

# Bluetooth Serial Adapter

## FB200AS User Guide



Version 1.0



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## Revision History

| Revision | Date       | Change Descriptions |
|----------|------------|---------------------|
| Ver 1.0  | 02-09-2009 | - Write a draft     |

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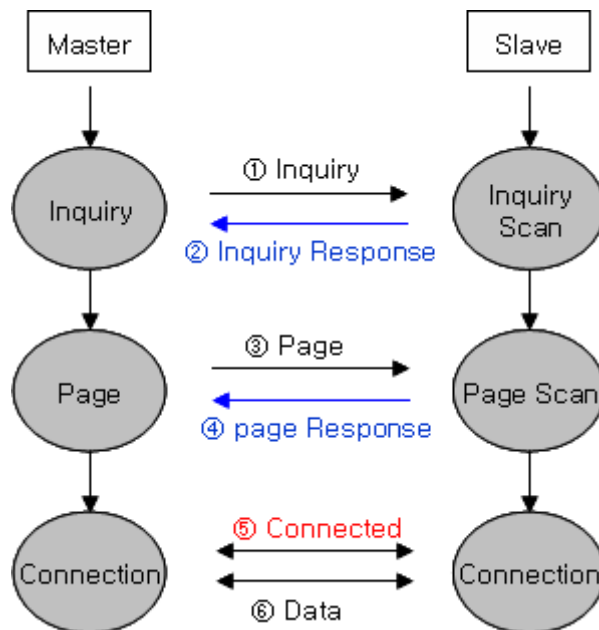
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# 1 What is Bluetooth?

## 1.1 Features of Bluetooth

- Objectives of Bluetooth : To Realize Wireless Communication for Short Distance with Low Power Consumption, High Reliability, and Low Cost.
- Frequency in Use: To Use ISM(Industrial, Scientific, Medical) Band which does not require any permission to use.
  - 2.400 – 2.4835 GHz, 79 channels
  - 2.465 – 2.4835 GHz, 23 channels (in France)
- Transmission Rate : 1Mbps ~ 3Mbps
- Transmission Output : 1mW (10m, Class2), 100mW (100m Class1)
- Network Configuration : Configured with Master and Slave relation. A Bluetooth unit shall allow simultaneous connections up to 7 devices (in case of ACL).
- Reliability : To Guarantee stable wireless communication even under severe noisy environment through adopting the technique of FHSS (Frequency Hopping Spread Spectrum).

## 1.2 Operation of Bluetooth



<Feature 1-1 Bluetooth Operation>

- Bluetooth operates based on the connection between "Master" and "Slave".
- Masters are simply supposed to do "Inquiry" and "Page". Slaves are supposed to do "Inquiry Scan" and "Page Scan".
- If a Master finds a Slave and so "inquiry" is successful, a Slave responds to the Master with its information.
- Interconnection between the Master and the Slave is achieved only if the information from the Slave is corresponded with the Master, and the Slave sends data to the Master.

## 2 Products Overview

FB200AS has been developed to replace the previous RS232 Cable system with wireless communication system to use.




Major Features of FB200AS

1. Bluetooth Specification 2.0 Support
2. Bluetooth Piconets(Point to Multipoint) are configurable up to (max. 1:7).
3. Easy to control communication speed by using DIP Switch. (2400 bps – 230400bps)
4. Support AT Command, and capable to control FB200AS by using AT Command.
5. Easy to connect to use with Bluetooth PDA, Bluetooth USB Dongle, etc.
6. Stable Data Transmission / Receipt

**※ We request the new users of FB200AS to read the information on this description carefully before they start to use the products.**

### 3 PRODUCT COMPONENTS

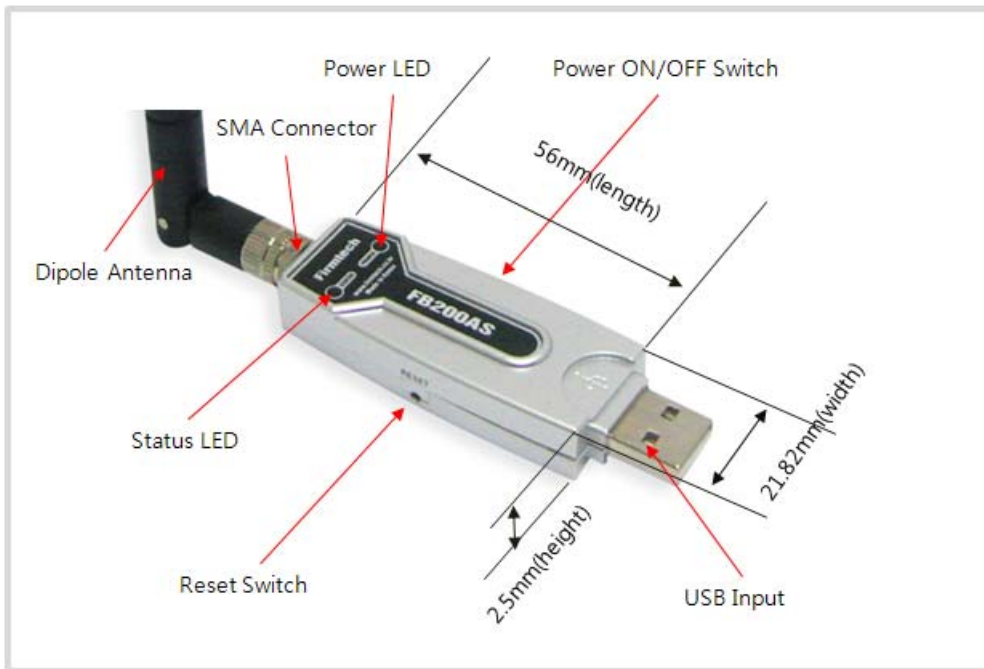
#### 3.1 Basic Components of FB200AS

| MODEL                                     | PICTURE   | Q'TY (EA) |
|---|---|-----------|
| FB200AS<br>(USB Serial Adapter)           |   | 1         |
| FBA004DAL<br>(4dBi Dipole Ant)            |   | 1         |
| CD<br>(Operation Manual and Test Program) |  | 1         |

<Table 3-1 Basic Components of FB200AS>

※ If you find any of above components is defective, or not included in the package, please contact the seller you purchased.

