Honeywell

Wireless Installation & Integration Reference Guide for TB7200/ TB7600 Series Thermostats

REFERENCE MANUAL

MESH TOPOLOGY
WIRELESS NETWORK

NETWORK
FIELD WIRING
ELIMINATED

TB-RP5000W
REPEATER

REMOTE HONEYWELL
THERMOSTAT(S) CLUSTER

HONEYWELL THERMOSTAT(S)
MAIN MESH CLUSTER
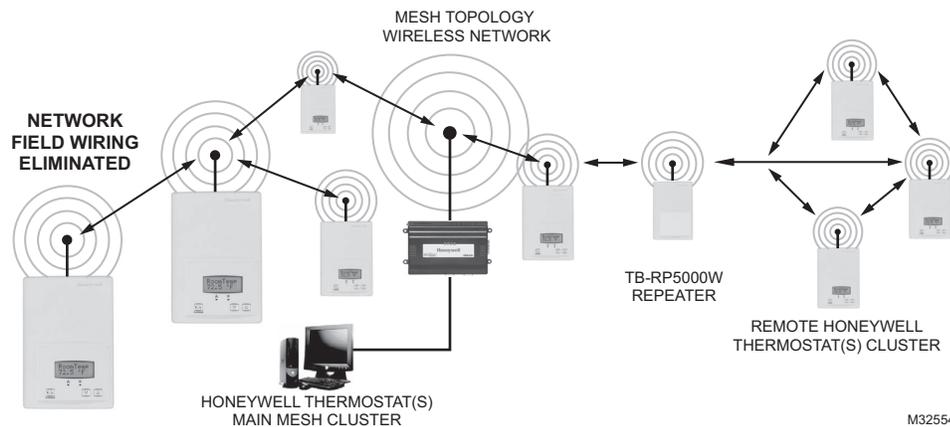
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PRODUCT OVERVIEW

The TB7200 and TB7600 Series wireless communicating thermostats are ideal for retrofit applications where the addition of communicating field bus wiring within the building space is prohibitive. These wireless thermostats allow for the use of equipment wiring used by existing electronic thermostats.

The Honeywell wireless thermostats, along with the TB-VWG-APP-1014 wireless communication card and the network driver and device .jar files, are specifically designed to be used by Honeywell WEBs-AX controllers WEB-2xx, WEB-6xx, and WEB-7xx controllers powered by Niagara$^{AX®}$.

This reference document provides wireless installation guidelines, .jar file installation, wireless thermostat setup in WEBStation-AX, and reference information on the available wireless objects and object properties supported by each wireless model.

NOTE: **Wireless installations require careful consideration of the environment where the wireless devices will be installed. We highly recommend a site survey be performed prior to bidding on or accepting a job.**

Contents

COMPATIBILITY

Honeywell TB7200 and TB7600 wireless thermostat compatibility information is provided in Table 1 below. The Honeywell TB7xxx Series ZigBee wireless network supports only the TB7xxx Series thermostats and repeater. No other ZigBee devices can be added to the network.

The theoretical maximum number of thermostats supported by a single WEBs controller is dependent on the resources available for the WirelessTstatNetwork driver .jar file and the extent of integration added to the station itself. When additional functions and services are added to the station, the available resources for the driver will be less. Once you have configured the station for the wireless network and all other features (graphics, services, histories, alarms, etc.), you should monitor the resources so that they do not exceed the recommended limits for each specific platform.

Table 1. TB7200 and TB7600 Thermostat Compatibility Information

WEBs-AX Controller	Thermostats Per Controller	WEBs-AX Workbench	.jar Files
WEB-2xx	30	3.0 or later	Network & Device 4.0.4.8
WEB-6xx	50	3.0 or later	
WEB-7xx	50	3.5 or later	

Honeywell .jar files

The network and device .jar files are required for the Honeywell ZigBee wireless thermostat network. You can download the files from the Honeywell Buildings Forum (http://buildingsforum.honeywell.com).

ZIGBEE MESH NETWORK OVERVIEW

ZigBee is a specification for a suite of high level communication protocols using small, low-power digital radios based on the IEEE 802.15.4-2003 standard for wireless personal area networks (WPANs).

Mesh networking is a type of network where each node in acts as an independent router. It allows for continuous connections and reconfiguration around broken or blocked paths by "hopping" and "re-meshing" from node to node until the final destination is reached.

General characteristics of the wireless physical communication layer are:

• Uses a wireless physical layer of 2.4GHz with data rates of 250 kbps
• Yields high throughput and low latency
• Automatic topology configuration: star, peer-to-peer, mesh
• Handshake protocol for transfer reliability
• Range: 50 feet (15 meters) typical and up to 100 feet (30 meters) based on environment

IEEE 802.15.4 along with ZigBee networks and application support layer provide:

• Low cost installation deployment
• Ease of implementation
• Reliable data transfer
• Short range operation
• Very low power consumption

For a successful ZigBee deployment, it is important to understand that the ZigBee wireless network is influenced by the same environmental factors that affect other wireless systems:

• Interference from radio emitters
• Various electronic devices
• Interference caused by solid objects that may slow or stop communication between devices

Even with potential sources of signal interference, the presence of these factors should not result in noticeable network performance degradation. Environmental issues will occur with any wireless network installation.

BASIC INITIAL DESIGN AND DEPLOYMENT CONSIDERATIONS

Proper design considerations need to be addressed prior to any installation of a WEBs-AX controller with a Honeywell wireless communication card and related wireless thermostats.

- Honeywell recommends using a per floor horizontal architecture vs. a vertical one. Transmitting from one floor to the other may be possible in certain applications (such as going through stairways), but the design and optimization of the thermostat antenna is designed for optimal horizontal distance penetration and not a vertical one. As such, be prepared to use AT LEAST ONE WEBs-AX controller and wireless communication card per floor.
- Please note that radio transmissions CANNOT travel through steel. If floors are constructed with steel joists or other steel materials it is highly unlikely that the wireless thermostat transmissions will be successful between floors.

Clear line of sight deployment

- To avoid network interference with 802.11 Wi-Fi devices in the 2.4GHz spectrum, Honeywell recommends the use of 802.15.4 channels 15 and 25 ONLY. 802.11 Wi-Fi transmissions overlap and may interfere with other channel selections allowed by 802.15.4 (Channels 11 to 26).
- With clear line of sight deployment (no physical obstacles between 2 communicating thermostats), the maximum distance between each thermostat is 100 feet (30 meters). See Fig. 1.
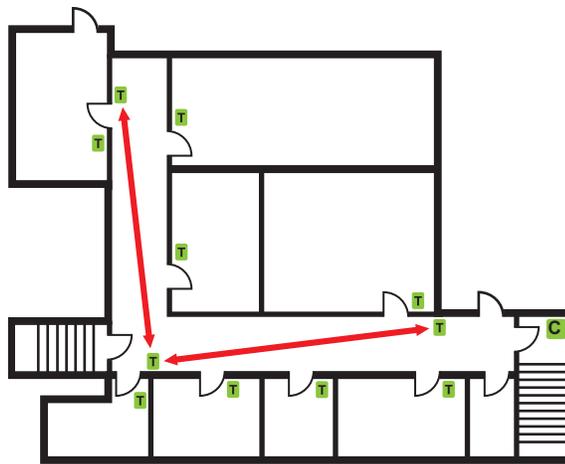
NOTE: LINE OF SIGHT DISTANCE BETWEEN TWO NODES IS A MAXIMUM OF 100 FEET (30 M).

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Fig. 1. Line of sight distance between two nodes is a maximum of 100 feet (30 M).

Non-clear line of sight deployment

- The maximum non-clear line of sight distance between thermostats for gypsum wall partitions which may include metal stud framing is a maximum of 50 feet (15 meters). See Fig. 2.
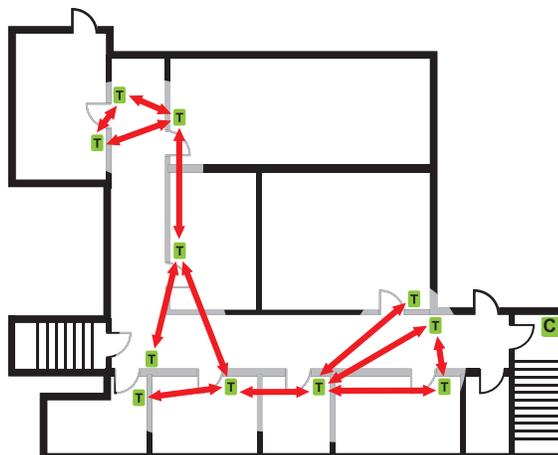
NOTE: MAXIMUM 50 FEET (15 M) BETWEEN 2 THERMOSTAT NODES.

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Fig. 2. Non-clear line of sight distance between two thermostat nodes is a maximum of 50 feet (15 M).

63-4522—04

- In order to avoid interference from other wireless devices, such as wireless routers, wireless adapters or laptops using wireless networks, etc., ensure that a minimum distance of 3 feet (1 meter) is maintained between any Honeywell wireless device and any Wi-Fi devices. A distance of 10 feet (3 meters) or more is preferred when possible (Fig. 3).

MINIMUM 3 FEET (1 M) BETWEEN WI-FI
EQUIPMENT AND HONEYWELL WIRELESS DEVICES

3 FEET (1 M)

PREFERABLY 10 FEET (3 M) OR MORE BETWEEN WI-FI
EQUIPMENT AND HONEYWELL WIRELESS DEVICES

10 FEET (3 M)

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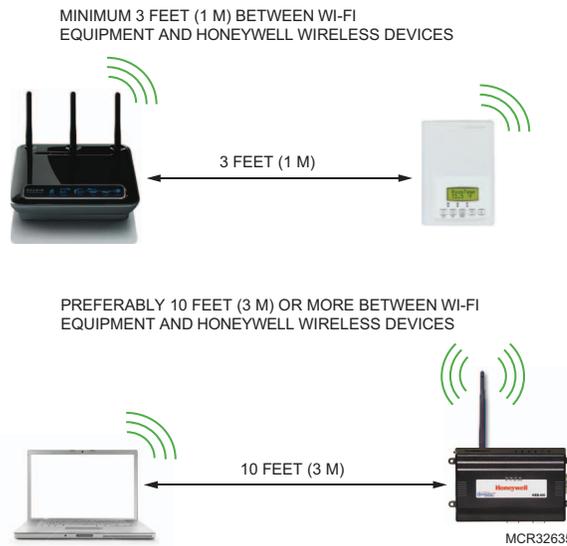
Fig. 3. Minimum 3 feet (1 M) between Wi-Fi equipment and Honeywell wireless devices.
Preferably 10 feet (3 M) or more between Wi-Fi equipment and Honeywell wireless devices

- Ensure that at least one thermostat is within 50 feet (15 M) of the controller with wireless card for every cluster of 10 thermostats installed. WEB-2xx controllers have a recommended max of 30 wireless thermostats per controller. If 30 thermostats are installed, three thermostats should be installed within 50 feet of the controller with wireless card. WEB-6xx and WEB-7xx controllers have a recommended max of 50 wireless thermostats per controller. If 50 thermostats are installed, five thermostats should be within 50 feet of the controller with wireless card. (Fig. 4 and Fig. 5)
- Always install the controller with wireless card closest to the center of all associated wireless thermostats.
- Always locate the controller with wireless card near or in the direct line of sight to as many wireless thermostats as possible.
- Avoid metal, brick walls or concrete obstructions between wireless devices as much as possible.
- Make sure the antenna on the wireless card is perpendicular to the floor.
- Avoid placing the controller with wireless card and the thermostats near metal or enclosing the controller with wireless card in a metal box. If the controller needs to be installed inside a metal cabinet, use the remote antenna accessory (TB-RA-1014).

SITE SURVEY OVERVIEW

If available, it is best to have a floor plan layout showing the location of all the proposed thermostats to be installed (Fig. 4).
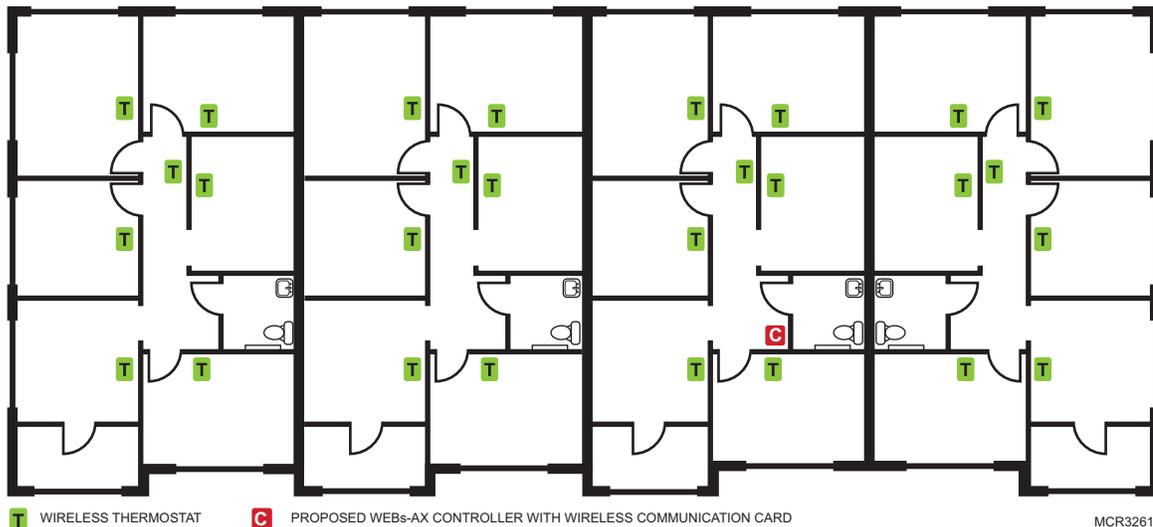
Fig. 4. Floor plan with proposed thermostats to be installed.

If possible, perform the survey during occupied hours when other electronic devices such as (computers, wireless laptop, cell phones, PDA's, wireless telephones, microwave ovens, light ballasts, etc.) would be in use as to generate as much interference as possible. Some of these devices can generate interference up to 20 feet (6.8 meters) away during normal operation. Even with possible sources of signal interference, the presence of these wireless devices will most probably not result in any network performance degradation.

It is important to understand that the survey values recorded are provided as a worst case scenario of a point to point application. Once the whole network is deployed with a WEBs-AX controller and wireless communication card and all wireless thermostats are present and functioning as routers, the ability of the network to efficiently route wireless signals cannot be compared to this simple survey analysis method (Fig. 5). Thus, it is important to remember that the displayed percent signal ONLY represents the signal strength from point A to point B. As other devices join the network mesh, the route taken from device A to device B will most likely change.

A dense cluster of wireless thermostats will allow your network to recover from temporary disturbances more swiftly.
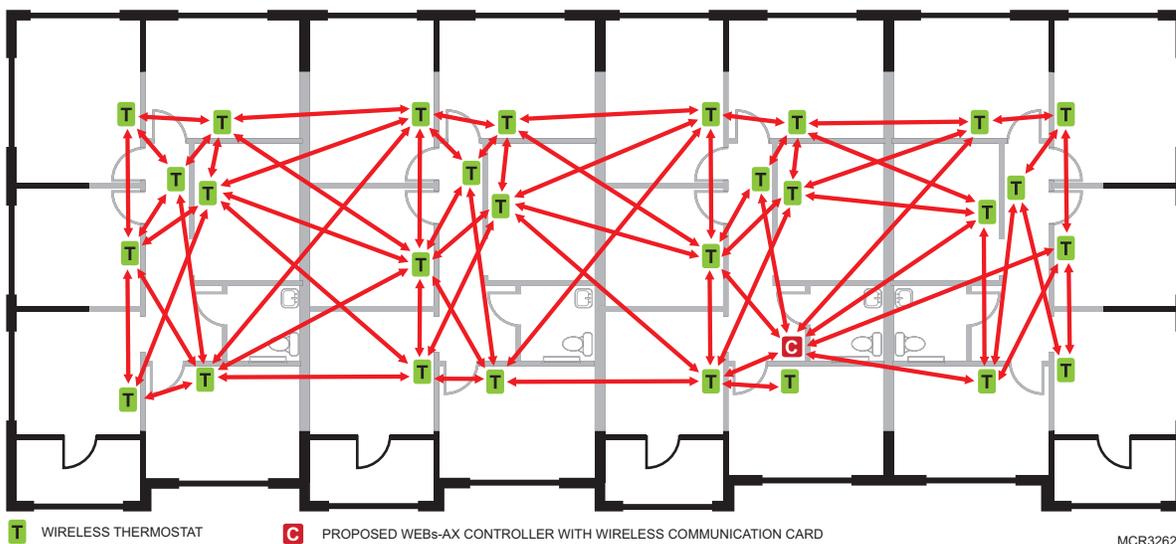
Fig. 5. A fully deployed wireless network will outperform the point-to-point wireless survey.

