

ZX-BLUETOOTH

Slave Embedded Serial Bluetooth board

Features and Benefits

- Simple serial UART communications and control
- Seamless connectivity with any Bluetooth device
- Open field range 10 meters
- 2.4GHz FHSS (Frequency Hopping Spread Spectrum) technology ensures high reliability and is robust to interference
- Low current consumption for long battery life

Specifications

Main Chip :	CSR BlueCore-04
Frequency Band :	2.4GHz
ISM Standard :	Bluetooth 2.0
Power Consumption :	Class 2
RF Power :	0~4dBm
Antenna :	External
Working Distance :	10 meters
Sensitivity :	-80 dBm or better
Size (mm) :	30x40 mm.
Profile :	SPP, HCI
Baudrate :	9,600 bps 8N1 format
Supply voltage :	+5V with on-board +3.3V regulator for MB-C04 module
Interface :	TxD (Transmit) and RxD (Receive) pin, TTL level supported. 3-pin JST connector comfort to use with INEX boards.
Indicator :	Blue LED for indication of Power On, Connect and Disconnect

Kit contents

- ZX-BLUETOOTH board
- JST3AA-8 cable x2
- Documentation

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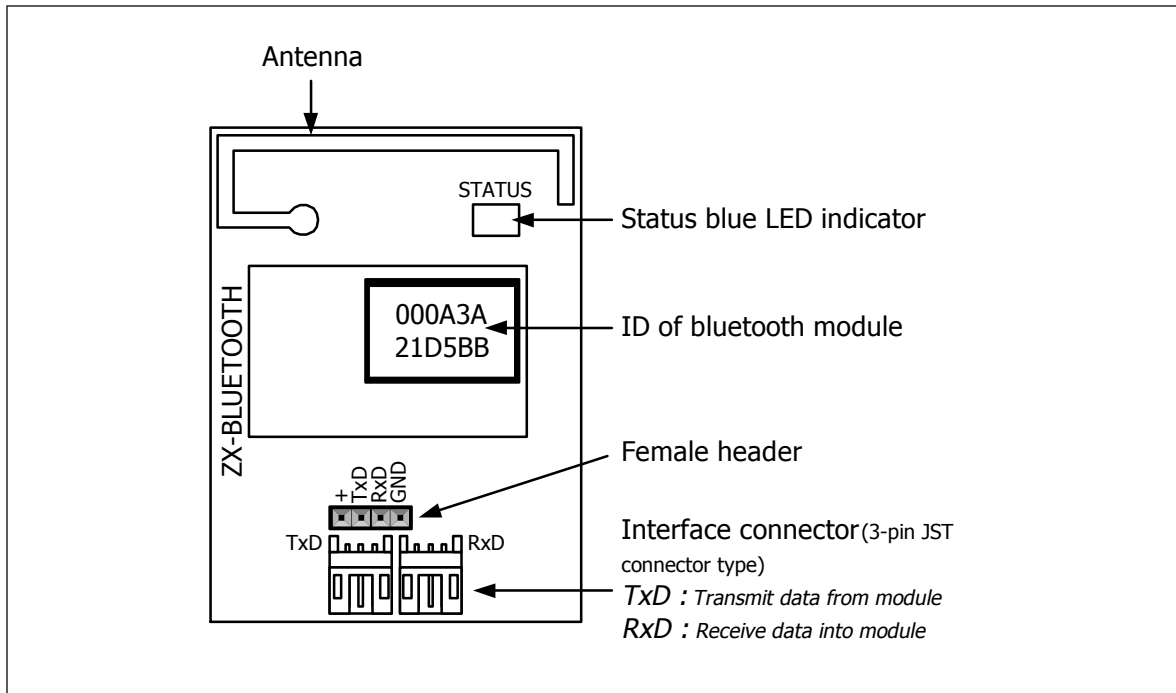


