IDENTIFICATION

PRODUCT CODE:	MAINDEC-08-DHKMA-A-D -C-PB
PRODUCT NAME:	PDP-8E EXTENDED MEMORY DATA CHECKERBOARD TEST
DATE CREATED:	10 APRIL 1972
MAINTAINER:	DIAGNOSTIC GROUP
AUTHOR:	VERNON FREY
NOTE:	REPLACES MAINDEC-8E-D1BC-D

3/3/77 & + write up

COPYRIGHT © 1972
DIGITAL EQUIPMENT CORPORATION

1. ABSTRACT

The PDP-8E Extended Memory Data & Checkerboard Test is designed to detect memory failure due to sense-line noise under worst case conditions. The four worst case patterns provided will generate worst case noise conditions in all standard and specially purchased PDP-8E core stacks, and will test systems equipped with from 8K to 32K words of core memory. The All Ø's and All 1's patterns are provided to identify basic memory failures. Automatic program relocation is provided in order to test all memory fields from each memory field. Teletype printouts are provided for error identification, and the operator is given a degree of control over the program by various switch register settings.

2. REQUIREMENTS

2.1 Equipment

A PDP-8E Computer equipped with at least 8K of core memory.

2.2 Storage

The program occupies core locations ØØØØ to 4777 and 6ØØØ to 7177 of the present field.

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 field.

4. OPERATING PROCEDURE

To start the program:

A. Set the SR to the IF and DF of the field that contains the program.

B. Press key EXTD ADDR LOAD.

C. Set the SR equal to Ø2ØØ.

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	Ø (down)	1 (up)
SRØØ	continue after error	halt after error
SRØ1	typeout errors	inhibit error typeouts
SRØ2	normal	TTY bell on error
SRØ3	relocate program	inhibit program relocation
SRØ4	normal	change field limits
SRØ5	normal	halt after current test
SRØ6-Ø8	starting field limit (Ø-7)	
SRØ9-11	ending field limit (Ø-7)	

F. Press key CONT.

4.1 Detailed SR Explanation

SRØØ-Ø2 SRØ2, if set, will ring the TTY bell once for each error. SRØØ and SRØ1 have no effect with SRØ2 set.

SRØ3 SRØ3 may be set or reset at any time and the program will act accordingly.

SRØ4 SRØ4 allows the operator to change the field limits as defined by SRØ6-11.

SRØ5 SRØ5 is normal halt for program.

SRØ6-Ø8 These switches define the starting field limit (normally Ø).

SRØ9-11 These switches define the ending field limit (normally 7).

4.2 Example of selecting fields for test

Example 1: SR = ØØØ7, 28K system
Fields selected for testing are 6, 5, 4, 3, 2, 1, Ø.

Example 2: SR = ØØØ4, 28K System
Fields selected for testing are 4, 3, 2, 1, Ø.

Example 3: SR = ØØ22, 28K System
Fields selected for testing are 2 (no relocation will occur).

Example 4: SR = ØØ41, 28K System
Fields selected for testing are 6, 5, 4, 1, Ø.

Note 1: Fields not in the system are automatically de-selected as in Example 1. Field 7 is not present, therefore, not selected.

Note 2: Do not select a field that contains a ROM.

Note 3: A single field can be selected for testing providing the program is not in that field as in Example 3.

Note 4: Any field or group of fields can be by-passed as in Example 4. Fields 2 and 3 are not selected, Field 7 is not present.

5. ERRORS

A Test Error will occur anytime the data written does not match the data read. 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.. FAIL. ADR..GOOD..BAD..PATTERN

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

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

GOOD = the data that was written.

BAD = the data that was read.

PATTERN= the present test pattern and the number of times it was complemented.
NC (Not Complemented).
1C (One Complement).
2C (Two Complements).

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.

5.3 Parity Error Typeouts

If the 8E System contains a Parity Option the interrupt will be turned on to allow Parity errors when the program is executing from Field Ø. The following 3 typeouts can occur with a Parity Option:

A. Parity Error, LOC Ø=XXXX TSTAD=XXXXX (present Pattern)

B. Interrupt from Keyboard

C. Unwanted Interrupt Occurred

6. RESTRICTIONS

6.1 Starting Restrictions

The program may be restarted at any time from location Ø2ØØ or Ø2Ø2 of the field the program is presently in.

6.2 Operating Restrictions

The parity error typeout can not be inhibited.

7. EXECUTION TIME

The time to write and read all six patterns in one field is approximately 6 seconds.

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

8.1 Scope Loop 1

This scope loop does a read, complement, write on the address specified by the SR. The address being looped on can be changed simply by changing the switch setting. The previous address will be left with its original content.

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 6ØØØ.

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 does a read, complement, write on the two addresses input via the SR. To change the addresses, the Loop must be restarted.

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 62ØØ.

D. Press keys ADDR LOAD, CLEAR, and CONT.

E. Follow directions that are typed out.

8.3 Scope Loop 3

This scope loop does a read, complement, write on the group of addresses input via the SR. 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 64ØØ.

D. Press keys ADDR LOAD, CLEAR, and CONT.

E. Follow directions that are typed out.

8.4 Scope Loop 4

This scope loop does a read, complement, write on the address input via the SR using the data specified by the SR. The data 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 66ØØ.

D. Press keys ADDR LOAD, CLEAR, and CONT.

E. A message will be typed out to set the SR to the selected address.

F. Set SR to the selected address and depress CONT.

G. Set SR to selected data (Scope Loop is cycling).

8.5 Scope Loop 5

This scope loop does a read, complement, write on the group of addresses input via the SR using the data specified by the SR. 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 7ØØØ.

D. Press keys ADDR LOAD, CLEAR, and CONT.

E. Follow the typed out message that inputs the address selections.

F. Set SR to selected Data (Scope Loop is cycling).

Note 1: The address(s) specified will be looped until stopped by the operator with key HALT. No error checking is done. To resume normal operation, restart program at address Ø2ØØ or Ø2Ø2 of the current instruction field.

9. PROGRAM DESCRIPTION

9.1 Test Patterns

The following test patterns are employed by the program:

A. Basic All Ø's pattern.

B. Basic All 1's pattern.

C. ØØØØ-7777 worst case checkerboard pattern.

D. 7777-ØØØØ worst case checkerboard pattern.

E. 2525-5252 worst case checkerboard pattern.

F. 5252-2525 worst case checkerboard pattern.

9.2 Program Relocation

Program relocation is governed by the status of SR bit 3 or by the fact that only one field is selected for testing. With SR bit 3 down (Ø position) program relocation occurs each time the test pattern and its complement have been completely tested in each selected field. The program first relocates to the highest order 4K field under test. The program keeps relocating to the next lower field under test until it reaches the lowest order field under test. The testing and relocation cycle is then repeated. The contents of the entire field 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 fields where errors occur. When a fualty field is next in sequence to contain the program, the program will skip the faulty field and relocate to the first lower order field which is error free. If all other selected fields are faulty, program relocation will not take place.

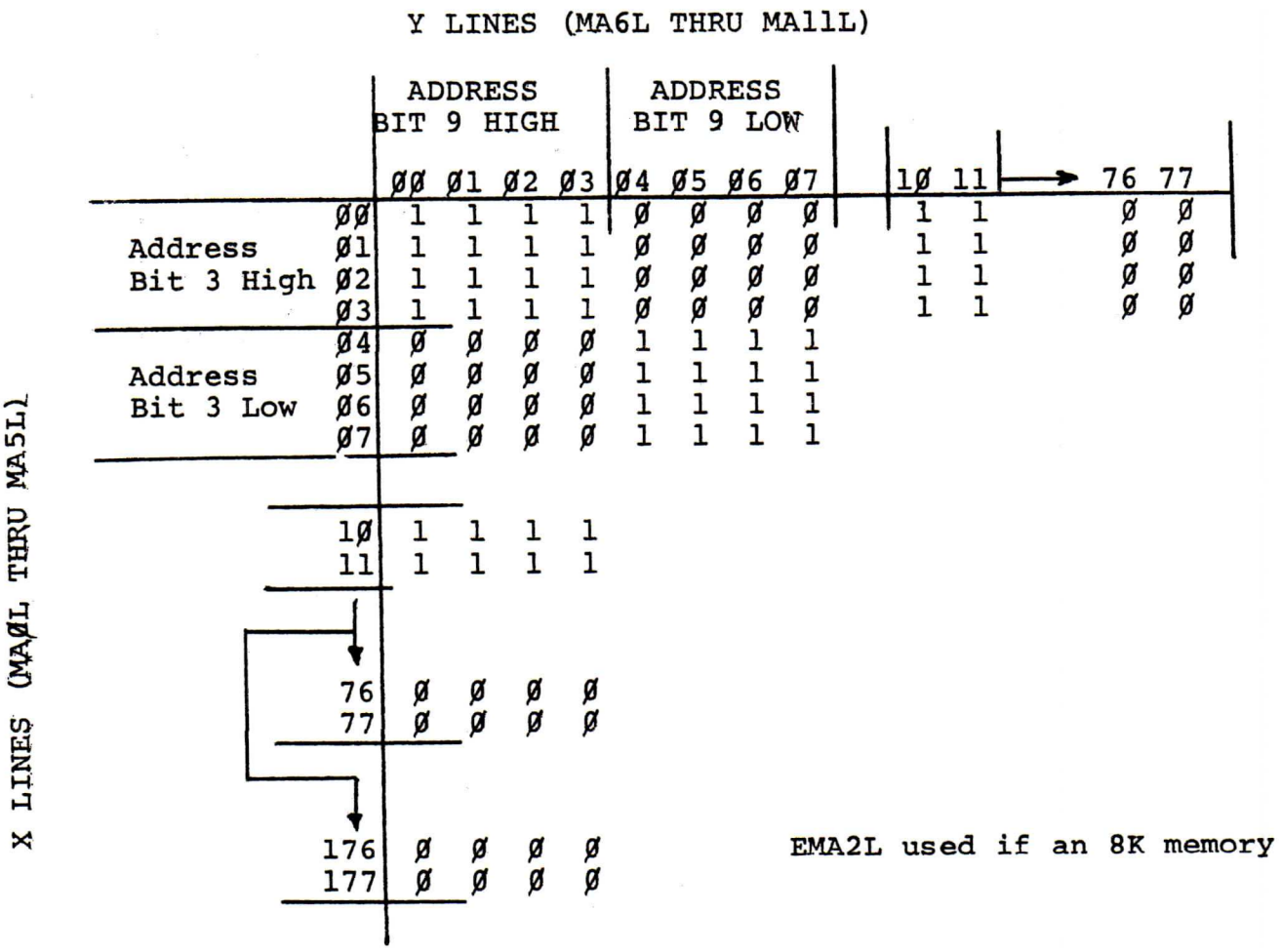
During relocation a comparison check is made to insure no program loss.

9.3 Test Procedure

A. Write the pattern in all selected fields (each location is then treated as follows):
B. Read-Write the location 11 times.
C. Read-Write-Test the location (NC).
D. Read-Write the location 11 times.
E. Read-Complement-Write the location.
F. Read-Write the location 11 times.
G. Read-Write-Test the location (1C).
H. Read-Write the location 11 times.
I. Read-Complement-Write the location.
J. Read-Write the location 11 times.
K. Read-Write-Test the location (2C).
L. Go on to next location repeating B-K.
M. Go on to next pattern repeating A-L when all locations of all selected fields are completed.

For further understanding of how the test is performed, refer to the listing.

The worst case checkerboard pattern consists of alternating 4 memory cores containing ØØØØ and 4 memory cores containing 1111 on a memory plane. This pattern is reversed every 4ØØ octal locations. (This test pattern is generated according to the stringing of the stack and the wiring of the memory system. It is the same pattern for <u>all</u> 8E stacks).



