BRYAN® BOILERS
Originators of the "Flexible Water Tube" design

Universal Communication Gateway Instruction Manual

The Universal Communication Gateway (UCG) is an external, high performance, low cost building automation multi-protocol gateway that has been preprogrammed to support BACnet®[1] MSTP, BACnet IP, Metasys®[2] N2 by JCI, Modbus TCP, and LonWorks®. All Honeywell SOLA, Siemens RWF 40/55, Siemens LMV, Honeywell RM7800 Series and the Precision Digital Trident PD765 boiler configurations and Node-ID's are selected through the ProtoNode Web GUI Configurator for fast and easy installation.

The UCG is provided as a 10" x 12" x 6" NEMA Type 1 control panel that must be mounted and supplied with 120 VAC. Additional specifications can be found in Section 6.

This document provides the necessary information to facilitate installation of the UCG on BACnet MSTP, BACnet IP, Metasys N2 and LonWorks network.

You must setup each device to communicate to the UCG

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

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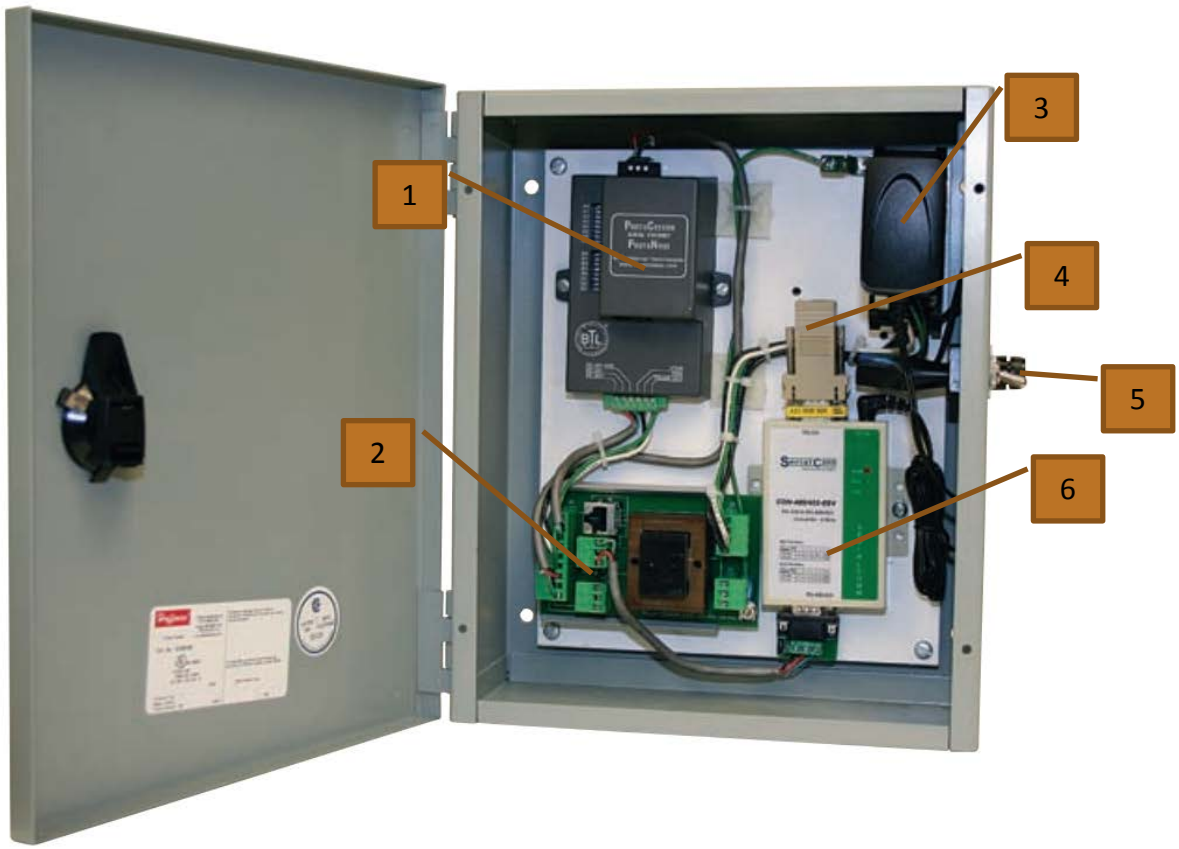


Figure 1 - UCG Component Description

Item	Description
1	ProtoNode
2	UCG-PCB WD-856
3	Power Adapter 120Vac to 9 Vdc (only for Siemens AZL)
4	RJ45 Adapter (only for Siemens AZL)
5	UCG Power Switch
6	RS232 to RS485 Converter (only for Siemens AZL)

Table 1 - UCG Component Description

1 HOW TO USE THIS MANUAL

This manual can be used in its entirety or as a reference. **You may need to reference your device's manual for information not covered in this UCG manual**. The three main sections are as follows:

Section 2: Mounting UCG – This section is for mounting the UCG control panel, connecting power and building management connections.

Section 3: Connect and Setup of Boiler Devices to the UCG – This section is for the connections and programming each device for communication to the UCG.

Section 4: Setup UCG – The section is for the programming of the UCG to communicate to the devices (Modbus) and to your building management system.

All other sections are supportive of the sections above.

2 MOUNTING UCG

2.1 MOUNTING

Mount the UCG in a suitable location that is easy to access. Verify that the UCG power switch is in the "off" position. Connect J1-1(L1), J1-2(L2) and J1-3(G) of the UCG-PCB WD-856 to a 120VAC power source.

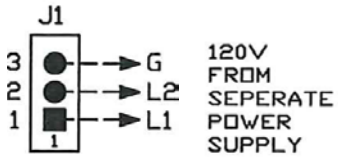


Figure 2 - Power Connection

2.2 BUILDING MANAGEMENT SYSTEM (BMS) WIRING

Building Management wiring depends on the protocol of the BMS.

- ***MODBUS TCP and BACnet IP*** see section 1.2.1
- ***BACNET MSTP AND MEYASYS N2*** see section 1.2.2
- ***LONWORKS*** see section 1.2.3

2.2.1 MODBUS TCP AND BACNET IP

Inside the UCG, use CAT5 twisted pair cable to connect from the Ethernet (RJ45) connection of the ProtoNode to the BMS network. See Figure 3. After BMS connection, skip to section 3.

Figure 3 - Ethernet Connection on the ProtoNode

2.2.2 BMS RS-485 (BACNET MSTP AND METASYS N2 PROTOCOL)

Use shielded cable to connect the field BMS computer to terminals J2-1(Gnd), J2-2(-), and J2-3(+) of the UCG-PCB WD-856 located inside UCG. After BMS connection, skip to section 3.

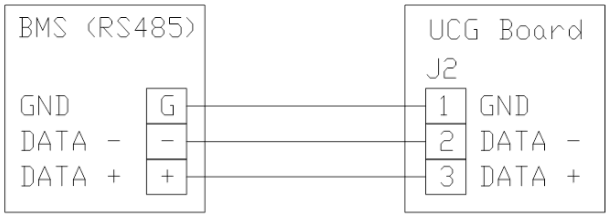


Figure 4 - BACnet MSTP and Metasys N2 BMS Connection

2.2.3 LONWORKS NETWORK

Use a twisted pair, non-shielded cable to connect the field BMS computer to J2-2(-) and J2-3(+) of the UCG-PCB WD-856 located inside UCG. After BMS connection, skip to section 3.

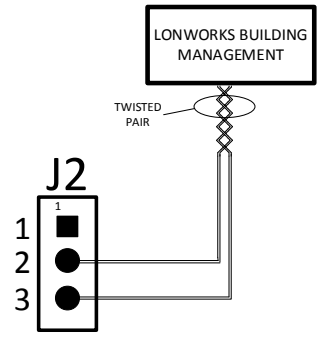


Figure 5 - LonWorks BMS connection

3 CONNECT AND SETUP OF BOILER DEVICES TO UCG

3.1 WIRING DEVICES TO THE UCG

If your boiler is equipped with a Bryan Boilers Printed Circuit Board (WD-857), see section 3.1.8. Otherwise connect all devices directly to the UCG-PCB WD-856 located inside UCG. The devices on this bus must be wired in a daisy chain configuration. The order of the interconnection is not important.

- ***HONEYWELL SOLA*** see section 3.1.1
- ***SIEMENS RWF40*** see section 3.1.2
- ***SIEMENS RWF55*** see section 3.1.3
- ***SIEMENS LMV2…/LMV3…*** see section 3.1.4
- ***SIEMENS LMV5…*** see section 3.1.5
- ***HONEYWELL RM7800 SERIES KEYBOARD DISPLAY OR MODBUS MODULE*** see section 3.1.6
- ***PRECISION DIGITAL TRIDENT PD765 PANEL METER*** see section 3.1.7

3.1.1 HONEYWELL SOLA

Use shielded cable to connect the Honeywell system display's COM2 port to terminals J3-1(GND), J3-2(-), and J3-3(+) of the UCG-PCB WD-856 inside the UCG. Up to 8 SOLA controls can be controlled from one UCG. See Figure 6.

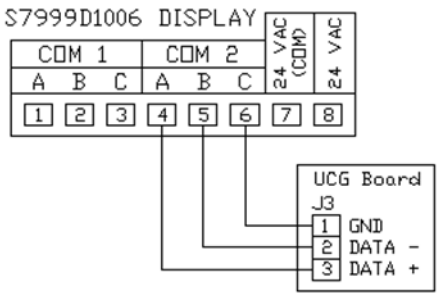


Figure 6 - Honeywell S7999 Display and UCG Connection

3.1.2 SIEMENS RWF40

Use shielded cable to connect terminals CG, CB, and CA of the Siemens RWF40 to terminals J3-1(GND), J3-2(-), and J3-3(+) of the UCG-PCB WD-856 inside the UCG.

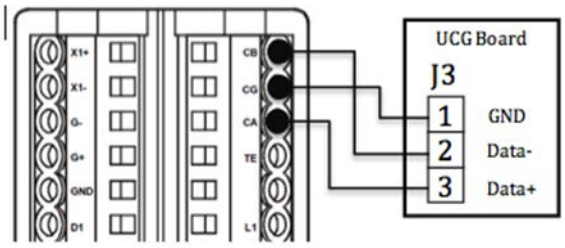


Figure 7 - Siemens RWF40 and UCG Connection

3.1.3 SIEMENS RWF55

Use shielded cable to connect terminals R+, and R- of the Siemens RWF55 to terminals J3-2(-), and J3-3(+) of the UCG-PCB WD-856 inside the UCG. See Figure 8.

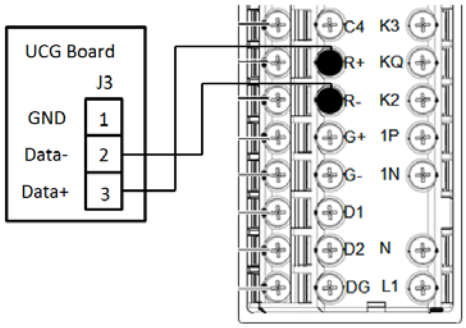


Figure 8 - Siemens RWF55 and UCG Connection

3.1.4 SIEMENS LMV2…/LMV3…

Use shielded cable to connect the burner mounted OCI412.10 RS-485 interface terminals X20.1, X20.2, and X20.3 to terminals J3-1(GND), J3-2(-), and J3-3(+) of the UCG-PCB WD-856 inside the UCG.

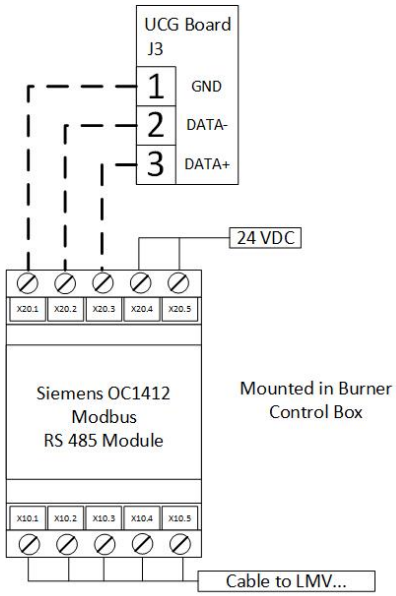


Figure 9 - Siemens LMV2.../LMV3... and UCG Connection

3.1.5 SIEMENS LMV5…

Use CAT5 twisted pair cable to connect from the RJ45 jack, COM2, of the Siemens AZL to the RJ45 jack of the UCG Serial Comm inside the UCG. See Figure 10.

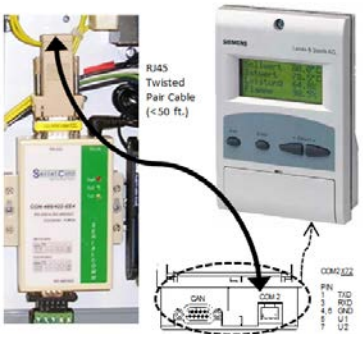


Figure 10 - LMV 5... And UCG Connection

3.1.6 HONEYWELL RM7800 SERIES

3.1.6.1 S7800A1142 KEYBOARD DISPLAY MODULE

Use shielded cable to connect terminals 1, 2, and 3 of the Honeywell S7800A1142 display to terminals J3-1(GND), J3-2(-), and J3-3(+) of the UCG-PCB WD-856 inside the UCG. (The 203541 Connector will be required for connection)

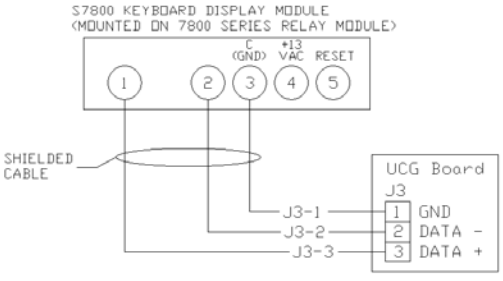


Figure 11 - Honeywell RM7800 with S7800 Keyboard Display

3.1.6.2 S7810M MODBUS™ MODULE

Use shielded cable to connect terminals 6(GND), 7(+), and 8(-) of the Honeywell S7810M ModBus Module to terminals J3-1(GND), J3-2(-), and J3-3(+) of the UCG-PCB WD-856 inside the UCG.

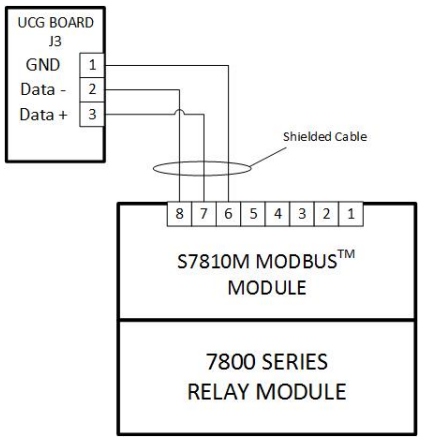


Figure 12 - RM7800 with S7810M ModBus Module

3.1.7 PRECISION DIGITAL TRIDENT PD765 PANEL METER

Use shielded cable to connect terminals ⏚, DO,$\overline{DO}$, $\overline{DI}$ and DI of the PDA7422 Trident RS-485 Serial Adapter to terminals J3-1(GND), J3-2(-), and J3-3(+) of the UCG-PCB WD-856 inside the UCG. Connect the PDA7420 modular cable to the serial port of the meter and adapter.

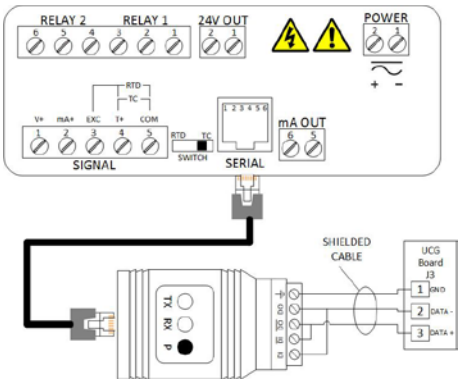


Figure 13 - Precision Digital Trident PD765 to UCG Connection

3.1.8 BOILERS EQUIPPED WITH BRYAN STEAM PRINTED CIRCUIT BOARD (WD-857)

Units equipped with a Bryan Steam Communication PCB (WD-857) can be interconnected using the two RJ45 jacks installed on the board. Standard CAT5 cable wired as T-568A or T-568B straight through can be used for the interconnection between the devices (factory wired to the Bryan Steam Communication PCB (WD-857)) and P1 of the UCG-PCB WD-856 inside the UCG.
The Bryan Steam Communication PCB does not need to be wired in sequential order as this will be handled in the device addressing.

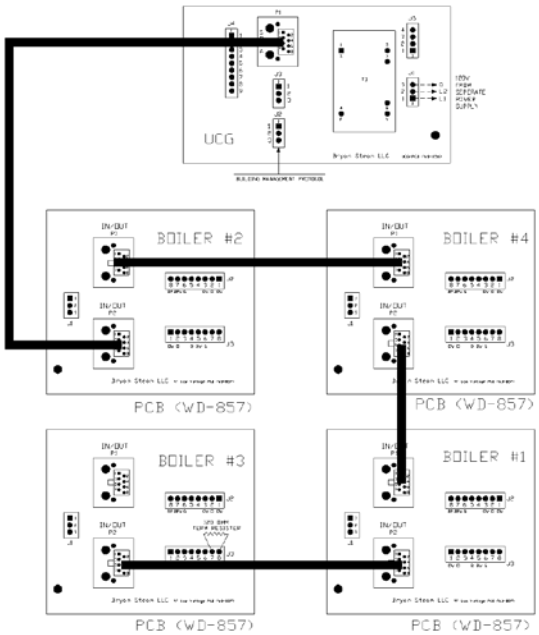


Figure 14 - Bryan Steam Communication PCB (WD-857) and Multi Boiler Connection

3.1.8.1 END OF LINE TERMINATION SWITCH

Long RS-485 cabling runs of 20ft. or more should be properly terminated at each end. If needed a 120Ω terminating resistor should be between J3-7 and J3-8 of the UCG-PCB WD-857 on each end of the trunk (See Figure 12, Boiler #3). If the UCG is placed at one of the ends of the trunk, the blue RS-485 End-of-Line Terminating switch inside the UCG will need to be moved to the ON position. Remove the cover of the ProtoNode and move the Modbus RS-485 EOL Switch to the ON position.

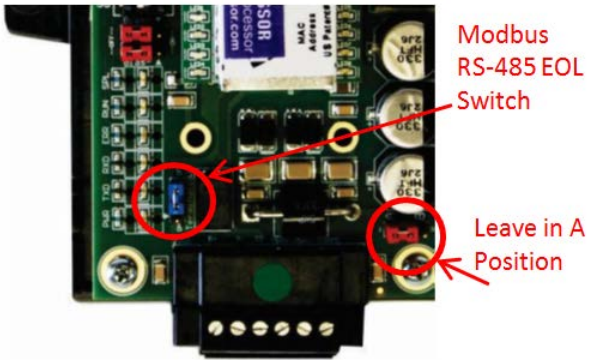


Figure 15 - End of Line Termination

Always leave the single Red Jumper in the A position.

On short cabling runs which most applications are, the EOL switch does not need to be turned ON. The default setting for this Blue EOL switch is OFF.

3.2 DEVICE MODBUS RTU COM SETTINGS

All devices connected to the UCG **MUST HAVE the same Baud Rate, Data Bits, Stop Bits, and Parity.** Refer to the UCG configuration sheet (generally shipped with boiler) for the appropriate address and baud rate settings for each device.

Section 7.1 defines the installed default serial port settings for each device.

Set Modbus Node-ID for each of the devices attached to UCG. The Modbus Node-IDs need to be uniquely assigned between 1 and 255. Use the table in section 8 to record boilers, devices and Node-ID.

- The Modbus Node-ID's assigned are used for designating the Device Instance for BACnet IP and BACnet MSTP.
- The Metasys N2 and Modbus/TCP Node-ID will be set to the same value as the Node-ID of the device (Modbus RTU).

Select the device below:

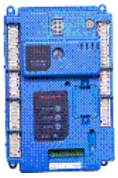
- Honeywell SOLA see section 3.2.1
- Siemens RWF40 see section 3.2.2
- Siemens RWF55 see section 3.2.3
- Siemens LMV2…/LMV3… see section 3.2.4
- Siemens LMV5…… see section 3.2.5
- Honeywell RM7800 Series see section 3.2.6
- Trident Model PD765 Universal Input Meter section 3.2.7

3.2.1 HONEYWELL SOLA

3.2.1.1 SET BOILER ADDRESS

The Passcode is **Bryan**.

Each individual SOLA will now need its own unique address. Follow these steps to setup the addressing for each SOLA:



- Select the SOLA controller
- Select Configure↲
- System Identification and Address↲
- Scroll to the bottom↲
- Change MB1 and MB2 to the same Address of the boiler↲

- Press the Home button
- Select Setup↲
- Select Display Diagnostics↲
- Select Display Reset↲
- **Repeat for each boiler.**

Refer to the UCG configuration sheet (generally shipped with boiler) for the appropriate address and baud rate settings for each device.

