Bluetooth Serial Adapter

FB100AS User Guide

Version 1.0

During transmitter operation, in order to meet RF Maximum permissible Exposure Safety Guidelines, a minimum distance of 20cm shall be maintained between antenna and personnel.

Firmtech

Firmtech Co., Ltd

B-606, Ssangyong IT Twin Tower, Sangdaewon-dong, 442-5

Jungwon-gu, Seongnam-si, Gyeonggi-do, Korea 462-120

Tel : +82-31-719-4812

Fax : +82-31-719-4834

Marketing Inquiry : contact@firmtech.co.kr

Technical Support Inquiry : techsupport@firmtech.co.kr

www.firmtech.co.kr

Revision History

Revision	Date	Change Descriptions
1.0	01-04-2009	- Write a draft

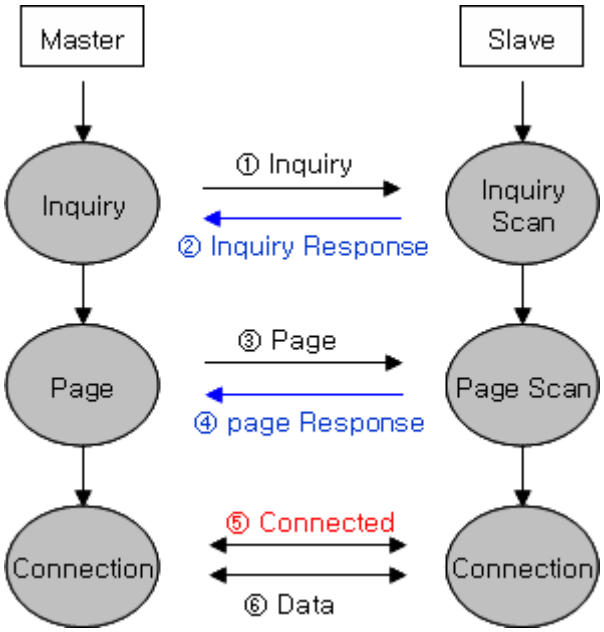
List of Content

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



<그림 1-1 블루투스 동작>

- Once the Master will inquire the Slave, the Slave will respond to the inquiry to the Master.
- When the information of Slave will agree with that of the Master, the interconnection will be achieved to transmit the data.
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- When the information of Slave will agree with that of the Master, the interconnection will be achieved to transmit the data.

2 Porducts Overview

FB100AS has been developed to replace the previous RS232 Cable system with wireless communication system to use.

Major Features of FB100AS

1. Bluetooth Specification 2.1 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 FB100AS & FB200AS by using AT Command.
5. Easy to connect to use with Bluetooth PDA, Bluetooth USB Dongle, etc.
6. Selectable Power Supply between D-Sub 9 pin Connector and USB Connector
7. Stable Data Transmission / Receipt

※ We request the new users of FB100AS to read the information on this description carefully before they start to use the products.

