## IDENTIFICATION

PRODUCT CODE: MAINDEC-8E-D1HA-D-(D)

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

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MAINTAINER: DIAGNOSTIC PROGRAMMING GROUP

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## 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 ENCOUNTERED 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 Ø 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 Ø" 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 Ø IS NOT INCLUDED.

SRØ=Ø 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 1970, 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
                        /
            0000        *0
     0000   0000        0000
     0001   5001        5001
     0002   0002        0002
     0003   0003        0003
                        /
            0020        *20
                        /
     0020   5400        JMPI0,  JMP I 0
     0021   0000        ISZ0,   ISZ 0
     0022   2443        XTFLG,  TFLG
     0023   2435        XSTKS,  NSTKS
     0024   1000        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  2311   XRET,   RET
0136  0000   XDATA,  0000
0137  0000   K0000,  0000
0140  0003   K0003,  0003
0141  0001   K0001,  0001
0142  1100   K1100,  1100
0143  7745   SR00,   7745
0144  3577   K3577,  3577
0145  7745   K7745,  7745
0146  3333   XXSR0,  XSR0
0147  1556   XELL,   BELL+1
0150  1555   XBELL,  BELL
0151  6046   TTS,    TLS
0152  3643   XTRAP,  TRAP
0153  5531   ATRAP,  JMP I TIME
0154  0000   FCO,    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 RQST.
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
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
                /
```

```
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  3027      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  5231            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  5200            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   CA8
0676  1037              TAD     KHLT
0677  3755              DCA I   CAC
0700  2031              ISZ     STKS
0701  7410              SKP
0702  5305              JMP     .+3
0703  1071              TAD     HLTS
0704  5267              JMP     HLTS-2
0705  6201              CDF     00
0706  6041              TSF                     /ENSURE TTO FLAG SET,
0707  4432              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  7110            CLL RAR
0737  7012            RTR
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 AC6-8, GOOD I.F. IN
                                              /AC9-11.  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    IDSF1,  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  3217    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  3266           DCA .+6
1053  1266           TAD .+5
1054  1045           TAD K10
1055  7240           DCA .+3
1056  7041           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  2001          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  5537          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 FIELD. 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  7450              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 0 IF THE JMP I 12
                            /WORKS.
                /LOCS. 13 TO 17 ARE ALL 0'S
                /
1315  1133          CAI     /20, EQUALS CAI IN F0.
                /
                /LOCS. 21 TO CAI-2 ARE ALL 0'S
                /
1316  6212    EXFD, CIF 10  /FIELD 1 TO START WITH
1317  6001          ION     /LOC. CAI. SEE SYMBOL TABLE
                            /FOR CAI.
                /LOCS. CAI+1 TO 7776 ARE ALL 0'S
                /
1320  5412      .   JMP I 12        /7777. PI SHOULD OCCUR.
                                    /AFTER THIS INSTRUCTION.
                                    /TO FIELD 0.


                /
                /ROUTINE TO TRANSFER TEST ROUTINE TO PROPER FIELD
                /
1321  0000    TRANS, 0
1322  1101          TAD KJMP        /KJMP=JMP I 2
1323  3001          DCA 1           /IN FIELD 0
1324  1102          TAD KNTR        /KNTR = LOC. ENTER
1325  3002          DCA 2           /OF FIELD 0
1326  1103          TAD KXFLD       /KXFLD = LOC. EXFLD
1327  3010          DCA 10
1330  3011          DCA 11
1331  1047          TAD K7766       /1-10 DECIMAL
1332  3000          DCA 0           /SAVE
1333  1476          TAD I XTDF      /CDF X0 IN STDF
1334  3337          DCA .+3
1335  6201          CDF 00
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 0           /DONE LOCS 1 TO 12 IF SKIP
1342  5335          JMP .-5
1343  1337          TAD TRFLD
1344  3347          DCA .+3
1345  6201          CDF 00
1346  1410          TAD I 10
1347  6211          CDF 10
1350  3423          DCA I K20       /PUT 540 IN LOC. 20
1351  6201          CDF 00
1352  1337          TAD TRFLD
1353  3355          DCA .+2
1354  1410          TAD I 10
1355  6211          CDF 10
1356  3465          DCA I KCAIM     /PUT CIF X0 IN CAI-1
1357  6201          CDF 00
1360  1337          TAD TRFLD
```

```
1361  3363          DCA ,*2
1362  1410          TAD I 10
1363  6211          CDF 10
1364  3466          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
              /212 TIMES,
              /
1400  6041    SFIB,   TSF             /SEE IF FLAG IS SET,
1401  4322            JMS I XTFLG     /SET IT
1402  1347            TAD K7000       /7000
1403  3327            DCA LOOP
1404  6211            CDF 10          /DF=FIELD 1
1405  1337            TAD KHLT        /HLT
1406  3347            DCA I K7000     /7000, FIELD 1=HLT
1407  6201            CDF 00          /DF=0
1410  1344            TAD JMP2        /JMP2=JMP I KFLD0
1411  3347            DCA I K7000     /7000, FIELD 0=JMP I KFLD0
                                      /KFLD0=LOC, RTRN
1412  1321            TAD KJMP        /KJMP=JMP I 2
1413  3001            DCA 1
1414  1306            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.
                        /
1462  6621              TAUTO,  CDF 00
1463  1[illegible]              TAD K7700
1464  3[illegible]              DCA LOOP        /LOOP COUNTER
1465  4[illegible]              JMS I XSTKS     /READ SR 9-11
1466  1[illegible]              TAD KCOUP       /6201
1467  3[illegible]              DCA OPN
1470  1[illegible]      NEWDF,  TAD OPN
1471  1[illegible]              TAD K10         /INCREMENT DF
1472  3[illegible]              DCA OPN
                        /
                        /CLEAR ONE FIELD TO 0
                        /
1473  7[illegible]              CMA
1474  3[illegible]              DCA 10
1475  3[illegible]              DCA 0           /USE LOC. 0 FOR A COUNTER
1476  6[illegible]      OPN,    CDF 10          /FIELD 1 TO START WITH
1477  3[illegible]              DCA I 10
1500  2[illegible]              ISZ 0
1501  5[illegible]              JMP .-4
1502  6[illegible]              CDF 00
                        /
                        /NOW PUT TEST ROUTINE IN THE EXTENDED FIELD
                        /
1503  1[illegible]              TAD DUAUTO      /1ST LOC. OF ROUTINE MINUS 1
1504  3[illegible]              DCA 10          /SOURCE
1505  1[illegible]              TAD K7744       /-228 DECIMAL
1506  3[illegible]              DCA 0           /USE LOC. 0 AS COUNTER
1507  1[illegible]              TAD DUAUTO
1510  3[illegible]              DCA 11          /DESTINATION
1511  1[illegible]              TAD OPN         /CDF XX
1512  3[illegible]              DCA .+3
1513  6[illegible]      MOVE,   CDF 00
1514  1[illegible]              TAD I 10
1515  6[illegible]              CDF 10          /FIELD 1 TO START
1516  3[illegible]              DCA I 11
1517  2[illegible]              ISZ 0           /MOVE WHEN SKIP
```

