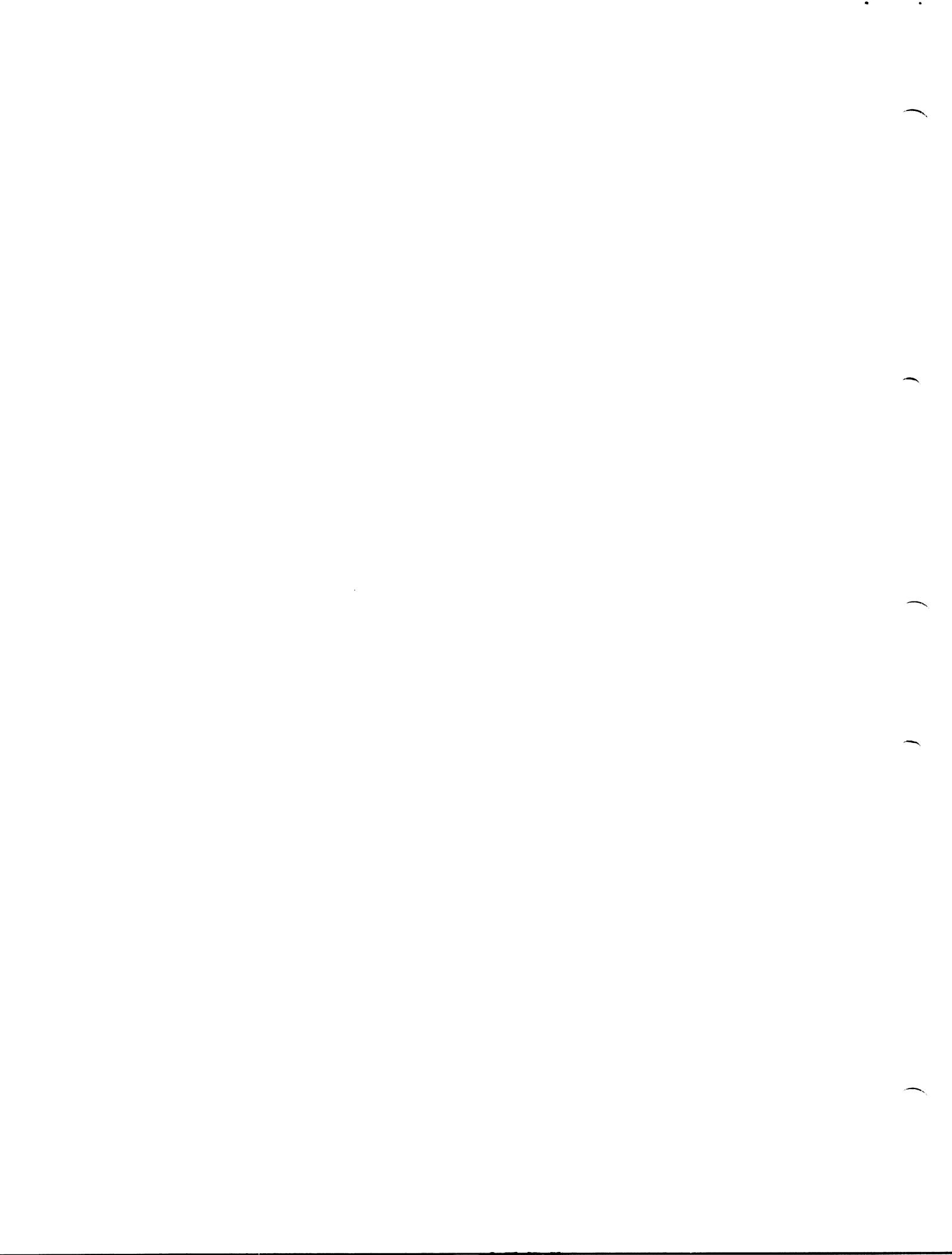IDENTIFICATION

PRODUCT CODE: MAINDEC-8E-DØEA-D(D)

PRODUCT NAME: RANDOM TAD TEST

DATE CREATED: NOVEMBER 2, 1970

MAINTAINER: DIAGNOSTIC GROUP

AUTHOR: MICHAEL DAVIS

1.   ABSTRACT

    THIS PROGRAM TESTS THE TAD INSTRUCTING OF THE PDP-8E. THE
    TAD INSTRUCTION, INSTRUCTION ADDRESS, OPERAND ADDRESS AND
    BOTH OPERANDS ARE PRODUCED BY RANDOM NUMBER GENERATORS.

2.   REQUIREMENTS

2.1   EQUIPMENT

    PDP-8E EQUIPPED WITH AT LEAST 4K OF MEMORY.

    TELETYPE.

2.2   STORAGE

    THE PROGRAM IS LOADED INTO LOCATIONS 6600 THRU 7577,
    THE TEST AREA IS 5000-6577. TEMPORARY STORAGE LOCATIONS
    ARE LOCATED ON PAGE 0.

2.3   PRELIMINARY PROGRAMS

    MAINDEC-8E-D0AA, D0BA, D0CA, D0DA

3.   LOADING PROCEDURE

    THE STANDARD PROCEDURE FOR LOADING BINARY TAPES IS TO BE USED.