3.2.1.2 SOLA BMS ACTIVATION

3.2.1.2.1 SOLA S7999B

The S7999B display's Modbus gateway must be enabled for BAS control. From the S7999B home screen follow these steps to enable the Modbus gateway.

- Setup↵
- Advanced Setup↵
- User Preferences↵
- Com 2 Tab↵

Check the "**Enable Modbus Gateway**" box

Set the Modbus gateway baud rate to 38400 bps.

3.2.1.2.2 SOLA S7999D

Before powering on any of the boilers make sure that all communication wires are disconnected from each boiler and BMS. Apply power to all boilers. From the S7999D home screen follow these steps to enable the Modbus gateway for each SOLA:

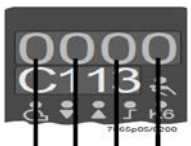
- Setup↵
- Display Setup↵
- COM2 Tab↵
  - ✓ "**Enable COM2 port**" ↵
- Check that Modbus baud rate is set at 38400 bps
- Select the Gateway tab↵
  - ✓ "**Enable Modbus gateway**" ↵
- Select "**Gateway on COM2 port**" ↵
- Select Save↵

Return to the home screen by pressing the home button in the upper left corner of the screen.

Reconnect all communication wires back to the boilers and BMS.

3.2.2 SIEMENS RWF40

Each RWF40 device will need to be setup with its own unique address. Refer to the UCG configuration sheet (generally shipped with boiler) for the appropriate address and baud rate settings. The decimal place, unit, and Baud rate will need to be setup the same on all devices.



Unit Address

Address 0	0	0
Address 1	0	1
…		…
Address 99	9	9

Modbus settings

Press **PGM** and hold for 3 seconds, and then release to access the parameter level.
From the parameter level, advance to the configuration level by pressing **PGM** again, holding for 3 seconds, and release.

Press **PGM** and release it, to advance to C112, press **PGM** again and release it, to advance to C113.

Changing Values

Select the desired digit that needs adjusted by pressing ▼ once and releasing it.
(Each time ▼ is pressed and released it will cycle, thru each digit, right-to-left and back again)
To change the value of the flashing digit, press ▲ and release it.
(Pressing ▲ and releasing will cycle up thru the allowable values, and back again.)
Once the desired value is displayed and flashing, accept it by pressing **PGM** once and release it. If no keys are pressed for 30 seconds, at any time, the controller will automatically return to the basic display.

Decimal place, unit, Baud rate

No decimal place, degrees Celsius, 9600 Bd	0
One decimal place, degrees Celsius, 9600 Bd	1
No decimal place, degrees Fahrenheit, 9600 Bd	2
One decimal place, degrees Fahrenheit, 9600 Bd	3
No decimal place, degrees Celsius, 19200 Bd	4
One decimal place, degrees Celsius, 19200 Bd	5
No decimal place, degrees Fahrenheit, 19200 Bd	6
One decimal place, degrees Fahrenheit, 19200 Bd	7
No decimal place, degrees Celsius, 4800 Bd	8
One decimal place, degrees Celsius, 4800 Bd	9
No decimal place, degrees Fahrenheit, 4800 Bd	A
One decimal place, degrees Fahrenheit, 4800 Bd	b

Signal for out-of-range

Limit comparators OFF	0
Limit comparators ON	1

Factory Setting	0	1	2	0

Press **EXIT** and release, to immediately return to the basic display.

3.2.3 SIEMENS RWF55

3.2.3.1 SETTINGS

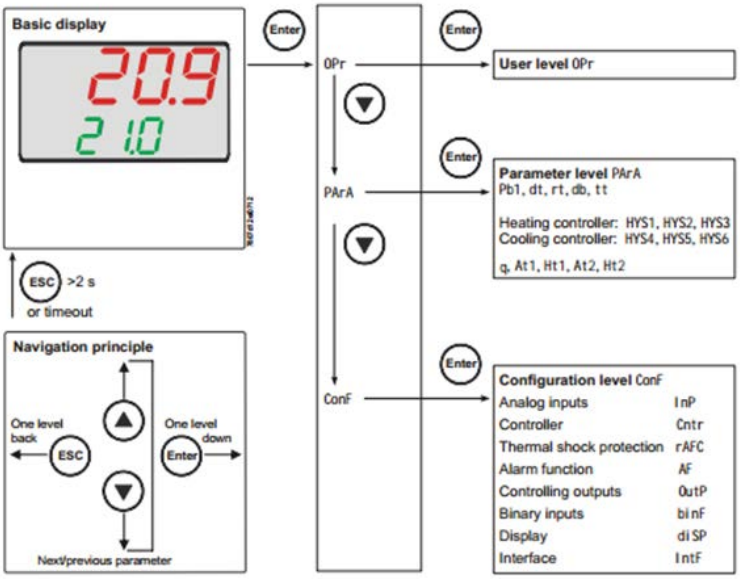


Figure 16 - Siemens RWF55 Programing

- From the basic display, press Enter so that **0Pr** appears
- Press ▼ so that **PArA** appears
- Press ▼ so that **ConF** appears
- Press Enter so that the first parameter of the **ConF** level is displayed
- Press ▼ until **IntF** appears
- Press Enter and **r485** appears. Press Enter again and the first parameter **bdrt** appears.

Note: The baud rate will need to be the same on all devices connected to the UCG.

- Press Enter again and the **bdrt** will begin to flash.
  - Use the ▼ to choose the following:
    - 0 for 4800 Baud
    - 1 for 9600 Baud
    - 2 for 19200 Baud
    - 3 for 38400
- Press Enter so that the **bdrt** stops flashing.
- Press ▼ and **Adr** is displayed.
- Press Enter again and the **Adr** will begin to flash.

Note: The device address will need to be different on all devices connected to the UCG. Refer to the UCG configuration sheet (generally shipped with boiler) for the appropriate address and baud rate settings for each device.

- The device address can be set from 0-254.
- Use the arrow keys to choose the device address.
- Press Enter and the RWF55 Setup is complete.

3.2.4 SIEMENS LMV2…/LMV3…

3.2.4.1 PASSCODE

The Passcode can be dependent on the burner manufacturer. The LMV2…/LMV3… passcode is “2345” or “Entry”. If the passcode is incorrect, check inside the burner control box panel. You may need to contact the burner manufacturer for the correct passcode.

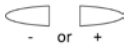
- Hold 

simultaneously for 3 seconds, **Co d E** will momentarily be displayed
- Press 

to adjust for each digit of the password
- Press 

after each correct character is displayed
- Press 

again after the password is complete
- **PA r A** is momentarily displayed, press 

simultaneously
- **400: S E t** should be displayed, press 

until **100:PArA** is displayed
- Press 

3.2.4.2 SETTINGS

- Press 

until **141: 0** is displayed, press 

- Press 

to change **141: 0** to **141: 1**, press 

- Press 

simultaneously

The Modbus functionality can only be made via the LMV2…/LMV3… not via Modbus. This functionality can only be activated by setting this parameter to “1”.

3.2.4.3 SLAVE ADDRESS

Each LMV2.../LMV3... device will need to be setup with its own unique address. Refer to the UCG configuration sheet (generally shipped with boiler) for the appropriate address and baud rate settings for each device.

- Press 

until **145: 0** is displayed, press 

- Press 

to change **145: 0** to **145: (*)**, press 

- Press 

simultaneously

*This is the address of the individual device.

3.2.5 SIEMENS LMV5…

3.2.5.1 PASSCODE

You may need a passcode. The passcode can be dependent on the burner manufacturer. The LMV5… passcode is "9876" or "WES". If the passcode is incorrect, check inside the burner control box panel. You may need to contact the burner manufacturer for the correct passcode.

3.2.5.2 BMS ACTIVATION

Activation takes place with the AZL5 menus.

- Operation↲
- OptgModeSelect↲
- GatewayBASon↲

When GatewayBASon is activated, plant operation and diagnostics via the AZL… are still possible.

The internal load controller must be turned on for controlling the load with BMS. Use the display menus as shown to activate the internal load controller.

- Params&Display↲
- LoadController↲
- Configuration↲
- LC_OptMode↲
- IntLCbus↲

3.2.5.3 SLAVE ADDRESS

The slave address can be selected via the AZL menu. Refer to the UCG configuration sheet (generally shipped with boiler) for the appropriate address and baud rate settings for each device. The slave address can be set between 1 and 247.

- Params&Display↲
- AZL↲
- Modbus↲
- Address↲

3.2.5.4 TRANSMISSION PARAMETERS

The Baud Rate can be set via the AZL menu. This can be set to 9600 bit/s or 19200 bit/s.

- Params&Display↲
- AZL↲
- Modbus↲
- Baud Rate↲

The Parity can also be setup via the AZL menu.

- Params&Display↲
- AZL↲
- Modbus↲
- Parity↲

This can be set to "none", "even", or "odd"

3.2.5.5 TIMEOUT COMMUNICATION FAILURE

The AZL will timeout when there is no communication from the BMS. The time can be set from 0 to 7200 seconds. When this time has elapsed the BMS control mode will change from remote to local control. This can be changed via the AZL menu.

- Params&Display↲
- AZL↲
- Modbus↲
- Timeout↲

3.2.5.6 REMOTE/LOCAL

The AZL has an internal remote / local switch. This switch can only be operated from the display menus.

- ManualOperation↲
- Auto/Manual/Off↲

There are three settings for this switch.

Off – Manually turn the boiler off. All set points are ignored.

Manual – Operates in manual based on the operator's inputted value. All set points are ignored. Normally used for commissioning the boiler.

Auto – Allows the boiler to be controlled by the BMS.

3.2.5.7 BMS OPERATING MODE

When the BAS remote / local switch is active and set to remote, control of the boiler is based on the operating mode selection.
There are three operating modes:

Off – The burner will remain off regardless of set point.

On – The burner will be controlled based on the fuel rate register #45. (Remote Firing Rate Control)

Auto – The burner will be controlled based on external set point register #44. (Remote Set point)

3.2.6 HONEYWELL RM7800 SERIES

There are two types of modules that can be used to set up communication on the RM7800.

- Keyboard Display Module S7800A see section 3.2.6.2
- Modbus Module S7810M see section 3.2.6.1

3.2.6.1 MODBUS MODULE S7810M

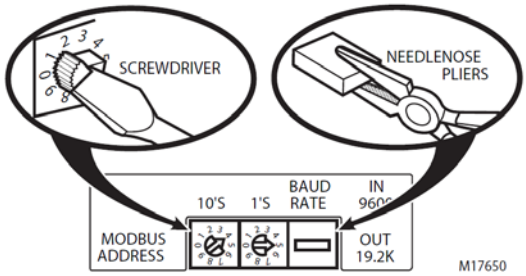


Figure 17 - 7810M Address Switches and Baud Rate Jumper

Assign a device address number from 01 to 99. 00 is not an acceptable address number and will not work.
The default baud rate is 9600. To change the baud rate to 19.2K, use needle nose pliers to remove the jumper. See Fig. 17.

3.2.6.2 KEYBOARD DISPLAY MODULE S7800A

3.2.6.2.1 BMS ACTIVATION

Press the left three buttons of the Keyboard Display Module for one second, then release.

DISPLAY Setup will appear. If you have a personal password, enter it to enter Setup.

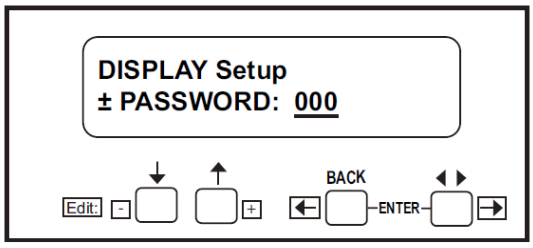
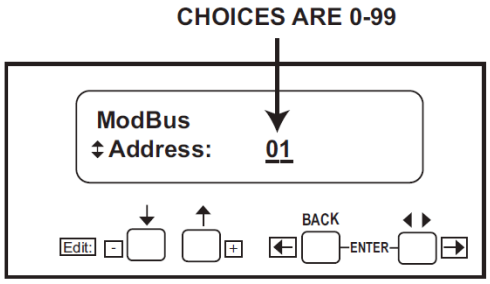


Figure 18 – Honeywell RM7800 Display Setup Screen

Press ENTER by pressing the two ENTER buttons simultaneously.

Choose Select.

Select: M B A D D R E S S, then ENTER.



00 is the default address (Modbus off). Refer to the UCG configuration sheet (generally shipped with boiler) for the appropriate address and baud rate settings for each device.

01-99 are available addresses.

Use ↑ and ↓ to select address. Press ENTER.

The left box blinking means ModBus activity is occurring. The right box blinking means this address is receiving activity (see Fig. 17).

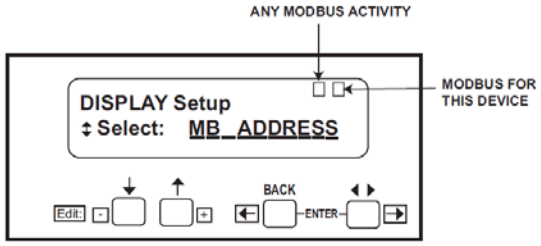
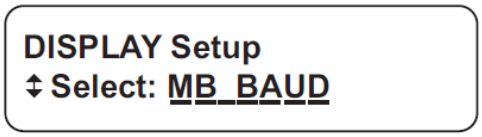


Figure 19 - Modbus Activity on RM7800

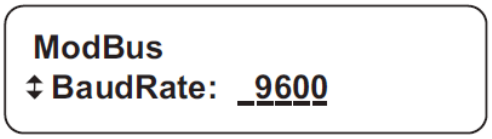
With default address 00 terminals 1, 2, 3 of the 203541 connector are available for the S7830 Expanded Annunciator or additional keyboard displays. With the addresses 01-99 enabled, ModBus is active and the S7830 Expanded Annunciator or additional displays will NOT work. If the Expanded Annunciator or additional displays are required, then order the S7810M1003 ModBus card to support the ModBus Function.

3.2.6.2.2 SETTING BAUD RATE



Display Setup MB Baud by pressing Enter.
Scroll to MB BAUD screen.
Select: M B B A U D.

Press ↓ to select.

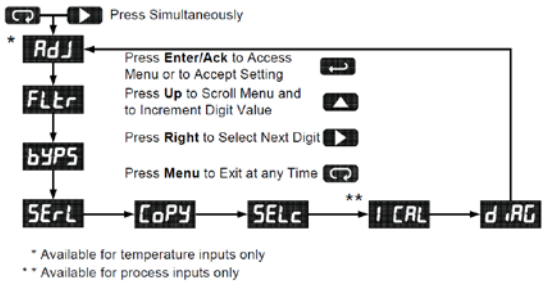


Use the ↑ and ↓ keys to change rates (choices are 9600, 19200, and 38400).

Press ENTER at the Save Changes/Exit No Save screen.

3.2.7 PRECISION DIGITAL TRIDENT PD765 PANEL METER

Press the Right arrow and Menu button simultaneously or hold the Menu button for approximately 3 seconds to access the Advanced Features Menu of the meter.



Prot - Verify that Protocol is set to Modbus.

Addr - Each meter must be provided with its own unique address from 1 to 247.

bAud – Rate must match all other devices connected to UCG.

trdE – Rate must match all other devices connected to UCG.

4 SETUP UCG

4.1 DEVICES AND POINT COUNT AVAILABILITY

- The total number of devices attached to UCG (RER) cannot exceed 1500 Modbus registers for BACnet MSTP, BACnet IP, Modbus TCP/IP or Metasys N2.
- The total number of devices attached to UCG(LER) cannot exceed 1000 Modbus registers for LonWorks

Devices	Point Count
SOLA	28
RWF40	15
LMV5…	30
RM7800	37
LMV3…	9

Table 2 - Modbus Registers

4.2 UCG PROTOCOL SETUP

4.2.1 CONFIGURE THE DIP SWITCHES

DIP switches on the ProtoNode, located inside UCG, may need to be set for the appropriate devices and communication settings. These DIP switches are factory preset when the field device and protocol are known at the time of ordering. If needed, remove the cover of the ProtoNode located inside the UCG.

Note: If the DIP switches need to be changed then the power to the unit will need to be shut off before proceeding.

4.2.1.1 BMS PROTOCOL (DIP SWITCH S0 – S3)

The S bank of DIP switches (S0 – S3) are used to select BACnet MSTP, BACnet IP, Modbus/TCP, or Metasys N2 configurations on the UCG (RER). The "S0 – S3" bank of DIP switches on the UCG (LER) (LonWorks) are disabled. See Table 2 below and set S bank Dip switches to the desired configuration.

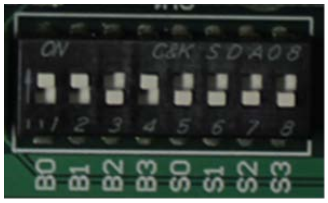


Figure 20 - S Bank DIP Switches

UCG RER	S Bank DIP Switches			
Profile	S0	S1	S2	S3
BACnet IP	Off	Off	Off	Off
BACnet MSTP	On	Off	Off	Off
Metasys N2	Off	On	Off	Off
Modbus TCP	On	On	Off	Off

Table 3 - BMS Protocol Selection

4.2.1.2 SETTING THE SERIAL BAUD RATE

DIP Switches B0 – B3 can be used to set the serial baud rate to match the baud rate provided by BMS. See Table 4 for B bank configurations.

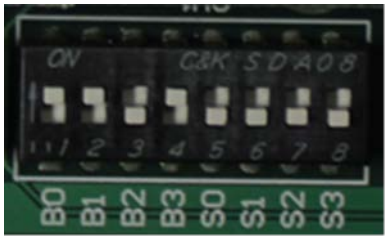


Figure 21 - B Bank DIP Switches

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

Table 4 - Baud Rate

Note: **Metasys N2 is always defaulted to 9600 baud and the B bank is disabled.**

Set up the specific protocol needed:

- ***BACnet MSTP*** see section 3.2.2
- ***Modbus TCP*** see section 3.2.3
- ***BACnet IP*** see section 3.2.4
- ***Metasys N2*** see section 3.2.5
- ***LonWorks*** see section 3.2.6

4.2.2 BACNET MSTP SETUP

4.2.2.1 SET MAC ADDRESS

Only 1 MAC address is set for ProtoNode regardless of how many devices are connected to UCG.

Set the BACnet MSTP MAC addresses of the UCG to a value between 1 and 127 (Master MAC addresses); this is so that the BMS Front End can find the UCG via BACnet auto discovery.

Note: Never set a BACnet MSTP MAC Address of the UCG to a value from 128 to 255. Addresses from 128 to 255 are Slave Addresses and cannot be discovered by BMS Front Ends that support Auto-Discovery of BACnet MSTP devices**.**

Set DIP switches A0 – A7 to assign MAC Address for BACnet MSTP.
Please refer to ***Appendix H*** for the complete range of MAC Addresses and DIP switch settings.

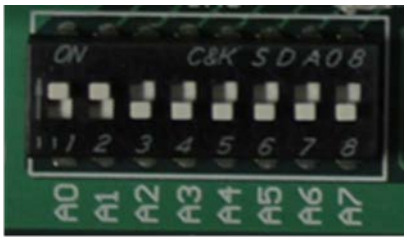


Figure 22 - A Bank DIP Switches (MAC Address)

4.2.2.2 SETTING THE DEVICE INSTANCE (NODE-ID)

The BACnet MSTP Node-ID will be set by taking the Node Offset found in the Web Configurator and adding to the value of the A Bank DIP switches (MAC Address). When more than one device is connected to the UCG, the subsequent BACnet Node-ID will be sequential. The BACnet Node-ID can range from 1 to 4,194,303.

For example:

- Node Offset (default) = 50,000
- A Bank DIP Switch (MAC Address)= 23
- Device 1 Node-ID = 50,023

To change the Node_offset see Section 3.3.2.1. The node offset can be changed from 50,000 to 1 to 4,194,302 via the Web Configurator.

4.2.2.2.1 SET NODE_OFF TO ASSIGN SPECIFIC DEVICE INSTANCES FOR BACNET MSTP

If the Device Instances need to be set for addresses other than 50,000 to 50,127,

change the Node+-Offset (50,000 is the default for Node+Offset). See section 3.3.1 to set the PC's IP address to the same Subnet as the ProtoNode see section 3.3.2 to connect to the ProtoNode's Web Configurator.

- The BACnet Device Instance can range from 1 to 4,194,303.
- BACnet MSTP Addressing: The BACnet device instances will be set by taking the Node_Offset found in Web Configurator and adding it to the Modbus Node-ID that was assigned to the device.
- Set the PC's IP- address to be on the same subnet as the ProtoNode.
- Open the PC browser; enter the default IP address of ProtoNode 192.168.1.24, which will bring you to the FST Web Configurator landing page for the ProtoNode.
- Change the Node+Offset to meet the required device instance.

