Orangutan X2 Firmware Update Procedure

Introduction

Most of the Orangutan X2 hardware is controlled by the mega168 microcontroller. Firmware updates with bug fixes or additional features can be installed using the procedure described in this document. The firmware update is performed through a terminal program on a PC via the Orangutan X2 USB connection. The terminal program we recommend is called Tera Term Pro v2.3, which is available for free at http://hp.vector.co.jp/authors/VA002416/teraterm.html.

Before you begin, make sure you have downloaded the updated firmware file, which should look like **ox2m168_vX_XX.ox2**.

Step 1: Install a suitable terminal program.

You can use any terminal program that can send binary files. We recommend Tera Term Pro v2.3, available for free at http://hp.vector.co.jp/authors/VA002416/teraterm.html, which has installation instructions in the downloaded .zip file.

Step 2: Close any Orangutan X2 serial port connections.

Close any existing COM port connections you have that might interfere with the upgrading process. For example, if you have AVR Studio open, make sure the AVRISP programming window is closed as this window ties up the COM port your X2 is using.

Step 3: Determine your COM port.

Power up the Orangutan X2 and connect the USB cable. The green LED below the reset button should be on, indicating that the USB connection is active. Next, bring up your computer's device manager. One way to accomplish this is through the hardware tab of the System control panel. Another way is to right-click on "My Computer" and select "manage," which should bring up a window like the one shown below. Select "Device Manager" on the left and then expand the "Ports (COM & LPT)" list on the right. Make note of the COM port associated with "Pololu USB-to-serial adapter". (If you have another Pololu device that uses the CP2102 USB adapter, you might see a different device description.) In our example below you can see the port is COM6. If your port is COM4 or less, or if your terminal can use higher port numbers, please move on to step 5; otherwise, proceed to step 4.

Step 4: Make sure your port is COM1 through COM4 (Tera Term only).

Tera Term cannot connect to COM6, so we need to change the COM port number. Right-click the "Pololu USB-to-serial adapter (COMx)" and select "Properties". Select the "Port Settings" tab of the resulting dialog box and click the "Advanced..." button.
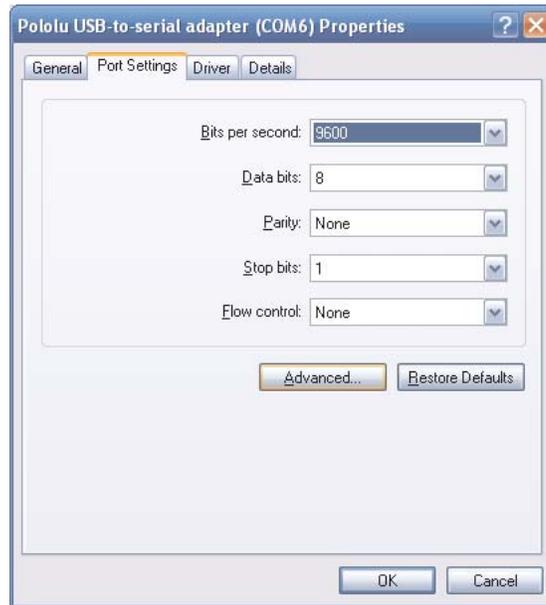
At the bottom of the next dialog box is a drop-down list labeled "COM Port Number". When you select this list you can see all the ports available to you. You need to select a port from COM1 to COM4 that is not marked as "(in use)". In the example below, valid choices would be COM2 or COM4; we select COM2.
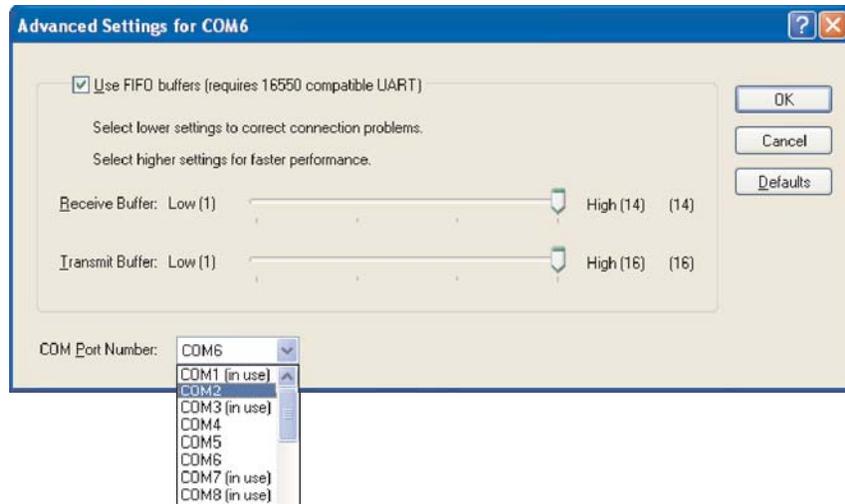
If COM1 through COM4 are all in use, you have two options: find a way to free up one of those ports by disconnecting something or find another terminal program that will let you send binary files to ports greater than COM4. Once you have chosen your new port, click OK on both the Advanced and Properties windows and close the Computer Management window. If you re-openComputer Management window, you should see your serial adapter mapped to your newly selected port.

