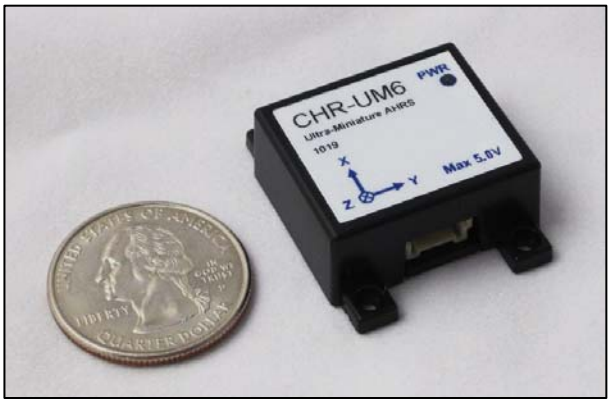
# 1. Introduction




CH Robotics continues to expand on the functionality of the UM6 and the UM6-LT Orientation Sensors by releasing periodic firmware upgrades. We ship all new sensors with the latest and greatest firmware pre-installed, so most customers will not need to worry about upgrading the firmware.

In some cases, customers may want to upgrade the firmware on older sensors, or even program the sensor with custom firmware for specialized projects. The UM6 and the UM6-LT were designed so that they could be easily reprogrammed when needed. This app note provides a detailed description of how to reprogram both devices.

Reprogramming the firmware is a simple three-step process:

1. Short the BOOT pin to +3.3V before applying power
2. Apply power. The sensor will start in programming mode
3. Open the CHR Serial Interface, select the firmware hex file for programming, and click "Program"

If the sensor is correctly connected to the computer, the new firmware will be written to the device (See Application Note AN-1003 for details about connecting the UM6 and the UM6-LT to a computer). Remove the short on the BOOT pin and restart.

The Serial Breakout Board simplifies the programming process for the UM6, but both the UM6 and the UM6-LT can be reprogrammed without using the breakout board. More details about the procedure are given below.

## 2. Reprogramming the UM6 with the Serial Breakout Board

To reprogram the firmware using the Serial Breakout Board, switch the PGM jumper to short the two pins marked by the white line as shown in Figure 1. Once the jumper is set, turn the power on. The sensor will start in programming mode.

