Cheap 2-Way Bluetooth Connection Between Arduino and PC
by techbitar on May 2, 2012

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**Intro: Cheap 2-Way Bluetooth Connection Between Arduino and PC**

**UPDATE**
- August 31, 2013: I have published a guide on how to modify the default settings for the HC-05 module.
- July 5, 2013: Please see my other guide on Controlling Arduino with Android over Bluetooth

**INTRODUCTION**

In the guide, I will explain how I managed to send data back and forth between a PC and Arduino via a cheap Bluetooth HC-05 transceiver, which can be found for less than $10 on ebay with the breakout board. The version I have used in this project does not have a breakout board so it's little cheaper but more difficult to solder. I strongly recommend buying the module with the breakout board. This Bluetooth transceiver basically acts as a generic serial COM port.

The PC to Arduino Bluetooth serial connection can be useful in many applications such as controlling servos, motors, and writing to LCDs. The Arduino to PC connection can be useful in applications where the Arduino reads sensors then pass their values via serial Bluetooth to a PC for processing. The distance for this transceiver is about 30 feet or so but it really depends on many other variables. This is ideal for indoors projects.

The only downside of this cheap Bluetooth transceiver is the absence of headers which means you have to solder at least 4 wires. Then there's the absence of power LED as well as no TX/RX LEDs. I did not consider these features a necessity but some of you might want to pay more and get an enhanced version of this transceiver with all of these features.

The Bluetooth serial module I bought has the following specs:

-- Default COM setting: 9600, N, 8, 1  
-- Default Password/pairing code: 1234.  
-- Supports the AT command to modify the baud rate, device name, passkey, master/slave, etc.  
-- Supports baud rates 2400 - 1382400  
-- Based on the CSR Bluetooth chip BC417143  
-- Bluetooth specification v2.0 + EDR  
-- Power supply: +3.3VDC 50mA  
-- Frequency: 2.4GHz ISM band  
-- Modulation: GFSK(Gaussian Frequency Shift Keying)  
-- Emission power: ?4dBm at 0.1% BER  
-- Speed: Asynchronous: 2.1Mbps(Max) / 160 kbps, Synchronous: 1Mbps/1Mbps  
-- Security: Authentication and encryption  
-- Size: 26.9mm x 13mm x 2.2 mm.  
-- Working temperature: -20 ~ +75 Centigrade  
-- Dimension: 26.9mm x 13mm x 2.2 mm

**CREDITS**

During my research, I have benefited from many projects on this and related topics. I have listed them in the references section.

**RELATED PROJECTS**

1) In a previous project, I used a Pololu Wixel and an Arduino to control a robot remotely from a PC terminal. Here, I will show similar data exchange functionality but without the robot.

2) I also hacked the RF system of cheap wireless car toy and used the Arduino to transmit signals.
Step 1: The parts list

HARDWARE

-- Arduino Uno (R2) or clone.
-- Bluetooth serial transceiver connected to Arduino. I got one from Ebay with the BlueCore4 chipset. Search Ebay for Wireless Bluetooth Transceiver Module RS232 / TTL.
-- Bluetooth USB dongle to be connected to PC. I used an old MSI pc2pc Bluetooth as well as a Bollionton Bluetooth USB dongles and both worked fine.
-- The 1.2K Ohms & 2.2K Ohms resistors will be used as voltage dividers to drop the Arduino's 5V to about 3.3V. You can substitute these with 10K Ohms & 20K Ohms resistors. If you know how to calculate voltage dividers, feel free to use other values for your resistors.
-- Breadboard and jumper wires.
-- Power source. I used a 9V battery.
-- Any PC that supports Arduino IDE will be needed to program the Arduino microcontroller.
-- Most PCs and smartphone w/Bluetooth and a terminal emulator can be used to control the Arduino.

SOFTWARE

-- Windows 7 64-bit. But this should work on other platforms supported by the Arduino IDE.
-- Arduino IDE 1.0
-- Tera Term Pro terminal emulator but other similar emulators should work.
-- Tera Term by the original author of the software

Step 2: Load the Arduino test sketches

NOTE: When uploading sketches from the Arduino IDE to the Arduino microcontroller, make sure your Bluetooth transceiver TX pin/wire is not connected to the Arduino's RX pin (pin 0). Else, this may prevent your PC from sending sketches to the Arduino microcontroller.

