# Bluetooth SPP Bridge

# FB900AS

## Model name: FB900AS

**User Manual ver 1.0D**

Firmtech

**ABOUT FB900AS**:

Class 1 / RS232 Interface

DIP switch is available for a second setting

4dBi Dipole Antenna provided

## Contact US

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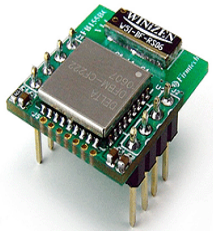
## BM series & FB Series

| | BM1001 | BM2001 | FB151AS | FB151AC | FB155BC |
|---|---|---|---|---|---|
| **Bluetooth Serial Adapter** | | | | |  |
| **Description** | Bluetooth Serial adapter | Bluetooth USB Adapter | Embedded bluetooth module | Embedded bluetooth module | Embedded bluetooth module |
| **Power Class** | Class1 | Class1 | Class1 | Class1 | Class2 |
| **RF Range** | Up to 100m | Up to 100m | Up to 100m | Up to 100m | Up to 30 m |
| **Power Connector** | DC plug or DB9 | USB port | Header 2.54mm | Header 2.54mm | Header 2.54mm |
| **Power Voltage** | DC 5V ~12V | DC 5V | DC 3.3V | DC 3.3V | DC 3.3 V |
| **Signal Interface** | Female DB9 | USB | Header 2.54mm 1X 9X2 | Header 2.54mm 1X 9X2 | Header 2.54mm 1X4X2 |
| **Serial Interface** | RS232 | RS232 | UART | UART | UART |
| **Flow Control** | RTS,CTS,DTR,DSR Support | RTS,CTS,DTR,DSR Support | RTS,CTS,DTR,DSR Support | RTS,CTS,DTR,DSR Support | RTS,CTS Support |
| **DIP Switch** | Support | Support | No | No | No |
| **Bluetooth Profile** | Serial Port Profile | Serial Port Profile | Serial Port Profile | Serial Port Profile | Serial Port Profile |
| **Bluetooth Version** | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 |
| **Applicable Antenna** | Stub Antenna Dipole Antenna Patch Antenna | Stub Antenna Dipole Antenna Patch Antenna | Stub Antenna Dipole Antenna Patch Antenna | Included Chip Antenna | Included Chip Antenna |
| **Certification** | FCC,CE,MIC | FCC,CE,MIC | MIC | MIC | MIC |
| **Dimension** | 68 X 21 X 16 | 70 X 23 X 11.5 | 36.5 X 23 mm | 37.5 X 23 mm | 18 X 20 mm |

# Accessories

| Antennas | | | | |
|---|---|---|---|---|
| **Part No** | **FBA001DA** | **FBA003DA** | **FBA004DA** | |
| **RF Gain** | 1 dBi | 3 dBi | 4 dBi | |
| **Dimension** | 30 X 8 mm | 105 X 11 mm | 170 X 13.5 mm | |
| **Connector** | SMA male | SMA male | SMA male | |
| **Hand direction** | Right Hand | Right Hand | Right Hand | |
| **Distance** | 100 M | 150 M | 200 M | |
| **Extension Cable** | | | | |
| **Part No** | **FBA015EC** | **FBA100REC** | | |
| **Length** | 150 mm | 1 M | | |
| **Power Supply** | | | | |
| **Part No** | **FBA001PA** | **FBA001UPC** | | |
| **Input Voltage** | Free | From USB port | | |
| **Output Voltage** | DC 5V | DC 5 V | | |

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# 1. About FB900AS

Bluetooth serial bridge, FB900AS is a product that is developed, designed and produced by Firmtech Co, ltd. (formerly BTnetworks Inc.). FB900AS can do serial link to extend the communication distance.

### Strong Security

Security of Bluetooth wireless communication is very strong because it use the frequency hopping and 128bit encryption in 2.4Ghz frequency range.

### Enhanced Frequency Hopping

FB151AX is supported Bluetooth version 1.2 for AFHS.

### Simple Using

Hardware setting is very easy and simple.

- The maintenance is very convenience.
- One pair of FB900AS will try to connect automatically whenever powered up.

It does not require extra software for operation.

- No installation of driver and application software.

### Simple Configuration

User may set the parameter of FB900AS with HyperTerminal on PC.

FB900AS has 4 DIP switches for the function select.

### Flow control support

FB900AS provides RTS, CTS, DTR, and DSR basically.

### Remote Control

FB900AS has the remote control feature.

## 2. Package Constitution

| Model no. | Pictures | Q'ty |
|---|---|---|
| **FB900AS** | | 1ea |
| **FBA001PO** | <br>(5V Power Adaptor) | 1ea |
| **FBA004DA** | <br>**(4 dBi)** | 1ea |
| **CD** | BTWIN™ User's Guide CD | 1ea |
| **FBA100REC** | <br>RS232 Extension Cable | 1ea |
| Bracket | <br>**External Antenna (8 dBi)** | 1ea |

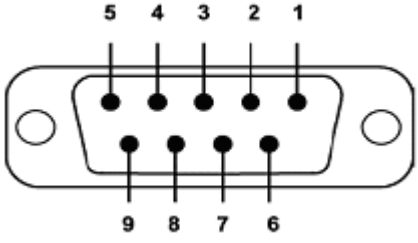
**<Table 2.1 FB900AS Package >**

# *3*. External view

**<Fig 3.1 FB900AS External view >**

| NO | Description |
|---|---|
| 1 | Power LED |
| 2 | STATUS LED |
| 3 | Channel 1 LED (display the connection status with the first device) |
| 4 | Channel 2 LED (display the connection status with the second device.) |
| 5 | Function select switch |
| 6 | Reset |
| 7 | Power switch |

