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Programming MC68HC711E9 Devices with PCbug11 and the M68HC11EVB

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Introduction

The PCbug11 software, 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.

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. The file is also on the software download system and is called `pcbug11.pdf`.*



To Execute the Program

Once you have obtained PCbug11, use this step-by-step procedure to program your MC68HC711E9 part. This procedure has been tested only on M68HC11EVB revision C boards and may not work properly on earlier revision A and revision B boards.

Step 1

- Before applying power to the M68HC11EVB, the MODA and MODB pins on the MC68HC11 must be grounded. To do this, connect pins 1, 2, and 3 on the EVB's P1 connector.

Grounding MODA and MODB will force the EVB into special bootstrap mode on power-up.

Also take note of P1 connector pin 18. In step 5, you will connect a +12-volt (at most +12.5 volts) programming voltage through a 100- Ω current limiting resistor to the XIRQ pin. Do not connect this programming voltage until you are instructed to do so in step 2.

- Remove the resident MC68HC11A1 from socket U10 on the EVB. Place a MC68HC711E9 in the open socket with the notched corner of the part aligned with the notch on the PLCC socket.
- Connect the EVB host port (the DB25 connector nearest to the EVB power supply connector) to one of your PC COM ports through a null modem cable or a serial cable with a null modem adapter. Null modem adapters and cables can be purchased from computer hardware vendors and specialized cable manufacturers. The null modem connection is required because the EVB host port swaps the transmit (TxD) and receive (RxD) connections so that the resident MC68HC11 can communicate with a remote computer via a modem. To communicate with a personal computer via a COM port, these connections must be reversed.
- Apply -12 volts to -12, ground to GND, +5 volts to +5, and +12 volts to +12 on the power connector P4 of your EVB.

Step 2 From a DOS command line prompt, start PCbug11 like this:

```
C:\PCBUG11\> PCBUG11 -E PORT = 1  
with the EVB connected to COM1
```

or

```
C:\PCBUG11\> PCBUG11 -E PORT = 2  
with the EVB connected to COM2
```

PCbug11 only supports COM ports 1 and 2.

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 addresses of the EPROM array to PCbug11.

To do this, type: EPROM D000 FFFF.

Step 5 You are now ready to download your program into the EPROM. Connect +12 volts (at most +12.5 volts) through a 100-Ω current limiting resistor to P1 connector pin 18, the XIRQ* pin.

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 6 After the programming operation is complete, PCbug11 will display this message:

```
Total bytes loaded: $xxxx
```

```
Total bytes programmed: $yyyy
```

You should now remove the programming voltage from P1 connector pin 18, the XIRQ* pin.

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 MC68HC711E9.

PCbug11 will display 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, you probably need to erase your part more completely. To do so, allow the MC68HC711E9 to sit for at least 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.

Step 7

To restore normal operation of the EVB after you are finished programming your MC68HC711E9 devices:

- Disconnect all voltages from power connector P4
- Disconnect the programming voltage from P1 connector pin 18 (XIRQ)
- Disconnect the null modem assembly from the host port
- Reinstall the MC68HC11A1 in socket U10
- Disconnect pins 1, 2, and 3 on the EVB's P1 connector

The EVB will now operate normally under the control of the BUFFALO monitor. You do not need the null modem assembly for normal operation, and you will connect your personal computer to the EVB via the terminal port, not the host port.

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