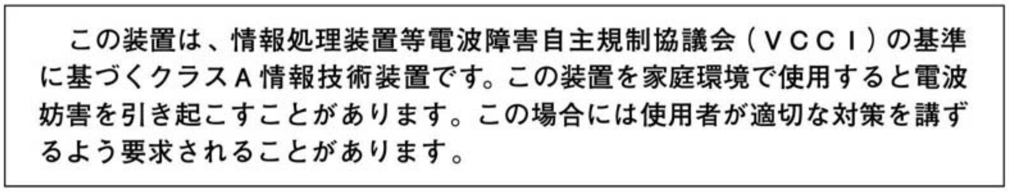
Managed ePDU™
User's Guide

FCC Information

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 in a commercial installation. This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential environment may cause harmful interference.

VCCI Information (Japan)



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Eaton is not responsible for damage to this product resulting from accident, disaster, misuse, abuse, non-Eaton modification of the product, or other events outside of Eaton’s reasonable control or not arising under normal operating conditions.

CE c UL US 1F61
LISTED I.T.E.

ePDU Features

All models and configurations of the ePDU provide the following features:

- The ability to control outlets collectively and individually
- The ability to power on, power off and reboot the devices connected to each outlet
- The ability to group outlets from multiple ePDUs as virtual outlets accessible from a single session
- The ability to monitor the following at the outlet level:
  - RMS Current
  - Power Factor
  - Maximum RMS Current
  - RMS Voltage
  - Active Power
  - Apparent power
- The ability to monitor internal CPU temperature of the ePDU
- The ability to monitor environmental factors such as external temperature and humidity
- An audible alarm (beeper) and a visual alarm (blinking LED) to indicate current overload
- Configurable alarm thresholds
- Support for SNMP v1, v2 and V3
- The ability to send traps using SNMP protocol
- The ability to retrieve outlet specific data using SNMP, including outlet state, current, voltage and power
- The ability to configure and set values through SNMP, including ePDU and outlet threshold levels
- Fully shrouded local branch circuit breakers on products rated over 20A to protect connected equipments against overload and short circuits

Package Contents

The following describes the equipment and other material included in each model package.

0U Models

- ePDU including power cord
- Bracket for 0U and screws
- Tool–less mounting bracket for 0U models
- Null modem cable with RJ–45 and DB–9F connectors on either end

1U Models

- ePDU including power cord 1.80m (6 ft)
- 1U bracket pack and screws
- Null modem cable with RJ–45 and DB–9F connectors on either end

Chapter 1 Introduction

Eaton's Managed ePDU™ is an intelligent power distribution unit that allows you to reboot remote servers and other network devices, and monitor power in the data center through KVM switches and Secure Console Servers. From the office or from anywhere, the ePDU can power on, power off, or reboot remote equipment, as well as monitor current, voltage, power, and temperature.

The ePDU offers the ability to recover systems remotely in the event of system failure and/or system lockup. It eliminates the need to perform manual intervention or dispatch field personnel, reduces downtime and mean time to repair, and increases productivity.

ePDU Models

The ePDU comes in several models that are built to stock and can be obtained almost immediately. Eaton also offers custom models that are built to order and can only be obtained on request.

ePDU Photos

The ePDU models are available in three sizes: zero U (0U), 1U, and 2U (see Figure 1 through Figure 3).

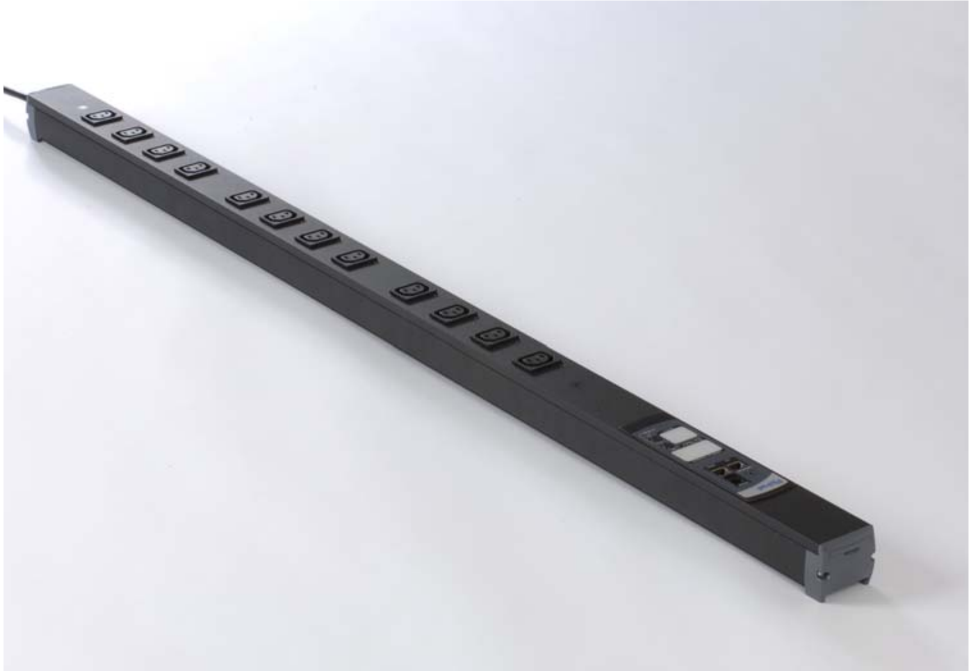
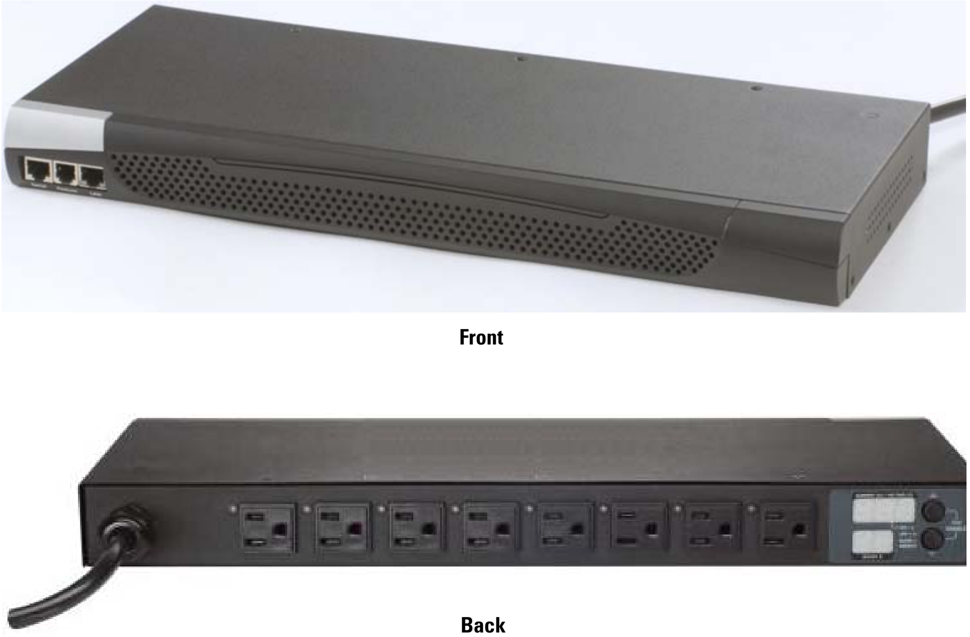


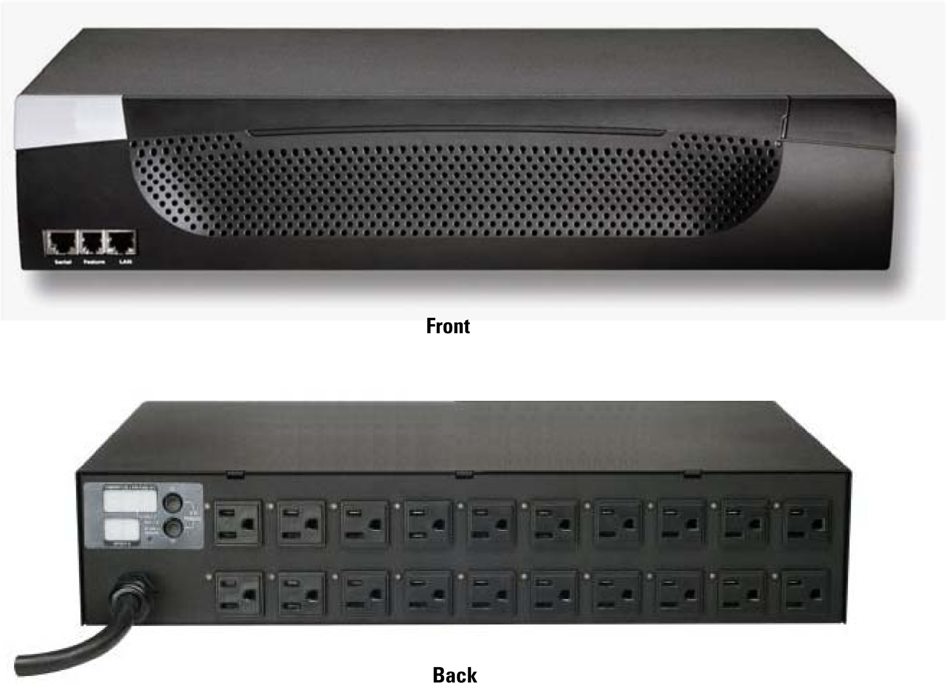
Figure 1. 0U Size



Front

Back

Figure 2. 1U Size



Front

Back

Figure 3. 2U Size

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- ePDU including power cord 1.80m (6 ft)
- Bracket for 0U and screws
- Tool-less mounting bracket for 0U models
- Null modem cable with RJ-45 and DB-9F connectors on either end

1U Models

- ePDU including power cord 1.80m (6 ft)
- 1U bracket pack and screws
- Null modem cable with RJ-45 and DB-9F connectors on either end

2U Models

- ePDU including power cord 1.80m (6 ft)
- 2U bracket pack and screws
- Null modem cable with RJ-45 and DB-9F connectors on either end

Chapter 2 Safety Warnings

IMPORTANT SAFETY INSTRUCTIONS
SAVE THESE INSTRUCTIONS

This manual contains important instructions that you should follow during installation and operation of the ePDU. Please read all instructions before operating the equipment and save this manual for future reference.

DANGER

This ePDU contains LETHAL VOLTAGES. All repairs and service should be performed by AUTHORIZED SERVICE PERSONNEL ONLY. There are NO USER SERVICEABLE PARTS inside the ePDU.

SYSTEMS SHOULD ONLY BE CONFIGURED BY A COMPETENT PERSON.

IT IS ESSENTIAL THAT THIS EQUIPMENT IS CONNECTED TO AN ELECTRICAL SUPPLY THAT HAS A PROTECTIVE GROUND CONDUCTOR

WARNING: TO ISOLATE THIS EQUIPMENT DISCONNECT POWER SUPPLY PLUG.

ATTENTION: AFIN D'ISOLER TOTALEMENT CET APPAREIL DEBRANCHER FICHE D'ALIMENTATION.

CAUTION: USE ONLY IN DRY LOCATIONS.

ATTENTION: UTILISER UNIQUEMENT DANS DES EMPLACEMENTS SECS.

WARNING

To avoid potentially fatal shock hazard and possible damage to Eaton equipment:

- Do not use a 2–wire power cord in any product configuration.
- Test AC outlets at your computer and monitor for proper polarity and grounding.
- Use only with grounded outlets at both the computer and monitor. When using a backup UPS, power the computer, monitor and appliance off the supply.
- The installation socket outlet used for the power supply to this equipment must be installed near the equipment and must be easily accessible.
- When installing this product, it is essential that the distribution circuit supplying the product is protected by a branch circuit protection device with a maximum rating to suit the product maximum rating.
- TO ISOLATE THIS EQUIPMENT DISCONNECT POWER SUPPLY PLUG.
- This power distribution unit is intended for power supply provision to equipment only. Secondary (Satellite) power strips shall not be connected to the receptacles.
- This product has been designed to conform to the latest safety requirements. In addition to compliance with standards for general use, it has been factory configured for use in rack mounting environments aiding the installer to provide systems compliant with relevant standards.

Chapter 3 Rack–Mounting the ePDU

Rack Mount Safety Guidelines

In Eaton products which require rack mounting, please follow these precautions:

- Operation temperature in a closed rack environment may be greater than 40°C . Do not exceed the rated maximum ambient temperature of the appliances (see Appendix E: Specifications).
- Ensure sufficient airflow through the rack environment.
- Mount equipment in the rack carefully to avoid uneven mechanical loading.
- Connect equipment to the supply circuit carefully to avoid overloading circuits.
- Ground all equipment properly, especially supply connections, such as power strips (other than direct connections), to the branch circuit.

Zero–U models are provided with high–grade engineering polycarbonate isolation hardware to allow fixing in a variety of positions within the rack.

For panel or flush mount, pull–out fixing brackets are available on each end cap to allow mounting on suitable rails (see Figure 4).

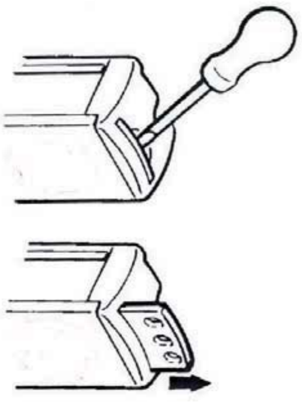


Figure 4. Pull–Out Fixing Brackets

See Figure 5 through Figure 7 for other options.

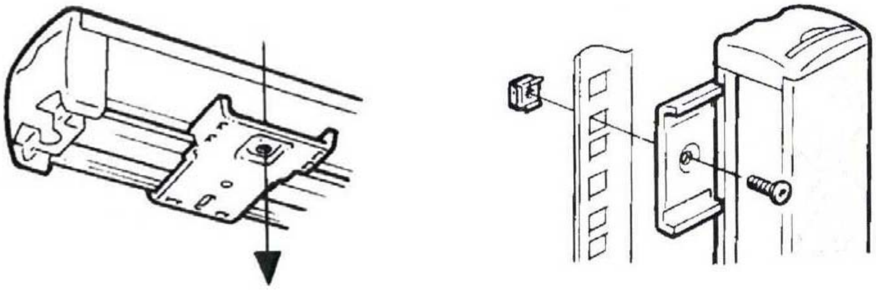


Figure 5. Side Fixing

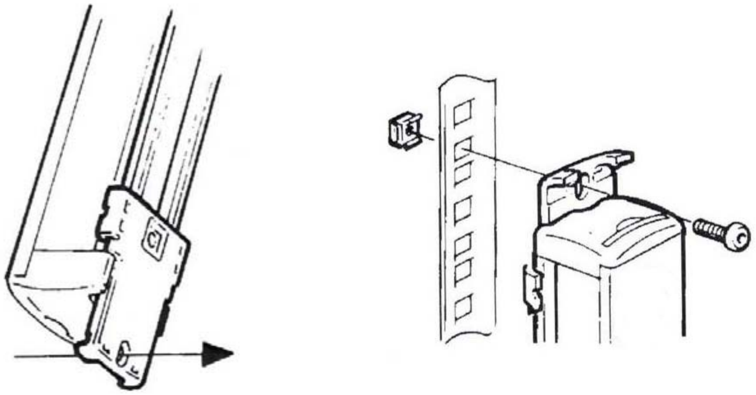


Figure 6. End Fixing

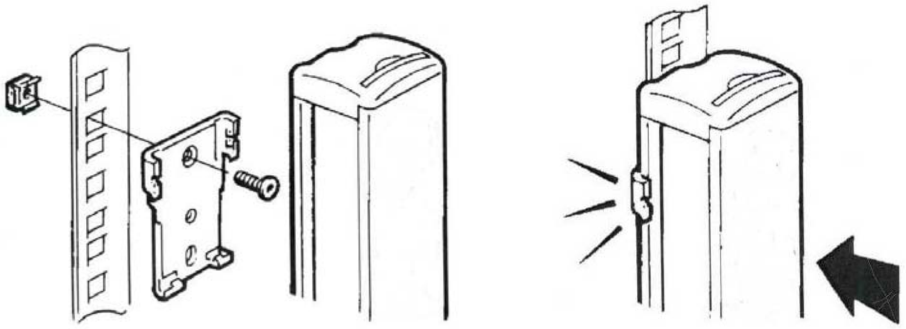


Figure 7. Blind Fixing

NOTE *For side and blind fixing:*

- *Do not repeatedly slide the bracket along the extrusion. This may degrade the support capability.*
- *For larger/heavier power strips more than one pair of clip fixings may be used.*

Tool-less Mounting Instructions

The 0U models also ship with a tool–less mounting kit consisting of a claw feet with a silver button on one side. These work by attaching to the back side of a 0U ePDU (the side opposite of the outlets) and fitting the button into the mounting holes of the cabinet. Note that not all racks allow the option of securing the ePDU in this way.

Before beginning:

- Ensure that you have sufficient space in the cabinet to mount the ePDU. Approximately one inch of clearance is required at each end (top and bottom) of the ePDU.
- It may help to mark the back of the ePDU through the mounting holes you intend to use. You can then use this mark to assist in aligning the silver buttons properly when attaching the claw–feet.

To mount:

1. Snap fit the claw feet mounts onto the back of the ePDU. Hook one side of the ePDU body into one side of a claw foot first, and then apply pressure to snap in the second side. Figure 8 shows how firm pressure is applied to snap fit the claw feet to the ePDU 0U model.

   Leave at least 610 mm between the buttons for stability. Once the claw feet are mounted on the ePDU rail, they will not readily move. A flat–head screwdriver can be used to remove the feet if they need to be repositioned.

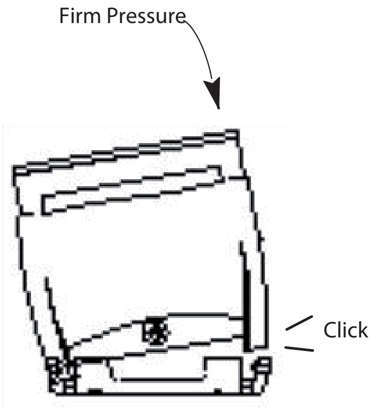


Figure 8. Snap Fit to Claw Foot

2. Align the silver buttons with the mounting holes in the cabinet, and ensure that both buttons can engage their mounting holes simultaneously.
3. Press the ePDU forward, pushing the silver buttons through the mounting holes, then letting the ePDU drop about 16 mm. This secures the ePDU in place and completes the installation.

Chapter 4 Installation and Configuration

This chapter explains how to install a ePDU and configure it for network connectivity.

Before You Begin

Before beginning the installation, perform the activities listed below:

Unpack the ePDU and Components

1. Remove the ePDU and other equipment from the box in which they were shipped. See “Package Contents” on page 3 for a complete list of the contents of the box.
2. Compare the model and serial number of the equipment with the number on the packing slip located on the outside of the box and make sure they match.
3. Inspect the equipment carefully. If any of the equipment is damaged or missing, contact your Eaton service representative for assistance.

Prepare the Installation Site

1. Make sure the installation area is clean and free of extreme temperatures and humidity.
2. Allow sufficient space around the ePDU for cabling and outlet connections.
3. Review the “Safety Instructions” in Chapter 2.

Fill Out the Equipment Setup Worksheet

An Equipment Setup Worksheet is provided in Chapter 9, Appendix A. Use this worksheet to record the model, serial number, and use of each device connected to the ePDU.

As you add and remove devices, keep the worksheet up to date.

Connect the ePDU to a Computer

You must connect the ePDU to a computer to configure it. This is done by means of a serial connection between the ePDU and the computer. If you plan to use this connection to log into the CLP command line interface, leave the cable connected after the configuration is complete.

The computer must have a communications program such as HyperTerminal™, Kermit, or PuTTy. You also need the null modem cable and connectors that were shipped with the ePDU.

1. Take the null modem cable and connect the end with the RJ-45 connector to the port labeled "Serial" on the front of the ePDU (see Figure 9 through Figure 11).

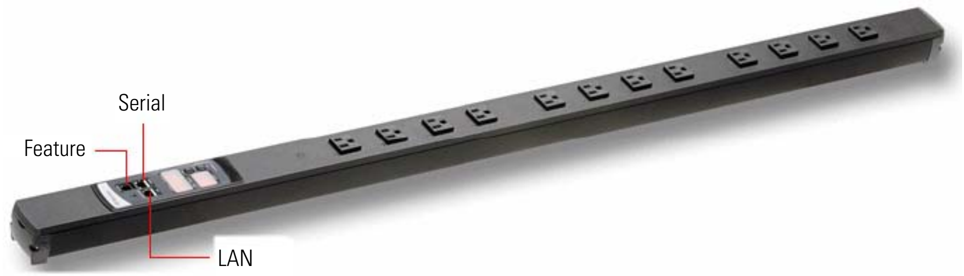


Figure 9. 0U ePDU Ports

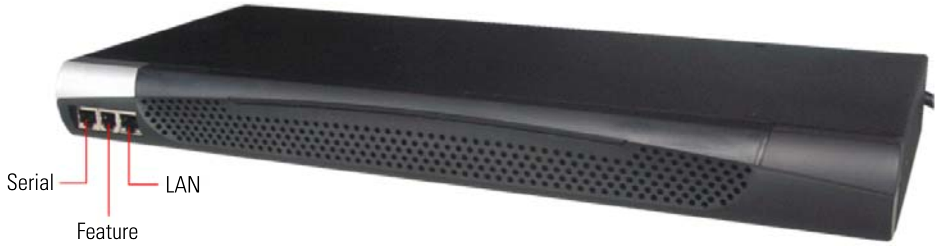


Figure 10. 1U ePDU Ports

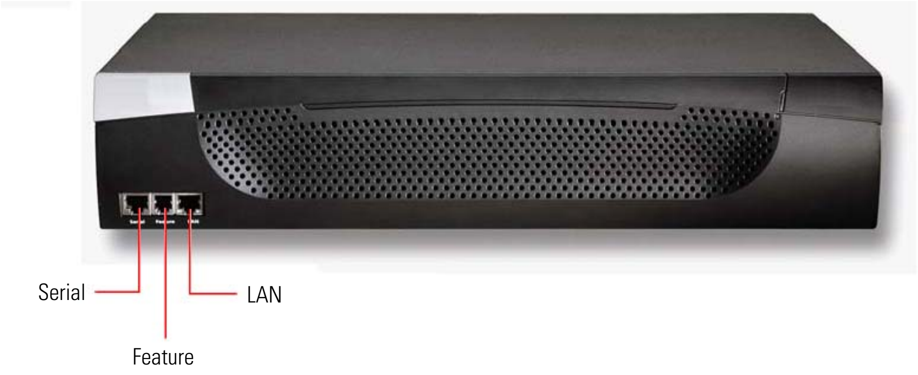


Figure 11. 2U ePDU Ports

2. Plug the other end of the null modem cable (containing the DB-9 connector) into the serial port (COM) of the computer.

Connect the ePDU to Your Network

To use the Web interface to administer the ePDU, you must connect the ePDU to your local area network (LAN).

1. Take a standard Category 5e UTP cable and connect one end to the LAN port on the front of the ePDU.

NOTE See Figure 9 through Figure 11 for the location of the LAN port on your size ePDU.

2. Connect the other end of the cable to your LAN.

Configure the ePDU for Network Connectivity

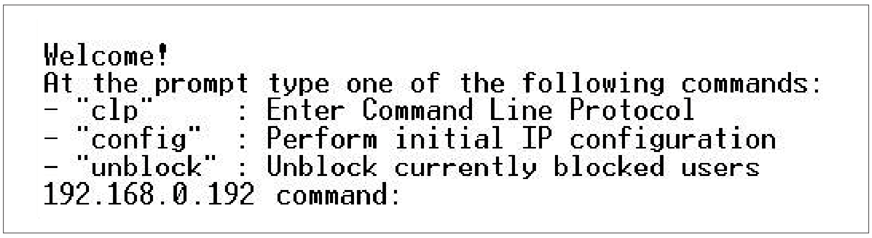
You have two options:

Connect immediately to your LAN for the device to communicate with your DHCP server and allocate an address. If using DHCP then this finishes the installation.
Or
Connect the serial configuration cable from the ePDU to the device and follow the below

1. Go to the computer that you connected to the ePDU and open a communications program such as HyperTerminal or PuTTy. Make sure the port settings are configured as follows:
   - Bits per second = 9600
   - Data bits = 8
   - Stop bits = 1
   - Parity = None
   - Flow control = None

NOTE The ˆFlow control˜ parameter must be set to ˆNone˜ for the communications program to work correctly with the ePDU.

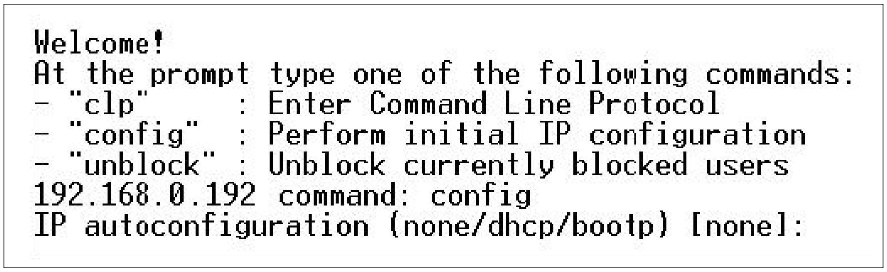
2. Point the communications program at the serial port connecting the ePDU and open a terminal window.
3. Press Enterto display the opening configuration prompt (see Figure 12).



```
Welcome!
At the prompt type one of the following commands:
- "clp"      : Enter Command Line Protocol
- "config"   : Perform initial IP configuration
- "unblock"  : Unblock currently blocked users
192.168.0.192 command:
```

Figure 12. Opening Configuration Prompt

4. Type **config** and press **Enter** to begin the configuration process. You are prompted to select an IP configuration method (see Figure 13).



```
Welcome!
At the prompt type one of the following commands:
- "clp"     : Enter Command Line Protocol
- "config"  : Perform initial IP configuration
- "unblock" : Unblock currently blocked users
192.168.0.192 command: config
IP autoconfiguration (none/dhcp/bootp) [none]:
```

Figure 13. IP Configuration Prompt

5. You must assign the ePDU an IP address. There are two ways to do this:

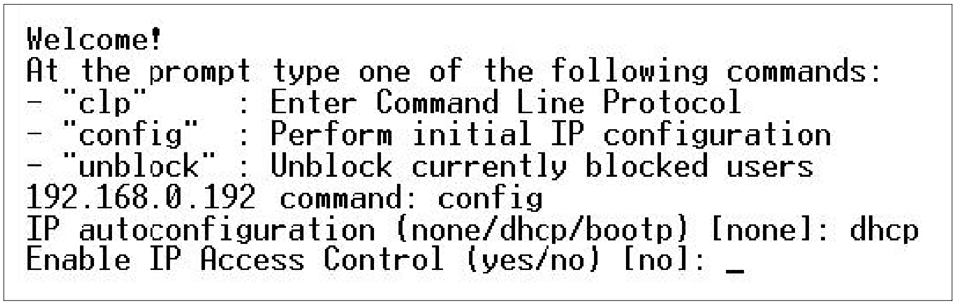
   - **Auto configuration:** Select an autoconfiguration method such as dhcp or bootp and let the DHCP or BOOTP server provide the IP address.

   - **Static IP address:** Select **None** and assign the ePDU a static IP address. You will be prompted for the address, network mask, and gateway.

NOTE *The ePDU IP address displays automatically in the system prompt. The default IP address is 192.168.0.192. The default IP configuration method is DHCP, and the default IP address is replaced by the address assigned by DHCP or BOOTP, or the static IP address you entered, as soon as the configuration process is complete.*

To use the factory default IP address, please type in ***none*** *as the IP autoconfiguration command, and accept the default value. The default IP address for static (none) configuration is 192.168.0.192.*

6. Type your selection and press **Enter**. You are prompted to enable IP access control (see Figure 14).



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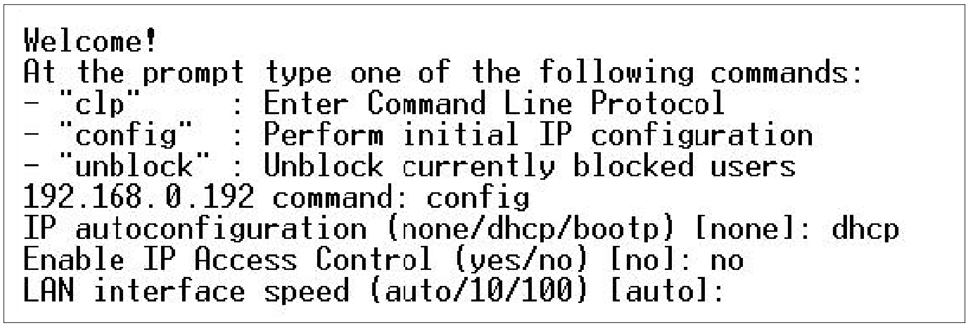
- "config"  : Perform initial IP configuration
- "unblock" : Unblock currently blocked users
192.168.0.192 command: config
IP autoconfiguration (none/dhcp/bootp) [none]: dhcp
Enable IP Access Control (yes/no) [no]: _
```

Figure 14. Access Control Prompt

NOTE *By default, IP access control is NOT enabled. This disables the ePDU firewall. Leave the firewall disabled for now. Later on, you can enable the firewall from the Web interface and create firewall rules (see "Configuring the Firewall" on page 39 for details).*

NOTE *If you accidentally create a rule that locks you out of the ePDU, you can rerun the configuration program and reset this parameter to* ***disabled*** *to allow you to access the ePDU.*

7. Press **Enter**. You are prompted to set the LAN interface speed (see Figure 15).



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- "clp"     : Enter Command Line Protocol
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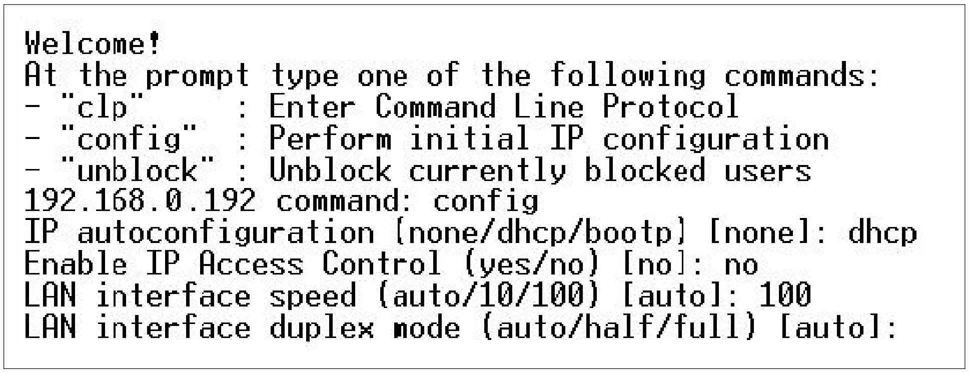
- "unblock" : Unblock currently blocked users
192.168.0.192 command: config
IP autoconfiguration (none/dhcp/bootp) [none]: dhcp
Enable IP Access Control (yes/no) [no]: no
LAN interface speed (auto/10/100) [auto]:
```

Figure 15. LAN Interface Speed Prompt

8. By default, the LAN interface speed is set to **Auto**, which allows the system to select the optimum speed. To keep the default, press **Enter**. To set the speed to 10 or 100 Mbps, type the speed you want and press **Enter**. You are prompted to select the duplex mode for the LAN interface. See Figure 16.



