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Programming MC68HC811E2 Devices with PCbug11 and the M68HC11EVBU

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Introduction

The PCbug11 software, needed along with the M68HC11EVBU to program MC68HC811E2 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.*

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Programming Procedure

Once you have obtained PCbug11, follow this step-by-step procedure to program the MC68HC811E2.

Step 1

- Before applying power to the EVBU (evaluation board), remove the jumper from J7 and place it across J3 to ground the MODB pin.
- Place a jumper across J4 to ground the MODA pin. This will force the EVBU into special bootstrap mode on power-up.
- Remove the resident MC68HC11E9 MCU from the EVBU.
- Place your MC68HC811E2 in the open socket with the notched corner of the part aligned with the notch on the PLCC socket.
- Connect the EVBU to one of your PC COM ports. Apply +5 volts to V_{DD} and ground to GND on the power connector of your EVBU.

Step 2

- From a DOS command line prompt, start PCbug11 with:
  - C:\PCBUG11\> PCBUG11 – A PORT = 1
    with the EVBU connected to COM1, or
  - C:\PCBUG11\> PCBUG11 – A PORT = 2
    with the EVBU 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. Barring these problems, the only way a "Comms fault" error can occur is if you are using a computer equivalent to a 386DX running faster than 25 MHz.
- If this is the case, when you get the PCbug11 command prompt, type:

  CONTROL TIMEOUT 10000

- Press the reset button on the EVBU and type:

  RESTART

  If you have made the proper connections and are using a high quality fabricated cable, then you should quickly receive the PCbug11 command prompt without any error messages. These additional steps are required because PCbug11's timing routines depend on processor speed and thus will run faster and time out sooner on more powerful machines.

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 four 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 you have previously reprogrammed the CONFIG register to relocate the EEPROM to the address range from $0800 to $0FFF, you would type this 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 our example of a CONFIG register reprogrammed to $0F above, you would type EEPROM 0800 0FFF at the PCbug11 command prompt.

Step 6

- Erase the EEPROM to allow byte programming as your code 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 four 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 When device programming is complete, PCbug11 will display 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 MC68HC811E2.

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 this command. 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. Do this and go back to step 5.

  Your part may have a bad EEPROM array. If this is the case, you will need to try a new MC68HC811E2 device.

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