

IDENTIFICATION  
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|                |                      |
|----------------|----------------------|
| PRODUCT CODE I | MAINDEC-8E-DBCC-0    |
| PRODUCT NAME I | 8E ADDER TESTS       |
| DATE CREATED I | SEPT. 1, 1971        |
| MAINTAINER I   | DIAGNOSTIC GROUP     |
| AUTHOR I       | M. DAVIS & J. VROBEL |

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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-00AA, 00BA

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=0B 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 FASI 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 SR05=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:

ARG1 SIMULATED ADD TEST FAILED  
ARG2 SIMULATED ARG1+ARG2 ARG2+ARG1  
XXXXXXXXXXXXX XXXXXXXXXXXXXXXX X XXXXXXXXXXXXXXXX X XXXXXXXXXXXXXXXX

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.

#### 6.1.1.2 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

#### 6.1.1.3 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.

#### 6.1.1.4 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

#### 6.1.1.5 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 RYL

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<br>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  
SIMROY  
ACT  
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 "AND'ED" TOGETHER, AND ANY BITS IN THE RESULT THAT ARE 1'S WILL BE CARRY BITS. THE ARGUMENTS ARE "OR'ED" TOGETHER AND THE RESULT IS STORED. THE PREVIOUSLY GENERATED CARRIES ARE ROTATED ONCE TO THE LEFT AND THEN "AND'ED" 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 MOA=7501  
 7421 MOL=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  
 0024 RLNK=ARG2  
 0031 RRAC=SUM1  
 0033 RRLNK=SUM2  
 0025 TEMPAC=SIMAC  
 0026 TEMPL=SIMLNK  
 0037 TEMPI=ND1  
 0040 W1=WD1  
 0040 W2=WD2  
 0035 RHFLG=AHFLG  
 0067 NERROP=XLOOP  
  
 7775  
 7775 TSTAB; 0  
 7776 TSTA1; 0  
 7777 TSTA2; 0  
  
 0000  
 0000 TSTA3; 0  
 5001 TSTA4; JMP  
 0002 TSTA5; 2  
 0003 TSTA6; 3  
 0004 TSTA7; 0

/AC TO BE ROTATED  
 /LINK TO BE ROTATED  
 /AQ AFTER REAL ROTATE  
 /LINK AFTER REAL ROTATE  
 /TEMPORARY AC STORAGE  
 /TEMPORARY LINK STORAGE  
 /TEMPORARY DATA STORAGE  
 /  
 /  
 /  
 /ROTATE TEST ERROR HEADER FLAG

```

0010 *10
/INDEX REGISTERS
/
0010 0000 TSTIND, 0
0011 0000 POINT1, 0
0012 0000 POINT2, 0

```

```

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 SIMAG, 0
0026 0000 SIMLNK, 0
0027 0000 AIORAZ, 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 AMPLG, 0
0036 0000 CHAR, 0
0037 0000 HQ1, 0
0040 0000 HQ2, 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
0047 1652 XIYPE, TYPE
0050 1133 XRHD, RHD
/CHARACTER STRING TYPE
/CHARACTER TYPE
/TYPE ROTATE ERROR HEADER

```

```

0051 1200 XSROT, SROTAL
0052 0756 XRALTA, RALTAB=1
0053 1157 XRTLTA, RTLTAB=1
0054 1140 XRTRTA, RTRTAB=1
0055 1657 XBSHTA, BSHTAB=1
0056 1000 XCOMRO, COMROT
0057 1031 XNXTRO, NXTROT
0060 0504 XLNKOU, LNKOUT
0061 0523 XMDOUT, MDOUT
0062 3000 XAMEAS, SAMEAS
0063 3780 XAMEA, SAMEA
0064 3017 XAVREG, SAVREG
0065 3037 XDATER, DATER
0066 3027 XHALT2, HALT2
0067 3046 XLOOP, LOOP
0070 7775 XSTAB, TSTAB
0071 7776 XSTA1, TSTA1
0072 7777 XSTA2, TSTA2
0073 3512 XRAND, RANDOM
0074 0410 XLOOP2, HLTA=4
0075 0952 XLOOP1, LOOP1

```

```

/COMMON ROTATE SIMULATOR
/RAL MASK TABLE
/RTL MASK TABLE
/RTR MASK TABLE
/BYTE SWAP MASK TABLE
/ROTATE COMPARISON FOR SIMULATION
/TYPE LINK
/TYPE DATA WORD
/COMPARE DATA
/SAVE AC AND LINK
/DATE ERROR HANDLER FOR FCT
/DATE ERROR HALT FOR FCT
/LOOP ON TEST
/RANDOM NUMBER GENERATOR

```

```

/WIDELY USED CONSTANTS

```

```

K240, 240
K260, 260
K261, 261
K6000, 6000
XRARTA, 4000
K4000, 4000
K2000, 2000
K1000, 1000
KB400, 400
K0200, 200
K0100, 100
K0040, 40
K0020, 20
K0010, 10
K0004, 4
K0002, 2
K0001, 1
K0000, 0

```

```

/TEST POINTERS FOR FCT

```

```

FCT1
FCT2
FCT3
FCT4
FCT5
SEQ1, 2004
SEQ2, 2043
SEQ3, 2076
SEQ4, 2200
SEQ5, 2232

```

|       |       |       |       |        |        |        |
|-------|-------|-------|-------|--------|--------|--------|
| 0127  | 0130  | 0131  | 0132  | 0133   | 0134   | 0135   |
| SEQ6, | SEQ7, | SEQ8, | SEQ9, | SEQ10, | SEQ11, | SEQ12, |
| FCT6  | FCT7  | FCT8  | FCT9  | FCT10  | FCT11  | FCT12  |

SETUP INSTRUCTIONS FOR FCI

|         |       |         |         |         |         |         |        |         |         |        |         |         |         |      |      |
|---------|-------|---------|---------|---------|---------|---------|--------|---------|---------|--------|---------|---------|---------|------|------|
| 0136    | 0137  | 0140    | 0141    | 0142    | 0143    | 0144    | 0145   | 0146    | 0147    | 0150   | 0151    | 0152    | 0153    | 0154 | 0155 |
| INS1,   | INS3, | INS4,   | INS5,   | INS6,   | INS7,   | INS8,   | INS9,  | INS10,  | INS11,  | INS12, | INS13,  | INS14,  | INS15,  | SEG, | BIN, |
| 1376    | 7001  | 5404    | 5402    | 7070    | 2376    | 2000    | 2410   | 4000    | 4776    | 4410   | 5403    | 5401    | 4377    | FCT1 | 5301 |
| BTAD    | BIAC  | BUMP    | BMA     | BIZE    | BIZE    | BJMS    | BJMS   | BJMS    | BJMS    | BJMP   | BJMP    | BJMS    |         |      |      |
| IN 7777 |       | IN 0002 | IN 0001 | CML RAR | IN 7777 | IN 7777 | TSTIND | IN 7777 | IN 7777 | TSTIND | IN 0002 | IN 0000 | IN 7777 |      |      |

TEST FOR FAST TAP SIMULATION

|        |      |      |        |       |      |      |      |      |      |          |        |      |        |        |         |         |         |         |
|--------|------|------|--------|-------|------|------|------|------|------|----------|--------|------|--------|--------|---------|---------|---------|---------|
| 0156   | 0157 | 0160 | 0161   | 0162  | 0163 | 0164 | 0165 | 0166 | 0167 | 0170     | 0171   | 0172 | 0173   | 0174   | 0175    | 0176    | 0177    |         |
| START, | CAP  | LAB  | AND    | SNA   | JMP  | CMA  | AND  | DCA  | JMP  | RSINAD#2 | KXXXX, | K0,  | K0007, | K0070, | FLDNUM, | FLDSAV, | FLDCNT, | GOTEST, |
| 6007   | 7604 | 0106 | 7650   | 5177  | 7240 | 0170 | 3024 | 5567 | 0202 | 0000     | 0000   | 0007 | 0070   | 0000   | 0000    | 0000    | 0177    | 7410    |
|        |      | SR03 | GOTEST | KXXXX | ARG2 | ARG2 | ARG2 | ARG2 | ARG2 | ARG2     |        |      |        |        |         |         |         |         |
|        |      |      |        |       |      |      |      |      |      |          |        |      |        |        |         |         |         |         |

TEST FOR FAST TAP SIMULATION

|         |       |         |         |         |         |         |        |         |         |        |         |         |         |        |        |        |        |        |        |        |        |
|---------|-------|---------|---------|---------|---------|---------|--------|---------|---------|--------|---------|---------|---------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0177    | 0178  | 0179    | 0180    | 0181    | 0182    | 0183    | 0184   | 0185    | 0186    | 0187   | 0188    | 0189    | 0190    | 0191   | 0192   | 0193   | 0194   | 0195   | 0196   | 0197   |        |
| INS1,   | INS2, | INS3,   | INS4,   | INS5,   | INS6,   | INS7,   | INS8,  | INS9,   | INS10,  | INS11, | INS12,  | INS13,  | INS14,  | INS15, | INS16, | INS17, | INS18, | INS19, | INS20, | INS21, | INS22, |
| 1376    | 7001  | 5404    | 5402    | 7070    | 2376    | 2000    | 2410   | 4000    | 4776    | 4410   | 5403    | 5401    | 4377    | FCT1   | 5301   |        |        |        |        |        |        |
| BTAD    | BIAC  | BUMP    | BMA     | BIZE    | BIZE    | BJMS    | BJMS   | BJMS    | BJMS    | BJMP   | BJMP    | BJMS    |         |        |        |        |        |        |        |        |        |
| IN 7777 |       | IN 0002 | IN 0001 | CML RAR | IN 7777 | IN 7777 | TSTIND | IN 7777 | IN 7777 | TSTIND | IN 0002 | IN 0000 | IN 7777 |        |        |        |        |        |        |        |        |

```

0200      JMP      START      /GO TO FAST TEST CHECK
0201      DCA      ARG2
0202      DCA      ARG1      /CLEAR SIMULATION VARIABLES
0203      DCA      AHFLG     /CLEAR ERROR MESSAGE FLAG

```

```

/SIMULATE ADDITION BY SIMULATED GENERATEION OF SUM
/AND CARRY BITS

```

```

/FORM OR OF ARG1 WITH ARG2

```

```

SIMAD,
0204      7340      CLA CLL CMA      /LOAD AC WITH ARG1
0205      0023      AND      ARG1      /PLACE IN MQ
0206      7421      MQL
0207      7040      CMA
0210      0024      AND      ARG2      /LOAD AC WITH ARG2
0211      7501      MQA
0212      5027      DCA      A10RA2     /FORM ARG1 OR ARG2

```

```

/FORM XOR(EXCLUSIVE OR) OF ARG1 WITH ARG2
/BY A XOR B=(A AND NOTB)OR(NOT A 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      5025      DCA      SIMAC     /TO GET ARG1 XOR ARG2
0225      5026      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
0234      7521      MQA MQL      /SAVE FIRST CARRIES
0235      0027      AND      A10RA2     /GET CARRIES FROM MQ

```

```

/AND WITH A10RA2 TO SEE IF MORE CARRIES ARE GENERATED

```

```

0236 7450 SNA /ARE THERE ANY MORE CARRIES
0237 5244 JMP ENCAR /NO, END SIMULATION OF CARRIES
0240 7104 CLL RAL /PROPIGATE 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
/
MQA /GET CARRIES
AND A10RA2 /AND WITH A10RA2
AND K4000 /TEST BIT 00
SNA /IS BIT 00 1
JMP ENCAR1 /NO, CARRIES DID NOT PROPAGATE INTO LINK
DCA SIMLNK /YES, SAVE CARRY INTO LINK
JMP XORALL /COMPLETE SIMULATION
CLL CML RAR /SET AC=4000
AND ARG1 /AND WITH ARG1
AND ARG2 /AND WITH ARG2 TO SEE IF ORIGINAL
SZA AND /NUMBERS GENERATED CARRY INTO LINK
DCA SIMLNK /SAVE SIMULATED LINK

```

```

/FORM XOR OF ARG1, ARG2 AND CARRIES
/TO GET FINAL SIMULATED SUM
/
MQA /SAVE SIMULATED CARRIES
DCA CARRY
MQA /FORM A10RA2 AND NOTCARRY
AND SIMAC /SAVE IN MQ
AND SIMAC
AND CARRY /FORM CARRY AND NOTA10RA2
MQA /OR WITH CONTENTS OF MQ
DCA SIMAC /TO GET FINAL SIMULATED SUM
/

```

```

/PERFORM ADDITIONS ARG1+ARG2 AND ARG2+ARG1
CLA CLL CMA
AND ARG1 /LOAD AC WITH ARG1
TAD ARG2 /ADD ARG2
NOP SUM1 /SAVE RESULT
DCA LINK1 /SAVE LINK
RAR ARG2 /LOAD AC WITH ARG2
DCA ARG1 /ADD ARG1
CMA SUM2 /SAVE RESULT
AND NOP
TAD DCA
NOP DCA
RAR 0310

