



## **Cytron Dual Mode Bluetooth Module**

### **BlueBee 4.0**



## **User's Manual**

**V1.0**

**Oct 2015**

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## 1. INTRODUCTION AND OVERVIEW

[BlueBee 4.0](#) is the latest version of [Bluetooth](#) wireless module from Cytron Technologies. BlueBee 4.0 supports dual mode, one is BLE (Bluetooth Low Energy) mode , and another one is EDR mode which is commonly used. The module comes with an on-board PCB antenna, that provides better signal quality.

Like BlueBee, BlueBee 4.0 is designed to adapt the form factor of XBee module. The pinout of BlueBee 4.0 is compatible with [XBEE](#) which is suitable for all kinds of microcontroller systems that have 3.3V power out. BlueBee is compatible with XBEE starter kit, so [SKXBEE-BOARD](#) or [Arduino-XBee shield](#) can be used for BlueBee communication. BlueBee 4.0 also contains onboard 3.3V voltage regulator and logic level shifter which makes it compatible to 5V systems as well.

Generally, BlueBee 4.0 has 2 operation modes: transparent mode and AT mode. This module doesn't require manual switching between these 2 modes. When the module is not connected to any other Bluetooth devices, it is in AT mode, when it is connected, it will enter transparent mode automatically. In BLE mode, BlueBee 4.0 can be configured as both master and slave module. Communication between 2 BlueBee 4.0 modules or between the module and other Bluetooth device is possible. It acts like a transparent serial port, which works with a variety of Bluetooth adapter and Bluetooth devices. Besides serial data transmission, BlueBee 4.0 module can be configured in remote control mode. In this mode, AT command can be sent remotely to inquire or set its parameters such as name, baudrate, etc or even control the I/O pins.

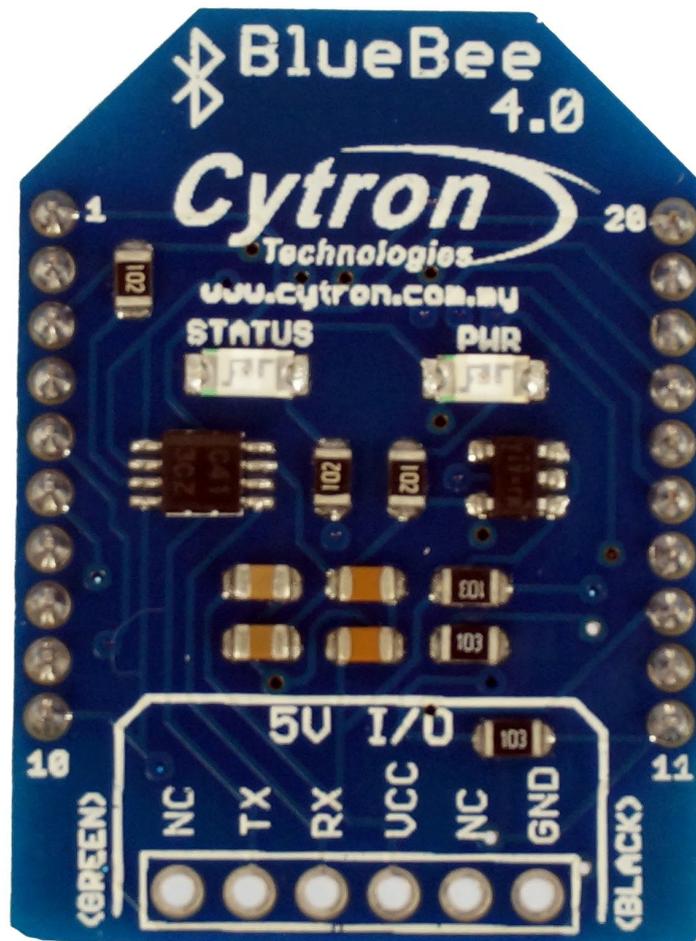
### Features and Specifications:

- BT Version: Bluetooth Specification V4.0 & BLE
- UART send and receive max bytes is 512.
- Other device to module in SPP mode: 90 Bytes per packet
- Other device to module in BLE mode: 20 Bytes per packet.
- Two data transmission mode, balance mode and high speed mode.
- Working frequency: 2.4GHz ISM band
- Modulation method: GFSK(Gaussian Frequency Shift Keying)
- RF Power: -23dbm, -6dbm, 0dbm, 6dbm.
- Speed: Asynchronous: 3K Bytes  
Synchronous: 3K Bytes
- Security: Authentication and encryption
- Service: Slave SPP, Peripheral BLE, UUID FFE0,FFE1
- Power: +3.3VDC 50mA
- Long range: SPP 30 meters, BLE 60 meters.
- Power: SPP 13.5mA, BLE 9.5mA.
- Serial port settings: 4800 ~ 230400 / N / 8 / 1
- Baud rate default: 115200 bps
- EDR Pair Number/ID: 1234
- Working temperature:-5 ~ +65 Centigrade

- Size: 33.9mm x 24.6mm x 9 mm

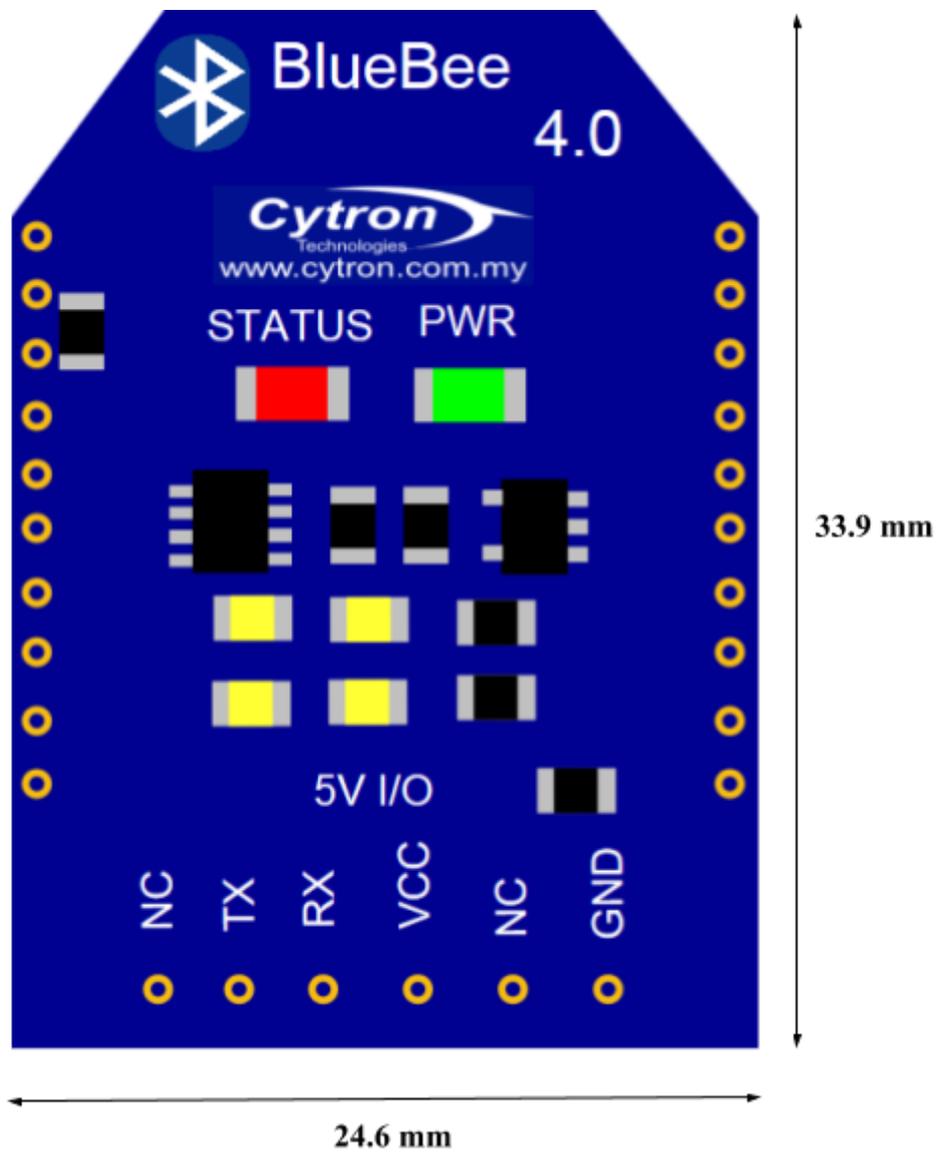
## 2. PACKING LIST

Please check the parts and components according to the packing lists. If there are any parts missing, please contact us at [sales@cytron.com.my](mailto:sales@cytron.com.my) immediately.

