# Introduction

The Bluetooth Shield integrates a Serial Bluetooth module. It can be easily used with Arduino/Seeedstudio for transparent wireless serial communication. You can choose two pins from Arduino D0 to D7 as Software Serial Ports to communicate with Bluetooth Shield (D0 and D1 is Hardware Serial Port). The shield also has two Grove connectors (one is Digital, the other is Analog) for you to install Grove modules.



# Features

- Seeeduino/Arduino compatible
- Up to10m communication distance in house without obstacle
- UART interface (TTL) with programmable baud rate (SPP firmware installed)
- Default Baud rate: 38400, Data bits: 8, Stop bit: 1, Parity: No parity
- Default PINCODE:"0000"
- A full set of configuration commands
- On board PCB Antenna
- FCC ID Certificated

## Specification

Item	Min	Typical	Max	Unit
Voltage	2.8	3.3	3.5	VDC

Current	3	/	50	mA
Communication Distance(in house)	/	/	10	m
Protocol	Blu	etooth V with SPF firmware	/2.0	/
Interface	Uart Serial Port(TTL)		/	
Supported Baudrate	9600, 19200, 38400, 57600, 115200, 230400, 460800		bps	
ESD contact discharge		±4		KV
ESD air discharge		$\pm 8$		/
Dimension	57.4x45.3x19.4		mm	
Net Weight		10±2		g

## Interface funcion



Pad Type	Description
PIO1	Status instruction port of Bluetooth module can be read by Arduino A1 port: low- disconnected, high-connected.
BT_RX	UART Data input of Bluetooth module.
BT_TX	UART Data output Bluetooth module.

Two Grove connectors

One is Digital (D8 and D9), the other is I2C/Analog (A4 and A5).

Usage

## Hardware Installation

## Connecting to Arduino with Bluetooth Shield

Connect **Bluetooth Shield** to Seeeduino / Arduino.



# Software Instruction Working Sketch Map

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



## Flowchat

The following flowchart gives a quick start guide to **Bluetooth Shield** 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

$r\n=115200\r\n$	Set baudrate 115200. Save and Rest.
Supported baudrate: 9600, 1	9200,38400,57600,115200,230400,460800

### 3. Set Device NAME

### 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

Т

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

### 6. Set PINCODE

r + 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 autoreconnect 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

The following sketch configures **Bluetooth Shield** as **Slave Device** and waits for connection request from PC or other master device. Bluetooth Shield is connected to Seeeduino via Stem - Basic Shield as shown above.

```
/*
BluetoothBee Demo Code
2010 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
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This library is distributed in the hope that it will be useful,
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```

```
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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 <NewSoftSerial.h> //Software Serial Port
#define RxD 6
#define TxD 7
#define DEBUG ENABLED 1
NewSoftSerial blueToothSerial(RxD,TxD);
void setup()
{
    pinMode(RxD, INPUT);
    pinMode(TxD, OUTPUT);
    setupBlueToothConnection();
}
void loop()
{
  if(blueToothSerial.read() == 'a')
  {
   blueToothSerial.println("You are connected to Bluetooth Shield");
    //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(int len = blueToothSerial.available())
    {
    a = blueToothSerial.read();
    if('0' == a)
    {
      b = blueToothSerial.read();
      if('K' == b)
      {
        break;
      }
    }
   }
  }
  while( (a = blueToothSerial.read()) != -1)
  {
    //Wait until all response chars are received
  }
}
//Send the command to Bluetooth Shield
void sendBlueToothCommand(char command[])
```