Figure 1 : ZX-BLUETOOTH board layout

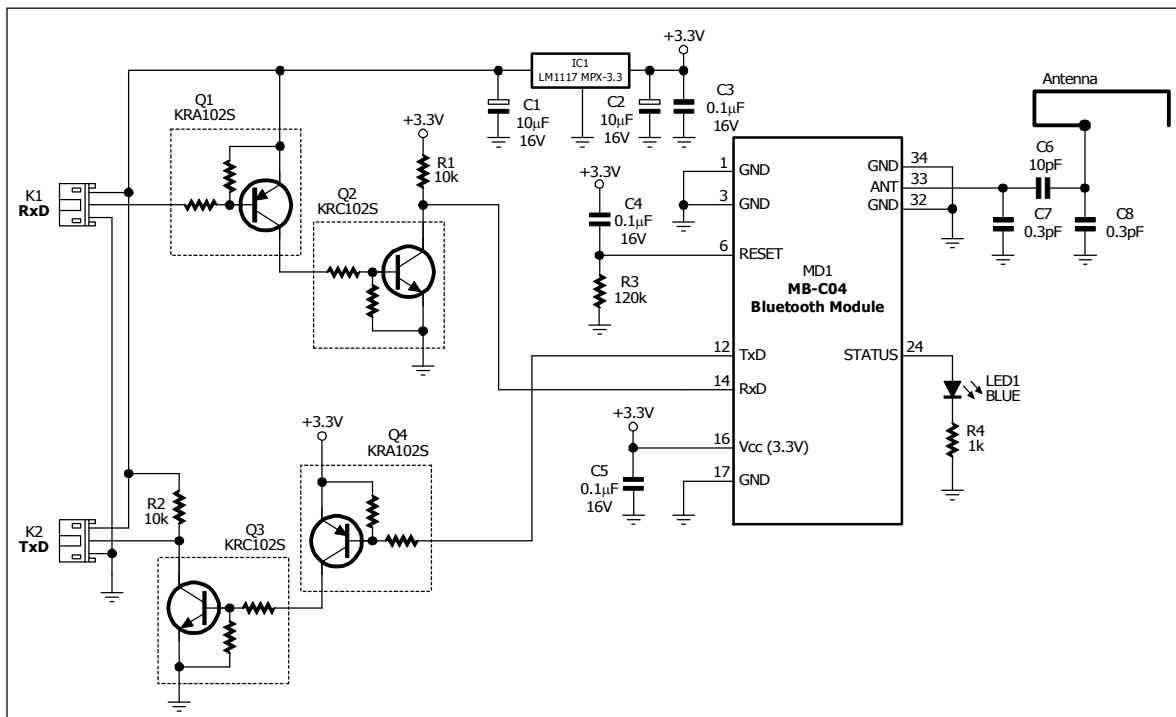


Figure 2 : ZX-BLUETOOTH schematic diagram

How to use the ZX-BLUETOOTH

The ZX-BLUETOOTH application board is ideal for enabling your embedded system with a widely supported industry standard wireless protocol.

A focus on low current consumption makes the ZX-BLUETOOTH ideal for use in standalone battery powered devices common to robotics and remote data capture.

It is important to know that the ZX-BLUETOOTH is a Slave device. Thus, in any operation it must be controlled via a master device. The simplest master device is a computer which is connected or has a built-in bluetooth module. User must select the profile to Serial Port Profile (SPP).

This example below presents the interfacing between i-Stamp (the OEM of BASIC Stamp2SX microcontroller) with computer via the bluetooth system.