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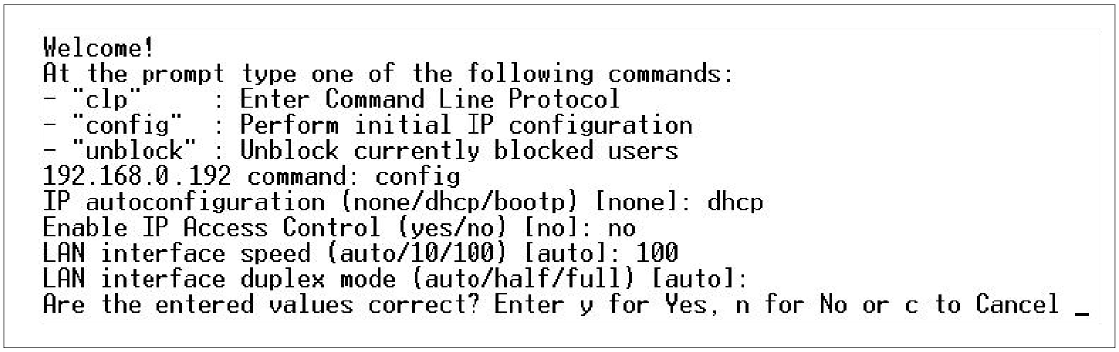
- "unblock" : Unblock currently blocked users
192.168.0.192 command: config
IP autoconfiguration (none/dhcp/bootp) [none]: dhcp
Enable IP Access Control (yes/no) [no]: no
LAN interface speed (auto/10/100) [auto]: 100
LAN interface duplex mode (auto/half/full) [auto]:
```

Figure 16. Duplex Mode Prompt

By default, the LAN interface duplex mode is set to Auto, which allows the system to pick the optimum mode. Half duplex allows data to be transmitted to and from the ePDU, but not at the same time. Full duplex allows data to be transmitted in both directions at the same time.

9. To keep the default, press **Enter**. To specify half or full duplex, type **half** or **full** and press **Enter**. You are prompted to confirm the information you just entered (see Figure 17).



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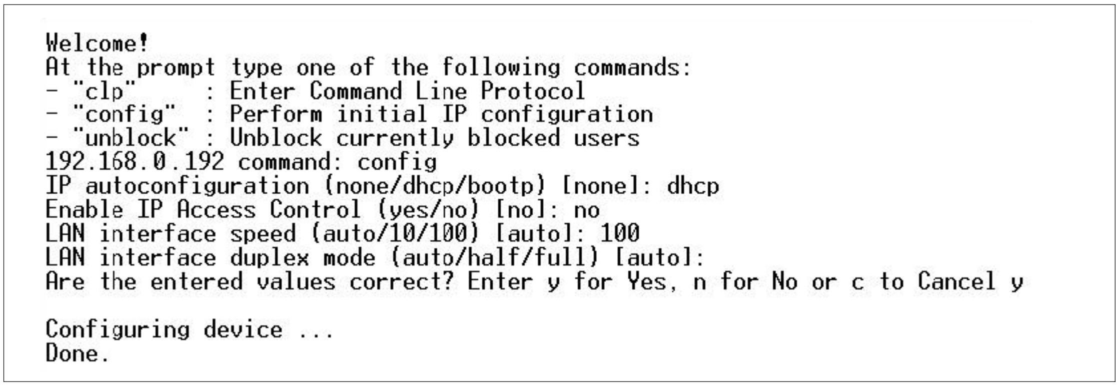
- "unblock" : Unblock currently blocked users
192.168.0.192 command: config
IP autoconfiguration (none/dhcp/bootp) [none]: dhcp
Enable IP Access Control (yes/no) [no]: no
LAN interface speed (auto/10/100) [auto]: 100
LAN interface duplex mode (auto/half/full) [auto]:
Are the entered values correct? Enter y for Yes, n for No or c to Cancel _
```

Figure 17. Confirmation Prompt

10. All the configuration parameters have now been entered. All the prompts are still displayed, so you can check the information you entered. Do one of the following:

    - If the information is correct, type **y** and press **Enter**. The system completes the configuration and displays a message when the configuration is done.
    - If one or more parameters are not correct, type **n** and press **Enter**. You are returned to the IP configuration prompt shown in Figure 13 on page 14 and given the opportunity to correct each piece of information. When the information is correct, type **y** and press **Enter** to complete the configuration and return to the opening prompt shown in Figure 12 on page 13.
    - If you want to terminate the configuration process, type **c** and press **Enter**. The configuration is cancelled and you are returned to the opening prompt shown in Figure 12 on page 13.

11. If you entered **y** to confirm the configuration, a message is displayed telling you when the configuration is complete (see Figure 18). You are then returned to the opening prompt shown in Figure 12 on page 13. You are now ready to begin using your ePDU.



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192.168.0.192 command: config
IP autoconfiguration (none/dhcp/bootp) [none]: dhcp
Enable IP Access Control (yes/no) [no]: no
LAN interface speed (auto/10/100) [auto]: 100
LAN interface duplex mode (auto/half/full) [auto]:
Are the entered values correct? Enter y for Yes, n for No or c to Cancel y