3 PRODUCT COMPONENTS

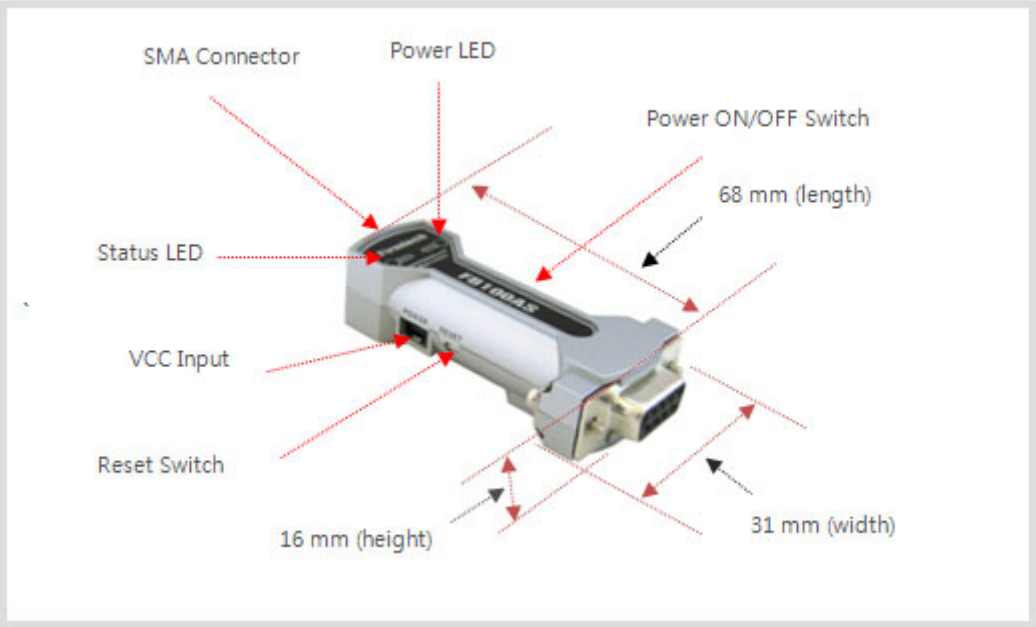
3.1 Basic Components of FB100AS

MODEL	PICTURE	Q'TY (EA)
FB100AS (RS-232 Serial Adapter)		1
FBA-UPC (USB Power Cable)		1
FBA004DA (4dBi Dipole Ant)		1
CD (Operation Manual and Test Program)		1

<Table 3-1 Basic Components of FB100AS>

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

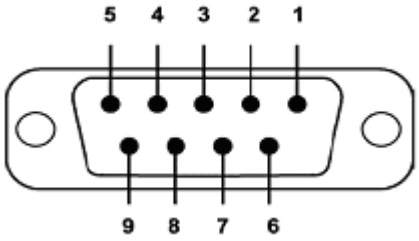
4 Product Appearance



<Figure 4-1 Details and Dimension of FB100AS>

5 Interface

5.1 FB100AS Interface



<Figure 5-1 D-SUB 9 Pin Connector>

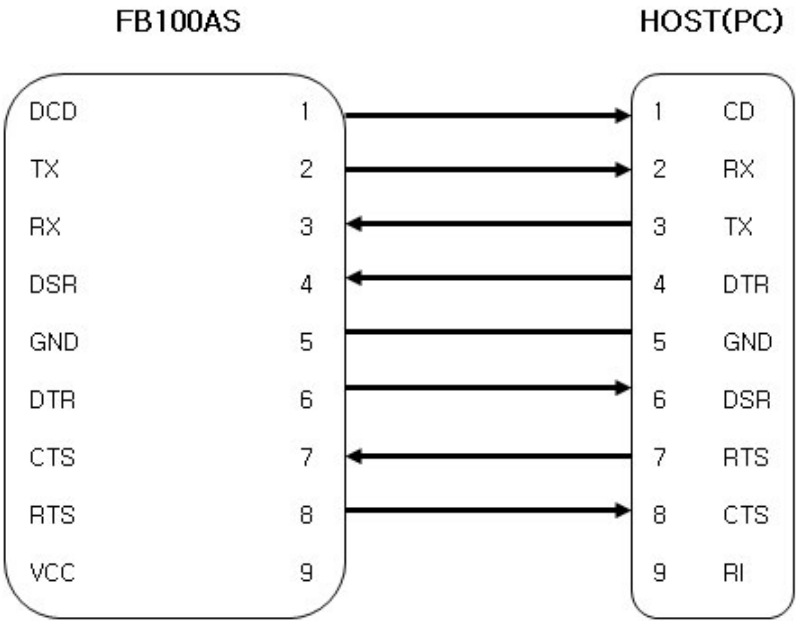
PIN NO.	NAME OF SIGNAL	FUNTION	INPUT/OUTPUT DIRECTION
1	CONNECT_CHECK DCD	1:N - Connect Check 1:1 - Data Carrier Detect	Output
2	TX	Transfer Data Data output	Output
3	RX	Received Data Data Input	Input
4	STREAM_CONTROL DSR	1:N - Stream Control 1:1 - Data Set Ready	Input
5	GND	Ground	
6	STREAM_STATUS DTR	1:N - Stream Status 1:1 - Data Terminal Ready	Output
7	MESSAGE_CONTROL CTS	1:N - Message Control 1:1 - Clear To Send	Input
8	MESSAGE_STATUS RTS	1:N - Message Status 1:1 - UART Ready To Send	Output
9	VCC	Power (DC 4 ~ 12V)	Input

<Table 5-1 Features of D-SUB 9 Signals>

※ The power can be supplied through pin number 9.

