IDENTIFICATION

PRODUCT CODE: MAINDEC-8E-D0FC-D

PRODUCT NAME: RANDOM ISZ TEST

DATE CREATED: JUNE 11, 1971

MAINTAINER: DIAGNOSTIC GROUP

AUTHOR: BRUCE HANSEN

)

)

)

1. ABSTRACT

THIS PROGRAM IS WRITTEN TO TEST THE ISZ INSTRUCTION OF THE PDP-8E. AN ISZ INSTRUCTION IS PLACED IN A FROM LOCATION, AND A TO LOCATION CONTAINS THE OPERAND. PART 1 OF THE PROGRAM SELECTS FROM, TO, AND OPERAND FROM A RANDOM NUMBER GENERATOR, WITH THE OPTION OF HOLDING ANY OR ALL CONSTANT. PART 2 USES A FIXED SET OF FROM, TO, AND OPERAND NUMBERS.

2. REQUIREMENTS

2.1 EQUIPMENT

ONE PDP-8E EQUIPPED WITH TELETYPE.

2.2 STORAGE

THIS PROGRAM USES LOCATIONS 0000-7600(8). THE BINARY LOADER MUST BE STORED IN THE LAST MEMORY PAGE.

2.3 PRELIMINARY PROGRAM

MAINDEC-8E-D0A(N), AND MAINDEC-8E-D0B(N) MUST HAVE RUN SUCCESSFULLY.

3. LOADING PROCEDURE

THE STANDARD BINARY LOADER IS USED.

4. STARTING PROCEDURE

4.1 SWITCH SETTINGS

```
SR0(0) = HALT ON ERROR
SR1(1) = ELIMINATE ERROR PRINTOUTS
SR3    = FIXED FROMS (1)
         RANDOM FROMS (0)
SR4    = FIXED TOS (1)
         RANDOM TOS (0)
SR5    = FIXED OPERAND (1)
         RANDOM OPERAND (0)
SR9(0) = DO ONE ISZ ONLY
SR11(1)= DO TEST PART 2 SR3, 4, 5, MUST BE 0'S
SR11(0)= DO TEST PART 1
```

4.2 STARTING ADDRESS

200

4,3 OPERATOR ACTION

A. SET SR (SWITCH REGISTER) TO 0200 AND PRESS LOAD ADDRESS.
B. SET SR TO DESIRED MODE OF OPERATION; FOR MOST RUNS, SR9=0 ALLOWS THE MOST TESTING IN THE LEAST AMOUNT OF TIME.

FOR FIXED FROM, TO, OR OPERAND USAGE, THE FIXED NUMBER MAY BE SELECTED AND ENTERED INTO THE MEMORY LOCATIONS SHOWN BELOW:

```
FROM        =0002
TO          =0021
OPERAND     =0022
```

C. PRESS, CLEAR AND THEN CONTINUE.

5. OPERATING PROCEDURE

SAME AS PARAGRAPH 4.

6. ERRORS

6.1 ERROR HALTS AND DESCRIPTION

C(PC)	CAUSE
0002	PERIPHERAL INTERRUPT
0254	HALT ON ERROR, SR0=0

6.2 ERROR PRINTOUTS

```
F       XXXX    T       YYYY
0       ZZZZ    F       MMMM    R       NNNN    NS
```

6.2.1 PRINTOUT EXPLANATION

(FROM)	F XXXX	-THE ISZ INSTRUCTION IN LOCATION XXXX FAILED.
(TO)	T YYYY	-THE OPERAND ADDRESS OF THE ISZ INSTRUCTION WAS YYYY.
(OPERAND)	0 ZZZZ	-THE STARTING COUNT IN THE ISZ LOOP WAS ZZZZ.
(FAILED)	F MMMM	-THE FAILURE OCCURRED TRYING TO ISZ THE NUMBER MMMM.
(RESULT)	R NNNN	-THE RESULT OF THIS ISZ WAS NNNN.
	NS	-NO SKIP OCCURRED
	S,	-INDICATES A SKIP.

