DHMCA

IDENTIFICATION

PRODUCT CODE: MAINDEC-8E-D1HB-D

PRODUCT NAME: PDP8-E MEMORY EXTENSION
AND TIME SHARE CONTROL TEST

DATE CREATED: OCTOBER 8, 1971

MAINTAINER: DIAGNOSTIC PROGRAMMING GROUP

AUTHOR: J. VROBEL

M. C. N. REQUIRED
THIS PROGRAM REQUIRES MCN(S)
IN ORDER TO WORK PROPERLY

1. ABSTRACT

THIS PROGRAM TESTS THE MEMORY EXTENSION AND TIME SHARE CONTROL LOGIC FOR PROPER OPERATION. THE PROGRAM EXERCISES AND TESTS ALL IOT'S ASSOCIATED WITH MEMORY EXTENSION AND TIME SHARE CONTROL.

ERRORS ENCCUNTERED DURING RUNNING WILL RESULT IN A PROGRAM "HALT" OR A "JUMP TO SELF", WHICH MAY OCCUR IN ANY FIELD DEPENDING ON THE PORTION OF THE TEST EXECUTED. ERRORS MAY BE IDENTIFIED BY REFERENCING THE PROGRAM LISTING.

2. REQUIREMENTS

2.1 EQUIPMENT

PDP8-E COMPUTER WITH THE KM8-E OPTION INSTALLED AND AT LEAST 4K OF EXTENDED MEMORY.

2.2 STORAGE

THE PROGRAM REQUIRES 4200(8) LOCATIONS OF CORE MEMORY AND MUST RESIDE IN FIELD 0 ONLY.

2.3 PRELIMINARY PROGRAMS

ALL THE PROGRAMS FOR THE BASIC PDP8-E MUST HAVE BEEN RUN SUCCESSFULLY.

3. LOADING PROCEDURE

3.1 METHOD

THE PROGRAM IS LOADED INTO "FIELD 0" USING THE STANDARD BINARY LOADER TECHNIQUE.

4. STARTING PROCEDURE

4.1 CONTROL SWITCH SETTINGS

SR 9, 10, AND 11 MUST CONTAIN AN OCTAL VALUE EQUAL TO THE NUMBER OF EXTENDED FIELDS AVAILABLE. NOTE THAT FIELD 0 IS NOT INCLUDED.

SR0=0 WILL RESULT IN COMPLETE PROGRAM EXECUTION OF THE MEMORY

EXTENSION AND TIME SHARE CONTROL.

SR0=1 WILL LOOP THE PROGRAM ON THE MEMORY EXTENSION PORTION AND TEST THAT THE TIME SHARE IS DISABLED.

SR1=1 WILL RESULT IN AN END OF TEST HALT AT LOCATION 1565(8).

4.2 STARTING ADDRESS

THE STARTING ADDRESS IS LOCATION 0200(8).

4.3 OPERATOR ACTION

4.3.1 MEMORY EXTENSION AND TIME SHARE CONTROL (TIME SHARE ENABLED)

WITH THE PROGRAM IN MEMORY, SET THE SWITCH REGISTER TO 0000.

PRESS EXTENDED ADDRESS LOAD.

SET THE REGISTER TO 0200 OCTAL.

PRESS ADDRESS LOAD.

PLACE THE OCTAL VALUE OF EXTENDED FIELDS AVAILABLE IN SR9-11.

PRESS CLEAR AND THEN CONTINUE.

THE PROGRAM SHOULD RUN UNTIL A FAILURE OCCURS OR UNTIL STOPPED BY THE OPERATOR WITH SR1=1. NOTE THAT THE PROGRAM SHOULD ALWAYS BE STOPPED WITH SR1=1.

THE TTY BELL WILL SIGNAL A SUCCESSFUL TEST AT THE COMPLETION OF EVERY PASS.

4.3.2 MEMORY EXTENSION PORTION (TIME SHARE DISABLED)

WITH THE PROGRAM IN MEMORY, SET THE SWITCH REGISTER TO 0000.

PRESS EXTENDED ADDRESS LOAD.

SET THE SWITCH REGISTER TO 0200 OCTAL.

PRESS ADDRESS LOAD.

PLACE THE OCTAL VALUE OF EXTENDED FIELDS AVAILABLE IN SR9-11.

PLACE SR0=1 TO EXECUTE MEMORY EXTENSION ONLY.

PRESS CLEAR AND THEN CONTINUE.

THE PROGRAM SHOULD HALT AT LOCATION 3651(8). THIS WILL

VERIFY THAT THE TIME SHARE IS DISABLED. ALL OTHER ERRORS
AT THIS TIME WILL BE CONSIDERED AS AN ILLEGAL CONDITION.

PRESS CONTINUE.

THE PROGRAM SHOULD LOOP UNTIL AN ERROR OCCURS OR UNTIL STOPPED
BY THE OPERATOR WITH SR1=1.

THE TTY BELL WILL SIGNAL A SUCCESSFULL TEST AT THE END
OF EVERY PASS.

5. OPERATING PROCEDURE

5.1 OPERATOR ACTION

5.1.1 MEMORY EXTENSION AND TIME SHARE CONTROL

VISUALLY VERIFY THAT THE TIME SHARE DISABLE JUMPER IS "OUT"
ON THE M837 MODULE AND FOLLOW THE OPERATOR ACTION IN 4.3.

5.1.2 MEMORY EXTENSION PORTION

VISUALLY VERIFY THAT THE TIME SHARE DISABLE JUMPER IS "IN"
ON THE M837 MODULE AND FOLLOW THE OPERATOR ACTION 4.3.

6. ERRORS

6.1 ERROR DESCRIPTION

BOTH "HALTS" AND "JUMP TO SELF" ARE USED TO INDICATE ERROR
CONDITIONS. IN EITHER CASE REFER TO THE PROGRAM LISTING
FOR MORE INFORMATION.

6.2 ERROR RECOVERY

ALL ERRORS ENCOUNTERED MUST BE CORRECTED BEFORE PROCEEDING
ON IN THE PROGRAM.

7. RESTRICTIONS

7.1 OPERATING RESTRICTIONS

PDP8-E ONLY WITH THE KM8-E OPTION INSTALLED AND AT LEAST 4K
OF EXTENDED MEMORY.

THE NUMBER OF EXTENDED AVAILABLE FIELDS MUST BE IN SR9-11.

IF MEMORY EXTENSION ONLY, THE TIME SHARE MUST BE DISABLED
AND SR0=1.

IF MEMORY EXTENSION AND TIME SHARE CONTROL, THE TIME
SHARE MUST BE ENABLED AND SR0=0.

IN ALL CASES SR1=1 MUST BE USED TO STOP PROGRAM.

THE PROGRAM MUST RESIDE IN FIELD 0 ONLY.

BOTH PORTIONS OF THE TEST MUST BE RUN, 4,3,1 AND 4,3.2, TO
VERIFY THAT THE TIME SHARE CAN BE DISABLED AND ENABLED.

8. MISCELLANEOUS

8.1 EXECUTION TIME

EXECUTION TIME DEPENDS ON THE AMOUNT OF AVAILABLE EXTENDED
FIELDS. EXECUTION TIME FOR 32K APPROXIMATIVELY 3.75 MINUTES.

9. PROGRAM DESCRIPTION

THE PROGRAM EXERCISES AND TESTS ALL IOT'S ASSOCIATED WITH
THE MEMORY EXTENSION AND TIME SHARE CONTROL; THE ABILITY TO RUN
WITH THE TIME SHARE DISABLED; THE ABILITY TO RUN "EXECUTIVE"
AND "USER MODES" IN ALL AVAILABLE FIELDS WITH THE TIME SHARE
ENABLED; THE ABILITY TO REFERENCE ALL MEMORY FIELDS FROM FIELD 0
AND VICE-VERSA; THE ABILITY TO READ AND WRITE DATA IN ALL
AVAILABLE FIELDS AND THE ABILITY TO RUN PROGRAM INTERRUPTS
AND INTERRUPT INHIBIT IN ALL FIELDS.

THE TIME SHARE OPTION DEVELOPES A NEW MODE OF OPERATION OR
THE "USER MODE". ALL HLT, OSR, AND IOT INSTRUCTIONS ARE ILLEGAL
IN USER MODE AND SHOULD "TRAP OUT". THE PROGRAM WILL THEN
DETERMINE IF AN ERROR CONDITION DOES EXIST. IN SOME CASES,
IN TIME SHARING, AN ERROR CONDITION CANNOT BE INDICATED WITH
A "HLT" OR "TYPE OUT" BECAUSE THIS WOULD BE ILLEGAL.
THEREFORE A "JUMP TO SELF" IS USED TO INDICATE ERRORS.

9.1 TEST 00

TEST CDF AND RDF FOR ALL COMBINATIONS 0 TO 7.

9.2 TEST 01

TEST INTERRUPT BUFFER BITS 9-11 WITH RIB, PI IS ENABLED
AND TTY FLAG IS USED FOR INTERRUPTS. DO ALL COMBINATIONS
0 TO 7.

9.3 TEST 02

TEST DCA I AND TAD I TO ALL AVAILABLE FIELDS. EACH STACK WILL CONTAIN ITS DF# IN LOCATION 7000.

9.4 TEST 03

TEST CIF INSTRUCTION, CHECKS THE ABILITY OF A CIF-ION-NOP-JMP AND CIF-ION-NOP-JMS.

9.5 TEST 04

TEST GTF INSTRUCTION FOR TTY FLAG AND SAVE FIELD, GET SAVE FIELD AFTER INTERRUPT AND CHECK INTERRUPT INHIBIT, DO ALL COMBINATIONS 0 TO 7.

9.6 TEST 05

TEST ION AND LINK FROM RTF, TEST INTERRUPT INHIBIT BEFORE PI, GET THE FLAGS WITH GTF.

9.7 TEST 06

TEST READ AND WRITE DATA IN ALL AVAILABLE EXTENDED FIELDS.

9.8 TEST 07

CONFIDENCE CHECK ON ALL EXISTENT FIELDS, MAKE SURE ALL STACKS ARE ACCESSED CORRECTLY.

9.9 TEST 08

TEST DF AND IF FROM SAVE FIELD AFTER PI.USE RTF TO SET THE FLAGS AND GTF TO GET THE FLAGS, CHECK INTERRUPT INHIBIT, DO ALL SF COMBINATIONS 0 TO 77.

9.10 TEST 09

TEST PROGRAM INTERRUPT IN ALL AVAILABLE EXTENDED FIELDS, USE RTF, GTF, RDF, AND RIF FOR CHECK.

9.11 TEST 10

TEST INTERRUPT INHIBIT IN ALL AVAILABLE EXTENDED FIELDS, TEST CIF-ION-JMP COMBINATION.

9.12 TEST 11

TEST SAVE FIELD WITH RMF IOT.

9.13 TEST 12

TEST AUTO-INDEX IN ALL AVAILABLE EXTENDED FIELDS.

9.14 TEST 13

DYNAMIC RMF TEST. TEST ALL SF TO DF TRANSFERS AND SF TO IB TRANSFERS.

9.15 TEST 14

TEST NON-EXISTENT FIELDS FOR ALL Ø'S. IF 32K PRESENT BY-PASS TEST.

9.16 TEST 15

TEST TIME SHARE IN FIELD Ø.

9.17 TEST 16

TEST TIME SHARE IN ALL AVAILABLE EXTENDED FIELDS.