Configuring device ...
Done.
```

Figure 18. Configuration Complete

NOTE *The configured IP address takes about 15 seconds to take effect for the device connected through the serial line, or even longer if configured over DHCP.*

Resetting to Factory Defaults

CAUTION

Exercise extreme caution before resetting the ePDU to the factory defaults. This wipes out any information you have entered, including user profiles, user groups, thresholds, alert policies, and so forth.

For security reasons the ePDU may only be restored to defaults at the local serial console. To do this:

1. Connect a computer to the serial port of the ePDU
2. Using a terminal emulation program such as HyperTerminal, Kermit, or PuTTY (at a speed of 9600 bps), open a window on the ePDU.

NOTE *About HyperTerminal and PuTTy terminal emulator applications:*

- *HyperTerminal is available on many of Windows® operating systems. But HyperTerminal is not available on the Windows Vista® operating system.*
- *PuTTY is a free program you can download from the internet. Please refer to PuTTY documentation for details on configuration.*

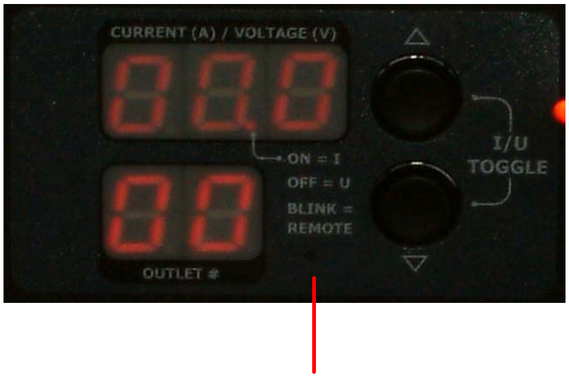
Make sure the serial port settings are configured as follows:

- Baud rate (bits per second) = 9600
- Data bits = 8
- Stop bits = 1
- Parity = None
- Flow control = None

3. Press and release the **Reset** button of the ePDU while pressing the [Esc] key several times in rapid succession. A prompt (=>) should appear after about one second.
4. Execute the **Defaults** command to reset the ePDU to the factory defaults.

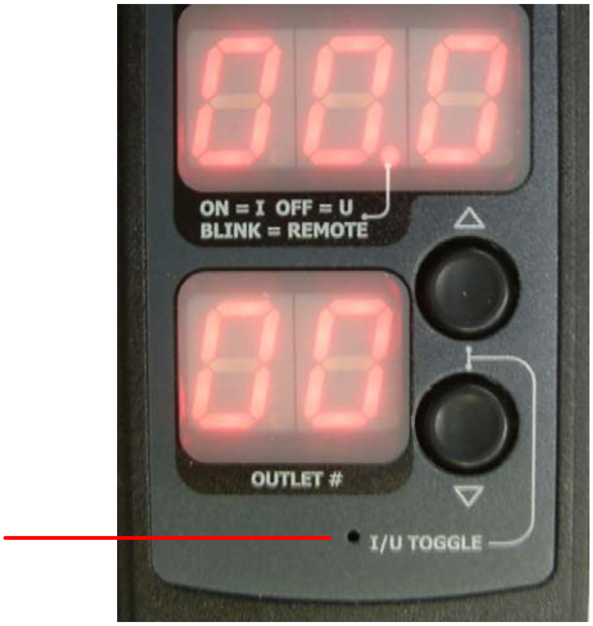
NOTE *Enter **help** to show a list of available commands and a short description of each one.*

Figure 19 shows the location of the reset hole for the 1U and 2U models. Figure 20 shows the reset hole for the 0U model.



Reset Hole

Figure 19. Reset Hole (1U and 2U Models)



Reset Hole

Figure 20. Reset Hole (0U Models)

Chapter 5 Using the ePDU

This chapter explains how to use the ePDU. It describes the LEDs and ports on the front and back panels of the ePDU, and explains how to use the display panel. It also explains how the circuit breaker works and when the beeper goes off.

Front Panel

The front panel of the 1U and 2U ePDU models consists of a blue LED to the right and three connection ports to the left. The front panel of the 0U model consists of power outlets to connect devices to the ePDU, a display panel, a recessed reset button, and three connection ports.

Ethernet Ports

The three RJ-45 Ethernet ports, from left to right, are labeled Serial, Feature, and LAN. Table 1 explains what each port is used for.

Table 1. Ethernet Ports

Port	Purpose
Serial	Establishing a serial connection between a computer and the ePDU. Take the null modem cable that was shipped with the ePDU , connect the end with the RJ-45 connector to the port labeled Serial on the front of the ePDU, and connect the end with the DB-9F connector to the serial (COM) port on the computer.
Feature	For use with Eaton-provided environmental sensors.
LAN	Connecting the ePDU to your company's network. Connect a standard Category 5e UTP cable to this port and connect the other end to your network. This connection is necessary to administer the ePDU remotely using the Web interface. There are two small LEDs under the LAN port. Green indicates a physical link and activity, and yellow indicates communication at 10/100 BaseT speeds.

Blue LED

Only the 1U and 2U models have a blue LED on the front panel. The blue LED on the right side of the front panel is lit solid when the ePDU is plugged in.

NOTE *If the blue LED is flashing, one of the two power supplies in the ePDU is not functional.*

NOTE *When the ePDU is powered on, the power-on self test and software loading takes approximately 40 seconds. Once the software has booted up, the outlet LEDs and the meter illuminate.*

Back Panel

The back panel of the 1U and 2U ePDUs consist of, from left to right, a power cord, power outlets to connect devices to the ePDU, and a display panel. Zero-U models do not have a back panel.

Power Cord

The power cord that connects the ePDU to a power source is located on the far left of the back panel, or on the end of the ePDU if the ePDU is a 0U model. All devices are non-rewireable by the user.

NOTE *Each ePDU should be plugged into an appropriately rated outlet for its type.*

There is no power switch on the ePDU. On models rated at over 20A, there are branch circuit breakers that are fully shrouded to prevent accidental operation. To power cycle the ePDU, remove the power cord from the power source and then re-connect it.

Outlets

The number of outlets on the back panel depends upon the ePDU model. To the upper left of each outlet is a small LED. The ePDUs are shipped from the factory with all outlets powered ON.

Table 2 explains how to interpret the different LED states.

Table 2. LED Status

LED State	Outlet Status	What it Means
Not lit	ePDU OFF	The outlet is not connected to power or the control circuitry's power supply is broken.
Red	ON and LIVE	The outlet is ON (relay closed) and LIVE (voltage present).
Red flashing	ON and LIVE	The outlet is ON and LIVE, but there is overload and the current has crossed the non-critical threshold.
Green	OFF and LIVE	The outlet is OFF (relay open) and the ePDU is LIVE.
Green flashing	OFF and NOT LIVE	The outlet is OFF and the supply is not present.
Yellow flashing	ON and NOT LIVE	The outlet is ON but NOT LIVE (circuit breaker open or other high voltage rail error).
Cycling through Red, Green and Yellow	—	Indicates one of two possibilities: • The ePDU has just been plugged in and its management software is loading. • A firmware upgrade is being performed on the ePDU

NOTE *When a ePDUis powered on, the power-on self-test and software loading takes a few moments. As the ePDU boots up, the outlet LEDs cycle through red, green and yellow. When the software has completed loading, the outlet LEDs displays a steady color and the meter illuminates.*

LED Display

The LED display panel is located adjacent to the outlets on the 0U model, and on the back right of the 1U and 2U models. Figure 21 shows the LED display.

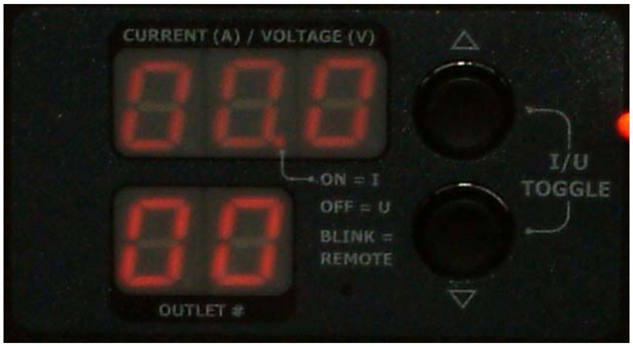


Figure 21. LED Display Panel

The LED display panel consists of these components:

- A top row that displays three digits
- A bottom row that displays two digits
- UP and DOWN buttons

NOTE *The small hole between the lower row and the Down button is the Reset hole. The ePDU can be reset to its factory default values through this hole only when connected to the serial port. See the "Resetting to Factory Defaults" section on page 17 for additional configuration details. Pressing the Reset button ONLY restarts the ePDU.*

Lower Row: The lower row shows the outlet number.

Upper Row: The upper row shows the current, voltage, and power readings for the outlet indicated in the lower row. During the firmware upgrade process, the upper row displays "FuP" to indicate that a Firmware Upgrade is being performed on the ePDU.

How to Operate the Display Panel:

- Use the Up and Down buttons to select an outlet. Pressing the Up button once moves up one outlet number. Pressing the Down button once moves down one outlet number.
- When an outlet is selected, the outlet number is displayed in the lower row and the current in the upper row. Current is displayed in the format: XX.X (A).
- To display the voltage for the selected outlet, press the Up and Down buttons simultaneously. The voltage reading will replace the current for about 5 seconds, after which the current will return.
- To display the active power for the selected outlet, first press the Up and Down buttons simultaneously to display the voltage, and then again to display the active power. Active Power is displayed in the format: X.XX in volt-amps (VA).

NOTE ***Tip:*** *A quick way to distinguish between voltage, current, and power is the placement of the decimal point in the display. Voltage has no decimal point, current has a decimal point between the first and second digits, and power has a decimal point between the second and third digits.*

Circuit Breaker

The ePDU includes branch circuit breakers that automatically trip when a power overload is detected. The ePDU standard circuit breakers have Type C trip characteristics. If the circuit breaker switches off the voltage rail, the lower row of the display panel will jump to the lowest outlet number affected by the circuit breaker error, and the upper row will display these three letters, which indicate a circuit breaker error:

CbE

You will still be able to switch between outlets on the ePDU display panel. Outlets affected by the error show CbE. Unaffected outlets show the current and voltage readings as described above.

To reset the breakers in the event of an overload:

- On the 1U and 2U models, unclip the front molding to access the breaker(s).
- On the 0U model, the breaker(s) can be accessed by lifting the hinged cover over the breaker element.

Beeper

The ePDU includes a beeper. The beeper rings if any of the circuit breakers are tripped or if the control board temperature sensor exceeds 80 °C (176 °F).

The beeper will cease ringing when the broken circuit breaker conditions disappear or the control board temperature sensor drops below 70 °C (158 °F).

The temperature thresholds are factory defaults, and can be user–configurable.

It takes a maximum of three seconds for the beeper to start ringing after the circuit breaker has been tripped.

Sensor Accuracy

Voltage (per outlet): Range 0–255V, ± 5%, 3 digits, resolution 1V

Current (per outlet): Range 0–25.5A, ± 5%, 3 digits, resolution 0.1A

Chapter 6 Using the Web Interface

This chapter explains how to use the Web interface to administer a ePDU.

Logging into the Web Interface

To log into the Web interface, you must enter a user name and password. The first time you log in, use the default user name (**admin**) and password (**pass**). You will then be prompted to change the password for security purposes.

Once you have logged in, you can create user profiles for your other users. These profiles define their login names and passwords. (See "Creating a User Profile" on page 32.)

Logging In

To log into the Web interface:

1. Open a browser such as Microsoft® Internet Explorer® or Mozilla® Firefox® and point it to this URL:

   http://<ip address>

   where <ip address> is the IP address of the ePDU. A login page displays (see Figure 22).

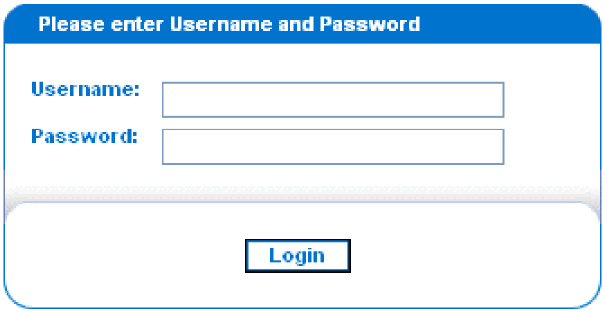
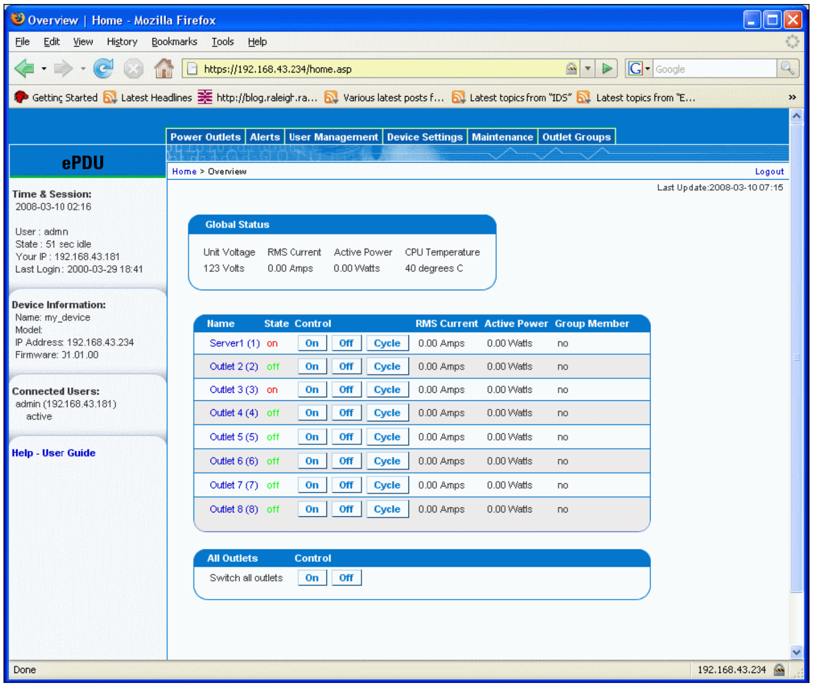


Figure 22. Login Page

2. Type your user name and password in the **Username** and **Password** fields. Both the user name and password are case-sensitive, so make sure you capitalize the letters correctly.

3. Click **Login**. The Home page displays (see Figure 23).



Last Update:2008-03-10 07:15

Time & Session:
2008-03-10 02:16

User : admn
State : 51 sec idle
Your IP : 192.168.43.181
Last Login : 2000-03-29 18:41

Device Information:
Name: my_device
Model:
IP Address: 192.168.43.234
Firmware: 01.01.00

Connected Users:
admin (192.168.43.181)
active

Global Status

Unit Voltage	RMS Current	Active Power	CPU Temperature
123 Volts	0.00 Amps	0.00 Watts	40 degrees C

Name	State	Control			RMS Current	Active Power	Group Member
Server1 (1)	on	On	Off	Cycle	0.00 Amps	0.00 Watts	no
Outlet 2 (2)	off	On	Off	Cycle	0.00 Amps	0.00 Watts	no
Outlet 3 (3)	on	On	Off	Cycle	0.00 Amps	0.00 Watts	no
Outlet 4 (4)	off	On	Off	Cycle	0.00 Amps	0.00 Watts	no
Outlet 5 (5)	off	On	Off	Cycle	0.00 Amps	0.00 Watts	no
Outlet 6 (6)	off	On	Off	Cycle	0.00 Amps	0.00 Watts	no
Outlet 7 (7)	off	On	Off	Cycle	0.00 Amps	0.00 Watts	no
Outlet 8 (8)	off	On	Off	Cycle	0.00 Amps	0.00 Watts	no

All Outlets	Control	
Switch all outlets	On	Off

Figure 23. Home Page

NOTE *The Home page example in Figure 23 shows 8 outlets. If your ePDU has 20 outlets, the Home page will show 20. See "Outlets Display" on Page 30 for a more information and pictures of both 8 and 20 outlet displays.*

NOTE *JavaScript™ must be enabled in the Web browser for proper operation. If JavaScript is not enabled, features such as the Status Panel on the left side of the interface will not display correctly.*

Changing Your Password

To change your password:

1. Select **User Management**, and then select **Change Password**. The Change Password page displays (see Figure 24).

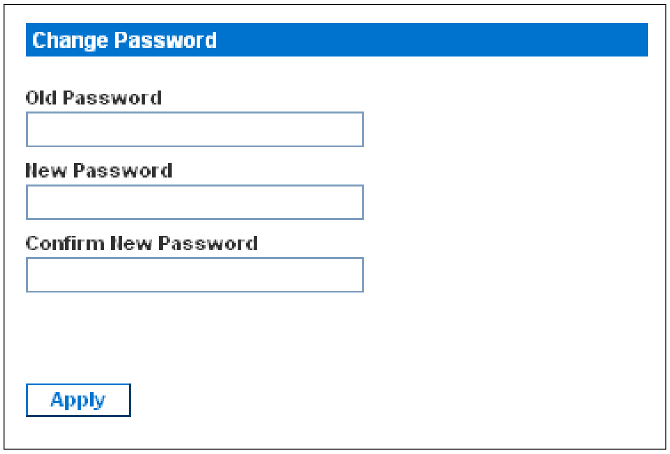


Figure 24. Change Password Page

2. Type your existing password in the **Old Password** field.
3. Type your new password in the **New Password** and **Confirm New Password** fields. Passwords are case sensitive, so be sure to capitalize the same letters each time.
4. Click **Apply**. Your password is changed.

Using the Web Interface

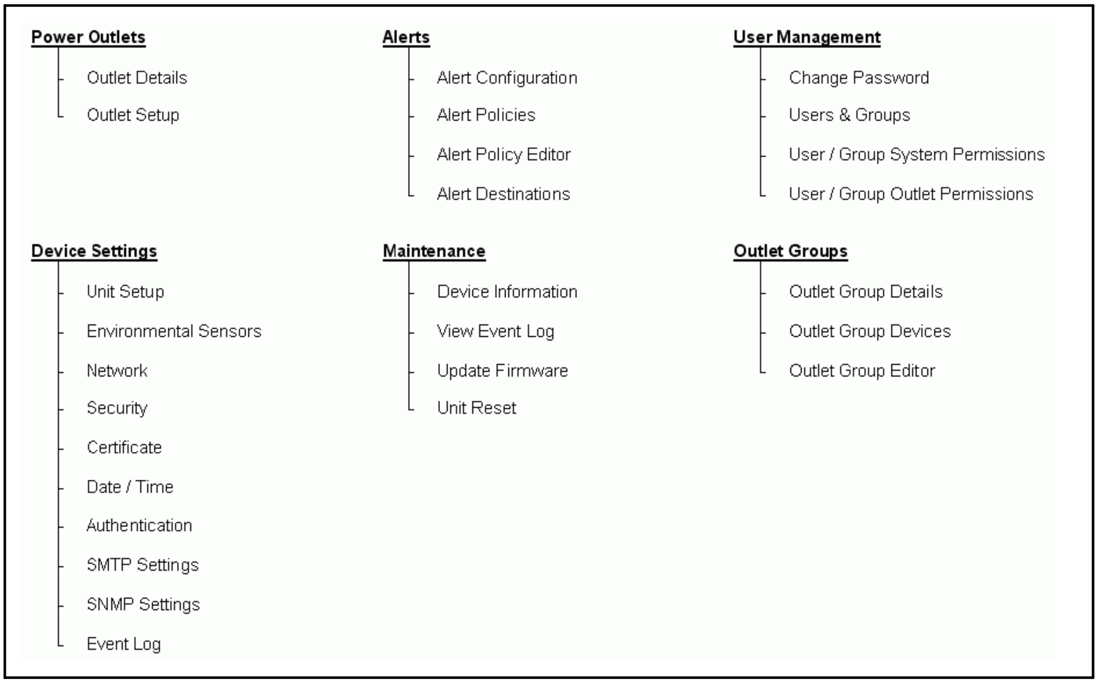
Every page in the Web interface provides menus and a navigation path across the top, and a status panel to the left.

Menus

There are several menus in the Web interface:

- Power Outlets
- Alerts
- User Management
- Device Settings
- Maintenance
- Outlet Groups

Figure 25 shows a complete list of the options available from each menu.



Power Outlets
- Outlet Details
- Outlet Setup

Alerts
- Alert Configuration
- Alert Policies
- Alert Policy Editor
- Alert Destinations

User Management
- Change Password
- Users & Groups
- User / Group System Permissions
- User / Group Outlet Permissions

Device Settings
- Unit Setup
- Environmental Sensors
- Network
- Security
- Certificate
- Date / Time
- Authentication
- SMTP Settings
- SNMP Settings
- Event Log

Maintenance
- Device Information
- View Event Log
- Update Firmware
- Unit Reset

Outlet Groups
- Outlet Group Details
- Outlet Group Devices
- Outlet Group Editor

Figure 25. Menu Options

There are two ways to select an option from a menu:

- Click the menu name to display a page listing each option, and then click the option you want to select.
- Position the cursor on the menu name. A list of options drops down from the menu. Move your pointer to the option you want and click it to select it.

Navigation Path

When you select an option from a menu and navigate to a specific page, the system displays a navigation path across the top that shows the menu and option you selected to get there.

For example, if you select User Management > User/Group System Permissions, the navigation path looks like the one shown in Figure 26.

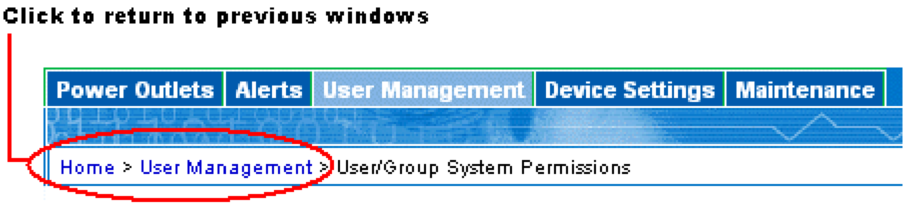

Click to return to previous windows

Figure 26. Navigation Path

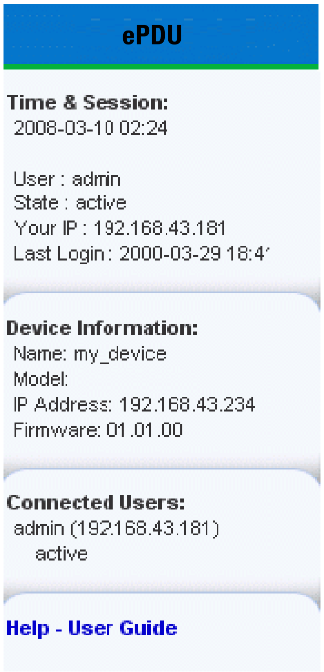
To return to a previous page, click the page name in the navigation path. Every navigation path begins at the Home page, so a single click always takes you back to the Home page from anywhere in the interface.

Status Panel

The Status panel displays on the left of every page in the interface (see Figure 27). It shows:

- Current date and time
- Information about the user, including:
  - User name
  - User's current state (active, idle, and so forth)
  - IP address of the user's computer
  - Date and time of the user's last login
- Information about the ePDU, including:
  - Model name and number
  - IP address
  - Firmware version
- Information about all the users currently connected, including:
  - User name
  - IP address
  - Current state

  Your current session is included in this list.
- A link to the User's Guide on the Eaton Web site.



Time & Session:
2008-03-10 02:24

User : admin
State : active
Your IP : 192.168.43.181
Last Login : 2000-03-29 18:4

Device Information:
Name: my_device
Model:
IP Address: 192.168.43.234
Firmware: 01.01.00

Connected Users:
admin (192168.43.181)
active

Figure 27. Status Panel

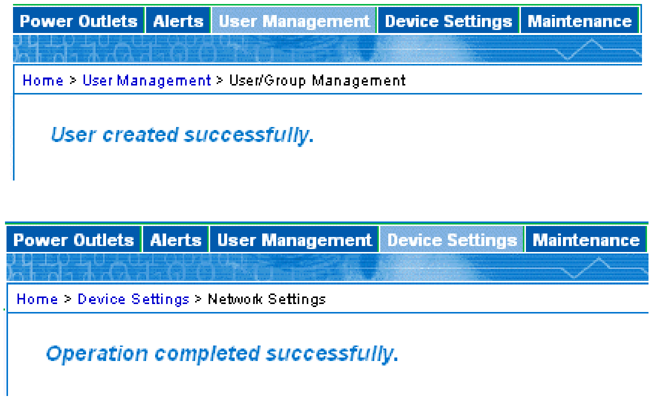
The **State** field in the user information section considers a user to be idle 30 seconds after the last keyboard or mouse action. It then updates the idle time every 10 seconds until another keyboard or mouse action is detected.

If you exceed the idle time limit, you will be logged out, and redirected to the main login page automatically.

Status Messages

When you perform an operation from the Web interface, such as creating a user profile or changing a network setting, a message displays at the top of the page indicating whether or not the operation was successful. Be sure to check this message to confirm that an operation was successful.

Figure 28 shows two examples of status messages after an operation has completed successfully.



Home > User Management > User/Group Management

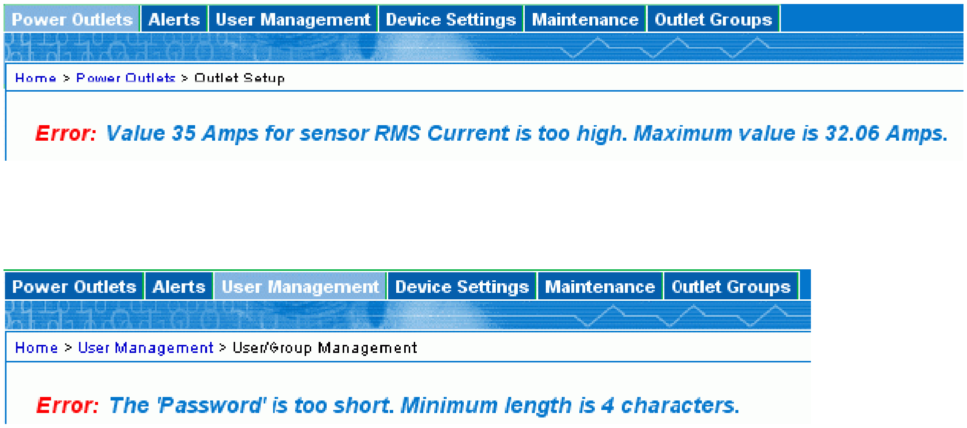
User created successfully.

Home > Device Settings > Network Settings

Operation completed successfully.

Figure 28. Status Messages (Operation Successful)

Figure 29 shows two examples of status messages after an operation has completed unsuccessfully.



Home > Power Outlets > Outlet Setup

Error: Value 35 Amps for sensor RMS Current is too high. Maximum value is 32.06 Amps.

Home > User Management > User/Group Management

Error: The 'Password' is too short. Minimum length is 4 characters.

Figure 29. Status Messages (Operation Unsuccessful)

Unavailable Options

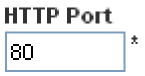
At times, certain actions will be unavailable. When this occurs, the appropriate buttons will be non-functional, though different browsers may display this differently. For example: if you select the Admin User Group in Internet Explorer, the buttons for Copy, Modify and Delete will be dimmed since you cannot Copy, Modify or Delete the Admin user group. In Firefox, however, these non-functioning buttons display normally.

Reset to Defaults

Many pages provide a **Reset to Defaults** button that returns all fields to their default values. If you use this button, you must click the **Apply** button afterward. This saves the defaults. If you neglect to do this, the next time you return to the page, you will still see the non-default values.

Default Asterisk

If a field has an asterisk after it, as shown in Figure 30, the value is set to the default. If you change the default, the asterisk disappears. If you reset to defaults, the asterisk returns.



HTTP Port

80 *

Figure 30. Default Asterisk

Refresh

Many pages provide a **Refresh** button. If a page is displayed for a while, the information may become "stale." Click this button periodically to reload the page and update the information displayed.

Using the Home Page

The Home page displays first after a successful login. It consists of a Global Status, an Outlets list, and an All Outlets Control panel. The Home page also contains an environmental sensors panel, and a time stamp in the top right corner, noting when the data on the screen was last refreshed.

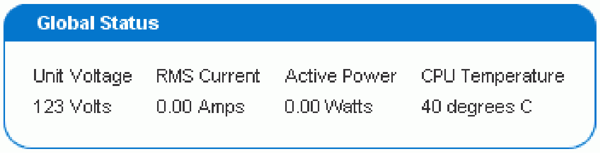
You can return to the Home page from any other page in the Web interface by clicking:

- The Home link in the navigation path
- The Eaton logo above the Status panel
- Model name under the logo

Global Status Panel

The Global Status panel provides an overview of the ePDU's power consumption and temperature. See Figure 31. It shows:

- Unit voltage
- RMS current (in amps)
- True power (in watts)
- CPU temperature (in degrees Celsius)



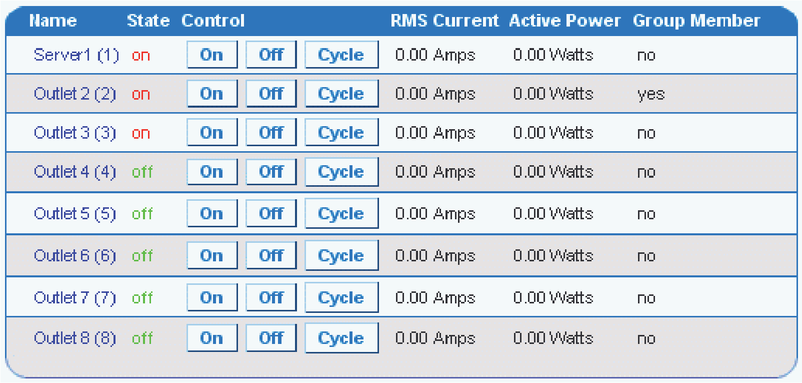
Global Status

Unit Voltage	RMS Current	Active Power	CPU Temperature
123 Volts	0.00 Amps	0.00 Watts	40 degrees C

Figure 31. Global Status Panel

Outlets List

The Outlets List displays each outlet on the ePDU as a table row with a view of the power status, the RMS current and the Active Power through the individual outlet.(see Figure 32). for an 8-outlet and for a 20–outlet display.



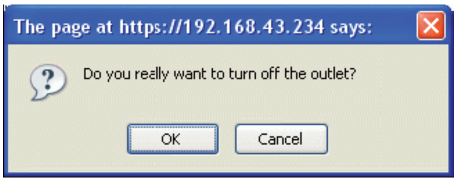
Name	State	Control			RMS Current	Active Power	Group Member
Server1 (1)	on	On	Off	Cycle	0.00 Amps	0.00 Watts	no
Outlet 2 (2)	on	On	Off	Cycle	0.00 Amps	0.00 Watts	yes
Outlet 3 (3)	on	On	Off	Cycle	0.00 Amps	0.00 Watts	no
Outlet 4 (4)	off	On	Off	Cycle	0.00 Amps	0.00 Watts	no
Outlet 5 (5)	off	On	Off	Cycle	0.00 Amps	0.00 Watts	no
Outlet 6 (6)	off	On	Off	Cycle	0.00 Amps	0.00 Watts	no
Outlet 7 (7)	off	On	Off	Cycle	0.00 Amps	0.00 Watts	no
Outlet 8 (8)	off	On	Off	Cycle	0.00 Amps	0.00 Watts	no

Figure 32. Outlets List

Turn an Outlet On, Off, or Cycle the Power

To turn an outlet ON, OFF or cycle the power to it, do the following:

1. Click the On, Off, or Cycle in the outlet row. You will be asked to confirm your action (see Figure 33).



The page at https://192.168.43.234 says:

Do you really want to turn off the outlet?

Figure 33. Confirmation Dialog Box

2. Click OK. The outlet will then switch ON, OFF, or will cycle its power.

   You can also turn an outlet on or off from the Outlet Details page (see Figure 54 on page 58).

Display Additional Details

To display additional details about an outlet, click the outlet icon. This displays the Outlet Details page (see Figure 54 on page 58). This page gives the name and status of the outlet, as well as:

- RMS Current
- Maximum RMS Current
- RMS Voltage
- Active Power
- Apparent Power
- Power Factor

NOTE *RMS refers to root mean square, a statistical method for measuring certain types of variables. In this context, it gives the value of current or voltage that is equivalent to a comparable DC value.*

All Outlets Control

The All Outlets Control panel at the bottom of the Home page allows you to turn all outlets ON and OFF. Click **On** to turn all outlets ON, click **Off** to turn all outlets OFF. As with individual outlets, you must confirm the selection before it takes effect.

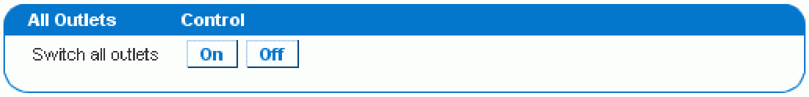


Figure 34.

NOTE *Users must have permission to access all outlets in order to use All Outlets Control.*

Setting Up User Profiles

The ePDU is shipped with one user profile built in. This is the admin profile, which was used for the original login. This profile has full system and outlet permissions, and should be reserved for the system administrator. This profile cannot be modified or deleted.

All users must have a user profile. The profile specifies a login name and password, and contains additional (optional) information about the user. It also assigns the user to a user group, and the user group determines the user's system and outlet permissions.

If you choose, you can refrain from assigning some or all users to a user group, and instead assign their system and outlets permissions on an individual basis.

NOTE *By default, multiple users can log in at the same time using the login name from the same profile. You can change this so only one user at a time can use a specific login. This is done by selecting Device Settings > Security and selecting the* ***Enable Single Login Limitation*** *check box.*

Creating a User Profile

To create a user profile:

1. Select **User Management**, and then select **Users & Groups**. The User/Group Management page displays. This page is divided into a User Management panel (see Figure 35) and a Group Management panel.

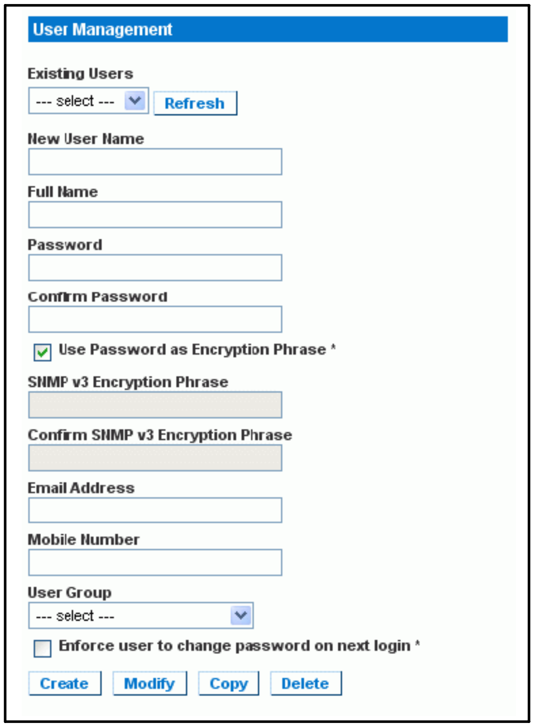


Figure 35. User/Group Management page - User Management Panel

NOTE *Before entering any information in the user profile, please make sure the user group is created and available for selection.*

2. Type the following information about the user in the corresponding fields in the User Management panel:

Fields	Enter
New User Name	The name the user will enter to log into the Web interface.
Full Name	The user's first and last name.
Password	The password the user will enter to log in. The password must be at least four characters long, and spaces are not permitted. The password is case sensitive, so be sure to capitalize the same letters each time.
Confirm Password	Reenter the user's password.
Email Address	An email address where the user can be reached.
Mobile Number	A cell phone number where the user can be reached.

NOTE The New User Name, Password, and Confirm Password are the only required fields.

3. Select a user group from the the **User Group** list. The user group determines the system functions and outlets this user can access.

   If you select **None**, the user is not assigned to a user group. This means you have to set the user's permissions individually. Until you do this, the user is effectively blocked from accessing any system functions and outlets. (For instructions on setting permissions individually, see "Setting User Permissions Individually" below.)

4. If you would like this user to set his or her own password, select the **Enforce user to change password on next login**. check box. The user logs in the first time using the password you entered above, and then is forced to change it to one of his or her choice.

5. Click **Create**. The user profile is created.

NOTE *The Use Password as Encryption Phrase, SNMP v3 Encryption Phrase, and Confirm SNMP Encryption Phrase apply only when using secure SNMP v3 communication. See "Appendix C - Using SNMP" for more details.*

Copying a User Profile

You can create a new user profile with the exact same settings as an existing profile by using the copy function. You can then modify the profile so that it differs as necessary from the original. This is a quick and easy way to create user profiles.

To copy a user profile:

1. Select **User Management**, and then select **Users & Groups** to display the User/Group Management page.

2. Select an existing user profile from the **Existing Users** list.

3. Type the name of the new user profile in the **New User Name** field.

4. Click **Copy**. A new user profile is created with the same settings as the existing profile. The new profile can be viewed by clicking the **Existing Users** list.

Modifying a User Profile

Every user with user management permissions can modify a user profile. See "Setting System Permissions" on page 36 for information about setting system permissions.

To modify a user profile:

1. Select **User Management**, and then select **Users & Groups** to display the User/Group Management page.

2. Select the user profile you want to modify from the **Existing Users** list. All the information in the user profile is displayed except the password.

3. Make all necessary changes to the information shown. To change the password, type a new password in the **Password** and **Confirm Password** fields. If the password field is left blank, the password is not changed.

4. Click **Modify**. The user profile is modified.

Deleting a User Profile

To delete a user profile:

1. Select **User Management**, and then select **Users & Groups** to display the User/Group Management page.
2. Select the user profile you want to delete from the **Existing Users** list.
3. Click **Delete**. The user profile is deleted.

Setting User Permissions Individually

If you selected `None` for user group when creating a user profile, you must set the user's permissions individually. Until you do this, the user is effectively blocked from all system functions and outlets.

To set the user's system permissions:

1. Select **User Management**, and then select **User/Group System Permissions** to display the User Group System Permissions page (see Figure 37 on page 36).
2. Select the user from the **User (not in a group)** list. The list shows all user profiles that have NOT been assigned to a users group.
3. Set the permissions as necessary. Click this icon ▾ in a field and select either **Yes** or **No**.
4. When you are finished, click **Apply**. The permissions are applied to the user.

To set the user's outlet permissions:

1. Select **User Management**, and then select **User/Group Outlet Permissions** to display the User/Group Outlet Permissions page (see Figure 38).
2. Select the user from the **User** list.
3. Set the permissions as necessary. Click this icon ▾ in a field and select either **Yes** or **No**.
4. When you are finished, click **Apply**. The permissions are applied to the user.

NOTE *IPMI privilege level "user" is the minimum level required to switch outlets over IPMI, which causes no effect on Web front-end use. However, privilege level has nothing to do with outlet permissions.*

Setting Up User Groups

The ePDU is shipped with one user group built in. This is the Admin User Group. This user group provides full system and outlet permissions. It cannot be modified and it cannot be deleted.

When creating user profiles, the User Group field defaults to the Admin User Group. This means that if you do not change the entry in this field, the user will enjoy full system and outlet permissions. To restrict the user's permissions, create a user group with limited system and/or outlet permissions, and assign the user to that group.

Creating a User Group

To create a user group:

1. Select **User Management**, and then select **Users & Groups** to display the User/Group Management page. This page is divided into a User Management panel and a Group Management panel. See Figure 36 shows the Group Management panel.

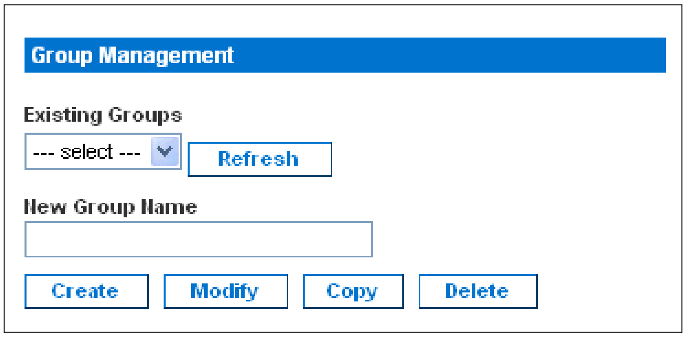


Figure 36. User Group Management page - Group Management Panel

2. In the Group Management panel, type the name of the group in the **New Group Name** field.

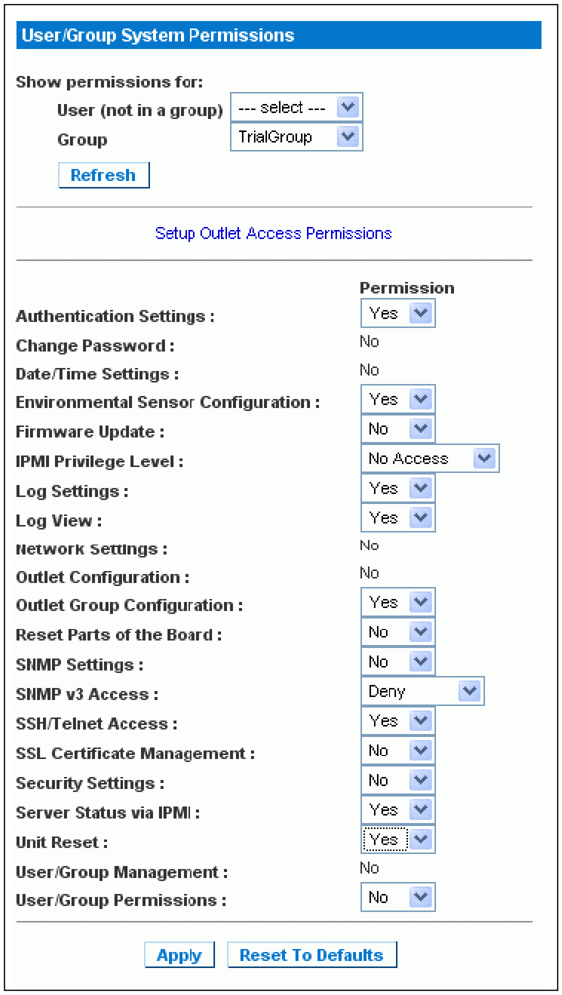
3. Click **Create**. The user group is created.

Setting System Permissions

System permissions include all the major functional areas of the Web interface. When you first create a user group, all system permissions are set to NO.

To set the system permissions for a user group:

1. Select **User Management**, and then select **Users/Group System Permissions**. The User/Group System Permissions page displays (see Figure 37).



User/Group System Permissions

Show permissions for:

User (not in a group): --- select ---

Group: TrialGroup

	Permission
Authentication Settings :	Yes
Change Password :	No
Date/Time Settings :	No
Environmental Sensor Configuration :	Yes
Firmware Update :	No
IPMI Privilege Level :	No Access
Log Settings :	Yes
Log View :	Yes
Network Settings :	No
Outlet Configuration :	No
Outlet Group Configuration :	Yes
Reset Parts of the Board :	No
SNMP Settings :	No
SNMP v3 Access :	Deny
SSH/Telnet Access :	Yes
SSL Certificate Management :	No
Security Settings :	No
Server Status via IPMI :	Yes
Unit Reset :	Yes
User/Group Management :	No
User/Group Permissions :	No

Figure 37. User/Group System Permissions Page

2. Select the user group from the **Group** list. The permissions that apply to this group are displayed. If this is the first time you are setting the permissions for this group, all permissions are set to **No**.

3. Set the permissions as necessary. Click this icon ▼ in a field and select either **Yes** or **No**.

4. When you are finished, click **Apply**. The permissions are applied to the user group.

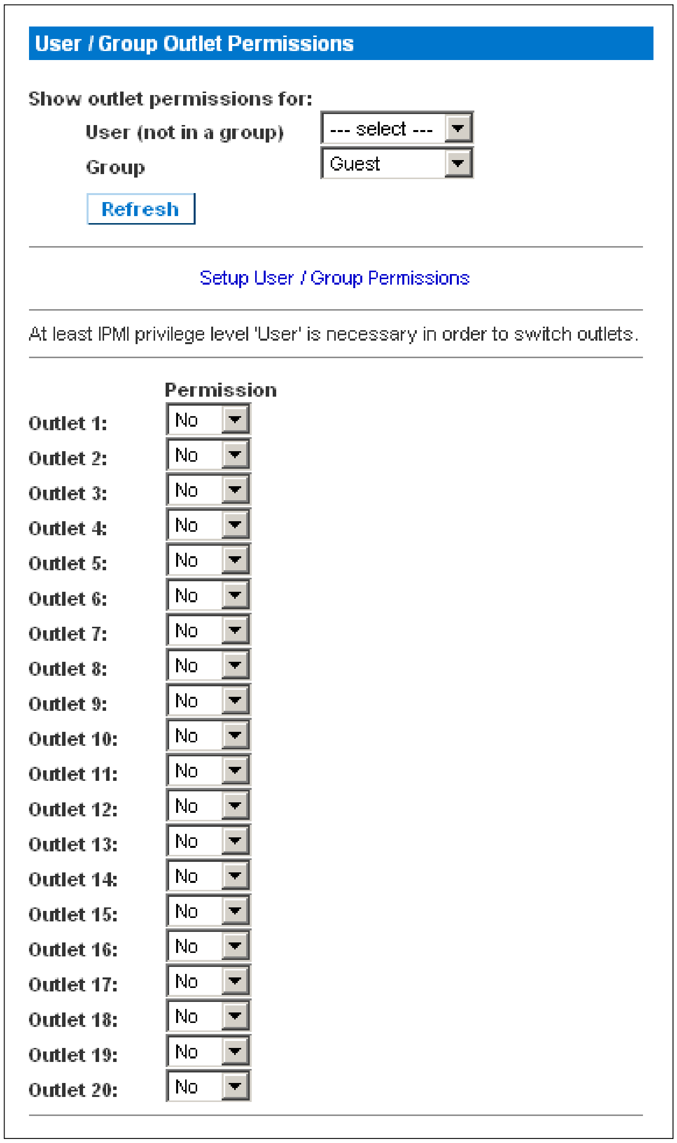
NOTE *The* ***User (not in a group)*** *list on this page is used to set individual user permissions. If you are setting group permissions, you may ignore this field. Furthermore, if IPMI privilege level is not set to at least "user" level, this group will not be granted to perform power control.*

Setting the Outlet Permissions

Setting outlet permissions allows you to specify which outlets members of a user group are permitted to access. When you first create a user group, all outlet permissions are set to NO.

To set the outlet permissions for a user group:

1. Select User Management, and then select Users/Group Outlet Permissions. The User/Group Outlet Permissions page displays (see Figure 38).



User / Group Outlet Permissions

Show outlet permissions for:

User (not in a group): --- select ---

Group: Guest

Refresh

Setup User / Group Permissions

At least IPMI privilege level 'User' is necessary in order to switch outlets.

	Permission
Outlet 1:	No
Outlet 2:	No
Outlet 3:	No
Outlet 4:	No
Outlet 5:	No
Outlet 6:	No
Outlet 7:	No
Outlet 8:	No
Outlet 9:	No
Outlet 10:	No
Outlet 11:	No
Outlet 12:	No
Outlet 13:	No
Outlet 14:	No
Outlet 15:	No
Outlet 16:	No
Outlet 17:	No
Outlet 18:	No
Outlet 19:	No
Outlet 20:	No

Figure 38. User/Group Outlet Permissions Page

2. Select the user group from the `Group` list. The permissions that apply to this group are displayed. If this is the first time you are setting the permissions for this group, all permissions are set to **No**.

3. Set the permissions as necessary. Click this icon ⌄ in a field and select either **Yes** or **No**.

4. When you are finished, click **Apply**. The permissions are applied to the user group.

NOTE *The **User (not in a group)** list on this page is used to set individual user permissions. If you are setting group permissions, you may ignore this field.*

Copying a User Group

You can create a new user group with the exact same permissions as an existing user group by using the copy function. You can then modify the group so that its permissions differ as necessary from the original. This is a quick and easy way to create user groups.

To copy a user group:

1. Select **User Management**, and then select **Users & Groups**. The User/Group Management page displays.

2. Select the existing user group from the **Existing Groups** list.

3. Type the name of the new user group in the **New Group Name** field.

4. Click **Copy**. A new user group is created with the same permissions as the existing group. The new user group can be viewed by clicking the **Existing Groups** list.

Modifying a User Group

The only attribute of a user group that can be modified is the group name. To do this:

1. Select **User Management**, and then select **Users & Groups**. The User/Group Management page displays.

2. Select the user group you want to modify from the **Existing Groups** list. The name displays in the **New Group Name** field.

3. Make any necessary changes to the name.

4. Click **Modify**. The user group is modified.

NOTE *To modify a user group's system or outlet permissions, repeat the procedure for setting the system or outlet permissions described above and make any necessary changes.*

Deleting a User Group

To delete a user group:

1. Select **User Management**, and then select **Users & Groups**. The User/Group Management page displays.
2. Select the user group you want to delete from the **Existing Groups** list.
3. Click **Delete**. The user group is deleted.

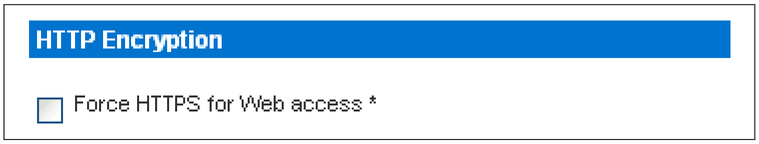
Setting Up Access Controls

The ePDU provides a number of tools to control access to the unit. You can require HTTPS encryption, enable the internal firewall and create firewall rules, and create login limitations.

Forcing HTTPS Encryption

HTTPS is a more secure protocol than HTTP because it uses Secure Sockets Layer (SSL) technology to encrypt all traffic to and from the ePDU. To require users to use HTTPS instead of HTTP when accessing the ePDU through the Web interface:

1. Select **Device Settings**, and then select **Security**. The Security Settings page displays. The panel at the upper left is labeled "HTTP Encryption." See Figure 39.



HTTP Encryption

□ Force HTTPS for Web access *

Figure 39. Security Settings Page – HTTP Encryption Panel

2. Select the **Force HTTPS for Web access** check box.
3. Click **Apply**. HTTPS is now required for browser access.

NOTE *Attempts to access the ePDU using HTTP will be redirected back to HTTPS automatically only if the **Force HTTPS for Web access** field is selected.*

Configuring the Firewall

The ePDU has a firewall that can be configured to prevent specific IP addresses and ranges of IP addresses from accessing the ePDU. When the ePDU was initially configured, you were prompted to enable or disable IP access control. If you selected **Disable** (the default), the ePDU firewall was not enabled.

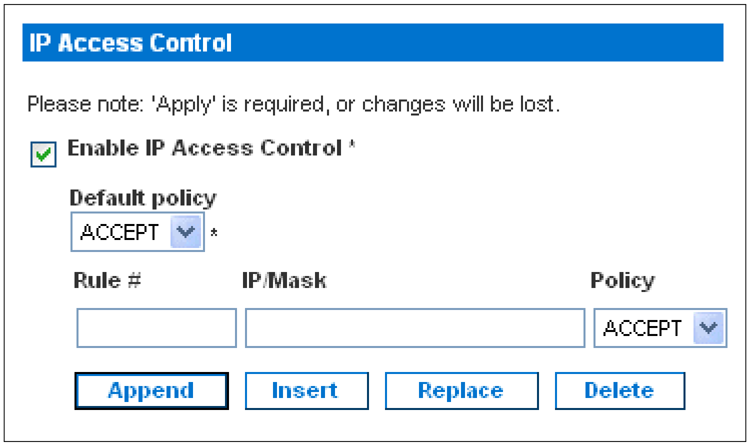
To configure the firewall, you have to enable the firewall, and then you have to set the default policy and create rules specifying which addresses to accept and which addresses to drop.

NOTE *The purpose of disabling the firewall by default is to prevent users from accidentally locking themselves out of the ePDU. See Chapter 4, "Installation and Configuration," for details.*

Enabling the Firewall

To enable the ePDU firewall:

1. Select **Device Settings**, and then select **Security**. The Security Settings page displays. The panel at the upper right is labeled **IP Access Control**. This controls the firewall. See Figure 40.



IP Access Control

Please note: 'Apply' is required, or changes will be lost.

☑ Enable IP Access Control *

Default policy

ACCEPT *

Rule #	IP/Mask	Policy
		ACCEPT

Figure 40. IP Access Control Panel (Firewall Enabled)

2. Select the **Enable IP Access Control** check box. This enables the firewall.

3. Click **Apply**. The firewall is enabled.

Changing the Default Policy

Once enabled, the firewall has a default policy built in that accepts traffic from all IP addresses. This means any IP addresses not dropped by a specific rule will be permitted to access the ePDU. You can change the default policy to DROP, in which case traffic from all IP addresses will be dropped except traffic allowed by a specific ACCEPT rule.

To change the default policy:

1. Select **Device Settings**, and then select **Security**. The Security Settings page displays. The panel at the upper right is labeled **IP Access Control**. This controls the firewall.

2. Make sure the **Enable IP Access Control** check box is selected.

3. The default policy is shown in the **Default Policy** field (see Figure 40). To change it, select the policy you want from the drop-down list in the field.

4. Click **Apply**. The new default policy is applied.

Creating Firewall Rules

Firewall rules accept or drop traffic intended for the ePDU, based on the IP address of the host sending the traffic. When creating firewall rules, keep the following in mind:

- **Rule order:** The order of the rules is important. When traffic reaches the ePDU, the rules are executed in numerical order. The first rule that matches the IP address determines whether the traffic is accepted or dropped. Any subsequent rules matching the IP address have no effect on the traffic
- **Subnet mask:** When typing the IP address, you MUST specify both the address and a subnet mask. For example, to specify a single address in a Class C network, use this format:

  x.x.x.x/24

  where /24 = a subnet mask of 255.255.255.0.To specify an entire subnet or range of addresses, change the subnet mask accordingly.

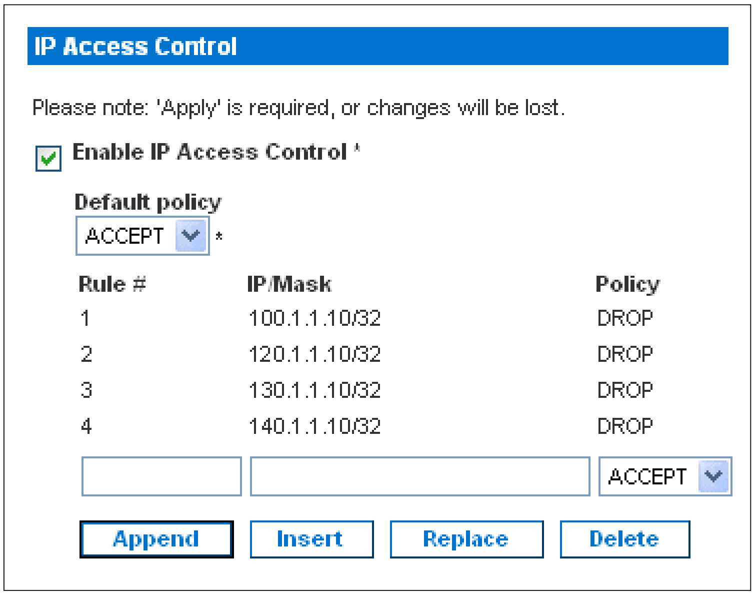
To create firewall rules:

1. Select **Device Settings**, and then select **Security**. The Security Settings page displays. The panel at the upper right is labeled **IP Access Control**. This controls the firewall.
2. Select the **Enable IP Access Control** check box if it is not already selected.
3. Follow the steps listed in Table 3 to create specific rules.

Table 3. Create Rules

Action	Steps
Add a rule to the end of the rules list	• Type an IP address and subnet mask in the IP/Mask field. • Select ACCEPT or DROP in the Policy field. • Click Append. Do NOT enter a rule number. The system automatically numbers the rule.
Insert a rule between two existing rules	• Type a rule number where you want to insert a new rule above in the Rule # field. For example, to insert a rule between #5 and #6, type 6. • Type an IP address and subnet mask in the IP/Mask field. • Select ACCEPT or DROP from the drop-down list in the Policy field. • Click Insert. The system inserts the rule and automatically renumbers the rules.
Replace an existing rule	• Type the number of the rule to be replaced in the Rule # field. • Type an IP address and subnet mask in the IP/Mask field. • Select ACCEPT or DROP from the drop-down list in the Policy field. • Click Replace. This system replaces the existing rule with the one you just created.

4. When you are finished, the rules are displayed in the IP Access Control panel (see Figure 41).



IP Access Control

Please note: 'Apply' is required, or changes will be lost.

☑ Enable IP Access Control *

Default policy

ACCEPT *

Rule #	IP/Mask	Policy
1	100.1.1.10/32	DROP
2	120.1.1.10/32	DROP
3	130.1.1.10/32	DROP
4	140.1.1.10/32	DROP
		ACCEPT

Figure 41. IP Access Control Panel (Firewall Rules Displayed)

5. Click **Apply**. The rules are applied.

Deleting a Firewall Rule

To delete a firewall rule:

1. Select **Device Settings**, and then select **Security**. The Security Settings page displays.
2. Make sure the check box labeled **Enable IP Access Control** is selected.
3. Type the number of the rule to be deleted in the **Rule #** field.
4. Click **Delete**. The rule is removed from the **IP Access Control** panel.
5. Click **Apply**. The rule is deleted.

Creating Group-Based Access Control Rules

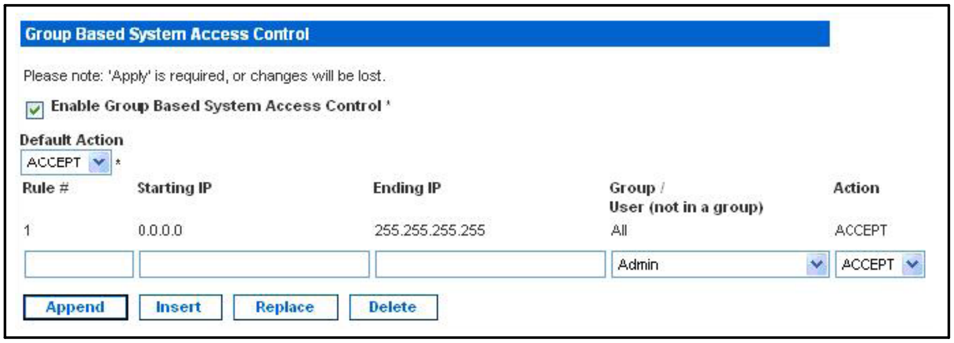
Group-based access control rules are similar to firewall rules, except they can be applied to members of specific user groups. In effect, this enables you to give entire user groups system and outlet permissions based on their IP addresses or subnets.

To create group-based access control rules, you first have to enable the feature. Then, you have to set the default action, specify an IP address range, and associate the rule with a specific User group. Finally, you have to indicate whether the rule will accept or drop traffic. Changes made do not affect users currently logged in until the next login.

Enabling Group-based Access Control Rules

To enable group-based access control rules:

1. Select **Device Settings**, and then select **Security**. The Security Settings page displays. The panel labeled **Group Based System Access Control** controls this feature. See Figure 42.



Group Based System Access Control

Please note: 'Apply' is required, or changes will be lost.

☑ Enable Group Based System Access Control *

Default Action

ACCEPT *

Rule #	Starting IP	Ending IP	Group / User (not in a group)	Action
1	0.0.0.0	255.255.255.255	All	ACCEPT
			Admin	ACCEPT

Figure 42. Group Based System Access Control Panel (Enabled)

2. Select the **Enable Group Based System Access Control** check box. This enables the feature.

3. Click **Apply**. Group-based access control rules are enabled.

Changing the Default Action

The default action is shown in the Group Based System Access Control panel on the Security Settings page. To change the default action:

1. Select **Device Settings**, and then select **Security**. The Security Settings page displays. The panel labeled **Group based System Access Control** controls this feature.

2. Select the **Enable Group based System Access Control** check box if it is not already selected.

3. Select the action you want from the **Default Action** list in the (see Figure 42).

4. Click **Apply**. The default action is applied.

Creating Group-Based Access Control Rules

Group-based access control rules accept or drop traffic intended for the ePDU, based on the user's group membership. Like firewall rules, the order of the rule is important, since the rules are executed in numerical order.

To create group-based access control rules:

1. Select **Device Settings**, and then select **Security**. The Security Settings page displays. The panel labeled **Group based System Access Control** controls this feature.
2. Make sure the **Enable Group based System Access Control** check box is selected.
3. Follow the steps listed in Table 4 to create or delete specific rules.

Table 4. Create or Delete Rules

Action	Steps
Add a rule to the end of the rules list	• Type a starting IP address in the Starting IP field. • Type an ending IP address in the Ending IP field. • Select a user group from the drop-down list in the Group field. This rule applies to members of this group only. • Select ACCEPT or DROP from the drop-down list in the Policy field. • Click Append. Do NOT enter a rule number. This system automatically numbers the rule.
Insert a rule between two existing rules	• Type the higher of the two rule numbers in the Rule # field. For example, to insert a rule between rules #5 and #6, type 6. • Type a starting IP address in the Starting IP field. • Type an ending IP address in the Ending IP field. • Select ACCEPT or DROP from the drop-down list in the Action field. • Click Insert. The system inserts the rule and automatically renumbers the rules.
Replace an existing rule	• Type the number of the rule to be replaced in the Rule # field. • Type an IP address and subnet mask in the IP/Mask field. • Select ACCEPT or DROP from the drop-down list in the Action field. • Click Replace. This system replaces the existing rule with the one you just created.

4. When you are finished, click **Apply**. The rules are applied.

Deleting a Group-based Access Control Rule

To delete a group-based access control rule:

1. Select **Device Settings**, and then select **Security**. The Security Settings page displays.
2. Make sure the **Enable Group based System Access Control** check box is selected.
3. Type the number of the rule to be deleted in the **Rule #** field.
4. Click **Delete**. The rule is removed from the **Group Based System Access Control** panel.
5. Click **Apply**. The rule is deleted.

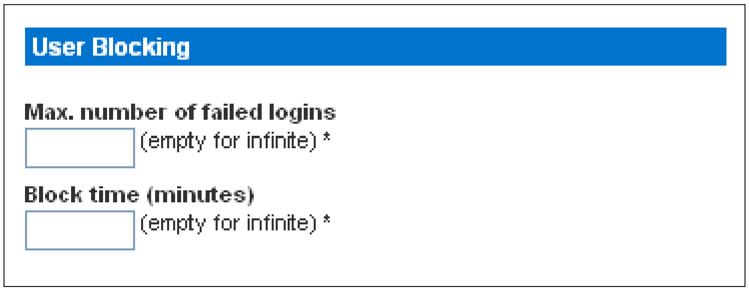
Setting Up User Login Controls

You can set up login controls to make it more difficult for hackers to access the ePDU and the devices connected to it. You can arrange to lock persons out after a specified number of failed logins, limit the number of persons who can log in at the same time using the same login, and force users to create strong passwords.

Enabling User Blocking

User blocking allows you to determine how many times a user can attempt to log into the ePDU and fail authentication before the user's login is blocked. To set up user blocking:

1. Select **Device Settings**, and then select **Security**. The Security Settings page displays. The **User Blocking** panel controls this feature. See Figure 43.



User Blocking

Max. number of failed logins

(empty for infinite) *

Block time (minutes)

(empty for infinite) *

Figure 43. User Blocking Panel

2. Type a number in the **Max number of failed logins** field. This is the maximum number of failed logins the user is permitted before the user's login is blocked from accessing the ePDU. If no number is entered, there is no limit on failed logins.

3. Type a number in the **Block time** field. This is the length of time in minutes the login is blocked.

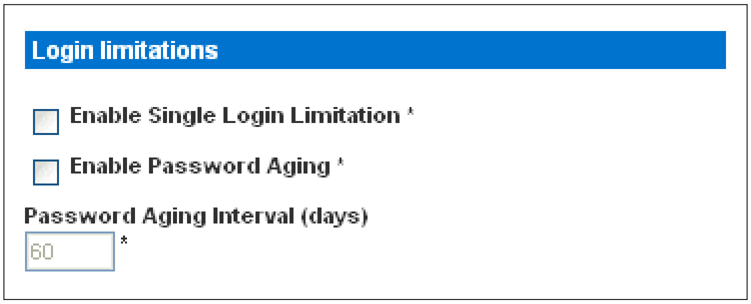
4. Click **Apply**. The user blocking limits are applied.

Enabling Login Limitations

Login limitations allow you to determine whether more than one person can use the same login at the same time, and whether or not users will be required to change passwords at regularly scheduled intervals.

To enable login limitations:

1. Select **Device Settings**, and then select **Security**. The Security Settings page displays. The **Login Limitations** panel controls this feature (see Figure 44).



Login limitations

□ Enable Single Login Limitation *

□ Enable Password Aging *

Password Aging Interval (days)
60 *

Figure 44. Login Limitations Panel

2. To prevent more than one person from using the same login at the same time, select the **Enable Single Login Limitation** check box.

3. To force users to change their passwords regularly, select the **Enabled Password Aging** check box, and then enter a number of days in the **Password Aging Interval** field. Users will be required to change their password every time that number of days has passed.

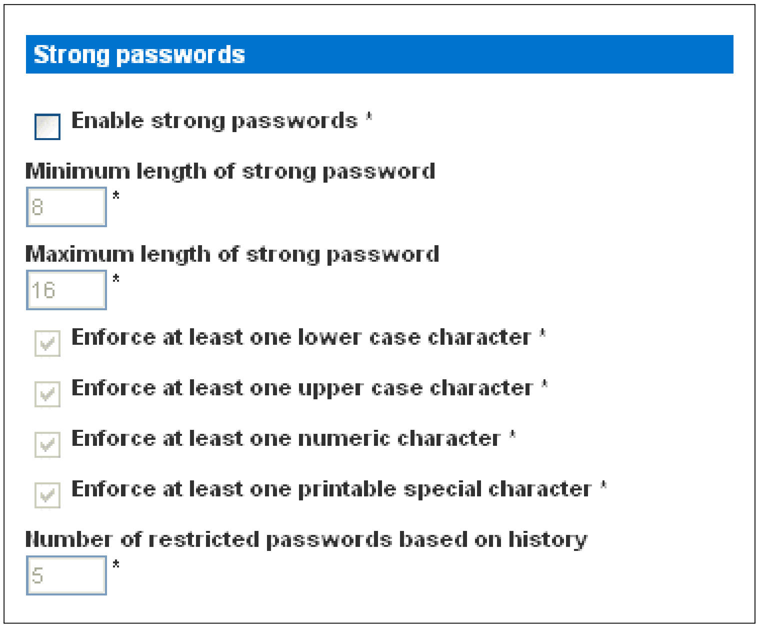
4. Click **Apply**. The controls are applied.

Enabling Strong Passwords

Forcing users to create strong passwords makes it more difficult for intruders to crack user passwords and access the ePDU. Strong passwords should be at least eight characters long and should contain upper and lowercase letters, numbers, and special characters (such as @ or &).

To force users to create strong passwords:

1. Select **Device Settings**, and then select **Security**. The Security Settings page displays. The **Strong Passwords** panel displays at the bottom of the page. See Figure 45.



Strong passwords

☐ Enable strong passwords *

Minimum length of strong password
8 *

Maximum length of strong password
16 *

☑ Enforce at least one lower case character *

☑ Enforce at least one upper case character *

☑ Enforce at least one numeric character *

☑ Enforce at least one printable special character *

Number of restricted passwords based on history
5 *

Figure 45. Strong Passwords Panel

2. Select the **Enable strong passwords** check box to activate the strong password feature. See Table 5 for password defaults.

Table 5. Strong Passwords Defaults

Field	Default
Minimum length	8 characters
Maximum length	16 characters
At least one lowercase character	Required
At least one uppercase character	Required
At least one numeric character	Required
At least one printable special character	Required
Number of restricted passwords	5

3. Make any necessary changes to the default settings.

4. When you are finished, click **Apply**. The changes are applied.

Setting Up a Digital Certificate

The purpose of an X.509 digital certificate is to ensure that both parties in an SSL connection are who they say they are. To obtain a certificate for the ePDU, you must create a Certificate Signing Request (CSR) and submit it to a certificate authority (CA).

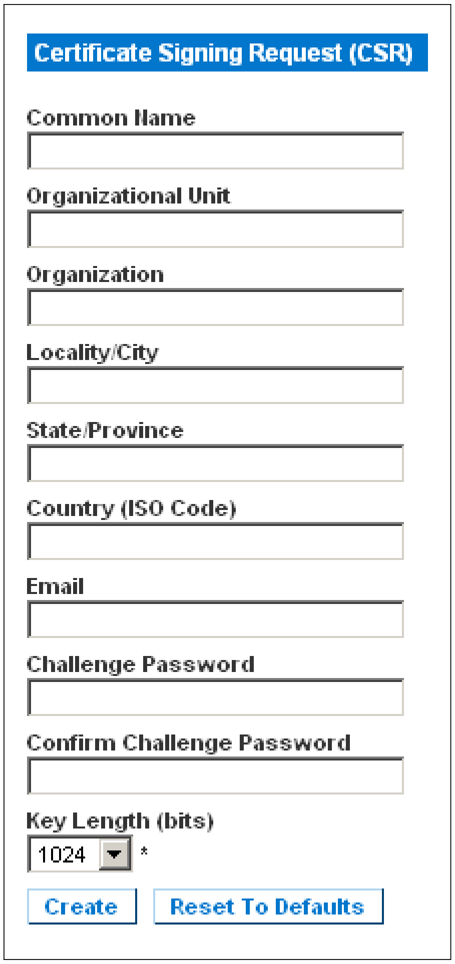
Once the CA has processed the information in the CSR, it will provide you with a certificate, which you must install on the ePDU.

NOTE *See "Forcing HTTPS Encryption" on page 39 for instructions on forcing users to employ SSL when connecting to the ePDU.*

Creating a Certificate Signing Request

To create a CSR:

1. Select **Device Settings**, and then select **Certificate**. The first page of the SSL Server Certificate Management page displays (see Figure 47).



Key Length (bits)
1024 *

Figure 46. SSL Server Certificate Signing (First Page)

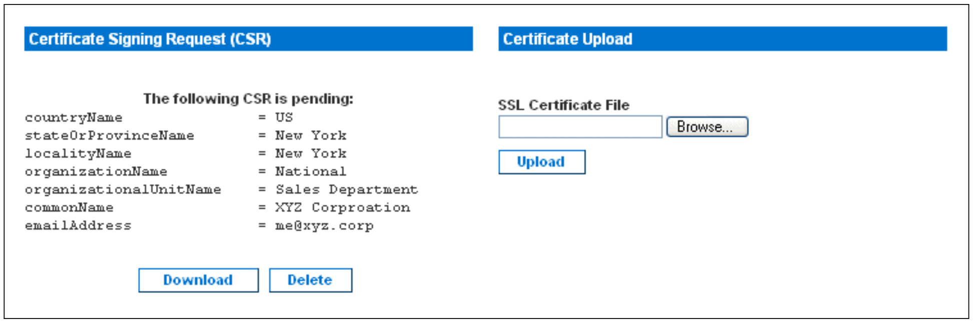
2. Provide the information requested. See Table 6 for field descriptions.

Table 6. Strong Passwords Defaults

Field	Description
Common Name	The name of your company
Organization Unit	The name of your department
Organization	The name of your organization within the department
Locality/City	The city where your company is located
State/Province	The state or province where your company is located
Country (ISO Code)	The country where your company is located. Use the standard ISO code. For a list of ISO codes, go to this Web site: http://www.iso.org/iso/en/prods-services/iso3166ma/02iso-3166-code-lists/list-en1.ht
Email	An email address where you or another administrative user can be reached
Challenge Password	The password that will be required to access the ePDU (the password is case-sensitive)
Confirm Challenge Password	Renter password

3. Select the key length from the **Key length (bits)** list. The default is 1024, but you can also select 2048.

4. Click **Create**. The CSR is created and the second page of the SSL Server Certificate Management page displays. This page shows the information you entered when creating the CSR. See Figure 47.



The following CSR is pending:

