# ZT-2000 Topology Tool

## Quick Start

## 1 Introduction to the ZT-2000 Topology Tool

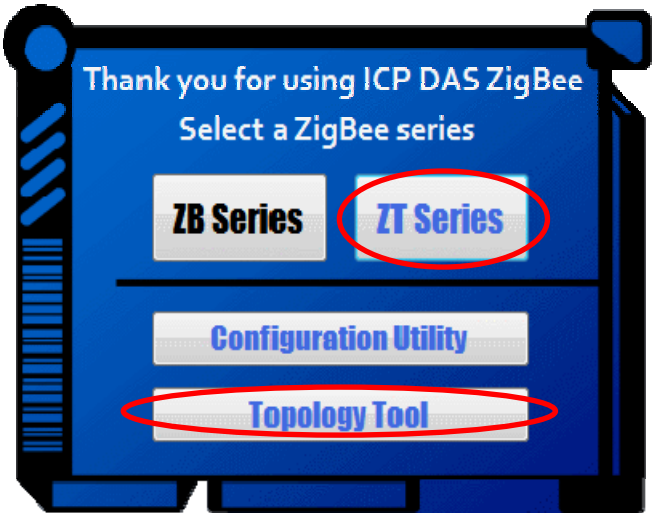
The ZT-2000 Topology Tool is a Windows application that can be used to determine the status of a ZigBee network, including information such as the topology of the network, the RSSI (Received Signal Strength Indicator), and the name and the address of the device, etc. This information can then be used to plan and configure the on-site application and perform any debugging tasks if necessary.

## 2 When should the ZT-2000 Topology Tool be used?

If communication with the ZigBee device is lost while attempting to establish a connection to the ZigBee network, or if the signal is weak, transmission can be improved by adding additional ZigBee repeaters, or by changing the location of the module to obtain a better result. By monitoring the ZigBee network using the ZT-2000 Topology Tool, it is easy to determine the status of each ZigBee node, enabling the devices to be placed in the most optimal locations to ensure reliable communication.

## 3 Downloading the ZT-2000 Topology Tool

The ZT-2000 Topology Tool is a built-in component of the ZT-2000 Configuration Utility, and can be downloaded from:
http://ftp.icpdas.com.tw/pub/cd/usbcd/napdos/zigbee/zt_series/utility





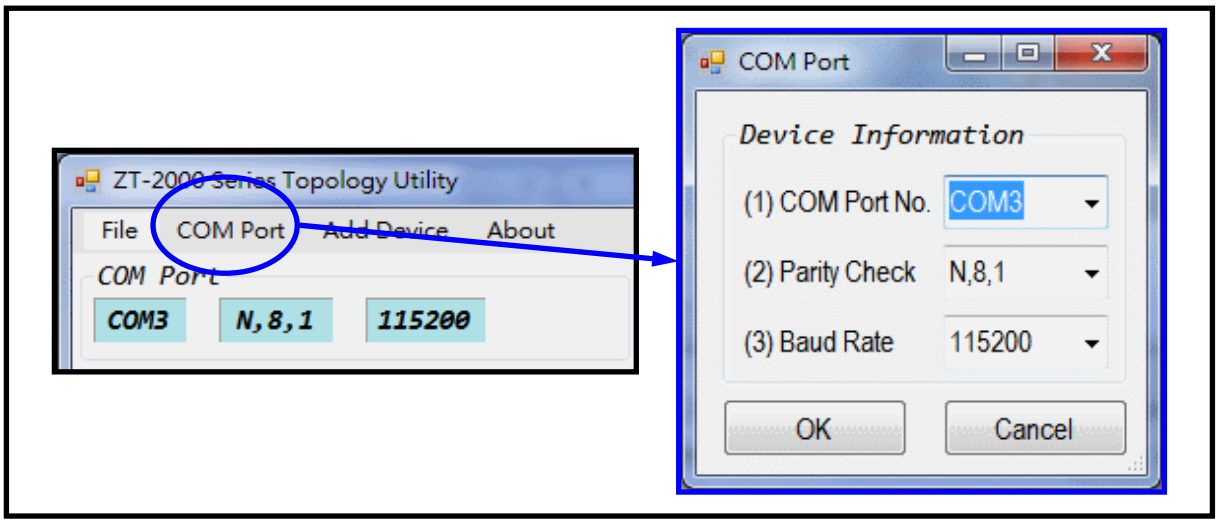
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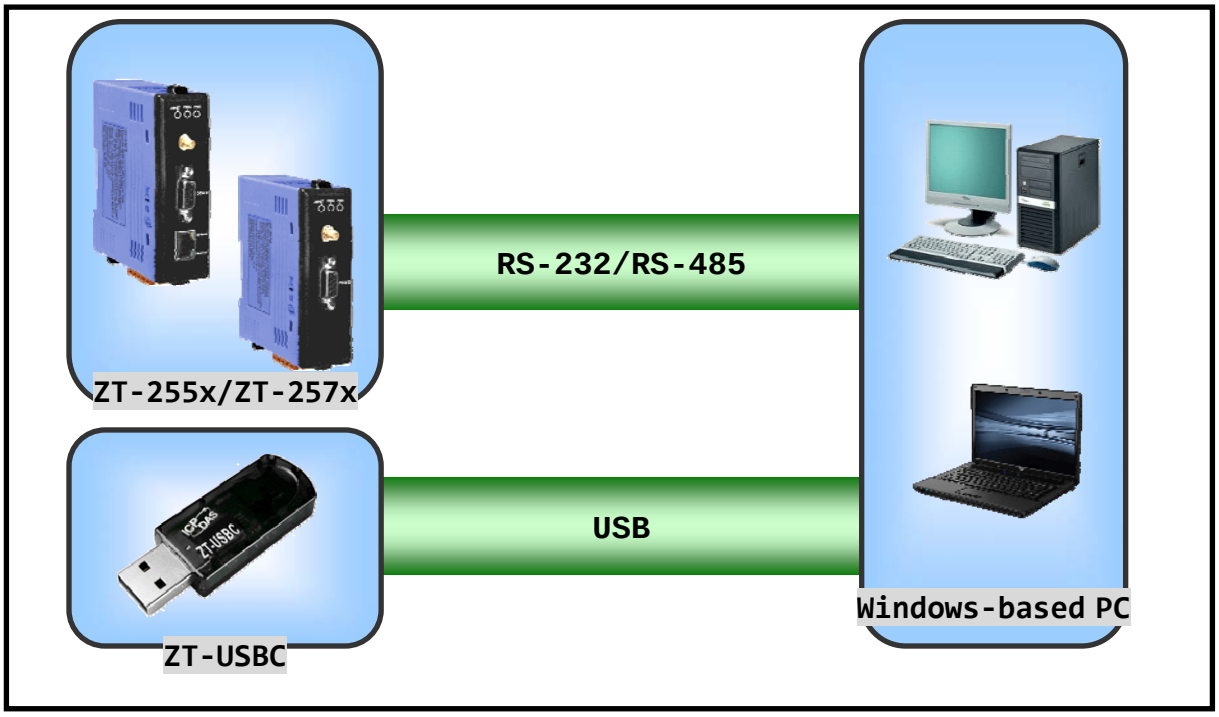
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# 4 Starting the ZT-2000 Topology Tool