Check the video to see how these demo sketches work.

I have two Arduino test sketches. The first one is a “send test.” The Arduino microcontroller sends numbers to the PC over serial Bluetooth. So if you have a terminal emulator running on your PC, such as Tera Term, you will see a list of numbers rolling down your emulator's screen.

I have done almost no error trapping in my code to keep the code clear and simple. I trust the developers will add it per their requirement.

The second Arduino test sketch is a “get test.” If you type 1 on your keyboard, from the terminal emulator application such as Tera Term, the Arduino's pin 13 LED will turn on. If you click 0 on your keyboard, the LED will turn off.

int counter = 0;

void setup() {
  Serial.begin(9600);
  delay(50);
}
```c
void loop() {
  counter++;
  Serial.print("Arduino counter: ");
  Serial.println(counter);
  delay(500); // wait half a sec
}

// REMIXED BY: TECHBITAR (HAZIM BITAR)
// LICENSE: PUBLIC DOMAIN
// DATE: MAY 2, 2012
// CONTACT: techbitar at gmail dot com

c char INBYTE;
int LED = 13; // LED on pin 13

void setup() {
  Serial.begin(9600);
  pinMode(LED, OUTPUT);
}

void loop() {
  Serial.println("Press 1 to turn Arduino pin 13 LED ON or 0 to turn it OFF;");
  while (!Serial.available()); // stay here so long as COM port is empty
  INBYTE = Serial.read(); // read next available byte
  if (INBYTE == '0') digitalWrite(LED, LOW); // if it's a 0 (zero) turn LED off
  if (INBYTE == '1') digitalWrite(LED, HIGH); // if it's a 1 (one) turn LED on
  delay(50);
}
```

Step 3: Wiring the Arduino + Bluetooth transceiver

WARNING: MY BLUETOOTH MODULE OPERATES AT +3.3V DC. THE ARDUINO UNO IO PINS OUTPUT 5V. SO AVOID CONNECTING THE ARDUINO 5V OUTPUT PINS TO THIS TRANSCIEVER WITHOUT A VOLTAGE DIVIDER.

However since the Bluetooth pins output 3.3V, this won't hurt the Arduino pins which tolerate 5V and will treat a 3.3V signal from the Bluetooth serial transceiver as a logical high. This is why I did not use a voltage divider for the connection between the Bluetooth transmission/TX pin (rated 3.3v) and the Arduino receive/RX pin 0 (rated 5V.)

START WIRING

1) Solder 4 wires to the Bluetooth module: TX, RX, GND, Vcc
2) Assemble the voltage divider. I have lots of photos to help with this step.
3) Wire the Bluetooth module to the Arduino Uno according to this:
   Bluetooth TX -----> Arduino Uno RX (Pin 0)
   Bluetooth RX -----> Arduino Uno TX (Pin 1) via the voltage divider!
   Bluetooth GND -----> Arduino GND pin
   Bluetooth Vcc -----> Arduino 3.3V pin but NOT the 5V pin.
4) Power the circuit. I used a 9V battery.

Keep a mobile phone or a Bluetooth device handy to detect whether your Bluetooth transceiver is available.

At this moment, your Bluetooth serial transceiver should come to life and other Bluetooth devices should see it. If you don’t see it, check the wiring again.

My Bluetooth serial transceiver has a default name of HC-05 and a default code of 1234 and speed of 9600. Check your vendor documentation for your device's name and password/pairing code. You can change all these defaults with the AT commands.

5) Plug the Bluetooth USB dongle into your PC and move along to the next section.

Step 4: Set up your PC for serial Bluetooth communication
When you insert the Bluetooth dongle into the USB port of your PC, Windows will install the necessary drivers automatically. When it’s done, it will display a system message stating the installation was a success.

You will then see the Bluetooth icon in your system tray or on your desktop. Click on it to see a menu with a number of options such as Show Bluetooth Devices. Click on it and follow the slides.

Select Add Devices or Show Bluetooth Devices.

If your Arduino Bluetooth serial transceiver is wired properly, your device name should show up on the list. Click on it and then click Next.

You will be prompted to enter your Bluetooth devices’ pairing code/password. The default for most Bluetooth devices is either 1234 or 0000. Click Next.

If the pairing is successful, you will see a system message saying so.

