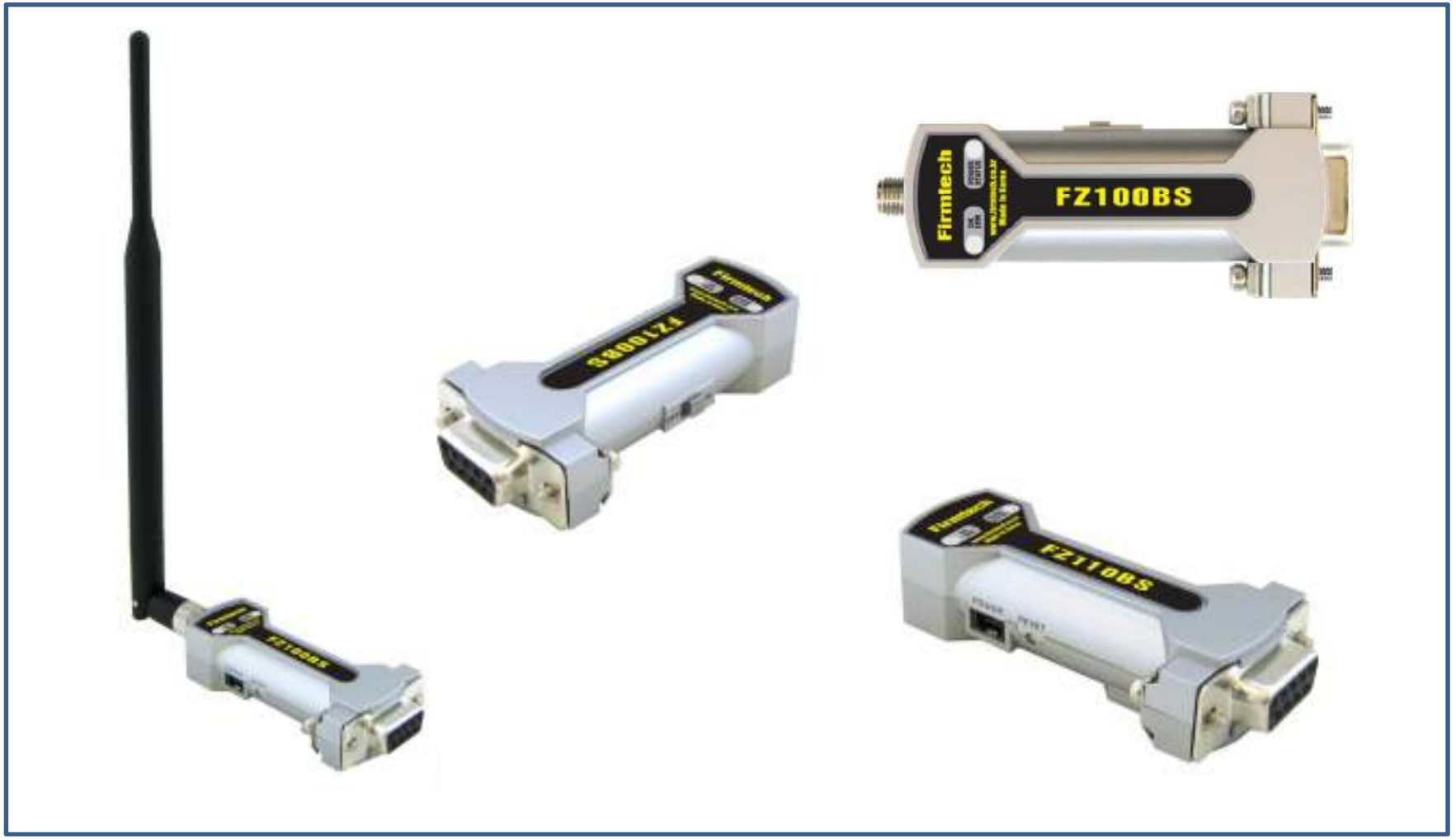
FZ100BS

Quick Guide

TinyBee™

Features of FZ100BS

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**

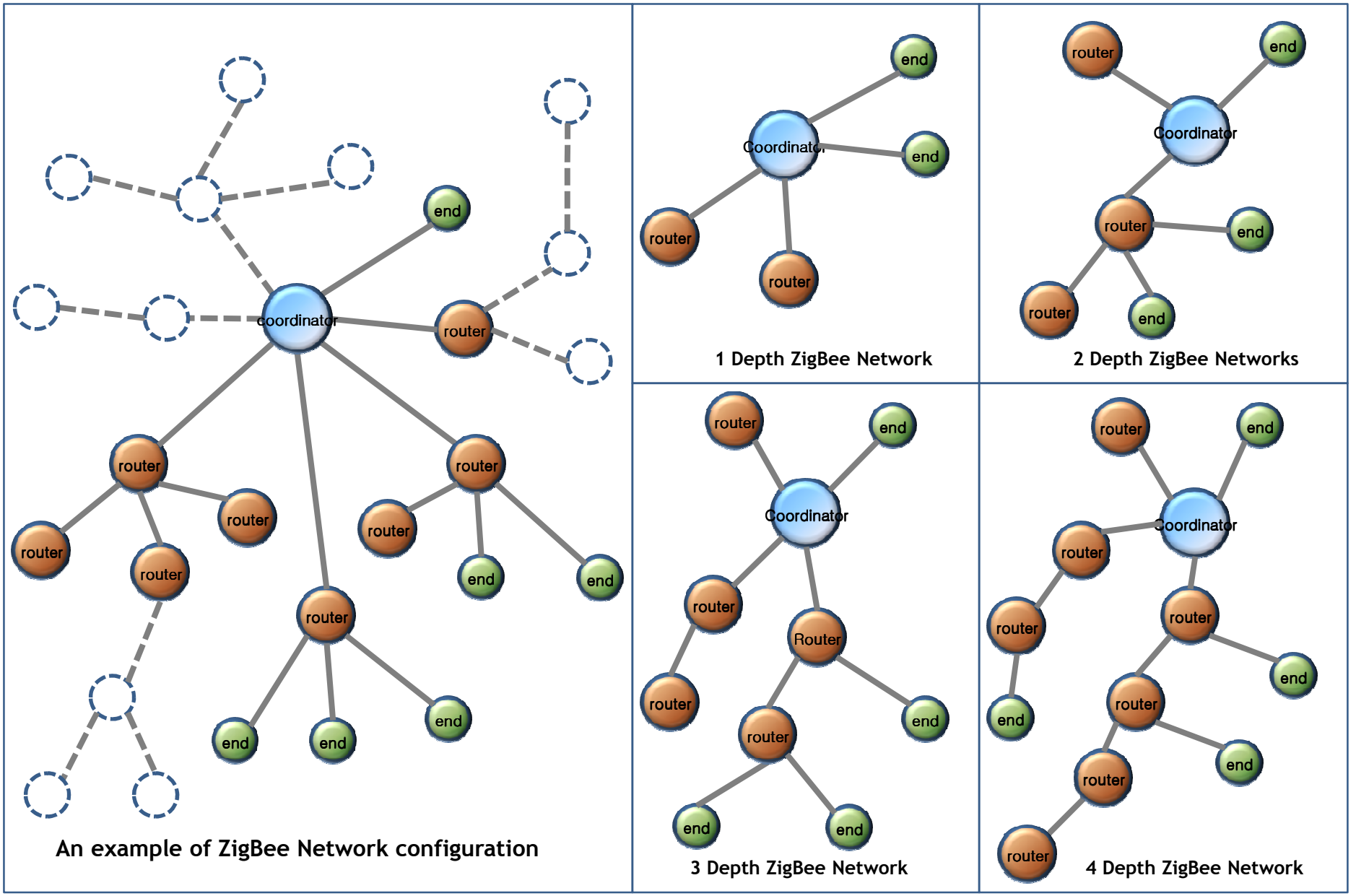
- **Wireless transmission rate : 250Kbps**

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

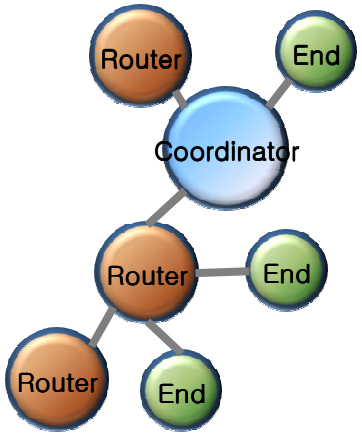
- **By using ACK, whether the data is successfully transmitted can be assured.**

- **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

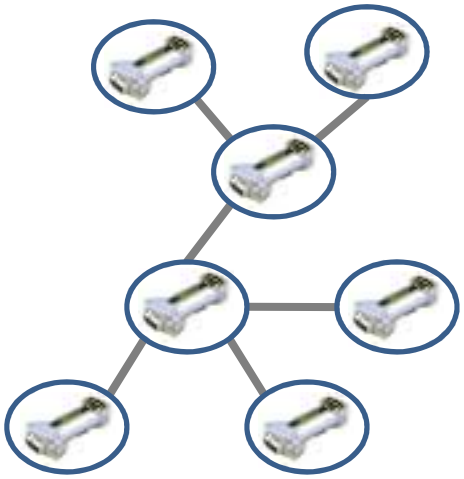


Features of FZ100BS

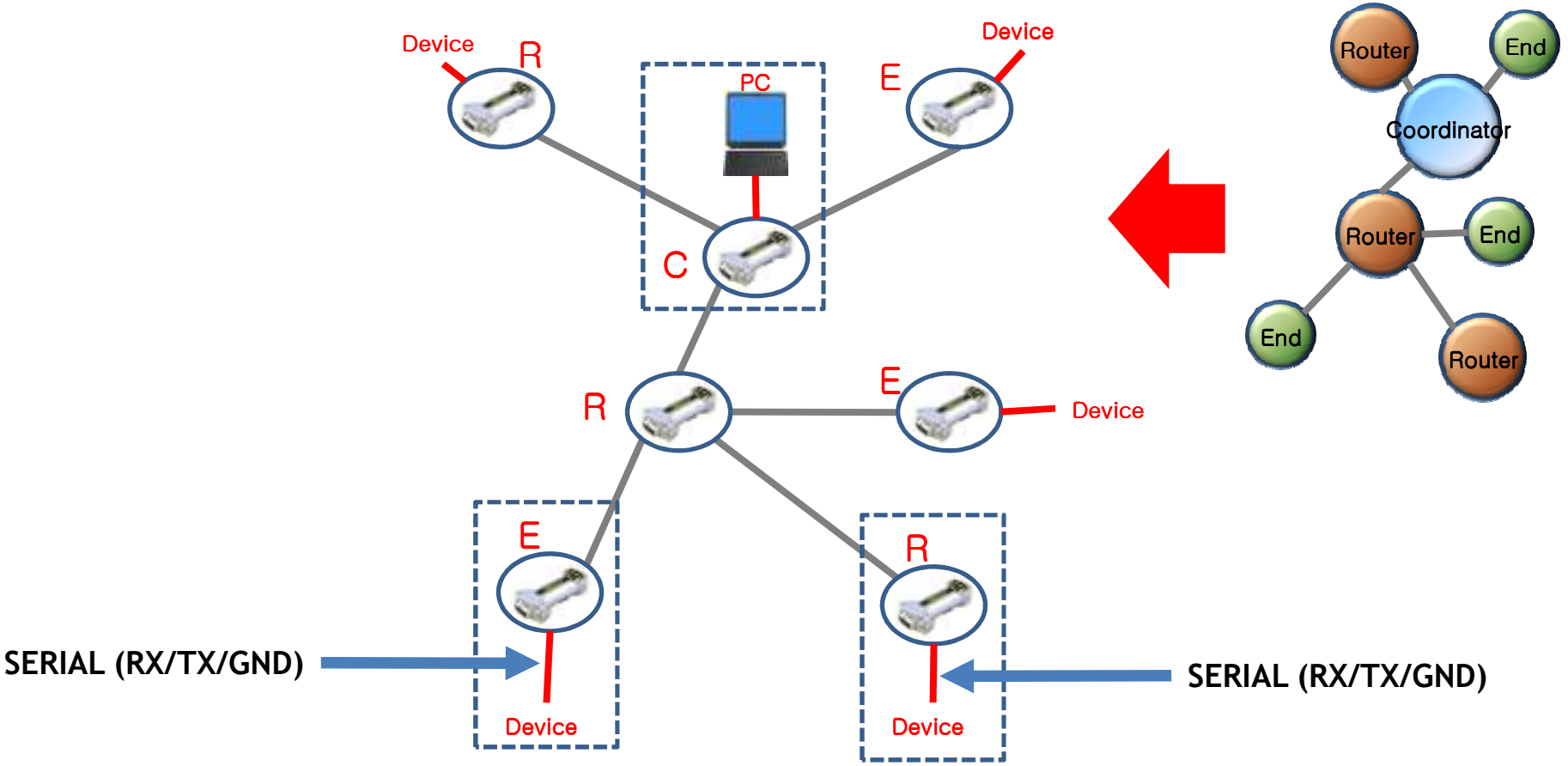


< FZ100BS >

- Can be freely set up as Coordinator, Router, or End device.
- Supports Mesh Network.
- Configured with RS-232 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 FZ100BS



< “FZ100BS Quick Guide” >

(1) It’s Composed of 7 chapters in total.