## 4 Product Appearance



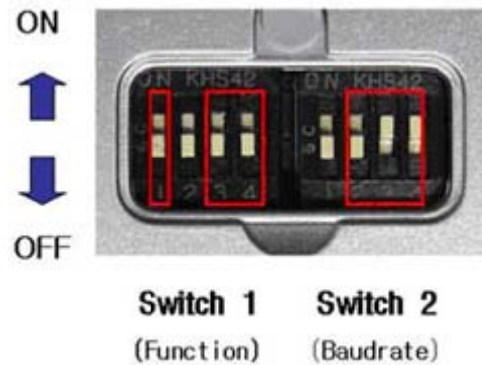
<Figure 4-1 Details and Dimension of FB200AS>



## 5 Features of Dip Switch

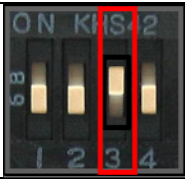
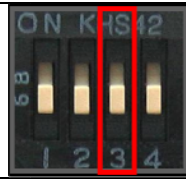
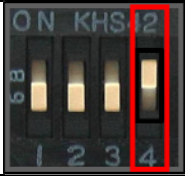
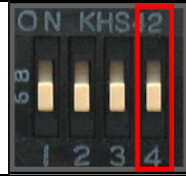


<Figure 5-1 FB200AS Dip Switch View>



<Figure 5-2 Features of Dip Switch>

### 5.1 Dip Switch 1 (FUNCTION Switch)

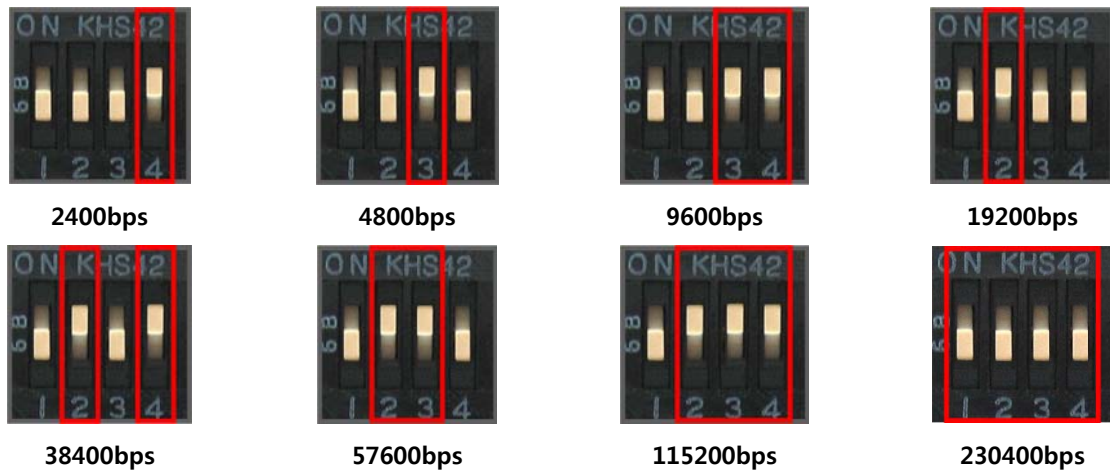
| SW | FEATURES   | ON  | OFF  | BASIC SET |
|----|--|---|--|-----------|
| 1  | None   | -   | -  | OFF       |
| 2  | None   | -   | -  | OFF       |
| 3  | ROLE   |  |  | OFF       |
|    |  | MASTER  | SLAVE  |           |
| 4  | Environment Setting<br>(PC Configuration Select) |  |  | OFF       |
|    |  | PC Configuration Mode   | Operation Mode   |           |

<Table 5-1 Features of FUNCTION Switch>

**Note :**

If you push a Reset Switch when a Dip Switch is turned ON in a PC Configuration Mode, the products return to the status of FATORY RESET.

### 5.2 Dip Switch 2 (Baud Rate Switch)



<Figure 5-3 Transmission Rate>

### 5.3 Initial Set Value of Dip Switch

| TYPE    | Function Switch | Baud Rate Switch |
|---------|-----------------|------------------|
| FB200AS |                 |                  |

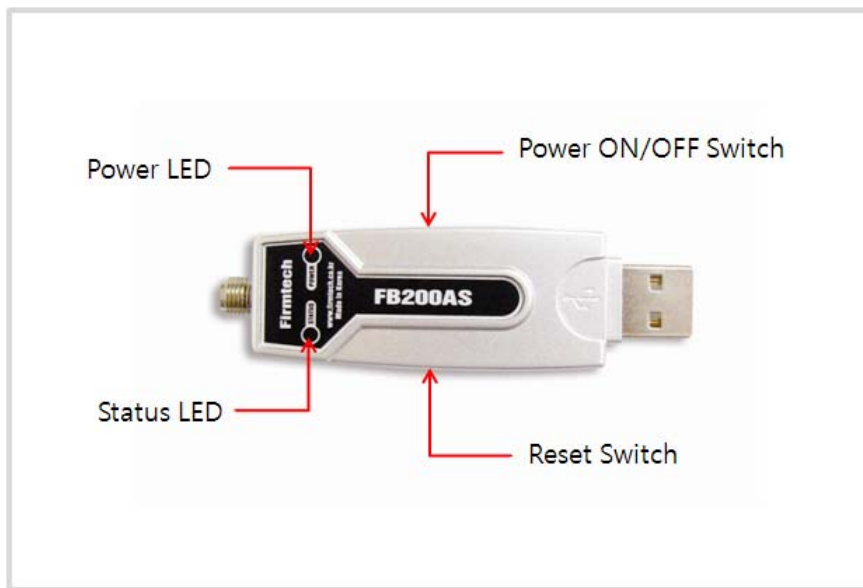
<Table 5-2 Initial Set Value of Dip Switch>

If the initial value is not consistent with <Figure 5-3>, please contact the seller you purchased the product.

**Note :**

If the CONNECTION MODE of PC Configuration is MODE4 (AT command MODE), it shall operate based on the Baud rate and at the value of Role established in PC configuration, regardless of setting of Baud rate and Role of Dip Switch.

## 6 Power Indicator LED / Status LED



<Figure 6-1 Appearance of FB200AS>

FB200AS has a red Power LED and green and red Status LED. Please, refer to the following description.

| LED TYPE                                 | STATUS                  | DESCRIPTION             |
|--|-------------------------|-------------------------|
| <b>Power Indicator LED (Power LED)</b>   | Power Input             | Red LED Turns on        |
|  | PC connected            | Green LED Turns on      |
| <b>Status Indicator LED (Status LED)</b> | Connecting to Bluetooth | Green LED is Flickering |
|  | Connected to Bluetooth  | Green LED turned on     |
|  | PC Configuration        | Red LED is Flickering   |

<Table 6-1 Operation Check by LED Status>

**Note :**

If you a Reset Switch when a red Status LED flickers in a PC configuration Mode, the products return to the status of FACTORY RESET.

