



## QW Series

ZigBee Wireless Devices

### Description

The QW Series allows monitoring and programming of building controls over a wireless network. This wireless network replaces the hard-wired RS485 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 QW1010A ZigBee Wireless Gateway manages the ZigBee wireless network. It connects a TCS Basys Controls ZigBee wireless network directly to a USB port of a PC or to an RS485 port of a QD1010. (Only one QW1010A is needed per ZigBee wireless network.)

The QW1011 ZigBee Wireless Repeater extends the reach of the wireless network and can be used to circumvent obstacles interfering with the wireless communications. It only requires local power (12 VDC or 24 VAC) to operate.

The QW1100 ZigBee Wireless Single Bridge connects a single, non-wireless TCS Basys Controls device to the TCS Basys Controls ZigBee wireless network or can also be used as a repeater if needed. The single bridge wires directly into a controller for both power and communications (24+, 24-, A, B, and Ref.).

The QW2100 ZigBee Wireless Multi-Bridge connects multiple (up to 15 devices) hard-wired TCS Basys Controls devices to a TCS Basys Controls ZigBee network. The multi-bridge wires directly into a controller for both power and communications (24+, 24-, A, B, and Ref.) or can be independently powered with a 12 VDC adapter

The QW1010A includes a jumper to select how it will be connected to the controller network. You can plug the device

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directly into the USB port or you can wire it into the RS485 terminals on a QD1010. The jumper must be set appropriately for each connection method.

All other QW devices are factory configured and provide no other settings, jumpers, or configuration options.

**NOTE: All of the QW Series devices listed work with the SZ10XXW series thermostats which have built-in ZigBee wireless capabilities.**

