Verify that you have the most current version of this document from [www.hvacpartners.com](http://www.hvacpartners.com) or your local Carrier office.

Important changes are listed in *Document revision history* at the end of this document.

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Contents

What is the i-Vu® XT Router? ....................................................................................................................... 1
Specifications .................................................................................................................................................. 2

To mount the i-Vu® XT Router .................................................................................................................... 5

Wiring for power .......................................................................................................................................... 7
To wire for power .......................................................................................................................................... 7

Addressing the i-Vu® XT Router .................................................................................................................. 8
- Rotary switch settings ............................................................................................................................... 9
- To set the IP address ................................................................................................................................ 9
- To set the Port S1 address and baud rate ............................................................................................... 11
- To set the Port S2 address and baud rate ............................................................................................... 11
- Configuring BACnet Device Instance and network number .................................................................. 12
- To set up BACnet Broadcast Management Devices (BBMDs) ............................................................. 13

Wiring for communications ....................................................................................................................... 16
- Wiring specifications ............................................................................................................................... 16
- To connect the i-Vu® XT Router to the Ethernet .................................................................................... 17
- To wire to a BACnet/ARCNET network ............................................................................................... 18
- To wire to a BACnet MS/TP network .................................................................................................... 18

Find and upload in the i-Vu® Interface ...................................................................................................... 19

Adjusting the i-Vu® XT Router driver properties ..................................................................................... 20
- Driver ..................................................................................................................................................... 20
- Device .................................................................................................................................................... 21
- Notification Classes .............................................................................................................................. 22
- Calendars ............................................................................................................................................... 23
- Common and Specific Alarms ................................................................................................................ 23
- BACnet router properties ....................................................................................................................... 23
- BACnet firewall .................................................................................................................................... 24
- Network Diagnostics - Statistics .......................................................................................................... 24
- Network Diagnostics - Packet Capture ................................................................................................. 26
- Communication Status .......................................................................................................................... 28
- To set up Network Statistic trends ....................................................................................................... 28

To set up the controller through the Service Port .................................................................................... 30
- ModStat tab .......................................................................................................................................... 30
- Device tab ............................................................................................................................................ 31
- Ports tab ............................................................................................................................................... 31
- BACnet tab .......................................................................................................................................... 32
- Security tab ......................................................................................................................................... 34

Troubleshooting ........................................................................................................................................ 35
- LEDs .................................................................................................................................................... 35
- To get a Module Status report ............................................................................................................. 37
- To get a Device Log ............................................................................................................................. 37
- To get the i-Vu® XT Router's serial number ....................................................................................... 38
- To replace the i-Vu® XT Router's fuse .............................................................................................. 38
- To take the i-Vu® XT Router out of service ......................................................................................... 40

Compliance ................................................................................................................................................ 41
- FCC Compliance ................................................................................................................................. 41
- CE Compliance .................................................................................................................................. 41
- Industry Canada Compliance .............................................................................................................. 41
- BACnet Compliance ............................................................................................................................ 41

Appendix - Module Status field descriptions ......................................................................................... 42
Document revision history ........................................................................................................................................44
What is the i-Vu® XT Router?

The i-Vu® XT Router:
- Provides BACnet routing between any supported BACnet communication types
- Supports DHCP IP addressing
- Can serve as a BACnet Broadcast Management Device (BBMD)
- Supports Foreign Device Registration (FDR)
- Works with the i-Vu® v6.5 or later system
What is the i-Vu® XT Router?

The i-Vu® XT Router has 3 physical BACnet communication ports:

<table>
<thead>
<tr>
<th>Port</th>
<th>Port type</th>
<th>For routing this type of communication...</th>
<th>At...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gig-E</td>
<td>10/100/1000 Mbps Ethernet</td>
<td>BACnet/IP and/or BACnet/Ethernet</td>
<td>10, 100, or 1000 Mbps (1 Gbps)</td>
</tr>
<tr>
<td>Port S1</td>
<td>High-speed EIA-485 port</td>
<td>BACnet/ARCNET or BACnet/MSTP</td>
<td>156 Kbps</td>
</tr>
<tr>
<td>Port S2</td>
<td>Electrically isolated EIA-485 port</td>
<td>BACnet/MSTP</td>
<td>9.6 to 115.2 Kbps</td>
</tr>
</tbody>
</table>

The i-Vu® XT Router also has a:
- 10/100 Mbps Ethernet Service Port for configuring, commissioning, and troubleshooting
- USB port for recovery

### Specifications

<table>
<thead>
<tr>
<th>Driver</th>
<th>drv_fwex_&lt; version &gt;.driverx</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td>24 Vac ±10%, 50–60 Hz, 50 VA</td>
</tr>
<tr>
<td></td>
<td>26 Vdc ±10%, 15 W</td>
</tr>
<tr>
<td>Gig-E port</td>
<td>10/100/1000 BaseT Ethernet port for BACnet/IP and/or BACnet/Ethernet communication on the Ethernet at 10, 100, or 1000 Mbps, full duplex</td>
</tr>
</tbody>
</table>
| Port S1         | For communication with either of the following:  
|                 | • A BACnet ARCNET network at 156 kbps  
|                 | • A BACnet MS/TP network at 9600 to 115200 bps  
|                 | This port’s End of Net? switch can be set to Yes to terminate the network segment.  
| Port S2         | For communication with a BACnet MS/TP network at 9600 to 115200 bps. This port’s End of Net? switch can be set to Yes to terminate the network segment. |
| Service Port    | Ethernet port at 10 or 100 Mbps for system start-up and troubleshooting |
| USB port        | USB 2.0 host port for device recovery |
| Microprocessor  | 32-bit ARM Cortex-A8, 600MHz, processor with multi-level cache memory |
| Memory          | 16 GBs eMMC Flash memory (120 MB available for use) and 256 MB DDR3 DRAM. User data is archived to non-volatile Flash memory when parameters are changed, every 90 seconds, and when the firmware is deliberately restarted. |
| Real-time clock | Real-time clock keeps track of time in the event of a power failure for up to 3 days |
**Protection**

Device is protected by a replaceable, fast acting, 250 Vac, 2A, 5mm x 20mm glass fuse.

The power and network ports comply with the EMC requirements EN50491-5-2.

⚠️ **CAUTION** To protect against large electrical surges on serial EIA-485 networks, place a PROT485 at each place wire enters or exits the building.

**LED status indicators**

- Tricolor **NET** LED to show network status
- Tricolor **SYS** LED to show system status
- **TX** (Transmit) and **RX** (Receive) LED for the following ports:
  - Gig-E
  - Port S1
  - Port S2

See LEDs (page 35).

**Environmental operating range**

32 to 140 °F (0 to 60 °C), 10–90% relative humidity, non-condensing

**Physical**

Fire-retardant plastic ABS, UL94-5VA

**Terminal blocks and connectors**

Screw-type terminal blocks. 0.2 in (5.08 mm) pitch connectors

**Mounting**

35mm DIN rail mounting or screw mounting

---

![Router Dimensions Diagram](image)

**Overall dimensions**

A: 7.1 in. (18.03 cm)  
B: 6.95 in. (17.65 cm)  
Depth: 2.09 in. (5.31 cm)

**Screw mounting dimensions**

C: 6.45 in (16.38 cm)  
D: 4.1 in. (10.4 cm)

**Weight**

1 lb. 1 oz. (0.482 kg)

**BACnet Support**

Conforms to the BACnet Router (B-R-TR) Standard Device Profile as defined in ANSI/ASHRAE Standard 135-2012 (BACnet) Annex L, Protocol Revision 9

**Compliance**

- United States of America:  
  - FCC compliant to Title CFR47, Chapter 1, Subchapter A, Part 15, Subpart B, Class A; UL Listed to UL 916, PAZX, Energy Management Equipment
- Canada:  
  - Industry Canada Compliant, ICES-003, Class A  
  - cUL Listed UL 916, PAZX7, Energy Management Equipment
Europe: "CE" Mark
EN50491-5-2:2009; Part 5-2: EMC requirements for HBES/BACS used in residential, commercial and light industry environment
EN50491-3:2009, Part 3: Electrical safety requirements for Home and Building Electronic Systems (HBES) and Building Automation and Control Systems (BACS)
Low Voltage Directive: 2014/35/EU
RoHS Compliant: 2011/65/EU

Australia and New Zealand:
"C-Tick" Mark, AS/NZS 61000-6-3
To mount the i-Vu® XT Router

The i-Vu® XT Router must be mounted in a metal enclosure or cabinet which is properly rated for the location where it is being installed.

