Bluetooth Bee

From Wiki 来自痴汉的爱

Contents

Introduction

Bluetooth Bee is an easy to use **Bluetooth Serial Port Profile(SPP)** module compatible with existing **Xbee** sockets, designed for transparent wireless serial connection setup. Serial port Bluetooth module is fully qualified Bluetooth V2.0+EDR(Enhanced Data Rate) 3Mbps Modulation with complete 2.4GHz radio transceiver and baseband. It uses **CSR Bluecore 04**-External single chip Bluetooth system with CMOS technology and with AFH(Adaptive Frequency Hopping Feature). It has the smallest footprint of **12.7mm x 27mm**. Hope it will simplify your overall design/development cycle for форекс брокеры (http://finbay.ru/dollarovyj-schet-brokery.html) .

Model:WLS125E1P (http://www.seeedstudio.com/depot/bluetooth-bee-p-598.html?cPath=139_142)

bbee_LRG.jpg

Features

Hardware Features

- Typical -80dBm sensitivity.
- Up to +4dBm RF transmit power.
- Fully Qualified Bluetooth V2.0+EDR 3Mbps Modulation.
- Low Power 1.8V Operation, 1.8 to 3.6V I/O.
- торговые сигналы FxLot (http://fxlot.ru/)
- PIO control.
- UART interface with programmable baud rate.
- Integrated PCB antenna.
- xBee compatible headers.

Software Features

- Default Baud rate: **38400**, Data bits:8, Stop bit:1,Parity:No parity, Data control: has.
- Supported baud rate: 9600,19200,38400,57600,115200,230400,460800.

- Use CTS and RTS to control the data stream.
- When a rising pulse is detected in PIO0, device will be disconnected.
- Status instruction port PIO1: low-disconnected, high-connected;
- PIO10 is connected to red led, PIO11 is connected to green led. When master and slave are paired, red and green led blinks 1time / 2s in interval, while disconnected only green led blinks 2 times/ s.
- Auto-connect the last device on power as default.
- Permit matched device connect by default.
- Default PINCODE:" 0000" .
- Auto-reconnect in 30 min when disconnected as a result of beyond the range of connection.

Application Ideas

- As a Wireless Serial Port for Arduino / Seeeduino and other MCUs
- As a Bluetooth Serial Port for PC when connected with UartSBee

Cautions

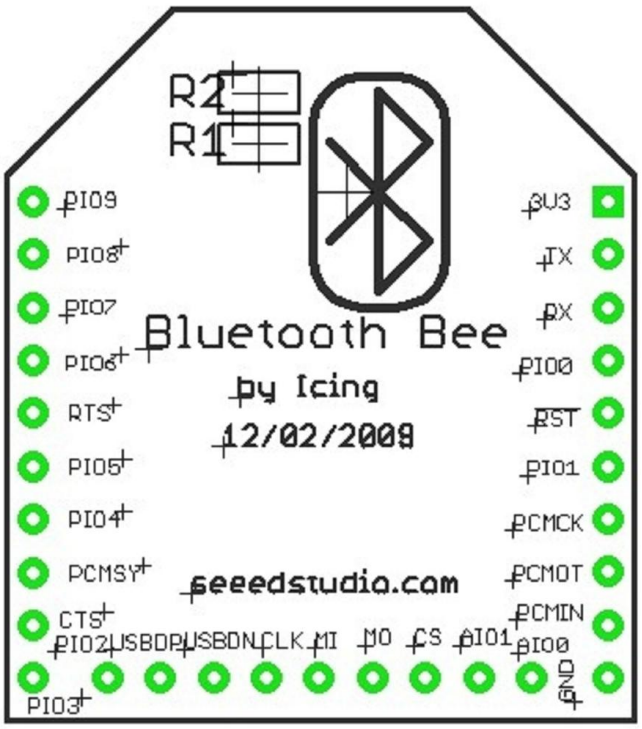
- **While using with Seeeduino / Arduino, set the operation voltage to 3.3V. Else use a proper logic level converter.**
- **While using with UartSBee, set the operation voltage to 3.3V**
- **Command to change baud rate is persistent even after reset. Hence remember the baud rate for next use.**
- **When using SoftwareSerial, do not set the baud rate above 38400**

Schematic

Bluetooth Bee Schematic and Board Files in Eagle Format (http://garden.seeedstudio.com/images/f/f6/Bluetooth_Bee_Schematic_Board.zip) refrigerated transport services (http://aps-solver.com/services/transportation/refrigerated-cargo/) from APS freight company

Pin definition and Rating

Bottom-view:



Pin	#	Pad Type	Description
PIO9	29	Bi-Direction	Programmable input/output line
PIO8	28	Bi-Direction	Programmable input/output line
PIO7	27	Bi-Direction	Programmable input/output line
PIO6	26	Bi-Direction	Programmable input/output line
RTS	25	CMOS output, tri-stable with weak internal pull -up	UART request to send, active low
PIO5	24	Bi-Direction	Programmable input/output line
PIO4	23	Bi-Direction	Programmable input/output line
PCMSY	22	Bi-Direction	Synchronous PCM data strobe
CTS	21	CMOS output, tri-stable with weak internal pull -up	UART clear to send, active low
PIO3	20	Bi-Direction	Programmable input/output line
PIO2	19	Bi-Direction	Programmable input/output line
USBDP	18	Bi-Direction	
USBDN	17	Bi-Direction	
CLK	16	CMOS output, tri-stable with weak internal pull -up	SPI(Serial peripheral interface) clock
MI	15	CMOS output, tri-stable with weak internal pull -up	SPI data output
MO	14	CMOS output, tri-stable with weak internal pull -up	SPI data output
CS	13	CMOS output, tri-stable with weak internal pull -up	Chip select for serial peripheral interface, active low
AIO1	12	Bi-Direction	Programmable input/output line
AIO0	11	Bi-Direction	Programmable input/output line
GND	10	VSS	Ground port
PCMIN	9	CMOS input	Synchronous PCM data input
PCMOT	8	CMOS output	Synchronous PCM data output
PCMCK	7	Bi-Direction	Synchronous PCM data clock
PIO1	6	Bi-Direction	Programmable input/output line
!RST	5	CMOS input with weak internal pull-up	Reset if low,input must be low for >5ms to cause a reset
PIO0	4	Bi-Direction	Programmable input/output line
RX	3	CMOS input with weak internal pull-up	UART Data input
TX	2	CMOS output,tri-stable with weak internal pull-up	UART Data output

