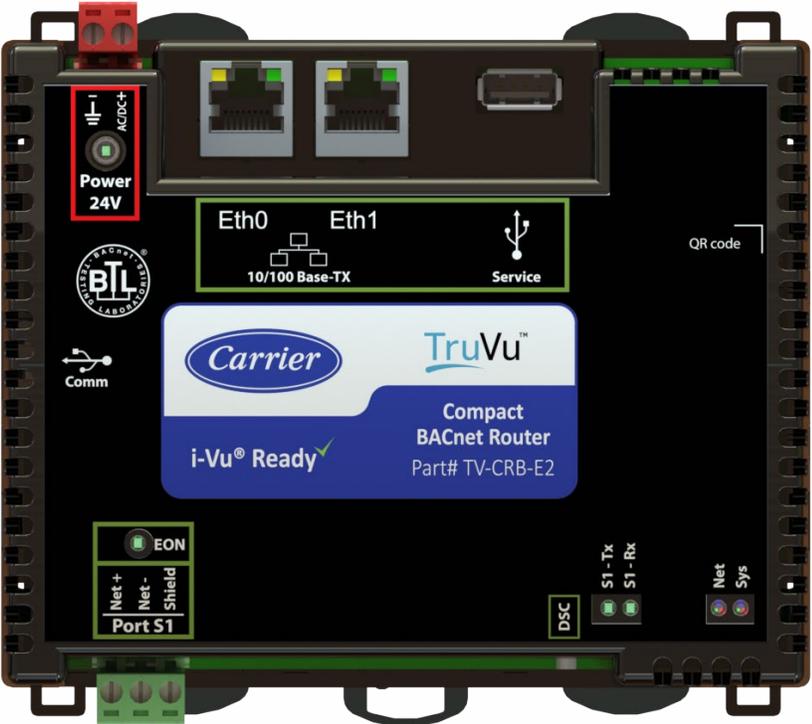


TruVu Compact BACnet Router (part no. TV-CRB-E2) (drv_gen5) Installation and Start-up Guide





Verify that you have the most current version of this document from www.hvacpartners.com, the **Carrier Partner Community** website, or your local Carrier office.

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

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What is the TruVu™ Compact BACnet Router (part no.TV-CRB-E2)

The TruVu™ Compact BACnet Router (TV-CRB-E2):

- Provides BACnet routing between any supported BACnet communication types
- Can serve as a BACnet Broadcast Management Device (BBMD)
- Supports Foreign Device Registration (FDR)
- Supports DHCP IP addressing
- Has built-in network diagnostic capture functionality for troubleshooting
- Has network statistics that can be viewed numerically or as trend graphs
- Works with the i-Vu® v9.0 or later system



The TV-CRB-E2 has 3 physical BACnet communication ports:

Port	Port type	For routing this type of communication...	At...
Eth0, Eth1	10/100 Mbps Ethernet	BACnet/IP BACnet/IPv6 BACnet/Ethernet BACnet/SC	10, 100 Mbps
S1	High-speed EIA-485 port	BACnet/MSTP	9.6 to 115.2 Kbsp
Service Port	USB	BACnet/IP Service Port	

Specifications

Driver	drv_gen5
Power	24 Vac \pm 10%, 50-60 Hz, 50 VA 24 Vdc \pm 10%, 18 W
Eth0, Eth1	10/100 BaseT, full duplex, Ethernet ports with built-in fail safe. Supports direct connection or daisy chain topology natively using BACnet/IP and/or BACnet Ethernet communication. Under normal operation, network traffic not destined for this router is repeated to the other Ethernet port.
Port S1	For communication with a BACnet MS/TP network at 9600 to 115200 bps or third-party protocols at various baud rates (see the specific protocol's integration guide). This port's End of Network termination can be set to Yes to terminate the network segment.
Service Port	USB 2.0 host port for setting up the controller and troubleshooting through a local connection to a computer, connecting to the interface, or the Carrier wireless service adapter.
USB Communication Port	USB 2.0 host port supports communicating expansion modules.
Microprocessor	32-bit ARM Cortex-A8, 600MHz, processor with multi-level cache memory
Memory	8 GBs eMMC Flash memory and 512 MB DDR3 DRAM (120 MB available to use). 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, 3A, 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	<ul style="list-style-type: none"> • Tricolor NET LED to show network status • Tricolor SYS LED to show system status • POWER LED • S1 EON LED • A TX (Transmit) and RX (Recieve) LED for the following ports: <ul style="list-style-type: none"> ◦ Port S1 <p>See LEDs (page 3)</p>								
Environmental operating range	<p>-40 to 158° F (-40 to 70° C), 10-95% relative humidity, non-condensing</p> <p>The TV-CRB-E2 is suitable for installation inside or outside the building envelope.</p> <p>It should be placed in a UL Listed enclosure. If installed outside, the enclosure must be suitable for the environmental conditions.</p>								
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								
Overall dimensions	<table> <tr> <td>A:</td> <td>5.51 in. (14 cm)</td> </tr> <tr> <td>D:</td> <td>5.88 in. (14.93 cm)</td> </tr> <tr> <td>E:</td> <td>4.41 in. (11.20 cm)</td> </tr> <tr> <td>Depth:</td> <td>2.01 in. (5.11 cm)</td> </tr> </table>	A:	5.51 in. (14 cm)	D:	5.88 in. (14.93 cm)	E:	4.41 in. (11.20 cm)	Depth:	2.01 in. (5.11 cm)
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Depth:	2.01 in. (5.11 cm)								
Screw mounting dimensions	<table> <tr> <td>B:</td> <td>3.00 in (7.62 cm)</td> </tr> <tr> <td>C:</td> <td>5.29 in. (13.44 cm)</td> </tr> </table>	B:	3.00 in (7.62 cm)	C:	5.29 in. (13.44 cm)				
B:	3.00 in (7.62 cm)								
C:	5.29 in. (13.44 cm)								
Weight	0.75 lb. (0.3402 kg)								
BACnet Support	Conforms to the BACnet Router (B-RTR) and BACnet Broadcast Management Device (B-BBMD), as defined in BACnet 135-2016 (BACnet) Annex L and tested to Protocol Revision 19								
Compliance	<p>United States of America: FCC compliant to Title CFR47, Part 15, Subpart B, Class A; UL Listed to UL 916, PAZX, Energy Management Equipment</p> <p>Canada: Industry Canada Compliant, ICES-003, Class A cUL Listed UL 916, PAZX7, Energy Management Equipment</p>								

Europe:  Mark, UK: 
EN50491-5-2:2009; Part 5-2: EMC requirements for HBES/BACS
used in residential, commercial and light industry environment
RoHS Compliant: 2015/863/EU
REACH Compliant

Australia and New Zealand:
 C-Tick Mark, AS/NZS 61000-6-3

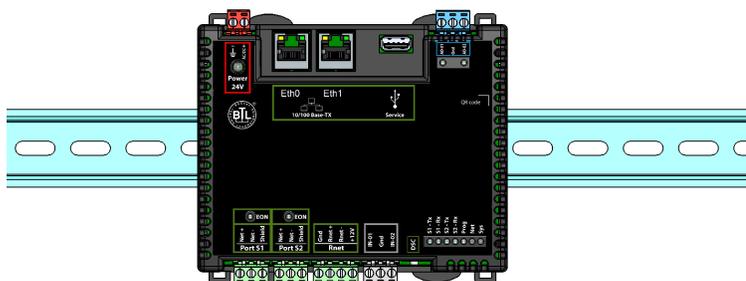
To mount the TV-CRB-E2

The TV-CRB-E2 can be mounted on a DIN rail or screwed to a surface.

NOTE We recommend screw mounting when installing in a high temperature and high humidity environment.

DIN rail mount

- 1 In the trough on the back of the router, hook the edge of the DIN rail under the controller's two mounting flanges.
- 2 Push the controller toward the DIN rail until you hear it click and the spring-loaded latch secures the controller to the DIN rail..



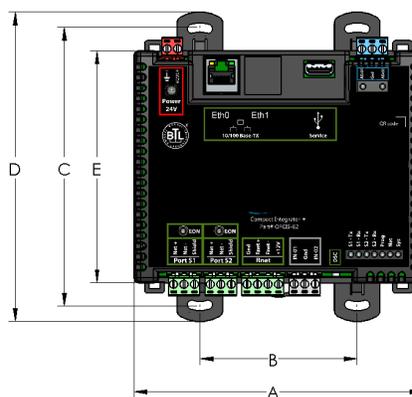
Screw Mount

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.

Overall dimensions
A: 5.51 in. (14 cm)
D: 5.88 in. (14.93 cm)
E: 4.41 in (11.20 cm)
Depth: 2.01 in. (5.11 cm)

Screw mounting dimensions
B: 3.00 in. (7.62 cm)
C: 5.29 in. (13.44 cm)



Wiring for power

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

CAUTIONS

- The TV-CRB-E2 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 same power supply only for Carrier controllers.

