IDENTIFICATION

PRODUCT CODE:	MAINDEC-08-DHKAB-A-D
	(REPLACES MAINDEC-8E-D0DB)
PRODUCT NAME:	RANDOM AND TEST
DATE CREATED:	APRIL 12, 1973
MAINTAINER:	DIAGNOSTIC GROUP
AUTHOR:	JOHN VROBEL

1, ABSTRACT

THIS PROGRAM TESTS THE AND INSTRUCTING OF THE PDP-8E, THE AND 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 INITIALLY LOADED INTO LOCATIONS 0000 THRU 1177,
THE INITIAL TEST AREA IS 1200-7777, WHEN THE PROGRAM RELOCATES,
IT OCCUPIES 6600-7777, THE TEST AREA IS THEN 0000-6577,

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
SR01=1, HALT AT END OF PASS, RESTORE LOADERS
SR02=1, SUPPRESS PROGRAM RELOCATION
SR03=1, SUPPRESS END OF PASS TYPEOUT
SR09=1, HOLD DATA 2 CONSTANT
SR10=1, HOLD DATA 1 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 RELOCATION ERROR

IF AN ERROR OCCURS DURING PROGRAM RELOCATION, THE PROGRAM WILL HALT AT 234 OR 6634, DEPENDING UPON WHETHER THE PROGRAM IS LOCATED LOW OR HIGH.

6,2 DATA ERRORS

WHEN DATA ERRORS OCCUR THE PROGRAM SHOULD HALT AT LOCATION 0457/7057 INDICATING IN THE AC WHETHER THE FAILURE WAS LINK OR AC DATA.
IF THE AC IS SET TO ALL ONES (7777), THE FAILURE WAS THE LINK.
IF THE AC IS SET TO ALL ZEROS (0000), THE FAILURE WAS THE AC.
(NOTE: THE LINK IS SET TO A 0 PRIOR TO THE EXECUTION OF THE RANDOM AND INSTRUCTION AND SHOULD REMAIN AT A 0.)

DEPRESS CONTINUE TO DISPLAY SIMULATED RESULTS IN THE AC.
DEPRESS CONTINUE TO DISPLAY REAL RESULTS IN THE AC.
DEPRESS CONTINUE TO DISPLAY DATA1 IN THE AC.
DEPRESS CONTINUE TO DISPLAY AND 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 AND) IN AC.
DEPRESS CONTINUE TO RESUME TEST

6,3 ERROR RECOVERY

6.3.1 RELOCATION ERROR

RELOAD PROGRAM

6.3.2 DATA ERROR

SEE 6.2

6.4 LOOPING

SET SR00=1 TO PREVENT HALT AFTER ERROR.

SET SR02=1 TO PREVENT RELOCATION.

SET SR03=1 TO SUPRESS 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 2 SECONDS AND THEN RELOCATES. THE PROGRAM WILL TYPE "A" AFTER EACH 4096 RANDOM TESTS UNLESS SR03=1.

9. PROGRAM DESCRIPTION

THE PROGRAM IS INITIALLY LOADED INTO LOCATIONS 0200-1177, WITH TEMPORARY STORAGE LOCATIONS ON PAGE 0. AFTER INITIAL KEYSTART, THE PROGRAM WILL SAVE RIM AND BIN LOADERS IN PAGE 0 AND WILL THEN PROCEED TO USE LOCATIONS 1200-7777 AS A TEST AREA.

THE PROGRAM USES SEPARATE RANDOM NUMBER GENERATORS TO GENERATE THE AND INSTRUCTION, INSTRUCTION AND DATA ADDRESSES, AND THE TWO ARGUMENTS TO BE "ANDED". 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 AND INSTRUCTION IS COMPARED TO A SIMULATED AND.