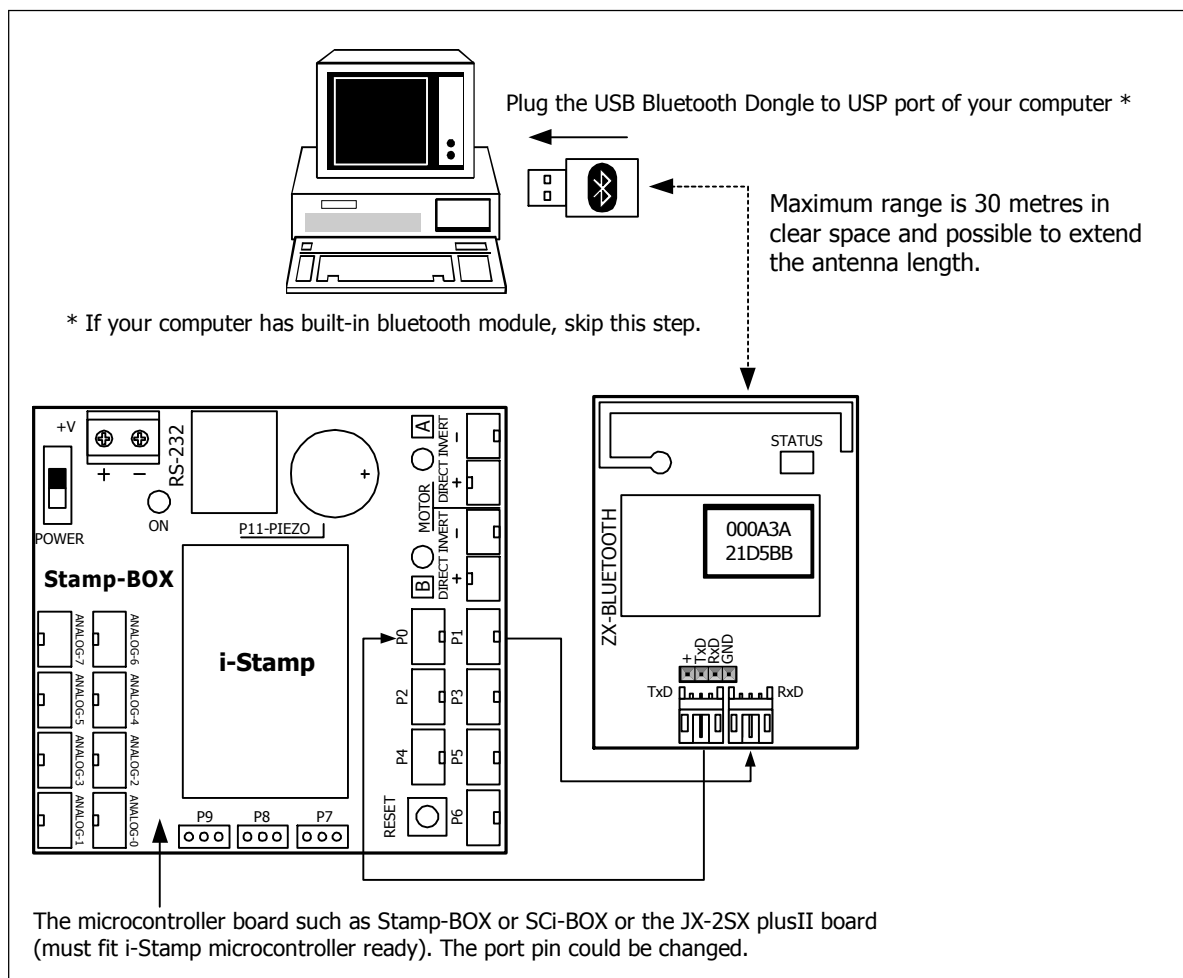


Figure 3 : Example interfacing of ZX-BLUETOOTH with i-Stamp microcontroller board for communication with computer via Bluetooth.

Tool and components

- (1) i-Stamp microcontroller board such as Stamp-BOX, SCi-BOX or JS-2SX plus II that fits the i-Stamp or another circuit board integrated with the i-STAMP
- (2) USB Bluetooth dongle in case the computer has no Bluetooth circuit built-in.
- (3) ZX-BLUETOOTH with cable

Hardware interfacing


In the figure 3, it shows the hardware interfacing to using microcontroller, ZX-BLUETOOTH and computer.

