

Base Module Board

User Manual



Engineering » Design » Product

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Revision History

Version #	Release Date	Revision/Release Comments
1.0	3/14/2011	Initial draft for release.

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Base Module Board

BWR-001

For Use in the FlashFly System

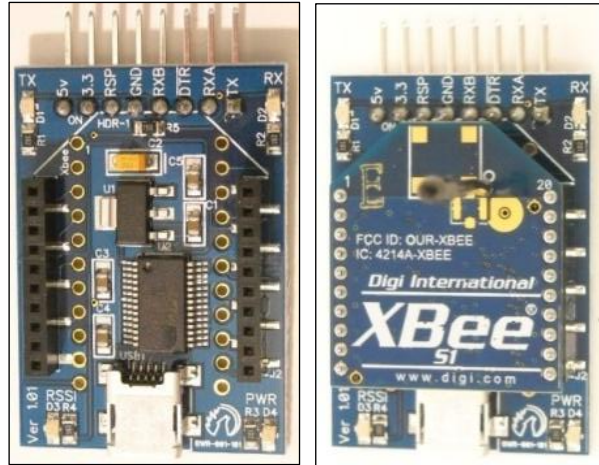


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The FlashFly System

FlashFly is an innovative system that allows a user to remotely download BASIC Stamp programs to Parallax's Stamp modules or interpreter chips. FlashFly's wireless capabilities, in coordination with common Series 1 XBee modules, will allow a user with a BASIC Stamp mobile robot or stationary platform to modify his or her program remotely.

Therefore, individuals who have mobile robots, sprinkler systems, weather stations, alarm systems, or any other remote or fixed controller board with a BASIC Stamp core will benefit from the FlashFly system because wirelessly downloading a program change is now achievable and easy.

FlashFly eliminates the tedious task of having to connect a robot or a fixed platform to a computer before any programming changes can be made. FlashFly also enriches a user's learning experience by providing instant feedback data to the DEBUG terminal screen, which allows a user to evaluate his or her program flow and I/O data wirelessly. FlashFly can also be used in conjunction with any other microprocessor platform that needs to transmit data wirelessly.

The two main components of the FlashFly system are the Base Module and the Remote Module. These two modules are responsible for communicating back and forth. In the FlashFly system, there are three options for the Remote Module component. Each of these options will allow for wireless downloading of BASIC Stamp programs.

1. The Remote Module can be inserted into a breadboard or user-defined board for direct communication with a BASIC Stamp interpreter chip.
2. The RS-232 serial adapter board can be used in the FlashFly system to connect to a mobile or fixed platform when the user has a serial BASIC Stamp version (a board that uses a DB-9 connector).
3. The USB Stamp adapter module can be used in the FlashFly system to connect to the Remote Module when the user has a USB-type board with BASIC Stamp.

The following list identifies each of the FlashFly system components, their respective product numbers, and their role in FlashFly. The last two boards are interchangeable, depending on the BASIC Stamp version a user has.

- Base Transmitter Board (BWR-001) – This board connects to the computer.
- Remote Receiver Board (BWR-002) – This board connects to a mobile or fixed robot.
- RS-232 Adapter Board (BWR-003) – This board connects to the remote board.
- USB Stamp Adapter Board (BWR-004) – This board connects to the remote board.

Base Module Board

The Base module is one of the components necessary to wirelessly download BASIC Stamp programs. The Base module comes in a partially assembled kit. This cost-effective solution is an easy way to interface the FlashFly system to a PC using a USB connection. Additionally, the Base module also serves as an experimentation board for the XBee modules. By using the additional connection points, one can connect pluggable wires, solder connections, or install 0.100" headers (not supplied) for breadboarding to the additional circuitry available on the XBee modules.

An additional benefit of the Base module, when paired to the RS-232 adapter module, is that it can also serve as an extra USB to COMM serial port adapter. **NOTE:** A USB A to mini B cable is required for use, but it is not supplied.