## *3.1* D Sub 9 Pin Interface




D-SUB 9 Pin Connector

| Pin No | Signal Line | Description | Direction |
|---|---|---|---|
| **2** | **TXD** | Transmit Data | Output |
| **3** | **RXD** | Receive Data | Input |
| **5** | **GND** | Ground | - |

# 4. Specification & Power consumption

| Part | Specification |
|---|---|
| Bluetooth Spec. | Bluetooth Specification V1.2 |
| Communication distance | 100 M |
| Frequency Range | 2.4 GHz ISM Band |
| Sensitivity | -83dBm (Typical) |
| Transmit Power | 13.86dBm (Typical) |
| Size | 61 x 84 x 25 |
| Support Bluetooth Profile | SPP |
| Input Power | 5V DC |
| Current Consumption | Maximum 100 mA |
| Operating Temperature | 0℃ ~ 55℃ |
| Communication Speed | 1,200bps ~ 115,200bps |
| Antenna | Dipole Antenna (4 dBi) |
| PC interface | 9pin DSUB Female (RS232) |

**<Table 5.1- FB900AS Specification >**

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

**<Table 5.2 Power Consumption >**

**Test Environment**

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

Power consumption is depends on the baud rate.

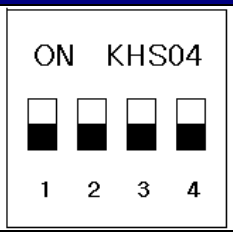
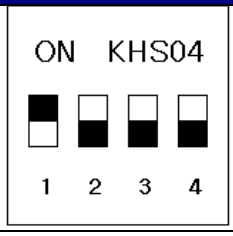
# 5. Function Select Switch

User can set the function of FB900AS with 4 DIP Switches.

| Pin NO | OFF | ON |
|---|---|---|
| 1 | Operation Mode1 | Operation Mode2 |
| 2 | Connection Mode1 | Connection Mode3 |
| 3 | Normal working mode | PC configuration Mode |
| 4 | Remote Control Disable | Remote control Enable |

## 5.1 Explain the DIP Switch

### [5.1.1] Operation MODE

| PIN No | MODE1 | MODE2 |
|---|---|---|
| 1 |  |  |

User uses the FB900AS to connect between two bluetooth devices normally.

The bluetooth device's role is **one of Master and Slave** normally.
Between two bluetooth devices to communicate, one should be a Master and opposite side should be a Slave. In this case FB900AS's operation mode is should be MODE1 to connect with them.

Sometimes the bluetooth devices to connect with FB900AS are slave.
In this case FB900AS's operation mode is should be MODE2 to connect with them.

### Operation MODE1

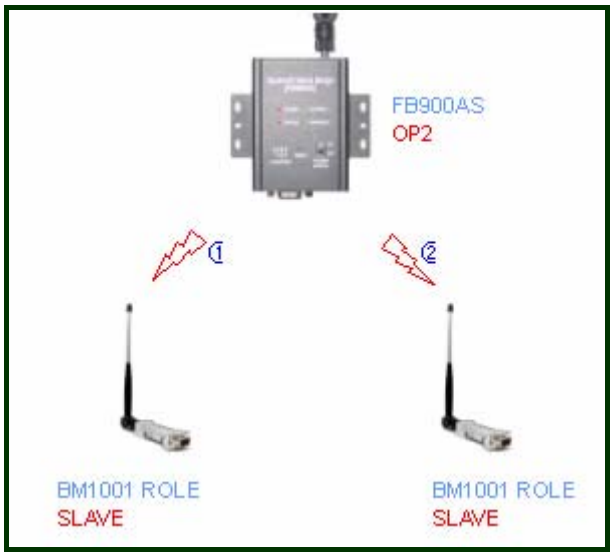
There are two bluetooth devices to connect with FB900AS.
One is master mode and the other device is slave mode.
FB900AS's operation mode should be **MODE1** to connect with them.
**If user wants to make the link chain with FB900AS, we recommend this mode.**

**<Fig 5.1. The connection when operation mode1 >**

## Operation Mode2

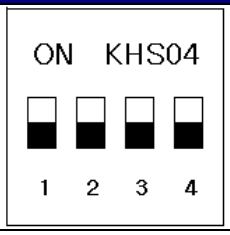
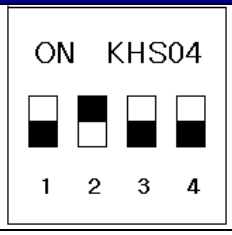
If two remote devices are slave mode, FB900AS should be Operation Mode2.

MODE2's connection time is shorter than MODE1.




**<Fig 5.2. The connection when Operation MODE2>**

### [5.1.2] Connection Mode

| PIN NO | MODE1 | MODE3 |
|---|---|---|
| 2 |  |  |

Firmtech's all bluetooth products have three connection modes normally.

FB900AS has two connection modes, MODE1 and MODE3.

**MODE1**

In this mode, FB900AS always connect the latest paired bluetooth device.

**MODE3**

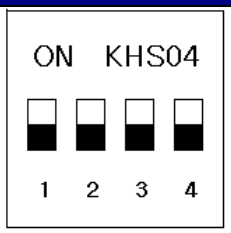
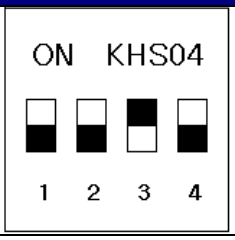
User can enter the Remote bluetooth device's address directly that user wants to pair with FB900AS.

If user wants to change the remote device often, we recommend this mode.

### [5.1.3] PC Configuration Mode

User can set the parameters of FB900AS on PC configuration mode.

