

VWG-50

Schneider-Electric Wireless Gateway Design Consideration and Setup Guide



Product overview

The VWG-50 and related wireless controllers target retrofit applications where the addition of communicating field bus wiring within the building space is prohibitive. The Gateway and Communicating Controllers utilizing wireless field bus allows you to re-use any existing wiring used by electronic Controller type controls.



The VWG-50-XX-5045 when utilized in conjunction with the VT7xxxXxxxxW series wireless controllers will offer the integrator simple BACnet® IP or BACnet® MS/TP objects to integrate over standard building automation systems using familiar integration toolsets.

A maximum of 30 wireless controllers can be wirelessly paired to a single VWG

The following additional documentation is available on www.Schneider-Electric.com

- Gateway BACnet® integration guide, is available in document ITG-VWG-50-BAC-Exx
- Information on VWG hardware installation is available in document LIT-VWG-50-INSTALL-Exx

Part available

Part number	Description
VWG-50-1000	• Supports both BACnet® IP & BACnet® MS-TP • Supports up to 50 wireless controllers • Factory mounted wireless adapter • 24 Vac panel mounted power supply • Gateway mounted antenna
VWG-RA	Remote antenna for gateway when the gateway is installed inside a metal cabinet or when remote antennal mounting is required by physical installation
VWG-WA	Replacement antenna for gateway mounted antenna setup
VWG-PS-DC	24 Vac to 15 Vdc panel mounted power supply for VWG
VWG-PS-AC	120 Vac to 15 Vdc power supply for VWG with cord
VWG-BB	Replacement battery backup pack for the VWG

Compatibility & History Revision Table -

Release 1, May 2009

Associated Jar Files	Revision Level	Compatible Devices
VWG-40-MSTP-1000 VWG-40-IP-1000	1	•VT7200 Zone wireless controllers •VT7300 FCU wireless controllers •VT7600 Staging wireless controllers

- Compatible VT7200 Zone wireless controllers are identified with wireless module 051-0021 Rx
- Compatible VT7300 FCU wireless controllers are identified with wireless module 051-0021 Rx
- Compatible VT7600 Staging wireless controllers are identified with wireless module 051-0022 Rx

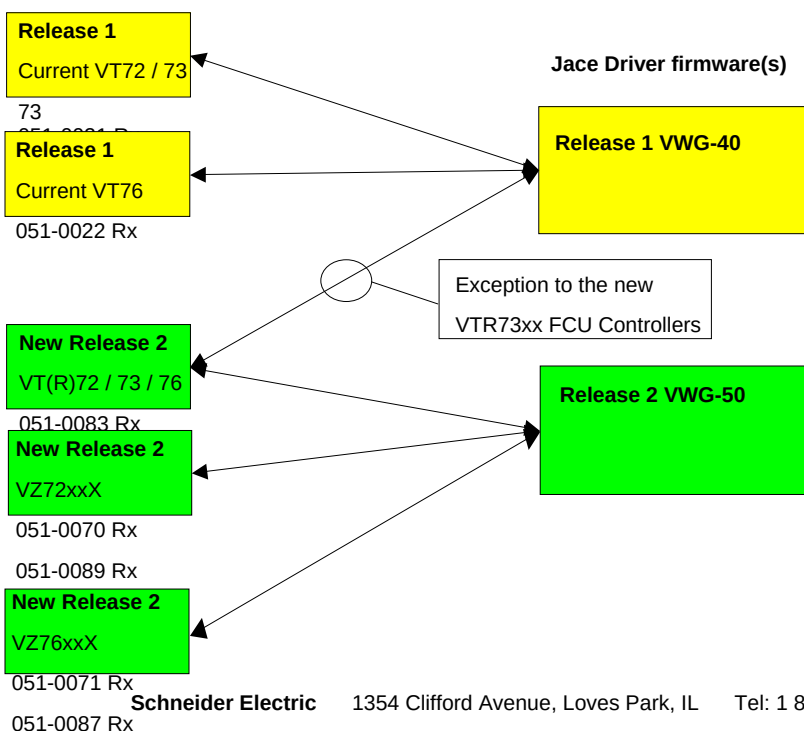
Release 2, June 2011

Associated Jar Files	Revision Level	Compatible Devices
VWG-50-5000	2	•VT7200 Series zone wireless controllers •VT7300 Series FCU wireless controllers •VT7600 Series staging wireless controllers •VTR7300 Series FCU wireless controllers •VZ7200 Series zone wireless controllers •VZ7600 Series RTU wireless controllers

- Compatible VT7200 Series zone wireless controllers are identified with wireless module 051-0083 Rx
- Compatible VT7300 Series FCU wireless controllers are identified with wireless module 051-0083 Rx
- Compatible VT7600 Series staging wireless controllers are identified with wireless module 051-0083 Rx
- Compatible VTR7300 Series FCU wireless controllers are identified with wireless module 051-0083 Rx
- Compatible VZ7200 Series zone wireless controllers are identified with wireless module 051-0070 Rx
- Compatible VZ7260 Series zone wireless controllers are identified with wireless module 051-0089 Rx
- Compatible VZ7656B RTU wireless controller is identified with wireless module 051-0071 Rx
- Compatible VZ7656R/H/F/E Series RTU wireless controllers are identified with wireless module 051-0087 Rx

Compatibility Overview

Controller wireless communication adapter revision(s)



Important Note

The Release 2 wireless controllers are fully compatible to the Release 1 VWG-40 versions. This means that if replacement controller parts are required on a Release 1 installation, Release 2 controllers are compatible.

Release 2 VTR7300 FCU controllers & Zoning products VZ72xxX / VZ76xxX are **Not compatible** to Release 1 VWG-40 versions installations.

Release 1 VWG-40 versions installations **Cannot be updated** to the new Release 2 VWG-50 versions as the controllers are **Not** compatible.

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Electronic controls are static sensitive devices. Discharge yourself properly before manipulation and installing the Schneider-Electric wireless gateway.

All Schneider-Electric wireless gateways and related wireless controllers are to be used only as operating controls. Whenever a control failure could lead to personal injury and/or loss of property, it becomes the responsibility of the user to add safety devices and or alarm system to protect against such catastrophic failures.

All VT7000 series wireless controllers and associated VWG (Schneider-Electric Wireless Gateway) have been rigorously tested to ensure reliable operation in most building applications using the latest 2.4 ZigBee® technologies. Schneider-Electric cannot guarantee against potential network interference should additional wireless systems be deployed sharing close proximity.

Best practices covered in this manual and all related Schneider-Electric VWG documents should be considered as a guide to apply Schneider-Electric Wireless Network devices only. The instructions included in this manual are based upon Schneider-Electric in house testing and should be referred to as a guide only.

Schneider-Electric Inc. may not be held liable for continued reliable or robust operation of any and all wireless based devices. Although Schneider-Electric has taken many precautions in assuring the robustness of the VT7000 series wireless controller product line and associated network access point (VWG-50-XXXX-1000) Please note; future application of additional wireless devices utilizing the same or similar channels and / or frequencies may degrade performance of overall system and or reliability.

Non-approved modifications or changes made to the VWG or wireless controllers may void the FCC compliance of the VWG and wireless controllers.

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

Only VWG-PS-DC and VWG-PS-AC power supply can be used with the VWG. The usage of another non-approved power supply may void the FCC compliance of the VWG and wireless controllers.

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 UNDESIRE OPERATION.

About Schneider-Electric Wireless Mesh Networks

The Schneider-Electric Wireless Gateway (VWG) and related wireless controller family (VT7xxxXxxxxW) networkable devices operate using ZigBee® IEEE 802.15.4 physical layer for communication.