AFTER 4096 TESTS, THE PROGRAM TYPES "A", RELOCATES, AND CONTINUES TESTING.

```
                        /
                        /RANDOM AND TEST
                        /
                        /TEMPORARY TRANSFER LOCATIONS ON PAGE 0
                        /
        0000    *0
0000    0000    TTANDL, 0
0001    5001    INSTL,  JMP     .                       /STORAGE FOR AND INSTRUCTION
0002    0002    INADDL, 2       /STORAGE FOR AND INSTRUCTION ADDRESS
0003    0003    DATADL, 3               /STORAGE FOR DATA ADDRESS
0004    0003    IFLAGL, 3               /STORAGE FOR INSTRUCTION INDIRECT FLAG
0005    0000    PADDL,  0               /STORAGE FOR DATA INDIRECT ADDRESS
0006    0000    LIML,   0
0007    0000    PAGL,   0

        0010    *10
0010    0000    PNTRL,  0

        6007            CAF=6007
        7501            MQA=7501
        7421            MQL=7421
        0266            CNTR1L=LOHIL
        0020    *20
0020    0000    TEMP3L, 0

                        /
                        /INITIALIZATION AND CONTROL ROUTINES
                        /
        0200    *200
0200    6007    STARTL, CAF
0201    1204            TAD     .+3             /SAVE RIM AND BIN IN PAGE 0
0202    3201    PNTR1L, DCA     .-1             /ONLY AT INITIAL KEYSTART
0203    4205    PNTR2L, JMS     SAVBNL          /201 BECOMES JMP SETLKL
0204    5274    TEMP1L, JMP     SETLKL          /FOR ALL FUTURE PASSES
                        /
                        /TRANSFER RIM AND BIN LOADERS TO PAGE 0
                        /
0205    0000    SAVBNL, 0
0206    1374            TAD     C7600L          /SET AC=-200, NUMBER OF
0207    3266            DCA     CNTR1L          /LOCATIONS TO BE TRANSFERRED
0210    1374            TAD     C7600L          /FIRST "FROM"
0211    3202            DCA     PNTR1L          /LOCATION=7600
0212    3203            DCA     PNTR2L          /FIRST "TO" LOCATION=0
0213    4225            JMS     RELOL           /PERFORM TRANSFER
0214    5605            JMP I   SAVBNL          /EXIT


                        /
                        /TRANSFER RIM AND BIN LOADERS TO PAGE 37
                        /
0215    0000    RESBNL, 0
0216    1374            TAD     C7600L          /SET AC=-200, NUMBER OF
0217    3266            DCA     CNTR1L          /LOCATIONS TO BE TRANSFERRED
0220    3202            DCA     PNTR1L          /FIRST "FROM" ADDRESS=0
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0221  1374            TAD     C7600L          /FIRST "TO"
0222  3203            DCA     PNTR2L          /ADDRESS=7600
0223  4225            JMS     RELOL           /PERFORM TRANSFER
0224  5615            JMP I   RESBNL          /EXIT
                      /
                      /DATA TRANSFER ROUTINE
                      /
0225  0000    RELOL,  0
0226  1602            TAD I   PNTR1L          /GET DATA
0227  3603            DCA I   PNTR2L          /TRANSFER
0230  1602            TAD I   PNTR1L          /GET DATA
0231  7041            CIA
0232  1603            TAD I   PNTR2L          /COMPARE
0233  7640            SZA CLA
0234  7402            HLT                     /TRANSFER ERROR
0235  2202            ISZ     PNTR1L          /NEXT "FROM" LOCATION
0236  7000            NOP
0237  2203            ISZ     PNTR2L          /NEXT "TO" LOCATION
0240  7000            NOP
0241  2266            ISZ     CNTR1L
0242  5226            JMP     RELOL+1
0243  5625            JMP I   RELOL
                      /
                      /TRANSFER PROGRAM TO UPPER MEMORY
                      /
0244  4215    REHL,   JMS     RESBNL          /TRANSFER RIM AND BIN LOADERS
0245  1373            TAD     C7000L          /SET AC=-1000, NUMBER OF
0246  3266            DCA     CNTR1L          /LOCATIONS TO BE TRANSFERRED
0247  1365            TAD     C200L           /FIRST "FROM"
0250  3202            DCA     PNTR1L          /ADDRESS=200
0251  1372            TAD     C6600L          /FIRST "TO"
0252  3203            DCA     PNTR2L          /ADDRESS=6600
0253  4225            JMS     RELOL           /PERFORM TRANSFER
0254  5772            JMP I   C6600L          /GO TO PROGRAM START
                      /
                      /TRANSFER PROGRAM TO LOWER MEMORY
                      /
0255  4205    RELL,   JMS     SAVBNL          /TRANSFER RIM AND BIN LOADERS
0256  1373            TAD     C7000L          /SET AC=-1000, NUMBER OF