10. LISTING

```
                        /PDP8-E, MEMORY EXTENSION AND TIME SHARE CONTROL TEST.
                        /
                        /COPYRIGHT 1971, DIGITAL EQUIPMENT CORP.,MAYNARD,MASS.
                        /
                        /STARTING ADDRESS IS 0200.
                        /
                        /CONSTANTS
                        /
                6201    CDF=6201
                6202    CIF=6202
                6214    RDF=6214
                6224    RIF=6224
                6244    RMF=6244
                6234    RIB=6234
                6274    SUF=6274
                6264    CUF=6264
                6254    SINT=6254
                6204    CINT=6204
                6007    CAF=6007
                6005    RTF=6005
                6004    GTF=6004
                6001    ION=6001
                6002    IOF=6002
                6000    SKON=6000
                6003    SRQ=6003
                6040    SPF=6040
                6041    TSF=6041
                6032    KCC=6032
                6002    IOF=6002
                6036    KRB=6036
                6000    IOT=6000
                7421    MQL=7421
                        /
                0000    *0
0000            0000    0000
0001            5001    5001
0002            0002    0002
0003            0003    0003
                        /
                0020    *20
                        /
0020            5400    JMPI0,  JMP I 0
0021            2000    ISZ0,   ISZ 0
0022            2443    XTFLG,  TFLG
0023            2435    XSTKS,  NSTKS
0024            1050    XRMF,   TRMF
0025            1321    XRANS,  TRANS
0026            1432    XAUTO,  TAUTO
0027            0000    LOOP,   0
0030            0000    NDF,    0
0031            0000    STKS,   0
0032            0000    DAT,    0
0033            0000    NOSTAK, 0
0034            0000    NOFLD,  0
0035            1132    KCAIM,  CAI-1
```

```
0036  1133    KCAI,   CAI
0037  7402    KHLT,   HLT
0040  6201    KCDF,   6201
0041  6202    KCIF,   6202
0042  1316    XFD,    EXFD
0043  0001    K1,     1
0044  0007    K7,     7
0045  0010    K10,    10
0046  7777    K7777,  7777
0047  7000    K7000,  7000
0050  7707    K7707,  7707
0051  7767    K7767,  7767
0052  7757    K7757,  7757
0053  7747    K7747,  7747
0054  7737    K7737,  7737
0055  7727    K7727,  7727
0056  7717    K7717,  7717
0057  7776    K7776,  7776
0060  7775    K7775,  7775
0061  7774    K7774,  7774
0062  7773    K7773,  7773
0063  7772    K7772,  7772
0064  7771    K7771,  7771
0065  0067    POINT,  .+2

0066  0067    K7S,    .+1
0067  7766    K7766,  7766
0070  7755            7755
0071  7744    K7744,  7744
0072  7733            7733
0073  7722            7722
0074  7711            7711
0075  7700            7700
0076  1127    XTDF,   STDF
0077  1130    XTDF1,  STDF+1
0100  1302    KXFLD,  EXFLD
0101  5402    KJMP,   JMP I 2
0102  1200    KNTR,   ENTER
0103  0020    K20,    20
0104  5505    JMP2,   JMP I KFLD0
0105  1427    KFLD0,  RTRN
0106  1422    KRTN,   CAG+2
0107  1400    XFIB,   SFIB
0110  7770    K7770,  7770
0111  0070    K0070,  0070
0112  0000    XSAV,   0000
0113  7770    XCOUNT, 7770
0114  0000    XTOR,   0000
0115  5200    K5200,  5200
0116  1200    K1200,  1200
0117  0077    K0077,  0077
0120  0011    K0011,  0011
0121  7700    K7700,  7700
0122  0002    K0002,  0002
```

```
0123  0004    K0004,  0004
0124  7402    K7402,  7402
0125  6000    K6000,  6000
0126  0100    K0100,  0100
0127  0203    PLACE,  BEGIN
0130  1000    K1000,  1000
0131  2600    TIME,   T1
0132  0017    K0017,  0017
0133  6001    K6001,  6001
0134  5535    JMPIR,  JMP I XRET
0135  2511    XRET,   RET
0136  0000    XDATA,  0000
0137  0000    K0000,  0000
0140  0003    K0003,  0003
0141  0001    K0001,  0001
0142  1100    K1100,  1100
0143  7745    SRC0,   7745
0144  3577    K3577,  3577
0145  7745    K7745,  7745
0146  3633    XXSR0,  XSR0
0147  1556    XELL,   BELL+1
0150  1555    XBELL,  BELL
0151  6046    TTB,    TLS
0152  3643    XTRAP,  TRAP
0153  5531    ATRAP,  JMP I TIME
0154  0000    FCD,    0000
0155  2047    XDATER, DATER
0156  6211    KCDF1,  CDF 10
0157  2525    KDATER, 2525



                /TEST 00
                /TEST CDF AND RDF, USE CDF TO SET THE DATA
                /FIELD AND RDF TO READ THE DATA FIELD.
                /DO ALL COMBINATIONS 0 TO 7.
                /
      0200      *200
                /
0200  7604    BEGIN1, LAS
0201  7510            SPA
0202  5552            JMP I XTRAP
0203  7300    BEGIN,  CLA CLL
0204  6007            CAF
0205  6264            CUF
0206  1037            TAD KHLT        /STORE A HLT IN LOC. 1 AND
0207  3001            DCA 1           /CHECK FOR STRAY INTERRUPT ROST.
0210  6001            ION
                /
0211  6201    DF0,    CDF 00          /DF 0
0212  6214            RDF
0213  7450            SNA             /SHOULD NOT SKIP
0214  5220            JMP DF7
0215  7402            HLT             /ERROR. CDF OR RDF FAILED
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```
0216  7200          CLA
0217  5211          JMP DF0         /REPEAT
                    /
0220  1050  DF7,    TAD K7707       /7707
0221  6271          CDF 70          /DF 7
0222  6214          RDF
0223  7040          CMA             /AC = 0
0224  7450          SNA             /SHOULD NOT SKIP
0225  5231          JMP OK1
0226  7402          HLT             /CDF OR RDF FAILED
0227  7200          CLA
0230  5220          JMP DF7
                    /
0231  2027  OK1,    ISZ LOOP        /CHECK DONE
0232  5211          JMP DF0
                    /
0233  7200          CLA
0234  3027          DCA LOOP        /LOOP COUNTER
                    /
0235  1051  DF1,    TAD K7767       /7767
0236  6211          CDF 10          /DF 10
0237  6214          RDF
0240  7040          CMA             /AC=0
0241  7450          SNA
0242  5246          JMP DF2
0243  7402          HLT             /CDF1 OR RDF FAILED
0244  7200          CLA
0245  5235          JMP DF1
                    /
0246  1052  DF2,    TAD K7757       /7757
0247  6221          CDF 20          /DF2
0250  6214          RDF
0251  7040          CMA             /AC=0
0252  7450          SNA
0253  5257          JMP OK2

0254  7402          HLT             /CDF 2 OR RDF FAILED
0255  7200          CLA
0256  5246          JMP DF2
                    /
0257  2027  OK2,    ISZ LOOP        /DONE IF SKP
0260  5235          JMP DF1
0261  7200          CLA
0262  3027          DCA LOOP
                    /
0263  1053  DF3,    TAD K7747       /7747
0264  6231          CDF 30          /DF 3
0265  6214          RDF
0266  7040          CMA             /AC=0
0267  7450          SNA
0270  5274          JMP DF4
0271  7402          HLT             /CDF 3 OR RDF FAILED
0272  7200          CLA
0273  5263          JMP DF3
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                    /
0274  1054  DF4,    TAD K7737       /7737
0275  6241          CDF 40          /DF 4
0276  6214          RDF
0277  7040          CMA             /AC=0
0300  7450          SNA
0301  5305          JMP OK3
0302  7402          HLT             /CDF 4 OR RDF FAILED
0303  7200          CLA
0304  5274          JMP DF4
                    /
0305  2027  OK3,    ISZ LOOP        /DONE IF SKP
0306  5263          JMP DF3
                    /
0307  7200          CLA
0310  3027          DCA LOOP
                    /
0311  1055  DF5,    TAD K7727       /7727
0312  6251          CDF 50          /DF5
0313  6214          RDF
0314  7040          CMA             /AC=0
0315  7450          SNA
0316  5322          JMP DF6
0317  7402          HLT             /CDF 5 OR RDF FAILED.
0320  7200          CLA
0321  5311          JMP DF5
                    /
0322  1056  DF6,    TAD K7717       /7717
0323  6261          CDF 60          /DF 6
0324  6214          RDF
0325  7040          CMA             /AC=0
0326  7450          SNA
0327  5333          JMP OK4

0330  7402          HLT             /CDF 6 OR RDF FAILED
0331  7200          CLA
0332  5322          JMP DF6
                    /
0333  2027  OK4,    ISZ LOOP        /DONE IF SKP
0334  5311          JMP DF5
0335  6000          SKON            /SKP IF ION
0336  7402          HLT             /IS ION STILL ON
                    /
                    /TEST 01
                    /NOW TEST INTERRUPT BUFFER (IB) BITS 9-11 WITH
                    /RIB. PI IS ENABLED. TELEPRINTER FLAG IS
                    /USED FOR INTERRUPT. DO ALL COMBINATIONS 0 TO 7.
                    /
0337  6201          CDF 00          /DF0
0340  1020          TAD JMPI0       /JMPI0=JMP I 0
0341  3001          DCA 1           /C(1)=JMP I 0
0342  3027          DCA LOOP
0343  6041          TSF             /TEST TTY FLAG
0344  4422          JMS I XTFLG     /SET FLAG
                    /
```

```
0345  6001  IB0,  ION             /ENABLE PI
0346  7200        CLA
0347  6234        RIB             /READ SF
0350  7450        SNA
0351  5354        JMP IB1
0352  7402        HLT             /RIB FAILED
0353  5345        JMP IB0
                  /
0354  6211  IB1,  CDF 10          /DF 1
0355  6001        ION
0356  7200        CLA
0357  6214        RDF             /DF SHOULD BE 0 AFTER A PI
0360  7450        SNA
0361  5364        JMP .+3
0362  7402        HLT
0363  5354        JMP IB1         /DF NOT CLEARED, OR NO PI
                  /
0364  1057        TAD K7776
0365  6234        RIB             /READ SF
0366  7040        CMA             /AC=0
0367  7450        SNA
0370  5373        JMP OK5
0371  7402        HLT             /RIB OR SF FAILED
0372  5354        JMP IB1
0373  2027  OK5,  ISZ LOOP        /DONE IF SKP
0374  5345        JMP IB0
0375  5776        JMP I .+1
0376  0400        IB2-2

      0400  *400
0400  7200        CLA
0401  3027        DCA LOOP
                  /
0402  6221  IB2,  CDF 20          /DF 2
0403  6001        ION
0404  7200        CLA
0405  6214        RDF             /SHOULD BE 0 AFTER PI
0406  7450        SNA
0407  5212        JMP .+3
0410  7402        HLT             /DF NOT CLEARED, OR NO PI
0411  5202        JMP IB2
                  /
0412  1060        TAD K7775
0413  6234        RIB             /AC=7777
0414  7040        CMA             /=0
0415  7450        SNA
0416  5221        JMP IB3
0417  7402        HLT             /RIB OR SF FAILED
0420  5202        JMP IB2
                  /
0421  6231  IB3,  CDF 30          /DF3
0422  6001        ION
0423  7200        CLA
0424  6214        RDF             /DF SHOULD BE CLEARED
```

```
0425  7450          SNA
0426  5251          JMP .+3
0427  7402          HLT             /DF NOT CLEARED
0430  5221          JMP IB3
                    /
0431  1061          TAD K7774
0432  6234          RIB             /AC=7777
0433  7040          CMA             /AC=0
0434  7450          SNA
0435  5240          JMP OK6
0436  7402          HLT             /RIB OR SF FAILED
0437  5221          JMP IB3
                    /
0440  2027    OK6,  ISZ LOOP        /DONE IF SKP
0441  5202          JMP IB2
                    /
0442  7200          CLA
0443  3027          DCA LOOP
                    /
0444  6241    IB4,  CDF 40          /DF 3
0445  6001          ION
0446  7200          CLA
0447  6214          RDF             /DF MUST BE 000 AFTER A PI
0450  7450          SNA             /ERROR IF SKIP
0451  5254          JMP .+3

0452  7402          HLT             /DF NOT 0 AFTER PI
0453  5244          JMP IB4
                    /
0454  1062          TAD K7773       /AC=7773
0455  6234          RIB             /AC=7777
0456  7040          CMA             /AC=0
0457  7450          SNA
0460  5263          JMP IB5
0461  7402          HLT             /RIB OR SF FAILED
0462  5244          JMP IB4
                    /
0463  6251    IB5,  CDF 50          /DF5
0464  6001          ION
0465  7200          CLA
0466  6214          RDF             /DF SHOULD=000
0467  7450          SNA
0470  5273          JMP .+3
0471  7402          HLT             /DF NOT 0 AFTER PI
0472  5263          JMP IB5
                    /
0473  1063          TAD K7772       /AC = 7772
0474  6234          RIB             /AC = 7777
0475  7040          CMA             /AC = 0000
0476  7450          SNA
0477  5302          JMP OK7
0500  7402          HLT             /RIB OR SF FAILED
0501  5263          JMP IB5
                    /
```

```
0502  2027    OK7,    ISZ LOOP        /DONE IF 0 AND SKIP
0503  5244            JMP IB4
                /
0504  7200            CLA
0505  3027            DCA LOOP
                /
0506  6261    IB6,    CDF 60          /DF6
0507  6001            ION
0510  7200            CLA
0511  6214            RDF             /DF MUST=0 AFTER PI
0512  7450            SNA
0513  5316            JMP .+3
0514  7402            HLT             /DF NOT 0 AFTER PI
0515  5306            JMP IB6

                /
0516  1064            TAD K7771       /7771
0517  6234            RIB             /AC=7777
0520  7040            CMA
0521  7450            SNA
0522  5325            JMP IB7
0523  7402            HLT             /RIB OR SF FAILED
0524  5306            JMP IB6
                /
0525  6271    IB7,    CDF 70          /DF 7
0526  6001            ION
0527  7200            CLA
0530  6214            RDF             /DF MUST = 0 AFTER PI
0531  7450            SNA
0532  5335            JMP .+3
0533  7402            HLT             /DF NOT 0
0534  5325            JMP IB7
                /
0535  1110            TAD K7770
0536  6234            RIB             /AC=7777
0537  7040            CMA
0540  7450            SNA
0541  5344            JMP OK8
0542  7402            HLT             /RIB OR SF FAILED
0543  5325            JMP IB7
                /

0544  2027    OK8,    ISZ LOOP        /DONE IF SKP
0545  5306            JMP IB6
0546  5747            JMP I .+1       /NEW PAGE
0547  0600            600

      0600    *600
              /TEST 02
              /NOW TEST DCA I AND TAD I TO ALL STACKS, NUMBER OF
              /EXTENDED STACKS SHOULD BE IN SR9 TO 11, EACH STACK WILL
              /CONTAIN ITS DF# IN LOCATION 7000.
              /
0600  3027            DCA LOOP
```

```
0601  4423    DCAI,   JMS I XSTKS     /READ SR 9-11
0602  7001            IAC
0603  3030            DCA NDF         /DF NUMBER = 1 TO START
0604  1040            TAD KCDF        /6201
0605  1045            TAD K10
0606  3207            DCA .+1         /DF 001 TO START WITH
0607  6201    DFLD,   CDF 00          /WILL BE INCREMENTED
0610  1030            TAD NDF         /DF#
0611  3447            DCA I K7000     /PUT IN 7000 OF STACK
0612  2031            ISZ STKS        /ALL STACKS WHEN 0
0613  7410            SKP
0614  5222            JMP TADI        /TEST TAD I
0615  1045            TAD K10
0616  1207            TAD DFLD        /INCR. CDF IOT
0617  3207            DCA DFLD
0620  2030            ISZ NDF
0621  5207            JMP DFLD
                /
0622  4423    TADI,   JMS I XSTKS     /SR9-11 AGAIN
0623  7001            IAC
0624  3030            DCA NDF         /DF#=1 AGAIN
0625  1040            TAD KCDF        /6201
0626  1045            TAD K10
0627  3230            DCA .+1
0630  6201    TFLD,   CDF 00
0631  1447            TAD I K7000     /AC=DF CONTENTS NOW
0632  3032            DCA DAT         /SAVE TEMP
0633  1032            TAD DAT
0634  7041            CIA             /2'S COMP
0635  1030            TAD NDF         /BETTER BE EQUAL
0636  7640            SZA CLA
0637  5252            JMP CAA-1       /ERROR PATH
0640  2031            ISZ STKS        /ALL WHEN 0
0641  5245            JMP .+4
0642  2027            ISZ LOOP        /DONE WHEN 0
0643  5201            JMP DCAI
0644  5256            JMP IBSF        /NEXT TEST
0645  1045            TAD K10
0646  1230            TAD TFLD        /CDF IOT + 10
0647  3230            DCA TFLD
0650  2030            ISZ NDF
0651  5230            JMP TFLD
                /
0652  1032            TAD DAT         /DATA AS READ
0653  7402    CAA,    HLT             /AC=DATA READ
0654  7200            CLA
0655  5230            JMP TFLD
                /TEST 03


                /CIF TEST, CHECKS THE ABILITY OF A CIF-ION-NOP-JMP OR
                        /CIF-ION-NOP-JMS SEQUENCE TO DO THE FOLLOWING:
                                /1.  CIF ENABLE MB TO IB TRANSFER,
                                /2.  INHIBIT INTERRUPT TILL JMP OR JMS EXECUTED,
                                /3.  INTERRUPT AFTER JMP OR JMS EXECUTED,
```

```
                                /4.  JMP OR JMS ENABLES IB TO IF TRANSFER,
                                /5.  INTERRUPT ENABLES IF TO SF TRANSFER,