```

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 /GET RESULT OF ARG1+ARG2  
AND SUM1 /COMPLEMENT  
CMA SUM2 /AND RESULTS OF ARG2+ARG1  
SEA /IS SUM2 AND NOTSUM1=0  
JMP ERROR1 /NO, ERROR  
CMA SUM2 /LOAD AC WITH RESULTS OF ARG2+ARG1  
AND /COMPLEMENT  
CMA SUM1 /AND WITH SUM1  
SEA /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 /LOAD AC WITH RESULTS OF ARG1+ARG2  
AND SUM1 /COMPLEMENT  
AND SIMAC /AND WITH RESULTS OF SIMULATION  
SEA /IS SIMAC AND NOTSUM1=0  
JMP ERROR1 /NO, ERROR  
CMA SIMAC /LOAD AC WITH SIMULATION RESULTS  
AND /COMPLEMENT  
CMA SUM1 /AND WITH RESULTS OF ARG1+ARG2  
SEA /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 /GET LINK FROM ARG1+ARG2  
AND LINK1  
RAL CMA /GET LINK FROM ARG2+ARG1  
AND LINK2  
SEA CLA  
CML  
SEL  
JMP ERROR1 /ARE THEY THE SAME  
/NO, ERROR

/COMPARE LINKS GENERATED BY REAL AND SIMULATED ADDS

```

0354 7340 / CLA CLL CMA /GET LINK FROM ARG1+ARG2
0355 0032 AND LINK1
0356 7004 RAL
0357 7240 CLA CMA SIMLNK /GET LINK FROM SIMULATION
0360 0026 AND SZA CLA
0361 7640 CHL
0362 7020 SZL
0363 7430 JMP ERROR1
0364 5377

```

```

/SET UP FOR NEXT ADDITION
/TEST FOR SIMULATION WITH SAME DATA
/INCREMENT ARG1
/GO TO SIMULATION
/INCREMENT ARG2
/GO TO SIMULATION
/TEST FOR TRANSFER TO NEXT TEST
/TRANSFER ARG2 TO ARG1
/CONTINUE SIMULATION

```

```

*377
ERROR1, NOP
/ERROR HANDLER FOR ADDITION TEST
/GET SWITCHES
/TEST SR01
/SUPPRESS TYPEOUT IF SR01#1
/TYPE ERROR MESSAGE
/HAUT IF SR00#0
/HAUT WITH ADDRESS OF TEST IN AC
/TEST SR02
/LOOP WITH SAME DATA IF SR02#1
/LOOP WITH SAME DATA

```

```

*400
ADERR,
HLTA,
XADD,
XNXTAD,
/TYPE ERROR MESSAGE FOR ADDITION TEST
/GET FLAG FOR ERROR MESSAGE HEADER TYPEOUT
/HAS HEADER FOR TEST BEEN TYPED
/NO TYPE HEADER

```

```

0400 7004
0401 0104
0402 7650
0403 4217
0404 7604
0405 0103
0406 7650
0407 4277
0410 7604
0411 0105
0412 7640
0413 5615
0414 5616
0415 0274
0416 0366

```



```

0424 7040 CMA
0425 0023 AND ARG1
0426 3037 DCA WD1
0427 4323 JMS WDOU /OUTPUT ARG1
0430 7040 CMA
0431 0024 AND ARG2
0432 3037 DCA WD1
0433 4323 JMS WDOU /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 WDOU /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 WDOU /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 WDOU /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
/
0 AHOUT;
0467 0000 JMS I XPRINT /TYPE "SIMULATED ADD TEST FAILED"
0470 4446 EM1=1 XPRINT /TYPE ARG1, ARG2, SIMULATED, ARG1+ARG2, ARG2+ARG1
0471 5417 JMS I XPRINT /SET ADD TEST HEADER FLAG
0472 4446 DH1=1 DCA CMA /TO PREVENT MULTIPLE HEADER TYPEOUTS
0473 5177 CLA CMA
0474 7240 DCA AHFLG
0475 3035 JMP I AHOUT
0476 5667 /HALT WITH ADDRESS OF TEST IN AC

/
0 HALTA;
0477 0000 CLA CMA
0500 7240 AND ADT
0501 0351 HLT
0502 7402 JMP I HALTA
0503 5677

```

```

/TYPE LINK
LNKOUT, 0000 CLA CLL CMA
0505 7340 AND HD2
0506 0040
0507 7640 SEA CLA
0510 5320 JMP OUT1
0511 7040 CMA
0512 0077 AND K260
0513 4447 JMS I XTYPE
0514 7040 CMA
0515 0076 AND K240
0516 4447 JMS I XTYPE
0517 5704 JMP I LNKOUT
0520 7040 CMA
0521 0100 AND K261
0522 5313 JMP TYLNK
/TYPE DATA WORD
WDOUT, 0000 CLA CLL CMA
0524 7340 AND XRARTA
0525 0102 DCA POINT1
0526 3011 CMA
0527 7040 AND I POINT1
0530 0411 SNA
0531 7450 JMP SP1
0532 5345 AND HD1
0533 0037 SEA CLA
0534 7640 JMP OUT1A
0535 5342 CMA
0536 7040 AND K260
0537 0077
TYBIT, 4447 JMS I XTYPE
0541 5327 JMP NXBIT
0542 7040 CMA
0543 0100 AND K261
0544 5340 JMP TYBIT
0545 7040 CMA
0546 0076 AND K240
0547 4447 JMS I XTYPE
0550 5723 JMP I WDOUT
0551 0204 SIMAD
/END OF SIMULATED ADD TEST
LOOP1, 7604 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
0556      7604      LAS
0557      0114      AND      SR09
0560      7640      SZA CLA
0561      7402      HLT
0562      7604      LAS
0563      0116      AND      SR11
0564      7650      SNA CLA
0565      5377      JMP      SIMR
0566      5767      JMP      I+1
0567      0204      SIMAD
0570      4446      JMS I   XPRINT
0571      5721      OK1=1
0572      5356      JMP      ADHLT
0577      0577      *577
0577      7000      SIMR,   NOP

```

```

/NO, TYPE END OF TEST MESSAGE
/TEST SR09
/IS SR09=1
/YES, HALT AT END OF TEST
/TEST SR11
/IS SR11=1
/NO, GO TO NEXT TEST
/REPEAT SIMAD

```

```

/TEST ROTATION BY COMPARISON OF REAL AND SIMULATED
/ROTATES
/SET UP FOR RAL TEST

```

```

*600      4752      SIMR01, JMS I   XR1
/TEST RAL
/GET MASK TABLE FOR
/SIMULATED RAL
/SIMULATE RAL
/SET UP TO DO REAL ROTATES

```

```

SIMRAL,   7340      CLA CLL CMA
0602      0052      AND      XRALTA
0603      3012      DCA     POINT2
0604      4451      JMS I   XSROT
0605      7340      CLA CLL CMA
0606      0024      AND      RLNK
0607      7640      SZA CLA
0610      7020      CML
0611      7040      CMA
0612      0023      AND
0613      7004      RAL
0614      7000      NOP
0615      3031      DCA
0616      7430      SZL
0617      7040      CMA
0620      3033      DCA
0621      4456      JMS I   XCOMRO
0622      5205      JMP      RRAL
0623      4457      JMS I   XNXTRO
0624      5201      JMP      SIMRAL

```

```

/DO REAL RAL
/SAVE ROTATED ACCUMULATOR
/SAVE ROTATED LINK
/COMPARE ROTATES
/RETURN HERE FOR LOOP ON ERROR
/SET UP FOR NEXT ROTATE
/CONTINUE RAL TEST

```

```

*577      7000      SIMR,   NOP
0625      4753      SIMR02, JMS I   XR2
/TEST RAR

```

```

0626 7340 /
0627 0102 /
0630 3012 /
0631 4451 /
0632 7340 /
0633 0024 /
0634 7640 /
0635 7020 /
0636 7040 /
0637 0023 /
0640 7010 /
0641 7000 /
0642 3031 /
0643 7430 /
0644 7040 /
0645 3033 /
0646 4456 /
0647 5232 /
0650 4457 /
0651 5226 /

SIMRAR, CLA CLL CMA /
AND XRARTA /
DCA POINT2 /
JMS I XSROT /
CLA CLL CMA /
AND RLNK /
SZA CLA /
CML /
CMA /
AND RAC /
RAR /
NOP RRAC /
DCA /
SZL /
CMA /
DCA RRLNK /
JMS I XCOMRO /
JMP RRAR /
JMS I XNXTRO /
JMP SIMRAR /

/GET MASK TABLE FOR
/SIMULATED RAR
/SIMULATED RAR
/SET UP TP DO REAL RAR

/DO REAL RAR
/SAVE ROTATED ACCUMULATOR

/SAVE ROTATED LINK
/COMPARE ROTATES
/RETURN HERE FOR LOOP ON ERROR
/SET UP FOR NEXT ROTATE
/CONTINUE RAR TEST

```

```

0652 4754 /
/TEST RTL /

SIMRTL, CLA CLL CMA /
AND XRILT A /
DCA POINT2 /
JMS I XSROT /
CLA CLL CMA /
AND RLNK /
SZA CLA /
CML /
CMA /
AND RAC /
RTL /
NOP RRAC /
DCA /
SZL /
CMA /
DCA RRLNK /
JMS I XCOMRO /
JMP RRAR /
JMS I XNXTRO /
JMP SIMRTL /

/GET MASK TABLE FOR
/SIMULATED RTL
/SIMULATED RTL
/SET UP TO DO REAL ROTATE

/DO REAL ROTATE
/SAVE ROTATED ACCUMULATOR

/SAVE ROTATED LINK
/COMPARE ROTATES
/RETURN HERE FOR LOOP ON ERROR
/SET UP TO DO NEXT ROTATE
/CONTINUE RTL TEST

```

```

0677 4755 /
/TEST RTR /

SIMR04, JMS I XR4 /
/TEST RTR /

```

```

0700 7340 SIMRTR, CLA CLL CMA
0701 0054 AND XRTRTA
0702 3012 DCA POINT2
0703 4451 JMS I XSROT
0704 7340 CLA CLL CMA
0705 0024 AND RLNK
0706 7640 SEA CLA
0707 7020 CHL
0710 7040 CMA
0711 0023 AND RAC
0712 7012 RTR
0713 7000 NOP
0714 3031 DCA RRAC
0715 7430 SZL
0716 7040 CMA
0717 3033 DCA RRLNK
0720 4456 JMS I XCOMRO
0721 5304 JMP RRTR
0722 4457 JMS I XNXTRO
0723 5300 JMP SIMRTR

```

```

/GET MASK TABLE FOR
/SIMULATED RTR
/SIMULATE RTR

```

```

/SET UP TO DO REAL ROTATE

```

```

/DO REAL ROTATE

```

```

/SAVE ROTATED ACCUMULATOR

```

```

/SAVE ROTATED LINK
/COMPARE ROTATES
/RETURN HERE FOR LOOP ON ERROR
/SET UP TO DO NEXT ROTATE
/CONTINUE RTR TEST

```

```

0724 4756 SIMR05, JMS I XR5

```

```

/TEST BYTE SWAP

```

```

0725 7340 SIMBSW, CLA CLL CMA
0726 0055 AND XBSNTA
0727 3012 DCA POINT2
0730 4776 JMS I XSBSW
0731 7340 CLA CLL CMA
0732 0084 AND RLNK
0733 7640 SEA CLA
0734 7020 CHL
0735 7040 CMA
0736 0023 AND RAC
0737 7002 BSW RRAC
0740 7000 NOP
0741 3031 DCA RRLNK
0742 7430 SZL XCOMRO
0743 7040 CMA RBSW
0744 3033 DCA JMS I
0745 4456 JMP XNXTRO
0746 5331 JMS I
0747 4457 JMP SIMBSW
0750 5325 JMP XROTDN
0751 5777 JMP I

```

```

/GET MASK TABLE FOR
/SIMULATED BSW
/SIMULATE BSW

```

```

/SET UP FOR REAL BSW

```

```

/DO REAL BSW

```

```

/SAVE ROTATED ACCUMULATOR

```

```

/SAVE ROTATED LINK
/COMPARE ROTATES
/RETURN HERE FOR LOOP ON ERROR
/SET UP FOR NEXT ROTATE
/CONTINUE BSW TEST
/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
0761 0004
0762 0010
0763 0020
0764 0040
0765 0100
0766 0200
0767 0400
0770 1000
0771 2000
0772 4000
0773 0000
0774 0001
0775 4000
0776 1236
0777 1323
    
```

XSBSH, SBSSH  
XROTON, ROYDNE

```

/ (TAPE 2)
/ COMPARE RESULTS OF REAL AND SIMULATED ROTATES
/
1000 0000
1000 0000
    *1000
    COMROT, 0
/ COMPARE ROTATED ACCUMULATORS
/
1001 7340
1002 0025
1003 7040
1004 0031
1005 7440
1006 5226
1007 7040
1010 0031
1011 7040
1012 0025
1013 7440
1014 5226
    CLA CLL CMA
    AND SIMAC
    CMA
    AND RRAC
    SEA
    JMP ERROT
    CMA
    AND RRAC
    CMA
    AND SIMAC
    SEA
    JMP ERROT
/ COMPARE ROTATED LINKS
/
1015 7340
1016 0026
1017 7640
1020 7020
1021 7040
1022 0033
1023 7440
1024 7020
1025 7430
1026 5246
    CLA CLL CMA
    AND SIMLINK
    SEA CLA
    CHL
    CMA
    AND RRLNK
    SEA
    CHL
    SEL
    JMP ERROT,
    *1000
    COMROT, 0
/ GET SIMULATED ROTATED ACCUMULATOR
/ COMPLEMENT
/ AND WITH REAL ROTATED ACCUMULATOR
/ IS NOT SIMAC AND RRAC50
/ NO, ERROR
/ GET REAL ROTATED ACCUMULATOR
/ COMPLEMENT
/ AND WITH SIMULATED ROTATED ACCUMULATOR
/ IS SIMAC AND NOT RRAC50
/ NO, ERROR
/ GET REAL ROTATED LINKS
/ GET SIMULATED LINK
/ GET REAL ROTATED LINK
/ ARE THEY THE SAME
/ NO, ERROR
    
```