DIN rail mount

1. Push down and pull out the center tabs shown below to clear the din rail trough on the back of the router.

2. Place the router on the DIN rail so that the rail is in the trough on the back of the router.

3. Push the center tabs towards the router until you hear them click.

4. Pull gently on the router to verify that it is locked in place.
Screw Mount

Leave about 2 in. (5 cm) on each side of the router for wiring.

Insert #6 screws through the mounting holes. Use no more than 8 in.lbs. torque to secure plastic tab to mounting surface.

A: 7.1 in. (18.03 cm)
B: 6.95 in. (17.65 cm)
C: 6.45 in. (16.38 cm)
D: 4.1 in. (10.4 cm)
Depth: 2.09 in (5.31 cm)
Wiring for power

**WARNING**  Do not apply line voltage (mains voltage) to the router’s ports and terminals.

**CAUTIONS**
- The i-Vu® XT Router is powered by a Class 2 power source. Take appropriate isolation measures when mounting it in a control panel where non-Class 2 circuits are present.
- Carrier controllers can share a power supply as long as you:
  - Maintain the same polarity.
  - Use the power supply only for Carrier controllers.

To wire for power

1. Make sure the i-Vu® XT Router’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 red screw terminal connector from the router’s power terminals labeled **24 Vac/Vdc (+/-)**.

4. Connect the power supply's wires to the red screw terminal connector.

5. Connect an 18 AWG or larger wire from the power supply's negative (-) terminal to earth ground. This wire must not exceed 12 in. (30.5 cm).

6. Apply power to the power supply.

7. Measure the voltage at the red screw terminal connector to verify that the voltage is within the operating range of 20 to 30 Vac or 23.4 to 30 Vdc.

8. Insert the red screw terminal connector into the router's power terminals.

9. To verify the polarity of the wiring, measure the voltage from the negative terminal of the red screw terminal connector to a nearby ground. The reading should be 0V.

10. Turn on the router's power switch.

11. Verify that the LED on top of the router is on.

12. Measure the voltage at the red screw terminal connector to verify that the voltage is within the operating range of 20 to 30 Vac or 23.4 to 30 Vdc.
Addressing the i-Vu® XT Router

<table>
<thead>
<tr>
<th>Set this port's address</th>
<th>In this location</th>
<th>See...</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP</td>
<td>Service Port</td>
<td>To set the IP address</td>
</tr>
<tr>
<td>Port S1</td>
<td>On the router's rotary switches</td>
<td>To set the Port S1 address and baud rate (page 11)</td>
</tr>
<tr>
<td>Port S2</td>
<td>Service Port</td>
<td>To set the Port S2 address and baud rate (page 11)</td>
</tr>
</tbody>
</table>

To access the controller setup through the **Service Port**:

1. Connect an Ethernet cable from a computer to the router as shown below.

   ![Connection Diagram](image)

2. If your computer uses a static IP address, set the address to 169.254.1.x, where x is 2 or greater. If it uses a DHCP address, leave the address as it is.

3. Turn off the computer's Wi-Fi if it is on.

4. Open a web browser on the computer.

5. Navigate to http://local.access or http://169.254.1.1 to see the controller setup pages.

See **To set up the controller through the Service Port** (page 30) for general information on using the controller setup pages.
Rotary switch settings

Rotary switch settings (see example below) are used to determine the following items in your system, so you should plan carefully before setting the switches.

- If you use a **Default IP address**, the final octet is the number created by the three rotary switch settings (must be a unique number from 1 to 253). See **To set the IP address** (page 9).

- If you autogenerate the following:
  
  **Device Instance**, the number is automatically set to a number equal to the \(((\text{IP network number} \times 100) + \text{rotary switch settings})\).

  **BACnet Network Number** for the ARC/MSTP port, the number is automatically set to a number equal to the \(((\text{IP network number} + \text{rotary switch settings}) \times 10)\).

  Autogenerating is set up through **the controller setup pages** (page 30).

- The rotary switch settings determine the router number in the i-Vu interface.

**EXAMPLE** The switches below are set to 125.

![Rotary switch settings diagram]

**CAUTION** Do not leave the rotary switches set at 0 (the factory default). The i-Vu® XT Router cannot be discovered if the rotary switches are left at 0.

To set the IP address

You must define the i-Vu® XT Router's IP addressing (IP address, subnet mask, and default gateway) in the controller setup pages so that the router can communicate with the i-Vu Pro Server on the IP network.

Use one of the IP addressing schemes described below with the associated instructions that follow.

<table>
<thead>
<tr>
<th>Use a...</th>
<th>If...</th>
</tr>
</thead>
<tbody>
<tr>
<td>DHCP IP Address generated by a DHCP server</td>
<td>The IP network uses a DHCP server for IP addressing</td>
</tr>
</tbody>
</table>
Addressing the i-Vu® XT Router

<table>
<thead>
<tr>
<th><strong>Use a...</strong></th>
<th><strong>If...</strong></th>
</tr>
</thead>
</table>
| **Custom Static IP Address**  
from your network administrator | You do not use a DHCP server and the answer to any of the following questions is yes. Will the i-Vu® system:  
• Share a facility's existing IP data network?  
• Have 254 or more devices with static IP addresses?  
• Be connected to the Internet?  
• Have at least one device located on the other side of an IP router?  
• Have any third-party IP devices? |
| **Default IP Address**  
that your system creates | The answer to all of the above questions is no. |

**NOTE**  
Carefully plan your addressing scheme to avoid duplicating addresses. If third-party devices are integrated into the system, make sure your addresses do not conflict with their addresses.

**To set a DHCP IP address**

1. On the controller setup pages **Modstat** tab, find the router's **Ethernet MAC address** and write it down.
2. On the **Ports** tab under **IP Port**, select **DHCP**.
3. Click **Save**.
4. Write down the **IP Address**.
5. Give the DHCP network administrator the IP address and Ethernet MAC address and ask him to reserve that IP address for the router so that it always receives the same IP address from the DHCP server.

**To set a custom IP address**

1. Obtain the IP address, subnet mask, and default gateway address for the router from the facility network administrator.
2. On the controller setup pages **Ports** tab under **IP Port**, select **Custom Static**.
3. Enter the **IP Address**, **Subnet Mask**, and **Default Gateway** addresses that the network administrator gave you.
4. Click **Save**.

**To set a default IP address**

Default IP addressing assigns the following to the router:

- **IP address** = 192.168.168.x  
  where x is the setting on the rotary switches in the range from 1 to 253
- **Subnet mask** = 255.255.255.0
- **Default Gateway** = 192.168.168.254
1. Set the router’s three rotary switches to a unique address on the network. Set the left rotary switch to the hundreds digit, the middle switch to the tens digit, and the right switch to the ones digit.

**EXAMPLE** The switches below are set to 125.

![Rotary Switches](image)

2. On the controller setup pages **Ports** tab under **IP Port**, select **Default IP Address**.

3. Click **Save**.

**CAUTIONS**

- The Default IP address range is 1 to 253. Setting the rotary switches to 0 will set the Default IP address to 1. Setting the switches to 255 will set the Default IP to 253. Do not set the switches to 254.

- If you set the Default IP address controller setup **Ports** tab and then change the rotary switches, you must do one of the following to correct the IP address in the router:
  - Go to the controller setup **Ports** tab and click the **Update IP Address**.
  - Cycle the router’s power.

You will then need to correct the IP address in the i-Vu® application using **Find Devices** and **Upload All Content**. See the i-Vu® Help for more information.

**NOTE** The default address is an intranet address. Data packets from this address are not routable to the Internet.

---

**To set the Port S1 address and baud rate**

**Port address**

- For ARCNET, you cannot change the default address of 254.
- For MS/TP, you cannot change the default address of 0.