```
countryName                = US
stateOrProvinceName        = New York
localityName               = New York
organizationName           = National
organizationalUnitName     = Sales Department
commonName                 = XYZ Corproation
emailAddress               = me@xyz.corp
```

Figure 47. SSL Server Certificate Management (Second Page)

5. To download the newly-created CSR to your computer, click **Download**. You will be prompted to open or save the file. The file is called **csr.txt**.

6. Once the file is stored on your computer, submit it to a CA to obtain the digital certificate.

Installing a Certificate

Once the CA has provided you with a digital certificate, you must install it on the ePDU. To do this:

1. Verify that a certificate has been created.
2. Select **Device Settings**, and then select **Certificate**. The second page of the Server Certificate Management page displays (see Figure 47).
3. Type the path and name of the certificate file in the **SSL Certificate File** field, or click **Browse** and go to the location of the file and select it.
4. Click **Upload**. The certificate is installed on the ePDU.

Setting Up External User Authentication

For security purposes, users attempting to log into the ePDU must be authenticated. You can use the local database of user profiles in the ePDU, or you can use the Lightweight Directory Access Protocol (LDAP) or the Remote Access Dial-In User Service (RADIUS) protocol.

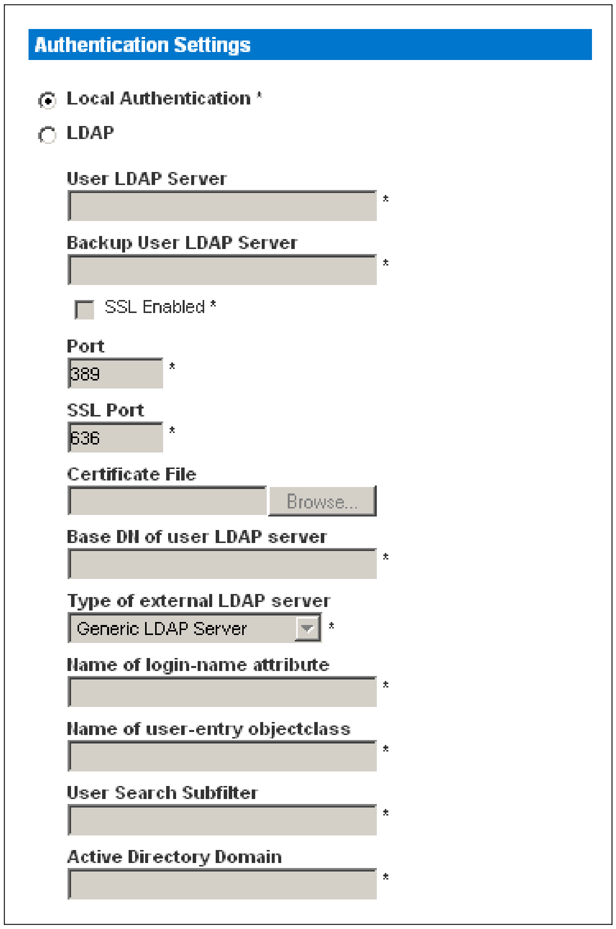
By default, the ePDU is configured for local authentication. If you stay with this method, you do not have to do anything other than create user profiles for each authorized user. If you prefer to use an external LDAP or RADIUS server, you have to provide the system with information about the server.

Keep in mind that you still need to create user profiles for users who are authenticated externally. This is because the user profile determines the user group to which the user belongs, and the user group determines the user's system and outlet permissions.

Setting Up LDAP Authentication

To set up LDAP authentication:

1. Select **Device Settings**, and then select **Authentication**. The Authentication Settings page displays. The LDAP parameters display on the left side of the page. See Figure 48.



Authentication Settings

● Local Authentication *

○ LDAP

User LDAP Server *

Backup User LDAP Server *

□ SSL Enabled *

Port: 389 *

SSL Port: 636 *

Certificate File

Base DN of user LDAP server *

Type of external LDAP server: Generic LDAP Server *

Name of login-name attribute *

Name of user-entry objectclass *

User Search Subfilter *

Active Directory Domain *

Figure 48. Authentication Settings Page with LDAP Parameters

2. Select **LDAP**.

3. Type the IP address of the LDAP server in the **User LDAP Server** field.

4. To encrypt traffic to and from the LDAP server, select the **SSL Enabled** check box.

NOTE *The SSL port is enabled if only if the **SSL Enabled** check box is selected.*

5. By default, the ePDU uses the standard ports 389 for LDAP and 636 for secure LDAP (SSL). If you prefer to use non-standard ports, change the ports.

6. Type the base distinguish name (DN) in the **Base DN of User LDAP Server** field. The DN base is the top level of the LDAP directory tree. It indicates where in the LDAP directory you want to begin searching for user credentials.

7. Select the type of LDAP server from the **Type of external LDAP server** list. Your choices are:

   - Generic LDAP Server
   - Novell Directory Service
   - Microsoft Active Directory

8. Type the following information in the corresponding fields. The LDAP needs this information to verify user names and passwords.

   - Login name attribute(also called as "AuthorizationString")
   - User entry object class
   - User search subfilter (also called as "BaseSearch")

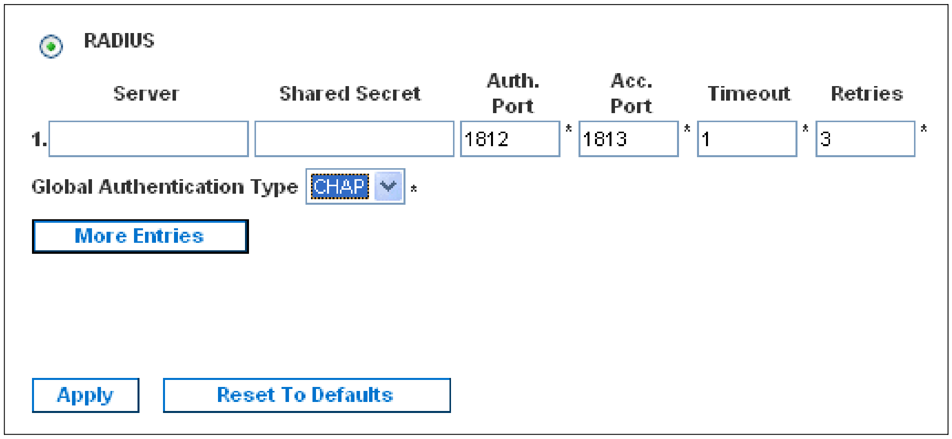
9. If you selected **Microsoft Active Directory** in Step 6, enter the domain name in the **Active Directory Domain** field.

10. Click **Apply**. LDAP authentication is now in place.

Setting Up RADIUS Authentication

To set up RADIUS authentication:

1. Select **Device Settings**, and then select **Authentication**. The Authentication Settings page displays. The RADIUS parameters display on the right side of the page. See Figure 49.



● RADIUS

	Server	Shared Secret	Auth. Port		Acc. Port		Timeout		Retries	
1.			1812	*	1813	*	1	*	3	*

Global Authentication Type CHAP *

Figure 49. Authentication Page – RADIUS Parameters

2. Select **RADIUS**.

3. Type the IP address of the RADIUS server in the **Server** field.

4. Type the shared secret in **Shared Secret** field. The shared secret is necessary to protect communication with the RADIUS server.

5. By default, the ePDU uses the standard RADIUS ports 1812 (authentication) and 1813 (accounting). If you prefer to use non-standard ports, change the ports.

6. Type the timeout period in seconds in the **Timeout** field. This sets the maximum amount of time to establish contact with the RADIUS server before timing out. The default is 1 second.

7. Type the number of retries permitted in the **Retries** field. The default is 3.

8. If you have additional RADIUS servers, click the **More Entries** button. Fields for four additional servers appear. Enter the same information in Step 2 through Step 7 for each additional server.

9. Select an authentication protocol from the drop-down list in the **Global Authentication Type** field. Your choices are:

   - PAP (Password Authentication Protocol)
   - CHAP (Challenge Handshake Authentication Protocol)

CHAP is generally considered more secure because the user name and password are encrypted, while in PAP they are transmitted in the clear.

10. Click **Apply**. RADIUS authentication is now in place.

Setting Up Outlets and Power Thresholds

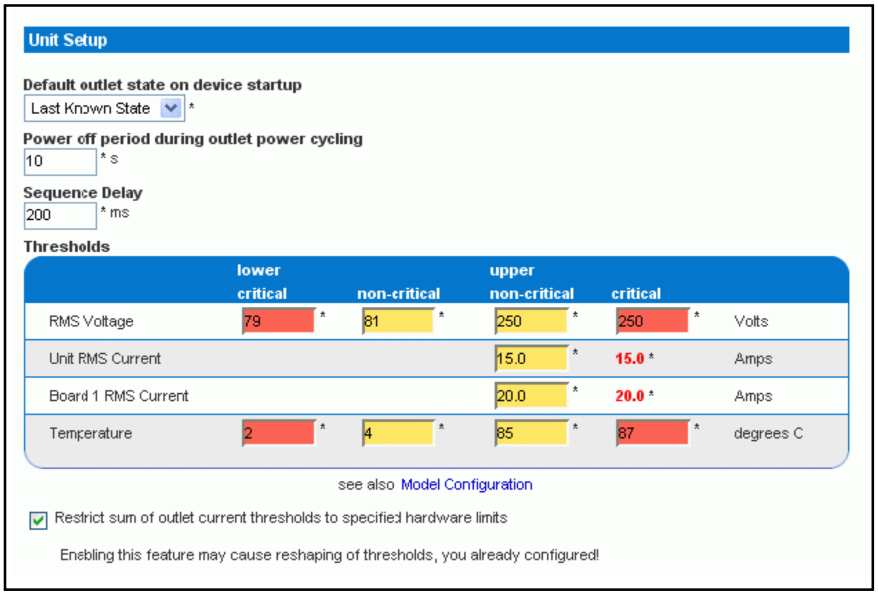
The ePDU is shipped with certain ePDU and outlet power thresholds already defined. You can change the default ePDU thresholds, and you can give each outlet a name and change its default thresholds.

When setting the thresholds, keep in mind that you can set up alerts that are triggered whenever any of these thresholds are crossed. See “Setting Up Alerts” on page 62 for details.

Setting Default Outlet State

You can set a global default for the power state of the outlets when the ePDU is powered on. Setting an individual outlet startup state to something other than Device Default (see Naming Outlets on page 57) overrides this default state for that outlet. To set this default:

1. Select **Device Settings**, and then select **Unit Setup**. The Unit Setup page displays.



Unit Setup

Default outlet state on device startup

Last Known State *

Power off period during outlet power cycling

10 * s

Sequence Delay

200 * ms

Thresholds

	lower		upper		
	critical	non-critical	non-critical	critical	
RMS Voltage	79 *	81 *	250 *	250 *	Volts
Unit RMS Current			15.0 *	**15.0** *	Amps
Board 1 RMS Current			20.0 *	**20.0** *	Amps
Temperature	2 *	4 *	85 *	87 *	degrees C

see also Model Configuration

☑ Restrict sum of outlet current thresholds to specified hardware limits

Enabling this feature may cause reshaping of thresholds, you already configured!

Figure 50. Unit Setup Page

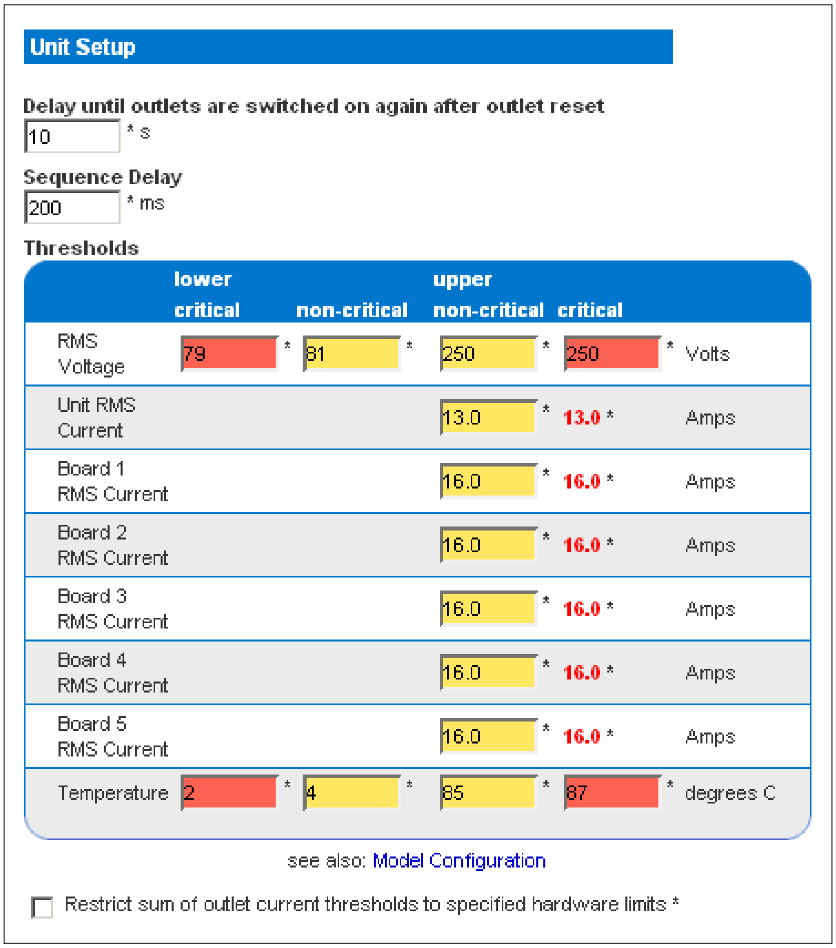
2. Select the default state from the **Default outlet state on device startup** list.

3. Click **Apply**. The default state is set.

Setting the ePDU Thresholds

To set the ePDU thresholds:

1. Select **Device Settings**, and then select **Unit Setup**. The Unit Setup page displays (see Figure 51).



Unit Setup

Delay until outlets are switched on again after outlet reset

10 * s

Sequence Delay

200 * ms

Thresholds

	lower		upper		
	critical	non-critical	non-critical	critical	
RMS Voltage	79 *	81 *	250 *	250 *	Volts
Unit RMS Current			13.0 *	13.0 *	Amps
Board 1 RMS Current			16.0 *	16.0 *	Amps
Board 2 RMS Current			16.0 *	16.0 *	Amps
Board 3 RMS Current			16.0 *	16.0 *	Amps
Board 4 RMS Current			16.0 *	16.0 *	Amps
Board 5 RMS Current			16.0 *	16.0 *	Amps
Temperature	2 *	4 *	85 *	87 *	degrees C

see also: Model Configuration

□ Restrict sum of outlet current thresholds to specified hardware limits *

Figure 51. Unit Setup Page

2. Type a number in the **Delay until outlets are switched on again after outlet reset** field. When the outlets on the ePDU are power cycled, they are turned off and then back on. The number you enter here determines the length of time (in seconds) it takes for the outlets to turn back on after they are shut down during the power cycle. The default is 10 seconds.

NOTE *The number you enter here applies to all outlets on the ePDU. However, you can override this number for specific outlets. See "Setting Outlet Thresholds" on page 58. You can power cycle an outlet from the Outlet Details page. See "Power Cycling an Outlet" on page 59 for instructions.*

3. Type a number of seconds in the **Sequence Delay** field. The default is 200 milliseconds.

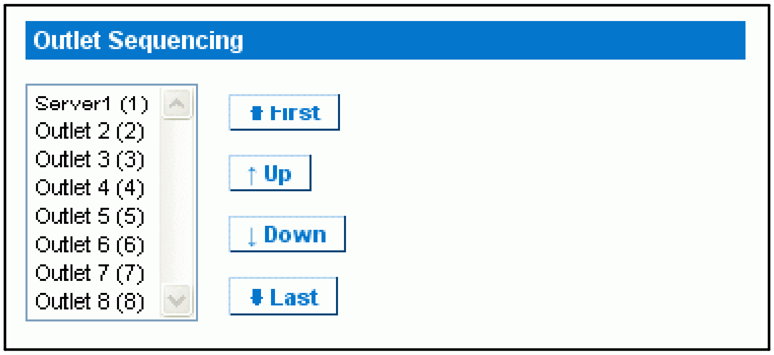
4. Set the RMS voltage, current, and temperature thresholds for the ePDU in the **Thresholds** panel. For each setting, enter critical and non-critical thresholds.

5. Click **Apply**. The delays and thresholds are applied.

Setting the Outlet Power-Up Sequence

You can set the order in which the ePDU outlets power up. This is useful when devices have multiple power supplies that should be powered-on together. To do this:

1. Select **Device Settings**, and then select **Unit Setup**. The Unit Setup page displays.
2. The current outlet power-up sequence displays in the list under Outlet Sequencing (see Figure 52). To change the priority of an outlet, select it from the list and click one of four options:
   - **First** moves the outlet to the top of the list and makes it the first outlet to receive power.
   - **Up** moves the outlet up one position in the list.
   - **Down** moves the outlet down one position in the list.
   - **Last** moves the outlet to the bottom of the list and makes it the last outlet to receive power.


Outlet Sequencing

Server1 (1)
Outlet 2 (2)
Outlet 3 (3)
Outlet 4 (4)
Outlet 5 (5)
Outlet 6 (6)
Outlet 7 (7)
Outlet 8 (8)

Figure 52. Outlet Sequencing

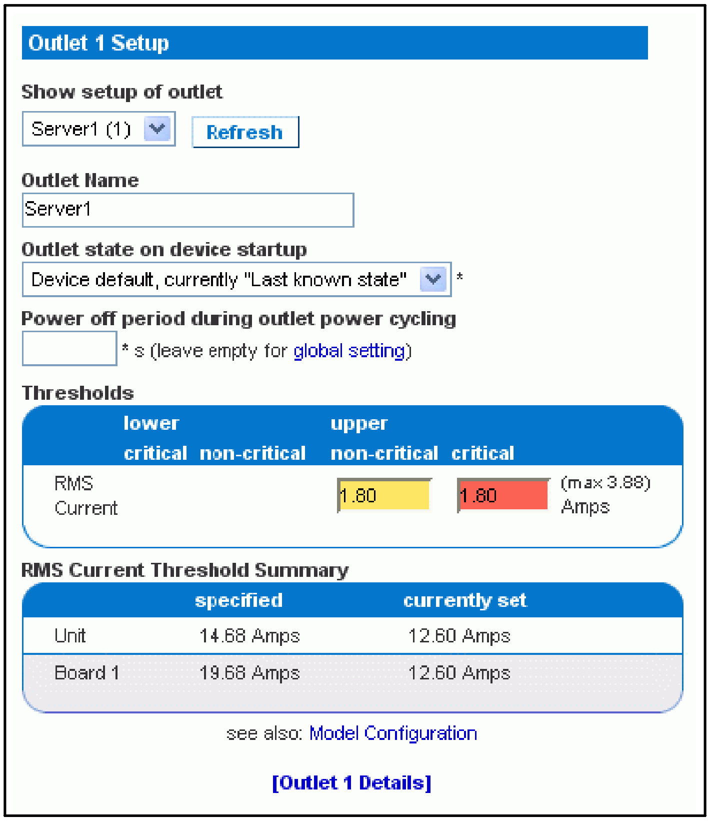
3. Click **Apply** to save the new sequence.

NOTE *If you use Outlet Grouping to group outlets together, you should adjust the Outlet Sequencing to ensure that all outlets from this ePDU, that are part of the same group, power up consecutively.*

Naming Outlets

You can give each outlet a name to help you identify the device connected to it. To do this:

1. Select **Power Outlets**, and then select **Outlet Setup**. The Outlet Setup page displays (see Figure 53).



Outlet 1 Setup

Show setup of outlet

Server1 (1)

Outlet Name

Server1

Outlet state on device startup

Device default, currently "Last known state" *

Power off period during outlet power cycling

* s (leave empty for global setting)

Thresholds

	lower		upper		
	critical	non-critical	non-critical	critical	
RMS Current			1.80	1.80	(max 3.88) Amps

RMS Current Threshold Summary

	specified	currently set
Unit	14.68 Amps	12.60 Amps
Board 1	19.68 Amps	12.60 Amps

Figure 53. Outlet Setup Page

2. Select the outlet from the **Show setup of outlet** list.

3. Type a name for the outlet in the **Outlet Name** field. It is a good idea to give the outlet an easily recognizable name that helps you identify the device connected to it. You can always change names if the device is replaced.

4. Select an outlet state from the **Outlet state on device startup** list . This will determine if the outlet is ON or OFF when the ePDU powers up. If set to **Device Default**, the state for this outlet will be determined by the Default Outlet State in the Unit Setup page (see page 54).

5. Click **Apply** to save your changes.

Setting Outlet Thresholds

To set the current thresholds of an outlet:

1. Select **Power Outlets**, and then select **Outlet Setup**. The Outlet Setup page displays (see Figure 53).
2. Select an outlet from the **Show setup of outlet** list.
3. Type a number in the **Power off period during outlet power cycling** field. When an outlet is power cycled, it is turned off and then back on. The number you enter here determines the length of time (in seconds) it takes for the outlet to turn back on after is shut down during the power cycle. If left blank, this outlet will use the value set in the Unit Setup page as a default.

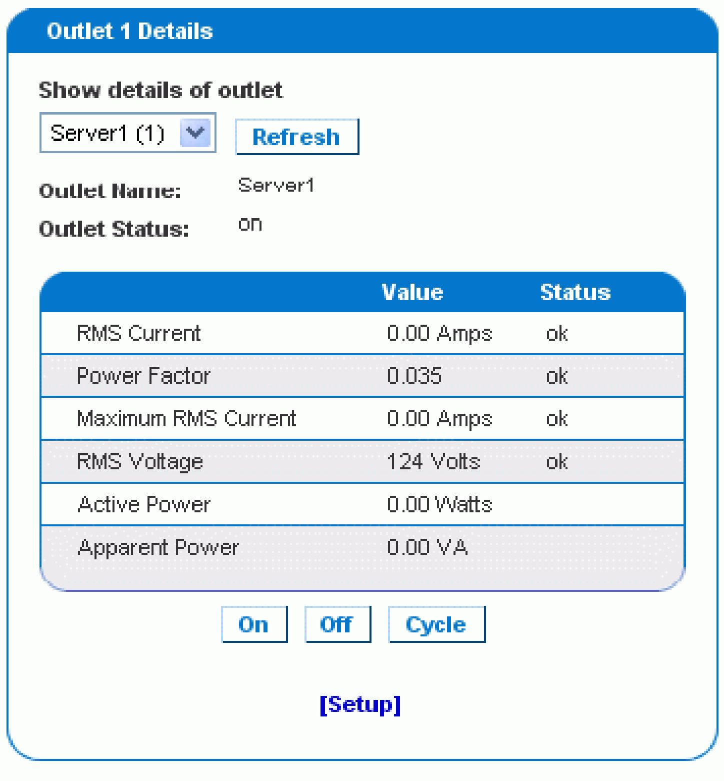
NOTE *You can power cycle an outlet from the Outlet Details page. See "Power Cycling an Outlet" below for instructions.*

4. Set the RMS current thresholds for the outlet in the **Thresholds** panel.
5. Click **Apply** to save your changes.

Viewing Outlet Details

To display details about a particular outlet:

1. Select **Power Outlet** and then select **Outlet Details**. The Outlet Details page displays (see Figure 54).



Outlet 1 Details

Show details of outlet

Server1 (1)

Outlet Name: Server1

Outlet Status: on

	Value	Status
RMS Current	0.00 Amps	ok
Power Factor	0.035	ok
Maximum RMS Current	0.00 Amps	ok
RMS Voltage	124 Volts	ok
Active Power	0.00 Watts	
Apparent Power	0.00 VA	

Figure 54. Outlet Details Page

2. Select an outlet from the **Show details of outlet** list. The page shows these details about the outlet:

   - Outlet name
   - Outlet status
   - RMS current, voltage and power readings, including:

     RMS Current
     Power Factor
     Maximum RMS Current
     RMS Voltage
     Active Power
     Apparent Power

NOTE *To display the Outlet Setup page, click the **[Setup]** link. See Figure 53 for a picture of the Outlet Setup page.*

Power Cycling an Outlet

To turn an outlet off and on:

1. Select **Power Ports** and then select **Outlet Details**. The Outlet Details page displays (see Figure 54).
2. Select an outlet from the **Show details of outlet** list. The outlet must be ON.
3. Click **Cycle**. The outlet turns OFF and then back ON.

NOTE *The length of time between the off and on states in a power cycle can be set on the ePDU as a whole and for individual outlets. See "Setting the ePDU Thresholds" on page 55 and "Setting the Outlet Thresholds" on page 58 for details.*

Turning an Outlet On or Off

To turn an outlet on or off:

1. Select **Power Outlets** and then select **Outlet Details**. The Outlet Details page displays (see Figure 54).
2. Select an outlet from the **Show details of outlet** list.
3. Click **On** to turn the outlet ON. Click **Off** to turn the outlet OFF.

NOTE *You can also turn an outlet on or off from the Home page.*

Environmental Sensors

In addition to monitoring its own internal temperature, the ePDU can monitor the environment where environmental sensors are placed.

Connecting the Environmental Sensors

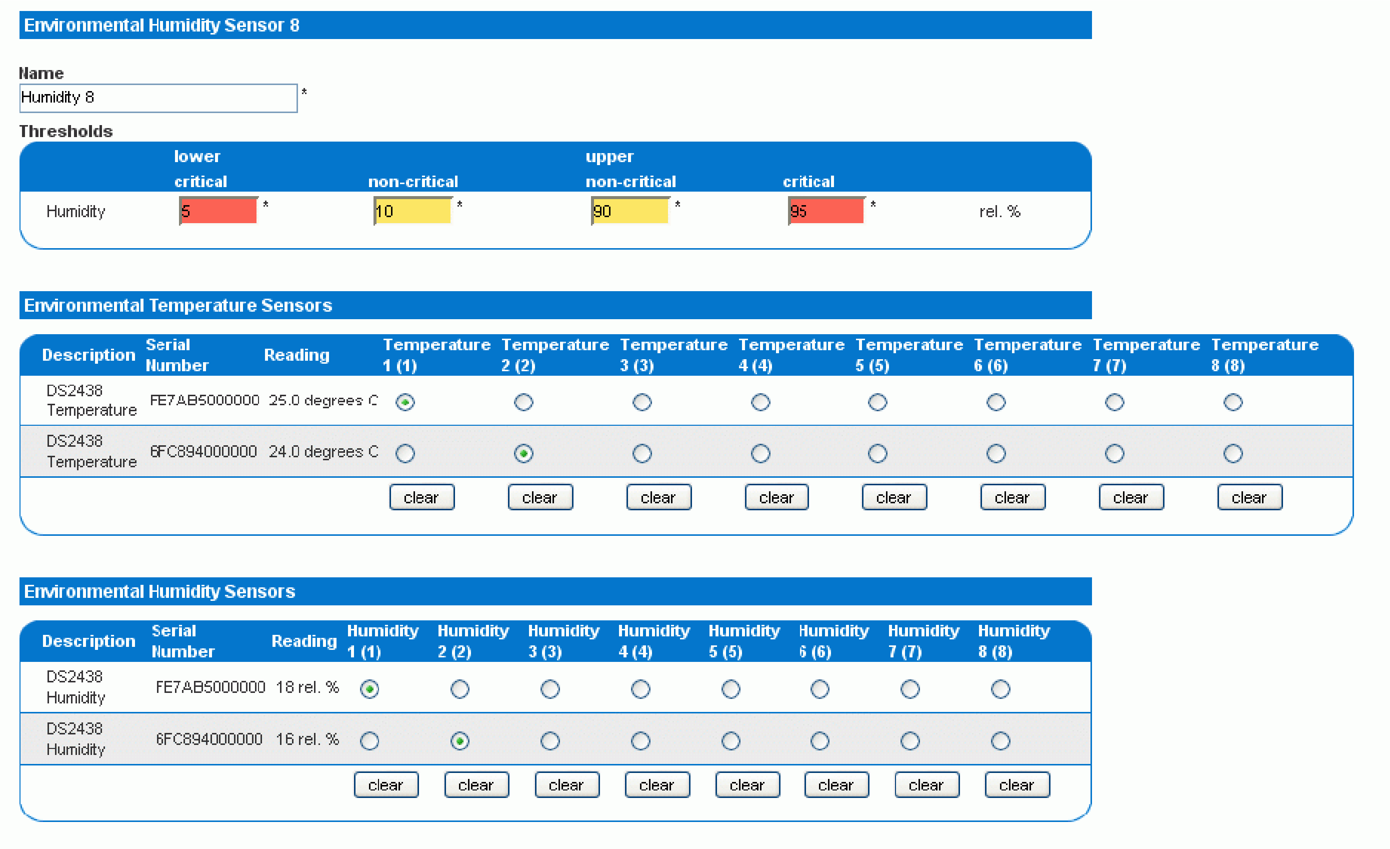
To enable the ePDU to measure environmental factors, connect the cable of the environmental sensors to the Feature port of the ePDU.

Mapping the Environmental Sensors

Once the sensors have been physically connected to the ePDU, they must be mapped to the unit's logical sensors before the ePDU recognizes and displays the readings from them. To do this:

1. Select **Device Settings**, and then select **Environmental Sensors**. The Environmental Sensors page displays (see Figure 55). The page lists the logical Temperature and Humidity sensors first.

   When physical sensors are attached to the ePDU, they appear listed below the logical sensors. Temperature sensors are listed in the Environmental Temperature Sensors table, humidity sensors in the Environmental Humidity Sensors table. If the sensors are not attached properly, the page will state that No sensors were detected.



Environmental Humidity Sensor 8

Name
Humidity 8 *

Thresholds

	lower critical	non-critical	upper non-critical	critical	
Humidity	5 *	10 *	90 *	95 *	rel. %

Environmental Temperature Sensors

Description	Serial Number	Reading	Temperature 1 (1)	Temperature 2 (2)	Temperature 3 (3)	Temperature 4 (4)	Temperature 5 (5)	Temperature 6 (6)	Temperature 7 (7)	Temperature 8 (8)
DS2438 Temperature	FE7AB5000000	25.0 degrees C	●	○	○	○	○	○	○	○
DS2438 Temperature	6FC894000000	24.0 degrees C	○	●	○	○	○	○	○	○
			clear	clear	clear	clear	clear	clear	clear	clear

Environmental Humidity Sensors

Description	Serial Number	Reading	Humidity 1 (1)	Humidity 2 (2)	Humidity 3 (3)	Humidity 4 (4)	Humidity 5 (5)	Humidity 6 (6)	Humidity 7 (7)	Humidity 8 (8)
DS2438 Humidity	FE7AB5000000	18 rel. %	●	○	○	○	○	○	○	○
DS2438 Humidity	6FC894000000	16 rel. %	○	●	○	○	○	○	○	○
			clear	clear	clear	clear	clear	clear	clear	clear

Figure 55. Environmental Sensors Page

2. For each physical sensor (shown as a row) in the table, select the logical sensor (shown as columns) you want to map it to. The ePDU will now track this sensor's readings and display them on the Home page when configuration is finished.

   If you do not want to track the readings of a particular sensor, leave that row blank.

3. To unmap a logical sensor from any physical sensor, click **clear** at the bottom of the column. That logical sensor will no longer be associated with any of the physical sensors.

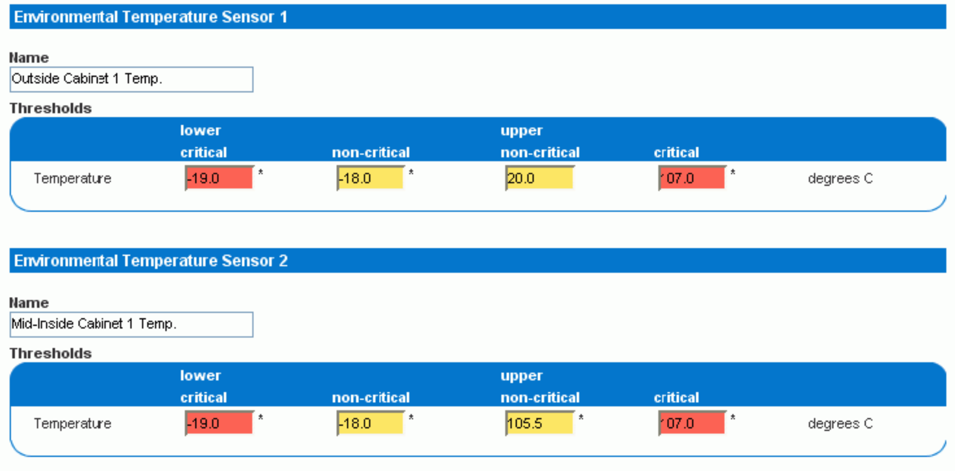
NOTE *It is possible (but not advisable) to map more than one logical sensor to a single physical sensor. You cannot map multiple physical sensors to a single logical one.*

Configuring Environmental Sensors and Thresholds

To make sensors more useful, you should rename the logical sensors that are in use and configure their threshold settings. Configuring thresholds for these sensors allows the ePDU to generate an alert whenever environmental factors at those sensors move outside of your ideal values.

1. From the Environmental Sensors page, locate the logical sensors that have been mapped to physical sensors as described above.

2. In the Name field, type a new name for each mapped sensor that will help you identify the sensor and its purpose.



Environmental Temperature Sensor 1

Name

Outside Cabinet 1 Temp.

Thresholds

	lower critical	non-critical	upper non-critical	critical	
Temperature	-19.0 *	-18.0 *	20.0	07.0 *	degrees C

Environmental Temperature Sensor 2

Name

Mid-Inside Cabinet 1 Temp.

Thresholds

	lower critical	non-critical	upper non-critical	critical	
Temperature	-19.0 *	-18.0 *	105.5 *	07.0 *	degrees C

Figure 56. Configuring Environmental Sensors

3. Configure the upper and lower thresholds for each sensor in use.

   - The Upper Critical and Lower Critical values are points at which the ePDU considers the operating environment is critical, and outside the range of the acceptable threshold.

   - Once critical, the temperature or humidity must drop below the Upper Non-Critical (or raise above the Lower Non-Critical) value before the ePDU considers the environment to be acceptable again.

4. Click **Apply** to save the settings.

When the configuration changes have been applied, the sensor readings will be displayed on the Home page next to the outlets list and the sensor names will be updated. This updated name will also display in the physical sensors table at the bottom of the Environmental Sensors page. This can be useful for ensuring that the physical and logical sensors are correctly mapped together.

NOTE *The recommended maximum ambient operating temperature for the ePDU is 40°C.*

Viewing Sensor Readings

Mapped sensor readings display beside the outlets list any time the Home page is displayed. To view the readings from any other page, click **Home** in the navigation path at the top of the page.

Setting Up Alerts

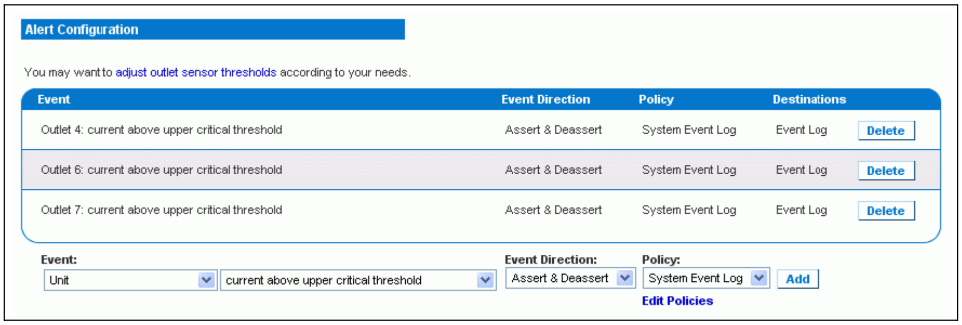
The ePDU can be configured to issue an alert whenever a threshold is crossed, either for the ePDU as a whole or for a specific outlet. The alert can be programmed to send an administrator an email message, or it can be programmed to send a Simple Network Management Protocol (SNMP) trap to a specific IP address.

NOTE *See "Setting Up Outlets and Power Thresholds" on page 53 for instructions on setting power thresholds.*

Configuring Alert Events

Alert events consist of an outlet, an associated threshold, and an associated policy. To configure an alert event:

1. Select **Alerts**, and then select **Alert Configuration**. The Alert Configuration page displays. It shows all existing policies (see Figure 57).



Alert Configuration

You may want to adjust outlet sensor thresholds according to your needs.

Event	Event Direction	Policy	Destinations	
Outlet 4: current above upper critical threshold	Assert & Deassert	System Event Log	Event Log	Delete
