```
CLEAR STORAGE 1     ,008015,022026,030037,044,049,053053N000000N00001026                                    1
CLEAR STORAGE 2     L068116,105106,110117B101/I9I#071029C029056B026/B001/0991,001/001117I0?                  2
BOOTSTRAP           ,008015,022029,036040,047054,061068,072/061039             ,0010011040                  3
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SEQ	PG	LIN	LABEL	OP	OPERANDS		SFX	CT	LOCN	INSTRUCTION TYPE	CARD	A-ADDR	B-ADDR
101				JOB	MULTIPLY ROUTINE 1 FROM ROB GARNER 31 JAN 2025								
102				SFX	1								
103				ORG	333		1		0333				
104			XXX	DCW	#9	9 DIGIT MULTIPLIER	1	9	0341				
105			YYY	DCW	#11	11 DIGIT MULTIPLICAND	1	11	0352				
106			ZZZ	EQU	*&1		1		0353				
107				ORG	901		1		0901				
108			MPLR	DC	#9	MULTIPLIER WORK AREA	1	9	0909				
109			PROD	DC	#20	PRODUCT	1	20	0929				
110				CS	PROD	CLEAR 20 DIGIT PRODUCT AREA	1	4	0930	/ 929		929	
111				LCA	XXX,MPLR	LOAD MULTIPLIER	1	7	0934	L 341 909		341	909
112			ZT	BCE	Z,MPLR,0	TEST MPLR FOR TRUE ZERO	1	8	0941	B 975 909 0		975	909
113				BCE	Z,MPLR,?	NOT TRUE ZERO - TEST FOR PLUS ZERO	1	8	0949	B 975 909 ?		975	909
114				A	YYY,PROD-8	NOT ZERO - ADD MULTIPLICAND TO PRODUCT	1	7	0957	A 352 921		352	921
115				S	K1,MPLR	REDUCE MULTIPLIER BY 1	1	7	0964	S 994 909		994	909
116				B	ZT	BRANCH TO ZERO TEST	1	4	0971	B 941		941	
117			Z	BW	DONE,MPLR	TEST MPLR FOR WORD MARK	1	8	0975	V 995 909 1		995	909
118				LCA	PROD-1,PROD	NO WORD MARK - SHIFT RIGHT	1	7	0983	L 928 929		928	929
119				B	ZT	BRANCH TO ZERO TEST	1	4	0990	B 941		941	
120			K1	DCW	1	CONSTANT "1"	1	1	0994				
121			DONE	B	ZZZ	MULTIPLICATION COMPLETE - BRANCH BACK	1	4	0995	B 353		353	
122				*									

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SEQ PG LIN  LABEL  OP    OPERANDS                                          SFX CT  LOCN  INSTRUCTION TYPE  CARD A-ADDR  B-ADDR

123                JOB   MULTIPLY ROUTINE 2 FROM ROB GARNER 31 JAN 2025
124                SFX   2
125                ORG   333                                               2          0333
126         XXX    DCW   #9          9 DIGIT MULTIPLIER                   2   9  0341
127         YYY    DCW   #11         11 DIGIT MULTIPLICAND                2  11  0352
128         ZZZ    EQU   *&1                                              2      0353
129                ORG   901                                               2          0901
130         MPLR   DC    #9           MULTIPLIER WORK AREA                2   9  0909
131         PROD   DC    #20          PRODUCT                             2  20  0929
132                CS    PROD         CLEAR 20 DIGIT PRODUCT AREA         2   4  0930  / 929                  929
133                LCA   XXX,MPLR     LOAD MULTIPLIER                     2   7  0934  L 341 909              341      909
134         ZT     BCE   Z,MPLR,0     TEST MPLR FOR TRUE ZERO             2   8  0941  B 967 909 0            967      909
135         *        BCE  Z,MPLR,?     NOT TRUE ZERO - TEST FOR PLUS ZERO
136                A     YYY,PROD-8   NOT ZERO - ADD MULTIPLICAND TO PRODUCT 2   7  0949  A 352 921              352      921
137                S     K1,MPLR      REDUCE MULTIPLIER BY 1              2   7  0956  S 986 909              986      909
138                B     ZT           BRANCH TO ZERO TEST                 2   4  0963  B 941                  941
139         Z      BW    DONE,MPLR    TEST MPLR FOR WORD MARK             2   8  0967  V 987 909 1            987      909
140                LCA   PROD-1,PROD  NO WORD MARK - SHIFT RIGHT           2   7  0975  L 928 929              928      929
141                B     ZT           BRANCH TO ZERO TEST                 2   4  0982  B 941                  941
142         K1     DCW   1            CONSTANT "1"                        2   1  0986
143         DONE   B     ZZZ          MULTIPLICATION COMPLETE - BRANCH BACK 2  4  0987  B 353                  353
144         *
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SEQ PG LIN  LABEL  OP    OPERANDS                                                SFX CT  LOCN  INSTRUCTION TYPE  CARD A-ADDR  B-ADDR

145                JOB   MULTIPLY ROUTINE THAT DOESN'T TEST FOR PLUS ZERO
146         *
147         * THIS WOULDN'T DO SIGNED MULTIPLY CORRECTLY. IT'S POSSIBLE TO WORK
148         * OUT THE ZONE FOR THE PRODUCT BEFOREHAND, AND THEN PUT IN PLACE
149         * AT THE END. THIS WOULD MAKE THE ROUTINE BIGGER, BUT WOULDN'T
150         * INCREASE THE LOOP TIMING.
