ProtoNode FPC-N34 and ProtoNode FPC-N35 Start-up Guide

For Interfacing LAARS Products:

Sola, Multiburner, SV2, HTD, OmniTherm, MagnaTherm

To Building Automation Systems:

BACnet MS/TP, BACnet/IP, Modbus TCP/IP, Metasys N2, LonWorks and SMC Cloud

APPLICABILITY & EFFECTIVITY

Explains ProtoNode hardware and how to install it.

The instructions are effective for the above as of July 2019.

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Web Configurator
Template Revision: 71

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Quick Start Guide

1. Record the information about the unit. (**Section** 3.1)
2. Check that the ProtoNode is set to the same COM settings as the customer device that will be connected. (**Section** 3.3)
3. Connect the ProtoNode 6 pin RS-485 connector to the RS-485 network that is connected to each of the devices. (**Section** 4.2)
4. **If using a serial field protocol:**
   Connect the ProtoNode FPC-N34 3 pin RS-485 port to the field protocol cabling, (**Section** 4.3)
   or connect the ProtoNode FPC-N35 2 pin LonWorks port to the field protocol cabling. (**Section** 4.4)
5. Connect power to the ProtoNode 6 pin port. (**Section** 4.5)
6. Use a web browser to access the ProtoNode Web Configurator page to select the profiles of the devices attached to the ProtoNode and enter any necessary device information. Once the devices are selected, the ProtoNode automatically builds and loads the appropriate configuration. (**Section** 6)
7. Ethernet Network (FPC-N34): If using an Ethernet field protocol, use a web browser to access the ProtoNode Web Configurator page to change the IP Address. (**Section** 6.4)
8. LonWorks (FPC-N35): The ProtoNode must be commissioned on the LonWorks Network. This needs to be done by the LonWorks administrator using a LonWorks commissioning tool. (**Section** 7)

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1 CERTIFICATIONS

1.1 BTL Mark – BACnet®[1] Testing Laboratory

The BTL Mark on ProtoNode 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.

1.2 LonMark Certification

LonMark International is the recognized authority for certification, education, and promotion of interoperability standards for the benefit of manufacturers, integrators and end users. LonMark International has developed extensive product certification standards and tests to provide the integrator and user with confidence that products from multiple manufacturers utilizing LonMark devices work together. Sierra Monitor has more LonMark Certified gateways than any other gateway manufacturer, including the ProtoCessor, ProtoCarrier and ProtoNode for OEM applications and the full featured, configurable gateways.

2 INTRODUCTION

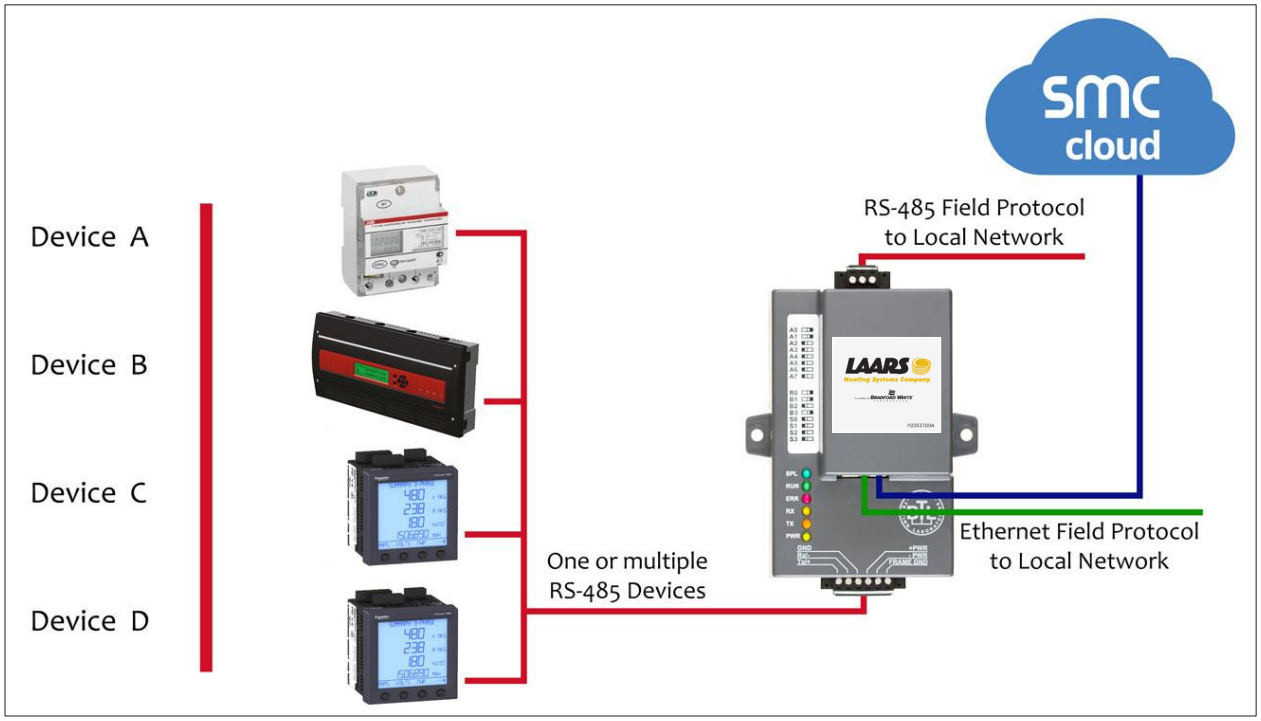
2.1 ProtoNode Gateway

The ProtoNode is an external, high performance **building automation multi-protocol gateway** that is preconfigured to automatically communicate between LAARS' products (hereafter called "device") connected to the ProtoNode and automatically configures them for BACnet MS/TP, BACnet/IP, Metasys®2 N2 by JCI, Modbus TCP/IP or LonWorks®3.

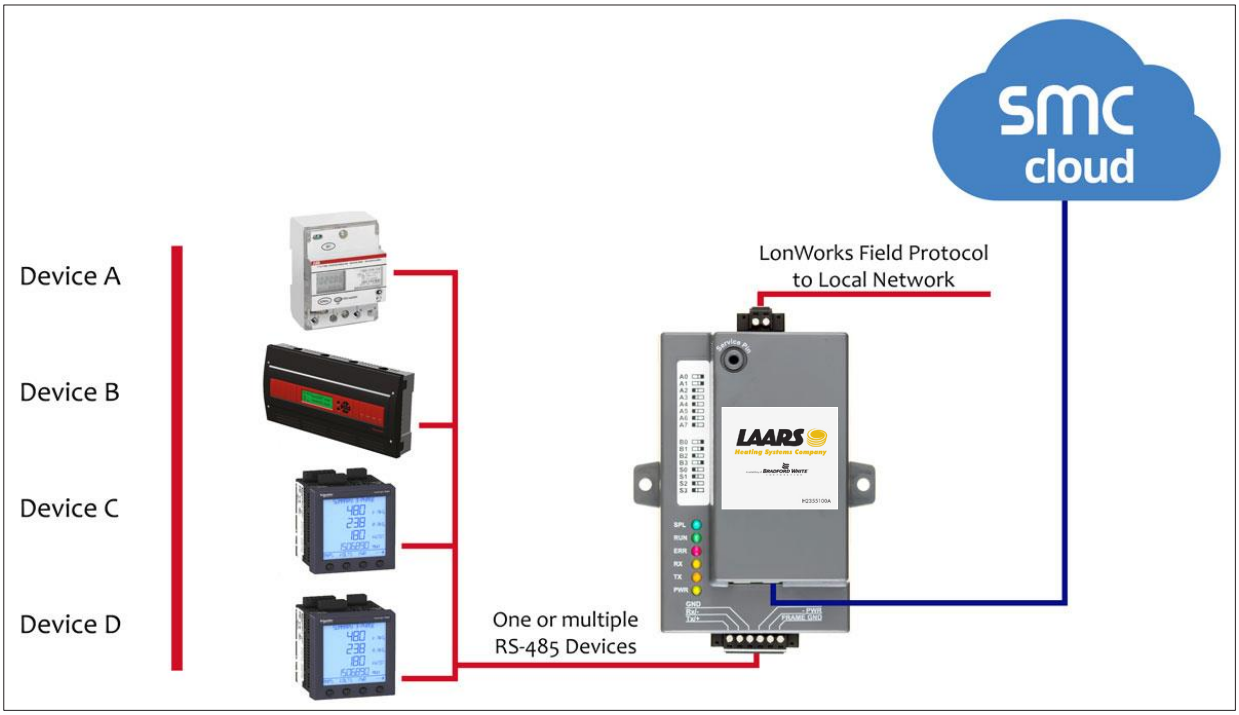
It is not necessary to download any configuration files to support the required applications. The ProtoNode is pre-loaded with tested profiles/configurations for the supported devices.

WARNING: Only use screws supplied by SMC in the holes found on the back of the unit when attaching the optional DIN rail bracket. Use of any other screws may damage the unit.

FPC-N34 Connectivity Diagram:



FPC-N35 Connectivity Diagram:



The ProtoNode can connect with Sierra Monitor's SMC Cloud. The SMC Cloud allows technicians, the OEM's support team and Sierra Monitor's support team to remotely connect to the ProtoNode. The SMC Cloud provides the following capabilities for any registered devices in the field:

- Remotely monitor and control devices.
- Collect device data and view it on the SMC Cloud Dashboard and the SMC Smart Phone App.
- Create user defined device notifications (alarm, trouble and warning) via SMS and/or Email.
- Generate diagnostic captures (as needed for troubleshooting) without going to the site.

For more information about the SMC Cloud, refer to the SMC Cloud Start-up Guide.

3 SETUP FOR PROTONODE

3.1 Record Identification Data

Each ProtoNode 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
ProtoNode FPC-N34	FPC-N34-0701
ProtoNode FPC-N35	FPC-N35-0702

Figure 1: ProtoNode Part Numbers

- FPC-N34 units have the following 3 ports: RS-485 + Ethernet + RS-485
- FPC-N35 units have the following 3 ports: LonWorks + Ethernet + RS-485

3.2 Point Count Capacity and Registers per Device

The total number of registers presented by the device(s) attached to the ProtoNode cannot exceed:

Part number	Total Registers
FPC-N34-0701	1,500
FPC-N35-0702	1,500

Figure 2: Supported Point Count Capacity

Devices	Registers Per Device
Sola	88
Multiburner	149
SV2	75
HTD	254
OmniTherm	174
MagnaTherm	174

Figure 3: Registers per Device

3.3 Configuring Device Communications

3.3.1 Input COM Settings on Any Serial Device Connected to the ProtoNode

- **Any connected serial device MUST have the same baud rate, data bits, stop bits, and parity settings as the ProtoNode.**
- Figure 4 specifies the device serial port settings required to communicate with the ProtoNode.

Port Setting	Device
Protocol	Modbus RTU
Baud Rate	38400
Parity	None
Data Bits	8
Stop Bits	1

Figure 4: COM Settings

3.3.2 Set Node-ID for Any Device Attached to the ProtoNode

- Set Node-ID for any device attached to ProtoNode. The Node-ID needs to be uniquely assigned between 1 and 255.
- Document the Node-ID that is assigned to any device. The Node-ID assigned is used for deriving the Device Instance for BACnet/IP and BACnet MS/TP. (**Section** 3.3.3)

NOTE: The Metasys N2 and Modbus TCP/IP field protocol Node-ID is automatically set to be the same value as the Node-ID of the device.

3.3.3 BACnet (FPC-N34): Calculating the Default Device Instance

- The Device Instance value is automatically generated using the following formula:

  BACnet Device Instance = (Device Node ID) + (Default Node Offset)

NOTE: The default Node Offset is 50,000.

For example, if Device A has a Node ID of 1 and Device B has a Node ID of 2, then:

BACnet Device Instance A = (1) + (50000) = 50001

BACnet Device Instance B = (2) + (50000) = 50002

NOTE: The Node ID is set in Section 3.3.2.

- To reach a specific BACnet Device Instance result, refer to **Section** 6.5.