(2) The “FZ100BS quick guide” proceeds in order.

(3) Thus, we recommend you to follow all chapters in order if you are unfamiliar with FZ100BS.

(4) Please refer to the FZ100BS manual for further details.

< List >

[0] Component parts

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Hardware Installation to operation FZ100BS

1. FZ100BS ZigBee Network components

(1) Basic components to operate FZ100BS (1 set)

< Basic components 1 set>

- **FZ100BS**
- **Antenna (4 dBi Gain)**
- **USB Power Cable**

(2) ZigBee Network composition using 3 sets

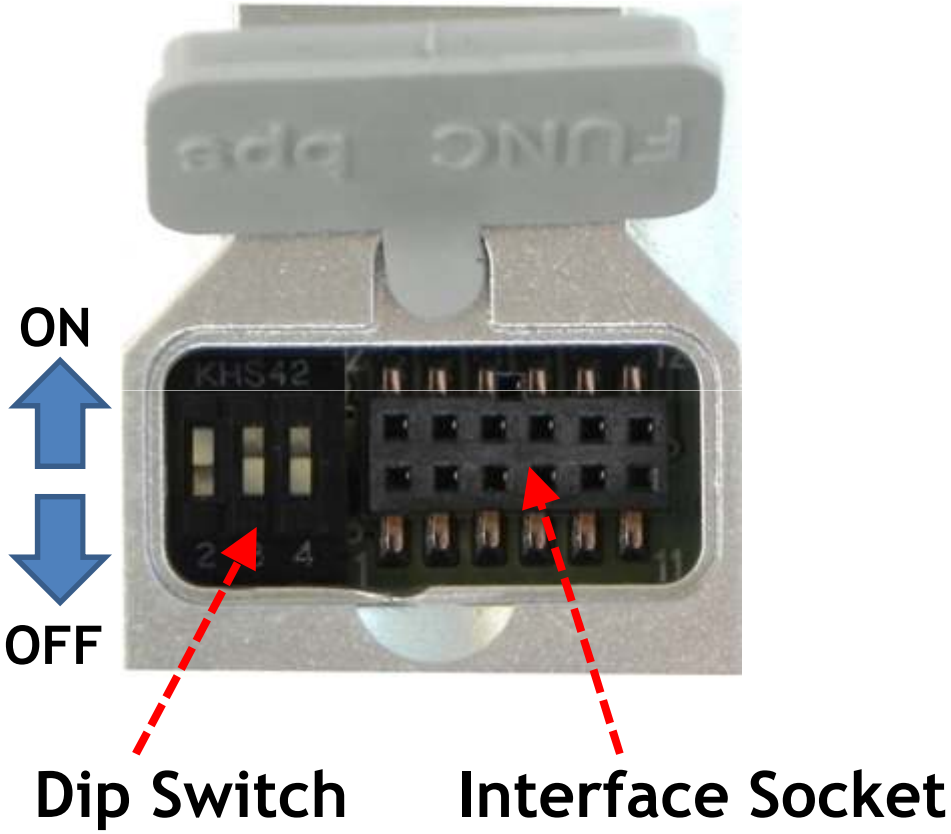
1 set for Coordinator set-up (Essential)

1 set for Router set-up (Essential)

1 set for End device (Optional)

3 devices are used in “FZ100BS Quick Guide” for explanation.

2. Check Dip-Switch before you install FZ100BS



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

- Select all the 3 FZ100BS 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 FZ100BS to the PC.

- "FZ100BS Quick Guide" explains how to connect 1 PC to 3 FZ100BS for convenience.

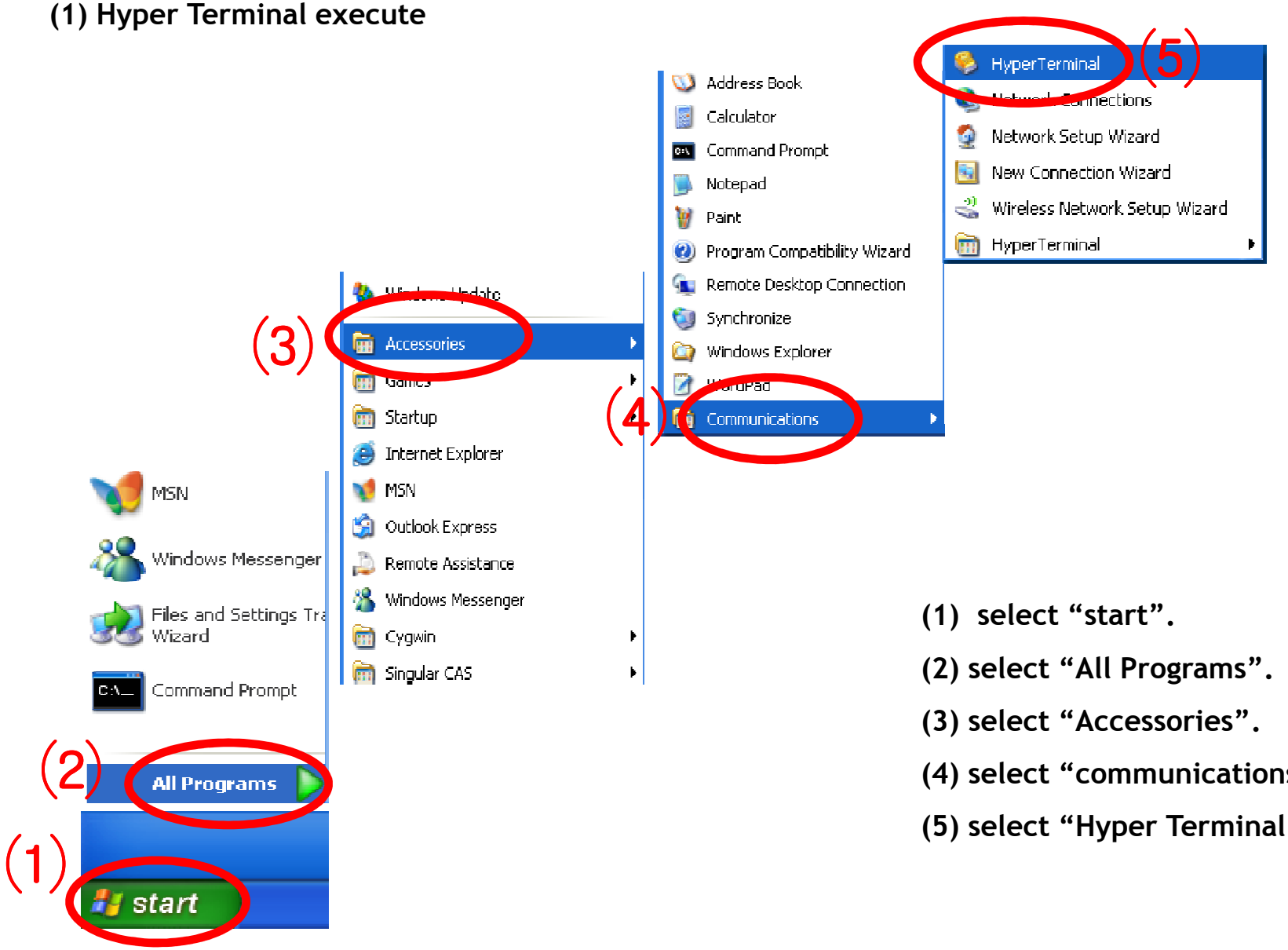
[1] Hyper Terminal

Set-up

Configuration setting with AT Command

1. Serial Communications Program(Hyper Terminal) Execution & Set-up

(1) Hyper Terminal execute



(1) select “start”.

(2) select “All Programs”.

(3) select “Accessories”.

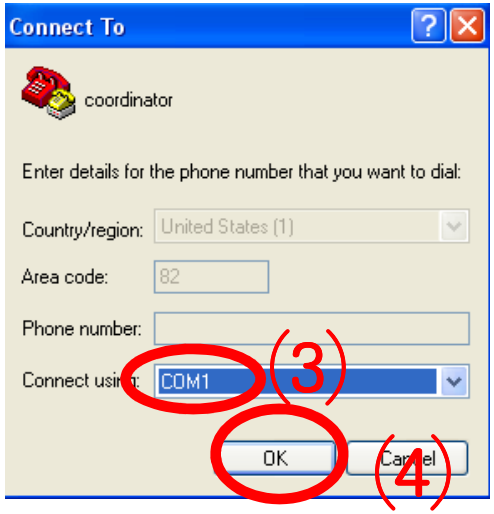
(4) select “communications”.

(5) select “Hyper Terminal”.

(2) Hyper terminal set-up - Name

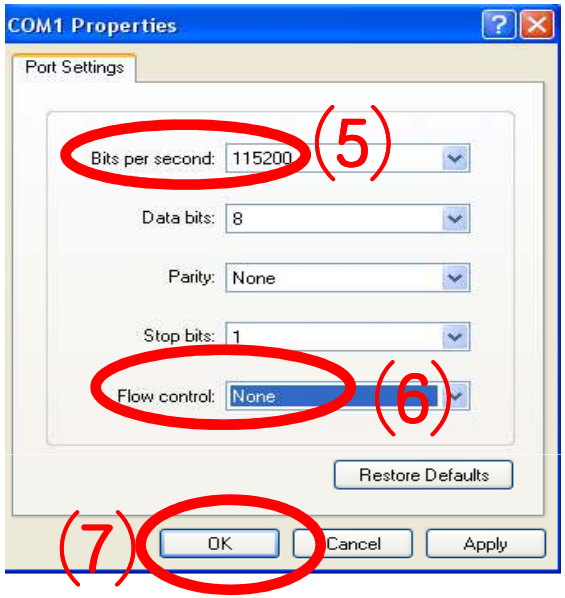
- Set up Hyper terminal connected with FZ100BS that is set to Coordinator
- Input “coordinator” in the “Name” space.
- Select “OK” and go forward.

(3) Hyper terminal set-up - Use Port



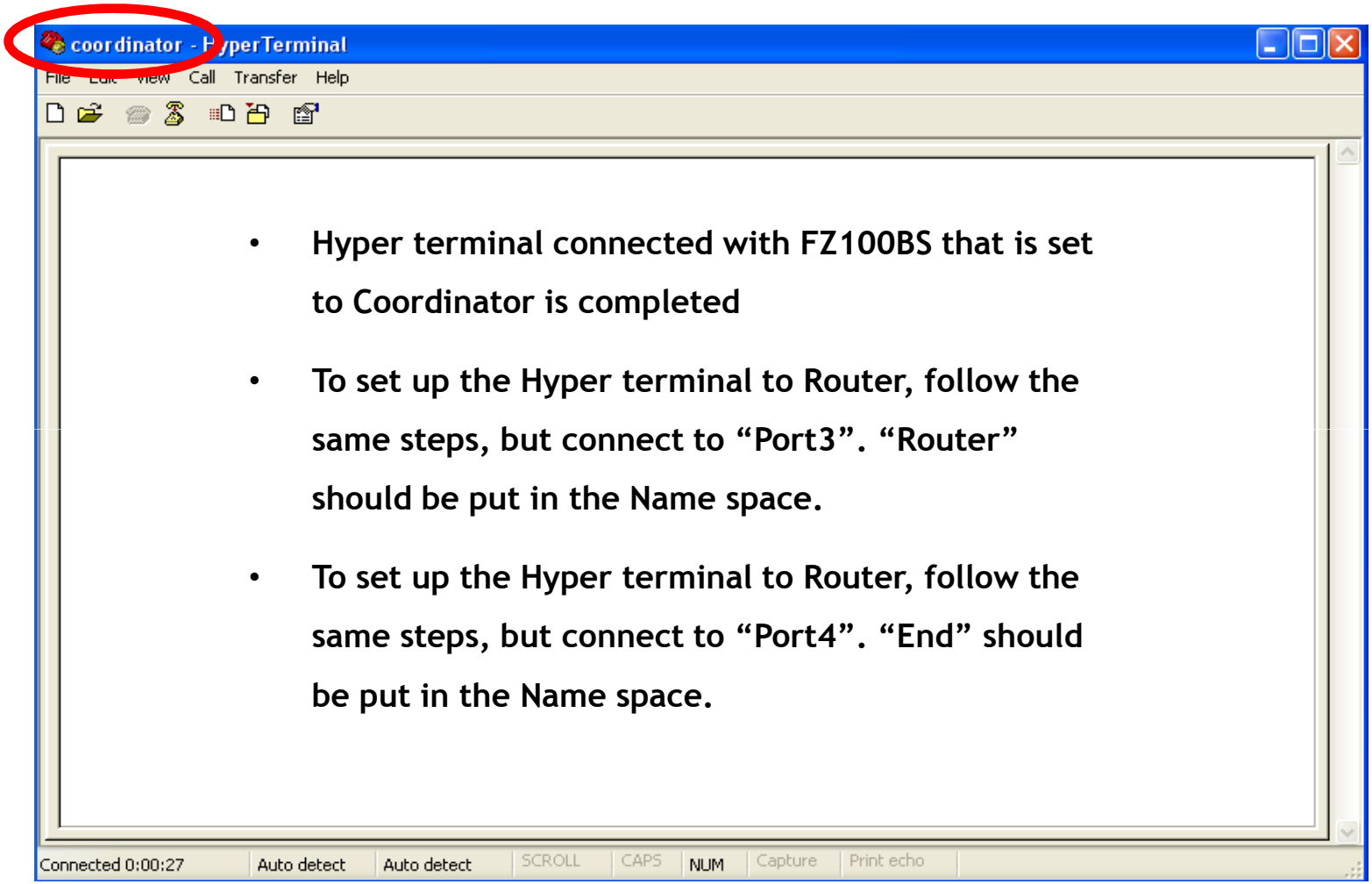
- Select the port connected with FZ100BS that is set to the Coordinator.
- Select “OK” and go forward.

