ProtoNode Start-up Guide

FPC-N34, FPC-N35, FPC-N36, FPC-N37, FPC-N38, FPC-N39, FPC-N40, FPC-N41 and FPC-N42

APPLICABILITY & EFFECTIVITY

Effective for all systems manufactured after June 2016.

Document Revision: 1.E

Technical Support

Please call us for any technical support needs related to the FieldServer product.

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1   INTRODUCTION

ProtoNode is an external, high performance, **Building and Industrial Automation multi-protocol gateway** for OEMs wanting to provide protocol translation between Serial and Serial, Serial-Ethernet and Ethernet-Ethernet devices using LonWorks®[1], BACnet®[2], Metasys®[3] N2 by JCI, Modbus, DNP3, and more.

This manual provides installation information for 2 types of customers:

- **OEMs** that have purchased the product to be used with their controllers and have not done a first time start with their controller. When the OEM completes the programming of the ProtoNode with their device, the ProtoNode will be vitually plug and play at the OEMs customer sites.
    - The OEM follows all the steps in this guide to complete the first time start up.

- **End Users** that have purchased the preprogrammed ProtoNode from one of our OEM customers and need some instructions to configure the device.

- The ProtoNode is always pre-configured by the OEM, requiring the end customer to only set of DIP switches to load a configuration file and set the specific network setting of the device.

NOTE: Technical Support for the end-user is provided by the device manufacturer and not Sierra Monitor.

NOTE: For FieldPoP™ information, refer to the FieldPoP™ Device Cloud Start-up Guide online at the Sierra Monitor.com Resource Center.
www.sierramonitor.com/customer-care/resource-center

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[1] LonWorks is a registered trademark of Echelon Corporation
[2] BACnet is a registered trademark of ASHRAE
[3] Metasys is a registered trademark of Johnson Controls Inc.

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2   CERTIFICATION

2.1   BTL Mark – BACnet Testing Laboratory

The BTL Mark on the BACnet Router 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 http://www.BACnetInternational.net/btl/ for more information about the BACnet Testing Laboratory. Click here for BACnet PIC Statement.

2.2   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.

3   BACNET/LONWORKS SETUP THROUGH PROTONODE

3.1   Features

- 10/100BaseT Ethernet LAN interface (auto-sensing)

- Multiple Protocol Support

- Supports multiple configuration files and the ability to automatically load any of the stored files for different OEM controllers or protocols supported.

- **ProtoNode- FPC-N34/N36/N38** – BACnet BTL Marked
  - o   FPC-N34: 2 RS-485 ports and 1 Ethernet port
  - o   FPC-N36: 1 RS-485 port, 1 Ethernet port and 1 RS-422
  - o   FPC-N38: 1 RS-485 port, 1 Ethernet port and 1 RS-232

- **ProtoNode- FPC-N35/N37/N39** – LonMark Certified
  - o   FPC-N35: 1 Ethernet Port, 1 LonWorks port and 1 RS-485 port
  - o   FPC-N36: 1 Ethernet port, 1 LonWorks port and 1 RS-422 port
  - o   FPC-N39: 1 Ethernet Port, 1 LonWorks port and 1 RS-232 port

- **ProtoNode- FPC-N40**
  - o   FPC-N40: 1 RS-485 port, 1 Ethernet port and KNX

- **ProtoNode- FPC-N42**
  - o   FPC-N42: 1 RS-485 port, 1 Ethernet port and M-Bus

3.2   Installation Steps for the Customer

1.   Record the information about the unit. (**Section 3.3**)

2.   Set the A, B, and S DIP Switch banks for Field Protocol baud rate, Node-ID/Device Instance, and proper configuration. (**Section 3.4**)

3.   Connect the ProtoNode to the Field Protocol port and customer's port to the ProtoNode's RS-485 interface. (**Section 4.4**)

4.   Connect Power to ProtoNode. After power up, the device is installed on BACnet MS/TP or Metasys N2.

5.   Where the Field protocol is BACnet/IP or Modbus TCP/IP, refer to **Section 4** to run the ProtoNode Web GUI program to change the IP Address. No changes to the configuration file are necessary.

3.3   Record Identification Data

Each ProtoNode has a unique part number located on the side or the back of the unit. The number format is FPC-N34-XXX-XXX-XXXX. This number should be recorded, as it may be required for technical support.

Part Number: _____

3.4   Configure the DIP Switches

3.4.1   Setting the Node/ID Device Instance (DIP Switch A0 – A7)

- The A Bank DIP switches on the ProtoNode allow users to set the Node-ID/Device Instance on the Field RS-485.

- DIP switches A0 – A7 can also be used to set the MAC Address for BACnet MS/TP and BACnet/IP.

Figure 1: A0 - A7 DIP Switches
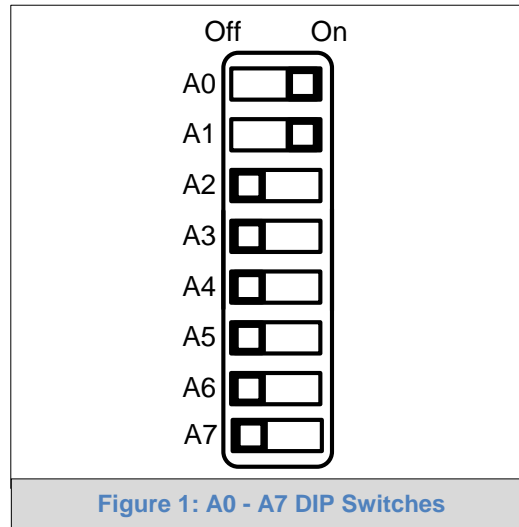
NOTE: When setting DIP Switches, please ensure that power to the board is OFF.

- Refer to **Appendix B.1** for the full range of addresses to set Node-ID/Device Instance.

3.4.2   Setting the Serial Baud Rate (DIP Switch B0 – B3)

- DIP Switches B0 – B3 can be used to set the serial baud rate to match the baud rate provided by the interfaced systems.

- Metasys N2 is always defaulted to 9600 baud and the B bank is disabled.

- "B" bank DIP switches B0 – B3 are disabled on ProtoNode FPC-N35 (LonWorks).

Figure 2: B0 – B3 DIP Switches
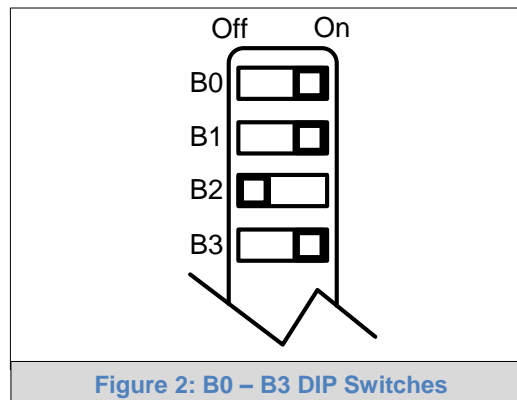
3.4.2.1 Baud Rate Dip Switch Selection

Baud	B0	B1	B2	B3
9600	On	On	On	Off
19200	Off	Off	Off	On
38400*	**On**	**On**	**Off**	**On**
57600	Off	Off	On	On
76800	On	Off	On	On
Figure 3: BMS Baud Rate				

* Factory default setting = 38400

3.4.3 Select and Load Configuration Files

- The S bank of DIP switches, S0 - S3 is used to select and load a configuration file from a group of pretested/preloaded configuration files that the OEM has programmed for their end users.

- End customers will need to go back to the OEM of the device that they are installing to get the DIP settings for the ProtoNode. The ProtoNode part number will need to be provided to identify the unit.

S0 – S3 DIP Switches

S Bank DIP Switch Location

Figure 4: S0 – S3 DIP Switches
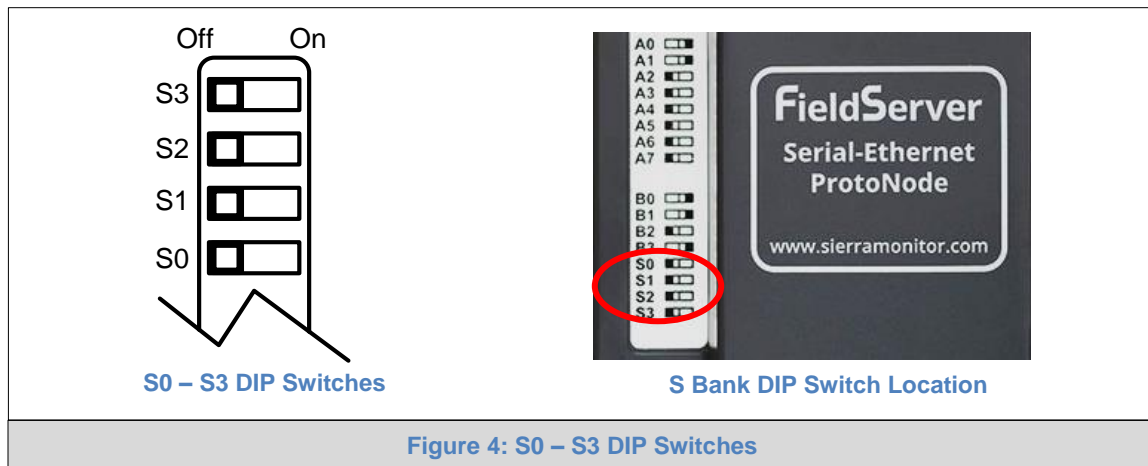
4   INTERFACING PROTONODE TO HOST OEM DEVICE