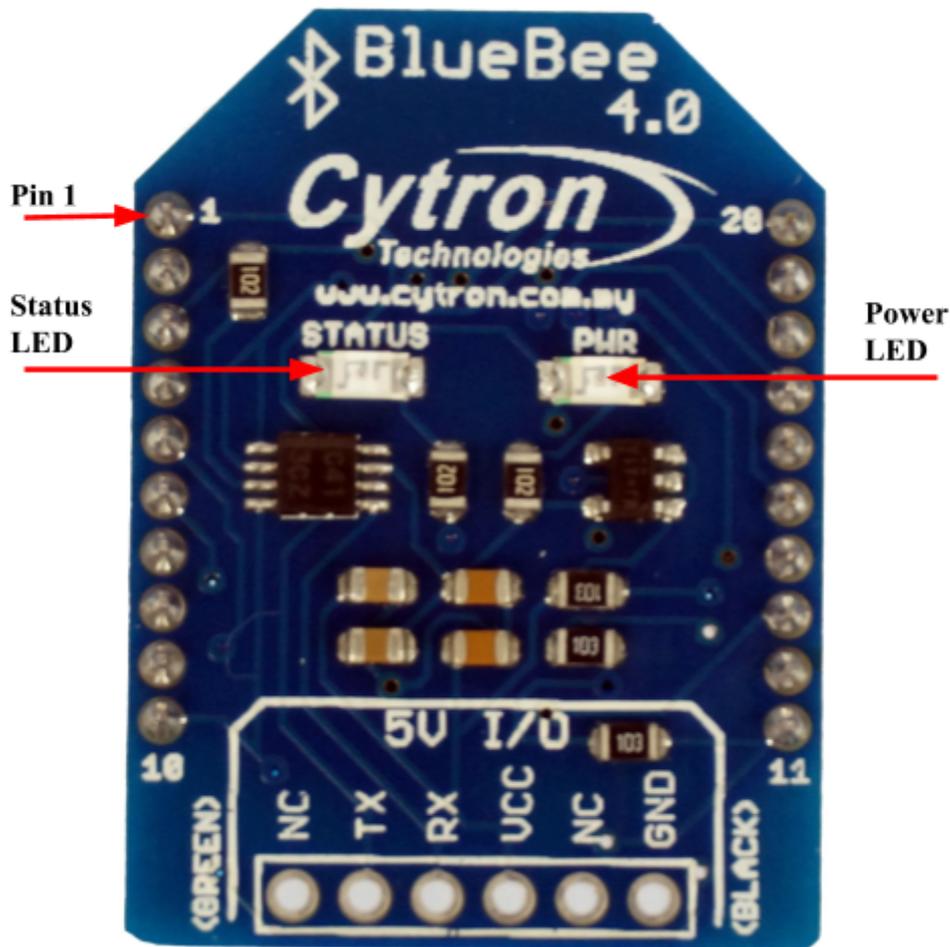


1. 1 x BlueBee 4.0 module
2. 1 x XBEE breakout board
3. 2 x straight 2mm female header 1x10 ways

### 3. DIMENSION



## 4. PRODUCT LAYOUT



### 1. Power LED (Green)

When the module is power on, power LED will light up.

### 2. Status LED (Red)

When the module is power on, LED will start blinking by default when it is not connected to any devices. If it is connected to other Bluetooth device, LED will stay lit.

### 3. BlueBee Working Modes

There are 2 working modes for BlueBee 4.0 module by default: AT mode and Trans mode. When the module is not connected to any devices, it will enter AT mode automatically. Once it is connected, it will enter Trans mode.

#### AT mode

Set or inquire control parameter in this mode. Default baud rate for AT mode is 115200 bps. User can set the baudrate to other values using AT command.

#### Trans mode

Transmit or receive data from other Bluetooth device.

## Pin Function

### XBEE form factor pinout

Pin	Name	Description
1	3V3	3.3V (+) supply for module
2	Dout (TXD)	UART Data output
3	Din (RXD)	UART Data input
4	P11	I/O pin 11
5	RST	Reset for BlueBee module
6	P9	I/O pin 9
7	P10	I/O pin 10
8	P8	I/O pin 8
9	P2	I/O pin 2
10	GND	Ground port
11	P0	KEY (refer to provided module datasheet for more info)
12	CTS	UART clear to send, active low
13	P1	Status LED, blinking when not connected, stay lit otherwise
14	NA	NA
15	P3	I/O pin 3
16	RTS	UART request to send, active low
17	P4	I/O pin 4
18	P5	I/O pin 5
19	P6**	I/O pin 6
20	P7**	I/O pin 7

**\*Please do not make any connection to NA pin.**

**\*XBEE form factor pinouts are 3.3V tolerant only, please do not connect them directly to system powered with more than 3.3V.**

**\*\* P6 and P7 are not functional due to the current firmware of the module.**

**5V I/O pinout**

Name	Description
NC	NC
TX	UART Data output
RX	UART Data input
VCC	5V (+) supply
NC	NC
GND	Ground

**\*5V I/O pinouts are 5V tolerant.**

## 5. PRODUCT SPECIFICATION AND LIMITATIONS

### Absolute Maximum Rating

Symbol	Parameter	Min	Max	Unit
XBEE form factor pinout				
3V3	Operating voltage	3.0	3.6	V
Din	Receiver pin of BlueBee 4.0 module	0	3.3	V
Dout	Transmit pin of BlueBee 4.0 module	0	3.3	V
RST	Reset pin of BlueBee 4.0 module	0	3.3	V
GND	Ground	0	0	V
5V I/O				
VCC	Operating voltage	5.0	5.5	V
TX	Transmit pin of BlueBee 4.0 module	0	5.0	V
RX	Receiver pin of BlueBee 4.0 module	0	5.0	V
GND	Ground	0	0	V

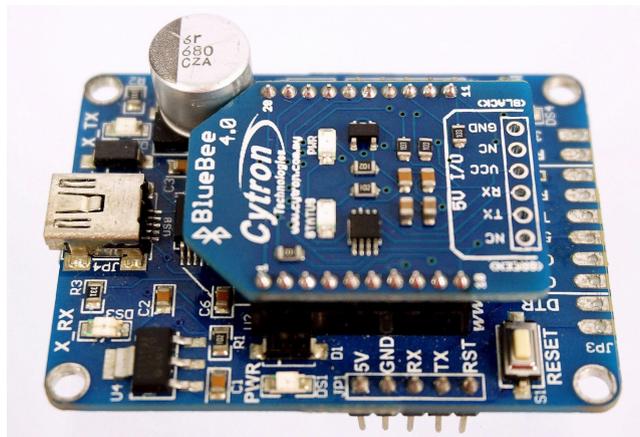
## 6. HARDWARE INTERFACE

[SKXBEE-Board](#), [UC00A/B](#) or Arduino Board + XBEE shield can be used to enable bluetooth wireless control. This section will show [BlueBee 4.0](#) installation with [SKXBEE-BOARD](#), [UC00A/B](#) and Arduino Board + XBEE shield for bluetooth wireless communication.

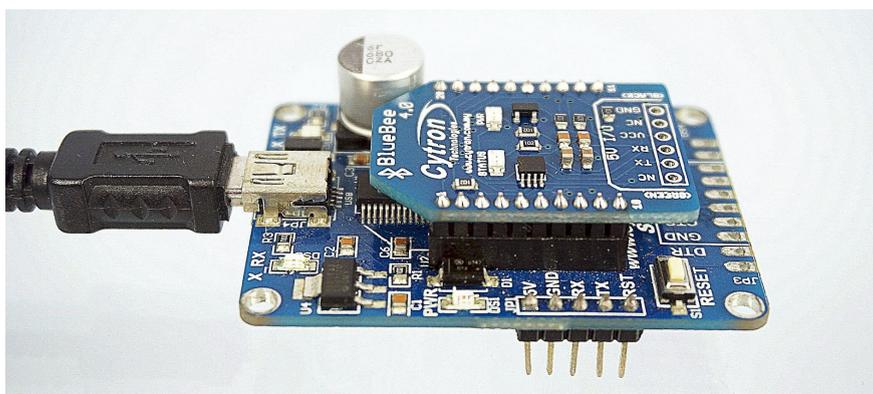
### 6.1 Using SKXBEE-BOARD

This board is basically a USB to UART breakout board for [XBee](#) module. The 2mm female header soldered on board allows user to plug in the [XBEE](#) module without soldering. BlueBee 4.0 is compatible with [XBEE](#), therefore user can use this board for Bluetooth wireless communication.

