FZ200BS

Quick Guide

TinyBee™

Features of FZ200BS

TinyBee™

< Features of Zigbee >

- **It meets International Standard specifications with the aim of achieving Low power consumption/Low cost/Low capacity**

- **It uses 2.4GHz ISM (Industrial, Scientific, Medical) Band which doesn't require any permission to use.**

- **It has 16 channels in 2.4GHz band**

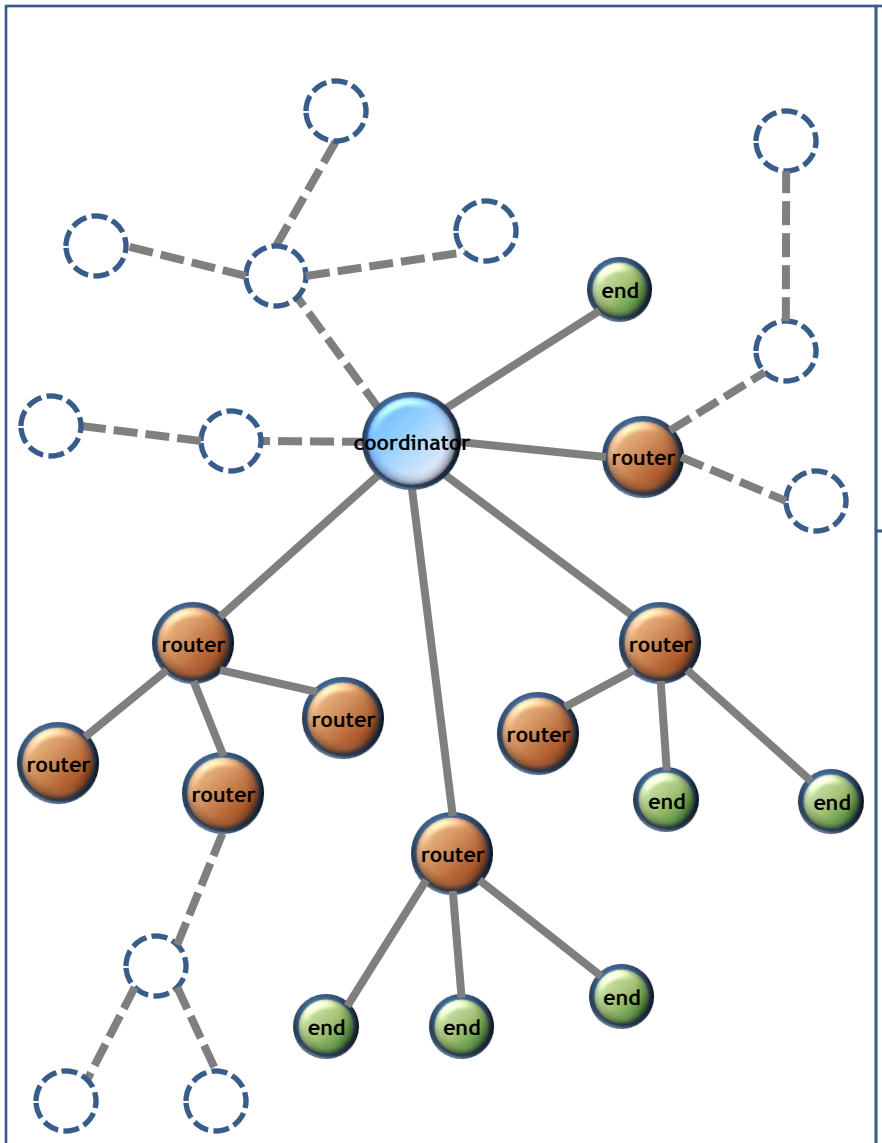
- **Wireless transmission rate : 250Kbps**

- **It configures the ZigBee Network using Coordinator, Router and End Device**

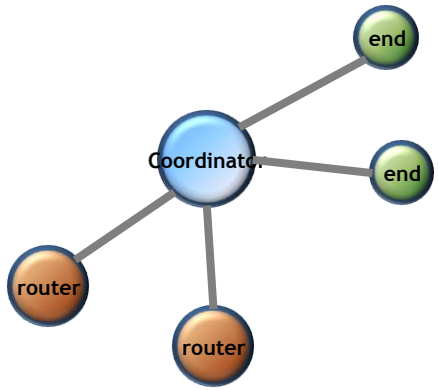
- **By using ACK, whether the data is successfully transmitted can be assured.**

- **It can reset the route for data transmission in the ZigBee network by using the function of data re-transmission**

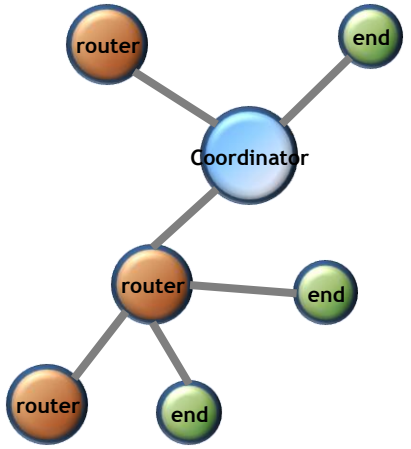
An Example of ZigBee Network configuration



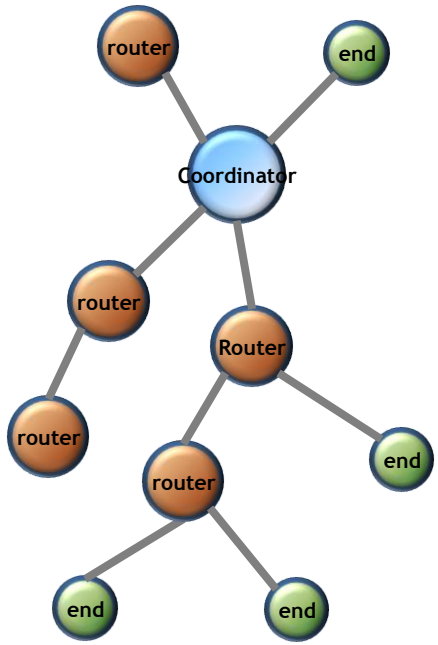
An example of ZigBee Network configuration



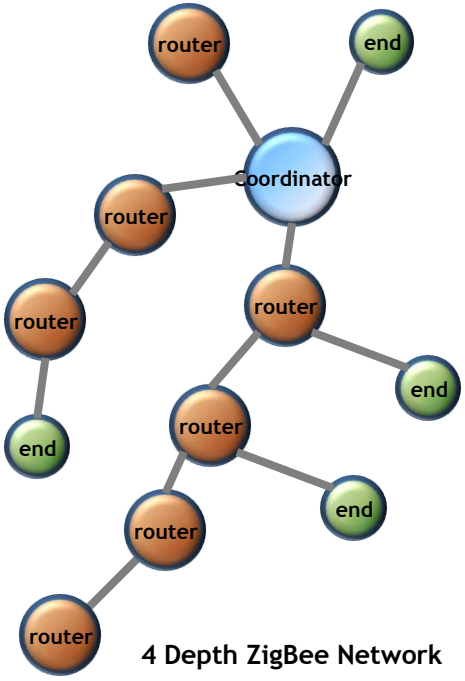
1 Depth ZigBee Network



2 Depth ZigBee Networks

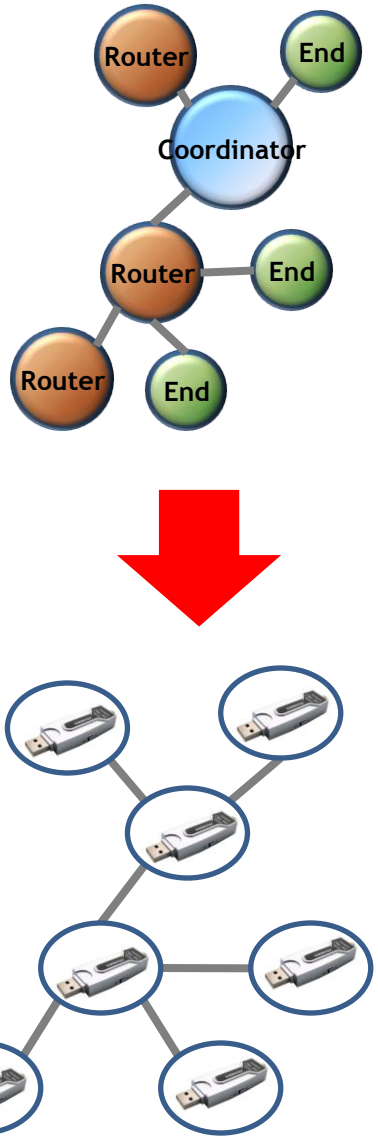


3 Depth ZigBee Network



4 Depth ZigBee Network

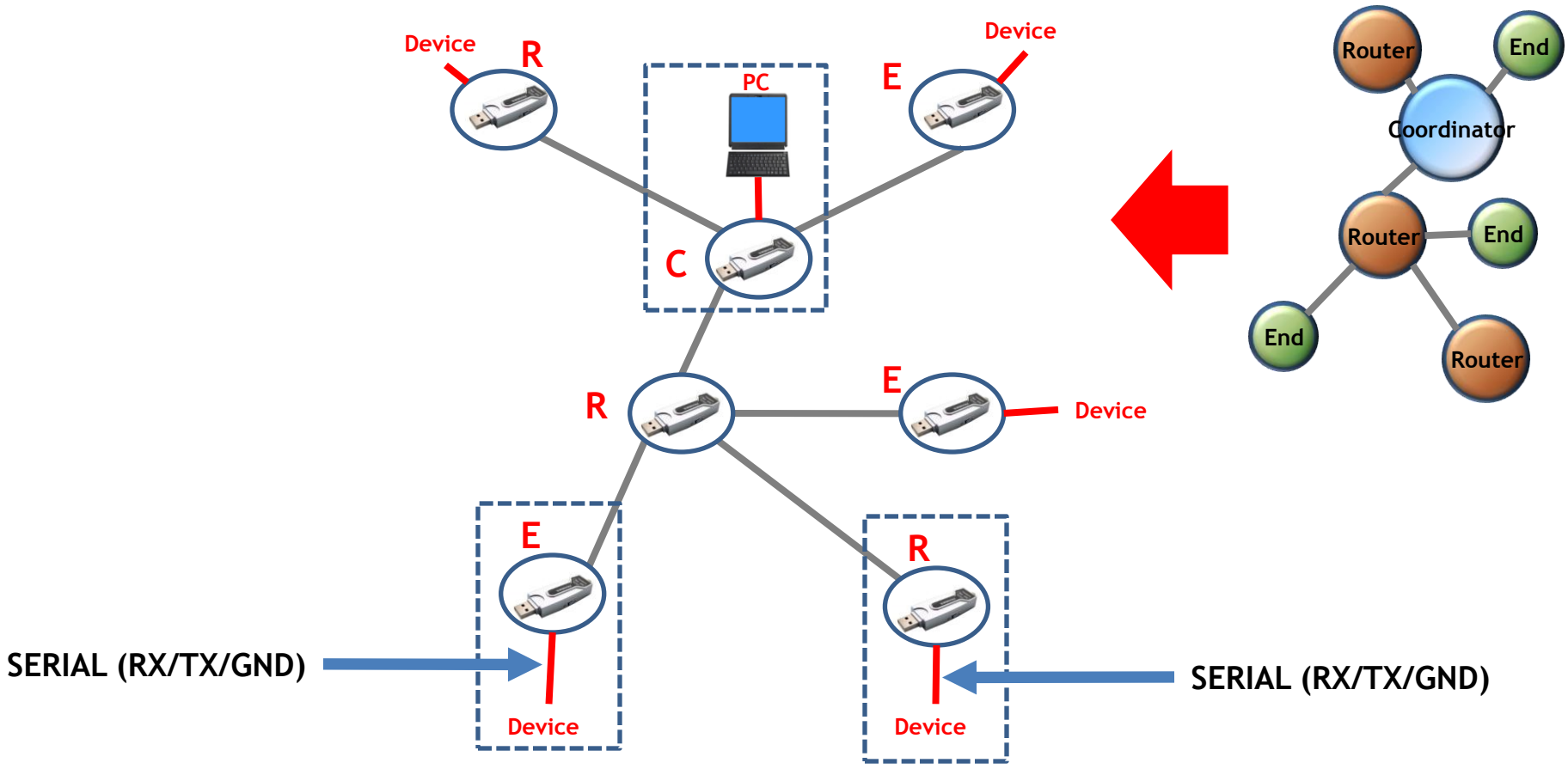
Features of FZ200BS



< FZ200BS >

- Can be freely set up as Coordinator, Router, or End device.
- Supports Mesh Network.
- Configured with USB Type.
- Controlled by AT Command
- Supports low power consumption mode in case of End Device. (Optional)
- Supports ACK function when data is transmitted.
- Provides function of data re-transmission and re-setting route.

An example of a ZigBee Network Configuration using FZ200BS



< “FZ200BS Quick Guide” >

(1) It’s Composed of 9 chapters in total.

(2) The “FZ200BS quick guide” proceeds in order.

(3) Thus, we recommend you to follow all chapters in order if you are unfamiliar with FZ200BS.

(4) Please refer to the FZ200BS manual for further details.

< List >

[0] Component parts

&

Hardware Installation to operation FZ200BS

1. FZ200BS ZigBee Network components

(1) Basic components to operate FZ200BS (1 set)

< Basic components 1 set>

- **FZ200BS**
- **Antenna (4 dBi Gain)**

(2) ZigBee Network composition using 3 sets

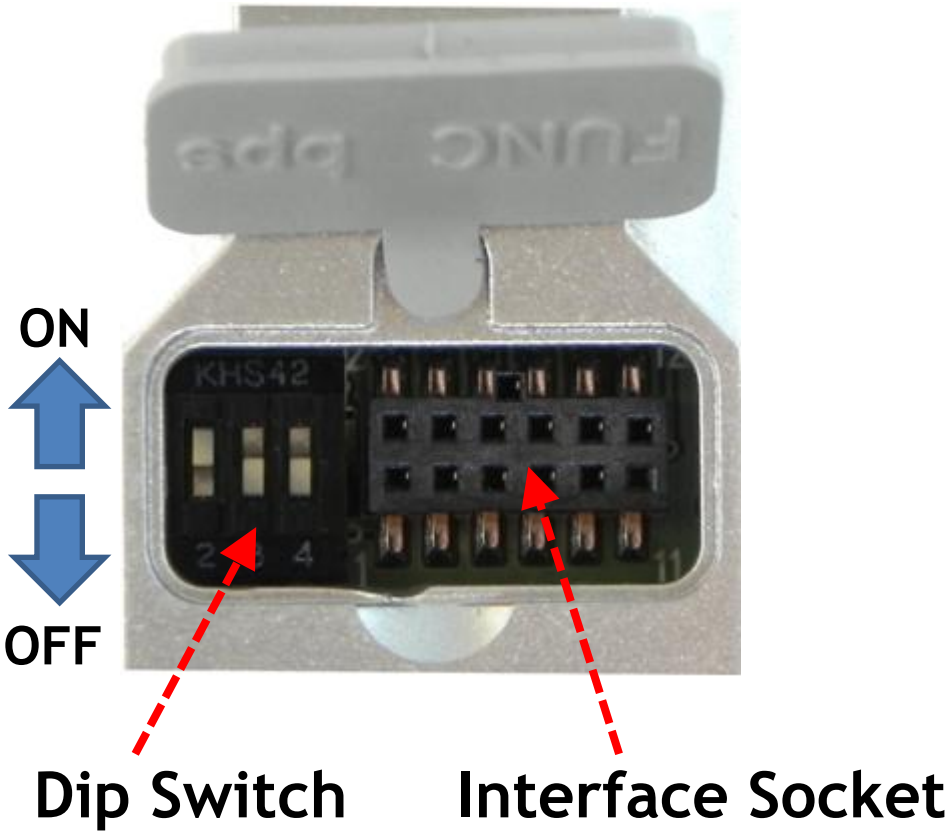
1 set for Coordinator set-up (Essential)

1 set for Router set-up (Essential)

1 set for End device (Optional)

3 devices are used in “FZ200BS Quick Guide” for explanation.

2. Check Dip-Switch before you install FZ200BS



- Dip Switch Number#1 OFF
- Dip Switch Number#2 ON
- Dip Switch Number#3 OFF
- Dip Switch Number#4 OFF

- Select all the 3 FZ200BS are the same way as above.

For even more details of Dip-Switch and Interface Socket, please refer to “FZx00_Appendix_3”.

3. Product Installation

- Connect all 3 FZ200BS to the PC.

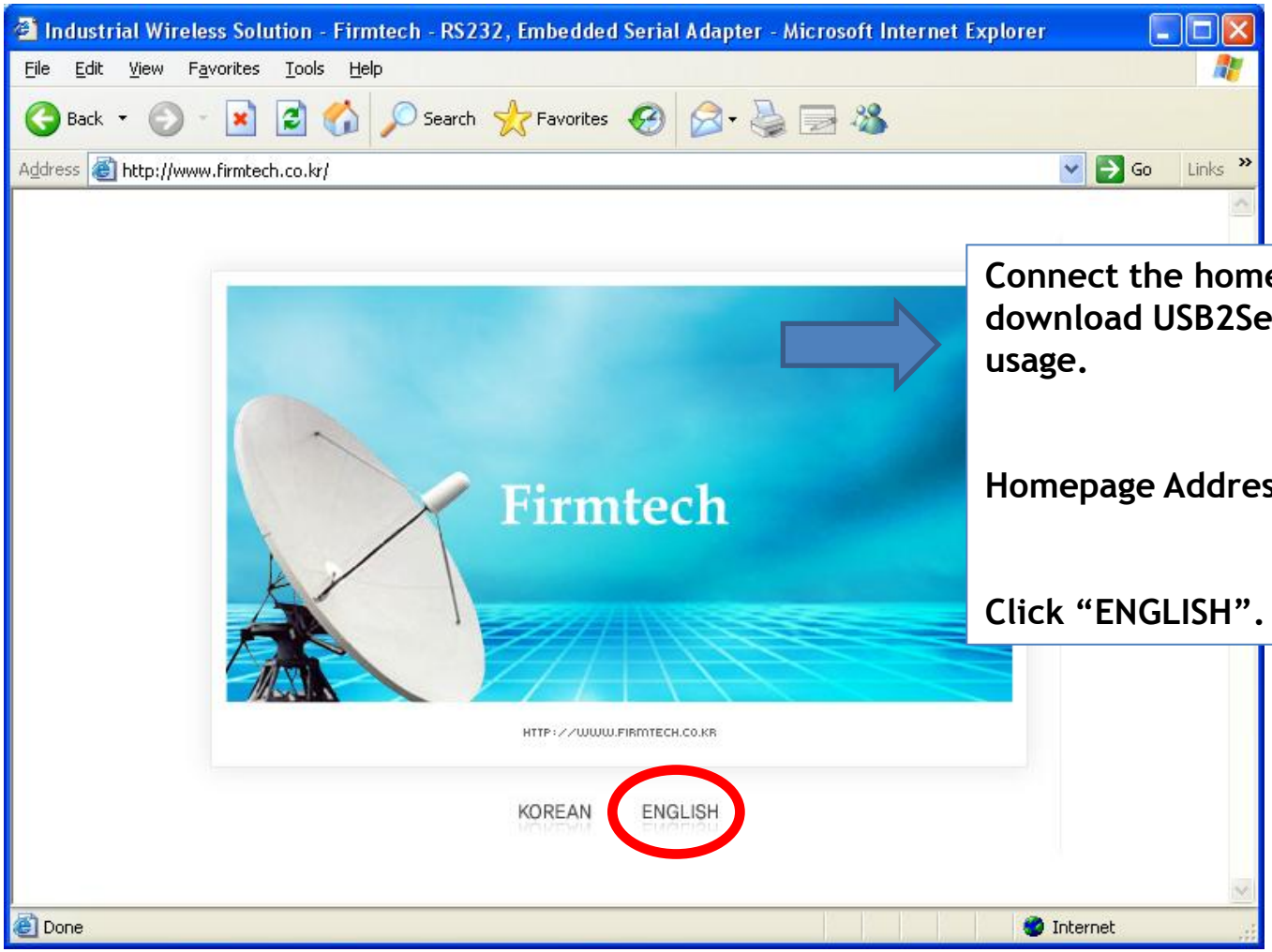
- “FZ200BS Quick Guide” explains how to connect 1 PC to 3 FZ200BS for convenience.

[1] Setup of FZ200BS Driver

FZ200BS USB Driver and FB200AS USB Driver is same.