4.   STARTING PROCEDURE

4.1   STARTING ADDRESS

    0200

4.2   CONTROL SWITCH SETTINGS

    SR00=1, SUPPRESS HALT ON ERROR
    SR03=1, SUPPRESS END OF PASS TYPEOUT
    SR09=1, HOLD DATA 1 CONSTANT
    SR10=1, HOLD DATA 2 CONSTANT
    SR11=1, HOLD INSTRUCTION CONSTANT

4.3   OPERATOR ACTION

4.3.1   SET SR TO 6200

4.3.2   PRESS LOAD ADDRESS SWITCH

4.3.3   SET SR TO 2000

4.3.4   PRESS CLEAR AND CONTINUE SWITCHES
          ----

5.   OPERATING PROCEDURE

          SAME AS 4,

6.   ERRORS

6.1   ERROR HALT

          IF THE RESULTS OF THE TAD INSTRUCTION ARE INCORRECT,
          THAT IS IF THE ACTUAL AND SIMULATED LINKS, OR THE ACTUAL
          AND SIMULATED SUMS DO NOT AGREE, THE PROGRAM
          WILL HALT AT 7407 WITH DATA1 IN THE AC.

          DEPRESS CONTINUE TO DISPLAY DATA2 IN THE AC.
          DEPRESS CONTINUE TO DISPLAY TAD INSTRUCTION IN AC.
          DEPRESS CONTINUE TO DISPLAY INSTRUCTION ADDRESS IN AC.
          DEPRESS CONTINUE TO DISPLAY DATA2 ADDRESS IN AC.
          DEPRESS CONTINUE TO DISPLAY INDIRECT POINTER (USED BY INDIRECT
          TAD) IN AC.
          DEPRESS CONTINUE TO RESUME TEST

6.2   ERROR RECOVERY

          SEE 6.1

SET SR00=1 TO PREVENT HALT AFTER ERROR.

SET SR03=1 TO SUPPRESS END OF PASS TYPEOUT.

SET SR09-SR11=1 TO HOLD INSTRUCTION AND DATA CONSTANT.

7.   RESTRICTIONS

NONE

8.   EXECUTION TIME
   --------------

THE PROGRAM PERFORMS 4096 RANDOM TESTS IN APPROXIMATELY 5
SECONDS. THE PROGRAM WILL TYPE "T" AFTER
EACH 4096 RANDOM TESTS UNLESS SR03=1.

9.   PROGRAM DESCRIPTION

THE PROGRAM IS LOADED INTO LOCATIONS 6600-7577,
WITH TEMPORARY STORAGE LOCATIONS ON PAGE 0.

THE PROGRAM USES SEPARATE RANDOM NUMBER GENERATORS TO GENERATE
THE TAD INSTRUCTION, INSTRUCTION AND DATA ADDRESSES, AND THE
TWO ARGUMENTS TO BE "TADDED". THE INSTRUCTIONS AND DATA ARE
STORED IN THEIR PREVIOUSLY GENERATED ADDRESSES. THE PROGRAM
TRANSFERS TO THE LOCATION OF THE INSTRUCTION AND EXECUTES IT.
THE PROGRAM THEN TRANSFERS TO A COMPARISON ROUTINE WHERE THE
ACTUAL RESULT OF THE TAD INSTRUCTION IS COMPARED TO A SIMULATED
TAD. THE SIMULATOR IS SIMILAR TO THE ONE USED IN MAINDEC-
8E-D0CA-D. NO TADS ARE USED IN THE PROGRAM ITSELF.