Now, both your PC’s Bluetooth and the Arduino’s Bluetooth are connected as if by serial cable.

Run Tera Term on your PC (or any similar terminal emulator) and select the COM port number specified by the pairing.

FORGOT WHICH COM PORT?
If you forgot the Bluetooth COM port used for the paired Bluetooth transceivers, right click on the Bluetooth icon on your System Icon area and select “Show Bluetooth Devices.” You will see a list of Bluetooth devices.

Right click on your Bluetooth device and select “Properties.”

Then click on the “Services” tab. There you will see the COM port number.

When you can’t make a connection/pairing even though you are certain your Bluetooth devices are running normally, delete your Bluetooth device and start the process from the top. That seems to reset the connection.

RUN TERA TERM
Once the pairing is done, run Tera Term to start communicating with your Arduino. Tera Term will prompt you to pick either Serial or TCP/IP. Select Serial and make sure Tera Term shows the COM port number from the previous steps. Also make sure the settings are the same for both Bluetooth serial modules. In this case: 9600, N, 8,1

If you have uploaded the get test sketch, then type either 1 (one) or 0 (zero) to turn pin 13 LED on the Arduino on or off. If you uploaded the send test sketch, you will see a growing list of ascending numbers on the Tera Term screen sent from Arduino over serial Bluetooth.
1. This icon should show your Bluetooth transceiver’s name.
2. Click here to be prompted for the password/pairing code which is 1234 for most devices.

1. Windows will tell you if the pairing between your PC’s Bluetooth and your Arduino’s Bluetooth.

1. When you return to the Bluetooth devices list, right click on the icon for your Arduino’s Bluetooth. Then select “Properties”

1. This COM port is now used to communicate from your PC to the Arduino. As far as your PC applications are concerned, your PC and your Arduino are connected via a standard serial cable and could care less whether there’s a Bluetooth connection or not.

1. To verify my connection is working from my PC to the Arduino I run Tera Term and select the serial COM port attached to my Bluetooth.

1. My Arduino was already loaded and running the test sketch that sends numeric values via the Arduino attached Bluetooth module which is also acting as a COM port for the Arduino.
Step 5: References

Special thanks to my good friend and top notch maker Jafar Quatineh for his input and to the developers of the many helpful Bluetooth projects that I used as a foundation for this project such as the ones listed here:

Wireless communication with PC and Arduino board using Bluetooth
http://arduino.cc/playground/Learning/Tutorial01

Androino! Control an Arduino from your Android device using a cheap bluetooth module.

how to Control arduino by bluetooth from (PC, pocket PC PDA)

USE THIS GUIDE AT YOUR OWN RISK

Related Instructables

IR Remote Control Station for Android - TURN THE TV DOWN by techbitar
ArduDroid: A Simple 2-Way Bluetooth-based Android Controller for Arduino by techbitar
SensoDuino: Turn Your Android Phone into a Wireless Sensors Hub for Arduino by techbitar
Modify The HC-05 Bluetooth Module Defaults Using AT Commands by techbitar
Infrared-RF 433-Bluetooth Arduino Remote by kcschenk01
Arduino bot Android remote control II by braserito66

Comments

50 comments Add Comment view all 55 comments

jcavanaugh05 says:
Dec 20, 2013, 1:41 PM REPLY
In case anyone has the same problem I had: the computer was receiving text from the arduino via bluetooth but I could not send text to the arduino from my computer or my phone. The break-out board I was using had a bad connection from the TX of the HC-05. If I bypass the break-out board and attach directly to the HC-05 TX pin everything works.

paras2661995 says:
Oct 21, 2014, 6:47 AM REPLY
Hey I too have a same problem cn u pls tell me how to bypass the breakout board connection or jst send me the pics of ur circuit pls on my mail id parasvohra30@gmail.com

mircalex11 says:
Oct 10, 2014, 5:51 AM REPLY
Good instructions , any idea about how to flash another firmware to this moudle ?

ngrigoriev says:
Aug 14, 2014, 9:29 AM REPLY
My voltage on input RX is not hight enough and is about 3.06V instead of 3.33V. I used 1k and 2k resistors and my output 4.13V. So I shouldn't rely on this schematic and do my own calculation...

guruvaraja says:
Apr 27, 2014, 3:35 AM REPLY
Very good instructional tutorial fine and working as stated. Thanks for the leading i correct path and android apps. for my future projects. I'm very much grateful to Bidar for his consistent support in this project

Thanks a lott

smaw51 says:
Mar 20, 2014, 11:47 PM REPLY
This came in handy! I had bought one of these a while ago and forgot how to wire it up. It is odd how the tx and rx on the arduino and bluetooth are mixed up, but it's the only way it'll work. And your method of communication is way better than the way I did it in the past!

