

1. Introduction

ZigBee is a specification based on the IEEE 802.15.4 standard for wireless personal area networks (WPANs). ZigBee operates in the ISM radio bands and its focus is to define a general-purpose, inexpensive, self-organizing, mesh network that can be used for industrial control, embedded sensing, medical data collection, smoke and intruder warning, building automation, home automation, and domotics, etc.

At present, the ICP DAS ZigBee converter ZB-2550 and ZB-2551, supports the [RS-232](#) and [RS-485](#) interfaces. The main design goal is limited data communication using [wireless transmission](#), so may provide a better solution for environments where wiring is difficult.

1.1 More Information

The ZB-2550 and the ZB-2551 are small-sized wireless ZigBee converters based on the IEEE 802.15.4 standard. They allow [RS-485/RS-232](#) interfaces to be converted to a ZigBee wireless network. Only one [ZB-2550 \(Host\)](#) is allowed in a ZigBee network and is used to initialize and manage the data transmission routes. The [ZB-2551 \(Slave\)](#) ZigBee router is responsible for transmitting/receiving data from its child/parent router or the host. ICP DAS ZigBee products are designed for low data rates. The main benefit of ICP DAS ZigBee products is that they can be used to define a [general-purpose, self-organizing mesh network](#), which can be highly advantageous for industrial control.

The typical transmission range of the ICP DAS Zigbee ZB-2550/ZB-2551 converter is 100m, and the [ZB-2550P/ZB-2551P](#) is 700m.



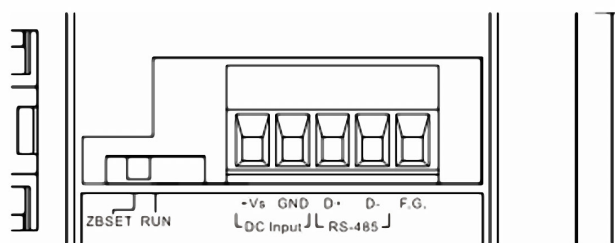
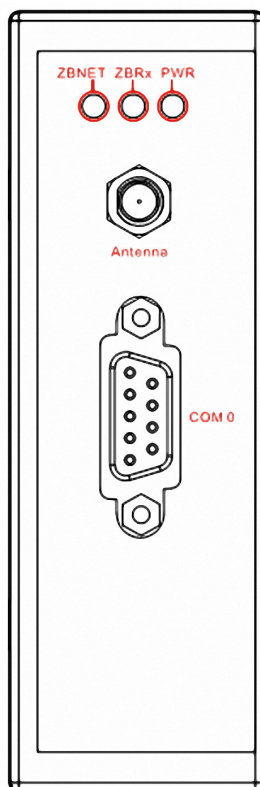
The transmission frequency range of the ZigBee converter is between 2.405 GHz and 2.48 GHz, separated into 5 MHz sectors, and provides 16 channels, and 65536 Pan IDs (65535 network groups can be set).

The ZigBee converter includes a repeater module that can be used to increase communication range or prevent data loss if the connection is interrupted or becomes unstable. Please refer to ZigBee converter other document for more information as following links:

http://ftp.icpdas.com/pub/cd/usbcd/napdos/zigbee/zigbee_converter/

1.2 Pin Assignment

ZB-2050(P)/ZB-2051(P)



1.3 Specifications

| Models | ZB-2550 | ZB-2550P | ZB-2551 | ZB-2551P |
|--------------------------|--|----------|---------|----------|
| Wireless | | | | |
| RF channels | 16 | | | |
| Receive sensitivity | -102 dBm | | | |
| Transmit power | 12 dBm | | | |
| Network Topology support | Star, Mesh and Cluster tree | | | |
| Certification | TUV(ZCP) | | | |
| Antenna | 2.4GHz - 3dBi Omni-Directional antenna | | | |
| Transmission Range | 100m | 700m | 100m | 700m |

