

Bluetooth Expansion Module

Wireless communications for BrainBoard

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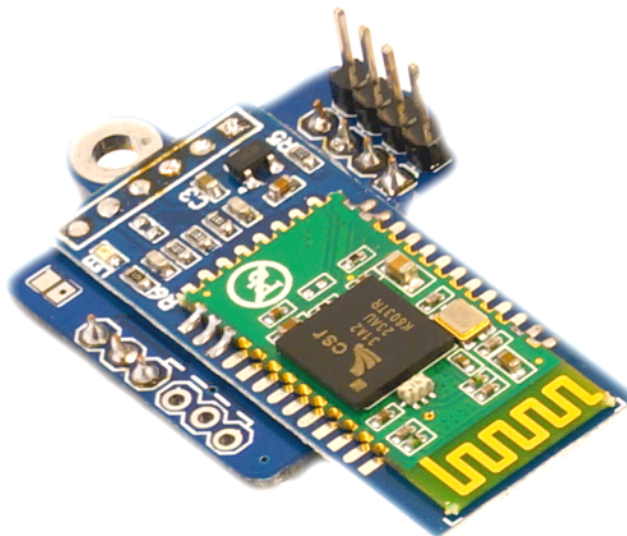
Introduction

The Bluetooth module plugs right into BrainBoard and provides easy wireless communications with computers, Android phones, and other embedded devices. It works out of the box as a wireless UART serial port, without the need for any configuration or knowledge of the Bluetooth protocol.

This makes it easy to send and receive wireless data to control robots, or get remote measurements and graph them on your smartphone or laptop.

Features

- Plugs directly into BrainBoard hardware serial port.
- Onboard level translation from 5V to 3.3V.
- Male and female plug options for flexible connectivity with hookup leads.
- Duplicated ISP / SPI header pins in case those are needed.
- 3mm mounting lug for mounting to BrainBoard, robot chassis, etc.

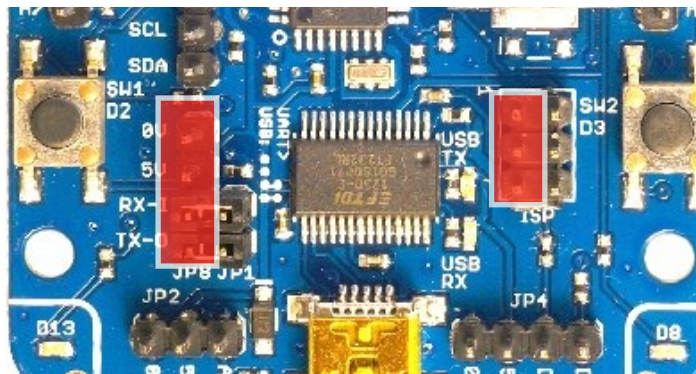


Note that some Bluetooth modules are mounted underneath the carrier board.

Getting Started

Now we're going to load some demo code, install the Bluetooth module, and connect to it from a computer or Android device and make BrainBoard generate tones by sending commands wirelessly.

1. Open Arduino and hit File > Examples > Communication > Dimmer.
2. Replace line 35 with **int brightness;**
3. Replace line 40 with **brightness = Serial.parseInt();**
4. Replace line 42 with **tone(ledPin, brightness);**
5. Upload your code.
6. Disconnect BrainBoard power.
7. Remove the two jumpers from JP8 and keep them somewhere handy. You can put one side of each on free header pins somewhere else on the board (not both sides of the jumper though, that would short the pins). Don't lose the jumpers; you'll need to put them back the same way next time you want to program the board. See **Pro Tip** below for a good trick here.
8. Plug in the module, making sure the sockets line up with pins on JP8 and the inner row of pins on the ISP header. See the picture below and on the cover page — the mounting lug goes to the USB end.

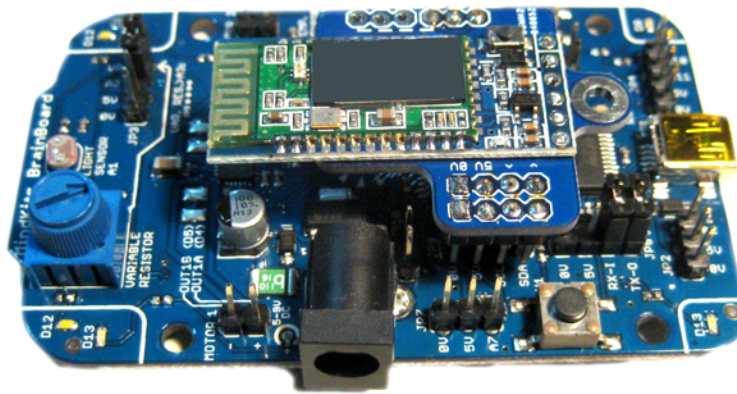


9. Plug in BrainBoard power.

Alternate Bluetooth Module Position for Software Serial

The Bluetooth module can be installed on JP8 as described above in Getting Started if it is necessary to use the hardware serial port to communicate over Bluetooth (reasons include the convenience of using the Serial class), but it can be more convenient to plug the module into another port and use software serial. This allows programming through the USB cable while using Bluetooth.

