



# Hamilton Engineering

*Innovative Hot Water Solutions*



## ProtoNode FPC-N54 Start-up Guide

**For Interfacing Hamilton Engineering Products:  
BDB-CDB**

**To Building Automation Systems:  
BACnet MS/TP, BACnet/IP, Modbus TCP/IP, Metasys N2 and SMC Cloud**

### APPLICABILITY & EFFECTIVITY

Explains ProtoNode hardware and installation.

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

## Technical Support

Thank you for purchasing the ProtoNode for Hamilton Engineering.

Please call Hamilton Engineering for technical support of the ProtoNode product.

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

Support Contact Information:

Hamilton Engineering, Inc.  
34000 Autry St  
Livonia, MI 48150

Customer Service:  
(734) 419-0200

Email: [sales@hamiltonengineering.com](mailto:sales@hamiltonengineering.com)

Website: [www.hamiltonengineering.com](http://www.hamiltonengineering.com)

## Quick Start Guide

1. Record the information about the unit. (**Section 3.1**)
2. Configure the COM settings for any device to connect to the ProtoNode. (**Section 3.3**)
3. Connect the ProtoNode 3 pin RS-485 R1 port to the RS-485 network connected to each of the devices. (**Section 4.1**)
4. Connect the ProtoNode 3 pin RS-485 R2 port to the field protocol cabling. (**Section 4.2**)
5. Connect power to ProtoNode 3 pin power port. (**Section 4.5**)
6. Connect a PC to the ProtoNode via Ethernet cable. (**Section 5**)
7. Use a web browser to access the ProtoNode Web Configurator page to select the profile of the device attached to the ProtoNode and enter any necessary device information. Once the device is selected, the ProtoNode automatically builds and loads the appropriate configuration. (**Section 6**)

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# 1 CERTIFICATION

## 1.1 BTL Mark – BACnet<sup>®1</sup> Testing Laboratory



BACnet is a registered trademark of ASHRAE. ASHRAE does not endorse, approve or test products for compliance with ASHRAE standards. Compliance of listed products to requirements of ASHRAE Standard 133 is the responsibility of the BTL Testing Laboratory. BTL is a registered trademark of the BTL International.

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](http://www.BACnetInternational.net) for more information about the BACnet Testing Laboratory. Click [here](#) for the BACnet PIC Statement.

<sup>1</sup> BACnet is a registered trademark of ASHRAE

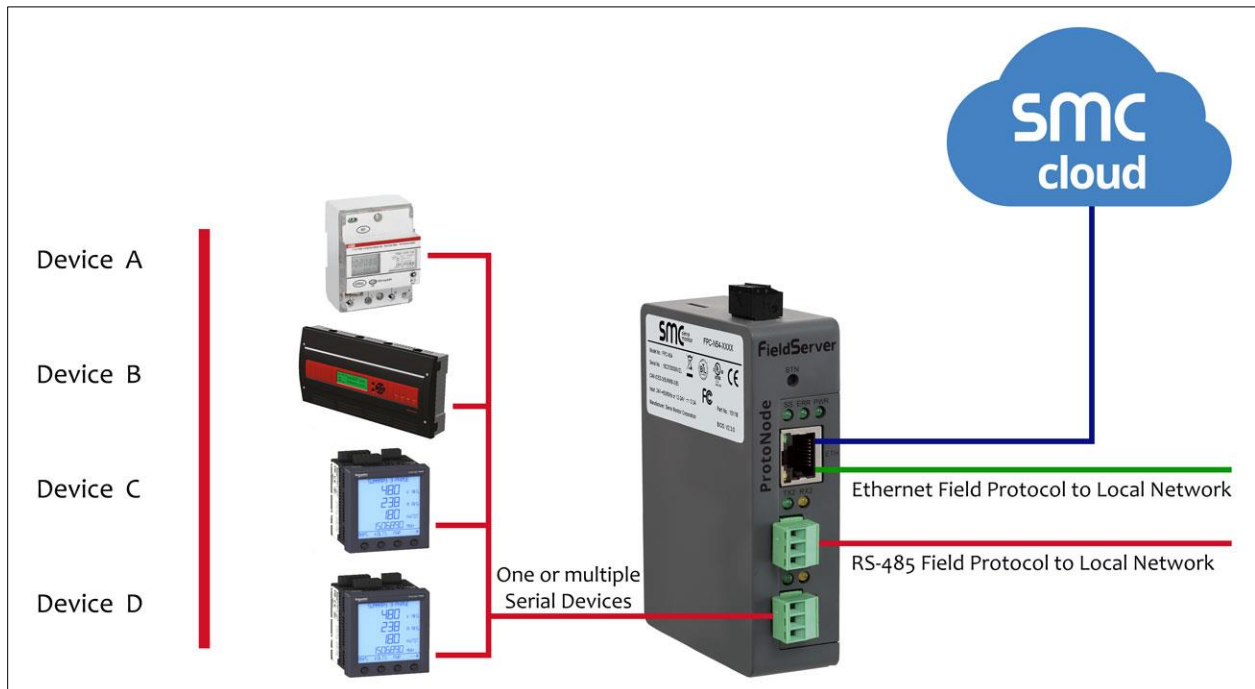
## 2 INTRODUCTION

### 2.1 ProtoNode Gateway

The ProtoNode wireless gateway is an external, high performance **building automation multi-protocol gateway** that is preconfigured to automatically communicate between Hamilton Engineering’s devices (hereafter simply called “device”) connected to the ProtoNode and automatically configures them for BACnet/IP, BACnet MS/TP, Modbus TCP/IP and Metasys<sup>®2</sup> N2 by JCI.

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.

**FPC-N54 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](#).

<sup>2</sup> Metasys is a registered trademark of Johnson Controls Inc.

### 3 PROTONODE SETUP

#### 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-N54-1776

**Figure 1: ProtoNode Part Numbers**

- FPC-N54 units have the following 3 ports: RS-485 + 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-N54-1776	1,500

**Figure 2: Supported Point Count Capacity**

Devices	Registers Per Device
BDB-CDB	99

**Figure 3: Registers per Device**

#### 3.3 Configuring Modbus Device Communications

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

- Any connected serial devices 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	9600
Parity	None
Data Bits	8
Stop Bits	1

**Figure 4: COM Settings**

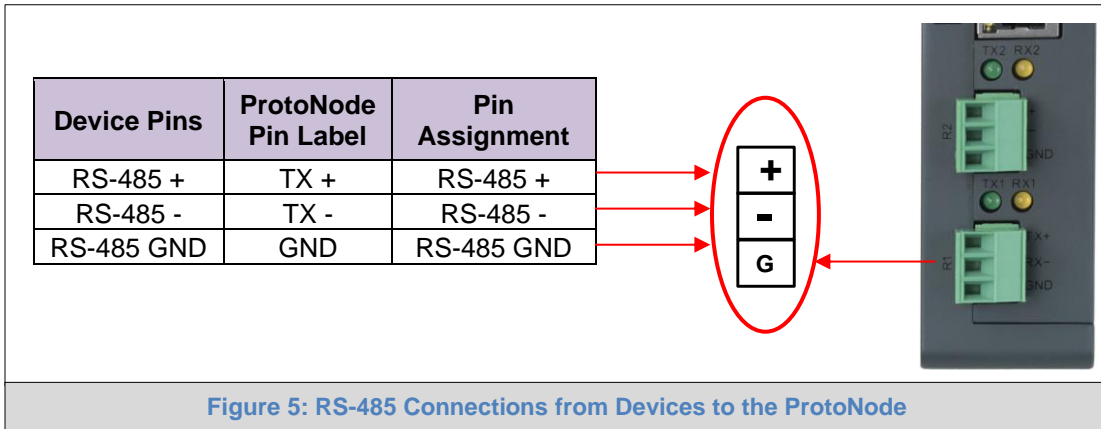


## 4 INTERFACING PROTONODE TO DEVICES

### 4.1 Device Connections to ProtoNode

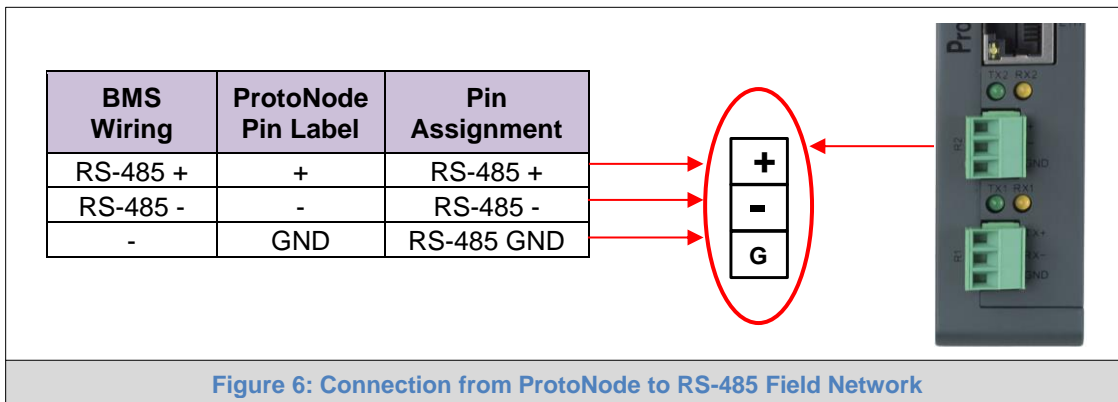
The ProtoNode has a 3-pin Phoenix connector for connecting RS-485 devices on the R1 port.