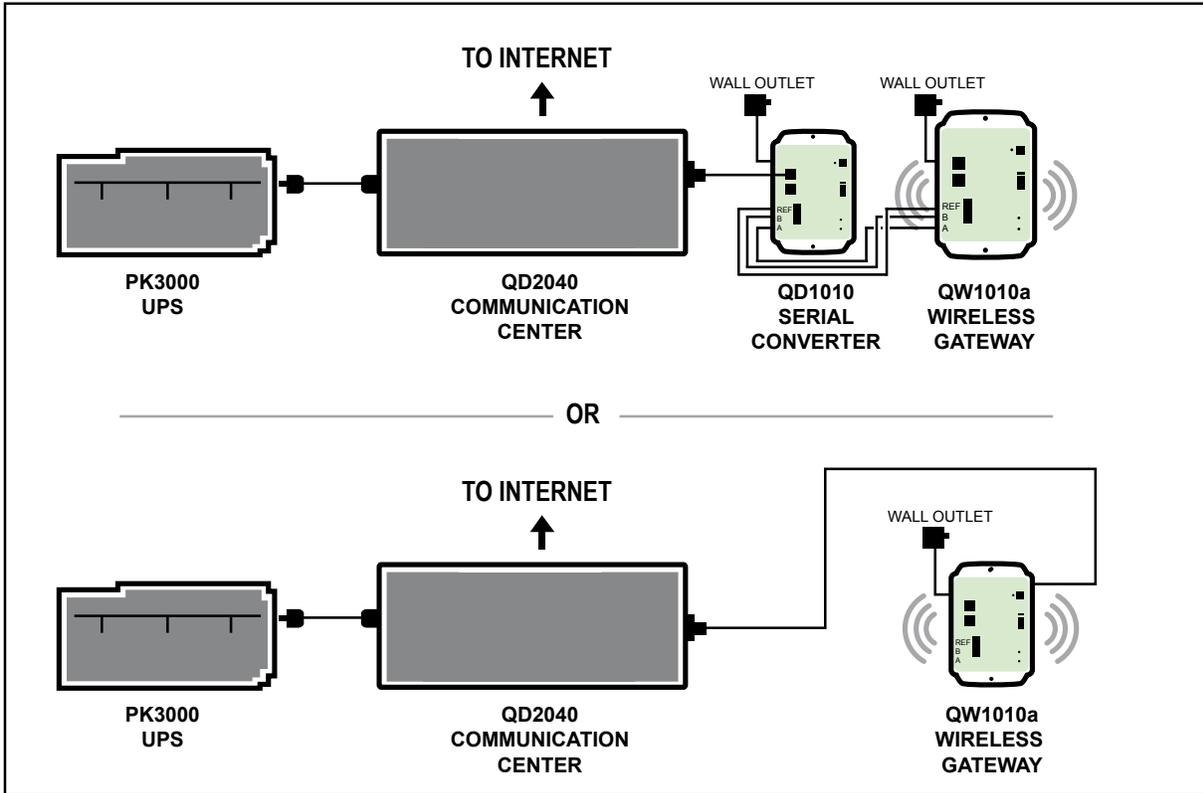
### Mounting

QW1010A -- Mount the device directly to block or drywall. The built-in mounting feet accept two #10 sheet metal screws (not provided).

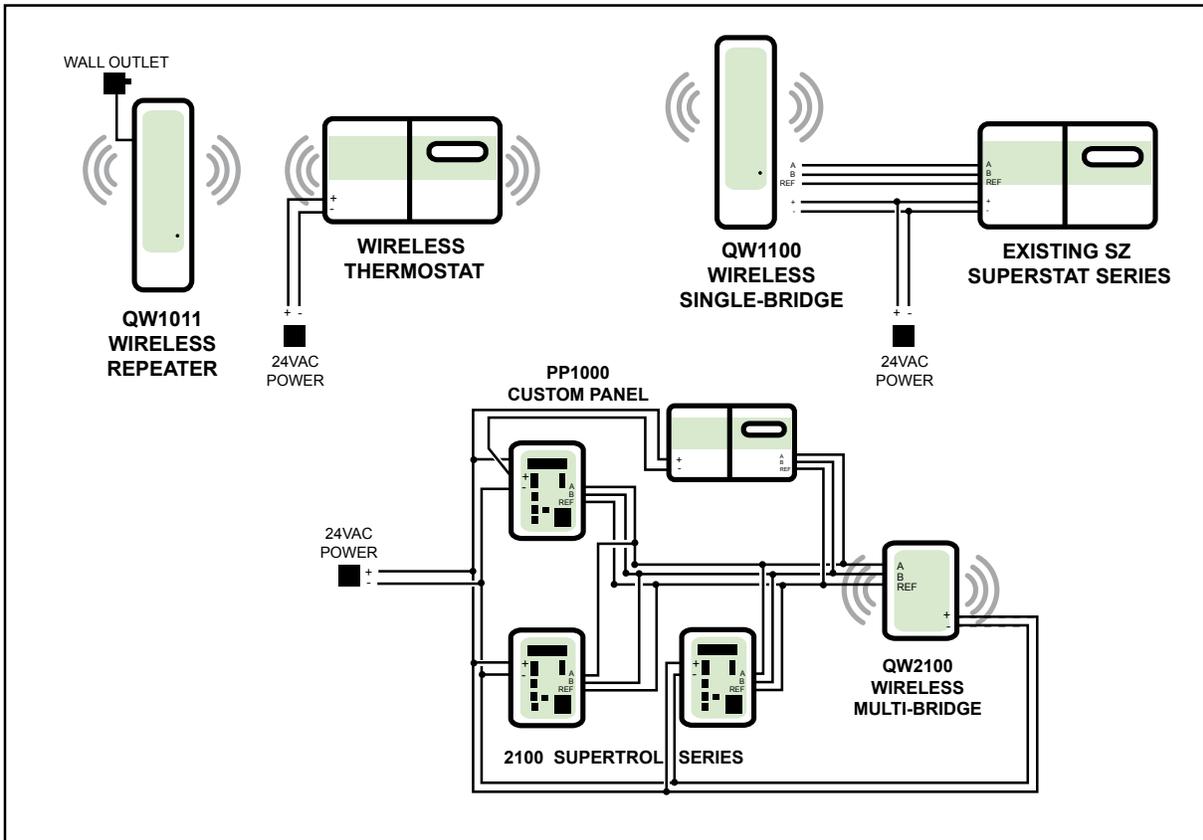
QW1100/QW1011 -- Mount the device directly to block or drywall. Open the housing. Mount the back of the housing using mounting screws and bantam plugs included with the unit. Attach the front of the housing to the back using the two allen screws and allen wrench included with the unit.