Outlet 6: current above upper critical threshold	Assert & Deassert	System Event Log	Event Log	Delete
Outlet 7: current above upper critical threshold	Assert & Deassert	System Event Log	Event Log	Delete

Event: Unit | current above upper critical threshold

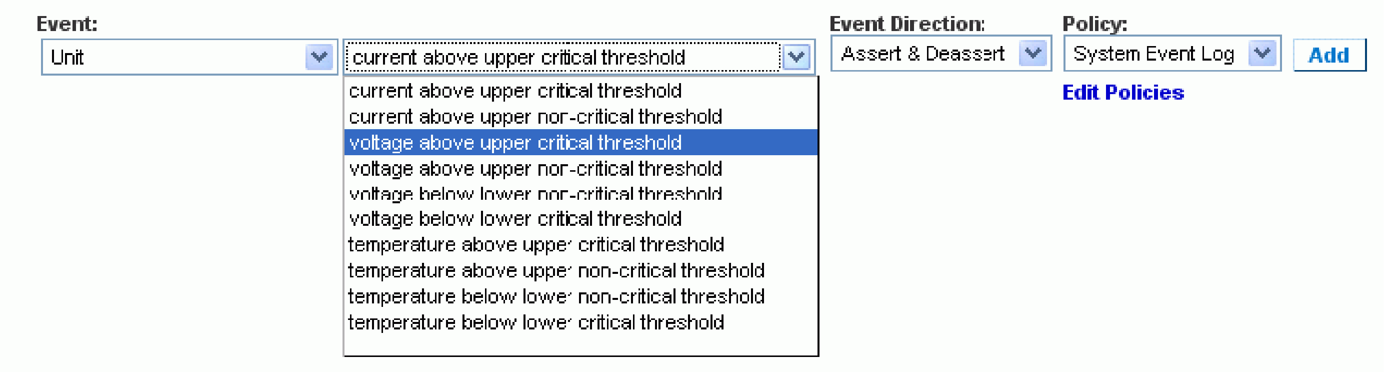
Event Direction: Assert & Deassert

Policy: System Event Log

Figure 57. Alert Configuration Page

2. Select the outlet from the first list under **Event**. You can select the ePDU as a whole or you can select a specific outlet. You can also select an individual relay board, the Environmental Temperature Sensors or the Environmental Humidity Sensors.

3. Select the threshold from the second list under **Event** (see Figure 58). The list of thresholds vary depending on what was selected in the first list.



Event: Unit — current above upper critical threshold

Event Direction: Assert & Deassert

Policy: System Event Log

current above upper critical threshold
current above upper nor-critical threshold
voltage above upper critical threshold
voltage above upper nor-critical threshold
voltage below lower nor-critical threshold
voltage below lower critical threshold
temperature above uppe' critical threshold
temperature above uppe' non-critical threshold
temperature below lowe' non-critical threshold
temperature below lowe' critical threshold
Add
Edit Policies

Figure 58. Thresholds

4. Select an direction from the **Event Direction** list.

   - If set to Assert, this alert will only trigger when a measured value moves past a critical threshold (either above an upper critical threshold, or below a lower critical one).

   - If set to Deassert, this alert will only trigger when a measured value returns to normal from a critical state (either below an upper noncritical threshold, or above a lower non□]critical one).

   - If set to Assert & Deassert, this alert will trigger when a measured value crosses any threshold state.

5. Select a policy from the **Policy** list.

6. Click **Add**. The alert is added to the system.

NOTE *No policies display in this drop-down list until you create them. See "Creating Alert Policies" below for instructions.*

NOTE *If an Environmental Temperature or Humidity sensor is selected, an event will be created for each logical Temperature or Humidity sensor. These event alerts can be deleted so that only the ones you want are present.*

Creating Alert Policies

Alert policies allow you to associate events with destinations. Policies determine whether specific events trigger an entry in the event log, an email message to an administrator, an SNMP trap, a selected outlet to be switched on/off/cycled, or any combination of the four.

About Policies

The diagram below illustrates the way policies associate events with destinations. In this example, five events and two policies are defined.

- Events 1 and 2 are associated with the Red policy. This means they trigger an email message to an administrator and an SNMP trap.
- Events 3, 4, and 5 are associated with the Syslog policy. They trigger entries in the event log, but do not send email messages or traps.

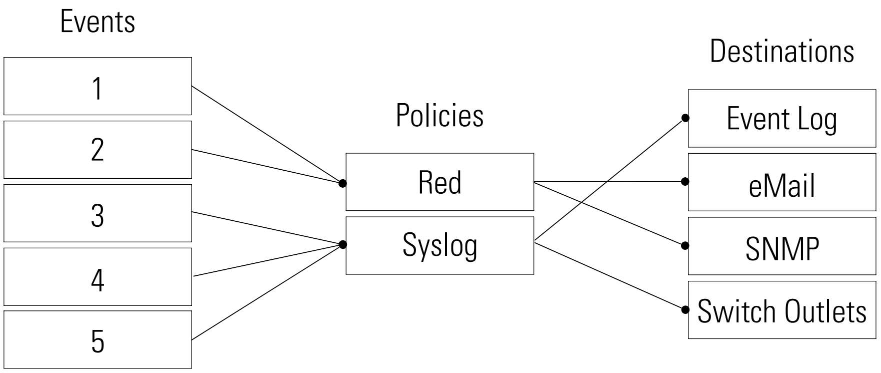
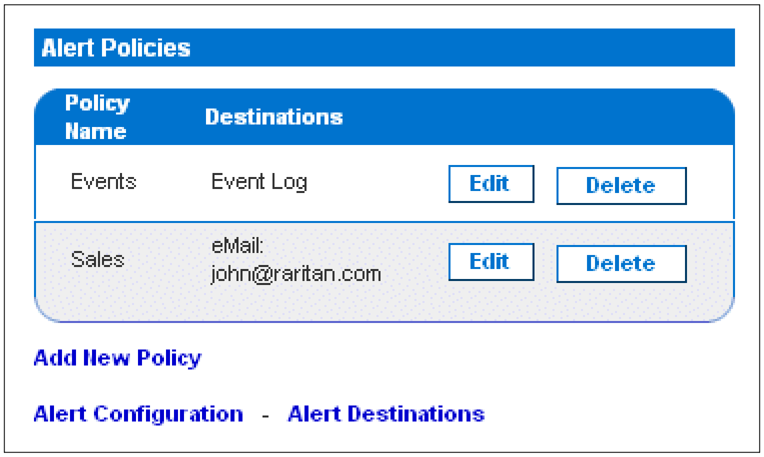


Figure 59. Policies

Display Existing Policies

To display a list of existing policies:

1. Select **Alerts**, and then select **Alert Policies**. The Alert Policies page displays. It lists each policy and shows their destinations (see Figure 60).



Alert Policies

Policy Name	Destinations		
Events	Event Log	Edit	Delete
Sales	eMail: john@raritan.com	Edit	Delete

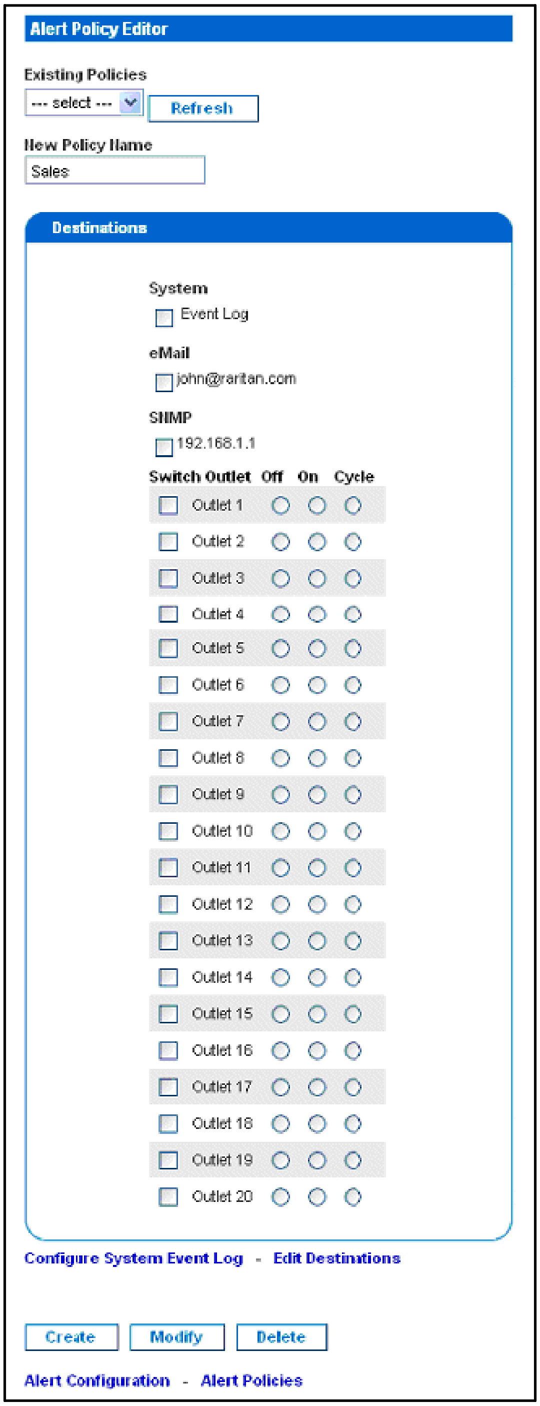
Figure 60. Alert Policies Page

2. You can modify or delete a policy by clicking the corresponding button next to the policy. You can add a new policy and configure alerts and destinations by clicking the appropriate link.

Create a Policy

To create a policy:

1. Select **Alerts**, and then select **Alert Policy Editor**. The Alert Policy Editor displays (see Figure 61).



Alert Policy Editor
Refresh
Destinations
Configure System Event Log - Edit Destinations
Create
Modify
Delete
Alert Configuration - Alert Policies

Existing Policies: --- select ---

New Policy Name: Sales

System
□ Event Log

eMail
□ john@raritan.com

SNMP
□ 192.168.1.1

Switch Outlet	Off	On	Cycle
□ Outlet 1	○	○	○
□ Outlet 2	○	○	○
□ Outlet 3	○	○	○
□ Outlet 4	○	○	○
□ Outlet 5	○	○	○
□ Outlet 6	○	○	○
□ Outlet 7	○	○	○
□ Outlet 8	○	○	○
□ Outlet 9	○	○	○
□ Outlet 10	○	○	○
□ Outlet 11	○	○	○
□ Outlet 12	○	○	○
□ Outlet 13	○	○	○
□ Outlet 14	○	○	○
□ Outlet 15	○	○	○
□ Outlet 16	○	○	○
□ Outlet 17	○	○	○
□ Outlet 18	○	○	○
□ Outlet 19	○	○	○
□ Outlet 20	○	○	○

Figure 61. Alert Policy Editor

2. Type a name for the policy in the **New Policy Name** field.

3. Select the destinations associated with the policy in the Destinations panel. Your choices are **System** (event log), **Switch Outlet**, **eMail**, and **SNMP**.

4. Click **Create**. The policy is created.

Modify a Policy

To modify a policy:

1. Select **Alerts**, and then select **Alert Policy Editor**. The Alert Policy Editor displays.

2. Select the policy to be modified from the **Existing Policies** list.

3. Make any necessary changes to the policy's name or destinations.

4. Click **Modify** to save your changes.

Delete a Policy

To delete a policy:

1. Select **Alerts**, and then select **Alert Policy Editor**. The Alert Policy Editor displays.

2. Select the policy to be deleted from the **Existing Policies** list.

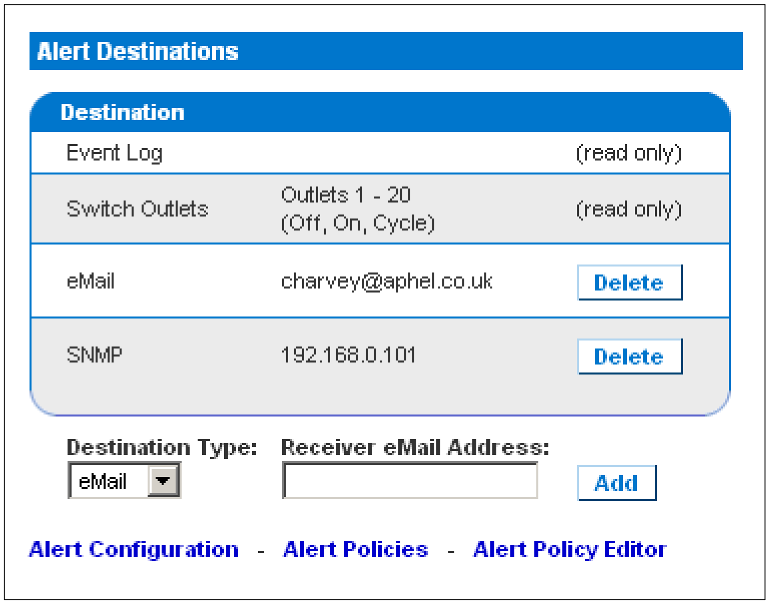
3. Click **Delete**. The policy is deleted.

NOTE *The default alert policy "System Event Log" cannot be deleted.*

Specifying the Alert Destination

The alert destination can be an email address or an SNMP trap. To specify the destination:

1. Select **Alerts**, and then select **Alert Destinations**. The Alert Destinations page displays (see Figure 62).



Alert Destinations

Destination		
Event Log		(read only)
Switch Outlets	Outlets 1 - 20 (Off, On, Cycle)	(read only)
eMail	charvey@aphel.co.uk	Delete
SNMP	192.168.0.101	Delete

Destination Type: eMail

Receiver eMail Address:

Figure 62. Alert Destinations Page

NOTE *If you have not configured the ePDU SMTP, a note will appear on this page prompting you to do so now. You cannot enter an email address until you have configured the SMTP server. Either click the* ***SMTP server here*** *link that displays on this page, or select Devices Settings > SMTP Settings. See "Configuring the SMTP Settings" on page 80 for details.*

2. Select the destination from the drop-down list in the **Destination Type** field. Your choices are **Event Log**, **Switch Outlets**, **eMail** and **SNMP**.

3. Do one of the following:

   - **Event Log.** This is one of the default options for Alert Destination. If you selected this option, event entries are recorded in the event log. This destination is built in by default, and can be neither added nor deleted.

   - **Switch Outlets.** This is one of the default options for Alert Destinations. If you selected this option, configured outlet is switched on, off, or cycled. This destination is built in by default, and can be neither added or deleted.

   - **eMail.** If you selected email, type the receiver's email address.

   - **SNMP.** If you selected SNMP, enter the IP address of the trap and the community string.

4. Click **Add**. The destination is added.

5. To delete an alert destination, click the appropriate **Delete** button.

NOTE *The ePDU is capable of sending out two types of SNMP traps:*

- ***PDU-specific traps****, which are sent if configured in Event Log setting, while the PDU MIBs should be self explanatory.*
- ***IPMI PET (Platform Event Traps)****, which are generated in alert configuration and sent out in IPMI-specific formats, containing raw data.*

Details of such traps can be referenced at:

http://www.intel.com/design/servers/ipmi/pdf/IPMIv2_0_rev1_0_E3_markup.pdf (http://www.intel.com/design/servers/ipmi/pdf/ipmiv2_0_rev1_0_e3_markup.pdf) (Chapter 17.16) and http://download.intel.com/design/servers/ipmi/PET100.pdf (http://download.intel.com/design/servers/ipmi/pet100.pdf).

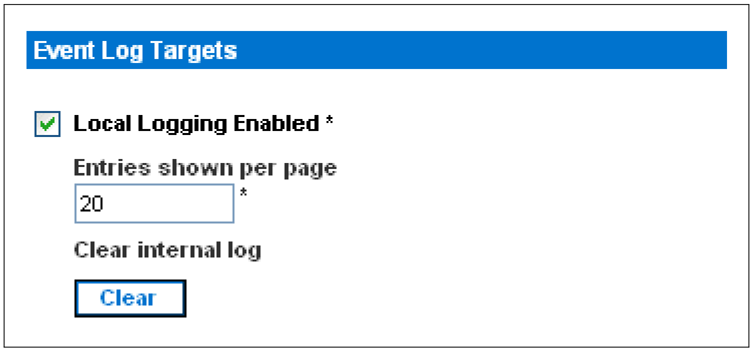
Setting Up Event Logging

By default, the ePDU captures certain system events and saves them in a local (internal) event log. You can expand the scope of the logging to also capture events in the NFS, SMTP, and SNMP logs.

Configuring the Local Event Log

To configure the local event log:

1. Select **Device Settings**, and then select **Event Log**. The Event Log Settings page displays. The **Local Logging** panel displays first. This panel controls the local event log. See Figure 63.


Event Log Targets

☑ Local Logging Enabled *

Entries shown per page

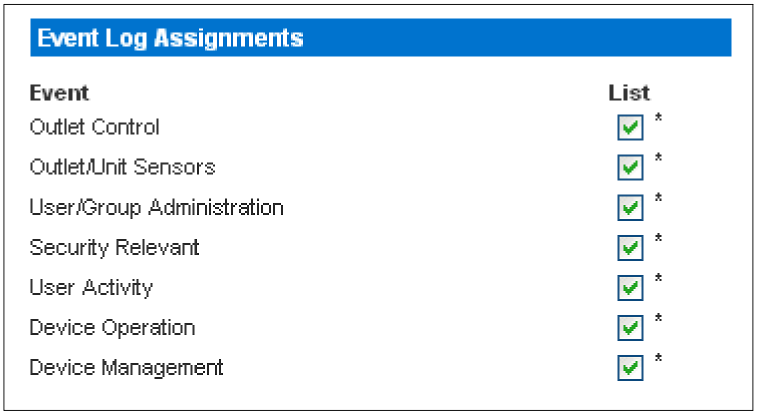
20 *

Clear internal log

Figure 63. Local Logging Panel

2. The local event log is enabled by default. To turn it off, clear the **Local Logging Enabled** check box.
3. By default, 20 log entries are listed on each page of the local event log when it is displayed on your screen. To change this, type a different number in the **Entries shown per page** field.
4. To clear all events from the local event log:
   - Click the **Clear** button. The button changes to **Really Clear** and you are prompted to click it only if you are certain you want to clear the log.
   - Click **Really Clear** to complete the clear operation, or click **Cancel** to terminate it.

5. By default, when the local event log is enabled, seven event types display in the **Event Log Assignments** panel to the right. All are enabled by default. To disable any of these event types, clear the appropriate check boxes. See Figure 64.



Event Log Assignments

Event	List
Outlet Control	☑ *
Outlet/Unit Sensors	☑ *
User/Group Administration	☑ *
Security Relevant	☑ *
User Activity	☑ *
Device Operation	☑ *
Device Management	☑ *

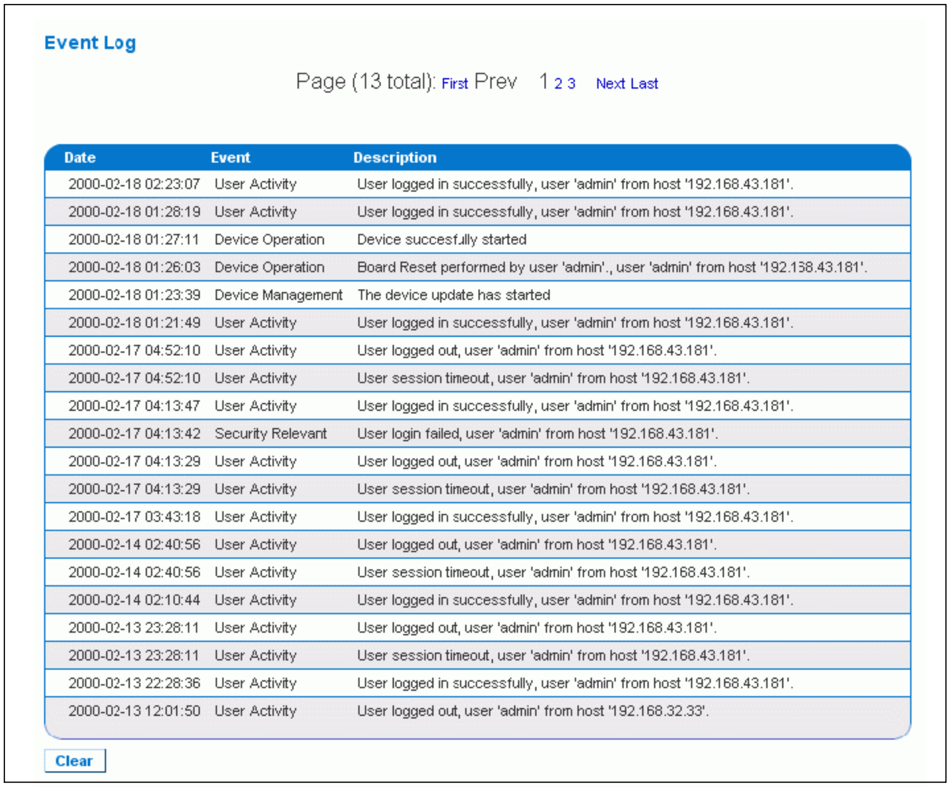
Figure 64. Event Log Assignments Panel (List Logging)

NOTE *See Chapter 10, Appendix B, "Event Types" for a more detailed explanation.*

6. Click **Apply**. Local logging is configured.

Viewing the Internal Event Log

To display the internal event log, select **Maintenance** and then select **View Event Log** (see Figure 65).



Event Log

Page (13 total): First Prev 1 2 3 Next Last

Date	Event	Description
2000-02-18 02:23:07	User Activity	User logged in successfully, user 'admin' from host '192.168.43.181'.
2000-02-18 01:28:19	User Activity	User logged in successfully, user 'admin' from host '192.168.43.181'.
2000-02-18 01:27:11	Device Operation	Device succesf.lly started
2000-02-18 01:26:03	Device Operation	Board Reset performed by user 'admin'., user 'admin' from host '192.158.43.181'.
2000-02-18 01:23:39	Device Management	The device update has started
2000-02-18 01:21:49	User Activity	User logged in successfully, user 'admin' from host '192.168.43.181'.
2000-02-17 04:52:10	User Activity	User logged out, user 'admin' from host '192.168.43.181'.
2000-02-17 04:52:10	User Activity	User session timeout, user 'admin' from host '192.168.43.181'.
2000-02-17 04:13:47	User Activity	User logged in successfully, user 'admin' from host '192.168.43.181'.
2000-02-17 04:13:42	Security Relevant	User login failed, user 'admin' from host '192.168.43.181'.
2000-02-17 04:13:29	User Activity	User logged out, user 'admin' from host '192.168.43.181'.
2000-02-17 04:13:29	User Activity	User session timeout, user 'admin' from host '192.168.43.181'.
2000-02-17 03:43:18	User Activity	User logged in successfully, user 'admin' from host '192.168.43.181'.
2000-02-14 02:40:56	User Activity	User logged out, user 'admin' from host '192.168.43.181'.
2000-02-14 02:40:56	User Activity	User session timeout, user 'admin' from host '192.168.43.181'.
2000-02-14 02:10:44	User Activity	User logged in successfully, user 'admin' from host '192.168.43.181'.
2000-02-13 23:28:11	User Activity	User logged out, user 'admin' from host '192.168.43.181'.
2000-02-13 23:28:11	User Activity	User session timeout, user 'admin' from host '192.168.43.181'.
2000-02-13 22:28:36	User Activity	User logged in successfully, user 'admin' from host '192.168.43.181'.
2000-02-13 12:01:50	User Activity	User logged out, user 'admin' from host '192.168.32.33'.

Figure 65. Internal Event Log

For each entry, the event log shows:

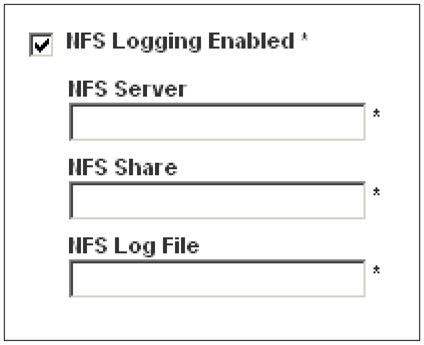
- The date and time of the event
- The type of event (board message, security, host control, or authentication)
- A brief description of the event. For example, for an authentication event, the entry in the log shows the user’s login name and the IP address of the user’s computer.

NOTE *By default, the internal event log displays 20 events per page. See“Configuring the Local Event Log” on page 68 for instructions on changing this number.*

Configuring NFS Logging

To configure Network File System (NFS) logging:

1. Select **Device Settings**, and then select **Event Log**. The Event Log Settings page displays. The **NFS Logging** panel controls NFS logging (see Figure 66).



☑ NFS Logging Enabled *

NFS Server

□ *

NFS Share

□ *

NFS Log File

□ *

Figure 66. NFS Logging Panel

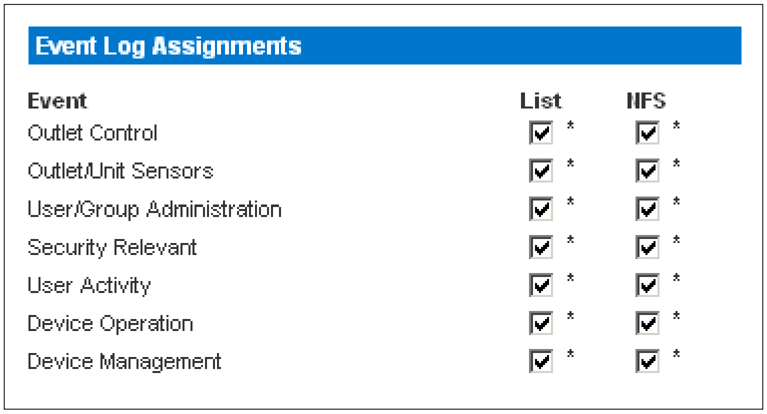
2. Select the **NFS Logging Enabled** check box.

3. Type the IP address of the NFS server in the **NFS Server** field.

4. Type the name of the shared NFS directory in the **NFS Share** field.

5. Type the name of the NFS log file in the **NFS Log File** field. The default is **evtlog**.

6. By default, when NFS logging is enabled, seven event types display in the **Event Log Assignments** panel to the right. All are disabled by default. To enable any of these event types, select the corresponding check boxes. See Figure 67.



Event Log Assignments

Event	List	NFS
Outlet Control	☑ *	☑ *
Outlet/Unit Sensors	☑ *	☑ *
User/Group Administration	☑ *	☑ *
Security Relevant	☑ *	☑ *
User Activity	☑ *	☑ *
Device Operation	☑ *	☑ *
Device Management	☑ *	☑ *

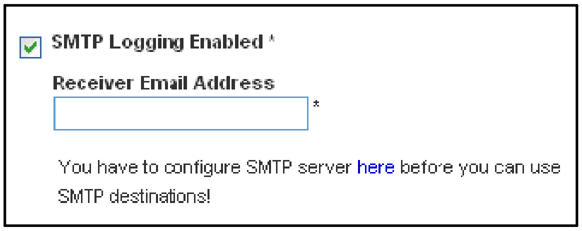
Figure 67. Event Log Assignments Panel (List and NFS Logging)

7. Click **Apply**. NFS logging is configured.

Configuring SMTP Logging

To configure Simple Mail Transfer Protocol (SMTP) logging:

1. Select **Device Settings**, and then select **Event Log**. The Event Log Settings page displays. The **SMTP Logging** panel controls SMTP logging (see Figure 68).



☑ SMTP Logging Enabled *

Receiver Email Address

[ ] *

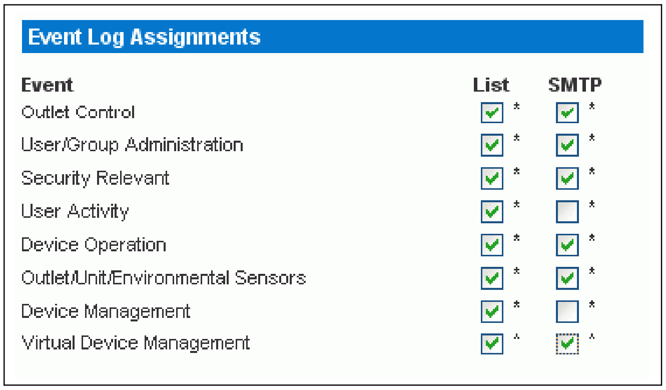
You have to configure SMTP server here before you can use SMTP destinations!

Figure 68. SMTP Logging Panel

2. Select the **SMTP Logging Enabled** check box.

3. Type the receiver's email address in the **Receiver Email Address** field.

4. By default, when SMTP logging is enabled, seven event types display in the **Event Log Assignments** panel to the right. All are disabled by default. To enable any of these event types, select the appropriate check boxes. See Figure 69.



Event Log Assignments

Event	List	SMTP
Outlet Control	☑ *	☑ *
User/Group Administration	☑ *	☑ *
Security Relevant	☑ *	☑ *
User Activity	☑ *	□ *
Device Operation	☑ *	☑ *
Outlet/Unit/Environmental Sensors	☑ *	☑ *
Device Management	☑ *	□ *
Virtual Device Management	☑ *	☑ *

Figure 69. Event Log Assignments Panel

5. Click **Apply**. SMTP Logging is configured.

NOTE *If you have not configured the ePDU SMTP settings, you must do so for SMTP logging to work. Click the* ***here*** *link at the bottom of the panel. See "Configuring the SMTP Settings" on page 80 for instructions.*

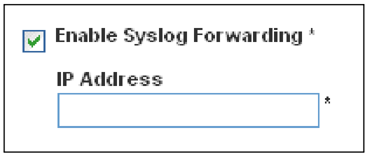
Configuring SNMP Logging

Event logging can be performed by sending SNMP traps to a third-party SNMP manager. See “Appendix C - Using SNMP” for instructions on enabling SNMP Event Logging on ePDU.

Configuring Syslog Forwarding

To configure Syslog Forwarding:

1. Select **Device Settings**, and then select **Event Log**. The Event Log Settings page displays. The **Syslog Forwarding** panel controls the forwarding of system logs (see Figure 70).



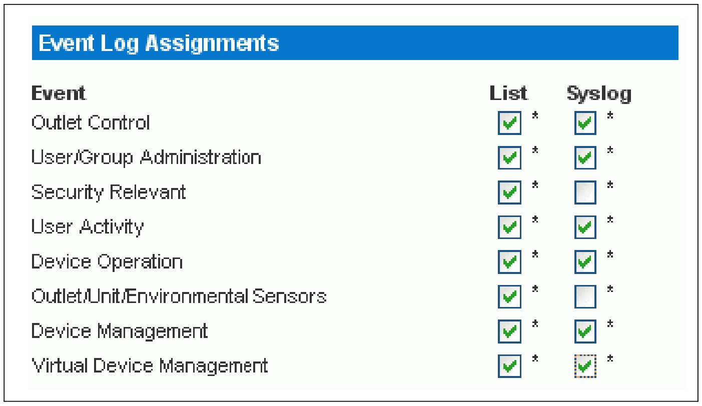
☑ Enable Syslog Forwarding *

IP Address

□ *

Figure 70. Syslog Logging Panel

2. Select the **Enable Syslog Forwarding** check box.
3. Type an IP address in the **IP Address** field. This is the address to which the Syslog will be forwarded.
4. By default, when Syslog Forwarding is enabled, seven event types display in the **Event Log Assignments** panel to the right. All are disabled by default. To enable any of these event types, select the appropriate check boxes. See Figure 71.



Event Log Assignments

Event	List	Syslog
Outlet Control	☑ *	☑ *
User/Group Administration	☑ *	☑ *
Security Relevant	☑ *	□ *
User Activity	☑ *	☑ *
Device Operation	☑ *	☑ *
Outlet/Unit/Environmental Sensors	☑ *	□ *
Device Management	☑ *	☑ *
Virtual Device Management	☑ *	☑ *

Figure 71. Event Log Assignments Panel

5. Click **Apply**. Syslog Forwarding is configured.

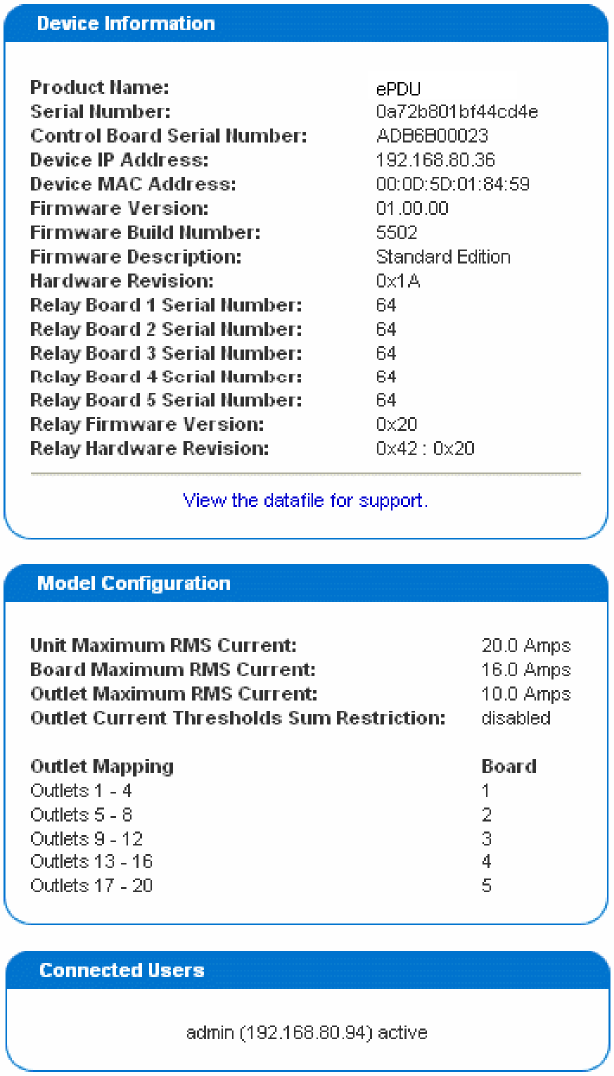
Managing the ePDU

You can display basic device information about the ePDU, give the ePDU a new device name, and modify any of the network settings that were entered during the initial configuration process. You can also set the ePDU's date and time and configure its SMTP settings so it can send email messages when alerts are issued.

Displaying Basic Device Information

1. To display basic information about an ePDU, select **Maintenance** and then select **Device Information**. The Device Information page displays (see Figure 72).

   This page displays the product name, serial number, IP and MAC addresses of the ePDU, and detailed information about the firmware running in the ePDU.



Device Information

Product Name:	ePDU
Serial Number:	0a72b801bf44cd4e
Control Board Serial Number:	ADB6B00023
Device IP Address:	192.168.80.36
Device MAC Address:	00:0D:5D:01:84:59
Firmware Version:	01.00.00
Firmware Build Number:	5502
Firmware Description:	Standard Edition
Hardware Revision:	0x1A
Relay Board 1 Serial Number:	64
Relay Board 2 Serial Number:	64
Relay Board 3 Serial Number:	64
Relay Board 4 Serial Number:	64
Relay Board 5 Serial Number:	64
Relay Firmware Version:	0x20
Relay Hardware Revision:	0x42 : 0x20

View the datafile for support.

Model Configuration

Unit Maximum RMS Current:	20.0 Amps
Board Maximum RMS Current:	16.0 Amps
Outlet Maximum RMS Current:	10.0 Amps
Outlet Current Thresholds Sum Restriction:	disabled

Outlet Mapping	**Board**
Outlets 1 - 4	1
Outlets 5 - 8	2
Outlets 9 - 12	3
Outlets 13 - 16	4
Outlets 17 - 20	5

Connected Users

admin (192.168.80.94) active

Figure 72. Device Information Page

2. To open or save an XML file providing details for Eaton Technical Support, click the **View the datafile for support** link.

Displaying Model Configuration

To display information about the specific model of the ePDU that you are using, select **Maintenance** and then select **Device Information**. The device information page displays. Information about your model is shown in the Model Configuration panel below the Device Information panel. See Figure 72 for details.

This panel shows:

- The ePDU's and board's maximum current capabilities
- The outlet maximum RMS current and the current threshold sum restriction
- The number of outlets mapped to the board

Displaying Connected Users

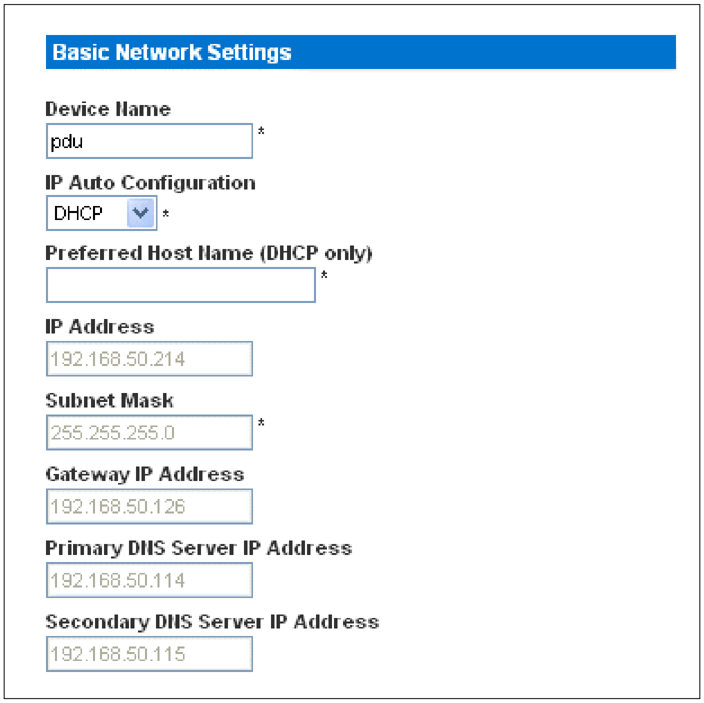
To display a list of users currently connected to the ePDU, select **Maintenance** and then select **Device Information**. The Device Information page displays. A list of connected users is shown in the Connected Users panel. See Figure 72 for details.

The panel shows the Username and IP address of each user, and indicates whether or not the connection is active.

Naming the ePDU

By default, the ePDU has a device name of "pdu." You may want to give the ePDU a more easily recognizable name to help identify it. To do this:

1. Select **Device Settings**, and then select **Network**. The Network Settings page displays. The left side of the page consists of the **Basic Network Settings** panel, which contains the device name. See Figure 73.



Basic Network Settings

Device Name
pdu *

IP Auto Configuration
DHCP *

Preferred Host Name (DHCP only)
*

IP Address
192.168.50.214

Subnet Mask
255.255.255.0 *

Gateway IP Address
192.168.50.126

Primary DNS Server IP Address
192.168.50.114

Secondary DNS Server IP Address
192.168.50.115

Figure 73. Basic Network Settings Panel

2. Type a new name in the **Device Name** field.

3. If DHCP is selected for IP configuration, the name entered in the field or **Preferred Host Name (DHCP only)** will be registered with DNS and used on the assigned IPs by DHCP.

4. Click **Apply**. The ePDU is renamed.

Modifying the Network Settings