0257  3266            DCA     CNTR1L          /LOCATIONS TO BE TRANSFERED
0260  1372            TAD     C6600L          /FIRST "FROM"
0261  3202            DCA     PNTR1L          /ADDRESS=6600
0262  1365            TAD     C200L           /FIRST "TO"
0263  3203            DCA     PNTR2L          /ADDRESS=200
0264  4225            JMS     RELOL           /PERFORM TRANSFER
0265  5765            JMP I   C200L           /GO TO PROGRAM START

                      /
                      /DETERMINE IF PROGRAM IS IN LOWER OR UPPER MEMORY
                      /
0266  0000    LOHIL,  0                       /PC
0267  7330            CLA CLL CML RAR         /SET AC=4000
0270  1266            TAD     .-2             /ADD PC
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0271  7630          SZL CLA                 /IS LINK=0
0272  1371          TAD     C6400L          /NO, HIGH CORE
0273  5666          JMP I   LOHIL           /RETURN
                    /
                    /TRANSFER TO LINKAGE GENERATION
                    /
0274  7300    SETLKL, CLA CLL
0275  3202          DCA     PNTR1L          /CLEAR PASS COUNTER
0276  4266          JMS     LOHIL           /DETERMINE IF PROGRAM IS HIGH OR LOW
0277  5377          JMP     GOSETL          /GO TO TEST WITH ADDRESS MODIFIER IN AC
                    /
                    /SIMULATE LOGICAL AND WITH A AND B=NOT((NOTA)OR(NOTB))
                    /
0300  0000    SANDL,  0
0301  7040          CMA                     /NOTA
0302  3204          DCA     TEMP1L          /SAVE NOTA
0303  7501          MQA                     /GET B
0304  7040          CMA                     /NOTB
0305  7421          MQL                     /SAVE NOTB
0306  1204          TAD     TEMP1L          /GET NOTA
0307  7501          MQA                     /OR WITH NOTB
0310  7040          CMA                     /COMPLEMENT
0311  5700          JMP I   SANDL           /EXIT WITH RESULT IN AC
                    /
                    /TEST SWITCHES
                    /
0312  0000    SWITCL, 0
0313  7421          MQL                     /SAVE TEST BIT
0314  7604          LAS                     /GET SWITCHES
0315  4300          JMS     SANDL           /AND SWITCHES WITH TEST BIT
0316  7650          SNA CLA                 /IS SWITCH 0
0317  2312          ISZ     SWITCL          /NO SKIP INSTRUCTION AFTER RETURN
0320  5712          JMP I   SWITCL



                    /
                    /END OF PASS
                    /
0321  0000    EPASL,  0
0322  2202          ISZ     PNTR1L          /END OF PASS ?
0323  5721          JMP I   EPASL           /NO, RETURN
0324  7332          CLA CLL CML RTR
0325  7012          RTR                     /SET AC=400
0326  4312          JMS     SWITCL          /TEST SR03
0327  5336          JMP     .+7             /SUPPRESS END OF PASS TYPEOUT
0330  1366          TAD     C215L
0331  4337          JMS     TYPEL           /TYPE CARRIAGE RETURN
0332  1367          TAD     C212L
0333  4337          JMS     TYPEL           /TYPE LINEFEED
0334  1370          TAD     A
0335  4337          JMS     TYPEL           /TYPE A
0336  5345          JMP     HALTL           /TEST FOR HALT, RELOCATION
                    /
                    /OUTPUT CHARACTER
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                        /
0337  0000    TYPEL,    0
0340  6046              TLS
0341  6041              TSF
0342  5341              JMP     .-1
0343  7200              CLA
0344  5737              JMP I   TYPEL



                        /
                        /CHECK FOR HALT
                        /
0345  7332    HALTL,    CLA CLL CML RTR         /SET AC=2000
0346  4312              JMS     SWITCL          /TEST SR01
0347  7410              SKP                     /SR01=1, HALT
0350  5355              JMP     RRELL           /CHECK FOR RELOCATION
0351  4266              JMS     LOHIL           /DETERMINE IF PROGRAM IS HIGH OR LOW
0352  7650              SNA CLA                 /AC=0, PROGRAM LOW
0353  4215              JMS     RESBNL          /PROGRAM LOW, RESTORE LOADERS
0354  7402              HLT
                        /
                        /CHECK FOR RELOCATION
                        /
0355  7332    RRELL,    CLA CLL CML RTR
0356  7010              RAR                     /SET AC=1000
0357  4312              JMS     SWITCL          /TEST SR02
