Appendix.Firmware

The respirometer node controller is a small pressure tolerant controller that provides remote I/O through out the system. Because the node controller is potted the onboard firmware must be updated via an instrument port using the built in bootloader. The bootloader's function is to start the firmware for the node controller or to allow it to be updated. Below are the instructions for updating a node controller's firmware.

Updating The Node Controller Firmware

1) Power on the node controller with a bench top RS-485 bus adapter.

2) Connect a port test cable to PORT-0 of the node controller and use a null modem adapter to connect that port to a PC serial port at 9600 8N1.

3) Using a serial terminal (i.e. hyperterm, RealTerm, etc.) bring up the configuration menu by typing a "?".

4) Select the option that sets the bootloader flag.

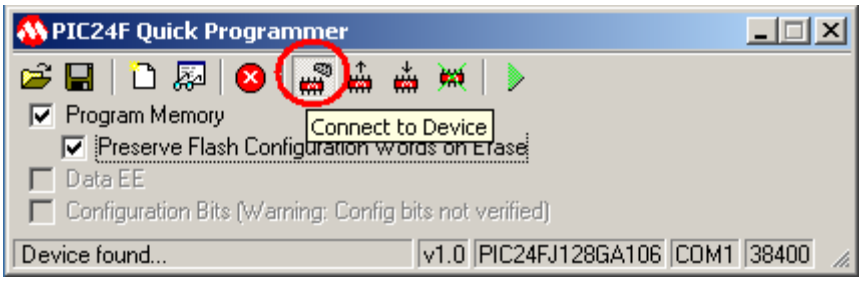
5) Close the serial terminal and open the bootloader GUI

The bootloader GUI can be found at,

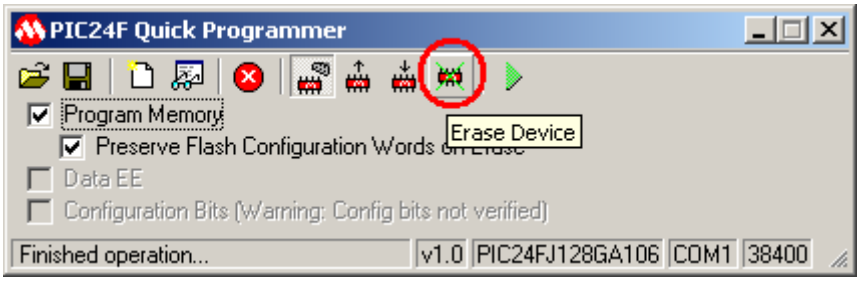
http://moonjelly.shore.mbari.org/cgi-bin/viewvc.cgi/respirometer/src/modbus_io/bootloader/pic24BootloaderGUI.zip

6) Power cycle the node controller.

7) Connect to the node controller.



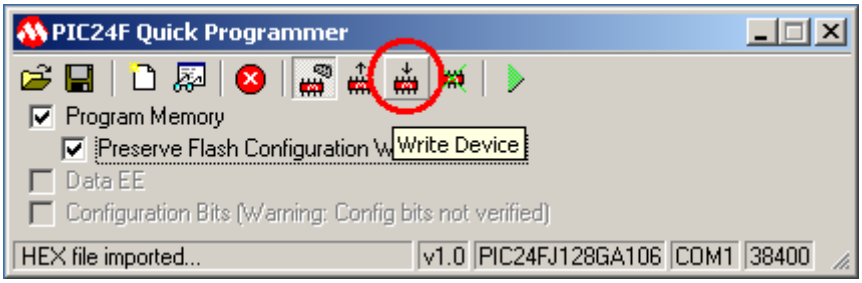
8) Erase the node controller.



9) Load the hex file of your choice, the most recent tagged version is located at

http://moonjelly.shore.mbari.org/cgi-bin/viewvc.cgi/respirometer/src/modbus_io/remote_serial/remote_serial.hex

10) Once the hex file is loaded, program it to the node controller's flash.



11) When the programming is complete close the bootloader GUI and open serial terminal. Power cycle the node controller to verify the new firmware is working.

Accessing The Bootloader Using the Escape Sequence

If for any reason the application firmware should become corrupt there is an escape sequence that can interrupt the normal boot process. When powering on a node controller the status LED will blink briefly, this is when the bootloader is checking for the boot escape sequence. The bootloader is waiting for a series of 4 'U' characters at 9600 8N1 on instrument port 0. If the bootloader receives these characters during this time, it will not jump to the application firmware. The

easiest way to achieve this is to continuously send the, ‘U’ character out a PC serial port while powering the node controller on. Once you have accessed the bootloader, you can use the above procedure to reprogram the node controller’s firmware.