BMS Gateway BMS-GW (ProtoAir FPA-W34) Start-up Guide

For Interfacing the SimplySNAP Site Controller (SS420/450)

To Building Automation Systems:

BACnet MS/TP, BACnet/IP, Modbus RTU and Modbus TCP/IP

APPLICABILITY & EFFECTIVITY

Explains BSM-GW/ProtoAir hardware and installation.

The instructions are effective for the above as of September 2017.

Document Revision: 1.E
Auto Discovery
Template Revision: 1

Technical Support

Thank you for purchasing the BMS Gateway/ProtoAir from Synapse Wireless.

Please call Synapse Wireless for technical support of the BMS Gateway/ProtoAir product.

Sierra Monitor Corporation does not provide direct support. If Synapse Wireless needs to escalate the concern, they will contact Sierra Monitor Corporation for assistance.

Support Contact Information:

Synapse Wireless
6723 Odyssey Drive
Huntsville, Alabama 35806

Customer Service:
877-982-7888

Website: www.synapsewireless.com

Additionally, a ticket can be opened at www.synapse-wireless.com/resources/contact-support/

Quick Start Guide

1. Record the information about the unit. (**Section** 3.1)
2. Set settings for the devices that will be connected to the BMS-GW/ProtoAir FPA-W34. (**Section** 3.2)
3. **Connect the BMS-GW/ProtoAir FPA-W34** 3 pin RS-485 port to the Field Protocol cabling. (**Section** 4.1)
4. Connect Power to the BMS-GW/ProtoAir's 3 pin connector. (**Section** 4.2)
5. Connect a PC to the BMS-GW/ProtoAir via Ethernet cable and change the IP Address of the PC to the same subnet as the BMS-GW/ProtoAir. Set the IP Address of the BMS-GW/ProtoAir to the subnet of the intended Network and reset IP details of the PC. (**Section** 5)
6. Set the field protocol via the Web Configurator. (**Section** 6.2.1)
7. Use the Discovery function to configure the BMS-GW/ProtoAir and to find any connected devices. (**Section** 6.3)

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1 CERTIFICATION

1.1 BTL Mark – BACnet®[1] Testing Laboratory

The BTL Mark on the BMS-GW/ProtoAir is a symbol that indicates that a product has passed a series of rigorous tests conducted by an independent laboratory which verifies that the product correctly implements the BACnet features claimed in the listing. The mark is a symbol of a high-quality BACnet product.

Go to www.BACnetInternational.net for more information about the BACnet Testing Laboratory. Click here for the BACnet PIC Statement.

[1] BACnet is a registered trademark of ASHRAE

2 INTRODUCTION

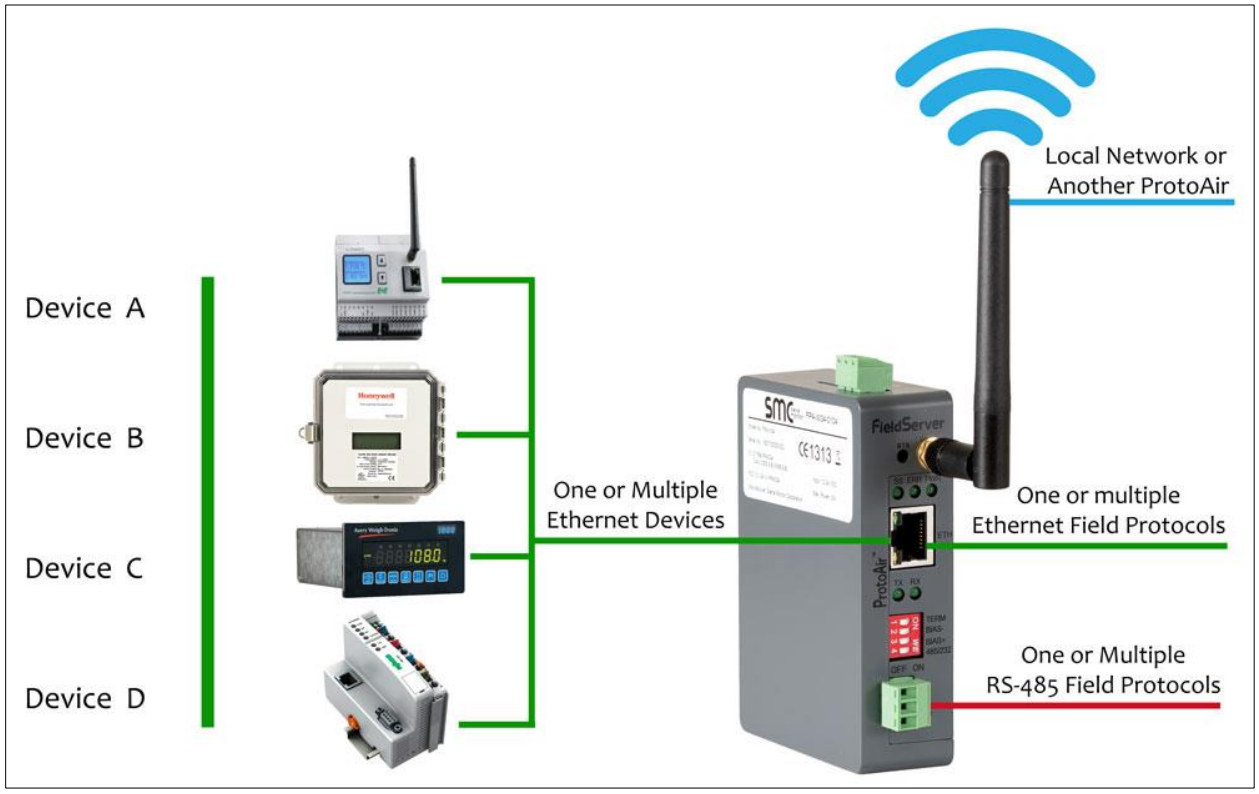
2.1 ProtoAir Gateway

NOTE: The BMS Gateway (BMS-GW) is a co-branded hardware and software solution manufactured by Sierra Monitor Corporation (SMC). The Synaspe Wireless p/n for this product is BMS-GW. However, within this document, the BMS-GW will be referred to as the ProtoAir, which is the product name provided by SMC.

The ProtoAir is an external, high performance **building automation multi-protocol gateway** that is preconfigured to auto-discover the SimplySNAP site controller SS420/450 (hereafter called “device”) connected to the ProtoAir and automatically configures them for BACnet MS/TP, BACnet/IP, Modbus RTU, Modbus TCP/IP.

It is not necessary to download any configuration files to support the required applications. The ProtoAir is pre-loaded with tested profiles/configurations for the supported devices.

FPA-W34 Connectivity Diagram:



3 PROTOAIR SETUP

3.1 Record Identification Data

Each ProtoAir has a unique part number located on the side or the back of the unit. This number should be recorded, as it may be required for technical support. The numbers are as follows:

Model	Part Number
ProtoAir	FPA-W34-1620

Figure 1: ProtoAir Part Numbers

- FPA-W34 units have the following 2 ports: RS-485 + Ethernet

3.2 Configuring Device Communications

- The device needs to be on the same IP subnet as the ProtoAir and the configuration PC.
- Record the following device information to start the setup:
  - IP Address
  - IP port
  - Username
  - Password

NOTE: This information is required for Section 5.

3.3 Attaching the Antenna

Wi-Fi Antenna:

Screw in the Wi-Fi antenna to the front of the unit as shown in Figure 38.

4 INTERFACING PROTOAIR TO DEVICES

4.1 BACnet MS/TP: Wiring Field Port to RS-485 Network

- Connect the BACnet MS/TP RS-485 network wires to the 3-pin RS-485 connector on ProtoAir FPA-W34. (**Figure 2**)
  - Use standard grounding principles for RS-485 GND
- See **Section 5** for information on connecting to BACnet/IP network.

BMS Wiring	ProtoAir Pin #	Pin Assignment
RS-485 +	Pin 1	RS-485 +
RS-485 -	Pin 2	RS-485 -
-	Pin 3	RS-485 GND

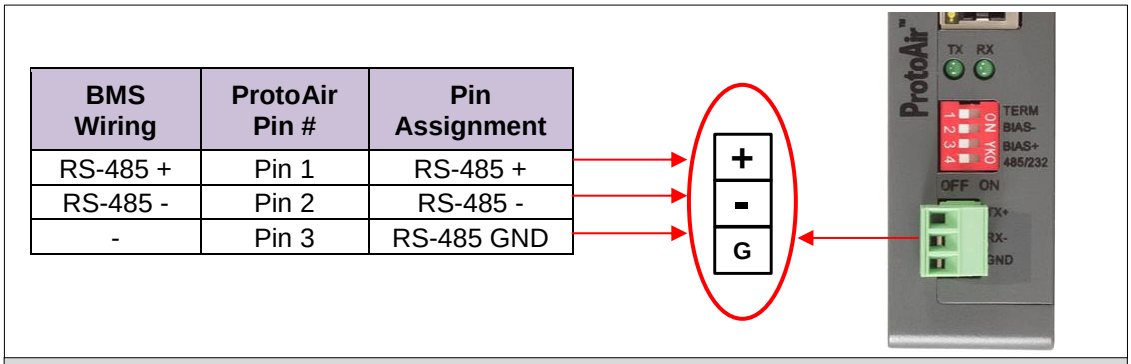


Figure 2: Connection from ProtoAir to RS-485 Field Network

- If the ProtoAir is the last device on the BACnet MS/TP trunk, then the End-Of-Line Termination Switch needs to be enabled. (**Figure 3**)
  - The default setting from the factory is OFF (switch position = right side)
  - To enable the Termination switch, turn the EOL switch ON (switch position = left side)

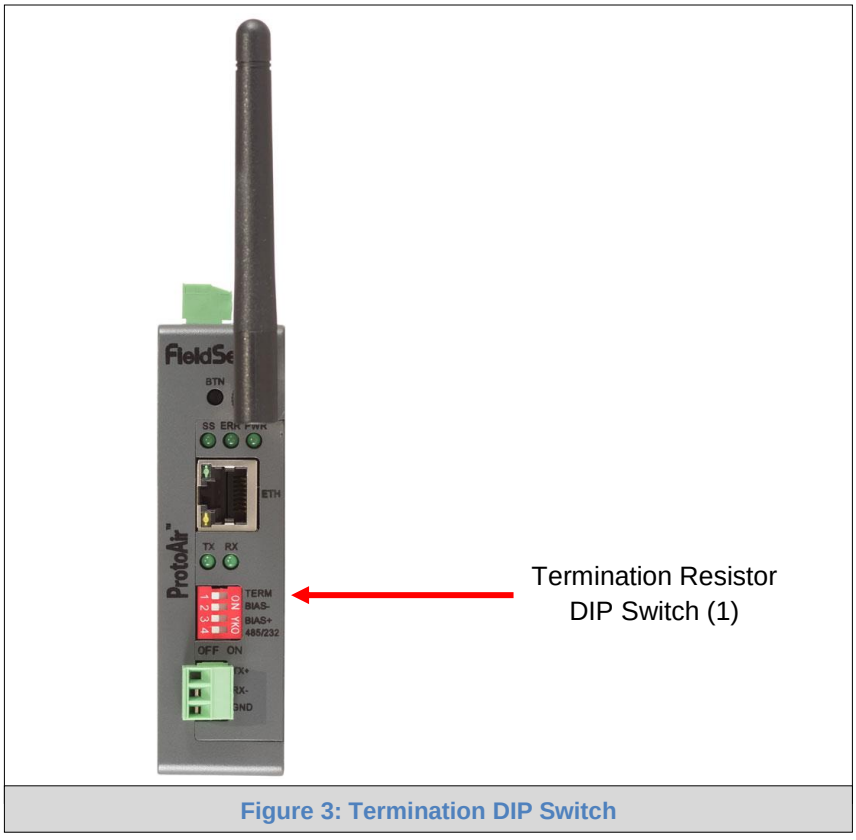


Figure 3: Termination DIP Switch

4.2 Power-Up ProtoAir

Check power requirements in the table below:

Power Requirement for ProtoAir External Gateway		
	Current Draw Type	
ProtoAir Family	12V DC	24V DC
FPA – W34 (Typical)	170mA	100mA
FPA – W34 (Maximum)	240mA	140mA
NOTE: These values are 'nominal' and a safety margin should be added to the power supply of the host system. A safety margin of 25% is recommended.		

Figure 4: Required Current Draw for the ProtoAir

Apply power to the ProtoAir as shown below in **Figure 5.** Ensure that the power supply used complies with the specifications provided in **Appendix C.1**.

- The ProtoAir accepts 12-24V DC on pins 4 and 5.
- **Frame GND should be connected.**

Power to ProtoAir	ProtoAir Pin #	Pin Assignment
Power In (+)	Pin 4	V +
Power In (-)	Pin 5	V -
Frame Ground	Pin 6	FRAME GND

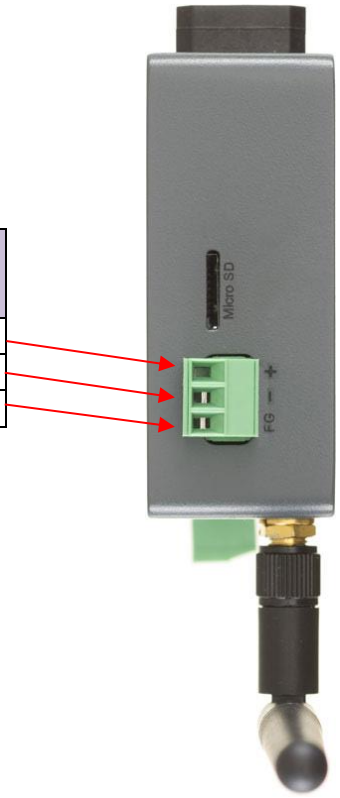


Figure 5: Power Connections

5 CONNECT THE PC TO THE PROTOAIR OVER ETHERNET

5.1 Connecting to the ProtoAir via the Ethernet Port

- Connect a CAT5 Ethernet cable (straight through or cross-over) between the local PC and ProtoAir.