The above represents one memory plane.

```
                    /PDP-8E EXTENDED MEMORY DATA AND CHECKERBOARD TEST
                    /COPYRIGHT 1972, DIGITAL EQUIPMENT CORPORATION, MAYNARD, MASS. 01754
                    /PROGRAMMER, VERNON FREY
                    /
                    /
                    /SR0#1          HALT AFTER ERROR
                    /SR1#1          INHIBIT ERROR TYPEOUT
                    /SR2#1          BELL ON ERROR (USEFUL FOR MAINTENANCE)
                    /SR3#1          INHIBIT PROGRAM RELOCATION
                    /SR4#1          CHANGE FIELD LIMITS
                    /SR5#1          HALT AFTER CURRENT TEST
                    /SR6-8          STARTING FIELD (0-7)
                    /SR9-11         ENDING FIELD (0-7)
                    /
                    /
                    /PROGRAM STARTING ADDRESS
                    /0200
                    /
                    /
                    /MACRO
                    /
                    /
                    DEFINE  NPAGE
                    <       JMP I   (.+200&7600>
                    /
                    /PDP-8E IOT COMMANDS & MICRO INSTRUCTIONS
                    /
              6203  CDI=6203                        /CHANGE TO DF & IF 0
              6107  SPO=6107                        /SKIP ON PARITY OPTION
              6101  SMP=6101                        /SKIP IF NO PARITY ERROR
              6104  CMP=6104                        /CLEAR PARITY ERROR FLAG
              6004  GTF=6004                        /GET INTERRUPT FLAGS
              6005  RTF=6005                        /RESTORE INTERRUPT FLAGS
              7701  ACL=7701                        /LOAD MQ INTO AC
              7002  BSW=7002                        /SWAP BYTES IN AC
              7421  MQL=7421                        /LOAD MQ FROM AC THEN CLR AC
              7521  SWP=7521                        /SWAP AC AND MQ
              6000  SKON=6000                       /SKIP IF INTERRUPT ON, & TURN OFF
              6007  CAF=6007                        /CLEAR ALL FLAGS

                    0000    *0
0000  0000                  0                       /INTERRUPT ADDRESS
0001  3061                  DCA     SAC             /SAVE AC
0002  7701                  ACL
0003  3062                  DCA     SMQ             /SAVE MQ
0004  5777'                 JMP     INTROU

                    0020    *20
                    /
                    /PAGE 0 CONSTANTS AND POINTERS
                    /
0020  4000          SR00,   4000            /HALT AFTER ERROR
```



```
0021  2000    SR01,   2000            /INHIBIT ERROR TYPEOUT
0022  1000    SR02,   1000            /BELL ON ERROR
0023  0400    SR03,   400             /INHIBIT PROGRAM RELOCATION
0024  0200    SR04,   200             /CHANGE FIELD LIMITS
0025  0100    SR05,   100             /HALT AFTER CURRENT TEST
0026  0070    SR06,   70              /STARTING FIELD (0-7)
0027  0007    SR911,  7               /ENDING FIELD (0-7)
0030  0000    CS,     0               /COMPLEMENT STATUS
                                              /0000=NC (NO COMPLEMENT)
                                              /BIT 1=1C (ONE COMPLEMENT)
                                              /BIT 2=2C (TWO COMPLEMENTS)
0031  0000    TS,     0                       /TEST STATUS
                                              /0000=NO TEST
                                              /BIT 0=ALL ZEROS TEST
                                              /BIT 1=ALL ONES TEST
                                              /BIT 2 = 0000-7777 WCP TEST
                                              /BIT 3 = 7777-0000 WCP TEST
                                              /BIT 4 = 2525-5252 WCP TEST
                                              /BIT 5 = 5252-2525 WCP TEST
0032  0000    FS,     0                       /FIELD STATUS
                                              /BITS 0-7 COINCIDE WITH FIELDS
                                              /0-7, FOR EACH FIELD NOT IN
                                              /THE SYSTEM THE EQUIVALENT BIT
                                              /IS SET.
0033  0000    RS,     0                       /RELOCATION STATUS
                                              /BITS 0-7 COINCIDE WITH FIELDS
                                              /0-7, FS IS XFERRED INTO RS.
                                              /EACH FIELD THAT FAILS SETS THE
                                              /EQUIVALENT BIT SO THAT PROGRAM
                                              /WILL NOT RELOCATE TO A FAILING FIELD.
0034  0000    CRELO,  0                       /0 = INHIBIT PROGRAM RELOCATION
0035  0000    PROFLD, 0                       /PROGRAM IN FIELD 00X0
0036  0000    TSTFLD, 0                       /TESTING FIELD 00X0
0037  0000    COUNT,  0                       /MOVE ERROR COUNTER
0040  0000    MOVE,   0                       /MOVE ADDRESS COUNTER
0041  0000    HEAD1,  0                       /7777 MEANS TYPEOUT ERROR HEADING
0042  0000    TEMP,   0                       /TEMP STORAGE LOCATION
0043  0000    TSTAD,  0                       /TEST ADDRESS COUNTER
0044  0000    FIVE,   0                       /5 MINUTE COUNTER
0045  7518    MIN5,   -270                    /5 MINUTE CONSTANT
0046  0000    FCNT,   0                       /COUNT # OF FIELDS PRESENT
0047  0000    STARTF, 0                       /STARTING FIELD 00X0
0050  0000    ENDF,   0                       /ENDING FIELD 00X0
0051  0000    INSAME, 0                       /PROGRAM IN SELECTED FIELD
0052  0000    LEGAL0, 0                       /LEGAL FIELD SELECTION CONTROL
0053  0000    A,      0                       /A REG TO WRITE/READ
0054  0000    B,      0                       /B REG TO WRITE/READ
0055  0000    P2,     0                       /CONTROLS 2 PAGES
0056  0000    W4,     0                       /CONTROLS 4 WORDS
0057  0000    GDATA,  0                       /GOOD DATA = DATA WRITTEN
0060  0000    BDATA,  0                       /BAD DATA = DATA READ
0061  0000    SAC,    0                       /SAVE AC (INT)
0062  0000    SMQ,    0                       /SAVE MQ (INT)
0063  0000    A1,     0
0064  0000    A2,     0
```

```
0065  0000  A3,    0
0066  0000  A4,    0
0067  0000  A5,    0
0070  0000  A6,    0
0071  0000  A7,    0
0072  0000  A8,    0
0073  0000  A9,    0
0074  0000  A10,   0
0075  0000  A11,   0
0076  0000  A12,   0
0077  0000  A13,   0
0100  0000  A14,   0
0101  0000  A15,   0
0102  0000  A16,   0
0103  0000  A17,   0
0104  0000  A18,   0
0105  0000  A19,   0
0106  0000  A20,   0
0107  0000  A21,   0
0110  0000  A22,   0
0111  0000  A23,   0
0112  0000  A24,   0

      0200  *200
0200  4232        JMS     DFEIF           /200 = START ADDRESS
0201  5204        JMP     .+3
0202  4232        JMS     DFEIF           /202 = RESTART ADDRESS
0203  7410        SKP
0204  4777'       JMS     TITLE           /TYPEOUT PROG TITLE
0205  6002  PATA, IOF
0206  4776'       JMS     SETSW           /SETUP SR
0207  3030        DCA     CS
0210  3031        DCA     TS
0211  3032        DCA     FS
0212  3033        DCA     RS
0213  7240        STA
0214  3034        DCA     CRELO           /CLEAR INH RELO
0215  3043        DCA     TSTAD           /CLEAR TEST ADDRESS COUNTER
0216  7240        STA
0217  3041        DCA     HEAD1           /RESET ERROR HEADING
0220  1045        TAD     MIN5
0221  3044        DCA     FIVE            /SETUP 5 MINUTE COUNTER
0222  4775'       JMS     SETFS           /SET FIELD STATUS & TYPE SELECTION
0223  4774'       JMS     LEGAL           /CHECK FOR LEGAL FIELD SELECTION
0224  1034        TAD     CRELO
0225  7650        SNA CLA
0226  5242        JMP     PATM            /NO RELOCATE & TEST ONLY 1 FIELD
0227  4773'       JMS     CSR03
0230  5276        JMP     PATO            /RELOCATION PROGRAM
0231  5257        JMP     PATN            /INHIBIT PROGRAM RELOCATION

                  /
                  /MAKE OF # IF
```



```
                  /
0232  0000  DFEIF, 0
0233  6002        IOF
0234  7300        CLA CLL
0235  6224        RIF
0236  1176        TAD     [6201
0237  3248        DCA     .+1
0240  6201        CDF     0
0241  5632        JMP I   DFEIF

                  /
                  /NO PROGRAM RELOCATION AND TEST ONLY 1 FIELD
                  /
0242  6224  PATM,  RIF
0243  3035        DCA     PRGFLD
0244  4772'       JMS     PNOREL          /TYPEOUT NO RELOCATION
0245  4771'  PATM0, JMS     TEST
0246  7604        LAS
0247  0025        AND     SR05            /HALT AFTER TEST
0250  7640        SZA CLA
0251  7402        HLT
0252  7604        LAS
0253  0024        AND     SR04            /CHANGE FIELD LIMITS
0254  7640        SZA CLA
0255  5205        JMP     PATA            /YES
0256  5245        JMP     PATM0           /NO

                  /
                  /NO PROGRAM RELOCATION BUT TEST ALL SELECTED FIELDS
                  /
0257  6224  PATN,  RIF
0260  3035        DCA     PRGFLD
0261  4772'       JMS     PNOREL          /TYPEOUT NO RELOCATION
0262  4771'  PATN0, JMS     TEST
0263  7604        LAS
0264  0025        AND     SR05            /HALT AFTER TEST
0265  7640        SZA CLA
0266  7402        HLT
0267  7604        LAS
0270  0024        AND     SR04            /CHANGE FIELD LIMITS
0271  7640        SZA CLA
0272  5205        JMP     PATA            /YES
0273  4773'       JMS     CSR03           /NO
0274  5276        JMP     PATO            /RELOCATE PROGRAM
0275  5262        JMP     PATN0           /CONTINUE

                  /
                  /CHECK ALL SELECTED FIELDS FROM EACH SELECTED FIELD
                  /
0276  6224  PATO,  RIF
0277  3035        DCA     PRGFLD
0300  1032        TAD     FS
```

```
0381  3033            DCA     RB              /SETUP RELO STATUS
0382  4770'           JMS     PREL            /TYPEOUT RELOCATION
0383  4771'  PAT08,   JMS     TEST
0384  7604            LAS
0385  0025            AND     SR05            /HALT AFTER TEST
0386  7640            SZA CLA
0387  7402            HLT
0388  7604            LAS
0389  0024            AND     SR04            /CHANGE FIELD LIMITS
0390  7640            SZA CLA
0391  5205            JMP     PATA            /YES
0392  4773'           JMS     CSR03           /NO
0393  7410            SKP
0394  5257            JMP     PATN            /INHIBIT PROGRAM RELOCATION
0395  4767'           JMS     SETREL          /RELOCATE THE PROGRAM
0396  5303            JMP     PAT08           /CONTINUE

0397  0400
0398  4400
0399  0600
0400  4316
0401  2007
0402  1670
0403  2015
0404  4301
0405  4256
      0406            PAGE

                      /
                      /SETUP TO RELOCATE THE PROGRAM
                      /
0406  0000  SETREL,   0
0407  7200            CLA
0410  6224            RIF
0411  3035            DCA     PROFLD          /MOVE FROM FIELD
0412  6224            RIF
0413  7112            CLL RTR
0414  7010            RAR
0415  1377            TAD     (SETRP
0416  3042            DCA     TEMP
0417  5442            JMP I   TEMP
0420  5222  SETRP,    JMP     SETR7           /POINTERS TO SETUP FOR RELOCATION
0421  5256            JMP     SETR0
0422  5252            JMP     SETR1
0423  5246            JMP     SETR2
0424  5242            JMP     SETR3
0425  5236            JMP     SETR4
0426  5232            JMP     SETR5
0427  5226            JMP     SETR6
0430  4776'  SETR7,   JMS     TR87
0431  5226            JMP     .+3
0432  1175            TAD     C78
0433  5260            JMP     CSAME
0434  4775'  SETR6,   JMS     TR86
```



```
0435  5232            JMP     .+3
0436  1174            TAD     C68
0437  5260            JMP     CSAME
0440  4774'  SETR5,   JMS     TR85
0441  5236            JMP     .+3
0442  1173            TAD     C58
0443  5260            JMP     CSAME
0444  4773'  SETR4,   JMS     TR84
0445  5242            JMP     .+3
0446  1172            TAD     C48
0447  5260            JMP     CSAME
0450  4772'  SETR3,   JMS     TR83
0451  5246            JMP     .+3
0452  1171            TAD     C38
0453  5260            JMP     CSAME
0454  4771'  SETR2,   JMS     TR82
0455  5252            JMP     .+3
0456  1170            TAD     C28
0457  5260            JMP     CSAME
0460  4770'  SETR1,   JMS     TR81
0461  5256            JMP     .+3
0462  1167            TAD     C18
0463  5260            JMP     CSAME
0464  4767'  SETR0,   JMS     TR80
0465  5222            JMP     SETR7

0466  3036  CSAME,    DCA     TSTFLD
0467  4766'           JMS     SAME            /PROFLD = ISTFLD?
0470  5600            JMP I   SETREL          /YES
0471  4765'           JMS     RELO            /NO - RELOCATE PROGRAM
0472  6224            RIF
0473  3035            DCA     PROFLD
0474  5600            JMP I   SETREL

