



ProtoCessor ProtoNode RER Startup Guide

For Interfacing Toshiba Products: G8000 & G9000
To Building Automation Systems:
Modbus/RTU, Modbus/TCP, BACnet MS/TP, BACnet/IP, Metasys N2,
SNMP and AB EIP

APPLICABILITY & EFFECTIVITY

Explains ProtoCessor ProtoNode RER hardware and how to install it.
The instructions are effective for the above as of February 2014

A Quick Start Guide

1. Record the information about the unit. (See Figure 2)
2. Configure the device's RS-232 COM setting and Node-ID. (See Section 2.3)
3. Set A, B, and S DIP Switch banks on the ProtoCessor ProtoNode (hereafter referred to as ProtoNode) for field protocol baud rate, Node-ID/Device Instance, and proper device configuration. (See Section 2.4)
4. Connect the ProtoNode to the Field protocol port (3 pin Phoenix connector) and the device's RS-232 port to the ProtoNode's RS-232 interface (located on the ProtoNode's 6 pin connector). (See Section 3)
5. Power up the ProtoNode RER. (See Section 3.3)
6. If the Field protocol is:
 - BACnet/IP
 - Modbus TCP
 - SNMP
 - AB EtherNet/IP

run the ProtoNode Web GUI to change IP address. See (Section 4)

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1 INTRODUCTION

1.1 ProtoNode Gateway

ProtoNode is an external, high performance **Building Automation multi-protocol gateway** that has been preprogrammed for Toshiba's G8000 and G9000 UPS (hereafter called "device") to various building automation protocols. These protocols include Modbus/RTU, Modbus/TCP, BACnet¹MS/TP, BACnet/IP, Metasys² N2 by JCI, SNMP and AB EIP.

Configurations for the various protocols are stored within the ProtoNode and are selectable via DIP switches for fast and easy installation. It is not necessary to download any configuration files to support the required applications.

1.2 ProtoCessor ProtoNode Package Contents

The ProtoCessor ProtoNode package contains the following items:

- **ProtoCessor ProtoNode Module**
- **Communication Cable:** Eight wire + ground with DB9 Connector
- **Power wire:** Pink & Gray , 20 AWG Zip Cord, 2ft long with ¼ inch stripped and secure (stripped but not removed), (Part # 20157)
- **Ethernet Cable:** Black, Category 5e UTP Patch Cable, 24 AWG, 9 foot; (UPC Code: 799471767603)

1.3 BTL Mark – BACnet Testing Laboratory



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

The BTL Mark on ProtoNode RER 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.

¹ BACnet is a registered trademark of ASHRAE

² Metasys is a registered trademark of Johnson Controls Inc.

2 BACNET SETUP FOR PROTOCESSOR PROTONODE RER

2.1 ProtoNode Component Identification

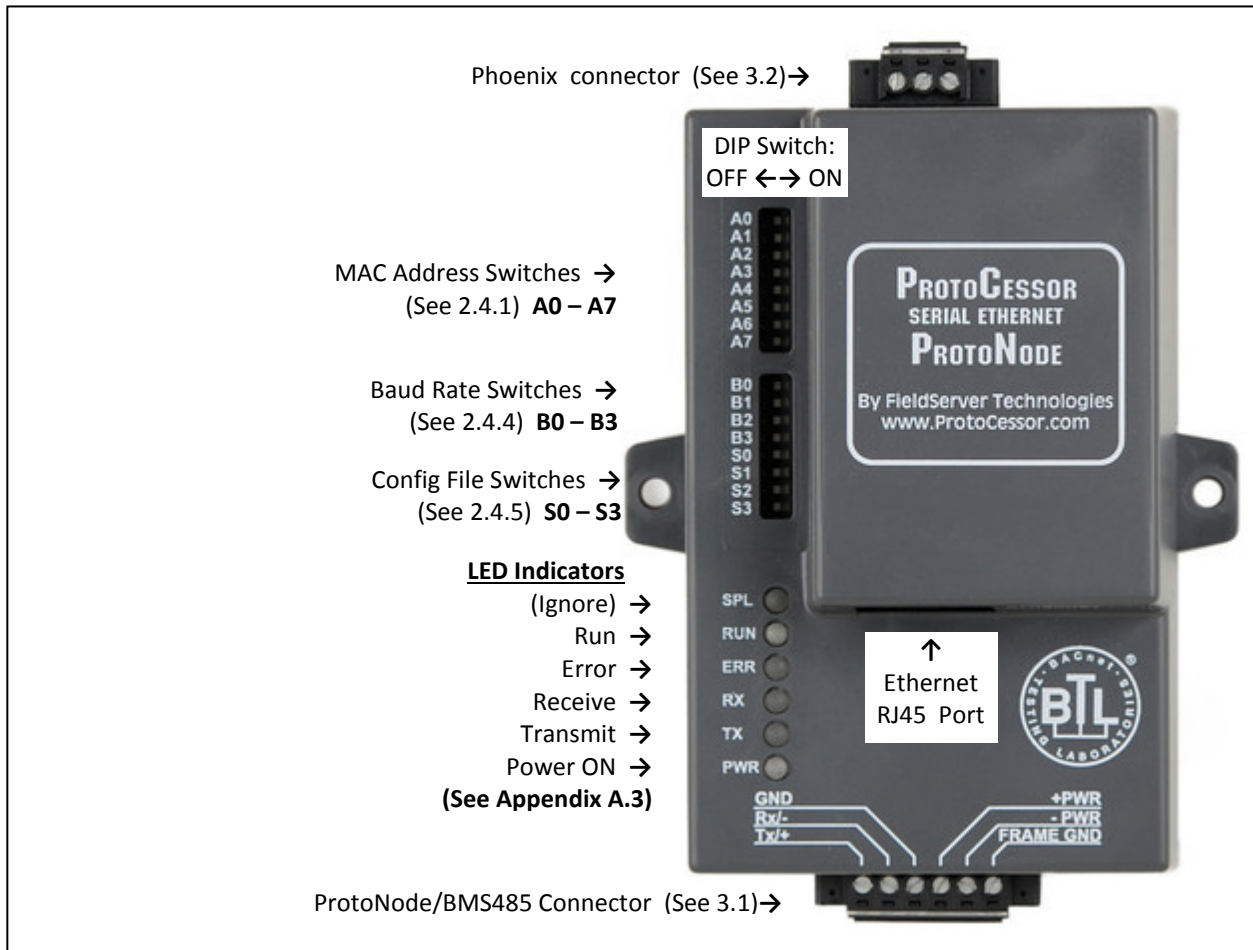


Figure 1 Baud Rate DIP Switches

2.2 Record Identification Data

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

Model	Field Service Part Number	Toshiba Part Number
ProtoNode RER	FPC-N38-xxx-xxx-0718	PROTOCESSOR
Recorded Part No.:		

Figure 2 ProtoNode Part Numbers

2.3 Configure Toshiba COM Settings on the Device Connected to ProtoNode RER (FPC-N34)

2.3.1 Set Toshiba COM setting on all of the devices connected to the ProtoNode

- All devices connected to ProtoNode MUST ALL have the same Baud Rate, Data Bits, Stop Bits, and Parity. (See Figure 3)

- The figure below defines the installed default serial port settings necessary to communicate with the device.

Serial Port Setting	Device
Protocol	Toshiba UPS
Baud Rate	9600
Parity	Even
Data Bits	7
Stop Bits	1

Figure 3 Toshiba COM Settings

2.4 Setting the Mac Address, Node_ID, Serial Baud Rate and Selecting the Stored Configurations on the ProtoNode RER (FPC-N34)

2.4.1 Setting the MAC Address (DIP Switch A0 – A7) for BACnet MS/TP for ProtoNode RER (FPC-N34 BACnet)

- Only 1 MAC address is set for ProtoNode regardless of how many devices are connected to ProtoNode.
- BACnet MS/TP MAC addresses between 1 to 127 are MAC Master Addresses and can be auto-discovered by BMS frontend systems that support Auto Discovery.
- BACnet MS/TP MAC addresses between 128 to 255 are Slave Addresses and can not be discovered by BMS Front Ends that support auto discovery of BACnet MS/TP devices.