**NOTE: Use standard grounding principles for RS-485 GND.**



### 4.2 Wiring Field Port to RS-485 Serial Network

- Connect the RS-485 network wires to the 3-pin RS-485 connector on the R2 port. (Figure 6)
  - Use standard grounding principles for RS-485 GND
- See **Section 5** for information on connecting to the Ethernet network.



### 4.3 Bias Resistors

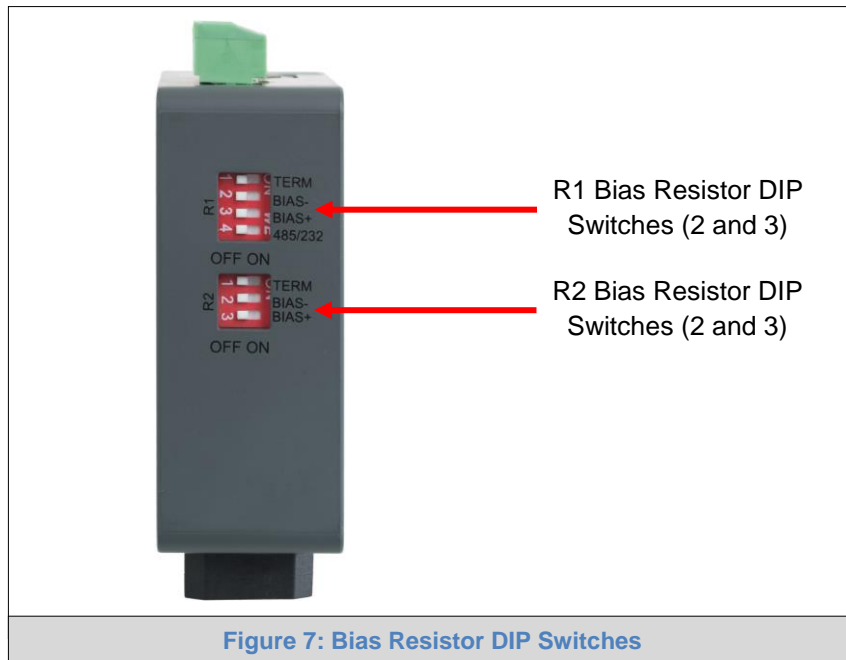


Figure 7: Bias Resistor DIP Switches

To enable Bias Resistors, move both the BIAS- and BIAS+ dip switches to the right in the orientation shown in [Figure 7](#).

The ProtoNode bias resistors are used to keep the RS-485 bus to a known state, when there is no transmission on the line (bus is idling), to help prevent false bits of data from being detected. The bias resistors typically pull one line high and the other low - far away from the decision point of the logic.

The bias resistor is 510 ohms which is in line with the BACnet spec. It should only be enabled at one point on the bus (for example, on the field port were there are very weak bias resistors of 100k). Since there are no jumpers, many gateways can be put on the network without running into the bias resistor limit which is < 500 ohms.

**NOTE:** See [www.ni.com/support/serial/resinfo.htm](http://www.ni.com/support/serial/resinfo.htm) for additional pictures and notes.

**NOTE:** The R1 and R2 DIP Switches apply settings to the respective serial port.

**NOTE:** If the gateway is already powered on, DIP switch settings will not take effect unless the unit is power cycled.

## 4.4 Termination Resistor

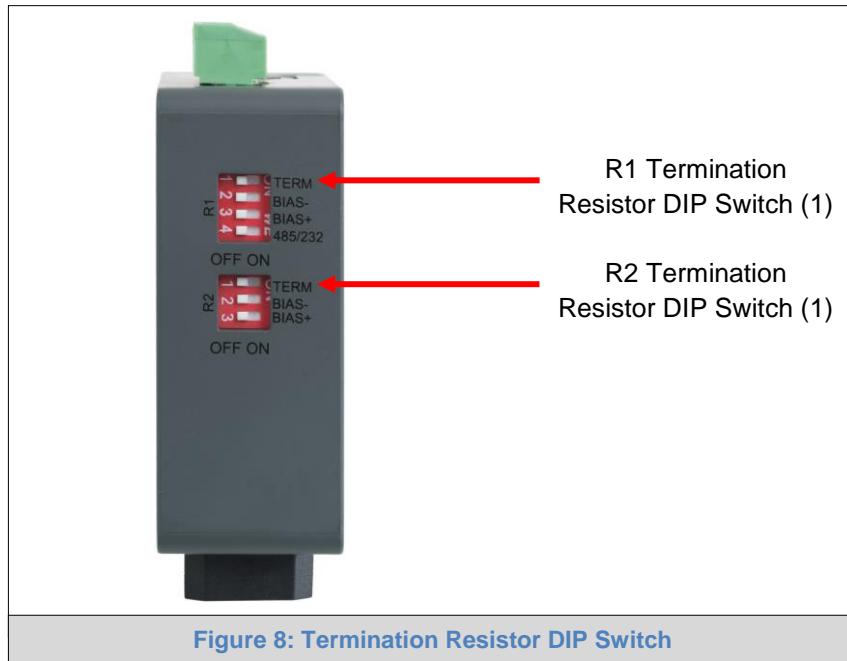


Figure 8: Termination Resistor DIP Switch

If the ProtoNode is the last device on the serial trunk, then the End-Of-Line Termination Switch needs to be enabled. **To enable the Termination Resistor, move the TERM dip switch to the right in the orientation shown in Figure 8.**

Termination resistor is also used to reduce noise. It pulls the two lines of an idle bus together. However, the resistor would override the effect of any bias resistors if connected.

**NOTE: The R1 and R2 DIP Switches apply settings to the respective serial port.**

**NOTE: If the gateway is already powered on, DIP switch settings will not take effect unless the unit is power cycled.**

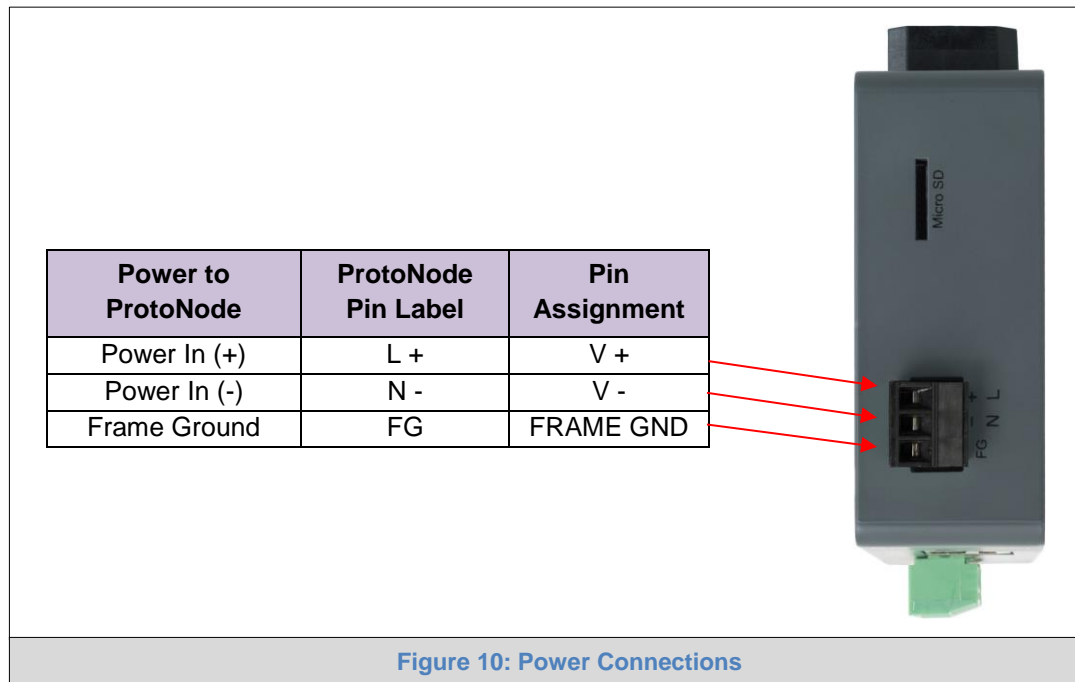
## 4.5 Power-Up ProtoNode

Check power requirements in the table below:

Power Requirement for ProtoNode External Gateway		
	Current Draw Type	
ProtoNode Family	12VDC	24V DC/AC
FPC – N54 (Typical)	250mA	125mA
<b>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.</b>		
Figure 9: Required Current Draw for the ProtoNode		

Apply power to the ProtoNode as shown below in [Figure 10](#). Ensure that the power supply used complies with the specifications provided in [Appendix D.1](#).