The ePDU was configured for network connectivity during the installation and configuration process (see Chapter 4, "Installation and Configuration" for details). If necessary, you can modify any of these settings. To do this:

1. Select **Device Settings**, and then select **Network**. The Network Settings page displays. The left side of the page consists of the **Basic Network Settings** panel, which displays the current network settings (see Figure 73).

2. Do one of the following:

   - **Auto configuration:** To auto configure the ePDU, select **DHCP** or **BOOTP** from the **IP Auto Configuration** list. If you select **DHCP**, you can also enter a preferred host name (this is optional).

   - **Static IP:** To enter a static IP address, select **None** from the **IP Auto Configuration** list, and then enter:

     IP address

     Subnet mask

     Gateway address

     Primary and (optional) secondary DNS server addresses

3. Click **Apply**. The network settings are modified.

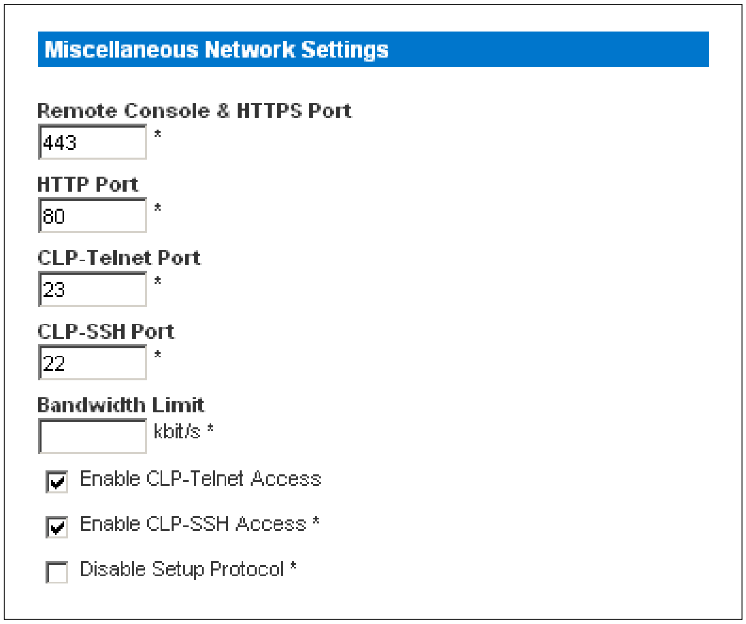
Modifying the Communications, Port, and Bandwidth Settings

You can use Telnet or SSH to log into the ePDU CLP interface. However, by default, SSH is enabled and Telnet is not (because it communicates in the clear and is therefore not secure). You can change this and enable or disable either application.

You can also set a bandwidth limit, and change any of the default port settings. Finally, you can enable or disable the Eaton Setup Protocol.

To do this:

1. Select **Device Settings**, and then select **Network**. The Network Settings page displays. The **Miscellaneous Network Settings** panel on the top right contains the communications, port, and bandwidth settings. See Figure 74.



Miscellaneous Network Settings

Remote Console & HTTPS Port
443 *

HTTP Port
80 *

CLP-Telnet Port
23 *

CLP-SSH Port
22 *

Bandwidth Limit
kbit/s *

☑ Enable CLP-Telnet Access

☑ Enable CLP-SSH Access *

☐ Disable Setup Protocol *

Figure 74. Miscellaneous Network Settings Panel

2. By default, **CLP-Telnet** is disabled and **CLP-SSH** is enabled. To change this, select either check box.

3. To set an upper limit on the amount of bandwidth allowed for Telnet or SSH, type the number of kilobits per second in the **Bandwidth Limit** field.

4. By default, the HTTP, HTTPS, Telnet, and SSH ports are set to the standard ports for these communications protocols. If you prefer to use different ports, you can change the port assignments here.

5. Select the **Disable Setup Protocol** check box to disable it.

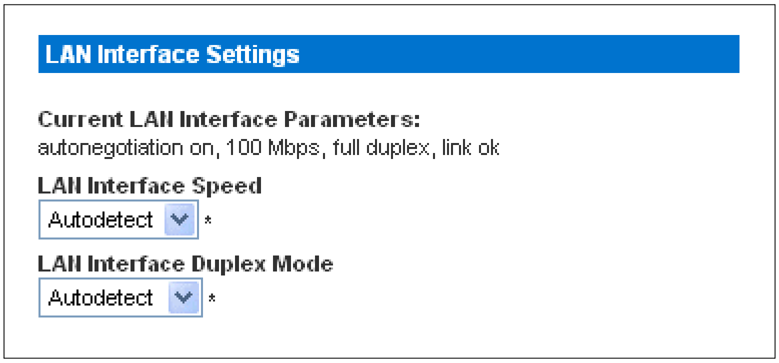
NOTE *No programs are currently available to use the Setup Protocol with ePDU. It is safe to leave this disabled.*

6. Click **Apply**. The settings are modified.

Modifying the LAN Interface Settings

The LAN interface speed and duplex mode were set during the installation and configuration process (see Chapter 4, "Installation and Configuration" for details). To modify either setting:

1. Select **Device Settings**, and then select **Network**. The Network Settings page displays. The **LAN Interface Settings** panel on the bottom right shows the interface speed and duplex mode. See Figure 75.



LAN Interface Settings

Current LAN Interface Parameters:
autonegotiation on, 100 Mbps, full duplex, link ok

LAN Interface Speed
Autodetect *

LAN Interface Duplex Mode
Autodetect *

Figure 75. LAN Interface Settings Panel

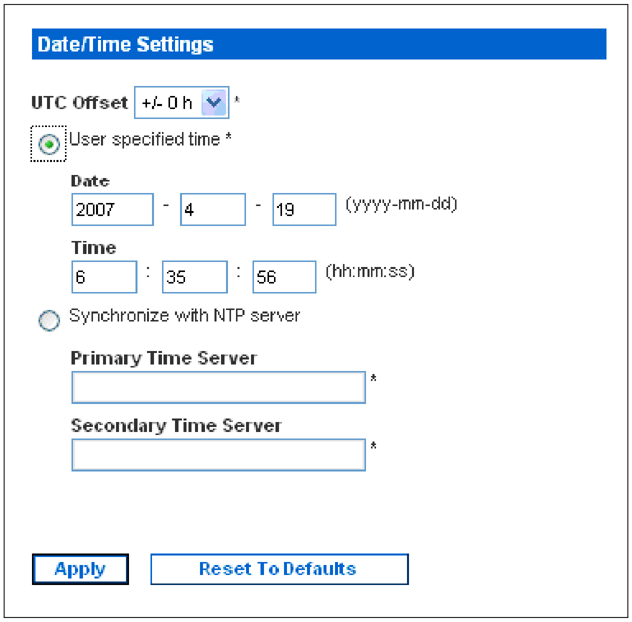
2. To change the interface speed, select the speed you want from the **LAN Interface Speed** list. Your choices are:
   - Autodetect (system selects optimum speed)
   - 10 Mbps
   - 100 Mbps
3. To change the duplex mode, select the mode you want from the **LAN Interface Duplex Mode** list. Your choices are:
   - Autodetect (system selects optimum mode)
   - Half duplex
   - Full duplex

   Half duplex allows data to be transmitted to and from the ePDU, but not at the same time. Full duplex allows data to be transmitted in both directions at the same time.
4. Click **Apply**. The settings are modified.

Setting the Date and Time

You can set the internal clock on the ePDU manually, or you can link to a Network Time Protocol (NTP) server and let it set the date and time.

1. Select **Device Settings**, and then select **Date/Time**. The Date/Time Settings page displays (see Figure 76).



Date/Time Settings

UTC Offset +/- 0 h *

● User specified time *

Date

2007 - 4 - 19 (yyyy-mm-dd)

Time

6 : 35 : 56 (hh:mm:ss)

○ Synchronize with NTP server

Primary Time Server

*

Secondary Time Server

*

Figure 76. Date/Time Settings Page

2. Enter a time zone by selecting the appropriate Coordinated Universal Time (UTC) offset from the **UTC Offset** list (for example, US Eastern Standard Time = UTC-5).

3. To set the date and time manually, select the **User Specified Time** option, then enter the date and time in the appropriate fields. Use the yyyy/mm/dd format for the date and hh:mm:ss format for the time.

4. To let an NTP server set the date and time, select the **Synchronize with NTP server** option and enter the IP addresses of primary and secondary NTP servers in the corresponding fields.

NOTE *If the ePDU's IP address is assigned through DHCP, the NTP server addresses will be automatically discovered, then users will not be able to enter any data in the fields of primary and secondary time server.*

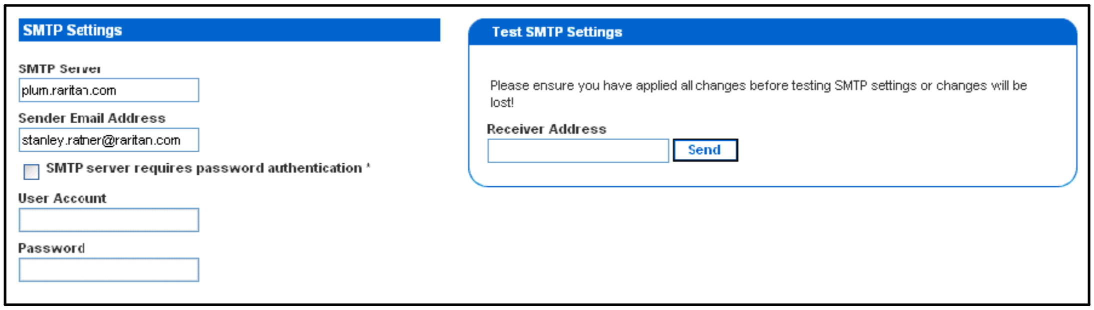
5. Click **Apply**. The date and time settings are applied.

Configuring the SMTP Settings

The ePDU allows you to configure alerts to send an email message to a specific administrator. To do this, you have to configure the ePDU SMTP settings and enter an IP address for your SMTP server and a sender's email address.

NOTE *See "Setting Up Alerts" on page 62 for instructions on configuring alerts to send email.*

1. Select **Device Settings**, and then select **SMTP Settings**. The SMTP Settings page displays (see Figure 77).



SMTP Settings

SMTP Server
plum.raritan.com

Sender Email Address
stanley.ratner@raritan.com

□ SMTP server requires password authentication *

User Account

Password

Test SMTP Settings

Please ensure you have applied all changes before testing SMTP settings or changes will be lost!

Receiver Address

Send

Figure 77. SMTP Settings Page

2. Type the IP address of the mail server in the **SMTP Server** field.
3. Type an email address in the **Sender Email Address** field.
4. If you SMTP server requires password authentication, type a user name and password in the **User Account** an **Password** fields.
5. Click **Apply**. Email is configured.
6. Now that you have applied the SMTP settings, you can test them to ensure that they work correctly. To do this, type the receiver's email address in the **Receiver Address** field and click **Send**.

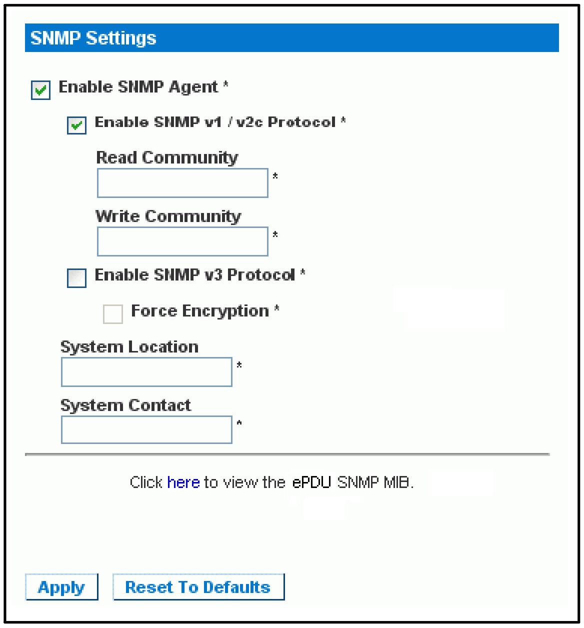
NOTE *Do not test the SMTP settings until you have first applied them. If you do, you will lose the settings and be forced to re-enter them.*

Configuring the SNMP Settings

The SNMP Settings page allows you to enable and disable SNMP communication between an SNMP manager and the ePDU. Enabling SNMP communication allows the ePDU to send SNMP trap events to the manager, and allow the manager to retrieve and control the power status of each outlet.

To configure SNMP communication (necessary for passing SNMP traps and individual outlet control):

1. Select **Device Settings**, and then select **SNMP Settings**. The SNMP Settings page displays.



SNMP Settings

☑ Enable SNMP Agent *

☑ Enable SNMP v1 / v2c Protocol *

Read Community *

Write Community *

□ Enable SNMP v3 Protocol *

□ Force Encryption *

System Location *

System Contact *

Click here to view the ePDU SNMP MIB.

Figure 78. SNMP Settings Page

2. Select the **Enable SNMP Agent** check box to enable the ePDU to communicate with external SNMP managers. A number of options will then become available.

3. Select the **Enable SNMP v1 / v2c Protocol** check box to enable communication with an SNMP manager using SNMP v2c protocol.

4. Type the SNMP read-only community string in the **Read Community** field

5. Type the read/write community string in the **Write Community** field.

6. Select the **Enable SNMP v3 Protocol** check box to enable communication with an SNMP manager using SNMP v3 protocol.

7. Type the system location in the **System Location** field.

8. Type the system contact in the **System Contact** field.

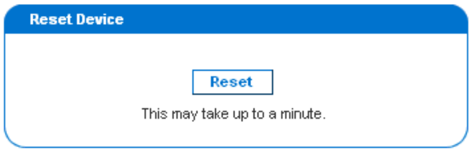
9. Click the link at the bottom of the page to download an SNMP MIB for your ePDU to use with your SNMP manager.

10. Click **Apply**. The SNMP configuration is set.

Resetting the ePDU

You can use Unit Reset function to reboot the ePDU from the Web interface. To do this:

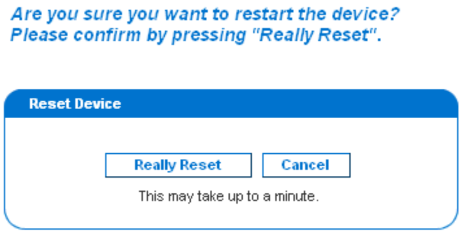
1. Select **Maintenance**, and then select **Unit Reset**. The Reset Operations page displays (see Figure 79).



This may take up to a minute.

Figure 79. Reset Operations Page

2. Click **Reset**. A Reset Confirmation page displays (see Figure 80).



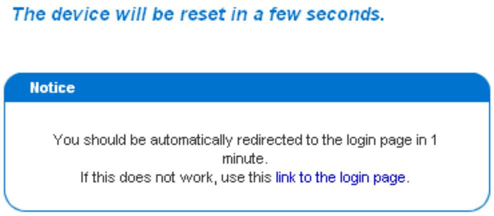
Are you sure you want to restart the device?
Please confirm by pressing "Really Reset".

This may take up to a minute.

Figure 80. Reset Confirmation Page

3. Click **Really Reset** to reboot ePDU. If you change your mind, click **Cancel** to terminate the reset operation.

   If you choose to proceed with the reset, the Reset Conclusion page displays and the reset takes place. The reset takes about one minute to complete. See Figure 81.



The device will be reset in a few seconds.

You should be automatically redirected to the login page in 1 minute.
If this does not work, use this link to the login page.

Figure 81. Reset Conclusion Page

4. When the reset is complete, the Login page displays, and you can log back into the ePDU.

Updating the Firmware

Eaton will notify customers when new firmware is available to update the ePDU. Customers will be given instructions where to go to download the new firmware. Once the firmware is downloaded onto a PC, you can install it on the ePDU from the Web interface.

To perform a firmware update:

1. Select **Maintenance**, and then select **Update Firmware**. The Firmware Upload page displays (see Figure 82).

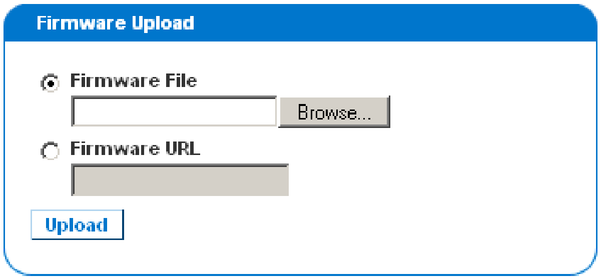
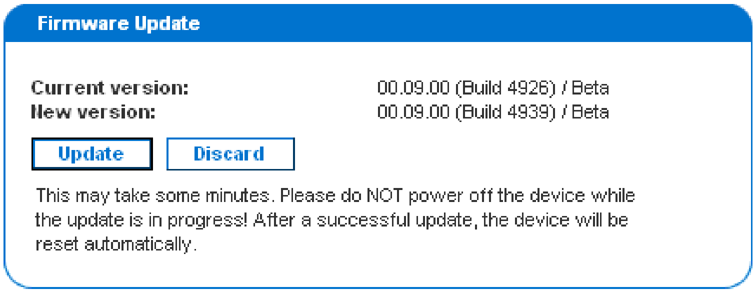


Figure 82. Firmware Upload Page

2. Do one of the following to select the firmware file to be uploaded:

   - Type the complete path to the firmware file in the **Firmware File** field, or click **Browse** and select the file.
   - Select the **Firmware URL** option and type the URL link in the **Firmware URL** field, where the firmware file is network-retrievable.

3. Click **Upload**. The Firmware Update page displays. It shows the current firmware version and the new firmware version, and gives you a last chance to terminate the update. See Figure 83.



Current version: 00.09.00 (Build 4926) / Beta
New version: 00.09.00 (Build 4939) / Beta

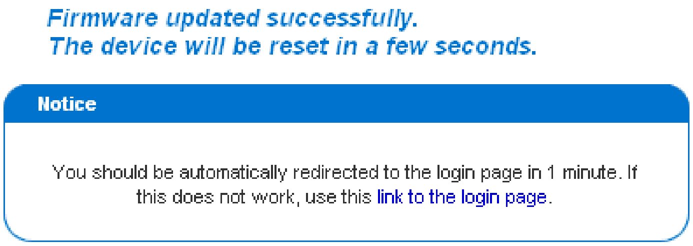
This may take some minutes. Please do NOT power off the device while the update is in progress! After a successful update, the device will be reset automatically.

Figure 83. Firmware Update Page

4. To proceed with the update, click **Update**. To terminate the update, click **Discard**. The update may take several minutes. The **Status** panel on the left tracks the progress of the upgrade.

NOTE *Do NOT power the ePDU off during the update. To indicate at the rack that an update is in progress, the outlet LEDs flash and the ePDU's three-digit display panel also shows "FuP".*

5. When the update is complete, a message appears similar to the one shown in Figure 84 indicating that the update was successful. The ePDU resets, and the Login page displays. You can now log in and resume managing the ePDU.



Firmware updated successfully.
The device will be reset in a few seconds.

Notice

You should be automatically redirected to the login page in 1 minute. If this does not work, use this link to the login page.

Figure 84. Update Successful

NOTE *If you are using the ePDU with an SNMP manager, you should re-download the ePDU MIB after updating the ePDU firmware. Re-downloading the MIB ensures your SNMP manager has the correct MIB for the release you are using. See "Appendix C - Using SNMP" for more information.*

Outlet Grouping

Outlet grouping provides a way to combine outlets from separate ePDUs into a single, logical group, allowing control from a single ePDU. Grouped outlets that power on and off in unison are ideal for servers with power supplies plugged into multiple ePDUs.

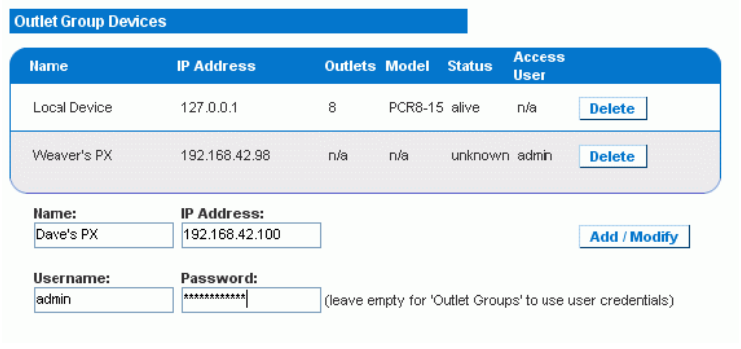
Users, or the group they belong to, must have the Outlet Group Configuration permission under User/Group System Permissions in order to manage or access an Outlet Group.

NOTE *Outlet Grouping supports adding outlets from up to four other ePDUs. All ePDUs must be accessible over IP and must be running firmware version 1.1 or higher.*

Identifying Other ePDUs

To add outlets from other ePDUs, you must first identify which ePDU will be sharing their outlets. To do this:

1. Select **Outlet Groups**, and then select **Outlet Group Devices**. The Outlet Group Devices page displays.



Outlet Group Devices

Name	IP Address	Outlets	Model	Status	Access User	
Local Device	127.0.0.1	8	PCR8-15	alive	n/a	Delete
Weaver's PX	192.168.42.98	n/a	n/a	unknown	admin	Delete

Name: Dave's PX
IP Address: 192.168.42.100

Username: admin
Password: ************ (leave empty for 'Outlet Groups' to use user credentials)

Figure 85. Outlet Group Devices Page

2. Type a name to identify the ePDU you want to add in the **Name** field.

3. Type the IP Address of the ePDU you want to add in the **IP Address** field.

4. Optionally, type a user name and password used to authenticate on the ePDU being added. You can leave these fields blank to use the same user name and password as the ePDU currently being accessed.

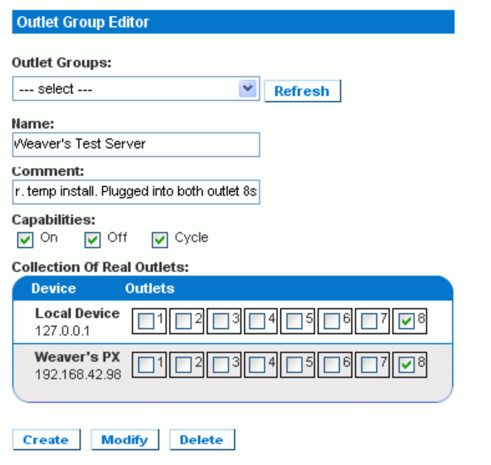
5. Click **Add/Modify**. The new ePDU is now available for outlet grouping.

6. To modify the name, or the user name and password used to access a participating ePDU, retype the information for the same ePDU and click **Add/Modify** again.

NOTE *You can re-add the ePDU you are accessing (if you deleted it from the list) or modify its details by using the IP address 127.0.0.1.*

Grouping Outlets Together

1. Select **Outlet Groups**, and then select **Outlet Group Editor**. The Outlet Group Editor page displays.



Outlet Group Editor

Outlet Groups: --- select ---

Name: Weaver's Test Server

Comment: r. temp install. Plugged into both outlet 8s

Capabilities: ☑ On ☑ Off ☑ Cycle

Collection Of Real Outlets:

Device	Outlets
Local Device 127.0.0.1	□1 □2 □3 □4 □5 □6 □7 ☑8
Weaver's PX 192.168.42.98	□1 □2 □3 □4 □5 □6 □7 ☑8

Figure 86.

2. Type a name for the outlet group in the **Name** field. It is a good idea to give the outlet group a recognizable name that helps identify the device(s) connected to it.

3. Type a comment for the outlet group in the **Comment** field. This can be used to further identify device(s) powered by the group.

4. Select the appropriate check box for each power control ability you want available for this outlet under **Capabilities**.

5. A list of available ePDUs and their outlets displays under **Collection of Real Outlets**. Select the check box representing the desired physical outlet to make it part of the outlet group. All outlets that are checked will be grouped together when you click **Create**.

NOTE *You should not add a physical outlet to more than one outlet group.*

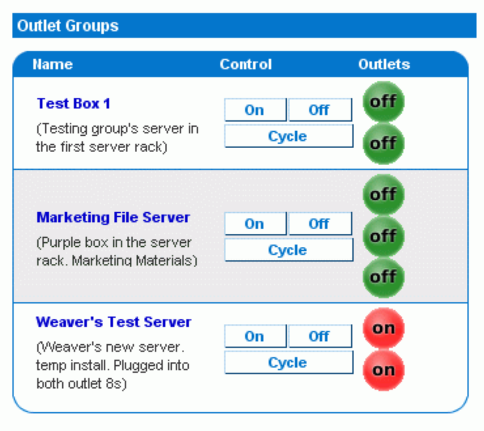
6. Click **Create**. The outlet group is created and added to the Outlet Groups list.

NOTE *Grouped outlets are designed to be controlled together. Avoid doing anything to affect these outlets individually, such as turning one of the outlets ON or OFF, or unplugging one of the participating ePDUs. Once grouped, power control to those outlets should be managed from the Outlet Groups list.*

Controlling Outlet Groups

Any outlet groups created from this ePDU are added to the Outlet Groups list. From this list, you can power ON, power OFF or cycle power to the outlet group (if the capability is available). To control the power to an outlet group:

1. Select **Outlet Groups**, then **Outlet Group Details**. The Outlet Groups list displays.



Outlet Groups

Name	Control	Outlets
Test Box 1 (Testing group's server in the first server rack)	On Off Cycle	off off
Marketing File Server (Purple box in the server rack. Marketing Materials)	On Off Cycle	off off off
Weaver's Test Server (Weaver's new server. temp install. Plugged into both outlet 8s)	On Off Cycle	on on

Figure 87. Outlet Groups List

NOTE *Only outlet groups created through this specific ePDU display in this Outlet Groups list. Outlet groups created through another ePDU do not display here, even if they contain outlets from this ePDU.*

2. To turn an outlet group on, off, or cycle the power to it, click **On**, **Off**, or **Cycle** in the row for the outlet group.

3. You will be prompted to confirm your choice. Click **OK** to proceed.

4. The page refreshes once to indicate that the desired command was performed, and again a few seconds later to update the status of the outlet group.

NOTE *The page must finish loading or refreshing before selecting an action. If you select an action before the page has finished updating the status of all outlet groups, the command will be ignored.*

5. To view or edit the composition of an outlet group, click on the name of the outlet group in the list to go to the Outlet Group Editor for the selected outlet group.

Editing or Deleting Outlet Groups

1. Select **Outlet Groups**, and then select **Outlet Group Editor**. The Outlet Group Editor page displays.
2. Select the desired outlet group from the **Outlet Groups** list.
3. The details for the outlet group appear. Change the name, comment, capabilities or any of the included Real Outlets if you are modifying the group.
4. Click **Modify** to save any changes if you are modifying the outlet group, or click **Delete** to remote the group from the outlet groups list.

Deleting Outlet Group Devices

To delete a ePDU from outlet grouping when it is no longer available or in use:

1. Select **Outlet Groups**, and then select **Outlet Group Devices**. The Outlet Group Devices page displays with a list of known ePDUs.
2. Click **Delete** for the ePDU you want to remove from outlet grouping.

NOTE *If you delete a ePDU that still has outlets in a group, it will remove the associated outlets from that group, but the group will still exist. Remove the group itself using the Outlet Group Editor. You should not delete the host device (the ePDU you are currently accessing) from the Outlet Group Devices list. If you do, you can add it back to the list using the IP address 127.0.0.1.*

Chapter 7 Using the CLP Interface

This chapter explains how to use the Command Line Protocol (CLP) interface to administer a ePDU.

About the CLP Interface

The ePDU provides a command line interface that enables data center administrators to perform certain basic management tasks. You can access the interface over a serial connection using a terminal emulation program such as HyperTerminal, or through a Telnet or SSH client such as PuTTy.

NOTE *Telnet access to the ePDU is disabled by default because Telnet transmits in the clear and is insecure. To enable Telnet, select* ***Device Settings → Network*** *and select the* ***Enable CLP-Telnet Access*** *check box.*

NOTE *About terminal emulation programs – HyperTerminal is available on many of Windows operating systems, but it is not available on Windows Vista. PuTTY is a free program that you can download from the internet. Please refer to PuTTY's documentation for configuration details.*

The command line interface is based on the Systems Management Architecture for Server Hardware (SMASH) Command Line Protocol (CLP). Using this interface, you can do the following:

- Display the name, power state (on or off), and sensors associated with each ePDU outlet
- Turn each outlet on or off
- Display the status of the sensors associated with each outlet

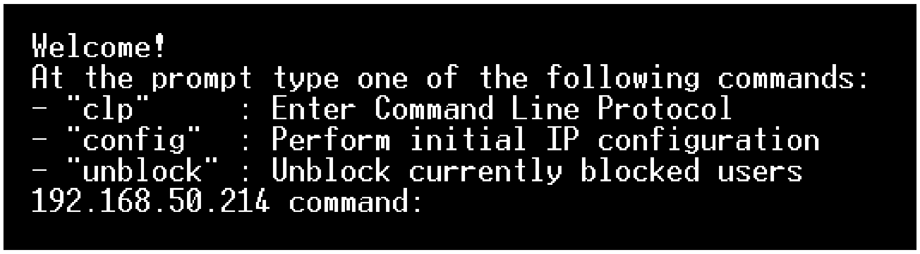
Logging into the CLP Interface

Logging in through HyperTerminal and a serial connection is a little different than logging in using SSH or Telnet.

Using HyperTerminal

To log in using HyperTerminal:

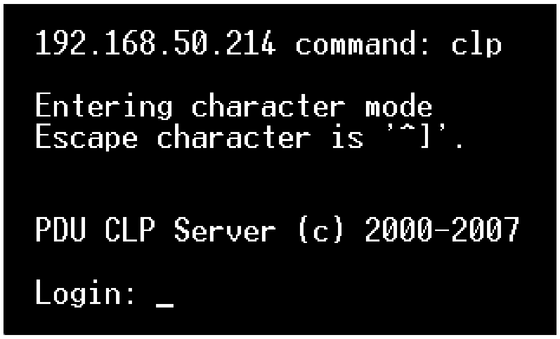
1. Launch HyperTerminal and open a console window. When the window first opens, it is blank.
2. Press **Enter** to display a **Command** prompt (see Figure 88).



