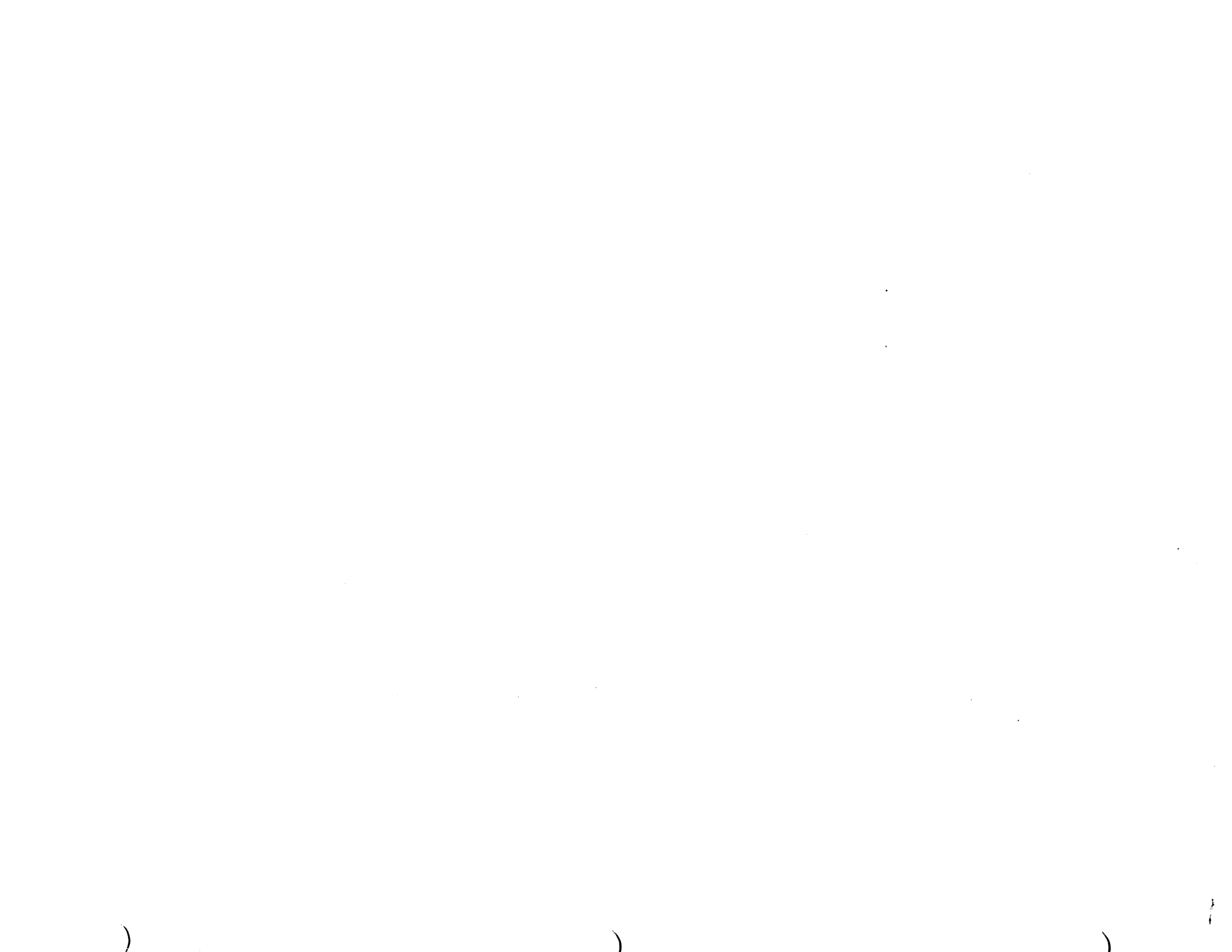


IDENTIFICATION

PRODUCT CODE: MAINDEC-8E-D8CC-D
PRODUCT NAME: 8E ADDER TESTS
DATE CREATED: SEPT. 1, 1971
MAINTAINER: DIAGNOSTIC GROUP
AUTHOR: M. DAVIS & J. YROBEL

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1. ABSTRACT

THIS PROGRAM TESTS THE ADDER CIRCUITS OF THE PDP-8E. THE PROGRAM IS COMPOSED OF FIVE PARTS,

A SIMULATOR FOR THE TAD INSTRUCTION WHICH TESTS ALL COMBINATIONS OF TWO ARGUMENT ADDITIONS,

A SIMULATOR FOR ROTATE INSTRUCTIONS THAT TESTS ROTATION OF ALL POSSIBLE ARGUMENTS WITH RAL, RAR, RTL, RTR AND BSW,

A CARRY GENERATION TEST

A SERIES OF RANDOM NUMBER TESTS

A FIELD RELOCATION ADDER TEST

2. REQUIREMENTS

2.1 EQUIPMENT

PDP-8E EQUIPPED WITH AT LEAST 4K OF MEMORY AND A TELETYPE

2.2 STORAGE

THE PROGRAM IS STORED IN LOCATIONS 0000-6000 AND UTILIZES LOCATIONS 7775-7777 AS A TEST AREA;

2.3 PRELIMINARY PROGRAMS

MAINDEC-8E-D0AA, Q0BA

RUN ALL EXTENDED MEMORY TESTS PRIOR TO RUNNING RELOCATION ADDER TEST.

3. LOADING PROCEDURE

THE STANDARD PROCEDURE FOR LOADING BINARY TAPES IS TO BE USED.

4. STARTING PROCEDURE

4.1 CONTROL SWITCH SETTINGS

SR00=1 SUPPRESS HALT ON ERROR
SR01=1 SUPPRESS ERROR TYPEOUT
SR02=1 LOOP ON ERROR
SR03=1 FAST TEST
SR04=0 LOOP IN CURRENT MEMORY BANK
SR04=1 RELOCATE TO NEXT EXISTING BANK
SR06-08 AMOUNT OF EXTENDED BANKS OF MEMORY
SR09=1 HALT AT END OF TEST
SR10=1 SUPPRESS END OF TEST TYPEOUT
SR11=1 LOOP ON PRESENT TEST

4.2 STARTING ADDRESSES

NORMAL STARTING ADDRESS=0200
RESTORE LOADERS=7600

4,3 OPERATOR ACTION

4.3.1 SET SR=0200

4,3,2 PRESS ADDR LOAD SWITCH

4,3,3 SET SR=0000

4,3,4 SET SWITCH REGISTER TO DESIRED FUNCTIONS SEE 4,1

4,3,5 PRESS CLEAR AND CONT SWITCHES

5, OPERATING PROCEDURE

5.1 FAST TEST

THE ADDITION SIMULATOR NORMALLY STARTS WITH ARG1 AND ARG2 0000, TO SPEED UP THE TEST, THE VALUE OF ARG2 MAY BE SET AT SOME OTHER VALUE INITIALLY, TO DO THIS, DEPOSIT THE DESIRED VALUE IN LOCATION 170, AND PROCEED AS IN 4,, BUT WITH SR=0400 INSTEAD OF 0000 IN 4,3,3

5,2 TO RESTORE AND START BINARY LOADER, STOP PROGRAM, LOAD ADDRESS 7600 AND START COMPUTER,

5,3 RELOCATION ADDER TEST

IF SR04=1 THE ADDER TEST WILL RELOCATE TO THE NEXT SEQUENTIAL EXISTING MEMORY BANK AT THE COMPLETION OF EVERY PASS, THE EXACT AMOUNT OF EXISTING EXTENDED MEMORY BANKS MUST BE IN SR06=00 TO RUN THIS PORTION OF THE ADDER TEST, PRIOR TO EACH RELOCATION THE PROGRAM WILL COMPARE THE BANKS FOUND UNDER TEST TO THE BANK AMOUNT IN SR06=00 AND START RELOCATION, THE FOLLOWING MESSAGE WILL BE TYPED ON TELETYPE,

***** X EXTENDED BANKS OF MEMORY TO BANK X *****

5,4 OPTIONS

SEE 4,1

6, ERRORS

6,1 ERROR MESSAGES

6,1,1 SIMULATED ADDITION TEST

IF A FAILURE OCCURS DURING THE SIMULATED ADDITION TEST, THE PROGRAM WILL TYPE THE FOLLOWING MESSAGE AND THEN HALT:

SIMULATED ADD TEST FAILED

ARG1 ARG2 SIMULATED ARG1+ARG2 ARG2+ARG1
XXXXXXXXXXXXX XXXXXXXXXXXXX X XXXXXXXXXXXXX X XXXXXXXXXXXXX X XXXXXXXXXXXXX

ARG1 AND ARG2 ARE THE TWO NUMBERS THAT WERE ADDED, SIMULATED IS THE ANSWER PRODUCED BY THE ADDITION SIMULATOR

(K AND AC)
(1+ARG2 IS THE RESULT OF ADDING ARG2 TO ARG1)

(ARG1 IS IN AC INITIALLY)
ARG2+ARG1 IS THE RESULT OF ADDING ARG1 TO ARG2
(ARG2 IS IN AC INITIALLY)

NOTE: EITHER THE SIMULATION OR THE ACTUAL ADDITIONS MAY
HAVE FAILED,

6.1.2 SIMULATED ROTATE TEST

IF A FAILURE OCCURS DURING THE SIMULATED ROTATE TEST, THE
PROGRAM WILL TYPE THE FOLLOWING MESSAGE AND THEN HALT:

SIMULATED AAA TEST FAILED
ORIGINAL SIMULATED ACTUAL
XXXXXXXXXXXXX X XXXXXXXXXXXXXXXX X XXXXXXXXXXXXXXXX

ORIGINAL IS THE LINK AND ACCUMULATOR TO BE ROTATED
SIMULATED IS THE SIMULATED RESULT OF ROTATION
ACTUAL IS THE REAL RESULT OF ROTATION
AAA IS THE INSTRUCTION BEING TESTED, I.E. RAL,RAR,RTL,RTR,BSW

6.1.3 FALSE CARRY TEST

IF A FAILURE OCCURS DURING THE FALSE CARRY TEST, THE PROGRAM
WILL TYPE THE FOLLOWING MESSAGE AND THEN HALT:

DATA ERROR
AAAA X XXXXXXXXXXXXXXXX

AAAA IS THE STARTING ADDRESS OF THE TEST THAT FAILED
X XXXXXXXXXXXXXXXX ARE THE CONTENTS OF THE LINK AND AC

NOTE: EACH FALSE CARRY TEST EXPECTS LINK=1 AND AC=0
AS A RESULT,

6.1.4 RANDOM ADD TEST 1

IF A FAILURE OCCURS DURING RANDOM ADD TEST 1, THE PROGRAM WILL
TYPE THE FOLLOWING MESSAGE AND THEN HALT:

RANDOM ADD TEST 1 FAILED
RANDA RANDC RESULT
XXXXXXXXXXXXX XXXXXXXXXXXXXXXX X XXXXXXXXXXXXXXXX

RANDA IS A RANDOM NUMBER
RANDC IS THE COMPLEMENT OF RANDA
RESULT IS THE RESULT OF CONSECUTIVE ADDITIONS OF
RANDA AND RANDC

NOTE: THE EXPECTED RESULT IS LINK=1, AC=0

6.1.5 RANDOM ADD TEST 2

IF A FAILURE OCCURS DURING RANDOM ADD TEST 2, THE PROGRAM
WILL TYPE THE FOLLOWING MESSAGE AND HALT:

RANDOM ADD TEST 2 FAILED
ARG1 ARG2 EXPECTED ARG1+ARG2
XXXXXXXXXXXXX XXXXXXXXXXXXXXXX X XXXXXXXXXXXXXXXX X XXXXXXXXXXXXXXXX

6.1.6 RANDOM ROTATE TESTS

IF A FAILURE OCCURS DURING ONE OF THE RANDOM ROTATE TESTS,
THE PROGRAM WILL TYPE THE FOLLOWING MESSAGE AND THEN HALT:

RANDOM AAA TEST FAILED

ORIGINAL ACTUAL

X XXXXXXXXXXXX X XXXXXXXXXXXX

AAA=RAR, RAL, RTR OR RTL

6.2 ERROR HALTS

THE FOLLOWING TABLE LISTS ERROR HALT LOCATIONS AND THE TEST
THAT THEY APPLY TO

LOCATION	TEST
502	SIMAD
1066	SIMROT (WITH LOCATION OF SPECIFIC TEST IN AC)
3035	FCT (WITH LOCATION OF SPECIFIC TEST IN AC)
3510	RNAD1
4041	RNAD2
5061	RANDOM ROTATE (WITH LOCATION OF SPECIFIC TEST IN AC)

6.2 ERROR RECOVERY

DEPRESS CONT TO RESUME TEST

6.3 LOOPING ON ERROR

6.3.1 SWITCH REGISTER CONTROL

SET SR00=1 TO SUPPRESS ERROR HALT
SET SR01=1 TO SUPPRESS ERROR IYPEOUT
SET SR02=2 TO LOOP
DEPRESS CONT

6.3.2 PROGRAM MODIFICATION

THERE ARE NOPS IN EACH TEST PROVIDED TO ALLOW THE OPERATOR
TO SET UP LOOPS TIGHTER THAN THOSE AVAILABLE IN 6.3.1.

7. RESTRICTIONS

EXTENDED MEMORY TESTS SHOULD BE RUN PRIOR TO
RUNNING RELOCATION ADDER TEST.

8, EXECUTION TIME

TIME DEPENDENT ON AMOUNT OF MEMORY, FOR EACH BANK
APPROXIMATELY 35 MINUTES; IF SR03=1, AND KXXXX=7777(SEE 5,1)
ONE PASS TAKES APPROXIMATELY 40 SECONDS,

AS EACH TEST OR GROUP OF TESTS IS COMPLETED, THE NAME OF THAT
TEST WILL BE TYPED; THE SEQUENCE IS:

SIMAD
SIMROT
FCT
RANDOM

9, PROGRAM DESCRIPTION

9.1 SIMULATED ADDITION TEST

THE SIMULATED ADDITION TESTS SIMULATES THE ADDITION OF TWO
ARGUMENTS, ARG1 AND ARG2, ACTUAL ADDITIONS ARE PERFORMED, AND
THEN THE ACTUAL RESULTS ARE COMPARED TO THE SIMULATED
ANSWER,

THE SIMULATOR OPERATES IN THE FOLLOWING MANNER:
THE ARGUMENTS ARE "ANDED" TOGETHER, AND ANY BITS IN THE
RESULT THAT ARE 1'S WILL BE CARRY BITS; THE ARGUMENTS ARE
"OR'D" TOGETHER AND THE RESULT IS STORED; THE PREVIOUSLY
GENERATED CARRIES ARE ROTATED ONCE TO THE LEFT AND THEN
"ANDED" WITH THE "OR" OF THE TWO ARGUMENTS; ANY BITS THAT ARE
1'S ARE ALSO CARRIES AND THESE ARE COMBINED WITH THE PREVIOUS
CARRIES; THE PROCEDURE CONTINUES UNTIL NO NEW CARRIES ARE
GENERATED; THE FINAL CARRY RESULT IS EXCLUSIVE "OR" WITH THE
"OR" OF THE ARGUMENTS TO GET THE SIMULATED SUM,

9.2 SIMULATED ROTATE TESTS

EACH OF THE ROTATE INSTRUCTIONS, RAR, RAL, RTR, RTL AND BSW
IS SIMULATED FOR ALL POSSIBLE COMBINATIONS OF AC AND LINK,
AND THE RESULTS ARE COMPARED TO THE RESULTS OF THE ACTUAL
ROTATE,

9.3 FALSE CARRY TEST

VARIOUS COMBINATIONS OF INSTRUCTIONS AND DATA ARE USED TO
DETECT EITHER FALSE CARRIES, OR MISSING CARRIES,

9,4 RANDOM ADD TEST 1

A RANDOM NUMBER AND ITS COMPLEMENT ARE ADDED SUCCESSIVELY
AND THE EXPECTED RESULT IS ALWAYS LINK=1, AC=0,

9,5 RANDOM ADD TEST 2

A RANDOM NUMBER, AND ITS MODIFIED COMPLIMENT ARE ADDED TO
PRODUCE 1 KNOW BIT IN THE AC, WITH THE LINK=1,

9,6 RANDOM ROTATE TEST

A RANDOM NUMBER IS SUCCESSIVELY ROTATED AND THE EXPECTED
RESULT IS THE ORIGINAL NUMBER,

9,6 RELOCATION ADDER TEST

ALL TESTS LISTED ABOVE ARE RELOCATED TO EXTENDED BANKS
AND RUN,

10, LISTING

/
 /ADDER TEST
 /FOR PDP-8/E
 /COPYRIGHT 1970 DIGITAL EQUIPMENT CORP, MAYNARD MASS,
 /V 82 07552
 /

/INSTRUCTION DEFINITIONS
 /

7501 MQA=7501
 7421 MQL=7421
 7002 BSN=7002
 6007 CAF=6007

/SWITCH REGISTER MASK BITS
 /

0103 SR00=K4000
 0104 SR01=K2000
 0105 SR02=K1000
 0106 SR03=K0400
 0107 SR04=K0200
 0110 SR05=K0100
 0111 SR06=K0040
 0112 SR07=K0020
 0113 SR08=K0010
 0114 SR09=K0004
 0115 SR10=K0002
 0116 SR11=K0001