4.1   ProtoNode FPC-N34 and FPC-N35 Showing Connection Ports
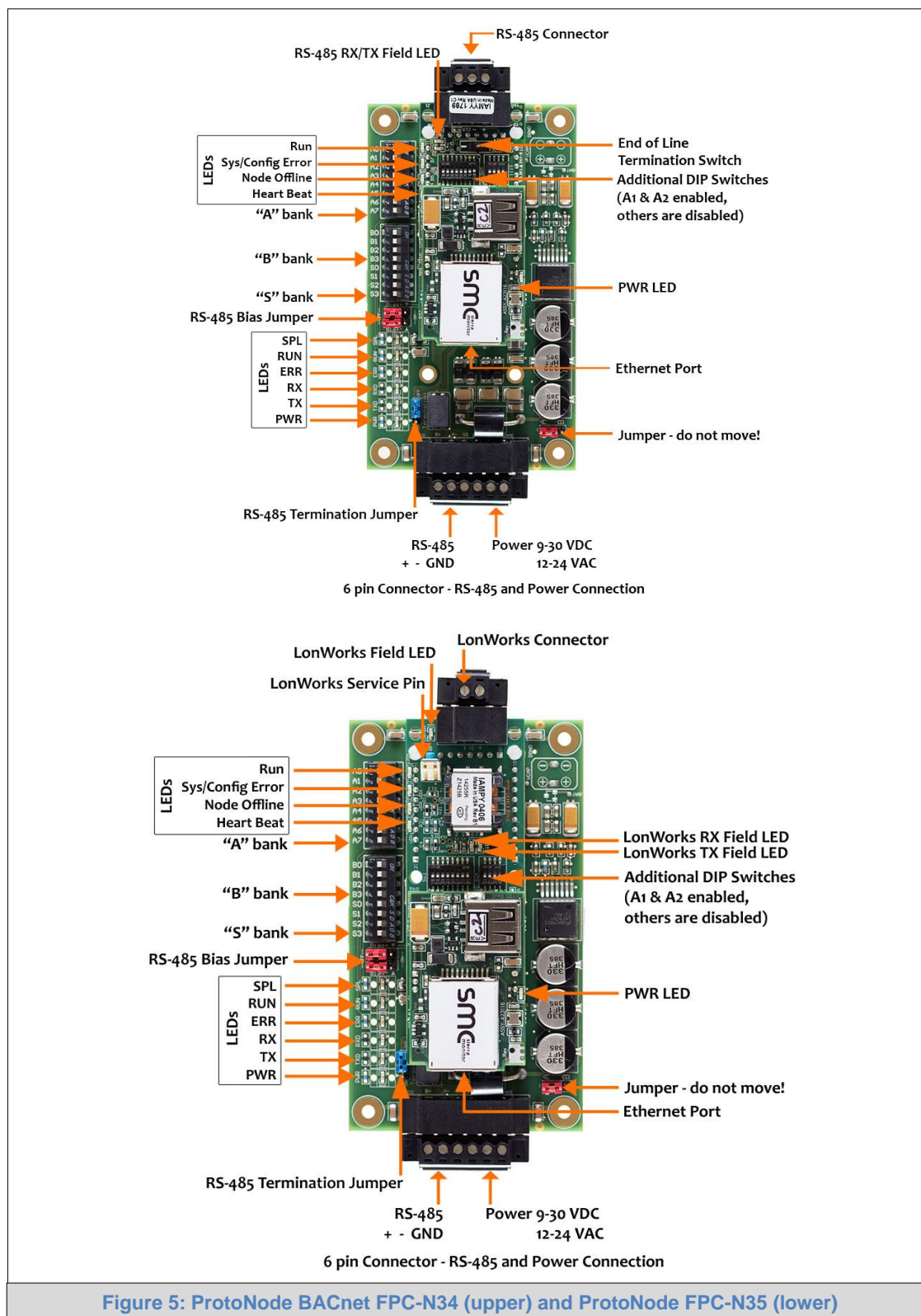
Figure 5: ProtoNode BACnet FPC-N34 (upper) and ProtoNode FPC-N35 (lower)

The top 3 pin port will always be R1, unless it's a LonWorks ProtoNode in which case the port designation is LonWorks (and the port is 2 pins). The bottom 6 pin port will be R2.

NOTE: The 6 pin port can be RS-232, RS-485, RS-422 or KNX (and we use the left 3 pins for this as currently shown).
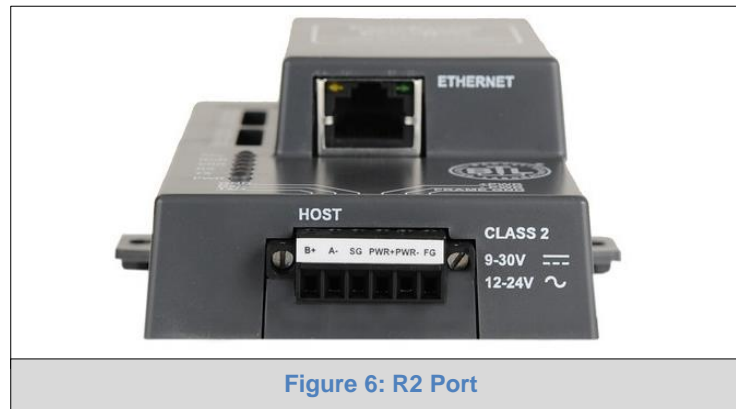
Figure 6: R2 Port

4.2   Device Connections to ProtoNode

ProtoNode 6 Pin Phoenix connector for RS-485 Devices

- The 6 pin Phoenix connector is the same for ProtoNode FPC-N34 (BACnet) and FPC-N35 (LonWorks).

- Pins 1 through 3 are for Modbus RS-485 devices.

    o   The RS-485 GND (Pin 3) is not typically connected

- Pins 4 through 6 are for power. **Do not connect power until Section 4.6**.

Device Pins	ProtoNode Pin #	Pin assignment
Pin RS-485 + / RS-232 Tx	Pin 1	RS-485 + / RS-232 Tx
Pin RS-485 - / RS-232 Rx	Pin 2	RS-485 - /RS-232 Rx
Pin GND	Pin 3	RS-485/RS-232 GND
Power In (+)	Pin 4	V +
Power In (-)	Pin 5	V -
Frame Ground	Pin 6	FRAME GND
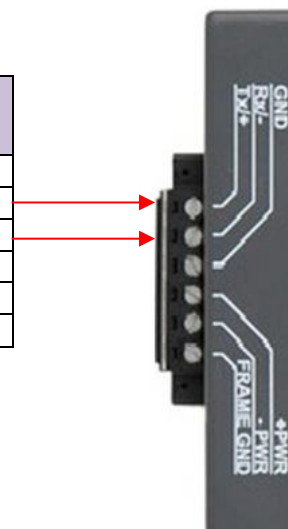
Figure 7: Power and RS-485 Connections

4.3   Resistor and Power Jumper Information

4.3.1 Bias Resistors
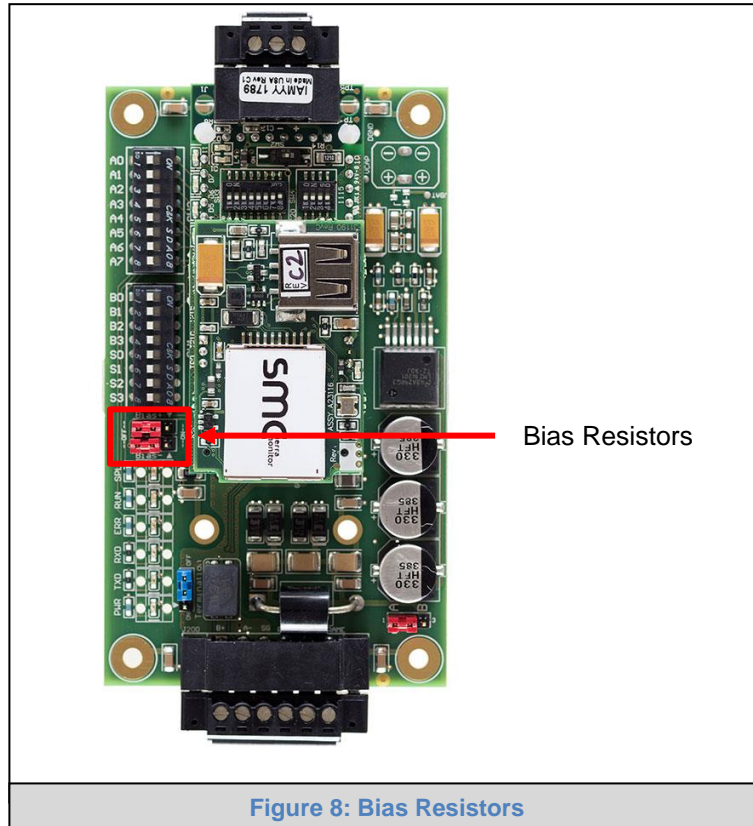
<p style="text-align:center">**Figure 8: Bias Resistors**</p>

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 - i.e. far away from the decision point of the logic.