AFTER 4096 TESTS, THE PROGRAM TYPES "T" AND CONTINUES TESTING.
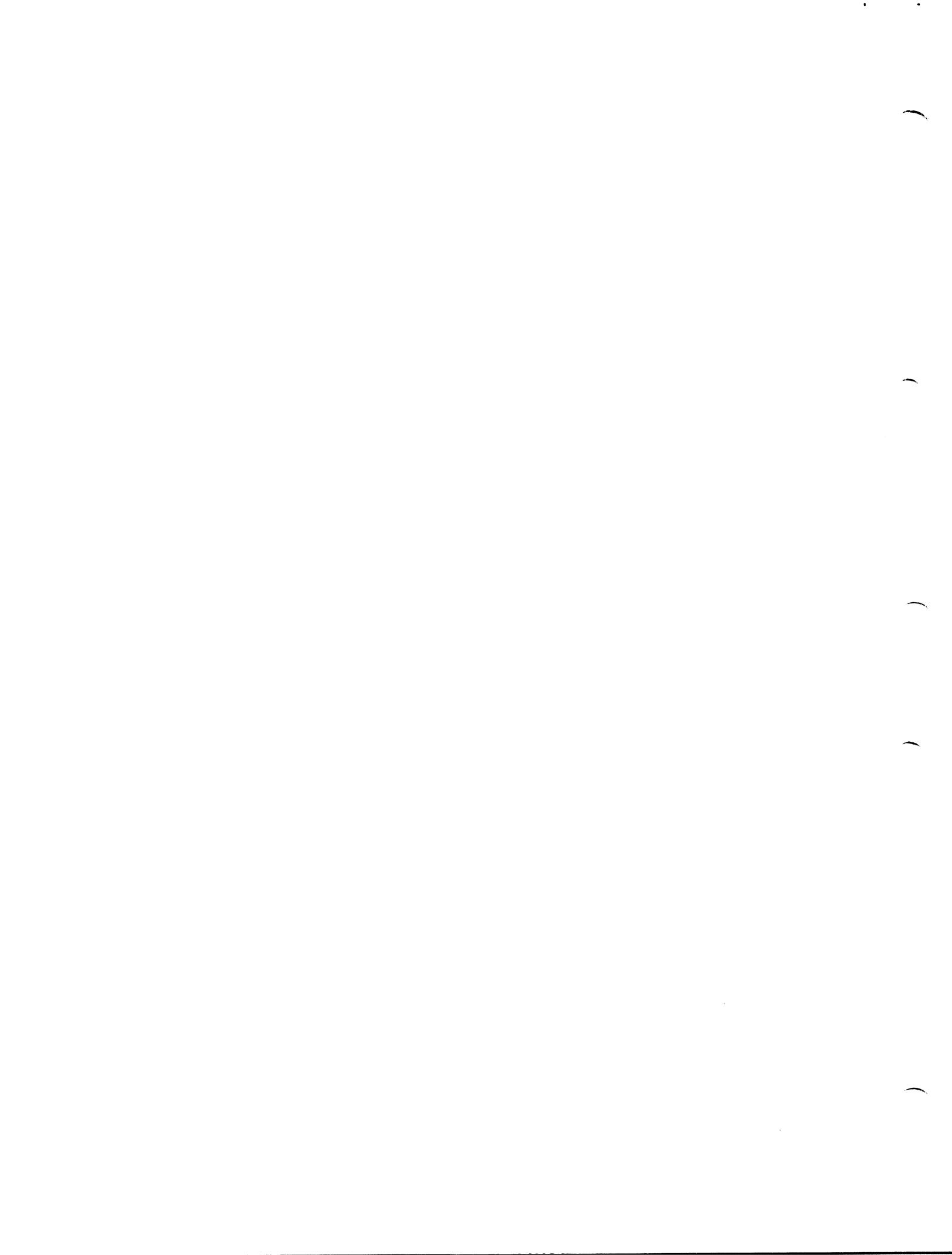
```
                /RANDOM TAD TEST
                /COPYRIGHT 1970, DIGITAL EQUIPMENT CORP., MAYNARD, MASS. 01754
                /V 82 07552

                /TEMPORARY STORAGE LOCATIONS

0000   0000            *0
0000   0000    RETURN, 0
0001   5001    INSTL,  JMP .
0002   0002    INADDL, 2
0003   0003    DATADL, 3
0004   0000    PADDL,  0
0005   0000    IFLAGL, 0

       7501    MQA=7501
       7421    MQL=7421
       6007    CAF=6007

0200                   *200
0200   6007    START,  CAF
0201   5602            JMP I   .+1
0202   6600            STARTL

                /GENERATE TEST INSTRUCTION AND DATA

6600                   *6600
6600   7300    STARTL, CLA CLL
6601   3376            DCA  CNTR1      /CLEAR PASS COUNTER
6602   7604    TEST1L, LAS
6603   0371            AND  SR11       /TEST SR11
6604   7640            SZA CLA         /IS SR11=1
6605   5224            JMP  TDAT1L     /SR11#1, DO NOT GENERATE INSTRUCTION
6606   4746            JMS I TGENL     /GENERATE INSTRUCTION
6607   3355            DCA  TIFLGL     /SAVE INDIRECT FLA
6610   7240            CMA
6611   0001            AND  INSTL      /GET INSTRUCTION
6612   3353            DCA  TINSTL     /SAVE IT
6613   7040            CMA
6614   0002            AND  INADDL     /GET INSTRUCTION ADDRESS
6615   3354            DCA  TINADL     /SAVE IT
6616   7040            CMA
6617   0003            AND  DATADL     /GET DATA ADDRESS
6620   3356            DCA  TDATAL     /SAVE IT
6621   7040            CMA
6622   0004            AND  PADDL      /GET INDIRECT TO DATA
6623   3357            DCA  TPADDL     /SAVE IT
6624   7604    TDAT1L, LAS
6625   0372            AND  SR10       /TEST SR10
```

```
6626  7645          SZA CLA                 /IS SR10=1
6627  5234          JMP   TDAT2L            /SR10=1, DO NOT GENERATE DATA1
6630  7040          CMA
6631  0365          AND   TDA1L             /GENERATE RANDOM NUMBER
6632  4752          JMS I TRANDL
6633  3365          DCA   TDA1L
6634  7604  TDAT2L, LAS                     /TEST SR09
6635  0373          AND   SR09              /IS SR09=1
6636  7640          SZA CLA
6637  5244          JMP   SETTL             /SR09=1, DO NOT GENERATE DATA2
6640  7040          CMA
6641  0361          AND   TDA2L             /GENERATE RANDOM NUMBER
6642  4752          JMS I TRANDL
6643  3361          DCA   TDA2L

                    /SET UP INSTRUCTION AND DATA AT TEST ADDRESS
                    /ALONG WITH RETURN TO THIS ROUTINE
                    /
6644  7340  SETTL,  CLA CLL
6645  0353          AND   TINSTL            /GET INSTRUCTION
6646  3754          DCA I TINADL            /STORE IN TEST LOCATION
6647  7040          CMA
6650  0355          AND   TIFLGL            /GET INDIRECT FLAG
6651  7650          SNA CLA                 /IS INSTRUCTION INDIRECT
6652  5302          JMP   DIRL              /NO, GET DATA
6653  7040          CMA
6654  0356          AND   TDATAL            /ADDRESS IS INDIRECT
6655  0367          AND   T7760             /IS ADDRESS AUTO-INDEX REGISTER
6656  7640          SZA CLA
6657  5276          JMP   NOTAUT            /NO
6660  7040          CMA
6661  0356          AND   TDATAL
6662  0375          AND   K10
6663  7650          SNA CLA
6664  5276          JMP   NOTAUT
6665  7040          CMA
6666  0357          AND   TPADDL            /ADDRESS IS AUTO-INDEX REGISTER
6667  7041          CIA                     /DECREMENT POINTER TO DATA
6670  7040          CMA
6671  3756          DCA I TDATAL            /STORE IN TEST LOCATION
6672  7040  NOTAUT, CMA
6673  0360          AND   TDA1L             /GET DATA
6674  3757          DCA I TPADDL            /STORE IN TEST LOCATION
6675  5305          JMP   DOTSTL
6676  7040          CMA
6677  0357          AND   TPADDL
6700  3756          DCA I TDATAL
6701  5272          JMP   .-7
6702  7040  DIRL,   CMA
6703  0363          AND   TDA1L             /GET DATA
6704  3756          DCA I TDATAL            /STORE IN TEST LOCATION