## 7 Performance of Product

| No. | Part                      |                 | Specification                       |
|-----|---------------------------|-----------------|-------------------------------------|
| 1   | Bluetooth Spec.           |                 | Bluetooth Specification 2.0 Support |
| 2   | Communication distance    |                 | 100 M                               |
| 3   | Frequency Range           |                 | 2402~2480MHz                        |
| 4   | Sensitivity               |                 | -83dBm (Typical)                    |
| 5   | Transmit Power            |                 | 0.18 mW (8 dBm typical)             |
| 6   | Size                      |                 | 73 x 22 mm                          |
| 7   | Support Bluetooth Profile |                 | SPP (Serial Port Profile)           |
| 8   | Input Power               |                 | 5V                                  |
| 9   | Current Consumption       |                 | 100mA (Max)                         |
| 10  | Temperature               | Operating       | -20°C ~ 55°C                        |
|     |                           | Limit Operating | -30°C ~ 80°C                        |
| 11  | Communication Speed       |                 | 1,200bps – 230,400bps               |
| 12  | Antenna                   |                 | Dipole Antenna                      |
| 13  | Interface                 |                 | USB                                 |
| 14  | Flow Control              |                 | RTS, CTS, DTR, DSR support          |

<Table 7-1 Performance of FB200AS>

## 8 Current Consumption

| STATUS                           |        | Current Consumption (mA) |     |           |
|----------------------------------|--------|--------------------------|-----|-----------|
|                                  |        | MIN                      | MAX | AVG       |
| Standby                          |        | 18                       | 24  | <b>22</b> |
| Inquiry scan & page scan (Slave) |        | 21                       | 63  | <b>42</b> |
| Page scan (Slave)                |        | 18                       | 30  | <b>23</b> |
| Inquiry (Master)                 |        | 77                       | 83  | <b>80</b> |
| Connected                        | Slave  | 36                       | 45  | <b>41</b> |
|                                  | Master | 21                       | 33  | <b>27</b> |
| Data transmission                | Slave  | 48                       | 54  | <b>51</b> |
|                                  | Master | 48                       | 57  | <b>52</b> |
| Data reception                   | Slave  | 45                       | 51  | <b>48</b> |
|                                  | Master | 45                       | 54  | <b>49</b> |
| Data transmission / reception    | Slave  | 48                       | 57  | <b>52</b> |
|                                  | Master | 51                       | 60  | <b>56</b> |
| Power save                       | Slave  | 21                       | 30  | <b>24</b> |
|                                  | Master | 21                       | 33  | <b>24</b> |

<Table 8-1 Current Consumption of FB200AS>

### TEST CONDITIONS

Baud rate : 9600 bps, Input Voltage : DC 5V

The power consumption is subject to change depending on the transmission rate and volume of data.

## 9 Initial Set Value of Products

The product has the initial Set Value as shown on the <Table 9-1>.

Please be sure to identify the initial Set Value, before you begin to use.

| TYPE  | Set Values  |
|---|-------------|
| Device Name                                   | FB200v1.0   |
| Pin Code (Pass key)                           | BTWIN       |
| Uart (baud rate-data bit-parity bit-stop bit) | 9600-8-N-1  |
| ROLE  | SLAVE       |
| Connection Mode                               | MODE3       |
| Operation Mode                                | MODE0 (1:1) |
| Debug Char                                    | 0x02        |

<Table 9-1 Initial Set Values of FB200AS>

The Operating Set Values of Products is changeable by using Dip Switch or PC software (Window Hyper Terminal, or FIRMTECH PC Configuration Program.)

**Note :**

Please refer to 11 PC Configuration for details on changing the setting.

## 10 Connecting the wireless section of Bluetooth

In order for Bluetooth devices to transmit data to each other, the wireless section of Bluetooth should be connected to each other. To connect the wireless section, you should set each role for each device, one for a **MASTER**, another for a **SLAVE**. It takes about 1~10 sec that a Master is connected to a Slave.

How to connect the wireless section of FB200AS can be performed with 2 significant ways.

### Note :

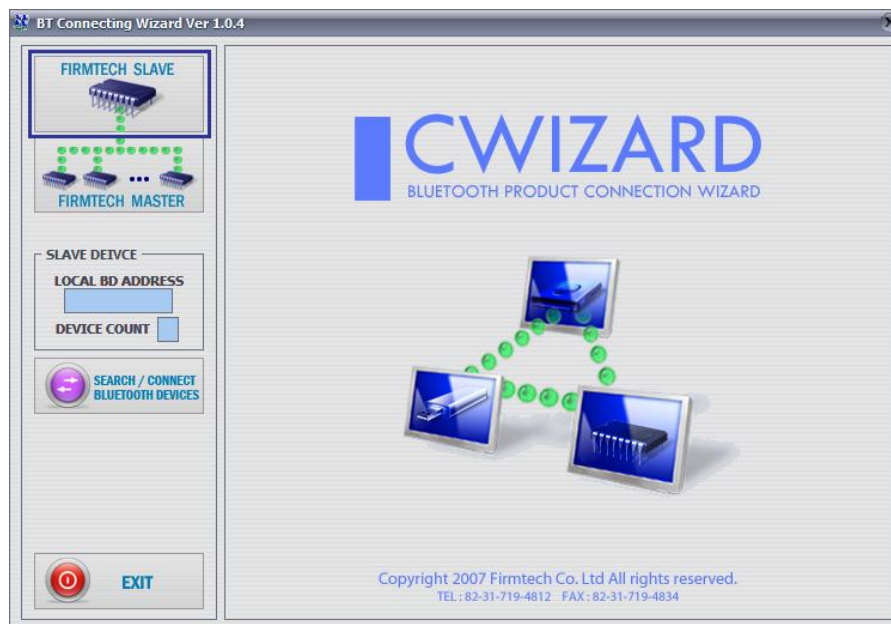
The FB200 uses virtual COM port which shall be operated first before the Hyper Terminal is being used so that the config tool shall be operable normally.

Please refer to the driver installation of Appendix D FB200 for the instructions of driver installation of FB200.

※ We will use 2 FB200AS and MS Windows in describing procedures.