                        /SET UP FOR CIF-ION-NOP-JMP CHECK,
0656  6201    IBSF,     CDF     00              /SET LOCS 1-2 TO ISZ 0,
0657  1021              TAD     ISZ0            /JMP I 0 RESPECTIVELY,
0660  3001              DCA     1
0661  1352              TAD     KNOP
0662  3002              DCA     2
0663  1020              TAD     JMPI0
0664  3003              DCA     3
                        /
                        /NOW STORE HALTS IN LOC1, CIFJMP+1,
                        /AND CIFJMS+1 OF ALL EXTENDED FIELDS.
                        /
0665  4423              JMS I   XSTKS
0666  1040              TAD     KCDF
0667  1045              TAD     K10
0670  3271              DCA     .+1
0671  6211    HLTS,     CDF     10
0672  1037              TAD     KHLT
0673  3443              DCA I   K1
0674  1037              TAD     KHLT
0675  3754              DCA I   CAB
0676  1037              TAD     KHLT
0677  3755              DCA I   CAC
0700  2031              ISZ     STKS
0701  7410              SKP
0702  5305              JMP     .+3
0703  1271              TAD     HLTS
0704  5267              JMP     HLTS-2
0705  6201              CDF     00
0706  6041              TSF                     /ENSURE TTO FLAG SET,
0707  4422              JMS I   XTFLG
0710  3027              DCA     LOOP            /SET COUNTER FOR 4096 PASSES,
0711  1041    AGAIN1,   TAD     KCIF            /INITIALIZE TO CIF 00,
0712  3323              DCA     CIFJMP
0713  3353              DCA     CIFCK           /INITIALIZE I.F. CHECK TO 0,
0714  4423              JMS I   XSTKS           /READ SR9-11,
0715  1323    CIFJPL,   TAD     CIFJMP
0716  1045              TAD     K10
0717  3323              DCA     CIFJMP
0720  1353              TAD     CIFCK
0721  1045              TAD     K10
0722  3353              DCA     CIFCK
0723  6202    CIFJMP,   CIF     00              /MODIFIED TO CURRENT FIELD
                                                /UNDER TEST,

0724  6001              ION
0725  7000              NOP
0726  5327              JMP     .+1
0727  7402              HLT                     /ERROR.  NO PI OR INHIBIT PI,
0730  6234              RIB
0731  7041              CIA
```

```
0732  1353          TAD     CIFCK
0733  7650          SNA CLA
0734  5344          JMP     CAD+3
0735  1353          TAD     CIFCK
0736  7421          MQL                     /LOAD MQ
0737  7300          CLA CLL
0740  6234          RIB
0741  7402  CAD,    HLT                     /ERROR.  I.B. TO I.F. TRANSFER
0742  7200          CLA                     /FAILED AFTER CIF-JMP, BAD
0743  5323          JMP     CIFJMP          /I.F. IN AC, GOOD I.F. IN
                                            /MQ.  REPEAT UPON CONTINUE.
0744  2031          ISZ     STKS            /DONE?
0745  5315          JMP     CIFJPL          /NO, DO NEXT FIELD
0746  2027          ISZ     LOOP            /4096 TIMES?
0747  5311          JMP     AGAIN1          /NO.  DO TI ALL AGAIN.
0750  5751          JMP I   .+1             /YES.  GO TEST CIF-JMS.
0751  1000          IBSF1
0752  7000  KNOP,    NOP
0753  0000  CIFCK,   0
0754  0724  CAB,     CIFJMP+1
0755  1020  CAC,     CIFJMS+1


      1000  *1000
1000  7200  IBSF1,   CLA
1001  6201          CDF     00
1002  6041          TSF                     /ENSURE TTO FLAG SET.
1003  4422          JMS I   XTFLG
1004  3027          DCA     LOOP            /SET UP FOR 4096 PASSES.
1005  1041  AGAIN2, TAD     KCIF            /INIT. TO CIF 00.
1006  3217          DCA     CIFJMS
1007  3246          DCA     CIFCK1          /INIT. I.F. CHECK TO 0.
1010  4423          JMS I   XSTKS           /READ SR9-11.
1011  1217  CIFJSL, TAD     CIFJMS
1012  1045          TAD     K10
1013  3217          DCA     CIFJMS
1014  1246          TAD     CIFCK1
1015  1045          TAD     K10
1016  3246          DCA     CIFCK1
1017  6202  CIFJMS, CIF     00              /MODIFIED TO CURRENT FIELD
                                            /UNDER TEST.
1020  6001          ION
1021  7000          NOP
1022  4223          JMS     .+1
1023  0000          0
1024  7402          HLT                     /ERROR.  NO PI OR INHIBIT PI.
1025  6234          RIB
1026  7041          CIA
1027  1246          TAD     CIFCK1
1030  7650          SNA CLA
1031  5241          JMP     CAE+3
1032  1246          TAD     CIFCK1
1033  7110          CLL RAR
1034  7012          RTR
```

```
1035  6234          RIB
1036  7402  CAE,    HLT                     /ERROR.  I.B. TO I.F, TRANSFER
1037  7200          CLA                     /FAILED AFTER CIF-JMS, BAD
1040  5217          JMP     CIFJMS          /I.F. IN AC6-8, GOOD I.F.
                                            /IN AC9-11.  REPEAT UPON CONTINUE
1041  2031          ISZ     STKS            /DONE?
1042  5211          JMP     CIFJSL          /NO.  DO NEXT FIELD,
1043  2027          ISZ     LOOP            /4096 TIMES?
1044  5205          JMP     AGAIN2          /NO.  DO IT ALL AGAIN,
1045  5647          JMP I   XGTF1           /YES.  GO ON TO NEXT TEST
1046  0000  CIFCK1,0
1047  2271  XGTF1,  GTF1

                    /
                    /TEST 10
                    /TEST INTERRUPT INHIBIT
                    /FROM EACH FIELD, REFER TO HEADING TITLED "EXTENDED
                    /FIELD TEST ROUTINE", THIS ROUTINE IS PLACED IN
                    /EACH TESTED FIELD AT THE ADDRESSES SPECIFIED. THE
                    /INDICATED ERROR HALTS WILL BE IN THE EXTENDED
                    /FIELD.  PRESS CONT. TO RECOVER, ONLY 1 FIELD WILL
                    /CONTAIN THE ROUTINE AT ANY ONE TIME. OTHER FIELDS
                    /WILL CONTAIN ALL0'S.  THE ROUTINE IS REPLACED WITH
                    /HALTS AFTER COMPLETION. THE PORTIONS OF THE FIELD
                    /WHICH DO NOT CONTAIN THE ROUTINE ARE SET TO 0000
                    /BEFOREHAND.
                    /
                    /
                    /SETUP FIELDS TO TEST, POINTERS, ETC..
                    /
1050  4423  TRMF,    JMS I XSTKS     /READ SR9-11
1051  1040          TAD KCDF        /6201
1052  3260          DCA .+6
1053  1260          TAD .+5
1054  1045          TAD K10
1055  3260          DCA .+3
1056  7040          CMA
1057  3010          DCA 10
1060  6201          CDF 00
1061  3410          DCA I 10        /PLACE 0'S IN EACH FIELD FROM
1062  1010          TAD 10          /LOC. 0 TO 7777.
1063  7040          CMA
1064  7640          SZA CLA
1065  5261          JMP .-4
1066  2031          ISZ STKS
1067  5253          JMP TRMF+3


                    /
                    /NOW PUT A HLT IN EACH FIELD IN THE SAME
                    /LOCATION AS CAI, BELOW.
                    /
1070  4423          JMS I XSTKS     /READ SR 9-11
1071  1040          TAD KCDF
1072  1045          TAD K10
```

```
1073  3274            DCA .+1
1074  6201  CHDF,     CDF 00
1075  1036            TAD KCAI        /KCAI = ADDRESS OF CAI.
1076  3027            DCA LOOP        /SAVE TEMPORARILY
1077  1037            TAD KHLT        /KHLT = 7402 (HLT)
1100  3427            DCA I LOOP
1101  2031            ISZ STKS        /DONE ALL STACKS WHEN SKIP
1102  7410            SKP
1103  5306            JMP .+3
1104  1274            TAD CHDF
1105  5272            JMP CHDF-2
                      /
1106  6201            CDF 00
1107  6041  STRMF,    TSF             /CHECK TTY FLAG
1110  4422            JMS I XTFLG     /GO SET IT
1111  1050            TAD K7707
1112  3027            DCA LOOP
1113  1065            TAD POINT
1114  3066            DCA K7S         /POINTER FOR K7700 TO K7766
1115  4423            JMS I XSTKS     /READ SR 9-11
1116  1040            TAD KCDF        /6201
1117  1045            TAD K10         /10
1120  3327            DCA STDF
1121  1041            TAD KCIF        /6202
1122  1045            TAD K10         /10
1123  3330            DCA STDF+1
1124  1330            TAD STDF+1
1125  3442            DCA I XFD
1126  4425            JMS I XRANS     /PUT TEST ROUTINE INTO FIELD X
                      /
1127  6211  STDF,     CDF 10          /FIELD 1 TO START WITH
1130  6212            CIF 10
1131  5332            JMP .+1         /SHOULD ENTER EXTENDED FIELD
                                      /AFTER THIS JMP, HLT IF NOT
1132  7000            NOP
1133  7402  CAI,      HLT             /ERROR, PI FAILED
                                      /C(AC) = C(I.B.)
1134  5327            JMP STDF        /REPEAT SAME TEST,
                      /


                      /ENTER HERE AFTER PI FROM EXTENDED BANK
      1200  *1200
                      /
1200  6214  ENTER,    RDF             /DF SHOULD BE 000
1201  7450            SNA             /ERROR IF SKIP
1202  5206            JMP .+4         /CHECK C(SF)
1203  7402            HLT             /AC=C(DF)
1204  7200            CLA
1205  5476            JMP I XTDF      /REPEAT TEST
1206  6212            CIF 10          /SET I.B. TO FIELD 1
1207  6244            RMF             /I.B. NOW EQUAL TO SF
1210  6234            RIB             /READ IB
1211  6202            CIF 00
1212  6201            CDF 00
```

```
1213  1466          TAD I K7S
1214  7040          CMA
1215  7650          SNA CLA         /ERROR IF SKIP
1216  5226          JMP CKPC
1217  6244          RMF
1220  6234          RIB
1221  7402          HLT             /ERROR RMF AND PI WORKED, BUT
                                    /I.B. NOT CORRECT AFTER RMF.
1222  7200          CLA             /AC=C(IB)
1223  6201          CDF 00
1224  6202          CIF 00
1225  5476          JMP I XTDF      /BACKUP A PAGE AND REPEAT
                /
1226  1036    CKPC, TAD KCAI        /KCAI=ADDRESS OF CAI
1227  7001          IAC             /MAKE CAI+1
1230  7041          CIA
1231  1000          TAD 0           /COMPARE TO C(0)
1232  7650          SNA CLA         /SHOULD NOT SKIP
1233  5240          JMP .+5         /ALL OK SETUP FOR NEXT FIELD
1234  1000          TAD 0
1235  7402          HLT             /ERROR. ALL WORKED, BUT
                                    /C(PC) WAS NOT=TO CAI+1
                                    /AFTER PI IN EXTENDED
                                    /FIELD, C(AC)=C(0),F0.
                                    /CHECK FOR PI NOT INHIBITED,
                                    /OR AUTO-INDEX REG.
                                    /12 FAILING IN THE EXTENDED FIELD.
1236  7200          CLA
1237  5476          JMP I XTDF      /BACKUP AND REPEAT
                /
                /SETUP FOR NEXT FIELD
                /
1240  2031          ISZ STKS        /DONE ALL IF SKIP
1241  5246          JMP .+5
1242  2027          ISZ LOOP        /DONE LOOPING IF SKIP
1243  5645          JMP I .+2       /REPEAT ALL AGAIN
1244  5507          JMP I XFIB      /EXIT TO NEXT TEST
1245  1113          STRMF+4         /BACK TO LAST PAGE


                /
                /SET LAST TESTED FIELD TO ALL 0'S AND PUT A
                /HLT IN RESPECTIVE ADDRESS OF CAI
                /
1246  7240          CLA CMA
1247  3010          DCA 10
1250  1476          TAD I XTDF      /CDF X0 AT STDF
1251  3252          DCA .+1
1252  6211          CDF 10          /F1 TO START WITH
1253  3410          DCA I 10
1254  1010          TAD 10
1255  7040          CMA
1256  7640          SZA CLA         /CLEARD IF SKIP
1257  5253          JMP .-4
1260  6201          CDF 00
```

```
1261  1476            TAD I XTDF      /CDF X0 AT STDF
1262  3263            DCA .+1
1263  6211            CDF 10
1264  1037            TAD KHLT        /=7402 (HLT)
1265  3436            DCA I KCAI      /KCAI=ADDRESS OF CAI
1266  6201            CDF 00          /RESTORE DF
                      /
                      /INCREMENT CDF AND CIF IOT'S AT STDF, STDF+1
                      /TO NEXT FIELD.
                      /
1267  1476            TAD I XTDF      /CDF X0 AT STDF
1270  1045            TAD K10
1271  3476            DCA I XTDF
1272  1477            TAD I XTDF1     /CIF X0 AT STDF
1273  1045            TAD K10
1274  3477            DCA I XTDF1
1275  1477            TAD I XTDF1
1276  3316            DCA EXFD
1277  2066            ISZ K7S
1300  4321            JMS TRANS       /PUT ROUTINE IN NEW FIELD
1301  5476            JMP I XTDF      /TEST NEW FIELD

                      /EXTENDED FIELD TEST ROUTINE
                      /
                      /THE FOLLOWING INSTRUCTIONS ARE PLACED IN
                      /EACH EXTENDED FIELD TESTED, THE NUMBERS IN THE
                      /COMMENTS FIELD CORRESPOND TO THE
                      /MEMORY LOCATIONS IN THE TESTED FIELLD. LOCATIONS
                      /0 THRU 11 ARE USED FOR AN ERROR ROUTINE
                      /IN CASE FIELD 0 IS NOT ENTERED AFTER AN
                      /INTERRUPT, THE EXTENDED FIELD SHOULD BE
                      /ENTERED AT LOCATION CAI-1 WHICH CORRESPONDS
                      /TO CAI-1 IN FIELD 0.
                      /
                      /EXTENDED FIELD INSTRUCTIONS:
                      /
1302  0000    EXFLD,  0       /0
1303  1000            TAD 0   /1
1304  7490            SNA     /IF LOC. 0 NOT =0 PI DIDN'T
                              /ENTER FIELD 0
1305  5312            JMP .+5 /3
1306  7402            HLT     /4. INTERRUPTED TO THIS FIELD
                              /INSTEAD OF FIELD 0,C(AC)=C(0)
                              /WHICH SHOULD BE CAI+1
                              /IF NOT, CHECK LOC. 7777,IT
                              /MUST = 5412 (JMP I 12).
1307  7200            CLA     /5
1310  3000            DCA 0   /6
1311  5420            JMP I 20        /7. C(20) =CAI
1312  7402            HLT     /10. THE JMP I 12 AT LOC.
                              /7777 WAS NOT EXECUTED,
                              /OR INTERRUPT FAILED. IF
                              /NO INTERRUPT, LOCATION 12
                              /NOW CONTAINS 0 INSTEAD
```

```
                                /OF ADDRESS CAI,
1313  5307                      JMP .-4 /11. REPEAT IN THIS FIELD
1314  1133                      CAI     /12. AUTO-INDEXS TO CAI+1
                                /IN F Ø IF THE JMP I 12
                                /WORKS.
                        /LOCS. 13 TO 17 ARE ALL Ø'S
                        /
1315  1133                      CAI     /2Ø. EQUALS CAI IN FØ.
                        /
                        /LOCS. 21 TO CAI-2 ARE ALL Ø'S
                        /
1316  6212              EXFD,   CIF 1Ø  /FIELD 1 TO START WITH
1317  6001                      ION     /LOC. CAI, SEE SYMBOL TABLE
                                /FOR CAI,
                        /LOCS. CAI+1 TO 7776 ARE ALL Ø'S
                        /
1320  5412                      JMP I 12        /7777, PI SHOULD OCCUR,
                                                /AFTER THIS INSTRUCTION,
                                                /TO FIELD Ø.


                        /
                        /ROUTINE TO TRANSFER TEST ROUTINE TO PROPER FIELD
                        /
1321  0000              TRANS,  Ø
1322  1101                      TAD KJMP        /KJMP=JMP I 2
1323  3001                      DCA 1           /IN FIELD Ø
1324  1102                      TAD KNTR        /KNTR = LOC. ENTER
1325  3002                      DCA 2           /OF FIELD Ø
1326  1100                      TAD KXFLD       /KXFLD = LOC. EXFLD
1327  3010                      DCA 10
1330  3011                      DCA 11
1331  1067                      TAD K7766       /1-1Ø DECIMAL
1332  3000                      DCA Ø           /SAVE
1333  1476                      TAD I XTDF      /CDF XØ IN STDF
1334  3337                      DCA .+3
1335  6201                      CDF ØØ
1336  1410                      TAD I 10
1337  6211              TRFLD,  CDF 10          /F1 TO START WITH
1340  3411                      DCA I 11        /PUT IN EXTENDED FIELD
1341  2000                      ISZ Ø           /DONE LOCS 1 TO 12 IF SKIP
1342  5335                      JMP .-5
1343  1337                      TAD TRFLD
1344  3347                      DCA .+3
1345  6201                      CDF ØØ
1346  1410                      TAD I 1Ø
1347  6211                      CDF 1Ø
1350  3503                      DCA I K2Ø       /PUT E4Ø IN LOC. 2Ø
1351  6201                      CDF ØØ
1352  1337                      TAD TRFLD
1353  3355                      DCA .+2
1354  1410                      TAD I 1Ø
1355  6211                      CDF 1Ø
1356  3435                      DCA I KCAIM     /PUT CIF XØ IN CAI-1
1357  6201                      CDF ØØ
```

```
1360  1337            TAD TRFLD
1361  3363            DCA .+2
1362  1410            TAD I 10
1363  6211            CDF 10