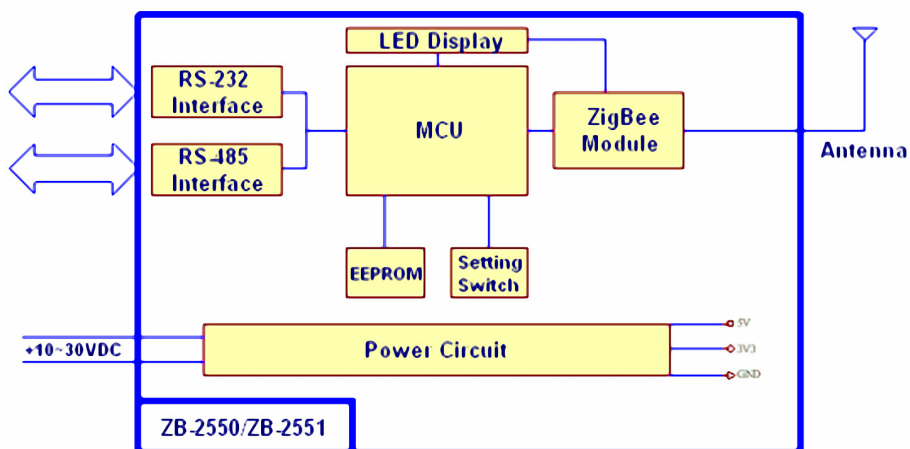
| Models | ZB-2550 | ZB-2550P | ZB-2551 | ZB-2551P |
|-------------------------|---|----------|---|----------|
| General | | | | |
| CPU | 8-bit microcontroller | | | |
| EEPROM | 128 KB (8 blocks, each block has 256 bytes);Data retention > 40 years; 1,000,000 erase/write cycles | | | |
| Module Type | Host | Host | Slave | Slave |
| Communication Interface | | | | |
| COM 0 | RS-232 (TXD, RXD and GND); D-SUB9 Female, Non-isolated | | RS-232 (TXD, RXD and GND); D-SUB9 Male, Non-isolated | |
| | RS-485 (D+, D-; internal ASIC self-tuner); Non-isolated | | | |
| COM 0 Settings | | | | |
| Data Bit | 8 | | | |
| Parity | Even, Odd, None | | | |
| Stop Bit | 1, 2 | | | |

| LED Indicators | |
|------------------|--------|
| ZigBee Net State | Green |
| ZigBee RxD | Yellow |
| Power | Red |

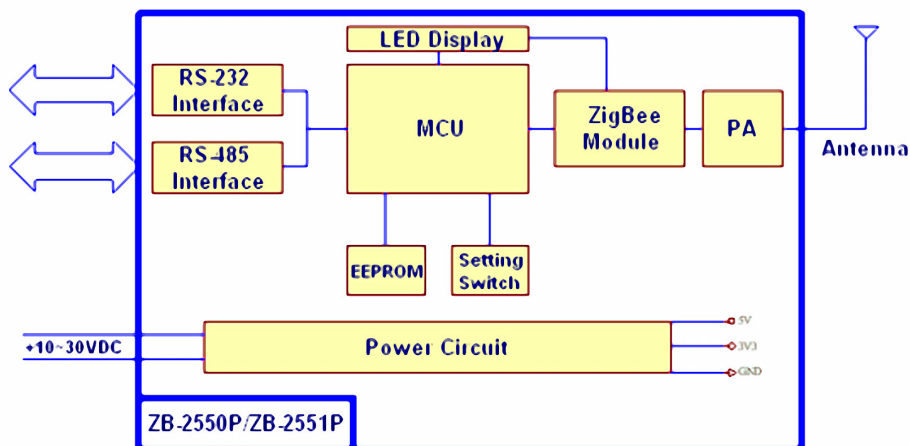
| Models | ZB-2550 | ZB-2550P | ZB-2551 | ZB-2551P |
|-------------------------|--|----------|---------|----------|
| Power | | | | |
| Protection | Power reverse polarity protection | | | |
| EMS Protection | ESD, Surge, EFT | | | |
| Required Supply Voltage | +10 VDC ~ +30 VDC | | | |
| Power Consumption | 0.5W | 2W (max) | 0.5W | 2W (max) |
| Connection | 5-Pin 5.08 mm Removable Terminal Block | | | |
| Mechanical | | | | |
| Casing | Plastic | | | |
| Flammability | UL 94V-0 materials | | | |
| Dimensions | 33 mm x 78 mm x 107 mm (W x L x H) | | | |
| Installation | DIN-Rail | | | |
| Environment | | | | |
| Operating Temperature | -25 °C ~ +75 °C | | | |
| Storage Temperature | -40 °C ~ +80 °C | | | |
| Relative Humidity | 5 ~ 95% RH, non-condensing | | | |

