M M 06

UNIQUE ADDRESS TESTS

JA BM6A

May 5, 1961

1. Programs becoming obsolete - JA CM6 Unique Address Tests

2. Used to check ability of memories to reference all addresses.

1. PURPOSE

This program provides a means of testing that every available location in core memory can be addressed uniquely, thus checking that no address decoding malfunction exists.

2. PROGRAM INTRODUCTION

1) General

The program alternately tests upper and lower memories, relocating the portion of the program which runs in upper memory while upper memory is tested, and relocating the portion of the program which runs in lower memory while lower memory is tested. The address of each location (of the memories in test) is stored into that location, together with the complement of the address and a padding to fill out the word. Each address is subsequently checked.

2) Output

Errors encountered will be printed out on the typewriter, giving the memory box in error, the memory location tested, and the location actually obtained.

3. OPERATING PROCEDURES

1) Loading Procedures

1.1. PUNFUL binary deck consists of 13 cards.

1.2. Procedure

1.2.1. Push Master Reset

1.2.2. Place Interrupt disable in the active position.

1.2.3. Place Maintenance switch in active (Maintenance Mode) position.

1.2.4. Place Sense Switches in desired positions.

1.2.5. Depress Initial Progress Program Load on maintenance console.

1.2.6. Place deck in card reader and START.

2) Options

Sense Switch	Function, when set to a 1
(Maintenance Bits)	
32	suppress printing of errors
35	repeat on error
36	loop on test of upper memories
37	loop on test of lower memories

3) Continuous operation with print out O.K. every 100 passes indicates success.

4. PROGRAM PHILOSOPHY

The address of each location is stored into that location, along with the complement of the address and padding bits to fill out the word. Subsequently, each address is read out and checked.

PROGRAM WRITEUP ADDENDUM

Program Unique ADDR

File No. JA BM6 A

MAINTENANCE TAPE CONTROL CARD

Location/s of Exit Branch/es

1.	1	0	0	0	3	1	0
2.			1	0	7	0	0
3.	1	0	0	0	6	7	4
4.							
5.							
6.							

Pre-Loading Manual Intervention Required ? Yes ____ No x

Pre-Loading Procedure (If Any)