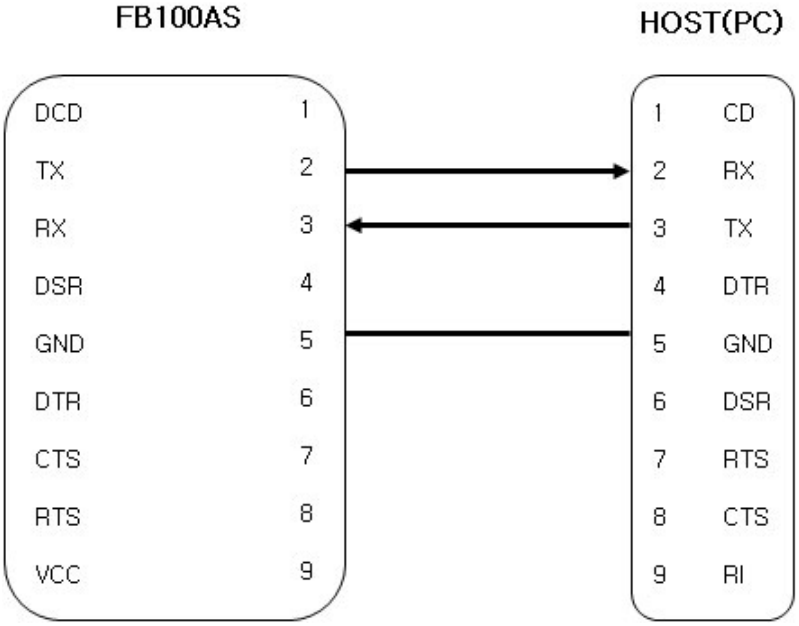
5.2 Pin Connection

5.2.1 Connection Diagram with Flow Control



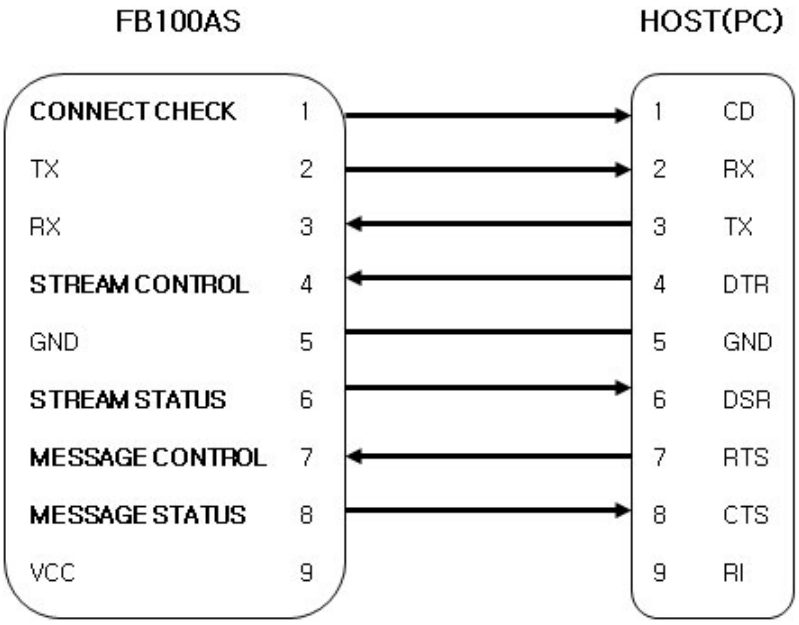
<Figure 5-2 FB100AS Connection Diagram with Flow Control>

5.2.2 Connection Diagram without Flow Control



<Figure 5-3 FB100AS Connection Diagram without Flow Control>

5.2.3 Connection Diagram with 1:N Function



<Figure 5-4 Connection Diagram with 1:N Function>

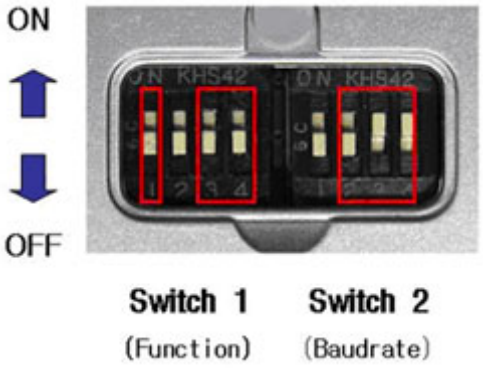
Note :

If Flow Control is not required, communication can be achieved with only RX, TX, and GND connected to the Host.