In the RS-485 carrier, 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 (on the Brian field port were there are very weak bias resistors of 100k). Since there are no jumpers, many Brains can be put on network without running into the bias resistor limit which is < 500 ohms.

NOTE: See www.ni.com/support/serial/resinfo.htm for additional pictures and notes.

4.3.2 Termination Resistor

Termination Resistor

Figure 9: Termination Resistor
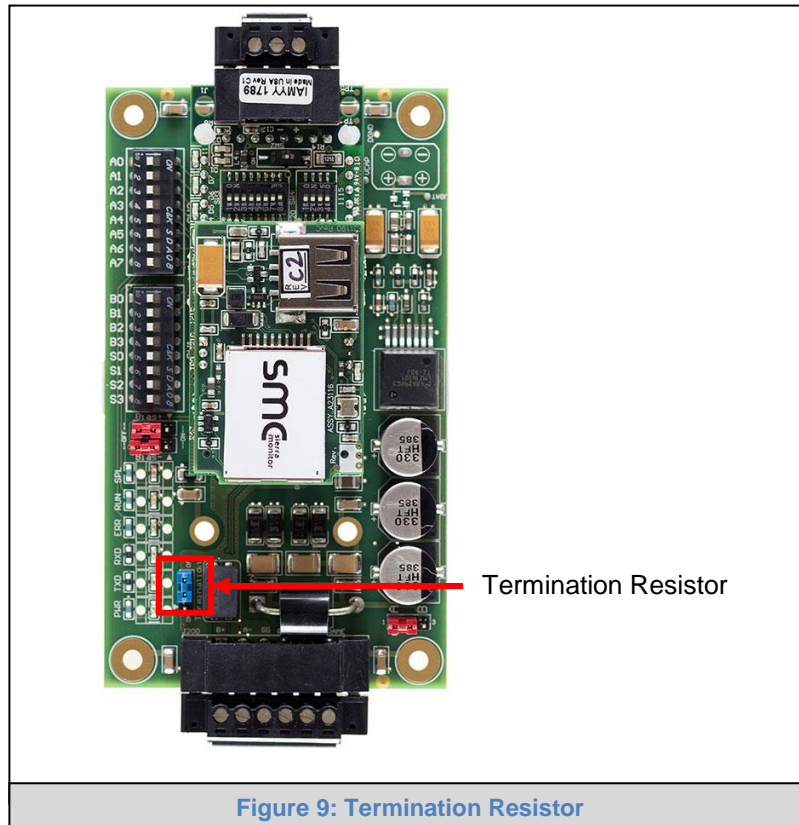
Termination resistors are also used to reduce noise. These pull the two lines of an idle bus together. However, they would override the effect of any bias resistors, if connected.

4.3.3 Power Jumper Settings

Power Jumper Switch
in position "A"

Figure 10: Power Jumper Switch
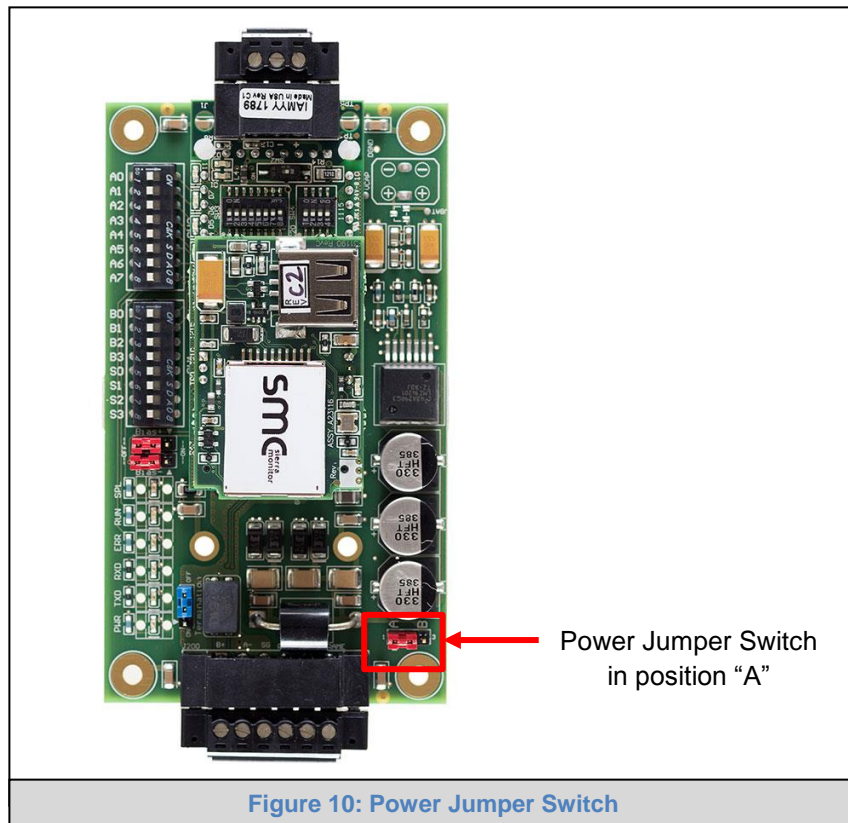
The ProtoNode Carrier Board power jumper is set to position A by default, but can be changed to position B for other power supply requirements.

Position A: The Carrier makes use of a full-wave rectifying bridge. Can be used for 12-24 VAC input or 9 – 30 VDC input. At 9 VDC this becomes marginal.

Position B: The Carrier makes use of a half-wave rectifying bridge. Best position for Grounded AC Transformers and for using DC voltage down to 9VDC.

4.4   Wiring Field Port to RS-485 BMS Network

- Connect the RS-485 network wires to the 3-pin RS-485 connector on ProtoNode FPC-N34 as shown below in **Figure 11**.

    o   The RS-485 GND (Pin 3) is not typically connected

- If the ProtoNode is the last device on the RS-485 trunk, then the End-Of-Line Termination Switch needs to be enabled (**Figure 12**).

    o   The default setting from the factory is OFF (switch position = right side)

    o   To enable the EOL Termination, turn the EOL switch ON (switch position = left side)

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

Figure 11: Connection from ProtoNode to RS-485 Field Network

End-of-Line Switch

Figure 12: RS-485 BMS Network EOL Switch
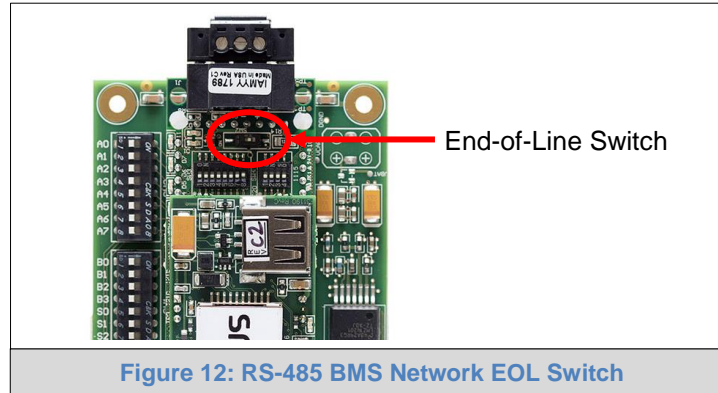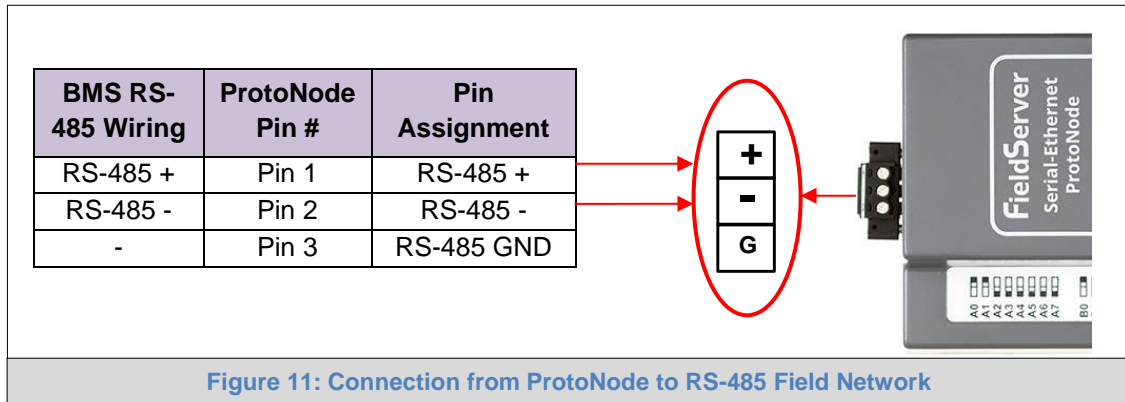
4.5   Wiring Field Port to a LonWorks Network

- Connect ProtoNode to the field network with the LonWorks terminal using approved cable per the FT-10 installation guidelines. LonWorks has no polarity.

Figure 13: LonWorks Terminal

4.6   Power-Up ProtoNode

Apply power to ProtoNode as show below in **Figure 15.** Ensure that the power supply used complies with the specifications provided in **Appendix C.1**.

- ProtoNode accepts either 9-30VDC or 12-24 VAC on pins 4 and 5.