```
1470  2600          JMP MOVE

                /
                /NOW SET AUTO-I REGS 10 TO 17 TO 7777.
                /
1471  1111          TAD K7770       /-8 DECIMAL
1472  3010          DCA 0
1473  1004          TAD K7          //
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  1141          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  2061      GOTO0,  ISZ SIKS        /DONE ALL WHEN SKIP
1511  5240              JMP NEWDF       /SETUP FOR NEXT
1512  2027              ISZ LOOP        /ALL DONE IF SKIP
1513  5255              JMP NEWDF-3     /REPEAT ALL
1514  5745              JMP I LBTP
1515  1600      LBTP,   RMFTSI
                /
1516  1517      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          SEA
1523  7402          HLT            /ERROR, INDEX REG, 10 FAILED
1524  1411          TAD I 11
1525  7440          SEA
1526  7402          HLT            /INDEX REG, 11 FAILED
1527  1412          TAD I 12
1530  7440          SEA
1531  7402          HLT            /12 FAILED
1532  1413          TAD I 13
1533  7440          SEA
1534  7402          HLT            /13 FAILED
1535  1414          TAD I 14
1536  7440          SEA
1537  7402          HLT            /14 FAILED
1540  1415          TAD I 15
1541  7440          SEA
1542  7402          HLT            /15 FAILED
1543  1416          TAD I 16
1544  7440          SEA
1545  7402          HLT            /16 FAILED
1546  1417          TAD I 17
1547  7440          SEA
1550  7402          HLT            /17 FAILED
1551  6201          CDF 00         /SET DF TO FIELD 0
1552  6202          CIF 00         /SET IB, TO FIELD 0
1553  5010          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  1554    BELL, TAD .-1
1556  6046          TLS            /RING BELL
1557  6041          TSF
1560  5357          JMP .-1
1561  7004          LAS
1562  7006          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    RMFTSI, 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    1210            TAD     K7770           /INITIALIZE DF COUNTER TO -10,
1630    3277            DCA     DFCN
1631    1210            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    0000            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  5233            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    0000    XFER,   0
2001    7200            CLA
2002    1400            TAD I   XFER            /GET -N2
2003    3242            DCA     N2
2004    2200            ISZ     XFER            /GET -N1
2005    1400            TAD I   XFER
2006    3243            DCA     N1
2007    2200            ISZ     XFER            /GET P-1
2010    1400            TAD I   XFER
2011    3244            DCA     P
2012    2200            ISZ     XFER            /UPDATE TO RETURN ADDRESS.
2013    1240            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    1245            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  7540          CLA CLL CMA
2056  3010          DCA 10          /SET AUTO REGISTER
2057  6201  RANA,   CDF
2060  4276          JMS FILL        /LOAD UP FIELD WITH DATA
2061  7540          CLA CMA CLL
2062  3010          DCA 10
2063  4412          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  3337          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  7650          SNA
2210  5546          JMP I XXSR0     /32K PRESENT, CAN'T TEST
2211  3333          DCA NOSTAK      /SAVE NO, MISSING
2212  3347          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  2236      XNOM, NOMEM+3
                /
2237  1245      POS,  TAD CDF0S
2240  1246            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  7001          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  7640          CLA CLL CMA             /CHECK FOR JAM ON GTF
2311  6204          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                      GTF
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 ISZ0
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  7004          LAS              /READ SR 9-11
2437  0044          AND K7
2440  7041          CIA
2441  3435          DCA STKS
2442  5635          JMP I NSTKS
              /
              /SET ITY 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  7640          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
2602  6264          CUF
2603  6204          CINT
2604  1021          TAD ISZ0
2605  3001          DCA 1
2606  1020          TAD JMPI0
2607  3002          DCA 2
2610  6007          CAF
2611  7410          SKP
2612  5212          JMP ,           /CAF TRAPED
2613  6001          ION
2614  7410          SKP
2615  5215          JMP ,           /ION TRAPED
2616  6002          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
2630  6274          CUF+10          /USER MODE
2631  5232          JMP ,+1
2632  7402          HLT
2633  5233          JMP ,           /HLT DID NOT TRAP
                    /EXECUTIVE MODE
2634  6254          SINT            /SKIP ON TRAP FLAG
2635  5235          JMP ,           /FLAG NOT UP
2636  6204          CINT            /CLEAR TRAP FLAG
2637  6254          SINT            /SKIP ON TRAP FLAG
2640  7410          SKP
2641  5241          JMP ,           /TRAP FLAG STILL SET
2642  7004          LAS             /SHOULD NOT TRAP
2643  7410          SKP
2644  5244          JMP ,           /LAS TRAPED IN EXECUTIVE MODE
2645  6244          RMF             /RESTORE USER
```

```
2646  6001          ION
2647  5250          JMP .+1          /GO TO USER
                /USER MODE
2650  7404          OSR              /SHOULD TRAP ON OSR
2651  5251          JMP .            /DID NOT TRAP
                /EXECUTIVE MODE
2652  6254          SINT             /SKIP ON TRAP FLAG
2653  5253          JMP .            /DID NOT SKIP
2654  6207          CAF              /CLEAR TRAP FLAG
2655  6254          SINT             /TEST IF CLEARED
2656  7410          SKP
2657  7402          HLT              /TRAP FLAG NOT CLEARED
2660  7404          OSR              /SHOULD NOT TRAP
2661  7410          SKP
2662  5262          JMP .            /ORS TRAPED IN EXECUTIVE MODE
2663  6244          RMF              /RESTORE MODE
2664  6001          ION
2665  5266          JMP .+1          /GO TN USER