(4) Hyper terminal Set-up – Signal Speed and etc



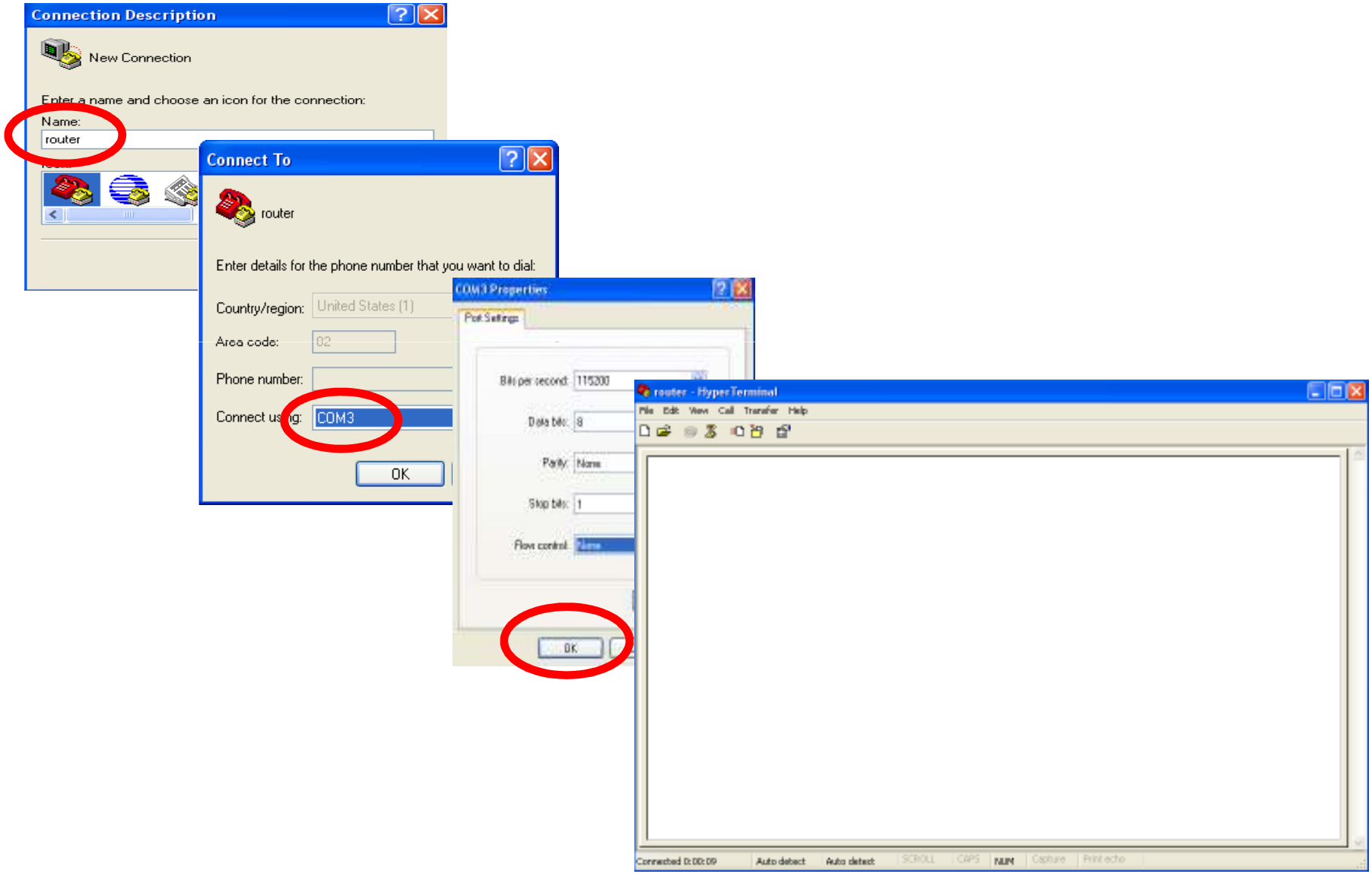
- Set “115200” in the “Bit/Sec(B)” space
- Set “None” in the “Flow control(F)” space
- Do not change other requirements.
- Select “OK”

(5) Hyper terminal set-up - completion

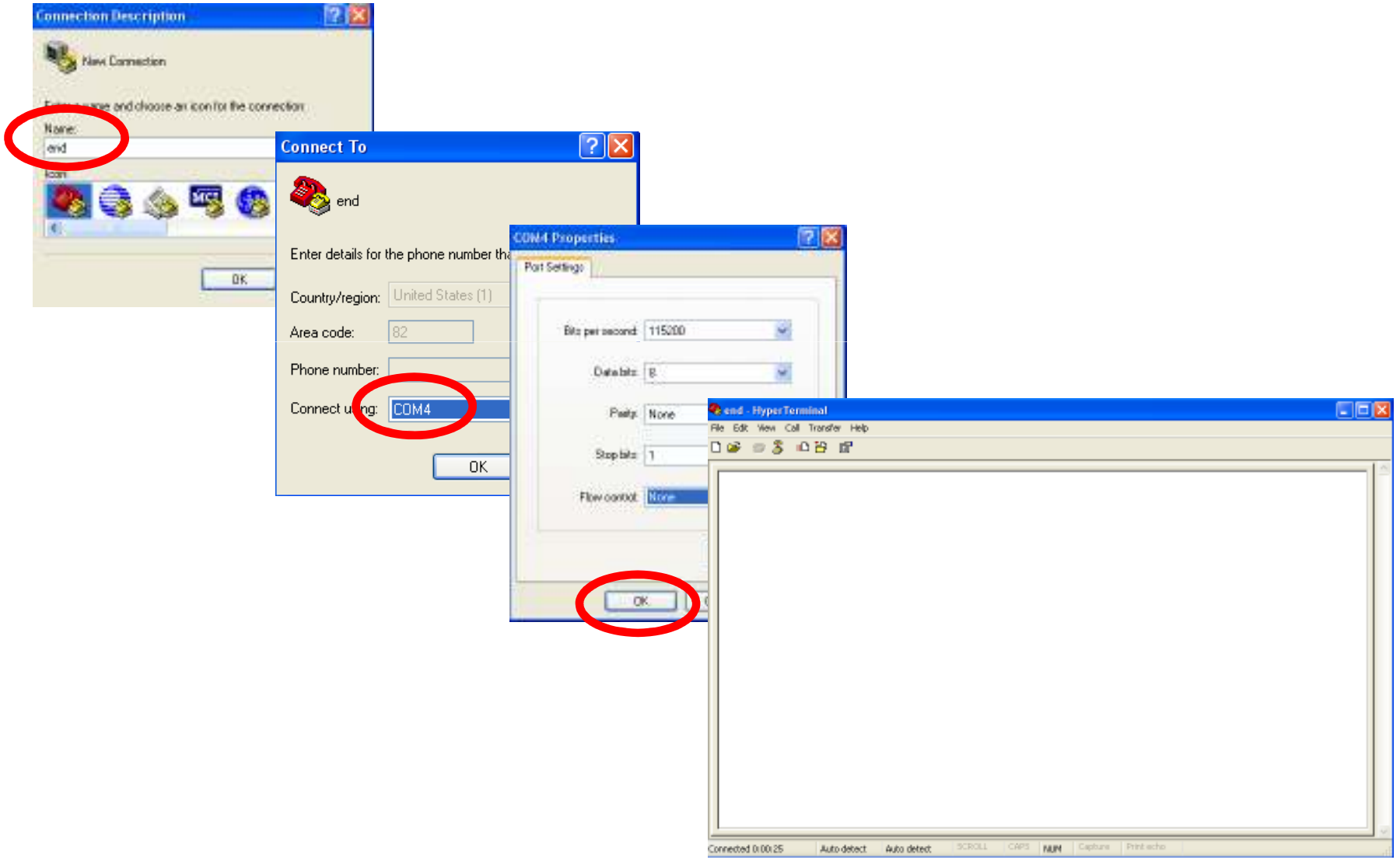


- Hyper terminal connected with FZ100BS that is set to Coordinator is completed
- To set up the Hyper terminal to Router, follow the same steps, but connect to “Port3”. “Router” should be put in the Name space.
- To set up the Hyper terminal to Router, follow the same steps, but connect to “Port4”. “End” should be put in the Name space.

If you want to use FZ100BS as Router, step by step diagram below - Use Port 3



If you want to use FZ100BS as End Device, step by step diagram below - Use Port 4



[2] FZ100BS

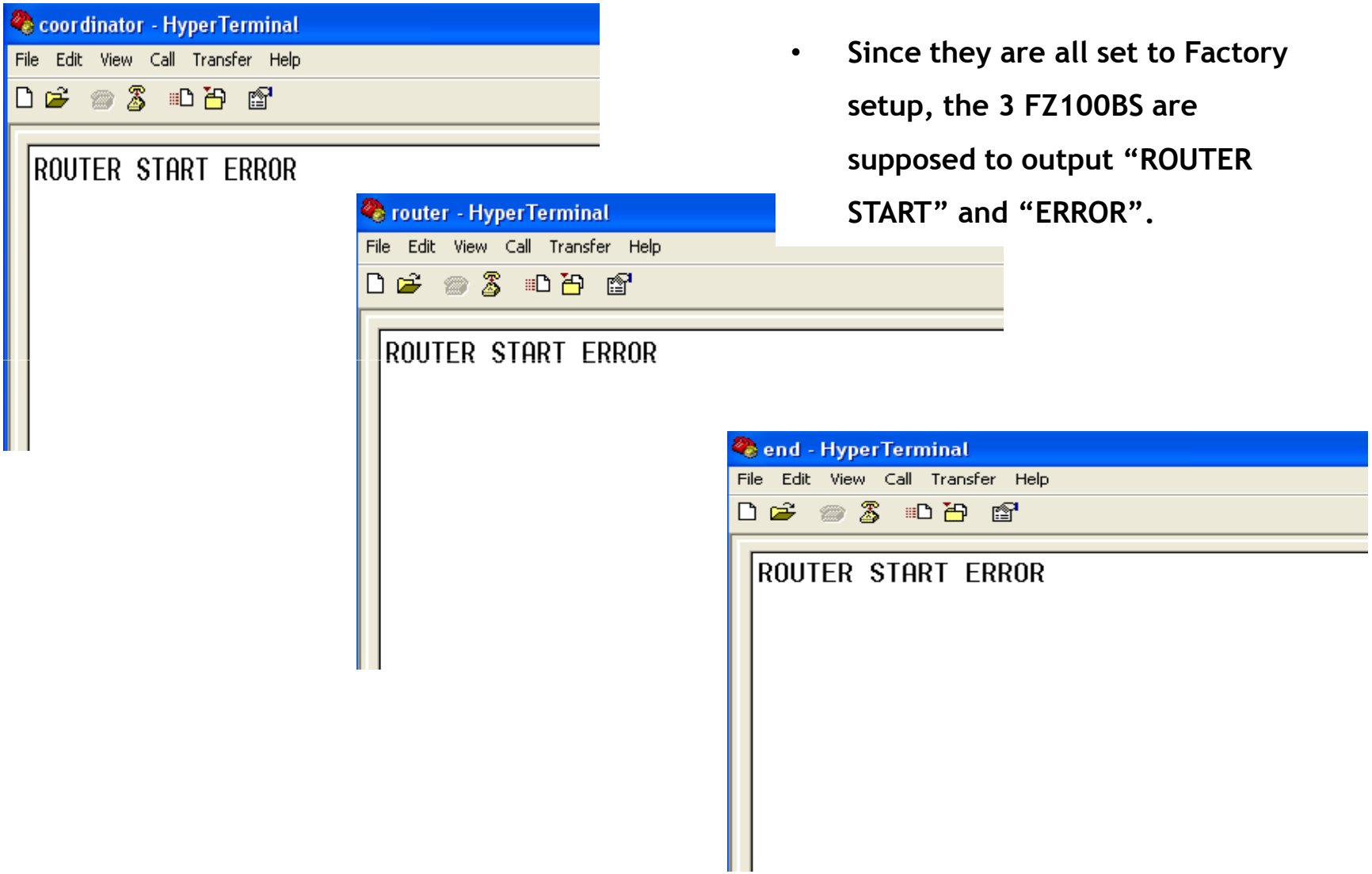
Operating

1. Operating FZ100BS

(1) FZ100BS Power ON

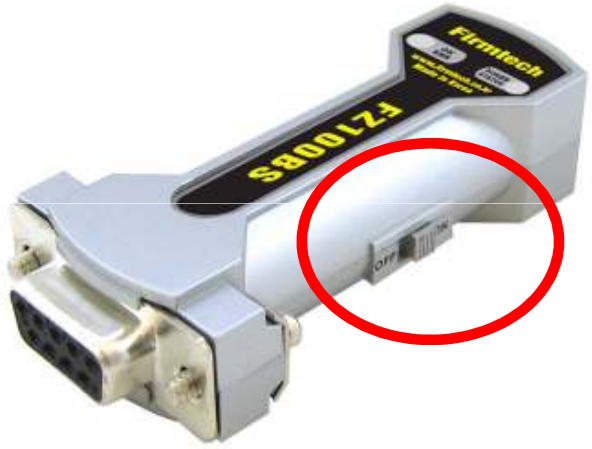
- Turn the power switch on.

