IDENTIFICATION

PRODUCT CODE:	MAINDEC-8E-D0EB-D
PRODUCT NAME:	RANDOM TAD TEST
DATE CREATED:	JUNE 7,1971
MAINTAINER:	DIAGNOSTIC GROUP
AUTHOR:	MICHAEL DAVIS

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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 0000-6577, 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 0200

4.3.2 PRESS LOAD ADDRESS SWITCH

4.3.3 SET SR TO 0000

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

6.3 LOOPING

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,

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                        /
                        /RANDOM TAD TEST
                        /COPYRIGHT 1970, DIGITAL EQUIPMENT CORP., MAYNARD, MASS. 01754
                        /V 82 07552
                        /
                        /
                        /TEMPORARY STORAGE LOCATIONS
                        /
        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    7040            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  7640            SZA CLA                 /IS SR10=1
6627  5234            JMP     TDAT2L          /SR10=1, DO NOT GENERATE DATA1
6630  7040            CMA
6631  0360            AND     TDA1L           /GENERATE RANDOM NUMBER
6632  4752            JMS I   TRANDL
6633  3360            DCA     TDA1L
6634  7604    TDAT2L, LAS
6635  0373            AND     SR09            /TEST SR09
6636  7640            SZA CLA                 /IS SR09=1
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

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                        /
                        /SET UP INSTRUCTION AND DATA AT TEST ADDRESS
                        /ALONG WITH RETURN TO THIS ROUTINE
                        /
6644  7340    SETTL,  CLA CLL CMA
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            CMA
6673  0360            AND     TDA1L           /GET DATA
6674  3757            DCA I   TPADDL          /STORE IN TEST LOCATION
6675  5305            JMP     DOTSTL
6676  7040    NOTAUT, CMA
6677  0357            AND     TPADDL
6700  3756            DCA I   TDATAL
6701  5272            JMP     .-7
6702  7040    DIRL,   CMA
6703  0360            AND     TDA1L           /GET DATA
6704  3756            DCA I   TDATAL          /STORE IN TEST LOCATION
                        /
                        /SIMULATE "TAD"
                        /
      7340    DOTSTL, CLA CLL CMA
```

```
 706  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

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                        /
                        /GO TO TEST
                        /
6716  7040    DOANDL, CMA
6717  0347            AND     TRETTL          /GET RETURN ADDRESS
6720  3000            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          /END OF PASS, 4096 TEST COMPLETE
6744  5202            JMP     TEST1L