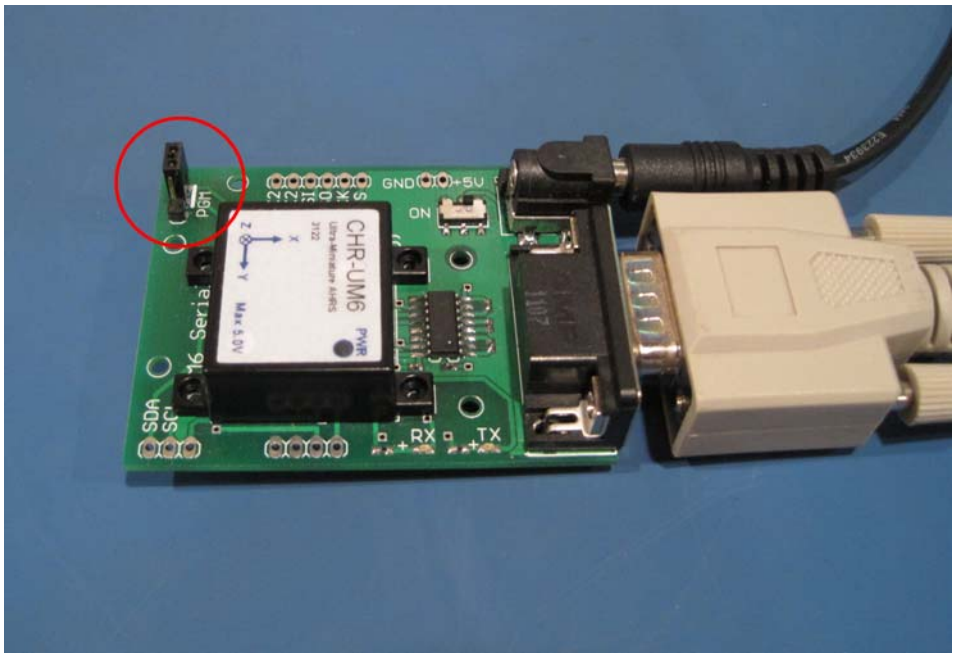



**Figure 1 - Setting the Program Jumper on the Serial Breakout Board**

Make sure the serial cable is connected to the sensor and open the CHR Serial Interface. Make sure the correct COM port is selected (COM 5 on my machine, but it will probably be different on yours), click "Browse" and select the HEX file you want to program the sensor with. Your display should look something like Figure 2. Notice the message near the bottom of the dialog that says "Firmware Loaded - Ready to Program."

With the firmware loaded and the correct COM port selected, click "Program." **Do NOT click "Connect" before pushing the Program button.** It won't hurt anything if you do, but it won't work and you'll have to cycle the power on the UM6 before trying again. While the device programs, the Serial Interface should look something like Figure 3.