(2) Hyper Terminal Output



- Turn the power of 3 FZ100BS on.
- Since they are all set to Factory setup, the 3 FZ100BS are supposed to output “ROUTER START” and “ERROR”.

FZ100BS Restart



- FZ100BS should be restarted when FZ100BS does not operate normally nor any words is displayed on hyper terminal.
- Restart the FZ100BS by cycle-power(off and then on) of FZ100BS power switch.
- Confirm communication-speed & other connection items etc.

[3] FZ100BS Set-up

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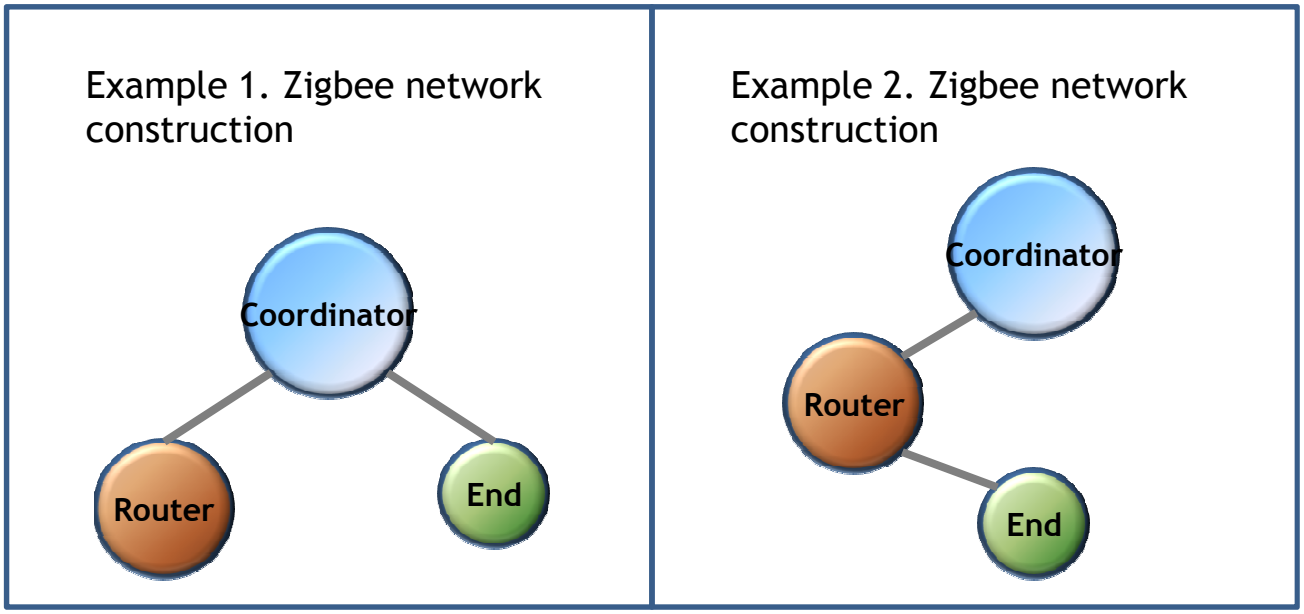
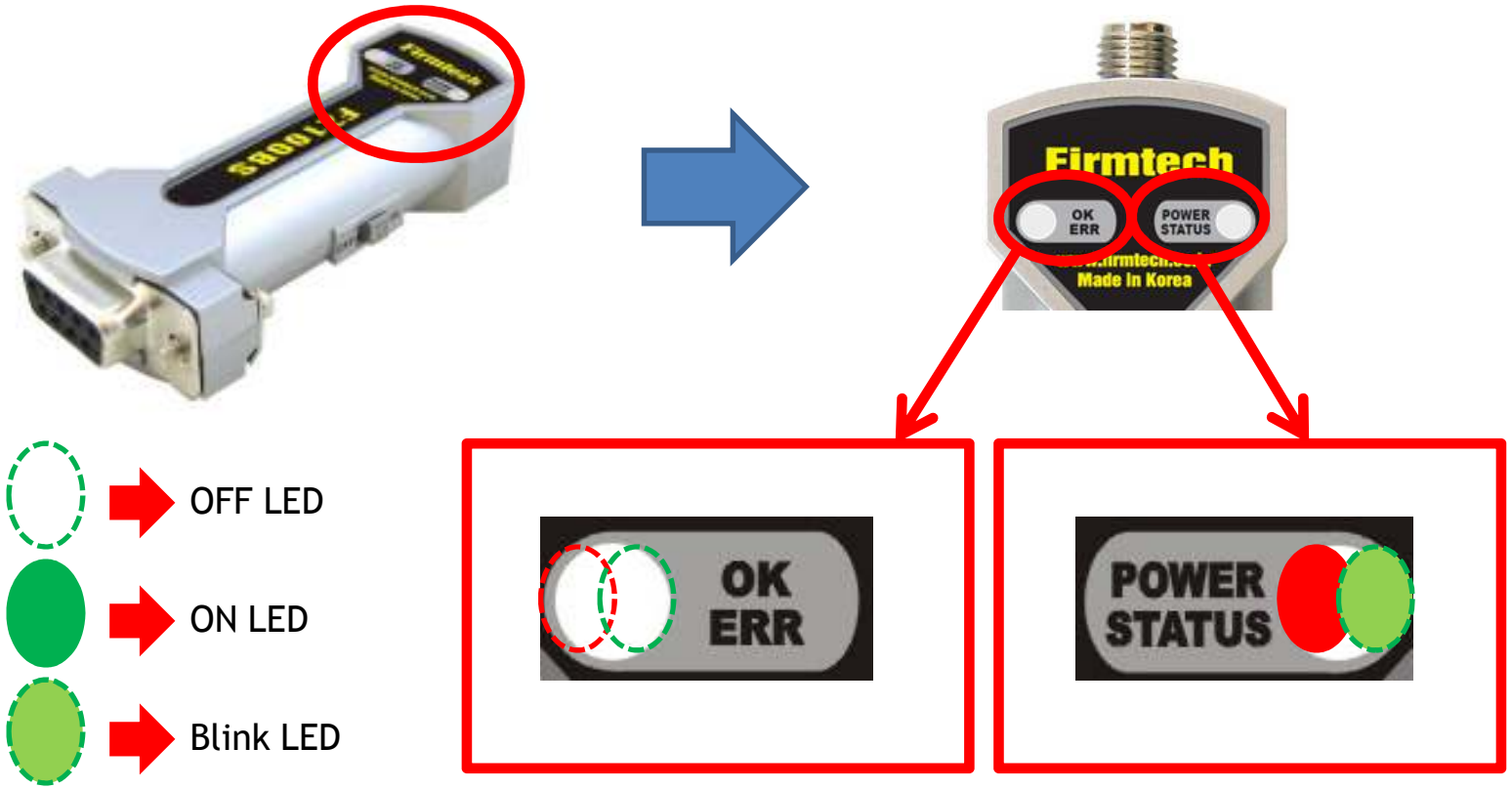
ZigBee Network Construction

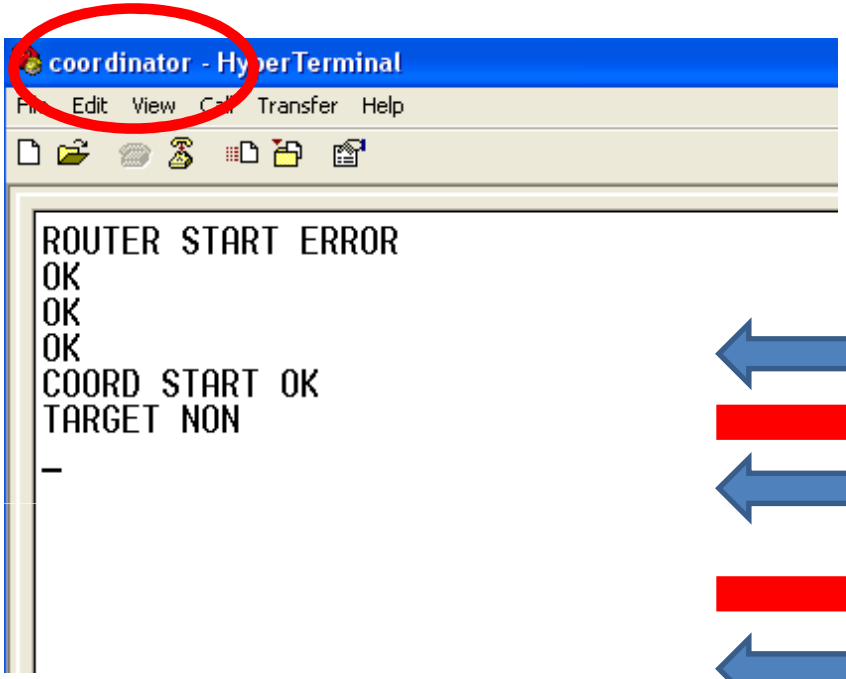


The Status LED condition of Operation Mode when Network construction/participation is failed



- The POWER LED displays a red light if FZ100BS 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 FZ100BS is in an Operation Mode.

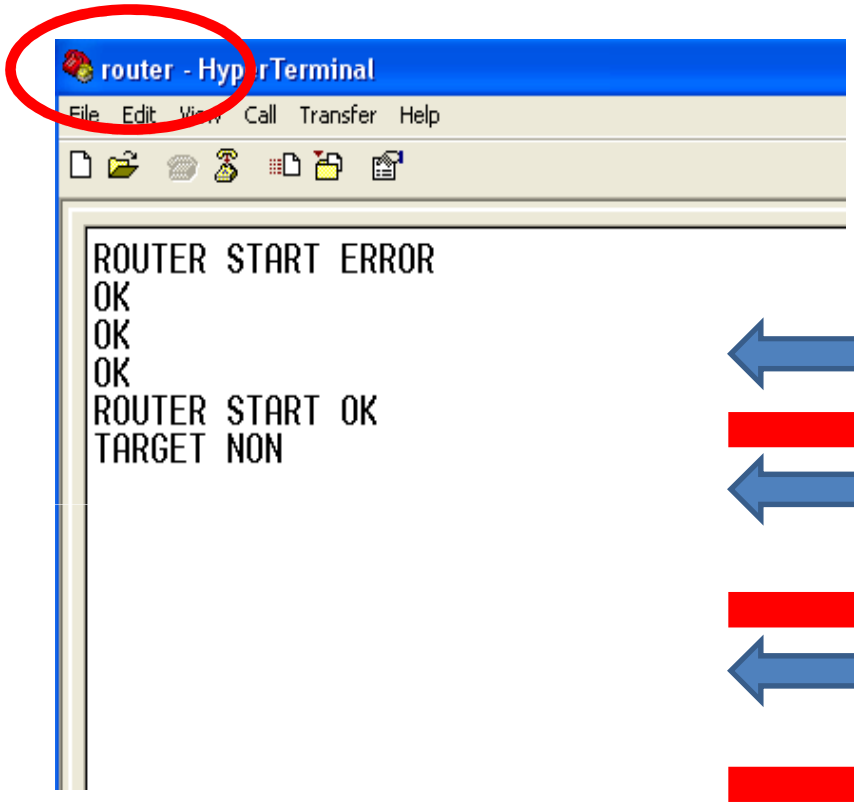
1. FZ100BS Coordinator Set-up & ZigBee Network Construction



- Input the following into Hyper terminal connected to FZ100BS that is set to Coordinator

- Input“+++”in Hyper terminal.
- “OK” is output from FZ100BS.
- After inputting “AT+SETCOORD” in Hyper terminal, press Enter key.
- “OK” is output from FZ100BS.
- Press Enter key after inputting “ATZ” in Hyper terminal.
- “OK” is output from FZ100BS
- FZ100BS Device is re-started
- “COORD START OK” is output
- “TARGET NON” is output

