

## EMX®

Thank you for purchasing the EMX rack management system and asset management strips (asset strips). This product provides a rack management solution that integrates both asset management and environment monitoring capabilities in the data center and server room.

This Quick Setup Guide explains how to install and configure the EMX. For additional information on any aspect of EMX, see EMX help, which can be accessed from the **Product Support** (<http://www.raritan.com/support>) section of Raritan's website. Or you can access the product's online help in the Product Online Help section (<http://www.raritan.com/support/online-help/>).

For more detailed information, see the latest release notes provided by Raritan.

### Package Contents

The following describes the equipment shipped with an EMX device. If anything is missing or damaged, contact the local dealer or Raritan Technical Support for help.

- The EMX device
- Power cord
- Bracket pack and screws
- Asset strips (optional)
- Asset tags (optional)

### Before You Begin

Prepare the installation site. Make sure the installation area is clean and not exposed to extreme temperatures or humidity. Allow sufficient space around the EMX for cabling and asset strip connections.

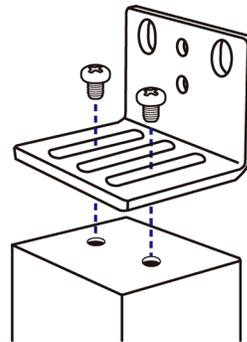
### Mounting a Zero U EMX

This section describes how to mount a Zero U EMX device using L-brackets and two buttons.



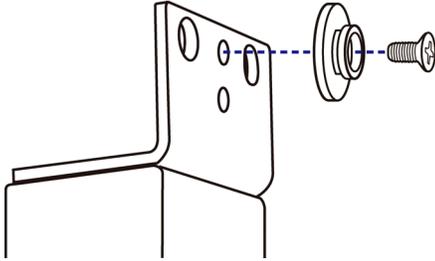
#### ► To mount Zero U models using L-brackets and two buttons:

1. Align the two edge slots of the L-bracket with the two screw holes on the top of the EMX device.
2. Screw the L-bracket to the device and ensure the bracket is fastened securely.



3. Repeat Steps 1 to 2 to screw another L-bracket to the bottom of the device.
4. After both L-brackets are installed, you can choose either of the following ways to mount the device in the rack.
  - Using rack screws, fasten the device to the rack through two identical holes near the edge of each L-bracket.

- Mount the device by screwing a mounting button in the back center of each L-bracket and then having both buttons engage the mounting holes in the rack. The recommended torque for the button is 1.96 N·m (20 kgf·cm).

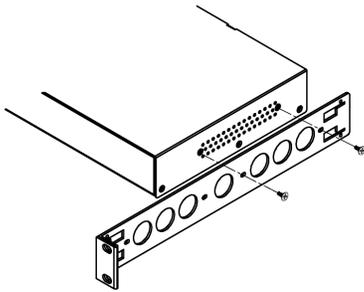


## Mounting a 1U EMX

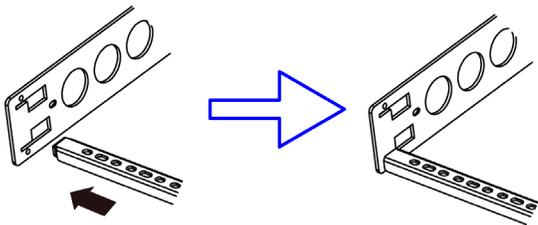
Using the appropriate brackets and tools, fasten the 1U EMX device to the rack or cabinet.