Refer to **7.PC configuration Mode.**

| PIN NO | Normal Mode | PC Configuration Mode |
|---|---|---|
| 3 |  |  |

**※ FB900AS's RS232 port setting is below.**

| Part | Baud Rate | Data Bit | Parity Bit | Stop Bit |
|---|---|---|---|---|
| Setting | 9600 bps | 8 bit | None | 1 |

1) Terminal program's setting is above table.

2) Turn on the FB900AS and user can see the pc configuration window.

If your PC's OS is Windows, user can use HYPER Terminal program of the windows.

3) If you want to get back the default setting, push the reset button on PC configuration Mode.

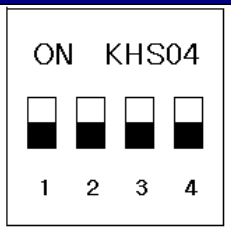
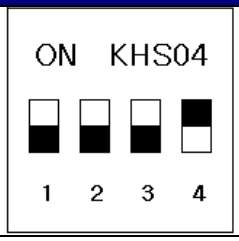
4) After finish the initialization, FB900AS will stop working.

5) Reboot FB900AS.

| Parameters | Remote control Disable | Remote control enable |
|---|---|---|
| Authentication | Enable | Enable |
| Pin code | BTWIN | BTWIN |
| Local Name | BT-bridge | BT-bridge |
| Target Master BD Address | 000000000000 | 000000000000 |
| Target Slave BD Address | 000000000000 | 000000000000 |
| Flow Control | OFF | OFF |
| Connection MODE | - | MODE1 |
| Remote Control ID | - | admin |
| Remote Control PW | - | BTWIN |
| Operation MODE | - | MODE1 |

< FB900AS 의 Default parameters >

## [5.1.4] Remote Control

| PIN NO | Remote Control Disable | Remote Control Enable |
|---|---|---|
| 4 |  |  |





FB900AS provided the remote control features.

User can access the FB900AS to change its parameters at remote site through Bluetooth serial device. If FB900AS is located in the position of difficult access, user can control and set the parameters of FB900AS through this feature.

When using this feature, the access delay time is about 2 seconds.

# 6. LED Indication

### STATUS LED

| Conditions | Action |
|---|---|
| Into the PC Configuration Mode | Blink every second. |
| Into the remote control mode | Blink every second. |
| Happen Error | Very fast blinking |

### CHANNEL_1 LED

| Conditions | Action |
|---|---|
| Try to connect with the first device | Blink every second. |
| Connected | LED is ON (Stable) |

### CHANNEL_2 LED

| Conditions | Action |
|---|---|
| Try to connect with the second device | Blink every second. |
| Connected | LED is ON (Stable) |

### RESET

All LEDs are on.

# 7. PC Configuration Mode

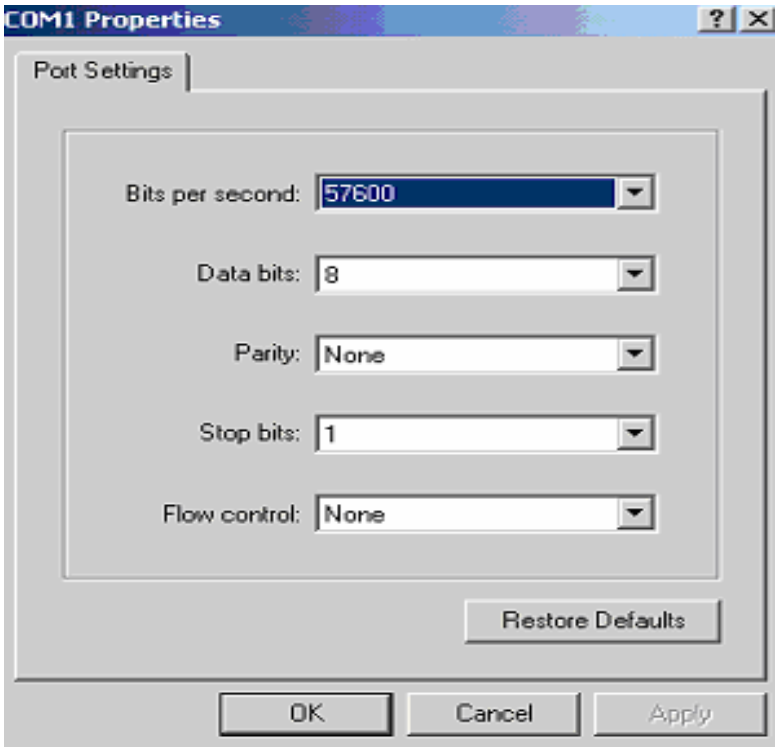
## *7.1* Prepare for PC Configuration mode

User does prepare the PC's setting to use the PC configuration mode.

[1] In order to use PC Configuration Mode, you need the serial communication software.
Here we explain the usage scenario with HyperTerminal of Windows.

[2] Find the COM port of Computer that is connected to FB900AS.
Computer has 2 COM port, COM1 and COM2.
If you use the USB to serial converter, find its COM port number.

[3] Run HyperTerminal program and select COM port.
COM port's properties window will be displayed.

