Orion Control Systems

www.orioncontrols.com

PT-Link-LON®
Technical Guide

VCM-X Controller Code: SS1026 & Y200920 Version 2.0 and up;
VCM-X Modular Controller Code: SS1030 & SS1034
VCM-X WSHP Controller Code: SS1032 & SS1033
SA Controller Code: Y200921
VCM Controller Code: SS1016, Y200409, Y200616, Y200822

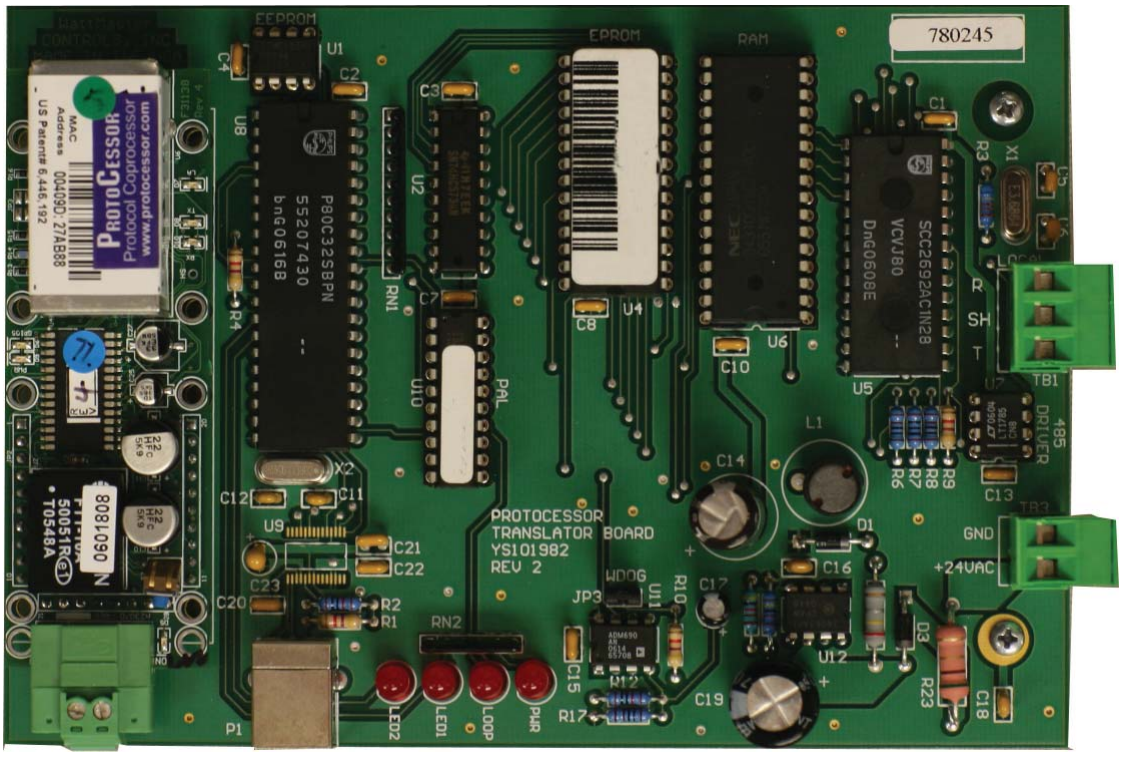


Table of Contents

WattMaster Controls, Inc.
8500 NW River Park Drive · Parkville , MO 64152
Toll Free Phone: 866-918-1100
PH: (816) 505-1100 · FAX: (816) 505-1101 · E-mail: mail@wattmaster.com
Visit our web site at www.orioncontrols.com

The OE368-23-LON, PT-Link-LON, provides bi-directional communication between ONE of the following types of Orion controllers—VCM-X, SA, VCM, MUA II, or VAV/CAV:

VCM-X Controller (SS1026, SS1030, SS1032, SS1033, SS1034, Y200920); SA Controller (Y200921)

VCM Controller (SS1016, Y200409, Y200616, Y200822)

*MUA II Controller (Y200405); VAV/CAV Controller (Y200301)

*NOTE: Documentation is available for MUA II/VAV/CAV on our Orion Controls website: www.orioncontrols.com/literature-new.html

NOTE: The PT-Link-LON device can be used to connect to only one Orion controller. If more than one Orion controller is present in a system, each one will require a PT-Link-LON device for integration with a LON protocol network.

To determine what controller you have, you must look at the label located on the controller EPROM. If the controller label does not match any of the SS or Y numbers listed above, your controller will not work with the PT-Link-LON®.

Data Sharing

The PT-Link-LON interface provides the following data sharing capabilities:

- Provides values from points on the Orion side of the gateway to LON® devices as if the values were originating from LON® objects.
- Allows LON® devices to modify point values on the Orion controller side of the PT-Link-LON® by using standard LON® write services.

Hardware Specifications

Table 1 contains the hardware specifications for the PT-Link-LON® interface.

Technical Data	
LON® Loop	TP/FT-10 (78 Kps)
Controller Loop	RS-485, 9600 Baud Rate
Network Protocol	LONWorks®
Protocol (WattMaster Loop)	HSI Open Protocol Token Passing
Power Input Voltage	24 VAC
Power Consumption	10 VA Maximum
Operating Temp	10°F to 149°F
Operating Humidity	90% RH Non-Condensing
Weight	8 oz.

Table 1: PT-Link-LON® Interface Technical Data

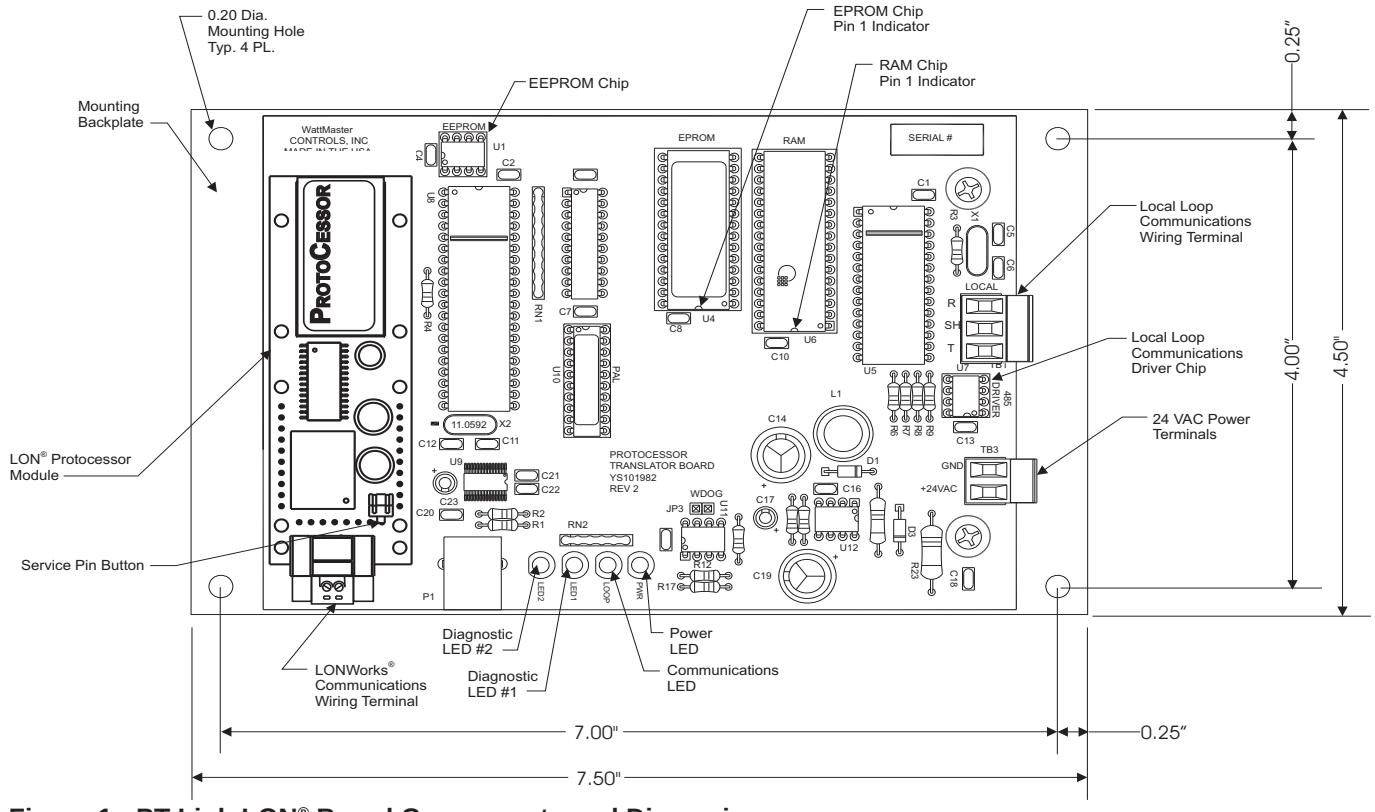


Figure 1: PT-Link-LON® Board Components and Dimensions

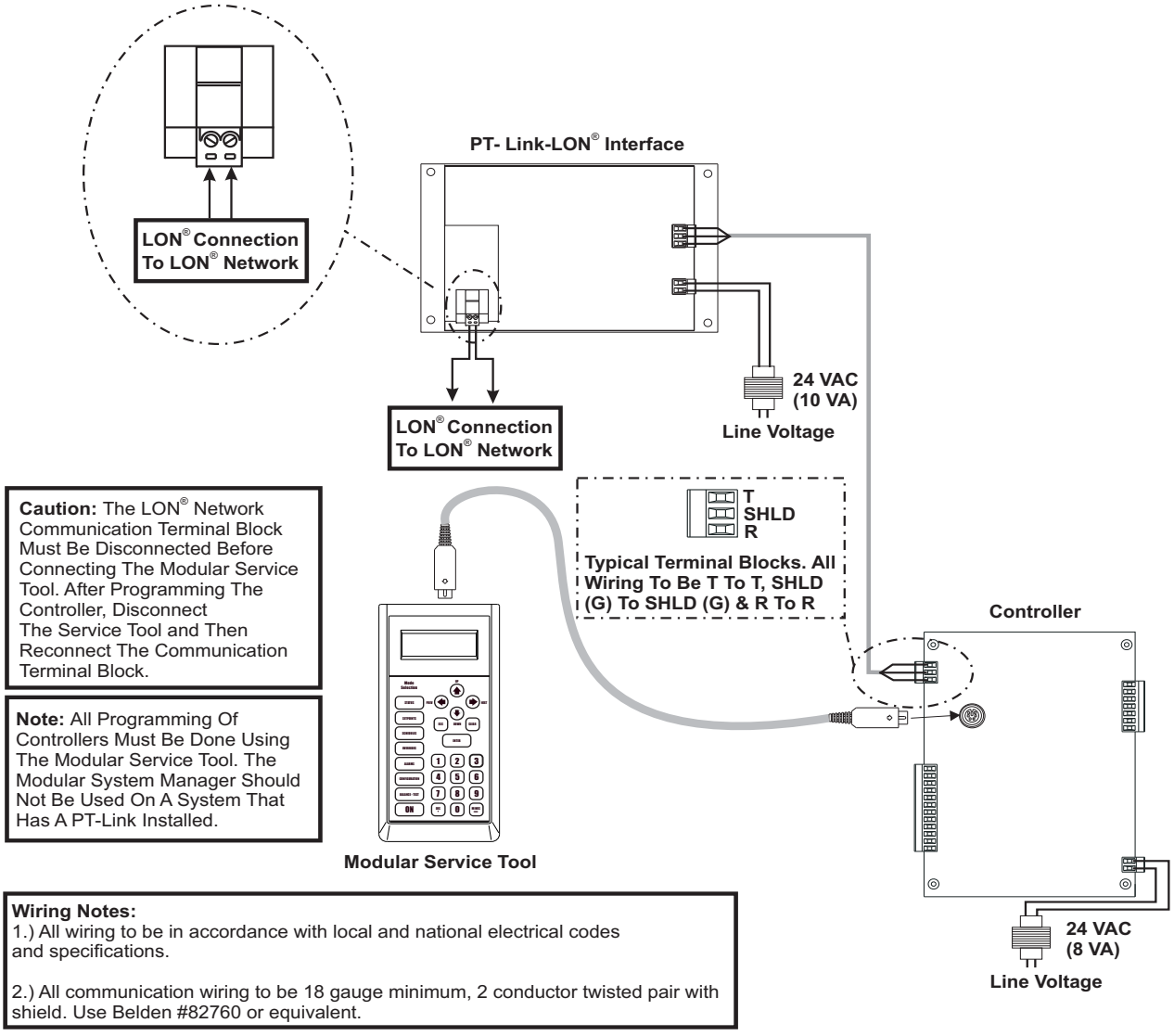


Figure 2: PT-Link-LON® Interface Wiring

PT-Link Hardware Connection

You have two options for connecting the PT-Link to your PC via Ethernet:

1.) You may connect the PT-Link directly to your PC by using a crossover cable (by others) as shown. **See Figure 3** for details.

2.) You can also connect both your PC and the PT-Link to an Ethernet Hub with standard CAT5 cables. **See Figure 4** for details.

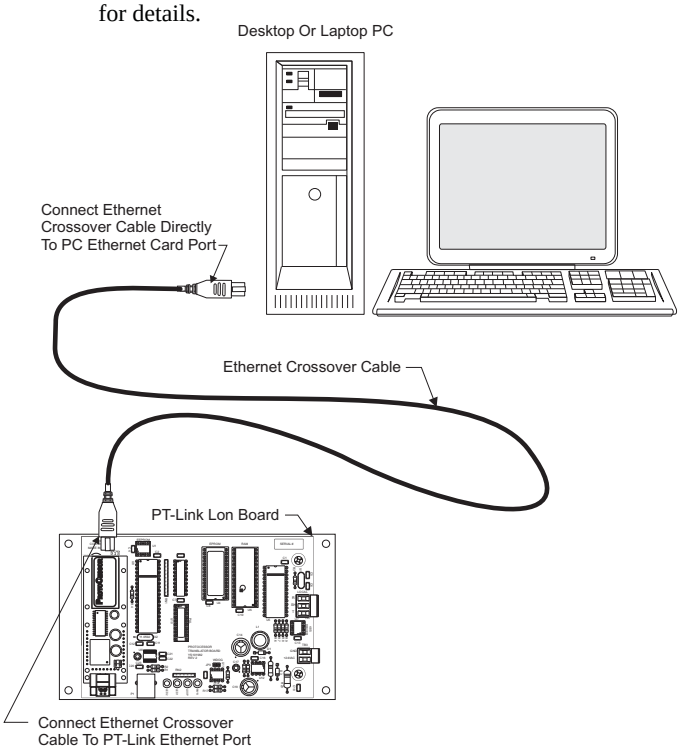


Figure 3: Connecting With Crossover Cable

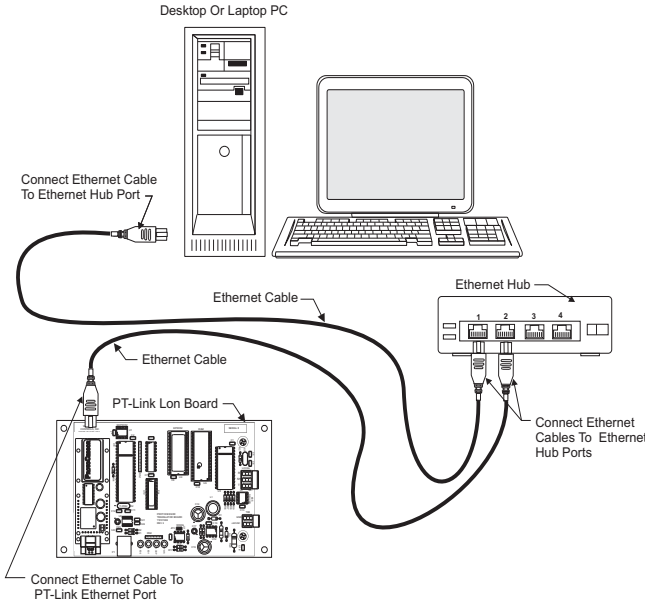


Figure 4: Connecting With Ethernet Cable & Hub

Locate a CAT5 cable and plug one end into your computer's Ethernet port (use a crossover cable if connecting directly to the PT-Link). If connecting directly, plug the other end of the Cable into the Ethernet port on the PT-Link. If connecting through an Ethernet Hub, plug the other end of the PC cable into the hub, and use a second CAT5 cable to connect the PT-Link to the hub as well.