Features

- Provides an easy interface for communicating with the FlashFly system
- Four status indicator LEDs for Power, RSSI, RX, and TX
- Converts XBee 2mm pin spacing to 0.100" pin spacing
- Provides easy pluggable wire or solder connections for XBee I/O
- When used with an RS-232 adapter board, this will function as an extra USB to RS-232 COMM port adapter (TX,RX,DTR)
- Partially assembled kit for flexible configuration
- Works with the FlashFly Remote module
- Can work as a transceiver for communication with other XBee systems
- Will support XBee or XBee Pro Modules (Series 1 is required for the FlashFly system)

Key Specifications

- Power requirements: comes from the computer USB port
- On board 3.3V regulator for XBee Module
- Operating temperature: -40 to +185F (-40 to 85 C)
- Dimensions: 1.13" wide by 1.83" long (with header)

Kit Contents

- BWR-001 PCB (1) — SMD components are pre-soldered
- 10-pin 2.0mm sockets (2) — Solder to top of board
- 8-pin right angle 0.100" header (1) — Solder to bottom of board, if desired

Tools Required

- Soldering iron (always wear safety glasses when soldering)
- Solder (some soldering experience required)
- Flux

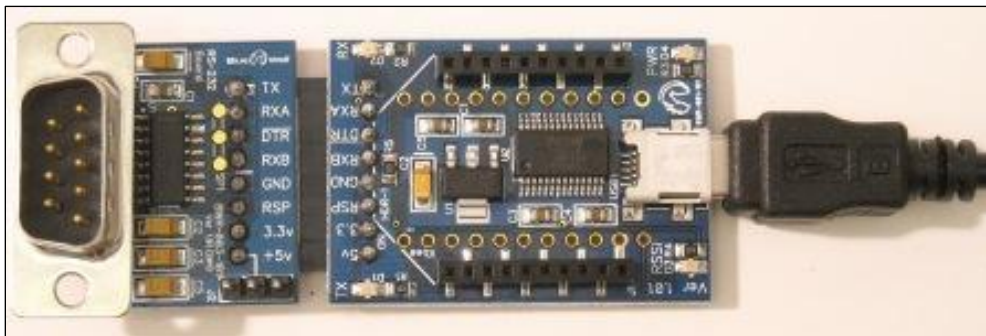
Application Ideas

- Can easily configure XBee or XBee Pro Modules using a PC
- Easy connection for mounting XBee modules to breadboard or proto boards
- Can be used as a transceiver for any microcontroller using a TX and RX line
- Can remotely monitor fixed or mobile devices (such as remote weather stations, mobile robots, alarm system, production operations, and so on)

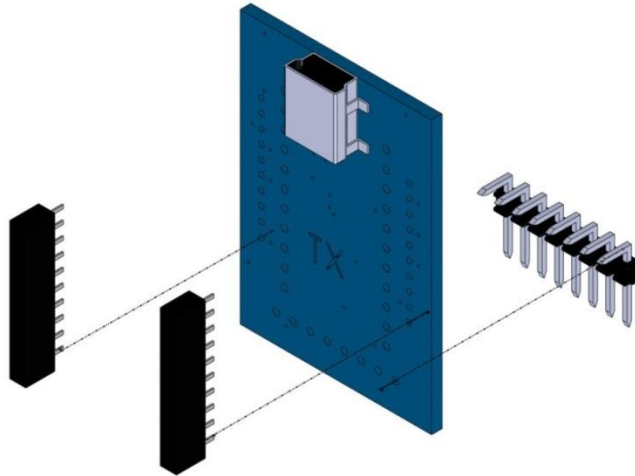
Optional USB to RS-232 Adapter Configuration

The Base module board has the option to solder an 8-position right-angle header on the board. This header is intended for use with the RS-232 adapter board so one can program directly with a USB port, if desired. Effectively, this optional enhancement allows for an extra USB to RS-232 port. To utilize this optional feature, which adds an additional USB to RS-232 converter:

1. Remove the XBee module from the Base transmitter board.
2. Plug the Base transmitter board into the RS-232 board.
3. Plug one end of the USB cable into the Base transmitter board and the other end into the USB port on the computer.