3V3	1	3.3V	Integrated 3.3V(+)supply with on-chip linear regulator output within 3.15-3.3V

Mechanic Dimensions

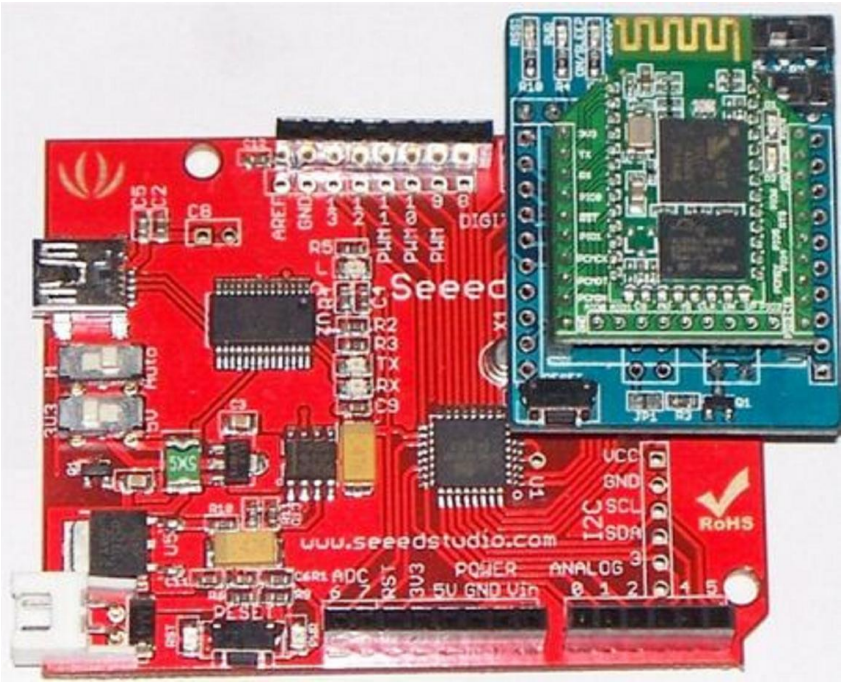
Bluetooth Bee board is of **12.7mm x 27mm** size.

Usage

Hardware Installation

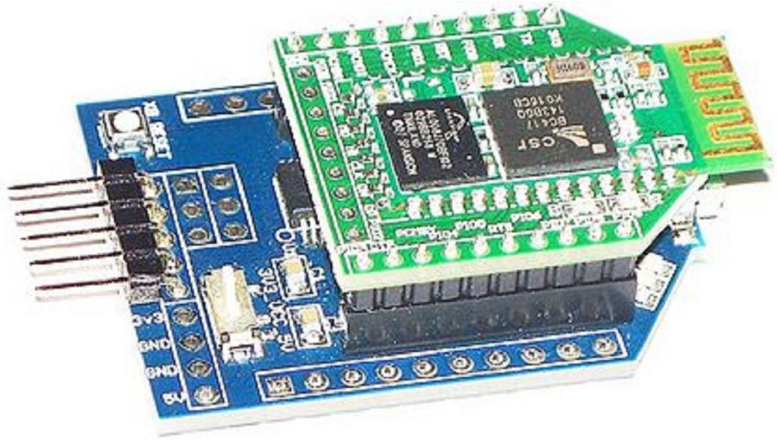
Connecting to Arduino with XBee Shield

Use a XBee® Shield to connect **Bluetooth Bee** to Seeeduino / Arduino. Refer the XBee® Shield documentation on how to set the toggle switches to correct positions.



Connecting to PC with UartSbee

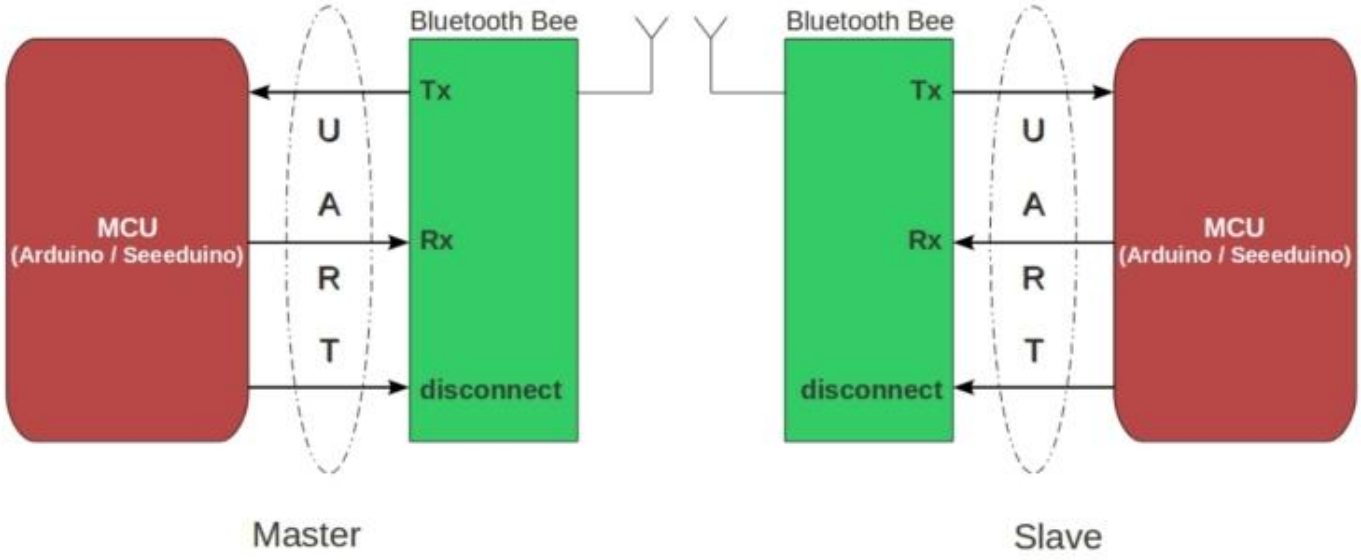
Use an UartSBee to connect **Bluetooth Bee** to PC. Set the power selection toggle switch to 3.3V before connecting BlueTooth Bee.