**For MS/TP, set the port’s baud rate**

1. On the controller setup **Ports** tab under **S1 Port**, select the **MSTP Baud Rate**. The default is 76,800 bps.

   **NOTE** Use the same baud rate for all devices on the MS/TP network.

2. Click **Save**.

---

**To set the Port S2 address and baud rate**

1. On the controller setup **Ports** tab under **Port S2**, type the address in the **Port S2 Address** field. The address must be in the range 0 to 127.

2. Select the MS/TP network’s **Baud Rate**. The default is 76,800 bps.

   **NOTE** Use the same baud rate for all devices on the MS/TP network.

3. Click **Save**.
Configuring BACnet Device Instance and network number

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

Legend
16 = Carrier's BACnet Vendor ID
xxx = i-Vu® XT Router's rotary switch address (See NOTES below.)
yy = Controller's rotary switch address (ARCNET/MSTP MAC address)

For the i-Vu® XT Router:
- BACnet Device Instance Number = (IP network number x 100) x rotary switch address
- BACnet Device Instance Name = the name "device" + the Device Instance
- BACnet IP Network Number = 1600
- BACnet ARC/MSTP Port S1 Network Number = ((IP network number + rotary switch address) x 10)
- Port S1 MSTP MAC Address = 0 (fixed)
- Port S1 ARCNET Address = 254 (fixed)
- BACnet MSTP Port 2 Network Number = ((IP network number + rotary switch address) x 10) +3
- Port S2 MSTP MAC Address = 0 by default (user configurable)

For the Open controllers connected to the i-Vu® XT Router:
- BACnet MSTP Device Instance Number = BACnet MSTP Network Number + yy
- BACnet ARCNET Device Instance Number = BACnet ARCNET Network Number +yy
- BACnet MSTP Device Instance Name = the name "device" + Device Instance
- BACnet ARCNET Device Instance Name = the name "device" + Device Instance
- BACnet MSTP or ARCNET MAC Address = yy
- BACnet MSTP Network Number = 161xx (learned from the router, defaults to 16101 if no i-Vu® XT Router is operating)

NOTES
- Do not configure the rotary switches on the i-Vu® XT Router to a number greater than 127 unless Port S1 is enabled for ARCNET. Doing so will not allow the i-Vu server to discover the i-Vu® XT Router.
- If you change the i-Vu® XT Router's switches or jumpers, you must cycle its power for the changes to take effect.
- If the BACnet automatic settings need to be changed, see To communicate through the Local Access port (page 30).
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 routers on that subnet to reach the rest of the routers on the network.

NOTES

- The i-Vu® Standard or Plus application - If the i-Vu® web server is on a separate subnet than the rest of the routers, the internal router must be assigned a routable IP address and configured as a BBMD.
- The i-Vu® Pro application - If the i-Vu® Pro server is on a separate subnet than the rest of the routers, you must register it as a foreign device to a router acting as a BBMD device.

Use the BBMD Configuration Tool to:

- Write/read the Broadcast Distribution Table (BDT) of each BBMD device
- Allow controllers on one subnet to communicate with controllers on other subnets
- Enable the i-Vu® application to see, upload, or configure controllers on different subnets
To set up BBMDs using the BBMD Configuration Tool

1. Assign an IP address, subnet mask, and default gateway for each i-Vu® XT Router on the IP network. See Addressing the i-Vu® XT Router (page 8).

2. Acquire the BBMD Configuration Tool from the Tech Tools USB drive or from the Carrier Control Systems Support Site http://www.hvacpartners.com/ https://accounts.ivusystems.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 Carrier router, address 172.18.1.2, must be configured as a BBMD for the 172.18 subnet, while the Carrier router, address 172.16.1.15, must be configured as a BBMD for the 172.16 subnet.

**CAUTIONS**

- Define only one BBMD per subnet. Multiple BBMDs on an IP subnet disrupt network communications.
- Unless explicitly modified, the UDP Port for BACnet/IP is 0xBAC0 (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 BBMDs. 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 the 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 BBMDs and, if so, add them to your .bdt file.

**NOTES**

- The BDTs in each BBMD should be identical. 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 to see the Broadcast Distribution Table.

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.
Wiring for communications

The i-Vu® XT Router communicates on the following ports.

<table>
<thead>
<tr>
<th>Port</th>
<th>Protocol</th>
<th>Port type(s)</th>
<th>Speed(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GigE</td>
<td>BACnet/IP and/or BACnet/Ethernet</td>
<td>Ethernet</td>
<td>10, 100, or 1000 Mbps (1 Gbps)</td>
</tr>
<tr>
<td>Port S1</td>
<td>BACnet/ARCNET</td>
<td>RS485</td>
<td>156 kbps</td>
</tr>
<tr>
<td>Port S1</td>
<td>BACnet/MSTP</td>
<td>RS485</td>
<td>9.6 to 115.2 Kbps</td>
</tr>
<tr>
<td>or Port S2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Service Port</td>
<td>HTTP/IP</td>
<td>Ethernet</td>
<td>10 Mbps</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>100 Mbps</td>
</tr>
<tr>
<td>USB Port</td>
<td>USB2.0</td>
<td>USB</td>
<td></td>
</tr>
</tbody>
</table>

1. Set the Port S1 Configuration rotary switch to:
   0 if the port is not used
   1 for MS/TP
   2 for ARCNET

2. Default for MS/TP is 76.8 kbps. Default for Modbus is 38.4 kbps.

3. See To set up the router through the Service Port.

Wiring specifications

<table>
<thead>
<tr>
<th>For...</th>
<th>Use...</th>
<th>Maximum Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethernet</td>
<td>CAT5e or higher Ethernet cable</td>
<td>328 feet (100 meters)</td>
</tr>
<tr>
<td>ARCNET</td>
<td>22 AWG, low-capacitance, twisted, stranded, shielded copper wire *</td>
<td>2000 feet (610 meters)</td>
</tr>
<tr>
<td>MS/TP</td>
<td>22 AWG, low-capacitance, twisted, stranded, shielded copper wire *</td>
<td>2000 feet (610 meters)</td>
</tr>
</tbody>
</table>

* See the Open Controller Network Wiring Guide.

WARNING: Do not apply line voltage (mains voltage) to the router's ports and terminals.
To connect the i-Vu® XT Router to the Ethernet

Connect an Ethernet cable to the Gig-E Ethernet port.

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 routers on that subnet to reach the rest of the routers on the network.

**NOTES**

- The i-Vu® Standard or Plus application - If the i-Vu® web server is on a separate subnet than the rest of the routers, the internal router must be assigned a routable IP address and configured as a BBMD.
- The i-Vu® Pro application - If the i-Vu® Pro server is on a separate subnet than the rest of the routers, you must register it as a foreign device to a router acting as a BBMD device.

Use the **BBMD Configuration Tool** to:

- Write/read the *Broadcast Distribution Table* (BDT) of each BBMD device
- Allow controllers on one subnet to communicate with controllers on other subnets
- Enable the i-Vu® application to see, upload, or configure controllers on different subnets
To wire to a BACnet/ARCNET network

1. Turn off the i-Vu® XT Router’s power.
2. Check the communications wiring for shorts and grounds.
3. Connect the communications wiring to the ARC/MSTP port’s screw terminals labeled Net +, Net -, and GND.
   **NOTE** Use the same polarity throughout the network segment.
4. Set the MSTP / ARCNET rotary switch to 2.
5. If the i-Vu® XT Router is at either end of a network segment, set the port’s End of Net switch to Yes.
   **NOTE** The router’s End of Net switch applies network termination and bias. See the Open Controller Network Wiring Guide.
6. Turn on the router’s power.
7. To verify communication with the network, get a Module Status report in the i-Vu® interface for a controller on the ARCNET network.
   **NOTE** This step requires that you have discovered and uploaded the router in the i-Vu® application.

To wire to a BACnet MS/TP network

An MS/TP network can be wired to either the ARC/MSTP port or the MSTP port.

