BM1001 & BM2001

Serial & USB Adaptor

Firmtech

ABOUT BM1001 & BM2001 version 4.0:

Class 1 / RS232 / USB Interface

DIP switch is available for a second setting

4dBi Dipole Antenna provided

AT Command provided

FIRMTECH Co., Ltd.

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What is Bluetooth?

1. Features of Bluetooth

1) Objectives of Bluetooth : To Realize Wireless Communication for Short Distance with Low Power Consumption, High Reliability, and Low Cost.

2) 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)

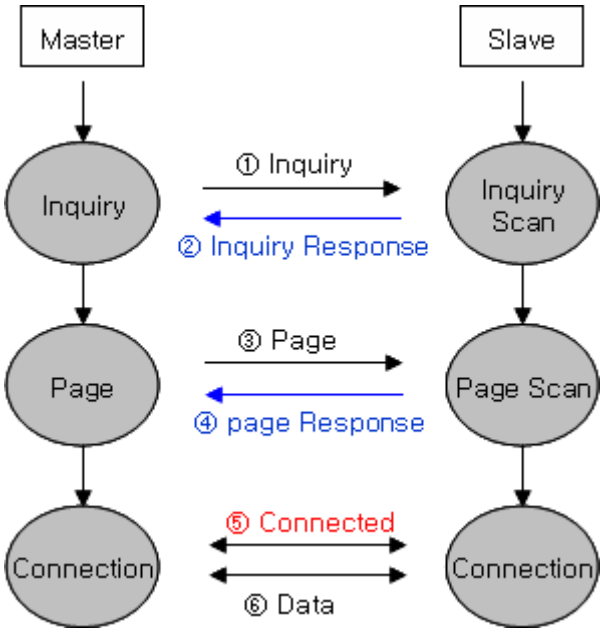
3) Transmission Rate : 1Mbps ~ 3Mbps

4) Transmission Output : 1mW(10m, Class2), 100mW(100m Class1)

5) Network Configuration : Configured with Master and Slave relation. A Bluetooth unit shall allow simultaneous connections up to 7 devices (in case of ACL).

6) Reliability : To Guarantee stable wireless communication even under severe noisy environment through adopting the technique of FHSS (Frequency Hopping Spread Spectrum).

2. Operation of Bluetooth



<Figure 0-1 Operation of Bluetooth>

1) Once the Master will inquire the Slave, the Slave will respond to the inquiry to the Master.

2) When the information of Slave will agree with that of the Master, the interconnection will be achieved to transmit the data.

Products Overview

BM1001 / BM2001 has been developed to replace the previous RS232 Cable system with wireless communication system to use.

Major Features of BM1001 & 2001

1. Bluetooth Specification 2.0 Support

2. Bluetooth Piconets(Point to Multipoint) are configurable up to (max. 1:5).

3. Easy to control communication speed by using DIP Switch. (2400 bps – 230400bps)

4. Support AT Command, and capable to control BM1001 & BM2001 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 BM1001 & 2001 to read the information on this description carefully before they start to use the products.

■ List of Conten

1 PRODUCT COMPONENTS

1-1 Basic Components of BM1001

MODEL	PICTURE	Q'TY
BM1001 (RS-232 Serial Adapter)		1EA
FBA-UPC (USB Power Cable)		1EA
FBA004DA (4dBi Dipole Ant)		1EA
CD (Operation Manual and Test Program)		1EA

<Table 1-1: Basic Components of BM1001>

1-2 Basic Components of BM2001

MODEL	PICTURE	Q'TY
BM2001 (USB Serial Adapter)		1EA
FBA004DA (4dBi Dipole Ant)		1EA
CD (Operation Manual and Test Program)		1EA

<Table 1-2 : Basic Components of BM2001>

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

2 Performance of Product and Power Consumption

2-1 Performance of Product

Part		Specification
Bluetooth Spec.		Bluetooth Specification V2.0 Support
Communication distance		100 M
Frequency Range		2.4 GHz ISM Band
Sensitivity		-83dBm (Typical)
Transmit Power		16dBm(Typical)
Size	BM1001	66 x 31 mm
	BM2001	73 x 22 mm
Support Bluetooth Profile		SPP
Input Power	BM1001	4 – 12V
	BM2001	5V
Current Consumption		100 mA(Maximum)
Operating Temperature		-10℃ - 50℃
Communication Speed		2,400bps – 230,400bps
Antenna		Dipole Antenna(4 dBi)
PC Interface	BM1001	9pin DSUB Female(RS232)
	BM2001	USB
Flow Control		RTS, CTS, DTR, DSR support

<Table 2-1: Performance of BM1001 & 2001>

2-2 Current Consumption

2-2-1 BM1001

Status	Current Consumption	
	MIN	MAX
Standby	9	17
Device searching	71	83
Pairing / Before Connection	65	71
After Connection	14	37
Data Transferring	36	43
Power save	7	9