- The ProtoNode accepts 12-24VDC or 24VAC on pins L+ and N-.
- **Frame GND should be connected.**



## 5 CONNECT THE PC TO THE PROTONODE

### 5.1 Connecting to the ProtoNode via Ethernet

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

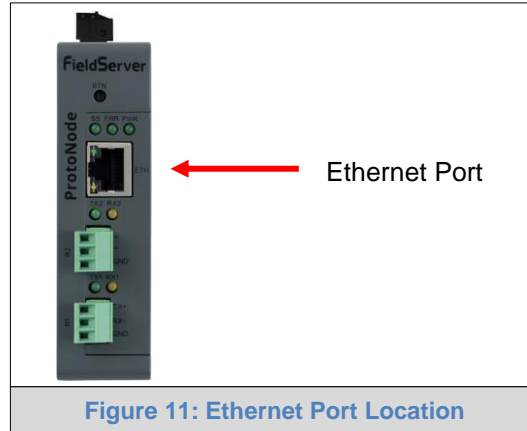


Figure 11: Ethernet Port Location

#### 5.1.1 Enable Access Through the Local Browser


There are two methods to enable access to the ProtoNode in the local browser, either by changing the subnet of the connected PC (Section 5.1.1.1) or using the FieldServer Toolbox to change the IP Address of the ProtoNode (Section 5.1.1.2).

**NOTE: Only perform one method or the other.**

##### 5.1.1.1 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:

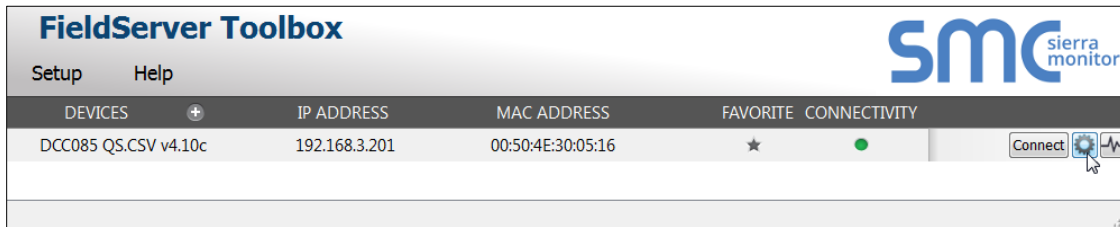
- Find the search field in the local computer’s taskbar (usually to the right of the windows icon ) and type in “Control Panel”.
- Click “Control Panel”, click “Network and Internet” and then click “Network and Sharing Center”.
- Click “Change adapter settings” on the left side of the window.
- Right-click 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.

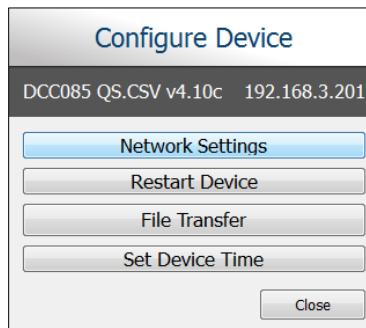
5.1.1.2 Changing the IP Address of the ProtoNode with FieldServer Toolbox

- 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.

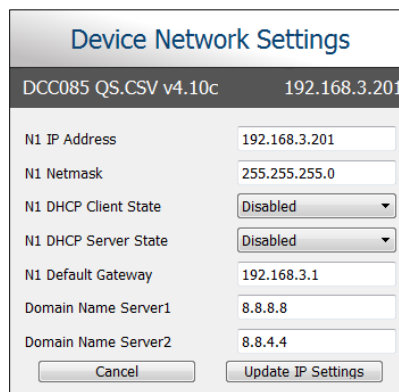
**NOTE: If connectivity status is green, then the IP Address doesn’t need to be changed (the ProtoNode is already on the same subnet). Skip the rest of the section and go to Section 6.**



- 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 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 ProtoNode on the local PC using one of two methods:
  - Open a web browser and enter the IP Address of the ProtoNode; the default Ethernet address is 192.168.1.24
  - If using the FieldServer Toolbox (**Section 5.1.1.2**), click the Connect button

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

### 6.2 Select Field Protocol Configuration

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

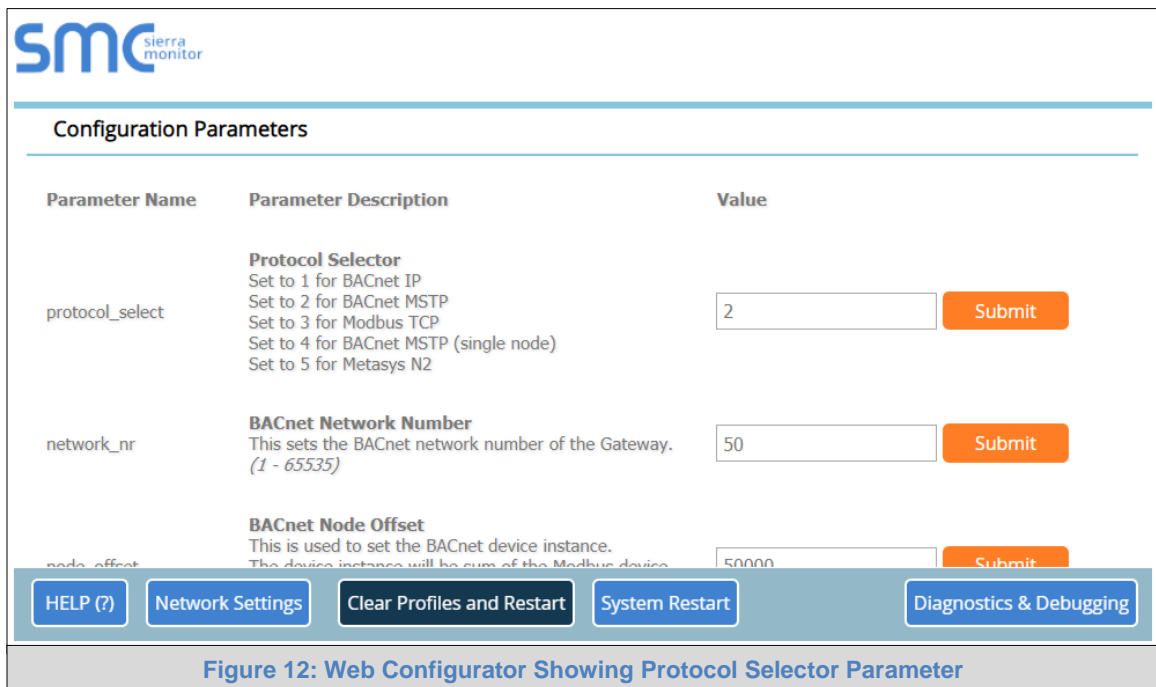


Figure 12: Web Configurator Showing Protocol Selector Parameter

- Select the configuration 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 Modbus TCP/IP was selected for the Field/BMS protocol, skip this section. Device profiles are NOT used for Modbus TCP/IP.**

### 6.3 Setting ProtoNode Configuration Parameters

- 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 13)

The screenshot shows the SMC Web Configurator interface. At the top left is the SMC Sierra Monitor logo. Below it is a section titled "Configuration Parameters" which contains a table of settings. Each row in the table includes a parameter name, a description, a value input field, and a "Submit" button. The parameters listed are: protocol\_select (value 2), network\_nr (value 50), node\_offset (value 50000), bac\_mac\_addr (value 127), bac\_baud\_rate (value 38400), bac\_max\_master (value 127), bac\_cov\_option (value COV\_Disable), and bac\_virt\_nodes (value No). Below the configuration parameters is an "Active profiles" section with a table that has columns for "Nr", "Node ID", "Current profile", and "Parameters". An "Add" button is located below the table. At the bottom of the interface is a navigation bar with buttons for "HELP (?)", "Network Settings", "Clear Profiles and Restart", "System Restart", and "Diagnostics & Debugging".

Parameter Name	Parameter Description	Value
protocol_select	<b>Protocol Selector</b> Set to 1 for BACnet IP Set to 2 for BACnet MSTP Set to 3 for Modbus TCP Set to 4 for BACnet MSTP (single node) Set to 5 for Metasys N2	2
network_nr	<b>BACnet Network Number</b> This sets the BACnet network number of the Gateway. (1 - 65535)	50
node_offset	<b>BACnet Node Offset</b> This is used to set the BACnet device instance. The device instance will be sum of the Modbus device address and the node offset. (0 - 4194303)	50000
bac_mac_addr	<b>BACnet MSTP Mac Address</b> This sets the BACnet MSTP MAC address. (1 - 127)	127
bac_baud_rate	<b>BACnet MSTP Baud Rate</b> This sets the BACnet MSTP baud rate. (9600/19200/38400/76800)	38400
bac_max_master	<b>BACnet MSTP Max Master</b> This sets the BACnet MSTP max master. (1 - 127)	127
bac_cov_option	<b>BACnet COV</b> This enables or disables COVs for the BACnet connection. Use COV_Enable to enable. Use COV_Disable to disable. (COV_Enable/COV_Disable)	COV_Disable
bac_virt_nodes	<b>BACnet Virtual Server Nodes</b> Set to NO if the unit is only converting 1 device to BACnet. Set to YES if the unit is converting multiple devices. (No/Yes)	No

**Active profiles**

Nr	Node ID	Current profile	Parameters
Add			

HELP (?)   Network Settings   Clear Profiles and Restart   System Restart   Diagnostics & Debugging

Figure 13: 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 column.
- Once the Profile for the device has been selected from the drop-down list, enter the value of the device’s Node-ID (32).
- 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 14](#).

