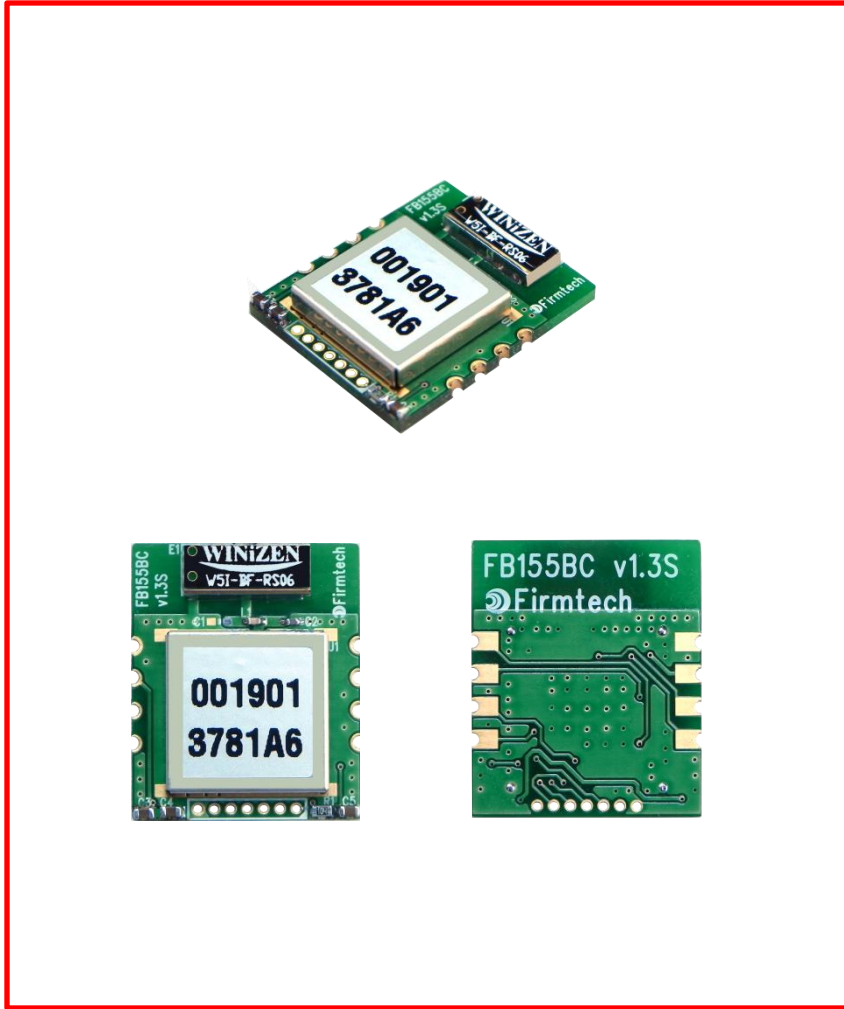


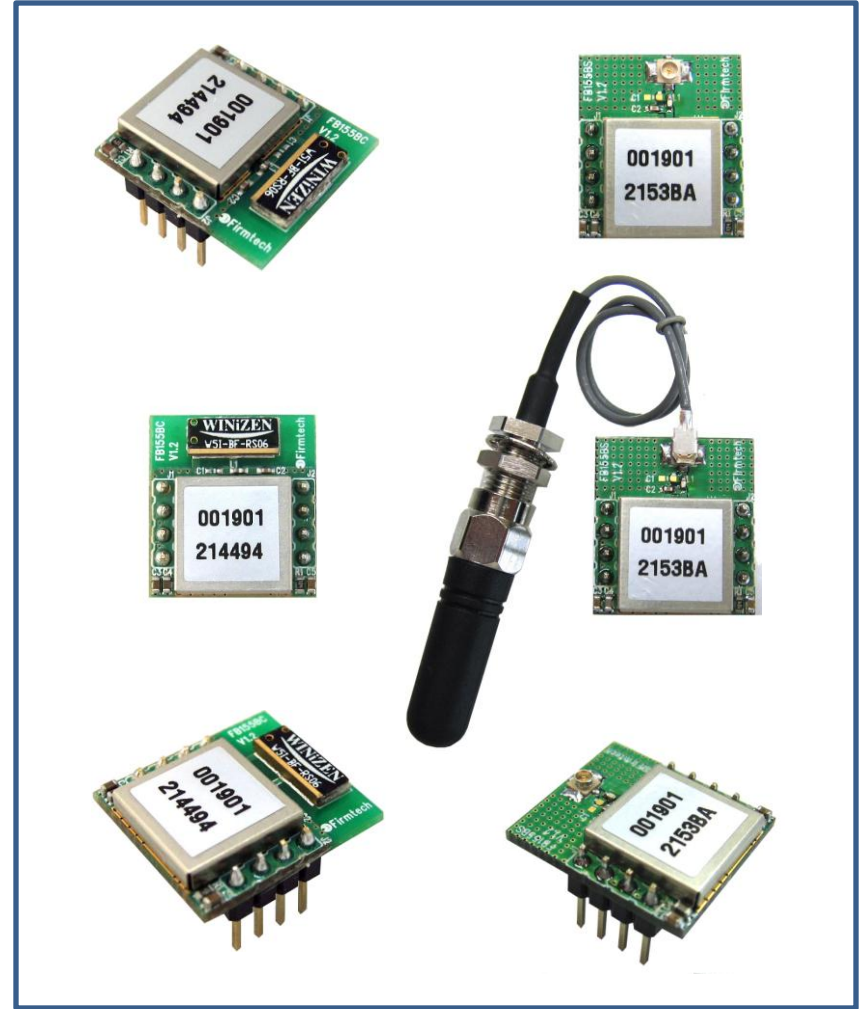
FB155BC_SMD

Quick Guide

Features of FB155BC_SMD



< FB155BC_SMD >



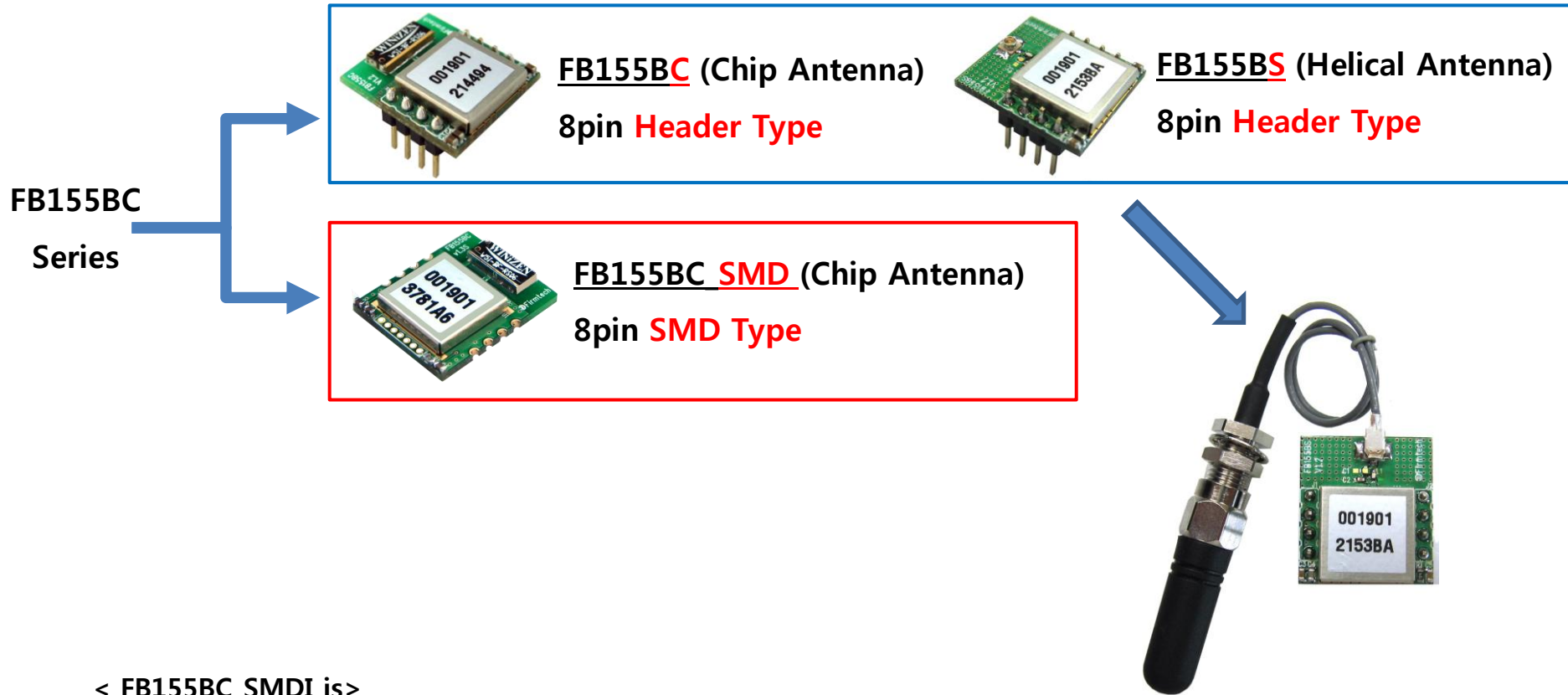
< FB155BC / FB155BS >

* Before Getting Started...

- ◆ **Bluetooth is an international standard specification for near-distance /low-electricity/ high-reliability/low-price wireless communication**
- ◆ **Bluetooth uses the internationally permitted 2.4GHz ISM band(Industrial,Scientific,Medical).**
- ◆ **Bluetooth uses a 1Mbps ~ 3Mbps wireless transmission speed**
- ◆ **Bluetooth consists of Master/Slave configuration as the relation between Master and Servant and one bluetooth device can be connected to Maximum 7 devices on the basis of ACL.**

(ACL : Asynchronous Connectionless)
- ◆ **Bluetooth guarantees a stable wireless connection even in much noise environment by using Frequency Hopping Method.**

* Features of FB155BC_SMD

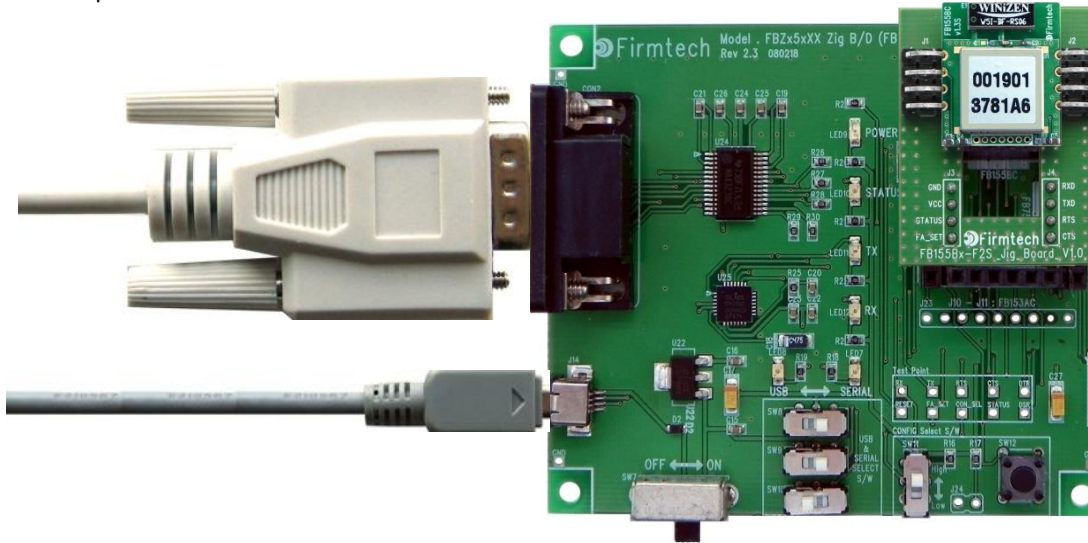


< FB155BC_SMDI is >

- Based on Bluetooth Specification 2.1
- Supports AT command and AT command based control available
- Connects Bluetooth PDA, Bluetooth USB Dongle etc available & smoothly
- Supports stable data transmission & reception
- 1:1 exclusive communication

* Interface Board (FBZx5xXX)

To test a FB155BC_SMD board on a PC, FBZx5xXX - a dedicated Bluetooth interface board - is required.

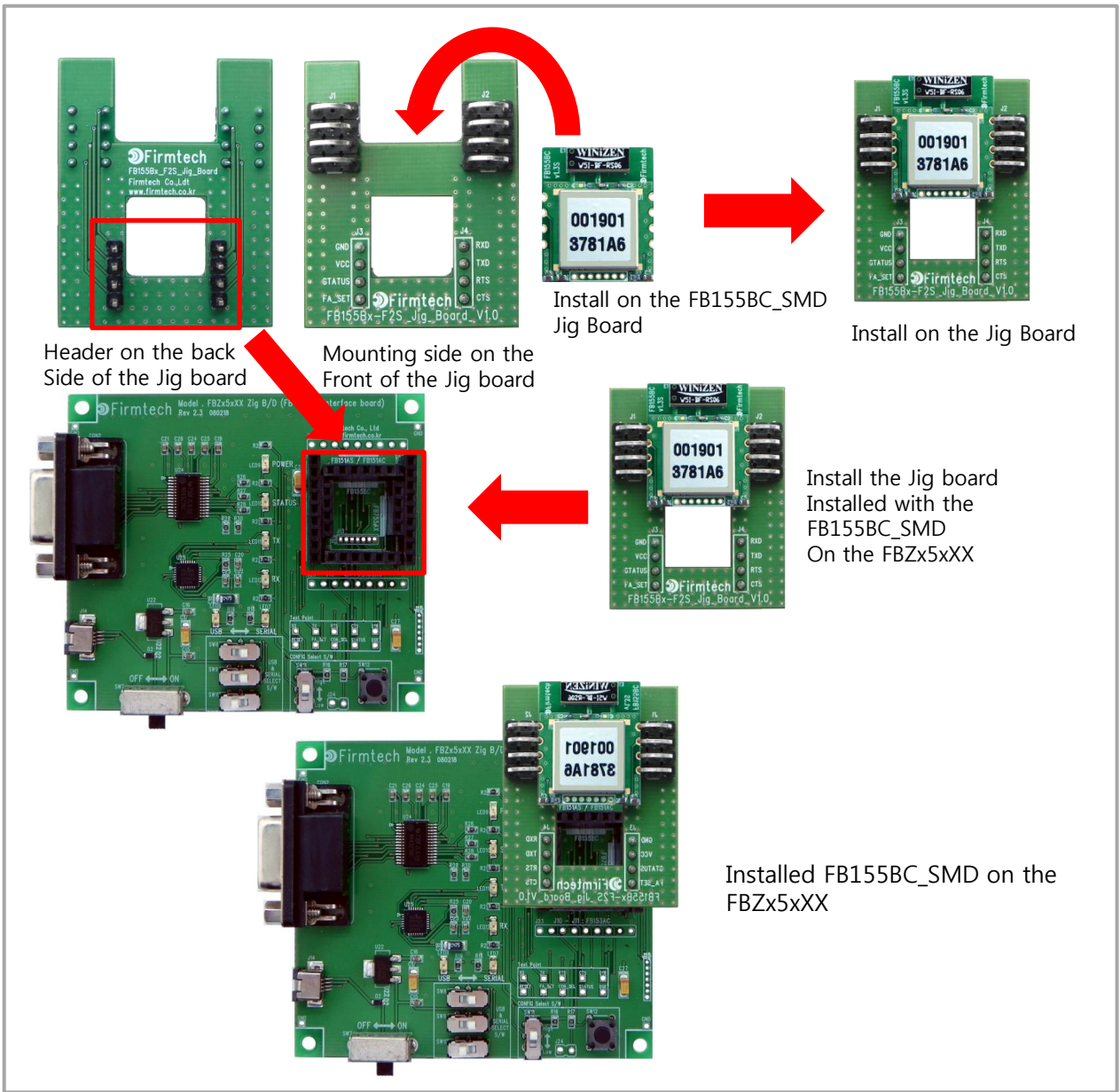


Interface Board (FBZx5xXX)



FBZx5xXX is a product for testing the operation and monitoring the status of the Bluetooth embedded module with the embedded SPP profile.