1.4 Block Diagram

ZB-2050/ZB-2551



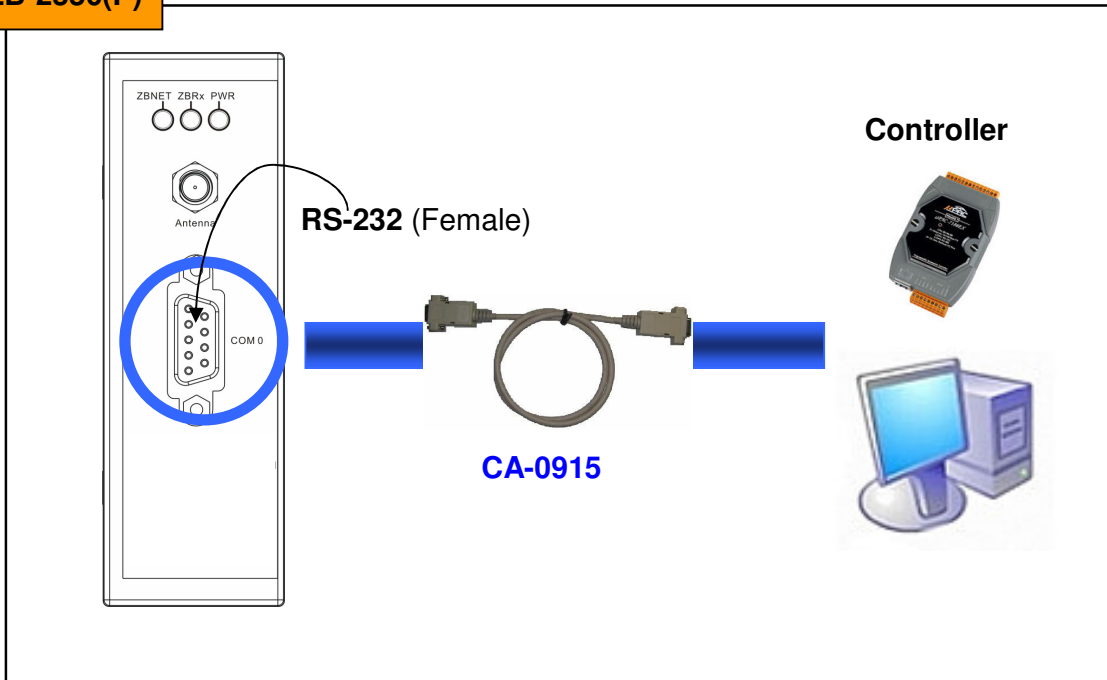
ZB-2050P/ZB-2551P



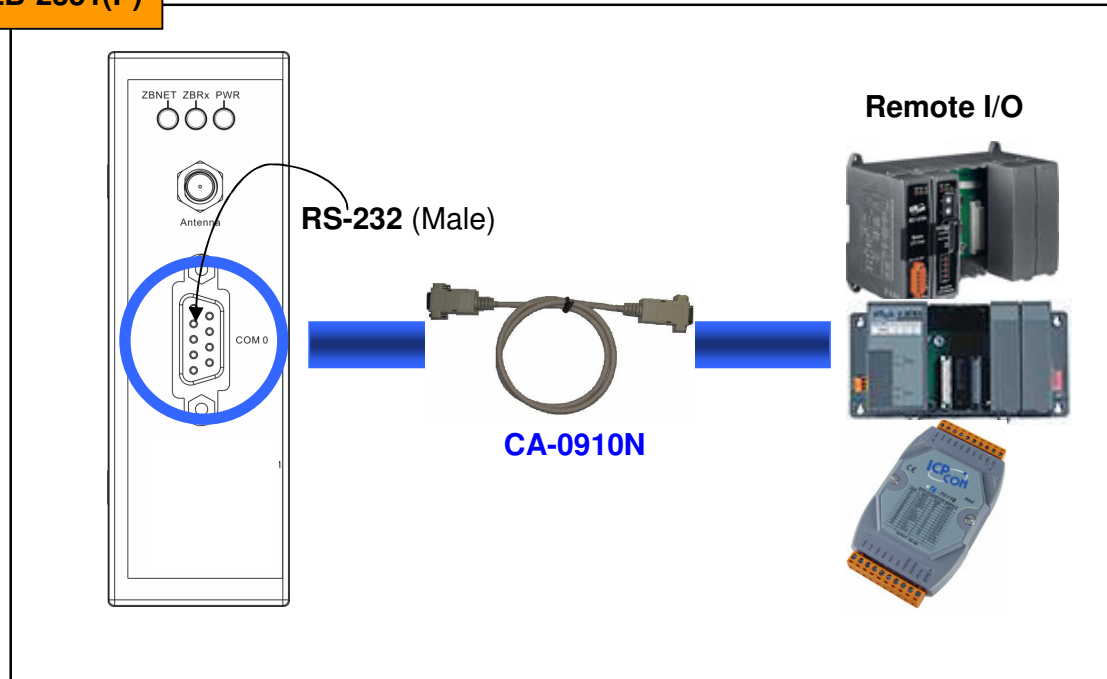
