

# Motorola Semiconductor Engineering Bulletin

---

## EB293

## Simplify MC68HC711E20 EPROM Programming with PCbug11

By John Bodnar  
Austin, Texas

### Introduction

---

This engineering bulletin describes a way to program MC68HC711E20 parts using the M68HC711E9PGMR board, since the GLOADE9 software shipped with this board cannot be used to program MC68HC711E20 devices.

The PCbug11, needed along with the M68HC11EVB to program MC68HC711E9 devices, is available from the download section of the Microcontroller Worldwide Web site [www.mcu.motsps.com](http://www.mcu.motsps.com).

Retrieve the file `pcbug342.exe` (a self-extracting archive) from the MCU11 directory.

Some Motorola evaluation board products also are shipped with PCbug11.

**NOTE:** *For specific information about any of the PCbug11 commands, see the appropriate sections in the PCbug11 User's Manual (part number M68PCBUG11/D2), which is available from the Motorola Literature Distribution Center, as well as the Worldwide Web at [www.mcu.motsps.com](http://www.mcu.motsps.com). The file is also on the software download system and is called `pcbug11.pdf`.*



## Programming Procedure

---

Once you have obtained PCbug11, follow this step-by-step procedure to program MC68HC711E20 parts.

### Step 1

- Before applying power to the programming board, connect the M68HC711E9PGMR serial port, P2, to one of your PC COM ports with a standard 25-pin RS-232 cable. Do not use a null modem cable or adapter which swaps the transmit and receive signals between the connectors at each end of the cable.
- Place a blank MC68HC711E20 part in the PLCC (plastic leaded chip carrier) socket on your board.
- Insert the part upside down with the notched corner pointing toward the red power LED (light-emitting diode).
- Make sure both switches, S1 and S2, are turned off.
- Apply +5 volts to +5-V, +12 volts (at most +12.5 volts) to  $V_{PP}$ , and ground to GND on your programmer board's power connector, P1. The remaining TXD/PD1 and RXD/PD0 connections are not used in this procedure. They are for gang programming MC68HC711E9 devices, which is discussed in the M68HC711E9PGMR Manual. You cannot gang program with PCbug11.
- Ensure that the "remove for multi-programming" jumper, J1, below the +5-V power switch has a fabricated jumper installed.

### Step 2

- Apply power to your programmer board by moving the +5V switch to the ON position.
- The  $V_{PP}$  switch should be off.
- From a DOS command line prompt, start PCbug11 with:
  - C:\PCBUG11\> PCBUG11 –E PORT = 1  
with the E9PGMR connected to COM1 or
  - C:\PCBUG11\> PCBUG11 –E PORT = 2  
with the E9PGMR connected to COM2

- PCbug11 only supports COM ports 1 and 2. If you have made the proper connections and have a high quality cable, you should quickly get a PCbug11 command prompt. If you do receive a "Comms fault" error, check your cable and board connections. Most PCbug11 communications problems can be traced to poorly made cables or bad board connections.

Step 3

- PCbug11 defaults to base 10 for its input parameters; change this to hexadecimal by typing

CONTROL BASE HEX

Step 4

- You must declare the address of the EPROM programming control register to PCbug11 since it resides at \$1036 on the MC68HC711E20 instead of \$103B as on the MC68HC711E9. To do so, type

CONTROL EPROG 1036

Step 5

- You must declare the addresses of the EPROM array to PCbug11. To do so, first type

EPROM 9000 AFFF

- And then type:

EPROM D000 FFFF

Step 6

You are now ready to download your program into the EPROM.

- Apply the programming voltage to your part by moving the  $V_{PP}$  switch to the ON position.
- At the PCbug11 command prompt, type

LOADS C:\MYPROG\ISHERE.S19

Substitute the name of your program into the command above. Use a full path name if your program is not located in the same directory as PCbug11.

## Step 7

After the programming operation is complete, PCbug11 displays this message:

Total bytes loaded: \$xxxx

Total bytes programmed: \$yyyy

- A pair of these lines will be displayed for each block of code in your S-record file or more specifically, each ORG directive in your assembly language source will cause a pair of these lines to be generated. For this operation, \$yyyy will be incremented by the size of each block of code programmed into the EPROM of the MC68HC711E20.
- PCbug11 will display the above message whether or not the programming operation was successful.
- As a precaution, have PCbug11 verify your code. At the PCbug11 command prompt, type:
- VERF C:\MYPROG\ISHERE.S19
- Substitute the name of your program into the command above. Use a full path name if your program is not located in the same directory as PCbug11.
- If the verify operation fails, a list of addresses which were not programmed correctly is displayed. Should this occur, you probably need to erase your part completely. To do so, allow the MC68HC711E20 to sit for 45 minutes under an ultraviolet light source. Attempt the programming operation again. If you have purchased devices in plastic packages (one-time-programmable parts), you will need to try again with a new, unprogrammed device.

Motorola reserves the right to make changes without further notice to any products herein. Motorola makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does Motorola assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation consequential or incidental damages. "Typical" parameters which may be provided in Motorola data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. Motorola does not convey any license under its patent rights nor the rights of others. Motorola products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the Motorola product could create a situation where personal injury or death may occur. Should Buyer purchase or use Motorola products for any such unintended or unauthorized application, Buyer shall indemnify and hold Motorola and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that Motorola was negligent regarding the design or manufacture of the part. Motorola and (AA) are registered trademarks of Motorola, Inc. Motorola, Inc. is an Equal Opportunity/Affirmative Action Employer.

### How to reach us:

**USA/EUROPE/Locations Not Listed:** Motorola Literature Distribution, P.O. Box 5405, Denver, Colorado 80217, 1-800-441-2447 or 1-303-675-2140. Customer Focus Center, 1-800-521-6274

**JAPAN:** Nippon Motorola Ltd.: SPD, Strategic Planning Office, 141, 4-32-1 Nishi-Gotanda, Shinigawa-Ku, Tokyo, Japan. 03-5487-8488

**ASIA/PACIFIC:** Motorola Semiconductors H.K. Ltd., 8B Tai Ping Industrial Park, 51 Ting Kok Road, Tai Po, N.T., Hong Kong. 852-26629298

**Mfax™, Motorola Fax Back System:** RMFAX0@email.sps.mot.com; <http://sps.motorola.com/mfax/>;

TOUCHTONE, 1-602-244-6609; US and Canada ONLY, 1-800-774-1848

**HOME PAGE:** <http://motorola.com/sps/>

Mfax is a trademark of Motorola, Inc.

© Motorola, Inc., 1998



**MOTOROLA**

EB293/D