- **Frame GND should be connected.**

Power Requirement for ProtoNode External Gateway			
	Current Draw Type		
ProtoNode Family	12VDC/VAC	24VDC/VAC	30VDC
FPC – N34, N36, N38 (Typical)	170mA	100mA	80mA
FPC – N34, N36, N38 (Maximum)	240mA	140mA	100mA
FPC – N35, N37, N39 (Typical)	210mA	130mA	90mA
FPC – N35, N37, N39 (Maximum)	250mA	170mA	110mA
FPC – N40 (Typical)	170mA	100mA	80mA
FPC – N40 (Maximum)	240mA	140mA	100mA
FPC – N42 Slave (Maximum)	550mA	280mA	220mA
FPC – N42 Master (Maximum)	980mA	510mA	400mA
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 14: Required current draw for the ProtoNode			

Power to ProtoNode	ProtoNode Pin #	Pin Assignment
Power In (+)	Pin 4	V +
Power In (-)	Pin 5	V -
Frame Ground	Pin 6	FRAME GND
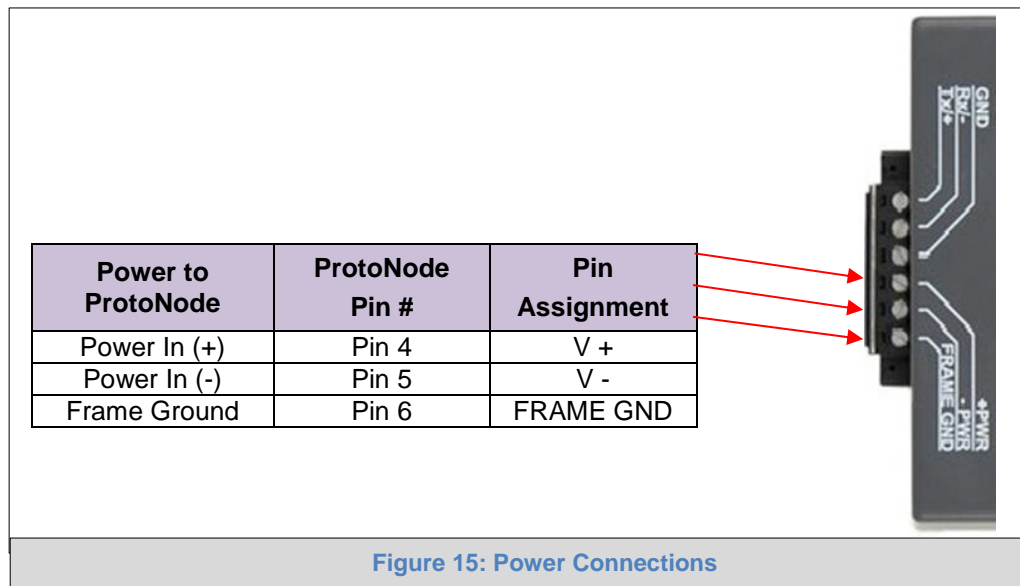
Figure 15: Power Connections

5 CONNECT THE PROTONODE'S WEB GUI TO SETUP IP ADDRESS FOR ETHERNET NETWORK

5.1 Connect the PC to ProtoNode via the Ethernet Port
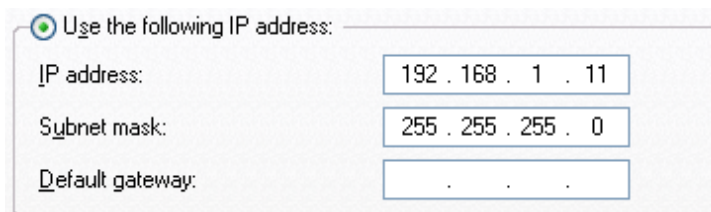
- Connect a CAT5 Ethernet cable (Straight through or Cross-Over) between the PC and ProtoNode.

- The Default IP Address of 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 XP:

  Go to **start** > Control Panel > Network Connections

  Right-click on Local Area Connection > Properties

  Highlight ☑ Internet Protocol (TCP/IP) > Properties

- For Windows 7 or later:

  Go to > Control Panel > Network and Internet

  > Network and Sharing Center > Change adapter settings

  Right-click on Local Area Connection > Properties

  Highlight ☑ Internet Protocol Version 4 (TCP/IPv4) > Properties
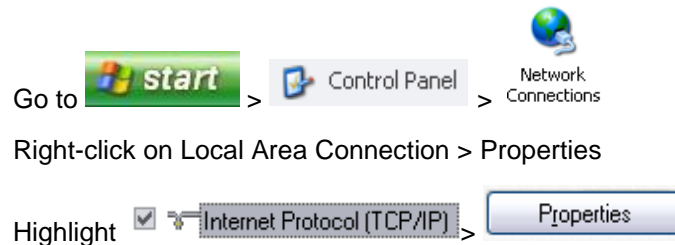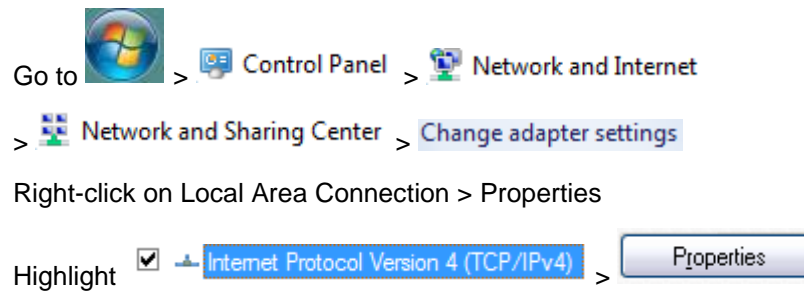
- For Windows XP and Windows 7, use the following IP Address:

  ⦿ Use the following IP address:

IP address:	192 . 168 . 1 . 11
Subnet mask:	255 . 255 . 255 . 0
Default gateway:	. . .

- Click OK twice.
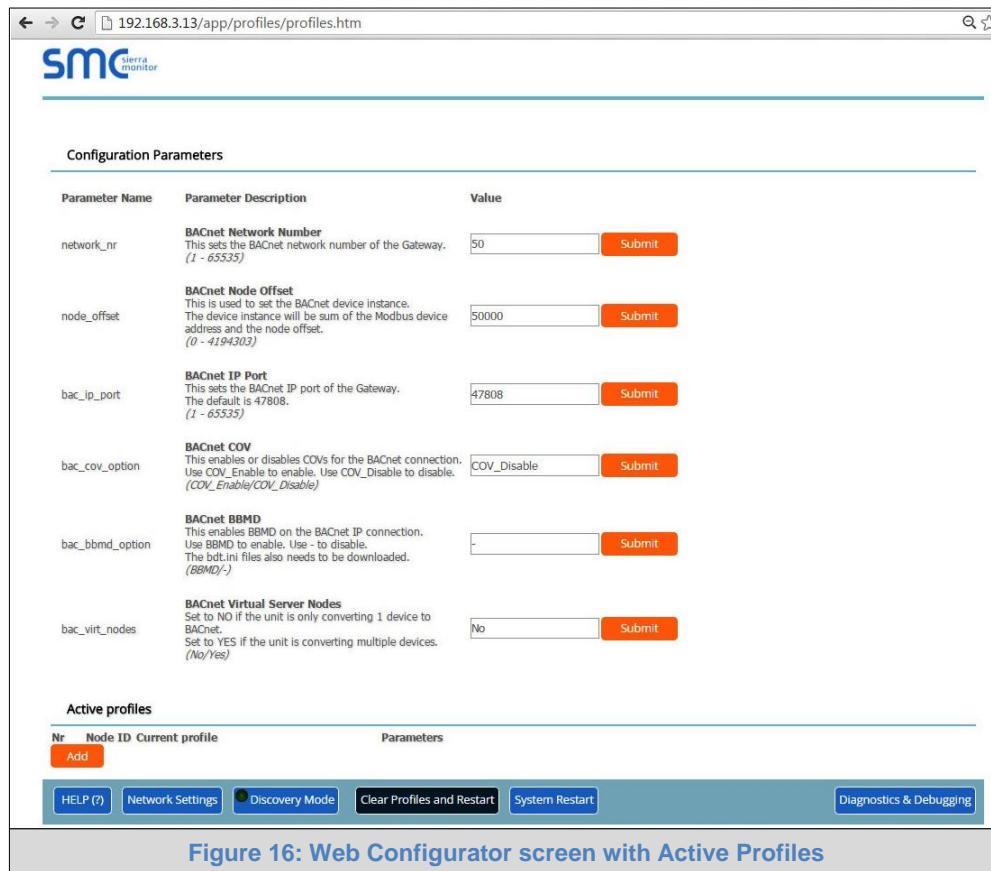
5.2   Setting IP Address for Field Network

- After setting a local PC to be on 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.

- The Web Configurator will be displayed as the landing page. (**Figure 16**)

NOTE: Below the "Active Profiles" heading are listed the profiles for connected devices. If no profiles are present, then the wiring, baud rate, and DIP switch settings must be checked, because there is a problem with device communications. All the active profiles must show the correct Node-ID's before proceeding.

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

- **To access the Web GUI, click on the "Diagnostics & Debugging" button** in the bottom right side of the page.