                /USER MODE
2666  6005          RTF              /MAKE THE FLAGS
2667  5267          JMP .            /RTF FAILED TO TRAP
                /EXECUTIVE MODE
2670  6254          SINT
2671  5271          JMP .            /TRAP FLAG NOT SET
2672  6204          CINT             /CLEAR TRAP FLAG
2673  6254          SINT             /TEST IF CLEARED
2674  7410          SKP
2675  7402          HLT              /TRAP FLAG NOT CLEARED
2676  6204          GTF              /SHOULD NOT TRAP
2677  7410          SKP
2700  5301          JMP .            /TRAPED IN EXECUTIVE MODE
2701  6244          RMF              /RESTORE MODE
2702  6001          ION
2703  5304          JMP .+1          /GO TO USER
                /USER MODE

2704  6001          ION
2705  5305          JMP .            /ION DID NOT TRAP

                /EXECUTIVE MODE
2706  6254          SINT             /SKIP ON TRAP FLAG
2707  5307          JMP .            /TRAP FLAG NOT SET
2710  7300          CLA CLL
2711  6204          GTF
2712  0126          AND K0100
2713  7450          SNA
2714  7402          HLT              /SUF NOT SET
2715  6204          CINT             /CLEAR TRAP FLAG
2716  6254          SINT             /TEST IF CLEARED
2717  7410          SKP
2720  7402          HLT              /FLAG NOT CLEARED
2721  6002          IOF              /SHOULD NOT TRAP
2722  7410          SKP
2723  5323          JMP .            /IOF TRAPED IN EXECUTIVE MODE
```

```
2724  6244          RMF            /RESTORE MODE
2725  6001          ION
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  7402          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          SRQ
2776  7410          SKP
2777  7402          HLT            /INTERRUPT REQUEST
```

```
3000  7300          CLA CLL
3001  1126          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  1126          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  0126          AND K0100
3024  7440          SZA              /DID GTF GET USER
3025  7402          HLT
3026  6003          SRQ              /IS USER FLAG SET
3027  5226          JMP .-1
3030  6234          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  6234          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  5252          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          /SHOUDLD 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  6254                    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  4476              JMS I XSTKS      /CHECK NO, OF FIELDS PRESENT
3505  1140              TAD KCDF
3506  1145              TAD K10
3507  3535              DCA SRD          /SET DF FOR FIRST FIELD
3510  1141              TAD KCIF
3511  1145              TAD K10
3512  3547              DCA SRI          /SET IF FOR FIRST FIELD
3513  1114      STAN,   TAD K5577        /GET START OF PROGRAM -1
3514  3010              DCA 10
3515  1145              TAD K7745        /NO. OF INSTRUCTIONS TO TRANSFER
3516  3143              DCA SRCO
3517  7040              CMA
3520  3111              DCA 11           /START AT 0000

3521  1535              TAD SRD          /MAKE FLAGS FOR RETURN CHECK
3522  0111              AND K0070
3523  7010              RAR
3524  7012              RTR
3525  3112              DCA XSAV
3526  1547              TAD SRI
3527  0111              AND K0070
3530  1112              TAD XSAV
3531  1142              TAD K1100
3532  3776              DCA I XFDCON
3533  6201              CDF 00
3534  1610              TAD I 10
```

```
3535  6201  SRD,    CDF 00
3536  3411          DCA I 11        /STORE INSTRUCTIONS
3537  2143          ISZ SRCO
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  5553          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  1232          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  1232          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  1231            TAD F1000
3624  7640            SZA CLA
3625  5202            JMP FDGO
3626  6202            CIF
3627  5630            JMP I FRET       /TEST DONE GO TO FIELD 0
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  5631            JMP I TIME
3637  6007            CAF
3640  1151            TAD TTB
3641  3647            DCA I XELL
3642  5630            JMP I XBELL
                /
3643  7300     TRAP,  CLA CLL
3644  1153            TAD ATRAP
3645  3001            DCA 1            /SET FOR RETURN
3646  6074            SUF              /SET FOR USER
3647  6044            ION
3650  5001            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,0
                /
        4000    *4000
                /
4000  0000     CON1,  0000             /FIRST FILL CORE, ALL STACKS
4001  7300            CLA CLL          /DCA I FOR 32K
4002  3623            DCA FDNUM
4003  3624            DCA NUMX
4004  1040            TAD KCDF
4005  3232            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  1232            TAD CONX
4040  1045            TAD K10
4041  3232            DCA CONX        /UPDATE FIELD CHANGE
4042  2323            ISZ FDNUM
4043  2027            ISZ MSTKS       /ARE ALL STACKS DONE
4044  5227            JMP CON2
4045  6203            CDF CIF
4046  6047            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 K0001
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  5552          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  5747          JMP I FILCOR
                /
4123  0000    FDNUM,  0000
4124  0000    NUMX,   0000
4125  4165    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 | KRB | 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 | MSTKS | 4127 |
| CAE | 1036 | FILDX | 1516 | K3577 | 0144 | N1 | 2043 |
| CAF | 6007 | FILL | 2076 | K5200 | 0115 | N2 | 2042 |
| CAG | 1420 | FRET | 3530 | K6000 | 0125 | NDF | 0030 |
| CAI | 1133 | GOTO0 | 1510 | K6001 | 0133 | NEWDF | 1440 |
| CAX | 2263 | GTF | 6004 | K7 | 0044 | NOFLD | 0034 |
| CDF | 6201 | GTF1 | 2271 | K7000 | 0047 | NOMEM | 2200 |
| CDF0S | 2245 | HALTA | 3426 | K7402 | 0124 | NOSTAK | 0033 |
| CHDF | 1074 | HLTS | 0671 | K7700 | 0121 | NSTKS | 2435 |
| CHECK | 0412 | IB0 | 0345 | K7707 | 0050 | NUMX | 4124 |
| CIF | 6202 | IB1 | 0354 | K7717 | 0056 | OK1 | 0231 |
| CIFCK | 0753 | IB2 | 0402 | K7727 | 0055 | OK2 | 0257 |
| CIFCK1 | 1046 | IB3 | 0421 | K7737 | 0054 | OK3 | 0305 |
| CIFJMP | 0723 | IB4 | 0444 | K7744 | 0071 | OK4 | 0333 |
| CIFJMS | 1017 | IB5 | 0463 | K7745 | 0145 | OK5 | 0373 |
| CIFJPL | 0715 | IB6 | 0506 | K7747 | 0053 | OK6 | 0440 |
| CIFJSL | 1011 | IB7 | 0525 | K7757 | 0052 | OK7 | 0502 |
| CINT | 6204 | IBSF | 0656 | K7766 | 0067 | OK8 | 0544 |
| CKPC | [illegible] | IBSF1 | 1000 | K7767 | 0051 | P | 2044 |
| CNSTK | [illegible] | IFCN | 1605 | K7770 | 0110 | PLACE | 0127 |
| CON1 | [illegible] | IFDF | 2460 | K7771 | 0064 | POINT | 0065 |
| CON2 | [illegible] | INST | 3407 | K7772 | 0063 | POS | 2237 |
| CONCH | [illegible] | INSTA | 3432 | K7773 | 0062 | RANA | 2057 |
| CONCHK | [illegible] | INTE | 1663 | K7774 | 0061 | RDF | 6214 |
| CONX | [illegible] | INTEP | 1674 | K7775 | 0060 | REPEAT | 1733 |
| CUF | 6264 | IOF | 6002 | K7776 | 0057 | RET | 2511 |
| DAT | 0032 | ION | 6001 | K7777 | 0046 | RETADD | 4065 |
| DATER | 2047 | ION1 | 2331 | K7S | 0066 | RIB | 6234 |
| DCAI | [illegible] | IOT | 6000 | KCAI | 0036 | RIF | 6224 |
| DF0 | 0211 | IOTST | 3403 | KCAIM | 0035 | RIG1 | 2452 |
| DF1 | 0230 | IOTX | 3606 | KCC | 6032 | RIG2 | 3502 |
| DF2 | 0246 | ISZ0 | 0021 | KCDF | 0040 | RMF | 6244 |
| DF3 | 0263 | JMP2 | 0104 | KCDF1 | 0156 | RMFCN1 | 1676 |
| DF4 | 0274 | JMPI0 | 0020 | KCIF | 0041 | RMFDY | 1703 |
| DF5 | 0611 | JMPI4 | 1702 | KDATER | 0157 | RMFDY1 | 1710 |
| DF6 | 0622 | JMPIR | 0134 | KDFSHB | 1737 | RMFE1 | 1665 |
| DF7 | 0220 | JMPRET | 4126 | KFLD0 | 0105 | RMFE2 | 1656 |
| DFCN | 1677 | K0000 | 0137 | KHLT | 0037 | RMFI1 | 1660 |
| DFLD | 0507 | K0001 | 0141 | KIFSHB | 1741 | RMFI2 | 1661 |
| DFN | 1446 | K0002 | 0122 | KJMP | 0101 | RMFL1 | 1633 |
| DOAUTO | 1517 | K0003 | 0140 | KNOP | 0752 | RMFL2 | 1621 |

