231	COUNT	0072	K6203	0142	RETURN	2200
CDF4	6241	CSS	3000	K6300	0137	RIB	6234
CDF5	6251	CSSB	3010	K6400	0140	RIF	6224
CDF6	6261	CUF	6264	K7	0101	RMF	6244
CDF7	6271	DOWN	1736	K70	0110	RTF	6005
CHECK	3015	ERR1	2256	K707	0130	RUN0	1600
CHECK0	3016	ERR1A	2273	K77	0111	RUN1	1605
CHEXA	0214	ERR2	2342	KABOVE	0051	RUN2	1612
CHEXB	0253	ERR3	2400	KBELOW	0052	RUN3	1617
CHEXC	0262	ERR4	2416	KBINT	0050	RUN4	1624
CHEXC1	1274	ERRLOC	0073	KDOWN	0070	RUNTST	0056
CHEXD	1312	ERRM	2434	KHIGH	2760	SAME	1631
CHEXD1	1310	ERROR0	2233	LAST	3625	SETSW	2621
CHEXE	0317	ERROR1	2234	LEGAL	0410	SINT	6254
CHEXE2	0400	ESL	0062	LEGAL0	0055	SIXTY	2000
CHEXM	0476	EXTAD	0200	LEGALA	0463	SIXTY0	2037
CHEXM1	0513	EXTAD0	0205	LIMIT	2251	SIXTY1	2040
CHEXM2	0510	FIRST	3624	LOOP1	3400	SIXTY2	2041
CHEXM3	0515	FIVE	0152	LOOP2	3600	SSL	0061
CHEXN	0527	GDATA	0066	LOOP2A	3605	STACK0	0032
CHEXN0	0530	GTF	6004	LOOP2B	3607	STACK1	0031
CHEXN1	0030	HEAD1	0053	M1	0074	STACK2	0032
CHEXN2	0622	HEAD12	2477	M2	0075	STACK3	0033
CHEXN3	0640	HIGHST	2737	M3	0076	STACK4	0034
CHEXN4	0656	INSAME	0054	M34	0100	STACK5	0035
CHEXN5	0674	K10	0102	M4	0077	STACK6	0036
CHEXN6	0712	K20	0103	MESAGE	2050	STACK7	0037
CHEXN7	0730	K207	0112	MIN5	0153	STK0	0040
CHEXN8	0746	K212	0113	MIN50	0154	STK1	0041

```
STK2      0042      Z10      2470
STK3      0043      Z11      2471
STK4      0044      Z20      2326
STK5      0045      Z21      2327
STK6      0046      Z22      2332
STK7      0047      Z23      2335
STKPIN    0063      Z24      2340
STKTST    0064      Z8       2666
STOP      2242
SUF       6274
SW0       0020
SW1       0021
SW2       0022
SW3       0023
SW4       0024
SW5       0025
SW68      0026
SW911     0027
SWAD      3416
SWAD0     3626
TOF1      1252
TOF2      1402
TOF3      1445
TOF4      1516
TEMP      0071
TEST      1200
TEST1     1250
TEST1A    1253
TEST1B    1257
TEST2     1400
TEST2A    1403
TEST2B    1410
TEST3     1443
TEST3A    1446
TEST3B    1456
TEST4     1514
TEST4A    1517
TEST4B    1530
TESTAD    0057
TITLE     2630
TJSEL     3074
TSTSYS    3017
TYPE      2042
TYPECH    2067
TYPESP    3044
X4NDER    0151
XCODER    1146
XMESAG    1144
XRETUR    0147
XSIXTY    0145
XSTOP     0150
XTYPE     0143
```

ERRORS DETECTED: 0

LINKS GENERATED: 133

RUN-TIME: 8 SECONDS

2K CORE USED