0475  4445
0476  2000
0477  4073
0500  4101
0501  4110
0502  4117
0503  4127
0504  4200
0505  4210
0506  4217
0507  0412
      0510            PAGE

                      /
                      /TEST PATTERN CONTROL
                      /
0510  0000  TEST,     0
0511  4777'           JMS     PAR
0512  7200            CLA
0513  3053            DCA     A
```

```
0604  3054          DCA     B
0605  4776'         JMS     ST80            /ALL ZEROS TEST
0606  4252          JMS     TEST0
0607  7240          STA
0610  3053          DCA     A
0611  7240          STA
0612  3054          DCA     B
0613  4775'         JMS     ST81            /ALL ONES TEST
0614  4252          JMS     TEST0
0615  7240          STA
0616  3054          DCA     B
0617  3053          DCA     A
0620  4774'         JMS     ST82            /0000-7777 WCP TEST
0621  4252          JMS     TEST0
0622  7240          STA
0623  3053          DCA     A
0624  3054          DCA     B
0625  4773'         JMS     ST83            /7777-0000 WCP TEST
0626  4252          JMS     TEST0
0627  7200          CLA
0630  1166          TAD     [2925
0631  3053          DCA     A
0632  1165          TAD     [5252
0633  3054          DCA     B
0634  4772'         JMS     ST84            /2525-5252 WCP TEST
0635  4252          JMS     TEST0
0636  7200          CLA
0637  1165          TAD     [5252
0640  3053          DCA     A
0641  1166          TAD     [2925
0642  3054          DCA     B
0643  4771'         JMS     ST85            /5252-2525 WCP TEST
0644  4252          JMS     TEST0
0645  7200          CLA
0646  3031          DCA     TS              /CLEAR TEST STATUS
0647  6002          IOF
0650  5600          JMP I   TEST

                /
                /TEST ALL FIELDS SELECTED FOR TEST
                /
0651  5652      KTEST,  JMP I   TEST0
0652  0000      TEST0,  0
0653  4770'         JMS     TF80
0654  5261          JMP     .+9
0655  3036          DCA     TSTFLD
0656  4767'         JMS     SAME
0657  7410          SKP
0660  4766'         JMS     WRFLD           /WRITE FIELD 0
0661  4765'         JMS     TF81
0662  5270          JMP     .+6
0663  1167          TAD     [10
0664  3036          DCA     TSTFLD
0665  4767'         JMS     SAME
0666  7410          SKP
```



```
0667  4766'         JMS     WRFLD           /WRITE FIELD 1
0670  4764'         JMS     TF82
0671  5277          JMP     .+6
0672  1170          TAD     [20
0673  3036          DCA     TSTFLD
0674  4767'         JMS     SAME
0675  7410          SKP
0676  4766'         JMS     WRFLD           /WRITE FIELD 2
0677  4763'         JMS     TF83
0700  5306          JMP     .+6
0701  1171          TAD     [30
0702  3036          DCA     TSTFLD
0703  4767'         JMS     SAME
0704  7410          SKP
0705  4766'         JMS     WRFLD           /WRITE FIELD 3
0706  4762'         JMS     TF84
0707  5315          JMP     .+6
0710  1172          TAD     [40
0711  3036          DCA     TSTFLD
0712  4767'         JMS     SAME
0713  7410          SKP
0714  4766'         JMS     WRFLD           /WRITE FIELD 4
0715  4761'         JMS     TF85
0716  5324          JMP     .+6
0717  1173          TAD     [50
0720  3036          DCA     TSTFLD
0721  4767'         JMS     SAME
0722  7410          SKP
0723  4766'         JMS     WRFLD           /WRITE FIELD 5
0724  4760'         JMS     TF86
0725  5333          JMP     .+6
0726  1174          TAD     [60
0727  3036          DCA     TSTFLD
0730  4767'         JMS     SAME
0731  7410          SKP
0732  4766'         JMS     WRFLD           /WRITE FIELD 6
0733  4757'         JMS     TF87
0734  5342          JMP     .+6
0735  1175          TAD     [70
0736  3036          DCA     TSTFLD
0737  4767'         JMS     SAME
0740  7410          SKP
0741  4766'         JMS     WRFLD           /WRITE FIELD 7
                    NPAGE
0742  5756          JMP I   (.+200&7600
0756  1000
0757  4063
0760  4054
0761  4044
0762  4034
0763  4024
0764  4015
0765  4006
0766  1200
0767  2000
```

```
0770  4000
0771  3470
0772  3463
0773  3456
0774  3451
0775  3445
0776  3441
0777  4525
      1000          PAGE


1000  4777'         JMS     TF00
1001  5212          JMP     TEST1
1002  3036          DCA     TSTFLD
1003  3037          DCA     COUNT
1004  4776'         JMS     SAME
1005  5212          JMP     TEST1
1006  4775'         JMS     RDFLD           /READ FIELD 0
1007  1037          TAD     COUNT
1010  7640          SZA CLA
1011  4774'         JMS     SR00            /ERROR FIELD 0
1012  4773'  TEST1, JMS     TF01
1013  5225          JMP     TEST2
1014  1167          TAD     C10
1015  3036          DCA     TSTFLD
1016  3037          DCA     COUNT
1017  4776'         JMS     SAME
1020  5225          JMP     TEST2
1021  4775'         JMS     RDFLD           /READ FIELD 1
1022  1037          TAD     COUNT
1023  7640          SZA CLA
1024  4772'         JMS     SR01            /ERROR FIELD 1
1025  4771'  TEST2, JMS     TF02
1026  5240          JMP     TEST3
1027  1170          TAD     C20
1030  3036          DCA     TSTFLD
1031  3037          DCA     COUNT
1032  4776'         JMS     SAME
1033  5240          JMP     TEST3
1034  4775'         JMS     RDFLD           /READ FIELD 2
1035  1037          TAD     COUNT
1036  7640          SZA CLA
1037  4770'         JMS     SR02            /ERROR FIELD 2
1040  4767'  TEST3, JMS     TF03
1041  5253          JMP     TEST4
1042  1171          TAD     C30
1043  3036          DCA     TSTFLD
1044  3037          DCA     COUNT
1045  4776'         JMS     SAME
1046  5253          JMP     TEST4
1047  4775'         JMS     RDFLD           /READ FIELD 3
1050  1037          TAD     COUNT
1051  7640          SZA CLA
1052  4766'         JMS     SR03            /ERROR FIELD 3
```



```
1053  4765'  TEST4, JMS     TF04
1054  5266          JMP     TEST5
1055  1172          TAD     C40
1056  3036          DCA     TSTFLD
1057  3037          DCA     COUNT
1060  4776'         JMS     SAME
1061  5266          JMP     TEST5
1062  4775'         JMS     RDFLD           /READ FIELD 4
1063  1037          TAD     COUNT
1064  7640          SZA CLA
1065  4764'         JMS     SR04            /ERROR FIELD 4

1066  4763'  TEST5, JMS     TF05
1067  5301          JMP     TEST6
1070  1173          TAD     C50
1071  3036          DCA     TSTFLD
1072  3037          DCA     COUNT
1073  4776'         JMS     SAME
1074  5301          JMP     TEST6
1075  4775'         JMS     RDFLD           /READ FIELD 5
1076  1037          TAD     COUNT
1077  7640          SZA CLA
1100  4762'         JMS     SR05            /ERROR FIELD 5
1101  4761'  TEST6, JMS     TF06
1102  5314          JMP     TEST7
1103  1174          TAD     C60
1104  3036          DCA     TSTFLD
1105  3037          DCA     COUNT
1106  4776'         JMS     SAME
1107  5314          JMP     TEST7
1110  4775'         JMS     RDFLD           /READ FIELD 6
1111  1037          TAD     COUNT
1112  7640          SZA CLA
1113  4760'         JMS     SR06            /ERROR FIELD 6
1114  4757'  TEST7, JMS     TF07
1115  5327          JMP     TEST8
1116  1175          TAD     C70
1117  3036          DCA     TSTFLD
1120  3037          DCA     COUNT
1121  4776'         JMS     SAME
1122  5327          JMP     TEST8
1123  4775'         JMS     RDFLD           /READ FIELD 7
1124  1037          TAD     COUNT
1125  7640          SZA CLA
1126  4756'         JMS     SR07            /ERROR FIELD 7
1127  7604  TEST8,  LAS
1130  0024          AND     SR04            /CHANGE FIELD LIMITS?
1131  7640          SZA CLA
1132  5755'         JMP     PATA            /YES
1133  5754'         JMP     KTEST

1134  0651
1135  0205
1136  3077
```

```
1197  4863
1198  3861
1199  4854
1200  3843
1201  4844
1202  3829
1203  4834
1204  3827
1205  4824
1206  3892
1207  4815
1208  3832
1209  4806
1210  3814
1211  1408
1212  2888
1213  4888
      1200          PAGE

                    /
                    /WRITE A & B REG PATTERN INTO SELECTED FIELD
                    /
1200  0000  WRFLD,  0
1201  7200          CLA
1202  1164          TAD     C-40
1203  3895          DCA     P2              /WRITE 2 PAGES
1204  4231          JMS     WRA             /WRITE 4 WORDS FROM A REG
1205  4253          JMS     WRB             /WRITE 4 WORDS FROM B REG
1206  2895          ISZ     P2
1207  5204          JMP     .-3
1210  1164          TAD     C-40
1211  3895          DCA     P2
1212  4253          JMS     WRB
1213  4231          JMS     WRA
1214  2895          ISZ     P2
1215  5212          JMP     .-3
1216  1843          TAD     TSTAD
1217  7640          SZA CLA
1220  5202          JMP     WRFLD+2
1221  2844          ISZ     FIVE            /INC 5 MIN COUNTER
1222  5600          JMP I   WRFLD           /END OF MEM REACHED
1223  1845          TAD     MIN5            /5 MINUTES REACHED
1224  3844          DCA     FIVE            /RESTORE COUNTER
1225  4777'         JMS     ME8
1226  4543          4543
1227  6580          6580                    /TYPE A 5
1230  5600          JMP I   WRFLD           /END OF MEMORY REACHED
1231  0000  WRA,     0
1232  1163          TAD     C-4
1233  3896          DCA     W4              //WRITE 4 WORDS FROM A REG
1234  1836          TAD     TSTFLD
1235  1176          TAD     C6201
1236  3237          DCA     .+1
1237  6201          CDF     0               /TEST DF
1240  1853  WRA1,   TAD     A
```



```
1241  3443          DCA I   TSTAD
1242  2843          ISZ     TSTAD
1243  7000          NOP
1244  2896          ISZ     W4
1245  5248          JMP     WRA1
1246  1835          TAD     PROFLD          /9 WORDS ARE WRITTEN
1247  1176          TAD     C6201
1250  3251          DCA     .+1
1251  6201          CDF     0               /PROGRAM DF
1252  5631          JMP I   WRA
1253  0000  WRB,     0
1254  1163          TAD     C-4
1255  3896          DCA     W4              /WRITE 4 WORDS FROM B REG
1256  1836          TAD     TSTFLD
1257  1176          TAD     C6201
1260  3261          DCA     .+1
1261  6201          CDF     0               /TEST DF
1262  1884  WRB1,   TAD     B
1263  3443          DCA I   TSTAD
1264  2843          ISZ     TSTAD
1265  7000          NOP
1266  2896          ISZ     W4
1267  5262          JMP     WRB1
1270  1835          TAD     PROFLD          /9 WORDS ARE WRITTEN
1271  1176          TAD     C6201
1272  3273          DCA     .+1
1273  6201          CDF     0               /PROGRAM DF
1274  5653          JMP I   WRB

1377  2448
      1400          PAGE

                    /
                    /READ & TEST A & B REG PATTERN FROM SELECTED FIELD
                    /
1400  0000  RDFLD,  0
1401  7200          CLA
1402  1836          TAD     TSTFLD
1403  1176          TAD     C6201
1404  3287          DCA     RDA2
1405  1287          TAD     RDA2
1406  3282          DCA     RDB2
1407  6201  RDA2,   CDF     0               /TEST DF
1410  1162          TAD     C-100
1411  3895          DCA     P2              /READ & TEST 2 PAGES
1412  1163  RDFLDA, TAD     C-4
1413  3896          DCA     W4              /READ & TEST 4 WORDS
1414  3838  RDAC,   DCA     CS              /NO COMPLEMENT
1415  4326          JMS     READ
1416  7041          CIA
1417  1853          TAD     A
1420  7440          SZA
1421  4777'         JMS     ERRA            /A REG ERROR = NC
1422  4326          JMS     READ
1423  7040          CMA
```

```
1424  3443            DCA I   TSTAD
1425  4776'           JMS     SC01            /1 COMPLEMENT
1426  4326            JMS     READ
1427  7001            IAC
1430  1053            TAD     A
1431  7440            SZA
1432  4775'           JMS     ERRA1           /A REG ERROR = 1C
1433  4326            JMS     READ
1434  7040            CMA
1435  3443            DCA I   TSTAD
1436  4774'           JMS     SC02            /2 COMPLEMENTS
1437  4326            JMS     READ
1440  7041            CIA
1441  1053            TAD     A
1442  7440            SZA
1443  4777'           JMS     ERRA            /A REG ERROR = 2C
1444  2043            ISZ     TSTAD
1445  7000            NOP
1446  2056            ISZ     W4
1447  5214            JMP     RDAC            /COMPLETE 4 WORDS
1450  2055            ISZ     P2
1451  5265            JMP     RDFLDB          /COMPLETE CURRENT 2 PAGES
1452  1035            TAD     PRGFLD
1453  1176            TAD     [6201
1454  3255            DCA     .+1
1455  6201            CDF     0               /PROGRAM DF
1456  1043            TAD     TSTAD
1457  7640            SZA CLA
1460  5207            JMP     RDA2            /READ ANOTHER 2 PAGES
1461  5600            JMP I   RDFLD           /END OF MEMORY REACHED

1462  6201    RDB2,   CDF     0               /TEST DF
1463  1162            TAD     [-100
1464  3055            DCA     P2              /READ & TEST 2 PAGES