| | | | |
|---|---|---|---|
| RMFL3 | 1615 | XNOM | 2236 |
| RMFTST | 1600 | XRANS | 0025 |
| RTF | 6005 | XRET | 0135 |
| RTF1 | 2400 | XRETAD | 4125 |
| RTRN | 1427 | XRIG1 | 2434 |
| SFIB | 1400 | XRMF | 0024 |
| SINT | 6254 | XRTF1 | 2372 |
| SKON | 6000 | XSAV | 0112 |
| SPF | 6240 | XSDF | 2304 |
| SRCO | 0143 | XSR0 | 3633 |
| SRD | 3535 | XSRTF | 2407 |
| SRI | 3547 | XSTKS | 0023 |
| SRC | 6003 | XTDF | 0076 |
| SRRET | 3551 | XTDF1 | 0077 |
| STAN | 3513 | XTFLG | 0022 |
| STDF | 1127 | XTOR | 0114 |
| STKS | 0031 | XTRAP | 0152 |
| STRMF | 1107 | XTRMF | 2550 |
| SUF | 6274 | XXSR0 | 0146 |
| T1 | 2600 | | |
| T2 | 2627 | | |
| TADI | 0622 | | |
| TAUTO | 1632 | | |
| TFLD | 0630 | | |
| TFLC | 2643 | | |
| TIMF | 0161 | | |
| TRANS | 1621 | | |
| TRAP | 3643 | | |
| TRFLD | 1637 | | |
| TRMF | [illegible] | | |
| TSF | [illegible] | | |
| TTR | [illegible] | | |
| XAUTO | 0120 | | |
| XBULL | [illegible] | | |
| XCON1 | 2073 | | |
| XCOURT | 0113 | | |
| XDATA | 0136 | | |
| XDATER | 0155 | | |
| XELL | 0147 | | |
| XFD | 0042 | | |
| XFDCON | 3076 | | |
| XFER | [illegible] | | |
| XFERC1 | 2046 | | |
| XFERC2 | 2045 | | |
| XFERIN | 2032 | | |
| XFERL1 | 2030 | | |
| XFERL2 | 2017 | | |
| XFERP | 1700 | | |
| XFIB | 0107 | | |
| XGTF1 | 1047 | | |
| XION1 | 2030 | | |
| XMEM | 1701 | | |

```
ERRORS DETECTED: 0
LINKS GENERATED: 0
RUN-TIME:  20 SECONDS
3K CORE USED
```