<Table 2-2 : Current Consumption of BM1001>

2-2-2 BM2001

Status	Current Consumption	
	MIN	MAX
Standby	20	24
Device searching	100	106
Pairing / Before Connection	86	88
After Connection	50	55
Data Transferring	59	64
Power save	7	9

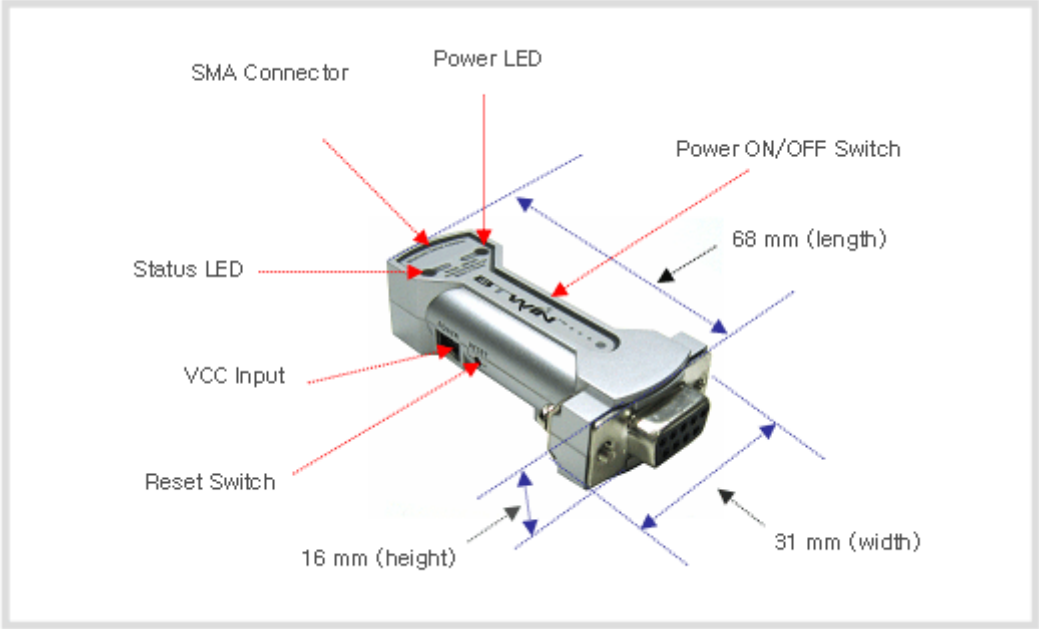
<Table 2-3 : Current Consumption of BM2001>

- TEST CONDITIONS

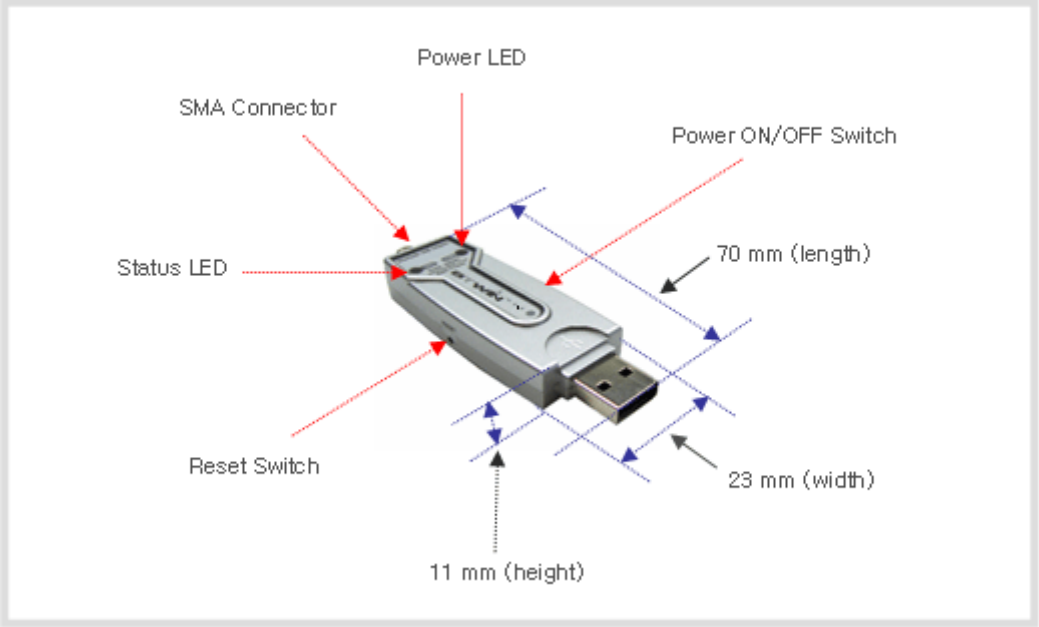
Baud rate : 9600 bps, Input Voltage : DC 5V

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

3 Product Appearance



<Figure 3-1 : Details and Dimension of BM1001>



<Figure 3-2 : Details and Dimension of BM2001>

4 Initial Set Value of Products

The product has the initial Set Value as shown on the <Table 4-1>.
Please be sure to identify the initial Set Value, before you begin to use.

