

IDENTIFICATION

PRODUCT CODE:	MAINDEC-8E-D0DB-D
PRODUCT NAME:	RANDOM AND TEST
DATE CREATED:	JUNE 7, 1971
MAINTAINER:	DIAGNOSTIC GROUP
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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,

2.3 PRELIMINARY PROGRAMS

MAINDEC-8E-00AA, 00BA, 00CA

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 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 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

IF THE LINK IS SET AFTER COMPLETION OF THE AND INSTRUCTION, OR IF THE RESULTS OF THE AND INSTRUCTION ARE INCORRECT, THE PROGRAM WILL HALT AT 731(7331) WITH DATA1 IN THE AC.

DEPRESS CONTINUE TO DISPLAY DATA2 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 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 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 "AND'ED". 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

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/V 82 07552

/

/

/TEMPORARY TRANSFER LOCATIONS ON PAGE 0

/

0000	0000	*0		
0001	5001	TTANDL, 0		
0002	0002	INADDL, 2		/STORAGE FOR AND INSTRUCTION
0003	0003	DATADL, 3		/STORAGE FOR AND INSTRUCTION ADDRESS
0004	0003	IFLAGL, 3		/STORAGE FOR DATA ADDRESS
0005	0000	PADDL, 0		/STORAGE FOR INSTRUCTION INDIRECT FLAG
0006	0000	LIML, 0		/STORAGE FOR DATA INDIRECT ADDRESS
0007	0000	PAGL, 0		

0010	0000	*10		
0010	0000	PNTRL, 0		

6007	CAF=6007
7501	HQA=7501
7421	MQL=7421
0266	CNTRL=LOHIL

0020	0000	*20		
0020	0000	TEMP3L, 0		

/

/INITIALIZATION AND CONTROL ROUTINES

/

0200	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

```

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
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 REHL, JMS SAVBNL /TRANSFER RIM AND BIN LOADERS
0256 1373 TAD C7000L /SET AC=-1000, NUMBER OF
0257 3266 DCA CNTR1L /LOCATIONS TO BE TRANSFERRED
0260 1372 TAD C6600L /FIRST "FROM"
0261 3202 DCA PNTR1L /ADDRESS=6600
0262 1365 TAD C200L /FIRST "TO"
0263 3203 DCA PNTR2L /ADDRESS=200

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0264 4225 JMS RELOL /PERFORM TRANSFER
0265 5/65 JMP I C200L /GO TO PROGRAM START

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/
/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
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 LOWIL /DETERMINE IF PROGRAM IS HIGH OR LOW
0277 5377 JMP GOSETL /GO TO TEST WITH ADDRESS MODIFIER IN AC

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```

/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 LAG /GET SWITCHES
0315 4300 JMS SANDL /AND SWITCHES WITH TEST BIT
0316 7650 SNA CLA /IS SWITCH 0
0317 2312 ISE 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

```

```

0336 5345      JMP      HALTL          /TEST FOR HALT, RELOCATION
/
/OUTPUT CHARACTER
/
0337 0000      TYPEL. 0
0340 6046      TLS
0341 6041      TSF
0342 5341      JMP      -1
0343 7200      CLA
0344 5737      JMP I   TYPEL

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```

/
/CHECK FOR HALT
/
0345 7332      HALTL.  CLA CLL CML RTR      /SET AC=2000
0346 4312      JMS      SWITCL          /TEST SR01
0347 7410      SKP
0350 5355      JMP      RRELL          /SR01=1, HALT
0351 4266      JMS      LOHIL          /CHECK FOR RELOCATION
0352 7650      SNA CLA          /DETERMINE IF PROGRAM IS HIGH OR LOW
0353 4215      JMS      RESBNL          /AC=0, PROGRAM LOW
0354 7402      HLT
/
/PROGRAM LOW, RESTORE LOADERS