1. Download for FZ200BS Driver Installation

(1) Homepage Connection: www.firmtech.co.kr

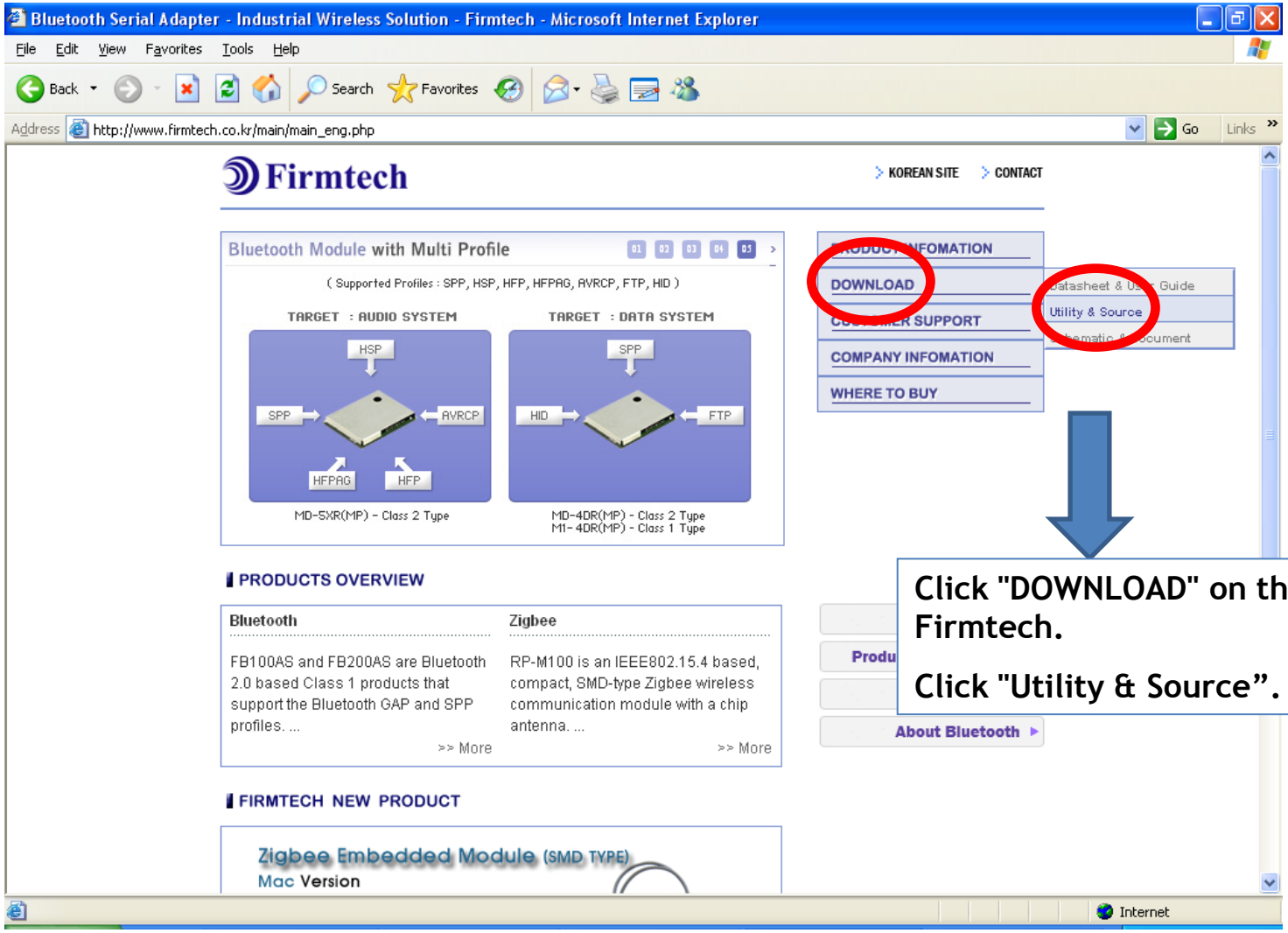


Connect the homepage of firmtech to download USB2Serial Driver for FZ200BS usage.

Homepage Address: www.firmtech.co.kr.

Click “ENGLISH”.

(2) Download Location Selection

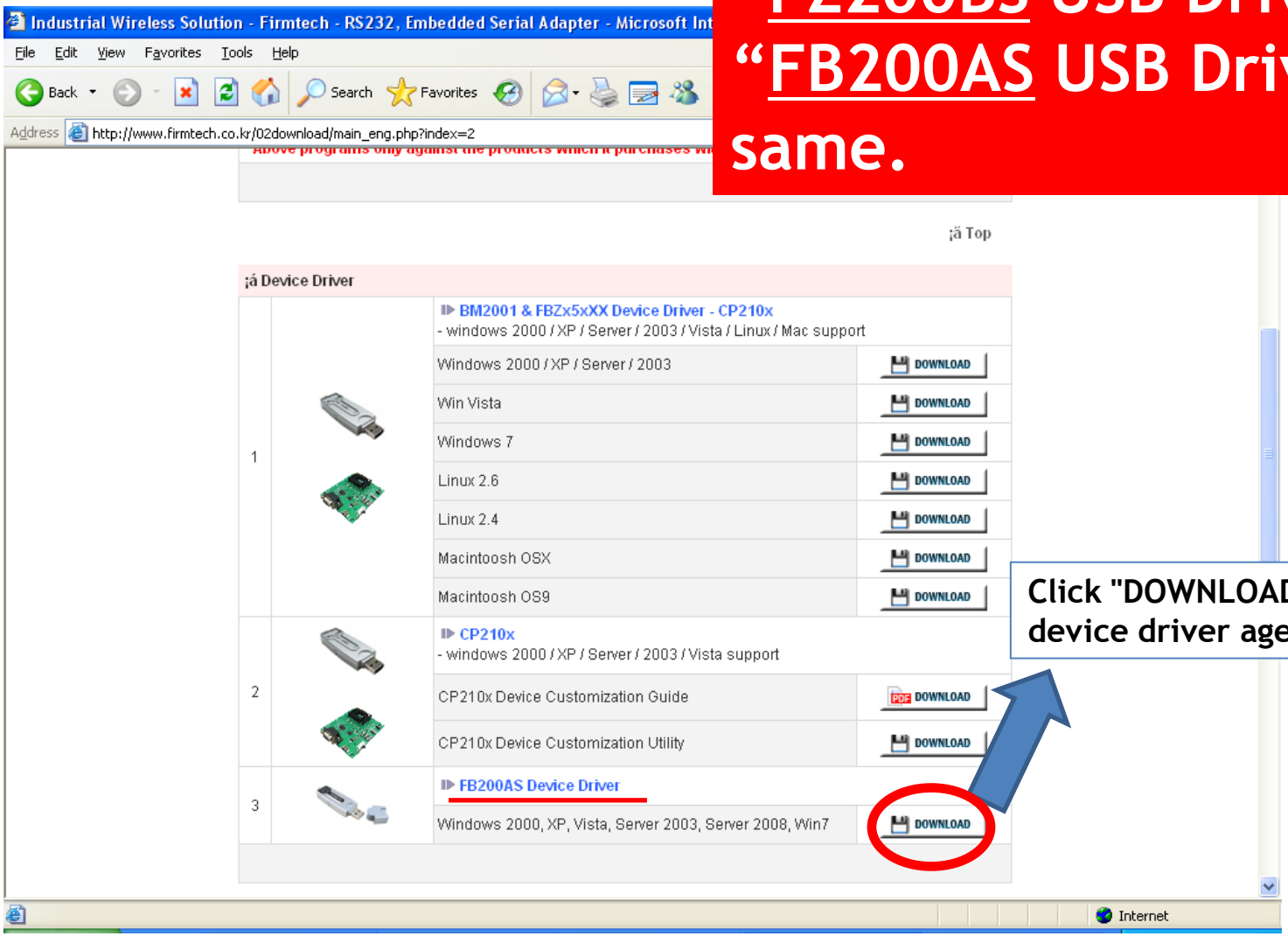


Click "DOWNLOAD" on the homepage of Firmtech.

Click "Utility & Source".

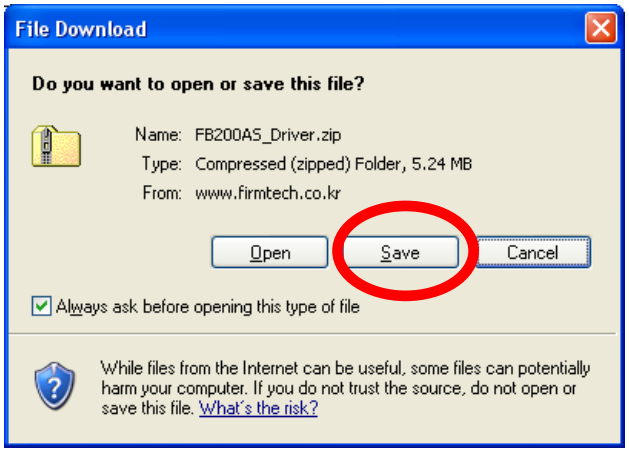
(3) “FZ200BS Device Driver” Download

“FZ200BS USB Driver” and “FB200AS USB Driver” is same.

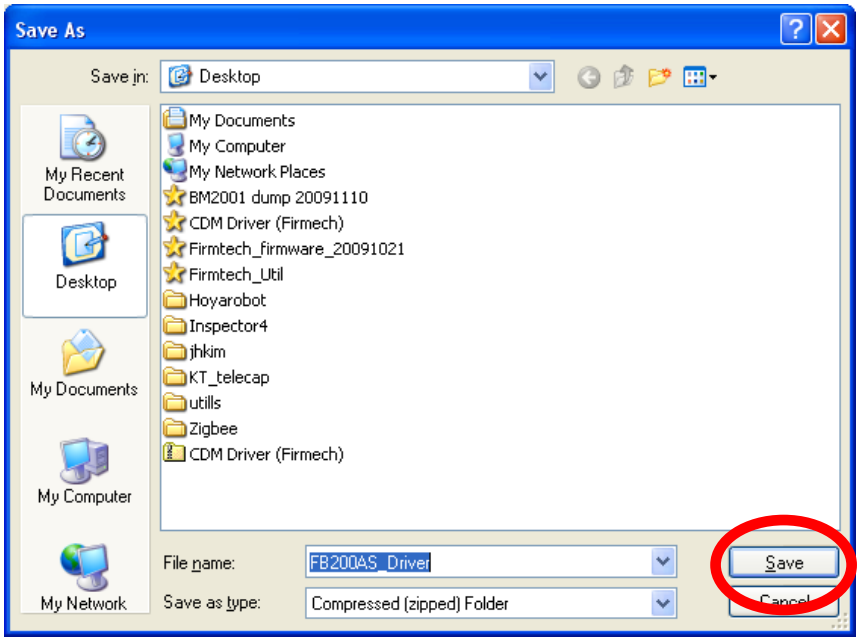


Click "DOWNLOAD“ of FB200AS device driver agenda.

(4) File Download Window

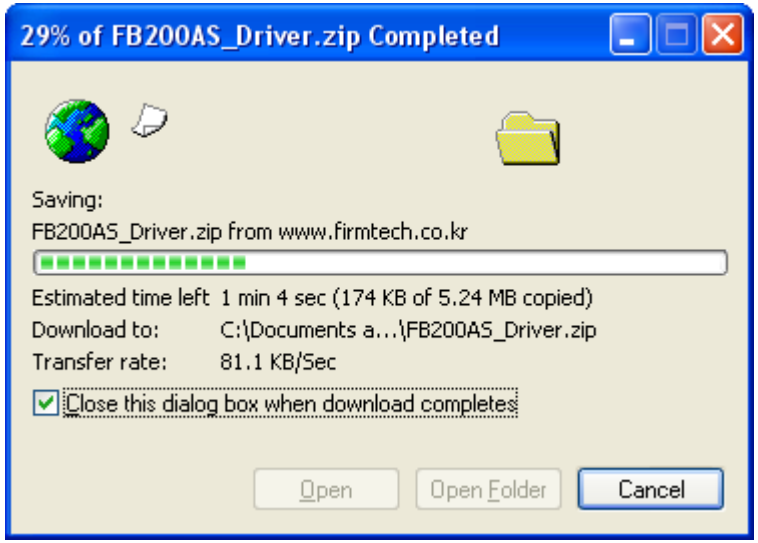


Click "Save" in file download window.



Position saving location and click "save".(assumption(left): save it in Desktop on the computer).

(5) Download Progress

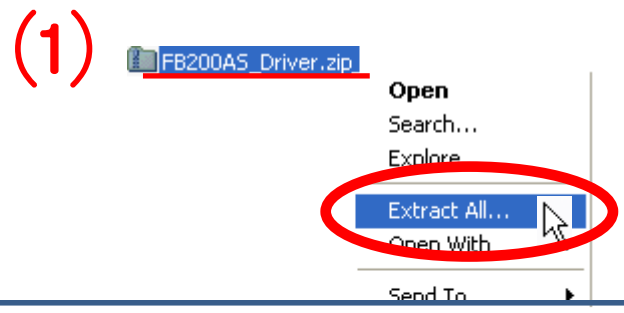


Wait until the download is completed.

"FB200AS_Driver.zip file is displayed on the Desktop.

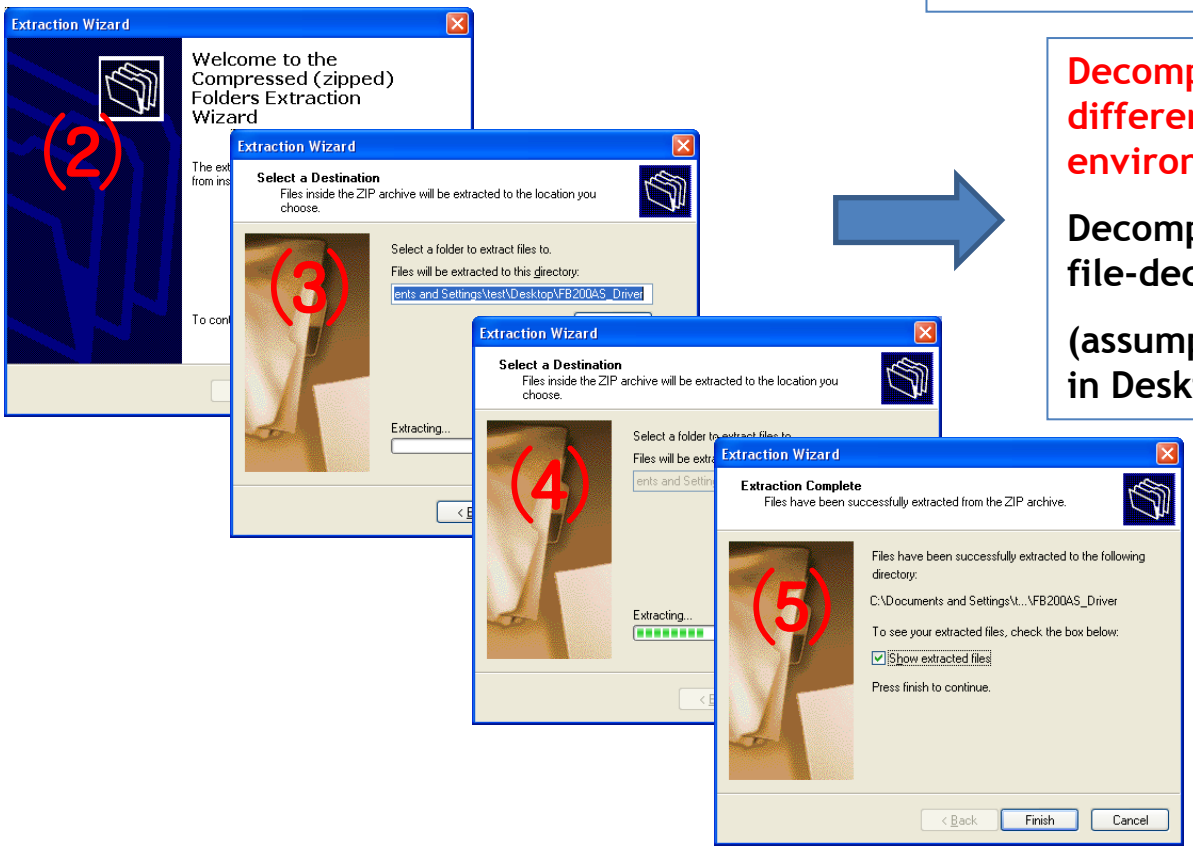
2. Downloaded File Copy

(1) Decompression



Decompress the FB200AS Driver.zip file by clicking the right mouse button

Basic assumption : A user makes use of decompressing program supported by Windows XP



Decompressing program can be different according to user's environment.

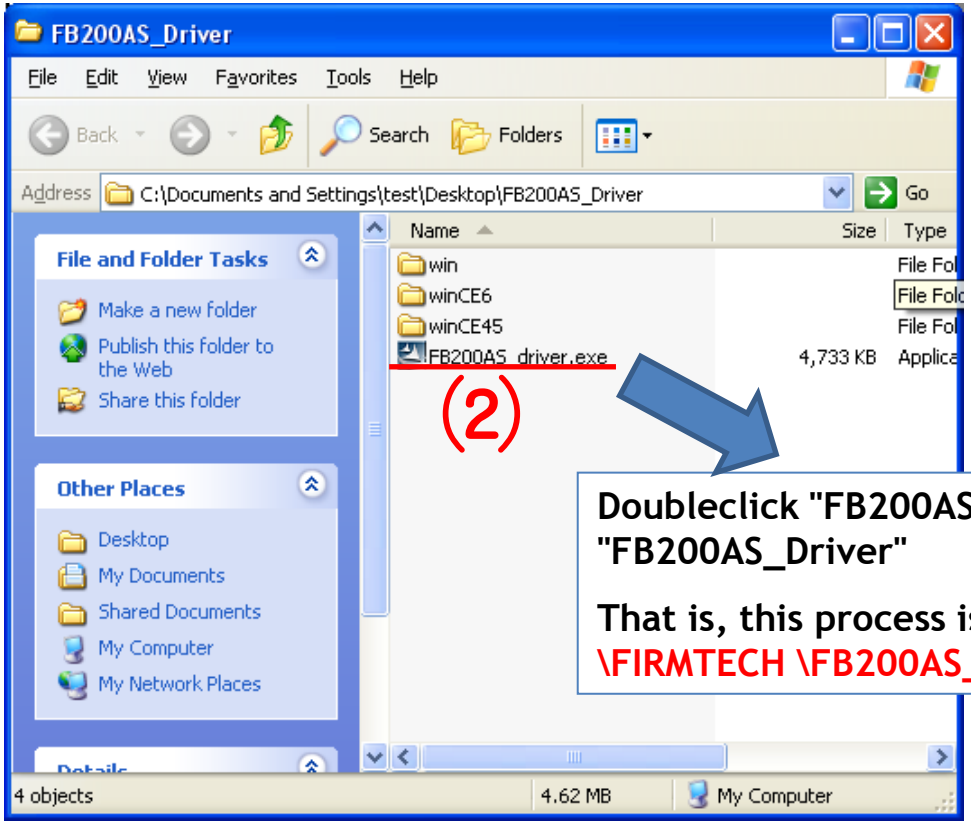
Decompress a file by using a file-decompressing program.

(assumption(left): Decompress it in Desktop on the computer)

(2) A created file by decompression

(1) FB200AS_Driver

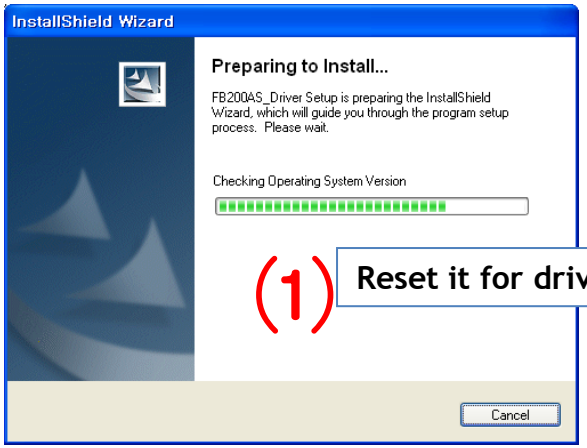
"FB200AS_Driver" folder is created on Desktop by decompressed file.



Doubleclick "FB200AS_driver.exe" out of the files of "FB200AS_Driver"

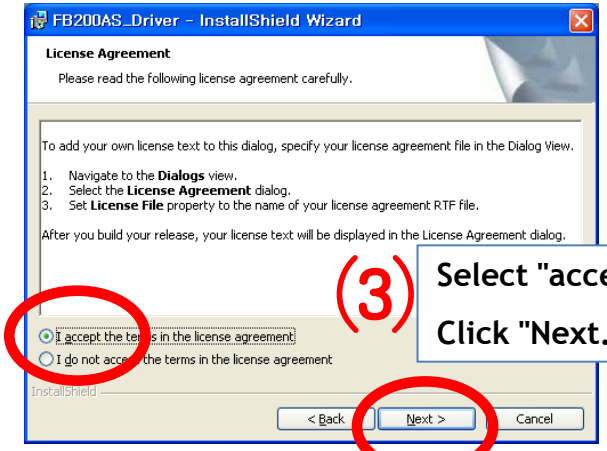
That is, this process is being copied at "C:\Program Files \FIRMTECH \FB200AS_Driver\" of user's computer.

(3) Driver File Copy 1

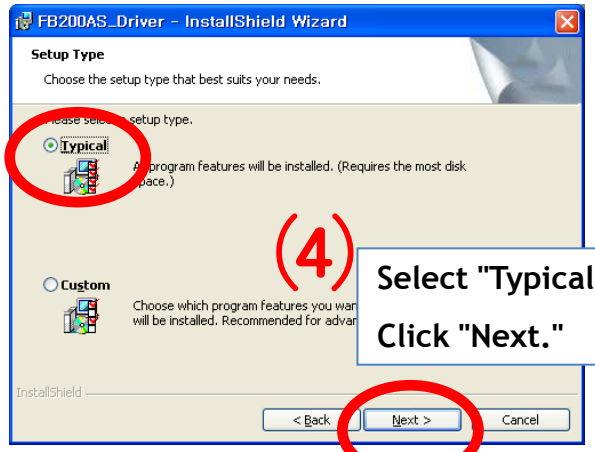


(1) Reset it for driver file copy.

(2) Click “Next.”