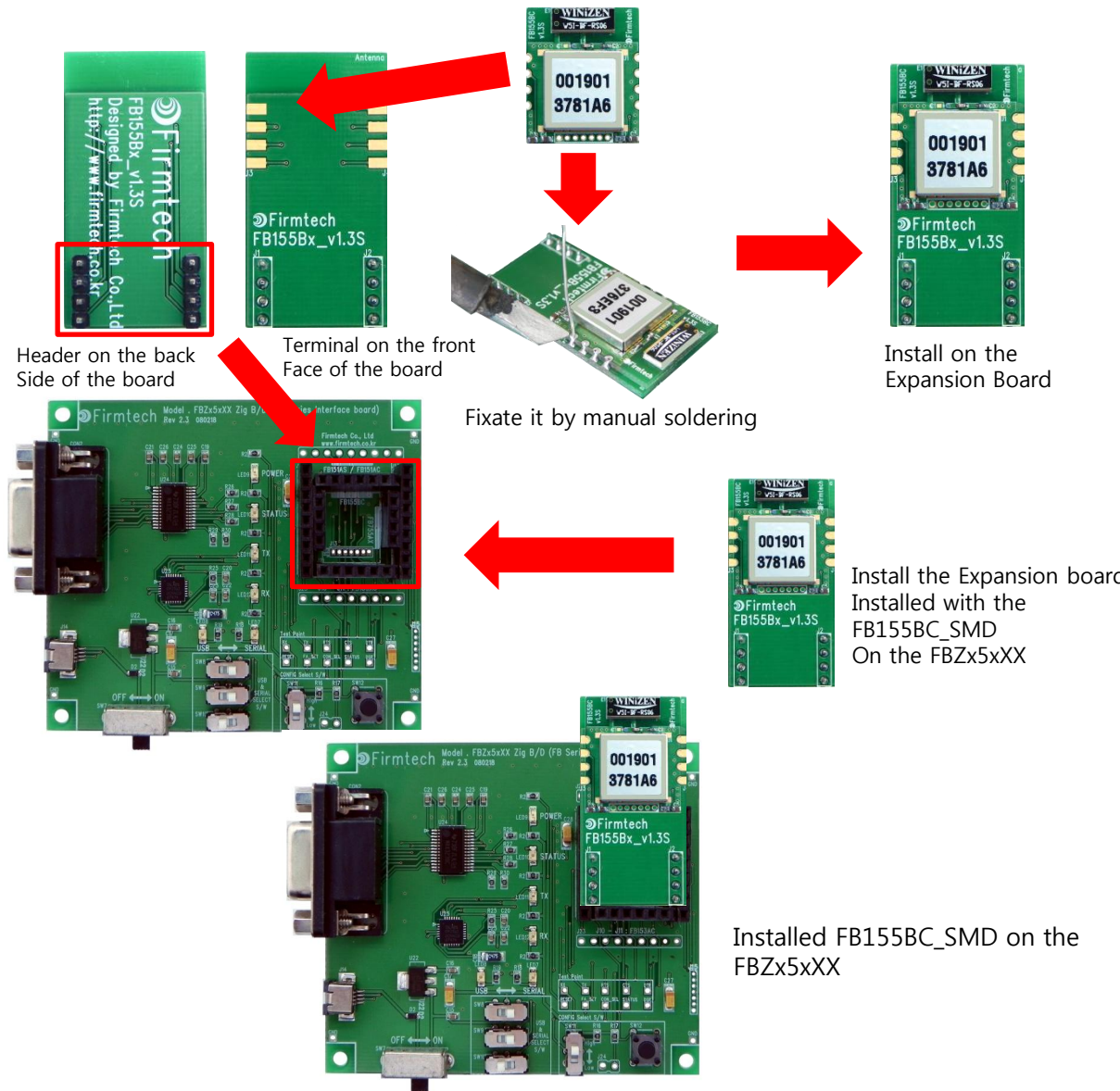
* JIG Board



To test FB155BC_SMD on FBZx5xXX - the Bluetooth interface board, first connect is to the jig board having an header and install it on the interface board as shown on the picture below.

(※ The jig board can be purchased separately as an option when purchasing FBZx5xXX)

* Expansion Board



Perform the following steps to test FB155BC_SMD using the Expansion board on the FBZx5xXX Bluetooth interface board. Install the FB155BC_SMD on the Expansion board using manual soldering. Install the Expansion board in the socket on the interface board

(※ The Expansion board can be purchased separately as an option when purchasing FBZx5xXX)

* Functions of interface Board 1

Support of TTL Level Conversion Function

Note : UART : **U**niversal **A**synchronous **R**eceiver **T**ransmitter

EIA-232 Level ↔ TTL Level

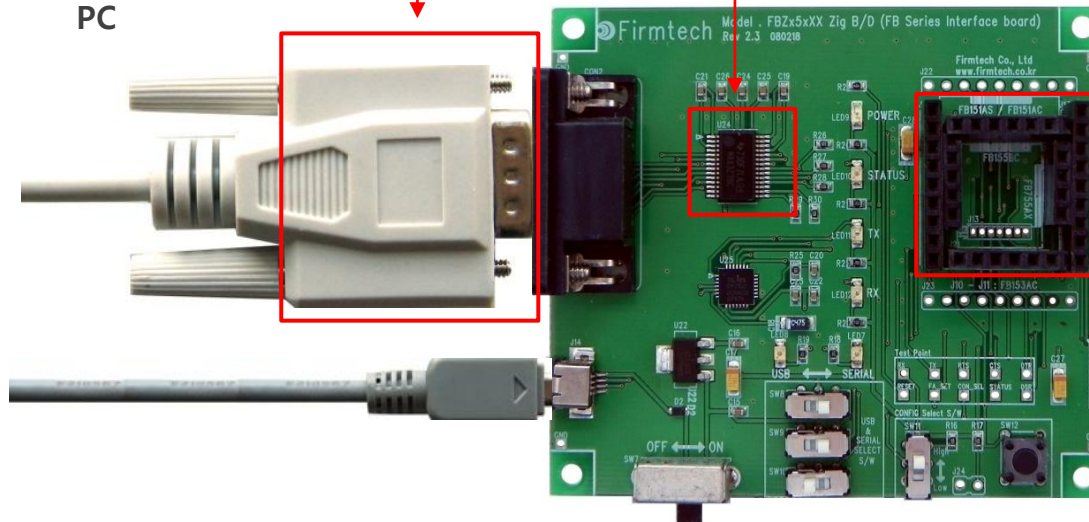
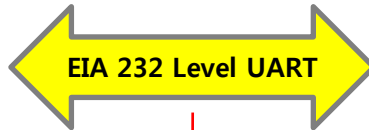
Dedicated Driver IC

For Level Conversion

(예) MAX3238, MAX3232 등



PC



Interface Board (FBZx5xXX)

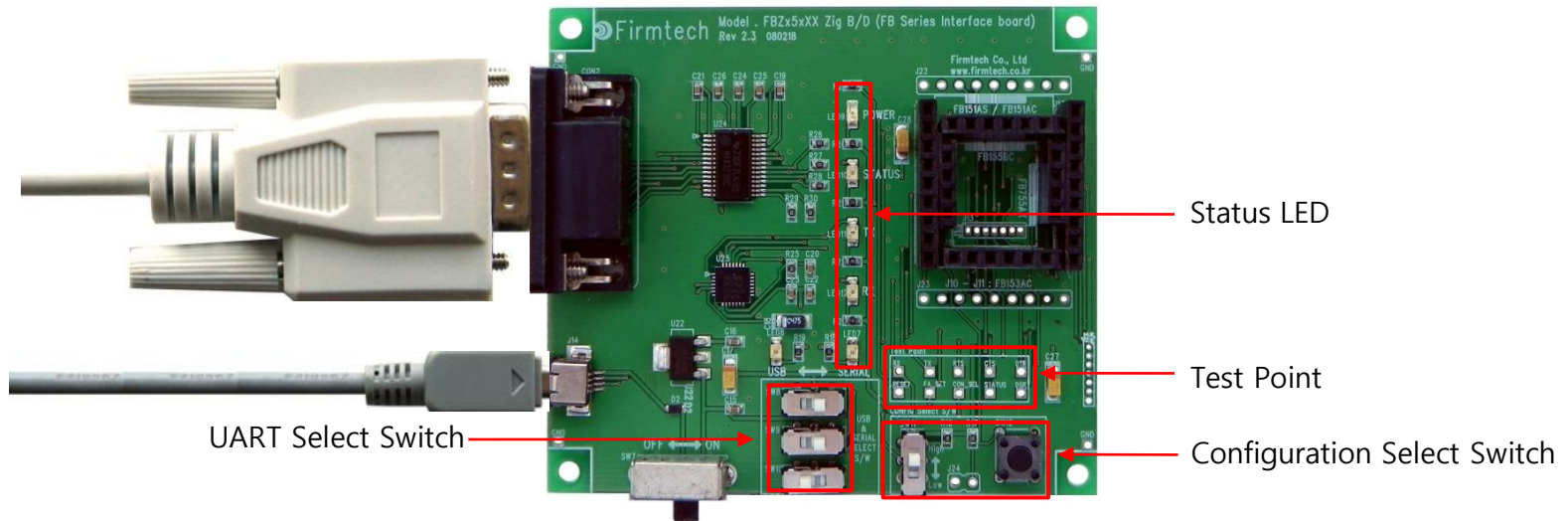
Application Device

FB155BC
FB155BS

FB755AC
FB755AS

* Functions of interface Board 2

Setup of FB155BC_SMD Environment and Monitoring & Basic Function Test of FB155BC_SMD



Interface Board (FBZx5xXX)

UART Select Switch	Switch for UART Interface selection
Status LED	LED that displays overall status
Test Point	Allows users to directly check the control signal line with an oscilloscope etc.
Configuration Select Switch	Entry-switch for environment setup

< “FB155BC_SMD Quick Guide”...>

1. Consists of eight chapters in total.
2. Even though it is divided into eight chapters, **in some chapters it uses the setup values that were used in previous chapters.**
3. In other words, the progressive method of this “FB155BC_SMD Quick Guide” **guides the user in order from the start.**
4. Thus, if you read this guide for the first time, you need to proceed chapter by chapter in order to correctly understand its meaning.
5. It is better for a user to understand the overall functions of the FB155BC_SMD first and migrate to subsequent chapters to refer to the functions necessary for each chapter.

< Table of Contents >

[0] Product Content & Installation

[1] Setup of Hyper Terminal

[2] Operating the FB155BC_SMD

[3] Master & Slave Setup

[4] Scan & Inquiry & Connect

[5] Transmitting Serial Data

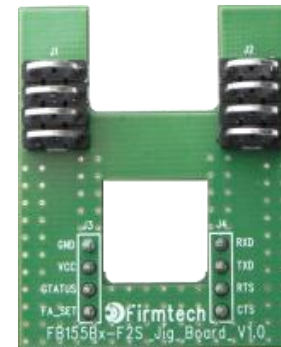
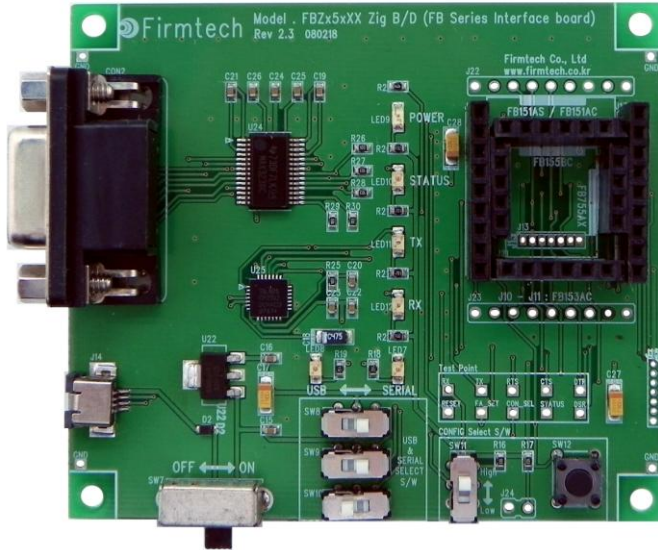
[6] Disconnect

[7] Re-connect

**[0] Product Content
&
Installation**

1. FB155BC_SMD Content

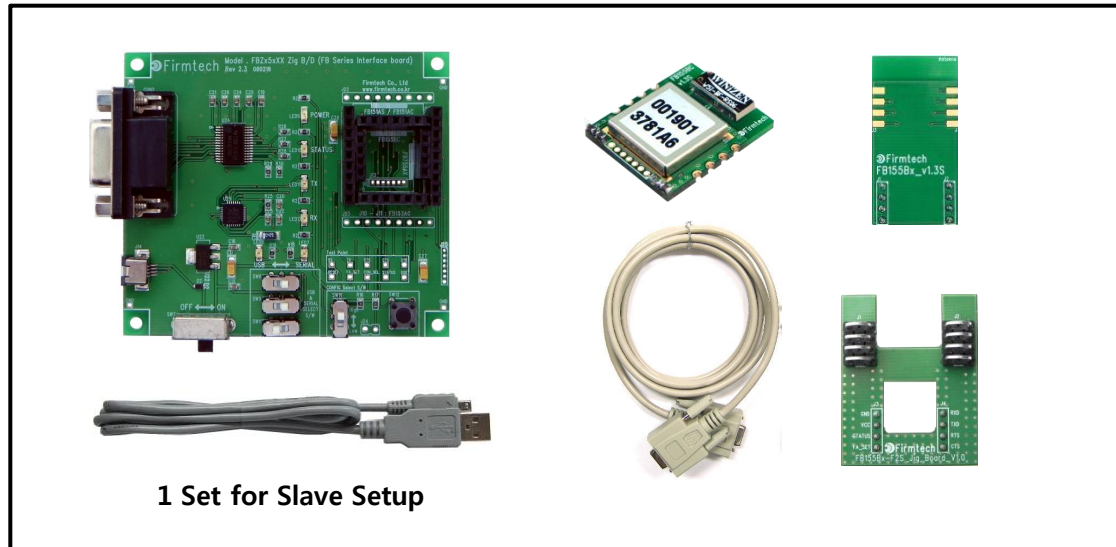
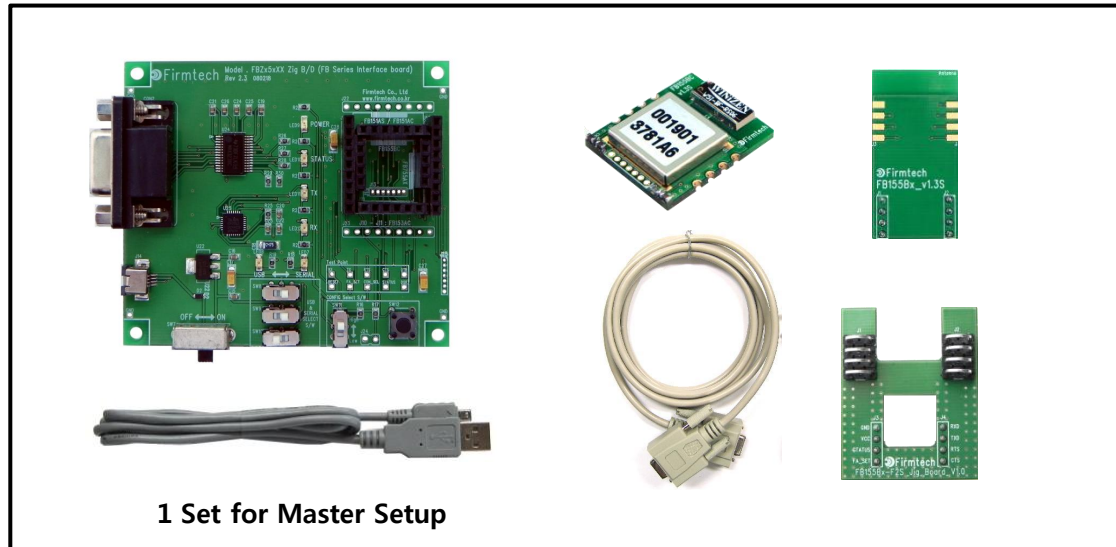
(1) Product Content in One Set of FB155BC_SMD - **FB155BC_SMD-Type** (1 Set)



< Product Content in One Set >

- FB155BC_SMD
- Interface Board
- JIG Board or Expansion Board
- USB Power Cable
- Serial Cable

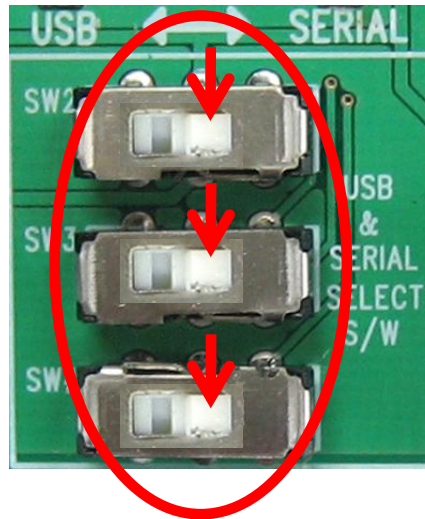
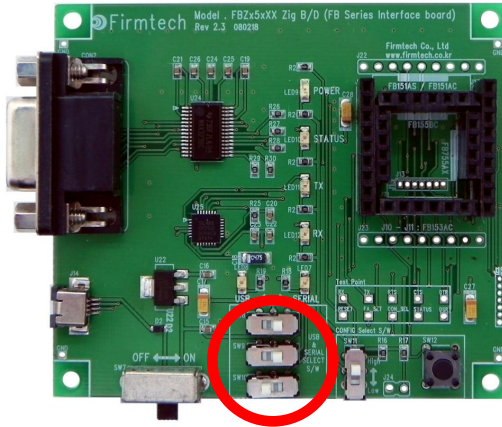
(3) Configuration Using 2 Sets



- “FB155BC_SMD Quick Guide” uses two devices for explanation purpose.