For 1:N communication, connection of STREAM CONTROL(DSR) and STREAM STATUS(DTR) are necessarily required. MESSAGE CONTROL(CTS) and MESSAGE STATUS(RTS) is used for the confirmation of the accurate information.

In 1:N communication, if all connection is successful, CONNECT CHECK(DCD) in SLAVE Device is outputted HIGH signal. However, if one or more of connections is disconnected, CONNECT CHECK(DCD) in SLAVE will be outputted LOW signal. (Default CONNECT CHECK(DCD) Output : LOW)

6 Features of Dip Switch



<Figure 6-1 Features of Dip Switch>

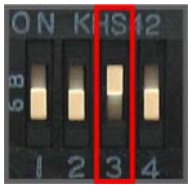
6.1 Dip Switch 1 (FUNCTION Switch)

SW	FEATURES	ON	OFF	BASIC SET
1	Selectable Power Supply	D-SUB Power Supply or USB Power Supply	USB Power Supply	ON
2	None	-	-	OFF
3	ROLE	MASTER	SLAVE	OFF
4	Environment Setting (PC Configuration Select)	PC Configuration Mode	Operation Mode	OFF

<Table 6-1 Features of FUNCTION Switch>

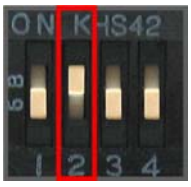
6.2 Dip Switch 2 (Baud Rate Switch)

2400bps

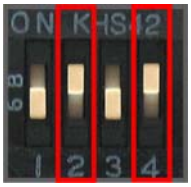


4800bps

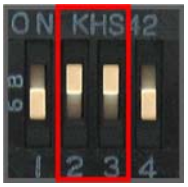
9600bps



19200bps

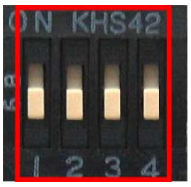


38400bps



57600bps

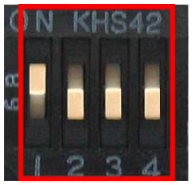
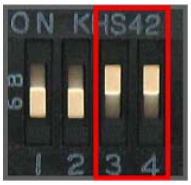
115200bps



230400bps

<Figure 6-3 Transmission Rate>

6.3 Initial Set Value of Dip Switch

TYPE	Function Switch	Baud Rate Switch
FB100AS		

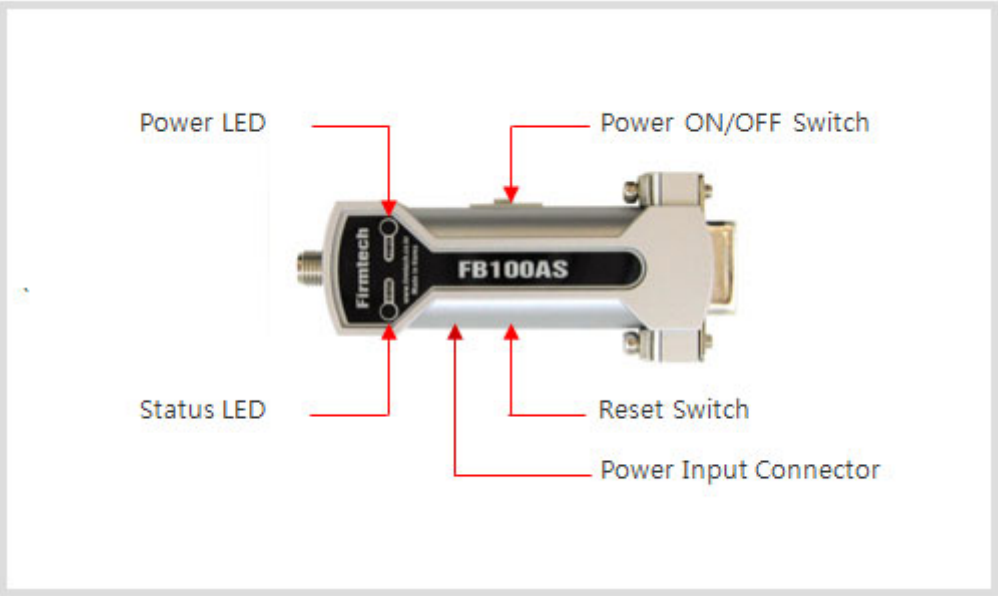
<Table 6-2 Initial Set Value of Dip Switch>

If the initial value is not consistent with <Figure 6-3>, please contact the seller you purchased the product.