/LOCATION EQUIVALENCIES
 /

0023	RAC=ARG1	/AC TO BE ROTATED
0024	RLNK=ARG2	/LINK TO BE ROTATED
0031	RRAC=SUM1	/AC AFTER REAL ROTATE
0033	RRLNK=SUM2	/LINK AFTER REAL ROTATE
0025	TEMPAC=SIMAC	/TEMPORARY AC STORAGE
0026	TEMPL=SIMLNK	/TEMPORARY LINK STORAGE
0037	TEMP1=WD1	/TEMPORARY DATA STORAGE
0037	W1=WD1	/ " " "
0040	W2=WD2	/ " " "
0035	RHFLG=AHFLG	/ROTATE TEST ERROR HEADER FLAG
0067	NERROP=XLOOP	

7775	*7775	
7775	0000	TSTA0, 0
7776	0000	TSTA1, 0
7777	0000	TSTA2, 0
0000	*0000	
0000	0000	TSTA3, 0
0001	5001	TSTA4, JMP
0002	0002	TSTA5, 2
0003	0003	TSTA6, 3
0004	0000	TSTA7, 0

0010 *10

/ INDEX REGISTERS

0010 0000 TSTIND, 0
0011 0000 POINT1, 0
0012 0000 POINT2, 0

0020 0020 *20
0020 0000 CNTRI, 0
0021 0022 ADA1, ADA2
0022 7777 ADA2, 7777

/ SIMULATION VARIABLES

0023 0000 ARG1, 0
0024 0000 ARG2, 0
0025 0000 SIMAC, 0
0026 0000 SIMLNK, 0
0027 0000 A1ORA2, 0
0030 0000 CARRY, 0
0031 0000 SUM1, 0
0032 0000 LINK1, 0
0033 0000 SUM2, 0
0034 0000 LINK2, 0

/ MESSAGE OUTPUT VARIABLES

0035 0000 AMFLG, 0
0036 0000 CHAR, 0
0037 0000 WQ1, 0
0040 0000 WQ2, 0

/ RANDOM VARIABLES

0041 0037 RANDA, 37
0042 0000 RANDB, 0
0043 0000 RANDC, 0
0044 0000 LINKR, 0
0045 0000 LINKRC, 0

/ INDIRECT POINTERS

0046 1600 XPRINT, PRINT /CHARACTER STRING TYPE
0047 1652 XTYPE, TYPE /CHARACTER TYPE
0050 1133 XRHD, RHD /TYPE ROTATE ERROR HEADER

0051	1200	XSROT,	SROTAL	/COMMON ROTATE SIMULATOR
0052	0756	XRALTA,	RALTAB=1	/RAL MASK TABLE
0053	1157	XRTLTA,	RTLTAB=1	/RTL MASK TABLE
0054	1140	XRTRTA,	RRTTAB=1	/RTR MASK TABLE
0055	1657	XBSWTA,	BSWTAB=1	/BYTE SWAP MASK TABLE
0056	1000	XCOMRO,	COMROT	/ROTATE COMPARISON FOR SIMULATION
0057	1031	XNXTRO,	NXTROT	/ROTATE SETUP FOR SIMULATION
0060	0504	XLNKOU,	LNKOUT	/TYPE LINK
0061	0523	XWDOUT,	WDOUT	/TYPE DATA WORD
0062	3000	XAMEAS,	SAMEAS	/COMPARE DATA
0063	3730	XAMEA,	SAMEA	
0064	3017	XAVREG,	SAVREG	/SAVE AC AND LINK
0065	3037	XDATER,	DATER	/DATA ERROR HANDLER FOR FCT
0066	3027	XHALT2,	HALT2	/DATA ERROR HALT FOR FCT
0067	3046	XLOOP,	LOOP	/LOOP ON TEST
0070	7775	XSTA0,	TSTA0	
0071	7776	XSTA1,	TSTA1	
0072	7777	XSTA2,	TSTA2	
0073	3512	XRAND,	RANDOM	/RANDOM NUMBER GENERATOR
0074	0410	XLOOP2,	HLTA+4	
0075	0552	XLOOP1,	LOOP1	
				/
				/WIDELY USED CONSTANTS
				/
0076	0240	K240,	240	
0077	0260	K260,	260	
0100	0261	K261,	261	
0101	6000	K6000,	6000	
0102	0102	XRARTA,	,	
0103	4000	K4000,	4000	
0104	2000	K2000,	2000	
0105	1000	K1000,	1000	
0106	0400	K0400,	400	
0107	0200	K0200,	200	
0110	0100	K0100,	100	
0111	0040	K0040,	40	
0112	0020	K0020,	20	
0113	0010	K0010,	10	
0114	0004	K0004,	4	
0115	0002	K0002,	2	
0116	0001	K0001,	1	
0117	0000		0	
0120	4000		4000	
0121	0001		1	
				/
				/
				/TEST POINTERS FOR FCT
				/
0122	2004	SEQ1,	FCT1	
0123	2043	SEQ2,	FCT2	
0124	2076	SEQ3,	FCT3	
0125	2200	SEQ4,	FCT4	
0126	2232	SEQ5,	FCT5	

```

0127 2270 SEQ6, FCT6
0130 2400 SEQ7, FCT7
0131 2436 SEQ8, FCT8
0132 2472 SEQ9, FCT9
0133 2600 SEQ10, FCT10
0134 2634 SEQ11, FCT11
0135 2667 SEQ12, FCT12

```

/
/SETUP INSTRUCTIONS FOR FCT
/

```

0136 1376 INS1, 1376 /BTAD I,-1 IN 7777
0137 7001 INS3, 7001 /BIAC
0140 5404 INS4, 5404 /BJMP I,+2 IN 0000
0141 5402 INS5, 5402 /BJMP I,+1 IN 0001
0142 7070 INS6, 7070 /BCMA CML RAR
0143 2376 INS7, 2376 /BISE I,-1 IN 7777
0144 2000 INS8, 2000 /BISE I,+1 IN 7777
0145 2410 INS9, 2410 /BISE I TSTIND
0146 4000 INS10, 4000 /BJMS I,+1 IN 7777
0147 4776 INS11, 4776 /BJMS I,-1 IN 7777
0150 4410 INS12, 4410 /BJMS I TSTIND
0151 5403 INS13, 5403 /BJMP I,+1 IN 0000
0152 5401 INS14, 5401 /BJMP I,+1 IN 0000
0153 4377 INS15, 4377 /BJMS I IN 7777
0154 2004 SEQ, FCT1
0155 5301 BIN, 5301

```

/
/TEST FOR FAST TAD SIMULATION
/

```

0156 6007 START, CAP /CLEAR ALL FLAGS
0157 7604 LAS /GET SWITCHES
0160 0106 AND SR03 /TEST SR03
0161 7650 SNA CLA /IS SR03=1
0162 5177 JMP GOTEST /DO TEST WITH ALL NUMBERS
0163 7240 CLA CMA
0164 0170 AND KXXXX /YES, START AT XXXX
0165 3024 DCA ARG2
0166 5567 JMP I,+1
0167 0202 RSIMAD*2
0170 0000 KXXXX, 0 /INSERT DESIRED STARTING VALUE FOR ARG2 HERE
0171 0000 K0, 0000
0172 0007 K0007, 0007
0173 0070 K0070, 0070
0174 0000 FLDNUM, 0
0175 0000 FLDSAV, 0
0176 0000 FLDCNT, 0
0177 0177 *177
0177 7410 GOTEST, SKP /SKIP JMP TO START

```

/
/SIMULATED ADDITION TEST
/

```

0200      *200
0200 5156  RSIMAD, JMP      START      /GO TO FAST TEST CHECK
0201 3024      DCA      ARG2
0202 3023      DCA      ARG1      /CLEAR SIMULATION VARIABLES
0203 3035      DCA      AHFLG     /CLEAR ERROR MESSAGE FLAG
/
/SIMULATE ADDITION BY SIMULATED GENERATEION OF SUM
/AND CARRY BITS
/
/FORM OR OF ARG1 WITH ARG2
/
0204 7340  SIMAD,  CLA  CLL  CMA
0205 0023      AND      ARG1      /LOAD AC WITH ARG1
0206 7421      MQL                      /PLACE IN MQ
0207 7040      CMA
0210 0024      AND      ARG2      /LOAD AC WITH ARG2
0211 7501      MQA                      /FORM ARG1 OR ARG2
0212 3027      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)
/
0213 7501      MQA                      /GET ARG1 FROM MQ
0214 7040      CMA                      /FORM NOTARG1
0215 0024      AND      ARG2      /AND WITH ARG2 TO GET ARG2 AND NOTARG1
0216 7421      MQL                      /SAVE IN MQ
0217 7040      CMA
0220 0024      AND      ARG2      /LOAD AC WITH ARG2
0221 7040      CMA                      /FORM NOTARG2
0222 0023      AND      ARG1      /AND WITH ARG1 TO GET ARG1 AND NOTARG2
0223 7501      MQA                      /OR WITH ARG2 AND NOTARG1
0224 3025      DCA      SIMAC
0225 3026      DCA      SIMLNK
/
/AND ARG1 WITH ARG2
/TEST FOR CARRIES
/IF THERE ARE NO BITS IN COMMON BETWEEN ARG1 AND ARG2
/THERE WILL BE NO CARRIES GENERATED
/
0226 7040      CMA
0227 0023      AND      ARG1      /LOAD AC WITH ARG1
0230 0024      AND      ARG2      /AND WITH ARG2
0231 7450      SNA                      /ARE THERE ANY CARRIES
0232 5274      JMP      ADD          /NO, TERMINATE SIMULATION
/
/GENERATE CARRIES
/
0233 7421      MQL                      /SAVE FIRST CARRIES
0234 7521  NXTCAR, MQA  MQL           /GET CARRIES FROM MQ
0235 0027      AND      A10RA2     /AND WITH A10RA2 TO SEE IF MORE CAPRIES ARE GENERATED

```

```

0236 7450 SNA /ARE THERE ANY MORE CARRIES
0237 5244 JMP ENCAR /NO, END SIMULATION OF CARRIES
0240 7104 CLL RAL /PROPAGATE CARRIES
0241 7521 MQA MQL /GET PREVIOUS CARRIES FROM MQ, SAVE NEW CARRIES
0242 7501 MQA /OR NEW CARRIES WITH PREVIOUS CARRIES
0243 5234 JMP NXTCAR /CONTINUE
/
/TEST FOR CARRY INTO LINK
/
0244 7501 ENCAR, MQA /GET CARRIES
0245 0027 AND A10RA2 /AND WITH A10RA2
0246 0103 AND K4000 /TEST BIT 00
0247 7450 SNA /IS BIT 00 1
0250 5253 JMP ENCAR1 /NO, CARRIES DID NOT PROPAGATE INTO LINK
0251 3026 DCA SIMLNK /YES, SAVE CARRY INTO LINK
0252 5260 JMP XORALL /COMPLETE SIMULATION
0253 7130 ENCAR1, CLL CML RAR /SET AC=4000
0254 0023 AND ARG1 /AND WITH ARG1
0255 0024 AND ARG2 /AND WITH ARG2 TO SEE IF ORIGINAL
0256 7440 SZA /NUMBERS GENERATED CARRY INTO LINK
0257 3026 DCA SIMLNK /SAVE SIMULATED LINK

```

/
/FORM XOR OF ARG1, ARG2 AND CARRIES
/TO GET FINAL SIMULATED SUM
/

```

0260 7501 XORALL, MQA /SAVE SIMULATED CARRIES
0261 3030 DCA CARRY
0262 7501 MQA
0263 7040 CMA
0264 0025 AND SIMAC /FORM A10RA2 AND NOTCARRY
0265 7421 MQL /SAVE IN MQ
0266 7040 CMA
0267 0025 AND SIMAC
0270 7040 CMA
0271 0030 AND CARRY /FORM CARRY AND NOTA10RA2
0272 7501 MQA /OR WITH CONTENTS OF MQ
0273 3025 DCA SIMAC /TO GET FINAL SIMULATED SUM
/
/

```

```

0274 7340 ADD, CLA CLL CMA /PERFORM ADDITIONS ARG1+ARG2 AND ARG2+ARG1
0275 0023 AND ARG1 /LOAD AC WITH ARG1
0276 1024 TAD ARG2 /ADD ARG2
0277 7000 NOP
0300 3031 DCA SUM1 /SAVE RESULT
0301 7010 RAR
0302 3032 DCA LINK1 /SAVE LINK
0303 7040 CMA
0304 0024 AND ARG2 /LOAD AC WITH ARG2
0305 1023 TAD ARG1 /ADD ARG1
0306 7000 NOP
0307 3033 DCA SUM2 /SAVE RESULT
0310 7010 RAR

```

0311 3034
0312 7000

DCA LINK2 /SAVE LINK
NOP

/

/COMPARE RESULTS OF REAL ADDS
/IF A=B, A XOR B=0, THIS IS USED TO COMPARE RESULTS

0313 7340
0314 0031
0315 7040
0316 0033
0317 7440
0320 5377
0321 7040
0322 0033
0323 7040
0324 0031
0325 7440
0326 5377

CLA CLL CMA
AND SUM1 /GET RESULT OF ARG1+ARG2
CMA /COMPLEMENT
AND SUM2 /AND RESULTS OF ARG2+ARG1
SZA /IS SUM2 AND NOTSUM1=0
JMP ERROR1 /NO, ERROR
CMA
AND SUM2 /LOAD AC WITH RESULTS OF ARG2+ARG1
CMA /COMPLEMENT
AND SUM1 /AND WITH SUM1
SZA /IS SUM1 AND NOTSUM2=0
JMP ERROR1 /NO, ERROR

/

/COMPARE REAL AND SIMULATED ADDS

0327 7340
0330 0031
0331 7040
0332 0025
0333 7440
0334 5377
0335 7040
0336 0025
0337 7040
0340 0031
0341 7440
0342 5377

CLA CLL CMA
AND SUM1 /LOAD AC WITH RESULTS OF ARG1+ARG2
CMA /COMPLEMENT
AND SIMAC /AND WITH RESULTS OF SIMULATION
SZA /IS SIMAC AND NOTSUM1=0
JMP ERROR1 /NO, ERROR
CMA
AND SIMAC /LOAD AC WITH SIMULATION RESULTS
CMA /COMPLEMENT
AND SUM1 /AND WITH RESULTS OF ARG1+ARG2
SZA /IS SUM1 AND NOTSIMAC=0
JMP ERROR1 /NO, ERROR

/

/COMPARE LINKS GENERATED BY REAL ADDS

0343 7340
0344 0032
0345 7004
0346 7240
0347 0034
0350 7640
0351 7020
0352 7430
0353 5377

CLA CLL CMA
AND LINK1 /GET LINK FROM ARG1+ARG2
RAL
CLA CMA
AND LINK2 /GET LINK FROM ARG2+ARG1
SZA CLA
CML
SEL /ARE THEY THE SAME
JMP ERROR1 /NO, ERROR

/

/COMPARE LINKS GENERATED BY REAL AND SIMULATED ADDS

```

/
0354 7340      /
0355 0032      CLA CLL CMA
0356 7004      AND      LINK1      /GET LINK FROM ARG1+ARG2
0357 7240      RAL
0360 0026      CLA CMA
0361 7640      AND      SIMLNK      /GET LINK FROM SIMULATION
0362 7020      SZA CLA
0363 7430      CML
0364 5377      SZL
                                /ARE THEY THE SAME
                                /NO, ERROR
                                /
                                /
                                /SET UP FOR NEXT ADDITION
                                /
0365 5474      NXTADD, JMP I  XLOOP2      /TEST FOR SIMULATION WITH SAME DATA
0366 2023      ISE      ARG1      /INCREMENT ARG1
0367 5204      JMP      SIMAD      /GO TO SIMULATION
0370 2024      ISE      ARG2      /INCREMENT ARG2
0371 7410      SKP
0372 5475      JMP I  XLOOP1      /GO TO SIMULATION
0373 7240      CLA CMA      /TEST FOR TRANSFER TO NEXT TEST
0374 0024      AND      ARG2      /TRANSFER ARG2 TO ARG1
0375 3023      DCA      ARG1
0376 5204      JMP      SIMAD      /CONTINUE SIMULATION
0377 7000      *377
                                ERROR1, NOP
/
/ERROR HANDLER FOR ADDITION TEST
/
0400 7604      *400
0401 0104      ADDERR, LAS      /GET SWITCHES
0402 7650      AND      SR01      /TEST SR01
0403 4217      SNA CLA      /SUPPRESS TIMEOUT IF SR01=1
0404 7604      HLTA,  JMS      ADPRT      /TYPE ERROR MESSAGE
0405 0103      LAS
0406 7650      AND      SR00
0407 4277      SNA CLA      /HALT IF SR00=0
0410 7604      JMS      HALTA      /HALT WITH ADDRESS OF TEST IN AC
0411 0105      LAS
0412 7640      AND      SR02      /TEST SR02
0413 5615      SZA CLA      /LOOP WITH SAME DATA IF SR02=1
0414 5616      JMP I  XADD      /LOOP WITH SAME DATA
0415 0274      JMP I  XNXTAD
0416 0366      XADD,  ADD
                                XNXTAD, NXTADD+1
/
/TYPE ERROR MESSAGE FOR ADDITION TEST
/
0417 0000      ADPRT, 0
0420 7340      CLA CLL CMA
0421 0035      AND      AHFLG      /GET FLAG FOR ERROR MESSAGE HEADER TIMEOUT
0422 7650      SNA CLA      /HAS HEADER FOR TEST BEEN TYPED
0423 4267      JMS      AHOUT      /NO TYPE HEADER