0360  5721              JMP I   EPASL           /SR02=1,DO NOT RELOCATE PROGRAM
0361  4266              JMS     LOHIL           /DETERMINE IF PROGRAM IS HIGH OR LOW
0362  7650              SNA CLA                 /AC=0, PROGRAM LOW
0363  5244              JMP     REHL            /PROGRAM LOW, RELOCATE TO HIGH CORE
0364  5255              JMP     RELL            /PROGRAM HIGH, RELOCATE TO LOW CORE
0365  0200    C200L,    200
0366  0215    C215L,    215
0367  0212    C212L,    212
0370  0301    A,        301
0371  6400    C6400L,   6400
0372  6600    C6600L,   6600
0373  7000    C7000L,   7000
0374  7600    C7600L,   7600
                        /
      0377              *377
0377  7000    GOSETL,   NOP



                        /
                        /SET UP ADDRESS POINTERS AND CONSTANTS AND TRANSFER TO NEXT PAGE
                        /
      0400    *400
0400  3303    SETAL,    DCA     TEMPL           /SAVE ADDRESS MODIFIER
0401  1306              TAD     LISTL           /GET POINTER FOR TRANSFER
0402  1303              TAD     TEMPL           /MODIFY FOR LOW OR HIGH CORE
0403  3010              DCA     PNTRL           /SET UP AUTO-INDEX REGISTER
0404  1307              TAD     LGENL           /GET POINTER TO INSTRUCTION GENERATION
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0405  1303            TAD     TEMPL           /MODIFY FOR LOW OR HIGH CORE
0406  3410            DCA I   PNTRL           /TRANSFER TO NEXT PAGE
0407  1311            TAD     LSANDL          /GET POINTER TO AND SIMULATER
0410  1303            TAD     TEMPL           /MODIFY FOR LOW OR HIGH CORE
0411  3410            DCA I   PNTRL           /TRANSFER TO NEXT PAGE
0412  1312            TAD     LRETUL          /GET POINTER FOR EXECUTION RETURN
0413  1303            TAD     TEMPL           /MODIFY FOR LOW OR HIGH CORE
0414  3410            DCA I   PNTRL           /TRANSFER TO NEXT PAGE
0415  1313            TAD     LSWITL          /GET POINTER TO SWITCH SENSING
0416  1303            TAD     TEMPL           /MODIFY FOR LOW OR HIGH CORE
0417  3410            DCA I   PNTRL           /TRANSFER TO NEXT PAGE
0420  1310            TAD     LEPASL          /GET POINTER TO END OF PASS
0421  1303            TAD     TEMPL           /MODIFY FOR LOW OR HIGH CORE
0422  3410            DCA I   PNTRL           /TRANSFER TO NEXT PAGE
0423  1303            TAD     TEMPL
0424  1314            TAD     ACINDL
0425  3410            DCA I   PNTRL
0426  1303            TAD     TEMPL
0427  1323            TAD     ERPNT
0430  3325            DCA     SAVE1
0431  1303            TAD     TEMPL           /GET ADDRESS MODIFIER
0432  7640            SZA CLA                 /IS TEST IN LOW CORE
0433  5241            JMP     LHICOL          /NO,SET UP FOR HIGH CORE
0434  1304            TAD     L200L           /SET PAGE 0 EXCLUSION BIT
0435  3410            DCA I   PNTRL           /TRANSFER TO NEXT PAGE
0436  1315            TAD     L6600L          /GET LOW CORE ADDRESS LIMIT
0437  3410            DCA I   PNTRL           /TRANSFER TO NEXT PAGE
0440  5377            JMP     GOTSTL          /GO TO TEST
0441  3410  LHICOL,  DCA I   PNTRL           /CLERA PAGE 0 EXCLUSION BIT
0442  1316            TAD     L1201L          /GET HIGH CORE ADDRESS LIMIT
0443  3410            DCA I   PNTRL           /TRANSFER TO NEXT PAGE
0444  5377            JMP     GOTSTL          /GO TO TEST

                      /
                      /ROUTINE TO DISPLAY SOME ERROR INFORMATION
                      /
0445  0000  ERINDL,  0
0446  7300            CLA CLL
0447  1303            TAD     TEMPL           /GET ADDRESS MODIFIER*
0450  1317            TAD     LNKIND          /GET ERROR POINTER
0451  3324            DCA     SAVEIT
0452  1724            TAD I   SAVEIT          /GET PC POINTER
0453  7041            CIA
0454  1325            TAD     SAVE1           /GET LOCATION POINTER
0455  7650            SNA CLA                 /LINK OR AC ERROR?
0456  7340            CLA CLL CMA             /LINK ERROR!!
0457  7402            HLT                     /AC=7777 FOR LINK ERROR
0460  7300            CLA CLL
0461  1321            TAD     SMLIND          /GET SIMULATE POINTER
0462  1303            TAD     TEMPL           /*
0463  3324            DCA     SAVEIT
0464  1724            TAD I   SAVEIT          /GET SIMULATED RESULTS
0465  7402            HLT                     /VALUE IN AC
