IDENTIFICATION

PRODUCT CODE: MAINDEC-8E-D0EB-D

PRODUCT NAME: RANDOM TAD TEST

DATE CREATED: JUNE 7,1971

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 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    rA1
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    T5423L, 5422
6767   7760    T7762,  7762
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
```

```
(   037   0353              AND     R2L           /GET   .GE 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
```

```
    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
```

```
                          /
                          /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
                       /
```

7   ) 7527   )   )

```
  176    7474
 7177    7303
         7200         PAGE
 7200    0020         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
```

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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   2771              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
```

)   )   )

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                        /
                        /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    6/63
7374    6764
7375    6/65
7376    6/62
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
```

```
 464   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
                       S
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
          /         PAL10    V141      17-JUN-71        7:23     PAGE 16-2


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
```

```
/          PAL10    V141      17-JUN-71        7:23     PAGE 16-3

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    7420          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
```

ERRORS DETECTED: 0

LINKS GENERATED: 23

RUN-TIME: 5 SECONDS

2K CORE USED

)   )   )