- Plug BlueBee 4.0 module onto [SKXBEE-BOARD](#).



- Connect USB cable to [SKXBEE-BOARD](#) and the other end to USB port of computer or laptop. Computer/laptop will detect COM port for the [SKXBEE-BOARD](#). You may check the COM port at Device Manager. If you are using SKXBEE-BOARD for the first time, you might need to wait until the driver installation is complete. For this example, the COM port for [SKXBEE-BOARD](#) is COM50. Now you can start communicating with BlueBee 4.0 module.



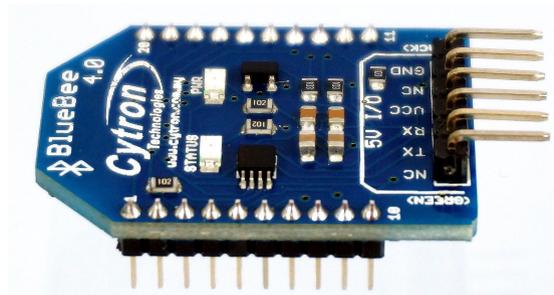


## 6.2 Using UC00A/UC00B

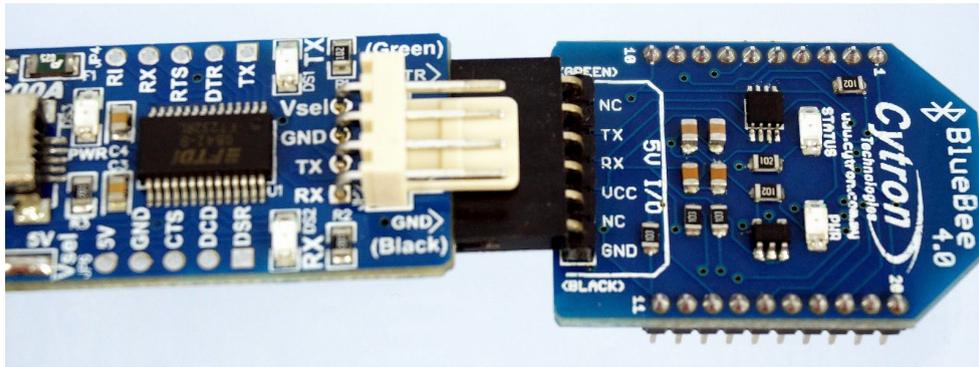
[UC00A/B](#) is USB to UART converter. It is used to connect a device to a PC/laptop via USB cable and carry out UART communication between these 2 devices. The driver for [UC00A/B](#) must be installed before we can use it.

### Using UC00A

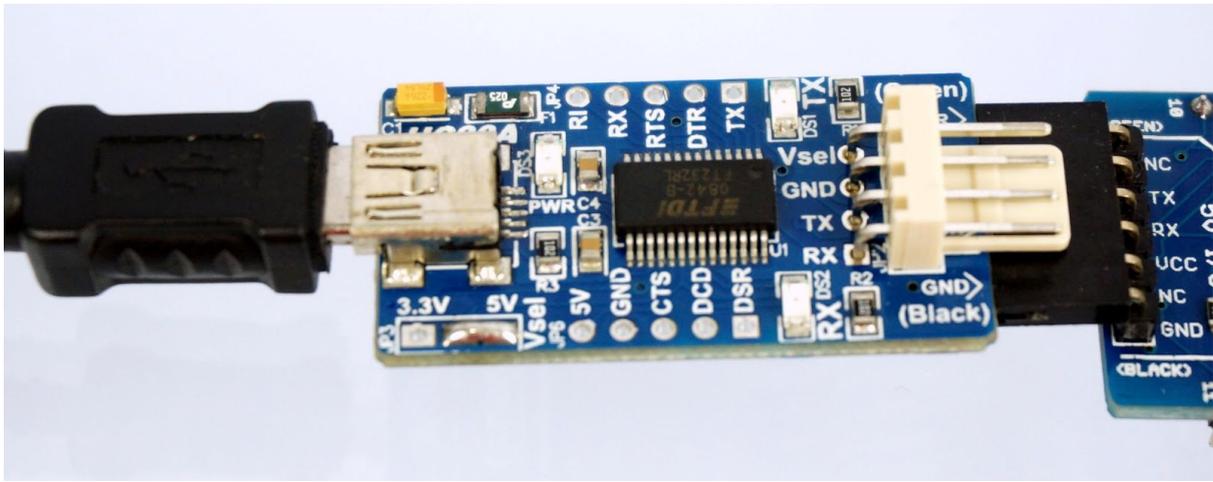
- Solder header pins on BlueBee 4.0 module.



- Plug the [BlueBee](#) 4.0 module directly with UC00A (5V I/O pinout from BlueBee 4.0 to 6 pin interface of UC00A).



- Connect USB cable to UC00A and the other end to USB port of computer or laptop.



### Using UC00B

- Connect the [BlueBee](#) 4.0 module with UC00B using jumper wires (5V I/O pinout from BlueBee 4.0 to 6 pin interface of UC00B).



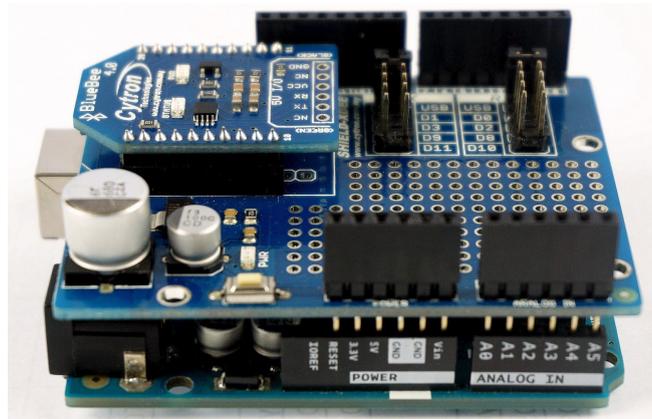
- Make sure the pins are connected correctly, such as VCC to VCC and GND to GND. As for TX and RX pins, both pins should be cross connected between them. In other words, TX pin of BlueBee should be connected to RX pin of [UC00B](#) and RX pin of BlueBee should be connected to TX pin of [UC00B](#).
- Plug [UC00B](#) into USB port of computer/laptop.



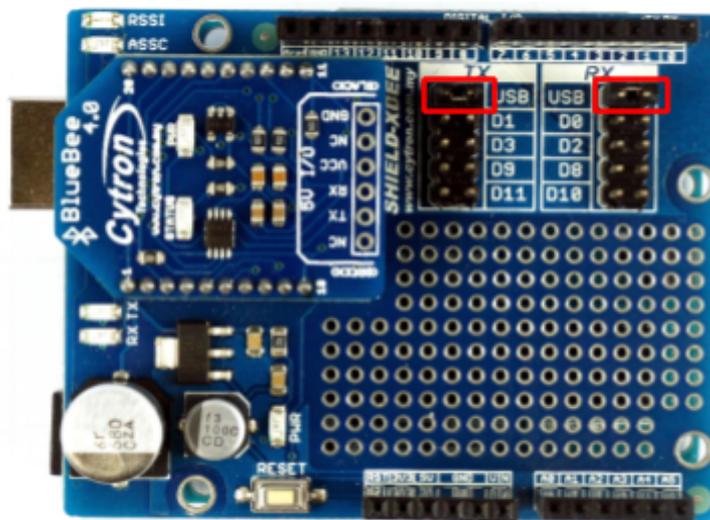
After connecting UC00A/B to computer or laptop, wait until the driver installation is completed if you are using UC00A/B for the first time. COM port for UC00A/B should be detected. You can check it under Device Manager.

### 6.3 Arduino Board + XBEE shield

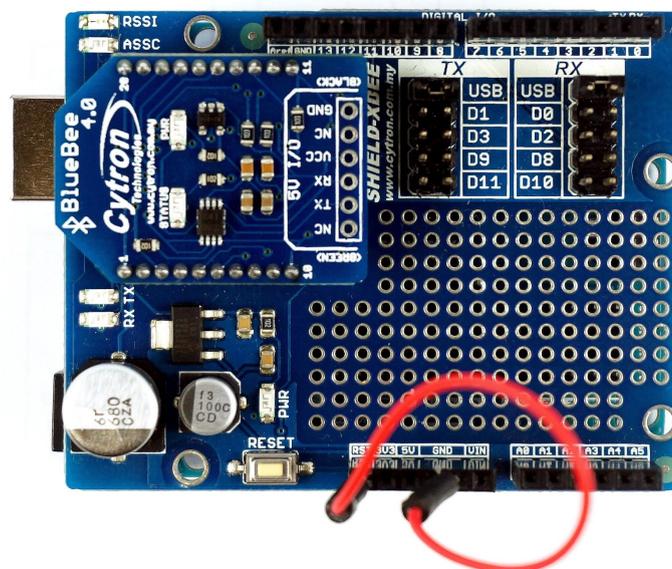
- Plug BlueBee 4.0 onto XBEE shield. Then stack the shield onto Arduino Board.