0466  7300            CLA CLL
0467  1322            TAD     RELIND          /GET REAL POINTER
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0470  1303            TAD     TEMPL           /*
0471  3324            DCA     SAVEIT
0472  1724            TAD I   SAVEIT          /GET REAL RESULTS
0473  7402            HLT                     /VALUE IN AC
0474  7300            CLA CLL
0475  1320            TAD     DATIND          /GET AC DATA1 POINTER
0476  1303            TAD     TEMPL           /*
0477  3324            DCA     SAVEIT
0500  1724            TAD I   SAVEIT          /GET AC DATA1
0501  7402            HLT
0502  5645            JMP I   ERINDL          /EXIT


                      /
0503  0000    TEMPL,  0
0504  0200    L200L,  200
0505  7000    L7000L, 7000
0506  0752    LISTL,  TGENL-1
0507  1000    LGENL,  GENL
0510  0321    LEPASL, EPASL
0511  0300    LSANDL, SANDL
0512  0712    LRETUL, TRETUL
0513  0312    LSWITL, SWITCL
0514  0445    ACINDL, ERINDL
0515  6600    L6600L, 6600
0516  1201    L1201L, 1201
0517  0724    LNKIND, ERROR
0520  0770    DATIND, TDA1L
0521  0772    SMLIND, TSIML
0522  0777    RELIND, TRACL
0523  0715    ERPNT,  TRETUL+3
0524  0000    SAVEIT, 0
0525  0000    SAVE1,  0
      0577    *577
0577  7000    GOTSTL, NOP


                      /
                      /GENERATE TEST INSTRUCTION AND DATA
                      /
      0600    *600
0600  7300    TEST1L, CLA CLL
0601  1354            TAD     TANDL           /GET POINTER TO SIMULATED AND
0602  3000            DCA     TTANDL          /PLACE IN TRANSFER LOCATION
0603  7001            IAC                     /SET AC=1
0604  4756            JMS I   TSWITL          /TEST SR11
0605  5224            JMP     TDAT1L          /SR11=1, DO NOT GENERATE INSTRUCTION
0606  1362            TAD     TLIML           /NO, GET ADDRESS LIMIT
0607  3006            DCA     LIML            /SAVE
0610  1361            TAD     TPAGBL          /GET PAGE EXCLUSION BIT
0611  3007            DCA     PAGL
0612  4753            JMS I   TGENL           /GENERATE INSTRUCTION
0613  3365            DCA     TIFLGL          /SAVE INDIRECT FLA
0614  1001            TAD     INSTL           /GET INSTRUCTION
0615  3363            DCA     TINSTL          /SAVE IT
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0616  1002          TAD     INADDL          /GET INSTRUCTION ADDRESS
0617  3364          DCA     TINADL          /SAVE IT
0620  1003          TAD     DATADL          /GET DATA ADDRESS
0621  3366          DCA     TDATAL          /SAVE IT
0622  1005          TAD     PADDL           /GET INDIRECT TO DATA
0623  3367          DCA     TPADDL          /SAVE IT
0624  7105  TDAT1L, CLL IAC RAL            /SET AC=2
0625  4756          JMS I   TSWITL          /TEST SR10
0626  5234          JMP     TDAT2L          /SR10=1, DO NOT GENERATE DATA1
0627  1370          TAD     TDA1L           /GENERATE RANDOM NUMBER
0630  7104          CLL RAL
0631  7430          SZL
0632  1374          TAD     T3L
0633  3370          DCA     TDA1L
0634  7307  TDAT2L, CLA CLL IAC RTL         /SET AC=4
0635  4756          JMS I   TSWITL          /TEST SR09
0636  5244          JMP     SETTL           /SR09=1, DO NOT GENERATE DATA2
0637  1371          TAD     TDA2L           /GENERATE RANDOM NUMBER
0640  7104          CLL RAL
0641  7430          SZL
0642  1374          TAD     T3L
0643  3371          DCA     TDA2L



                    /
                    /SET UP INSTRUCTION AND DATA AT TEST ADDRESS
                    /ALONG WITH RETURN TO THIS ROUTINE
                    /
0644  7300  SETTL,  CLA CLL
0645  1363          TAD     TINSTL          /GET INSTRUCTION
0646  3764          DCA I   TINADL          /STORE IN TEST LOCATION
0647  1365          TAD     TIFLGL          /GET INDIRECT FLAG
0650  7650          SNA CLA                 /IS INSTRUCTION INDIRECT
0651  5267          JMP     DIRL            /NO, GET DATA
0652  1366          TAD     TDATAL          /INDIRECT, IS ADDRESS
0653  1375          TAD     T7760           /AUTO-INDEX REGISTER
0654  7630          SZL CLA
0655  5262          JMP     .+5             /NO, USE POINTER AS IS
0656  1366          TAD     TDATAL
0657  1376          TAD     T7770
0660  7630          SZL CLA
0661  7040          CMA                     /ADDRESS IS AUTO-INDEX REGISTER
0662  1367          TAD     TPADDL          /GET INDIRECT ADDRESS