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PERFORMING A SITE SURVEY

This section provides information to complete a site survey.

Tools Needed

- WEBs 2xx, 6xx or 7xx controller
- TB-VWG-APP-1014 Wireless communication card
- 2 to 5 TB7xxx thermostats or repeaters
- 24 Vac power supplies for controller and thermostats/repeaters
- Site floor plan drawing

Preparing for the Site Survey

Prepare the following prior to going to the job site to do a site survey.

1. Create a site drawing of proposed locations for all wireless devices like the floor plan shown in Fig. 4.

2. Add and configure a wireless communication card to a WEB-2xx, WEB-6xx, or WEB-7xx controller. See the Programming section for more information.

NOTE: **To ensure a proper survey, Honeywell recommends using ONLY channels 15 or 25 to avoid network interference with 802.11 Wi-Fi devices in the 2.4GHz spectrum range. Begin by setting BOTH devices to the SAME channel & PAN ID.**

3. Add two to five wireless thermostats and/or wireless repeaters to the controller using the Workbench. Be sure to configure all thermostats/repeaters with the same PAN ID and Channel as the wireless communication card.

NOTE: **Using five thermostats/repeaters for the site survey will save time in completing the survey. If you have fewer than five, you may need to shut down and move the controller several times to test the number of hops at the site.**

Best Practices When Performing the Site Survey

- Always hold the thermostat vertically to ensure proper measurements. The thermostats antenna is designed for optimal horizontal distance penetration. Holding the thermostat horizontally will dramatically lower the range of connectivity.
- Hold the thermostat at the location where you would like to install it. The closer the thermostat is to the actual installation location of the thermostat, the more accurate the survey results will be.
- Do NOT stand directly in between the thermostat and the controller while measuring. Your body will interfere with transmission signals. Always stand out of line of sight to avoid interfering with the signal readings.
- To ensure accurate readings, ALWAYS hold the thermostat near the bottom. Do not hold it up higher, as you may cover the antenna (Fig. 6).

NOTE: **Always place thermostat as close as possible to the final location of the wireless thermostat once installed.**

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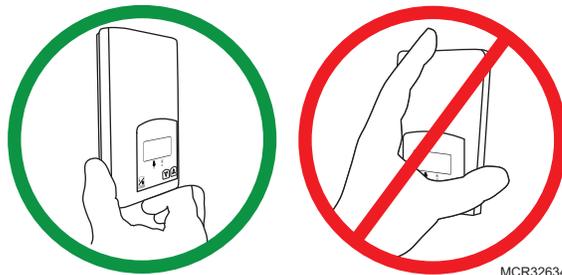
Fig. 6. Hold the thermostat, as shown in the left image, when doing a site survey.

At the Job Site

1. Begin by positioning the controller with the wireless communication card centrally in the floor space you are working in.

2. Find the coverage radius of the controller at its proposed location. This coverage radius is the first hop from the controller. Any thermostat or repeater should be NO FARTHER than 5 hops to and from the WEBs-AX controller with the wireless communication card. This is due to the nature of the ZigBee stack in the wireless controllers. Walk about the floor where a cluster of thermostats are to be installed. Locate the boundary where the signal strength is about 20%. The signal strength can be viewed in the thermostat's property sheet in the Workbench in the TRSS field (Fig. 7).
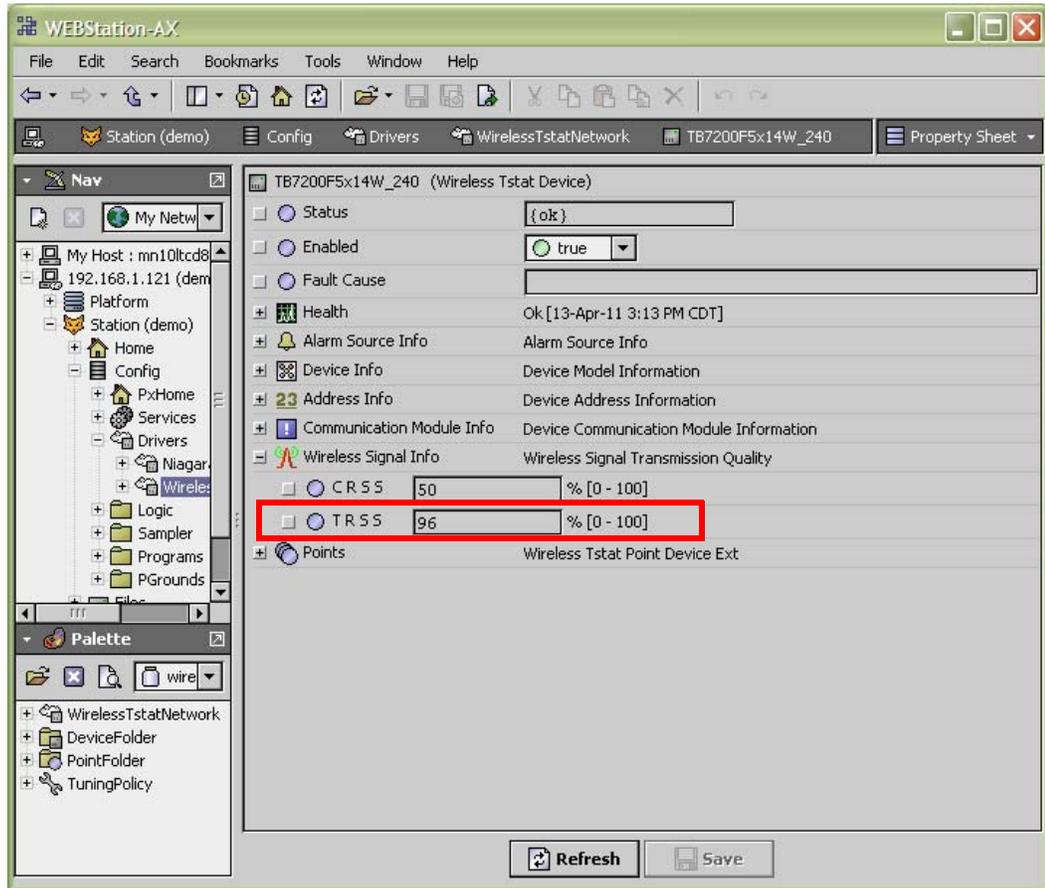
Fig. 7. TRSS field shows signal strength.

Move to another cluster of thermostats at different points to determine the radius. This represents the maximum radius of the first hop where connectivity is possible based on the building environment and partition construction. Please note that this distance can be anywhere from 0 to hundreds of feet (Fig. 8). It's possible that another location may improve your network performance or that you may require an additional controller with a wireless communication card or additional wireless repeaters.

| T | WIRELESS THERMOSTAT | C | PROPOSED WEBs-AX CONTROLLER WITH WIRELESS COMMUNICATION CARD |

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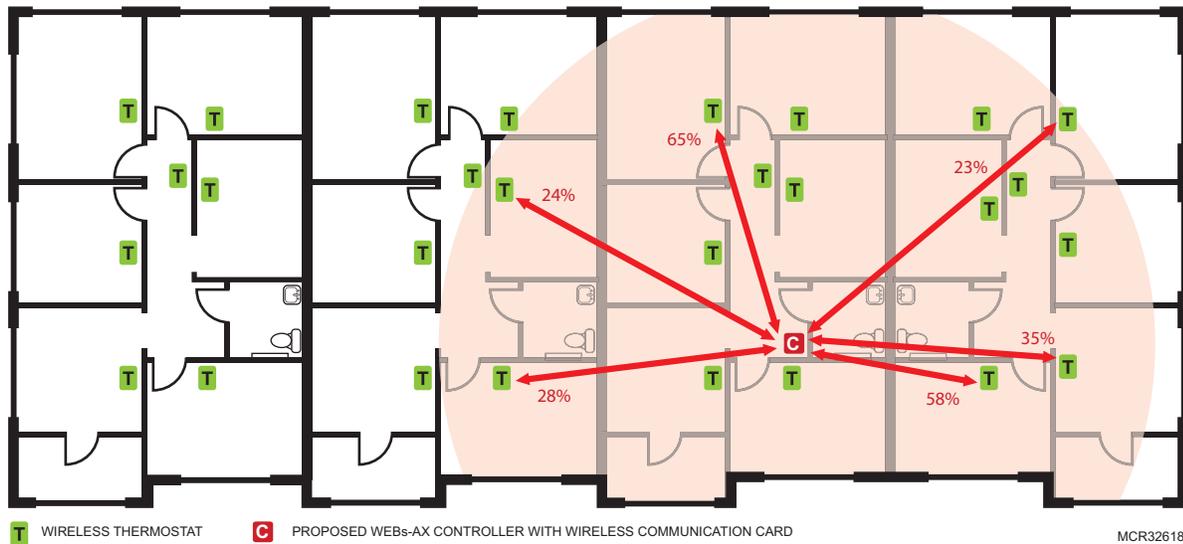
Fig. 8. Measuring the radius of the first hop.

3. Next test the signal strength at each location where a thermostat is to be installed. The signal strength at each location can be anywhere from 10% to 100%. Testing each proposed thermostat location ensures no unexpected obstacles or unforeseen sources of interference will affect each wireless thermostat at the time of installation.

4. Once all thermostats within the radius have been tested, place a thermostat at the first cluster of thermostats tested. Go to another cluster of thermostats extending outward from the radius of the first hop. Locate the boundary where the signal strength is about 20%. This represents the maximum radius of the second hop where connectivity is possible based on the building environment and partition construction.

NOTE: To force an immediate reading from the thermostat, right click on the thermostat, select Actions > Ping.
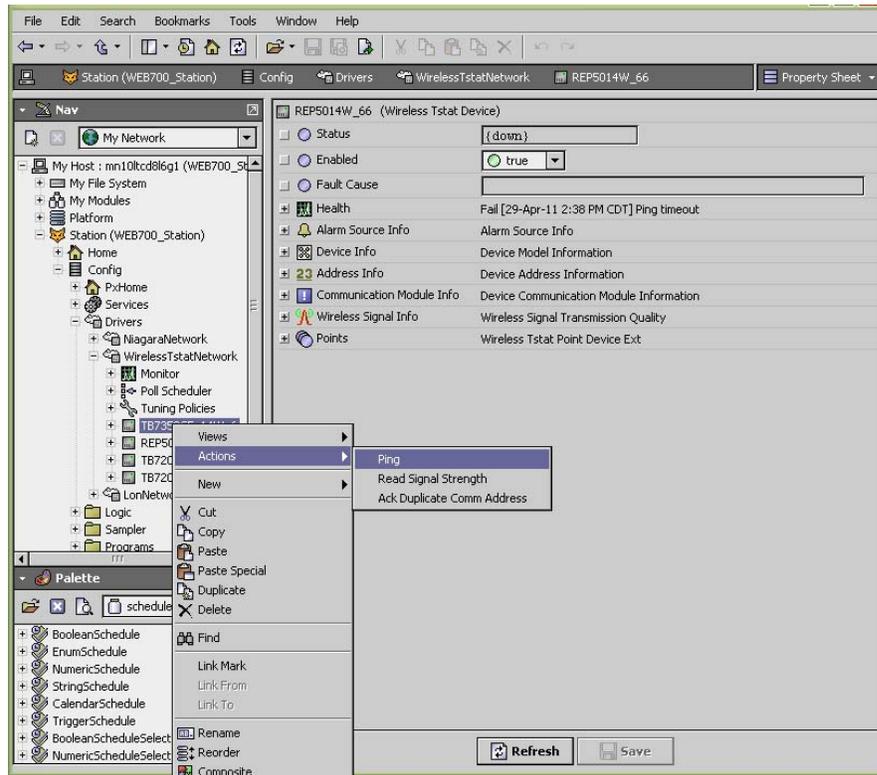
Fig. 9. Ping a thermostat to get an immediate reading of the thermostat's transmission signal (TRSS) at the station.

5.   Next test the signal strength at each location where a thermostat is to be installed. The signal strength at each location can be anywhere from 10% to 100%. Testing each proposed thermostat location ensures no unexpected obstacles or unforeseen sources of interference will affect each wireless thermostat at the time of installation. Fig. 10 shows the Proposed Site Floor Plan Example with three hops as indicated by the red (hop 1), blue (hop 2) and purple (hop 3) arcs.
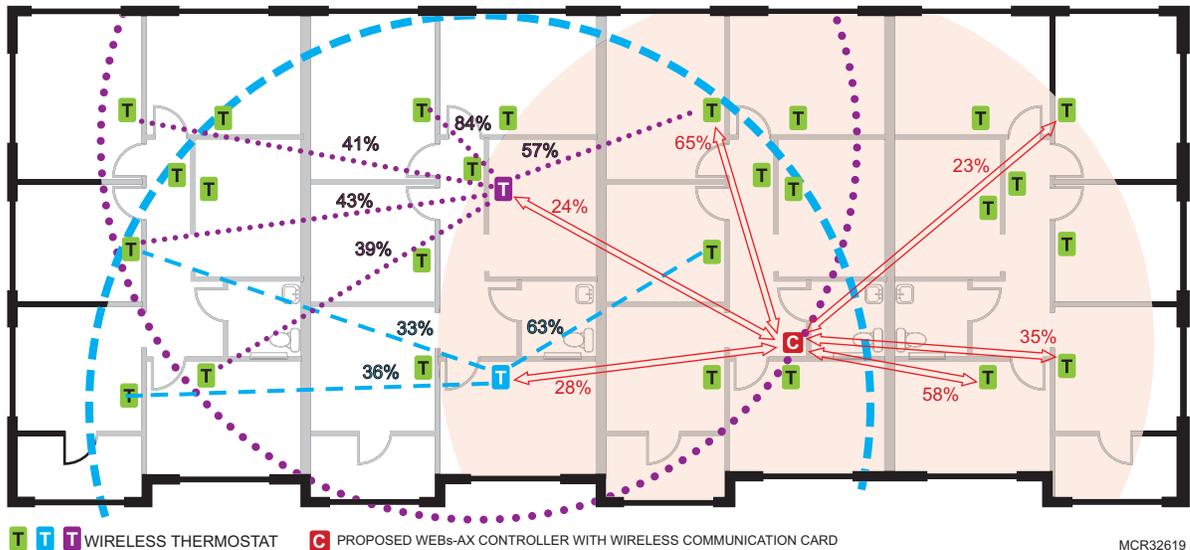
Fig. 10. Proposed floor plan with three hop radiuses.

6. Repeat steps 2-5 until you establish the maximum range covered by 5 hops where the last position recorded represents the safest furthest position that can be covered by a single controller (Fig. 11) and each thermostat location has been confirmed to have a signal strength of 10% or greater.
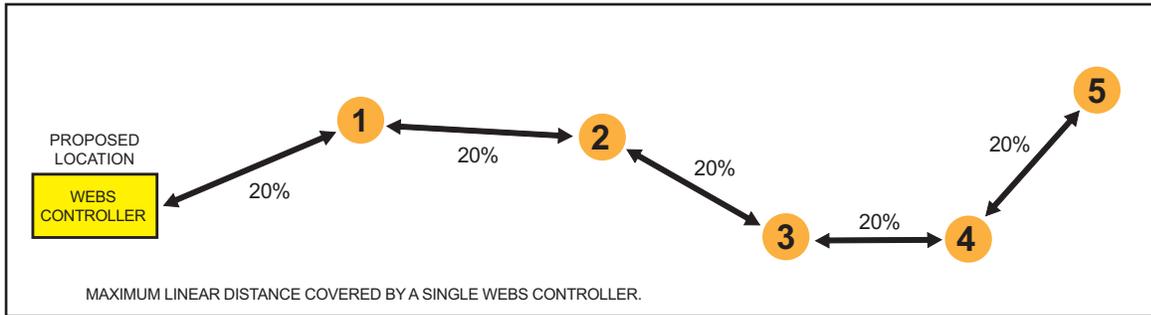
Fig. 11. Maximum of 5 hops from controller.