Note: Never set a BACnet MS/TP MAC Address from 128 to 255.

- Set DIP switches A0 – A7 to assign MAC Address for BACnet MS/TP for the ProtoNode RER (FPC-N34).
- Refer to Appendix C.1 for the full range of addresses to set Node-ID/Device Instance.

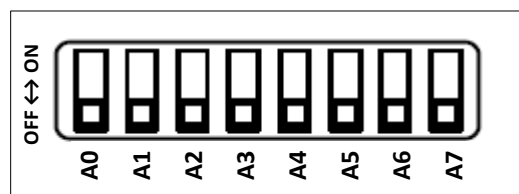


Figure 4 MAC Address DIP Switches

NOTE: When setting DIP Switches, ensure that power to the board is OFF.

2.4.2 Setting the Device Instance (Node-ID) for BACnet MS/TP and BACnet/IP on ProtoNode RER (FPC-N34 BACnet)

- The A Bank of DIP switches are also used to set the BACnet Device Instance.
- The BACnet Device Instance can range from 1 to 4,194,303.

BACnet/IP/BACnet MS/TP Addressing: The BACnet device instance will be set by taking the Node_Offset (default is 50,000) found in Web Configurator (Section 2.4.2.1) and adding it to the value of the A Bank DIP switches (MAC address).

For example:

- Default Node_Offset value = 50,000
- A Bank DIP switch = 11

- Device 1 Instance = 50,011
- To change the node_offset see Section 2.4.2.1. The node offset can be changed from 50,000 to 1 to 4,194,302 via the Web Configurator.

2.4.2.1 Set Node_Off to Assign Specific Device Instance for BACnet MS/TP and BACnet/IP

- If the Device Instance needs to be set for an addresses other than 50,000 to 50,127, change the Node+Offset (default is 50,000). See Section 4.1 to set the PC’s IP address to the same Subnet as the ProtoNode and Section 4.2 to connect to the ProtoNode’s Web Configurator which is shown in Figure 19.
- The BACnet Device Instance can range from 1 to 4,194,303.
- BACnet/IP/BACnet MS/TP Addressing: The BACnet device instance will be set by taking the Node_Offset found in Web Configurator (see Figure 19) and adding it to the value of the A Bank DIP switches.
- Set the PC address to be on the same subnet as the ProtoNode. See Section 4.1 on how to change the IP address. (See Figure 19)
- Open the PC browser to default IP address, which will bring you to the FST Web Configurator for the ProtoNode.
- Change the Node-offset to meet the required device instance.

For example:

- Changed Node_Offset value = 1000
- A Bank DIP switch = 11
- Device 1 Instance = 1,011

NOTE: The A bank dip switch setting + node offset = device instance setting

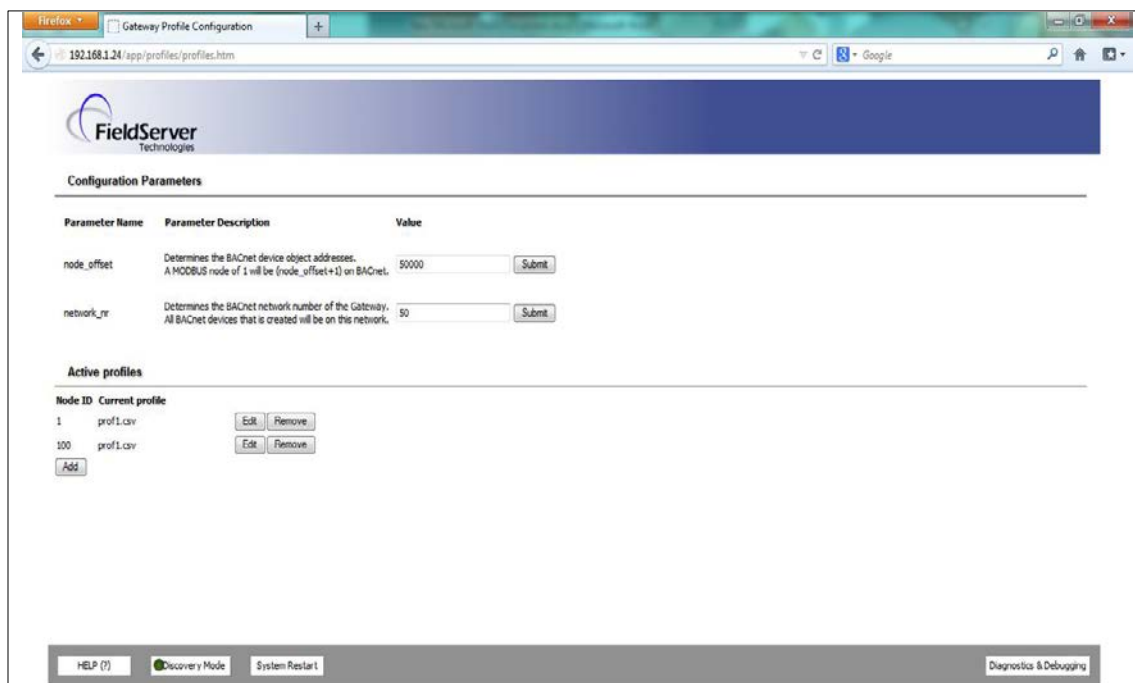


Figure 5 FST Web GUI screen

2.4.3 Setting the Node-ID for Modbus/RTU, Modbus/TCP and Metasys N2 on ProtoNode RER (FPC-N34 Metasys N2)

- Set DIP switches A0 – A7 to assign Node-ID for Modbus/RTU, Modbus/TCP and Metasys N2 for the ProtoNode RER (FPC-N34).
- Modbus/RTU, Modbus/TCP and Metasys N2 Node-ID Addressing: Modbus/RTU, Modbus/TCP and Metasys N2 Node-ID's range from 1-255
- Please refer to Appendix C.1 for the full range of addresses to set Node-ID/Device Instance.

2.4.4 Setting the Serial Baud Rate (DIP Switch B0 – B3) for Modbus/RTU and BACnet MS/TP

- DIP Switches B0 – B3 can be used to set the serial baud rate to match the baud rate provided by the Building Management System for Modbus/RTU and BACnet MS/TP.
- The baud rate on ProtoNode for Metasys N2 is set for 9600. DIP Switches B0 – B3 are disabled for Metasys N2 on ProtoNode RER (FPC-N34).

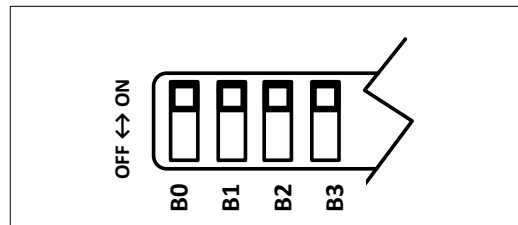


Figure 6 Baud Rate DIP Switches

NOTE: When setting DIP Switches, please ensure that power to the board is OFF.

2.4.4.1 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 7 Baud Rate

2.4.5 Using S0 – S3 bank of DIP Switches to select and load Configuration Files for Device

- 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 which are stored in the ProtoNode RER FPC-N34 (Modbus/RTU, Modbus/TCP, BACnet MS/TP, BACnet/IP, Metasys N2, SNMP and AB EIP).