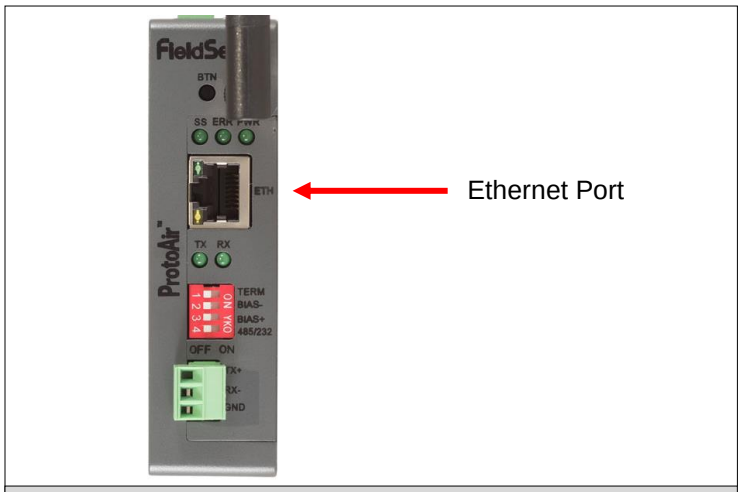


Figure 6: Ethernet Port

- The default IP Address for the ProtoAir Ethernet connection is **192.168.1.24**, subnet mask is **255.255.255.0**. If the PC and ProtoAir are on different IP networks, assign a static IP Address to the PC on the 192.168.1.xxx network.

For Windows 10:

Right click on  > Control Panel > Network and Internet >

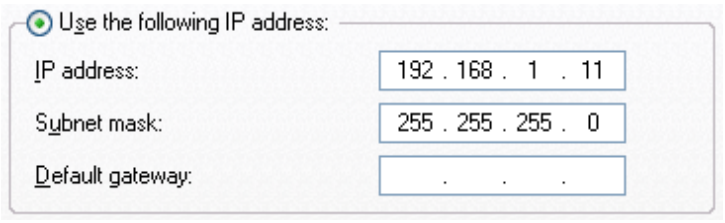
> Network and Sharing Center > Change adapter settings

Right-click on Local Area Connection then click Properties

Highlight 

then click 

Use the following IP Address:



Click 

twice.

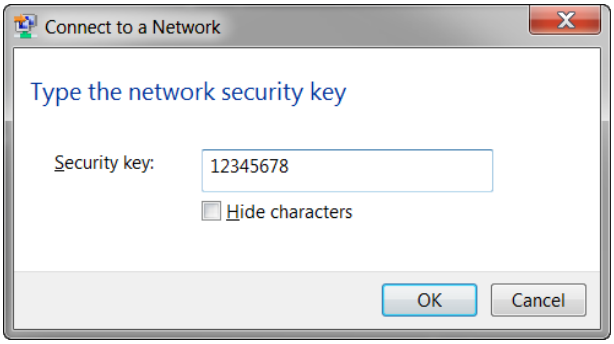
5.2 Connecting to the ProtoAir via Wi-Fi Access Point

When the ProtoAir is first powered up the Wi-Fi access point will be enabled allowing direct connection to the ProtoAir via Wi-Fi.

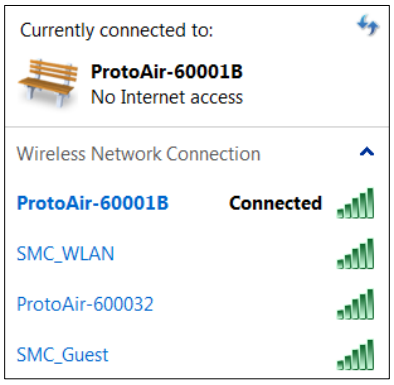
To connect to the ProtoAir Wi-Fi access point:

- Click the icon (found in the bottom-right corner of the computer screen) to open the available Wireless Network Connections.
- Select the desired ProtoAir and click Connect

- Enter the Security key; the **default is 12345678**.



The available Wireless Network Connection menu should now show that the computer is connected to the ProtoAir.



5.3 Updating Network Settings – Setting IP Address for Field Network

After setting a local PC on the same subnet as the ProtoAir (**Section 5.1** or **Section 5.3**), open a web browser on the PC and enter the IP Address of the ProtoAir; the default Ethernet address is 192.168.1.24, the default Wi-Fi access point address is 192.168.50.1.

NOTE: If the IP Address of the ProtoAir has been changed by previous configuration, the assigned IP Address can be discovered using the FS Toolbox utility. See Appendix A.1 for instructions.

From the Web Configurator landing page, click the Network Settings tab to open the Network Settings page for the ProtoAir.

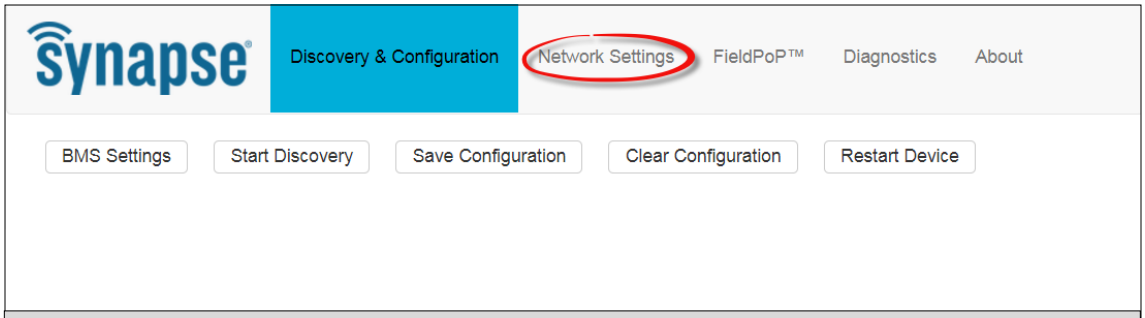


Figure 7: Web Configurator Landing Page – Showing Network Settings Tab

5.3.1 IP Settings

IP Settings are the first set of fields on the Network Settings page.

To change the IP Address settings, follow these instructions:

- Click the DHCP Client State checkbox to automatically assign IP Settings or modify the settings manually as needed, via these fields: IP Address, Netmask, Default Gateway and Domain Name Server1/2.

NOTE: If the ProtoAir is connected to a router, the Default Gateway of the ProtoAir should be set to the same IP Address of the router.

- Click Save, then click on Refresh to restart the ProtoAir and activate the new IP Address.

NOTE: If the Network Settings page was open in a browser, the browser will need to be pointed to the new IP Address before the page will be accessible again.

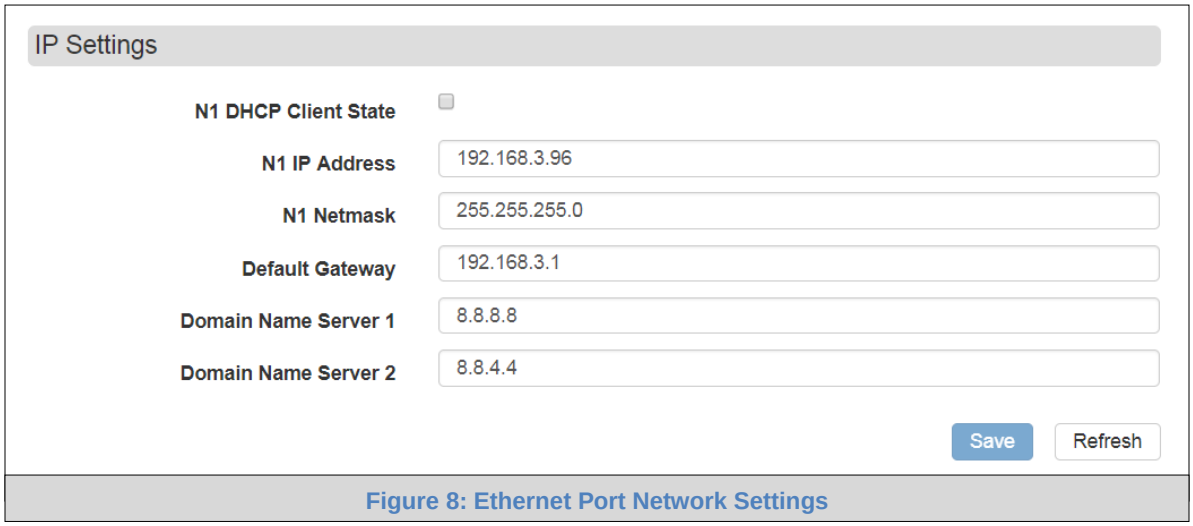


Figure 8: Ethernet Port Network Settings

5.3.2 WiFi Client Settings

From the top of the Network Settings page, scroll down to the WiFi Client Settings header.

To change the Wi-Fi client settings, follow these instructions:

- Check the WiFi Status checkbox and enter the supplied WiFi SSID/Password for the Wi-Fi network. This will allow the ProtoAir to communicate with other devices on that Wi-Fi network.
- Click the WiFi DHCP Client State checkbox to automatically assign all WiFi Client Settings fields or modify the settings manually, via the fields immediately below the checkbox (IP Address, Netmask, Default Gateway and Domain Name Server 1/2).

NOTE: If the ProtoAir is connected to a router, the Default Gateway of the ProtoAir should be set to the same IP Address of the router.

- Click Save, then click on Refresh to restart the gateway and activate the new Wi-Fi settings.

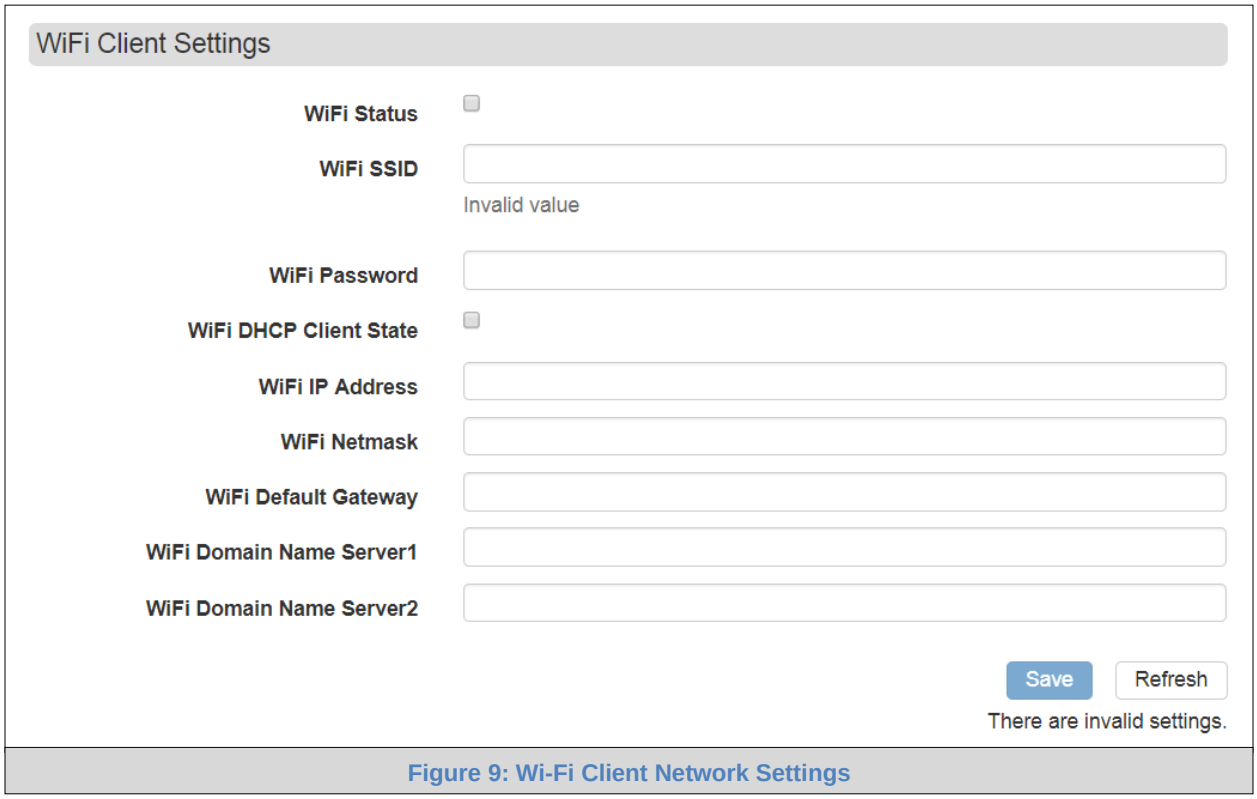


Figure 9: Wi-Fi Client Network Settings

5.3.3 WiFi Access Point Settings

From the top of the Network Settings page, scroll down to the WiFi Access Point Settings header.

To change the Wi-Fi access point settings, follow these instructions:

- Check the Access Point Status checkbox and enter the supplied Access Point SSID/ Password for the ProtoAir. This creates a direct connection to the ProtoAir.
- Modify the Settings manually as needed, via these fields: Access Point SSID, Password, SSID Braodcast, Channel, IP Address, Netmask, IP Pool Address Start/End.

NOTE: The default channel is 11.

- Click Save, then click on Refresh to restart the ProtoAir and activate the Wi-Fi settings.

NOTE: If the Network Settings page was open in a browser, the browser will need to be pointed to the new IP Address before the page will be accessible again.