1.5 Wire Connection

Serial Port - RS-232

ZB-2550(P)

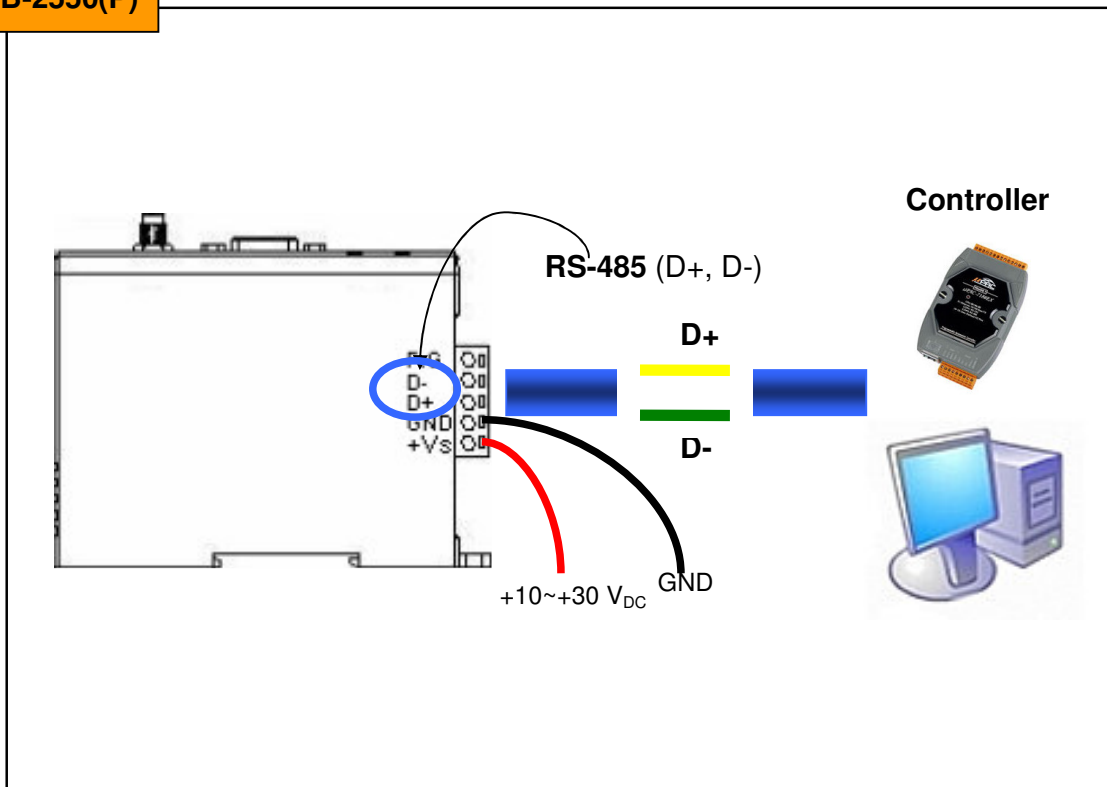


ZB-2551(P)