General characteristics of the wireless physical communication layer are:

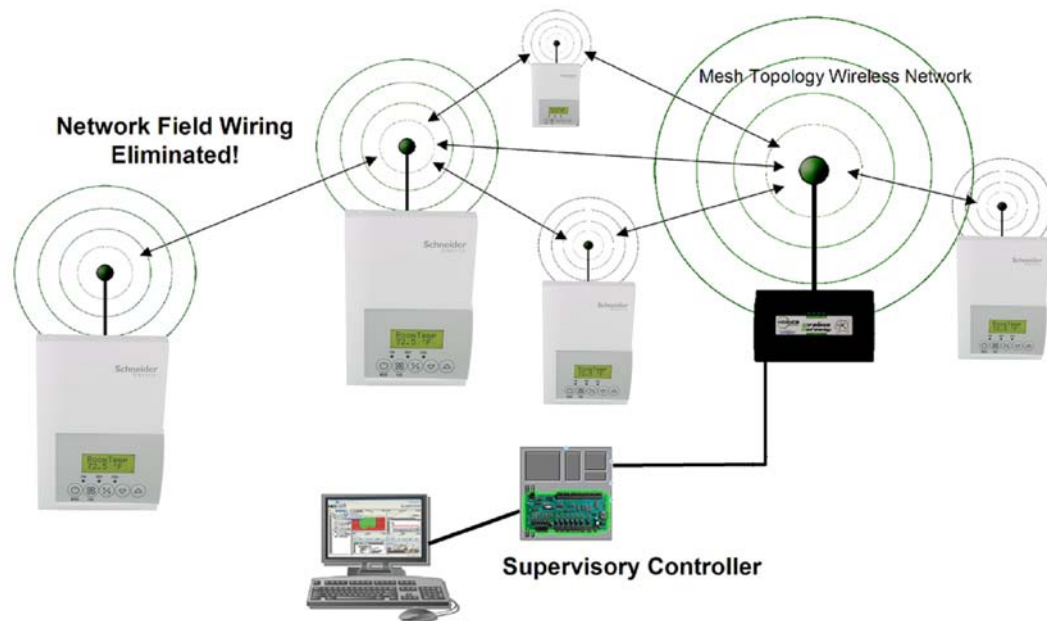
- Uses a wireless physical layer of 2.4GHz with a data rates of 250 kbps
- Yields high throughput and low latency
- Automatic multiple topologies configuration: star, peer-to-peer, mesh
- Fully handshake protocol for transfer reliability
- Range: 50 feet or 15M typical (up to 100 feet or 30 M based on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

IEEE 802.15.4 along with the ZigBee® Network and Application Support Layer provide:

- Low cost installation deployment
- Ease of implementation
- Reliable data transfer
- Short range operation
- Very low power consumption
- Appropriate levels of security

The VWG acts as network coordinator device for the IEEE 802.15.4 ZigBee® network used with the Schneider-Electric wireless controllers.

Many network specific features of the IEEE 802.15.4 standard are not covered in detail in this paper. However, these are necessary for the efficient operation of a ZigBee® network. The features of the network physical layer include receiver energy detection, link quality indication and clear channel assessment. Both contention-based and contention-free channel access methods are supported with a maximum packet size of 128 bytes, which includes a variable payload up to 104 bytes. Also employed are 64-bit IEEE and 16-bit short addressing, supporting over 65,000 nodes per network. All the properties of the physical layer are used and employed by the Schneider-Electric mesh network but are hidden to the installed / user for ease of configuration and commissioning of the network database.



A maximum of **50** networkable controllers can be supported by a single VWG. Database creation and configuration is easily made using a Schneider-Electric software appliance that communicates with the VWG.

Basic Initial Design and Deployment Consideration

IMPORTANT: It is **HIGHLY** recommended that you do a proper field survey using the Schneider-Electric survey tools to establish connectivity limitations and architecture layout on **ALL** job sites being considered for deployment with the Schneider-Electric wireless controller products. Please refer to the following manual for the survey procedures and tool usage: MAN VWG-SURVEY-Exx.

Please note that the following is well covered in the field survey tool procedure manual. A quick summary is provided here as a reference.

The Schneider-Electric wireless survey tools are intended to verify and validate the deployment and use of the Schneider-Electric wireless controllers on a potential job site.

The survey tool will display a numerical percentage value on the LCD screen which represents the wireless network ZigBee® RSSI dBi value (Receiving Signal Strength Indicator).

- Any value from 10 to 100% indicates good ZigBee® connectivity.
- Any value below 10% “may” indicate that an extra Router VRP 5000W1000W may need to be installed.

Knowing and understanding the 6A and 5H rule of ZigBee® and how to cover orphan nodes!!!

ZigBee® is a standard which is suitable for wireless sensor and controller networks. In ZigBee®, a device node controller 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.

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

ZigBee® supports three kinds of networks type: star, tree, and mesh networks. The ZigBee® coordinator (In our case, this is the VWG with the wireless communication card) is responsible for initializing, maintaining, and controlling the network.

- A star network has a coordinator with devices directly connecting to the coordinator.
- A tree and mesh networks, devices can communicate with each other in a multi-hop fashion.

The network is formed by one ZigBee® coordinator and multiple ZigBee® routers. A device can join a network as an end device by the associating with the coordinator or a router.

A ZigBee® device node controller is said to have successfully joined a network if it can obtain a ZigBee® network address from the main VWG coordinator or any other router devices, nodes or controller.

6A stands for a maximum 6 addresses per device, node or controller.

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

Please note that once a device, node or controller has been assigned a ZigBee® address and has joined the active ZigBee® network, it will save its assigned ZigBee® address to flash memory and re-use it afterwards even after a power failure or a network re-start. The ONLY time a device, node or controller would require a NEW ZigBee® address is if the network is re-started 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 node or controller to try to re-join a new network.

Orphan Nodes.

It is important to understand that at times how the network is initially started up “may” create orphan or unassigned devices, these nodes or controllers will seem to NOT want to join the ZigBee® network. Let’s first understand how an orphan node is created. A typical example is when jobs are started on a technician desk before sending the devices, nodes or controllers to the field for installation. Often the integration technician will power the VWG – coordinator and connect it to the Workbench tool by first creating and adding the **WirelessTstatNetwork** driver layer.

Once the **WirelessTstatNetwork** driver layer is up and running, they will open and start up the wireless devices, nodes or controllers one by one on their desk and add them to their Niagara database.

- They will power the first unit, add it to the database and then power it down.
- They will power the second unit, add it to the database and then power it down.
- And will continue this sequence for up to 6 devices maximum

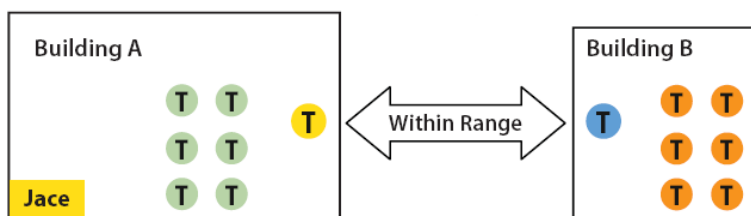
This will work fine for the first 6 devices simply because the VWG – coordinator has filled its maximum 6 available addresses. So when the technician powers up the 7th device, node or controller, the controller will NOT be able to join the ZigBee® network unless one of the previous device, node or controller is powered back on.

In order to add another 6 devices, one of the previously added devices needs to be left on. And so forth as the number of added devices, nodes or controllers grows. If 42 devices are to be added to the network, 8 of them should be ALWAYS powered and be within the connectivity range of all the others controllers.

So how would orphan nodes appear in the field and how would you allow them to join the ZigBee® network?

Please note that this ONLY applies to the initial network start-up and that once all the devices are online and communicating to the Niagara database, everything will operate seamlessly even on power up and power down and during network re-starts.

How Orphan nodes are created in the field. Ex.: 2 small buildings are within a few feet of each other. Both have 6+ devices, nodes or controller each.



A possible case for Building B orphan nodes is as follow: Building A is first stated & sets the VWG – coordinator configuration parameters for the PAN ID & Channel.

Premises:

- Building A is first stated.
- **Yellow device, node or controllers** have given out its 6 addresses to other devices in building A.
- Building B devices, nodes or controllers can only be connected through **blue device, nodes or controllers** due to maximum distance coverage.

Result:

- Orange devices, nodes or controllers cannot join the ZigBee® network.