Figure 16: Web Configurator screen with Active Profiles

- From the Web GUI's landing page, click on "Setup" to expand the navigation tree and then select "Network Settings" to access the IP Settings menu. (**Figure 17**)
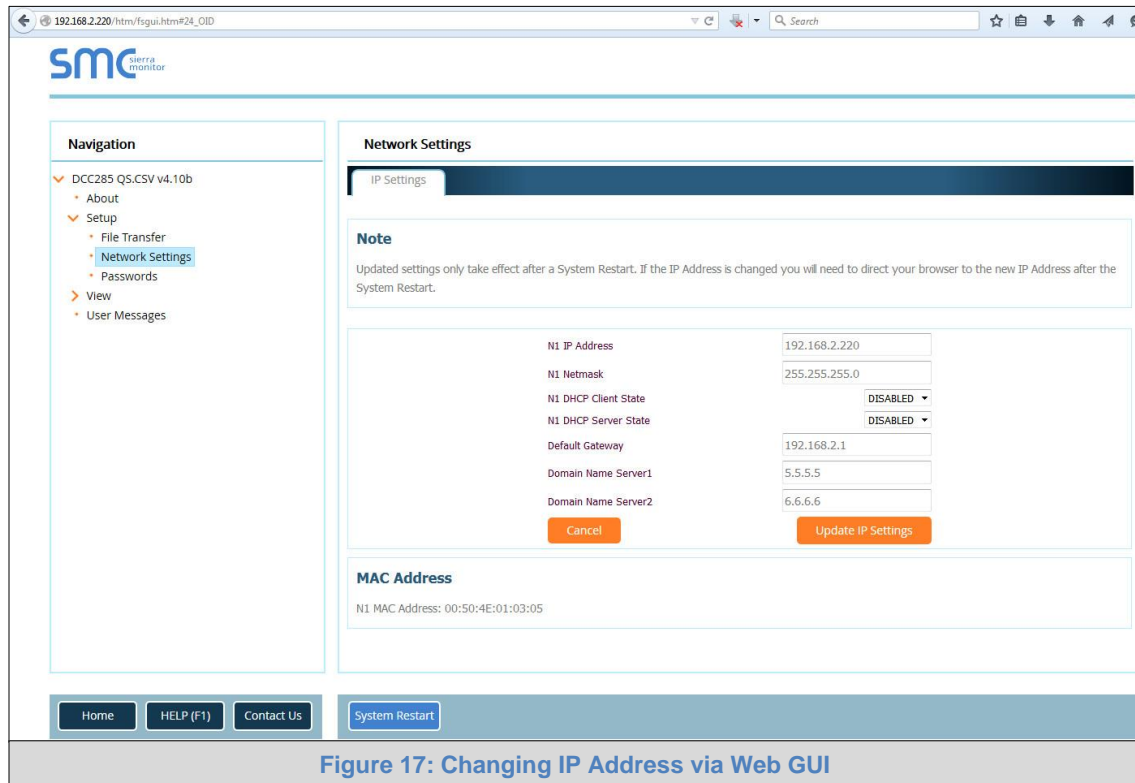
Figure 17: Changing IP Address via Web GUI

- Modify the IP Address (N1 IP Address field) of the ProtoNode Ethernet port.

- If necessary, change the Netmask (N1 Netmask field).

- Type in a new Subnet Mask.

- If necessary, change the IP Gateway (Default Gateway field).

- Type in a new IP Gateway.

NOTE: If the ProtoNode is connected to a router, the IP Gateway of the ProtoNode should be set to the IP Address as the router.

- Reset ProtoNode.

- Unplug Ethernet cable from PC and connect it to the network hub or router.

- **Record the IP Address assigned to the ProtoNode for future reference.**

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

Commissioning may only be performed by the LonWorks administrator.

6.1   Commissioning ProtoNode FPC-N35 on a LonWorks Network

The User will be prompted by the LonWorks Administrator to hit the Service Pin on the ProtoNode FPC-N35 at the correct step of the Commissioning process which is different for each LonWorks Network Management Tool.

- If an XIF file is required, see steps in **Section 6.1.1** to generate XIF.

Figure 18: LonWorks Service Pin Location

### 6.1.1   Instructions to Download XIF File from ProtoNode FPC-N35 Using Browser
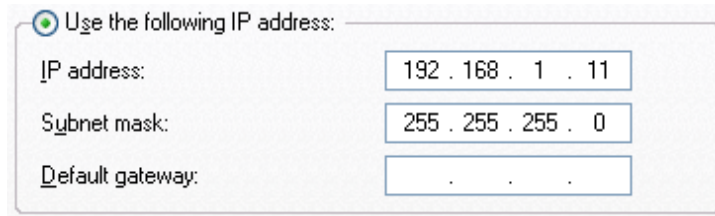
- Connect a CAT5 Ethernet cable (Straight through or Cross-Over) between the PC and ProtoNode.

- The Default IP Address of 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 XP:

  Go to [start] > [Control Panel] > [Network Connections]

  Right-click on Local Area Connection > Properties

  Highlight [☑ Internet Protocol (TCP/IP)] > [Properties]

- For Windows 7 or later:

  Go to [⊞] > [Control Panel] > [Network and Internet]

  > [Network and Sharing Center] > [Change adapter settings]

  Right-click on Local Area Connection > Properties

  Highlight [☑ Internet Protocol Version 4 (TCP/IPv4)] > [Properties]
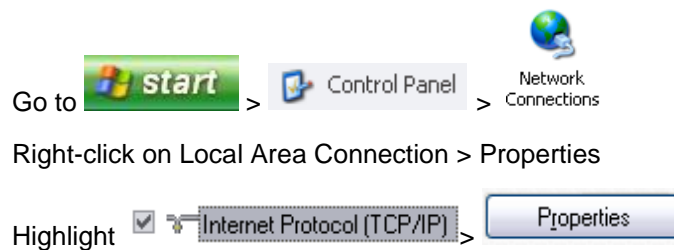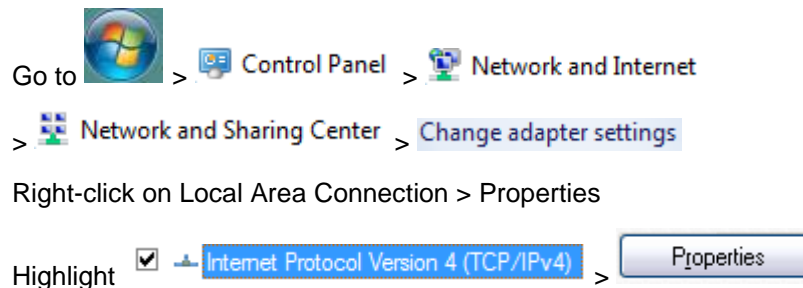
- For Windows XP and Windows 7, use the following IP Address:

- Click [OK] twice.

- 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 on the local PC as "fserver.xif".
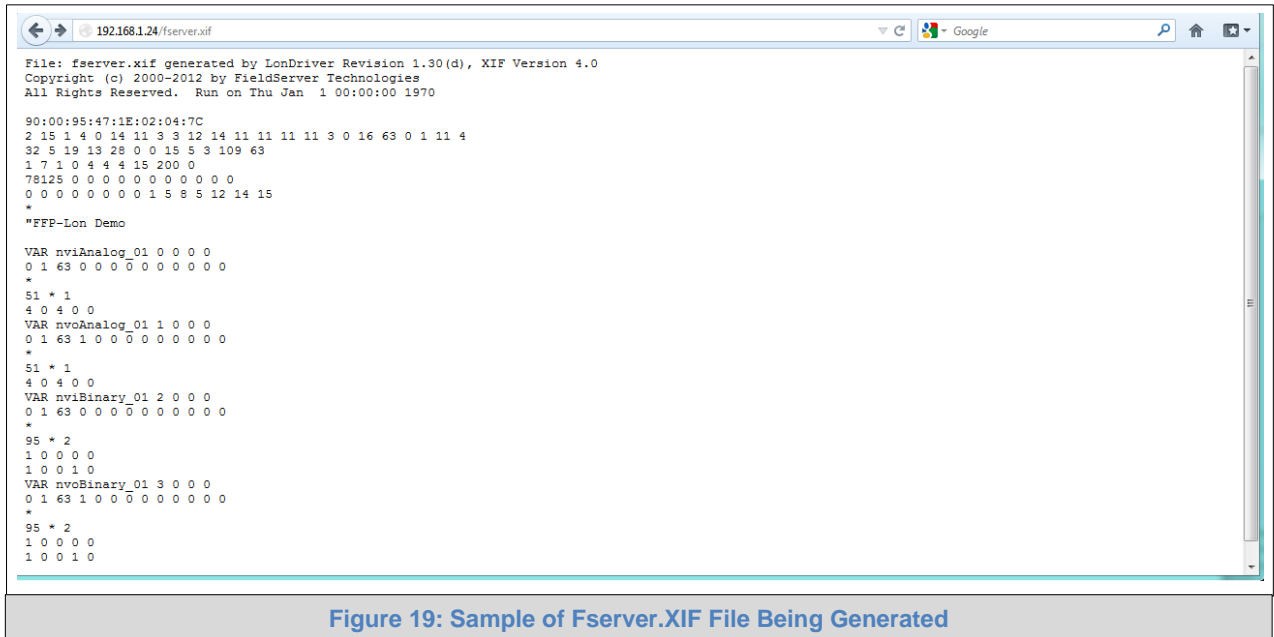
Figure 19: Sample of Fserver.XIF File Being Generated

Appendix A. Troubleshooting

Appendix A.1. Lost or Incorrect IP Address

- Ensure that FieldServer Toolbox is Loaded on the PC that is currently being used, or download FieldServer-Toolbox.zip on the Sierra Monitor webpage, under Customer Care: Resource Center, Software Downloads:
  www.sierramonitor.com/customer-care/resource-center?filters=software-downloads

- Extract the executable file and complete the installation.