PRNID,UNIQUE ADDRESS %6 BOX¤ A. BROWN
PRNID,MAY 5, 1961, JA BM6A

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                PUNFUL,
                SEM,6,G
                SLC,509.                                                                                    000775.00
                CW%CDSC¤,510.,2,510                                    776.00 60 000040.01 FE               000775.00
                CW%CDSC¤,512.,M06Z-M06,$&1.0                          1000.00 60 002460.01 FF               000776.00
                CW%CD¤,32768.,M06AZ-PHA2,$                          100000.00 20 002420.01 FF               000777.00
                @MEMORY UNIQUENESS TEST M006
                SLC,512.                                                                                    001000.00
M06             BD,$&,32                                              1000.44 00                            001000.00
                NOP                                                      0.30 00                            001000.40
                    NOP,                    @B,LCI,$X6 FOR NON PRINT     0.30 00                            001001.00
                REL%SEOP¤,TYPE                                          23.40 80 000000.33 00               001001.40
                LCI,$X1,200000                                         606530.03 02                         001002.40
                W%SEOP¤,TYPE,CW01A      @TITLE                          23.40 80 001071.13 00               001003.00
                CBR,$X1,$@DELAY                                       1004.02 4C                            001004.00
                REL%SEOP¤,TYPE                                          23.40 80 000000.33 00               001004.40
                LCI,$X6,100.  @SETUP PASS COUNTER                      144.15 02                            001005.40
                @GENERATION ROUTINE 1
PHA1            LCI,$X2,100                                           144.05 02                             001006.00
                T,$X2,PHA2,PHA1&100.                                100000.00 80 001152.04 20               001006.40
                Z,$X3                                                   23.22 00                            001007.40
                LVI,$X3,32768.@FIRST LOCATION CHECKED                 100000.07 01                          001010.00
                SX,$X3,$R@PLACE LOC. INR. ACC. LEFT HAL                11.07 10                             001010.40
GEN1            C1100%BU,18,8¤,$R,14@PLACE COMPLEMENT INR. ACC. RIGHT HALF  11.00 80 022007.30 70           001011.00
                ST%BU,64,8¤,$X4@SETUP X4 WITH PROPER VALUE FIELD        24.00 80 000000.20 D0               001012.00
                ST%BU,64,8¤,0%$X4¤@PLACE ADDRESS-COMPL IN LOCATION       0.00 84 000000.20 D0               001013.00
                CTI0110%BU,18,8¤,98303,46@UPPER LIMIT                277777.00 80 422027.15 70           001014.00
                BZRGZ,CHK1@TO CHECK ROUTINE                           1017.35 40                            001015.00
                &I%BU,18,8¤,1.,46@INCREMENT ADDRESS                      1.00 80 422027.20 10               001015.40
                B,GEN1@REPEAT LOOP                                                                          10
                @CHECKING ROUTINE
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CHK1     SX,$X3,$R@RESTORE FIRST ADDRESS                    11.07 10                    001017.00
CHK1A    C1100%BU,18,8□,$R,14@COMPL                         11.00 80 022007.30 70       001017.40
         ST%BU,64,8□,$X4@SETUP FOR PROPER VALUE FIELD       24.00 80 000000.20 D0       001020.40
         CT0110%BU,64,8□,0%$X4□@CMP ACC TO ADDRESSED WORD    0.00 84 000000.15 70       001021.40
         SIC,EXIT1                                       1070.00 80                     001022.40
                 BRGZ,ERROR1@TO ERROR ROUTINE            1031.75 42                     001023.00
         CTI0110%BU,18,8□,98303,46@UPPER LIMIT          277777.00 80 422027.15 70       001023.40
         BZRGZ,$&2,@TO LOWER MEM SETUP                   1026.75 40                     001024.40
         &I%BU,18,8□,1,,46@INCREMENT ADDRESS                1.00 80 422027.20 10       001025.00
         B,CHK1A@RETURN TO CK LOOP                       1017.50 00                     001026.00
         BB,4.36,PHA1&1.32          @LOOP ON UPPER MEM       4.44 80 001007.74 02       001026.40
         LCI,$X2,100                                      144.05 02                     001027.40
         T,$X2,PHA1&100.,PHA2@REPLACE LOWER TEST         1152.00 80 100000.04 20        001030.00
         B,PHA2@GIVE CONTROL TO LOWER TEST               100000.10 00                   001031.00
         @ERROR ROUTINE 1