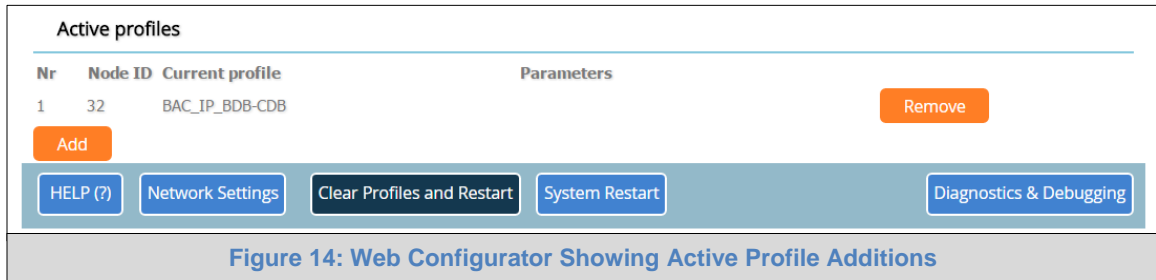


Figure 14: Web Configurator Showing Active Profile Additions

**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.

### 6.3.1 Verify Device Communications

- **Check that the port R1 TX1 and RX1 LEDs are rapidly flashing.** See [Appendix A.4](#) for additional LED information and images.
- Confirm the software shows good communications 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 6.1** to access the ProtoAir Web Configurator.
- The Web Configurator is displayed as the landing page. (**Figure 15**)
- To access the FS-GUI, click on the “Diagnostics & Debugging” button in the bottom right corner of the page.

**Configuration Parameters**

Parameter Name	Parameter Description	Value
protocol_select	<b>Protocol Selector</b> Set to 1 for BACnet IP Set to 2 for BACnet MSTP Set to 3 for Modbus TCP Set to 4 for BACnet MSTP (single node) Set to 5 for Metasys N2	2 <input type="button" value="Submit"/>
network_nr	<b>BACnet Network Number</b> This sets the BACnet network number of the Gateway. (1 - 65535)	50 <input type="button" value="Submit"/>
node_offset	<b>BACnet Node Offset</b> This is used to set the BACnet device instance. The device instance will be sum of the Modbus device address and the node offset. (0 - 4194303)	50000 <input type="button" value="Submit"/>
bac_mac_addr	<b>BACnet MSTP Mac Address</b> This sets the BACnet MSTP MAC address. (1 - 127)	127 <input type="button" value="Submit"/>
bac_baud_rate	<b>BACnet MSTP Baud Rate</b> This sets the BACnet MSTP baud rate. (9600/19200/38400/76800)	38400 <input type="button" value="Submit"/>
bac_max_master	<b>BACnet MSTP Max Master</b> This sets the BACnet MSTP max master. (1 - 127)	127 <input type="button" value="Submit"/>
bac_cov_option	<b>BACnet COV</b> This enables or disables COVs for the BACnet connection. Use COV_Enable to enable. Use COV_Disable to disable. (COV_Enable/COV_Disable)	COV_Disable <input type="button" value="Submit"/>
bac_virt_nodes	<b>BACnet Virtual Server Nodes</b> Set to NO if the unit is only converting 1 device to BACnet. Set to YES if the unit is converting multiple devices. (No/Yes)	No <input type="button" value="Submit"/>

**Active profiles**

Nr	Node ID	Current profile	Parameters
1	32	BAC_MSTP_BDB-CDB	<input type="button" value="Remove"/>

**Figure 15: Web Configurator Screen**

- 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 16)

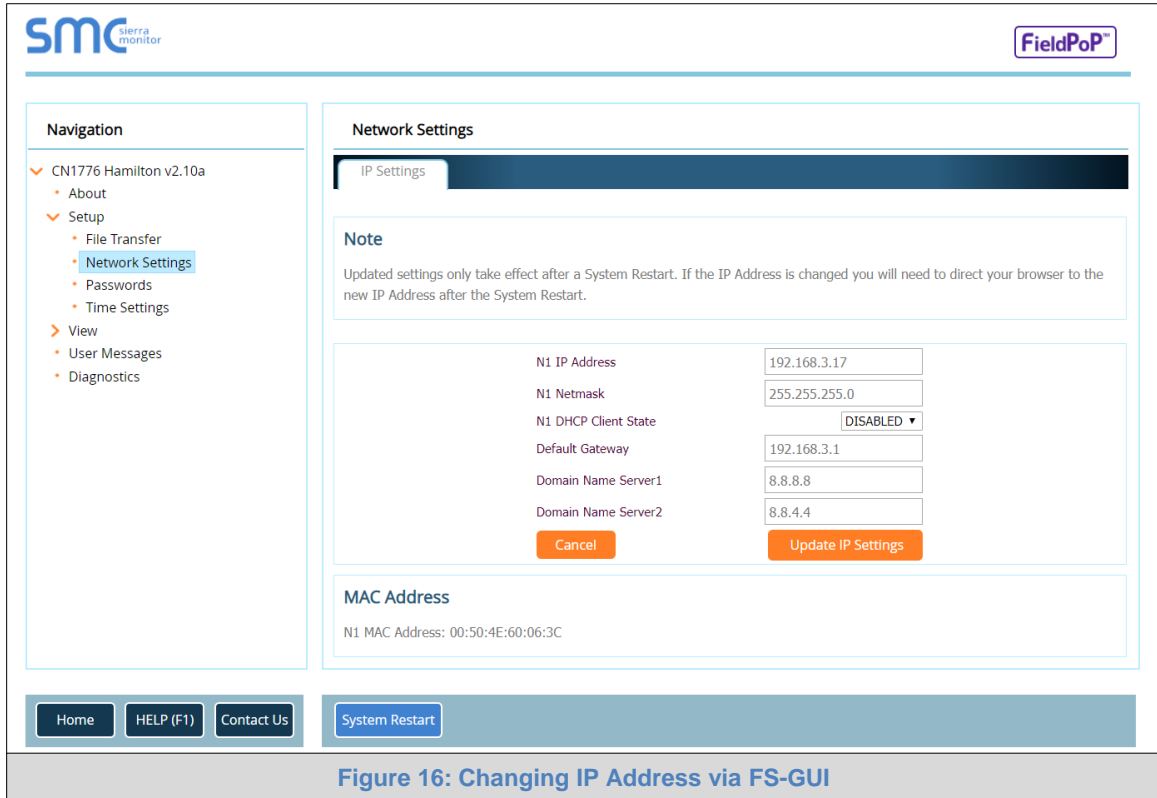



Figure 16: Changing IP Address via FS-GUI

- 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 FieldPoP™ button  (see Figure 16) 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

- Follow the steps outlined in **Section 6.1** to access the ProtoAir Web Configurator.
- 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:

$$\text{Device Instance (desired)} = \text{Node\_Offset} + \text{Node\_ID}$$

For example, if the desired Device Instance for the device is 50,035 and the Node\_ID is 32, plug the device’s information into the formula to find the desired Node\_Offset:

$$50,035 = \text{Node\_Offset} + 32$$

➤ **50,003 = Node\_Offset**

Once the Node\_Offset value is input, it will be applied as shown below:

- Device Instance = 50,003 + Node\_ID = 50,003 + 32 = 50,035

- Click “Submit” once the desired value is entered.

**BACnet Node Offset**  
 This is used to set the BACnet device instance.  
 The device instance will be sum of the node id and the node offset.  
 (0 - 4194303)

node\_offset

Figure 17: Web Configurator Node Offset Field

Active profiles			Parameters
Nr	Node ID	Current profile	
1	32	BAC_IP_BDB-CDB	<input type="button" value="Remove"/>

Figure 18: Active Profiles

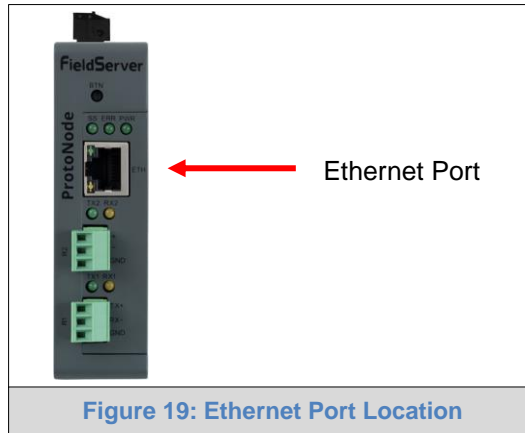
## 6.6 How to Start the Installation Over: Clearing Profiles

- Follow the steps outlined in **Section 6.1** to access the ProtoNode Web Configurator.
- 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.