## 4.1 Connecting to the ZT-2000 Converter

Connect the ZT-2000 Series converter to the Host system using the either USB, an RS-232 or an RS-485 cable. Execute the ZT-2000 Topology Tool and click the **COM Port** menu item. Select the relevant **COM Port** number from the drop-down menu, and then select the data format and Baud Rate for the serial port. Click the **OK** button to initialize communication with the device.





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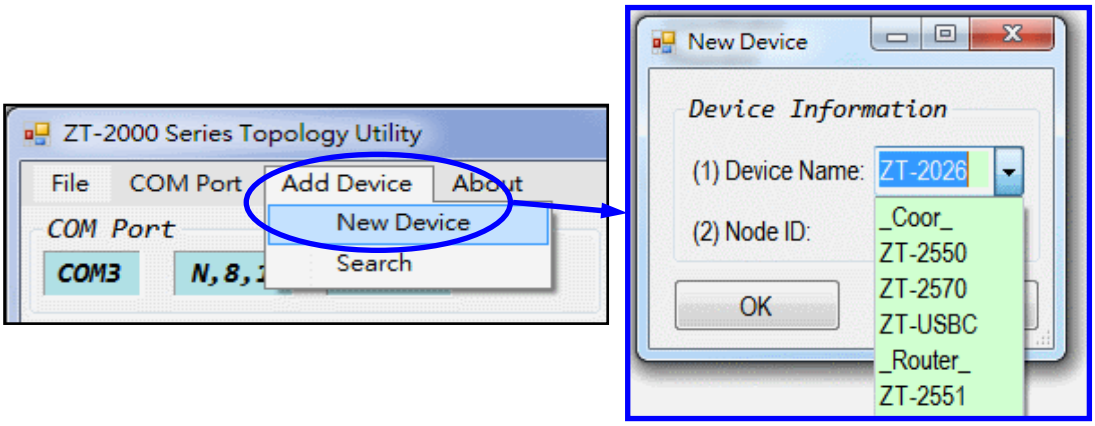
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## 4.2 Locating ZT-2000 Devices

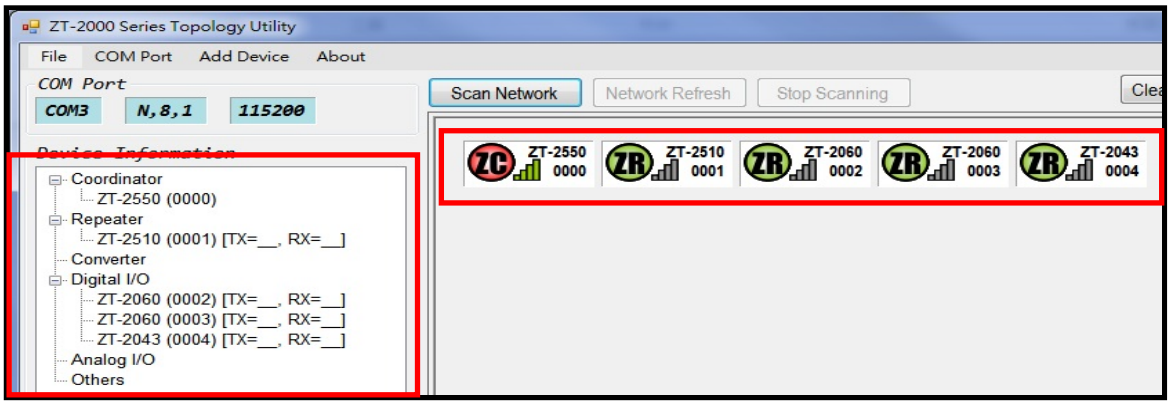
Three methods can be used to detect ZT-2000 Devices: “Manually Add”, “Auto Search” and “Save/Load Project Setup”, each of which are described below.

### a. Manually Adding a Device

To manually create a new ZigBee node for monitoring, click the **Add Device** menu item and then click **New Device** to open the **Device Information** dialog box. Select the **Device Name** from the drop-down menu and then select the **Node ID**. Click the **OK** button to complete the node creation process, and then the device will be displayed in the main Topology Utility window.




Once the ZigBee nodes have been added to the Topology Tool, the details will be displayed in both the Device Information pane (left) and the Network pane (right).