Thanks!

bstott says:
Mar 17, 2014, 9:19 AM REPLY
Hi, Thanks for your work.

A suggestion - Do not use repetitive tinny sounding music. Any verbal is better, even if a different language.

After watching and listening to several videos it becomes grating on the nerves to listen and filter out such noise. And if we turn down the volume - IF - someone begins to speak we may miss some good instruction.
Abood13 says:
the BT module appeared in the serial ports menu on tera term but then i get the error “cant open com6”... although the arduino serial monitor received the
serial.println order and the boards rx light blinks when i send 1 using the monitor but the led dnt work although it works if i switch to the blink led example
by ardino website ... any suggestions,?

adriannlu says:
Worked perfectly. Cheers!

n_galia says:
Hai tech.. I would like to ask question...what if i dont have any 9V battery and I only connected the cable to my PC..the same set-up with your set-up ,the
difference is that I will have PC and with the cable wire as the source of the power for my arduino.Will My Bluetooth Module works in this manner?

deepankarmaithani says:
gr8 tutorial, did you use processing to create the app for android you are using,and is the source code for app available,i want to customise it according to my
need. by the way thanx for the tutorial.

bergeo says:
I just got this working using an HC-05 module sold by nyplatform on ebay. It has a built-in regulator and level shifting, and an led to show connection status.

One problem that took me a long time to figure out was that instead of connecting my Arduino RX pin to the module's TX pin, and vice versa, I had to go TX
to TX and RX to RX. After I did that everything worked fine.

So wiring to that module is as simple as can be. Just connect like so:

Arduino module
TX  TX
RX  RX
5V  5V
GND GND

No voltage dividers needed. And it has header pins so it plugs right into a breadboard.

settra says:
very nice work. can i ask you. could i, isntead of soldering to dig pins 0,1, do this:
plug usb cable. cut the cables, and solder those cables to the bluetooth??

ronk4rompy says:
can any body explain me what is role of master/slave/slave loop role in hc05 .
bcz when i was use hc 05as master role that could not find by othe BT device .
and can slave mode send data from uc to pc? 
plz help me i cant understand..

dracorabbid says:
Is the voltage divider needed or can I just plug the Bluetooth module into the 3.3v pin of the arduino?

Ignore this, I wasn't paying attention.

roboCop.ultron says:
thanks sir! It will help me a lot , but can hc-05 Bluetooth module sustain 4V of power supply ???

renefabri says:
Thank you for the video. You helped me. You show how to add a new device in Windows, and at 5 minutes 25 seconds in the video, one can see that "Other
Bluetooth Other" is replaced by "HC05 Bluetooth Other". With my system, there was no change. It stayed on "Other Bluetooth Other", and subsequently the
device could not be added. So, You made me think my Bluetooth dongle is failing. I tried with another Bluetooth dongle, and, hurray, "Other Bluetooth Other"
is changing to something else, i.e. "Linvor Bluetooth Other" in my case. And afterwards, everything is ok.

hurkankartal says:
Hey, thanks for guide. It helped much enough! The only thing that I did not like is, I cant see com ports sometime. I don't know the reason why but when I
unplug the power and give it again to the hc05 it becomes normal.
**milen.your** says:

hello,
Thank you very much for the tutorial. I followed all the steps but i was not able to see the COM PORT number for my bluetooth (HC-05), there wasn't anything listed under "Service" inside the properties of the BT. Please suggest me what i can do next.

Thanks,
Milan

**limbo** says:

Great guide. Thanks

**cmagro** says:

The Problem I have is that I am sending it AT and the BT module SHOULD answer back with OK but nothing happens. If I use my mobile phone, I can see and connect to it easily!

The BT TX is directly going to the Arduino RX however the Arduino TX is going into a 10k resistor, and into the RX of the BT. From here, I connect 20k to ground.

So its like a potential divider, with RX of BT in the middle, 20k at bottom to gnd and 10k at top to Arduino Tx...