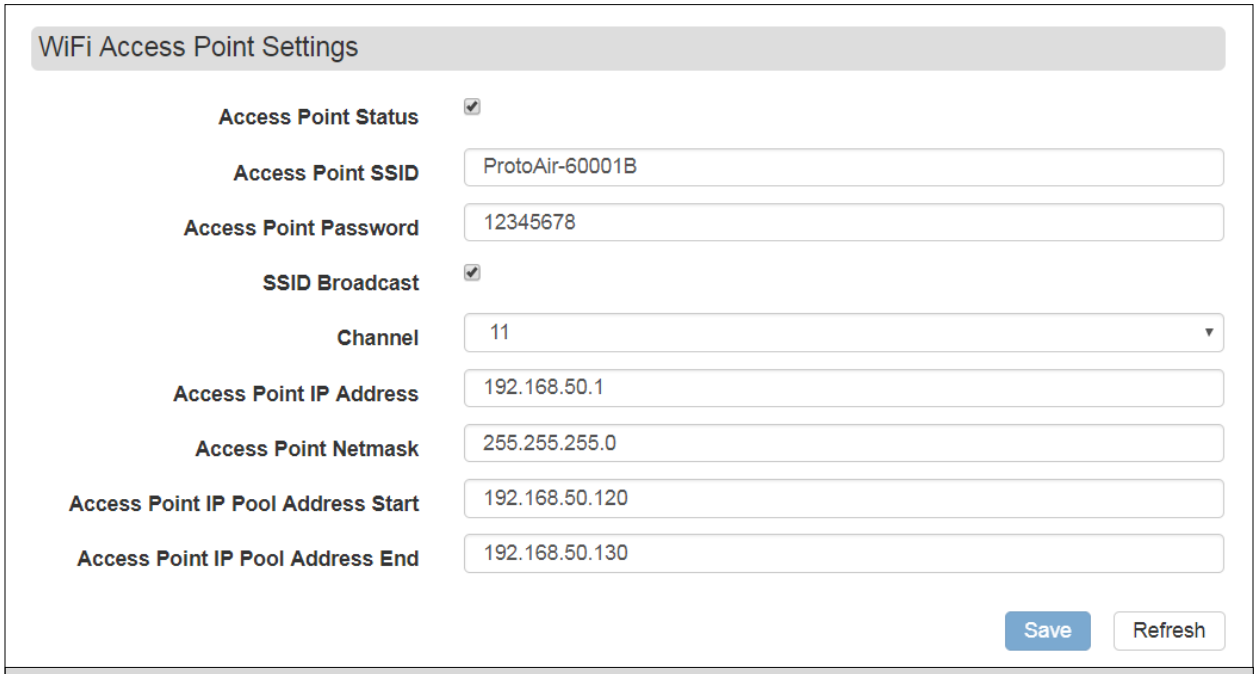


Figure 10: Wi-Fi Access Point Settings

5.3.4 Common Settings

From the top of the Network Settings page, scroll down to the Common Settings header.

To change the primary connection when both Ethernet and WiFi Client connections are available:

- Select the desired option from the Primary Connection drop-down menu.
- Click Save, then click on Refresh to restart the ProtoAir and activate the new settings.

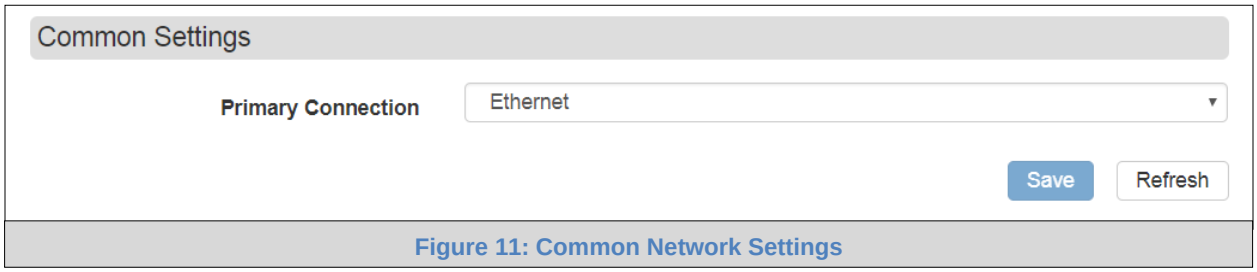


Figure 11: Common Network Settings

6 CONFIGURE THE PROTOAIR

6.1 Connecting to the ProtoAir Web Configurator

- After setting the PC on the same subnet as the ProtoAir (**Section 5**), open a web browser on the PC and enter the IP Address of the ProtoAir.
- The Web Configurator will now appear when entering the device's IP Address on the browser.

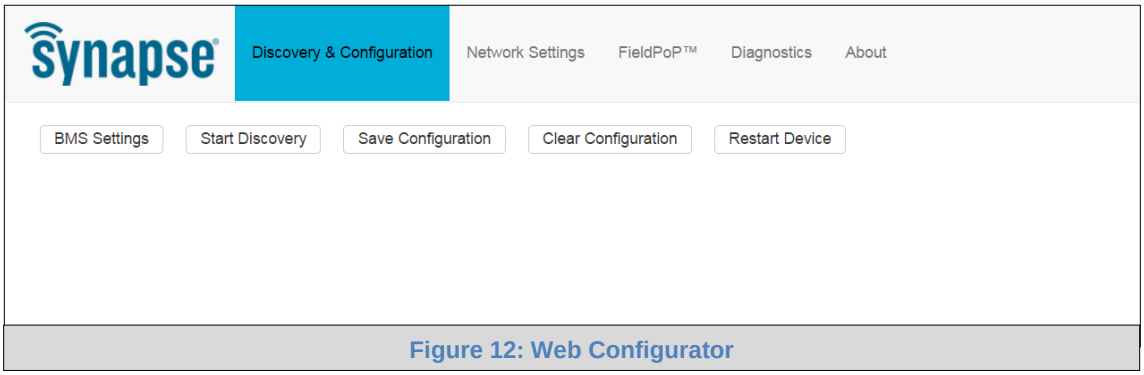


Figure 12: Web Configurator

6.2 Configure Building Management System (BMS) Settings

6.2.1 Select Network Protocol Settings

- Click back on the "Discovery and Configuration" tab, and then click the "BMS Settings" button to view or change the Building Management System (BMS) Settings.
- Select the appropriate protocol and edit the settings as needed.
- Once completed, click Save and allow the ProtoAir to restart.

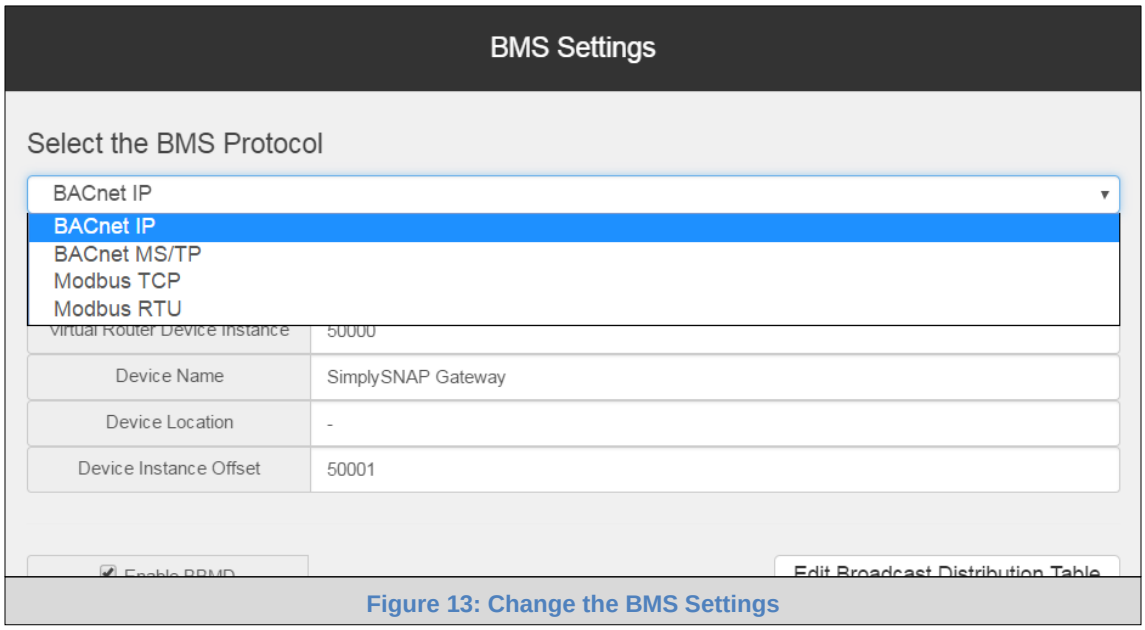


Figure 13: Change the BMS Settings

6.2.1.1 BACnet: Set each Device's Virtual Router Device Instance

NOTE: The Device Instance can be set independently of the site administrator.

- A Device Instance is a BACnet Node-ID which is obtained by the network administrator.
- Each device connected to the ProtoAir will have its own BACnet Device Instance.
- The values allowed for a BACnet Device Instance can range from 1 to 4,194,303.
- With the default Device Instance Offset of 50001, the values generated will be within the range of 50001 plus the incremental number of devices that are connected to the ProtoAir. The first device will therefore be 50001, the second device will be 50002, etc.
- To assign a specific Device Instance (or range); change the Device Instance Offset value to the assigned value of the first device.
- Virtual Router Device Instance is set to a default of 50000. This value can be changed if the device instance is already in use on the BACnet Network.

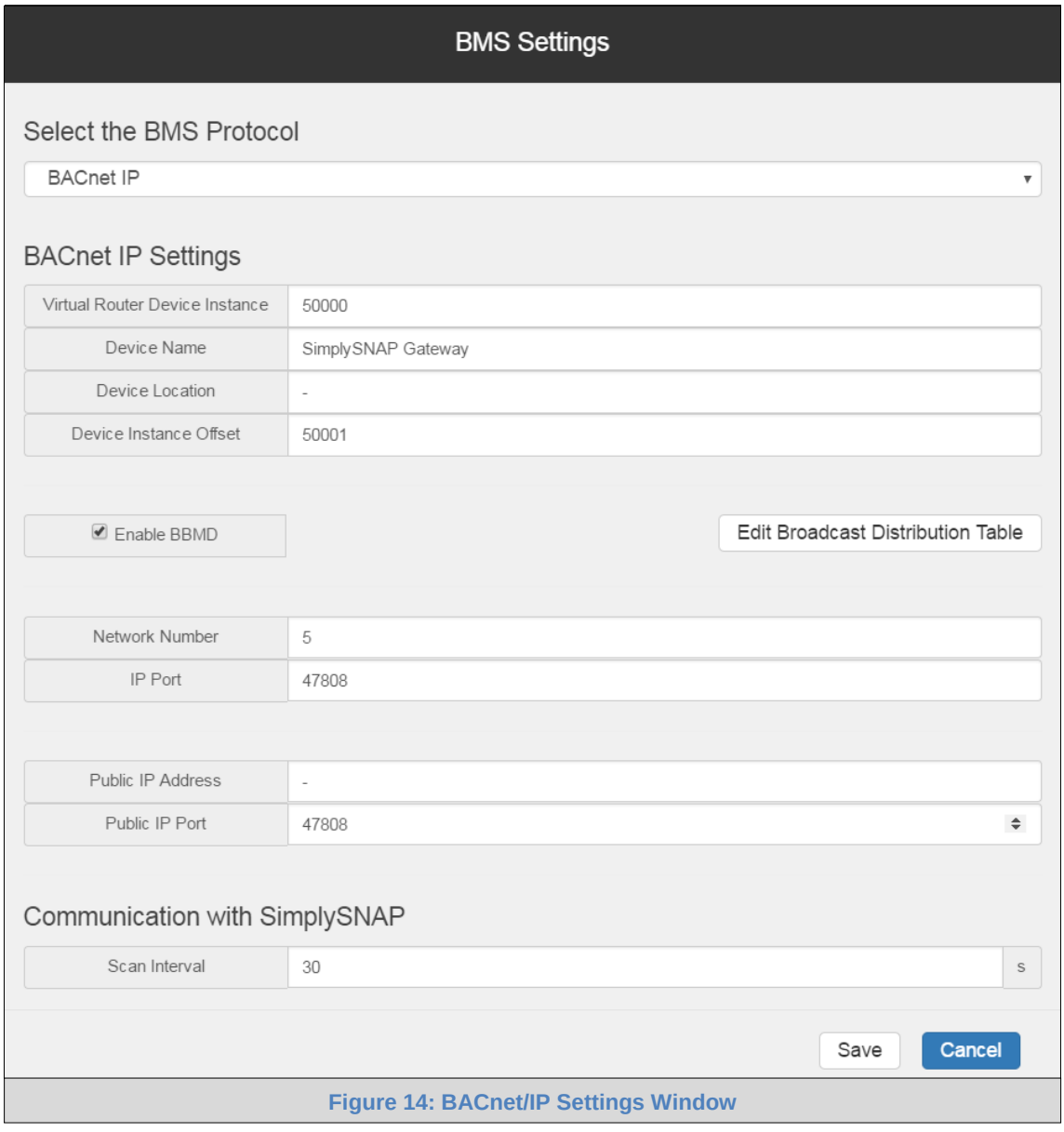


Figure 14: BACnet/IP Settings Window

6.2.1.2 BACnet MS/TP: Setting the MAC Address BACnet Network

NOTE: Only 1 MAC address is set for the ProtoAir regardless of how many devices are connected to the ProtoAir.

Set the BACnet MS/TP MAC address of the ProtoAir to a value between 1 to 127 (MAC Master Addresses); this is so that the BMS Front End can find the ProtoAir via BACnet auto-discovery.

NOTE: Never set a BACnet MS/TP MAC Address from 128 to 255. Addresses from 128 to 255 are Slave Addresses and cannot be discovered by BMS front ends that support auto-discovery of BACnet MS/TP devices.

Enter the following details into the web configuration as per **Figure 15** below:

Virtual Router Device Instance – Enter a value between 1 and 4,194,303.

Name – Enter the desired BACnet device name of the gateway.

Location – Enter the location of the ProtoAir.

Device Instance Offset – Default of 50001 so that Device Instance begins at 50001.

Network Number – Leave as default unless instructed by BMS integrator.

Baud Rate – Select a value of 9600, 19200, 38400 or 76800.