6.2.2 EXAMPLES

A. THE FOLLOWING IS A TYPICAL ERROR PRINTOUT.

```
F 3003 T 5470
0 3705 F 4777 R 5000 S
```

LINE 1 OF THE PRINTOUT IS A STATEMENT OF THE PROBLEM. IT SAYS THAT LOCATED AT 3003 IS AN ISZ INSTRUCTION INCREMENTING AN OPERAND STORED IN LOCATION 5470. LINE 2 OF THE PRINTOUT GIVES INFORMATION FOR ERROR ANALYSIS. 3705 WAS THE INITIAL OPERAND, 4777 WAS THE OPERAND BEING INCREMENTED WHEN THE ERROR OCCURRED, AND 5000 IS THE OPERAND FOLLOWING THE FAILING INCREMENT. THE S INDICATES THAT THE INCREMENT RESULTED IN A SKIP. THE ERROR HERE IS OBVIOUSLY THAT THE SKIP SHOULD NOT HAVE OCCURRED.

B. THE FOLLOWING IS ANOTHER TYPICAL ERROR PRINTOUT.

```
F 3003 T 5470
0 3705 F 4777  R 5020  NS
```

THIS IS IDENTICAL TO EXAMPLE (A) EXCEPT THAT A DIFFERENT TYPE OF ERROR HAS OCCURRED. THE RESULT OF INCREMENTING 4777 SHOULD BE 5000, NOT 5020.

6.3 ERROR RECOVERY

THE PROGRAM CONTINUES ON, FOLLOWING AN ERROR PRINTOUT UNLESS SR0=0. AFTER A HALT ON ERROR, PUSH CONTINUE TO RESUME TESTING. WHEN ERRORS EXIST, A FAILING CONDITION CHOSEN FROM THOSE TYPED OUT MUST BE USED WITH THE SCOPE MODE. FOR THE SCOPE MODE, PERFORM THE FOLLOWING STEPS:

A. STOP THE PROGRAM.

B. INSERT CHOSEN FROM INTO LOCATION 0002.

C. INSERT CHOSEN TO INTO LOCATION 0021.

D. INSERT CHOSEN FAILING OPERAND INTO LOCATION 0022

E. RESTART PROGRAM WITH CONTROL SWITCHES 1,3,4,5, SET TO 1 AND 9 SET TO A 0.

NOTE: BY SETTTING SR0 TO A 0, THE PROGRAM HALTS FOLLOWING THE ERROR PRINTOUT. THE OPERATOR MAY AT THIS TIME SET SWITCHES 1, 3, 4, 5, TO A 1 AND 9 TO A 0 AND PUSH CONTINUE. THE PROGRAM ENTERS A SCOPE MODE USING THE FAILING CONDITIONS JUST PRINTED.

7. RESTRICTIONS

7.1 STARTING RESTRICTIONS

NONE.

7.2 OPERATING RESTRICTIONS

THE INTERRUPT IS ENABLED DURING PROGRAM OPERATION. ANY ATTACHED DEVICE WHICH MIGHT CAUSE SPURIOUS INTERRUPTS, MUST BE DISABLED.

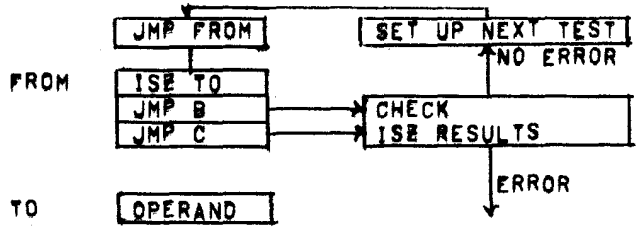
8. MISCELLANEOUS

8.1 EXECUTION TIME

SR9 = 1. 11,000 ISZ OPERATIONS/SECOND.
SR9 = 0. 3,500 ISZ OPERATIONS/SECOND.

9. PROGRAM DESCRIPTION

THE TEST LOOP IS SHOWN BELOW:



PART 1 OF THE PROGRAM USES A RANDOM NUMBER GENERATOR TO SELECT THE FROM, TO, AND OPERAND NUMBERS. ONCE SELECTED, THE OPERAND IS INCREMENTED UNTIL IT REACHES ZERO. EACH ISZ IS CHECKED BY DUPLICATING ISZ WITH TAD, IAC, DCA. EACH ITERATION IS ALSO CHECKED FOR THE PROPER SKIP OR NO-SKIP CONDITION.

