

## EMX®

### Quick Setup Guide

Thank you for purchasing the EMX rack management system and asset management sensors (asset sensors). 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.

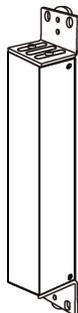
- The EMX device
- Power cord
- Bracket pack and screws
- Asset sensors (optional)
- Asset tags (optional)

### 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 sensor connections.

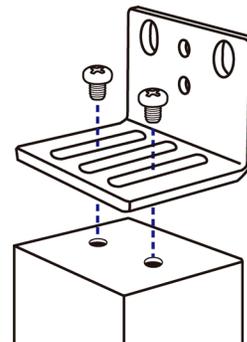
### Mounting a Zero U EMX

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



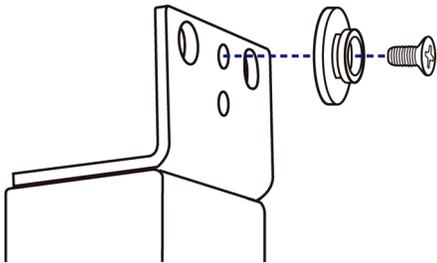
#### ► To mount Zero U models using L-brackets and two buttons:

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).

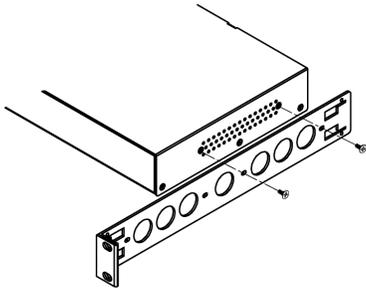


### Mounting a 1U EMX

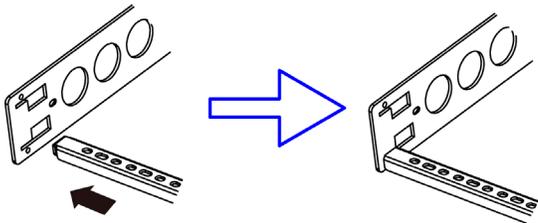
Using the appropriate brackets and tools, fasten the 1U EMX device to the rack or cabinet.

#### ► To mount the 1U EMX device:

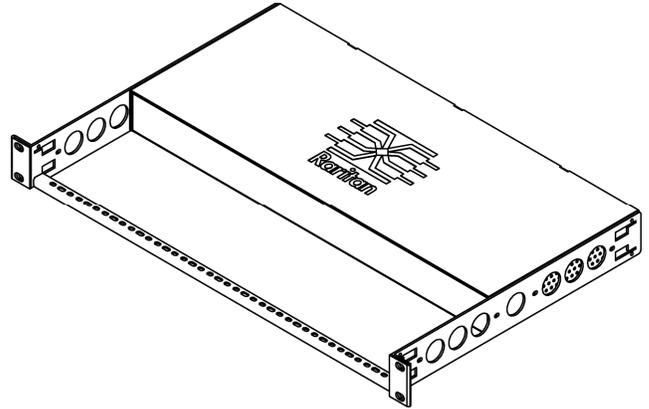
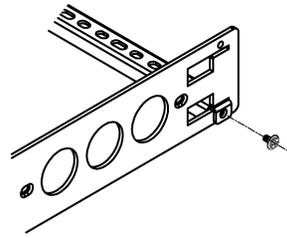
1. Attach a rackmount bracket to both sides of the EMX with the provided screws.



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.

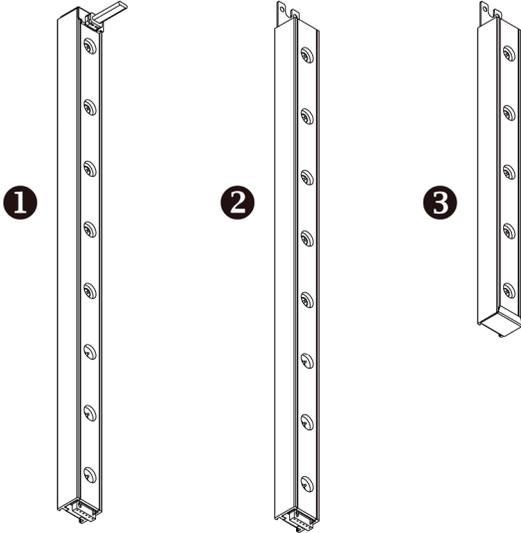
### Introduction to Regular Asset Sensors

Each tag port on the regular asset sensor 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 sensors up to 64U long, consisting of one MASTER and multiple SLAVE asset sensors.

