Dominion PX

User Guide

Release 1.3.5

DPX-0L-v1.3.5-E

April 2010

255-80-6080-00

Safety Guidelines

WARNING! Read and understand all sections in this guide before installing or operating this product.

WARNING! Connect this product to an AC power source whose voltage is within the range specified on the product’s nameplate. Operating this product outside the nameplate voltage range may result in electric shock, fire, personal injury and death.

WARNING! Connect this product to an AC power source that is current limited by a suitably rated fuse or circuit breaker in accordance with national and local electrical codes. Operating this product without proper current limiting may result in electric shock, fire, personal injury and death.

WARNING! Connect this product to a protective earth ground. Never use a “ground lift adaptor” between the product’s plug and the wall receptacle. Failure to connect to a protective earth ground may result in electric shock, fire, personal injury and death.

WARNING! This product contains no user serviceable parts. Do not open, alter or disassemble this product. All servicing must be performed by qualified personnel. Disconnect power before servicing this product. Failure to comply with this warning may result in electric shock, personal injury and death.

WARNING! Use this product in a dry location. Failure to use this product in a dry location may result in electric shock, personal injury and death.

WARNING! Do not rely on this product’s receptacle lamps, receptacle relay switches or any other receptacle power on/off indicator to determine whether power is being supplied to a receptacle. Unplug a device connected to this product before performing repair, maintenance or service on the device. Failure to unplug a device before servicing it may result in electric shock, fire, personal injury and death.

WARNING! Only use this product to power information technology equipment that has a UL/IEC 60950-1 or equivalent rating. Attempting to power non rated devices may result in electric shock, fire, personal injury and death.

WARNING! Do not use this product to power inductive loads such as motors or compressors. Attempting to power inductive loads may result in damage to the product.

WARNING! Do not use this product to power critical patient care equipment, fire or smoke alarm systems. Use of this product to power such equipment may result in personal injury and death.

WARNING! If this product is a model that requires assembly of its line cord or plug, all such assembly must be performed by a licensed electrician and the line cord or plugs used must be suitably rated based on the product’s nameplate ratings and national and local electrical codes. Assembly by unlicensed electricians or failure to use suitably rated line cords or plugs may result in electric shock, fire, personal injury or death.

WARNING! This product contains a chemical known to the State of California to cause cancer, birth defects, or other reproductive harm.

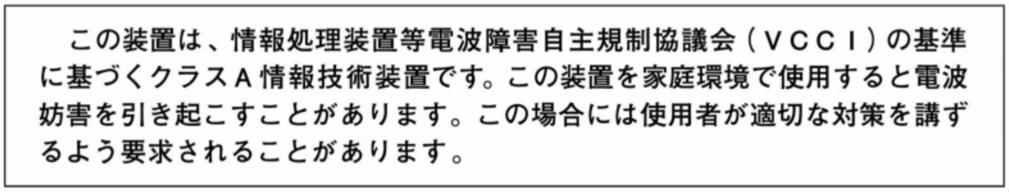
Safety Instructions

1. Installation of this product should only be performed by a person who has knowledge and experience with electric power.
2. Make sure the line cord is disconnected from power before physically mounting or moving the location of this product.
3. This product is designed to be used within an electronic equipment rack. The metal case of this product is electrically bonded to the line cord ground wire. A threaded grounding point on the case may be used as an additional means of protectively grounding this product and the rack.
4. Examine the branch circuit receptacle that will supply electric power to this product. Make sure the receptacle's power lines, neutral and protective earth ground pins are wired correctly and are the correct voltage and phase. Make sure the branch circuit receptacle is protected by a suitably rated fuse or circuit breaker.
5. If the product is a model that contains receptacles that can be switched on/off, electric power may still be present at a receptacle even when it is switched off.

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)



この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づくクラスＡ情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

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

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Chapter 1 Introduction

Dominion PX is an intelligent power distribution unit (PDU) that allows you to reboot remote servers and other network devices and/or to monitor power in the data center.

The intended use of the Raritan Dominion PX is distribution of power to information technology equipment such as computers and communication equipment where such equipment is typically mounted in an equipment rack located in an information technology equipment room.

Raritan offers different types of PDUs -- some with the outlet switching function, and others without. With the outlet switching function, you can recover systems remotely in the event of system failure and/or system lockup, eliminate the need to perform manual intervention or dispatch field personnel, reduce downtime and mean time to repair, and increase productivity.

In This Chapter

Product Models

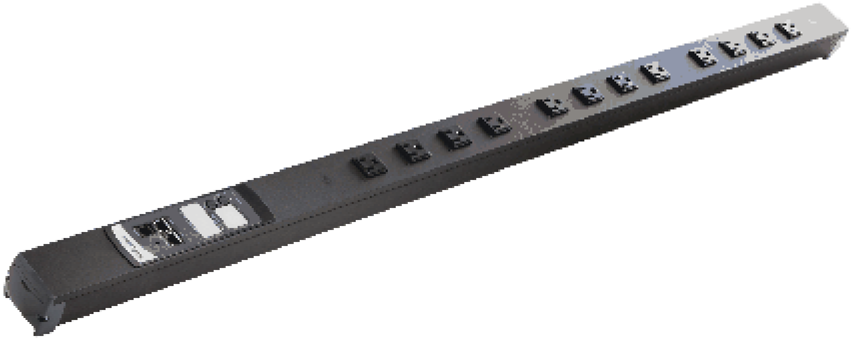
Dominion PX comes in several models that are built to stock and can be obtained almost immediately. Raritan also offers custom models that are built to order and can only be obtained on request.

Visit ***Raritan website*** (http://www.raritan.com) or contact your local reseller for a list of available models.

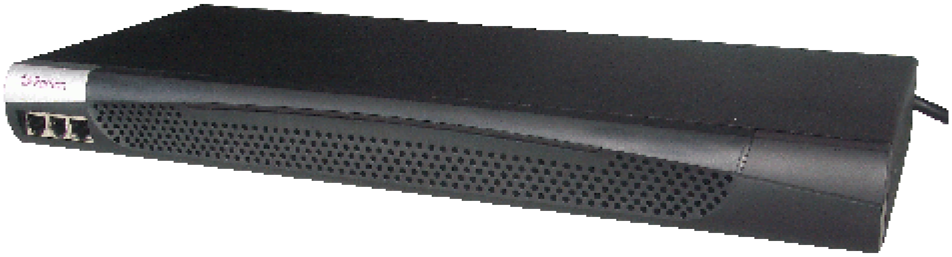
Product Photos

Dominion PX comes in Zero U, 1U, and 2U sizes.

Zero U Size



1U Size



2U Size

Product Features

Dominion PX models vary in sizes and features. In general, Dominion PX features include:

- The ability to power on, power off, and reboot the devices connected to each outlet
- The ability to group outlets from multiple Dominion PX devices 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

  Voltage

  Active Power

  Apparent Power

  Energy Consumption (Active Energy) on some models (part numbers follow PX-nnnn format)

- The ability to monitor the internal CPU temperature of the Dominion PX device
- The ability to monitor environmental factors such as external temperature and humidity
- User-specified location attributes for environmental sensors
- 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 retrieve a history of sampled data at all levels (unit, circuit breaker, outlet, etc) via SNMP
- The ability to configure and set values through SNMP, including unit and outlet threshold levels
- The ability to save one Dominion PX device's configuration settings and then deploy those settings to other Dominion PX devices
- Fully shrouded local branch circuit breakers on products rated over 20A to protect connected equipment against overload and short circuits
- Integration with Raritan's Paragon II, CommandCenter Secure Gateway (CC-SG), and Dominion access devices
- Line current and circuit breaker monitoring
- Load imbalance calculations, for 3-phase models
- A combination of outlet types (for example, C13 and C19 outlets) in select models
- A combination of outlet voltages (120 and 208 volts) in select models
- Support for high current devices (such as Blade Servers) in select models

Note: Select models may be available without outlet switching. Please check with your reseller or distributor.

Package Contents

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

Zero U Products

- Dominion PX device
- Bracket for Zero U and screws
- Tool-less mounting bracket for Zero U devices
- Null-modem cable with RJ-45 and DB9F connectors on either end

1U Products

- Dominion PX device
- 1U bracket pack and screws
- Null-modem cable with RJ-45 and DB9F connectors on either end

2U Products

- Dominion PX device
- 2U bracket pack and screws
- Null-modem cable with RJ-45 and DB9F connectors on either end

Chapter 2 Rack-Mounting Dominion PX

The rackmount methods for Zero U Dominion PX devices vary from model to model. Follow the procedure suitable for your model and rack (or cabinet).

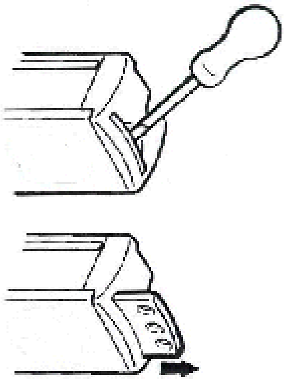
In This Chapter

Rackmount Safety Guidelines

In Raritan products which require rack mounting, follow these precautions:

- Operation temperature in a closed rack environment may be greater than room temperature. Do not exceed the rated maximum ambient temperature of the Power Distribution Units. See ***Appendix A: Specifications*** (see "Specifications" on page 148) in the User Guide.
- 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, to the branch circuit.

Standard Rackmount

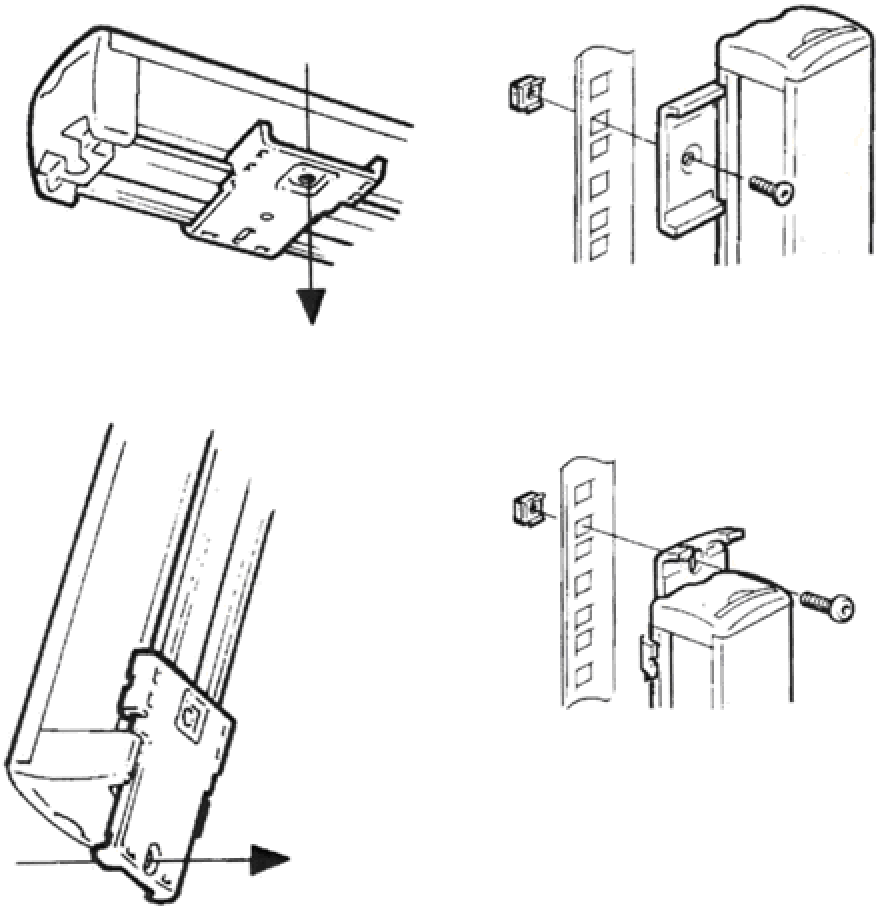


The Zero U units are provided with high grade engineering polycarbonate isolation hardware to allow fixing in a variety of positions within the rack.

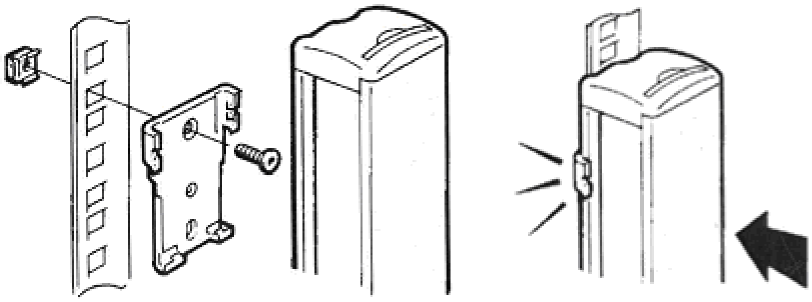
For panel/flush mount, pull out fixing brackets are available on each end cap to allow mounting on suitable rails.

See other options shown below.

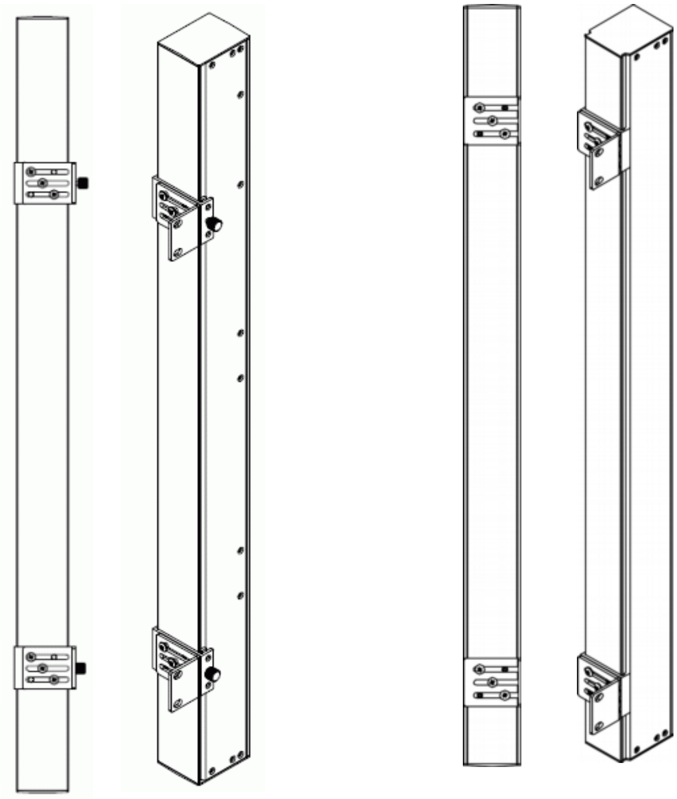
Side Fixing



Blind Fixing

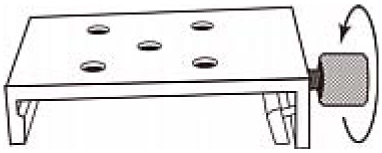


Mounting Zero U Models Using L-Bracket

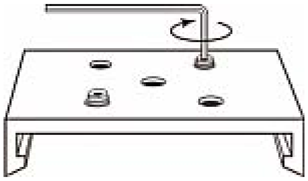


To mount Zero U models using L-Bracket:

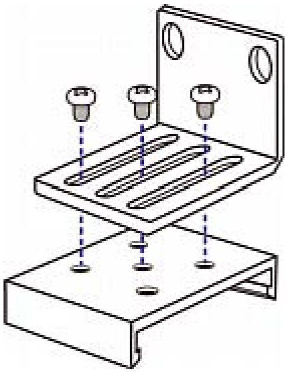
1. Align the baseplates on the rear of the Dominion PX device.
2. Secure the baseplates in place. Different models ship with different types of baseplates.
   - To secure a baseplate with the thumbscrew, turn the thumbscrew until it is tightened.



   - To secure a baseplate without the thumbscrew, use the included L-shaped hex key to loosen the hex socket screws until the baseplate is fastened.



3. Align the L-brackets with the baseplates so that the five screw-holes on the baseplates line up through the L-Bracket's slots. The rackmount side of brackets should face either the left or right side of the Dominion PX device.
4. Fasten the brackets in place with at least three screws (one through each slot). Use additional screws as desired.



