

# Motorola Semiconductor Engineering Bulletin

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## Programming MC68HC811E2 Devices with PCbug11 and the M68HC711E9PGMR

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### Introduction

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The PCbug11 software, needed along with the M68HC711E9PGMR to program MC68HC811E2 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 and [www.mcu.motsps.com](http://www.mcu.motsps.com). The file is also on the software download system and is called `pcbug11.pdf`.*



### To Execute the Program

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Once you have obtained PCbug11, use this step-by-step procedure to program your MC68HC811E2 part.

#### 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 your MC68HC811E2 part in the PLCC socket on your board.
- Insert the part upside down with the notched corner pointing toward the red power LED.
- Make sure both S1 and S2 switches 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.

#### Step 2

Apply power to your programmer board by moving the +5-V switch to the ON position.

From a DOS command line prompt, start PCbug11 this way:

```
C:\PCBUG11\ > PCBUG11 -A PORT = 1  
with the E9PGMR connected to COM1
```

or

```
C:\PCBUG11\ > PCBUG11 -A PORT = 2  
with the E9PGMR connected to COM2
```

PCbug11 only supports COM ports 1 and 2. If the proper connections are made and you 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**

Clear the block protect register (BPROT) to allow programming of the MC68HC811E2 EEPROM.

At the PCbug11 command prompt, type: MS 1035 00.

**Step 5**

PCbug11 defaults to a 512-byte EEPROM array located at \$B600. This must be changed since the EEPROM is, by default, located at \$F800 on the MC68HC811E2.

At the PCbug11 command prompt, type: EEPROM 0.

Then type: EEPROM F800 FFFF.

This assumes you have not relocated the EEPROM by previously reprogramming the upper 4 bits of the CONFIG register. If you have done this, and your S-records reside in an address range other than \$F800 to \$FFFF, you will need to first relocate the EEPROM.

When the MC68HC811E2 powers up in bootstrap mode, the EEPROM is forced to the addresses from \$F800 to \$FFFF. You can relocate the EEPROM in bootstrap mode by directly modifying the CONFIG register.

For example, if the CONFIG register has been reprogrammed to relocate the EEPROM to the address range from \$0800 to \$0FFF, this should be typed at the PCbug11 command prompt:

MS 103F 0F

For other address ranges, you would replace the 0 following 103F with any value between 1 and E with the exception of B.

You cannot relocate the EEPROM to the addresses from \$B800 to \$BFFF in bootstrap mode because the bootstrap ROM code resides there and always has read and write precedence over the internal EEPROM.

Now that you have done this, simply replace the arguments of the second PCbug11 EEPROM instruction above with the appropriate values.

For the example here of a CONFIG register reprogrammed to \$0F, type EEPROM 0800 0FFF at the PCbug11 command prompt.

### Step 6

Erase the EEPROM to allow byte programming of your code as it is downloaded.

At the PCbug11 command prompt, type: EEPROM ERASE BULK F800.

Once again, remember to substitute the correct value for F800 in the command above if you relocated the EEPROM by changing the upper 4 bits of the CONFIG register.

### Step 7

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

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 8

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 EEPROM of the MC68HC811E2.

**NOTE:** *PCbug11 displays the above message whether or not the programming operation was successful.*

As a precaution, you should 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 did not program correctly is displayed.

Should this occur, one of several things may be wrong:

- You did not clear the block protect register. Return to step 4.
- Your part did not erase properly.
  - At the PCbug11 command prompt, type: EEPROM DELAY 20. This will increase the EEPROM erase delay timing. After increasing delay timing, go back to step 5.
- Your part may have a damaged EEPROM array. If this is the case, you will need to try a new MC68HC811E2 device.





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