Setting the USB Bluetooth Dongle

There are many USB bluetooth dongles in the market. Each bundles the Bluetooth Connection Management software different. The most popular is **BlueSoleil**. It is developed by IVT Corporation. Before using the Bluetooth Dongle, must install the drive and this management software. User can see and read more information about installation and how to use the management software from documentation that come with the dongle.

For **BlueSoleil** software can see more information at www.bluesoleil.com

How to communicate BlueSoleil with ZX-BLUETOOTH

1. After install the **BlueSoleil** complete, the icon of this program will appear.
2. Double click at  icon. The main window will appear following the figure 4.

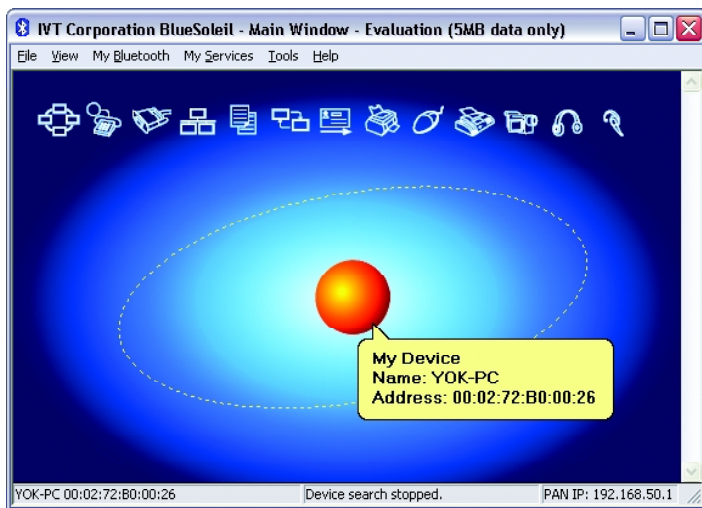


Figure 4 : My Bluetooth Places window for accessing to any service of USB bluetooth dongle. *The centre orange ball is symbol of user device or computer. The many icon are above the ball as the services of this device. The yellow box will appear when use that service.*

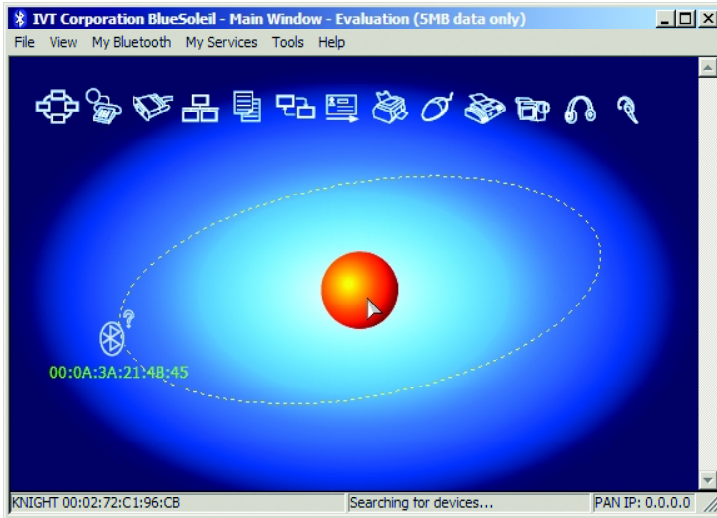


Figure 5 : shows the searching the bluetooth device and display their address first follows the name of them.

3. Apply the supply voltage to the microcontroller board and ZX-BLUETOOTH

4. Search the device by clicking on the orange ball. After seaching, the devices are listed with their address as shown in the figure 5. The ZX-BLUETOOTH device name is "**BT GPS**"

Note : In subsequent searching, the user can clear all device listing by clicking at menu **View>Refresh Device** or press the **F5** button.

5. Pairing the master device (computer) and slave device (ZX-BLUETOOTH) by clicking the right button mouse at device, select **Pair Device** following the figure 6.