5. Using rack screws, fasten the Dominion PX device to the rack through the L-Brackets.

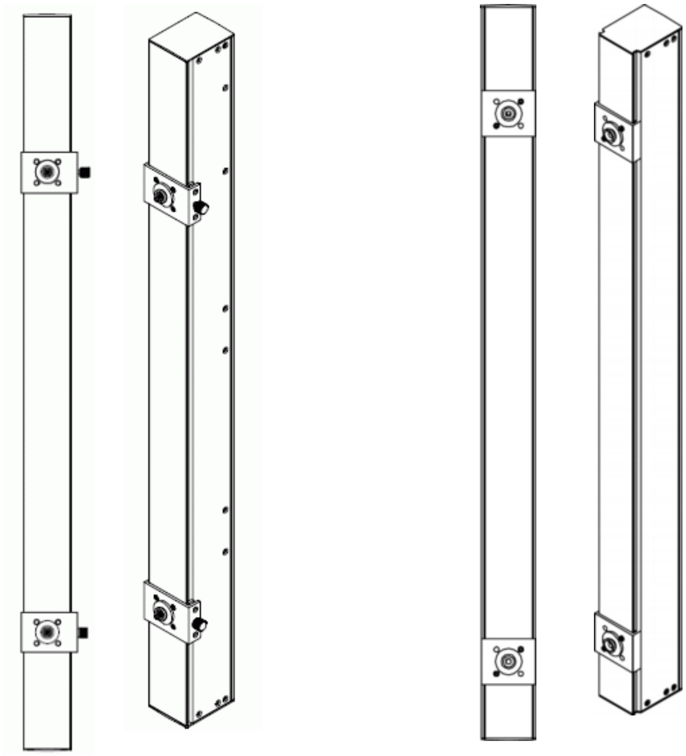
For Zero U Models Using Tool-less Button Mounting

The Zero U devices ship with tool-less mounting brackets consisting of an adjustable baseplate with a large button. These work by attaching to the back side of a Zero U Dominion PX device (the side opposite of the outlets) and fitting the button into the mounting holes of the cabinet. Note that not all racks may allow the option of securing the Dominion PX device in this way.

Before You Begin Tool-less Mounting:

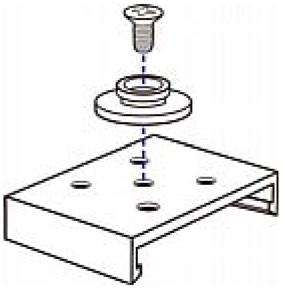
- Ensure that you have sufficient space in the cabinet to mount the Dominion PX device. Approximately one inch of clearance is required at each end (top and bottom) of the device.
- It may help to mark the back of the Dominion PX device through the mounting holes you intend to use. You can then use this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

Mounting Zero U Models Using Button Mount



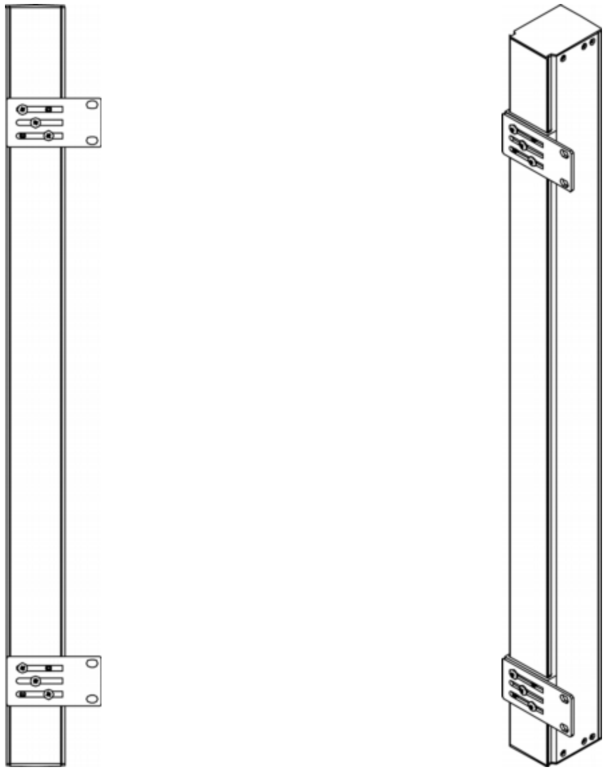
To mount Zero-U models using button mount:

1. Align the baseplates on the rear of the Dominion PX device. Leave at least 24 inches between the baseplates for stability.
2. Make the baseplates grasp the Dominion PX device lightly.
    - For a baseplate with the thumbscrew, turn the thumbscrew until it is "slightly" tightened.
    - For a baseplate without the thumbscrew, use the included L-shaped hex key to loosen the hex socket screws until the baseplate is "slightly" fastened.
3. Screw each mounting button in the center of each baseplate.



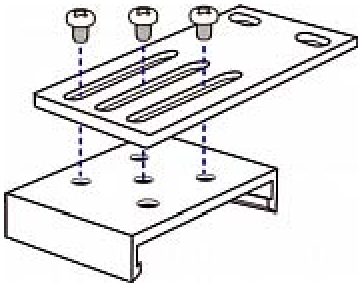
4. Align the large mounting buttons with the mounting holes in the cabinet, fixing one in place and adjusting the other.
5. Depending on the type of your baseplates, either further tighten the thumbscrews or loosen the hex socket screws until the mounting buttons are secured in their position.
6. Ensure that both buttons can engage their mounting holes simultaneously.
7. Press the Dominion PX device forward, pushing the mounting buttons through the mounting holes, then letting the device drop about 5/8". This secures the Dominion PX device in place and completes the installation.

Mounting Zero U Models Using Claw-Foot Bracket



To mount Zero U models using claw-foot brackets:

1. Align the baseplates on the rear of the Dominion PX device.
2. Secure the baseplates in place.
    - To secure a baseplate with the thumbscrew, turn the thumbscrew until it is tightened.
    - To secure a baseplate without the thumbscrew, use the included L-shaped hex key to loosen the hex socket screws until the baseplate is fastened.
3. Align the claw-foot brackets with the baseplates so that the five screw-holes on the baseplates line up through the bracket's slots. The rackmount side of brackets should face either the left or right side of the Dominion PX device.
4. Fasten the brackets in place with at least three screws (one through each slot). Use additional screws as desired.



5. Using rack screws, fasten the Dominion PX device to the rack through the claw-foot brackets.

Chapter 3 Installation and Configuration

This chapter explains how to install a Dominion PX device and configure it for network connectivity.

In This Chapter

Before You Begin

Before beginning the installation, perform the following activities:

Unpacking the Product and Components

1. Remove the Dominion PX device and other equipment from the box in which they were shipped. See Package Contents for a complete list of the contents of the box.
2. Compare the 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 Raritan's Technical Support Department for assistance.

Preparing the Installation Site

1. Make sure the installation area is clean and free of extreme temperatures and humidity.
2. Allow sufficient space around the Dominion PX device for cabling and outlet connections.
3. Review the ***Safety Instructions*** (on page iii) listed in the beginning of this user guide.

Filling Out the Equipment Setup Worksheet

An Equipment Setup Worksheet is provided in this guide. See ***Equipment Setup Worksheet*** (on page 150). Use this worksheet to record the model, serial number, and use of each device connected to Dominion PX.

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

Configuring Dominion PX

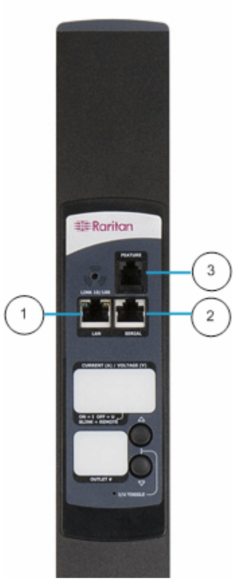
You must connect the Dominion PX device to a computer to configure it, using a serial connection between Dominion PX and the computer.

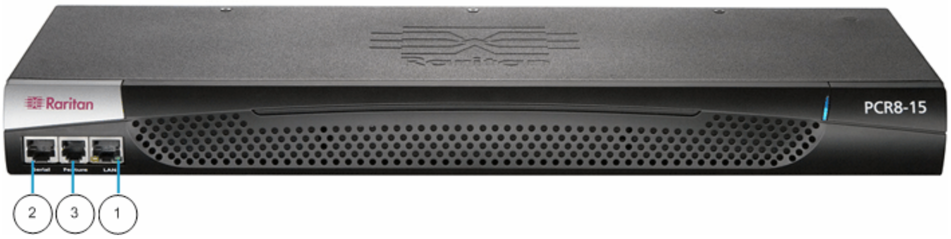
The computer must have a communications program such as HyperTerminal or PuTTY. In addition, you need a null-modem cable with RJ-45 and DB9F connectors on either end.

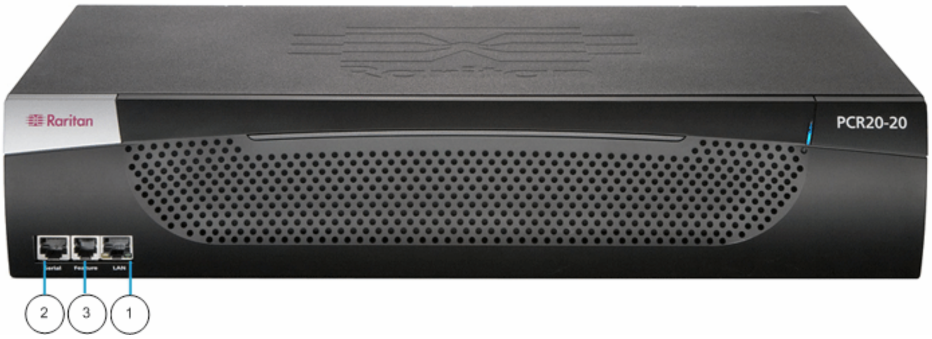
Connecting Dominion PX to a Computer

▶ **To connect the PDU to the computer:**

1. Connect the RJ-45 end of the null-modem cable to the port labeled Serial on the front of the Dominion PX device.







Item #	Description
1	LAN Port
2	Serial Port
3	Network Port

2. Connect the DB9 end of the null-modem cable to the serial port (COM) of the computer.

Note: If you plan to use the serial connection to log in to the command line interface, leave the cable connected after the configuration is complete.

Connecting Dominion PX to Your Network

To use the web interface to administer Dominion PX, you must connect the Dominion PX device to your local area network (LAN).

▶ **To connect the PDU to the network:**

1. Connect a standard Cat 5e UTP cable to the LAN port on the front of the Dominion PX device. See ***Connecting Dominion PX to a Computer*** (on page 15) for the location of this port on your PDU.
2. Connect the other end of the cable to your LAN.

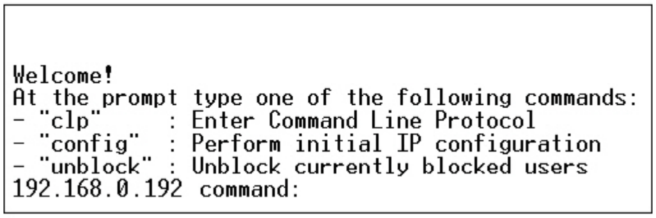
Initial Network Configuration

After the Dominion PX device is connected to your network, you must provide it with an IP address and some additional networking information.

To configure the networking parameters:

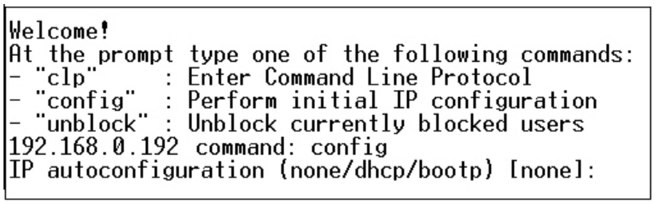
1. Go to the computer that you connected to the Dominion PX device and open a communications program such as HyperTerminal or PuTTY.
2. Select the appropriate serial port, and make sure the port settings are configured as follows:
   - Bits per second = 9600
   - Data bits = 8
   - Stop bits = 1
   - Parity = None
   - Flow control = None

   Note: The "Flow control" parameter must be set to "None" to ensure that the communications program will work correctly with Dominion PX.
3. Press Enter to display the opening configuration prompt.



```
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:
```

4. Type config and press Enter to begin the configuration process. You are prompted to select an IP configuration method.



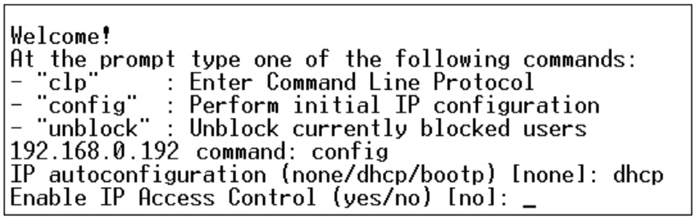
```
Welcome!
At the prompt type one of the following commands:
- "clp"      : Enter Command Line Protocol
- "config"   : Perform initial IP configuration
- "unblock"  : Unblock currently blocked users
192.168.0.192 command: config
IP autoconfiguration (none/dhcp/bootp) [none]:
```

5. You must assign the Dominion PX device 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 Dominion PX device a static IP address. You will be prompted for the address, network mask, and gateway.

Note: Dominion PX's IP address is automatically displayed 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 will be 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, 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.*

Type your selection and press Enter. You are prompted to enable IP access control.

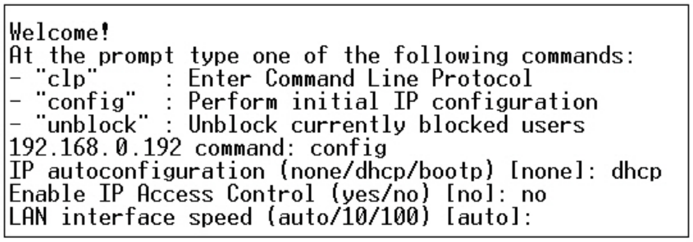


```
Welcome!
At the prompt type one of the following commands:
- "clp"     : Enter Command Line Protocol
- "config"  : Perform initial IP configuration
- "unblock" : Unblock currently blocked users
192.168.0.192 command: config
IP autoconfiguration (none/dhcp/bootp) [none]: dhcp
Enable IP Access Control (yes/no) [no]: _
```

6. By default, IP access control is NOT enabled. This disables the Dominion PX firewall. Leave the firewall disabled for the present; later you will enable the firewall from the web interface and create firewall rules. See ***Configuring the Firewall*** (on page 55).

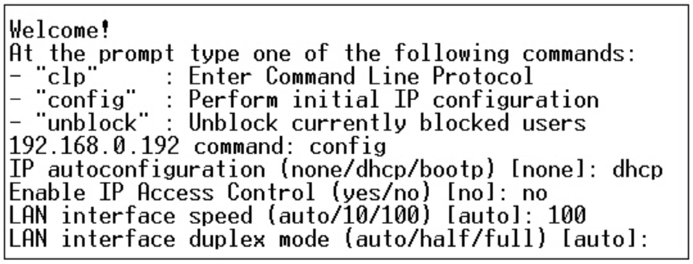
Note: If you ever accidentally create a rule that locks you out of Dominion PX, you can rerun the configuration program and reset this parameter to disabled to allow you to access the Dominion PX device.

7. Press Enter. You are prompted to set the LAN interface speed.



```
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]: dhcp
Enable IP Access Control (yes/no) [no]: no
LAN interface speed (auto/10/100) [auto]:
```

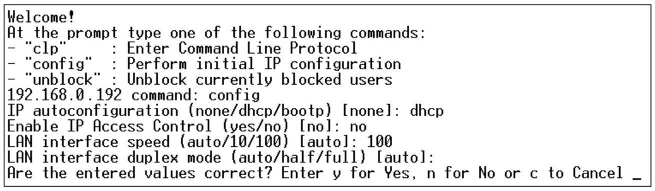
8. By default, the LAN interface speed is set to Auto, which allows the system to select the optimum speed. To keep the default, press Enter. To set the speed to 10 or 100 Mbps, type the speed you want and press Enter. You are prompted to select the duplex mode for the LAN interface.



```
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]: 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]:
```

9. 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 Dominion PX device, but not at the same time. Full duplex allows data to be transmitted in both directions at the same time.

   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.

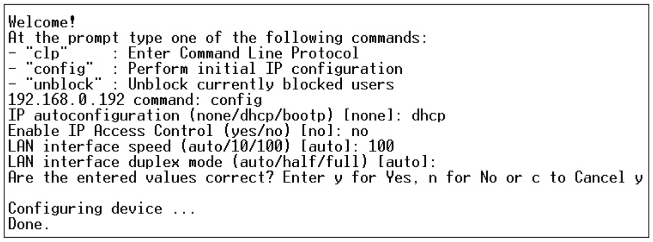


```
Welcome!
At the prompt type one of the following commands:
- "clp"     : Enter Command Line Protocol
- "config"  : Perform initial IP configuration
- "unblock" : Unblock currently blocked users
192.168.0.192 command: config
IP autoconfiguration (none/dhcp/bootp) [none]: dhcp
Enable IP Access Control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

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 as shown in the screenshot of Step 4, 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.
    - 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.

11. If you entered y to confirm the configuration, a message appears when the configuration is complete. You will be returned to the opening prompt. You are now ready to begin using your Dominion PX.