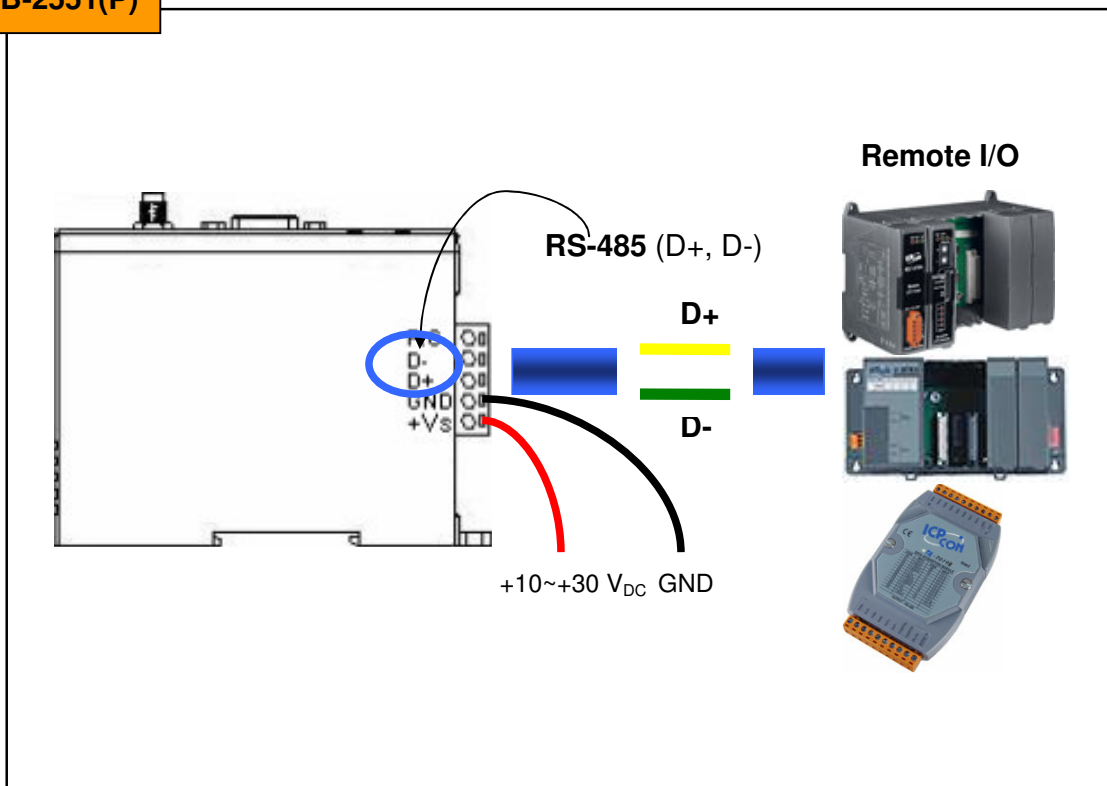


Serial Port - RS-485

ZB-2550(P)

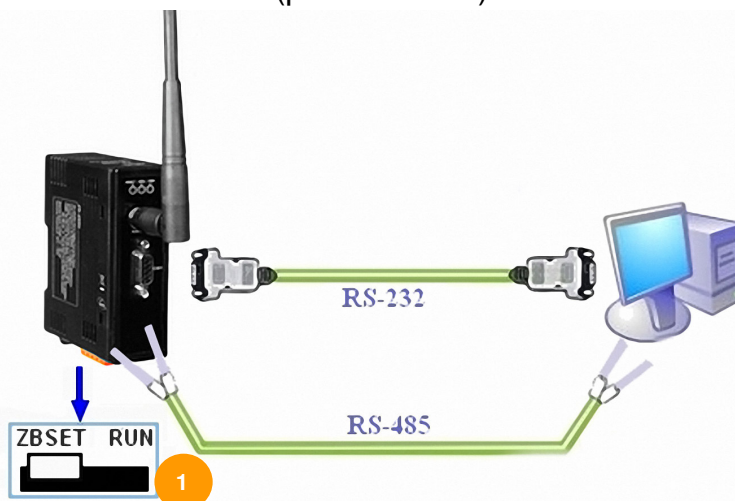


ZB-2551(P)