PART 2 OF THE PROGRAM IS ACTUALLY PART 1, WITH THE RANDOM NUMBER GENERATED REPLACED BY A FIXED NUMBER GENERATOR. SEQUENCING OF EVENTS IS AS FOLLOWS:

(NOTE: 621(8)<MEMORY TEST AREA<7600(8)):

A. FROM = 621 TO = 624 TEST A SET OF 24 SELECTED OPERANDS. TO SAVE TIME IT IS SUGGESTED THAT SR9 = 0, SO THAT THE ISZ IS PERFORMED ON EACH OPERAND ONLY ONCE INSTEAD OF INCREMENTING IT UNTIL THE ISZ INSTRUCTION SKIPS.

B. FROM = 621 TO =625 REPEAT THE SET OF OPERANDS USED IN (A) ABOVE.

THIS SEQUENCE CONTINUES UNTIL TO REACHES THE UPPER LIMIT OF THE MEMORY TEST AREA. FROM IS THEN INCREMENTED BY 1 AND THE PROCESS IS REPEATED. WHEN FROM REACHES THE UPPER LIMIT OF THE MEMORY TEST AREA, THE TEST IS COMPLETE.

IDEALLY, IT IS DESIRABLE TO ISZ EVERY LOCATION FROM EVERY OTHER LOCATION IN THE TEST AREA AND, IN DOING SO, USE ALL 24 OF THE SELECTED WORST CASE OPERANDS FOR EACH SET OF ADDRESSES. THIS IS WHAT PART 2 DOES, BUT IT TAKES MANY DAYS TO COMPLETE THE TEST. IT IS FOR THIS REASON THAT THE PROGRAM USES THE RANDOM NUMBER GENERATOR SYSTEM OF PART 1. PART 2 IS AN ADDITIONAL FEATURE OF THE PROGRAM WITH VERY LIMITED USE.

A FC IS PRINTED AFTER EACH GROUP OF 32,000 TESTS.

)

)