1465  1163    RDFLDB, TAD     [-4
1466  3056            DCA     W4              /READ & TEST 4 WORDS
1467  3030    RDBC,   DCA     CS              /NO COMPLEMENT
1470  4326            JMS     READ
1471  7041            CIA
1472  1054            TAD     B
1473  7440            SZA
1474  4773'           JMS     ERRB            /B REG ERROR = 0C
1475  4326            JMS     READ
1476  7040            CMA
1477  3443            DCA I   TSTAD
1500  4776'           JMS     SC01            /1 COMPLEMENT
1501  4326            JMS     READ
1502  7001            IAC
1503  1054            TAD     B
1504  7440            SZA
1505  4772'           JMS     ERRB1           /B REG ERROR = 1C
1506  4326            JMS     READ
1507  7040            CMA
1510  3443            DCA I   TSTAD
1511  4774'           JMS     SC02            /2 COMPLEMENTS
```



```
1512  4326            JMS     READ
1513  7041            CIA
1514  1054            TAD     B
1515  7440            SZA
1516  4773'           JMS     ERRB            /B REG ERROR = 2C
1517  2043            ISZ     TSTAD
1520  7000            NOP
1521  2056            ISZ     W4
1522  5267            JMP     RDBC            /COMPLETE 4 WORDS
1523  2055            ISZ     P2
1524  5212            JMP     RDFLDA          /COMPLETE CURRENT 2 PAGES
1525  5262            JMP     RDB2
                /
                /READ TEST ADDRESS SUBROUTINE
                /
1526  0000    READ,   0
1527  1443            TAD I   TSTAD
1530  1443            TAD I   TSTAD
1531  1443            TAD I   TSTAD
1532  1443            TAD I   TSTAD
1533  1443            TAD I   TSTAD
1534  1443            TAD I   TSTAD
1535  1443            TAD I   TSTAD
1536  1443            TAD I   TSTAD
1537  1443            TAD I   TSTAD
1540  1443            TAD I   TSTAD
1541  1443            TAD I   TSTAD
1542  7200            CLA
1543  1443            TAD I   TSTAD
1544  5726            JMP I   READ

1572  1037
1573  1026
1574  3500
1575  1011
1576  3474
1577  1000
      1600            PAGE

1600  0000    ERRA,   0
1601  7041            CIA
1602  1053            TAD     A
1603  3060            DCA     BDATA           /DATA READ
1604  1053            TAD     A
1605  4254            JMS     GERRC           /GO TO ERR SETUP ROUTINE
1606  1053            TAD     A
1607  3443            DCA I   TSTAD           /RE-WRITE BAD LOCATION
1610  5600            JMP I   ERRA
1611  0000    ERRA1,  0
1612  3042            DCA     TEMP
1613  1053            TAD     A
1614  7040            CMA
1615  1042            TAD     TEMP
1616  3060            DCA     BDATA           /DATA READ
1617  1053            TAD     A
```

```
1620  7040            CMA
1621  4254            JMS     GERRC           /GO TO ERRC SETUP ROUTINE
1622  1053            TAD     A
1623  7040            CMA
1624  3443            DCA I   TSTAD           /RE-WRITE BAD LOCATION
1625  5611            JMP I   ERRA1
1626  0000    ERRB,   0
1627  7041            CIA
1630  1054            TAD     B
1631  3060            DCA     BDATA           /DATA READ
1632  1054            TAD     B
1633  4254            JMS     GERRC           /GO TO ERRC SETUP ROUTINE
1634  1054            TAD     B
1635  3443            DCA I   TSTAD           /RE-WRITE BAD LOCATION
1636  5626            JMP I   ERRB
1637  0000    ERRB1,  0
1640  3042            DCA     TEMP
1641  1054            TAD     B
1642  7040            CMA
1643  1042            TAD     TEMP
1644  3060            DCA     BDATA           /DATA READ
1645  1054            TAD     B
1646  7040            CMA
1647  4254            JMS     GERRC           /GO TO ERRC SETUP ROUTINE
1650  1054            TAD     B
1651  7040            CMA
1652  3443            DCA I   TSTAD
1653  5637            JMP I   ERRB1
1654  0000    GERRC,  0                       /GO TO ERRC
1655  3057            DCA     GDATA           /DATA WRITTEN
1656  1035            TAD     PROFLD
1657  1176            TAD     [6201
1660  3261            DCA     .+1
1661  6201            CDF     0               /PROGRAM DF
1662  4777'           JMS     ERRC            /DATA OR CHKBD ERROR
1663  1036            TAD     TSTFLD
1664  1176            TAD     [6201
1665  3266            DCA     .+1
1666  6201            CDF     0               /TEST DF
1667  5654            JMP I   GERRC

                /
                /CHECK FOR LEGAL FIELD SELECTION
                /
1670  0000    LEGAL,  0
1671  7300            CLA CLL
1672  3051            DCA     INSAME          /SAME FIELD CONTROL
1673  1161            TAD     [-2
1674  3052            DCA     LEGALB          /LEGAL SELECTION CONTROL
1675  3036            DCA     TSTFLD
1676  4776'           JMS     TF90
1677  7410            SKP
1700  4353            JMS     LEGALA
1701  1167            TAD     [10
1702  3036            DCA     TSTFLD
```



```
1703  4775'           JMS     TF81
1704  7410            SKP
1705  4353            JMS     LEGALA
1706  1170            TAD     [20
1707  3036            DCA     TSTFLD
1710  4774'           JMS     TF82
1711  7410            SKP
1712  4353            JMS     LEGALA
1713  1171            TAD     [30
1714  3036            DCA     TSTFLD
1715  4773'           JMS     TF83
1716  7410            SKP
1717  4353            JMS     LEGALA
1720  1172            TAD     [40
1721  3036            DCA     TSTFLD
1722  4772'           JMS     TF84
1723  7410            SKP
1724  4353            JMS     LEGALA
1725  1173            TAD     [50
1726  3036            DCA     TSTFLD
1727  4771'           JMS     TF85
1730  7410            SKP
1731  4353            JMS     LEGALA
1732  1174            TAD     [60
1733  3036            DCA     TSTFLD
1734  4770'           JMS     TF86
1735  7410            SKP
1736  4353            JMS     LEGALA
1737  1175            TAD     [70
1740  3036            DCA     TSTFLD
1741  4767'           JMS     TF87
1742  7410            SKP
1743  4353            JMS     LEGALA
1744  2052            ISZ     LEGALB
1745  5766'           JMP     NOFLD           /NO FIELD SELECTION
1746  1051            TAD     INSAME
1747  7648            SNA CLA
1750  5765'           JMP     PINF            /PROG IN SELECTED FIELD
1751  3034            DCA     CRELD           /ONLY 1 FIELD SELECTED
1752  5670            JMP I   LEGAL

                /
                /LEGAL FIELD SELECTION SUBROUTINE
                /
1753  0000    LEGALA, 0
1754  2052            ISZ     LEGALB          /FIELD SELECTED
1755  7410            SKP
1756  5670            JMP I   LEGAL           /AT LEAST 2 FIELDS SELECTED
1757  6224            RIF
1760  3035            DCA     PROFLD
1761  4764'           JMS     SAME            /PROGRAM IN SELECTED FIELD?
1762  2051            ISZ     INSAME          /YES
1763  5753            JMP I   LEGALA

1764  2000
```

```
1765  4420
1766  4440
1767  4060
1770  4054
1771  4044
1772  4034
1773  4024
1774  4010
1775  4006
1776  4000
1777  3000
```



```
                2000            PAGE

                        /
                        /RETURN IF PROGRAM IN SELECTED FIELD
                        /RETURN +1 IF PROGRAM NOT IN SELECTED FIELD
                        /
2000  0000      SAME,   0
2001  1035              TAD     PROFLD
2002  7041              CIA
2003  1036              TAD     TSTFLD
2004  7040              SZA CLA
2005  2200              ISZ     SAME            /PROG NOT IN SEL FIELD
2006  5600              JMP I   SAME
                        /
                        /RETURN IF SR03=0, RETURN +1 IF SR03=1
                        /
2007  0000      CSR03,  0
2010  7604              LAS
2011  0023              AND     SR03
2012  7640              SZA CLA
2013  2207              ISZ     CSR03           /INHIBIT PROGRAM RELOCATION
2014  5607              JMP I   CSR03
                        /
                        /SETUP FIELD STATUS (FS)
                        /ING FIELDS NOT PRESENT OR NOT SELECTED
                        /STORE NUMBER OF FIELDS PRESENT IN FCNT
                        /
2015  0000      SETFS,  0
2016  7200              CLA
2017  3032              DCA     FS              /CLEAR FIELD STATUS
2020  3046              DCA     FCNT            /CLEAR FIELD COUNT
2021  7604              LAS
2022  0026              AND     SR68            /STARTING FIELD
2023  3047              DCA     STARTF
2024  7604              LAS
2025  0027              AND     SR911           /ENDING FIELD
2026  7106              CLL RTL
2027  7004              RAL
2030  3050              DCA     ENDF
2031  6201              CDF     70
2032  4777'             JMS     CF0             /CHECK FIELD PRESENT
2033  4776'             JMS     SF07            /SET FIELD STATUS BIT ?
2034  6261              CDF     60
2035  4777'             JMS     CF0
2036  4775'             JMS     SF06
2037  6291              CDF     50
2040  4777'             JMS     CF0
2041  4774'             JMS     SF05
2042  6241              CDF     40
2043  4777'             JMS     CF0
2044  4773'             JMS     SF04
2045  6231              CDF     30
2046  4777'             JMS     CF0
2047  4772'             JMS     SF03
```

```
2050  6201          CDF     20
2051  4777'         JMS     CF0
2052  4771'         JMS     SFS2
2053  6211          CDF     10
2054  4777'         JMS     CF0
2055  4770'         JMS     SFS1
2056  6201          CDF     00
2057  4777'         JMS     CF0
2060  4767'         JMS     SFS0
2061  4766'         JMS     MES
2062  4543          4543
2063  0000          0
2064  1046          TAD     FCNT
2065  1160          TAD     [260
2066  4765'         JMS     TYPSP           /TYPEOUT # OF FIELDS IN THIS SYSTEM
2067  4766'         JMS     MES
2070  0611          TEXT            "FIELDS IN THIS SYSTEM"
2071  0514
2072  0423
2073  4011
2074  1640
2075  2410
2076  1123
2077  4023
2100  3123
2101  2405
2102  1500
2103  4766'         JMS     MES
2104  4543          TEXT            "%#FIELDS SEL'D ARE "
2105  0611
2106  0514
2107  0423
2110  4023
2111  0514
2112  4704
2113  4001
2114  2205
2115  4000
2116  4764'         JMS     TOSEL
2117  5615          JMP I   SETFS

2164  2263
2165  2531
2166  2440
2167  3505
2170  3523
2171  3541
2172  3600
2173  3616
2174  3634
2175  3652
2176  3670
2177  2200
      2200          PAGE
```



```
                    /
                    /RETURN+1 IF FIELD PRESENT IN SYSTEM & IS SELECTED
                    /
2200  0000          CFP,    0
2201  7300                  CLA CLL
2202  6224                  RIF
2203  1176                  TAD     [6201
2204  3212                  DCA     CF00
2205  1157                  TAD     [-1
2206  3661                  DCA I   CHECK
2207  1661                  TAD I   CHECK
2210  7640                  SZA CLA                 /SKIP IF NOT PRESENT
2211  5214                  JMP     .+3
2212  6201          CFP0,   CDF     0               /PROGRAM DF
2213  5600                  JMP I   CF0
2214  2046                  ISZ     FCNT            /FIELD IS PRESENT
2215  1050                  TAD     ENDF
2216  7041                  CIA
2217  1047                  TAD     STARTF
2220  7440                  SZA
2221  5230                  JMP     CF02
2222  6214                  RDF                     /STARTF = ENDF
2223  7041                  CIA
2224  1047                  TAD     STARTF
2225  7650                  SNA CLA
2226  2200          CFP1,   ISZ     CF0             /FIELD IS PRESENT & SELECTED
2227  5212                  JMP     CF00
2230  7710          CFP2,   SPA CLA
2231  5251                  JMP     CF04            /STARTF < ENDF
2232  6214                  RDF                     /STARTF > ENDF
2233  7041                  CIA
2234  1047                  TAD     STARTF
2235  7450                  SNA
2236  5226                  JMP     CF01            /DF = STARTF (SELECTED)
2237  7710                  SPA CLA
2240  5226                  JMP     CF01            /DF > STARTF (SELECTED)
2241  6214          CFP3,   RDF                     /DF < STARTF ***
2242  7041                  CIA
2243  1050                  TAD     ENDF
2244  7450                  SNA
2245  5226                  JMP     CF01            /DF = ENDF (SELECTED)
2246  7710                  SPA CLA
2247  5212                  JMP     CF00            /DF > ENDF (NOT SELECTED)
2250  5226                  JMP     CF01            /DF < ENDF (SELECTED)
2251  6214          CFP4,   RDF                     /STARTF < ENDF
2252  7041                  CIA
2253  1047                  TAD     STARTF
2254  7450                  SNA
2255  5226                  JMP     CF01            /DF = STARTF (SELECTED)
2256  7710                  SPA CLA
2257  5241                  JMP     CF03            /DF > STARTF THIS TIME ***