- Make sure USB are selected for both UART selector jumpers.



- Connect RST pin to GND.



- Connect Arduino Board to the computer using USB cable.

## 7.0 AT COMMAND

BlueBee 4.0 has 2 modes of operation which is AT mode and Trans mode. User may send the AT command to the module to set the parameters. AT commands must be in **UPPERCASE** and can be entered directly **without any ending symbols** such as \r or \n. The default baud rate in both AT and Trans mode is 115200 bps.

### 1. Test

Command	Response	Parameter
AT	OK	None

### 2. Reset

Command	Response	Parameter
AT+ RESET	OK+RESET	None

### 3. Get bluetooth module EDR address

Command	Response	Parameter
AT+ADDE?	OK+Get:[param]	Param: EDR address

### 4. Get bluetooth module BLE address

Command	Response	Parameter
AT+ADDB?	OK+Get:[param]	Param: BLE address

Example:

Bluetooth module EDR address: 00: 0E: 0E: XX: XX: XX

Send: AT+ADDE?

Receive: OK+Get:000E0EXXXXXX

Bluetooth module BLE address: 00: 0E: 0B: XX: XX :XX

Send: AT+ADDB?

Receive: OK+Get:000E0BXXXXXX

### 5. Set/Inquire baud rate

Command	Response	Parameter
AT+BAUD[Param]	OK+Set:[Param]	Param: 1~7 1 - 4800 2 - 9600 3 - 19200 4 - 38400 5 - 57600 6 - 115200 7 - 230400  Default: 6
AT+BAUD?	OK+Get:[Param]	

Example:

#### Obtain current baudrate

Send: AT+BAUD?

Receive: OK+Get:6 (baud rate obtained is 115200)

#### Set baudrate to 9600

Send: AT+BAUD2

Receive: OK+Set:2

### 6. Set/Inquire UART parity bit

Command	Response	Parameter
AT+PARI[Param]	OK+Set:[Param]	Param: 0, 1, 2 0 - Parity None 1 - Parity even 2 - Parity odd  Default: 0
AT+PARI?	OK+Get:[Param]	

### 7. Set/Inquire hardware flow control switch

Command	Response	Parameter
AT+FLOW[Param]	OK+Set:[Param]	Param: 0, 1 0 - Hardware flow control off 1 - Hardware flow control on  Default: 0
AT+FLOW?	OK+Get:[Param]	

### 8. Set/Inquire UART stop bit

Command	Response	Parameter
AT+STOP[Param]	OK+Set:[Param]	Param: 0, 1 0 - 1 stop bit 1 - 2 stop bits  Default: 0
AT+STOP?	OK+Get:[Param]	

### 9. Set/Inquire EDR Pin Code

Command	Response	Parameter
AT+PINE[Param]	OK+Set:[Param]	Param: Passkey  Max length: 8  Default: "1234"
AT+PINE?	OK+Get:[Param]	

### 10. Set/Inquire BLE Name

Cammand	Response	Parameter
AT+NAMB[Param]	OK+Set:[Param]	Param: BLE Device name  Max length: 12  Default : BlueBee4.0
AT+NAMB?	OK+Get:[Param]	

Example:

Set the module device name: "BlueBee4.0"

Send: AT+NAMBBBlueBee4.0

Receive: OK+Set:BlueBee4.0

### 10. Set/Inquire EDR Name

Cammand	Response	Parameter
AT+NAME[Param]	OK+Set:[Param]	Param: EDR Device name  Max length: 12  Default : BlueBee4.0
AT+NAME?	OK+Get:[Param]	

## Methods to send AT commands

### i) Using USB cable

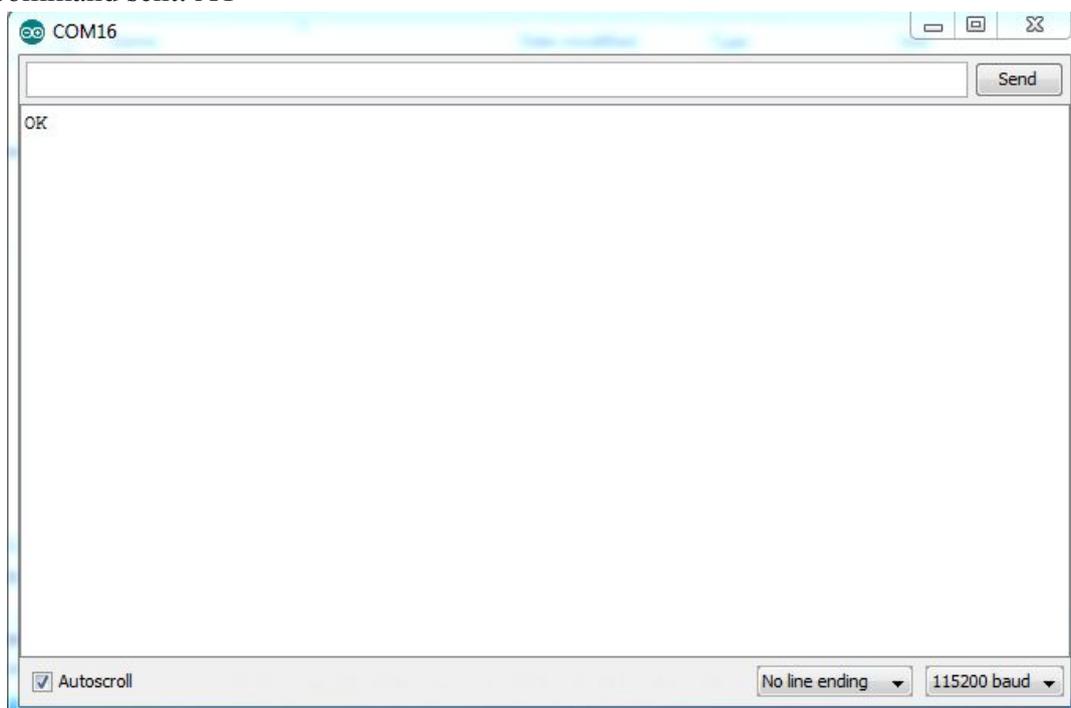
To send AT commands using USB cable, user needs to set up hardware interface refer to [Section 6 “Hardware Interface”](#). User may use either [SKXBEE-BOARD](#), [UC00A/B](#) or Arduino Board + XBEE shield and software application such as Arduino Serial Monitor, RealTerm, or HyperTerminal to set/inquire the control parameter. At the same time, the module need to stay unconnected to other Bluetooth devices.

This manual shows example of sending AT command using Arduino Serial Monitor. Open Arduino IDE. Determine which COM port BlueBee 4.0 is connected to and configure the port settings under Tools -> Port. Open and set up Arduino Serial Monitor with settings below.

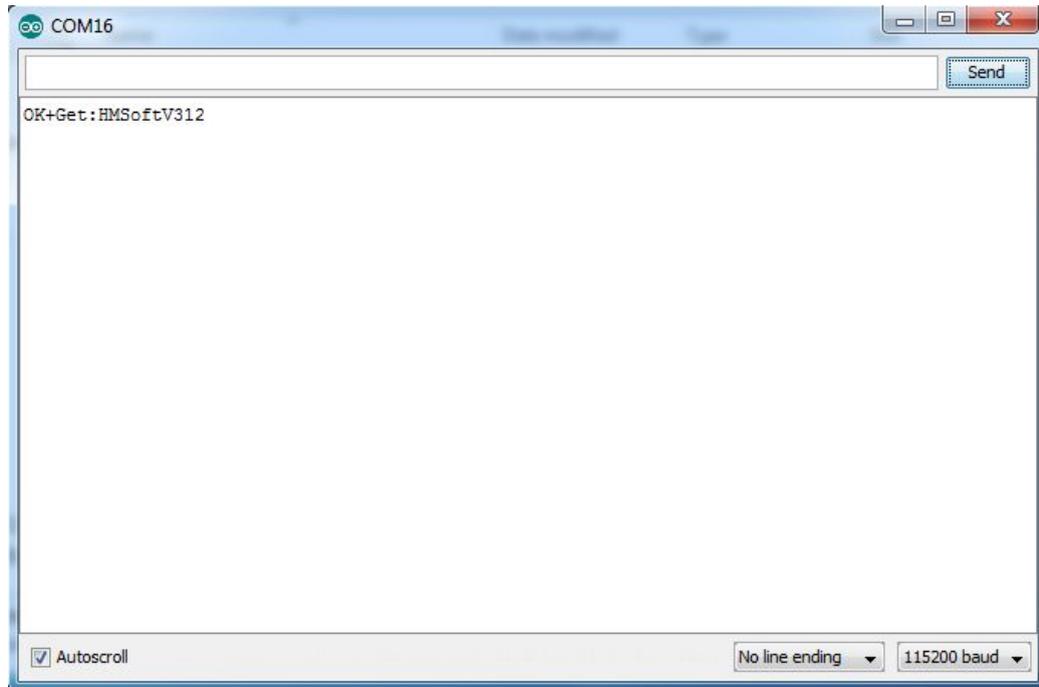
- 115200 Baud
- No line ending

Figures below are the examples to send AT command using Arduino Serial Monitor.