4 INTERFACING PROTONODE TO DEVICES

4.1 ProtoNode FPC-N34 and FPC-N35 Showing Connection Ports

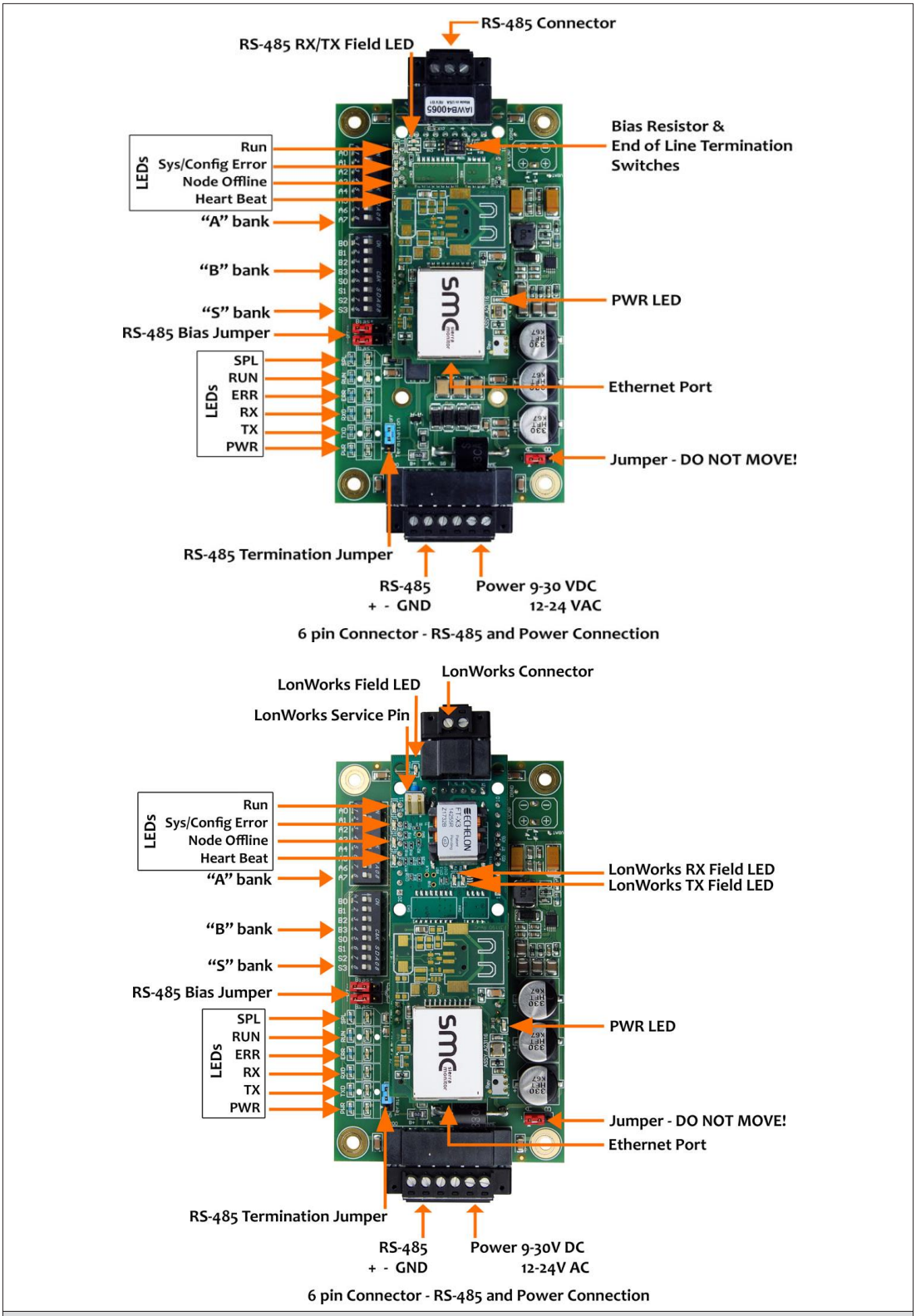


Figure 5: ProtoNode FPC-N34 (Top) and ProtoNode FPC-N35 (Bottom)

4.2 Serial Device Connections to the ProtoNode

ProtoNode 6 Pin Phoenix connector:

- The 6 pin Phoenix connector is the same for ProtoNode FPC-N34 and FPC-N35 (LonWorks).
- Pins 1 through 3 are for RS-485 devices.
  - Use standard grounding principles for RS-485 GND
- Pins 4 through 6 are for power. **Do not connect power until Section 4.5**.

Device Pins	ProtoNode Pin #	Pin Assignment
Pin RS-485 +	Pin 1	RS-485 +
Pin RS-485 -	Pin 2	RS-485 -
Pin GND	Pin 3	RS-485 GND
Power In (+)	Pin 4	V +
Power In (-)	Pin 5	V -
Frame Ground	Pin 6	FRAME GND

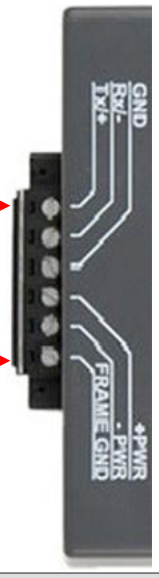


Figure 6: RS-485 and Power Connections

4.2.1 Biasing the RS-485 Device Network

- An RS-485 network with more than one device needs to have biasing to ensure proper communication. The biasing only needs to be done on one device.
- The ProtoNode has 510 ohm resistors that can be used to set the biasing. The ProtoNode's default positions from the factory for the biasing jumpers are OFF.
- The OFF position is when the 2 red biasing jumpers straddle the 4 pins closest to the outside of the board of the ProtoNode. (Figure 7)
- **Only turn biasing ON:**
  - **IF the BMS cannot see more than one device connected to the ProtoNode**
  - **AND all the settings (COM settings, wiring, and DIP switches) have been checked**
- To turn biasing ON, move the 2 red biasing jumpers to straddle the 4 pins closest to the inside of the board of the ProtoNode.

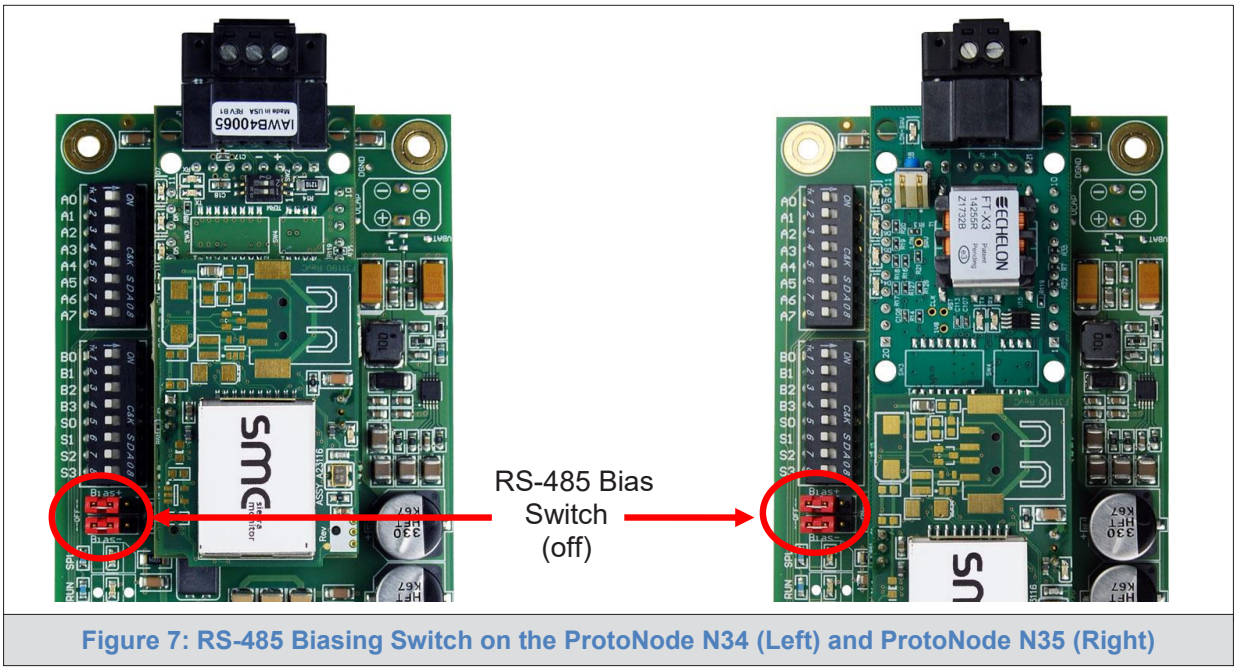


Figure 7: RS-485 Biasing Switch on the ProtoNode N34 (Left) and ProtoNode N35 (Right)

4.2.2 End of Line Termination Switch for the RS-485 Device Network

- On long RS-485 cabling runs, the RS-485 trunk must be properly terminated at each end.
- The ProtoNode has an end of line (EOL) blue jumper. The default setting for this blue EOL switch is OFF with the jumper straddling the pins closest to the inside of the board of the ProtoNode.
  - On short cabling runs the EOL switch does not to need to be turned ON
- **If the ProtoNode is placed at one of the ends of the trunk, set the blue EOL jumper to the ON position straddling the pins closest to the outside of the board of the ProtoNode.**
- **Always leave the single red jumper in the A position (default factory setting).**

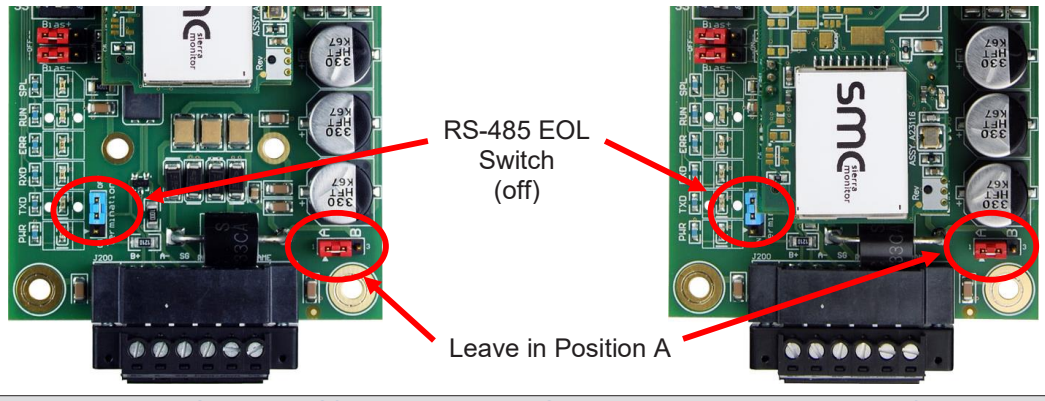


Figure 8: RS-485 End-Of-Line Termination Switch on the ProtoNode N34 (Left) and ProtoNode N35 (Right)

4.3 Serial Network (FPC-N34): Wiring Field Port to RS-485 Network

- Connect the RS-485 network wires to the 3-pin RS-485 connector on ProtoNode as shown below in Figure 9.
  - Use standard grounding principles for RS-485 GND
- See **Section** 6.4 for information on connecting to an Ethernet network.

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

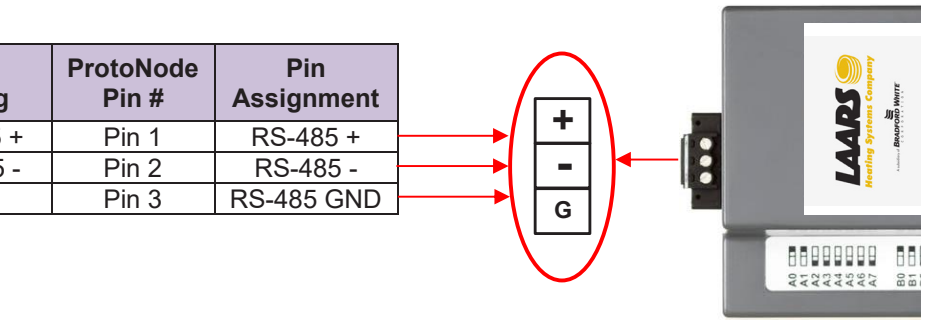


Figure 9: Connection from ProtoNode to RS-485 Field Network

- If the ProtoNode is the last device on the trunk, then the end of line (EOL) termination switch needs to be enabled. **See Figure 10 for the orientation of switch positions referenced below.**
  - The default setting from the factory is OFF (switch position = right side)
  - To enable the EOL termination, turn the EOL switch ON (switch position = left side)

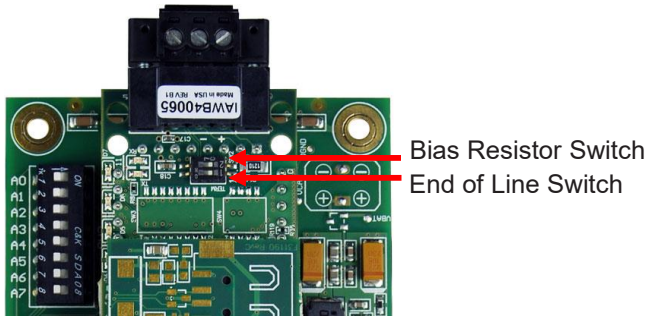


Figure 10: RS-485 EOL & Bias Resistor Switches

- If more than one RS-485 device is connected to the network, then the field bias resistor switch needs to be enabled to ensure proper communication. **See Figure 10 for the orientation of switch positions referenced below.**
  - The default factory setting is OFF (switch position = right side)
  - To enable biasing, turn the bias switch ON (switch position = left side)

NOTE: Biasing only needs to be enabled on one device. The ProtoNode has 510 ohm resistors that are used to set the biasing.