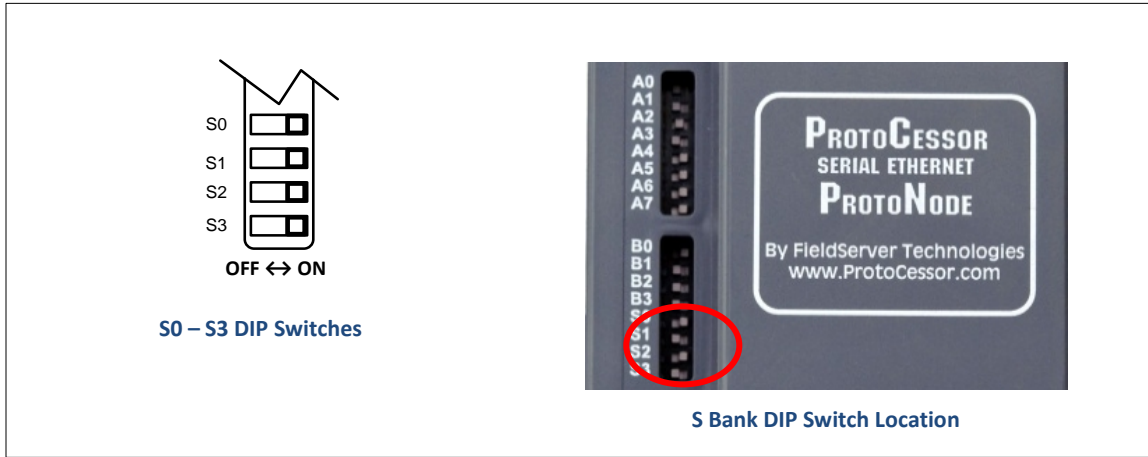


Figure 8 S Bank DIP Switch Location

2.4.5.1 Modbus/RTU, Modbus/TCP, BACnet MS/TP, BACnet/IP, Metasys N2, SNMP and AB EIP DIP Switch Settings

The following chart describes S0 - S3 DIP Switch configuration settings for application to support **Modbus/RTU, Modbus/TCP, BACnet MS/TP, BACnet/IP, Metasys N2, SNMP and AB EIP** on a ProtoNode RER

- To set G8000 or G9000 DIP switch settings, the cover does not need to be removed.

(Note: Cover does not need to be removed)		ProtoCarrier DIP Switches			
Profile - FPC-N38-0718		S0	S1	S2	S3
G9000	G9000 Modbus TCP/Modbus RTU	Off	Off	Off	Off
	G9000 BACnet IP/BACnet MSTP	On	Off	Off	Off
	G9000 Metasys N2	Off	On	Off	Off
	G9000 SNMP	On	On	Off	Off
	G9000 EIP	Off	Off	On	Off
G8000	G8000 Modbus TCP/Modbus RTU	On	Off	On	Off
	G8000 BACnet IP/BACnet MSTP	Off	On	On	Off
	G8000 Metasys N2	On	On	On	Off
	G8000 SNMP	Off	Off	Off	On
	G8000 EIP	On	Off	Off	On

Figure 9 S Bank DIP Switch Setting

3 INTERFACING PROTONODE TO THE DEVICE

3.1 Wiring Connections to ProtoNode RER (FPC-N34 BACnet)

ProtoNode 6 Pin Phoenix connector – Pin outs to the G9000

- The pin outs to Toshiba connector is the same for ProtoNode RER (FPC-N34 BACnet). Pins 1 through 3 are for RS-232 to the G8000/G9000 and pins 4 through 6 are for power.

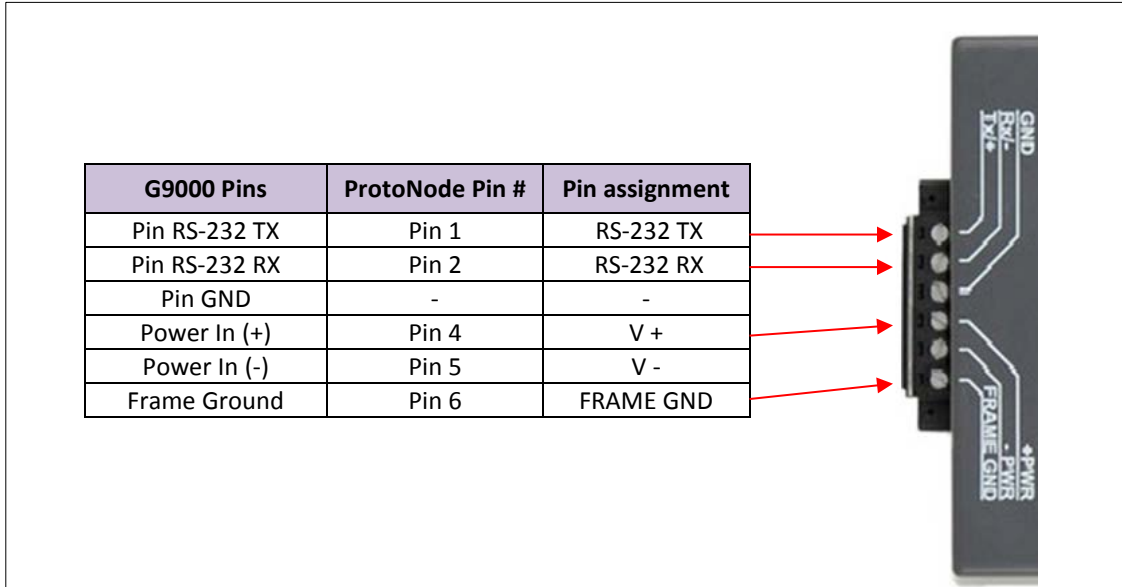


Figure 10 Power and Communications Connections

3.1.1 Connecting G9000 to ProtoNode

1. Connect the Pink/Grey twisted pair wire between the ProtoNode Phoenix Pins 5/6 and the G9000 PSAU-60 Power Supply Board Terminal Block TN.
2. Connect the Communications Cable’s connector to the G9000 PSAU-60 CN1 connector.
3. Strip and connect the Red, Orange, And Yellow wires of the communication cable to the ProtoNode Phoenix Pins 1, 2, and 3 as shown below.

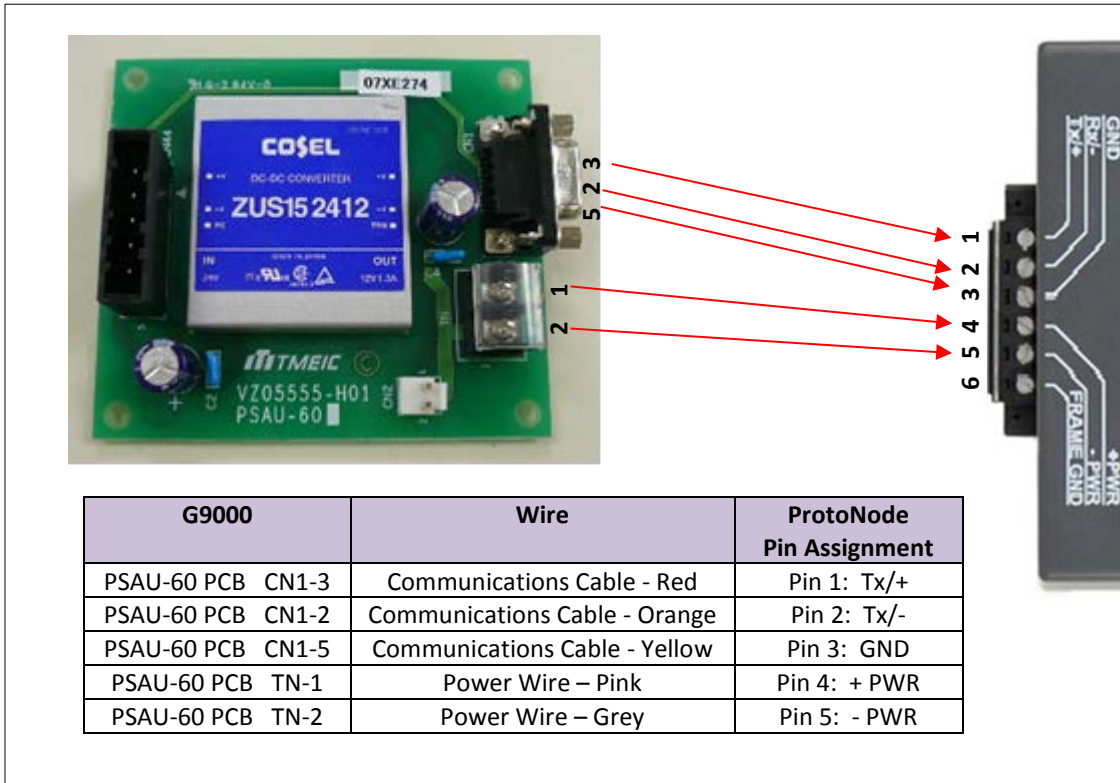


Figure 11 G9000 Power and Communications Connections

3.1.2 Connecting G8000 to ProtoNode

Connect the AC Adapter output power cable to the ProtoNode Phoenix Pins 5 and 6.
Connect the Communication connector DB9 pins to the ProtoNode Phoenix Pins 1,2, and 3 as shown below.