ISE COMROT /RETURN HERE IF NO LOOP ON ERROR  
JMP I COMROT

/SET UP TO DO NEXT ROTATE

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

/ERROR HANDLER FOR ROTATE TEST

|      |      |               |                                      |
|------|------|---------------|--------------------------------------|
| 1046 | 7604 | LAS           | /TEST SR01                           |
| 1047 | 0104 | AND SR01      | /IS SR01=1                           |
| 1050 | 7650 | SNA CLA       | /NO, TYPE ERROR MESSAGE              |
| 1051 | 4271 | JMS ROTPR     |                                      |
| 1052 | 7604 | LAS           | /TEST SR00                           |
| 1053 | 0103 | AND SR00      | /IS SR00=1                           |
| 1054 | 7650 | SNA CLA HALTB | /NO, HALT WITH ADDRESS OF TEST IN AC |
| 1055 | 5263 | JMP           |                                      |
| 1056 | 7684 | LAS           | /TEST SR02                           |
| 1057 | 0105 | AND SR02      | /IS SR02=1                           |
| 1060 | 7650 | SNA CLA       | /NO, GO TO NEW DATA                  |
| 1061 | 5227 | JMP           | /YES, LOOP WITH SAME DATA            |
| 1062 | 5230 | JMP           |                                      |
| 1063 | 7340 | CLA CLL CMA   |                                      |
| 1064 | 0451 | AND I XSR0T   |                                      |
| 1065 | 1270 | TAD M4        |                                      |
| 1066 | 7402 | HLT           |                                      |
| 1067 | 5256 | JMP HLTB+4    |                                      |
| 1070 | 7774 | M4, 04        |                                      |

/ERROR TYPEOUT FOR SIMULATED ROTATE TEST ERRORS

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

```

1075 4331 JMS RHOUT
1076 7040 CMA
1077 0023 AND RAC
1100 3037 DCA WDI
1101 7040 CMA
1102 0024 AND RLNK
1103 3040 DCA WDI
1104 4460 JMS I XLNKOU
1105 4461 JMS I XWDOUT
1106 7040 CMA
1107 0025 AND SIMAC
1110 3037 DCA WDI
1111 7040 CMA
1112 0026 AND SIMLNK
1113 3040 DCA WDI
1114 4460 JMS I XLNKOU
1115 4461 JMS I XWDOUT
1116 7040 CMA
1117 0031 AND RRAC
1120 3037 DCA WDI
1121 7040 CMA
1122 0033 AND RRLNK
1123 3040 DCA WDI
1124 4460 JMS I XLNKOU
1125 4461 JMS I XWDOUT
1126 4446 JMS I XPRINT
1127 5742 CRLF=1
1130 5671 JMP I ROTPRY

```

/OUTPUT ORIGINAL LINK  
/OUTPUT ORIGINAL WORD

/OUTPUT SIMULATED ROTATED LINK  
/OUTPUT SIMULATED ROTATED WORD

/OUTPUT ACTUAL ROTATED LINK  
/OUTPUT ACTUAL ROTATED WORD

/OUTPUT HEADER FOR ROTATE ERROR MESSAGE

```

RHOUT, 0000
RHD, 0000
JMS I XPRINT
JMS I XPRINT
DH2=1
CLA CMA
DCA RHFLG
JMP I RHOUT

```

/TYPE SIMULATED XXX TEST FAILED  
/WHERE XXX IS THE INSTRUCTION THAT FAILED  
/TYPE ORIGINAL, SIMULATED ACTUAL

```

RIRTAB, 2000
2000
0400
0100
0020
0004
0001
4000
1000
0200
0040
0010
0002

```



|      |      |           |
|------|------|-----------|
| 1155 | 0000 |           |
| 1156 | 2000 |           |
| 1157 | 0002 |           |
|      |      |           |
| 1160 | 0002 | RILTAB, 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 0000 CLA CLL
1201 0000 SROTAL, 0
1202 3025 DCA SIMAC
1203 3026 DCA SIMLNK
1204 7040 CMA
1205 0412 AND I POINT2
1206 3037 DCA WD1
1207 7040 CMA AND I POINT2
1210 0412 SNA
1211 7450 JMP ENDR0T
1212 5303 DCA WD2
1213 3040 CMA
1214 7040 CMA RAC
1215 0023 AND WD1
1216 0037 AND OR1
1217 7440 SEA WD2
1220 4225 JMS NBIT
1221 7040 CMA
1222 0040 AND
1223 3037 DCA
1224 5207 JMP
/ OR BITS TO FORM PARTIALLY ROTATED WORD
/
1225 0000 OR1,
1226 7240 CLA CMA

```

```

/ CLEAR SIMULATION ARGUMENTS
/ GET FIRST MASK BIT FROM TABLE
/ GET MASK BIT FROM TABLE
/ IS IT 0
/ YES, FINISH SIMULATION
/ LOAD AC WITH WORD TO BE ROTATED
/ TEST BIT TO BE ROTATED
/ IS IS 0
/ NO, PLACE BIT INTO NEW POSITION
/ BIT TO BE ROTATED
/ BECOMES NEW MASK
/ CONTINUE SIMULATION

```

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

```

/SIMULATE BYTE SWAP
/
0
SBSW,
1236 0000 CLA CLL CMA /SET UP FOR ERROR RETURN
1237 7340 AND SBSW /CLEAR SIMULATION ARGUMENTS
1240 0236 DCA I XSROT /GET MASK FROM TABLE
1241 3451 DCA SIMAC /IS IT 0
1242 3025 DCA SIMLNK /YES, FINISH SIMULATION
1243 3026 CMA AND I POINT2
1244 7040 AND I SNA ENDBSW
1245 0412 JMP DCA WD1
1246 7450 JMP DCA POINT2
1247 5277 DCA AND I WD2
1250 3037 CMA AND AND RAC
1251 7040 AND AND WD1
1252 0412 AND AND OR1
1253 3040 DCA AND WD1
1254 7040 CMA AND AND WD2
1255 0023 AND AND RAC
1256 0037 AND AND WD1
1257 7440 AND AND OR1
1260 4225 AND AND WD1
1261 7040 AND AND WD2
1262 0037 AND AND RAC
1263 7421 AND AND WD1
1264 7040 AND AND OR1
1265 0040 AND AND WD2
1266 3037 DCA AND WD2
1267 7501 MQA AND RAC
1270 3040 DCA AND WD1
1271 7040 CMA AND WD2
1272 0023 AND AND OR1
1273 0037 AND AND N1BIT
1274 7440 AND AND CMA
1275 4225 AND AND RLNK
1276 5244 AND AND SIMLNK
1277 7340 AND AND DCA
1300 0024 AND AND JMP I
1301 3026 AND AND SBSW
1302 5636 AND AND
  
```

/END OF ROTATE, SHIFT LINK

```

1303 7340  ENDROT,  CLA CLL CMA
1304 0412  AND I  POINT2
1305 3040  DCA     WD2
1306 7040  CMA
1307 0116  AND     K0001
1310 0024  AND     RLNK
1311 7440  SZA
1312 4225  JMS     OR1
1313 7040  CMA
1314 0412  AND I  POINT2
1315 0023  AND     RAC
1316 7440  SZA
1317 7240  CLA CMA
1320 0116  AND     K0001
1321 3026  DCA     SIMLNK
1322 5600  JMP I   SROTAL

```

/GET BIT TO BE ROTATED FROM LINK

/GET MASK FOR LINK  
/TEST LINK  
/IS LINK 0  
/PLACE LINK IN NEW POSITION

/GET MASK FOR BIT TO BE ROTATED INTO LINK  
/TEST BIT IN WORD TO BE ROTATED INTO LINK  
/IS IT 0  
/NO, SET LINK=1

ROTPONE, LAS

/TEST SR10  
/IS SR10=1  
/NO, TYPE "SIMROT"

ROTHLT, LAS

/TEST SR09  
/IS SR09=1  
/YES, HALT AT END OF ROTATE TESTS

SROTOK, JMS I

/TEST SR11  
/IS SR11=1  
/NO, GO TO NEXT TEST  
/YES, REPEAT ROTATE TESTS

OK2=1

XPRINT ROTHLT

/SET UP FOR ROTATE TESTS

/SET UP HEADER  
/FOR RAL TEST ERROR MESSAGE  
/CLEAR ROTATE HEADER FLAG

PAGE R1:

```

1400 0000
1401 7340
1402 0250
1403 3450
1404 3035
1405 3024
1406 3023
1407 5600
1410 0000
1411 7340

```

PAGE R2:

```

1400 0000
1401 7340
1402 0250
1403 3450
1404 3035
1405 3024
1406 3023
1407 5600
1410 0000
1411 7340

```

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  
1421 7340 CLA CLL CMA  
1422 0252 AND XM4  
1423 3450 DCA I XRHD  
1424 3035 DCA RHFLG  
1425 3024 DCA RLNK  
1426 3023 DCA RAC  
1427 5620 JMP I R3  
1430 0000  
1431 7340 CLA CLL CMA  
1432 0253 AND XM5  
1433 3450 DCA I XRHD  
1434 3035 DCA RHFLG  
1435 3024 DCA RLNK  
1436 3023 DCA RAC  
1437 5630 JMP I R4  
1440 0000  
1441 7340 CLA CLL CMA  
1442 0254 AND XM6  
1443 3450 DCA I XRHD  
1444 3035 DCA RHFLG  
1445 3024 DCA RLNK  
1446 3023 DCA RAC  
1447 5640 JMP I R5  
1450 5440 EM2=1  
1451 5461 EM3=1  
1452 5502 EM4=1  
1453 5523 EM5=1  
1454 5544 EM6=1

R3,  
R4,  
R5,  
XM2,  
XM3,  
XM4,  
XM5,  
XM6,

/SET UP HEADER  
/FOR RTR TEST ERROR MESSAGE

/SET UP HEADER  
/FOR RIL TEST ERROR MESSAGE

/SET UP HEADER  
/FOR BSH TEST ERROR MESSAGE

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

1600 PRINT,  
1601 1600 CLA CLL  
1602 1600 TAD I PRINT  
1603 3011 DCA POINT1  
1604 2200 ISZ PRINT  
1605 1411 TAD I POINT1  
1606 3036 DCA CHAR  
1607 1036 TAD CHAR  
1610 7012 RTR  
1611 7012 RTR  
1612 7012 RTR  
1613 4217 JMS  
1614 1036 TAD CHAR  
1615 4217 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 I+3 K240
1626 1076 TAD MTP
1627 5243 JMP IAC
1638 7001 IAC
1639 7440 SZA
1652 5235 JMP I+3 K215
1633 1251 TAD MTP
1634 5243 JMP IAC
1635 7001 IAC
1636 7440 SZA
1637 5242 JMP I+3 K212
1640 1250 TAD MTP
1641 5243 JMP K336
1642 1247 TAD XTYPE
1643 4447 JMP I TYPSET
1644 5617 K0077,
1645 0077 M40,
1646 7740 K336,
1647 0336 K212,
1650 0212 K215,
1651 0215 TYPSET,
1652 0000
1653 6046 TLS
1654 6041 TSP
1655 5254 JMP I+1
1656 7200 CLA
1657 5652 JMP I TYPE

```

```

BSWTAB, 1
0001 1
0100 100
0002 2
0200 200
0004 4
0400 400
0010 10
1000 1000
0020 20
2000 2000
0040 40
4000 4000
0000 0

```

```

PAGE PAGE
FCT, FCT,
CLA CLL CLA CLL
TAD TAD TAD
DCA DCA DCA
SEQ SEQ SEQ

```

2003 3020 DCA CNTR1

/ / FALSE CARRY TEST#1

2004 7300 CLA CLL

/ PLACE INSTRUCTIONS AND DATA IN TEST ADDRESSES

2005 7300 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 CLA CLL

2024 5472 JMP I XSTA2

2025 7000 NOP

2026 7000 NOP

2027 4464 JMS I XAVREG /SAVE LINK AND AC

/ PROVIDED FOR PROGRAM MODIFICATION

/ EXPECTED RESULTS ARE AC=0, LINK=1

2030 7430 SZL

2031 7440 SEA

2032 4465 JMS I XDATER /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 /GO TO NEXT TEST

2042 5554 JMP I SEQ

/ / FALSE CARRY TEST#2

2043 7300 CLA CLL

/

2044 7340  
 2045 3471  
 2046 1136  
 2047 3472  
 2050 1137  
 2051 3000  
 2052 1141  
 2053 3001  
 2054 1330  
 2055 3002