AT command sent: AT

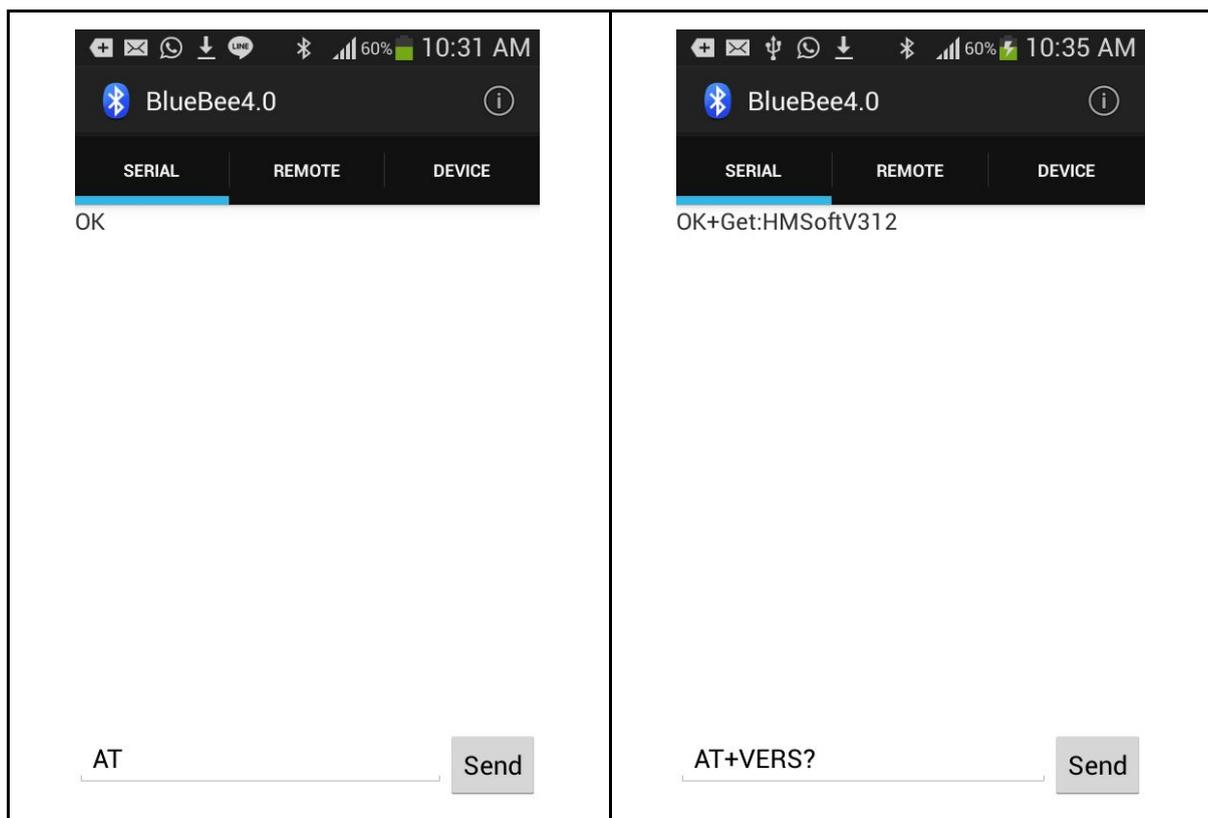


AT command sent: AT+VERS?



## ii) Wireless

To send AT commands wirelessly to the module, the module must be in remote control mode. By default, BlueBee 4.0 is set to this mode. Download and install the phone apps provided at product page. Open the apps and turn on Bluetooth. Select BlueBee 4.0 from the Bluetooth device list to connect the module. Once it is connected, user can send AT commands.

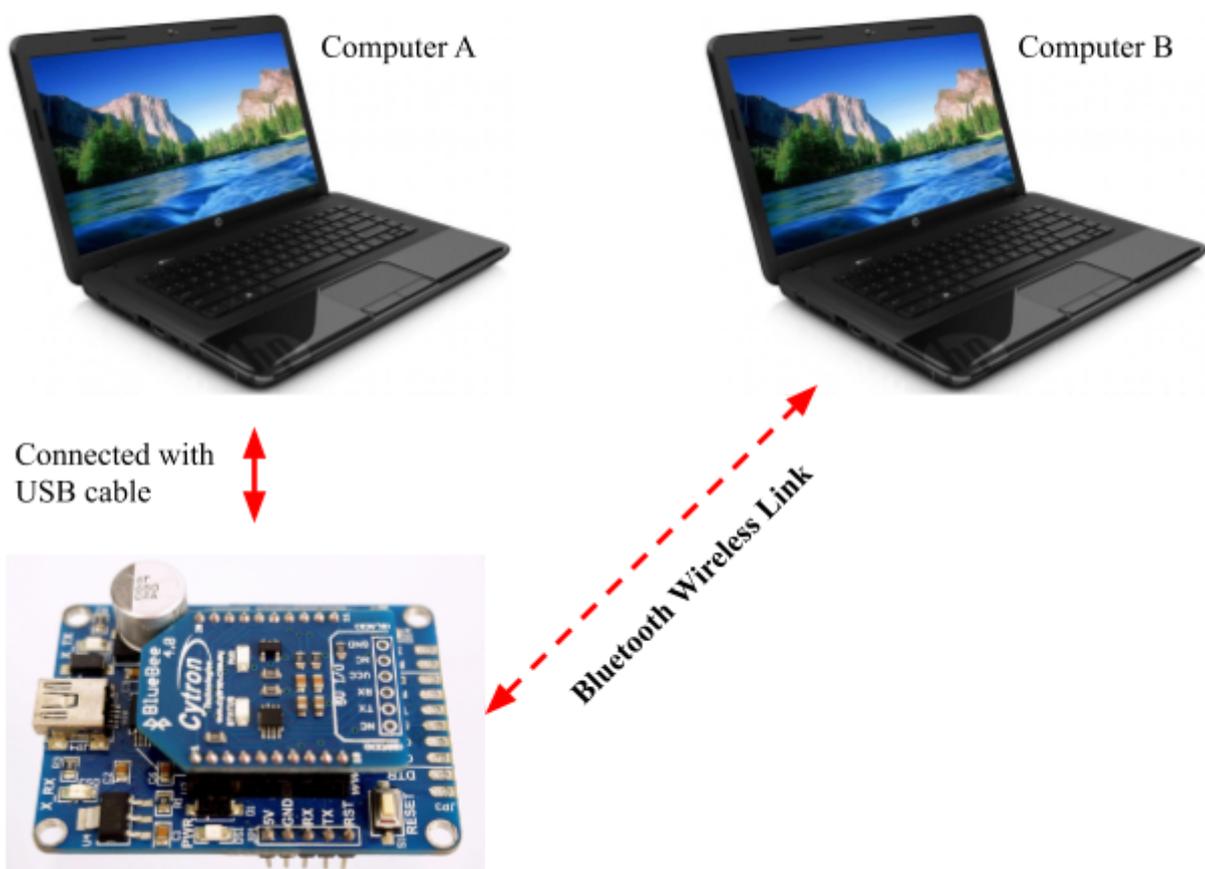


## 8.0 GETTING STARTED

BlueBee 4.0 can create Bluetooth wireless link other host/master device such as Bluetooth handphone, computer with built-in Bluetooth, and others Bluetooth devices. This section will show example communication of BlueBee 4.0 between 2 computers and between computer and microcontroller.