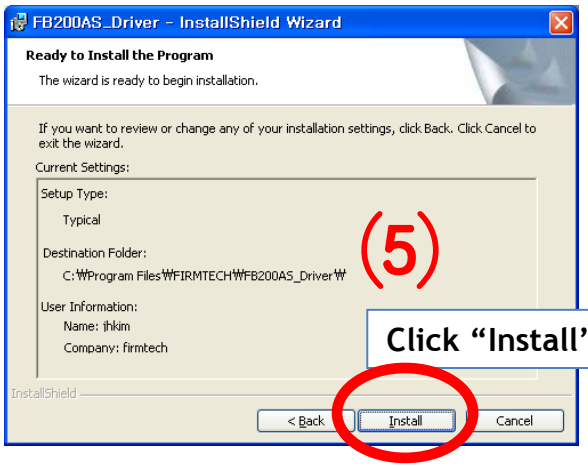


(3) Select "accept."
Click "Next."

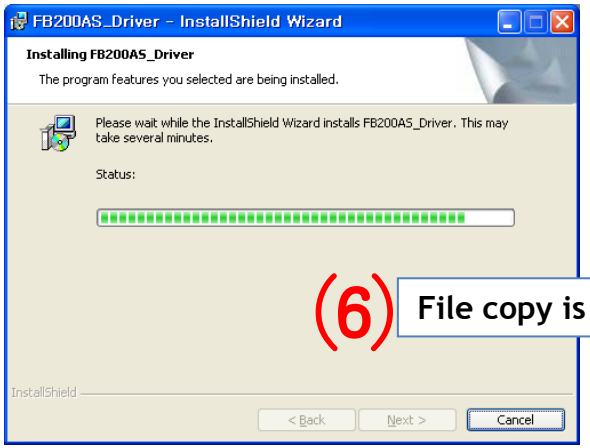


(4) Select "Typical."
Click "Next."

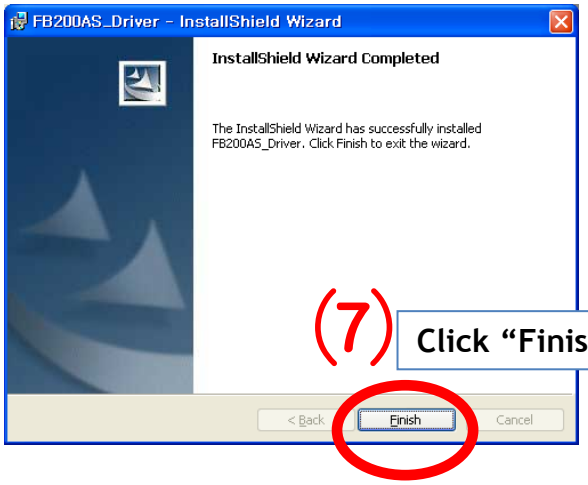
(4) Driver File Copy 2



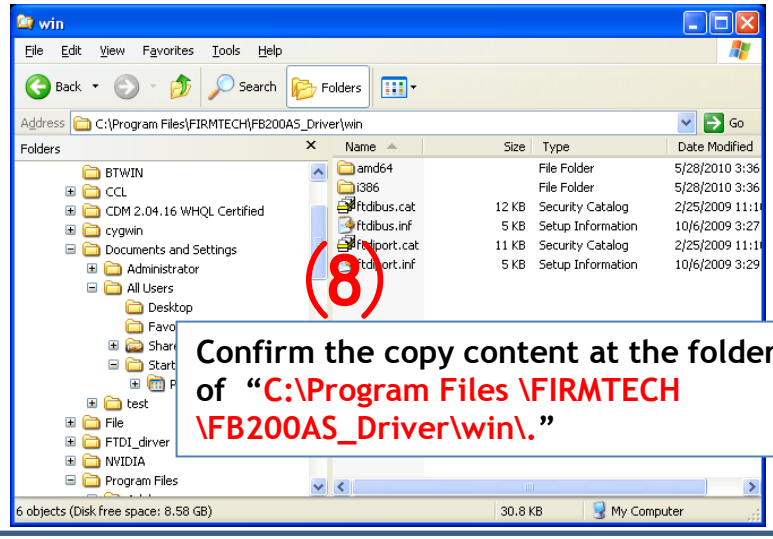
(5) Click “Install”



(6) File copy is being copied.



(7) Click “Finish.”



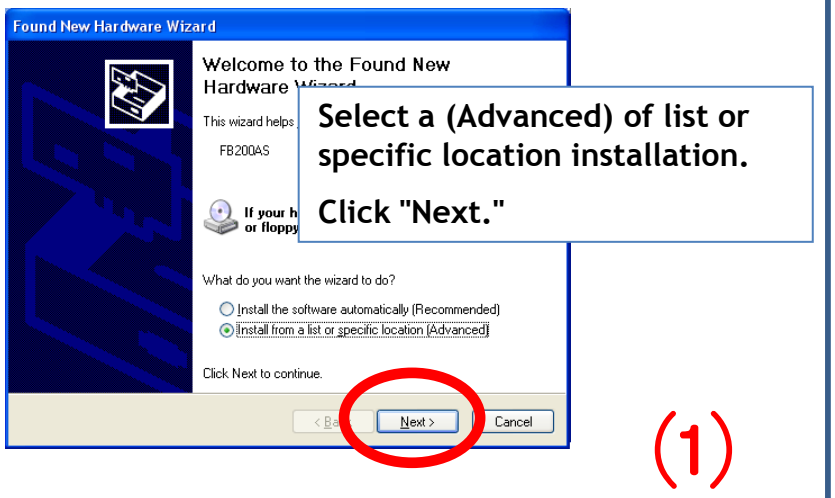
(8) Confirm the copy content at the folder of “C:\Program Files \FIRMTECH \FB200AS_Driver\win\.”

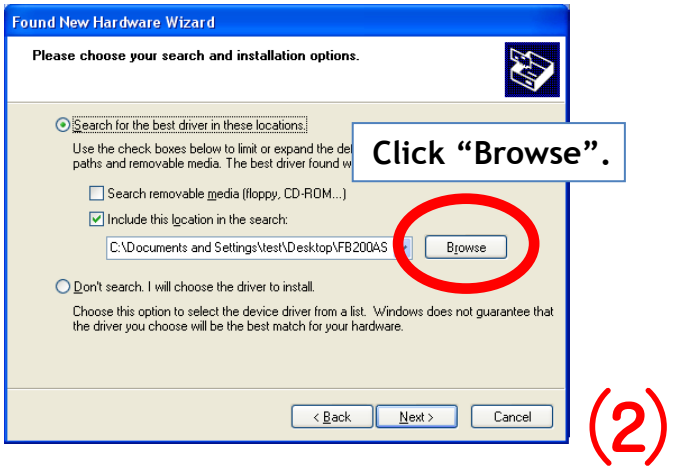
3. FZ200BS_Driver Installation Setup

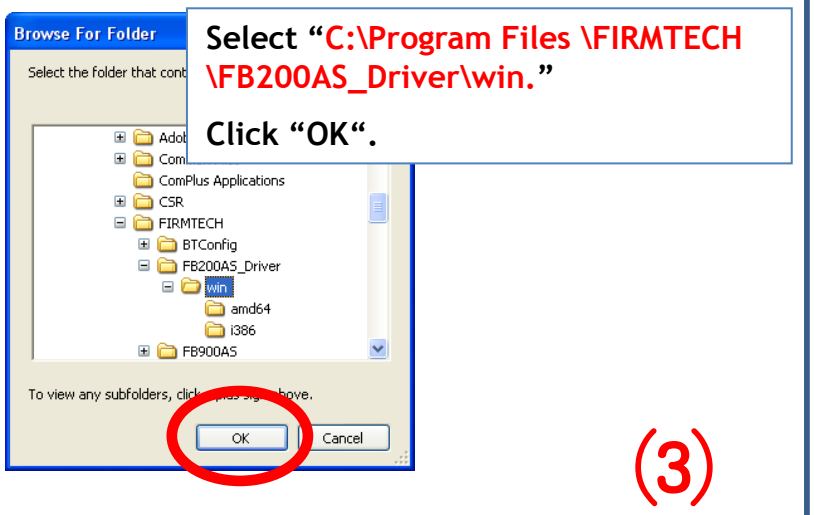
(1) FZ200BS Power-Supply ON

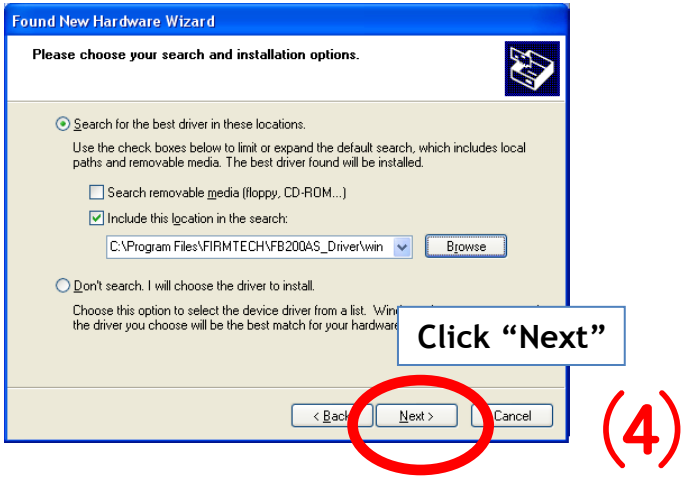
- Install FZ200BS at a PC.
- Power Supply ON of FZ200BS.

(2) Driver installation 1





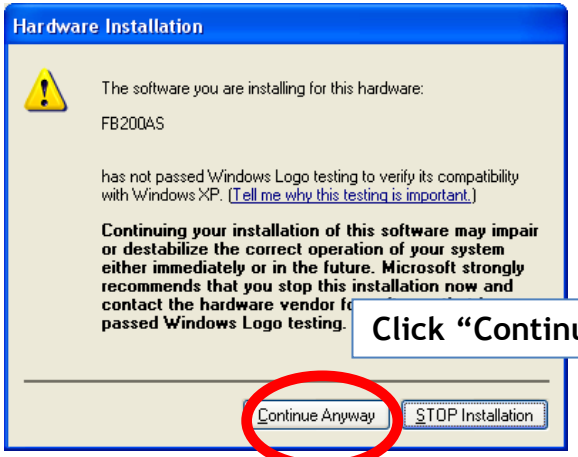




(3) Driver installation 2

Wait while a index is progressed.

(5)

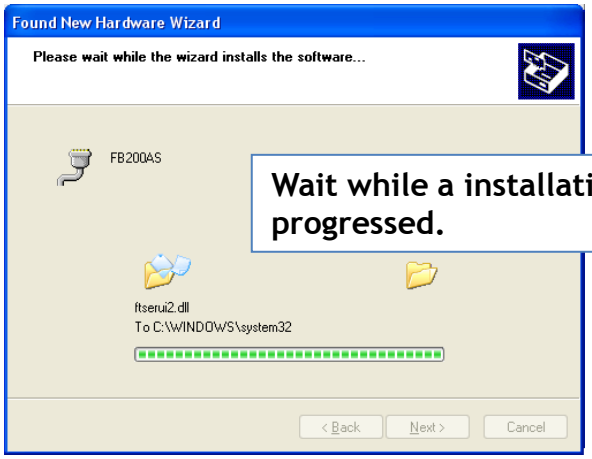


Click “Continue Anyway”

(6)

Wait while a installation is progressed.

(7)

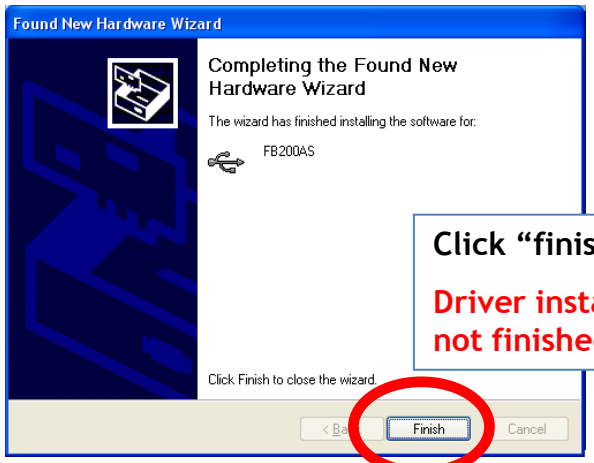


Wait while a installationis is progressed.

(8)

(4) Driver Installation 3

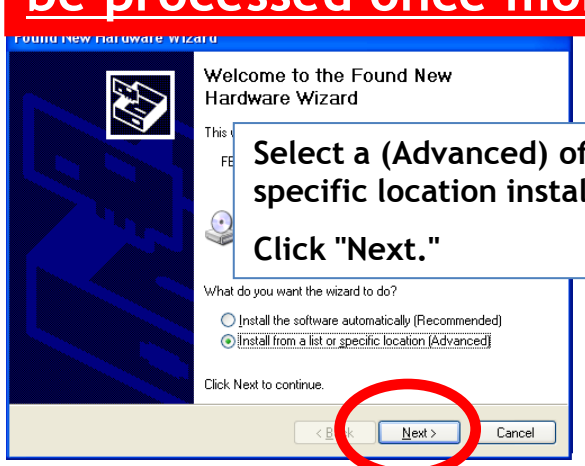
Soon, Driver installation will be processed once more.



Click “finish.”

Driver installation is not finished yet.

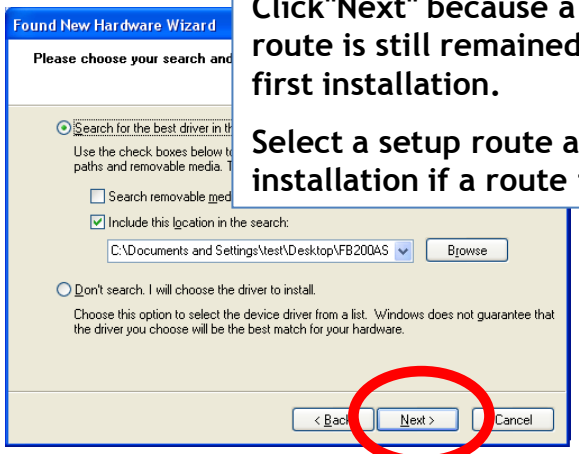
(9)



Select a (Advanced) of list or specific location installation.

Click "Next."

(10)



Click"Next" because a setup route is still remained at the first installation.

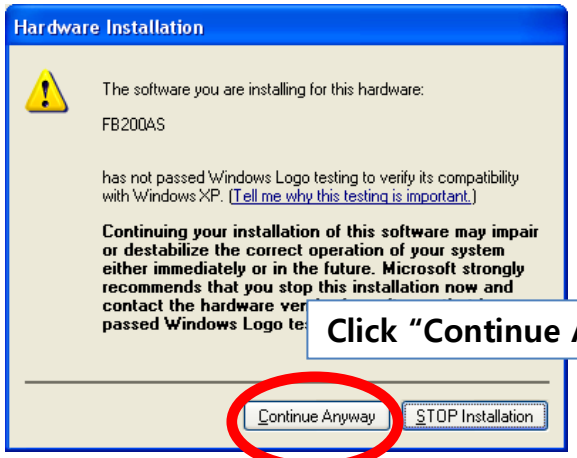
Select a setup route at the first installation if a route is wrong.

(11)

Wait while a index is progressed.

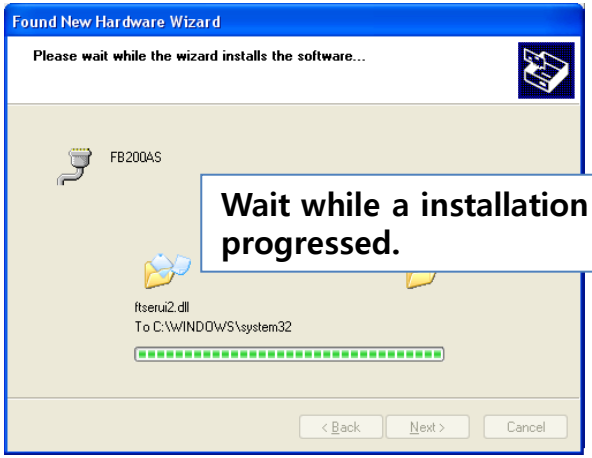
(12)

(5) Driver Installation 4



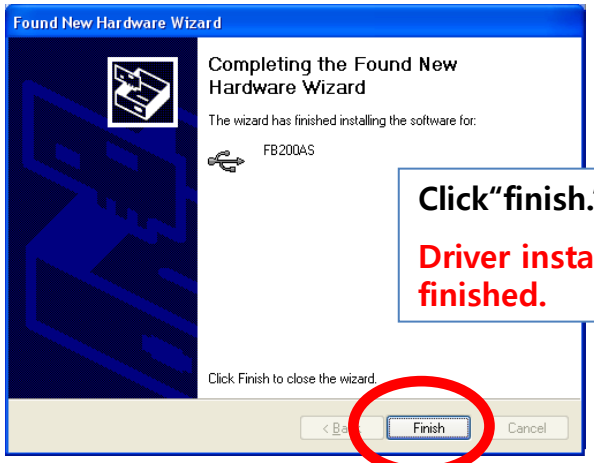
Click "Continue Anyway"

(13)



Wait while a installation is progressed.

(14)



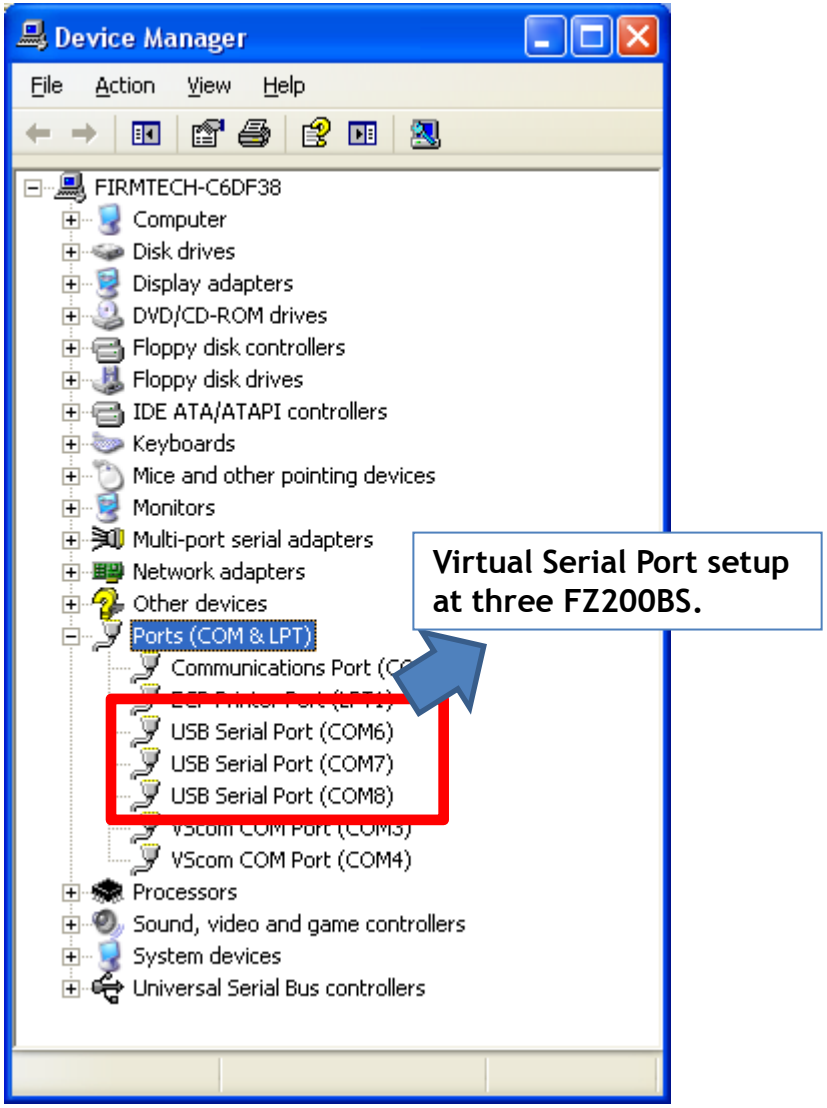
Click"finish."

Driver installation is finished.

(15)

Power-supply of FZ200BS remains ON.