2. **Checking Items** Before Installing the FB155BC_SMD Product Content

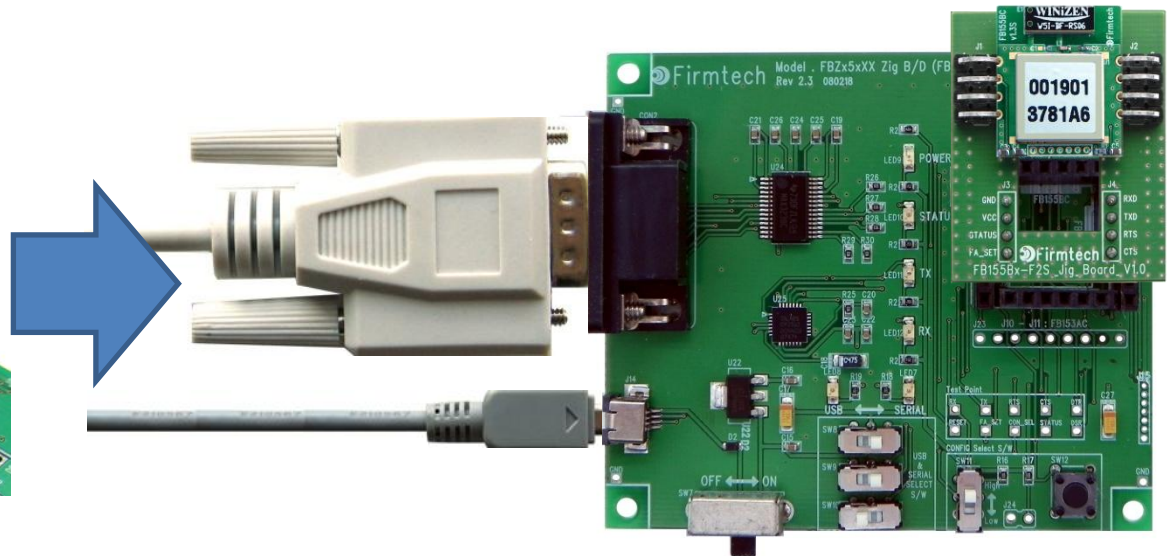
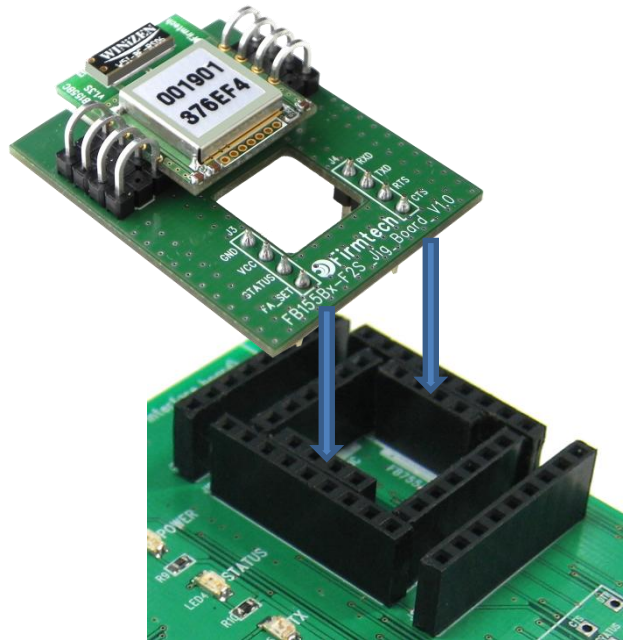
(1) UART Selection Switch



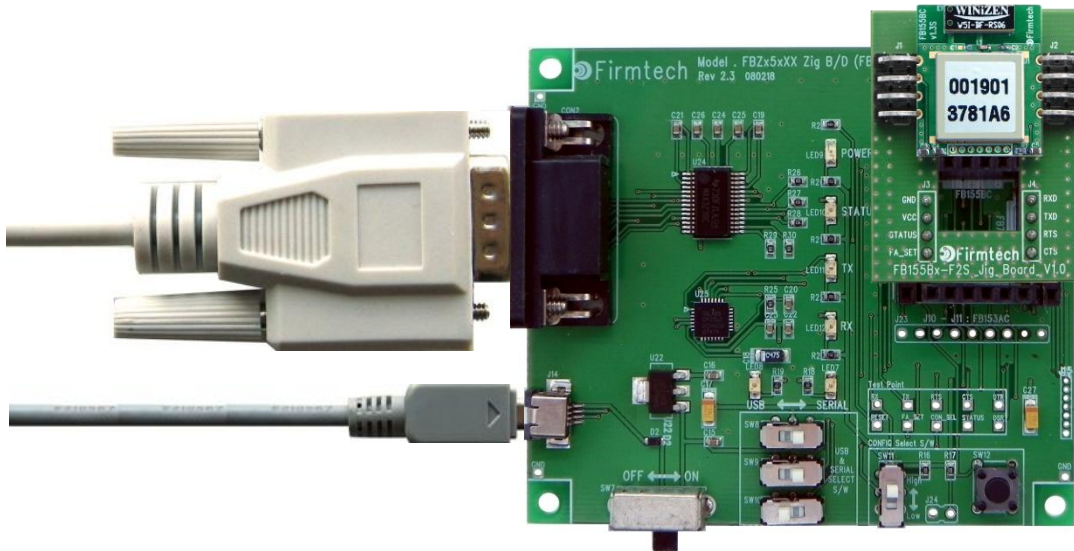
- Position the UART selection switch to Serial.
- Do the switch selection as above for all two Interface Boards.

3. Installing the Product Content

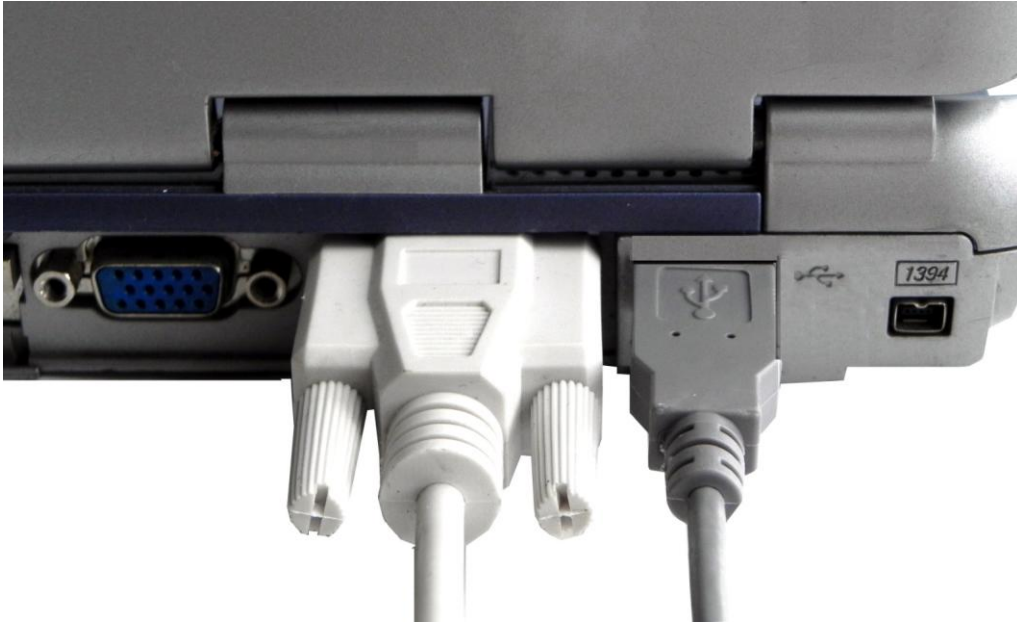
(1) FB155BC_SMD + Interface Board



(2) Interface Board + USB Power Cable & Serial Cable



(3) PC + USB Power Cable & Serial Cable



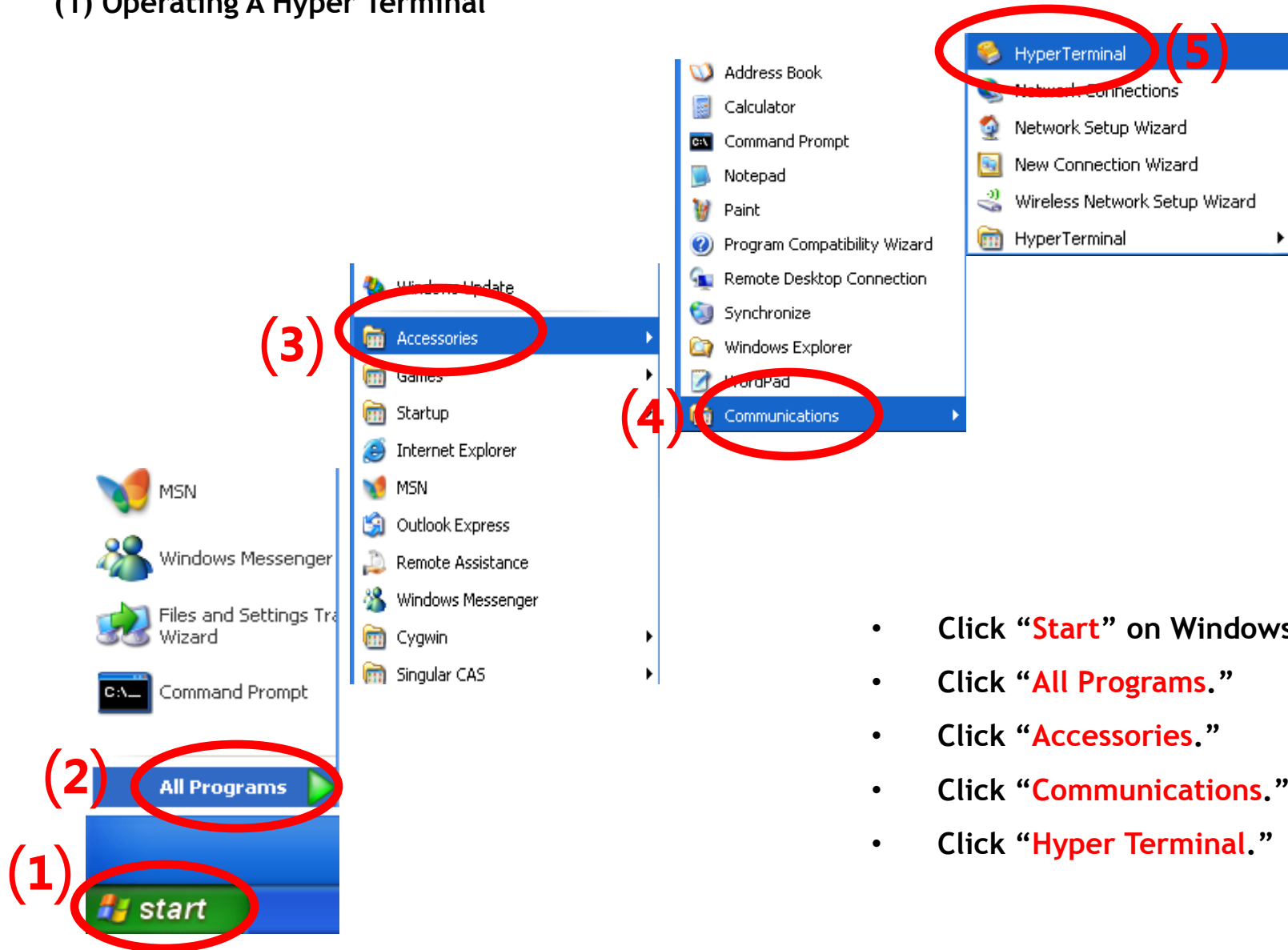
- Connect all two FB155BC_SMD to a PC.
- In this “FB155BC_SMD Quick Guide,” two FB155BC_SMD are connected to one PC for convenient explanation.

[1] Setup of Hyper Terminal

Checking received data using hyper terminals.

1. Running and Setup of Serial Communication Program (Hyper Terminal)

(1) Operating A Hyper Terminal



- Click “**Start**” on Windows Start menu.
- Click “**All Programs.**”
- Click “**Accessories.**”
- Click “**Communications.**”
- Click “**Hyper Terminal.**”

(2) Setup of Hyper Terminal - Name Setting



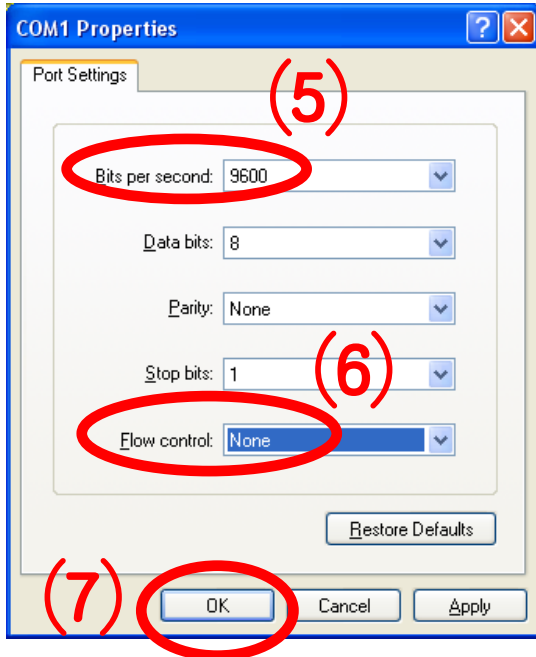
- Set up the hyper terminal connected to FB155BC_SMD to be set up to **Master**.
- Enter “Master” as a name.
- Click “OK” and proceed to the next step.

(3) Setup of Hyper Terminal - Port Setting



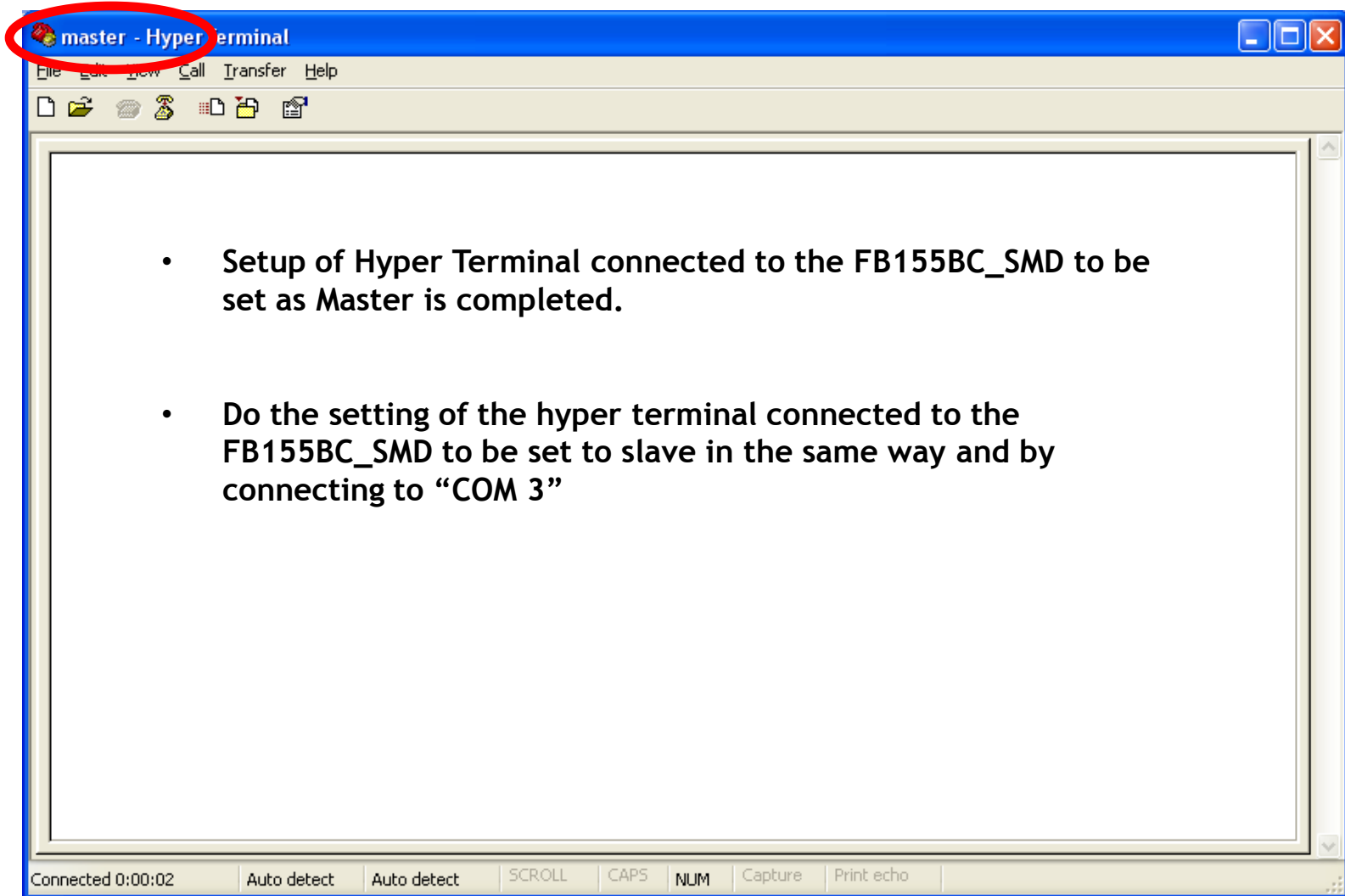
- Select a port to be connected to FB155BC_SMD set up to **Master**. (Assumed here as ‘COM1’)
- Click “OK” and proceed to the next step.

(4) Setup of Hyper Terminal - Communication Speed, etc.



- Select “9600” for “Bits Per Second”.
- Select “None” for “Flow Control”
- No change for other items.
- Click “OK.”

