



turn to the experts

i-Vu Open Link

Installation and Start-up Guide

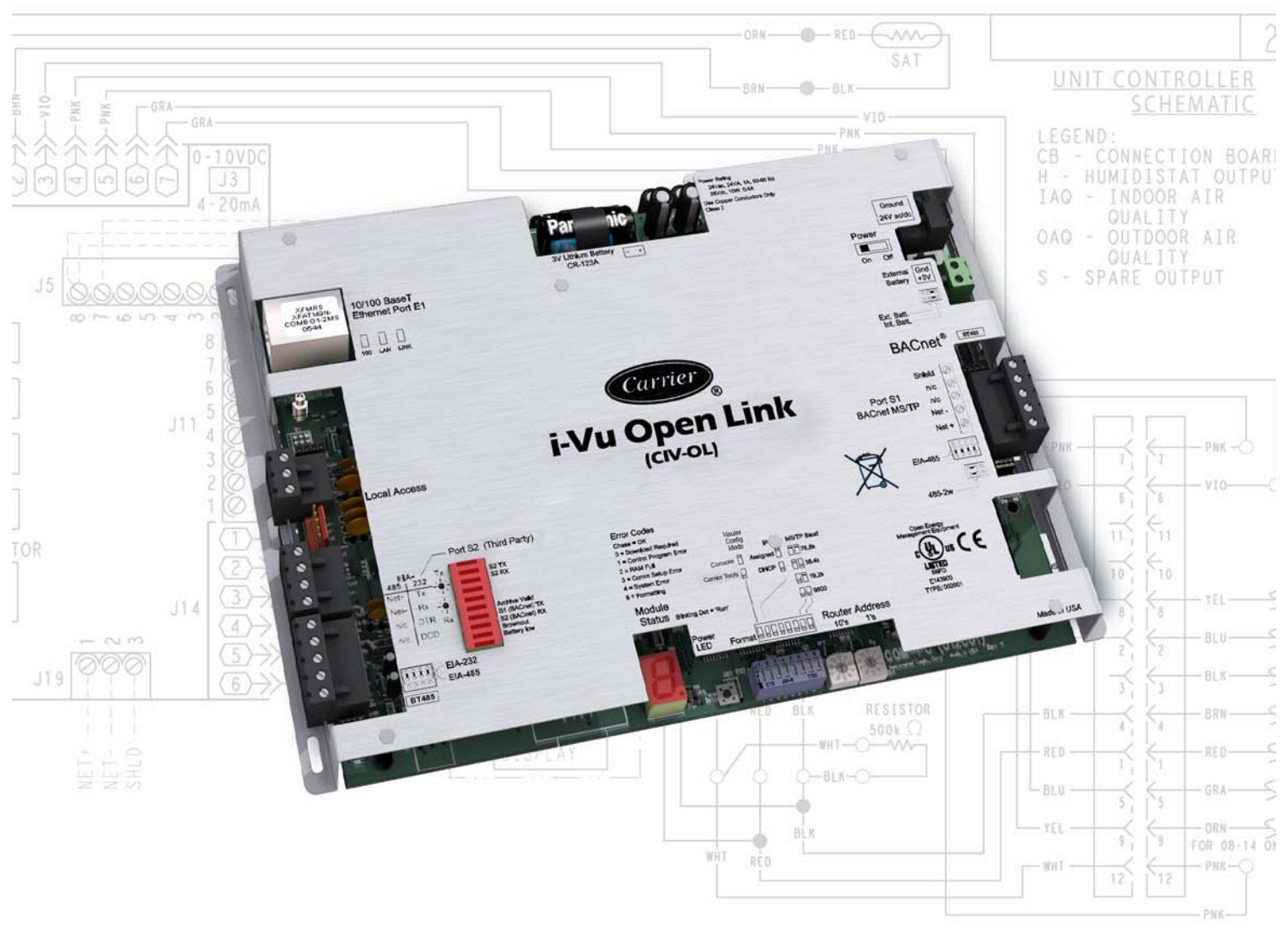


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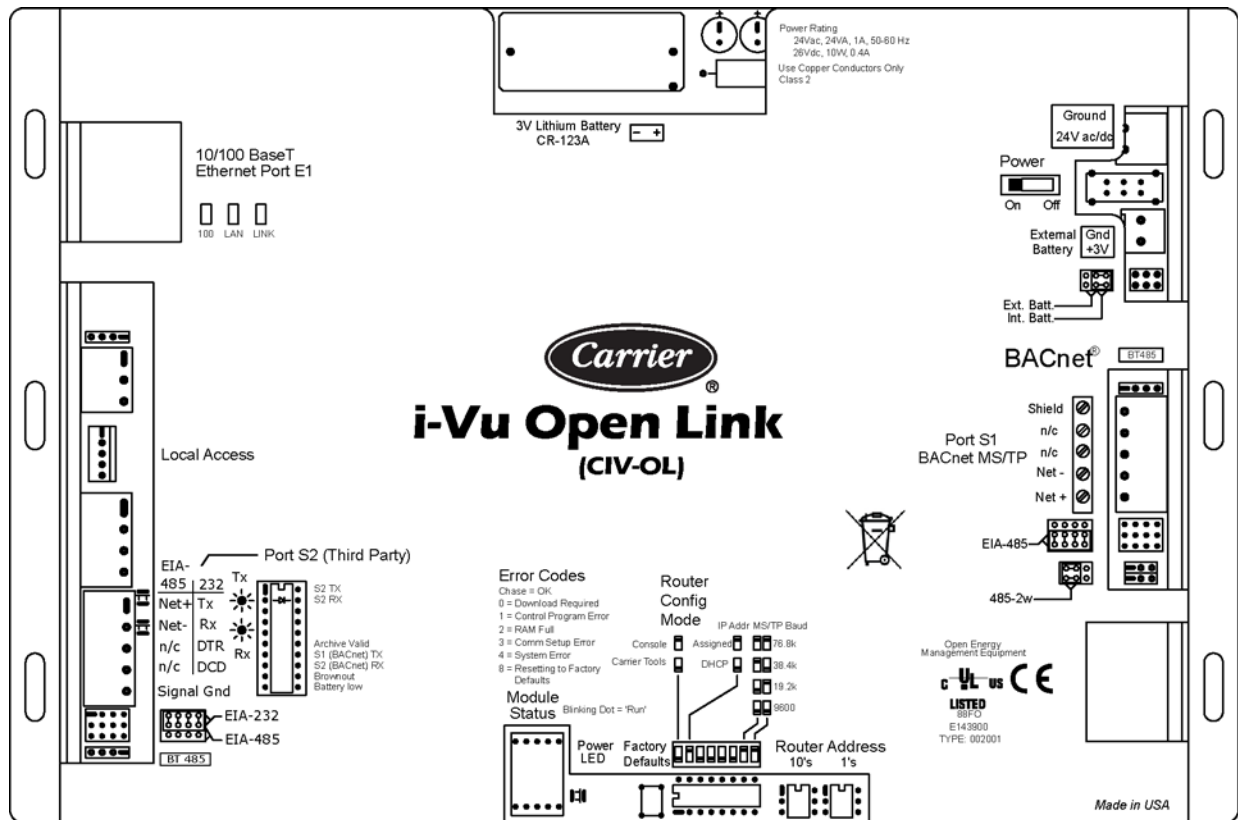
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Introduction

What is the i-Vu Open Link?