For example: Required Device Instance = 20,001

- Node_Offset changed to = 20,000.
- Device 1 has a Modbus Node-ID of 1, Device 2 has a Modbus Node-ID of 2, Device 3 has a Modbus Node-ID of 3

- Device 1 - Device Instance = 20,001
- Device 2 - Device Instance = 20,002
- Device 3 - Device Instance = 20,003

NOTE: The Modbus Node address + Node_Offset = Device Instance setting

4.2.3 MODBUS TCP SETUP

When using Modbus/TCP, the A Bank of DIP switches are disabled and not used. They should be set to OFF.

4.2.3.1 SETTING THE DEVICE NODE-ID FOR MODBUS/TCP

- The Modbus RTU Node-ID's assigned to the devices attached to the UCG in section 2 and will be the Modbus TCP Node_ID's for the field protocols.

- Modbus/TCP Node-ID Addressing range from 1-255.

4.2.4 BACNET IP SETUP

4.2.4.1 SETTING THE DEVICE INSTANCE

The A Bank of DIP switches are also used to set the BACnet IP Device Instances.

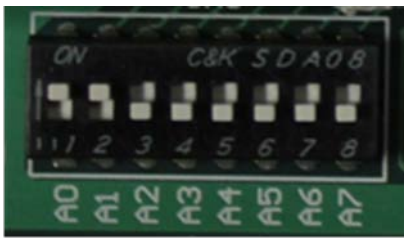


Figure 23 - A Bank DIP Switches (BACnet Address)

The BACnet IP device instance will be set by taking the Node Offset found in section 3.3.2 Web Configurator and adding to the value of the A Bank DIP switches. When more than one device is connected to the UCG, the subsequent BACnet device instances will be sequential. The BACnet

Device Instance can range from 1 to 4,194,303.

For example:

- Node Offset (default) = 50,000
- A Bank DIP Switch = 23
- Device 1 Device Instance = 50,023

4.2.4.1.1 SET NODE_OFF TO ASSIGN SPECIFIC DEVICE INSTANCES FOR BACNET IP

If the Device Instances need to be set for addresses other than 50,000 to 50,127, change the Node+-Offset (50,000 is the default for Node+Offset). See section 3.3.1 to set the PC's IP address to the same Subnet as the ProtoNode and section 3.3.2 to connect to the ProtoNode's Web Configurator.

- The BACnet Device Instance can range from 1 to 4,194,303.
- BACnet IP Addressing: The BACnet device instances will be set by taking the Node_Offset found in Web Configurator and adding it to the Modbus Node-ID that was assigned to the device.
- Set the PC's IP- address to be on the same subnet as the ProtoNode.
- Open the PC browser; enter the default IP address of ProtoNode 192.168.1.24, which will bring you to the FST Web Configurator landing page for the ProtoNode.
- Change the Node+Offset to meet the required device instance.

For example: Required Device Instance = 20,001

- Node_Offset changed to = 20,000.
- Device 1 has a Modbus Node-ID of 1, Device 2 has a Modbus Node-ID of 2, Device 3 has a Modbus Node-ID of 3
- Device 1 - Device Instance = 20,001
- Device 2 - Device Instance = 20,002
- Device 3 - Device Instance = 20,003

NOTE: The Modbus Node address + Node_Offset = Device Instance setting

4.2.5 METASYS N2

When using Metasys N2 the A Bank of DIP switches are disabled and not used. They should be set to OFF.

4.2.5.1 SETTING THE NODE-ID

The Modbus RTU Node-ID assigned to each device attached to the UCG in section 2 will be the Metasys N2 Node-ID for the field protocols. Metasys N2 Node-ID's range from 1-255.

4.2.6 LONWORKS

Commissioning may only be performed by the LonWorks administrator.

4.2.6.1 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.

Figure 24 - LonWorks Service Pin Location

If an XIF file is required, see steps in section 3.2.6.2 to generate XIF

4.2.6.2 Instructions to Upload XIF File from the UCG (LER) using Field Server GUI Web Server

- Follow the steps in section 3.3.1
- Open a web browser and go to the following address: IP address of ProtoCessor/fserver.xif
- Example: 192.168.1.24/fserver.xif
- If the web browser prompts you to save file, save the file onto the PC. If the web browser displays the xif file as a web page, save the file on your PC as fserver.xif. See Figure 20.

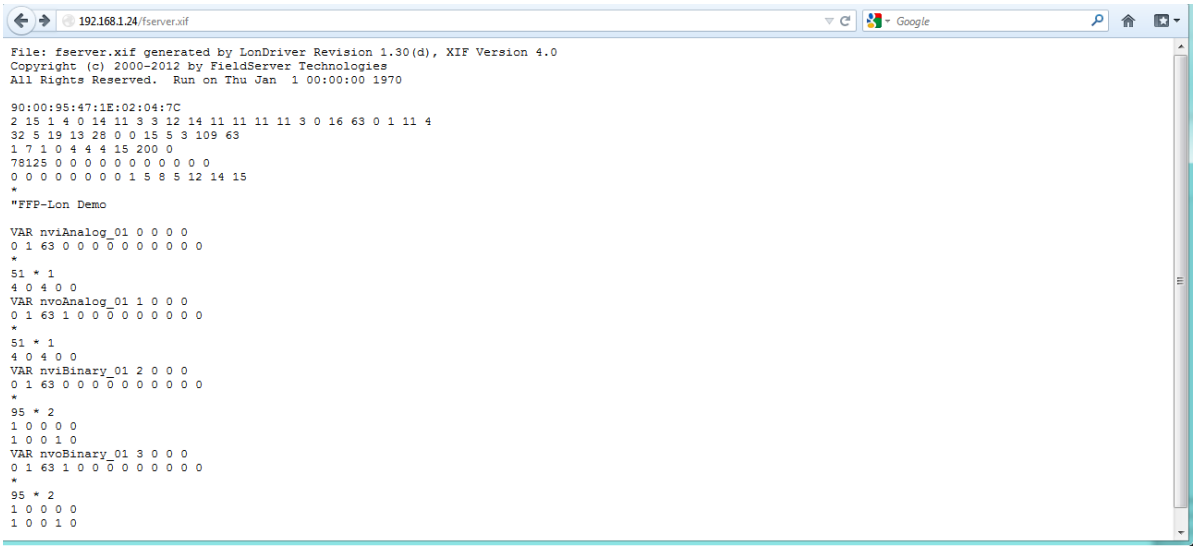


Figure 25 - Sample of Fserver.XIF File Being Generated

4.3 SETUP UCG VIA WEB CONFIGURATOR

Through the ProtoNode Web GUI Configurator parameters such as the Modbus Node-ID, Network Number, device profiles, and many other options can be set. This interface gives a quick and intuitive way to setup communication if needed.

4.3.1 CONNECT THE PC TO THE PROTONODE VIA THE ETHERNET PORT

Figure 26 - ProtoNode Ethernet Port

- Disable any wireless Ethernet adapters on the PC/Laptop.
- Disable firewall and virus protection software.
- Connect a standard CAT5 Ethernet cable (straight through **or** cross) between the PC and ProtoNode inside the UCG.
- The default IP Address of the ProtoNode is 192.168.1.24, Subnet Mask is 255.255.255.0. If the PC and the 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**

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, select:**

Use the following IP address:

IP address: 192 . 168 . 1 . 11

Subnet mask: 255 . 255 . 255 . 0

Default gateway:

Click OK twice

4.3.2 CONFIGURE PROFILES IN PROTONODE'S WEB CONFIGURATOR

- Follow the steps in section 3.3.1 .
- Open PC web browser and enter the default IP address of the ProtoNode 192.168.1.24
- When the S bank of DIP switches are set for BACnet MSTP or BACnet IP or Metasys N2 or Modbus TCP, profiles for all of the devices for that particular protocol will be listed in the Configurator.

4.3.2.1 SELECTING THE DEVICE'S PROFILES THAT WILL BE CONNECTED PROTONODE

When you open the Web Configurator, you will see the available device Profiles on the lower left side of the screen. Use the drop-down box under "Current Profile" to view all of the available profiles.
To active a profile for a device, select the device from the drop-down list, then click the "Add" button. For every device that will be connected, you will need to add an Active Profile and declare the Modbus Node Address that was assigned to the device.

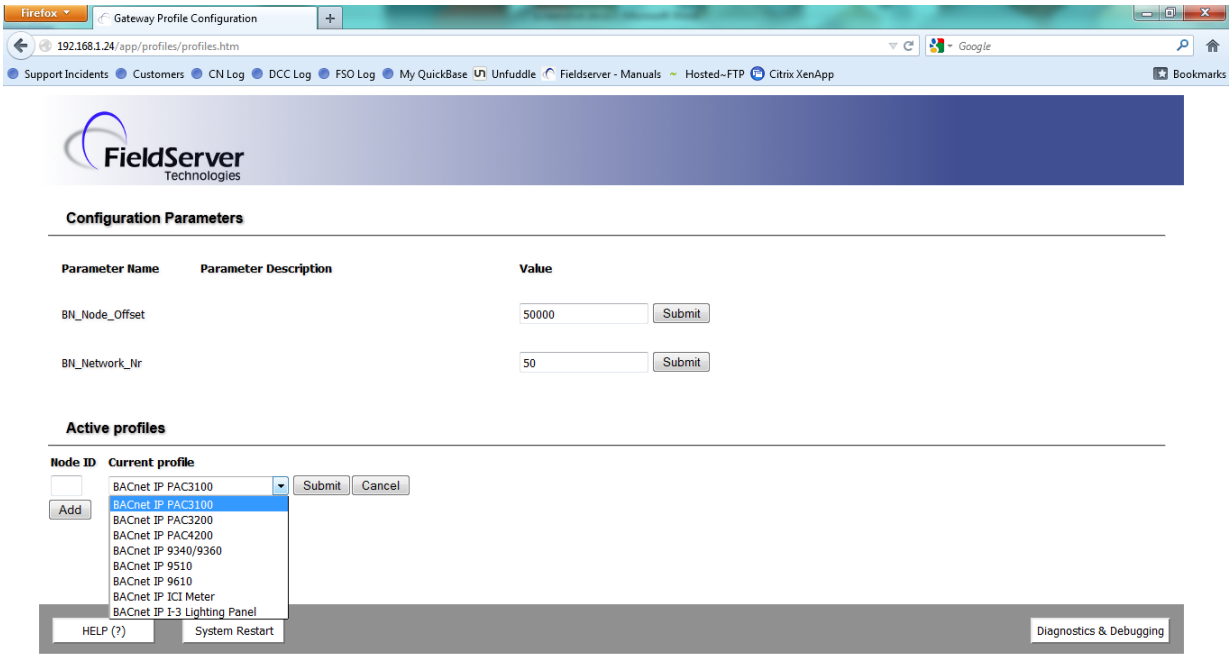


Figure 27 - Web Configurator Showing the Active Profiles to Select From

Once the Profile has been selected and the Modbus Node Address has been declared, click the "Add" button to activate the Profile for inclusion in the configuration.

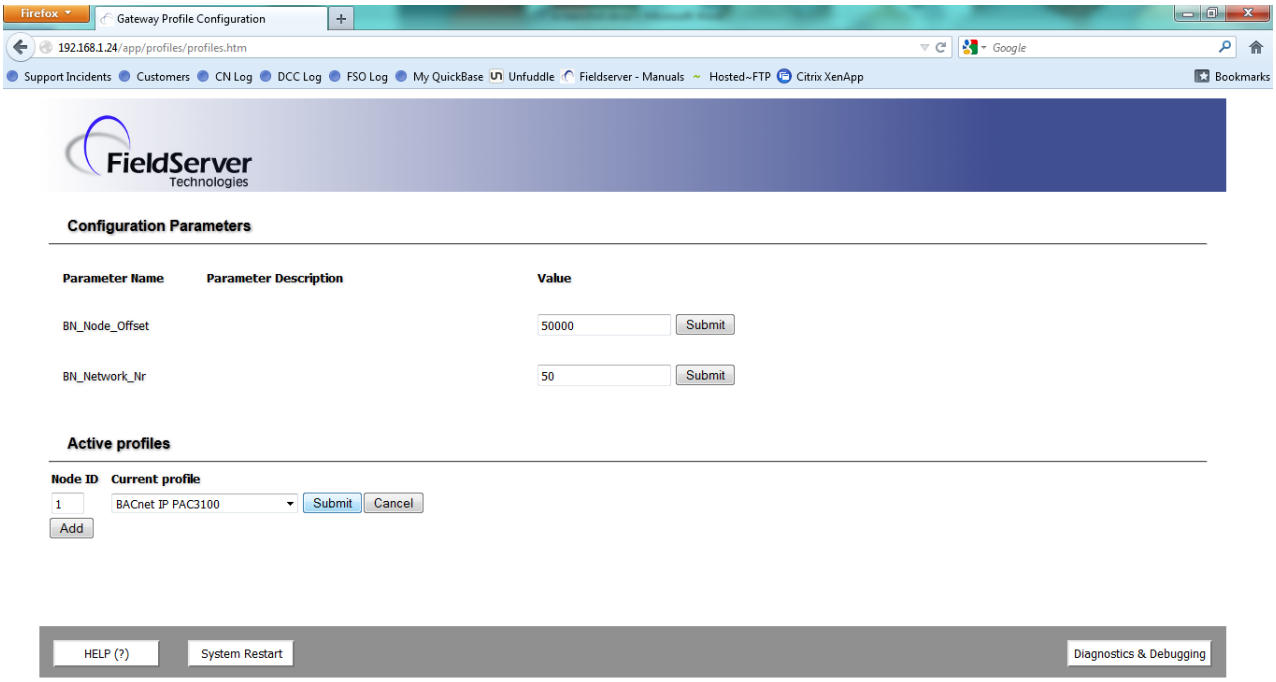


Figure 28 - Web Configurator Showing a Profile Selected

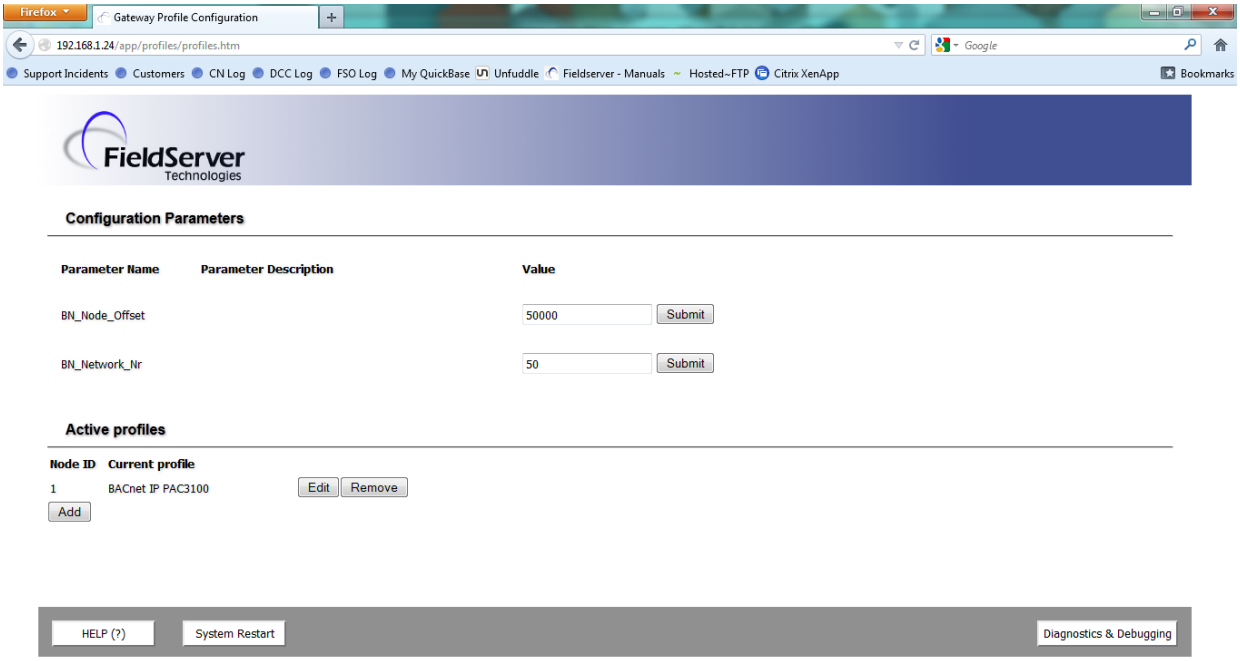


Figure 29 - Web Configurator Showing a Completed Profile Added

Continue this process until all devices have been added.

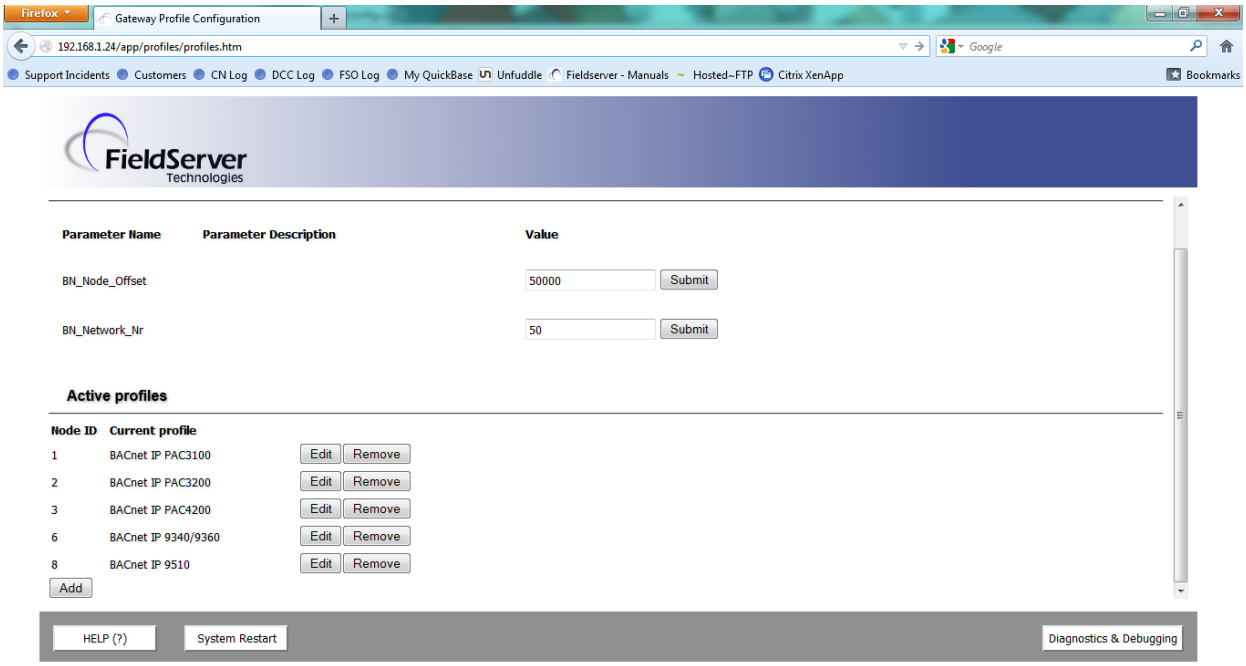


Figure 30 - Web Configurator Showing Completed Profiles Added

4.3.3 SET IP ADDRESS FOR BACNET IP VIA GUI

- Open a PC web browser, enter the default IP address of ProtoNode 192.168.1.24 and connect to ProtoNode.
- The Default GUI landing page is the Web Configurator.
- Press the Diagnostics and Debugging button at the bottom right corner of the page to go to FSGUI utility.