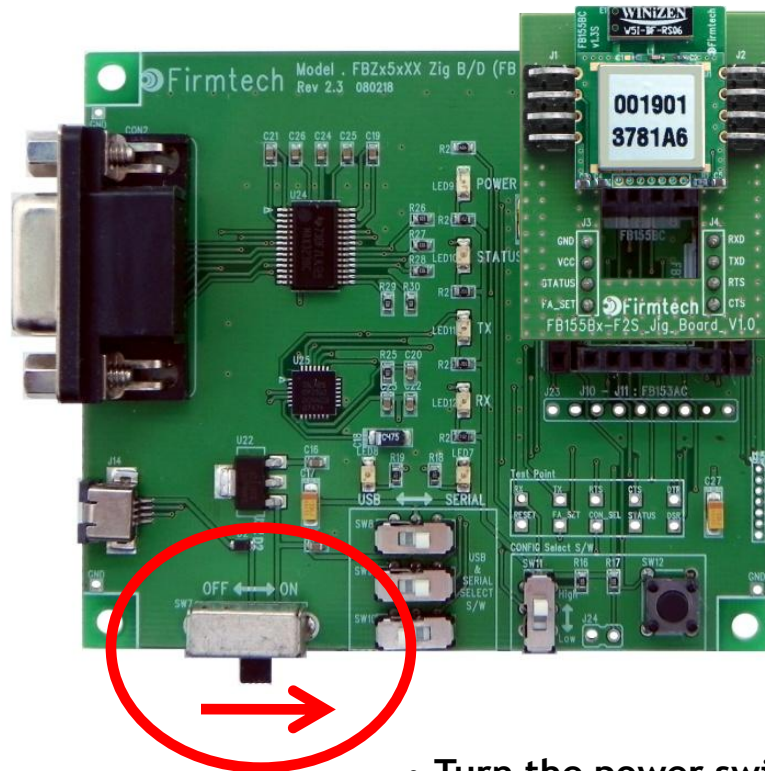
(5) Setup of Hyper Terminal - Finish



[2] Operating the FB155BC_SMD

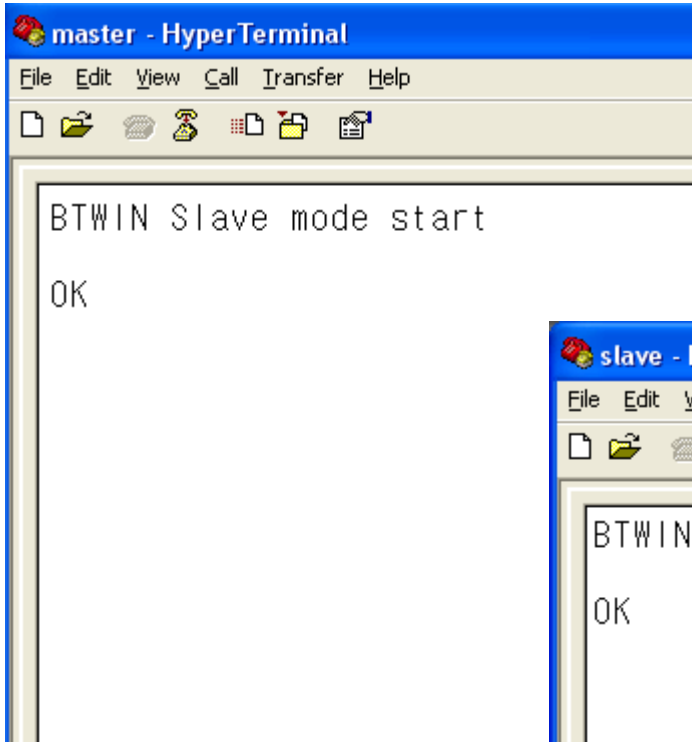
1. Operating the FB155BC_SMD

(1) Powering On the FB155BC_SMD

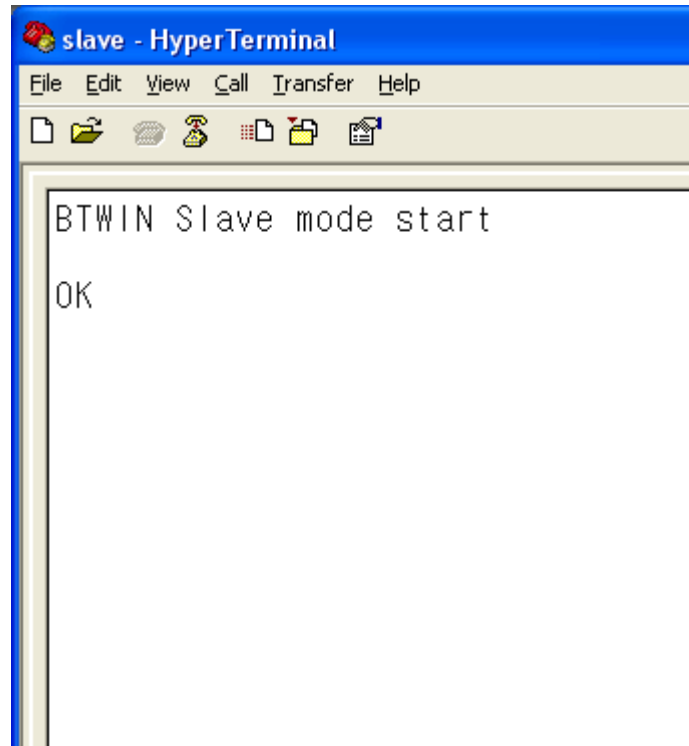


- Turn the power switch on.

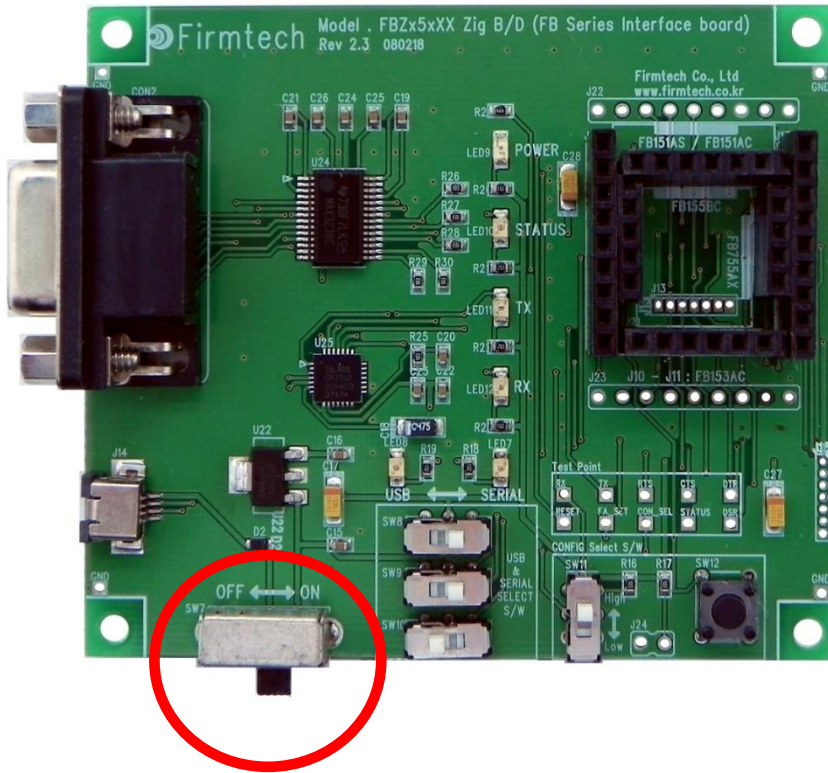
(2) Hyper Terminal Output Screen



- Turn on the power switches of all two Interface Boards.
- You can see “BTWIN Slave mode start” displayed on the screen.
- You can see “OK” message displayed on the screen.

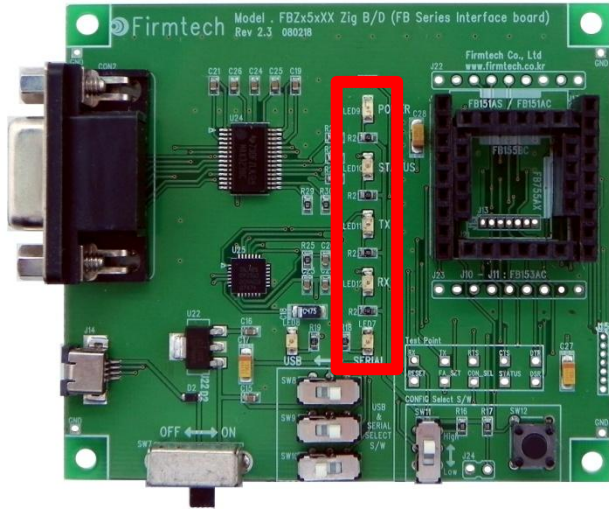


* Restarting the FB155BC_SMD



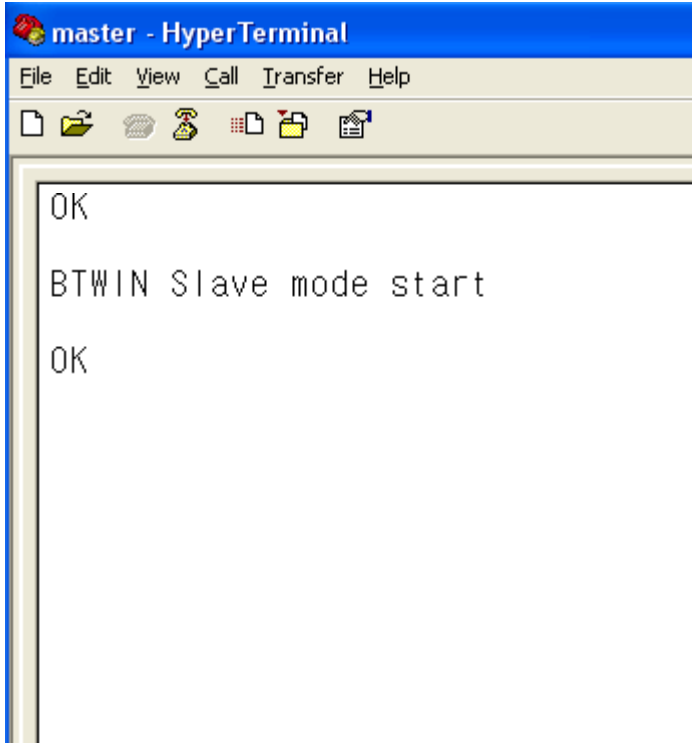
- If the FB155BC_SMD does not operate normally nor displayed any letter on the hyper terminal, restart the FB155BC_SMD.
- Restart the FB155BC_SMD by cycle-power(off and then on) on the Interface Board.
- Check the communication speed and other connection parameters as well.

*** Normal Operating Status of POWER LED & TX LED**



- If the electricity power is supplied normally, POWER LED remain to be ON.
- If operated normally, the TX LED blinks when a message is made from the FB155BC_SMD.





* Factory Reset Progress



```
master - HyperTerminal
File Edit View Call Transfer Help
[Icons]
OK
BTWIN Slave mode start
OK
```

Instructions Quick Guide is based on factory reset value.

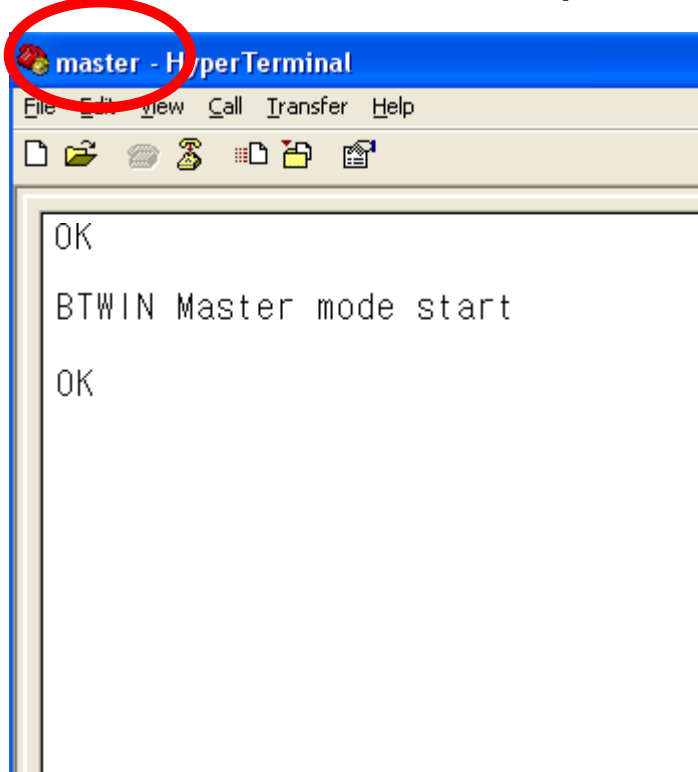
If it is already used or in customized setting, go to factory reset process as follows.

- After entering “AT&F” on the hyper terminal, press enter-key. 
- “OK” output is made from the FB155BC_SMD. 
- FB155BC_SMD restarts
- “BTWIN Slave mode start” output is made from the FB155BC_SMD. 
- “OK” output is made from the FB155BC_SMD. 
- Factory reset process is now completed.

[3] Setup of Master & Slave

1. Setup Progress Using AT Command

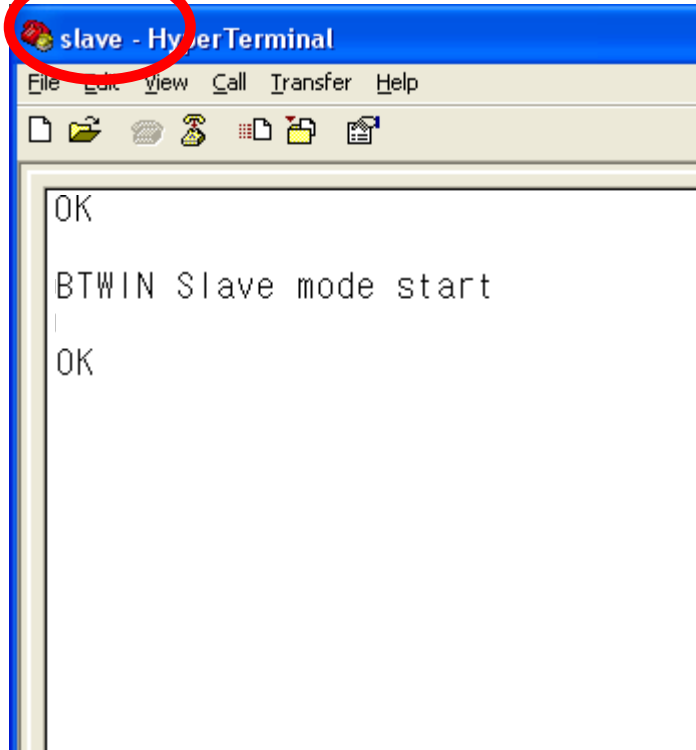
(1) FB155BC_SMD master setup



Enter the following on the hyper terminal connected to the FB155BC_SMD set up to **Master**.

- After entering “AT+BT**ROLE=M**” on the hyper terminal, press enter-key.
- “OK” output is made from the FB155BC_SMD.
- After entering “ATZ” on the hyper terminal, press enter key.
- FB155BC_SMD restarts.
- “BTWIN Master mode start” output is made from the FB155BC_SMD.
- “OK” output is made from the FB155BC_SMD.
- **Master** setup is finished.

(2) FB155BC_SMD slave setup



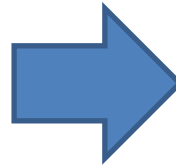
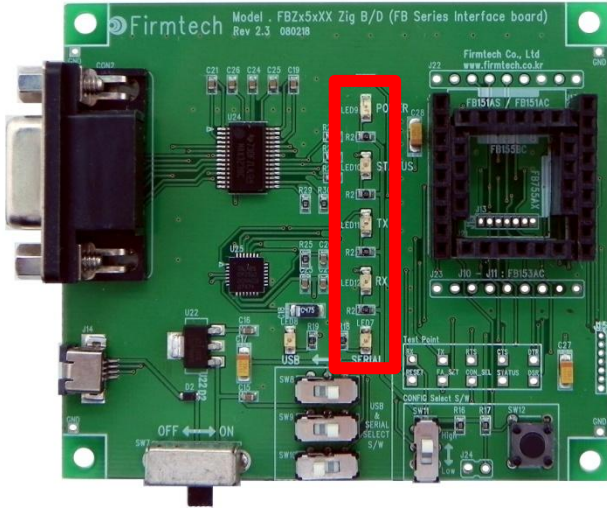
Enter the following on the hyper terminal connected to the FB155BC_SMD set up to **slave**.

- After entering “AT+BT**ROLE=S**” on the hyper terminal, press enter-key.
- “OK” output is made from the FB155BC_SMD.
- After entering “ATZ” on the hyper terminal, press enter-key.
- FB155BC_SMD restarts.
- “BTWIN Slave mode start” output is made from the FB155BC_SMD.
- “OK” output is made from the FB155BC_SMD.

- **Slave** setup is finished.

In case of factory reset value, slave is basically setup(No need to be changed here).

*** RX LED Condition**

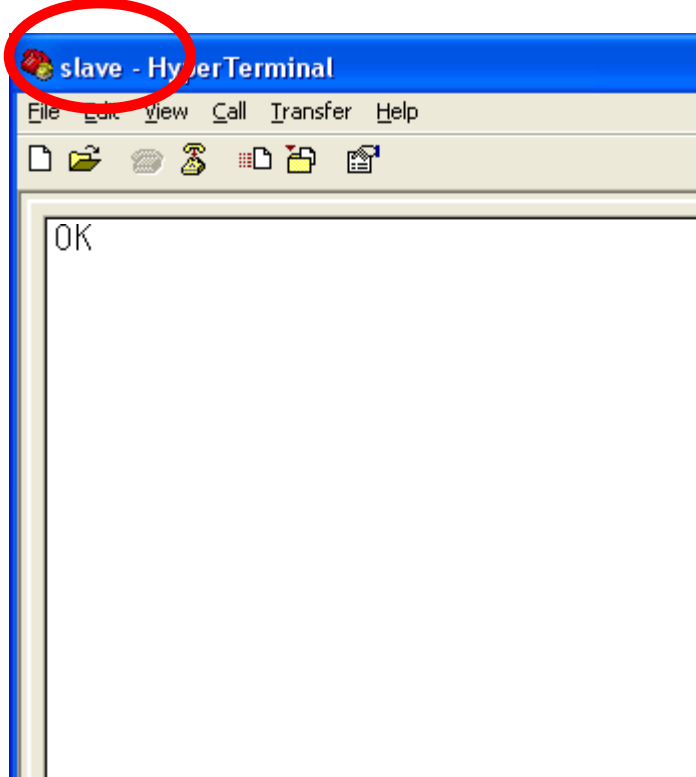


- RX LED blinks when a serial data (AT Command) input is made from FB155BC_SMD.