FCS2,  
 CLA CLL CMA /DATA=7777  
 DCA I XSTA1 /LOC,=7776  
 TAD I INS1 /INSTRUCTION=TAD I,=1  
 DCA I XSTA2 /LOC,=7777  
 TAD INS3 /INSTRUCTION=IAC  
 DCA TSTA3 /LOC,=0000  
 DCA INS5 /INSTRUCTION=JMP I,=1  
 TAD TSTA4 /LOC,=0001  
 TAD AD2 /ADDRESS=RET2  
 DCA TSTA5 /LOC,=0002

/EXECUTE INSTRUCTIONS PREVIOUSLY ASSEMBLED IN TEST  
 /ADDRESSES

2056 7300  
 2057 5472  
 2060 7000  
 2061 7000  
 2062 4464

FCL2,  
 RET2,  
 CLA CLL XSTA2  
 JMP I XSTA2  
 NOP  
 NOP  
 JMS I XAVREG /SAVE AC AND LINK  
 /EXPECTED RESULTS ARE AC=0, LINK=1

2063 7430  
 2064 7440  
 2065 4465  
 2066 7410  
 2067 4466  
 2070 4467  
 2071 5256  
 2072 7300  
 2073 1124  
 2074 3154  
 2075 5554

SEL  
 SEA  
 JMS I XDATER  
 SKP  
 JMS I XHALT2  
 JMS I XLOOP  
 JMP FCL2  
 CLA SEQ3  
 TAD SEQ  
 DCA SEQ  
 JMP I SEQ

2076 7300

/FALSE CARRY TEST #3

CLA CLL

2077 1137  
 2100 3471  
 2101 1333  
 2102 3472  
 2103 1152  
 2104 3000  
 2105 1331  
 2106 3001

FCS3,  
 TAD INS3 /INSTRUCTION=IAC  
 DCA I XSTA1 /LOC,=7776  
 TAD INS16 /INSTRUCTION=TAD I 21  
 DCA I XSTA2 /LOC,=7777  
 TAD INS14 /INSTRUCTION=JMP I,=1  
 DCA TSTA3 /LOC,=0000  
 TAD AD3 /ADDRESS=RET3  
 DCA TSTA4 /LOC,=0001





```

2214 5472 JMP I XSTA2
2215 7000 NOP
2216 7000 NOP
2217 4464 JMS I XAVREG
/
/
/
2220 7430 SZL
2221 7440 SZA
2222 4465 JMS I XDATA
2223 7410 SKP
2224 4466 JMS I XHALT2
2225 4467 JMS I XLOOP
2226 5213 JMP FCL4
2227 1126 TAD SEQ5
2228 3134 DCA SEQ
2231 5534 JMP I SEQ

```

/FALSE CARRY TEST #5

```

2232 7300 FCL5, CLA CLL
/
/
/
2233 7300 FCL5, CLA CLL
2234 1143 TAD IN97
2235 3472 DCA I XSTA2
2236 1137 TAD IN93
2237 3000 DCA TSTA3
2240 1137 TAD IN93
2241 3001 DCA TSTA4
2242 1151 TAD IN93
2243 3002 DCA TSTA5
2244 1325 TAD AD5
2245 3003 DCA TSTA6
/
/
/
/INSTRUCTION=ISE ;+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 NOP
2253 7000 NOP
2254 4464 JMS I XAVREG
/
/
/
2255 7430 SZL
2256 7440 SZA
2257 4465 JMS I XDATA

```

```

2260 7410 SKP
2261 4466 JMS I XHALT2
2262 4467 JMS I XLOOP
2263 5246 JMP FCL5
2264 7200 CLA
2265 1127 YAD 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 5472 DCA I XSTA2
2274 1137 TAD INS3
2275 3001 DCA TSTA4
2276 1151 YAD INS13
2277 3002 DCA TSTA5
2300 1326 TAD AD6
2301 3003 DCA TSTA6
/ /
/ /INSTRUCTION=ISE ,+1
/ /LOC,=7777
/ /INSTRUCTION=IAC
/ /LOC,=0001
/ /INSTRUCTION=JMP I ,+1
/ /LOC,=0002
/ /ADDRESS=RET6
/ /LOC,=0003

```

```

2302 7340 FCL6, CLA CLL CMA
2303 3000 DCA TSTA5
2304 7240 CLA CMA
2305 5472 JMP I XSTA2
2306 7000 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,
2325 2252 AD5,
2326 2306 AD6,
RET4
RET5
RET6

```

/FALSE CARRY TEST#7

CLA CLL

INSTRUCTION=ISE I TSTIND  
/LOC,=7777  
/INSTRUCTION=IAC  
/LOC,=0001  
/INSTRUCTION=JMP I ,+1  
/LOC,=0002  
/ADDRESS=RET7  
/LOC,=0003

2400 7300 FCT7,

2401 7300 FCS7,

TAD INS9  
DCA I XSTA2  
TAD INS3  
DCA TSTA4  
TAD INS13  
DCA TSTA5  
TAD AD7  
DCA TSTA6

FCL7,

CLA CLL CMA  
DCA TSTIND  
CMA TSTAS  
DCA XSTA2  
JMP I XAVREG  
NOP  
NOP  
JMS I

RET7,

SZL  
SZA  
JMS I XDATE  
SKP I XHALT2  
JMS I XLOOP  
JMP FCL7  
CLA SEQ8  
TAD SEQ  
DCA SEQ  
JMP I

/FALSE CARRY TEST #8

CLA CLL

CLA CLL INS3

TAD

/INSTRUCTION=IAC

2400 7300 FCT8,

2436 7300 FCS8,

2437 7300  
2440 1137

2412 7340  
2413 3010  
2414 7040  
2415 3000  
2416 7040  
2417 5472  
2420 7000  
2421 7000  
2422 4464

2423 7430  
2424 7440  
2425 4465  
2426 7410  
2427 4466  
2430 4467  
2431 5212  
2432 7200  
2433 1131  
2434 3134  
2435 5954

/INSTRUCTION=IAC





```

2620 4464 JMS I XAVREG
/
/
/
2621 7430 SZL
2622 7440 SZA
2623 4465 JMS I XDATER
2624 7410 SKP I
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
2637 3000 DCA TSTAS
2640 1141 TAD INS5
2641 3001 DCA TSTA4
2642 1316 TAD AD11
2643 3002 DCA TSTA5
/
/
/

```

```

/INSTRUCTION=IAC
/LOC.=0000
/INSTRUCTION=JMP I ,+1
/ADDRESS=0001
/ADDRESS=RETI1
/LOC.=0002

```

```

2644 7300 FCL11, CLA CLL
2645 1133 TAD INS15
2646 3472 DCA I XSTA2
2647 7240 CLA CMA
2650 5472 JMP I XSTA2
2651 7000 NOP
2652 7000 NOP
2653 4464 JMS I XAVREG
/
/
/

```

```

/INSTRUCTION=JMS
/LOC.=7777

```

```

2654 7430 SZL
2655 7440 SZA
2656 4465 JMS I XDATER
2657 7410 SKP I
2660 4466 JMS I XHALT2
2661 4467 JMS I XLOOP
2662 5244 JMP FCL11
2663 7200 CLA
2664 1135 TAD SEQ12

```



```

3004 0037 AND W1
3005 7640 SEA CLA
3006 5600 JMP I SAMEAS
3007 7040 CMA
3010 0037 AND W1
3011 7040 CMA
3012 0040 AND W2
3013 7640 SEA CLA
3014 5600 JMP I SAMEAS
3015 2200 ISE
3016 5600 JMP I SAMEAS

```

```

/W1*NOT(W2)=0
/W1*NOT(W2)NOT 0, ERROR

/W2*NOT(W1)=0
/W2*NOT(W1) NOT 0, ERROR

/W1=W2

```

/SAVE AC AND LINK

```

3017 0000 SAVREG, 0
3020 3025 DCA
3021 7430 SZL
3022 7040 CMA
3023 3026 DCA
3024 7040 CMA
3025 0025 AND
3026 5617 JMP I SAVREG

```

/HALT ON ERROR; DISPLAY ADDRESS OF FAILED TEST IN AC

```

3027 0000 HALT2, 0
3030 7604 LAS
3031 0103 AND SR00
3032 7640 SEA CLA
3033 5627 JMP I HALT2
3034 1154 TAD
3035 7402 HLT
3036 5627 JMP I HALT2

```

```

/TEST SR00
/SUPPRESS HALT IF SR00=1

/PUT ADDRESS OF FAILED TEST IN
/AC AND STOP
/CONTINUE TESTING

```

/DATA ERROR HAS OCCURED

```

3037 0000 DATER, 0
3040 7604 LAS
3041 0104 AND SR01
3042 7450 SNA
3043 4256 JMS
3044 2237 ISE
3045 5637 JMP I DATER

```

```

/TEST SR01
/SUPPRESS ERROR TYPE IF SR01=1
/SET UP FOR ERROR TYPE

```

/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 ISZ LOOP
3055 5646 JMP I LOOP

```

NLOOP,

/TYPE DATA ERROR MESSAGE

```

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

```

TYP2,

XADOUT,

/END OF PASS

```

3200 7300 PAGE
3201 2020 ENDFCT, CLA CLL CNTR1
3202 5224 JMP LAS OUT
3203 7604 LAS AND SR10
3204 0115 SNA CLA FCTOK
3205 7650 JMP LAS SR09
3206 5221 FCTHLT, AND SZA CLA
3207 7604 HLT LAS
3210 0114 AND SR11
3211 7640 SZA CLA
3212 7402 HLT LAS
3213 7604 AND SR11
3214 0116 SZA CLA
3215 7640 JMP I OUT
3216 5224 JMP I,+1
3217 5620 RNAD1
3220 3400 JMS I XPRINT
3221 4446 OK3=1
3222 5732 JMP FCTHLT
3223 5207 TAD SEQ1
3224 1122 DCA SEQ
3225 3154 JMP I SEQ
3226 5554 /

```

PAGE

ENDFCT,

FCTHLT,

FCTOK,

OUT,

/ CONVERT ADDRESS TO ASCII AND OUTPUT

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

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

|      |      |        |         |                          |
|------|------|--------|---------|--------------------------|
| 3400 | 3400 |        |         |                          |
| 3401 | 4473 | PAGE   | CLA CLL | XRAND                    |
| 3402 | 7300 | RNAD1, | JMS I   |                          |
| 3403 | 1041 |        | CLA CLL | /GENERATE RANDOM NUMBERS |
| 3404 | 1043 |        | TAD     |                          |
| 3405 | 1043 |        | TAD     | RANDA                    |
| 3406 | 1041 |        | TAD     | RANDC                    |
| 3407 | 1041 |        | TAD     | RANDC                    |
| 3410 | 1041 |        | TAD     | RANDA                    |
| 3411 | 1043 |        | TAD     | RANDA                    |
| 3412 | 1043 |        | TAD     | RANDC                    |
| 3413 | 1041 |        | TAD     | RANDC                    |
| 3414 | 1041 |        | TAD     | RANDA                    |
| 3415 | 1043 |        | TAD     | RANDA                    |
| 3416 | 1041 |        | TAD     | RANDC                    |
| 3417 | 1043 |        | TAD     | RANDA                    |
| 3420 | 1043 |        | TAD     | RANDC                    |

```

3421 1041 TAD RANDB
3422 1041 TAD RANDB
3423 1043 TAD RANDB
3424 1043 TAD RANDB
3425 1043 TAD RANDB
3426 1041 TAD RANDB
3427 1043 TAD RANDB
3430 1041 TAD RANDB
3431 1041 TAD RANDB
3432 1041 TAD RANDB
3433 1043 TAD RANDB
3434 1043 TAD RANDB
3435 7000 NOP
3436 4464 JMS I XAVREG
3437 7430 SZL
3440 7440 SZA
3441 4646 JMS I XRN1ER
3442 4467 JMS I NERROP
3443 5202 JMP RNAD1+2
3444 5645 JMP I
3445 3600 RNAD2
3446 3447 XRN1ER, RN1ER
    
```

/AC=0

/AC=0

/AC=0

/SAVE AC AND LINK  
/IS LINK=1, AND AC=0

/ERROR, AC NOT 0, OR LINK NOT 1 OR BOTH  
/RESULTS OK

```

/RANDOM ADD TEST & ERROR HANDLER
/
0
LAS
AND SR01
SZA CLA SR01
JMP SKHLT
JMS I XPRINT
EM10-1 XPRINT
JMS I XPRINT
DH4-1 CMA
CLA CLL RANDB
AND RANDB
DCA WD1
JMS I XWDOUT
CLA CLL CMA
AND RANDB
DCA WD1
JMS I XWDOUT
CLA CLL CMA
AND TEMPAC
DCA WD1
CMA
AND
DCA WD1
CMA
AND
DCA WD1
JMS I XLNKOU
JMS I XWDOUT
JMS I XPRINT
CRLF-1
    
```

/TEST SR01  
/IS SR01=1  
/YES, SUPPRESS ERROR TYPEOUT  
/TYPE "RANDOM ADD TEST1 FAILED"  
/TYPE "RANDB, RANDB, RESULT"  
/OUTPUT RANDB  
/OUTPUT RANDB  
/OUTPUT RESULTANT LINK  
/OUTPUT RESULTANT AC