```
blueToothSerial.print(command);
CheckOK();
```

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

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

Install gnome-bluetooth

{

}

sudo apt-get install gnome-bluetooth

• Open bluetooth-properties application from shell

File Edit View Terminal Help @desktop:~\$ bluetooth-pr ** Message: adding killswitch idx 0 ** Message: killswitch 0 is 1 ** Message: killswitches state 1	operties state l	
Bluetooth Preferences      Make computer visible      Friendly name      desktop      Devices		₿ 
Device	Туре	Set up new device Disconnect Remove Close

Click Set up new device

Friendly name		
desktop		
Devices		
Device	Туре	Set up new device
		~
		Disconnect
		Remove

#### and click Forward



Open PIN options...

		C C
elect the d	evice you want to setup	Searching for devices
Device		Туре
() Constal	AND MALE STREET, STOLEN	Unknown
U Seeedu	noBluetooth	
ihow Only E	Bluetooth	
seeedu	Bluetooth Devices With	Ţ

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

ix	automatic PIN selection
	'0000' (most headsets, mice and GPS devices
5	'1111'
6	'1234'
0	Custom PIN:

Device Setup Window opens



and

Setup Completed dialog opens. Click Close.



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



 Bind the Bluetooth Shield to rfcomm port. Here the address of Bluetooth Shield 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 Shield will reply with "You are connected to Bluetooth Shield"

Open device	Device:	/dewncommu	₽ ×	Parity: None
Close device	Baud rate:		\$	Handshake: 🗌 Software 🗌 Hardw
<u>A</u> bout	Data bits:		\$	Open for: 🗹 Reading 🗹 Writing
Quit	Stop bits:	1	\$	Apply settings when opening

### Connecting Bluetooth Shield to PC (via Bluetooth Dongle) under Windows



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

### Click Add button.

Devices	Ontines	COM Parts	Hardware		
Devices	Uptions	COM Ports	Hardware		
					1
Ad	d	Remove	1	Properties	
Concession of the	Commences (		-	And the second	

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



Select the "SeeedBlueToothBee" device and click Next.

ve Kat ž is
a device, <u>Search Again</u>

• Select Use the passkey found in the documentation and enter 0000

Add Bluetooth Device Wizard	
Do you need a passkey to add your device?	
To answer this question, refer to the "Bluetooth" section your device. If the documentation specifies a passkey,	n of the documentation that came with use that one.
O Choose a passkey for me	
O Use the passkey found in the documentation:	0000
Let me choose my own passkey:	
O Don't use a passkey	
You should always use a <u>passkey</u> , unless your dev recommend using a passkey that is 8 to 16 digits lo more secure it will be.	ice does not support one. We ng. The longer the passkey, the
	Back Next> Cancel

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

Add Bluetooth Device Wizard	
Windows is exchanging passkeys.	*
When instructed below, enter the passkey using your Bluetooth device.	
For more information about entering a passkey, see the documentation that came device.	with your
Connecting  Please enter the passkey on your Bluetonth device now	
Passkey. 0000	
Installing Bluetooth device	
(Sack Next>	Cancel

•

.

• 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 Shield.



- 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 Shield will reply with "You are connected to Bluetooth Shield"

UBeComm		2
You are connected	l to Bluetooth Bee	
Input Data 🛛		Send Clear
Prefix Data Configurations	Postfix Data	Rx 🕘 Tx 🔕
Device	Baud Rate Data Bits Stop Bits Parity FlowControl Dis	sconnect) Run Script

### Connecting Bluetooth Shield to PC using <u>UartSBee</u> in Master Mode

This demo uses hardware arrangement described in <u>Hardware Installation - UartSBee</u>. Connect UartSbee to PC using a mini USB cable.