### ► To mount the 1U EMX device:

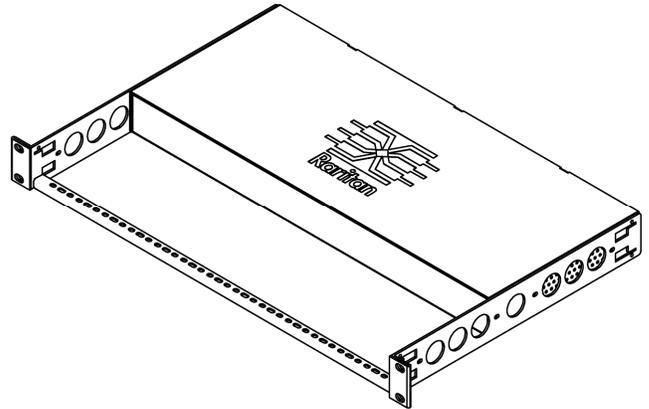
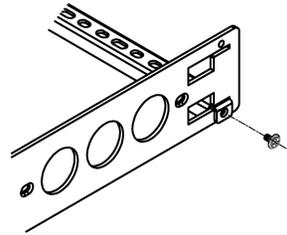
1. Attach a rackmount bracket to both sides of the EMX with the provided screws.



2. Insert the cable-support bar into rackmount brackets.



3. Secure with the provided end cap screws.



4. Fasten the rackmount brackets' ears to the rack using your own fasteners.

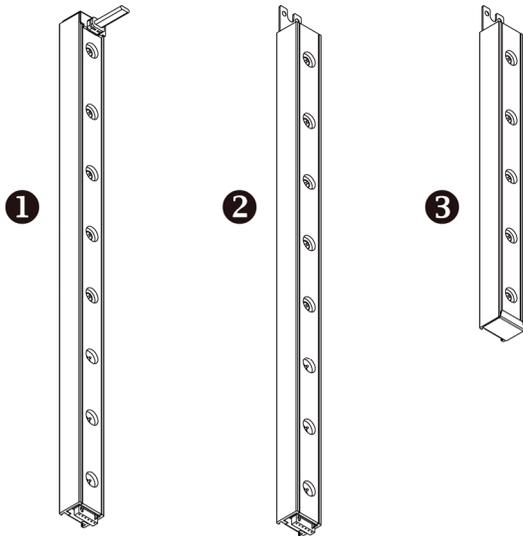
## Introduction to Regular Asset Strips

Each tag port on the regular asset strips corresponds to a rack unit and can be used to locate IT devices in a specific rack (or cabinet).

For each rack, you can attach asset strips up to 64U long, consisting of one MASTER and multiple SLAVE asset strips.

The difference between the master and slave asset strips is that the master asset strip has an RJ-45 connector while the slave does not.

The following diagram illustrates some asset strips. Note that Raritan provides more types of asset strips than the diagram.



①	8U MASTER asset strip with 8 tag ports
②	8U SLAVE asset strip with 8 tag ports
③	5U "ending" SLAVE asset strip with 5 tag ports

Note: Unlike general slave asset strips, which have one DIN connector respectively on either end, the ending slave asset strip has one DIN connector on only one end. An ending asset strip is installed at the end of the asset strip assembly.

## Introduction to Asset Tags

You need both asset strips and asset tags for tracking IT devices.

Asset tags provide an ID number for each IT device. The asset tags are adhered to an IT device at one end and plugged in to an asset strip at the other.

The asset strip is connected to the EMX, and the asset tag transmits the ID and positioning information to the asset strip.

The following diagram illustrates an asset tag. Note that there are two types of asset tags: non-programmable and programmable tags. The only difference is that programmable asset tags allow you to customize each tag's ID or barcode number while non-programmable ones have factory default ID or barcode numbers, which you cannot change.



<b>A</b>	Barcode (ID number), which is available on either end of the "non-programmable" asset tag
<b>B</b>	Tag connector
<b>C</b>	Adhesive area with the tape

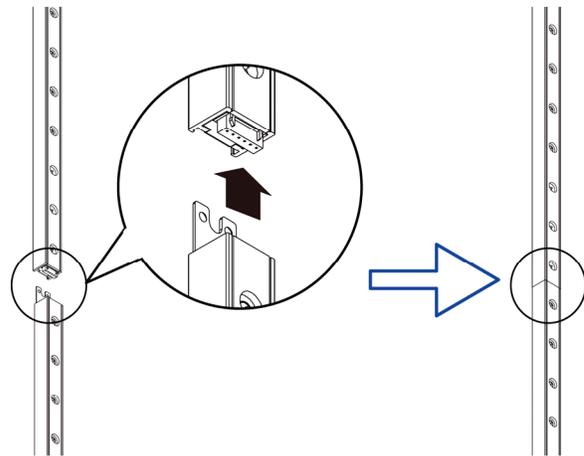
Note: The barcode of each "non-programmable" asset tag is unique and is displayed in the EMX device's web interface for identification.

