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Programming the BUFFALO Monitor into an MC68HC711E9

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Introduction

If communication with the EVBU (evaluation) board cannot be established using a terminal emulation program such as Procomm or Kermit, the information in this engineering bulletin is for you. The probable reason for communication failure is that the EPROM in the MC68HC711E9 has not been programmed with the BUFFALO monitor.

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Programming the BUFFALO Monitor

Use these steps to determine if the BUFFALO monitor is present:

- Look at the top of the MC68HC11 chip on your EVBU board. The chip has the BUFFALO monitor programmed into it if MC68HC11E9FN1 is printed on the top.
- The MC68HC11 chip may not have the BUFFALO monitor programmed into it if:
  - The part has an exposed window, or
  - The part has a blue sticker that actually covers the window, or
  - The part has MC68HC711E9FS printed on top.
- The EVBU board comes with the BUFFALO monitor programmed into an MC68HC11E9FN1. The EVBU that is sold as a student experimental board was formerly shipped with a blank MC68HC711E9FS. However, since 1992, these boards have been shipped with the MC68HC11E9FN1 (with the BUFFALO monitor) and a blank MC68HC711E9FS included in the box.
- If the EVBU does not have the BUFFALO monitor programmed into the MC68HC11, use an IBM PC compatible running PCbug11 to communicate with the board. The PC must either have a color monitor, or, if it uses a monochrome monitor, be able to accept the DOS command MODE CO80. Once communication with the EVBU is established using PCbug11, programming the BUFFALO monitor into the MC68HC711E9FS can be accomplished. Both PCbug11 and BUFFALO monitor come on disks supplied with the EVBU board. These programs can also be found on the Freeware Data System. If the version of PCbug11 shipped on the disks is not at least 3.24a, then download the newest version available.

- Remove the jumper from J7 and place it across J3. This grounds the MODB pin. J4 has a trace across it on the bottom of the board which grounds MODA. This should be intact. If it is not, put a jumper at J4. This configuration places the MC68HC11 in special bootstrap mode upon reset.

- Connect the EVBU to your PC serial port with a DB-25 connector. The port can be either COM1 or COM2. The cable to use is "straight through," RS232C, DB25 to DB25. If you have a DB9 connector on your PC end, the pinout is described in this table:

DB9-F	DB25-M	Signal
1	8	DCD
2	3	RXD
3	2	TXD
4	20	DTR
5	7	GND
6	6	DSR
7	4	RTS
8	5	CTS
9	—	NO CONNECT

The EVBU needs +5 volts DC going to the power connector and +12 volts DC going through a 100-ohm resistor connected to P4, pin 18 (this is the programming voltage pin, V_{PP}). The +5 volt supply must be turned on before +12 volts.

- Start PCbug11 by typing

  PCBUG11 –E port = 1

  If you are using COM 2, use port = 2 instead. If your screen freezes and doesn't finish bringing up PCbug11, reset the computer and type

  mode C080

  Then try to restart PCbug11.

  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. Then 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.

  Once you have received the PCbug11 command prompt, type

  CONTROL BASE HEX

  This tells PCbug11 that your inputs will be in hexadecimal. When using hexadecimal, you do not have to add the $ to inputs.

- Now type

  EEPROM B600 B7FF EPROM D000 FFFF LOADS (path) BUF34.S19

  Where path is wherever the file BUF34.S19 is located. This could be floppy drive A.

  Therefore, type

  LOADS A:BUF34.S19

  If BUF34.S19 was located on the hard drive under a directory called junk, type

  LOADS C:\JUNK\BUF34.S19

  Programming takes approximately five minutes. After programming is finished, turn off all power to the board.

- Remove the V_{PP} wire from connector P4 pin 18.
- Make the jumper off of J3 and put it on J7.
- Apply the +5 volts DC power to the board again.
- To quit PCbug11, type

  QUIT

  Answer yes, when the program asks if you are sure.

- Start your standard terminal program, for example, Procomm, set up for 9600 baud, no parity, eight data bits, and one stop bit (commonly written as 9600,N,8,1).
- Push the board reset button, and you should get the BUFFALO 3.4 prompt on the screen. See the *M68HC11EVBU Universal Evaluation Board User's Manual,* Motorola document order number MC68HC11EVBU/AD2, when using the board with the BUFFALO monitor.

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