```
Welcome!
At the prompt type one of the following commands:
- "clp"     : Enter Command Line Protocol
- "config"  : Perform initial IP configuration
- "unblock" : Unblock currently blocked users
192.168.50.214 command:
```

Figure 88. HyperTerminal Command Prompt

3. At the **Command** prompt, type **CLP** and press **Enter**. You are prompted to enter a login name. The login name is case-sensitive, so make sure you capitalize the correct letters. See Figure 89.



```
192.168.50.214 command: clp

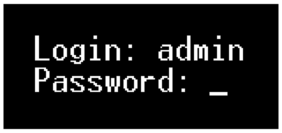
Entering character mode
Escape character is '^]'.


PDU CLP Server (c) 2000-2007

Login: _
```

Figure 89. Login Prompt

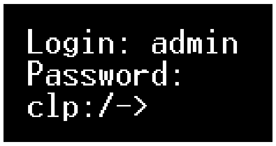
4. Type a login name and press **Enter**. You are prompted to enter a password (see Figure 90).



```
Login: admin
Password: _
```

Figure 90. Password Prompt

5. Type a password and press **Enter**. The password is case-sensitive, so make sure you capitalize the correct letters. Once the password is accepted, the `clp:/->` system prompt appears. See Figure 91.



```
Login: admin
Password:
clp:/->
```

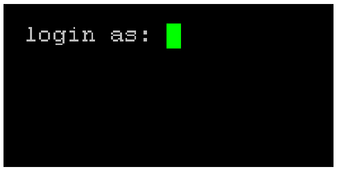
Figure 91. System Prompt

You are now logged into the CLP interface and can begin using the interface to administer the ePDU.

Using SSH or Telnet

To log in using SSH or Telnet:

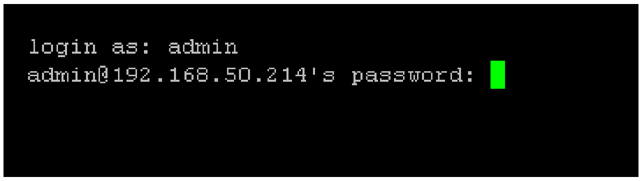
1. Launch an SSH or Telnet client such as PuTTy and open a console window. A Login prompt appears (see Figure 92).



```
login as:
```

Figure 92. Login Prompt

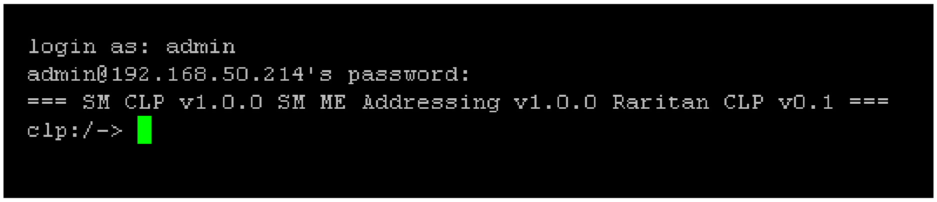
2. Type a login name and press **Enter**. You are prompted to enter a password (see Figure 93).



```
login as: admin
admin@192.168.50.214's password:
```

Figure 93. Password Prompt

3. Type a password and press **Enter**. The password is case-sensitive, so make sure you capitalize the correct letters. Once the password is accepted, the `clp:/->` system prompt appears. See Figure 94.



```
login as: admin
admin@192.168.50.214's password:
=== SM CLP v1.0.0 SM ME Addressing v1.0.0 Raritan CLP v0.1 ===
clp:/->
```

Figure 94. System Prompt

You are now logged into the CLP interface and can begin using the interface to administer the ePDU.

Showing Outlet Information

The show command displays the name, power state (on or off), and associated sensors for one outlet or for all outlets.

Syntax

The following is the syntax for the `show` command:

```
clp:/->  show /system1/outlet<outlet number>
```

where <outlet number> is the number of the outlet. To display information for all outlets, type the wild card asterisk (*) instead of a number.

Attributes

You can use the `name` and `powerState` attributes to filter the output of the `show` command. The `name` attribute displays only the name of the outlet, and the `powerState` attribute displays only the power state (on or off).

The following shows the syntax for both attributes:

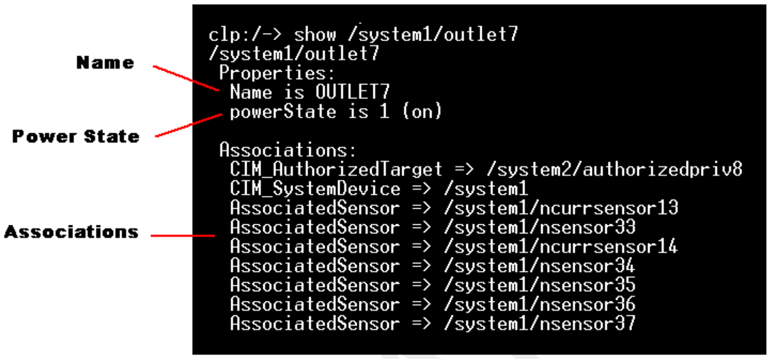
```
clp:/->  show –d properties=name /system1/outlet<outlet number>
```

```
clp:/->  show –d properties=powerState
/system1/outlet<outlet number>
```

where <outlet number> is the number of the outlet. In both cases, the outlet number can also be a wild card asterisk (*).

Examples

Figure 95 shows an example of the output when a `show` command is entered without attributes.

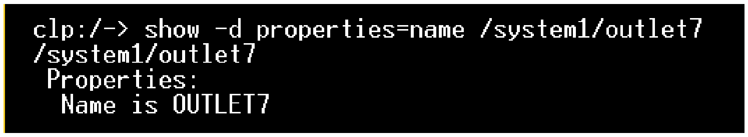


```
clp:/-> show /system1/outlet7
/system1/outlet7
 Properties:
  Name is OUTLET7
  powerState is 1 (on)

 Associations:
  CIM_AuthorizedTarget => /system2/authorizedpriv8
  CIM_SystemDevice => /system1
  AssociatedSensor => /system1/ncurrsensor13
  AssociatedSensor => /system1/nsensor33
  AssociatedSensor => /system1/ncurrsensor14
  AssociatedSensor => /system1/nsensor34
  AssociatedSensor => /system1/nsensor35
  AssociatedSensor => /system1/nsensor36
  AssociatedSensor => /system1/nsensor37
```

Figure 95. Example 1 – No Attributes

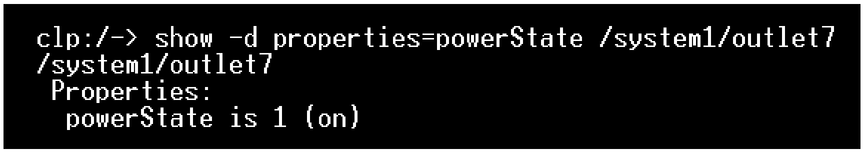
Figure 96 shows an example of the output when the `show` command is entered with the `name` attribute.



