APEX INSTRUMENTS, INC

XC6000 Firmware Upgrade Procedure

Upgrading Firmware

From time to time, Apex Instruments may release updated device firmware for the XC6000EPC console. These firmware upgrades may add additional functionality or capabilities to the console, and may be required in order to use the latest version of the monitor / control client software. If the XC6000 software displays a message regarding your firmware revision number, please contact Apex Instruments to get more information.

The XC6000EPC firmware may be programmed using a PC and the Apex Firmware Programming Cable. PLEASE NOTE: The drivers for the programming cable and the version of the XC6000 firmware most current at the time of shipment are installed along with the Apex software. Please install the Apex XC6000EPC software before attempting to upgrade the firmware.

The Apex Firmware Programming Cable uses a USB Serial Converter similar to the one in the main console. When connecting the Firmware Programming Cable to the PC for the first time, the Found New Hardware Wizard may appear.

Early revision program cables have a 6-pin Molex connector on one end, and a 9-pin D-sub connector on the other. These cables are supplied with a USB serial adaptor (usually made by Belkin.) Please follow the same directions as detailed above in Software Installation, directing the wizard to the "C: \Apex\F5U109 USB Serial Port Driver" folder. Once the drivers are installed, please re-open the Device Manager and note the COM number of the new serial port installed by the Apex Firmware Programming Cable.

DB-9 Serial Plug   **USB-A Plug**

For later revision programming cables with the 6-pin Molex connector and a 4-pin USB A connector on the other, please use the same steps as for connecting the XC6000 to the PC via USB. The later programming cables use the same USB converter as the XC6000 so no additional drivers are necessary. The COM port installed may not be the same as the XC6000 virtual COM port, so please re-open the Device Manager and note the COM number of the new serial port installed by the Apex Firmware Programming Cable.

XC6000 Firmware Upgrade Procedure Cont.

Important Notes About Upgrading Firmware:

The older versions of the XC6000 firmware lack several important new features of the current consoles. These include the ability to set alarms based on test conditions, the optional ability to sample at flow rates above 1 Lpm, and the provision for communication with the optional ModBus module. In addition, the calibration tables for the older versions are not immediately compatible with the newer versions, and some conversion must be performed. In addition, the XC6000 Modbus module may be upgraded to communicate over either ASCII or RTU protocols.

To upgrade the XC6000 Modbus module only, please skip to the PROGRAMMING THE MODBUS MODULE section.

Before upgrading your XC6000 firmware, please connect the console to your current software and make a note of the application and firmware version.

The application version is visible before the console is connected. Once the console makes connection, the firmware revision is displayed to the right of the application version number, separated by a dash: "80530-94." Make a note of these version numbers. Also go to the config/utils screen and make a note of the DSP and Modbus versions.

Once connected, enter the Config / Utilities screen and then the Calibration screen.

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Enter the word "enable" (no quotes) into the protected password space on the Calibration screen. Press the "Save to File" button. Choose a location for your saved table, and give it a unique name.

Password

Calibration Screen 2

Save To File
Restore from File

DGM Gamma

Calibration Screen

Programming the XC6000 Firmware

1. Ensure XC6000EPC console is powered off. Disconnect any connecting cables from the console, and remove the console from its rack enclosure. Remove the nine (9) screws from the top of the unit and the six (6) screws from the outside left and right edges of the rear panel, and open the lid of the console by lifting it up from the front. Please note: portable case units must unlatch the front panel retaining screws and fold down the front panel to access the DAC board.
2. Units installed in an environmental enclosure may have a separate firmware programming connector located on the front panel of the unit. For units in an environmental enclosure, please connect the programming cable to the front-panel connector, and proceed to Step 4.
3. Upgrading the XC6000EPC console *from* version 070904x-46 or similar to a higher firmware revision (above 46) will require the DSP processor to be programmed as well as the Main processor. If your console does not require a DSP firmware upgrade, please skip to step 15.