To wire for power

- 1 Remove power from the power supply.
- 2 Pull the red screw terminal connector from the router's power terminals labeled **24 Vac/Vdc (+/-)**.
- 3 Connect the power supply's wires to the red screw terminal connector.
- 4 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).
- 5 Apply power to the power supply.
- 6 Measure the voltage at the red screw terminal connector to verify that the voltage is within the operating range of 20.4 to 28.8 Vac or 21.6 to 28.8 Vdc.
- 7 Insert the red screw terminal connector into the router's power terminals.
- 8 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.
- 9 Verify that the  LED on top of the router is on.
- 10 Measure the voltage at the red screw terminal connector to verify that the voltage is within the operating range of 20.4 to 28.8 Vac or 21.6 to 28.8 Vdc.

Connecting to the TV-CRB-E2 through the USB Service Port

You can connect the TV-CRB-E2 to a computer using a wireless or cable connection to the Service Port. This allows you to communicate with the TV-CRB-E2 through a web browser to:

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

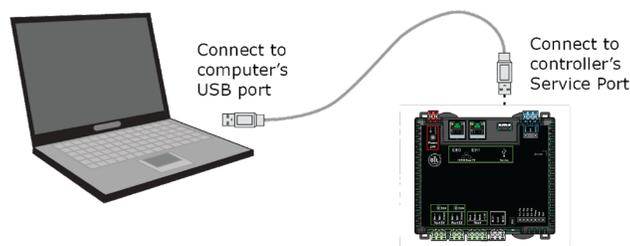
You can set a site level **Device Password** to restrict access to the Service Port controller setup pages of a device with a Gen5 driver. You can set it in SiteBuilder in the site dialog box. You can also set it in the i-Vu® interface, at the site level on the **Network** tree > **Properties** page.

To connect the TV-CRB-E2 to a computer using the i-Vu® wireless service adapter:

- 1 Insert the TruVu™ wireless service adapter (part# USB-W) into the router's USB Service Port to communicate with a Wi-Fi-compatible computer.
- 2 Open your computer's wireless network display to view your available wireless networks.
NOTE The TV-CRB-E2 only supports the 5 GHz band and not the 2.4 GHz band.
- 3 Connect to the wireless network using the network SSID and password that are printed on the TruVu™ wireless service adapter.
- 4 Open a web browser on the computer and navigate to <https://local.access> or <https://169.254.1.1> to see the controller setup pages.

To connect the TV-CRB-E2 to a computer using a cable:

- 1 Connect a USB-A cable from a computer to the router as shown below.



- 2 Turn off the computer's Wi-Fi if it is on.
- 3 If your computer uses a static IP address, use the following settings:
 - Address: 169.254.1.x, where x is 2 to 7
 - Subnet Mask: 255.255.255.248
 - Default Gateway: 169.254.1.1
- 4 If it uses a DHCP address, leave the address as it is.

- 5 Open a web browser on the computer.
- 6 Navigate to **https://local.access** or **https://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.

Connecting to the TV-CRB-E2 through the Eth0/Eth1 Port

Using a computer and an Ethernet cable, you can communicate with the TV-CRB-E2 through a web browser to:

- Address and configure controllers
- View/change router and network settings. Changes take effect immediately after clicking 
- View the router's Modstat
- Troubleshoot

You can set a site level **Device Password** to restrict access to the Service Port controller setup pages of a device with a Gen5 driver. You can set it in SiteBuilder in the site dialog box. You can also set it in the i-Vu® interface, at the site level on the **Network** tree > **Properties** page.

To access the controller setup pages through the Eth0/Eth1 Port

- 1 In the i-Vu® interface, on the **Network** tree, select the TV-CRB-E2.
- 2 Navigate to the TV-CRB-E2's **Driver** > **Properties** > **Advanced** > **Security** tab.
- 3 Ensure **Disable Service Ports** is unchecked.
- 4 Enable **Allow Configuration on Eth0/Eth1 Port**.
- 5 On the **Network** tree > **Properties** page, select the site level of the TV-CRB-E2.
- 6 Set the **Device Password**, which will be required to access the setup pages.
NOTE You can also set it in SiteBuilder in the site dialog box.
- 7 Connect an Ethernet cable from a computer to the same IP subnet that the Eth0/Eth1 port of the TV-CRB-E2 is connected to.
NOTE Based on the building network configuration, this connection could be at a building switch or panel-mounted switch.
- 8 Turn off the computer's Wi-Fi, if it is on.
- 9 If your computer uses a static IP address, use settings appropriate for the building network.
- 10 If it uses a DHCP address, leave the address as it is.
- 11 Open a web browser on the computer.
- 12 Navigate to **https://<router ip address>**.

NOTE The IP address is preset in the device for interfacing with the Ethernet network.

NOTE The first time you access the device 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 device.

Addressing through the Service Port

The TV-CRB-E2 is addressed using the router setup pages. The **Local Network** tab allows you to discover all devices on a single network and configure them from that page.

You can connect the TV-CRB-E2 to a computer using either the Carrier wireless service adapter or a USB cable.

NOTE You cannot access the Service Port by plugging an Ethernet cable into Eth0 or Eth1.

To set the IP address

To set an IPV4 address

You must define the TV-CRB-E2's IPv4 addressing (IPv4 address and default gateway) in the Service Port controller setup pages so that the router can communicate with the i-Vu® Server on the IPv4 network.

Use one of the IPv4 addressing schemes described below with the instructions that follow.

Use a...	If...
Custom Static from your network administrator	You have a permanent IP address which does not change and is usually obtained from the network administrator.
DHCP generated by a DHCP server	The IP network uses a DHCP server for IP addressing

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 custom IP address

- 1 Obtain the IP address and default gateway address for the router from the facility network administrator.
- 2 On the Connections page, under the **Eth0/Eth1 Port tab > IP Addressing > IPv4**, select **Custom Static** in the drop-down list for Address Mode.
- 3 Enter the **IP Address**, **Subnet Mask**, and **Default Gateway** addresses that the network administrator gave you.

- 4 Click 

To set an IPv6 address

You must define the TV-CRB-E2's IPv6 addressing (**IPv6 address**, **prefix length**, and **default gateway**) in the Service Port controller setup pages so that the router can communicate with the i-Vu® Server on the IPv6 network.

Use one of the IPv6 addressing schemes described below with the instructions that follow. See the IPv6 Best Practices Guide.

Use a...	If...
Custom Static from your network administrator	You have a permanent IP address which does not change and is usually obtained from the network administrator.
DHCP generated by a DHCP server	The IP network uses a DHCP server for IP addressing
Link-Local	This is an autogenerated private IP address used for local network segment communication. Segment starts with FE80.
SLAAC	Used for Global Scope addressing and multicasting. This is defined by the building network administrator.

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 custom IP address

- 1 Obtain the IP address and default gateway address for the router from the facility network administrator.
- 2 On the Connections page, under the **Eth0/Eth1 Port tab > IP Addressing > IPv4**, select **Custom Static** in the drop-down list for Address Mode.
- 3 Enter the **IP Address**, **Subnet Mask**, and **Default Gateway** addresses that the network administrator gave you.

- 4 Click  **Restart** 

To set the Port S1 address and baud rate

The address should be in the following range based on the port's use.

- For MS/TP, the range is 0 to 127.

For MS/TP, set up the port's baud rate

1 On the **Connections** > **Port S1** tab, select the **Baud Rate**. The default is 76,800 bps.

2 Click the **Restart** button .

To set up the Local Network

You can use the controller setup **Local Network** tab to discover Carrier devices on a single network. You can configure them and assign addresses to each one using one of the methods described below.

Method 1: To address when you know the serial numbers

- 1 Connect one TruVu™ device on the IP network to the Service port.
NOTE This device is referred to as the "connected controller".
- 2 Browse to the Service Port address (**https://local.access** or **https://169.254.1.1**).
- 3 On the **Ports** tab, set the device's **IP Address** and **Subnet Mask**.
- 4 On the controller setup **Local Network** tab, click the **Clear All** button to erase the Local Devices table if there is information in the table.
- 5 On the **Local Network** tab, click the **Clear All** button to erase the **Local Devices** table if there is information in it.
- 6 Click **Discover**. The table finds and lists the first 256 unconfigured devices on the same subnet. The table is sorted by serial number.
NOTE A maximum of 256 controllers can be discovered and displayed in the **Local Devices** table. If you have more than 256 controllers on your network, configure some or all the controllers in the table and click **Clear**. Check **Only Unconfigured** and click **Discover** again. A count appears above the table to report the total number of controllers and the discovered number.
- 7 To configure devices:
 - One at a time - Enter the **IP Address** and **Location** or name (optional) of each device you wish to configure. When you enter the IP address, that device inherits the original device's subnet mask and default gateway.
 - Multiple devices simultaneously - **Select** the devices you want to address, enter the starting IP address in the field under the **Address** heading, and then click **Assign**. The selected devices are automatically assigned sequential IP addresses.**NOTE** To change the IP Address, the device's **Mode** must be **Custom Static**.

For more details about discovering and configuring your devices, see **Local Network** tab.

Method 2: To address when you do not know the serial numbers

You will need physical access to each device so that you can press the DSC button on the bottom right of the TV-CRB-E2. This allows you to identify the device on the controller setup **Local Network** page.