                    /
```

```
                        /SIMULATE "TAD"
6705  7340  DOTSTL,  CLA CLL CMA
6706  0360           AND  TDA1L          /GET DATA1
6707  7421           MQL                 /SAVE IN MQ
6710  7040           CMA
6711  0361           AND  TDA2L          /GET DATA2
6712  4751           JMS I TSIMAD        /DO SIMULATION
6713  3363           DCA  TSIMAC         /SAVE ANSWER
6714  7010           RAR
6715  3362           DCA  TSIML          /SAVE LINK

                        /GO TO TEST
6716  7040  DOANDL,  CMA
6717  0347           AND  TRETTL         /GET RETURN ADDRESS
6720  3024           DCA  RETURN         /SAVE
6721  7040           CMA
6722  0354           AND  TINADL         /GET INSTRUCTION ADDRESS
6723  7001           IAC                 /INCREMENT
6724  7450           SNA                 /IS IT 0
6725  5202           JMP  TEST1L         /YES, GENERATE NEW INFORMATION
6726  3345           DCA  TEMP2L         /NO, SAVE
6727  7040           CMA
6730  0366           AND  T5400L         /GET RETURN INSTRUCTION
6731  3745           DCA I TEMP2L        /PUT IN TEST LOCATION
6732  7140           CLL CMA
6733  0361           AND  TDA2L          /GET DATA2
6734  5754           JMP I TINADL        /EXECUTE "TAD"

                        /RETURN HERE AFTER EXECUTION
6735  3364  TRETUL,  DCA  TAC            /SAVE AC
6736  7010           RAR
6737  3365           DCA  TLINK          /SAVE LINK
6740  4774           JMS I TCOMAD        /COMPARE REAL AND SIMULATED ADDITIONS
6741  2376           ISZ  CNTR1
6742  5202           JMP  TEST1L
6743  4750           JMS I TEPASL
6744  5202           JMP  TEST1L         /END OF PASS, 4096 TEST COMPLETE

6745  0000  TEMP2L,  0
6746  7000  TGENL,   GENL
6747  6735  TRETTL,  TRETUL
            TERROR,  EPASL
6750  7442  TEPASL,  EPASL
6751  7203  TSIMAD,  RSIMAD
6752  7430  TRANDL,  RANDL
6753  0000  TINSTL,  0
```

```
6754   0000         TINADL,   0
6755   0000         TIFLGL,   0
6756   0000         TDATAL,   0
6757   0000         TPADDL,   0
6760   0021         TDA1L,    21
6761   0037         TDA2L,    37
6762   0000         TSIML,    0
6763   0000         TSIMAC,   0
6764   0000         TAC,      0
6765   0000         TLINK,    0
6766   5400         T5400L,   5400
6767   7760         T7760,    7760
6770   7770         T7770,    7770
6771   0001         SR11,     1
6772   0002         SR10,     2
6773   0004         SR09,     4
6774   7313         TCOMAD,   COMAD
6775   0010         K10,      10
6776   0000         CNTR1,    0
                              /
                              /GENERATE INSTRUCTIONS AND ADDRESSES
                              /
7000   7000         PAGE
7000   0000         GENL,     0

                              /GENERATE "AND" INSTRUCTION

7001   7040         GANDL,    CMA
7002   0353                   AND     R1L
7003   4762                   JMS I   SRANDL      /GENERATE RANDOM NUMBER
7004   3353                   DCA     R1L         /SAVE NUMBER
7005   7040                   CMA
7006   0353                   AND     R1L
7007   7421                   MQL
7010   7040                   CMA
7011   0365                   AND     K1000       /GENERATE OP CODE
7012   7501                   MQA
7013   0352                   AND     K1777
7014   3001                   DCA     INSTL       /SAVE INSTRUCTION
7015   7040                   CMA
7016   0001                   AND     INSTL       /GET INSTRUCTION
7017   0355                   AND     K0177L      /EXTRACT PAGE ADDRESS OF INSTRUCTION
7020   3361                   DCA     TEMP3L      /SAVE PAGE ADDRESS OF INSTRUCTION

                              /GENERATE ADDRESS FOR INSTRUCTION

7021   7040         GANADL,   CMA
7022   0353                   AND     R2L
7023   4762                   JMS I   SRANDL      /GENERATE RANDOM NUMBER
7024   3353                   DCA     R2L         /SAVE NUMBER
7025   7040                   CMA
7026   0353                   AND     R2L
7027   4777                   JMS     LIMIT       /IS ADDRESS WITHIN LIMITS
```