1364  3436            DCA I KCAI      /ION TO LOC. CAI
1365  6201            CDF 00
1366  1337            TAD TRFLD
1367  3371            DCA .+2
1370  1410            TAD I 10
1371  6211            CDF 10
1372  3446            DCA I K7777     /PUT JMP I 12 IN 7777
1373  6201            CDF 00
1374  5721            JMP I TRANS     /EXIT

      1400      *1400
                /
                /TEST 11
                /TEST SF WITH AN RMF IOT, AN INTERRUPT IN FIELD 0 IS CREATED, AFTER
                /WHICH, THE DF AND IB REGISTERS ARE SET TO FIELD 1.
                /THE SF SHOULD CONTAIN FIELD 0. THE TEST
                /THEN MAKES SURE THE IB IS CLEARED, THEN SET BY ISSUING AN RMF,
                /FOLLOWED BY A JMP I K7000. IF THE IB IS CLEARED, THE JMP GOES TO 7000 IN FIELD 0.
                /IF THE IB AND SF ARE INCLUSIVE OR'D, THE JMP GOES TO 7000 IN FIELD 1, AND
                /A HALT OCCURS THERE. RESTART FROM 1400 AFTER AN ERROR. THE TEST IS LOOPED
                /512 TIMES.
                /
1400  6041      SFIB,   TSF             /SEE IF FLAG IS SET.
1401  4422              JMS I XTFLG     /SET IT
1402  1047              TAD K7000       /7000
1403  3027              DCA LOOP
1404  6211              CDF 10          /DF=FIELD 1
1405  1037              TAD KHLT        /HLT
1406  3447              DCA I K7000     /7000, FIELD 1=HLT
1407  6201              CDF 00          /DF=0
1410  1104              TAD JMP2        /JMP2=JMP I KFLD0
1411  3447              DCA I K7000     /7000, FIELD 0=JMP I KFLD0
                                        /KFLD0=LOC. RTRN
1412  1101              TAD KJMP        /KJMP=JMP I 2
1413  3001              DCA 1
1414  1106              TAD KRTN        /KRTN=LOC. CAG+2
1415  3002              DCA 2
                /
                /BEGIN TEST
                /
1416  6001              ION             /ENABLE PI
1417  7000              NOP
1420  7402      CAG,    HLT             /ERROR NO PI
1421  5200              JMP SFIB        /REPEAT TEST
                /
                /RETURN HERE AFTER PI
                /
1422  7200              CLA
1423  6211              CDF 10          /DF=FIELD1
1424  6212              CIF 10          /IB=FIELD1
1425  6244              RMF             /IB SHOULD=FIELD0
```

```
1426  5447          JMP I K7000     /IF SHOULD=FIELD0
                    /
1427  2027  RTRN,   ISZ LOOP        /WORKED OK
1430  5216          JMP CAG-2       /LOOP
1431  5232          JMP TAUTO       /DONE, GO TO NEXT TEST


                    /
                    /
                    /TEST 12
                    /TEST ALL AUTO-INDEX REGISTERS IN EACH EXTENDED FIELD,
                    /IDENTICAL TEST ROUTINES ARE PERFORMED FROM EACH FIELD,
                    /AND ERROR HALTS OCCUR IN THE FIELD CURRENTLY RUNNING
                    /THE ROUTINE. PRESS CONT, TO RESUME TESTING. EACH
                    /FIELD CONTAINS ALL 0'S EXCEPT FOR THE AREA OCCUPIED
                    /BY THE TEST ROUTINE. FIELD 0 IS RE-ENTERED
                    /AFTER EACH TEST, AND THE NEXT SEQUENTIAL FIELD
                    /IS THEN ENTERED. REFER TO THE HEADING "AUTO-
                    /INDEX TEST" FOR THE SEQUENCE OF OPERATIONS.
                    /
1432  6201  TAUTO,  CDF 00
1433  1050          TAD K7707
1434  3027          DCA LOOP        /LOOP COUNTER
1435  4423          JMS I XSTKS     /READ SR 9-11
1436  1040          TAD KCDF        /6201
1437  3246          DCA DFN
1440  1246  NEWDF,  TAD DFN
1441  1045          TAD K10         /INCREMENT DF
1442  3246          DCA DFN
                    /
                    /CLEAR ONE FIELD TO 0
                    /
1443  7040          CMA
1444  3010          DCA 10
1445  3000          DCA 0           /USE LOC. 0 FOR A COUNTER
1446  6211  DFN,    CDF 10          /FIELD 1 TO START WITH
1447  3410          DCA I 10
1450  2000          ISZ 0
1451  5247          JMP .-2
1452  6201          CDF 00
                    /
                    /NOW PUT TEST ROUTINE IN THE EXTENDED FIELD
                    /
1453  1317          TAD DOAUTO      /1ST LOC. OF ROUTINE MINUS 1
1454  3010          DCA 10          /SOURCE
1455  1071          TAD K7744       /-28 DECIMAL
1456  3000          DCA 0           /USE LOC. 0 AS COUNTER
1457  1317          TAD DOAUTO
1460  3011          DCA 11          /DESTINATION
1461  1246          TAD DFN         /CDF X0
1462  3265          DCA .+3
1463  6201  MOVE,   CDF 00
1464  1410          TAD I 10
1465  6211          CDF 10          /FIELD 1 TO START
1466  3411          DCA I 11
```

```
1467  2000            ISZ 0           /MOVE WHEN SKIP
1470  5263            JMP MOVE


                      /
                      /NOW SET AUTO-I REGS 10 TO 17 TO 7777.
                      /
1471  1110            TAD K7770       /-8 DECIMAL
1472  3000            DCA 0
1473  1044            TAD K7          /7
1474  3010            DCA 10
1475  7040            CMA             /7777
1476  3410            DCA I 10
1477  2000            ISZ 0           /10 TO 17 = 7777 WHEN SKIP
1500  5275            JMP .-3
1501  7040            CMA
1502  3446            DCA I K7777     /PUT 7777 IN LOC, 7777 OF EXTENDED FIELD
1503  6214            RDF             /READ D.F.
1504  1041            TAD KCIF        /6202
1505  3306            DCA .+1
1506  6212            CIF 10          /FIELD 1 TO START
1507  4716            JMS I FILDX     /ENTER EXTENDED FIELD
                                      /515 OCTAL LOCS, BEFORE THE
                                      /TAD I 10 INSTRUCTION.
                                      /THIS IS A TEST OF THE
                                      /DEFER BIT, 500 US DELAY
                      /
                      /ENTER FIELD 0 FROM EXTENDED FIELD HERE.
                      /
1510  2031    GOTO0,  ISZ STKS        /DONE ALL WHEN SKIP
1511  5240            JMP NEWDF       /SETUP FOR NEXT
1512  2027            ISZ LOOP        /ALL DONE IF SKIP
1513  5235            JMP NEWDF-3     /REPEAT ALL
1514  5715            JMP I LBTP
1515  1600    LBTP,   RMFTST
                      /
1516  1002    FILDX,  DOAUTO-515

                      /
                      /       AUTO-INDEX TEST
                      /
                      /THE ROUTINE WILL BE PLACED IN THE SAME RESPECTIVE
                      /LOCATIONS IN EACH EXTENDED FIELD, ANY ERROR
                      //HALTS WILL OCCUR IN THE EXTENDED FIELD, PRESS
                      /CONTINUE TO PROCEED WITH TESTING. THE INDEX
                      /REGISTERS 10 TO 17 INITIALLY CONTAIN 7777, AND
                      /ARE AUTO-INDEXED TO 0000 BY A TAD I INSTRUCTION.
                      /A HALT OCCURS IF THE REG, IS NOT INCREMENTED TO 0,
                      /THE TAD I WOULD HAVE THEN REFERENCED LOC. 7777,
                      /WHICH CONTAINS 7777.
                      /

1517  1517    DOAUTO, .               /THIS LOC, IS NOT MOVED TO
                                      /THE EXTENDED FIELD.
1520  7200            CLA
```

```
1521  1410            TAD I 10
1522  7440            SZA
1523  7402            HLT             /ERROR, INDEX REG, 10 FAILED
1524  1411            TAD I 11
1525  7440            SZA
1526  7402            HLT             /INDEX REG, 11 FAILED
1527  1412            TAD I 12
1530  7440            SZA
1531  7402            HLT             /12 FAILED
1532  1413            TAD I 13
1533  7440            SZA
1534  7402            HLT             /13 FAILED
1535  1414            TAD I 14
1536  7440            SZA
1537  7402            HLT             /14 FAILED
1540  1415            TAD I 15
1541  7440            SZA
1542  7402            HLT             /15 FAILED
1543  1416            TAD I 16
1544  7440            SZA
1545  7402            HLT             /16 FAILED
1546  1417            TAD I 17
1547  7440            SZA
1550  7402            HLT             /17 FAILED
1551  6201            CDF 00          /SET DF TO FIELD 0
1552  6202            CIF 00          /SET I.B. TO FIELD 0
1553  5310            JMP GOTO0       /EXIT TO FIELD 0
                /END OF TEST ROUTINE
                /
                /

                /
                /RING BELL AT THE COMPLETION OF TEST
                /CHECK SR1=1 FOR HLT AT END OF TEST
                /
1554  0007            AND 7
1555  1354    BELL,   TAD .-1
1556  6046            TLS             /RING BELL
1557  6041            TSF
1560  5357            JMP .-1
1561  7604            LAS
1562  7004            RAL
1563  7500            SMA
1564  5527            JMP I PLACE     /START  TEST OVER
1565  7402            HLT             /END OF TEST
1566  5527            JMP I PLACE     /HIT CONTINUE TO START TEST OVER
                /

                /TEST 13
                /DYNAMIC RMF TEST,
                /TESTS ALL SF TO DF TRANSFERS AND THOSE SF TO IB TRANSFERS
                /AS APPLICABLE TO THE NUMBER OF EXTENDED FIELDS PRESENT,
                /THE GENERAL METHOD IS TO INTERRUPT FROM EACH EXTENDED FIELD
                /WITH THE DF=FROM 0 THROUGH 7,  AN RMF INSTRUCTION IS THEN ISSUED
                /AND CONTROL TRANSFERRED TO AN EXTENDED FIELD.  THE RMFDY ROUTINE
```

```
                    /IN THAT FIELD THEN CHECKS THAT THE IF AND DF ARE CORRECT.  IF NOT,
                    /THE FAILING IF OR DF IS IN THE IF OR DF REG. AND THE CORRECT FIELD
                    /NUMBER IS IN AC BITS 6 THRU 8.
                    /
                    /
                    /
          1600      *1600
                    /
                    /
 1600  7604     RMFTST, LAS                     /CHECK HOW MANY EXTENDED FIELDS
 1601  0044             AND     K7              /ARE PRESENT
 1602  7041             CIA                     /NEGATE AND SAVE.
 1603  3205             DCA     IFCN
 1604  4700             JMS I   XFERP           /TRANSFER RMFDY ROUTINE TO ALL
 1605  0000     IFCN,   0                       /EXTENDED FIELDS.
 1606  7744             -34
 1607  1702             RMFDY-1
 1610  3275             DCA     LBTSTC          /SET RMFTST COUNTER FOR 4096 PASSES
 1611  1302             TAD     JMPI4           /SET INTERRUPT LINK.
 1612  3001             DCA     1
 1613  1274             TAD     INTEP
 1614  3004             DCA     4
 1615  6201     RMFL3,  CDF     00              /INITIALIZE IF TO 0,
 1616  3341             DCA     KIFSHB
 1617  1205             TAD     IFCN            /INITIALIZE TEST COUNTER
 1620  3276             DCA     RMFCN1
 1621  1341     RMFL2,  TAD     KIFSHB          /UPDATE CURRENT IF,
 1622  1045             TAD     K10
 1623  3341             DCA     KIFSHB
 1624  1341             TAD     KIFSHB
 1625  7041             CIA
 1626  3342             DCA     MIFSHB
 1627  1110             TAD     K7770           /INITIALIZE DF COUNTER TO -10.
 1630  3277             DCA     DFCN
 1631  1110             TAD     K7770           /INITIALIZE DF TO -10,
 1632  3337             DCA     KDFSHB
 1633  1337     RMFL1,  TAD     KDFSHB          /UPDATE DF.
 1634  1045             TAD     K10
 1635  3337             DCA     KDFSHB
 1636  1337             TAD     KDFSHB
 1637  7041             CIA
 1640  3340             DCA     MDFSHB
 1641  1205             TAD     IFCN            /TRANSFER DF AND IF INFORMATION
 1642  3244             DCA     .+2             /TO EXTENDED FIELDS.
 1643  4700             JMS I   XFERP
 1644  0020             0
 1645  7774             -4
 1646  1736             KDFSHB-1
 1647  6201             CDF     00


 1650  1040             TAD     KCDF            /UPDATE CDF INST.
 1651  1337             TAD     KDFSHB
 1652  3260             DCA     RMFI1
 1653  1041             TAD     KCIF            /UPDAT CIF INST.
```

```
1654  1341          TAD     KIFSHB
1655  3261          DCA     RMFI2
1656  6041  RMFE2,  TSF                     /ENSURE TTO FLAG SET.
1657  4422          JMS I   XTFLG
1660  6201  RMFI1,  CDF                     /SET DF AND IF TO CURRENT FIELD.
1661  6202  RMFI2,  CIF
1662  5303          JMP     RMFDY           /GO TO RMFDY IN CURRENT IF.
1663  6244  INTE,   RMF                     /ENTER FROM INTERRUPT FROM EX. FLD.
1664  5310          JMP     RMFDY1          /GO BACK TO EXTENDED FIELD.
1665  2277  RMFE1,  ISZ     DFCN            /ALL DF'S USED WITH CURRENT IF.
1666  5293          JMP     RMFL1           /NO, DO NEXT DF.
1667  2276          ISZ     RMFCN1          /ONE PASS OF RMFTST COMPLETE?
1670  5221          JMP     RMFL2           /NO, DO NEXT IF.
1671  2275          ISZ     LBTSTC          /RMFTST DONE?
1672  5215          JMP     RMFL3           /NO,  DO AGAIN.
1673  5701          JMP I   XMEM            /YES, GO TO NEXT TEST
1674  1663  INTEP,  INTE
1675  0000  LBTSTC, 0
1676  0000  RMFCN1, 0
1677  0000  DFCN,   0
1700  2000  XFERP,  XFER
1701  2200  XMEM,   NOMEM
1702  5404  JMPI4,  JMP I 4
                    /
                    /
                    /
                    /
                    /

                    /ROUTINE TO CHECK CORRECT TRANSFERS FOR SAVE FIELD TO DATA FIELD AND
                          /SAVE FIELD TO INST, BUFFER TO INSTRUCTION FIELD AFTER
                          /RMF.
                    /STORED IN ALL EXTENDED FIELDS.

1703  6001  RMFDY,  ION                     /THIS IS NOT TRANSFERRED.
1704  7000          NOP
1705  6002          IOF
1706  7402          HLT                     /INTERRUPT FAILURE.
1707  5333          JMP     REPEAT
1710  7200  RMFDY1, CLA
1711  6214          RDF                     /CHECK FOR CORRECT DATA FIELD
1712  1340          TAD     MDFSHB
1713  7650          SNA CLA
1714  5320          JMP     .+4
1715  1337          TAD     KDFSHB          /DATA FIELD INCORRECT
1716  7402          HLT                     /SF TO DF TRANSFER FAILED AFTER RMF.
1717  5333          JMP     REPEAT          /REPEAT THIS TEST.
1720  6224          RIF                     /CHECK FOR CORRECT INSTRUCTION FIELD.
1721  1342          TAD     MIFSHB
1722  7650          SNA CLA
1723  5327          JMP     .+4
1724  1341          TAD     KIFSHB          /INSTRUCTION FIELD INCORRECT.
1725  7402          HLT                     /SF TO IB TRANSFER FAILED AFTER RMF
1726  5333          JMP     REPEAT          /REPEAT THIS TEST.
```

```
1727  6201            CDF     00              /GO BACK AND RUN NEXT TEST.
1730  6202            CIF     00
1731  5732            JMP I   .+1
1732  1665            RMFE1
1733  6201    REPEAT, CDF     00              /GO BACK AND REPEAT FAILING
1734  6202            CIF     00              /TEST.
1735  5736            JMP I   .+1
1736  1656            RMFE2
1737  0000    KDFSHB, 0                       /DATA FIELD SHOULD BE
1740  0000    MDFSHB, 0                       /TWO'S COMPLEMENT OF ABOVE.
1741  0000    KIFSHB, 0                       /INSTRUCTION FIELD SHOULD BE
1742  0000    MIFSHB, 0                       /TWO'S COMPLEMENT OF ABOVE
                /
                /
                /
                /
                /
                /
                /ROUTINE TO TRANSFER N1 WORDS STARTING AT P IN FIELD 0 TO P IN THE
                        /NEXT N2 EXTENDED FIELDS.
                        /THE CALLING SEQUENCE IS:
                        /JMS I  XFERP
                        /-N2
                        /-N1
                        /P-1


                /
      2000      *2000
                /
2000  0000    XFER,   0
2001  7200            CLA
2002  1600            TAD I   XFER            /GET -N2
2003  3242            DCA     N2
2004  2200            ISZ     XFER            /GET -N1
2005  1600            TAD I   XFER
2006  3243            DCA     N1
2007  2200            ISZ     XFER            /GET P-1
2010  1600            TAD I   XFER
2011  3244            DCA     P
2012  2200            ISZ     XFER            /UPDATE TO RETURN ADDRESS.
2013  1040            TAD     KCDF            /INITIALIZE CDF INST.
2014  3232            DCA     XFERIN
2015  1242            TAD     N2
2016  3245            DCA     XFERC2
2017  1244    XFERL2, TAD     P               /PUT POINTER IN AUTO 10 AND 11.
2020  3010            DCA     10
2021  1244            TAD     P
2022  3011            DCA     11
2023  1243            TAD     N1              /SET COUNTER 1 TO -N1
2024  3246            DCA     XFERC1
2025  1232            TAD     XFERIN          /UPDATE CDF INST.
2026  1045            TAD     K10
2027  3232            DCA     XFERIN
```

```
2030  6201  XFERL1, CDF     00              /TRANSFER
2031  1410          TAD I   10
2032  6201  XFERIN, CDF
2033  3411          DCA I   11