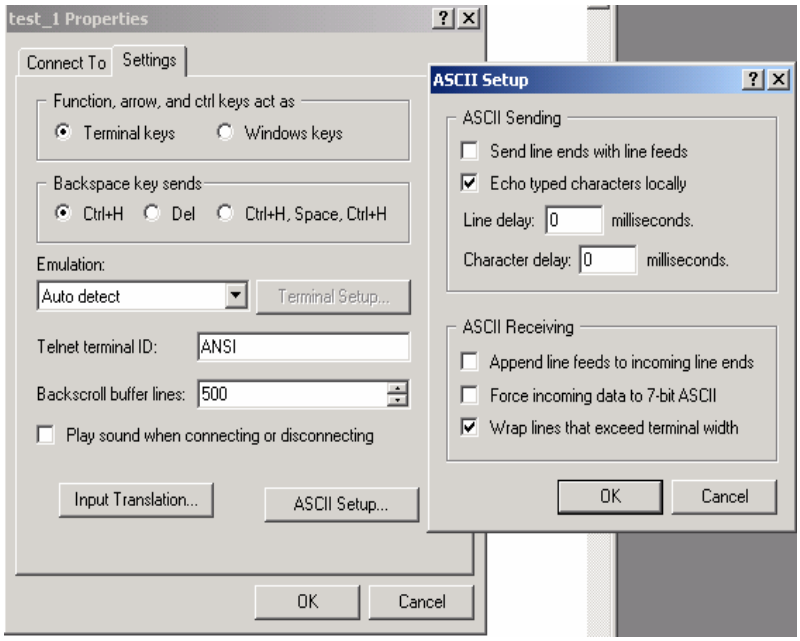



[4] Set the Values as below.

| Part | Baud Rate | Data Bit | Parity Bit | Stop Bit |
|---|---|---|---|---|
| Setting | 9600 bps | 8 bit | None | 1 |

[5] Push the OK button.

[6] Open the menu [File➔Property➔Configuration] at Menu Bar.




[7] Click to “ASCII Setup” button of Settings tab in the properties to into ASCII setup mode. Check the “Echo typed characters locally” box in the ASCII Sending.

[8] Afterward above set up and turn on the FB900AS.

***FB900AS’s pin 3 has to be up (the PC configuration Mode).**

## 7.2 Start the PC configuration Mode

When start the PC configuration Mode, user can see the below menu.

Maybe the menu is different the below image as the Remote control setting.

```
|=============================================|
|              Made by : Firmtech             |
|              Model   : FB900AS              |
|              Version : 1.0d                 |
|=============================================|
===============================================
 1 : BlueTooth Address => 0011b1a108f0
 2 : Authentication    => Enable PIN='BTWIN'
 3 : LOCAL NAME        => BT-Bridge
 4 : TARGET master Addr=> 000000000000
 5 : TARGET slave Addr => 000000000000
 6 : FLOW CONTROL      => OFF
===============================================
[ Back Space(Input cancel)        Esc(Move menu) ]
===============================================
Select menu >_
```

[PC Configuration Menu]

### How to use the menu

Select the menu that is user want to change in the menu list.
Input the number of menu to select the menu.

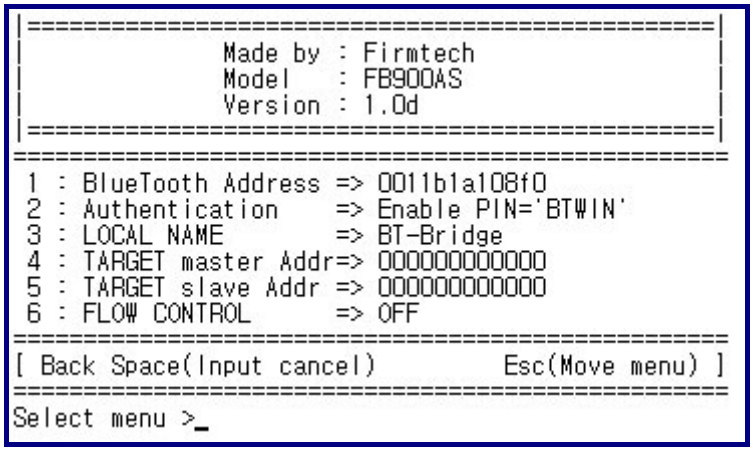
Ex) If you want to change DEVICE NAME
Input "0" and "Enter" key. [ **0** ↵ ]

1) Input the number of menu and then input "Enter" key.
2) Small "**t**" always moves to TOP MENU.
3) To cancel current input character use the "←" Back Space key and "**ESC**" key.
4) If the entered character is wrong, "**Retry >** " message will be displayed.
5) You can enter the character until maximum 12 characters.
   If the entered characters exceed than 12 characters, it will display "**Overflow buffer**" message. And then it will display "**Retry >** " message.

***If you want to get the factory setting, push the reset button on PC configuration mode.**

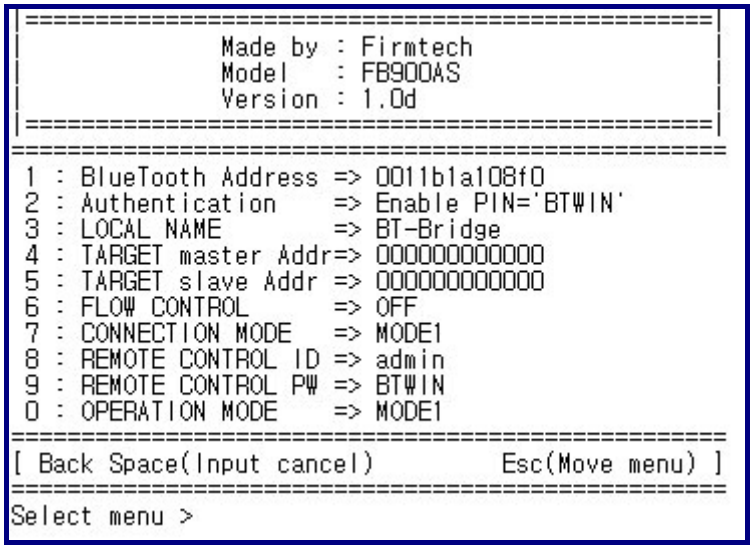
6) After change the configuration, to take effect FB900AS's power off and on.
7) Change the mode to **Normal mode**.

