```
BOOTSTRAP FOR CLEAR ,008015,022026,030040/019,001L020100   ,047054,061068,072072)0810811022                    1
CLEAR OR BOOTSTRAP  ,008047/047046       /000H025B022100  4/047046,054061,068072,0010401040                    2

                        COMPUTE MERSENNE PRIME 23 = 2**11213 - 1                  MERSN              PAGE    1

 SEQ PG LIN  LABEL  OP    OPERANDS                                          SFX CT  LOCN  INSTRUCTION TYPE  CARD

 101                JOB   COMPUTE MERSENNE PRIME 23 = 2**11213 - 1
 102                CTL   6611
 103         *
 104         * COMPUTE THE 23RD MERSENNE PRIME = 2**11213 - 1. WE START
 105         * WITH THE 6 THAT'S THE LOW-ORDER DIGIT OF 2**4 IN THE
 106         * NUMBER.  THE OVFL LOOP ADDS A HIGH-ORDER 1 TO MAKE 16.
 107         * THEN IT PROCEEDS BY DOUBLING FROM THEN, WITH THE OVERFLOW
 108         * LOOP MOVING OVER THE HIGH-ORDER DIGIT WORD MARK, AND
 109         * PUTTING IN A 1.  WE DON'T NEED TO CLEAR THE OVERFLOW ZONE,
 110         * BECAUSE THE NEXT DOUBLING WILL DO IT.
 111         *
 112                ORG   081                                                        0081
 113         WHAT   DCW   @0001: @    STARTING DIGIT NUMBER PRINT FIELD          6  0086                      3
 114         *
 115         * X1 IS USED TO KEEP TRACK OF THE CURRENT HIGH-ORDER DIGIT
 116         * (ACTUALLY ONE CHARACTER BEFORE IT).  AT THE END, IT'S ONE
 117         * BEFORE THE HIGH-ORDER DIGIT FOR THE WHOLE NUMBER.  THEN,
 118         * IT'S USED TO PRINT THE RESULT, BEING INCREMENTED BY 100 FOR
 119         * EACH LINE.
 120         *
 121         X1     DSA   NUMBER-1    INITIAL CONTENT OF X1, AT 87-89           3  0089  G07                 3
 122         *
 123         * COMPUTE THE 23RD MERSENNE PRIME.  THIS CODE RUNS THROUGH X2
 124         * AND X3, AND INTO THE PUNCH AREA, BUT WE'RE NOT USING X2 OR
 125         * X3, OR PUNCHING, SO WE MIGHT AS WELL USE IT.
 126         *
 127         START  W                 PRINT THE TITLE PRELOADED AT 201-...      1  0090  2                   3
 128         OVFL   CW    1&X1        CLEAR WM TO MAKE MORE ROOM                4  0091  ) 0'1               3
 129                LCA   ONE         DO THE OVERFLOW, SET THE WM               4  0095  L 198               3
 130                SBR   X1          HIGH-ORDER DIGIT INDEX - 1                4  0099  H 089               3
 131         INNER  BWZ   DONE,NDOUBL,K  DONE IF NEGATIVE                        8  0103  V 131 G37 K         3
 132                S     ONE,NDOUBL                                            7  0111  S 198 G37           4
 133                A     NUMBER      DOUBLE IT                                 4  0118  A G08               4
 134                BAV   OVFL        OVERFLOW?                                 5  0122  B 091 Z             4
 135                B     INNER       NO                                        4  0127  B 103               4
 136         DONE   S     ONE,NUMBER  PUTS A ZONE ON LOW-ORDER DIGIT            7  0131  S 198 G08           4
 137                MZ    ONE,NUMBER  CLEAR ZONE ON LOW-ORDER DIGIT             7  0138  Y 198 G08           4
 138         *
 139         * PRINT IT
 140         *
 141                SW    207                                                   4  0145  , 207              4
 142                LCA   WHAT                                                  4  0149  L 086              5
 143         PLOOP  SBR   X1,100&X1   BUMP PRINTING INDEX BY 100               7  0153  H 089 1'0           5
 144                MCS   WHAT-2,204  INDEX OF FIRST DIGIT                      7  0160  Z 084 204           5
 145                A     ONE,WHAT-4  ADD 100 TO DIGIT NUMBER TO PRINT          7  0167  A 198 082           5
 146                MCW   0&X1,306    NEXT HUNDRED DIGITS                       7  0174  M 0'0 306           5
 147                W                 PRINT THEM                                1  0181  2                   5
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SEQ PG LIN  LABEL   OP    OPERANDS                                          SFX CT  LOCN  INSTRUCTION TYPE  CARD

148                 BCE   FINIS,306,  DONE IF BLANK IN PRINT AREA             8  0182  B 194 306           6
149                 B     PLOOP       PRINT 100 MORE DIGITS                   4  0190  B 153               6
150         FINIS   H     FINIS       HALT LOOP (AS GOOD HERE AS ANYWHERE)    4  0194  . 194               6
151         ONE     DCW   1                                                   1  0198                      6
152         *
153                 ORG   201         PRE-LOAD TITLE INTO PRINT AREA                 0201
154                 DCW   @23RD MERSENNE PRIME = 2**11213 - 1@               34  0234                      7
155         *
156         * HERE'S THE NUMBER
157         *
158                 ORG   333                                                          0333
159                 DA    1X3375                                                 0333  3707
160         NUMHI         1,1         HIGH-ORDER DIGIT                         0333            FIELD
161         NUMBER  DCW   6           LOW-ORDER DIGIT                       1  3708                      8
162                 DC    #24         BLANKS FOR PRINTING THE LAST LINE    24  3732                      8
163         *
164         NDOUBL  DCW   11208       EXPONENT - 4 - 1                      5  3737                      8
165                 END   START                                                      / 090 080
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SYMBOL	ADDRESS	SYMBOL	ADDRESS	SYMBOL	ADDRESS	SYMBOL	ADDRESS	SYMBOL	ADDRESS	SYMBOL	ADDRESS	SYMBOL	ADDRESS
DONE	131	FINIS	194	INNER	103	NDOUBL	3737	NUMBER	3708	NUMHI	333	ONE	198
OVFL	91	PLOOP	153	START	90	WHAT	86	X1	89				