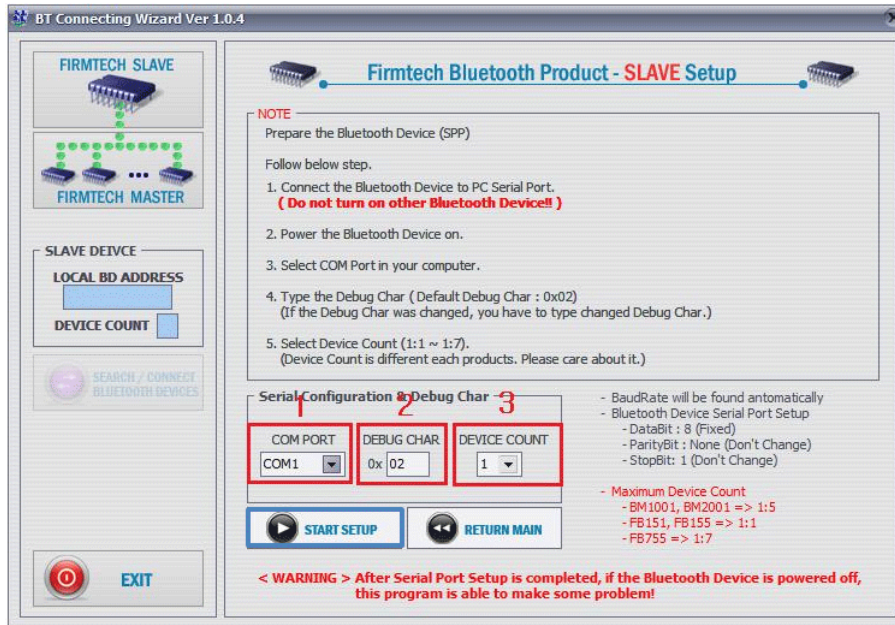
### 10.1 Connecting with Connection WIZARD

- (1) Connect FB200AS(1) to the USB port of PC, and turn the power on.
- (2) Execute C-Wizard Program.



<Figure 10-1 Connection Wizard Step 1>

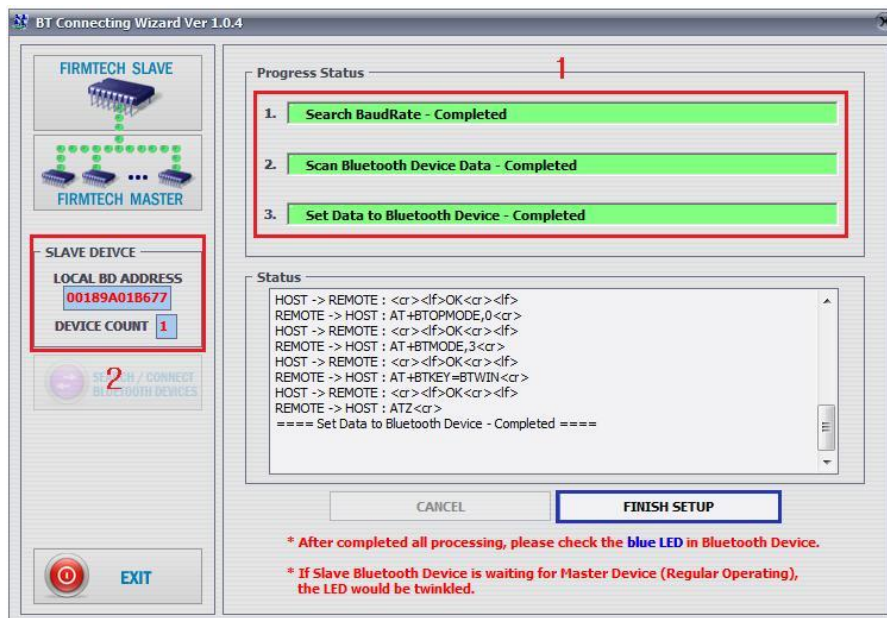
- (3) Click FIRMTECH SLAVE Set-up button (<Figure 10-1> Blue borders)



- 1 COM PORT** : Select Serial port of PC connected a product.
- 2 DEBUG CHAR** : Default is 0x02. (Refer to the appendix A about PC Configuration)
- 3 DEVICE COUNT** : Select number of devices to be connected. (Default 1)

<Figure 10-2 Connection Wizard Step 2>

- (4) Click the Set-up Start Button(<Figure 10-2> Blue borders) after setting each values in blanks (<Figure 10-2> Red borders **N.1 - Com Port connected to FB200AS, N.2 - 0x02, N.3 - 1**)



- 1 Procedures**: procedures of Device Set-up.
- 2 SLAVE Device value**: It shows values if the SLAVE Set-up is completed (optional)

<Figure 10-3 Connection Wizard Step 3>

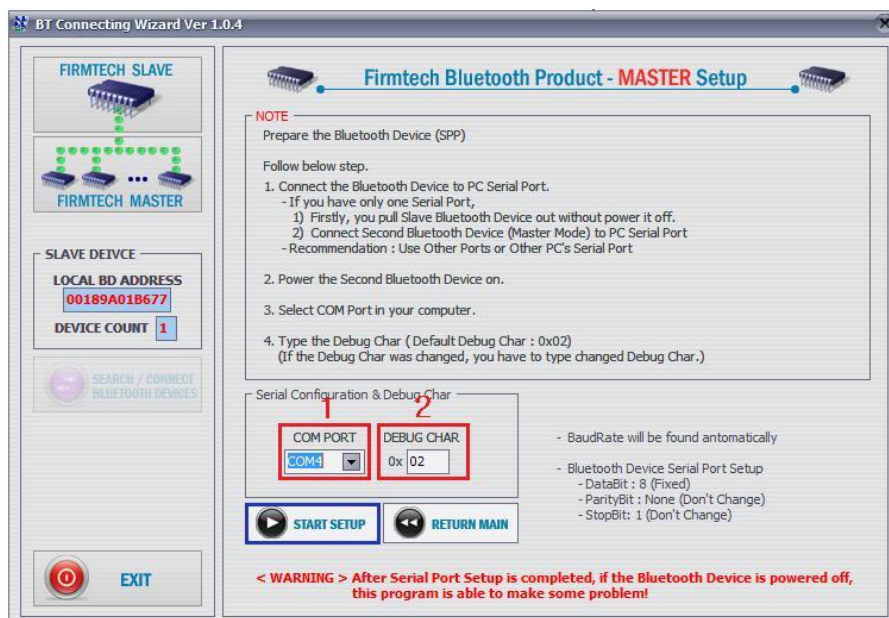


- (5) Status Display of Procedures(<Figure 10-3>N. 1 red borders) turns red into green after Set-up is completed. Click the OK button if the blank of SLAVE Device Value is filled. (<Figure 10-3>N. 2 red borders)
- (6) Connect FB200AS(2) to the USB port, and turn the power on.



