

Cutting the last wire in the DIVA system: Integrating the Polhemus Patriot with Firefly Bluetooth

May 2009

Johnty Wang
johntywang@gmail.com

Overview

This article describes the process of setting up the FireFly Bluetooth RS-232 adapter with the Polhemus Patriot tracker used for the DIVA project. It can also be applied when attempting to convert a wired RS-232 device into a wireless bluetooth device.

The Polhemus Patriot used by the DIVA system for right hand tracking sends data through a RS-232 serial port. Currently the port is connected to a usb-serial adapter which plugs into the laptop running the system. This is the last wired input device of the system (the rest have been built into wireless bluetooth modules). Making the Patriot connection wireless would mean that the laptop (heaviest component in the system) will no longer have to be included in the backpack, thereby drastically reducing the weight and bulk for the performer.

The FireFly, made by Gridconnect, is a RS232-bluetooth module that can be used to form a serial connection over bluetooth. Two of these devices connected to end devices can create a wireless serial port. Since the MacBook laptops used by the DIVA system already has built-in bluetooth, a single FireFly, connected to the Patriot, will allow wireless data transfer between the tracker and computer.

Most of the work in setting up the wireless connection is configuring the FireFly device to send and receive data correctly from the Patriot. The [user manual](#) for the FireFly contains configuration details for the device. There are 3 places to configure the FireFly. First are the DIP switches that can be accessed without opening the device. Second are the jumpers inside the device that requires opening the case. Finally, there are software-controlled settings as well (which are not required for the purpose of this document).

Configuration

- Bluetooth Settings

These can be set from the DIP switches 2 and 3. The default (Auto master, Auto discover) are fine.

- RS-232 Port settings

The Firefly needs to be set up as a DTE device, so that the RX and TX pins match that of the Polhemus. This is done using the jumpers inside the device. Jumpers 1 must be connected with 2, and 3 with 4. Since the Polhemus does not make use of CTS/RTS signals, the FireFly's RTS should be jumpered to the CTS (Pins 9 and 10) so that it can send . The rest of the jumpers can be left open.

The serial transmission baud rate is set by the external DIP switch. The FireFly operates at 9600 or 115200 bps. This should be matched to the Polhemus. (In our case, 115200).

Connecting it up!

Once the FireFly is configured properly, it needs to be paired with the computer. Power up the device with DC power, and search for a new bluetooth device. Once it is found, enter the passkey (default 1234), and a new serial port should be added into the

system. The Bluetooth connection to the FireFly can be tested using a terminal program and a serial loopback cable connected to the FireFly's RS232 port. The Loopback cable is simply a serial plug with the Receive and Transmit lines tied together (DB-9 pins 2 and 3). This way any character sent to the serial port is received back by it, and commands sent through the terminal application will simply be echoed back.

Once the FireFly's bluetooth is tested to be working, it can be plugged into the Patriot tracker. If everything is set up properly, the tracker should operate exactly the same way as when connected directly with a usb-serial cable.

Troubleshooting

If no response is seen from the Patriot, check the following:

- Patriot is operating normally (test with usb-serial connection). 8 seconds after power up it should send a "Patriot ready!" message.
- Serial loopback test is working with the FireFly on its own
- RX/TX lights on the FireFly should be flashing when sending or receiving data. If nothing is happening when commands are sent from the computer, check the RTS/CTS jumper on the FireFly and make sure its connected)
- If the received data from the Patriot is garbled, check the baud rate (on the back of the Patriot, as well as the FireFly). If polled data from the Patriot appears to be garbled in the terminal program, it may be transmitting in BINARY mode. (Send F0<return> to switch to ASCII mode, and F1<return> for BINARY).