Figure 20: Ethernet Port Location
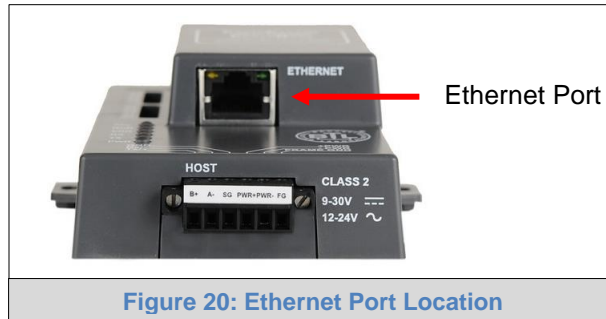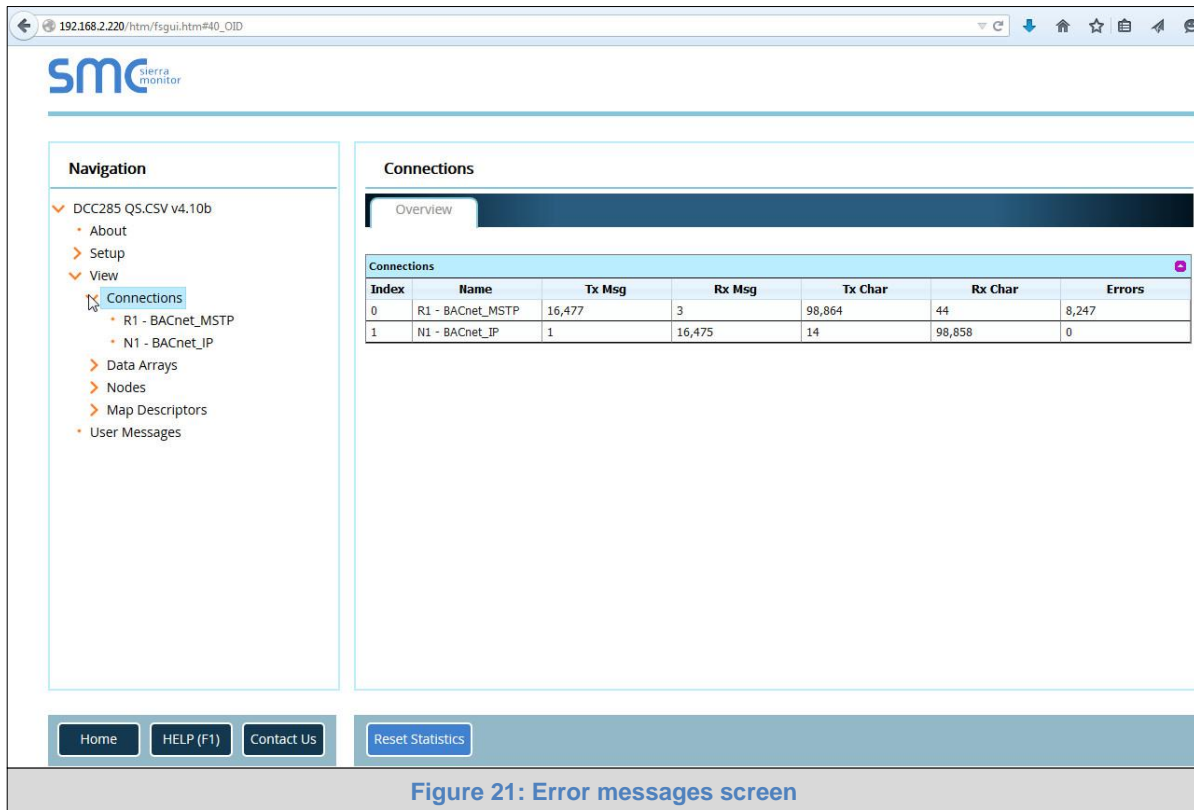
- Disable any wireless Ethernet adapters on the PC/Laptop.

- Disable firewall and virus protection software if possible.

- Connect a standard CAT5 Ethernet cable between the PC and ProtoNode.

- Double click on the FS Toolbox Utility.

- Check IP Addresses from the Device listings.
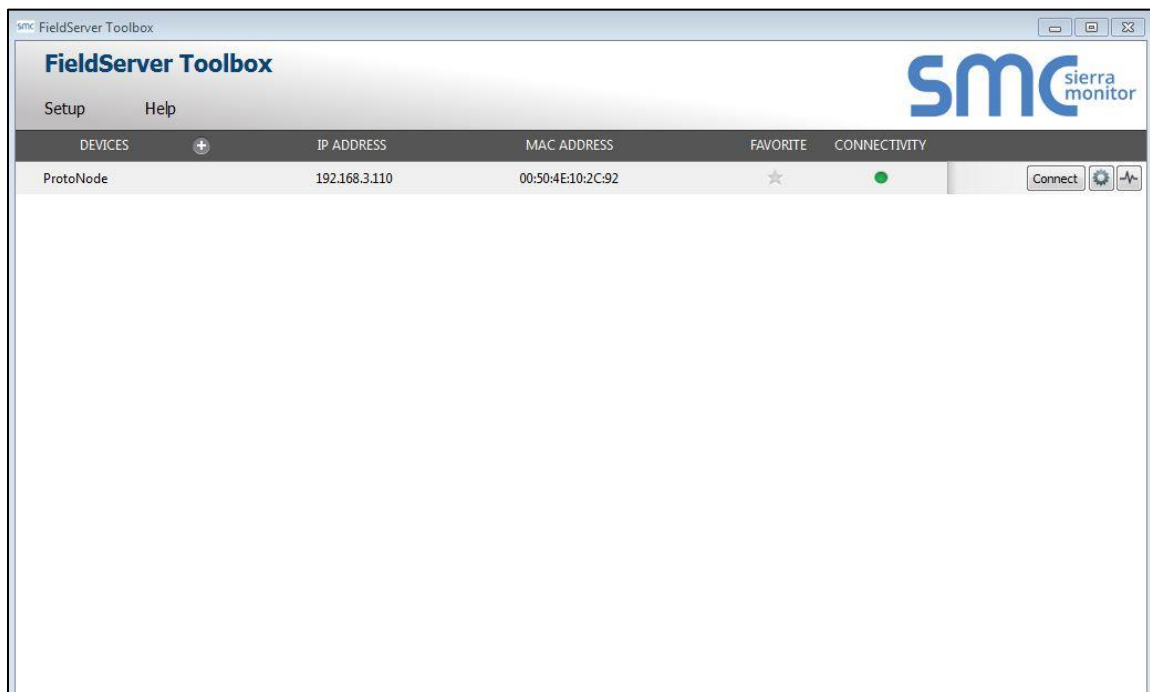
- Correct IP Address(es) by right clicking the settings icon and changing the IP Address.

Appendix A.2. Viewing Diagnostic information

- Type the IP Address of the ProtoNode into the local PC's 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, please refer to **Appendix A.3** for the relevant wiring and settings.

Figure 21: Error messages screen

Appendix A.3. Check Wiring and Settings

- No COMS on Modbus RTU side. If Tx/Rx are not flashing rapidly then there is a COM issue on the Modbus side. To fix this problem, check the following:
    - Visual observations of LEDs on ProtoNode. (**Appendix A.4**)
    - Check baud rate, parity, data bits, stop bits
    - Check Modbus device address
    - Verify wiring
    - Verify Modbus device is connected to the same subnet as the ProtoNode
    - Verify all the Modbus devices were discovered in Web Configurator. (**Section 5.2**)

- No COMS on Modbus TCP/IP side. To fix, check the following:
    - Visual observations of LEDs on ProtoNode (**Appendix A.4**)
    - Check device address
    - Verify wiring
    - Verify device is connected to the same subnet as the ProtoNode
    - Verify all the Modbus TCP/IP devices were discovered in Web Configurator (**Section 5.2**)

- Field COM problems:
    - If Ethernet protocols are used, observe Ethernet LEDs on the ProtoNode (**Appendix A.4**)
    - Visual dipswitch settings (using correct baud rate and device instance)
    - Verify IP Address setting
    - Verify wiring

If the problem still exists, a Diagnostic Capture needs to be taken and sent to Sierra Monitor Corporation. (Appendix A.5)

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

Please 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	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 the unit. If this occurs, immediately report the related "system error" shown in the error screen of the GUI interface to support for evaluation.
RX	**If socket protocol is serial,** the RX LED will flash when a message is received on the host port. **If socket protocol is Ethernet,** this LED is **not used**.
TX	**If socket protocol is serial,** the TX LED will flash when a message is sent on the host port. **If socket protocol is Ethernet,** this LED is **not used**.
PWR	This is the power light and should show steady green at all times when the unit is powered.
Figure 22: Diagnostic LEDs	

Appendix A.5. Take Diagnostic Capture With the FieldServer Toolbox

- **Once the Diagnostic Capture is complete, email it to support@sierramonitor.com. The Diagnostic Capture will allow us to rapidly diagnose the problem.**

- Ensure that FieldServer Toolbox is Loaded on the PC that is currently being used, or download FieldServer-Toolbox.zip on the Sierra Monitor Corporation webpage, under Customer Care: Resource Center, Software Downloads:
  www.sierramonitor.com/customer-care/resource-center?filters=software-downloads

- Extract the executable file and complete the installation.