<Figure 10-4 Connection Wizard Step 4>

- (7) Click the FIRMTECH MASTER Set-up (<Figure 10-4> Blue borders) Button

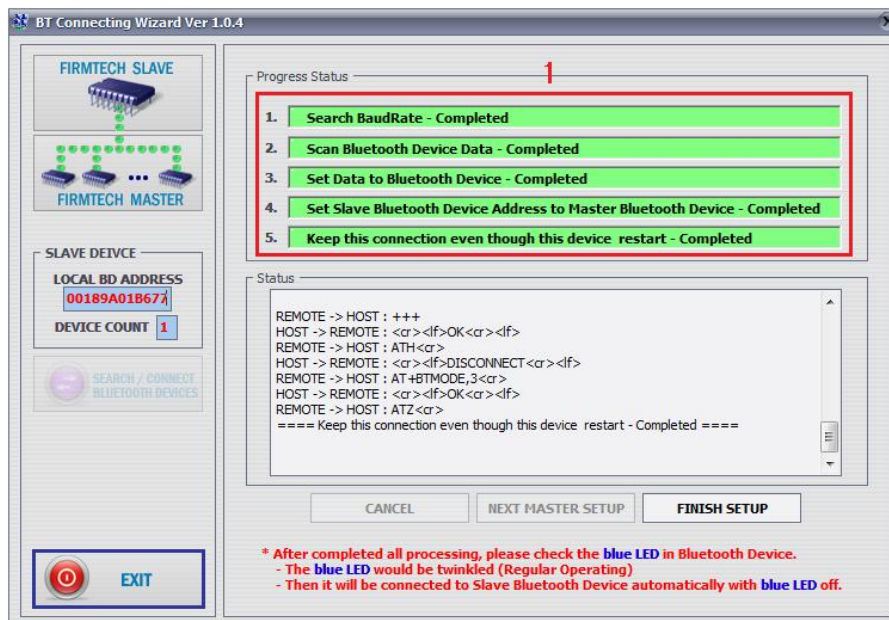


**1 COM PORT** : Select the Serial port of PC connected a product

**2 DEBUG CHAR** : Default is 0x02. (Refer to the appendix A about PC Configuration)

<Figure 10-5 Connection Wizard Step 5>

- (8) Click Set-up Start (<Figure 10-5> blue borders) button after setting each value (<Figure 10-5> red borders **N.1 - Com Port connected to FB200AS** , **N.2 - 0x02**) in blanks.



<Figure 10-6 Connection Wizard Step 6>

- (9) If the Status Display of Procedures (<Figure 10-6> N.1 red borders) turns red into green, Connection Set-up is completed. With Clicking the End button(<Figure 10-6> Blue borders), finish the C-Wizard
- (10) Set Function Dip Switch #3 to MASTER after turn the FB200AS(2)'s power off.
- (11) Turn ON the FB100AS(2) and check status LED of FB100AS(2) is turns ON in 1~10seconds. If LED is ON, the section of Bluetooth is connected properly and Data Transmission is usable

## 10.2 How to connect with Dip Switch Set-up

FB200AS can perform data communication once you change the Dip Switch Set-up.

The following is the method of setting the Dip Switch.

- (1) Set Baud rate Dip Switch of FB200AS(1) to the proper speed for communication
- (2) Set FUNCTION Dip Switch #3 of FB200AS(1) to **SLAVE**.
- (3) Turn the power of FB200AS(1) on.
- (4) Set Baud rate Dip Switch of FB200AS(2) to the proper speed for communication.
- (5) Set FUNCTION Dip Switch #3 of FB200AS(2) to **MASTER**.
- (6) Turn the power of FB200AS(2) ON.
- (7) If Status LED of FB200AS is turned on shortly, it means the wireless section of Bluetooth is properly connected, so Data transmission can be performed.

## 11 How to complete PC Configuration?

The Baud rate or Role is selectable using Dip Switch. (In case, CONNECTION MODE is not MODE4.)

For other setting values, you can establish the setting using PC Configuration.

PC Configuration can be performed with two significant ways.

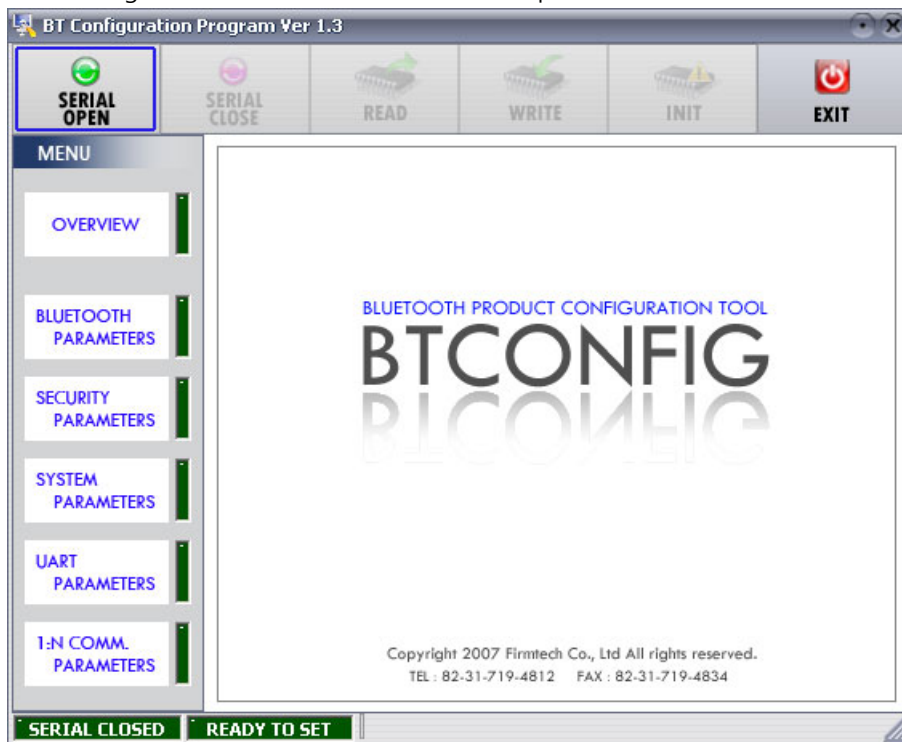
First way is to use Configuration tool provided by FIRMTECH Co., Ltd.

Second is to use the serial communication programs such as Hyper Terminal or Mincom provided by OS.

To set these are shown below.