## Assembling Regular Asset Strips

Before connecting regular asset strips to the EMX, you must assemble them.

### ► To assemble regular asset strips:

1. Connect all regular asset strips up to 64U. For detailed information, see the user documentation accompanying Raritan asset strips.



- a. The MASTER asset strip is installed as the first one in the asset strip assembly.
  - b. All SLAVE asset strips are connected following the MASTER asset strip.
  - c. The "ending" slave asset strip is installed as the final one.
2. Vertically attach the asset strip assembly to the rack, next to the IT equipment, making each tag port horizontally align with a rack unit.  
The asset strips are automatically attracted to the rack because of magnetic stripes on the back.

## Connecting Regular Asset Strips to EMX

The EMX supports a cabling distance up to 10 meters for each connected asset strip assembly.

For EMX2-111, a Raritan X cable is required for connecting asset strips, or the EMX2-111 CANNOT detect them.

► **To connect regular asset strips to the EMX:**

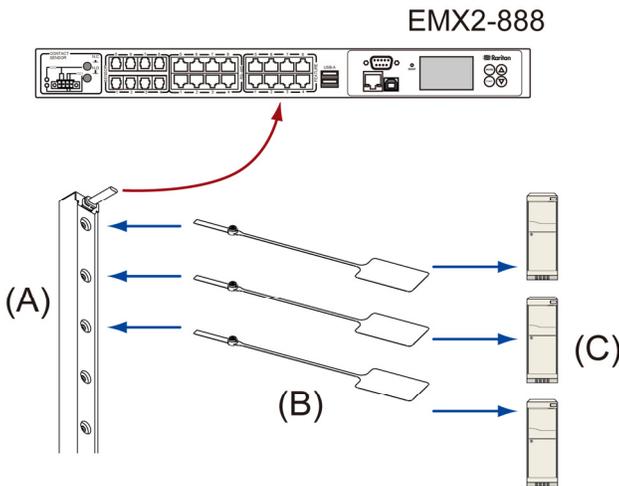
1. Affix the adhesive end of an asset tag to each IT device through the tag's tape.
2. Plug the connector of each asset tag into the corresponding tag port on the asset strip.
3. Connect the asset strip assembly to the EMX device, using a network patch cable (CAT5e or higher).  
See the following instructions, based on the model you purchased.

In both of the following diagrams, items represented by letters are:

(A)	MASTER asset strip
(B)	Asset tags
(C)	IT devices
(D)	Raritan X cable

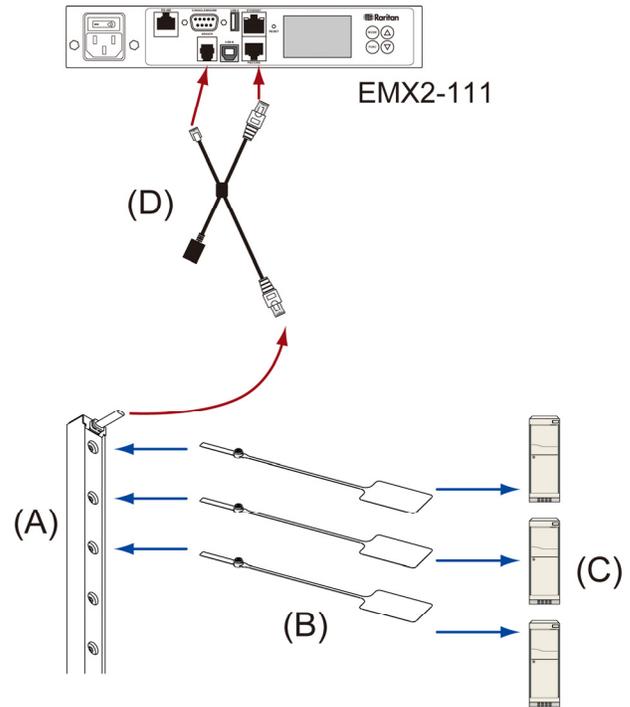
• **EMX2-888 models:**

Use a standard network patch cable to connect the MASTER asset strip's RJ-45 connector to a FEATURE port on the EMX2-888.



• **EMX2-111 models:**

- a. Connect the MASTER asset strip's RJ-45 connector to the male RJ-45 connector at the longer end of the Raritan X cable.
- b. Plug the male RJ-12 phone connector at the shorter end of the X cable into the RJ-12 SENSOR port on the EMX device.
- c. Plug the male RJ-45 connector at the shorter end of the X cable into the FEATURE port on the EMX device.



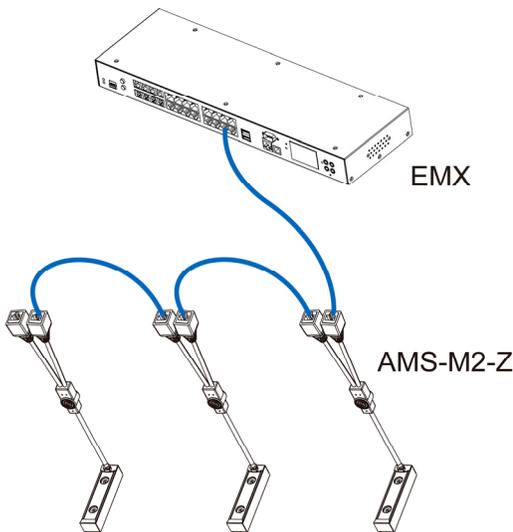
## Other Types of Asset Strips

Raritan provides more types of asset strips than regular asset strips, such as composite asset strips or blade extension strips. For detailed information, see the user documentation accompanying Raritan asset strips.

► **Composite asset strips:**

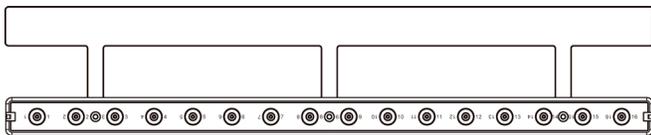
- A composite asset strip is named AMS-Mx-Z, where x is a number, such as AMS-M2-Z or AMS-M3-Z.
- A composite asset strip has two RJ-45 connectors but less tag ports.
- The composite asset strip is especially useful for tracking large devices such as SAN boxes in the cabinet.

- Composite asset strips can be daisy chained as shown below.



▶ **Blade extension strips:**

- For blade servers, which are contained in a single chassis, you can use a blade extension strip to track individual blade servers.
- A blade extension strip contains 4 to 16 tag ports. Below shows a blade extension strip with 16 tag ports.



- The blade extension strip is connected to a tag port on a regular or composite asset strip via a Raritan's tag connector cable.

## Connecting the EMX to a Power Source

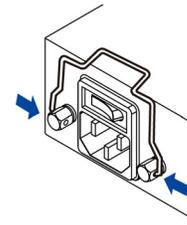
If your EMX device is designed to use a cable retention clip, install the clip before connecting a power cord. A cable retention clip prevents the connected power cord from coming loose or falling off.

The use of cable retention clips is highly recommended for regions with high seismic activities, and environments where shocks and vibrations are expected.

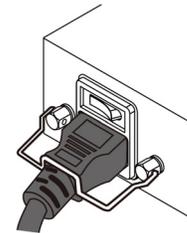


▶ **To connect the EMX to a power source:**

1. Install the cable retention clip by inserting both ends into the tiny holes on two hexagon screws adjacent to the power socket.