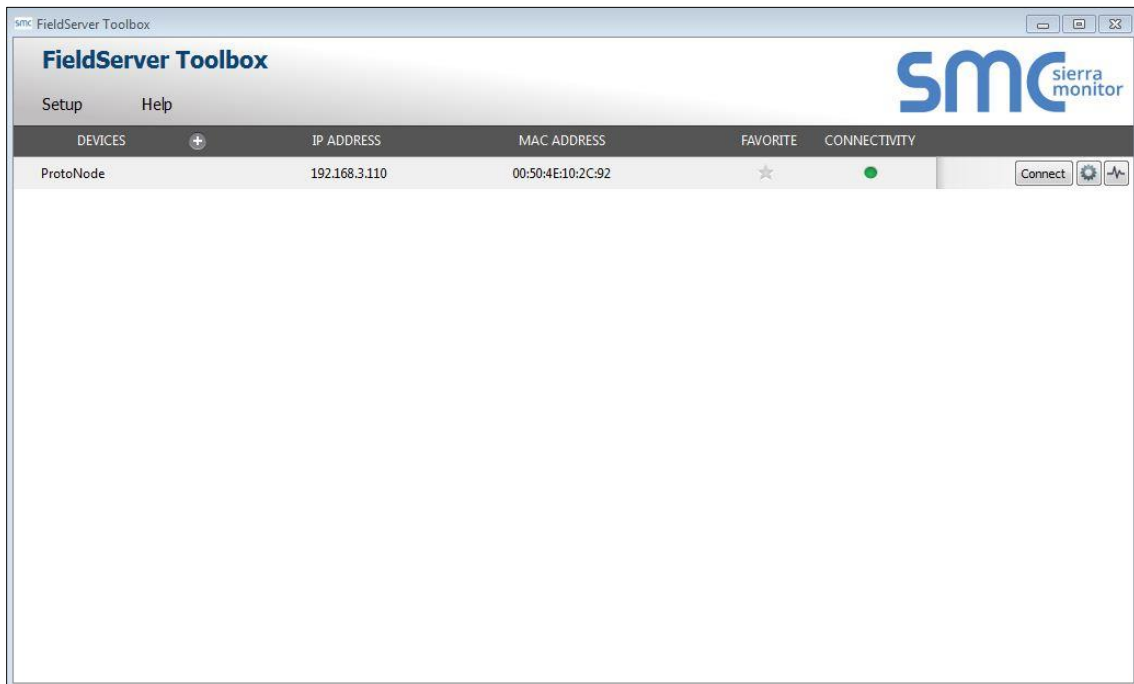
**Appendix A Troubleshooting**


**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.



- 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 Button, then click on view, and then on connections.
- If there are any errors showing on the Connections page, refer to [Appendix A.3](#) to check the wiring and settings.

The screenshot displays the SMC FieldPoP web interface. On the left is a navigation menu under 'View' with 'Connections' selected. The main area shows a 'Connections' table with the following data:

Index	Name	Tx Msg	Rx Msg	Tx Char	Rx Char	Errors
0	R1 - MODBUS_RTU	0	0	0	0	0
1	R2 - BACnet_MSTP	0	0	0	0	0

At the bottom of the interface are buttons for 'Home', 'HELP (F1)', 'Contact Us', and 'Reset Statistics'.

Figure 20: Error Messages Screen

### Appendix A.3 Checking Wiring and Settings

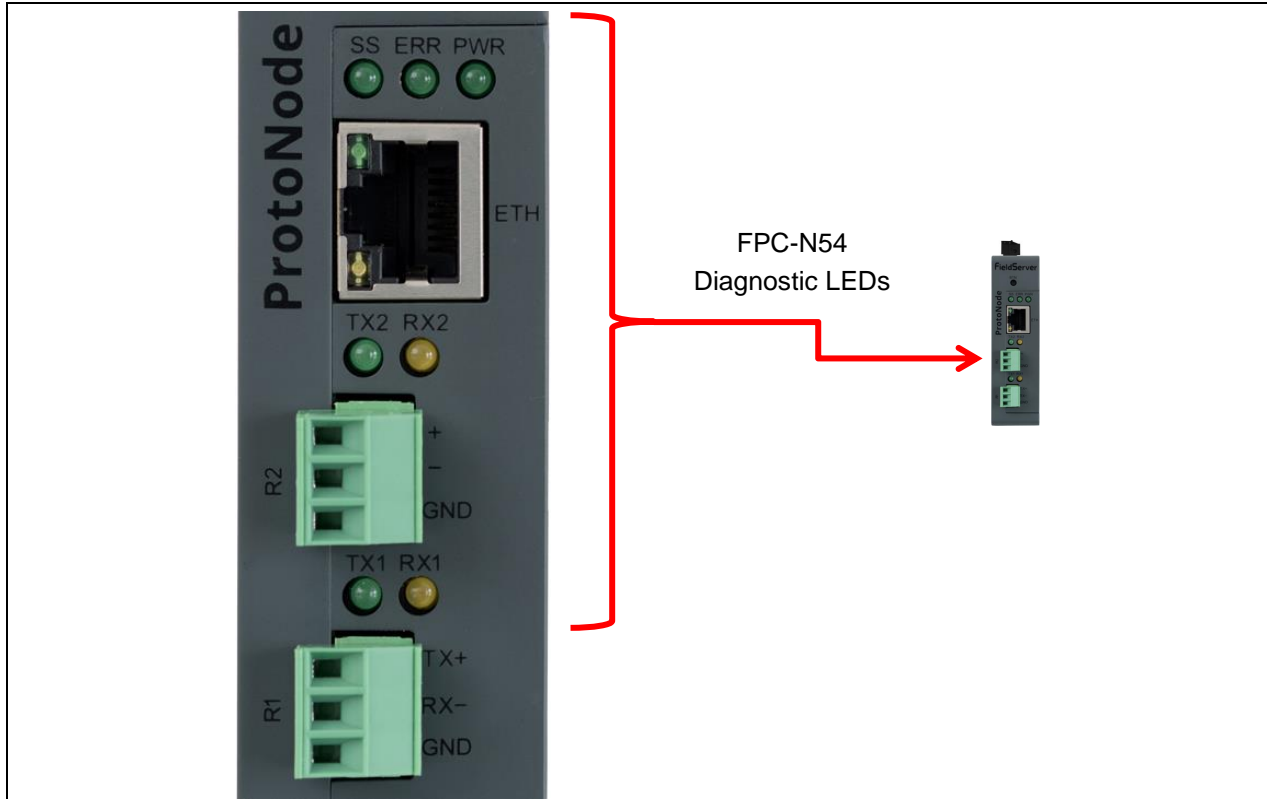
- No COMS on Modbus RTU side. If the Tx/Rx LEDs are not flashing rapidly then there is a COM issue. To fix this, check the following:
  - Visual observations of LEDs on ProtoNode ([Appendix A.4](#))
  - Check baud rate, parity, data bits, stop bits
  - Check Detector ID matches the correct device
  - Verify wiring
  - Verify the device was listed under the Web Configurator Active Profiles ([Section 6](#))
- Field COM problems:
  - Visual observations of LEDs on the ProtoNode ([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 ProtoNode and Devices

See the diagram below for ProtoNode FPC-N54 LED Locations.



Tag	Description
SS	The SS 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 indicating there is a system error. 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 always show steady green when the unit is powered.
RX	The RX LED will flash when a message is received on the serial port on the 3-pin connector. <b>If the serial port is not used, this LED is non-operational.</b> RX1 applies to the R1 connection while RX2 applies to the R2 connection.
TX	The TX LED will flash when a message is sent on the serial port on the 3-pin connector. <b>If the serial port is not used, this LED is non-operational.</b> TX1 applies to the R1 connection while TX2 applies to the R2 connection.

Figure 21: 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.

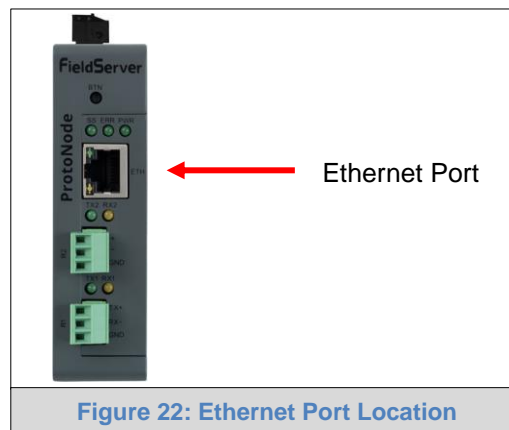
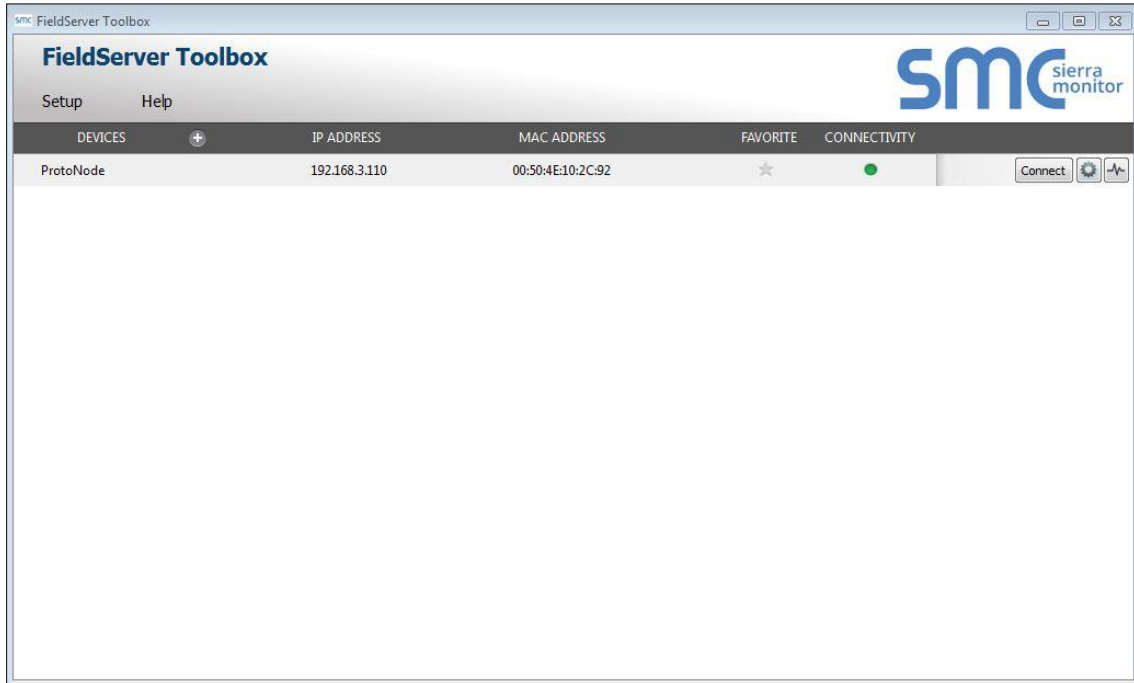


