SYNAPSENSE®

Wireless Monitoring & Cooling Control

SynapSense Intelligent Gateway

Installation Guide

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SynapSense Intelligent Gateway Installation Guide

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Regulatory Information

Notice to Users:

This equipment has been tested and found to comply with the limits for Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If the equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Plug the equipment into an outlet on a circuit different from that which the receiver is plugged.
- Consult the dealer or an experienced radio/TC technician for help. This product works using a radio frequency, so use on an airplane may be restricted due to interference.

FCC Statement:

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. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. The antenna(s) used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

CE Statement:

This equipment has been tested and found to comply with the limits of the European Council Directive on the approximation of the law of the member states relating to electromagnetic compatibility (89/336/EEC) according to EN 55022 Class B.

Industry Canada Equipment Notice:

The Industry Canada certification identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational and safety requirements as prescribed in the appropriate Terminal Equipment Technical Document(s). The Department does not guarantee the equipment will operate to the user's satisfaction. Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations. Repairs to certified equipment should be coordinated by a representative designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure, for their own protection, that the electrical ground connectors of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This presentation may be particularly important in rural areas.

Caution: Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority or electrician, as appropriate.

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de

brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Warranty Information

Limited One Year Warranty

Our company warrants that for one year from the date of purchase, it will replace this product if found to be defective in materials or workmanship. For a prompt, no charge replacement of equivalent product, contact technical support at **support@synapsense.com** or by phone.

Technical Support Center
Telephone: +1.916.294.0110 option 2
Email: support@synapsense.com
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United States of America

This replacement is the company's sole obligation under this warranty. SynapSense Corporation will not be responsible for any incidental or consequential damages or for any loss arising in connection with the use or inability to use this product. Some states/provinces do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty excludes defects or damage due to misuse, abuse, or neglect. This warranty gives you specific legal rights, and you may also have other rights, which vary from state to state/province to province.

Table of Contents

About This Guide

This document provides guidelines and instructions for installing and configuring the SynapSense Intelligent Gateway device. The intended audience for this document consists of customers or partners of SynapSense Corporation or a SynapSense installer (or installation team). Customers, partners, or installers should receive training from SynapSense prior to installing the hardware detailed in this document.

Organization

Although we prefer the entire document to be read in order of presentation, we realize that readers may jump to a particular section. The table below describes the chapters and summarizes their content.

Table 1 – Chapter Summary

Chapter	Description
Introduction	Provides an overview of the device, its capabilities, and minimum requirements for use.
Installation & Configuration	Provides detailed steps for installing and configuring the device.
Installation Inspection	Provides the steps to verify proper installation and device connectivity.
Troubleshooting	Provides information about correcting problems that may occur during installation, configuration, or use of the device.

Document Conventions

The table below defines the style conventions used throughout this document.

Table 2 – Installation Guide Style Conventions

Item	Description
Bold and Blue	This style is used for anything a user types, clicks, presses, or taps. The style also highlights SynapSense products. For example, Click **OK**.
NOTE:	Exceptions to the rule and other important information will be set off with this note style.
	This triangular red exclamation mark icon denotes a WARNING.
	This triangular yellow electrical icon denotes a SAFETY WARNING of a physical or electrical nature.

Warnings and Precautions

The following warnings and precautions pertain to Gateway installations.

Failure to adhere to warnings and precautions could result in physical injury or damage to equipment, which may void the warranty.

Installation of this equipment must be in accordance with local and national electrical codes.

Data centers may pose a risk of hearing loss. Use appropriate ear protection prior to entry into high-noise areas.

When performing subfloor work in a data center, be careful not to stress, crush, pull, or disconnect wiring and hoses running underneath electrical and data cables, leak detectors, etc. (including fire alarm/suppression systems).

Subfloor work poses significant trip/fall hazards and eye hazards from airflow-borne debris. Eye protection must be worn at all times when removing or replacing floor tiles and when working in or around areas with removed tiles.

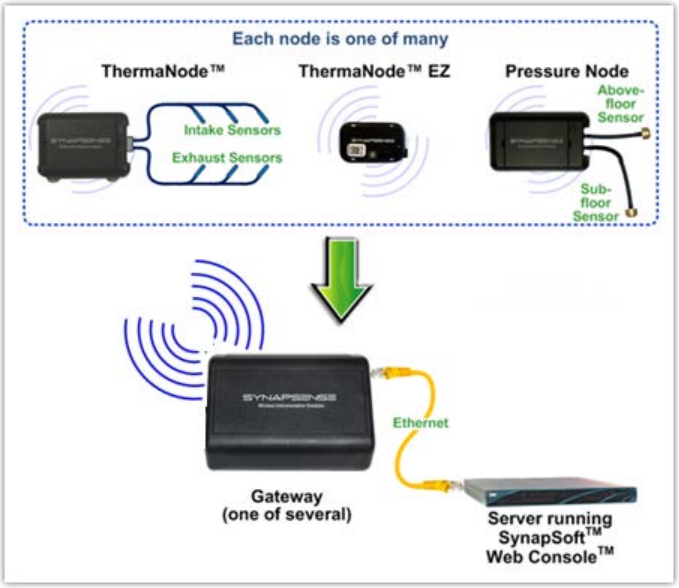
Do not touch any electrical or computer/server equipment in the data center without approval from data center operators (including loose cables, pushcarts, and terminals).

CHAPTER 1.

Introduction

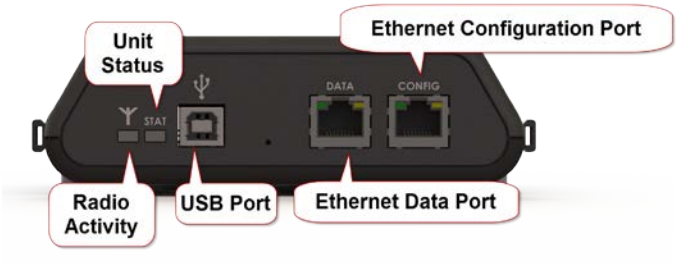
The SynapSense Intelligent Gateway™ is an Ethernet to wireless Network Bridge designed to collect data from any of the SynapSense wireless sensors or meter hardware and send the data to a remote, or Cloud-based, server. It is also designed to operate in standalone mode for some time if the Ethernet connection is lost.