```
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]: 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.
```

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

Resetting to Factory Defaults

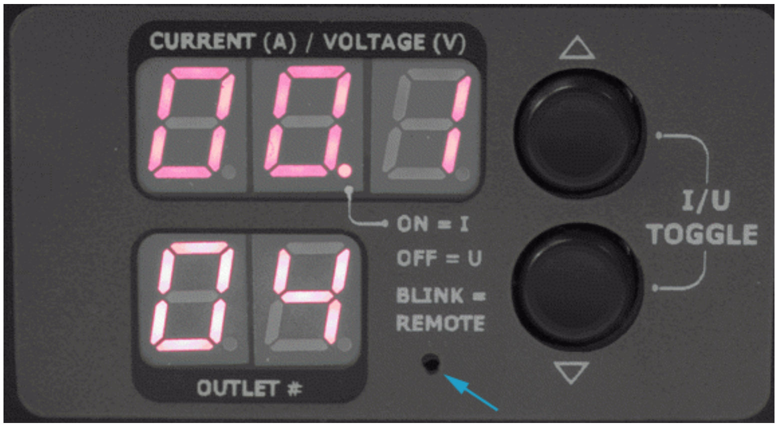
For security reasons, the Dominion PX device may be reset to factory defaults only at the local serial console.

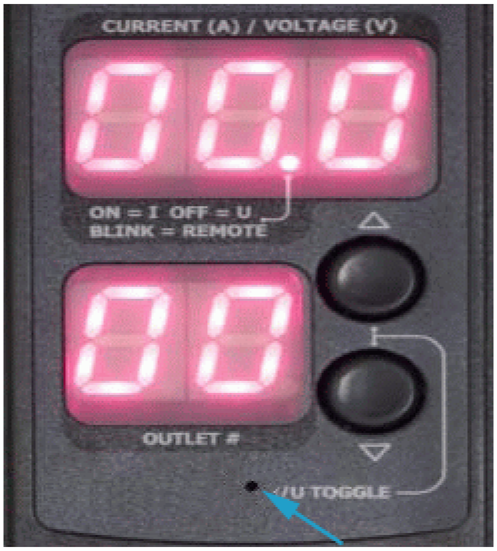
Important: Exercise caution before resetting Dominion PX to its factory defaults. This erases any existing information and customized settings, such as user profiles and threshold values.

► To reset to factory defaults:

1. Connect a computer to the Dominion PX device over a serial connection.
2. Launch a terminal emulation program such as HyperTerminal, Kermit, or PuTTY, and open a window on the Dominion PX. Make sure serial port settings use this configuration:
   - 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 Dominion PX while pressing the Esc key several times in rapid succession. A prompt (=>) should appear after about one second.
4. Type *defaults* to reset the Dominion PX to its factory defaults.

The pictures show the location of the reset hole.





When resetting to factory defaults, do not use a DB9-to-USB adapter to connect the Dominion PX serial cable to your PC. This may result in misinterpreted characters at the special prompt. Connect the Dominion PX serial cable to a PC with a DB9 serial port instead.

Note: HyperTerminal is available on Windows operating systems prior to Windows Vista. For Windows Vista or later versions, you may use PuTTY, which is a free program you can download from the Internet. See PuTTY's documentation for details on configuration.

Chapter 4 Using Dominion PX

This chapter explains how to use Dominion PX. It describes the LEDs and ports on the Dominion PX device, and explains how to use the LED display panel. It also explains how the circuit breaker (overcurrent protector) works and when the beeper sounds.

In This Chapter

Panel Components

Dominion PX comes in Zero U, 1U, and 2U sizes. All types of models come with the following components on the outer panels.

- Power cord
- Outlets
- Connection ports
- LED display
- Reset button
- On 1U and 2U models, there is an additional component -- a blue power LED.

Blue LED

Only 1U and 2U models have a blue power LED on the right side of the front panel. This LED is lit solid as soon as the Dominion PX device is powered on.

Power Cord

Most of Raritan PDUs come with an installed power cord, which is ready to be plugged into an appropriate receptacle for receiving the input of electricity. Such devices cannot be rewired by the user.

Connect each Dominion PX device to an appropriately rated branch circuit. See the label or nameplate affixed to your Dominion PX device for appropriate input ratings or range.

There is no power switch on the Dominion PX device. To power cycle the PDU, unplug it from the branch circuit, wait 10 seconds and then plug it back in.

Outlets

The number of outlets varies from model to model. A small LED is adjacent to each outlet to indicate the outlet or PDU state. The PDU is shipped from the factory with all outlets turned ON. The table below explains how to interpret different LED states.

LED state	Outlet status	What it means
Not lit (light grey)	Powered OFF	The outlet is not connected to power, or the control circuitry's power supply is broken.
Red	ON and LIVE	LIVE power. The outlet is on and power is available.
Red flashing	ON and LIVE	The current flowing through the outlet is greater than the upper warning (non-critical) threshold.
Green	OFF and LIVE	The outlet is turned off and power is available when the outlet is turned on.
Green flashing	OFF and NOT LIVE	The outlet is turned off and power is not available because the circuit breaker has tripped.
Yellow flashing	ON and NOT LIVE	The outlet is turned on but power is not available because a circuit breaker has tripped.
Cycling through Red, Green and Yellow	n/a	The Dominion PX device has just been plugged in and its management software is loading. -- OR -- A firmware upgrade is being performed on the device.

Note: When a Dominion PX device powers up, it proceeds with the power-on self test and software loading for a few moments. At this time, the outlet LEDs cycle through different colors. When the software has completed loading, the outlet LEDs show a steady color and the LED display illuminates.

Connection Ports

The three ports, from left to right, are labeled as Serial (RJ-45), Feature (RJ-12), and LAN (Ethernet, RJ-45). The table below explains what each port is used for.

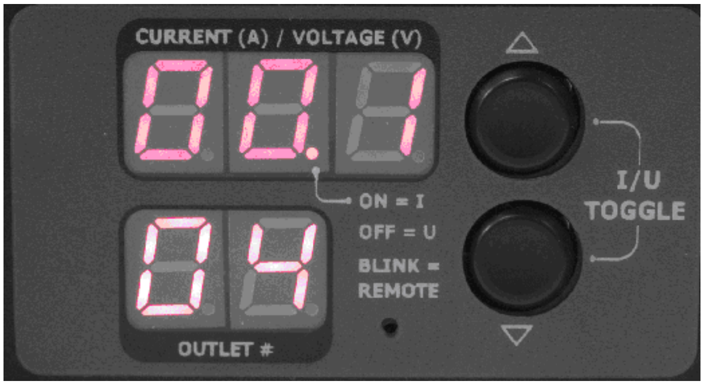
Port	Used for...
Serial	Establishing a serial connection between a computer and the Dominion PX device: Take the null-modem cable that was shipped with the Dominion PX device, connect the end with the RJ-45 connector to the RS-232 serial port on the front of the Dominion PX device, and connect the end with the DB9F connector to

Port	Used for...
	the serial (COM) port on the computer. The serial port is also used to interface with some Raritan access products (such as the Dominion KX) through the use of a power CIM.
Feature	Connection to Raritan's environmental sensors.
LAN	Connecting the Dominion PX device to your company's network: Connect a standard Cat5e/6 UTP cable to this port and connect the other end to your network. This connection is necessary to administer the Dominion PX remotely using the web interface. There are two small LEDs adjacent to the port: ▪ Green indicates a physical link and activity. ▪ Yellow indicates communications at 10/100 BaseT speeds.

Note: Connecting any power CIM except for the D2CIM-PWR (such as P2CIM-PWR) to the Dominion PX serial port causes all outlets to switch ON state, even if they were previously OFF.

LED Display

The LED display is located on the side where the outlets are available. The following picture shows the LED display.



The LED display consists of:

- A row displaying three digits
- A row displaying two digits
- Up and Down buttons

Three-Digit Row

The three-digit row shows the power readings for the selected component. Values that may appear include:

- Current, voltage, or active power of the selected outlet
- Current of the selected line or circuit breaker
- The text “FuP,” which indicates that the firmware upgrade is being performed
- The text "CbE," which indicates the circuit breaker associated with the selected outlet has been tripped

Two-Digit Row

The lower row shows the number of currently selected outlet, line or circuit breaker. Values that may appear include:

- Two-digit numbers: This indicates the selected outlet. For example, 03 indicates outlet 3.
- Cx: This indicates the selected circuit breaker, where x is the circuit breaker number. For example, C1 indicates Circuit Breaker 1.
- n: This indicates the neutral line in a three-phase Y-wired model.
- Lx: This indicates the selected line of a single-inlet PDU, where x is the line number. For example, L2 indicates Line 2.

Note: For a single-phase model, L1 current represents the Unit Current.

Automatic Mode

When left alone, the LED display cycles through the line readings and circuit breaker readings, as available for your Dominion PX model. This is the Automatic Mode.

Manual Mode

You can press the Up or Down button to enter the Manual Mode so that a particular outlet, line or circuit breaker can be selected to show specific readings.

To operate the LED display:

1. Press the Up or Down button until the desired outlet, line or circuit breaker number is selected in the two-digit row.
   - Pressing the Up button moves up one selection.
   - Pressing the Down button moves down one selection.

2. Current of the selected component is shown in the three-digit row. It appears in this format: XX.X (A).
3. If you select an outlet, you can press the Up and Down buttons simultaneously to switch between the voltage, active power and current readings.
   - The voltage appears in this format: XXX (V). It is displayed for about five seconds, after which the current reading re-appears.
   - Active power appears in this format: X.XX (W). It is displayed for about five seconds, after which the current reading re-appears.

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, active power has a decimal point between the first and second digits, and current has a decimal point between the second and third digits.

You can view current and voltage for the entire Dominion PX using the Up and Down buttons to select outlet number 00.

Note: The LED display returns to the Automatic Mode after 10 seconds elapse since the last time any button was pressed.

Reset Button

The reset button is located inside the small hole near the two-digit row.

The Dominion PX device can be reset to its factory default values using this button when a serial connection is available. See ***Resetting to Factory Defaults*** (on page 20).

Without the serial connection, pressing this reset button restarts the device.

Circuit Breaker

Dominion PX models rated over 20 Amps (North American) or 16A (international) contain branch circuit breakers with Type C Trip Characteristic. These circuit breakers automatically trip (disconnect power) when the current flowing through the circuit breaker exceeds its rating.

If the circuit breaker switches off power, the LED display shows:

- `CbE`, which means "circuit breaker error," on the three-digit row.
- The lowest outlet number affected by the circuit breaker error on the two-digit row.

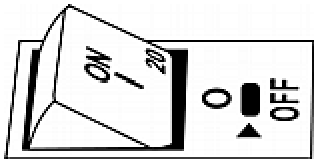
You are still able to switch between outlets on the LED display when the circuit breaker error occurs. Outlets affected by the error show `CbE`. Unaffected outlets show the current and voltage readings as described in ***LED Display*** (on page 24).

Resetting the Button-Type Circuit Breaker

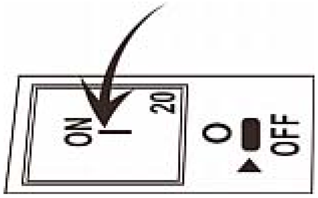
Your button-type circuit breakers may look slightly different from the images shown in this section, but the reset procedure remains the same.

▶ To reset the button-type breakers:

1. Locate the breaker whose ON button is up, indicating the breaker has tripped.



2. Examine your Dominion PX device and the connected equipment to remove or resolve the cause that results in the overload or short circuit. **This step is required, or you cannot proceed with the next step.**
3. Press the ON button until it is completely down.

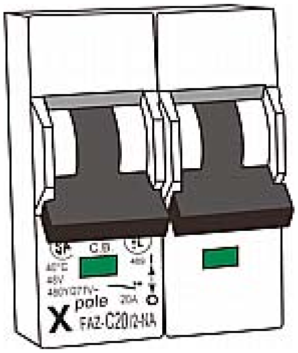


Resetting the Handle-Type Circuit Breaker

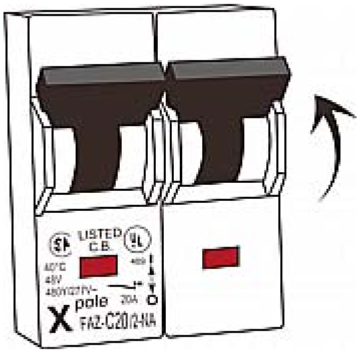
Your handle-type circuit breakers may look slightly different from the images shown in this section, but the reset procedure remains the same.

▶ To reset the handle-type breakers:

1. Lift the hinged cover over the breaker.
2. Check if the colorful rectangle or triangle below the operating handle is GREEN, indicating the breaker has tripped.



3. Examine your Dominion PX device and the connected equipment to remove or resolve the cause that results in the overload or short circuit. **This step is required, or you cannot proceed with the next step.**
4. Pull up the operating handle until the colorful rectangle or triangle becomes RED.



Beeper

The Dominion PX device includes a beeper to issue an audible alarm when a critical situation occurs.

- The beeper sounds an alarm within 3 seconds of a circuit breaker trip.

  - OR -

- The beeper sounds an alarm when the control board temperature sensor exceeds 80 degrees Celsius (or 176 degrees Fahrenheit).

The beeper stops ringing after the critical situation disappears.

- The beeper stops as soon as all circuit breakers have been reset.

  - OR -

- The beeper stops after the control board temperature sensor drops below 70 degrees Celsius (or 158 degrees Fahrenheit).

Note: The temperature thresholds are factory defaults and can be user-configurable.

Measurement Accuracy

- Voltage (per outlet): Range 0-255V, +/-5%, 3 digits, resolution 1V
- Current (per outlet): Range 0-25A, +/-5%, 3 digits, resolution 0.1A

Chapter 5 Using the Web Interface

This chapter explains how to use the web interface to administer a Dominion PX device.

In This Chapter

Logging in to the Web Interface

To log in to 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 (raritan). You are then prompted to change the password for security purposes.