QW2100 -- Mount the device directly to block or drywall. The built-in mounting feet accept two #10 sheet metal screws (not provided).

# Wiring



THEN



# Setup & Troubleshooting

Throughout the setup document the terms coordinator, gateway and QW1010A will be understood to mean the same thing and will be used interchangeably.

## 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.
- A Universal Subsystem 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 should be given a separate Personal Area Network Identification (PAN ID) and 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:

1. Power up the QW1010A/Coordinator. Important!! Do not connect the coordinator to the QD2040.
2. Set the desired network PAN ID and Channel on the Coordinator.

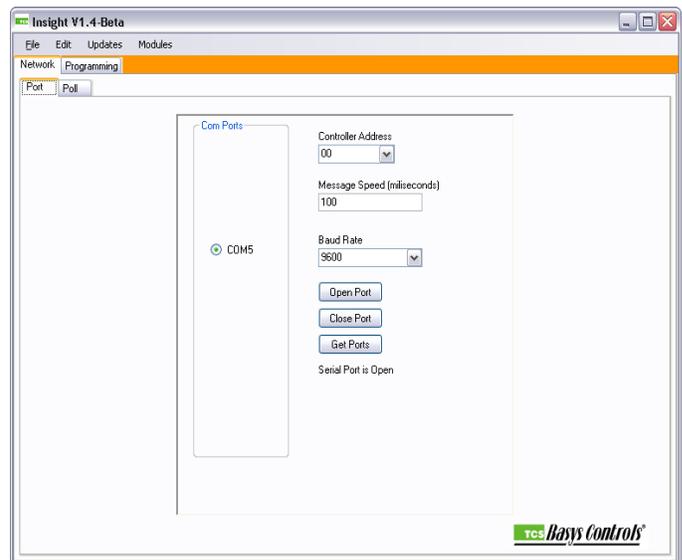
3. Move the thermostat/router to the installation location.
4. Power up the wireless thermostat/router with the wireless module removed.
5. Set a unique TCS address on the router.
6. Remove power from the wireless thermostat/router and install the wireless module.
7. Power up the wireless router.
8. Repeat steps 2-6 for all the wireless routers on the network, being sure that each router has a unique TCS address. Install the routers so that each anticipated first hop is powered first, followed by the anticipated second hops, etc.