The SynapSense Intelligent Gateway operates in a more centralized mode compared to previous generations of SynapSense Gateways, so it has a relatively high power CPU for its core, capable of running WSN Plug-in, Device Manager, and SynapSense control schemes.



The Gateway is 5.5in x 5.25in x 1.63in. The Gateway can be used in a variety of mounting locations and orientations such as tops of racks, wall mounts, or zip tied to many other structures.

LED shining solid blue or solid green means the unit is functioning normally. See **Troubleshooting** for the table of LED settings and error conditions.



CHAPTER 2.

Getting Started

Before entering the facility to install and configure the Gateway devices, ensure the completion of the following preparatory steps.

1. Review all **warnings and precautions**.
2. **Unpack Gateway kit**(s) from boxes. Count and verify quantities. At least two Gateways are required for redundancy.
3. Verify that **one 110VAC or 220VAC power outlet** is available within a few feet of each Gateway's intended installation location.
4. Verify that the data center operators have provided **one static IP address and two open ports for each Gateway** to be installed (configuration uses port 80, data uses port 10001). Installation and testing cannot begin without these address and port assignments.
5. Verify you have the **latest SynapSense firmware and software**, and applicable documentation.
6. Verify that the install team has all of the **required tools and materials**.

Two ports per Gateway IP address must be open:
Port 80 = Configuration via the Gateway's web page.
Port 10001 = Data received from SynapSense wireless sensors.

Kit Components

The SynapSense Intelligent Gateway kit includes:

- One Gateway module with jacks for Ethernet and external power
- One DC Power Adapter, to convert 90-264 VAC wall power to +5VDC for the Gateway

- Gateway Mounting Shelf (optional)

- 3M™ Command Strips

- Adhesive Cable Clips

Tools and Materials

The table below lists the minimum tools and additional material requirements that SynapSense Field Engineers (FEs) and contracted electricians must bring to the job site.

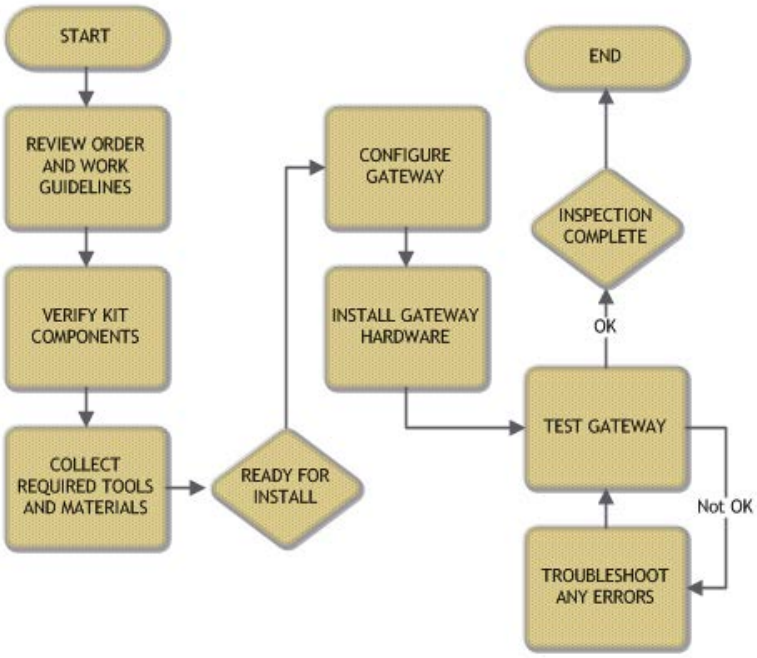
Table of Tools and Materials

Item	Description/Comments
Attire	Proper dress and shoes for performing work in a data center (including areas inside the sub-floor and above ceiling tiles)
Ladder or step stool	Ladder or step stool of sufficient height to reach all Gateway installation locations (typically placed well above the height of all server cabinets in their service radius)
Laptop	Laptop computer with supported browser installed (Internet Explorer, Firefox, or Chrome)
Spares	Spare Gateway modules.
Materials	Plenum-rated Zip-ties Adhesive Sensor Clips Cable Clips 3M Command Strips Alcohol Wipes
Tools	Multi-Meter Flashlight Diagonal cutters Utility knife Scissors Screwdrivers Torque wrench Pliers Wire strippers
Drill/bits	Drill pilot holes for enclosure mounting
Label maker	Create identification labels for wires
Documentation	This installation document Printed MapSense layout of the data center (shows where Gateways will be located in the data center)
Identification	Photo ID to present to data center security personnel

CHAPTER 3.

Installation and Configuration

The following sections provide general information and specific installation instructions for installing the SynapSense Intelligent Gateway devices. The diagram below shows the process flow for a typical installation.



General Installation Guidelines

Be consistent. All installations should match in appearance where possible (including centering, location, method for securing extra wire, etc.).

Be neat. Ensure installation is straight and vertical or horizontal as much as possible.

- Install Gateways on flat smooth surfaces such as the tops of server cabinets. Gateways should not be installed in hot aisles or in any location that violates environmental specifications.
- Use adhesive cable clips to keep cable and AC Power Adapter wires neat and contained.
- Each Gateway installation location should have a 110/240VAC outlet and an Ethernet port within a few feet.
- Ensure Gateway installations should not be in areas where concrete walls, support pillars, large cable bundles, air ducting, or other metal enclosures can block the signals at close range.

Keep installation area clean.

NOTE: To save time, it is best to configure all Gateway devices first, and then mount the Gateways in the desired locations in the data center.

Configuring the Gateway

Prior to mounting each Gateway module in its assigned position in the data center, take a laptop, Ethernet cable and all the Gateways to a comfortable location near a power outlet (e.g. break room, data center IT office) and configure the Gateway IP addresses and subnet masks.