4.4 LonWorks (FPC-N35): Wiring LonWorks Devices to the LonWorks Terminal

- Wire the LonWorks device network to the ProtoNode LonWorks Terminal.
  - Use approved cable per the FT-10 installation guidelines
  - LonWorks has no polarity.

Figure 11: LonWorks Terminal

4.5 Power-Up ProtoNode

Check power requirements in the table below:

Power Requirement for ProtoNode External Gateway			
	Current Draw Type		
ProtoNode Family	12VDC/AC	24VDC/AC	30VDC
FPC – N34 (Typical)	170mA	100mA	80mA
FPC – N34 (Maximum)	240mA	140mA	100mA
FPC – N35 (Typical)	210mA	130mA	90mA
FPC – N35 (Maximum)	250mA	170mA	110mA
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 12: Required Current Draw for the ProtoNode

Apply power to the ProtoNode as shown below in Figure 13. Ensure that the power supply used complies with the specifications provided in Appendix D.1.

- ProtoNode accepts either 9-30VDC or 12-24VAC on pins 4 and 5.
- Frame GND should be connected.

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

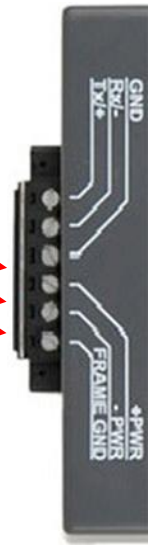


Figure 13: Power Connections

5 CONNECT THE PC TO THE PROTONODE

5.1 Connect the PC to the ProtoNode via the Ethernet Port

First, connect a Cat-5 Ethernet cable (straight through or cross-over) between the local PC and ProtoNode.

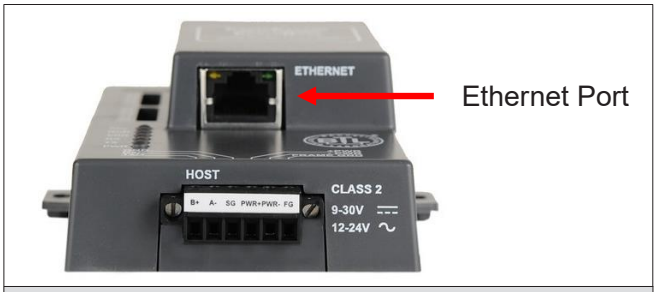


Figure 14: Ethernet Port Location

There are two methods to access the ProtoNode via Ethernet connection, either by changing the subnet of the connected PC (Section 5.1.1) or using the FieldServer Toolbox to change the IP Address of the ProtoNode (Section 5.1.2).

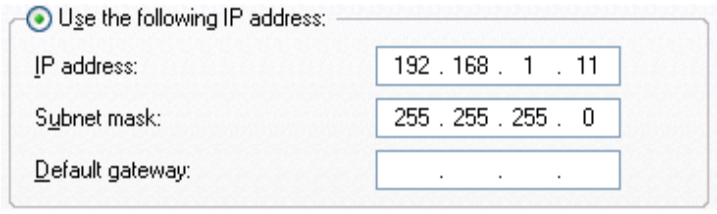
NOTE: Only perform one method or the other.

5.1.1 Changing the Subnet of the Connected PC

The default IP Address for the ProtoNode is **192.168.1.24**, Subnet Mask is **255.255.255.0**. If the PC and ProtoNode are on different IP networks, assign a static IP Address to the PC on the 192.168.1.xxx network.

For Windows 10:

- Find the search field in the local computer's taskbar (usually to the right of the windows icon) and type in "Control Panel".
- Click "Control Panel", click "Network and Internet" and then click "Network and Sharing Center".
- Click "Change adapter settings" on the left side of the window.
- Right-click on "Local Area Connection" and select "Properties" from the dropdown menu.
- Highlight Internet Protocol Version 4 (TCP/IPv4) and then click the Properties button.
- Select and enter a static IP Address on the same subnet. For example:

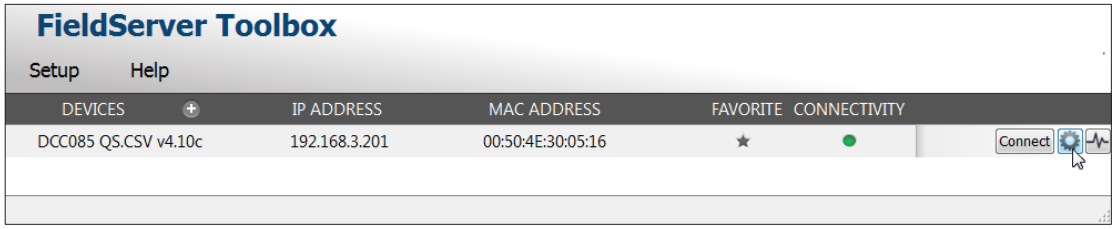


- Click the Okay button to close the Internet Protocol window and the Close button to close the Ethernet Properties window.

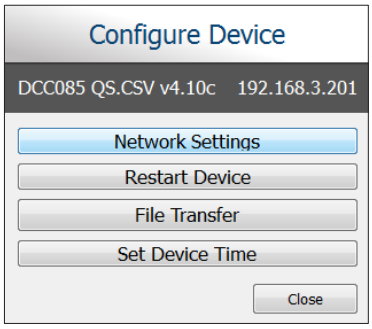
5.1.2 Changing the IP Address of the ProtoNode with FieldServer Toolbox

- Ensure that FieldServer Toolbox is loaded onto the local PC. Otherwise, download the FieldServer-Toolbox.zip via the Sierra Monitor website's Software Downloads.
- Extract the executable file and complete the installation.
- Double click on the FS Toolbox Utility and click Discover Now on the splash page.
- Find the desired gateway and click the Configure Device button (gear icon) to the right of the gateway information.

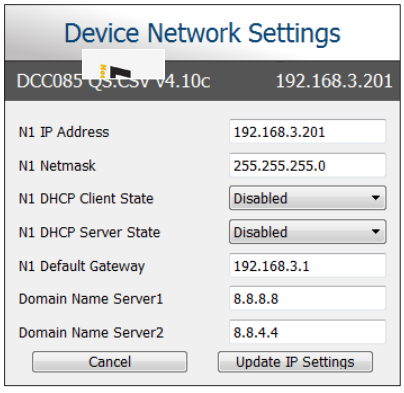
NOTE: If connectivity status is green, then the IP Address doesn't need to be changed (the ProtoNode is already on the same subnet). Skip to the next section.



- Select Network Settings in the Configure Device window.



- Modify the IP Address (N1 IP Address field) of the gateway Ethernet port.
  - Change additional fields as needed



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

NOTE: Do not change the DHCP Server State (N1 DHCP Server State field).

NOTE: If DNS settings are unknown, set DNS1 to "8.8.8.8" and DNS2 to "8.8.4.4".

- Click Update IP Settings, then click on the "Change and restart" button to reboot the gateway and activate the new IP Address. See the FieldServer Toolbox and GUI Manual for more information.

6 CONFIGURE THE PROTONODE

6.1 Accessing the ProtoNode Web Configurator

- Navigate to the IP Address of the ProtoAir on the local PC using one of two methods:
  - Open a web browser and enter the IP Address of the ProtoAir; the default Ethernet address is 192.168.1.24
  - If using the FieldServer Toolbox (**Section** 5.1.2), click the Connect button

NOTE: If the IP Address of the ProtoNode was changed, the assigned IP Address can be discovered using the FS Toolbox utility. See Appendix A.1 for instructions.

- Once at the Web App splash page, click the Login button.

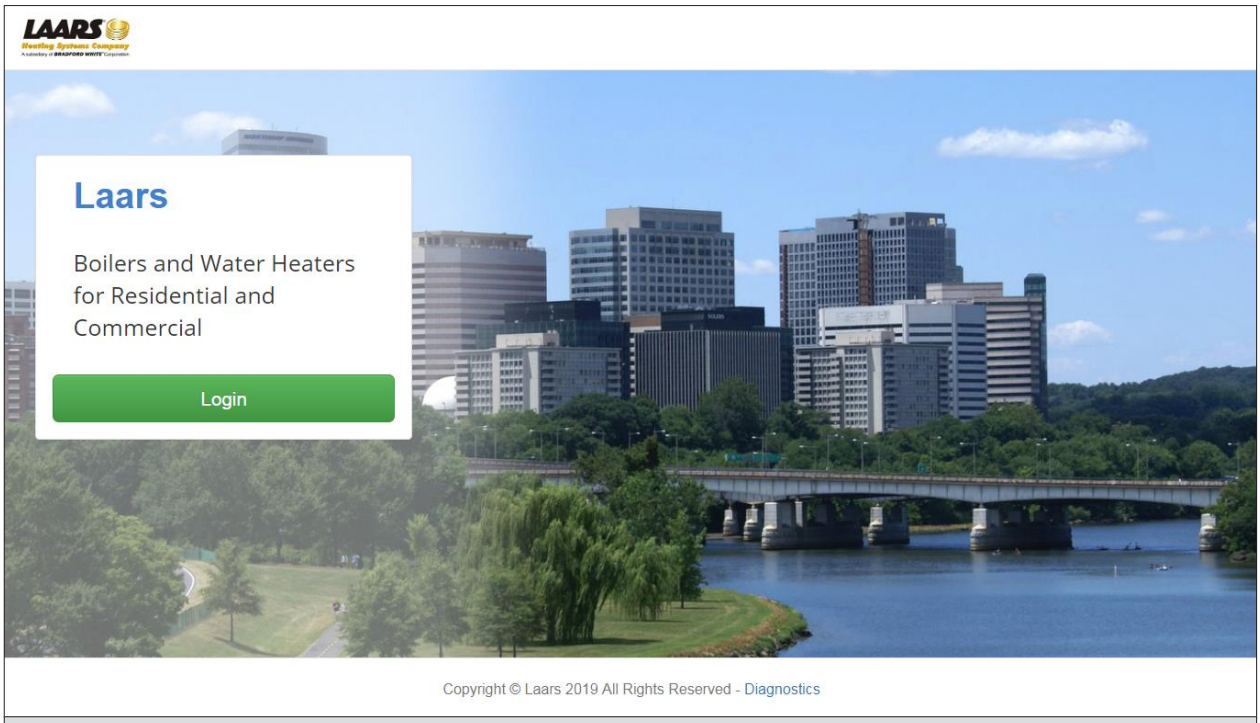


Figure 15: Web App Splash Page

- Enter the previously set up or default username and password.

NOTE: The default username is "admin". The default password is "admin".

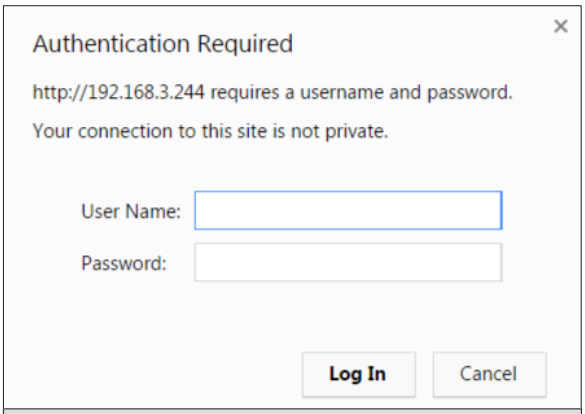


Figure 16: Login Window

- From the Web App landing page (Figure 17), click the Settings tab and then click Configuration.