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

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



|   |   |
|---|---|
| ① | 8U MASTER asset sensor with 8 tag ports         |
| ② | 8U SLAVE asset sensor with 8 tag ports          |
| ③ | 5U "ending" SLAVE asset sensor with 5 tag ports |

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

### Introduction to Asset Tags

You need both asset sensors 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 sensor at the other.

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

The following diagram illustrates an asset tag.



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

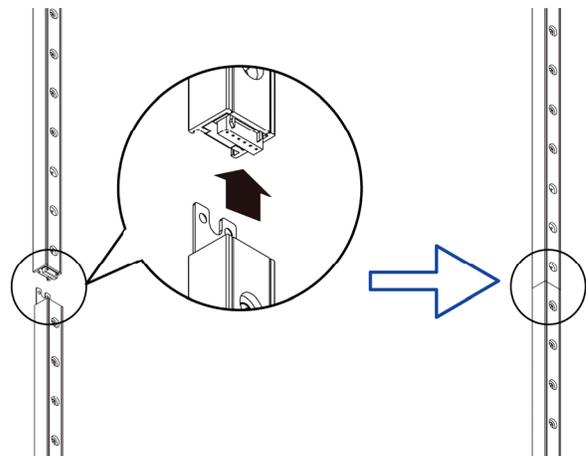
Note: The barcode of each asset tag is unique and is displayed in the EMX device's web interface for identification.

### Assembling Regular Asset Sensors

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

#### ► To assemble regular asset sensors:

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



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

### Connecting Regular Asset Sensors to the EMX

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

For EMX2-111, a Raritan X cable is required for connecting asset sensors at a distance ranging between 1 to 10 meters.

In the following diagrams, items represented by letters are:

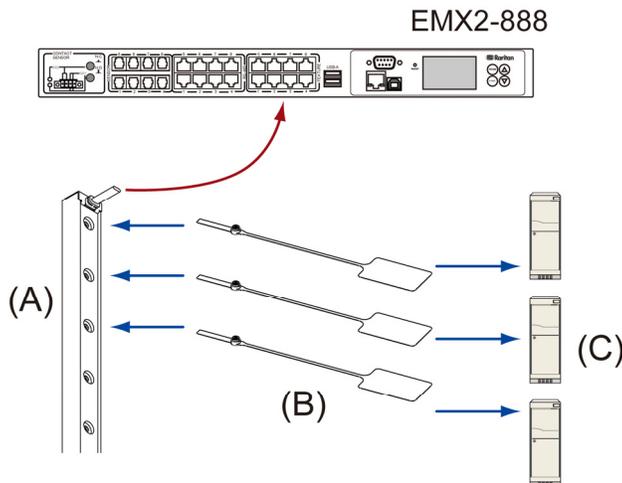
|     |                     |
|-----|---------------------|
| (A) | MASTER asset sensor |
| (B) | Asset tags          |
| (C) | IT devices          |
| (D) | Raritan X cable     |

► **To connect regular asset sensors 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 sensor.
3. Connect the asset sensor assembly to the EMX device, using a network patch cable (CAT5e or higher).  
See the following instructions, based on the model you purchased.