Type	Set Values
Device Name	BMx001v.x.x.x
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
Debug char	0x02

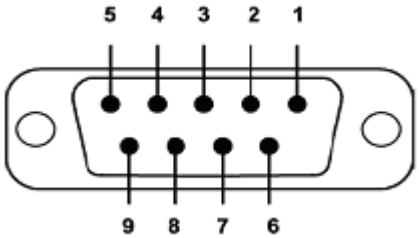
<Table 4-1 : Initial Set Values of BMx001>

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 8 PC Configuration for details on changing the setting.

5 Interface

5-1 BM1001 Interface



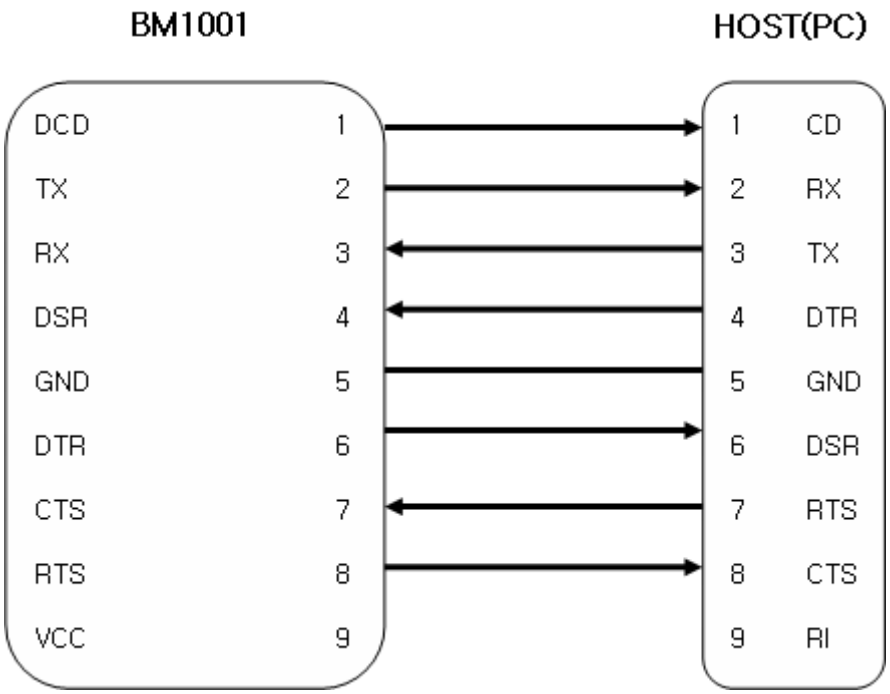
<Figure 5-1 D-SUB 9 Pin Connector>

PIN NO.	NAME OF SIGNAL	FUNCTION	INPUT/OUTPUT DIRECTION
1	DCD	1:1 - Data Carrier Detect	Output
	CONNECT CHECK	1:N – CONNECT CHECK	
2	TX	Transmit Data	Output
3	RX	Receive Data	Input
4	DSR	1:1 - Data Set Ready	Input
	STREAM CONTROL	1:N - STREAM CONTROL	
5	GND	Ground	
6	DTR	1:1 - Data Terminal Ready	Output
	STREAM STATUS	1:N – STREAM STATUS	
7	CTS	1:1 - Clear To Send	Input
	MESSAGE CONTROL	1:N – MESSAGE CONTROL	
8	RTS	1:1 - Ready To Send	Output
	MESSAGE STATUS	1:N – MESSAGE STATUS	
9	VCC	Power(DC 4-12V)	Input

<Table 5-1 : Features of D-SUB9 Signals>

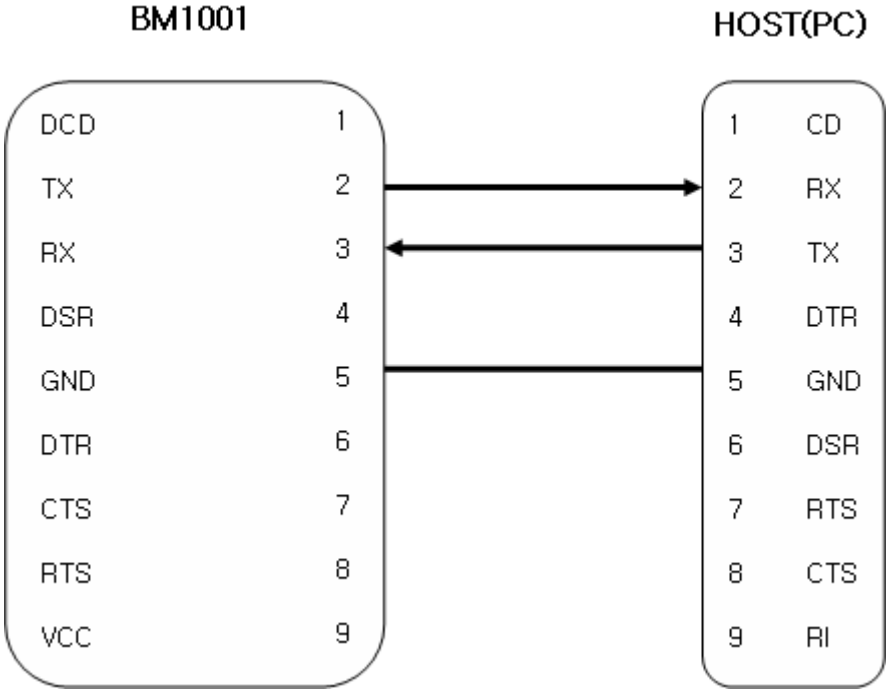
※ The power can be supplied through pin number 9.