Power up the PT-Link by plugging in the power cable. The PT-Link may take up to three minutes to power up completely. Once the PT-Link is powered up, you should notice that the green "**GPI05**" LED light on the ProtoCessor Board remains on continuously. **See Figure 19** on page 12 for a diagram showing the location of the ProtoCessor "**GPI05**" LED.

Computer IP Address Set-up for Windows 98, NT, and XP

In order for the PT-Link to communicate properly, it is imperative to set the IP address of both the PT-Link as well as the computer to be within the same netmask. You need to change the IP address on your computer. The following instructions will explain how to configure the IP address for Microsoft® Windows 98 and Microsoft® Windows NT and XP computers.

Computer IP Address Set-up for Windows 98

1.) From the Windows START button select **Start-> Setting->Control panel**.

2.) Double click on the **Network** icon.

3.) In the **Configuration** window, select the **TCP/IP** entry.

4.) Select **Properties** and go to the **IP Address** tab.

5.) Select **Specify an IP address** and then enter the following information:

   a.) IP Address 192.168.1.5

   b.) Netmask 255.255.255.0

6.) Select **OK** until the network configuration program exits.

7.) You might have to reboot the computer before the IP address is valid.

Computer IP Address Set-up for Windows NT or XP

1.) *Click* <start>; then *click* <Control Panel>.

2.) *Double-click* on the **Network Connections** icon. The Network Connections Window will appear.

Figure 5: Network Connections Window

NOTE: If any wireless connections are listed, disable them by *right-clicking* the connection and *selecting* <Disable>.

3.) In the **Network Connections** window, *select* the **Local Area Connections** entry. The Local Area Connection Status Window will appear.

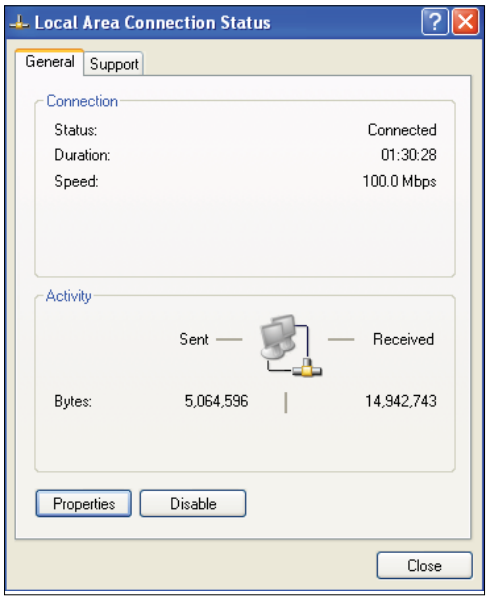


Figure 6: Local Area Connection Status Window

4.) *Click* <Properties> in the lower left of the window. The Local Area Connection Properties window will appear.

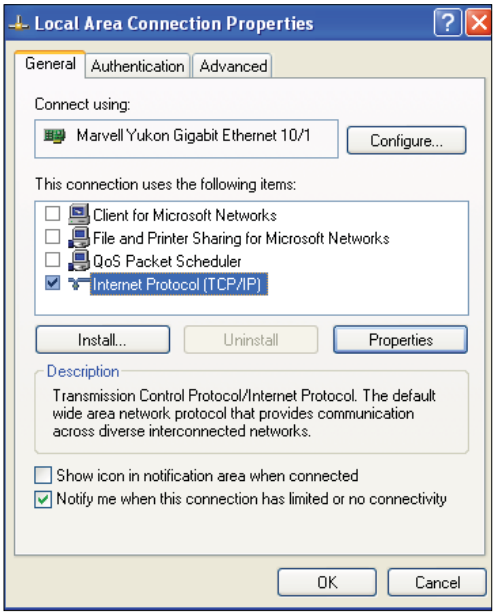


Figure 7: Local Area Connection Properties Window

5). In the Connection Items list box, be sure the Internet Protocol (TCP/IP) is checked. Select the Internet Protocol (TCP/IP) item to highlight it and then *click* <Properties>. The Internet Protocol Properties window will appear.

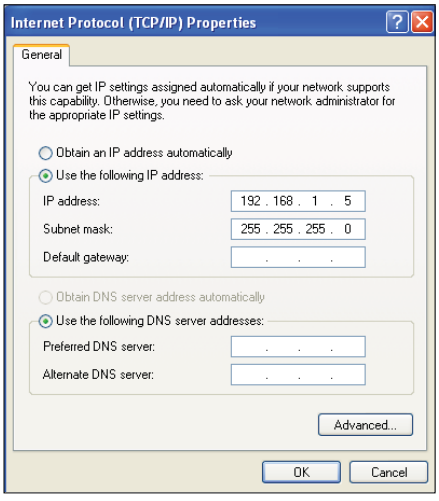


Figure 8: Internet Protocol Properties Window

6). *Type in* the following information:

a.) IP address 192.168.1.5
b.) Subnet mask 255.255.255.0
c.) Default Gateway is blank

7.) *Select* <OK> until all of the above network configuration windows are closed. You may have to *reboot* the computer before the new values are valid.

Connecting To The PT-Link

In order to communicate and program the PT-Link you will need to install RUINET software on your computer. If you do not have the software, it is available for downloading at www.orioncontrols.com in the software area of the web site. After installing the software, proceed with the following instructions.

WARNING: Make sure to load RUINET onto your hard drive and run the program from your hard drive. DO NOT under any circumstances run RUINET from your cd drive.

If RUINET is in the desktop directory (if it isn't, locate its directory), double-click on RUINET, and the RUINET program should run. If you have only one PT-Link connected to the network, then RUINET will automatically connect to that particular PT-Link; otherwise, a menu will appear to allow the selection of the desired PT-Link.

This menu will look similar to the one shown in **Figure 9.**

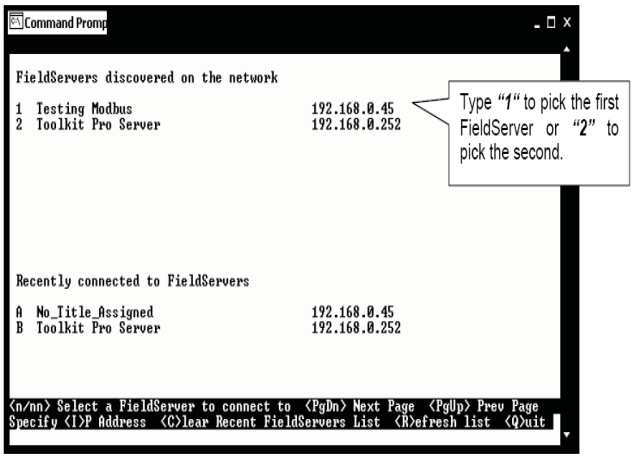


Figure 9: RUINET PT-Link Selection Menu

Select the required PT-Link by typing the Number or Letter in the left hand column. You should now have a menu that looks like **Figure 10**. You are now ready to send and receive files to and from the PT-Link.

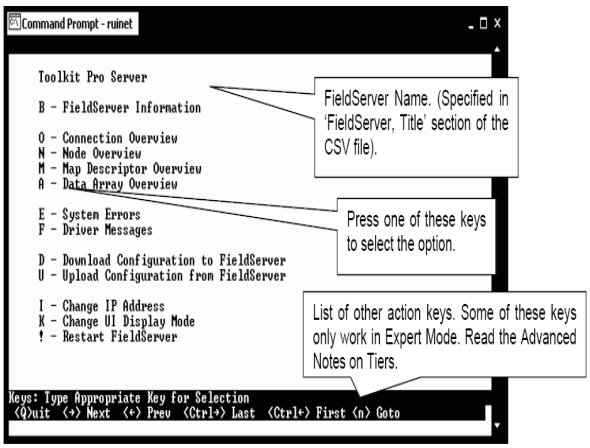


Figure 10: RUINET PT-Link Main Menu

Note: If RUINET is unable to establish a connection, there are a few simple procedures you can perform to try to determine the problem. To verify your network cables, observe the "**Yellow**" LED displayed below "**Ethernet Connection**" on the PT-Link's ProtoCessor Module. This LED should be on if the 10 BaseT cable is good. Secondly, observe the "**Green**" LED below "**Ethernet Connection**". This LED should be solid while RUINET is running. If the LEDs are lit as expected, and RUINET still does not receive replies, then the netmask is probably incorrect. If this does not help, then your Ethernet setup on your PC is possibly not compatible. Ensure that you have an Ethernet adapter installed in your software configuration and that it is configured to run the TCP/IP protocol. If you are still unable to connect, please contact WattMaster Controls, Inc.

Making Changes to the Configuration File (config.csv)

To make changes to the configuration file on the PT-Link, use the procedures outlined that follow — Upload, Address, Poll, and Download the Configuration File.

Upload Config.csv from the PT-Link

The PT-Link contains a configuration file (config.csv) that includes information such as addressing. This file can be uploaded from the PT-Link for modification if needed. The PT-Link also contains an external interface file otherwise called an XIF file (fserver.xif). The XIF file includes information such as SNVT names and LON network information. This file can be uploaded for use with LON programming software. When uploaded, these files can be located in the same directory that the RUINET executable file is stored and run from. Be sure when uploading that the correct file is specified in the upload window. Refer to **Figures 11 & 12** for screen details. Refer to Appendix B for details on uploading XIF files.

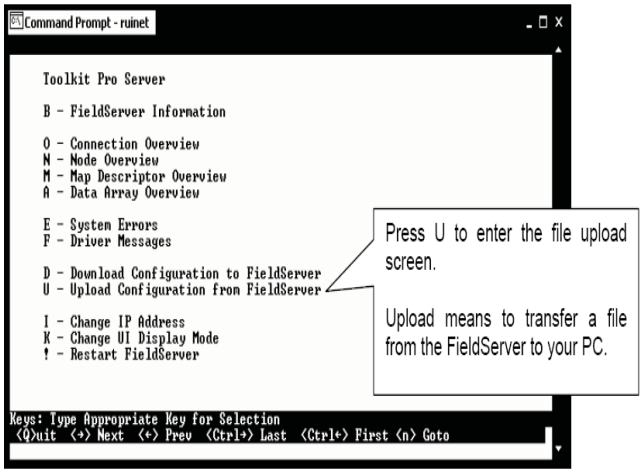


Figure 11: RUINET PT-Link Main Menu - Upload

From the Main Menu, type ***"U"***. The menu shown in **Figure 12** will appear.

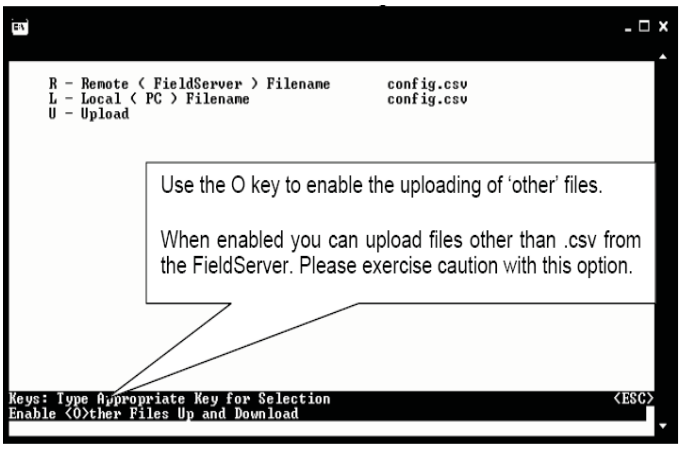


Figure 12: RUINET PT-Link Uploading Files

1.) Begin the upload by pressing ***"U."***

2.) When the upload is completed, open the uploaded file with Microsoft® Notepad. This program is supplied with Microsoft® Windows. Type ***"N"*** to open using Notepad.

WARNING: Only edit the config.sys file using Notepad. Do not use Excel. Using Excel to edit the config.sys file will corrupt its contents!

Explicit and Implicit Addressing

Clients can address the PT-Link using explicit or implicit addressing. Clients using explicit addressing obtain their data transfer parameters directly from the PT-Link-LON configuration file (config.csv). Implicit addressing is used when a Network Management Tool such as LonMaker® is used to connect a PT-Link-LON to other LonWorks nodes—the PT-Link-LON is assigned its data transfer (binding) parameters by the Network Management Tool.

NOTE: The PT-Link-LON is configured from the factory to use implicit addressing.

Implicit Addressing — Network Manager assigns addresses for communication and ensures (via address tables in the devices) that communication connections are known.

Explicit Addressing — Device knows the address of the point in the remote device and communicates directly without the assistance of the Network Manager.

Implicit Addressing Commissioning Using LonMaker

1.) Ensure that the correct firmware and latest configuration is loaded on the PT-Link-LON.

NOTE: Each change in the PT-Link-LON requires re-commissioning of the PT-Link-LON in LonMaker.

2.) Ensure that the PT-Link-LON and the LonMaker machine are on the same network.

3.) Open the existing Network in LonMaker or create a new Network.

4.) Click on "Create New Network" and follow the network wizard, making the following selections:

Network Interface: Choose Network Attached
Management Mode: Choose Onnet unless you are working offline
Registered Plug-ins required: None

5.) Once Visio is open with the Network showing, drag a new device onto the drawing from the toolbox.