- 1 Connect to the Service Port of one TruVu™ IP device on the network. Connection can be wireless or through USB.
- 2 Browse to the Service Port address (**https://local.access** or **https://169.254.1.1**).
- 3 On the **Connections > Eth0/Eth1 Port** tab, select the **Address Mode**. For custom static, set the device's **IP Address** and **Subnet Mask**.
NOTE The other devices that you configure inherit this device's subnet mask and default gateway.
- 4 On the **Connections > Local Network** tab, click the **Clear All** button to erase any pre-existing data in the **Local Devices** table.
- 5 On the controller you want to address, press the DSC button on the bottom right. When pressed, a row appears in the **Local Devices** table on the **Local Network** tab. The row has a blue dot to indicate which controller has just had the button pressed.
- 6 In the row for the identified controller, enter the **Address** and **Location** (optional).
- 7 Repeat steps 3 and 4 for each controller that you want to address.
- 8 For more details about discovering and configuring your devices, see **Local Network** tab.

NOTE To physically identify a device that is displayed on the **Local Devices** table, you can click the **Blink** button, which lights up the Locator LED in the actuator release button.

The following are two possible methods you could use to identify and assign a network of controllers' addresses after following steps 1 - 4 above.

- Two technicians can work together if they are communicating throughout the process. The first technician physically travels around the building to each controller, tells his co-worker exactly where he is, and then presses the DSC button. The second technician, who is sitting at a computer connected to the controller, watches for the blue dot to show up on the **Local Devices** table on the **Local Network** tab, where he can enter the appropriate addressing and identifying information.
- One technician alone can address the controllers on a mobile device showing the Local Network page by plugging the Carrier wireless service adapter into a controller's Service Port. Then, with the computer, move to each controller within 100 ft. of the adapter. Pressing the DSC button on the controller displays a blue dot in the table where the addressing information can be entered.

Wiring for communications

The TV-CRB-E2 communicates on the following ports.

Port	Protocol	Port type(s)	Speed(s)
Eth0	BACnet/IP	Ethernet	10 or 100 Mbps
Eth1	BACnet/IPv6 BACnet/Ethernet BACnet SC		
Port S1 ¹	BACnet/MSTP	EIA-485	9.6 to 115.2 Kbps ²
Service Port ²	USB 2.0E	USB	
USB Port	USB2.0	USB	

¹ Default for MS/TP is 76.8 kbps.

² See To set up the TV-CRB-E2 through the Service Port.

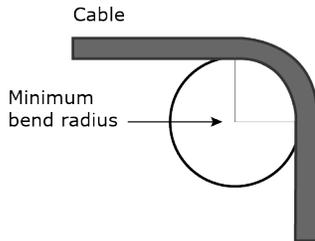
Wiring specifications

For...	Use...	Maximum Length
Ethernet - not daisy chained	Cat5e or higher Ethernet cable	328 feet (100 meters)
Ethernet - a daisy chain configuration	Cat5e or higher Ethernet cable	164 feet (50 meters)
MS/TP ¹	22 AWG, low-capacitance, twisted, stranded, shielded copper wire	2000 (610 meters)

¹ For details, see the Open Controller Network Wiring Guide.

 **WARNING**

- Do not apply line voltage (mains voltage) to the router's ports and terminals.
- Do not exceed the minimum bend radius of the Cat5e or Cat6e Ethernet cable. Refer to Ethernet cable manufacturer specifications for minimum bend radius.



To connect the TV-CRB-E2 to the Ethernet

Connect an Ethernet cable from the building BAS system or another TV-CRB-E2 controller to the Eth0 Ethernet port. If necessary, connect another Ethernet cable from the Eth1 port to the next controller in a daisy chain.

The TV-CRB-E2 has a fail-safe Ethernet relay that bypasses a daisy chained controller in the event of an internal disruption, such as a power loss. When a failure occurs and the switch is bypassing a controller, the network connection on both sides of the controller are electrically connected, which continues the signal and passes it to the next controller.

NOTE If your system has controllers on different IP subnets separated by an IP router, you must configure one controller on each subnet as a BACnet Broadcast Management Device (BBMD). Do not configure more than one BBMD per subnet as this may cause circular routes. See "Setting up BACnet Broadcast Management Devices (BBMDs)" in SiteBuilder or i-Vu® Help.

To wire to a BACnet MS/TP network

An MS/TP network can be wired to **Port S1**.

- 1 Remove power from the TV-CRB-E2.
- 2 Check the communications wiring for shorts and grounds.
- 3 Connect the communications wiring to the **Port S1** screw terminals labeled Net +, Net -, and Shield.
NOTE Use the same polarity throughout the network segment.
- 4 If the TV-CRB-E2 is at either end of a network segment, set the port's **End of Network** termination to **Yes**.
NOTE The router's **End of Network Command** applies network termination and bias. If the router is at the end of a network segment that includes a DIAG485 that has its Bias jumper in the ON position, set the **End of Network Command** to **No** and connect a 120 ohm termination resistor to the **Net+** and **Net-** terminals. See DIAG485 Technical Instructions for more information.
- 5 Restore power to the device.
- 6 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 set up the router in SiteBuilder and downloaded it from the i-Vu® interface.

Downloading the TV-CRB-E2

Download to send the following items to the TV-CRB-E2:

- drv_gen5 (See **NOTES** below.)
- Editable properties

NOTES

- The driver must be in <system_name>**drivers**. The exact location of the system directory depends on where you have saved it. It is typically under **I-Vux.x\programdata\systems**.
- To verify that you have the driver's latest version, go to the Carrier Partner Community website. Compare the latest version to the TV-CRB-E2's driver in SiteBuilder.
- If you change any of the above items or the TV-CRB-E2's address after the initial download, you must download again. The first download takes longer than subsequent downloads.

To download from the i-Vu® interface

- 1 On the i-Vu® **Network** tree, select the TV-CRB-E2.
- 2 Click **Downloads**.
- 3 Do one of the following:
 - If the router is in the **Downloads** list, go to step 4.
 - If the router is not in the list:
 - a. Click **Add**.
 - b. In the pop-up, select the router.
 - c. Select **All Content**.
 - d. Click **Add**.
 - e. Click **Close**.
- 4 Select the router in the Downloads list.
- 5 Click **Start**.

NOTES

- If the download fails, locate, and resolve the problem, then retry the download.
- You can also download from the **Devices** page.

To stage a driver for later installation

To avoid interrupting controller function when installing a driver, you can first stage the driver to the controller before installing it. The controller retains full functionality while the new driver is staged and continues to use the existing driver until you install the new driver.

- 1 On the i-Vu® Network tree, choose a network and go to the **Devices > Drivers** tab.
- 2 Select the TV-CRB-E2 and click  .
- 3 Check **Stage driver in controller**.
- 4 Do one of the following:
 - If the driver is in the **Driver Version** drop-down list:
 - a. Select the driver.
 - b. Click **Accept**.
 - If the driver is not in the list:
 - a. Click **Add**.
 - b. Browse to select the driver.
 - c. Click **Open**.
 - d. Click **Continue**.
 - e. Click **Close**.
 - f. Click **Close** again.
- 5 On the **Devices > Drivers** tab, click **Start Staging**.
- 6 Once you are ready to install the staged driver to the controller, click **Start Installation**.

Adjusting driver properties and controller setup through the Service Port or the i-Vu® interface

The driver properties pages are the same controller setup interface that you access by connecting to the Service Port.

NOTES

- The **Home Network** portion of the **Connections > Device** tab is available only by connecting to the Service Port and not through the driver properties.
- Some properties, such as the home network settings, cannot be changed through the i-Vu® driver interface. This prevents losing communication to the router. You can change those settings by connecting directly through the Service Port.

After you download the driver to the TV-CRB-E2, you may want to change the driver's properties in the i-Vu® interface to suit your application.

- 1 On the i-Vu® **Network** tree, click ▶ to the left of your TV-CRB-E2.
- 2 Click **Driver** to open the driver properties, which are detailed below.

Home tabs

Dashboard tab

This page shows general controller information.

Controller Status	
BACnet System Status	Current state of the controller
Sys Net	Current connection status
Performance	
CPU Load	Percentage of CPU used
Memory Load	Percentage of long-term memory used
Port Info	
Device Instance	Unique ID assigned to the controller
Enabled BACnet Ports	 indicates the port set as the home network
Active Alarms	If there are any currently active alarms, they are shown here.

Diagnostics tab

This page allows you to:

- Access additional diagnostic tools with assistance from Carrier Technical Support.
NOTE You can only access this tool in the controller setup pages connecting through the Service Port.
- Download log files
- Blink the device's Locator LED
- Capture network communication and then download the capture file for troubleshooting
- View network diagnostics

Technical Support Tools

Enable the toggle switch to view the Challenge key. Send the displayed **Challenge Key** to the Carrier Technical Support representative who will provide an **Activation Key** for you to enter.

Additional tools will be displayed to help Carrier® Technical Support troubleshoot issues. Enabling these tools has security implications, therefore they are automatically disabled after 2 hours.

Logs

- **Retrieve all** – Downloads all logs in a zip file to your computer
- **Specific log** – Allows you to choose to download the application logs (by date) or the system logs
- **Delete all** – Deletes all logs, including current logs

Locator LED

To physically identify a device that is displayed on the Local Devices table, click **Blink** to light the **Locator LED** in the actuator release button

Packet Capture**Primary/secondary
BACnet/IP****BACnet/IPv4****BACnet/IPv6****BACnet/Ethernet****Primary/secondary
BACnet/SC****Port S1 BACnet/MSTP**

This allows you to capture network communication on the corresponding port and then download the capture file for troubleshooting.