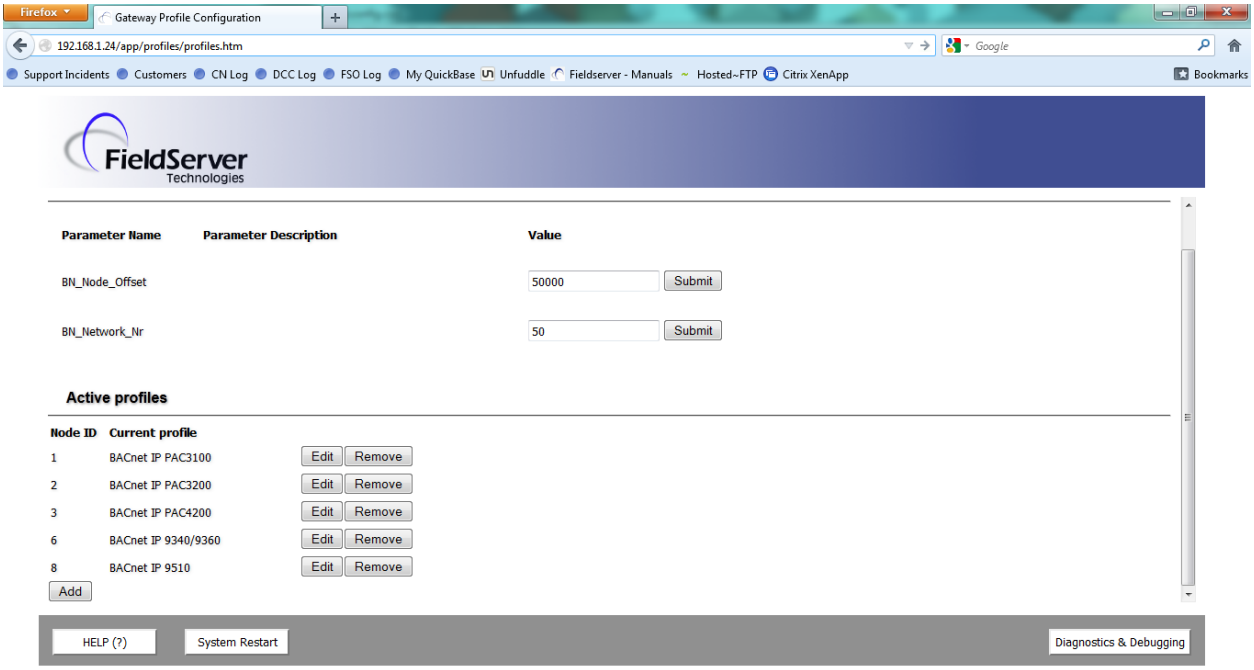


Figure 31 - Default FS Web GUI Landing Page

- Click on setup and then Network Settings to enter the Edit IP Address Settings menu.

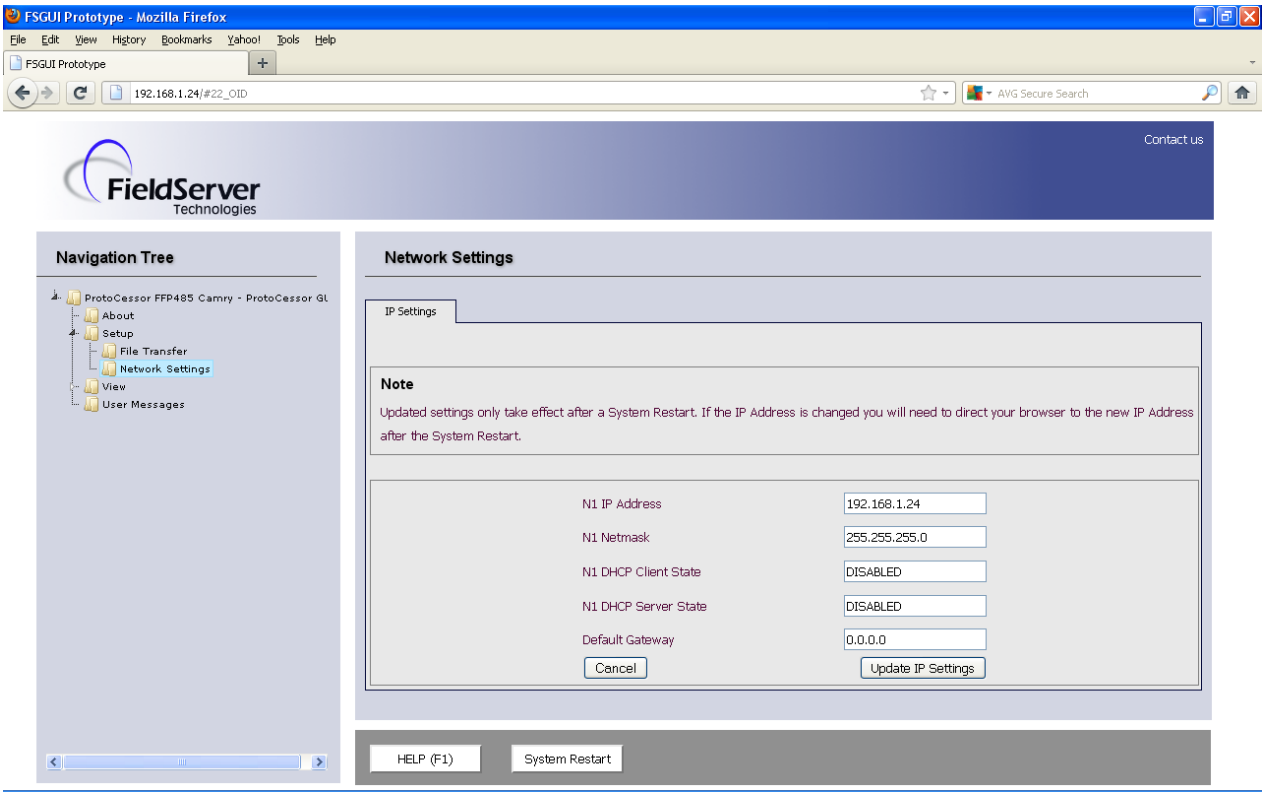


Figure 32 - Changing IP Address via FST Web GUI

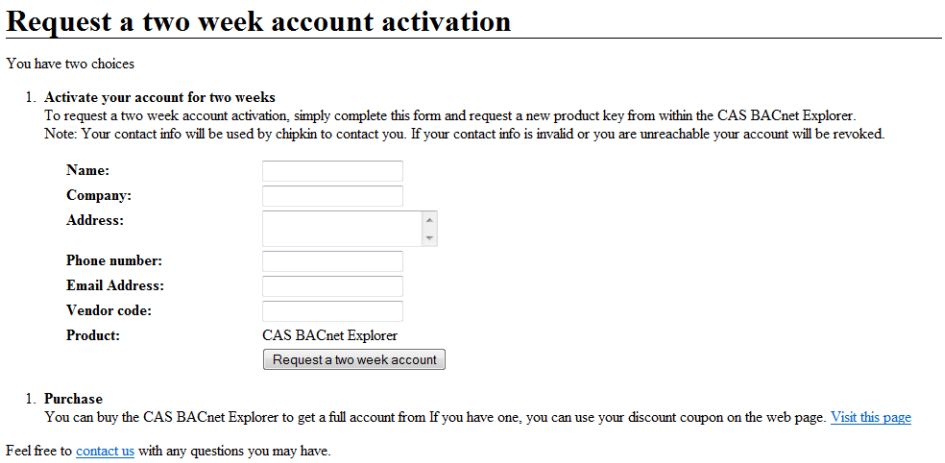
- Modify the IP address (N1 IP address field) of ProtoNode Ethernet port.
- If necessary, change the Netmask (N1 Netmask field).
- Type in a new Subnet Mask.
- If necessary, change the IP Gateway (Default Gateway field).
- Type in a new IP Gateway.
- Note: If ProtoNode is connected to a router, the IP Gateway of 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.**

4.3.4 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 MSTP 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 MSTP.

4.3.4.1 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 "BryanSteam2013".** 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
Request a two week account

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 33 - 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. See Figure 29.

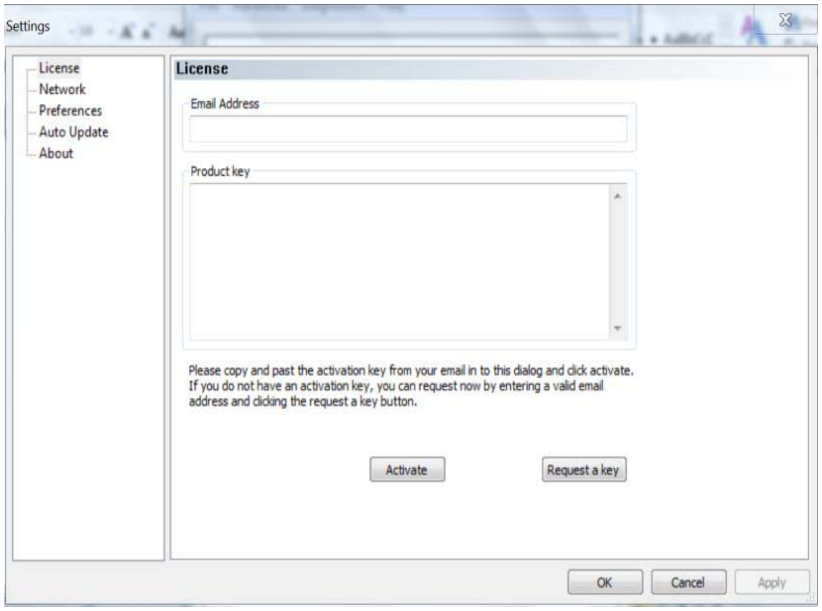


Figure 34 - Requesting CAS Activation Key

4.3.4.2 CAS BACNET SETUP

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

4.3.4.2.1 CAS BACNET MSTP SETUP

- Using the Serial or USB to RS-485 converter, connect it to your PC and the 3 Pin BACnet MSTP connector on ProtoNode FPC-N34.

- 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

4.3.4.2.2 CAS BACNET IP SETUP

- See Section 3.3.1 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

5 POINTS LIST BY DEVICE

5.1 HONEYWELL SOLA POINTS LIST BY PROTOCOL

5.1.1 MODBUS TCP (HONEYWELL SOLA)

Protocol Name	Description	Read / Write	Modbus Register
Enables / Disables			
CH enable	Enable/Disable central heating. 1 = on 0 = off	R/W	208
DHW Enable	Enable/Disable domestic hot water. 1 = on 0 = off	R/W	448
Lead/Lag Enable	Enable/ Disable Lead Lag 1 = on 0 = off	R/W	555
Demand source	0 = Unknown 1 = No source demand 2 = Central heat 3 = Domestic hot water 4 = Lead/Lag slave 5 = Lead/Lag master 6 = Central heat frost protection 7 = Domestic hot water frost protection 8 = No demand due to burner switch turned off 9 = Domestic hot water storage 11 = Warm weather shutdown	R	6
Temperature Set points			
CH set point	Change Boiler Set point	R/W	211
DHW set point	Use this register to change the domestic hot water set point.	R/W	453
Lead Lag set point	Use this register to change the lead lag set point.	R/W	546
CH TOD set point	Boiler Set point when Time of Day switch is on	R/W	212
Temperature Sensors			
Outlet sensor	Boiler supply water temperature	R	7
Stack sensor	Temperature of the flue gasses	R	14
Outdoor temperature	Temperature of the remote outdoor sensor	R	170
DHW sensor	Domestic hot water temperature	R	12

Protocol Name	Description	Read / Write	Modbus Register
S5 sensor	(header water temperature) & (outdoor temperature) (Depends on S5 (J8-11) sensor setting. See section 2.2.19 of the IO&M.)	R	13
Inlet sensor	Boiler return water temperature	R	11
4 - 20 mA remote ctl input	mA value for S2 (J8-6) (see section 2.2.20 of the SOLA IO&M) (remote set point) & (remote modulation)	R	15
Burner			
Burner switch	Used to Enable/Disable boiler firing 1 = on 0 = off	R/W	203
Fan speed	Speed of the combustion air blower in rpm	R	9
Flame signal	Signal strength of the flame 0 – 15 VDC	R	10
Burner control status	0 = Disabled 1 = Locked out 4 = Anti-short cycle 5 = Safety data not configured 34 = Standby hold 35 = Standby delay 48 = Normal standby 49 = Preparing 50 = Ignition 51 = Firing 52 = Postpurge	R	32
Troubleshooting			
Lockout code	0 = No lockout 1 – 4096 (see table 12 of the SOLA IO&M)	R	34
Annunciator first out	0 = None or undetermined 1 = Running interlock (Air flow switch) 2 = Pre ignition interlock (Proof of valve closure when provided) 11 = Boiler low water 12 = High internal burner temperature 13 = Water flow switch 14 = High gas pressure 15 = Low gas pressure 16 = Low pilot gas pressure 17 = High air exchanger pressure 18 = High burner air pressure	R	36
Statistics			
Burner cycle count	0-999,999 (U32)	R/W	128
Burner run time	Hours (U32)	R/W	130
CH pump cycle count	0-999,999 (U32)	R/W	132

Protocol Name	Description	Read / Write	Modbus Register
DHW pump cycle count	0-999,999 (U32)	R/W	134
System pump cycle count	0-999,999 (U32)	R/W	136
Boiler pump cycle count	0-999,999 (U32)	R/W	138

Table 5 - Honeywell SOLA Modbus TCP Points List

5.1.2 BACNET IP/MSTP, METASYS N2 (HONEYWELL SOLA)

Protocol Name	Description	Read / Write	BACnet / N2 Type	Object ID / Point Address
Enables / Disables				
CH enable	Enable/Disable central heating. 1 = on 0 = off	R/W	BV / DO	21
DHW Enable	Enable/Disable domestic hot water. 1 = on 0 = off	R/W	BV / DO	24
Lead/Lag Enable	Enable/ Disable Lead Lag 1 = on 0 = off	R/W	BV / DO	27
Demand source	0 = Unknown 1 = No source demand 2 = Central heat 3 = Domestic hot water 4 = Lead/Lag slave 5 = Lead/Lag master 6 = Central heat frost protection 7 = Domestic hot water frost protection 8 = No demand due to burner switch turned off 9 = Domestic hot water storage 11 = Warm weather shutdown	R	AI / AI	1
Temperature Setpoints				
CH setpoint	Use this register to change the boiler setpoint.	R/W	AV / AO	22
DHW setpoint	Use this register to change the domestic hot water setpoint.	R/W	AV / AO	25
Lead Lag setpoint	Use this register to change the lead lag setpoint.	R/W	AV / AO	26
CH TOD setpoint	Use this register to change the central heat “time of day” setpoint.	R/W	AV / AO	23
Temperature Sensors				
Outlet sensor	Boiler supply water temperature	R	AI / AI	2
Stack sensor	Temperature of the flue gasses	R	AI / AI	8
Outdoor temperature	Temperature of the remote outdoor sensor	R	AI / AI	19
DHW sensor	Domestic hot water temperature	R	AI / AI	6
S5 sensor	(header water temperature) & (outdoor temperature) (Depends on S5 (J8-11) sensor setting. See section 2.2.19 of the IO&M.)	R	AI / AI	7
Inlet sensor	Boiler return water temperature	R	AI / AI	5

Protocol Name	Description	Read / Write	BACnet / N2 Type	Object ID / Point Address
4 - 20 mA remote ctl input	mA value for S2 (J8-6) (see section 2.2.20 of the SOLA IO&M) (remote set point) & (remote modulation)	R	AI / AI	9
Burner				
Burner switch	Used to Enable/Disable boiler firing 1 = on 0 = off	R/W	BV / DO	20
Fan speed	Speed of the combustion air blower in rpm	R	AI / AI	3
Flame signal	Signal strength of the flame 0 – 15 VDC	R	AI / AI	4
Burner control status	0 = Disabled 1 = Locked out 4 = Anti-short cycle 5 = Safety data not configured 34 = Standby hold 35 = Standby delay 48 = Normal standby 49 = Preparing 50 = Ignition 51 = Firing 52 = Postpurge	R	AI / AI	10
Troubleshooting				
Com Status	0 = No Communication 1 = Communication	R	BI / DI	1
Lockout code	0 = No lockout 1 – 4096 (see table 12 of the SOLA IO&M)	R	AI / AI	11
Annunciator first out	0 = None or undetermined 1 = Running interlock (Air flow switch) 2 = Pre ignition interlock (Proof of valve closure when provided) 11 = Boiler low water 12 = High internal burner temperature 13 = Water flow switch 14 = High gas pressure 15 = Low gas pressure 16 = Low pilot gas pressure 17 = High air exchanger pressure 18 = High burner air pressure	R	AI / AI	12
Statistics				
Burner cycle count	0-999,999 (U32)	R/W	AI / AI	13
Burner run time	Hours (U32)	R/W	AI / AI	14
CH pump cycle count	0-999,999 (U32)	R/W	AI / AI	15
DHW pump cycle count	0-999,999 (U32)	R/W	AI / AI	16

Protocol Name	Description	Read / Write	BACnet / N2 Type	Object ID / Point Address
System pump cycle count	0-999,999 (U32)	R/W	AI / AI	17
Boiler pump cycle count	0-999,999 (U32)	R/W	AI / AI	18

Table 6 - Honeywell SOLA BACnet IP/MSTP, Metasys N2 Points List

5.1.3 LONWORKS (HONEYWELL SOLA)

Protocol Name	Description	Read / Write	LonWorks Name	LonWorks SNVT Type
Enables / Disables				
CH enable	Enable/Disable central heating. 1 = on 0 = off	R/W	nvi/nvoCH_Enable_XXX	SNVT_switch
DHW Enable	Enable/Disable domestic hot water. 1 = on 0 = off	R/W	nvi/nvoDHW_Enabl_XXX	SNVT_switch
Lead/Lag Enable	Enable/ Disable Lead Lag 1 = on 0 = off	R/W	nvi/nvoLdLgEnabl_XXX	SNVT_switch
Demand source	0 = Unknown 1 = No source demand 2 = Central heat 3 = Domestic hot water 4 = Lead/Lag slave 5 = Lead/Lag master 6 = Central heat frost protection 7 = Domestic hot water frost protection 8 = No demand due to burner switch turned off 9 = Domestic hot water storage 11 = Warm weather shutdown	R	nvoDemSrc_XXX	SNVT_count_f
Temperature Setpoints				
CH setpoint	Use this register to change the boiler setpoint.	R/W	nvi/nvoCH_SP_XXX	SNVT_temp_f
DHW setpoint	Use this register to change the domestic hot water setpoint.	R/W	nvi/nvoDHW_SP_XXX	SNVT_temp_f
Lead Lag setpoint	Use this register to change the lead lag setpoint.	R/W	nvi/nvoLeadLagSP_XXX	SNVT_temp_f
CH TOD setpoint	Use this register to change the central heat “time of day” setpoint.	R/W	nvi/nvoCH_TOD_SP_XXX	SNVT_temp_f
Temperature Sensors				
Outlet sensor	Boiler supply water temperature	R	nvoOutletSen_XXX	SNVT_temp_f
Stack sensor	Temperature of the flue gasses	R	nvoStackSen_XXX	SNVT_temp_f
Outdoor temperature	Temperature of the remote outdoor sensor	R	nvoOutdrTmp_XXX	SNVT_temp_f
DHW sensor	Domestic hot water temperature	R	nvoDHW_Sen_XXX	SNVT_temp_f

Protocol Name	Description	Read / Write	LonWorks Name	LonWorks SNVT Type
S5 sensor	(header water temperature) & (outdoor temperature) (Depends on S5 (J8-11) sensor setting. See section 2.2.19 of the IO&M.)	R	nvoS5Sensor_XXX	SNVT_temp_f
Inlet sensor	Boiler return water temperature	R	nvoInletSen_XXX	SNVT_temp_f
4-20mA remote ctl input	mA value for S2 (J8-6) (see section 2.2.20 of the IO&M) (remote set point) & (remote modulation)	R	nvoRemCtlIn_XXX	SNVT_count_f
Burner				
Burner switch	Used to Enable/Disable boiler firing 1 = on 0 = off	R/W	nvi/nvoBurnerSw_XXX	SNVT_switch
Fan speed	Speed of the combustion air blower in rpm	R	nvoFanSpeed_XXX	SNVT_count_f
Flame signal	Signal strength of the flame 0 – 15 VDC	R	nvoFlmSignal_XXX	SNVT_count_f
Burner control status	0 = Disabled 1 = Locked out 4 = Anti-short cycle 5 = Safety data not configured 34 = Standby hold 35 = Standby delay 48 = Normal standby 49 = Preparing 50 = Ignition 51 = Firing 52 = Postpurge	R	nvoBrnCtlSt_XXX	SNVT_count_f
Troubleshooting				
Com Status	0 = No Communication 1 = Communication	R	nvoComStatus_XXX	SNVT_switch
Lockout code	0 = No lockout 1 – 4096 (see table 12 of the IO&M)	R	nvoLockotCod_XXX	SNVT_count_f

Protocol Name	Description	Read / Write	LonWorks Name	LonWorks SNVT Type
Annunciator first out	0 = None or undetermined 1 = Running interlock (Air flow switch) 2 = Pre ignition interlock (Proof of valve closure when provided) 11 = Boiler low water 12 = High internal burner temperature 13 = Water flow switch 14 = High gas pressure 15 = Low gas pressure 16 = Low pilot gas pressure 17 = High air exchanger pressure 18 = High burner air pressure	R	nvoAnn1stOut_XXX	SNVT_count_f
Statistics				
Burner cycle count	0-999,999 (U32)	R/W	nvoBrnCycCnt_XXX	SNVT_count_f
Burner run time	Hours (U32)	R/W	nvoBrnRunTim_XXX	SNVT_count_f
CH pump cycle count	0-999,999 (U32)	R/W	nvoCHPmpCyCn_XXX	SNVT_count_f
DHW pump cycle count	0-999,999 (U32)	R/W	nvoDHWPmCyCt_XXX	SNVT_count_f
System pump cycle count	0-999,999 (U32)	R/W	nvoSysPmCyCt_XXX	SNVT_count_f
Boiler pump cycle count	0-999,999 (U32)	R/W	nvoBlrPmCyCt_XXX	SNVT_count_f