After successfully logging 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 45).

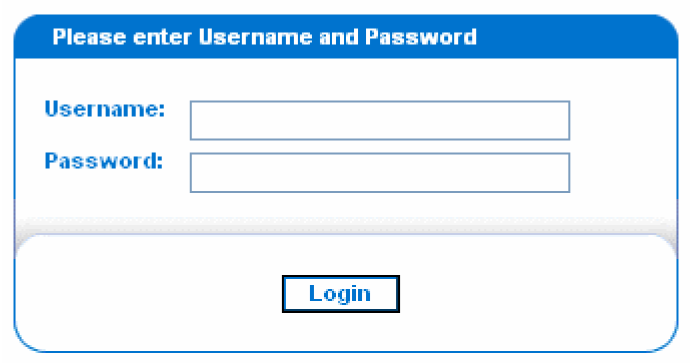
Login

▶ **To log in to the web interface:**

1. Open a browser, such as Microsoft Internet Explorer or Mozilla Firefox, and type this URL:

   http(s)://<ip address>

where *<ip address>* is the IP address of the Dominion PX device. The Login page opens..

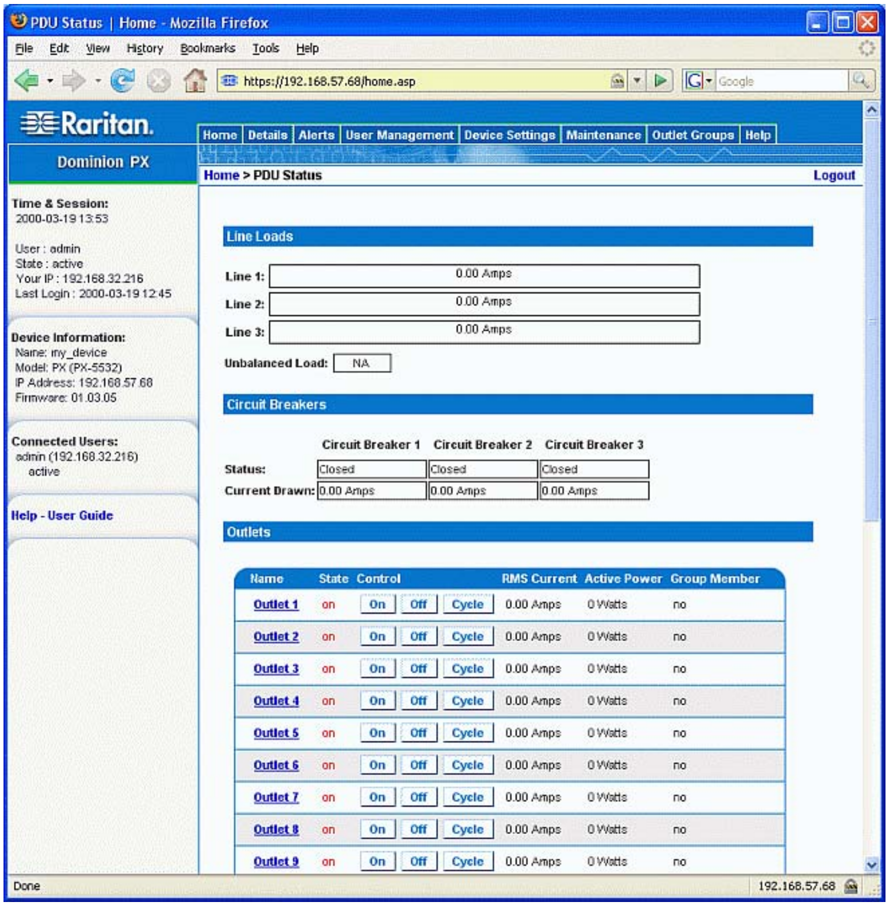


2. Type your user name and password in the Username and Password fields.

Note: Both the user name and password are case sensitive, so make sure you capitalize them correctly.

---

3. Click Login. The Home window opens.



Time & Session:
2000-03-19 13:53

User : admin
State : active
Your IP : 192.168.32.216
Last Login : 2000-03-19 12:45

Device Information:
Name: my_device
Model: PX (PX-5532)
IP Address: 192.168.57.68
Firmware: 01.03.05

Connected Users:
admin (192.168.32.216)
active

Help - User Guide

Line Loads

Line 1:	0.00 Amps
Line 2:	0.00 Amps
Line 3:	0.00 Amps
Unbalanced Load:	NA

Circuit Breakers

	Circuit Breaker 1	Circuit Breaker 2	Circuit Breaker 3
Status:	Closed	Closed	Closed
Current Drawn:	0.00 Amps	0.00 Amps	0.00 Amps

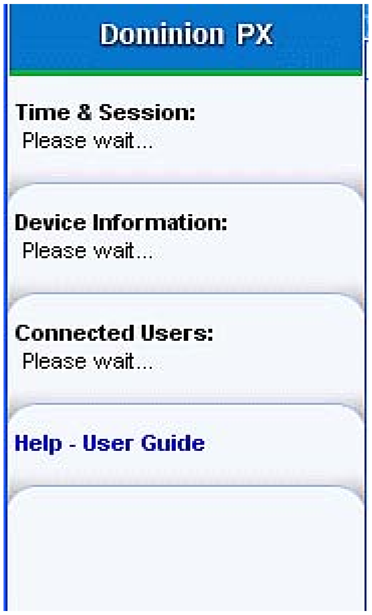
Outlets

Name	State	Control	RMS Current	Active Power	Group Member
Outlet 1	on	On Off Cycle	0.00 Amps	0 Watts	no
Outlet 2	on	On Off Cycle	0.00 Amps	0 Watts	no
Outlet 3	on	On Off Cycle	0.00 Amps	0 Watts	no
Outlet 4	on	On Off Cycle	0.00 Amps	0 Watts	no
Outlet 5	on	On Off Cycle	0.00 Amps	0 Watts	no
Outlet 6	on	On Off Cycle	0.00 Amps	0 Watts	no
Outlet 7	on	On Off Cycle	0.00 Amps	0 Watts	no
Outlet 8	on	On Off Cycle	0.00 Amps	0 Watts	no
Outlet 9	on	On Off Cycle	0.00 Amps	0 Watts	no

Note: Depending on your model type and hardware configuration, elements shown on your Home window may appear differently from this image.

The web interface allows a maximum of 16 users to log in simultaneously.

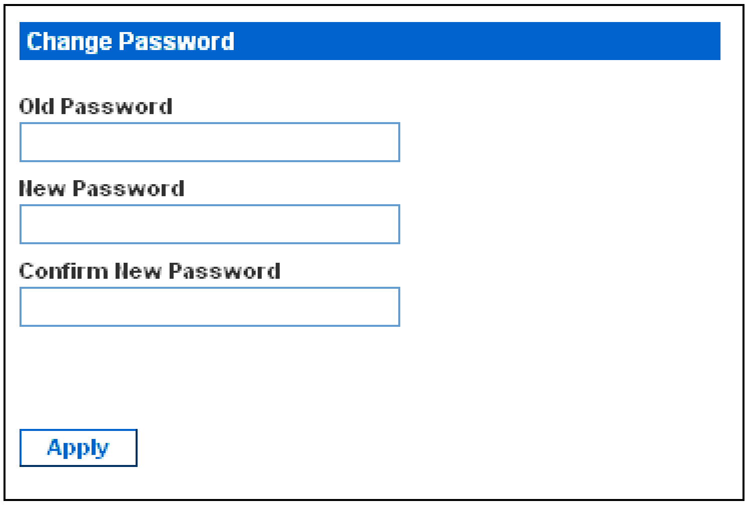
You must enable Java script in the web browser for proper operation. If Java Script is not enabled, features such as the Status Panel on the left side of the interface does not display correctly.



Changing Your Password

▶ To change your password:

1. Choose User Management > Change Password. The Change Password window opens.



2. Type your current password in the Old Password field.
3. Type your new password in the New Password and Confirm New Password fields. Passwords are case sensitive.
4. Click Apply. Your password is changed.

Web Interface Elements

Every window 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, each with their own set of menu items:

Details
Outlet Details
Line Details
CB Details
PDU 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
PDU 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
Help
About Dominion PX

▶ To select an option:

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

- Click the menu name to display a window listing each option, and then click the option you want to select.

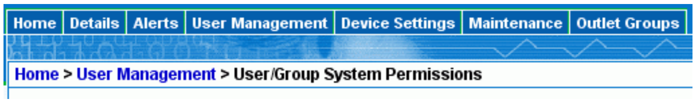
Note: The Home tab is not a menu. Clicking the Home tab takes you back to the Dominion PX home page.

- Position the cursor on the menu name. A list of options drops down from the menu. Slide the cursor 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 window, the system displays a navigation path across the top that shows the menu and option you selected to get there.

For example, if you choose User Management > User/Group System Permissions, the navigation path looks like the following example.



Home > User Management > User/Group System Permissions

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

Status Panel

The Status panel appears on the left of every window in the interface. It shows:

- Present date and time.
- Information about the user, including:

  User name

  User's present state (active, idle, and so on)

  IP address of the user's computer

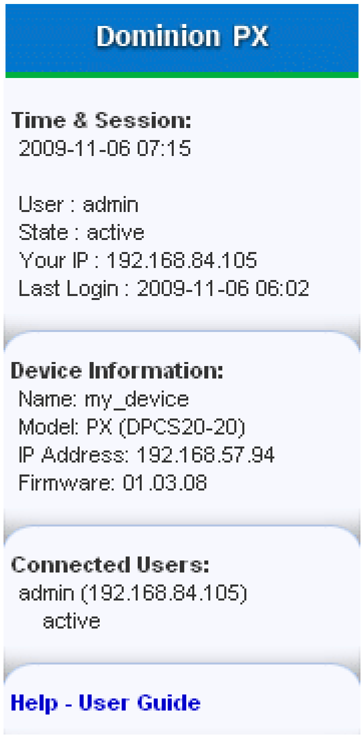
  Date and time of the user's last login
- Information about the Dominion PX device, including:

  Model name and number

  IP address

  Firmware version

- Information about all the users currently connected, including user name, IP address, and present state. Your active session is included in this list.
- A link to the User Guide on the Raritan website.



Dominion PX

Time & Session:
2009-11-06 07:15

User : admin
State : active
Your IP : 192.168.84.105
Last Login : 2009-11-06 06:02

Device Information:
Name: my_device
Model: PX (DPCS20-20)
IP Address: 192.168.57.94
Firmware: 01.03.08

Connected Users:
admin (192.168.84.105)
active

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 (by default, 15 minutes), you are logged out and re-directed to the main login window automatically.

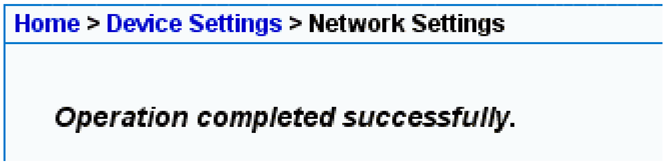
Important: Users still appear in the Connected Users list if they end their session by closing their browser window without logging off. Dominion PX removes their names when their sessions reach the idle time limit.

Status Messages

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

Successful messages

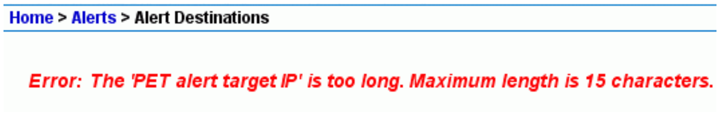
The following is an examples of a status message after an operation has completed successfully:


Home > Device Settings > Network Settings

Operation completed successfully.

Unsuccessful messages

The following is an example of a status message after an operation has completed unsuccessfully:


Home > Alerts > Alert Destinations

Error: The 'PET alert target IP' is too long. Maximum length is 15 characters.

Unavailable Options

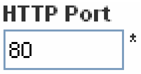
Sometimes certain actions are unavailable. When this occurs, the appropriate buttons are non-functional, though different browsers may display this differently. For example, if you select the Admin User Group in Internet Explorer, the buttons for Copy, Modify, and Delete are grayed-out since you cannot Copy, Modify, or Delete the Admin user group. In Firefox, these buttons appear normal, but are unclickable.

Reset to Defaults

Many windows 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 to save the defaults. If you do not, these fields retain the non-default values.

Default Asterisk

If a field has an asterisk after it, as shown below,



HTTP Port

80 *

then this field is currently set to its default value. If you change the default, the asterisk disappears. If you reset it to the default, the asterisk returns.

Refresh

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

Using the Home Window

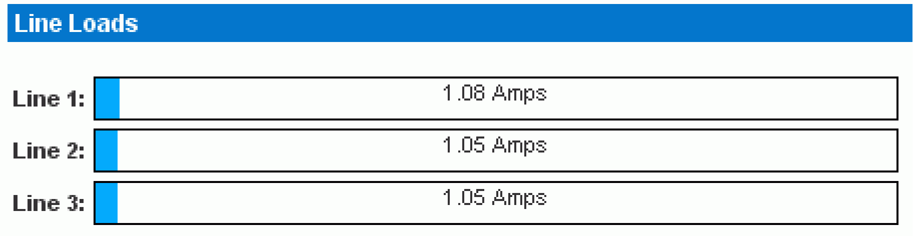
The Home window is the first window to appear after a successful login. It consists of a Lines Status Display, Circuit Breaker Status, an Outlets list, and an All Outlets Control panel. The home window also contains an environmental sensors panel when environmental sensors are connected to Dominion PX. The Home window refreshes every 30 seconds to keep the data displayed up to date.

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

- The Home tab at the top of the interface
- The Home link in the navigation path
- The Raritan logo in the upper left of the window
- The Device Model Name under the logo

Line Loads Display

The Line Loads display shows the current load on each of the Dominion PX's current-carrying lines.



Line Loads

Line 1: 1.08 Amps

Line 2: 1.05 Amps

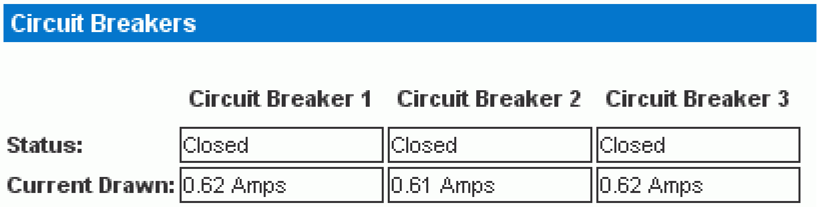
Line 3: 1.05 Amps

The status of each line is represented by a status bar. As the load on the line increases, the colored portion grows to fill the bar. A status bar that is nearly full indicates that the particular line is approaching its rated current limit. The colored portion of the bar also changes colors as the load crosses configured thresholds.

For more information on the status of each line, click the Details tab, then select Line Detail.

Circuit Breaker Status

For Dominion PX models with circuit breakers, a circuit breaker status display appears on the home page. This provides a quick view of each circuit breaker's status and the current handled by each circuit breaker.



Circuit Breakers

	Circuit Breaker 1	Circuit Breaker 2	Circuit Breaker 3
Status:	Closed	Closed	Closed
Current Drawn:	0.62 Amps	0.61 Amps	0.62 Amps

A status of Closed indicates that the circuit is closed and functioning properly. A status of Open and a change in color indicates that a circuit breaker has tripped.

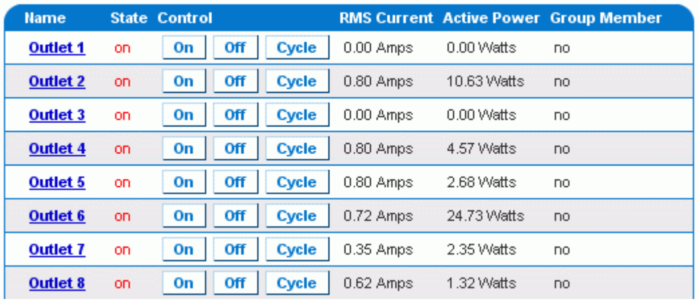
For details on each circuit breaker, click the Details tab, then select CB Detail.

Note: The most efficient use of Dominion PX occurs when current loads are balanced between all circuit breakers. Using the Outlet Mapping on the Device Details page, and the Circuit Breaker status on the Home Page, you can arrange where devices are plugged into Dominion PX in order to maintain that balance.

Note: The current drawn through a circuit breaker indicates the amount of current flowing to a bank of outlets. In three-phase Dominion PX models, this number does not match the current draw on each line since each bank of outlets is tied to two lines.

Outlets List

The Outlets List displays each outlet on the Dominion PX device as a table row with a view of the power status, the RMS current, and the RMS Power through the individual outlet.



Name	State	Control			RMS Current	Active Power	Group Member
Outlet 1	on	On	Off	Cycle	0.00 Amps	0.00 Watts	no
Outlet 2	on	On	Off	Cycle	0.80 Amps	10.63 Watts	no
Outlet 3	on	On	Off	Cycle	0.00 Amps	0.00 Watts	no
Outlet 4	on	On	Off	Cycle	0.80 Amps	4.57 Watts	no
Outlet 5	on	On	Off	Cycle	0.80 Amps	2.68 Watts	no
Outlet 6	on	On	Off	Cycle	0.72 Amps	24.73 Watts	no
Outlet 7	on	On	Off	Cycle	0.35 Amps	2.35 Watts	no
Outlet 8	on	On	Off	Cycle	0.62 Amps	1.32 Watts	no

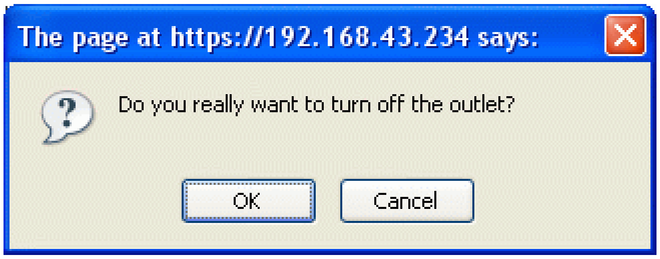
Note: RMS refers to Root Mean Square, a statistical method for measuring certain types of variables. In this context, it gives the value of current that is equivalent to a DC value.

Turning an Outlet On, Off, or Cycling the Power

▶ To turn an outlet on, off, or cycle the power

1. Click On, Off, or Cycle.
2. A dialog for confirming the operation appears. Click OK and the outlet switches ON, OFF, or cycles its power.

Tip: You can also turn an outlet on or off from the Outlet Details window.



The page at https://192.168.43.234 says:

Do you really want to turn off the outlet?

Displaying Additional Details

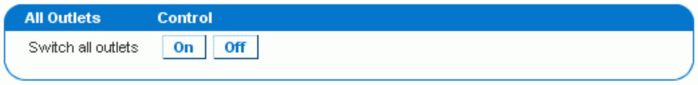
To display additional details about an outlet, click the outlet name. This displays the Outlet Details window. This window gives the name and status of the outlet, as well as:

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

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 that is equivalent to a DC value.

All Outlets Control

The All Outlets Control panel at the bottom of the Home Window 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.



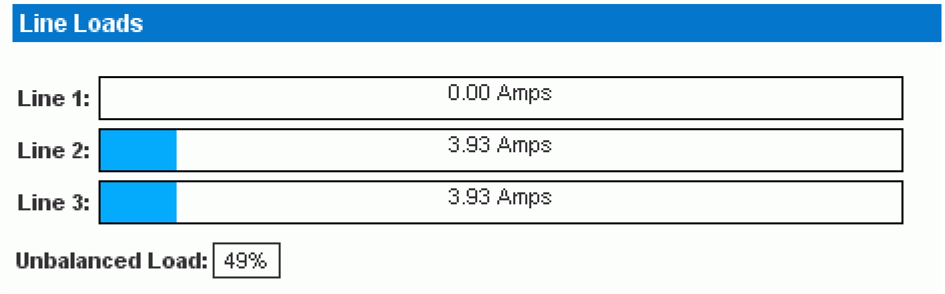
Note: Users must have permission to access all outlets in order to use All Outlets Control.

Monitoring Line and Circuit Breaker Status

Dominion PX provides details for additional information on Line and Circuit Breaker status.

Monitoring Unbalanced Loads

In a three-phase Dominion PX, a load imbalance occurs when the current on a line differs from the average current of all three lines. The largest absolute difference in current is expressed as a percentage of the average current. This value is the unbalanced load percentage.



An unbalanced load indicates that more current is being drawn from one line than it is from the others. The larger the percentage, the greater the difference. Reducing this imbalance maximizes the power available for use.

Enabling Unbalanced Load Detection displays the unbalanced loads percentage below the three individual Line graphs. This Unbalanced Load indicator is color coded:

- White indicates the imbalance is below the non-critical threshold.
- Yellow indicates the imbalance is above the non-critical threshold.
- Red indicates the imbalance is above the critical threshold.

Enabling Unbalanced Load Detection

▶ **To enable unbalanced load detection:**

1. Select Device Settings > PDU setup.
2. Select the Enable Unbalanced Load Detection checkbox.
3. Click Apply.

You can configure non-critical and critical thresholds for the percentage of imbalance. This allows you to use the Alerts and Notification system as another means to react to load imbalance events.