1. Turn off the i-Vu® XT Router’s power.
2. Check the communications wiring for shorts and grounds.
3. Connect the communications wiring to the ARC/MSTP or MSTP port’s screw terminals labeled Net +, Net -, and GND.
   **NOTE** Use the same polarity throughout the network segment.
4. If you are using the ARC/MSTP port, set the MSTP / ARCNET rotary switch to 1.
   **NOTE** If the ARC/MSTP port is not being used for any network, set this rotary switch to 0.
5. If the i-Vu® XT Router is at either end of a network segment, set the port’s End of Net switch to Yes.
   **NOTE** The router’s End of Net switch applies network termination and bias.
6. Turn on the router’s power.
7. To verify communication with the network, get a Module Status report in the i-Vu® interface for a controller on the MS/TP network.
   **NOTE** This step requires that you have discovered and uploaded the router in the i-Vu® application.
Find and upload in the i-Vu® interface

1. In the i-Vu® interface, select the system level in the navigation tree.
2. On the Devices page > Manage tab, click Find Devices to discover your routers.
3. Once routers are found, select one or more routers in the list on the Manage tab and click Upload All Content to upload to the i-Vu® application. Use Ctrl+click, Shift+click, or both to select multiple items.
4. Click OK when you see the message This will upload all content for the controller. Are you sure you want to do this?. When complete, a check mark under Status indicates a successful upload.

NOTES
○ If an error message appears, click on the message to view an explanation.
○ For details, see the i-Vu® Help.
After you find and upload the i-Vu® XT Router in the i-Vu® interface, you may want to customize the i-Vu® XT Router’s settings for your applications. You can change settings on the **Driver Properties** page.

1. In the i-Vu® interface, right-click the i-Vu® XT Router in the navigation tree and select **Driver Properties**.
2. Adjust the driver as desired.

### Driver

On the **Driver** page > **Update** tab, you can:
- Obtain information about the i-Vu® XT Router, get a Modstat and device logs
- Add, update, or delete drivers
- Add, update, or delete screen files for an Equipment Touch

The **Driver** page > **Settings** tab provides the following information plus the items described in the table below:
- The date/time of last parameter change or the last time the database was archived
- If control programs, properties, and schedules were successfully stored in memory
- Undelivered Alarm Status

<table>
<thead>
<tr>
<th><strong>Controller Clock</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Clock Fall Date and Time</strong></td>
<td>Date and time the router uses when its real-time clock is invalid.</td>
</tr>
</tbody>
</table>

| **Time Synch Sensitivity (seconds)** | When the router receives a time sync request, if the difference between the router's time and the time sync's time is greater than this field's value, the router's time is immediately changed. If the difference is less than this field's value, the router's time is slowly adjusted until the time is correct. |

<table>
<thead>
<tr>
<th><strong>Debug</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Enable Debug Messages</strong></td>
<td>Enable only if directed by Carrier Controls System Support.</td>
</tr>
</tbody>
</table>
## Device

The **Device** page provides the following information plus the items described in the table below:

- BACnet device object properties for the i-Vu® XT Router
- Status of the BACnet communication
- The character sets supported by this device for BACnet communication

### Configuration

<table>
<thead>
<tr>
<th>BACnet System Status</th>
<th>The current state of the router:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Operational</td>
</tr>
<tr>
<td></td>
<td>Download in Progress</td>
</tr>
<tr>
<td></td>
<td>Download Required</td>
</tr>
<tr>
<td></td>
<td>Backup in Progress</td>
</tr>
<tr>
<td></td>
<td>Non-Operational</td>
</tr>
</tbody>
</table>

The following three fields refer to all networks over which the i-Vu® XT Router communicates.

<table>
<thead>
<tr>
<th>APDU Timeout</th>
<th>How many milliseconds the device will wait before resending a message if no response is received.</th>
</tr>
</thead>
<tbody>
<tr>
<td>APDU Segment Timeout</td>
<td>How many milliseconds the device will wait before resending a message segment if no response is received.</td>
</tr>
<tr>
<td>Number of APDU Retries</td>
<td>The number of times the device will resend a message.</td>
</tr>
</tbody>
</table>

### Controller Clock

<table>
<thead>
<tr>
<th>Time Broadcaster will synchronize time every ____</th>
<th>If you have third-party BACnet devices on one of the router's networks, you can have the router send a BACnet time sync to those devices at the interval you define in this field.</th>
</tr>
</thead>
</table>

### Time Synchronization Recipients

To define third-party BACnet devices as Time Synchronization Recipients:

1. Click **Add**.
2. Select **Device ID** or **Address** in the **Recipient Type** field.
3. Enter the Device ID or Address information.
4. Click **Accept**.
### Notification Classes

A BACnet alarm's Notification Class defines:
- Alarm priority for Alarm, Fault, and Return to Normal states
- Options for BACnet alarm acknowledgment
- Where alarms should be sent (recipients)

Alarms in the i-Vu® application use Notification Class #1. The i-Vu® application is automatically a recipient of these alarms.

<table>
<thead>
<tr>
<th>Priorities</th>
<th>NOTE</th>
<th>BACnet defines the following Network message priorities for Alarms and Events.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Priority range</td>
<td></td>
<td></td>
</tr>
<tr>
<td>00–63</td>
<td></td>
<td>Life Safety</td>
</tr>
<tr>
<td>64–127</td>
<td></td>
<td>Critical Equipment</td>
</tr>
<tr>
<td>128–191</td>
<td></td>
<td>Urgent</td>
</tr>
<tr>
<td>192–255</td>
<td></td>
<td>Normal</td>
</tr>
</tbody>
</table>

**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**

Specifies whether alarms associated with this Notification Class require a BACnet Acknowledgment for Off-Normal, Fault, or Normal alarms.

💡 **TIP** You can require operator acknowledgment for an Alarm or Return-to-normal message (stored in the i-Vu® database). In the i-Vu® interface on the **Alarm > Enable/Disable** tab, change the acknowledgment settings for an alarm source or an alarm category.

### Recipient List

<table>
<thead>
<tr>
<th>Recipients</th>
<th>The first row in this list is the i-Vu® application. Do not delete this row. Click <strong>Add</strong> if you want other BACnet devices to receive alarms associated with this Notification Class.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recipient</td>
<td>Name that appears in the <strong>Recipients</strong> table.</td>
</tr>
<tr>
<td>Type</td>
<td>Use <strong>Address</strong> (static binding) for either of the following:</td>
</tr>
<tr>
<td></td>
<td>- Third-party BACnet device recipients that do not support dynamic binding</td>
</tr>
<tr>
<td></td>
<td>- When you want alarms to be broadcast (you must uncheck <strong>Issue Confirmed Notifications</strong>). This use is rare.</td>
</tr>
<tr>
<td>Days and times</td>
<td>The days and times during which the recipient will receive alarms.</td>
</tr>
<tr>
<td>Device Object</td>
<td>Type the <strong>Device Instance</strong> in the <strong>#</strong> field.</td>
</tr>
<tr>
<td>Identifier</td>
<td>Change for third-party devices that use a BACnet Process Identifier other than 1. The i-Vu® application processes alarms for any 32-bit Process Identifier.</td>
</tr>
</tbody>
</table>
Adjusting the i-Vu® XT Router driver properties

| Issue Confirmed Notifications | Select to have a device continue sending an alarm message until it receives delivery confirmation from the recipient. |
| Transitions to Send | Uncheck the types of alarms you do not want the recipient to get. |

Calendars

Calendars are provided in the driver for BACnet compatibility only. Instead, use the Schedules feature in the i-Vu® interface.

Common and Specific Alarms

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

**Common alarm:**
- Controller Halted
- Duplicate Address

**Specific alarm:**
- Dead Controller Timeout

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

| Controller Generated Alarm |
| Description | Short message shown on the Alarms page or in an alarm action when this type of alarm is generated. |
| Events |
| Alarm Category and Alarm Template | See Customizing alarms in i-Vu® Help. |
| Enable | Clear these checkboxes to disable Alarm or Return to normal messages of this type from the i-Vu® XT Router. |
| Notification Class | In a typical i-Vu® system, the Notification Class is 1; however, if needed, you can associate a different notification class with the alarm. See Notification Classes to set up alarm delivery options for a specific Notification Class. |

BACnet router properties

**CAUTION** Do not change the settings on this page as it will result in communication failure. Use the controller setup pages (page 30) to change settings and then resolve mismatches in the i-Vu® application.
BACnet firewall

If this IP router is accessible from the Internet, you can increase security by enabling its BACnet firewall. When enabled, this feature prevents the router from responding to BACnet messages from unidentified sources and allows communication only with IP addresses that you define. These can be all private IP addresses and/or a list of IP addresses. Follow the instructions in the i-Vu® interface to set up the BACnet firewall.