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7030  5221            JMP   GANADL     /NO, GENERATE NEW ADDRESS
7031  7041            CMA
7032  0353            AND   R2L
7033  0354            AND   P0L
7034  7641            SZA CLA           /IS ADDRESS ON PAGE 0
7035  5244            JMP   PAGADL     /NO
7036  7040            CMA
7037  0353            AND   R2L
7040  4776'  PAGAL,   JMS   ABSL       /GET PAGE ADDRESS OF INSTRUCTION
7041  7700            SMA CLA           /GET DIFFERENCE BETWEEN PAGE ADDRESSES
7042  5221            JMP   GANADL     /IS DIFFERENCE >2
7043  5255            JMP   PAL        /NO

7044  7040  PAGADL,   CMA              /GET INSTRUCTION
7045  0001            AND   INSTL
7046  0357            AND   K200L      /IS PAGE BIT SET
7047  7650            SNA CLA
7050  5255            JMP   PAL        /NO, USE ADDRESS AS IS
7051  7040            CMA
7052  0353            AND   R2L        /PAGE BIT SET, EXTRACT PAGE ADDRESS FOR INSTRUCTION
7053  0355            AND   K0177L
7054  5240            JMP   PAGAL      /TEST FOR INTERFERENCE
7055  7040  PAL,      CMA              /MAKE SURE DATA WILL
7056  0361            AND   TEMP3L     /NOT BE STORED IN LOCATION 0
7057  7650            SNA CLA           /LOCATION ZERO, TRY AGAIN
7060  5201            JMP   GANDL      /USE ADDRESS AS IS
7061  7040            CMA
7062  0353            AND   R2L
7063  3002            DCA   INADDL