2034  2246          ISZ     XFERC1          /DONE WITH CURRENT FIELD?
2035  5230          JMP     XFERL1          /NO, CONTINUE.
2036  2245          ISZ     XFERC2          /DONE WITH ALL FIELDS?
2037  5217          JMP     XFERL2          /NO, DO NEXT FIELD
2040  6201          CDF     00              /ALL DONE,  SET DF=0,
2041  5600          JMP I   XFER            /EXIT.
2042  0000  N2,      0
2043  0000  N1,      0
2044  0000  P,       0
2045  0000  XFERC2,  0
2046  0000  XFERC1,  0
                    /
                    /TEST 06
                    /NOW DO A READ AND WRITE DATA TEST IN
                    /ALL AVAILABLE EXTENDED FIELDS,
                    /IF A FAILURE OCCURS CHECK LOC. 10
                    /FOR BAD ADDRESS AREA AND LOC. RANA
                    /FOR THE MOST RECENT FIELD CHANGE.
                    /LOC. KDATER CONTAINS DATA PATTERN USED.
                    /
2047  0000  DATER,   0000
2050  7300          CLA CLL
2051  4423          JMS I XSTKS
2052  1040          TAD KCDF
2053  1045          TAD K10
2054  3257          DCA RANA          /MODIFIED UNDER TEST
2055  7340          CLA CLL CMA
2056  3010          DCA 10            /SET AUTO REGISTER
2057  6201  RANA,   CDF
2060  4276          JMS FILL          /LOAD UP FIELD WITH DATA
2061  7340          CLA CMA CLL
2062  3010          DCA 10
2063  4312          JMS CHECK         /CHECK DATA IN FIELD
2064  7300          CLA CLL
2065  2031          ISZ STKS
2066  7410          SKP
2067  5274          JMP .+5
2070  1257          TAD RANA
2071  1045          TAD K10
2072  3257          DCA RANA          /CHECK NEXT FIELD
2073  5255          JMP RANA -2
2074  6201          CDF
2075  5647          JMP I DATER
                    /
                    /ROUTINE TO FILL FIELD WITH DATA
                    /
2076  0000  FILL,    0000
2077  7300          CLA CLL
2100  1157          TAD KDATER
2101  3410          DCA I 10
2102  1157          TAD KDATER
```

```
2103  7040            CMA
2104  3410            DCA I 10
2105  1010            TAD 10
2106  7001            IAC
2107  7640            SZA CLA
2110  5277            JMP FILL +1
2111  5676            JMP I FILL
                      /
                      /ROUTINE TO CHECK DATA IN FIELD
                      /
2112  0000    CHECK,  0000
2113  7300            CLA CLL
2114  1410            TAD I 10
2115  7001            IAC
2116  1410            TAD I 10
2117  7440            SZA             /AC CONTAINS BAD BITS
2120  7402            HLT             /MEMORY CONTROL WORKED BUT
2121  7300            CLA CLL         /DATA PATTERN FAILURE IN
2122  1010            TAD 10          /EXTENDED MEMORY.
2123  7001            IAC
2124  7640            SZA CLA         /IS CHECK DONE
2125  5313            JMP CHECK +1
2126  5712            JMP I CHECK
                      /
                      /
                      /
      2200    *2200
                      /
                      /TEST 14
                      /REFERENCE ALL 4K FIELDS NOT PRESENT.
                      /IF 32K IS PRESENT, THE TEST IS BY-PASSED.
                      /EACH FIELD NOT PRESENT IS REFERENCED
                      /BY THE PROGRAM WITH JMP, DCA AND TAD.
                      /THE PROGRAM MUST CONTINUE IN SEQUENCE
                      /BELL WILL SIGNAL A SUCCESSFUL TEST
                      /
2200  7200    NOMEM,  CLA
2201  1110            TAD K7770
2202  3027            DCA LOOP        /TEST LOOP COUNTER
2203  7604            LAS             /READ SR9-11
2204  0044            AND K7
2205  7041            CIA
2206  1044            TAD K7          /SUBTRACT MAX. POSSIBLE
2207  7450            SNA
2210  5546            JMP I XXSR0     /32K PRESENT. CAN'T TEST
2211  3033            DCA NOSTAK      /SAVE NO. MISSING
2212  3547            DCA I XELL      /CLEAR THE TLS IOT AT
                                      /BELL+1 TO PROHIBIT
                                      /FALSE INDICATION. TLS
                                      /IS RESTORED LATER WRONG
                                      /ENTRY FROM NON-EXISTENT
```

```
                                        /MEMORY MAY CAUSE A
                                        /HANG-UP AT BELL+2 AND +3,
2213  7604          LAS                 /# OF FIELDS PRESENT
2214  0044          AND K7
2215  7001          IAC                 /+1 TO GET 1ST MISSING
2216  7100          CLL
2217  7006          RTL                 /POSITION TO AC 6-8,
2220  7004          RAL
2221  3034          DCA NOFLD           /1ST MISSING
2222  1033          TAD NOSTAK          /# STACKS NOT HERE
2223  7041          CIA
2224  3033          DCA NOSTAK          /USED AS COUNTER


              /
              /
2225  1040          TAD KCDF            /6201
2226  1034          TAD NOFLD           /MISSING STACK
2227  3245          DCA CDF0S
              /
              /NOW READ ALL 0'S FROM ALL NON-EXISTENT FIELDS
              /IF CONTROL PORTION ONLY, RING BELL.
              /IF NOT PROCEED TO TIME SHARE.
              /
2230  4244          JMS ALL0            /READ ALL 0 FROM 1ST
2231  2033  CNSTK,  ISZ NOSTAK          /DONE ALL MISSING IF SKIP
2232  5237          JMP POS
2233  2027          ISZ LOOP            /DONE LOOPING IF SKIP
2234  5636          JMP I XNOM          /REPEAT
2235  5546          JMP I XXSR0
              /
2236  2203  XNOM,   NOMEM+3
              /
2237  1245  POS,    TAD CDF0S
2240  1045          TAD K10             /DF PLUS 1
2241  3245          DCA CDF0S
2242  4244          JMS ALL0            /READ ALL 0'S
2243  5231          JMP CNSTK           /CHECK DONE


              /
              /ROUTINE TO READ ALL 0'S.
              /
2244  0000  ALL0,   0
2245  6201  CDF0S,  CDF 00             /SET DF TO 1ST MISSING
2246  7240          CLA CMA
2247  3010          DCA 10              /10 AND 11 USED FOR ADDRESS
2250  7040          CMA
2251  3011          DCA 11
2252  3002          DCA 2               /USE AS COUNTER
2253  7040          CMA
2254  3410          DCA I 10            /WRITE 1'S INTO NON-EXIS-
                                        /TENT FIELD.
2255  2002          ISZ 2
```

```
2256  5253            JMP .-3
2257  1411            TAD I 11        /READ NON-EXIST. FIELD
2260  7650            SNA CLA         /SHOULD = 0000
2261  5264            JMP .+3
2262  1011            TAD 11
2263  7402  CAX,       HLT             /ERROR. AN EXISTING FIELD
                                      /WAS REFERENCED. C(AC)=
                                      /ADDRESS REFERENCED
2264  2002            ISZ 2
2265  5257            JMP CAX-4       /READ NEXT
                /
2266  6201  DONE0,     CDF 00
2267  6202            CIF 00
2270  5644            JMP I ALL0      /EXIT
                /

                /
                /TEST 04

                /TEST GTF FOR FLAG AND SAVE FIELDS
                /GET SAVE FIELDS  AFTER INTERRUPT
                /CHECK  INTERRUPT INHIBIT, DO ALL
                /COMBINATIONS 0 TO 7.
                /
2271  7300  GTF1,    CLA CLL
2272  1020            TAD JMPI0               /SET FOR RETURN
2273  3001            DCA 1
2274  1040            TAD KCDF
2275  3304            DCA XSDF
2276  1304  MGTF,    TAD XSDF                /GET FIRST FIELD
2277  0111            AND K0070
2300  7120            STL
2301  7010            RAR
2302  7012            RTR
2303  3112            DCA XSAV
2304  6201  XSDF,    CDF 00
2305  6041            TSF                     /IS TTY FLAG SET
2306  4422            JMS I XTFLG             /GET THE FLAG
2307  6001            ION
2310  7340            CLA CLL CMA             /CHECK FOR JAM ON GTF
2311  6004            GTF                     /GET THE FLAGS
2312  7041            CIA
2313  1112            TAD XSAV                /TTY + CURRENT FIELD
2314  7440            SZA
2315  7402            HLT                     /FLAG + FIELD
2316  2027            ISZ LOOP                /4096 TIMES
2317  5276            JMP MGTF
2320  1045            TAD K10
2321  1304            TAD XSDF
2322  3304            DCA XSDF
2323  2113            ISZ XCOUNT              /MORE FIELDS TO CHECK
2324  5276            JMP MGTF
2325  1110            TAD K7770
2326  3113            DCA XCOUNT
2327  5730            JMP I XION1             /YES.  GO TO NEXT TEST
```

```
2330  2331    XION1,  ION1
                /
                /TEST 05
                /TEST ION AND LINK FROM RTF
                /TEST INTERRUPT INHIBIT BEFORE PI
                /GET THE FLAGS WITH GTF.
                /
2331  7300    ION1,   CLA CLL
2332  1021            TAD ISZ0
2333  3001            DCA 1
2334  1020            TAD JMPI0
2335  3002            DCA 2
2336  6005            RTF
2337  5340            JMP .+1
2340  7402            HLT                     /WAS INT, INH.
2341  7300            CLA CLL
2342  1115            TAD K5200
2343  6005            RTF
2344  7240            CLA CMA                 /CHECK FOR JAM ON GTF
2345  6004            GTF             /GET LINK,ION,TTY FLAG
2346  7041            CIA
2347  1115            TAD K5200       /EXPECTED BITS
2350  7440            SZA
2351  7402            HLT             /WAS LINK,ION,TTY FLAG SET
2352  7300            CLA CLL
2353  6005            RTF             /REPLACE ION,INT INH
2354  7300            CLA CLL
2355  6004
2356  7041            CIA
2357  1116            TAD K1200
2360  7440            SZA
2361  7402            HLT             /TTY FLAG,ION,NO LINK
2362  5363            JMP .+1
2363  7402            HLT             /WAS INT INH
2364  7300            CLA CLL
2365  2027            ISZ LOOP        /4096 TIMES
2366  5331            JMP ION1
2367  4555            JMS I XDATER    /GO TO NEXT TEST
2370  4773            JMS I XCON1     /GO TO NEXT TEST
2371  5772            JMP I XRTF1     /GO TO NEXT TEST
2372  2400    XRTF1,  RTF1
2373  4000    XCON1,  CON1
                /
                /TEST 08
                /TEST DF00 + IF00 FROM SAVE FIELD AFTER PI
                /USE RTF TO SET THE FLAGS AND GTF TO GET THE FLAGS
                /CHECK INTERRUPT INHIBIT, DO ALL SAVE
                /FIELD COMBINATIONS 0 TO 77.
                /
      2400      *2400
                /
2400  7300    RTF1,   CLA CLL
2401  4422            JMS I XTFLG     /SET TTY FLAG
2402  1021            TAD ISZ7
2403  3001            DCA 1
```

```
2404  1020            TAD JMPI0
2405  3002            DCA 2
2406  3114            DCA XTOR
2407  1114    XSRTF,  TAD XTOR
2410  6005            RTF             /MAKE DF 00 + IF 00
2411  5212            JMP .+1
2412  7402            HLT             /WAS INT INH
2413  7300            CLA CLL
2414  6004            GTF             /GET THE FLAGS
2415  0117            AND K0077
2416  7041            CIA
2417  1114            TAD XTOR        /EXPECTED BITS
2420  7440            SZA
2421  7402            HLT             /WAS DF + IF SET
2422  2027            ISZ LOOP        /4096 TIMES
2423  5207            JMP XSRTF
2424  1114            TAD XTOR
2425  1120            TAD K0011
2426  3114            DCA XTOR
2427  2113            ISZ XCOUNT
2430  5207            JMP XSRTF               /DO THE REST DF 00 + IF 00
2431  1110            TAD K7770
2432  3113            DCA XCOUNT
2433  5634            JMP I XRIG1
2434  2452    XRIG1,  RIG1
2435  0000    NSTKS,  0
                /
2436  7604            LAS             /READ SR 9-11
2437  0044            AND K7
2440  7041            CIA
2441  3031            DCA STKS
2442  5635            JMP I NSTKS
                /
                /SET TTY FLAG
                /
2443  0000    TFLG,   0
2444  7200            CLA
2445  6040            SPF
2446  6041            TSF
2447  5246            JMP .-1
2450  7200            CLA
2451  5643            JMP I TFLG      /EXIT
                /
                /TEST 09
                /TEST PROGRAM INTERRUPT IN EXISTING FIELDS
                /USE RTF, GTF, RDF AND RIF FOR CHECK
                /CHECK PC, AC, SF AND FLAGS AFTER PI
                /IF FAILURE OCCURS CHECK XDATA FOR AC DATA,
                /LOC. 0 FIELD 0 FOR CORRECT PC AFTER PI,
                /AND IFDF FOR CORRECT DF XX + IF XX,
                /PROGRAM SHOULD INTERRUPT INHIBIT TILL JMP I ADRS
                /IF PI FAILS TO INTERRUPT HLT IN THAT FIELD
                /
2452  7300    RIG1,   CLA CLL
2453  4423            JMS I XSTKS
```

```
2454  1120            TAD K0011
2455  3260            DCA IFDF
2456  1132            TAD K0017
2457  3010            DCA 0010
2460  0000  IFDF,     0000                /SET TO CURRENT FIELD UNDER TEST
2461  7300            CLA CLL
2462  1260            TAD IFDF
2463  6005            RTF                 /SET FIELDS AND TURN ION
2464  6002            IOF
2465  7300            CLA CLL
2466  2537            ISZ I K0000
2467  7000            NOP
2470  1537            TAD I K0000
2471  3136            DCA XDATA
2472  1124            TAD K7402
2473  3541            DCA I K0001         /STORE A HLT IN LOC 1 OF THAT FIELD
2474  1133            TAD K6001
2475  3410            DCA I 0010          /ION FOR THAT FIELD
2476  1130            TAD K1000
2477  3410            DCA I 0010          /TAD FOR THAT FIELD
2500  1124            TAD K7402
2501  3410            DCA I 0010          /HLT FOR FAILURE
2502  1010            TAD 10
2503  1057            TAD K7776
2504  3310            DCA ADRS
2505  1134            TAD JMPIR
2506  3001            DCA 0001            /SET LOC 1 FOR RETURN AFTER PI
2507  5710            JMP I .+1           /GO TO THAT FIELD
2510  0000  ADRS,     0000
2511  7041  RET,      CIA
2512  1136            TAD XDATA
2513  7440            SZA
2514  7402            HLT                 /AC DATA FAILED DURING PI
2515  1000            TAD 0000
2516  7041            CIA
2517  1010            TAD 0010
2520  7440            SZA
2521  7402            HLT                 /PC FAILED DURING PI
2522  6214            RDF
2523  6224            RIF
2524  7640            SZA CLA
2525  7402            HLT                 /SHOULD BE 0 AFTER PI
2526  6004            GTF
2527  0117            AND K0077
2530  7041            CIA
2531  1260            TAD IFDF
2532  7440            SZA
2533  7402            HLT                 /GTF OR RTF OR SF FAILED
2534  1010            TAD 0010
2535  7001            IAC
2536  7640            SZA CLA
2537  5261            JMP IFDF+1
2540  2031            ISZ STKS
2541  7410            SKP
2542  5750            JMP I XTRMF
```

```
2543  7300          CLA CLL
2544  1120          TAD K0011
2545  1260          TAD IFDF
2546  3260          DCA IFDF        /SET FOR NEXT FIELD
2547  5256          JMP IFDF -2
2550  1050  XTRMF,  TRMF
                    /


                    /TEST 15
                    /TEST TIME SHARE IN FIELD 0,
                    /ALL HLT, OSR, AND IOT INSTRUCTIONS
                    /SHOULD TRAP IN USER MODE,
                    /
      2600          *2600
                    /
2600  7300  T1,      CLA CLL
2601  6007          CAF  Clear all flags
2602  6264          CUF  clear user flag
2603  6204          CINT Clear user int.
2604  1021          TAD ISZ0    2000(ISZ)
2605  3001          DCA 1
2606  1020          TAD JMPI0   5400 (adr. given in 0000
2607  3002          DCA 2
2610  6007          CAF clear all flags.
2611  7410          SKP
2612  5212          JMP .           /CAF TRAPED
2613  6001          ION
2614  7410          SKP
2615  5215          JMP .           /ION TRAPED
2616  6032          KCC
2617  7410          SKP
2620  5220          JMP .           /KCC TRAPED
2621  6002          IOF
2622  7410          SKP
2623  5223          JMP .           /IOF TRAPED
2624  6004          GTF
2625  7410          SKP
2626  5226          JMP .           /GTF TRAPED
                    /THESE INSTRUCTIONS SHOULD TRAP
2627  6001  T2,      ION  Turn Interrupt enable on
2630  6274          CUF+10 = SUF    /USER MODE  set user flag
2631  5232          JMP .+1  allow user interrupt
2632  7402          HLT  Trap and interrupt, go to 0000, 0001, 0002, return to 6254
2633  5233          JMP .           /HLT DID NOT TRAP
                    /EXECUTIVE MODE
2634  6254          SINT            /SKIP ON TRAP FLAG  Skip on user interupt.
2635  5235          JMP .           /FLAG NOT UP
2636  6204          CINT            /CLEAR TRAP FLAG  clear user interrupt
2637  6254          SINT            /SKIP ON TRAP FLAG  Skip on user interupt.
2640  7410          SKP
2641  5241          JMP .           /TRAP FLAG STILL SET
2642  7604          LAS             /SHOULD NOT TRAP
2643  7410          SKP
2644  5244          JMP .           /LAS TRAPED IN EXECUTIVE MODE
```