```

```

/
/CHECK FOR RELOCATION
/
0355 7332      RRELL.  CLA CLL CML RTR
0356 7010      RAR
0357 4312      JMS      SWITCL          /SET AC=1000
0360 5721      JMP I   EPASL          /TEST SR02
0361 4266      JMS      LOHIL          /SR02=1, DO NOT RELOCATE PROGRAM
0362 7600      SNA CLA          /DETERMINE IF PROGRAM IS HIGH OR LOW
0363 5244      JMP      REHL          /AC=0, PROGRAM LOW
0364 5255      JMP      RELL          /PROGRAM LOW, RELOCATE TO HIGH CORE
0365 0200      C200L.  200          /PROGRAM HIGH, RELOCATE TO LOW CORE
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
/

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0377 0377      *377
0377 7000      GOSETL. NOP

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```

/
/SET UP ADDRESS POINTERS AND CONSTANTS AND TRANSFER TO NEXT PAGE
/
0400 0400      *400
0400 3237      SETAL.  DCA      TEMPL          /SAVE ADDRESS MODIFIER
0401 1242      TAD      LISTL          /GET POINTER FOR TRANSFER
0402 1237      TAD      TEMPL          /MODIFY FOR LOW OR HIGH CORE

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0403	3010	DCA	PNTRL	/SET UP AUTO-INDEX REGISTER
0404	1243	TAD	LGENL	/GET POINTER TO INSTRUCTION GENERATION
0405	1237	TAD	TEMPL	/MODIFY FOR LOW OR HIGH CORE
0406	3410	DCA I	PNTRL	/TRANSFER TO NEXT PAGE
0407	1245	TAD	LSANDL	/GET POINTER TO AND SIMULATOR
0410	1237	TAD	TEMPL	/MODIFY FOR LOW OR HIGH CORE
0411	3410	DCA I	PNTRL	/TRANSFER TO NEXT PAGE
0412	1246	TAD	LRETUL	/GET POINTER FOR EXECUTION RETURN
0413	1237	TAD	TEMPL	/MODIFY FOR LOW OR HIGH CORE
0414	3410	DCA I	PNTRL	/TRANSFER TO NEXT PAGE
0415	1247	TAD	LSWITL	/GET POINTER TO SWITCH SENSING
0416	1237	TAD	TEMPL	/MODIFY FOR LOW OR HIGH CORE
0417	3410	DCA I	PNTRL	/TRANSFER TO NEXT PAGE
0420	1244	TAD	LEPASL	/GET POINTER TO END OF PASS
0421	1237	TAD	TEMPL	/MODIFY FOR LOW OR HIGH CORE
0422	3410	DCA I	PNTRL	/TRANSFER TO NEXT PAGE
0423	1237	TAD	TEMPL	/GET ADDRESS MODIFIER
0424	7640	SZA	CLA	/IS TEST IN LOW CORE
0425	5233	JMP	LHICOL	/NO, SET UP FOR HIGH CORE
0426	1240	TAD	L200L	/SET PAGE 0 EXCLUSION BIT
0427	3410	DCA I	PNTRL	/TRANSFER TO NEXT PAGE
0430	1250	TAD	L6600L	/GET LOW CORE ADDRESS LIMIT
0431	3410	DCA I	PNTRL	/TRANSFER TO NEXT PAGE
0432	5377	JMP	GOTSTL	/GO TO TEST
0433	3410	LHICOL, DCA I	PNTRL	/CLERA PAGE 0 EXCLUSION BIT
0434	1251	TAD	L1201L	/GET HIGH CORE ADDRESS LIMIT
0435	3410	DCA I	PNTRL	/TRANSFER TO NEXT PAGE
0436	5377	JMP	GOTSTL	/GO TO TEST

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0437	0000	TEMPL,	0
0440	0200	L200L,	200
0441	7000	L7000L,	7000
0442	0753	LISTL,	TGENL-1
0443	1000	LGENL,	GENL
0444	0521	LEPASL,	EPASL
0445	0300	LSANDL,	SANDL
0446	0712	LRETUL,	TRETUL
0447	0312	LSWITL,	SWITCL
0450	6600	L6600L,	6600
0451	1201	L1201L,	1201
	0577	*577	
0577	7000	GOTSTL,	NOP

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/
/GENERATE TEST INSTRUCTION AND DATA
/

0600	0600	*600	
0600	7300	TEST1L,	CLA CLL
0601	1355	TAD	TANDL
0602	3000	DCA	TTANDL
0603	7001	IAC	
0604	4757	JMS I	TSWITL

/GET POINTER TO SIMULATED AND
/PLACE IN TRANSFER LOCATION