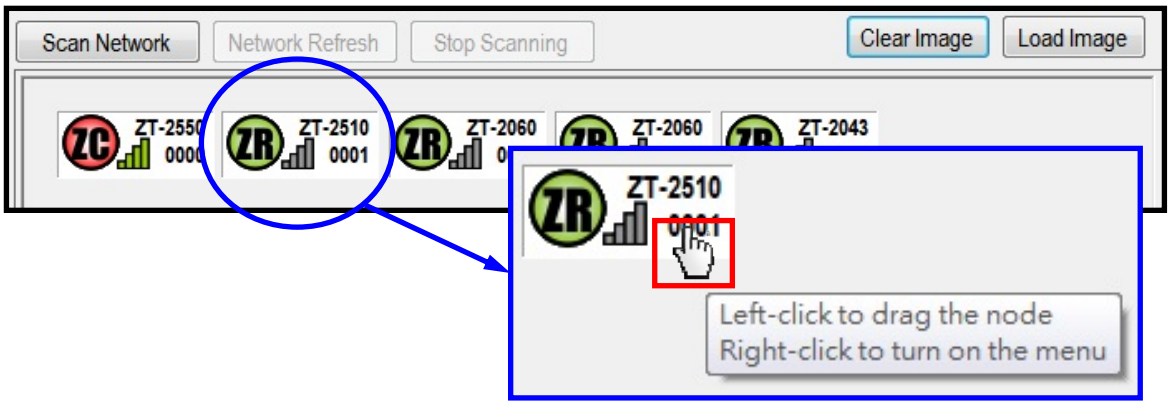




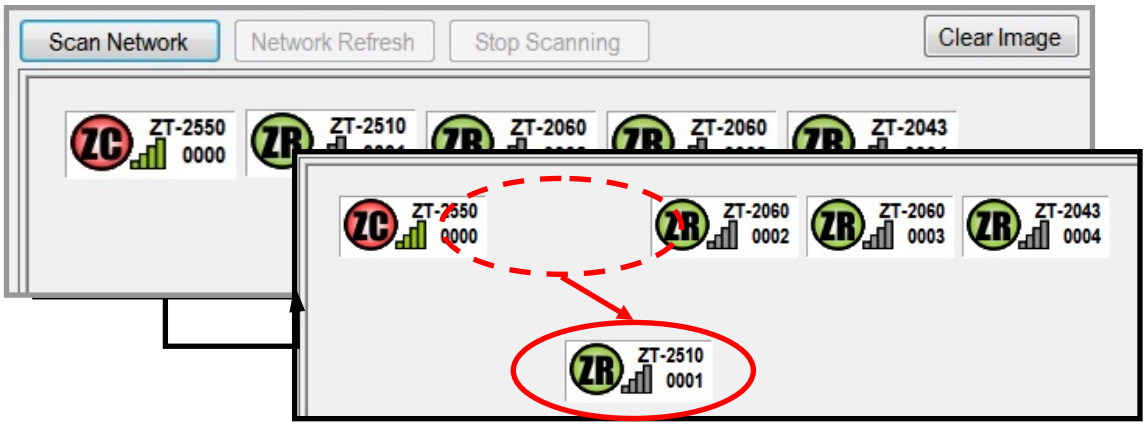
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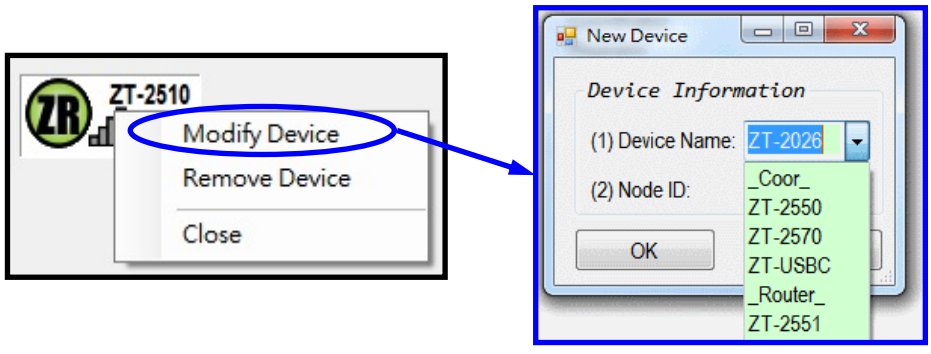
When the mouse is hovered over the icon for a node, a pop-up ToolTip will be displayed containing a message, as illustrated below.




In order to view the topology of ZigBee network with the map clearly, the location of the nodes are movable. To move the position of a node, click and hold the icon for a node and then drag it to the specific location, as illustrated below.




To modify the Device Information for a node, or to remove a node from the sequence, right-click the node icon and select the required option from the shortcut menu.



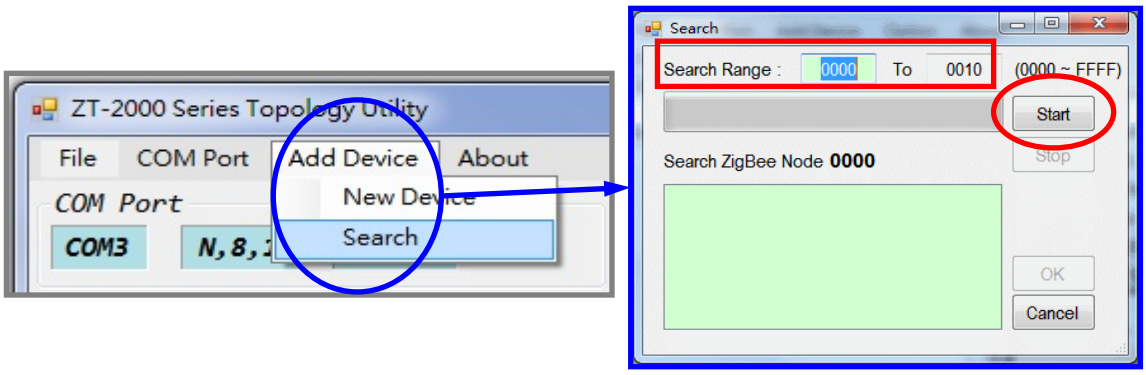


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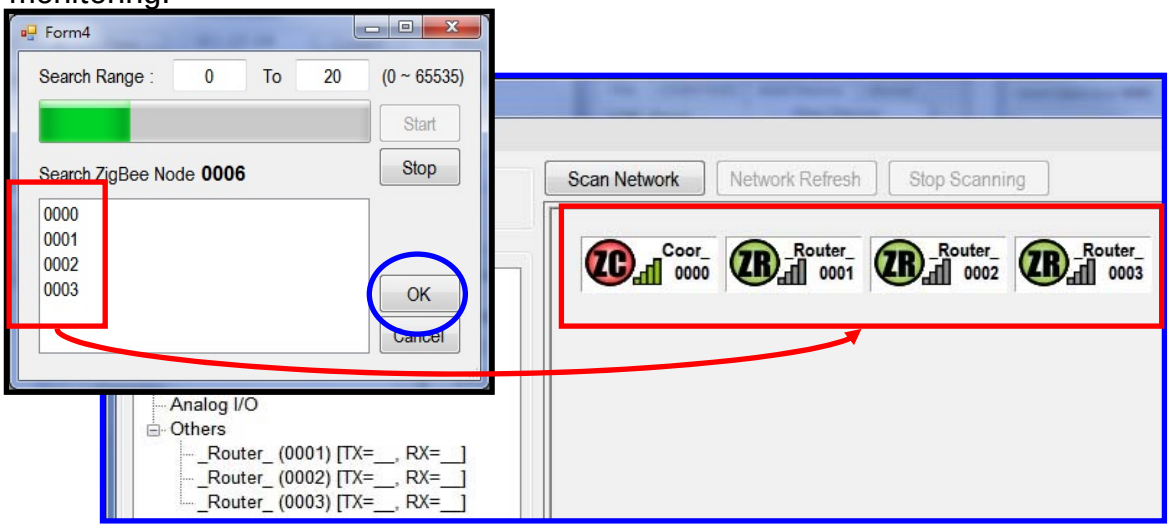
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## **b.** Automatic Searching