- **Start now** – Start a capture immediately. The capture runs until you click **Stop** or until it reaches the file size limit, whichever occurs first.
- **Start continuous** – Start a continuous capture immediately. The capture stores the most recent 5MB of captured data and runs continuously until you click **Stop**.

NOTES

- The number of continuous captures that you can run simultaneously is limited.
- Continuous captures are disabled when the router is in a low-memory state.
- **Schedule** – Schedule a packet capture to automatically run at a future date and time of your choosing. Choose whether the capture stops until it reaches the file size limit or specify a duration of time for the capture to run.
- **Capture Data of Type** – Choose whether to capture all packets or only BACnet packets (BACnet MS/TP only).
- **Get capture file** – Download the capture file once you have stopped the capture or the capture has reached the file size limit.

NOTE Capture files have a 25MB limit. If you need a larger capture, contact Carrier® Technical Support.

Contact Carrier® Technical Support for assistance with using packet captures.

Network Diagnostics

Click **Reset statistics** to reset values to 0, which then resume accumulating.

See Appendix - Module Status field descriptions for descriptions of these fields.

Connections tabs

Use these pages to set up communication with the TV-CRB-E2. The fields are editable when the setup pages are accessed by connecting directly to the Service Port. Some of those fields will not be editable when you access them through the i-Vu® system driver properties.

Device tab

Typically, you define the information on the **Device** tab in the Service Port controller setup interface and then configure the same information in the i-Vu® interface. Except for the **Home Network**, you can adjust the settings on the **Device** tab in the i-Vu® system.

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.

The **Device > Home Network** tab is auto-populated based on what is set for the home network. Refer to the Network Parameters listed in the appropriate section based on the home network you selected.

Device Communication	The current BACnet BMS connection status
Auto Identity Scheme	<ul style="list-style-type: none">• Not Autogenerated—you can enter a specific ID that is unique on the network.• Autogenerated—the Device Instance is automatically set. You cannot edit the field.
Device Instance	A specific identifier that is unique on the BACnet network. Contents and editability depend on your Auto Identity Scheme choice.

Identification	
Auto Name Scheme	<ul style="list-style-type: none">• Not Autogenerated—you can enter a specific name that is unique on the network.• Autogenerated—the Device Name is automatically set as the word "device + the Device Instance". For example, "device2423911". You cannot edit the field.
Device Name	Contents and editability depend on your Auto Name Scheme choice.
Location	You can enter an intuitive location for the device in the i-Vu® interface. This will be the device's display name when discovered through Find Devices .
Description	You can enter an intuitive description for the device in the i-Vu® interface.

APDU	
APDU Timeout	How many milliseconds the device waits before resending a message if no response is received.
APDU Segment Timeout	How many milliseconds the device waits before resending a message segment if no response is received.
Number of APDU Retries	The number of times the device resends a message.
Max APDU Length Accepted	The maximum length of a message segment that can be accepted by the BACnet device.

Eth0/Eth1 port

Eth0/Eth1 port using BACnet/IPv4

802.1x Port Authentication	Enable the toggle switch to use 802.1x Port Authentication. Then, click Manage Port Certificates .
Manage Port Certificates	<p>Opens the 802.1x Port Authentication window where you can manage port certificates. Enter your Identity and User Private Key Password, then upload the CA certificate, user certificate, and user private key. Upon successful upload, a Certificate/key valid message appears next to the upload button.</p> <p>Once the connection has been authenticated, Port Authentication Status will change from Authentication Pending to Authenticated. This may take up to a minute.</p>

IP Addressing

IPv4	
Address Mode	<p>Select the type of addressing the router is to use. See Addressing through the USB service port.</p> <p>Select Custom Static if you have a permanent IP address which does not change and is usually obtained from the network administrator.</p> <p>Select DHCP if the network uses a DHCP server for IP addressing.</p>
Address	Displays the unique address of the device, if assigned. Editable only if using Custom Static addressing.

IPv4	
Subnet Mask	Displays the Subnet Mask of the device, if assigned. Editable only if using Custom Static addressing.
Default Gateway	Displays the Default Gateway of the device, if assigned. Editable only if using Custom Static addressing.
Inhibit BACnet/IP on loss of DHCP lease	Inhibits BACnet communications via the IPv4 port when DHCP lease is not available or not renewed. NOTE Checkbox visible only if using DHCP addressing.
DNS	
Edit Servers	DNS servers are required if Internet host name resolution for BBMD, NTP, or BACnet/SC are needed. For DHCP application, enter in the DNS name servers provided by the building network administrator. <ul style="list-style-type: none"> To add a server, click Add and then enter the Name Server Address field below. To delete a server in the table, select it in the list and click Delete.
Protocols	
Primary BACnet/IP	
Home network or Set as home	This is the network that communicates with the i-Vu® application. This sets the BACnet Address of the Device Object. To set this port as the home network, activate the toggle switch and click Set as home. To disable the port from use, deactivate the toggle switch.
Network Number	Specify a number for the BACnet/IP network or set to 0 if the port is not used. The network number is 0 by default. NOTE When downloaded from the i-Vu® application, these numbers match those set using SiteBuilder.
UDP Port	The port that the TV-CRB-E2 will use for BACnet communication. If the TV-CRB-E2 has two BACnet/IP networks communicating on the Eth0/Eth1 port, confirm that the home network interface has the port number set to what the i-Vu® application will use for BACnet communication.
Primary IPv4 Statistics	
Reset statistics	Resets values to 0, which then resume accumulating.
Import BBMD Export BBMD	If this network interface will be used to access BBMDs, set the BBMD tables by using the BBMD buttons. <ul style="list-style-type: none"> Import BBMD—Import BBMD tables in the specified format. See "Setting up BACnet Broadcast Management Devices (BBMDs)" in SiteBuilder or i-Vu® Help. Export BBMD—Export the BBMD table that is in the controller to use for storage, viewing, or troubleshooting.

Secondary BACnet/IP	Enable for a secondary BACnet/IP network.
Home network or Set as home	This is the network that communicates with the i-Vu® application. This sets the BACnet Address of the Device Object. To set this port as the home network, activate the toggle switch and click Set as home . To disable the port from use, deactivate the toggle switch.
Network Number	The network number for the secondary BACnet/IP network. This number must be unique for the system. NOTE When downloaded from the i-Vu® application, these numbers match those set using SiteBuilder.
UDP Port	The port that the TV-CRB-E2 will use for BACnet communication. If the TV-CRB-E2 has two BACnet/IP networks communicating on the Eth0/Eth1 port, confirm that the home network interface has the port number set to what the i-Vu® application will use for BACnet communication. NOTE This UDP Port number must be different from the one used for the primary BACnet/IP port.
Secondary IPv4 Statistics	
Import BBMD Export BBMD	If this network interface will be used to access BBMDs, set the BBMD tables by using the BBMD buttons. <ul style="list-style-type: none"> • Import BBMD—Import BBMD tables in the specified format. See "Setting up BACnet Broadcast Management Devices (BBMDs)" in SiteBuilder or i-Vu® Help. • Export BBMD—Export the BBMD table that is in the controller to use for storage, viewing, or troubleshooting.

Eth0/Eth1 port using BACnet/IPv6

802.1x Port Authentication	Enable the toggle switch to use 802.1x Port Authentication. Then, click Manage Port Certificates .
Manage Port Certificates	<p>Opens the 802.1x Port Authentication window where you can manage port certificates. Enter your Identity and User Private Key Password, then upload the CA certificate, user certificate, and user private key. Upon successful upload, a Certificate/key valid message appears next to the upload button.</p> <p>Once the connection has been authenticated, Port Authentication Status will change from Authentication Pending to Authenticated. This may take up to a minute.</p>

IP Addressing

IPv6	
Address Mode	<p>Select the type of addressing the router is to use. See Addressing the TV-CRB-E2.</p> <p>Select Custom Static if you have a permanent IP address which does not change and is usually obtained from the network administrator.</p> <p>Select DHCP if the network uses a DHCP server for IP addressing.</p> <p>Select Link-Local to autogenerate a private IP address for local network segment communications. Segments start with FE80.</p> <p>Select SLAAC for Global Scope addressing and multicasting. This is defined by the building network administrator.</p>
Address	Displays the unique address of the device, if assigned. Editable only if using Custom Static addressing.
Prefix Length	Value set between 10 and 128 to define the number of leftmost bits identifying the network portion of the address.
Default Gateway	Displays the Default Gateway of the device, if assigned. Editable only if using Custom Static addressing.
DNS	
Edit Servers	<p>DNS servers are required if Internet host name resolution for BBMD, NTP, or BACnet/SC are needed. For DHCP application, enter in the DNS name servers provided by the building network administrator.</p> <ul style="list-style-type: none"> To add a server, click Add and then enter the Name Server Address field below. To delete a server in the table, select it in the list and click Delete.
IPv6 Network Interfaces	
— IPv6 Network Interfaces —	System message showing the setting for IPv6, including the display name, interface name, set address, Link-Local, Zone Index, MAC address, etc..