```



```

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0424 7040 CMA
0425 0023 AND ARG1
0426 3037 DCA WD1
0427 4323 JMS WDOUT /OUTPUT ARG1
0430 7040 CMA
0431 0024 AND ARG2
0432 3037 DCA WD1
0433 4323 JMS WDOUT /OUTPUT ARG2
0434 7040 CMA
0435 0026 AND SIMLNK
0436 3040 DCA WD2
0437 7040 CMA
0440 0025 AND SIMAC
0441 3037 DCA WD1
0442 4304 JMS LNKOUT /OUTPUT SIMULATED LINK
0443 4323 JMS WDOUT /OUTPUT SIMULATED SUM
0444 7040 CMA
0445 0032 AND LINK1
0446 3040 DCA WD2
0447 7040 CMA
0450 0031 AND SUM1
0451 3037 DCA WD1
0452 4304 JMS LNKOUT /OUTPUT LINK1
0453 4323 JMS WDOUT /OUTPUT SUM1
0454 7040 CMA
0455 0034 AND LINK2
0456 3040 DCA WD2
0457 7040 CMA
0460 0033 AND SUM2
0461 3037 DCA WD1
0462 4304 JMS LNKOUT /OUTPUT LINK2
0463 4323 JMS WDOUT /OUTPUT SUM2
0464 4446 JMS I XPRINT
0465 5742 CRLF-1
0466 5204 JMP HALT /TEST FOR HALT

/
/TYPE HEADER FOR ADDITION TEST ERROR MESSAGE
/
0467 0000 AHOUT, 0
0470 4446 JMS I XPRINT /TYPE "SIMULATED ADD TEST FAILED
0471 5417 EM1-1
0472 4446 JMS I XPRINT /TYPE ARG1, ARG2, SIMULATED, ARG1+ARG2, ARG2+ARG1
0473 5177 DH1-1
0474 7240 CLA CMA /SET ADD TEST HEADER FLAG
0475 3035 DCA AHFLG /TO PREVENT MULTIPLE HEADER TYPEOUTS
0476 5667 JMP I AHOUT

/
/HAUT WITH ADDRESS OF TEST IN AC
/
0477 0000 HALTA, 0
0500 7240 CLA CMA
0501 0351 AND ADT
0502 7402 HLT /HAUT WITH ADDRESS OF ADDITION TEST IN AC
0503 5677 JMP I HALTA

```

```

/
/
/TYPE LINK
/
0504 0000 LNKOUT, 0
0505 7340 CLA CLL CMA
0506 0040 AND WD2
0507 7640 SEA CLA
0510 5320 JMP OUT1
0511 7040 CMA
0512 0077 AND K260
0513 4447 TYLNK, JMS I XTYPE
0514 7040 CMA
0515 0076 AND K240
0516 4447 JMS I XTYPE
0517 5704 JMP I LNKOUT
0520 7040 OUT1, CMA
0521 0100 AND K261
0522 5313 JMP TYLNK
/
/TYPE DATA WORD
/
0523 0000 WDOUT, 0
0524 7340 CLA CLL CMA
0525 0102 AND XRARTA
0526 3011 DCA POINT1
0527 7040 NXBIT, CMA
0530 0411 AND I POINT1
0531 7450 SNA
0532 5345 JMP SP1
0533 0037 AND WD1
0534 7640 SEA CLA
0535 5342 JMP OUT1A
0536 7040 CMA
0537 0077 AND K260

0540 4447 TYBIT, JMS I XTYPE
0541 5327 JMP NXBIT
0542 7040 OUT1A, CMA
0543 0100 AND K261
0544 5340 JMP TYBIT
0545 7040 SP1, CMA
0546 0076 AND K240
0547 4447 JMS I XTYPE
0550 5723 JMP I WDOUT
0551 0204 ADT, SIMAD
/
/
/END OF SIMULATED ADD TEST
/
0552 7604 LOOP1, LAS
0553 0115 AND SR10
0554 7650 SNA CLA /TEST SR10
/IS SR10=1

```

```

) / PAL10 V141 13=SEP=71 13131 F. 2 1=10
0555 5370 JMP SADOK /NO, TYPE END OF TEST MESSAGE
0556 7604 ADHLT, LAS
0557 0114 AND SR09 /TEST SR09
0560 7640 SZA CLA /IS SR09=1
0561 7402 HLT /YES, HALT AT END OF TEST
0562 7604 LAS
0563 0116 AND SR11 /TEST SR11
0564 7650 SNA CLA /IS SR11=1
0565 5377 JMP SIMR /NO, GO TO NEXT TEST
0566 5767 JMP I ,*1 /REPEAT SIMAD
0567 0204 SIMAD
0570 4446 SADOK, JMS I XPRINT
0571 5721 OK1=1
0572 5356 JMP ADHLT
0577 0577 *577
0577 7000 SIMR, NOP

```

```

/
/
/TEST ROTATION BY COMPARISON OF REAL AND SIMULATED
/ROTATES
/

```

```

0600 0600 *600
0600 4752 SIMR01, JMS I XR1 /SET UP FOR RAL TEST
/
/TEST RAL
/
0601 7340 SIMRAL, CLA CLL CMA
0602 0052 AND XRALTA /GET MASK TABLE FOR
0603 3012 DCA POINT2 /SIMULATED RAL
0604 4451 JMS I XSROT /SIMULATE RAL
0605 7340 RRAL, CLA CLL CMA
0606 0024 AND RLNK /SET UP TO DO REAL ROTATES
0607 7640 SZA CLA
0610 7020 CML
0611 7040 CMA
0612 0023 AND RAC
0613 7004 RAL /DO REAL RAL
0614 7000 NOP
0615 3031 DCA RRAC /SAVE ROTATED ACCUMULATOR
0616 7430 SZL
0617 7040 CMA
0620 3033 DCA RRLNK /SAVE ROTATED LINK
0621 4456 JMS I XCOMRO /COMPARE ROTATES
0622 5205 JMP RRAL /RETURN HERE FOR LOOP ON ERROR
0623 4457 JMS I XNXTRO /SET UP FOR NEXT ROTATE
0624 5201 JMP SIMRAL /CONTINUE RAL TEST

```

```

0625 4753 SIMR02, JMS I XR2
/
/TEST RAR

```

```

0626 7340 SIMRAR, CLA CLL CMA
0627 0102 AND XRARTA
0630 3012 DCA POINT2 /GET MASK TABLE FOR
0631 4451 JMS I XSROT /SIMULATED RAR
0632 7340 RRAR, CLA CLL CMA /SIMULATED RAR
0633 0024 AND RLNK
0634 7640 SEA CLA /SET UP TP DO REAL RAR
0635 7020 CML
0636 7040 CMA
0637 0023 AND RAC
0640 7010 RAR /DO REAL RAR
0641 7000 NOP
0642 3031 DCA RRAC /SAVE ROTATED ACCUMULATOR
0643 7430 SEL
0644 7040 CMA
0645 3033 DCA RRLNK /SAVE ROTATED LINK
0646 4456 JMS I XCOMRO /COMPARE ROTATES
0647 5232 JMP RRAR /RETURN HERE FOR LOOP ON ERROR
0650 4457 JMS I XNXTRO /SET UP FOR NEXT ROTATE
0651 5226 JMP SIMRAR /CONTINUE RAR TEST

```

0652 4754 SIMR03, JMS I XR3

/TEST RTL

```

0653 7340 SIMRTL, CLA CLL CMA
0654 0053 AND XRRTLA /GET MASK TABLE FOR
0655 3012 DCA POINT2 /SIMULATED RTL
0656 4451 JMS I XSROT /SIMULATE RTL
0657 7340 RRTL, CLA CLL CMA
0660 0024 AND RLNK /SET UP TO DO REAL ROTATE
0661 7640 SEA CLA
0662 7020 CML
0663 7040 CMA
0664 0023 AND RAC /DO REAL ROTATE
0665 7000 RTL
0666 7000 NOP /SAVE ROTATED ACCUMULATOR
0667 3031 DCA RRAC
0670 7430 SEL
0671 7040 CMA
0672 3033 DCA RRLNK /SAVE ROTATED LINK
0673 4456 JMS I XCOMRO /COMPARE ROTATES
0674 5257 JMP RRTL /RETURN HERE FOR LOOP ON ERROR
0675 4457 JMS I XNXTRO /SET UP TO DO NEXT ROTATE
0676 5253 JMP SIMRTL /CONTINUE RTL TEST

```

0677 4755 SIMR04, JMS I XR4

/TEST RTR

```

0700 7340 SIMRTR, CLA CLL CMA
0701 0054 AND XRTRTA /GET MASK TABLE FOR
0702 3012 DCA POINT2 /SIMULATED RTR
0703 4451 JMS I XSROT /SIMULATE RTR
0704 7340 RRTR, CLA CLL CMA
0705 0024 AND RLNK /SET UP TO DO REAL ROTATE
0706 7640 SZA CLA
0707 7020 CML
0710 7040 CMA
0711 0023 AND RAC
0712 7012 RTR /DO REAL ROTATE
0713 7000 NOP
0714 3031 DCA RRAC /SAVE ROTATED ACCUMULATOR
0715 7430 SZL
0716 7040 CMA
0717 3033 DCA RRLNK /SAVE ROTATED LINK
0720 4456 JMS I XCOMRO /COMPARE ROTATES
0721 5304 JMP RRTR /RETURN HERE FOR LOOP ON ERROR
0722 4457 JMS I XNXTRO /SET UP TO DO NEXT ROTATE
0723 5300 JMP SIMRTR /CONTINUE RTR TEST

0724 4756 SIMR05, JMS I XR5
/TEST BYTE SWAP

0725 7340 SIMBSW, CLA CLL CMA
0726 0054 AND XBSWTA /GET MASK TABLE FOR
0727 3012 DCA POINT2 /SIMULATED BSW
0730 4776 JMS I XSBSW /SIMULATE BSW
0731 7340 RBSW, CLA CLL CMA
0732 0024 AND RLNK /SET UP FOR REAL BSW
0733 7640 SZA CLA
0734 7020 CML
0735 7040 CMA
0736 0023 AND RAC
0737 7002 BSW /DO REAL BSW
0740 7000 NOP
0741 3031 DCA RRAC /SAVE ROTATED ACCUMULATOR
0742 7430 SZL
0743 7040 CMA
0744 3033 DCA RRLNK /SAVE ROTATED LINK
0745 4456 JMS I XCOMRO /COMPARE ROTATES
0746 5331 JMP RBSW /RETURN HERE FOR LOOP ON ERROR
0747 4457 JMS I XNXTRO /SET UP FOR NEXT ROTATE
0750 5325 JMP SIMBSW /CONTINUE BSW TEST
0751 5777 JMP I XROTDN /END OF ROTATE SIMULATION TESTS

0752 1400 XR1, R1
0753 1410 XR2, R2
0754 1420 XR3, R3
0755 1430 XR4, R4
0756 1440 XR5, R5
0757 0001 RALTAB, 1

```

0760	0002	2
0761	0004	4
0762	0010	10
0763	0020	20
0764	0040	40
0765	0100	100
0766	0200	200
0767	0400	400
0770	1000	1000
0771	2000	2000
0772	4000	4000
0773	0000	0
0774	0001	1
0775	4000	4000
0776	1236	XBSW, SBSW
0777	1323	XROTON, ROTONE

/(TAPE 2)
/COMPARE RESULTS OF REAL AND SIMULATED ROTATES

1000 1000 *1000
1000 0000 COMROT, 0

/COMPARE ROTATED ACCUMULATORS

1001	7340	CLA CLL CMA	
1002	0025	AND SIMAC	/GET SIMULATED ROTATED ACCUMULATOR
1003	7040	CMA	/COMPLEMENT
1004	0031	AND RRAC	/AND WITH REAL ROTATED ACCUMULATOR
1005	7440	SEA	/IS NOTSIMAC AND RRAC=0
1006	5226	JMP ERROT	/NO, ERROR
1007	7040	CMA	
1010	0031	AND RRAC	/GET REAL ROTATED ACCUMULATOR
1011	7040	CMA	/COMPLEMENT
1012	0025	AND SIMAC	/AND WITH SIMULATED ROTATED ACCUMULATOR
1013	7440	SEA	/IS SIMAC AND NOTRRAC=0
1014	5226	JMP ERROT	/NO, ERROR

/COMPARE ROTATED LINKS

1015	7340	CLA CLL CMA	
1016	0026	AND SIMLNK	/GET SIMULATED LINK
1017	7640	SEA CLA	
1020	7020	CML	
1021	7040	CMA	
1022	0033	AND RRLNK	/GET REAL ROTATED LINK
1023	7440	SEA	
1024	7020	CML	
1025	7430	SZL	/ARE THEY THE SAME
1026	5246	ERROT, JMP ERROR2	/NO, ERROR

1027 2200 ISZ COMROT /RETURN HERE IF NO LOOP ON ERROR
 1030 5600 JMP I COMROT

/SET UP TO DO NEXT ROTATE

1031 0000 NXTROT, 0
 1032 7340 CLA CLL CMA
 1033 0024 AND RLNK /GET LINK OF WORD TO BE ROTATED
 1034 7640 SZA CLA /IS IT 0
 1035 5244 JMP NEWLNK /NO, CLEAR IT
 1036 7040 CMA /YES, SET IT
 1037 3024 DCA RLNK
 1040 2023 ISZ RAC /INCREMENT NUMBER TO BE ROTATED
 1041 5631 JMP I NXTROT /CONTINUE SIMULATION OF PRESENT ROTATE INSTRUCTION
 1042 2231 ISZ NXTROT /PRESENT SIMULATION DONE
 1043 5631 JMP I NXTROT /GO TO NEXT TEST
 1044 3024 NEWLNK, DCA RLNK
 1045 5631 JMP I NXTROT

/ERROR HANDLER FOR ROTATE TEST

1046 7604 ERROR2, LAS
 1047 0104 AND SR01 /TEST SR01
 1050 7650 SNA CLA /IS SR01=1
 1051 4271 JMS ROTPRT /NO, TYPE ERROR MESSAGE
 1052 7604 HALTB, LAS
 1053 0103 AND SR00 /TEST SR00
 1054 7650 SNA CLA /IS SR00=1
 1055 5263 JMP HALTB /NO, HALT WITH ADDRESS OF TEST IN AC
 1056 7604 LAS
 1057 0103 AND SR02 /TEST SR02
 1060 7650 SNA CLA /IS SR02=1
 1061 5227 JMP ERROT+1 /NO, GO TO NEW DATA
 1062 5230 JMP ERROT+2 /YES, LOOP WITH SAME DATA
 1063 7340 HALTB, CLA CLL CMA
 1064 0451 AND I XSROT
 1065 1270 TAD M4
 1066 7402 HLT
 1067 5256 JMP HALTB+4
 1070 7774 M4, =4

/ERROR TYPEOUT FOR SIMULATED ROTATE TEST ERRORS

1071 0000 ROTPRT, 0
 1072 7340 CLA CLL CMA
 1073 0035 AND RHPLG /GET ROTATE TEST HEADER FLAG
 1074 7650 SNA CLA /HAS HEADER BEEN TYPED

```

1075 4331 JMS RHOUT /NO, TYPE HEADER
1076 7040 CMA
1077 0023 AND RAC
1100 3037 DCA WD1
1101 7040 CMA
1102 0024 AND RLNK
1103 3040 DCA WD2
1104 4460 JMS I XLNKOU /OUTPUT ORIGINAL LINK
1105 4461 JMS I XWDOUT /OUTPUT ORIGINAL WORD
1106 7040 CMA
1107 0025 AND SIMAC
1110 3037 DCA WD1
1111 7040 CMA
1112 0026 AND SIMLNK
1113 3040 DCA WD2
1114 4460 JMS I XLNKOU /OUTPUT SIMULATED ROTATED LINK
1115 4461 JMS I XWDOUT /OUTPUT SIMULATED ROTATED WORD
1116 7040 CMA
1117 0031 AND RRAC
1120 3037 DCA WD1
1121 7040 CMA
1122 0033 AND RRLNK
1123 3040 DCA WD2
1124 4460 JMS I XLNKOU /OUTPUT ACTUAL ROTATED LINK
1125 4461 JMS I XWDOUT /OUTPUT ACTUAL ROTATED WORD
1126 4446 JMS I XPRINT
1127 5742 CRLF-1
1130 5671 JMP I ROTPR