                      /GENERATE ADDRESS FOR DATA
                      /
7064  7040  DAADL,    CMA              /GET INSTRUCTION
7065  0001            AND   INSTL
7066  0357            AND   K200L      /IS PAGE BIT OF INSTRUCTION SET
7067  7650            SNA CLA
7070  5307            JMP   P0AL       /NO, USE PAGE ADDRESS BITS OF INSTRUCTION FOR DATA ADDRESS
7071  7040            CMA
7072  0002            AND   INADDL
7073  0354            AND   P0L        /EXTRACT PAGE OF INSTRUCTION ADDRESS
7074  7421            MQL
7075  7040            CMA
7076  0361            AND   TEMP3L
7077  7501            MQA              /"OR" TOGETHER TO GET
7100  3003            DCA   DATADL     /DATA ADDRESS
7101  7040  INDIRL,   CMA
7102  0001            AND   INSTL      /GET INSTRUCTION
7103  0356            AND   K400L      /IS PAGE BIT OF INSTRUCTION SET
7104  7640            SZA CLA           /IS INSTRUCTION INDIRECT
7105  5313            JMP   PADL       /YES, INSTRUCTION IS INDIRECT
```

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7106  5603        JMP I  GENL      /EXIT
7107  7041  PEAL, CMA              /USE PAGE ADDRESS OF INSTRUCTION
7110  0361        AND    TEMP3L    /AS DTAT ADDRESS
7111  3003        DCA    DATADL
7112  5301        JMP    INDIRL

                  /GENERATE INDIRECT ADDRESS FOR DATA

7113  7041  PADL, CMA              /GENERATE RANDOM NUMBER
7114  0365        AND    R3L
7115  4762        JMS I  SRANDL
7116  3360        DCA    R3L
7117  7040        CMA
7120  0363        AND    R3L
7121  4777        JMS    LIMIT     /IS ADDRESS WITHIN LIMITS
7122  5313        JMP    PADL      /NO, TRY AGAIN
7123  7040        CMA
7124  0002        AND    INADDL    /GET INSTRUCTION ADDRESS
7125  4775        JMS    ABSL1     /GENERATE DIFFERENCE BETWEEN ADDRESSES
7126  7700        SMA CLA          /DO INSTRUCTION AND ADDRESS INTERFERE
7127  5313        JMP    PADL      /YES
7130  7040        CMA              /NO, TEST DATA ADDRESS AS ABOVE
7131  0003        AND    DATADL
7132  .775        JMS    ABSL1
7133  7700        SMA CLA
7134  5313        JMP    PADL
7135  7040        CMA
7136  0363        AND    R3L       /ADDRESSES DO NOT INTERFERE
7137  7041        CIA              /WILL LOCATION BE 0 IF DECREMENTED
7140  7040        CMA
7141  7650        SNA CLA

7142  5313        JMP    PADL
7143  7040        CMA
7144  0360        AND    R3L       /YES, GENERATE NEW POINTER
7145  3004        DCA    PADDL
7146  7040        CMA
7147  5600        JMP I  GENL      /EXIT
                  /
                  /
7150  0001  R1L,    1
7151  0003  K3L,    3
7152  1777  K1777,  1777
7153  0005  R2L,    5
7154  7600  POL,    7600
7155  0177  K0177L, 177
7156  0405  K400L,  400
7157  0200  K200L,  200
7160  0015  R3L,    15
7161  0000  TEMP3L, 0
7162  7430  SRANDL, RANDL
7163  7201  SRIMAD, RSIMAD
```

```
7164  1201        LIML,   1201
7165  1000        K1000,  1000

                  /
                  /SIMULATED ADDITION
                  /
7175  7507
7176  7474
7177  7303
7200  0000        PAGE
7201  3344        RSIMAD,  0
7202  7501                DCA   ARG2      /SAVE ARGUMENTS
7203  3343                MQA   ARG1
                          DCA   ARG1

                  /SIMULATE ADDITION BY SIMULATED GENERATEION OF SUM
                  /AND CARRY BITS

                  /FORM OR OF ARG1 WITH ARG2

7204  7342        SIMAD,  CLA CLL CMA
7205  0343                AND   ARG1      /LOAD AC WITH ARG1
7206  7421                MQL             /PLACE IN MQ
7207  7040                CMA
7211  0344                AND   ARG2      /LOAD AC WITH ARG2
7211  7501                MQA             /FORM ARG1 OR ARG2
7212  3345                DCA   A1ORA2    /SAVE ARG1 OR ARG2

                  /FORM XOR(EXCLUSIVE OR) OF ARG1 WITH ARG2
                  /BY A XOR B=(A AND NOTB)OR(NOTA AND B)

7213  7501                MQA             /GET ARG1 FROM MQ
7214  7040                GMA             /FORM NOTARG1
7215  0344                AND   ARG2      /AND WITH ARG2 TO GET ARG2 AND NOTARG1
7216  7421                MQL             /SAVE IN MQ
7217  7040                CMA
7220  0344                AND   ARG2      /LOAD AC WITH ARG2
7221  7040                CMA             /FORM NOTARG2
7222  0343                AND   ARG1      /AND WITH ARG1 TO GET ARG1 AND NOTARG2
7223  7501                MQA             /OR WITH ARG2 AND NOTARG1
7224  3346                DCA   SIMAC     /TO GET ARG1 XOR ARG2
7225  3347                DCA   SIMLNK

                  /AND ARG1 WITH ARG2
                  /TEST FOR CARRIES
                  /IF THERE ARE NO BITS IN COMMON BETWEEN ARG1 AND ARG2
                  /THERE WILL BE NO CARRIES GENERATED
```

```
7226  7041            CMA                   /LOAD AC WITH ARG1
7227  0343            AND     ARG1          /AND WITH ARG2
7230  0344            AND     ARG2          /ARE THERE ANY CARRIES
7231  7450            SNA                   /NO, TERMINATE SIMULATION
7232  5274            JMP     ENDSIM

                      /GENERATE CARRIES

7233  7421  NXTCAR,   MQL                   /SAVE FIRST CARRIES
7234  7521            MQA MQL               /GET CARRIES FROM MQ
7235  0345            AND     A1ORA2        /AND WITH A1ORA2 TO SEE IF MORE CARRIES ARE GENERATED
7236  7450            SNA                   /ARE THERE ANY MORE CARRIES
7237  5244            JMP     ENCAR         /NO, END SIMULATION OF CARRIES
7240  7104            CLL RAL               /PROPIGATE CARRIES
7241  7521            MQA MQL               /GET PREVIOUS CARRIES FROM MQ, SAVE NEW CARRIES
7242  7501            MQA                   /OR NEW CARRIES WITH PREVIOUS CARRIES
7243  5234            JMP     NXTCAR        /CONTINUE

                      /TEST FOR CARRY INTO LINK

7244  7501  ENCAR,    MQA                   /GET CARRIES
7245  0345            AND     A1ORA2        /AND WITH A1ORA2
7246  0350            AND     K4000         /TEST BIT 00
7247  7450            SNA                   /IS BIT 00 1
7250  5253            JMP     ENCAR1        /NO, CARRIES DID NOT PROPIGATE INTO LINK
7251  3347            DCA     SIMLNK        /YES, SAVE CARRY INTO LINK
7252  5260            JMP     XORALL        /COMPLETE SIMULATION
7253  7130  ENCAR1,   CLL CML RAR           /SET AC=4000
7254  0343            AND     ARG1          /AND WITH ARG1
7255  0344            AND     ARG2          /AND WITH ARG2 TO SEE IF ORIGINAL
7256  7440            SZA                   /NUMBERS GENERATED CARRY INTO LINK
7257  3347            DCA     SIMLNK        /SAVE SIMULATED LINK

                      /FORM XOR OF ARG1, ARG2, AND CARRIES
                      /TO GET FINAL SIMULATED SUM

7260  7501  XORALL,   MQA                   /GET CARRIES
7261  3351            DCA     CARRY         /SAVE SIMULATED CARRIES
7262  7501            MQA
7263  7043            CMA
7264  0346            AND     SIMAC         /FORM A1ORA2 AND NOTCARRY
7265  7421            MQL                   /SAVE IN MQ
7266  7040            CMA
7267  0346            AND     SIMAC
7270  7040            CMA
7271  0351            AND     CARRY         /FORM CARRY AND NOTA1ORA2
7272  7501            MQA                   /OR WITH CONTENTS OF MQ
7273  3346  ENDSIM,   DCA     SIMAC
7274  7340            CLA CLL CMA
7275  0347            AND     SIMLNK
7276  7640            SZA CLA
7277  7020            CML
```

```
7300   7040        CMA
7301   0346        AND    SIMAC
7302   5603        JMP I  RSIMAD        /TO GET FINAL SIMULATED SUM

                   /TEST ADDRESS
                   /
7303   0000  LIMIT, 0                   /SAVE ARGUMENT IN MQ
7304   7421        MQL
7305   7040        CMA
7306   0777'       AND    LIML          /LOAD AC WITH LIMIT
7307   4200        JMS    RSIMAD        /DO ADDITION
7310   7620        SNL CLA              /LINK SET IF NUMBER TO LARGE
7311   2303        ISZ    LIMIT         /NUMBER OK
7312   5703        JMP I  LIMIT

                   /COMPARE SIMULATED AND REAL RESULT
                   /
7313   0000  COMAD, 0
7314   7342        CLA CLL CMA
7315   0776'       AND    TSIML         /GET SIMULATED RESULTANT LINK
7316   7640        SZA CLA
7317   7020        CML
7320   7042        CMA
7321   0775'       AND    TLINK         /COMPARE TO REAL LINK
7322   7640        SZA CLA
7323   7020        CML
7324   7430        SZL
7325   5341        JMP    ERROR1        /IF SAME, LINK=0
7326   7340        CLA CLL CMA          /NOT THE SAME, ERROR
7327   2774'       AND    TAC           /GET ADDITION RESULT
7330   7040        CMA
7331   0773'       AND    TSIMAC        /COMPARE TO COMPLEMENT OF SIMULATION RESULT
7332   7440        SZA
7333   5341        JMP    ERROR1        /NOT 0, ERROR
7334   7040        CMA
7335   0773'       AND    TSIMAC        /GET SIMULATION RESULT
7336   7040        CMA
7337   2774'       AND    TAC           /COMPARE TO COMPLEMENT OF REAL ADDITION
7340   7640        SZA CLA
7341   4752  ERROR1, JMS I  ERRORS
7342   5713        JMP I  COMAD
7343   0000  ARG1,  0
7344   0000  ARG2,  0
7345   0000  A1ORA2, 0
7346   0000  SIMAC,  0
7347   0000  SIMLNK, 0
7350   4000  K4000,  4000
7351   0000  CARRY,  0
7352   7429  ERRORS, ERROR
```

```
                                    /
                                    /ERROR HANDLER
                                    /
7400 0000               PAGE
                        ERROR,  0
7401 7604                       LAS
7402 0267                       AND  SR00        /TEST SR00
7403 7640                       SZA CLA          /IS SR00=1
7404 5603                       JMP I ERROR      /YES, DO NOT HALT
7405 7240                       CLA CMA
7406 0777'                      AND  TDA1L        /HALT WITH DATA1 IN AC
7407 7402                       HLT
7410 7240                       CLA CMA
7411 0776'                      AND  TDA2L        /HALT WITH DATA2 IN AC
7412 7402                       HLT
7413 7240                       CLA CMA
7414 0775'                      AND  TINSTL       /HALT WITH INSTRUCTION IN AC
7415 7402                       HLT
7416 7240                       CLA CMA
7417 0774'                      AND  TINADL       /HALT WITH INSTRUCTION ADDRESS IN AC
7420 7402                       HLT
7421 7240                       CLA CMA
7422 0773'                      AND  TDATAL       /HALT WITH DATA ADDRESS IN AC
7423 7402                       HLT
7424 7240                       CLA CMA
7425 0772'                      AND  TPADDL       /HALT WITH INDIRECT IN AC
7426 7402                       HLT
7427 5600                       JMP I ERROR

                                    /RANDOM NUMBER GENERATOR
                                    /
7430 0000               RANDL,  0
7431 7104                       CLL RAL
7432 7420                       SNL
7433 5240                       JMP  ENRAN
7434 7040                       MQL
7435 7040                       CMA
7436 0241                       AND  K3
7437 4771'                      JMS  RSIMAD
7440 5630               ENRAN,  JMP I RANDL
7441 0003               K3,     3

                                    /
                                    /END OF PASS
                                    /
7442 0000               EPASL,  0
7443 7604                       LAS
```