G8000	Wire	ProtoNode Pin Assignment
DB9 Comm. Connector: Pin 3	(User Supplied)	Pin 1: Tx/+
DB9 Comm. Connector: Pin 2	(User Supplied)	Pin 2: Tx/-
DB9 Comm. Connector: Pin 5	(User Supplied)	Pin 3: GND
AC Power Adapter: (+)	(User Supplied)	Pin 4: + PWR
AC Power Adapter: (-)	(User Supplied)	Pin 5: - PWR

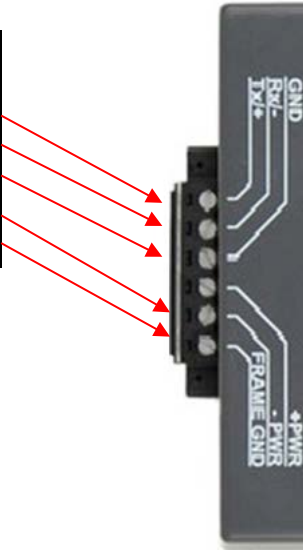








Figure 12 G8000 Power and Communications Connections

3.2 Wiring ProtoNode RER to RS-485 Field Protocol (Modbus/RTU, BACnet MS/TP or Metasys N2)

Connect BMS Modbus/RTU, BACnet MS/TP or Metasys N2 RS-485 port to the 3-pin RS-485 connector on ProtoNode RER as shown below.

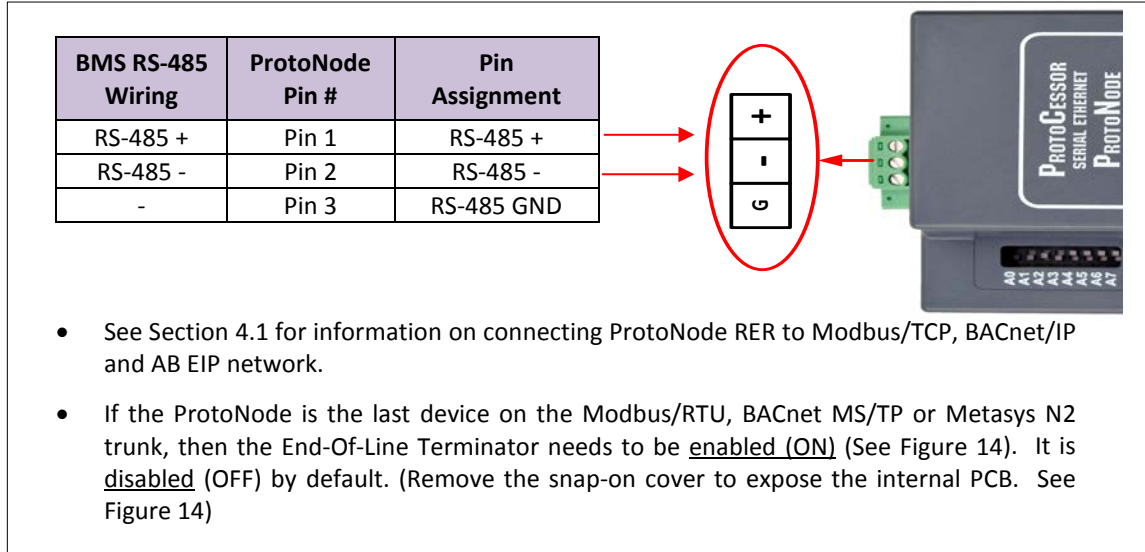


Figure 13 Connection from ProtoNode to RS-485 Field Protocol

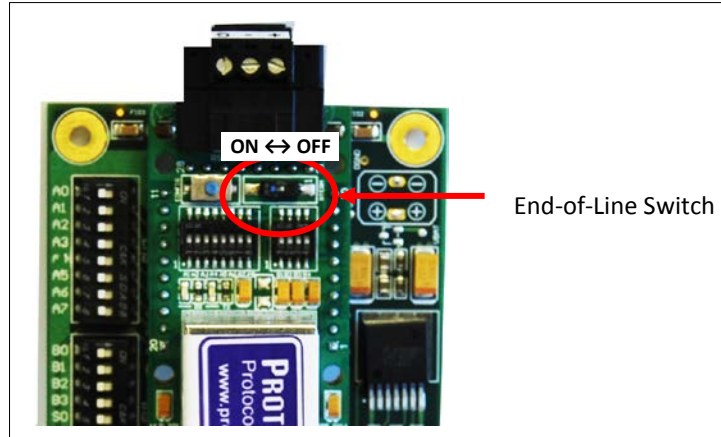


Figure 14 RS-485 EOL Switch

3.3 Power-Up ProtoNode RER (FPC-N34 BACnet)

Apply power to ProtoNode. Ensure that the power supply used complies with the specifications provided in Appendix D.1. Ensure that the cable is grounded using the “Frame-GND” terminal. ProtoNode accepts either 9-30VDC or 12-24 VAC.

Power Requirement for ProtoNode is 9V through 30 VDC or 12-24 VAC			
ProtoNode Family	Current Draw Type		
	12VDC/VAC	24VDC/VAC	30VDC
FPC – N34 (Typical)	170mA	100mA	80mA
FPC – N34 (Maximum)	240mA	140mA	100mA

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 15 Required current draw for the ProtoNode

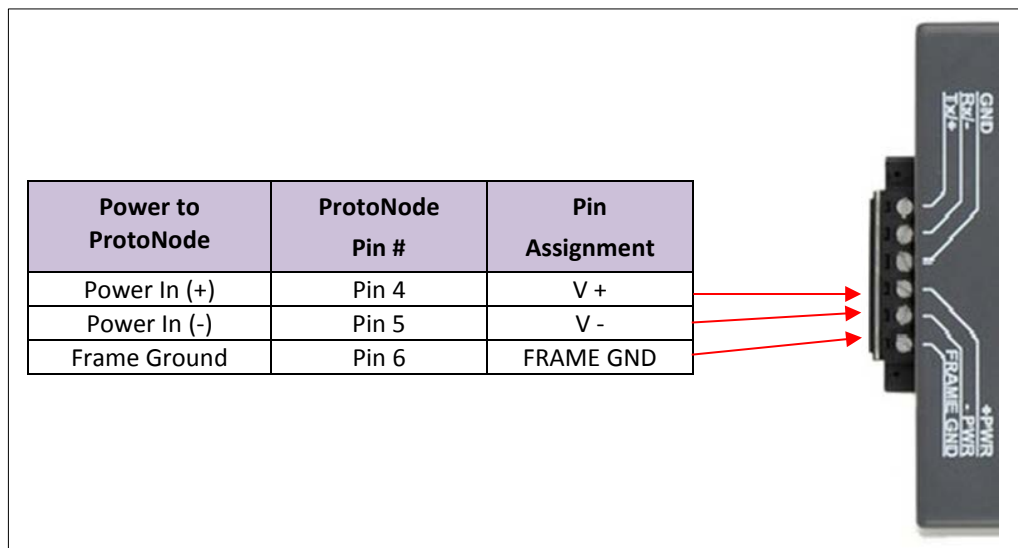


Figure 16 Power Connections




4 CHANGE THE PROTONODE IP ADDRESS USING THE WEB GUI FOR MODBUS/TCP, BACNET/IP, SNMP AND AB EIP



4.1 Connect the PC to ProtoNode via the Ethernet Port



Figure 17 Ethernet Port Location

- Connect a standard 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

- Go to  >  >  Network Connections
- Right-click on Local Area Connection > Properties

- Highlight  Internet Protocol (TCP/IP) > 

- Select: Use the following IP address

Use the following IP address:

IP address:	<input type="text" value="192 . 168 . 1 . 11"/>
Subnet mask:	<input type="text" value="255 . 255 . 255 . 0"/>
Default gateway:	<input type="text" value=" . . ."/>

- Click  twice

4.2 Use the ProtoNode Web GUI to Connect to the ProtoNode

- Open PC web browser enter the default IP address of the ProtoNode 192.168.1.24 determine if the ProtoNode is up and communicating. [Figure 19](#) is the main landing page for the ProtoNode.