```

```

/
/OUTPUT HEADER FOR ROTATE ERROR MESSAGE
/

```

```

1131 0000 RHOUT, 0
1132 4446 JMS I XPRINT /TYPE SIMULATED XXX TEST FAILED
1133 0000 RHD, 0 /WHERE XXX IS THE INSTRUCTION THAT FAILED
1134 4446 JMS I XPRINT /TYPE ORIGINAL, SIMULATED ACTUAL
1135 5244 DH2-1
1136 7240 CLA CMA
1137 3035 DCA RHPLG
1140 5731 JMP I RHOUT

```

```

1141 2000 RIRTAB, 2000
1142 0400 400
1143 0100 100
1144 0020 20
1145 0004 4
1146 0001 1
1147 4000 4000
1150 1000 1000
1151 0200 200
1152 0040 40
1153 0010 10
1154 0002 2

```


1155	0000	0
1156	2000	2000
1157	0002	2
1160	0002	RTL TAB, 2
1161	0010	10
1162	0040	40
1163	0200	200
1164	1000	1000
1165	4000	4000
1166	0001	1
1167	0004	4
1170	0020	20
1171	0100	100
1172	0400	400
1173	2000	2000
1174	0000	0
1175	0002	2
1176	2000	2000

```

/
/
/ROTATION SIMULATOR COMMON ROUTINE
/ROTATE FUNCTION SIMULATED DEPENDS
/UPON MASK TABLE SELECTED
/

```

1200	1200	*1200		
1200	0000	SROTAL,	0	
1201	7300		CLA CLL	
1202	3025		DCA SIMAC	/CLEAR SIMULATION ARGUMENTS
1203	3026		DCA SIMLNK	
1204	7040		CMA	
1205	0412		AND I POINT2	/GET FIRST MASK BIT FROM TABLE
1206	3037		DCA WD1	
1207	7040	NBIT,	CMA	
1210	0412		AND I POINT2	/GET MASK BIT FROM TABLE
1211	7450		SNA	/IS IT 0
1212	5303		JMP ENDROT	/YES, FINISH SIMULATION
1213	3040		DCA WD2	
1214	7040		CMA	
1215	0023		AND RAC	/LOAD AC WITH WORD TO BE ROTATED
1216	0037		AND WD1	/TEST BIT TO BE ROTATED
1217	7440		SZA	/IS IS 0
1220	4225		JMS OR1	/NO, PLACE BIT INTO NEW POSITION
1221	7040		CMA	
1222	0040		AND WD2	/BIT TO BE ROTATED
1223	3037		DCA WD1	/BECOMES NEW MASK
1224	5207		JMP NBIT	/CONTINUE SIMULATION
/				
/OR BITS TO FORM PARTIALLY ROTATED WORD				
/				
1225	0000	OR1,	0	
1226	7240		CLA CMA	

1227	0040	AND	WD2	/GET BIT TO BE INSERTED
1230	7421	MQL		/SAVE IN M0
1231	7040	CMA		
1232	0025	AND	SIMAC	/GET SIMULATED ROTATED WORD
1233	7501	MQA		/OR BIT INTO POSITION
1234	3025	DCA	SIMAC	/SAVE PARTIALLY ROTATED WORD
1235	5625	JMP I	OR1	

/

/SIMULATE BYTE SWAP

/

1236	0000	SBSW,		
1237	7340			
1240	0236	CLA CLL CMA		
1241	3451	AND	SBSW	/SET UP FOR ERROR RETURN
1242	3025	DCA I	XSROT	
1243	3026	DCA	SIMAC	/CLEAR SIMULATION ARGUMENTS
1244	7040	DCA	SIMLNK	
1245	0412	N1BIT,	CMA	
1246	7450	AND I	POINT2	/GET MASK FROM TABLE
1247	5277	SNA		/IS IT 0
1250	3037	JMP	ENDBSW	/YES, FINISH SIMULATION
1251	7040	DCA	WD1	
1252	0412	CMA		
1253	3040	AND I	POINT2	
1254	7040	DCA	WD2	
1255	0023	CMA		
1256	0037	AND	RAC	/GET WORD TO BE ROTATED
1257	7440	AND	WD1	/TEST BIT TO BE ROTATED
1260	4225	SZA		/IS IT 0
1261	7040	JMS	OR1	/NO, PLACE BIT IN NEW POSITION
1262	0037	CMA		
1263	7421	AND	WD1	/INTERCHANGE MASK AND BIT TO BE ROTATED
1264	7040	MQL		
1265	0040	CMA		
1266	3037	AND	WD2	
1267	7501	DCA	WD1	
1270	3040	MQA		
1271	7040	DCA	WD2	
1272	0023	CMA		
1273	0037	AND	RAC	/GET WORD TO BE ROTATED
1274	7440	AND	WD1	/TEST BIT TO BE ROTATED
1275	4225	SZA		/IS IT 0
1276	5244	JMS	OR1	/NO, PLACE BIT IN NEW POSITION
1277	7340	JMP	N1BIT	/CONTINUE SIMULATION
1300	0024	ENDBSW,	CLA CLL CMA	
1301	3026	AND	RLNK	
1302	5636	DCA	SIMLNK	
		JMP I	SBSW	

```

/END OF ROTATE, SHIFT LINK
/
1303 7340  ENDROT, CLA CLL CMA
1304 0412  AND I POINT2 /GET BIT TO BE ROTATED FROM LINK
1305 3040  DCA WD2
1306 7040  CMA
1307 0116  AND K0001 /GET MASK FOR LINK
1310 0024  AND RLNK /TEST LINK
1311 7440  SZA /IS LINK 0
1312 4225  JMS OR1 /PLACE LINK IN NEW POSITION
1313 7040  CMA
1314 0412  AND I POINT2 /GET MASK FOR BIT TO BE ROTATED INTO LINK
1315 0023  AND RAC /TEST BIT IN WORD TO BE ROTATED INTO LINK
1316 7440  SZA /IS IT 0
1317 7240  CLA CMA /NO, SET LINK=1
1320 0116  AND K0001
1321 3026  DCA SIMLNK
1322 5600  JMP I SROTAL
/
1323 7604  ROTONE, LAS
1324 0115  AND SR10 /TEST SR10
1325 7650  SNA CLA /IS SR10=1
1326 5342  JMP SROTOK /NO, TYPE "SIMROT"
1327 7604  ROTHLT, LAS
1330 0114  AND SR09 /TEST SR09
1331 7640  SZA CLA /IS SR09=1
1332 7402  HLT /YES, HALT AT END OF ROTATE TESTS
1333 7604  LAS
1334 0116  AND SR11 /TEST SR11
1335 7650  SNA CLA /IS SR11=1
1336 5740  JMP I ,+2 /NO, GO TO NEXT TEST
1337 5741  JMP I ,+2 /YES, REPEAT ROTATE TESTS
1340 2000  FCT
1341 0600  SIMRO1
1342 4446  SROTOK, JMS I XPRINT
1343 5725  OK2=1
1344 5327  JMP ROTHLT

```

```

/
/
/SET UP FOR ROTATE TESTS
/

```

```

1400 1400 PAGE
1400 0000 R1, 0
1401 7340 CLA CLL CMA
1402 0250 AND XM2 /SET UP HEADER
1403 3450 DCA I XRWD /FOR RAL TEST ERROR MESSAGE
1404 3035 DCA RHFLG /CLEAR ROTATE HEADER FLAG
1405 3024 DCA RLNK
1406 3023 DCA RAC
1407 5600 JMP I R1
1410 0000 R2, 0
1411 7340 CLA CLL CMA

```

```

1412 0251      AND      XM3      /SET UP HEADER
1413 3450      DCA I    XRHD      /FOR RAR TEST ERROR MESSAGE
1414 3035      DCA      RHFLG
1415 3024      DCA      RLNK
1416 3023      DCA      RAC
1417 5610      JMP I    R2
1420 0000      R3,      0
1421 7340      CLA CLL CMA
1422 0252      AND      XM4      /SET UP HEADER
1423 3450      DCA I    XRHD      /FOR RTR TEST ERROR MESSAGE
1424 3035      DCA      RHFLG
1425 3024      DCA      RLNK
1426 3023      DCA      RAC
1427 5620      JMP I    R3
1430 0000      R4,      0
1431 7340      CLA CLL CMA
1432 0253      AND      XM5      /SET UP HEADER
1433 3450      DCA I    XRHD      /FOR RIL TEST ERROR MESSAGE
1434 3035      DCA      RHFLG
1435 3024      DCA      RLNK
1436 3023      DCA      RAC
1437 5630      JMP I    R4
1440 0000      R5,      0
1441 7340      CLA CLL CMA
1442 0254      AND      XM6      /SET UP HEADER
1443 3450      DCA I    XRHD      /FOR BSW TEST ERROR MESSAGE
1444 3035      DCA      RHFLG
1445 3024      DCA      RLNK
1446 3023      DCA      RAC
1447 5640      JMP I    R5
1450 5440      XM2,    EM2-1
1451 5461      XM3,    EM3-1
1452 5502      XM4,    EM4-1
1453 5523      XM5,    EM5-1
1454 5544      XM6,    EM6-1

```

```

/
/
/CHARACTER STRING TYPE ROUTINE
/*=RETURN, +=LINE FEED

```

```

1600 1600
1600 0000      PAGE
1601 7300      PRINT, 0
1602 1600      CLA CLL
1603 3011      TAD I    PRINT
1604 2200      DCA      POINT1
1605 1411      ISZ      PRINT
1606 3036      TAD I    POINT1
1607 1036      DCA      CHAR
1610 7012      TAD      CHAR
1611 7012      RTR
1612 7012      RTR
1613 4217      RTR
1614 1036      JMS      TYPSET
1615 4217      TAD      CHAR
          JMS      TYPSET

```

1616	5205	JMP	PRINT+5
1617	0000	TYPSET, 0	
1620	0245	AND	K0077
1621	7450	SNA	
1622	5600	JMP I	PRINT
1623	1246	TAD	M40
1624	7510	SPA	
1625	5230	JMP	,+3
1626	1076	TAD	K240
1627	5243	JMP	MTP
1630	7001	IAC	
1631	7440	SZA	
1632	5235	JMP	,+3
1633	1251	TAD	K215
1634	5243	JMP	MTP
1635	7001	IAC	
1636	7440	SZA	
1637	5242	JMP	,+3
1640	1250	TAD	K212
1641	5243	JMP	MTP
1642	1247	TAD	K336
1643	4447	MTP, JMS I	XTYPE
1644	5617	JMP I	TYPSET
1645	0077	K0077,	0077
1646	7740	M40,	7740
1647	0336	K336,	0336
1650	0212	K212,	0212
1651	0215	K215,	0215
1652	0000	TYPE,	0
1653	6046	TL5	
1654	6041	TSP	
1655	5254	JMP	,=1
1656	7200	CLA	
1657	5652	JMP I	TYPE

1660	0001	BSWTAB, 1	
1661	0100		100
1662	0002		2
1663	0200		200
1664	0004		4
1665	0400		400
1666	0010		10
1667	1000		1000
1670	0020		20
1671	2000		2000
1672	0040		40
1673	4000		4000
1674	0000		0

2000	7300	PAGE	
2001	1122	FCT,	CLA CLL
2002	3154	TAD	SEQ1
		DCA	SEQ

```

2003 3020          DCA   CNTR1
/
/
/ FALSE CARRY TEST#1
/
2004 7300  FCT1,  CLA CLL
/
/ PLACE INSTRUCTIONS AND DATA IN TEST ADDRESSES
/
2005 7300  FCS1,  CLA CLL          /DATA=0000
2006 3471          DCA I   XSTA1      /LOC,=7776
2007 1136          TAD   INS1        /INSTRUCTION=TAD ,=1
2010 3472          DCA I   XSTA2      /LOC,=7777
2011 1332          TAD   INS2        /INSTRUCTION=TAD ,=3
2012 3000          DCA   TSTA3      /LOC,=0000
2013 1137          TAD   INS3        /INSTRUCTION=IAC
2014 3001          DCA   TSTA4      /LOC,=0001
2015 1140          TAD   INS4        /INSTRUCTION=JMP I ,+2
2016 3002          DCA   TSTA5      /LOC,=0002
2017 7240          CLA CMA          /DATA=7777
2020 3003          DCA   TSTA6      /LOC,=0003
2021 1327          TAD   ADI         /ADDRESS=RETI
2022 3004          DCA   TSTA7      /LOC,=0004
/
/ EXECUTE INSTRUCTIONS PREVIOUSLY ASSEMBLED IN TEST
/ ADDRESSES
/
2023 7300  FCL1,  CLA CLL
2024 3472          JMP I   XSTA2
2025 7000  RET1,  NOP              /PROVIDED FOR PROGRAM MODIFICATION
2026 7000          NOP
2027 4464          JMS I   XAVREG      /SAVE LINK AND AC
/
/ EXPECTED RESULTS ARE AC=0, LINK=1
/
2030 7430          SZL
2031 7440          SZA
2032 4465          JMS I   XDATAER    /COMPUTATION ERROR HAS OCCURED
2033 7410          SKP
2034 4466          JMS I   XHALT2     /TEST FOR HALT
2035 4467          JMS I   XLOOP     /TEST FOR LOOP
2036 5223          JMP   FCL1
2037 7200          CLA
2040 1123          TAD   SEQ2        /ADDRESS OF NEXT TEST
2041 3154          DCA   SEQ
2042 5554          JMP I   SEQ          /GO TO NEXT TEST
/
/
/ FALSE CARRY TEST#2
/
2043 7300  FCT2,  CLA CLL

```

```

/
/PLACE INSTRUCTIONS AND DATA IN TEST ADDRESSES
/
2044 7340 FCS2, CLA CLL CMA /DATA=7777
2045 3471 DCA I XSTA1 /LOC,=7776
2046 1136 TAD INS1 /INSTRUCTION=TAD I ,+1
2047 3472 DCA I XSTA2 /LOC,=7777
2050 1137 TAD INS3 /INSTRUCTION=IAC
2051 3000 DCA TSTA3 /LOC,=0000
2052 1141 TAD INS5 /INSTRUCTION=JMP I ,+1
2053 3001 DCA TSTA4 /LOC,=0001
2054 1330 TAD AD2 /ADDRESS=RET2
2055 3002 DCA TSTA5 /LOC,=0002
/
/EXECUTE INSTRUCTIONS PREVIOUSLY ASSEMBLED IN TEST
/ADDRESSES
/
2056 7300 FCL2, CLA CLL
2057 5472 JMP I XSTA2
2060 7000 RET2, NOP
2061 7000 NOP
2062 4464 JMS I XAVREG /SAVE AC AND LINK
/
/EXPECTED RESULTS ARE AC=0, LINK=1
/
2063 7430 SZL
2064 7440 SEA
2065 4465 JMS I XDATER
2066 7410 SKP
2067 4466 JMS I XHALT2
2070 4467 JMS I XLOOP
2071 5256 JMP FCL2
2072 7000 CLA
2073 1124 TAD SEQ3
2074 3154 DCA SEQ
2075 5554 JMP I SEQ
/
//
//FALSE CARRY TEST #3
/
2076 7300 FCT3, CLA CLL
/
/
2077 1137 FCS3, TAD INS3 /INSTRUCTION=IAC
2100 3471 DCA I XSTA1 /LOC,=7776
2101 1333 TAD INS16 /INSTRUCTION=TAD I 21
2102 3472 DCA I XSTA2 /LOC,=7777
2103 1152 TAD INS14 /INSTRUCTION=JMP I ,+1
2104 3000 DCA TSTA3 /LOC,=0000
2105 1331 TAD AD3 /ADDRESS=RET3
2106 3001 DCA TSTA4 /LOC,=0001
/

```

```

/
/
/
2107 7300 FCL3, CLA CLL
2110 5471 JMP I XSTA1
2111 7000 RET3, NOP
2112 7000 NOP
2113 4464 JMS I XAVREG
/
/
/
2114 7430 SZL
2115 7440 SZA
2116 4465 JMS I XDATER
2117 7410 SKP
2120 4466 JMS I XHALT2
2121 4467 JMS I XLOOP
2122 5307 JMP FCL3
2123 7200 CLA
2124 1125 TAD SEQ4
2125 3154 DCA SEQ
2126 5554 JMP I SEQ
2127 2025 AD1, RET1
2130 2060 AD2, RET2
2131 2111 AD3, RET3
2132 1003 INS2, 1003
2133 1421 INS16, 1421