Figure 22: Ethernet Port Location

- 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

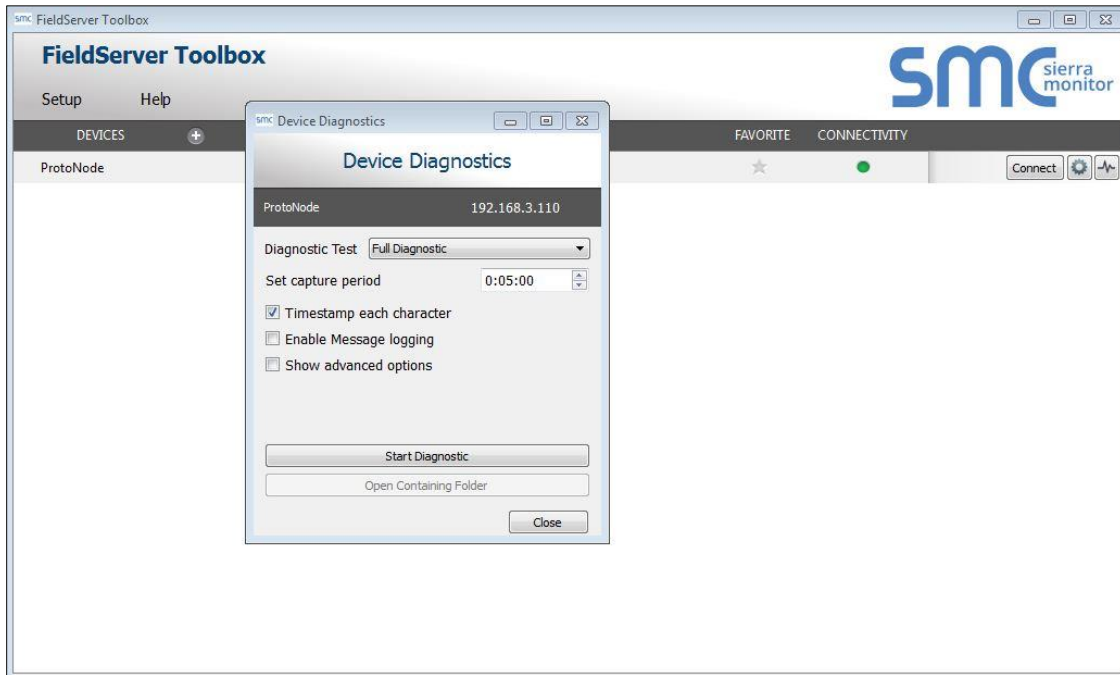


- Ensure "Full Diagnostic" is selected (this is the default)



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

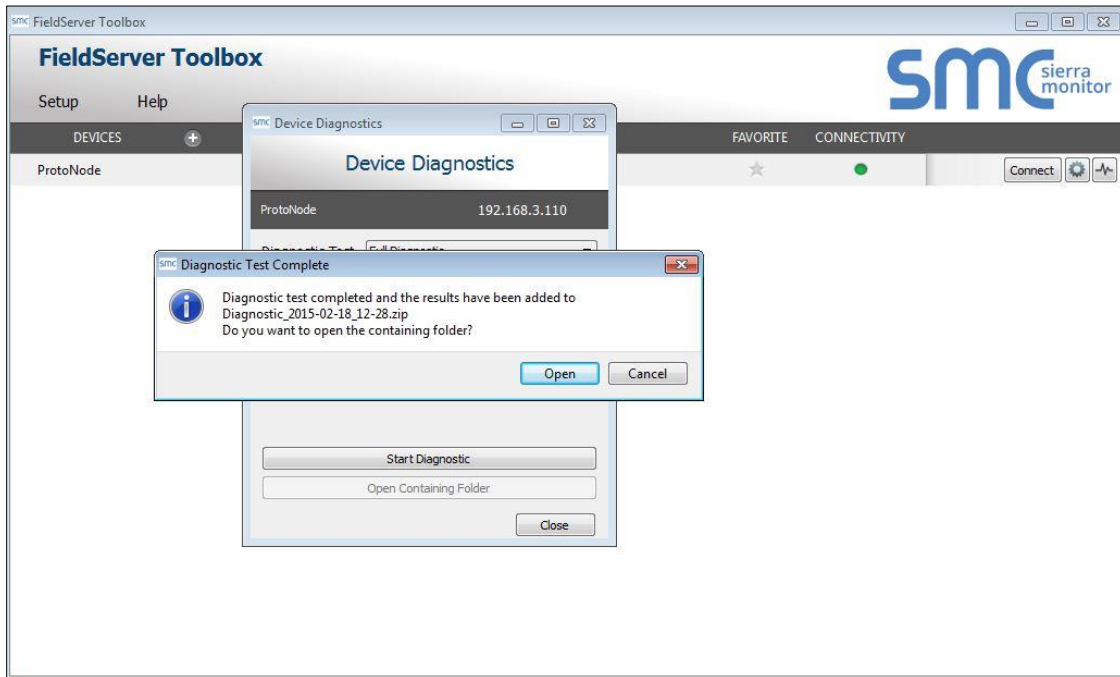
- o Click on “Start Diagnostic”