If more than 5 hops could be required by any device, we recommend adding another controller with wireless communication card. (Fig. 12). Please note that a hop in this case is defined as the maximum linear connectivity between 2 devices independently of other devices being present in between. If adding another network, use a different PAN ID and Channel on the second network. If additional networks, alternate between Channel 15 and Channel 25 for each level.
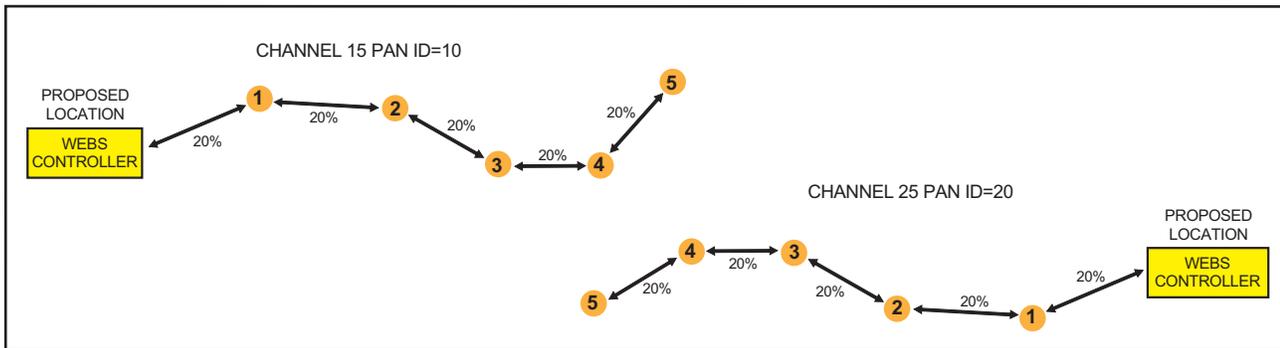
Fig. 12. Two wireless networks covering a maximum of 5 hops each.

Once the network is deployed and all wireless thermostats are present and functioning as routers, the ability of the network to efficiently route wireless signals cannot be compared to this simple survey analysis method.

Site Survey Summary

- Always write your transmission results on a plan when possible.
- Use TB-RP5000W repeaters if remote devices are too far to bridge or the signal is too weak.
- You can move the controller with wireless card to a new location if it helps create better clusters of thermostats.
- You should always plan for a floor by floor horizontal architecture vs. a vertical one.
- Additional controllers with wireless card can be used when clusters become too far apart in an installation.
- You can always contact your Honeywell sales representative for recommendations if you have a floor plan layout available for review.

BEST PRACTICES FOR INITIAL NETWORK START-UP

The startup of a ZigBee wireless network is easy once you understand how devices join the network. Review this section to learn how to do the initial network startup so all devices join the network.

Six Addresses Per Device

ZigBee is a standard which is suitable for wireless thermostat networks. In ZigBee, a device is said to join a network if it can obtain a ZigBee network address from a parent device. This ZigBee address is a value which is NOT initially exposed or available for the integrator to see.

Wireless devices can calculate and assign addresses for their surrounding devices by a distributed address assignment scheme. This assignment is flexible, but it may somewhat restricts the number of attached devices and the possible depth of the network for any given device on the network.

The WEBs-AX controller is responsible for initializing, maintaining, and controlling the network and devices on the network that can communicate with each other in a multi-hop fashion. The network is formed by one ZigBee controller and multiple ZigBee thermostats or repeaters. A device can join a network by associating with the controller, a thermostat, or a repeater. A ZigBee device is said to have successfully joined a network if it can obtain a ZigBee network address from the main controller or any other device. See "Wireless Device Status LEDs" on page 27. for information on network sanity.

Each controller, thermostat or repeater can ONLY give a maximum of 6 ZigBee addresses out to other devices so they join the active ZigBee network. This means for any device to be able to successfully join a ZigBee network, it needs an address to be assigned by another device which is within connectivity and that has NOT already assigned its maximum of 6 addresses.

Please note that once a device has been assigned a ZigBee address and has joined the active ZigBee network, it will save its assigned ZigBee address to flash memory and use it afterwards even after a power failure or a network restart. The ONLY time a device would require a NEW ZigBee address is if the network is restarted with either a new PAN ID or a new Channel value. This causes the currently assigned and saved ZigBee address in flash to be erased and will force the device to try to rejoin a new network. In this case it is necessary to rediscover the device(s), and if necessary, match them to the existing devices in the station's database.

Orphan Nodes

It is important to understand that if a network is started up incorrectly it may result in orphaned or unassigned devices that will NOT join the ZigBee network. Let's first understand how an orphan node is created. A typical example is when jobs are started on an integrator's desk before sending the devices to the field for installation. Often the integration technician will begin by adding thermostats to the Workbench station as follows:

• They will power the first unit, add it to the database and power it down.
• They will power up the second unit, add it to the database and then power it down.
• This will be repeated to a maximum of 6 devices.

This will work fine for the first 6 devices only because the controller can provide a maximum of 6 assignable addresses. When the integrator powers up the 7th device it will NOT be able to join the ZigBee network unless one of the devices that has already received a ZigBee address is powered back on. Once this is done, it will be able to assign the next 6 addresses as usual.

In order to add another 6 devices, one of the previously added devices needs to be left on. If 42 devices are to be added to the network, 8 should ALWAYS be powered and be within connectivity range of the others.

Please note that this ONLY applies to the initial network start-up. Once all the devices are online with the Workbench station everything will operate seamlessly even on power up / down and network restarts.

HOW ORPHAN NODES ARE CREATED IN THE FIELD
Example: 2 small buildings are within a few feet of each other. Both have 6+ devices each (Fig. 13).

NOTE: A configuration like this, with communicating thermostats split between two buildings, is not recommended.

Premises
- Building A is started first.
- Yellow device has given its 6 addresses out to other devices in building A.
- Building B devices can only be connected through blue device due to maximum distance coverage.

Result
Because the blue device cannot have an address assigned by the yellow device which is within range, the blue device and orange devices cannot join the ZigBee network.
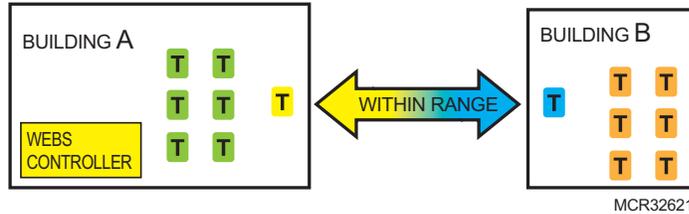
Fig. 13. Two small buildings within range. Both have 6+ devices each.

GETTING ORPHAN DEVICES BACK ON THE NETWORK
1.   Disconnect and bring one of the building B devices and power it up in building A until it joins the ZigBee network (confirmed either at the device or using the status LED on the wireless communication card of the device).
2.   When the device has joined the network in building A and is added to the Workbench station, bring it back into building B so it can propagate ZigBee addresses to the other devices in building B.

Initial Network Startup at the Job Site

1.   As shown in Fig. 14 below, first power up the orange devices in sequence and wait until they are joined to the network or matched to their offline created counterparts.
2.   All the remaining yellow devices / nodes / controllers can now all be powered up to also join the network.
3.   This start-up sequencing allows for ALL devices to be discovered without creating orphan nodes.
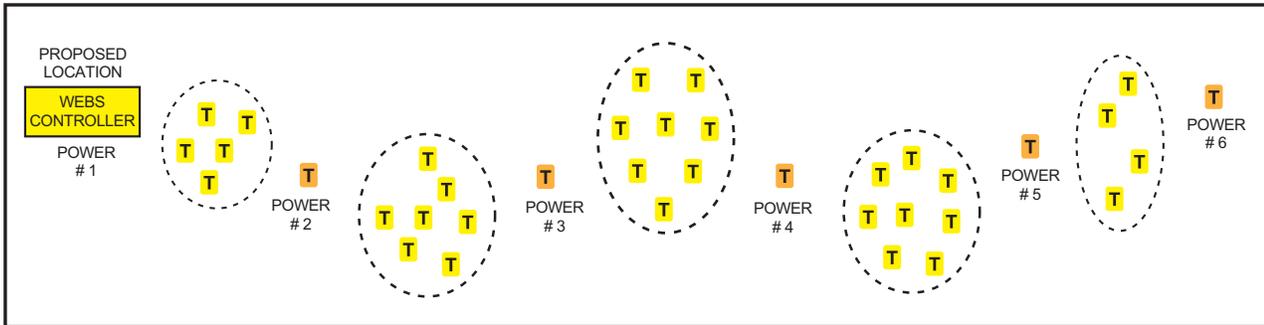
Fig. 14. Power Up Sequence for Onsite Initial Network Setup

Initial Network Startup at the Integrator's Office

1.   Power up the WEBs-AX controller with the wireless communication card installed and set the PAN ID and Channel.
2.   Power up the first thermostat or repeater to add to the Workbench. Once it has an address, which you can see in the Workbench under the device's property sheet, it has used one of the six addresses the controller can assign.
3.   Continue adding devices to the network with one thermostat previously added always powered up so there will be sufficient device addresses available. For example, if you have 48 thermostats to add to the station, the controller and seven other devices would be needed to assign addresses to all of the other devices being added to the network.

Installing the Honeywell Wireless Communication Card

The Honeywell wireless card (TB-VWG-APP-1014) and related Honeywell TB7200 and TB7600 wireless thermostats use ZigBee/IEEE 802.15.4 physical layer for communication. The WEBs-AX controller with the wireless communication card acts as network coordinator device for the IEEE 802.15.4/ZigBee network used with the Honeywell wireless thermostats.

A recommended typical maximum of:

- **30** wireless thermostats can be supported by a single WEB-2xx controller
- **50** wireless thermostats can be supported by a single WEB-600 or WEB-700 controller

The theoretical maximum of number of thermostats supported by a single WEBs controller is dependent on the resources available for the WirelessTstatNetwork driver .jar file and the extent of integration added to the station itself. When additional functions and services are added to the station, the available resources for the driver will be less. Once you have configured the station for the wireless network and all other features (graphics, services, histories, alarms, etc.), you should monitor the resources so that they do not exceed the recommended limits for each specific platform.

Refer to the *Wireless Communication Card for TB7200/7600 Installation Instructions* supplied with the TB-VWG-APP-1000 communication card for detailed information on how to install the wireless communication card in a WEBs-AX controller.

Fig. 15. Wireless communication card.

NOTE: **The wireless communication card must be installed in option slot 1 on WEB-2xx and WEB-6xx controllers and installed in either option slot 1 or slot 2 on a WEB-7xx controller.**

PROGRAMMING IN WEBS-AX WORKBENCH

Configuring the Wireless Network

The following instructions assume you are familiar with the WEBs-AX Workbench and its related functions. This section guides you through the steps to set up a Honeywell wireless network in WEBs-AX. Install the wireless communication card (TB-VWG-APP-1014) on a WEBs-AX controller before you begin.

Note: WEB-7xx controllers require WEBs-AX Workbench version 3.5 or greater.

1. Install the wireless communication card on the WEBs-AX controller according to instructions provided with the wireless card.
2. Copy the WirelessTstatNetwork.jar and WirelessTstatDevices.jar files to your local WEBStation-AX module folder. The .jar files are available for download from on the Honeywell Buildings Forum (http://buildingsforum.honeywell.com).
3. Open the controller's Platform, then click on **Software Manager**.
4. Select the **wirelessTstat** file, the **wirelessTstatDevices** file, and the **basicDriver** file to install on the station
5. Click on the **Install** button, and then click on the **Commit** button.
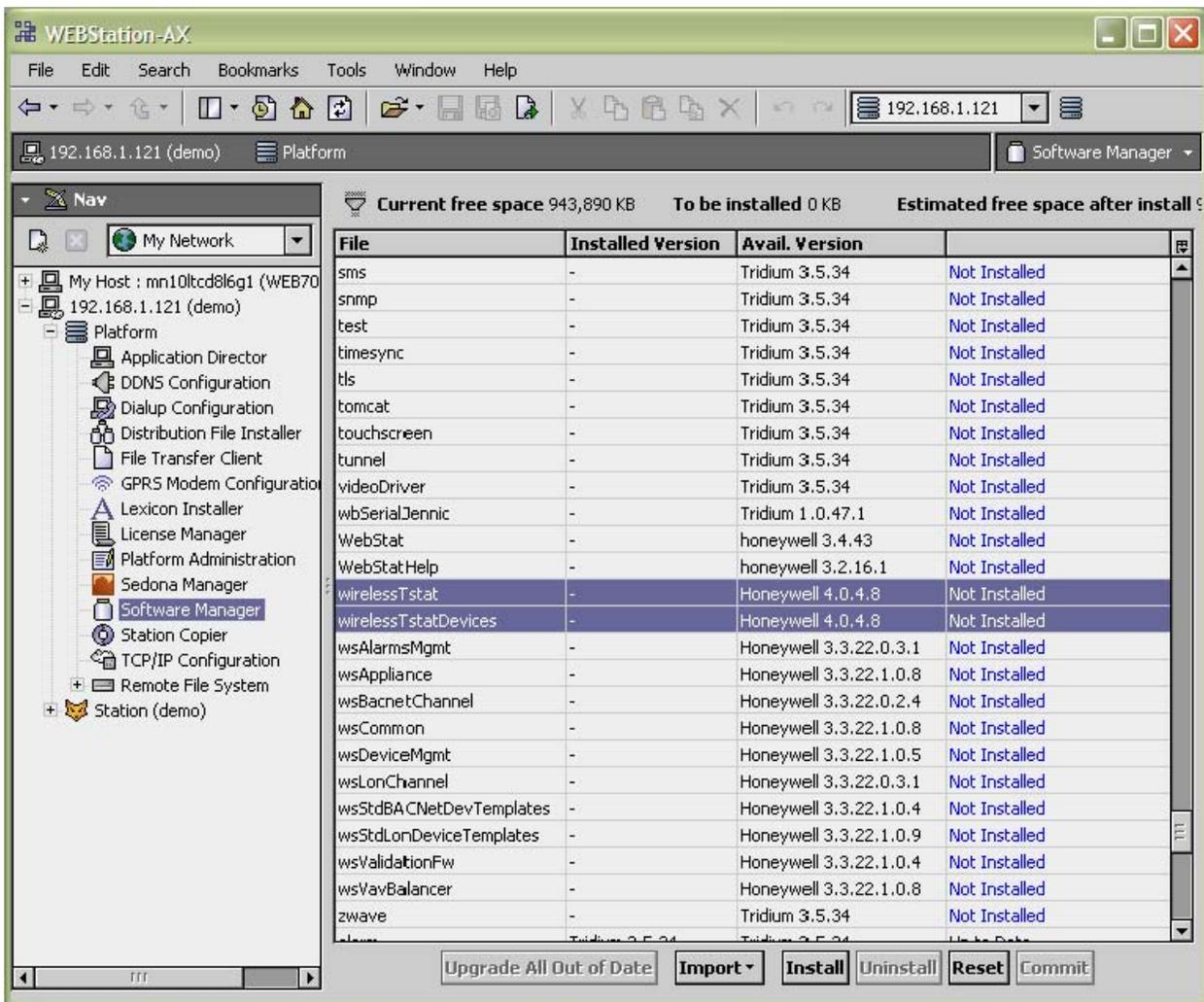
6. Reboot the Workbench and the WEBs-AX controller to properly load the .jar files. The wireless card will not work unless you reboot after installing these files.
7. Open the **wirelessTstat** palette, then drag and drop the **WirelessTstatNetwork** driver to the controller's Station Drivers folder.
8. Rename the WirelessTstatNetwork driver if desired.

