

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
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/V 82 07552
/
/
/TEMPORARY STORAGE LOCATIONS
/

0000 0000 *0
0000 0000 RETURN, 0
0001 5001 INSTL, JMP
0002 0002 INADDL, 2
0003 0003 DATADL, 3
0004 0000 PADDL, 0
0005 0000 IFLAGL, 0
7501 MQA=7501
7421 MQL=7421
6007 CAF=6007

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

/
/GENERATE TEST INSTRUCTION AND DATA
/

6600 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 TDATA /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

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6626 7640      SZA CLA      /IS SR10=1
6627 5234      JMP          TDATA2L  /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 7624      TDATA2L, 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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/ PAL10 V141 17-JUN-71 7:23 PAGE 3

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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          TDATA1  /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          TDATA1
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       TDATA1 /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       TDATA1
6701 5272      JMP          .-7
6702 7040      DIRL, CMA
6703 0360      AND          TDA1L /GET DATA
6704 3756      DCA I       TDATA1 /STORE IN TEST LOCATION
/
/SIMULATE "TAD"
/
7340      DOTSTL, CLA CLL CMA

```

6706	0360	AND	TDA1L	/GET TA1
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

/ PAL10 V141 17-JUN-71 7:23 PAGE 4

/
/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	

/ PAL10 V141 17-JUN-71 7:23 PAGE 5

/
/
/

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	T5400L,	5400
6767	7760	T7760,	7760
6770	7770	T7770,	7770
6771	0001	SR11,	1
6772	0002	SR10,	2
6773	0004	SR09,	4
6774	7313	TCOMAD,	COMAD
6775	0010	K10,	10
6776	0000	CNTR1,	0

/ PAL10 V141 17-JUN-71 7:23 PAGE 6

/
/GENERATE INSTRUCTIONS AND ADDRESSES
/

7000 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 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	

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

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	

/ PAL10 V141 17-JUN-71 7:23 PAGE 8

/

/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	0022		AND	INADDL	/GET INSTRUCTION ADDRESS
7125	4775'		JMS	ABSL1	/GENERATE DIFFERENCE BETWEEN ADDRESSES
7126	7700		SMA CLA		/DO INSTRUCTION AND ADDRESS INTERFERE
7127	5313		JMP	PADL	/YES
7130	7040		CMA		/NO, TEST DATA ADDRESS AS ABOVE
7131	0023		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		

/ PAL10 V141 17-JUN-71 7:23 PAGE 9

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		

/ PAL10 V141 17-JUN-71 7:23 PAGE 10

/

/

/SIMULATED ADDITION

/

176 7474
7177 7303
7200 7200
7200 0000
7201 3344
7202 7501
7203 3343

PAGE
RSIMAD, 0
DCA ARG2 /SAVE ARGUMENTS
MQA
DCA ARG1
/
/
/SIMULATE ADDITION BY SIMULATED GENERATEION OF SUM
/AND CARRY BITS
/
/
/FORM OR OF ARG1 WITH ARG2
/

7204 7340
7205 0343
7206 7421
7207 7040
7210 0344
7211 7501
7212 3345

SIMAD, CLA CLL CMA
AND ARG1 /LOAD AC WITH ARG1
MQL /PLACE IN MQ
CMA
AND ARG2 /LOAD AC WITH ARG2
MQA /FORM ARG1 OR ARG2
DCA A10RA2 /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
7214 7040
7215 0344
7216 7421
7217 7040
7220 0344
7221 7040
7222 0343
7223 7501
7224 3346
7225 3347

/

MQA /GET ARG1 FROM MQ
CMA /FORM NOTARG1
AND ARG2 /AND WITH ARG2 TO GET ARG2 AND NOTARG1
MQL /SAVE IN MQ
CMA
AND ARG2 /LOAD AC WITH ARG2
CMA /FORM NOTARG2
AND ARG1 /AND WITH ARG1 TO GET ARG1 AND NOTARG2
MQA /OR WITH ARG2 AND NOTARG1
DCA SIMAC /TO GET ARG1 XOR ARG2
DCA SIMLNK

/ PAL10 V141 17-JUN-71 7:23 PAGE 11

/

/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
7227 0343
7230 0344
7231 7450
7232 5274

CMA
AND ARG1 /LOAD AC WITH ARG1
AND ARG2 /AND WITH ARG2
SNA /ARE THERE ANY CARRIES
JMP ENDSIM /NO, TERMINATE SIMULATION
/

/GENERATE CARRIES
/

7233 7421
7234 7521
7235 0345
7236 7450

NXTCAR, MQL /SAVE FIRST CARRIES
MQA MQL /GET CARRIES FROM MQ
AND A10RA2 /AND WITH A10RA2 TO SEE IF MORE CARRIES ARE GENERATED
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 A10RA2 /AND WITH A10RA2
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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/ PAL10 V141 17-JUN-71 7:23 PAGE 12

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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 A10RA2 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 NOTA10RA2
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 2777 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 5700 JMP I LIMIT

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/
/COMPARE SIMULATED AND REAL RESULT
/
7313 0020 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 A10RA2, 0
7346 0000 SIMAC, 0
7347 0000 SIMLNK, 0
7350 4000 K4000, 4000
7351 0000 CARRY, 0
7352 7400 ERRORS, ERROR

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```

/
/ERROR HANDLER
/

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7373 6763
7374 6764
7375 6765
7376 6762
7377 7164
7400 7400 PAGE
7401 0000 ERROR, 0
7402 7604 LAS
7403 0267 AND SR00 /TEST SR00
7404 7640 SZA CLA /IS SR00=1
7405 5600 JMP I ERROR /YES, DO NOT HALT
7405 7240 CLA CMA

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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	

/ PAL10 V141 17-JUN-71 7:23 PAGE 15

/
/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
7465 7200
7466 5661

JMP .-1
CLA
JMP I TYPE

7467 4000
7470 0400
7471 0215
7472 0212
7473 0324

SR00, 4000
SR03, 0400
C215, 215
C212, 212
C324, 324

/ TEST FOR PROPER DIFFERENCE

7474 0000
7475 7041
7476 7421
7477 7040
7500 0770
7501 4771
7502 7500
7503 7041
7504 7001
7505 7001
7506 5674

ABSL, 0
CIA
MQL
CMA
AND TEMP3L
JMS RSIMAD
SMA
CIA
IAC
IAC
JMP I ABSL

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

7507 0000
7510 7041
7511 7421
7512 7040
7513 0767
7514 4771
7515 7500
7516 7041
7517 7001
7520 7001
7521 5707

ABSL1, 0
CIA
MQL
CMA
AND R3L
JMS RSIMAD
SMA
CIA
IAC
IAC
JMP I ABSL1
S

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

/ PAL10 V141 17-JUN-71 7:23 PAGE 16-1

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

/ 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	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
MOA	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		

/ PAL10 V141 17-JUN-71 7:23 PAGE 16-4

ERRORS DETECTED: 0

LINKS GENERATED: 23

RUN-TIME: 5 SECONDS

2K CORE USED