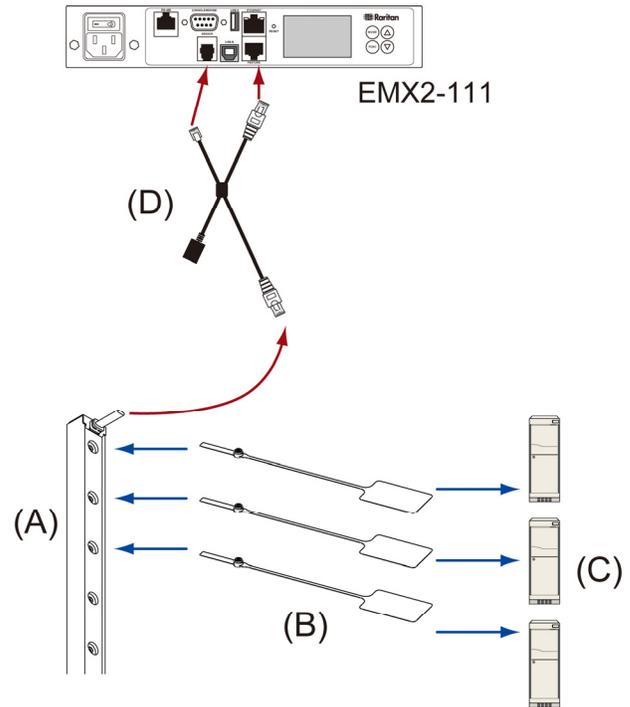
• **EMX2-888 models:**

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



• **EMX2-111 models:**

- a. Connect the MASTER asset sensor'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 SENSOR port on the EMX.
- c. Plug the male RJ-45 connector at the shorter end of the X cable into the FEATURE port on the EMX.



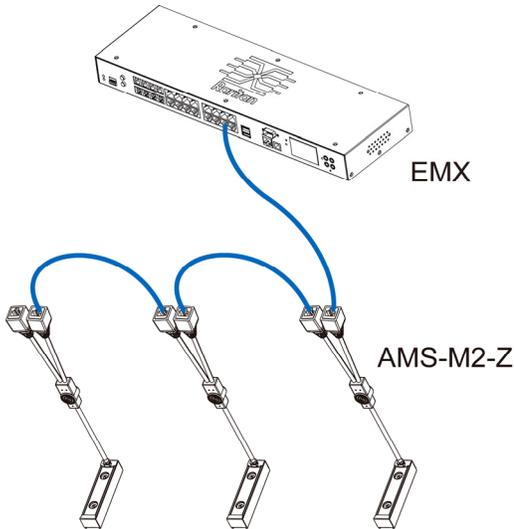
**Other Types of Asset Sensors**

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

► **Composite asset sensors:**

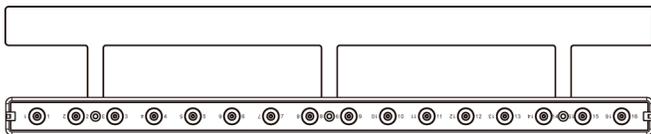
- A composite asset sensor is named AMS-Mx-Z, where x is a number, such as AMS-M2-Z or AMS-M3-Z.
- A composite asset sensor has two RJ-45 connectors but less tag ports.
- The composite asset sensor is especially useful for tracking large devices such as SAN boxes in the cabinet.

- Composite asset sensors 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 sensor via a Raritan's tag connector cable.

### Connecting the EMX to a Power Source

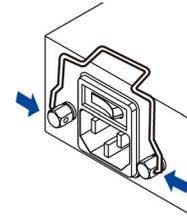
If your EMX device is designed to use a cable retention clip, install the clip before connecting a power cord. A cable retention clip prevents the connected power cord from coming loose or falling off.

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

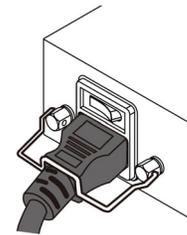


► **To connect the EMX device to a power source:**

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.

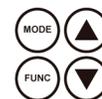
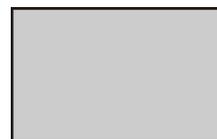
Note: You can also connect to a wireless network. See **Appendix B: Wireless Configuration** (on page 9).

### 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 7) 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:

192 --> 168 --> 84 --> 4

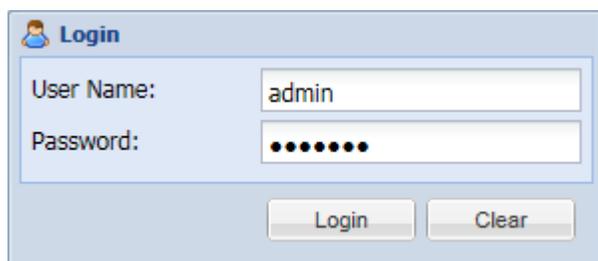
Note: If your network only supports IPv6 or DHCP is unavailable, the IP address must be configured through a direct connection to a computer. See **Appendix A: Configuration via a Connected Computer** (on page 7).