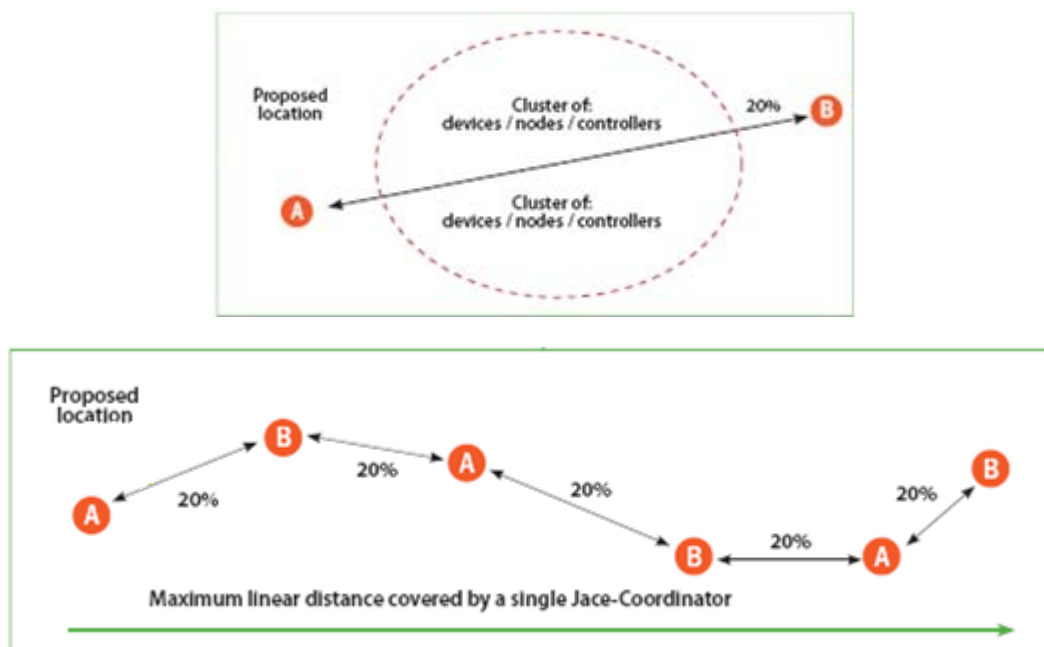
Workaround to get orphan devices on the network:

- Disconnect & bring one of building B device, node or controller & power it up in building A until it joins the ZigBee® network (confirmed either at the VWG – coordinator or using the status LED on the wireless communication card of the device, node or controller.
- When the device , node or controller has joined the network in building A and is added to the Niagara database, bring it back into building B so it can propagate ZigBee® addresses to the other devices in

building B.

5H stands for 5 hops maximum recommended.

5H is for a simple process when laying out the architecture of the network. ANY given device, node or controller should be **“optimized”** to be **NO FURTHER IF POSSIBLE** than **5 Hops** to & from the VWG / Coordinator. This is due to the nature of the Schneider-Electric ZigBee® stack in the wireless controllers. To properly layout the potential architecture and determine the number of VWG's required on the job site, you first need to establish the maximum possible coverage of a single VWG with a wireless communication card with a 5 hop maximum. This is also done with the survey tools & is covered in detail in the manual for the survey procedures and tool usage: MAN VWG-SURVEY-Exx.

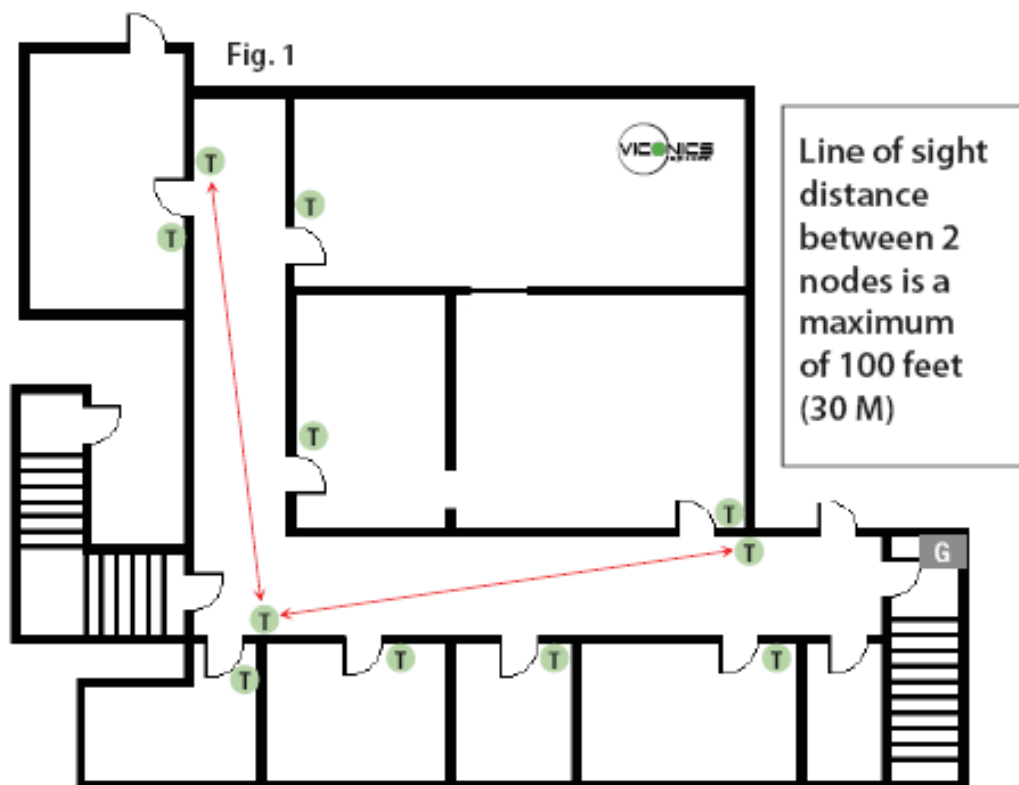


Best practice ZigBee® initial network start-up procedure

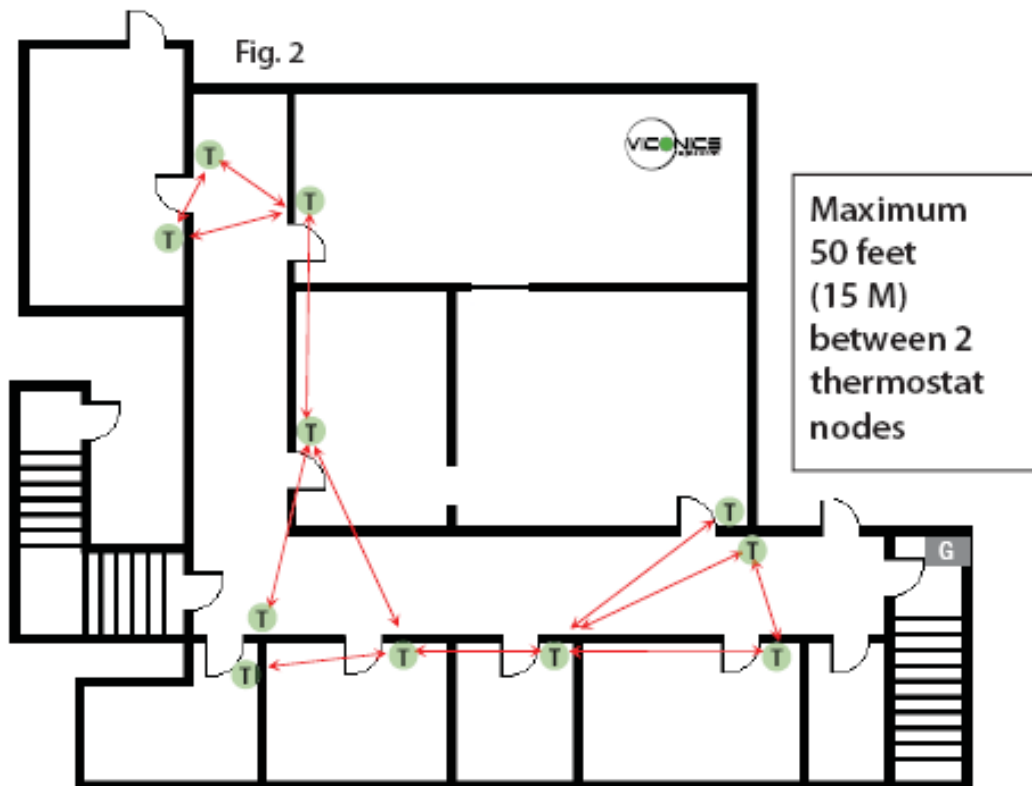
In order to avoid creating orphan devices / nodes/ controllers and moving about devices / nodes / controllers during the initial network start-up, it is recommended that you use the same power up sequence for devices as you originally did during the survey. Again, please note that once a device, node or controller has been assigned a ZigBee® address and has joined the active ZigBee® network, it will save its assigned ZigBee® address to flash memory & re-use it afterwards even after a power failure or a network re-start. The **ONLY** time a device, node or controller would require a **NEW** ZigBee® address is if the network is re-started with either a new PAN ID or a new Channel value. This causes the currently assigned & saved ZigBee® address in flash to be erased and will force the / node / controller to try to re-join a new network. I.E. this is **ONLY** applicable during the initial network start-up.

Proper design considerations need to be addressed prior to any installation of a Schneider-Electric Wireless Gateway (VWG) and related wireless controllers.