5-1-1 Connection Diagram with Flow Control



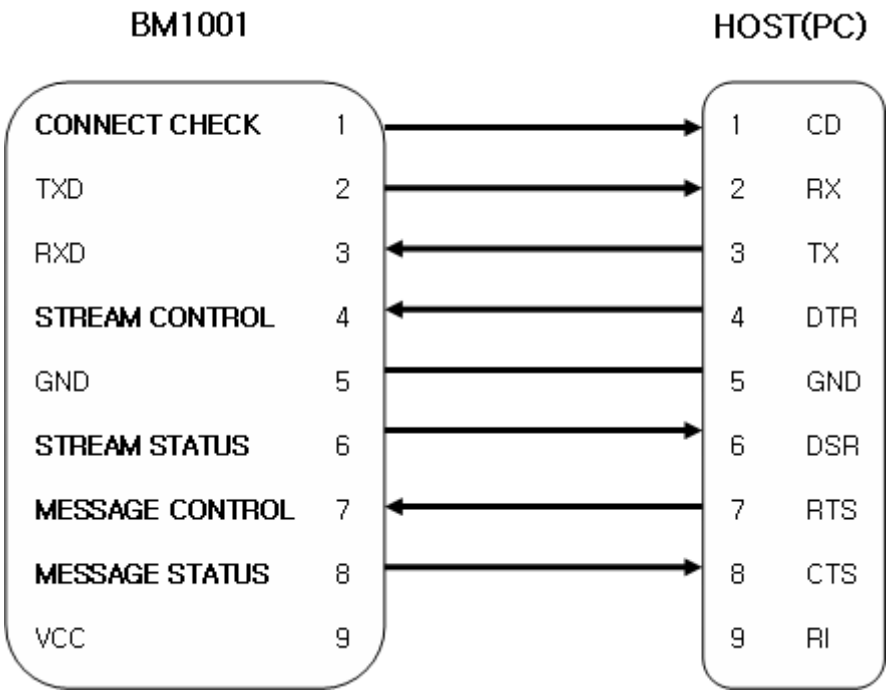
<Figure 5-2 : BM1001 Connection Diagram with Flow Control>

5-1-2 Connection Diagram without Flow Control



<Figure 5-3 : BM1001 Connection Diagram without Flow Control>

5-1-3 Connection Diagram with 1:N Function



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

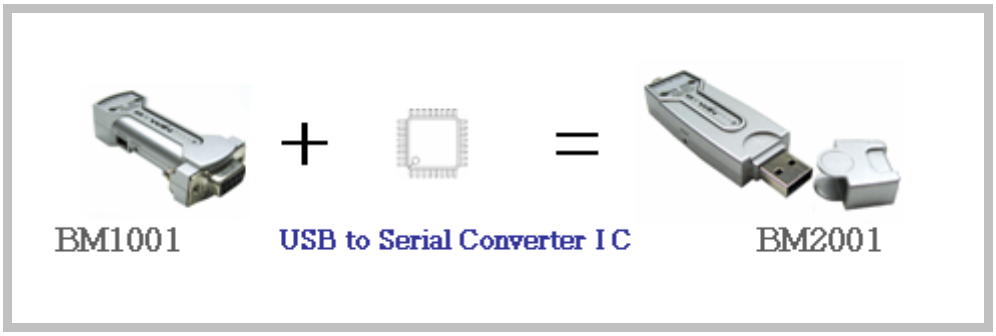
Note : If Flow Control is not required, communication can be achieved with only RX, TX, and GND connected to the Host.