NOTE: SynapSense may have performed the Gateway configuration prior to shipment.
If configuration **is complete,** proceed to **Installing the Gateway**.
If configuration **is not complete**, or to change an IP address, perform all installation activities.

Static IP addresses and **open ports** for each of the Gateways should already be assigned by the data center's IT department and ready for use.

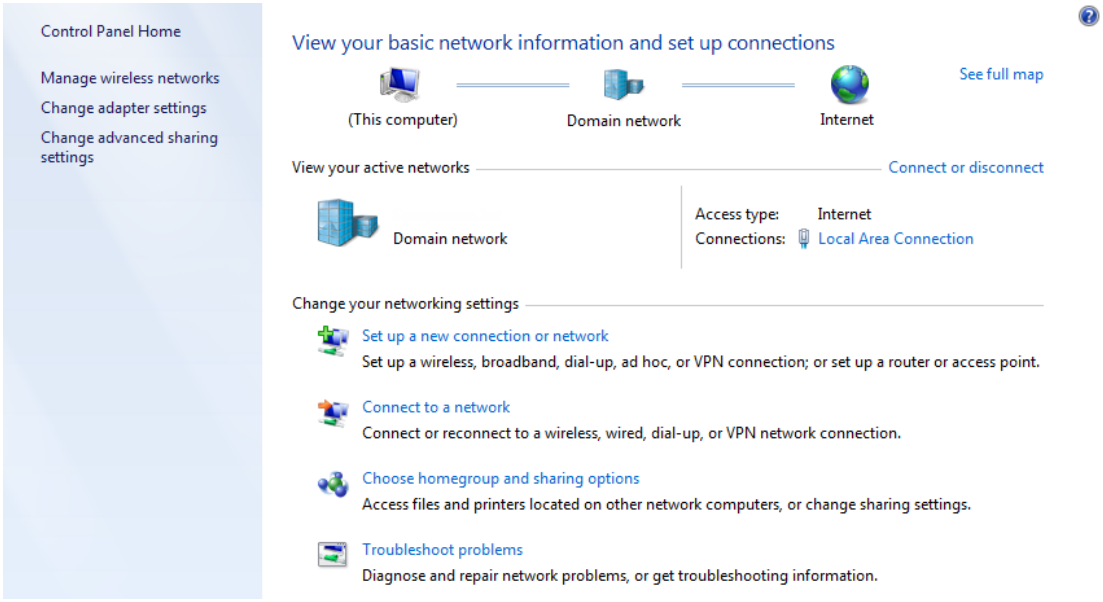
To connect the gateway to the laptop

1. Connect the Power Adaptor cord to the Gateway. Plug into an outlet.
2. With an Ethernet cable, connect the Gateway Configuration Port to a laptop that is loaded with an Internet browser.
3. The Radio Activity LED should be OFF and the Unit Status LED will blink RED continuously to indicate the unit is ON.

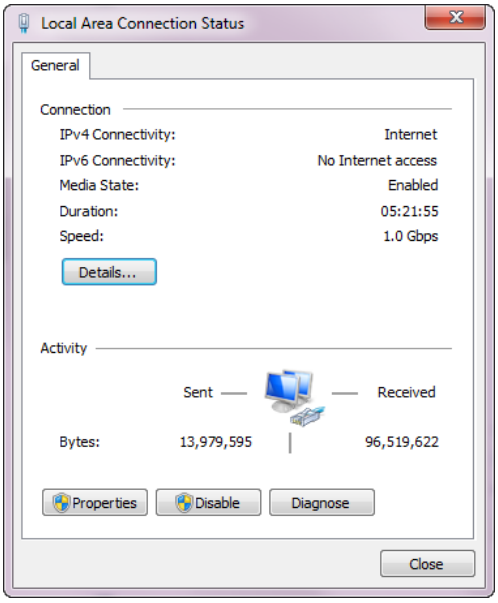
To change the laptop Host IP address

On the laptop, change the Host IP Address setting (temporarily) to enable communication with the Gateway. The exact steps vary, depending on the operating system (the goal is to find and open the Local Area Network Properties dialog box). The instructions below are for Microsoft Windows 7:

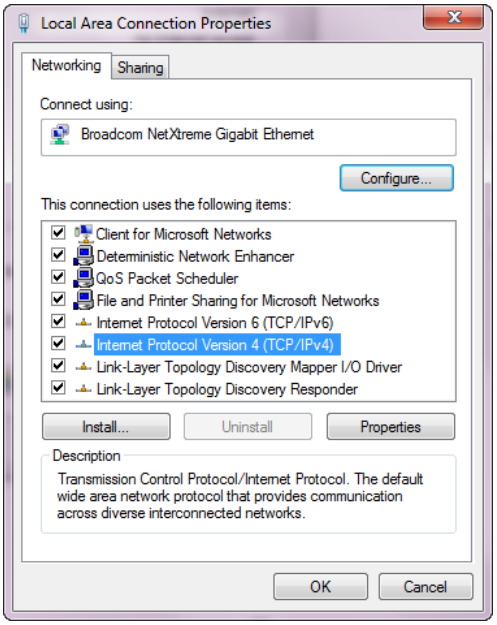
1. Open the Control Panel and select the **Network and Sharing Center**.
2. In the Access type connections box, select the **Local Area Connection** link.



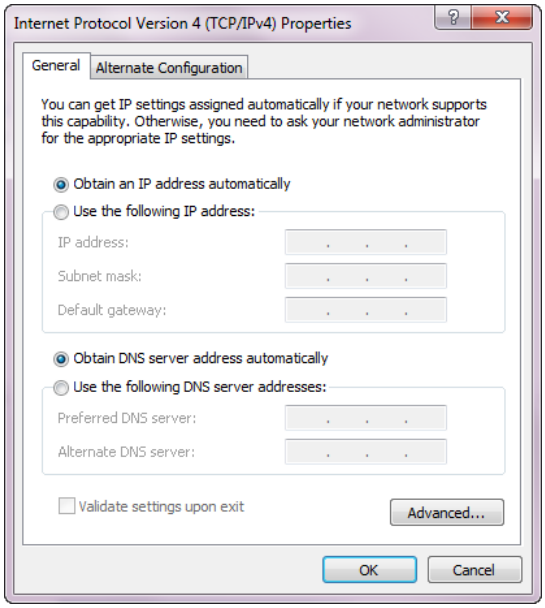
3. In the Local Area Connection Status dialog, click **Properties**.