6.) Follow the Device Network, making the following selections:

Enter Device Name: Choose commission device
Specify Device Template: Choose upload from device
Specify Device Channel: Choose Auto Detect
Specify Device Properties: Leave as is (Ping is optional)
Identify Device: Choose service pin
Device Application Image: Leave unchecked
Initial State: Leave as is

7.) Press the service pin on the PT-Link-LON when asked to do so, and the PT-Link-LON will be commissioned.

8.) Drag a new function block onto the drawing from the toolbox. Give the function block a name and ensure that it is allocated to the PT-Link-LON device.

9.) Once the function block is on the drawing, you can drag input and output variables onto the function block. When you do this, LonMaker will show you the variables available for binding. Click on the variables you require (or use the select "all" option), and they will be commissioned onto the function block.

10.) You are now ready to connect these variables to other devices by dragging connections from the toolbox and connecting the variables.

Explicit Addressing & Domain Table Setup

To use explicit addressing, the client needs to change the factory settings contained in the PT-Link-LON's configuration file (config.csv). The following are the steps to change the configuration file from implicit to explicit addressing:

1.) Upload and open the config.csv file.

2.) Locate the "Connections" section.

3.) Locate the "Lonworks_Server" column and change the value from "Implicit" shown in **Figure 13** to "Explicit" shown in **Figure 14**. You should also change the "Lon works _Input" and "Lonworks_Outputs" from Update to Polled.

```
Connections
Port ,Baud  ,Data_Bits ,Stop_Bits ,Parity ,Protocol ,Auto_Config_Client ,Auto_Config_Server , Lonworks_Server, Lonworks_Inputs, Lonworks_Outputs,
S1   ,38400 ,8         ,1         ,None   ,Wattmstr  ,Yes               ,Lonworks          , Implicit       , Update         , Update         ,
```

Figure 13: PT-Link-LON Implicit Configuration

```
Connections
Port ,Baud  ,Data_Bits ,Stop_Bits ,Parity ,Protocol ,Auto_Config_Client ,Auto_Config_Server, Lonworks_Server, Lonworks_Inputs, Lonworks_Outputs,
S1   ,38400 ,8         ,1         ,None   ,Wattmstr ,Yes               ,Lonworks          , Explicit      , Polled         , Polled         ,
```

Figure 14: PT-Link-LON Explicit Configuration

In addition, the PT-Link-LON must have its domain, subnet, and node IDs set. This feature is enabled in the configuration file by filling out the Title and System_Address fields of the PT-Link-LON parameters as follows:

```
//=================================================
//
//   Common Information
//
Bridge
System_Address ,Title
23          ,":D48:S01:Wattmaster Explicit Lon v1.00d"
```

Figure 15: PT-Link-LON Domain and Subnet Setting

The Title field must start with ":D", followed by the domain_id in hexadecimal notation, followed by ":S", followed by the subnet_id in hexadecimal notation, and enclosed by ":". The domain length is automatically determined by the number of digits in the [domain_id] field. With 2 hexadecimal digits constituting 1 byte, ":D123456:", for example, would have a length of 3.

Once the domain table has been set, the ":Dxx:Sxx:" part of the Title field will be removed.

Now the Title field will be left with [Title continued…] which may be the Node self documentation string or any title.

After the changes are done, do not forget to save the file, download the new configuration file, and restart the PT-Link-LON. Refer to the Download Section that follows.

Download Config.csv to the PT-Link

NOTE: Before attempting to send files to the PT-Link, make sure that these files are in the same directory as the RUINET utility being used for sending.

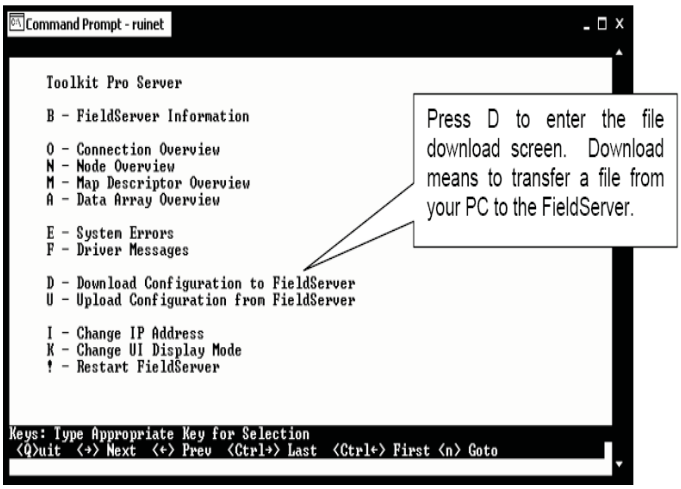


Figure 16: RUINET PT-Link Main Menu - Download

From the Main Menu, type ***"D"***. The menu shown in **Figure 17** will appear.

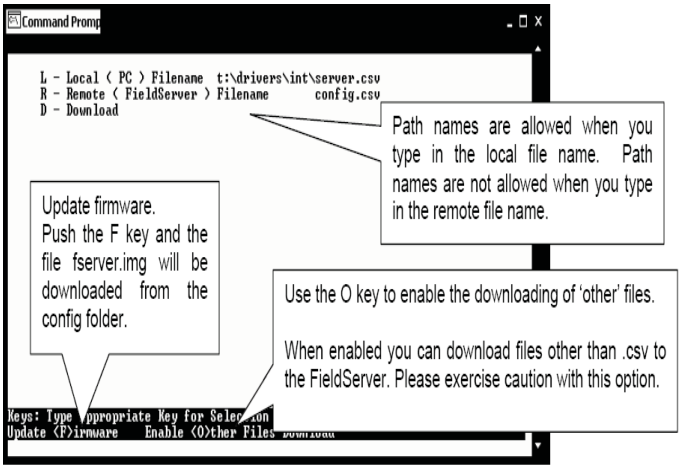


Figure 17: RUINET PT-Link Downloading Files

1.) Begin the download by selecting ***"D."***

NOTE: The utility will indicate when downloading is complete. **DO NOT** reset the PT-Link until this message is displayed, as this will corrupt the PT-Link.

2.) Once the download is complete, push <***Esc***> to get back to the main menu and use the "**!**" option (or simply cycle power to the PT-Link) to put the new file into operation. It is possible to do multiple downloads to the PT-Link before resetting it.

NOTE: The Remote Filename option must always be named "**config.csv**" for configurations; otherwise, they will be ignored by the PT-Link.

PT-Link Board LEDs

The PT-Link-LON® is equipped with LEDs that can be used for troubleshooting. There are four LEDs on the PT-Link board. **See Figure 18** for the locations of the LEDs on the PT-Link board. The LED descriptions and functions are listed in the following paragraphs.

PWR LED

When the PT-Link-LON® is powered up, the "**PWR**" LED should light up and stay on continuously. If it does not light up, check to be sure that you have 24 VAC connected to the board, that the wiring connections are tight, and that they are wired for correct polarity. The 24 VAC power must be connected so that all ground wires remain common. If after making all these checks the "**PWR**" LED still does not light up, please contact WattMaster Controls Technical Support at our Toll Free number—866-918-1100—for assistance.

LOOP LED

When power is applied to the PT-Link-LON®, the "**LOOP**" LED will also light up. The LED should flicker rapidly, indicating that the PT-Link is trying to communicate with the controllers on the loop. A "**flicker**" is defined as a brief moment when the LED turns off and back on. If the "**LOOP**" LED does not operate as indicated above, first power down the unit and then reapply power. If this does not work, please contact WattMaster Controls Technical Support at our Toll Free number—866-918-1100—for assistance.

LED 1

When power is first applied, "**LED 1**" will be off temporarily and then will blink once if it is communicating with the controller. If the LED is not blinking, there is a communication problem between the HVAC controller and the PT-Link board. The "**COMM**" LED on the HVAC controller also should be solid and will flicker occasionally indicating communication with the PT-Link-LON®. If the "**COMM**" LED does not flicker, then there is no communication between the PT Link and the controller.

LED 2

When power is first applied, "**LED 2**" will be off temporarily and then will blink slowly indicating that the PT-Link baseboard is communicating with the Protocessor Module. If **"LED 2"** does not blink, check that the Protocessor Module is installed correctly in the PT-Link baseboard.

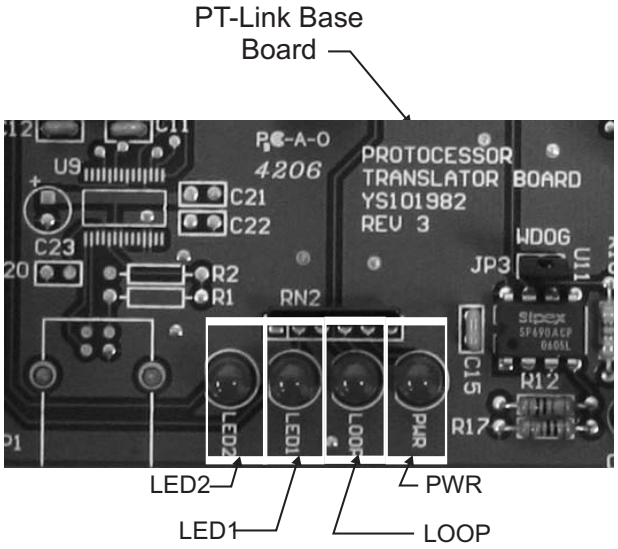


Figure 18: PT-Link-LON® LED Locations

Troubleshooting the PT-Link Controller

ProtoCessor Module LEDs

PWR LED

When the PT-Link is first powered up, the "**PWR**" LED should light up and stay on continuously. **See Figure 19.** If the LED doesn't light up, check that the ProtoCessor is installed correctly and firmly connected to the Base Board.

GPI05 LED

The "**GPI05**" LED will light up when the Base Board and the ProtoCessor Module have established communications. This can take up to 3 minutes depending on the number of units connected to the PT-Link. If it fails to light up after 3 minutes, check that the ProtoCessor is installed correctly and firmly to the Base Board.

LON LED

When the unit is first powered up, before commissioning has occurred, this LED will be blinking to indicate the unit has not been commissioned yet. Once the unit is commissioned, the LED will stay off during normal operations.

LA LED

When the unit is first powered up, this LED should be blinking constantly. If this LED is constantly on or constantly off, the Module is not working properly and needs to be replaced.

TX & RX LEDs

These LEDs work together to indicate that communication is being established with the desired protocol network. If both LEDs are blinking, then communication is working properly. If both are not blinking, check the protocol network wiring.

If all of these tests are made and the controller still doesn't operate, please contact WattMaster Controls Technical Support at our Toll Free number—866-918-1100—for assistance.

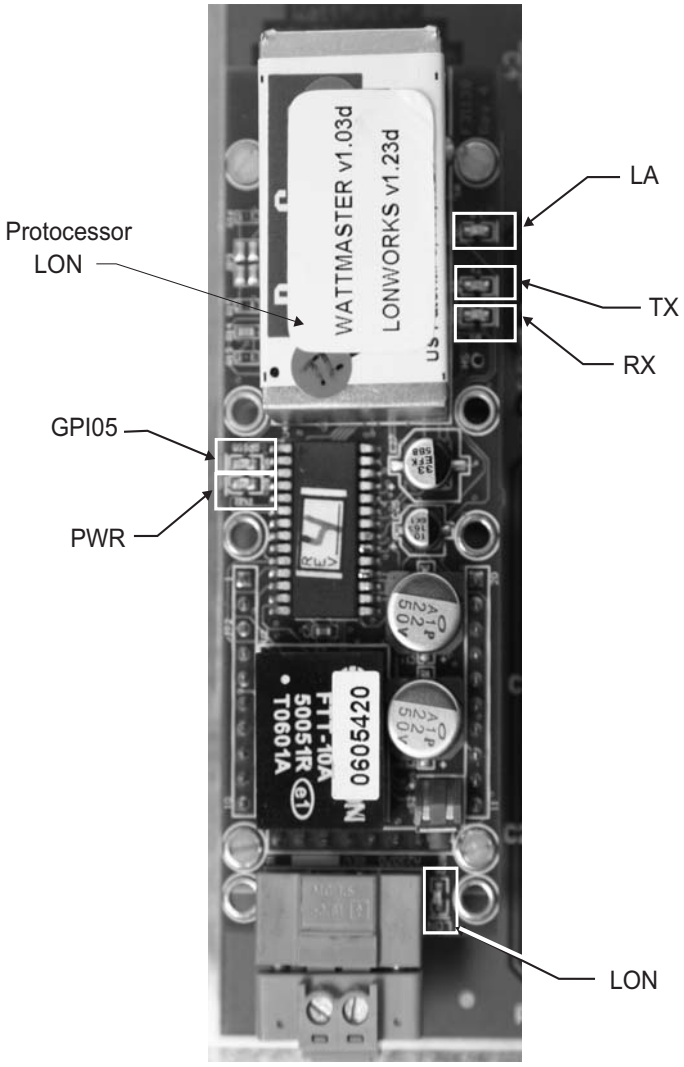


Figure 19: PT-Link-LON® LED Locations

Using RUINET

Before continuing with the troubleshooting, make sure the PT-Link is connected correctly and the RUINET software is installed, running, and functioning correctly.

Verifying Proper Communications

From the **Main Screen**, press ***"O"*** to go the **Connection Overview Screen**. This screen supplies information on communication between the PT-Link and remote devices. A number of aspect screens are available, and some of the aspect screens have more than one page. Use the space bar to toggle between aspects and use the <***PgUp***> and <***PgDn***> keys to toggle between pages of the same aspect. The **Connection Overview and Settings Aspect Screen** is shown in **Figure 20**.

The main purpose in this screen is to verify that messages and characters are being transmitted and received. In addition, it shows the number of communication errors. If the PT-Link connection "**03**" is the protocol connection, verify that is communicating appropriately. If it is not, check that the PT-Link LEDs are working properly, the unit is wired correctly, and the PT-Link is configured correctly (Baud Rate, Unit Address & MAC Address). If the number of errors is constantly increasing, move to the **Error Screen** by pressing the <***Space Bar***> 3 times to find out the cause of the errors. Use the <***PgUp***> and <***PgDn***> keys to toggle between pages of the **Error Screen**.

Verifying Proper Values

To verify that the correct values for each unit are being communicated to the PT-Link, move to the **Data Array Overview Screen.** To get to the screen, press ***"A"*** from the **Main Menu**. See **Figure 21** for screen details.

In the **Data Array Overview Screen** (**Figure 21**) you will be able to see the data arrays of all the units connected to the PT-Link denoted by an array name **"DA_XXX_IY"—Y** being the address of the unit minus one. The Address of the unit is determined by a set of dip switches. To view the values being communicated from a specific unit, move to the **Data Array Detail Screen** (**Figure 22**) of the unit by entering the number under which it is listed. For example, for the unit listed in the third position, enter **"03"**.