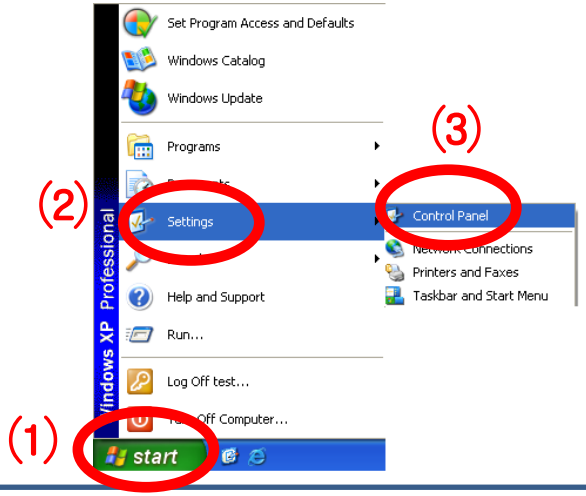
(6) Driver Installation Retrieval & Virtual Serial Port Number



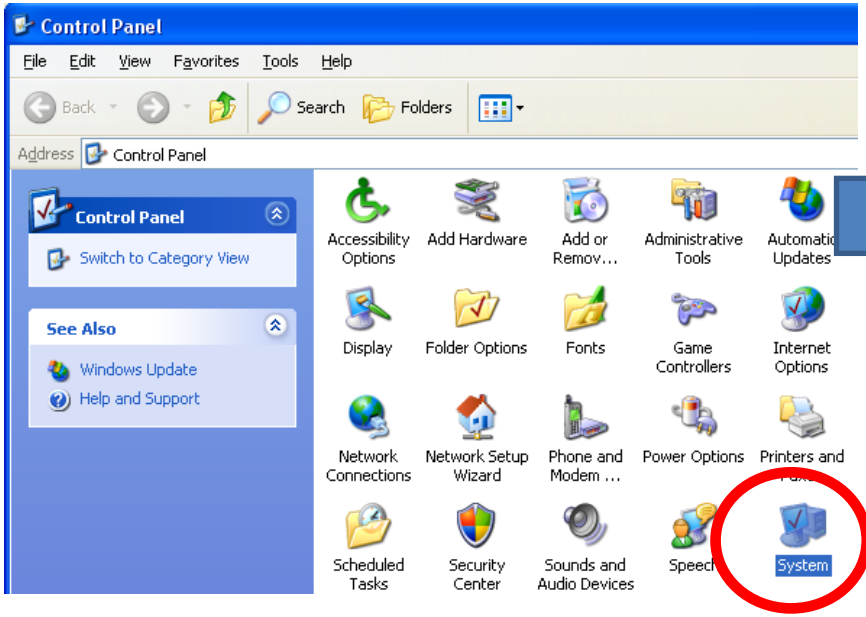
- By using three FZ200BS at FZ200BS Quick Guide, FZ200BS driver installation should be progressed three times.
- Three setup finished FZ200BS is not progressed a installation any more if FZ200BS Driver installation is progressed three times in order to use three devices of FZ200BS.
- The first assigned virtual serial port is used as it is if three virtual serial port of FZ200BS is assigned each and a registry of OS is not changed
- Progress FZ200BS Driver installation again in order to use other FZ200BS besides previous installed FZ200BS.
- Newly installed FZ200BS should be assigned a virtual serial port of new number.

4. FB200AS Driver Confirmation Method

(1) “Control Panel” & “System” Execution



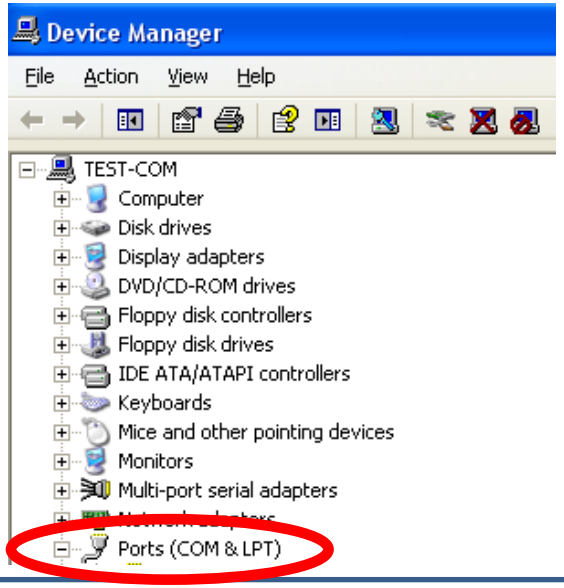
- Click “Start” on Windows Start menu.
- Click “Settings.”
- Click “Control Panel.”



- Execute "SYSTEM" in control panel.

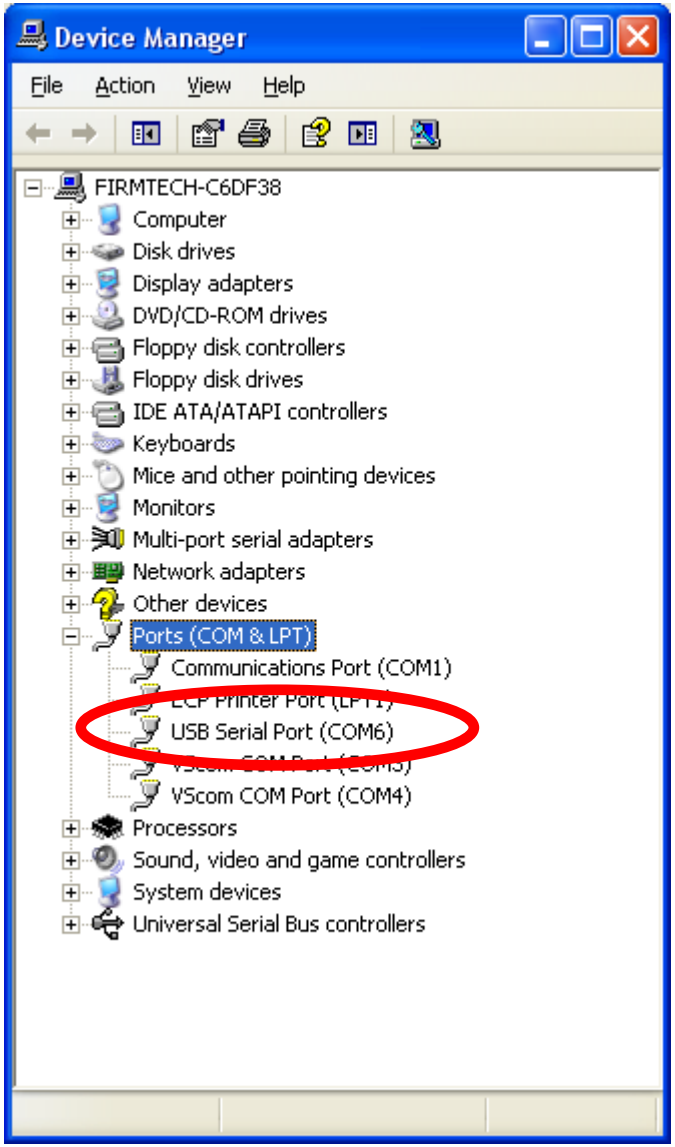
(2) “Device Manager” & “Port” Selection

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



- Select "Port" in Device Manager."

(3) A created Virtual Serial Port Confirmation



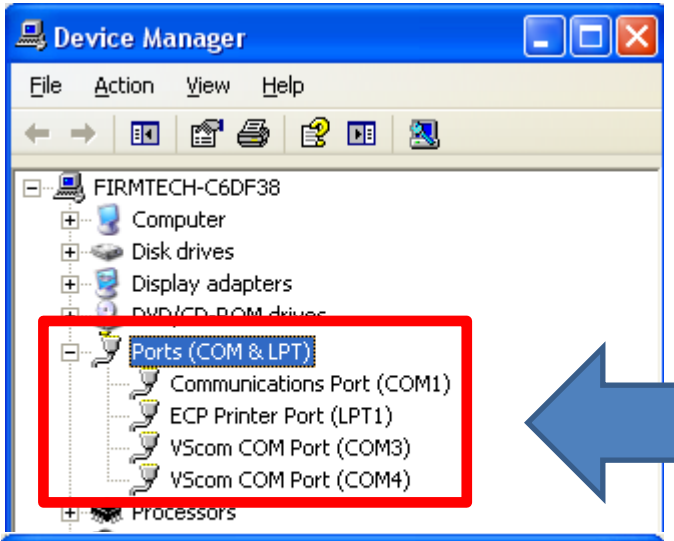
- Virtual serial port creation is confirmed if FZ200BS Driver is installed normally and FZ200BS power-supply is ON.
- "COM6" creation is confirmed in virtual serial port.
- Virtual serial port number is created differently according to user's environment.
- OFF FZ200BS power-supply if a virtual serial port number is confirmed.

[2] Virtual Serial Port

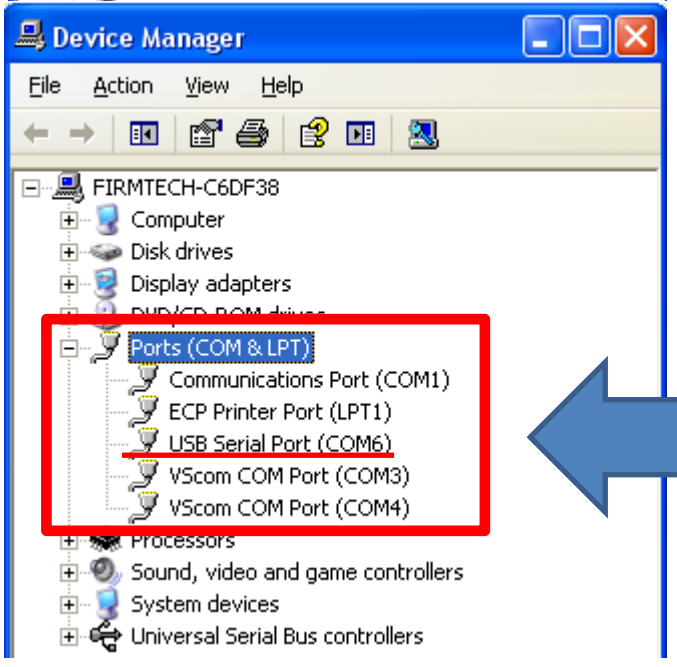
Matters to be attended to

1. A creation of Virtual Serial Port

(1) Virtual serial port & FZ200BS

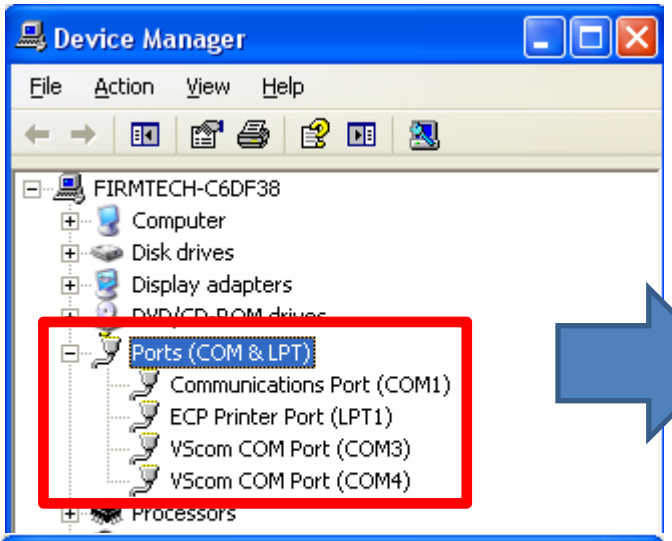


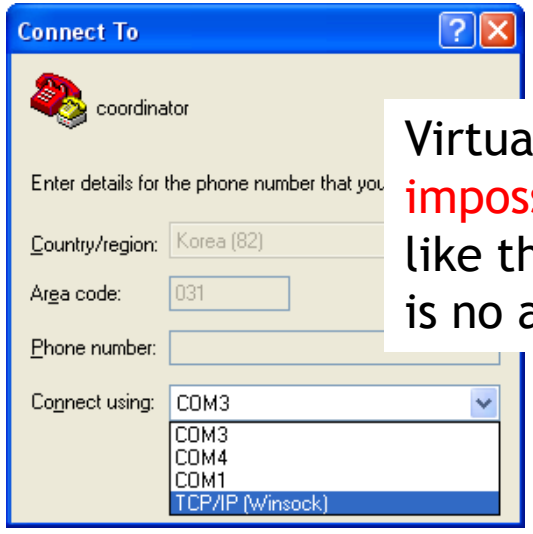
There is no "virtual serial port in "port agenda" if a power-supply of FZ200BS is OFF.



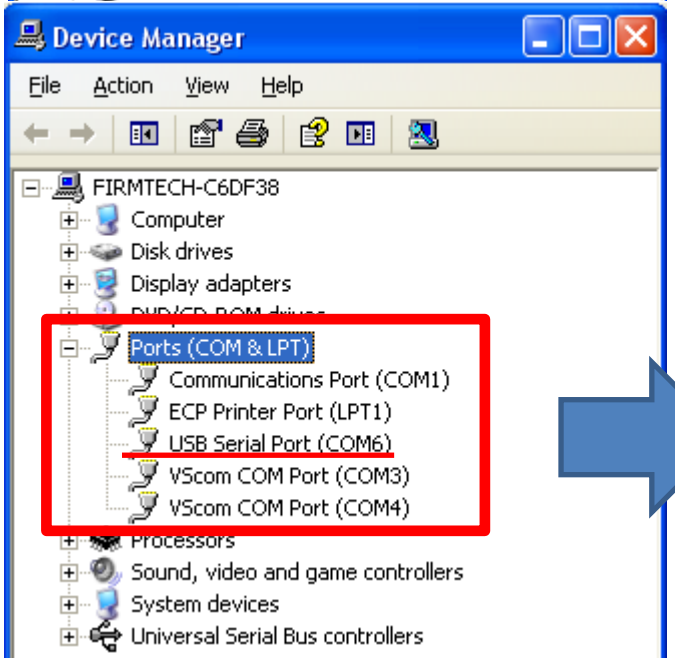
There is "virtual serial port in "port agenda" if a power-supply of FZ200BS is ON.

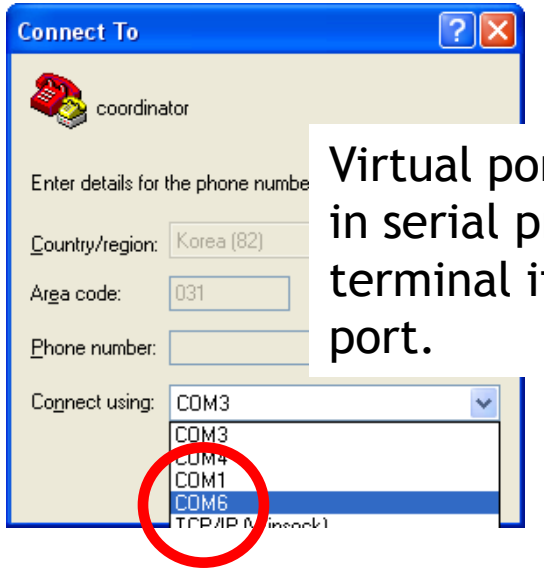
(2) Virtual Serial Port & Serial Communication Program





Virtual port connection is impossible in serial program like the hyper terminal if there is no a virtual serial port.



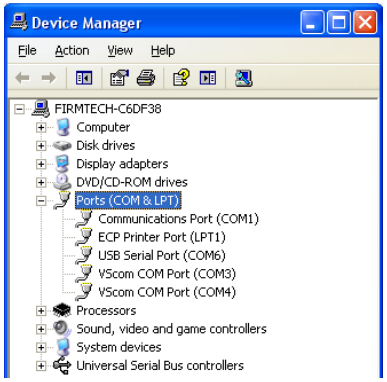


Virtual port connection is possible in serial program like the hyper terminal if there is a virtual serial port.

(3) Virtual Serial Port & Serial Communication Program & FZ200BS

(1) Power Supply ON

(2) Virtual Port Creation



(3) Virtual Port OPEN

(4) Power Supply OFF

- Virtual port may be disappeared by power-supply OFF of FZ200BS while using virtual serial port created at serial communication program.
- Even though a virtual serial port is disappeared by power supply OFF of FZ200BS,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.
- There may occur critical situation at OS if virtual port is disappeared under a serial communication program operating.
- Therefore, certainly, serial communication program should be finished before power-supply OFF of FZ200BS. That is, the power supply of FZ200BS should be OFF under finishing virtual port.

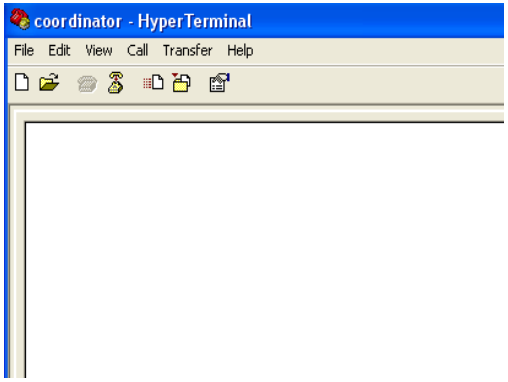
(4) Virtual Serial Port & FZ200BS & Start Message

(1) Power-Supply ON

(2) Message Output

(3) Virtual Port OPEN

(4) No Message



- Start Message is made out if power-supply of FZ200BS is ON.
- Virtual Port is created after power-supply of FZ200BS 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 a virtual port.
- In case of using a virtual port, a user can not see Start Message output of FZ200BS immediately.

[3] FZ200BS Operating

&

Reset

Configuration setting with AT Command

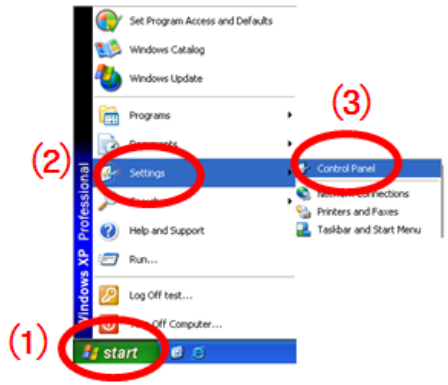
1. Operating FZ200BS

(1) FZ200BS Power ON

- Turn the power switch on.

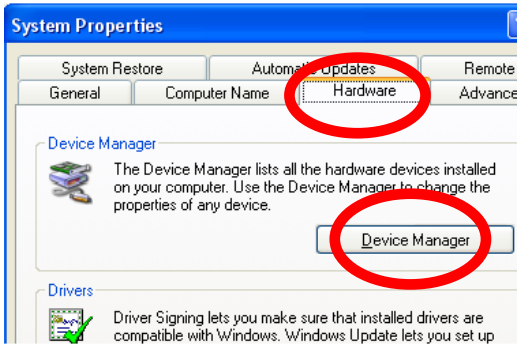
Virtual Serial Port Number Confirmation

1. “Control Panel” Execution

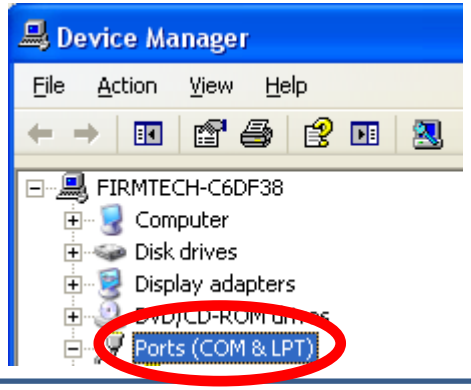


2. “System” Execution

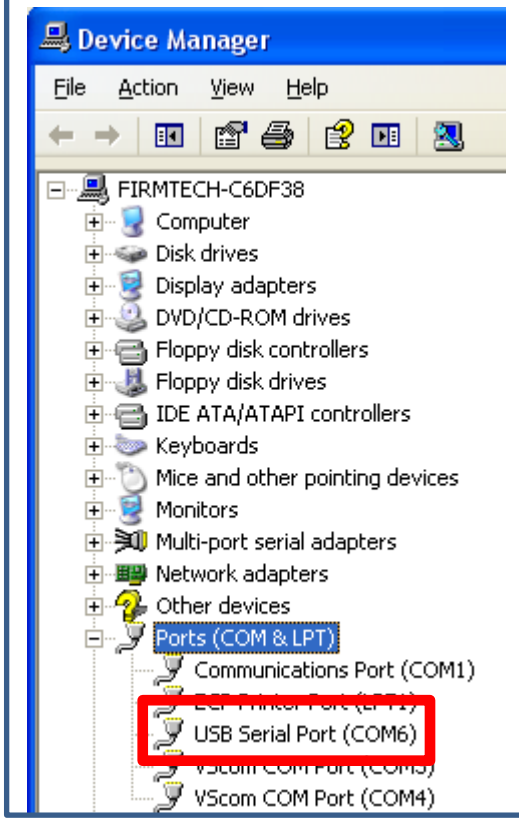
3. “Device Manager" Execution



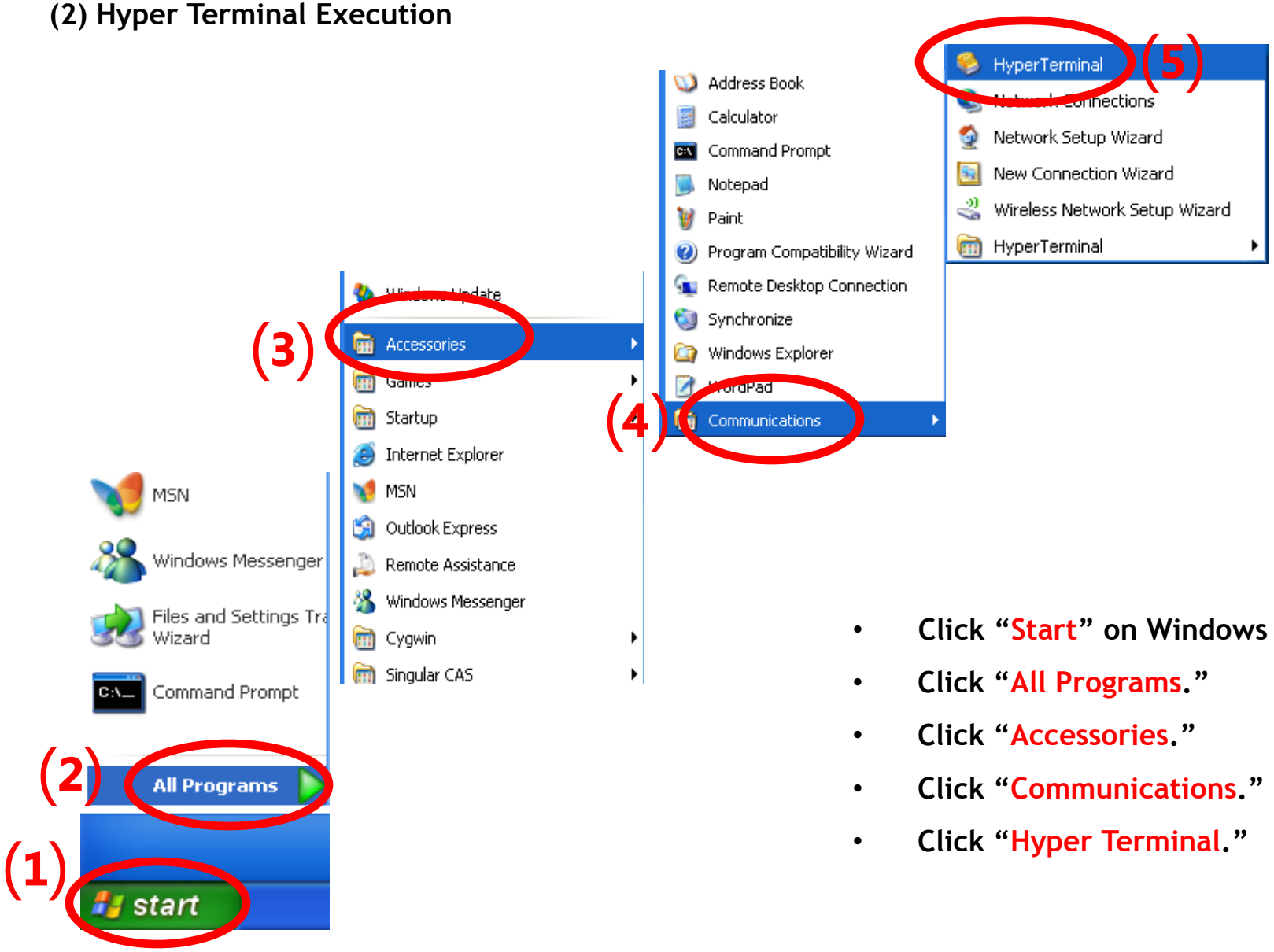
4. “Port” Selection



5. “Port Number” Confirmation



(2) Hyper Terminal Execution

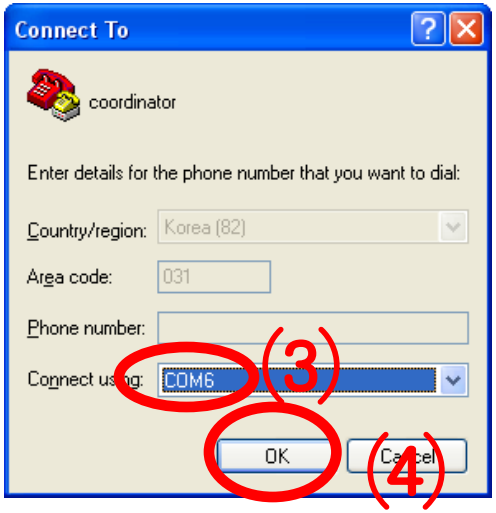


- Click "Start" on Windows Start menu.
- Click "All Programs."
- Click "Accessories."
- Click "Communications."
- Click "Hyper Terminal."