)

```
                    /PDP-8E ISZ TEST
                    /COPYRIGHT 1970, DIGITAL EQUIPMENT CORP., MAYNARD, MASS.  01754
                    /
                    /CONSTANTS AND VARIABLES
          0000      *0
0000      0000              0
0001      5001              JMP 1               /PERIPHERAL INTERRUPT
0002      0002      FRMLOC, 2                   /ISZ TEST INSTRUCTION LOCATION
0003      0003      LIMLO,  3                   /LOW LIMIT TEST AREA
0004      0000              0
0005      0000              0
0006      0202      LIMHI,  -7576               /HIGH LIMIT TEST AREA
0007      0547      ASUC,   SUC
0010      0007      MSK7,   0007                /OCTAL CONVERSION MASK
0011      0000      WORK,   0                   /IR0
0012      0000      WORK1,  0                   /IR1
0013      7401      M377,   -377
0014      3607      NUM,    3607                /THE RANDOM NUMBER LOCATION
0015      0003      THREE,  3

0016      2421      ISZ1,   ISZ I TOLOC         /MOVING ISZ
0017      5116      JMP1,   JMP BACK                    /TEST INSTRUCTION
0020      5141      JMP2,   JMP BAKBRN          /GROUP.
0021      0000      TOLOC,  0                   /LOCATION TO BE ISZ'D
0022      0000      PATRN,  0                   /STARTING ISZ PATTERN
0023      0000      BEFOR,  0                   /FAILING PATTERN BEFORE FAILING ISZ
0024      0000      AFTER,  0                   /PREDICTED RESULTS OF EACH ISZ
0025      0004      K4,     4                   /SWITCH REGISTER MASKS
0026      0400      K0400,  0400
0027      0200      K0200,  0200
0030      0100      K0100,  0100
0031      0000      NOTE,   0                   /7'S=ERROR WITH NO SKIP
0032      0257      PRINT,  INF1-1              /0'S=ERROR WITH SKIP
0033      0201      AERR1,  ERR1
0034      0206      AERR2,  ERR2
0035      0413      APDR,   PDR
0036      1014      ITADNM, TAD NUM
0037      0600      ATFCLF, TFCLF


                    /SR0(0)=HALT AFTER ERROR PRINTOUT
                    /SR1(1)=NO PRINTOUTS
                    /SR3(1) = HOLD FROM CONSTANT
                    /SR4(1) = HOLD TO CONSTANT
                    /SR5(1) = HOLD PATTERN CONSTANT
                    /SR9(0) = DO ONE ISZ ONLY
                    /SR11(1) = DO TEST PART 2
                    /
                    /

                    /PROGRAM START
0040      4441      START,  JMS I .+1           /ION
0041      0614              PATCH               /LAS
0042      0015              AND THREE
```

```
0043  7640          SZA CLA         /SKIP IF PART 1
0044  5426          JMP I K0400     /GO TO PART 2
0045  1036          TAD ITADNM
0046  3165          DCA RANUM+1
                    /CHECK FOR FIXED PATTERN
0047  7604  CHEK1,  LAS
0050  0030          AND K0100
0051  7440          SZA
0052  5055          JMP CHEK2


                    /SELECT THE PATTERN
0053  4164  SELPAT, JMS RANUM
0054  3022          DCA PATRN

                    /CHECK FOR FIXED TO
0055  7604  CHEK2,  LAS
0056  0027          AND K0200
0057  7640          SZA CLA
0060  5065          JMP CHEK3

                    /SELECT THE TO LOCATION
0061  4164  SELTO,  JMS RANUM
0062  3021          DCA TOLOC
0063  1021          TAD TOLOC
0064  4151          JMS LIMTST

                    /CHECK FOR FIXED FROM
0065  7604  CHEK3,  LAS
0066  0026          AND K0400
0067  7640          SZA CLA
0070  5075          JMP PLCINT

                    /SELECT THE FROM LOCATION
0071  4164  SELFRM, JMS RANUM
0072  3002          DCA FRMLOC
0073  1002          TAD FRMLOC
0074  4151          JMS LIMTST

                    /PLACE FROM INSTRUCTIONS

0075  7240  PLCINT,       CLA CMA
0076  1002          TAD FRMLOC
0077  3011          DCA WORK
0100  1016          TAD ISZ1
0101  3411          DCA I WORK
0102  1017          TAD JMP1
0103  3411          DCA I WORK
0104  1020          TAD JMP2
0105  3411          DCA I WORK


                    /DEPOSIT PATTERN IN TO LOCATION
0106  1022          TAD PATRN
0107  3421          DCA I TOLOC
```

```
                        /STORE PREDICTED ISZ RESULT
0110  1022              TAD PATRN
0111  3023              DCA BEFOR
0112  1023    LUP1,     TAD BEFOR
0113  7001              IAC
0114  3024              DCA AFTER
0115  5407              JMP I ASUC

                        /RETURN FOR NO SKIP CONDITION
0116  7604    BACK,     LAS
0117  7004              RAL