To understand what each value means, look at the Data Array Tables for the desired unit type, VAV/CAV, MUA II, or VCM. You can change the writable values from this screen by using the modify command. To use the modify command press ***"M"*** from the **Data Array Detail Screen** and then enter the Offset you want to change followed by a space and the new value. Example: To change the Cooling Supply Setpoint to 60 in the VAV/CAV, press ***"M"***, enter ***"58 60"***, and then press <***Enter***>. This could be useful to prove that the unit can take and keep the set-points properly.

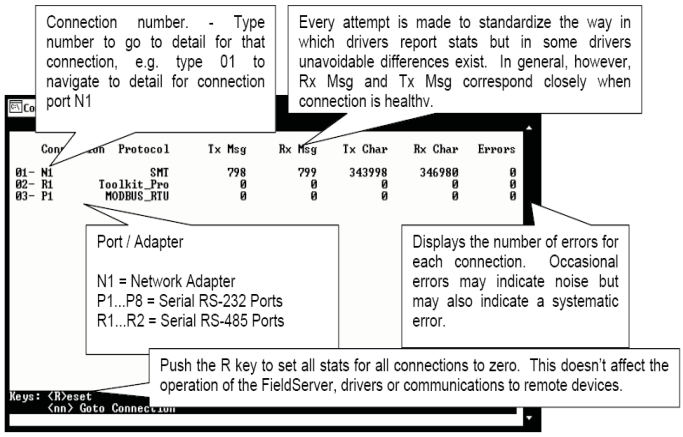


Figure 20: Connection Overview Screen

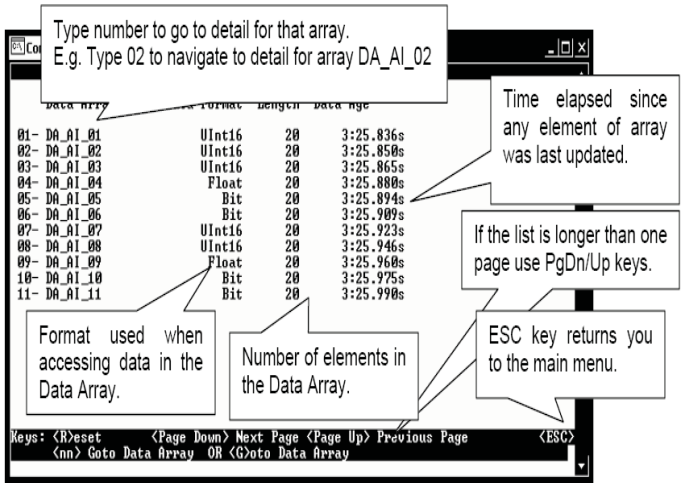


Figure 21: Data Array Overview Screen

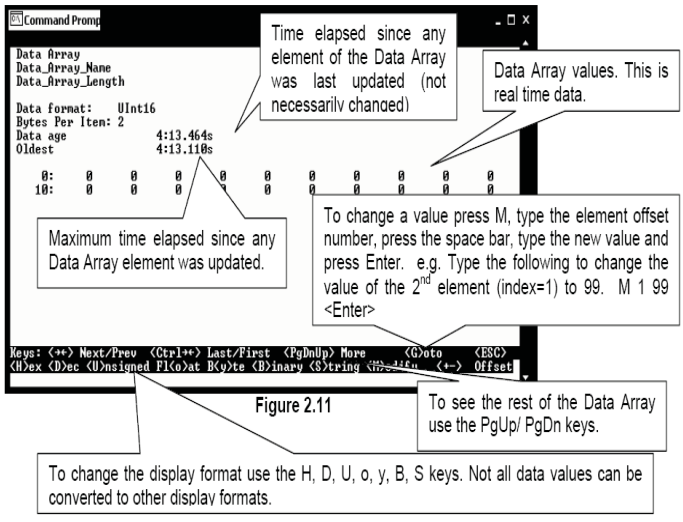


Figure 22: Data Array Detail Screen

Data Arrays

VCM-X Modular Data Array For Field Server								
Offset	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
0	AppVer	ClSt	HtSt	OaWtbl	TpDmnd	SpcTp	SaTp	RaTp
8	OaTp	DuctPr	OaRh	UnitMode	CtrlSts	ClEnbl	HtEnbl	EcoEnbl
16	FanDly	PofCfg	CO2Cfg	MdHt2Ins	Rt2Ins	OnRlys	ExRlys12	ExRlys34
24	EcoPos	VfdBwPos	VfdExPos	AlrmSts	AlrmGrp1	AlrmGrp2	AlrmGrp3	SaTpAlm
32	OaTpAlm	SpcTpAlm	MchClAlm	MchHtAlm	PofAlm	DrtFAlm	SmokeAlm	LoSaAlm
40	HiSaAlm	CtrlTpCF	CtrlTpHF	CtrlTp	InRh	InRhStM	DptStM	MdClPos
48	MdHtPos	MdHt2Pos	Rt2Pos	OcpClSt	OcpHtSt	UnClOst	UnHtOst	WtblSt
56	SaClSt	SaHtSt	WmupSt	SpcTpOst	SaTpOst	RaTpOst	OaTpOst	CoilTpSt
64	DptSt	InRhSt	DuctPrSt	RfPrSt	SchdFrc	OnRly1	OnRly2	OnRly3
72	OnRly4	OnRly5	ExRly1	ExRly2	ExRly3	ExRly4	ExRly5	ExRly6
80	ExRly7	ExRly8	ExRly9	ExRly10	ExRly11	ExRly12	ExRly13	ExRly14
88	ExRly15	ExRly16	CO2St	MinEcoSt	CO2Level	ByPasDmp	RaDmp	RfPr
96	OaDwpt	CoilTp	SaTpStM	PreHtSp	OaCFM	EtCFM	SaCFM	OACfmSt
104	OACfmRs	OACfmStM	MdCmp2	HdPr1	HdPr2	CdFan1	CdFan2	–

Table 2: VCM-X Modular Data Array For Field Server

VCM-X WSHP (Tulsa) Data Array For Field Server								
Offset	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
0	AppVer	ClSt	HtSt	OaWtbl	TpDmnd	SpcTp	SaTp	RaTp
8	OaTp	DuctPr	OaRh	UnitMode	CtrlSts	ClEnbl	HtEnbl	EcoEnbl
16	FanDly	PofCfg	CO2Cfg	MdHt2Ins	Rt2Ins	OnRlys	ExRlys12	ExRlys34
24	EcoPos	VfdBwPos	VfdExPos	AlrmSts	AlrmGrp1	AlrmGrp2	AlrmGrp3	SaTpAlm
32	OaTpAlm	SpcTpAlm	MchClAlm	MchHtAlm	PofAlm	DrtFAlm	SmokeAlm	LoSaAlm
40	HiSaAlm	CtrlTpCF	CtrlTpHF	CtrlTp	InRh	InRhStM	DptStM	MdClPos
48	MdHtPos	MdHt2Pos	Rt2Pos	OcpClSt	OcpHtSt	UnClOst	UnHtOst	WtblSt
56	SaClSt	SaHtSt	WmupSt	SpcTpOst	SaTpOst	RaTpOst	OaTpOst	CoilTpSt
64	DptSt	InRhSt	DuctPrSt	RfPrSt	SchdFrc	OnRly1	OnRly2	OnRly3
72	OnRly4	OnRly5	ExRly1	ExRly2	ExRly3	ExRly4	ExRly5	ExRly6
80	ExRly7	ExRly8	ExRly9	ExRly10	ExRly11	ExRly12	ExRly13	ExRly14
88	ExRly15	ExRly16	CO2St	MinEcoSt	CO2Level	ByPasDmp	RaDmp	RfPr
96	OaDwpt	CoilTp	SaTpStM	PreHtSp	OaCFM	EtCFM	SaCFM	OACfmSt
104	OACfmRs	OACfmStM	MdCmp2	HdPr1	HdPr2	CdFan1	CdFan2	WaterTpA
112	WaterTpB	A1LSPAlm	A1LktAlm	A2LSPAlm	A2LktAlm	B1LSPAlm	B1LktAlm	B2LSPAlm
120	B2LktAlm	LWT1Alm	LWT2Alm	POWF1Alm	POWF2Alm	ComMAlm	–	–

Table 3: VCM-X WSHP (Tulsa) Data Array For Field Server

VCM-X WSHP (Coil) Data Array For Field Server								
Offset	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
0	AppVer	ClSt	HtSt	OaWtbl	TpDmnd	SpcTp	SaTp	RaTp
8	OaTp	DuctPr	OaRh	UnitMode	CtrlSts	ClEnbl	HtEnbl	EcoEnbl
16	FanDly	PofCfg	CO2Cfg	MdHt2Ins	Rt2Ins	OnRlys	ExRlys12	ExRlys34
24	EcoPos	VfdBwPos	VfdExPos	AlrmSts	AlrmGrp1	AlrmGrp2	AlrmGrp3	SaTpAlm
32	OaTpAlm	SpcTpAlm	MchClAlm	MchHtAlm	PofAlm	DrtFAlm	SmokeAlm	LoSaAlm
40	HiSaAlm	CtrlTpCF	CtrlTpHF	CtrlTp	InRh	InRhStM	DptStM	MdClPos
48	MdHtPos	MdHt2Pos	Rt2Pos	OcpClSt	OcpHtSt	UnClOst	UnHtOst	WtblSt
56	SaClSt	SaHtSt	WmupSt	SpcTpOst	SaTpOst	RaTpOst	OaTpOst	CoilTpSt
64	DptSt	InRhSt	DuctPrSt	RfPrSt	SchdFrc	OnRly1	OnRly2	OnRly3
72	OnRly4	OnRly5	ExRly1	ExRly2	ExRly3	ExRly4	ExRly5	ExRly6
80	ExRly7	ExRly8	ExRly9	ExRly10	ExRly11	ExRly12	ExRly13	ExRly14
88	ExRly15	ExRly16	CO2St	MinEcoSt	CO2Level	ByPasDmp	RaDmp	RfPr
96	OaDwpt	CoilTp	SaTpStM	PreHtSp	OaCFM	EtCFM	SaCFM	OACfmSt
104	OACfmRs	OACfmStM	MdCmp2	HdPr1	HdPr2	CdFan1	CdFan2	WaterTpA
112	A1LSPAlm	A1LktAlm	B1LSPAlm	B1LktAlm	LWT1Alm	POWF1Alm	ComMAlm	–

Table 4: VCM-X WSHP (Coil) Data Array For Field Server

VCM-X Data Array For Field Server								
Offset	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
0	AppVer	ClSt	HtSt	OaWtbl	TpDmnd	SpcTp	SaTp	RaTp
8	OaTp	DuctPr	OaRh	UnitMode	CtrlSts	ClEnbl	HtEnbl	EcoEnbl
16	FanDly	PofCfg	CO2Cfg	MdHt2Ins	Rt2Ins	OnRlys	ExRlys12	ExRlys34
24	EcoPos	VfdBwPos	VfdExPos	AlrmSts	AlrmGrp1	AlrmGrp2	AlrmGrp3	SaTpAlm
32	OaTpAlm	SpcTpAlm	MchClAlm	MchHtAlm	PofAlm	DrtFAlm	SmokeAlm	LoSaAlm
40	HiSaAlm	CtrlTpCF	CtrlTpHF	CtrlTp	InRh	InRhStM	DptStM	MdClPos
48	MdHtPos	MdHt2Pos	Rt2Pos	OcpClSt	OcpHtSt	UnClOst	UnHtOst	WtblSt
56	SaClSt	SaHtSt	WmupSt	SpcTpOst	SaTpOst	RaTpOst	OaTpOst	CoilTpSt
64	DptSt	InRhSt	DuctPrSt	RfPrSt	SchdFrc	OnRly1	OnRly2	OnRly3
72	OnRly4	OnRly5	ExRly1	ExRly2	ExRly3	ExRly4	ExRly5	ExRly6
80	ExRly7	ExRly8	ExRly9	ExRly10	ExRly11	ExRly12	ExRly13	ExRly14
88	ExRly15	ExRly16	CO2St	MinEcoSt	CO2Level	ByPasDmp	RaDmp	RfPr
96	OaDwpt	CoilTp	SaTpStM	PreHtSp	OaCFM	EtCFM	SaCFM	OACfmSt
104	OACfmRs	OACfmStM	–	–	–	–	–	–

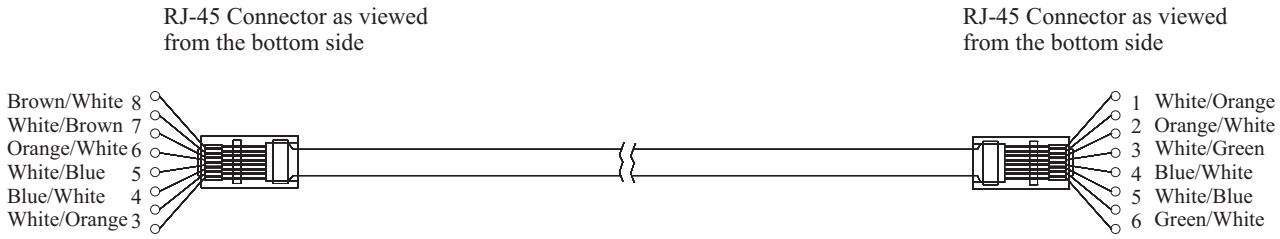
Table 5: VCM-X Data Array For Field Server

SA Controller Data Array For Field Server								
Offset	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
0	AppVer	ClSt	HtSt	TpDmnd	SpcTp	SaTp	DuctPr	UnitMode
8	CtrlSts	ClEnbl	HtEnbl	EcoEnbl	FanDly	MdHt2Ins	Rt2Ins	EcoPos
16	VfdBwPos	SaTpAlm	SpcTpAlm	MchClAlm	MchHtAlm	PofAlm	DrtFAlm	LoSaAlm
24	HiSaAlm	CtrlTpCF	CtrlTpHF	CtrlTp	InRh	InRhStM	DptStM	MdClPos
32	MdHtPos	MdHt2Pos	Rt2Pos	OcpClSt	OcpHtSt	UnClOst	UnHtOst	SaClSt
40	SaHtSt	WmupSt	SpcTpOst	SaTpOst	CoilTpSt	DptSt	InRhSt	DuctPrSt
48	SchdFrc	OnRly1	OnRly2	OnRly3	OnRly4	OnRly5	ExRly1	ExRly2
56	ExRly3	ExRly4	ExRly5	ExRly6	ExRly7	ExRly8	ExRly9	ExRly10
64	ExRly11	ExRly12	ExRly13	ExRly14	ExRly15	ExRly16	CoilTp	SaTpStM
72	PreHtSp	EaTp	EwTp	EaRH	HdPr1	HdPr2	CoilTp2	EaDpt
80	WSEByp	WSEByp2	MdCmp2	CoilTpSt	CdPos1	CdPos2	EaTpAlm	EmerAlm
88	PoWFAlm	DrnAlm	EaTpOst	EwTpOst	–	–	–	–

Table 6: SA Controller Data Array For Field Server

VCM Data Array For Field Server								
Offset	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
0	AppVer	ClSt	HtSt	OaWtbl	TpDmnd	SpcTp	SaTp	RaTp
8	OaTp	DuctPr	OaRh	UnitMode	CtrlSts	ClDmnd	HtDmnd	DehmDmnd
16	ClEnbl	HtEnbl	EcoEnbl	FanDly	WmupDmnd	PofCfg	CO2Cfg	MdHt2Ins
24	Rt2Ins	OnRlys	ExRlys12	ExRlys34	EcoPos	VfdBwPos	VfdExPos	AlrmSts
32	AlrmGrp1	AlrmGrp2	AlrmGrp3	SaTpAlm	OaTpAlm	SpcTpAlm	MchClAlm	MchHtAlm
40	PofAlm	DrtFlAlm	SmokeAlm	LoSaAlm	HiSaAlm	CtrlTpCF	CtrlTpHF	CtrlTp
48	InRh	InRhStM	DptStM	MdClPos	MdHtPos	MdHt2Pos	Rt2Pos	OcpClSt
56	OcpHtSt	UnClOst	UnHtOst	WtblSt	SaClSt	SaHtSt	WmupSt	SpcTpOst
64	SaTpOst	RaTpOst	OaTpOst	CoilTpSt	DptSt	InRhSt	DuctPrSt	RfPrSt
72	SchdFrc	OnRly1	OnRly2	OnRly3	OnRly4	OnRly5	ExRly1	ExRly2
80	ExRly3	ExRly4	ExRly5	ExRly6	ExRly7	ExRly8	ExRly9	ExRly10
88	ExRly11	ExRly12	ExRly13	ExRly14	ExRly15	ExRly16	CO2St	MinEcoSt
96	CO2Level	ByPasDmp	RaDmp	RfPr	OaDwpt	CoilTp	SaTpStM	PreHtSp

Table 7: VCM Data Array For Field Server



Use the standard EIA/TIA color code for "CROSS OVER CABLE" as shown.
It is not the same as a standard Cat 5 patch cabling. The outer cable jacket should
Be "Orange" in color. This is not a straight thru pin 1 to pin 1 cable.