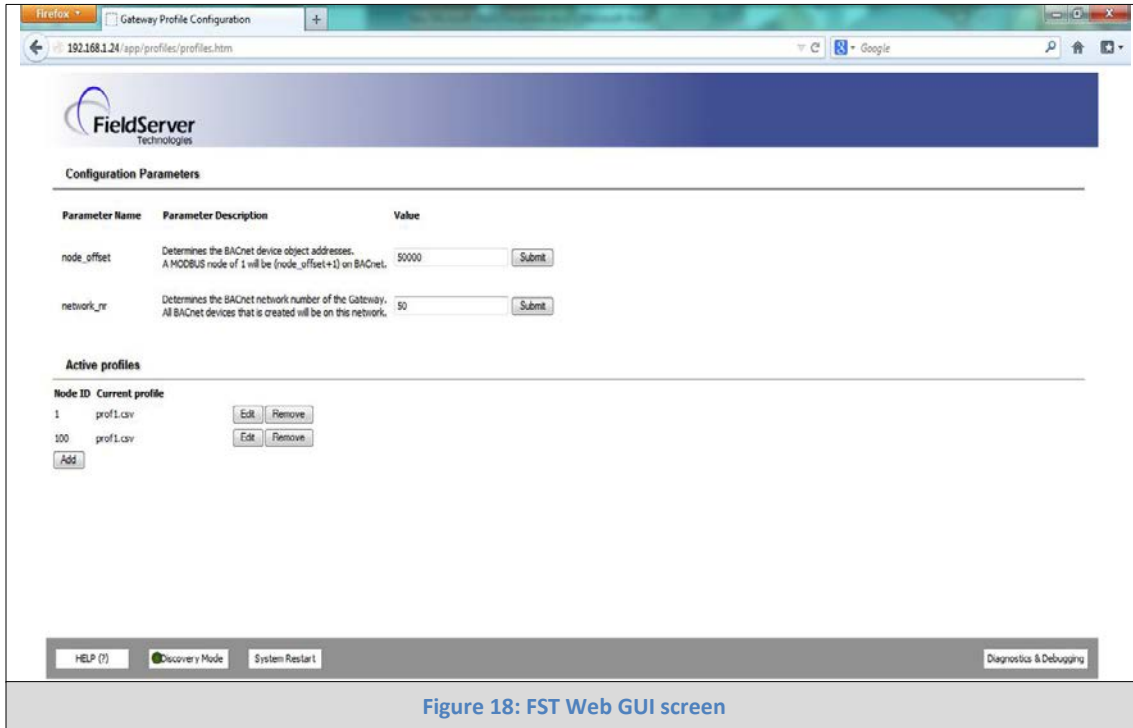


Figure 18: FST Web GUI screen

4.3 Set IP Address for Modbus/TCP, BACnet/IP, SNMP and AB EIP

- Open a PC web browser, enter the default IP address of the ProtoNode 192.168.1.24 and connect to the ProtoNode.
- From the GUI main landing, click on Diagnostics and Debugging (See Figure 19) to get to the Utilities section of the GUI (to change IP Address and other capabilities). (See Figure 20)

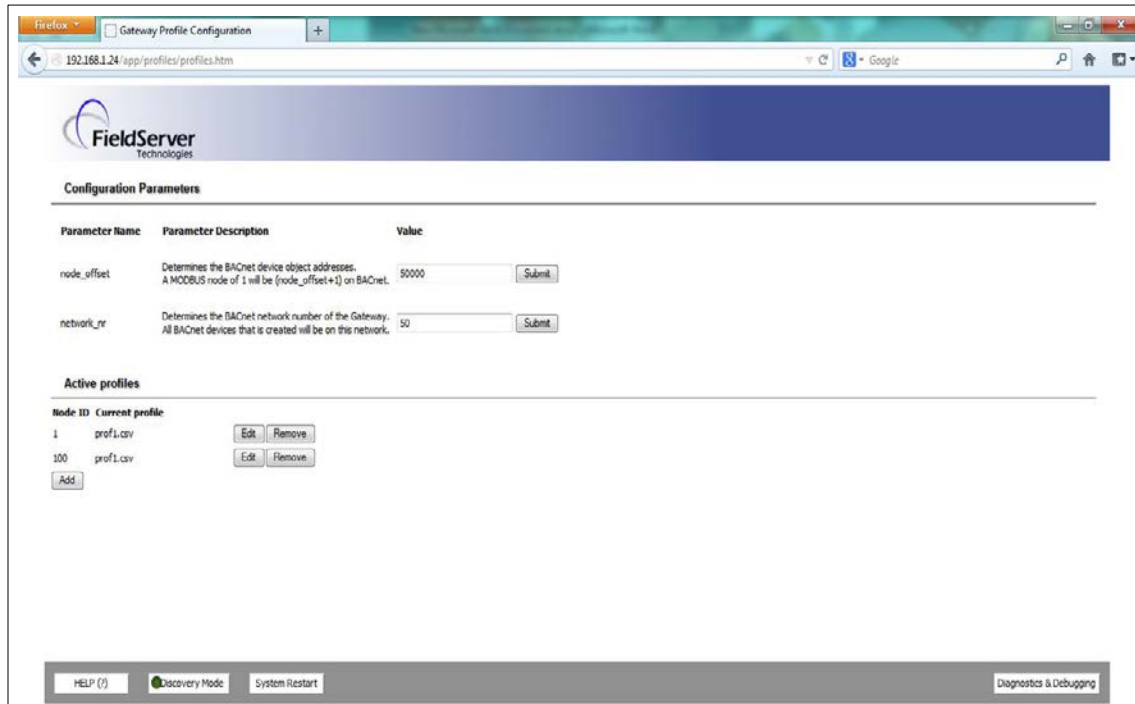


Figure 19 FST Web GUI Utilities page



- From the GUI's Utility page, click on setup and then Network Settings to enter the Edit IP Address Settings menu.
- 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 of the router that it is connected to
- Reset ProtoNode
- Unplug Ethernet cable from PC and connect it to the network hub or router