2260  5212                  JMP     CF00            /DF < STARTF (NOT SELECTED)
2261  2262          CHECK,  CHECK0
2262  0000          CHECK0, 0
```

```
                    /
                    /TYPEOUT FIELDS SELECTED FOR TESTING
                    /
2263  0000  TOSEL,  0
2264  4777'         JMS     TF87
2265  5270          JMP     .+3
2266  1156          TAD     [267
2267  4776'         JMS     TYPSP           /FIELD 7
2270  4775'         JMS     TF86
2271  5274          JMP     .+3
2272  1155          TAD     [266
2273  4776'         JMS     TYPSP           /FIELD 6
2274  4774'         JMS     TF85
2275  5300          JMP     .+3
2276  1154          TAD     [265
2277  4776'         JMS     TYPSP           /FIELD 5
2300  4773'         JMS     TF84
2301  5304          JMP     .+3
2302  1153          TAD     [264
2303  4776'         JMS     TYPSP           /FIELD 4
2304  4772'         JMS     TF83
2305  5310          JMP     .+3
2306  1152          TAD     [263
2307  4776'         JMS     TYPSP           /FIELD 3
2310  4771'         JMS     TF82
2311  5314          JMP     .+3
2312  1151          TAD     [262
2313  4776'         JMS     TYPSP           /FIELD 2
2314  4770'         JMS     TF81
2315  5320          JMP     .+3
2316  1150          TAD     [261
2317  4776'         JMS     TYPSP           /FIELD 1
2320  4767'         JMS     TF80
2321  5324          JMP     .+3
2322  1160          TAD     [260
2323  4776'         JMS     TYPSP           /FIELD 0
2324  5663          JMP I   TOSEL

2367  4000
2370  4006
2371  4015
2372  4024
2373  4034
2374  4044
2375  4054
2376  2531
2377  4063
      2400          PAGE

                    /
                    /CONVERT OCTAL NUMBERS FOR TYPEOUT
                    /
```



```
2400  0000  SIXTY,  0
2401  7300          CLA CLL
2402  1600          TAD I   SIXTY           /ADDRESS OF OPERAND
2403  3235          DCA     S0
2404  2200          ISZ     SIXTY
2405  1600          TAD I   SIXTY           /STORAGE ADDRESS
2406  3236          DCA     S1
2407  2200          ISZ     SIXTY
2410  1147          TAD     [77
2411  7040          CMA                     /AC=7700
2412  0635          AND I   S0              /FIRST 2 DIGITS OF OPERAND
2413  7002          BSW
2414  4222          JMS     CNV             /CONVERT DIGITS FOR TYPEOUT
2415  2236          ISZ     S1              /INC STORAGE ADDRESS
2416  1147          TAD     [77
2417  0635          AND I   S0              /SECOND 2 DIGITS OF OPERAND
2420  4222          JMS     CNV
2421  5600          JMP I   SIXTY           /DONE
2422  0000  CNV,    0
2423  3237          DCA     S2
2424  1237          TAD     S2
2425  7106          CLL RTL
2426  7004          RAL
2427  0146          AND     [707            /LEFT DIGIT
2430  1237          TAD     S2
2431  0146          AND     [707            /RIGHT DIGIT
2432  1145          TAD     [6060
2433  3636          DCA I   S1              /STORE CONVERTED DIGITS
2434  5622          JMP I   CNV
2435  0000  S0,     0
2436  0000  S1,     0
2437  0000  S2,     0
                    /
                    /TELETYPE OUTPUT WITH BELL
                    /
2440  0000  MES,    0
2441  7240          STA
2442  1240          TAD     MES             /FIRST WORD =1
2443  3010          DCA     10
2444  1410          TAD I   10
2445  3307          DCA     MB
2446  1307          TAD     MB
2447  7002          BSW
2450  4254          JMS     TYPCH           /TYPEOUT FIRST CHARACTER
2451  1307          TAD     MB
2452  4254          JMS     TYPCH           /TYPEOUT SECOND CHARACTER
2453  5244          JMP     MES+4           /CONTINUE

2454  0000  TYPCH,  0
2455  0147          AND     [77
2456  7450          SNA
2457  5410          JMP I   10              /END OF MESSAGE RETURN
2460  1144          TAD     [-34
2461  7440          SZA
```

```
2462  5265            JMP     .+3
2463  1143            TAD     [207            /CODE IS BELL
2464  5305            JMP     MTP
2465  1163            TAD     [-4
2466  7500            SMA                     /CODE LESS THAN 40?
2467  5272            JMP     .+3             /NO
2470  1142            TAD     [330            /YES, ADD 300, CODE IS ALPHA
2471  5305            JMP     MTP
2472  1141            TAD     [-3
2473  7440            SZA
2474  5277            JMP     .+3
2475  1140            TAD     [212            /CODE IS LINE FEED
2476  5305            JMP     MTP
2477  1161            TAD     [-2
2500  7440            SZA
2501  5304            JMP     .+3
2502  1137            TAD     [215            /CODE IS CR
2503  7410            SKP
2504  1136            TAD     [240            /ADD 200 TO OTHERS > 46
2505  4310    MTP,    JMS     TYPE
2506  5654            JMP I   TYPCH
2507  0000    MB,     0
                      /
                      /TYPEOUT CHARACTER IN AC
                      /
2510  0000    TYPE,   0
2511  6000            SKON
2512  5323            JMP     TYPOFF
2513  6046            TLS                     /TRANSMIT CHARACTER
2514  6041            TSF
2515  5314            JMP     .-1             /WAIT FOR FLAG
2516  6042            TCF
2517  6007            CAF
2520  6001            ION
2521  7200            CLA
2522  5710            JMP I   TYPE
2523  6046    TYPOFF, TLS
2524  6041            TSF
2525  5324            JMP     .-1
2526  6042            TCF
2527  7200            CLA
2530  5710            JMP I   TYPE
                      /
                      /TYPEOUT CHARACTER IN AC AND A SPACE
                      /
2531  0000    TYPSP,  0
2532  4310            JMS     TYPE
2533  1135            TAD     [240
2534  4310            JMS     TYPE
2535  5731            JMP I   TYPSP

      2000            PAGE

                      /
```



```
                      /ERROR ROUTINE (BELL ON ERROR HAS PRIORITY)
                      /
2600  0000    RETURN, 0                       /PROGRAM RETURN ADDRESS
2601  7604    CODERR, LAS
2602  0022            AND     SR02            /BELL ON ERROR?
2603  7650            SNA CLA
2604  5210            JMP     .+4
2605  1143    RBELL,  TAD     [207
2606  4777'           JMS     TYPE            /RING BELL
2607  5600            JMP I   RETURN
2610  7604            LAS
2611  0021            AND     SR01
2612  7640            SZA CLA
2613  5241            JMP     STOP            /INHIBIT TYPEOUT
2614  6224            RIF
2615  7012            RTR
2616  7010            RAR
2617  0134            AND     [7
2620  1133            TAD     [4060
2621  3232            DCA     ERROR0
2622  1200            TAD     RETURN
2623  1157            TAD     [-1
2624  3042            DCA     TEMP
2625  4776'           JMS     SIXTY
2626  0042            TEMP
2627  2633            ERROR1
2630  4775'           JMS     ME8
2631  4543            4543
2632  0000    ERROR0, 0                       /FIELD
2633  0000    ERROR1, 0
2634  0000            0                       /PROGRAM LOCATION OF ERROR JMS
2635  4040            4040
2636  0000            0
2637  5640            JMP I   .+1             /TYPEOUT ERROR
2640  0000    ADDER,  0                       /ADDRESS OF ERROR TYPEOUT
2641  7604    STOP,   LAS
2642  0020            AND     SR00            /HALT AFTER ERROR?
2643  7650            SNA CLA
2644  5250            JMP     LIMIT           /INHIBIT ERROR HALT
2645  1200            TAD     RETURN
2646  1157            TAD     [-1
2647  7402            HLT                     /HALT WITH AC & ERROR JMS
2650  7604    LIMIT,  LAS
2651  0024            AND     SR04            /CHANGE FIELD LIMITS?
2652  7640            SZA CLA
2653  5774'           JMP     PATA            /YES
2654  5600            JMP I   RETURN          /NO

                      /
                      /RELOCATION MOVE ERROR
                      /
2655  0000    ERRM,   0
2656  2037            ISZ     COUNT           /MOVE ERROR OCCURRED
2657  7410            SKP
```

```
2660  5256            JMP     .-2
2661  7200            CLA
2662  1255            TAD     ERRM
2663  3200            DCA     RETURN          /RETURN ADDRESS
2664  1373            TAD     (PERRM
2665  3240            DCA     ADDER           /ERROR TYPEOUT ADDRESS
2666  5201            JMP     CODERR
2667  1036    PERRM,  TAD     TSTFLD
2670  7112            CLL RTR
2671  7010            RAR
2672  1133            TAD     C4060
2673  3310            DCA     E10
2674  4776'           JMS     SIXTY
2675  0040            MOVE
2676  2711            E11
2677  4775'           JMS     MES
2700  2205            TEXT
2701  1417                            "RELO ERR AT "
2702  4005
2703  2222
2704  4001
2705  2440
2706  0000
2707  4775'           JMS     MES
2710  0000    E10,    0
2711  0000    E11,    0
2712  0000            0
2713  0000            0
2714  7240            STA
2715  3041            DCA     HEAD1
2716  5241            JMP     STOP

2773  2667
2774  0285
2775  2440
2776  2400
2777  2510
      3000            PAGE

                /
                /DATA OR CHECKERBOARD ERROR OCCURRED
                /
3000  0000    ERRC,   0
3001  2037            ISZ     COUNT   /ERROR OCCURRED
3002  7410            SKP
3003  5201            JMP     .-2
3004  7200            CLA
3005  1220            TAD     ERRC
3006  3777'           DCA     RETURN  /RETURN ADDRESS
3007  1376            TAD     (PERRC
3010  3775'           DCA     ADDER   /ERROR TYPEOUT ADDRESS
3011  7604            LAS
3012  0022            AND     SR02    /BELL ON ERROR
3013  7640            SZA CLA
```



```
3014  5774'           JMP     RBELL   /RING BELL
3015  7604            LAS
3016  0021            AND     SR01
3017  7640            SZA CLA
3020  5773'           JMP     STOP    /INHIBIT TYPEOUT
3021  2041            ISZ     HEAD1
3022  7410            SKP
3023  4772'           JMS     ERRHD   /TYPEOUT ERROR HEADING
3024  5771'           JMP     CODERR

3025  1036    PERRC,  TAD     TSTFLD
3026  7112            CLL RTR
3027  7010            RAR
3030  1133            TAD     C4060
3031  3244            DCA     E1
3032  4770'           JMS     SIXTY
3033  0043            TSTAD
3034  3045            E2
3035  4770'           JMS     SIXTY
3036  0057            CDATA
3037  3051            E3
3040  4770'           JMS     SIXTY
3041  0060            BDATA
3042  3054            E4
3043  4767'           JMS     MES
3044  0000    E1,     0
3045  0000    E2,     0
3046  0000            0               /FAIL ADR
3047  4040            4040
3050  4040            4040
3051  0000    E3,     0
3052  0000            0               /GOOD

3053  4040            4040
3054  0000    E4,     0
3055  0000            0               /BAD
3056  4000            4000
3057  4766'   PARORC, JMS     TTS
3060  4765'           JMS     TN      /NONE
3061  5773'           JMP     STOP
3062  4764'           JMS     T0      /ALL 0
3063  5275            JMP     PERRC0
3064  4763'           JMS     T1      /ALL 1
3065  5275            JMP     PERRC0
3066  4762'           JMS     T07     /0000 - 7777 MQP
3067  5275            JMP     PERRC0
3070  4761'           JMS     T70     /7777 - 0000 MQP
3071  5275            JMP     .+4
3072  4760'           JMS     T25     /2525 - 5252 MQP
3073  7410            SKP
3074  4757'           JMS     T52     /5252 - 2525 MQP
3075  4756'   PERRC0, JMS     TC0
3076  1132            TAD     C38     /NO
3077  1157            TAD     C-1     /IC
```

```
3100  1151          TAD     C262    /2C
3101  4755'         JMS     TYPE
3102  1131          TAD     C303
3103  4755'         JMS     TYPE
3104  5773'         JMP     STOP

3105  2510
3106  3706
3107  3275
3108  3261
3109  3245
3110  3231
3111  3221
3112  3211
3113  3200
3114  3724
3115  2440
3116  2400
3117  2601
3120  4227
3121  2641
3122  2605
3123  2640
3124  3025
3125  2600
      3200          PAGE

                    /
                    /TYPEOUT TEST BEING EXECUTED
                    /
3200  0000  TN,     0
3201  4777'         JMS     MES
3202  1617          TEXT          "NO PATTERN"
3203  4020
3204  0124
3205  2405
3206  2216
3207  0000
3210  5600          JMP I   TN

3211  0000  T0,     0
3212  4777'         JMS     MES
3213  0114          TEXT          "ALL 0 = "
3214  1440
3215  6040
3216  5340
3217  0000
3220  5611          JMP I   T0

3221  0000  T1,     0
3222  4777'         JMS     MES
3223  0114          TEXT          "ALL 1 = "
3224  1440
3225  6140
```



```
3226  5340
3227  0000
3230  5621          JMP I   T1

3231  0000  T07,    0
3232  4777'         JMS     MES
3233  6060          TEXT          "0000-7777 WCP = "
3234  6060
3235  5367
3236  6767
3237  6740
3240  2703
3241  2040
3242  5340
3243  0000
3244  5631          JMP I   T07
3245  0000  T70,    0
3246  4777'         JMS     MES
3247  6767          TEXT          "7777-0000 WCP = "
3250  6767
3251  5360
3252  6060
3253  6040
3254  2703