0120  7710              SPA CLA
0121  5132              JMP LAS1
0122  1421              TAD I TOLOC
0123  7041              CIA
0124  1024              TAD AFTER
0125  7640              SZA CLA
0126  5433              JMP I AERR1       /ERROR IN ISZ OPERATION
0127  1421              TAD I TOLOC
0130  7650              SNA CLA
0131  5433              JMP I AERR1       /ERROR IN ISZ SKIP DETECTION
0132  7604    LAS1,     LAS
0133  0025              AND K4
0134  7650              SNA CLA           /SKIP IF NOT ONE ISZ (SR9)
0135  5047              JMP CHEK1
0136  7001              IAC
0137  1023              TAD BEFOR
0140  5111              JMP LUP1-1

                        /RETURN FOR SKIP CONDITION
0141  7604    BAKBRN,   LAS
0142  7004              RAL
0143  7710              SPA CLA
0144  5047              JMP CHEK1
0145  1421              TAD I TOLOC
0146  7640              SZA CLA           /SKIP IF TO LOCATION OK
0147  5434              JMP I AERR2       /ERROR IN ISZ LOCATION
0150  5047              JMP CHEK1

                        /TEST HIGH-LOW LIMITS

0151  0000    LIMTST,   0
0152  7510              SPA
0153  5160              JMP .+5
0154  1003              TAD LIMLO
0155  7700              SMA CLA
0156  5551              JMP I LIMTST
0157  5165              JMP RANUM+1
0160  1006              TAD LIMHI
0161  7700              SMA CLA
0162  5165              JMP RANUM+1
0163  5551              JMP I LIMTST
```

```
                        /RANDOM NUMBER GENERATOR
0164  0000  RANUM,  0
0165  1014          TAD NUM
0166  7104          RAL CLL
0167  7430          SEL
0170  1015          TAD THREE
0171  3014          DCA NUM
0172  1014          TAD NUM          /AC=NEW RANDOM NUMBER
0173  5564          JMP I RANUM

0174  1000  K1000,  1000
0175  0000  KP,     0


      0200  *200
0200  5040          JMP     START
                    /ERROR ROUTINE 1
0201  1340  ERR1,   TAD SKPDAT+6
0202  3332          DCA SKPDAT
0203  7040          CMA
0204  3031          DCA NOTE
0205  5210          JMP KPGO

                    /ERROR ROUTINE 2
0206  1331  ERR2,   TAD SKPDAT-1
0207  3332          DCA SKPDAT
0210  1002  KPGO,   TAD FRMLOC
0211  3011          DCA WORK
0212  1370          TAD A3
0213  4342          JMS SETUP

0214  1021          TAD TOLOC
0215  3011          DCA WORK
0216  1371          TAD A4
0217  4342          JMS SETUP

0220  1022          TAD PATRN
0221  3011          DCA WORK
0222  1372          TAD A5
0223  4342          JMS SETUP
0224  1023          TAD BEFOR
0225  3011          DCA WORK
0226  1373          TAD A6
0227  4342          JMS SETUP

0230  1421          TAD I TOLOC
0231  3011          DCA WORK
0232  1374          TAD A7
0233  4342          JMS SETUP

                    /TTY PRINT ROUTINE
0234  6002  TTY,    IOF
0235  1032          TAD PRINT
0236  3011          DCA WORK
0237  1411          TAD I WORK
```

```
0240  6046          TLS
0241  6041          TSF
0242  5241          JMP .-1
0243  1013          TAD M377
0244  7640          SZA CLA
0245  5237          JMP TTY+3
0246  6042          TCF
0247  6001          ION
0250  7604          LAS
0251  7700          SMA CLA
0252  7402          HLT             /HALT AFTER ERROR (SR0)

0253  1031          TAD NOTE
0254  7650          SNA CLA
0255  5047          JMP CHEK1
0256  3031          DCA NOTE
0257  5132          JMP LAS1                /RETURN TO NO SKIP ROUTINE


                    /ERROR PRINT OUT LINE 1
0260  0306  INF1,    306             /F    FROM (INSTRUCTION LOCATION)
0261  0240          240             /SPACE
0262  0000  INDATA,  0               /X      LOCATION
0263  0000          0               /X
0264  0000          0               /X
0265  0000          0               /X
0266  0240          240             /SPACE
0267  0240          240             /SPACE
0270  0324          324             /T    TO (OPERAND ADDRESS)
0271  0240          240             /SPACE
0272  0000  ONDATA,  0               /X      ADDRESS
0273  0000          0               /X
0274  0000          0               /X
0275  0000          0               /X
0276  0215          215             /CR
0277  0212          212             /LF
0300  0215          215             /CR
0301  0215          215             /CR

                    /ERROR PRINTOUT LINE 2
0302  0317          317             /O    OPERAND (STARTING COUNT)
