



QW1010c

TCS ZigBee Wireless Gateway

Description

The QW1010c allows monitoring and programming of building controls over a TCS ZigBee wireless network. This wireless network replaces the hard-wired RS-485 bus. By eliminating the need for running communication cables between devices, the wireless network provides an economical means to easily expand existing controller networks.

General

The QW1010c TCS ZigBee Wireless Gateway manages the TCS ZigBee wireless network. It connects a TCS Basys Controls TCS ZigBee wireless network directly to a USB port of a PC or to an RS-485 port of a QD1010. (Only one QW1010c is needed per TCS ZigBee wireless network.)

NOTE: The QW1010c works with the SZWXXX series thermostats which have built-in TCS ZigBee wireless capabilities.

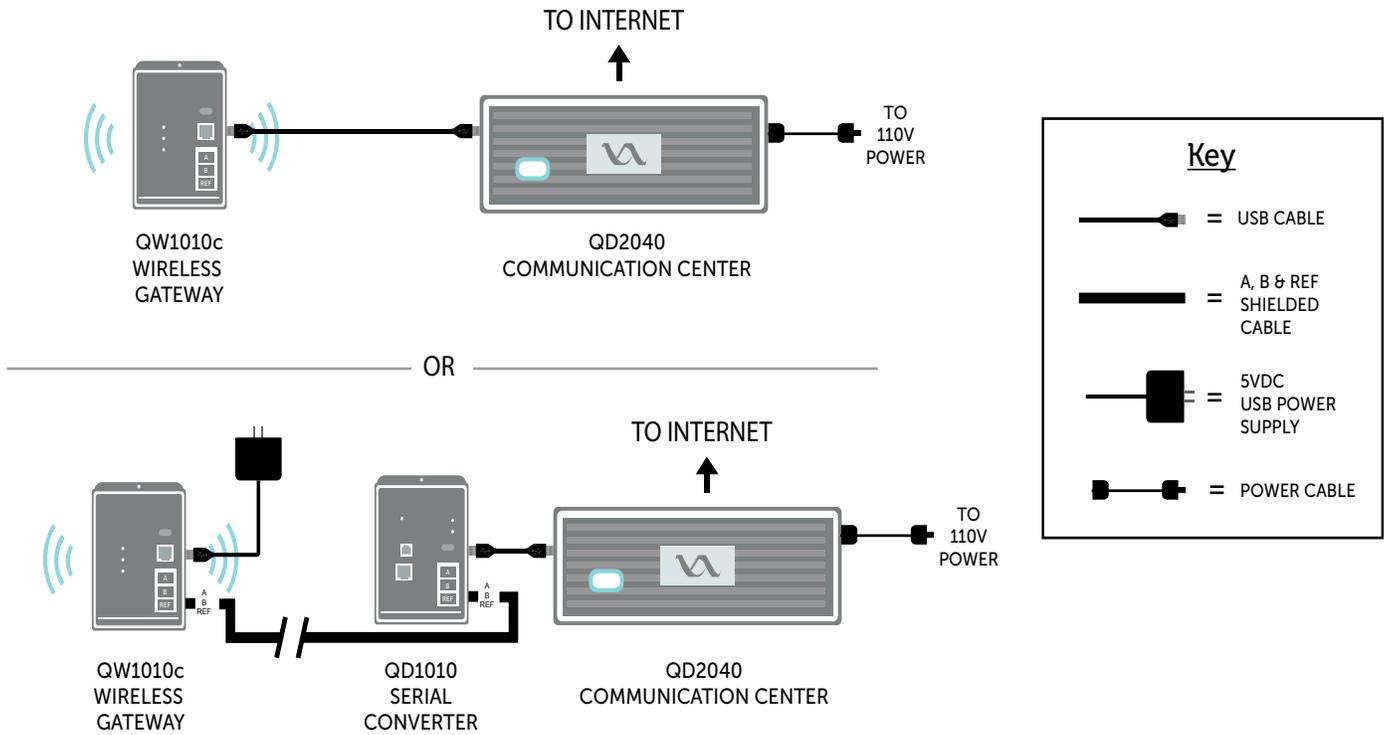
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Mounting

QW1010c -- Mount the device directly to block or drywall. The built-in mounting feet accept two #10 sheet metal screws (not provided).