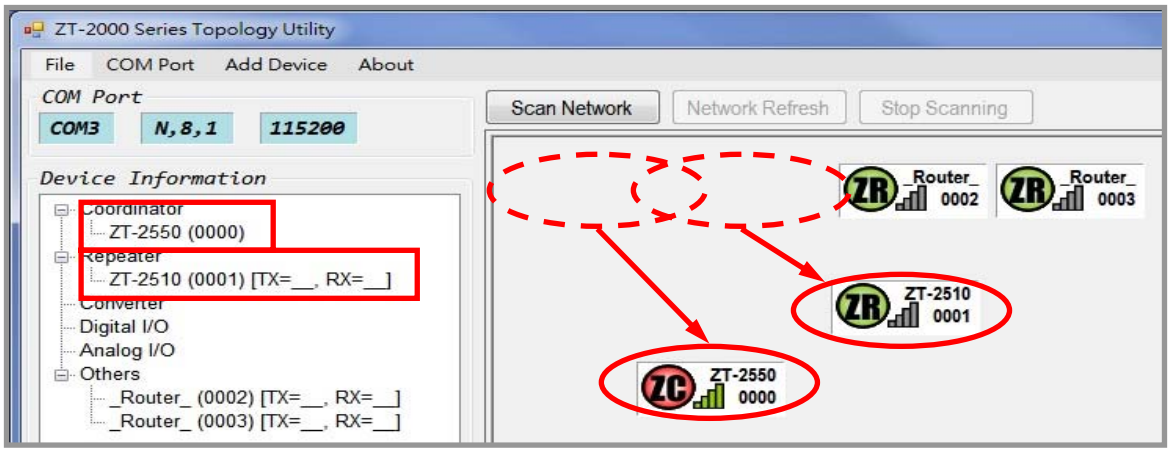
To automatically add a new ZigBee node for monitoring, click the **Add Device** menu item and then click the **Search** item to open the Search dialog box. Enter a valid range in the **Search Range** fields and then click the **Start** button to begin scanning for available devices, as illustrated below.




Once the search process is complete, all available ZigBee nodes will be displayed in the results field. Click the **OK** button to add the nodes to the Topology Tool for monitoring.




Once all the required ZigBee nodes have been added, the position of a node and the device information for the ZigBee node may be modified. (Refer to the descriptions in the sections above for more details.)



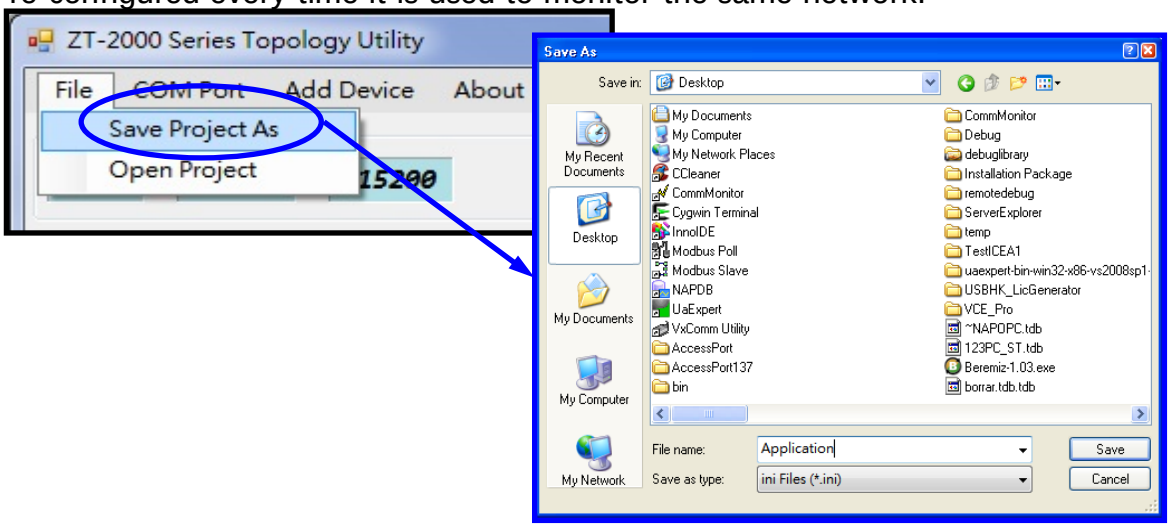


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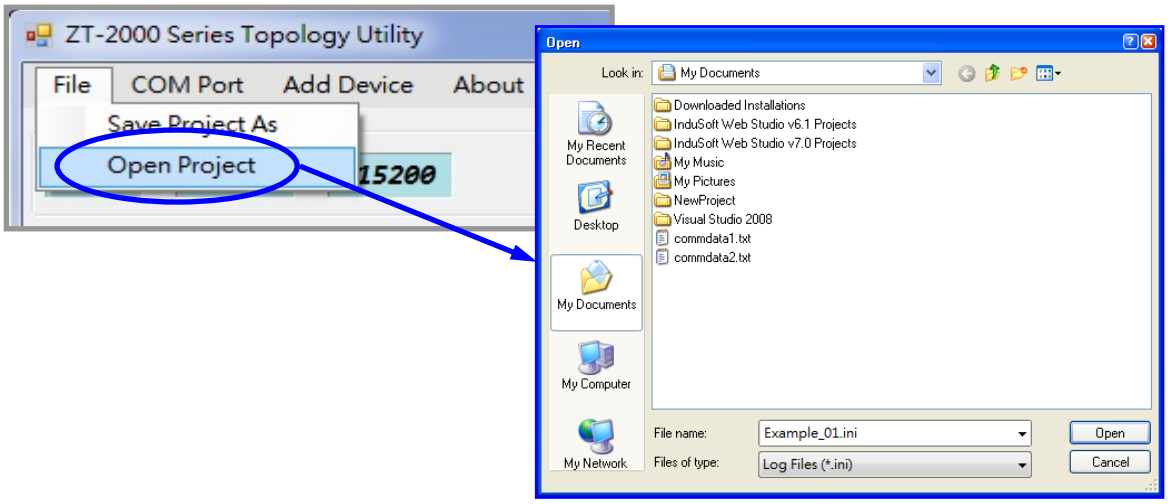
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## c. Save/Load Project Setup

The **Save Project As** feature allows the state of the ZT-2000 Topology Tool to be a backup saved to an *.ini file, meaning that the topology will not need to be re-configured every time it is used to monitor the same network.