Step 5: Run Tera Term Pro v2.3.

You will be greeted by a "Tera Term: New connection" dialog box. Click cancel, then go to the "Setup" menu and select "Serial port...".
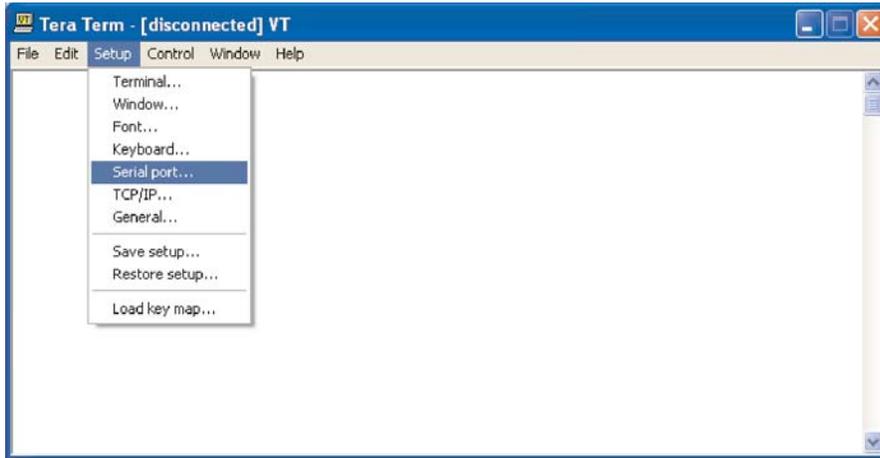
Configure the settings as shown below, substituting your own COM port. The baud rate should be 115200 with 8-bit data, no parity, one stop bit, and no flow control. You do not need any transmit delays. The only settings you should have to change from their default values are the port and the baud rate.
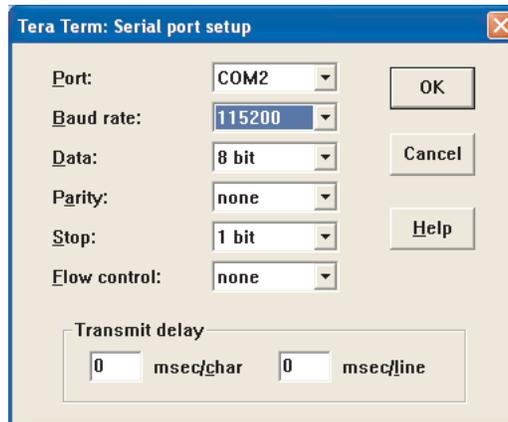
Step 6: Enter the Orangutan X2 bootloader mode.