4. Click to highlight **Internet Protocol Version (TCP/IPv4 or IPv6)**, then select Properties.



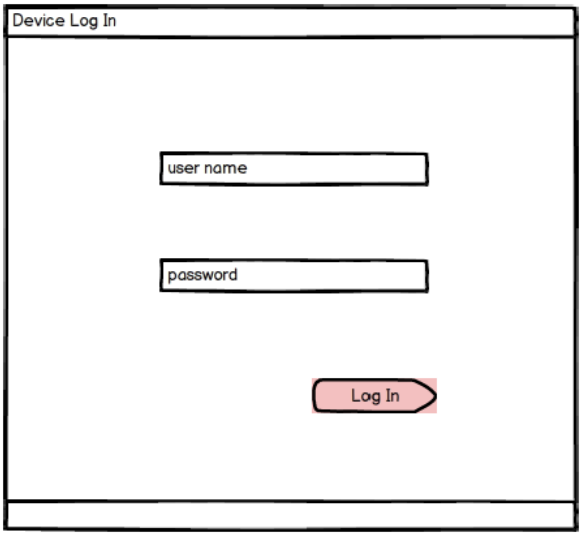
5. Change the IP address field (network address of the laptop) to "**Obtain an IP address automatically**".



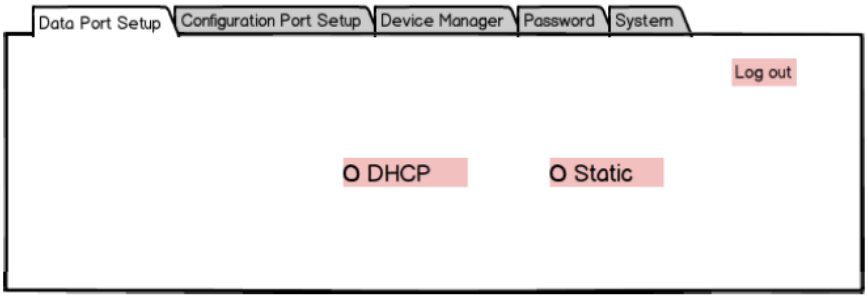
6. Click **OK**.

To change the Gateway IP address and subnet mask

1. Open a browser window and type **http://synapconfig** into the URL field.
2. Log in as "**admin**" with the password "**PASS**" (upper case).