Configuring Unbalanced Load Thresholds

Configuring these thresholds determines when the Unbalanced Load indicator changes colors from white to yellow to red. It also configures the unbalanced load event thresholds used in Alert Notifications.

Unbalanced Load Detection must be enabled before these thresholds take effect.

▶ To configure unbalanced load thresholds:

1. Select Device Settings > PDU setup.
2. Set the Unbalanced Load percentage for the Upper Non-Critical threshold and the Upper Critical threshold.

   Warning: The difference between Critical and Non-Critical threshold values must be at least 2 percent, and both threshold values cannot exceed 100, so you must type a value below 99 for the Upper Non-Critical threshold.

3. Click Apply.

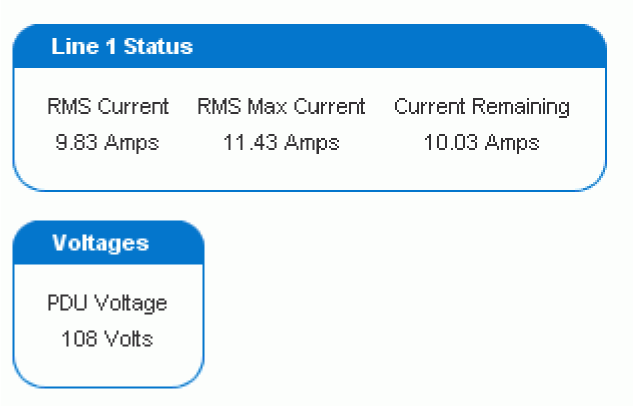
Balancing Loads

Balancing the current draw on your lines maximizes the power usage before a circuit breaker is tripped. To keep line loads as balanced as possible, move servers and other equipment from over-utilized lines to under-utilized ones.

In general this involves:

1. Checking what outlets receive power from the over-utilized line.
2. Unplugging a server from those outlets.
3. Plugging the server into an outlet receiving power from the under-utilized line.

Line Details Page



Line 1 Status

RMS Current	RMS Max Current	Current Remaining
9.83 Amps	11.43 Amps	10.03 Amps

Voltages

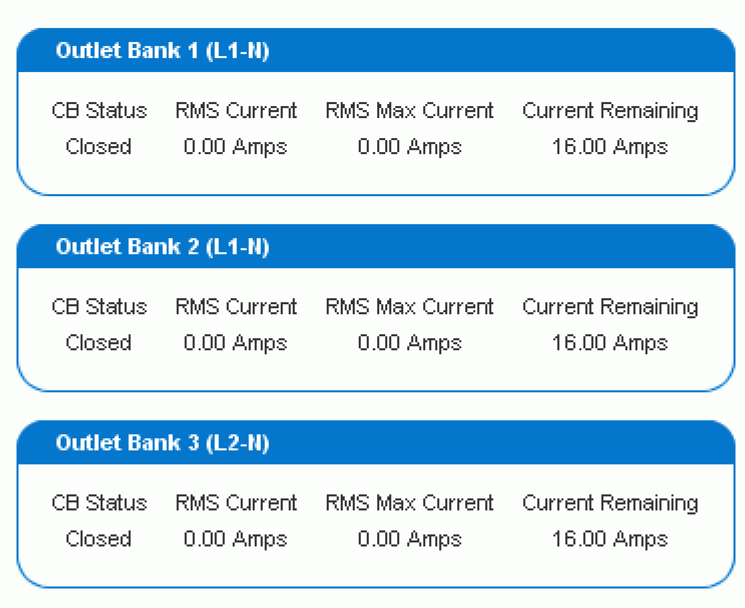
PDU Voltage
108 Volts

To open the Line Details Page, choose Details > Line Details. The page opens and displays for each line the present current draw, the largest amount of current drawn since the Dominion PX device's last boot, and the amount of available current that can be drawn.

The page also displays the amount of Voltage provided by each line.

Circuit Breaker Details Page

To view the Circuit Breaker details, click the Details tab, then select CB Details.



Outlet Bank 1 (L1-N)

CB Status	RMS Current	RMS Max Current	Current Remaining
Closed	0.00 Amps	0.00 Amps	16.00 Amps

Outlet Bank 2 (L1-N)

CB Status	RMS Current	RMS Max Current	Current Remaining
Closed	0.00 Amps	0.00 Amps	16.00 Amps

Outlet Bank 3 (L2-N)

CB Status	RMS Current	RMS Max Current	Current Remaining
Closed	0.00 Amps	0.00 Amps	16.00 Amps

Each bank of outlets governed by a circuit breaker is listed as a table, and indicates what lines they draw power from. Each table contains the status of the circuit breaker, present current draw through that bank, the largest amount of current that was drawn by that bank since the Dominion PX device last booted, and the amount of available current that the circuit breaker can handle.

Setting Up User Profiles

Dominion PX is shipped with one built-in user profile: the admin profile, which is 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.

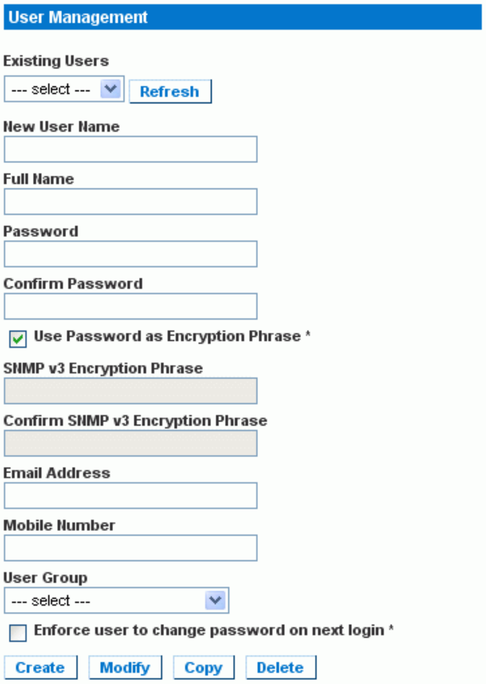
Note: By default, multiple users can log in at the same time using the login name from the same profile. You can change this so only one user at a time can use a specific login. This is done by choosing Device Settings > Security and selecting the Enable Single Login Limitation checkbox.

Creating a User Profile

Creating new users adds a new login to Dominion PX. To create a new user, you must have both the User/group Management privilege and an IPMI Privilege level of OEM.

► **To create a user profile:**

1. Choose User Management > Users & Groups. The User/Group Management window opens, divided into a User Management panel and a Group Management panel.



☑ Use Password as Encryption Phrase *

□ Enforce user to change password on next login *

Note: Before entering any information in the user profile, make sure the User Group is created and available for selection. See **Setting Up User Groups** *(on page 49).*

2. In the User Management panel, type the following information about the user in the corresponding fields:

Field	**Type this...**
New user name	The name the user enters to log in to the web interface.
Full Name	The user's first and last names.
Password, Confirm Password	The password the user enters to log in. Type it first in the Password field and then again in the Confirm Password field. ▪ The password can be 4 to 32 characters long. ▪ It is case sensitive. ▪ Spaces are not permitted.
Email address	An email address where the user can be reached.
Mobile Number	A cell phone number where the user can be reached.

Note: New user name, Password, and Confirm Password are the only required fields.

3. Select a User Group from the drop-down list in the User Group field. The User Group determines the system functions and outlets this user can access.
4. 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 blocked from accessing any system functions and outlets. See ***Setting User Permissions Individually*** (on page 48).
5. If you would like this user to set his or her own password, select the Enforce user to change password on next login checkbox. 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 choices.
6. 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 **Using SNMP** *(on page 163) for more details.*

When using SNMP v3, both the user password and the encryption phrase must be at least eight characters long.

Copying a User Profile

You can create a new user profile with the same settings as an existing profile 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. Choose User Management > Users & Groups. The User/Group Management window opens.
2. Select the existing user profile from the Existing Users drop-down 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 seen by clicking the drop-down list in the Existing Users field.

Modifying a User Profile

Users with User/Group Management permissions can modify user profiles. See ***Setting the System Permissions*** (see "Setting System Permissions" on page 50) for details on setting user permissions.

► **To modify a user profile:**

1. Choose User Management > Users & Groups. The User/Group Management window opens.

2. Select the user profile you want to modify from the Existing Users drop-down list. All 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.

Note: The name displayed in the "User (not in a group)" list on the User/Goup System Permissions window remains unchanged even though the user name has been modified on the User/Group Management window. To make the user name assigned to the "None" User Group consistent on both windows, either leave the user name unchanged, or delete the user profile and then re-create it with a new name.

Deleting a User Profile

▶ **To delete a user profile:**

1. Choose User Management > Users & Groups. The User/Group Management window opens.
2. Select the user profile you want to delete from the Existing Users drop-down 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 blocked from all system functions and outlets.

System Permissions

▶ **To set the system permissions:**

1. Choose User Management > User/Group System Permissions. The User/Group System Permissions window opens. See ***Setting System Permissions*** (on page 50).
2. Select the user from the User (not in group) drop-down list. The drop-down list shows all user profiles that have NOT been assigned to a User Group.
3. Set the permissions as necessary. Click on the drop-down list to select a permission level for each permission listed.
4. When you are finished, click Apply. The permissions are applied to the user.

Outlet Permissions

▶ **To set the outlet permissions:**

1. Choose User Management > User/Group Outlet Permissions. The User/Group Outlet Permissions window opens. See ***Setting Outlet Permissions*** (on page 52).
2. Select the user from the User drop-down list.
3. Set the permissions as necessary. Click on the drop-down list to select a permission level for each outlet.
4. When you are finished, click Apply. The permissions are applied to the user.

Note: A minimum IPMI privilege level "user" is required to switch outlets over IPMI, which causes no effect on web front-end use. However, privilege level has no affect on outlet permissions.

Setting Up User Groups

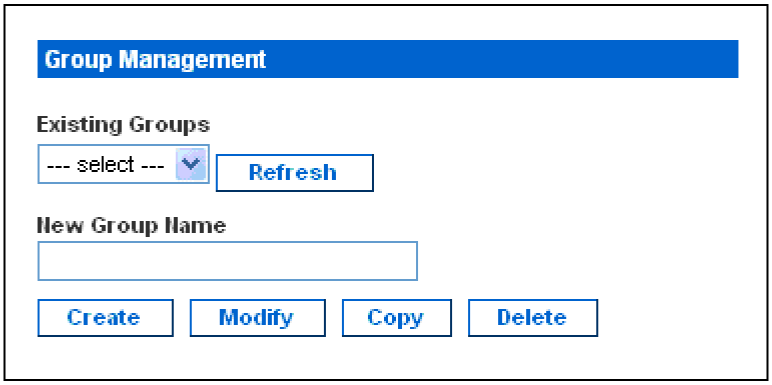
Dominion PX is shipped with one User Group built in: the Admin User Group. This User Group provides full system and outlet permissions. It can be neither modified nor deleted.

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 has 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. Choose User Management > Users & Groups. The User/Group Management window opens. This window is divided into a User Management panel and a Group Management panel.



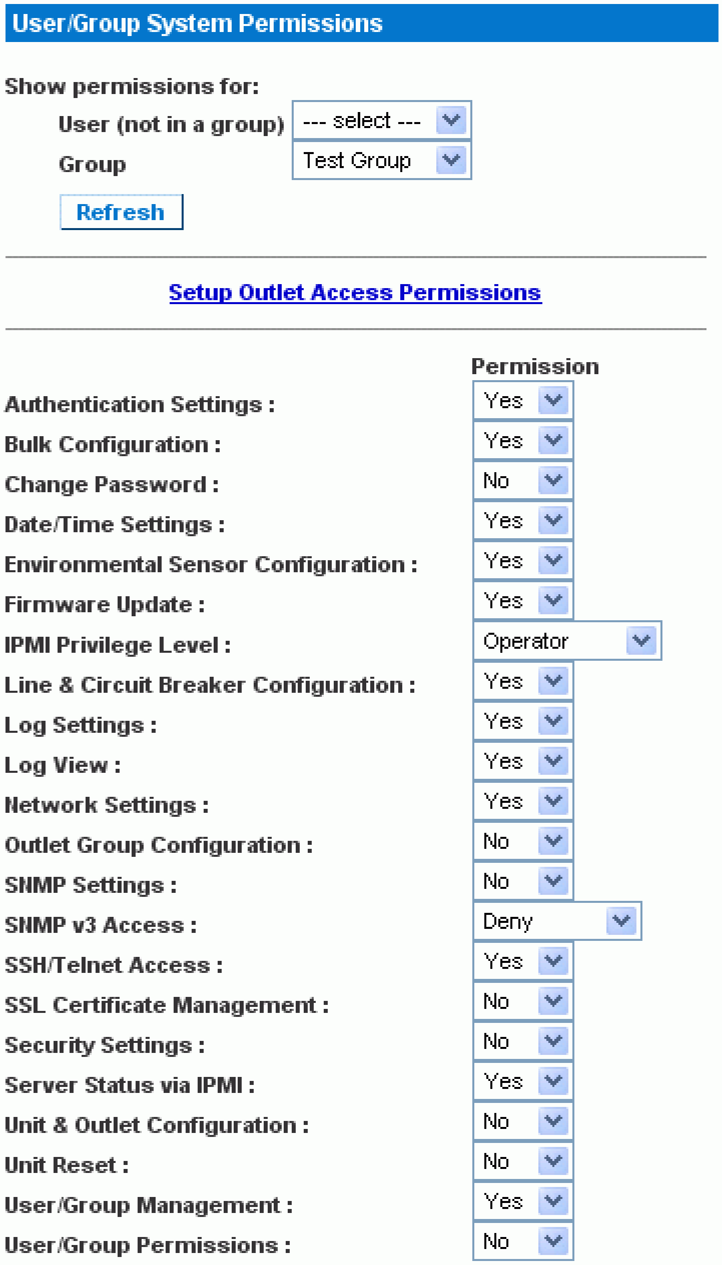
2. In the Group Management panel, type the name of the group in the New Group Name field.
3. Click Create. The User Group is created.

Setting System Permissions

System permissions include all 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. Choose User Management > Users/Group System Permissions. The User/Group System Permissions window opens.



User/Group System Permissions

Show permissions for:

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

Group: Test Group

Setup Outlet Access Permissions

	Permission
Authentication Settings :	Yes
Bulk Configuration :	Yes
Change Password :	No
Date/Time Settings :	Yes
Environmental Sensor Configuration :	Yes
Firmware Update :	Yes
IPMI Privilege Level :	Operator
Line & Circuit Breaker Configuration :	Yes
Log Settings :	Yes
Log View :	Yes
Network Settings :	Yes
Outlet Group Configuration :	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 & Outlet Configuration :	No
Unit Reset :	No
User/Group Management :	Yes
User/Group Permissions :	No

2. Select the User Group from the Group drop-down list. The permissions that apply to this group appear. 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 on the drop-down list to select a permission level for each permission listed.
4. When you are finished, click Apply. The permissions are applied to the User Group.

Note: The "User (not in group)" field on this window is used to set individual user permissions. If you are setting group permissions, you may ignore this field.

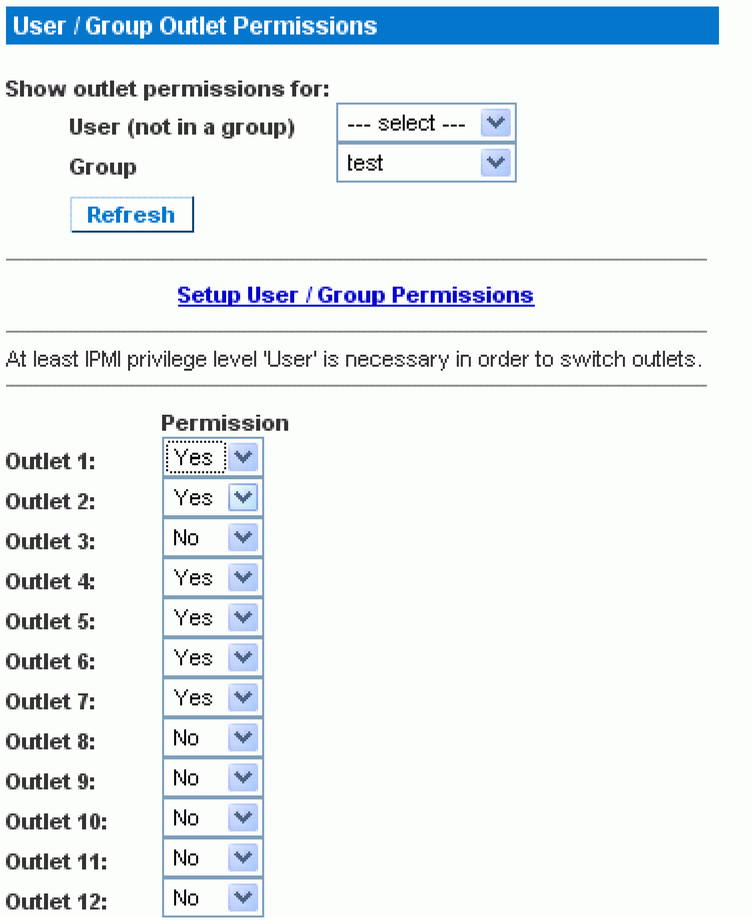
Some permissions must be enabled with other permission for the effects to apply. Check the individual task descriptions in this guide for details.

Setting Outlet Permissions

Setting outlet permissions allows you to specify which outlets the 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. Choose User Management > Users/Group Outlet Permissions. The User/Group Outlet Permissions window opens.



User / Group Outlet Permissions

Show outlet permissions for:

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

Group: test

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

	Permission
Outlet 1:	Yes
Outlet 2:	Yes
Outlet 3:	No
Outlet 4:	Yes
Outlet 5:	Yes
Outlet 6:	Yes
Outlet 7:	Yes
Outlet 8:	No
Outlet 9:	No
Outlet 10:	No
Outlet 11:	No
Outlet 12:	No

2. Select the User Group from the Group drop-down list. The permissions that apply to this group appear. 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 on the drop-down list to select a permission level for each outlet.
4. When you are finished, click Apply. The permissions are applied to the User Group.

Note: The User field on this window 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 same permissions as an existing User Group 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. Choose User Management > Users & Groups. The User/Group Management window opens.
2. Select the existing User Group from the Existing Groups drop-down 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 seen by clicking the drop-down list in the Existing Groups field.

Modifying a User Group

The only attribute of a User Group that can be modified is the group name.

▶ To modify a User Group name:

1. Choose User Management > Users & Groups. The User/Group Management window opens.
2. Select the User Group you want to modify from the Existing Groups drop-down list. The name appears 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. Choose User Management > Users & Groups. The User/Group Management window opens.
2. Select the User Group you want to delete from the Existing Groups drop-down list.
3. Click Delete. The User Group is deleted.

Access Security Control