To use the Bluetooth module on a software-only serial port, plug it into JP9 as pictured:



Now instead of using `Serial.begin()` and `Serial.println()` you would use:

```
#include <SoftwareSerial.h>
SoftwareSerial mySerial(A5, A4); // RX, TX pins on JP9
...
mySerial.begin(9600);
mySerial.println("Hello, world?");
...
```

See the example under `Arduino > File > Examples > SoftwareSerial > SoftwareSerialExample`.

Bluetooth Pairing

Bluetooth devices must be paired the first time they connect:

10. Open the Bluetooth settings on the other device (Android phone or computer) and search for devices.
11. The Bluetooth module will usually appear as HC-05 or linvor depending on the model, or you may just see the MAC address (numbers and letters). Connect to it and enter **1234** for the pairing key (password). Once paired the devices will be able to communicate.
12. Open a serial terminal on your computer / Android and open the Bluetooth serial port that was just created. You may need to do some guesswork to determine the port if it's not clearly named.

If you're on Windows [Realterm](#) and [Terminal](#) are good terminal programs. Both are very useful for controlling devices and logging data. Save yourself a headache and avoid Hyperterminal at all costs!

On MAC OS you can use CoolTerm. If you're on Linux, you probably already have a decent terminal installed.

If you're on Android you can use Blueterm or Bluetooth Graphics, both free on Google Play.

13. Once you're connected the red LED on the Bluetooth module will stop flashing and remain on. Now you can type numbers from 0 to 20000 into the terminal followed by the enter key. Your sketch will receive the numbers and generate a tone of matching the frequency you entered.

Arduino Bluetooth RC Car (Remote Control)

In this example we control BrainBoard with an Android phone.

1. Follow the instructions above to mount the Bluetooth module on JP9 (see *Alternate Bluetooth Module Position for Software Serial*).
2. Connect motors to BrainBoard (Motor 1 and Motor 2).
3. Connect batteries to BrainBoard.
4. Program (Upload) *bluetooth_rc_car.ino* to BrainBoard.
5. Follow the instructions above to pair the Bluetooth module with your Android phone.
6. Now download *Arduino Bluetooth RC Car* to your Android phone. <https://play.google.com/store/apps/details?id=braulio.calle.bluetoothRCcontroller>
7. Open Arduino Bluetooth RC Car and go to menu > Connect > HC-05 module. The red indicator will turn green when connected.

Once connected you can use the buttons to control BrainBoard. You can use the tilt sensor by clicking menu > Accelerometer.

Pro Tips

<This has mostly been covered in *Alternate Bluetooth Module Position for Software Serial* but is here for further reference>. If you want to keep the hardware serial port (JP8) free for programming, you can plug the Bluetooth module into JP9 and use the SoftwareSerial library. Note the pinout on each header; attach the module so that 0V, 5V... line up.

Open Examples > SoftwareSerial > SoftwareSerialExample.

Change line 35 to **Serial.begin(9600);**

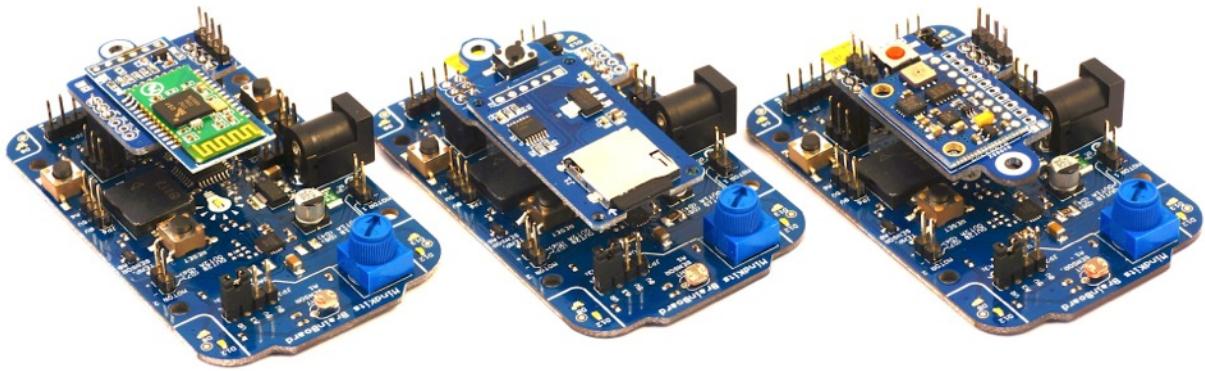
Change line 44 to **mySerial.begin(9600);**

Change line 30 to **SoftwareSerial mySerial(A5, A4); // RX, TX**

Now you can open two terminals and connect one to the USB serial port, and the other to the Bluetooth port. The microcontroller will relay data between them, so text typed in one will pop out the other.

BrainBoard Expansion Modules

BrainBoard supports a variety of simple, affordable expansion modules that are easy to use. For the full range see www.mindkits.co.nz



Bluetooth

Micro-SD card reader

10-DOF inertial measurement unit

Getting Help

If something doesn't make sense, doesn't work as expected, or you have any comments or suggestions then get in touch with us and we'll sort you out.

Contact support@mindkitsinvent.com

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