Wiring



For detailed instructions on A - B - REF covered wiring, see QD1010 product manual.

Setup & Troubleshooting

Throughout the setup document the terms coordinator, gateway and QW1010c will be understood to mean the same thing. A router is a TCS ZigBee wireless thermostat, bridge or repeater.

Location:

- A wireless network will not function correctly if it is separated by walls or other structures in which a wireless signal cannot penetrate such as steel, concrete, or rocks.
- The area containing wireless devices should be static/non-changing, for example, do not place wireless devices behind a steel door that is open during occupied times and closed during unoccupied times.
- No part of a wireless network should be placed outdoors. The varying atmospheric conditions cause the wireless signals to distort resulting in an unstable wireless network; for example, a wireless network formed on a foggy day will have trouble communicating on a clear day and vice versa.
- The coordinator of the wireless network should be placed at a central location with respect to the routers.
- Coordinators and routers should be placed in an area with little external wireless interference, away from other wireless devices.

Distance:

- A wireless network will not function correctly if the distance between the coordinator and/or routers exceeds approximately 150 feet line of sight. Walls or other barriers will severely limit the maximum distance.
- Wireless networks are only able to travel a maximum of 5 hops from the coordinator; routers placed beyond the 5 hop limit will not join the network.
- Routers are only able to have 6 children each.

Special Considerations:

- A wireless network should be oriented in such a way that routers are spread out equidistant in a circular pattern from the coordinator so as to maximize the communicating area available. Routers placed in a straight line may cause network instability.
- Subsystems and energy policies should never be placed on a wireless network because a subsystem is dependent on uninterrupted continuous communication.
- Only 15 routers should be placed on a single wireless network. A router is defined as a wireless thermostat, bridge, or repeater. Large networks cause the wireless communication to become unstable.
- If multiple wireless networks are present, each network must be given a separate Personal Area Network Identification (PAN ID) wireless channel. Wireless channels should be chosen in a way so as to limit interference from other area neighboring channels, for example, instead of using channels 11 and 12 use channels 11 and 25 or 11 and 14.

Wireless Deployment Overview:

All wireless thermostats are shipped with the H1 TCS ZigBee Enable Jumper, located in the upper left of the base of the thermostat, in the Off position. Wireless thermostats should be powered up and given a TCS address prior to enabling the TCS

ZigBee Wireless module. See wireless thermostat instruction manual for details.

For small networks with five or less thermostats, that is all that is necessary is to enable wireless thermostats (place the H1 jumper on the left and middle posts). Power up the QW1010c by plugging the USB cable into a laptop running Insight, into a QD2040, or into the 120 VAC to 5 VDC USB power adapter included with the QW1010c. Wait 15 to 20 minutes for the wireless network to form. The wireless network should now be usable.

For larger networks, or where multiple QW1010c are to be used use the following procedure.

1. Power up the QW1010c by plugging the USB cable into a laptop or PC running Insight software. Important: Do not connect the QW1010c to the QD2040 at this time.
2. Using Insight, set the desired network Pan ID and Channel on the Coordinator. Then click on Clear Tables and Software Reset in the Reset tab. This will store the new PanID and Channel. Then click on Reset Network in the Reset tab. This will tell the QW1010c to form a new wireless network.
3. Move the wireless thermostat to the installation location and power it. Once it is addressed, move the H1 TCS ZigBee Wireless Enable jumper to the Enable position (middle and left post). The red LED should then be lit and start blinking, thus indicating that the TCS ZigBee module has power.
4. Connect a QD1010 to the wireless thermostat and to a laptop running Insight.
5. Using Insight, set the same PanID and Channel that is used on the QW1010c. Once these are set, click on Clear Tables and Software Reset in the Reset tab. This will tell the thermostat (router) to join a new network using this PanID and Channel.
6. Repeat steps 3-5 for all the wireless thermostats / routers on the network.