Figure 17: Web App Landing Page

- Then click the Profiles Configuration button to go to the Web Configurator page.

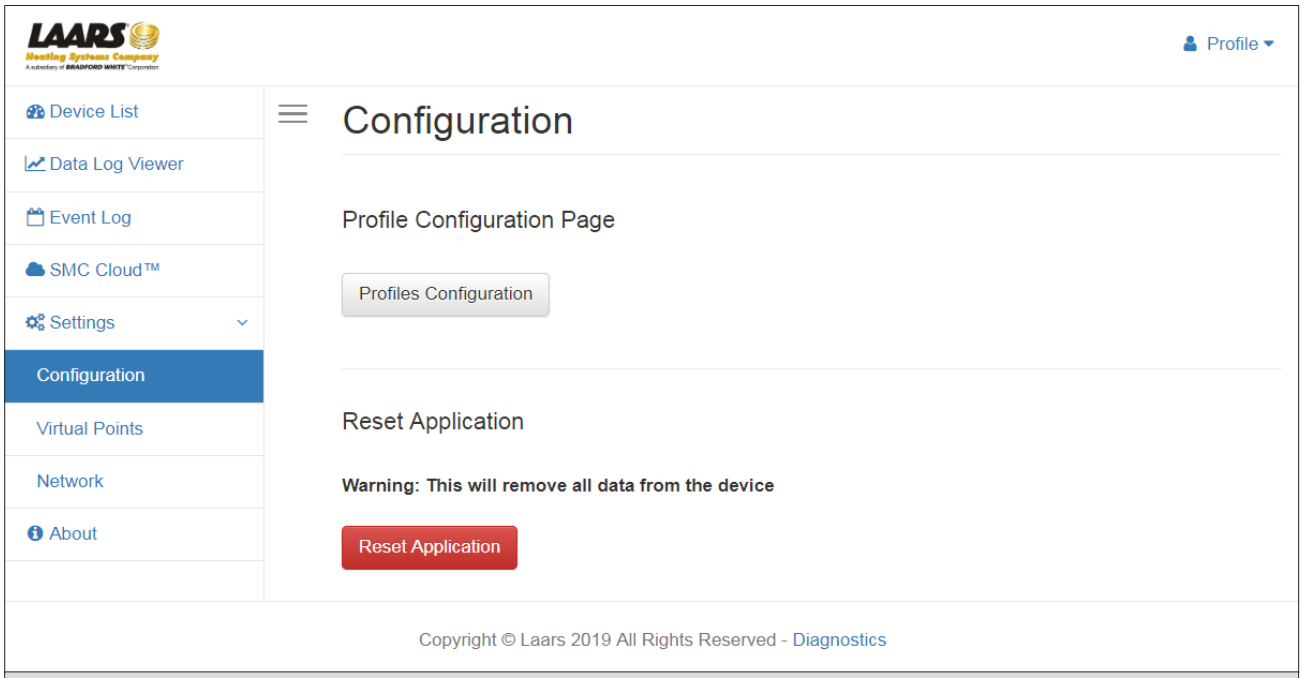


Figure 18: Configuration Tab

NOTE: The SMC Cloud™ tab 

(see Figure 18) allows users to connect to the SMC Cloud, Sierra Monitor's device cloud solution for IIoT. The SMC Cloud enables secure remote connection to field devices through a FieldServer and its local applications for configuration, management, maintenance. For more information about the SMC Cloud, refer to the SMC Cloud Start-up Guide.

NOTE: For Web App instructions to the System View, Historian, Event Logger and Virtual Points functions, see the SMC Cloud Start-up Guide.

6.2 Select Field Protocol Configuration and Set Configuration Parameters

- On the Web Configurator page, the first configuration parameter is the Protocol Selector.

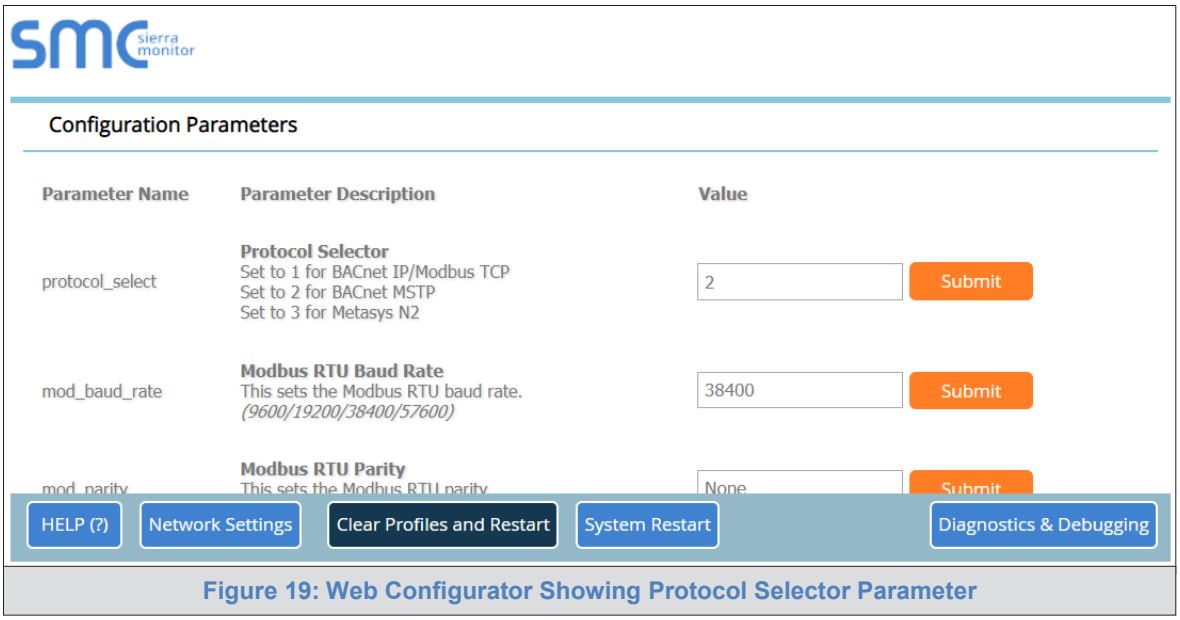


Figure 19: Web Configurator Showing Protocol Selector Parameter

- Select the field protocol desired, using the number key under the Parameter Description header, and click the Submit button.
  - A message will appear at the top of the screen stating that the update was completed and to restart the system
- Click the System Restart button on the bottom of the screen and wait for the system to reset.

NOTE: If multiple devices are connected to the ProtoNode, set the BACnet Virtual Server Nodes field to "Yes"; otherwise leave the field on the default "No" setting.

Check the following:

- If using BACnet MS/TP, update the parameters: MAC Address, Baud Rate and Max Master. See **Figure 20** for the legal value range of each under the Parameter Description in paretheses.
- If Modbus TCP/IP is used for the field protocol, skip **Section 6.3**. Device profiles are NOT used for Modbus TCP/IP.

6.3 Setting ProtoNode Active Profiles

- In the Web Configurator, the Active Profiles are shown below the Configuration Parameters. The Active Profiles section lists the currently active device profiles, including previous Web Configurator additions. This list is empty for new installations, or after clearing all configurations. (Figure 20)

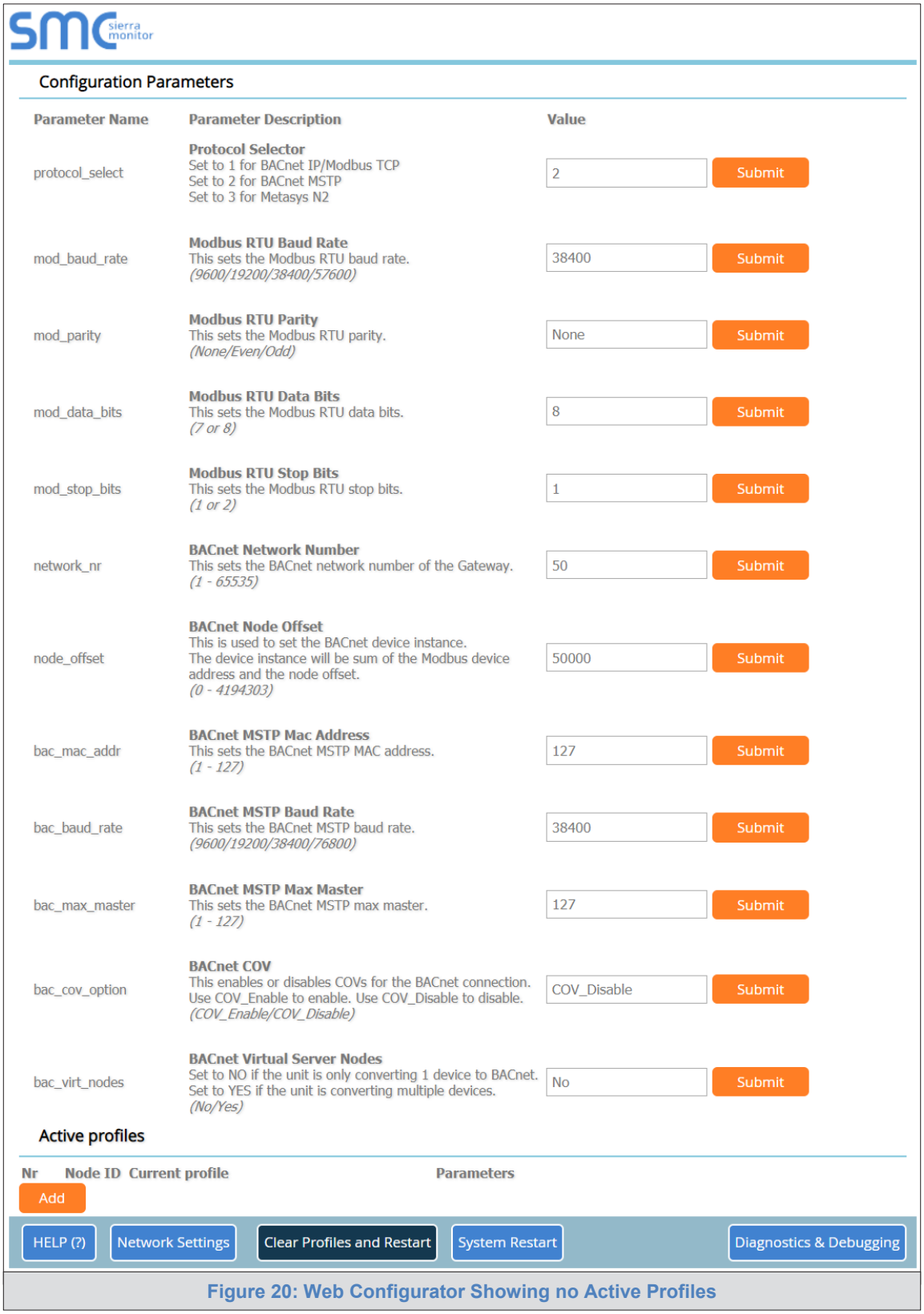


Figure 20: Web Configurator Showing no Active Profiles

- To add an active profile to support a device, click the Add button under the Active Profiles heading. This will present a profile drop-down menu underneath the Current profile colmn. (Figure 21)
- Once the Profile for the device has been selected from the drop-down list, enter the value of the device's Node-ID which was assigned in **Section** 3.3.2.

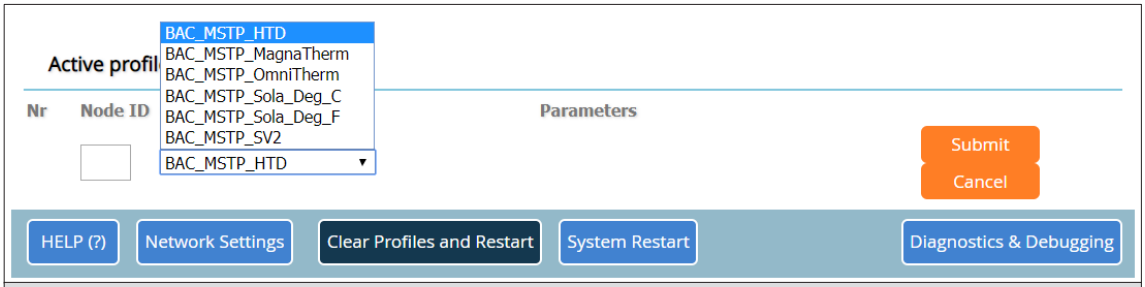


Figure 21: Web Configurator Showing Available Profile Selection

- Then press the "Submit" button to add the Profile to the list of devices to be configured.
- Repeat this process until all the devices have been added.
- Completed additions are listed under "Active profiles" as shown in Figure 22.