0303  0240          240             /SPACE
0304  0000  STDATA,  0               /X      PATTERN
0305  0000          0               /X
0306  0000          0               /X
0307  0000          0               /X
0310  0240          240             /SPACE
0311  0240          240             /SPACE
0312  0306          306             /F      FAILING COUNT
0313  0240          240             /SPACE
0314  0000  FLDATA,  0               /X      PATTERN BEFORE FAILING ISZ
0315  0000          0               /X
0316  0000          0               /X
0317  0000          0               /X
0320  0240          240             /SPACE
```

```
0321  0240            240             /SPACE
0322  0322            322             /R      RESULT AFTER FAILURE
0323  0240            240             /SPACE


0324  0000    RSDATA, 0               /X      PATTERN AFTER FAILING ISZ
0325  0000            0               /X
0326  0000            0               /X
0327  0000            0               /X
0330  0240            240             /SPACE
0331  0240            240             /SPACE
0332  0316    SKPDAT, 316             /N      NO
0333  0323            323             /S      SKIP
0334  0215            215             /CR
0335  0212            212             /LF
0336  0212            212             /LF
0337  0377            377             /RUBOUT
0340  0316            316             /N
0341  0323            323             /S

0342  0000    SETUP,  0
0343  3012            DCA WORK1
0344  1011            TAD WORK
0345  7006            RTL
0346  7006            RTL
0347  4362            JMS MORSU
0350  7012            RTR
0351  7012            RTR
0352  7012            RTR
0353  4362            JMS MORSU
0354  7012            RTR
0355  7010            RAR
0356  4362            JMS MORSU
0357  4362            JMS MORSU
0360  7200            CLA
0361  5742            JMP I SETUP
0362  0000    MORSU,  0
0363  0010            AND MSK7
0364  1375            TAD TW6
0365  3412            DCA I WORK1
0366  1011            TAD WORK
0367  5762            JMP I MORSU

                      /PAGE 1 CONSTANTS
0370  0261    A3,     INDATA-1
0371  0271    A4,     ONDATA-1
0372  0303    A5,     STDATA-1
0373  0313    A6,     FLDATA-1
0374  0323    A7,     RSDATA-1
0375  0260    TW6,    0260


                      /PART 2 INITIALIZATION ROUTINE
      0400    *400
0400  1003            TAD LIMLO
```

```
0401  7041          CIA
0402  3310          DCA FROM                /LOW LIMIT TO FROM
0403  1003          TAD LIMLO
0404  7040          CMA
0405  3311          DCA TO
0406  1346          TAD A0
0407  3313          DCA PATCYC
0410  1314          TAD INST1
0411  3165          DCA RANUM+1

0412  5047          JMP CHEK1               /GO TO PAGE 0 START

                    /PATH DECISION ROUTINE
0413  1164    PDR,  TAD RANUM
0414  7041          CIA
0415  1305          TAD GFROM
0416  7650          SNA CLA          /SKIP IF NOT REQUESTING FROM
0417  5303          JMP FRUT                /GO TO FROM ADDRESS ROUTINE

0420  1164          TAD RANUM
0421  7041          CIA
0422  1306          TAD GTO
0423  7650          SNA CLA         /SKIP IF NOT REQUESTING TO
0424  5301          JMP TORUT               /GO TO TO ADDRESS ROUTINE
0425  5226          JMP PRUT                /GO TO PATTERN ROUTINE


                    /SELECT PATTERN AND OTHER THINGS
0426  1713    PRUT, TAD I PATCYC
0427  3312          DCA PATT
0430  1312          TAD PATT
0431  7450          SNA                     /NO SKIP IF END OF PATTERN TABLE
0432  5240          JMP .+6                 /END PATTERN TABLE LOOK AROUND
0433  7201          CLA IAC
0434  1313          TAD PATCYC
0435  3313          DCA PATCYC
0436  1312          TAD PATT
0437  5564          JMP I RANUM             /RETURN, AC=NEW PATTERN
                    /
0440  1345          TAD AK7776
0441  3313          DCA PATCYC              /RESTOR START ADDRESS OF PATT. TABLE
0442  7001          IAC
0443  1311          TAD TO
0444  3311          DCA TO                  /INCREMENT TO
0445  1311          TAD TO
0446  7041          CIA
0447  1310          TAD FROM
0450  7640          SZA CLA                 /SKIP IF TO = FROM
0451  5255          JMP .+4
0452  1311          TAD TO
0453  1015          TAD THREE
0454  3311          DCA TO                  /SKIP AROUND FROM