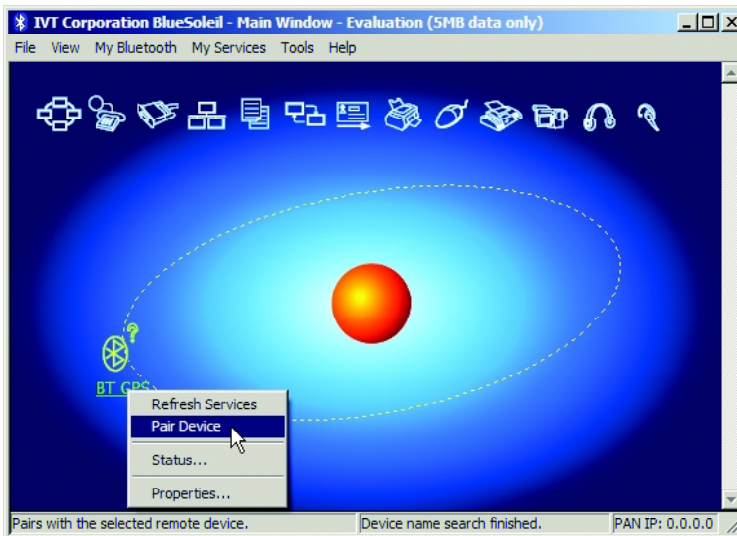


Figure 6 : Pairing the device between computer (the orange ball) and ZX-BLUETOOTH (in BT GPS name)

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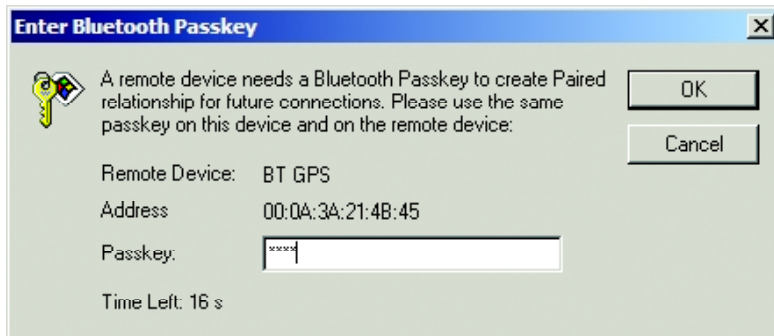


Figure 7 : Putting the Passkey for pairing the ZX-BLUETOOTH (BT GPS) with computer

6. The Enter Bluetooth Passkey dialog box will appear. Put the code "0000" into the Passkey box. The characters would be display "*" following the figure 7.

7. Click the right-button mouse at the BT GPS device and select Refresh Services for checking the device service. The yellow box will appear at the Bluetooth Serial Port Service following the figure 8. User can send and receive the serial data via 2 wires; TxD and RxD.

8. Connect the ZX-BLUETOOTH with Bluetooth Serial Port Service by clicking at the yellow serial port on top of window or click the right-button mouse at BT GPS to select **Connect > Bluetooth Serial Port Service** following the figure 9.