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                        /
                        /
                        /
6745  0000    TEMP2L, 0
6746  7000    TGENL,  GENL
6747  6735    TRETTL, TRETUL
              TERROR,
6750  7442    TEPASL, EPASL
6751  7200    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    T5420L, 5420
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      PAGE
7000  0000      GENL,   0
                        /
                        /GENERATE "AND" INSTRUCTION
                        /
7001  7040      GANDL,  CMA
7002  0350              AND     R1L
7003  4762              JMS I   SRANDL          /GENERATE RANDOM NUMBER
7004  3350              DCA     R1L             /SAVE NUMBER
7005  7040              CMA
7006  0350              AND     R1L
7007  7421              MQL                     /GENERATE OP CODE
7010  7040              CMA
7011  0365              AND     K1000
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
7030  5221              JMP     GANADL          /NO, GENERATE NEW ADDRESS
7031  7040              CMA
7032  0353              AND     R2L
7033  0354              AND     P0L
7034  7640              SZA CLA                 /IS ADDRESS ON PAGE 0
7035  5244              JMP     PAGADL          /NO
      7040              CMA
```

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 037  0353           AND     R2L             /GET PAGE ADDRESS OF INSTRUCTION
7040  4776'  PAGAL,  JMS     ABS_            /GET DIFFERENCE BETWEEN PAGE ADDRESSES
7041  7700           SMA CLA                 /IS DIFFERENCE >2
7042  5221           JMP     GANADL          /NO
7043  5255           JMP     PAL

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7044  7040   PAGADL, CMA
7045  0001           AND     INSTL           /GET INSTRUCTION
7046  0357           AND     K200L
7047  7650           SNA CLA                 /IS PAGE BIT SET
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
7056  0361           AND     TEMP3L          /MAKE SURE DATA WILL
7057  7650           SNA CLA                 /NOT BE STORED IN LOCATION 0
7060  5201           JMP     GANDL           /LOCATION ZERO, TRY AGAIN
7061  7040           CMA                     /USE ADDRESS AS IS
7062  0353           AND     R2L
7063  3002           DCA     INADDL

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                     /
                     /GENERATE ADDRESS FOR DATA
                     /
7064  7040   DAADL,  CMA
7065  0001           AND     INSTL           /GET INSTRUCTION
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          /EXTRACT PAGE OF INSTRUCTION ADDRESS
7073  0354           AND     P0L
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
7103  0356           AND     K400L
7104  7640           SZA CLA                 /IS INSTRUCTION INDIRECT
7105  5313           JMP     PADL            /YES, INSTRUCTION IS INDIRECT
7106  5600           JMP I   GENL            /EXIT
7107  7040   P0AL,   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  7040    PADL,   CMA
7114  0360            AND     R3L             /GENERATE RANDOM NUMBER
7115  4762            JMS I   SRANDL
7116  3360            DCA     R3L
7117  7040            CMA
7120  0360            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           /GENEREATE 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  4775'           JMS     ABSL1
7133  7700            SMA CLA
7134  5313            JMP     PADL
7135  7040            CMA
7136  0360            AND     R3L             /ADDRESSES DO NOT INTERFERE
7137  7041            CIA                     /WILL LOCATION BE 0 IF DECREMENTED
7140  7040            CMA
7141  7650            SNA CLA

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7142  5313            JMP     PADL            /YES, GENERATE NEW POINTER
7143  7040            CMA
7144  0360            AND     R3L
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    P0L,    7600
7155  0177    K0177L, 177
7156  0400    K400L,  400
7157  0200    K200L,  200
7160  0015    R3L,    15
7161  0000    TEMP3L, 0
7162  7430    SRANDL, RANDL
7163  7200    SRIMAD, RSIMAD
7164  1201    LIML,   1201
7165  1000    K1000,  1000

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                      /
                      /
                      /SIMULATED ADDITION
                      /
```

```
 7176  7474
 7177  7303
       7200     PAGE
 7200  0000     RSIMAD, 0
 7201  3344             DCA      ARG2            /SAVE ARGUMENTS
 7202  7501             MQA
 7203  3343             DCA      ARG1
                        /
                        /
                        /SIMULATE ADDITION BY SIMULATED GENERATEION OF SUM
                        /AND CARRY BITS
                        /
                        /
                        /FORM OR OF ARG1 WITH ARG2
                        /
 7204  7340     SIMAD,  CLA CLL CMA
 7205  0343             AND      ARG1            /LOAD AC WITH ARG1
 7206  7421             MQL                      /PLACE IN MQ
 7207  7040             CMA
 7210  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             CMA                      /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


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                        /
                        /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  7040             CMA
 7227  0343             AND      ARG1            /LOAD AC WITH ARG1
 7230  0344             AND      ARG2            /AND WITH ARG2
 7231  7450             SNA                      /ARE THERE ANY CARRIES
 7232  5274             JMP      ENDSIM          /NO, TERMINATE SIMULATION
                        /
                        /GENERATE CARRIES
                        /
 7233  7421             MQL                      /SAVE FIRST CARRIES
 7234  7521     NXTCAR, 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

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                      /
                      /FORM XOR OF ARG1, ARG2, AND CARRIES
                      /TO GET FINAL SIMULATED SUM
                      /
7260  7501  XORALL,   MQA                     /SAVE SIMULATED CARRIES
7261  3351            DCA     CARRY
7262  7501            MQA
7263  7040            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            DCA     SIMAC
7274  7340  ENDSIM,   CLA CLL CMA
7275  0347            AND     SIMLNK
7276  7640            SZA CLA
7277  7020            CML
7300  7040            CMA
7301  0346            AND     SIMAC
7302  5600            JMP I   RSIMAD          /TO GET FINAL SIMULATED SUM
                      /
                      /TEST ADDRESS
                      /
7303  0000  LIMIT,    0
7304  7421            MQL                     /SAVE ARGUMENT IN MQ
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  7340              CLA CLL CMA
7315  0776'             AND     TSIML           /GET SIMULATED RESULTANT LINK
7316  7640              SZA CLA
7317  7020              CML
7320  7040              CMA
7321  0775'             AND     TLINK           /COMPARE TO REAL LINK
7322  7640              SZA CLA
7323  7020              CML
7324  7430              SZL                     /IF SAME, LINK=0
7325  5341              JMP     ERROR1          /NOT THE SAME, ERROR
7326  7340              CLA CLL CMA
7327  0774'             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  0774'             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  7400    ERRORS,   ERROR
```



```
                        /
                        /ERROR HANDLER
                        /
7373  6763
7374  6764
7375  6765
7376  6762
7377  7164
      7400    PAGE
7400  0000    ERROR,    0
7401  7604              LAS
7402  0267              AND     SR00            /TEST SR00
7403  7640              SZA CLA                 /IS SR00=1
7404  5600              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  7421           MQL
7435  7040           CMA
7436  0241           AND     K3
7437  4771'          JMS     RSIMAD
7440  5630  ENRAN,   JMP I   RANDL
7441  0003  K3,      3

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                     /
                     /END OF PASS
                     /
7442  0000  EPASL,   0
7443  7604           LAS
7444  0270           AND     SR03
7445  7640           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  0770'           AND     TEMP3L
7501  4771'           JMS     RSIMAD
7502  7500            SMA
7503  7041            CIA
7504  7001            IAC
7505  7001            IAC
7506  5674            JMP I   ABSL

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                      /
                      /
                      /
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

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```

```
0000  11111100  00000000  00000000  00000000  00000000  00000000  00000000  00000000
0100  00000000  00000000  00000000  00000000  00000000  00000000  00000000  00000000

0200  11100000  00000000  00000000  00000000  00000000  00000000  00000000  00000000
0300  00000000  00000000  00000000  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  11111111  11111111
6700  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111110


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

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

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

7600
7700
```


A10RA2	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   7400            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
K4000   7350            TINSTL  6753
K400L   7156            TLINK   6765
LIMIT   7303            TPADDL  6757
LIML    7164            TRANDL  6752
MQA     7501            TRETTL  6747
MQL     7421            TRETUL  6735
NOTAUT  6676            TSIMAC  6763
NXTCAR  7234            TSIMAD  6751
P0AL    7107            TSIML   6762
P0L     7154            TYPE    7461
PADDL   0004            XORALL  7260
PADL    7113
PAGADL  7044

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ERRORS DETECTED: 0

LINKS GENERATED: 23

RUN-TIME:  5 SECONDS

2K CORE USED
```