Note :

If the CONNECTION MODE of PC Configuration is MODE4 (AT command language), 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.

7 Power Indicator LED / Status LED



<Figure 7-1 Appearance of FB100AS>

LED TYPE	STATUS	DESCRIPTION
Power Indicator LED (Power LED)	Power Input	The Red Light Turns on
Status Indicator LED (Status LED)	Connecting to Bluetooth	Green LED is Flickering
	Connected to Bluetooth	Green LED turned on
	PC Configuration	Red LED is Flickering

<Table 7-1 Operation Check by LED Status>

8 Performance of Product

No.	Part		Specification
1	Bluetooth Spec.		Bluetooth Specification 2.1 Support (EDR disabled)
2	Communication distance		100 M
3	Frequency Range		2402~2480MHz
4	Sensitivity		-83dBm (Typical)
5	Size		66 x 31 mm
6	Support Bluetooth Profile		SPP (Serial Port Profile) DUN (Dial-Up Network Profile)
7	Input Power		5V
8	Current Consumption		100 mA (Max)
9	Temperature	Operating	-20℃ ~ +55℃
10		Limit Operating	-30℃ ~ +80℃
	Communication Speed		1,200bps – 230,400bps
11	Antenna		Dipole Antenna
12	Interface		9 pin D-SUB Female (RS232)
13	Flow Control		RTS, CTS, DTR, DSR support

<Table 8-1 Performance of FB100AS>

9 Current Consumption

STATUS		Current Consumption (mA)		
		MIN	MAX	AVG
Standby		3	12	**8**
Inquiry scan & page scan (Slave)		6	51	**28**
Page scan (Slave)		6	21	**9**
Inquiry (Master)		66	69	**67**
Connected	**Slave**	27	39	**29**
	Master	9	21	**12**
Data transmission	**Slave**	33	42	**37**
	Master	30	39	**36**
Data reception	**Slave**	27	42	**35**
	Master	30	42	**37**
Data transmission / reception	**Slave**	36	42	**39**
	Master	36	45	**40**
Power save	**Slave**	6	18	**10**
	Master	5	18	**10**

<Table 9-1 Current Consumption of FB100AS>

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.

10 Initial Set Value of Products

The product has the initial Set Value as shown on the <Table 10-1>.
Please be sure to identify the initial Set Value, before you begin to use.

TYPE	Set Values
Device Name	FB100AS 1.0
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 통신)
Debug Char	0x02

<Table 10-1 Initial Set Values of FB100AS>

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 12 PC Configuration for details on changing the setting.

11 Bluetooth Pairing

11.1 Configuration using Dip Switch

11.2 Configuration using C-WIZARD

12 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 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.
The ways to configure are as follows respectively.

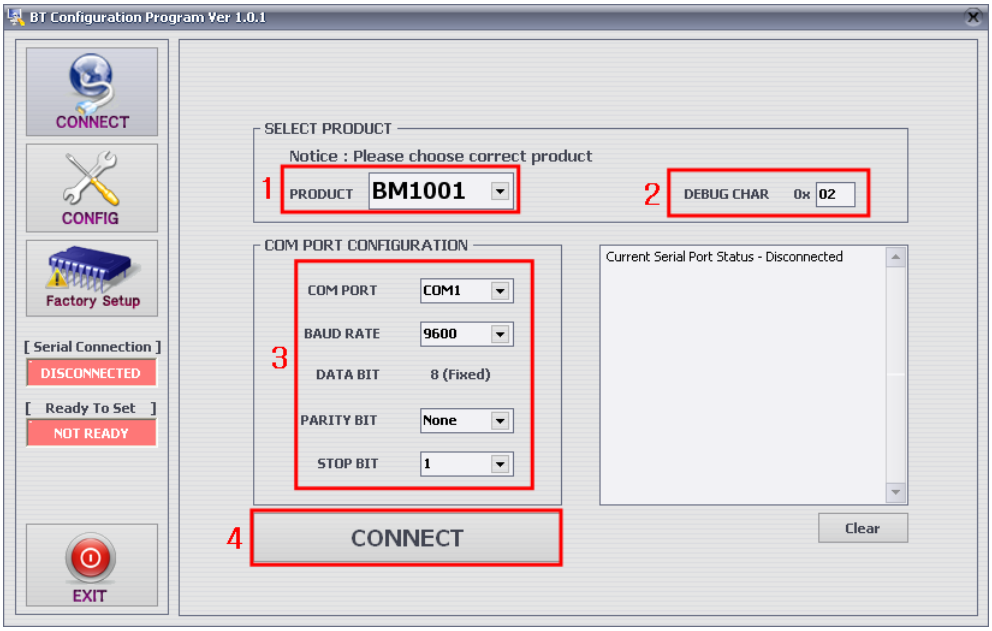
12.1 PC Configuration using BTConfig tool