0663  3766          DCA I   TDATAL          /STORE IN TEST LOCATION
0664  1370          TAD     TDA1L           /GET DATA
0665  3767          DCA I   TPADDL          /STORE IN TEST LOCATION
0666  5271          JMP     DOTSTL
0667  1370  DIRL,   TAD     TDA1L           /GET DATA
0670  3766          DCA I   TDATAL          /STORE IN TEST LOCATION
                    /
                    /SIMULATE "AND"
                    /

0671  7300  DOTSTL, CLA CLL
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```
0672  1370          TAD     TDA1L           /GET DATA1
0673  7421          MQL                     /SAVE IN MQ
0674  1371          TAD     TDA2L           /GET DATA2
0675  4754          JMS I   TANDL           /DO SIMULATION
0676  3372          DCA     TSIML           /SAVE ANSWER
                    /
                    /GO TO TEST
                    /
0677  1355  DOANDL, TAD     TRETTL          /GET RETURN ADDRESS
0700  3000          DCA     TTANDL          /SAVE
0701  1364          TAD     TINADL          /GET INSTRUCTION ADDRESS
0702  7001          IAC                     /INCREMENT
0703  7450          SNA                     /IS IT 0
0704  5200          JMP     TEST1L          /YES, GENERATE NEW INFORMATION
0705  3352          DCA     TEMP2L          /NO, SAVE
0706  1373          TAD     T5400L          /GET RETURN INSTRUCTION
0707  3752          DCA I   TEMP2L          /PUT IN TEST LOCATION
0710  1371          TAD     TDA2L           /GET DATA2
0711  5764          JMP I   TINADL          /EXECUTE "AND"

                    /
                    /RETURN HERE AFTER EXECUTION
                    /
0712  3377  TRETUL, DCA     TRACL           /SAVE AC
0713  7430          SZL                     /IS LINK=1
0714  4324          JMS     ERROR           /LINK=1, ERROR
0715  1372          TAD     TSIML           /GET SIMULATION RESULT
0716  7041          CIA
0717  1377          TAD     TRACL           /ADD REAL RESULT
0720  7640          SZA CLA                 /ARE THEY THE SAME
0721  4324          JMS     ERROR           /NO, ERROR
0722  4757          JMS I   TEPASL          /END OF PASS
0723  5200          JMP     TEST1L
                    /
                    /ERROR HANDLER
                    /
0724  0000  ERROR,  0
0725  7330          CLA CLL CML RAR         /SET AC=4000
0726  4756          JMS I   TSWITL          /TEST SR00
0727  5350          JMP     TEXITL          /SR00=1, DO NOT HALT ON ERROR
0730  4760          JMS I   ACIND
0731  7200          CLA
0732  1371          TAD     TDA2L           /DISPLAY DATA2 IN AC
0733  7402          HLT
0734  7200          CLA
0735  1001          TAD     INSTL           /DISPLAY INSTRUCTION IN AC
0736  7402          HLT
0737  7200          CLA
0740  1364          TAD     TINADL          /DISPLAY INSTRUCTION ADDRESS IN AC
0741  7402          HLT
0742  7200          CLA
0743  1366          TAD     TDATAL          /DSIPLAY DATA ADDRESS IN AC
0744  7402          HLT
0745  7200          CLA
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0746  1367          TAD     TPADDL          /DSIPLAY INDIRECT IN AC
0747  7402          HLT
0750  7300  TEXITL, CLA CLL
0751  5724  JMP I   ERROR
                    /
                    /
                    /
0752  0000  TEMP2L, 0
0753  0000  TGENL,  0
0754  0000  TANDL,  0
0755  0000  TRETTL, 0
0756  0000  TSWITL, 0
0757  0000  TEPASL, 0
0760  0000  ACIND,  0
0761  0000  TPAGBL, 0
0762  0000  TLIML,  0
0763  0000  TINSTL, 0
0764  0000  TINADL, 0
0765  0000  TIFLGL, 0
0766  0000  TDATAL, 0
0767  0000  TPADDL, 0
0770  0021  TDA1L,  21
0771  0037  TDA2L,  37
0772  0000  TSIML,  0
0773  5400  T5400L, 5400
0774  0003  T3L,    3
0775  7760  T7760,  7760
0776  7770  T7770,  7770
0777  0000  TRACL,  0


                    /
                    /GENERATE INSTRUCTIONS AND ADDRESSES
                    /
      1000  *1000
1000  0000  GENL,   0
                    /
                    /GENERATE "AND" INSTRUCTION
                    /
1001  1367  GANDL,  TAD     R1L
1002  4340          JMS     RANDL           /GENERATE RANDOM NUMBER
1003  3367          DCA     R1L             /SAVE NUMBER
1004  1367          TAD     R1L
1005  7421          MQL
1006  1007          TAD     PAGL
1007  7501          MQA                     /OR RANDOM NUMBER WITH EXCLUSION BIT
1010  7421          MQL
1011  1371          TAD     K0777           /MASK OFF 3MSB