[4] Scan & Inquiry & Connect

1. AT Command using operation progress

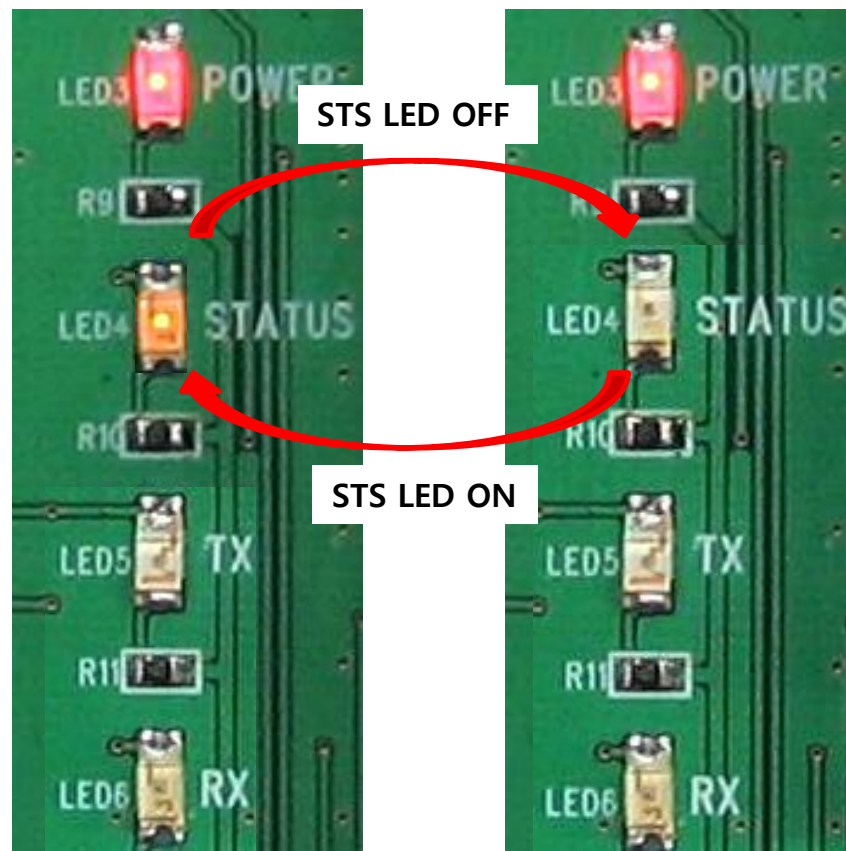
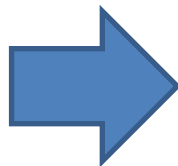
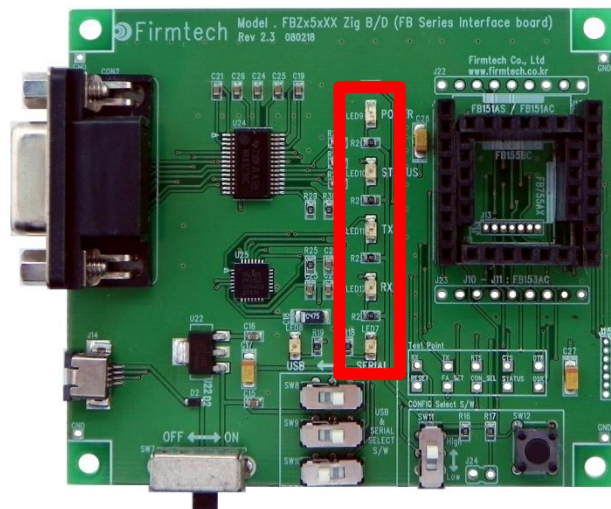
(1) Slave Scan Start



Enter the following on the hyper terminal connected to the FB155BC_SMD **setup to slave.**

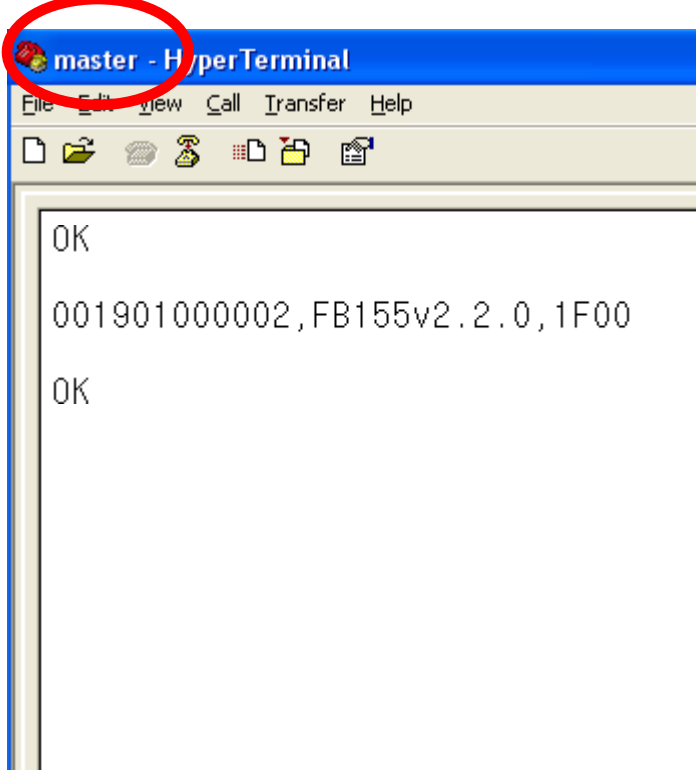
- After entering “AT+BTSCAN” on the hyper terminal, press enter-key.
- “OK” output is made from the FB155BC_SMD.
- Slave setup FB155BC_SMD transmits its information when a master scans.
- **The slave doesn't send its information to the master unless the slave is in scannig. Namely, the master is not able to scan the slave-device in the condition.**

* Status LED condition of slave in scanning







- If FB155BC_SMD is scanning, the Status LED blinks once in every one second.
- The Status LED blinks continuously until Scan command is cancelled.

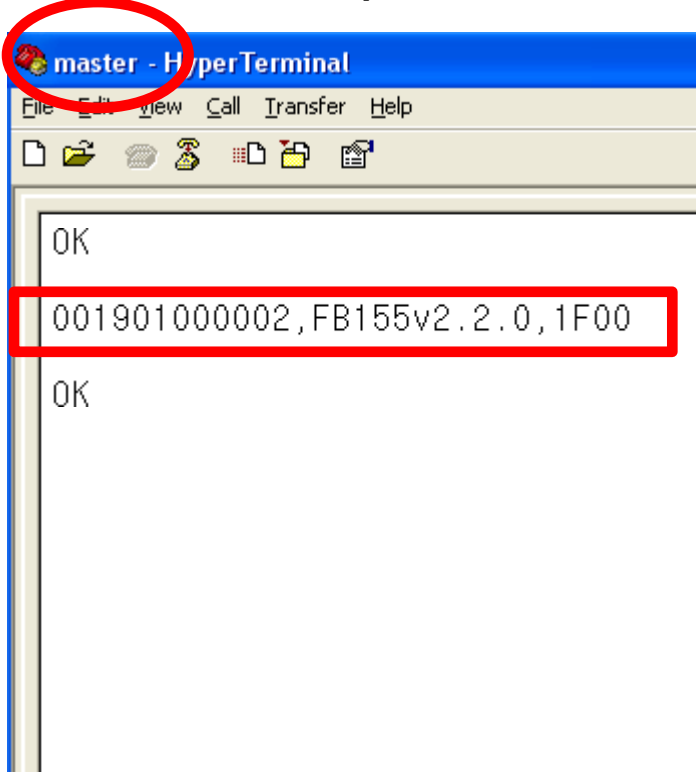
(2) Master Inquiry Start



Enter the following on the hyper terminal connected to the FB155BC_SMD **set up to Master**

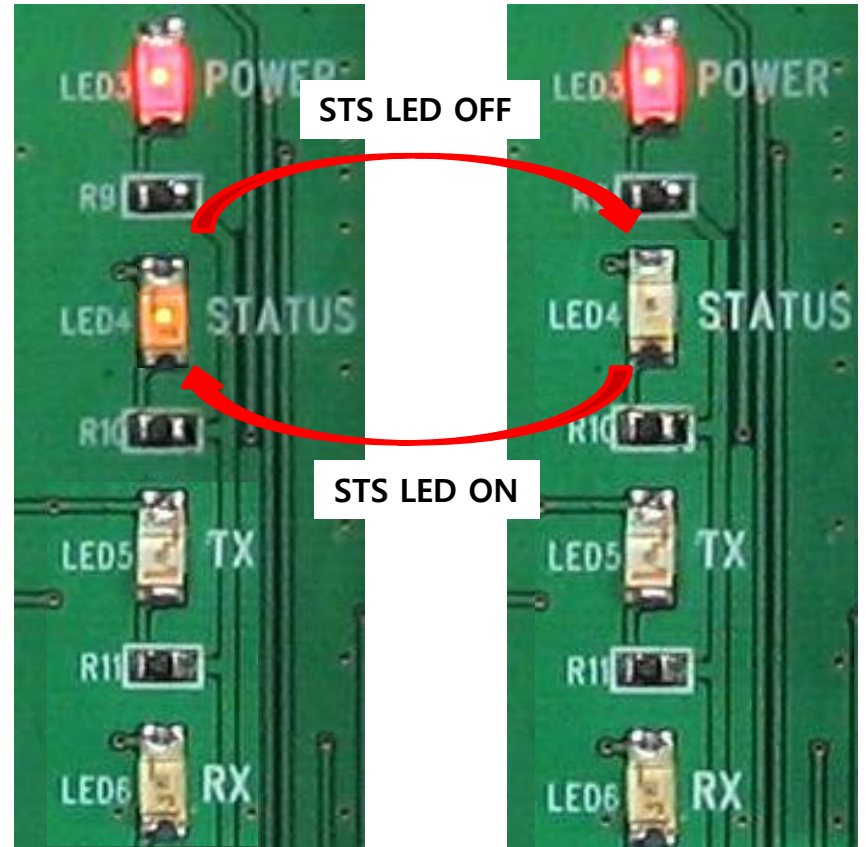
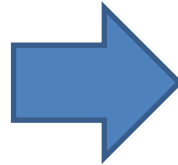
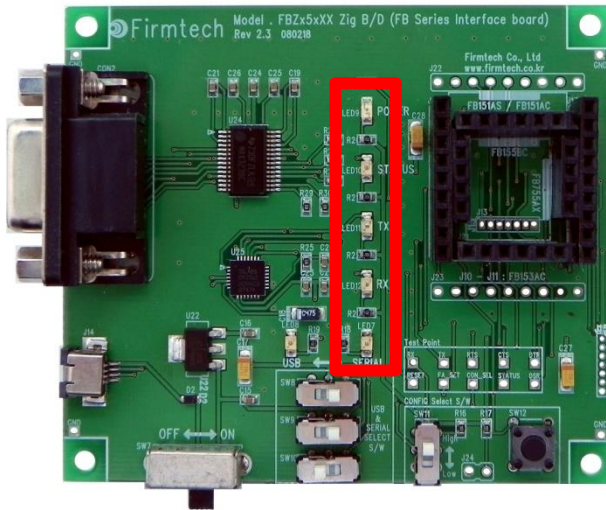
- After entering "AT+BT**INQ?**" on the hyper terminal, press enter-key. 
- "OK" output is made from the FB155BC_SMD. 
- Soon, information-output of Bluetooth slave devices located close is made from the FB155BC_SMD. 
- "OK" output is made from the FB155BC_SMD. 
- Output can be made from a various kinds of devices as cellular phone, PC,PDA etc.

(3) Scan device output content



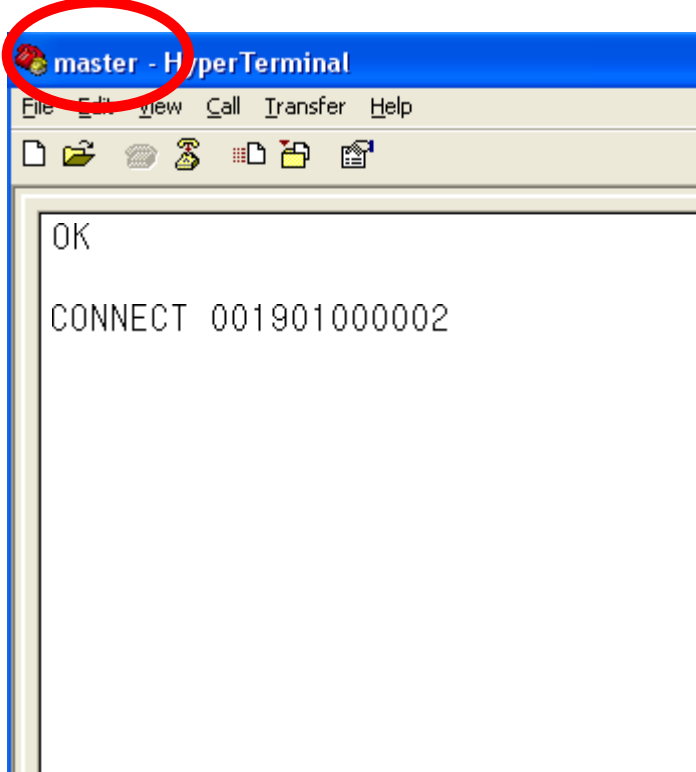
- "001901000002" means address of scanned device.
- "FB155v2.2.0" shows a name of scanned device.
- "1F00" shows Class of Device.
- By using Bluetooth Address of "001901000002", the connection between devices can be progressed.
- Since device name, FB155v2.2.0 supports SPP, it is regarded as a device capable for SPP connection.
- Whether other devices can be connected to it or not depends on recognizing profiles that are supported by the devices.

* Status LED condition of master in inquiring



- While FB155BC_SMD is inquiring, the status LED keeps blinking rapidly.
- Inquiry command is automatically cancelled after a certain time.
- When the inquiry command is cancelled, LED status keeps OFF.

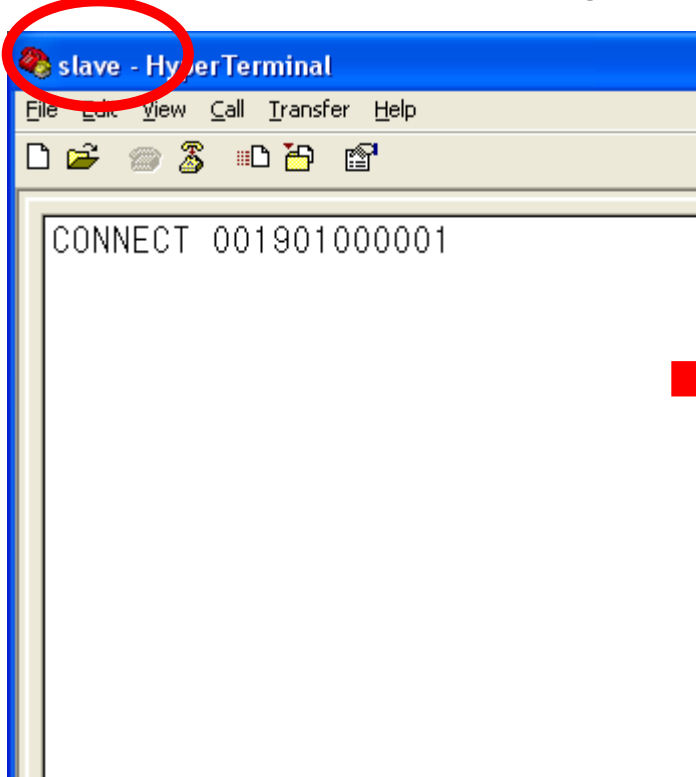
(3) Connection



Enter the following on the hyper terminal connected to the FB155BC_SMD **set up to master.**

- After entering **"ATD001901000002"** on the hyper terminal, press enter.
- "OK" output is made from the FB155BC_SMD.
- **"CONNECT 001901000002"** output is made from the FB155BC_SMD.
- **Bluetooth Address displays the connection with "001901000002" device**
- **master & slave connection is finished**

(4) slave Device Connect Message

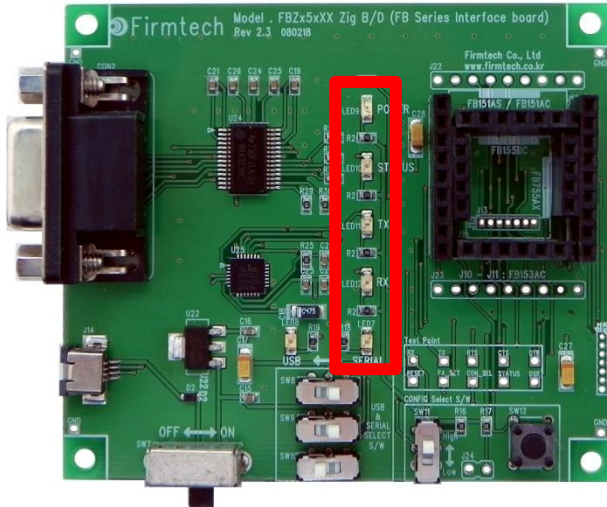


In case of master & slave connection, the following is displayed on the hyper terminals connected FB155BC_SMD set up to slave.



- "CONNECT 001901000001" output is made from the FB155BC_SMD.
- Bluetooth Address displays the connection with "001901000001" device

*** Connected Status LED Condition**

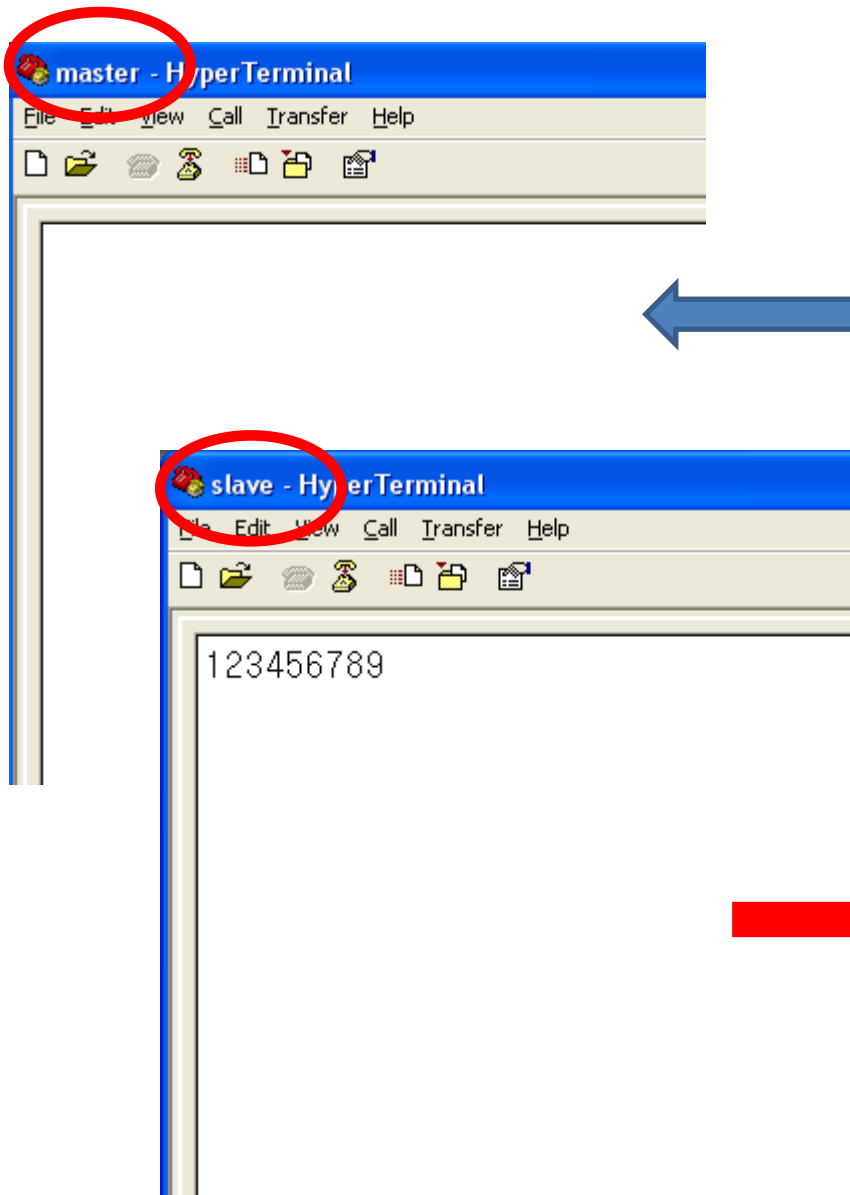


- **Status LED maintains ON condition when FB155BC_SMD master/slave is connected.**