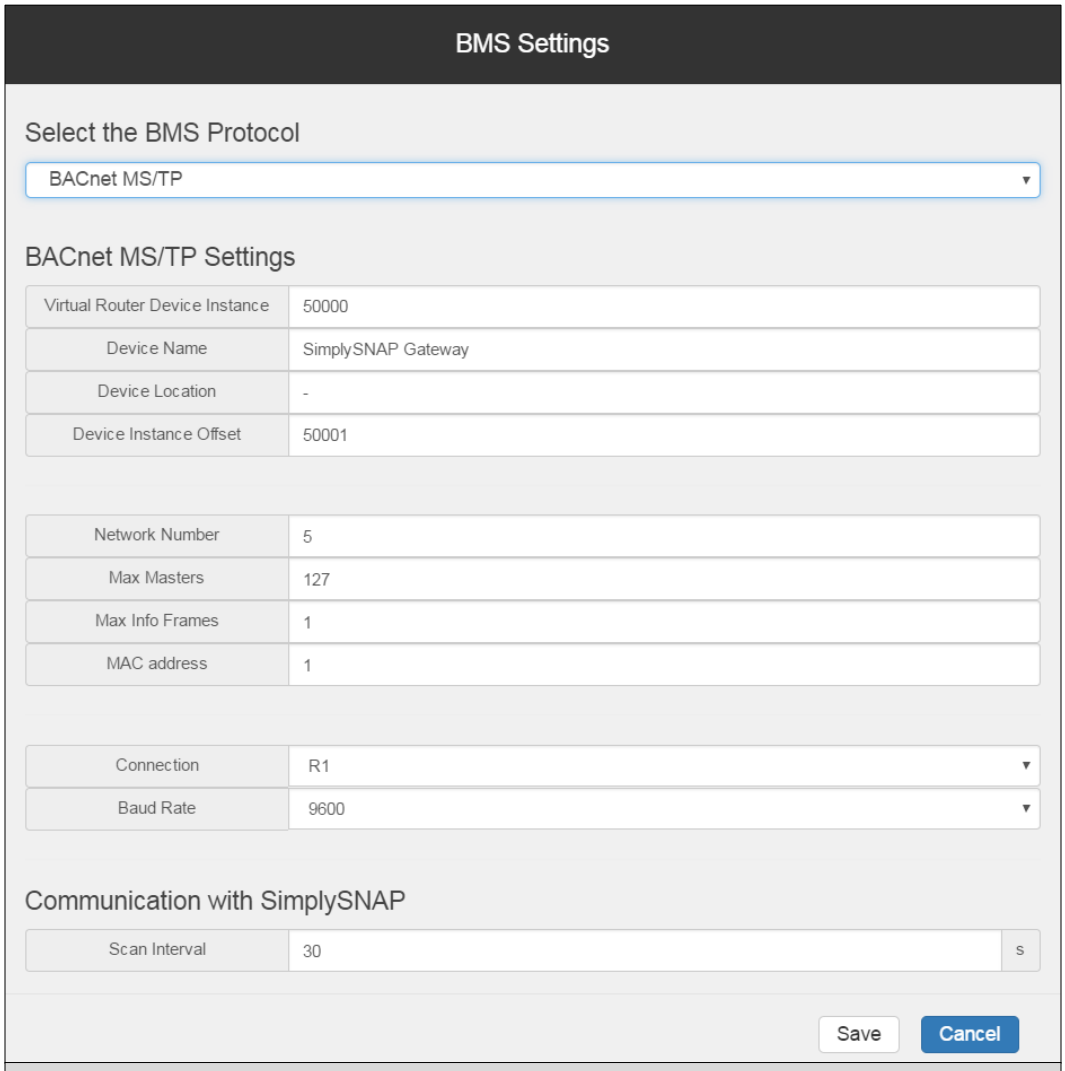


Figure 15: BACnet MS/TP Settings Window

6.2.1.3 Modbus: Setting the Device Address

When the Slave ID field is entered, the Slave ID Offset will not be used. In this setting, only one Modbus server node willl be created.

NOTE: If there are more than 254 devices connected to the ProtoAir, the Slave ID field should be used.

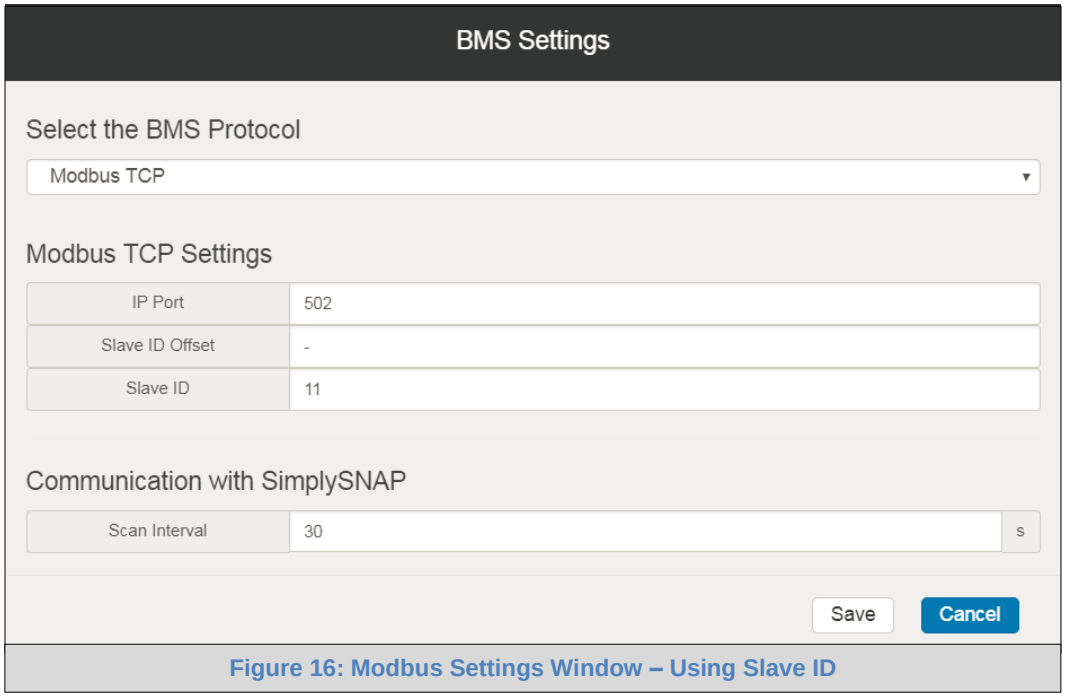


Figure 16: Modbus Settings Window – Using Slave ID

If Slave ID is not used (input a dash [-] into the Slave ID field), the Slave ID Offset will be used to generate multiple Modbus server nodes.

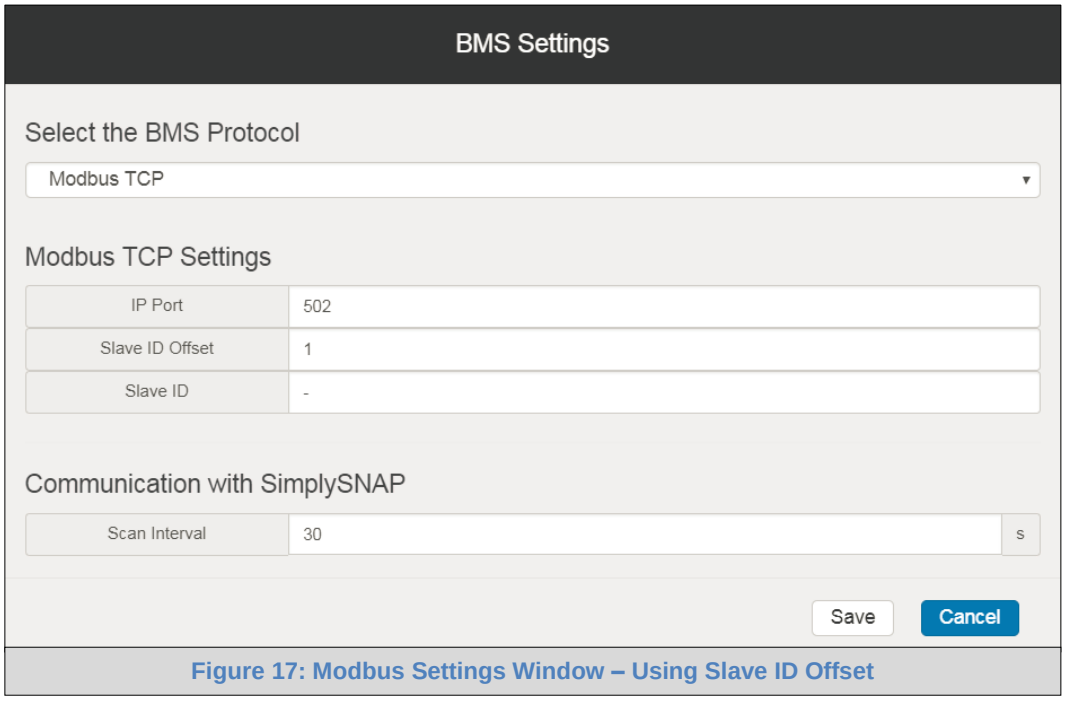


Figure 17: Modbus Settings Window – Using Slave ID Offset

6.3 Discover Devices Connected to the ProtoAir

- Click on “Start Discovery” to enter the network address, port, username and password for the SimplySNAP Site Controller. (**Section** 3.2)

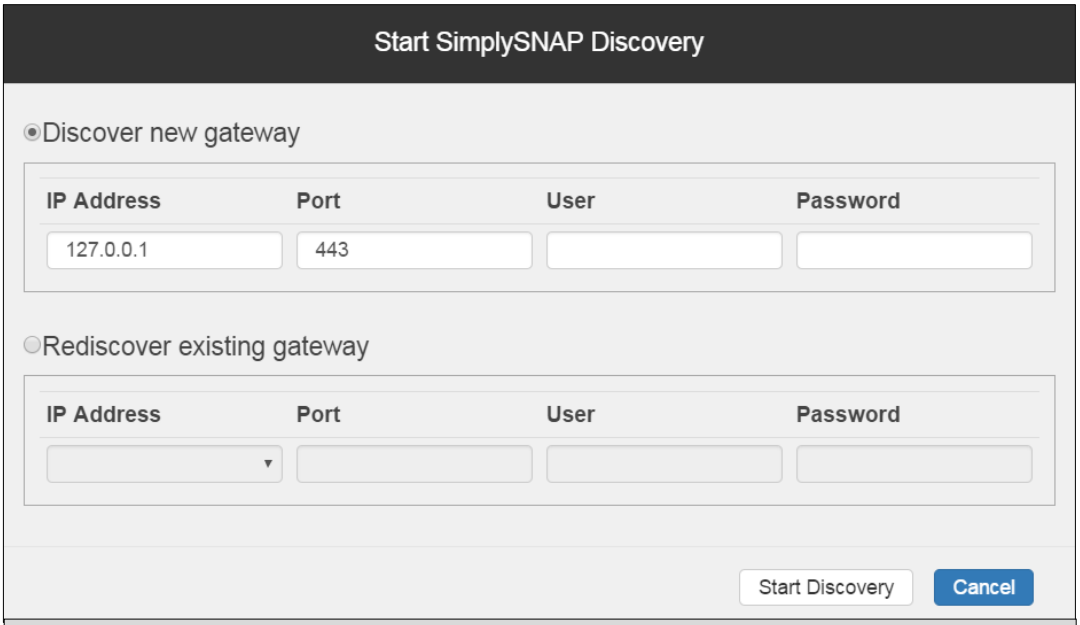


Figure 18: Discovery Window

- After entering details, click on “Start Discovery” and the discovery progress bar will display.
  - Discovery may take a few minutes depending on the number of points to discover

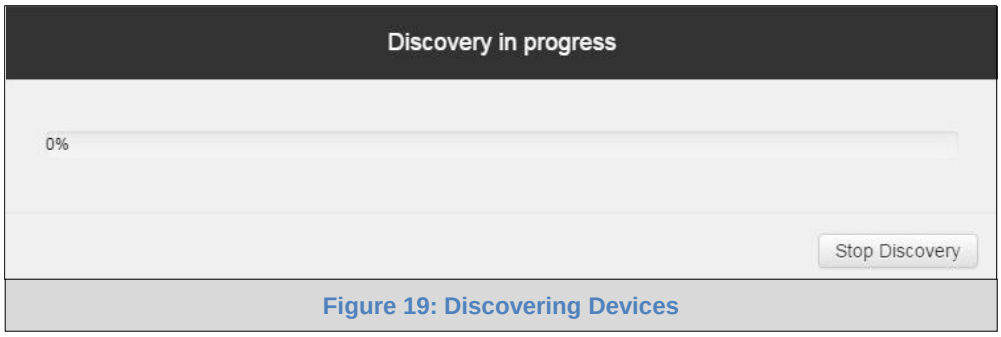


Figure 19: Discovering Devices

- After the discovery process is complete, the device tree will appear (see **Appendix B.1** for device tree structure details).

6.4 Configure Devices and Data Points

6.4.1 General Configuration Instructions

- Click on the right facing arrows next to each item in the device tree to view the points or parameters underneath.

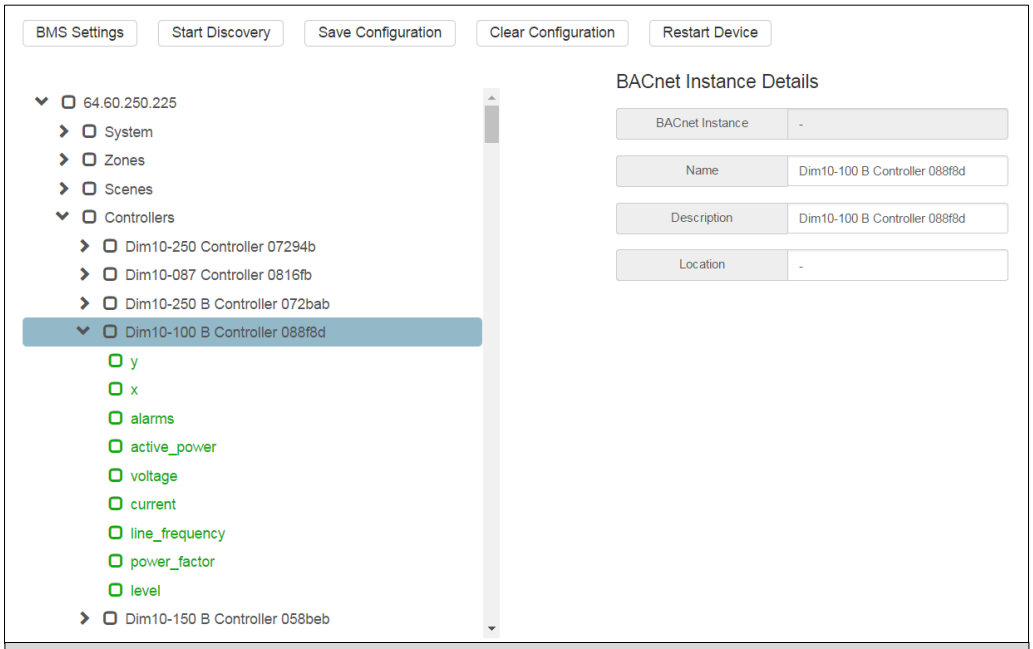


Figure 20: The Device Tree

NOTE: The device tree structure is detailed in Appendix B.1.