2. Plug one end of the Raritan-provided power cord into the power socket, and press the cable retention clip toward the power cord until it holds the cord firmly.



3. Connect the other end of the power cord to an appropriate power source.

## Connecting the EMX to Your Network

1. Connect a standard network patch cable to the ETHERNET port on the EMX.
2. Connect the other end of the cable to your LAN.

Note: You can also connect to a wireless network. See [Appendix B: Wireless Configuration](#) (on page 9).

## EMX Configuration

Note: If your networking environment is not the DHCP IPv4 networking environment, for example, an IPv6 network, refer to [Appendix A: Configuration via a Connected Computer](#) (on page 6) for initial configuration.

### Step 1: Display the IPv4 Address

The DHCP-assigned IPv4 address is available using the front panel display.



▶ **To display the IPv4 address:**

1. Press the MODE button to enter the Device mode, indicated by an alphabet "d" at the top left of the display.
2. The LCD display cycles between the four octets of the IPv4 address, indicated by "i4" at the upper right corner of the display.

For example, 192.168.84.4 cycles in this sequence:

Note: If your network only supports IPv6 or DHCP is unavailable, the IP address must be configured through a direct connection to a computer. See **Appendix A: Configuration via a Connected Computer** (on page 6).

## Step 2: Log in to the EMX Web Interface

1. Open a web browser and type the IP address of the EMX device.
  - If the link-local addressing has been enabled, you can type `pdu.local` instead of an IP address. See **Appendix A: Configuration via a Connected Computer** (on page 6).
2. Accept any security warnings that may appear.
3. Type the default user credentials and click Login.
  - User name: `admin`
  - Password: `raritan`
4. When prompted to change the password, change or ignore it.
  - To change it, type the new password and click Ok.
  - To ignore it for this time only, click Not Now.
  - To ignore it permanently, select "Do not ask again" and click Not Now.



## Step 3: Configure the EMX

After logging in to the EMX web interface, you can:

- Use the menu in the left pane to configure connected assets strips and environmental sensor packages.
- Use the menu to change network settings, set the system date and time, create user profiles, set privileges and security.

## Connecting Environmental Sensors (Optional)

An EMX provides SENSOR port(s) for connecting Raritan environmental sensor packages so that you can remotely monitor environmental factors, such as temperature and humidity, around the rack.

- For sensor connection instructions, see the EMX User Guide or Online Help.
- For detailed information on each sensor package, refer to the Environmental Sensors Guide or Online Help on the Raritan website's **Support page** (<http://www.raritan.com/support/>).

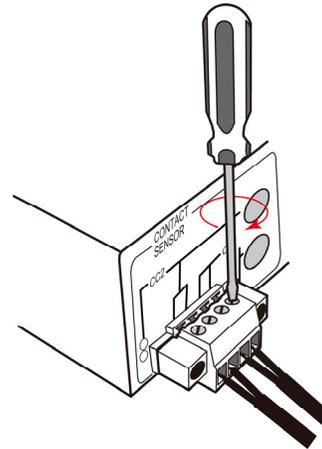
## EMX2-888 Contact Closure Sensor Terminals

EMX2-888 provides two built-in contact closure (CC) sensor channels for connecting Raritan's or third-party contact closure detectors/switches.

**Important: It is not guaranteed that all third-party detectors/switches are compatible with the EMX. You need to test the compatibility after installing them.**

### ► To connect detectors to the built-in CC termination:

1. Strip the insulation around 12 mm from the end of each wire of discrete detectors/switches.
2. Fully insert each wire of the detectors/switches into each termination point on the EMX2-888.
3. Use a screwdriver with a 2.5 mm wide shaft to tighten the screws above each termination point to secure the wires, using a torque of 0.196 N·m [2 kgf·cm].



## Appendix A: Configuration via a Connected Computer

To use the command line interface (CLI) for configuration, establish an RS-232 or USB connection.