(1) Please provide FB100AS with power, then check if the Status LED of FB100AS is flickering or not. If red LED is flickering, turn off the power and set the fourth of FUNCTION Dip-Switch at OFF position.

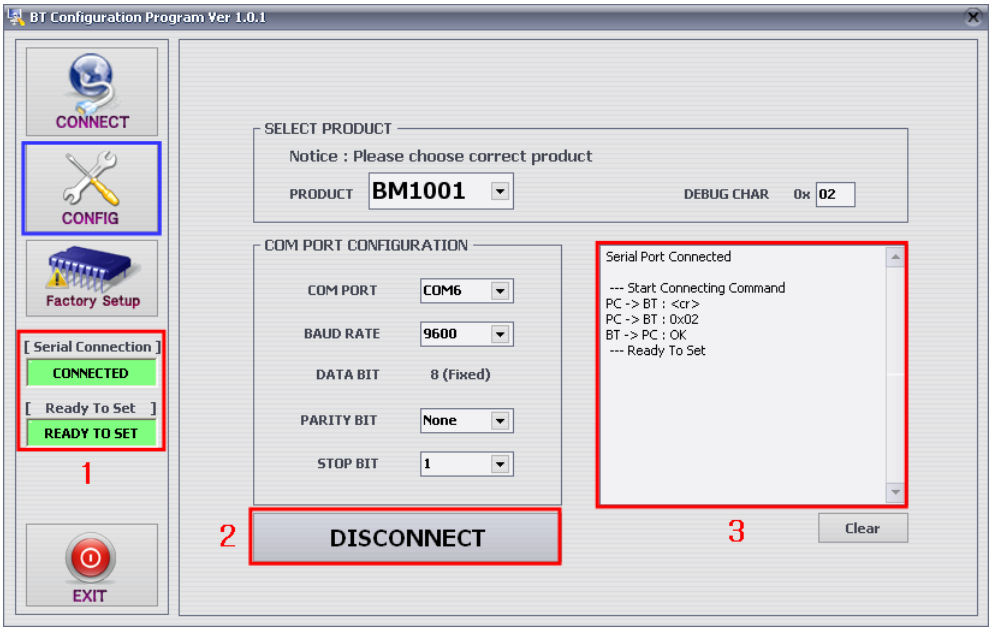
(2) Please connect FB100AS to the serial port of PC, and turn the power on to execute the BTConfig tool.

<Figure 12-1 BTConfig tool main display>

(3) Select main "CONNECT" (<Figure 12-1> Outlined Blue) on main display.



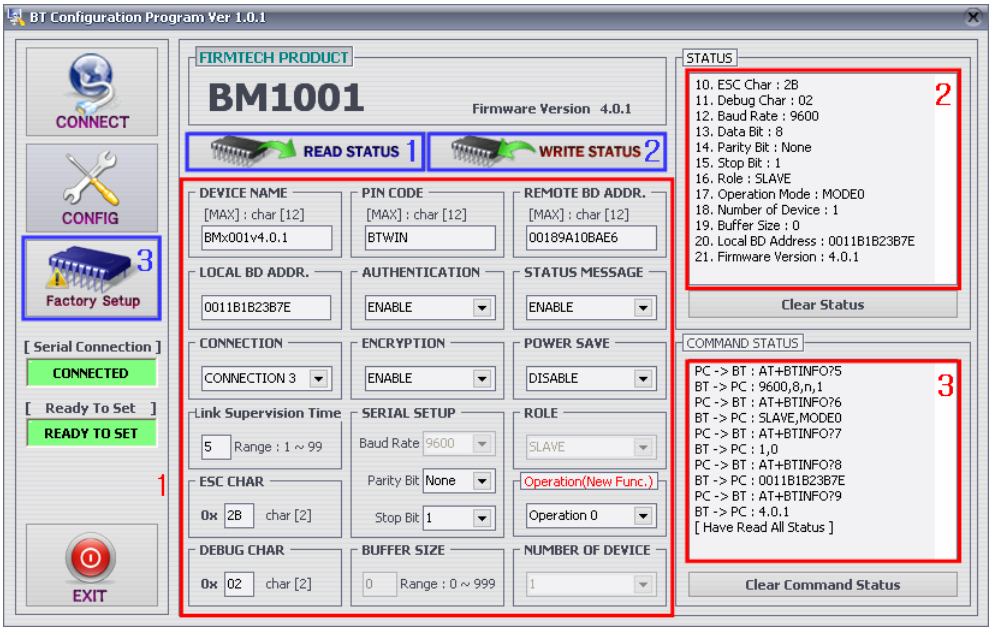
<Figure 12-2 BTConfig tool CONNECT display>