```

3447 0000 RN1ER,
3450 7604 LAS
3451 0104 AND SR01
3452 7640 SZA CLA SR01
3453 5302 JMP SKHLT
3454 4446 JMS I XPRINT
3455 5565 EM10-1 XPRINT
3456 4446 JMS I XPRINT
3457 5316 DH4-1 CMA
3460 7340 CLA CLL RANDB
3461 0041 AND RANDB
3462 3037 DCA WD1
3463 4461 JMS I XWDOUT
3464 7340 CLA CLL CMA
3465 0043 AND RANDB
3466 3037 DCA WD1
3467 4461 JMS I XWDOUT
3470 7340 CLA CLL CMA
3471 0025 AND TEMPAC
3472 3037 DCA WD1
3473 7040 CMA
3474 0026 AND
3475 5040 DCA WD1
3476 4460 JMS I XLNKOU
3477 4461 JMS I XWDOUT
3480 4446 JMS I XPRINT
3501 5742 CRLF-1
    
```

PAL10 V141 13-SEP-71 13131 PAGE 1-35  
 3502 7604 SKHLT, LAS SR00 /TEST SR00  
 3503 0103 AND SZA CLA /IS SR00=1  
 3504 7640 JMP I RN1ER /YES, SUPPRESS ERROR HALT  
 3505 5647 CLA CLL  
 3506 7300 TAD HLT  
 3507 1247 JMP I RN1ER /HALT WITH ADDRESS OF RNAD1 IN AC  
 3510 7402  
 3511 5647

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

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

PAGE RNAD2, CLA CLL CMA /GET RANDOM NUMBER  
 3600 7340 AND RANAD /STORE IT  
 3601 0041 DCA APOS  
 3602 3346 CMA RANAD  
 3603 7040 AND CMA  
 3604 0041 AND RANAD  
 3605 7040 CMA ANEG  
 3606 3347 DCA

```

3607 7040 CMA
3610 0103 AND
3611 3352 DCA
3612 7040 CMA
3613 0352 AND
3614 7040 CMA
3615 3353 DCA
3616 7040 CMA
3617 0346 AND
3620 0352 AND
3621 7440 SZA
3622 5232 JMP
3623 7040 CMA
3624 0346 AND
3625 4301 JMS
3626 7040 CMA
3627 0347 AND
3630 3351 DCA
3631 5240 JMP
3632 7240 CMA
3633 0347 AND
3634 4315 JMS
3635 7040 CMA
3636 0346 AND
3637 3351 DCA
3640 7340 CLA
3641 0350 AND
3642 1351 TAD
3643 7430 SZL
3644 7001 IAC
3645 4464 JMS
3646 4463 JMS
3647 7410 SKP
3650 4756 JMS
3651 4467 JMS
3652 5240 JMP
3653 5254 JMP

3654 7340 CBTST2, CLL CLA CMA
3655 0351 AND BNEG
3656 1350 TAD BPOS
3657 7430 SZL
3658 7001 IAC
3659 4464 JMS
3661 4463 JMS
3662 7410 SKP
3663 4756 JMS
3664 4467 JMS
3665 4467 JMP
3666 5254 JMP /SHIFT MASK ONE PLACE TO RIGHT

MOVMSK, CLA CLL CMA
3667 7340 AND MASK
3670 0352 RAR
3671 7010 RAR
3672 3352 DCA MASK

CMA
AND
DCA
CMA
AND
CMA
DCA
CMA
AND
AND
SZA
JMP
CMA
AND
JMS
CMA
AND
DCA
JMP
CMA
AND
JMS
CMA
AND
DCA
CLA CLL
AND
TAD
SZL
IAC
JMS
JMS
SKP
JMS
JMS
JMP
JMP

K4000 MASK
MASK
NMASK
APOS MASK
MODNEG
APOS XOR1
ANEG BNEG CBTST1
ANEG XOR2
APOS BNEG BPOS BNEG
XAVREG XAMEA
XRN2ER NERROR CBTST1 CBTST2

/GET MASK
/COMPLIMENT MASK
/GET RANDOM NUMBER
/TEST SIGN BIT
/IS NUMBER NEGATIVE
/YES, MODIFY COMPLIMENT OF NUMBER
/GET RANDOM NUMBER
/MODIFY WITH MASK
/GET COMPLIMENT OF RANDOM NUMBER
/AND USE AS IS
/MODIFY NEGATIVE NUMBER
/GET COMPLIMENT OF RANDOM NUMBER
/MODIFY WITH MASK
/GET RANDOM NUMBER
/AND USE AS IS
/LOAD AC WITH MODIFIED ARGUMENT
/ADD UNMODIFIED ARGUMENT
/DID CARRY PROPAGATE INTO LINK
/NO, INCREMENT NUMBER
/SAVE AC
/COMPARE MODIFIED BIT AND MASK
/AC AND MASK DIFFERENT, ERROR
/NO ERROR, AC AND MASK THE SAME
/RETURN HERE FOR LOOPING

/LOAD AC WITH UNMODIFIED ARGUMENT
/ADD MODIFIED ARGUMENT
/DID CARRY PROPAGATE INTO LINK
/NO, INCREMENT NUMBER
/SAVE AC
/COMPARE AC AND MASK
/AC AND MASK NOT THE SAME, ERROR
/NO ERROR, AC AND MASK THE SAME
/RETURN HERE FOR LOOPING

```

/HAVE ALL BITS BEEN TESTED  
 /NO, CONTINUE  
 /YES, TEST FOR LOOP ON RNAD2

|      |      |       |        |
|------|------|-------|--------|
| 3673 | 7420 | SNL   |        |
| 3674 | 5212 | JMP I | NXTBT  |
| 3675 | 4467 | JMP I | NERROP |
| 3676 | 5200 | JMP I | RNAD2  |
| 3677 | 5700 | JMP I | ,*1    |
| 3700 | 4200 | RARR  |        |
| 3701 | 0000 | Ø     |        |
| 3702 | 0353 | AND   | NMASK  |
| 3703 | 7040 | CMA   | ABNOT  |
| 3704 | 3354 | DCA   | ANEG   |
| 3705 | 7040 | CMA   | MASK   |
| 3706 | 0347 | AND   | ABNOT  |
| 3707 | 0352 | AND   |        |
| 3710 | 7040 | CMA   |        |
| 3711 | 0354 | AND   |        |
| 3712 | 7040 | CMA   |        |
| 3713 | 3350 | DCA   | BPOS   |
| 3714 | 5701 | JMP I | XOR1   |
| 3715 | 0000 | Ø     |        |
| 3716 | 0352 | AND   | MASK   |
| 3717 | 7040 | CMA   | ABNOT  |
| 3720 | 3354 | DCA   |        |
| 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 | Ø           |               |
| 3731 | 7040 | CMA         |               |
| 3732 | 3355 | DCA         | NOTAC         |
| 3733 | 7040 | CMA         |               |
| 3734 | 0025 | AND         | TEMPAC        |
| 3735 | 0353 | AND         | NMASK         |
| 3736 | 7440 | SEA         |               |
| 3737 | 5344 | JMP         | EROUT1        |
| 3740 | 7040 | CMA         |               |
| 3741 | 0352 | AND         | MASK          |
| 3742 | 0355 | AND         | NOTAC         |
| 3743 | 7440 | SEA         |               |
| 3744 | 2330 | EROUT1, ISE | SAMEA         |
| 3745 | 5730 | JMP I       | SAMEA         |
| 3746 | 0000 | Ø           |               |
| 3747 | 0000 | Ø           | APOS,         |
| 3750 | 0000 | Ø           | ANEG,         |
| 3751 | 0000 | Ø           | BPOS,         |
| 3752 | 0000 | Ø           | BNEG,         |
| 3753 | 0000 | Ø           | MASK,         |
| 3754 | 0000 | Ø           | NMASK,        |
| 3755 | 0000 | Ø           | ABNOT,        |
| 3756 | 4000 | Ø           | NOTAC,        |
|      |      |             | XRN2ER, RN2ER |

```

4000 PAGE
/ERROR HANDLER FOR RANDOM ADD TEST 2,
/ RN2ER,
0000 LAS
4001 7604 AND
4002 0104 SZA CLA
4003 7640 SR01
4004 5253 JMP I
4005 4446 XPRINT
4006 5605 EM11=1
4007 4446 JMS I
4010 5364 DH6=1
4011 7340 CLA CLL
4012 0777 AND
4013 3037 DCA I
4014 4461 JMS I
4015 7040 CMA
4016 0776 AND
4017 3037 DCA I
4020 4461 JMS I
4021 7040 CMA
4022 0775 AND
4023 3037 DCA I
4024 4461 JMS I
4025 7040 CMA
4026 0025 AND
4027 3037 DCA I
4030 4461 JMS I
4031 4446 XPRINT
4032 5742 CRLF=1
4033 7604 SHLT,
4034 0103 AND
4035 7640 SZA CLA
4036 5600 JMP I
4037 7300 CLA CLL
4040 1200 TAD
4041 7402 HLT
4042 5600 JMP I RN2ER

/TEST SR01
/IS SR01 = 1
/YES SUPPRESS ERROR TYPEOUT
/NO, TYPE "RANDOM ADD TEST 2 FAILED"
/TYPE ARG1, ARG2, ARG1, ARG2, EXPECTED
/OUTPUT ARG1
/OUTPUT ARG2
/OUTPUT EXPECTED RESULT
/OUTPUT RESULTANT IC

/TEST SR00
/IS SR00 = 1
/YES, DO NOT HALT
/NO, HALT WITH ADDRESS IN AC

```

/ROTATE RANDOM NUMBER RIGHT USING RAR

PAGE RARR, CLA CLL

```

4175 3752
4176 3751
4177 3750
4200 4200
4300 7300

```

```

4201 1044 TAD LINKR
4202 7440 SEA /GET LINK TO BE ROTATED
4203 7220 CLA CML
4204 1041 TAD RANDA
4205 7010 RAR /GET NUMBER TO BE ROTATED
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
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
4242 1043 TAD RANDC
4243 7640 SEA CLA
4244 5250 JMP I+4
4245 1044 TAD LINKR
4246 3037 DCA HD1
4247 1026 TAD TEMPL
4250 3040 DCA WD2
4251 4462 JMS I XAMEAS
4252 4735 JMS I XRARR
4253 4467 JMS I NERROP
4254 5200 JMP RARR

/SAVE AC AND LINK
/ADD COMPLEMENT OF NUMBER TO AC
/ARE THEY EQUAL
/NO, ERROR

/ARE LINKS THE SAME
/NO, ERROR
/TEST FOR LOOPING
/LOOP ON RARR

```

```

RALS,
4255 7300 /ROTATE RANDOM NUMBER LEFT USING RAL
4256 1044 CLA CCL
4257 7440 TAD LINKR
4260 7220 SEA CML /GET LINK TO BE ROTATED
4261 1041 TAD RANDA
4262 7004 RAL /GET NUMBER TO BE ROTATED
4263 7004 RAL
4264 7004 RAL

```



4265 RAL 7004  
 4266 RAL 7004  
 4267 RAL 7004  
 4270 RAL 7004  
 4271 RAL 7004  
 4272 RAL 7004  
 4273 RAL 7004  
 4274 RAL 7004  
 4275 RAL 7004  
 4276 RAL 7004  
 4277 RAL 7004  
 4300 RAL 7004  
 4301 RAL 7004  
 4302 RAL 7004  
 4303 RAL 7004  
 4304 RAL 7004  
 4305 RAL 7004  
 4306 RAL 7004  
 4307 RAL 7004  
 4311 RAL 7004  
 4312 RAL 7004  
 4313 RAL 7004  
 4314 RAL 7004  
 4315 RAL 7004  
 4316 RAL 7004  
 4317 RAL 7004  
 4320 RAL 7004  
 4321 RAL 7004  
 4322 RAL 7004  
 4323 RAL 7004  
 4324 RAL 7004  
 4325 RAL 7004  
 4326 RAL 7004  
 4327 RAL 7004  
 4328 RAL 7004  
 4329 RAL 7004  
 4330 RAL 7004  
 4331 RAL 7004  
 4332 RAL 7004  
 4333 RAL 7004  
 4334 RAL 7004  
 4335 RAL 7004

XAVREG  
 RANDC  
 .+4  
 LINKR  
 WD1  
 TEMPL  
 WD2  
 XAMEAS  
 XRALR  
 NERROP  
 RALR  
 .+1

/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

XRALR;  
 XRARR;

/ROTATE RANDOM NUMBER LEFT USING RTL

4400  
 4401  
 4402  
 4403  
 4404  
 4405  
 4406  
 4407  
 4410

PAGE  
 RTL,;

CLA CLL  
 TAD  
 SZA  
 CLA CML  
 TAD  
 RTL  
 RTL  
 RTL

LINKR  
 RANDA

/GET LINK TO BE ROTATED  
 /GET NUMBER TO BE ROTATED



```

4474 RTR
4475 RTR
4476 RTR
4477 RTR
4500 RTR
4501 RTR
4502 RTR
4503 RTR
4504 RTR
4505 RTR
4506 RTR
4507 RTR
4510 RTR
4511 RTR
4512 RTR
4513 RTR
4514 NOP
4515 NOP
4516 JMS I
4517 TAD
4520 SZA
4521 JMP
4522 TAD
4523 DCA
4524 TAD
4525 DCA
4526 JMS I
4527 JMS I
4530 JMP
4531 JMP