Configuring the Wireless Communication Card

1. Right click on the WirelessTstatNetwork driver, select **Views**, then **Property Sheet.**
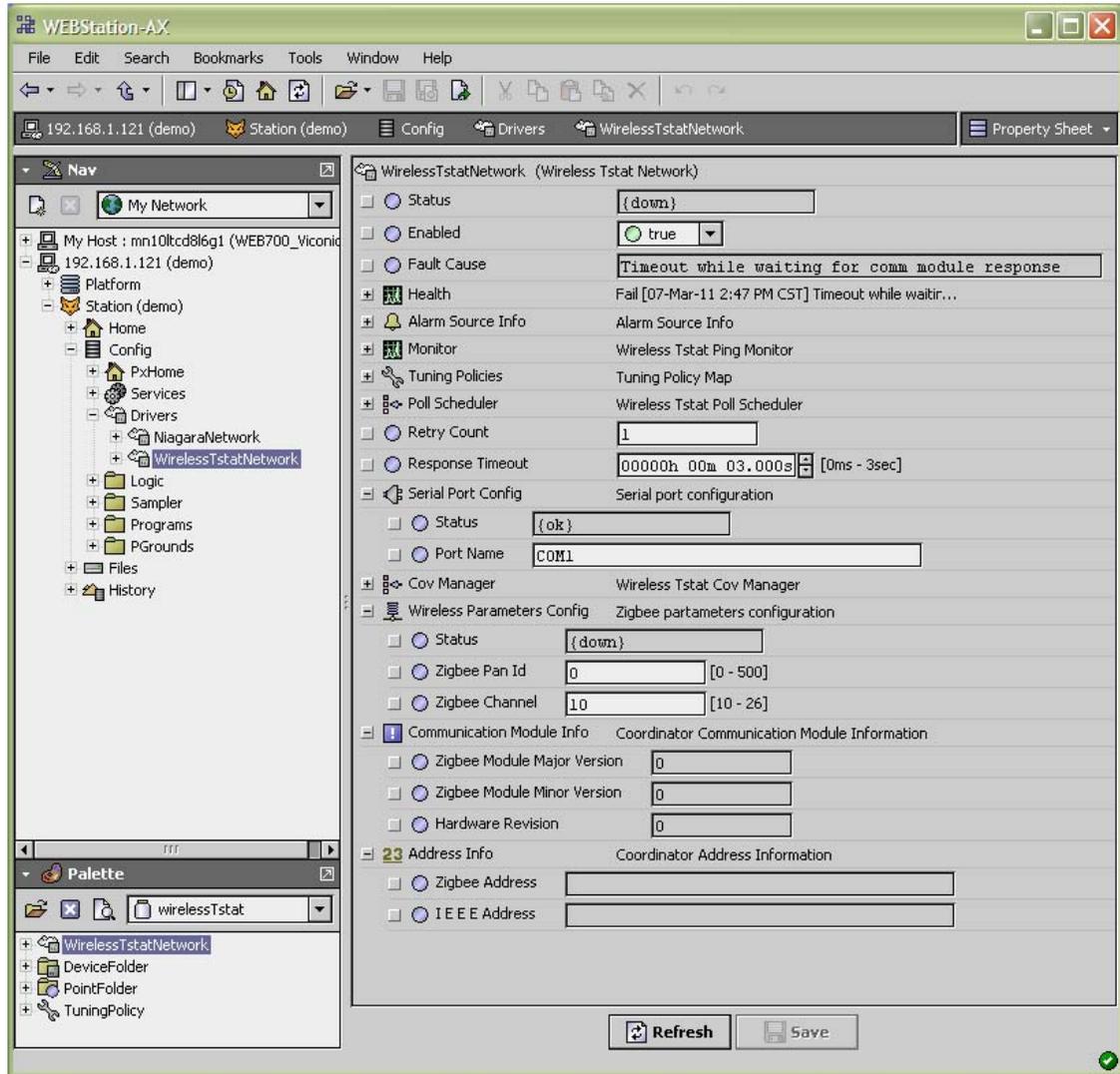
2. Enter the **Port Name** for the wireless card in the **Serial Port Config** section.
    WEB-2xx and WEB-6xx controllers must use option slot 1 on the controller and must be set to **COM1**.
    WEB-700 controllers can use slot 1 or slot 2. Set slot 1 to COM3 or slot 2 to COM4.
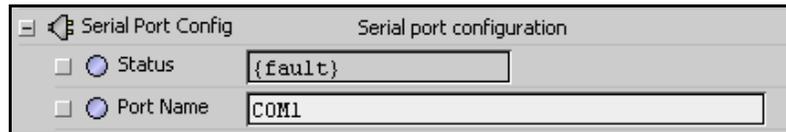
3. Set the Zigbee Pan ID and the Zigbee Channel for the wireless network in the Wireless Parameters Config section. All thermostats and the wireless network should use the same Pan ID and Channel.

    Pan ID range is 1-500. 0 is not a valid PAN ID option. In multi-level buildings or buildings with more than one wireless thermostat network on the same floor, set a different PAN ID for each network.

    Channel should be set to 15 or 25. In a multi-level building, alternate channels between channel 15 and 25. For example, set the first floor to channel 15, the second floor to channel 25, the third floor to channel 15, etc. In a building with more that one wireless network on one level, channels should also be mixed between channels 15 and 25.

4. The Status field at the top of the Property Sheet should display (ok). This means your wireless card on the controller is recognized.
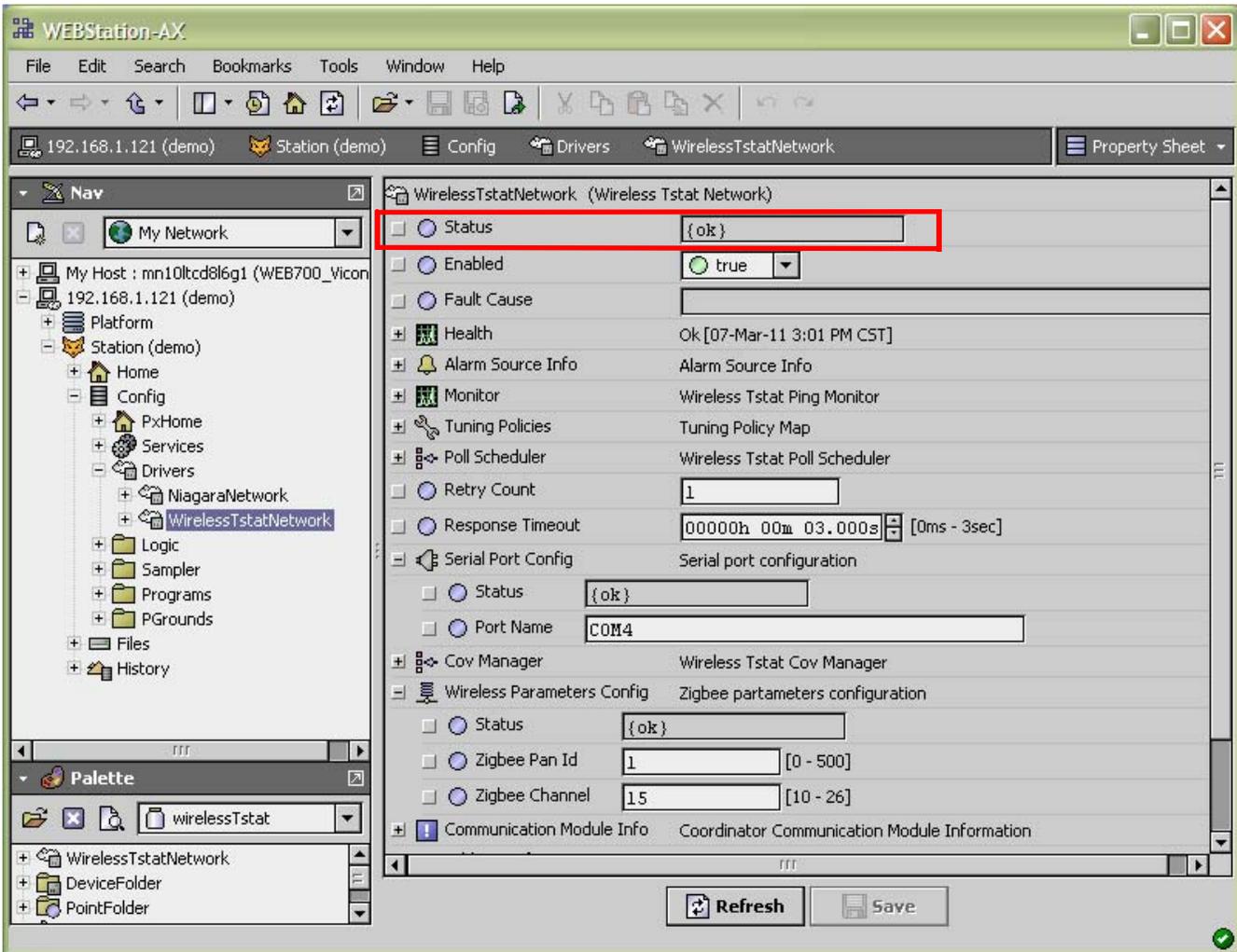
5. Click on the Save button to save your settings and to properly start the network.
    As soon as a valid PAN ID and Channel are given to the WEBs-AX controller's wireless communication card, any thermo-stat having the same configuration of PAN ID and Channel can be detected and registered to the wireless card.

MORE INFORMATION ON THE WIRELESS NETWORK PROPERTY SHEET
This section provides additional information on the Wireless Network Property Sheet.

ZigBee PAN ID: (Personal Area Network Identification). This is where the PAN ID of the gateway is set. Range is from address 1 to 500. The default of "0" is *not* a valid PAN ID.

ZigBee Channel: This is where the current Channel frequency used by the wireless thermostat network is set. While the range is from 11 to 26 (2405 MHz to 2480 MHz, 5 MHz channel spacing), use only Channel 15 or 25. Please note that channel 26 is attenuated by 4 db compared to the other channels. The default of "10" is not a valid Channel. 802.11 Wi-Fi transmissions overlap and *may* interfere with other channel selections allowed by 802.15.

ZigBee Address: Individual unique ZigBee address for any ZigBee device on a ZigBee network. The address is assigned during the initial network start-up and is saved in flash memory. This is the main address used for all key low level network functions.

The communication module information and the assigned IEEE and ZigBee wireless address information are given for information references only.

Any time the PAN ID or Channel is changed, a new ZigBee address is assigned by the network manager to the devices.

IEEE Address: Individual unique IEEE address for any ZigBee device on the network. Factory assigned and non-editable.

Adding Thermostats to a Station

This section describes how to add wireless thermostats to a station.

1. Double click on the WirelessTstatNetwork in the Nav pane.
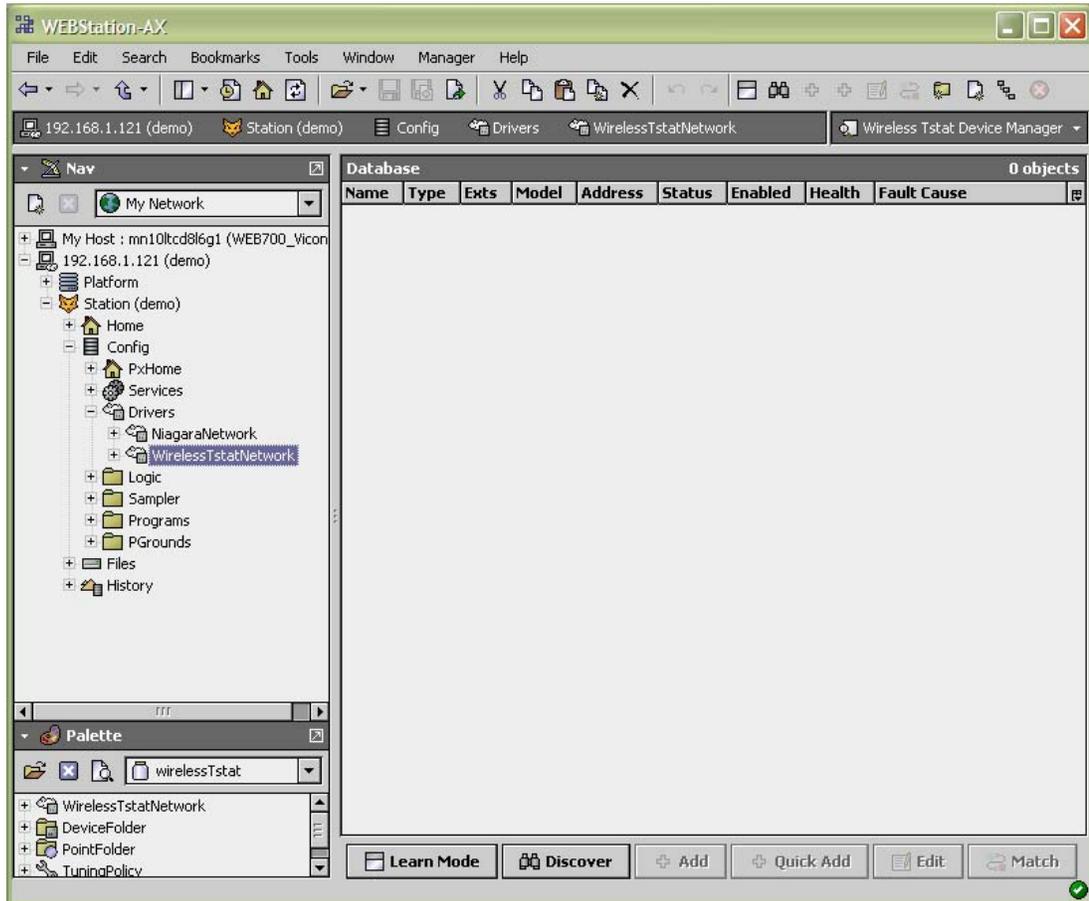
2. Click on the Discover button, and click OK. If desired, you can enter the lowest and highest thermostat Com Addr number in the Device Low Limit and Device High Limit text boxes if you want to limit the number of devices discovered.

All thermostats that have been properly configured with a unique Com Addr, the network PAN ID and network Channel and that are powered up will be discovered.

The "Discovered Device" folder lists the current thermostats and repeaters detected by the WEBs-AX controller that have the same PAN ID and Channel settings as the WEBs-AX controller. A Yellow highlight indicates a previously discovered thermostat that has not updated it's mandatory wireless heartbeat to the WEBs-AX controller and is now offline to the WEBs-AX controller.

If a properly configured thermostat has issues joining the network and cannot be discovered by the WEBs-AX controller (typically the ones farthest from the WEBs-AX controller), a forced sync can be done by right clicking on the WirelessTstatNetwork driver extension and selecting "ping." Bringing the device close to the WEBs-AX controller or another device that has already joined the

network is another option. This will enable it to have a Zigbee address assigned by the wireless communication card of the WEBs-AX controller or another thermostat. It will then enable the WEBs-AX controller to discover it; once discovered, re-install it at the proper location.

3. Select the thermostats to add to the Station's database and click Add. The Add dialog box appears.
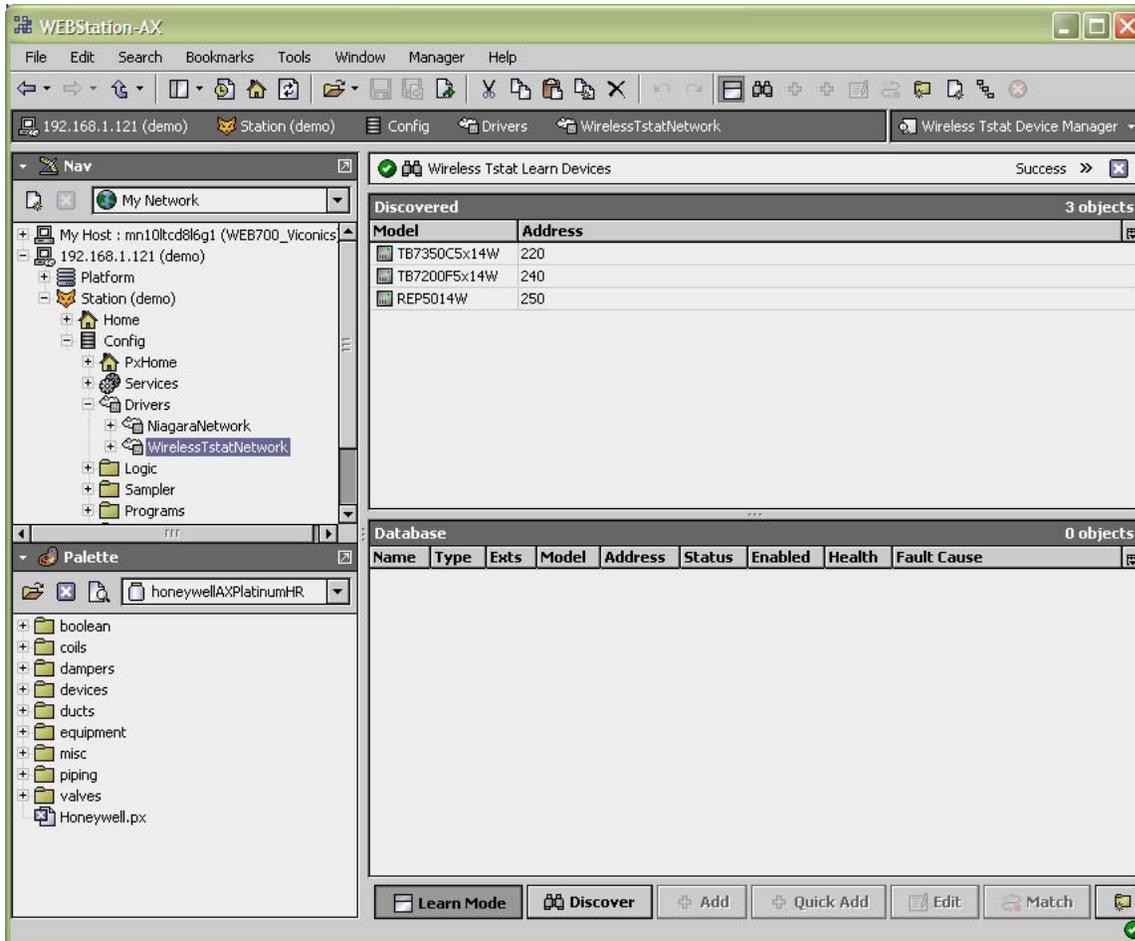
MORE INFORMATION ON ADDING DEVICES
At the bottom of the "WirelessTstatNetwork" folder, Add and Quick Add buttons are used to add devices to the network along with other options.