<Figure 12-3 Connection Display of BTconfig tool>

(4) If above <Figure 12-2> appears on the display, select the red lined square 1 ~ 3, and press CONNECT button(red lined square 4), then the Serial Connection, Ready To Set (red lined box 1) will be turned into green color as shown on <Figure 12-3>.
If it does not change its color, please check with the set value of product and try to execute the config tool again.

(5) Upon the product connected with config tool normally, select the Config Button(outlined in blue) of Figure<12-3> to have the display appeared as seen on <Figure 12-4> where you can set the PC Configuration.



<Figure 12-4 BTConfig tool - Device Configuration >

(6) Following is to describe the procedures of setting up the config tool.

- Upon completion of all setting up, please click WRITE STATUS to store the newly set up values.
- To verify if the stored values are correct, just simply click READ STATUS to read out the current PC Configuration stored.
- If you want to set up as it was originally received, just simply click Factory Setup, which will reset to the initial received value.
- Since config tool is designed on the basis of AT command of the Product, which enables to look and verify the command language with its status through status value and message window of the command language status

Note :

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

12.2 PC Configuration using Serial Communication (Hyper Terminal) Program

12.2.1 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 FB100AS 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.

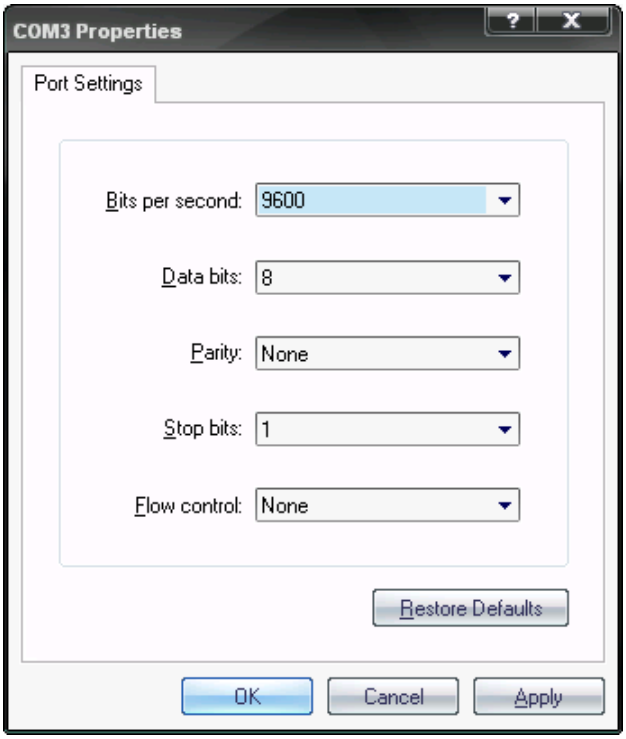
(1) Fix the number 4 switch of Function Dip Switch at ON.