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

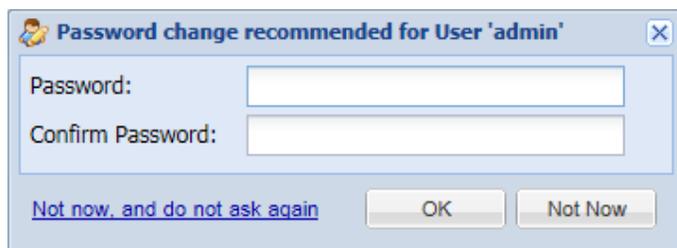
1. Open a web browser and type the IP address of the EMX device.
  - If the link-local addressing has been enabled, you can type *pdu.local* instead of an IP address. See **Appendix A: Configuration via a Connected Computer** (on page 7).



2. Accept any security warnings that may appear.
3. Type the default user name "admin" and password "raritan." Then click Login.



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, click "Not now, and do not ask again."

**Step 3: Configure the EMX**

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

- Use the navigation tree in the left pane to configure connected assets sensors and environmental sensor packages.
- Use the menu at the top of the web interface 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**

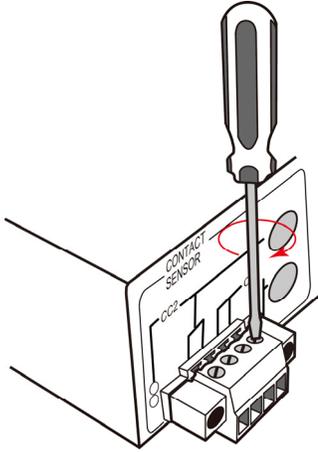
EMX2-888 provides two built-in contact closure (CC) sensor channels for connecting Raritan's or third-party contact closure detectors/switches.

**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.

- 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 RS-232 connection:

- Connect one end of the null-modem cable to the male RS-232 port labeled CONSOLE / MODEM on the EMX.
- Connect the other end to your computer's RS-232 port (COM).
- Perform **Step 2: Configure the EMX via CLI (Optional)** (on page 7).

#### ► USB connection:

- 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 10).
- Connect a USB cable between the EMX device's USB-B port and a computer's USB-A port.
- Perform **Step 2: Configure the EMX via CLI (Optional)** (on page 7).

#### ► Direct network connection:

- Connect one end of a standard network patch cable to the ETHERNET port of the EMX.
- Connect the other end to a computer's Ethernet port.
- 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.

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

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### 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:

- On the computer connected to the EMX, open a communications program such as HyperTerminal or PuTTY.
- 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

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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.

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- In the communications program, press Enter to send a carriage return to the EMX.
- The EMX prompts you to log in. Both user name and password are case sensitive.
  - Username: `admin`
  - Password: `raritan` (or a new password if you have changed it).
- 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.
- The `#` prompt appears.
- Type `config` and press Enter.
- To configure network settings, type appropriate commands and press Enter. All commands are case sensitive.
  - To set the networking mode, type this command:  
`network mode <mode>`  
where `<mode>` is `wired` (default) or `wireless`.

- b. For the wired network mode, you may configure the LAN interface settings. In most scenarios, the default setting (auto) works well and should not be changed unless required.

| To set                    | Use this command   |
|---------------------------|--|
| LAN interface speed       | network interface LANInterfaceSpeed <option><br><br><option> = <i>auto</i> , <i>10Mbps</i> , or <i>100Mbps</i> . |
| LAN interface duplex mode | network interface LANInterfaceDuplexMode <mode><br><br><mode> = <i>half</i> , <i>full</i> or <i>auto</i> .       |

Tip: You can combine multiple commands to configure multiple parameters at a time. For example, `network interface LANInterfaceSpeed <option> LANInterfaceDuplexMode <mode>`

- c. For the wireless network mode, you must configure the Service Set Identifier (SSID) parameter.

| To set | Use this command   |
|--------|--|
| SSID   | network wireless SSID <ssid><br><br><ssid> = SSID string |

If necessary, configure more wireless parameters shown in the following table.

| To set                   | Use this command   |
|--------------------------|--|
| BSSID                    | network wireless BSSID <bssid><br><br><bssid> = AP MAC address or <i>none</i>          |
| Authentication method    | network wireless authMethod <method><br><br><method> = <i>psk</i> or <i>eap</i>        |
| PSK                      | network wireless PSK <psk><br><br><psk> = PSK string                                   |
| EAP outer authentication | network wireless eapOuterAuthentication <outer_auth><br><br><outer_auth> = <i>PEAP</i> |