ERROR1   LX,$X5,$R@SAVE ACC                              11.12 10                     001031.40
         Z,$SB@RESET ZONES                               12.22 00                     001032.00
         LX,$X8,POUT3                @UP                1117.20 10                   001032.40
         L%BU,2,2□,$X4&.16           @SET                 24.20 80 002200.20 50      001033.00
         ST%BU,2,8□,$X8&.18          @UP                  30.22 80 002000.20 D0      001034.00
         V&,$X8,PLS02                @AND               1121.20 B0                   001035.00
         L%BU,8,8□,0.0%$X8□          @OBTAIN               0.00 88 010000.20 50      001035.40
         ST%BU,8,8□,MSGC1            @PROPER BOX NO.    1104.00 80 010000.20 D0      001036.40
         LX,$X7,POUT2                @SET               1116.16 10                   001037.40
         LX,$X8,POUT3                @UP                1117.20 10                   001040.00
         LX,$X9,0.0                  @INDEX                0.22 10                   001040.40
         SV,$X4,FRADP1               @SET               1115.11 30                   001041.00
ERRSU    L%BU,3,3□,FRADP1%$X7□       @UP                1115.00 87 003300.20 50      001041.40
         ST%BU,3,3□,$X8&.18          @AND                 30.22 80 003300.20 D0      001042.40
         L%BU,8,8□,0.0%$X8□          @OBTAIN               0.00 88 010000.20 50      001043.40
         ST%BU,8,8□,MSGD1%$X9□       @ADDRESS           1105.00 89 010000.20 D0      001044.40
         V&,$X9,PLS08                @TESTED            1122.22 B0                   001045.40
         V&,$X7,PLS03                @AND               1121.56 B0                   001046.00
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                CB,$X7,ERRSU        @IN ERROR                1041.56 48                  001046.40
                LX,$X7,POUT2        @SET                     1116.16 10                  001047.00
                LX,$X8,POUT3        @UP                      1117.20 10                  001047.40
                LX,$X9,0.0          @INDEX                     0.22 10                   001050.00
                LX,$X10,0.0         @REGS                      0.24 10                   001050.40
                LV,$X10,0.0%$X4¤    @                          0.24 34                   001051.00
                SV,$X10,=RADP1      @SET                     1115.25 30                  001051.40
ERRSU1          L%BU,3,3¤,ERADP1%$X7¤  @UP                   1115.00 87 003300.20 50     001052.00
                ST%BU,3,3¤,$X8&.18  @AND                      30.22 80 003300.20 D0      001053.00
                L%BU,8,8¤,0.0%$X8¤  @OBTAIN                    0.00 88 010000.20 50     001054.00
                ST%BU,8,8¤,MSGE1%$X9¤  @ADDRESS              1111.00 89 010000.20 D0     001055.00
                V&,$X9,PLS08        @TESTED                  1122.22 B0                  001056.00
                V&,$X7,PLS03        @AND                     1121.56 B0                  001056.40
                CB,$X7,ERRSU1       @OBTAINED                1052.16 48                  001057.00
                SX,$X5,$R@RESTORE ACC                        11.13 10                    001057.40
                BB,4.32,$&4.0                                 4.40 80 001064.34 02       001060.00
                LCI,$X1,200000                              606530.03 02                  001061.00
                W%SEOP¤,TYPE,CW01B     @ERROR PRINT OUT      23.40 80 001072.13 00       001061.40
                CBR,$X1,$@DELAY                             1062.42 4C                    001062.40
                CBR,$X1,$@DELAY                             1063.02 4C                    001063.00
                REL%SEOP¤,TYPE                                23.40 80 000000.33 00       001063.40
                BZB,4.35,$&?.32                               4.43 80 001070.34 00       001064.40
                ST%BU,64,8¤,0%$X4¤                            0.00 84 000000.20 D0       001065.40
                CT0110%BU,64,8¤,0%$X4¤                        0.00 84 000000.15 70       001066.40
                BRGZ,ERROR1                                 1031.75 42                    001067.40
EXIT1           B,EXIT1                                     1070.10 00                    001070.00
                @CONTROL WORDS AND CONSTANTS
CW01A           CW%CR¤,MSGA1,5,CW01A                        1073.00 00 000120.02 39       001071.00
CW01B           CW%CR¤,MSGB1,11,CW01B                       1100.00 00 000260.02 3A       001072.00
MSGA1           DD%BU,64,8¤,0,0,0                                                         001073.00
                                                                                          001074.00