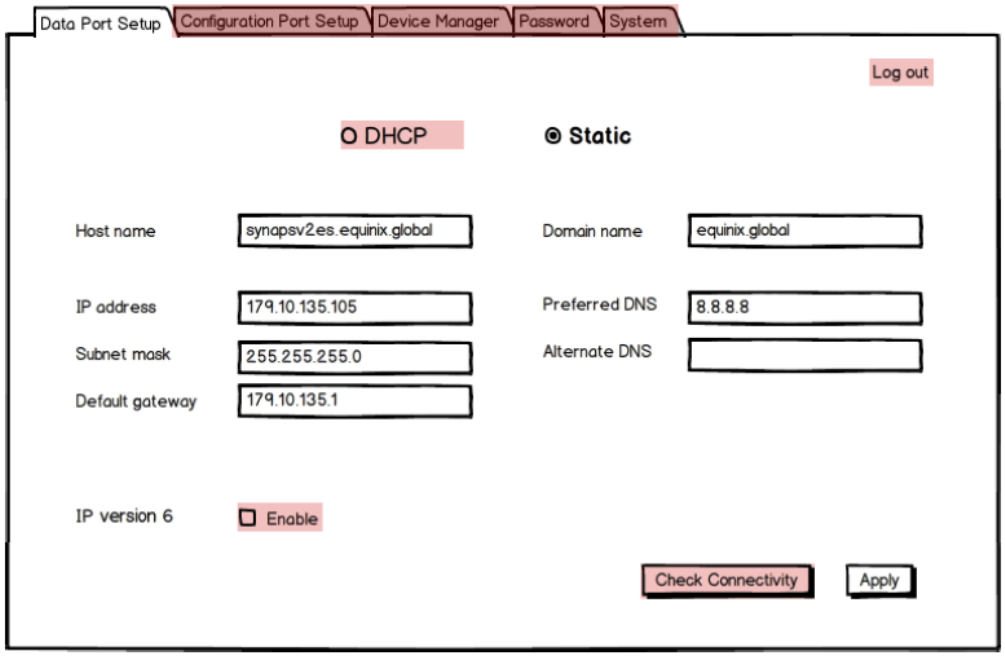


3. On the Data Port Setup tab, select the type of IP address to be used: DHCP or Static.



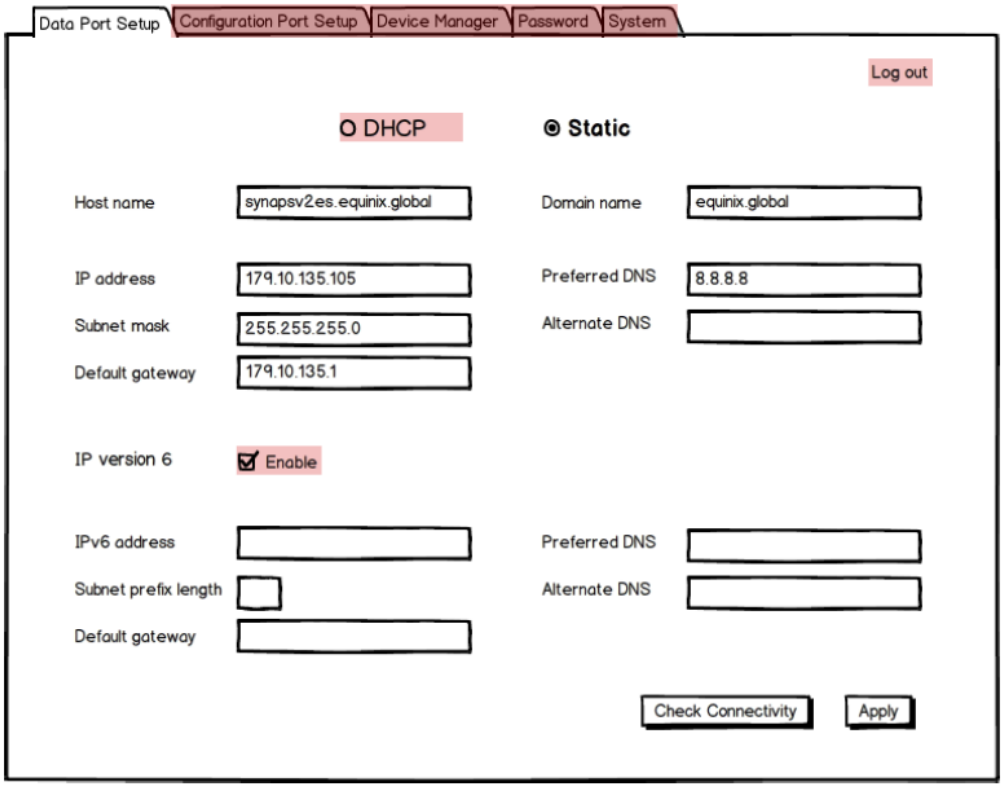
4. For Static IPv4, do the following:

   a. Select the **Static** radio button.
   b. Enter the appropriate information in the fields provided.
   c. Click **Check Connectivity** to ping the device.
   d. Click **Apply**.



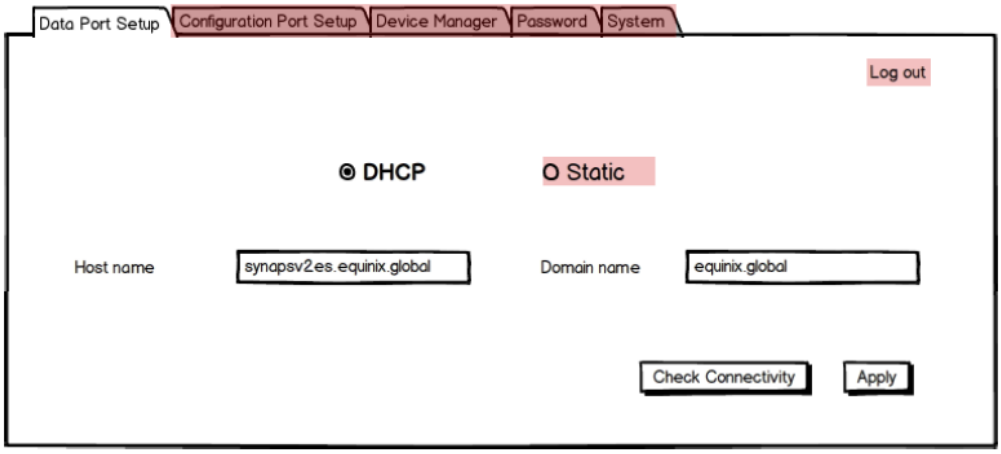
5. For Static IPv6, do the following:

   a. Select the **Static** radio button.
   b. Check **Enable** IP version 6.
   c. Click **Check Connectivity**.
   d. Click **Apply**.