```

/BTAD ,+3 IN 0000

2200 PAGE

```

/
/
/ FALSE CARRY TEST #4
/

```

```

2200 7300 FCT4, CLA CLL
/
/
2201 7340 FCS4, CLA CLL CMA /DATA=7777
2202 3471 DCA I XSTA1 /LOC,=7776
2203 1136 TAD INS1 /INSTRUCTION=TAD ,+1
2204 3472 DCA I XSTA2 /LOC,=7777
2205 1142 TAD INS6 /INSTRUCTION=CMA CML RAR
2206 3000 DCA TSTA3 /LOC,=0000
2207 1141 TAD INS5 /INSTRUCTION=JMP I ,+1
2210 3001 DCA TSTA4 /LOC,=0001
2211 1324 TAD AD4 /ADDRESS=RET4
2212 3002 DCA TSTA5 /LOC,=0002
/
/
/

```

2213 7340 FCL4, CLA CLL CMA


```

2214 5472      JMP I   XSTA2
2215 7000      RET4,   NOP
2216 7000      NOP
2217 4464      JMS I   XAVREG
/
/
/
2220 7430      SZL
2221 7440      SZA
2222 4465      JMS I   XDATER
2223 7410      SKP
2224 4466      JMS I   XHALT2
2225 4467      JMS I   XLOOP
2226 5213      JMP     FCL4
2227 1126      TAD     SEQ5
2230 3154      DCA     SEQ
2231 5554      JMP I   SEQ

/
/
/
/ FALSE CARRY TEST #5
/
2232 7300      FCT5,   CLA CLL
/
/
/
2233 7300      FCS5,   CLA CLL
2234 1143      TAD     INS7
2235 3472      DCA I   XSTA2
2236 1137      TAD     INS3
2237 3000      DCA     TSTA3
2240 1137      TAD     INS3
2241 3001      DCA     TSTA4
2242 1151      TAD     INS13
2243 3002      DCA     TSTA5
2244 1325      TAD     A05
2245 3003      DCA     TSTA6
/
/
/
/ INSTRUCTION=ISZ ;,=1
/ LOC,=7777
/ INSTRUCTION=IAC
/ LOC,=0000
/ INSTRUCTION=IAC
/ LOC,=0001
/ INSTRUCTION=JMP I ;,+1
/ LOC,=0002
/ ADDRESS=RET5
/ LOC,=0003
/
/
/
/
2246 7340      FCL5,   CLA CLL CMA
2247 3471      DCA I   XSTA1
2250 7040      CMA
2251 5472      JMP I   XSTA2
2252 7000      RET5,   NOP
2253 7000      NOP
2254 4464      JMS I   XAVREG
/
/
/
/
2255 7430      SZL
2256 7440      SZA
2257 4465      JMS I   XDATER

```

2260	7410		SKP	
2261	4466		JMS I	XHALT2
2262	4467		JMS I	XLOOP
2263	5246		JMP	FCL5
2264	7200		CLA	
2265	1127		TAD	SEQ6
2266	3154		DCA	SEQ
2267	5554		JMP I	SEQ
/				
/				
/FALSE CARRY TEST #6				
/				
2270	7300	FCT6,	CLA CLL	
/				
2271	7300	FCS6,	CLA CLL	
2272	1144		TAD	INS8
2273	3472		DCA I	XSTA2
2274	1137		TAD	INS3
2275	3001		DCA	TSTA4
2276	1151		TAD	INS13
2277	3002		DCA	TSTA5
2300	1326		TAD	AD6
2301	3003		DCA	TSTA6
/				
/				
/				
2302	7340	FCL6,	CLA CLL CMA	
2303	3000		DCA	TSTA3
2304	7240		CLA CMA	
2305	5472		JMP I	XSTA2
2306	7000	RET6,	NOP	
2307	7000		NOP	
2310	4464		JMS I	XAVREG
/				
/				
/				
2311	7430		SZL	
2312	7440		SZA	
2313	4465		JMS I	XDATER
2314	7410		SKP	
2315	4466		JMS I	XHALT2
2316	4467		JMS I	XLOOP
2317	5302		JMP	FCL6
2320	7200		CLA	
2321	1130		TAD	SEQ7
2322	3154		DCA	SEQ
2323	5554		JMP I	SEQ
2324	2215	AD4,	RET4	
2325	2252	AD5,	RET5	
2326	2306	AD6,	RET6	

```

/INSTRUCTION=ISE ,+1
/LOC,=7777
/INSTRUCTION=IAC
/LOC,=0001
/INSTRUCTION=JMP I ,+1
/LOC,=0002
/ADDRESS=RET6
/LOC,=0003

```

2400 PAGE

2400 7300 FCT7,

CLA CLL

2401 7300 FCS7,

CLA CLL

2402 1145

TAD INS9

/INSTRUCTION=ISZ I TSTIND

2403 3472

DCA I XSTA2

/LOC,=7777

2404 1137

TAD INS3

/INSTRUCTION=IAC

2405 3001

DCA TSTA4

/LOC,=0001

2406 1151

TAD INS13

/INSTRUCTION=JMP I ,+1

2407 3002

DCA TSTA5

/LOC,=0002

2410 1326

TAD AD7

/ADDRESS=RET7

2411 3003

DCA TSTA6

/LOC,=0003

2412 7340 FCL7,

CLA CLL CMA

2413 3010

DCA TSTIND

2414 7040

CMA

2415 3000

DCA TSTAS

2416 7040

CMA

2417 5472

JMP I XSTA2

2420 7000 RET7,

NOP

2421 7000

NOP

2422 4464

JMS I XAVREG

2423 7430

SZL

2424 7440

SZA

2425 4465

JMS I XDATER

2426 7410

SKP

2427 4466

JMS I XHALT2

2430 4467

JMS I XLOOP

2431 5212

JMP FCL7

2432 7200

CLA

2433 1131

TAD SEQ8

2434 3154

DCA SEQ

2435 5354

JMP I SEQ

2436 7300 FCT8,

CLA CLL

2437 7300

FCS8,

CLA CLL

2440 1137

TAD INS3

/INSTRUCTION=IAC

2441	3000		DCA	TSTA3		/LOC,=0000
2442	1137		TAD	INS3		/INSTRUCTION=IAC
2443	3001		DCA	TSTA4		/LOC,=0001
2444	1140		TAD	INS4		/INSTRUCTION=JMP I ,+2
2445	3002		DCA	TSTA5		/LOC,=0002
2446	1327		TAD	ADB		/ADDRESS=RET8
2447	3004		DCA	TSTA7		/LOC,=0004
			/			
			/			
2450	7300	FCL8,	CLA	CLL		
2451	1146		TAD	INS10		/INSTRUCTION=JMS I ,+1
2452	3472		DCA I	XSTA2		/LOC,=7777
2453	7240		CLA	CMA		
2454	5472		JMP I	XSTA2		
2455	7000	RET8,	NOP			
2456	7000		NOP			
			/			
			/			
2457	7430		SZL			
2460	7440		SEA			
2461	4465		JMS I	XDATA		
2462	7410		SKP			
2463	4466		JMS I	XHALT2		
2464	4467		JMS I	XLOOP		
2465	5250		JMP	FCL8		
2466	7200		CLA			
2467	1132		TAD	SEQ9		
2470	3154		DCA	SEQ		
2471	5554		JMP I	SEQ		
			/			
			/			
			/FALSE CARRY TEST #9			
2472	7300	FCT9,	CLA	CLL		
			/			
			/			
2473	7340	FCS9,	CLA	CLL	CMA	/DATA=7777
2474	3471		DCA I	XSTA1		/LOC,=7776
2475	1137		TAD	INS3		/INSTRUCTION=IAC
2476	3000		DCA	TSTA3		/LOC,=0000
2477	1141		TAD	INS5		/INSTRUCTION=JMP I ,+1
2500	3001		DCA	TSTA4		/LOC,=0001
2501	1330		TAD	AD9		/ADDRESS=RET9
2502	3002		DCA	TSTA5		/LOC,=0002
			/			
			/			
2503	7300	FCL9,	CLA	CLL		
2504	1147		TAD	INS11		/INSTRUCTION=JMS I ,+1

2505	3472		DCA I	XSTA2
2506	7240		CLA CMA	
2507	5472		JMP I	XSTA2
2510	7000	RET9,	NOP	
2511	7000		NOP	
2512	4464		JMS I	XAVREG
			/	
			/	
			/	
2513	7430		SZL	
2514	7440		SZA	
2515	4465		JMS I	XDATER
2516	7410		SKP	
2517	4466		JMS I	XHALT2
2520	4467		JMS I	XLOOP
2521	5303		JMP	FCL9
2522	7200		CLA	
2523	1133		TAD	SEQ10
2524	3154		DCA	SEQ
2525	5554		JMP I	SEQ
2526	2420	AD7,	RET7	
2527	2455	AD8,	RET8	
2530	2510	AD9,	RET9	

2600 PAGE

//
//
//FALSE CARRY TEST #10
//

2600 7300 FCT10, CLA CLL

2601 7300 FCS10, CLA CLL

2602	1150		TAD	INS12	/INSTRUCTION=JMS I TSTIND
2603	3472		DCA I	XSTA2	/LOC,=7777
2604	1137		TAD	INS3	/INSTRUCTION=IAC
2605	3001		DCA	TSTA4	/LOC,=0001

2606	1151		TAD	INS13	/INSTRUCTION=JMP I ,+1
2607	3002		DCA	TSTA5	/LOC,=0002
2610	1315		TAD	AD10	/ADDRESS=RET10
2611	3003		DCA	TSTA6	/LOC,=0003

2612	7340	FCL10,	CLA CLL CMA	
2613	3010		DCA	TSTIND
2614	7040		CMA	
2615	5472		JMP I	XSTA2
2616	7000	RET10,	NOP	
2617	7000		NOP	

```

2620 4464      JMS I   XAVREG
/
/
/
2621 7430      SZL
2622 7440      SZA
2623 4465      JMS I   XDATER
2624 7410      SKP
2625 4466      JMS I   XHALT2
2626 4467      JMS I   XLOOP
2627 5212      JMP     FCL10
2630 7200      CLA
2631 1134      TAD     SEQ11
2632 3134      DCA     SEQ
2633 5554      JMP I   SEQ

/
/
/
/ FALSE CARRY TEST #11
/
2634 7300      FCT11, CLA CLL
/
/
/
2635 7300      FCS11, CLA CLL
2636 1137      TAD     INS3           /INSTRUCTION=IAC
2637 3000      DCA     TSTA3        /LOC.=0000
2640 1141      TAD     INS5           /INSTRUCTION=JMP I ,+1
2641 3001      DCA     TSTA4        /ADDRESS=0001
2642 1316      TAD     AD11          /ADDRESS=RET11
2643 3002      DCA     TSTA5        /LOC.=0002
/
/
/
2644 7300      FCL11, CLA CLL
2645 1133      TAD     INS15          /INSTRUCTION=JMS ;
2646 3472      DCA I   XSTA2        /LOC.=7777
2647 7240      CLA CMA
2650 5472      JMP I   XSTA2
2651 7000      RET11, NOP
2652 7000      NOP
2653 4464      JMS I   XAVREG
/
/
/
2654 7430      SZL
2655 7440      SZA
2656 4465      JMS I   XDATER
2657 7410      SKP
2660 4466      JMS I   XHALT2
2661 4467      JMS I   XLOOP
2662 5244      JMP     FCL11
2663 7200      CLA
2664 1135      TAD     SEQ12

```

PAL10

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13131

1-30

2665 3154
2666 5554

DCA SEQ
JMP I SEQ

/

/

/FALSE CARRY TEST #12

/

2667 7300

FCT12, CLA CLL

2670 7300
2671 1137
2672 3472
2673 1152
2674 3000
2675 1317
2676 3001

FCS12, CLA CLL

TAD INS3
DCA I XSTA2
TAD INS14
DCA TSTA3
TAD AD12
DCA TSTA4

/INSTRUCTION=IAC
/LOC,=7777
/INSTRUCTION=JMP I ,+1
/LOC,=0000
/ADDRESS=RET12
/LOC,=0001

2677 7340
2700 5472
2701 7000
2702 7000
2703 4464

FCL12, CLA CLL CMA
JMP I XSTA2
RET12, NOP
NOP
JMS I XAVREG

2704 7430
2705 7440
2706 4465
2707 7410
2710 4466
2711 4467
2712 5277
2713 5714
2714 3200
2715 2616
2716 2051
2717 2701

/

/

/

SZL
SZA
JMS I XDATER
SKP
JMS I XHALT2
JMS I XLOOP
JMP FCL12
JMP I ,+1
ENDFCT
AD10, RET10
AD11, RET11
AD12, RET12

3000 PAGE

/(TAPE 3)
/COMPARE TWO NUMBERS! W1*NOT(W2)+W2*NOT(W1)=0, W1=W2

3000 0000
3001 7340
3002 0040
3003 7040

SAMEAS, 0
CLA CLL CMA
AND W2
CMA

```

3004 0037 AND W1
3005 7640 SZA CLA /W1*NOT(W2)=0
3006 5600 JMP I SAMEAS /W1*NOT(W2) NOT 0, ERROR
3007 7040 CMA
3010 0037 AND W1
3011 7040 CMA
3012 0040 AND W2
3013 7640 SZA CLA /W2*NOT(W1)=0
3014 5600 JMP I SAMEAS /W2*NOT(W1) NOT 0, ERROR
3015 2200 ISZ SAMEAS
3016 5600 JMP I SAMEAS /W1=W2
/
/SAVE AC AND LINK
/
3017 0000 SAVREG, 0
3020 3025 DCA TEMPAC
3021 7430 SZL
3022 7040 CMA
3023 3026 DCA TEMPL
3024 7040 CMA
3025 0025 AND TEMPAC
3026 5617 JMP I SAVREG
/
/HAULT ON ERROR, DISPLAY ADDRESS OF FAILED TEST IN AC
/
3027 0000 HALT2, 0
3030 7604 LAS
3031 0103 AND SR00 /TEST SR00
3032 7640 SZA CLA /SUPPRESS HALT IF SR00=1
3033 5627 JMP I HALT2
3034 1154 TAD SEQ /PUT ADDRESS OF FAILED TEST IN
3035 7402 HLT /AC AND STOP
3036 5627 JMP I HALT2 /CONTINUE TESTING
/
/
/ DATA ERROR HAS OCCURED
/
3037 0000 DATER, 0
3040 7604 LAS
3041 0104 AND SR01 /TEST SR01
3042 7450 SNA /SUPPRESS ERROR TYPE IF SR01=1
3043 4256 JMS TYP52 /SET UP FOR ERROR TYPE
3044 2237 ISZ DATER
3045 5637 JMP I DATER
/
/
/ LOOP ON DATA ERROR
/
3046 0000 LOOP, 0
3047 7604 LAS

```



```

3050 0105          AND      SR02          /TEST SR02
3051 7650          SNA CLA          /LOOP IF SR02=1
3052 5254          JMP      NLOOP        /DO NOT LOOP
3053 5646          JMP I     LOOP
3054 2246          NLOOP, ISZ     LOOP
3055 5646          JMP I     LOOP

/
/TYPE DATA ERROR MESSAGE
/
3056 0000          TYP2, 0
3057 4446          JMS I     XPRINT
3060 5744          DATE=1          /TYPE "DATA ERROR"
3061 1037          TAD      W1
3062 4673          JMS I     XADOUT        /TYPE TEST ADDRESS
3063 7340          CLA CLL CMA
3064 0025          AND      TEMPAC
3065 3037          DCA      WD1
3066 0026          AND      TEMPL
3067 3040          DCA      WD2
3070 4460          JMS I     XLNKOU        /OUTPUT RECEIVED LINK
3071 4461          JMS I     XWDOUT        /OUTPUT RECEIVED AC
3072 5656          JMP I     TYP2
3073 3227          XADOUT, ADOUT

/
/END OF PASS
/
3200 3200          PAGE
3201 7300          ENDFCT, CLA CLL
3202 2020          ISZ      CNTR1        /INCREMENT PASS COUNT
3203 5224          JMP      OUT          /PASS NOT COMPLETE
3204 7604          LAS
3205 0115          AND      SR10        /TEST SR10
3206 7650          SNA CLA          /IS SR10=1
3207 5221          JMP      FCTOK        /NO, TYPE FCT
3208 7604          FCTHLT, LAS
3210 0114          AND      SR09        /TEST SR09
3211 7640          SZA CLA          /IS SR09=1
3212 7402          HLT                      /YES, HALT
3213 7604          LAS
3214 0116          AND      SR11        /TEST SR11
3215 7640          SZA CLA          /IS SR11=1
3216 9224          JMP      OUT          /YES, LOOP ON FCT
3217 5620          JMP I     ,*1        /NO, GO TO NEXT TEST
3220 3400          RNAD1
3221 4446          FCTOK, JMS I     XPRINT
3222 5732          OK3=1
3223 5207          JMP      FCTHLT
3224 1122          OUT,  TAD      SEQ1
3225 3154          DCA      SEQ
3226 5554          JMP I     SEQ

/
/