Network Diagnostics - Statistics

This page shows the network statistics for each of the i-Vu® XT Router's ports that are in use. This same information is provided in a Module Status report (page 37).

Click the Error Rate Trend or Packet Rate Trend link at the bottom of each section to see the statistics displayed as trend graphs. You can also access these trends by clicking on the driver in the network tree, and then selecting Trends > Enabled Points > and the desired trend graph.

Click a port's Reset button to set all of the numbers to zero so the counting can start over.

<table>
<thead>
<tr>
<th>Router Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Error Counters</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Network Activity</strong></td>
</tr>
<tr>
<td><strong>Router Sourced Packets</strong></td>
</tr>
<tr>
<td><strong>Trends</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>GigE Port Statistics</strong></td>
</tr>
</tbody>
</table>
### BACnet/IP Statistics
- **BACnet/IP Rx Unicast Packets**: BACnet/IP packets received from a single BACnet device.
- **BACnet/IP Tx Unicast Packets**: BACnet/IP packets transmitted to a single BACnet device.
- **BACnet/IP Rx Broadcast Packets**: BACnet/IP broadcast packets received by the i-Vu® XT Router.
- **BACnet/IP Tx Broadcast Packets**: BACnet/IP broadcast packets transmitted by the i-Vu® XT Router.
- **Whitelist Rejections** *(if BACnet Firewall (page 24) is enabled)*: Messages blocked by the BACnet Firewall because the IP address that sent the message was not in the whitelist.

### Ethernet Statistics
- **Ethernet Rx packets**: All packets (including non-BACnet packets such as a ping) received by the i-Vu® XT Router.
- **Ethernet Tx packets**: All packets (including non-BACnet packets such as a ping) transmitted by the i-Vu® XT Router.
- **Receive Errors (total)**: All errors related to received packets such as CRC errors, FIFO errors, frame errors, length errors, missed errors, and overrun errors.
- **Transmit Errors (total)**: All errors related to transmitted packets such as aborted errors, carrier errors, dropped errors, FIFO errors, heartbeat errors, and window errors.
- **Dropped Packets**: Packets dropped by the i-Vu® XT Router's Ethernet interface.

### Trends
- **Error Rate Trend**: Shows the total number of errors within the interval time.
- **Packet Rate Trend**: Shows the total number of packets transmitted and received within the trend sampling interval.

### Port S1 Statistics
- *when used for ARCNET*

### Error Counters
- **Node Reconfiguration**: The ARCNET reconfigurations initiated by the i-Vu® XT Router.
- **Bus Reconfiguration**: An ARCNET reconfiguration not generated by the i-Vu® XT Router (such as when a controller connects to the network).
- **Excessive NACK**: Excessive NACKs received by the i-Vu® XT Router's ARCNET chip. Excessive NACKs are usually the result of a station which is unable to process a steady stream of packets due to buffer overflows or slow responses.
- **Dropped Packets**: Dropped receive and transmit frames. These may be dropped due to buffer allocation failures, length errors, or NACKed transmit packets.

### Activity Counters
- **BACnet/ARCNET Rx Packets**: BACnet/ARCNET data packets received by the i-Vu® XT Router.
- **BACnet/ARCNET Tx Packets**: BACnet/ARCNET data packets transmitted by the i-Vu® XT Router.

### Latency
- **Average Value (milliseconds)**: The average time from when a packet is queued to be transmitted until it is actually transmitted on the bus.
- **Maximum Value (milliseconds)**: The maximum time from when a packet is queued to be transmitted until it is actually transmitted on the bus.
Network Diagnostics - Packet Capture

This page allows you to capture network communication on a port and then download the capture file for troubleshooting. Choose one of the following capture options:

- **Start/Stop** - Define the start and stop criteria, and then click **Start** and **Accept** to begin the capture. When the capture stops, the capture file is generated.
  
  **NOTE** If a Start/Stop capture is running on any other port, the **Get capture file** button will be disabled until all Start/Stop captures have completed.

  - **Start capture** - When you check **At (mm/dd/yyyy hh:mm AM/PM)**, enter the time and date, and click **Start** the packet capture begins at the date and time you specified.
    
    **NOTE** The hours field is validated from 0 to 12, and minute field is validated from 0 to 59.

  - **Continuous** - Click **Start** and **Accept** to begin the capture. Click **Save** to momentarily stop the capture and create the capture file. The capture will automatically resume. Click on the **Start/Stop** option to end the **Continuous** capture.

---

**Trends**

- **Error Rate Trend** - Total number of errors within the interval time on this network, including break errors, framing errors, etc..

- **Packet Rate Trend** - BACnet/ARCNET data packets transmitted through router, not the total utilization.

---

**Port S1 Statistics**

Port S1 Statistics when used for MSTP or Port S2 Statistics

---

**Error Counters**

- **UART Errors** - UART receive and transmit errors such as break errors, framing errors, parity errors, and overrun errors.

- **Invalid Frames** - Received MS/TP frames that contain an error such as CRC.

- **Dropped Packets** - Dropped receive and transmit frames. These may be dropped due to buffer allocation failures, length errors, or APDU timeouts (in the case of transmit frames)

- **Dropped Tokens** - Dropped tokens that have been retransmitted.

- **No responses** - Messages that did not receive a response from the destination device.

---

**Activity Counters**

- **BACnet/MSTP Rx Packets** - BACnet/MSTP data packets received by the i-Vu® XT Router.

- **BACnet/MSTP Tx Packets** - BACnet/MSTP data packets transmitted by the i-Vu® XT Router.

---

**Latency**

- **Average Value (milliseconds)** - The average time from when a packet is queued to be transmitted until it is actually transmitted on the bus.

- **Maximum Value (milliseconds)** - The maximum time from when a packet is queued to be transmitted until it is actually transmitted on the bus.

---

**Trends**

- **Error Rate Trend** - Total number of errors within the interval time on this network, including break errors, framing errors, etc.

- **Packet Rate Trend** - Percentage of total bus bandwidth used to transmit data packets.

  **NOTE** This is for all bus traffic, not just traffic generated by the i-Vu® XT Router.
Adjusting the i-Vu® XT Router driver properties

○ If the port is set up for MS/TP, select an option in the Capture section.

To download the capture file

Capture files are Wireshark files that are added to the Device Log Archive .tgz file. Do the following to view the files.

1. If you do not have Wireshark installed on your computer, download the latest version from the Wireshark website (http://www.wireshark.org).
2. Run the install program, accepting all defaults. Include WinPcap in the installation.
3. On the i-Vu® Packet Capture page, click Get capture file to download the .tgz file. The message appears "Retrieving the file, this may take a little while". Click OK.
   
   **NOTE** If the size of the .tgz is large, there could be a considerable delay (for example, over 2 minutes) after you click Get capture file until your browser begins the download.
4. Open the .tgz file. The files are in the captures folder.

Capture file names are based on the ports.

**NOTES**

- If you have an MSTP capture file for both Port S1 and Port S2, the file names will be:
  - mstpcap0 for Port S1
  - mstpcap1 for Port S2
- Clicking Get capture file generates the port's .pcap file. If the port has a .pcap file from a previous capture, that file will be overwritten.

5. Extract the .pcap file from the .tgz file.
6. Open the .pcap file in Wireshark.
Communication Status

The Protocols page shows the status of the protocols currently running on the i-Vu® XT Router.

To set up Network Statistic trends

PREREQUISITE To view Network Statistic trends, you must have an i-Vu® v6.5 or later system with the latest cumulative patch.

To view the Network Statistics (page 24) as trend graphs, go to one of the following on the i-Vu® Network tree:

- Under Driver, on the Network Diagnostics > Statistics page, click a Trend link at the bottom of each section.
- On the Driver page, click the Trends drop-down button, select Enabled Points and then the graph you want.