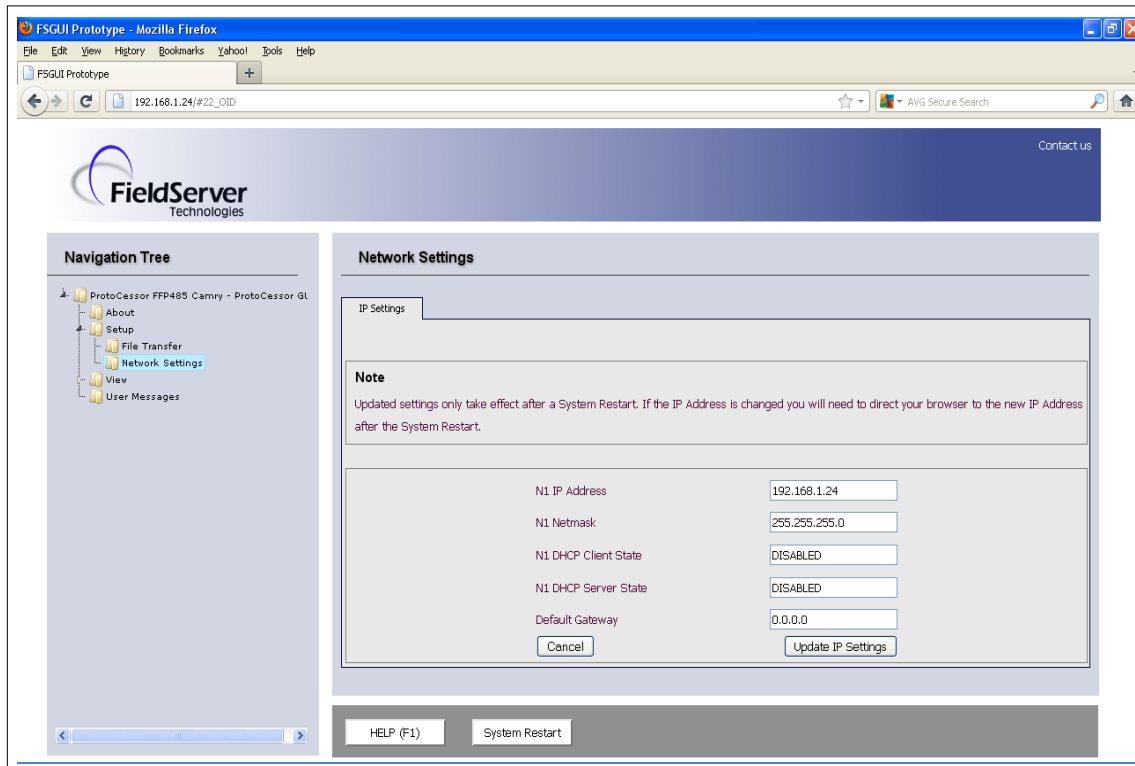


Figure 20 Changing IP Address via FST Web GUI

5 CAS BACNET EXPLORER FOR VALIDATING PROTONODE IN THE FIELD

ProtoCessor has arranged a complementary 2 week fully functional copy of CAS BACnet Explorer (through Chipkin Automation) that can be used to validate BACnet MS/TP and/or BACnet/IP communications of ProtoNode in the field without having to have the BMS Integrator on site. A Serial or USB to RS-485 converter is needed to test BACnet MS/TP.

5.1 Downloading the CAS Explorer and Requesting an Activation Key

- To request the complementary BACnet CAS key, go to <http://app.chipkin.com/activation/twoweek/> and fill in all the information. **Enter Vendor Code "toshiba2014"**. Once completed, the key will be sent to the email address that was submitted. From this email, the long key will need to be copied and pasted into the CAS key activation page.

Request a two week account activation

You have two choices

1. **Activate your account for two weeks**
To request a two week account activation, simply complete this form and request a new product key from within the CAS BACnet Explorer.
Note: Your contact info will be used by chipkin to contact you. If your contact info is invalid or you are unreachable your account will be revoked.

Name:
 Company:
 Address:
 Phone number:
 Email Address:
 Vendor code:
 Product: CAS BACnet Explorer

1. **Purchase**
You can buy the CAS BACnet Explorer to get a full account from If you have one, you can use your discount coupon on the web page. [Visit this page](#)

Feel free to [contact us](#) with any questions you may have.

Figure 21 Downloading the CAS Explorer

- Go to the following web site, download and install the CAS BACnet Explorer to your PC: <http://www.chipkin.com/technical-resources/cas-bacnet-explorer/>
- In the CAS Activation form, enter the email address and paste the CAS key that was sent. Once completed, select Activation.

Settings

License
 Network
 Preferences
 Auto Update
 About

License

Email Address:
 Product key:

Please copy and past the activation key from your email in to this dialog and click activate.
 If you do not have an activation key, you can request now by entering a valid email address and clicking the request a key button.

Figure 22 Requesting CAS Activation Key

5.2 CAS BACnet Setup

These are the instructions to set CAS Explorer up for the first time on BACnet MS/ST and BACnet/IP.

5.2.1 CAS BACnet MS/TP Setup

- Using the Serial or USB to RS-485 converter, connect it to your PC and the 3 Pin BACnet MS/TP connector on ProtoNode RER.
- In CAS Explorer, do the following:
 - Click on settings
 - Check the BACnet MSTP box and uncheck the BACnet/IP and BACnet Ethernet boxes
 - Set the BACnet MSTP MAC address to 0
 - Set the BACnet MSTP Baud Rate to 38400
 - Click Ok
 - On the bottom right-hand corner, make sure that the BACnet MSTP box is green
 - Click on discover
 - Check all 4 boxes
 - Click Send

5.2.2 CAS BACnet BACnet/IP Setup

- See Section 4.1 to set the IP address and subnet of the PC that will be running the CAS Explorer.
- Connect a straight through or cross Ethernet cable from the PC to ProtoNode.
- In CAS Explorer, do the following:
 - Click on settings
 - Check the BACnet/IP box and uncheck the BACnet MSTP and BACnet Ethernet boxes
 - In the “Select a Network Device” box, select the network card of the PC by clicking on it
 - Click Ok
 - On the bottom right-hand corner, make sure that the BACnet/IP box is green
 - Click on discover
 - Check all 4 boxes
 - Click Send

Appendix A. Troubleshooting

Appendix A.1. Check Wiring and Settings

- No COMS on Toshiba Protocol side. If Tx/Rx are not flashing rapidly then there is a COM issue on the Toshiba side and you need to check the following things:
 - Visual observations of LEDs on ProtoNode. (Appendix A.3)
 - Check baud rate, parity, data bits, stop bits
 - Check Toshiba device address
 - Verify wiring
- Field COM problems:
 - Visual observations of LEDs on ProtoNode. (Appendix A.3)
 - 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 FieldServer. (Appendix A.2)

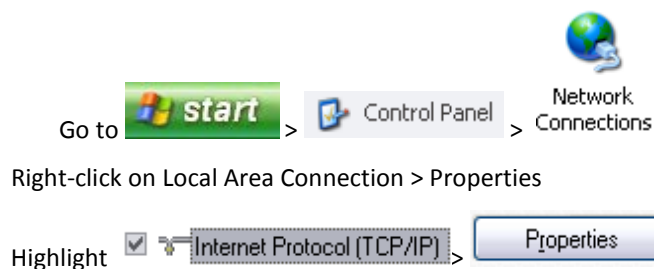
Appendix A.2. Take Diagnostic Capture With the FieldServer Utilities

- Once the log for Diagnostic Capture is complete, email it to support@protocessor.com. The Diagnostic Capture will allow us to rapidly diagnose the problem.
- Make sure the FieldServer utilities are loaded on the PC
<http://fieldserver.com/techsupport/utility/utility.php>

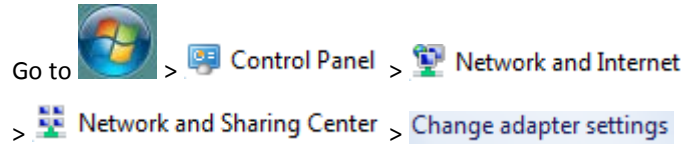


Figure 23 Ethernet Port Location

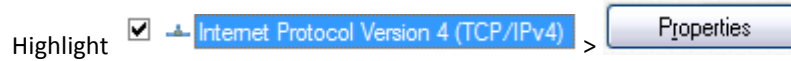
- Disable any wireless Ethernet adapters on the PC/Laptop
- Disable firewall and virus protection software if possible
- Connect a standard cat5 Ethernet cable between the PC and ProtoNode
- The Default IP Address of ProtoNode is **192.168.1.24**, Subnet Mask is **255.255.255.0**. If the PC and ProtoNode are on different IP Networks, assign a static IP Address to the PC on the 192.168.1.xxx network
- For Windows XP:



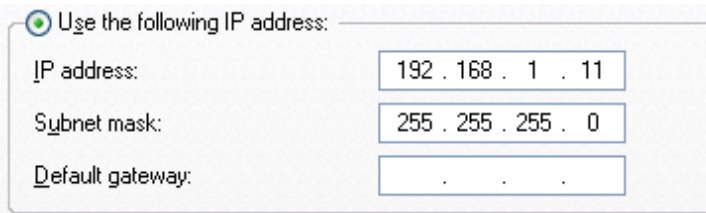
- For Windows 7:




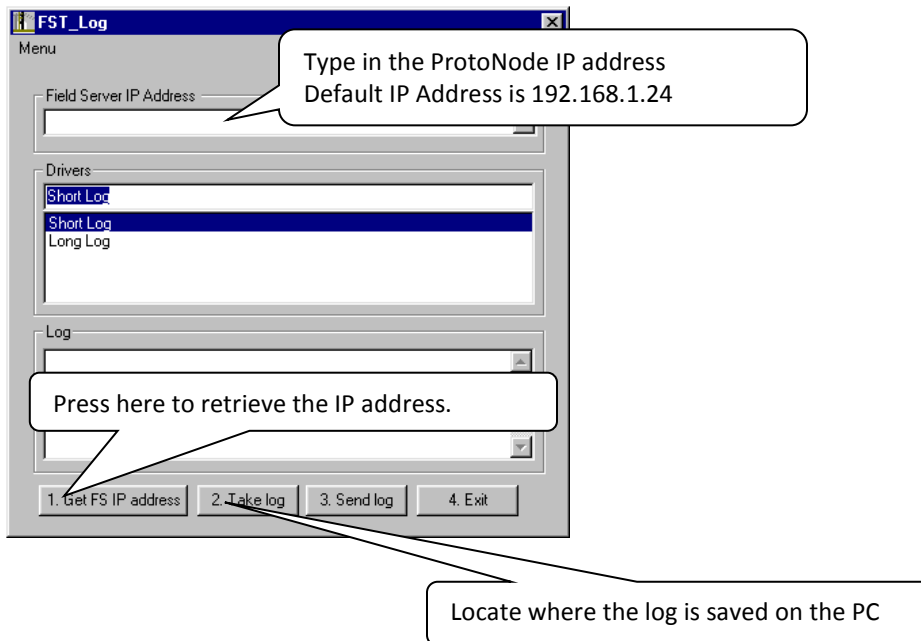
Right-click on Local Area Connection > Properties

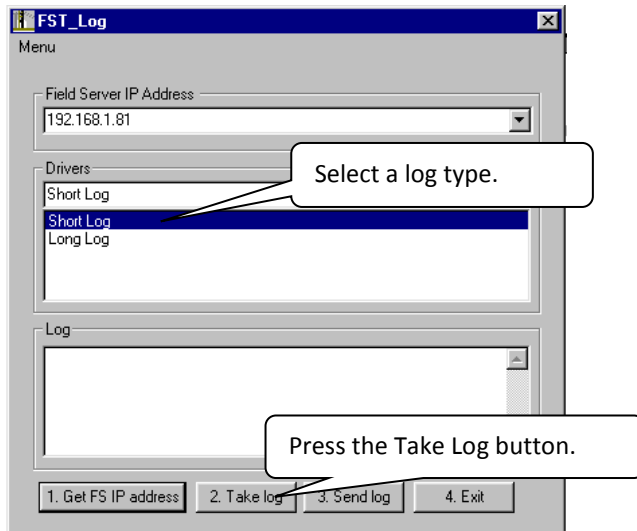


- For Windows XP and Windows 7, select: Use the following IP address

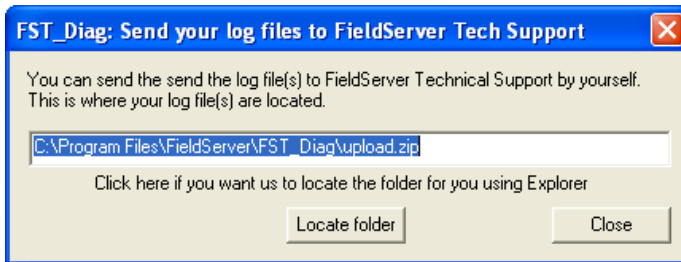


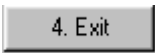
- Click  twice
- Double click on the FST Diag Utility
- **Step 1:** Select a Field Server IP Address
- The IP address can be entered manually or selected by clicking on button 1 using the Utility





- **Step 2:** Take a Log
- Press the Take Log button. While the Utility runs a few DOS prompts will flash across the monitor. Don't click or type anything in to these DOS prompts. This step may take a few minutes depending on the chosen Log Type and computer speed. When the Utility is finished you will be presented with a log of events that have occurred.
- **Step 3:** Send Log
- Click the "Send Log" button located near the bottom of the dialog. The following dialog should appear



- Push the 'Locate Folder' button to launch explorer and have it point directly at the correct folder. The file upload.zip must be sent to support@fieldserver.com
- **Step 4:** Close the Program
- Press the exit button when the log is completed 

Appendix A.3. LED Diagnostics for Toshiba Communications Between ProtoNode and Device

Please see the diagram below for ProtoNode RER LED Locations.

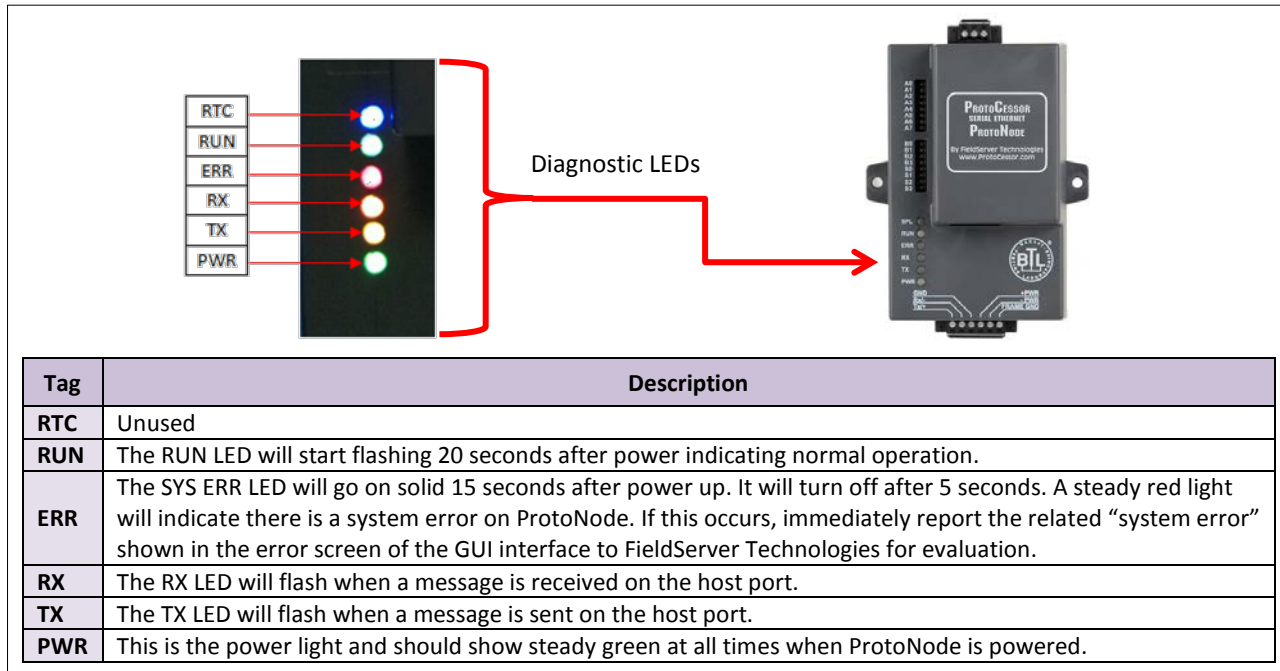


Figure 24 Diagnostic LEDs

Appendix B. Vendor Information - Toshiba

Appendix B.1. G9000 Mappings to Modbus/RTU, Modbus/TCP, BACnet MS/TP, BACnet/IP, Metasys N2, SNMP, AB EIP