Figure 23: RJ-45 8P8C Cable for WattMaster Cross Over Networking - WattMaster Part #HZ000136

Appendix B

External Interface Files (XIF Files)

At start-up the PT-Link-LON creates an external interface file (XIF) called fServer.xif based on the information contained in the PT-Link-LON's configuration file (config.csv). The PT-Link-LON's configuration can be changed by uploading and editing the config.csv file; therefore, the XIF file must be obtained by uploading it from the PT-Link-LON.

The recommended procedure for obtaining the XIF file for the PT-Link-LON is to upload it. Remember that this XIF file will change whenever the configuration file has been changed and downloaded and the PT-Link-LON restarted. The following are the steps to extract the external interface file (XIF) from the PT-Link-LON:

1.) Start RUINET application.

2.) Select Fieldserver option ***"1"*** (this step may be skipped when application auto detects PT Link).

3.) In the **Main Menu** select ***"A"*** – Data Array Overview.

4.) You should see 2 array items that are labeled wattmstr-dump and wattmstr-stats. Ignore these.

5.) You should see 2 additional arrays for the controller connected.

Example: DA_C162_I0 and DA_C162_I0b.

5.1.) The "b" at the end of the Data Array Name indicates that it is a mirror array. You can ignore these.

5.2) Verify that your controller is visible or the XIF will not be generated.

6.) After connection has been verified, you can now exit to the **Main Menu** using the escape key.

7.) Type ***"U"*** – Upload Configuration.

8.) Type ***"O"*** to select other files.

9.) If prompted, press any key to continue.

10.) Type ***"R"*** – Remote Filename.

11.) Type "fserver.xif"

12. You should now see the name fserver.xif in the column to the right.

13. Type ***"U"*** to upload the XIF file.

14. Once finished you will have an .xif file available in the same directory as the RUINET executable file you were running from.

WARNING: For easier configuration, set the unit address to 1.

NOTE: The following points for the VCM-X Modular and VCM-X WSHP Controllers are additional points. All points and property identifiers in the VCM-X Controller table (pages 21-26) also apply to the VCM-X Modular and VCM-X WSHP Controllers.

SNVTs for the VCM-X Modular

Binary Output SNVTs are SNVT_lev_disc

all other SNVTs are SNVT_count_inc_f

Parameter	Name	Object	Description	Limits	
Modulating Compressor 2	MdCmp2	Analog Output	Current position of the 2nd Stage of Compressor Modulation.		
Head Pressure 1	HdPr1	Analog Output	Head Pressure for 1st Compressor		
Head Pressure 2	HdPr2	Analog Output	Head Pressure for 2nd Compressor		
Condenser Fan 1	CdFan1	Analog Output	Condenser Fan 1 Signal Status		
Condenser Fan 2	CdFan2	Analog Output	Condenser Fan 2 Signal Status		

SNVTs for the VCM-X WSHP (Tulsa)

Binary Output SNVTs are SNVT_lev_disc

all other SNVTs are SNVT_count_inc_f

Parameter	Name	Object	Description
Modulating Compressor 2	MdCmp2	Analog Output	Current position of the 2nd Stage of Compressor Modulation.
Head Pressure 1	HdPr1	Analog Output	Head Pressure for 1st Compressor
Head Pressure 2	HdPr2	Analog Output	Head Pressure for 2nd Compressor
Condenser Fan 1	CdFan1	Analog Output	Condenser Fan 1 Signal Status
Condenser Fan 2	CdFan2	Analog Output	Condenser Fan 2 Signal Status
Water Temp. A	WaterTpA	Analog Output	Current water temperature of refrigerant for System A.
Water Temp. B	WaterTpB	Analog Output	Current water temperature of refrigerant for System B.

SNVTs for the VCM-X WSHP (Tulsa)

Binary Output SNVTs are SNVT_lev_disc

all other SNVTs are SNVT_count_inc_f

Parameter	Name	Object	Description
Compressor A1 Low Suction Pressure Alarm	A1LSPAlm	Binary Output	Alarm that indicates Suction Pressure for Compressor A1 is below the Low Suction Pressure Cooling (Heating) Setpoint.
Compressor A1 Lockout Alarm	A1LktAlm	Binary Output	Alarm that indicates Compressor A1 is locked out.
Compressor A2 Low Suction Pressure Alarm	A2LSPAlm	Binary Output	Alarm that indicates Suction Pressure for Compressor A2 is below the Low Suction Pressure Cooling (Heating) Setpoint.
Compressor A2 Lockout Alarm	A2LktAlm	Binary Output	Alarm that indicates Compressor A2 is locked out.
Compressor B1 Low Suction Pressure Alarm	B1LSPAlm	Binary Output	Alarm that indicates Suction Pressure for Compressor B1 is below the Low Suction Pressure Cooling (Heating) Setpoint.
Compressor B1 Lockout Alarm	B1LktAlm	Binary Output	Alarm that indicates Compressor B1 is locked out.
Compressor B2 Low Suction Pressure Alarm	B2LSPAlm	Binary Output	Alarm that indicates Suction Pressure for Compressor B2 is below the Low Suction Pressure Cooling (Heating) Setpoint.
Compressor 4 Lockout Alarm	B2LktAlm	Binary Output	Alarm that indicates Compressor B2 is locked out.
Low Water Temperature 1 Alarm	LWT1Alm	Binary Output	Alarm that indicates water temperature is below the Leaving Water Safety Setpoint (Heating only) for System A.
Low Water Temperature 2 Alarm	LWT2Alm	Binary Output	Alarm that indicates water temperature is below the Leaving Water Safety Setpoint (Heating only) for System B
Proof of Water 1 Flow Alarm	POWF1Alm	Binary Output	Alarm that indicates no Proof of Water Flow for System A (A1/A2)
Proof of Water 2 Flow Alarm	POWF2Alm	Binary Output	Alarm that indicates no Proof of Water Flow for System B (B1/B2)
Module Communications Alarm	ComMAlm	Binary Output	Alarm that indicates that one or more Modules are not communicating with the VCM-X WSHP Controller.

Appendix C - VCM-X Modular and WSHP LON Parameters

SNVTs for the VCM-X WSHP (Coil)			
Binary Output SNVTs are SNVT_lev_disc			
all other SNVTs are SNVT_count_inc_f			
Parameter	**Name**	**Object**	**Description**
Modulating Compressor 2	MdCmp2	Analog Output	Current position of the 2nd Stage of Compressor Modulation.
Head Pressure 1	HdPr1	Analog Output	Head Pressure for 1st Compressor
Head Pressure 2	HdPr2	Analog Output	Head Pressure for 2nd Compressor
Condenser Fan 1	CdFan1	Analog Output	Condenser Fan 1 Signal Status
Condenser Fan 2	CdFan2	Analog Output	Condenser Fan 2 Signal Status
Water Temp. A	WaterTpA	Analog Output	Current water temperature.
Compressor A Low Suction Pressure Alarm	A1LSPAlm	Binary Output	Alarm that indicates Suction Pressure for Circuit A is below the Low Suction Pressure Cooling (Heating) Setpoint.
Compressor A Lockout Alarm	A1LktAlm	Binary Output	Alarm that indicates Circuit A Compressors are locked out.
Compressor B Low Suction Pressure Alarm	B1LSPAlm	Binary Output	Alarm that indicates Suction Pressure for Circuit B is below the Low Suction Pressure Cooling (Heating) Setpoint.
Compressor B Lockout Alarm	B1LktAlm	Binary Output	Alarm that indicates Circuit B Compressors are locked out.
Low Water Temperature Alarm	LWT1Alm	Binary Output	Alarm that indicates water temperature is below the Leaving Water Safety Setpoint (Heating only).
Proof of Water Flow Alarm	POWF1Alm	Binary Output	Alarm that indicates no Proof of Water Flow.
Module Communications Alarm	ComMAlm	Binary Output	Alarm that indicates that one or more Modules are not communicating with the VCM-X WSHP Controller.

SNVTs for the VCM-X Controller

Binary Output SNVTs are SNVT_lev_disc

all other SNVTs are SNVT_count_inc_f

Parameter	Name	Object	Description	Limits
Alarm Status	AlrmSts	Analog Output	Needed only in legacy application.	
Control Status	CtrlSts	Analog Output	Current operational status.	
Occupied/ Mode Enable Cooling Setpoint Mirror	ClSt	Analog Output	Occupied/ Mode Enable Cooling Setpoint Mirror.	
Control Temperature	CtrlTp	Analog Output	Current value of the control temperature sensor.	
Duct Static Pressure	DuctPr	Analog Output	Current value of the duct static pressure sensor.	
Economizer Position	EcoPos	Analog Output	Current position of the economizer damper.	
Occupied/ Mode Enable Heating Setpoint Mirror	HtSt	Analog Output	Occupied/ Mode Enable Heating Setpoint Mirror.	
Modulating Gas Valve Position	MdHt-2Pos	Analog Output	Current position of MODGAS II modulating gas valve control.	
On Board Relays	OnRlys	Analog Output	Needed only in legacy application.	
Outdoor Air Dewpoint	OaDwpt	Analog Output	Current calculated outdoor air dewpoint added on version 1.09.	
Outdoor Air Humidity	OaRh	Analog Output	Current value of the outdoor humidity sensor.	
Outdoor Air Temperature	OaTp	Analog Output	Current value of the outdoor tempera-ture sensor.	
Outdoor Air Wetbulb	OaWtbl	Analog Output	Current calculated value of the out-door wetbulb temperature.	
Reheat Value Position	Rt2Pos	Analog Output	Current position of MHGRV modulat-ing hot gas reheat valve control.	
Relief Pressure	RfPr	Analog Output	Current value of the building pressure sensor.	
Return Air Temperature	RaTp	Analog Output	Current value of the return temperature sensor.	

SNVTs for the VCM-X Controller

Binary Output SNVTs are SNVT_lev_disc

all other SNVTs are SNVT_count_inc_f

Parameter	Name	Object	Description	Limits
Indoor Humidity	InRh	Analog Output	Current value of the indoor humidity sensor.	
Space Temperature	SpcTp	Analog Output	Current value of the space temperature sensor.	
Current Supply Air Setpoint	SaTpStM	Analog Output	Current SAT Cooling or Heating setpoint if there is no reset source; Current calculated SAT setpoint with Reset Source.	
Supply Air Temperature	SaTp	Analog Output	Current value of the supply air temperature sensor.	
Temperature Demand	TpDmnd	Analog Output	Based on the comparison between the current Control Temperature and the Heating or Cooling Setpoint Temperatures. Does not work for supply air control	
VFD Blower Fan	VfdBw-Pos	Analog Output	Current position of the VFD blower fan signal.	
VFD Relief Fan	VfdExPos	Analog Output	Current position of the VFD relief fan signal.	
Application Software Version	AppVer	Analog Output	Current version of the software in the unit.	
Alarm Group 1	AlrmGrp1	Analog Output	Needed only in legacy application.	
Alarm Group 2	AlrmGrp2	Analog Output	Needed only in legacy application.	
Alarm Group 3	AlrmGrp3	Analog Output	Needed only in legacy application.	
Dewpoint Setpoint Mirror	DptStM	Analog Output	Mirror of the DPtSt “read only.”	
External Relays 1-2	ExRlys12	Analog Output	Needed only in legacy application.	
External Relays 3-4	ExRlys34	Analog Output	Needed only in legacy application.	
Indoor Rh Setpoint Mirror	InRhStM	Analog Output	Mirror of the InRhSt “read only.”	
Modulating Cool Position	MdClPos	Analog Output	Current position of the modulating cooling signal (Chilled water or digital compressor).	