The i-Vu Open Link is a BACnet device router that acts as a gateway between the BACnet IP network and a BACnet MS/TP network. The i-Vu Open Link increases the capacity of an Open system, allowing individual MS/TP networks (with up to 60 Open controllers each) to be connected via a common BACnet/IP backbone.

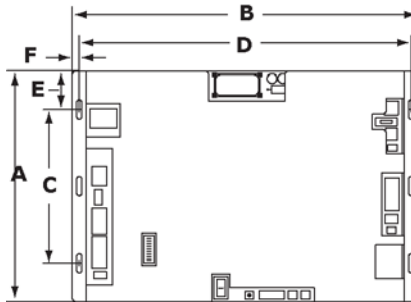
The i-Vu Open Link can also integrate third-party equipment, supporting BACnet MS/TP, BACnet/IP, Modbus RTU, Modbus/IP, and LON FT-10 protocols. The i-Vu Open Link has one EIA-485 port for connecting to the Open or third-party MS/TP bus, and one jumper-configurable EIA-232/EIA-485 port for connecting to a Modbus or LonWorks network. It also has one 10/100 Base-T Ethernet port for connecting to the building LAN and integrating to third-party IP control networks.



Specifications

Driver	drv_ivuopenlink_lon
Maximum number of Open (MS/TP) controllers supported	60
Maximum number of control programs	199
Power	24 Vac \pm 10%, 50–60 Hz 24 VA power consumption (30 VA with BACview attached) 26 Vdc (25 V min, 30 V max) Single Class 2 source only, 100 VA or less
Third-party integration points	500
Communication ports	<p>Port E1 (10/100 BaseT Ethernet):</p> <ul style="list-style-type: none"> For Ethernet LAN, BACnet IP, and Modbus TCP/IP communication at 10 or 100 Mbps, half duplex Both Assigned (default) and DHCP IP addressing are supported and DIP switch selectable <p>Port S1 (BACnet MS/TP):</p> <ul style="list-style-type: none"> For communication with Open and third-party controllers via BACnet MS/TP at 9600 bps, 19.2 kbps, 38.4 kbps, or 76.8 kbps (DIP switch selectable). Default is 76.8k bps. A BT485 may need to be installed on Port S1 if the i-Vu Open Link is at the beginning or end of a network segment. The BT485 adds bias and terminates a network segment. <p>Port S2 (Configurable EIA-485/EIA-232 port for third-party network connections, including):</p> <ul style="list-style-type: none"> Modbus (RTU) - 9600 bps, 19.2 kbps, 38.4 kbps LonWorks (requires SLTA-10 adapter) <p>Local Access (115.2k bps port):</p> <ul style="list-style-type: none"> For i-Vu Open Link configuration using a terminal program (such as Windows Hyperterminal) via RS-232 For system start-up and troubleshooting using Carrier tools via Rnet
Real time clock	Battery-backed real-time clock keeps track of time in event of power failure
Battery	10-year Lithium CR123A battery provides a maximum of 720 hours data retention during power outages. The battery retains time, trend data, alarm data, configuration data, and operating parameters in the event of power failure. To conserve battery life, battery backup turns off after a specified number of days defined in the controller driver.

Protection	Incoming power and network connections are protected by non-replaceable internal solid-state polyswitches that reset themselves when the condition that causes a fault returns to normal. The power and network connections are also protected against voltage transient and surge events.
Status indicators	LED status indicators for Port S1 and S2 communication, Ethernet Port E1 communication, and low battery status. Seven segment status display for running, error, power status, archive valid, and brownout.
Environmental operating range	0 to 140° F (-18 to 60°C), 0 to 90% relative humidity, non-condensing
Storage temperature range	-24 to 140° F (-30 to 60°C), 0 to 90% relative humidity, non-condensing
Physical	Rugged aluminum cover, removable, screw-type terminal blocks



Overall dimensions	A:	7-1/2 in. (19.1 cm)
	B:	11-3/8 in. (28.9 cm)
Mounting dimensions	C:	5 in. (12.7 cm)
	D:	10-7/8 in. (27.6 cm)
	E:	1-1/4 in. (3.2 cm)
	F:	1/4 in. (12.7 cm)
Mount with 6-32 by 1/2 in. mounting screws		
Panel depth	2 in. (5.1 cm)	
Weight	1.4 lbs (0.64 kg)	
Listed by	UL916 (Canadian Std C22.2 No. 205-M1983, CE, FCC Part 15 - Subpart B - Class A	

Safety considerations

Warning!

Disconnect electrical power to the i-Vu Open Link before wiring it. Failure to follow this warning could cause electrical shock, personal injury, or damage to the controller.

Installation

To install the i-Vu Open Link:

- 1 *Mount the i-Vu Open Link.* (page 4)
- 2 *Wire for power.* (page 5)
- 3 *Wire for communications* (page 5).
- 4 *Connect the i-Vu Open Link to the Ethernet* (page 6).
- 5 *Set the i-Vu Open Link's address and IP address.* (page 7)

To mount the i-Vu Open Link

Warning!

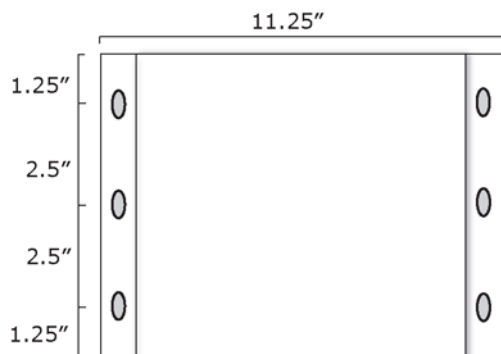
When you handle the i-Vu Open Link:

- Do not contaminate the printed circuit board with fingerprints, moisture, or any foreign material.
- Do not touch components or leads.
- Handle the board by its edges.
- Isolate from high voltage or electrostatic discharge.
- Ensure that you are properly grounded.

Screw the i-Vu Open Link into an enclosed panel using the mounting slots on the cover plate. Leave about 2 in. (5 cm) on each side of the controller for wiring.

Mounting hole dimensions:

- 11.25" (27.64cm) width
- 1.25" (31.75mm) top edge to center of first hole
- 3.75" (63.5mm) top edge to center of second hole



To wire for power

- 1 Make sure the i-Vu Open Link's power switch is in the **OFF** position to prevent it from powering up before you can verify the correct voltage.
- 2 Remove power from the power supply.
- 3 Pull the screw terminal connector from the controller's power terminals labeled **24V ac/dc** and **Ground**.
- 4 Connect the transformer wires to the screw terminal connector.
- 5 Apply power to the power supply.
- 6 Measure the voltage at the i-Vu Open Link's power input terminals to verify that the voltage is within the operating range of 21.6 – 26.4 Vac or 23.4 - 28.6 Vdc.
- 7 Insert the screw terminal connector into the i-Vu Open Link's power terminals.
- 8 Turn **on** the i-Vu Open Link's power.
- 9 Verify that the Run LED (a dot in the lower right corner of the **Module Status** LED) begins blinking. The **Module Status** LED will display **8** for about 5 seconds and then reverts to **0**, until Open controllers have been discovered and uploaded. There is a chase pattern when the controller is running with no errors.