If a ZigBee network needs to be monitored again using the same settings, simply load the previously saved *.ini file into the tool to restore the ZT-2000 Topology Tool to its earlier state, making it easy to configure the Tool for future use.



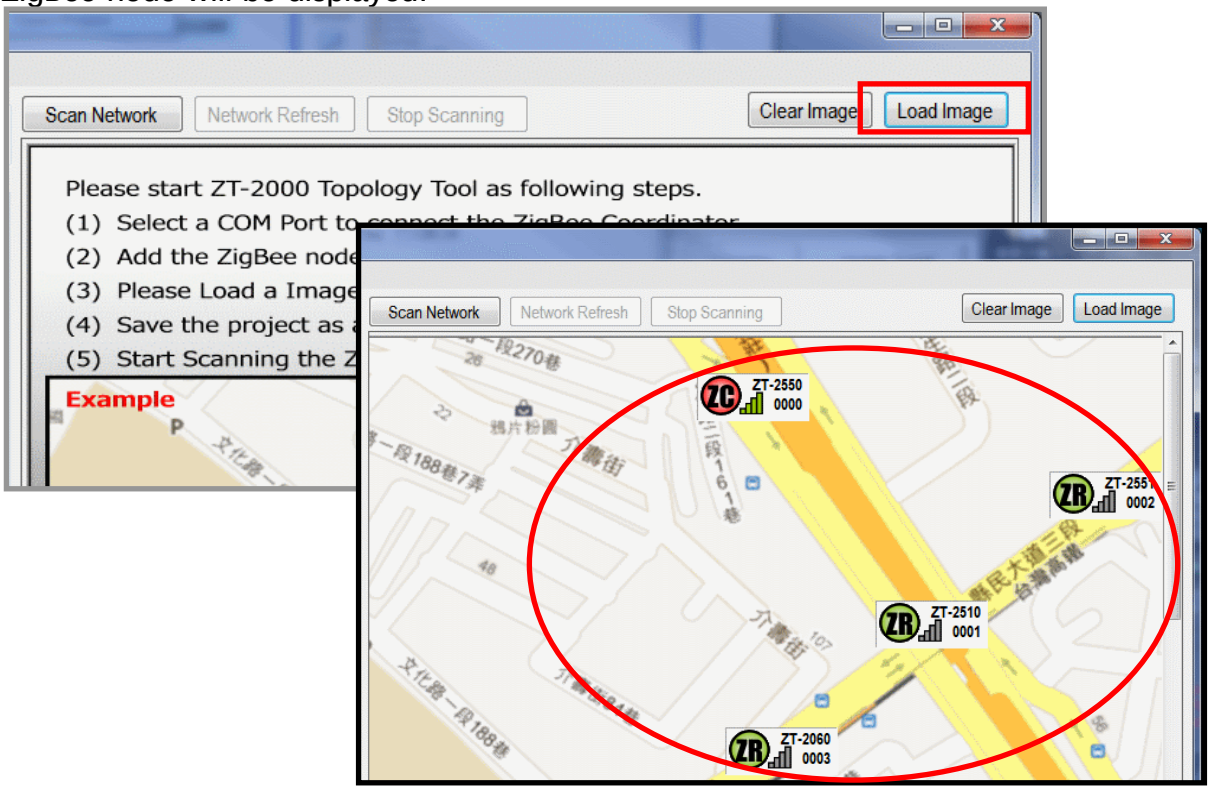


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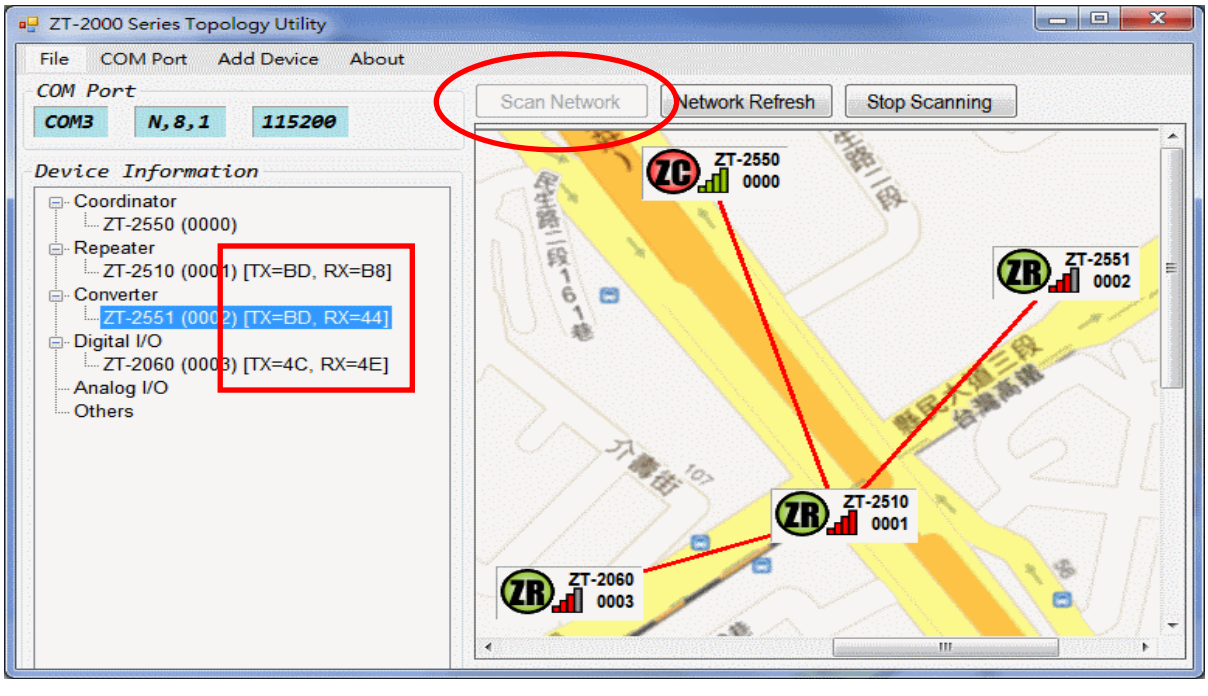
## 4.3 Clear and Load User Maps

Through the image is replaced with the user map, the position of the ZigBee nodes can be adjusted to the actual mounting locations, then, the relative position of every ZigBee node will be displayed.