To use a web browser for configuration, make a network connection to the computer. The EMX is automatically configured with the following link-local addressing in any network without DHCP available:

- `https://169.254.x.x` (where x is a number)
- `https://pdu.local`

## Step 1: Connect the EMX to a Computer

Establish one of the following connections to a computer.

### ► Serial connection for "DB9" RS-232 connector on EMX:

1. Connect one end of the null-modem DB9 cable to the male "DB9" RS-232 port labeled CONSOLE / MODEM on the EMX.

2. Connect the other end to your computer's RS-232 port (COM).
3. Perform **Step 2: Configure the EMX via CLI (Optional)** (on page 7).
  - ▶ **USB connection:**
    1. A USB-to-serial driver is required in Windows®. Install this driver before connecting the USB cable. See **Installing the USB-to-Serial Driver (Optional)** (on page 9).
    2. Connect a USB cable between the EMX device's USB-B port and a computer's USB-A port.
    3. Perform **Step 2: Configure the EMX via CLI (Optional)** (on page 7).
  - ▶ **Direct network connection:**
    1. Connect one end of a standard network patch cable to the ETHERNET port of the EMX.
    2. Connect the other end to a computer's Ethernet port.
    3. On the connected computer, launch a web browser to access the EMX, using either link-local addressing: *pdu.local* or *169.254.x.x*. See **EMX Configuration** (on page 5). You CANNOT use the CLI for this connection.

Note: Make sure the computer's wireless interface is disabled.

## Step 2: Configure the EMX via CLI (Optional)

You perform the following over an **RS-232** or **USB** connection only.

- ▶ **To configure the EMX via CLI:**
  1. On the computer connected to the EMX, open a communications program such as HyperTerminal or PuTTY.
  2. Select the appropriate COM port, and set the following port settings:
    - Bits per second = 115200 (115.2Kbps)
    - Data bits = 8
    - Stop bits = 1
    - Parity = None
    - Flow control = None

Tip: For a USB connection, you can determine the COM port by choosing Control Panel > System > Hardware > Device Manager, and locating the "Dominion EMX Serial Console" under the Ports group.

3. In the communications program, press Enter to send a carriage return to the EMX.
4. The EMX prompts you to log in. Both user name and password are case sensitive.
  - a. Username: admin

- b. Password: raritan (or a new password if you have changed it).
5. If prompted to change the default password, change or ignore it.
  - To change it, follow onscreen instructions to type your new password.
  - To ignore it, simply press Enter.
6. The # prompt appears.
7. Type `config` and press Enter.
8. To configure network settings, type appropriate commands and press Enter. Refer to the following commands list. CLI commands are case sensitive.
9. After finishing the network settings, type `apply` to save changes. To abort, type `cancel`.

- ▶ **Commands for wired networking:**

The `<ipvX>` variable in the following commands is either *ipv4* or *ipv6*, depending on the type of IP protocol you are configuring. Replace the `<ETH>` variable with the word 'ethernet' when you are configuring the wired networking.

- **General IP settings:**

To set or enable	Use this command
IPv4 or IPv6 protocol	<code>network &lt;ipvx&gt; interface &lt;ETH&gt; enabled &lt;option&gt;</code>  <code>&lt;option&gt; = true, or false</code>
IPv4 configuration method	<code>network ipv4 interface &lt;ETH&gt; configMethod &lt;mode&gt;</code>  <code>&lt;mode&gt; = dhcp (default) or static</code>
IPv6 configuration method	<code>network ipv6 interface &lt;ETH&gt; configMethod &lt;mode&gt;</code>  <code>&lt;mode&gt; = automatic (default) or static</code>
Preferred host name (optional)	<code>network &lt;ipvx&gt; interface &lt;ETH&gt; preferredHostName &lt;name&gt;</code>  <code>&lt;name&gt; = preferred host name</code>
IP address returned by the DNS server	<code>network dns resolverPreference &lt;resolver&gt;</code>  <code>&lt;resolver&gt; = preferV4 or preferV6</code>