/SET
/TEST 21

0605	5224	JMP	TDAT1L	/SR	DO NOT GENERATE INSTRUCTION
0606	1362	TAD	TLIML	/NO	ADDRESS LIMIT
0607	3026	DCA	LIML	/SAVE	
0610	1361	TAD	TPAGBL	/GET	PAGE EXCLUSION BIT
0611	3027	DCA	PAGL		
0612	4754	JMS I	TGENL	/GENERATE	INSTRUCTION
0613	3365	DCA	TIFLGL	/SAVE	INDIRECT FLA
0614	1001	TAD	INSTL	/GET	INSTRUCTION
0615	3363	DCA	TINSTL	/SAVE	IT
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	4757	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	4757	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		

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/
 /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

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0670 3766          DCA I  TDATA1      /STORE IN TEST LOCATION
/
/SIMULATE "AND"
/
0671 7300          DOTSTL, CLA CLL
0672 1370          TAD      TDA1L      /GET DATA1
0673 7421          MQL
0674 1371          TAD      TDA2L      /GET DATA2
0675 4755          JMS I  TANDL      /DO SIMULATION
0676 3372          DCA      TSIML      /SAVE ANSWER
/
/GO TO TEST
/
0677 1356          DOANOL, TAD      TRETTL   /GET RETURN ADDRESS
0700 3000          DCA      TTANDL   /SAVE
0701 1364          TAD      TINADL   /GET INSTRUCTION ADDRESS
0702 7001          IAC
0703 7450          SNA
0704 5200          JMP      TEST1L   /YES, GENERATE NEW INFORMATION
0705 3353          DCA      TEMP2L   /NO, SAVE
0706 1373          TAD      T5400L   /GET RETURN INSTRUCTION
0707 3753          DCA I  TEMP2L   /PUT IN TEST LOCATION
0710 1371          TAD      TDA2L      /GET DATA2
0711 5764          JMP I  TINADL      /EXECUTE "AND"

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/
/RETURN HERE AFTER EXECUTION
/
0712 3377          TRETUL, DCA      TRACL      /SAVE AC
0713 7430          SEL
0714 4324          JMS      ERROR     /IS LINK=1
0715 1372          TAD      TSIML      /LINK=1, ERROR
0716 7041          CIA
0717 1377          TAD      TRACL      /GET SIMULATION RESULT
0720 7640          SEA CLA
0721 4324          JMS      ERROR     /ADD REAL RESULT
0722 4760          JMS I  TEPASL   /ARE THEY THE SAME
0723 5200          JMP      TEST1L   /NO, ERROR
/
/END OF PASS
/
/ERROR HANDLER
/
0724 0000          ERROR, 0
0725 7330          CLA CLL CML RAR   /SET AC=4000
0726 4757          JMS I  TSWITL   /TEST SR00
0727 5351          JMP      TEXITL   /SR00=1, DO NOT HALT ON ERROR
0730 1370          TAD      TDA1L      /DISPLAY DATA1 IN AC
0731 7402          HLT
0732 7200          CLA
0733 1371          TAD      TDA2L      /DISPLAY DATA2 IN AC
0734 7402          HLT
0735 7200          CLA
0736 1001          TAD      INSTL      /DISPLAY INSTRUCTION IN AC
0737 7402          HLT
740 7200          CLA
741 1364          TAD      TINADL      /DISPL ) INSTRUCTION ADDRESS IN AC

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0742 7402 HLT
0743 7200 CLA
0744 1366 TAD TDATAL /DSI, LAY DATA ADDRESS IN AC
0745 7402 HLT
0746 7200 CLA
0747 1367 TAD TPADDL /DSIPLAY INDIRECT IN AC
0750 7402 HLT
0751 7300 TEXTL, CLA CLL
0752 5724 JMP I ERROR
/
/
/