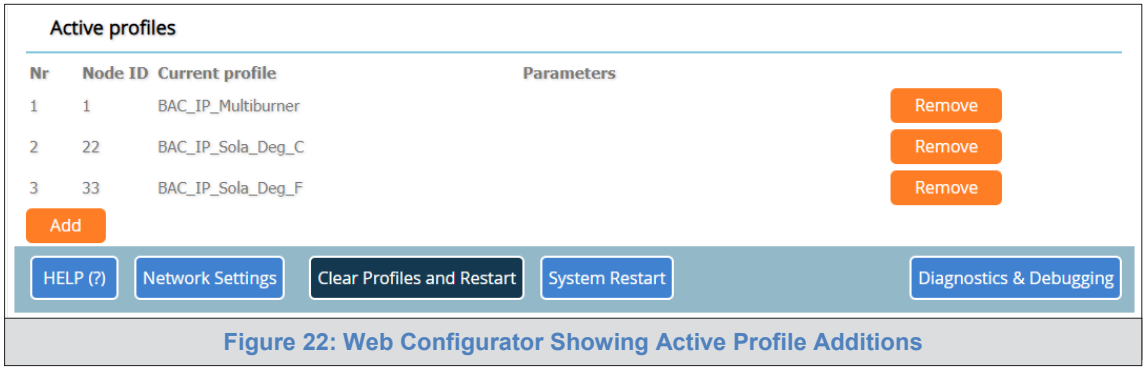


Figure 22: Web Configurator Showing Active Profile Additions

6.3.1 Verify Device Communications

- **Check that TX and RX LEDs** are rapidly flashing. See Appendix A.4 for information and images.
- Confirm the software shows communication without errors. Go to Appendix A.2 for instructions.

6.4 Ethernet Network: Setting IP Address for the Field Network

- Follow the steps outlined in **Section** 5.1 to access the ProtoNode Web Configurator.
- The Web Configurator is displayed as the landing page. (Figure 23)
- To access the FS-GUI, click on the “Diagnostics & Debugging” button in the bottom right corner of the page.

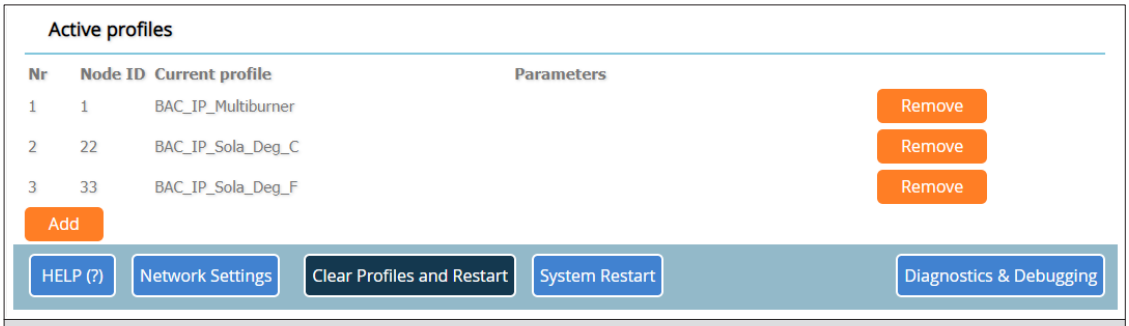


Figure 23: Web Configurator Screen with Active Profiles

- From the FS-GUI landing page, click on “Setup” to expand the navigation tree and then select “Network Settings” to access the IP Settings menu. (Figure 24)

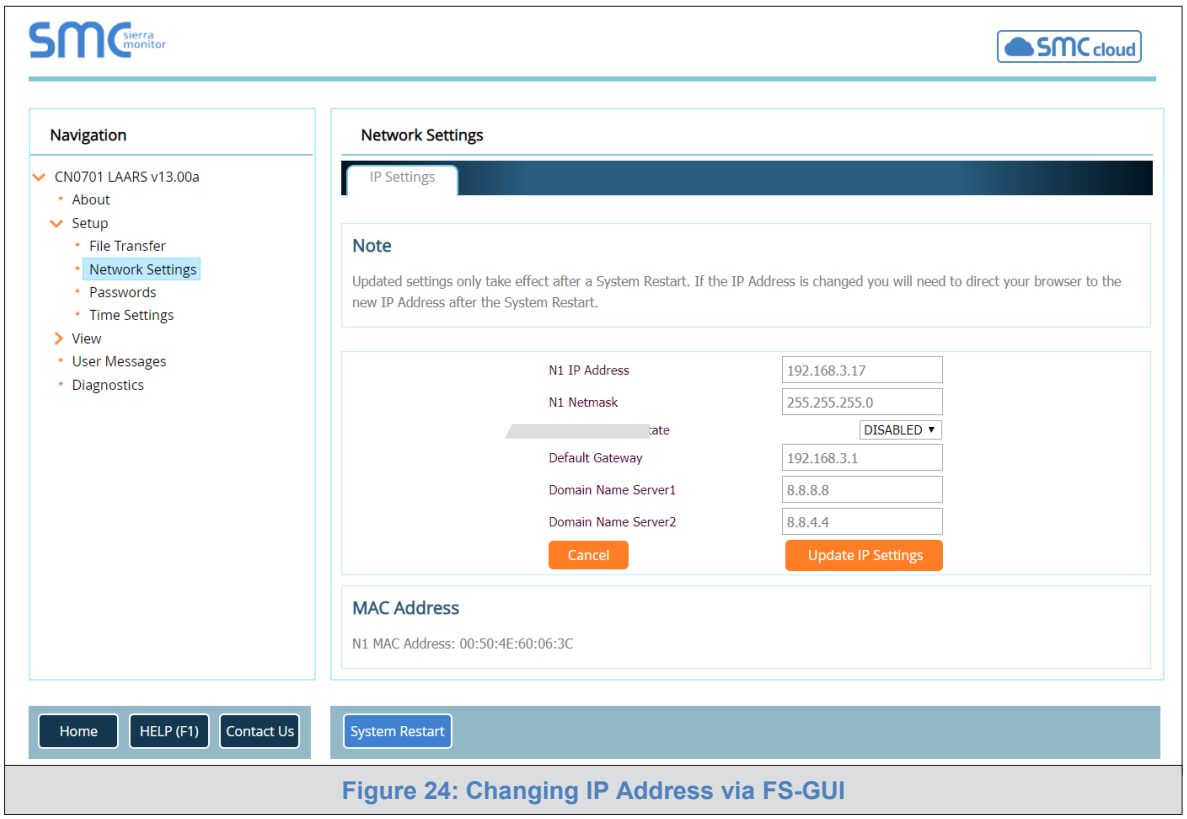


Figure 24: Changing IP Address via FS-GUI

- Modify the IP Address (N1 IP Address field) of the ProtoNode Ethernet port.
- If necessary, change the Netmask (N1 Netmask field).
- If necessary, change the IP Gateway (Default Gateway field).

NOTE: If the ProtoNode is connected to a managed switch/router, the IP Gateway of the ProtoNode should be set to the IP Address of that managed switch/router.

- Click the “System Restart” button at the bottom of the page to apply changes and restart the ProtoNode.
- Unplug Ethernet cable from PC and connect it to the network switch or router.
- Record the IP Address assigned to the ProtoNode for future reference.

NOTE: The SMC Cloud button SMC cloud (see Figure 24) allows users to connect to the SMC Cloud, Sierra Monitor’s device cloud solution for IIoT. The SMC Cloud enables secure remote connection to field devices through a FieldServer and its local applications for configuration, management, maintenance. For more information about the SMC Cloud, refer to the SMC Cloud Start-up Guide.

6.5 BACnet: Setting Node_Offset to Assign Specific Device Instances

- After setting a local PC to the same subnet as the ProtoNode (**Section 5.1**), open a web browser on the PC and enter the IP Address of the ProtoNode.
  - If the IP Address of the ProtoNode has been changed by previous configuration, the assigned IP Address must be gathered from the network administrator
  - The Web Configurator is displayed as the landing page
- Node_Offset field shows the current value (default = 50,000).
  - The values allowed for a BACnet Device Instance can range from 1 to 4,194,303
- To assign a specific Device Instance (or range); change the Node_Offset value as needed using the calculation below:

  Device Instance (desired) = Node_Offset + Node_ID

  For example, if the desired Device Instance for the device 1 is 50,001 and the following is true:
  - Device 1 has a Node-ID of 1
  - Device 2 has a Node-ID of 22
  - Device 3 has a Node-ID of 33

  Then plug the device 1's information into the formula to find the desired Node_Offset:

  50,001 = Node_Offset + 1

  ➢ **50,000 = Node_Offset**

  Once the Node_Offset value is input, it will be applied as shown below:
  - Device 1 Instance = 50,000 + Node_ID = 50,000 + 1 = 50,001
  - Device 2 Instance = 50,000 + Node_ID = 50,000 + 22 = 50,022
  - Device 3 Instance = 50,000 + Node_ID = 50,000 + 33 = 50,033
- Click "Submit" once the desired value is entered.

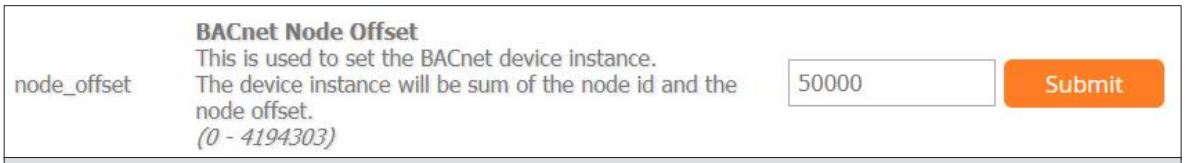


Figure 25: Web Configurator Node Offset Field

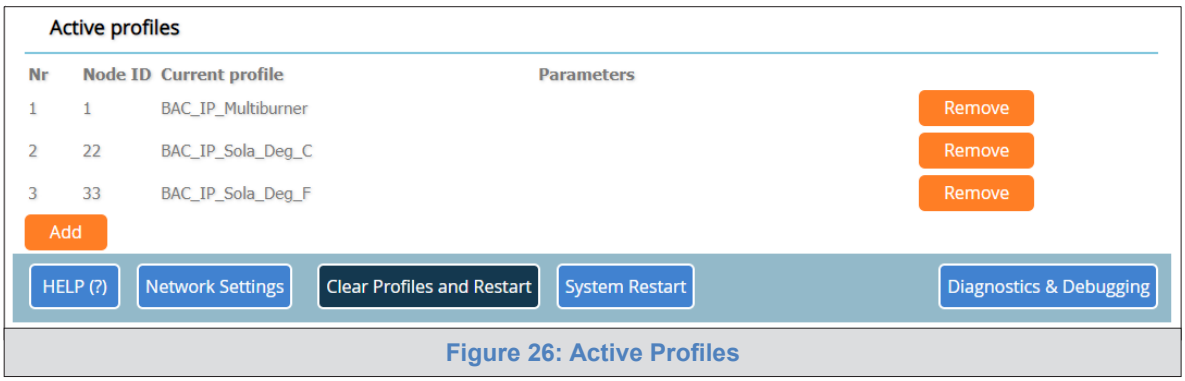


Figure 26: Active Profiles

6.6 How to Start the Installation Over: Clearing Profiles

- After setting a local PC to the same subnet as the ProtoNode (**Section 5.1**), open a web browser on the PC and enter the IP Address of the ProtoNode; the default address is 192.168.1.24.
- If the IP Address of the ProtoNode has been changed by previous configuration, the assigned IP Address must be gathered from the network administrator.
- The Web Configurator is displayed as the landing page.
- At the bottom-left of the page, click the “Clear Profiles and Restart” button.
- Once restart is complete, all past profiles discovered and/or added via Web configurator are deleted. The unit can now be reinstalled.