### 8.1 Communication between 2 computers

For this example, 2 computers named computer A and computer B will be used. Computer A will be using BlueBee 4.0 with [SKXBEE-BOARD](#) or [UC00A/B](#) and computer B will be using its own built-in bluetooth module. (If computer B is desktop, bluetooth dongle can be used)

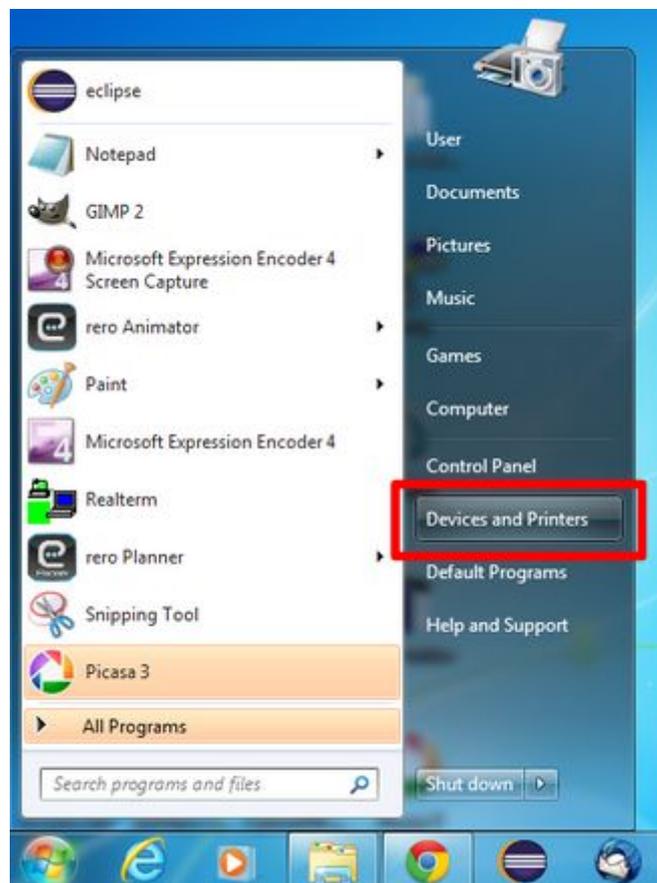


Setup for computer A:

- Setup hardware installation refer to [section 6](#). User may use either [SKXBEE-BOARD](#) or [UC00A/B](#).
- Open and setup Arduino Serial Monitor for Computer A. For this example, the COM Port for BlueBee 4.0 is COM3 and baud rate is 115200. The COM port may different with other computer/laptop.

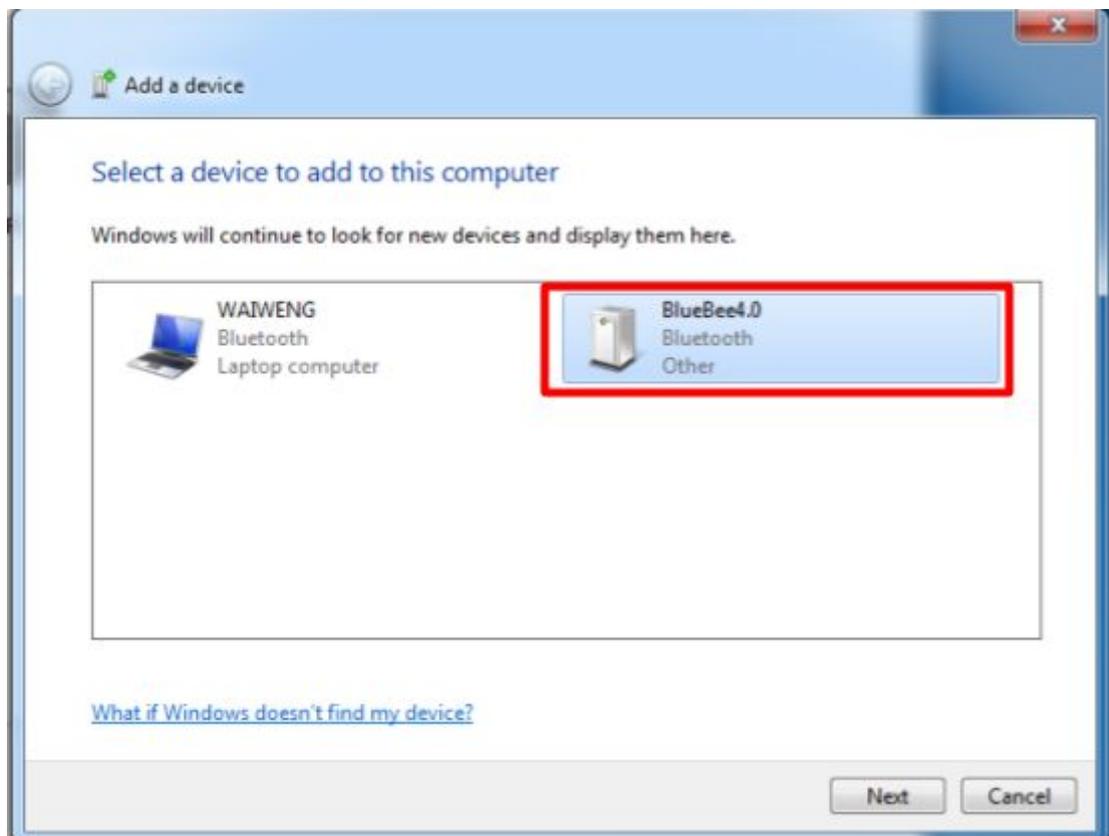
Setup for computer B:

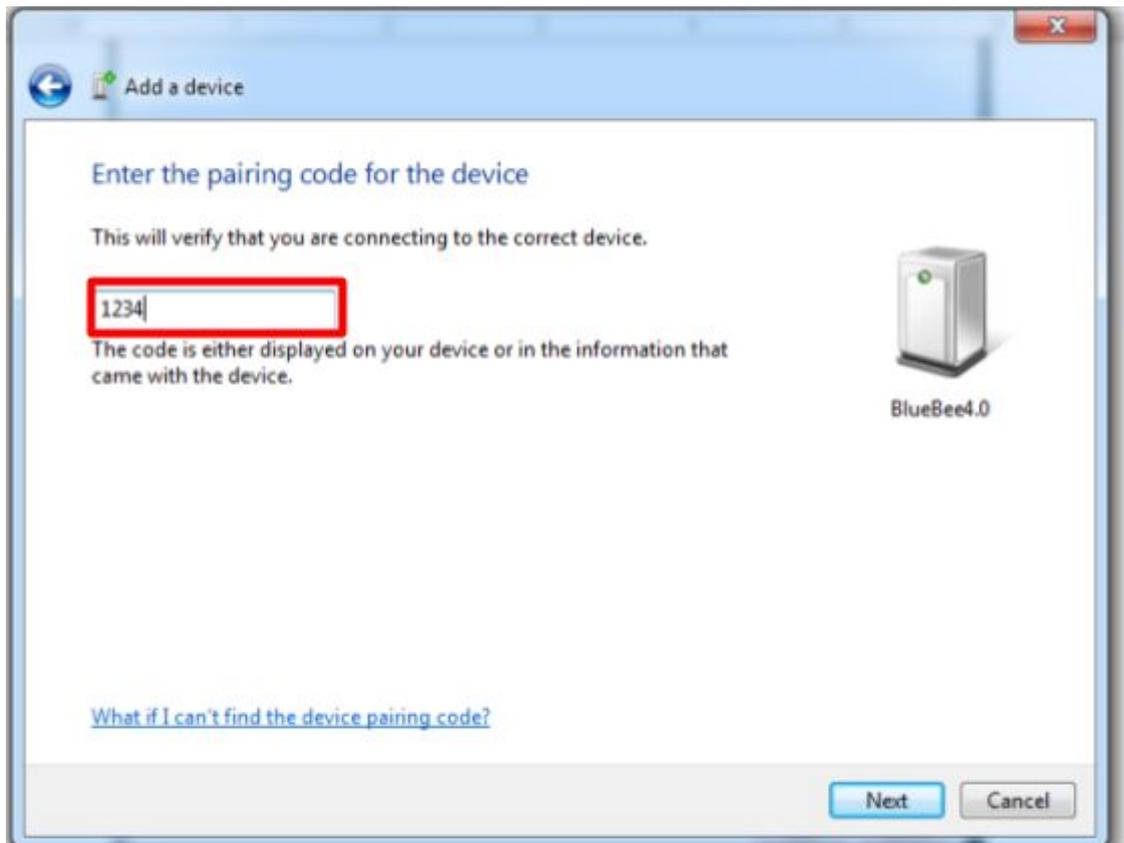
- User needs to turn on bluetooth on computer B to enable bluetooth connection with computer A. If computer B does not have built in bluetooth, user can install USB bluetooth dongle instead.
- Go to Devices and Printers on Computer B -> Add a device.