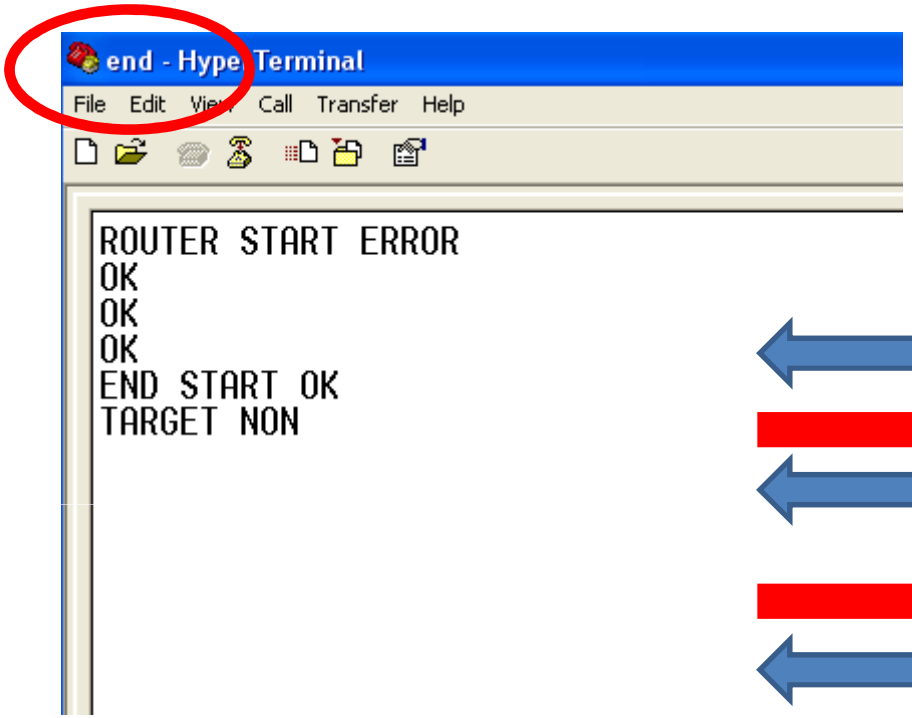
2. FZ100BS Router set-up & ZigBee Network Participation



- Input the following into Hyper Terminal connected to FZ100BS that is set to Router

- Input“+++”in Hyper terminal.
- “OK” is output from FZ100BS.
- After inputting “AT+SETROUTER” in Hyper terminal, press Enter key.
- “OK” is output from FZ100BS.
- After inputting “ATZ” in Hyper Terminal, press Enter key.
- “OK” is output from FZ100BS
- FZ100BS Device re-started.
- “ROUTER START OK” is output.
- “TARGET NON” is output.

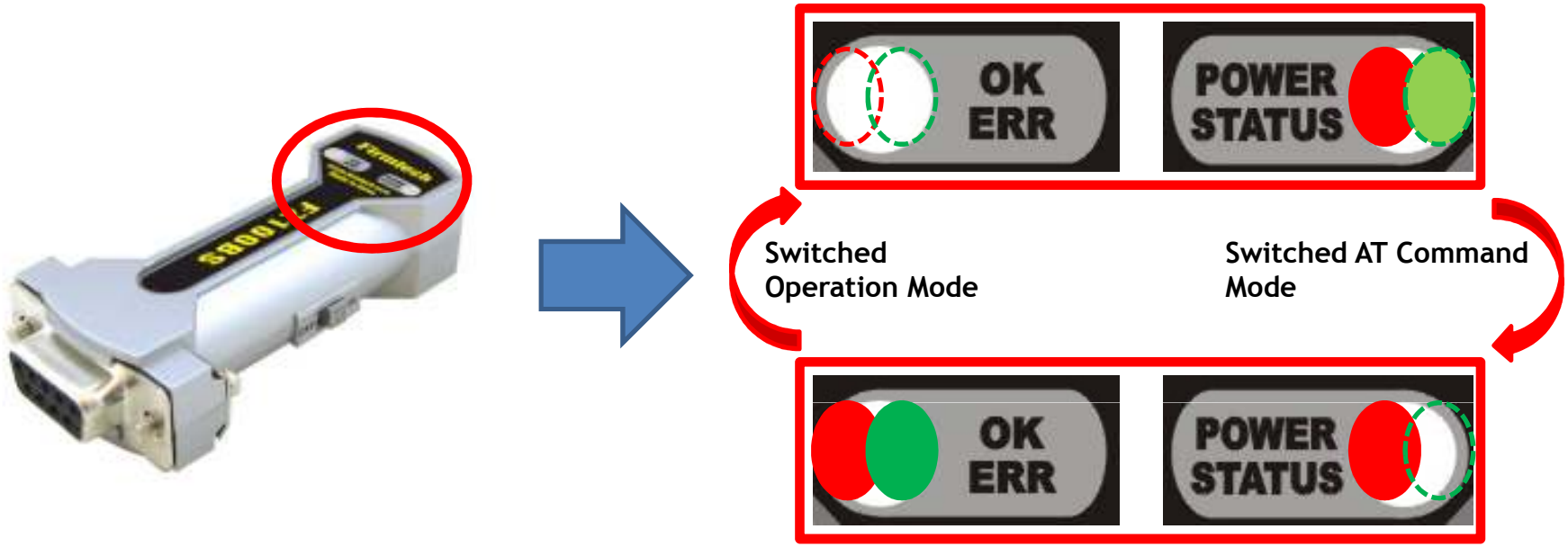
3. FZ100BS End Device set-up & ZigBee Network Participation



- Input the following into Hyper terminal connected to FZ100BS that is set to End Device

- Input“+++”in Hyper terminal.
- “OK” is output from FZ100BS.
- After inputting “AT+SETEND” in Hyper terminal, press Enter key.
- “OK” is output from FZ100BS.
- Press Enter key after inputting “ATZ” in Hyper terminal.
- “OK” is output from FZ100BS.
- FZ100BS Device re-started.
- “END START OK” is output.
- “TARGET NON” is output.

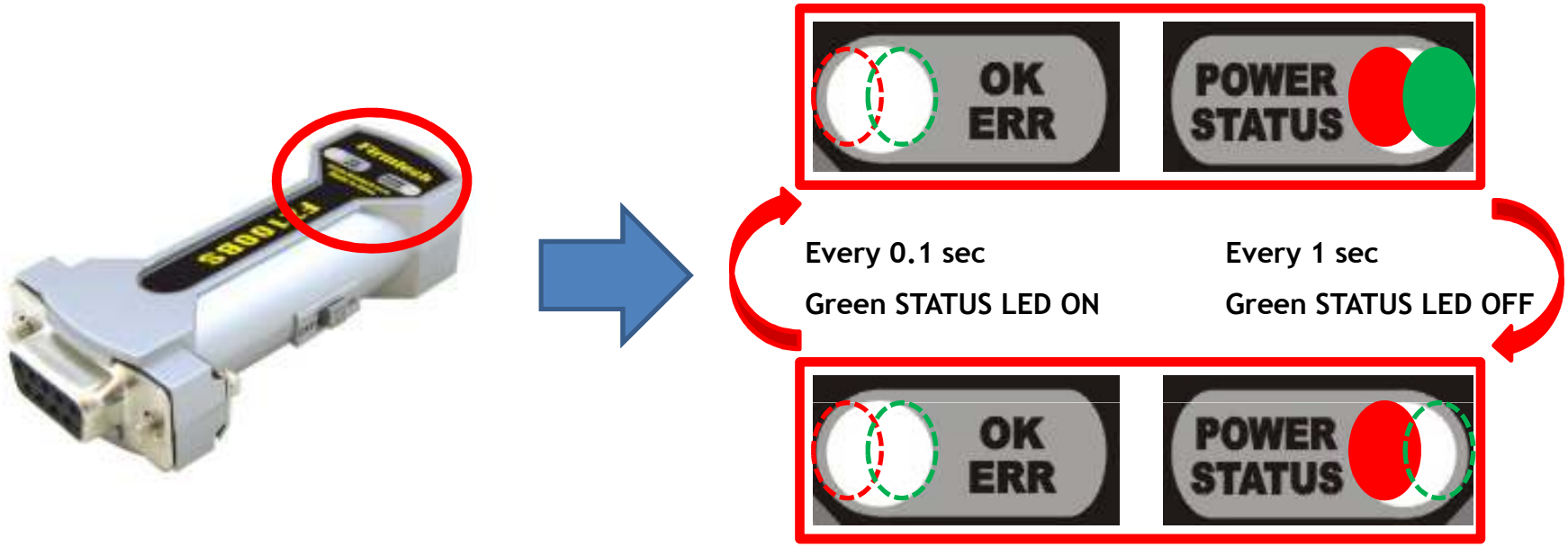
STATUS/OK/ERR LED conditions in AT Command Mode



- Mode is switched from Operation to AT Command when you input “+++” in Hyper Terminal.
- The Green STATUS LED keeps being turned off when FZ100BS is in an AT Command Mode.
- The OK/ERR LED holds the light turned on when FZ100BS 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.

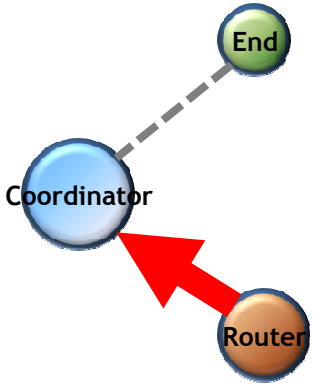


- When Network Construction/Participation is completed, the Green STATUS LED blinks every 1 second.
- The OK/ERR LED of FZ100BS keeps being turned off.

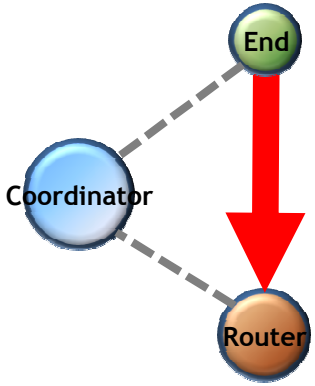
- When Network Construction/Participation is completed for the first time, it is automatically proceeded from the next even if device is reset.

[4] FZ100BS

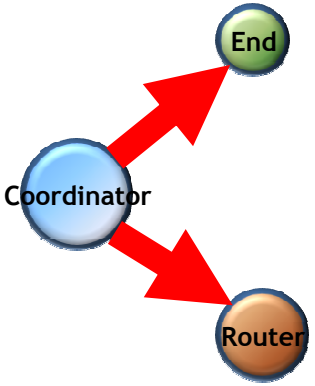
Setting up Target Device



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.

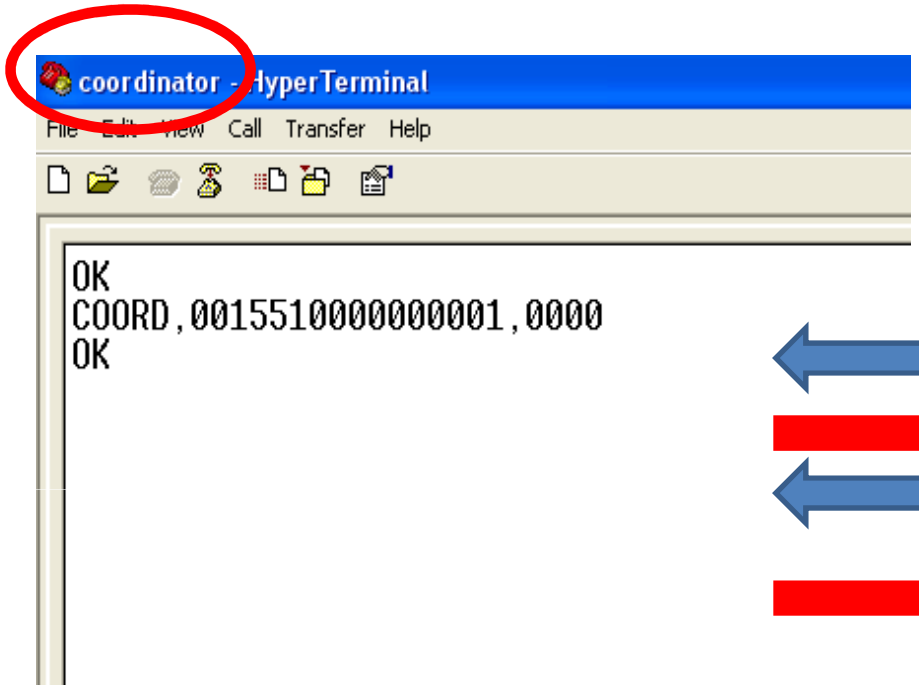


In order to communicate,

Coordinator uses Broadcast's address.