Software Instruction

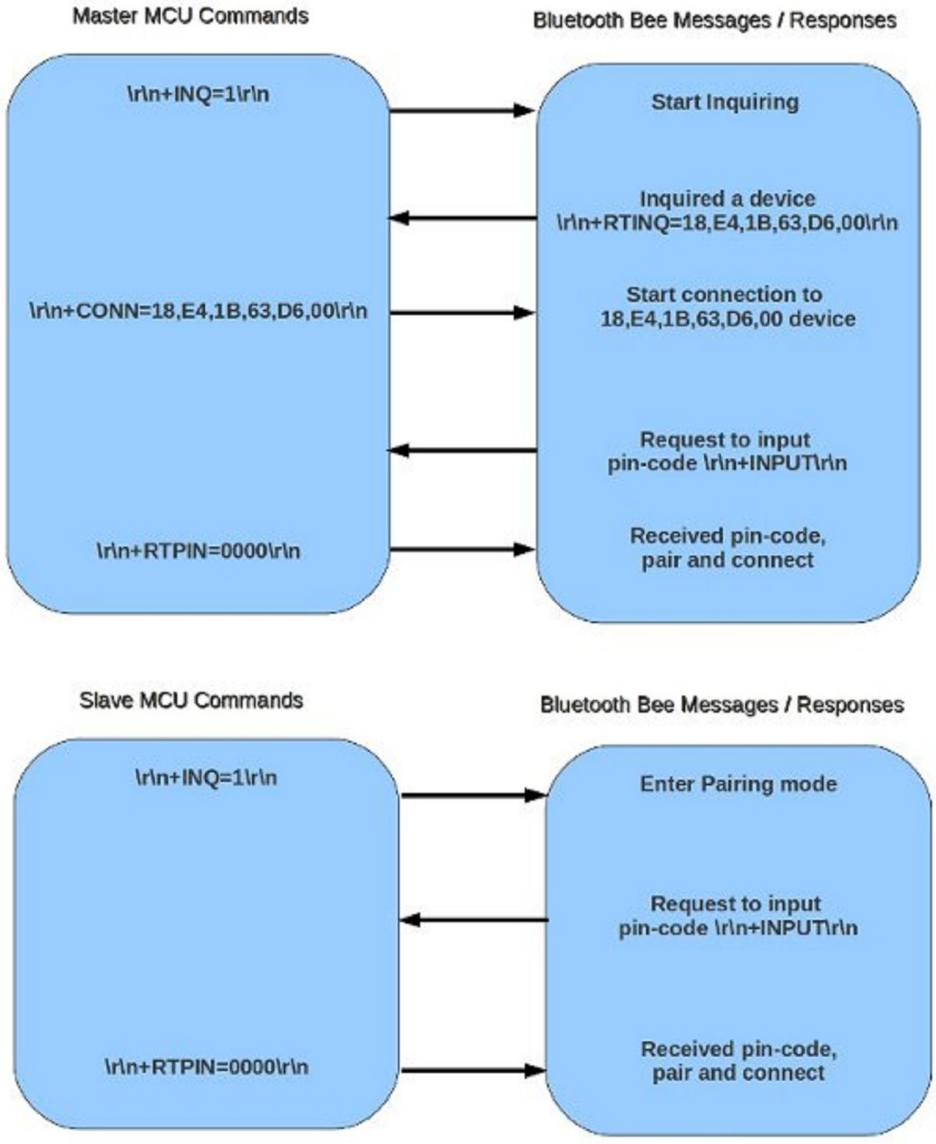
Working Sketch Map

The following sketch presents an overview of **Bluetooth Bee** operation in master and slave mode.



Flowchat

The following flowchart gives a quick start guide to **Bluetooth Bee** programming.



Commands to change default configuration

1. Set working MODE

\r\n+STWMOD=0\r\n	Set device working mode as client (slave). Save and Rest.
\r\n+STWMOD=1\r\n	Set device working mode as server (master). Save and Rest.

Note: \r\n is necessary for operation and the value of are **0x0D 0x0A** in Hex. **\r** and **\n** represent **carriage-return** and **line-feed**(or next line),

2.Set BAUDRATE

\r\n+STBD=115200\r\n	Set baudrate 115200. Save and Rest.
Supported baudrate: 9600, 19200,38400,57600,115200,230400,460800.	

3. Set Device NAME

\r\n+STNA=abcdefg\r\n	Set device name as “abcdefg”. Save and Rest.

4. Auto-connect the last paired device on power

\r\n+STAUTO=0\r\n	Auto-connect forbidden. Save and Rest.
\r\n+STAUTO=1\r\n	Permit Auto-connect. Save and Rest.

5. Permit Paired device to connect me

\r\n+STOAUT=0\r\n	Forbidden. Save and Rest.
\r\n+STOAUT=1\r\n	Permit. Save and Rest.

6. Set PINCODE

\r\n +STPIN=2222\r\n	Set pincode “2222”, Save and Rest.

7. Delete PINCODE(input PINCODE by MCU)

\r\n+DLPIN\r\n	Delete pincode. Save and Rest.

8. Read local ADDRESS CODE

\r\n+RTADDR\r\n	Return address of the device.