(3) Hyper terminal set-up - Name

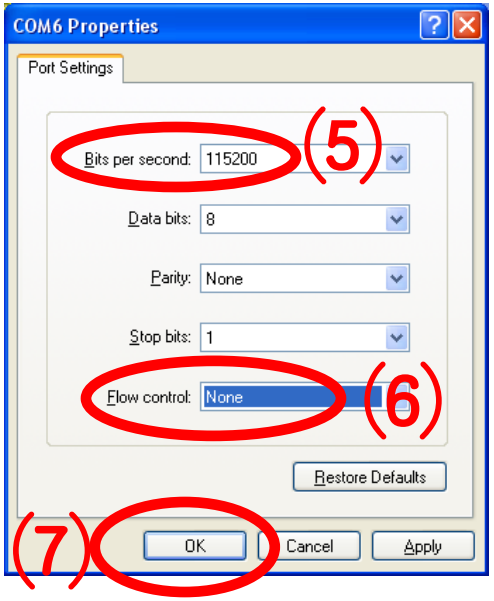
- Set up Hyper terminal connected with FZ200BS that is set to Coordinator
- Input “coordinator” in the “Name” space.
- Select “OK” and go forward.

(4) Hyper terminal set-up - Use Port



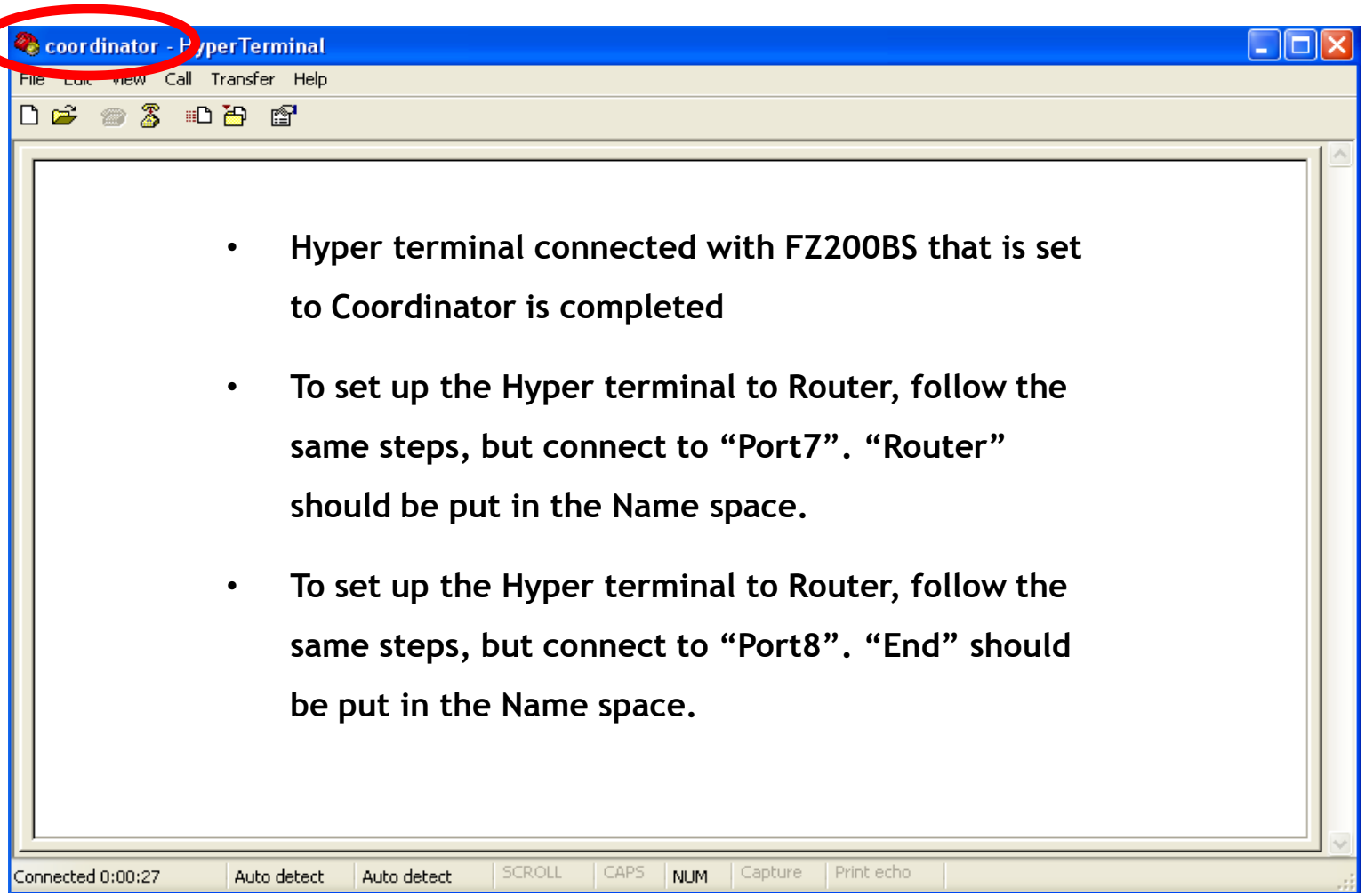
- Select the port connected with FZ200BS that is set to the Coordinator.
- Select “OK” and go forward.

(5) Hyper terminal Set-up - Signal Speed and etc



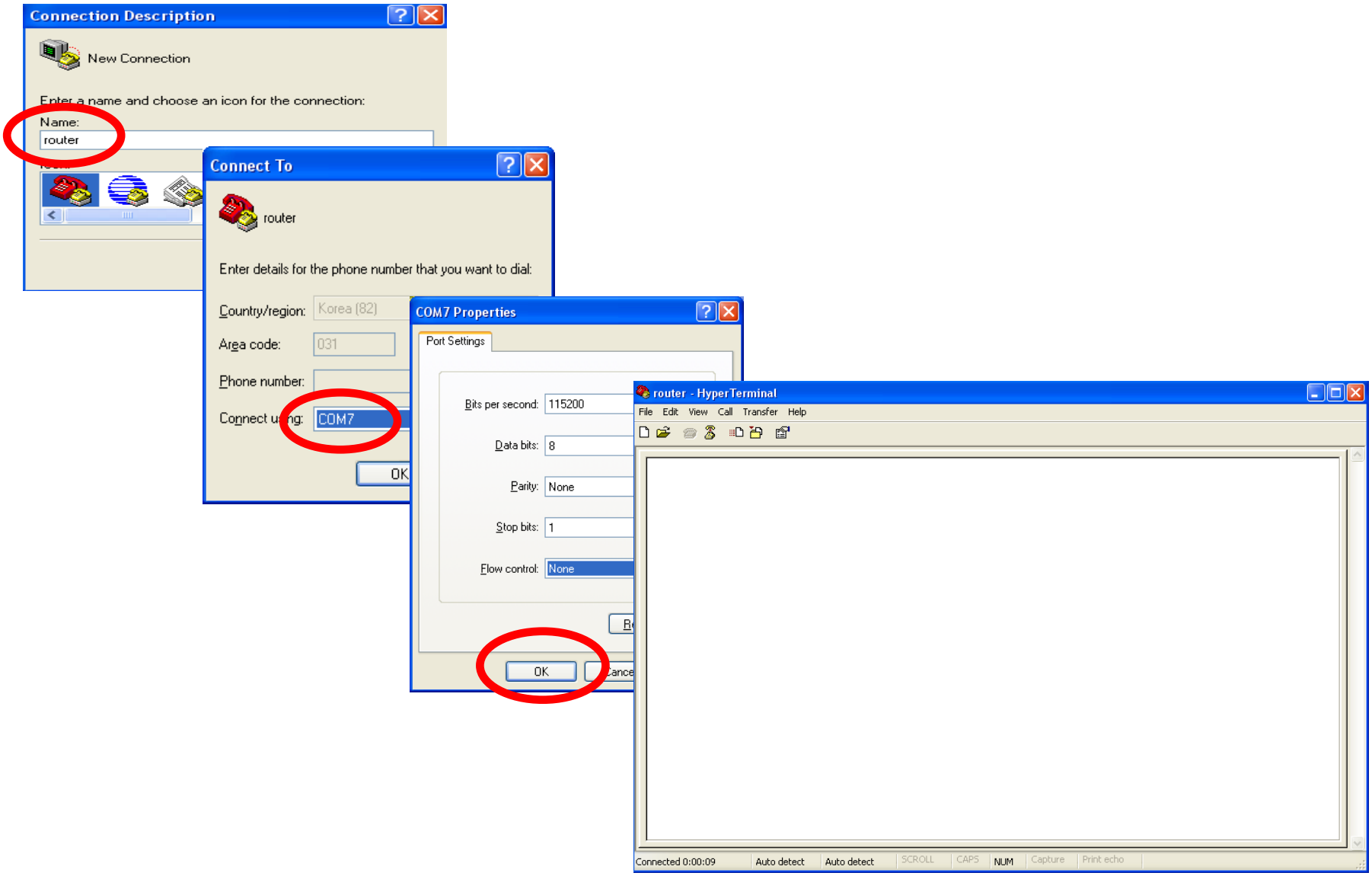
- Set “115200” in the “Bit/Sec(B)” space
- Set “None” in the “Flow control(F)” space
- Do not change other requirements.
- Select “OK”

(6) Hyper terminal set-up - completion

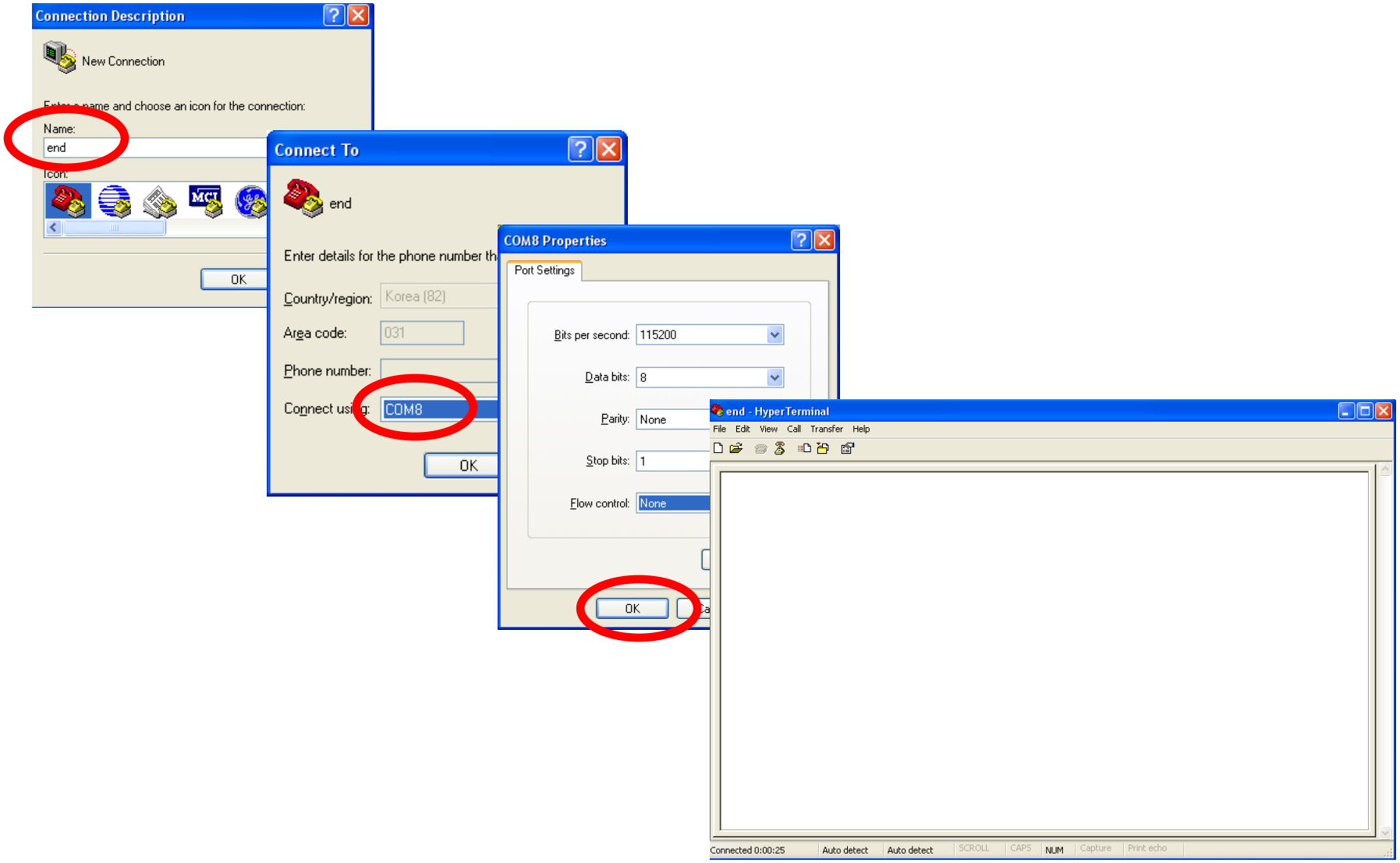


- Hyper terminal connected with FZ200BS that is set to Coordinator is completed
- To set up the Hyper terminal to Router, follow the same steps, but connect to “Port7”. “Router” should be put in the Name space.
- To set up the Hyper terminal to Router, follow the same steps, but connect to “Port8”. “End” should be put in the Name space.

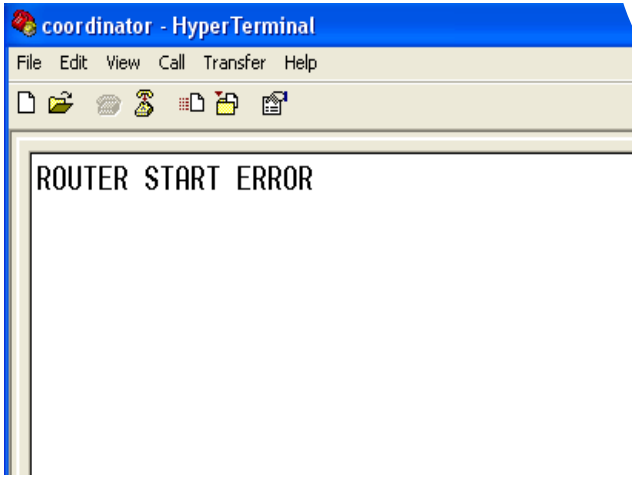
If you want to use FZ200BS as Router, step by step diagram below - Use Port 7



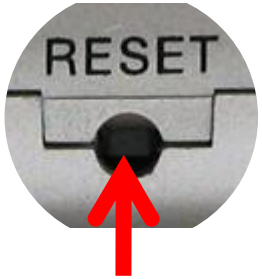
If you want to use FZ200BS as End Device, step by step diagram below - Use Port 8



FZ200BS Reset



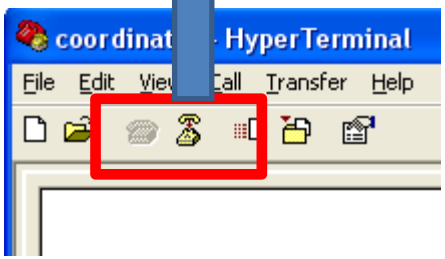
- FZ200BS uses virtual serial port. Therefore, FZ200BS will be operated before serial communication program like hyper terminal.
- Here is all start message output made before hyper terminal execution. So execute reset of FZ200BS, in order to make an output of start message again.



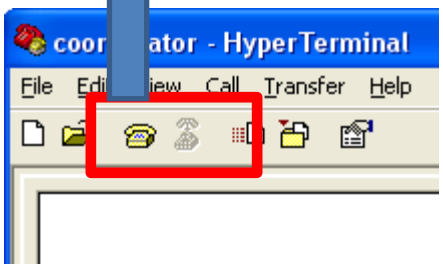
- Confirm "RESET" of a side “FZ200BS".
- Press a Reset Switch in hole by using tweezers.
- FZ200BS is operated if start message output is made from hyper terminal.

FZ200BS connection condition check-sequence

Disconnected with virtual port on hyper terminal using virtual port by changing to( ) after clicking ( ).



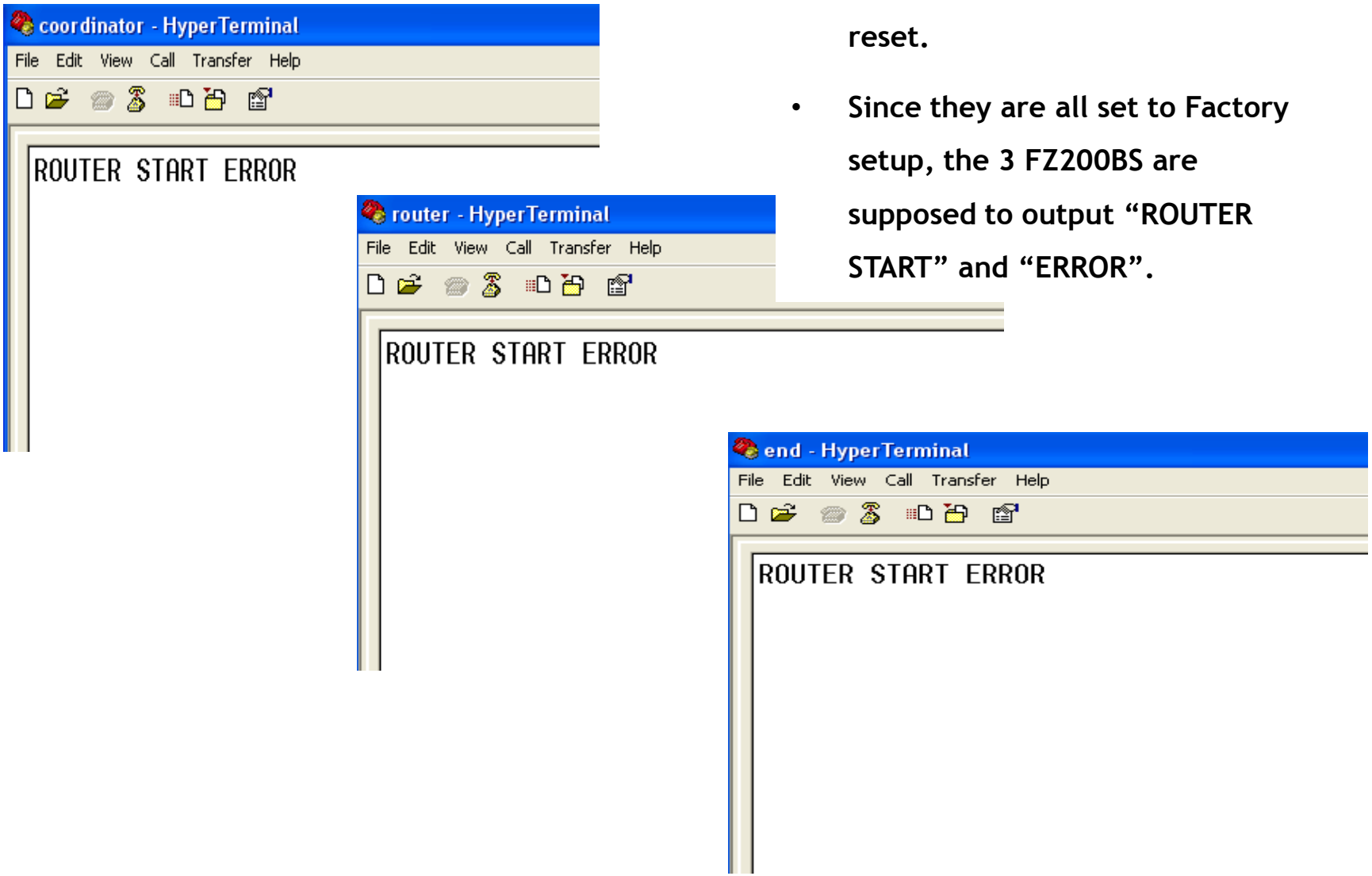
< Condition using virtual serial port >



< Condition not using virtual serial port >

- Finish hyper terminal or the condition connected with virtual serial port, if FZ200BS is not operated normally or any word output is not made from hyper terminal. (Please refer to the left in order to disconnect virtual serial port.)
- Restart FZ200BS by pressing OFF and then ON switch of FZ200BS power-supply.
- Confirm communication speed and other connection agendas.