**Normal Mode**



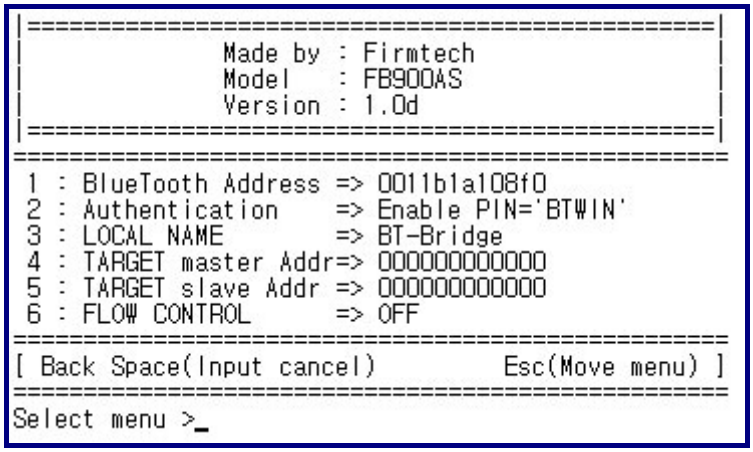

[**Remote Control Switch is OFF**]

**Remote Control Mode**




**[Remote Control Switch is ON]**

## 7.3 Configuration Menu - Remote Control is OFF.




### [1] Bluetooth Address

| NO | Menu | Default Value |
|---|---|---|
| 1 | Bluetooth Address | MAC Address |

[1-1] This is a MAC address of Bluetooth Device. It is fixed parameter. You can't change it.

[1-2] If you choice this menu, curser goes to the main menu automatically.

### [2] Authentication

To connect other bluetooth devices it needs an authentication, pin code, encryption.

User may set them in this menu.

| NO | Menu | Default Value |
|---|---|---|
| 2 | Authentication | Enable PIN Code [BTWIN] |
| Sub Menu | | |
| No | Menu | Default Value |
| 1 | Authentication | Enable |
| 2 | PIN CODE | BTWIN |
| 3 | Encryption | Enable |

### 2.1 Authentication

[1-1-1] User may set to request the authentication procedure.

[1-1-2] When it is disable, the encryption feature is disable too.

[1-1-3] The default setting is enable.

## 2.2 PIN CODE

[1-2-1] It is like a password.

[1-2-2] To connect between two devices, they have to have a same pin code.

[1-2-3] You can enter the pin code within 12 characters.

[1-2-4] After enter the pin code, “Change complete !!” message will be displayed.
And then move to AUTHENTICATION SUB MENU.

## 2.3 Encryption

[1-3-1] This encrypt the data between two bluetooth devices.

[1-3-2] The default setting is enable.

[1-3-3] If the authentication is disable, this is disable too.

## [3] LOCAL NAME

| NO | Menu | Default Value |
|---|---|---|
| 3 | Local Name | BT-Bridge |

[3.1] Bluetooth device’s name

User can change the device name within 12 characters.

[3.2] Afterward input the name then press the enter key.

Appear “Change Complete!!” message and then move to TOP MENU.

## [4] TARGET address

| NO | Menu | Default Value |
|---|---|---|
| 4 | Target Master Add | 000000000000 |
| 5 | Target Slave Add | 000000000000 |

[4-1] The last connected device’s address.

[4-2] If user wants to connect with new bluetooth devices, enter the new address to this menu.

[4-3] To enter the BD address the connection mode should be MODE3.

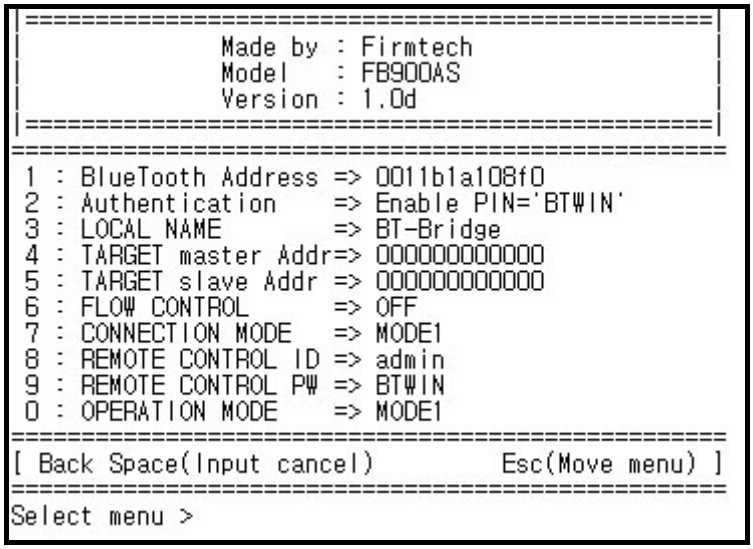
### [5] Flow Control

| NO | Menu | Default Value |
|---|---|---|
| 6 | Flow Control | OFF |

[5-1] It is bypass the flow control signal.

This menu has to be ON when make the link chain on Operation mode1.

## 7.4 Configuration Menu (Remote Control is On)




**User can not use pin1 and 2 of DIP switch when the remote control is enable.**

Instead of that, User can set the operation mode and connection mode on PC configuration mode.

### [6] CONNECTION MODE

| NO | Menu | Default Value |
|---|---|---|
| 7 | Connection Mode | Mode1 |

Set the connection mode.

**[6.1] MODE1**

Whenever FB900AS try to connect with the latest paired bluetooth devices.

If TARGET BD ADDRESS is “000000000000”, it search the bluetooth device has same pin code.

After searching, it will try to connect with that automatically.