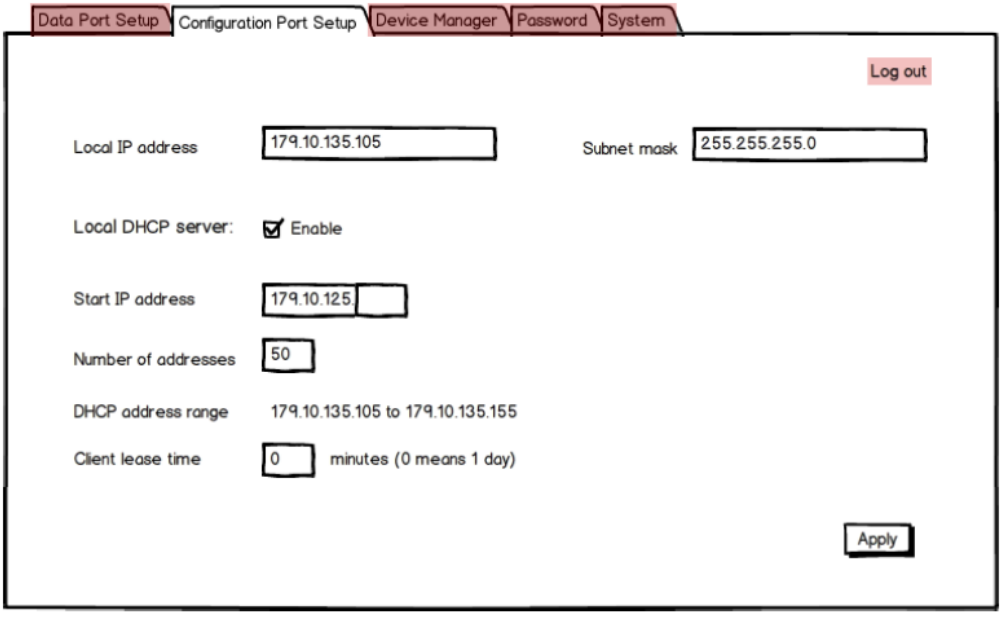


6. For DHCP, do the following:

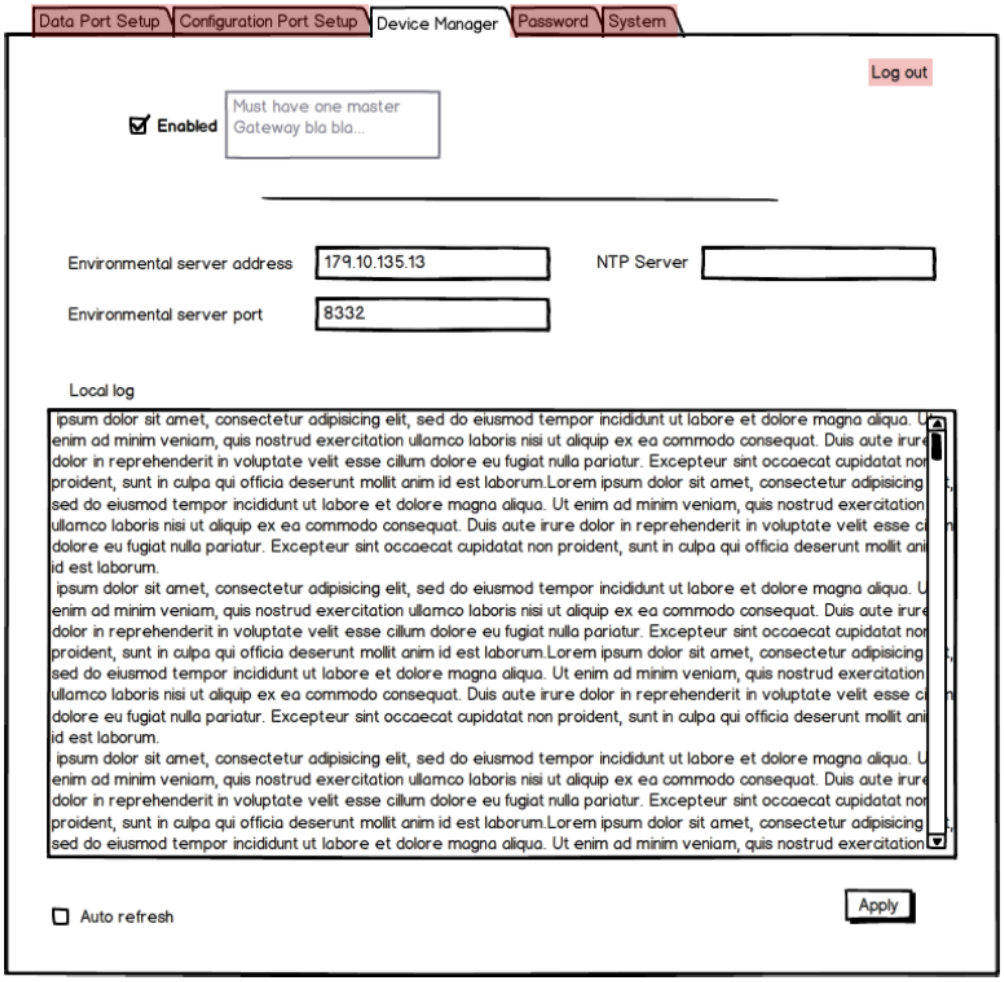
   a. Select the **DHCP** radio button.
   b. Enter the appropriate Host and Domain names.
   c. Click **Check Connectivity**.
   d. Click **Apply**.



7. On the Configuration Port Setup tab, enter the local IP address and local DHCP server information, then click **Apply**.

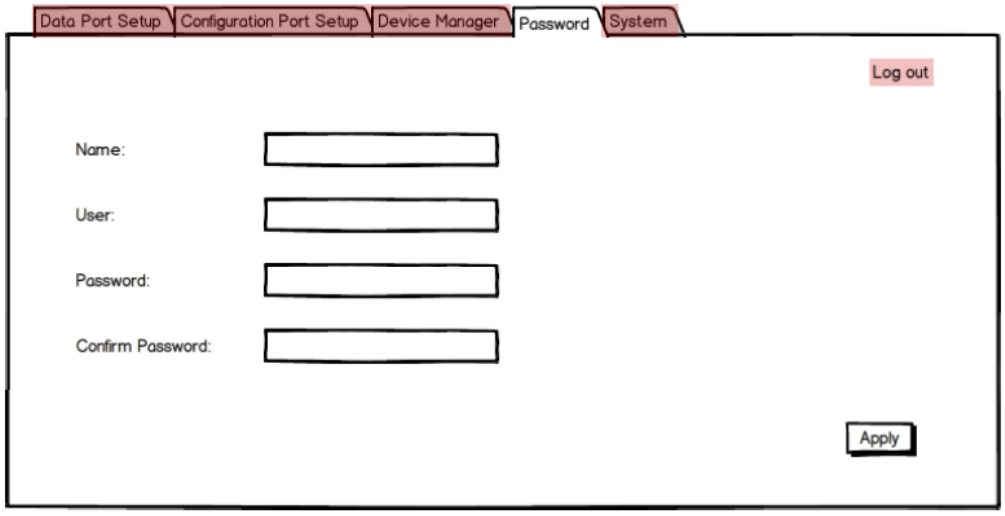


8. On the Device Manager tab, enter the IP address for the SynapSense Environment Server and its server port, then click **Apply**.
9. Check **Enabled** to start Device Manager. If Device Manager starts properly but does not yet have connectivity to the SynapSense Environment Server, the Status LED on the Gateway will blink Red and Blue.