Dominion PX provides tools to control access. You can require HTTPS encryption, enable the internal firewall and create firewall rules, and create login limitations.

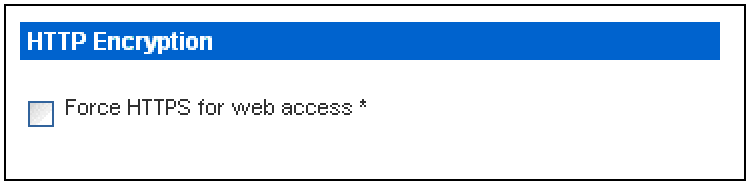
Forcing HTTPS Encryption

HTTPS uses Secure Sockets Layer (SSL) technology to encrypt all traffic to and from the Dominion PX so it is a more secure protocol than HTTP.

You can force users to access the Dominion PX web interface through the HTTPS protocol only.

To force HTTPS access to the Dominion PX web interface:

1. Choose Device Settings > Security. The Security Settings window opens. The panel at the upper left is labeled HTTP Encryption.



HTTP Encryption

□ Force HTTPS for web access *

2. Select the Force HTTPS for web access checkbox.
3. Click Apply. HTTPS is now required for browser access.

Attempts using HTTP are redirected back to HTTPS automatically after the "Force HTTPS for web access" checkbox is selected.

Configuring the Firewall

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

▶ To configure the firewall:

1. Enable the firewall.
2. Set the default policy.
3. Create rules specifying which addresses to accept and which ones to drop.

Changes made to firewall rules take effect immediately. Any unauthorized IP activities cease instantly.

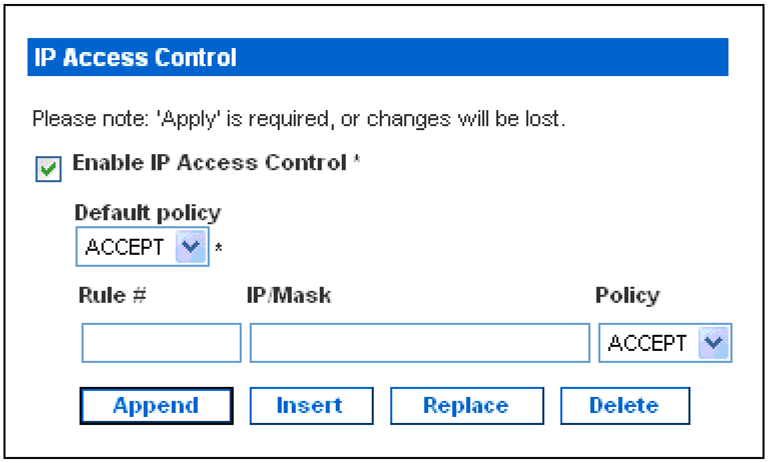
Note: The purpose of disabling the firewall by default is to prevent users from accidentally locking themselves out of the device. See **Installation and Configuration** *(on page 14).*

Enabling the Firewall

The firewall rules, if any, take effect only after the IP firewall is enabled.

▶ To enable the Dominion PX firewall:

1. Choose Device Settings > Security. The Security Settings window opens. Locate the panel labeled IP Access Control.



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

2. Select the Enable IP Access Control checkbox. This enables the firewall.
3. Click Apply. The firewall is enabled.

Changing the Default Policy

After enabling the firewall, the default policy is to accept traffic from all IP addresses. This means only IP addresses dropped by a specific rule will NOT be permitted to access the Dominion PX.

You can change the default policy to DROP, in which case traffic from all IP addresses is dropped except the IP addresses accepted by a specific rule.

▶ **To change the default policy:**

1. Choose Device Settings > Security. The Security Settings window opens. The panel at the upper right is labeled IP Access Control.
2. Make sure the Enable IP Access Control checkbox is selected.
3. The default policy is shown in the Default Policy field. 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 determine whether to accept or drop traffic intended for Dominion PX, based on the IP address of the host sending the traffic. When creating firewall rules, keep these principles in mind:

- **Rule order is important.**

  When traffic reaches the Dominion PX device, the rules are executed in numerical order. Only the first rule that matches the IP address determines whether the traffic is accepted or dropped. Any subsequent rules matching the IP address are ignored by Dominion PX.

- **Subnet mask is required.**

  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.

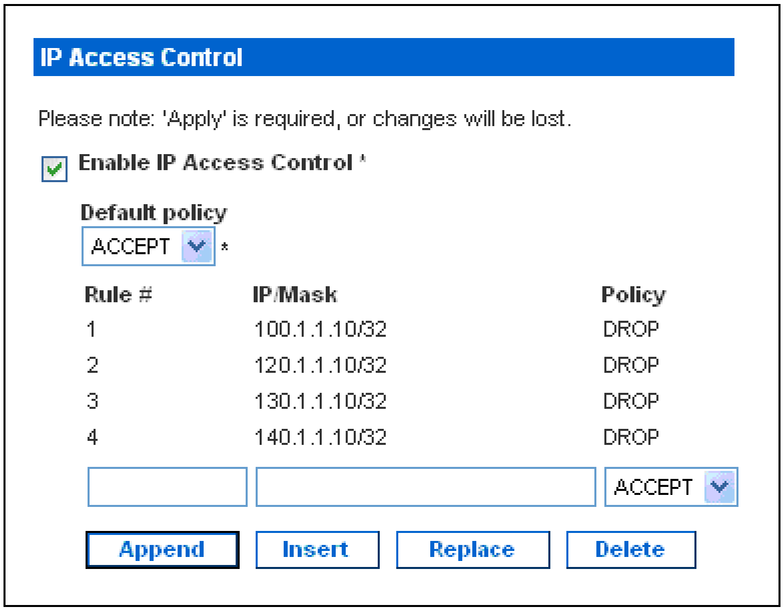
  Note: Valid IP addresses range from 0.0.0.0 through 255.255.255.255. Make sure any IP addresses you entered are within the scope.

To create firewall rules:

1. Choose Device Settings > Security. The Security Settings window opens. The panel at the upper right is labeled IP Access Control.
2. Make sure the Enable IP Access Control checkbox is selected.
3. Create specific rules. The following explains how to:

Action	Do this...
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 from the drop-down list 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 rules #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 finished, the rules appear in the IP Access Control panel.



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

5. Click Apply. The rules are applied.

Deleting Firewall Rules

Remove obsolete or unneeded firewall rules from the rules list when necessary.

To delete a firewall rule:

1. Choose Device Settings > Security. The Security Settings window opens.
2. Make sure the Enable IP Access Control checkbox 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. 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:

1. Enable the feature.

2. Set the default action.
3. Create rules that accept or drop traffic sending from specific addresses when they are associated with a specific User Group.

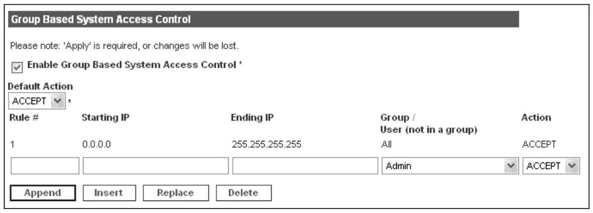
Changes made do not affect users currently logged in until the next login.

Enabling the Feature

You must enable this access control feature before any relevant rule can take effect.

▶ To enable group based access control rules:

1. Choose Device Settings > Security. The Security Settings window opens. Go to the panel labeled Group based System Access Control.



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

2. Select the Enable Group based System Access Control checkbox. 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 window.

▶ To change the default action:

1. Choose Device Settings > Security. The Security Settings window opens. Go to the panel labeled Group based System Access Control.
2. Make sure the Enable Group based System Access Control checkbox is selected.
3. Select the action you want from the Default Action drop-down list.
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 Dominion PX device, 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. Choose Device Settings > Security. The Security Settings window opens. Go to the panel labeled Group based System Access Control.
2. Make sure the Enable Group based System Access Control checkbox is selected.
3. Create or delete specific rules:

Action	Do this...
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 *5*. ▪ 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

Action	Do this...
	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 Group Based Access Control Rules

When any access control rule becomes unnecessary or obsolete, you should remove it.

To delete a group based access control rule:

1. Choose Device Settings > Security. The Security Settings window opens.
2. Make sure the Enable Group based System Access Control checkbox 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

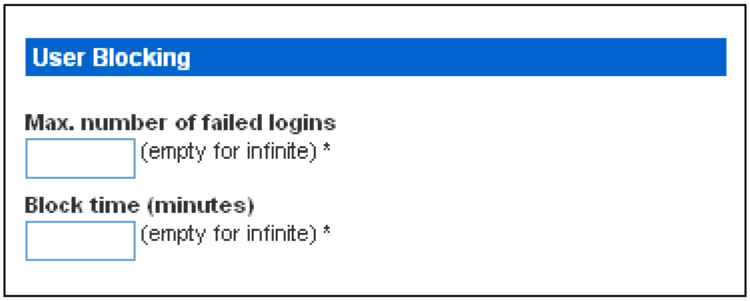
You can set up login controls to make it more difficult for hackers to access Dominion PX and the devices connected to it. You can arrange to lock persons out after a specified number of failed logins, limit the number of persons who can log in at the same time using the same login, and force users to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

Enabling User Blocking

User blocking determines how many times a user can attempt to log in to Dominion PX and fail authentication before the user's login is blocked.

To enable user blocking:

1. Choose Device Settings > Security. The Security Settings window opens. Go to the User Blocking panel.



User Blocking

Max. number of failed logins

(empty for infinite) *

Block time (minutes)

(empty for infinite) *

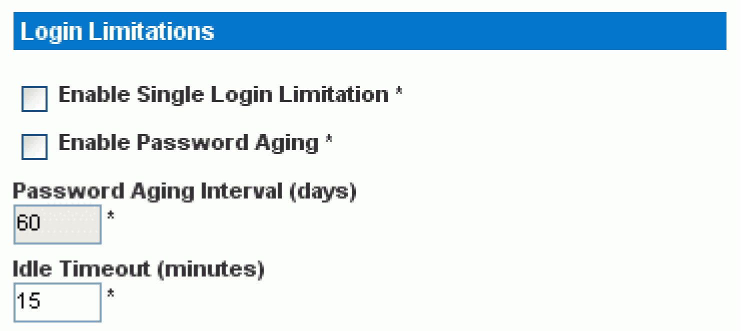
2. Type a number in the "Max. number of failed logins" field. This is the maximum number of failed logins the user is permitted before the user's login is blocked from accessing the Dominion PX device. If no number is entered, there is no limit on failed logins.
3. Type a number in the "Block time" field. 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 determine whether more than one person can use the same login name at the same time, and whether users are required to change passwords at regular intervals.

To enable login limitations:

1. Choose Device Settings > Security. The Security Settings window opens. Go to the Login Limitations panel.



□ Enable Single Login Limitation *

□ Enable Password Aging *

Password Aging Interval (days)
60 *

Idle Timeout (minutes)
15 *

2. To prevent more than one person from using the same login at the same time, select the Enable Single Login Limitation checkbox.
3. To force users to change their passwords regularly, select the Enable Password Aging checkbox, and then enter a number of days in the Password Aging Interval field. Users are required to change their password every time that number of days has passed.
4. To adjust how long users can remain idle before they are forcibly logged out by Dominion PX, enter a time in minutes in the Idle Timeout field. The default value is 15 minutes.
5. Click Apply. The controls are applied.

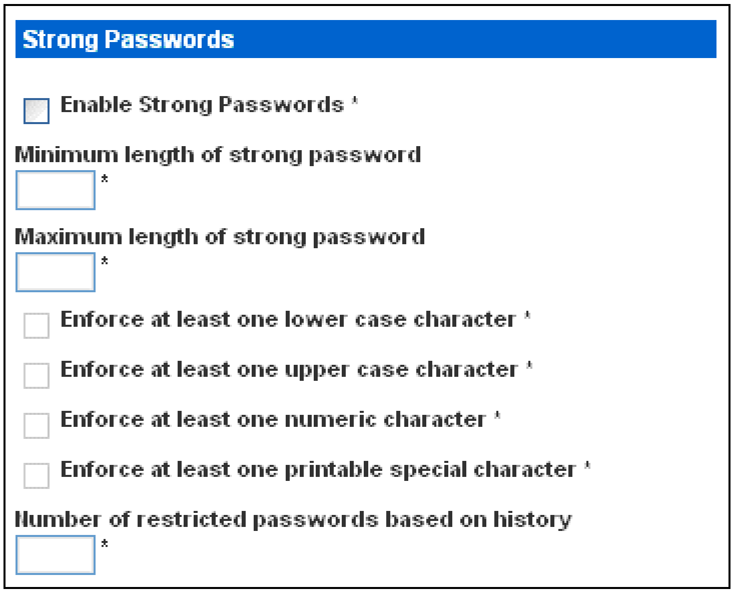
Tip: Keep the idle timeout to 15 minutes or less if possible. This reduces the number of idle sessions connected, and the number of simultaneous commands sent to Dominion PX.

Enabling Strong Passwords

Use of strong passwords makes it more difficult for intruders to crack user passwords and access the Dominion PX device. By default, strong passwords should be at least eight characters long and contain upper- and lower-case letters, numbers, and special characters, such as @ or &.

▸ To force users to create strong passwords:

1. Choose Device Settings > Security. The Security Settings window opens. The Strong Passwords panel appears at the bottom of the window.



Strong Passwords

□ Enable Strong Passwords *

Minimum length of strong password
*

Maximum length of strong password
*

□ 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
*

2. Select the Enable Strong Passwords checkbox to activate the strong password feature. The following are the default settings:

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

Note: The maximum password length accepted by Dominion PX is 32 characters.

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

Having an X.509 digital certificate ensures that both parties in an SSL connection are who they say they are. To obtain an SSL certificate for Dominion PX, create a Certificate Signing Request (CSR) and submit it to a certificate authority (CA).

After the CA processes the information in the CSR, it provides you with a certificate, which you must install on the Dominion PX device.

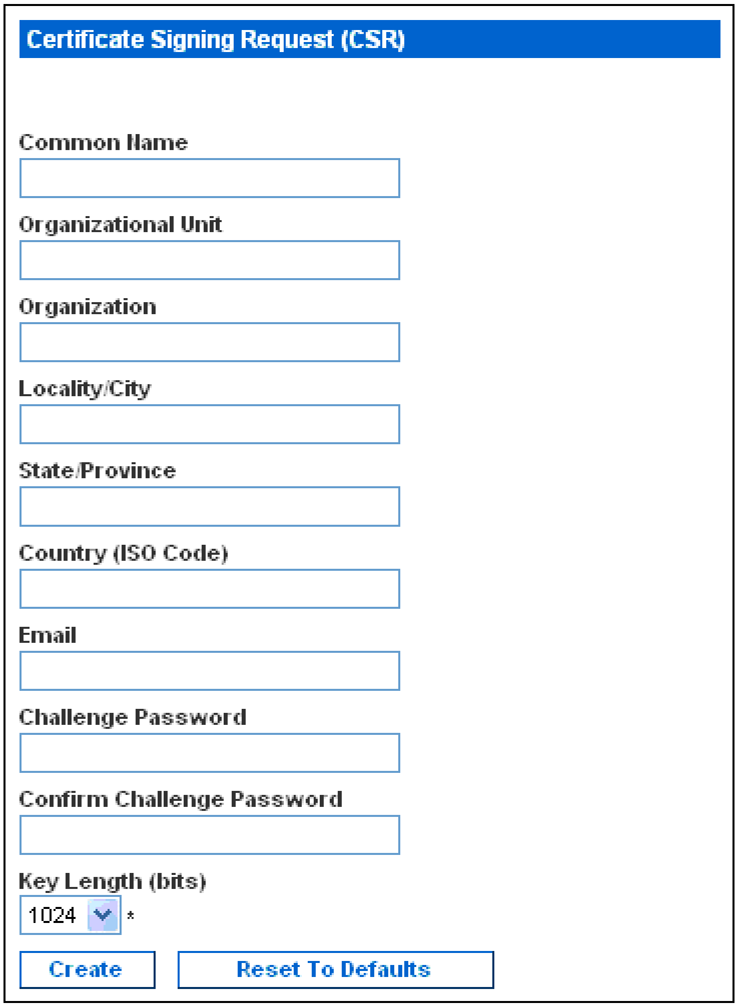
Note: See **Forcing HTTPS Encryption** *(on page 54) for instructions on forcing users to employ SSL when connecting to Dominion PX.*

Creating a Certificate Signing Request

Follow this procedure to create the CSR for your Dominion PX device.

▶ **To create a CSR:**

1. Choose Device Setting > Certificate. The first page of the SSL Server Certificate Management window appears.



Certificate Signing Request (CSR)

Common Name

Organizational Unit

Organization

Locality/City

State/Province

Country (ISO Code)

Email

Challenge Password

Confirm Challenge Password

Key Length (bits): 1024 *

2. Provide the information requested.

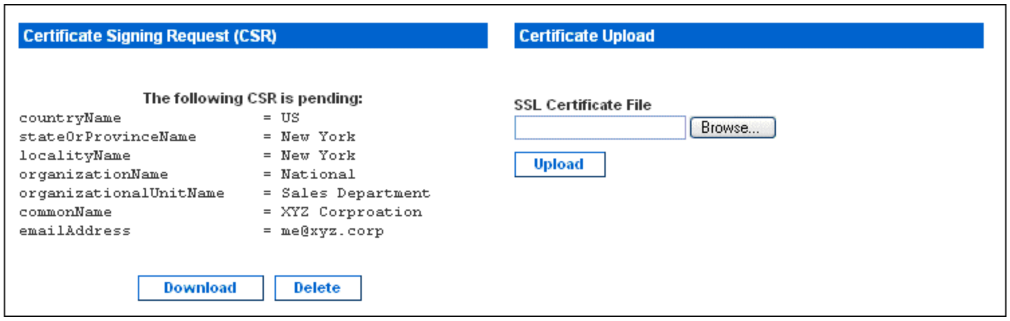
Field	Type this...
Common name	The fully qualified domain name (FQDN) of your Dominion PX device.
Organizational unit	The name of your department.
Organization	The registered name of your company.

Field	Type this...
Locality/City	The city where your company is located.
State/Province	The full name of the state or province where your company is located.
Country (ISO code)	The country where your company is located. Use the standard ISO country code. For a list of ISO codes, visit the ***ISO website*** (http://www.iso.org/iso/country_codes/iso_3166_code_lists.htm).
Email	An email address where you or another administrative user can be reached.
Challenge Password Confirm Challenge Password	The password used to protect the private key. Type it first in the Challenge Password field and then again in the Confirm Challenge password field. The password is case sensitive, so ensure you capitalize the letters correctly.

Note: All fields are mandatory, including the Organizational Unit, Locality/City and State/Province fields. If you generate a CSR without values in the required fields, you cannot obtain third party certificates.

3. Select the key length (bits) from the drop-down list in this field. 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 window opens. This window shows the information you entered when creating the CSR.



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
```