Protocols

BACnet/IPv6	
Home network or Set as home	This is the network that communicates with the i-Vu® application. This sets the BACnet Address of the Device Object. To set this port as the home network, activate the toggle switch and click Set as home . To disable the port from use, deactivate the toggle switch.
Network Number	The network number for the BACnet/IPv6 network. This number must be unique for the system. NOTE When downloaded from the i-Vu® application, these numbers match those set using SiteBuilder.
UDP Port	The port that the TV-CRB-E2 will use for BACnet communication.
Multicast Address	Used for broadcasts on an Ipv6 network using SLAAC. Defined by the building network administrator.
Multicast UDP Port	The port that the TV-CRB-E2 will use for BACnet communication.
IPv6 Statistics	
Import BBMD Export BBMD	If this network interface will be used to access BBMDs, set the BBMD tables by using the BBMD buttons. <ul style="list-style-type: none">• Import BBMD—Import BBMD tables in the specified format. See "Setting up BACnet Broadcast Management Devices (BBMDs)" in SiteBuilder or i-Vu® Help.• Export BBMD—Export the BBMD table that is in the controller to use for storage, viewing, or troubleshooting.

Eth0/Eth1 port using BACnet/SC

NOTE Because BACnet/SC runs on your IP network, you must configure the router's IPv4 or IPv6 address information under **IP Addressing**. If the router will route to IP devices, you must enable the IP protocol in addition to the BACnet/SC protocol.

The **BACnet/SC** sections provide hub status information and the ability to configure the items described in the table below for up to 2 Secure Connect ports.

IP Addressing

IPv4	
Address Mode	Select the type of addressing the router is to use. See Addressing the TV-CRB-E2. Select Custom Static if you have a permanent IP address which does not change and is usually obtained from the network administrator. Select DHCP if the network uses a DHCP server for IP addressing.
Address	Displays the unique address of the device, if assigned. Editable only if using Custom Static addressing.
Subnet Mask	Displays the Subnet Mask of the device, if assigned. Editable only if using Custom Static addressing.
Default Gateway	Displays the Default Gateway of the device, if assigned. Editable only if using Custom Static addressing.
Inhibit BACnet/IP on loss of DHCP lease	Inhibits BACnet communications via the IPv4 port when DHCP lease is not available or not renewed. NOTE Checkbox visible only if using DHCP addressing.
DNS	
Edit Servers	DNS servers are required if Internet host name resolution for BBMD, NTP, or BACnet/SC will be needed. For DHCP application, enter in the DNS name servers provided by the building network administrator. <ul style="list-style-type: none"> To add a server, click Add and then enter the Name Server Address field below. To delete a server in the table, select it in the list and click Delete.
IPv6	
Address Mode	Select the type of addressing the router is to use. See Addressing the TV-CRB-E2. Select Custom Static if you have a permanent IP address which does not change and is usually obtained from the network administrator. Select DHCP if the network uses a DHCP server for IP addressing. Select Link-Local to autogenerate a private IP address for local network segment communications. Segments start with FE80. Select SLAAC for Global Scope addressing and multicasting. This is defined by the building network administrator.

IPv6	
Address	Displays the unique address of the device, if assigned. Editable only if using Custom Static addressing.
Prefix Length	Value set between 10 and 128 to define the number of leftmost bits identifying the network portion of the address.
Default Gateway	Displays the Default Gateway of the device, if assigned. Editable only if using Custom Static addressing.
DNS	
Edit Servers	<p>DNS servers are required if Internet host name resolution for BBMD, NTP, or BACnet/SC are needed. For DHCP application, enter in the DNS name servers provided by the building network administrator.</p> <ul style="list-style-type: none"> To add a server, click Add and then enter the Name Server Address field below. To delete a server in the table, select it in the list and click Delete.
IPv6 Network Interfaces	
— IPv6 Network Interfaces —	System message showing the setting for IPv6, including the display name, interface name, set address, Link-Local, Zone Index, MAC address, etc..

Protocols

Primary/BACnet SC	
Home network or Set as home	This is the network that communicates with the i-Vu® application. This sets the BACnet Address of the Device Object. To set this port as the home network, activate the toggle switch and click Set as home . To disable the port from use, deactivate the toggle switch.
Network number	<p>Specify a number for the BACnet/SC network or set to 0 if the port is not used. The network number is 0 by default.</p> <p>NOTE When downloaded from the i-Vu® application, these numbers match those set using SiteBuilder.</p>
Address	<p>The Virtual MAC address of the router on the BACnet/SC network. It is the hex representation of the Device Instance found on the Connections > Device tab.</p> <p>NOTE If the Device ID of the router is zero (not recommended), a '01' is assigned to the third octet of this address because zero addresses are not valid on a BACnet/SC network.</p>
Connection State	The status of the router's connection as a client on the BACnet/SC network.

Primary Hub URI	<p>Web address used to connect to the primary hub.</p> <p>Format options (address can be an IP address or DNS name):</p> <ul style="list-style-type: none"> • <code>wss://address</code> (if using standard port 443) • <code>wss://address:port</code> <p>NOTE If you must use a proxy to reach the hub, enter proxy information on the Advanced > Network tab.</p>
Primary Hub Status	The state of the primary hub communication.
Failover Hub URI	<p>Web address used to connect to the optional failover hub.</p> <p>Format options (address can be an IP address or DNS name):</p> <ul style="list-style-type: none"> • <code>wss://address</code> (if using standard port 443) • <code>wss://address:port</code> <p>NOTE If you must use a proxy to reach the hub, enter proxy information on the Advanced > Network tab.</p>
Failover Hub Status	The state of the failover hub communication.
Advanced	
Is Failover Hub?	<p>Indicates if being used as a failover hub.</p> <p>NOTES</p> <ul style="list-style-type: none"> • A router can serve as a failover hub, but not as a primary hub. A supported BACnet/SC network requires a virtual or cloud-hosted hub to be used as the primary BACnet/SC hub. • Using a router as a failover hub is supported for up to 10 BACnet/SC router connections. For BACnet/SC networks with more than 10 router connections, purchase an additional BACnet/SC Virtual Hub to use as a failover hub.
Listening Connection Type	When set as a failover hub, select interface type used to listen for connections.
Server Port	When set as a failover hub, enter the port on which the hub will be listening.
URIs	When set as a failover hub, this is the web address used by network devices to connect to the hub. The URI is derived from the IP Port configured on the Connections > Eth0/Eth1 Port tab.
Minimum Reconnect Time	Initial number of seconds to wait before retrying a connect to a hub which increases with each failure.
Maximum Reconnect Time	Maximum number of seconds to wait between connection retries to a hub.
Connection Wait Timeout	Number of seconds to wait for a hub to reply to a connection request.
Disconnect Wait Timeout	Number of seconds to wait for a hub to reply to a disconnect request.
Initiating Heartbeat Interval	Number of seconds to wait to send a heartbeat.

Accepting Heartbeat Interval Number of seconds to wait to receive a heartbeat.

Primary SC Statistics

Manage certificates See "To create or replace a BACnet/SC device's operational certificate" in the *BACnet/SC Setup Guide* for instructions on how to create the router's operational certificate, signed by the BACnet/SC network's Certificate Authority.

Eth0/Eth1 using BACnet/Ethernet

Protocols

BACnet/Ethernet

Home network
or
Set as home This is the network that communicates with the i-Vu® application. This sets the BACnet Address of the Device Object. To set this port as the home network, activate the toggle switch and click **Set as home**. To disable the port from use, deactivate the toggle switch.

Network Number The network number for the BACnet/Ethernet network. This number must be unique for the system.
NOTE When downloaded from the i-Vu® application, these numbers match those set using SiteBuilder.

MAC Address A factory-assigned Ethernet MAC Address

Port S1

Port S1

Port S1 BACnet/MSTP	
Network Number	The network number is 0 by default. NOTE When downloaded from the i-Vu® application, these numbers match those set using SiteBuilder.
MAC Address	Editable once the protocol has been selected.
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.
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.
Baud Rate	Set this to a baud rate that all other devices on the MS/TP network are set to. Select 9600, 19200, 38400, 57600, 76800, or 115200.
End of Network	Configures the controller's End of Network termination.
Port S1 MSTP Statistics	Shows statistics for the port. Click Reset Statistics to reset values to 0, which then resumes accumulating.

Local Network tab

Use the **Local Network** tab to:

- Discover 256 devices on a single network at a time.
- Discover both configured or unconfigured devices on this device's network.
- See the number of devices discovered and the total number on the network.
- Identify the device that has had its DSC button pressed.
- Export the **Local Devices** that are present in the table (limited to 100) to a .csv file.
- Set a device's **Mode**, **Address**, and **Location**.
- Assign IP addresses to multiple devices at one time.
- Prompt an LED to flash on a device. The Blink button is used to start an LED indication pattern on a discovered device.

Address Mode	Select the type of addressing the router is to use. See Addressing through the USB service port. Select Custom Static if you have a permanent IP address which does not change and is usually obtained from the network administrator. Select DHCP if the network uses a DHCP server for IP addressing.
Address	Displays the unique address of the device, if assigned. Editable only if using Custom Static addressing.
Subnet Mask	Displays the Subnet Mask of the device, if assigned. Editable only if using Custom Static addressing.
Default Gateway	Displays the Default Gateway of the device, if assigned. Editable only if using Custom Static addressing.
Device Instance	Displays the IP address of the device, if assigned. You can edit the address only if the device is set to Custom Static . To auto-assign multiple sequential addresses, select the devices, enter the beginning address, and click Assign .
Network Number	Specify a number or set to 0 if the port is not used.