Wait about 3 minutes per wireless thermostat on the network before connecting the QW1010c to a QD2040. The network should now be usable. It can be verified with Insight if desired.

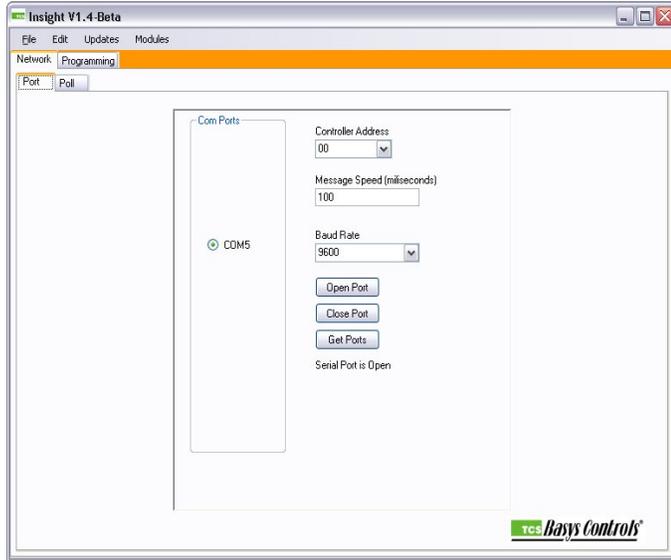
Note: The baud rate for the QW1010c as well as all wireless TCS products is 9600 baud.

Start Insight by clicking on the icon on the desktop or by going to:

Start->All Programs-> TCS Basys Controls->Insight

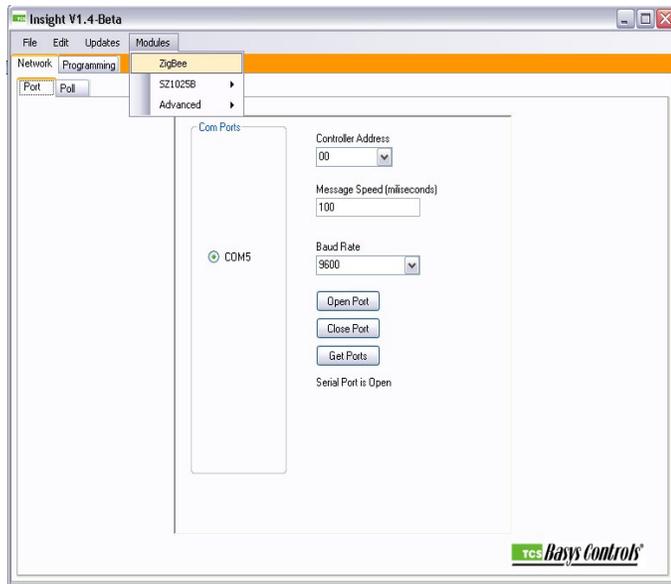
Insight Startup Window

Select a serial port from the list displayed and select the Open Port button. Leave the controller address and message speed box at their default.



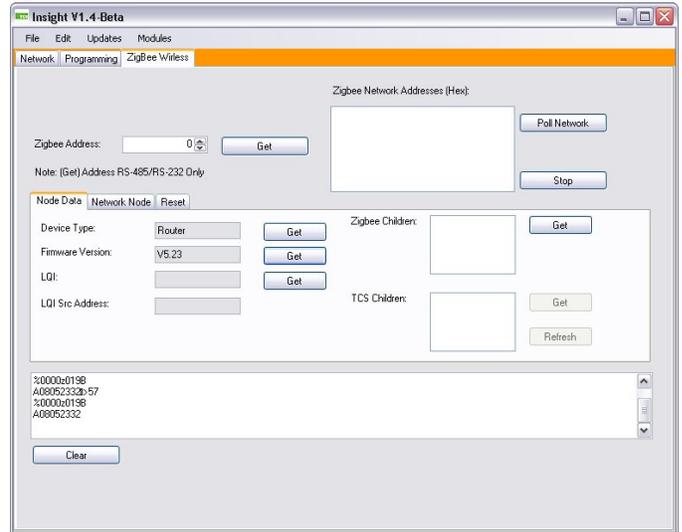
Opening ZigBee Module Tab

Select Modules from the menu, then select Zigbee from the drop down list. A new tab will be added to the tab list named Zigbee Wireless. Click on the ZigBee wireless tab.