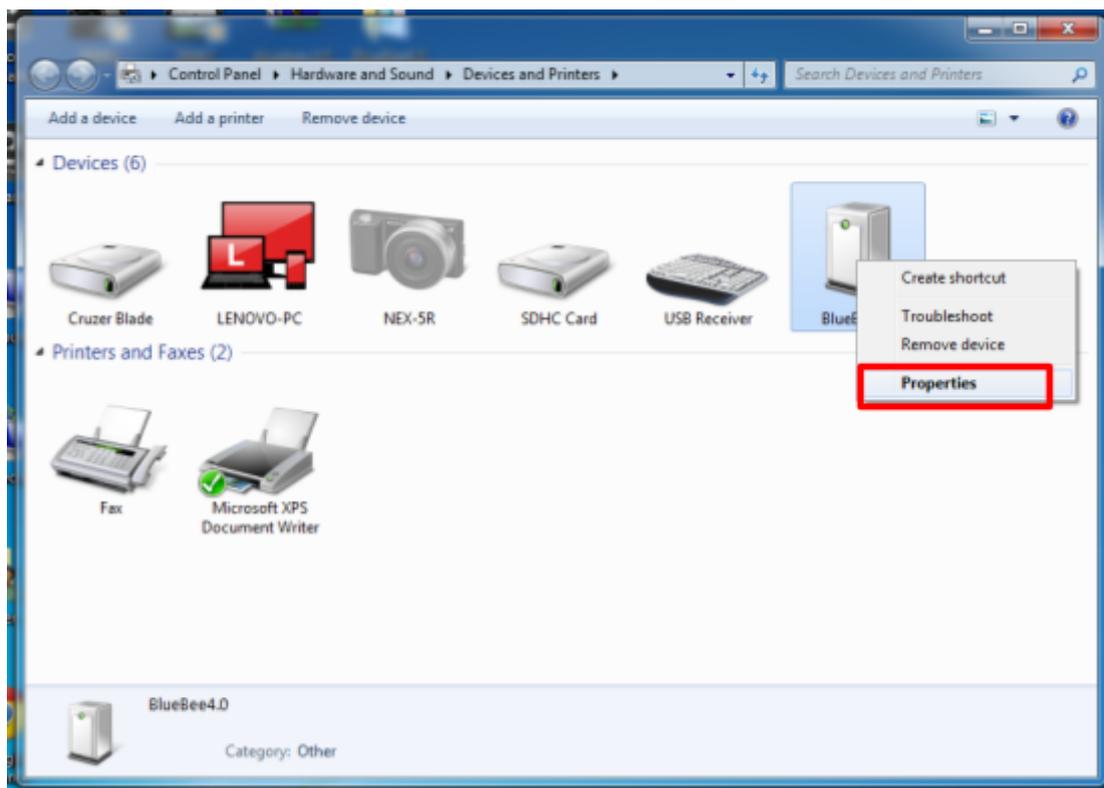


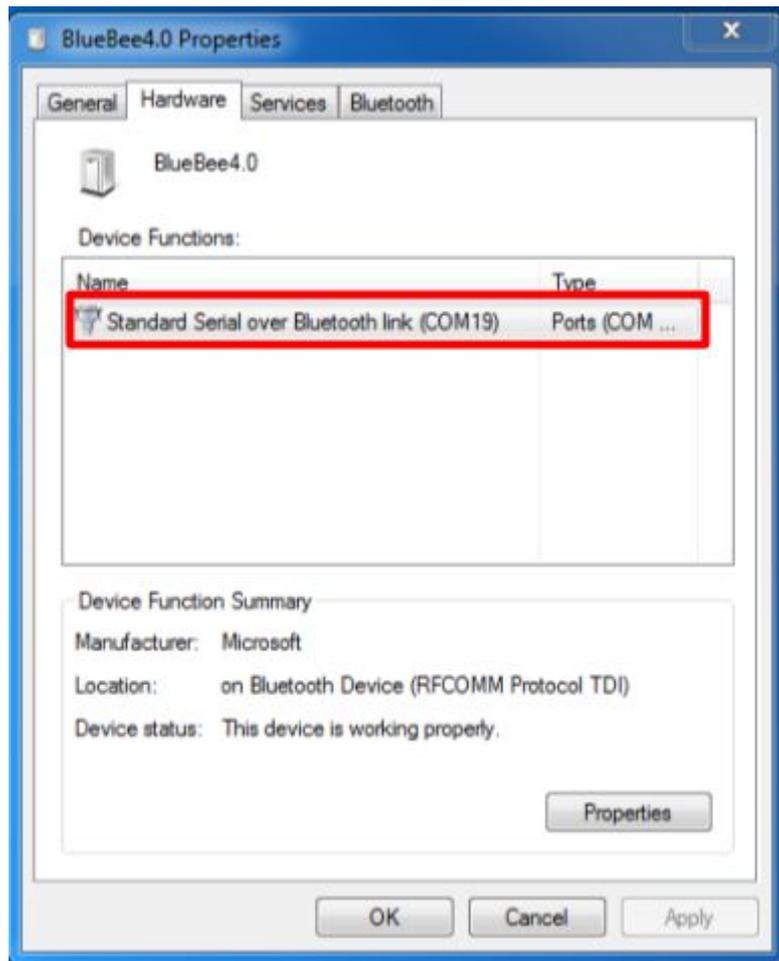
- Search for BlueBee4.0 and click Next. Enter the pin code, by default it is 1234.



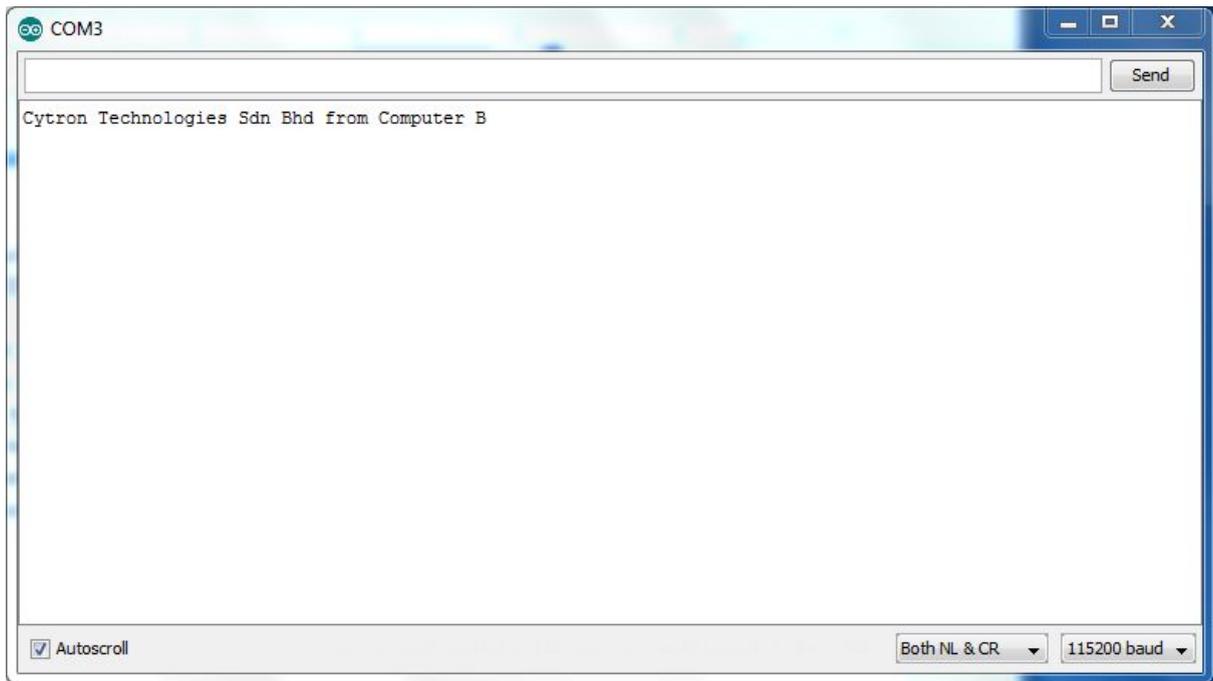


- After the pairing is complete, **BlueBee4.0** icon will be listed in the devices and printers list. Right click the icon to search for bluetooth serial COM Port. Under Hardware tab -> Device Functions, COM Port will be shown. In this case, bluetooth serial COM Port is COM19.