- Open a serial terminal and connect to <u>UartSBee</u> 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 Shield in master mode.

	Comm			
*STWMOD+1	1			•
ок				
WORK:MAST	TER			
+BTSTATE:0				1
+BTSTATE:1	1			
Input Data	+STWMOD=1		Send Cl	lear
Input Data Prefix Data	+STWMOD=1	Postfix Data Wn	Send Cl	lear Tx (
Input Data Prefix Data Configurati	+STWMOD=1	Postfix Data Vin	Send Cl	lear Tx (
Input Data Prefix Data Configurati Devi	+STWMOD=1 V/n ions ce Baud F	Postfix Data Vin	Send Cl Rx O	lear Tx (

 Send \r\n+INQ=1\r\n command. Bluetooth Shield 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

WORK:MASTER			
+BTSTATE:0			
+BTSTATE:1 +INQ=1			
ок			
+BTSTATE:2			
+RTINQ=0,19,85,0,19,1E;desktop			-
Input Data HING=1		Send	Clear
Prefix Data Vin	Postfix Data Vin		Rx 🛑 Tx 🔵
Configurations			
Device Baud Rate Da	ta Bits Stop Bits Parity FlowContro	Disconnect	<u>R</u> un Script
/dew/ttyUSB0 💌 38400 💌 8	0 1 0 None 0 None 0	Options	Help

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.

+CONN=0,18,85,0,19,1E OK +BTSTATE:3 Input Data +CONN=0,18,88,0,18,1E Prefix Data V/m Configurations Device Baud Rate Data Bits Stop Bits Parity FlowControl Disconnect Run Script devitevUSB0 V 8 0 1 0 None 0 Options Help	😣 💿 UBed	Comm			
OK •BTSTATE:3 Input Data +CONN=0,18,88,0,19,1E Prefix Data \Un Postfix	+CONN=0,19	,85,0,19,1E			-
BTSTATE:3      Input Data +CONN=0,19,98,0,19,1E      Prefix Data Van      Prefix Data Van      Rx      Tx      Configurations      Device Baud Rate Data Bits Stop Bits      Parity      FlowControl      Disconnect      Run Script      devitevUSB0      39400      8      1      None      Options      Help	ок				
Input Data +CCNN=0,19,88,0,19,1E Prefix Data V/n Postfix Data V/n Px Tx Configurations Device Baud Rate Data Bits Stop Bits Parity FlowControl Disconnect Run Script devitevUS80 28400 28 0 1 0 None 0 Options Help	+BTSTATE:3				
Input Data     +CCNN=0,18,88,0,19,1E     Send     Clear       Prefix Data     Vm     Px     Tx       Configurations     Device     Baud Rate Data Bits Stop Bits     Parity     FlowControl     Disconnect     Run Script       IdevitevUSB0     38400     8     1     None     Options     Help					-
Input Data +CONN=0,19,98,0,19,1E Send Clear Prefix Data Van Rx Tx Configurations Device Baud Rate Data Bits Stop Bits Parity FlowControl Disconnect Run Script RevittyUSB0 28400 28 0 1 0 None 0 Options Help					
Input Data +CCNN=0,19,98,0,19,1E Send Clear Prefix Data \u03c6 n Postfix Postfix Data \u03c6 n Postfix P					
Input Data +CONN=0,19,88,0,19,1E Send Clear Prefix Data Vin Pix Tx Configurations Device Baud Rate Data Bits Stop Bits Parity FlowControl Disconnect Run Script Idevitiv(USB0 > 38400 > 8 \$ 1 \$ None \$ None \$ Options Help					
Prefix Data Vin Postfix Data Vin Pix Tx Configurations Device Baud Rate Data Bits Stop Bits Parity FlowControl Disconnect Run Script IdevitivUSB0 V 8 0 1 0 None 0 Options Help	Input Data	+CONN=0,19,88,0,19,1E		Send	Clear
Configurations Device Baud Rate Data Bits Stop Bits Parity FlowControl Disconnect Run Script IdeviteVUSB0 > 38400 > 8 + 1 + None + Options Help	Prefix Data	V/n	Postfix Data Vin		Rx 🛑 Tx 🔵
Device         Baud Rate Data Bits Stop Bits         Parity         FlowControl         Disconnect         Run Script           //dev/tty/USB0         38400         9         8         1         1         None         0         Options         Help	Configurati	ons			
/dev/ttyUS80 v 38400 v 8 ¢ 1 ¢ None ¢ None ¢ Options Help	Devi	ce Baud Rate Data Bit	s Stop Bits Parity FlowControl	Disconnect	<u>R</u> un Script
Tele Trans a Tele Tele		iB0 🖌 38400 🖌 8 💠	1   0   None   0   None   0	Options	Help

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