                                                                                          001075.00
                %16¤DD%BU,64,8¤,00 00 00 00 00 00 00 00 @                                 001076.00
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         %16¤DD%RU,64,8¤,00 45 60 60 6C 00 FD FE @ M006          0001053006015400176776   001077.00
         CNOP
MSGB1    DD%RU,64,8¤,0,0,0                                       00000000000000000000     001100.00
                                                                 00000000000000000000     001101.00
                                                                 00000000000000000000     001102.00
         %16¤DD%RU,64,8¤,00 2F 48 5A 00 47 48 74 @ BOX NO.       00005722055000216441 64  001103.00
MSGC1    %16¤DD%RU,64,8¤,00 00 00 2D 32 32 4F 00 @   ADDR        00000000026462144470 00  001104.00
MSGD1    %16¤DD%RU,64,8¤,00 00 00 00 00 00 00 FD @               00000000000000000375     001105.00
         %16¤DD%RU,64,8¤,53 3A 34 00 2D 32 32 4E @THE ADDR       05147215000055144311 16  001106.00
         %16¤DD%RU,64,8¤,00 48 2E 52 2C 3C 46 34 @ OBTAINE       00011013451054170430 64  001107.00
         %16¤DD%BU,64,8¤,32 00 3C 50 00 00 00 00 @D IS           03100017050000000000     001110.00
MSGE1    %16¤DD%RU,64,8¤,00 00 00 00 00 00 FD FE @               00000000000000176776     001111.00
         DD%RU,64,8¤,0,0,0                                       00000000000000000000     001112.00
                                                                 00000000000000000000     001113.00
                                                                 00000000000000000000     001114.00
         CNOP
ERADP1   %8¤DD%RU,32,8¤,0          @BINARY ADDRESS                        00000000000  001115.00
POUT2    XW,0.0,6,$                @COUNT AND                0.00 00 000140.02 4E      001116.00
POUT3    XW,NOCOM2,0,0             @INDEX WORDS              1120.00 00 000000.00 00   001117.00
NOCOM2   %16¤DD%RU,64,8¤,60 62 64 66 68 6A 6C 6E @01234567        06014231063150324661 56  001120.00
PLS02    VF,%8¤0.20                @%8¤ 20 INCREMENT         0.206                     001121.00
PLS03    VF,0.03                   @03 INCREMENT             0.036                     001121.40
PLS08    VF,0.08                   @08 INCREMENT             0.106                     001122.00
         CNOP,0.0                                            0.30 00                   001122.40
M06Z     NOP,0.0                                             0.30 00                   001123.00
         SLC,32768.                                                                    100000.00
         @GENERATION ROUTINE 2
PHA2     LCI,$X2,612                                         1144.05 02                100000.00
         T,$X2,64.0,PHA2&100.      @SAVE UPPER TEST          100.00 80 100144.04 20    100000.40
         Z,$X3                                               23.22 00                  100001.40
         LVI,$X3,64.@FIRST ADDRESS                           100.07 01                 100002.00
         SX,$X3,$R@PLACE LOC INR. ACC RIGHT HALF             11.07 10                  100002.40
GEN2     C1100%BU,18,8¤,$R,14@PLACE COMPL                    11.00 80 022007.30 70     100003.00
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                ST%BU,64,8¤,$X4@SETUP X4 WITH PROPER VALUE FIELD          24.00 80 000000.20 D0   100004.00
                ST%BU,64,8¤,0%$X4¤@PLACE ADDRESS-COMPL IN LOCATION         0.00 84 000000.20 D0   100005.00
                CTI0110%BU,18,8¤,32767,46@UPPER LIMIT                  77777.00 80 422027.15 70   100006.00
                BZRGZ,CHK2@TO CHECK ROUTINE                           100011.35 40                100007.00
                &I%BU,18,8¤,1.,46@INCREMENT ADDRESS                        1.00 80 422027.20 10   100007.40
                B,GEN2@REPEAT LOOP                                    100003.10 00                100010.40
                @CHECKING ROUTINE
        CHK2    SX,$X3,$R@RESTORE ACC                                     11.07 10                100011.00
        CHK2A   C1100%BU,18,8¤,$R,14@COMPL                                11.00 80 022007.30 70   100011.40
                ST%BU,64,8¤,$X4@SETUP FOR PROPER VALUE FIELD              24.00 80 000000.20 D0   100012.40
                CT0110%BU,64,8¤,0%$X4¤@CMP ACC TO ADDRESSED WORD           0.00 84 000000.15 70   100013.40
                SIC,EXIT2                                             100067.40 80                100014.40
                        BRGZ,ERROR2@TO ERROR ROUTINE                  100031.75 42                100015.00
                CTI0110%BU,18,8¤,32767,46@UPPER LIMIT                  77777.00 80 422027.15 70   100015.40
                BZRGZ,$&2.@UPPER TEST SET UP                          100020.75 40                100016.40