3255  2040
3256  5340
3257  0000
3260  5645          JMP I   T70

3261  0000  T25,    0
3262  4777'         JMS     MES
3263  6265          TEXT          "2525-5252 WCP = "
3264  6265
3265  5565
3266  6265
3267  6240
3270  2703
3271  2040
3272  5340
3273  0000
3274  5661          JMP I   T25

3275  0000  T52,    0
3276  4777'         JMS     MES
3277  6562          TEXT          "5252-2525 WCP = "
3300  6562
3301  5562
3302  6542
3303  6540
3304  2703
3305  2040
3306  5340
3307  0000
3310  5675          JMP I   T52
```

```
                    /
                    /PARITY ERROR
                    /
3311  7200  PARINT, CLA
3312  1376          TAD     (INTR
3313  3775'         DCA     RETURN
3314  4777'         JMS     MES
3315  4543          TEXT    "%@PARITY ERR, LOC @="
3316  2001
3317  2211
3320  2431
3321  4005
3322  2222
3323  5440
3324  1417
3325  0340
3326  6075
3327  0000
3330  4774'         JMS     SIXTY
3331  0000          0
3332  3337          220
3333  4774'         JMS     SIXTY
3334  0043          TSTAD
3335  3393          221
3336  4777'         JMS     MES
3337  0000  220,    0
3340  0000          0                       /CONTENT OF LOC 0
3341  4040          4040
3342  2423          2423
3343  2401          2401
3344  0475          0475                    /ISTAD=
3345  0000          0000
3346  6004          GTF
3347  0134          AND     (7
3350  1160          TAD     (200
3351  4773'         JMS     TYPE            /TYPE DATA FIELD
3352  4777'         JMS     MES
3353  0000  221,    0
3354  0000          0
3355  4000          4000                    /CONTENT OF TSTAD
3356  6104          CMP
3357  7240          STA
3360  3041          DCA     HEAD1
3361  5772'         JMP     PARORC          /TYPE PRESENT TEST

3372  3057
3373  2510
3374  2400
3375  2600
3376  4514
3377  2440
      3400          PAGE
                    /
                    /KEYBOARD INTERRUPT OCCURRED
```



```
                    /
3400  0000  KBINI,  0
3401  4777'         JMS     MES
3402  4543          TEXT            "%@INT FROM KB="
3403  1116
3404  2440
3405  0022
3406  1715
3407  4013
3410  0200
3411  6032          KCC
3412  7240          STA
3413  3041          DCA     HEAD1
3414  5600          JMP I   KBINT

                    /
                    /UNWANTED INTERRUPT OCCURRED
                    /
3415  4777'  BADINT, JMS     MES
3416  4543          TEXT    "%@UNWANTED INTERRUPT OCCURRED="
3417  2516
3420  2701
3421  1024
3422  0504
3423  4011
3424  1024
3425  0522
3426  2225
3427  2024
3430  4017
3431  0303
3432  2522
3433  2205
3434  0400
3435  6007          CAF
3436  7240          STA
3437  3041          DCA     HEAD1
3440  5776'         JMP     INTR
                    /
                    /SET ONLY STATUS BIT SPECIFIED
                    /
3441  0000  STS0,   0                       /SET TS0 (ALL 0 TEST)
3442  7330          CLA STL RAR
3443  3031          DCA     TS
3444  5641          JMP I   STS0
3445  0000  STS1,   0                       /SET TS1 (ALL 1 TEST)
3446  7332          CLA STL RTR
3447  3031          DCA     TS
3450  5645          JMP I   STS1
3451  0000  STS2,   0                       /SET TS2 (0000 & 7777 MQP TEST)
3452  7332          CLA STL RTR
3453  7010          RAR
3454  3031          DCA     TS
3455  5651          JMP I   STS2
```

```
3456  0000   STS3,   0                          /SET TS3 (7777 - 0000 WCP TEST
3457  7332           CLA STL RTR
3460  7012           RTR
3461  3031           DCA     TS
3462  5656           JMP I   STS3
3463  0000   STS4,   0                          /SET TS4 (2525 - 5252 WCP TEST)
3464  7203           CLA IAC BSW
3465  7104           CLL RAL
3466  3031           DCA     TS
3467  5663           JMP I   STS4
3470  0000   STS5,   0                          /SET TS5 (5252 - 2525 WCP TEST)
3471  7203           CLA IAC BSW
3472  3031           DCA     TS
3473  5670           JMP I   STS5

3474  0000   SCS1,   0                          /SET CS1 (1 COMPLEMENT)
3475  7332           CLA STL RTR
3476  3030           DCA     CS
3477  5674           JMP I   SCS1
3500  0000   SCS2,   0                          /SET CS2 (2 COMPLEMENTS)
3501  7332           CLA STL RTR
3502  7010           RAR
3503  3030           DCA     CS
3504  5700           JMP I   SCS2
                /
                /SET ALSO STATUS BIT SPECIFIED
                /
3505  0000   SFS0,   0                          /SET FS0 (DON'T TEST FIELD 0)
3506  7200           CLA
3507  1032           TAD     FS
3510  7004           RAL
3511  7130           STL RAR
3512  3032           DCA     FS
3513  5705           JMP I   SFS0
3514  0000   SRS0,   0                          /SET RS0 (DON'T RELO TO FIELD 0)
3515  7200           CLA
3516  1033           TAD     RS
3517  7004           RAL
3520  7130           STL RAR
3521  3033           DCA     RS
3522  5714           JMP I   SRS0
3523  0000   SFS1,   0                          /SET FS1 (DON'T TEST FIELD 1)
3524  7200           CLA
3525  1032           TAD     FS
3526  7006           RTL
3527  7132           STL RTR
3530  3032           DCA     FS

3531  5723           JMP I   SFS1
3532  0000   SRS1,   0                          /SET RS1 (DON'T RELO TO FIELD 1)
3533  7200           CLA
3534  1033           TAD     RS
3535  7006           RTL
```



```
3536  7132           STL RTR
3537  3033           DCA     RS
3540  5732           JMP I   SRS1
3541  0000   SFS2,   0                          /SET FS2 (DON'T TEST FIELD 2)
3542  7200           CLA
3543  1032           TAD     FS
3544  7006           RTL
3545  7500           SMA
3546  1130           TAD     [4000
3547  7012           RTR
3550  3032           DCA     FS
3551  5741           JMP I   SFS2
3552  0000   SRS2,   0                          /SET RS2 (DON'T RELO TO FIELD 2)
3553  7200           CLA
3554  1033           TAD     RS
3555  7006           RTL
3556  7500           SMA
3557  1130           TAD     [4000
3560  7012           RTR
3561  3033           DCA     RS
3562  5752           JMP I   SRS2
3576  4514
3577  2440
      3600           PAGE
3600  0000   SFS3,   0                          /SET FS3 (DON'T TEST FIELD 3)
3601  7200           CLA
3602  1032           TAD     FS
3603  0127           AND     [7360
3604  1126           TAD     [400
3605  3032           DCA     FS
3606  5600           JMP I   SFS3
3607  0000   SRS3,   0                          /SET RS3 (DON'T RELO TO FIELD 3)
3610  7200           CLA
3611  1033           TAD     RS
3612  0127           AND     [7360
3613  1126           TAD     [400
3614  3033           DCA     RS
3615  5607           JMP I   SRS3
3616  0000   SFS4,   0                          /SET FS4 (DON'T TEST FIELD 4)
3617  7200           CLA
3620  1032           TAD     FS
3621  0125           AND     [7560
3622  1124           TAD     [200
3623  3032           DCA     FS
3624  5616           JMP I   SFS4

3625  0000   SRS4,   0                          /SET RS4 (DON'T RELO TO FIELD 4)
3626  7200           CLA
3627  1033           TAD     RS
3630  0125           AND     [7560
3631  1124           TAD     [200
3632  3033           DCA     RS
3633  5625           JMP I   SRS4
```

```
3634  0000  SFS5,   0
3635  7200          CLA                     /SET FS5 (DON'T TEST FIELD 5)
3636  1032          TAD     FS
3637  0123          AND     C7660
3640  1122          TAD     C100
3641  3032          DCA     FS
3642  5634          JMP I   SFS5
3643  0000  SRS5,   0
3644  7200          CLA                     /SET RS5 (DON'T RELO TO FIELD 5)
3645  1033          TAD     RS
3646  0123          AND     C7660
3647  1122          TAD     C100
3650  3033          DCA     RS
3651  5643          JMP I   SRS5
3652  0000  SFS6,   0                       /SET FS6 (DON'T TEST FIELD 6)
3653  7200          CLA
3654  1032          TAD     FS
3655  0121          AND     C7720
3656  1172          TAD     C40
3657  3032          DCA     FS
3660  5652          JMP I   SFS6
3661  0000  SRS6,   0
3662  7200          CLA                     /SET RS6 (DON'T RELO TO FIELD 6)
3663  1033          TAD     RS
3664  0121          AND     C7720
3665  1172          TAD     C40
3666  3033          DCA     RS
3667  5661          JMP I   SRS6
3670  0000  SFS7,   0
3671  7200          CLA                     /SET FS7 (DON'T TEST FIELD 7)
3672  1032          TAD     FS
3673  0164          AND     C7740
3674  1170          TAD     C20
3675  3032          DCA     FS
3676  5670          JMP I   SFS7
3677  0000  SRS7,   0
3700  7200          CLA                     /SET RS7 (DON'T RELO TO FIELD 7)
3701  1033          TAD     RS

3702  0164          AND     C7740
3703  1170          TAD     C20
3704  3033          DCA     RS
3705  5677          JMP I   SRS7
                /
                /TEST COMPLEMENT STATUS
                /RETURN IF NC, RETURN+1 IF 1C, RETURN+2 IF 2C
                /
3706  0000  TCS,    0
3707  7200          CLA
3710  1030          TAD     CS
3711  7450          SNA
3712  5706          JMP I TCS               /NC
3713  2306          ISZ     TCS
3714  7106          CLL RTL
```



```
3715  7430          SZL
3716  5706          JMP I   TCS             /1C
3717  2306          ISZ     TCS
3720  7710          SPA CLA
3721  5706          JMP I   TCS             /2C
3722  7402          HLT                     /ERRONEOUS STATUS BITS SET
3723  5322          JMP     .+1
                /
                /TEST TEST STATUS
                /RETURN IF NO TEST
                /RETUN +2 IF ALL 0 TEST
                /RETURN +4 IF ALL 1 TEST
                /RETURN +6 IF 0000 - 7777 WCP
                /RETURN +8 IF 7777 - 0000 WCP
                /RETURN +10 IF 2525 - 5252 WCP
                /RETURN +12 IF 5252 - 2525 WCP
                /
3724  0000  TTS,    0
3725  7200          CLA
3726  1031          TAD     TS
3727  0120          AND     C7760
3730  7450          SNA
3731  5724          JMP I   TTS             /NO TEST
3732  2324          ISZ     TTS
3733  2324          ISZ     TTS
3734  7104  TTS0,   CLL RAL
3735  7421          MQL
3736  7430          SZL                     /CHECK THIS TEST BIT
3737  5724          JMP I   TTS
3740  2324          ISZ     TTS
3741  2324          ISZ     TTS
3742  7521          SWP
3743  5334          JMP     TTS0            /CHECK NEXT TEST BIT

      4000          PAGE


                /
                /TEST FIELD STATUS
                /RETURN IF FIELD STATUS BIT SET (DON'T TEST FIELD)
                /RETURN +1 IF FIELD STATUS BIT RESET (TEST THIS FIELD)
                /
4000  0000  TFS0,   0
4001  7200          CLA
4002  1032          TAD     FS
4003  7700          SMA CLA                 /FIELD 0
4004  2200          ISZ     TFS0
4005  5600          JMP I   TFS0

4006  0000  TFS1,   0
4007  7200          CLA
4010  1032          TAD     FS
4011  7004          RAL
4012  7700          SMA CLA         /FIELD 1
4013  2206          ISZ     TFS1
```

```
4014  5606          JMP I   TFS1

4015  0000  TFS2,   0
4016  7200          CLA
4017  1032          TAD     FS
4020  7006          RTL
4021  7700          SMA CLA                 /FIELD 2
4022  2215          ISZ     TFS2
4023  5615          JMP I   TFS2

4024  0000  TFS3,   0
4025  7200          CLA
4026  1032          TAD     FS
4027  7006          RTL
4030  7004          RAL
4031  7700          SMA CLA                 /FIELD 3
4032  2224          ISZ     TFS3
4033  5624          JMP I   TFS3

4034  0000  TFS4,   0
4035  7200          CLA
4036  1032          TAD     FS
4037  7006          RTL
4040  7006          RTL
4041  7700          SMA CLA                 /FIELD 4
4042  2234          ISZ     TFS4
4043  5634          JMP I   TFS4
4044  0000  TFS5,   0
4045  7200          CLA
4046  1032          TAD     FS
4047  7002          BSW
4050  7010          RAR
4051  7620          SNL CLA                 /FIELD 5
4052  2244          ISZ     TFS5
4053  5644          JMP I   TFS5

4054  0000  TFS6,   0
4055  7200          CLA
4056  1032          TAD     FS
4057  7002          BSW
4060  7700          SMA CLA                 /FIELD 6
4061  2254          ISZ     TFS6
4062  5654          JMP I   TFS6

4063  0000  TFS7,   0
4064  7200          CLA
4065  1032          TAD     FS
4066  7002          BSW
4067  7004          RAL
4070  7700          SMA CLA                 /FIELD 7
4071  2263          ISZ     TFS7
4072  5663          JMP I   TFS7

                    /
```



```
                    /TEST RELOCATION STATUS
                    /RETURN IF RELO STATUS BIT SET (DON'T RELO TO FIELD)
                    /RETURN+1 IF RELO STATUS BIT RESET (RELO TO THIS FIELD)
                    /
4073  0000  TRS0,   0
4074  7200          CLA
4075  1033          TAD     RS
4076  7700          SMA CLA                 /FIELD 0