Preceding word-address values:
```
7373 6763
7374 6764
7375 6765
7376 6762
7377 7164
```

```
7444  0270          AND    SR03
7445  7642          SZA CLA
7446  5642          JMP I  EPASL
7447  7040          CMA
7450  0271          AND    C215
7451  4261          JMS    TYPE
7452  7040          CMA
7453  0272          AND    C212
7454  4261          JMS    TYPE
7455  7040          CMA
7456  0273          AND    C324
7457  4261          JMS    TYPE
7460  5642          JMP I  EPASL
                    /
7461  0000   TYPE,  0
7462  6046          TLS
7463  6041          TSF
7464  5263          JMP    .-1
7465  7200          CLA
7466  5661          JMP I  TYPE
                    /
7467  4000   SR00,  4000
7470  0400   SR03,  0400
7471  0215   C215,  215
7472  0212   C212,  212
7473  0324   C324,  324

                    /TEST FOR PROPER DIFFERENCE
7474  0000   ABSL,  0
7475  7041          CIA
7476  7421          MQL
7477  7040          CMA
7500  0772          AND    TEMP3L
7501  4771          JMS    RSIMAD
7502  7500          SMA
7503  7041          CIA
7504  7001          IAC
7505  7001          IAC
7506  5674          JMP I  ABSL
                    /
7507  0000   ABSL1, 0
7510  7041          CIA
7511  7421          MQL
7512  7040          CMA
7513  0767          AND    R3L
```

```
7514  4771'        JMS   RSIMAD
7515  7500         SMA
7516  7041         CIA
7517  7001         IAC
7520  7001         IAC
7521  5707         JMP I ABSL1
                   $

7567  7160
7570  7161
7571  7200
7572  6757
7573  6756
7574  6754
7575  6753
7576  6761
7577  6760
```

```
0000   11111100   000 3300   00000000   00000000   00000000   00000000   00000000
0100   000 0000   000 0700   00000000   00000000   00000000   00000000   00000000

0200   111 0000   000 0000   00000000   00000000   00000000   00000000   00000000
0300   000 0000   000 0200   00000000   00000000   00000000   00000000   00000000

0400
0500

0600
0700

1000
1100

1200
1300

1400
1500

1600
1700

2000
2100

2200
2300

2400
2500

2600
2700

3000
3100

3200
3300

3400
3500

3600
3700
```

```
4000
4100

4200
4300

4400
4500

4600
4700

5000
5100

5200
5300

5400
5500

5600
5700

6000
6100

6200
6300

6400
6500

6600   11111111   11111111   11111111   11111111   11111111   11111111
6700   11111111   11111111   11111111   11111111   11111111   11111110

7000   11111111   11111111   11111111   11111111   11111111   11111111
7100   11111111   11111111   11111111   11111111   11111100   00000111

7200   11111111   11111111   11111111   11111111   11111111   11111111
7300   11111111   11111111   11100000   00000000   00000000   00011111

7400   11111111   11111111   11111111   11111111   11111111   11111111
7500   11111111   11000000   00000000   00000000   00000001   11111111

7600
7700
```