Retrieve Router Information

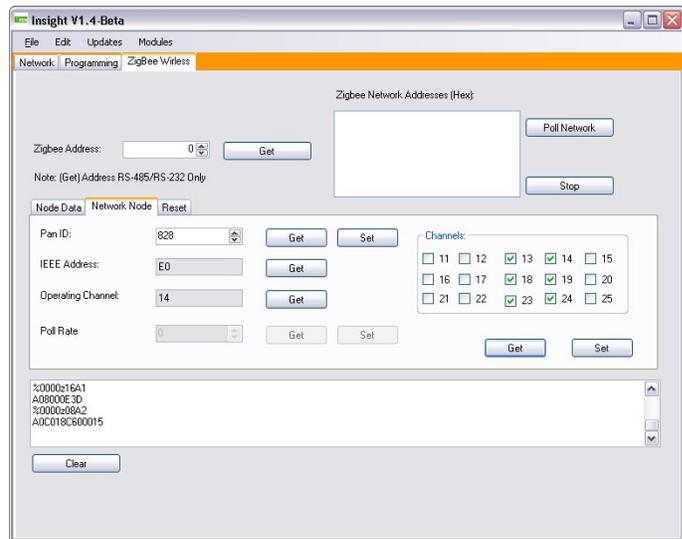
After the router has a unique TCS address, connect the QD1010 to each router using the RS-485 via phone jack or terminal blocks located on the bottom board. Select the "Get" button for the Device Type and Firmware Version, verify that it displays router and the current firmware version as shown.



Set PAN ID and Channel for Wireless Network

On the Network Mode tab set the PAN ID on each router to that of your network. In this example, the PAN ID is set to 828. It is important that each router and the gateway be set to the same PAN ID otherwise nodes will not be able to join the wireless network. A different PAN ID should be given to each wireless network in a given area.

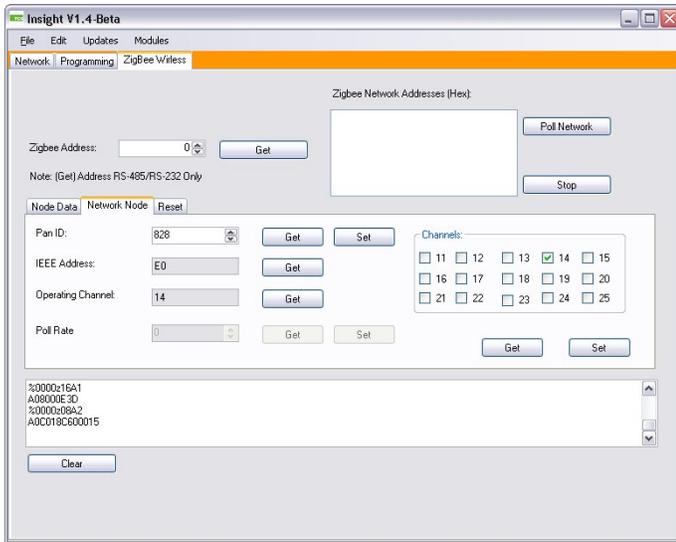
Hit the set button once you have set the PAN ID, hit the get button to verify that it was successfully set. It is a good idea to record the IEEE Address of each of your routers for future reference.