```

/CONVERT ADDRESS TO ASCII AND OUTPUT

3227	0000	ADOUT,	0	
3230	3037		DCA	TEMP1
3231	1037		TAD	TEMP1
3232	0172		AND	K0007
3233	3264		DCA	A2
3234	1037		TAD	TEMP1
3235	7006		RTL	
3236	7004		RAL	
3237	0266		AND	K0700
3240	1264		TAD	A2
3241	1267		TAD	K6060
3242	3264		DCA	A2
3243	1037		TAD	TEMP1
3244	7012		RTR	
3245	7012		RTR	
3246	7012		RTR	
3247	0172		AND	K0007
3250	3263		DCA	A1
3251	1037		TAD	TEMP1
3252	7012		RTR	
3253	7010		RAR	
3254	0266		AND	K0700
3255	1263		TAD	A1
3256	1267		TAD	K6060
3257	3263		DCA	A1
3260	4446		JMS I	XPRINT
3261	3262		A1-1	
3262	5627		JMP I	ADOUT
3263	0000	A1,	0	
3264	0000	A2,	0	
3265	4000		4000	
3266	0700	K0700,	0700	
3267	6060	K6060,	6060	

/MULTIPLE ADDITIONS OF RANDOM NUMBER AND ITS TWO'S COMPLEMENT

3400	3400	PAGE	CLA CLL	
3401	7300	RNADI,	JMS I	XRAND
3402	4473		CLA CLL	/GENERATE RANDOM NUMBERS
3403	7300		TAD	RANDA
3404	1041		TAD	RANDC
3405	1043		TAD	RANDC
3406	1043		TAD	RANDA
3407	1041		TAD	RANDA
3410	1041		TAD	RANDA
3411	1043		TAD	RANDC
3412	1043		TAD	RANDC
3413	1041		TAD	RANDA
3414	1041		TAD	RANDA
3415	1043		TAD	RANDC
3416	1041		TAD	RANDA
3417	1043		TAD	RANDC
3420	1043		TAD	RANDC

3421	1041	TAD	RANDA	
3422	1041	TAD	RANDA	
3423	1043	TAD	RANDC	
3424	1043	TAD	RANDC	/AC=0
3425	1043	TAD	RANDC	
3426	1041	TAD	RANDA	
3427	1043	TAD	RANDC	
3430	1041	TAD	RANDA	/AC=0
3431	1041	TAD	RANDA	
3432	1041	TAD	RANDA	
3433	1043	TAD	RANDC	
3434	1043	TAD	RANDC	/AC=0
3435	7000	NOB		
3436	4464	JMS I	XAVREG	/SAVE AC AND LINK
3437	7430	SZL		/IS LINK=1, AND AC=0
3440	7440	SZA		
3441	4646	JMS I	XRN1ER	/ERROR, AC NOT 0, OR LINK NOT 1 OR BOTH
3442	4467	JMS I	NERROP	/RESULTS OK
3443	5202	JMP	RNAD1+2	
3444	5645	JMP I	,+1	
3445	3600	RNAD2		

3446 3447 XRN1ER, RN1ER

/RANDOM ADD TEST 1 ERROR HANDLER

3447	0000	RN1ER,	0	
3450	7604	LAS		
3451	0104	AND	SR01	/TEST SR01
3452	7640	SZA CLA		/IS SR01=1
3453	5302	JMP	SKHLT	/YES, SUPPRESS ERROR TYPEOUT
3454	4446	JMS I	XPRINT	/TYPE "RANDOM ADD TEST1 FAILED"
3455	5565	EM10-1		
3456	4446	JMS I	XPRINT	/TYPE "RANDA, RANDC, RESULT"
3457	5316	DH4-1		
3460	7340	CLA CLL	CMA	
3461	0041	AND	RANDA	
3462	3037	DCA	WD1	
3463	4461	JMS I	XWDOUT	/OUTPUT RANDA
3464	7340	CLA CLL	CMA	
3465	0043	AND	RANDC	
3466	3037	DCA	WD1	
3467	4461	JMS I	XWDOUT	/OUTPUT RANDC
3470	7340	CLA CLL	CMA	
3471	0025	AND	TEMPAC	
3472	3037	DCA	WD1	
3473	7040	CMA		
3474	0026	AND	TEMPL	
3475	3040	DCA	WD2	
3476	4460	JMS I	XLNKOU	/OUTPUT RESULTANT LINK
3477	4461	JMS I	XWDOUT	/OUTPUT RESULTANT AC
3500	4446	JMS I	XPRINT	
3501	5742	CRLF-1		

3502	7604	SKHLT,	LAS		
3503	0103		AND	SR00	
3504	7640		SZA	CLA	/TEST SR00
3505	5647		JMP I	RN1ER	/IS SR00=1
3506	7300		CLA	CLL	/YES, SUPPRESS ERROR HALT
3507	1247		TAD		
3510	7402		HLT	RN1ER	
3511	5647		JMP I	RN1ER	/HALT WITH ADDRESS OF RNAD1 IN AC

/
/RANDOM NUMBER GENERATOR

3512	0000	RANDOM,	0		
3513	7300		CLA	CLL	
3514	1041		TAD		RANDA
3515	7004		RAL		
3516	7430		SZL		
3517	1342		TAD		K0003
3520	3041		DCA		RANDA
3521	1041		TAD		RANDA
3522	7041		CIA		
3523	3043		DCA		RANDC
3524	7100		CLL		
3525	1341		TAD		R2A
3526	7004		RAL		
3527	7430		SZL		
3530	1342		TAD		K0003
3531	3341		DCA		R2A
3532	7430		SZL		
3533	7040		CMA		
3534	3044		DCA		LINKR
3535	1044		TAD		LINKR
3536	7040		CMA		
3537	3045		DCA		LINKRC
3540	5712		JMP I		RANDOM
3541	0001	R2A,	1		
3542	0003	K0003,	3		

/ADDITION OF RANDOM NUMBER AND MODIFIED
/COMPLEMENT TO PRODUCE ONE KNOWN BIT
/SET IN AC

/

3600	3600	PAGE			
3600	7340	RNAD2,	CLA	CLL	CMA
3601	0041		AND		RANDA
3602	3346		DCA		APOS
3603	7040		CMA		
3604	0041		AND		RANDA
3605	7040		CMA		
3606	3347		DCA		ANEG

/GET RANDOM NUMBER
/STORE IT

/ONE'S COMPLIMENT OF RANDOM NUMBER

3607	7040		CMA		
3610	0103		AND	K4000	/GET MASK
3611	3352		DCA	MASK	
3612	7040	NXTBT,	CMA		
3613	0352		AND	MASK	
3614	7040		CMA		
3615	3353		DCA	NMASK	/COMPLIMENT MASK
3616	7040	ALT1BT,	CMA		
3617	0346		AND	APOS	/GET RANDOM NUMBER
3620	0352		AND	MASK	/TEST SIGN BIT
3621	7440		SZA		/IS NUMBER NEGATIVE
3622	5232		JMP	MODNEG	/YES, MODIFY COMPLIMENT OF NUMBER
3623	7040		CMA		
3624	0346		AND	APOS	/GET RANDOM NUMBER
3625	4301		JMS	XOR1	/MODIFY WITH MASK
3626	7040		CMA		
3627	0347		AND	ANEG	/GET COMPLIMENT OF RANDOM NUMBER
3630	3351		DCA	BNEG	/AND USE AS IS
3631	5240		JMP	CBTST1	
3632	7240	MODNEG,	CMA CLA		/MODIFY NEGATIVE NUMBER
3633	0347		AND	ANEG	/GET COMPLEMENT OF RANDOM NUMBER
3634	4315		JMS	XOR2	/MODIFY WITH MASK
3635	7040		CMA		
3636	0346		AND	APOS	/GET RANDOM NUMBER
3637	3351		DCA	BNEG	/AND USE AS IS
3640	7340	CBTST1,	CLA CLL	CMA	
3641	0350		AND	BPOS	/LOAD AC WITH MODIFIED ARGUMENT
3642	1351		TAD	BNEG	/ADD UNMODIFIED ARGUMENT
3643	7430		SZL		/DID CARRY PROPAGATE INTO LINK
3644	7001		IAC		/NO, INCREMENT NUMBER
3645	4464		JMS I	XAVREG	/SAVE AC
3646	4463		JMS I	XAMEA	/COMPARE MODIFIED BIT AND MASK
3647	7410		SKP		
3650	4756		JMS I	XRN2ER	/AC AND MASK DIFFERENT, ERROR
3651	4467		JMS I	NERROP	/NO ERROR, AC AND MASK THE SAME
3652	5240		JMP	CBTST1	/RETURN HERE FOR LOOPING
3653	5254		JMP	CBTST2	
3654	7340	CBTST2,	CLL CLA CMA		
3655	0351		AND	BNEG	/LOAD AC WITH UNMODIFIED ARGUMENT
3656	1350		TAD	BPOS	/ADD MODIFIED ARGUMENT
3657	7430		SZL		/DID CARRY PROPAGATE INTO LINK
3660	7001		IAC		/NO, INCREMENT NUMBER
3661	4464		JMS I	XAVREG	/SAVE AC
3662	4463		JMS I	XAMEA	/COMPARE AC AND MASK
3663	7410		SKP		
3664	4756		JMS I	XRN2ER	/AC AND MASK NOT THE SAME, ERROR
3665	4467		JMS I	NERROP	/NOERROR, AC AND MASK THE SAME
3666	5254		JMP	CBTST2	/RETURN HERE FOR LOOPING
3667	7340	MOVMSK,	CLA CLL CMA		/SHIFT MASK ONE PLACE TO RIGHT
3670	0352		AND	MASK	
3671	7010		RAR		
3672	3352		DCA	MASK	

3673	7420		SNL		/HAVE ALL BITS BEEN TESTED
3674	5212		JMP	NXTBT	/NO, CONTINUE
3675	4467		JMS I	NERROP	/YES, TEST FOR LOOP ON RNAD2
3676	5200		JMP	RNAD2	
3677	5700		JMP I	,+1	
3700	4200		RARR		
3701	0000	XOR1,	0		
3702	0353		AND	NMASK	
3703	7040		CMA		
3704	3354		DCA	ABNOT	
3705	7040		CMA		
3706	0347		AND	ANEG	
3707	0352		AND	MASK	
3710	7040		CMA		
3711	0354		AND	ABNOT	
3712	7040		CMA		
3713	3350		DCA	BPOS	
3714	5701		JMP I	XOR1	
3715	0000	XOR2,	0		
3716	0352		AND	MASK	
3717	7040		CMA		
3720	3354		DCA	ABNOT	
3721	7040		CMA		
3722	0346		AND	APOS	
3723	0353		AND	NMASK	
3724	7040		CMA		
3725	0354		AND	ABNOT	
3726	3350		DCA	BPOS	
3727	5715		JMP I	XOR2	

3730	0000	SAMEA,	0		
3731	7040		CMA		
3732	3355		DCA	NOTAC	
3733	7040		CMA		
3734	0025		AND	TEMPAC	
3735	0353		AND	NMASK	
3736	7440		SZA		
3737	5344		JMP	EROUT1	
3740	7040		CMA		
3741	0352		AND	MASK	
3742	0355		AND	NOTAC	
3743	7440		SZA		
3744	2330	EROUT1,	ISE	SAMEA	
3745	5730		JMP I	SAMEA	
3746	0000	APOS,	0		
3747	0000	ANEG,	0		
3750	0000	BPOS,	0		
3751	0000	BNEG,	0		
3752	0000	MASK,	0		
3753	0000	NMASK,	0		
3754	0000	ABNOT,	0		
3755	0000	NOTAC,	0		
3756	4000	XRN2ER,	RN2ER		

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4000 PAGE
/
/ERROR HANDLER FOR RANDOM ADD TEST 2,
/
RN2ER, 0
4000 0000 LAS
4001 7604 AND SR01 /TEST SR01
4002 0104 SZA CLA /IS SR01 = 1
4003 7640 JMP I SHLT /YES SUPPRESS ERROR TYPEOUT
4004 5233 JMS I XPRINT /NO, TYPE "RANDOM ADD TEST 2 FAILED"
4005 4446 EM11=1
4006 5605 JMS I XPRINT /TYPE ARG1, ARG2, ARG1+ARG2, EXPECTED
4007 4446 DH6=1
4010 5364 CLA CLL CMA
4011 7340 AND BPOS /OUTPUT ARG1
4012 0777 DCA WD1
4013 3037 JMS I XWDOUT
4014 4461 CMA
4015 7040 AND BNEG /OUTPUT ARG2
4016 0776 DCA WD1
4017 3037 JMS I XWDOUT
4020 4461 CMA
4021 7040 AND MASK /OUTPUT EXPECTED RESULT
4022 0775 DCA WD1
4023 3037 JMS I XWDOUT
4024 4461 CMA
4025 7040 AND TEMPAC /OUTPUT RESULTANT IC
4026 0025 DCA WD1
4027 3037 JMS I XWDOUT
4030 4461 JMS I XPRINT
4031 4446 CRLF=1
4032 5742 SHLT, LAS
4033 7604 AND SR00 /TEST SR00
4034 0103 SZA CLA /IS SR00 = 1
4035 7640 JMP I RN2ER /YES, DO NOT HALT
4036 5600 CLA CLL /NO, HALT WITH ADDRESS IN AC
4037 7300 TAD RN2ER
4040 1200 HLT
4041 7402 JMP I RN2ER
4042 5600

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/ROTATE RANDOM NUMBER RIGHT USING RAR

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4175 3752
4176 3751
4177 3750
4200 4200
4200 7300

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PAGE
RARR, CLA CLL

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4201	1044	TAD	LINKR	/GET LINK TO BE ROTATED
4202	7440	SEA		
4203	7220	CLA	CML	
4204	1041	TAD	RANDA	/GET NUMBER TO BE ROTATED
4205	7010	RAR		
4206	7010	RAR		
4207	7010	RAR		
4210	7010	RAR		
4211	7010	RAR		
4212	7010	RAR		
4213	7010	RAR		
4214	7010	RAR		
4215	7010	RAR		
4216	7010	RAR		
4217	7010	RAR		
4220	7010	RAR		
4221	7010	RAR		
4222	7010	RAR		
4223	7010	RAR		
4224	7010	RAR		
4225	7010	RAR		
4226	7010	RAR		
4227	7010	RAR		
4230	7010	RAR		
4231	7010	RAR		
4232	7010	RAR		
4233	7010	RAR		
4234	7010	RAR		
4235	7010	RAR		
4236	7010	RAR		
4237	7000	NOP		
4240	7000	NOP		
4241	4464	JMS I	XAVREG	/SAVE AC AND LINK
4242	1043	TAD	RANDC	/ADD COMPLEMENT OF NUMBER TO AC
4243	7640	SEA	CLA	/ARE THEY EQUAL
4244	5250	JMP	,+4	/NO, ERROR
4245	1044	TAD	LINKR	
4246	3037	DCA	WD1	
4247	1026	TAD	TEMPL	
4250	3040	DCA	WD2	
4251	4462	JMS I	XAMEAS	/ARE LINKS THE SAME
4252	4735	JMS I	XRARR	/NO, ERROR
4253	4467	JMS I	NERROP	/TEST FOR LOOPING
4254	5200	JMP	RARR	/LOOP ON RARR
4255	7300	RALR,	/ROTATE RANDOM NUMBER LEFT USING RAL	
4256	1044	CLA	CLL	
4257	7440	TAD	LINKR	/GET LINK TO BE ROTATED
4260	7220	SEA		
4261	1041	CLA	CML	
4262	7004	TAD	RANDA	/GET NUMBER TO BE ROTATED
4263	7004	RAL		
4264	7004	RAL		

4265	7004	RAL
4266	7004	RAL
4267	7004	RAL
4270	7004	RAL
4271	7004	RAL
4272	7004	RAL
4273	7004	RAL
4274	7004	RAL
4275	7004	RAL
4276	7004	RAL
4277	7004	RAL
4300	7004	RAL
4301	7004	RAL
4302	7004	RAL
4303	7004	RAL
4304	7004	RAL
4305	7004	RAL
4306	7004	RAL
4307	7004	RAL
4310	7004	RAL
4311	7004	RAL
4312	7004	RAL
4313	7004	RAL
4314	7000	NOP
4315	7000	NOP
4316	4464	JMS I
4317	1043	TAD
4320	7440	SZA
4321	5325	JMP
4322	1044	TAD
4323	3037	DCA
4324	1026	TAD
4325	3040	DCA
4326	4462	JMS I
4327	4734	JMS I
4330	4467	JMS I
4331	5255	JMP
4332	5733	JMP I
4333	4400	RTL
4334	5013	XRALR,
4335	5000	XRARR,

XAVREG

RANDC

SZA

JMP

TAD

DCA

TAD

DCA

JMS I

JMS I

JMS I

JMP

JMP I

RTL

XRALR,

XRARR,

RALER

RARER

/SAVE AC AND LINK
 /ADD COMPLIMENT OF ORIGINAL NUMBER TO AC
 /ARE THEY THE SAME
 /NO, ERROR

/COMPARE ORIGINAL AND ROTATED LINKS
 /LINKS NOT THE SAME, ERROR

/ROTATE RANDOM NUMBER LEFT USING RTL

4400	7300	PAGE
4401	1044	RTL,
4402	7440	CLA CLL
4403	7220	TAD
4404	1041	SZA
4405	7006	CLA CML
4406	7006	TAD
4407	7006	RTL
4410	7006	RTL
		RTL