Table 7 - Honeywell SOLA LonWorks Points List

5.2 SIEMENS RWF40/55 POINTS LIST BY PROTOCOL

5.2.1 MODBUS TCP (RWF40 / RWF55)

Protocol Name	Description	Read / Write	RWF Address
Sensor Inputs			
Input 1	Actual value of input 1 (E1)	R	0
Input 2	Actual value of Input 2 (E2)	R	2
Input 3	Actual value of Input 3 (E3)	R	4
A value of 200,000 indicates an invalid sensor reading.			
Setpoints			
First Setpoint	Set the process setpoint (SP1) at any value between SPL to SPH	R/W	8
Second Setpoint	Set the process setpoint (SP2) at any value between SPL to SPH	R/W	10
Remote Operation			
Operation Mode	Set mode of operation 0 = local 1 = remote setpoint 2 = full remote	R/W	1280
Process Enable	Enable / Disable process 1 = off 0 = on (remote setpoint) and (full remote)	R/W	1281
Process Setpoint	Set the process setpoint at any value between SPL to SPH	R/W	1288
Enable K1	Burner On / Off (full remote only) 1 = off 0 = on	R/W	1290
Enable K2	Metering valve opens (switch Q to Y1) (full remote only) 1 = off 0 = on	R/W	1291
Enable K3	Metering valve closes (switch Q to Y2) (full remote only) 1 = off 0 = on	R/W	1292
Enable K6	Limit comparator (switch Q64 to Q63) 1 = off 0 = on (remote setpoint) and (full remote)	R/W	1293
Step Control	Bumping output cycles (opening / closing) -100 to 0 (closing) 0 to 100 (opening)	R/W	1294
Modulation	Degree of modulation (0% to 100%) for the analog output (full remote only)	R/W	1295

Table 8 - Siemens RWF 40/55 Modbus TCP Points List

5.2.2 BACNET IP/MSTP, METASYS N2 (RWF40 / RWF55)

Protocol Name	Description	Read / Write	BACnet / N2 Type	Object ID / Point Address
Sensor Inputs				
Input 1	Actual value of input 1 (E1)	R	AI / AI	1
Input 2	Actual value of Input 2 (E2)	R	AI / AI	2
Input 3	Actual value of Input 3 (E3)	R	AI / AI	3
A value of 200,000 indicates an invalid sensor reading.				
Setpoints				
First Setpoint	Set the process setpoint (SP1) at any value between SPL to SPH	R/W	AV / AO	4
Second Setpoint	Set the process setpoint (SP2) at any value between SPL to SPH	R/W	AV / AO	5
Remote Operation				
Operation Mode	Set mode of operation 0 = local 1 = remote setpoint 2 = full remote	R/W	AV / AO	6
Process Enable	Enable/Disable process(remote setpoint)or(full remote) 1 = off 0 = on	R/W	BV / DO	7
Process Setpoint	Set the process setpoint at any value between SPL to SPH	R/W	AV / AO	8
Enable K1	Burner On / Off (full remote only) 1 = off 0 = on	R/W	BV / DO	9
Enable K2	Metering valve opens (switch Q to Y1) (full remote only) 1 = off 0 = on	R/W	BV / DO	10
Enable K3	Metering valve closes (switch Q to Y2) (full remote only) 1 = off 0 = on	R/W	BV / DO	11
Enable K6	Limit comparator (switch Q64 to Q63)(remote setpoint)or(full remote) 1 = off 0 = on	R/W	BV / DO	12
Step Control	Bumping output cycles (opening / closing) -100 to 0 (closing) 0 to 100 (opening)	R/W	AV / AO	13
Modulation	Degree of modulation (0% to 100%) for the analog output (full remote only)	R/W	AV / AO	14
Troubleshooting				

Protocol Name	Description	Read / Write	BACnet / N2 Type	Object ID / Point Address
Com Status	0 = No Communication 1 = Communication	R	BI / DI	1

Table 9 - Siemens RWF40/55 BACnet IP/MSTP, Metasys N2 Points List

5.2.3 LONWORKS (RWF40 / RWF55)

Protocol Name	Description	Read / Write	Lon Name	Lon SNVT Type
Sensor Inputs				
Input 1	Actual value of input 1 (E1)	R	nvoInput1_XXX	SNVT_count_inc_f
Input 2	Actual value of Input 2 (E2)	R	nvoInput2_XXX	SNVT_count_inc_f
Input 3	Actual value of Input 3 (E3)	R	nvoInput3_XXX	SNVT_count_inc_f
A value of 200,000 indicates an invalid sensor reading.				
Setpoints				
First Setpoint	Set the process setpoint (SP1) at any value between SPL to SPH	R/W	nvoFirstSP_XXX	SNVT_count_inc_f
Second Setpoint	Set the process setpoint (SP2) at any value between SPL to SPH	R/W	nvoSecondSP_XXX	SNVT_count_inc_f
Remote Operation				
Operation Mode	Set mode of operation 0 = local 1 = remote setpoint 2 = full remote	R/W	nvoOpMode_XXX	SNVT_count_inc_f
Process Enable	Enable / Disable process 1 = off 0 = on (remote setpoint) and (full remote)	R/W	nvi/nvoProcEnbl_XXX	SNVT_switch
Process Setpoint	Set the process setpoint at any value between SPL to SPH	R/W	nvi/nvoProcSP_XXX	SNVT_count_inc_f
Enable K1	Burner On / Off 1 = off 0 = on (full remote only)	R/W	nvi/nvoEnableK1_XXX	SNVT_switch
Enable K2	Metering valve opens (switch Q to Y1) 1 = off 0 = on (full remote only)	R/W	nvi/nvoEnableK2_XXX	SNVT_switch
Enable K3	Metering valve closes (switch Q to Y2) 1 = off 0 = on (full remote only)	R/W	nvi/nvoEnableK3_XXX	SNVT_switch
Enable K6	Limit comparator (switch Q64 to Q63) 1 = off 0 = on (remote setpoint) and (full remote)	R/W	nvi/nvoEnableK6_XXX	SNVT_switch
Step Control	Bumping output cycles (opening / closing) -100 to 0 (closing) 0 to 100 (opening)	R/W	nvi/nvoStepCtrl_XXX	SNVT_count_inc_f
Modulation	Degree of modulation (0% to 100%) for the analog output (full remote only)	R/W	nvi/nvoModulatn_XXX	SNVT_lev_percent

Protocol Name	Description	Read / Write	Lon Name	Lon SNVT Type
Troubleshooting				
Com Status	0 = No Communication 1 = Communication	R	nvoComStatus_XXX	SNVT_switch

Table 10 - Siemens RWF40/55 LonWorks Points List

5.3 SIEMENS LMV2… AND LMV3… SERIES POINTS LIST BY PROTOCOL

5.3.1 MODBUS TCP (LMV2… / LMV3…)

Protocol Name	Description	Read / Write	LMV 2… / LMV 3… Address
Data Points			
Flame Signal	Burner flame signal strength (0% to 100%)	R	13
Remote Control Points			
Control Mode	Control mode 0 = Local - The boiler will be controlled based on the process set point. 1 = Remote - The boiler is controlled by the BMS operating mode.	R/W	41
Operating Mode	Operating mode (Only when Control Mode = 1) 0 = Auto - The burner will be controlled based on external set point. 1 = ON - The burner will be controlled based on the fuel rate address 45. (Fuel Rate) 2 = OFF - The burner will remain off regardless of set point.	R/W	43
Fuel Rate	Commanded fuel rate Modulation = 0% to 100% Multistage: 1001 = stage 1 1002 = stage 2 1003 = stage 3	R/W	45
Statistics			
Lockout Error Code	Error code (see table for the specific LMV… used)	R	25
Lockout Diagnostic Code	Diagnostic code (see table for the specific LMV… used)	R	26

Table 11 - Siemens LMV2.../3... Series Modbus TCP Points List

5.3.2 BACNET IP/MSTP, METASYS N2 (LMV2… / LMV3…)

Protocol Name	Description	Read / Write	BACnet / N2 Type	Object ID / Point Address
Data Points				
Flame Signal	Burner flame signal strength (0% to 100%)	R	AI / AI	1
Remote Control Points				
Control Mode	Control mode 0 = Local - The boiler will be controlled based on the process set point. 1 = Remote - The boiler is controlled by the BMS operating mode.	R/W	BV / DO	4
Operating Mode	Operating mode (Only when Control Mode = 1) 0 = Auto - The burner will be controlled based on external set point. 1 = ON - The burner will be controlled based on the fuel rate address 45. (Fuel Rate) 2 = OFF - The burner will remain off regardless of set point.	R/W	AV / AO	5
Fuel Rate	Commanded fuel rate Modulation = 0% to 100% Multistage: 1001 = stage 1 1002 = stage 2 1003 = stage 3	R/W	AV / AO	6
Statistics				
Lockout Error Code	Error code (see table for the specific LMV… used)	R	AI / AI	2
Lockout Diagnostic Code	Diagnostic code (see table for the specific LMV… used)	R	AI / AI	3
Troubleshooting				
Com Status	0 = No Communication 1 = Communication	R	BI / DI	1

Table 12 - Siemens LMV2.../3... BACnet IP/MSTP, Metasys N2 Points List

5.3.3 LONWORKS (LMV2… / LMV3…)

Protocol Name	Description	Read / Write	Lon Name	LMV 2…/3… Address
Data Points				
Flame Signal	Burner flame signal strength (0% to 100%)	R	nvoFlameSig_XXX	SNVT_lev_percent
Remote Control Points				
Control Mode	Control mode 0 = Local - The boiler will be controlled based on the process set point. 1 = Remote - The boiler is controlled by the BMS operating mode.	R/W	nvi/nvoCtrlMode_XXX	SNVT_switch
Operating Mode	Operating mode (Only when Control Mode = 1) 0 = Auto - The burner will be controlled based on external set point. 1 = ON - The burner will be controlled based on the fuel rate address 45. (Fuel Rate) 2 = OFF - The burner will remain off regardless of set point.	R/W	nvi/nvoOp_Mode_XXX	SNVT_count_f
Fuel Rate	Commanded fuel rate Modulation = 0% to 100% Multistage: 1001 = stage 1 1002 = stage 2 1003 = stage 3	R/W	nvi/nvoFuelRate_XXX	SNVT_count_f
Statistics				
Lockout Error Code	Error code (see table for the specific LMV… used)	R	nvoLckotErCd_XXX	SNVT_count_f
Lockout Diagnostic Code	Diagnostic code (see table for the specific LMV… used)	R	nvoLckotDgCd_XXX	SNVT_count_f
Troubleshooting				
Com Status	0 = No Communication 1 = Communication	R	nvoComStatus_XXX	SNVT_switch

Table 13 - Siemens LMV2.../3... LonWorks Points List

5.4 SIEMENS LMV5… POINTS LIST BY PROTOCOL

5.4.1 MODBUS TCP (SIEMENS LMV5…)

Protocol Name	Description	Read / Write	LMV5… Address
Data Points			
Process Value	Process value (temperature or pressure)	R	12
Flame Signal	Burner flame signal strength (0% to 100%)	R	13
Fuel Rate Volume	Burner fuel rate Oil = gallons Gas = cubic feet	R	14
O2 Level	Level of O2 in flue gas (0% to 20.9%)	R	15
Supply Air	Supply air temperature	R	30
Flue Gas	Flue gas temperature	R	31
Combustion Efficiency	Combustion efficiency (0% to 100%)	R	32
Remote Control Points			
Control Mode	Control mode 0 = Local - The boiler will be controlled based on the process set point in address 47 below. 1 = Remote - The boiler is controlled by the BMS operating mode.	R/W	41
Operating Mode	Operating mode (Only when Control Mode = 1) 0 = Auto - The burner will be controlled based on external set point address 44. (External Setpoint) 1 = ON - The burner will be controlled based on the fuel rate address 45. (Fuel Rate) 2 = OFF - The burner will remain off regardless of set point.	R/W	43
Fuel Rate	Commanded fuel rate Modulation = 0% to 100% Multistage: 1001 = stage 1 1002 = stage 2 1003 = stage 3	R/W	45
External Setpoint	External setpoint W3	R/W	44
Process Setpoint	Process setpoint (temperature or pressure)	R/W	47
Statistics			
Hours	Hours run counter	R	23
Lockout Error Code	Error code (see table for the specific LMV… used)	R	25

Lockout Diagnostic Code	Diagnostic code (see table for the specific LMV… used)	R	26
Current Lockout	Error code	R	400
	Error diagnosis	R	401
	Error class	R	402
	Error phase	R	403
	Fuel	R	404
	Output	R	405
	Date: Year	R	406
	Date: Month	R	407
	Date: Day	R	408
	Time of day: Hours	R	409
	Time of day: Minutes	R	410
	Time of day: Seconds	R	411
	Startup counter total	R	412
	Hours run total	R	414

Table 14 - Siemens LMV5… Modbus TCP Points List

5.4.1 BACNET IP/MSTP, METASYS N2 (SIEMENS LMV5…)

Protocol Name	Description	Read / Write	BACnet / N2 Type	Object ID / Point Address
Data Points				
Process Value	Process value (temperature or pressure)	R	AI / AI	1
Flame Signal	Burner flame signal strength (0% to 100%)	R	AI / AI	2
Fuel Rate Volume	Burner fuel rate Oil = gallons Gas = cubic feet	R	AI / AI	3
O2 Level	Level of O2 in flue gas (0% to 20.9%)	R	AI / AI	4
Supply Air	Supply air temperature	R	AI / AI	5
Flue Gas	Flue gas temperature	R	AI / AI	6
Combustion Efficiency	Combustion efficiency (0% to 100%)	R	AI / AI	7
Remote Control Points				
Control Mode	Control mode 0 = Local - The boiler will be controlled based on the process set point in address 47 below. 1 = Remote - The boiler is controlled by the BMS operating mode.	R/W	BV / DO	8

Operating Mode	Operating mode (Only when Control Mode = 1) 0 = Auto - The burner will be controlled based on external set point address 11. (External Setpoint) 1 = ON - The burner will be controlled based on the fuel rate address 10. (Fuel Rate) 2 = OFF - The burner will remain off regardless of set point.	R/W	AV / AO	9
Fuel Rate	Commanded fuel rate Modulation = 0% to 100% Multistage: 1001 = stage 1 1002 = stage 2 1003 = stage 3	R/W	AV / AO	10
External Setpoint	External setpoint W3	R/W	AV / AO	11
Process Setpoint	Process setpoint (temperature or pressure)	R/W	AV / AO	12
Statistics				
Hours	Hours run counter	R	AI / AI	13
Lockout Error Code	Error code (see table for the specific LMV… used)	R	AI / AI	14
Lockout Diagnostic Code	Diagnostic code (see table for the specific LMV… used)	R	AI / AI	15
Current Lockout	Error code	R	AI / AI	16
	Error diagnosis	R	AI / AI	17
	Error class	R	AI / AI	18
	Error phase	R	AI / AI	19
	Fuel	R	AI / AI	20
	Output	R	AI / AI	21
	Date: Year	R	AI / AI	22
	Date: Month	R	AI / AI	23
	Date: Day	R	AI / AI	24
	Time of day: Hours	R	AI / AI	25
	Time of day: Minutes	R	AI / AI	26
	Time of day: Seconds	R	AI / AI	27
	Startup counter total	R	AI / AI	140
	Hours run total	R	AI / AI	141
Troubleshooting				
Com Status	0 = No Communication 1 = Communication	R	BI / DI	1

Table 15 - Siemens LMV5… BACnet IP/MSTP, Metasys N2 Points List

5.4.1 LONWORKS (SIEMENS LMV5…)

Protocol Name	Description	Read / Write	Lon Name	Lon SNVT Type
Data Points				
Process Value	Process value (temperature or pressure)	R	nvoProcVal_XXX	SNVT_count_f
Flame Signal	Burner flame signal strength (0% to 100%)	R	nvoFlameSig_XXX	SNVT_lev_percent
Fuel Rate Volume	Burner fuel rate Oil = gallons Gas = cubic feet	R	nvoFuelRtVol_XXX	SNVT_count_f
O2 Level	Level of O2 in flue gas (0% to 20.9%)	R	nvoO2Level_XXX	SNVT_lev_percent
Supply Air	Supply air temperature	R	nvoSupplyAir_XXX	SNVT_count_f
Flue Gas	Flue gas temperature	R	nvoFlueGas_XXX	SNVT_count_f
Combustion Efficiency	Combustion efficiency (0% to 100%)	R	nvoCombstEff_XXX	SNVT_lev_percent
Remote Control Points				
Control Mode	Control mode 0 = Local - The boiler will be controlled based on the process set point. 1 = Remote - The boiler is controlled by the BMS operating mode.	R/W	nvi/nvoCtrlMode_XXX	SNVT_switch
Operating Mode	Operating mode (Only when Control Mode = 1) 0 = Auto - The burner will be controlled based on external set point. 1 = ON - The burner will be controlled based on the fuel rate. 2 = OFF - The burner will remain off regardless of set point.	R/W	nvi/nvoOpMode_XXX	SNVT_count_f
Fuel Rate	Commanded fuel rate Modulation = 0% to 100% Multistage: 1001 = stage 1 1002 = stage 2 1003 = stage 3	R/W	nvi/nvoExtSP_XXX	SNVT_count_f
External Setpoint	External setpoint W3	R/W	nvi/nvoFuelRate_XXX	SNVT_count_f

Process Setpoint	Process setpoint (temperature or pressure)	R/W	nvi/nvoProcSP_XXX	SNVT_count_f
Statistics				
Hours	Hours run counter	R	nvoHours_XXX	SNVT_time_hour
Lockout Error Code	Error code (see table for the specific LMV… used)	R	nvoCrntErCd_XXX	SNVT_count_f
Lockout Diagnostic Code	Diagnostic code (see table for the specific LMV… used)	R	nvoCrntErDg_XXX	SNVT_count_f
Current Lockout	Error code	R	nvoCrntErCls_XXX	SNVT_count_f
	Error diagnosis	R	nvoCrntErPh_XXX	SNVT_count_f
	Error class	R	nvoCrntFuel_XXX	SNVT_count_f
	Error phase	R	nvoCrntOutpt_XXX	SNVT_count_f
	Fuel	R	nvoCrntTPDYr_XXX	SNVT_count_f
	Output	R	nvoCrntTPDMn_XXX	SNVT_count_f
	Date: Year	R	nvoCrntTPDDy_XXX	SNVT_count_f
	Date: Month	R	nvoCrntTODHr_XXX	SNVT_count_f
	Date: Day	R	nvoCrntTODMn_XXX	SNVT_count_f
	Time of day: Hours	R	nvoCrntTODSc_XXX	SNVT_count_f
	Time of day: Minutes	R	nvoCrntStCtT_XXX	SNVT_count_f
	Time of day: Seconds	R	nvoCrntHrRnT_XXX	SNVT_time_hour
	Startup counter total	R	nvoLckotErCd_XXX	SNVT_count_f
	Hours run total	R	nvoLckotDgCd_XXX	SNVT_count_f
Troubleshooting				
Com Status	0 = No Communication 1 = Communication	R	nvoComStatus_XXX	SNVT_switch

Table 16 - Siemens LMV 5... LonWorks Points List

5.5 HONEYWELL RM7800 SERIES POINTS LIST BY PROTOCOL

5.5.1 MODBUS TCP (HONEYWELL RM7800)

Protocol Name	Description		Read / Write	RM7800 Address
Data Points				
Flame Signal	Burner flame signal strength 0 – 255 represents 0 to 25.5 volts		R	10
Burner State Bits	Initiate	0 = off 1 = on When the “Hold” state is on, one other state may be on. For example, “Purge” and “Hold” would represent that the burner is in a “Purge Hold” state. When the “Alarm” state is on the “Lockout” state will be on and vice versa.	R	12
	Standby			
	Purge			
	Pilot Ignition			
	Main Ignition			
	Run			
	Post Purge			
	Pre Ignition			
	Valve Proving			
	Alarm			
	Hold			
	Lockout			
Expanded Annunciator State Bits	Main Valve Proof of Closure	0 = off 1 = on EA State Bits are represented in a U32 binary format	R	14
	Burner Switch			
	Operating Control			
	Auxiliary Limit #1			
	Auxiliary Limit #2			
	Low Water Cutoff			
	High Limit			
	Auxiliary Limit #3			
	Oil Select Switch			
	High Oil Pressure			
	Low Oil Pressure			
	High Oil Temperature			
	Low Oil Temperature			
	Gas Select Switch			
	High Gas Pressure			
	Low Gas Pressure			
	Air Flow Switch			
	Auxiliary Interlock #4			
	Auxiliary Interlock #5			
Statistics				
Burner Cycles	Total burner Cycles		R	6
Burner Hours	Total burner run hours		R	8
Burner Fault Code	Burner lockout code (see Appendix A.1)		R	0