Wiring for communications

The i-Vu Open Link has multiple ports. See table below for port descriptions.

Port	Protocol	Port type(s)	Baud rate(s)	Use for
Ethernet Port E1	BACnet/IP	Ethernet	10 Mbps 100 Mbps	LAN connection
S1	BACnet MS/TP	EIA-485 (2-wire)	DIP Switch selectable: <ul style="list-style-type: none"> • 9600 bps • 19.2 kbps • 38.4 kbps • 76.8 kbps (default) 	Open network connection
S2	Modbus LonWorks	EIA-485 EIA-232	DIP switch selectable	Third-party communication
Local Access	N/A	Rnet	115.2 kbps	<ul style="list-style-type: none"> • Router configuration • System start-up and troubleshooting with Carrier Tools

Wiring specifications

For...	Use...	Maximum Length
Ethernet	CAT5e or higher Ethernet cable	328 feet (100 meters)
MS/TP *	22 or 24 AWG, low-capacitance, twisted, stranded, shielded copper wire	2000 feet (610 meters)

* See the *MS/TP Networking and Wiring Installation Guide*.

To connect the i-Vu Open Link to the Ethernet

Connect an Ethernet cable to the **Ethernet Port E1**.

To wire the MS/TP network on Port S1

- 1 Turn the i-Vu Open Link's power off.
- 2 Check the communications wiring for shorts and grounds.
- 3 Verify that the **Port S1** jumpers are set to **485-2w**.
- 4 Set the MS/TP baud rate DIP switches **1** and **2** to match the baud rate of the Open network. The default is 76.8k.
- 5 Connect the i-Vu Open Link's **Port S1** to the Open/MS/TP network. Use the same polarity throughout the network segment.

Wire this	To this Open
Port S1 terminal	controller terminal
Shield (Pin 1)	Shield
Net- (Pin 4)	Net-
Net+ (Pin 5)	Net+

- 6 Turn the i-Vu Open Link's power on.

To wire Modbus or LonWorks devices on Port S2

- 1 Turn off the i-Vu Open Link's power.
- 2 Check the communications wiring for shorts and grounds.
- 3 Wire the i-Vu Open Link's Port S2 to the third-party device, then set the S2 jumper. See table and notes below.

- 4 Turn on the i-Vu Open Link's power.

For...	Use i-Vu Open Link port...	Wire Carrier terminal...	...to third-party device terminal	Set the port's jumper(s) on i-Vu Open Link
EIA-232	S2	TX Rx Signal Ground	Rx Tx Gnd	EIA-232
EIA-485, 2-wire	S2	Net+ Net-	+ -	EIA-485 2-wire

NOTES

- If you cannot determine the media type or connections of the third-party device, contact your third-party representative.
- Use the same polarity throughout the network segment.
- Repeaters are required for more than 31 devices. See your third-party device manufacturer's recommendations.
- To reduce communication and data errors, terminate each end of an EIA-485 network with a resistor whose value equals the network's characteristic impedance. Some third-party manufacturers provide a built-in resistor that you enable or disable with a jumper. Make sure that only devices at the end of a network have termination enabled.
EXAMPLE If an EIA-485 2-wire network's characteristic impedance is 120 Ohms, terminate one pair by placing a 120 Ohm resistor across the **Net+** and **NET-** connectors of the i-Vu Open Link. Terminate the other pair by placing a 120 Ohm resistor across the **+** and **-** connectors of the furthest third-party controller.
- A solid receive light on the i-Vu Open Link indicates a wiring or polarity problem.

Addressing the i-Vu Open Link

i-Vu Open Control hardware, when used in conjunction with i-Vu Open routers (i-Vu Open Link and i-Vu Open Router), has a convenient feature of automatic addressing. To address the i-Vu Open Link for third-party integration, using i-Vu/Field Assistant, go to **Driver Properties > Protocols > Properties** tab. Refer to the appropriate protocol *Integration Guide* for further details.

The i-Vu Open Link needs two addresses, one for the Open network and one for the IP Network.

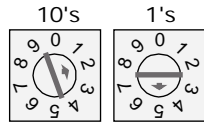
The i-Vu Open Link needs...	That is unique on the...	Notes
A router address	Open network	You set the i-Vu Open Link address on the controller's rotary switches. (1 - 99) NOTES <ul style="list-style-type: none"> The i-Vu Open Link address is also used to auto-generate the BACnet device instance/name for the router and the MS/TP network number for the connected Open network. See <i>Configuring BACnet device instance and network number</i>.
An IP address	IP Network	Use the IP Address DIP switch to choose one of the following: <ul style="list-style-type: none"> Use DHCP to obtain an IP address Assign a custom IP address (default) The default IP settings are: <ul style="list-style-type: none"> 192.168.168x, where x = router address subnet mask = 255.255.255.0 default gateway = 192.168.168.254

To set the i-Vu Open Link address on the Open network

CAUTION The router address must be unique on the IP and Open network.

- If wired for power, turn off the controller's power. The controller reads the address each time you turn it on.
- Use the rotary switches to set the address. Set the **Tens (10's)** switch to the tens digit of the address, and set the **Ones (1's)** switch to the ones digit. Valid addresses are 1 - 99.

EXAMPLE If the controller's address is 25, point the arrow on the **Tens (10's)** switch to 2 and the arrow on the **Ones (1's)** switch to 5.



- Turn on the i-Vu Open Link's power.

NOTE The factory default setting is "00" and must be changed to successfully install your i-Vu Open Link.

To choose an IP addressing scheme

Carefully plan your addressing scheme to avoid duplicating addresses.

- If there is a DHCP server on the network, and, if you have a single i-Vu Open Link or multiple i-Vu Open Links that exist on the SAME subnet, use DHCP addressing. Skip to the section *To obtain an IP address using DHCP* (page 9).
- If you have multiple i-Vu Open Links that reside on different subnets, you cannot use DHCP addressing. Instead, give each i-Vu Open Link an assigned IP address. Skip to the section *To assign a custom IP address* (page 9).

NOTE This network configuration also requires that you configure IP Broadcast Management Devices (BBMDs. See *To set up BACnet Broadcast Management Devices*. (page 15)

By default, the i-Vu Open Link is set up for assigned IP addressing. The default IP address settings are as follows:

- IP address = 192.168.168.x, where x = i-Vu Open Link address (rotary switch settings)
- Subnet Mask = 255.255.255.0
- Default Gateway = 192.168.168.254

To obtain an IP address using DHCP

- 1 Turn the i-Vu Open Link's power off.
- 2 Set the **IP Addr DIP switch** to **OFF** (DHCP).
- 3 Turn the i-Vu Open Link's power on. The DHCP server assigns an IP address to the i-Vu Open Link.