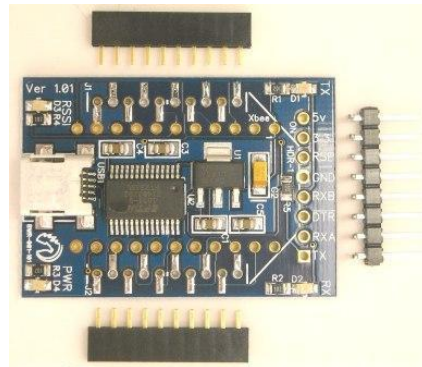
Assembly Instructions



HINT: When soldering headers or pins, solder one and align the connector so it is perpendicular to the board. If needed, reheat the first soldered pin to realign. Once the connector is straight and perpendicular, securely solder the remaining headers or pins.

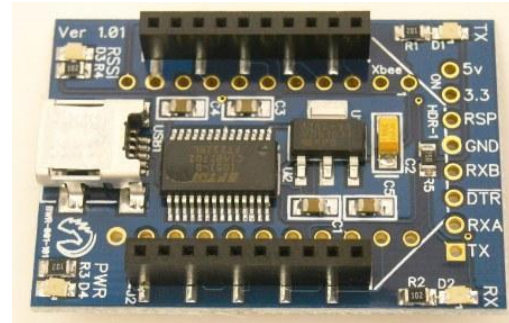
Step 1:

Verify the kit contains the following parts, as shown in the photograph to the right.



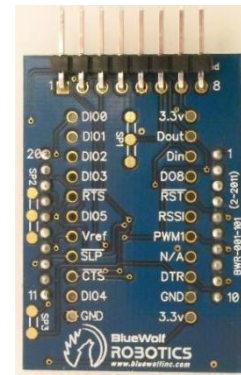
Step 2:

Install both (2) 10 position 2.0mm sockets into the **TOP** of the board. Once installed, solder them in place from the **BOTTOM** of the board.



Step 3:

Optional, install the 8 pin right angle 0.100" male header on the **BOTTOM** of the board. Once installed, solder it in place from the **TOP** of the board.



Step 4:

The unit (along with the XBee module) is complete.



USB Driver Installation

A USB A to Mini B cable is needed to connect the Base module to the PC, which is sold separately on Blue Wolf's website. The appropriate drivers for the FTDI VCP chip are also necessary, which can be downloaded from the FTDI website (<http://www.ftdichip.com/Drivers/VCP.htm>).

It is possible that the FTDI USB drivers are already installed, since this is a common chip used in the market. If any problems arise with these drivers, there is a lot of information on the internet that explains how to install and/or troubleshoot the drivers.

Depending upon which option was selected, when purchasing the FlashFly system, each XBee module (Base and Remote) will have to be configured using the X-CTU software from Digi (see the links on the FlashFly product page for the latest locations and files). If a completely programmed XBee kit was purchased, configuring the modules is not necessary.



CAUTION

As long as the USB port is providing power, the Base module is powered up. Also, the I/O signal lines on the XBee module are at a 3.3V level and should not be connected directly to a 5V system without proper signal buffering. The XBee I/O lines are not 5V tolerant, so damage may occur.

Configuring the XBee Modules for FlashFly

If the XBee modules need to be configured for FlashFly, visit Blue Wolf's website (www.bluewolfinc.com) for the latest XBee configuration profiles. From the homepage, navigate to the Products section of the website. Under the FlashFly product description, there is a FlashFly Downloads link where the latest profiles can be downloaded and saved locally to a PC.

The .zip file contains the configuration files needed for FlashFly to work properly. There are two files in the .zip package: one for the Base module and one for the Remote module. Using the X-CTU configuration software and the Base module for programming, load the respective profiles onto each respective XBee module (be sure to mark them accordingly).