Protocol Name	Description		Read / Write	RM7800 Address
Troubleshooting				
First Out Code	No Expanded Annunciator	0 = off 1 = on The first out code is represented in a U16 binary format.	R	13
	Burner Sw.			
	Operating Control			
	Aux. Limit #1			
	Aux. Limit #2			
	LWCO			
	High Limit			
	Aux. Limit #3			
	Fuel Select Off			
	Both Fuel Select			
	High Oil Pres.			
	Low Oil Pres.			
	High Oil Temp.			
	Low Oil Temp.			
	Atomizing Sw.			
	Main Valve Proof of Closure			
	Oil Select Switch			
	Gas Select Switch			
	High Gas Pressure			
	Low Gas Pressure			
	Air Flow Switch			
	Auxiliary Interlock 4			
	Auxiliary Interlock 5			

Table 17 - Honeywell RM7800 Modbus TCP Points List

5.5.2 BACNET IP/MSTP, METASYS N2 (HONEYWELL RM7800)

Protocol Name	Description		Read / Write	BACnet / N2 Type	Object ID / Point Address
Data Points					
Flame Signal	Burner flame signal strength 0 – 255 represents 0 to 25.5 volts		R	AI / AI	1
Burner State Bits	Initiate	0 = off 1 = on When the "Hold" state is on, one other state may be on. For example, "Purge" and "Hold" would represent that the burner is in a "Purge Hold" state. When the "Alarm" state is on the "Lockout" state will be on and vice versa.	R	AI / AI	53
	Standby				54
	Purge				55
	Pilot Ignition				56
	Main Ignition				57
	Run				58
	Post Purge				59
	Pre Ignition				60
	Valve Proving				61
	Alarm				62
	Hold				63
	Lockout				64
Expanded Annunciator State Bits	Main Valve Proof of Closure	0 = off 1 = on EA State Bits are represented in a U32 binary format	R	BI / DI	66
	Burner Switch				67
	Operating Control				68
	Auxiliary Limit #1				69
	Auxiliary Limit #2				70
	Low Water Cutoff				71
	High Limit				72
	Auxiliary Limit #3				73
	Oil Select Switch				74
	High Oil Pressure				75
	Low Oil Pressure				76
	High Oil Temperature				77
	Low Oil Temperature				78
	Gas Select Switch				79
	High Gas Pressure				80
	Low Gas Pressure				81
	Air Flow Switch				82
	Auxiliary Interlock #4				83
	Auxiliary Interlock #5				84
Statistics					
Burner Cycles	Total burner Cycles		R	AI / AI	2
Burner Hours	Total burner run hours		R	AI / AI	3
Burner Fault Code	Burner lockout code (see Appendix A.1)		R	AI / AI	4

Protocol Name	Description		Read / Write	BACnet / N2 Type	Object ID / Point Address
Troubleshooting					
First Out Code	No Expanded Annunciator	0 = off 1 = on The first out code is represented in a U16 binary format.	R	AI / AI	65
	Burner Sw.				
	Operating Control				
	Aux. Limit #1				
	Aux. Limit #2				
	LWCO				
	High Limit				
	Aux. Limit #3				
	Fuel Select Off				
	Both Fuel Select				
	High Oil Pres.				
	Low Oil Pres.				
	High Oil Temp.				
	Low Oil Temp.				
	Atomizing Sw.				
	Main Valve Proof of Closure				
	Oil Select Switch				
	Gas Select Switch				
	High Gas Pressure				
	Low Gas Pressure				
	Air Flow Switch				
	Auxiliary Interlock 4				
	Auxiliary Interlock 5				
Com Status	0 = No Communication 1 = Communication		R	BI / DI	1

Table 18 - Honeywell RM7800 BACnet IP/MSTP, Metasys N2 Points List

5.5.3 LONWORKS (HONEYWELL RM7800)

Protocol Name	Description		Read / Write	Lon Name	Lon SNVT Type
Data Points					
Flame Signal	Burner flame signal strength 0 – 255 represents 0 to 25.5 volts		R	nvoFlameSig_XXX	SNVT_count_f
Burner State Bits	Initiate	0 = off 1 = on When the "Hold" state is on one other state may be on.	R	nvoInitiate_XXX	SNVT_switch
	Standby			nvoStandby_XXX	SNVT_switch
	Purge			nvoPurge_XXX	SNVT_switch
	Pilot Ignition			nvoPilotIgn_XXX	SNVT_switch
	Main Ignition			nvoMainIgn_XXX	SNVT_switch
	Run			nvoRun_XXX	SNVT_switch
	Post Purge			nvoPostpurge_XXX	SNVT_switch
	Pre Ignition			nvoPreIgntn_XXX	SNVT_switch
	Valve Proving			nvoVlvProv_XXX	SNVT_switch
	Alarm			nvoAlarm_XXX	SNVT_switch
	Hold			nvoHold_XXX	SNVT_switch
	Lockout			nvoLockout_XXX	SNVT_switch
Expanded Annunciator State Bits	Main Valve Proof of Closure	0 = off 1 = on EA State Bits are represented in a U32 binary format	R	nvoMnVlvCls_XXX	SNVT_switch
	Burner Switch			nvoBrnrSw_XXX	SNVT_switch
	Operating Control			nvoOpCtrl_XXX	SNVT_switch
	Auxiliary Limit #1			nvoAuxLim1_XXX	SNVT_switch
	Auxiliary Limit #2			nvoAuxLim2_XXX	SNVT_switch
	Low Water Cutoff			nvoLoWtrCut_XXX	SNVT_switch
	High Limit			nvoHiLim_XXX	SNVT_switch
	Auxiliary Limit #3			NvoAuxLim3_XXX	SNVT_switch
	Oil Select Switch			nvoOilSelSw_XXX	SNVT_switch
	High Oil Pressure			nvoHiOilPrs_XXX	SNVT_switch
	Low Oil Pressure			nvoLoOilPrs_XXX	SNVT_switch
	High Oil Temperature			nvoHiOilTmp_XXX	SNVT_switch
	Low Oil Temperature			nvoLoOilTmp_XXX	SNVT_switch
	Gas Select Switch			nvoGasSelSw_XXX	SNVT_switch
	High Gas Pressure			nvoHiGasPrs_XXX	SNVT_switch
	Low Gas Pressure			nvoLoGasPrs_XXX	SNVT_switch
	Air Flow Switch			nvoAirFLoSw_XXX	SNVT_switch
	Auxiliary Interlock #4			nvoAuxIntlk4_XXX	SNVT_switch
	Auxiliary Interlock #5			nvoAuxIntlk5_XXX	SNVT_switch
Statistics					
Burner Cycles	Total burner Cycles		R	nvoBrnCyc_XXX	SNVT_count_f
Burner Hours	Total burner run hours		R	nvoBrnHrs_XXX	SNVT_time_hour
Burner Fault Code	Burner lockout code (see Appendix A.1)		R	nvoBrnFltCod_XXX	SNVT_count_f

Protocol Name	Description		Read / Write	Lon Name	Lon SNVT Type
Troubleshooting					
First Out Code	No Expanded Annunciator	0 = off 1 = on The first out code is represented in a U16 binary format.	R	nvo1stOutCod_XXX	SNVT_count_f
	Burner Sw.				
	Operating Control				
	Aux. Limit #1				
	Aux. Limit #2				
	LWCO				
	High Limit				
	Aux. Limit #3				
	Fuel Select Off				
	Both Fuel Select				
	High Oil Pres.				
	Low Oil Pres.				
	High Oil Temp.				
	Low Oil Temp.				
	Atomizing Sw.				
	Main Valve Proof of Closure				
	Oil Select Switch				
	Gas Select Switch				
	High Gas Pressure				
	Low Gas Pressure				
	Air Flow Switch				
	Auxiliary Interlock 4				
	Auxiliary Interlock 5				
Com Status	0 = No Communication 1 = Communication		R	BI / DI	1

Table 19 - Honeywell RM7800 LonWorks Points List

5.5.4 BURNER FAULT CODES (HONEYWELL RM7800)

Code	FAULT Message
0	*Blank (no fault)*
1	FAULT 1: NO PURGE CARD
2	FAULT 2: AC FREQUENY/NOISE
3	FAULT 3: AC LINE DROPOUT
4	FAULT 4: AC FREQUENCY
5	FAULT 5: LOW LINE VOLTAGE
6	FAULT 6: PURGE CARD ERROR
7	FAULT 7: FLAME AMPLIFIER
8	FAULT 8: FLAME AMP/SHUTR
9	FAULT 9: FLAME DETECTED
10	FAULT 10: PREIGNITION ILK
11	FAULT 11: RUNNING ILK ON
12	FAULT 12: LOCKOUT ILK ON
13	FAULT 13: AIRFLOW SW. ON
14	FAULT 14: HIGH FIRE SWITCH
15	FAULT 15: FLAME DETECTED
16	FAULT 16: FLAME-OUT TIMER
17	FAULT 17: MAIN FLAME FAIL
18	FAULT 18: FLAME DETECTED
19	FAULT 19: MAIN FLAME IGN.
20	FAULT 20: LOW FIRE SW OFF
21	FAULT 21: RUNNING ILK
22	FAULT 22: LOCKOUT ILK
23	FAULT 23: AIRFLOW SWITCH
24	FAULT 24: CALL SERVICE
25	FAULT 25: CALL SERVICE
26	FAULT 26: MAN-OPEN SW. OFF
27	FAULT 27: START SWITCH ON
28	FAULT 28: PILOT FLAME FAIL
29	FAULT 29: LOCKOUT ILK
30	FAULT 30: RUNNING ILK
31	FAULT 31: LOW FIRE SW OFF
32	FAULT 32: AIRFLOW SWITCH
33	FAULT 33: PREIGNITION ILK
34	FAULT 34: CONTROL ON
35	FAULT 35: CALL SERVICE
36	FAULT 36: CALL SERVICE
37	FAULT 37: CALL SERVICE
38	FAULT 38: CALL SERVICE
39	FAULT 39: CALL SERVICE
40	FAULT 40: CALL SERVICE
41	FAULT 41: MAIN VALVE ON

Code	FAULT Message
42	FAULT 42: PILOT VALVE 1 ON
43	FAULT 43: IGNITION ON
44	FAULT 44: PILOT VALVE 2 ON
45	FAULT 45: LOW FIRE SW OFF
46	FAULT 46: FLAME AMP TYPE
47	FAULT 47: JUMPERS CHANGED
48	FAULT 48: DELAYED MV ON
49	FAULT 49: MAN-OPEN SW. ON
50	FAULT 50: JUMPERS WRONG
51	FAULT 51: FLAME TOO STRONG
52	FAULT 52: CALL SERVICE
53	FAULT 53: LOCKOUT SWITCH
54	FAULT 54: COMB. PRESSURE
55	FAULT 55: PURGE FAN SW ON
56	FAULT 56: BLOCK INTAKE
57	FAULT 57: PURGE FAN SW OFF
58-66	FAULT 58-66: CALL SERVICE
67	FAULT 67: AC PHASE
68	FAULT 68: PREIGNITION ILK
69	FAULT 69: CALL SERVICE
70	FAULT 70: CALL SERVICE
71-75	FAULT 71-75: DEVICE SPECIFIC
76-93	FAULT 76-93: ACCESSORY FAULT
94-127	FAULT 94-127: CALL SERVICE
128	FAULT 128: POOR FLAME SENSOR
129-143	FAULT 129-143: CALL SERVICE
144	FAULT 33z: OTHER PREIGN ILK[EA]
145	FAULT 33y: VALVE CLOSURE[EA]
146	FAULT 32s: OTHER INTERLOCKS[EA]
147	FAULT 32r: AUX INTERLOCK #5[EA]
148	FAULT 32q: AUX INTERLOCK #4[EA]
149	FAULT 32p: AIRFLOW SWITCH[EA]
150	FAULT 32o: LOW GAS PRESSURE[EA]
151	FAULT 32n: HIGH GAS PRESSURE[EA]
152	FAULT 32m: ATOMIZING SW[EA]
153	FAULT 32k: LOW OIL TEMP[EA]
154	FAULT 32j: HIGH OIL TEMP[EA]
155	FAULT 32i: LOW OIL PRESSURE[EA]
156	FAULT 32h: HIGH OIL PRESSURE[EA]
157	FAULT 32g: BOTH FUELS SELECT[EA]
158	FAULT 32f: FUEL SELECT OFF[EA]
159	FAULT 32e: AUX LIMIT #3[EA]

Code	FAULT Message
160	FAULT 32d: HIGH LIMIT[EA]
161	FAULT 32c: LWCO[EA]
162	FAULT 32b: AUX LIMIT #2[EA]
163	FAULT 32a: AUX LIMIT #1[EA]
164	FAULT 30s: OTHER INTERLOCKS[EA]
165	FAULT 30r: AUX INTERLOCK #5[EA]
166	FAULT 30q: AUX INTERLOCK #4[EA]
167	FAULT 30p: AIRFLOW SWITCH[EA]
168	FAULT 30o: LOW GAS PRESSURE[EA]
169	FAULT 30n: HIGH GAS PRESSURE[EA]
170	FAULT 30m: ATOMIZING SW[EA]
171	FAULT 30k: LOW OIL TEMP[EA]
172	FAULT 30j: HIGH OIL TEMP[EA]
173	FAULT 30i: LOW OIL PRESSURE[EA]
174	FAULT 30h: HIGH OIL PRESSURE[EA]
175	FAULT 30g: BOTH FUELS SELECT[EA]
176	FAULT 30f: FUEL SELECT OFF[EA]
177	FAULT 30e: AUX LIMIT #3[EA]
178	FAULT 30d: HIGH LIMIT[EA]
179	FAULT 30c: LWCO[EA]
180	FAULT 30b: AUX LIMIT #2[EA]
181	FAULT 30a: AUX LIMIT #1[EA]
182	FAULT 29s: OTHER INTERLOCKS[EA]
183	FAULT 29r: AUX INTERLOCK #5[EA]
184	FAULT 29q: AUX INTERLOCK #4[EA]
185	FAULT 29p: AIRFLOW SWITCH[EA]
186	FAULT 29o: LOW GAS PRESSURE[EA]
187	FAULT 29n: HIGH GAS PRESSURE[EA]
188	FAULT 29m: ATOMIZING SW[EA]
189	FAULT 29k: LOW OIL TEMP[EA]
190	FAULT 29j: HIGH OIL TEMP[EA]
191	FAULT 29i LOW OIL PRESSURE[EA]
192	FAULT 29h: HIGH OIL PRESSURE[EA]
193	FAULT 29g: BOTH FUELS SELECT[EA]
194	FAULT 29f: FUEL SELECT OFF[EA]
195	FAULT 29e: AUX LIMIT #3[EA]
196	FAULT 29d: HIGH LIMIT[EA]
197	FAULT 29c: LWCO[EA]
198	FAULT 29b: AUX LIMIT #2[EA]
199	FAULT 29a: AUX LIMIT #1[EA]
200	FAULT 23s: OTHER INTERLOCKS[EA]
201	FAULT 23r: AUX INTERLOCK #5[EA]
202	FAULT 23q: AUX INTERLOCK #4[EA]
203	FAULT 23p: AIRFLOW SWITCH[EA]

Code	FAULT Message
204	FAULT 23o: LOW GAS PRESSURE[EA]
205	FAULT 23n: HIGH GAS PRESSURE[EA]
206	FAULT 23m: ATOMIZING SW[EA]
207	FAULT 23k: LOW OIL TEMP[EA]
208	FAULT 23j: HIGH OIL TEMP[EA]
209	FAULT 23i: LOW OIL PRESSURE[EA]
210	FAULT 23h: HIGH OIL PRESSURE[EA]
211	FAULT 23g: BOTH FUELS SELECT[EA]
212	FAULT 23f: FUEL SELECT OFF[EA]
213	FAULT 23e: AUX LIMIT #3[EA]
214	FAULT 23d: HIGH LIMIT[EA]
215	FAULT 23c: LWCO[EA]
216	FAULT 23b: AUX LIMIT #2[EA]
217	FAULT 23a: AUX LIMIT #1[EA]
218	FAULT 22s: OTHER INTERLOCKS[EA]
219	FAULT 22r: AUX INTERLOCK #5[EA]
220	FAULT 22q: AUX INTERLOCK #4[EA]
221	FAULT 22p: AIRFLOW SWITCH[EA]
222	FAULT 22o: LOW GAS PRESSURE[EA]
223	FAULT 22n: HIGH GAS PRESSURE[EA]
224	FAULT 22m: ATOMIZING SW[EA]
225	FAULT 22k: LOW OIL TEMP[EA]
226	FAULT 22j: HIGH OIL TEMP[EA]
227	FAULT 22i: LOW OIL PRESSURE[EA]
228	FAULT 22h: HIGH OIL PRESSURE[EA]
229	FAULT 22g: BOTH FUELS SELECT[EA]
230	FAULT 22f: FUEL SELECT OFF[EA]
231	FAULT 22e: AUX LIMIT #3[EA]
232	FAULT 22d: HIGH LIMIT[EA]
233	FAULT 22c: LWCO[EA]
234	FAULT 22b: AUX LIMIT #2[EA]
235	FAULT 22a: AUX LIMIT #1[EA]
236	FAULT 21s: OTHER INTERLOCKS[EA]
237	FAULT 21r: AUX INTERLOCK #5[EA]
238	FAULT 21q: AUX INTERLOCK #4[EA]
239	FAULT 21p: AIRFLOW SWITCH[EA]
240	FAULT 21o: LOW GAS PRESSURE[EA]
241	FAULT 21n: HIGH GAS PRESSURE[EA]
242	FAULT 21m: ATOMIZING SW[EA]
243	FAULT 21k: LOW OIL TEMP[EA]
244	FAULT 21j: HIGH OIL TEMP[EA]
245	FAULT 21i: LOW OIL PRESSURE[EA]
246	FAULT 21h: HIGH OIL PRESSURE[EA]
247	FAULT 21g: BOTH FUELS SELECT[EA]

Code	FAULT Message
248	FAULT 21f: FUEL SELECT OFF[EA]
249	FAULT 21e: AUX LIMIT #3[EA]
250	FAULT 21d: HIGH LIMIT[EA]
251	FAULT 21c: LWCO[EA]
252	FAULT 21b: AUX LIMIT #2[EA]
253	FAULT 21a: AUX LIMIT #1[EA]
254	FAULT 10z: OTHER PREIGN ILK[EA]
255	FAULT 10y: VALVE CLOSURE[EA]

Table 20 - Honeywell RM7800 Burner FAULT Codes

5.6 PRECISION DIGITAL TRIDENT PD765 PANEL METER

5.6.1 MODBUS TCP

Protocol Name	Description	Read / Write	PD765 Address
Data Points			
Display Value	Represents the display value without the decimal point. (-1999 to +9999)	R	1
Relay 1 Status	Energized/non-energized status of relay 1 0 = non-energized 1 = energized	RW	2
Relay 2 Status	Energized/non-energized status of relay 2 0 = non-energized 1 = energized	RW	3
Alarm 1 Status	Alarm status 1 0 = no alarm 1 = alarm	R	4
Alarm 2 Status	Alarm status 2 0 = no alarm 1 = alarm	R	5
Alarm 1 Acknowledge	Write 1 to acknowledge alarm 1	W	6
Alarm 2 Acknowledge	Write 1 to acknowledge alarm 2	W	7
Relay 1 Set Point	Set point represents the display value without the decimal point. (-1999 to +9999)	R	8
Relay 1 Reset Point	Reset point represents the display value without the decimal point. (-1999 to +9999)	R	9
Relay 1 Turn-on Delay	(0 to 199 seconds)	RW	10
Relay 1 Turn-off Delay	(0 to 199 seconds)	RW	11
Relay 1 Normal/Fail-Safe	0 = Normal 1 = Fail-Safe	RW	12
Relay 1 Operation (See PD765 Manual)	0 = Automatic reset 1 = Auto & Manual reset 2 = Latching 3 = Latching with Clear 4 = Pump Alternation 5 = Unused 6 = Unused 7 = Off (Disabled)(Modbus accessible)	RW	13
Relay 2 Set Point	Set point represents the display value without the decimal point. (-1999 to +9999)	RW	14