To assign a custom IP address

- 1 Obtain the IP address, subnet mask, and default gateway address for your router from the facility network administrator.
 - 2 Turn the i-Vu Open Link's power off.
 - 3 Set the i-Vu Open Link's **IP Addr DIP switch** to **ON. (Assigned)**
 - 4 Configure the i-Vu Open Link by setting the **Router Config Mode** DIP switch to **(Console)**:
 - **ON** if you use a terminal program, such as Hyperterminal
 - **OFF** if you use Carrier software, such as BACview
- NOTE** The DIP switch on older models was labeled **Hyperterminal**.
- 5 Turn the i-Vu Open Link's power on.

Connecting to the i-Vu Open Link

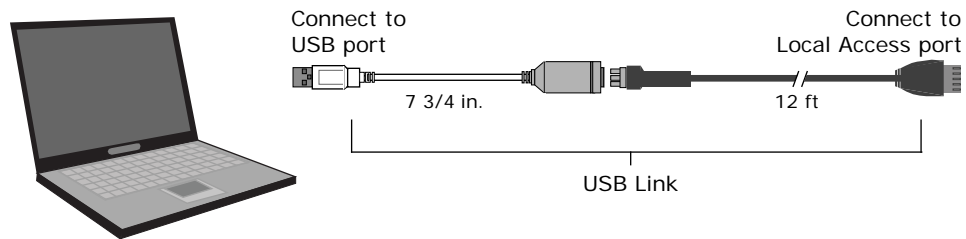
You can connect a PC to the i-Vu Open Link through the **Local Access** port or through **Port S2**. See below for details.

Using Local Access port

PREREQUISITES

- A computer with a USB port
- A USB Link (Part #USB-L)

- 1 If using the USB Link with your computer for the first time, install the USB Link's driver before you connect the cable to the computer.
 - a) Put the USB Link Driver CD into your computer.
 - b) Run **CP210x_VCP_Win2K_XP_S2K3.exe**. Accept all of the wizard's default settings.
- 2 Connect the laptop to the local access port of the controller using the USB Link cable(s).



- 3 Note which COM port has been assigned to the USB Link.

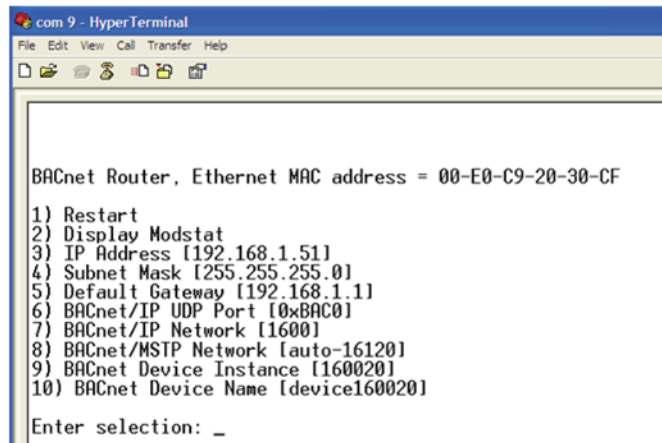
Windows XP or Vista

- a) If using Classic desktop, right-click on **My Computer** and select **Manage**. If using Standard desktop, select **Start**, right-click on **My Computer** and select **Manage**.
 - b) In the **Computer Management** window, select **Device Manager** and expand **Ports (COM & LPT)**. Note which COM port has been assigned to the 'CP210x USB to UART Bridge Controller (COMx)'.
- 4 Ensure that i-Vu Open Link's **Router Config Mode** DIP switch is **ON (Console)**.

NOTES

- The DIP switch on older models was labeled **Hyperterminal**.
 - You must cycle power on the router for DIP switch settings to be accepted.
- 5 Launch a terminal program, such as Window's Hyperterminal, by browsing to **Start > Programs > Accessories > Communications**.
 - 6 Type a name for the local access port in the **Name** field (example: Access port).
NOTE If you do not see the **Name** field, select **File > New Connection**.
 - 7 Select an icon for this connection file, then click **OK**.
 - 8 Set the **Connect using** field to **COMX** in the **Connect to** dialog box, where X is the number of the computer's **COM** port that is connected to the USB Link, then click **OK**.
 - 9 In the **Com Properties** dialog box, set the **Port Settings** for your local access port connection, then click **OK**.

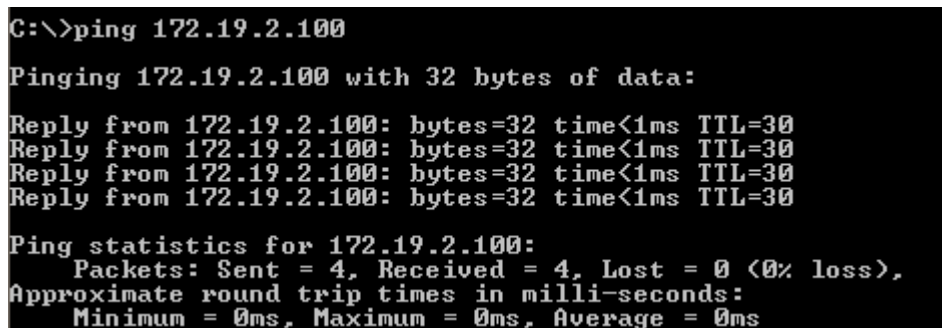
- Click **Enter** to view the **Router Configuration** screen. See example below.



```
com 9 - HyperTerminal
File Edit View Call Transfer Help
BACnet Router, Ethernet MAC address = 00-E0-C9-20-30-CF
1) Restart
2) Display Modstat
3) IP Address [192.168.1.51]
4) Subnet Mask [255.255.255.0]
5) Default Gateway [192.168.1.1]
6) BACnet/IP UDP Port [0xBAC0]
7) BACnet/IP Network [1600]
8) BACnet/MSTP Network [auto-16120]
9) BACnet Device Instance [160020]
10) BACnet Device Name [device160020]
Enter selection: _
```

- Type **3** to change the IP Address. Click **Enter**.
- Type the new IP Address. Click **Enter**. This IP address will now show up on the **Router Configuration** screen.
- Type **4** to change the Subnet Mask. Click **Enter**.
- Type the new Subnet Mask. Click **Enter**. This Subnet Mask will now show up on the **Router Configuration** screen.
- Type **5** to change the Default Gateway. Click **Enter**.
- Type in the new Default Gateway. Click **Enter**. This Default Gateway will now show up on the **Router Configuration** screen.
- After entering your settings, type **1** to reset and click **Enter**.
- Verify that you can communicate with the i-Vu Open Link by issuing a PING command to the IP address specified in step 12.