- The points highlighted green indicate that they have not been configured for protocol conversion.
- When viewing points or parameters containing points, click inside the checkbox to select or deselect items for protocol conversion.

NOTE: Clicking a checkbox will also select all points nested under that item.

  - By clicking on a point, the endpoint parameters for that point will be shown and, depending on the protocol, some fields may be editable

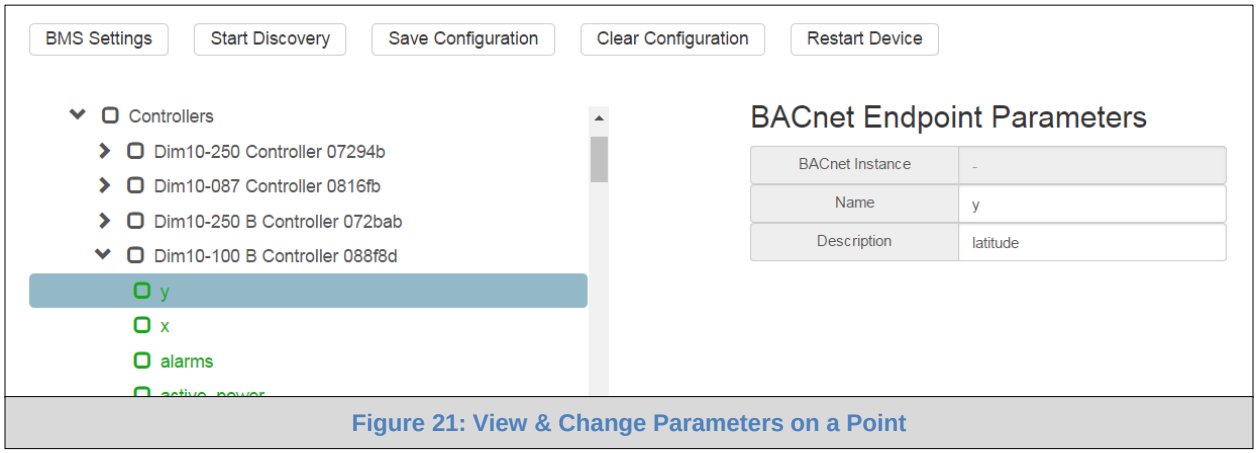


Figure 21: View & Change Parameters on a Point

NOTE: Items with a "-" for BACnet Instance or Node ID are not yet configured for protocol conversion.

- Clicking on a device displays the device details and allows editing of these parameters

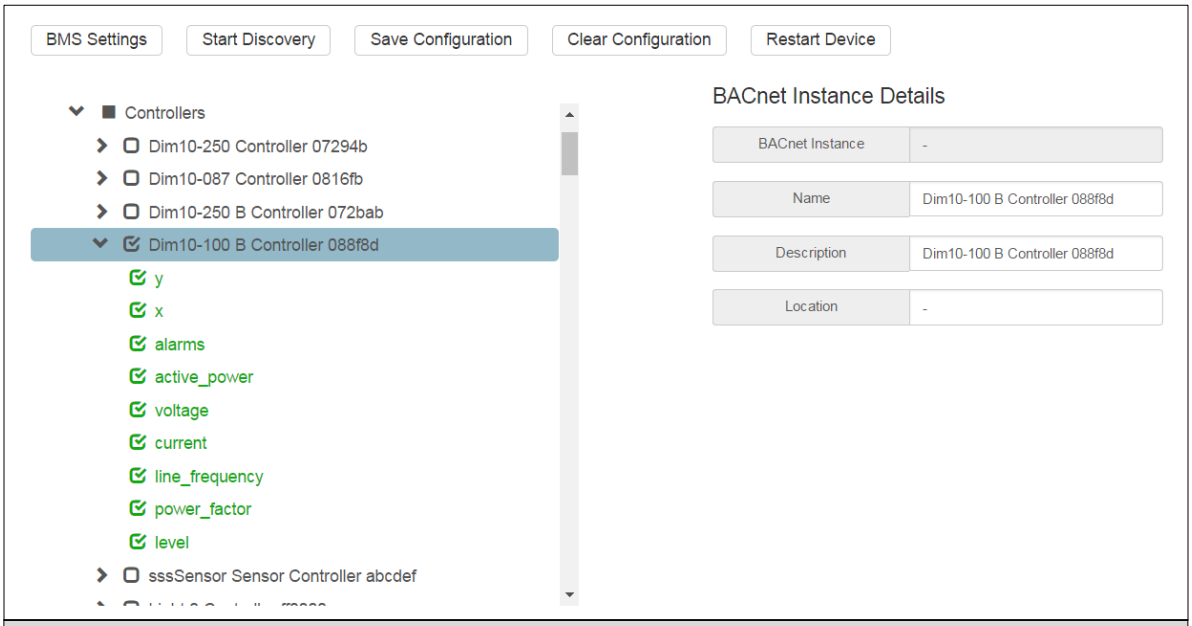


Figure 22: View & Edit Node Parameters

- Once the points for configuration are chosen, click on “Save Configuration”. The save configuration progress bar will appear. This process may take several minutes.

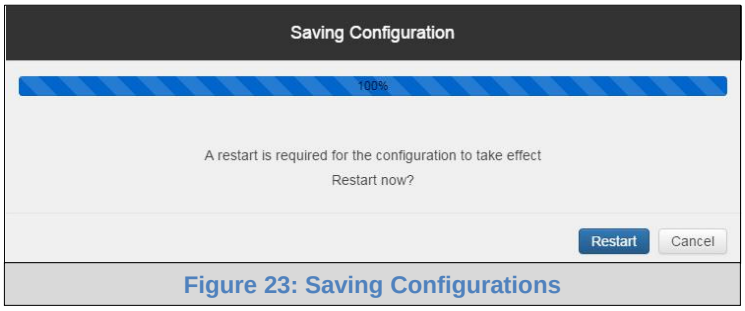


Figure 23: Saving Configurations

- When this process is complete a window will appear to request a system restart, click restart.
  - The checkboxes of the selected points will now be filled in to show they are configured.
  - Protocol specific reference fields (such as BACnet Instance and Modbus Node ID information) will also populate for all configured points/devices.

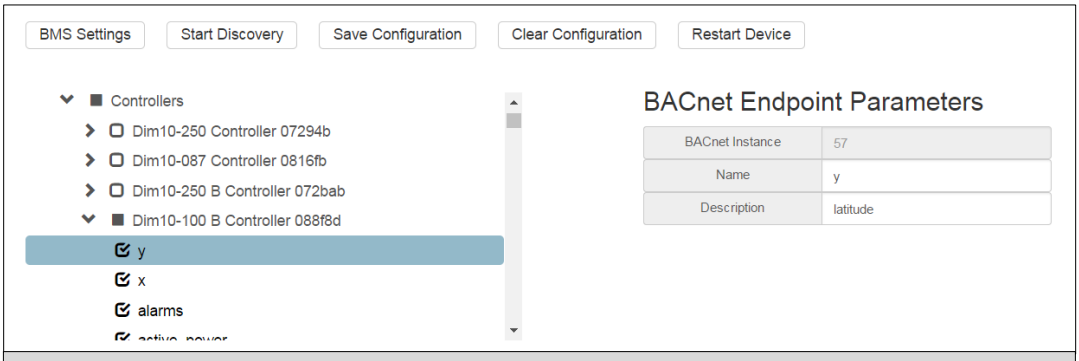


Figure 24: Saved Configurations

NOTE: This configuration method is the same for all protocols.

6.4.2 Modbus Map Window

NOTE: When configuring points for Modbus, an option to view point details from a quick look up table or CSV file download is also available.

- Click on the IP Address to view the Modbus Node details for the entire configuration or click on a specific device to view the map for just the selected device.

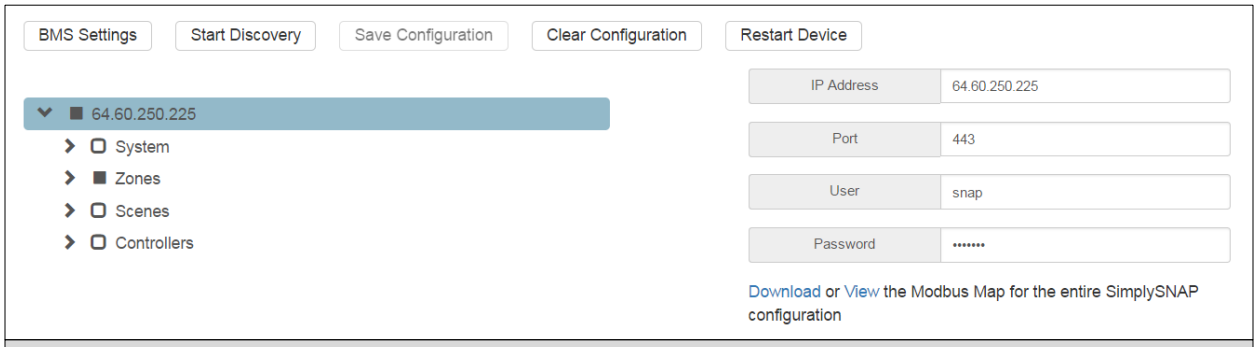


Figure 25: Modbus Map Window

- To view or download the Modbus mapping click the “Download” or “View” links.
  - Click View to open a window that lists the Modbus data points

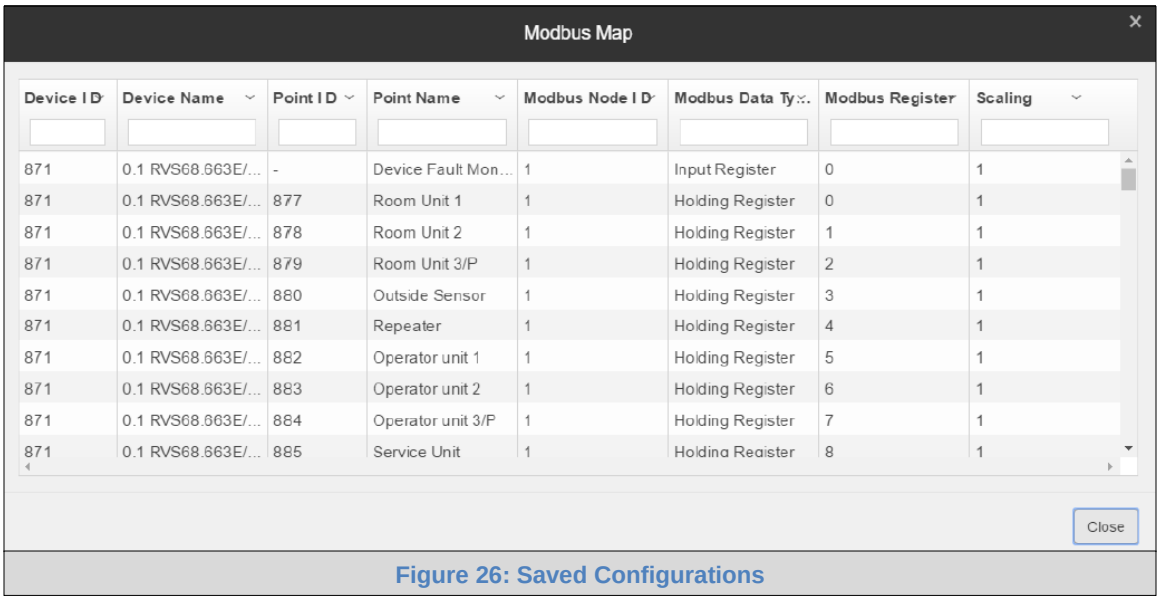


Figure 26: Saved Configurations

NOTE: Find specific points using the search bars above each data element.

- Click Download to download a CSV file of the Modbus data points to the local PC’s default download folder

6.5 Clearing Configuration

- To clear a configuration, click on “Clear Configuration”. An additional option to clear all other device configurations will appear.

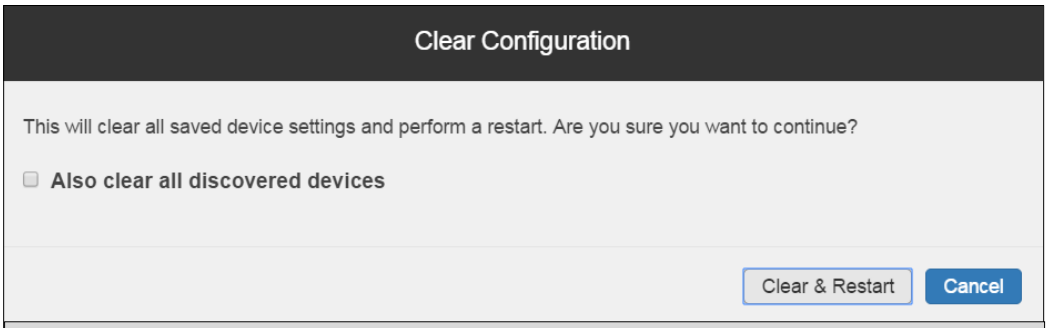


Figure 27: Clear Configuration Window

- Click on “Clear & Restart” to continue.
- When the clearing process is complete, the ProtoAir will automatically restart.