5. To download the newly-created CSR to your computer, click Download. You are prompted to open or save the file, named csr.txt.

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

Installing a Certificate

After the CA provides a signed certificate according to the CSR you submitted, you must install it on the Dominion PX device.

▶ **To install the certificate:**

1. Choose Device Settings > Certificate. The second page of the Server Certificate Management window opens.
2. Type the path and name of the certificate file in the SSL Certificate File field, or click Browse and select the file.
3. Click Upload. The certificate is installed on the Dominion PX device.

Setting Up External User Authentication

For security purposes, users attempting to log in to Dominion PX must be authenticated. Dominion PX supports the access using one of these authentication mechanisms:

- Local database of user profiles in the Dominion PX device
- Lightweight Directory Access Protocol (LDAP)
- Remote Access Dial-In User Service (RADIUS) protocol

By default, Dominion PX is configured for local authentication. If you stay with this method, you do not need to do anything other than create user profiles for each authorized user. If you prefer to use an external LDAP or RADIUS server, you must:

- Provide Dominion PX with the information about the server.
- Create user profiles for users who are authenticated externally because a user profile determines the User Group to which the user belongs, and determines the system and outlet permissions for the user accordingly.

When users log in with External Authentication, they cannot perform operations on Outlet Groups. Users must authenticate locally to do this.

Note: Setting the LDAP user attribute `rciusergroup` *to admin allows an Active Directory user to log in to Dominion PX with Administrator privileges. This occurs even if the user is assigned to the Unknown user group that normally has no access permissions.*

When configured for LDAP authentication, all Dominion PX users must have an account on the LDAP server. Local-authentication-only users will no longer have access to Dominion PX except for the admin, who always have access to Dominion PX.

Gathering Information for LDAP Configuration

It requires knowledge of your LDAP server and directory settings to configure Dominion PX for LDAP authentication. If you are not famillIar with the settings, consult your LDAP administrator for help.

To configure LDAP authentication, you need to check:

- The IP Address or hostname of the LDAP server
- The IP address of a backup or secondary LDAP server (optional)
- Whether the Secure LDAP protocol (LDAP over SSL) is being used

  - If Secure LDAP is in use, consult your LDAP administrator for the CA certificate file.
- The network port used by the LDAP server
- The type of LDAP server used, usually one of the following options:

  - A generic LDAP server

  - Novell Directory Service

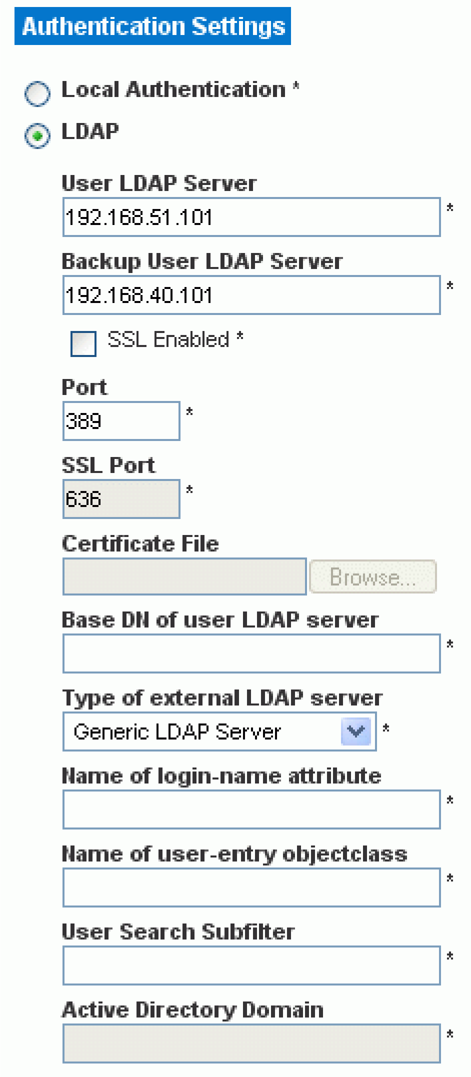
  - Microsoft Active Directory (AD)

    - If using a Microsoft Active Directory server, consult your AD administrator for the name of the Active Directory Domain.
- The Base DN of the server (used for searching for users)
- The login name attribute (or AuthorizationString)
- The user entry object class
- The user search subfilter (or BaseSearch)

Setting Up LDAP Authentication

▶ To set up LDAP authentication:

1. Choose Device Settings > Authentication. The AuthenSettings window opens. The LDAP parameters appear on the left side of the window.



Authentication Settings

○ Local Authentication *

● LDAP

User LDAP Server: 192.168.51.101 *

Backup User LDAP Server: 192.168.40.101 *

□ SSL Enabled *

Port: 389 *

SSL Port: 636 *

Certificate File: [Browse...]

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: *

2. Select the LDAP radio button to enable the LDAP section of the page.
3. User LDAP Server - Type the IP address or DNS name of your LDAP/LDAPS remote authentication server (up to 37 characters). When the Enable Secure LDAP option is selected, the DNS name must be used.

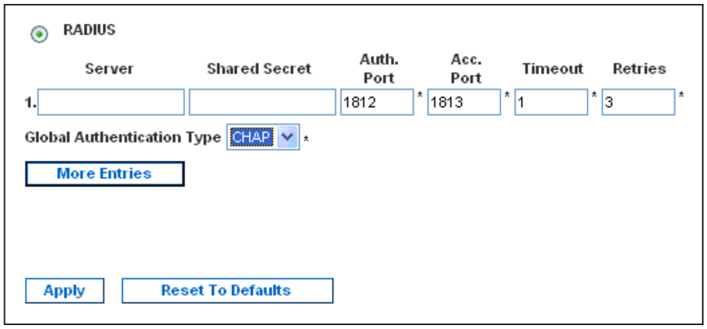
4. Backup User LDAP Server - Type the IP address or DNS name of your backup LDAP/LDAPS server (up to 37 characters). When the Enable Secure LDAP option is selected, the DNS name must be used. Note that the remaining fields share the same settings with the Primary LDAP Server field. **Optional**
5. SSL Enabled - Select this checkbox if you would like to use SSL. Secure Sockets Layer (SSL) is a cryptographic protocol that allows Dominion PX to communicate securely with the LDAP/LDAPS server.
6. Port - The default Port is 389. Either use the standard LDAP TCP port or specify another port.
7. SSL Port - The default is 636. Either use the default port or specify another port. This field is enabled when the Enable Secure LDAP checkbox is selected.
8. Certificate File - Consult your authentication server administrator to get the CA certificate file in Base64 encoded X-509 format for the LDAP/LDAPS server. Use the Browse button to navigate to the certificate file. This field is enabled when the Enable Secure LDAP option is selected.
9. Base DN of user LDAP server - Enter the name you want to bind against the LDAP/LDAPS (up to 31 characters), and where in the database to begin searching for the specified Base DN. An example Base Search value might be: `cn=Users,dc=raritan,dc=com`. Consult your authentication server administrator for the appropriate values to enter into these fields.
10. Type of external LDAP/LDAPS server. Choose from among the options available:
    - Generic LDAP Server.
    - Novell Directory
    - Microsoft Active Directory. Active Directory is an implementation of LDAP/LDAPS directory services by Microsoft for use in Windows environments.
11. Type the following information in the corresponding fields. LDAP needs this information to verify user names and passwords.
    - Login name attribute (also called AuthorizationString)
    - User entry object class
    - User search subfilter (also called BaseSearch)
12. Active Directory Domain - Type the name of the Active Directory Domain. For example, testradius.com. Consult with your Active Directive Administrator for a specific domain name.
13. Click Apply**.** LDAP authentication is now in place.

Note: If the Dominion PX clock and the LDAP server clock are out of sync, the certificates are considered expired and users are unable to authenticate using LDAP. To ensure proper synchronization, administrators should configure Dominion PX and the LDAP server to use the same NTP server.

Setting Up RADIUS Authentication

To set up RADIUS authentication:

1. Choose Device Settings > Authentication. The Authentication Settings window opens. The RADIUS parameters appear on the right side of the window.