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

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

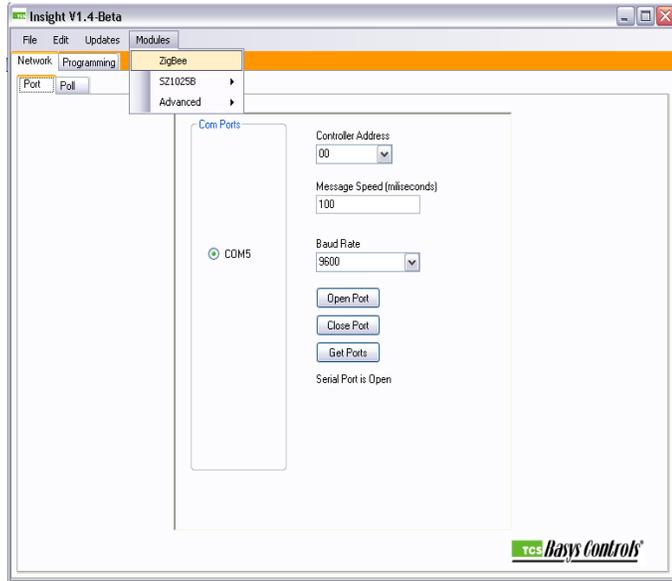
## Insight Startup Window

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

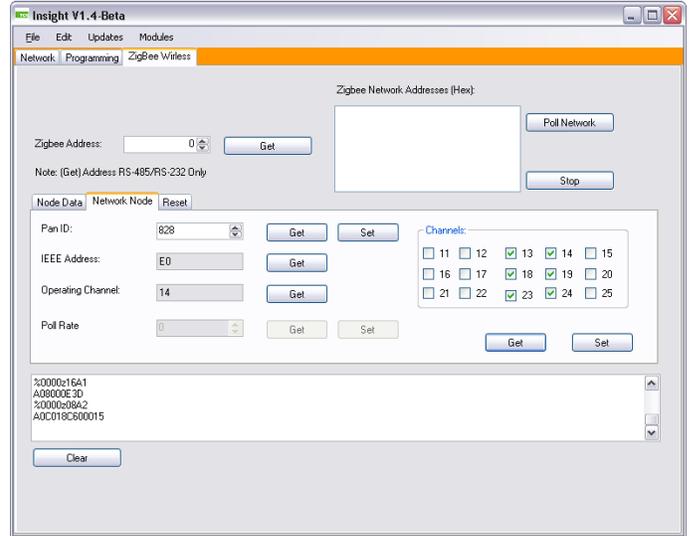
Select Modules from the menu, then select Zigbee from the drop down list. A new tab will be added to the tab list named Zigbee Wireless.



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.

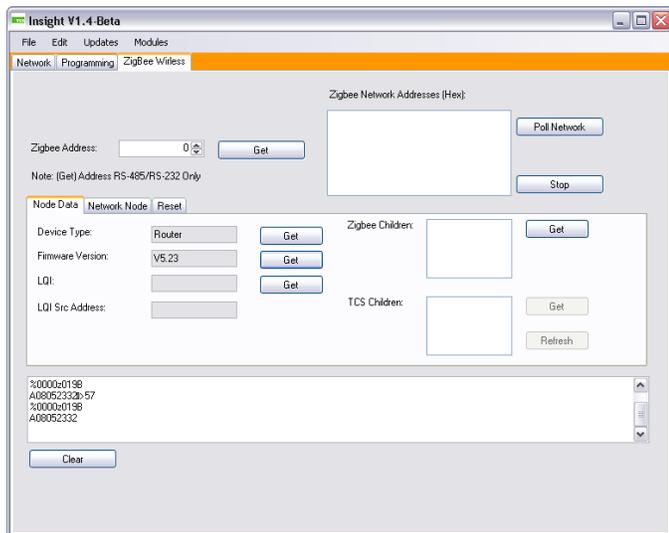
Hit the set button once you have set the PAN ID, hit the get button to verify that it was successfully set.

It is a good idea to record the IEEE Address of each of your routers for future reference.



## Retrieve Router Information

After the router has a unique TCS address, connect the QD1010 to each router using the RS485 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.

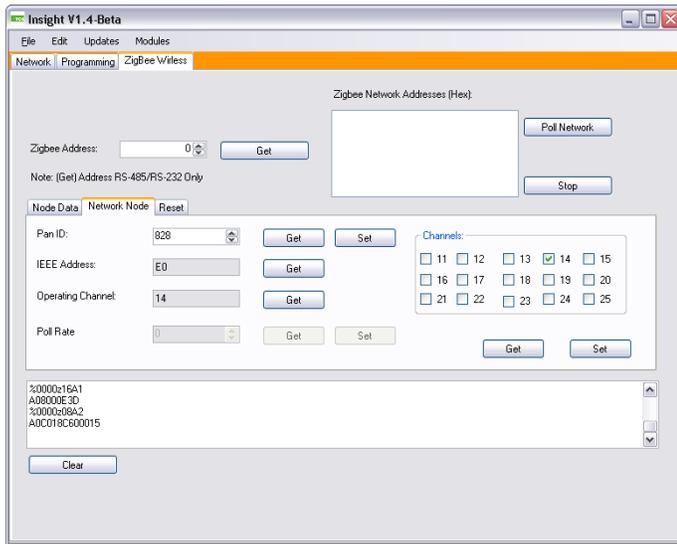


## Set Channel List for Wireless Network

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.