Appendix D - VCM-X LON Parameters

SNVTs for the VCM-X Controller

Binary Output SNVTs are SNVT_lev_disc

all other SNVTs are SNVT_count_inc_f

Parameter	Name	Object	Description	Limits	
Modulating Heat Position	MdHtPos	Analog Output	Current position of the modulating heating signal (hot water or SCR heat).		
Unit Mode	UnitMode	Analog Output	Needed only in legacy application.		
Return Air CO_2 Level	CO2Level	Analog Output	Current value of the CO_2 sensor.		
Bypass Damper Position	ByPas-Dmp	Analog Output	Current position of the bypass damper signal.		
Return Damper Position	RaDmp	Analog Output	Current position of the return damper signal.		
Coil Temperature	CoilTp	Analog Output	Current coil temperature reading added on version 1.09.		
Outdoor Air CFM	OaCFM	Analog Output	Current Outdoor Airflow Measurement		
Exhaust CFM	EtCFM	Analog Output4	Current Exhaust Airflow Measurement		
Supply Air CFM	SaCFM	Analog Output	Current Supply Airflow Measurement		
Current Calculated OA CFM setpoint	OACfm-StM	Analog Output	Current calculated Outdoor Air CFM based on CO_2 level.		
Dewpoint Setpoint	DptSt	Analog Input	If the outdoor dewpoint rises above this setpoint, the unit will activate the Dehumidification Demand.	35	80
Occupied/ Mode Enable Cooling Setpoint	OcpClSt	Analog Input	If the control temperature rises one degree above this setpoint, the control will activate the cooling demand. If the control temperature is the Supply Air Sensor, then the cooling demand is always active.	0	99

SNVTs for the VCM-X Controller

Binary Output SNVTs are SNVT_lev_disc

all other SNVTs are SNVT_count_inc_f

Parameter	Name	Object	Description	Limits	
Occupied/ Mode Enable Heating Setpoint	OcpHtSt	Analog Input	If the control temperature drops one degree below this setpoint, the control will activate the heating demand. If the control temperature is the Supply Air Sensor, then there is no heating demand.		99
Outdoor Air Sensor Offset	OaTpOst	Analog Input	If the Outdoor Temperature Sensor is reading incorrectly, you can use this option to enter an offset temperature to adjust the Sensor's Temperature.	-100	100
Return Air Sensor Offset	RaTpOst	Analog Input	If the Return Temperature Sensor is reading incorrectly, you can use this option to enter an offset temperature to adjust the Sensor's Temperature.	-100	100
Schedule Force	SchdFrc	Analog Input	0 = Auto/ Unoccupied Mode 1 = Forced On 2 = Forced Off	0	2
Space Sensor Offset	SpcTpOst	Analog Input	If the Space Temperature Sensor is reading incorrectly, you can use this option to enter an offset temperature to adjust the Sensor's Temperature.	-100	100
SAT/Reset Source Cooling Setpoint	SaClSt	Analog Input	Supply Air setpoint or Reset Source target temperature in Cooling Mode.	40	80
SAT/Reset Source Heating Setpoint	SaHtSt	Analog Input	Supply Air setpoint or Reset Source target temperature in Heating Mode.	40	200
Supply Air Sensor Offset	SaTpOst	Analog Input	If the Supply Air Temperature Sensor is reading incorrectly, you can use this option to enter an offset temperature to adjust the Sensor's Temperature.	-100	100

SNVTs for the VCM-X Controller Binary Output SNVTs are SNVT_lev_disc all other SNVTs are SNVT_count_inc_f					
Parameter	**Name**	**Object**	**Description**	**Limits**	
Warm Up Setpoint	WmupSt	Analog Input	In a VAV application, upon entering the occupied mode, the Warm-up Demand will be activated if the return air temperature falls one degree below this setpoint.		
Wet Bulb Setpoint	WtblSt	Analog Input	The economizer is enabled if the outdoor temperature or wetbulb falls below this setpoint.	0	80
Coil Temperature Setpoint	CoilTpSt	Analog Input	This is the coil suction temperature target during dehumidification mode. Produces dewpoint in the supply air approximately 10°F above this setpoint.	35	70
Relief Pressure Setpoint	RfPrSt	Analog Input	This is the target building pressure to be maintained by the VFD Relief signal.	-0.2	0.2
Indoor Humidity Setpoint	InRhSt	Analog Input	If the indoor humidity rises above this setpoint, the unit will activate the Dehumidification Demand.	0	100
Unoccupied Cooling Offset	UnClOst	Analog Input	During the Unoccupied Mode of Operation, this Setpoint spreads the Occupied Cooling Setpoint out by a user adjustable amount. If you do not want Cooling to operate during the Unoccupied Mode, use the default setting of 30°F for these setpoints.	0	30

SNVTs for the VCM-X Controller Binary Output SNVTs are SNVT_lev_disc all other SNVTs are SNVT_count_inc_f					
Parameter	**Name**	**Object**	**Description**	**Limits**	
Unoccupied Heating Offset	UnHtOst	Analog Input	During the Unoccupied Mode of Operation, this Setpoint spreads the Occupied Heating Setpoint out by a user adjustable amount. If you do not want Heating to operate during the Unoccupied Mode, use the default setting of 30°F for these setpoints.	0	30
CO_2 Setpoint	CO2St	Analog Input	When the CO_2 level rises above the CO_2 Protection Limit Max Level, the Economizer's Minimum Position will begin to reset open proportionally between the CO_2 Protection Limit Max Level Setpoint and the Reset Range Setpoint.	0	3000
Minimum Outside Air Setpoint	MinEcoSt	Analog Input	This is the minimum position of the economizer in the occupied modes.	1	100
Static Pressure Setpoint	DuctPrSt	Analog Input	This is the target duct pressure to be maintained by the VFD blower signal.	0.01	3
Preheater Setpoint	PreHtSp	Analog Input	Low Outside Air Ambient Protection Setpoint	0	100
Outdoor Air CFM Setpoint	OACfmSt	Analog Input	Minimum desired Outdoor Air CFM.	0.10 K	200 K
Outdoor Air CFM Reset Limit	OACfmRs	Analog Input	Maximum desired Outdoor Air CFM when CO_2 reaches its reset limit.	0.10 K	200 K

Appendix D - VCM-X LON Parameters

SNVTs for the VCM-X Controller Binary Output SNVTs are SNVT_lev_disc all other SNVTs are SNVT_count_inc_f				
Parameter	**Name**	**Object**	**Description**	**Limits**
Bad Supply Air Sensor	SaTpAlm	Binary Output	Alarm that indicates a failure in the supply air sensor.	
CO_2 Sensor Installed	CO2Cfg	Binary Output	Status that indicates the CO_2 function has been configured.	
Cooling Enabled	ClEnbl	Binary Output	Status that indicates mechanical cooling is enabled.	
Economizer Enabled	EcoEnbl	Binary Output	Status that indicates the economizer is enabled.	
Fan Start Up Delay	FanDly	Binary Output	Status that indicates the fan is commanded to run, but it is in the start up delay mode.	
Fan Proving Alarm	PofAlm	Binary Output	Alarm that indicates a failure in the flow of the VFD blower.	
Heating Enabled	HtEnbl	Binary Output	Status that indicates that mechanical heating is enabled.	
High Supply Air Temperature Alarm	HiSaAlm	Binary Output	The Supply Air has risen above the Hi SAT Cutoff Setpoint. Heating stages begin to deactivate and the fan continues to run.	
Low Supply Air Temperature Alarm	LoSaAlm	Binary Output	The Supply Air has fallen below the Hi SAT Cutoff Setpoint and cooling stages will begin to deactivate. If the unit is in Economizer, Vent, or Heating Mode the Supply Fan will shut off.	
MODGAS II Connected	MdHt2Ins	Binary Output	Status that indicates the MODGAS II controller is connected.	
Proof of Flow Configured	PofCfg	Binary Output	Status that indicates the proof of flow function has been configured.	
REHEAT II Connected	Rt2Ins	Binary Output	Status that indicates the MHGRV controllers is connected to the system.	

SNVTs for the VCM-X Controller Binary Output SNVTs are SNVT_lev_disc all other SNVTs are SNVT_count_inc_f				
Parameter	**Name**	**Object**	**Description**	**Limits**
Mechanical Cooling Alarm	MchClAlm	Binary Output	Compressor Relays are enabled but the Supply Air Temperature has not fallen 5°F w/in a user-adjustable time period. This does not indicate compressors are active and will not shut the unit down.	
Mechanical Heating Alarm	MchHtAlm	Binary Output	Heating Mode has been initiated but the Supply Air Temperature has not risen 5°F w/in a user-adjustable time period. This does not indicate heat stages are active and will not shut the unit down.	
Dirty Filter Detected	DrtFlAlm	Binary Output	Alarm that indicates the filters are dirty.	
Control Temperature Cool Failure	CtrlTpCF	Binary Output	This alarm is activated if the control temperature does not get within 5°F to the occupied cooling setpoint in an hour in the cooling mode. This alarm is not used in 100% outside air units or supply air control.	
Control Temperature Heat Failure	CtrlTpHF	Binary Output	This alarm is activated if the control temperature does not get within 5°F to the occupied heating setpoint in an hour in the heating mode. This alarm is not used in 100% outside air units or supply air control.	
Outdoor Air Temperature Lost	OaTpAlm	Binary Output	Alarm that indicates a failure in the outdoor air temperature.	
Smoke Detected Alarm	SmokeAlm	Binary Output	Alarm that indicates the Smoke sensor has been activated.	
Space Temperature Sensor Lost	SpcTpAlm	Binary Output	Alarm that indicates a failure in the space temperature sensor.	

SNVTs for the VCM-X Controller Binary Output SNVTs are SNVT_lev_disc all other SNVTs are SNVT_count_inc_f				
Parameter	**Name**	**Object**	**Description**	**Limits**
On Board Relay 1	OnRly1	Binary Output	Current status of relay 1.	
On Board Relay 2	OnRly2	Binary Output	Current status of relay 2.	
On Board Relay 3	OnRly3	Binary Output	Current status of relay 3.	
On Board Relay 4	OnRly4	Binary Output	Current status of relay 4.	
On Board Relay 5	OnRly5	Binary Output	Current status of relay 5.	
Expansion Relay 1	ExRly1	Binary Output	Current status of relay 6.	
Expansion Relay 2	ExRly2	Binary Output	Current status of relay 7.	
Expansion Relay 3	ExRly3	Binary Output	Current status of relay 8.	
Expansion Relay 4	ExRly4	Binary Output	Current status of relay 9.	
Expansion Relay 5	ExRly5	Binary Output	Current status of relay 10.	
Expansion Relay 6	ExRly6	Binary Output	Current status of relay 11.	
Expansion Relay 7	ExRly7	Binary Output	Current status of relay 12.	
Expansion Relay 8	ExRly8	Binary Output	Current status of relay 13.	
Expansion Relay 9	ExRly9	Binary Output	Current status of relay 14.	
Expansion Relay 10	ExRly10	Binary Output	Current status of relay 15.	
Expansion Relay 11	ExRly11	Binary Output	Current status of relay 16.	
Expansion Relay 12	ExRly12	Binary Output	Current status of relay 17.	
Expansion Relay 13	ExRly13	Binary Output	Current status of relay 18.	
Expansion Relay 14	ExRly14	Binary Output	Current status of relay 19.	
Expansion Relay 15	ExRly15	Binary Output	Current status of relay 20.	
Expansion Relay 16	ExRly16	Binary Output	Current status of relay 21.	

VCM-X PT-Link-LON® Property Identifier:

The PT-Link-LON® Link amends the following property identity to the LON® property identifier.

LONPropertyIdentifier :

WattLONScheduleForce ::= ENUMERATED {
- NormalOperation (0),
- ForceOccupied (1),
- ForceUnoccupied (2)

}

VcmxUnitMode ::= ENUMERATED {
- Unoccupied (0),
- RemoteContactOccupied (1),
- NormalScheduleOccupied (2),
- PushButtonOrZoneOverride (3),
- HolidayModeActive (4),
- UnoccupiedZoneDemand (5),
- RemoteScheduleOverride (6),
- CurrentOutputForceMode (7),
- SATHighOrLowCutOff (8),
- CO2OverrideInProgress (9),
- PurgeModeActive (10)

}

VcmxControlStatusBits ::= ENUMERATED {
- Off (0),
- Vent (1),
- Cool (2),
- Heat (3),
- Dehum (4),
- Dehum Cool (5),
- Dehum Heat (6),
- Warm Up Mode (7)

}

VcmxOnBoardRelaysBits ::= BIT STRING {
- OnBoardRelay1 (0),
- OnBoardRelay2 (1),
- OnBoardRelay3 (2),
- OnBoardRelay4 (3),
- OnBoardRelay5 (4)

}

Appendix D - VCM-X LON Parameters

VcmxExternal Relays1-2Bits::= BIT STRING {

ExpansionBoard1Relay1	(0),
ExpansionBoard1Relay2	(1),
ExpansionBoard1Relay3	(2),
ExpansionBoard1Relay4	(3),
ExpansionBoard2Relay1	(4),
ExpansionBoard2Relay2	(5),
ExpansionBoard2Relay3	(6),
ExpansionBoard2Relay4	(7)

}

VcmxExternal Relays2-4Bits::= BIT STRING {

ExpansionBoard3Relay1	(0),
ExpansionBoard3Relay2	(1),
ExpansionBoard3Relay3	(2),
ExpansionBoard3Relay4	(3),
ExpansionBoard4Relay1	(4),
ExpansionBoard4Relay2	(5),
ExpansionBoard4Relay3	(6),
ExpansionBoard4Relay4	(7)

}

VcmxAlarmStatusBits ::= BIT STRING {

Alarm Group1	(0),
Alarm Group2	(1),
Alarm Group3	(2)

}

VcmxAlarmGroup1Bits ::= BIT STRING {

SupplyTempSensorFailure	(0),
LostOutdoorTempSensorSignal	(1),
LostSpaceTempSensorSignal	(2)

}

VcmxAlarmGroup2Bits ::= BIT STRING {

MechanicalCoolingAlarm	(0),
MechanicalHeatingAlarm	(1),
FanProvingAlarm	(2),
DirtyFilterDetected	(3),
SmokeDetected	(4)

}

VcmxAlarmGroup3Bits ::= BIT STRING {

LowSupplyAirTempAlarm	(0),
HighSupplyAirTempAlarm	(1),
LowControlTempAlarm	(2),
HighControlTempAlarm	(3)

}

SNVTs for the SA Controller Binary Output SNVTs are SNVT_lev_disc all other SNVTs are SNVT_count_inc_f			
Parameter	**Name**	**Object**	**Description**
Control Status	CtrlSts	Analog Output	Current operational status.
Occupied/ Mode Enable Cooling Setpoint Mirror	ClSt	Analog Output	Occupied/ Mode Enable Cooling Setpoint Mirror.
Control Temperature	CtrlTp	Analog Output	Current value of the control temperature sensor.
Duct Static Pressure	DuctPr	Analog Output	Current value of the duct static pressure sensor.
Economizer Position	EcoPos	Analog Output	Current position of the economizer damper.
Occupied/ Mode Enable Heating Setpoint Mirror	HtSt	Analog Output	Occupied/ Mode Enable Heating Setpoint Mirror.
Modulating Gas Valve Position	MdHt-2Pos	Analog Output	Current position of MODGAS II modulating gas valve control.
Reheat Value Position	Rt2Pos	Analog Output	Current position of MHGRV modulating hot gas reheat valve control.
Indoor Humidity	InRh	Analog Output	Current value of the indoor humidity sensor.
Space Temperature	SpcTp	Analog Output	Current value of the space temperature sensor.
Current Supply Air Setpoint	SaTpStM	Analog Output	Current SAT Cooling or Heating setpoint if there is no reset source; Current calculated SAT setpoint with Reset Source.
Supply Air Temperature	SaTp	Analog Output	Current value of the supply air temperature sensor.
Temperature Demand	TpDmnd	Analog Output	Based on the comparison between the current Control Temperature and the Heating or Cooling Set-point Temperatures. Does not work for supply air control.
VFD Blower Fan	VfdBw-Pos	Analog Output	Current position of the VFD blower fan signal.
Application Software Version	AppVer	Analog Output	Current version of the software in the unit.
Coil Temperature Setpoint	CoilTpSt	Analog Output	Current Coil Temperature Setpoint.
Dewpoint Setpoint Mirror	DptStM	Analog Output	Mirror of the DPtSt “read only.”