7 LONWORKS (FPC-N35): COMMISSIONING PROTONODE ON A LONWORKS NETWORK

Commissioning may only be performed by the LonWorks administrator.

7.1 Commissioning ProtoNode FPC-N35 on a LonWorks Network

During the commissioning process, the LonWorks administrator may prompt the user to hit the service pin on the ProtoNode FPC-N35 at a specific point (this step occurs at different points of the commissioning process for each LonWorks network management tool).

- If an XIF file is required, see steps in **Section** 7.1.1 to generate XIF.

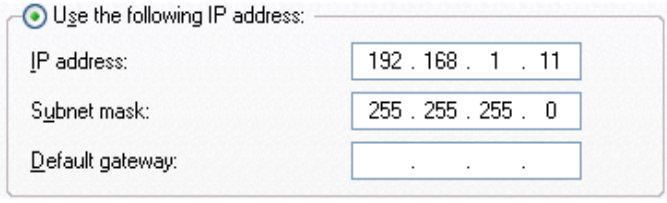
Figure 27: LonWorks Service Pin Location

7.1.1 Instructions to Upload XIF File from ProtoNode FPC-N35 Using Browser

- Connect a Cat-5 Ethernet cable (straight through or cross-over) between the PC and ProtoNode.
- The default IP Address for the ProtoNode is **192.168.1.24**, Subnet Mask is **255.255.255.0**. If the PC and ProtoNode are on different IP networks, assign a static IP Address to the PC on the 192.168.1.xxx network.

For Windows 10:

- Find the search field in the local computer's taskbar (usually to the right of the windows icon) and type in "Control Panel".
- Click "Control Panel", click "Network and Internet" and then click "Network and Sharing Center".
- Click "Change adapter settings" on the left side of the window.
- Right-click on "Local Area Connection" and select "Properties" from the dropdown menu.
- Highlight Internet Protocol Version 4 (TCP/IPv4) and then click the Properties button.
- Select and enter a static IP Address on the same subnet. For example:



- Click the Okay button to close the Internet Protocol window and the Close button to close the Ethernet Properties window.

- Open a web browser and go to the following address: [IP Address of ProtoNode]/fserver.xif
  - Example: 192.168.1.24/fserver.xif
- If the web browser prompts to save the file, save the file onto the PC. If the web browser displays the xif file as a web page, save the file onto the local PC as “fserver.xif”.

```
File: fserver.xif generated by LonDriver Revision 1.30(d), XIF Version 4.0
Copyright (c) 2000-2012 by FieldServer Technologies
All Rights Reserved.  Run on Thu Jan  1 00:00:00 1970

90:00:95:47:1E:02:04:7C
2 15 1 4 0 14 11 3 3 12 14 11 11 11 11 3 0 16 63 0 1 11 4
32 5 19 13 28 0 0 15 5 3 109 63
1 7 1 0 4 4 4 15 200 0
78125 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0 1 5 8 5 12 14 15
*
"FFP-Lon Demo

VAR nviAnalog_01 0 0 0 0
0 1 63 0 0 0 0 0 0 0 0 0 0
*
51 * 1
4 0 4 0 0
VAR nvoAnalog_01 1 0 0 0
0 1 63 1 0 0 0 0 0 0 0 0 0
*
51 * 1
4 0 4 0 0
VAR nviBinary_01 2 0 0 0
0 1 63 0 0 0 0 0 0 0 0 0 0
*
95 * 2
1 0 0 0 0
1 0 0 1 0
VAR nvoBinary_01 3 0 0 0
0 1 63 1 0 0 0 0 0 0 0 0 0
*
95 * 2
1 0 0 0 0
1 0 0 1 0
```

Figure 28: Sample of Fserver.XIF File Generated

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 website's Software Downloads.
- Extract the executable file and complete the installation.

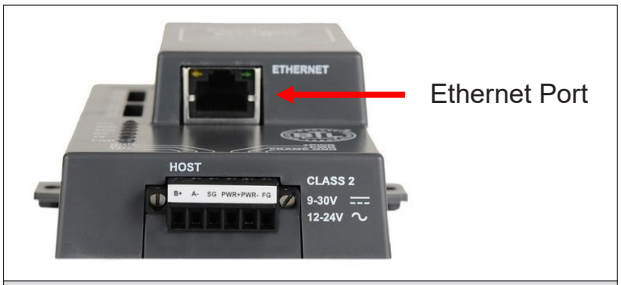
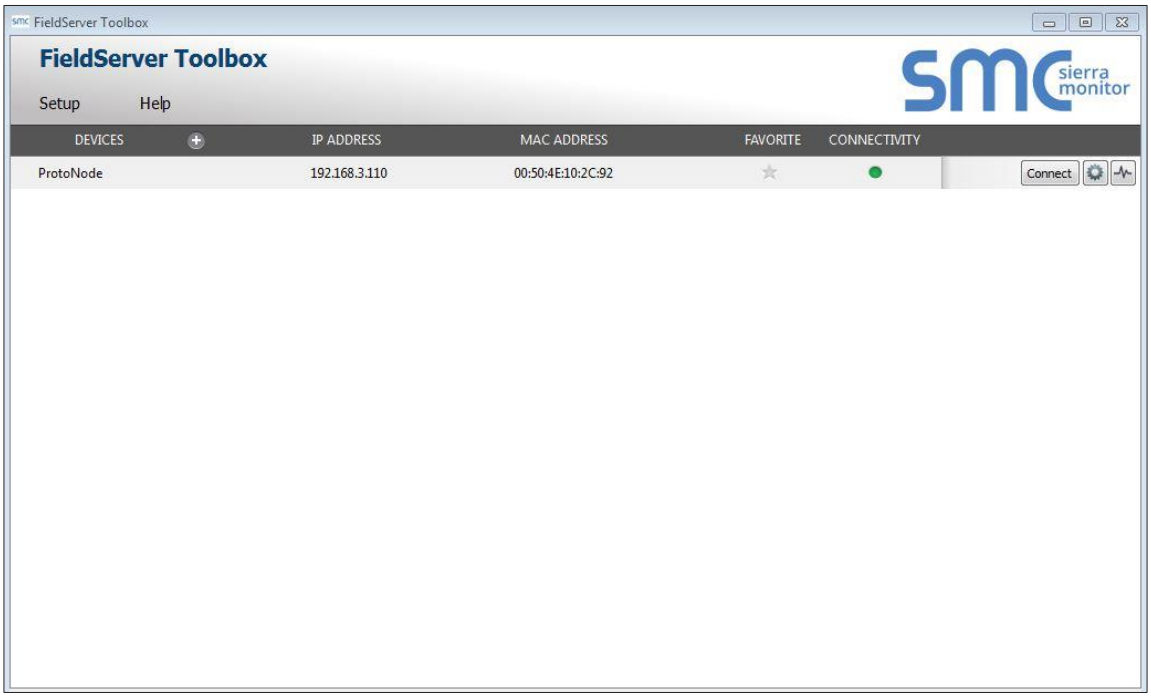


Figure 29: Ethernet Port Location

- Connect a standard Cat-5 Ethernet cable between the user's PC and ProtoNode.
- 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 ProtoNode into the web browser or use the FieldServer Toolbox to connect to the ProtoNode.
- 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.

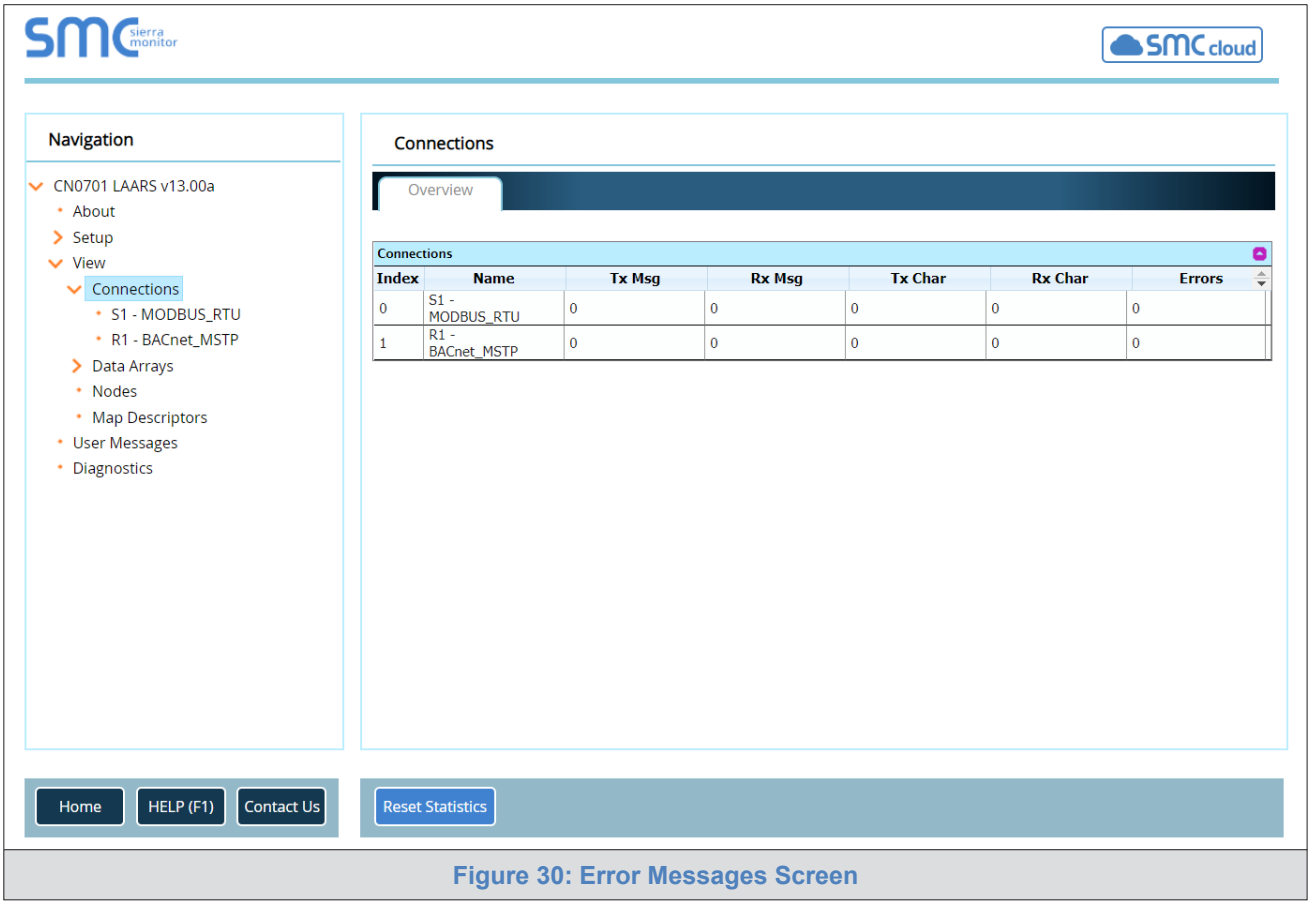


Figure 30: Error Messages Screen

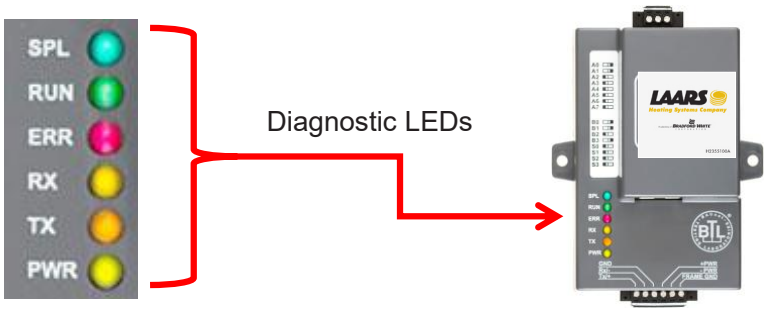
Appendix A.3. Check Wiring and Settings

- No COMS on Modbus RTU side. If the Tx/Rx LEDs are not flashing rapidly then there is a COM issue. To fix this, check the following:
  - Visual observations of LEDs on the ProtoNode (**Appendix A.4**)
  - Check baud rate, parity, data bits, stop bits
  - Check device address
  - Verify wiring
  - Verify device is connected to the same subnet as the ProtoNode
  - Verify the Modbus device(s) were listed in the Web Configurator (**Section 6**)
- Field COM problems:
  - If Ethernet protocols are used, observe Ethernet LEDs on the ProtoNode (**Appendix A.4**)
  - Check dipswitch settings (using correct baud rate and device instance)
  - Verify IP Address setting
  - Verify wiring

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

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

See the diagram below for ProtoNode FPC-N34 and FPC-N35 LED Locations.