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)

5-2 BM2001 Interface

5-2-1 Difference of BM1001 from BM2001



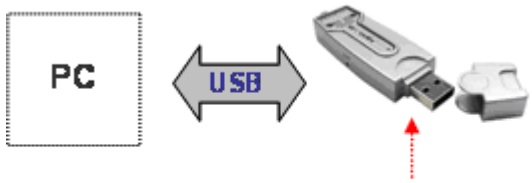
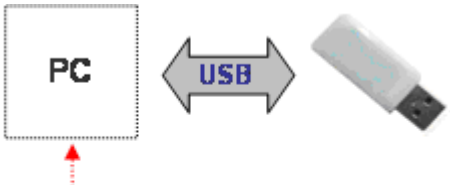
<Figure 5-5 : Difference of BM1001 from BM2001>

As you can see <Figure 5-5>, BM2001 is combined product of features of Bluetooth Serial Adapter(BM1001) with features of USB to Serial Change Chip.

5-2-2 Differences of BM2001 from USB Dongle

TYPE		BM2001	USB Dongle
In view of Hardware		Configured of features of USB to Serial Converter Chip, and features of Bluetooth Serial Adapter	Configured with Bluetooth Module and Antenna
In view of Software		The product operates by the software programmed into the flash memory of inside of Bluetooth Module.	The product operates by dedicated driver to each O/S of PC, and applications software.
Others	Device Driver Installation (USB Device Recognition)	Installation is required.	Installation is required.
	Install Applications	Installation is not required.	Installation is required.
	Bluetooth Support Profile	SPP	SPP, PAN, DUN, etc.

BM2001	USB Dongle
	

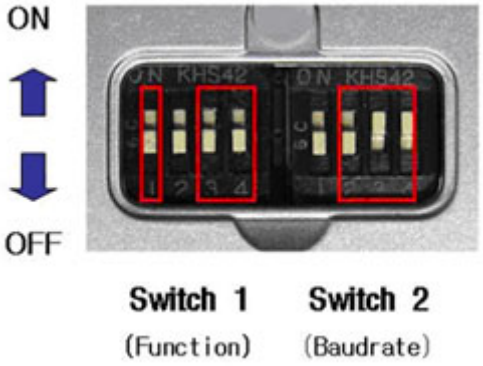
 Position of SPP Profile and Application (Built in BM2001)	 Position of SPP Profile and Application (Built in PC HDD)

<Table 5-2 : Difference of BM2001 from USB Dongle>

6 Features of Dip Switch

<Figure 6-1 : BM1001 Dip Switch View>

<Figure 6-2 : BM2001 Dip Switch View>



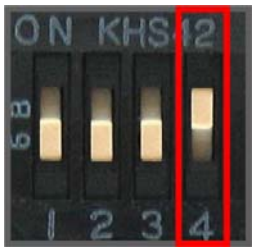
<Figure 6-3 : Features of Dip Switch>

6-1 Dip SWITCH 1(FUNCTION Select)

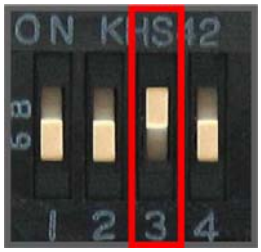
SW	FEATURES		ON	OFF	BASIC SET
1	Selectable Power Supply	BM1001	D-SUB Power Supply / USB Power Supply	USB Power Supply	ON
		BM2001	-		OFF
2	None		-	-	OFF
3	ROLE		MASTER	SLAVE	OFF
4	Environment Setting (PC Configuration Select)		PC Configuration	Operation	OFF

<Table 6-1 : Features of FUNCTION Switch>

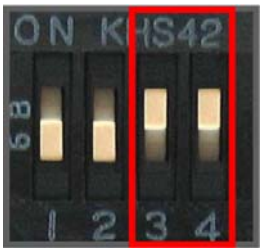
6-2 Dip SWITCH 2(Baud Rate Selectable)



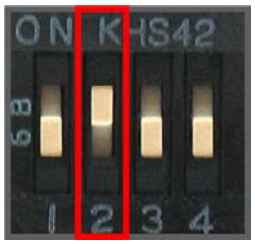
2400 baud



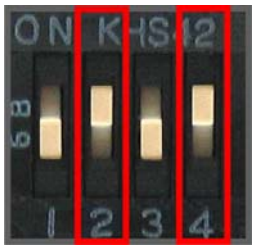
4800 baud



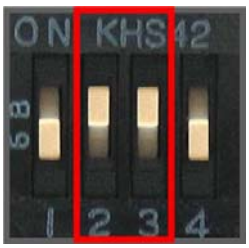
9600 baud



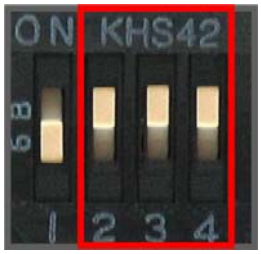
19200 baud



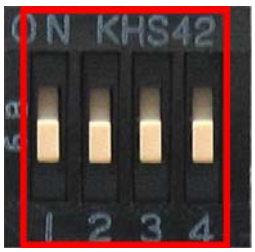
38400 baud



57600 baud



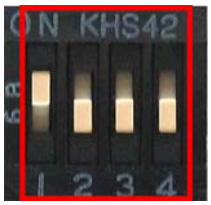
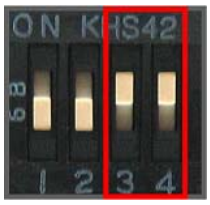
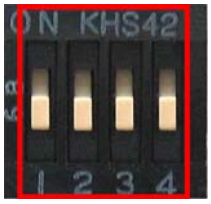
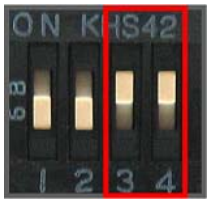
115200 baud