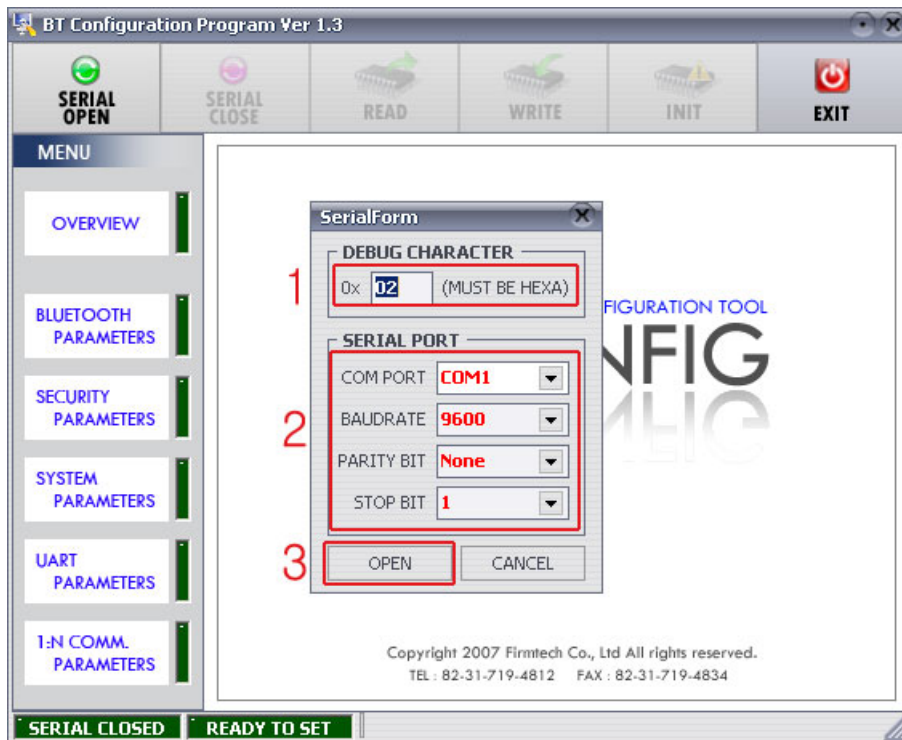
### 11.1 PC Configuration using BTConfig tool

- (1) After setting 4<sup>th</sup> Switch (PC Configuration Switch) of Function Dip Switch FB200AS ON and connect the power. Check if red LED is flickers on Status LED.
- (2) Execute BTConfig tool after connect FB200AS to USB port of PC.



<Figure 11-1 BTConfig tool initialization>

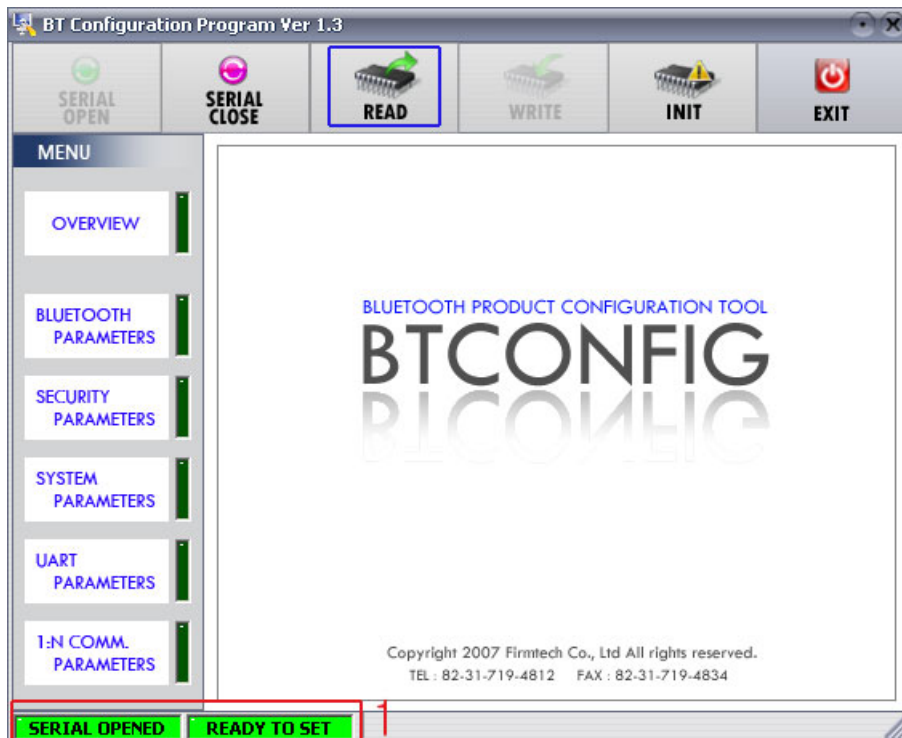
- (3) Click "SERIAL OPEN" button. (<Figure 11-1> blue borders)



**1 DEBUG CHARACTER** : Default is 0x02. (refer to the appendix A about PC Configuration)

**2 SERIAL PORT** : COM PORT proper port, BAUDRATE **9600**, PARITY BIT **None**, STOP BIT **1**

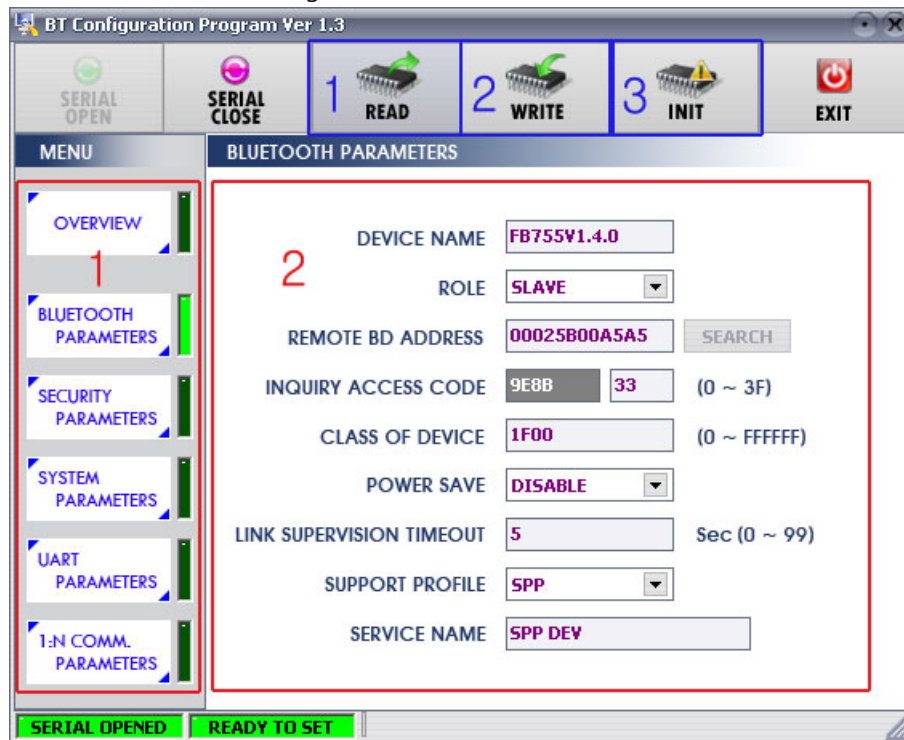
<Figure 11-2 BTConfig tool Serial connection >



**1 SERIAL OPENED, READ TO SET** : BTConfig tool and communication status of products.

<Figure 11-3 BTconfig tool connection >

- (4) If the <Figure 11-2> comes up, set each blank (Red borders N.1~2) to (COM PORT – **Port connected to FB200AS**, BAUDRATE – **9600**, PARITY BIT – **None**, STOP BIT – **1**). After the set-up, click the OPEN button (Red borders N.3), then *Serial Connection* and *Ready To Set* (Red borders N.1) lights become green as shown on <Figure 11-3> .  
If the lights doesn't change into green, check the COM PORT and execute BTConfig tool once again.
- (5) If click the READ button (blue borders) as shown on <Figure 11-3> after BTConfig tool is connected to products, MENU Buttons (<Figure 11-4> red borders N.1) are activated.