<Figure 12-6 Hyper Terminal Set up Window 1>

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

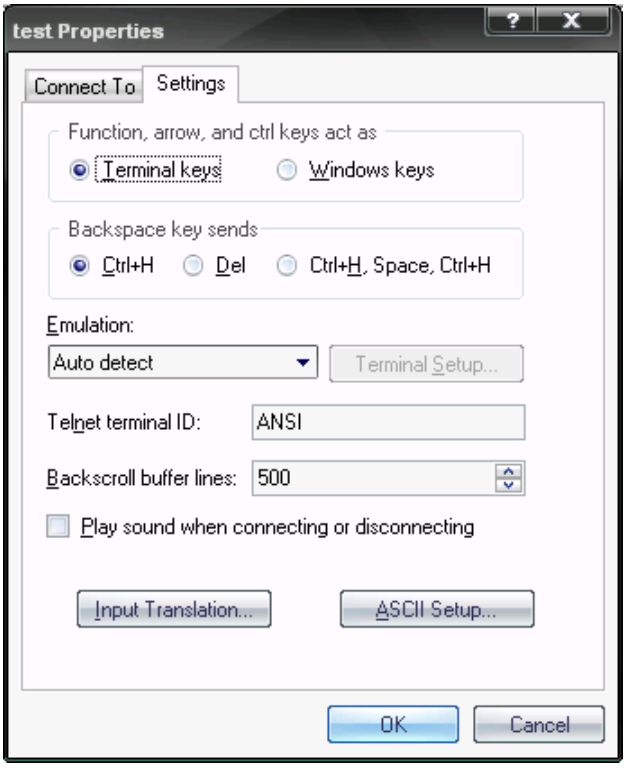
<Figure 12-7 Hyper Terminal Set up Window 2>

(3) When the <Figure 12-7> comes up, select the COM port connected to FB100AS, and clicks the OK button.



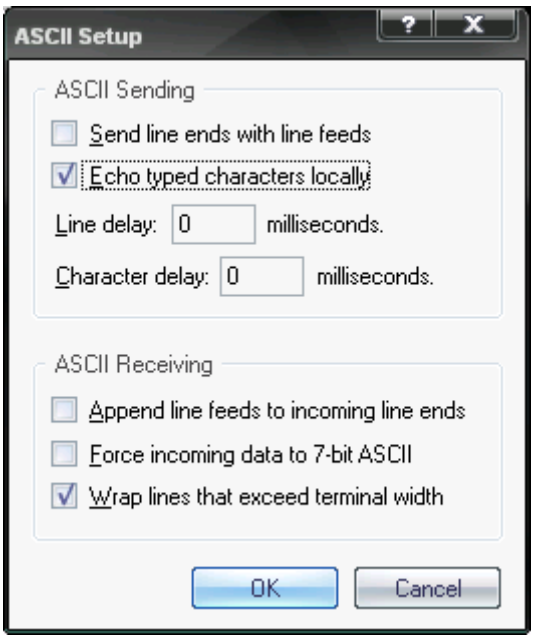
<Figure 12-8 Hyper Terminal Set up Window 3>

(4) When Registration Information Window comes up as on <Figure 12-8>, select **Bit per second** : **9600**, **Data bit** : **8**, **Parity** : **none**, **Stop bit** : **1**, **Flow control** : **none**, which will execute Hyper Terminal.



<Figure 12-9 Hyper Terminal Set Up Window 4>

(5) (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 12-9>, click the ASCII Setup button.



<Figure 12-10 Hyper Terminal Set Up Window 5>

(6) As shown on <Figure 12-10>, 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.

(7) If the Power is approved for FB100AS, the menu such as <Figure 12-11> will appear on the Hyper Terminal.

```
|================================|
|  Model name     : FB755        |
|  S/W Version    : 1.4.0        |
|  Bluetooth Spec : 2.1          |
|  Local BD Addr  : 00189A018554 |
|================================|

==================== MAIN MENU ============================
1 => GO TO BLUETOOTH PARAMETER MENU
2 => GO TO SECURITY PARAMETER MENU
3 => GO TO SYSTEM PARAMETER MENU
4 => GO TO UART PARAMETER MENU
5 => GO TO 1:N COMMUNICATION PARAMETER MENU
===========================================================
[ Back Spcae : Input data Cancel                           ]
[ t : Move top menu                                        ]
===========================================================
Select(1 ~ 5) >
```

<Figure 12-11 Pc Configuration Menu>

12.2.2 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 FB100AS, 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.

13 Approval Information

13.1 KCC

13.2 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.

13.3 CE

Hereby, Firmtech Co., Ltd, declares that this FB100AS is in compliance with the essential requirements and other relevant provisions of directive 1999/5/EC.

13.4 TELEC

13.5 SIG