7 BACNET EXPLORER NG

A working example of a BACnet Explorer NG on a BACnet Network:

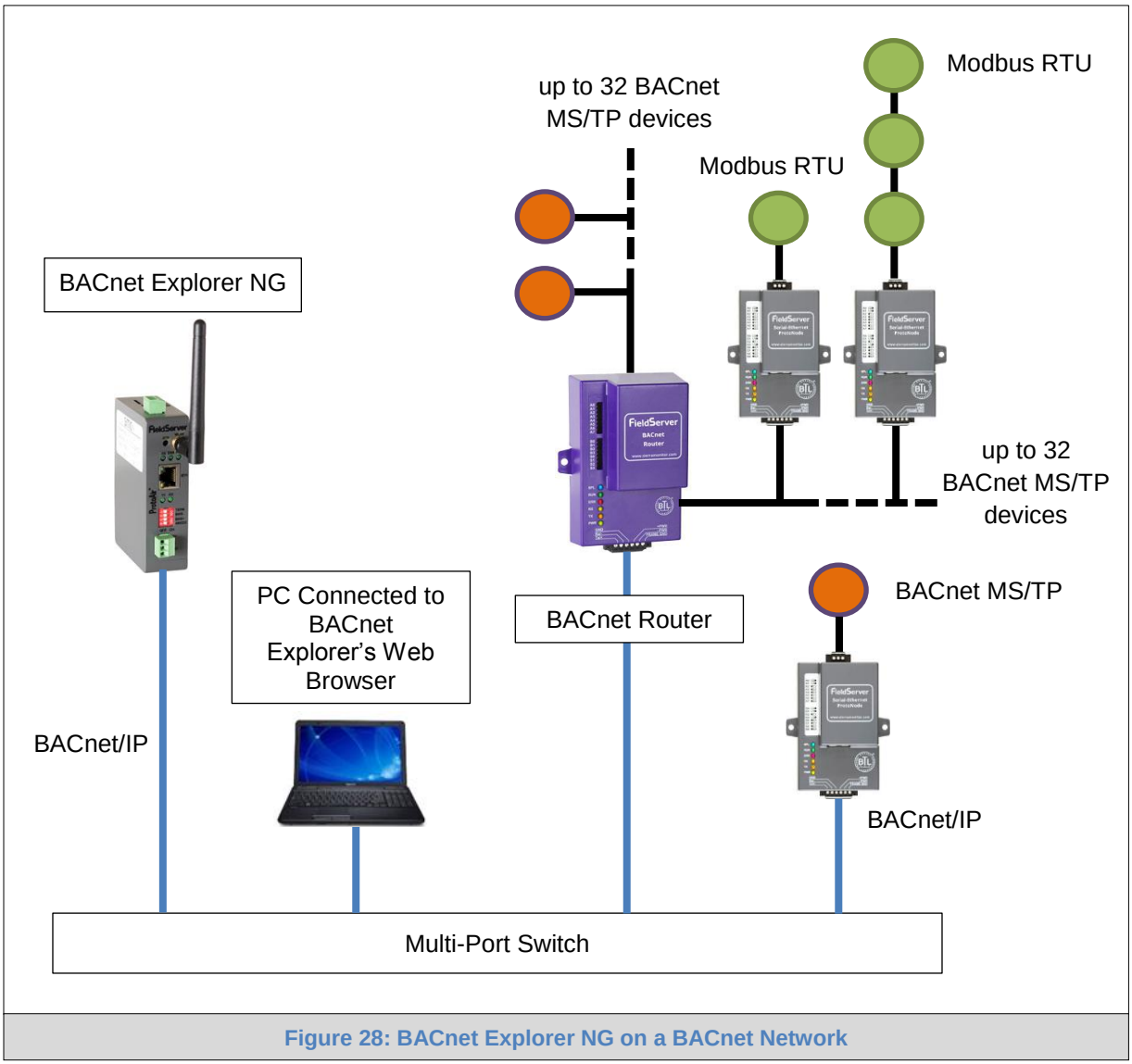


Figure 28: BACnet Explorer NG on a BACnet Network

For additional details related to the BACnet Explorer NG, go to the Sierra Monitor website's Resource Center and download the BACnet Explorer NG Start-up Guide.

For purchasing information, look up the BACnet Explorer NG page on the Sierra Monitor website and click on the "BUY NOW" tab.

Appendix A. Troubleshooting

Appendix A.1. Lost or Incorrect IP Address

- Ensure that FieldServer Toolbox is loaded onto the local PC. Otherwise, download the FieldServer-Toolbox.zip via the Sierra Monitor Resource Center Software Downloads.
- Extract the executable file and complete the installation.

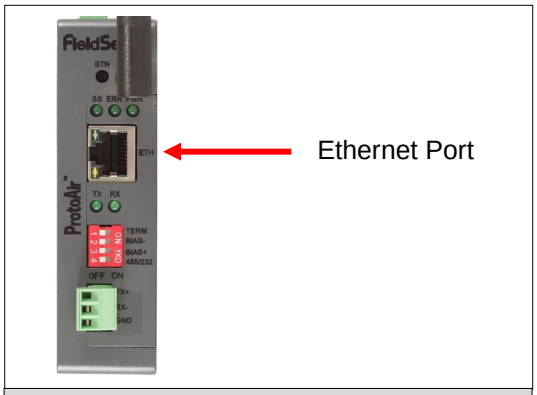
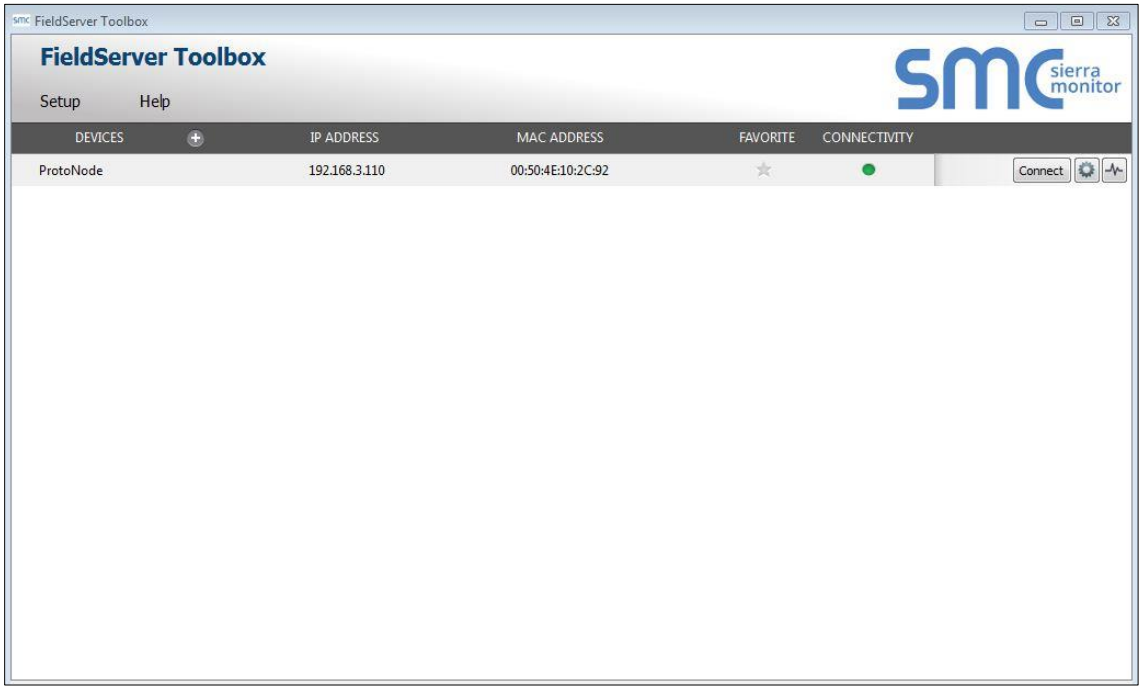


Figure 29: Ethernet Port Location

- Connect a standard CAT5 Ethernet cable between the user's PC and ProtoAir.
- Double click on the FS Toolbox Utility and click Discover Now on the splash page.
- Check for the IP Address of the desired gateway.



- If correcting the IP Address of the gateway: click the settings icon on the same row as the gateway, then click Network Settings, change the IP Address and click Update IP Settings to save.

Appendix A.2. Viewing Diagnostic information

- Type the IP Address of the ProtoAir into the web browser or use the FieldServer Toolbox to connect to the ProtoAir.
- Click on Diagnostics and Debugging Button, then click on view, and then on connections.
- If there are any errors showing on the Connection page, refer to **Appendix A.3** for the relevant wiring and settings.

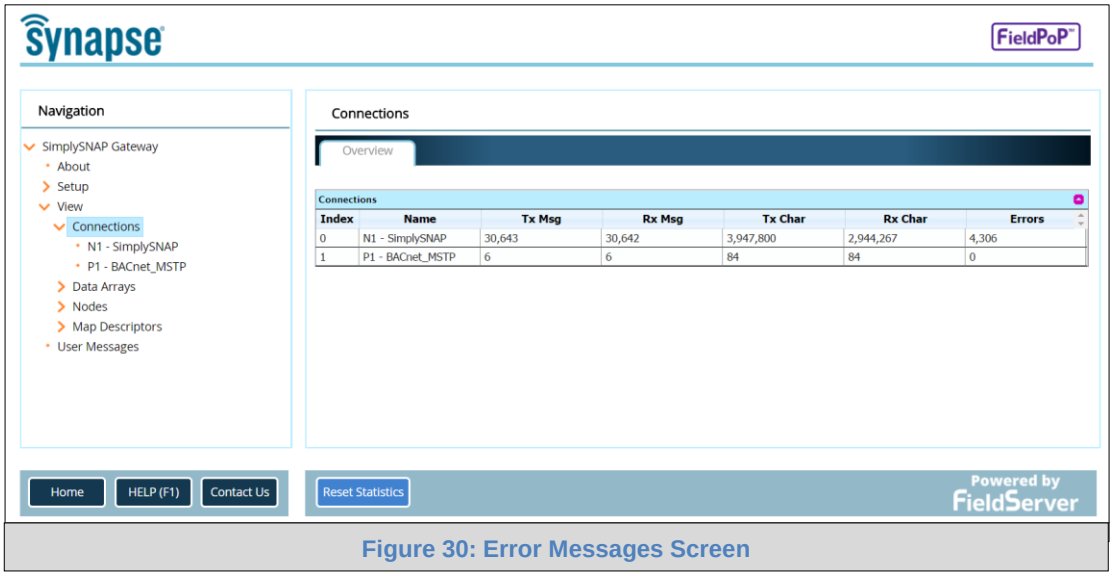


Figure 30: Error Messages Screen

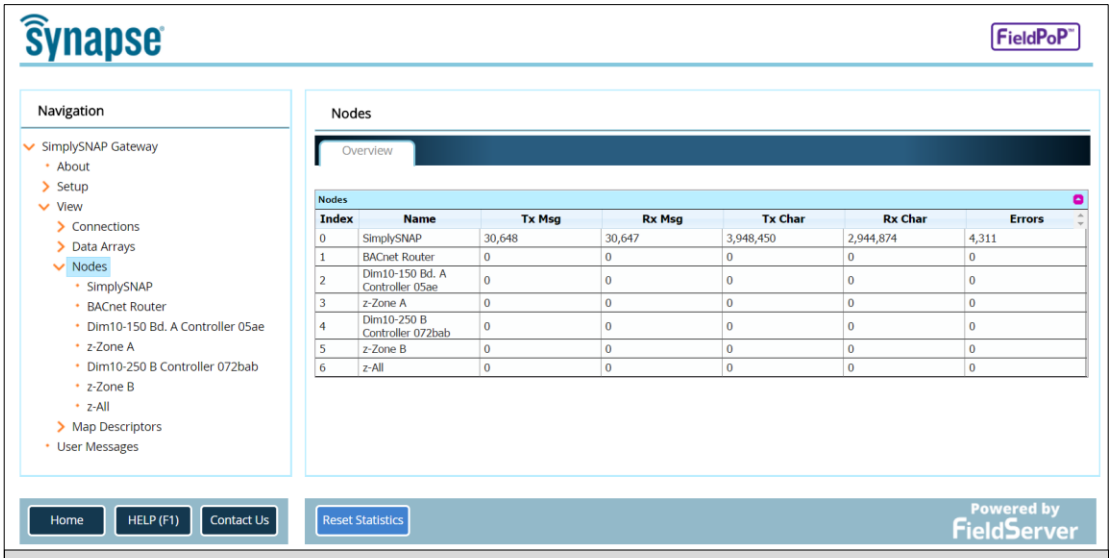


Figure 31: Nodes Information Screen

NOTE: The FieldPoP™ button FieldPoP™ (see Figure 30) allows users to connect to FieldPoP, Sierra Monitor's device cloud solution for the IIoT. FieldPoP enables secure remote connection to field devices through a FieldServer and its local applications for configuration, management, maintenance. For more information about FieldPoP, refer to the FieldPoP™ Device Cloud Start-up Guide.

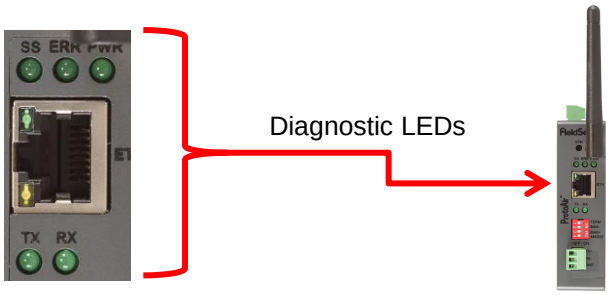
Appendix A.3. Checking Wiring and Settings

- No COMS on Ethernet side. To fix, check the following:
  - Visual observations of LEDs on ProtoAir (**Appendix A.4**)
  - Check device address
  - Verify wiring
  - Verify device is connected to the same subnet as the ProtoAir
  - Verify all the devices were discovered in Web Configurator (**Section 6.4**)
- Field COM problems:
  - Visual observations of LEDs on the ProtoAir (**Appendix A.4**)
  - Verify IP Address setting
  - Verify wiring

NOTE: If the problem still exists, a Diagnostic Capture needs to be taken and sent to technical support. (Appendix A.5)

Appendix A.4. LED Diagnostics for Communications Between ProtoAir and Devices

See the diagram below for ProtoAir FPA-W34 LED Locations.