9. Auto-reconnecting when master device is beyond the valid range (slave device will auto-reconnect in 30 min when it is beyond the valid range)

\r\n+LOSSRECONN=0\r\n	Forbid auto-reconnecting.
\r\n+LOSSRECONN=1\r\n	Permit auto-reconnecting.

Commands for Normal Operation:

1. Inquire

a) Master	
\r\n+INQ=0\r\n	Stop Inquiring
\r\n+INQ=1\r\n	Begin/Restart Inquiring
b) Slave	
\r\n+INQ=0\r\n	Disable been inquired
\r\n+INQ=1\r\n	Enable been inquired

When **+INQ=1** command is successful, the red and green LEDS blink alternatively.

2. Bluetooth module returns inquiring result

\r\n+RTINQ=aa,bb,cc,dd,ee,ff;name\r\n	Serial Bluetooth device with the address “aa,bb,cc,dd,ee,ff” and the name “name” is inquired

3. Connect device

\r\n+CONN=aa,bb,cc,dd,ee,ff\r\n	Connect to a device with address of "aa,bb,cc,dd,ee,ff”

4. Bluetooth module requests inputting PINCODE

\r\n+INPIN\r\n

5. Input PINCODE

\r\n+RTPIN=code\r\n	
Example: RTPIN=0000	Input PINCODE which is four zero

6. Disconnect device Pulling PIO0 high will disconnect current working Bluetooth device.

7. Return status \r\n+BTSTA:**xx**\r\n
xx status:

- 0 - Initializing
- 1 - Ready
- 2 - Inquiring
- 3 - Connecting
- 4 - Connected

(**Note:** This is not a command, but the information returned from the module after every command)

Programming

Flow Control Based Implementation

The following sketch configures **Bluetooth Bee** for Transportunternehmen (http://aps-solver.de/leistungen/) as **Slave Device** and waits for connection request from PC or other master device. Bluetooth Bee is connected to Seeeduino via XBee Shield as shown above. Bluetooth Bee is connected to digital Pins 11 and 12 of Arduino / Seeduino. We use NewSoftSerial library for supporting serial communication on these pins. The hardware serial port of Arduino is available for uploading sketch or debugging. This sketch uses a flow control mechanism using CheckOK(). It avoids using arbitrary delay between each command. If CheckOK() is not required, use a delay of at least 3 seconds between commands.

```
/*
BluetoothBee Demo Code - Flowcontrol Based Implementation
2010,2011 Copyright (c) Seeed Technology Inc.  All right reserved.

Author: Visweswara R

This demo code is free software; you can redistribute it and/or
modify it under the terms of the GNU Lesser General Public
License as published by the Free Software Foundation; either
version 2.1 of the License, or (at your option) any later version.

This library is distributed in the hope that it will be useful,
but WITHOUT ANY WARRANTY; without even the implied warranty of
MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the GNU
Lesser General Public License for more details.

You should have received a copy of the GNU Lesser General Public
License along with this library; if not, write to the Free Software
Foundation, Inc., 51 Franklin St, Fifth Floor, Boston, MA  02110-1301  USA

For more details about the product please check http://www.seeedstudio.com/depot/

*/


/* Upload this sketch to Seeeduino and press reset*/

#include <SoftwareSerial.h>   //Software Serial Port
#define RxD 11
```

```
#define TxD 12

#define DEBUG_ENABLED  1

SoftwareSerial blueToothSerial(RxD,TxD);

void setup()
{
    pinMode(RxD, INPUT);
    pinMode(TxD, OUTPUT);
    setupBlueToothConnection();

}

void loop()
{
  //Typical Bluetoth command - response simulation:

  //Type 'a' from PC Bluetooth Serial Terminal
  //See Bluetooth Bee - Wiki for instructions

  if(blueToothSerial.read() == 'a')
  {
    blueToothSerial.println("You are connected");
    //You can write you BT communication logic here
  }

}


void setupBlueToothConnection()
{
    blueToothSerial.begin(38400); //Set BluetoothBee BaudRate to default baud rate 38400
    delay(1000);
    sendBlueToothCommand("\r\n+STWMOD=0\r\n");
    sendBlueToothCommand("\r\n+STNA=SeeeduinoBluetooth\r\n");
    sendBlueToothCommand("\r\n+STAUTO=0\r\n");
    sendBlueToothCommand("\r\n+STOAUT=1\r\n");
    sendBlueToothCommand("\r\n +STPIN=0000\r\n");
    delay(2000); // This delay is required.
    sendBlueToothCommand("\r\n+INQ=1\r\n");
    delay(2000); // This delay is required.
}

//Checks if the response "OK" is received
void CheckOK()
{
  char a,b;
  while(1)
  {
    if(blueToothSerial.available())
    {
    a = blueToothSerial.read();

    if('O' == a)
    {
      // Wait for next character K. available() is required in some cases, as K is not immediately available.
      while(blueToothSerial.available())
      {
         b = blueToothSerial.read();
         break;
      }
      if('K' == b)
      {
        break;
      }
    }
   }
  }

  while( (a = blueToothSerial.read()) != -1)
  {
    //Wait until all other response chars are received
  }
}

void sendBlueToothCommand(char command[])
{
    blueToothSerial.print(command);
    CheckOK();
}
```