**[6.2] MODE3**

User may set the target BD address at the remote site.

## [7] REMOTE CONTROL ID

| NO | Menu | Default Value |
|---|---|---|
| 8 | Remote Control ID | admin |

[7-1] This is the login ID to access to FB900AS at the remote site.

[7-2] User can change this within 12 characters.

## [8] REMOTE CONTROL PW

| NO | Menu | Default Value |
|---|---|---|
| 9 | Remote Control PW | BTWIN |

[8-1] This is the password to access to FB900AS at the remote site.

[8-2] User can change this within 12 characters.

## [9] Operation Mode

| NO | Menu | Default Value |
|---|---|---|
| 0 | Operation Mode | MODE1 |

[9-1] User can set the operation mode with this menu.

[9-2] **User can not use PIN 1 (the operation switch) when the remote control is enable.**

User only can set the operation mode on PC configuration mode.

[9-3] Remote control is used at operation mode1.

# 8. Operation Mode

User uses the FB900AS to connect between two bluetooth devices normally.

The bluetooth device's role is **one of Master and Slave** normally.
Between two bluetooth devices to communicate, one should be a Master and opposite side should be a Slave. In this case FB900AS's operation mode is should be MODE1 to connect with them.

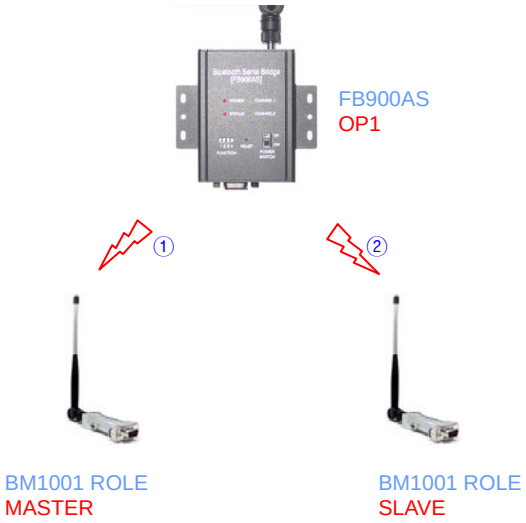
Sometimes the bluetooth devices to connect with FB900AS are slave.
In this case FB900AS's operation mode is should be MODE2 to connect with them.

## 8.1 Operation Mode1

There are two BM1001s. One is master mode and the other is slave.

FB900AS is should be Operation MODE1 to connect with them.

**[1] One FB900AS and two BM1001s**




[운영모드 MODE1의 접속 형태]

1) Set the PIN code of BM1001s as "BTWIN".
2) FB900AS's 4 DIP switches are OFF.
3) Power on the BM1001 is Master mode.
4) Power on the FB900AS.
5) FB900AS's CHANNEL_1 LED is blinking.
   It means that FB900AS try to connect with BM1001 (Master mode device).

6) After establish the connection, CHANNEL_1 LED is ON.

7) Power on the BM1001 is Slave mode.

8) FB900AS's CHANNEL_2 LED is blinking.

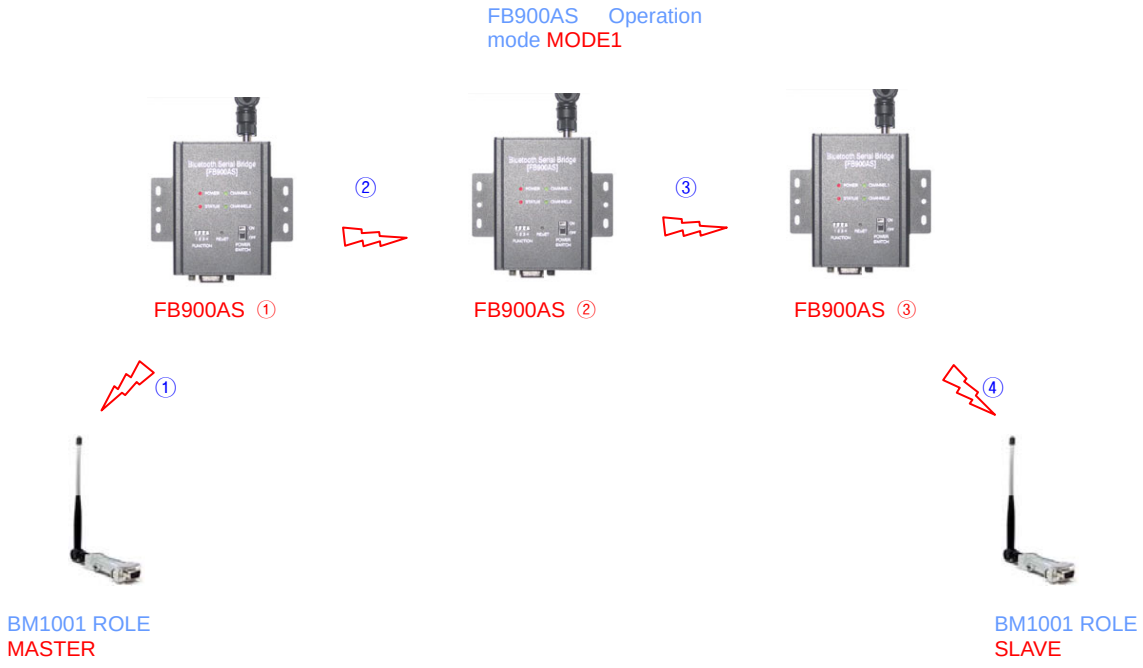
It means that FB900AS try to connect with BM1001 (Slave mode device).

9) After establish the connection, CHANNEL_2 LED is ON.

10) After finish the connection, BM1001 output "BT-Bridge Connection OK" message.