NOTE Your PC must be on the same subnet as the Router for the PING command to work.



```
C:\>ping 172.19.2.100
Pinging 172.19.2.100 with 32 bytes of data:
Reply from 172.19.2.100: bytes=32 time<1ms TTL=30
Reply from 172.19.2.100: bytes=32 time<1ms TTL=30
Reply from 172.19.2.100: bytes=32 time<1ms TTL=30
Reply from 172.19.2.100: bytes=32 time<1ms TTL=30
Ping statistics for 172.19.2.100:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

- When finished, set the i-Vu Open Link's **Router Config Mode** DIP switch to **OFF** to restore normal functionality to the Local Access port.
- Cycle the i-Vu Open Link's power to accept the **Router Config Mode** changes.

Using Port S2

Prerequisite Computer must have a standard serial port.

- 1 Make sure that the Port S2 jumper is set for **EIA-232**.
- 2 Obtain a standard 9-pin serial cable. There are two different ways to connect the serial cable to **Port S2**:
 - Connect an S2-DB9 converter (part# S2-DB9) into Port S2. Plug the 9-pin end of the serial cable directly into the DB9 connector of the S2-DB9.
 - Trim one end of the serial cable to expose the wires to be connected directly to **Port S2** of the i-Vu Open Link.
- 3 If you are using a trimmed cable, then terminate the **TX, RX,** and **Ground** wires of the 9-pin serial cable to **Port S2** on the i-Vu Open Link. See table below.

Serial Cable (9 pin)	Port S2
TX (pin 3)	RX (pin 2)
RX (pin 2)	TX (pin 1)
Ground (pin 5)	Ground (pin 5)

- 4 Follow steps 4 - 19 above to launch a terminal program and access the **Router Configuration** screen to set the IP parameters.
- 5 Reset the Port S2 jumper to the EIA-485 position.
- 6 Cycle the i-Vu Open Link's power to accept the DIP switch settings.

Configuring BACnet device instance and network number

All BACnet Open controllers must have a unique device instance and name. These BACnet addresses are automatically generated and usually do not require modification. However, sometimes you need to override the automatic addressing assignments.

Autogenerated Addressing Scheme:

The i-Vu Open Link's rotary address setting determines the automatic BACnet addressing scheme for the connected Open network.

Legend

16 = Carrier's BACnet Vendor ID

xx = Router's rotary address (router address)

yy = Open controller's rotary address (MS/TP MAC address)

For the router:

- BACnet Device Instance Number = 1600xx
- BACnet Device Instance Name = device1600xx

- BACnet IP Network Number = 1600
- BACnet MS/TP Network Number = 161xx
- Port S1 MS/TP MAC Address = 0 (fixed)

For the connected Open controllers:

- BACnet Device Instance Number = 161xxyy
- BACnet Device Instance Name = device161xxyy
- MS/TP MAC Address = yy
- BACnet MS/TP Network Number = 161xx (actually learned from the router, defaults to 16101 if no i-Vu Open Link is operating)

If the BACnet automatic settings need to be changed, launch the **Router Configuration** utility using a terminal program. See *To assign a custom IP address* (page 9) for instructions on connecting to and using a terminal program.

To change the BACnet settings:

- 1 Enter the BACnet selection# from the menu. Type the new setting and click **Enter**. The new setting will appear on the **Router Configuration** screen.
- 2 Cycle power to the router for the new settings to effect.

NOTE If the BACnet MS/TP network number of the router is assigned and not auto-generated, and the Open controllers connected to that router are set such that their BACnet settings are auto-generated, then the Open controller BACnet settings will be auto-generated based on the assigned MS/TP network number in the Router:

Example A router's BACnet MS/TP network has been assigned to 200.

If the connected Open Controllers are using the auto-generate scheme, then their settings will be:

BACnet MS/TP Network Number = 200

BACnet Device Instance Number = 200xxyy

BACnet Device Instance Name = device200xxyy

MS/TP MAC Address = yy

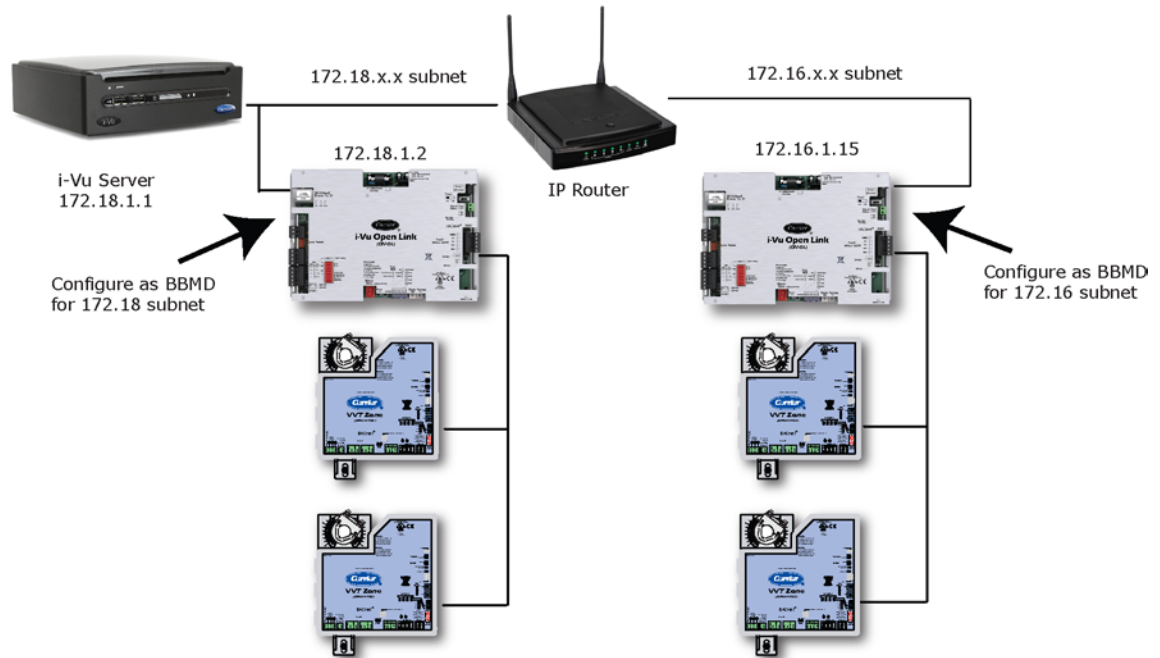
Driver

On the **Driver** page, you can change the following properties:

- Backup battery conservation settings. See table below.
- BACview inactivity timeout and user password. See table below.
- Module clock synchronization and failure. See table below.

Backup Battery	
Turn off internal backup battery after ___ days to conserve battery life (shutoff date/time)	<p>How long backup battery should run after power loss.</p> <p>TIP Downloading memory activates the battery backup. This conserves battery life when you know the i-Vu Open Link will be without power for an extended period after downloading (for example, during shipment):</p> <p>Verify the Archive Valid LED is lit, then set this field to 0.</p> <p>After you install the i-Vu Open Link and apply power, enter a number greater than 0.</p>
BACview Control	
Overwrite Daylight Saving parameters set in BACview?	<p>Yes—Every memory download includes Daylight Saving Time properties from the System Options tab and overwrites changes to these properties made from BACview.</p> <p>No—Download Daylight Saving Time properties during first download. You must make subsequent changes from BACview.</p>
Keypad inactivity timeout (minutes)	End the user session, turn off the backlight, and display the standby screen after this period of inactivity.
Keypad user-level password	Numeric password user must enter to access system through BACview.
Module Clock	
Clock Fail Date and Time	<p>Date and time control program uses when controller's real-time clock is invalid.</p> <p>TIP Use an occupied date and time (such as a Tuesday at 10 a.m.) so the equipment does not operate in unoccupied mode if the controller loses power during occupancy.</p>