Delay Based Implementation

The following sketch is a modification of above program using delay() instead of CheckOK(). In this case the hardware serial port is used for debugging purpose. Open serial monitor with setting 9600 baud. The complete communication between MCU and Bluetooth Bee will be visible in serial monitor.

```
/*
BluetoothBee Demo Code - Delay Based Implementaion
2011 Copyright (c) Seeed Technology Inc.  All right reserved.

Author: Visweswara R

This demo code is free software; you can redistribute it and/or
modify it under the terms of the GNU Lesser General Public
License as published by the Free Software Foundation; either
version 2.1 of the License, or (at your option) any later version.

This library is distributed in the hope that it will be useful,
but WITHOUT ANY WARRANTY; without even the implied warranty of
MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the GNU
Lesser General Public License for more details.

You should have received a copy of the GNU Lesser General Public
License along with this library; if not, write to the Free Software
Foundation, Inc., 51 Franklin St, Fifth Floor, Boston, MA  02110-1301  USA

For more details about the product please check http://www.seeedstudio.com/depot/

*/

/* Upload this sketch into Seeeduino and press reset*/

#include <SoftwareSerial.h>   //Software Serial Port
#define RxD 11
#define TxD 12

SoftwareSerial blueToothSerial(RxD,TxD);

void setup()
{
    Serial.begin(9600);          //Serial port for debugging, Comment this line if not required
    pinMode(RxD, INPUT);
    pinMode(TxD, OUTPUT);
    setupBlueToothConnection();

}

void loop()
{

  if(blueToothSerial.read() == 'a')
  {
    blueToothSerial.println("You are connected to Bluetooth Bee");
    //You can write you BT communication logic here
  }
}

void setupBlueToothConnection()
{
    Serial.print("Setting up Bluetooth link");       //For debugging, Comment this line if not required
    blueToothSerial.begin(38400); //Set BluetoothBee BaudRate to default baud rate 38400
    delay(1000);
    sendBlueToothCommand("\r\n+STWMOD=0\r\n");
    sendBlueToothCommand("\r\n+STNA=modem\r\n");
    sendBlueToothCommand("\r\n+STAUTO=0\r\n");
    sendBlueToothCommand("\r\n+STOAUT=1\r\n");
    sendBlueToothCommand("\r\n+STPIN=0000\r\n");
    delay(2000); // This delay is required.
    blueToothSerial.print("\r\n+INQ=1\r\n");
    delay(2000); // This delay is required.
    Serial.print("Setup complete");

}

void sendBlueToothCommand(char command[])
{
    char a;
    blueToothSerial.print(command);
    Serial.print(command);                          //For debugging, Comment this line if not required
    delay(3000);

    while(blueToothSerial.available())              //For debugging, Comment this line if not required
    {                                               //For debugging, Comment this line if not required
```

```
        Serial.print(char(blueToothSerial.read()));  //For debugging, Comment this line if not required
    }                                                //For debugging, Comment this line if not required
}
```

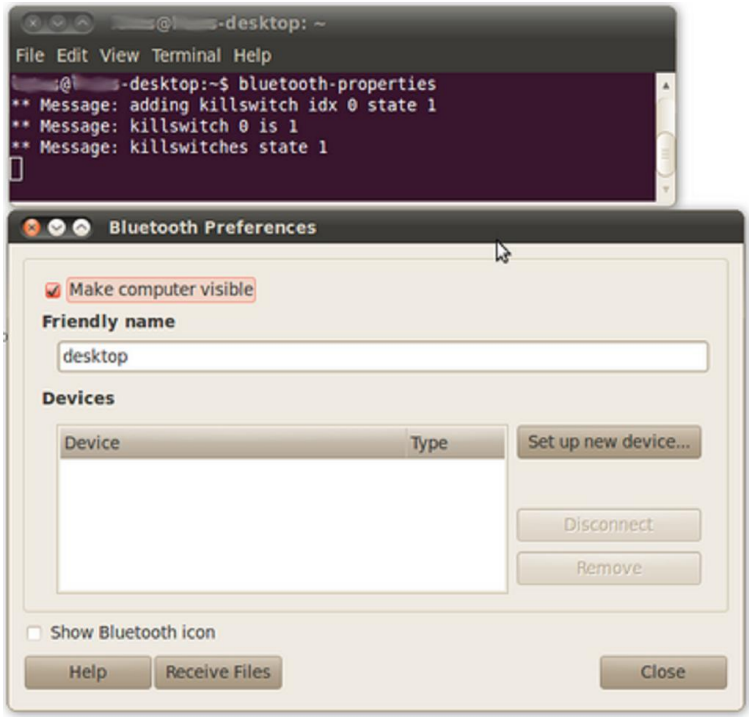
Connecting Bluetooth Bee to PC (via Bluetooth Dongle) under GNU/Linux

This procedure demonstrates how **Bluetooth Bee** can be connected to PC under GNU/Linux OS. An USB Bluetooth Dongle is used at PC side to communicate with **Bluetooth Bee**. The flow control implementation sketch is uploaded to Seeeduino.

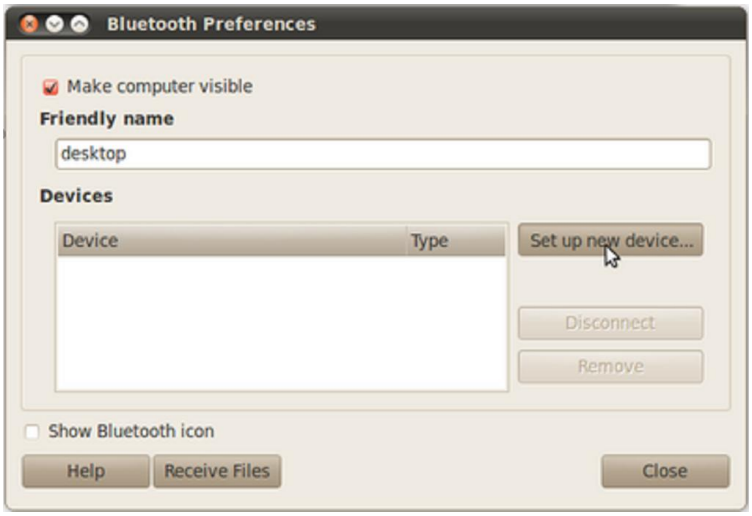
- Install gnome-bluetooth

```
sudo apt-get install gnome-bluetooth
```

- Open **bluetooth-properties** application from shell



- Click **Set up new device**



and click **Forward**

- Open **PIN options...**

- Set Fixed PIN **0000**. 0000 is the default pin used in the above sketch.