**[2] Several FB900AS and two BM1001s**

**this is the Bluetooth Link chain.**

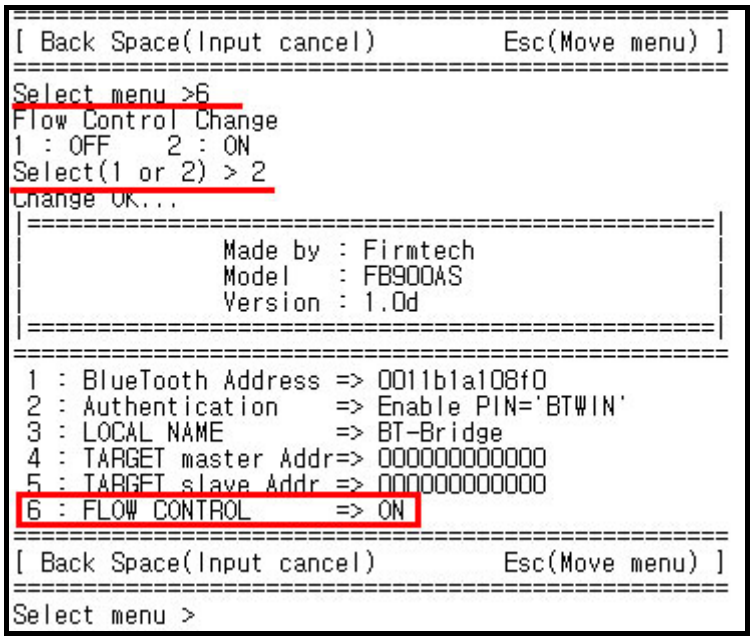



[FB900AS multi connection]

1) Set the PIN code of BM1001s as "BTWIN"

2) Set the PIN3 of the DIP switch of FB900AS① and FB900AS② as on in order to into the pc configuration mode.

3) PC configuration mode is start. User can see the below picture.




4) Set the flow control of FB900AS① and FB900AS② as on.

   When the flow control is on, it does not output “BT-Bridge Connection OK” message.

5) After setting, power off them and their PIN3 is off.

6) Power on FB900AS①.

7) Power on BM1001 is Master mode.

8) After FB900AS① CHANNEL_1 is connected, power on FB900AS②.

9) After FB900AS② CHANNEL_1 is connected, power on FB900AS③

10) After FB900AS③ CHANNEL_1 is connected, power on BM1001 is slave mode.

11) After finish all connection, BM1001 output “BT-Bridge Connection OK” message.

## 8.2 Operation Mode2

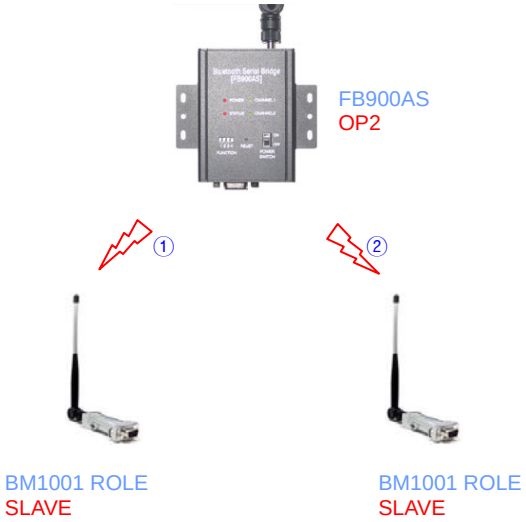
When BM1001s are slave, FB900AS should be Operation Mode2.

**User can not use the multi connection (Link Chain) with FB900AS at Operation Mode2.**

It also not supports the remote control feature.

**MODE2's advantage**

The connection time is faster than MODE1. And the connection status is stable than MODE1.




[운영모드 MODE2의 접속 형태]

1) Set the PIN1 and 2 of FB900AS as ON.
2) Set the pin code of BM1001 as "BTWIN"
3) Power on BM1001s.
4) Power on FB900AS.
5) After finish the connection, BM1001 output "BT-Bridge Connection OK" message.
6) Set the pin2 of FB900AS as OFF.

# 9. Remote Control

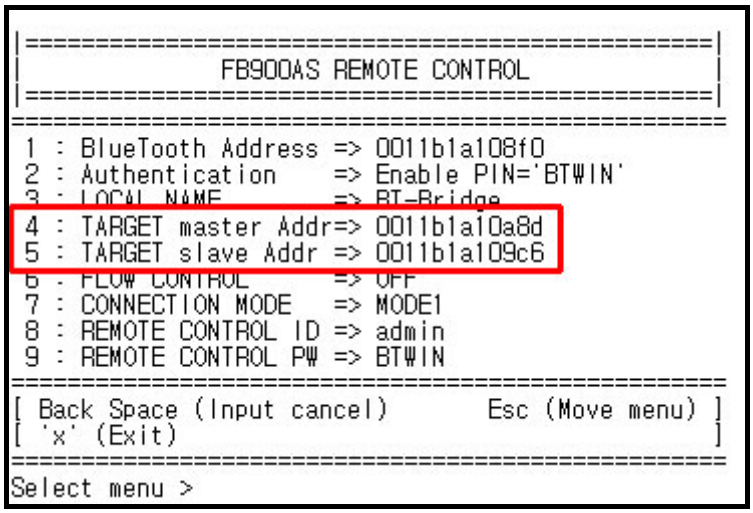
FB900AS provided the remote control features.

User can access the FB900AS to change its parameters at remote site with Bluetooth serial device. If FB900AS is located in the position of difficult access, user can control and set the parameters of FB900AS through this feature.

When using this feature, the access delay time is about 2 seconds.