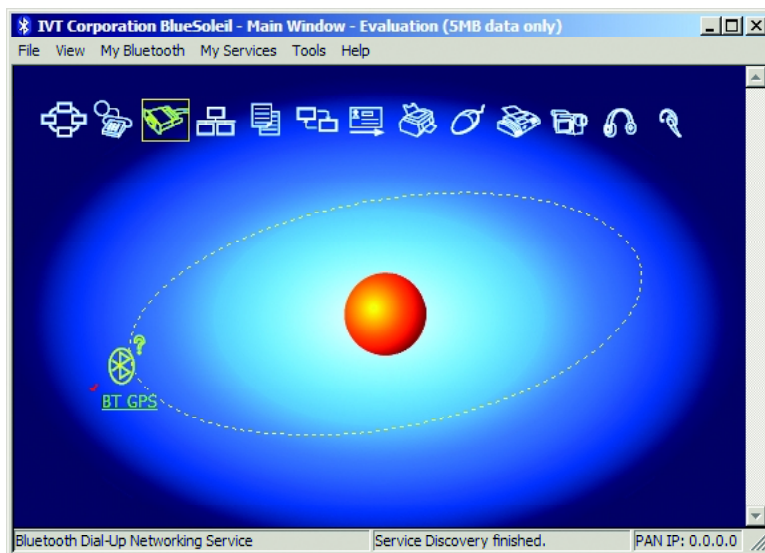


Figure 8 : The yellow box will appear to cover the Serial Port Service icon after checking the serive of ZX-BLUETOOTH (in BT_GPS name)

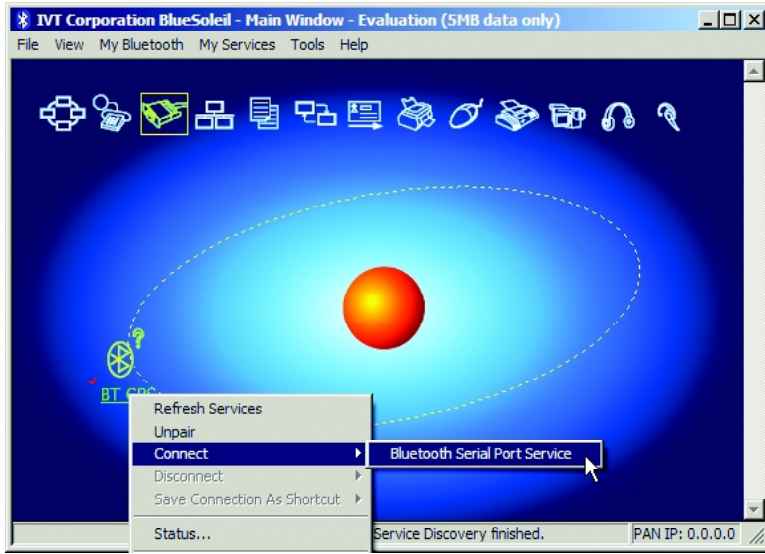


Figure 9 : shows the connection between the ZX-BLUETOOTH (in BT GPS name) with Bluetooth Serial Port Service

9. After the connection is complete, the Quick Connect dialogbox will appear and report the number of virtual COM ports (serial port) that was generated for ZX-BLUETOOTH (in BT GPS name) following the figure 10. This dialogbox ask about connecting to this device automatically when Windows applications open the serial port. Click on the **No** button to deselect the automatic connection.

10. Now the ZX-BLUETOOTH can connect with computer via BlueSoleil the Bluetooth Connection Management software. At computer side, user can send or receive serial data with simple terminal program such as Hyper Terminal similar using hardware COM port.

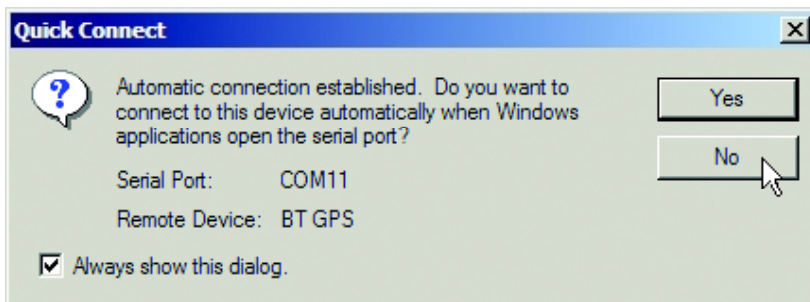


Figure 10 : The Quick Connect dialogbox reports the number of virtual COM port that ZX-BLUETOOTH (in BT GPS name) reserved. From the example is COM11.