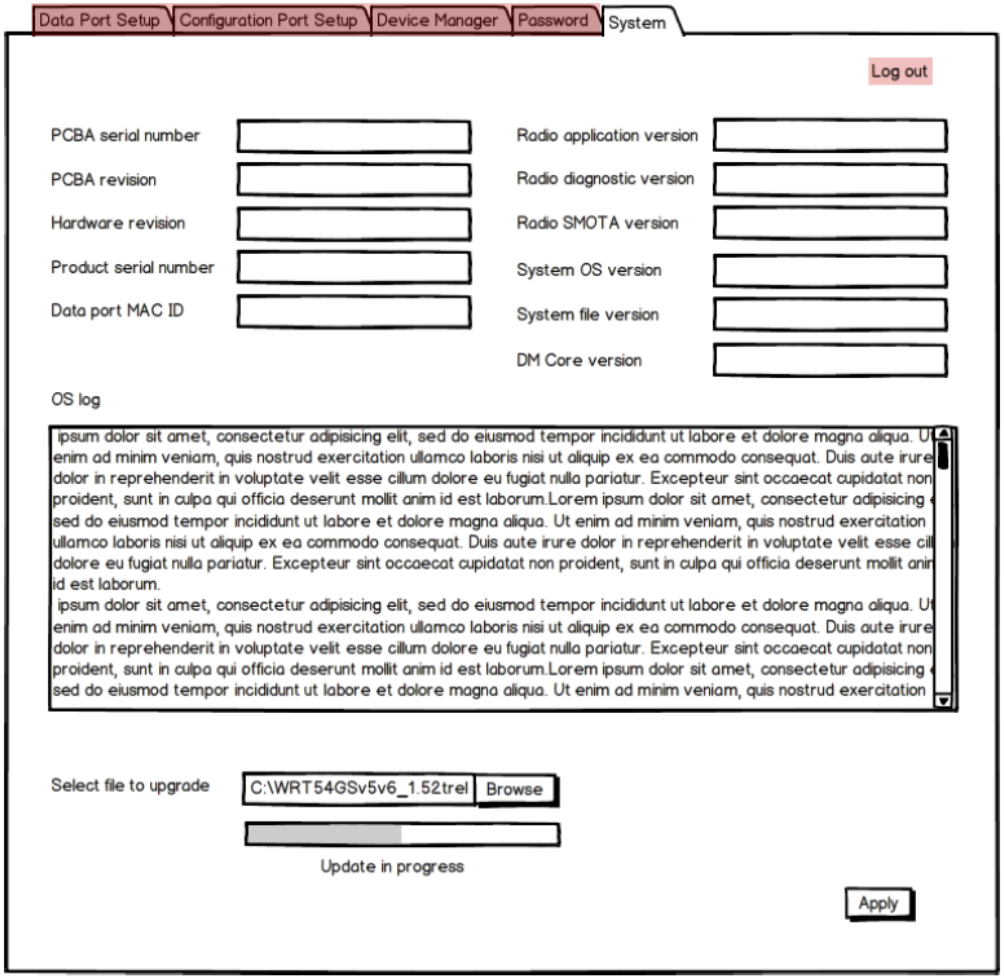
To change the user password

Use the Password tab to change the user password. The User Name is predefined. The default password is "PASS".



To setup the System tab

All of the information on the System tab auto-populates and is Read-Only.



Installing the Gateway

Assess the installation location and determine which type of mounting is best.

- If the location requires an adhesive mount, proceed to **3M Command Strip** instructions.
- If the location requires a mounting shelf, proceed to **Gateway Mounting Shelf** instructions.

3M Command Strip

1. Clean installation surface with alcohol wipes. Allow area to dry thoroughly.
2. Attach **two** Command Strips (double-sided adhesive strips) to the back of the Gateway.

3. Connect the Power Adapter to the Gateway and the designated power outlet.
4. Connect the designated Ethernet Cable (originating from a server port assigned by the data center's IT department) to the Gateway.
5. The Radio Activity LED will remain ON to indicate on-going radio communication activity.
6. The Unit Status LED will remain OFF unless there is a problem. See **Troubleshooting** for a table of status colors.
7. Remove adhesive covers from the Command Strips on the back of the Gateway.
8. Mount the Gateway onto cleaned surface (i.e. top of server cabinet). Press firmly for 30 seconds.
9. Secure and route Power Adapter wire and Ethernet Cable using adhesive Cable Clips.

10. Repeat previous steps for remaining Gateways to be installed.

When all Gateways are installed, proceed to the **Final Installation Activities** section.

Gateway Mounting Shelf

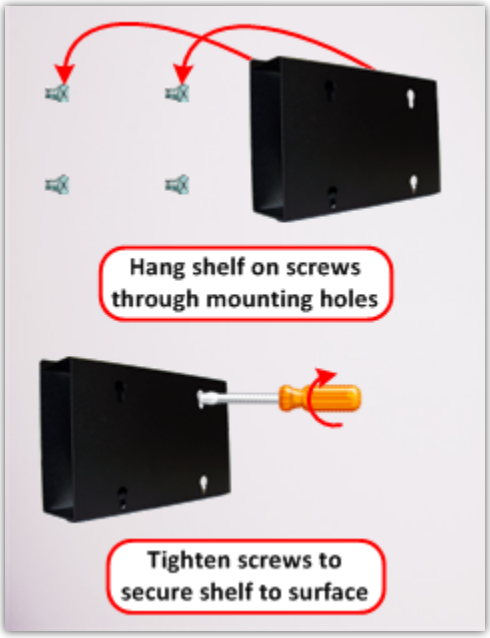
NOTE: Screws and other associated hardware for mounting the Gateway Mounting Shelf are not included in the SynapSense Gateway kits and must be supplied by the customer.

1. Using the Gateway Mounting Shelf mounting holes as a template, position the shelf in the desired location (i.e. wall or pillar), and mark the holes to be drilled with a pencil.

2. Using a drill and the appropriate drill bit, drill the four mounting holes marked on the installation surface.

3. Install appropriate-sized screws in the drilled mounting holes. Do not tighten screws completely.

4. Insert Gateway Mounting Shelf on screws. Insert screwdriver through front mounting holes and tighten screws to secure shelf to surface.



5. Connect the Power Adapter to the Gateway and the designated power outlet.
6. Connect the designated Ethernet Cable (originating from a server port assigned by the data center's IT department) to the Gateway.

   The Radio Activity LED will remain OFF

   The Unit Status LED will blink RED continuously when the unit is ON.
7. Insert the Gateway's mounting spacers in the shelf's front mounting holes and slide the Gateway downward to bottom of mounting hole slots.

8. Secure and route Power Adapter wire and Ethernet Cable using adhesive Cable Clips.

Repeat previous steps for remaining Gateways to be installed.