Programming the DSP Processor

4. Remove the 20-pin ribbon cable from the XC6000EPC TC/MUX board.
   Reference: Figure DAC-1 below, item A.
5. Connect the 6-pin Molex connector on the end of the programming cable to the DAC board header labeled **DSP Firm Pgm**
   Reference: Figure DAC-1 below, item B.
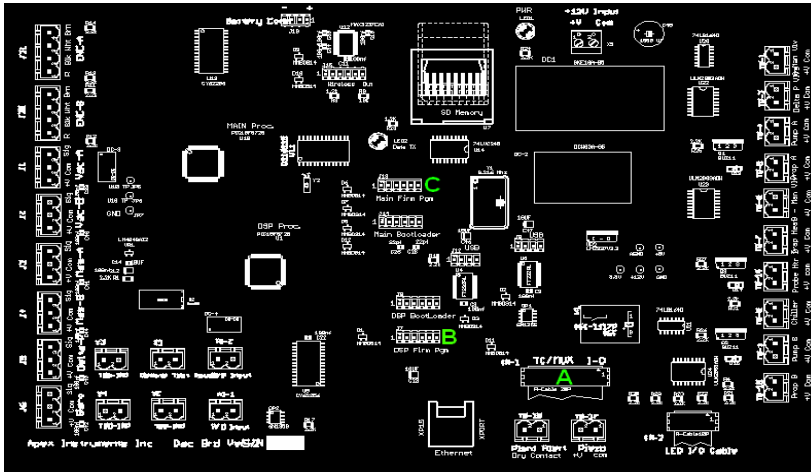
6. Power on XC6000EPC console
7. Navigate to the install location *default: C:\Apex\Firmware*
8. Execute **dl.exe**
9. The Tiny Bootloader window will launch
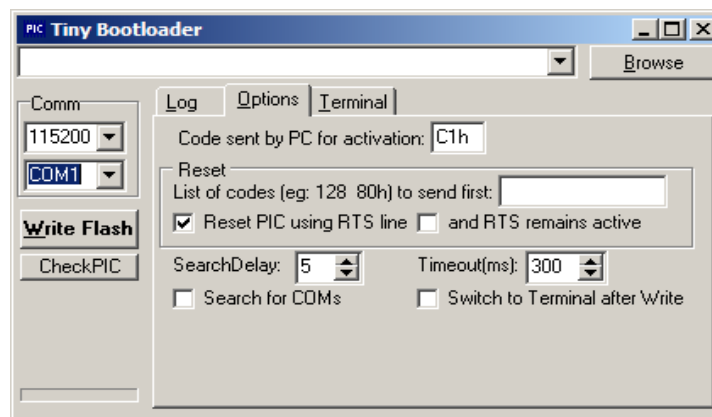
DL.EXE - Tiny Bootloader

10. Click Browse and select ApexDSP.hex from the current directory
11. Select the following options:
    - Comm: 115200
    - Comm (use the COM number noted earlier)
    - Enable Options -> Reset PIC using RTS line
12. Click Write Flash
13. When update is complete, Log window will read **Write OK.** The writing process should take between 3 and 6 seconds.

14. Power off XC6000EPC console and remove 6-pin Molex connector on the end of the programming cable from the DAC board.

XC6000 Firmware Upgrade Procedure Cont.

Programming the Main Processor

15. Connect the 6-pin Molex connector on the end of the programming cable to DAC board header labeled **Main Firm Pgm**
    Reference: Figure DAC-1 below, item C.

16. Power on XC6000EPC console
17. Navigate to the install location
    default: C:\Apex\Firmware
18. Execute **dl.exe**
19. The Tiny Bootloader window will launch

DL.EXE - Tiny Bootloader

20. Click Browse and select ApexMAIN.hex from the current directory
21. Select the following options: (same as for DSP Processor)
    - Comm: 115200
    - Comm (use the COM number noted earlier)
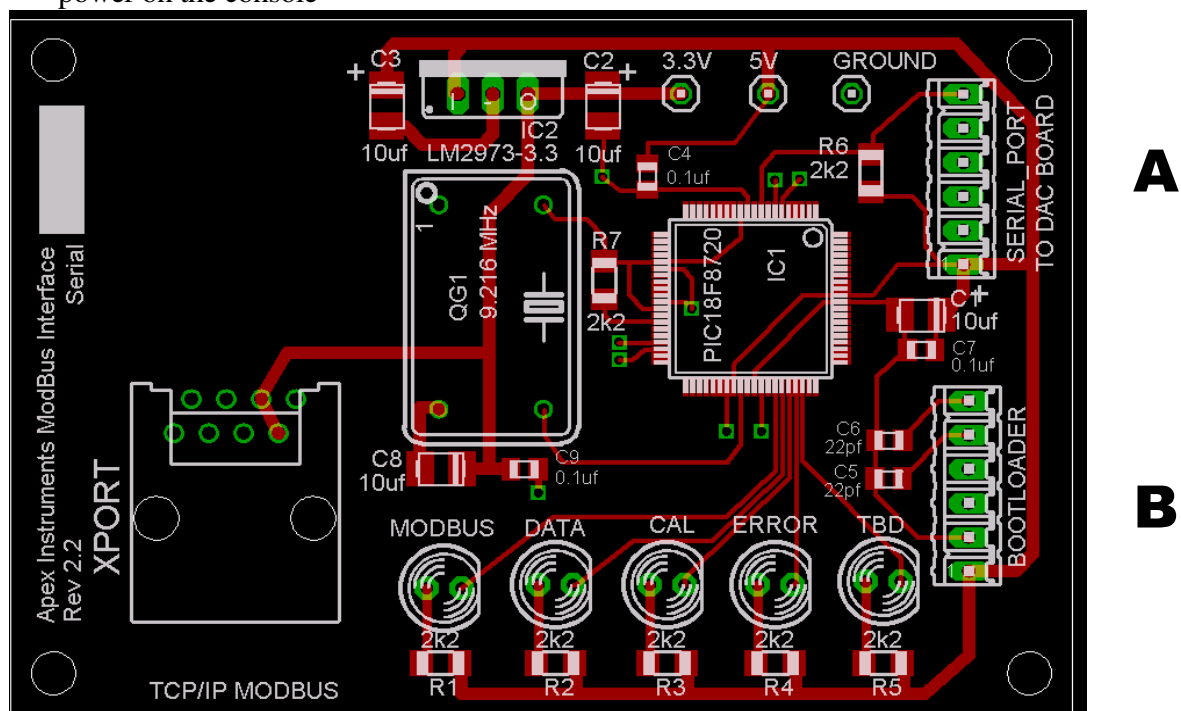   - Enable Options -> Reset PIC using RTS line
22. Click Write Flash