Ethernet Port

Figure 23: Ethernet Port Location
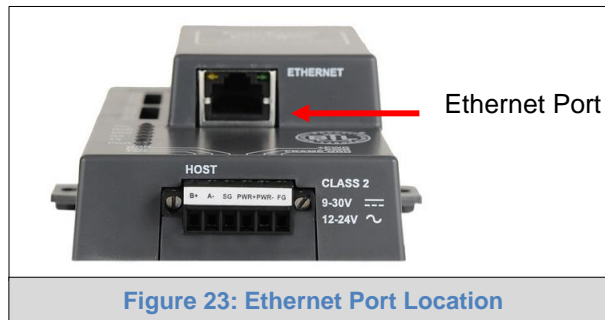
- Disable any wireless Ethernet adapters on the PC/Laptop.

- Disable firewall and virus protection software if possible.

- Connect a standard CAT5 Ethernet cable between the PC and ProtoNode .

- Double click on the FS Toolbox Utility.

- **Step 1:** Take a Log

  o Click on the diagnose icon [icon] of the desired device
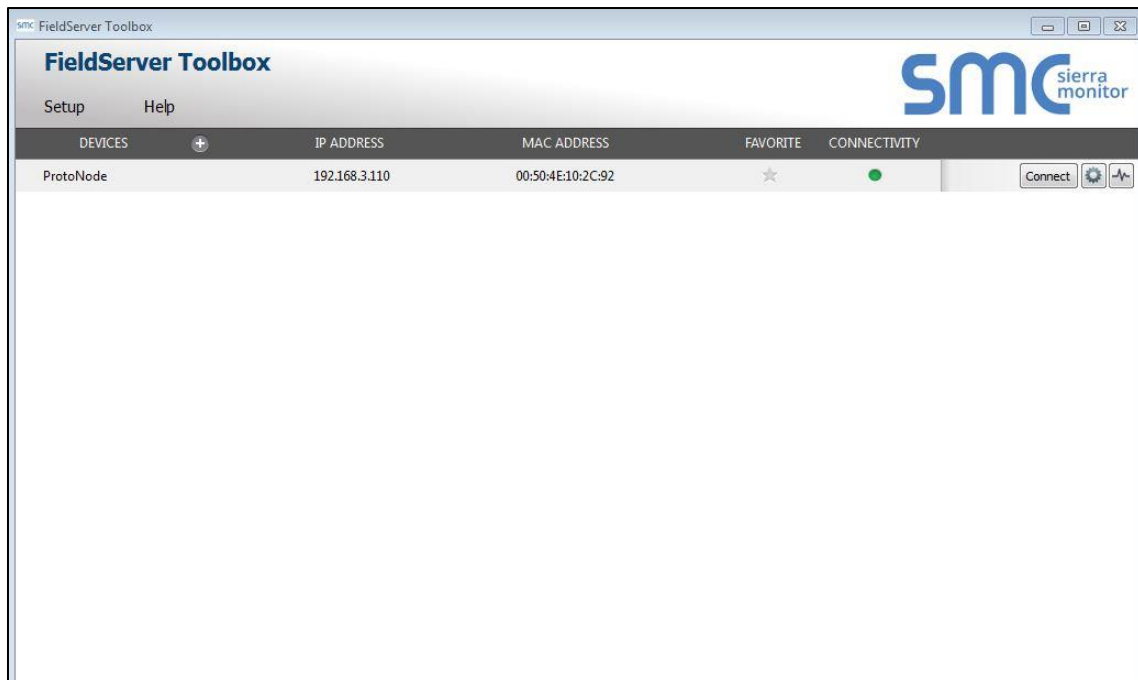
o   Select full Diagnostic

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

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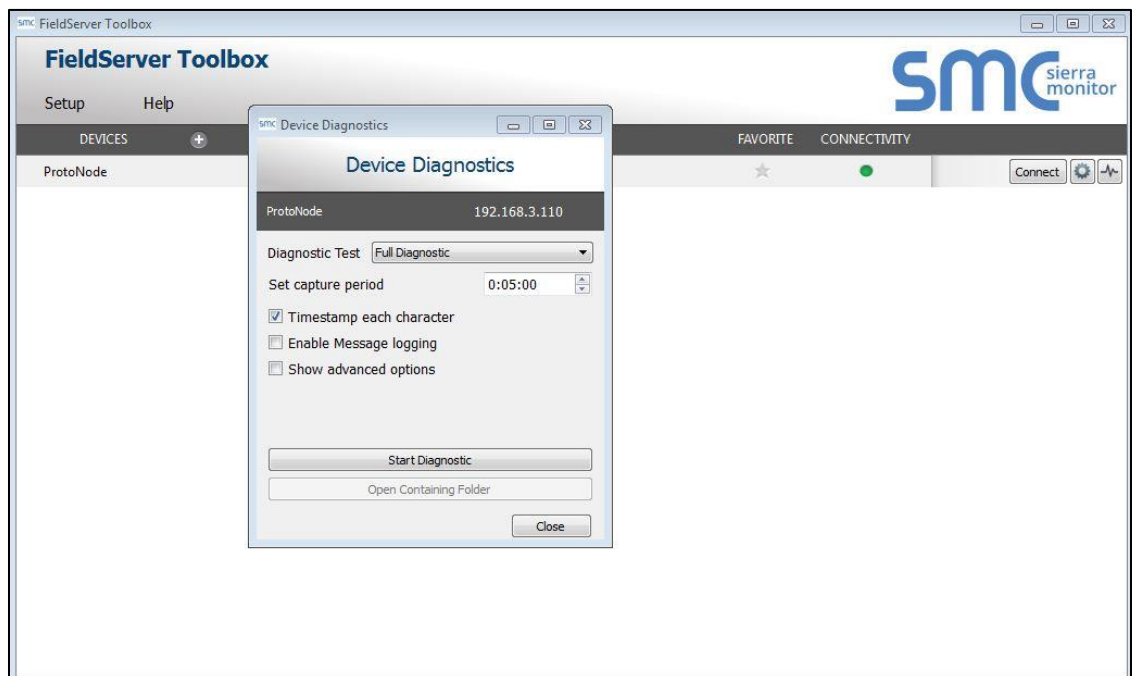
o   Wait for Capture period to finish, then the Diagnostic Test Complete window will appear

- **Step 2**: Send Log

    o Once the Diagnostic test is complete, a .zip file will be saved on the PC
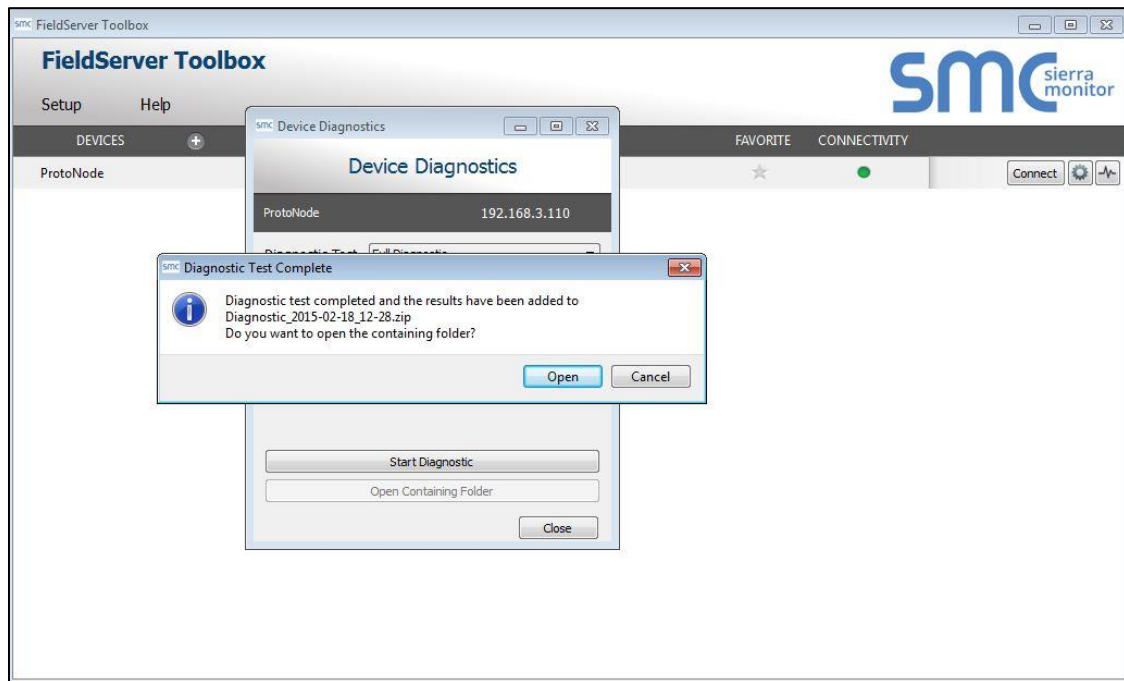
    o Choose Open to launch explorer and have it point directly at the correct folder