- **Static IP configuration:**

To set	Use this command
Static IPv4 or IPv6 address	<pre>network &lt;ipvX&gt; interface &lt;ETH&gt; address &lt;ip address&gt;</pre> <p>&lt;ip address&gt; = static IP address, with a syntax similar to the example below. Example: <i>192.168.7.9/24</i></p>
Static IPv4 or IPv6 gateway	<pre>network &lt;ipvX&gt; gateway &lt;ip address&gt;</pre> <p>&lt;ip address&gt; = gateway's IP address</p>
IPv4 or IPv6 primary DNS server	<pre>network dns firstServer &lt;ip address&gt;</pre> <p>&lt;ip address&gt; = DNS server's IP address</p>
IPv4 or IPv6 secondary DNS server	<pre>network dns secondServer &lt;ip address&gt;</pre> <p>&lt;ip address&gt; = DNS server's IP address</p>
IPv4 or IPv6 third DNS server	<pre>network dns thirdServer &lt;ip address&gt;</pre> <p>&lt;ip address&gt; = DNS server's IP address</p>

- ▶ **Commands for wireless networking:**
- **General wireless settings:**

To set or enable	Use this command
Wireless interface	<pre>network wireless enabled &lt;option&gt;</pre> <p>&lt;option&gt; = <i>true</i>, or <i>false</i></p>
SSID	<pre>network wireless SSID &lt;ssid&gt;</pre> <p>&lt;ssid&gt; = SSID string</p>
BSSID	<pre>network wireless BSSID &lt;bssid&gt;</pre> <p>&lt;bssid&gt; = AP MAC address or <i>none</i></p>
802.11n protocol	<pre>network wireless enableHT &lt;option&gt;</pre> <p>&lt;option&gt; = <i>true</i>, or <i>false</i></p>
Authentication method	<pre>network wireless authMethod &lt;method&gt;</pre> <p>&lt;method&gt; = <i>psk</i> or <i>eap</i></p>
PSK	<pre>network wireless PSK &lt;psk&gt;</pre> <p>&lt;psk&gt; = PSK string</p>
EAP outer authentication	<pre>network wireless eapOuterAuthentication &lt;outer_auth&gt;</pre> <p>&lt;outer_auth&gt; = <i>PEAP</i></p>

To set or enable	Use this command
EAP inner authentication	<pre>network wireless eapInnerAuthentication &lt;inner_auth&gt;</pre> <p>&lt;inner_auth&gt; = <i>MSCHAPv2</i></p>
EAP identity	<pre>network wireless eapIdentity &lt;identity&gt;</pre> <p>&lt;identity&gt; = your user name for EAP authentication</p>
EAP password	<pre>network wireless eapPassword</pre> <p>When prompted to enter the password for EAP authentication, type the password.</p>
EAP CA certificate	<pre>network wireless eapCACertificate</pre> <p>When prompted to enter the CA certificate, open the certificate with a text editor, copy and paste the content into the communications program.</p>

The content to be copied from the CA certificate does NOT include the first line containing "BEGIN CERTIFICATE" and the final line containing "END CERTIFICATE." If a certificate is installed, configure the following:

Whether to	Use this command
Verify the certificate	<pre>network wireless enableCertVerification &lt;option1&gt;</pre> <p>&lt;option1&gt; = <i>true</i> or <i>false</i></p>
Accept an expired or not valid certificate	<pre>network wireless allowOffTimeRangeCerts &lt;option2&gt;</pre> <p>&lt;option2&gt; = <i>true</i> or <i>false</i></p>
Make the connection successful by ignoring the "incorrect" system time	<pre>network wireless allowConnectionWithIncorrectClock &lt;option3&gt;</pre> <p>&lt;option3&gt; = <i>true</i> or <i>false</i></p>

- **Wireless IPv4 / IPv6 settings:**

Commands for wireless IP settings are identical to those for wired networking. Just replace the variable <ETH> with the word 'wireless'. The following illustrates a few examples.