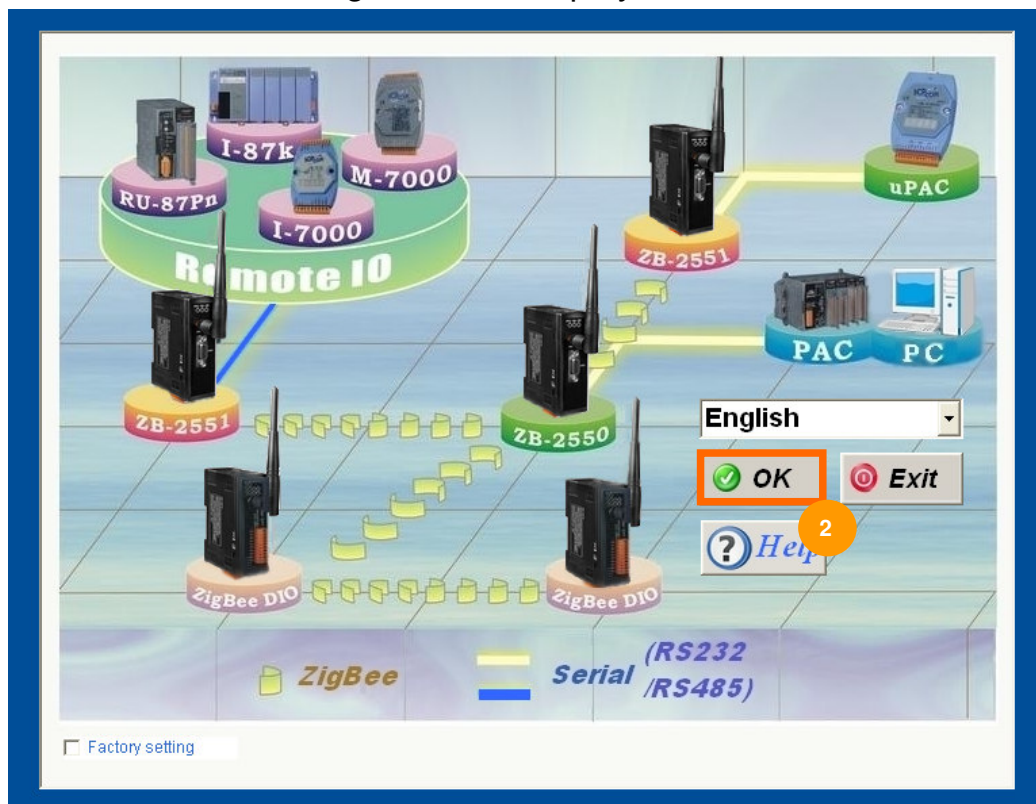


1.6 Quick Start

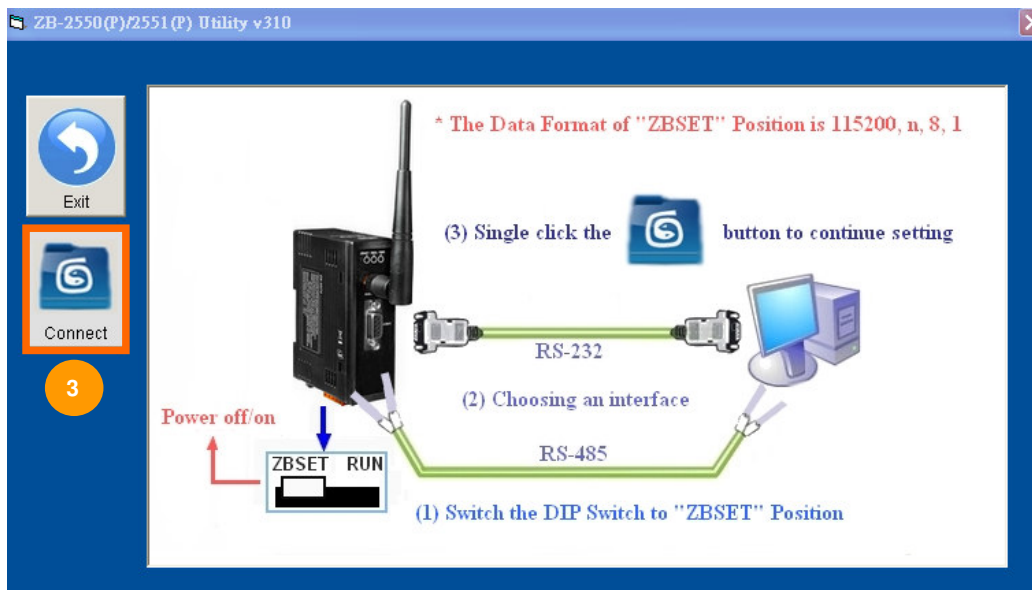
1. Before configuring the ZigBee converter, adjust the switch to the **ZBSET** position then re-boot (power off/on) the module. After configuration is complete, adjust the switch to the **RUN** position then re-boot (power off/on) the module.