When all Gateways are installed, proceed to the Final Installation Activities section.

Final Installation Activities

Perform the following activities to complete the Gateway installation.

1. Clean installation area of debris (packaging etc.).
2. Dispose of trash appropriately.
3. Proceed to Chapter 4, **Installation Inspection**.

CHAPTER 4.

Installation Inspection

Inspections ensure installations are correct and Gateway devices communicate with SynapSense Web Console™.

Inspect Operations and Appearance

1. Verify all installed Gateway devices are connected properly (Power Adapter, Ethernet Cable, etc.) and receiving power.
2. Verify Gateway devices are installed in areas in which there is a clear line of sight for wireless sensor's radio transmissions.
3. Verify Ethernet cables and Power Adapter wires are secured where needed.

Inspect Software Communication

Perform the following steps to confirm Gateway operations and communications (Figure 26 corresponds with steps 1 through 4). Refer to the Web Console User Guide for detailed information.

1. Access the SynapSoft Web Console software and select the appropriate data center from the Sites list.
2. Click the Floor plan tab in the Data Center section.
3. Select the slide-out menu on the right of the screen then select Wireless Sensor Network.
4. Select the appropriate settings for the network as needed (Network: and Hop Level: dropdown lists, and associated checkboxes).

Figure 1 – Accessing Web Console Data Center Floor plan

The screen refreshes and displays the wireless sensor network (including Gateways) for the data center.

Place your cursor over a Gateway device on the display. The name and status of the device displays next the Gateway graphic representation (see Figure 2).

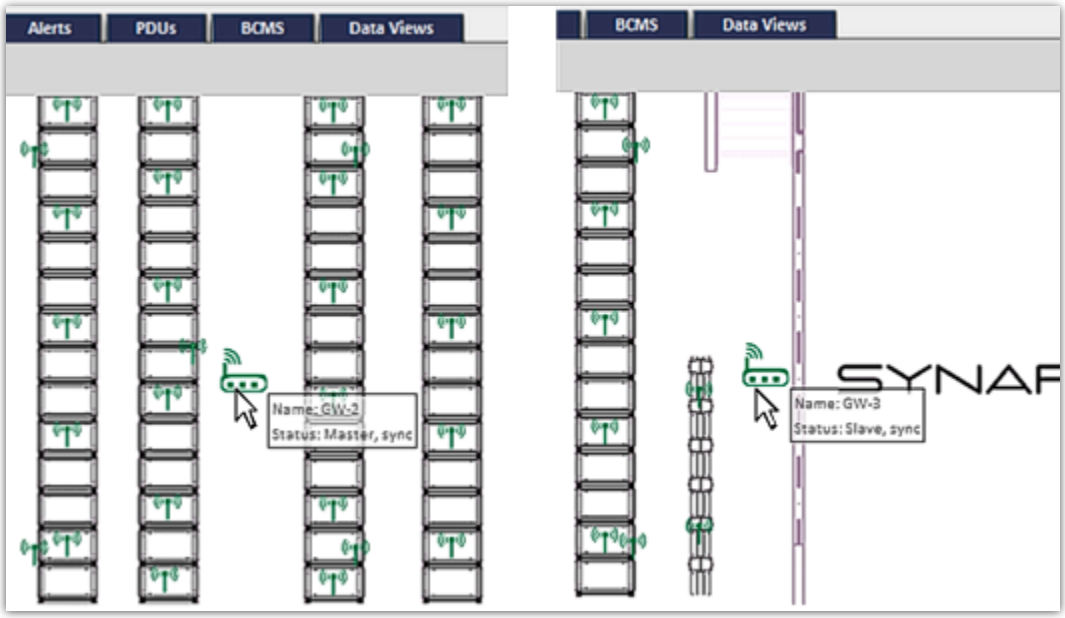


Figure 2 – Web Console: Gateway Master and Slave Syncs

NOTE: In a data center with multiple Gateway devices, one Gateway device is designated the "master", and the remaining Gateway devices are designated as "slaves".

If the rollover display states “Master, sync” or “Slave, sync”, the Gateway is communicating with the software.

If the rollover display states “Master, not sync” or “Slave, not sync”, the Gateway is not communicating with the software. Refer to **Troubleshooting** for tips on resolving connectivity and communication issues.

When issues are resolved, perform the previous steps in this procedure to confirm the Gateways are communicating properly.

CHAPTER 5.

Troubleshooting

Gateway Testing

Make sure that the Gateway is reporting data properly in the SynapSoft Web Console:

Open the SynapSoft Web Console software, go to the Wireless Sensor Network view and check the following:

- Gateway icon should be green (operating normally).
- Gateway icon's rollover tool tip should display "Master, syncd" or "Slave, syncd". If the tool tip indicates "Master, not syncd" or "Slave, not syncd" then the Gateway is not properly communicating with the software.

LED behavior for Gateway Status.

Color	Duty Cycle and Period	Meaning
Red	Solid	Critical error, call Customer Support
Red	Blinking	Power cycle the Gateway
Red/Blue	Blinking	Configuration problem. Check the Gateway configuration and MapSense for correct IP configuration
Yellow	Solid	DM running locally, but unable to talk to the Environment Server. The data is being buffered locally.
Green	Solid	Running normally.
Blue	Solid	Running normally with device manager running locally on the Gateway.

LED behavior for Radio Activity.

COLOR	Duty Cycle and Period	Meaning
RED	SOLID	Critical Error (Boot fail)
GREEN / YELLOW	Toggle	Noise scan
GREEN	Blink	Time not synchronized in App mode
GREEN	SOLID	Time synchronized in App mode
GREEN / CYAN	Cyan blink	Received WSN traffic in App mode
BLUE	Blink	Time not synchronized in SMOTA mode
BLUE	SOLID	Time synchronized in SMOTA mode
BLUE / CYAN	Cyan blink	Received WSN traffic in SMOTA mode
MAGENTA	SOLID	Diagnostic mode
none		Not running

SynapSense Technical Support

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