Protocol Name	Description	Read / Write	PD765 Address
Relay 2 Reset Point	Reset point represents the display value without the decimal point. (-1999 to +9999)	RW	15
Relay 2 Turn-on Delay	(0 to 199 seconds)	RW	16
Relay 2 Turn-off Delay	(0 to 199 seconds)	RW	17
Relay 2 Normal/Fail-Safe (See PD765 Manual)	0 = Normal 1 = Fail-Safe	RW	18
Relay 2 Operation (See PD765 Manual)	0 = Automatic reset 1 = Auto & Manual reset 2 = Latching 3 = Latching with Clear 4 = Pump Alternation 5 = Unused 6 = Unused 7 = Off (Disabled)(Modbus accessible)	RW	19
4-20mA Out-Mode Output Option	0 = Relays 1 = 4-20 mA	RW	20
4-20mA Out-Mode Data Source	0 = Display value - The data for the 4-20 mA output is the display (process) value. 1 = Max Display value - The data for the 4-20 mA output is the Maximum display value. 2 = Min Display value - The data for the 4-20 mA output is the Minimum display value. 3 = Serial Comm.,mA - The data for the 4-20 mA output is register 40412. 4 =Serial Comm.,bits - The data for the 4-20 mA output is register 40412. 5 Unused 6 Unused 7 Unused	RW	21
4-20mA Out–Sensor Break Value	(0 to 2399) Due to hardware variations, actual output range is designed to be at least 1.00 to 23.00 mA. Writing out of range data results in a value of 3.00 mA.	RW	22
4-20mA Out–Overrange value	(0 to 2399) This feature is not available through manual programming. Due to hardware variations, actual output range is designed to be at least 1.00 to 23.00 mA. Writing out of range data results in a value of 21.00 mA.	RW	23
4-20mA Out–Underrange value	(0 to 2399) This feature is not available through manual programming. Due to hardware variations, actual output range is designed to be at least 1.00 to 23.00 mA. Writing out of range data results in a value of 3.00 mA.	RW	24
4-20mA Out–Max value Allowed	(0 to 2399) This feature is not available through manual programming. Due to hardware variations, actual output range is designed to be at least 1.00 to 23.00 mA. Writing out of range data results in a value of 23.00 mA.	RW	25

Protocol Name	Description	Read / Write	PD765 Address
4-20mA Out–Min value Allowed	(0 to 2399) This feature is not available through manual programming. Due to hardware variations, actual output range is designed to be at least 1.00 to 23.00 mA. Writing out of range data results in a value of 0.00 mA.	RW	26
4-20mA Out–Display Value 1	(-1999 to +9999) 4-20mA out scaling. Represents the display value without the decimal point.	RW	27
4-20mA Out–Display Value 2	(-1999 to +9999) 4-20mA out scaling. Represents the display value without the decimal point.	RW	28
4-20mA Out–Output 1	(0 to 2399) 4-20mA out scaling. Represents the mA output at Display 1 value without decimal point. Writing out of range data results in a value of 23.99 mA.	RW	29
4-20mA Out–Output 2	(0 to 2399) 4-20mA out scaling. Represents the mA output at Display 2 value without decimal point. Writing out of range data results in a value of 23.99 mA.	RW	30
4-20mA Out–Data in mA or Data in bit	(0 to 2399 or 0 to 65535) If 4-20mA out mode is set to "Serial Comm., mA" (0x83) this register is in 10's of µA. Due to hardware variations, the actual output range is at least 1.00 to 23.00 mA. Writing out of range data results in a value of 23.99 mA. If 4-20mA out mode is set to "Serial Comm., bits" (0x84), this register is in DAC bits.	RW	31

Table 21 - PD765 Modbus TCP Points List

5.6.2 BACNET IP/MSTP, METASYS N2

Protocol Name	Description	Read / Write	BACnet / N2 Type	Object ID / Point Address
Display Value	Represents the display value without the decimal point. (-1999 to +9999)	R	AI / AI	1
Relay 1 Status	Energized/non-energized status of relay 1 0 = non-energized 1 = energized	RW	BV / DO	2
Relay 2 Status	Energized/non-energized status of relay 2 0 = non-energized 1 = energized	RW	BV / DO	3
Alarm 1 Status	Alarm status 1 0 = no alarm 1 = alarm	R	BI / DI	4
Alarm 2 Status	Alarm status 2 0 = no alarm 1 = alarm	R	BI / DI	5

Protocol Name	Description	Read / Write	BACnet / N2 Type	Object ID / Point Address
Alarm 1 Acknowledge	Write 1 to acknowledge alarm 1	W	BV / DO	6
Alarm 2 Acknowledge	Write 1 to acknowledge alarm 2	W	BV / DO	7
Relay 1 Set Point	Set point represents the display value without the decimal point. (-1999 to +9999)	R	AV / AO	8
Relay 1 Reset Point	Reset point represents the display value without the decimal point. (-1999 to +9999)	R	AV / AO	9
Relay 1 Turn-on Delay	(0 to 199 seconds)	RW	AV / AO	10
Relay 1 Turn-off Delay	(0 to 199 seconds)	RW	AV / AO	11
Relay 1 Normal/Fail-Safe	0 = Normal 1 = Fail-Safe	RW	BV / DO	12
Relay 1 Operation (See PD765 Manual)	0 = Automatic reset 1 = Auto & Manual reset 2 = Latching 3 = Latching with Clear 4 = Pump Alternation 5 = Unused 6 = Unused 7 = Off (Disabled)(Modbus accessible)	RW	AV / AO	13
Relay 2 Set Point	Set point represents the display value without the decimal point. (-1999 to +9999)	RW	AV / AO	14
Relay 2 Reset Point	Reset point represents the display value without the decimal point. (-1999 to +9999)	RW	AV / AO	15
Relay 2 Turn-on Delay	(0 to 199 seconds)	RW	AV / AO	16
Relay 2 Turn-off Delay	(0 to 199 seconds)	RW	AV / AO	17
Relay 2 Normal/Fail-Safe (See PD765 Manual)	0 = Normal 1 = Fail-Safe	RW	BV / DO	18

Protocol Name	Description	Read / Write	BACnet / N2 Type	Object ID / Point Address
Relay 2 Operation (See PD765 Manual)	0 = Automatic reset 1 = Auto & Manual reset 2 = Latching 3 = Latching with Clear 4 = Pump Alternation 5 = Unused 6 = Unused 7 = Off (Disabled)(Modbus accessible)	RW	AV / AO	19
4-20mA Out-Mode Output Option	0 = Relays 1 = 4-20 mA	RW	BV / DO	20
4-20mA Out-Mode Data Source	0 = Display value - The data for the 4-20 mA output is the display (process) value. 1 = Max Display value - The data for the 4-20 mA output is the Maximum display value. 2 = Min Display value - The data for the 4-20 mA output is the Minimum display value. 3 = Serial Comm.,mA - The data for the 4-20 mA output is register 40412. 4 =Serial Comm.,bits - The data for the 4-20 mA output is register 40412. 5 Unused 6 Unused 7 Unused	RW	AV / AO	21
4-20mA Out–Sensor Break Value	(0 to 2399) Due to hardware variations, actual output range is designed to be at least 1.00 to 23.00 mA. Writing out of range data results in a value of 3.00 mA.	RW	AV / AO	22
4-20mA Out–Overrange value	(0 to 2399) This feature is not available through manual programming. Due to hardware variations, actual output range is designed to be at least 1.00 to 23.00 mA. Writing out of range data results in a value of 21.00 mA.	RW	AV / AO	23
4-20mA Out–Underrange value	(0 to 2399) This feature is not available through manual programming. Due to hardware variations, actual output range is designed to be at least 1.00 to 23.00 mA. Writing out of range data results in a value of 3.00 mA.	RW	AV / AO	24

Protocol Name	Description	Read / Write	BACnet / N2 Type	Object ID / Point Address
4-20mA Out–Max value Allowed	(0 to 2399) This feature is not available through manual programming. Due to hardware variations, actual output range is designed to be at least 1.00 to 23.00 mA. Writing out of range data results in a value of 23.00 mA.	RW	AV / AO	25
4-20mA Out–Min value Allowed	(0 to 2399) This feature is not available through manual programming. Due to hardware variations, actual output range is designed to be at least 1.00 to 23.00 mA. Writing out of range data results in a value of 0.00 mA.	RW	AV / AO	26
4-20mA Out–Display Value 1	(-1999 to +9999) 4-20mA out scaling. Represents the display value without the decimal point.	RW	AV / AO	27
4-20mA Out–Display Value 2	(-1999 to +9999) 4-20mA out scaling. Represents the display value without the decimal point.	RW	AV / AO	28
4-20mA Out–Output 1	(0 to 2399) 4-20mA out scaling. Represents the mA output at Display 1 value without decimal point. Writing out of range data results in a value of 23.99 mA.	RW	AV / AO	29
4-20mA Out–Output 2	(0 to 2399) 4-20mA out scaling. Represents the mA output at Display 2 value without decimal point. Writing out of range data results in a value of 23.99 mA.	RW	AV / AO	30
4-20mA Out–Data in mA or Data in bit	(0 to 2399 or 0 to 65535) If 4-20mA out mode is set to “Serial Comm., mA” (0x83) this register is in 10’s of µA. Due to hardware variations, the actual output range is at least 1.00 to 23.00 mA. Writing out of range data results in a value of 23.99 mA. If 4-20mA out mode is set to “Serial Comm., bits” (0x84), this register is in DAC bits.	RW	AV / AO	31

Table 22 - PD765 Bacnet IP/MSTP Points List

5.6.3 LONWORKS

Protocol Name	Description	Read / Write	Lon Name	Lon SNVT Type
Data Points				

Protocol Name	Description	Read / Write	Lon Name	Lon SNVT Type
Display Value	Represents the display value without the decimal point. (-1999 to +9999)	R	nvoDispVal_XXX	SNVT_count_f
Relay 1 Status	Energized/non-energized status of relay 1 0 = non-energized 1 = energized	RW	nvi/nvoRel1Stat_XXX	SNVT_switch
Relay 2 Status	Energized/non-energized status of relay 2 0 = non-energized 1 = energized	RW	nvi/nvoRel2Stat_XXX	SNVT_switch
Alarm 1 Status	Alarm status 1 0 = no alarm 1 = alarm	R	nvoAlm1Stat_XXX	SNVT_switch
Alarm 2 Status	Alarm status 2 0 = no alarm 1 = alarm	R	nvoAlm2Stat_XXX	SNVT_switch
Alarm 1 Acknowledge	Write 1 to acknowledge alarm 1	W	nvi/nvoAlm1Ack_XXX	SNVT_switch
Alarm 2 Acknowledge	Write 1 to acknowledge alarm 2	W	nvi/nvoAlm2Ack_XXX	SNVT_switch
Relay 1 Set Point	Set point represents the display value without the decimal point. (-1999 to +9999)	R	nvi/nvoRl1SP_XXX	SNVT_count_f
Relay 1 Reset Point	Reset point represents the display value without the decimal point. (-1999 to +9999)	R	nvi/nvoRl1ResPt_XXX	SNVT_count_f
Relay 1 Turn-on Delay	(0 to 199 seconds)	RW	nvi/nvoRl1TnOnDl_XXX	SNVT_count_f
Relay 1 Turn-off Delay	(0 to 199 seconds)	RW	nvi/nvoRl1TnOfDl_XXX	SNVT_count_f
Relay 1 Normal/Fail-Safe	0 = Normal 1 = Fail-Safe	RW	nvi/nvoRl1NrFlSf_XXX	SNVT_switch

Protocol Name	Description	Read / Write	Lon Name	Lon SNVT Type
Relay 1 Operation (See PD765 Manual)	0 = Automatic reset 1 = Auto & Manual reset 2 = Latching 3 = Latching with Clear 4 = Pump Alternation 5 = Unused 6 = Unused 7 = Off (Disabled)(Modbus accessible)	RW	nvi/nvoRl1Oper_XXX	SNVT_count_f
Relay 2 Set Point	Set point represents the display value without the decimal point. (-1999 to +9999)	RW	nvi/nvoRl2SP_XXX	SNVT_count_f
Relay 2 Reset Point	Reset point represents the display value without the decimal point. (-1999 to +9999)	RW	nvi/nvoRl2ResPt_XXX	SNVT_count_f
Relay 2 Turn-on Delay	(0 to 199 seconds)	RW	nvi/nvoRl2TnOnDl_XXX	SNVT_count_f
Relay 2 Turn-off Delay	(0 to 199 seconds)	RW	nvi/nvoRl2TnOfDl_XXX	SNVT_count_f
Relay 2 Normal/Fail-Safe (See PD765 Manual)	0 = Normal 1 = Fail-Safe	RW	nvi/nvoRl2NrFlSf_XXX	SNVT_switch
Relay 2 Operation (See PD765 Manual)	0 = Automatic reset 1 = Auto & Manual reset 2 = Latching 3 = Latching with Clear 4 = Pump Alternation 5 = Unused 6 = Unused 7 = Off (Disabled)(Modbus accessible)	RW	nvi/nvoRl2Oper_XXX	SNVT_count_f
4-20mA Out-Mode Output Option	0 = Relays 1 = 4-20 mA	RW	nvi/nvo420MdOtOp_XXX	SNVT_switch

Protocol Name	Description	Read / Write	Lon Name	Lon SNVT Type
4-20mA Out-Mode Data Source	0 = Display value - The data for the 4-20 mA output is the display (process) value. 1 = Max Display value - The data for the 4-20 mA output is the Maximum display value. 2 = Min Display value - The data for the 4-20 mA output is the Minimum display value. 3 = Serial Comm.,mA - The data for the 4-20 mA output is register 40412. 4 =Serial Comm.,bits - The data for the 4-20 mA output is register 40412. 5 Unused 6 Unused 7 Unused	RW	nvi/nvo420MdDtSr_XXX	SNVT_count_f
4-20mA Out–Sensor Break Value	(0 to 2399) Due to hardware variations, actual output range is designed to be at least 1.00 to 23.00 mA. Writing out of range data results in a value of 3.00 mA.	RW	nvi/nvo420SnBkVl_XXX	SNVT_count_f
4-20mA Out–Overrange value	(0 to 2399) This feature is not available through manual programming. Due to hardware variations, actual output range is designed to be at least 1.00 to 23.00 mA. Writing out of range data results in a value of 21.00 mA.	RW	nvi/nvo420OvrVal_XXX	SNVT_count_f
4-20mA Out–Underrange value	(0 to 2399) This feature is not available through manual programming. Due to hardware variations, actual output range is designed to be at least 1.00 to 23.00 mA. Writing out of range data results in a value of 3.00 mA.	RW	nvi/nvo420UndVal_XXX	SNVT_count_f
4-20mA Out–Max value Allowed	(0 to 2399) This feature is not available through manual programming. Due to hardware variations, actual output range is designed to be at least 1.00 to 23.00 mA. Writing out of range data results in a value of 23.00 mA.	RW	nvi/nvo420MxVlAl_XXX	SNVT_count_f

Protocol Name	Description	Read / Write	Lon Name	Lon SNVT Type
4-20mA Out– Min value Allowed	(0 to 2399) This feature is not available through manual programming. Due to hardware variations, actual output range is designed to be at least 1.00 to 23.00 mA. Writing out of range data results in a value of 0.00 mA.	RW	nvi/nvo420MnVlAl_XXX	SNVT_count_f
4-20mA Out– Display Value 1	(-1999 to +9999) 4-20mA out scaling. Represents the display value without the decimal point.	RW	nvi/nvo420DspVl1_XXX	SNVT_count_f
4-20mA Out– Display Value 2	(-1999 to +9999) 4-20mA out scaling. Represents the display value without the decimal point.	RW	nvi/nvo420DspVl2_XXX	SNVT_count_f
4-20mA Out– Output 1	(0 to 2399) 4-20mA out scaling. Represents the mA output at Display 1 value without decimal point. Writing out of range data results in a value of 23.99 mA.	RW	nvi/nvo420Outpt1_XXX	SNVT_count_f
4-20mA Out– Output 2	(0 to 2399) 4-20mA out scaling. Represents the mA output at Display 2 value without decimal point. Writing out of range data results in a value of 23.99 mA.	RW	nvi/nvo420Outpt2_XXX	SNVT_count_f
4-20mA Out– Data in mA or Data in bit	(0 to 2399 or 0 to 65535) If 4-20mA out mode is set to “Serial Comm., mA” (0x83) this register is in 10’s of µA. Due to hardware variations, the actual output range is at least 1.00 to 23.00 mA. Writing out of range data results in a value of 23.99 mA. If 4-20mA out mode is set to “Serial Comm., bits” (0x84), this register is in DAC bits.	RW	nvi/nvo420DtmABt_XXX	SNVT_count_f

Table 23 - PD765 Lonworks Points List

6 TROUBLESHOOTING TIPS

Confirm that the network cabling is correct

1. Confirm that the computer network card is operational and correctly configured
2. Confirm that there is an Ethernet adapter installed in the PC's Device Manager List, and that it is configured to run the TCP/IP protocol.
3. Check that the IP netmask of the PC matches the ProtoNode. The Default IP Address of the ProtoNode is 192.168.1.24, Subnet Mask is 255.255.255.0
    a. Go to Start > Run
    b. Type in "ipconfig"
    c. The account settings should be displayed
    d. Ensure that the IP address is 192.168.1.xxx and the netmask 255.255.255.0
    e. Ensure that the PC and ProtoNode are on the same IP Network, or assign a Static IP Address to the PC on the 192.168.1.0 network using the Remote User Interface Utility.
4. If Using Windows XP, ensure that the firewall is disabled
5. Ensure that all other Ethernet cards active on the PC, especially wireless adapters are disabled
6. Refer to the FieldServer Troubleshooting Guide which can be found at: www.protocessor.com/downloads/ under documentation.

- No COMS on Modbus RTU side. If Tx/Rx are not flashing rapidly then there is a COM issue on the Modbus side and you need to check the following things:
    - Visual observations of LEDs on ProtoNode. (Appendix F.1)
    - Check baud rate, parity, data bits, stop bits
    - Check Modbus device address
    - Verify wiring

- Field COM problems
    - Visual observations of LEDs on ProtoNode. (Appendix F.1)
    - 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. (5.2)

6.1 LED DIAGNOSTICS FOR COMMUNICATIONS BETWEEN THE UCG AND DEVICES

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

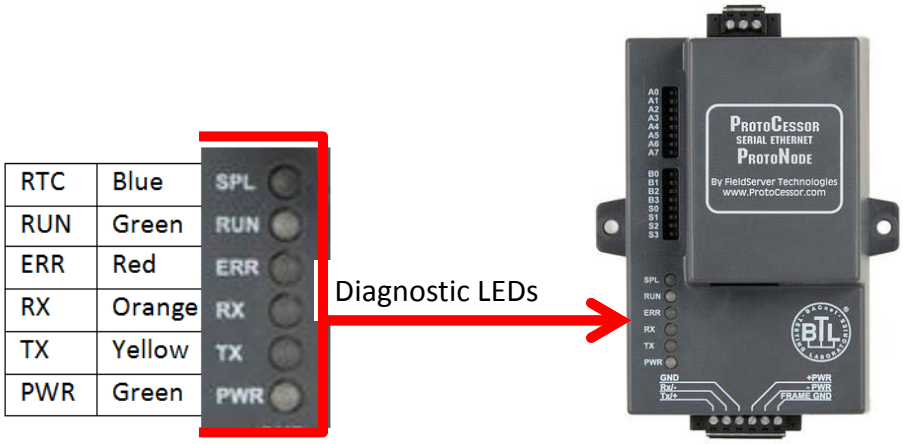


Figure 35 - Diagnostic LEDs

Tag	Description
RTC (Blue)	Unused
RUN (Green)	The RUN LED will start flashing 20 seconds after power indicating normal operation.
ERR (Red)	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 ProtoNode. If this occurs, immediately report the related "system error" shown in the error screen of the GUI interface to FieldServer Technologies for evaluation.
RX (Orange)	The RX LED will flash when a message is received on the host port.
TX (Yellow)	The TX LED will flash when a message is sent on the host port.
PWR (Green)	This is the power light and should show steady green at all times when ProtoNode is powered.