A device that is new from the factory or has not been previously configured with an IP address, can always be configured using the **Local Devices** table. However, once you have assigned a valid IP address, you have up to 24 hours to make any other changes. After 24 hours, the fields are not editable and the device is **Locked**.

You can unlock a device for 24 hours by either pressing the DSC button on the TV-CRB-E2 controller or by using the i-Vu® application. In the i-Vu® navigation tree, right-click the TV-CRB-E2, select **Driver Properties** and go to **Driver > Settings** tab > **Local Network Configuration**. Check **Allow Local Network Configuration from other devices on the local network for 24 hours** and click **Accept**.

To discover devices on a network

- 1 On the **Connections > Eth0/Eth1 Port tab > IP Addressing**, select the **Address Mode**.
- 2 On the **Connections > Local Network** tab, select the **Eth0/Eth1** port and verify the device's **Address, Subnet Mask, Default Gateway, Device Instance**, and **Network Number** displayed at the top of the page.
- 3 In the **Local Devices** table, click the **Clear All** to erase any pre-existing data
- 4 Click **Discover**. The table finds and lists the first 256 unconfigured devices on the same subnet. The devices displayed in the table are sorted by MAC address, but can be adjusted through the **Sort** column..
- 5 Use the following settings to define the devices that you want to discover in the **Local Devices** table.

Local Devices	
Only Unconfigured	When checked, only discovers devices that do not have an IP address and are linked to the connected controller's network. When unchecked, discovers both configured and unconfigured devices.
Clear All	Erases all information in the table.
Export	Creates .csv file of the data in the table, limited to 256 devices.

- 6 Click **Discover** to populate the table with your devices that are on a single network communicating with the connected controller.

Sequential IP addressing

- 1 Follow the above steps to **Discover** devices.
- 2 In the **Select** column, click the checkbox for the devices you want to assign addresses to.
NOTE To change the IP Address, the device's **Mode** must be **Custom Static**.
- 3 Enter the starting IP address under **Address** and click **Assign** to automatically assign sequential IP addresses.

NOTE Changes in the Local Network interface are pending and need to be submitted. A warning will appear when navigating away with pending changes.

There are different workflows for using the **Local Devices** table to address your devices, depending on the information you have from the installation. See **To address when you know the serial numbers** or **To address when you do not know the serial numbers**.

Local Devices table	
Select	<p>Check to select devices for:</p> <ul style="list-style-type: none"> • Changing the Mode • Resolving a Mismatch • Auto-assigning an IP Address <p>NOTE You cannot select devices with a lock symbol.</p>
MAC	Ethernet MAC address of device
Model	
Serial#	<p>The discovered devices are in order by serial number.</p> <p>NOTE To change how the rows are sorted, click a different column heading.</p>
Mode	<p>To change the Mode:</p> <ol style="list-style-type: none"> 1 Select the devices you want to change. 2 Select one of the following IP addressing modes: <ul style="list-style-type: none"> • Default IP - Devices with rotary switches that are used when autogenerating the address (if applicable) • Custom Static - A permanent IP addresses which does not change and is usually obtained from the network administrator <p>NOTE Selecting this automatically sets the device's subnet and default gateway to match the connected controller.</p> • DHCP - Allows the DHCP server to automatically assign an IP address 3 Click the Set button.
Address	<p>Displays the IP address of the device, if assigned. You can edit the address only if the device is set to Custom Static.</p> <p>To auto-assign multiple sequential addresses, select the devices, enter the beginning address, and click Assign.</p>
Device Instance	Unique ID assigned to the controller.
Location	You can describe the location of the device or any other helpful information.
Mismatch	<p>A Mismatch occurs when the connected controller's mode is set to Custom Static and a discovered device's subnet and default gateway do not match the connected controller. The incorrect addresses are shown with SN for subnet and GW for default gateway.</p> <p>To resolve a mismatch, select the device(s) by clicking the Select checkbox and then clicking the Resolve button. The subnet mask and default gateway addresses of the selected devices change to match the connected controller.</p>

Local Devices table

Status	<p>The following are the results of changing Mode, Address, Location, or pressing Blink:</p> <ul style="list-style-type: none">• Success - Successful operation• No Response - Device is not communicating• Device Locked - Device must be unlocked before you can make any changes using the Local Devices table. You can unlock the TV-CRB-E2 by pressing the DSC button on the device or by using the i-Vu® application. (See instructions above.) <p>NOTE The status of a device changes to locked 24 hours after unlocking it. The device can be unlocked through the Local Access interface under the Advanced tab. Click the Configuration Access subsection and then select "Allow Local Network Configuration from other devices on the local network for 24 hours".</p> <ul style="list-style-type: none">• Failure - A conflict between the device and the information entered
Device indicator	<p>A blue dot appears for the most recent device to have the:</p> <ul style="list-style-type: none">• Device Indicator icon clicked in the table• Address or Location entered• DSC button pressed on the device <p>NOTE If the device is not already listed in the table, pressing the DSC button immediately adds it to the table and displays a blue dot.</p> <p> TIP You can build a table of devices in the order that you've pressed the DSC buttons. Clear the table and then press each DSC button in turn. The devices will be listed in the table in the order in which the button was pressed, but only the most recent one will show the blue dot.</p>
Blink	<p>Click the Blink button to prompt the Locator LED to flash for 15 seconds, allowing you to verify the controller's physical location. After flashing, whenever the actuator moves, the LED rotates in the same direction. LED rotation is automatically disabled after 1 hour and can be re-enabled by pressing the Blink button again.</p> <p>At the same time, the Sys and Net LEDs blink white, once per second for 10 seconds, and then stop.</p> <p>NOTES</p> <ul style="list-style-type: none">• The blue dot appears when you Blink a device.• You can Blink a locked device.

NOTE If a device's IP address is the loopback address (127.0.0.1), it is considered unconfigured and unlocked. The IP address, subnet mask, and default gateway fields are blank in the **Ports** and **Local Network** tabs. You can configure it in the **Local Devices** table.

Licensing tab

Status

Activate temporary license Use for initial setup. A temporary license is valid for 30 days.

Import license Upload a point license file to a controller to increase the number of permitted integration points as determined by protocol.

License Status Current status of the license.

Points

Point Distribution Shows how points are distributed across protocols.

License Distribution A negative value in the **Remaining** column indicates how many more points are required to restore proper function to the controller.

Advanced tabs

Security tab

Configuration Access	
Disable Service Ports	When checked, disables all communication through the Service Port. You can only configure the TV-CRB-E2 in the i-Vu® application or Field Assistant.
Allow Configuration on Service Port	Enables access to the controller setup pages through the Service Port.
Allow Configuration on Eht0/Eth1 Port	Enables access to the controller setup pages through the network that the Eth0/Eth1 Port is connected to. See Connecting to the router through the Eth0/Eth1 Port. NOTE You must first set a password in the i-Vu® application.
Enable http Redirect	
Disable Network Port Configuration via BACnet	When checked, disables Network Port Objects properties such as network numbers from being written to via BACnet.
Allow Remote Management of IP Configuration	Enables you to configure IP settings remotely through tunneled Enhanced Access Protocol commands. NOTE The Address Mode must be set to Custom Static .
Allow Local Network Configuration from other Devices on the Local Network for 24 Hours.	Allows Local Network Configuration for 24 hours. It is the same as pressing the DCS button on the controller.
Device Unlock Time Remaning	Displays the amount of time that the device will be unlocked.
TouchScreen Control	
TouchScreen Schedule Edit Enable	Check to enable.
BACnet Whitelist for Eth0/Eth1	
Enable BACnet Whitelist	Check to enable. The list of IP addresses displayed on the page are the IP addresses the device is allowed to communicate with. Must include the server IP address.

Enable Private IP Ranges	Check to enable. Permits communication with any BACnet device configured with a private IP address.
IPv4	List of IPv4 ranges that can be used in whitelisting
IPv6	List of IPv6 ranges that can be used in whitelisting
Whitelist	
Enable Custom Range Whitelist	Check to enable.
Address Ranges	Click Add to enter information or Delete to remove existing information.

Alarms tab

Use this tab to configure settings for the following Alarms:

- **Controller Halted**
- **Dead Controller Timeout**
- **Port Authentication Expiration**
- **Program Manually Stopped**
- **Excessive COV**
- **BACnet/SC Certificate Expiration**
- **Locked I/O**
- **Duplicate Address Alarm**
- **Program Unexpectedly Stopped**

Enable To Off-Normal Event	Clear this checkbox to disable Alarm or Return to off-normal messages of this type from the TV-CRB-E2.
Enable to Normal Event	Clear this checkbox to disable Alarm or Return to normal messages of this type from the TV-CRB-E2.
Time Delay	Specifies the delay between the onset of the Off-Normal condition and the reporting of the alarm to the i-Vu® application.
Description	Short message shown when this type of alarm is generated.

Notification Class	<p>A BACnet alarm's Notification Class defines:</p> <ul style="list-style-type: none"> • Alarm priority for Alarm, Fault, and Return to Normal states • Options for BACnet alarm acknowledgment • Where alarms should be sent (recipients) <p>Alarms in the i-Vu® application use Notification Class #1. The i-Vu® application is automatically a recipient of these alarms.</p>
Object Name	A unique alphanumeric string that defines the BACnet object.
Warning Threshold	<p>If a certificate is within this number of days of expiring, it will appear yellow in the Certificate Management table.</p> <p>A weekly alarm will be triggered in the i-Vu® application when one of the router's BACnet/SC certificates is in this state.</p>
Critical Threshold	<p>If a certificate is within this number of days of expiring, it will appear red in the Certificate Management table.</p> <p>A daily alarm will be triggered in the i-Vu® application when one of the router's BACnet/SC certificates is in this state.</p>

Notification Class tab

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.