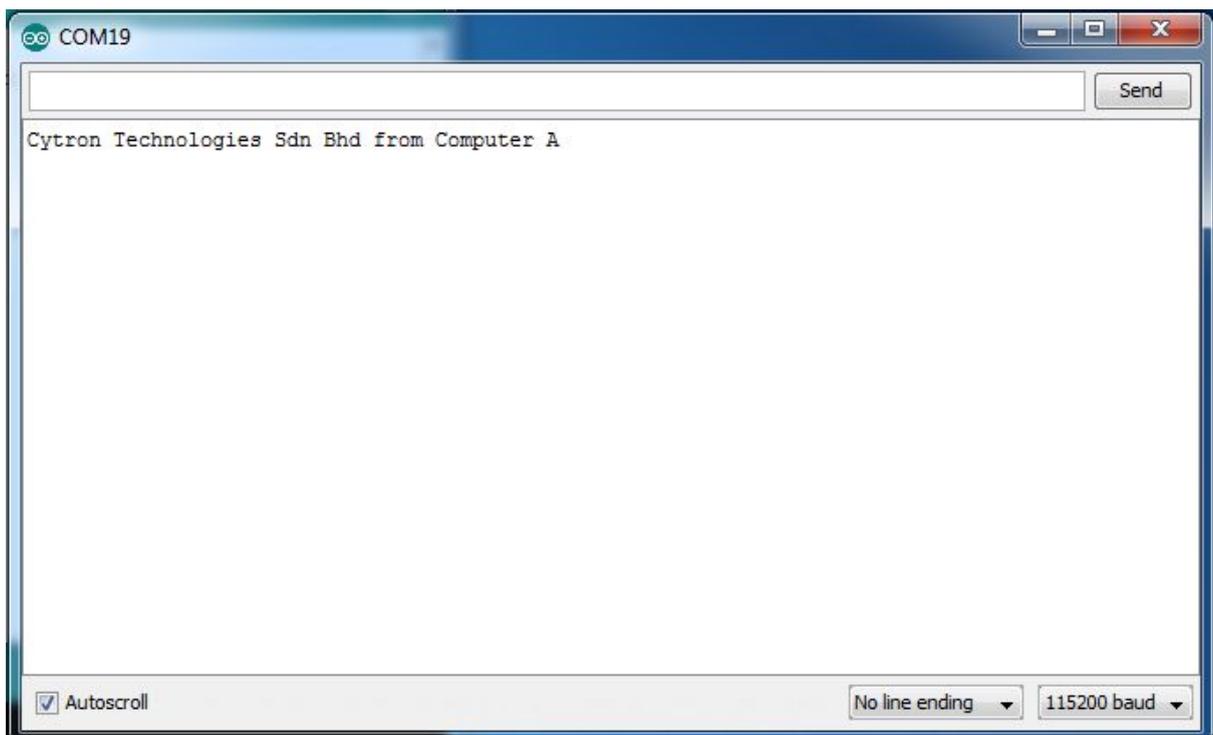




- Open and setup Arduino Serial Monitor for computer B. For this example port setting for Bluetooth is COM19 and the baudrate is 115200.
- Type any words at Arduino Serial Monitor at computer A. User may see, the words typed on computer A will be received by Arduino Serial Monitor of computer B and displayed. Then, type any words at Arduino Serial Monitor computer B and those words also received and displayed on Arduino Serial Monitor computer A. That means that Bluetooth link is created and data is able to communicate (transmit and receive) between computer A and computer B.



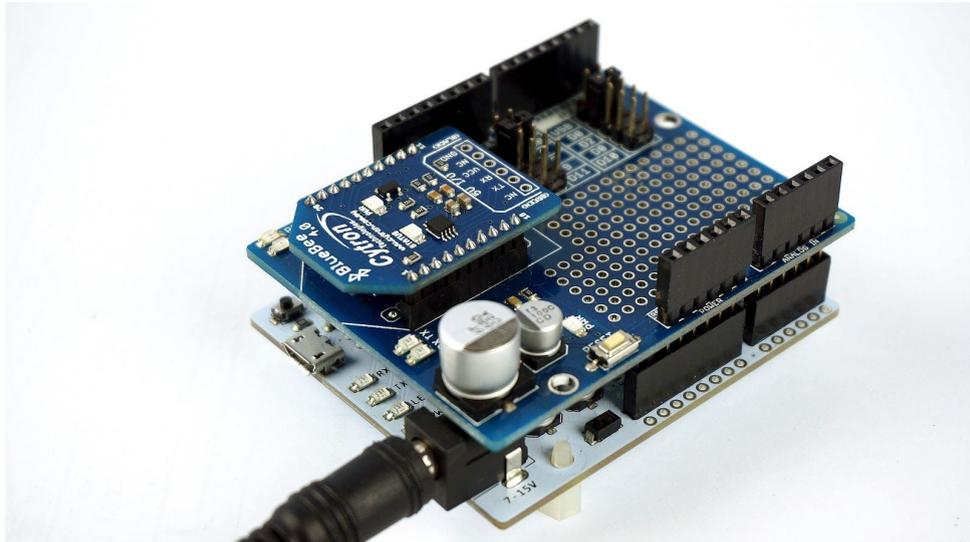
Computer A (COM3)



Computer B(COM19)

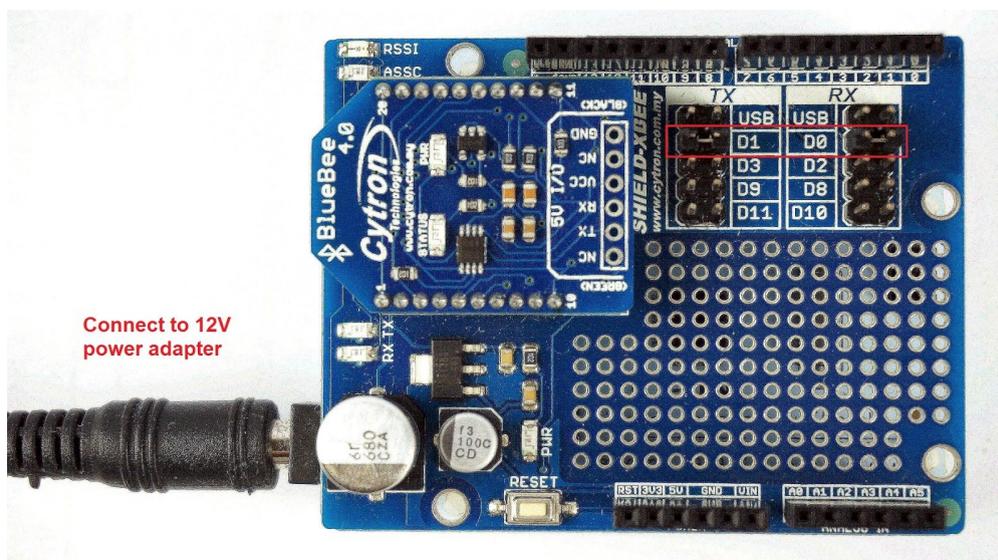
## 8.2 Communication between microcontroller and computer

Besides communication between 2 computers, BlueBee 4.0 can also be used with microcontroller to communicate with computer. Arduino board will be used as microcontroller. XBEE shield is being used as well to provide easy platform between BlueBee 4.0 and Arduino.



Setup for Arduino + XBEE shield +BlueBee 4.0:

- The setup is almost similar with Section 6 “Hardware Interface”. but with following modifications to be made:
  - UART selector change to D1 for TX and D0 for RX.
  - Remove the connection between RST and GND.
- Upload *BlueBeeExample* sketch to Arduino Board (the sketch can be downloaded from link [here](#)). Arduino Board can be disconnected from the computer after the sketch upload is complete.
- Power up Arduino Board and BlueBee 4.0 with power adapter.



Setup for computer:

- Turn on the Bluetooth.
- Pair with BlueBee 4.0 and identify the bluetooth Serial COM Port. (can refer to Section Communication between Computers – Setup for Computer B)
- Open Arduino IDE. Go to Tools -> Port and select Bluetooth Serial COM Port. Open Serial Monitor with 115200 Baud.

When Serial Monitor is opened, bluetooth connection starts and Status LED on BlueBee 4.0 should be staying lit. Now you can send anything you want (less than 64 characters). If the serial monitor shows “From BlueBee4.0:” followed by anything you have sent, the connection is considered successful.

## 9. WARRANTY

- Product warranty is valid for 6 months.
- Warranty only applies to manufacturing defect.
- Damaged caused by misuse is not covered under warranty
- Warranty does not cover freight cost for both ways.

*Prepared by*  
***Cytron Technologies Sdn. Bhd.***

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