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

- **Step 2: Send Log**

- o Once the Diagnostic test is complete, a .zip file is saved on the PC



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

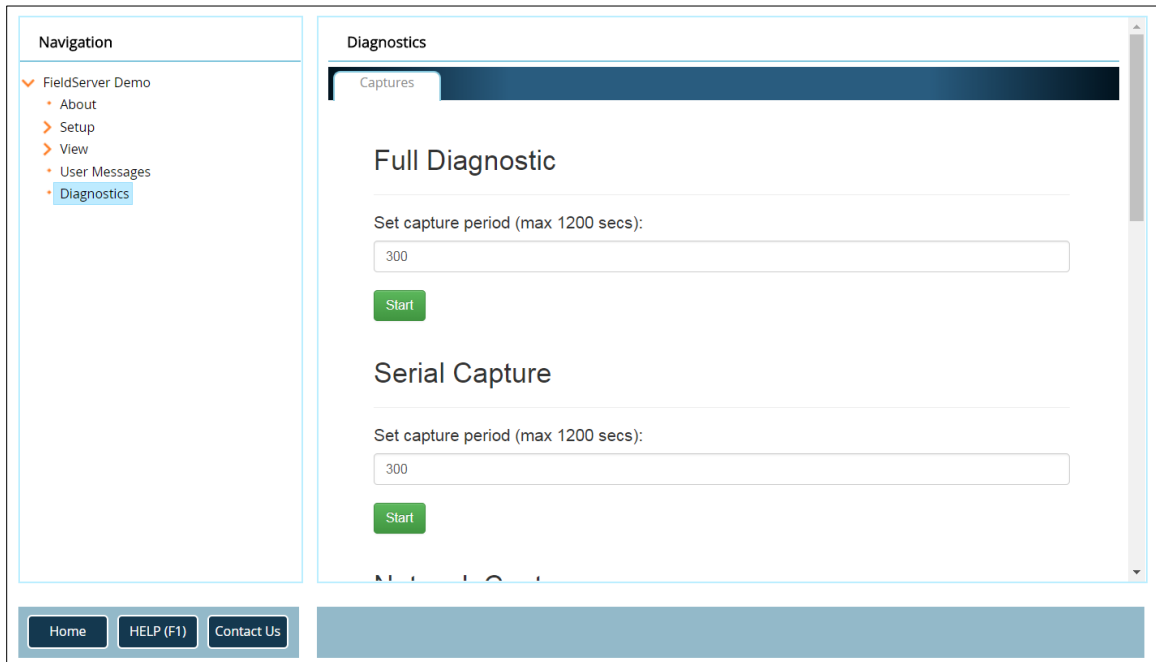


Appendix A.5.2 Using FS-GUI

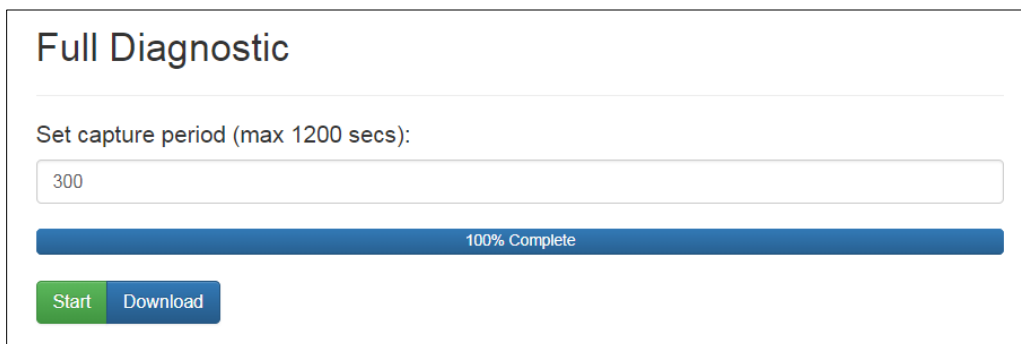
Diagnostic Capture via FS-GUI is only available on FieldServers with a bios updated/released on November 2017 or later. Completing a Diagnostic Capture through the FieldServer allows network connections (such as Ethernet and Wi-Fi) to be captured.

**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.
- Email 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 A.6 Factory Reset Instructions

For instructions on how to reset a FieldServer back to its factory released state, see [ENOTE - FieldServer Next Gen Recovery](#).

## Appendix B Additional Information

### Appendix B.1 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.
  - o Default IP Address is 192.168.1.24
  - o 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 50001.

<code>network_nr</code>	<b>BACnet Network Number</b> This sets the BACnet network number of the Gateway. <i>(1 - 65535)</i>	<input type="text" value="50"/>	<input type="button" value="Submit"/>
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Figure 23: 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 customer support team. Access the ProtoNode to set a new password.

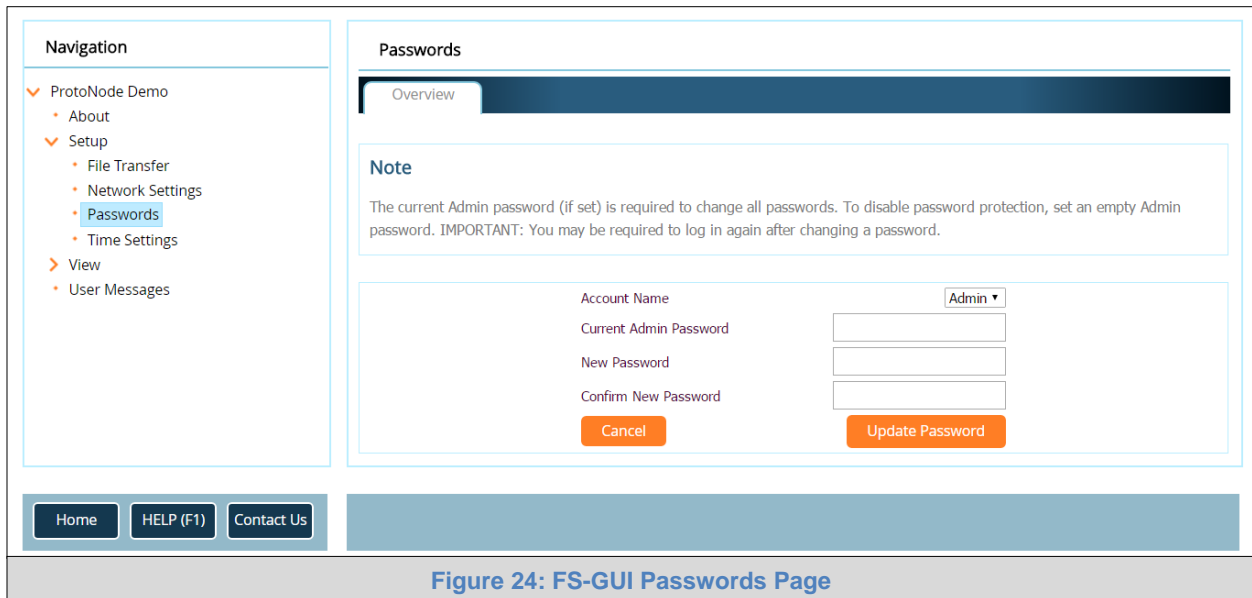


Figure 24: FS-GUI Passwords Page

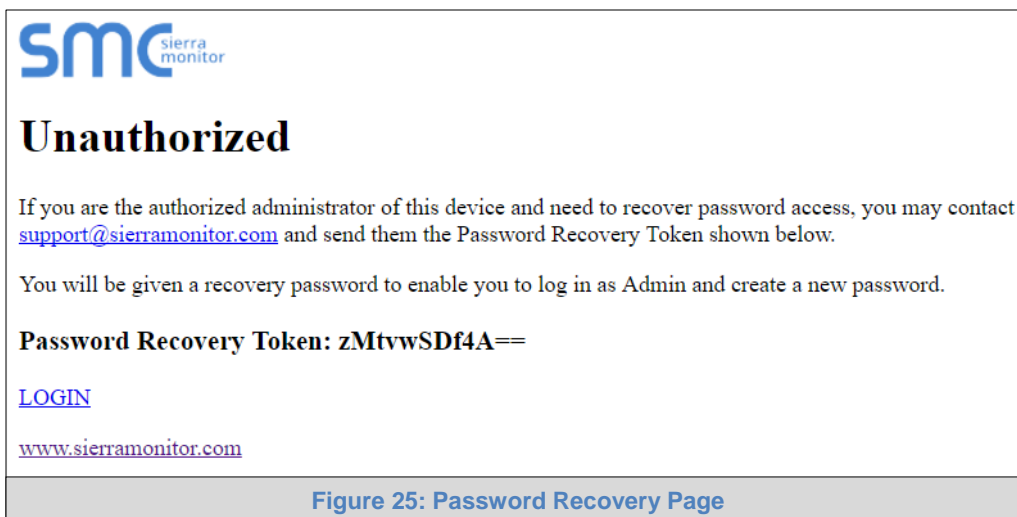
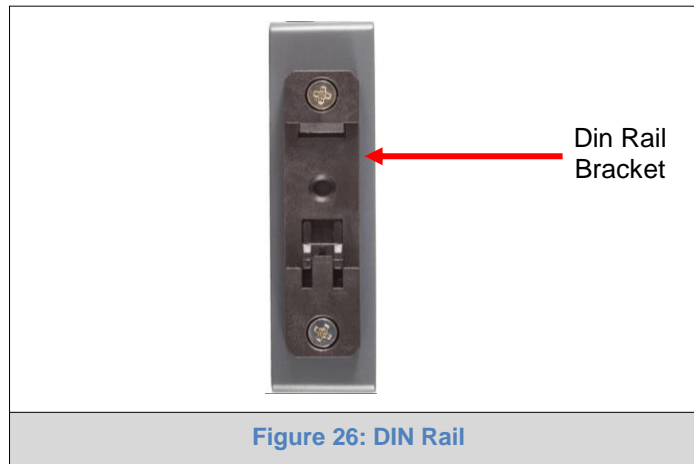