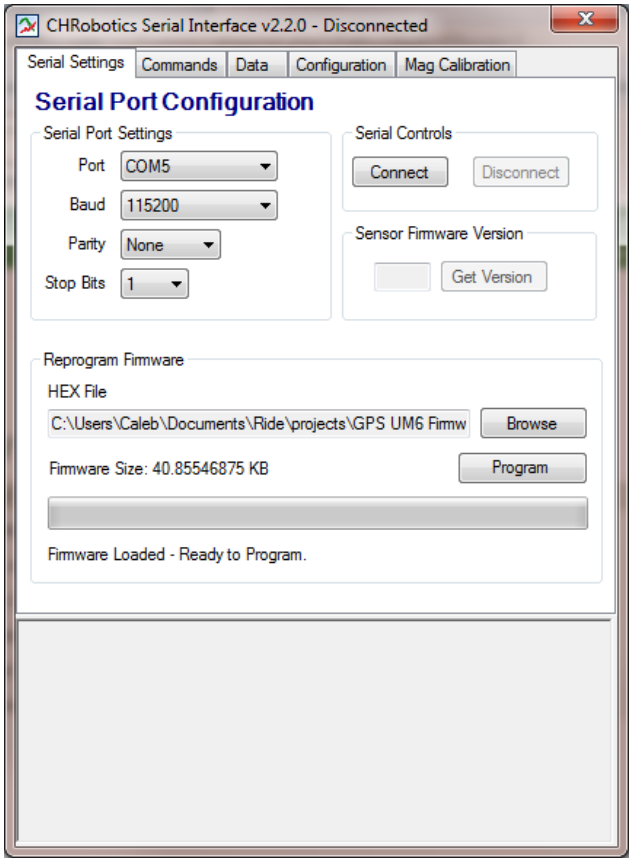



**Figure 2 - Firmware loaded and ready to program**

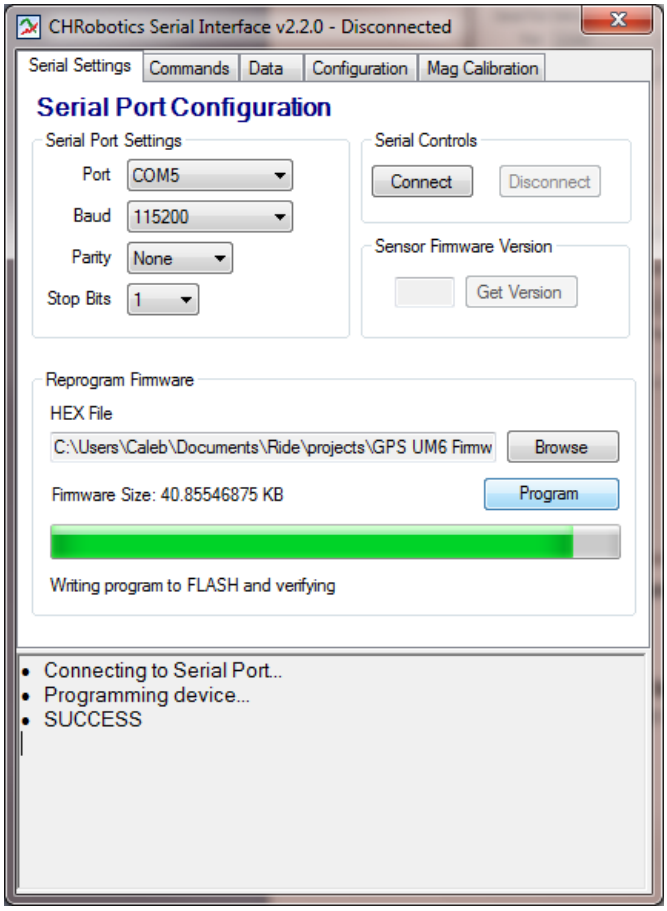



**Figure 3 - Device being programmed**

When the firmware is written completely to the sensor, the software display should look like Figure 4. Notice the "Programming and Verification Complete" message in the window. You are finished! Remove the PGM jumper and restart. The new firmware should be loaded.

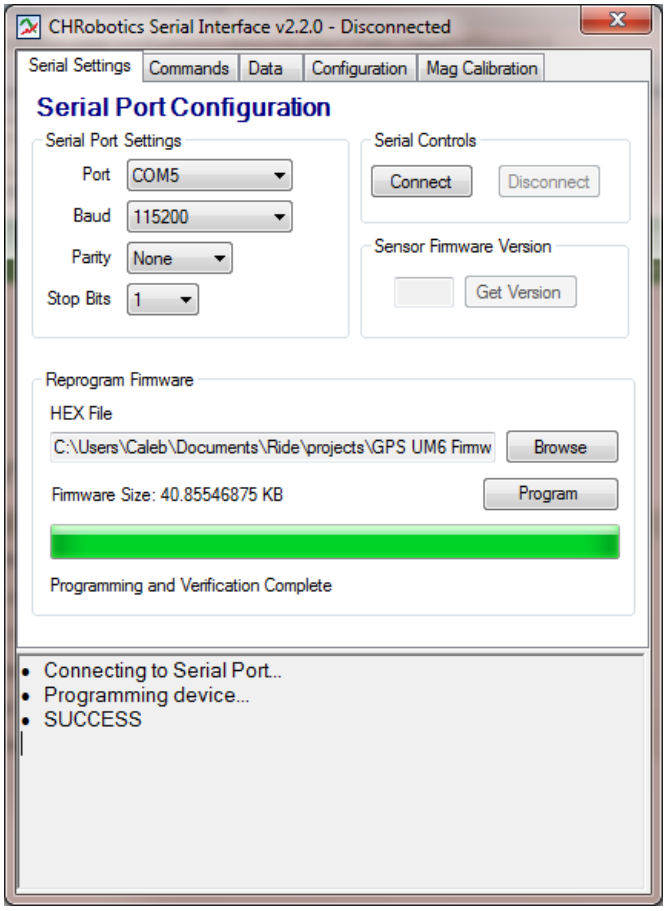



**Figure 4 - Programming Complete**

## 3. Reprogramming the UM6 without the Serial Breakout Board

The UM6 can also be reprogrammed without the Serial Breakout Board by shorting pins 1 and 12 on the bottom connector before applying power. This is demonstrated in Figure 5. Once the pins are shorted together, apply power. The sensor is now in programming mode.

Make sure that the UM6 is connected to the computer using a TTL to USB converter or a TTL to RS-232 converter as described in Application Note 1003 - Getting Started with the UM6 Orientation Sensor. The Serial Interface Software can then be used to program the sensor as described in Section 2 of this app note - Reprogramming the UM6 with the Serial Breakout Board.