    o Send the Diagnostic zip file to **support@sierramonitor.com**

Appendix A.6. Update Firmware
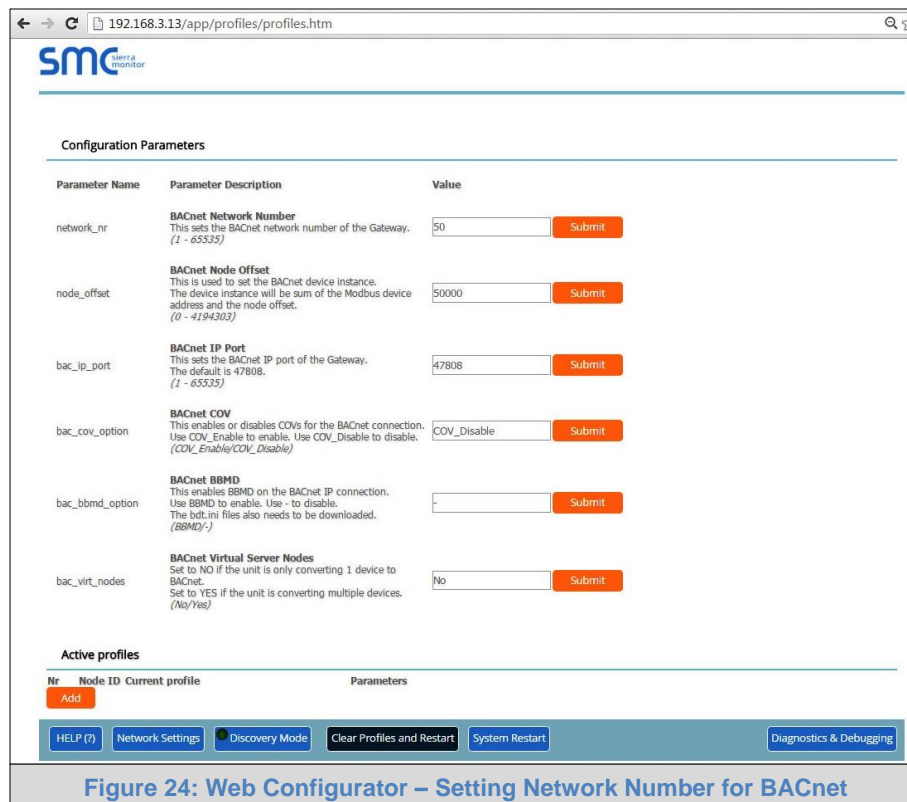
To load a new version of the firmware, follow these instructions:

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.
   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 ProtoNode on 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 Network Number with the "network_nr" field and click submit. The default value is 50.

Figure 24: Web Configurator – Setting Network Number for BACnet

Appendix A.8. Passwords

Access to the ProtoNode 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 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 e-mail the Password recovery token to support@sierramonitor.com to receive a temporary password from the Sierra Monitor support team. Access the ProtoNode to set a new password.

Appendix A.9. Reading Data Arrays

- Connect to the ProtoNode with a browser and click on the Diagnostics & Debugging button.

- Select the User Messages branch.

- Select the info tab.

- See which profile has been loaded.
  - Example: prof1b.csv

- In the address bar of the browser, type the IP address/filename.
  - Example: 192.168.1.24/prof1b.csv

- Press the enter key and save the file.

- Open the file and go to the server side map descriptors section.

- The map_descriptor_name, data_array_name, and data array_offset will be shown for each point.

- Go back to the browser and select the view branch.

- Select the data arrays branch.

- Select the data array that corresponds with the point that you want to monitor.

- View the offset that corresponds with the point that you want to monitor.

Appendix B. Vendor Information

Appendix B.1. Additional DIP switch settings

When more configuration settings are needed than possible via the external S Bank DIP Switches, then the user can access the A Bank DIP Switches internal to the ProtoNode.

NOTE: The lid on top of the ProtoNode has to be removed in order to select the A Bank of DIP switches. Pull on the lid while holding the on to the 6 pin Phoenix connector. Please do not hold the wall mount tabs as these are designed to break off if not required!

- To set select these configurations, open the ProtoNode and select the A bank of switches (A1 or A2 or A3) on the small ProtoCessor module that sits on top of the ProtoCarrier (inside the ProtoNode).

A1, A2, and A3 DIP Switches

S Bank DIP Switches

Figure 25: Additional DIP Switches
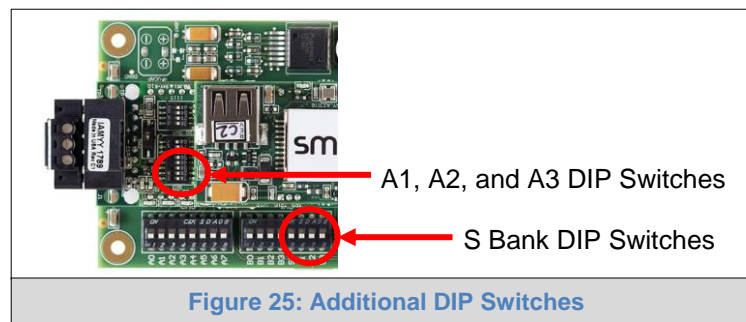
Appendix C. Reference

Appendix C.1. Specifications

	ProtoNode FPC-N34/-N36/-N38	**ProtoNode FPC-N35/-N37/-N39**

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 Ethernet 10/100 BaseT port
		One FTT-10 LonWorks port

Approvals	CE Certified; TUV approved to UL 916, EN 60950-1, EN 50491-3 and CSA C22-2 standards; FCC Class A Part 15; DNP3 Conformance Tested; RoHS Compliant; CSA 205 Approved	
	BTL Marked	LonMark Certified
Power Requirements	Multi-mode power adapter: 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 26: Specifications

		Interface Connections						
		RS-232[1]	**RS-485**[2]	**RS-422**[3]	**Ethernet**[4]	**LonWorks**[5]	**KNX**[6]	**M-Bus**[7]
ProtoNode	**FPC-N34**		2		1			
	FPC-N35		1		1	1		
	FPC-N36		1	1	1			
	FPC-N37			1	1	1		
	FPC-N38	1	1		1			
	FPC-N39	1			1	1		
	FPC-N40		1		1		1	
	FPC-N41				1	1	1	
	FPC-N42		1		1			1

1 Tx/Rx/GND
2 +/-/Frame Ground
3 +/-/Frame Ground
4 10/100 BaseT
5 FTT 10
6 +/-/Frame Ground
7 +/-/Frame Ground

Appendix C.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:
  o Comply with local electrical code.
  o Be suited to the expected operating temperature range.
  o Meet the current and voltage rating for ProtoNode

- Furthermore, the interconnecting power cable shall:
  o Be of length not exceeding 3.05m (118.3")
  o Be constructed of materials rated VW-1 or 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. Bank DIP Switch Settings

Appendix D.1. "A" Bank DIP Switch Settings

Address	A0	A1	A2	A3	A4	A5	A6	A7	Address	A0	A1	A2	A3	A4	A5	A6	A7
1	On	Off	Off	Off	Off	Off	Off	Off	46	Off	On	On	On	Off	On	Off	Off
2	Off	On	Off	Off	Off	Off	Off	Off	47	On	On	On	On	Off	On	Off	Off
3	On	On	Off	Off	Off	Off	Off	Off	48	Off	Off	Off	Off	On	On	Off	Off
4	Off	Off	On	Off	Off	Off	Off	Off	49	On	Off	Off	Off	On	On	Off	Off
5	On	Off	On	Off	Off	Off	Off	Off	50	Off	On	Off	Off	On	On	Off	Off
6	Off	On	On	Off	Off	Off	Off	Off	51	On	On	Off	Off	On	On	Off	Off
7	On	On	On	Off	Off	Off	Off	Off	52	Off	Off	On	Off	On	On	Off	Off
8	Off	Off	Off	On	Off	Off	Off	Off	53	On	Off	On	Off	On	On	Off	Off
9	On	Off	Off	On	Off	Off	Off	Off	54	Off	On	On	Off	On	On	Off	Off
10	Off	On	Off	On	Off	Off	Off	Off	55	On	On	On	Off	On	On	Off	Off
11	On	On	Off	On	Off	Off	Off	Off	56	Off	Off	Off	On	On	On	Off	Off
12	Off	Off	On	On	Off	Off	Off	Off	57	On	Off	Off	On	On	On	Off	Off
13	On	Off	On	On	Off	Off	Off	Off	58	Off	On	Off	On	On	On	Off	Off
14	Off	On	On	On	Off	Off	Off	Off	59	On	On	Off	On	On	On	Off	Off
15	On	On	On	On	Off	Off	Off	Off	60	Off	Off	On	On	On	On	Off	Off
16	Off	Off	Off	Off	On	Off	Off	Off	61	On	Off	On	On	On	On	Off	Off
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44	Off	Off	On	On	Off	On	Off	Off	89	On	Off	Off	On	On	Off	On	Off
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254	Off	On	On	On	On	On	On	On
255	On	On	On	On	On	On	On	On

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.