Time Synch Sensitivity (seconds)	On a Time Synch signal, update the controller clock only if the controller time differs from the signal time by more than this value.
BACnet COV Throttling	
Enable COV Throttling	<p>Under normal circumstances, COV Throttling should be enabled to prevent excessive network traffic if an object's COV Increment is set too low. See EXCEPTION below.</p> <p>When enabled, if an object generates excessive COV broadcasts (5 updates in 3 seconds), the module driver automatically throttles the broadcasts to 1 per second. Also, if the object's value updates excessively for 30 seconds, an alarm is sent to i-Vu/Field Assistant listing <u>all</u> objects that are updating excessively. A Return-to-normal alarm is sent only after <u>all</u> objects have stopped updating excessively.</p> <p>EXCEPTION In rare circumstances, such as process control, a subscribing object may require COV updates more frequently than once per second. For these situations, clear this checkbox, but make sure that your network can support the increased traffic. You also need to disable the Excessive COV alarms under the driver's Common Alarms.</p>

To set up BACnet Broadcast Management Devices (BBMDs)



If your system has multiple routers that reside on different IP subnets, you must set up one router on each IP subnet as a BACnet/IP Broadcast Management Device (BBMD).

Every subnet with a router must have a BBMD configured in order for broadcasts from controllers on that subnet to reach the rest of the routers on the network.

NOTE If the i-Vu appliance is on a separate subnet than the rest of the routers, the internal router must be assigned an IP address and configured as a BBMD.

Use the **BBMD Configuration Tool** to:

- Define the **Broadcast Distribution Table** (BDT) in each BBMD
- Enable an i-Vu Open Control System to find routers that are on different subnets
- Allow controllers on one subnet to communicate with controllers on other subnets
- Enable i-Vu to see, upload, or configure controllers on different subnets

NOTE In this document, the term "router" refers to the i-Vu Open Router or the i-Vu Open Link.

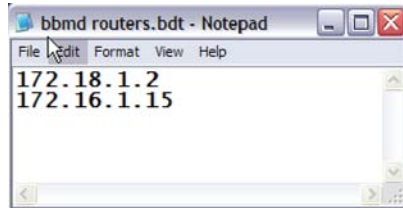
To set up BBMDs using the BBMD Configuration Tool

- 1 Assign an IP address, subnet mask, and default gateway for each i-Vu Open Link on the IP network. See *Addressing the i-Vu Open Link* (page 7).
- 2 Acquire the **BBMD Configuration Tool** from the Tech Tools DVD or from the *Carrier Control Systems Support Site* <http://www.hvacpartners.com/>. This is a stand-alone executable file and no installation is necessary.
- 3 Make a list of the IP addresses for each router that will function as a BBMD in your system.

In the above illustration, the i-Vu Open Link, address 172.18.1.2, must be configured as a BBMD for the 172.18 subnet, while the i-Vu Open Link, address 172.16.1.15, must be configured as a BBMD for the 172.16 subnet.

CAUTIONS

- Multiple BBMD's on an IP subnet disrupt BACnet communications. Define only one BBMD per subnet.
 - Unless explicitly modified, the UDP Port for BACnet/IP is 0xBACO (47808). Do not change this parameter unless you made a change in the router.
- 4 In a text editor such as Notepad, create a list of the routers that will be BBMD's. List each IP address on a separate line. (Maximum of 50 IP addresses per file)



- 5 Save the file to your folder of choice with a .bdt extension instead of .txt.

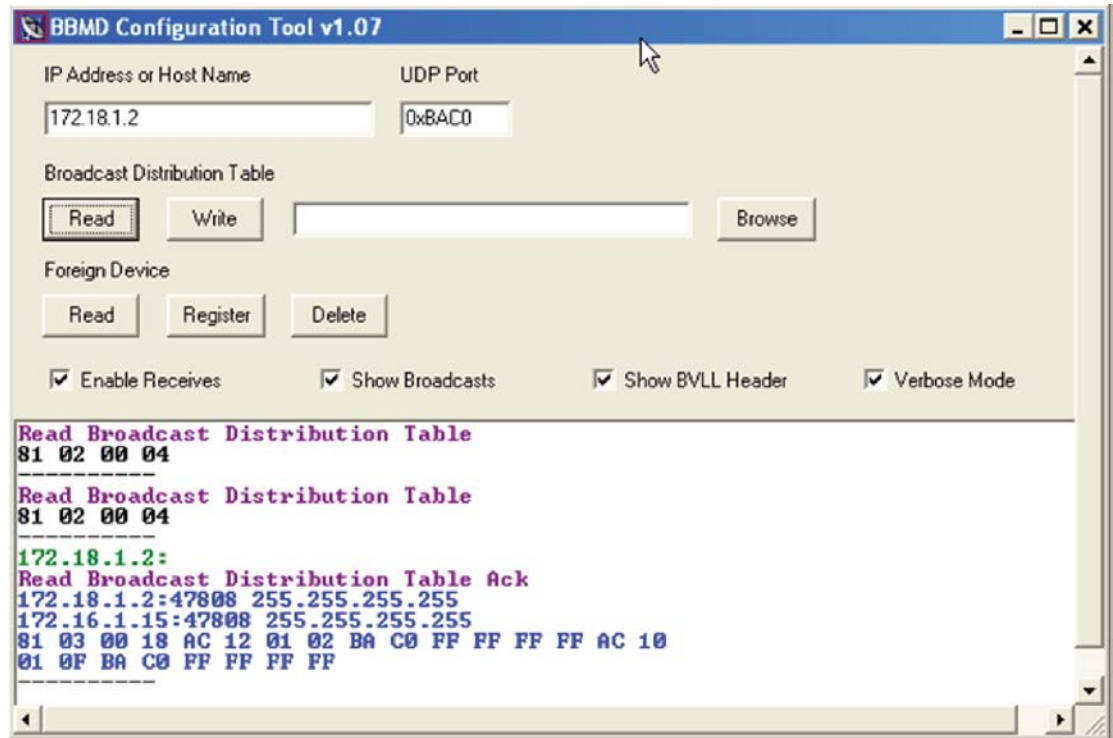
NOTE ".bdt" is a **Broadcast Distribution Table** file.

- 6 Open the **BBMD Configuration Tool**.
- 7 In the **IP Address** or **Host Name** field, type the IP address of the router that functions as the BBMD (BACnet Broadcast Management Device) for its subnet.
- 8 To check if the router has an existing BBMD table, click **Broadcast Distribution Table Read** button.
- 9 If the **Broadcast Distribution Table** contains IP addresses that are not in your .bdt file, verify that they are valid BBMD's and, if so, add them to your .bdt file.

NOTES

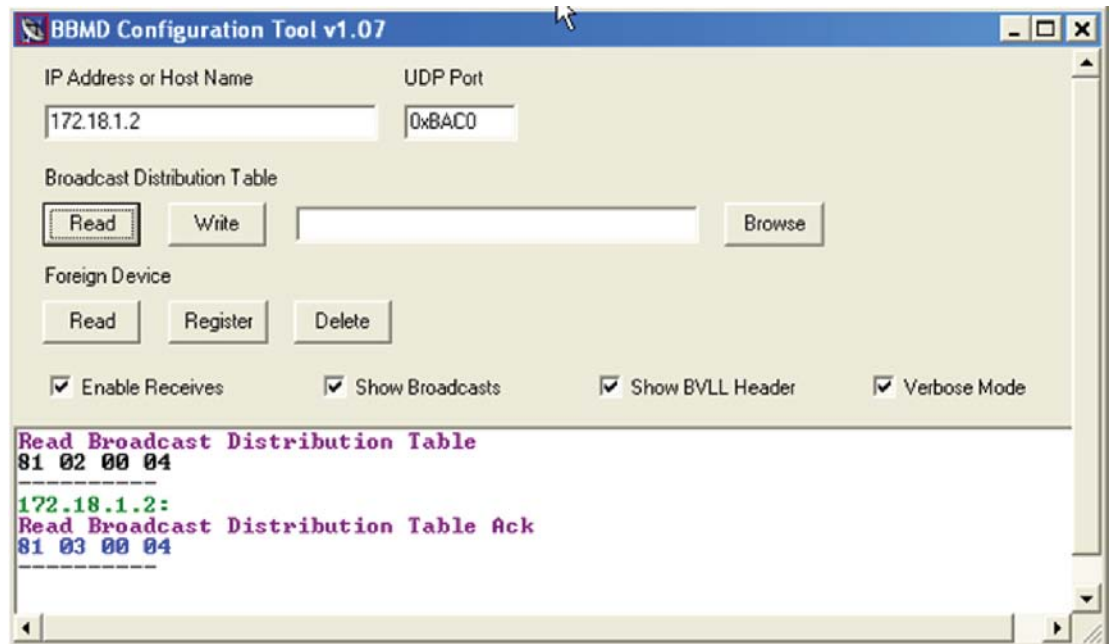
- The BDT's in each BBMD must be identical. Be sure to repeat this entire process whenever a BBMD is added.
 - If needed, disable the checkbox next to **Show Broadcast** to limit the amount of scrolling text that is displayed.
- 10 Click the **Broadcast Distribution Table Browse** button and select the .bdt file that you made in step 4.
- 11 Verify that the appropriate IP address is still in the **IP Address** or **Host Name** field.
- 12 Click the **Broadcast Distribution Table Write** button.
- 13 Click **Read** again to verify that the new .bdt file was written to the router. See example below.

NOTE If you have a large BDT, you may have to re-size the **BBMD Configuration Tool** window.



- 14 Using the next IP address in the .bdt file, repeat steps 7 through 14 until every file has been updated.

NOTE To clear the BBMD entries from a router, follow the steps above using an empty (blank) .bdt file. A cleared BBMD table contains just the router's IP address without entries in the BBMD table, as shown below.



Configuring i-Vu Open Link Driver Properties

After you discover the i-Vu Open Link, you may want to customize the i-Vu Open Link's settings for your applications. Change settings on the **Driver Properties** page.

- 1 Start i-Vu/Field Assistant.
- 2 Right-click the i-Vu Open Link in the navigation tree (**Installer** view) and select **Driver Properties**.