Table 24 - Diagnostic LEDs

6.2 TAKE DIAGNOSTIC CAPTURE WITH THE FIELDSERVER UTILITIES

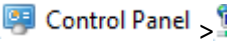
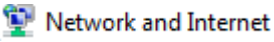
- **Once the log is Diagnostic Capture is complete, email it to support@protocessor.com . The Diagnostic Capture will allow us to rapidly diagnose the problem.**
- Make sure the FildServer Utilities are loaded on your PC

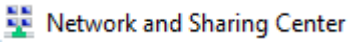
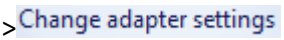
  http://fieldserver.com/techsupport/utility/utility.php
- Disable any wireless Ethernet adapters on the PC/laptop
- Connect a standard CAT5 Ethernet cable between the PC and the ProtoNode

Figure 36 - Ethernet Port Location

- The Default IP address of the ProtoNode is **192.168.1.24**, Subnet Mask is **255.255.255.0**. If the PC and the ProtoNode are on different IP Networks, assign a static IP Address to the PC on the 192.168.1.xxx network
  - For Windows XP:
    a. Go to  >  > 

    Right-click on Local Area Connection > Properties

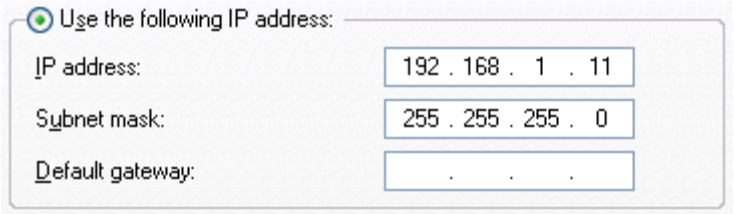
    Highlight  > 
  - For Windows 7:
    b. Go to  >  > 

    >  > 

    Right-click on Local Area Connection > Properties

    Highlight  > 

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

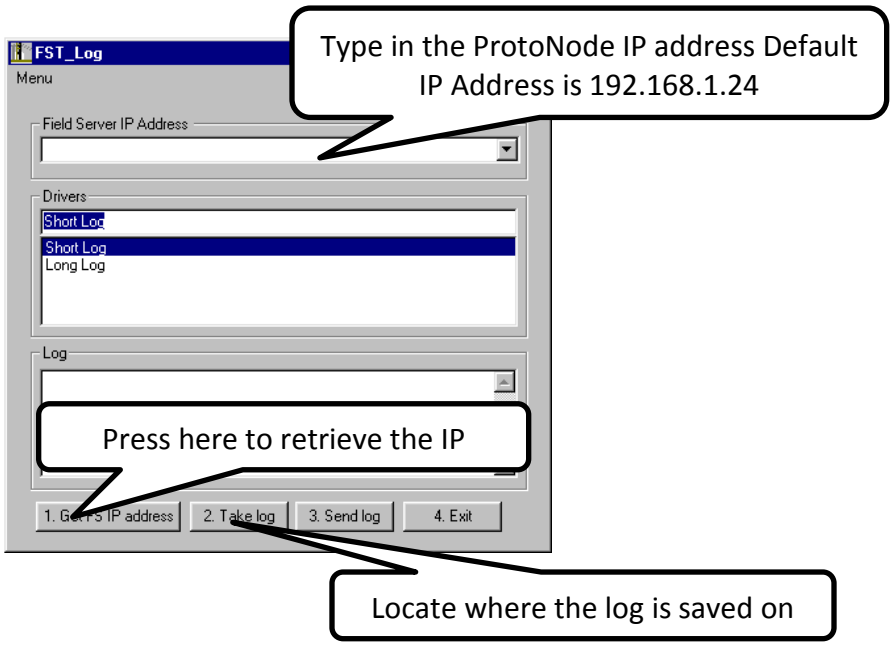


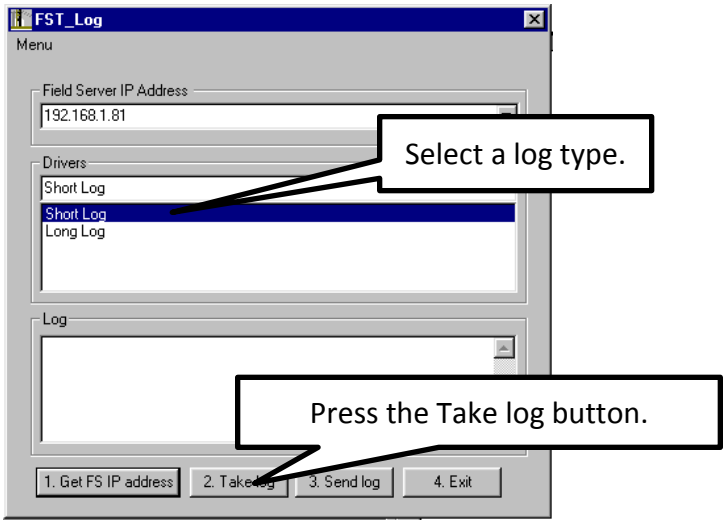
- Click OK twice

- 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





Note:

1. Delete existing log file from directory (C:\Program Files\FieldServer\FST_Diag)

2. You may need to disable your fire wall

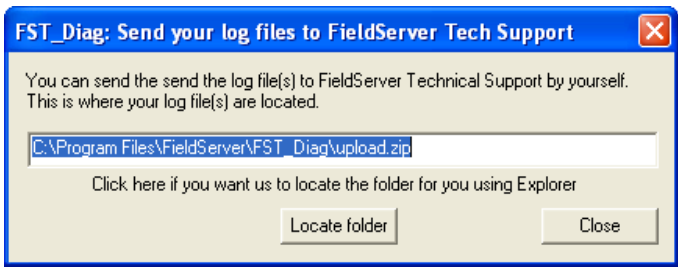
3. You may need to disable any wireless internet connections.

- **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.



- Click 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 

7 SPECIFICATIONS

	Electrical Connections	
	BACnet/Metasys N2/Modbus TCP	LonWorks
RJ45	10/100 Ethernet port	10/100 Ethernet port
J1-1	120 Vac line voltage	120 Vac line voltage
J1-2	120 Vac return voltage	120 Vac return voltage
J1-3	PE Ground	PE Ground
RJ45	SOLA Port	SOLA Port
J3-3	Device RS485 Data+	Device RS485 Data+
J3-2	Device RS485 Data-	Device RS485 Data-
J3-1	Device RS485 Ground	Device RS485 Ground
J2-3	BMS RS485 Data+	BMS FTT-10 LonWorks port
J2-2	BMS RS485 Data-	BMS FTT-10 LonWorks port
J2-1	BMS RS485 Ground	NA
Approvals:	CE (EN55022;EN55024; EN60950), UL916, FCC Class A Part 15, DNP3 Conformance Tested, OPC Self-tested for Compliance, RoHS Compliant, CSA 205 Approved	
	BTL Marked	LonMark Certified
Power Requirements	120 Vac @ < 3.5 Watts	
Physical Dimensions	10 in. x 12 in. x 6 in.	
Weight:	13.2 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)		

Table 25 - Specifications

7.1 DEVICE RTU COM SETTINGS

Serial Port Setting	Sola*	RWF40	RWF55	LMV3…	LMV5…	RM7800
Protocol	RTU	RTU	RTU	RTU	RTU	RTU
Baud Rate	38400	9600	9600	9600	9600	9600
Parity	None	None	None	None	None	None
Data Bits	8	8	8	8	8	8
Stop Bits	1	1	1	1	1	1

Table 26 - Device RTU COM Setting

* If the Sola device is connected with any other device in the table then the baud rate will need to be changed to 19200bps.

7.2 ADDRESS DIP SWITCH SETTINGS

A7	A6	A5	A4	A3	A2	A1	A0	Address
Off	Off	Off	Off	Off	Off	Off	Off	0
Off	Off	Off	Off	Off	Off	Off	On	1
Off	Off	Off	Off	Off	Off	On	Off	2
Off	Off	Off	Off	Off	Off	On	On	3
Off	Off	Off	Off	Off	On	Off	Off	4
Off	Off	Off	Off	Off	On	Off	On	5
Off	Off	Off	Off	Off	On	On	Off	6
Off	Off	Off	Off	Off	On	On	On	7
Off	Off	Off	Off	On	Off	Off	Off	8
Off	Off	Off	Off	On	Off	Off	On	9
Off	Off	Off	Off	On	Off	On	Off	10
Off	Off	Off	Off	On	Off	On	On	11
Off	Off	Off	Off	On	On	Off	Off	12
Off	Off	Off	Off	On	On	Off	On	13
Off	Off	Off	Off	On	On	On	Off	14
Off	Off	Off	Off	On	On	On	On	15
Off	Off	Off	On	Off	Off	Off	Off	16
Off	Off	Off	On	Off	Off	Off	On	17
Off	Off	Off	On	Off	Off	On	Off	18
Off	Off	Off	On	Off	Off	On	On	19
Off	Off	Off	On	Off	On	Off	Off	20
Off	Off	Off	On	Off	On	Off	On	21
Off	Off	Off	On	Off	On	On	Off	22
Off	Off	Off	On	Off	On	On	On	23
Off	Off	Off	On	On	Off	Off	Off	24
Off	Off	Off	On	On	Off	Off	On	25
Off	Off	Off	On	On	Off	On	Off	26
Off	Off	Off	On	On	Off	On	On	27
Off	Off	Off	On	On	On	Off	Off	28
Off	Off	Off	On	On	On	Off	On	29
Off	Off	Off	On	On	On	On	Off	30
Off	Off	Off	On	On	On	On	On	31
Off	Off	On	Off	Off	Off	Off	Off	32
Off	Off	On	Off	Off	Off	Off	On	33
Off	Off	On	Off	Off	Off	On	Off	34
Off	Off	On	Off	Off	Off	On	On	35

A7	A6	A5	A4	A3	A2	A1	A0	Address
Off	Off	On	Off	Off	On	Off	Off	36
Off	Off	On	Off	Off	On	Off	On	37
Off	Off	On	Off	Off	On	On	Off	38
Off	Off	On	Off	Off	On	On	On	39
Off	Off	On	Off	On	Off	Off	Off	40
Off	Off	On	Off	On	Off	Off	On	41
Off	Off	On	Off	On	Off	On	Off	42
Off	Off	On	Off	On	Off	On	On	43
Off	Off	On	Off	On	On	Off	Off	44
Off	Off	On	Off	On	On	Off	On	45
Off	Off	On	Off	On	On	On	Off	46
Off	Off	On	Off	On	On	On	On	47
Off	Off	On	On	Off	Off	Off	Off	48
Off	Off	On	On	Off	Off	Off	On	49
Off	Off	On	On	Off	Off	On	Off	50
Off	Off	On	On	Off	Off	On	On	51
Off	Off	On	On	Off	On	Off	Off	52
Off	Off	On	On	Off	On	Off	On	53
Off	Off	On	On	Off	On	On	Off	54
Off	Off	On	On	Off	On	On	On	55
Off	Off	On	On	On	Off	Off	Off	56
Off	Off	On	On	On	Off	Off	On	57
Off	Off	On	On	On	Off	On	Off	58
Off	Off	On	On	On	Off	On	On	59
Off	Off	On	On	On	On	Off	Off	60
Off	Off	On	On	On	On	Off	On	61
Off	Off	On	On	On	On	On	Off	62
Off	Off	On	On	On	On	On	On	63
Off	On	Off	Off	Off	Off	Off	Off	64
Off	On	Off	Off	Off	Off	Off	On	65
Off	On	Off	Off	Off	Off	On	Off	66
Off	On	Off	Off	Off	Off	On	On	67
Off	On	Off	Off	Off	On	Off	Off	68
Off	On	Off	Off	Off	On	Off	On	69
Off	On	Off	Off	Off	On	On	Off	70
Off	On	Off	Off	Off	On	On	On	71
Off	On	Off	Off	On	Off	Off	Off	72
Off	On	Off	Off	On	Off	Off	On	73

A7	A6	A5	A4	A3	A2	A1	A0	Address
Off	On	Off	Off	On	Off	On	Off	74
Off	On	Off	Off	On	Off	On	On	75
Off	On	Off	Off	On	On	Off	Off	76
Off	On	Off	Off	On	On	Off	On	77
Off	On	Off	Off	On	On	On	Off	78
Off	On	Off	Off	On	On	On	On	79
Off	On	Off	On	Off	Off	Off	Off	80
Off	On	Off	On	Off	Off	Off	On	81
Off	On	Off	On	Off	Off	On	Off	82
Off	On	Off	On	Off	Off	On	On	83
Off	On	Off	On	Off	On	Off	Off	84
Off	On	Off	On	Off	On	Off	On	85
Off	On	Off	On	Off	On	On	Off	86
Off	On	Off	On	Off	On	On	On	87
Off	On	Off	On	On	Off	Off	Off	88
Off	On	Off	On	On	Off	Off	On	89
Off	On	Off	On	On	Off	On	Off	90
Off	On	Off	On	On	Off	On	On	91
Off	On	Off	On	On	On	Off	Off	92
Off	On	Off	On	On	On	Off	On	93
Off	On	Off	On	On	On	On	Off	94
Off	On	Off	On	On	On	On	On	95
Off	On	On	Off	Off	Off	Off	Off	96
Off	On	On	Off	Off	Off	Off	On	97
Off	On	On	Off	Off	Off	On	Off	98
Off	On	On	Off	Off	Off	On	On	99
Off	On	On	Off	Off	On	Off	Off	100
Off	On	On	Off	Off	On	Off	On	101
Off	On	On	Off	Off	On	On	Off	102
Off	On	On	Off	Off	On	On	On	103
Off	On	On	Off	On	Off	Off	Off	104
Off	On	On	Off	On	Off	Off	On	105
Off	On	On	Off	On	Off	On	Off	106
Off	On	On	Off	On	Off	On	On	107
Off	On	On	Off	On	On	Off	Off	108
Off	On	On	Off	On	On	Off	On	109
Off	On	On	Off	On	On	On	Off	110
Off	On	On	Off	On	On	On	On	111

A7	A6	A5	A4	A3	A2	A1	A0	Address
Off	On	On	On	Off	Off	Off	Off	112
Off	On	On	On	Off	Off	Off	On	113
Off	On	On	On	Off	Off	On	Off	114
Off	On	On	On	Off	Off	On	On	115
Off	On	On	On	Off	On	Off	Off	116
Off	On	On	On	Off	On	Off	On	117
Off	On	On	On	Off	On	On	Off	118
Off	On	On	On	Off	On	On	On	119
Off	On	On	On	On	Off	Off	Off	120
Off	On	On	On	On	Off	Off	On	121
Off	On	On	On	On	Off	On	Off	122
Off	On	On	On	On	Off	On	On	123
Off	On	On	On	On	On	Off	Off	124
Off	On	On	On	On	On	Off	On	125
Off	On	On	On	On	On	On	Off	126
Off	On	On	On	On	On	On	On	127
On	Off	Off	Off	Off	Off	Off	Off	128
On	Off	Off	Off	Off	Off	Off	On	129
On	Off	Off	Off	Off	Off	On	Off	130
On	Off	Off	Off	Off	Off	On	On	131
On	Off	Off	Off	Off	On	Off	Off	132
On	Off	Off	Off	Off	On	Off	On	133
On	Off	Off	Off	Off	On	On	Off	134
On	Off	Off	Off	Off	On	On	On	135
On	Off	Off	Off	On	Off	Off	Off	136
On	Off	Off	Off	On	Off	Off	On	137
On	Off	Off	Off	On	Off	On	Off	138
On	Off	Off	Off	On	Off	On	On	139
On	Off	Off	Off	On	On	Off	Off	140
On	Off	Off	Off	On	On	Off	On	141
On	Off	Off	Off	On	On	On	Off	142
On	Off	Off	Off	On	On	On	On	143
On	Off	Off	On	Off	Off	Off	Off	144
On	Off	Off	On	Off	Off	Off	On	145
On	Off	Off	On	Off	Off	On	Off	146
On	Off	Off	On	Off	Off	On	On	147
On	Off	Off	On	Off	On	Off	Off	148
On	Off	Off	On	Off	On	Off	On	149

A7	A6	A5	A4	A3	A2	A1	A0	Address
On	Off	Off	On	Off	On	On	Off	150
On	Off	Off	On	Off	On	On	On	151
On	Off	Off	On	On	Off	Off	Off	152
On	Off	Off	On	On	Off	Off	On	153
On	Off	Off	On	On	Off	On	Off	154
On	Off	Off	On	On	Off	On	On	155
On	Off	Off	On	On	On	Off	Off	156
On	Off	Off	On	On	On	Off	On	157
On	Off	Off	On	On	On	On	Off	158
On	Off	Off	On	On	On	On	On	159
On	Off	On	Off	Off	Off	Off	Off	160
On	Off	On	Off	Off	Off	Off	On	161
On	Off	On	Off	Off	Off	On	Off	162
On	Off	On	Off	Off	Off	On	On	163
On	Off	On	Off	Off	On	Off	Off	164
On	Off	On	Off	Off	On	Off	On	165
On	Off	On	Off	Off	On	On	Off	166
On	Off	On	Off	Off	On	On	On	167
On	Off	On	Off	On	Off	Off	Off	168
On	Off	On	Off	On	Off	Off	On	169
On	Off	On	Off	On	Off	On	Off	170
On	Off	On	Off	On	Off	On	On	171
On	Off	On	Off	On	On	Off	Off	172
On	Off	On	Off	On	On	Off	On	173
On	Off	On	Off	On	On	On	Off	174
On	Off	On	Off	On	On	On	On	175
On	Off	On	On	Off	Off	Off	Off	176
On	Off	On	On	Off	Off	Off	On	177
On	Off	On	On	Off	Off	On	Off	178
On	Off	On	On	Off	Off	On	On	179
On	Off	On	On	Off	On	Off	Off	180
On	Off	On	On	Off	On	Off	On	181
On	Off	On	On	Off	On	On	Off	182
On	Off	On	On	Off	On	On	On	183
On	Off	On	On	On	Off	Off	Off	184
On	Off	On	On	On	Off	Off	On	185
On	Off	On	On	On	Off	On	Off	186
On	Off	On	On	On	Off	On	On	187

A7	A6	A5	A4	A3	A2	A1	A0	Address
On	Off	On	On	On	On	Off	Off	188
On	Off	On	On	On	On	Off	On	189
On	Off	On	On	On	On	On	Off	190
On	Off	On	On	On	On	On	On	191
On	On	Off	Off	Off	Off	Off	Off	192
On	On	Off	Off	Off	Off	Off	On	193
On	On	Off	Off	Off	Off	On	Off	194
On	On	Off	Off	Off	Off	On	On	195
On	On	Off	Off	Off	On	Off	Off	196
On	On	Off	Off	Off	On	Off	On	197
On	On	Off	Off	Off	On	On	Off	198
On	On	Off	Off	Off	On	On	On	199
On	On	Off	Off	On	Off	Off	Off	200
On	On	Off	Off	On	Off	Off	On	201
On	On	Off	Off	On	Off	On	Off	202
On	On	Off	Off	On	Off	On	On	203
On	On	Off	Off	On	On	Off	Off	204
On	On	Off	Off	On	On	Off	On	205
On	On	Off	Off	On	On	On	Off	206
On	On	Off	Off	On	On	On	On	207
On	On	Off	On	Off	Off	Off	Off	208
On	On	Off	On	Off	Off	Off	On	209
On	On	Off	On	Off	Off	On	Off	210
On	On	Off	On	Off	Off	On	On	211
On	On	Off	On	Off	On	Off	Off	212
On	On	Off	On	Off	On	Off	On	213
On	On	Off	On	Off	On	On	Off	214
On	On	Off	On	Off	On	On	On	215
On	On	Off	On	On	Off	Off	Off	216
On	On	Off	On	On	Off	Off	On	217
On	On	Off	On	On	Off	On	Off	218
On	On	Off	On	On	Off	On	On	219
On	On	Off	On	On	On	Off	Off	220
On	On	Off	On	On	On	Off	On	221
On	On	Off	On	On	On	On	Off	222
On	On	Off	On	On	On	On	On	223
On	On	On	Off	Off	Off	Off	Off	224
On	On	On	Off	Off	Off	Off	On	225

A7	A6	A5	A4	A3	A2	A1	A0	Address
On	On	On	Off	Off	Off	On	Off	226
On	On	On	Off	Off	Off	On	On	227
On	On	On	Off	Off	On	Off	Off	228
On	On	On	Off	Off	On	Off	On	229
On	On	On	Off	Off	On	On	Off	230
On	On	On	Off	Off	On	On	On	231
On	On	On	Off	On	Off	Off	Off	232
On	On	On	Off	On	Off	Off	On	233
On	On	On	Off	On	Off	On	Off	234
On	On	On	Off	On	Off	On	On	235
On	On	On	Off	On	On	Off	Off	236
On	On	On	Off	On	On	Off	On	237
On	On	On	Off	On	On	On	Off	238
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On	On	On	On	Off	Off	On	On	243
On	On	On	On	Off	On	Off	Off	244
On	On	On	On	Off	On	Off	On	245
On	On	On	On	Off	On	On	Off	246
On	On	On	On	Off	On	On	On	247
On	On	On	On	On	Off	Off	Off	248
On	On	On	On	On	Off	Off	On	249
On	On	On	On	On	Off	On	Off	250
On	On	On	On	On	Off	On	On	251
On	On	On	On	On	On	Off	Off	252
On	On	On	On	On	On	Off	On	253
On	On	On	On	On	On	On	Off	254
On	On	On	On	On	On	On	On	255

Table 27 - A Bank Address Setting

8 DEVICE LOG

Modbus Side		
Boiler	Device	Node ID

Record the boiler number, device name and the node id that you have assigned to each device. Copy the record and provide it to your building management station for reference.

Example:

Modbus Side		
Boiler	Device	Node ID
1	RM7800	1
1	RWF55	2
2	RM7800	3
2	RWF55	4
3	RM7800	5
3	RWF55	6

9 INDEX