23. When update is complete, Log window will read **Write OK.** The writing process should take between 18 and 25 seconds.

XC6000 Firmware Upgrade Procedure Cont.

24. Power off XC6000EPC console and remove 6-pin Molex connector on the end of the programming cable from the DAC board.
25. Replace the 20-pin ribbon cable from the TC/MUX board (item A above)
26. Power on the XC6000EPC console and connect using the XC6000EPC MercSampler application. The version number of the console should appear in the upper right of the application window once connected. Ensure that the version number that the console reports matches the version number of the supplied firmware update.

Programming the XC6000 Modbus Module Firmware

1. Power off the XC6000 console
2. Remove the 6-pin Molex connector from the Modbus SERIAL_PORT (A) and place it on the BOOTLOADER (B) connector. This supplies power to the Modbus module during programming.
3. Place the XC6000 Firmware upgrade cable on the Modbus SERIAL_PORT (A) and power on the console

XC6000 Firmware Upgrade Procedure Cont.

4. Navigate to the install location
   default: C:\Apex\Firmware
5. Execute **dl.exe**
6. The Tiny Bootloader window will launch
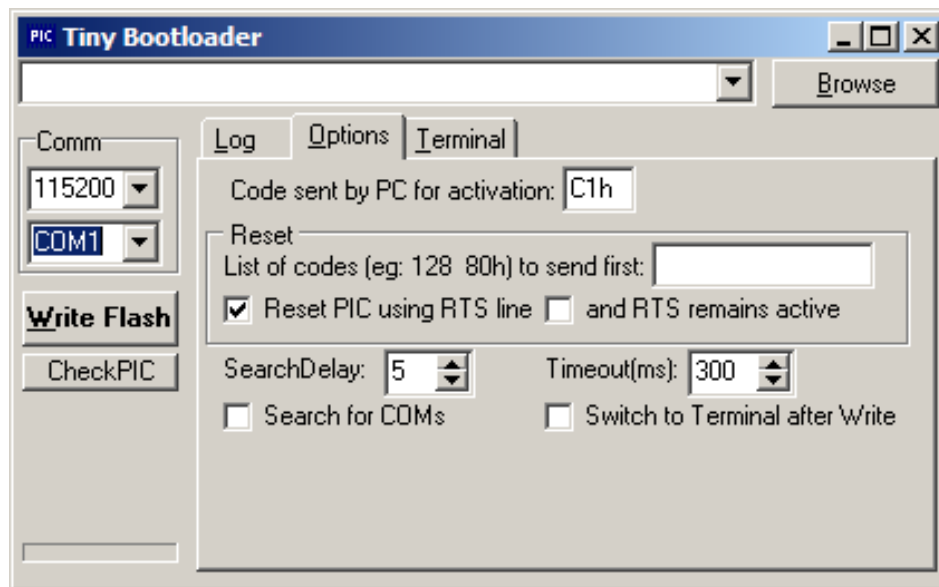
DL.EXE - Tiny Bootloader

7. Click Browse and select ApexModbus.hex from the current directory
8. Select the following options:
    - Comm: 115200
    - Comm (use the COM number noted earlier)
    - Enable Options -> Reset PIC using RTS line
9. Click Write Flash
10. When update is complete, Log window will read **Write OK.** The writing process should take several seconds.
11. Power off XC6000EPC console and remove 6-pin Molex connector on the end of the programming cable from the Modbus board.
12. Replace the Modbus serial cable on the SERIAL_PORT and power on the console. After the initial console warm-up (front panel lights stop blinking,) the blue DATA light should flash, and the yellow CAL light should be illuminated.

Note: If you encounter any problems with this procedure please contact Apex Instruments at 919-557-7300 and ask for technical support on your XC6000 mercury sampler.

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