New. The "New" thermostat button is a utility that allows the integrator to create offline devices prior to the installation. This allows the integrator to pre-build a database and all related utilities before the actual installation takes place. When the assigned thermostat would be automatically discovered in the field during commissioning, all required functions and bindings would already be done and assigned.

Select the number of devices to add of the same type and the starting local MAC address each thermostat will be assigned in the field.

Then select the required thermostat model number that will be installed on the job site. Remember to select **_ALL_** thermostats if more than one is required. The thermostat can be enabled now or at a later date if the installation is done in segments. If the devices in the field match the configuration of the devices created offline: PAN ID, Channel, Comm Address (MAC address) & model number, they will automatically be matched to the devices created offline upon discovery.

Edit. Allows you to edit the characteristics assigned to any specific wireless thermostat. The thermostat name, Com Address and enabled flag can be modified. The thermostat Model Type cannot be changed. If another model is required under the same address, simply delete it and either create a new one offline or re-discover the proper one.

Match. When replacing thermostats or matching them in the field during the initial commissioning, this feature allows you to match the characteristics of an offline created thermostat or an existing replaced one to a newly discovered one.

Add and Quick Add. Transfers any selected device from a "temporary" status under the discovered window and loads them directly under the "WirelessTstatNetwork" folder in the database window. This enables the thermostat to display all its point extensions. The add button allows you to edit the device before it is addedt to the network. Quick add is directly added to the network.

4. You can rename the thermostats now or after they are added to the database by double clicking each device.
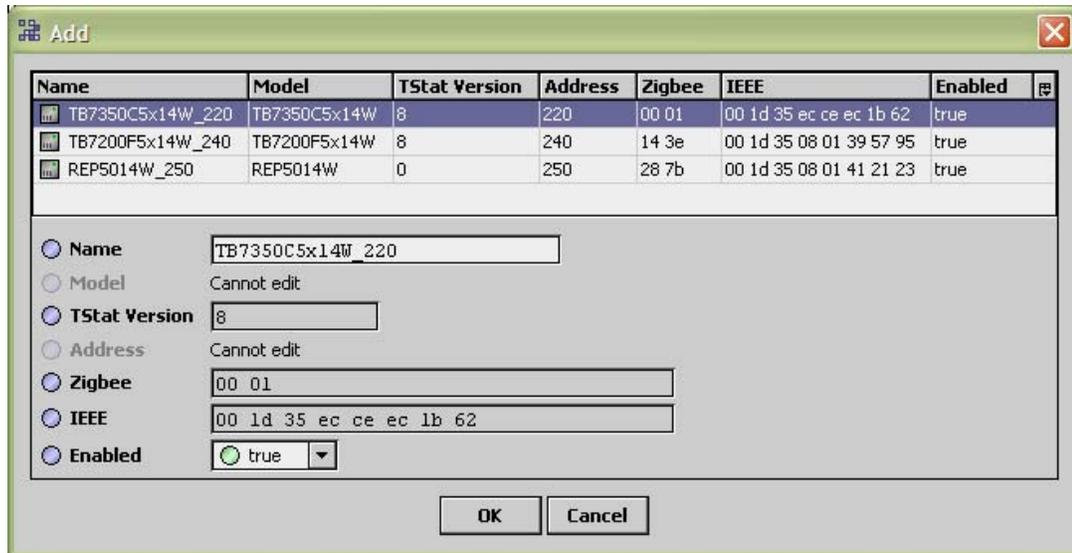
5. Review the status of each device in the Database section. Note the status of each device should be ok.
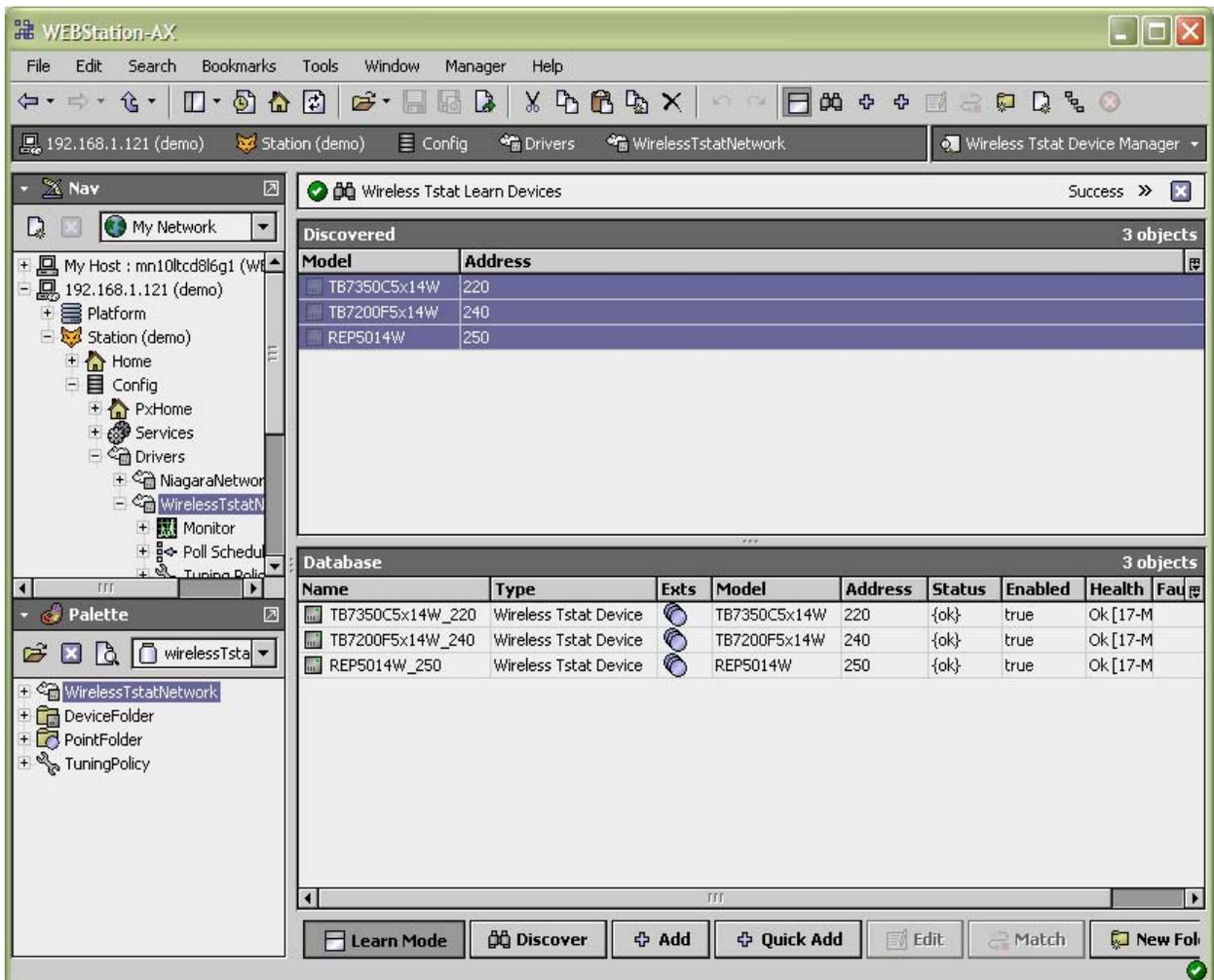
MORE INFORMATION ON DEVICES ADDED TO THE DATABASE.
The wireless objects related to any specific thermostat exchange present value to and from the WEBs-AX controller on a fixed COV subscription base.

Back and forth from the WEBs-AX controller to the wireless thermostats, the COV values are fixed to:

- 0.1 for all numerics
- 1% for demand & RH
- COV for enums & booleans

The total number of thermostats supported is also dependent on the resources available for the WirelessTstatNetwork driver .jar file and the extent of integration added to the WEBs-AX controller station.

It is safe to assume that if more advanced functions and services are added to the station, the available resources for the driver will be less. It is important that once the station is all done and installed with all GUI, services, trends, logs, etc. that resources are monitored and are not above what is recommended for each specific type of WEBs-AX controller platform.

All objects such as GUI's, configuration parameters and statuses will be discovered when a discovery process is done. Afterwards, it is up to the user to pick and choose what is needed for the implementation. We recommend selecting only the objects needed for the integration and discarding the unused objects.

Name: The thermostat's given name in the database. The name is constructed of the thermostat model number and its current local MAC address. Ex. A TB7200C5014W with a local MAC address of 21 will carry a name in the database of TB7200C5000_21. The model name text string is fully editable as required.

Model: The default thermostat model number given in the database.

Type: Identified for the moment which type of Honeywell wireless device has been detected

Com Address: The current physical MAC address set at each individual thermostat in its local configuration (Com Addr parameter set at the thermostat or repeater).

Status: Indicates if the current thermostat is online to the WEBs-AX controller or not.

> If online, the status will be {OK} and the thermostat line will be white
> If offline, the status will be {down} and the thermostat line will be yellow

Health: The current status of each thermostat wireless node. "OK" is for an online thermostat and the date and time represent the last time a communication event was received by the WEBs-AX controller from a thermostat. A "Fail" represents a thermostat that stopped responding to its mandatory heartbeat.

MORE INFORMATION ON THE WIRELESS DEVICE PROPERTIES
Right click any thermostat on the WirelessTstatNetwork to load the thermostat property sheet**.**
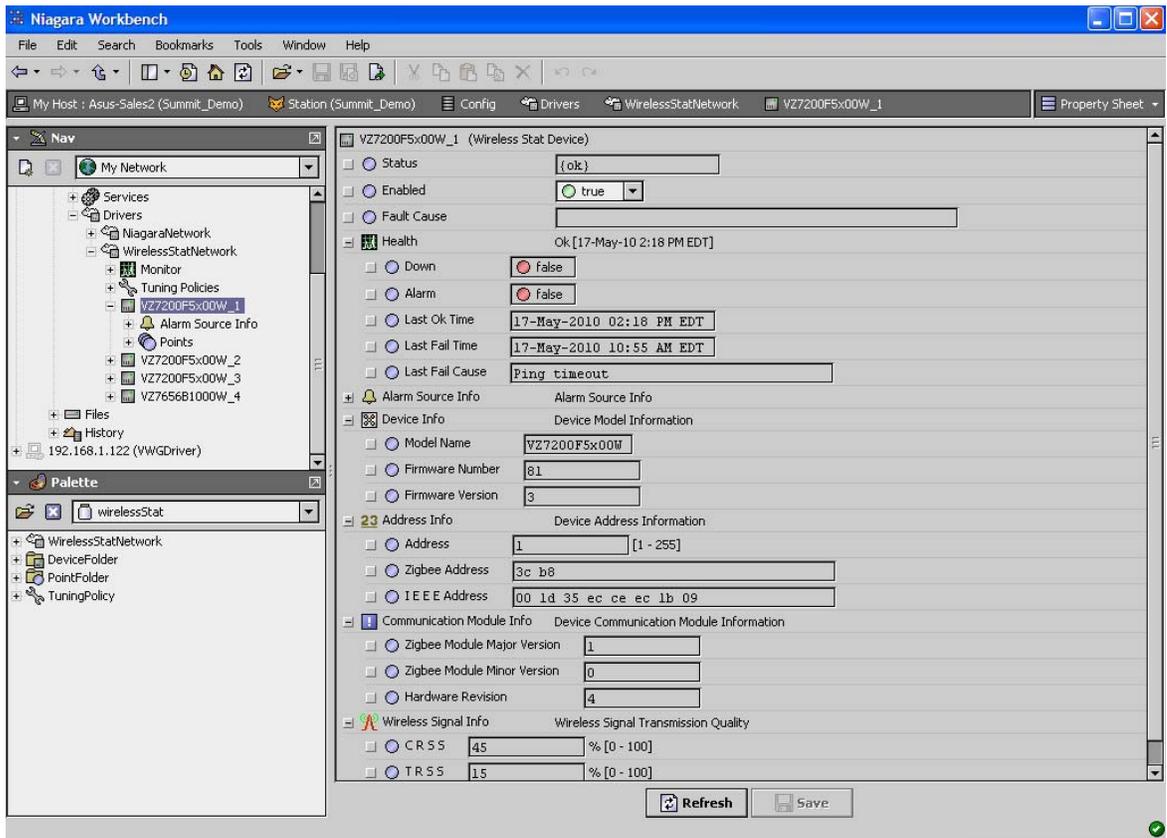
Status: Will give the status of the wireless thermostat on the network

- **(ok) Device heartbeat reporting properly with no fault encountered**
- **(down) Device heartbeat failed. No communication to the device**
- **(fault) Transaction time out on specific object write(s). Device heartbeat is still valid**
- **(disabled, fault) Device has been disabled**

Enabled: Enables or disables the communication to the wireless thermostat. It can be used if a complete database is created for all the devices and the installation / integration is done in segments.

Health: Health status of the device. The "Last Ok Time" represents the last time the WEBs-AX controller received the mandatory heartbeat from the thermostat.

Device Info, Address Info and Communication Module Info: All read only properties related to the local thermostat and are given as general information.

Wireless Signal Info:

- CRSS - Controller (with wireless card) Receiving Signal Strength (in %)
- TRSS - Thermostat Receiving Signal Strength (in %)

Any value from 10 to 100% indicates good ZigBee connectivity. Any value below 10% "may" indicate that an extra repeater (TB-RP5000W) may need to be installed.

63-4522—04

6. To see the points available for a thermostat or repeater, double click on a point to see the WirelessTstatPoint Manager view, then click on the Discover button. We recommend only adding the points needed for each device.
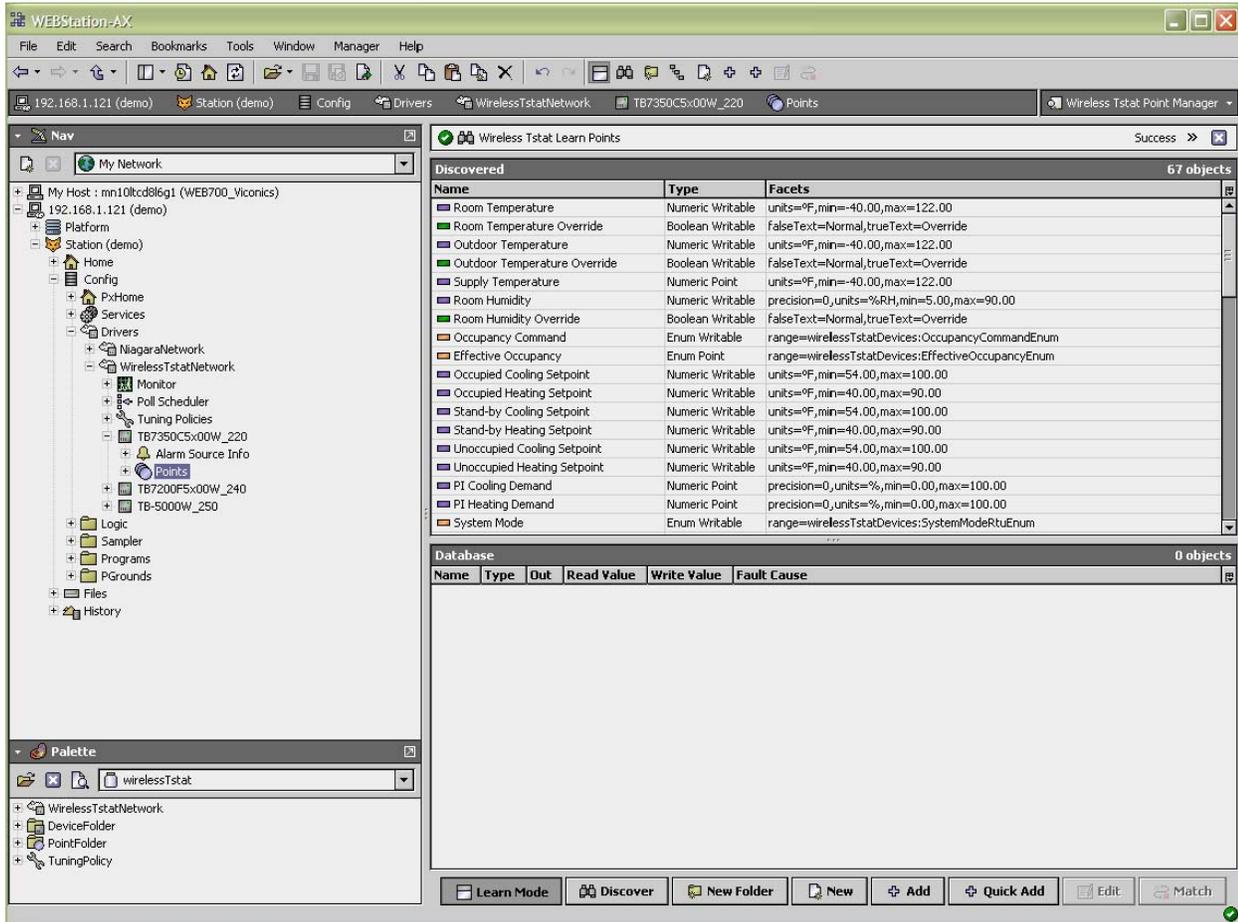
7. Select the points to add to the database, and click Add. Like adding thermostats, you can add one point at a time or group select and add all desired points to the database. Changes to point parameters can be made as you add them to the database or after the points are added.