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ADRS | 1619 | 1623# | | | | | | | | | | | |
| AGAIN1 | 530# | 564 | | | | | | | | | | | |
| AGAIN2 | 580# | 613 | | | | | | | | | | | |
| ALL0 | 1399 | 1411 | 1419# | 1443 | | | | | | | | | |
| ATRAP | 134# | 2220 | | | | | | | | | | | |
| BEGIN | 114 | 153# | | | | | | | | | | | |
| BEGIN1 | 150# | | | | | | | | | | | | |
| BELL | 130 | 131 | 1081# | | | | | | | | | | |
| CAA | 471 | 484# | | | | | | | | | | | |
| CAB | 518 | 569# | | | | | | | | | | | |
| CAC | 520 | 570# | | | | | | | | | | | |
| CAD | 552 | 557# | | | | | | | | | | | |
| CAE | 601 | 606# | | | | | | | | | | | |
| CAF | 19# | 154 | 1667 | 1674 | 1714 | 1909 | 1913 | 1918 | 2107 | 2119 | 2170 | 2222 | 2238 | 2289 |
| CAG | 97 | 926# | 938 | | | | | | | | | | |
| CAI | 54 | 55 | 695# | 827 | 832 | | | | | | | | |
| CAX | 1435# | 1439 | | | | | | | | | | | |
| CDF | 9# | 137 | 160 | 169 | 185 | 195 | 212 | 222 | 238 | 248 | 268 | 283 | 309 | 326 |
| | 349 | 368 | 391 | 409 | 446 | 464 | 499 | 514 | 526 | 576 | 643 | 661 | 672 | 690 |
| | 714 | 724 | 763 | 769 | 772 | 775 | 861 | 863 | 869 | 871 | 873 | 877 | 879 | 883 |
| | 885 | 889 | 891 | 910 | 913 | 932 | 955 | 970 | 974 | 986 | 988 | 1069 | 1122 | 1148 |
| | 1159 | 1210 | 1214 | 1265 | 1267 | 1273 | 1297 | 1310 | 1420 | 1441 | 1465 | 1998 | 2144 | 2146 |
| | 2262 | 2277 | 2279 | 2288 | | | | | | | | | | |
| CDF0S | 1393 | 1408 | 1410 | 1420# | | | | | | | | | | |
| CHDF | 661# | 669 | 670 | | | | | | | | | | | |
| CHECK | 1301 | 1330# | 1341 | 1342 | | | | | | | | | | |
| CIF | 10# | 540 | 590 | 691 | 710 | 713 | 725 | 836 | 933 | 1010 | 1070 | 1160 | 1211 | 1215 |
| | 1442 | 1866 | 1875 | 1998 | 2156 | 2210 | 2279 | 2288 | 2303 | | | | | |
| CIFCK | 532 | 537 | 539 | 550 | 553 | 568# | | | | | | | | |
| CIFCK1 | 582 | 587 | 589 | 599 | 602 | 615# | | | | | | | | |
| CIFJNP | 531 | 534 | 536 | 540# | 559 | 569 | | | | | | | | |
| CIFJNS | 579 | 581 | 584 | 586 | 590# | 608 | | | | | | | | |
| CIFJPL | 544 | 562 | | | | | | | | | | | | |
| CIFJSL | 544# | 611 | | | | | | | | | | | | |
| CINT | 18# | 1669 | 1698 | 1731 | 1754 | 1769 | 1778 | 1789 | 1800 | 1812 | 1830 | 1846 | 1856 | 1871 |
| | 1889 | 1939 | 1952 | 1967 | 1982 | 2000 | 2020 | 2041 | 2050 | 2064 | 2074 | 2204 | | |
| CKPC | 715 | 728# | | | | | | | | | | | | |
| CNSTK | 1400 | 1412 | | | | | | | | | | | | |
| CON1 | 1526 | 2250# | 2291 | 2292 | | | | | | | | | | |
| CON2 | 2267 | 2274# | 2287 | | | | | | | | | | | |
| CONCH | 2303# | 2310 | 2318 | 2320 | 2322 | | | | | | | | | |
| CONCHK | 2266 | 2280 | 2294# | 2317 | | | | | | | | | | |
| CONX | 2265 | 2277# | 2282 | 2284 | | | | | | | | | | |
| CUF | 16# | 155 | 1668 | 1691 | 1771 | 1779 | 1925 | 1984 | 1991 | 1999 | 2010 | 2040 | 2063 | 2086 |
| | 2108 | 2171 | 2237 | | | | | | | | | | | |
| DAT | 51# | 466 | 467 | 483 | | | | | | | | | | |
| DATER | 136 | 1269# | 1311 | | | | | | | | | | | |
| DCAI | 440# | 475 | | | | | | | | | | | | |
| DF0 | 160# | 166 | 179 | | | | | | | | | | | |
| DF1 | 184# | 192 | 207 | | | | | | | | | | | |
| DF2 | 189 | 194# | 204 | | | | | | | | | | | |
| DF3 | 211# | 219 | 232 | | | | | | | | | | | |
| DF4 | 216 | 221# | 229 | | | | | | | | | | | |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DF5 | 237# | 245 | 259 | | | | | | | | | | |
| DF6 | 242 | 247# | 256 | | | | | | | | | | |
| DF7 | 163 | 168# | 176 | | | | | | | | | | |
| DFCN | 1133 | 1164 | 1174# | | | | | | | | | | |
| DFLD | 446# | 453 | 454 | 456 | | | | | | | | | |
| DFN | 960 | 961 | 963 | 970# | 984 | | | | | | | | |
| DOAUTO | 978 | 982 | 1026 | 1042# | | | | | | | | | |
| DONE0 | 1441# | | | | | | | | | | | | |
| ENTER | 93 | 704# | | | | | | | | | | | |
| EXFD | 59 | 787 | 836# | | | | | | | | | | |
| EXFLD | 91 | 807# | | | | | | | | | | | |
| EXITT | 2161 | 2169# | | | | | | | | | | | |
| F1000 | 2207 | 2213# | | | | | | | | | | | |
| FCO | 135# | | | | | | | | | | | | |
| FDCON | 2180 | 2189 | 2199 | 2214# | | | | | | | | | |
| FDGO | 2168# | 2209 | | | | | | | | | | | |
| FDNUM | 2252 | 2275 | 2285 | 2337# | | | | | | | | | |
| FDWRD | 2262# | 2269 | 2270 | 2272 | | | | | | | | | |
| FILCOR | 2263 | 2278 | 2324# | 2335 | | | | | | | | | |
| FILDX | 1011 | 1029# | | | | | | | | | | | |
| FILL | 1298 | 1315# | 1325 | 1326 | | | | | | | | | |
| FRET | 2211 | 2212# | | | | | | | | | | | |
| GOTO0 | 1019# | 1071 | | | | | | | | | | | |
| GTF | 21# | 1470 | 1504 | 1512 | 1548 | 1637 | 1680 | 1735 | 1750 | 1838 | 1851 | 2102 | 2197 |
| GTF1 | 616 | 1454# | | | | | | | | | | | |
| HALTA | 2063# | 2084 | | | | | | | | | | | |
| HLTS | 514# | 524 | 525 | | | | | | | | | | |
| IB0 | 275# | 281 | 300 | | | | | | | | | | |
| IB1 | 272 | 283# | 290 | 298 | | | | | | | | | |
| IB2 | 302 | 309# | 316 | 324 | 344 | | | | | | | | |
| IB3 | 322 | 326# | 333 | 341 | | | | | | | | | |
| IB4 | 349# | 358 | 366 | 386 | | | | | | | | | |
| IB5 | 354 | 368# | 375 | 383 | | | | | | | | | |
| IB6 | 391# | 398 | 407 | 428 | | | | | | | | | |
| IB7 | 400 | 409# | 416 | 424 | | | | | | | | | |
| IBSF | 478 | 499# | | | | | | | | | | | |
| IBSF1 | 566 | 575# | | | | | | | | | | | |
| IFCN | 1112 | 1114# | 1124 | 1142 | | | | | | | | | |
| IFDF | 1596 | 1599# | 1601 | 1640 | 1646 | 1652 | 1653 | 1654 | | | | | |
| INST | 2039 | 2045# | 2054 | 2055 | | | | | | | | | |
| INSTA | 2062 | 2068# | 2078 | 2080 | 2081 | | | | | | | | |
| INTE | 1162# | 1171 | | | | | | | | | | | |
| INTEP | 1120 | 1171# | | | | | | | | | | | |
| IOF | 23# | 29# | 1192 | 1603 | 1683 | 1758 | 1971 | 2089 | | | | | |
| ION | 22# | 158 | 275 | 284 | 310 | 327 | 350 | 369 | 392 | 410 | 544 | 592 | 837 | 924 |
| | 1190 | 1468 | 1677 | 1690 | 1706 | 1722 | 1739 | 1743 | 1762 | 1772 | 1780 | 1791 | 1802 | 1820 |
| | 1835 | 1848 | 1860 | 1879 | 1904 | 1910 | 1926 | 1941 | 1954 | 1962 | 1975 | 1992 | 2001 | 2011 |
| | 2042 | 2065 | 2087 | 2096 | 2231 | | | | | | | | | |
| ION1 | 1485 | 1492# | 1521 | | | | | | | | | | | |
| IOT | 31# | 2193 | | | | | | | | | | | | |
| IOTST | 2040# | 2058 | | | | | | | | | | | | |
| IOTX | 2193# | 2205 | 2206 | | | | | | | | | | | |