## 4.4 Scan the ZigBee Network

After clicking the Scan Network button to enable the polling function, the topology and the RSSI information will be displayed. This information may be used to determine whether the signal for any of the ZigBee nodes is weak, or whether the device has been disconnected.



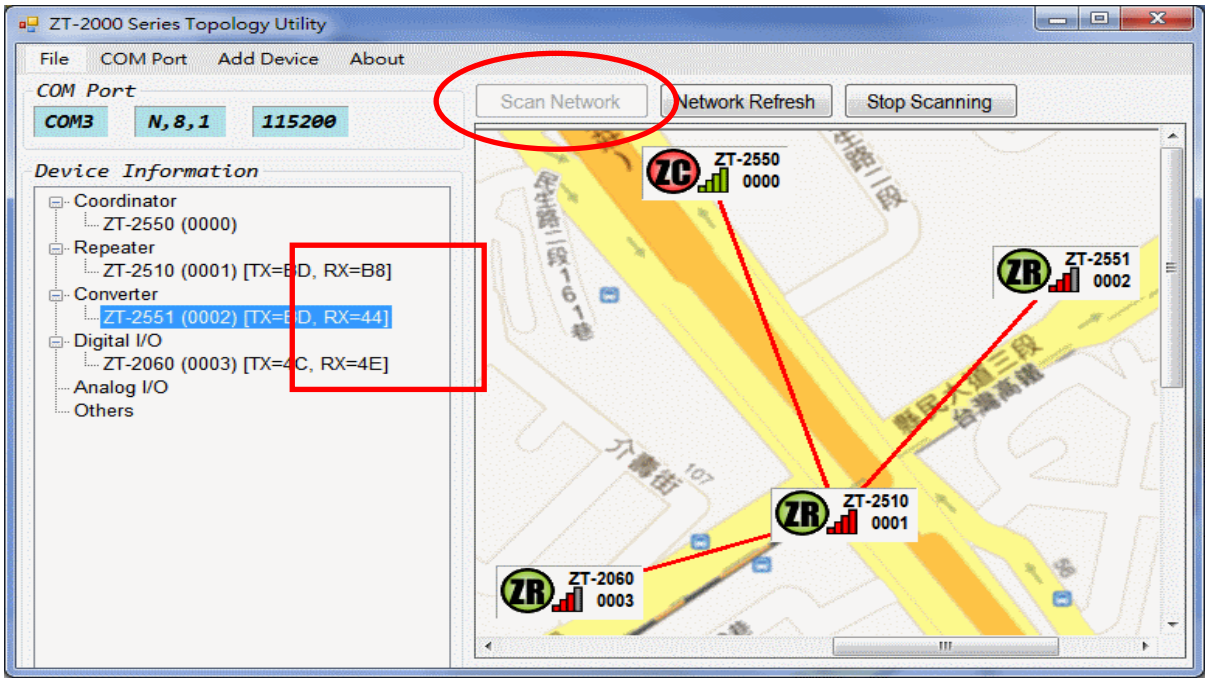


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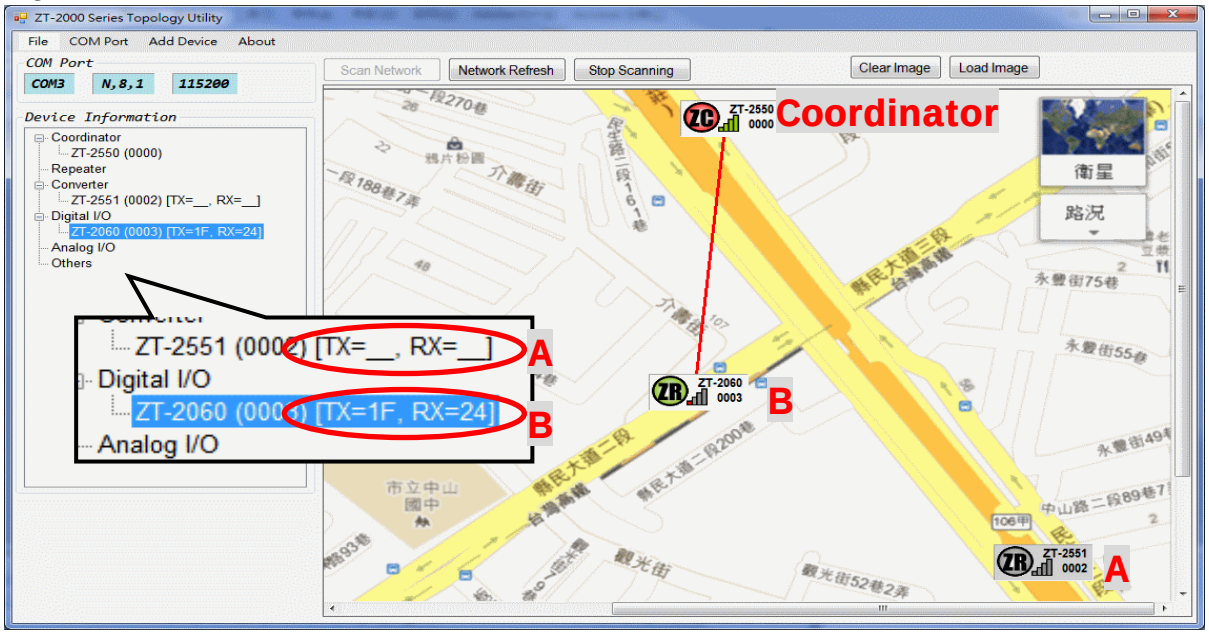
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# 5 Troubleshooting

After clicking the Scan Network button to enable the polling function, the topology and the RSSI information will be displayed. This information may be used to determine whether the signal for any of the ZigBee nodes is weak, or whether the device has been disconnected.




As shown in the example below, two ZigBee router devices exist in a ZigBee network. One ZigBee device “B” on the map is mounted on the opposite side to the street corner so that the signal is obstructed, which causes the signal to become weak. The other device “A” on the map is too far away, so it is unable to communicate with the ZigBee coordinator.