Exec mode
none should trap.

This works

```
                        RMF             /RESTORE USER
                        ION             /ENABLE INTERRUPT
                        JMP .+1         /GO TO USER
                /USER MODE
                        OSR             /SHOULD TRAP ON OSR
                        JMP .           /DID NOT TRAP
                /EXECUTIVE MODE
                        SINT            /SKIP ON TRAP FLAG
                        JMP .           /DID NOT SKIP
                        CAF             /CLEAR TRAP FLAG
                        SINT            /TEST IF CLEARED
                        SKP
                        HLT             /TRAP FLAG NOT CLEARED
                        OSR             /SHOULD NOT TRAP
                        SKP
                        JMP .           /ORS TRAPED IN EXECUTIVE MODE
                        RMF             /RESTORE MODE
                        ION
                        JMP .+1         /GO TN USER

                /USER MODE
                        RTF             /MAKE THE FLAGS
                        JMP .           /RTF FAILED TO TRAP
                /EXECUTIVE MODE
                        SINT
                        JMP .           /TRAP FLAG NOT SET
                        CINT            /CLEAR TRAP FLAG
                        SINT            /TEST IF CLEARED
                        SKP
                        HLT             /TRAP FLAG NOT CLEARED
                        GTF             /SHOULD NOT TRAP
                        SKP
                        JMP .           /TRAPED IN EXECUTIVE MODE
                        RMF             /RESTORE MODE
                        ION
                        JMP .+1         /GO TO USER
                /USER MODE

                        ION
                        JMP .           /ION DID NOT TRAP

                /EXECUTIVE MODE
                        SINT            /SKIP ON TRAP FLAG
                        JMP .           /TRAP FLAG NOT SET
                        CLA CLL
                        GTF
                        AND K0100
                        SNA
                        HLT             /SUF NOT SET
                        CINT            /CLEAR TRAP FLAG
                        SINT            /TEST IF CLEARED
                        SKP
                        HLT             /FLAG NOT CLEARED
                        IOF             /SHOULD NOT TRAP
                        SKP
```