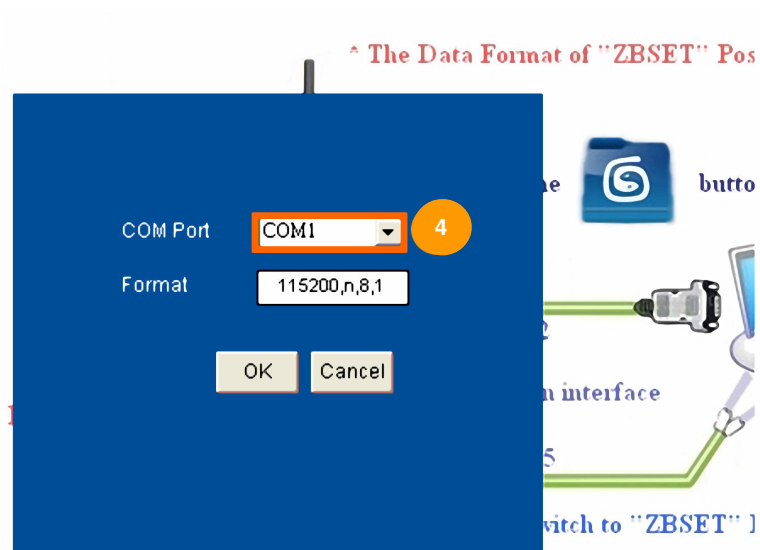
2. When the following screen is displayed, click on the **OK** button



3. Click on the **Connect** button



4. Please select the **COM Port** on your PC



- Click on the **Config** button to configure setting for the ZigBee Converter - ZB-2550(P)/ZB-2551(P). e.g : ZB-2551(P)

| | |
|---|--------------|
| Module Type | ZB-2551(P) |
| Version | 01.00 |
| Pan ID(0x0000~0xFFFF) | FF 00 |
| Node ID(0x0000~0xFFFF) | 00 10 |
| RF Channel | 0 |
| Network Survival Detecting Time(0x00~0xFF, in 1s) | 14 |
| Operating Mode | Transparent |
| Data Format | 115200,n,8,1 |

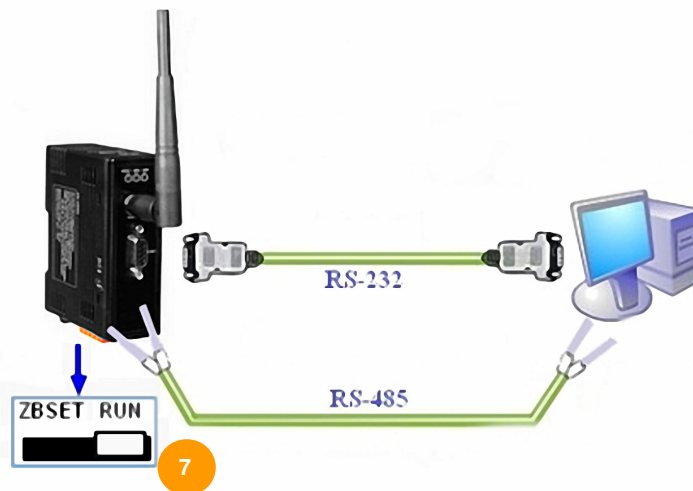
COM 1 | Connect OK

- Click on the **Config** button for set the new ZigBee setting.

| | |
|---|-------------|
| Pan ID(0x0000~0xFFFF) | FF 00 |
| Node ID(0x0000~0xFFFF) | 00 10 |
| RF Channel | 0 |
| Baud Rate | 115200 |
| Data Format | n,8,1 |
| Operating Mode | Transparent |
| Network Survival Detecting Time(0x00~0xFF, in 1s) | 14 |

COM 1 | Default Completed!