SNVTs for the SA Controller Binary Output SNVTs are SNVT_lev_disc all other SNVTs are SNVT_count_inc_f			
Parameter	**Name**	**Object**	**Description**
Indoor RH Setpoint Mirror	InRhStM	Analog Output	Mirror of the InRhSt “read only.”
Modulating Cool Position	MdClPos	Analog Output	Current position of the modulating cooling signal (Chilled water or digital compressor).
Modulating Heat Position	MdHtPos	Analog Output	Current position of the modulating heating signal (hot water or SCR heat).
Unit Mode	UnitMode	Analog Output	Needed only in legacy application.
Coil Temperature	CoilTp	Analog Output	Current coil temperature reading added on version 1.09.
Modulating Compressor 2 Position	MdCmp2	Analog Output	Current position of the 2nd Stage of Compressor Modulation.
Head Pressure 1	HdPr1	Analog Output	Head Pressure for 1st unit.
Head Pressure 2	HdPr2	Analog Output	Head Pressure for 2nd unit.
Entering Air Temperature	EaTp	Analog Output	Temperature of the air that is entering the unit.
Entering Water Temperature	EwTp	Analog Output	Temperature of the water that is entering the unit.
Entering Air Humidity	EaRh	Analog Output	Relative Humidity of the Entering Air.
Coil Temperature 2	CoilTp2	Analog Output	Current Coil Temperature for 2nd unit.
Entering Air Dewpoint	EaDpt	Analog Output	Current Entering Air Dewpoint
Water Side Economizer Bypass	WSEByp	Analog Output	Current Water Side Economizer Bypass Position for 1st unit.
Water Side Economizer Bypass 2	WSEByp2	Analog Output	Current Water Side Economizer Bypass Position for 2nd unit.
Condenser Position 1	CdPos1	Analog Output	Current Condenser Position for 1st unit.
Condenser Position 2	CdPos2	Analog Output	Current Condenser Position for 2nd unit.

Appendix E - SA Controller LON Parameters

SNVTs for the SA Controller Binary Output SNVTs are SNVT_lev_disc all other SNVTs are SNVT_count_inc_f					
Parameter	**Name**	**Object**	**Description**	**Limits**	
Dewpoint Setpoint	DptSt	Analog Input	If the outdoor dewpoint rises above this setpoint, the unit will activate the Dehumidification Demand.	35	80
Occupied/ Mode Enable Cooling Setpoint	OcpClSt	Analog Input	If the control temperature rises one degree above this setpoint, the control will activate the cooling demand. If the control temperature is the Supply Air Sensor, then the cooling demand is always active.	0	99
Occupied/ Mode Enable Heating Setpoint	OcpHtSt	Analog Input	If the control temperature drops one degree below this setpoint, the control will activate the heating demand. If the control temperature is the Supply Air Sensor, then there is no heating demand.		99
Schedule Force	SchdFrc	Analog Input	0 = Auto/ Unoccupied Mode 1 = Forced On 2 = Forced Off	0	2
Space Sensor Offset	SpcTpOst	Analog Input	If the Space Temperature Sensor is reading incorrectly, you can use this option to enter an offset temperature to adjust the Sensor's Temperature.	-100	100
SAT/Reset Source Cooling Setpoint	SaClSt	Analog Input	Supply Air setpoint or Reset Source target temperature in Cooling Mode.	40	80
SAT/Reset Source Heating Setpoint	SaHtSt	Analog Input	Supply Air setpoint or Reset Source target temperature in Heating Mode.	40	200

SNVTs for the SA Controller Binary Output SNVTs are SNVT_lev_disc all other SNVTs are SNVT_count_inc_f					
Parameter	**Name**	**Object**	**Description**	**Limits**	
Supply Air Sensor Offset	SaTpOst	Analog Input	If the Supply Air Temperature Sensor is reading incorrectly, you can use this option to enter an offset temperature to adjust the Sensor's Temperature.	-100	100
Warm Up Setpoint	WmupSt	Analog Input	In a VAV application, upon entering the occupied mode, the Warm-up Demand will be activated if the return air temperature falls one degree below this setpoint.	50	90
Coil Temperature Setpoint	CoilTpSt	Analog Input	This is the coil suction temperature target during dehumidification mode. Produces dewpoint in the supply air approximately 10°F above this setpoint.	35	70
Indoor Humidity Setpoint	InRhSt	Analog Input	If the indoor humidity rises above this setpoint, the unit will activate the Dehumidification Demand.	0	100
Unoccupied Cooling Offset	UnClOst	Analog Input	During the Unoccupied Mode of Operation, this Setpoint spreads the Occupied Cooling Setpoint out by a user adjustable amount. If you do not want Cooling to operate during the Unoccupied Mode, use the default setting of 30°F for these setpoints.	0	30

SNVTs for the SA Controller					
Binary Output SNVTs are SNVT_lev_disc					
all other SNVTs are SNVT_count_inc_f					
Parameter	**Name**	**Object**	**Description**	**Limits**	
Unoccupied Heating Offset	UnHtOst	Analog Input	During the Unoccupied Mode of Operation, this Setpoint spreads the Occupied Heating Setpoint out by a user adjustable amount. If you do not want Heating to operate during the Unoccupied Mode, use the default setting of 30°F for these setpoints.	0	30
Static Pressure Setpoint	DuctPrSt	Analog Input	This is the target duct pressure to be maintained by the VFD blower signal.	0.01	3
Preheater Setpoint	PreHtSp	Analog Input	Low Outside Air Ambient Protection Setpoint	0	100
Entering Air Offset Setpoint	EaTpOst	Analog Input	If the Entering Air Temperature Sensor is reading incorrectly, you can use this option to enter an offset temperature to adjust the Sensor's Temperature.		
Entering Water Offset Setpoint	EwTpOst	Analog Input	If the Entering Water Temperature Sensor is reading incorrectly, you can use this option to enter an offset temperature to adjust the Sensor's Temperature.		

SNVTs for the SA Controller			
Binary Output SNVTs are SNVT_lev_disc			
all other SNVTs are SNVT_count_inc_f			
Parameter	**Name**	**Object**	**Description**
Bad Supply Air Sensor	SaTpAlm	Binary Output	Alarm that indicates a failure in the supply air sensor.
Cooling Enabled	ClEnbl	Binary Output	Status that indicates mechanical cooling is enabled.
Economizer Enabled	EcoEnbl	Binary Output	Status that indicates the economizer is enabled.
Fan Start Up Delay	FanDly	Binary Output	Status that indicates the fan is commanded to run, but it is in the start up delay mode.
Fan Proving Alarm	PofAlm	Binary Output	Alarm that indicates a failure in the flow of the VFD blower.
Heating Enabled	HtEnbl	Binary Output	Status that indicates that mechanical heating is enabled.
High Supply Air Temperature Alarm	HiSaAlm	Binary Output	The Supply Air has risen above the Hi SAT Cutoff Setpoint. Heating stages begin to deactivate and the fan continues to run.
Low Supply Air Temperature Alarm	LoSaAlm	Binary Output	The Supply Air has fallen below the Hi SAT Cutoff Setpoint and cooling stages will begin to deactivate. If the unit is in Economizer, Vent, or Heating Mode the Supply Fan will shut off.
MODGAS II Connected	MdHt2Ins	Binary Output	Status that indicates the MODGAS II controller is connected.
REHEAT II Connected	Rt2Ins	Binary Output	Status that indicates the MHGRV controllers is connected to the system.
Mechanical Cooling Alarm	MchClAlm	Binary Output	Compressor Relays are enabled but the Supply Air Temperature has not fallen 5°F w/in a user-adjustable time period. This does not indicate compressors are active and will not shut the unit down.
Mechanical Heating Alarm	MchHtAlm	Binary Output	Heating Mode has been initiated but the Supply Air Temperature has not risen 5°F w/in a user-adjustable time period. This does not indicate heat stages are active and will not shut the unit down.

Appendix E - SA Controller LON Parameters

SNVTs for the SA Controller Binary Output SNVTs are SNVT_lev_disc all other SNVTs are SNVT_count_inc_f			
Parameter	**Name**	**Object**	**Description**
Dirty Filter Detected	DrtFlAlm	Binary Output	Alarm that indicates the filters are dirty.
Control Temperature Cool Failure	CtrlTpCF	Binary Output	This alarm is activated if the control temperature does not get within 5°F to the occupied cooling setpoint in an hour in the cooling mode. This alarm is not used in 100% outside air units or supply air control.
Control Temperature Heat Failure	CtrlTpHF	Binary Output	This alarm is activated if the control temperature does not get within 5°F to the occupied heating setpoint in an hour in the heating mode. This alarm is not used in 100% outside air units or supply air control.
Space Temperature Sensor Lost	SpcTpAlm	Binary Output	Alarm that indicates a failure in the space temperature sensor.
On Board Relay 1	OnRly1	Binary Output	Current status of relay 1.
On Board Relay 2	OnRly2	Binary Output	Current status of relay 2.
On Board Relay 3	OnRly3	Binary Output	Current status of relay 3.
On Board Relay 4	OnRly4	Binary Output	Current status of relay 4.
On Board Relay 5	OnRly5	Binary Output	Current status of relay 5.
Expansion Relay 1	ExRly1	Binary Output	Current status of relay 6.
Expansion Relay 2	ExRly2	Binary Output	Current status of relay 7.
Expansion Relay 3	ExRly3	Binary Output	Current status of relay 8.
Expansion Relay 4	ExRly4	Binary Output	Current status of relay 9.
Expansion Relay 5	ExRly5	Binary Output	Current status of relay 10.
Expansion Relay 6	ExRly6	Binary Output	Current status of relay 11.
Expansion Relay 7	ExRly7	Binary Output	Current status of relay 12.

SNVTs for the SA Controller Binary Output SNVTs are SNVT_lev_disc all other SNVTs are SNVT_count_inc_f			
Parameter	**Name**	**Object**	**Description**
Expansion Relay 8	ExRly8	Binary Output	Current status of relay 13.
Expansion Relay 9	ExRly9	Binary Output	Current status of relay 14.
Expansion Relay 10	ExRly10	Binary Output	Current status of relay 15.
Expansion Relay 11	ExRly11	Binary Output	Current status of relay 16.
Expansion Relay 12	ExRly12	Binary Output	Current status of relay 17.
Expansion Relay 13	ExRly13	Binary Output	Current status of relay 18.
Expansion Relay 14	ExRly14	Binary Output	Current status of relay 19.
Expansion Relay 15	ExRly15	Binary Output	Current status of relay 20.
Expansion Relay 16	ExRly16	Binary Output	Current status of relay 21.
Emergency Shutdown Alarm	EmerAlm	Binary Output	Alarm that indicates Emergency Shutdown.
Drain Pan Overflow	DrnAlm	Binary Output	Alarm that indicates overflow of the drain pan.
Proof of Water Flow Alarm	PoWFAlm	Binary Output	Alarm that indicates no Proof of Water Flow.
Entering Air Temperature Alarm	EaTpAlm	Binary Output	Alarm that indicates failure in the Entering Air Temperature Sensor.

SA Controller PT-Link-LON® Property Identifier:

The PT-Link-LON® Link amends the following property identity to the BACnet® property identifier.

LONPropertyIdentifier :

VcmxControlStatusBits ::= ENUMERATED {

Off	(0),
Vent	(1),
Cool	(2),
Heat	(3),
Dehum	(4),
Dehum Cool	(5),
Dehum Heat	(6),
Warm Up Mode	(7)

}

SNVTs for the VCM Controller				
Binary Output SNVTs are SNVT_lev_disc				
All other SNVTs are SNVT_count_inc_f				
Parameter	**Name**	**Object**	**Description**	**Limits**
Application Software Version	AppVer	Analog Output	Current version of the software in the unit.	
Alarm Status	AlrmSts	Analog Output	Needed only in legacy application.	
Unit Mode	UnitMode	Analog Output	Needed only in legacy application.	
Control Status	CtrlSts	Analog Output	Current operational status.	
Control Temperature	CtrlTp	Analog Output	Current value of the control temperature sensor.	
Occupied/ Mode Enable Cooling Setpoint Mirror	ClSt	Analog Output	Occupied/ Mode Enable Cooling Setpoint Mirror.	
Duct Static Pressure	DuctPr	Analog Output	Current value of the duct static pressure sensor.	
Economizer Position	EcoPos	Analog Output	Current position of the economizer damper.	
External Relays 1-2	ExRlys12	Analog Output	Needed only in legacy application.	
External Relays 3-4	ExRlys34	Analog Output	Needed only in legacy application.	
Indoor Humidity	InRh	Analog Output	Current value of the indoor humidity sensor.	
Occupied/ Mode Enable Heating Setpoint Mirror	HtSt	Analog Output	Occupied/ Mode Enable Heating Setpoint Mirror.	
On Board Relay	OnRlys	Analog Output	Needed only in legacy application.	
Outdoor Air Humidity	OaRh	Analog Output	Current value of the outdoor humidity sensor.	
Outdoor Air Temperature	OaTp	Analog Output	Current value of the outdoor temperature sensor.	
Outdoor Air Wetbulb	OaWtbl	Analog Output	Current calculated value of the outdoor wetbulb temperature.	
Relief Pressure	RfPr	Analog Output	Current value of the building pressure sensor.	
Return Air CO_2 Level	CO2Level	Analog Output	Current value of the CO_2 sensor.	
Return Air Temperature	RaTp	Analog Output	Current value of the return temperature sensor.	
Space Temperature	SpcTp	Analog Output	Current value of the space temperature sensor.	

SNVTs for the VCM Controller				
Binary Output SNVTs are SNVT_lev_disc				
All other SNVTs are SNVT_count_inc_f				
Parameter	**Name**	**Object**	**Description**	**Limits**
Supply Air Temperature	SaTp	Analog Output	Current value of the supply air temperature sensor.	
Temperature Demand	TpDmnd	Analog Output	Based on the comparison between the current Control Temperature and the Heating or Cooling Setpoint Temperatures. Does not work for supply air control.	
VFD Blower Fan	VfdBwPos	Analog Output	Current position of the VFD blower fan signal.	
VFD Relief Fan	VfdExPos	Analog Output	Current position of the VFD relief fan signal.	
Modulating Gas Valve Position	MdHt2Pos	Analog Output	Current position of MODGAS II modulating gas valve control.	
Reheat Value Position	Rt2Pos	Analog Output	Current position of MHGRV modulating hot gas reheat valve control.	
Alarm Group 1	AlrmGrp1	Analog Output	Needed only in legacy application.	
Alarm Group 2	AlrmGrp2	Analog Output	Needed only in legacy application.	
Alarm Group 3	AlrmGrp3	Analog Output	Needed only in legacy application.	
Dewpoint Setpoint Mirror	DptStM	Analog Output	Mirror of the DPtSt “read only.”	
Indoor RH Setpoint Mirror	InRhStM	Analog Output	Mirror of the InRhSt “read only.”	
Modulating Cool Position	MdClPos	Analog Output	Current position of the modulating cooling signal (Chilled water or digital compressor).	
Modulating Heat Position	MdHtPos	Analog Output	Current position of the modulating heating signal (hot water or SCR heat).	
Bypass Damper Position	ByPasDmp	Analog Output	Current position of the bypass damper signal.	