**1 BLUETOOTH PARAMETERS:** Set-up Group Button

**2 Set-up window:** change Set-up Groups and values

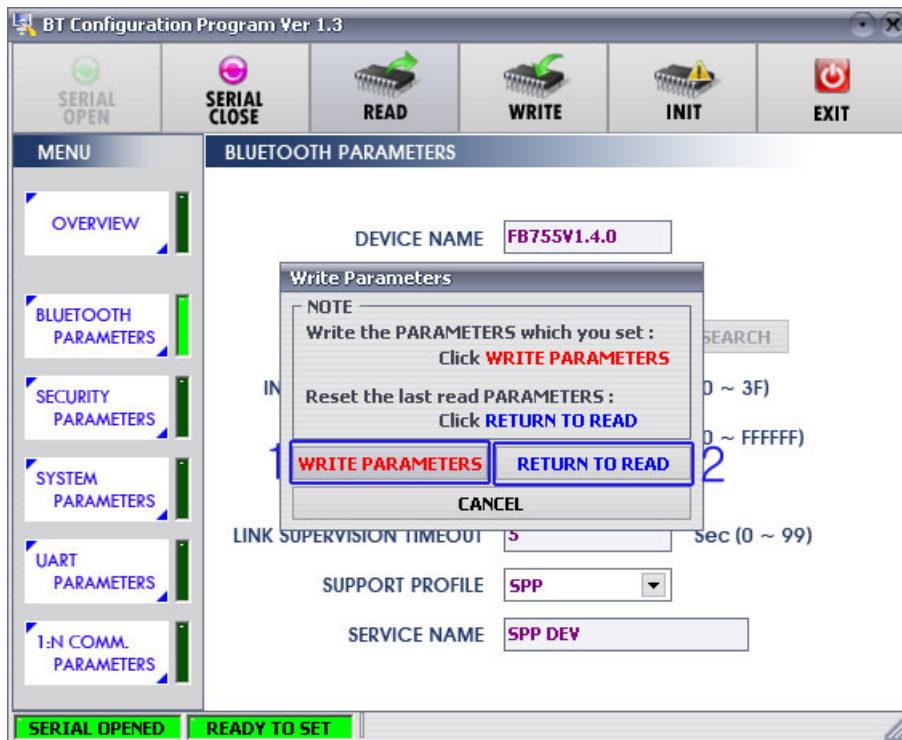
**1 READ button:** read set values. (During first initialization, value should be READ after BTConfig tools are connected to products)

**2 WRITE button:** Save set values. (Serial port is automatically off after saving is completely.)

**3 INIT button:** Reset all the set values to Factory fix points.

<Figure 11-4 BTConfig tool Set-up >

- (6) If you select any PARAMETERS(<Figure 11-4> red borders N.1), the window for Value Check and Set-up comes up on the right
- (7) Save the set values by clicking the WRITE button after Set-up completed.



**1 WRITE PARAMETERS:** Save the currently set values.

**2 RETURN TO READ:** Set to the initial value.

<Figure 11-5 BTConfig tool WRITE >

**Note:**

Please refer to the *appendix A* of PC Configuration for the further description.

## 11.2 PC Configuration using Serial Communication (Hyper Terminal) Program

### 11.2.1 To Execute Hyper Terminal

To set up PC Configuration using Hyper Terminal, following procedures shall be performed prior to the power is being supplied after the FB200AS is connected to the PC.

To set up PC Configuration, the Serial Communication Program is required. We will use Hyper Terminal in describing the procedures.

- (1) Fix the number 4 switch of Function Dip Switch at ON.
- (2) Connect FB200AS to the USB port of PC, and turn the power on.



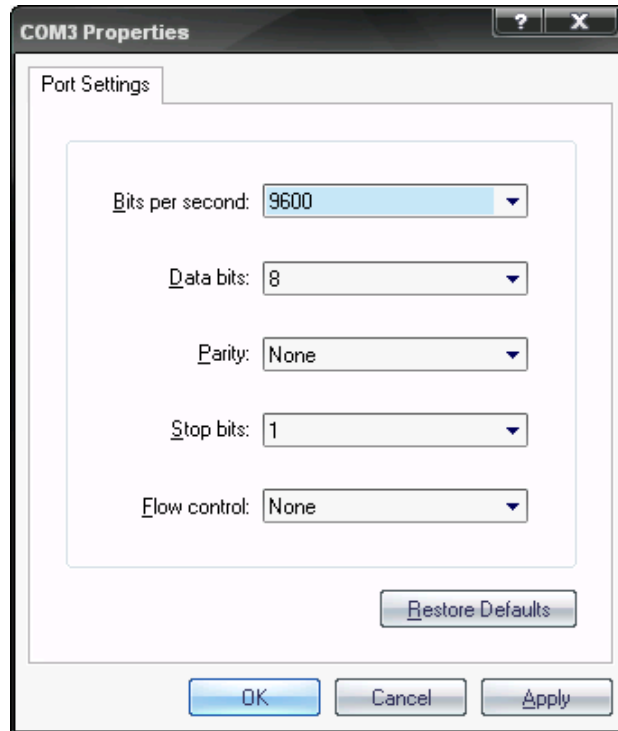
<Figure 11-6 Hyper Terminal Set up Window 1>

- (3) Execute in the order of **[start]→[All Programs]→[Accessories]→[Communications]→[Hyper Terminal]**, then connection window will appear. Enter appropriate name and click.



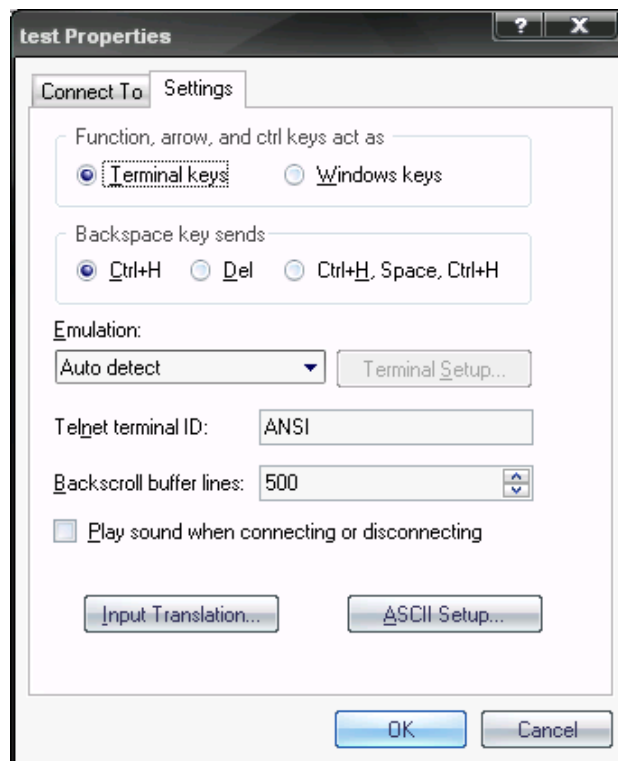
<Figure 11-7 Hyper Terminal Set up Window 2>

- (4) When the <Figure 11-7> comes up, select the COM port connected to FB200AS, and clicks the OK button.