4077  2273          ISZ     TRS0
4100  5673          JMP I   TRS0

4101  0000  TRS1,   0
4102  7200          CLA
4103  1033          TAD     RS
4104  7004          RAL
4105  7700          SMA CLA                 /FIELD 1
4106  2301          ISZ     TRS1
4107  5701          JMP I   TRS1

4110  0000  TRS2,   0
4111  7200          CLA
4112  1033          TAD     RS
4113  7006          RTL
4114  7700          SMA CLA                 /FIELD 2
4115  2310          ISZ     TRS2
4116  5710          JMP I   TRS2

4117  0000  TRS3,   0
4120  7200          CLA
4121  1033          TAD     RS
4122  7004          RAL
4123  7006          RTL
4124  7700          SMA CLA                 /FIELD 3
4125  2317          ISZ     TRS3
4126  5717          JMP I   TRS3

4127  0000  TRS4,   0
4130  7200          CLA
4131  1033          TAD     RS
4132  7006          RTL
4133  7006          RTL
4134  7700          SMA CLA                 /FIELD 4
4135  2327          ISZ     TRS4
4136  5727          JMP I   TRS4

      4200          PAGE

4200  0000  TRS5,   0
4201  7200          CLA
4202  1033          TAD     RS
4203  7002          BSW
4204  7010          RAR
4205  7020          SNL CLA                 /FIELD 5
4206  2200          ISZ     TRS5
```

```
4207  5600            JMP I   TR85

4210  0000    TR86,   0
4211  7200            CLA
4212  1033            TAD     RS
4213  7002            BSW
4214  7700            SMA CLA                 /FIELD 6
4215  2210            ISZ     TR86
4216  5610            JMP I   TR86

4217  0000    TR87,   0
4220  7200            CLA
4221  1033            TAD     RS
4222  7002            BSW
4223  7004            RAL
4224  7700            SMA CLA                 /FIELD 7
4225  2217            ISZ     TR87
4226  5617            JMP I   TR87

                /
                /TYPEOUT ERROR HEADING
                /
4227  0000    ERRHD,  0
4230  4777'           JMS     MES
4231  4543            TEXT    "%@PR LOC  FAIL ADR  GOOD  BAD  PATTERN"
4232  2022
4233  4014
4234  1703
4235  4040
4236  0601
4237  1114
4240  4001
4241  0422
4242  4040
4243  0717
4244  1704
4245  4040
4246  0201
4247  0440
4250  4020
4251  0124
4252  2405
4253  2216
4254  0000
4255  5627            JMP I   ERRHD

                /
                /TYPEOUT PROGRAM TITLE
                /
4256  0000    TITLE,  0
4257  4777'           JMS     MES
4260  4543            TEXT    "%@@PDP-8E EXT MEM DATA & CHKBD@"
4261  4320
4262  0420
4263  5570
```



```
4264  0540
4265  0530
4266  2440
4267  1505
4270  1540
4271  0401
4272  2401
4273  4046
4274  4003
4275  1013
4276  0204
4277  4300
4300  5656            JMP I   TITLE

                /
                /TYPEOUT TO SET SWITCHES
                /
4301  0000    SETSW,  0
4302  4777'           JMS     MES
4303  4543            TEXT    "%@SETUP SR & CONT"
4304  2305
4305  2425
4306  2040
4307  2322
4310  4046
4311  4003
4312  1716
4313  2400
4314  7402            HLT
4315  5701            JMP I   SETSW


                /
                /TYPEOUT 'NO RELOCATION'
                /
4316  0000    PNOREL, 0
4317  4777'           JMS     MES
4320  4543            TEXT    "%@NO RELOCATION, PROG IN FIELD "
4321  1617
4322  4022
4323  0514
4324  1703
4325  0124
4326  1117
4327  1654
4330  4020
4331  2217
4332  0740
4333  1116
4334  4006
4335  1105
4336  1404
4337  4000
4340  6224            RIF
```

```
4341  7106            CLL RTL
4342  7004            RAL
4343  1117            TAD     [6000
4344  3346            DCA     .+2
4345  4777'           JMS     .+2
4346  0000    .+2,    0
4347  7240            STA
4350  3041            DCA     HEAD1
4351  5716            JMP I   PNOREL

4377  2440
      4400            PAGE
                /
                /TYPEOUT 'RELOCATION'
                /
4400  0000    PREL,   0
4401  4777'           JMS     .+2
4402  4543            TEXT    "%%PROG WILL RELOCATE"
4403  2022
4404  1707
4405  4027
4406  1114
4407  1440
4410  2205
4411  1417
4412  0301
4413  2405
4414  0000
4415  7240            STA
4416  3041            DCA     HEAD1
4417  5600            JMP I   PREL

                /
                /TYPEOUT 'PROGRAM IN SELECTED FIELD'
                /
4420  4777'   PINF,   JMS     .+2
4421  4543            TEXT    "%%PROGRAM IN SELECTED FIELD"
4422  2022
4423  1707
4424  2201
4425  1540
4426  1116
4427  4023
4430  0514
4431  0503
4432  2405
4433  0440
4434  0611
4435  0514
4436  0400
4437  5776'           JMP     PATA            /SETUP SWITCHES AGAIN

                /
                /TYPEOUT 'NONE' FOR NO LEGAL FIELD SELECTION
                /
```



```
4440  4777'   NOFLD,  JMS     .+2
4441  1017            TEXT    "NONE"
4442  1605
4443  0000
4444  5776'           JMP     PATA            /SETUP SWITCHES AGAIN


                /
                /RELOCATE THE PROGRAM
                /
4445  0000    RELO,   0
4446  7200            CLA
4447  3037            DCA     COUNT           /CLEAR ERROR COUNTER
4450  3040            DCA     MOVE            /CLEAR MOVE COUNTER
4451  1176            TAD     [6201
4452  1035            TAD     PROFLD
4453  3264            DCA     RELO2
4454  1176            TAD     [6201
4455  1036            TAD     TSTFLD
4456  3266            DCA     RELO3
4457  1264            TAD     RELO2
4460  3271            DCA     RELO4
4461  1116            TAD     [6203
4462  1036            TAD     TSTFLD
4463  3302            DCA     RELO5
4464  6201    RELO2,  CDF     0               /MOVE FROM DF
4465  1440            TAD I   MOVE
4466  6201    RELO3,  CDF     0               /MOVE TO DF
4467  3440            DCA I   MOVE
4470  1440            TAD I   MOVE
4471  6201    RELO4,  CDF     0               /MOVE FROM DF
4472  7041            CIA
4473  1440            TAD I   MOVE
4474  7640            SZA CLA
4475  4775'           JMS     ERRM            /MOVE ERROR
4476  2040            ISZ     MOVE
4477  5264            JMP     RELO2
4500  1037            TAD     COUNT
4501  7650            SNA CLA                 /SKIP IF MOVE ERROR
4502  6203    RELO5,  CDI     0               /NEW PROGRAM FIELD
4503  5645            JMP I   RELO

                /
                /INTERRUPT ROUTINE
                /
4504  4774'   INTROU, JMS     SAVINT
4505  6107            SPD                     /SKIP IF PARITY OPTION
4506  5311            JMP     .+3
4507  6101            SMP
4510  5773'           JMP     PARINT          /PARITY ERROR
4511  6031            KSF
4512  5772'           JMP     BADINT          /UNWANTED INTERRUPT
4513  4771'           JMS     KBINT           /KEYBOARD INTERRUPT
4514  4770'   INTR,   JMS     RESINT
```

```
4515  7200          CLA
4516  1062          TAD     SMQ
4517  7421          MQL                     /RESTORE MQ
4520  6004          GTF
4521  6005          RTF
4522  7200          CLA
4523  1061          TAD     SAC             /RESTORE AC
4524  5400          JMP I   0

                    /
                    /TURN INTERRUPT ON IF FIELD 0 AND PARITY OPTION INSTALLED
                    /
4525  0000    PAR,  0
4526  7300          CLA CLL
4527  6007          CAF
4530  6107          SPO                     /SKIP ON PARITY OPTION
4531  5725          JMP I   PAR
4532  6224          RIF
4533  7650          SNA CLA                 /SKIP IF NOT FIELD 0
4534  6001          ION
4535  5725          JMP I   PAR
4570  4663
4571  3400
4572  3415
4573  3311
4574  4000
4575  2655
4576  0205
4577  2440
      4600          PAGE
4600  0000    SAVINT, 0
4601  7200          CLA
4602  1777'         TAD     SIXTY
4603  3063          DCA     A1
4604  1776'         TAD     CNV
4605  3064          DCA     A2
4606  1775'         TAD     SB
4607  3065          DCA     A3
4610  1774'         TAD     S1
4611  3066          DCA     A4
4612  1773'         TAD     S2
4613  3067          DCA     A5
4614  1772'         TAD     MEB
4615  3070          DCA     A6
4616  1771'         TAD     TYPCH
4617  3071          DCA     A7
4620  1770'         TAD     MB
4621  3072          DCA     A8
4622  1767'         TAD     TYPE
4623  3073          DCA     A9
4624  1766'         TAD     TYPSP
4625  3074          DCA     A10
4626  1765'         TAD     RETURN
4627  3075          DCA     A11
```



```
4630  1764'         TAD     ERROR0
4631  3076          DCA     A12
4632  1763'         TAD     ERROR1
4633  3077          DCA     A13
4634  1762'         TAD     ERROR1+1
4635  3100          DCA     A14
4636  1761'         TAD     ADDER
4637  3101          DCA     A15
4640  1760'         TAD     TN
4641  3102          DCA     A16
4642  1757'         TAD     T0
4643  3103          DCA     A17
4644  1756'         TAD     T1
4645  3104          DCA     A18
4646  1755'         TAD     T07
4647  3105          DCA     A19
4650  1754'         TAD     T7B
4651  3106          DCA     A20
4652  1753'         TAD     T2B
4653  3107          DCA     A21
4654  1752'         TAD     T52
4655  3110          DCA     A22
4656  1751'         TAD     TCB
4657  3111          DCA     A23
4660  1750'         TAD     TTB
4661  3112          DCA     A24
4662  5600          JMP I   SAVINT
4663  0000    RESINT, 0
4664  7200          CLA
4665  1063          TAD     A1
4666  3777'         DCA     SIXTY
4667  1064          TAD     A2
4670  3776'         DCA     CNV
4671  1065          TAD     A3
4672  3775'         DCA     SB
4673  1066          TAD     A4
4674  3774'         DCA     S1
4675  1067          TAD     A5
4676  3773'         DCA     S2
4677  1070          TAD     A6
4700  3772'         DCA     MEB
4701  1071          TAD     A7
4702  3771'         DCA     TYPCH
4703  1072          TAD     A8
4704  3770'         DCA     MB
4705  1073          TAD     A9
4706  3767'         DCA     TYPE
4707  1074          TAD     A10
4710  3766'         DCA     TYPSP
4711  1075          TAD     A11
4712  3765'         DCA     RETURN
4713  1076          TAD     A12
4714  3764'         DCA     ERROR0
4715  1077          TAD     A13
4716  3763'         DCA     ERROR1
```

```
4717  1100            TAD     A11
4720  3762'           DCA     ERROR1+1
4721  1101            TAD     A10
4722  3761'           DCA     ADDER
4723  1102            TAD     A16
4724  3760'           DCA     TN
4725  1103            TAD     A17
4726  3757'           DCA     T0
4727  1104            TAD     A18
4730  3756'           DCA     T1
4731  1105            TAD     A19
4732  3755'           DCA     T07
4733  1106            TAD     A20
4734  3754'           DCA     T70
4735  1107            TAD     A21
4736  3753'           DCA     T20
4737  1110            TAD     A22
4740  3752'           DCA     T50
4741  1111            TAD     A23
4742  3751'           DCA     TC0
4743  1112            TAD     A24
4744  3750'           DCA     TT0
4745  5663            JMP I   RESINT

4750  3724
4751  3706
4752  3275
4753  3261
4754  3245
4755  3231
4756  3221
4757  3211
4760  3200
4761  2648
4762  2634
4763  2633
4764  2632
4765  2608
4766  2531
4767  2518
4770  2507
4771  2454
4772  2440
4773  2437
4774  2436
4775  2435
4776  2422
4777  2400
      6000    *6000
6000  4777'   LOOP1,  JMS     SAVDF
6001  4776'           JMS     MES
6002  4543            TEXT    "%@LOOP ON ADDRESS SET IN SR"
6003  1417
6004  1720
6005  4017
```



```
6006  1040
6007  0104
6010  0422
6011  0523
6012  2340
6013  2305
6014  2440
6015  1116
6016  4023
6017  2200
6020  4775'           JMS     RESDF
6021  7604    LOOP1A, LAS
6022  3232            DCA     SR
6023  1632            TAD I   SR
6024  7040            CMA
6025  3632            DCA I   SR
6026  1632            TAD I   SR
6027  7040            CMA
6030  3632            DCA I   SR
6031  5221            JMP     LOOP1A
6032  0000    SR,     0

6175  6672
6176  2440
6177  6000
      6200    *6200
6200  4777'   LOOP2,  JMS     SAVDF
6201  4776'           JMS     MES
6202  4543            TEXT    "%@LOOP ONLY THE 2 ADDRESSES INPUT FROM THE SR"
6203  1417
6204  1720
6205  4017
6206  1614
6207  3140
6210  2416
6211  0540
6212  6246
6213  0104
6214  0422
6215  0523
6216  2305
6217  2340
6220  1116
6221  2023
6222  2440
6223  0622
6224  1715
6225  4024
6226  1005
6227  4023
6230  2200
6231  4242            JMS     INIT
6232  4775'           JMS     RESDF
6233  1716    LOOP2A, TAD I   FIRST
6234  7040            CMA
```

```
6235  3716            DCA I   FIRST
6236  1717            TAD I   SECOND
6237  7040            CMA
6240  3717            DCA I   SECOND
6241  5233            JMP     LOOP2A
6242  0000    IN12,   0
6243  4776'           JMS     ME8
6244  4943            TEXT    "%8SET SR TO FIRST ADDRESS & CONT"
6245  2385
6246  2440
6247  2322
6250  4824
6251  1740
6252  0611
6253  2223
6254  2440
6255  0104
6256  0402
6257  0523
6260  2340
6261  4040
6262  0317
6263  1024
6264  0000
6265  7402            HLT
6266  7004            LAS