Refer to additional sections in the remainder of this reference guide to learn more about the available objects for each thermostat.
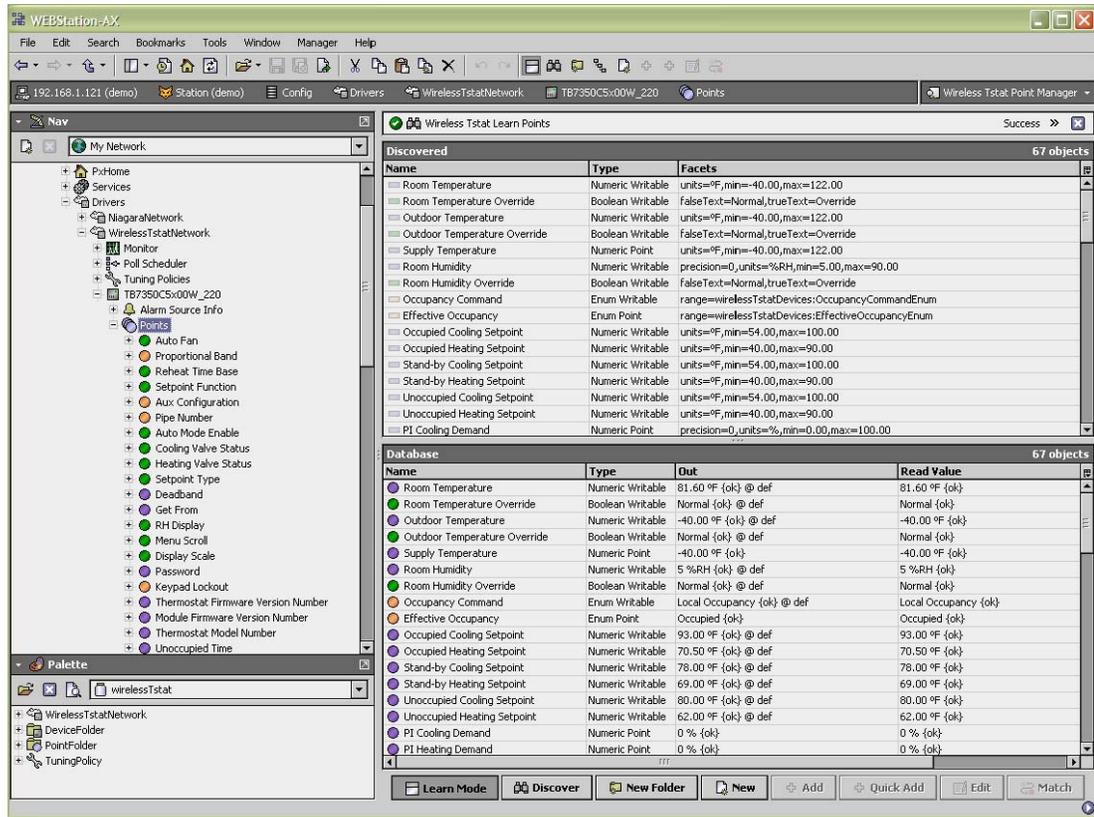
INTEGRATION

Global Commands

The following figure shows typical objects from each thermostat that can be monitored and commanded from the front-end.
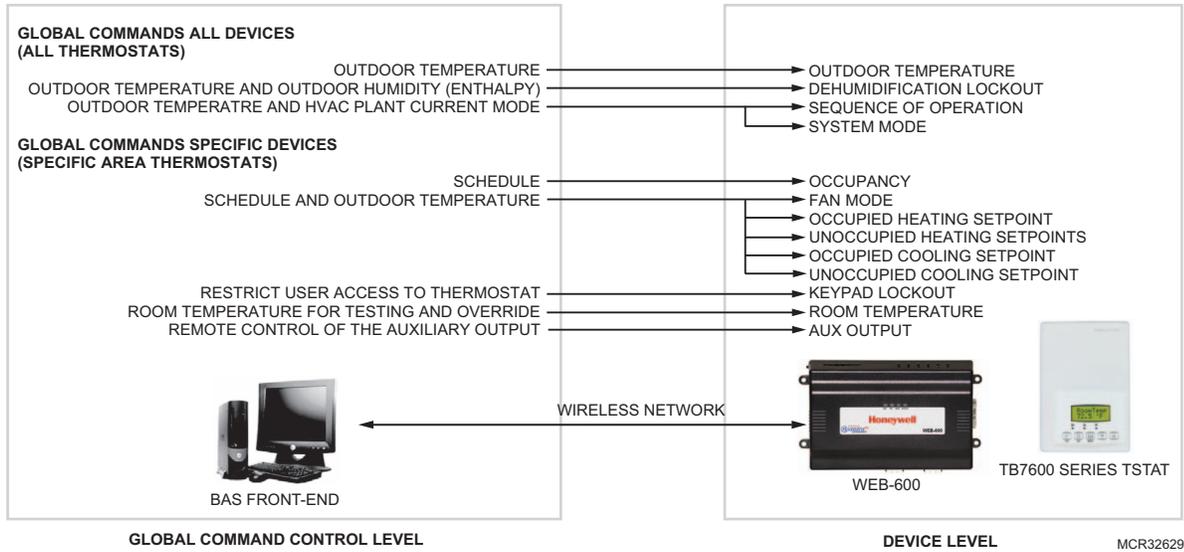
Fig. 16. Global commands from a BAS front-end to a WEBs-AX controller and associated thermostat.

TB7200 Integration Graphical User Interface (GUI) objects

The following objects should be typically used in a GUI:

- Room Temperature (Numeric);
- Occupied and Unoccupied Heat Setpoints (Numeric);
- Occupied and Unoccupied Cool Setpoints (Numeric);
- Outdoor Temperature (Numeric);
- Supply Temperature (Numeric) (If available);
- Occupancy Command (Enum);
- System Mode (Enum);
- Heating Valve Status (Enum);
- Cooling Valve Status (Enum);
- PI Heating Demand (Numeric)
- PI Cooling Demand (Numeric)
- Window Alarm (Boolean);
- Filter Alarm (Boolean);
- Service Alarm (Boolean);
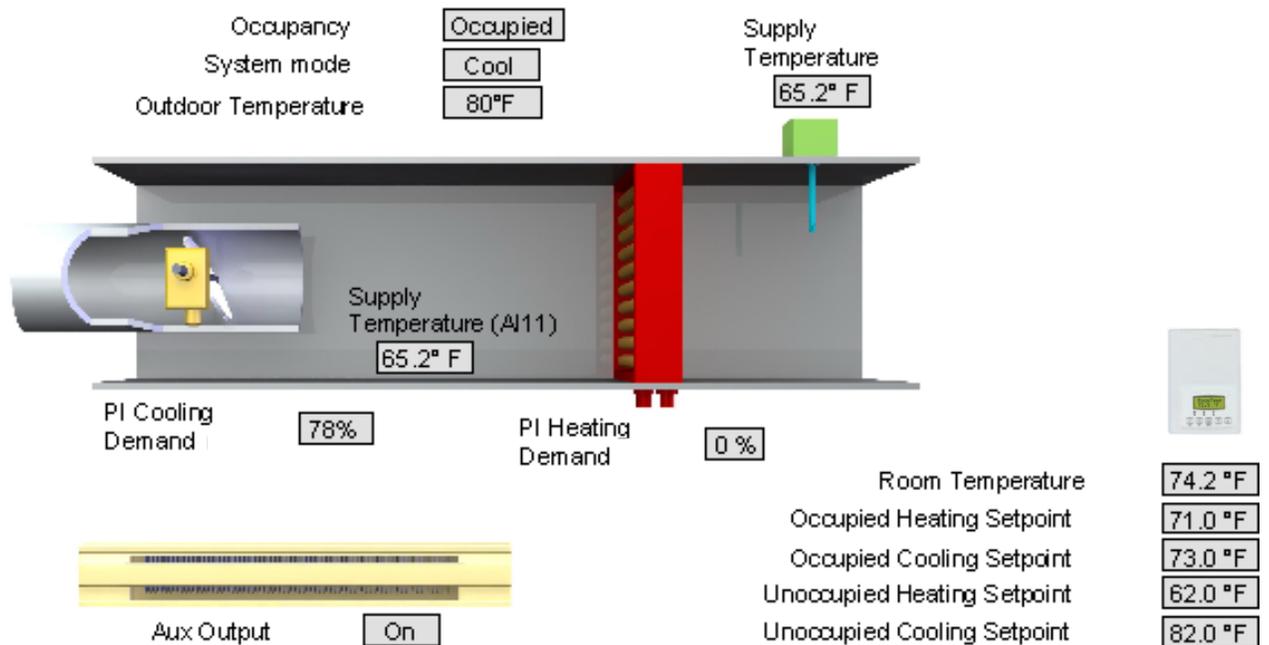
Fig. 17. Typical GUI for TB7200 Series.

TB7600 Integration – Graphical User Interface Objects

The following objects should be typically used in a GUI:

• Room Temperature (Numeric);
• Occupied and Unoccupied Heat Setpoints (Numeric);
• Occupied and Unoccupied Cool Setpoints (Numeric);
• Outdoor Temperature (Numeric);
• Supply Temperature (Numeric) (If available);
• Occupancy Command (Enum);
• Effective Occupancy (Enum);
• System Mode RTU (Enum) or System Mode HPU (Enum);
• G Fan (Boolean);
• Y1 Cool (Boolean);
• Y2 Cool (Boolean);
• W1 Heat (Boolean);
• W2 Heat (Boolean) or Reversing Valve (Boolean);
• Economizer Output (Numeric) (if available);
• Aux (Boolean);
• DI 1 Status (Boolean);
• DI 2 Status (Boolean);
• Frost Alarm (Boolean) (if available);
• Filter Alarm (Boolean) (if available);
• Service Alarm (Boolean) (if available);
• Fan Lock Alarm (Boolean) (if available);
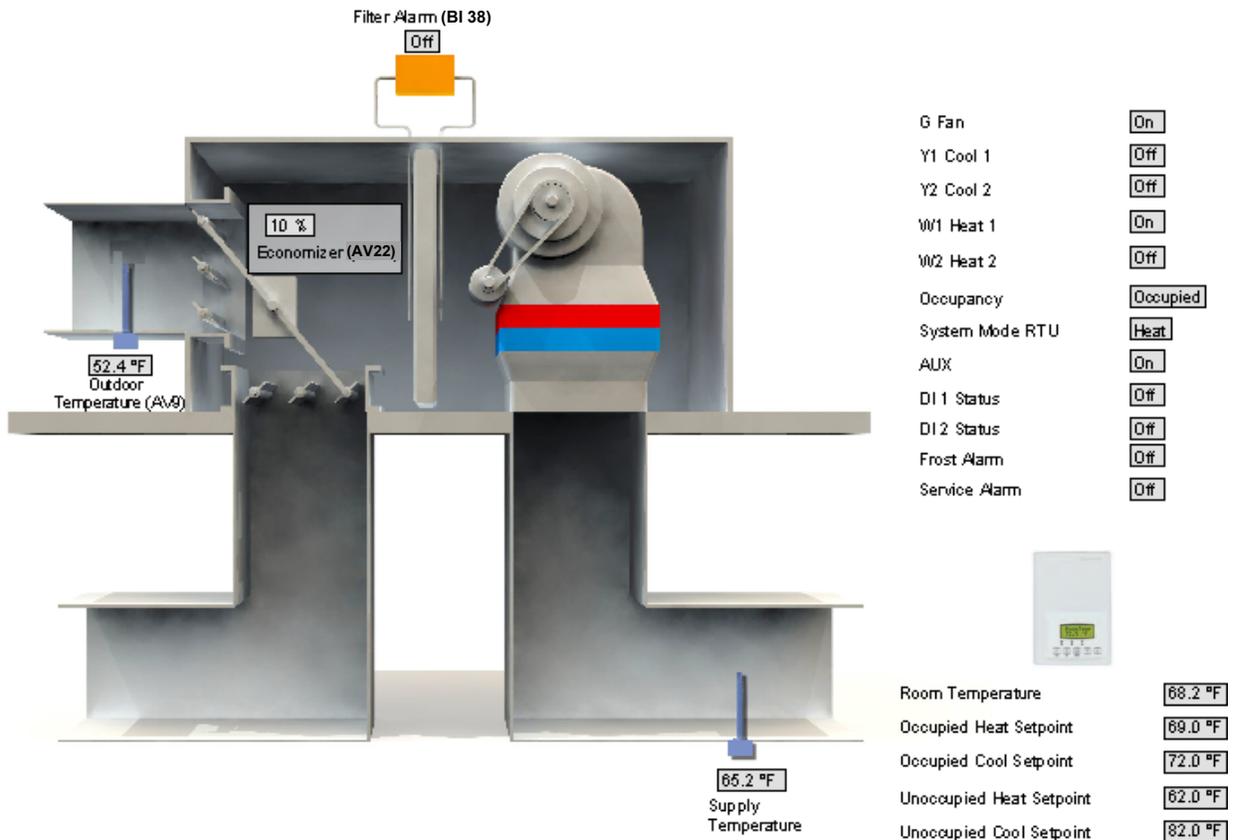
Fig. 18. Typical GUI for a TB7605B5014W with Economizer Control.

TIPS AND THINGS YOU NEED TO KNOW

- Be sure all thermostats communicating to any single WEBs-AX controller are using the same PAN ID and Channel as the WEBs-AX controller wireless communication card.

- Room Temperature, Outdoor Temperature and Room Humidity need to have their Boolean override counterpart object set to "Override" first if the present value needs to be written over from the network. Ex To set a network present value on the numeric "{Room Temperature" numeric object, the "Room Temperature Override" Boolean object needs to be set from Normal to Override. The thermostat local present value will then be derived from the wireless network instead of the present value at the thermostat.

- For TB72xx, the currently selected Sequence of Operation Enumeration limits the System Mode usable Enumeration index. A change in the Sequence Of Operation Enum will set the active system mode and also restrict the usable range that a local thermostat can accept.

- Each thermostat connected to a wireless network reports to the WEBs-AX controller with an automatic heartbeat for the local online-offline sanity. Please refer to the health status "Last Ok Time" value for the total amount of time a single thermostat has not updated its mandatory 3 minutes heartbeat update to the WEBs-AX controller.

WIRELESS DEVICE STATUS LEDS

Wireless Communication Card Status LEDs

WEBs-AX Controller Wireless Card (TB-VWG-APP-1014) LED Status Indicators	
1 x (200ms) short blink	Power on
2 x (200ms) short blinks	Power on and card memory initialized properly
3 x (200ms) short blinks	Power on, card memory initialized properly and serial communication with the WEBs-AX controller main board active
4 x (200ms) short blinks	Power on, card memory initialized properly, serial communication with the WEBs-AX controller main board active and wireless networks started successfully
4 x (200ms) short blinks and 1 x (1500ms) long blink	Power on, card memory initialized properly, serial communication with the WEBs-AX controller main board active, wireless networks started successfully and wireless communication with thermostats active

Thermostat and Repeater Wireless Status LEDs

Thermostat Wireless Adapter LED Status Indicators	
1 x(200ms) short blink	Power on
2 x (200ms) short blinks	Power on and communicating with thermostat
3 x (200ms) short blinks	Power on, communicating with thermostat and there is connectivity to wireless network
4 x (200ms) short blinks	Power on, communicating with thermostat, connectivity to wireless network and the WEBs-AX controller is communicating with wireless thermostat
4 x (200ms) short blinks And 1 x (1500ms) long blink	Power on, communicating with thermostat, connectivity to wireless network and the WEBs-AX controller is communicating with wireless thermostat.