Notification Class Recipients	<p>The first row in this list is from the i-Vu® application. Do not delete this row. Click Add if you want other BACnet devices to receive alarms associated with this Notification Class.</p> <p>NOTE Additional entries in this table may be lost after a download.</p>
Recipient Type	<p>Select Recipient Device for device recipients that support dynamic binding. Complete the Recipient Device field if you are using this recipient type.</p> <p>Select Recipient Address (static binding) for either of the following:</p> <ul style="list-style-type: none"> • Third-party BACnet device recipients that do not support dynamic binding • When you want alarms to be broadcast (you must uncheck Issue Confirmed Notifications). This use is rare. <p>Complete the Network Number and MAC Address fields if you are using this recipient type.</p>
Recipient Device	Type the Device Instance from SiteBuilder (or from the network administrator for third-party devices) in the # field.

Network Number	Specify the number of the BACnet network on which to send the notification.  TIP For the home network, this can be set to 0.
MAC Address	MAC address of the recipient software or device.
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 receive.
Off Normal	BACnet priority for Alarms.
Fault	BACnet priority for Fault messages.
Normal	BACnet priority for Return-to-normal messages.
Days and Times to Send	
Monday to Sunday From Time To Time	Select days and times during which the recipient will receive alarms.
Process Identifier	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.
Acknowledgments Required	
To Fault Ack Required	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.
To Normal Ack Required	
To Off-Normal Ack Required	
Priority	
To Fault Priority	BACnet priority for Fault messages.
To Normal Priority	BACnet priority for Return-to-normal messages.
To Off Normal Priority	BACnet priority for Alarms.

Identification	
Notification Class	<p>A BACnet alarm's Notification Class defines:</p> <ul style="list-style-type: none"> • Alarm priority for Alarm, Fault, and Return to Normal states • Options for BACnet alarm acknowledgment • Where alarms should be sent (recipients) <p>Alarms in the i-Vu® application use Notification Class #1. The i-Vu® application is automatically a recipient of these alarms.</p>
Object Instance	The instance number of this BACnet Notification Class object. It must be unique within the BACnet Device that contains it.
Object Name	The alpha-numeric name of this BACnet Notification Class object.
Description	The description of this BACnet Notification Class object.

Controller Clock tab

The Controller Clock page provides the following information plus the items described in the table below:

- Date Format
- Local Date
- Time Format
- Local Time
- UTC Offset
- Daylight Saving Status
- Offset for Daylight Saving

Advanced Clock Options	
Clock Fall Date	Date the router uses when its real-time clock is invalid.
Clock Fall Time	Time the router uses when its real-time clock is invalid.
Network Time Protocol	

To define an NTP server to use for time synchronization:

- 1 Click **Add**.
- 2 Define **Server** by one of the following:
 - **IP Address**
 - **Host name**
 - **Fully qualified domain name**

NOTE DNS has to be set up on the **Eth0/Eth1 Port** tab in order to use names on NTP.

- 3 Check the **Enable** box.
- 4 Click **Restart**.

BACnet Time Synchronization

Time Synchronization Sensitivity

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.

Time Broadcaster will synchronize time every

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.

Time Synchronization Recipients

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

- 1 Click **Add**.
 - 2 Select **Recipient Type**:
 - **Device ID**
 - **Address**
 - **Local Broadcaster**
 - **Global Broadcaster**
 - 3 Enter the **Recipient Device** information.
 - 4 Click **Accept**.
-

Color Cache tab

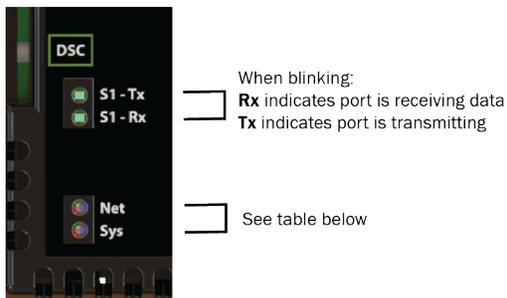
Cache Group Number	For use by the i-Vu® system
Peer Caching Enabled	This checkbox will be checked for the router that was defined in SiteBuilder as the peer caching router.
Disable Color Cache	<p>Clear (enable) to improve responsiveness of retrieving thermographic colors and prime values from networked controllers. See <i>EIKON® Help</i> for more information regarding thermographic colors and prime values.</p> <p>Select (disable) to reduce network traffic to third-party (non-color-supporting) devices.</p> <p>NOTE Selecting this checkbox also disables Dead Controller Timeout alarms.</p>
Dead Controller Timeout	After this period (minutes:seconds) of non-response from a peer Carrier® controller, the router sends an alarm to the server as defined by the Dead Controller Timeout alarm configuration.
Reports Colors To	The BACnet Object Identifier of the router that was defined in SiteBuilder as the peer caching router.

Network tab

Device Host Name	<p>Device name identified on the IP network. Primarily used for DHCP to help the IT administrator identify this device on their network.</p> <p>Characters allowed are:</p> <ul style="list-style-type: none">• ASCII letters from A to Z, lower or upper case• 0 to 9• hyphen <p>A Host Name may not start with a hyphen or have only numerals</p>
Enable Proxy	Enable this checkbox if the communication interface needs to get through a proxy firewall to communicate out to other networks.
Proxy Server Address	<p>Set the IP address of the proxy host.</p> <p>NOTE If you have a DNS set up on the Eth0/Eth1 Port tab, you can use the DNS name of the proxy server here.</p>
Proxy Port	Set the port for communication on the proxy host.
Proxy Username	Set a username if required to authenticate on the proxy server.
Proxy Password	Set a password if required to authenticate on the proxy server.
No Proxy For	Set addresses that do not require passing through the proxy to communicate. These addresses are typically exempt from the proxy requirements.

Troubleshooting

LEDs



Color	Pattern	Condition	Message in Module Status
Red	On	Ethernet connection problem	No Ethernet Link
Red	1 blink	BACnet/IP (Ethernet) DLL reporting issue <ul style="list-style-type: none"> Unable to create datalink Unable to open socket for BACnet port 	BACnet/IP Not Running
Red	2 blinks	Current default IP address does not match	Default IP Address mismatch
Red	4 blinks	<ul style="list-style-type: none"> There was an error getting an IPv4 address using DHCP or an IPv6 address using SLAAC 	DHCP or SLAAC Error
Red	5 blinks	An error was detected in the NAT configuration.	NAT Configuration Error Detected
White	On	Error connecting to the Primary BACnet/SC hub, but connection to the BACnet/SC failover hub was successful	BACnet/SC Connected to Failover Hub
White	1 blink	Unable to connect to BACnet/SC Hub	BACnet/SC Not Connected
Blue	2 blinks	Controller has same MAC address as another connected controller	MSTP - Duplicate Address detected
Blue	3 blinks	Controller is sole master on the bus	MSTP - No peers
Blue	4 blinks	Excessive errors detected over 4 second period	MSTP - Communication Errors
Blue	6 blinks	Error(s) detected in configuration of MSTP datalinks	Configuration error

Color	Pattern	Condition	Message in Module Status
Green	On		No Errors

SYS (System Status) Tricolor LED

Color	Pattern	Condition	Message in Module Status
Red	On	Ethernet connection problem	No Ethernet Link
Red	1 blink	More than 4 consecutive restarts from a prior fatal error condition	Controller Halted
Red	2 blinks		Auto Restart Delay
Red	3 blinks	At least one control program halted. A program could be halted due to one of the following reasons: <ul style="list-style-type: none"> • Unable to allocate memory • No memory for schedule • Unsupported microblock Parameter error	Controller Program Stopped
Red	Fast blinks		Fatal error detected
Blue	On	Uboot execution	Uboot
Blue	Slow blinks	Linux loads all the services and runs all the startup scripts	Linux startup
Blue	Fast blinks	Linux is running but application is not	Firmware Load Failure Firmware Files Missing Failsafe
Green	On	All enabled networks are functioning properly	No errors
Green	2 blinks		Application Download in Progress
Green	3 blinks		Download Required
Orange	Slow blinks	Linux has finished booting and started the firmware application	Firmware Application is Starting

To get a Module Status (ModStat)

A ModStat provides information about the router and verifies proper network communication with the router. To view the ModStat:

- In the i-Vu® application—Right-click the router on the **Network** tree, then select **Module Status**.
- In the i-Vu® application—Select the router on the **Network** tree. On the **Properties** page, click **Module Status**.
- On the controller setup **ModStat** tab—See To set up the controller through the Comm/Service ports.

See Appendix - Module Status field descriptions.

To get a Device Log

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

- 1 Select the TV-CRB-E2 in the i-Vu® **Network** 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 driver page.

To get the TV-CRB-E2's serial number

If you need the router's serial number when troubleshooting, the number is on:

- A Module Status report (Modstat).
- A laser-etched number and QR code on the circuit board inside the router.
- A sticker on the front with the serial number, MAC address, and a QR code.
- In the driver properties or controller setup interface under  > **Dashboard** tab > **Controller Status** > .