(7) Hyper Terminal Output

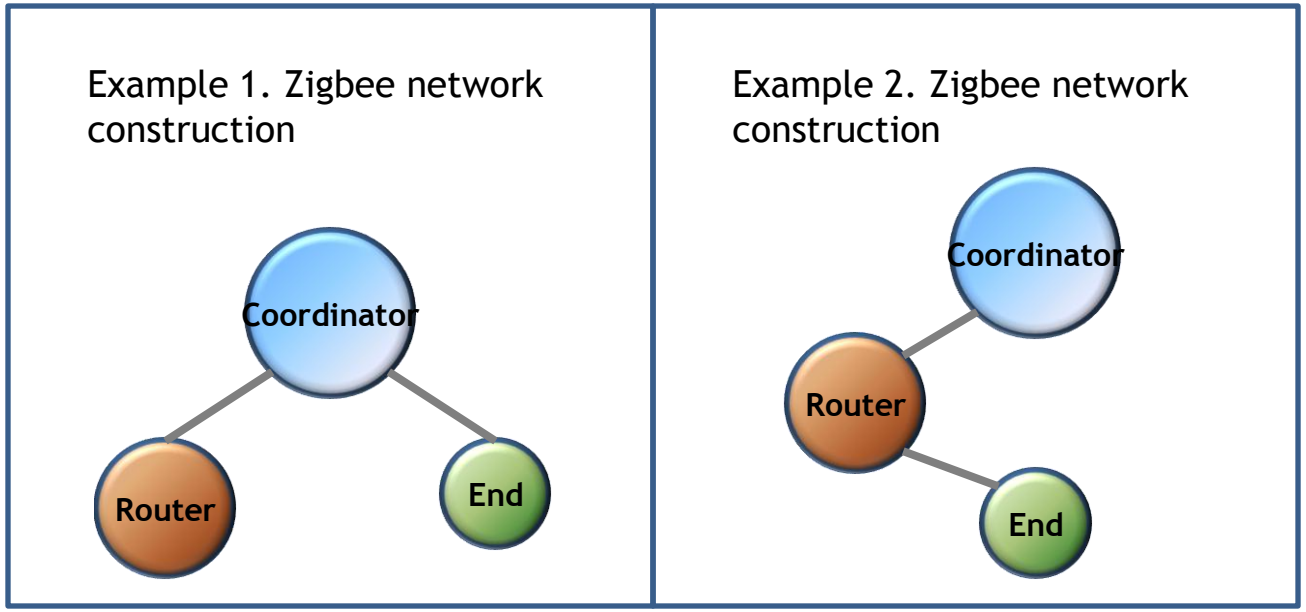


- Turn the power of 3 FZ200BS on & reset.
- Since they are all set to Factory setup, the 3 FZ200BS are supposed to output “ROUTER START” and “ERROR”.

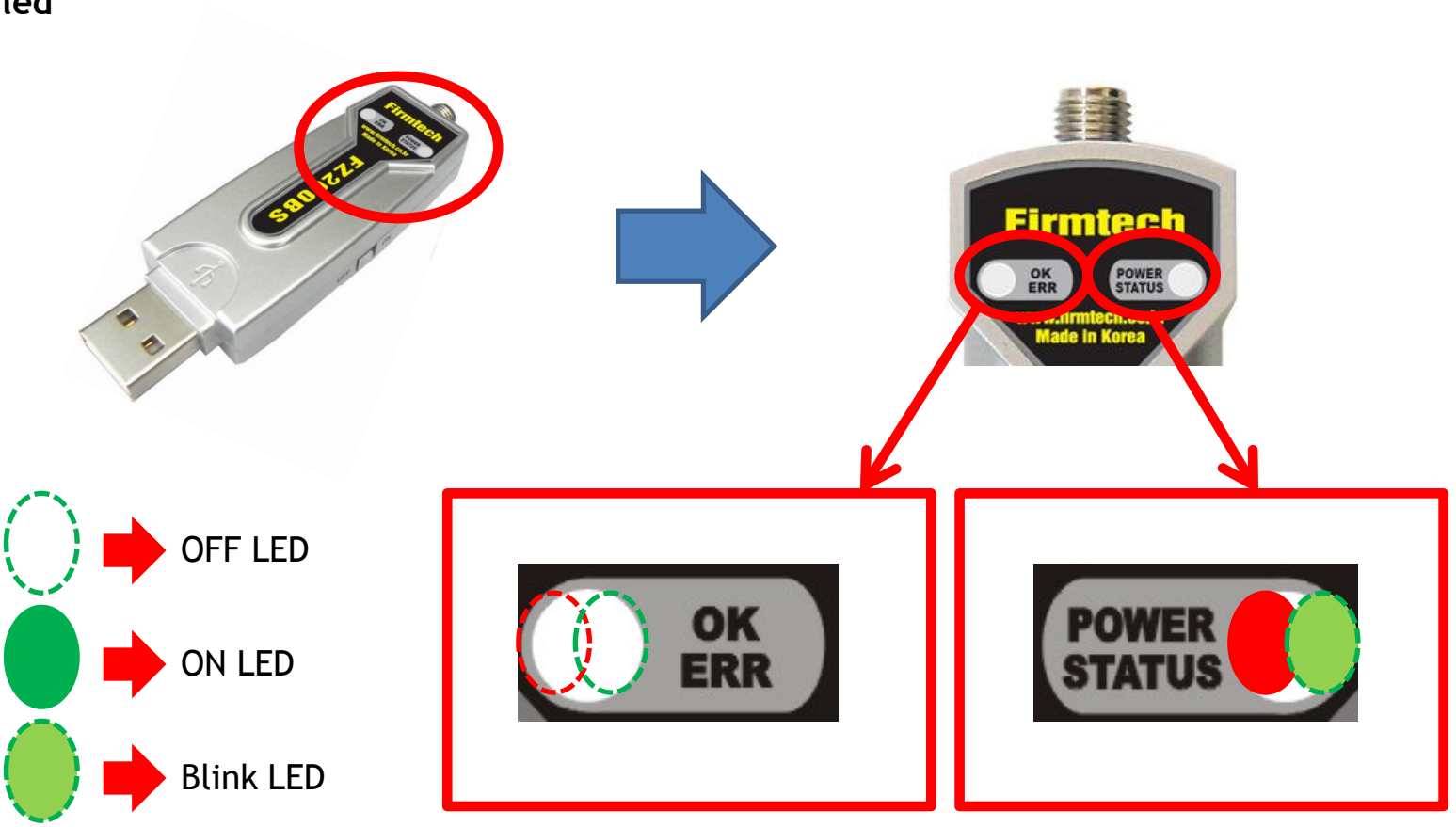
[4] FZ200BS Set-up

&

ZigBee Network Construction

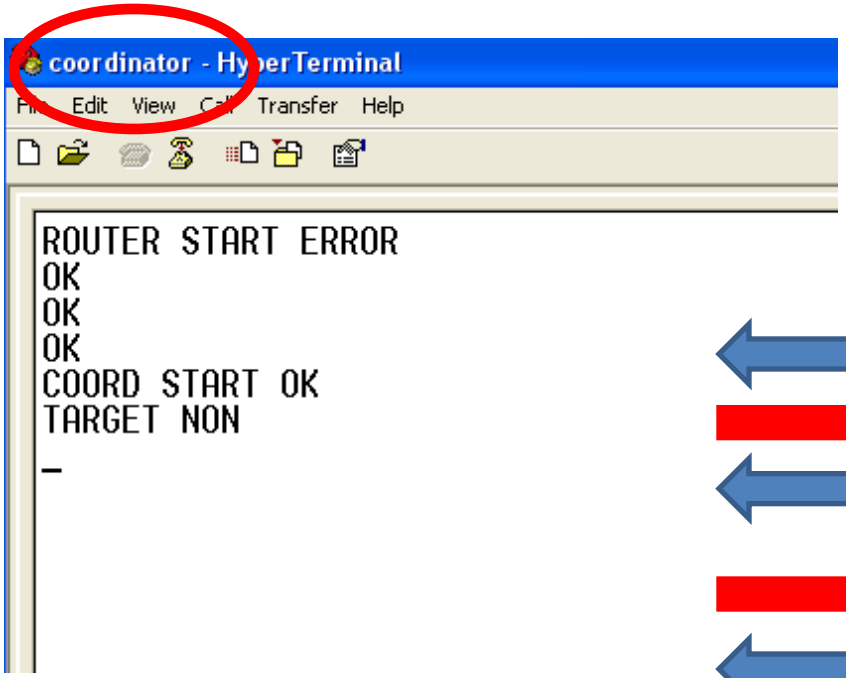


The Status LED condition of Operation Mode when Network construction/participation is failed



- The POWER LED displays a red light if FZ200BS power supply is ON.
- The Green STATUS LED blinks quickly every 0.1 sec because Network construction / Participation has yet to be successful.
- The OK/ERR LED keep being turned off when FZ200BS is in an Operation Mode.

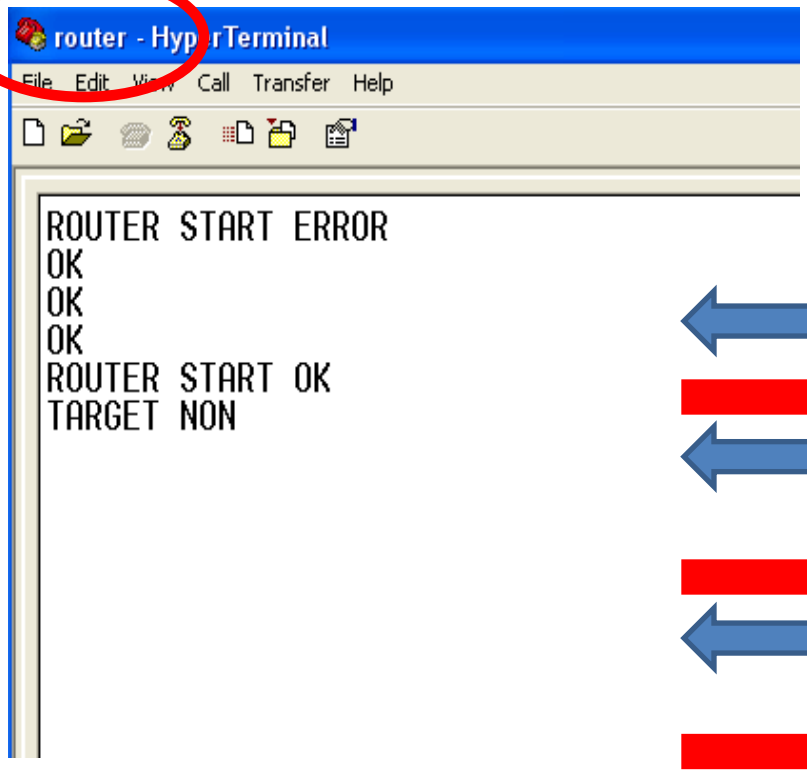
1. FZ200BS Coordinator Set-up & ZigBee Network Construction



- Input the following into Hyper terminal connected to FZ200BS that is set to Coordinator

- Input“+++”in Hyper terminal.
- “OK” is output from FZ200BS.
- After inputting “AT+SETCOORD” in Hyper terminal, press Enter key.
- “OK” is output from FZ200BS.
- Press Enter key after inputting “ATZ” in Hyper terminal.
- “OK” is output from FZ200BS
- FZ200BS Device is re-started
- “COORD START OK” is output
- “TARGET NON” is output

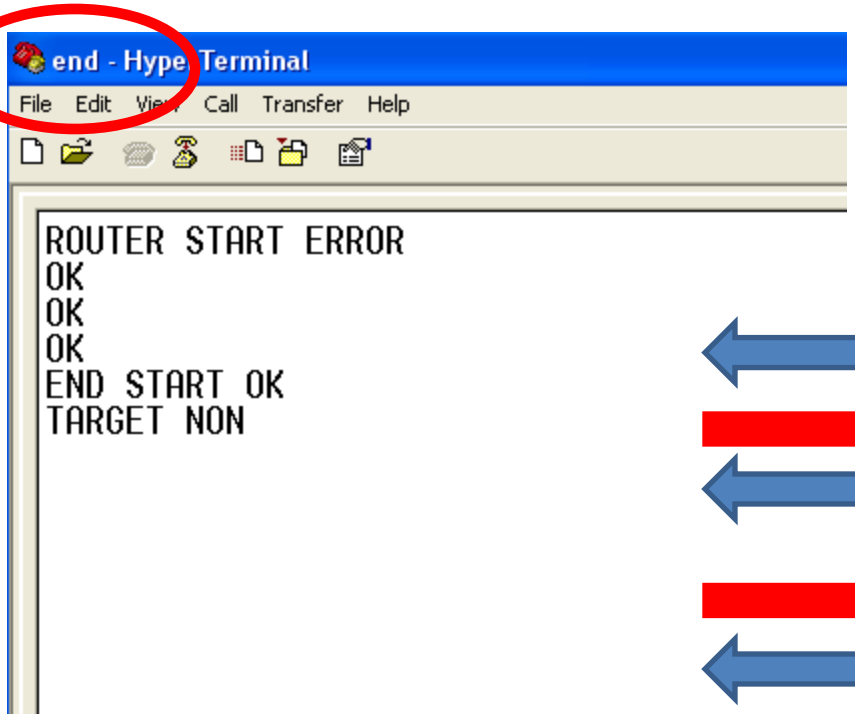
2. FZ200BS Router set-up & ZigBee Network Participation



- Input the following into Hyper Terminal connected to FZ200BS that is set to Router

- Input“+++”in Hyper terminal.
- “OK” is output from FZ200BS.
- After inputting “AT+SETROUTER” in Hyper terminal, press Enter key.
- “OK” is output from FZ200BS.
- After inputting “ATZ” in Hyper Terminal, press Enter key.
- “OK” is output from FZ200BS
- FZ200BS Device re-started.
- “ROUTER START OK” is output.
- “TARGET NON” is output.

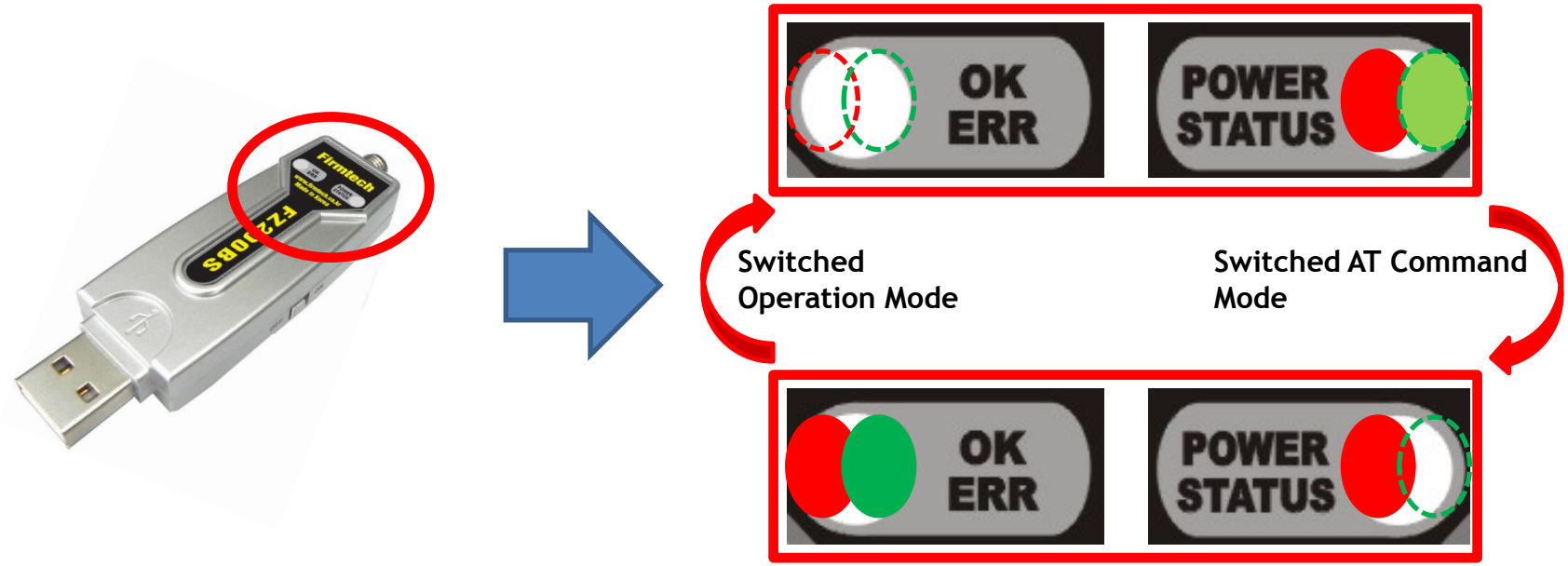
3. FZ200BS End Device set-up & ZigBee Network Participation



- Input the following into Hyper terminal connected to FZ200BS that is set to End Device

- Input“+++”in Hyper terminal.
- “OK” is output from FZ200BS.
- After inputting “AT+SETEND” in Hyper terminal, press Enter key.
- “OK” is output from FZ200BS.
- Press Enter key after inputting “ATZ” in Hyper terminal.
- “OK” is output from FZ200BS.
- FZ200BS Device re-started.
- “END START OK” is output.
- “TARGET NON” is output.

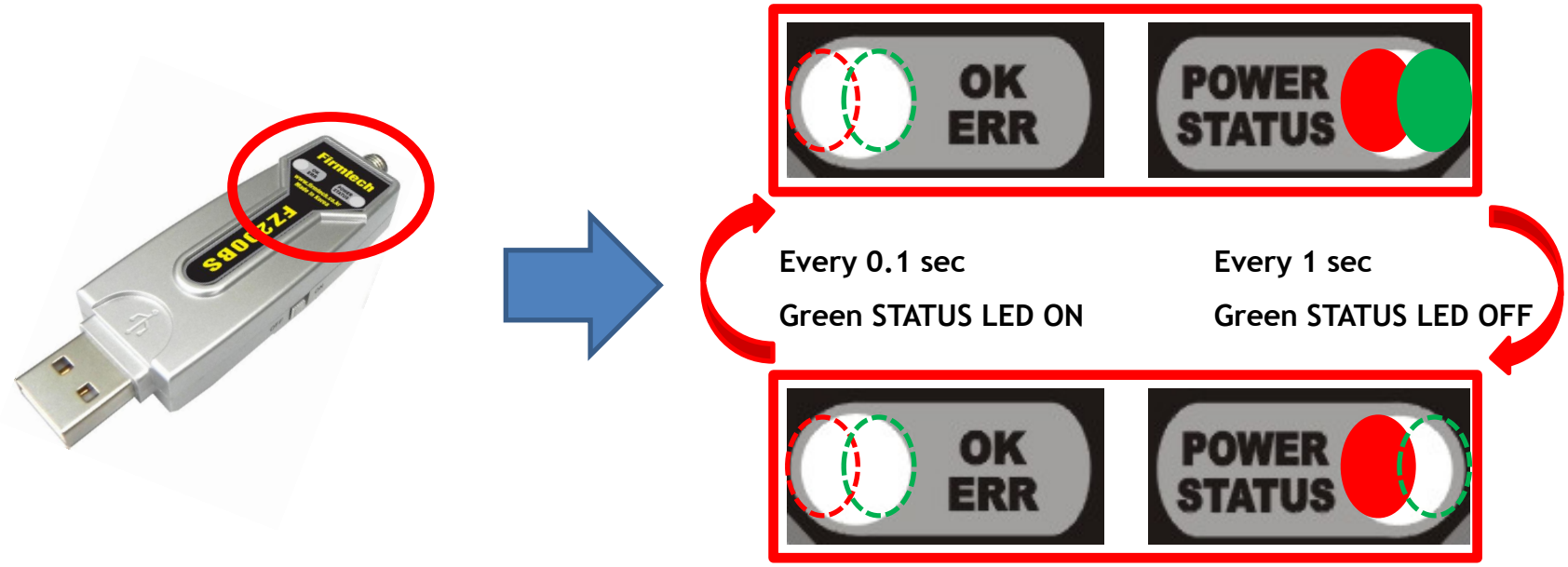
STATUS/OK/ERR LED conditions in AT Command Mode



- Mode is switched from Operation to AT Command when you input “+++” in Hyper Terminal.
- The Green STATUS LED keeps being turned off when FZ200BS is in an AT Command Mode.
- The OK/ERR LED holds the light turned on when FZ200BS is an AT Command Mode.