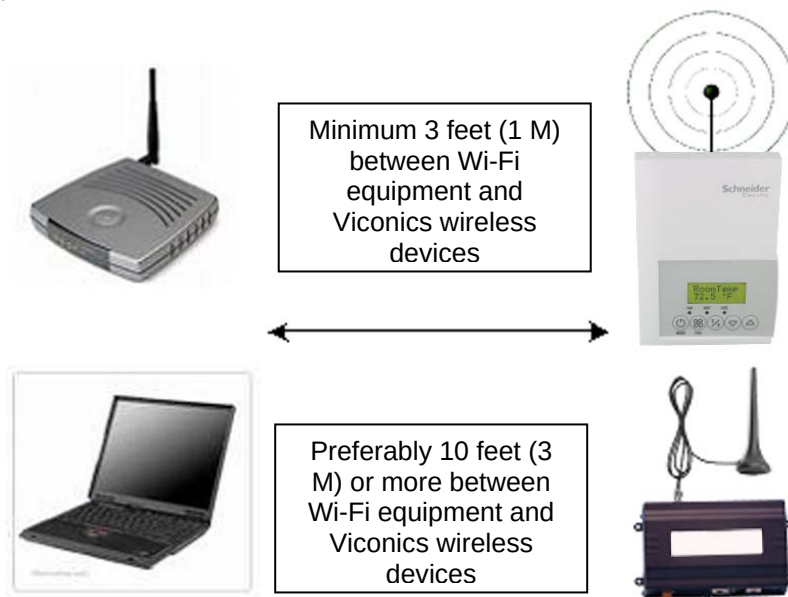
1. To properly avoid network interference with 802.11 Wi-Fi devices in the 2.4GHz spectrum range, Schneider-Electric recommends the use of 802.15.4 channels 25 and 26 only. 802.11 Wi-Fi transmissions overlap and may interfere with other channel selection allowed by 802.15.4 (Channels 11 to 24)
2. Maximum distance between each node (controller) should be:
 - Clear line of sight between 2 nodes should be under 100 feet (30 M)



- Non line of sight, typical wall gypsum wall partitions made with metal stud frame should be under 50 feet (15M)

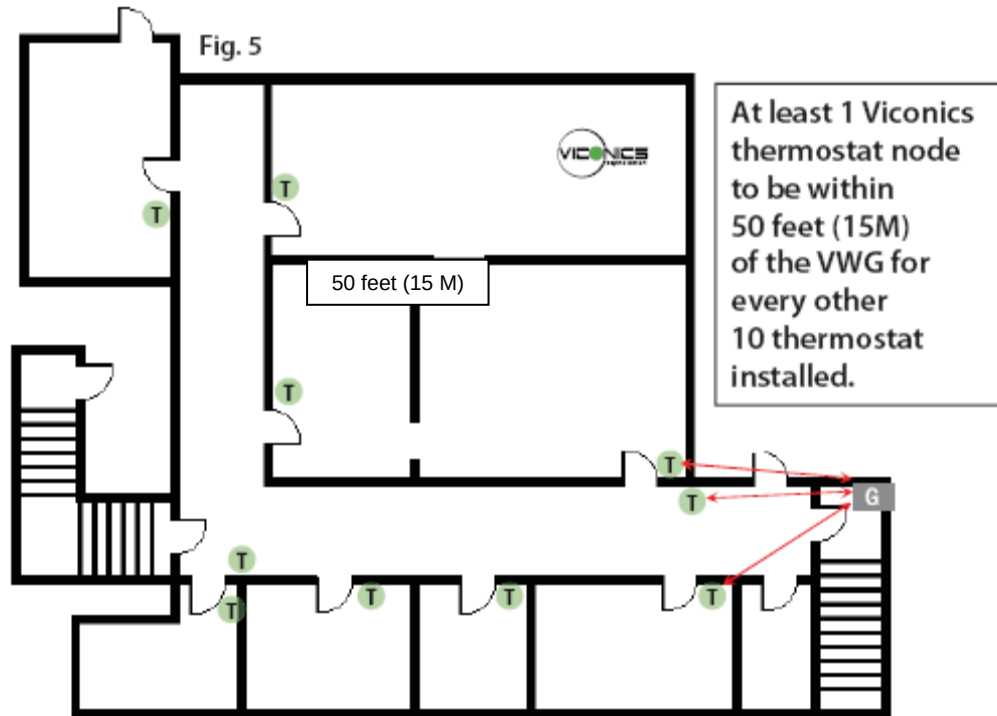


3. Ensure that the minimum distance between any Schneider-Electric node and any Wi-Fi devices (wireless routers, wireless adapters, lap-tops using wireless networks, etc....) to be at least 3 foot (1 M) and preferably 10 feet (3 M) or more.



4. Ensure that at least one controller is within 50 feet of the VWG for every cluster of 10 controllers installed.
5. Always try to locate if possible the VWG near the center of all associated wireless controllers.
6. Always try to locate the VWG near on in line of sight to as many wireless controllers as possible.
7. Try to avoid metal, brick walls or concrete obstructions between wireless devices as much as possible.
8. Make sure the antenna on the VWG is always perpendicular to the floor.
9. Avoid placing VWG and controllers near metal or enclosed in metal boxes. If the VWG needs to be installed inside a metal cabinet, use the remote antenna accessory.

Ex. 50 wireless controllers total. A minimum of 3 of them should be within 50 feet (15 M) of the VWG range.



Gateway Configuration

Initial Connection

The setup will guide you through the necessary installation steps. The minimum system requirements for installation are:

- An Ethernet adapter with TCP/IP support.
- A WEB browser installed. (Google Chrome or Firefox recommended)

An Ethernet TCP/IP connection to the VWG is required for commissioning. For this initial Ethernet connection, you can use either:

- A “crossover” cable connected directly between your PC and the VWG
- A normal LAN connection, meaning that both your PC and the VWG are physically connected to the same Ethernet hub or switch.

Initial IP address When shipped, a new VWG is pre-configured with an IP address in the range of: 192.168.1.12*n* (*primary* “LAN1” port, the “LAN2” port is disabled) where the last numeral (*n*) in the IP address matches the last numeral in the VWG *serial number*. The VWG serial number can be found directly on the label inside the VWG. In all cases, the default subnet mask is: 255.255.255.0 .

Two areas of preparation are required before proceeding with the configuration. Provide power and connectivity. After you complete the commissioning process described in this document, you can mount and wire the VWG controller at the job site, making permanent mounting and wiring connections.

Configuration of the wireless gateway

The configuration of the wireless gateway is performed through a web browser. In order to connect to the wireless gateway, start the web browser and enter <http://192.168.1.12x> in for the URL where x where the last digit (x) in the IP address matches the last digit in the gateway’s serial number as visible under the gateway cover.

Username: tstat

Password: tstat

Wireless Gateway Engineering Demo 1



Username:

Password:

Login

Recommended setting for java

Open the java control panel and on the advanced tab under the "Java Plug-In" and disable the "next generation Plug-In " which might solve your issue.

- Go to the control panel of the machine
- Click on “java”, this opens the java control panel
- In the java control panel click on the “advanced” tab, then view under “Java Plug-In”.
- Uncheck “Enable the next generation plug-in”