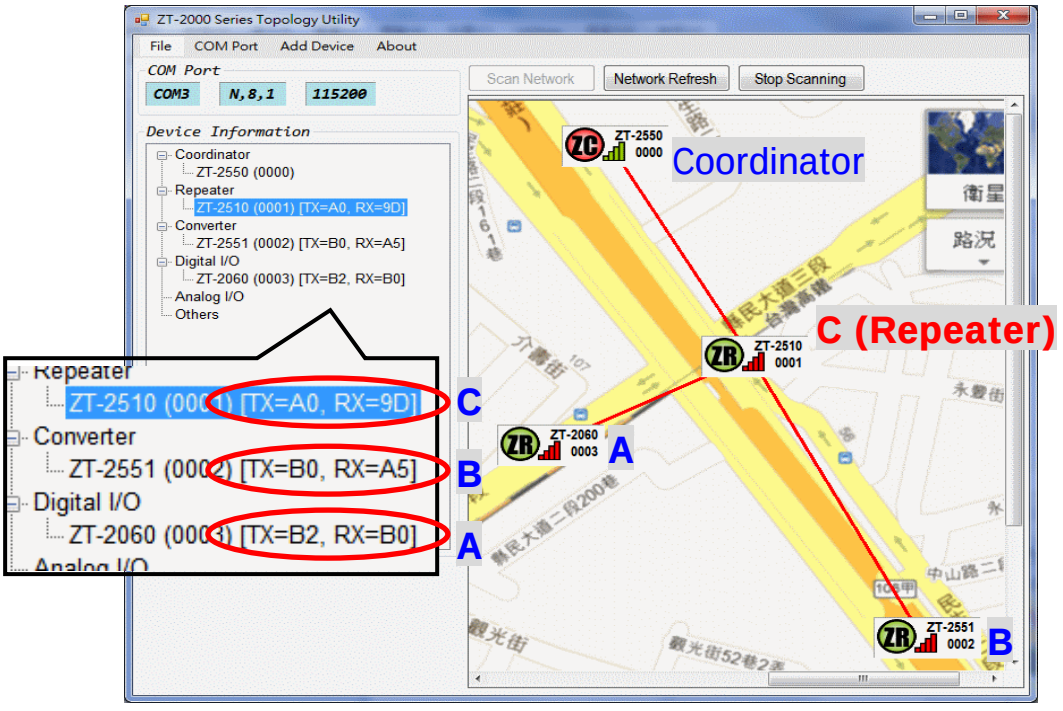




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In the situation described above, the best approach is to confirm whether there is any possible interference to the signal, or if there are any obstacles affecting the network environment and, if so, add a ZigBee repeater that can be used to relay the wireless signal, as illustrated in the image below. Once installed, an improvement in the communication quality should be seen.





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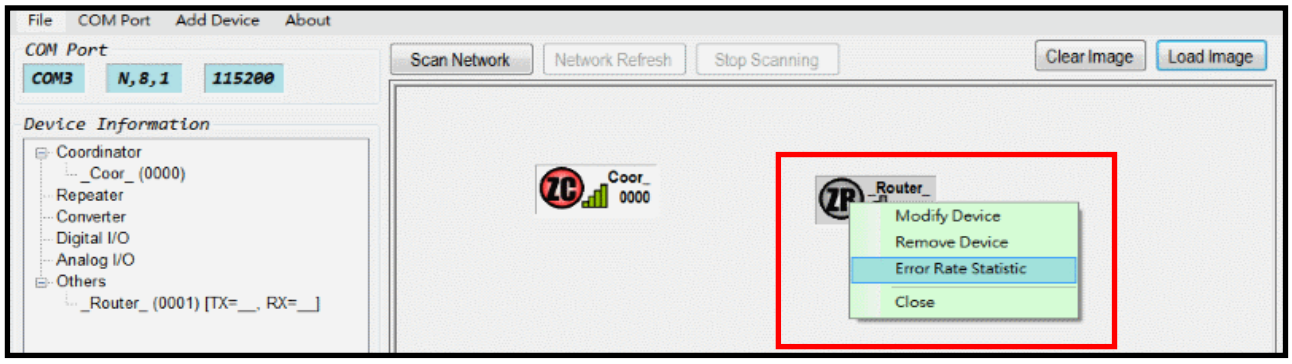
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# 6 Advanced Function

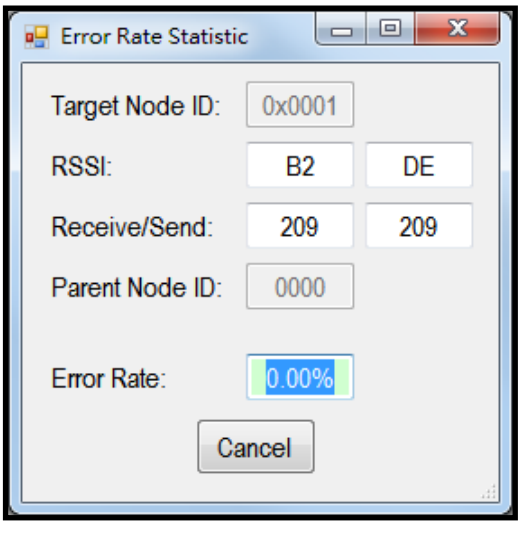
## 6.1 Communication Error Rate Statistics

The ZT-2000 Topology Tool includes a feature that can be used to record communication error rate statistics between a specific ZigBee Router and the ZigBee Coordinator. The following describes procedure for using this feature.

a. Right-click the icon for the specific the ZigBee Router to be monitored, and a menu listing the available advanced features will be displayed. Select the **Error Rate Statistics** item to display the ZigBee Wireless Polling dialog box.




b. Once the dialog box is displayed, the ZigBee wireless polling function will be initialized which will begin recording the communication error rate. This feature can be used to estimate the real signal quality.