                &I%BU,18,8¤,1.,46@INCREMENT ADDRESS                        1.00 80 422027.20 10   100017.00
                B,CHK2A                                               100011.50 00                100020.00
                BB,4.37,PHA2&1.32       @LOOP ON LOWER MEM                 4.45 80 100001.74 02   100020.40
                LCI,$X2,612                                             1144.05 02                100021.40
                T,$X2,PHA2&100.,64.0    @REPLACE UPPER TEST           100144.00 80 000100.04 20   100022.00
                C-I,$X6,1@ADJUST PASS COUNTER                              1.15 08                100023.00
                BXCZ,$&1.                                             100024.70 42                100023.40
                B,PHA1                                                  1006.10 00                100024.00
                NOP                                                        0.30 00                100024.40
                    NOP,                @B,LCI,$X3 FOR NON PRINT           0.30 00                100025.00
                LCI,$X1,200000                                          606530.03 02                100025.40
                W%SEOP¤,TYPE,CW02C      @PRINT SUCCESS I ID               23.40 80 100071.13 00   100026.00
                CBR,$X1,$                                             100027.02 4C                100027.00
                REL%SEOP¤,TYPE                                            23.40 80 000000.33 00   100027.40
                LCI,$X6,100.  @SETUP PASS COUNTER                       144.15 02                100030.40
                B,PHA1                                                  1006.10 00                100031.00
                @ERROR ROUTINE 2
        ERROR2  LX,$X5,$R@SAVE ACC                                        11.12 10                100031.40
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                Z,$SB@RESET ZONES                                    12.22 00                  100032.00
                LX,$X8,POUT32           @UP                     100115.20 10                   100032.40
                L%BU,2,2¤,$X4&.16       @SET                      24.20 80 002200.20 50        100033.00
                ST%BU,2,8¤,$X8&.18      @UP                       30.22 80 002000.20 D0        100034.00
                L%BU,8,8¤,0.0%$X8¤      @OBTAIN                    0.00 88 010000.20 50        100035.00
                ST%BU,8,8¤,MSGC2        @PROPER BOX NO.         100076.00 80 010000.20 D0      100036.00
                LX,$X7,POUT22           @SET                    100114.16 10                   100037.00
                LX,$X8,POUT32           @UP                     100115.20 10                   100037.40
                LX,$X9,0.0              @INDEX                     0.22 10                     100040.00
                SV,$X4,ERADP2           @SET                    100113.11 30                   100040.40
ERRSU2          L%BU,3,3¤,FRADP2%$X7¤   @UP                     100113.00 87 003300.20 50      100041.00
                ST%BU,3,3¤,$X8&.18      @AND                      30.22 80 003300.20 D0        100042.00
                L%BU,8,8¤,0.0%$X8¤      @OBTAIN                    0.00 88 010000.20 50        100043.00
                ST%BU,8,8¤,MSGD2%$X9¤   @ADDRESS                100077.00 89 010000.20 D0      100044.00
                V&,$X9,PLS082           @TESTED                 100120.22 B0                   100045.00
                V&,$X7,PLS032           @AND                    100117.56 B0                   100045.40
                CB,$X7,ERRSU2           @IN ERROR               100041.16 48                   100046.00
                LX,$X7,POUT22           @SET                    100114.16 10                   100046.40
                LX,$X8,POUT32           @UP                     100115.20 10                   100047.00
                LX,$X9,0.0              @INDEX                     0.22 10                     100047.40
                LX,$X10,0.0             @REGS                      0.24 10                     100050.00
                LV,$X10,0.0%$X4¤        @                          0.24 34                     100050.40
                SV,$X10,ERADP2          @SET                    100113.25 30                   100051.00
ERRSU4          L%BU,3,3¤,ERADP2%$X7¤   @UP                     100113.00 87 003300.20 50      100051.40
                ST%BU,3,3¤,$X8&.18      @AND                      30.22 80 003300.20 D0        100052.40
                L%BU,8,8¤,0.0%$X8¤      @OBTAIN                    0.00 88 010000.20 50        100053.40
                ST%BU,8,8¤,MSGE2%$X9¤   @ADDRESS                100103.00 89 010000.20 D0      100054.40