| ISZ0 | 42# | 500 | 1493 | 1538 | 1670 | 2150 | | | | | | | |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| JMP2 | 95# | 914 | | | | | | | | | | | | |
| JMPI0 | 41# | 269 | 504 | 1455 | 1495 | 1540 | 1672 | 2154 | | | | | | |
| JMPI4 | 1118 | 1177# | | | | | | | | | | | | |
| JMPIR | 119# | 1620 | | | | | | | | | | | | |
| JMPRET | 2331 | 2340# | | | | | | | | | | | | |
| K0000 | 122# | 1605 | 1607 | 2326 | | | | | | | | | | |
| K0001 | 124# | 1610 | 2304 | 2328 | | | | | | | | | | |
| K0002 | 109# | 2082 | 2330 | | | | | | | | | | | |
| K0003 | 123# | 2332 | | | | | | | | | | | | |
| K0004 | 110# | 2079 | 2334 | | | | | | | | | | | |
| K0011 | 107# | 1557 | 1595 | 1651 | | | | | | | | | | |
| K0017 | 117# | 1597 | | | | | | | | | | | | |
| K0070 | 100# | 1460 | 2135 | 2140 | 2311 | | | | | | | | | |
| K0077 | 106# | 1549 | 1638 | | | | | | | | | | | |
| K0100 | 113# | 1751 | 1817 | 1832 | 1841 | 1907 | 2103 | | | | | | | |
| K1 | 60# | 516 | | | | | | | | | | | | |
| K10 | 62# | 444 | 452 | 462 | 477 | 512 | 535 | 538 | 585 | 588 | 639 | 659 | 681 | 684 |
| | 781 | 784 | 962 | 1127 | 1137 | 1263 | 1293 | 1307 | 1409 | 1477 | 2122 | 2125 | 2163 | 2166 |
| | 2268 | 2283 | 2319 | | | | | | | | | | | |
| K1000 | 115# | 1613 | 2056 | 2327 | | | | | | | | | | |
| K1100 | 125# | 2142 | | | | | | | | | | | | |
| K1200 | 105# | 1514 | | | | | | | | | | | | |
| K20 | 94# | 872 | | | | | | | | | | | | |
| K3577 | 127# | 2127 | | | | | | | | | | | | |
| K5200 | 104# | 1501 | 1506 | | | | | | | | | | | |
| K6000 | 112# | 2030 | | | | | | | | | | | | |
| K6001 | 118# | 1611 | | | | | | | | | | | | |
| K7 | 61# | 999 | 1110 | 1364 | 1366 | 1378 | 1568 | 2298 | | | | | | |
| K7000 | 64# | 448 | 465 | 908 | 912 | 915 | 935 | | | | | | | |
| K7002 | 111# | 1609 | 1615 | 2061 | | | | | | | | | | |
| K7700 | 108# | | | | | | | | | | | | | |
| K7707 | 65# | 168 | 675 | 956 | | | | | | | | | | |
| K7717 | 71# | 247 | | | | | | | | | | | | |
| K7727 | 70# | 237 | | | | | | | | | | | | |
| K7737 | [illegible] | 221 | | | | | | | | | | | | |
| K7744 | [illegible] | [illegible] | | | | | | | | | | | | |
| K7745 | 103# | 2129 | | | | | | | | | | | | |
| K7747 | 68# | 211 | | | | | | | | | | | | |
| K7757 | 67# | 194 | | | | | | | | | | | | |
| K7766 | 82# | 857 | | | | | | | | | | | | |
| K7767 | 66# | 184 | | | | | | | | | | | | |
| K7770 | 99# | 418 | 997 | 1132 | 1134 | 1361 | 1482 | 1561 | 2256 | 2258 | | | | |
| K7771 | 77# | 401 | | | | | | | | | | | | |
| K7772 | 76# | 377 | | | | | | | | | | | | |
| K7773 | 75# | 360 | | | | | | | | | | | | |
| K7774 | 74# | 335 | | | | | | | | | | | | |
| K7775 | 73# | 318 | | | | | | | | | | | | |
| K7776 | 72# | 292 | 1618 | | | | | | | | | | | |
| K7777 | 63# | 890 | 1006 | | | | | | | | | | | |
| K7S | 81# | 676 | 715 | 788 | | | | | | | | | | |
| KCAI | 55# | 662 | 728 | 774 | 884 | | | | | | | | | |
| KCAIM | 54# | 878 | | | | | | | | | | | | |
| KCC | 28# | 1680 | 1824 | | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| KCDF | 57# | 443 | 461 | 511 | 636 | 658 | 680 | 759 | 1151 | 1252 | 1292 | 1391 | 1457 | 2121 |
| | 2254 | 2260 | | | | | | | | | | | | |
| KCDF1 | 137# | | | | | | | | | | | | | |
| KCIF | 58# | 530 | 580 | 683 | 1008 | 1154 | 2124 | 2301 | 2329 | | | | | |
| KDATER | 138# | 1317 | 1319 | | | | | | | | | | | |
| KDFSHB | 1135 | 1136 | 1138 | 1139 | 1147 | 1152 | 1200 | 1218# | | | | | | |
| KFLD0 | 95 | 96# | | | | | | | | | | | | |
| KHLT | 56# | 156 | 515 | 517 | 519 | 664 | 773 | 911 | | | | | | |
| KIFSHB | 1123 | 1126 | 1128 | 1129 | 1155 | 1207 | 1220# | | | | | | | |
| KJMP | 92# | 850 | 917 | | | | | | | | | | | |
| KNOP | 502 | 567# | | | | | | | | | | | | |
| KNTR | 93# | 852 | | | | | | | | | | | | |
| KRB | 30# | 1929 | | | | | | | | | | | | |
| KRTN | 97# | 919 | | | | | | | | | | | | |
| KXFLD | 91# | 854 | | | | | | | | | | | | |
| LBTP | 1023 | 1024# | | | | | | | | | | | | |
| LBTSTC | 1117 | 1168 | 1172# | | | | | | | | | | | |
| LOOP | 48# | 178 | 182 | 206 | 209 | 231 | 235 | 258 | 271 | 299 | 306 | 343 | 347 | 385 |
| | 389 | 427 | 439 | 474 | 529 | 563 | 579 | 612 | 663 | 665 | 676 | 749 | 909 | 937 |
| | 957 | 1021 | 1362 | 1402 | 1475 | 1520 | 1554 | 2290 | | | | | | |
| MDFSHB | 1141 | 1197 | 1219# | | | | | | | | | | | |
| MGTP | 1459# | 1476 | 1481 | | | | | | | | | | | |
| MIFSHB | 1131 | 1204 | 1221# | | | | | | | | | | | |
| MOVE | 986# | 991 | | | | | | | | | | | | |
| MSTKS | 2257 | 2286 | 2341# | | | | | | | | | | | |
| M1 | 1247 | 1260 | 1276# | | | | | | | | | | | |
| M2 | 1244 | 1254 | 1275# | | | | | | | | | | | |
| NDF | 49# | 442 | 447 | 455 | 460 | 469 | 480 | | | | | | | |
| NEWDF | 961# | 1020 | 1022 | | | | | | | | | | | |
| NOFLD | 53# | 1383 | 1392 | | | | | | | | | | | |
| NOMEM | 1176 | 1360# | 1406 | | | | | | | | | | | |
| NOSTAK | [illegible] | 1319 | 1384 | 1386 | 1400 | | | | | | | | | |
| NSTKS | [illegible] | 1565# | 1571 | | | | | | | | | | | |
| NUMX | 2283 | 2271 | 2270 | 2296 | 2306 | 2321 | 2325 | 2338# | | | | | | |
| OK1 | 173 | 178# | | | | | | | | | | | | |
| OK2 | 199 | 230# | | | | | | | | | | | | |
| OK3 | 226 | 231# | | | | | | | | | | | | |
| OK4 | 252 | 258# | | | | | | | | | | | | |
| OK5 | 296 | 299# | | | | | | | | | | | | |
| OK6 | 339 | 343# | | | | | | | | | | | | |
| OK7 | 381 | 385# | | | | | | | | | | | | |
| OK8 | 422 | 427# | | | | | | | | | | | | |
| P | 1250 | 1256 | 1258 | 1277# | | | | | | | | | | |
| PLACE | 114# | 1088 | 1090 | 2239 | | | | | | | | | | |
| POINT | 70# | 677 | | | | | | | | | | | | |
| POS | 1401 | 1408# | | | | | | | | | | | | |
| PANA | 1294 | 1297# | 1306 | 1308 | 1309 | | | | | | | | | |
| RDF | 11# | 161 | 170 | 186 | 196 | 213 | 225 | 239 | 249 | 286 | 312 | 329 | 352 | 371 |
| | 394 | 412 | 704 | 1007 | 1196 | 1633 | 1884 | 1894 | | | | | | |
| REPEAT | 1194 | 1202 | 1209 | 1214# | | | | | | | | | | |
| RET | 120 | 1624# | | | | | | | | | | | | |
| RETADD | 2305# | 2339 | | | | | | | | | | | | |
| RIB | 14# | 277 | 296 | 319 | 336 | 361 | 378 | 402 | 419 | 548 | 556 | 597 | 605 | 712 |