/GET LINK TO BE ROTATED

/GET NUMBER TO BE ROTATED

4411	7006	RTL		
4412	7006	RTL		
4413	7006	RTL		
4414	7006	RTL		
4415	7006	RTL		
4416	7006	RTL		
4417	7006	RTL		
4420	7006	RTL		
4421	7006	RTL		
4422	7006	RTL		
4423	7006	RTL		
4424	7006	RTL		
4425	7006	RTL		
4426	7006	RTL		
4427	7006	RTL		
4430	7006	RTL		
4431	7006	RTL		
4432	7006	RTL		
4433	7006	RTL		
4434	7006	RTL		
4435	7006	RTL		
4436	7006	RTL		
4437	7000	NOP		
4440	7000	NOP		
4441	4464	JMS I	XAVREG	
4442	1043	TAD	RANDC	/SAVE AC AND LINK
4443	7440	SZA		/ADD COMPLEMENT OF ORIGINAL NUMBER TO AC
4444	5250	JMP	,+4	/ARE THEY THE SAME
4445	1044	TAD	LINKR	/NO, ERROR
4446	3037	DCA	WD1	
4447	1026	TAD	TEMPL	
4450	3040	DCA	WD2	
4451	4462	JMS I	XAMEAS	/COMPARE ORIGINAL AND ROTATED LINKS
4452	4771	JMS I	XRTLRL	/LINKS NOT THE SAME, ERROR
4453	4467	JMS I	NERROP	
4454	5200	JMP	RTLRL	

/ROTATE RANDOM NUMBER RIGHT USING RTR

4455	7300	RTRR,	CLA CLL	
4456	1044		TAD	LINKR
4457	7440		SZA	/GET LINK TO BE ROTATED
4460	7220		CLA CML	
4461	1041		TAD	RANDA
4462	7012		RTR	/GET NUMBER TO BE ROTATED
4463	7012		RTR	
4464	7012		RTR	
4465	7012		RTR	
4466	7012		RTR	
4467	7012		RTR	
4470	7012		RTR	
4471	7012		RTR	
4472	7012		RTR	
4473	7012		RTR	

4474	7012	RTR		
4475	7012	RTR		
4476	7012	RTR		
4477	7012	RTR		
4500	7012	RTR		
4501	7012	RTR		
4502	7012	RTR		
4503	7012	RTR		
4504	7012	RTR		
4505	7012	RTR		
4506	7012	RTR		
4507	7012	RTR		
4510	7012	RTR		
4511	7012	RTR		
4512	7012	RTR		
4513	7012	RTR		
4514	7000	NOP		
4515	7000	NOP		
4516	4464	JMS I	XAVREG	/SAVE AC AND LINK
4517	1043	TAD	RANDC	/ADD COMPLEMENT OF ORIGINAL NUMBER TO AC
4520	7440	SEA		/ARE THEY THE SAME
4521	5325	JMP	,+4	/NO, ERROR
4522	1044	TAD	LINKR	
4523	3037	DCA	WD1	
4524	1026	TAD	TEMPL	
4525	3040	DCA	WD2	
4526	4462	JMS I	XAMEAS	/ARE LINKS THE SAME
4527	4770	JMS I	XRTRR	/NO, ERROR
4530	4467	JMS I	NERROP	
4531	5255	JMP	RTRR	

4532	2020	ISE	CNTR1	/INCREMENT PASS COUNTER
4533	5366	JMP	ENRN	/NOT END OF PASS
4534	7604	LAS		
4535	0115	AND	SR10	/TEST SR10
4536	7650	SNA CLA		/IS SR10=1
4537	5363	JMP	RNDOK	/NO, TYPE RANDOM
4540	7604	RNDHLT, LAS		
4541	0114	AND	SR09	/TEST SR09
4542	7640	SEA CLA		/IS SR09=1
4543	7402	HLT		/YES, HALT AT END OF RANDOM
4544	7604	LAS		
4545	0116	AND	SR11	/TEST SR11
4546	7640	SEA CLA		/IS SR11=1
4547	5366	JMP	ENRN	/YES, LOOP ON RANDOM TESTS
4550	7604	FLDSW, LAS		
4551	0173	AND K0070		
4552	7110	RAR CLL		
4553	7012	RTR		
4554	3175	DCA FLDSAV		/SAVE THE SWITCHES
4555	7604	LAS		
4556	0107	AND SR04		/MASK FIELD RELOCATION SWITCH
4557	7640	SEA CLA		

4560 5772
 4561 5762
 4562 0200
 4563 4446
 4564 5735
 4565 5340
 4566 5767
 4567 3400
 4570 5026
 4571 5041
 4572 4600

4600

JMP I XFLDCK
 JMP I ,+1
 RSIMAD
 RNDOK, JMS I XPRINT
 OK4-1
 JMP RNDHLT
 ENRN, JMP I ,+1
 RNAD1
 XRTRR, RTRER
 XRTRLR, RYLER
 XFLDCK, FLDCHK

/GOT FIELD RELOCATION SWITCH AND GO
 /NO, GO TO SIMULATED ADDITION TEST

PAGE

/ROUTINE TO SORT AND COMPARE RELOCATION INFORMATION

4600 4231
 4601 4264
 4602 7346
 4603 4341
 4604 4331
 4605 4352
 4606 4446
 4607 5755
 4610 4360
 4611 4331
 4612 7344
 4613 4341
 4614 1175
 4615 7041
 4616 1174
 4617 7050
 4620 5223
 4621 7602
 4622 5770
 4623 1314
 4624 1115
 4625 3226
 4626 0000
 4627 5630
 4630 0200

FLDCHK, JMS FLDEND /YES, FIND NUMBER OF FIELDS PRESENT
 JMS RELOC /RELOCATE TO NEXT BANK PRESENT OR BANK 0
 CLA CLL CMA RTL /AC TO 7775
 JMS LFCR /PRINT SOME CR=LF
 JMS ASTRK /PRINT SOME *****
 JMS FLDNO /PRINT AMOUNT OF MEMORY
 JMS I XPRINT /PRINT " EXTENDED BANKS OF MEMORY TO BANK "
 BKMES /TEXT FOR EXTENDED BANKS OF MEMORY TO BANK
 JMS FLDHR /PRINT NEW FIELD
 JMS ASTRK /PRINT SOME *****
 CLA CLL CMA RAL /AC TO 7776
 JMS LFCR /PRINT SOME CR = LF
 TAD FLD SAV
 CIA
 TAD FLDNUM
 SNA CLA /COMPARE SWITCHES
 JMP ,+3
 HLT CLA
 JMP I XFLDSW /TRY IT AGAIN
 TAD FLDGO
 TAD K0002
 DCA ,+1
 0000
 FLDEX, JMP I ,+1 /MODIFIED FOR NEW FIELD
 RSIMAD /START POINTER

/ROUTINE TO DETERMINE NUMBER OF BANKS OF MEM;

4631 0000
 4632 7300
 4633 3174
 4634 1371
 4635 3176
 4636 6201
 4637 3571
 4640 1372
 4641 1113
 4642 3243
 4643 0000

FLDFND, 0
 CLA CLL
 DCA FLDNUM
 TAD KSTOP
 DCA FLDCNT /JUST A COUNTER
 CDF 0 /TO FIELD 0
 DCA I K0
 TAD KCDF
 TAD K0010
 DCA FLDDF
 FLDDF, 0 /MODIFIED BY TEST

4644	7340	CLA CLL CMA	
4645	3571	DCA I K0	/TRY EXTENDED FIELD
4646	1571	TAD I K0	
4647	7650	SNA CLA	/SAME IF FIELD PRESENT
4650	5255	JMP ,+5	/DATA BAD OR FIELD NOT THERE
4651	2174	ISZ FLBNUM	/UPDATE FIELD COUNT
4652	1243	TAD FLDDF	/GET LAST FIELD CDF
4653	2176	ISZ FLDCNT	/STOP AFTER ?
4654	5241	JMP FLDDF =2	/TRY NEXT FIELD
4655	7300	CLA CLL	
4656	6201	CDF 0	/BACK TO FIELD 0
4657	1571	TAD I K0	
4660	7650	SNA CLA	/DID FIELD 0 CHANGE
4661	5631	JMP I FLDFND	/FIELD 0 O.K; EXIT
4662	7602	HLT CLA	/FIELD ERROR
4663	5274	JMP FLDFND ,+1	/TRY AGAIN

/ROUTINE TO MOVE PROGRAM TO NEXT FIELD OR FIELD 0

4664	0000	RELOC, 0	
4665	7300	CLA CLL	
4666	3176	DCA FLDCNT	
4667	6224	RIP	/GET CURRENT FIELD
4670	1113	TAD K0010	/UPDATE TO NEXT FIELD
4671	0375	AND K0170	/MASK 6-8
4672	3312	DCA FLDFRM	/NEW FIELD POINTER
4673	7301	CLA CLL IAC	
4674	1174	TAD FLBNUM	
4675	7004	RAL	
4676	7006	RTL	/MOVE TO 6-8
4677	7041	CIA	
4700	1312	TAD FLDFRM	
4701	7620	SNL CLA	/COMPARE TO FIELDS PRESENT
4702	1312	TAD FLDFRM	/YES, GOOD FIELD
4703	1372	TAD KCDF	/GO BACK TO FIELD 0
4704	3314	DCA FLDDG	/SET POINTER FOR NEW FIELD
4705	6224	RIP	/WHERE IS PROGRAM
4706	1372	TAD KCDF	
4707	3312	DCA FLDFRM	/SET POINTER FOR FIELD JUST TESTED
4710	1312	TAD FLDFRM	
4711	3317	DCA FLDRM1	/SAME MOVE
4712	0000	FLDFRM, 0000	/MODIFIED TO CURRENT FIELD
4713	1576	TAD I FLDCNT	/GET DATA WORD
4714	0000	FLDDG, 0000	
4715	3576	DCA I FLDCNT	/STORE DATA
4716	1576	TAD I FLDCNT	
4717	0000	FLDRM1, 0000	
4720	7041	CIA	
4721	1576	TAD I FLDCNT	/THIS THE GOOD ONE
4722	7650	SNA CLA	/DID DATA CHANGE
4723	5326	JMP ,+3	/DATA O.K.
4724	7602	HLT CLA	/RELOCATION ERROR
4725	5312	JMP FLDFRM	/TRY SAME WORD AGAIN
4726	2176	ISZ FLDCNT	/UPDATE TO NEXT ADDRESS
4727	5312	JMP FLDFRM	/TRANSFER NEXT WORD

```

/ PAL10 V141 13-SEP-71 13131 PAGE 1-45
4730 5664 JMP I RELOC /CORE LOADED EXIT
4731 0000 /
ASTRK, 0
4732 1371 TAD KSTOP
4733 3176 DCA FLDCNT
4734 1376 TAD K252 /GET ASTRK CHAR,
4735 4447 JMS I XTYPE
4736 2176 ISZ FLDCNT
4737 5334 JMP ,=3
4740 5731 JMP I ASTRK

/
LFCR, 0
4741 0000 DCA FLDCNT
4742 3176 TAD KCR
4743 1374 JMS I XTYPE
4744 4447 TAD KLF
4745 1373 JMS I XTYPE
4746 4447 ISZ FLDCNT
4747 2176 JMP ,=5
4750 5343 JMP I LFCR
4751 5741

/
FLDNO, 0
4752 0000 TAD FLBNUM
4753 1174 AND K0007
4754 0172 TAD K260
4755 1077 JMS I XTYPE
4756 4447 JMP I FLDNO
4757 5752

/
FLDHR, 0
4760 0000 TAD FLBGO
4761 1314 AND K0070
4762 0173 RAR
4763 7010 RTR
4764 7012 TAD K260
4765 1077 JMS I XTYPE
4766 4447 JMP I FLDHR
4767 5760

/
XFLOSW, FLOSW
4770 4550 KSTOP, 7771
4771 7771 KQDF, 6201
4772 6201 KLF, 0212
4773 0212 KCR, 0215
4774 0215 K0170, 0170
4775 0170 K252, 0252
4776 0252

/
PAGE
5000

/
RARER, 0
5000 0000 LAS
5001 7604 AND SR01
5002 0104 SZA CLA
5003 7640 JMP ,+4
5004 5210 JMS I XPRINT
5005 4446 EM12=1
5006 5625 JMS ROPRT
5007 4264

```

5010	7300		CLA CLL	
5011	1200		TAD	RARER
5012	5253		JMP	ROHLT
5013	0000	RALER,	0	
5014	7604		LAS	
5015	0104		AND	SR01
5016	7640		SEA CLA	
5017	5223		JMP	,+4
5020	4446		JMS I	XPRINT
5021	5644		EM13-1	
5022	4264		JMS	ROPRT
5023	7300		CLA CLL	
5024	1213		TAD	RALER
5025	5253		JMP	ROHLT
5026	0000	RTRER,	0	
5027	7604		LAS	
5030	0104		AND	SR01
5031	7640		SEA CLA	
5032	5236		JMP	,+4
5033	4446		JMS I	XPRINT
5034	5663		EM14-1	
5035	4264		JMS	ROPRT
5036	7300		CLA CLL	
5037	1226		TAD	RTRER
5040	5253		JMP	ROHLT
5041	0000	RTLER,	0	
5042	7604		LAS	
5043	0104		AND	SR01
5044	7640		SEA CLA	
5045	5251		JMP	,+4
5046	4446		JMS I	XPRINT
5047	5702		EM15-1	
5050	4264		JMS	ROPRT
5051	7300		CLA CLL	
5052	1241		TAD	RTLER
5053	3263	ROHLT,	DCA	ROBACK
5054	7604		LAS	
5055	0104		AND	SR00
5056	7640		SEA CLA	
5057	3242		JMP	,+3
5060	1263		TAD	ROBACK
5061	7402		HLT	
5062	5663		JMP I	ROBACK
5063	0000	ROBACK,	0	
5064	0000	ROPRT,	0	
5065	4446		JMS I	XPRINT
5066	5347		DMS-1	
5067	7340		CLA CLL	CMA
5070	0044		AND	LINKR
5071	3040		DCA	WD2

5072	7040	CMA	
5073	0041	AND	RANDA
5074	3037	DCA	WD1
5075	4460	JMS I	XLNKOU
5076	4461	JMS I	XWDOUT
5077	7040	CMA	
5100	0026	AND	TEMPL
5101	3040	DCA	WD2
5102	4460	JMS I	XLNKOU
5103	7040	CMA	
5104	0025	AND	TEMPAC
5105	3037	DCA	WD1
5106	4461	JMS I	XWDOUT
5107	4446	JMS I	XPRINT
5110	5742	CRLF=1	
5111	5664	JMP I	ROPRT

/

	PAGE	TEXT	/*	ARG1	ARG2	SIMULATED	ARG1+ARG2	ARG2+ARG1+*/
5200	3736							
5201	4040							
5202	4001							
5203	2207							
5204	6140							
5205	4040							
5206	4040							
5207	4040							
5210	4040							
5211	0122							
5212	0762							
5213	4040							
5214	4040							
5215	4040							
5216	4040							
5217	4023							
5220	1115							
5221	2514							
5222	0124							
5223	0504							
5224	4040							
5225	4040							
5226	4040							
5227	4001							
5230	2207							
5231	6153							
5232	0122							
5233	0762							
5234	4040							
5235	4040							
5236	4001							
5237	2207							
5240	6253							
5241	0122							

5242	0761					
5243	3736					
5244	0000					
5245	3736	DH2,	TEXT	/** ORIGINAL	SIMULATED	ACTUAL**/
5246	4040					
5247	4040					
5250	4017					
5251	2211					
5252	0711					
5253	1601					
5254	1440					
5255	4040					
5256	4040					
5257	4023					
5260	1115					
5261	2514					
5262	0124					
5263	0504					
5264	4040					
5265	4040					
5266	4040					
5267	4001					
5270	0324					
5271	2501					
5272	1437					
5273	3600					
5274	3736	DH3,	TEXT	/**RANDA	RANDC	RESULT**/
5275	2201					
5276	1604					
5277	0140					
5300	4040					
5301	4040					
5302	4040					
5303	4022					
5304	0116					
5305	0403					
5306	4040					
5307	4040					
5310	4040					
5311	4040					
5312	2205					
5313	2325					
5314	1424					
5315	3736					
5316	0000					
5317	3736	DH4,	TEXT	/**RANDA	BPOS	BNEG
5320	2201					RESULT**/
5321	1604					
5322	0140					
5323	4040					
5324	4040					
5325	4040					
5326	4002					
5327	2017					
5330	2340					