- Device **Setup Window** opens

and

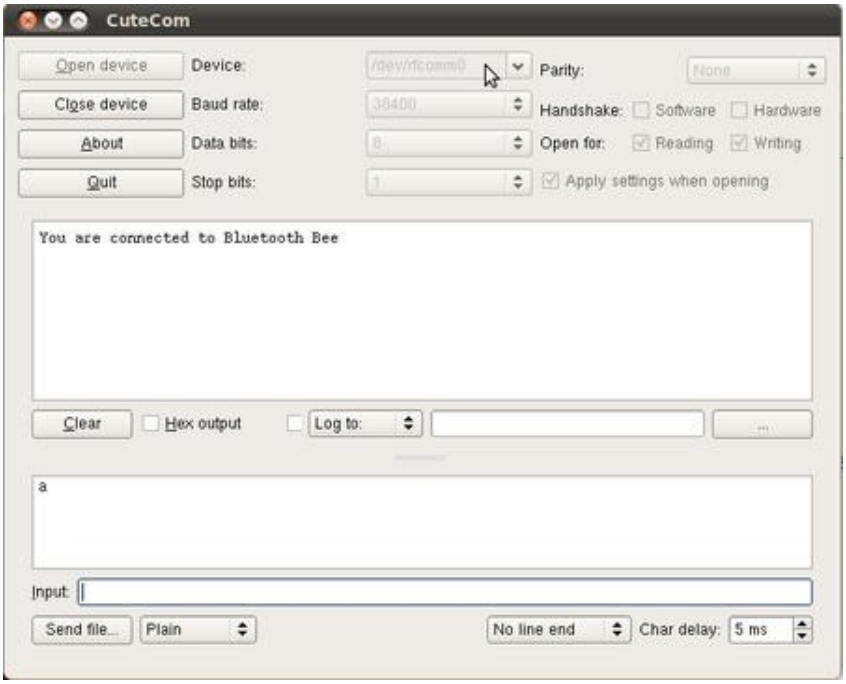
Setup Completed dialog opens. Click **Close**.

- The address of the **Bluetooth Bee 00:13:EF:00:00:24** is displayed in shell.

- Bind the **Bluetooth Bee** to rfcomm port. Here the address of **Bluetooth Bee** is bound to a serial port device **/dev/rfcomm0**

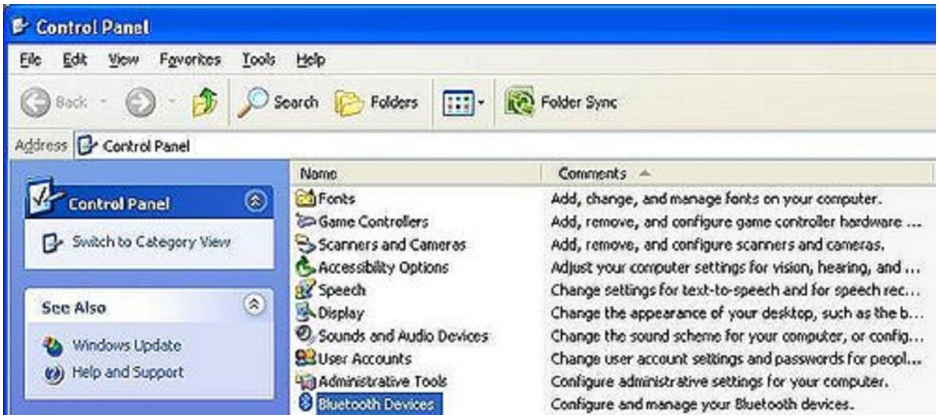
```
user@user-desktop:~$ sudo rfcomm bind 0 00:13:EF:00:00:24 1

user@user-desktop:~$ ls /dev/rfcomm*

/dev/rfcomm0
```

- This **/dev/rfcomm0** serial port can be accessed by any serial port terminal like **cutecom**.
  - Open **/dev/rfcomm0** with baud rate:**38400**, Databits: **8**, Stopbits: **1** and **No Flow Control**
  - Send character 'a'
  - Seeeduino + Bluetooth Bee will reply with "**You are connected to Bluetooth Bee**"



Connecting Bluetooth Bee to PC (via Bluetooth Dongle) under Windows

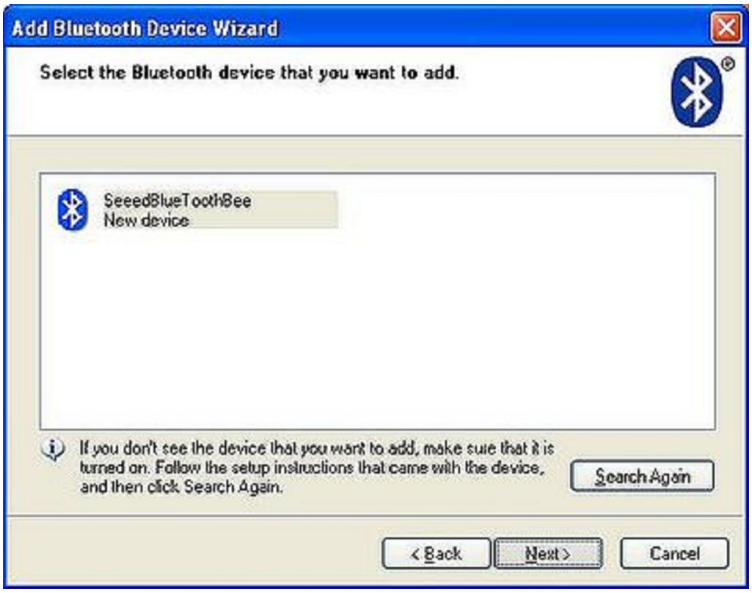
- Install the Microsoft Bluetooth default drivers. Open **Control Panel** -> **Bluetooth Devices**