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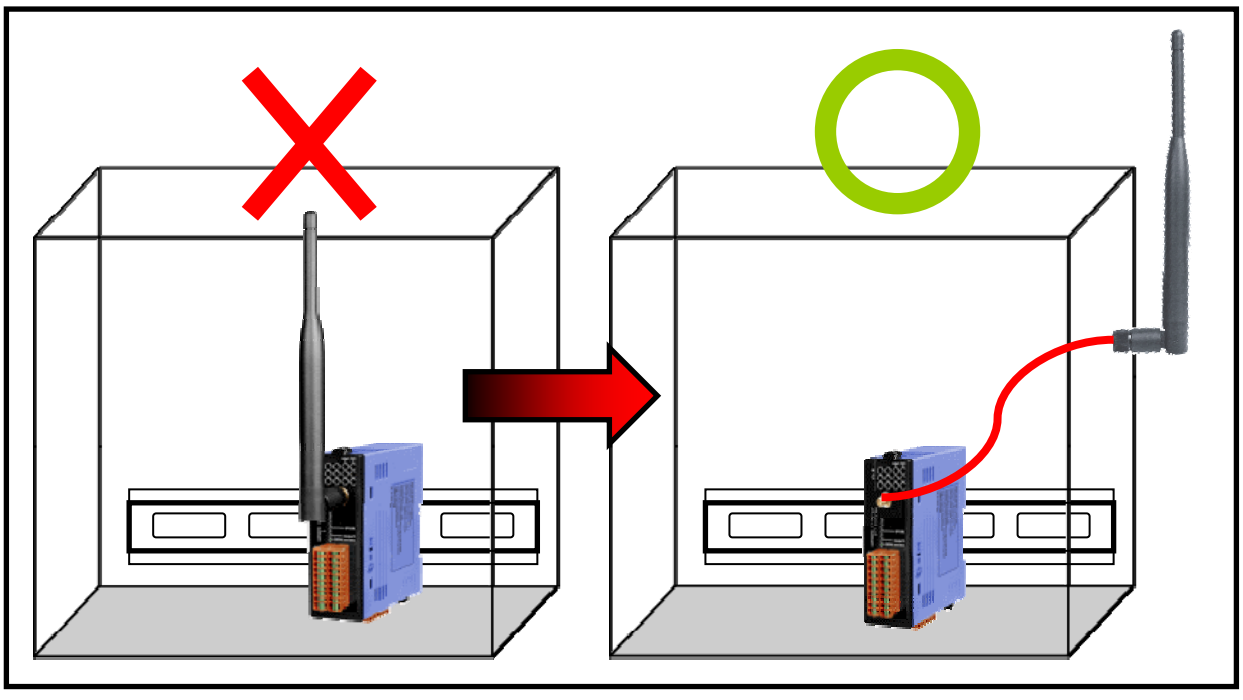
# 7 Appendix

A number of conditions can affect the quality of Zigbee signals, such as the blocking, obstruction, reflection and diffraction of signals. Some of the common mistakes made during installation are illustrated below.

(1) Control Enclosure

If the antenna for a Zigbee device is installed inside a control enclosure, the signal will be shielded and the communication range and strength will be seriously reduced. Consequently, the antenna must be positioned outdoors or in an open space and then connected to the device via an extension cable, such as a 3S00x-1, where 'x' indicates the length of the cable in meters, and "-1" denotes that the cable uses an RPSMA connector. The suggested installation method is to connect the ZT-2000 module to the antenna extension cable, and then connect the cable to the antenna, as illustrated below.

For more details regarding available cables, refer to:
http://www.icpdas.com/products/Accessories/cable/cable_selection.htm

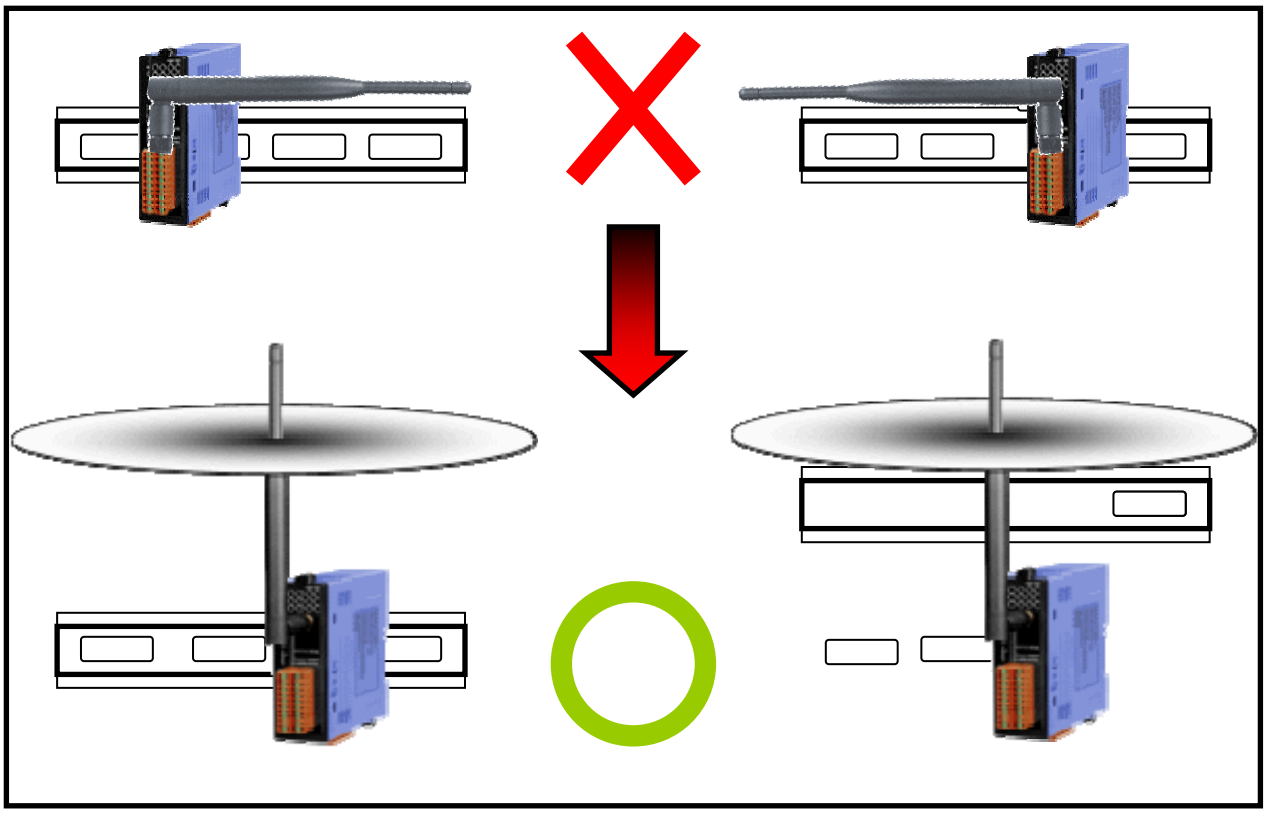



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(2) Location and Orientation of the Antenna

All ZigBee products manufactured by ICP DAS use an omnidirectional antenna. The signal in an omnidirectional antenna is strongest in the horizontal direction, but weaker in the vertical direction. Consequently, special attention must be paid to the angle and the direction of the antenna. The direction of the antenna for each device should be adjusted such that they are pointed in the same direction and are parallel to each other, as illustrated below.




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