Tag	Description
SPL	The SPL LED will light if the unit is not getting a response from one or more of the configured devices. **For LonWorks units**, LED will light until the unit is commissioned on the LonWorks network.
RUN	The RUN LED will start flashing 20 seconds after power indicating normal operation.
ERR	A steady red light will indicate there is a system error on the unit. If this occurs, immediately report the related “system error” shown in the error screen of the FS-GUI interface to support for evaluation.
RX	The RX LED will flash when a message is received on the serial port on the 6-pin connector. **If the serial port is not used,** this LED is non-operational.
TX	The TX LED will flash when a message is sent on the serial port on the 6-pin connector. **If the serial port is not used,** this LED is non-operational.
PWR	This is the power light. It should always show a steady green light when powered.

Figure 31: Diagnostic LEDs

Appendix A.5. Take a FieldServer Diagnostic Capture

When there is a problem on-site that cannot easily be resolved, perform a diagnostic capture before contacting support so that support can quickly solve the problem. There are two methods for taking diagnostic captures:

- **FieldServer Toolbox:**
  This method requires installation of the FS Toolbox program. A FS Toolbox diagnostic capture takes a snapshot of the loaded configuration files and a log of all the communications on the serial ports over a specified period of time. If the problem occurs over an Ethernet connection, then take a Wire Shark capture.
- **Gateway's FS-GUI Page:**
  This method doesn't require downloading software. The diagnostic capture utilities are embedded in the FS-GUI web interface. Starting a diagnostic capture takes a snapshot of the loaded configuration files and a log of all the communications over a specified period of time. This works for both serial and Ethernet connections.

NOTE: The information in the zipped files contains everything support needs to quickly resolve problems that occur on-site.

Appendix A.5.1. Using the FieldServer Toolbox

Once the Diagnostic Capture is complete, email it to technical support. 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 website's Software Downloads.
- Extract the executable file and complete the installation.

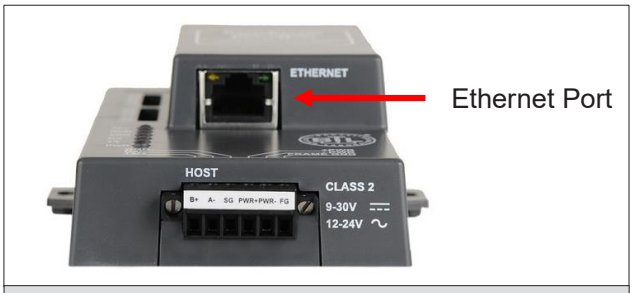
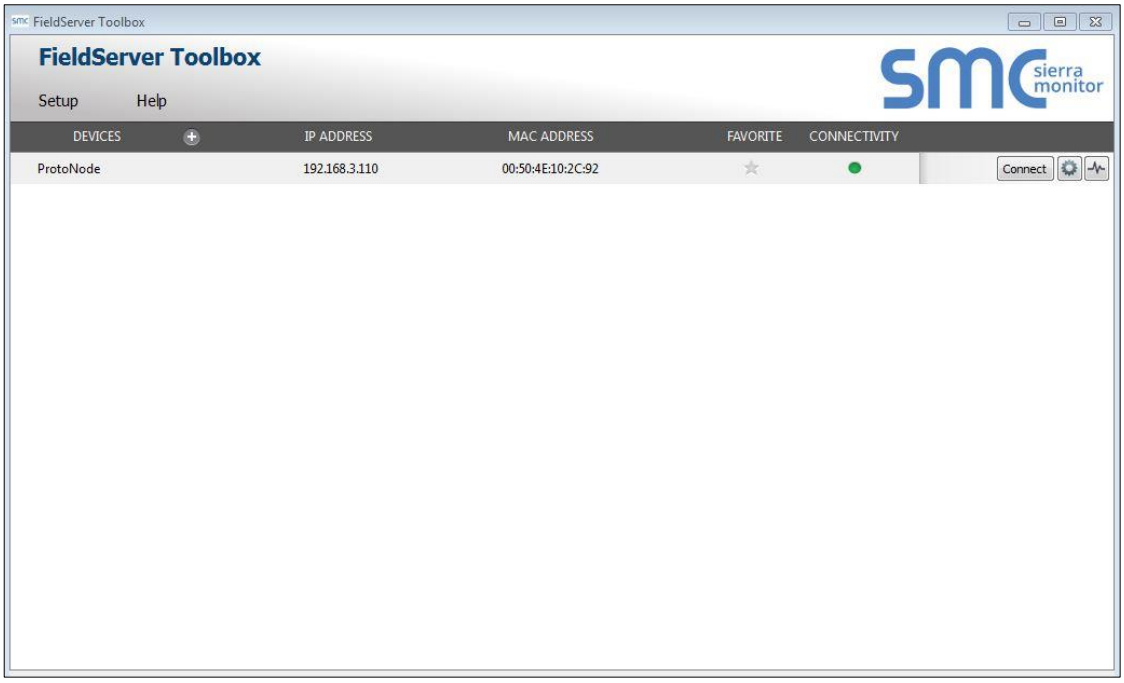


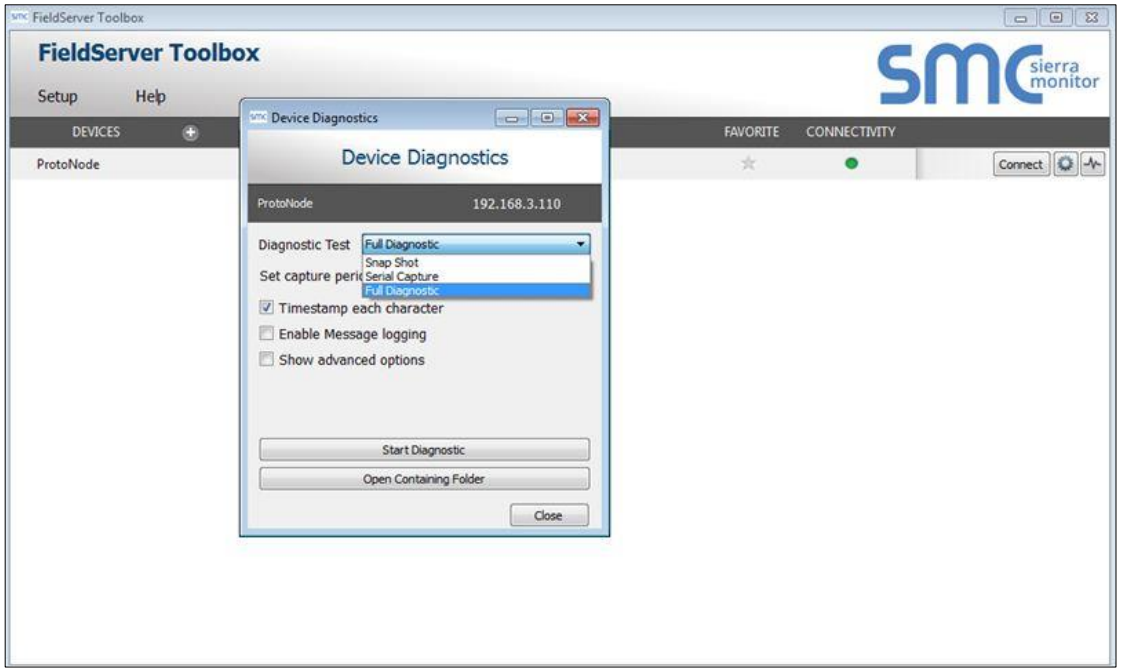
Figure 32: Ethernet Port Location

- Connect a standard Cat-5 Ethernet cable between the PC and ProtoNode.
- Double click on the FS Toolbox Utility.

- **Step 1:** Take a Log
  - Click on the diagnose icon  of the desired device

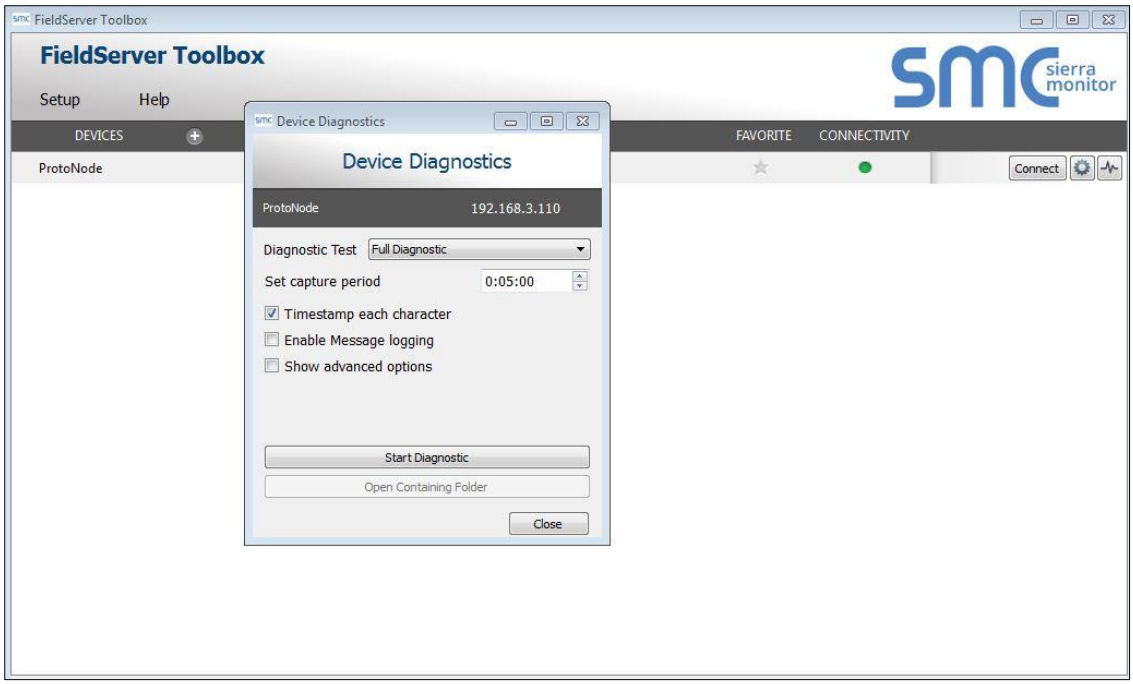


  - Ensure “Full Diagnostic" is selected (this is the default)



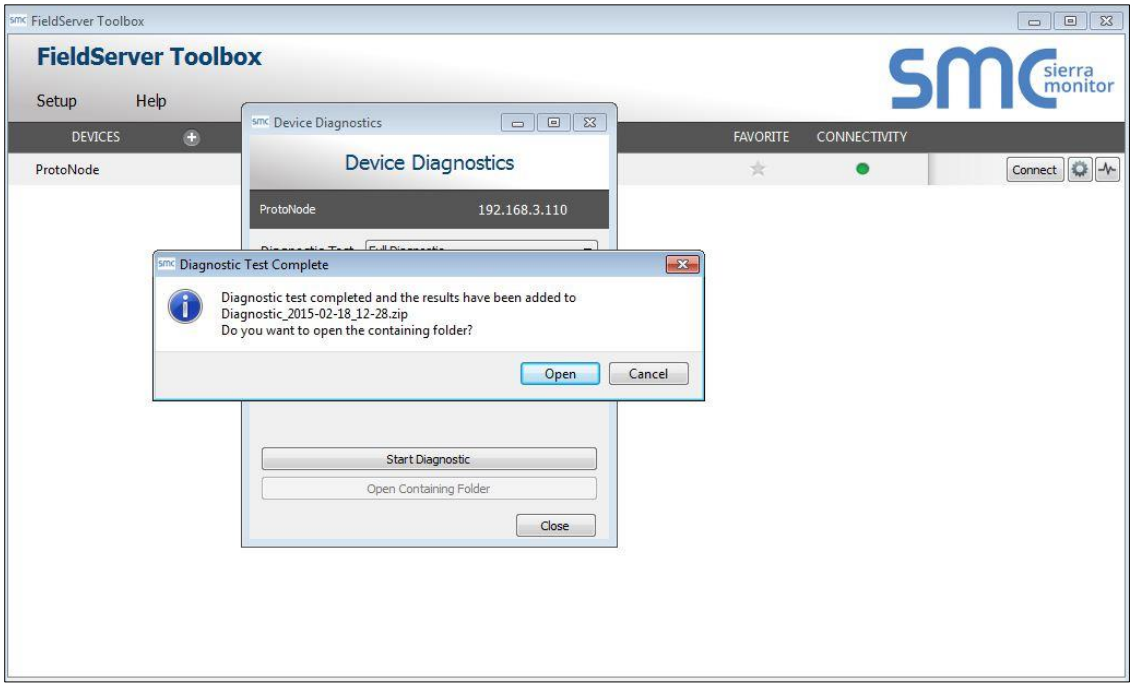
NOTE: If desired, the default capture period can be changed.