```
clp:/-> show -d properties=name /system1/outlet7
/system1/outlet7
 Properties:
  Name is OUTLET7
```

Figure 96. Example 2 – Name Attribute

Figure 97 shows an example of the output when the `show` command is entered with the `powerState` attribute.



```
clp:/-> show -d properties=powerState /system1/outlet7
/system1/outlet7
 Properties:
  powerState is 1 (on)
```

Figure 97. Example 3 – powerState Attribute

Turning an Outlet On or Off

The `set` command turns an outlet on or off.

Syntax

The following is the syntax for the `set` command:

```
clp:/->  set /system1/outlet powerState=on|off
```

where the keyword `on` turns the outlet on and the keyword `off` turns the outlet off.

Querying an Outlet Sensor

The `show` command with the `Antecedent` key word queries the outlet sensors

clp:/-> Show –d properties=Antecedent system1/<outlet number>=> AssociatedSensor

where <outlet number> is the number of the outlet.

Chapter 8 Using the IPMI Tool Set

The Intelligent Platform Management Interface (IPMI) toolset is a command line interface that allows you to display channel information, print sensor data, and set LAN configuration parameters. This chapter explains the available IPMI commands.

NOTE *The open source IPMI tool can be downloaded from SourceForge, and compiled on a Linux system. You can then interact with the ePDU using IPMI protocol through this tool. An example at the Linux command shell is given as: $ ipmitool -I lan -H 192.168.51.58 -U admin -a channel info.*

Channel Commands

authcap <channel number> <max priv>

Purpose:

Displays information about the authentication capabilities of the selected channel at the specified privilege level. Possible privilege levels are:

- Callback
- User
- Operator
- Administrator
- OEM proprietry

Example:

```
$ ipmitool –I lan –H 192.168.51.58 –U admin –a channel authcap
14 5
```

The IPMI level assigned determines what information can be viewed and what LAN configuration parameters can be set. Table 7 lists what functions are allowed for each IPMI privilege level.

Table 7. IPMI Privilege Levels

	Privilege Levels					
Function	**No Access**	**Callback**	**User**	**Operator**	**Administrator**	**OEM**
Authentication Settings	No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
Change Password	No	No	No	No	Yes	Yes
Date/Time Settings	No	No	No	Yes	Yes	Yes
Firmware Update	No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
Log Settings	No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
Log View	No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
Network Dyn/DSN Settings	No	No	No	No	Yes	Yes
Power Control Settings	No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
SNMP Settings	No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
SSH/Telnet Access	No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
SSL Certificate Management	No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
Security Settings	No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
Unit Reset	No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
User/Group Management	No	No	No	No	Yes	Yes
User Group Permissions	No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No

info [channel number]

Purpose:

Displays information about the selected channel. If no channel is given it will display information about the currently used channel:

Example:

```
$ ipmitool –I lan –H 192.168.51. 58 –U admin –a channel info
```

getaccess <channel number> [userid]

Purpose:

Configures the given user ID as the default on the given channel number. When the given channel is subsequently used, the user is identified implicitly by the given user ID.

Example:

```
$ ipmitool –I lan –H test-pdupcr20-20 –U admin –P pass channel
setaccess 14 63
```

setaccess <channel number> <userid>[callin=on|off] [ipmi=on|off] [link=on|off] [privilege=level]

Purpose:

Configures user access information on the given channel for the given userid.

Example:

```
$ ipmitool –I lan –H test–pdupcr20–20 –U admin –P pass channel
setaccess 14 63 privilege=5
```

getciphers <all | supported> <ipmi | sol> [channel]

Purpose:

Displays the list of cipher suites supported for the given application (ipmi or sol) on the given channel.

Example:

```
$ ipmitool –I lan –H test–pdupcr20–20 –U admin –P pass channel
getciphers ipmi 14
```

Event Commands

The Event commands allow you to send predefined events to a management controller.

<predefined event number>

Purpose:

Sends a predefined event to the System Event Log. The currently supported values are:

- Temperature: Upper Critical: Going High
- Voltage Threshold: Lower Critical: Going Low
- Memory: Correctable ECC Error Detected

NOTE *The event DIR/Type field is encoded with the event direction as the high bit (bit 7) and the event type as the low 7 bits.*

Example:

```
$ ipmitool –I lan –H test–pdupcr20–20 –U admin –P pass event 1
```

file <filename>

Purpose:

Event log records specified in filename will be added to the System Event Log. The format of each line in the file is as follows:

<{EvM Revision} {Sensor Type} {Sensor Num} {Event DIR/Type} {Event Data 0} {Event Data 1} {Event Data 2}> [#COMMENT]

NOTE *The Event DIR/Type field is encoded with the event direction as the high bit (bit 7) and the event type as the low 7 bits.*

Example:

```
0x4 0x2 0x60 0x1 0x52 0x0 0x0 # Voltage threshold: Lower
Critical: Going Low
```

LAN Commands

The LAN commands allow you to configure the LAN channels.

print <channel>

Purpose:

Prints the current configuration for the given channel.

set <channel> <parameter>

Purpose:

This command sets the given parameter on the given channel. Table 8 lists the valid parameters and descriptions.

Table 8. Valid Set Channel Parameters

Parameter	Description
ipaddr <x.x.x.x>	Sets the IP address for this channel
netmask <x.x.x.x>	Sets the netmask for this channel
macaddr <xx.xx.xx.xx.xx.xx>	Sets the MAC address for this channel
defgw ipaddr <x.x.x.x>	Sets the default gateway IP address
defgw macaddr <xx.xx.xx.xx.xx.xx>	Sets the default gateway MAC address
bakgw ipaddr <x.x.x.x>	Sets the backup gateway IP address
bakgw macaddr <xx.xx.xx.xx.xx.xx>	Sets the backup gateway MAC address
password <pass>	Sets the null user password
snmp <community string>	Sets the SNMP community string
user	Enables user access mode for userid 1 (issue the user command to display information about user ids for a given channel)
access <on|off>	Set LAN channel access mode
ipsrc	Sets the IP address source • none (unspecified) • static (manually configured static IP address) • dhcp (address obtained by DHCP) • bios (address loaded by BIOS or system software)
arp respond <on|off>	Sets generated ARP responses
arp generate <on|off>	Sets generated gratuitous ARPs
arp interval <seconds>	Sets generated gratuitous ARP interval

Table 8. Valid Set Channel Parameters (continued)

Parameter	Description
auth <level,...> <type,...>	Sets the valid authtypes for a given auth level • Levels: callback, user, operator, admin • Types: none, md2, md5, password, oem
cipher_privs <privlist>	Correlates cipher suite numbers with the maximum privilege level that is allowed to use it. In this way, cipher suites can be restricted to users with a given privilege level, so that, for example, administrators are required to use a stronger cipher suite than normal users. The format of privlist is as follows: Each character represents a privilege level and the character position identifies the cipher suite number. For example, the first character represents cipher suite 1 (cipher suite 0 is reserved), the second represents cipher suite 2, and so on. Privlist must be 15 characters in length. Characters used in privlist and their associated privilege levels are: x Cipher Suite Unused c Callback u User o Operator a Admin o OEM

Sensor Commands

The sensor commands allow you to display detailed sensor information.

list

Purpose:

Lists sensors and thresholds in a wide table format.

Example:

```
$ ipmitool –I lan –H test-pdupcr20-20 –U admin –a sensor list
```

get 0 [<id>]

Purpose:

Prints information for sensors specified by name.

Example:

```
$ ipmitool –I lan –H test-pdupcr20-20 –U admin –P pass sensor
get “R.14 Current”
```

thresh <id> <threshold> <setting>

Purpose:

Sets a particular sensor threshold value. The sensor is specified by name. Valid thresholds are:

• unr	Upper Non-Recoverable
• ucr	Upper Critical
• unc	Upper Non-Critical
• Inc	Lower Non-Critical
• Icr	Lower Critical
• Inr	Lower Non-Recoverable

Example:

```
$ ipmitool –I lan –H test-pdupcr20-20 –U admin –P pass sensor
get "R.14 Current" unr 10.5
```

OEM Commands

You can use the OEM commands to manage and control the operation of the ePDU.

OEM Net-fn is as defined below:

```
#define IPMI_NETFN_OEM_PP0x3C
```

Table 9 lists each OEM command and gives its ID. The sections that follow explain each command in greater detail.

Table 9. OEM Command IDs

Command Name	ID
Set Power On Delay	0x10
Get Power On Delay	0x11
Set Socket State	0x12
Get Socket State	0x13
Set Group State	0x14
Set Group Membership	0x15
Get Group Membership	0x16
Set Group Power On Delay	0x17
Get Group Power On Delay	0x18
Set Socket ACL	0x19
Get Socket ACL	0x1A
Set Sensor Calibration	0x1B
Test Actors	0x1C
Test Sensors	0x1D
Set Power Cycle Delay	0x1E
Get Power Cycle Delay	0x1F

Set Power Set Delay Command

The global power-on delay defines how much time has to pass between two power-on actions.

Request Data	1	Delay in 1/10 seconds. The delay is the minimum time after which a socket will be switched on after a previous socket has been switched on.
Response Data	1	Completion Code

Get Power On Delay Command

Request Data	–	–
Response Data	1	Completion Code
	2	Delay

Set Socket State Command

This command is used to switch on/off individual sockets.

Request Data	1	Socket number [7–5] reserved [4–0] socket number, 0-based, highest valid number depends on device model
	2	New state [7–5] reserved [0] 1b = power on, 0b = power off
Response Data	1	Completion Code

Get Socket State Command

Request Data	1	Socket number [7–5] reserved [4–0] socket number, 0-based, highest valid number depends on device model
Response Data	1	Completion Code
	2	Current socket state and visual state [7] reserved [6] 1b = blinking, 0b = steady [5] 1b = LED green on, 0b = off [4] 1b = LED red on, 0b = off [3] 1b = waiting to be switched on, 0b = not waiting [2] 1b = in power cycle delay phase, 0b = not delayed [1] 1b = released because of soft breaker, 0b = norm [0] 1b = power on, 0b = power off

Set Group State Command

This command is used to switch on/off all sockets belonging to a group. There is no Get Group State command. Getting the state of a socket has to be carried out with Get Receptacle State command.

Request Data	1	Group number [7–5] reserved [4–0] group number, valid numbers: 0–23
	2	New state [7–1] reserved [0] 1b = power on, 0b = power off
Response Data	1	Completion Code

Set Group Membership Command

Request Data	1	Group number [7–5] reserved [4–0] group number, valid numbers: 0–23
	2	[7–1] reserved [0] 1b = enable group, 0b = disable group
	3	[7] 1b = socket 7 belongs to group … [0] 1b = socket 0 belongs to group
	4	[7] 1b = socket 15 belongs to group … [0] 1b = socket 8 belongs to group
	5	[7] 1b = socket 23 belongs to group … [0] 1b = socket 16 belongs to group
Response Data	1	Completion Code

Get Group Membership Command

Request Data	1	Group number [7–5] reserved [4–0] group number, valid numbers: 0–23
Response Data	1	Completion Code
	2	[7–1] reserved [0] 1b = group is enabled, 0b = group is disabled
	3	[7] 1b = socket 7 belongs to group … [0] 1b = socket 0 belongs to group
	4	[7] 1b = socket 15 belongs to group … [0] 1b = socket 8 belongs to group
	5	[7] 1b = socket 23 belongs to group … [0] 1b = socket 16 belongs to group

Set Group Power On Delay Command

Request Data	1	Group number [7–5] reserved [4–0] group number, valid numbers: 0–23
	2	Delay in 1/10 seconds This delay overwrites the global delay for all of the sockets in that group. The delay applies not only when using the Set Group State command, but also when using the Set Receptacle State command.
Response Data	1	Completion Code

Get Group Power On Delay Command

Request Data	1	Group number [7–5] reserved [4–0] group number, valid numbers: 0–23
Response Data	1	Completion Code
	2	Delay in 1/10 seconds

Set Socket ACL

Request Data	1	Socket number
	2	Number of ACL entries to follow
	3 +N	ACL entry [7] 0b = deny, 1b = allow [6] 0b = user id, 1b = privilege level [5–0] user id or privilege level depending on [6]
Response Data	1	Completion Code

Get Socket ACL

Request Data	1	Socket number
Response Data	1	Completion Code
	2	Number of ACL entries to follow
	3 +N	ACL entry [7] 0b = deny, 1b = allow [6] 0b = user id, 1b = privilege level [5-0] user id or privilege level depending on [6]

Set Sensor Calibration

Sensor calibration is only allowed for threshold-based sensors that return a sensor reading byte with the Get Sensor Reading command. Also, not all threshold-based sensors have the capability to be calibrated.

Request Data	1	Sensor number (fhh = reserved)
	2	Actual sensor reading value. Assumes, that at the time this command is executed a calibrated measurement is applied to the sensor.
Response Data	1	Completion Code 00h – If calibration OK CDh – If the sensor cannot be calibrated

Test Actors

Used for hardware testing during production.

Request Data	1	[7–2] reserved [1] Beeper test, 0b = disable, 1b = enable [0] 7 segment display test, 0b = disable, 1b = enable
Response Data	1	Completion Code

Test Sensors

Used for hardware testing during production.

Request Data	1	–
Response Data	1	Completion Code
	2	[7–2] reserved [1] down button, 0b = not pressed, 1b = pressed [0] up button, 0b = not pressed, 1b = pressed

Set Power Cycle Delay Command

Request Data	1	Socket number (0xFF for the global unit delay)
	2	Delay (seconds), 1–255 for unit and socket, 0 fallback to the unit delay (socket only)
Response Data	1	Completion Code

Get Power Cycle Delay Command

Request Data	1	Socket number (0xFF for the global unit delay)
Response Data	1	Completion Code
	2	Delay (seconds), 1–255, 0 if not set (socket only)

Chapter 9 Appendix A: Equipment Setup Worksheet

ePDU Series Model ______________________________

ePDU Series Serial Number ______________________________

	Outlet 1	Outlet 2	Outlet 3
Model			
Serial Number			
Use			

	Outlet 4	Outlet 5	Outlet 6
Model			
Serial Number			
Use			

	Outlet 7	Outlet 8	Outlet 9
Model			
Serial Number			
Use			

	Outlet 10	Outlet 11	Outlet 12
Model			
Serial Number			
Use			

	Outlet 13	Outlet 14	Outlet 15
Model			
Serial Number			
Use			

	Outlet 16	Outlet 17	Outlet 18
Model			
Serial Number			
Use			

	Outlet 19	Outlet 20	
Model			
Serial Number			
Use			

Types of adapters ____

Types of cables ____

Name of software program ____

Chapter 10 Appendix B: Event Types

Event Type	Examples
Outlet Control	Outlet(#) switched on by user Outlet(#) switched off by user Outlet(#) cycled by user
Outlet/Unit/Environmental Sensors	Assertion: Environmental Temperature (#) above upper noncritical threshold Deassertion: Environmental Temperature (#) above upper critical threshold
User/Group Administration	User added successfully User successfully changed User successfully deleted User password successfully changed Group added successfully Group successfully changed Group successfully deleted
Security Relevant	User login failed
User Activity	User logged in successfully User logged out User session timeout **Note** The user activity entries in the event log always show the IP address of the computer that logged in or out. Entries with an IP address of 127.0.0.1 (the loopback IP address) represent a serial connection and a CLP session.
Device Operation	Device successfully started
Device Management	The Device update has started
Virtual Device Management	Master PDU lost connectivity with SlaveIPAddress

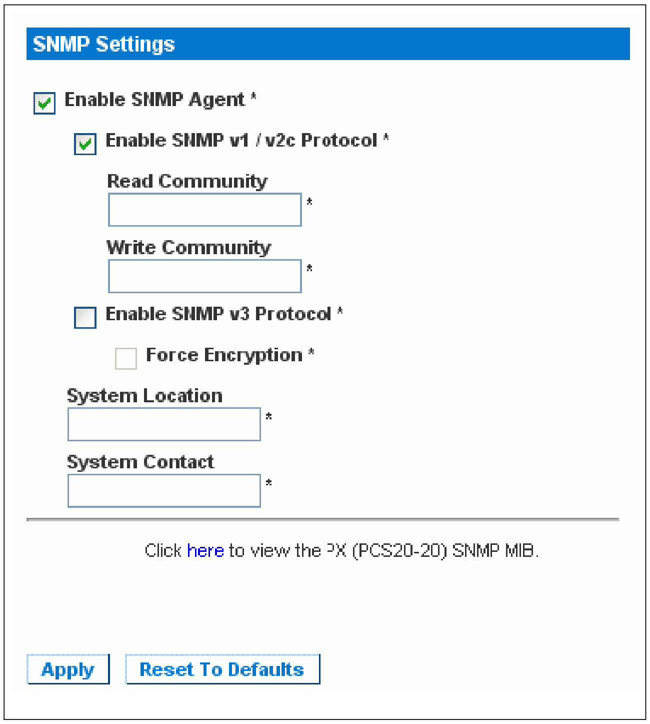
Chapter 11 Appendix C: Using SNMP

This chapter guides you through setting up the ePDU for use with an SNMP manager. The ePDU can be configured to send traps to an SNMP manager, as well as receive GET and SET commands in order to retrieve status and configure some basic settings.

Enabling SNMP

To communicate with an SNMP manager, you must first enable the SNMP agent on ePDU. This can be done from the SNMP Settings page:

1. Select **Device Settings**, and then select **SNMP Settings**. The SNMP Settings page displays.



SNMP Settings

☑ Enable SNMP Agent *

☑ Enable SNMP v1 / v2c Protocol *

Read Community *

Write Community *

☐ Enable SNMP v3 Protocol *

☐ Force Encryption *

System Location *

System Contact *

Click here to view the PX (PCS20-20) SNMP MIB.

Figure 98. SNMP Settings Page

2. Select the **Enable SNMP Agent** check box to enable the ePDU to communicate with external SNMP managers. A number of options become available.

3. Select **Enable SNMP v1 / v2c Protocol** check box to enable communication with an SNMP manager using SNMP v1 or v2c protocol. Then type the SNMP read-only community string in the **Read Community** field and the read/write community string in the **Write Community** field.

4. Select **Enable SNMP v3 Protocol** check box to enable communication with an SNMP manager using SNMP v3 protocol.

5. Select the **Force Encryption** check box to force using encrypted SNMP communication. Then type:

- The SNMP MIBII sysLocation value in the **System Location** field.
- The SNMP MIBII sysContact value in the **System Contact** field.

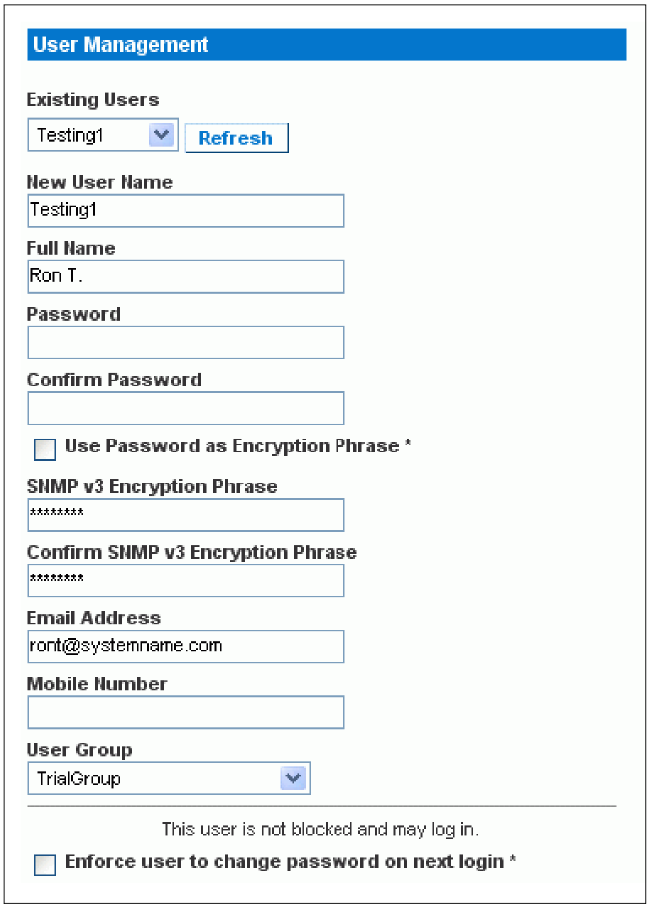
6. Click the link at the bottom of the page to download an SNMP MIB for your ePDU to use with your SNMP manager.

7. Click **Apply**. The SNMP configuration is set.

Configuring Users for Encrypted SNMP v3

The SNMP v3 protocol allows for encrypted communication. To take advantage of this, users need to have a Encryption Phrase, which acts as a shared secret between them and the ePDU. This encryption phrase can be set in the User Management page.

1. Choose **User Management**, then **Users & Groups**. The User Management page displays.



User Management

Existing Users: Testing1

New User Name: Testing1

Full Name: Ron T.

Password:

Confirm Password:

□ Use Password as Encryption Phrase *

SNMP v3 Encryption Phrase: ********

Confirm SNMP v3 Encryption Phrase: ********

Email Address: ront@systemname.com

Mobile Number:

User Group: TrialGroup

This user is not blocked and may log in.

□ Enforce user to change password on next login *

Figure 99. User Management Page

2. Select the user profile you want to modify from the **Existing Users** list.

3. If you want to use the user's password as their Encryption Phrase select the **Use Password as Encryption Phrase** check box if it not already selected.

4. If you want to specify a different encryption phrase do the following:

- Clear the **Use Password as Encryption Phrase** check box if selected.
- Type the new phrase in the **SNMP v3 Encryption Phrase** field.
- Type it again in the **Confirm SNMP v3 Encryption Phrase** field.

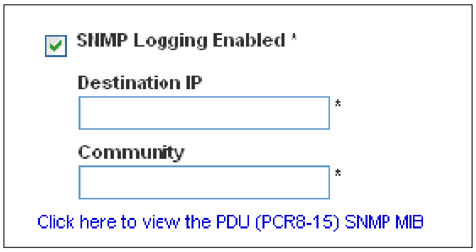
5. Click **Modify**. The user is now setup for encrypted SNMP v3 communication.

Configuring SNMP Traps

The ePDU automatically keeps an internal log of events that occur. See "Setting Up Event Logging" on page 68 of Chapter 6, "Using the Web interface" for more information. These events can also be used to send SNMP traps to a third party manager.

To configure ePDU to send SNMP traps:

1. Choose **Device Settings --> Event Log**. The Event Log Settings window opens. The SNMP Logging panel controls the use of SNMP traps.



☑ SNMP Logging Enabled *

Destination IP

[   ] *

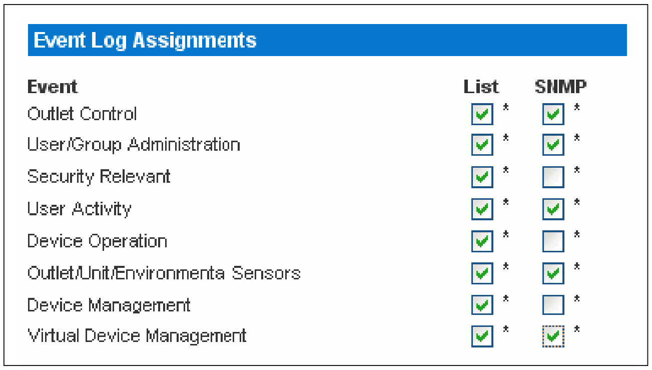
Community

[   ] *

Click here to view the PDU (PCR8-15) SNMP MIB

Figure 100. Event Log Settings

2. Click the **SNMP Logging Enabled** check box.
3. Type an IP address in the **Destination IP** field. This is the address to which traps are sent by the SNMP system agent.
4. Type the name of the SNMP community in the **Community** field. The community is the group representing the ePDU and all SNMP management stations.
5. To take a look at the Management Information Base (MIB), click the link **Click here to view the (<device name>) SNMP MIB**. It is located under the **Community** field.
6. When SNMP logging is enabled, seven event types display in the Event Log Assignments panel to the right. All are disabled by default. To enable any of these event types, select the appropriate check boxes.



Event Log Assignments

Event	List	SNMP
Outlet Control	☑ *	☑ *
User/Group Administration	☑ *	☑ *
Security Relevant	☑ *	□ *
User Activity	☑ *	☑ *
Device Operation	☑ *	□ *
Outlet/Unit/Environmenta Sensors	☑ *	☑ *
Device Management	☑ *	□ *
Virtual Device Management	☑ *	☑ *

Figure 101. Event Log Assignments Panel

7. Click **Apply**. SNMP logging is configured.

NOTE *Re-download the ePDU MIB after updating the ePDU firmware. This will ensure your SNMP manager has the correct MIB for the release you are using.*

SNMP Gets and Sets

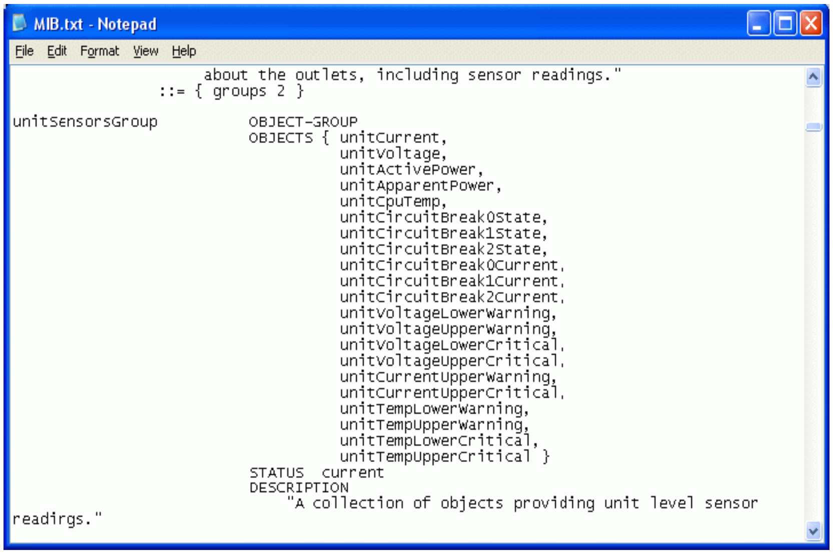
In addition to sending traps, the ePDU is able to receive SNMP get and set requests from third-party SNMP managers. Get requests can be used to retrieve information about the ePDU (such as the system location, or the current on a specific outlet). Set requests can be used to configure a subset of this information (such as the SNMP system name).

Valid objects for these requests are limited to those found in the SNMP MIBII System Group and the custom ePDU MIB.

ePDU MIB

This MIB is available from the SNMP Settings page, the Event Logging page, or by pointing your browser to **http://<ipaddress>/ MIB.txt**, where <ip-address> is the IP address of your ePDU.

Opening the MIB reveals the custom objects that describe the ePDU system at the unit level as well as at the individual outlet level. As standard, these objects are first presented at the beginning of the file, listed under their parent group. The objects then display again individually, defined and described in detail.



```
                     about the outlets, including sensor readings."
                ::= { groups 2 }

unitSensorsGroup          OBJECT-GROUP
                          OBJECTS { unitCurrent,
                                    unitVoltage,
                                    unitActivePower,
                                    unitApparentPower,
                                    unitCpuTemp,
                                    unitCircuitBreak0State,
                                    unitCircuitBreak1State,
                                    unitCircuitBreak2State,
                                    unitCircuitBreak0Current,
                                    unitCircuitBreak1Current,
                                    unitCircuitBreak2Current,
                                    unitVoltageLowerWarning,
                                    unitVoltageUpperWarning,
                                    unitVoltageLowerCritical,
                                    unitVoltageUpperCritical,
                                    unitCurrentUpperWarning,
                                    unitCurrentUpperCritical,
                                    unitTempLowerWarning,
                                    unitTempUpperWarning,
                                    unitTempLowerCritical,
                                    unitTempUpperCritical }
                          STATUS  current
                          DESCRIPTION
                              "A collection of objects providing unit level sensor
readirgs."
```

Figure 102. MIB File

For example, the **unitSensorsGroup** section contains objects for sensor readings of the ePDU as a whole. One object listed under this group, **unitCurrent**, is described later in the MIB as "The value for the unit's current sensor in millamps"—the measure of the current drawn by the ePDU. The **outletCurrent**, part of the **outletsGroup** group, describes the current passing through a specific outlet.

NOTE *When performing an SNMP get, all current values are measured in milliamps (ma). However, when performing an SNMP set, all are measured in amps (A).*

Several of these objects can be configured from the SNMP manager using SNMP set commands. Objects that can be written to have a MAXACCESS level of "read\write" in the MIB. These objects include threshold objects that trigger the ePDU to provide a warning (and send an SNMP trap) when certain parameters are exceeded. See "Setting Up Outlets and Power Thresholds" section on page 53 in Chapter 6, "Using the Web interface" for a description of how thresholds work.

Chapter 12 Appendix D: Specifications

This appendix contains information describing the serial RJ-45 pinouts (Table 10) and the serial RJ-11 (Table 11).

Table 10. RJ-45 PIN/Signal Definition

Pin No.	Signal	Direction	Description
1	DTR	Output	Reserved
2	GND	—	Signal Ground
3	+5V	—	Power for CIM
4	RX	Input	Receive Data (Data in)
5	TX	Output	Transmit Data (Data out)
6	N/C	N/C	No Connection
7	GND	—	Signal Ground
8	DCD	Input	Reserved

Table 11. RJ-11 PIN/Signal Definition

Pin No.	Signal	Direction	Description
1	+5V	—	Power (500mA, fuse-protected)
2	GND	—	Signal Ground
3	RS485 (Data +)	bidirectional	Data Line +
4	RS485 (Data -)	bidirectional	Data Line -
5	GND	—	Signal Ground
6	1-wire	—	—