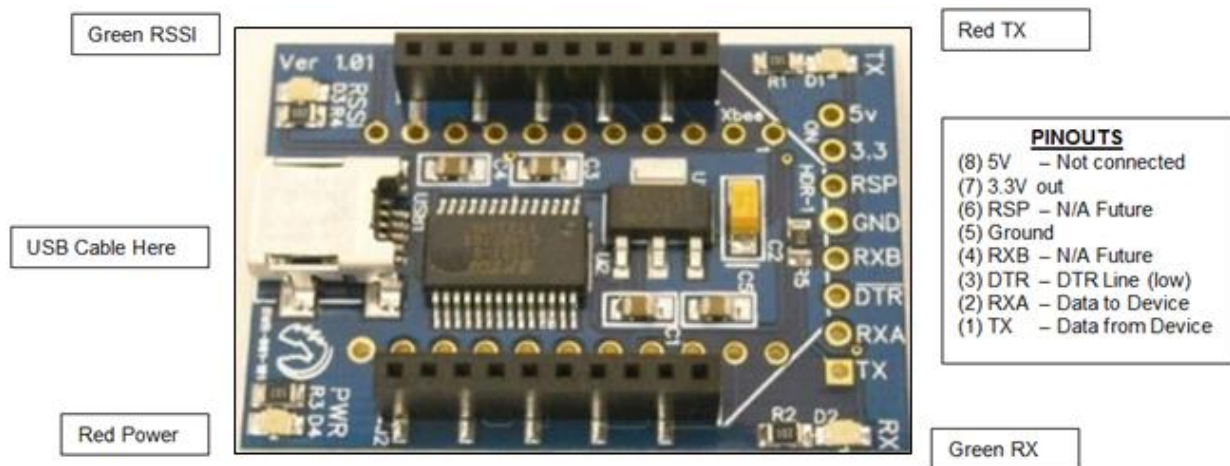
NOTE: Preconfigured XBee modules can be purchased through the Blue Wolf website.

LED Status Indicators

The Base module board has four LED's for status indication. If the board is connected to a USB cable, the Red PWR LED is illuminated. If data is being transmitted, the TX Red LED is illuminated. Conversely, if data is being received, the GRN RX LED will be illuminated. The Green RSSI LED will illuminate if the signal strength is strong enough from the Remote module.

The following list identifies the LED functions.

- Red – Power On
- Green – RSSI
- Red – Transmit (TX) data is being sent from the computer.
- Green – Receive (RX) data is being received from the remote device.



Connection Diagrams for Base Module

The Base module board is primarily made for use with the FlashFly system to wirelessly download programs. However, the board also allows for additional experimentation with other XBee I/O modules using soldered wires or 0.100" male headers.



WARNING

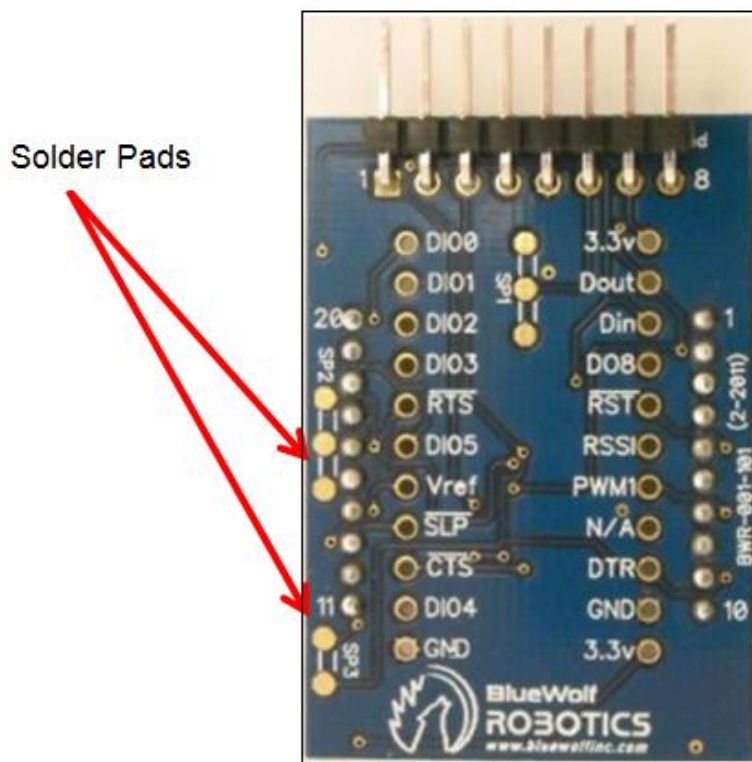
Experimenting with other XBee I/O modules will disable the use of the FlashFly in-system downloading capabilities if you need to use DIO4 or DIO5.