To enable the remote control feature, set the PIN4 of FB900AS as ON.

## 9.1 Change the Target device address at remote site.




**[Connected bluetooth device's address]**

We will try to change the target BD address.

Attached BM1001 to PC to set its parameters and run the HYPER terminal program.

We use HYPER terminal of widows.

Set the pin code of Bluetooth device as "BTWIN".

The " Remote Control mode" message will be displayed in HYPER terminal window.

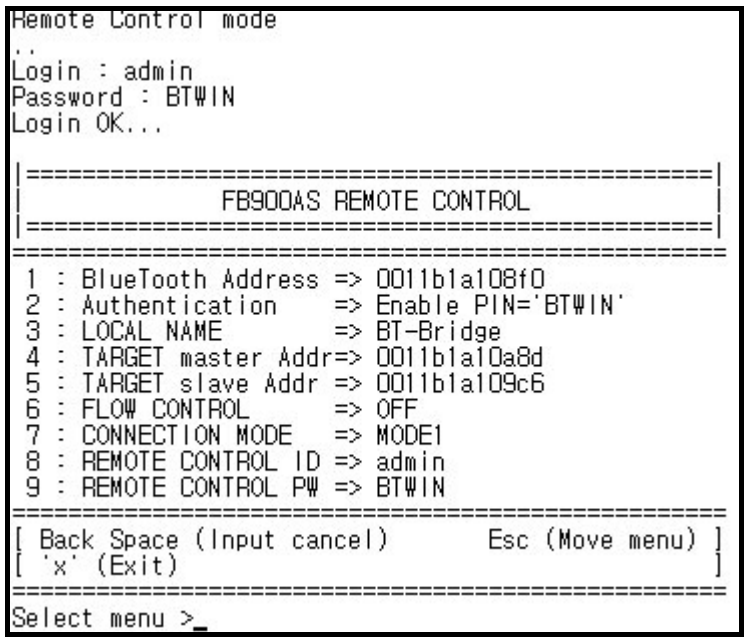
Push the enter key within 2 seconds.

If user doesn't do it, FB900AS will try to connection with the second device.

**[Remote control intro message]**

It will request two answers.

| Question | Answer |
|---|---|
| Login | “admin”+ Enter key |
| Password | “BTWIN”+ Enter key |




**[Remote Control Menu]**

Now, user can change the parameters of FB900AS.

The connection mode should be **mode3** to change the target BD address.

After set the connection mode as mode3, enter the target BD address to Menu4 and Menu5.

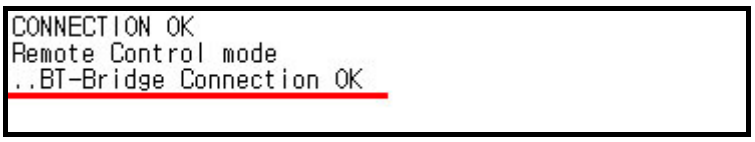
If user doesn’t know the address, enter twelve zero “000000000000” to address.

After setting, push “x” and enter key to out the remote control mode.

Reconnect with FB900AS. The remote control intro message wills be displayed.

Don’t push enter key. Wait for a minutes.

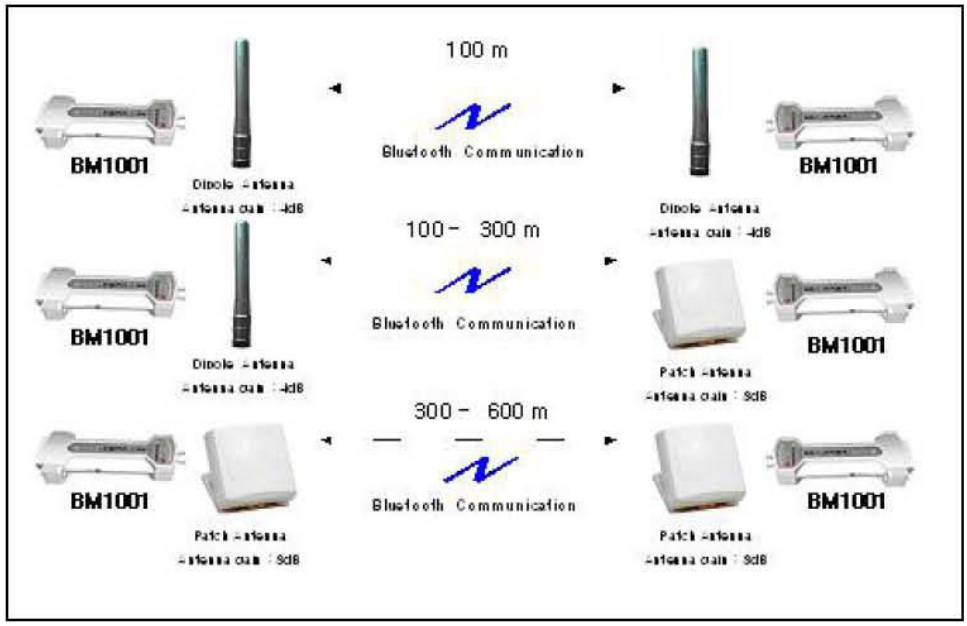
After finish the connection, BM1001 output “BT-Bridge Connection OK” message.




**[Successful connection message]**

**If you want to keep this connection, change the connection mode to MODE1 at remote control menu.**

# 10. Range information with External Antennas




| Antenna | Part No | RF Gain | Distance |
|---|---|---|---|
| | **FBA001DA** | 1 dBi | Within 100 M |
| | **FBA003DA** | 3 dBi | Within 150 M |
| | **FBA004DA** | 4 dBi | Within 200M |
| | | | |

< Table 10.1 Dipole Antennas and distance >

•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, and
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.

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