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

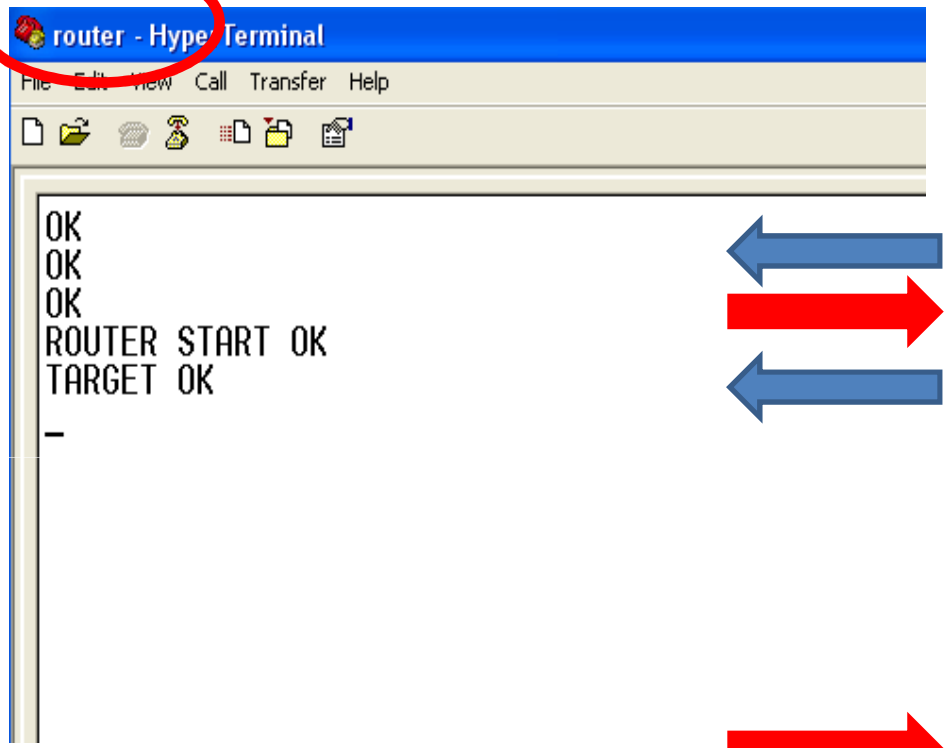
(1) Coordinator IEEE address search



- Input the following into Hyper terminal connected to FZ100BS that is set to Coordinator

- Input “+++”
- “OK” is output from FZ100BS
- After inputting “AT+GETLOCAL” and press Enter key.
- “COORD, 0015510000000001, 0000” is output from FZ100BS
- IEEE ADDRESS of Coordinator is “0015510000000001”
- After inputting “ATO”, Enter key.
- “OK” is output

(2) Setting Target Device of Router to Coordinator

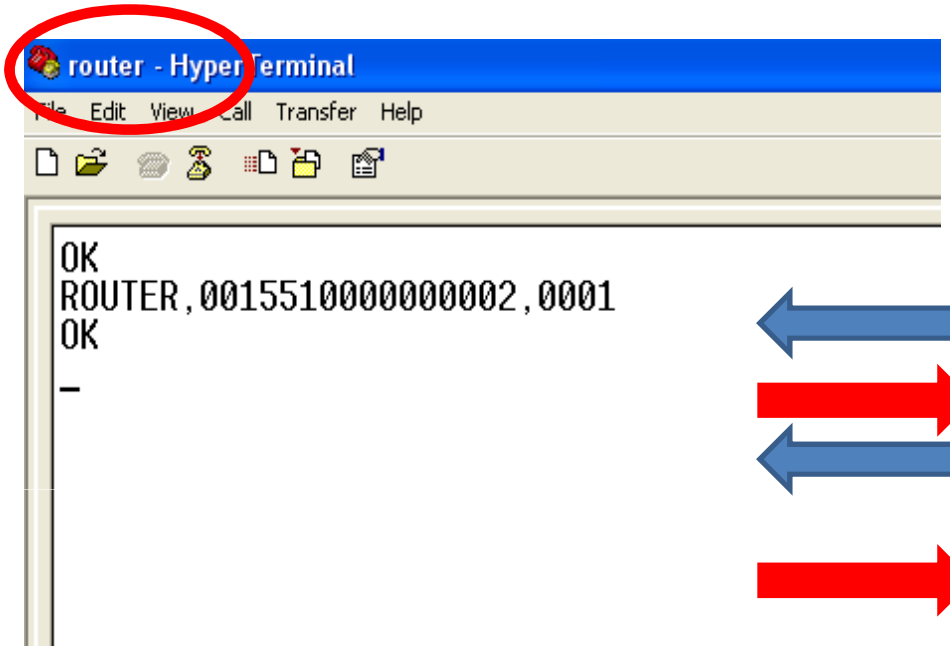


- Input the following into Hyper Terminal connected to FZ100BS that is set to Router

- Input “+++”
- “OK” is output from FZ100BS
- 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 FZ100BS
- After inputting “ATZ” in Hyper Terminal, address Enter key.
- “OK” is output from FZ100BS
- 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)

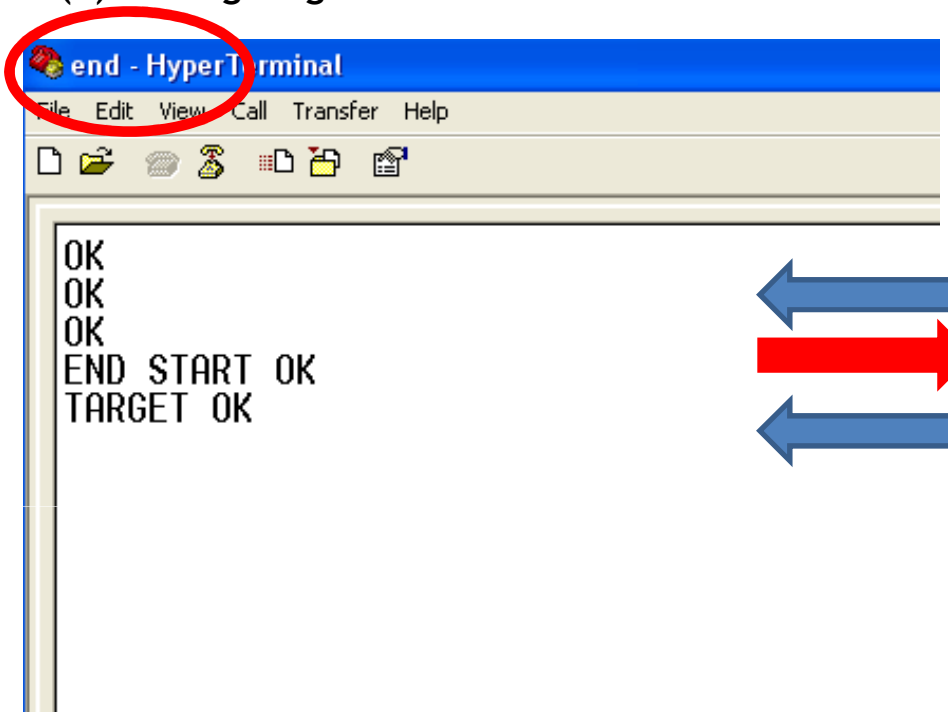
(1) Router device IEEE address search



- Input the following into Hyper Terminal connected to FZ100BS that is set to Router

- Input “+++”
- “OK” is output from FZ100BS
- After inputting “AT+GETLOCAL” and press Enter key.
- “ROUTER, 0015510000000002, 0001” is output from FZ100BS
- IEEE address of Router is “0015510000000002”
- After inputting “ATO”, press Enter key.
- “OK” is output.

(2) Setting Target Device of End Device to Router

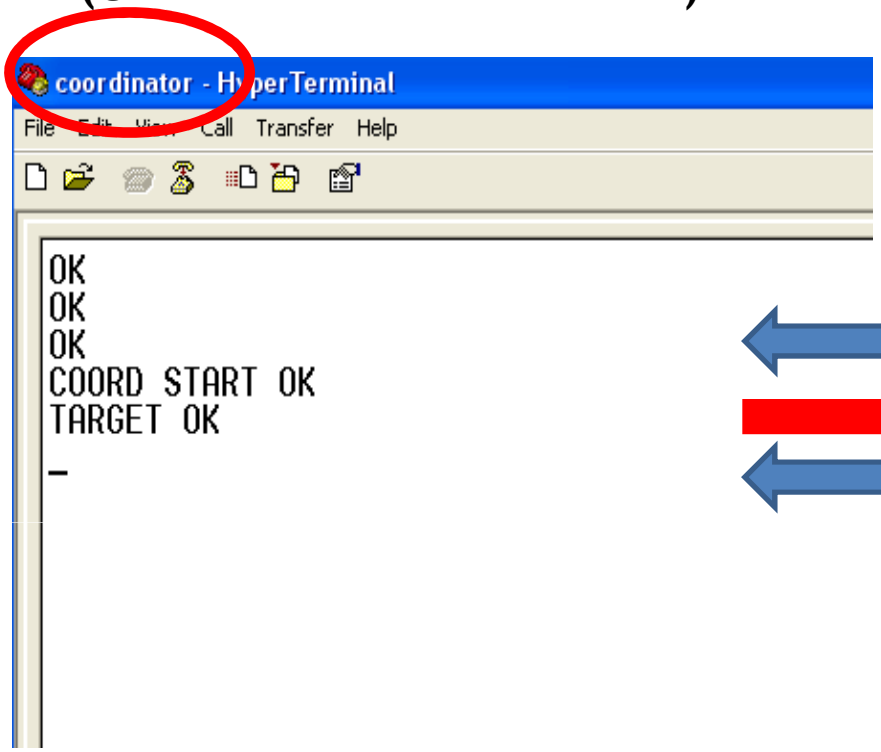


- Input the following into Hyper terminal connected to FZ100BS that is set to End Device

- Input “+++”
- “OK” is output from FZ100BS
- After inputting “AT+SETTARGET 0015510000000002” and press Enter key.
- 0015510000000002 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 FZ100BS
- After inputting “ATZ” in Hyper Terminal, press Enter key.
- “OK” is output from FZ100BS
- Device is re-started
- “END START OK” is output
- “TARGET OK” is output

3. Setting the Target device of Coordinator to ALL Device

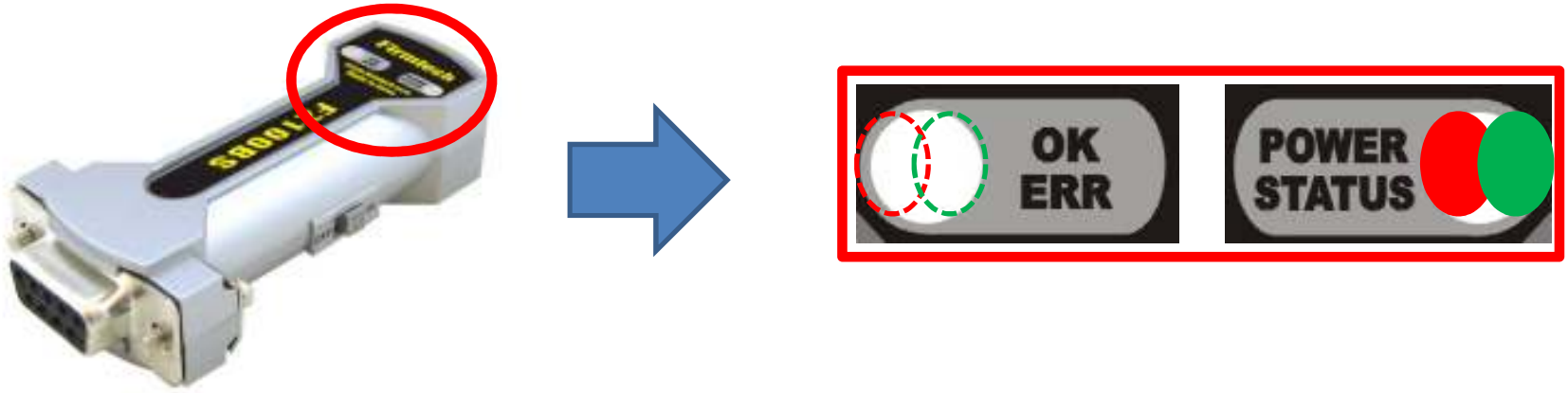
(Coordinator -> ALL Device)



- Input the following into Hyper terminal connected to FZ100BS that is set to Coordinator

- Input “+++”
- “OK” is output from FZ100BS
- 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 FZ100BS
- After inputting “ATZ” , press Enter key.
- “OK” is output from FZ100BS
- Device is re-started.
- “COORD START OK” is output.
- “TARGET OK” is output.