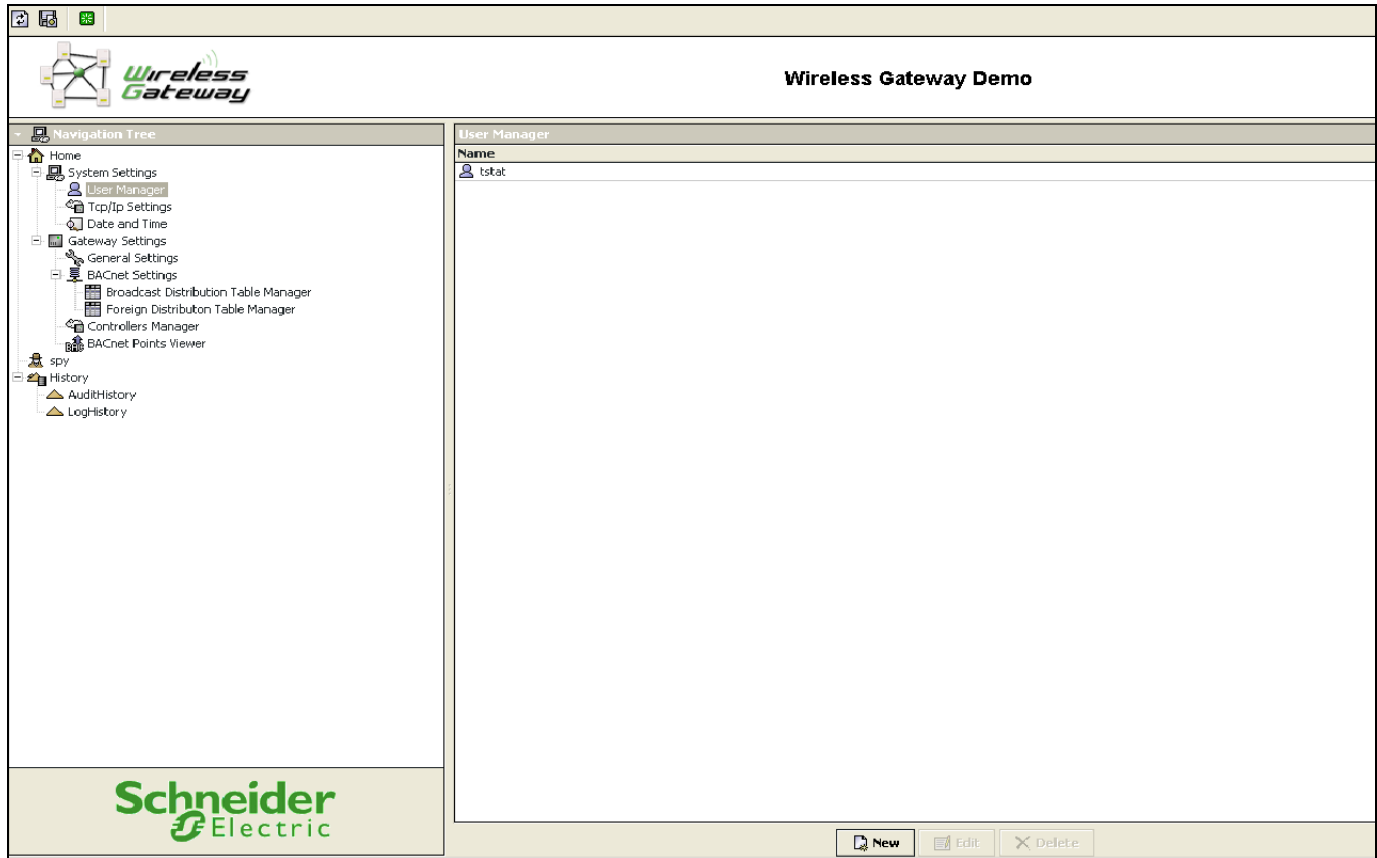
Recommended setting for internet explorer

- In Internet Explorer, select the “Tools” menu
- In the Tools menu, select “Internet Options”, you will get an “Internet Options” dialog box
- In the dialog box “Internet Options”, select the “General” tab
- Under the group “Browsing History” click on the “Settings” button, you will get a dialog box “Temporary Internet Files and History Settings”
- Under the group “Check for newer versions of Store Pages” select “Every time I visit the Webpage”

Once logged into the webpage:

Note: When a page is loading, do not perform another command (re-click) or re-call the same function twice. Allow time for the pages to remotely load normally. Not doing so “can” cause the system to hang or go down. If this happens, a simple browser reboot will be necessary.

Click on the “User Manager” tab, to edit the username and password, click on the “Edit” button.



This step can be skipped and left as is. Next, click on the “General Settings” tab.

Please note that access of only “ONE” user is provided. If changed, please be sure it is properly documented for traceability.

VWG ZigBee® Settings

Wireless Gateway Demo

Navigation Tree

- Home
- System Settings
 - User Manager
 - Top/Ip Settings
 - Date and Time
- Gateway Settings
 - General Settings
 - BACnet Settings
 - Broadcast Distribution Table Manager
 - Foreign Distribution Table Manager
 - Controllers Manager
 - BACnet Points Viewer
- sp/
 - History
 - AuditHistory
 - LogHistory

Wireless Network

Global Status: (down)

Fault Cause: Communication disabled for default Channel 10

Enabled: ☒ true

Enable Disable Test Comm Card

Serial Port

Serial Port Status: (ok)

Wireless Parameters

Wireless Card Status: (down)

Wireless PAN ID: 5 [0 - 500]

Wireless Channel: 25 [10 - 26]

General Parameters

Conversion Units: English

Point Name Convention: <DEVICE_NAME>_<POINT_NAME>

Refresh Save

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The following settings page is where you set the ZigBee® PAN ID (Personal Area Network Identification) address and the channel for the wireless network.

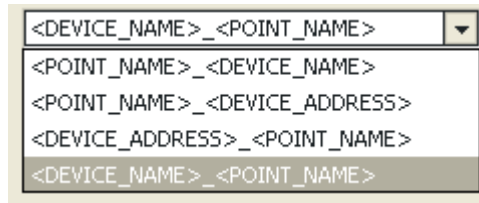
- **Gateway Wireless PAN ID.** (Personal Area Network Identification). This is where the PAN ID of the gateway is set. Range is from address 1 to 500. The default of "0" is **not** a valid PAN ID.
- **Wireless Channel.** This is where the current Channel frequency used by the gateway is set. Range is from 11 to 26. (2405 MHz to 2480 MHz, 5 MHz channel spacing) Please note that channel 26 is attenuated by 4 db compared to the other channels. The default of "10" is not a valid Channel.
- Schneider-Electric **highly recommends** the use of 802.15.4 channels 15 & 25 only. 802.11 Wi-Fi transmissions overlap and **"may"** interfere with other channel selection allowed by 802.15.4 (Channels 11 to 14 & 16 to 24).

General Parameters

- **Conversion Units.** Use this function **prior** to the addition of controllers to the BACnet® database. This allows setting the desired exposed temperature analog variables of the selected controllers to be exposed either in degree Celsius or degree Fahrenheit scale with the proper unit attribute attached to the objects. English sets the units to degree Fahrenheit. Metric sets the units to degree Celsius.

- **Point Name Convention.** This provides the option to display the BACnet® point names in several fashions:

Options:



<DEVICE_NAME>_<POINT_NAME>	▼
<POINT_NAME>_<DEVICE_NAME>	
<POINT_NAME>_<DEVICE_ADDRESS>	
<DEVICE_ADDRESS>_<POINT_NAME>	
<DEVICE_NAME>_<POINT_NAME>	

Example of a VZ7200F5X00 WITH COMM ADDRESS OF 15

“Point_Name” _ “Device_Name”: Ex: RoomTemp_VZ7200F5X00W_15

“Point_Name” _ “Device_Address”: Ex: RoomTemp_15

“Device Address” _ “Point_Name”: Ex: 15_RoomTemp

“Device Name” _ “Point_Name”: Ex: VZ7200F5X00W_ RoomTemp_15

BACnet® Settings

Use this tab when configuring general BACnet® IP and MS-TP settings of the gateway.

Wireless Gateway Demo

Navigation Tree

- Home
- System Settings
 - User Manager
 - Top/Ip Settings
 - Date and Time
- Gateway Settings
 - General Settings
 - BACnet Settings**
 - Broadcast Distribution Table Manager
 - Foreign Distribution Table Manager
 - Controllers Manager
 - BACnet Points Viewer
- spy
- History
 - AuditHistory
 - LogHistory

Instance Number [-1 - 4194303]

Vendor Name

Vendor BACnet ID

Model Name

Description

Location

IP Settings ±

Port Status

Fault Cause

Enabled ☐ false

Adapter

IP Address

UDP Port

Bbmd Address

Registration Lifetime

MSTP Settings ±

Port Status

Fault Cause

Enable ☐ false

Baud Rate

MSTP Address [0 - 127]

Max Info Frame [0 - 100]

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Broadcast Distribution Table Manager

When the station is operating as a BBMD, Niagara maintains this table listing and all other participating BBMDs, including their IP address and broadcast distribution masks. If necessary, this view allows you to manually edit the BDT.

Foreign Distribution Table Manager

When the station is operating as a (BACnet®) "foreign device", this table lists all other BACnet® foreign devices that are registered with Niagara, including their IP address, time to live, and purge time. This view allows you to manually edit the FDT, if necessary, to support devices that cannot register themselves.

The screenshot displays the 'Wireless Gateway Demo' web interface. On the left is a 'Navigation Tree' with the following structure:

- Home
- System Settings
 - User Manager
 - Tcp/Ip Settings
 - Date and Time
- Gateway Settings
 - General Settings
 - BACnet Settings
 - Broadcast Distribution Table Manager** (highlighted)
 - Foreign Distributon Table Manager
 - Controllers Manager
 - BACnet Points Viewer
- spy
- History
 - AuditHistory
 - LogHistory

The main content area on the right is titled 'Wireless Gateway Demo' and contains a table with the following data:

BACnet/IP Address	Broadcast Distribution Mask
192.168.1.120:0xBAC0	255.255.255.255

At the bottom left is the 'Schneider Electric' logo. At the bottom right are buttons for 'New', 'Edit', and 'Delete'.