- Click on “Start Diagnostic”



- When the capture period is finished, 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



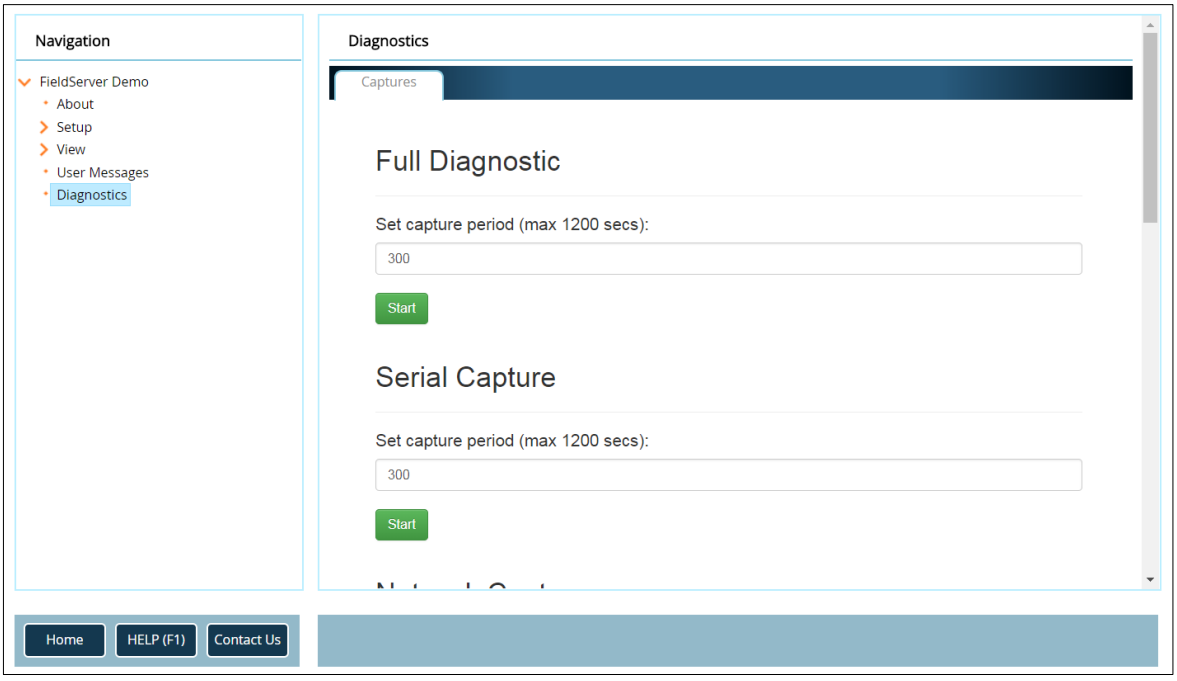
  - Choose “Open” to launch explorer and have it point directly at the correct folder
  - Send the diagnostic zip file to technical support

Appendix A.5.2. Using FS-GUI

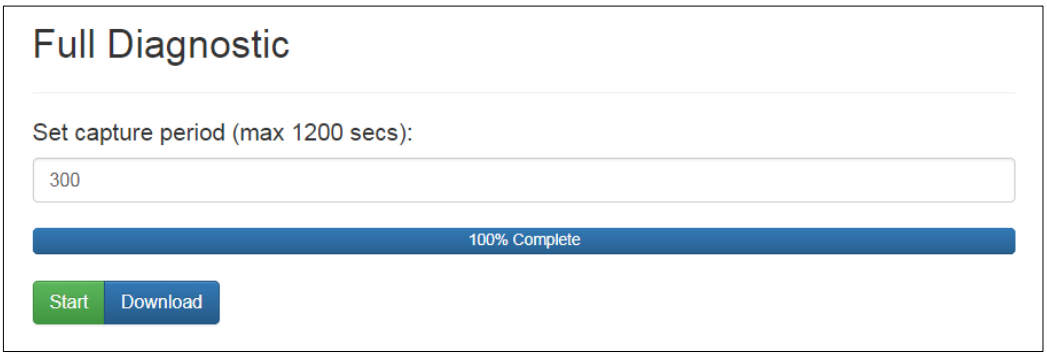
Diagnostic Capture via FS-GUI is only available on FieldServers with a bios updated/released on November 2017 or later. Completing a Diagnostic Capture through the FieldServer allows network connections (such as Ethernet and Wi-Fi) to be captured.

Once the Diagnostic Capture is complete, email it to technical support. The Diagnostic Capture will accelerate diagnosis of the problem.

- Open the FieldServer FS-GUI page.
- Click on Diagnostics in the Navigation panel.



- Go to Full Diagnostic and select the capture period.
- Click the Start button under the Full Diagnostic heading to start the capture.
  - When the capture period is finished, a Download button will appear next to the Start button



- Click Download for the capture to be downloaded to the local PC.
- Send the diagnostic zip file to technical support.

NOTE: Diagnostic captures of BACnet MS/TP communication are output in a ".PCAP" file extension which is compatible with Wireshark.

Appendix B. Additional Information

Appendix B.1. Update 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.
   - Default IP Address is 192.168.1.24
   - 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 "General" tab
5. In the General tab, click on "Choose Files" and select the web.img 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 B.2. BACnet: Setting Network_Number for More Than One ProtoNode on the Subnet

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

On the main Web Configuration screen, update the BACnet Network Number field and click submit. The default value is 50.

Figure 33: Web Configurator – Network Number Field

Appendix B.3. Securing ProtoNode with Passwords

Access to the ProtoNode can be restricted by enabling a password on the FS-GUI Passwords page – click Setup and then Passwords in the navigation panel. There are 2 access levels defined by 2 account names: Admin and User.

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

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 email the password recovery token to technical support to receive a temporary password from the support team. Access the ProtoNode to set a new password.

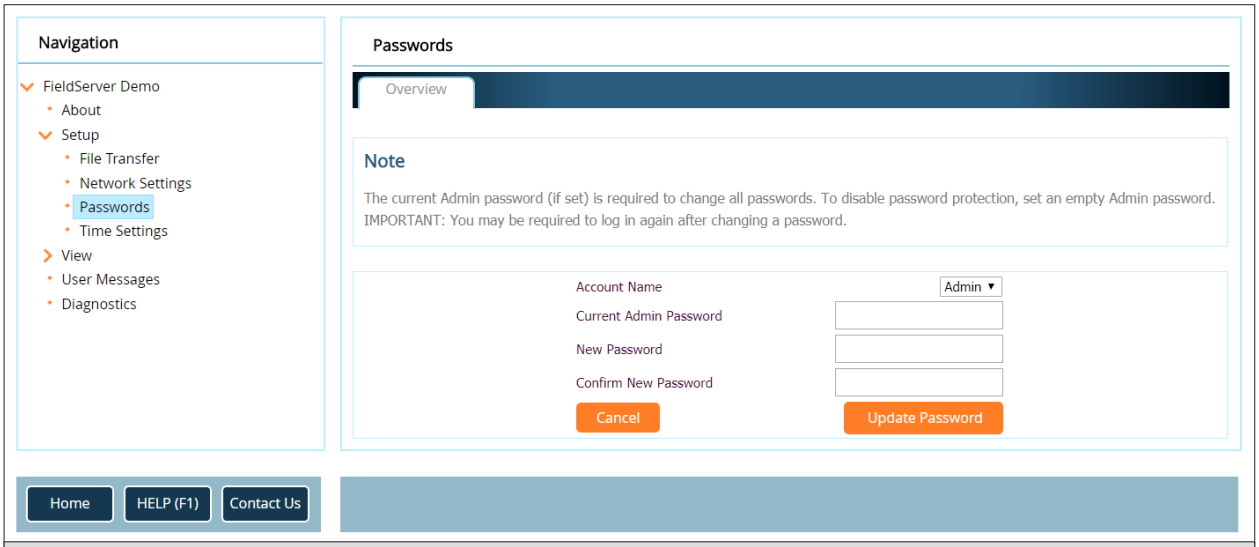


Figure 34: FS-GUI Passwords Page

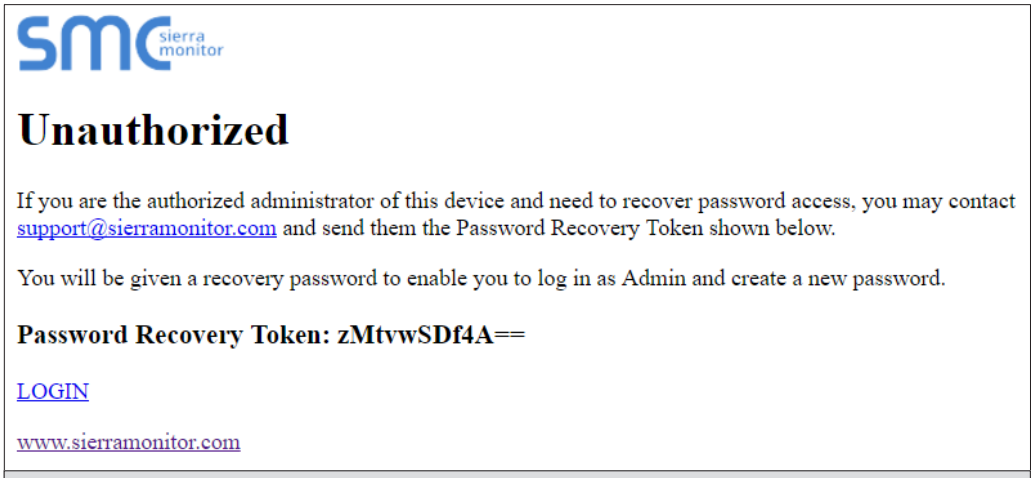


Figure 35: Password Recovery Page

Appendix C. Vendor Information – LAARS

See the document “LAARS Vendor Mappings” for the complete point list for all the LAARS devices referenced in this manual. Only the protocols listed as supported for this FieldServer are supported (see **Section** 2.1). Ignore all points referring to unsupported protocols when using this FieldServer.

Appendix D. Reference

Appendix D.1. Specifications

	ProtoNode FPC-N34	ProtoNode FPC-N35
Electrical Connections	One 6-pin Phoenix connector with: RS-485 port (+ / - / gnd) Power port (+ / - / Frame-gnd) One 3-pin Phoenix connector with RS-485 port (+ / - / gnd) One Ethernet 10/100 BaseT port	One 6-pin Phoenix connector with: RS-485 port (+ / - / gnd) Power port (+ / - / Frame-gnd) One 2-pin Phoenix connector with: One FTT-10 LonWorks port One Ethernet 10/100 BaseT port
Approvals	CE certified; UL 916 approved; WEEE compliant; EN 60950-1, EN 50491-3 and CSA C22-2 standards; FCC Class A Part 15; DNP 3.0 conformance tested; RoHS compliant; CSA 205 approved	
	BTL Marked	LonMark Certified
Power Requirements	9-30VDC or 12 - 24VAC	
Physical Dimensions	11.5 cm L x 8.3 cm W x 4.1 cm H (4.5 x 3.2 x 1.6 in.)	
Weight	0.2 kg (0.4 lbs)	
Operating Temperature	-40°C to 75°C (-40°F to167°F)	
Surge Suppression	EN61000-4-2 ESD EN61000-4-3 EMC EN61000-4-4 EFT	
Humidity	5 - 90% RH (non-condensing)	
(Specifications subject to change without notice)		

Figure 36: Specifications

Appendix D.1.1. Compliance with UL Regulations

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

- 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 ProtoNode
- 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 E. 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.

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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.