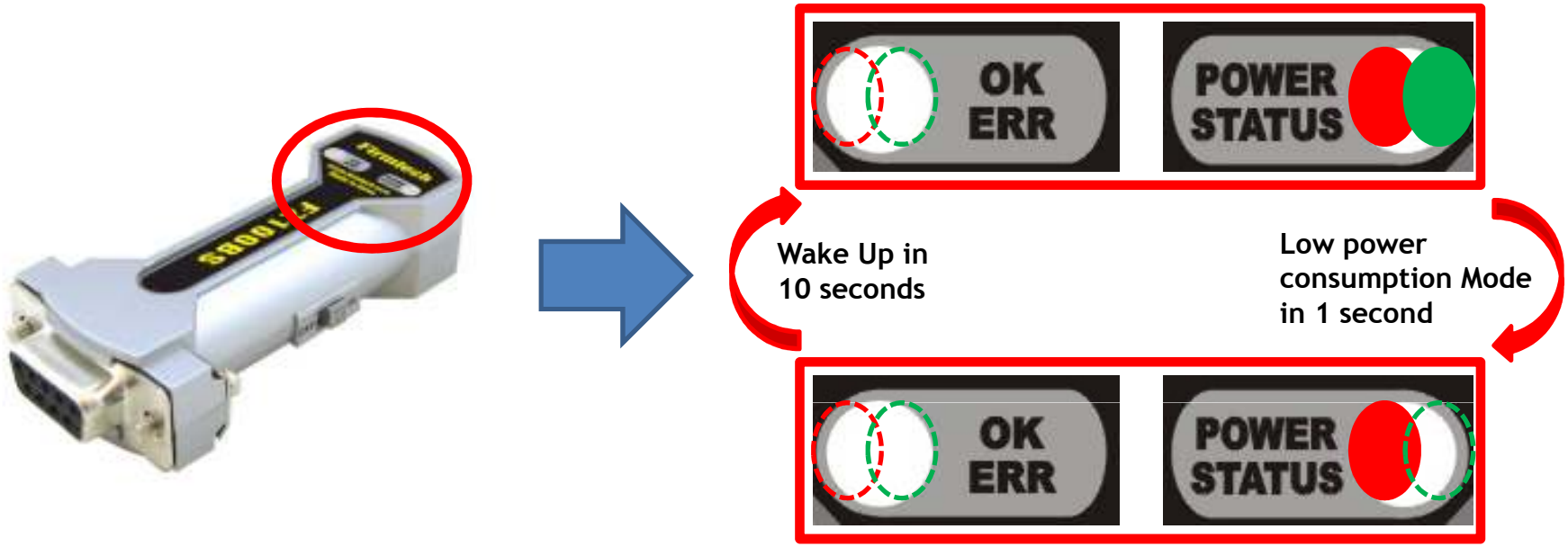
STATUS LED conditions of Operation Mode that was set to Target Device (Coordinator & Router)



- 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.

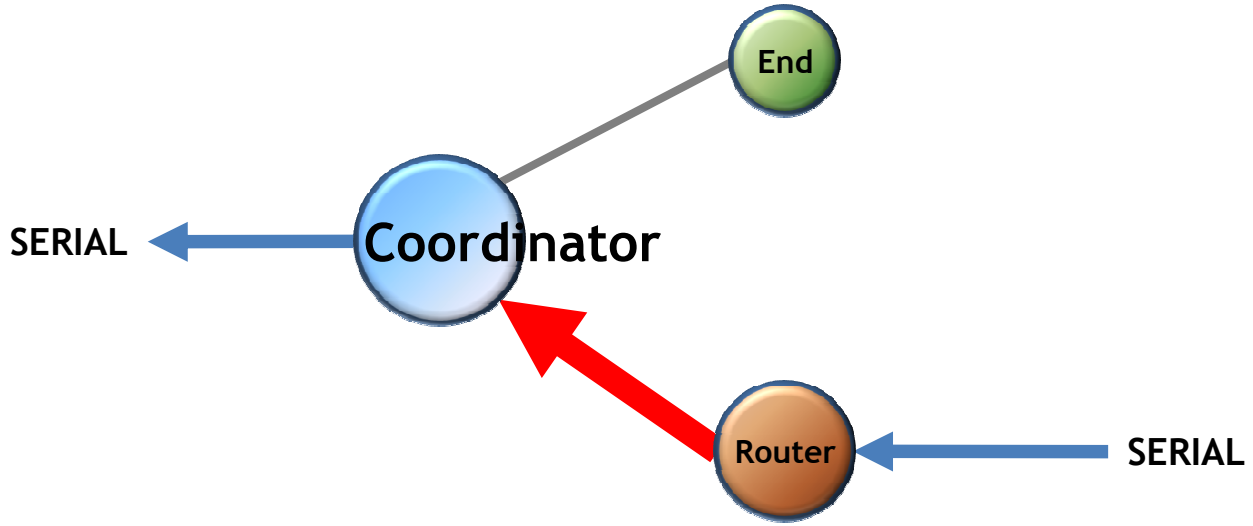
STATUS LED conditions of Operation Mode that was set to Target Device (End Device)



- 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.

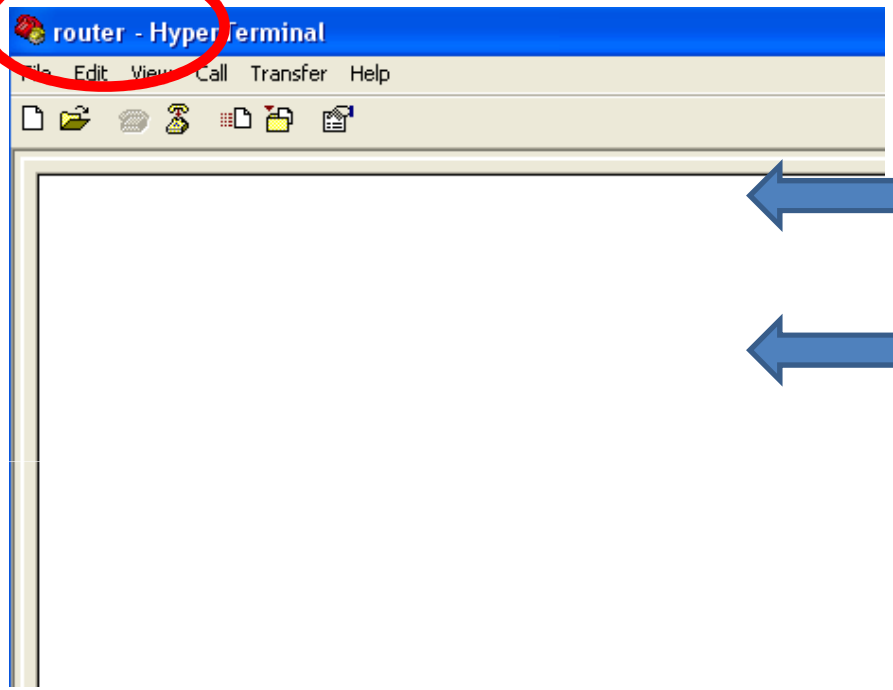
- After Target Device is set, End Device automatically goes into low power consumption mode and makes wake-up every certain time that is currently set to 10 seconds.
- Once Target Device set-up is done for the first time, it is automatically proceeded from the next even if the device is reset.

[5] Serial Data transmission from Router to Coordinator

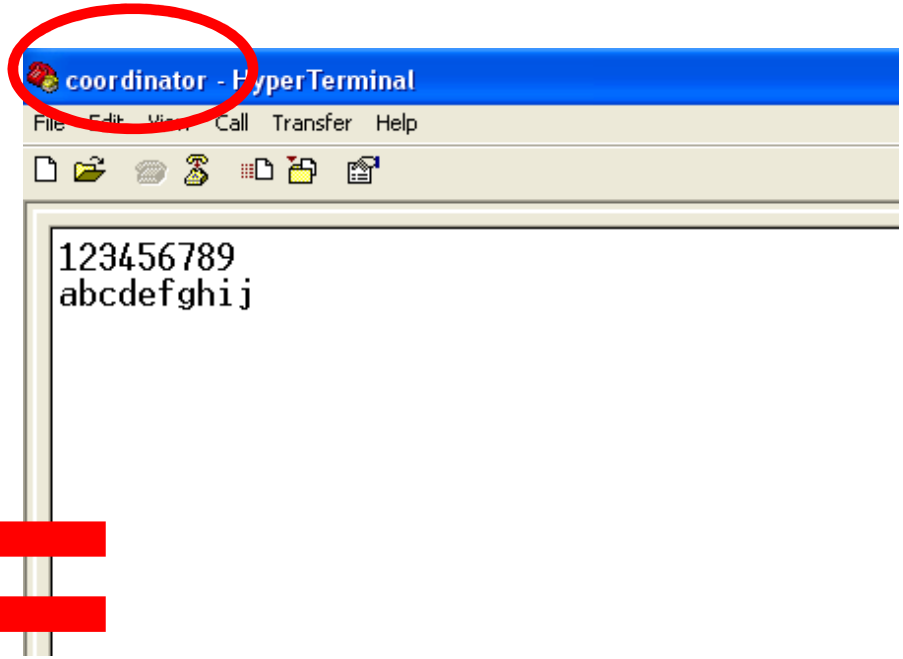


1. Serial Data Transmission “Router -> Coordinator”

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

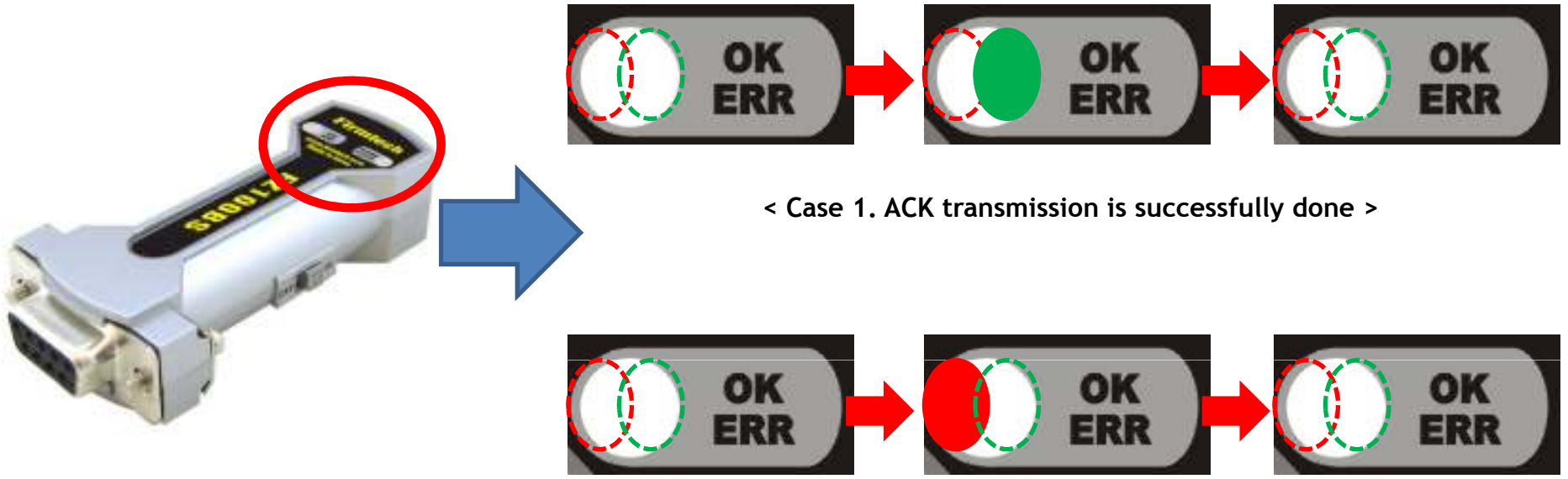


- Input the following into Hyper Terminal connected to FZ100BS that is set to Router
- After inputting “123456789” into Hyper Terminal, press Enter key.
- After inputting “abcdefghij” into Hyper Terminal, press Enter key.



- Displays the followings on Hyper Terminal connected to FZ100BS that is set to Coordinator
- “123456789” is output
- “abcdefghij” is output.

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

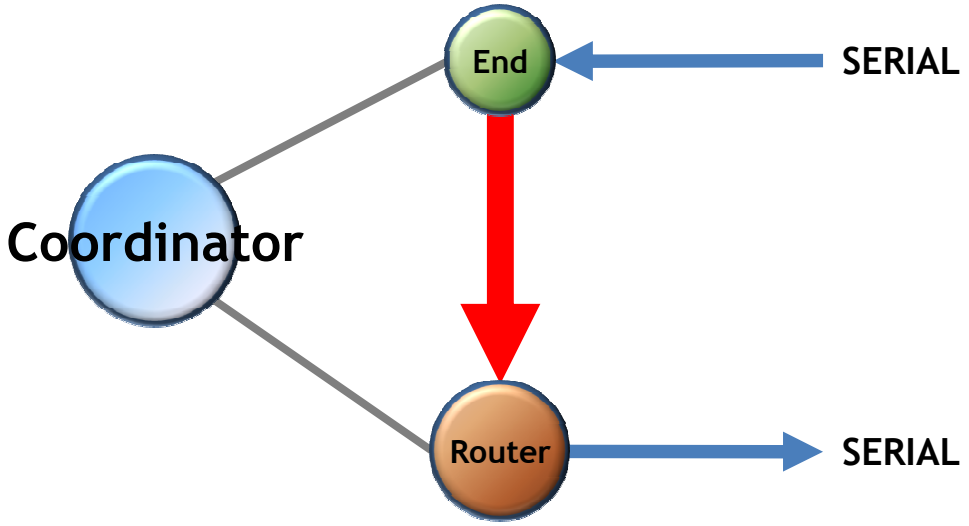


< Case 1. ACK transmission is successfully done >

< 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.