Point Name	SNMP		Modbus Registers	BACnet		N2		EIP Tag Name
	OIDs	Trap OIDs		Object Type	Object ID	Data Type	Point Address	
Batt_Volt_Perc	.1.3.6.1.4.1.6347.1.1.0.0	.1.3.6.1.4.1.6347.0.6	30001	AI	1	AI	1	analog_in_1[0]
Battery_Charge_Current	.1.3.6.1.4.1.6347.1.1.1.0	.1.3.6.1.4.1.6347.0.7	30002	AI	2	AI	2	analog_in_1[1]
Batt_Est_Charge	.1.3.6.1.4.1.6347.1.1.2.0	.1.3.6.1.4.1.6347.0.8	30003	AI	3	AI	3	analog_in_1[2]
DC_Bus_Voltage	.1.3.6.1.4.1.6347.1.1.3.0	.1.3.6.1.4.1.6347.0.9	30004	AI	4	AI	4	analog_in_1[3]
Input_Voltage_p1	.1.3.6.1.4.1.6347.1.1.4.0	.1.3.6.1.4.1.6347.0.10	30005	AI	5	AI	5	analog_in_1[4]
Input_Voltage_p2	.1.3.6.1.4.1.6347.1.1.5.0	.1.3.6.1.4.1.6347.0.11	30006	AI	6	AI	6	analog_in_1[5]
Input_Voltage_p3	.1.3.6.1.4.1.6347.1.1.6.0	.1.3.6.1.4.1.6347.0.12	30007	AI	7	AI	7	analog_in_1[6]
Input_Current_p1	.1.3.6.1.4.1.6347.1.1.7.0	.1.3.6.1.4.1.6347.0.13	30008	AI	8	AI	8	analog_in_1[7]
Input_Current_p2	.1.3.6.1.4.1.6347.1.1.8.0	.1.3.6.1.4.1.6347.0.14	30009	AI	9	AI	9	analog_in_1[8]
Input_Current_p3	.1.3.6.1.4.1.6347.1.1.9.0	.1.3.6.1.4.1.6347.0.15	30010	AI	10	AI	10	analog_in_1[9]
Input_Frequency	.1.3.6.1.4.1.6347.1.1.10.0	.1.3.6.1.4.1.6347.0.16	30011	AI	11	AI	11	analog_in_1[10]
Output_Current_p1	.1.3.6.1.4.1.6347.1.1.11.0	.1.3.6.1.4.1.6347.0.17	30012	AI	12	AI	12	analog_in_1[11]
Output_Current_p2	.1.3.6.1.4.1.6347.1.1.12.0	.1.3.6.1.4.1.6347.0.18	30013	AI	13	AI	13	analog_in_1[12]
Output_Current_p3	.1.3.6.1.4.1.6347.1.1.13.0	.1.3.6.1.4.1.6347.0.19	30014	AI	14	AI	14	analog_in_1[13]
Output_Freq	.1.3.6.1.4.1.6347.1.1.14.0	.1.3.6.1.4.1.6347.0.20	30015	AI	15	AI	15	analog_in_1[14]
Output_Load_Perc_p1	.1.3.6.1.4.1.6347.1.1.15.0	.1.3.6.1.4.1.6347.0.21	30016	AI	16	AI	16	analog_in_1[15]
Output_Load_Perc_p2	.1.3.6.1.4.1.6347.1.1.16.0	.1.3.6.1.4.1.6347.0.22	30017	AI	17	AI	17	analog_in_1[16]
Output_Load_Perc_p3	.1.3.6.1.4.1.6347.1.1.17.0	.1.3.6.1.4.1.6347.0.23	30018	AI	18	AI	18	analog_in_1[17]
Bypass_Voltage_p1	.1.3.6.1.4.1.6347.1.1.18.0	.1.3.6.1.4.1.6347.0.24	30019	AI	19	AI	19	analog_in_1[18]
Bypass_Voltage_p2	.1.3.6.1.4.1.6347.1.1.19.0	.1.3.6.1.4.1.6347.0.25	30020	AI	20	AI	20	analog_in_1[19]
Bypass_Voltage_p3	.1.3.6.1.4.1.6347.1.1.20.0	.1.3.6.1.4.1.6347.0.26	30021	AI	21	AI	21	analog_in_1[20]
Bypass_Freq	.1.3.6.1.4.1.6347.1.1.21.0	.1.3.6.1.4.1.6347.0.27	30022	AI	22	AI	22	analog_in_1[21]
Output_Voltage_p12	.1.3.6.1.4.1.6347.1.1.22.0	.1.3.6.1.4.1.6347.0.28	30023	AI	23	AI	23	analog_in_1[22]
Output_Voltage_p23	.1.3.6.1.4.1.6347.1.1.23.0	.1.3.6.1.4.1.6347.0.29	30024	AI	24	AI	24	analog_in_1[23]
Output_Voltage_p31	.1.3.6.1.4.1.6347.1.1.24.0	.1.3.6.1.4.1.6347.0.30	30025	AI	25	AI	25	analog_in_1[24]

Appendix C. MAC Address DIP Switch Settings

Appendix C.1. MAC Address DIP Switch Settings

Address	A0	A1	A2	A3	A4	A5	A6	A7
0	Off	Off	Off	Off	Off	Off	Off	Off
1	On	Off	Off	Off	Off	Off	Off	Off
2	Off	On	Off	Off	Off	Off	Off	Off
3	On	On	Off	Off	Off	Off	Off	Off
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Address	A0	A1	A2	A3	A4	A5	A6	A7
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235	On	On	Off	On	Off	On	On	On
236	Off	Off	On	On	Off	On	On	On
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Address	A0	A1	A2	A3	A4	A5	A6	A7
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240	Off	Off	Off	Off	On	On	On	On
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242	Off	On	Off	Off	On	On	On	On
243	On	On	Off	Off	On	On	On	On
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245	On	Off	On	Off	On	On	On	On
246	Off	On	On	Off	On	On	On	On
247	On	On	On	Off	On	On	On	On
248	Off	Off	Off	On	On	On	On	On
249	On	Off	Off	On	On	On	On	On
250	Off	On	Off	On	On	On	On	On
251	On	On	Off	On	On	On	On	On
252	Off	Off	On	On	On	On	On	On
253	On	Off	On	On	On	On	On	On
254	Off	On	On	On	On	On	On	On
255	On	On	On	On	On	On	On	On

Appendix D. References

Appendix D.1. Specifications



	ProtoNode RER
Electrical Connections	<ul style="list-style-type: none"> • One 6-pin Phoenix connector, one RS-485 +/- ground port, power +/- frame ground port • One 3-pin RS-485 Phoenix connector, one RS-485 +/- ground port • One Ethernet-10/100 Ethernet port
Approvals:	Pending CE (EN55022;EN55024; EN60950), UL916, Pending FCC Class A Part 15, DNP3 Conformance Tested, OPC Self-tested for Compliance, RoHS Compliant, CSA 205 Approved BTL Marked
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 to 167°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 25 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/Net
- Furthermore, the interconnecting power cable shall:
 - Be of length not exceeding 3.05m (118.3")
 - 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 E. Limited 2 Year Warranty

FieldServer Technologies warrants its products to be free from defects in workmanship or material under normal use and service for two years after date of shipment. FieldServer Technologies 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 FieldServer Technologies 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 FieldServer Technologies 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 FieldServer Technology'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, FieldServer Technologies 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 FieldServer Technologies for damages including, but not limited to, consequential damages arising out of/or in connection with the use or performance of the product.