230400 baud

<Figure 6-2 : Transmission Rate>

6-3 Initial Set Value of Dip Switch

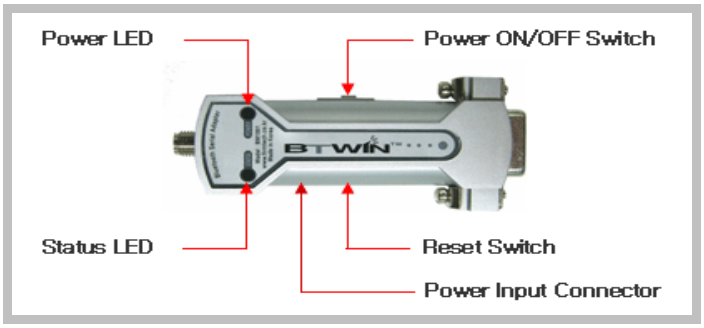
TYPE	Function Switch	Baud rate Switch
BM1001		
BM2001		

<Figure 6-3 : Initial Set Value of Dip Switch>

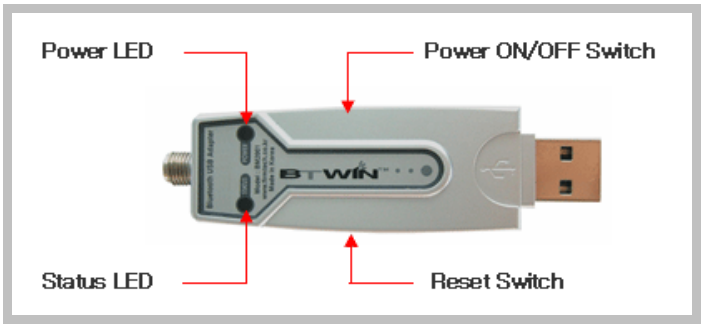
If the initial value is not consistent with <Figure 6-3>, please contact the seller you purchased the product.

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 BM1001>



<Figure 7-2 : Appearance of BM2001>

LED TYPE	STATUS	DESCRIPTION
BM1001		
Power Indicator LED	Power Input	The Red Light turns on.
Status Indicator LED	Connecting to Bluetooth	Green LED is Flickering
	Connected to Bluetooth	Green LED turned on.
	PC Configuration	Red LED is Flickering.
BM2001		
Power Indication LED	Power Input	Red LED turns on.
	PC connected	Green LED turns on.
Status Indication LED	Connecting to Bluetooth	Green LED is Flickering.
	Connected to Bluetooth	Green LED turns on.
	PC Configuration	Red LED is Flickering.

<Table 7-1 : Operation Check by LED Status>

If the product does not operate as described on Table 7-1, please contact the seller you purchased.

8 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.

Note : The BM2001 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 BM2001 for the instructions of driver installation of BM2001.

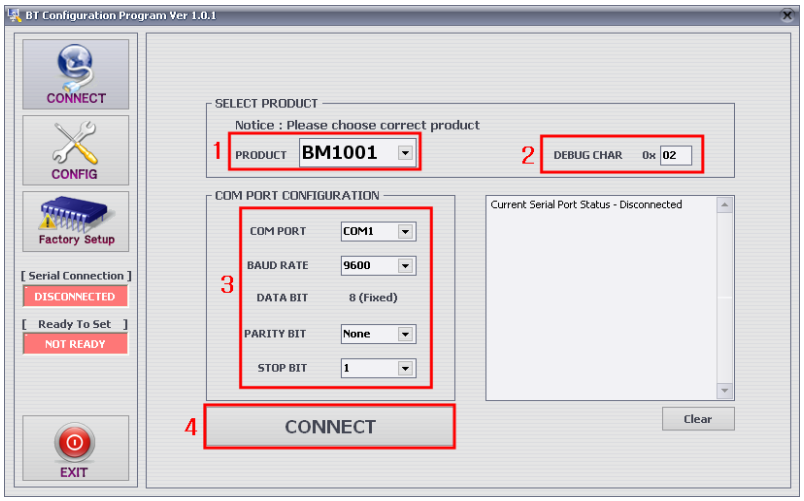
8-1 PC Configuration using Config tool

(1) Please provide BMx001 with power, then check if the Status LED of BMx001 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 BMx001 to the serial port of PC, and turn the power on to execute the Config tool.