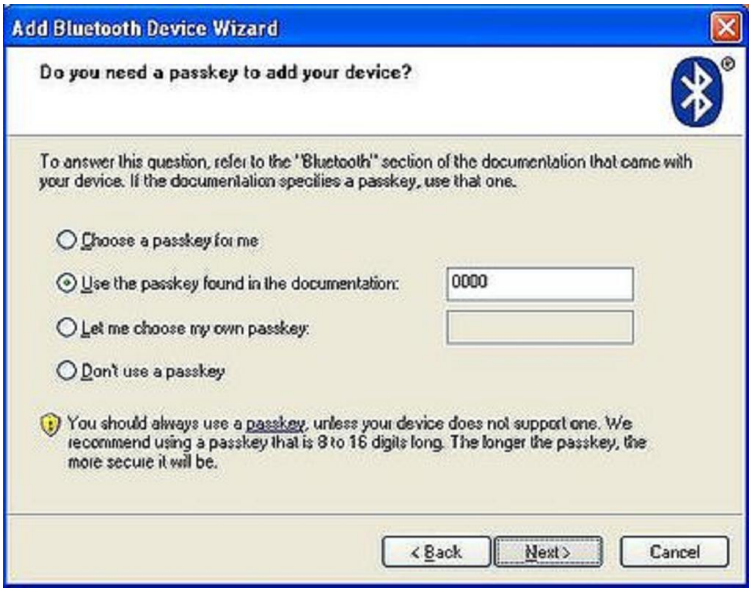
- Click **Add** button.

- Check **My devices is set up and ready to be found** and click **Next** button

- Select the "**SeeedBlueToothBee**" device and click **Next**.



- Select **Use the passkey found in the documentation** and enter **0000**



- Passkeys are exchanged and an outgoing serial port **COM5** is assigned for our communication.

- A task-bar balloon shows that a new Bluetooth Serial Port link is added.

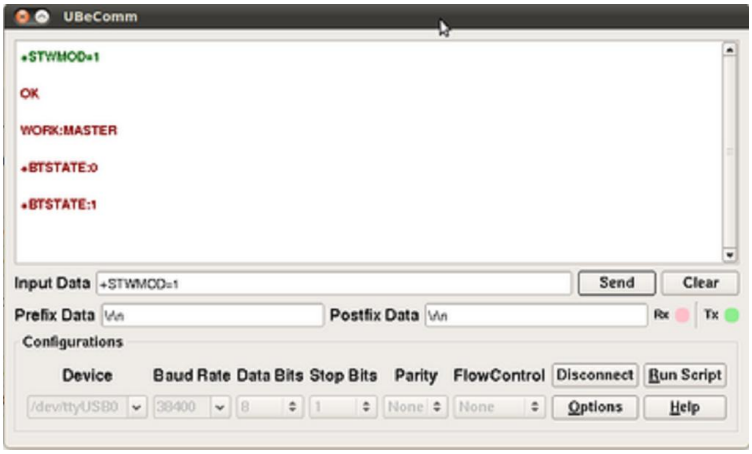
- **COM5** is assigned for communication. This port should be used to communicate PC with Bluetooth Bee.

- This **COM5** serial port can be accessed by any Serial Port terminal.
  - Open **COM5** with baud rate:**38400**, Databits: **8**, Stopbits: **1** and **No Flow Control**
  - Send character 'a'
  - Seeeduino + Bluetooth Bee will reply with "**You are connected to Bluetooth Bee**"

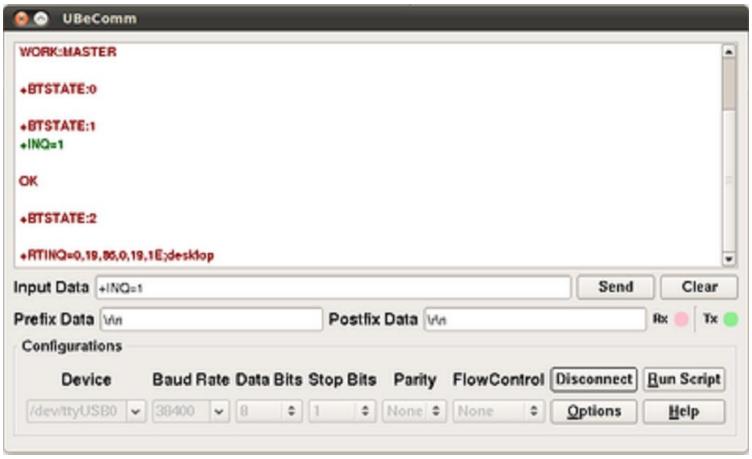
Connecting Bluetooth Bee to PC using UartSBee in Master Mode

This demo uses hardware arrangement described in Hardware Installation - UartSBee (http://garden.seeedstudio.com /index.php?title=Bluetooth_Bee#Connecting_to_PC_with_UartSbee) . Connect UartSbee to PC using a mini USB cable.

- Open a serial terminal and connect to UartSBee serial port device like **COM1** in Windows or **/dev/ttyUSB0** in GNU/Linux with baud rate:**38400**, Databits: **8**, Stopbits: **1** and **No Flow Control**
- Send **\r\n+STWMOD=1\r\n** command. This configures the **Bluetooth Bee** in master mode.



- Send **\r\n+INQ=1\r\n** command. **Bluetooth Bee** searches available Bluetooth devices in neighborhood and list the address of the devices. In this case with **+RTINQ=0,19,86,0,19,1E;desktop**, where **desktop** is a PC with Bluetooth interface. While inquiring the red and green led blinks alternatively.



- Send **\r\n+CONN=0,19,86,0,19,1E\r\n** where **0,19,86,0,19,1E** is the address of desktop.

- Enter the pin 0000 at PC side and complete the connection.

Bill of Materials (BOM) /parts list

- Bluetooth Bee bare PCB
- Serial_port_bluetooth_module_(Master/Slave)

FAQ

Please list your questions here:

Support

If you have questions or other better design ideas, you can go to our forum (http://www.seeedstudio.com/forum) or wish (http://wish.seeedstudio.com) to discuss.