```

```

0753 0000 TEMP2L, 0
0754 0000 TGENL, 0
0755 0000 TANDL, 0
0756 0000 TRETTL, 0
0757 0000 TSWITL, 0
0760 0000 TEPASL, 0
0761 0000 TPAGBL, 0
0762 0000 TLIML, 0
0763 0000 TINSTL, 0
0764 0000 TINADL, 0
0765 0000 TIFLGL, 0

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```

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

```

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```

/
/GENERATE INSTRUCTIONS AND ADDRESSES
/

```

```

1000 1000 *1000
1000 0000 GENL, 0

```

```

/GENERATE "AND" INSTRUCTION
/

```

```

1001 1367 GANDL, TAD R1L
1002 4340 JMS RANL /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

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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

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1054	1372	TAD	R2L
1055	4354	JMS	AND17L
1056	7041	CIA	
1057	1020	TAD	TEMP3L
1060	5235	JMP	PAGAL

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/

/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		
071	1373	TAD	P0L	

```

1072 8900 JMS I TTANDL /EXIT 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 P0AL, 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

```

```

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1137 5600 JMP I GENL /EXIT

```

```

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```

```

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	

S

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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	11000000	00000000	00000000
0500	00000000	00000000	00000000	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

/ PAL10 V141 17-JUN-71 7:23 PAGE 13-2

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

/	PAL10	V141	17-JUN-71	7:23	PAGE 13-3	
A	0370		PADDL	0005	TSIML	0772
ABSL	1161		PADL	1111	TSWITL	0757
AND17L	1154		PAGADL	1046	TTANDL	0000
C200L	0365		PAGAL	1035	TYPEL	0337
C212L	0367		PAGL	0007		
C215L	0366		PAL	1040		
C6400L	0371		PNTR1L	0202		
C6600L	0372		PNTR2L	0203		
C7000L	0373		PNTRL	0010		
C7600L	0374		R1L	1167		
CAF	6007		R2L	1172		
CLIML	1145		R3L	1177		
CNTR1L	0266		RANDL	1140		
DAADL	1061		REHL	0244		
DATADL	0003		RELL	0255		
DIRL	0667		RELOL	0225		
DOANDL	0677		RESBNL	0215		
DOTSTL	0671		RRELL	0355		
EPASL	0521		SANDL	0300		
ERROR	0724		SAVBNL	0205		
GANADL	1017		SETAL	0400		
GANDL	1001		SETLKL	0274		
GENL	1000		SETTL	0644		
GOSETL	0377		STARTL	0200		
GOTSTL	0577		SWITCL	0312		
HALTL	0345		T3L	0774		
IFLAGL	0004		T5400L	0773		
INADDL	0002		T7760	0775		
INDIRL	1077		T7770	0776		
INSTL	0001		TANDL	0755		
)77L	1174		TDA1L	0770		
77	1171		TDA2L	0771		

K7 1176
K8 1170
K400L 1175
L1201L 0451
L200L 0440
L6600L 0450
L7000L 0441
LEPASL 0444
LGENL 0443
LHICOL 0433
LIML 0006
LISTL 0442
LOHIL 0266
LRETUL 0446
LSANDL 0445
LSWITL 0447
MQA 7501
MQL 7421
P0AL 1106
P0L 1173

TDAT1L 0624
TDAT2L 0634
TDATAL 0766
TEMP1L 0204
TEMP2L 0753
TEMP3L 0020
TEMPL 0437
TEPASL 0760
TEST1L 0600
TEXT1L 0751
TGENL 0754
TIFLGL 0765
TINADL 0764
TINSTL 0763
TLIML 0762
TPADDL 0767
TPAGBL 0761
TRACL 0777
TRETTL 0756
TRETUL 0712

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ERRORS DETECTED: 0

LINKS GENERATED: 0

RUN-TIME: 3 SECONDS

2K CORE USED