Tag	Description
SS	The SPL LED will light if the unit is not getting a response from one or more of the configured devices.
ERR	The SYS ERR LED will go on solid 15 seconds after power up. It will turn off after 5 seconds. A steady red light will indicate there is a system error on unit. If this occurs, immediately report the related “system error” shown in the error screen of the FS-GUI interface to support for evaluation.
PWR	This is the power light and should show steady green at all times when the unit is powered.
TX	The TX LED will flash when a message is received on the serial port on the 3-pin connector. **If the serial port is not used,** this LED is non-operational.
RX	The RX LED will flash when a message is sent on the serial port on the 3-pin connector. If the serial port is not used, this LED is non-operational.

Figure 32: Diagnostic LEDs

Appendix A.5. Taking Diagnostic Capture with the FieldServer Toolbox

- **Once the Diagnostic Capture is complete, contact technical support for delivery instructions. The Diagnostic Capture will accelerate diagnosis of the problem.**
- Ensure that FieldServer Toolbox is loaded onto the local PC. Otherwise, download the FieldServer-Toolbox.zip via the Sierra Monitor Resource Center Software Downloads.
- Extract the executable file and complete the installation.

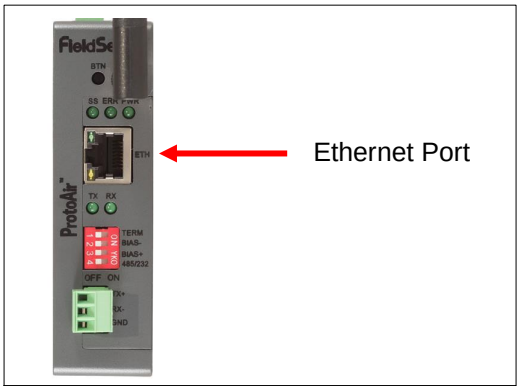
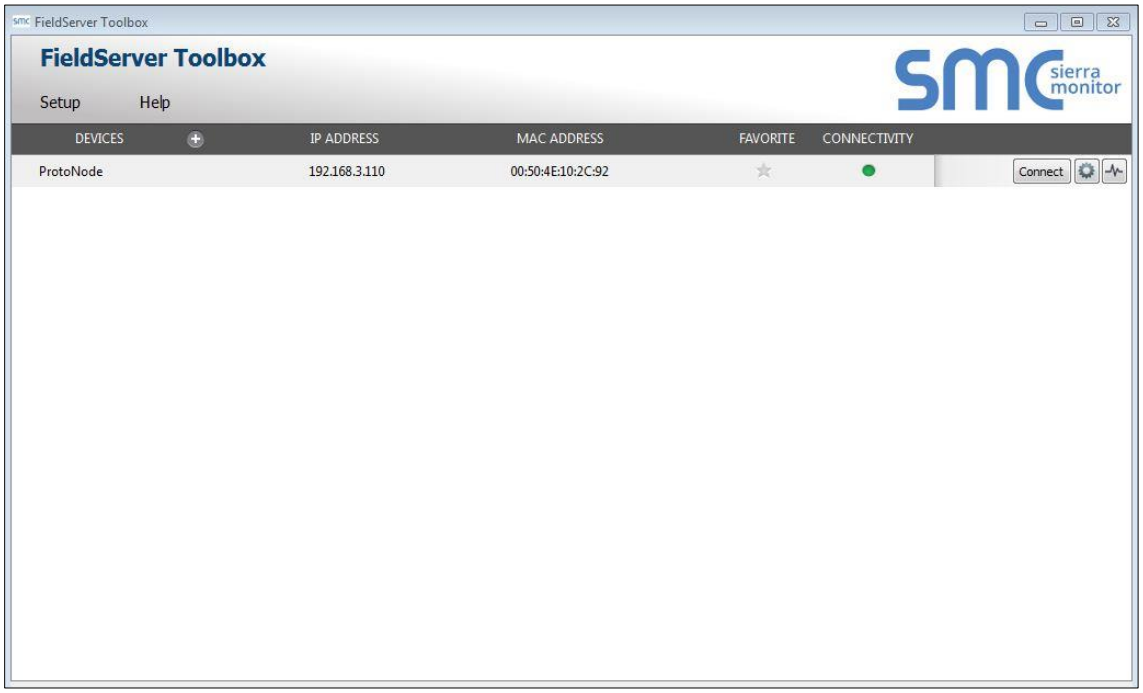
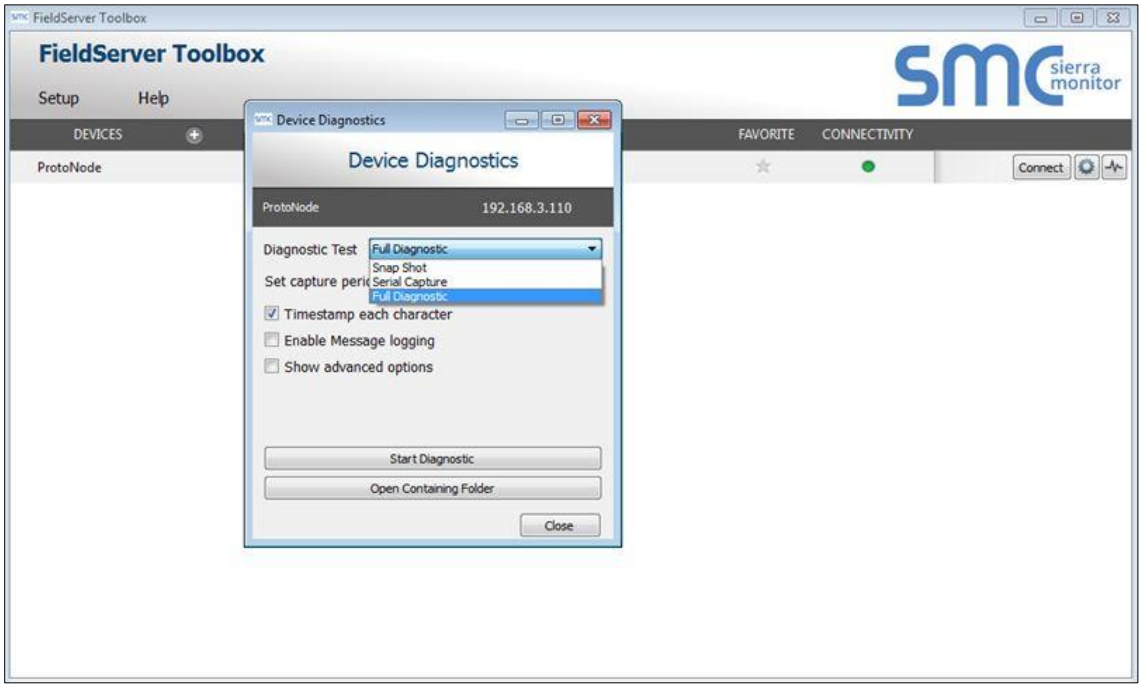


Figure 33: Ethernet Port Location

- Connect a standard Cat5 Ethernet cable between the PC and ProtoAir.
- Double click on the FS Toolbox Utility.
- **Step 1:** Take a Log
  - Click on the diagnose icon of the desired device

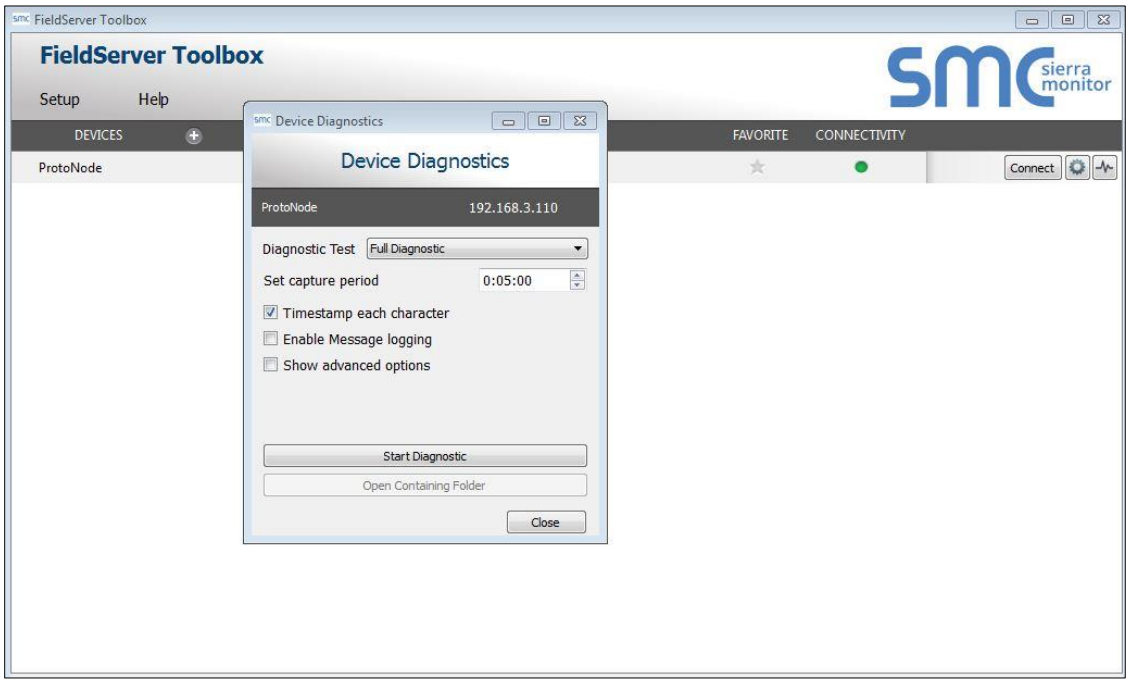


- Ensure “Full Diagnostic” is selected (this is the default)



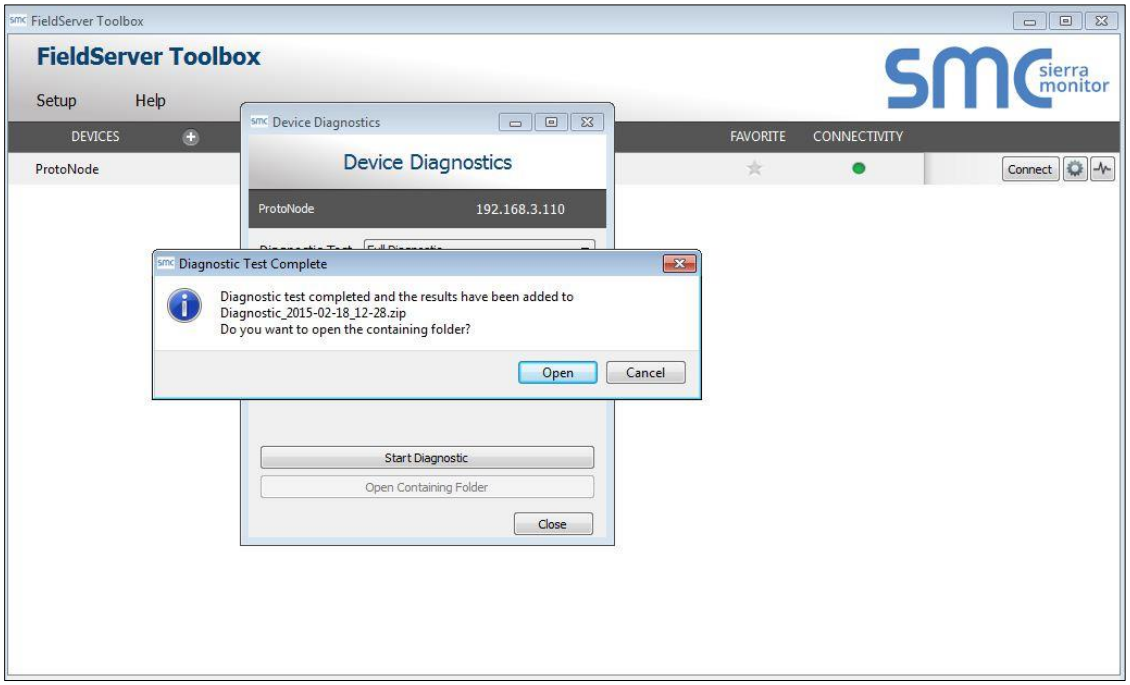
NOTE: If desired, the default capture period can be changed.

- Click on “Start Diagnostic”



- Wait for Capture period to finish, then the Diagnostic Test Complete window will appear

- **Step 2**: Send Log
    - Once the Diagnostic test is complete, a .zip file is saved on the PC



    - Choose “Open” to launch explorer and have it point directly at the correct folder
    - Contact technical support for delivery instructions and send the Diagnostic zip file

Appendix A.6. Updating Firmware

To load a new version of the firmware, follow these instructions:

1. Extract and save the new file onto the local PC.
2. Open a web browser and type the IP Address of the FieldServer in the address bar.

   NOTE: Default IP Address is 192.168.1.24

   NOTE: Use the FS Toolbox utility if the IP Address is unknown (**Appendix A.1**)
3. Click on the “Diagnostics & Debugging” button.
4. In the Navigation Tree on the left-hand side, do the following:
   a. Click on “Setup”
   b. Click on “File Transfer”
   c. Click on the “Firmware” tab
5. In the Firmware tab, click on “Choose Files” and select the firmware file extracted in step 1.
6. Click on the orange “Submit” button.
7. When the download is complete, click on the “System Restart” button.

Appendix A.7. BACnet: Setting Network_Number for more than one ProtoAir on Subnet

For both BACnet MS/TP and BACnet/IP, if more than one ProtoAir is connected to the same subnet, they must be assigned unique Network_Number values.

On the main Web Configuration screen, click the BMS Settings Button. Enter a unique Network Number and click Save. The default value is 5.

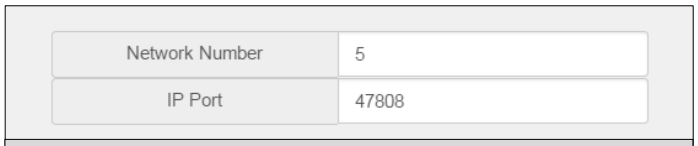


Figure 34: BMS Settings – Network Number for BACnet

Appendix A.8. Securing ProtoAir with Passwords

Access to the ProtoAir can be restricted by enabling a password. There are 2 access levels defined by 2 account names: Admin and User.