Enter the bootloader mode by holding the reset button down for longer than five seconds, until you see the red LED below the reset button illuminate (at which point the yellow, programming-mode LED will turn off). The bootloader will send text to your terminal program. You should see the version number of the bootloader followed by a "?" that indicates the bootloader is now waiting for the proper activation input sequence. An example of this is shown below. The bootloader will transmit a "?" every five seconds as a reminder that it is waiting for a response from you.
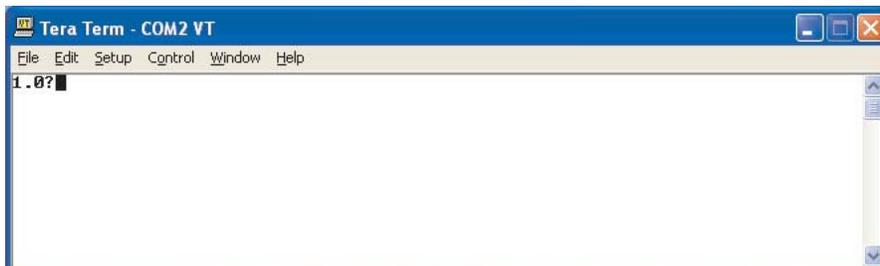
Step 6: Enter the Orangutan X2 bootloader mode (continued).

The sequence the bootloader is waiting for is "load". Type this string of letters using *lowercase letters* in the terminal window (be sure you do not have the Caps Lock button on!). Each correct letter in the string will cause the capital version of itself to be echoed back, so as you type "load", you should see "LOAD". If you make a mistake entering the sequence, you will see a "?" and will need to start over. This sequence exists as a safety mechanism to prevent someone from unintentionally using the bootloader to erase his mega168 firmware. When the sequence is entered correctly, you will see a ":", which means the boatloader is now ready to execute a command. Transmitting an "x" will cause the bootloader to run the mega168's main application code (i.e. leave the bootloader). Transmitting an "s" will cause the bootloader to erase the mega168's main application section and wait for you to upload a new program. Since we wish to upgrade our firmware, this latter command is the one we need to send. Once the application section is erased, the bootloader will echo back an "S", indicating it is ready to receive the new program. At this point, your terminal window will look something like this:

Step 7: Use the bootloader to program the mega168.

From the "File" menu, select "Send file...."
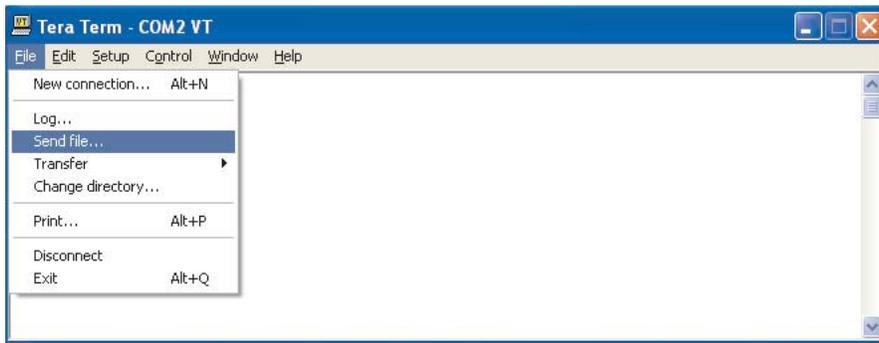
Navigate to the directory that has the *.ox2 file you wish to upload and select the file. Before you click "Open," **make sure you have checked the binary checkbox option in the lower left part of the window**. If you fail to check this box, the upload will fail.
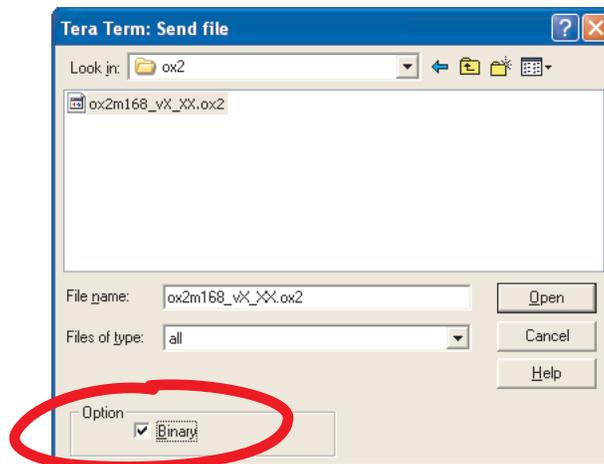
Step 7: Use the bootloader to program the mega168 (continued).