## Set PAN ID and Channel for Wireless Network

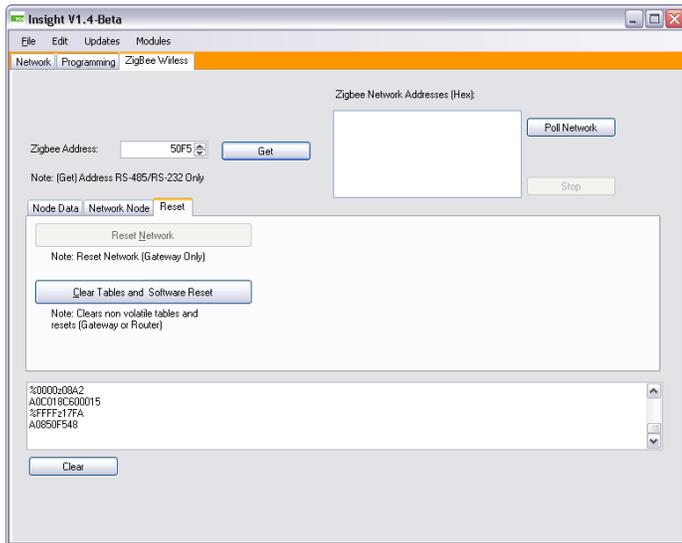
On the Network Node tab set the PAN ID on each router to that of your network. In this example, the PAN ID is set to 828. It is



### 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.



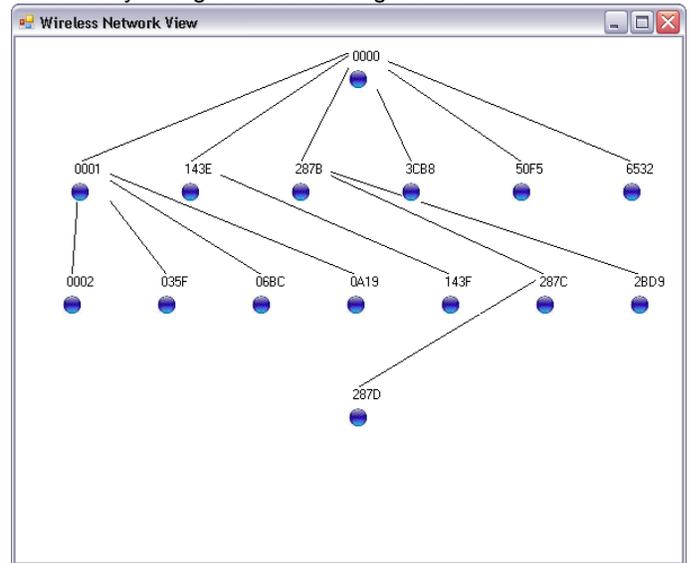
Set the PAN ID and channel list for each device in the wireless network. Once all the routers have been programmed and the network has had enough time to form (approximately 2 min. for each node), connect the QW1010A to the computer running the Insight software. In the wireless module tab, click the “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.