No Int
No Int, I ON
I ON, UM
Interrupt (INT, BUS, ION)
INT BUS no lights
Restore user mode, as saved during interupt. when jmp. (no int until then)
INT is trap flag BUS
(causes trap & interrupt)
Doesn't clear
flag up but this works
should clear INT BUS

```
2723  5323          JMP .           /IOF TRAPED IN EXECUTIVE MODE
2724  6244          RMF             /RESTORE MODE  ~~Restore memory field (if used above)~~
2725  6001          ION              enable interrupt
2726  5327          JMP .+1         /GO TO USER
                /USER MODE
                /TEST CUF AND CUF+10
2727  7604          LAS
2730  5330          JMP .           /DID NOT TRAP
                /EXECUTIVE MODE
2731  6204          CINT
2732  6244          RMF
2733  6264          CUF             /STAY IN EXECUTIVE MODE
2734  6001          ION
2735  5336          JMP .+1
2736  7404          OSR
2737  7410          SKP
2740  5340          JMP .           /CUF DID NOT WORK
                /TEST THAT INSTRUCTION ARE INHIBITED WHILE IN USER MODE
2741  6204          CINT
2742  6274          CUF+10          /SET USER
2743  6001          ION
2744  5345          JMP .+1         /GO TO USER
                /USER MODE
2745  7240          CMA CLA         /AC=7777
2746  7604          LAS             /SHOULD CLEAR AC
2747  5347          JMP .           /DID LAS TRAP
                /EXECUTIVE MODE
2750  7440          SZA
2751  7402          HLT             /LAS CHANGED AC
2752  6204          CINT
2753  6244          RMF
2754  6001          ION
2755  5356          JMP .+1
                /USER MODE
2756  7200          CLA
2757  7404          OSR             /SHOULD NOT READ SR
2760  5360          JMP .
                /EXECUTIVE MODE
2761  7440          SZA
2762  7402          HLT             /OSR CHANGED AC
2763  6204          CINT
2764  6244          RMF
2765  6001          ION
2766  5367          JMP .+1

                /USER MODE
2767  7240          CLA CMA
2770  7602          HLT CLA         /SHOULD CLA
2771  5371          JMP .           /DID HLT TRAP
                /EXECUTIVE MODE
2772  7440          SZA
2773  7402          HLT             /(HLT CLA) DID NOT CLEAR
2774  6204          CINT
2775  6003          SRC
2776  7410          SKP
```