When you click open , you should see periods streaming across your terminal window . Each period represents the successful transmission of a packet to the bootloader. You should also see the red LED below the reset button flickering as the mega168 programs itself.
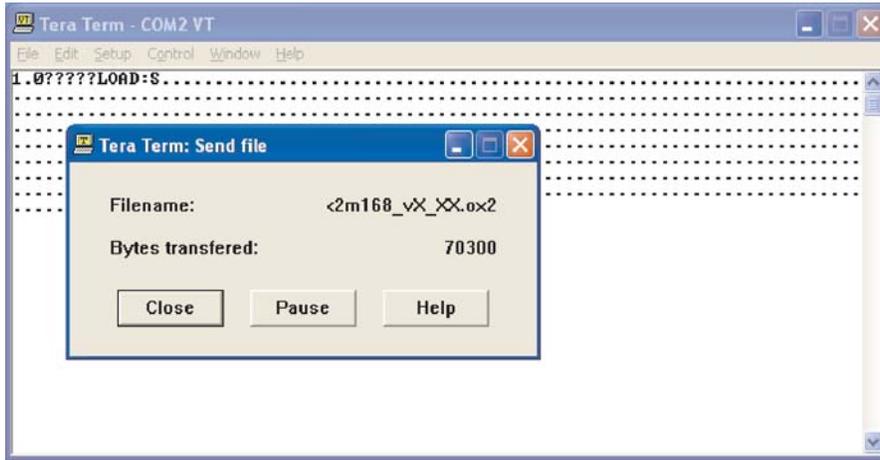
When the upload is complete, the bootloader will transmit an "*", and you should hear the mega168 make its startup sound (unless you have disabled this feature) as it automatically begins execution of the mega168's new main application section.
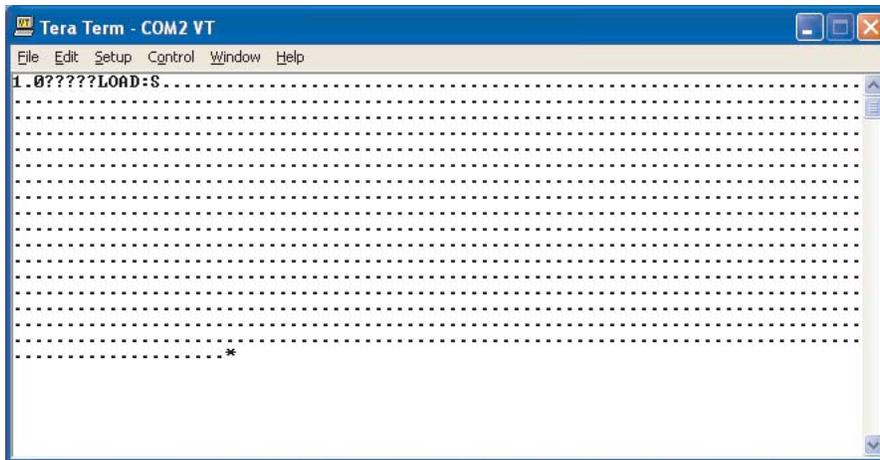
Note: Upgrading your mega168 firmware will not erase its EEPROM.

Step 8: Close the terminal program.

You will need to close the terminal to give the Orangutan X2 normal use of the serial port.