Version Tracker

Revision	Descriptions	Release
v1.0	Initial public release	Dec 14, 2009
v1.1	Modify Inquire command and add some notes	Mar 15, 2010
v1.2	Modify Hardware and Software features	Apr 04, 2010
v1.3	Update the profile, add the return status, delete ECHO command.	Apr 21, 2010
v2.0	Update the module as HM - 01 (The same with the newest Bluetooth shield) . The AT command can not compatible with before.	Dec 4, 2014

Bug Tracker

Bug Tracker is the place you can publish any bugs you think you might have found during use. Please write down what you have to say, your answers will help us improve our products.

Additional Idea

- Implement a wireless PS/2 Keyboard / Mouse.
- Wireless control a toy robot from PC.

Resources

- Bluetooth Bee Schematic and Board Files (http://garden.seeedstudio.com/images/f/f6/Bluetooth_Bee_Schematic_Board.zip)
- NewSoftLibrary (http://arduiniana.org/NewSoftSerial/NewSoftSerial10c.zip)
- Information (http://www.seeedstudio.com/forum/viewtopic.php?f=4&t=687) on how to setup connections between Bluetooth Bees is available in Seeedstudio Forum.
- Information (http://www.seeedstudio.com/forum/viewtopic.php?f=18&t=1436&p=5637#p5637) on PC connecting Bluetooth Bee in Seeedstudio Forum
- File:Bluetooth Bee datasheet.pdf
- Bluetooth_Bee_v2.0_SCH_PCB.zip (http://images/0/06/Bluetooth_Bee_v2.0_SCH_PCB.zip)

- HM - 01_Datasheet.pdf (http://www.seeedstudio.com/wiki/images/b/bd/HM - 01_Datasheet.pdf)

How to buy

Click here to buy:http://www.seeedstudio.com/depot/bluetooth-bee-p-598.html?cPath=139_142.

See Also

- Bee series

Licensing

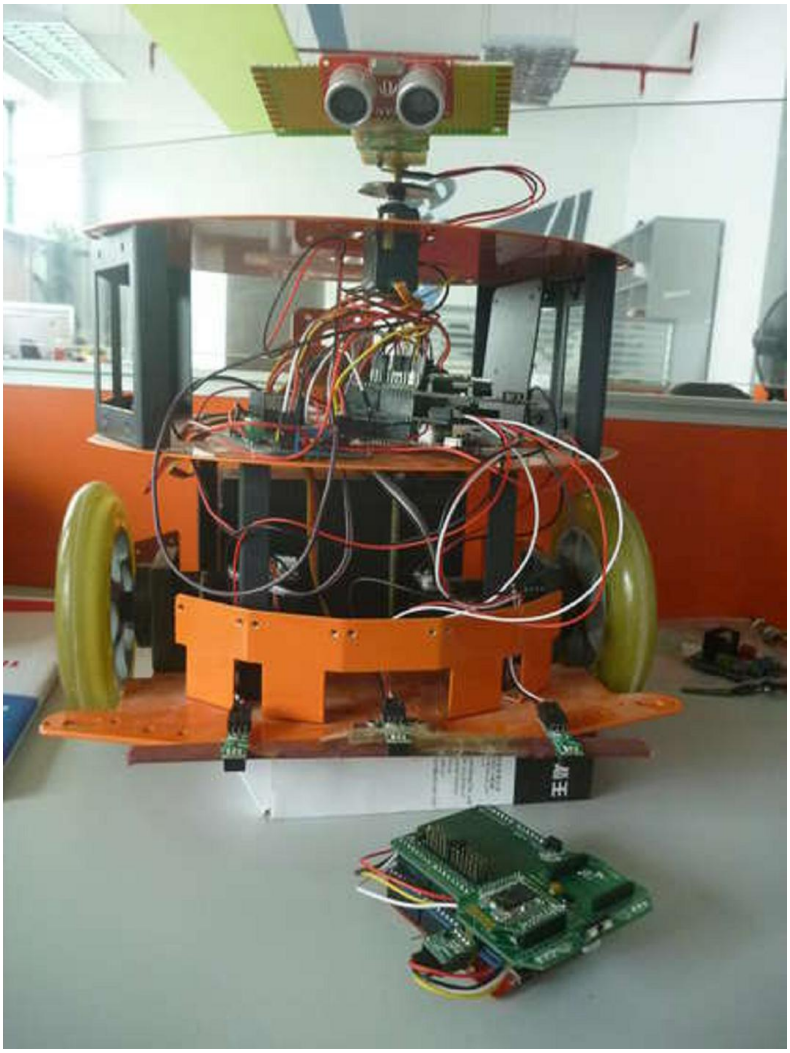
External Links

Links to external webpages which provide more application ideas, documents/datasheet or software libraries

Related Projects

If you want to make some awesome projects by Bluetooth Bee, here's some projects for reference.

Seeed Pet



This is an interesting demo made by seeduino and Grove. SEEED PET is kind of an electronic pet in our studio. It is a platform for the newbie engineers to be familiar with our company' s products and practice. Every newbie engineer will be added some new ideas or elements on the SEEED PET.

I want to make it. (http://www.seeedstudio.com/recipe/16-seeed-pet.html)

Share Your Awesome Projects with Us

Born with the spirit of making and sharing, that is what we believe makes a maker.

And only because of this , the open source community can be as prosperous as it is today.

It does not matter what you are and what you have made, hacker, maker, artist and engineers,

as long as you start sharing your works with others,

you are being part of the open source community and you are making your contributions .

Now share you awesome projects on with us on Recipe (http://www.seeedstudio.com/recipe/) , and win a chance to become the Core User of Seeed.

- Core Users, are those who showing high interests and significant contributions in Seeed products.

- We cooperate with our Core Users in the development of our new product, this, in another word, the Core Users will have the chance to experience any new products of Seeed before its official launch, and in return we expect valuable feedback from them to help us improving the product performance and user experience. And for most of cases if our Core Users have any good ideas for making things, we'll offer hardware pieces, PCBA services as well as technical support. Besides, further commercial cooperation with the Core Users is highly possible.

Get more information about Core User please email to: recipe@seeed.cc