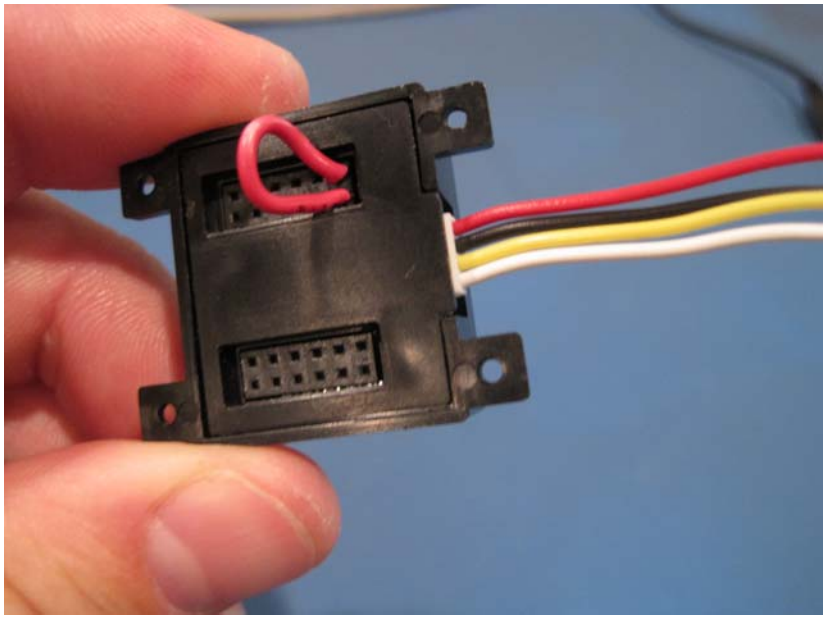


**Figure 5 - Starting in programming mode without the serial breakout board**

## 4. Reprogramming the UM6-LT

The UM6-LT can be reprogrammed by following the same procedure as the one described above. The pins to be shorted together are shown in Figure 6.

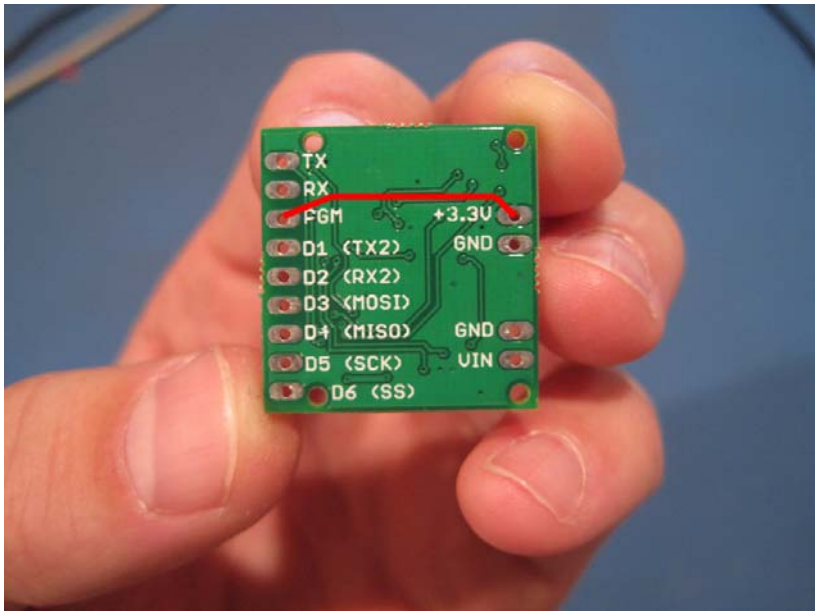



**Figure 6 - Pins to Connect for Reprogramming the UM6-LT**

As was the case for reprogramming the UM6 without the Serial Breakout Board, it is important that the UM6-LT be connected to the computer through a USB to TTL converter or a RS-232 to TTL converter to avoid damaging the sensor. This is described in greater detail in Application Note AN-1003 - Getting Started with the UM6 Orientation Sensor.

## Disclaimer

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