<Figure 8-1 config tool main display>

(3) Select main **"CONNECT"** (<Figure 8-1> Outlined Blue) on main display.



1 Product Selection : name of product in use

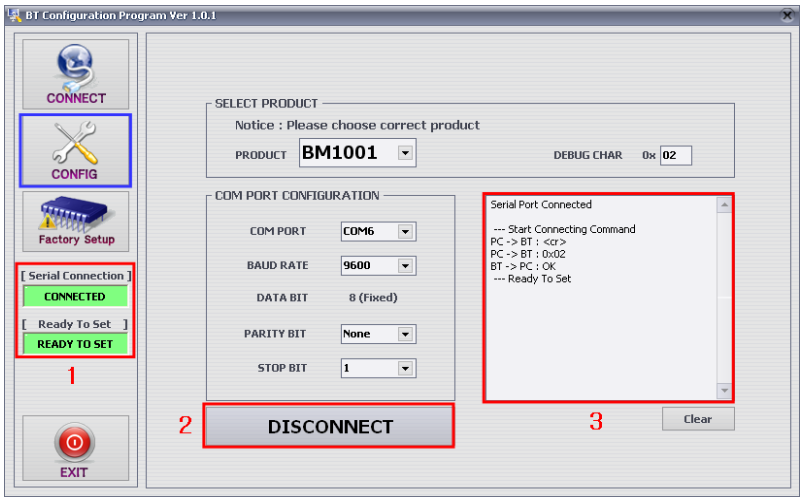
2 DEBUG CHAR : Default value is 0x02. (Please refer to the Appendix for the details of PC Configuration)

3 Set Serial Port : Please select communication speed set for Dipswitch currently. (Default is 9600.)

<Figure 8-2 config tool CONNECT display>

(4) If above <Figure 8-2> 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 8-3>.

If it does not change its color, please check with the set value of product and try to execute the config tool again.



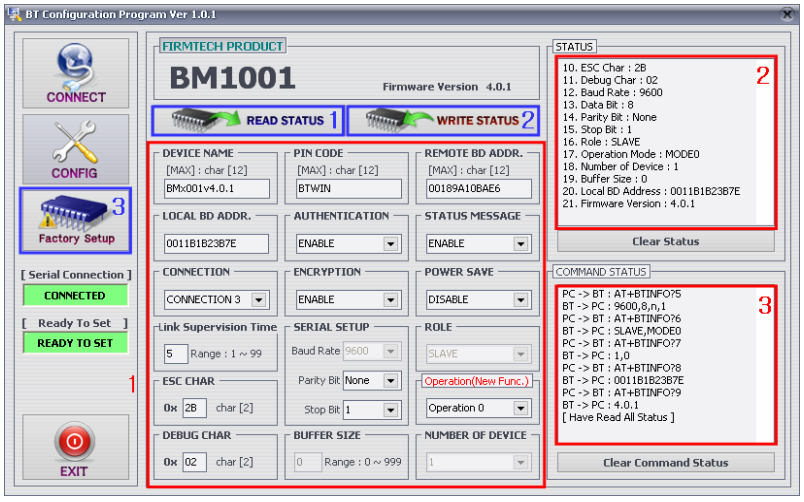
1 Serial Connection, Ready To Set : Shows the status of Config tool connected with the product

3 Status Message : Displays the status of command language in processing.

<Figure 8-3 Connection Display of Config Tool>

(5) Upon the product connected with config tool normally, select the Config Button(outlined in blue) of Figure<8-3> to have the display appeared as seen on <Figure 8-4> where you can

set the PC Configuration.



1 To Set PC Configuration Window : Enables to select the value of PC Configuration.

2 Status Value : Outputs message of the status value has been recognized.

3 Status of Command Language : The underlying operation principle of the config tool is achieved by using AT command language, therefore the processed status of the AT command language is displayed with the form of message.

1 READ STATUS BUTTON : Reads out the PC Configuration Value fixed in the Product.

2 WRITE STATUS BUTTON : Stores the new value set in the PC Configuration Window in the Product.

3 Factory Setup BUTTON : Resets all the values of the PC Configuration to its factory setup.

<Figure 8-4 config 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 of PC Configuration for the detailed description.

8-2 PC Configuration using Serial Communication(Hyper Terminal) Program

8-2-1 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 BM1001 & 2001 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) The power to the BM2001 shall be supplied after being connection with USB port.

Note : The BM2001 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 BM2001 for the instructions of driver installation of BM2001.