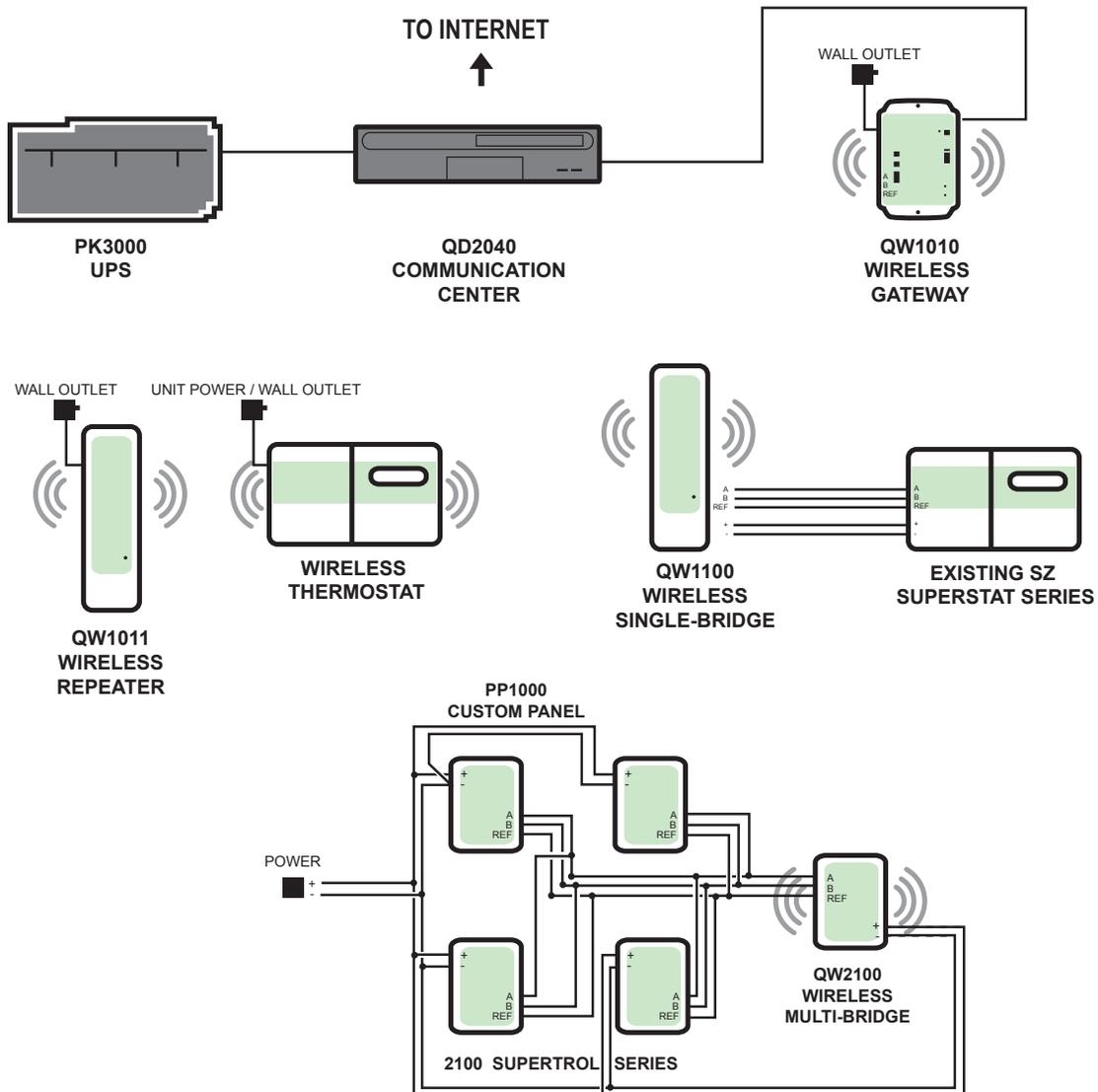
When one of the Zigbee addresses is selected in the poll network box it will appear in the Zigbee address section of the page. Once the address is displayed in the Zigbee Address box that addresses device type, firmware version, LQI, etc. can be retrieved by hitting the associated get button.



# ZigBee Wireless

EZ Installation Instructions for TCS ZigBee wireless devices

1. Install all SZ10xxW and SZW series controllers and QW2100 series devices. Ensure that you have a unique RS485 address programmed in each controller. Insert the ZigBee module.
2. Install the QW1010, give the ZigBee network 1 minute per controller to mesh before connecting to the QD2040-MAX.
3. Install the QD2040-MAX, PK3000 and then wire the QW1010 to the QD2040-MAX.
4. Log into [www.ubiquitysystems.net](http://www.ubiquitysystems.net) or a stand-alone QD2040-MAX and, using Ubiquity, or connect using InSight verify that all controllers are communicating.
5. If any controller(s) is (are) not communicating it may require a QW1011 wireless repeater nearby to connect to the ZigBee network.



**NOTE:** max distance for indoor ZigBee wireless network is 150' to 500' depending on conditions.

**The ZigBee wireless network supports 40 wireless nodes (including Gateway, Bridges & Repeaters)**

**PP1000**

Custom panel

**PK3000**

UPS

**QD2040**

Embedded site communication center

**QW1010**

Wireless Gateway

**QW1011**

ZigBee wireless indoor repeater

**QW1100**

ZigBee wireless bridge - single device

**QW2100**

ZigBee wireless bridge - multi device supports up to 32 hard wired controllers/devices

**SW Superstat Series**

ZigBee wireless thermostat (SZ10xxW series)

**SW133**

ZigBee wireless thermostat

**SW244**

ZigBee wireless unit board - Input

**SZ Superstat Series**

Hard-ware thermostat (SZ10xx series)

**2100 Supertrol Series**

SL21xx + SZ21xx series controllers