- Mode is switched from AT Command to Operation by inputted “ATO” into Hyper Terminal and pressing enter key.
- In the AT Command mode, you can change the mode to operation mode by inputting “ATZ” into Hyper Terminal and pressing enter key. In this case device is reset simultaneously.

STATUS LED conditions of Operation Mode when Network Construction/Participation is completed.

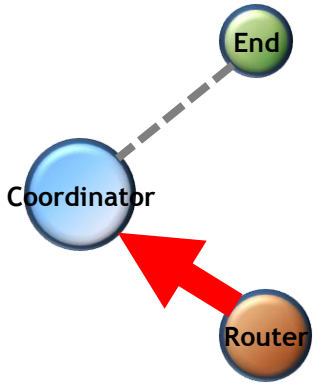


- When Network Construction/Participation is completed, the Green STATUS LED blinks every 1 second.
- The OK/ERR LED of FZ200BS keeps being turned off.

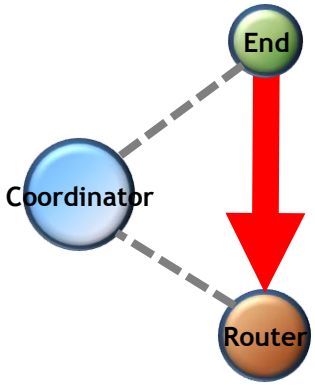
- When Network Construction/Participation is completed for the first time, it is automatically proceeded from the next even if device is reset.

[5] FZ200BS

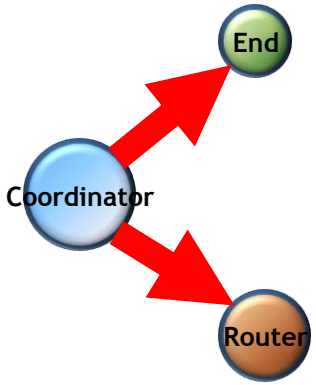
Setting up Target Device



In order to communicate, Router should be aware of Coordinator's address.



In order to communicate, End Device should be aware of Router's address.

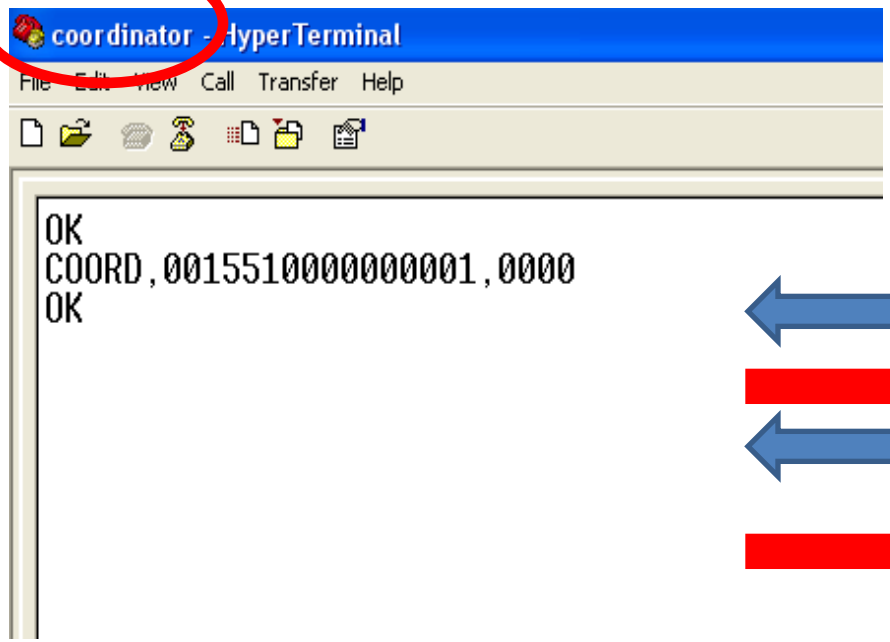


In order to communicate,

Coordinator uses Broadcast's address.

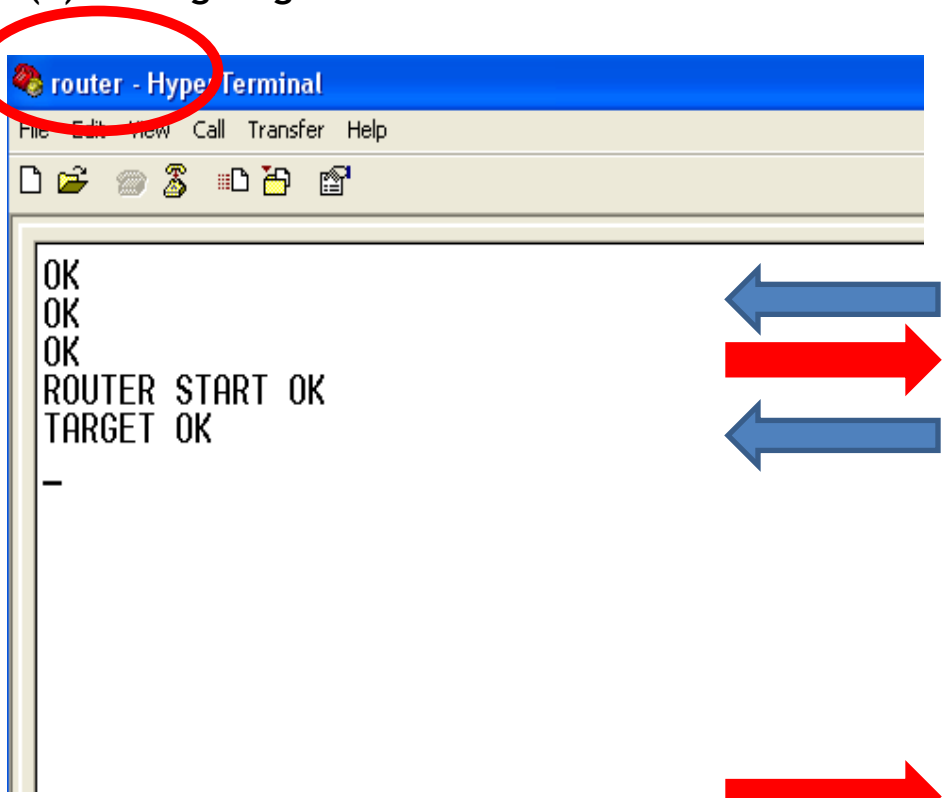
1. Setting Target Device of Router to Coordinator(Router ->Coordinator)

(1) Coordinator IEEE address search



- Input the following into Hyper terminal connected to FZ200BS that is set to Coordinator
- Input “+++”
- “OK” is output from FZ200BS
- After inputting “AT+GETLOCAL” and press Enter key.
- “COORD, 0015510000000001, 0000” is output from FZ200BS
- IEEE ADDRESS of Coordinator is “0015510000000001”
- After inputting “ATO”, Enter key.
- “OK” is output

(2) Setting Target Device of Router to Coordinator

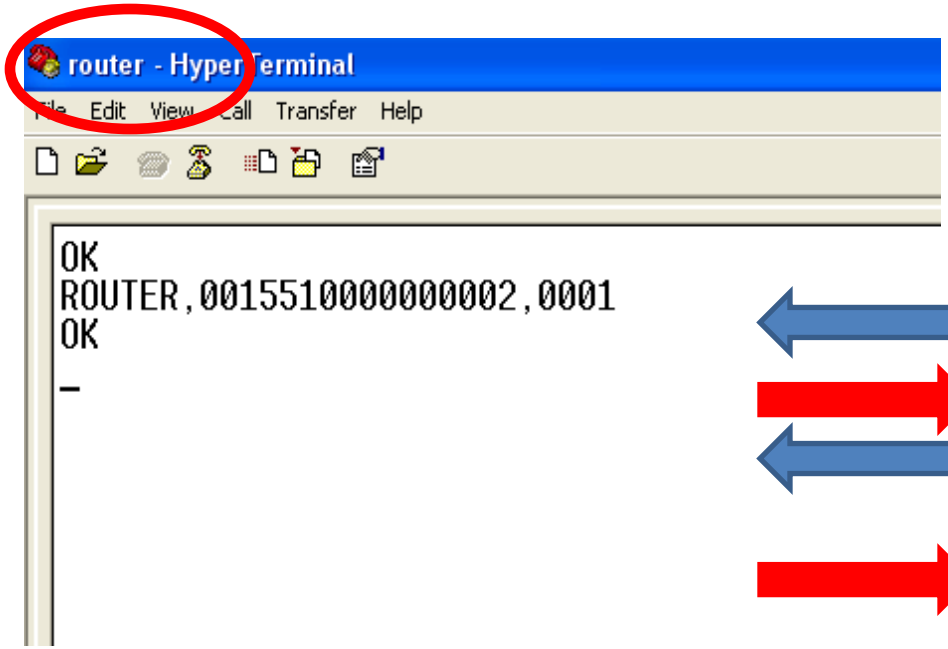


- Input the following into Hyper Terminal connected to FZ200BS that is set to Router

- Input "+++"
- "OK" is output from FZ200BS
- After inputting "AT+SETTARGET 0015510000000001"and press Enter key.
- 0015510000000001 is the address that has already been searched before. If you use another device, you should search the address again because each device has its own address.
- "OK" is output from FZ200BS
- After inputting "ATZ" in Hyper Terminal, address Enter key.
- "OK" is output from FZ200BS
- Device is re-started.
- "ROUTER START OK" is output.
- "TARGET OK" is output.

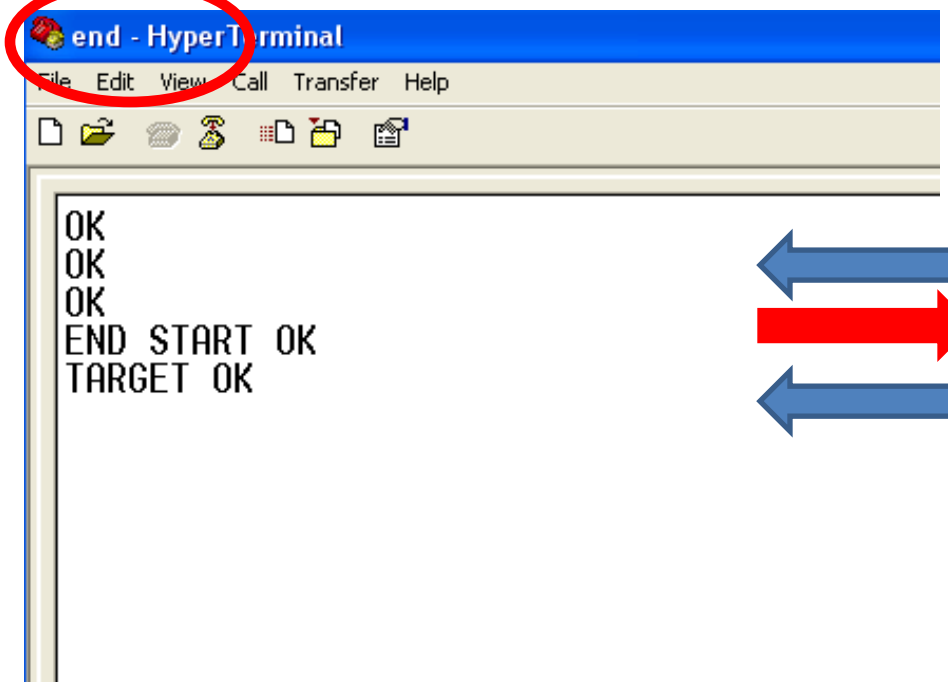
2. Setting Target Device of End Device to Router (End Device -> Router)

(1) Router device IEEE address search



- Input the following into Hyper Terminal connected to FZ200BS that is set to Router
- Input “+++”
- “OK” is output from FZ200BS
- After inputting “AT+GETLOCAL” and press Enter key.
- “ROUTER, 0015510000000002, 0001” is output from FZ200BS
- IEEE address of Router is “0015510000000002”
- After inputting “ATO”, press Enter key.
- “OK” is output.

(2) Setting Target Device of End Device to Router

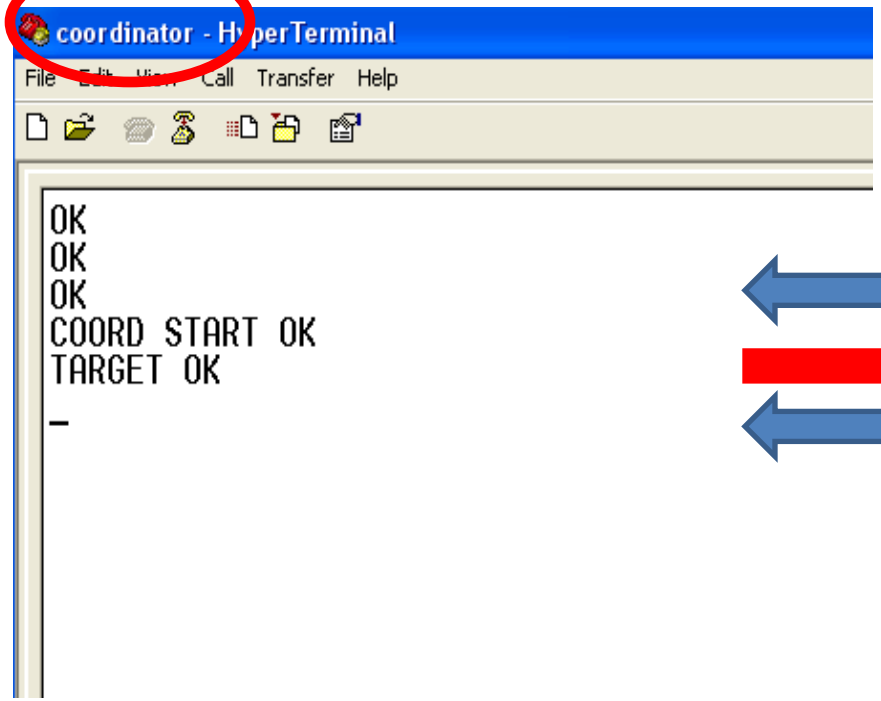


- Input the following into Hyper terminal connected to FZ200BS that is set to End Device

- Input “+++”
- “OK” is output from FZ200BS
- After inputting “AT+SETTARGET 00155100000000002” and press Enter key.
- 00155100000000002 is the address that has already been searched before. If you use another device, you should search the address again because each device has its own address.
- “OK” is output from FZ200BS
- After inputting “ATZ” in Hyper Terminal, press Enter key.
- “OK” is output from FZ200BS
- Device is re-started
- “END START OK” is output
- “TARGET OK” is output

3. Setting the Target device of Coordinator to ALL Device

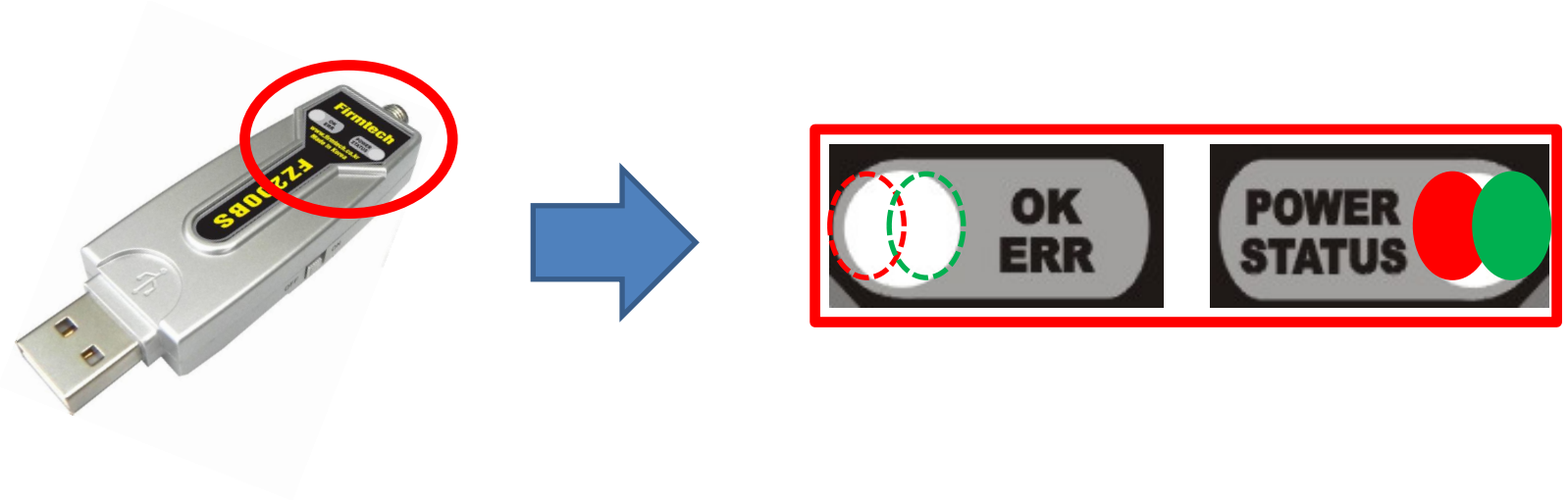
(Coordinator -> ALL Device)



- Input the following into Hyper terminal connected to FZ200BS that is set to Coordinator

- Input “+++”
- “OK” is output from FZ200BS
- After inputting “AT+SETTARGETFFFFFFFFFFFFFFFF” and press Enter key.
- FFFFFFFFFFFFFFFF is all devices that are not in a low power consumption mode, and still working with ZigBee Network
- “OK” is output from FZ200BS
- After inputting “ATZ” , press Enter key.
- “OK” is output from FZ200BS
- Device is re-started.
- “COORD START OK” is output.
- “TARGET OK” is output.

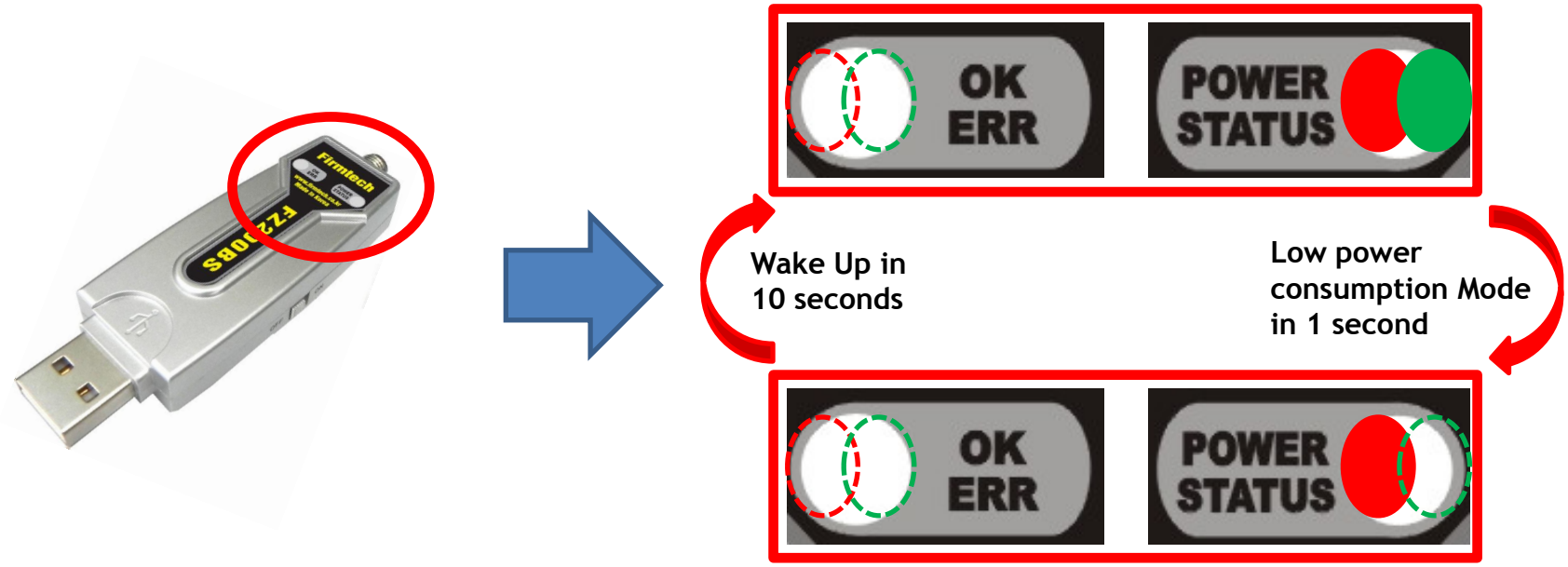
STATUS LED conditions of Operation Mode that was set to Target Device (Coordinator & Router)



- The Green STATUS LED keeps being turned ON after Target Device is set.
- The OK/ERR LED keeps being turned OFF in an Operation Mode.

- Once Target Device set-up is done for the first time, it is automatically proceeded from the next even if the device is reset.