In order to experiment with other XBee I/O modules, some of the solder pad jumpers (on the back side of the board) will have to be modified if use of the DIO4 or DIO5 individual I/O lines is

needed. DIO4 and DIO5 are tied to DTR and RTS respectively, so cutting these solder traces breaks the connection from DIO4 to DTR and from DIO5 to RTS.

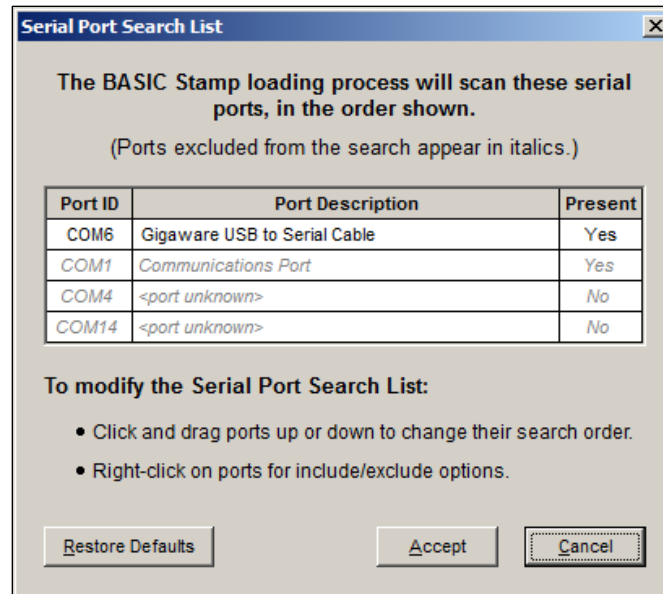
Using an X-ACTO™ knife, cut the trace on SP2 from the middle pad to the pad on the bottom side. Next, cut the trace on SP3. At this point, the FlashFly module can no longer be used for wireless downloading unless jumper wires are soldered back in place on the SP2 and SP3 solder pads.

NOTE: SP1 is reserved for those who are experimenting with their own non-BASIC Stamp microcontroller. In this case, pin 6 of the RS-232 adapter board connects to SP1, which in turn can be connected to any XBee I/O.



Troubleshooting Suggestions

1. Occasionally, on the first programming attempt after the editor is started, a user may receive a hardware error or STAMP not found error (incorrect DIP switch settings can cause this too). If a user does an identify Stamp, make sure a COMM port is not disabled in the Port List.



2. When writing BASIC programs in the Editor, it is best to have a Port Directive defined in the program. For example, if the BASE module board is showing up as COMM 19, complete a Port Directive assignment of `'{$PORT COM19}` to ensure connectivity.
3. Also, ensure the red PWR LED is on when the Base module board is connected to the computer.
4. If a user is running a USB cable through a USB expansion port and is having problems, try connecting the USB cable directly to the computer.
5. Running more than one FlashFly system has been tested and everything works properly. However, the PAN ID on the XBee modules should NOT be the same between the two sets. Refer to the XBee manuals for more information on how to configure Pan ID's in the X-CTU software from Digi.
6. The FlashFly system was designed for (and tested on) both Series 1 regular modules and Series 1 XBee Pro modules.
7. If a remote device has a significant amount of SERIAL OUT data in a tight programming loop (for example, an immediate GOTO statement back to the output line), make sure the BASIC program has a minimum of a 25 msec. delay somewhere in the program loop. This ensures the transmit module can communicate with the RX module. If a user does not have this delay, programming the Remote module may be unsuccessful.

8. If a user is having problems programming remotely, and an RS-232 adapter module is available, try this:
 - a. Remove the XBee module from the Base module board.
 - b. Connect the Base module board to the RS-232 adapter board.
 - c. Plug this into the device and try programming directly.



Module Dimensions

The Base module board measures 1.13" wide by 1.835" long.