Example program

1. Create the PBASIC code following the listing 1 and download to i-Stamp.
2. At computer side, enable the Bluetooth service and pairing with ZX-BLUETOOTH at microcontroller side. Select the service to Serial port.
3. Open the HyperTerminal. Select the serial port that connected and set the parameter as 9600 bps Baud, 8-bit data, 1 stop bit and None parity (8N1).
4. Run the program on i-Stamp board. Observe the program operation at the Hyper Terminal.

The operation can show in the figure 11. The Hyper Terminal screen will be blank in the beginning. After press any key at computer's keyboard (such as key "a"). The ASCII code of a will send from computer through the virtual COM port of Bluetooth service and distribute to the ZX-BLUETOOTH board. The data would be transmitted to i-Stamp microcontroller. The i-Stamp will send that data back to computer with number of data via same way. The data will be shown on the Hyper Terminal's screen following the figure 12.

```

\ {$STAMP BS2sx}
\ {$PBASIC 2.5}
TX CON 0
RX CON 1
BAUD CON 240
Ack VAR Byte
i VAR Word

main:  SERIN RX,BAUD,[Ack]
        i = i+1
        SEROUT TX, BAUD, [DEC4 i, " ", Ack, CR, LF]
        GOTO main

```

Listing 1 : The PBASIC code for testing the communication between computer and i-Stamp microcontroller through the Bluetooth device.