1012  4400          JMS I   TTANDL          /TO GET "0" OP CODE
1013  3001          DCA     INSTL           /SAVE INSTRUCTION
1014  1001          TAD     INSTL           /GET INSTRUCTION
1015  4354          JMS     AND17L          /EXTRACT PAGE ADDRESS OF INSTRUCTION
1016  3020          DCA     TEMP3L          /SAVE PAGE ADDRESS OF INSTRUCTION
                    /
                    /GENERATE ADDRESS FOR INSTRUCTION
```

```
                        /
1017  1372    GANADL, TAD     R2L
1020  4340            JMS     RANDL           /GENERATE RANDOM NUMBER
1021  3372            DCA     R2L             /SAVE NUMBER
1022  4345            JMS     CLIML           /SET UP TO TEST ADDRESS LIMITS
1023  1372            TAD     R2L
1024  7620            SNL CLA                 /IS ADDRESS WITHIN LIMITS
1025  5217            JMP     GANADL          /NO, GENERATE NEW ADDRESS
1026  1372            TAD     R2L
1027  1373            TAD     P0L
1030  7620            SNL CLA                 /IS ADDRESS ON PAGE 0
1031  5246            JMP     PAGADL          /NO
1032  1020            TAD     TEMP3L          /GET PAGE ADDRESS OF INSTRUCTION
1033  7041            CIA
1034  1372            TAD     R2L             /SUBTRACT ADDRESS
1035  4361    PAGAL,  JMS     ABSL
1036  7700            SMA CLA                 /IS DIFFERENCE >2
1037  5217            JMP     GANADL          /NO
1040  1020    PAL,    TAD     TEMP3L          /GET PAGE ADDRESS OF INSTRUCTION
1041  7650            SNA CLA                 /DOES INSTRUCTION REFERENCE LOCATION 0
1042  5201            JMP     GANDL           /YES, GENERATE NEW INSTRUCTION
1043  1372            TAD     R2L             /YES, USE ADDRESS
1044  3002            DCA     INADDL
1045  5261            JMP     DAADL           /GENERATE ADDRESS FOR DATA
1046  1001    PAGADL, TAD     INSTL           /GET INSTRUCTION
1047  7421            MQL
1050  1376            TAD     K200L
1051  4400            JMS I   TTANDL          /MASK CURRENT PAGE BIT
1052  7650            SNA CLA                 /IS PAGE BIT SET
1053  5240            JMP     PAL             /NO, USE ADDRESS AS IS
1054  1372            TAD     R2L
1055  4354            JMS     AND17L
1056  7041            CIA
1057  1020            TAD     TEMP3L
1060  5235            JMP     PAGAL


                        /
                        /GENERATE ADDRESS FOR DATA
                        /
1061  1001    DAADL,  TAD     INSTL           /GET INSTRUCTION
1062  7421            MQL
1063  1376            TAD     K200L
1064  4400            JMS I   TTANDL          /DOES INSTRUCTION REFERENCE PAGE 0
1065  7650            SNA CLA
1066  5306            JMP     P0AL            /YES
1067  1002            TAD     INADDL
1070  7421            MQL
1071  1373            TAD     P0L
1072  4400            JMS I   TTANDL          /EXTRACT PAGE OF ADDRESS
1073  7421            MQL
1074  1020            TAD     TEMP3L
1075  7501            MQA                     /"OR" TOGETHER TO GET
```

```
1076  3003          DCA     DATADL          /DATA ADDRESS
1077  1001  INDIRL, TAD     INSTL
1100  7421          MQL
1101  1375          TAD     K400L
1102  4400          JMS I   TTANDL
1103  7640          SZA CLA                 /IS INSTRUCTION INDIRECT
1104  5311          JMP     PADL            /YES, INSTRUCTION IS INDIRECT
1105  5600          JMP I   GENL            /EXIT
1106  1020  POAL,   TAD     TEMP3L
1107  3003          DCA     DATADL
1110  5277          JMP     INDIRL
                    /
                    /GENERATE INDIRECT ADDRESS FOR DATA
                    /
1111  1377  PADL,   TAD     R3L             /GENERATE RANDOM NUMBER
1112  4340          JMS     RANDL
1113  3377          DCA     R3L
1114  4345          JMS     CLIML
1115  1377          TAD     R3L
1116  7620          SNL CLA                 /IS ADDRESS WITHIN LIMITS
1117  5311          JMP     PADL            /NO, TRY AGAIN
1120  1002          TAD     INADDL          /GET INSTRUCTION ADDRESS
1121  7041          CIA
1122  1377          TAD     R3L             /SUBSTRACT INDIRECT
1123  4361          JMS     ABSL            /GENERATE -ABSOLUTE VALUE
1124  7700          SMA CLA                 /DO INSTRUCTION AND ADDRESS INTERFERE
1125  5311          JMP     PADL            /YES
1126  1003          TAD     DATADL
1127  7041          CIA
1130  1377          TAD     R3L