- 3 Select from the menu and adjust properties.

Device

On the **Device** page, you can change the following properties:

- BACnet device object properties for the i-Vu Open Link
- i-Vu Open Link communication

Configuration	NOTE The three APDU fields refer to all networks over which the i-Vu Open Link communicates.
Max Masters and Max Info Frames	<p>Max Masters - defines the highest MS/TP Master MAC address on the MS/TP network.</p> <p>For example, if there are 3 master nodes on an MS/TP network, and their MAC addresses are 1, 8, and 16, then Max Masters would be set to 16 (since this is the highest MS/TP MAC address on the network).</p> <p>This property optimizes MS/TP network communications by preventing token passes and “poll for master” requests to non-existent Master nodes.</p> <p>In the above example, MAC address 16 would know to pass the token back to MAC address 1 instead of counting up to MAC address 127). Each MS/TP master node on the network must have their Max Masters set to this same value. The default is 127.</p> <p>Max Info Frames - defines the maximum number of responses that will be sent when the i-Vu Open Link receives the token.</p> <p>Any positive integer is a valid number. The default is 10 and should be ideal for the majority of applications. In cases where the i-Vu Open Link is the target of many requests, this number could be increased as high as 100 or 200.</p>

Notification Class #1

i-Vu/Field Assistant alarms use Notification Class #1. A BACnet alarm's Notification Class defines:

- Alarm priority for Alarm, Fault, and Return to Normal states
- Options for BACnet alarm acknowledgement
- Where alarms should be sent (recipients)

NOTE You may need to set up additional Notification Classes if your system will handle Life Safety alarms or if you need to send certain types of alarms only to an alarm manager other than i-Vu/Field Assistant.

Priorities	NOTE BACnet defines the following Network message priorities for Alarms and Events.										
	<table border="1"> <thead> <tr> <th>Priority range</th> <th>Network message priority</th> </tr> </thead> <tbody> <tr> <td>00-63</td> <td>Life Safety</td> </tr> <tr> <td>64-127</td> <td>Critical Equipment</td> </tr> <tr> <td>128-191</td> <td>Urgent</td> </tr> <tr> <td>192-255</td> <td>Normal</td> </tr> </tbody> </table>	Priority range	Network message priority	00-63	Life Safety	64-127	Critical Equipment	128-191	Urgent	192-255	Normal
Priority range	Network message priority										
00-63	Life Safety										
64-127	Critical Equipment										
128-191	Urgent										
192-255	Normal										
Priority of Off-Normal	BACnet priority for Alarms.										
Priority of Fault	BACnet priority for Fault messages.										
Priority of Normal	BACnet priority for Return-to-normal messages.										
Ack Required for Off-Normal, Fault, and Normal	<p>Requires a controller acknowledgement for each message type. Normally not required.</p> <p>TIP To require operator acknowledgement for an Alarm or Return-to-normal message (stored in the i-Vu/Field Assistant database), change the acknowledgement settings on i-Vu/Field Assistant's Alarm > Enable/Disable tab for an alarm source or an alarm category.</p>										
Recipient List											
Recipients	The first row in this list is i-Vu/Field Assistant. Do not delete this row. Click Add if you want other BACnet devices to receive alarms.										
Recipient Description	Name that appears in the Recipients table.										
Recipient Type	Use Address (static binding) only for third-party BACnet device recipients that do not support dynamic binding.										
Recipient Device Object Identifier	Type the Device Instance from the network administrator for third-party devices in the # field.										
Process Identifier	Change for third-party devices that use a BACnet Process Identifier other than i-Vu/Field Assistant processes alarms for any 32-bit Process Identifier.										
Issue Confirmed Notifications	Select to have a device continue sending an alarm message until it receives delivery confirmation from the recipient.										

Calendars

Calendars are provided in the module driver for BACnet compatibility only. Use i-Vu/Field Assistant's **Schedules** feature instead.

Common and Specific Alarms

On these pages, you can enable/disable, change BACnet alarm properties, or set delays for the following BACnet alarms:

Common alarms:

- All Programs Stopped
- Control Program
- Duplicate Address
- Excessive COV
- Locked I/O
- Module Halted
- Program Stopped

Specific Alarms:

- Dead Module Timeout
- Low Battery Alarm

NOTE To set up alarm actions for controller-generated alarms, see *Set up alarm actions* in i-Vu Help.

Controller-generated Alarm	
Description	Short message shown on i-Vu's Alarm page or in an alarm action when this type of alarm is generated.
Events	
Enable	Clear these checkboxes to disable Alarm or Return to normal messages of this type from this controller.
Notification Class	Do not change this field.

BACnet router properties

On the **BACnet router properties** page, you can change the following properties:

- BACnet routing settings
- Color and prime variable caching settings

BACnet Router Options	
Ignore all Reject-Message-to-Network, Reason=1 messages	Clear to delete and rediscover a route if a network's router indicates that the network is no longer present (reason=1). Select to continue routing messages to a network even if its router indicates that the network is no longer present.

Color/Prime Variable Caching

Disable Color Cache