You can define:

- How the graph looks on the trend's Configure tab.
- How you want trend samples to be collected on the Enable/Disable tab. See table below.

<table>
<thead>
<tr>
<th>Field</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample every <strong>:</strong>:_ (hh:mm:ss)</td>
<td>(Recommended method) To record the value at a regular time interval, enter hh:mm:ss in this field.</td>
</tr>
<tr>
<td>Sample on COV (change of value)</td>
<td>To record the value only when the value changes by at least the amount of the COV Increment, set the Sample every field to 0:00:00 and enter a value in the COV Increment field.</td>
</tr>
<tr>
<td>Max samples</td>
<td>Network Statistic trends have a non-configurable maximum trend log buffer size of 1440.</td>
</tr>
<tr>
<td></td>
<td>NOTE Trending consumes memory in the router. Click Reset to delete all samples currently stored in the router.</td>
</tr>
<tr>
<td>Stop When Full</td>
<td>Check this field to stop trend sampling when the maximum number of samples is reached.</td>
</tr>
<tr>
<td>Enable trend log at specific times only</td>
<td>Collects trend data for the specific period of time you define in the time and date fields.</td>
</tr>
<tr>
<td>Enable Trend Historian</td>
<td>Archives trend data to the system database.</td>
</tr>
<tr>
<td>Store Trends Now</td>
<td>Writes all trend data in the router to the system database without having to enable trend historian.</td>
</tr>
<tr>
<td>Write to historian every ___ trend samples</td>
<td>Writes all trend data in the router to the system database each time the router collects the number of samples that you enter in this field. This number must be greater than zero and less than the number entered in the Max samples field. The number of trends specified must be accumulated at least once before the historical trends can be viewed.</td>
</tr>
<tr>
<td></td>
<td>NOTE Any trends not stored in the historian will be lost if the router loses power.</td>
</tr>
<tr>
<td>Field</td>
<td>Notes</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Trend samples accumulated since last notification</strong></td>
<td>Shows the number of samples stored in the router since data was last written to the database.</td>
</tr>
<tr>
<td><strong>Last Record Written to Historian</strong></td>
<td>Shows the number of trend samples that were last written to the database.</td>
</tr>
<tr>
<td><strong>Keep historical trends for ___ days</strong></td>
<td>This is based on the date that the sample was read. Select the first option to use the system default that is defined on the System Settings &gt; General tab. Select the second option to set a value for this trend only.</td>
</tr>
</tbody>
</table>
To set up the controller through the Service Port

Using a computer and an Ethernet cable, you can communicate with the i-Vu® XT Router through a web browser to:

- View the router's Module Status report
- View/change router and network settings. Changes take effect immediately.
- Troubleshoot

1. Connect an Ethernet cable from a computer to the router as shown below.

2. If your computer uses a static IP address, set the address to 169.254.1.x, where x is 2 or greater. If it uses a DHCP address, leave the address as it is.

3. Turn off the computer's Wi-Fi if it is on.

4. Open a web browser on the computer.

5. Navigate to http://local.access or http://169.254.1.1 to see the controller setup pages.

NOTE: The first time you access the router in the i-Vu® interface after you have changed settings through the Service Port, be sure to upload the changes to the system database. This will preserve those settings when you download memory or parameters to the router.

ModStat tab

This tab provides the router's Module Status report that gives information about the router and network communication status. See Appendix - Module Status field descriptions (page 42).
To set up the controller through the Service Port

**Device tab**

<table>
<thead>
<tr>
<th>BACnet Object</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Device Instance</strong></td>
</tr>
<tr>
<td><strong>Device Name</strong></td>
</tr>
<tr>
<td><strong>Device Location</strong></td>
</tr>
<tr>
<td><strong>Device Description</strong></td>
</tr>
</tbody>
</table>

**Configuration**

| APDU Timeout | How many milliseconds the device will wait before resending a message if no response is received. |
| APDU Segment Timeout | How many milliseconds the device will wait before resending a message segment if no response is received. |
| APDU Retries | The number of times the device will resend a message. |

**Controller Information**

| Clear Counts/Logs | Clears Reset counters and the three message history fields from the Module Status. |

**Ports tab**

<table>
<thead>
<tr>
<th>IP Port</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IP Addressing</strong></td>
</tr>
<tr>
<td><strong>Port S1</strong></td>
</tr>
<tr>
<td><strong>End of Network</strong></td>
</tr>
<tr>
<td><strong>Active Protocol</strong></td>
</tr>
<tr>
<td><strong>MAC Address</strong></td>
</tr>
</tbody>
</table>
To set up the controller through the Service Port

<table>
<thead>
<tr>
<th>Port S2</th>
</tr>
</thead>
<tbody>
<tr>
<td>End of Network</td>
</tr>
<tr>
<td>Active Protocol</td>
</tr>
</tbody>
</table>

**BACnet tab**

<table>
<thead>
<tr>
<th>IP Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>BACnet Network Number</td>
</tr>
<tr>
<td>BACnet UDP Port</td>
</tr>
<tr>
<td>Enable NAT Routing</td>
</tr>
<tr>
<td>Global NAT IP Address</td>
</tr>
<tr>
<td>Global NAT BACnet UDP Port</td>
</tr>
<tr>
<td>BACnet Secondary IP Net Number</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>BACnet Secondary UDP Port</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ethernet Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAC Address</td>
</tr>
<tr>
<td>BACnet Network Number</td>
</tr>
<tr>
<td>Port S1</td>
</tr>
<tr>
<td>End of Network</td>
</tr>
</tbody>
</table>
### Active Protocol
Indicates status of the router’s Port S1 rotary switch.
- 0=Disabled
- 1=MS/TP
- 2=ARCNET
- 3=Modbus

### MAC Address
The address that is set on the three rotary switches. See To set the Port S1 address and baud rate (page 11).

### ARCNET Baud Rate
156000

### MSTP Baud Rate
Set this to a baud rate that all other devices on the MS/TP network are set to.

### MSTP Max Master
To increase MS/TP performance, enter the highest address used on the MS/TP network for a master controller. This number must be less than or equal to 127.

### MSTP Max Info Frames
This is the maximum number of information messages a controller may transmit before it must pass the token to the next controller. Valid values are 1 to 255.

**TIP** Set Max Info Frames to a number in the range 20 to 100 so that the router does not become a bottleneck for traffic being routed from a high speed network to the slower MS/TP network.

### BACnet Network Number
Select:
- **Disable Routing** if Port S1 is not used.
- **Autogenerated** to have the network number for Port S1 automatically set to a number equal to ((IP network number + rotary switch address) x 10).
- **Assigned** to enter a specific number.

### Port S2

### End of Network
Indicates status of the router’s End of Net? switch.

### Active Protocol
Shows one of the following:
- Modbus if enabled on the Modbus tab
- BACnet/MSTP if you enter a BACnet Network Number below for an MS/TP network
- Disabled if neither of the above have been done

### MSTP Address
The router’s unique address on the MS/TP network.

### MSTP Baud Rate
Set this to a baud rate that all other devices on the MS/TP network are set to.

### MSTP Max Master
To increase MS/TP performance, enter the highest address used on the MS/TP network for a master controller. This number must be less than or equal to 127.

### MSTP Max Info Frames
This is the maximum number of information messages a controller may transmit before it must pass the token to the next controller. Valid values are 1 to 255.

**TIP** Set Max Info Frames to a number in the range 20 to 100 so that the router does not become a bottleneck for traffic being routed from a high speed network to the slower MS/TP network.

### BACnet Network Number
Select:
- **Disable Routing** if Port S2 is not used.
- **Autogenerated** to have the network number for Port S2 automatically set to a number equal to ((IP network number + rotary switch address) x 10) + 3.
- **Assigned** to enter a specific number.
To set up the controller through the Service Port

| **Home Network** | This is typically the network that is communicating with the building automation system's application. This sets the BACnet Address of the Device object. |

**Security tab**

| **BACnet Firewall** | If your BACnet Firewall configuration in the i-Vu® interface did not include the i-Vu® server IP address, thus blocking communication with the i-Vu® server, you can disable the router's BACnet Firewall on the controller setup **Security** tab.  