XAVREG
RANDC
+4
LINKR
WD1
TEMPL
WD2
XAMEAS
XRTRR
NERROP
RTRR

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

/ARE LINKS THE SAME
/NO, ERROR

```

```

4532 2820
4533 JMP
4534 LAS
4535 AND
4536 SNA CLA
4537 JMP
4540 LAS
4541 AND
4542 SZA CLA
4543 HLT
4544 LAS
4545 AND
4546 SZA CLA
4547 JMP
4550 LAS
4551 AND
4552 RAR CLL
4553 RTR
4554 DCA FLOSAV
4555 LAS
4556 AND SR04
4557 SZA CLA

INCRMENT PASS COUNTER
/NOT END OF PASS
/TEST SR10
/IS SR09=1
/NO, TYPE RANDOM
/TEST SR09
/IS SR09=1
/YES, HALT AT END OF RANDOM
/TEST SR11
/IS SR11=1
/YES, LOOP ON RANDOM TESTS

/SAVE THE SWITCHES
/MASK FIELD RELOCATION SWITCH

```

```

PAL10      V141      13-SEP-71      13131      PAGE 1-43
4560      JMP I XFLDCK
4561      JMP I ,+1
4562      RSIMAD
4563      JMS I XPRINT
4564      OK4-1
4565      JMP I RNDHLT
4566      JMP I ,+1
4567      RNAD1
4570      RTRER
4571      RYLER
4572      XFLDCK, FLDCHK
PAGE
/ROUTINE TO SORT AND COMPARE RELOCATION INFORMATION
/
FLDCHK,   JMS FLDEND
          JMS RELOC
          CLA CLL CHA RTL
          JMS LFCR
          JMS ASTRK
          JMS FLDNO
          JMS I XPRINT
          BKMS
          JMS FLDHR
          JMS ASTRK
          CLA CLL CHA RAL
          JMS LFCR
          TAD FLDLAV
          CIA
          TAD FLDNUM
          SNA CLA
          JMP ,+3
          HLT CLA
          JMP I XFLDSH
          TAD FLDGO
          TAD K0002
          DCA ,+1
          0000
          JMP I ,+1
          RSIMAD
/ROUTINE TO DETERMINE NUMBER OF BANKS OF MEM.
/
FLDFND,  0
          CLA CLL
          DCA FLDNUM
          TAD KSTOP
          DCA FLD CNT
          CDF
          DCA I K0
          TAD KCDF
          TAD K0010
          DCA FLD OF
          0
FLDFF,   0
          /YES, FIND NUMBER OF FIELDS PRESENT
          /RELOCATE TO NEXT BANK PRESENT OR BANK 0
          /AC TO 7775
          /PRINT SOME CR-LF
          /PRINT SOME *****
          /PRINT AMOUNT OF MEMORY
          /PRINT " EXTENDED BANKS OF MEMORY TO BANK "
          /TEXT FOR EXTENDED BANKS OF MEMORY TO BANK
          /PRINT NEW FIELD
          /PRINT SOME *****
          /AC TO 7776
          /PRINT SOME CR = LP
          /COMPARE SWITCHES
          /TRY IT AGAIN
          /MODIFIED FOR NEW FIELD
          /START POINTER
          /ROUTINE TO DETERMINE NUMBER OF BANKS OF MEM.
          /
          /JUST A COUNTER
          /TO FIELD 0
          /MODIFIED BY TEST

```

```

4560      5772
4561      5762
4562      0200
4563      4446
4564      5735
4565      5340
4566      5767
4567      3400
4570      5026
4571      5041
4572      4600
4600
4600      4231
4601      4264
4602      7346
4603      4341
4604      4331
4605      4352
4606      4446
4607      5735
4610      4360
4611      4331
4612      7344
4613      4341
4614      1175
4615      7041
4616      1174
4617      7050
4620      5223
4621      7002
4622      5770
4623      1314
4624      1115
4625      3226
4626      0000
4627      5630
4630      0200
4631      0000
4632      7300
4633      3174
4634      1371
4635      3176
4636      6201
4637      3571
4640      1372
4641      1113
4642      3243
4643      0000

```

```

4644 7340 CLA CLL CMA
4645 3571 DCA I K0
4646 1571 TAD I K0
4647 7650 SNA CLA
4650 5255 JMP ,+5
4651 2174 ISZ FLDNUM
4652 1243 TAD FLD0F
4653 2176 ISZ FLD0CNT
4654 5241 JMP FLD0F =2
4655 7300 CLA CLL
4656 4201 CDF 0
4657 1571 TAD I K0
4660 7650 SNA CLA
4661 5631 JMP I FLD0ND
4662 7602 HLT CLA
4663 5274 JMP FLD0ND ,+1

```

/ROUTINE TO MOVE PROGRAM TO NEXT FIELD OR FIELD 0

```

RELOC,
0
4664 0000 CLA CLL
4665 7300 DCA FLD0CNT
4666 3176 RIF
4667 6224 TAD K0010
4670 1113 AND K0070
4671 0375 DCA FLD0FRM
4672 3312 CLA CLL IAC
4673 7301 TAD FLDNUM
4674 1174 RAL
4675 7004 RTL
4676 7006 CIA
4677 7041 TAD FLD0FRM
4678 1312 SNL CLA
4679 7600 TAD FLD0FRM
4682 1312 TAD K00F
4683 1372 DCA FLD0G
4684 3314 RIF
4685 6224 TAD K00F
4686 1372 DCA FLD0FRM
4687 3312 TAD FLD0FRM
4690 1312 DCA FLD0R1
4691 3317 FLD0FRM,
4692 0000 TAD I FLD0CNT
4693 1576 FLD0G,
4694 0000 DCA I FLD0CNT
4695 3576 TAD I FLD0CNT
4696 1576 FLD0R1,
4697 0000 CIA
4698 7041 TAD I FLD0CNT
4699 1576 SNA CLA
4700 7650 JMP ,+3
4701 5326 HLT CLA
4702 7602 JMP FLD0FRM
4703 5312 ISZ FLD0CNT
4704 2176 JMP FLD0FRM
4705 5312

```

```

/TRY EXTENDED FIELD
/SAME IF FIELD PRESENT
/DATE BAD OR FIELD NOT THERE
/UPDATE FIELD COUNT
/GET LAST FIELD CDF
/STOP AFTER 7
/TRY NEXT FIELD
/BACK TO FIELD 0
/DID FIELD 0 CHANGE
/FIELD 0 O.K. EXIT
/FIELD ERROR
/TRY AGAIN

```

```

/GET CURRENT FIELD
/UPDATE TO NEXT FIELD
/MASK 0=0
/NEW FIELD POINTER

```

/MOVE TO 6=0

```

/COMPARE TO FIELDS PRESENT
/YES, GOOD FIELD
/NO BACK TO FIELD 0
/SET POINTER FOR NEW FIELD
/WHERE IS PROGRAM

```

/SET POINTER FOR FIELD JUST TESTED

```

/SAME MOVE
/MODIFIED TO CURRENT FIELD
/GET DATA WORD

```

/STORE DATA

```

/THIS THE GOOD ONE
/DID DATA CHANGE
/DATA O.K.
/RELOCATION ERROR
/TRY SAME WORD AGAIN
/UPDATE TO NEXT ADDRESS
/TRANSFER NEXT WORD

```

```

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

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

/ FLDNO:
4752      0000      TAD FLDNO
4753      1174      AND K007
4754      0172      TAD K260
4755      1077      JMS I XTYPE
4756      4447      JMP I FLDNO
4757      5752

/ FLDHR:
4760      0000      TAD FLDGO
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:
4770      4550      FLD SW
4771      7771      KSTOP
4772      6201      KDF
4773      0212      KLF
4774      0215      KCR
4775      0170      K0170
4776      0252      K252