<Figure 11-8 Hyper Terminal Set up Window 3>

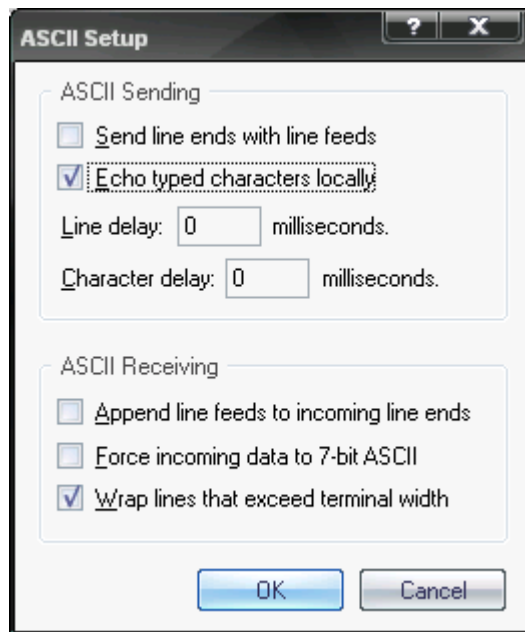
- (5) When Registration Information Window comes up as on <Figure 11-8>, select **Bit per second : 9600, Data bit : 8, Parity : none, Stop bit : 1, Flow control : none**, which will execute Hyper Terminal.



<Figure 11-9 Hyper Terminal Set Up Window 4>

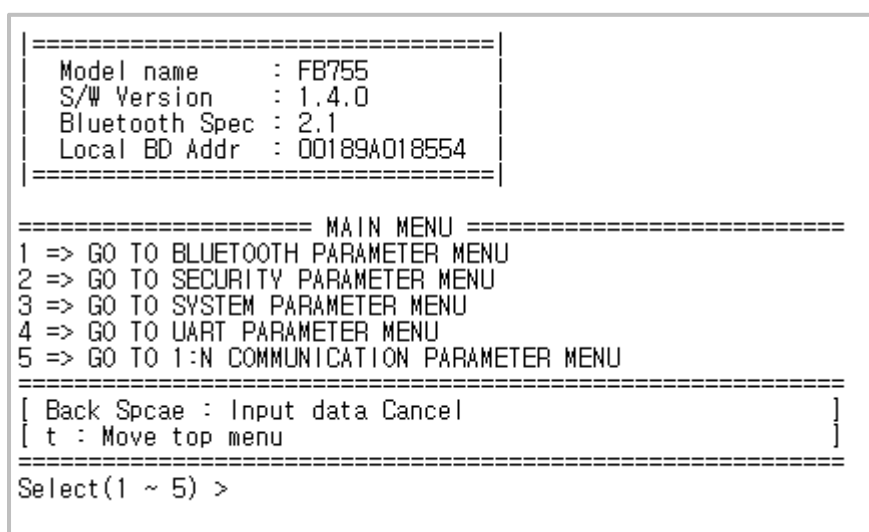


- (6) (6) Basically, the Hyper Terminal does not show the entered character. To make sure of the entered character, select **[File]→[Properties]** on the Menu, then registration information window will appear shown as on <Figure 11-9>, click the ASCII Setup button.



<Figure 11-10 Hyper Terminal Set Up Window 5>

- (7) As shown on <Figure 11-10>, Check **"Echo typed characters locally"** and come out pressing the acknowledge button. Now the Hyper Terminal program setting procedure is completed to use PC Configuration.
- (8) Press enter with small character "t" for FB200, the menu such as <Figure 11-11> will appear on the Hyper Terminal.



<Figure 11-11 PC Configuration Menu>

### 11.2.2 How to Use PC Configuration Menu

The user may select the menu to change by selecting the given number in front of the left end menu.

For example : To change "DEVICE NAME", enter : **[1]→[Enter]**

**Note :**

When Reset Button is pressed at <Figure 12-11>, all the set up value shall be reset to the initial set up status (factory fix point).

Following is the order to use the menu.

- (1) The execution will only be executed by pressing the "Enter" key.
- (2) The small character "t" will always move to be positioned at upper side of the menu.
- (3) To move menu, use the number in the end of left side. Please be sure to "Enter" key upon completion of input.
- (4) "←" key is used to delete the entered character currently.
- (5) If the entered character is unreadable or is not supported at the appropriate menu, "Retry >" message will be output.
- (6) If the input message is more than 12 characters, "Overflow buffer" message will be output and then "Retry >" message appeared as well.

Upon completion of PC Configuration setting up, turn off the FB200AS, and change the Function Dip Switch #4 (PC configuration) to OFF position and turn the power ON, which will start the Bluetooth to operate normally.

**Note :**

Please refer to the Appendix A, details of PC Configuration for detailed value description of PC Configuration.

## 12 Approval Information

### 12.1 KCC

### 12.2 FCC compliance Information

This device complies with part 15 of FCC Rules.

Operation is subject to the following two conditions:

1. This device may not cause harmful interference received.
2. This device must accept any interference received.

Including interference that may cause undesired operation.

#### **FCC WARNING**

This equipment may generate or use radio frequency energy. Changes or modifications to this Equipment may cause harmful interference unless the modifications are expressly approved in the instruction manual. The user could lose the authority to operate this equipment if an unauthorized change or modification is made.

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to Part 15 of the Federal Communication Commission(FCC) rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and , if not installed and used in accordance with the instructions, may cause harmful interference to radio communication. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures. Reorient or relocate the receiving antenna. Increase the separation between the equipment and the receiver. Connect the equipment into an outlet on a circuit different from that to which the receiver is connected Consult the dealer or an experienced radio/television technician for help.

### 12.3 CE

Hereby, Firmtech Co., Ltd, declares that this FB200AS is in compliance with the essential requirements and other relevant provisions of directive 1999/5/EC.

### 12.4 TELEC

### 12.5 SIG