                V&,$X9,PLS082           @TESTED                 100120.22 B0                   100055.40
                V&,$X7,PLS032           @AND                    100117.56 B0                   100056.00
                CB,$X7,ERRSU4           @OBTAINED               100051.56 48                   100056.40
                SX,$X5,$R@RESTORE ACC                              11.13 10                     100057.00
                BB,4.32,$&4.0                                       4.40 80 100063.74 02        100057.40
                LCI,$X1,200000                                 606530.03 02                     100060.40
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                W%SEOP¤,TYPE,CW02B     @ERROR PRINT OUT                23.40 80 100070.13 00     100061.00
                CBR,$X1,$                                           100062.02 4C              100062.00
                CBR,$X1,$@DELAY                                     100062.42 4C              100062.40
                RFL%SEOP¤,TYPE                                        23.40 80 000000.33 00   100063.00
                BZB,4.35,$&3.32                                        4.43 80 100067.74 00   100064.00
                ST%BU,64,8¤,0%$X4¤                                     0.00 84 000000.20 D0   100065.00
                CT0110%BU,64,8¤,0%$X4¤                                 0.00 84 000000.15 70   100066.00
                BRGZ,ERROR2                                         100031.75 42              100067.00
EXIT2           B,EXIT2                                             100067.50 00              100067.40
                @CONTROL WORD AND CONSTANTS
CW02B           CW%CR¤,MSGB2,11,CW02B                               100072.00 00 000262.00 38 100070.00
CW02C           CW%CR¤,MSGF2,5,CW02C                                100104.00 00 000122.00 39 100071.00
MSGB2           DD%BU,64,8¤,0,0,0                                   00000000000000000000      100072.00
                                                                    00000000000000000000      100073.00
                                                                    00000000000000000000      100074.00
                %16¤DD%BU,64,8¤,00 2F 48 5A 00 47 48 74 @ BOX NO.   00005722055000216441 64    100075.00
MSGC2           %16¤DD%BU,64,8¤,00 00 00 2D 32 32 4E 00 @   ADDR    00000000026462144470 00   100076.00
MSGD2           %16¤DD%BU,64,8¤,00 00 00 00 00 00 00 FD @           00000000000000000375      100077.00
                %16¤DD%BU,64,8¤,53 3A 34 00 2D 32 32 4E @THE ADDR   05147215000055144311 16    100100.00
                %16¤DD%BU,64,8¤,00 48 2E 52 2C 3C 46 34 @ OBTAINE   00011013451054170430 64    100101.00
                %16¤DD%BU,64,8¤,32 00 3C 50 00 00 00 00 @D IS       03100017050000000000      100102.00
MSGE2           %16¤DD%BU,64,8¤,00 00 00 00 00 00 FD FE @           00000000000000000176 76   100103.00
MSGF2           DD%BU,64,8¤,0,0,0                                   00000000000000000000      100104.00
                                                                    00000000000000000000      100105.00
                                                                    00000000000000000000      100106.00
                %16¤DD%BU,64,8¤,00 49 74 41 74 00 FD FE @O.K.       00011135040564001767 76   100107.00
                DD%BU,64,8¤,0,0,0                                   00000000000000000000      100110.00
                                                                    00000000000000000000      100111.00
                                                                    00000000000000000000      100112.00
                CNOP
ERADP2          %8¤DD%BU,32,8¤,0          @BINARY ADDRESS                   00000000000     100113.00
POUT22          XW,0.0,6,$                @COUNT AND                0.00 00 000142.00 4C    100114.00
POUT32          XW,NOCOM3,0,0             @INDEX WORDS          100116.00 00 000000.00 00   100115.00
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NOCOM3  %16□DD%RU,64,8□,60 62 64 66 68 6A 6C 6E @01234567          0601423106315032466156   100116.00
        NOP                                                        0.30 00                  100117.00
PLS032  VF,0.03                  @03 INCREMENT                     0.036                    100117.40
PLS082  VF,0.08                  @08 INCRE 1ENT                    0.106                    100120.00
TYPE    SYN,19.32                                                  23.406    &00000000
        CNOP,0.0                                                   0.30 00                  100120.40
M06A7   NOP,0.0                                                    0.30 00                  100121.00
        END,99.                                                  143.00                     100121.40
```