TROUBLESHOOTING

System Troubleshooting Recommendations
1. If a thermostat/repeater is not detected by a WEBs-AX controller, verify that the LED is blinking at least 4 times. For any devices to be added to the database, 4 short blinks have to be seen on the thermostat/repeater network card. If it is only blinking twice, ensure that the PAN ID and Channel of the thermostat/repeater is the same as the WEBs-AX controller it must communicate with.
2. When commissioning a network, use channels 15 or 25. Alternate these channels between floors.
3. If a particular thermostat refuses to join the network and cannot be seen by the WEBs-AX controller move the thermostat closer to the WEBs-AX controller until it has joined the network and it is added to the database. It can then be re-located to its original position.

APPENDIX A: THERMOSTAT OBJECTS

OBJECTS SUPPORTED BY TB7200 SERIES

Please refer to the specific installation guide of each TB7200 thermostats for a detailed overview on each property listed.

Object Name	Object Type	Object Property	TB7200C5x14W	TB7200F5x14W
Room Temperature	Numeric Writable	Present Value (R,W)	✓	✓
Outdoor Temperature	Numeric Writable	Present Value (R,W)	✓	✓
Supply Temperature	Numeric Point	Present Value (R)	✓	✓
Occupied Cooling Setpoint	Numeric Writable	Present Value (R,W)	✓	✓
Occupied Heating Setpoint	Numeric Writable	Present Value (R,W)	✓	✓
Stand-By Cooling Setpoint	Numeric Writable	Present Value (R,W)	✓	✓
Stand-By Heating Setpoint	Numeric Writable	Present Value (R,W)	✓	✓
Unoccupied Cooling Setpoint	Numeric Writable	Present Value (R,W)	✓	✓
Unoccupied Heating Setpoint	Numeric Writable	Present Value (R,W)	✓	✓
Occupancy Command	Enum Writable	Present Value (R,W)	✓	✓
Sequence of Operation	Enum Writable	Present Value (R,W)	✓	✓
System Mode	Enum Writable	Present Value (R,W)	✓	✓
Keypad Lockout	Enum Writable	Present Value (R,W)	✓	✓

Object Name	Object Type	Object Property	TB7200C5x14W	TB7200F5x14W
Aux Command	Boolean Writable	Present Value (R,W)	✓	✓
Password	Numeric Writable	Present Value (R,W)	✓	✓
PI Heating Demand	Numeric Point	Present Value (R)	✓	✓
PI Cooling Demand	Numeric Point	Present Value (R)	✓	✓
Effective Occupancy	Enum Point	Present Value (R)	✓	✓
Aux Status	Boolean Point	Present Value (R)	✓	✓
BI1 Status	Boolean Point	Present Value (R)	✓	✓
BI2 Status	Boolean Point	Present Value (R)	✓	✓
UI3 Status	Boolean Point	Present Value (R)	✓	✓
PIR Motion Status	Boolean Point	Present Value (R)	✓	✓
Service Alarm	Boolean Point	Present Value (R)	✓	✓
Filter Alarm	Boolean Point	Present Value (R)	✓	✓
Window Alarm	Boolean Point	Present Value (R)	✓	✓
Temporary Occupancy Time	Enum Writable	Present Value (R,W)	✓	✓
Get From	Numeric Writable	Present Value (R,W)	✓	✓
Deadband	Numeric Writable	Present Value (R,W)	✓	✓
Heating Setpoint Limit	Numeric Writable	Present Value (R,W)	✓	✓
Cooling Setpoint Limit	Numeric Writable	Present Value (R,W)	✓	✓
Display Scale	Boolean Writable	Present Value (R,W)	✓	✓
Menu Scroll	Boolean Writable	Present Value (R,W)	✓	✓

Object Name	Object Type	Object Property	TB7200C5x14W	TB7200F5x14W
Room Temperature Override	Boolean Writable	Present Value (R,W)	✓	✓
Configuration Setpoint Type	Boolean Writable	Present Value (R,W)	✓	✓
Outdoor Temperature Override	Boolean Writable	Present Value (R,W)	✓	✓
BI1 Configuration	Enum Writable	Present Value (R,W)	✓	✓
BI2 Configuration	Enum Writable	Present Value (R,W)	✓	✓
UI3 Configuration	Enum Writable	Present Value (R,W)	✓	✓
Output #1 Configuration	Enum Writable	Present Value (R,W)	✓	✓
Aux Configuration	Enum Writable	Present Value (R,W)	✓	✓
Reheat Time Base	Boolean Writable	Present Value (R,W)	✓	✓
Proportional Band	Enum Writable	Present Value (R,W)	✓	✓
Stand-By Time	Numeric Writable	Present Value (R,W)	✓	✓
Unoccupied Time	Numeric Writable	Present Value (R,W)	✓	✓
Control Type	Boolean Writable	Present Value (R,W)	✓	
Floating Motor Timing	Enum Writable	Present Value (R,W)	✓	
On Off Control CPH	Enum Writable	Present Value (R,W)	✓	
Direct Reverse Acting	Boolean Writable	Present Value (R,W)		✓

OBJECTS SUPPORTED BY TB7600 SERIES

Please refer to the specific installation guide of each TB7600 thermostats for a detailed overview on each property listed.

Object Name	Object Type	Object Property	TB7600A5x14W	TB7652A5x14W	TB7600B5x14W	TB7652B5x14W	TB7605B5x14W	TB7656B5x14W	TB7600H5x14W	TB7652H5x14W
Room Temperature	Numeric Writable	Present Value (R,W)	✓	✓	✓	✓	✓	✓	✓	✓
Outdoor Temperature	Numeric Writable	Present Value (R,W)	✓	✓	✓	✓	✓	✓	✓	✓
Supply Temperature	Numeric Point	Present Value (R)	✓	✓	✓	✓	✓	✓	✓	✓
Occupied Cooling Setpoint	Numeric Writable	Present Value (R,W)	✓	✓	✓	✓	✓	✓	✓	✓
Occupied Heating Setpoint	Numeric Writable	Present Value (R,W)	✓	✓	✓	✓	✓	✓	✓	✓
Unoccupied Cooling Setpoint	Numeric Writable	Present Value (R,W)	✓	✓	✓	✓	✓	✓	✓	✓
Unoccupied Heating Setpoint	Numeric Writable	Present Value (R,W)	✓	✓	✓	✓	✓	✓	✓	✓
Occupancy Command	Enum Writable	Present Value (R,W)	✓	✓	✓	✓	✓	✓	✓	✓
System Mode RTU	Enum Writable	Present Value (R,W)	✓	✓	✓	✓	✓	✓		
System Mode HPU	Enum Writable	Present Value (R,W)							✓	✓
Fan Mode	Enum Writable	Present Value (R,W)	✓	✓	✓	✓	✓	✓	✓	✓
Keypad Lockout	Enum Writable	Present Value (R,W)	✓	✓	✓	✓	✓	✓	✓	✓

Object Name	Object Type	Object Property	TB7600A5x14W	TB7652A5x14W	TB7600B5x14W	TB7652B5x14W	TB7605B5x14W	TB7656B5x14W	TB7600H5x14W	TB7652H5x14W
Password	Numeric Writable	Present Value (R,W)	✓	✓	✓	✓	✓	✓	✓	✓
PI Heating Demand	Numeric Point	Present Value (R)	✓	✓	✓	✓	✓	✓	✓	✓
PI Cooling Demand	Numeric Point	Present Value (R)	✓	✓	✓	✓	✓	✓	✓	✓
Effective Occupancy	Enum Point	Present Value (R)	✓	✓	✓	✓	✓	✓	✓	✓
Economizer Output	Numeric Point	Present Value (R)					✓	✓		
G Fan Status	Boolean Point	Present Value (R)	✓	✓	✓	✓	✓	✓	✓	✓
W2 Status	Boolean Point	Present Value (R)			✓	✓	✓	✓		
W1 Status	Boolean Point	Present Value (R)	✓	✓	✓	✓	✓	✓	✓	✓
Y1 Status	Boolean Point	Present Value (R)	✓	✓	✓	✓	✓	✓	✓	✓
Y2 Status	Boolean Point	Present Value (R)			✓	✓	✓	✓	✓	✓
Reversing Valve Status	Boolean Point	Present Value (R)							✓	✓
Aux Status	Boolean Point	Present Value (R)	✓	✓	✓	✓	✓	✓	✓	✓
DI1 Status	Boolean Point	Present Value (R)	✓	✓	✓	✓	✓	✓	✓	✓
DI2 Status	Boolean Point	Present Value (R)	✓	✓	✓	✓	✓	✓	✓	✓
PIR Motion Status	Boolean Point	Present Value (R)	✓	✓	✓	✓	✓	✓	✓	✓
Frost Alarm	Boolean Point	Present Value (R)	✓	✓	✓	✓	✓	✓	✓	✓

Object Name	Object Type	Object Property	TB7600A5x14W	TB7652A5x14W	TB7600B5x14W	TB7652B5x14W	TB7605B5x14W	TB7656B5x14W	TB7600H5x14W	TB7652H5x14W
Set Clock Alarm	Boolean Point	Present Value (R)		✓		✓		✓		✓
Service Alarm	Boolean Point	Present Value (R)	✓	✓	✓	✓	✓	✓	✓	✓
Filter Alarm	Boolean Point	Present Value (R)	✓	✓	✓	✓	✓	✓	✓	✓
Fan Lock Alarm	Boolean Point	Present Value (R)	✓	✓	✓	✓	✓	✓	✓	✓
Heating Lockout Temperature	Numeric Writable	Present Value (R,W)		✓	✓	✓	✓	✓	✓	✓
Cooling Lockout Temperature	Numeric Writable	Present Value (R,W)	✓	✓	✓	✓	✓	✓	✓	✓
Power up Delay	Numeric Writable	Present Value (R,W)	✓	✓	✓	✓	✓	✓	✓	✓
Progressive Recovery	Boolean Writable	Present Value (R,W)		✓		✓		✓		✓
Aux Contact	Boolean Writable	Present Value (R,W)	✓	✓	✓	✓	✓	✓	✓	✓
Fan Purge Delay	Boolean Writable	Present Value (R,W)	✓	✓	✓	✓	✓	✓	✓	✓
Heating Stages	Enum Writable	Present Value (R,W)			✓	✓	✓	✓		
Cooling Stages	Enum Writable	Present Value (R,W)			✓	✓	✓	✓		
Heating CPH	Enum Writable	Present Value (R,W)	✓	✓	✓	✓	✓	✓	✓	✓
Cooling CPH	Enum Writable	Present Value (R,W)	✓	✓	✓	✓	✓	✓	✓	✓
Minimum On/Off Time (Anticycle)	Enum Writable	Present Value (R,W)	✓	✓	✓	✓	✓	✓	✓	✓
Temporary Occupancy Time	Enum Writable	Present Value (R,W)	✓	✓	✓	✓	✓	✓	✓	✓
Event Display	Enum Writable	Present Value (R,W)		✓		✓		✓		✓
Get From	Numeric Writable	Present Value (R,W)	✓	✓	✓	✓	✓	✓	✓	✓
Deadband	Numeric Writable	Present Value (R,W)	✓	✓	✓	✓	✓	✓	✓	✓
Heating Setpoint Limit	Numeric Writable	Present Value (R,W)	✓	✓	✓	✓	✓	✓	✓	✓

Object Name	Object Type	Object Property	TB7600A5x14W	TB7652A5x14W	TB7600B5x14W	TB7652B5x14W	TB7605B5x14W	TB7656B5x14W	TB7600H5x14W	TB7652H5x14W
Cooling Setpoint Limit	Numeric Writable	Present Value (R,W)	✓	✓	✓	✓	✓	✓	✓	✓
Display Scale	Boolean Writable	Present Value (R,W)	✓	✓	✓	✓	✓	✓	✓	✓
Menu Scroll	Boolean Writable	Present Value (R,W)	✓	✓	✓	✓	✓	✓	✓	✓
Room Temperature Override	Boolean Writable	Present Value (R,W)	✓	✓	✓	✓	✓	✓	✓	✓
Outdoor Temperature Override	Boolean Writable	Present Value (R,W)	✓	✓	✓	✓	✓	✓	✓	✓
Proprational Band	Enum Writable	Present Value (R,W)	✓	✓	✓	✓	✓	✓	✓	✓
Unoccupied Time	Numeric Writable	Present Value (R,W)	✓	✓	✓	✓	✓	✓	✓	✓
Frost Protection	Boolean Writable	Present Value (R,W)	✓	✓	✓	✓	✓	✓	✓	✓
Fan Control	Boolean Writable	Present Value (R,W)	✓	✓	✓	✓	✓	✓	✓	✓
DI1 Configuration	Enum Writable	Present Value (R,W)	✓	✓	✓	✓	✓	✓	✓	✓
DI2 Configuration	Enum Writable	Present Value (R,W)	✓	✓	✓	✓	✓	✓	✓	✓
Heatpump Stages	Enum Writable	Present Value (R,W)							✓	✓
Economizer Changeover Setpoint	Numeric Writable	Present Value (R,W)					✓	✓		
Economizer Minimun Position	Numeric Writable	Present Value (R,W)					✓	✓		

Object Name	Object Type	Object Property	TB7600A5x14W	TB7652A5x14W	TB7600B5x14W	TB7652B5x14W	TB7605B5x14W	TB7656B5x14W	TB7600H5x14W	TB7652H5x14W
Mechanical Cooling Enable	Boolean Writable	Present Value (R,W)					✓	✓		
Mixed Air Setpoint	Numeric Writable	Present Value (R,W)					✓	✓		
High Balance Point	Numeric Writable	Present Value (R,W)							✓	✓
Low Balance Point	Numeric Writable	Present Value (R,W)							✓	✓
Comfort Mode	Boolean Writable	Present Value (R,W)							✓	✓
Reversing Valve Configuration	Boolean Writable	Present Value (R,W)							✓	✓
Compressor Auxiliary Lockout	Boolean Writable	Present Value (R,W)							✓	✓

Wireless Repeater

The wireless repeater (TB-RP5000W) has been specifically designed to be used within a Honeywell wireless ZigBee network. It is intended to be a low cost additional communication component when some remote thermostats are too far from the main mesh of Honeywell devices and cannot communicate. The repeater will enable the remote thermostats to establish communication and will act as bridges to the main mesh. Furthermore, it does not need to be added to the database network to lessen the resource required for the WEBs-AX controller and station. However, if added to the database, their online status can be established and monitored.