- After ZigBee module configuration has been successfully established. Now, **adjust the switch to the RUN position then re-boot (power off/on) the module**. Leverage the power of your data. Make it work for you.



- Click **Default button** to load factory default parameters if you want to load factory default setting of ZigBee Module

The screenshot shows the configuration software interface. On the left, there are three buttons: 'Exit', 'Config', and 'Default'. The 'Default' button is highlighted with a circled '8'. The main configuration area contains the following parameters:

| | |
|---|--------------|
| Module Type | ZB-2551(P) |
| Version | 01.00 |
| Pan ID(0x0000~0xFFFF) | FF 00 |
| Node ID(0x0000~0xFFFF) | 00 10 |
| RF Channel | 0 |
| Network Survival Detecting Time(0x00~0xFF, in 1s) | 14 |
| Operating Mode | Transparent |
| Data Format | 115200,n,8,1 |

On the right, a network diagram titled 'Transparent' shows three ZB-2551 modules connected to a ZB-2550 module. The connections are labeled with '\$01M' and 'RS-485'. The modules are identified by their addresses and node IDs: Address: 01 (Node ID = 0x0005), Address: 02 (Node ID = 0x0002), and Address: 03 (Node ID = 0x001F). The ZB-2550 module is labeled 'ZB-DIO ZB-AIO'.

At the bottom of the interface, it shows 'COM 1' and 'Connect OK.' with a progress bar.

Zigbee Addressing and Identifiers

- **Node ID (0x0000~0xFFFF)**
 - A 16-bit address that describes a Zigbee node
 - Randomly assigned during network join
 - ZB-2570(P)/ZB-2550(P) always uses 0x0000
 - ZB-2571(P)/ZB-2551(P) ranges 0x0001~0xFFFF
 - ZB-DIO/ZB-AIO ranges 0x0001~0x001F
 - Resolve by stack in case of collision
 - Included in all message to identify node

- **Pan ID (0x0000~0xFFFF)**
 - A 16-bit ID to identify the network
 - Included in every packet
 - A “logical” way to separate Zigbee networks running on same RF channel
 - Defined during network formation by ZB-2570(P)/ZB-2550(P)
 - ZB-DIO/ZB-AIO always uses 0xFF00 or 0xFF01

- **RF Channel**
 - 1 of 16 RF channels
 - Defined during network formation by ZB-2570(P)/ZB-2550(P)

Note : A Work Network - Running on the same **Pan ID** and **RF Channel**

- **Network Survival Detecting Time**
 - ZB-2551(P) will connect with Parent (ZB-2550(P)) periodically to confirm the survival of network. If it detects unsuccessfully, and it process initialize network again to find a new parent.

1.7 Default Settings

Default settings for the ZB-2550 are as follows :

| | |
|---------------------------|--------------|
| ZB Node ID : | 0x0000 |
| ZB Pan ID : | 0xFF00 |
| ZB Channel (RF Channel) : | 0x00 |
| ZBSET Data Format : | 115200,n,8,1 |
| Operating Mode : | Transparent |

Default settings for the ZB-2551 are as follows :

| | |
|-----------------------------------|------------------|
| ZB Node ID : | 0x0020 |
| ZB Pan ID : | 0xFF00 |
| ZB Channel (RF Channel) : | 0x00 |
| ZBSET Data Format : | 115200,n,8,1 |
| Operating Mode : | Transparent |
| Network Survival Detecting Time : | 20 second (0x14) |



- **Technical Support**

If you have problems about using the ZB-2000 series modules, please contact ICP DAS Product Support.

Email: Service@icpdas.com