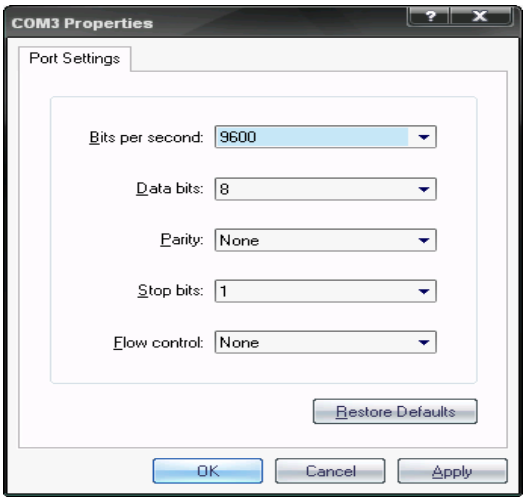
(3) Execute in the order of **[start]→[All Programs]→[Accessories]→[Communications]→[Hyper Terminal],** then connection window will appear on which enter appropriate name and click.

<Figure 8-5 Set Up Window 1 of Hyper Terminal>

(4) When the <Figure 8-6> comes up, select the COM port connected to BM1001 & BM2001, and clicks the Acknowledge button.

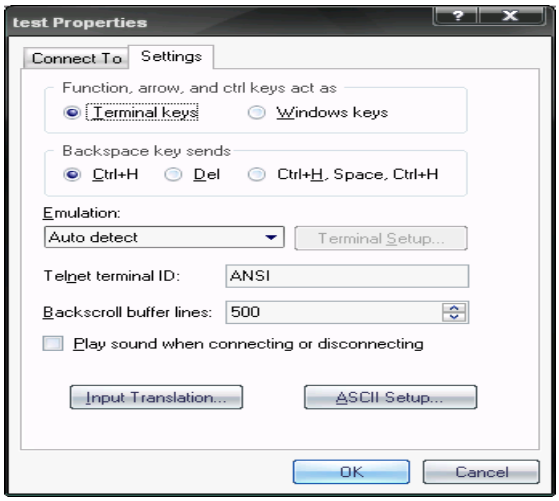
<Figure 8-6 Hyper Terminal Set Up Window 2>

(5) When Registration Information Window comes up as on <Figure 8-7>, select **Bit per second : 9600, Data bit : 8, Parity : none, Stop bit : 1, Flow control : none,** which will execute Hyper Terminal.



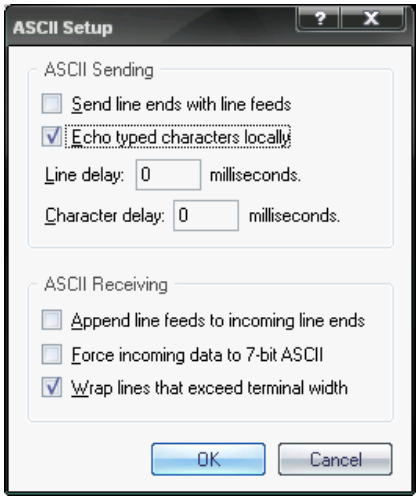
<Figure 8-7 Hyper Terminal Set Up Window 3>

(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 8-8>, click the **ASCII Setup** button.



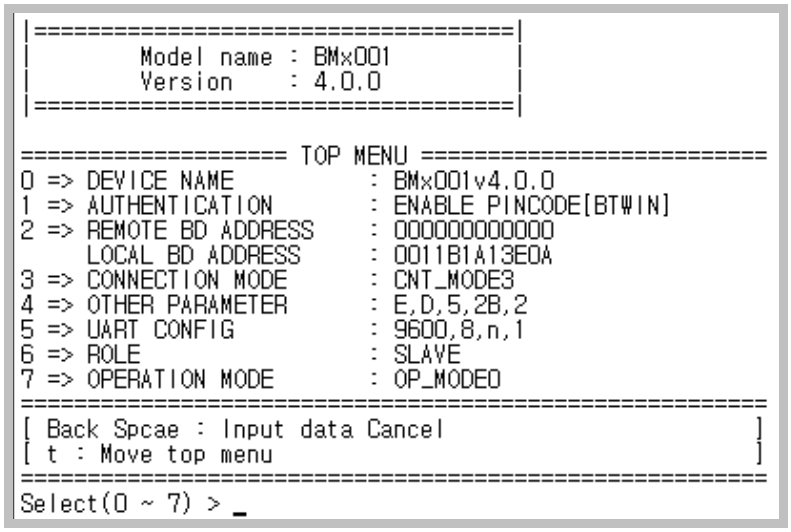
<Figure 8-8 Hyper Terminal Set Up Window 4>

(7) As shown on <Figure 8-9>, "**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.



<Figure 8-9 Hyper Terminal Set Up Window 5>

(8) If the Power is approved for BM1001, and press enter with small character "t" for **BM2001**, the menu such as <Figure 8-10> will appear on the Hyper Terminal.



<Figure 8-10 PC Configuration Menu>

8-2-2 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 : **[“0”]→[Enter]**

Note : When Reset Button is pressed at <Figure 8-10>, 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.

(7) Upon completion of PC Configuration setting up, turn off the BM1001, and change the Function Dip Switch #4 (PC configuration) to OFF position. In case of BM2001, the Hyper Terminal shall also be turned off for its normal operation.

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