BACnet® IP Settings

- **BACnet® Adapter.** This selects which of the 2 IP network connections are to be used for BACnet® IP communication. Net1 or Net2. The default is set to Net 1.
- **UDP Port.** Is the default BACnet® UDP port number assigned to the device of the VWG for BACnet® IP communication. The default port for BACnet® communication used is: 47808 (0xBAC0). Do not change this value.
- **Bbmd Address.** The BACnet® IP Address of the BBMD this foreign device should register with.

Note: A BACnet® IP Address requires the HTTP port number of the remote device (i.e. 192.168.100.120:47808 where 192.168.100.120 is the TCP-IP address and 47808 is the HTTP port used when redistributing broadcast messages).

- **Registration Lifetime.** Is the duration of registration with the selected BBMD. The device will re-register itself periodically before this time expires. Default value is 15 minutes.

Make sure to click “*Enable*” after entering the proper settings.

BACnet® Settings. BACnet® MS-TP Settings

- **MS-TP Address.** Is the BACnet® MAC address assigned to the VWG. It is a unique identification number of a device on a BACnet® MS-TP network and needs to be unique on that RS-485 trunk. Usable MS-TP MAC range is from 0 to 127. Default is value is –1, which disables BACnet® MS-TP communication.
- **MS-TP Baud Rate.** Is the assigned Baud rate of the VWG on the BACnet® MS-TP Networks. All node on

the trunk need to be set to the same speed for proper operation

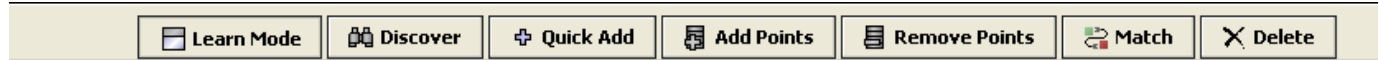
Valid and usable ranges are: 9600 Kbps, 19200 Kbps, 38400 Kbps, 76800 Kbps

Make sure to click “Enable” after entering the proper settings.

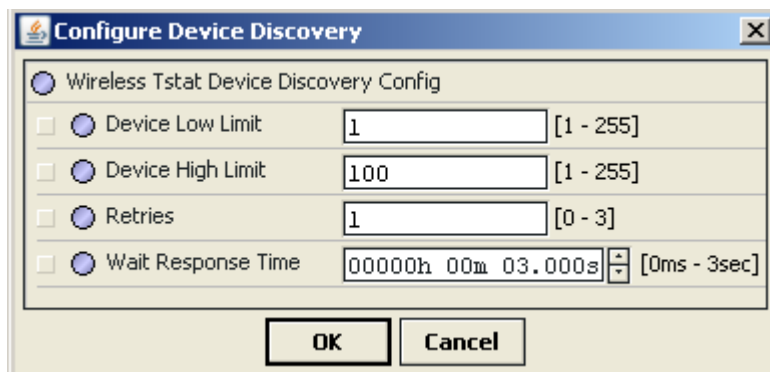
Wireless Controller & Controllers Manager

This is where the wireless controllers are discovered and then added to the database together with the associated points for each device.

Toolbar



Click on the “**Discover**” button and set the range of the com addresses. EX: (Discover controllers in the range of com address from 1 to 100).



PLEASE NOTE: During the process of adding or removing “many” controllers at once, the tool “may” not respond to new inputs while the process is active. Wait until the VWG has finished processing the required modification before initiating any new commands. The addition of 50 controllers in a database can take up to 10 minutes.

Note: During anytime a page loads, do not perform another command (re-click) or re-call the same function twice. DO give time for the pages to remotely load normally. Not doing so “can” cause the system to hang or go down. If this happens, a simple browser reboot will be necessary.

Also be sure to delete old controllers no longer used in the database once a fresh discovery process is finished. This will also eliminate all the unwanted objects on the exported BACnet® database.

Once the controllers have been discovered, right hand click on one of the controllers and click “select all”. Next, click on the “**Quick Add**” button to add the controllers to the database of the wireless network.

Wireless Gateway Demo

Navigation Tree:

- Home
- System Settings
 - User Manager
 - Tcp/Ip Settings
 - Date and Time
- Gateway Settings
 - General Settings
 - BACnet Settings
 - Broadcast Distribution Table Manager
 - Foreign Distribution Table Manager
 - Controllers Manager
 - BACnet Points Viewer
- spy
- History
 - AuditHistory
 - LogHistory

Discovered (4 objects)

Model	Address
VZ7200FSx00W_1	1
VZ7200FSx00W_3	3
VZ7656B1000W_4	4
VZ7200FSx00W_8	8

Database (4 objects)

Name	Added	Exts	Model	Address	Status	Enabled	Health	Fault Cause
VZ7200FSx00W_1	false		VZ7200FSx00W	1	{ok}	true	Ok [24-Aug-11]	
VZ7200FSx00W_3	false		VZ7200FSx00W	3	{ok}	true	Ok [24-Aug-11]	
VZ7656B1000W_4	false		VZ7656B1000W	4	{ok}	true	Ok [24-Aug-11]	
VZ7200FSx00W_8	false		VZ7200FSx00W	8	{ok}	true	Ok [24-Aug-11]	

Schneider Electric

Learn Mode Discover Quick Add Add All Points Remove All Points Match Delete

If a particular controller refuses to join the network and cannot be seen by the VWG. Please move closer to the VWG until it has joined the network and it is added to the database. It can then be re-located to its original position. This is necessary for it to be assigned a ZigBee® address to join the network.

Adding Points

After the controllers have been added to the network, the next step is to add the points to the BACnet® export table of the VWG.

Select the required controllers from the database (more than one can be selected) and click on the **“Add Points”** button. This will add all the points from each selected controller in the “BACnet® Points Viewer” tab.

“Match Button”

Is used when replacing controllers or matching them in the field during the initial commissioning. This feature allows you to match the characteristics of an offline created database controller or an existing replaced one to a newly discovered one in the field.

Name	Model	Version	Address	Zigbee	IEEE
VZ7200F5x00W_1	VZ7200F5x00W	3	1	00 01	00 1d 35 ec ce ec 1b 09

☐ Name:
☐ Model:
☐ Version:
☐ Address: [1 - 255]
☐ Zigbee:
☐ IEEE:

OK Cancel

- **Address.** The current physical MAC address set at each individual controller in its local configuration.
- **Name.** The controller's given name in the database. The name is constructed of the controller model number and its current local MAC address. Ex. A VT7300C5x00W with a local MAC address of 21 will carry a name in the database of VT7300C5x000_21
- **Added to Network**
 - o True = controller already added to the database.
 - o False = controller **NOT** added to the database