LIST OF PROPERTY NUMERIC VALUE RANGE RESTRICTIONS

Object Name	Object Type	Range Restrictions
Room Temperature	Numeric Writable	temperature,min=-40,max=122
Outdoor Temperature	Numeric Writable	temperature,min=-40,max=122
Supply Temperature	Numeric Point	temperature,min=-40,max=122
PI Heating Demand	Numeric Point	percent,min-0,max=100
Weighted PI Heating Demand	Numeric Point	percent,min-0,max=100
PI Cooling Demand	Numeric Point	percent,min-0,max=100
Weighted PI Cooling Demand	Numeric Point	percent,min-0,max=100
Economizer Output	Numeric Point	percent,min=0,max=100
Static Pressure	Numeric Point	pascal,min=0,max=5000
By-Pass Damper	Numeric Point	percent,min=0,max=100
Transferred Zone PI Heating Demand	Numeric Point	percent,min=0,max=100
Transferred Zone PI Cooling Demand	Numeric Point	percent,min=0,max=100
Highest PI Heating Zone Mac	Numeric Point	percent,min=0,max=100
Highest PI Cooling Zone Mac	Numeric Point	percent,min=0,max=100
Highest PI Heating Demand	Numeric Point	percent,min=0,max=100
Highest PI Cooling Demand	Numeric Point	percent,min=0,max=100
AO2 Status	Numeric Point	percent,min=0,max=100
RUI1 Status	Numeric Point	temperature,min=-40,max=122
Occupied Cooling Setpoint	Numeric Writable	temperature,min=54,max=100
Occupied Heating Setpoint	Numeric Writable	temperature,min=40,max=90
Stand-By Cooling Setpoint	Numeric Writable	temperature,min=54,max=100
Stand-By Heating Setpoint	Numeric Writable	temperature,min=40,max=90
Unoccupied Cooling Setpoint	Numeric Writable	temperature,min=54,max=100
Unoccupied Heating Setpoint	Numeric Writable	temperature,min=40,max=90
Password	Numeric Writable	none,min=0,max=1000
Heating Lockout Temperature	Numeric Writable	temperature,min=-15,max=120
Cooling Lockout Temperature	Numeric Writable	temperature,min=-40,max=95
Static Pressure Setpoint	Numeric Writable	pascal,min=0,max=5000
Discharge High Limit Setpoint	Numeric Writable	temperature,min=-70,max=150
Discharge Low Limit Setpoint	Numeric Writable	temperature,min=-35,max=65
Power-up Delay	Numeric Writable	seconds,min=10,max=120
Get From	Numeric Writable	none,min=0,max=254
Deadband (TB76xx)	Numeric Writable	temperature,min=2.0,max=4.0
Deadband (TB72 / 73xx)	Numeric Writable	temperature,min=2.0,max=5.0
RTC Communication Address	Numeric Writable	none,min=1,max=127
Config BO5 Outside Air Lockout Setpoint	Numeric Writable	temperature,min=-40,max=122
Damper Minimum Position	Numeric Writable	percent,min=0,max=100
Damper Maximum Position	Numeric Writable	percent,min=0,max=100
Damper Max Heat Position	Numeric Writable	percent,min=0,max=100
Heating Setpoint Limit	Numeric Writable	temperature,min=40,max=90
Cooling Setpoint Limit	Numeric Writable	temperature,min=54,max=100
Stand-By Time	Numeric Writable	hours,min=5.0,max=240.0
Unoccupied Time	Numeric Writable	hours,min=5.0,max=240.0
Economizer Changeover Setpoint	Numeric Writable	temperature,min=14,max=70

Object Name	Object Type	Range Restrictions
Economizer Minimum Position	Numeric Writable	percent,min=0,max=100
Mixed Air Setpoint	Numeric Writable	temperature,min=50,max=90
High Balance Point	Numeric Writable	temperature,min=34,max=90
Low Balance Point	Numeric Writable	temperature,min=-40,max=30
Damper Position	Numeric Writable	percent,min=0,max=100
Heat Demand Limit	Numeric Writable	percent,min=0,max=100
Cool Demand Limit	Numeric Writable	percent,min=0,max=100

NOTE: **Room Temperature and Outdoor Temperature need to have their Boolean override counterpart object set to "Override" first if the present value needs to be written over from the network. Ex To set a network present value on the numeric "{Room Temperature" numeric object, the "Room Temperature Override" Boolean object needs to be set from Normal to Override. The thermostat's local present value will then be derived from the wireless network instead of the present value at the thermostat.**

LIST OF PROPERTY ENUMERATION SETS FOR BV OBJECTS

Object Name	Object Type	Range Restrictions
G Fan Status	Boolean Point	falseText=Off,trueText=On
W2 Status	Boolean Point	falseText=Off,trueText=On
W1 Status	Boolean Point	falseText=Off,trueText=On
Y1 Status	Boolean Point	falseText=Off,trueText=On
Y2 Status	Boolean Point	falseText=Off,trueText=On
Reversing Valve Status	Boolean Point	falseText=Off,trueText=On
Aux Status	Boolean Point	falseText=Off,trueText=On
Aux Status	Boolean Point	falseText=Off,trueText=On
DI Status	Boolean Point	falseText=Deactivated,trueText=Activated
DI1 Status	Boolean Point	falseText=Deactivated,trueText=Activated
DI2 Status	Boolean Point	falseText=Deactivated,trueText=Activated
BI1 Status	Boolean Point	falseText=Deactivated,trueText=Activated
BI2 Status	Boolean Point	falseText=Deactivated,trueText=Activated
UI3 Status *	Boolean Point	falseText=Deactivated,trueText=Activated
PIR Motion Status	Boolean Point	falseText=No Motion,trueText=Motion
Frost Alarm	Boolean Point	falseText=Off,trueText=On
Set Clock Alarm	Boolean Point	falseText=Off,trueText=On
Service Alarm	Boolean Point	falseText=Off,trueText=On
Filter Alarm	Boolean Point	falseText=Off,trueText=On
Fan Lock Alarm	Boolean Point	falseText=Off,trueText=On
Window Alarm	Boolean Point	falseText=Off,trueText=On
Heat Stages Lockout Status	Boolean Point	falseText=Off,trueText=On
Cool Stages Lockout Status	Boolean Point	falseText=Off,trueText=On
Discharge Temperature Alarm	Boolean Point	falseText=Off,trueText=On
Comm Lost	Boolean Point	falseText=Off,trueText=On
RTC Smart Recovery Active	Boolean Point	falseText=Off,trueText=Active
BO5 Status	Boolean Point	falseText=Off,trueText=On
AO2 Lock Status	Boolean Point	falseText=Inactive,trueText=Active
BO5 Lock Status	Boolean Point	falseText=Inactive,trueText=Active
Heating Valve Status	Boolean Point	falseText=Off,trueText=On
Cooling Valve Status	Boolean Point	falseText=Off,trueText=On
RBI2 Status	Boolean Point	falseText=Off,trueText=On
Low Battery Alarm	Boolean Point	falseText=Off,trueText=On
Wireless Window Switch Used	Boolean Point	falseText=Not Used,trueText=Used
Wireless Window Switch Status	Boolean Point	falseText=Off,trueText=On
Wireless Door Switch Used	Boolean Point	falseText=Not Used,trueText=Used
Wireless Door Switch Status	Boolean Point	falseText=Off,trueText=On

Object Name	Object Type	Range Restrictions
Aux Command	Boolean Writable	falseText=Off,trueText=On
Units	Boolean Writable	falseText=Imperial,trueText=SI
Progressive Recovery	Boolean Writable	falseText=Off,trueText=Active
Aux Contact	Boolean Writable	falseText=Normally Opened,trueText=Normally Closed
Fan Purge Delay	Boolean Writable	falseText=Off,trueText=On
Display Scale	Boolean Writable	falseText=C,trueText=F
Menu Scroll	Boolean Writable	falseText=No Scroll,trueText=Scroll Active
Config Motion Detection	Boolean Writable	falseText=No PIR,trueText=PIR Cover Present
AO2 RA/DA	Boolean Writable	falseText=Direct Acting,trueText=Reverse Acting
BO5 Time Base	Boolean Writable	falseText=15 Minutes,trueText=10 Seconds
BO5 Contact Function	Boolean Writable	falseText=Normally Opened,trueText=Normally Closed
Room Temperature Override	Boolean Writable	falseText=Normal,trueText=Override
Config Setpoint Type	Boolean Writable	falseText=Permanent,trueText=Temporary
Outdoor Temperature Override	Boolean Writable	falseText=Normal,trueText=Override
Auto Mode Enable	Boolean Writable	falseText=Disabled,trueText=Enabled
Setpoint Function	Boolean Writable	falseText=Dual Setpoints,trueText=Attached Setpoints
Reheat Time Base	Boolean Writable	falseText=15 Minutes,trueText=10 Seconds
Auto Fan	Boolean Writable	falseText=Auto Speed,trueText=Auto Speed / Auto Demand
Control Type	Boolean Writable	falseText=On/Off,trueText=Floating
Direct Reverse Acting	Boolean Writable	falseText=Direct Acting,trueText=Reverse Acting
Fan Options	Boolean Writable	falseText=On Heat,trueText=Auto Heat
Frost Protection	Boolean Writable	falseText=Off,trueText=On
Fan Control	Boolean Writable	falseText=Off,trueText=On
Mechanical Cooling Enable	Boolean Writable	falseText=Off,trueText=On
Comfort Mode	Boolean Writable	falseText=Comfort,trueText=Economy
Reversing Valve Config	Boolean Writable	falseText=Normally Cool,trueText=Normally Heat
Comp Aux Lockout	Boolean Writable	falseText=Off,trueText=On
Heat No/Nc	Boolean Writable	falseText=Normally Closed,trueText=Normally Openend
Cool No/Nc	Boolean Writable	falseText=Normally Closed,trueText=Normally Openend
Pulsed Heat	Boolean Writable	falseText=Off,trueText=On

This object is linked to UI3 input on all TB7200 series thermostat when used in binary mode. The Not Activated / Activated flag status is changed upon a local contact closing on the input and will also result in the SupplyTemp Numeric to respond from one end of its range to the other.

LIST OF PROPERTY ENUMERATION SETS FOR MV OBJECTS

Object	Index	Range Restrictions
Alarm (TB72xx)	1	No alarm
	2	Window alarm
	3	Filter alarm
	4	Service alarm
	5	Window & filter alarms
	6	Window & service alarms
	7	Filter & service alarms
Alarm-TB76xx	1	No alarm
	2	Frost alarm
	3	Clock alarm
	4	Clock & frost alarms
	5	Filter alarm
	6	Filter & frost alarms
	7	Filter & clock alarms
	8	Filter & frost & clock alarms
	9	Service alarms
	10	Service & frost alarms
	11	Service & clock alarms
	12	Service & frost & clock alarms
	13	Filter & service alarms
	14	Service & filter & frost alarms
	15	Service & filter & clock alarms
	16	Clock & filter & frost & service alarms
Aux Configuration	1	Not Used
	2	Normally Opened With Occupancy
	3	Normally Closed With Occupancy
	4	Normally Opened With Occupancy & Fan
	5	Normally Closed With Occupancy & Fan
	6	Network Controlled
Cooling CPH	1	3 CPH
	2	4 CPH
Control Type	1	Highest
	2	Average of 3 highest
	3	Average of 5 highest
BI1 Config (TB72xx)	1	None
	2	Rem NSB
	3	Motion NO
	4	Motion NC
	5	Window

63-4522—04

Object	Index	Range Restrictions
BI2 Config (TB72xx)	1	None
	2	Door Dry
	3	Rem OVR
	4	Filter
	5	Service
DI1 Config (TB76xx)	1	None
	2	Rem NSB
	3	Rem OVR
	4	Filter
	5	Service
	6	Fan Lock Alarm
DI2 Config (TB76xx)	1	None
	2	Rem NSB
	3	Rem OVR
	4	Filter
	5	Service
	6	Fan Lock Alarm
Effective Occupancy	1	Occupied
	2	Unoccupied
	3	Temporary Occupied
	4	Stand-by
Fan Mode (TB76xx) **See Table Note 3 on page 47**	1	On
	2	Auto
	3	Smart
Floating Motor Timing	1	0.5 Minutes
	2	1 Minute
	3	1.5 Minutes
	4	2 Minutes
	5	2.5 Minutes
	6	3 Minutes
	7	3.5 Minutes
	8	4 Minutes
	9	4.5 Minutes
	10	5 Minutes
	11	5.5 Minutes
	12	6 Minutes
	13	6.5 Minutes
	14	7 Minutes
	15	7.5 Minutes
	16	8 Minutes
	17	8.5 Minutes
	18	9 Minutes

Object	Index	Range Restrictions
Heat Pump Stage	1	One Stage
	2	Two Stages
Heating CPH	1	3 CPH
	2	4 CPH
	3	5 CPH
	4	6 CPH
	5	7 CPH
	6	8 CPH
Cooling Valve Status Heating Valve Status	1	Closed
	2	Opened
Keypad Lockout (TB72xx)	1	Level 0
	2	Level 1
	3	Level 2
	4	Level 3
Keypad Lockout (TB76xx)	1	Level 0
	2	Level 1
	3	Level 2
Minimum On/Off Time (Anticycle)	1	0 Minutes
	2	1 Minute
	3	2 Minutes
	4	3 Minutes
	5	4 Minutes
	6	5 Minutes
Event Display	1	2 Events
	2	4 Events
Heating Stages Cooling Stages	1	1 Stage
	2	2 Stages
Network Handle	1	Default Zone Handle
	2	Default Minus Occupancy
	3	Full Release
Occupancy Command	1	Local Occupancy
	2	Occupied
	3	Unoccupied
On Off Control CPH	1	3 CPH
	2	4 CPH
	3	5 CPH
	4	6 CPH
	5	7 CPH
	6	8 CPH
Output #1 Configuration (TB72xx)	1	One Output
	2	Separate Outputs

63-4522—04

Object	Index	Range Restrictions
PI Cooling Weight PI Heating Weight	1	0%
	2	25%
	3	50%
	4	75%
	5	100%
Proportional Band (TB76xx)	1	3 ℉ / 1.7 ℃
	2	4 ℉ / 2.2 ℃
	3	5 ℉ / 2.8 ℃
	4	6 ℉ / 3.3 ℃
	5	7 ℉ / 3.9 ℃
	6	8 ℉ / 4.4 ℃
	7	9 ℉ / 5.0 ℃
	8	10 ℉ / 5.6 ℃
Proportional Band-(TB72xx)	1	2 ℉ / 1.1 ℃
	2	3 ℉ / 1.7 ℃
	3	4 ℉ / 2.2 ℃
	4	5 ℉ / 2.8 ℃
	5	6 ℉ / 3.3 ℃
	6	7 ℉ / 3.9 ℃
	7	8 ℉ / 4.4 ℃
RUI1 Config	1	None
	2	Filter
	3	Service
	4	(COC/NH) Change over dry contact. Normally Heat
	5	(COC/NC) Change over dry contact. Normally Cool
	6	(COS) Change over analog sensor
RBI2 Config	1	None
	2	Filter
	3	Service
Reheat Config	1	None
	2	Analogue Duct Heater Only
	3	On/Off Duct Heater Only
	4	On/Off Peripheral Heating Only
	5	Analogue Duct and On/Off Peripheral Heating
Reheat CPH	1	2 CPH
	2	3 CPH
	3	4 CPH
	4	5 CPH
	5	6 CPH
	6	7 CPH
	7	8 CPH
Zone Sequence	1	Cool
	2	Heat

Object	Index	Range Restrictions
Sequence Of Operation (TB72xx) **Note 2**	1	Cooling only
	2	Heating only
	3	Cooling & reheat
	4	Heating & reheat
Static Pressure Range	1	0 to 1.5 in WC
	2	0 to 2 in WC
	3	0 to 3 in WC
	4	0 to 4 in WC
	5	0 to 5 in WC
System Mode-TB76Hxx	1	Off
	2	Auto
	3	Cool
	4	Heat
	5	Emergency
System Mode – TB76xx	1	Off
	2	Auto
	3	Cool
	4	Heat
System Mode – TB72xx **See Table Notes 1 and 2 on page 47**	1	Off
	2	Auto
Temporary Occupancy Time (TB76xx)	1	0 Hours
	2	1 Hour
	3	2 Hours
	4	3 Hours
	5	4 Hours
	6	5 Hours
	7	6 Hours
	8	7 Hours
	9	8 Hours
	10	9 Hours
	11	10 Hours
	12	11 Hours
	13	12 Hours

Object	Index	Range Restrictions
Temporary Occupancy Time-(TB72xx)	1	0 Hours
	2	1 Hour
	3	2 Hours
	4	3 Hours
	5	4 Hours
	6	5 Hours
	7	6 Hours
	8	7 Hours
	9	8 Hours
	10	9 Hours
	11	10 Hours
	12	11 Hours
	13	12 Hours
	14	13 Hours
	15	14 Hours
	16	15 Hours
	17	16 Hours
	18	17 Hours
	19	18 Hours
	20	19 Hours
	21	20 Hours
	22	21 Hours
	23	22 Hours
	24	23 Hours
	25	24 Hours
UI3 Config	1	None
	2	(COC/NH) Change over dry contact. Normally Heat
	3	(COC/NC) Change over dry contact. Normally Cool
	4	(COS) Change over analog sensor
	5	(SS) Supply air sensor monitoring

Table Notes

1. For TB72xx devices, usable enumerations for the System Mode depends on Sequence of Operation selected. The Auto mode can be used only if the AutoMode configuration parameter is set to On.
2. For TB72xx, the default value of System Mode depends on the Local Sequence of Operation selected and the value of the AutoMode configuration parameter.

Sequence Of Operation	Function	Auto Mode parameter Enabled	Auto Mode parameter Disabled
1	Cooling Only	Cool	Cool
2	Cooling with Reheat	Auto	Heat
3	Heating Only	Heat	Heat
4	Heating with Reheat	Heat	Heat

3. TB7200 does not have fan outputs and fan mode commands
TB7600 fan mode inputs accepted are: Auto and On. All other modes are rejected.

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All Honeywell Series wireless thermostats and associated components have been rigorously tested to ensure reliable operation in most building applications using the latest 2.4 ZigBee technologies. Honeywell cannot guarantee against potential network interference should additional wireless systems be deployed sharing close proximity.

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Non-approved modifications or changes made to the communication card, the wireless thermostat driver or wireless thermostats may void the FCC compliance of the wireless card and wireless thermostats.

Ferrites supplied with the power supply and controller with wireless card MUST be installed according to instructions. Failure to do so may void the FCC compliance of the wireless card and wireless thermostats.

THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES. OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS: (1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE, AND (2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE RECEIVED, INCLUDING INTERFERENCE THAT MAY CAUSE UNDESIRED OPERATION.

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