[5] Serial Data Transmission

1. Serial Data Transmission

(1) Serial Data Transmission from master => Received by slave



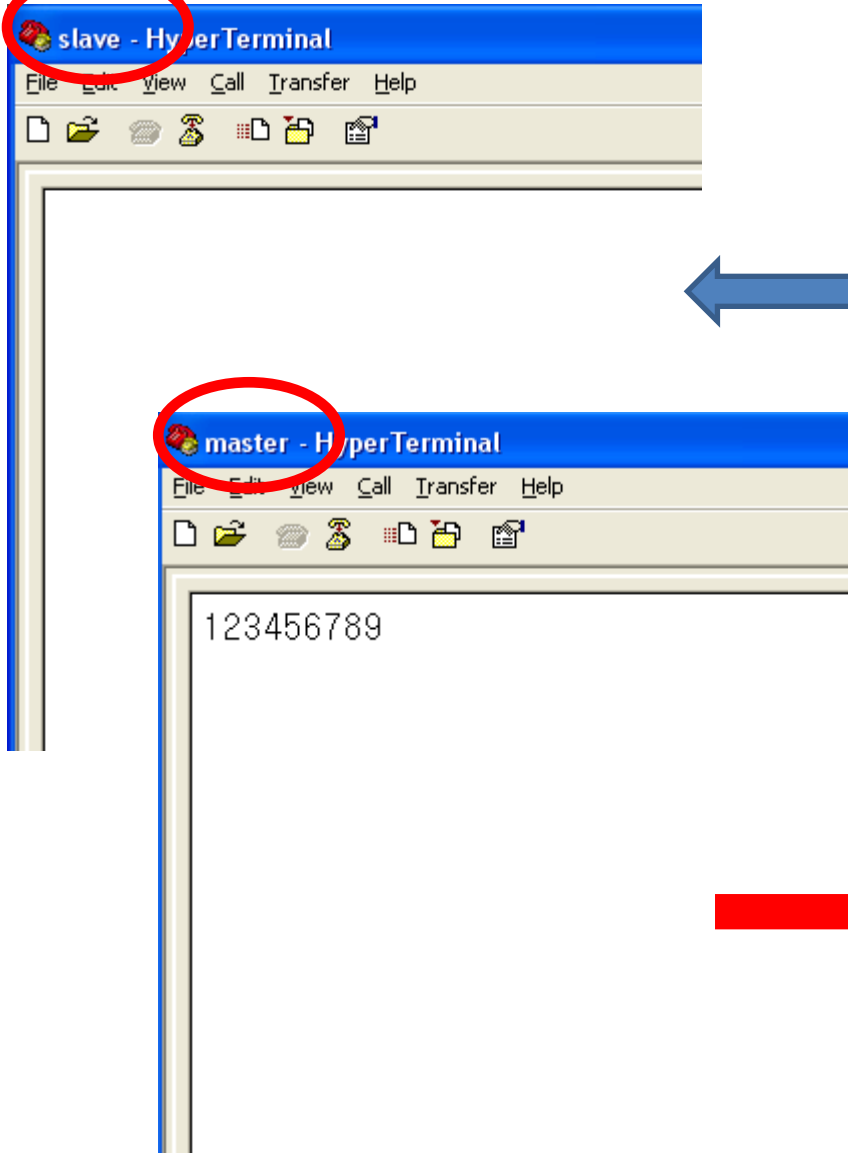
Enter as follows on the hyper terminal connected to the FB155BC_SMD **set up to master**

- Enter "123456789" on the hyper terminal.
- **Input data is not displayed on the screen of the hyper terminal.**

The following output is displayed on the hyper terminal connected to FB155BC_SMD **set up to slave.**

- "123456789" is displayed on the screen of the hyper terminal.

(2) Serial Data Transmission From Slave => Received by Master



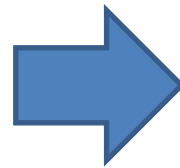
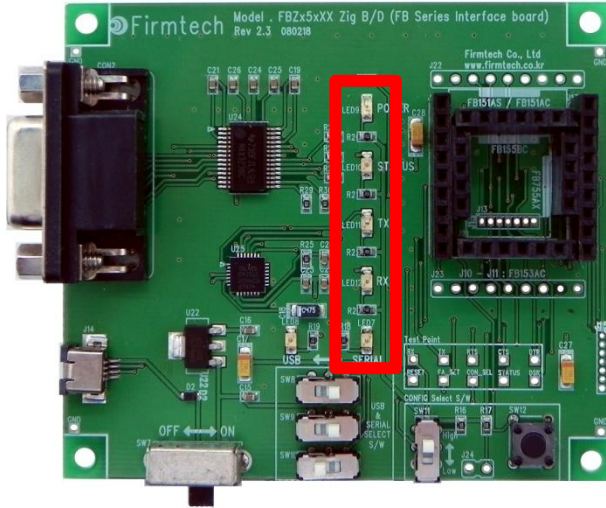
Enter as follows on the hyper terminal connected to the FB155BC_SMD **set up to slave**

- Enter "123456789" on the hyper terminal.
- **Input data is not displayed on the screen of the hyper terminal.**

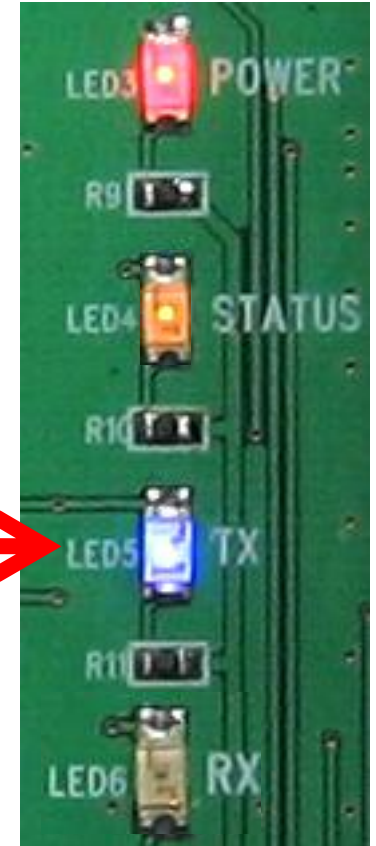
The following output is displayed on the hyper terminal connected to FB155BC_SMD **set up to master.**

- "123456789" is displayed on the screen of the hyper terminal.

* TX/RX LED Status on data transmission & reception



<Serial Data Input>

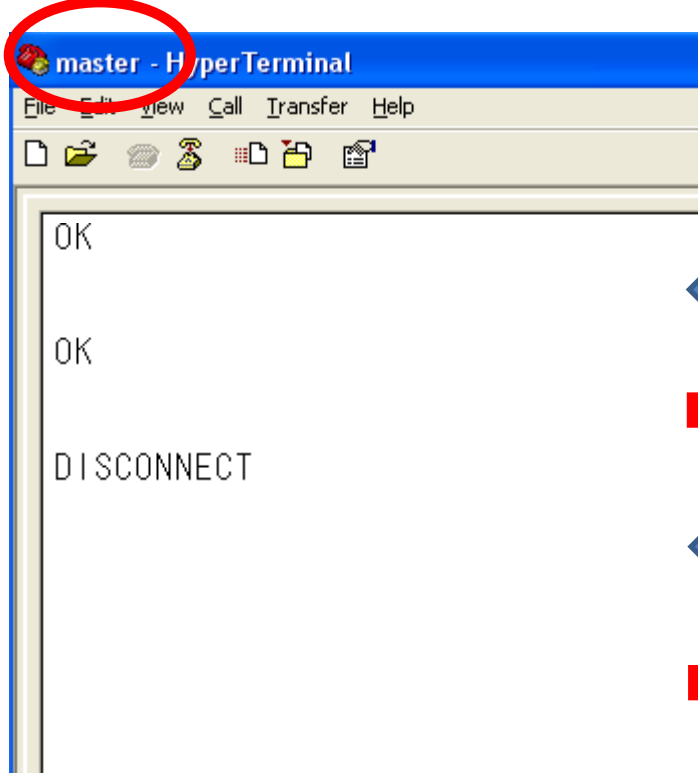


<Serial Data Output>

- STATUS LED is OFF when master & slave are connected.
- FB155BC_SMD RX LED blinks when a real data is entered.
- FB155BC_SMD TX LED blinks when a serial data is output.

[6] Disconnect

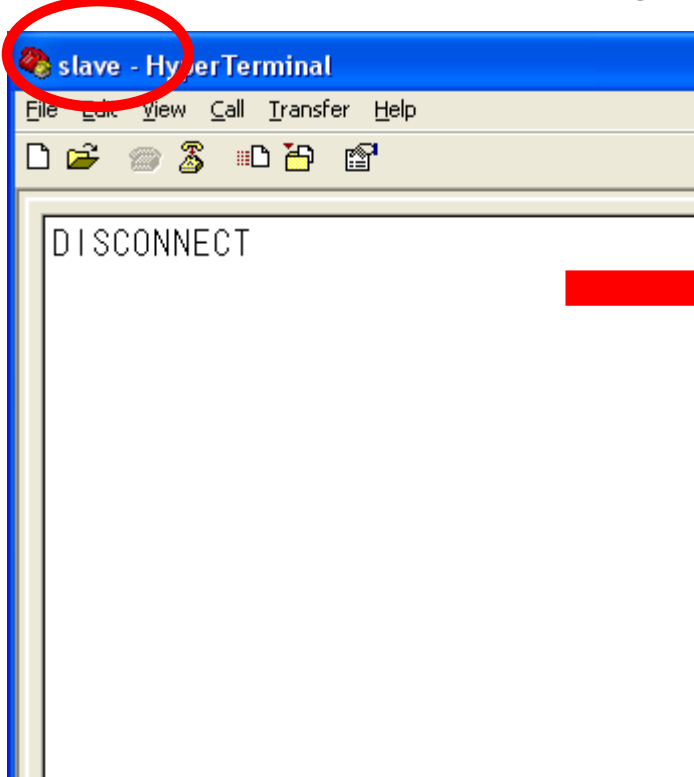
(1) Operation Mode => AT Command Mode Conversion



Enter as follows on the hyper terminal
connected to the FB155BC_SMD **set up to master**

- Enter “+++” on the hyper terminal.
- “OK” output is made from the FB155BC_SMD.
- Enter “ATH” on the hyper terminal.
- “OK” output is made from the FB155BC_SMD.
- “DISCONNECT” output is made from the FB155BC_SMD.
- **Conversion from Operation Mode to AT Command mode is possible only at master.**
- **Connection-finish by using a command is possible only at master.**

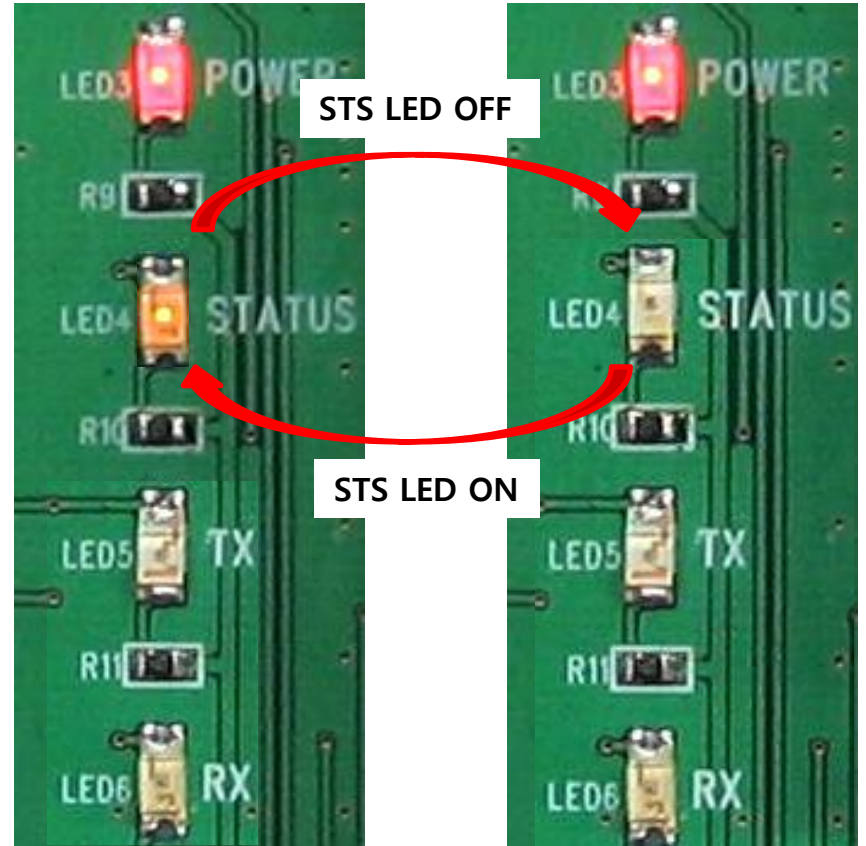
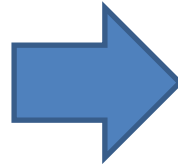
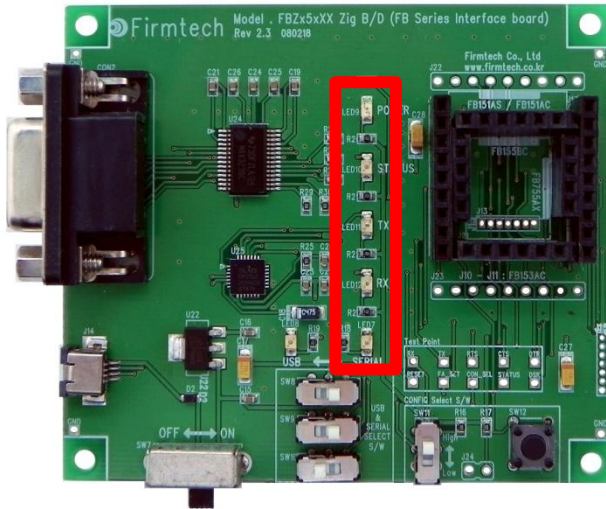
(2) slave Device Disconnect Message



If master & slave connection is finished, the followings are displayed on the hyper terminals connected FB155BC_SMD set up to slave.

- "DISCONNECT" output is made form the FB155BC_SMD.
- Input data is transmitted to master device and a serial output is made out from master device when enter "+++" or AT Command on FB155BC_SMD set up to slave under the condition of master & slave connection.
- Slave device can not use AT command mode under the condition of master & slave connection.

* Status LED Condition After Disconnect

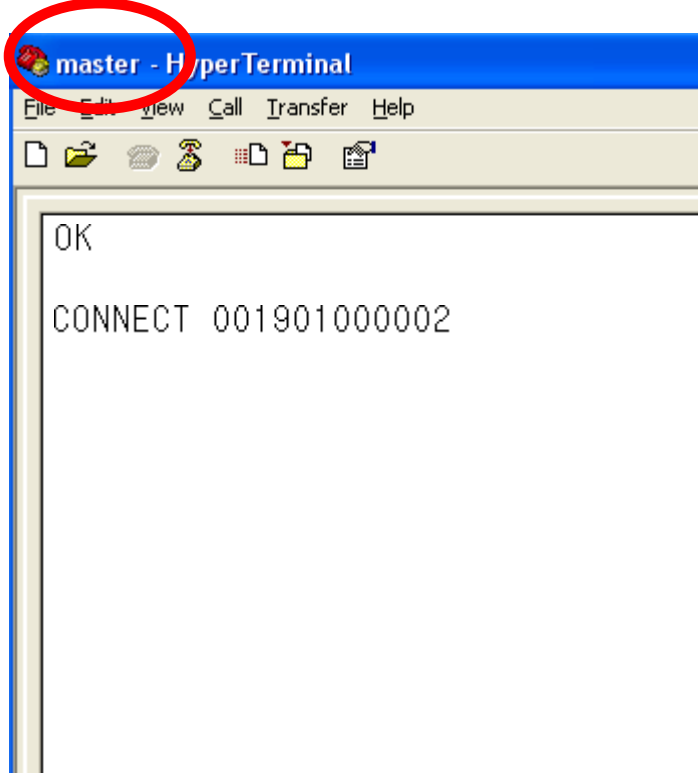


- STATUS LED is OFF when FB15BC_SMD master is disconnected.
- Status LED blinks once in every one second when FB15BC_SMD slave is disconnected. (on operating a scan-command)

< STATUS LED condition of slave device >

[7] Re-connect

(1) Re-connect



Enter the followings on the hyper terminal connected to FB155BC_SMD **set up to master**, in case of connecting previous connected device again.

- After entering “**ATD**” on the hyper terminal, press enter-key.
- “OK” output is made from the FB155BC_SMD.
- “CONNECT001901000002” output is made from the FB155BC_SMD.
- **Connected again with previous connected device**

**In case of connecting with a device connected more than once previously, it keeps a memory of Bluetooth Address for previous lastly connected device.
In case of connecting with new device, please do progress a connection as explained the above.
However, in order to connect (reconnection) with previous connected device, the connection with previously memorized Bluetooth Address is progressed.**

For even more details, please refer to FB155BC_SMD user manual.