Clear (enable) to improve responsiveness in retrieving colors.

Select (disable):

- To reduce network traffic to third-party (non-color-supporting) devices
- If using the i-Vu Open Link on the controller network, but not as a router

NOTE Selecting this checkbox also disables dead controller alarms.

Dead Module Timeout

After this period (minutes:seconds) of non-response from an Open controller, the router sends an alarm to the server.

Alarm Store/Forward

On the **Alarm Store and Forward** page, you can change alarm delivery settings for the i-Vu Open Link used to store and forward alarms from a remote dial-up site.

Configuring Router Properties using BACview

View or configure i-Vu Open Link properties using the BACview Handheld (part#BV6H), or Virtual BACview software. Refer to the *BACview Installation and User Guide* for details.

Troubleshooting

If you have problems mounting, wiring, or addressing the i-Vu Open Link, contact Carrier Control Systems Support.

LED's

The LED's indicate if the i-Vu Open Link is speaking to other devices on the network. The LED's should reflect communication traffic based on the baud rate set. The higher the baud rate, the more solid the LED's will look.

The **Module Status** LED can display the following error codes.

Error Code...	Indicates...	Possible solutions
0	Open controllers have not been discovered and uploaded in i-Vu/Field Assistant	Discover controllers on the Open network in i-Vu/Field Assistant. In i-Vu/Field Assistant, import the i-Vu Open Link.
1	A control program error	Obtain a Module Status Report (Modstat) and look for error conditions.* If you cannot determine the error from the Modstat, send a screenshot of the Modstat to Carrier Technical Support. To obtain a Modstat: <ul style="list-style-type: none"> • Go to the the Enhanced Access menu > Selection 2 > Display Modstat • In i-Vu/Field Assistant, click the Main Menu button, select Manual Command and type in Modstat.
2	The i-Vu Open Link's memory is full	In i-Vu/Field Assistant, reduce the amount of trend data being stored in the controller.
3	A setup error	Verify that the IP address has been set properly. See <i>Addressing the i-Vu Open Link</i> . (page 7)
4	A system error	Obtain a Module Status Report (Modstat) and look for error messages. If you cannot determine the error from the Modstat, send a screenshot of the Modstat to Carrier Technical Support. To obtain a Modstat: <ul style="list-style-type: none"> • Go to the the Enhanced Access menu > Selection 2 > Display Modstat • In i-Vu/Field Assistant, click the Main Menu button, select Manual Command and type in Modstat.

Other LED's show the status of certain functions.

If this LED is on...	Status is...
Power	The i-Vu Open Link has power
Link	The i-Vu Open Link is connected to the Ethernet
LAN	The Ethernet port is transmitting or receiving data
100	The connection speed is 100 Mbps. If LED is not lit, the connection speed is 10 Mbps.
S2 Tx	The i-Vu Open Link is transmitting data on the Port S2 network
S2 Rx	The i-Vu Open Link is receiving data from the Port S2 network
Archive Valid	The i-Vu Open Link's memory backup is valid
S1 (BACnet) Tx	The i-Vu Open Link is transmitting data to the MS/TP (Open) network
S1 (BACnet) Rx	The i-Vu Open Link is receiving data to the Open network
Brownout	Low-level incoming power
Battery low	The battery is low

Replacing the i-Vu Open Link's battery

The i-Vu Open Link's 10-year Lithium CR123A battery provides a maximum of 720 hours data retention during power outages. To conserve battery life, battery backup turns off after a specified number of days defined in the module driver.

If the i-Vu Open Link's **Battery low** LED is lit or if the i-Vu Open Link sends a Low Battery alarm to i-Vu/Field Assistant, replace the battery. Replacement batteries can be purchased from any electronics retailer that sells a CR123A battery.

CAUTION Power must be **ON** to the i-Vu Open Link when replacing the battery, or the date and time in the i-Vu Open Link will be lost.

- 1 Using a small flathead screwdriver, pry up each side of the black battery clip until it is free and you can remove it.
- 2 Remove the battery from the controller, making note of the battery's polarity.
- 3 Insert the new battery into the controller, matching the polarity of the battery you removed.
- 4 Push the black clip back onto the battery until you hear both sides click in place.

Serial number

If you need the i-Vu Open Link's serial number when troubleshooting, the number is on:

- a sticker on the back of the main controller board
- a Module Status report (modstat) from your user interface

Compliance

FCC Compliance

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

CAUTION Changes or modifications not expressly approved by the responsible party for compliance could void the user's authority to operate the equipment.

CE Compliance

WARNING This is a Class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

BACnet Compliance

BACnet® is a registered trademark of ASHRAE. ASHRAE does not endorse, approve or test products for compliance with ASHRAE standards. Compliance of listed products to requirements of ASHRAE Standard 135 is the responsibility of the BACnet manufacturers Association (BMA). BTL® is a registered trademark of the BMA.

Appendix A: BACnet Protocol Implementation Conformance Statement

The PIC statements are updated regularly. Please refer to the *BACnet website*
<http://www.bacnetinternational.net/catalog/index.php?m=28> for the latest information.



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