Appendix F - VCM LON Parameters

SNVTs for the VCM Controller					
Binary Output SNVTs are SNVT_lev_disc					
All other SNVTs are SNVT_count_inc_f					
Parameter	**Name**	**Object**	**Description**	**Limits**	
Return Damper Position	RaDmp	Analog Output	Current position of the return damper signal.		
Outdoor Air Dewpoint	OaDwpt	Analog Output	Current calculated outdoor air dewpoint added on version 1.09.		
Current Supply Air Setpoint	SaTpStM	Analog Output	Current SAT Cooling or Heating setpoint if there is no reset source; Current calculated SAT setpoint with Reset Source.		
Coil Temperature	CoilTp	Analog Output	Current coil temperature reading added on version 1.09.		
Preheater Setpoint	PreHtSp	Analog Input	Low Outside Air Ambient Protection Setpoint	0	100
CO_2 Setpoint	CO2St	Analog Input	When the CO_2 level rises above the CO_2 Protection Limit Max Level, the Economizer's Minimum Position will begin to reset open proportionally between the CO_2 Protection Limit Max Level Setpoint and the Reset Range Setpoint.	0	3000
Static Pressure Setpoint	DuctPrSt	Analog Input	This is the target duct pressure to be maintained by the VFD blower signal.	0.01	3
Minimum Outside Air Setpoint	MinEcoSt	Analog Input	This is the minimum position of the economizer in the occupied modes.	1	100
Occupied/ Mode Enable Cooling Setpoint	OcpClSt	Analog Input	If the control temperature rises one degree above this setpoint, the control will activate the cooling demand. If the control temperature is the Supply Air Sensor, then the cooling demand is always active.	0	99

SNVTs for the VCM Controller					
Binary Output SNVTs are SNVT_lev_disc					
All other SNVTs are SNVT_count_inc_f					
Parameter	**Name**	**Object**	**Description**	**Limits**	
Occupied/ Mode Enable Heating Setpoint	OcpHtSt	Analog Input	If the control temperature drops one degree below this setpoint, the control will activate the heating demand. If the control temperature is the Supply Air Sensor, then there is no heating demand.	0	99
Outdoor Air Sensor Offset	OaTpOst	Analog Input	If the Outdoor Temperature Sensor is reading incorrectly, you can use this option to enter an offset temperature to adjust the Sensor's Temperature.	-100	100
Relief Pressure Setpoint	RfPrSt	Analog Input	This is the target building pressure to be maintained by the VFD Relief signal.	-0.2	0.2
Return Air Sensor Offset	RaTpOst	Analog Input	If the Return Temperature Sensor is reading incorrectly, you can use this option to enter an offset temperature to adjust the Sensor's Temperature.	-100	100
Schedule Force	SchdFrc	Analog Input	0 = Auto Unoccupied Mode 1 = Forced On 2 = Forced Off	0	2
Space Sensor Offset	SpcTpOst	Analog Input	If the Space Temperature Sensor is reading incorrectly, you can use this option to enter an offset temperature to adjust the Sensor's Temperature.	-100	100
SAT/Reset Source Cooling Setpoint	SaClSt	Analog Input	Supply Air setpoint or Reset Source target temperature in Cooling Mode.	40	80
SAT/Reset Source Heating Setpoint	SaHtSt	Analog Input	Supply Air setpoint or Reset Source target temperature in Heating Mode.	40	200

SNVTs for the VCM Controller					
Binary Output SNVTs are SNVT_lev_disc					
All other SNVTs are SNVT_count_inc_f					
Parameter	**Name**	**Object**	**Description**	**Limits**	
Supply Air Sensor Offset	SaTpOst	Analog Input	If the Supply Air Temperature Sensor is reading incorrectly, you can use this option to enter an offset temperature to adjust the Sensor's Temperature.	-100	100
Unoccupied Cooling Offset	UnClOst	Analog Input	During the Unoccupied Mode of Operation, this Setpoint spreads the Occupied Cooling Setpoint out by a user adjustable amount. If you do not want Cooling to operate during the Unoccupied Mode, use the default setting of 30°F for these setpoints.	0	30
Unoccupied Heating Offset	UnHtOst	Analog Input	During the Unoccupied Mode of Operation, this Setpoint spreads the Occupied Heating Setpoint out by a user adjustable amount. If you do not want Heating to operate during the Unoccupied Mode, use the default setting of 30°F for these setpoints.	0	30
Dewpoint Setpoint	DptSt	Analog Input	If the outdoor dewpoint rises above this setpoint, the unit will activate the Dehumidification Demand.	35	80

SNVTs for the VCM Controller					
Binary Output SNVTs are SNVT_lev_disc					
All other SNVTs are SNVT_count_inc_f					
Parameter	**Name**	**Object**	**Description**	**Limits**	
Indoor Humidity Setpoint	InRhSt	Analog Input	If the indoor humidity rises above this setpoint, the unit will activate the Dehumidification Demand.	0	100
Warm Up Setpoint	WmupSt	Analog Input	In a VAV application, upon entering the occupied mode, the Warm-up Demand will be activated if the return air temperature falls one degree below this setpoint.	50	90
Wet Bulb Setpoint	WtblSt	Analog Input	The economizer is enabled if the out-door temperature or wetbulb falls below this setpoint.	0	80
Bad Supply Air Sensor	SaTpAlm	Binary Output	Alarm that indicates a failure in the supply air sensor.		
CO_2 Sensor Installed	CO2Cfg	Binary Output	Status that indicates the CO_2 function has been configured.		
Cooling Demand	ClDmnd	Binary Output	Status that indicates a demand for cooling.		
Cooling Enabled	ClEnbl	Binary Output	Status that indicates mechanical cooling is enabled.		
Economizer Enabled	EcoEnbl	Binary Output	Status that indicates the economizer is enabled.		
Fan Start Up Delay	FanDly	Binary Output	Status that indicates the fan is commanded to run, but it is in the start up delay mode.		
Fan Proving Alarm	PofAlm	Binary Output	Alarm that indicates a failure in the flow of the VFD blower.		
Heating Demand	HtDmnd	Binary Output	Status that indicates a demand for heating.		

Appendix F - VCM LON Parameters

SNVTs for the VCM Controller

Binary Output SNVTs are SNVT_lev_disc

All other SNVTs are SNVT_count_inc_f

Parameter	Name	Object	Description	Limits	
Coil Temperature Setpoint	CoilTpSt	Analog Input	This is the coil suction temperature during dehumidification mode. Produces dewpoint in the supply air approximately 10°F above this setpoint.	35	70
Heating Enabled	HtEnbl	Binary Output	Status that indicates that mechanical heating is enabled.		
High Supply Air Temperature Alarm	HiSaAlm	Binary Output	The Supply Air has risen above the Hi SAT Cutoff Setpoint. Heating stages begin to de-activate and the fan continues to run.		
Low Supply Air Temperature Alarm	LoSaAlm	Binary Output	The Supply Air has fallen below the Hi SAT Cutoff Setpoint and cooling stages will begin to deactivate. If the unit is in Economizer, Vent, or Heating Mode the Supply Fan will shut off.		
MODGAS II Connected	MdHt2Ins	Binary Output	Status that indicates the MODGAS II controller is connected.		
Proof of Flow Configured	PofCfg	Binary Output	Status that indicates the proof of flow function has been configured.		
REHEAT II Connected	Rt2Ins	Binary Output	Status that indicates the MHGRV controllers is connected to the system.		
Warm Up Mode Active	WmupDmnd	Binary Output	Status that indicates the control is in the Warm-up mode.		
Mechanical Cooling Alarm	MchClAlm	Binary Output	Compressor Relays are enabled but the Supply Air Temperature has not fallen 5°F w/in a user-adjustable time period. This does not indicate compressors are active and will not shut the unit down.		

SNVTs for the VCM Controller

Binary Output SNVTs are SNVT_lev_disc

All other SNVTs are SNVT_count_inc_f

Parameter	Name	Object	Description	Limits
Mechanical Heating Alarm	MchHtAlm	Binary Output	Heating Mode has been initiated but the Supply Air Temperature has not risen 5°F w/in a user-adjustable time period. This does not indicate heat stages are active and will not shut the unit down.	
Dirty Filter Detected	DrtFlAlm	Binary Output	Alarm that indicates the filters are dirty.	
Control Temperature Cool Failure	CtrlTpCF	Binary Output	This alarm is activated if the control temperature does not get within 5°F to the occupied cooling setpoint in an hour in the cooling mode. This alarm is not used in 100% outside air units or supply air control.	
Control Temperature Heat Failure	CtrlTpHF	Binary Output	This alarm is activated if the control temperature does not get within 5°F to the occupied heating setpoint in an hour in the heating mode. This alarm is not used in 100% outside air units or supply air control.	
Dehumidification Demand	DehmDmnd	Binary Output	Status that indicates a demand for dehumidification.	
Outdoor Air Temperature Lost	OaTpAlm	Binary Output	Alarm that indicates a failure in the outdoor air temperature.	
Smoke Detected Alarm	SmokeAlm	Binary Output	Alarm that indicates the Smoke sensor has been activated.	
Space Temperature Sensor Lost	SpcTpAlm	Binary Output	Alarm that indicates a failure in the space temperature sensor.	
On Board Relay 1	OnRly1	Binary Output	Current status of relay 1.	
On Board Relay 2	OnRly2	Binary Output	Current status of relay 2.	
On Board Relay 3	OnRly3	Binary Output	Current status of relay 3.	
On Board Relay 4	OnRly4	Binary Output	Current status of relay 4.	
On Board Relay 5	OnRly5	Binary Output	Current status of relay 5.	

SNVTs for the VCM Controller				
Binary Output SNVTs are SNVT_lev_disc				
All other SNVTs are SNVT_count_inc_f				
Parameter	**Name**	**Object**	**Description**	**Limits**
Expansion Relay 1	ExRly1	Binary Output	Current status of relay 6.	
Expansion Relay 2	ExRly2	Binary Output	Current status of relay 7.	
Expansion Relay 3	ExRly3	Binary Output	Current status of relay 8.	
Expansion Relay 4	ExRly4	Binary Output	Current status of relay 9.	
Expansion Relay 5	ExRly5	Binary Output	Current status of relay 10.	
Expansion Relay 6	ExRly6	Binary Output	Current status of relay 11.	
Expansion Relay 7	ExRly7	Binary Output	Current status of relay 12.	
Expansion Relay 8	ExRly8	Binary Output	Current status of relay 13.	
Expansion Relay 9	ExRly9	Binary Output	Current status of relay 14.	
Expansion Relay 10	ExRly10	Binary Output	Current status of relay 15.	
Expansion Relay 11	ExRly11	Binary Output	Current status of relay 16.	
Expansion Relay 12	ExRly12	Binary Output	Current status of relay 17.	
Expansion Relay 13	ExRly13	Binary Output	Current status of relay 18.	
Expansion Relay 14	ExRly14	Binary Output	Current status of relay 19.	
Expansion Relay 15	ExRly15	Binary Output	Current status of relay 20.	
Expansion Relay 16	ExRly16	Binary Output	Current status of relay 21.	

VCM PT-Link-LON® Property Identifier:

The PT-Link-LON® Link amends the following property identity to the LON® property identifier.

LONPropertyIdentifier :

WattLONScheduleForce ::= ENUMERATED {
NormalOperation (0),
ForceOccupied (1),
ForceUnoccupied (2)
}

VcmUnitMode ::= ENUMERATED {
Unoccupied (0),
RemoteContactOccupied (1),
NormalScheduleOccupied (2),
PushButtonOrZoneOverride (3),
HolidayModeActive (4),
UnoccupiedZoneDemand (5),
RemoteScheduleOverride (6),
CurrentOutputForceMode (7),
SATHighOrLowCutOff (8),
CO2OverrideInProgress (9),
PurgeModeActive (10)
}

VcmControlStatusBits ::= BIT STRING {
AhuControlEconomizer (0),
NoOutdoorAirTempSensor (1),
CarbonDioxideSensorPresent (2),
HeatCoolStagingDisabled (3),
DehumidificationMode (4),
ModGasIIConnected (5),
ReheatIIConnected (6)
}

VcmOnBoardRelaysBits ::= BIT STRING {
OnBoardRelay1 (0),
OnBoardRelay2 (1),
OnBoardRelay3 (2),
OnBoardRelay4 (3),
OnBoardRelay5 (4)
}

Appendix F - VCM LON Parameters

VcmExternal Relays1-2Bits::= BIT STRING {

ExpansionBoard1Relay1	(0),
ExpansionBoard1Relay2	(1),
ExpansionBoard1Relay3	(2),
ExpansionBoard1Relay4	(3),
ExpansionBoard2Relay1	(4),
ExpansionBoard2Relay2	(5),
ExpansionBoard2Relay3	(6),
ExpansionBoard2Relay4	(7)

}

VcmExternal Relays2-4Bits::= BIT STRING {

ExpansionBoard3Relay1	(0),
ExpansionBoard3Relay2	(1),
ExpansionBoard3Relay3	(2),
ExpansionBoard3Relay4	(3),
ExpansionBoard4Relay1	(4),
ExpansionBoard4Relay2	(5),
ExpansionBoard4Relay3	(6),
ExpansionBoard4Relay4	(7)

}

VcmAlarmStatusBits ::= BIT STRING {

Alarm Group1	(0),
Alarm Group2	(1),
Alarm Group3	(2)

}

VcmAlarmGroup1Bits ::= BIT STRING {

SupplyTempSensorFailure	(0),
LostOutdoorTempSensorSignal	(1),
LostSpaceTempSensorSignal	(2)

}

VcmAlarmGroup2Bits ::= BIT STRING {

MechanicalCoolingAlarm	(0),
MechanicalHeatingAlarm	(1),
FanProvingAlarm	(2),
DirtyFilterDetected	(3),
SmokeDetected	(4)

}

VcmAlarmGroup3Bits ::= BIT STRING {

LowSupplyAirTempAlarm	(0),
HighSupplyAirTempAlarm	(1),
LowControlTempAlarm	(2),
HighControlTempAlarm	(3)

}

Notes

Notes

Notes

Orion Control Systems

Form: OR-PTLNKLON-TGD-01M Printed in the USA June 2010

WattMaster Controls Inc. • 8500 NW River Park Drive • Parkville, Mo. • 64152
Phone (816) 505-1100 www.orioncontrols.com Fax (816) 505-1101