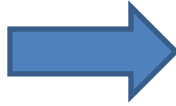
[x] USB2Serial Driver Installation

1. USB2Serial Driver Installation

(1) Step 1

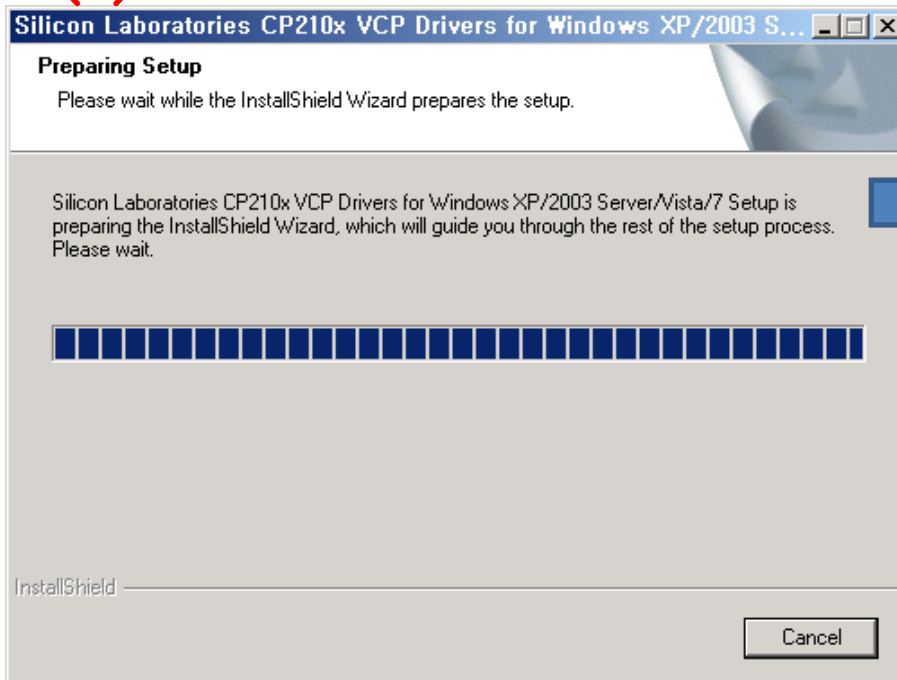
(1)

CP210x_VCP_Win_XP_S2K3_Vista_7.exe



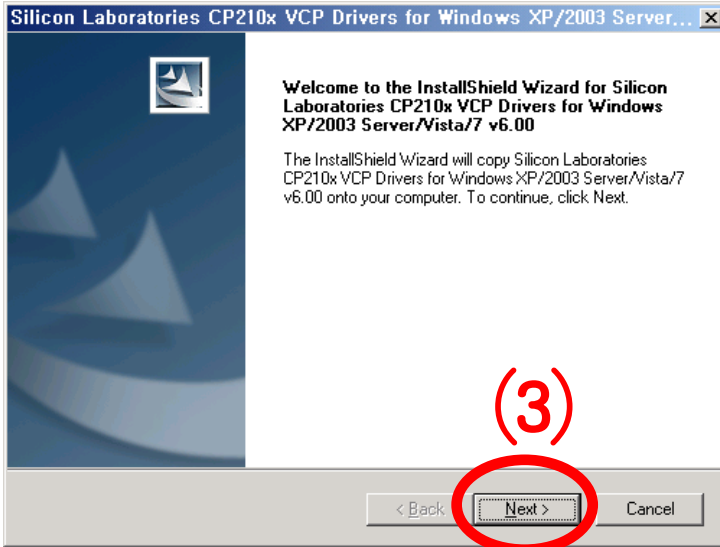
Doubleclick driver execution file.

(2)

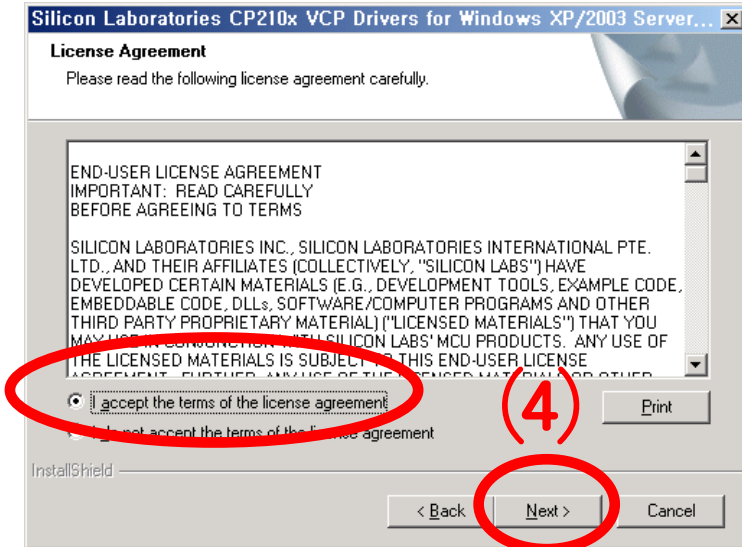


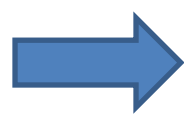
Reset for driver-setup is progressed

(2) Step 2

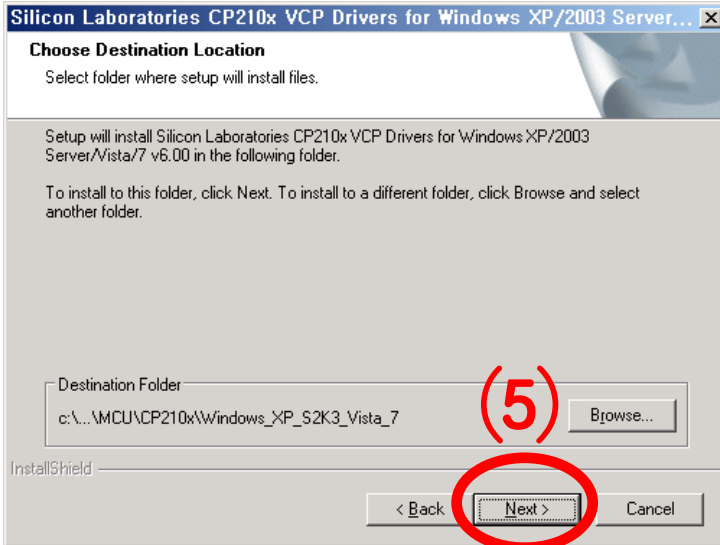


 **Click Next.**

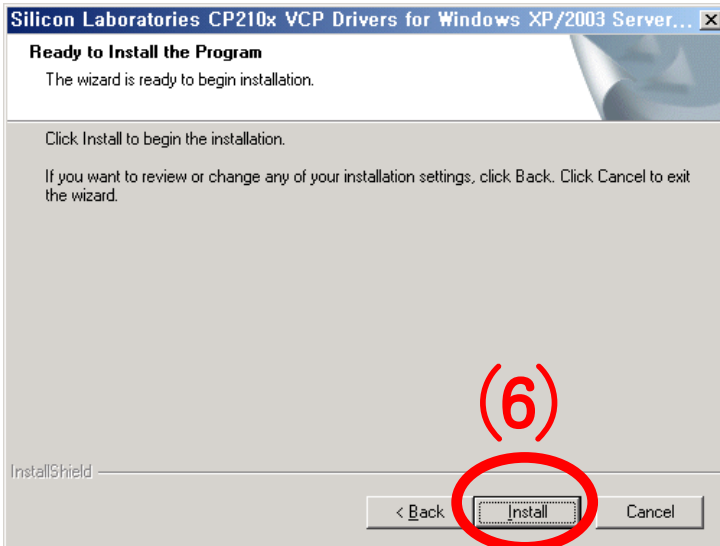


 **Click next and choose Accept.
And then, Click Next.**

(3) Step 3

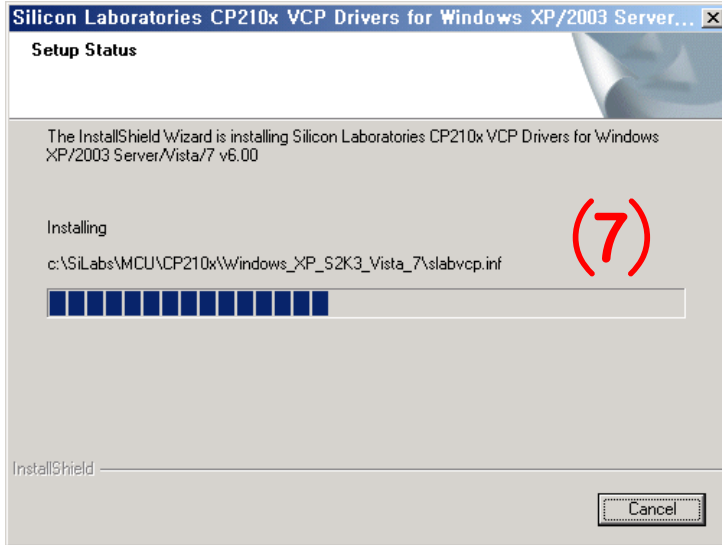


 **Click Next.**

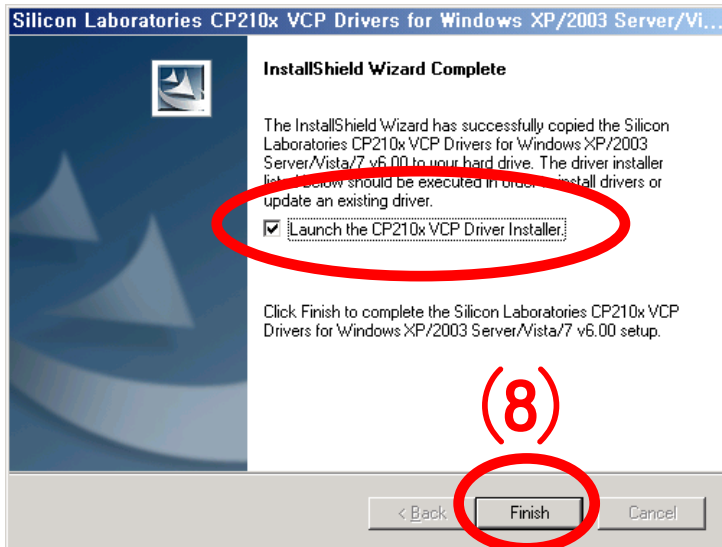


 **Click Install.**

(4) Step 4

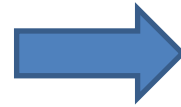


Install is progressing.

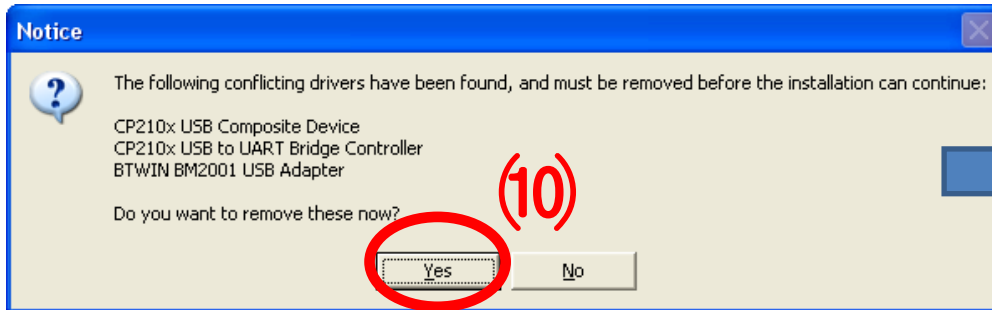


After checking Launch the CP210x VCP Driver Installer, click Finish.

(5) Step 5



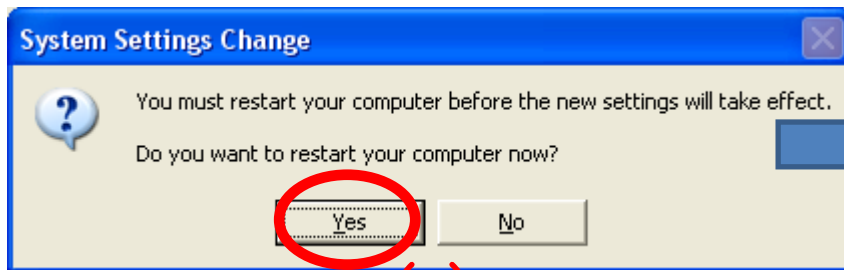
Click Install.



The left message is made if the driver is already existed.

Click "Yes". (the left message may not be made.)

It may takes some time on deleting the existing driver.

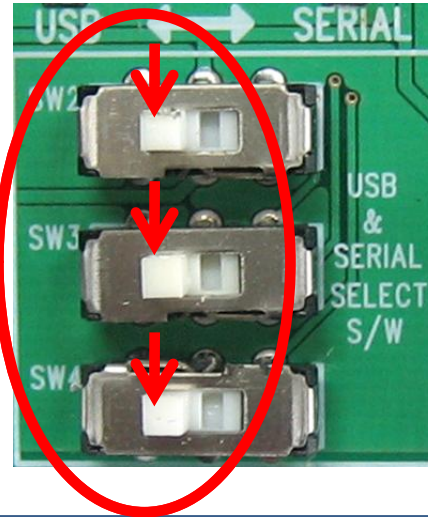
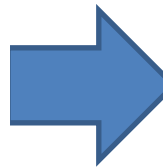
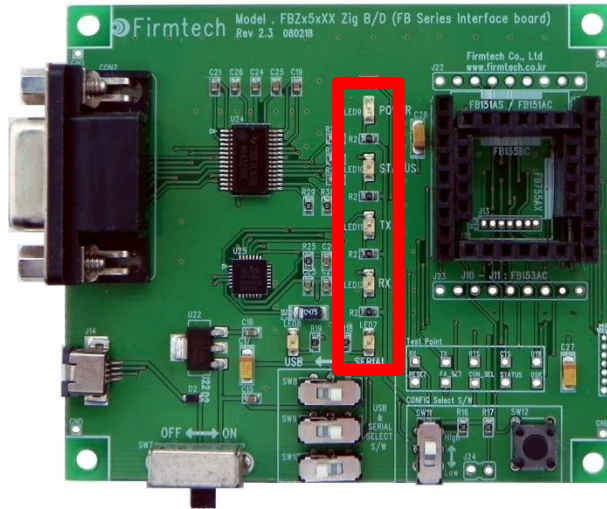


Window System-restart is progressed by clicking "Yes".

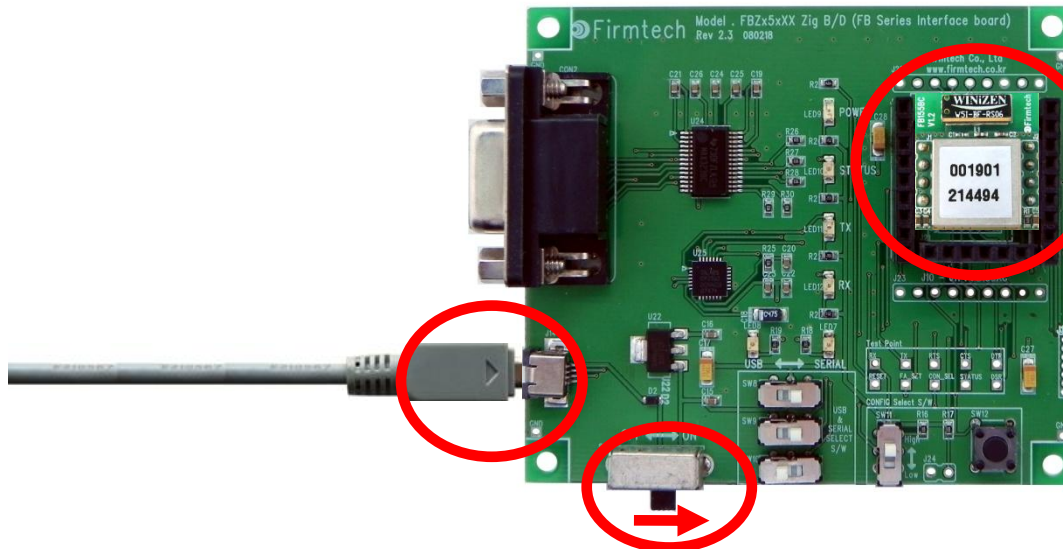
(11)

2. USB2Serial Driver Confirmation Method

(1) Interface Board Setup and Power-Supply ON

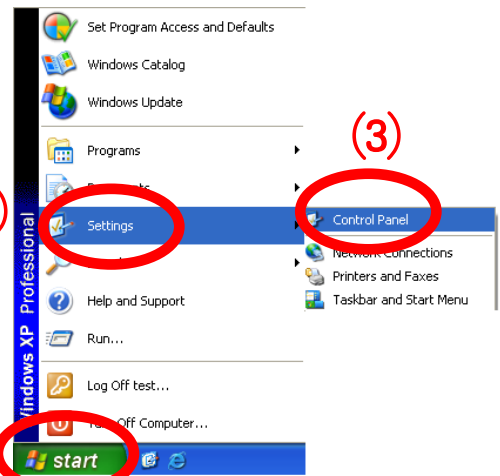


Select USB as UART select switch.



- Build a module.
- Build USB cable.
- Connect PC with USB cable.
- Power Supply **ON** of Interface Board

(2) "Control Panel" & "System" Execution



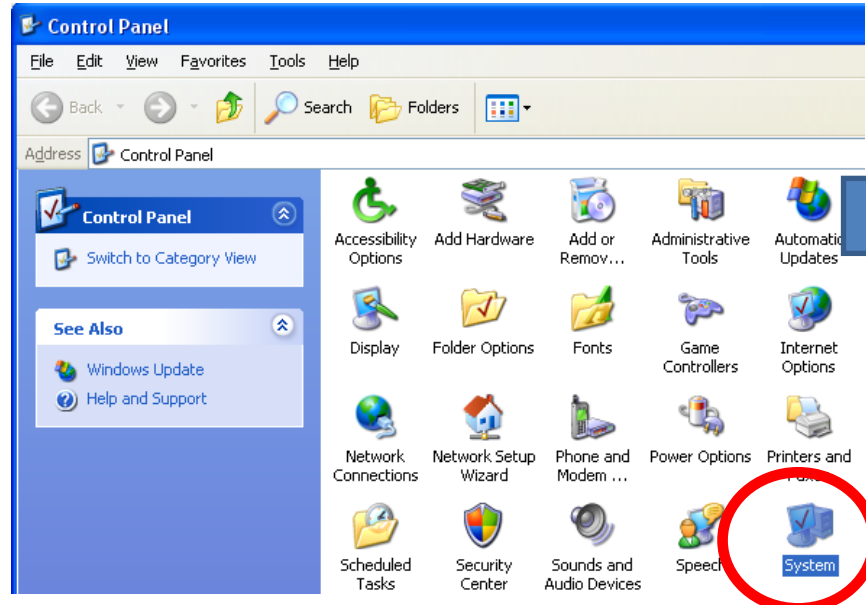
(1) Start button
(2) Settings
(3) Control Panel

Windows XP Professional

- Set Program Access and Defaults
- Windows Catalog
- Windows Update
- Programs
- Settings
- Control Panel
- Network Connections
- Printers and Faxes
- Taskbar and Start Menu
- Help and Support
- Run...
- Log Off test...
- Turn Off Computer...

start

- Click "Start" on Windows Start menu.
- Click "Settings."
- Click "Control Panel."