Figure 25: Password Recovery Page



## Appendix B.4 Mounting

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



Appendix B.5 Physical Dimension Drawing

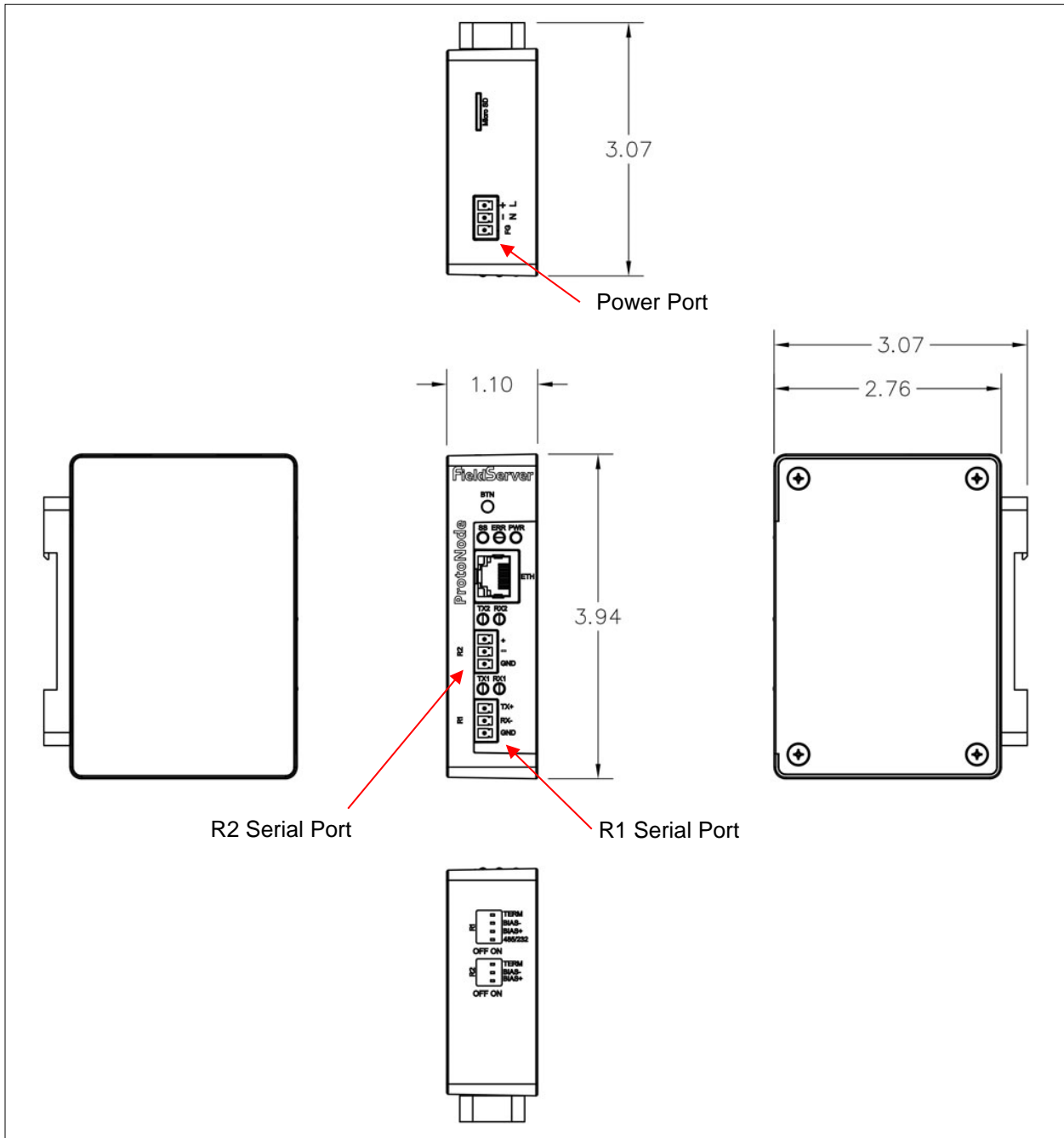


Figure 27: ProtoNode FPC-N54 Dimensions

**Appendix C Vendor Information – Hamilton Engineering**

**NOTE: All Modbus TCP/IP registers are the same as the Modbus RTU registers for the serial device. If this point list is needed, contact technical support. The Modbus TCP/IP node address of the device is also the same as the Modbus RTU node address.**

**Appendix C.1 BDB-CDB Modbus RTU Mappings to BACnet & Metasys N2**

Point Name	BACnet Object Type	BACnet Object ID	N2 Data Type	N2 Address
System Configuration	AI	1	AI	1
CH Requests	AV	2	AO	2
CH SP / CH Offset 1	AV	3	AO	3
CH SP / CH Offset 2	AV	4	AO	4
CH SP / CH Offset 3	AV	5	AO	5
CH SP / CH Offset 4	AV	6	AO	6
CH SP / CH Offset 5	AV	7	AO	7
CH SP / CH Offset 6	AV	8	AO	8
CH SP / CH Offset 7	AV	9	AO	9
CH SP / CH Offset 8	AV	10	AO	10
Boiler For Heating Setpoint	AV	11	AO	11
Dhw SP Temp	AV	12	AO	12
Recirculation SP For Cascade Reg	AV	13	AO	13
Idhw SP Temp	AV	14	AO	14
Boiler For Idhw Load Setpoint	AV	15	AO	15
Ispsa SP Temp	AV	16	AO	16
Boiler For Pool Load Setpoint	AV	17	AO	17
Ipool SP Temp	AV	18	AO	18
Boiler For Spa Load Setpoint	AV	19	AO	19
Cascade Temp Sensors State	AI	20	AI	20
Cascade S1 Temp Sensor Value	AI	21	AI	21
Cascade S2 Temp Sensor Value	AI	22	AI	22
Cascade S3 Temp Sensor Value	AI	23	AI	23
Cascade S4 Temp Sensor Value	AI	24	AI	24
Cascade S5 Temp Sensor Value	AI	25	AI	25
Cascade S6 Temp Sensor Value	AI	26	AI	26
Cascade Anomaly	AI	27	AI	27
BCB1 Temp Sensors State	AI	28	AI	28
BCB1 T1 Temp Sensor Value	AI	29	AI	29
BCB1 T2 Temp Sensor Value	AI	30	AI	30
BCB1 Working Status	AI	31	AI	31
BCB1 Anom Code 1	AI	32	AI	32
BCB1 Anom Code 2 Prefix	MI	33	ADI	33
BCB1 Anom Code 2 Suffix	MI	34	ADI	34
BCB1 Fan Modulation Relative Per	AI	35	AI	35
BCB1 Fan Modulation Absolute Per	AI	36	AI	36
BCB2 Temp Sensors State	AI	37	AI	37
BCB2 T1 Temp Sensor Value	AI	38	AI	38
BCB2 T2 Temp Sensor Value	AI	39	AI	39
BCB2 Working Status	AI	40	AI	40
BCB2 Anom Code 1	AI	41	AI	41
BCB2 Anom Code 2 Prefix	MI	42	ADI	42
BCB2 Anom Code 2 Suffix	MI	43	ADI	43
BCB2 Fan Modulation Relative Per	AI	44	AI	44
BCB2 Fan Modulation Absolute Per	AI	45	AI	45
BCB3 Temp Sensors State	AI	46	AI	46
BCB3 T1 Temp Sensor Value	AI	47	AI	47
BCB3 T2 Temp Sensor Value	AI	48	AI	48
BCB3 Working Status	AI	49	AI	49
BCB3 Anom Code 1	AI	50	AI	50
BCB3 Anom Code 2 Prefix	MI	51	ADI	51
BCB3 Anom Code 2 Suffix	MI	52	ADI	52
BCB3 Fan Modulation Relative Per	AI	53	AI	53
BCB3 Fan Modulation Absolute Per	AI	54	AI	54
BCB4 Temp Sensors State	AI	55	AI	55
BCB4 T1 Temp Sensor Value	AI	56	AI	56
BCB4 T2 Temp Sensor Value	AI	57	AI	57
BCB4 Working Status	AI	58	AI	58

BCB4 Anom Code 1	AI	59	AI	59
BCB4 Anom Code 2 Prefix	MI	60	ADI	60
BCB4 Anom Code 2 Suffix	MI	61	ADI	61
BCB4 Fan Modulation Relative Per	AI	62	AI	62
BCB4 Fan Modulation Absolute Per	AI	63	AI	63
BCB5 Temp Sensors State	AI	64	AI	64
BCB5 T1 Temp Sensor Value	AI	65	AI	65
BCB5 T2 Temp Sensor Value	AI	66	AI	66
BCB5 Working Status	AI	67	AI	67
BCB5 Anom Code 1	AI	68	AI	68
BCB5 Anom Code 2 Prefix	MI	69	ADI	69
BCB5 Anom Code 2 Suffix	MI	70	ADI	70
BCB5 Fan Modulation Relative Per	AI	71	AI	71
BCB5 Fan Modulation Absolute Per	AI	72	AI	72
BCB6 Temp Sensors State	AI	73	AI	73
BCB6 T1 Temp Sensor Value	AI	74	AI	74
BCB6 T2 Temp Sensor Value	AI	75	AI	75
BCB6 Working Status	AI	76	AI	76
BCB6 Anom Code 1	AI	77	AI	77
BCB6 Anom Code 2 Prefix	MI	78	ADI	78
BCB6 Anom Code 2 Suffix	MI	79	ADI	79
BCB6 Fan Modulation Relative Per	AI	80	AI	80
BCB6 Fan Modulation Absolute Per	AI	81	AI	81
BCB7 Temp Sensors State	AI	82	AI	82
BCB7 T1 Temp Sensor Value	AI	83	AI	83
BCB7 T2 Temp Sensor Value	AI	84	AI	84
BCB7 Working Status	AI	85	AI	85
BCB7 Anom Code 1	AI	86	AI	86
BCB7 Anom Code 2 Prefix	MI	87	ADI	87
BCB7 Anom Code 2 Suffix	MI	88	ADI	88
BCB7 Fan Modulation Relative Per	AI	89	AI	89
BCB7 Fan Modulation Absolute Per	AI	90	AI	90
BCB8 Temp Sensors State	AI	91	AI	91
BCB8 T1 Temp Sensor Value	AI	92	AI	92
BCB8 T2 Temp Sensor Value	AI	93	AI	93
BCB8 Working Status	AI	94	AI	94
BCB8 Anom Code 1	AI	95	AI	95
BCB8 Anom Code 2 Prefix	MI	96	ADI	96
BCB8 Anom Code 2 Suffix	MI	97	ADI	97
BCB8 Fan Modulation Relative Per	AI	98	AI	98
BCB8 Fan Modulation Absolute Per	AI	99	AI	99



## **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.