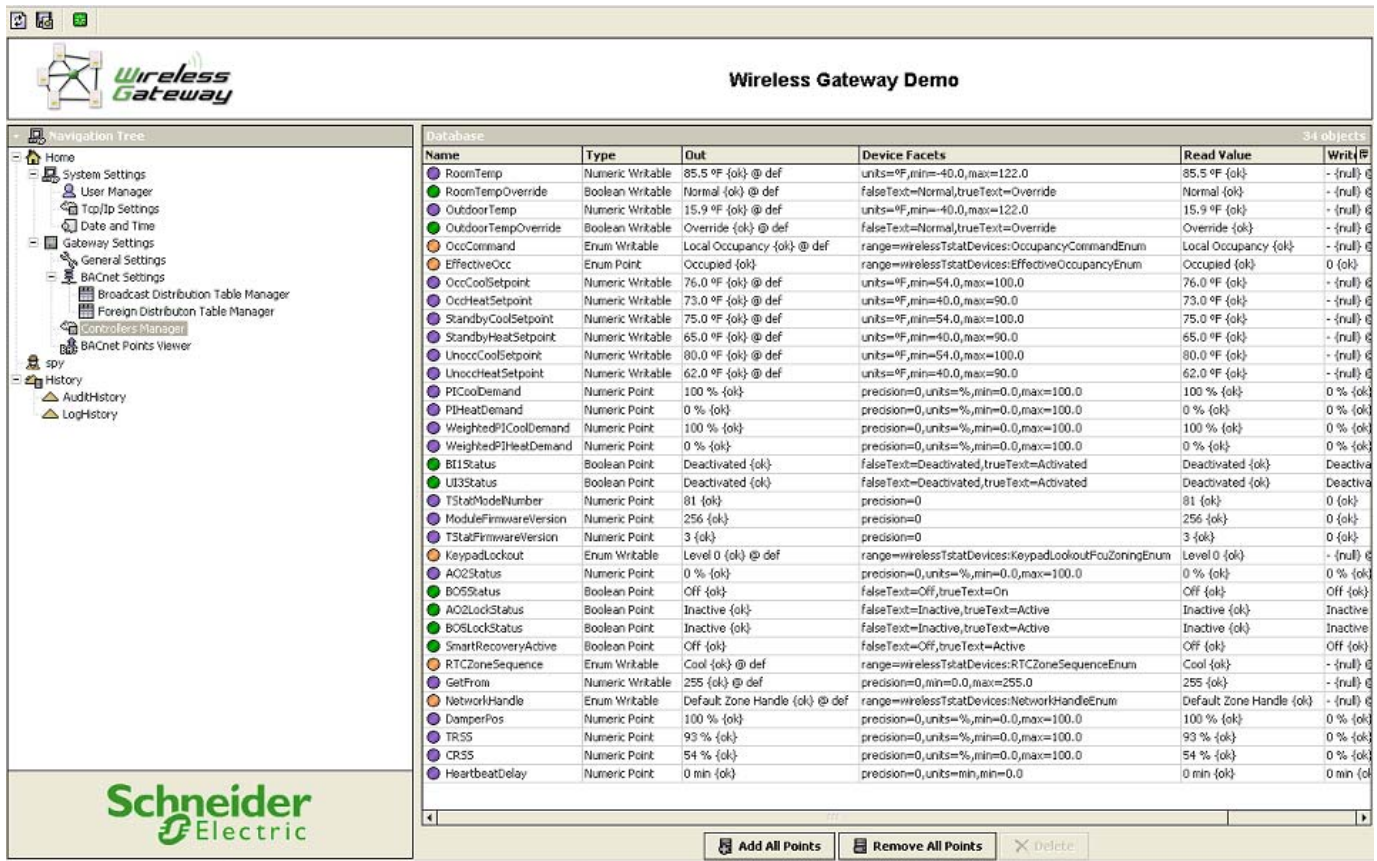
BACnet® Points Viewer

This displays all the of the point objects that are loaded on the VWG BACnet® export table from each controller

BACnet® points include:

- Analog Values
- Binary Values
- Multistate Values

The displayed BACnet® object names are displayed as configured by the installer from the general parameters section, under point name convention.



Wireless Gateway Demo

Navigation Tree:

- Home
 - System Settings
 - User Manager
 - Tcp/Ip Settings
 - Date and Time
 - Gateway Settings
 - General Settings
 - BACnet Settings
 - Broadcast Distribution Table Manager
 - Foreign Distribution Table Manager
 - Controller Manager**
 - BACnet Points Viewer
 - History
 - Audit History
 - Log History

Database (34 objects):

Name	Type	Out	Device Facets	Read Value	Write Value
RoomTemp	Numeric Writable	85.5 °F {ok} @ def	units=°F,min=-40.0,max=122.0	85.5 °F {ok}	- {null} {ok}
RoomTempOverride	Boolean Writable	Normal {ok} @ def	falseText=Normal,trueText=Override	Normal {ok}	- {null} {ok}
OutdoorTemp	Numeric Writable	15.9 °F {ok} @ def	units=°F,min=-40.0,max=122.0	15.9 °F {ok}	- {null} {ok}
OutdoorTempOverride	Boolean Writable	Override {ok} @ def	falseText=Normal,trueText=Override	Override {ok}	- {null} {ok}
OccCommand	Enum Writable	Local Occupancy {ok} @ def	range=WirelessStatDevices:OccupancyCommandEnum	Local Occupancy {ok}	- {null} {ok}
EffectiveOcc	Enum Point	Occupied {ok}	range=WirelessStatDevices:EffectiveOccupancyEnum	Occupied {ok}	0 {ok}
OccCoolSetpoint	Numeric Writable	76.0 °F {ok} @ def	units=°F,min=54.0,max=100.0	76.0 °F {ok}	- {null} {ok}
OccHeatSetpoint	Numeric Writable	73.0 °F {ok} @ def	units=°F,min=40.0,max=90.0	73.0 °F {ok}	- {null} {ok}
StandbyCoolSetpoint	Numeric Writable	75.0 °F {ok} @ def	units=°F,min=54.0,max=100.0	75.0 °F {ok}	- {null} {ok}
StandbyHeatSetpoint	Numeric Writable	65.0 °F {ok} @ def	units=°F,min=40.0,max=90.0	65.0 °F {ok}	- {null} {ok}
UnoccCoolSetpoint	Numeric Writable	80.0 °F {ok} @ def	units=°F,min=54.0,max=100.0	80.0 °F {ok}	- {null} {ok}
UnoccHeatSetpoint	Numeric Writable	62.0 °F {ok} @ def	units=°F,min=40.0,max=90.0	62.0 °F {ok}	- {null} {ok}
PICoolDemand	Numeric Point	100 % {ok}	precision=0,units=%,min=0.0,max=100.0	100 % {ok}	0 % {ok}
PIHeatDemand	Numeric Point	0 % {ok}	precision=0,units=%,min=0.0,max=100.0	0 % {ok}	0 % {ok}
WeightedPICoolDemand	Numeric Point	100 % {ok}	precision=0,units=%,min=0.0,max=100.0	100 % {ok}	0 % {ok}
WeightedPIHeatDemand	Numeric Point	0 % {ok}	precision=0,units=%,min=0.0,max=100.0	0 % {ok}	0 % {ok}
BT1Status	Boolean Point	Deactivated {ok}	falseText=Deactivated,trueText=Activated	Deactivated {ok}	Deactivated {ok}
UI3Status	Boolean Point	Deactivated {ok}	falseText=Deactivated,trueText=Activated	Deactivated {ok}	Deactivated {ok}
TStatModeNumber	Numeric Point	81 {ok}	precision=0	81 {ok}	0 {ok}
ModuleFirmwareVersion	Numeric Point	256 {ok}	precision=0	256 {ok}	0 {ok}
TStatFirmwareVersion	Numeric Point	3 {ok}	precision=0	3 {ok}	0 {ok}
KeypadLockout	Enum Writable	Level 0 {ok} @ def	range=WirelessStatDevices:KeypadLockoutFouZoningEnum	Level 0 {ok}	- {null} {ok}
AO2Status	Numeric Point	0 % {ok}	precision=0,units=%,min=0.0,max=100.0	0 % {ok}	0 % {ok}
BO5Status	Boolean Point	Off {ok}	falseText=Off,trueText=On	Off {ok}	Off {ok}
AO2LockStatus	Boolean Point	Inactive {ok}	falseText=Inactive,trueText=Active	Inactive {ok}	Inactive {ok}
BO5LockStatus	Boolean Point	Inactive {ok}	falseText=Inactive,trueText=Active	Inactive {ok}	Inactive {ok}
SmartRecoveryActive	Boolean Point	Off {ok}	falseText=Off,trueText=Active	Off {ok}	Off {ok}
RTCZoneSequence	Enum Writable	Cool {ok} @ def	range=WirelessStatDevices:RTCZoneSequenceEnum	Cool {ok}	- {null} {ok}
GetFrom	Numeric Writable	255 {ok} @ def	precision=0,min=0.0,max=255.0	255 {ok}	- {null} {ok}
NetworkHandle	Enum Writable	Default Zone Handle {ok} @ def	range=WirelessStatDevices:NetworkHandleEnum	Default Zone Handle {ok}	- {null} {ok}
DamperPos	Numeric Point	100 % {ok}	precision=0,units=%,min=0.0,max=100.0	100 % {ok}	0 % {ok}
TR55	Numeric Point	93 % {ok}	precision=0,units=%,min=0.0,max=100.0	93 % {ok}	0 % {ok}
CR55	Numeric Point	54 % {ok}	precision=0,units=%,min=0.0,max=100.0	54 % {ok}	0 % {ok}
HeartbeatDelay	Numeric Point	0 min {ok}	precision=0,units=min,min=0.0	0 min {ok}	0 min {ok}

Buttons: Add All Points, Remove All Points, Delete

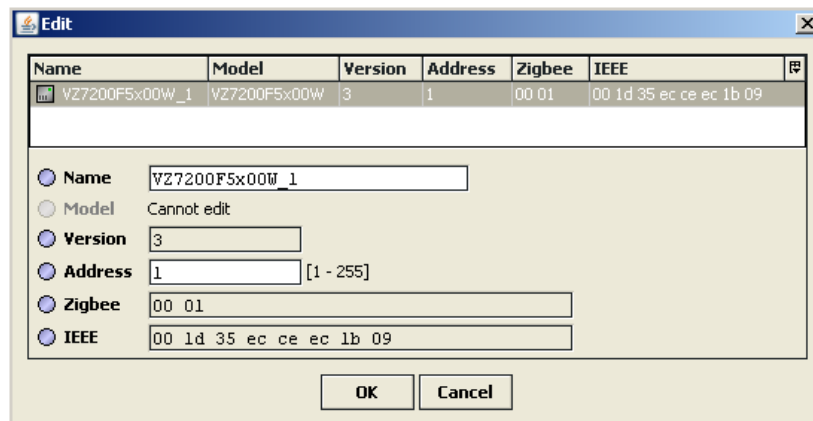
To view only the objects from any specific controller; in the “Controller Manager” tab, double click on the  icon.