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

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   | network wireless enableCertVerification <option1><br><br><option1> = <i>true</i> or <i>false</i>            |
| Accept an expired or not valid certificate                             | network wireless allowOffTimeRangeCerts <option2><br><br><option2> = <i>true</i> or <i>false</i>            |
| Make the connection successful by ignoring the "incorrect" system time | network wireless allowConnectionWithIncorrectClock <option3><br><br><option3> = <i>true</i> or <i>false</i> |

- d. To determine which IP protocol (IPv4 or IPv6) is enabled and which IP address (IPv4 or IPv6) returned by the DNS server is used, configure the following parameters.

| To set                                | Use this command  |
|---------------------------------------|---|
| IP protocol                           | <code>network ip proto &lt;protocol&gt;</code><br><protocol> = <i>v4Only</i> , <i>v6Only</i> or <i>both</i>       |
| IP address returned by the DNS server | <code>network ip dnsResolverPreference &lt;resolver&gt;</code><br><resolver> = <i>preferV4</i> or <i>preferV6</i> |

- e. After enabling the IPv4 or IPv6 protocol in the earlier step, configure the IPv4 or IPv6 network parameters.

| To set                    | Use this command   |
|---------------------------|--|
| IPv4 configuration method | <code>network ipv4 ipConfigurationMode &lt;mode&gt;</code><br><mode> = <i>dhcp</i> (default) or <i>static</i>      |
| IPv6 configuration method | <code>network ipv6 ipConfigurationMode &lt;mode&gt;</code><br><mode> = <i>automatic</i> (default) or <i>static</i> |

- Configure the preferred host name for the IPv4 DHCP or IPv6 automatic configuration.

Note: The <version> variable in all of the following commands is either *ipv4* or *ipv6*, depending on the type of the IP protocol you have enabled.

| To set                         | Use this command  |
|--------------------------------|---|
| Preferred host name (optional) | <code>network &lt;version&gt; preferredHostName &lt;name&gt;</code><br><name> = preferred host name |

Tip: To override the DHCP-assigned DNS servers with those you specify manually, type this command:

```
network <version> overrideDNS <option>
```

where <option> is *enable* or *disable*. See the table below for the commands for manually specifying DNS servers.

- For static IP configuration, configure these parameters.

| To set                                       | Use this command  |
|--|---|
| Static IPv4 or IPv6 address                  | <code>network &lt;version&gt; ipAddress &lt;ip address&gt;</code><br><ip address> = static IP address                               |
| IPv4 subnet mask                             | <code>network ipv4 subnetMask &lt;netmask&gt;</code><br><netmask> = subnet mask   |
| IPv4 or IPv6 gateway                         | <code>network &lt;version&gt; gateway &lt;ip address&gt;</code><br><ip address> = gateway's IP address                              |
| IPv4 or IPv6 primary DNS server              | <code>network &lt;version&gt; primaryDNSServer &lt;ip address&gt;</code><br><ip address> = IP address of the primary DNS server     |
| IPv4 or IPv6 secondary DNS server (optional) | <code>network &lt;version&gt; secondaryDNSServer &lt;ip address&gt;</code><br><ip address> = IP address of the secondary DNS server |

9. To quit the configuration mode, type either of the following commands, and press Enter.

| Command             | Description                               |
|---------------------|---|
| <code>apply</code>  | Save all configuration changes and exit.  |
| <code>cancel</code> | Abort all configuration changes and exit. |

The # prompt appears, indicating that you have quit the configuration mode.

10. To verify whether all settings are correct, type the following commands one by one.

| Command                                    | Description                           |
|--|---------------------------------------|
| <code>show network</code>                  | Show network parameters.              |
| <code>show network ip all</code>           | Show all IP configuration parameters. |
| <code>show network wireless details</code> | Show all wireless parameters.         |

Tip: You can type "show network wireless" to display a shortened version of wireless settings.

11. If all are correct, type `exit` to log out of the EMX. If any are incorrect, repeat Steps 7 to 10 to change network settings.

## 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 |
|-----------------------|----------------------------|
| 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)

**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).**

### 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 docking station to the USB-A port on the EMX. Then plug the supported USB wireless LAN adapter into the appropriate USB port on the docking station.

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 USB serial console driver from the Raritan website's **Support page** (<http://www.raritan.com/support/>). The driver contains the *dominion-serial.inf*, *dominion-serial.cat* and *dominion-serial-setup-<n>.exe* files.

Note: <n> in the filename of "dominion-serial-setup-<n>.exe" 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.

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

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

Note: Manually install the driver 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.

#### ► 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 "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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