1131  4361          JMS     ABSL
1132  7700          SMA CLA
1133  5311          JMP     PADL
1134  1377          TAD     R3L             /NO
1135  3005          DCA     PADDL
1136  7040          CMA
1137  5600          JMP I   GENL            /EXIT


1140  0000  RANDL,  0
1141  7104          CLL RAL
1142  7430          SZL
1143  1370          TAD     K3L
1144  5740          JMP I   RANDL
                    /
                    /
                    /
1145  0000  CLIML,  0
1146  1007          TAD     PAGL
1147  7100          CLL
1150  7650  SNA CLA
1151  7020          CML
1152  1006          TAD     LIML
1153  5745          JMP I   CLIML
                    /
```

```
                        /
                        /
1154  0000  AND17L,     0
1155  7421              MQL
1156  1374              TAD     K0177L
1157  4400              JMS I   TTANDL
1160  5754              JMP I   AND17L
                        /
                        /
                        /
1161  0000  ABSL,       0
1162  7500              SMA
1163  7041              CIA
1164  7001              IAC
1165  7001              IAC
1166  5761              JMP I   ABSL
                        /
                        /
                        /
1167  0001  R1L,        1
1170  0003  K3L,        3
1171  0777  K0777,      777
1172  0005  R2L,        5
1173  7600  P0L,        7600
1174  0177  K0177L,     177
1175  0400  K400L,      400
1176  0200  K200L,      200
1177  0015  R3L,        15

                        $
```

```
0000  11111111  10000000  10000000  00000000  00000000  00000000  00000000  00000000
0100  00000000  00000000  00000000  00000000  00000000  00000000  00000000  00000000

0200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
0300  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111001

0400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
0500  11111111  11111111  11111100  00000000  00000000  00000000  00000000  00000001

0600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
0700  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

1000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1100  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

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
6700


7000
7100

7200
7300

7400
7500

7600
7700
```

```
A       0370        LSANDL  0511        TGENL   0753
ABSL    1161        LSWITL  0513        TIFLGL  0765
ACIND   0760        MQA     7501        TINADL  0764
ACINDL  0514        MQL     7421        TINSTL  0763
AND17L  1154        P0AL    1106        TLIML   0762
C200L   0365        P0L     1173        TPADDL  0767
C212L   0367        PADDL   0005        TPAGBL  0761
C215L   0366        PADL    1111        TRACL   0777
C6400L  0371        PAGADL  1046        TRETTL  0755
C6600L  0372        PAGAL   1035        TRETUL  0712
C7000L  0373        PAGL    0007        TSIML   0772
C7600L  0374        PAL     1040        TSWITL  0756
CAF     6007        PNTR1L  0202        TTANDL  0000
CLIML   1145        PNTR2L  0203        TYPEL   0337
CNTR1L  0266        PNTRL   0010
DAADL   1061        R1L     1167
DATADL  0003        R2L     1172
DATIND  0520        R3L     1177
DIRL    0667        RANDL   1140
DOANDL  0677        REHL    0244
DOTSTL  0671        RELIND  0522
EPASL   0321        RELL    0255
ERINDL  0445        RELOL   0225
ERPNT   0523        RESBNL  0215
ERROR   0724        RRELL   0355
GANADL  1017        SANDL   0300
GANDL   1001        SAVBNL  0205
GENL    1000        SAVE1   0525
GOSETL  0377        SAVEIT  0524
GOTSTL  0577        SETAL   0400
HALTL   0345        SETLKL  0274
IFLAGL  0004        SETTL   0644
INADDL  0002        SMLIND  0521
INDIRL  1077        STARTL  0200
INSTL   0001        SWITCL  0312
K0177L  1174        T3L     0774
K0777   1171        T5400L  0773
K200L   1176        T7760   0775
K3L     1170        T7770   0776
K400L   1175        TANDL   0754
L1201L  0516        TDA1L   0770
L200L   0504        TDA2L   0771
L6600L  0515        TDAT1L  0624
L7000L  0505        TDAT2L  0634
LEPASL  0510        TDATAL  0766
LGENL   0507        TEMP1L  0204
LHICOL  0441        TEMP2L  0752
LIML    0006        TEMP3L  0020
LISTL   0506        TEMPL   0503
LNKIND  0517        TEPASL  0757
LOHIL   0266        TEST1L  0600
LRETUL  0512        TEXITL  0750
```

ERRORS DETECTED: 0

LINKS GENERATED: 0

RUN-TIME: 5 SECONDS

2K CORE USED