**chanakypm** says:


**ianmcrv** says:

I just released my Android software BTInterface I've used this module with a backplane.
Lots of info on my site www.btinterface.com
Please take a look.

ian

**jfenwick** says:

It turned out that I needed a 2.2K resistor going from the HC-05 TX pin to GND. I suspect the default state either had too much or too little voltage going to the Arduino RX pin.

**jfenwick** says:

I'm seeing some strange behavior.

I hooked up the electronics as shown in your diagrams, except I used an adafruit level shifter instead of resistors.
I'm using a Mac and i'm able to pair with the device.
When I run the sketch that sends counter data, i'm able to open CoolTerm, connect to the HC-05 serial port, and i'm able to receive the data.
However, when i try to run the program where you can turn an LED on with 1 or off with 0, it does not work!
What could I be doing wrong?

**ssarantis** says:

Hello, when i use the resistor as voltage dividers i receive only random caracters on my computer and if i use it directly it works normal... i get confused :/

**ZOUZZOUZ** says:

plz i want some help i have bought an hc05 bluetooth module andhave done all the necessary wiring that you have done in the next steps but i am still not having any results when i am searching for the device from a mobile phone or any device. thx

**diy_bloke** says:

Still dont have this working. My problem seems to be that when I have everything installed, communication over COM3, both the Arduino IDE as well as TeraTerm can't connect to that port because 'it is already in use' yeah, by the bluetooth module I would think, so how do i fix this? I have followed the ibble to the letter

**diy_bloke** says:

I am quite unknowledgeable about what would be a master or a slave in Bluetooth, but as for now I am even unable to get any type of significant connection and I'd be glad if someone could offer some pointers/help

I have what I believe is the HC06 connected to my Arduino Rx ->Tx and Tx ->Rx
I have a bluetooth dongle on my pc. I easily establish a connection, at least that is wht my computer says, it recognizes the HC06 and comes back with teh device 'linvor'.

But that is it. I have a program running on my arduino at 9600 Baud that basically repeatedly sends the message ' test' to the serial port, but I get nothing on my pc (In the IDE serial monitor or a terminal program that is) and I keep having a flashing LED on my bluetooth HC06 module, whereas I understand it should go on uninterrupted when there is transmission.
What is it i do wrong?
yaly says:
Dec 7, 2012, 2:22 PM  REPLY
I don't know about the led code thingie but right click on the bluetooth icon in the task bar, click open settings, select com ports tab from the top, click add, select outgoing check box, browse for the module and click ok, you should have a comport installing and close any arduino ide open and reopen it, select the serial port (eg: com 30) from tools drop down menu, now try the testing program again

Dec 7, 2012, 2:05 PM  REPLY
slightly off-point: although its uno r2 the atmega 8 (usb to serial ttl coverter) is 90 degrees oriented but mine is 45 degrees, weird but cool. My real question: what is the difference between HC-05 module and HC-03 module?

diy_bloke says:
Dec 11, 2012, 6:37 AM  REPLY
I actually seem to have a similar problem in UBUNTU ;-) there it is connected to rfcomm0 and though I change it in the conf file, I still cant select that, but I already would be happy if I got it to work under windows

Dec 8, 2012, 3:32 PM  REPLY
Thanks, But I have no problem installing or finding the device/module or installing com ports, I just dont get anything into my serial monitor. I think what you describe is what I did (cant repeat right now, on Linux) and I have no problem connecting to other bluetooth devices, except this one. My computer finds the module it hets assigned a com port, but I dont get anything on it

I guess I just have to try it again step by step when I am back on windows. On Linux now and the same problem

Dec 9, 2012, 1:14 AM  REPLY
I can ping the device and everything says it is connected, I see the LED change from flickering to solid burning, but at least on Ubuntu the problem seems to be that the IDE can't see the rfcomm device (not even when i define it in preferences.conf). Odd, I have no problem exchanging date with e.g. my phone

I'll just have to wait till I got windows installed again and try again, maybe I overlooked something

yaly says:
Dec 7, 2012, 2:05 PM  REPLY

offtherails2010 says:
Nov 17, 2012, 2:22 PM  REPLY
Okay just thought i'd let you know that ive managed to get this all working as your awesome little test sketches have instructed !