[6] Serial Data Transmission from End Device to Router

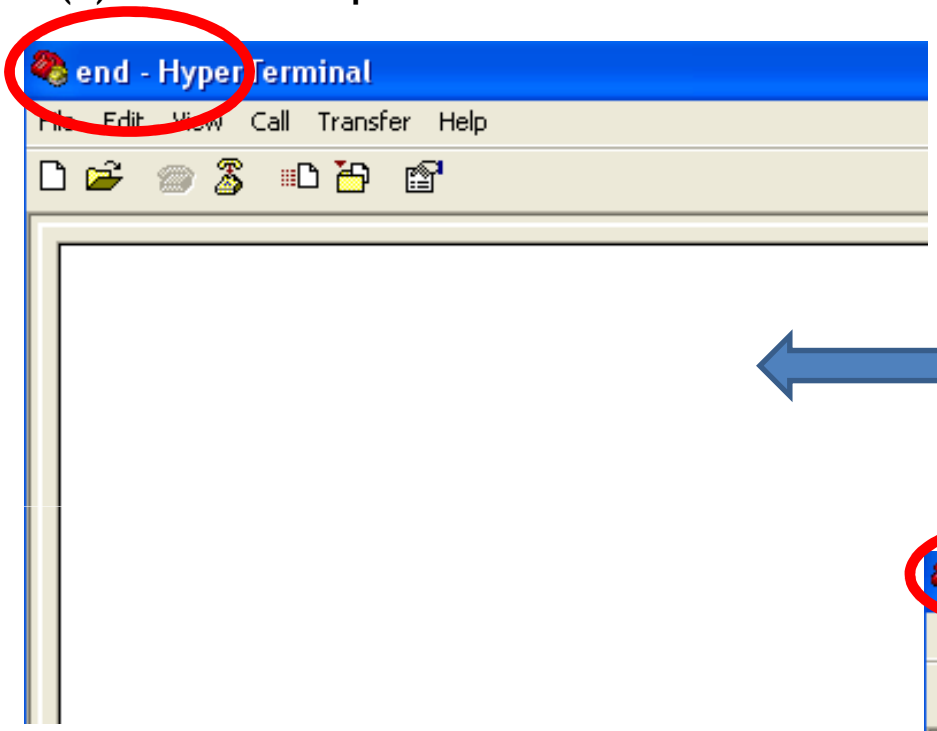


< The following is a summary of End Device status >

- FZ100BS 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.

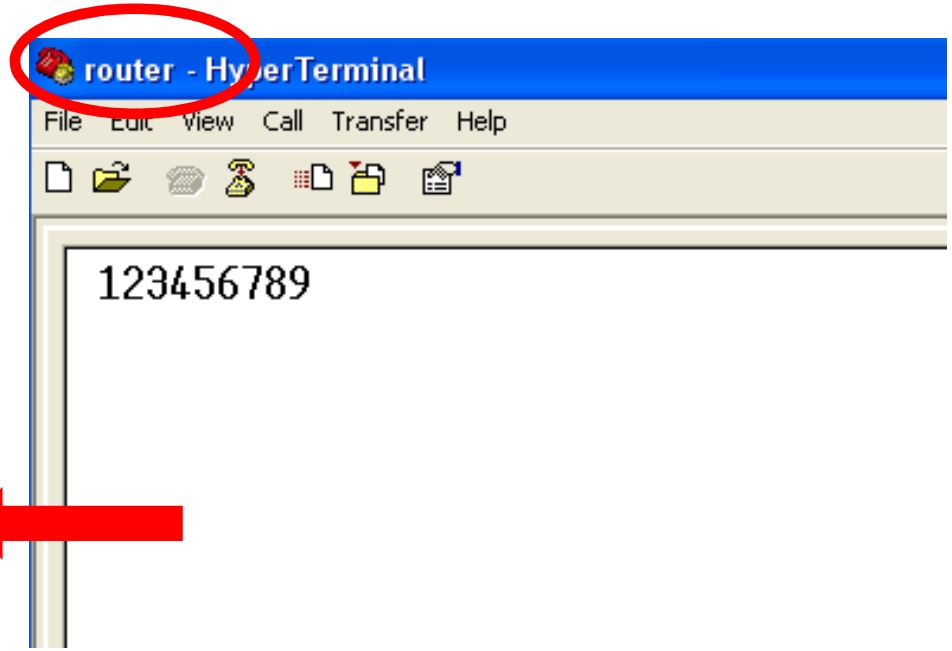
1. Serial Data Transmission “End Device -> Router”

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



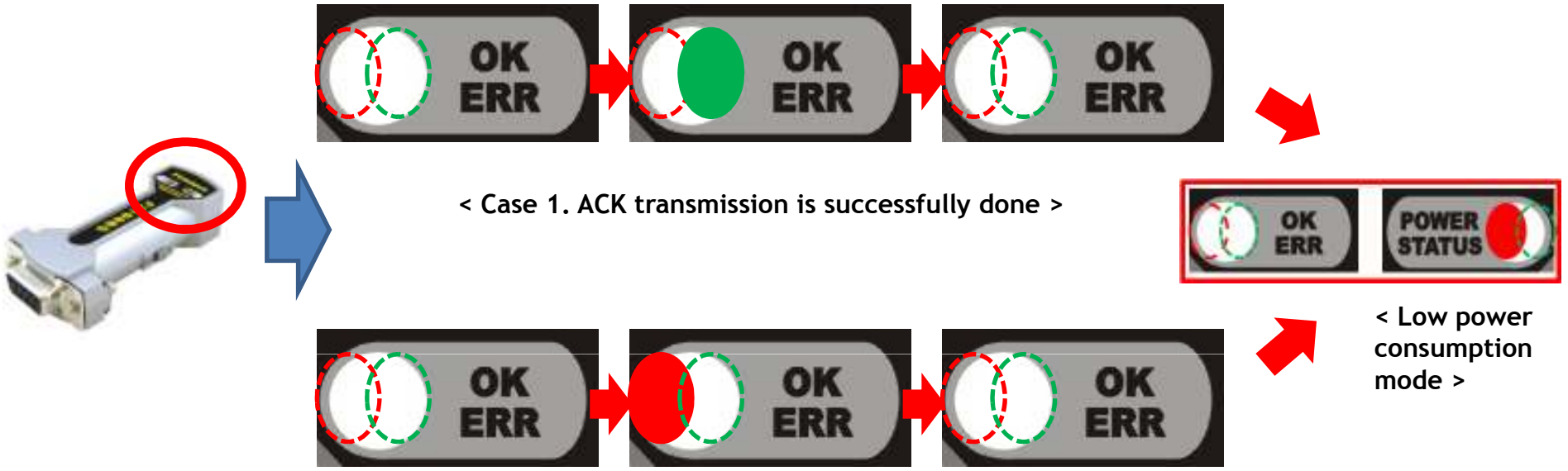
After putting End Device in wake-up mode, input the following into Hyper Terminal connected to FZ100BS set to End Device

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



- Displays the followings on Hyper Terminal connected to FZ100BS that is set to Router
- “123456789” is output

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

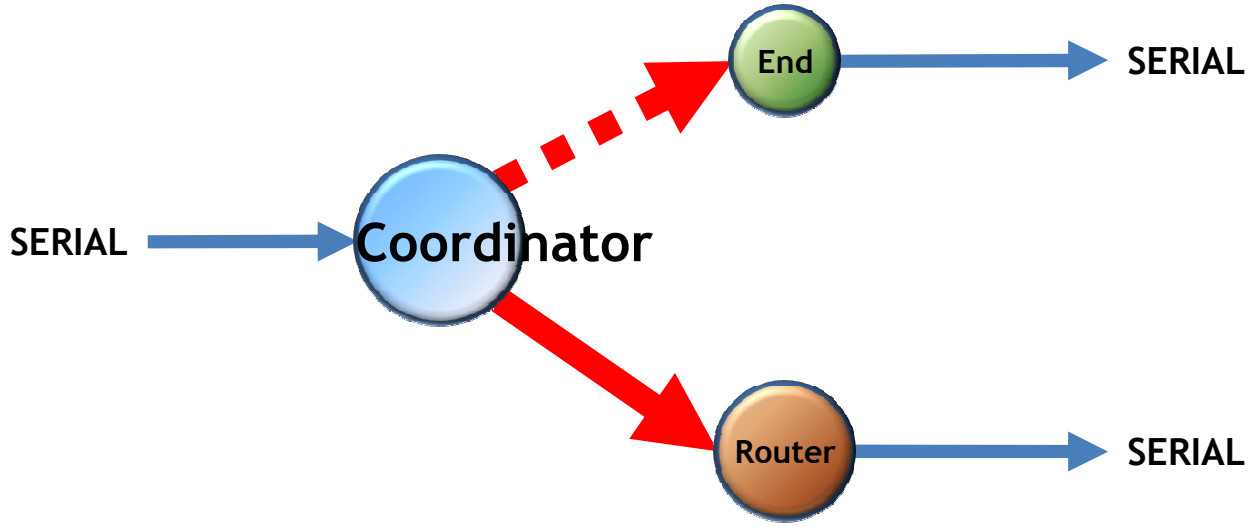


- The Green OK LED blinks once if the Data transmission is successfully done.
- The Red ERR LED blinks once if the Data transmission is failed.

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

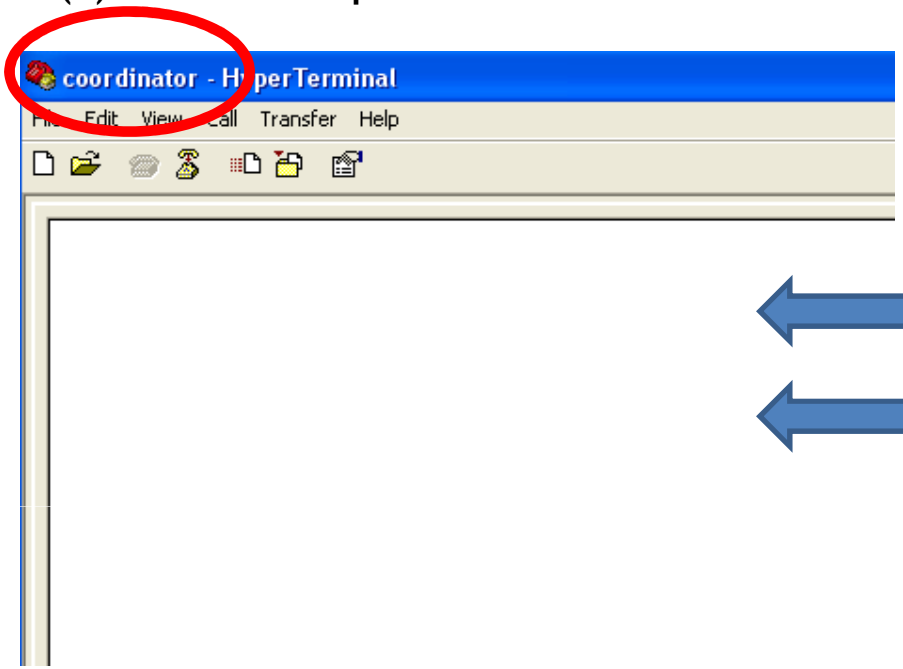
[7] Serial Data Transmission

From Coordinator to All devices



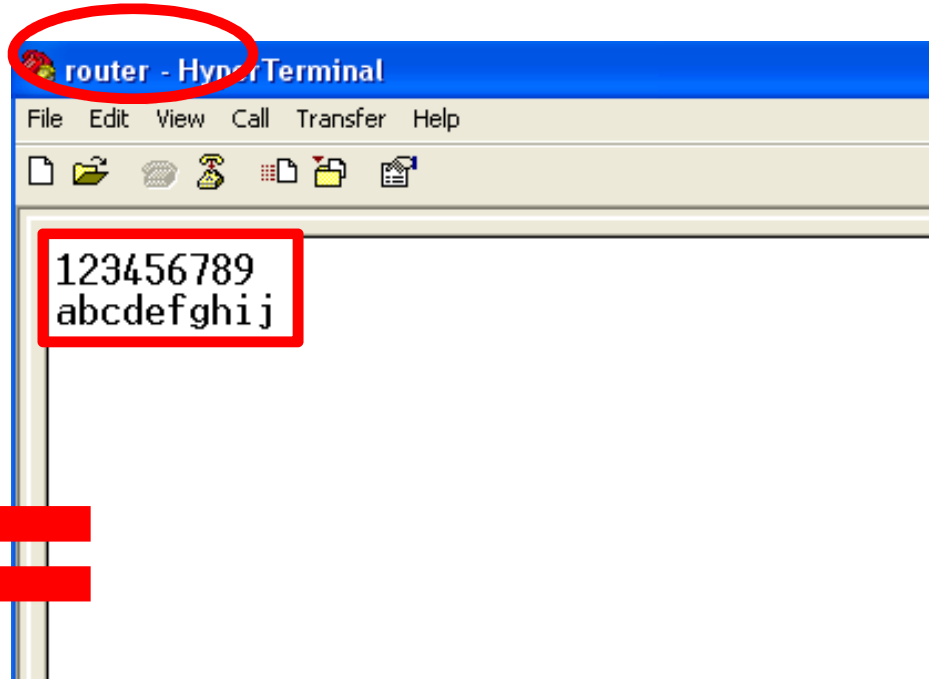
1. Serial Data Transmission “Coordinator -> ALL Device”

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



- Input the following into Hyper Terminal connected to FZ100BS 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 FZ100BS that is set to Router

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

- **FZ100BS set to coordinator transmits Serial Data to all Devices.**
- **However, FZ100BS 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 >

- FZ100BS set to Coordinator does not receive ACK when it transmits Data to all devices.
- FZ100BS 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 FZ100BS manual for further details.