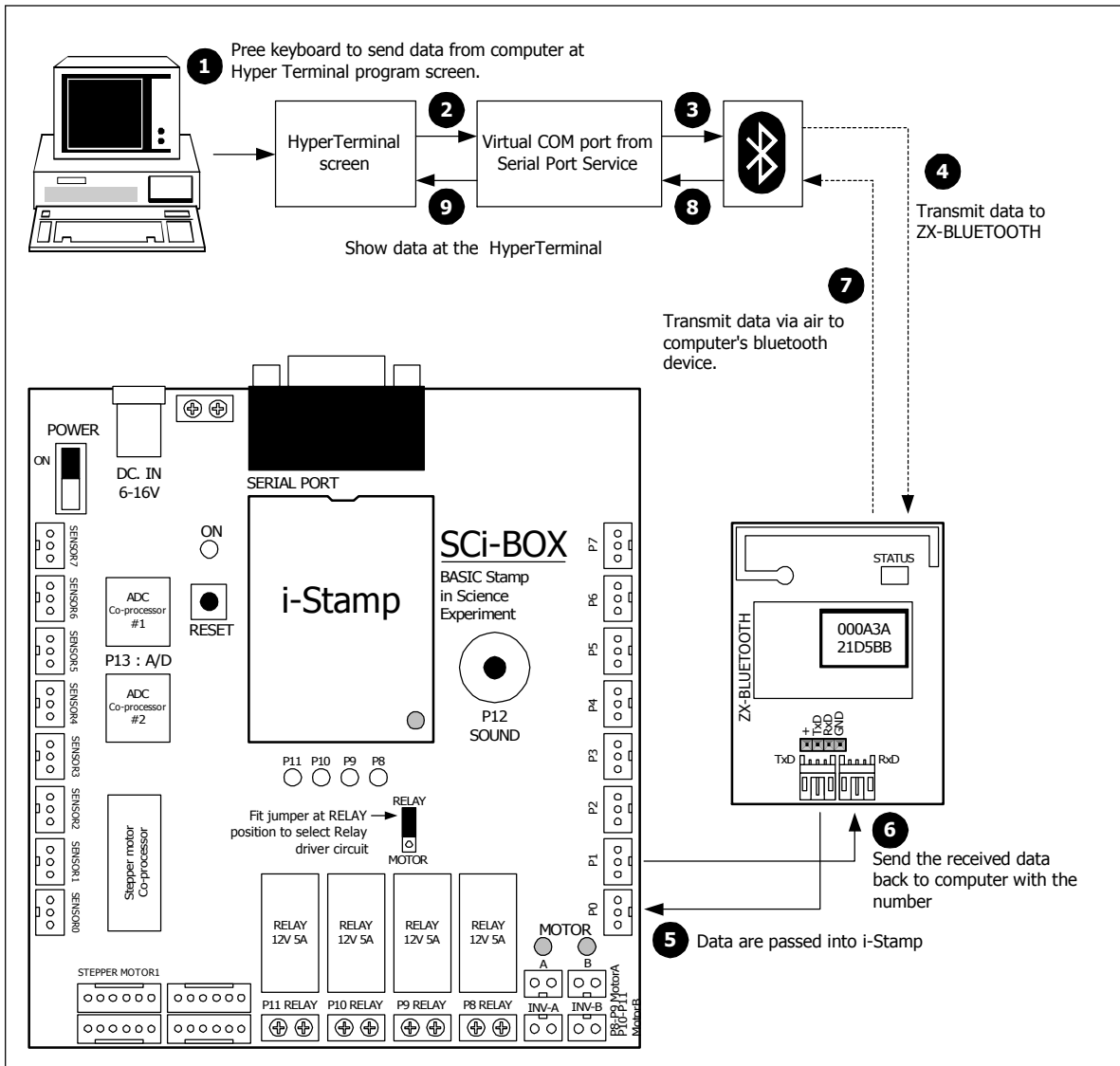


Figure 11 : The operation diagram of communication between i-Stamp microcontroller board and computer via bluetooth devices.

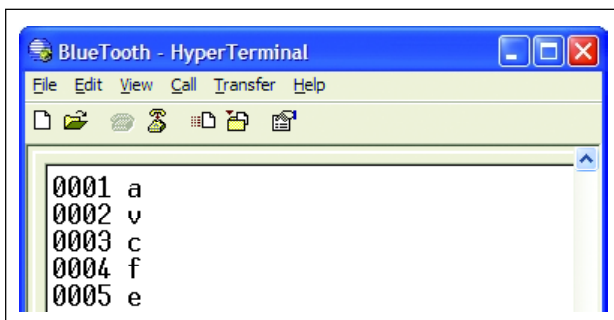


Figure 13 : The HyperTerminal shows the result of the listing 1. It is simple data communication between i-Stamp with computer via ZX-BLUETOOTH.

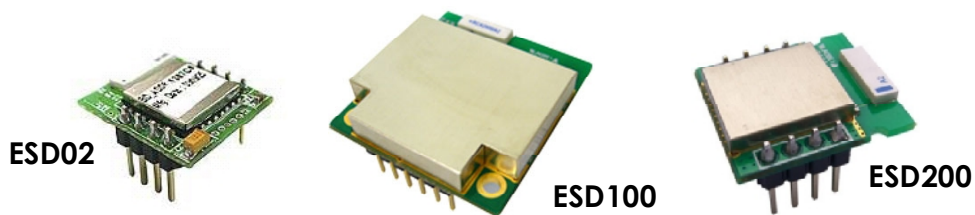
How to use ZX-BLUETOOTH with the other microcontroller

The using of ZX-BLUETOOTH is very easy. Only 2 wires; RxD and TxD are required. For interfacing with any microcontroller is simple by using the UART module within the microcontroller. Only connect the RxD pin of ZX-BLUETOOTH to TxD pin of microcontroller and connect the TxD pin of ZX-BLUETOOTH to RxD pin of microcontroller.

About programming, it is similar the serial port interface programming. Because the ZX-BLUETOOTH operation is similar the serial port device.

ZX-BLUETOOTH's limitation

ZX-BLUETOOTH use MB-CB04 bluetooth module. It cause this board can work in Slave device only. The system must provides the master device for working together. Thus, the master or host device must have the bluetooth master device module such as USB bluetooth dongle or ESD02/ESD100/ESD200 Embedded master bluetooth module (www.sena.com).



Baudrate of ZX-BLUETOOTH is fixed at 9600 bit per second and support 8N1 data format only. But with this baudrate and data format are enough for interfaing with any popular microcontroller.