To set or enable	Use this command
IPv4 configuration method	network ipv4 interface WIRELESS configMethod <mode>  <mode> = <i>dhcp</i> (default) or <i>static</i>
IPv6 configuration method	network ipv6 interface WIRELESS configMethod <mode>  <mode> = <i>automatic</i> (default) or <i>static</i>

► **To verify network settings:**

After exiting the above configuration mode and the # prompt re-appears, type this command to verify all network settings.

- show network

## Appendix B: Wireless Configuration

### USB Wireless LAN Adapters

The EMX supports the following USB Wi-Fi LAN adapters.

Wi-Fi LAN adapters	Supported 802.11 protocols
SparkLAN WUBR-508N	A/B/G/N
Proxim Orinoco 8494	A/B/G
Zyxel NWD271N	B/G
Edimax EW-7722UnD	A/B/G/N
TP-Link TL-WDN3200 v1	A/B/G/N
Raritan USB WIFI	A/B/G/N

Note: To use the Edimax EW-7722UnD or Raritan USB WIFI wireless LAN adapter to connect to an 802.11n wireless network, the handshake timeout setting must be changed to 500 or greater, or the wireless connection will fail.

### Supported Wireless LAN Configuration

If wireless networking is preferred, ensure that the wireless LAN configuration of your EMX matches the access point. The following is the wireless LAN configuration that the EMX supports.

- Network type: 802.11 A/B/G/N
- Protocol: WPA2 (RSN)
- Key management: WPA-PSK, or WPA-EAP with PEAP and MSCHAPv2 authentication
- Encryption: CCMP (AES)

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**Important: Supported 802.11 network protocols vary according to the wireless LAN adapter being used with the EMX. See *USB Wireless LAN Adapters* (on page 9).**

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### Making a Wireless Connection

Make the EMX connect to a wireless network as needed.

► **To make a wireless connection:**

Do one of the following:

- Plug a supported USB wireless LAN adapter into the USB-A port on your EMX.
- Connect a USB hub to the USB-A port on the EMX. Then plug the supported USB wireless LAN adapter into the appropriate USB port on the hub.

See *USB Wireless LAN Adapters* (on page 9) for a list of supported wireless LAN adapters.

## Appendix C: Other Information

### Installing the USB-to-Serial Driver (Optional)

The EMX can emulate a USB-to-serial converter over a USB connection. A USB-to-serial driver named "Dominion EMX Serial Console" is required for Microsoft® Windows® operating systems.

Download the Windows driver for USB serial console from the Raritan website's *Support page* (<http://www.raritan.com/support/>). The downloaded driver's name is *dominion-serial-setup-<n>.exe*, where <n> represents the file's version number.

There are two ways to install this driver: automatic and manual installation. Automatic driver installation is highly recommended.

► **Automatic driver installation in Windows®:**

1. Make sure the EMX is NOT connected to the computer via a USB cable.
2. Run *dominion-serial-setup-<n>.exe* on the computer and follow online instructions to install the driver.

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Note: If any Windows security warning appears, accept it to continue the installation.

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3. Connect the EMX to the computer via a USB cable. The driver is automatically installed.

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Note: Manual installation is required only if the automatic installation fails. See the section titled "Installing the USB-to-Serial Driver (Optional)" in the online help for manual installation procedure.

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► **In Linux:**

No additional drivers are required, but you must provide the name of the tty device, which can be found in the output of the



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"dmesg" after connecting the EMX to the computer. Usually the tty device is `"/dev/ttyACM#"` or `"/dev/ttyUSB#,"` where # is an integer number.

For example, if you are using the kermit terminal program, and the tty device is `"/dev/ttyACM0,"` perform the following commands:

```
> set line /dev/ttyACM0
> connect
```

### Additional Information

For more information about EMX and the entire Raritan product line, see Raritan's website ([www.raritan.com](http://www.raritan.com)). For technical issues, contact Raritan Technical Support. See the Contact Support page in the Support section on Raritan's website for technical support contact information worldwide.

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