**NOTE** You can enable the BACnet Firewall only in the i-Vu® interface. |
Troubleshooting

If you have problems mounting, wiring, or addressing the i-Vu® XT Router, contact Carrier Controls System Support.

LEDs

NET (Network Status) Tricolor LED

<table>
<thead>
<tr>
<th>Color</th>
<th>Pattern</th>
<th>Condition</th>
<th>Message in Module Status</th>
<th>Possible Solutions</th>
</tr>
</thead>
</table>
| Red   | On      | Ethernet connection problem | No Ethernet Link | • Connect Ethernet Cable  
|       |         |           |                          | • Check other network components |
| Red   | 1 blink | One of the following BACnet/IP (Ethernet) DLL reporting issue:  
|       |         | • Unable to create tasks  
|       |         | • Unable to open socket for BACnet port | BACnet/IP error | Cycle power |
| Red   | 2 blink | Current default IP address does not match the current rotary switch setting | Default IP address mismatch | • Use the controller setup Ports tab to set the IP address  
|       |         |           |                          | • Cycle power to accept new IP address  
|       |         |           |                          | • Change rotary switches to match current default IP address |
## NET (Network Status) Tricolor LED

<table>
<thead>
<tr>
<th>Color</th>
<th>Pattern</th>
<th>Condition</th>
<th>Message in Module Status</th>
<th>Possible Solutions</th>
</tr>
</thead>
</table>
| Blue  | On      | One of the following issues:  
• Port communication firmware did not load properly  
• Port communication firmware is not running  
• Invalid protocol selected | ARCNET/MSTP firmware error | • Change rotary switch to select valid protocol  
• Cycle power |
| Blue  | 1 blink | Invalid address selected for protocol | Invalid address selection for ARCNET/MSTP | Change rotary switch to valid address |
| Blue  | 2 blink | Router has same MAC address as another connected device | Duplicate address on ARCNET/MSTP | Change rotary switch to unique address |
| Blue  | 3 blink | Router is the only device on the network | No other devices detected on ARCNET/MSTP | • Check that network cable is connected properly  
• Check that baud rate is correct |
| Blue  | 4 blink | Excessive errors detected over 3 second period | Excessive communication errors on ARCNET/MSTP | • Check that network cable is connected properly  
• Check that baud rate is correct |
| Blue  | 5 blink | ARCNET traffic overload possibly due to circular router or excessive COVs (change of values) | Event System Error - FPGA RX FIFO full | • Check the network configuration for a circular route  
• Increase the time between COVs to reduce excessive COV traffic |
| Green | On      | All enabled networks are functioning properly | No errors | No action required |

## SYS (System Status) Tricolor LED

<table>
<thead>
<tr>
<th>Color</th>
<th>Pattern</th>
<th>Condition</th>
<th>Message in Module Status</th>
<th>Possible Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>2 blink</td>
<td>Restarting after an abnormal exit</td>
<td>Auto restart delay due to system error on startup</td>
<td>After 5 minute delay has expired, if condition occurs again then cycle power</td>
</tr>
<tr>
<td>Red</td>
<td>4 blink</td>
<td>Firmware image is corrupt</td>
<td>Firmware error</td>
<td>Download driver again</td>
</tr>
<tr>
<td>Red</td>
<td>Fast blink</td>
<td>Firmware error has caused the firmware to exit and restart</td>
<td>Fatal error detected</td>
<td>No action required</td>
</tr>
<tr>
<td>Green</td>
<td>1 blink</td>
<td>No errors</td>
<td>Operational</td>
<td>No action required</td>
</tr>
<tr>
<td>Green</td>
<td>2 blink</td>
<td>Download of driver is in progress</td>
<td>Download in progress</td>
<td>No action required</td>
</tr>
</tbody>
</table>
SYS (System Status) Tricolor LED

<table>
<thead>
<tr>
<th>Color</th>
<th>Pattern</th>
<th>Condition</th>
<th>Message in Module Status</th>
<th>Possible Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td>3 blink</td>
<td>BACnet Device ID is not set</td>
<td>Download required</td>
<td>Download the router</td>
</tr>
<tr>
<td>Green</td>
<td>Fast blink</td>
<td>Installation of recently downloaded driver is occurring</td>
<td>N/A</td>
<td>No action required</td>
</tr>
<tr>
<td>Blue</td>
<td>On</td>
<td>Router is starting up</td>
<td>N/A</td>
<td>No action required</td>
</tr>
<tr>
<td>Blue</td>
<td>Slow blink</td>
<td>Linux (operating system) is starting up</td>
<td>N/A</td>
<td>No action required</td>
</tr>
<tr>
<td>Blue</td>
<td>Fast blink</td>
<td>Linux is running but it could not start the firmware application</td>
<td>N/A</td>
<td>Download driver</td>
</tr>
</tbody>
</table>

To get a Module Status report

A Module Status report provides information about the router and verifies proper network communication with the router. You can get this report:

- In the i-Vu® application—Right-click the router on the navigation tree, then select Module Status.
- In the i-Vu® application—Select the router on the navigation tree. On the Properties page, click Module Status.
- On the controller setup (page 30) ModStat tab.

See Appendix - Module Status field descriptions (page 42).

To get a Device Log

If Carrier Controls System Support instructs you to get the router's Device Log containing diagnostic information for troubleshooting:

1. Select the i-Vu® XT Router in the i-Vu® navigation tree.
2. On the Properties page, click Device Log.

**NOTE** You can click Device Log Archive to download a file containing multiple Device Logs to your computer. This also contains any network packet captures that have been run from the Network Diagnostics - Packet Captures (page 26) driver page.
To get the i-Vu® XT Router's serial number

To get the i-Vu® XT Router's serial number when troubleshooting, the number is on:

- A Module Status report (Modstat) under **Core** (or **Main**) board hardware

![Module Status report showing Core board hardware and serial number](image)

- A sticker on the main board

![Sticker on main board showing serial number](image)

See To get a Module Status report (page 37).

To replace the i-Vu® XT Router's fuse

If you turn on the router’s power switch and the **LED** is not lit, the fuse that protects the router may be blown. Remove the fuse and use a multimeter to check it.

The fuse is a fast acting, 250Vac, 2A, 5mm x 20mm glass fuse that you can purchase from one of the following vendors:

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Mfr. Model #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Littelfuse</td>
<td>0217002.HXP</td>
</tr>
<tr>
<td>Bussmann</td>
<td>S500-2-R</td>
</tr>
<tr>
<td>Belfuse</td>
<td>5SF 2-R</td>
</tr>
<tr>
<td>Optifuse</td>
<td>FSD-2A</td>
</tr>
</tbody>
</table>

Before replacing the fuse, try to determine why the fuse blew. Check the power wiring polarity of the i-Vu® XT Router and any other devices that share the power supply. Use the same polarity for all of them.

To replace the fuse:
1. Turn off the router’s power.
2. Remove the red power connector.
3. On one end of the router, insert a small flathead screwdriver as shown below, and then gently pry up on the cover until it is released from the base.

4. Remove the cover from the base.
5. The fuse labeled F1 is located near the power connector. Use a fuse puller to remove the fuse.

6. Use the fuse puller to snap the new fuse into the fuse holder.
7. Replace the router’s cover.
8. Replace the power connector.
9. Turn on the router’s power switch.
10. Verify that the LED on top of the router is on.
To take the i-Vu® XT Router out of service

If needed for troubleshooting or start-up, you can prevent the i-Vu® application from communicating with the i-Vu® XT Router by shutting down communication from the i-Vu® XT Router to the i-Vu® application. When Out of Service, i-Vu® no longer communicates properties, colors, trends, etc.

1. On the i-Vu® navigation tree, select the i-Vu® XT Router.

2. On the Properties page, check Out of Service.

3. Click Accept.
FCC Compliance

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

NOTE 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 it is not installed and used in accordance with this document, it 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 Any modifications made to this device that are not approved by Carrier will void the authority granted to the user by the FCC to operate this equipment.