Set Channel List for Wireless Network

Get the channel list, and set the channels you want the wireless network to be able to use. If only a single wireless network is present, the network will automatically pick the best channel among the channels that you have selected. To force the network to use a specific channel select only one channel

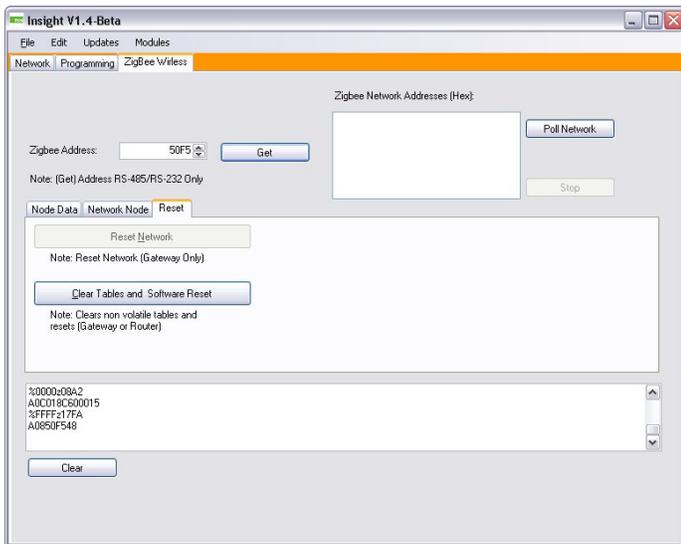
from the list. Hit the set button, then the Get button to verify the channel list you have selected.



Reset Device

Once the router PAN ID and wireless channel have been set correctly, select the Reset tab and click on the “Clear Tables and Software Reset” button. Resetting the Router/Gateway will save the settings programmed into it.

Each time the network, PAN ID, Channel list, etc have changed a “Clear Tables and Software Reset” is required to accept the changes.



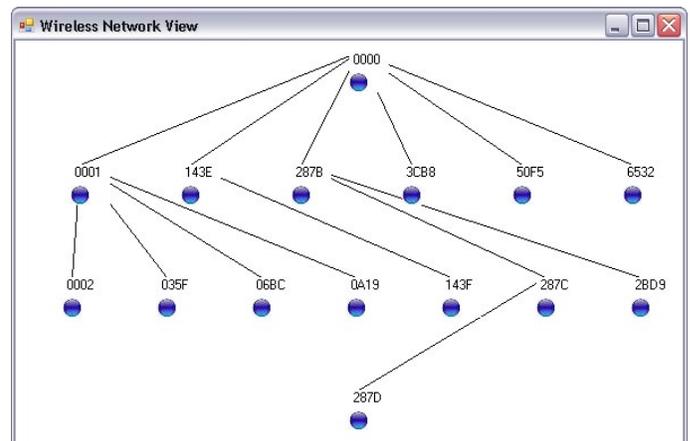
Set the PAN ID and channel list for each device in the wireless network. Once all the routers have been programmed and the network has had enough time to form (approximately 2 min. for each node), connect the QW1010c to the computer running the Insight software. In the wireless module tab, click the “Poll Network” button. A network view window will pop up. After the network view window has loaded fully (approximately

30 seconds) it should look similar to the picture. The blue dots displayed on the network view window represent the wireless nodes on the network. By hovering the mouse pointer over each node it is possible to see the TCS as well as Zigbee address. If a node does not have a valid TCS address or is a repeater, it will be displayed in a yellow green color. If all the nodes in the wireless network are accounted for and show up in blue, then the wireless network is functioning correctly and the Coordinator can be connected to the QD2040.

Wireless Network View

The Zigbee tree will also be displayed as a list view in the Zigbee tab. When an address is selected from the network list that nodes, children can be displayed by pressing the get button next to the Zigbee children box.

When one of the Zigbee addresses is selected in the poll network box it will appear in the Zigbee address section of the page. Once the address is displayed in the Zigbee Address box that addresses device type, firmware version, LQI, etc. can be retrieved by hitting the associated get button.



Diagnostic

LEDs:

- Power- lit when device is powered
- Wired Data- blinking indicates receiving traffic on either RS-485 or USB ports
- Wireless Data- blinking indicates receiving traffic on TCS ZigBee wireless network.