0455  1311          TAD TO
0456  7500          SMA
0457  5276          JMP GOUT
```

```
0460  1006          TAD LIMHI
0461  7710          SPA CLA          /SKIP IF END TEST AREA
0462  5276          JMP GOUT
0463  7201          CLA IAC
0464  1310          TAD FROM
0465  3310          DCA FROM                 /ADVANCE FROM
0466  1003          TAD LIMLO
0467  7041          CIA
0470  3311          DCA TO           /RESET TO ADDRESS
0471  1310          TAD FROM
0472  1006          TAD LIMHI
0473  7710          SPA CLA
0474  5276          JMP GOUT
0475  5200          JMP 400
0476  7200  GOUT,    CLA
0477  1312          TAD PATT
0500  5564          JMP I RANUM


                    /SELECT TO ROUTINE
0501  1311  TORUT,  TAD TO
0502  5564          JMP I RANUM

                    /SELECT FROM ROUTINE
0503  1310  FRUT,   TAD FROM
0504  5564          JMP I RANUM

                    /PAGE 3 CONSTANTS
0505  0072  GFROM,  SELFRM+1                 /STORED RETURN ADDRESS WHEN
                                    /RANDOM FROM IS REQUESTED
0506  0062  GTO,    SELTO+1          /STORED RETURN ADDRESS WHEN
                                    /RANDOM TO IS REQUESTED
0507  0054  GPAT,   SELPAT+1                /STORED RETURN ADDRESS WHEN
                                    /RANDOM PATTERN IS REQUESTED
0510  0000  FROM,   0                /CURRENT FROM ADDRESS
0511  0000  TO,     0                /CURRENT TO ADDRESS
0512  0000  PATT,   0                /CURRENT PATTERN
0513  0000  PATCYC, 0                /CURRENT PATTERN ADDRESS
0514  5435  INST1,  JMP I APDR
0515  7776  K7776,  7776
0516  7775          7775
0517  7773          7773
0520  7767          7767
0521  7757          7757
0522  7737          7737
0523  7677          7677
0524  7577          7577
0525  7377          7377
0526  6777          6777
0527  5777          5777
0530  3777          3777
0531  0001          0001
0532  0003          0003
0533  0007          0007
0534  0017          0017
```

```
0535  0037              0037
0536  0077              0077
0537  0177              0177
0540  0377              0377
0541  0777              0777
0542  1777              1777
0543  3777    K3777,    3777
0544  0000              0
0545  0515    AK7776,   K7776
0546  0544    A0,       K3777+1


0547  1375    SUC,      TAD CT
0550  7001              IAC
0551  3375              DCA CT
0552  1375              TAD CT
0553  7640              SZA CLA
0554  5437              JMP I ATFCLF
0555  1175              TAD KP
0556  1174              TAD K1000
0557  3175              DCA KP
0560  1175              TAD KP
0561  7640              SZA CLA
0562  5437              JMP I ATFCLF
0563  6002              IOF
0564  1376              TAD INF2
0565  3011              DCA WORK
0566  5767              JMP I .+1
0567  7602              7602
0570  0215              215
0571  0212              212
0572  0306              306
0573  0303              303
0574  0377              377
0575  0000    CT,       0
0576  0567    INF2,     567



      0600    *600

              /CHECK FOR TO=FROM CONFLICT

0600  1021    TFCLF,    TAD TOLOC
0601  7041              CIA
0602  1002              TAD FRMLOC
0603  7450              SNA
0604  5055              JMP CHEK2
0605  7001              IAC
0606  7450              SNA
0607  5055              JMP CHEK2
0610  7001              IAC
0611  7650              SNA CLA
0612  5055              JMP CHEK2
```

```
0613  5402          JMP I FRMLOC

0614  0000  PATCH,  0              /RESTORE THEN GO AWAY
0615  3000          DCA 0
0616  1232          TAD X
0617  3001          DCA 1
0620  1233          TAD X1
0621  3002          DCA 2
0622  1234          TAD X2
0623  3003          DCA 3
0624  1235          TAD X3
0625  3040          DCA START
0626  1236          TAD X4
0627  3041          DCA START+1
0630  6001          ION
0631  5614          JMP I PATCH

0632  7402  X,      7402
0633  0000  X1,     0
0634  7157  X2,     7157
0635  6001  X3,     ION
0636  7604  X4,     LAS

      7602  *7602
7602  1411          TAD I WORK
7603  6046          TLS
7604  6041          TSF
7605  5204          JMP .-1
7606  1013          TAD M377
7607  7640          SZA CLA
7610  5202          JMP .-6
7611  5217          JMP OVR

      7617  *7617
7617  6042  OVR,    TCF
7620  6001          ION
7621  5437          JMP I ATFCLF

              $
```