CE Compliance

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

Industry Canada Compliance

This Class A digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

BACnet Compliance

Compliance of listed products to requirements of ASHRAE Standard 135 is the responsibility of BACnet International. BTL® is a registered trademark of BACnet International.
### Appendix - Module Status field descriptions

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date/Time</td>
<td>Date and time the Modstat was run</td>
</tr>
<tr>
<td>CM</td>
<td>The controller's rotary switch address (MAC address)</td>
</tr>
<tr>
<td>Model Name</td>
<td>Model Name identifies the Product Type</td>
</tr>
<tr>
<td>Device Instance</td>
<td>A unique ID assigned to the controller</td>
</tr>
<tr>
<td>Driver built</td>
<td>When the driver was built</td>
</tr>
<tr>
<td>Downloaded by</td>
<td>When and where the last download was performed</td>
</tr>
<tr>
<td>Data Partition Version</td>
<td>Data Partition identifies the clipping used when the product was manufactured.</td>
</tr>
<tr>
<td><strong>NOTE</strong></td>
<td>This field will say <strong>None</strong> except for a Carrier product from the factory. If a Carrier product is subsequently downloaded in the field, then this field will say <strong>None</strong>.</td>
</tr>
<tr>
<td># PRGs initialized</td>
<td>If applicable, the number of control programs that were downloaded vs. the number that are running. If these numbers are not the same, the controller has a problem such as lack of memory.</td>
</tr>
<tr>
<td># PRGs running</td>
<td></td>
</tr>
<tr>
<td>Driver version</td>
<td>The name, version, and date of the driver, as well as all the bundles and versions.</td>
</tr>
<tr>
<td>Reset Counters:</td>
<td>The number of times each of the following events have occurred since the last time the controller was commanded to clear the reset counters. See <strong>NOTE</strong> below this table.</td>
</tr>
<tr>
<td>Power failures</td>
<td>Interruption of incoming power</td>
</tr>
<tr>
<td>Commanded boots</td>
<td>Includes commands issued from the i-Vu® interface such as the zap manual command, plus commands issued during a memory download.</td>
</tr>
<tr>
<td>System errors</td>
<td>Error in the controller's firmware or hardware</td>
</tr>
<tr>
<td>S/W Watchdog timeouts</td>
<td>Watchdog is firmware that monitors the application firmware for normal operation. If the watchdog firmware detects a problem, it restarts the application firmware.</td>
</tr>
<tr>
<td>H/W Watchdog timeouts</td>
<td>H/W Watchdog will restart the controller if it detects a severe problem with the controller's operating system</td>
</tr>
<tr>
<td>System status</td>
<td>Gives the current status of the controller's operation. See LEDs (page 35) for all possible conditions.</td>
</tr>
<tr>
<td>Network status</td>
<td>Gives the current status of the controller's networks. See LEDs (page 35) for all possible conditions.</td>
</tr>
<tr>
<td>System error message history</td>
<td>High-severity errors since the last memory download. Shows the most recent 10 messages. See <strong>NOTE</strong> below this table.</td>
</tr>
<tr>
<td>Field</td>
<td>Description</td>
</tr>
<tr>
<td>----------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Warning message history</td>
<td>Low-severity errors and warning messages since the last memory download. Shows the most recent 10 messages. See <strong>NOTE</strong> below this table.</td>
</tr>
<tr>
<td>Information message history</td>
<td>Information-only messages since the last memory download. Shows the most recent 10 messages. See <strong>NOTE</strong> below this table.</td>
</tr>
<tr>
<td>ARC156 reconfigurations during the last hour</td>
<td>An ARCNET network normally reconfigures itself when a controller is added to or taken off the network. The <strong>Total</strong> field indicates the number of reconfigurations in the last hour. <strong>Initiated by this node</strong> indicates the number of reconfigurations initiated by this controller. Typical sources of the problem could be this controller, the controller with the next lower rotary switch address, any controller located on the network between these two controllers, or the wiring between these controllers. An excessive number in these fields indicates a problem with the network.</td>
</tr>
<tr>
<td>Core and Base board hardware</td>
<td>Gives the following information about the controller's boards:</td>
</tr>
<tr>
<td></td>
<td>• Type and board numbers that are used internally by Carrier.</td>
</tr>
<tr>
<td></td>
<td>• The manufacture date and serial number.</td>
</tr>
<tr>
<td>Number of BACnet Objects</td>
<td>Indicates the number of BACnet objects that were created in the device and the number of those objects that are network visible</td>
</tr>
<tr>
<td>Database Partition</td>
<td><strong>Non-Volatile</strong> partition (16 MB maximum) contains data that needs to be preserved through a power cycle and archived to flash such as parameters and trend data.</td>
</tr>
<tr>
<td></td>
<td><strong>Volatile</strong> partition (6 MB maximum) contains data that does not need to be preserved through a power cycle such as status values that are calculated during runtime.</td>
</tr>
<tr>
<td>IP Networks - BBMDs</td>
<td>Shows the following information for each active IP network:</td>
</tr>
<tr>
<td></td>
<td><strong>BBMD Active</strong> shows whether the BACnet Broadcast Management Device is currently active (1) or inactive (0).</td>
</tr>
<tr>
<td></td>
<td><strong>BBMD Entries</strong>—the number of entries in the BBMD table (500 maximum).</td>
</tr>
<tr>
<td></td>
<td><strong>FDT Entries</strong>—the number of entries in the Foreign Device Table (500 maximum).</td>
</tr>
<tr>
<td>Third party integration points</td>
<td>Shows number of points used.</td>
</tr>
<tr>
<td>Network Information</td>
<td>The various network addresses for the controller. The <strong>Current</strong> and <strong>Assigned</strong> addresses will be the same unless the <strong>Enable IP configuration changeover</strong> on the <strong>BACnet Router Properties</strong> page is being implemented.</td>
</tr>
<tr>
<td>Statistics and Network Activity</td>
<td>Shows network communication statistics to assist with troubleshooting. See <strong>Network Diagnostics - Statistics</strong> (page 24) for more information.</td>
</tr>
<tr>
<td>Route Information Port Number</td>
<td>BACnet networks that a router is currently routing traffic to. The list changes as BACnet routers are added or removed from the system.</td>
</tr>
</tbody>
</table>

**NOTE** If you want to clear the Reset counters and the three message history fields, click the **Clear Counts/Logs** button on the controller's **Properties** page in the i-Vu® application or in the controller setup **Device** tab.
### Document revision history

Important changes to this document are listed below. Minor changes such as typographical or formatting errors are not listed.

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Change description</th>
<th>Code*</th>
</tr>
</thead>
<tbody>
<tr>
<td>4/12/19</td>
<td>Specifications</td>
<td>Changed Depth dimension from 7.09 cm to 5.31 cm.</td>
<td>X-D</td>
</tr>
<tr>
<td></td>
<td>To mount the i-Vu® XT Router</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Configuring BACnet Device Instance and network number</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>To set up BACnet Broadcast Management Devices (BBMDs)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Driver</td>
<td>Added that you can add, update, or delete screen files for an Equipment Touch.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>BACnet firewall</td>
<td>Changed &quot;controller from receiving&quot; to &quot;controller from responding to&quot;.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Network Diagnostics - Statistics</td>
<td>Changed names of Trend links at the bottom of each section.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Added Latency under Port S1 Statistics</td>
<td></td>
</tr>
<tr>
<td>10/2/18</td>
<td>Entire document</td>
<td>Major changes due to:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Controller label changes</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- New and revised controller setup pages</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Driver pages revisions</td>
<td></td>
</tr>
<tr>
<td>4/20/18</td>
<td>Network Diagnostics (2 topics) and</td>
<td>New topics</td>
<td>C-D</td>
</tr>
<tr>
<td></td>
<td>To set up Network Statistics trends</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/12/18</td>
<td>To set the ARC/MSTP port address and baud rate</td>
<td>Correction - default address for ARCNET is 254.</td>
<td>C-TS-CI-E</td>
</tr>
<tr>
<td>10/24/17</td>
<td>Rotary switch settings</td>
<td>New topic</td>
<td>C-TS-CI-F</td>
</tr>
<tr>
<td>7/27/17</td>
<td>Specification</td>
<td>Added BACnet support specification.</td>
<td>X-D-LG</td>
</tr>
<tr>
<td></td>
<td>BACnet Compliance</td>
<td>New topic</td>
<td></td>
</tr>
</tbody>
</table>

* For internal use only