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| RIF | 12# | 1203 | 1634 | 1979 | | | | | | | | | | |
| RIG1 | 1564 | 1593# | | | | | | | | | | | | |
| RIG2 | 2118# | | | | | | | | | | | | | |
| RMF | 13# | 711 | 719 | 934 | 1162 | 1705 | 1721 | 1738 | 1761 | 1770 | 1790 | 1801 | 1847 | 1863 |
| | 1878 | 1940 | 1953 | 1974 | 1983 | 2085 | | | | | | | | |
| RMFCN1 | 1125 | 1166 | 1173# | | | | | | | | | | | |
| RMFDY | 1116 | 1161 | 1190# | | | | | | | | | | | |
| RMFDY1 | 1163 | 1195# | | | | | | | | | | | | |
| RMFE1 | 1164# | 1213 | | | | | | | | | | | | |
| RMFE2 | 1157# | 1217 | | | | | | | | | | | | |
| RMFI1 | 1153 | 1159# | | | | | | | | | | | | |
| RMFI2 | 1156 | 1160# | | | | | | | | | | | | |
| RMFL1 | 1136# | 1165 | | | | | | | | | | | | |
| RMFL2 | 1126# | 1167 | | | | | | | | | | | | |
| RMFL3 | 1122# | 1169 | | | | | | | | | | | | |
| RMFTST | 1024 | 1109# | | | | | | | | | | | | |
| RTF | 20# | 1497 | 1502 | 1510 | 1544 | 1602 | 1726 | 1818 | 1833 | 1908 | 2190 | | | |
| RTF1 | 1525 | 1536# | | | | | | | | | | | | |
| RTRN | 96 | 937# | | | | | | | | | | | | |
| SFIB | 98 | 906# | 927 | | | | | | | | | | | |
| SINT | 17# | 1696 | 1699 | 1712 | 1715 | 1729 | 1732 | 1747 | 1755 | 1854 | 1857 | 1869 | 1872 | 1887 |
| | 1891 | 1919 | 1937 | 1950 | 1965 | 1968 | 2018 | 2021 | 2048 | 2051 | 2072 | 2075 | 2090 | 2234 |
| SKON | 24# | 260 | | | | | | | | | | | | |
| SPF | 26# | 1977 | 1898 | 1944 | 2093 | | | | | | | | | |
| SRCO | 126# | 2130 | 2148 | | | | | | | | | | | |
| SRD | 2123 | 2134 | 2146# | 2149 | 2162 | 2164 | | | | | | | | |
| SRI | 2126 | 2139 | 2152 | 2156# | 2165 | 2167 | | | | | | | | |
| SRO | 25# | 1813 | 1827 | 1844 | 1902 | 1916 | 2202 | | | | | | | |
| SRRET | 2158# | 2212 | | | | | | | | | | | | |
| STAN | 2127# | 2168 | | | | | | | | | | | | |
| STDF | 89 | 90 | 682 | 685 | 686 | 690# | 697 | | | | | | | |
| STKS | [illegible] | 449 | 472 | 521 | 561 | 610 | 649 | 666 | 747 | 1019 | 1303 | 1570 | 1647 | 2159 |
| | [illegible] | 2264 | 2300 | 2315 | | | | | | | | | | |
| STRMF | 673# | 752 | | | | | | | | | | | | |
| SUF | 15# | 2239 | | | | | | | | | | | | |
| T1 | 110 | 1660# | | | | | | | | | | | | |
| T2 | 1694# | | | | | | | | | | | | | |
| TADI | 451 | 458# | | | | | | | | | | | | |
| TAUTO | 47 | 939 | 955# | | | | | | | | | | | |
| TFLD | 464# | 478 | 479 | 481 | 486 | | | | | | | | | |
| TFLG | 63 | 1575# | 1581 | | | | | | | | | | | |
| TIME | 115# | 134 | 2027 | 2221 | | | | | | | | | | |
| TRANS | 16 | 789 | 849# | 892 | | | | | | | | | | |
| TRAP | 133 | 2227# | | | | | | | | | | | | |
| TRFLD | 863# | 867 | 874 | 880 | 886 | | | | | | | | | |
| TRNF | 45 | 635# | 650 | 1655 | | | | | | | | | | |
| TSF | 27# | 272 | 527 | 577 | 673 | 906 | 1083 | 1157 | 1466 | 1578 | 1900 | 1947 | 2094 | |
| TTB | 132# | 2172 | 2223 | | | | | | | | | | | |
| XAUTO | 47# | | | | | | | | | | | | | |
| XBELL | 131# | 2176 | 2225 | | | | | | | | | | | |
| XCON1 | 1523 | 1526# | | | | | | | | | | | | |
| XCOUNT | 102# | 1480 | 1483 | 1559 | 1562 | | | | | | | | | |