6267  3316            DCA     FIRST
6270  4776'           JMS     ME8
6271  4943            TEXT    "%8SET SR TO SECOND ADDRESS & CONT"
6272  2385
6273  2440
6274  2322
6275  4824
6276  1740
6277  2385
6300  0317
6301  1604
6302  4001
6303  0404
6304  2285
6305  2303
6306  4046
6307  4003
6310  1716
6311  2400
6312  7402            HLT
6313  7004            LAS
6314  3317            DCA     SECOND
6315  5642            JMP I   IN12
6316  0000    FIRST,  0
6317  0000    SECOND, 0

6375  6672
6376  2440
6377  6440
```



```
6400    *6400
6400  4777'     LOOP3,  JMS     SAVDF
6401  4776'             JMS     ME8
6402  4543              TEXT    "%8LOOP FROM FIRST ADDRESS THRU SECOND ADDRESS"
6403  1417
6404  1720
6405  4006
6406  2217
6407  1340
6410  0611
6411  2223
6412  2440
6413  0104
6414  0402
6415  0523
6416  2340
6417  2410
6420  2225
6421  4023
6422  0503
6423  1716
6424  0440
6425  0104
6426  0402
6427  0523
6430  2300
6431  4775'             JMS     IN12
6432  1774'             TAD     FIRST
6433  3261              DCA     SRL1
6434  1773'             TAD     SECOND
6435  3262              DCA     SRL2
6436  4772'             JMS     RESDF
6437  1261    LOOP3A,   TAD     SRL1
6440  3268              DCA     SRL
6441  1668    LOOP3B,   TAD I   SRL
6442  7040              CMA
6443  3668              DCA I   SRL
6444  1668              TAD I   SRL
6445  7040              CMA
6446  3668              DCA I   SRL
6447  1268              TAD     SRL
6450  7041              CIA
6451  1262              TAD     SRL2
6452  7650              SNA CLA
6453  5237              JMP     LOOP3A
6454  2268              ISZ     SRL
6455  5241              JMP     LOOP3B
6456  7402              HLT
6457  5200              JMP     LOOP3           /HALT RESULTED FROM ILLEGAL LIMITS
6460  0000    SRL;      0
6461  0000    SRL1,     0
6462  0000    SRL2,     0

6572  6672
6573  6317
```

```
6574  6316
6575  6242
6576  2448
6577  6668
      6600    *6600
6600  4266    LOOP4,  JMS     SAVDF
6601  4777'           JMS     MES
6602  4543            TEXT    "%%LOOP DATA IN THE SR ON THE INPUT ADDRESS"
6603  1417
6604  1720
6605  4804
6606  0124
6607  0140
6610  1116
6611  4824
6612  1005
6613  4823
6614  2240
6615  1716
6616  4824
6617  1005
6620  4811
6621  1020
6622  2524
6623  4801
6624  6404
6625  2205
6626  2323
6627  0000
6630  4777'           JMS     MES
6631  4543            TEXT    "%%SET SR TO ADDRESS & CONT"
6632  2305
6633  2440
6634  2322
6635  4824
6636  1740
6637  0104
6640  6402
6641  6523
6642  2340
6643  4440
6644  6317
6645  1624
6646  0000
6647  4272            JMS     RESDF
6650  7402            HLT
6651  7604            LAS
6652  3257            DCA     SR4
6653  7604    LOOP4A, LAS
6654  3657            DCA I   SR4
6655  1657            TAD I   SR4
6656  5253            JMP     LOOP4A
6657  0000    SR4,    0
6660  0000    SAVDF,  0
6661  7200            CLA
```



```
6662  6214            RDF
6663  3271            DCA     SAVE
6664  6224            RIF
6665  1176            TAD     [6201
6666  3267            DCA     .+1
6667  6201            CDF     00              /PROGRAM DF
6670  5660            JMP I   SAVDF
6671  0000    SAVE,   0

6672  0000    RESDF,  0
6673  1271            TAD     SAVE
6674  1176            TAD     [6201
6675  3276            DCA     .+1
6676  6201            CDF     00              /LOOP DF
6677  5672            JMP I   RESDF

6777  2448
      7000    *7000
7000  4777'   LOOP5,  JMS     SAVDF
7001  4776'           JMS     MES
7002  4543            TEXT    "%%LOOP DATA IN THE SR THRU THE ADDRESS SELECTION"
7003  1417
7004  1720
7005  4804
7006  0124
7007  0140
7010  1116
7011  4824
7012  1005
7013  4823
7014  2240
7015  2416
7016  2225
7017  4824
7020  1005
7021  4801
7022  6404
7023  2205
7024  2323
7025  4523
7026  6514
7027  6503
7030  2411
7031  1716
7032  0000
7033  4775'           JMS     INI2
7034  1774'           TAD     FIRST
7035  3260            DCA     SR5A
7036  1773'           TAD     SECOND
7037  3261            DCA     SR5B
7040  4772'           JMS     RESDF
7041  1260    LOOP5A, TAD     SR5A
7042  3262            DCA     SR5C
7043  7604    LOOP5B, LAS
7044  3662            DCA I   SR5C
```

```
7045  1662          TAD I   SR8C
7046  3662          DCA I   SR8C
7047  1262          TAD     SR8C
7050  7041          CIA
7051  1261          TAD     SR9B
7052  7650          SNA CLA
7053  5241          JMP     LOOP5A          /START AGAIN WITH FIRST ADDRESS
7054  2262          ISZ     SR8C
7055  5243          JMP     LOOP5B          /DO NEXT ADDRESS
7056  7402          HLT                     /HALT RESULTED FROM ILLEGAL LIMITS
7057  5200          JMP     LOOP5
7060  0000  SR5A,   0                       /FIRST ADDRESS OF GROUP
7061  0000  SR5B,   0                       /LAST ADDRESS OF GROUP
7062  0000  SR5C,   0                       /ADDRESS COUNTER

                    $
7172  6672
7173  6317
7174  6316
7175  6242
7176  2440
7177  6660
0116  6203
0117  6000
0120  7760
0121  7720
0122  0100
0123  7660
0124  0200
0125  7560
0126  0400
0127  7360
0130  4000
0131  0303
0132  0035
0133  4060
0134  0007
0135  0240
0136  0245
0137  0215
0140  0212
0141  7775
0142  0340
0143  0207
0144  7744
0145  6060
0146  0707
0147  0077
0150  0261
0151  0262
0152  0263
0153  0264
0154  0265
0155  0266
0156  0267
```



```
0157  7777
0160  0260
0161  7776
0162  7700
0163  7774
0164  7740
0165  5252
0166  2525
0167  0010
0170  0020
0171  0030
0172  0040
0173  0050
0174  0060
0175  0070
0176  6201
0177  4504
```

```
0000  11111000  00000000  11111111  11111111  11111111  11111111  11111111  11111111
0100  11111111  11100011  11111111  11111111  11111111  11111111  11111111  11111111

0200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
0300  11111111  11111111  10000000  00000000  00000000  00000000  00000001  11111111

0400  11111111  11111111  11111111  11111111  11111111  11111111  11111110  00000000
0500  00000000  00000000  00000000  00000000  00000000  00000000  00000111  11111111

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

1000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1100  11111111  11111111  11111111  11110000  00000000  00001111  11111111  11111111

1200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1300  00000000  00000000  00000000  00000000  00000000  00000000  00000000  00000001

1400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1500  11111111  11111111  11111111  11111111  11111000  00000000  00000000  00111111

1600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1700  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

2000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2100  11111111  11111111  00000000  00000000  00000000  00000000  00001111  11111111

2200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2300  11111111  11111111  11110000  00000000  00000000  00000000  00000001  11111111

2400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2500  11111111  11111111  11111111  11111100  00000000  00000000  00000000  00000000

2600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2700  11111111  11111110  00000000  00000000  00000000  00000000  00000000  00111111

3000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
3100  11111000  00000000  00000000  00000000  00000000  00000111  11111111  11111111

3200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
3300  11111111  11111111  11111111  11111111  11111111  11111111  11000000  00111111

3400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
3500  11111111  11111111  11111111  11111111  11111111  11111111  11100000  00000011

3600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
3700  11111111  11111111  11111111  11111111  11110000  00000000  00000000  00000000
```



```
4000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
4100  11111111  11111111  11111111  11111110  00000000  00000000  00000000  00000000

4200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
4300  11111111  11111111  11111111  11111111  11111111  11000000  00000000  00000001

4400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
4500  11111111  11111111  11111111  11111100  00000000  00000000  00000000  11111111

4600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
4700  11111111  11111111  11111111  11111111  11111100  11111111  11111111  11111111

5000
5100

5200
5300

5400
5500

5600
5700

6000  11111111  11111111  11111111  11100000  00000000  00000000  00000000  00000000
6100  00000000  00000000  00000000  00000000  00000000  00000000  00000000  00000111

6200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
6300  11111111  11111111  00000000  00000000  00000000  00000000  00000000  00000111

6400  11111111  11111111  11111111  11111111  11111111  11111111  11100000  00000000
6500  00000000  00000000  00000000  00000000  00000000  00000000  00000000  00111111

6600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
6700  00000000  00000000  00000000  00000000  00000000  00000000  00000000  00000001

7000  11111111  11111111  11111111  11111111  11111111  11111111  11100000  00000000
7100  00000000  00000000  00000000  00000000  00000000  00000000  00000000  00111111

7200
7300

7400
7500

7600
7700
```

```
A       0053
A1      0063
A10     0074
A11     0075
A12     0076
A13     0077
A14     0100
A15     0101
A16     0102
A17     0103
A18     0104
A19     0105
A2      0064
A20     0106
A21     0107
A22     0110
A23     0111
A24     0112
A3      0065
A4      0066
A5      0067
A6      0070
A7      0071
A8      0072
A9      0073
ACL     7701
ADDER   2640
B       0054
BADINT  3415
BDATA   0060
BSW     7002
CAF     6007
CDI     6203
CFF     2200
CFF0    2212
CFF1    2226
CFF2    2230
CFF3    2241
CFF4    2251
CHECK   2261
CHECK0  2262
CMP     6104
CNV     2422
CODERR  2001
COUNT   0037
CRELO   0034
CS      0030
CSAME   0460
CSR03   2007
DFEIF   0232
ENDF    0050
ERRA    1600
ERRA1   1611
ERRB    1626
ERRB1   1637
ERRC    3000
ERRMD   4227
ERRM    2655
ERROR0  2632
ERROR1  2633
FCNT    0046
FIRST   6316
FIVE    0044
FS      0032
GDATA   0057
GERRC   1604
GTF     6004
HEAD1   0041
IN12    6242
INSAME  0051
INTR    4514
INTROU  4564
KBINT   3400
KTEST   0651
LEGAL   1670
LEGAL0  0052
LEGALA  1793
LIMIT   2650
LOOP1   6000
LOOP1A  6021
LOOP2   6200
LOOP2A  6233
LOOP3   6400
LOOP3A  6437
LOOP3B  6441
LOOP4   6600
LOOP4A  6633
LOOP5   7000
LOOP5A  7041
LOOP5B  7043
M0      2507
MES     2440
MIN5    0045
MOVE    0040
MQL     7421
MTP     2505
NOFLD   4440
P2      0055
PAR     4525
PARINT  3311
PARORC  3057
PATA    0205
PATM    0242
PATM0   0245
PATN    0237
PATN0   0202
PATO    0276
PATO0   0303
PERRC   3025
PERRC0  3075
PERRM   2667
PINF    4420
PNOREL  4316
PREL    4400
PROFLD  0035
RBELL   2605
RQA2    1407
RQAC    1414
RQB2    1402
RQBC    1407
RQFLD   1400
RQFLDA  1412
RQFLDB  1405
READ    1526
RELO    4445
RELO2   4404
RELO3   4406
RELO4   4471
RELO5   4502
RESDF   0672
RESINT  4003
RETURN  2600
RF      0033
RTF     6005
S0      2435
S1      2436
S2      2437
SAC     0001
SAME    2000
SAVDF   0600
SAVE    0671
SAVINT  4000
SCS1    3474
SCS2    3500
SECOND  6317
SETFS   2015
SETR0   0456
SETR1   0452
SETR2   0446
SETR3   0442
SETR4   0436
SETR5   0432
SETR6   0426
SETR7   0422
SETREL  0400
SETRP   0412
SETSW   4701
SF00    3505
SF01    3503
SF02    3501
SF03    3000
SF04    3016
SF05    3034
SF06    3002
SF07    3070
SIXTY   2400
SKON    6000
SMP     6101
SMQ     0062
SPO     6107
SR      6032
SR00    0000
SR01    0001
SR02    0002
SR03    0003
SR04    0004
SR05    0005
SR4     6007
SR5A    7000
SR5B    7001
SR5C    7002
SR60    0006
SR11    0007
SRL     6466
SRL1    6461
SRL2    6462
SR00    3514
SR01    3512
SR02    3502
SR03    3007
SR04    3005
SR05    3043
SR06    3041
SR07    3077
STARTF  0047
STOP    2041
ST00    3441
ST01    3440
ST02    3451
ST03    3456
ST04    3463
ST05    3470
SWP     7521
T0      3211
T07     3231
T1      3221
T25     3261
T52     3275
T70     3245
TCS     3706
TEMP    0042
TEST    0000
TEST0   0052
TEST1   1012
TEST2   1025
TEST3   1040
TEST4   1053
TEST5   1066
TEST6   1101
TEST7   1114
TEST8   1127
TFS0    4000
TFS1    4006
TFS2    4015
TFS3    4024
TFS4    4034
TFS5    4044
TFS6    4054
TFS7    4063
TITLE   4256
TN      3200
TOSEL   2263
TRS0    4073
TRS1    4101
TRS2    4110
TRS3    4117
TRS4    4127
TRS5    4200
TRS6    4210
TRS7    4217
TS      0031
TSTAD   0043
TSTFLD  0036
TTS     3724
TTS0    3734
TYPCH   2454
TYPE    2510
TYPOFF  2523
TYPSP   2531
W4      0056
WRA     1231
WRA1    1240
WRB     1253
WRB1    1262
WRFLD   1200
Z1      3044
Z10     2710
Z11     2711
Z2      3045
Z20     3337
Z21     3353
Z3      3051
Z4      3054
Z8      4346
```

```
ERRORS DETECTED: 0
LINKS GENERATED: 284
RUN-TIME: 18 SECONDS
3K CORE USED
```