Restore user mode as saved for user buffer during interrupt

```
2777  7402            HLT             /INTERRUPT REQUEST
3000  7300            CLA CLL
3001  1146            TAD K0100
3002  6005            RTF             /ENABLE USER

3003  6001            ION
3004  7000            NOP
3005  5206            JMP .+1
                /USER MODE
3006  6032            KCC
3007  5207            JMP .           /DID KCC TRAP
                /EXECUTIVE MODE
3010  6003            SRQ             /IS USER FLAG SET

3011  5210            JMP .-1
3012  6204            CINT
3013  7300            CLA CLL
3014  1146            TAD K0100
3015  6005            RTF
3016  7300            CLA CLL
3017  6001            ION
3020  5221            JMP .+1         /ENTER USER
                /USER MODE
3021  6004            GTF
3022  5222            JMP .           /DID GTF TRAP
                /EXECUTIVE MODE
3023  0146            AND K0100
3024  7440            SZA             /DID GTF GET USER
3025  7402            HLT
3026  6003            SRQ             /IS USER FLAG SET
3027  5226            JMP .-1
3030  6204            CINT
3031  6244            RMF
3032  6001            ION
3033  5234            JMP .+1
                /USER MODE
3034  6004            GTF
3035  5235            JMP .           /GTF DID NOT TRAP
                /EXECUTIVE MODE
3036  6254            SINT            /SKIP ON TRAP FLAG
3037  5237            JMP .           /FLAG NOT UP
3040  6204            CINT            /CLEAR TRAP FLAG
3041  6254            SINT            /SKIP ON TRAP FLAG
3042  7410            SKP
3043  5243            JMP .           /TRAP FLAG STILL SET
3044  6001            ION
3045  7410            SKP
3046  5246            JMP .           /ION TRAPED IN EXECUTIVE MODE
3047  6244            RMF             /RESTORE USER
3050  5251            JMP .+1         /GO TO USER
                /USER MODE
3051  6202            CIF             /SHOULD TRAP ON CIF
3052  3252            JMP .           /DID NOT TRAP
                /EXECUTIVE MODE
3053  6254            SINT            /SKIP ON TRAP FLAG
```

```
3054  5254          JMP .           /DID NOT SKIP
3055  6204          CINT            /CLEAR TRAP FLAG
3056  6254          SINT            /TEST IF CLEARED
3057  7410          SKP
3060  7402          HLT             /TRAP FLAG NOT CLEARED
3061  6202          CIF             /SHOULD NOT TRAP
3062  7410          SKP
3063  5263          JMP .           /CIF TRAPED IN EXECUTIVE MODE
3064  6244          RMF             /RESTORE MODE
3065  6001          ION
3066  5267          JMP .+1         /GO TO USER


              /USER MODE
3067  6214          RDF             /READ DATA FIELD
3070  5270          JMP .           /DID RDF TRAP
              /EXECUTIVE MODE
3071  6254          SINT
3072  5272          JMP .           /TRAP FLAG NOT SET
3073  6204          CINT            /CLEAR TRAP FLAG

3074  6254          SINT            /TEST IF CLEARED
3075  7410          SKP
3076  7402          HLT             /TRAP FLAG NOT CLEARED
3077  6214          RDF             /SHOULD NOT TRAP
3100  7410          SKP
3101  5301          JMP .           /TRAPED IN EXECUTIVE MODE
              /EXECUTIVE MODE
3102  6040          SPF             /FLAG SHOULD WORK

3103  6041          TSF
3104  5303          JMP .-1         /SHOULD SKP
3105  6003          SRQ
3106  5305          JMP .-1         /SHOULD SKP
3107  6001          ION
3110  7300          CLA CLL
3111  5311          JMP .           /DID PI WORK
3112  1126          TAD K0100
3113  6005          RTF
3114  6007          CAF
3115  6001          ION
3116  5317          JMP .+1
              /USER MODE
3117  6007          CAF
3120  5320          JMP .           /DID CAF TRAP
              /EXECUTIVE MODE
3121  6003          SRQ
3122  7402          HLT             /USER FLAG UP
3123  6007          CAF
3124  6254          SINT
3125  7410          SKP
3126  7402          HLT             /FLAG CLEARED
              /TEST THAT TTI DOES NOT CHANGE AC
3127  7240          CLA CMA         /AC=7777
3130  7120          STL             /LINK=1
```

```
3131  6274            CUF+10
3132  6001            ION
3133  5334            JMP .+1
                /USER MODE
3134  6036            KRB             /SHOULD NOT ZERO LINK OR SHIFT AC
3135  5335            JMP .
                /EXECUTIVE MODE
3136  7040            CMA
3137  7440            SZA             /AC SHOULD=0000
3140  5340            JMP .           /AC WAS CHANGED
3141  7420            SNL             /LINK SHOULD EQUAL 1
3142  5342            JMP .           /LINK WAS CHANGE
3143  6254            SINT            /SKIP ON TRAP FLAG
3144  5344            JMP .           /TRAP FLAG NOT SET
3145  6204            CINT
3146  6244            RMF
3147  6001            ION
3150  5351            JMP .+1
                /USER MODE
3151  6040            SPF             /FLAG
3152  5352            JMP .           /DID SPF TRAP
                /EXECUTIVE MODE
3153  6041            TSF
3154  7410            SKP
3155  7402            HLT             /TTY FLAG
3156  6254            SINT
3157  5357            JMP .           /TRAP FLAG NOT SET
3160  6204            CINT            /CLEAR TRAP FLAG
3161  6244            RMF
3162  6001            ION
3163  5764            JMP I .+1       /GO TO USER
3164  3200            . 177+1

      3200      *. 177+1

                /USER MODE

3200  6001            ION
3201  5201            JMP .           /ION DID NOT TRAP
                /EXECUTIVE MODE
3202  6254            SINT            /SKIP ON TRAP FLAG
3203  5203            JMP .           /TRAP FLAG NOT SET
3204  6204            CINT            /CLEAR TRAP FLAG
3205  6254            SINT            /TEST IF CLEARED
3206  7410            SKP
3207  7402            HLT             /FLAG NOT CLEARED
3210  6002            IOF             /SHOULD NOT TRAP
3211  7410            SKP
3212  5212            JMP .           /IOF TRAPED IN EXECUTIVE MODE
3213  6244            RMF             /RESTORE MODE
3214  6001            ION
3215  5216            JMP .+1         /GO TO USER
                /USER MODE
                /TEST CUF AND CUF+10
3216  6224            RIF
```

```
3217  5217          JMP .           /DID NOT TRAP
                /EXECUTIVE MODE
3220  6204          CINT
3221  6244          RMF
3222  6264          CUF             /STAY IN EXECUTIVE MODE
3223  5224          JMP .+1
3224  7404          OSR
3225  7410          SKP
3226  5226          JMP .           /CUF DID NOT WORK
                /EXECUTIVE MODE
3227  7240          CLA CMA
3230  6274          CUF +10         /SET UP USER
3231  6001          ION
3232  5233          JMP .+1
                /USER MODE
3233  7402          HLT             /SHOULD TRAP
3234  5234          JMP .           /DID HLT TRAP
                /EXECUTIVE MODE
3235  6203          CDF CIF
3236  6264          CUF             /SETUP FOR EXECUTIVE
3237  6204          CINT            /CLEAR INTERRUPT
3240  6001          ION
3241  5242          JMP .+1
3242  7604          LAS             /SHOULD NOT TRAP
3243  7410          SKP
3244  5244          JMP .
3245  7450          SNA             /SR AND AC SHOULD NOT EQUAL ZERO
3246  5246          JMP .           /LAS WAS INHIBITED

                /TEST HLT AND SKIP
3247  6274          CUF+10          /USER SETUP
3250  6001          ION
3251  5252          JMP .+1         /GO TO USER
                /USER MODE
3252  7412          SKP HLT         /SHOULD TRAP
3253  5253          JMP .           /DID NOT TRAP
3254  5254          JMP .           /SKP DID NOT INDEX PC.
                /EXECUTIVE MODE
3255  6254          SINT            /SKP ON TRAP FLAG
3256  5256          JMP .
3257  6204          CINT            /CLEAR FLAG
3260  6254          SINT            /IS IT CLEAR
3261  7410          SKP             /YES
3262  5262          JMP .           /NO-FLAG NO CLEAR

                /LOOP PROGRAM
3263  2266          ISZ .+3         /DO FIRST SECTION 4096
3264  5531          JMP I TIME
3265  7410          SKP
3266  0000          0               /COUNT FOR LOOP
3267  5670          JMP I .+1
3270  3400          . 177+1


      3400    *. 177+1
```

```
                        /TEST THAT ALL IOTS TRAP IN USER MODE
3400  7200              CLA
3401  1125              TAD K6000       /BASIC IOT
3402  3207              DCA INST        /SET UP
3403  6274    IOTST,    CUF+10          /SET FOR USER
3404  6204              CINT            /CLEAR FLAG
3405  6001              ION
3406  5207              JMP .+1         /GO TO USER MODE
                        /USER MODE
3407  6000    INST,     6000            /IOT THAT FAILED
3410  5210              JMP .           /IOT DID NOT TRAP
                        /EXECUTIVE MODE
3411  6254              SINT            /SKIP ON TRAP FLAG
3412  5212              JMP .           /TRAP FLAG NOT SET
3413  6204              CINT            /CLEAR FLAG
3414  6254              SINT
3415  7610              SKP CLA
3416  7402              HLT             /FLAG DID NOT CLEAR
3417  2207              ISZ INST        /CREATE NEW INSTRUCTION
3420  1207              TAD INST        /TESTED ALL IOT?
3421  0130              AND K1000
3422  7650              SNA CLA
3423  5203              JMP IOTST       /NO -- TEST THE REST

                        /TEST THAT ALL (HLT AND OSR) TRAP IN USER MODE
3424  1124              TAD K7402       /BASIC HALT INST
3425  3232              DCA INSTA       /SET UP
3426  6274    HALTA,    CUF+10          /SET FOR USER
3427  6204              CINT            /CLEAR FLAG
3430  6001              ION
3431  5232              JMP .+1         /GO TO USER MODE
                        /USER MODE
3432  7406    INSTA,    HLT OSR         /OPERATE TRAP INST
3433  5233              JMP .           /DID NOT TRAP
                        /EXECUTIVE MODE
3434  7000              NOP             /FOR (HLT,SKP)(OSR,SKP)
3435  6254              SINT            /SKIP ON TRAP FLAG
3436  5236              JMP .           /TRAP FLAG NOT SET
3437  6204              CINT            /CLEAR FLAG
3440  6254              SINT
3441  7610              SKP CLA
3442  7402              HLT             /FLAG DID NOT CLEAR
3443  1232              TAD INSTA
3444  1123              TAD K0004       /GENERATE ALL GROUPS OF
3445  3232              DCA INSTA       /HALTS AND OSR
3446  1232              TAD INSTA
3447  1122              TAD K0002
3450  7640              SZA CLA         /GENERATED ALL
3451  5226              JMP HALTA       /NO - TEST THE REST
3452  6244              RMF
3453  6264              CUF
3454  6001              ION
3455  5256              JMP .+1
3456  6002              IOF             /SHOULD NOT TRAP
```

```
3457  6254            SINT
3460  7410            SKP
3461  7402            HLT             /TRAP FLAG SET
3462  6040            SPF
3463  6041            TSF             /SHOULD SKP
3464  5263            JMP .-1
3465  6001            ION
3466  7410            SKP
3467  7402            HLT             /DID PI INTERRUPT
3470  7402            HLT             /DID PC INCR.

3471  7300            CLA CLL
3472  6004            GTF
3473  0126            AND K0100
3474  7440            SZA
3475  7402            HLT             /SUF SET
3476  7300            CLA CLL
3477  6007            CAF
3500  6264            CUF
3501  7000            NOP
                /
                /TEST 16
                /TEST TIME SHARE IN EXTENDED MEMORY
                /NOW TEST USER MODE TRAP IN ALL EXTENDED FIELDS
                /IF TRAP ERROR OCCURS HLT IN THAT FIELD
                /USE RTF TO SET USER MODE AND GTF TO GET THE FLAGS
                /TEST ALL IOT'S FOR TRAP AND RETURN
                /
3502  7300      RIG2,   CLA CLL
3503  6007              CAF
3504  4423              JMS I XSTKS     /CHECK NO. OF FIELDS PRESENT
3505  1040              TAD KCDF
3506  1045              TAD K10
3507  3335              DCA SRD         /SET DF FOR FIRST FIELD
3510  1041              TAD KCIF
3511  1045              TAD K10
3512  3347              DCA SRI         /SET IF FOR FIRST FIELD
3513  1144      STAN,   TAD K3577       /GET START OF PROGRAM -1
3514  3010              DCA 10
3515  1145              TAD K7745       /NO. OF INSTRUCTIONS TO TRANSFER
3516  3143              DCA SRC0
3517  7040              CMA
3520  3011              DCA 11          /START AT 0000

3521  1335              TAD SRD         /MAKE FLAGS FOR RETURN CHECK
3522  0111              AND K0070
3523  7010              RAR
3524  7012              RTR
3525  3112              DCA XSAV
3526  1347              TAD SRI
3527  0111              AND K0070
3530  1112              TAD XSAV
3531  1142              TAD K1100
3532  3776              DCA I XFDCON
3533  6201              CDF 00
```

```
3534  1410            TAD I 10
3535  6201  SRD,     CDF 00
3536  3411            DCA I 11        /STORE INSTRUCTIONS
3537  2143            ISZ SRC0
3540  5333            JMP SRD-2
3541  1021            TAD ISZ0
3542  3001            DCA 1           /SET FIELD 0 FOR RETURN
3543  1347            TAD SRI
3544  3002            DCA 2
3545  1020            TAD JMPI0
3546  3003            DCA 3
3547  6202  SRI,      CIF 00
3550  5002            JMP 2           /GO TO FIELD UNDER TEST
3551  7300  SRRET,    CLA CLL
3552  2031            ISZ STKS
3553  7410            SKP             /MORE FIELDS
3554  5364            JMP EXITT       /GO TO CONTROL
3555  1335            TAD SRD         /SET UP FOR NEXT FIELD
3556  1045            TAD K10
3557  3335            DCA SRD
3560  1347            TAD SRI
3561  1045            TAD K10
3562  3347            DCA SRI
3563  5313            JMP STAN        /TEST THIS FIELD
3564  7300  EXITT,    CLA CLL         /TEST DONE GO TO BEGIN
3565  6007            CAF
3566  6264            CUF
3567  1151            TAD TTB
3570  3547            DCA I XELL
3571  7604            LAS
3572  7700            SMA CLA
3573  5550            JMP I XBELL
3574  7402            HLT             /TIME SHARE ENABLED
                                      /AN ERROR CONDITION  EXISTS,
3575  5552            JMP I XTRAP     /HIT CONTINUE TRY AGAIN
3576  3632  XFDCON, FDCON
                /
                /INSTRUCTIONS TO BE TRANSFERED TO FIELDS
                /
      3600  *3600
                /
3600  7402            HLT             /SHOULD NOT HLT HERE
3601  7402            HLT             /SHOULD NOT TRAP HERE
3602  7300  FDGO,     CLA CLL
3603  1252            TAD FDCON       /GET USER BIT
3604  6005            RTF             /SET FOR USER
3605  5206            JMP .+1         /GO TO USER
                /USER MODE
3606  6000  IOTX,     IOT
3607  5207            JMP .           /DID IOT TRAP
                /EXECTUTIVE MODE
3610  7300            CLA CLL
3611  6004            GTF             /GET THE FLAGS
3612  7041            CIA
3613  1252            TAD FDCON       /FLAGS THAT SHOULD BE PRESENT
```

```
3614  7640          SZA CLA
3615  7402          HLT             /CHECK THE FLAGS
3616  6003          SRQ
3617  5216          JMP .-1         /IS TRAP FLAG SET
3620  6204          CINT
3621  2206          ISZ IOTX
3622  1206          TAD IOTX
3623  1251          TAD F1000
3624  7640          SZA CLA
3625  5202          JMP FDGO
3626  6202          CIF
3627  5630          JMP I FRET      /TEST DONE GO TO FIELD 3
3630  3551  FRET,   SRRET
3631  1000  F1000,  1000
3632  0000  FDCON,  0000
                    /
                    /CHECK SR0=1 FOR MEMORY EXTENSION ONLY
                    /
3633  7300  XSR0,   CLA CLL
3634  7604          LAS
3635  7700          SMA CLA
3636  5531          JMP I TIME
3637  6007          CAF
3640  1151          TAD TTB
3641  3547          DCA I XELL
3642  5550          JMP I XBELL
                    /
3643  7300  TRAP,   CLA CLL
3644  1153          TAD ATRAP
3645  3001          DCA 1           /SET FOR RETURN
3646  6274          SUF             /SET FOR USER
3647  6001          ION
3650  5251          JMP .+1         /GO TO USER
3651  7402          HLT             /TIME SHARE DISABLED, HIT
3652  6254          SINT            /CONTINUE TO LOOP ON CONTROL,
3653  7410          SKP
3654  7402          HLT             /ERROR, TRAP INT, RQST, UP
3655  6264          CUF
3656  6007          CAF
3657  5527          JMP I PLACE     /GO TO BEGIN
                    /
                    /TEST 07
                    /CONFIDENCE CHECK ON ALL EXISTENT FIELDS.
                    /MAKE SURE DCA I AND TAD I ARE TO CORRECT STACK.
                    /MAKE SURE JUMP IS TO CORRECT STACK.
                    /CHECK ALL COMBINATIONS.
                    /FIELDS WILL CONTAIN THEIR DF NUMBER IN LOC.?
                    /
      4000          *4000
                    /
4000  0000  CON1,   0000            /FIRST FILL CORE, ALL STACKS
4001  7300          CLA CLL         /DCA I FOR 32K
4002  3523          DCA FDNUM
4003  3524          DCA NUMX
4004  1040          TAD KCDF
```

```
4005  3252            DCA CONx
4006  1110            TAD K7770
4007  3327            DCA MSTKS       /SET FOR MAX. 32K
4010  1110            TAD K7770
4011  3031            DCA STKS
4012  1040            TAD KCDF
4013  3214            DCA .+1
4014  6201  FDWRD,    CDF             /MODIFIED UNDER TEST
4015  4307            JMS FILCOR
4016  2031            ISZ STKS        /ARE ALL STACKS DONE
4017  5222            JMP .+3
4020  4252            JMS CONCHK      /CHECK RESULTS
4021  5227            JMP CON2
4022  1045            TAD K10
4023  1214            TAD FDWRD
4024  3214            DCA FDWRD       /UPDATE FIELD CHANGE
4025  2324            ISZ NUMX
4026  5214            JMP FDWRD
                      /
4027  7300  CON2,     CLA CLL         /DO ONE AT A TIME
4030  1323            TAD FDNUM
4031  3324            DCA NUMX
4032  6201  CONX,     CDF
4033  4307            JMS FILCOR
4034  6203            CDF CIF
4035  4252            JMS CONCHK
4036  7300            CLA CLL
4037  1252            TAD CONX
4040  1045            TAD K10
4041  3252            DCA CONX        /UPDATE FIELD CHANGE
4042  2323            ISZ FDNUM
4043  2327            ISZ MSTKS       /ARE ALL STACKS DONE
4044  5227            JMP CON2
4045  6203            CDF CIF
4046  6007            CAF
4047  2027            ISZ LOOP        /DO 4096 TIMES
4050  5201            JMP CON1 +1
4051  5600            JMP I CON1      /TEST COMPLETE
                      /
4052  0000  CONCHK,   0000            /CHECK ALL AVAILABLE STACKS
4053  7300            CLA CLL
4054  3324            DCA NUMX
4055  7604            LAS
4056  0044            AND K7
4057  7040            CMA
4060  3031            DCA STKS        /STACKS PRESENT
4061  1041            TAD KCIF
4062  3263            DCA .+1         /START WITH FIELD 0
4063  6202  CONCH,    CIF             /MODIFIED UNDER TEST
4064  5541            JMP I K2001
4065  7041  RETADD,   CIA             /RETURN HERE FROM FIELDS
4066  1324            TAD NUMX
4067  7450            SNA
4070  5276            JMP .+6         /GOOD FIELD
4071  3112            DCA XSAV
```

```
4072  1263            TAD CONCH
4073  0111            AND K0070
4074  1112            TAD XSAV        /INCORRECT STACK REFERENCED,
4075  7402            HLT             /AC BITS 6-8 GOOD FIELD,
4076  7300            CLA CLL         /AC BITS 9-11 BAD FIELD,
4077  2031            ISZ STKS
4100  7410            SKP             /CHECK ALL AVAILABLE STACKS,
4101  5652            JMP I CONCHK
4102  1263            TAD CONCH
4103  1045            TAD K10
4104  3263            DCA CONCH       /UPDATE FIELD CHANGE
4105  2324            ISZ NUMX
4106  5263            JMP CONCH
                      /
4107  0000    FILCOR, 0000            /INSTRUCTIONS FOR FIELDS
4110  1324            TAD NUMX        /MODIFIED TO DF#
4111  3537            DCA I K0000
4112  1130            TAD K1000
4113  3541            DCA I K0001
4114  1041            TAD KCIF
4115  3522            DCA I K0002
4116  1326            TAD JMPRET
4117  3540            DCA I K0003
4120  1325            TAD XRETAD
4121  3523            DCA I K0004
4122  5707            JMP I FILCOR
                      /
4123  0000    FDNUM,  0000
4124  0000    NUMX,   0000
4125  4065    XRETAD, RETADD
4126  5404    JMPRET, JMP I 4
4127  0000    MSTKS,  0000
                      $
```

```
0000  11110000  00000000  11111111  11111111  11111111  11111111  11111111  11111111
0100  11111111  11111111  11111111  11111111  11111111  11111111  00000000  00000000

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

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

0600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
0700  11111111  11111111  11111111  11111111  11111111  11111100  00000000  00000000


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

1200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1300  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111000

1400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1500  11111111  11111111  11111111  11111111  11111111  11111111  11111110  00000000

1600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1700  11111111  11111111  11111111  11111111  11100000  00000000  00000000  00000000


2000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2100  11111111  11111111  11111110  00000000  00000000  00000000  00000000  00000000

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

2400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2500  11111111  11111111  11111111  11111111  11111111  10000000  00000000  00000000

2600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2700  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111


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

3200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  10000000
3300  00000000  00000000  00000000  00000000  00000000  00000000  00000000  00000000

3400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
3500  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111110

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

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

4200
4300

4400
4500

4600
4700


5000
5100

5200
5300

5400
5500

5600
5700


6000
6100

6200
6300

6400
6500

6600
6700


7000
7100

7200
7300

7400
7500

7600
7700
```

```
ADRS    2510    DONE0   2266    K0004   0123    KNTR    0102
AGAIN1  0711    ENTER   1200    K0011   0120    KRR     6036
AGAIN2  1005    EXFD    1316    K0017   0132    KRTN    0106
ALL0    2244    EXFLD   1302    K0070   0111    KXFLD   0100
ATRAP   0153    EXITT   3564    K0077   0117    LBTP    1515
BEGIN   0203    F1000   3631    K0100   0126    LBTSTC  1675
BEGIN1  0200    FCO     0154    K1      0043    LOOP    0027
BELL    1555    FDCON   3632    K10     0045    MDFSHB  1740
CAA     0653    FDGO    3602    K1000   0130    MGTF    2276
CAB     0754    FDNUM   4123    K1100   0142    MIFSHB  1742
CAC     0755    FDWRD   4014    K1200   0116    MOVE    1463
CAD     0741    FILCOR  4107    K20     0103    MQL     7421
CAE     1036    FILDX   1516    K3577   0144    MSTKS   4127
CAF     6007    FILL    2076    K5200   0115    N1      2043
CAG     1420    FRET    3630    K6000   0125    N2      2042
CAI     1133    GOTO0   1510    K6001   0133    NDF     0030
CAX     2263    GTF     6004    K7      0044    NEWDF   1440
CDF     6201    GTF1    2271    K7000   0047    NOFLD   0034
CDF0S   2245    HALTA   3426    K7402   0124    NOMEM   2200
CHDF    1074    HLTS    0671    K7700   0121    NOSTAK  0033
CHECK   2112    IB0     0345    K7707   0050    NSTKS   2435
CIF     6202    IB1     0354    K7717   0056    NUMX    4124
CIFCK   0753    IB2     0402    K7727   0055    OK1     0231
CIFCK1  1046    IB3     0421    K7737   0054    OK2     0257
CIFJMP  0723    IB4     0444    K7744   0071    OK3     0305
CIFJMS  1017    IB5     0463    K7745   0145    OK4     0333
CIFJPL  0715    IB6     0506    K7747   0053    OK5     0373
CIFJSL  1011    IB7     0525    K7757   0052    OK6     0440
CINT    6204    IBSF    0656    K7766   0067    OK7     0502
CKPC    1226    IBSF1   1000    K7767   0051    OK8     0544
CNSTK   2231    IFCN    1605    K7770   0110    P       2044
CON1    4000    IFDF    2460    K7771   0064    PLACE   0127
CON2    4027    INST    3407    K7772   0063    POINT   0065
CONCH   4003    INSTA   3432    K7773   0062    POS     2237
CONCHK  4052    INTE    1663    K7774   0061    RANA    2057
CONX    4032    INTEP   1674    K7775   0060    RDF     6214
CUF     6204    IOF     6002    K7776   0057    REPEAT  1733
DAT     0032    ION     6001    K7777   0046    RET     2511
DATER   2047    ION1    2331    K7S     0066    RETADD  4065
DCAI    0601    IOT     6000    KCAI    0036    RIB     6234
DF0     0211    IOTST   3403    KCAIM   0035    RIF     6224
DF1     0235    IOTX    3606    KCC     6032    RIG1    2452
DF2     0246    ISE0    0021    KCDF    0040    RIG2    3502
DF3     0263    JMP2    0104    KCDF1   0156    RMF     6244
DF4     0274    JMPI0   0020    KCIF    0041    RMFCN1  1676
DF5     0311    JMPI4   1702    KDATER  0157    RMFDY   1703
DF6     0322    JMPIR   0134    KDFSHB  1737    RMFDY1  1710
DF7     0220    JMPRET  4126    KFLD0   0105    RMFE1   1665
DFCN    1677    K0000   0137    KHLT    0037    RMFE2   1656
DFLD    0607    K0001   0141    KIFSHB  1741    RMFI1   1660
DFN     1446    K0002   0122    KJMP    0101    RMFI2   1661
DCAUTO  1517    K0003   0140    KNOP    0752    RMFL1   1633
```

```
RMFL2   1621
RMFL3   1615
RMFT$T  1600
RTF     6005
RTF1    2400
RTRN    1427
SFIB    1400
SINT    6254
SKON    6000
SPF     6040
SRCO    0143
SRD     3535
SRI     3547
SRQ     6003
SRRET   3551
STAN    3513
STDF    1127
STKS    0031
STRMF   1107
SUF     6274
T1      2600
T2      2627
TADI    0622
TAUTO   1432
TFLD    0630
TFLG    2443
TIME    0131
TRANS   1321
TRAP    3643
TRFLD   1337
TRMF    1050
TSF     6041
TTB     0191
XAUTO   0026
XBELL   0150
XCON1   2373
XCOUNT  0113
XDATA   0136
XDATER  0158
XELL    0147
XFD     0042
XFDCON  3576
XFER    2000
XFERC1  2046
XFERC2  2045
XFERIN  2032
XFERL1  2030
XFERL2  2017
XFERP   1700
XFIB    0107
XGTF1   1047
XION1   2330
XMEM    1701
XNOM    2236
XRANS   0025
XRET    0135
XRETAD  4125
XRIG1   2434
XRMF    0024
XRTF1   2372
XSAV    0112
XSDF    2304
XSR0    3633
XSRTF   2407
XSTKS   0023
XTDF    0076
XTDF1   0077
XTFLG   0022
XTOR    0114
XTRAP   0152
XTRMF   2550
XXSR0   0146
```

ERRORS DETECTED: 0

LINKS GENERATED: 0

RUN-TIME: 17 SECONDS

2K CORE USED