See To get a Module Status report.

To replace the TV-CRB-E2's fuse

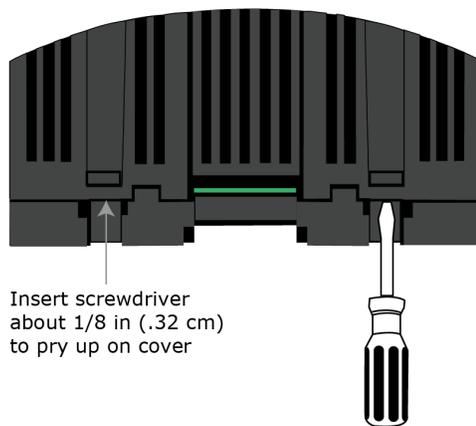
The TV-CRB-E2 has one fuse. If the TV-CRB-E2's power  LED is not lit, this could be due to a blown power fuse.

If you suspect a fuse is blown, remove the fuse as described below, and use a multimeter to check it. If the fuse is blown, try to determine why it blew before you replace it. Check the power wiring polarity of the TV-CRB-E2 and any other devices that share the power supply. Use the same polarity for all of them.

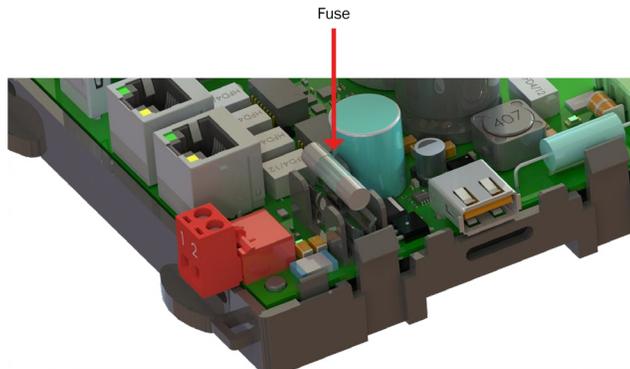
You can purchase the 3A, fast-acting, 5mm x 20mm glass fuse from Littelfuse, mfr part #0235003.MXP

To replace the fuse:

- 1 Remove power from the device.
- 2 On both ends of the device, insert a small flathead screwdriver as shown below, and then gently pry up the cover until it is released from the base.



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



- 5 Use the fuse puller to snap the new fuse into the fuse holder.
- 6 Replace the device's cover.

- 7 Restore power to the device.
- 8 Verify that the  LED on top of the router is on.

To revert to default settings

 **WARNING** This erases all archived information and user-configured settings. When recovery is complete, you must connect locally to the TV-CRB-E2 and manually reconfigure all BACnet, IP, and firewall information once the recovery is complete. We highly recommend that you revert the default settings only under the guidance of Carrier® Technical Support.

- 9 Copy the newest driver to the root directory of a FAT32-formatted USB flash drive.

NOTE To verify that you have the driver's latest version, go to the Carrier® Partner Community website. Compare the latest version to the TV-CRB-E2's driver in SiteBuilder.

- 10 Remove power from the TV-CRB-E2.
- 11 Press and keep holding the DSC button on the router, apply power, and release button after the **Sys** and **Net** LEDs change to flashing magenta.
- 12 Plug the USB flash drive into the router's USB port.

 **WARNING** Do not remove power or the USB flash drive until the **Sys** LED turns solid green and the **Net** LED turns solid magenta. This process could take several minutes to complete.

- 13 Remove power from the TV-CRB-E2.
- 14 Remove the USB drive from the USB port.
- 15 Apply power to the TV-CRB-E2.

NOTE The router is now running the new version of the firmware and is in the default state.
- 16 In SiteBuilder, configure the Device Instance, Network Number, and address so that the router can communicate with the server. Set these values by selecting an item in the **Network** tree.
- 17 In SiteBuilder, assign the new driver version to the router.
- 18 To recover the router's previous parameters and programs, click **Download all content** from the i-Vu® **Downloads** page.

To take the TV-CRB-E2 out of service

If needed for troubleshooting or start-up, you can stop communication between the i-Vu® application and the TV-CRB-E2.

- 1 On the i-Vu® **Network** tree, select the TV-CRB-E2.
- 2 On the **Properties** page, check **Out of Service**.
- 3 Click **Accept**.

Compliance

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 and UKCA Compliance



WARNING This is a Class B product. In a light industrial 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

Field	Description
Product Name	Identifies the Product Type
Version	The version of the driver
Date/Time	Date and time the Modstat was run
Product Serial Number	The serial number of the module set at the factory
Operating System Java Version Processor Architecture	Underlying hardware and software architecture of the router
Device Instance	A unique ID assigned to the router
Number of BACnet Objects	The number of BACnet objects that were created in the device and the number of those objects that are trends or events.
Model Name	Identifies the Product Type
Downloaded by	When and where the last download was performed
Memory	Total size of the router's memory and the amount being used for the application and short term memory. Cleanup indicates the rate of memory cleanup.
Reset Counters	<p>The number of times each of the following events have occurred since the last time the router was commanded to clear the reset counters. See NOTE below this table.</p> <p>Power failures—Interruption of incoming power</p> <p>Commanded boots—Includes commands issued from the i-Vu® interface such as the zap manual command, plus commands issued during a memory download.</p> <p>System errors—Error in the router's firmware or hardware</p> <p>S/W Watchdog timeouts—Watchdog is firmware that monitors the application firmware for normal operation. If the watchdog firmware detects a problem, it restarts the application firmware.</p> <p>H/W Watchdog timeouts—H/W Watchdog will restart the router if it detects a severe problem with the router's operating system</p>
Network Information	The various network addresses for the router. The Current and Assigned addresses will be the same unless there are configuration changes that have not been activated.

Field	Description
BBMD Configuration	Shows the following information for each active IP network: BBMD Active shows whether the BACnet Broadcast Management Device is currently active (true) or inactive (false). BBMD Entries —the number of entries in the BBMD table (500 maximum). FDT Entries —the number of entries in the Foreign Device Table (500 maximum).
BACnet/SC Information	BACnet/SC connection status as of when the Modstat was run. Also shows the web addresses used to access the primary and/or failover hubs.
BACnet/SC Certificates	Lists the operational certificates and certificate authorities installed on the router, with expiration information.
Routing Information	BACnet networks that a router is currently routing traffic to. The list changes as BACnet routers are added or removed from the system.
Router statistics	Dropped Packets —Data packets that could not be delivered. Route Not Found —Packets that could not be delivered because the requested network does not exist. Route Unreachable —Routed packets whose destination network is either busy or offline. Router Sourced Packets —Shows the number of packets initiated by the router that are not in response to a request from another device.
Device statistics	Shows the number of incoming and outgoing unicast and broadcast packets for each of the router's networks. Dropped incoming indicates the number of incoming packets that could not be delivered.
BACnet/IP Statistics	Rx Unicasts —BACnet/IP packets received from a single BACnet device. Tx Unicasts —BACnet/IP packets transmitted to a single BACnet device. Rx Broadcasts —BACnet/IP broadcast packets received by the TV-CRB-E2. Tx Broadcasts —BACnet/IP broadcast packets transmitted by the TV-CRB-E2. Whitelist Rejections (if BACnet Firewall is enabled)—Messages blocked by the BACnet Firewall because the IP address that sent the message was not in the whitelist.
Eth0/Eth1 Port Statistics	Rx packets —All packets (including non-BACnet packets such as a ping) received by the TV-CRB-E2. Tx packets —All packets (including non-BACnet packets such as a ping) transmitted by the TV-CRB-E2. Rx Error Count —All errors related to received packets such as CRC errors, FIFO errors, frame errors, length errors, missed errors, and overrun errors. Tx Error Count —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 TV-CRB-E2.

Field	Description
Base and Core board hardware	<p>Gives the following information about the router's boards:</p> <ul style="list-style-type: none"> • Type and board numbers that are used internally by Carrier®. • The manufacture date and serial number.
System status	Gives the current status of the router's operation. See LEDs for all possible conditions.
Network status	Gives the current status of the router's networks. See LEDs for all possible conditions.
Driver	The name, version, and date of the driver, as well as all the bundles and versions.
Switch Settings	<p>Protocol Rotary—The router's rotary switch setting for Port S1 protocol</p> <p>Address Rotary—The router's rotary switch address (MAC address)</p> <p>Port S1 End of Network—End of Network switch position for Port S1</p> <p>Port S2 End of Network—End of Network switch position for Port S2</p>
System error message history	<p>High-severity errors since the last memory download. Shows the most recent 10 messages.</p> <p>See NOTE below this table.</p>
Warning message history	<p>Low-severity errors and warning messages since the last memory download. Shows the most recent 10 messages.</p> <p>See NOTE below this table.</p>
Information message history	<p>Information-only messages since the last memory download. Shows the most recent 10 messages.</p> <p>See NOTE below this table.</p>

NOTE To clear the Reset counters and the three message history fields, click the **Clear Counts/Logs** button on the router's **Properties** page in the i-Vu® application. To delete all logs, including current logs, click the **Delete All** button in the **Home > Diagnostics** tab under **Logs**.

Document revision history

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

Date	Topic	Change description	Code*

* For internal use only



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