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

```

/GET ASTRK CHAR.

5010 7300  
5011 1200  
5012 5253

|      |      |           |         |
|------|------|-----------|---------|
| 5013 | 0000 | RALER, 0  | CLA CLL |
| 5014 | 7604 | LAS       | TAD     |
| 5015 | 0104 | AND       | JMP     |
| 5016 | 7640 | SEA CLA   | SR01    |
| 5017 | 5223 | JMP       | I+4     |
| 5020 | 4446 | JMS I     | XPRINT  |
| 5021 | 3644 | EM13-1    | ROPRT   |
| 5022 | 4264 | JMS       | CLA CLL |
| 5023 | 7300 | CLA CLL   | RALER   |
| 5024 | 1213 | TAD       | ROHLT   |
| 5025 | 5253 | JMP       | 0       |
| 5026 | 0000 | RTRER, 0  | LAS     |
| 5027 | 7604 | LAS       | AND     |
| 5030 | 0104 | AND       | SEA CLA |
| 5031 | 7640 | SEA CLA   | JMP     |
| 5032 | 5236 | JMP       | I+4     |
| 5033 | 4446 | JMS I     | XPRINT  |
| 5034 | 5663 | EM14-1    | ROPRT   |
| 5035 | 4264 | JMS       | CLA CLL |
| 5036 | 7300 | CLA CLL   | RTRER   |
| 5037 | 1226 | TAD       | ROHLT   |
| 5040 | 5253 | JMP       | 0       |
| 5041 | 0000 | RTLER, 0  | LAS     |
| 5042 | 7604 | LAS       | AND     |
| 5043 | 0104 | AND       | SEA CLA |
| 5044 | 7640 | SEA CLA   | JMP     |
| 5045 | 5251 | JMP       | I+4     |
| 5046 | 4446 | JMS I     | XPRINT  |
| 5047 | 5702 | EM15-1    | ROPRT   |
| 5050 | 4264 | JMS       | CLA CLL |
| 5051 | 7300 | CLA CLL   | RTLER   |
| 5052 | 1241 | TAD       | ROBACK  |
| 5053 | 3243 | DCA       | ROBACK  |
| 5054 | 7604 | LAS       | AND     |
| 5055 | 0103 | AND       | SEA CLA |
| 5056 | 7640 | SEA CLA   | JMP     |
| 5057 | 5262 | JMP       | I+3     |
| 5060 | 1263 | TAD       | ROBACK  |
| 5061 | 7402 | HLT       | ROBACK  |
| 5062 | 5663 | JMP I     | ROBACK  |
| 5063 | 0000 | ROBACK, 0 |         |

|      |      |          |         |
|------|------|----------|---------|
| 5064 | 0000 | ROPRT, 0 | JMS I   |
| 5065 | 4446 | JMS I    | XPRINT  |
| 5066 | 5347 | DM5-1    | CLA CLL |
| 5067 | 7340 | CLA CLL  | CMA     |
| 5070 | 0044 | AND      | LINKR   |
| 5071 | 5040 | DCA      | WD2     |

5072 7040 CMA  
 5073 0041 AND  
 5074 3037 DCA  
 5075 4460 JMS I  
 5076 4461 XLNKOU  
 5077 7040 JMS I  
 5078 0026 CMA  
 5101 3040 AND  
 5102 4460 DCA  
 5103 7040 JMS I  
 5104 0025 CMA  
 5105 3037 AND  
 5106 4461 DCA  
 5107 4446 JMS I  
 5110 5742 JMS I  
 5111 5664 CRLF=1  
 JMP I ROPRT

| PAGE | TEXT | ARG1 | ARG2 | SIMULATED | ARG1+ARG2 | ARG2+ARG1+1 |
|------|------|------|------|-----------|-----------|-------------|
| 5200 |      |      |      |           |           |             |
| 5201 |      |      |      |           |           |             |
| 5202 |      |      |      |           |           |             |
| 5203 |      |      |      |           |           |             |
| 5204 |      |      |      |           |           |             |
| 5205 |      |      |      |           |           |             |
| 5206 |      |      |      |           |           |             |
| 5207 |      |      |      |           |           |             |
| 5210 |      |      |      |           |           |             |
| 5211 |      |      |      |           |           |             |
| 5212 |      |      |      |           |           |             |
| 5213 |      |      |      |           |           |             |
| 5214 |      |      |      |           |           |             |
| 5215 |      |      |      |           |           |             |
| 5216 |      |      |      |           |           |             |
| 5217 |      |      |      |           |           |             |
| 5220 |      |      |      |           |           |             |
| 5221 |      |      |      |           |           |             |
| 5222 |      |      |      |           |           |             |
| 5223 |      |      |      |           |           |             |
| 5224 |      |      |      |           |           |             |
| 5225 |      |      |      |           |           |             |
| 5226 |      |      |      |           |           |             |
| 5227 |      |      |      |           |           |             |
| 5230 |      |      |      |           |           |             |
| 5231 |      |      |      |           |           |             |
| 5232 |      |      |      |           |           |             |
| 5233 |      |      |      |           |           |             |
| 5234 |      |      |      |           |           |             |
| 5235 |      |      |      |           |           |             |
| 5236 |      |      |      |           |           |             |
| 5237 |      |      |      |           |           |             |
| 5240 |      |      |      |           |           |             |
| 5241 |      |      |      |           |           |             |



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|      | DH2, | TEXT | ORIGINAL | SIMULATED | ACTUAL |
|------|------|------|----------|-----------|--------|
| 5242 |      |      |          |           |        |
| 5243 |      |      |          |           |        |
| 5244 |      |      |          |           |        |
| 5245 |      |      |          |           |        |
| 5246 |      |      |          |           |        |
| 5247 |      |      |          |           |        |
| 5250 |      |      |          |           |        |
| 5251 |      |      |          |           |        |
| 5252 |      |      |          |           |        |
| 5253 |      |      |          |           |        |
| 5254 |      |      |          |           |        |
| 5255 |      |      |          |           |        |
| 5256 |      |      |          |           |        |
| 5257 |      |      |          |           |        |
| 5260 |      |      |          |           |        |
| 5261 |      |      |          |           |        |
| 5262 |      |      |          |           |        |
| 5263 |      |      |          |           |        |
| 5264 |      |      |          |           |        |
| 5265 |      |      |          |           |        |
| 5266 |      |      |          |           |        |
| 5267 |      |      |          |           |        |
| 5270 |      |      |          |           |        |
| 5271 |      |      |          |           |        |
| 5272 |      |      |          |           |        |
| 5273 |      |      |          |           |        |
| 5274 |      |      |          |           |        |
| 5275 |      |      |          |           |        |
| 5276 |      |      |          |           |        |
| 5277 |      |      |          |           |        |
| 5300 |      |      |          |           |        |
| 5301 |      |      |          |           |        |
| 5302 |      |      |          |           |        |
| 5303 |      |      |          |           |        |
| 5304 |      |      |          |           |        |
| 5305 |      |      |          |           |        |
| 5306 |      |      |          |           |        |
| 5307 |      |      |          |           |        |
| 5310 |      |      |          |           |        |
| 5311 |      |      |          |           |        |
| 5312 |      |      |          |           |        |
| 5313 |      |      |          |           |        |
| 5314 |      |      |          |           |        |
| 5315 |      |      |          |           |        |
| 5316 |      |      |          |           |        |
| 5317 |      |      |          |           |        |
| 5320 |      |      |          |           |        |
| 5321 |      |      |          |           |        |
| 5322 |      |      |          |           |        |
| 5323 |      |      |          |           |        |
| 5324 |      |      |          |           |        |
| 5325 |      |      |          |           |        |
| 5326 |      |      |          |           |        |
| 5327 |      |      |          |           |        |
| 5330 |      |      |          |           |        |

|      | DH3, | TEXT | RANDC | RESULT |
|------|------|------|-------|--------|
| 5242 |      |      |       |        |
| 5243 |      |      |       |        |
| 5244 |      |      |       |        |
| 5245 |      |      |       |        |
| 5246 |      |      |       |        |
| 5247 |      |      |       |        |
| 5250 |      |      |       |        |
| 5251 |      |      |       |        |
| 5252 |      |      |       |        |
| 5253 |      |      |       |        |
| 5254 |      |      |       |        |
| 5255 |      |      |       |        |
| 5256 |      |      |       |        |
| 5257 |      |      |       |        |
| 5260 |      |      |       |        |
| 5261 |      |      |       |        |
| 5262 |      |      |       |        |
| 5263 |      |      |       |        |
| 5264 |      |      |       |        |
| 5265 |      |      |       |        |
| 5266 |      |      |       |        |
| 5267 |      |      |       |        |
| 5270 |      |      |       |        |
| 5271 |      |      |       |        |
| 5272 |      |      |       |        |
| 5273 |      |      |       |        |
| 5274 |      |      |       |        |
| 5275 |      |      |       |        |
| 5276 |      |      |       |        |
| 5277 |      |      |       |        |
| 5300 |      |      |       |        |
| 5301 |      |      |       |        |
| 5302 |      |      |       |        |
| 5303 |      |      |       |        |
| 5304 |      |      |       |        |
| 5305 |      |      |       |        |
| 5306 |      |      |       |        |
| 5307 |      |      |       |        |
| 5310 |      |      |       |        |
| 5311 |      |      |       |        |
| 5312 |      |      |       |        |
| 5313 |      |      |       |        |
| 5314 |      |      |       |        |
| 5315 |      |      |       |        |
| 5316 |      |      |       |        |
| 5317 |      |      |       |        |
| 5320 |      |      |       |        |
| 5321 |      |      |       |        |
| 5322 |      |      |       |        |
| 5323 |      |      |       |        |
| 5324 |      |      |       |        |
| 5325 |      |      |       |        |
| 5326 |      |      |       |        |
| 5327 |      |      |       |        |
| 5330 |      |      |       |        |

|      | DH4, | TEXT | RANDC | RESULT |
|------|------|------|-------|--------|
| 5242 |      |      |       |        |
| 5243 |      |      |       |        |
| 5244 |      |      |       |        |
| 5245 |      |      |       |        |
| 5246 |      |      |       |        |
| 5247 |      |      |       |        |
| 5250 |      |      |       |        |
| 5251 |      |      |       |        |
| 5252 |      |      |       |        |
| 5253 |      |      |       |        |
| 5254 |      |      |       |        |
| 5255 |      |      |       |        |
| 5256 |      |      |       |        |
| 5257 |      |      |       |        |
| 5260 |      |      |       |        |
| 5261 |      |      |       |        |
| 5262 |      |      |       |        |
| 5263 |      |      |       |        |
| 5264 |      |      |       |        |
| 5265 |      |      |       |        |
| 5266 |      |      |       |        |
| 5267 |      |      |       |        |
| 5270 |      |      |       |        |
| 5271 |      |      |       |        |
| 5272 |      |      |       |        |
| 5273 |      |      |       |        |
| 5274 |      |      |       |        |
| 5275 |      |      |       |        |
| 5276 |      |      |       |        |
| 5277 |      |      |       |        |
| 5300 |      |      |       |        |
| 5301 |      |      |       |        |
| 5302 |      |      |       |        |
| 5303 |      |      |       |        |
| 5304 |      |      |       |        |
| 5305 |      |      |       |        |
| 5306 |      |      |       |        |
| 5307 |      |      |       |        |
| 5310 |      |      |       |        |
| 5311 |      |      |       |        |
| 5312 |      |      |       |        |
| 5313 |      |      |       |        |
| 5314 |      |      |       |        |
| 5315 |      |      |       |        |
| 5316 |      |      |       |        |
| 5317 |      |      |       |        |
| 5320 |      |      |       |        |
| 5321 |      |      |       |        |
| 5322 |      |      |       |        |
| 5323 |      |      |       |        |
| 5324 |      |      |       |        |
| 5325 |      |      |       |        |
| 5326 |      |      |       |        |
| 5327 |      |      |       |        |
| 5330 |      |      |       |        |

|      |      |
|------|------|
| 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 | 0701 |
| 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

| V141  | 13=SEP=71 | 13131 | 1=50 | EM1, | TEXT | /.. | SIMULATED ADD TEST FAILED/ |
|-------|-----------|-------|------|------|------|-----|----------------------------|
| PAL10 |           |       |      |      |      |     |                            |
| 5420  |           |       |      | 3736 |      |     |                            |
| 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 |      |     | 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 |      |     | 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 |      |     | 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/

| PAL10 | V141 | 13-SEP-71 | 13131 | 1-50                       |
|-------|------|-----------|-------|----------------------------|
| 5420  | EM1, | TEXT      | /     | SIMULATED ADD TEST FAILED/ |
| 5421  |      |           |       |                            |
| 5422  |      |           |       |                            |
| 5423  |      |           |       |                            |
| 5424  |      |           |       |                            |
| 5425  |      |           |       |                            |
| 5426  |      |           |       |                            |
| 5427  |      |           |       |                            |
| 5430  |      |           |       |                            |
| 5431  |      |           |       |                            |
| 5432  |      |           |       |                            |
| 5433  |      |           |       |                            |
| 5434  |      |           |       |                            |
| 5435  |      |           |       |                            |
| 5436  |      |           |       |                            |
| 5437  |      |           |       |                            |
| 5440  |      |           |       |                            |
| 5441  |      |           |       |                            |
| 5442  |      |           |       |                            |
| 5443  |      |           |       |                            |
| 5444  |      |           |       |                            |
| 5445  |      |           |       |                            |
| 5446  |      |           |       |                            |
| 5447  |      |           |       |                            |
| 5450  |      |           |       |                            |
| 5451  |      |           |       |                            |
| 5452  |      |           |       |                            |
| 5453  |      |           |       |                            |
| 5454  |      |           |       |                            |
| 5455  |      |           |       |                            |
| 5456  |      |           |       |                            |
| 5457  |      |           |       |                            |
| 5460  |      |           |       |                            |
| 5461  |      |           |       |                            |
| 5462  |      |           |       |                            |
| 5463  |      |           |       |                            |
| 5464  |      |           |       |                            |
| 5465  |      |           |       |                            |
| 5466  |      |           |       |                            |
| 5467  |      |           |       |                            |
| 5470  |      |           |       |                            |
| 5471  |      |           |       |                            |
| 5472  |      |           |       |                            |
| 5473  |      |           |       |                            |
| 5474  |      |           |       |                            |
| 5475  |      |           |       |                            |