Control Panel

File Edit View Favorites Tools Help

Back Search Folders

Address Control Panel

Control Panel

Switch to Category View

See Also

- Windows Update
- Help and Support

Accessibility Options

Add Hardware

Add or Remov...

Administrative Tools

Automatic Updates

Display

Folder Options

Fonts

Game Controllers

Internet Options

Network Connections

Network Setup Wizard

Phone and Modem ...

Power Options

Printers and Faxes

Scheduled Tasks

Security Center

Sounds and Audio Devices

Speed

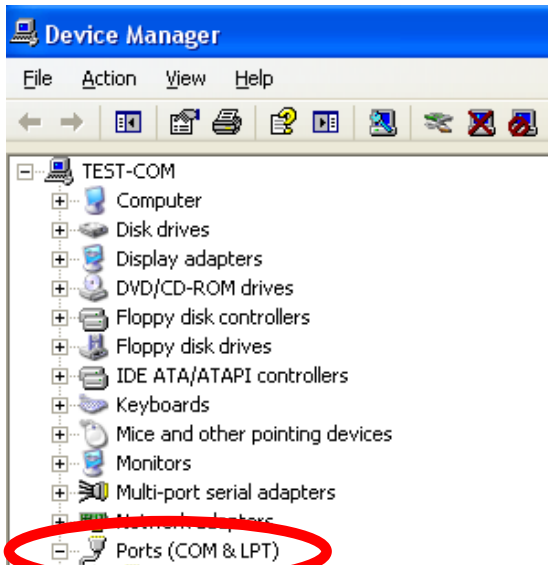
System

- Execute "SYSTEM" in control Panel.

(3) "Device Manager" & "Port" Selection

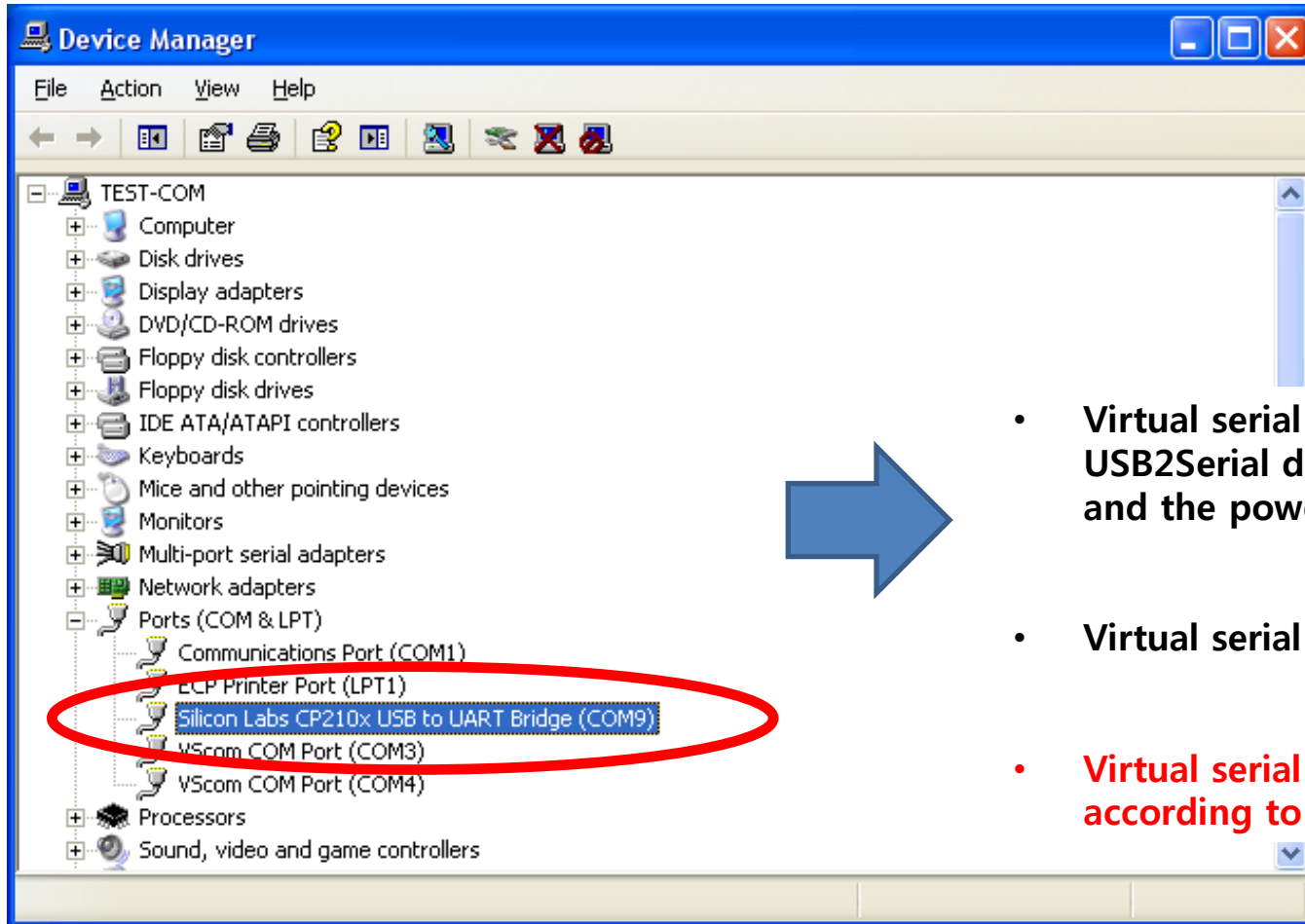


- Select "**Hardware**" tab in system Properties window.
- Select "**Device Manager.**"



- Select "**Port**" in Device Manager."

(4) Created Virtual Serial Port Confirmation



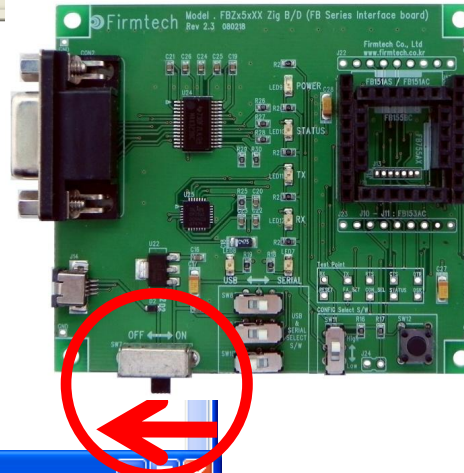
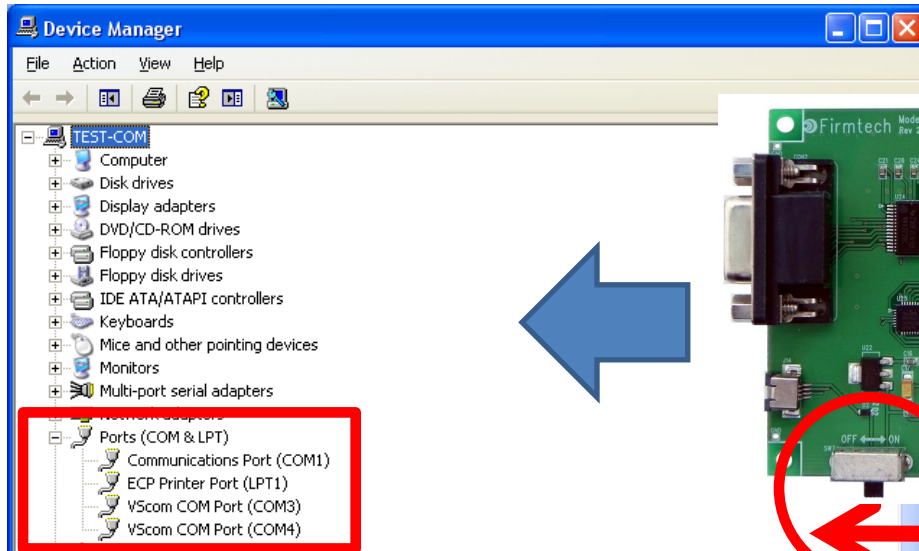
- Virtual serial port is displayed if USB2Serial driver is installed normally and the power-supply is ON.
- Virtual serial port "COM9" is displayed
- Virtual serial port is made differently according to user's environment.

[x] Virtual Serial Port

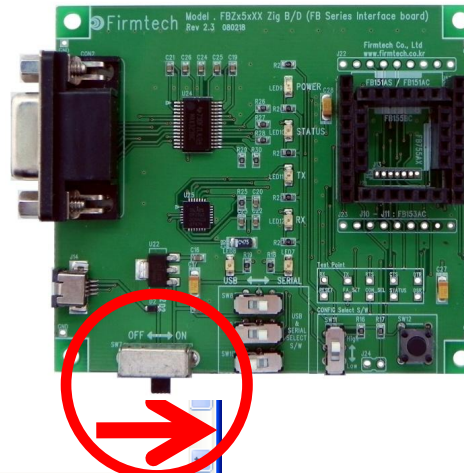
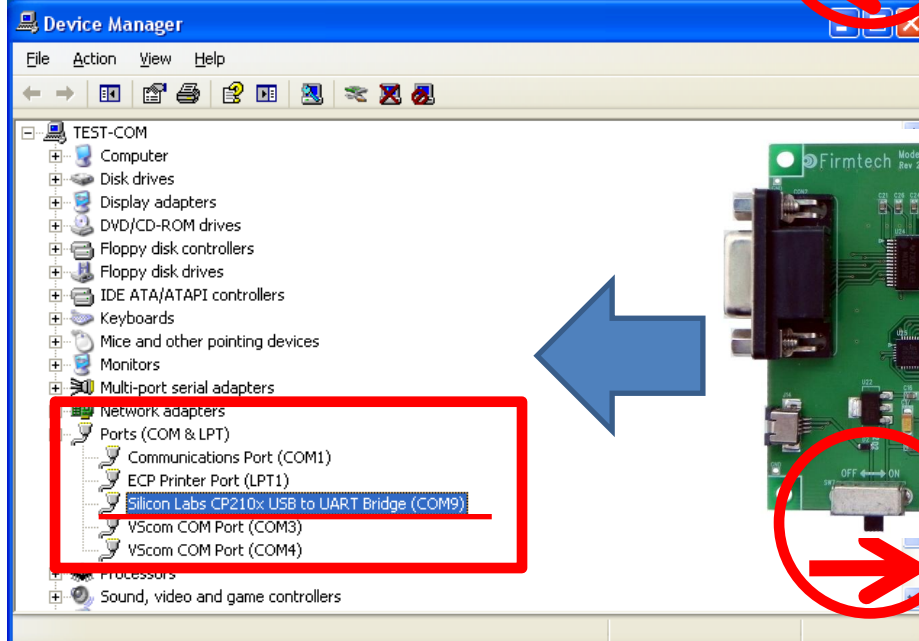
Usage matters to be attended to

1. The Creation of Virtual Serial Port

(1) Virtual Serial Port & Interface Board



There is no a virtual serial port at "Port" clause if power-supply of interface board is OFF.



There is virtual serial port at "Port" clause if power-supply of interface board is ON.

(2) Virtual Serial Port & Serial Communication Program

The screenshot shows the Windows Device Manager for a virtual machine named 'TEST-COM'. The 'Ports (COM & LPT)' category is expanded and highlighted with a red box. It lists: Communications Port (COM1), ECP Printer Port (LPT1), VScom COM Port (COM3), and VScom COM Port (COM4). A blue arrow points from this area to a 'Connect To' dialog box. The dialog box has a 'Country/region' field set to 'United States (1)', an 'Area code' field set to '82', and a 'Phone number' field. The 'Connect using' dropdown menu is open, showing options: COM3, COM4, COM1, and TCP/IP (Winsock).

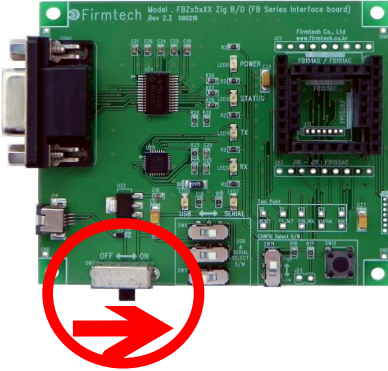
It is impossible for virtual port to be connected to a serial program as hyper-terminal if there is no virtual serial port.

The screenshot shows the Windows Device Manager for a virtual machine named 'TEST-COM'. The 'Ports (COM & LPT)' category is expanded and highlighted with a red box. It lists: Communications Port (COM1), ECP Printer Port (LPT1), Silicon Labs CP210x: USB to UART Bridge (COM9), VScom COM Port (COM3), and VScom COM Port (COM4). The 'Silicon Labs CP210x: USB to UART Bridge (COM9)' entry is highlighted with a blue selection bar. A blue arrow points from this area to a 'Connect To' dialog box. The dialog box has a 'Country/region' field set to 'United States (1)', an 'Area code' field set to '82', and a 'Phone number' field. The 'Connect using' dropdown menu is open, showing options: COM3, COM4, COM1, COM9, and TCP/IP (Winsock). The 'COM9' option is circled in red.

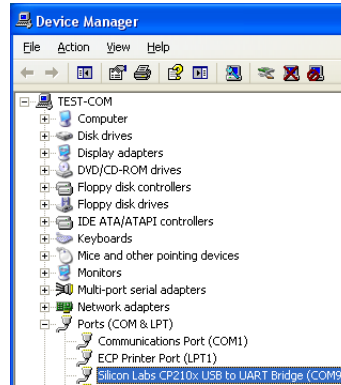
It is possible for virtual port to be connected to a serial program as hyper-terminal if there is virtual serial port.

(3) Virtual Serial Port & Serial Communication Program & Interface Board

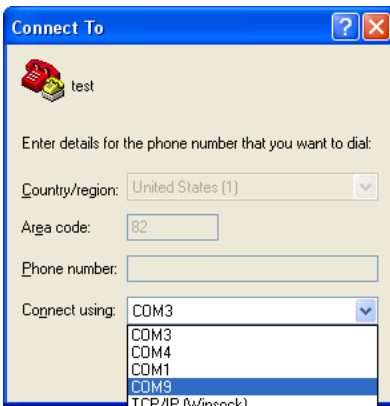
(1) Power Supply ON



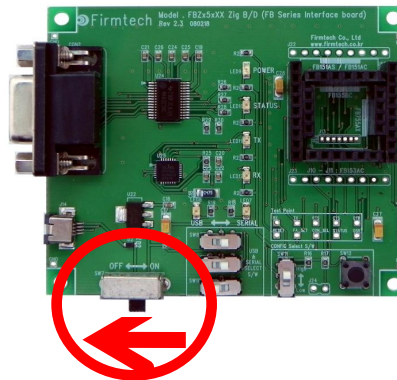
(2) Virtual Port Creation



(3) Virtual Port OPEN



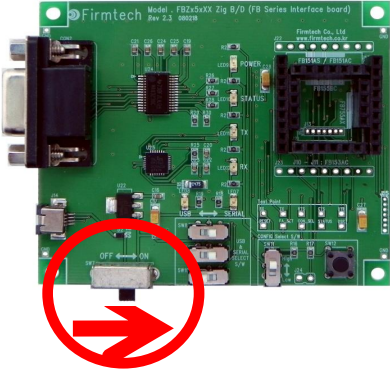
(4) Power Supply OFF



- A virtual port may be disappeared by power-supply OFF of interface board while using virtual serial port created at serial communication program.
- Even though a virtual serial port is disappeared by power-supply OFF of interface board, may not see virtual serial port disappearing at serial communication program.
- Communication is not available because of realistic port (Virtual port) disappearing even though serial communication program is operated normally.
- It may occur critical situation at OS if virtual port is disappeared under a serial communication program operating.
- Therefore, certainly, serial port communication should be finished before power-supply OFF of interface board. That is, the power-supply of interface board should be OFF under finishing virtual port.

(4) Virtual Serial Port & Bluetooth Module

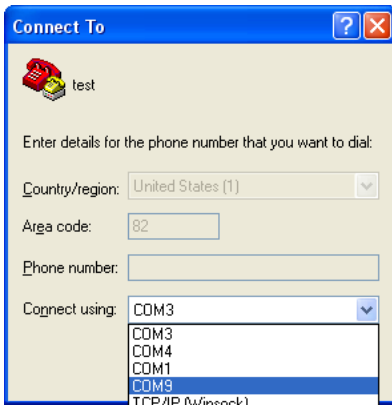
(1) Power-Supply ON



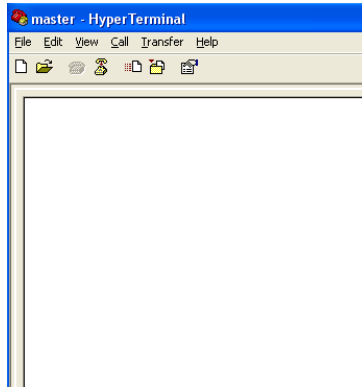
(2) Message Output



(3) Virtual Port OPEN



(4) No Message



- Start Message is made out by Bluetooth Module if power-supply of interface board is OFF.
- Virtual Port is created after power-supply of interface board is ON.
- Serial communication program is available after virtual port creation.
- Can not see operation-situation (Start Message etc) immediately just after ON of module power supply if serial communication program is used at virtual port.
- In case of using virtual port, a user makes appropriate action (System reset etc by using "ATZ" command after Bluetooth operation) for seeing general operation situation of Bluetooth Module.