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| XDATA | 121# | 1608 | 1625 | | | | | | | | | | |
| XDATER | 136# | 1522 | | | | | | | | | | | |
| XELL | 130# | 1370 | 2176 | 2224 | | | | | | | | | |
| XFD | 59# | 687 | | | | | | | | | | | |
| XFDCON | 2143 | 2180# | | | | | | | | | | | |
| XFER | 1175 | 1241# | 1243 | 1245 | 1246 | 1248 | 1249 | 1251 | 1274 | | | | |
| XFERC1 | 1261 | 1269 | 1279# | | | | | | | | | | |
| XFERC2 | 1255 | 1271 | 1278# | | | | | | | | | | |
| XFERIN | 1233 | 1262 | 1264 | 1267# | | | | | | | | | |
| XFERL1 | 1265# | 1270 | | | | | | | | | | | |
| XFERL2 | 1256# | 1272 | | | | | | | | | | | |
| XFERP | 1113 | 1144 | 1175# | | | | | | | | | | |
| XFIB | 98# | 751 | | | | | | | | | | | |
| XGTF1 | 614 | 616# | | | | | | | | | | | |
| XION1 | 1484 | 1485# | | | | | | | | | | | |
| XMEM | 1170 | 1176# | | | | | | | | | | | |
| XNOM | 1403 | 1406# | | | | | | | | | | | |
| XRANS | 46# | 686 | | | | | | | | | | | |
| XRET | 119 | 120# | | | | | | | | | | | |
| XRETAD | 2333 | 2339# | | | | | | | | | | | |
| XRIG1 | 1563 | 1564# | | | | | | | | | | | |
| XRMF | 45# | | | | | | | | | | | | |
| XRTF1 | 1524 | 1525# | | | | | | | | | | | |
| XSAV | 101# | 1464 | 1472 | 2138 | 2141 | 2309 | 2312 | | | | | | |
| XSDF | 1458 | 1459 | 1465# | 1478 | 1479 | | | | | | | | |
| XSR0 | 129 | 2218# | | | | | | | | | | | |
| XSRTF | 1543# | 1555 | 1560 | | | | | | | | | | |
| XSTKS | 44# | 440 | 458 | 510 | 533 | 583 | 635 | 657 | 679 | 958 | 1291 | 1594 | 2120 |
| XTDF | 89# | 709 | 726 | 743 | 761 | 770 | 780 | 782 | 790 | 859 | | | |
| XTDF1 | 90# | 783 | 785 | 786 | | | | | | | | | |
| XTFLG | 43# | 273 | 528 | 578 | 674 | 907 | 1158 | 1467 | 1537 | | | | |
| XTOR | 1534 | 1542 | 1543 | 1551 | 1556 | 1558 | | | | | | | |
| XTRAP | 133# | 152 | 2179 | | | | | | | | | | |
| XTRMF | 1549 | 1553# | | | | | | | | | | | |
| XXSRC | 129# | 1366 | 1404 | | | | | | | | | | |