| 5476  |      |           |       |                            |
| 5477  |      |           |       |                            |
| 5500  |      |           |       |                            |
| 5501  |      |           |       |                            |
| 5502  |      |           |       |                            |
| 5503  |      |           |       |                            |
| 5504  |      |           |       |                            |
| 5505  |      |           |       |                            |
| 5506  |      |           |       |                            |

  

| EM2, | TEXT | / | SIMULATED RAL TEST FAILED/ |
|------|------|---|----------------------------|
| 5420 |      |   |                            |
| 5421 |      |   |                            |
| 5422 |      |   |                            |
| 5423 |      |   |                            |
| 5424 |      |   |                            |
| 5425 |      |   |                            |
| 5426 |      |   |                            |
| 5427 |      |   |                            |
| 5430 |      |   |                            |
| 5431 |      |   |                            |
| 5432 |      |   |                            |
| 5433 |      |   |                            |
| 5434 |      |   |                            |
| 5435 |      |   |                            |
| 5436 |      |   |                            |
| 5437 |      |   |                            |
| 5440 |      |   |                            |
| 5441 |      |   |                            |
| 5442 |      |   |                            |
| 5443 |      |   |                            |
| 5444 |      |   |                            |
| 5445 |      |   |                            |
| 5446 |      |   |                            |
| 5447 |      |   |                            |
| 5450 |      |   |                            |
| 5451 |      |   |                            |
| 5452 |      |   |                            |
| 5453 |      |   |                            |
| 5454 |      |   |                            |
| 5455 |      |   |                            |
| 5456 |      |   |                            |
| 5457 |      |   |                            |
| 5460 |      |   |                            |
| 5461 |      |   |                            |
| 5462 |      |   |                            |
| 5463 |      |   |                            |
| 5464 |      |   |                            |
| 5465 |      |   |                            |
| 5466 |      |   |                            |
| 5467 |      |   |                            |
| 5470 |      |   |                            |
| 5471 |      |   |                            |
| 5472 |      |   |                            |
| 5473 |      |   |                            |
| 5474 |      |   |                            |
| 5475 |      |   |                            |
| 5476 |      |   |                            |
| 5477 |      |   |                            |
| 5500 |      |   |                            |
| 5501 |      |   |                            |
| 5502 |      |   |                            |
| 5503 |      |   |                            |
| 5504 |      |   |                            |
| 5505 |      |   |                            |
| 5506 |      |   |                            |

  

| EM3, | TEXT | / | SIMULATED RAR TEST FAILED/ |
|------|------|---|----------------------------|
| 5420 |      |   |                            |
| 5421 |      |   |                            |
| 5422 |      |   |                            |
| 5423 |      |   |                            |
| 5424 |      |   |                            |
| 5425 |      |   |                            |
| 5426 |      |   |                            |
| 5427 |      |   |                            |
| 5430 |      |   |                            |
| 5431 |      |   |                            |
| 5432 |      |   |                            |
| 5433 |      |   |                            |
| 5434 |      |   |                            |
| 5435 |      |   |                            |
| 5436 |      |   |                            |
| 5437 |      |   |                            |
| 5440 |      |   |                            |
| 5441 |      |   |                            |
| 5442 |      |   |                            |
| 5443 |      |   |                            |
| 5444 |      |   |                            |
| 5445 |      |   |                            |
| 5446 |      |   |                            |
| 5447 |      |   |                            |
| 5450 |      |   |                            |
| 5451 |      |   |                            |
| 5452 |      |   |                            |
| 5453 |      |   |                            |
| 5454 |      |   |                            |
| 5455 |      |   |                            |
| 5456 |      |   |                            |
| 5457 |      |   |                            |
| 5460 |      |   |                            |
| 5461 |      |   |                            |
| 5462 |      |   |                            |
| 5463 |      |   |                            |
| 5464 |      |   |                            |
| 5465 |      |   |                            |
| 5466 |      |   |                            |
| 5467 |      |   |                            |
| 5470 |      |   |                            |
| 5471 |      |   |                            |
| 5472 |      |   |                            |
| 5473 |      |   |                            |
| 5474 |      |   |                            |
| 5475 |      |   |                            |
| 5476 |      |   |                            |
| 5477 |      |   |                            |
| 5500 |      |   |                            |
| 5501 |      |   |                            |
| 5502 |      |   |                            |
| 5503 |      |   |                            |
| 5504 |      |   |                            |
| 5505 |      |   |                            |
| 5506 |      |   |                            |

  

| EM4, | TEXT | / | SIMULATED RTL TEST FAILED/ |
|------|------|---|----------------------------|
| 5420 |      |   |                            |
| 5421 |      |   |                            |
| 5422 |      |   |                            |
| 5423 |      |   |                            |
| 5424 |      |   |                            |
| 5425 |      |   |                            |
| 5426 |      |   |                            |
| 5427 |      |   |                            |
| 5430 |      |   |                            |
| 5431 |      |   |                            |
| 5432 |      |   |                            |
| 5433 |      |   |                            |
| 5434 |      |   |                            |
| 5435 |      |   |                            |
| 5436 |      |   |                            |
| 5437 |      |   |                            |
| 5440 |      |   |                            |
| 5441 |      |   |                            |
| 5442 |      |   |                            |
| 5443 |      |   |                            |
| 5444 |      |   |                            |
| 5445 |      |   |                            |
| 5446 |      |   |                            |
| 5447 |      |   |                            |
| 5450 |      |   |                            |
| 5451 |      |   |                            |
| 5452 |      |   |                            |
| 5453 |      |   |                            |
| 5454 |      |   |                            |
| 5455 |      |   |                            |
| 5456 |      |   |                            |
| 5457 |      |   |                            |
| 5460 |      |   |                            |
| 5461 |      |   |                            |
| 5462 |      |   |                            |
| 5463 |      |   |                            |
| 5464 |      |   |                            |
| 5465 |      |   |                            |
| 5466 |      |   |                            |
| 5467 |      |   |                            |
| 5470 |      |   |                            |
| 5471 |      |   |                            |
| 5472 |      |   |                            |
| 5473 |      |   |                            |
| 5474 |      |   |                            |
| 5475 |      |   |                            |
| 5476 |      |   |                            |
| 5477 |      |   |                            |
| 5500 |      |   |                            |
| 5501 |      |   |                            |
| 5502 |      |   |                            |
| 5503 |      |   |                            |
| 5504 |      |   |                            |
| 5505 |      |   |                            |
| 5506 |      |   |                            |

|      |      |  |  |  |
|------|------|--|--|--|
| 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 | 0023 |  |  |  |
| 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/

5276 0440  
 5277 2405  
 5300 2324  
 5301 4061  
 5302 4006  
 5303 0111  
 5304 1405  
 5305 0400  
 5306 3736  
 5307 4040  
 5310 4040  
 5311 4022  
 5312 0116  
 5313 0417  
 5314 1540  
 5315 0104  
 5316 0440  
 5317 2405  
 5320 2324  
 5321 4062  
 5322 4006  
 5323 0111  
 5324 1405  
 5325 0400  
 5326 3736  
 5327 4040  
 5330 4040  
 5331 4022  
 5332 0116  
 5333 0417  
 5334 1540  
 5335 2201  
 5336 2240  
 5337 2603  
 5340 2324  
 5341 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

EMIS, TEXT /.. RANDOM RTR TEST FAILED?

OK1, TEXT /..SIMAD/

OK2, TEXT /..SIMROT/

OK3, TEXT /..FCT/

OK4, TEXT /..RANDOM/

CRLF, TEXT /..//

DATE, TEXT /.. DATA ERROR..//



PAL10

V141

13-SEP-71

13131

1-54

5754 3600  
 5755 7777  
 5756 4005  
 5757 3024  
 5760 0516  
 5761 0405  
 5762 0440  
 5763 0201  
 5764 1613  
 5765 2340  
 5766 1706  
 5767 4015  
 5770 0515  
 5771 1722  
 5772 3140  
 5773 2417  
 5774 4002  
 5775 0116  
 5776 1340  
 5777 0000

BKMS,

7777  
 4005  
 3024  
 0516  
 0405  
 0440  
 0201  
 1613  
 2340  
 1706  
 4015  
 0515  
 1722  
 3140  
 2417  
 4002  
 0116  
 1340  
 0000

/TEXT FOR EXTENDED BANKS OF MEMORY TO BANK

/RESTORE BINARY LOADER AND START LOADER

\*7600

7600  
 7601  
 7602  
 7603

CLA CLL  
 TAD BIN  
 DCA TSTA2  
 JMP TSTA2  
 S





| Label  | Value | Label  | Value | Label   | Value | Label  | Value |
|--------|-------|--------|-------|---------|-------|--------|-------|
| A1     | 3263  | DH5    | 5350  | FCT12   | 2667  | K0010  | 0113  |
| A10RA2 | 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   | 5631  | 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  | FLODFF  | 4643  | K215   | 1651  |
| AD8    | 2527  | ENCAR  | 0244  | FLODIX  | 4627  | K240   | 0076  |
| AD9    | 2530  | ENCAR1 | 0253  | FLODND  | 4631  | K252   | 4776  |
| ADA1   | 0021  | ENDBSH | 1277  | FLODFRM | 4712  | K260   | 0077  |
| ADA2   | 0022  | ENDFCT | 3200  | FLODGO  | 4714  | K261   | 0100  |
| ADD    | 0274  | ENDROI | 1303  | FLODHR  | 4760  | K336   | 1647  |
| ADDERR | 0400  | ENRN   | 4566  | FLODNO  | 4752  | K400   | 0103  |
| ADHLT  | 0556  | ERRUT1 | 3744  | FLONUM  | 0174  | K600   | 0101  |
| ADOUT  | 3227  | ERROR1 | 0377  | FLODRM1 | 4717  | K6060  | 3267  |
| ADPRT  | 0417  | ERROR2 | 1046  | FLODSAV | 0175  | KCDF   | 4772  |
| ADT    | 0551  | ERROT  | 1026  | FLOST   | 4590  | KCR    | 4774  |
| ADFLG  | 0035  | FCL1   | 2023  | GOEST   | 0177  | KLF    | 4773  |
| AHOUT  | 0467  | FCL10  | 2612  | HALT2   | 3027  | KSTOP  | 4791  |
| ALTB   | 3616  | FCL11  | 2644  | HALTA   | 0477  | KXXX   | 0190  |
| ANEG   | 3747  | FCL12  | 2677  | HALTB   | 1063  | LPCR   | 4741  |
| APOS   | 3746  | FCL2   | 2056  | HLTA    | 0404  | LINK1  | 0052  |
| ARG1   | 0023  | FCL3   | 2107  | HLTB    | 1052  | LINK2  | 0034  |
| ARG2   | 0024  | FCL4   | 2213  | INS1    | 0136  | LINKR  | 0044  |
| ASTRK  | 4731  | FCL5   | 2246  | INS10   | 0146  | LNKRC  | 0045  |
| BJN    | 0155  | FCL6   | 2302  | INS11   | 0147  | LNKOUT | 0504  |
| BKMS   | 5755  | FCL7   | 2412  | INS12   | 0150  | LOOP   | 3046  |
| BNEG   | 3751  | FCL8   | 2450  | INS13   | 0151  | LOOP1  | 0552  |
| BPOS   | 3750  | FCL9   | 2503  | INS14   | 0152  | M4     | 1070  |
| BSH    | 7002  | FCS1   | 2005  | INS15   | 0153  | M40    | 1646  |
| BSWIAB | 1660  | FCS10  | 2601  | INS16   | 2153  | MASK   | 3752  |
| CAF    | 6007  | FCS11  | 2635  | INS2    | 2132  | MODNEG | 3632  |
| CARRY  | 0030  | FCS12  | 2670  | INS3    | 0137  | MOVMSK | 3667  |
| CBTST1 | 3640  | FCS2   | 2044  | INS4    | 0140  | MGA    | 7501  |
| CBTST2 | 3654  | FCS3   | 2077  | INS5    | 0141  | MQL    | 7421  |
| CHAR   | 0036  | FCS4   | 2201  | INS6    | 0142  | MPP    | 1643  |
| CNTR1  | 0020  | FCS5   | 2233  | INS7    | 0143  | NIBIT  | 1244  |
| COMHOT | 1000  | FCS6   | 2271  | INS8    | 0144  | NBIT   | 1207  |
| CRLF   | 5743  | FCS7   | 2401  | INS9    | 0145  | NERROR | 0067  |
| DATE   | 5745  | FCS8   | 2437  | K0      | 0171  | NEWLNK | 1044  |
| DATER  | 3037  | FCS9   | 2473  | K0001   | 0116  | NLOOP  | 3054  |
| DH1    | 5200  | FCT    | 2000  | K0002   | 0115  | NMASK  | 3753  |
| DH2    | 5245  | FCT1   | 2004  | K0003   | 3542  | NOTAC  | 3755  |
| DH3    | 5274  | FCT10  | 2600  | K0004   | 0114  | NXBIT  | 0527  |
| DH4    | 5317  | FCT11  | 2634  | K0007   | 0172  | NXTADD | 0365  |

|        |      |        |      |        |      |        |      |
|--------|------|--------|------|--------|------|--------|------|
| NXTBT  | 3612 | RNDHLI | 4540 | SIMRTL | 0653 | XFLDSW | 4770 |
| NXTCAR | 0234 | RNDOK  | 4563 | SIMRTR | 0700 | XHALT2 | 0066 |
| NXTROT | 1031 | ROBACK | 5063 | SKHLT  | 3502 | XLNK04 | 0080 |
| 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 | RRAN   | 0632 | SR06   | 0111 | XM6    | 1454 |
| POINT1 | 0011 | RRLNK  | 0033 | SR07   | 0112 | XNXTAD | 0416 |
| POINT2 | 0012 | RRTL   | 0037 | SR08   | 0113 | XNXTRO | 0057 |
| PRINT  | 1600 | RRTR   | 0704 | SR09   | 0114 | XOR1   | 3701 |
| R1     | 1400 | RSIMAD | 0200 | SR10   | 0115 | XOR2   | 3719 |
| R2     | 1410 | RTLR   | 5041 | SR11   | 0116 | XORALL | 0260 |
| R2A    | 3541 | RTLER  | 4400 | SROTAL | 1200 | XPRINT | 0046 |
| R3     | 1420 | RILTAB | 1160 | SROTOK | 1342 | XR1    | 0752 |
| R4     | 1430 | TYRER  | 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 | 0757 | SAMEAS | 3000 | TEMPL  | 0026 | XRALTA | 0052 |
| RANDA  | 0041 | SAVREG | 3017 | TSTA0  | 7776 | XRAND  | 0093 |
| RANDB  | 0042 | SBSW   | 1236 | TSTA1  | 7777 | XRARR  | 4335 |
| RANDC  | 0043 | SEQ    | 0154 | TSTA2  | 0000 | XRARTA | 0102 |
| RANDD  | 3512 | SEQ1   | 0122 | TSTA3  | 0001 | XRHD   | 0090 |
| RARER  | 5000 | SEQ10  | 0133 | TSTA4  | 0002 | XRN1ER | 3446 |
| RARR   | 4200 | SEQ11  | 0134 | TSTA5  | 0003 | XRN2ER | 3756 |
| RBSW   | 0731 | SEQ12  | 0135 | TSTA6  | 0004 | XROTDN | 0777 |
| RELOC  | 4664 | SEQ2   | 0123 | TSTA7  | 0004 | XRTL   | 4571 |
| RELT   | 2025 | SEQ3   | 0124 | TSTIND | 0010 | XRTLTA | 0053 |
| RETI0  | 2616 | SEQ4   | 0125 | TYBIT  | 0540 | XTRR   | 4570 |
| RETI1  | 2631 | SEQ5   | 0126 | TYLNK  | 0513 | XTRTA  | 0094 |
| RETI2  | 2701 | SEQ6   | 0127 | TYPE   | 1652 | XSBSW  | 0776 |
| RETI3  | 2060 | SEQ7   | 0130 | TYP52  | 3056 | XSTAB  | 0051 |
| RETI4  | 2111 | SEQ8   | 0131 | W1     | 1617 | XSTA0  | 0070 |
| RETI5  | 2215 | SEQ9   | 0132 | W2     | 0037 | XSTA1  | 0071 |
| RETI6  | 2306 | SHLT   | 4033 | WD1    | 0040 | XSTA2  | 0072 |
| RETI7  | 2420 | SIMAC  | 0025 | WD2    | 0037 | XTYPE  | 0047 |
| RETI8  | 2495 | SIMAD  | 0204 | WDOUT  | 0040 | XWDOUT | 0061 |
| RETI9  | 2510 | SIMBSW | 0725 | XADD   | 0523 |        |      |
| RHD    | 1133 | SIMLNK | 0026 | XADOUT | 0415 |        |      |
| RHFLG  | 0035 | SIMR   | 0577 | XAMEA  | 3093 |        |      |
| RHOUT  | 1131 | SIMRAL | 0601 | XAMEAS | 0063 |        |      |
| RLNK   | 0024 | SIMRAR | 0626 | XAVREG | 0062 |        |      |
| RN1ER  | 3447 | SIMRO1 | 0600 | XBSWA  | 0064 |        |      |
| RN2ER  | 4000 | SIMRO2 | 0625 | XCOMRO | 0055 |        |      |
| RNAD1  | 3400 | SIMRO3 | 0652 | XDATER | 0056 |        |      |
| RNAD2  | 3600 | SIMRO4 | 0677 | XFLDCK | 4572 |        |      |

ERRORS DETECTED: 0  
LINKS GENERATED: 3  
RUN-TIME: 32 SECONDS  
3K CORE USED