5331 4040
 5332 4040
 5333 4040
 5334 4040
 5335 0216
 5336 0507
 5337 4040
 5340 4040
 5341 4040
 5342 4040
 5343 4022
 5344 0523
 5345 2514
 5346 2437
 5347 3600
 5350 3736
 5351 1722
 5352 1107
 5353 1116
 5354 0114
 5355 4040
 5356 4040
 5357 4040
 5360 0103
 5361 2425
 5362 0114
 5363 3736
 5364 0000
 5365 3736
 5366 4040
 5367 4040
 5370 0122
 5371 0761
 5372 4040
 5373 4040
 5374 4040
 5375 4040
 5376 4001
 5377 2207
 5400 6240
 5401 4040
 5402 4040
 5403 4040
 5404 0530
 5405 2005
 5406 0324
 5407 0504
 5410 4040
 5411 4040
 5412 4040
 5413 0103
 5414 2425
 5415 0114
 5416 3736
 5417 0000

DH5, TEXT /*ORIGINAL ACTUAL**/

DH6, TEXT /* ARG1 ARG2 EXPECTED ACTUAL**/

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5420	3736	EM1,	TEXT	/**	SIMULATED ADD TEST FAILED/
5421	4040				
5422	4040				
5423	4023				
5424	1115				
5425	2514				
5426	0124				
5427	0504				
5430	4001				
5431	0404				
5432	4024				
5433	0523				
5434	2440				
5435	0601				
5436	1114				
5437	0504				
5440	0000				
5441	3736	EM2,	TEXT	/**	SIMULATED RAL TEST FAILED/
5442	4040				
5443	4040				
5444	4023				
5445	1115				
5446	2514				
5447	0124				
5450	0504				
5451	4022				
5452	0114				
5453	4024				
5454	0523				
5455	2440				
5456	0601				
5457	1114				
5460	0504				
5461	0000				
5462	3736	EM3,	TEXT	/**	SIMULATED RAR TEST FAILED/
5463	4040				
5464	4040				
5465	4023				
5466	1115				
5467	2514				
5470	0124				
5471	0504				
5472	4022				
5473	0122				
5474	4024				
5475	0523				
5476	2440				
5477	0601				
5500	1114				
5501	0504				
5502	0000				
5503	3736	EM4,	TEXT	/**	SIMULATED RTL TEST FAILED/
5504	4040				
5505	4040				
5506	4023				

5507 1115
5510 2514
5511 0124
5512 0504
5513 4022
5514 2414
5515 4024
5516 0523
5517 2440
5520 0601
5521 1114
5522 0504
5523 0000
5524 3736
5525 4040
5526 4040
5527 4023
5530 1115
5531 2514
5532 0124
5533 0504
5534 4022
5535 2422
5536 4024
5537 0523
5540 2440
5541 0601
5542 1114
5543 0504
5544 0000
5545 3736
5546 4040
5547 4040
5550 4023
5551 1115
5552 2514
5553 0124
5554 0504
5555 4002
5556 2327
5557 4024
5560 0523
5561 2440
5562 0601
5563 1114
5564 0504
5565 0000
5566 3736
5567 4040
5570 4040
5571 4022
5572 0116
5573 0417
5574 1540
5575 0104

EM5, TEXT /** SIMULATED RTR TEST FAILED/

EM6, TEXT /** SIMULATED BSW TEST FAILED/

EM10, TEXT /** RANDOM ADD TEST 1 FAILED/

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5420	3736	EM1,	TEXT	/**	SIMULATED ADD TEST FAILED/
5421	4040				
5422	4040				
5423	4023				
5424	1115				
5425	2514				
5426	0124				
5427	0504				
5430	4001				
5431	0404				
5432	4024				
5433	0523				
5434	2440				
5435	0601				
5436	1114				
5437	0504				
5440	0000				
5441	3736	EM2,	TEXT	/**	SIMULATED RAL TEST FAILED/
5442	4040				
5443	4040				
5444	4023				
5445	1115				
5446	2514				
5447	0124				
5450	0504				
5451	4022				
5452	0114				
5453	4024				
5454	0523				
5455	2440				
5456	0601				
5457	1114				
5460	0004				
5461	0000				
5462	3736	EM3,	TEXT	/**	SIMULATED RAR TEST FAILED/
5463	4040				
5464	4040				
5465	4023				
5466	1115				
5467	2514				
5470	0124				
5471	0504				
5472	4022				
5473	0122				
5474	4024				
5475	0523				
5476	2440				
5477	0601				
5500	1114				
5501	0504				
5502	0000				
5503	3736	EM4,	TEXT	/**	SIMULATED RTL TEST FAILED/
5504	4040				
5505	4040				
5506	4023				

5507 1115
 5510 2514
 5511 0124
 5512 0504
 5513 4022
 5514 2414
 5515 4024
 5516 0523
 5517 2440
 5520 0601
 5521 1114
 5522 0504
 5523 0000
 5524 3736
 5525 4040
 5526 4040
 5527 4023
 5530 1115
 5531 2514
 5532 0124
 5533 0504
 5534 4022
 5535 2422
 5536 4024
 5537 0523
 5540 2440
 5541 0601
 5542 1114
 5543 0504
 5544 0000
 5545 3736
 5546 4040
 5547 4040
 5550 4023
 5551 1115
 5552 2514
 5553 0124
 5554 0504
 5555 4002
 5556 2327
 5557 4024
 5560 0523
 5561 2440
 5562 0601
 5563 1114
 5564 0504
 5565 0000
 5566 3736
 5567 4040
 5570 4040
 5571 4022
 5572 0116
 5573 0417
 5574 1540
 5575 0104

EM5, TEXT /** SIMULATED RTR TEST FAILED/

EM6, TEXT /** SIMULATED BSW TEST FAILED/

EM10, TEXT /** RANDOM ADD TEST 1 FAILED/

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13=SEP=71

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2 1=52

5276 0440
 5277 2405
 5280 2324
 5281 4061
 5282 4006
 5283 0111
 5284 1405
 5285 0400
 5286 3736
 5287 4040
 5288 4040
 5289 4022
 5292 0116
 5293 0417
 5294 1540
 5295 0104
 5296 0440
 5297 2405
 5298 2324
 5299 4062
 5302 4006
 5303 0111
 5304 1405
 5305 0400
 5306 3736
 5307 4040
 5308 4040
 5309 4022
 5312 0116
 5313 0417
 5314 1540
 5315 2201
 5316 2240
 5317 2405
 5318 2324
 5319 4006
 5322 0111
 5323 1405
 5324 0400
 5325 3736
 5326 4040
 5327 4040
 5328 4040
 5329 4022
 5332 0116
 5333 0417
 5334 1540
 5335 2201
 5336 2240
 5337 2405
 5338 2324
 5339 4006
 5342 0111
 5343 1405
 5344 0400
 5345 3736
 5346 4040
 5347 4040
 5350 4022
 5351 0116
 5352 0417
 5353 1540
 5354 2201
 5355 1440
 5356 2405
 5357 2324
 5360 4006
 5361 0111
 5362 1405
 5363 0400
 5364 3736

EM11, TEXT /** RANDOM ADD TEST 2 FAILED/

EM12, TEXT /** RANDOM RAR TEST FAILED/

EM13, TEXT /** RANDOM RAL TEST FAILED/

EM14, TEXT /** RANDOM RTL TEST FAILED/

5665 4040
5666 4040
5667 4022
5670 0116
5671 0417
5672 1540
5673 2224
5674 1440
5675 2485
5676 2324
5677 4006
5700 0111
5701 1405
5702 0400
5703 3736
5704 4040
5705 4040
5706 4022
5707 0116
5710 0417
5711 1540
5712 2224
5713 2240
5714 2485
5715 2324
5716 4006
5717 0111
5720 1405
5721 0400
5722 3736
5723 2311
5724 1501
5725 0400
5726 3736
5727 2311
5730 1522
5731 1724
5732 0000
5733 3736
5734 0603
5735 2400
5736 3736
5737 2201
5740 1604
5741 1715
5742 0000
5743 3736
5744 0000
5745 3736
5746 4004
5747 0124
5750 0140
5751 0522
5752 2217
5753 2237

EM15, TEXT /* RANDOM RTR TEST FAILED?

OK1, TEXT /*SIMAD/

OK2, TEXT /*SIMROT/

OK3, TEXT /*FCT/

OK4, TEXT /*RANDOM/

CRLF, TEXT /*/

DATE, TEXT /* DATA ERROR*/

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E 1-54

5754 3600

5755 7777

BKMS, 7777

/TEXT FOR EXTENDED BANKS OF MEMORY TO BANK

5756 4005

4005

5757 3024

3024

5760 0516

0516

5761 0405

0405

5762 0440

0440

5763 0201

0201

5764 1613

1613

5765 2340

2340

5766 1706

1706

5767 4015

4015

5770 0515

0515

5771 1722

1722

5772 3140

3140

5773 2417

2417

5774 4002

4002

5775 0116

0116

5776 1340

1340

5777 0000

0000

/RESTORE BINARY LOADER AND START LOADER

7600

*7600

7600 7300

7601 1155

7602 3377

7603 5377

CLA CLL

TAD

BIN

DCA

TSTA2

JMP

TSTA2

S

A1	3263	DH5	5350	FCT12	2667	K0010	0113
A1ORA2	0027	DH6	5365	FCT2	2043	K0020	0112
A2	3264	EM1	5420	FCT3	2076	K0040	0111
ABNOT	3754	EM10	5566	FCT4	2200	K0070	0173
AD1	2127	EM11	5606	FCT5	2232	K0077	1645
AD10	2715	EM12	5626	FCT6	2270	K0100	0110
AD11	2716	EM13	5664	FCT7	2400	K0170	4775
AD12	2717	EM14	5664	FCT8	2436	K0200	0107
AD2	2130	EM15	5703	FCT9	2472	K0400	0106
AD3	2131	EM2	5441	FCTHLT	3207	K0700	3266
AD4	2324	EM3	5462	FCTOK	3221	K1000	0105
AD5	2325	EM4	5503	FLOCHK	4600	K2000	0104
AD6	2326	EM5	5524	FLODCH	0176	K212	1650
AD7	2526	EM6	5545	FLODCT	4643	K213	1651
AD8	2527	ENCAR	0244	FLODF	4627	K240	0076
AD9	2530	ENCAR1	0253	FLODEX	4631	K252	4776
ADA1	0021	ENDBSW	1277	FLODFND	4712	K260	0077
ADA2	0022	ENDFCT	3200	FLOFRM	4714	K261	0100
ADD	0274	ENDROT	1303	FLOGO	4714	K336	1647
ADDERR	0400	ENRN	4566	FLOHR	4760	K4000	0103
ADHLT	0556	EROUT1	3744	FLONO	4752	K6000	0101
ADOUT	3227	ERROR1	0377	FLONUM	0174	K6060	3267
ADPRT	0417	ERROR2	1046	FLDRM1	4717	KCDF	4772
ADT	0551	ERROT	1026	FLDSAV	0175	KCR	4774
ANFLG	0035	FCL1	2023	FLOSW	4550	KLF	4773
AHOUT	0467	FCL10	2612	GOTEST	0177	KSTOP	4771
ALT1BT	3616	FCL11	2644	HALT2	3027	KXXXX	0170
ANEG	3747	FCL12	2677	HALTA	0477	LPCR	4741
APOS	3746	FCL2	2056	HALTB	1063	LINK1	0032
ARG1	0023	FCL3	2107	HALT	0404	LINK2	0034
ARG2	0024	FCL4	2213	HLTB	1052	LINKR	0044
ASTRK	4731	FCL5	2246	INS1	0136	LINKRC	0045
BIN	0155	FCL6	2302	INS10	0146	LNKOUT	0504
BKMES	5755	FCL7	2412	INS11	0147	LOOP	3046
BNEG	3751	FCL8	2450	INS12	0150	LOOP1	0552
BPOS	3750	FCL9	2503	INS13	0151	M4	1070
BSW	7002	FCS1	2005	INS14	0152	M40	1646
BSWIAB	1660	FCS10	2601	INS15	0153	MASK	3752
CAF	6007	FCS11	2635	INS16	2133	MODNEG	3632
CARRY	0030	FCS12	2670	INS2	2132	MOVMSK	3667
CBTST1	3640	FCS2	2044	INS3	0137	MOA	7501
CBTST2	3654	FCS3	2077	INS4	0140	MQL	7421
CHAR	0036	FCS4	2201	INS5	0141	MFP	1643
CNTR1	0020	FCS5	2233	INS6	0142	N1BIT	1244
COMROT	1000	FCS6	2271	INS7	0143	NBIT	1207
CRLF	5743	FCS7	2401	INS8	0144	NERROP	0067
DATE	5745	FCS8	2437	INS9	0145	NEWLNK	1044
DATER	3037	FCS9	2473	K0	0171	NLOOP	3054
DH1	5200	FCT	2000	K0001	0116	NMASK	3753
DH2	5245	FCT1	2004	K0002	0115	NOTAC	3755
DH3	5274	FCT10	2600	K0003	3542	NXBIT	0527
DH4	5317	FCT11	2634	K0004	0114	NXTADD	0365
				K0007	0172		

NXTBT	3612	RNDHLT	4540	SIMRTL	0653	XFLDSH	4770
NXTCAR	0234	RNDOK	4563	SIMRTR	0700	XHALT2	0066
NXPROT	1031	ROBACK	5063	SKHLT	3502	XLNK09	0060
OK1	5722	ROHLT	5053	SP1	0545	XLOOP	0067
OK2	5726	ROPRT	5064	SR00	0103	XLOOP1	0075
OK3	5733	ROTDNE	1323	SR01	0104	XLOOP2	0074
OK4	5736	ROTHLT	1327	SR02	0105	XM2	1450
OR1	1225	ROTPRT	1071	SR03	0106	XM3	1451
OUT	3224	RRAC	0031	SR04	0107	XM4	1452
OUT1	0520	RRAL	0605	SR05	0110	XM5	1453
OUT1A	0542	RRAR	0632	SR06	0111	XM6	1454
POINT1	0011	RRLNK	0033	SR07	0112	XNXTAD	0416
POINT2	0012	RRTL	0657	SR08	0113	XNXTRO	0057
PRINT	1600	RRTR	0704	SR09	0114	XOR1	3701
R1	1400	RSIMAD	0200	SR10	0115	XOR2	3715
R2	1410	RTLER	5041	SR11	0116	XORALL	0260
R2A	3541	RTLRTAB	4400	SROTAL	1200	XPRINT	0046
R3	1420	RTLTA	1160	SROTK	1342	XR1	0752
R4	1430	RTRER	5026	START	0156	XR2	0753
R5	1440	RTRR	4455	SUM1	0031	XR3	0754
RAC	0023	RTRTAB	1141	SUM2	0033	XR4	0755
RALER	5013	SADOK	0570	TEMP1	0037	XR5	0756
RALR	4255	SAMEA	3730	TEMPAC	0025	XRALR	4334
RALTAB	0737	SAMEAS	3000	TEMPL	0026	XRALTA	0052
RANDA	0041	SAVREG	3017	TSTA0	7775	XRAND	0073
RANDB	0042	SBSW	1236	TSTA1	7776	XRARR	4335
RANDC	0043	SEQ	0134	TSTA2	7777	XRARTA	0102
RANDOM	3512	SEQ1	0122	TSTA3	0000	XRWD	0050
RARER	3000	SEQ10	0133	TSTA4	0001	XRN1ER	3446
RARR	4200	SEQ11	0134	TSTA5	0002	XRN2ER	3756
RBSW	0731	SEQ12	0135	TSTA6	0003	XROTDN	0777
RELOC	4664	SEQ2	0123	TSTA7	0004	XRTLRT	4571
RET1	2025	SEQ3	0124	TSTIND	0010	XRTLTA	0053
RET10	2616	SEQ4	0125	TYBIT	0540	XRTRR	4570
RET11	2651	SEQ5	0126	TYLNK	0513	XRTRTA	0054
RET12	2701	SEQ6	0127	TYPE	1652	XSBSW	0776
RET2	2060	SEQ7	0130	TYP52	3056	XSROT	0051
RET3	2111	SEQ8	0131	TYPSET	1617	XSTA0	0070
RET4	2215	SEQ9	0132	W1	0037	XSTA1	0071
RET5	2252	SHLT	4033	W2	0040	XSTA2	0072
RET6	2306	SIMAC	0025	WD1	0037	XTYPE	0047
RET7	2420	SIMAD	0204	WD2	0040	XWDOUT	0061
RET8	2455	SIMBSW	0725	WDOUT	0523		
RET9	2510	SIMLNK	0026	XADD	0415		
RHD	1133	SIMR	0577	XADOUT	3073		
RHFLG	0035	SIMRAL	0601	XAMEA	0063		
RHOUT	1131	SIMRAR	0626	XAMEAS	0062		
RLNK	0024	SIMRO1	0600	XAVREG	0064		
RN1ER	3447	SIMRO2	0625	XBSWTA	0055		
RN2ER	4000	SIMRO3	0652	XCOMRO	0056		
RNAD1	3400	SIMRO4	0677	XDATER	0065		
RNAD2	3600	SIMRO5	0724	XFLDCK	4572		

ERRORS DETECTED: 0

LINKS GENERATED: 3

RUN-TIME: 32 SECONDS

3K CORE USED