- The Admin account has unrestricted access to the ProtoAir.
- The User account can view any ProtoAir information, but cannot make any changes or restart the ProtoAir.

The password needs to be a minimum of eight characters and **is case sensitive**.

If the password is lost, click cancel on the password authentication popup window, and contact technical support for delivery instructions for the password recovery token. Once delivered, a temporary password will be sent from the customer support team. Access the ProtoAir to set a new password.

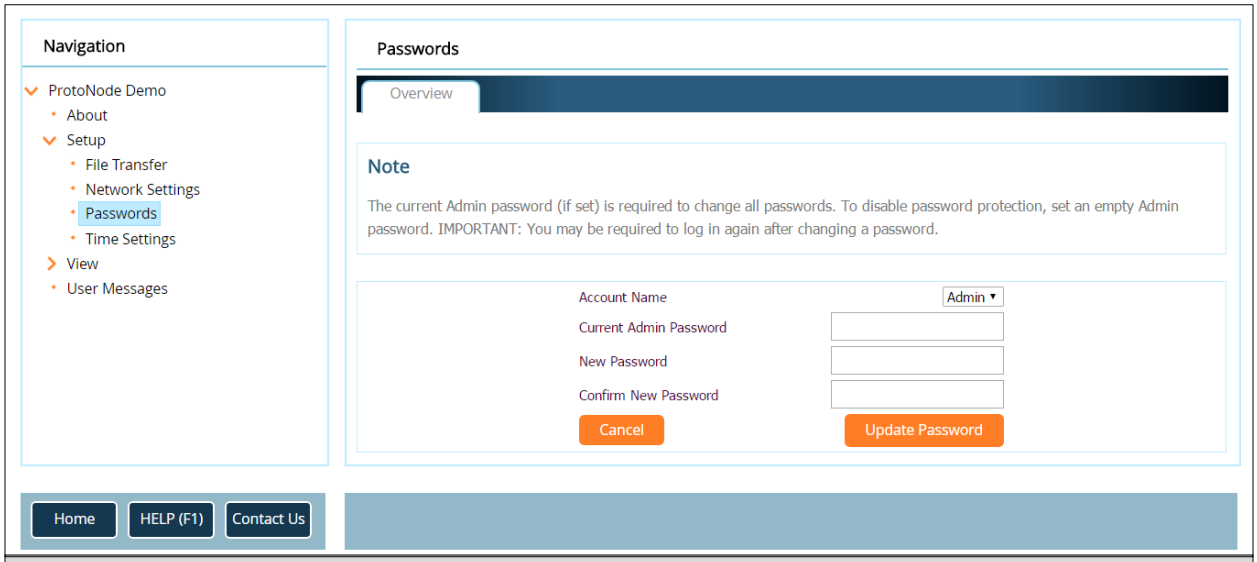


Figure 35: FS-GUI Passwords Page

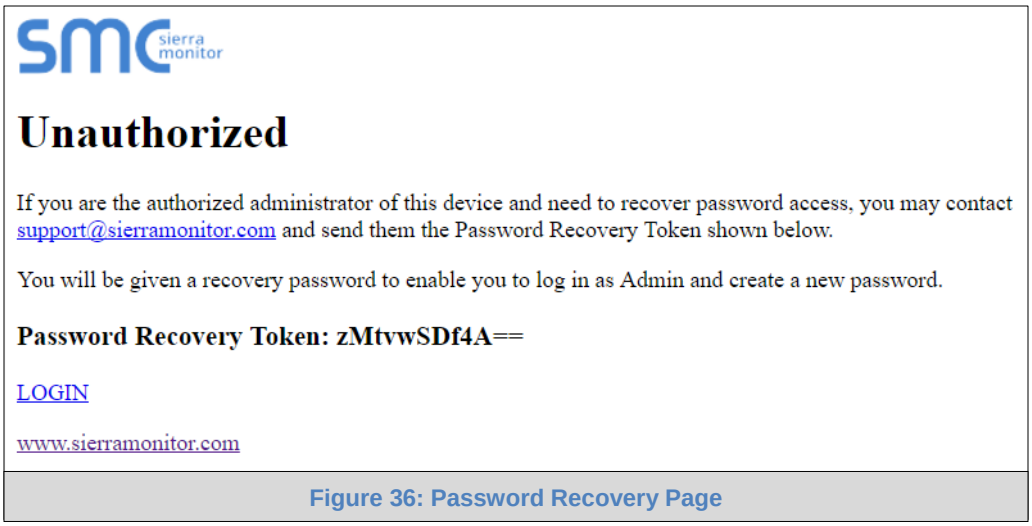


Figure 36: Password Recovery Page

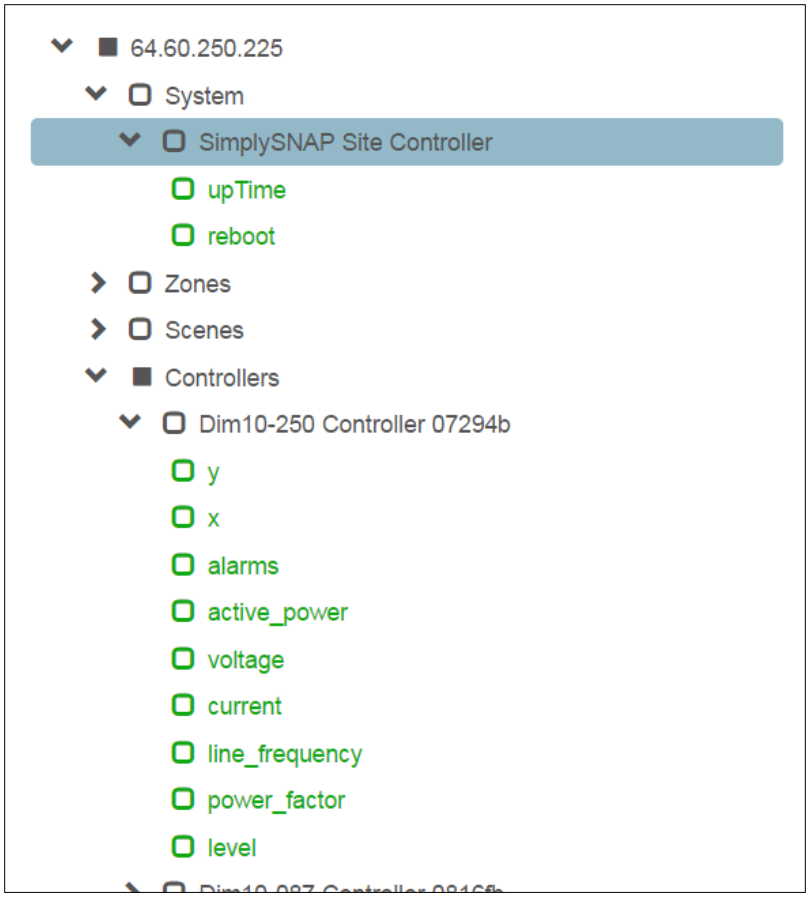
Appendix B. Additional Information

Appendix B.1. Structure of the Device Tree

The Device Tree follows the below structure:

- ProtoAir IP Address
  - Device types
    - List of devices connected to this ProtoAir
      - List of device parameters

For example:



Appendix B.2. Mounting

The ProtoAir can be mounted using the DIN rail mounting bracket on the back of the unit.

Figure 37: DIN Rail

Appendix B.3. Physical Dimensions for FPA-W34

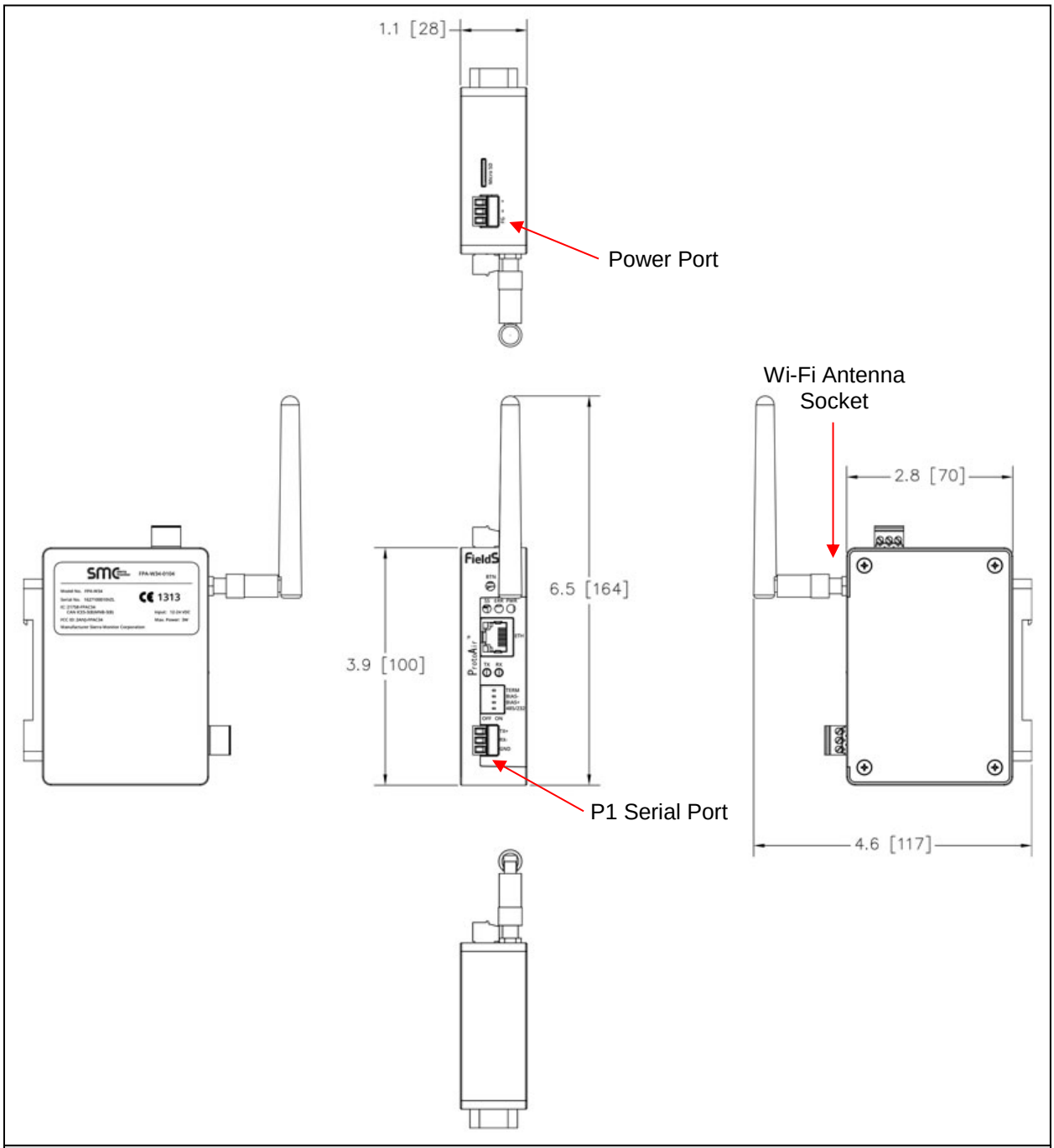


Figure 38: ProtoAir FPA-W34 Dimensions

Appendix C. Reference

Appendix C.1. Specifications

	ProtoAir FPA-W34
Electrical Connections	One 3-pin Phoenix connector with: RS-485 (Tx+ / Rx- / gnd) One 3-pin Phoenix connector with: Power port (+ / - / Frame-gnd) One Ethernet 10/100 BaseT port
Power Requirements	*Input Voltage:* 12-24V DC *Current draw:* @ 12V, 240 mA *Power Rating:* 2.5 Watts
Approvals	CE and FCC Class B & C Part 15, TUV approved to UL 60950 pending, IC Canada, RoHS Compliant, PTCRB and CTIA
Power Requirements	12-24V DC
Physical Dimensions	4 x 1.1 x 2.7 in (10.16 x 2.8 x 6.8 cm)
Weight	0.4 lbs (0.2 Kg)
Operating Temperature	-20°C to 70°C (-4°F to158°F)
Humidity	10-95% RH non-condensing

Figure 39: Specifications

Appendix C.1.1. Compliance with UL Regulations

For UL compliance, the following instructions must be met when operating ProtoAir.

- The units shall be powered by listed LPS or Class 2 power supply suited to the expected operating temperature range.
- The interconnecting power connector and power cable shall:
  - Comply with local electrical code
  - Be suited to the expected operating temperature range
  - Meet the current and voltage rating for ProtoAir
- Furthermore, the interconnecting power cable shall:
  - Be of length not exceeding 3.05m (118.3”)
  - Be constructed of materials rated VW-1, FT-1 or better
- If the unit is to be installed in an operating environment with a temperature above 65 °C, it should be installed in a Restricted Access Area requiring a key or a special tool to gain access.
- This device must not be connected to a LAN segment with outdoor wiring.

Appendix D. Limited 2 Year Warranty

Sierra Monitor Corporation warrants its products to be free from defects in workmanship or material under normal use and service for two years after date of shipment. Sierra Monitor Corporation will repair or replace any equipment found to be defective during the warranty period. Final determination of the nature and responsibility for defective or damaged equipment will be made by Sierra Monitor Corporation personnel.

All warranties hereunder are contingent upon proper use in the application for which the product was intended and do not cover products which have been modified or repaired without Sierra Monitor Corporation's approval or which have been subjected to accident, improper maintenance, installation or application, or on which original identification marks have been removed or altered. This Limited Warranty also will not apply to interconnecting cables or wires, consumables or to any damage resulting from battery leakage.

In all cases Sierra Monitor Corporation's responsibility and liability under this warranty shall be limited to the cost of the equipment. The purchaser must obtain shipping instructions for the prepaid return of any item under this warranty provision and compliance with such instruction shall be a condition of this warranty.

Except for the express warranty stated above, Sierra Monitor Corporation disclaims all warranties with regard to the products sold hereunder including all implied warranties of merchantability and fitness and the express warranties stated herein are in lieu of all obligations or liabilities on the part of Sierra Monitor Corporation for damages including, but not limited to, consequential damages arising out of/or in connection with the use or performance of the product.