151         *
152                SFX   3
153                ORG   333                                                     3          0333
154         XXX    DCW   #9           9 DIGIT MULTIPLIER                       3   9  0341
155         YYY    DCW   #11          11 DIGIT MULTIPLICAND                    3  11  0352
156         ZZZ    EQU   *&1                                                   3      0353
157                ORG   900                                                    3          0900
158         MPLR   DC    #9           MULTIPLIER WORK AREA                     3   9  0908
159         MPLZ   DC    0                                                     3   1  0909
160         PROD   DC    #20          PRODUCT                                  3  20  0929
161                CS    PROD         CLEAR 20 DIGIT PRODUCT AREA              3   4  0930  / 929                    929
162                LCA   XXX,MPLR     LOAD MULTIPLIER                          3   7  0934  L 341 908                341     908
163         ZT     BCE   Z,MPLR,0     TEST MPLR FOR TRUE ZERO                  3   8  0941  B 967 908 0              967     908
164                A     YYY,PROD-8   NOT ZERO - ADD MULTIPLICAND TO PRODUCT   3   7  0949  A 352 921                352     921
165                S     K10,MPLZ     REDUCE MULTIPLIER BY 1                   3   7  0956  S 987 909                987     909
166                B     ZT           BRANCH TO ZERO TEST                      3   4  0963  B 941                    941
167         Z      BW    DONE,MPLR    TEST MPLR FOR WORD MARK                  3   8  0967  V 988 908 1              988     908
168                LCA   PROD-1,PROD  NO WORD MARK - SHIFT RIGHT               3   7  0975  L 928 929                928     929
169                B     ZT           BRANCH TO ZERO TEST                      3   4  0982  B 941                    941
170         K10    DCW   10           CONSTANT "1"                             3   2  0987
171         DONE   B     ZZZ          MULTIPLICATION COMPLETE - BRANCH BACK    3   4  0988  B 353                    353
172                END                                                         3          / 353 080                353
```

SYMBOL	ADDRESS	SYMBOL	ADDRESS	SYMBOL	ADDRESS	SYMBOL	ADDRESS	SYMBOL	ADDRESS	SYMBOL	ADDRESS
DONE 1	0995: 0	DONE 2	0987: 0	DONE 3	0988: 0	K1 1	0994: 0	K1 2	0986: 0	K10 3	0987: 0
MPLR 1	0909: 0	MPLR 2	0909: 0	MPLR 3	0908: 0	MPLZ 3	0909: 0	PROD 1	0929: 0	PROD 2	0929: 0
PROD 3	0929: 0	XXX 1	0341: 0	XXX 2	0341: 0	XXX 3	0341: 0	YYY 1	0352: 0	YYY 2	0352: 0
YYY 3	0352: 0	Z 1	0975: 0	Z 2	0967: 0	Z 3	0967: 0	ZT 1	0941: 0	ZT 2	0941: 0
ZT 3	0941: 0	ZZZ 1	0353: 0	ZZZ 2	0353: 0	ZZZ 3	0353: 0				