Symbol	Value		Symbol	Value
A1ORA2	7345		PAGAL	7040
ABSL	7474		PAL	7055
ABSL1	7507		R1L	7150
ARG1	7343		R2L	7153
ARG2	7344		R3L	7160
C212	7472		RANDL	7430
C215	7471		RETURN	0000
C324	7473		RSIMAD	7200
CAF	6007		SETTL	6644
CARRY	7351		SIMAC	7346
CNTR1	6776		SIMAD	7204
COMAD	7313		SIMLNK	7347
DAADL	7064		SR00	7467
DATADL	0003		SR03	7470
DIRL	6702		SR09	6773
DOANDL	6716		SR10	6772
DOTSTL	6705		SR11	6771
ENCAR	7244		SRANDL	7162
ENCAR1	7253		SRIMAD	7163
ENDSIM	7274		START	0200
ENRAN	7440		STARTL	6600
EPASL	7442		T5400L	6766
ERROR	7405		T7760	6767
ERROR1	7341		T7770	6770
ERRORS	7352		TAC	6764
GANADL	7021		TCOMAD	6774
GANDL	7001		TDA1L	6760
GENL	7000		TDA2L	6761
IFLAGL	0005		TDAT1L	6624
INADDL	0002		TDAT2L	6634
INDIRL	7101		TDATAL	6756
INSTL	0001		TEMP2L	6745
K0177L	7155		TEMP3L	7161
K10	6775		TEPASL	6750
K1000	7165		TERROR	6750
K1777	7152		TEST1L	6602
K200L	7157		TGENL	6746
K3	7441		TIFLGL	6755
K3L	7151		TINADL	6754
K400O	7350		TINSTL	6753
K400L	7156		TLINK	6765
LIMIT	7333		TPADDL	6757
LIML	7164		TRANDL	6752
MQA	7501		TRETTL	6747
MQL	7421		TRETUL	6735
NOTAUT	6676		TSIMAC	6763
NXTCAR	7234		TSIMAD	6751
PAL	7107		TSIML	6762
PL	7154		TYPE	7461
PADDL	0004		XORALL	7260
PADL	7113			
PAGADL	7044			

ERRORS DETECTED: 0

LINKS GENERATED: 23

RUN-TIME: 5 SECONDS

2K CORE USED