I have no idea why this all started working as it should for me, i must have started from scratch building this circuit up on my breadboard well-over 30 times and now im finally getting the arduino counting onto terra term and also the pin-13 LED on/off sketch is working as it should !

Once again thanks for the instructable !!!

Nov 17, 2012, 11:52 AM  REPLY
Also the Counter-sketch comes up with similar jibberish and im so stuck now and dont know what else to do, ive wired it up several times from scratch following your guide but still get the same results from both sketches, please help ?

many many thanks in advance for any help

Nov 17, 2012, 8:04 AM  REPLY
thanks for the GREAT instructable - ive just dived into the Arduino world and loving it !

i have a few of these bluetooth modules, not sure about what firmware they are or if they are slave or master but thats not what i need help with lol !

Please would you be able to tell me why i keep getting a load of writing keep being sent to my terraterm monitor from the Arduino please?

the thing is, i have your Pin-13 sketch loaded up and its sending this stuff:

```
¿-¿ass
åë_¿¿!¿¿}-#!¿-#¿¿guw¿ac¿!¿¿!¿¿-¿ass
åë_¿¿!¿¿}-#¿-#¿¿guw¿ac¿!¿¿!¿¿-¿ass
åë_¿¿!¿¿}-#
```

Im not quite sure what ive done wrong as ive connected it up as per your instructable and cant seem to get this sketch to turn on the pin-13 LED when i enter either 1 or 0 in terraterm because the Arduino is sending that above repeating line to my serial terminal !

Please please help !

i know this is an old post but ive got all this setup on my desk and it took hours to get this far, i would really appreciate some enlightenment on this if you would know whats going on here, please please help

Many thanks in advance !
Notice these modules externally all looks very similar but the major differences are in the firmware.

I resume the firmwares:

HC-05: master / slave mode, programmable via AT commands.
HC-06 (or Linvor 1.5): only slave mode
I think there is other HC-06 fixed for master mode, so, two different HC-06 firmwares and FIXED for master or slave: you can't change the mode.

HC-03 and HC-04 are industrial versions of the HC-05 and HC-06 firmwares.

Have this in mind before purchasing these modules because not all vendors are clear about this (I found some vendors that mixed all the firmwares in the description and at the end you don't know really what it is using -surely neither them know it xdD-).

The most common is HC-06 (linvor 1.5) firmware in slave mode.

So, double check this before buying if you intend to buy a master module.

I talk from my own experience ;)

Exactly same happening to me. I have HC-06 and now can't enter into AT mode, though I have paired HC-05 as master and HC-06 as slave. But still no communication is found :(

Is possible to make another of this and communicate each other?

Hi, whether I use Arduino BT (instead of Arduino Uno (R2) or clone), then should I have to use BT transceiver?? Also give some clone models...

And also can I provide a circuit diagram about how to build a BT transceiver...bcz I can't afford to buy online.......thank you though for your post.

Could you connect 2 arduinos like this and have them talk to each other?

If you use the transceiver's AT command set I see no reason why you can't.

Sorry, I'm a noob so I have no idea what you're talking about.

I barely passed electronics in college, but based on some online voltage divider calculators, you can recreate this with any three identical resistors. Place the 3 resistors in series and R1 becomes the 1.2k resistor and R2 and R3 replace the 2.2k resistor. I've successfully done this with 3 33 ohm resistors.

Thanks for the instructable. I visited it while connecting a Bluetooth chip to a Parallax Boe Bot Shield for Arduino.

You're welcome. You can also use a zener diode to drop the voltage.

Per quelli che sono italiani, ecco una guida completa:
http://arduino.cc/forum/index.php/topic,104903.0.html
Parla di moduli HC05 e HC06, in particolare:
- connessione hardware
- programmazione AT
- connessione seriale BT (pc <-> arduino)
- applicazione base per Android (fatta con AppInventor)
- breakout pcb (disponibili i file eagle)
- esempi vari

for those who are Italian, here is a complete guide:
http://arduino.cc/forum/index.php/topic,104903.0.html

He talks about HC05 & HC06 module, particularly:
- Hardware connection
- AT Programming
- BT serial connection (pc <-> arduino)
- The basic application for Android (made with AppInventor)
- Breakout pcb (Eagle files available)
- Various examples

**dunnos** says:
would it be possible to use the arduino IDE terminal for this?

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