IMPORTANT NOTES (Please Read Carefully):

- For every controller reporting to a gateway (maximum of 50 controllers per gateway), be sure to set the **SAME** PAN ID and Channel value at both the gateway and the controller(s).
- When properly configured, the issue of RF interference or data loss between the gateway and the controllers can be avoided. Without proper care or proper software configuration serious interference issues can occur.
- Schneider-Electric **highly recommends** the use of 802.15.4 channels 15 & 25 only. 802.11 Wi-Fi transmissions overlap and “may” interfere with other channel selection allowed by 802.15.4 (Channels 11 to 14 & 16 to 24)

Additional Options

The default name of discovered controller is “Model#_Address”. To change the name, enter the controller manager tab, right hand click on the desired controller and click “edit”.



Name	Model	Version	Address	Zigbee	IEEE
VZ7200F5x00W_1	VZ7200F5x00W	3	1	00 01	00 1d 35 ec ce ec 1b 09

☒ Name: VZ7200F5x00W_1
☐ Model: Cannot edit
☒ Version: 3
☒ Address: 1 [1 - 255]
☒ Zigbee: 00 01
☒ IEEE: 00 1d 35 ec ce ec 1b 09

OK Cancel

** The ZigBee® address and IEEE address information can also be seen.

To **delete** a controller from the database, simply select the device and click on the “delete” button. This option also deletes it from the discovered controllers field. The controller can always be re-discovered if needed.

Module Version. The current software version of the wireless communication module installed inside the wireless controller.

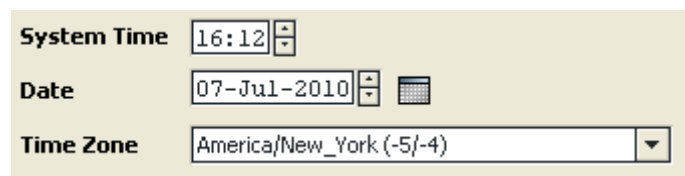
Status. Indicates if the current controller is online to the VWG or not.

- o **If online**, the status will be {OK} and the controller line will be white
- o **If offline**, the status will be {down} and the controller line will be yellow

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

Station Date and Time

This is used to set the local time and date at the VWG, as well as the Time Zone.



System Time 16:12
Date 07-Jul-2010
Time Zone America/New_York (-5/-4)

General TCP-IP Configuration

The image shows a software window titled "Wireless Gateway Demo". On the left is a "Navigation Tree" with the following structure:

- Home
 - System Settings
 - User Manager
 - TCP/IP Settings (selected)
 - Date and Time
 - Gateway Settings
 - General Settings
 - BACnet Settings
 - Broadcast Distribution Table Manager
 - Foreign Distribution Table Manager
 - Controllers Manager
 - BACnet Points Viewer
 - spy
 - History
 - AuditHistory
 - LogHistory

The main area displays the following configuration fields:

- Hostname: localhost
- DNS Domain:
- IPv4 Gateway: 192.168.1.1
- DNSv4 Servers: (Add, Delete, Move Up/Down icons)
- Interface 1
 - ID: en0
 - Description: Ethernet Adapter NET1
 - Adapter Enabled: ☒ Enabled
 - DHCPv4: ☐ Enabled
 - IPv6 Support: No
 - IPv4 Address: 192.168.1.122
 - IPv4 Subnet Mask: 255.255.255.0
 - DHCPv4 Server: n/a
 - DHCPv4 Lease Granted: n/a
 - DHCPv4 Lease Expires: n/a
- Interface 2
 - ID: en1
 - Description: Ethernet Adapter NET2
 - Adapter Enabled: ☐ Enabled
 - IPv6 Support: No
 - IPv4 Address:
 - IPv4 Subnet Mask:

At the bottom left is the Schneider Electric logo. At the bottom right are "Refresh" and "Save" buttons.

Hostname. Is the local hostname exposed on the network. Please do not change and leave to "Localhost"

DNS Domain. The TCP-IP Domain Name System (DNS) the domain host belongs to. Only when DNS is used.

IPv4 Gateway. The IP address for the device that forwards packets to other networks or subnets.

DNSv4 Servers. The IP address for one or more DNS servers, each of which can automate associations between hostnames and IP addresses. Included are icon-buttons to Add (to enter IP address of server), delete and move Up/Down (to set the DNS search order).

- **Interface 1.** Set's the local device IP settings for NET1
- **Interface 2,** Set's the local device IP settings for NET2

The interface selected for BACnet® IP communication is made at the "BACnet® Network" tab under BACnet® IP Settings. The default connection used is NET1

Selectable fields are as follows:

ID. A read-only OS identifier for the hardware interface).

Description. A read-only text string such as "Ethernet Adapter".

Adapter Enabled. Read-only checkbox that indicates whether the Ethernet port is usable.

DHCPv4. A checkbox to specify DHCP (Dynamic Host Configuration Protocol) instead of static IP addressing. Successful use requires a DHCP server installed on your network. If enabled, other interface fields such as IP Address and Subnet Mask become read-only, as the DHCP server assigns these after the platform reboots.

Note: In general (for stability), static IP addressing is recommended over DHCP. Caution: Do not enable DHCP unless sure that your network has one or more DHCP servers! Otherwise, the VWG may become unreachable over the network.

IPv4 Address. Represents the “static” IP address for the host unique to your network. When changed and saved, this will be the new IP address under which you will connect to the VWG.

IPv4 Subnet Mask. Represents the “static” IP subnet mask used by this host.

DHCPv4 Server. Applies only if DHCP is enabled. Shows read-only address of the DHCP server from which this host last obtained its IP address settings.

DHCPv4 Lease Granted. Applies only if DHCP is enabled. Shows a read-only timestamp of when the DHCP lease started.

DHCPv4 Lease Expires. Applies only if DHCP is enabled. Shows a read-only timestamp of when the DHCP lease will expire, and will need renewal.

Important Tips -

- Be sure all controllers communicating to any VWG are using the same PAN ID and Channel as the VWG wireless communication card set in the property sheet.
- 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 controller local present value will then be derived from the wireless network instead of the present value at the controller.
- For VT72xx, VT73xx & VTR73xx, 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 controller can accept.
- For VT73xx & VTR73xx, Fan Mode Enumerations. Controllers will **not** accept all possible index values. VT73xx & VTR73xx fan mode input is dependent on local Fan Configuration parameter. Fan actual current value is read at Fan Status object.
- Each controller connected to a wireless network reports to the VWG 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 controller has not updated its mandatory 3 minutes heartbeat update to the VWG.

VWG Wireless Adapter 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 VWG main board active
4 x (200ms) short blinks	Power on, card memory initialized properly, serial communication with the VWG 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 VWG main board active, wireless networks started successfully and wireless communication with controllers active
Controller / Controller Wireless Adapter LED Status Indicators	
1 x(200ms) short blink	Power on
2 x (200ms) short blinks	Power on and communicating with controller
3 x (200ms) short blinks	Power on, communicating with controller and there is connectivity to wireless network
4 x (200ms) short blinks	Power on, communicating with controller, connectivity to wireless network and the VWG is communicating with Wireless controller
4 x (200ms) short blinks And 1 x (1500ms) long blink	Power on, communicating with controller, connectivity to wireless network and the VWG is communicating with Wireless controller.
System Troubleshooting Recommendations	
1. If a controller is not detected by a VWG, verify that the LED is blinking at least 4 times. If it is only blinking twice, ensure that the PAN and Channel of the controller is the same as the VWG it must communicate with. 2. When commissioning a network, it is recommended to use channels 15 or 25. Alternate these channels between floors. 3. If a particular controller refuses to join the network and cannot be seen by the VWG. Please move momentarily closer to the VWG until it has joined the network and it is added to the database. It can then be re-located to its original position.	

**** Note: A second long blink is required for VZ72xx models.** On all VZ72xx Zone controllers, a second long blink of 3000 ms indicates connectivity and communication to the master VZ76xx RTU controller