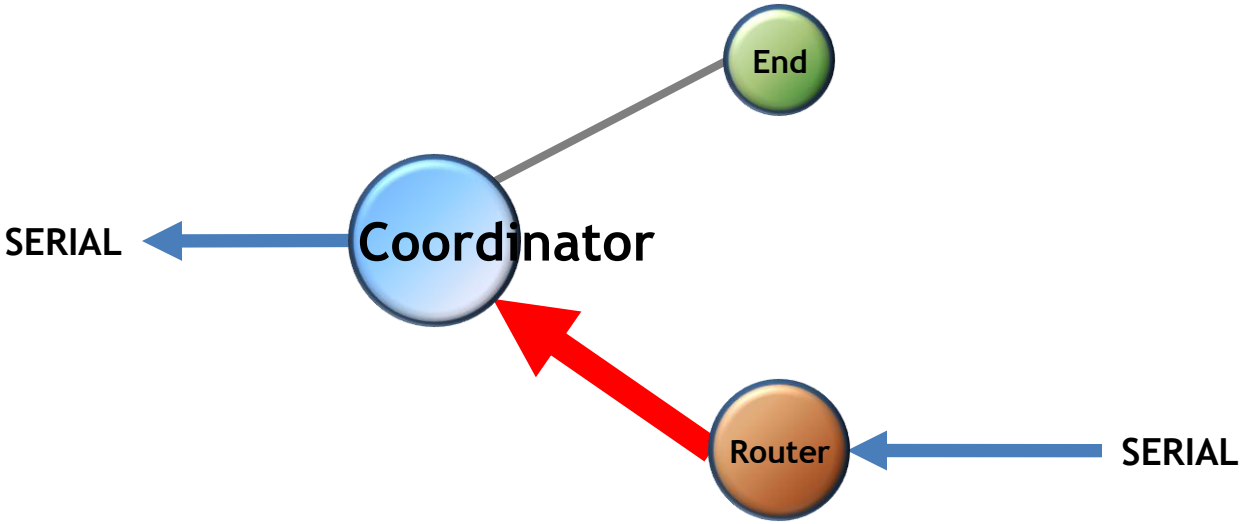
STATUS LED conditions of Operation Mode that was set to Target Device (End Device)



- The Green STATUS LED keeps being turned ON after Target Device is set.
- The OK/ERR LED keeps being turned OFF in an Operation Mode.

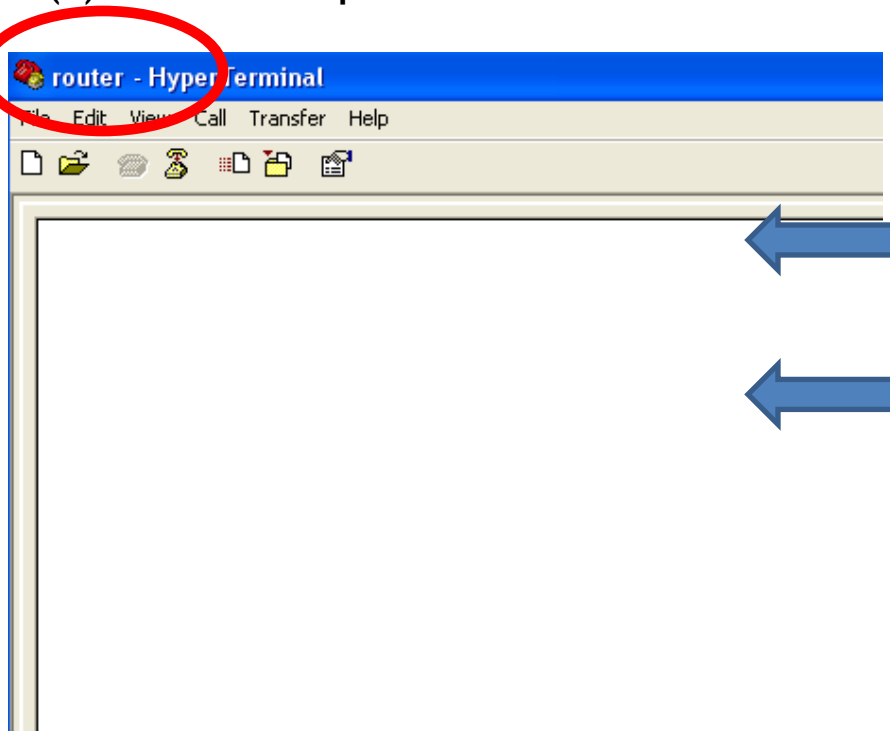
- After Target Device is set, End Device automatically goes into low power consumption mode and makes wake-up every certain time that is currently set to 10 seconds.
- Once Target Device set-up is done for the first time, it is automatically proceeded from the next even if the device is reset.

[6] Serial Data transmission from Router to Coordinator

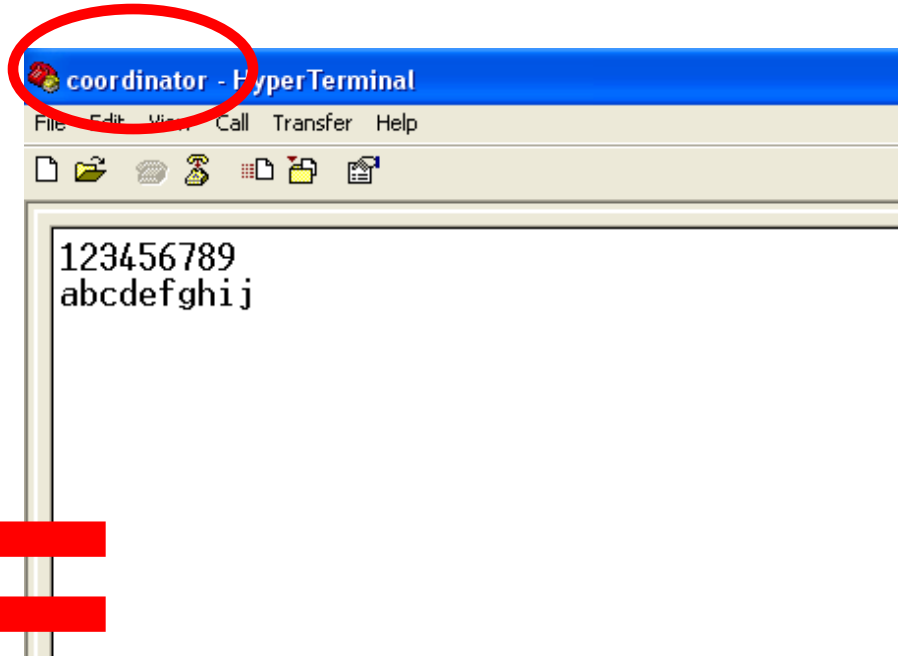


1. Serial Data Transmission “Router -> Coordinator”

(1) Serial Data Input in Router - Check it in Coordinator.



- Input the following into Hyper Terminal connected to FZ200BS that is set to Router
- After inputting “123456789” into Hyper Terminal, press Enter key.
- After inputting “abcdefghij” into Hyper Terminal, press Enter key.



- Displays the followings on Hyper Terminal connected to FZ200BS that is set to Coordinator
- “123456789” is output
- “abcdefghij” is output.

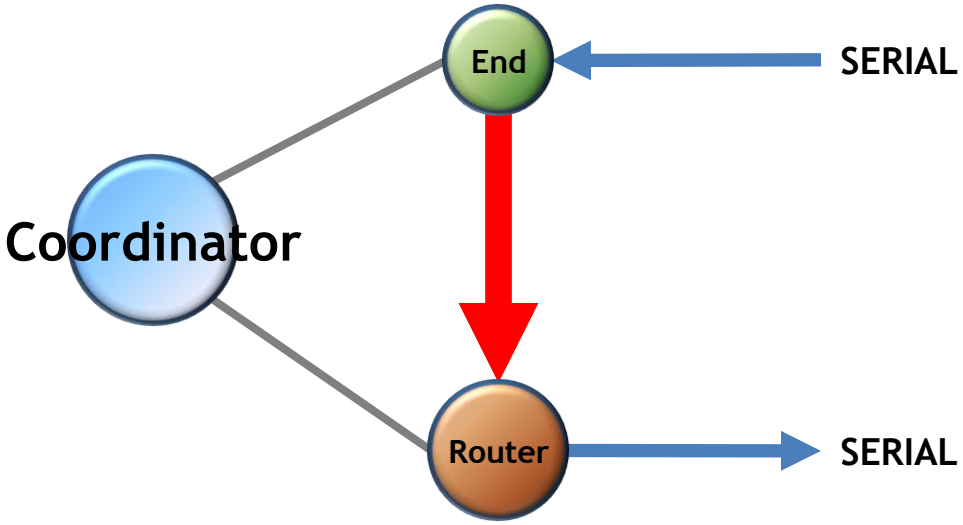
OK/ERR LED conditions related ACK after Data transmission. (Router)

< Case 1. ACK transmission is successfully done >

< Case 2. ACK transmission is failed >

- The Green OK LED blinks once if the Data transmission is successfully done.
- The Red ERR LED blinks once if the Data transmission is failed.

[7] Serial Data Transmission from End Device to Router

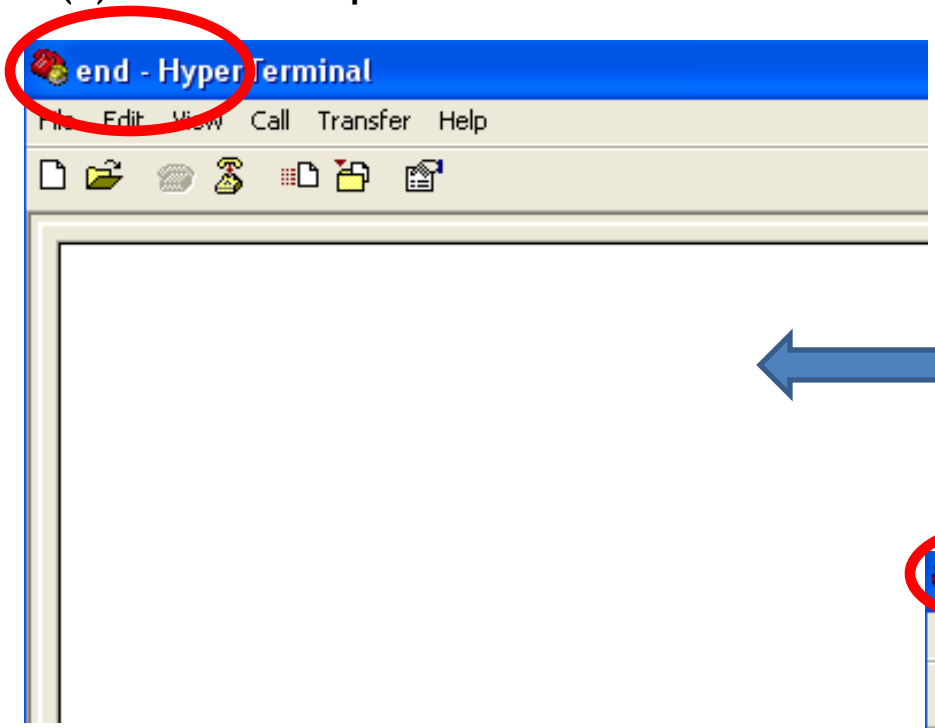


< The following is a summary of End Device status >

- FZ200BS set to End Device enters into a low power consumption mode automatically because it has a Target Device, and makes wake-up every once 10 seconds(default setting time)
- You can not input any Serial Data while End Device is in a low power consumption Mode
- End Device can not receive wireless Data while the End Device is in a low power consumption Mode
- If End Device is in a Low power consumption Mode, You need to work on the following in order to input Serial Data(Please refer to the "FZx00_Appendix_3" for further details)
  - ✓ You can check End Device making wake-up at certain time, so you can input Serial Data before the End Device enters into a low power consumption mode again.
  - ✓ If End Device doesn't make wake-up by certain time, you should input KEY Data to make End Device start wake-up forcefully. After that, you can input Serial Data before the End Device enters into a low power consumption mode again.

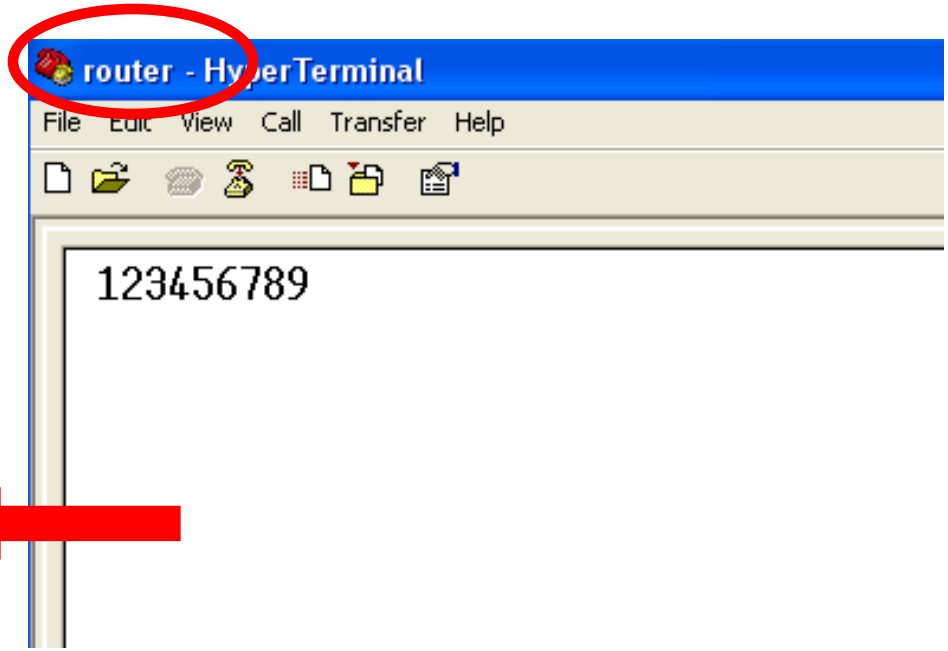
1. Serial Data Transmission “End Device -> Router”

(1) Serial Data Input in End Device – Check in Router



After putting End Device in wake-up mode, input the following into Hyper Terminal connected to FZ200BS set to End Device

- After inputting “123456789” into Hyper terminal, press Enter key



- Displays the followings on Hyper Terminal connected to FZ200BS that is set to Router
- “123456789” is output

OK/ERR LED conditions related ACK after Data transmission. (End Device)

< Case 1. ACK transmission is successfully done >

< Low power consumption mode >

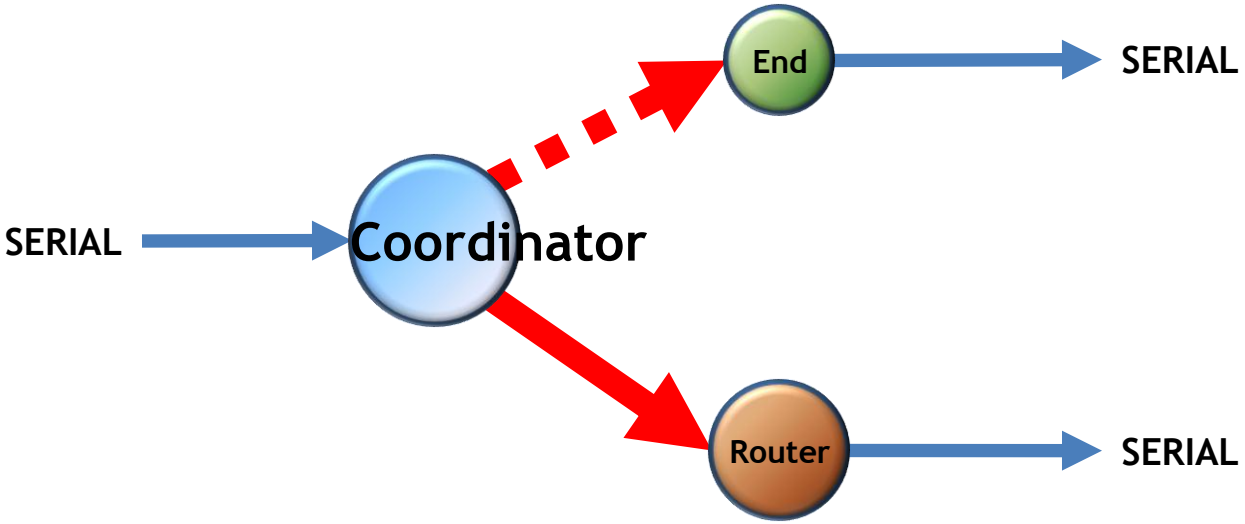
< Case 2. ACK transmission is failed >

- The Green OK LED blinks once if the Data transmission is successfully done.
- The Red ERR LED blinks once if the Data transmission is failed.

- End Device into the Low power consumption mode 1 second after ACK or NACK is transmitted.

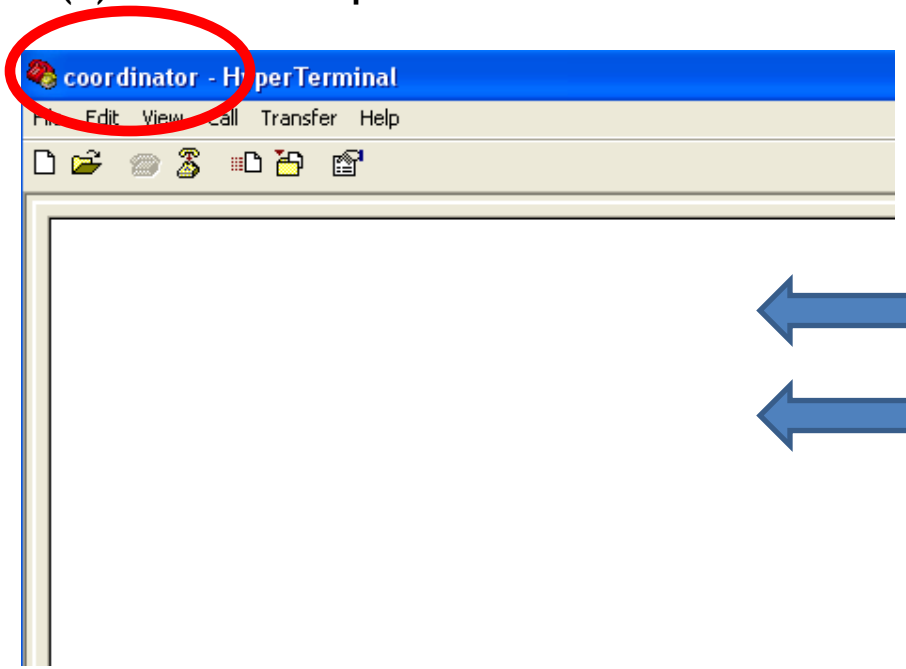
[8] Serial Data Transmission

From Coordinator to All devices



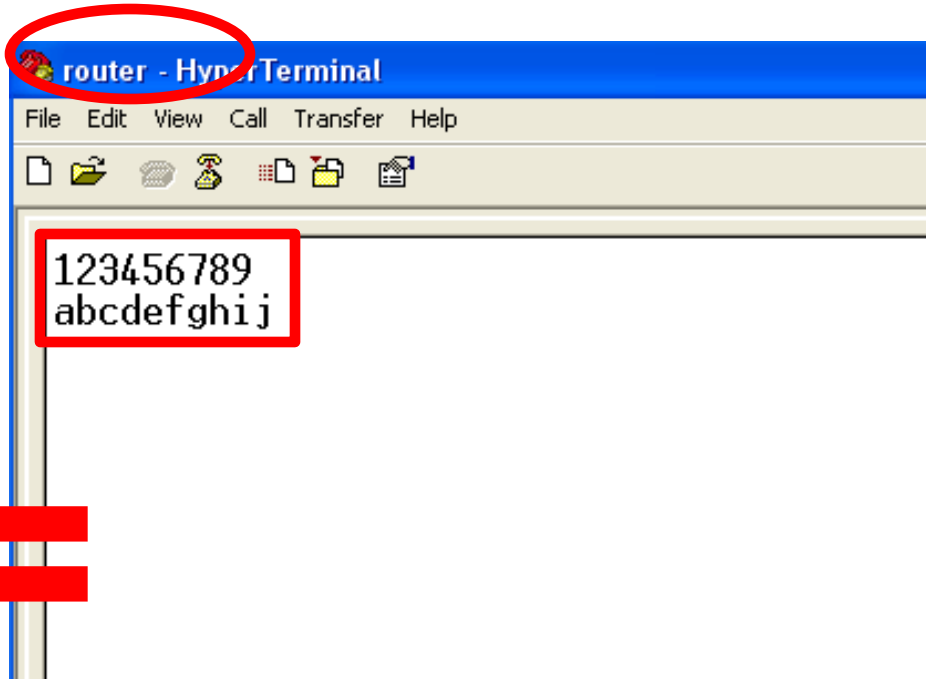
1. Serial Data Transmission “Coordinator -> ALL Device”

(1) Serial Data input in Coordinator – Check it in Router



- Input the following into Hyper Terminal connected to FZ200BS that is set to Coordinator

- After inputting “123456789” into Hyper Terminal, press Enter key.
- After inputting “abcdefghij” into Hyper Terminal, press Enter key.



- Displays the followings on Hyper Terminal connected to FZ200BS that is set to Router

- “123456789” is output.
- “abcdefghij” is output.

- **FZ200BS set to coordinator transmits Serial Data to all Devices.**
- **However, FZ200BS set to End Device can not receive Data from Coordinator because it is in a low power consumption mode.**
- **In order for End Device to receive Data while it is in a low power consumption mode, you should put the End Device in a wake-up mode.**
- **If End Device receives wireless Data while it is in the wake-up mode, it outputs Data to Serial port.**

OK/ERR LED conditions related ACK after Data transmission. (Coordinator)

< Case 1. ACK transmission is successfully done >

< Case 2. ACK transmission is failed >

- FZ200BS set to Coordinator does not receive ACK when it transmits Data to all devices.
- FZ200BS set to Coordinator use OK/ERR LED to see if Data is transmitted by using wireless.

- The Green OK LED blinks once if Data transmission is successfully done by using wireless.
- The Red ERR LED blinks once if Data transmission is failed.

Please refer to the FZ200BS manual for further details.