● RADIUS

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

Global Authentication Type: CHAP *

2. Click the RADIUS radio button.
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, Dominion PX uses the standard RADIUS port 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. Default is 1 second.
7. Type the number of retries permitted in the Retries field. Default is 3.
8. If you have additional RADIUS servers, click More Entries. Fields for four additional servers appear. Enter the same information in Steps 2-7 for each additional server.
9. Select an authentication protocol from the drop-down list in the Global Authentication Type field. Your choices include:
   - 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

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

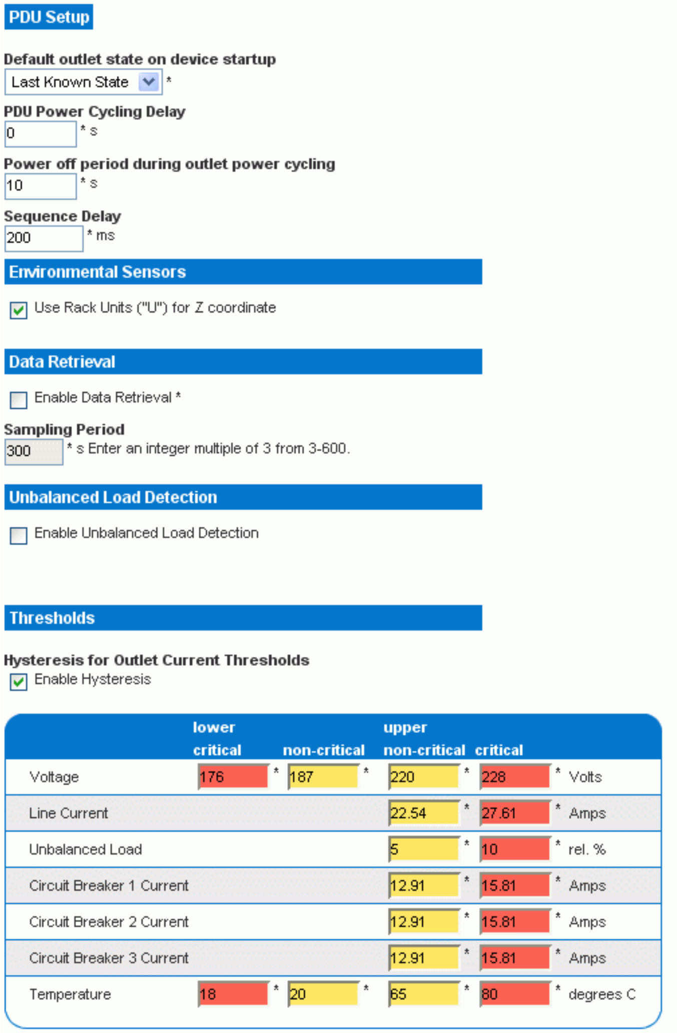
When setting the thresholds, remember that you can set up alerts that are triggered whenever any of these thresholds are crossed. See ***Configuring and Using Alert Notifications*** (on page 88).

Setting the Global Default Outlet State

Set a global default for the power state of the outlets when the Dominion PX device is powered on. Setting an individual outlet's startup state to something other than Device Default overrides this default state for that outlet. See ***Naming Outlets*** (on page 77).

▶ To set the default outlet state:

1. Choose Device Settings > PDU Setup. The PDU Setup window opens.



PDU Setup

Default outlet state on device startup
Last Known State *

PDU Power Cycling Delay
0 * s

Power off period during outlet power cycling
10 * s

Sequence Delay
200 * ms

Environmental Sensors

☑ Use Rack Units ("U") for Z coordinate

Data Retrieval

□ Enable Data Retrieval *

Sampling Period
300 * s Enter an integer multiple of 3 from 3-600.

Unbalanced Load Detection

□ Enable Unbalanced Load Detection

Thresholds

Hysteresis for Outlet Current Thresholds
☑ Enable Hysteresis

	lower critical	non-critical	upper non-critical	critical	
Voltage	176 *	187 *	220 *	228 *	Volts
Line Current			22.54 *	27.61 *	Amps
Unbalanced Load			5 *	10 *	rel. %
Circuit Breaker 1 Current			12.91 *	15.81 *	Amps
Circuit Breaker 2 Current			12.91 *	15.81 *	Amps
Circuit Breaker 3 Current			12.91 *	15.81 *	Amps
Temperature	18 *	20 *	65 *	80 *	degrees C

2. Select the default state from the "Default outlet state on device startup" drop-down list.
3. When you are finished, click Apply. The default state setting is applied.

Users require the Unit & Outlet Configuration permission to see the contents of the PDU Setup page.

Setting the Global Power Cycling Delay

▶ **To set the power cycling and sequence delay for all outlets:**

1. Choose Device Settings > PDU Setup. The PDU Setup window opens.
2. Type a number in the field labeled PDU Power Cycling Delay. When power to the Dominion PX device is cycled (either manually or because of a temporary power loss), this number determines how many seconds Dominion PX waits before it provides power to the outlets. This is useful in cases where power may not initially be stable after being restored, or when UPS batteries may be charging. The PDU Power Cycling Delay can be set from 0 to 3600 seconds (one hour).
3. Type a number in the field labeled Power off period during outlet power cycling. When the outlets on the Dominion PX device 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. The Power Off Period can be set from 0 to 3600 seconds (one hour).

   Note: The number you enter here applies to all outlets on the Dominion PX device. However, you can override this number for specific outlets (see **Setting Outlet Thresholds** *(on page 78)). You can power cycle an outlet from the Outlet Details window (see* **Power Cycling an Outlet** *(on page 80)).*

4. Type a number of seconds in the field labeled Sequence Delay in ms. The outlet sequence delay determines the time interval the Dominion PX device takes from outlet to outlet when powering ON or cycling all outlets. The default is 200 milliseconds.
5. When you are finished, click Apply.

When there are a large number of outlets, set both the Power off period and the Sequence Delays to lower numbers. This way you can avoid a long wait before all the outlets are available again. This is especially useful when dealing with outlets grouped from other Dominion PX devices.

Users require the Unit & Outlet Configuration permission to see the contents of the PDU Setup page.

Setting the Hysteresis for Outlet Thresholds

By default, Dominion PX uses a Hysteresis setting when measuring the outlet current against thresholds. See ***A Note About Untriggered Alerts*** (on page 98) to understand how this setting works.

Setting PDU Thresholds

Users require the Unit & Outlet Configuration permission to see the contents of the PDU Setup page. Both the Unit & Outlet Configuration and the Line & Circuit Configuration permissions are required to adjust thresholds on the page.

▶ To set the Dominion PX thresholds:

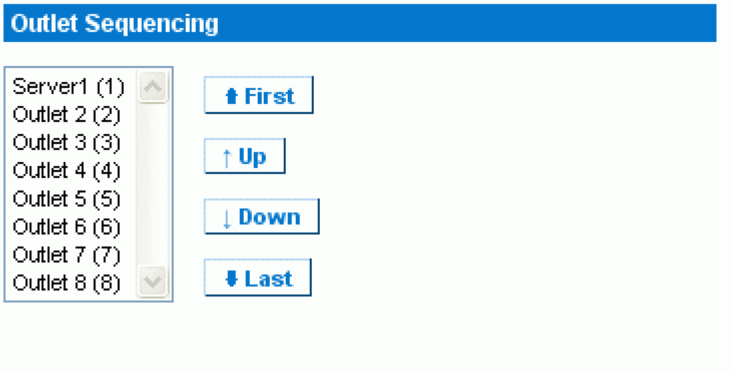
1. Choose Device Settings > PDU Setup. The PDU Setup window opens.
2. Set the voltage, current, temperature, and (if applicable) circuit breaker current thresholds for the device in the Thresholds panel. Enter critical or non-critical threshold for each setting.
3. When you are finished, click Apply.

Setting the Outlet Power-On Sequence

By default, the outlets are sequentially powered on in the ascending order from outlet 1 to the final outlet when turning ON or power cycling all outlets on the Dominion PX device. You can change the order in which the outlets power ON. This is useful when the connected IT equipment has multiple power supplies that should be powered up together.

▶ To set the outlet power-on sequence:

1. Choose Device Settings > PDU Setup. The PDU Setup window opens.



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)

2. The current outlet power-on sequence appears in the list under Outlet Sequencing. To change the priority of an outlet, select it from the list and click one of the following buttons.
   - First: Moves the outlet to the top of the list, making 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, making it the last outlet to receive power.

3. Click Apply. The new sequence is saved.

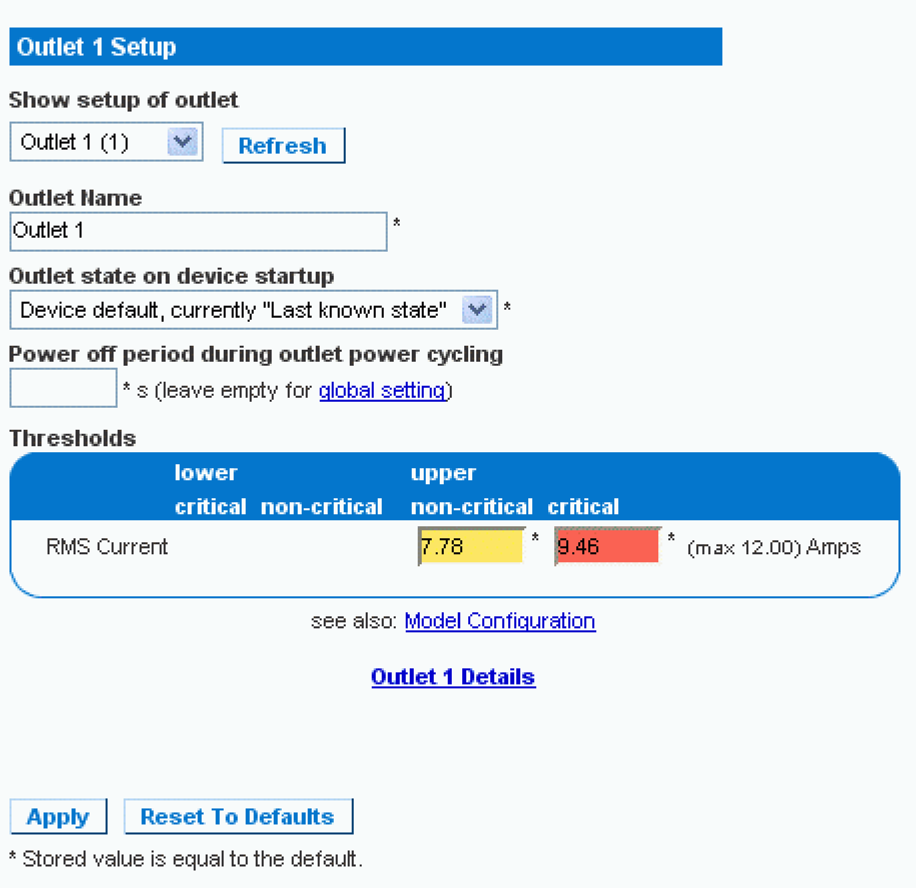
Note: If you use Outlet Grouping to group outlets together, you should adjust the Outlet Sequencing to ensure that all outlets from this Dominion PX that are part of the same group, power up consecutively.

Naming Outlets

You can give each outlet a name to help you identify the IT equipment connected to it.

To name outlets:

1. Choose Details > Outlet Setup. The Outlet Setup window opens.



Outlet 1 Setup

Show setup of outlet: Outlet 1 (1)

Outlet Name: Outlet 1 *

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			7.78 *	9.46 *	(max 12.00) Amps

* Stored value is equal to the default.

2. Select the outlet from the "Show setup of outlet" drop-down 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 drop-down list in the "Outlet state on device startup" field. This determines if the outlet is ON or OFF when the Dominion PX device powers up. If set to Device Default, the state for this outlet is determined by the Default Outlet State in the PDU Setup page.
5. Click Apply. The new name is applied.

Setting Outlet Thresholds

▶ **To set the current thresholds of an outlet:**

1. Choose Details > Outlet Setup. The Outlet Setup window opens.
2. Select an outlet from the "Show setup of outlet" drop-down list.
3. Type a number in the field labeled Power off period during outlet power cycling. 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 it is shut down during the power cycle. If left blank, this outlet uses the value set in the PDU Setup page as a default.

   Note: You can power cycle an outlet from the Outlet Details window. See **Power Cycling an Outlet** *(on page 80).*

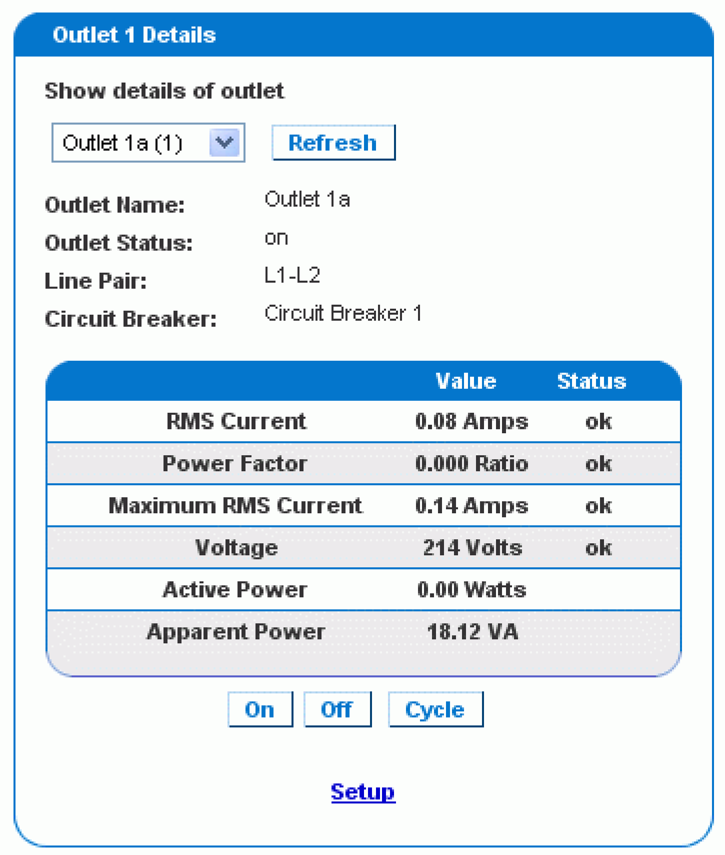
4. Set the RMS current thresholds for the outlet in the Thresholds panel. Ensure the value you enter for the upper critical threshold is NOT larger than the maximum current rating of the outlet.
5. When you are finished, click Apply. The setup details are applied.

Note: For any outlet whose current rating is 10A, the difference of default lower non-critical and lower critical thresholds is less than 1 Amp after both values are encoded and then decoded. When this occurs, change either default value to make the difference equal to or larger than 1 Amp.

Viewing Outlet Details

▶ To display details about a particular outlet:

1. Choose Details > Outlet Details. The Outlet Details window opens.



Outlet Name: Outlet 1a

Outlet Status: on

Line Pair: L1-L2

Circuit Breaker: Circuit Breaker 1

	Value	Status
RMS Current	0.08 Amps	ok
Power Factor	0.000 Ratio	ok
Maximum RMS Current	0.14 Amps	ok
Voltage	214 Volts	ok
Active Power	0.00 Watts	
Apparent Power	18.12 VA	

2. Select an outlet from the "Show details of outlet" drop-down list. The window shows these details about the outlet:
   - Outlet name
   - Outlet status
   - Line Pair (if applicable)
   - Circuit Breaker (if applicable)
   - Readings, including:

     RMS current

     Power Factor

     Maximum RMS Current

     Voltage

Active Power

Apparent Power

Active Energy (energy consumption, if applicable)

Note: To display the Outlet Setup window, click the Setup link. See **Naming Outlets** *(on page 77) for a picture of the Outlet Setup Window.*

Power Cycling an Outlet

Power Cycling an Outlet turns an outlet OFF, then ON again. This works only for outlets that are in the ON state.

▶ **To power cycle an outlet:**

1. Choose Details > Outlet Details. The Outlet Details window opens.
2. Select an outlet from the "Show details of outlet" drop-down list. The outlet must be ON.
3. Click Cycle.

Note: You can also power cycle an outlet from the Home window.

The length of time between the off and on states in a power cycle can be set on the Dominion PX device as a whole, and for individual outlets. See **Setting PDU Thresholds** *(on page 76) and* **Setting Outlet Thresholds** *(on page 78).*

Turning an Outlet On or Off

▶ **To turn an outlet on or off:**

1. Choose Details > Outlet Details. The Outlet Details window opens.
2. Select an outlet from the "Show details of outlet" drop-down 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 window.

Environmental Sensors

Dominion PX can monitor the environmental conditions where external sensors are placed, such as temperature and humidity in the surrounding environment.

▶ **To add environmental sensors:**

1. Physically connect the environmental sensors to the Dominion PX device. See ***Connecting Environmental Sensors*** (on page 81).

2. Configure the sensors in the Dominion PX web interface.

    a. Map the physical sensor to a logical sensor entry.

    b. Configure thresholds for that sensor entry.

    c. Describe the sensor's physical location in the rack or server room.

Connecting Environmental Sensors

To enable Dominion PX to measure environmental factors, connect one or multiple environmental sensors to the Dominion PX device. For connecting a number of environmental sensors, Raritan's sensor hubs are required.

▶ To directly connect an environmental sensor:

- Connect the cable of the environmental sensor to the Feature port on the Dominion PX device.

▶ To connect environmental sensors via the sensor hubs:

1. Connect a sensor hub to the Dominion PX device.

    a. Plug one end of the Raritan-provided phone cable (4-wire, 6-pin) into the IN port (Port 1) of the hub.

    b. Plug the other end into the Feature port of the Dominion PX device.

2. Connect environmental sensors to any of the four OUT ports on the hub.

3. If necessary, you can cascade sensor hubs to connect more environmental sensors.

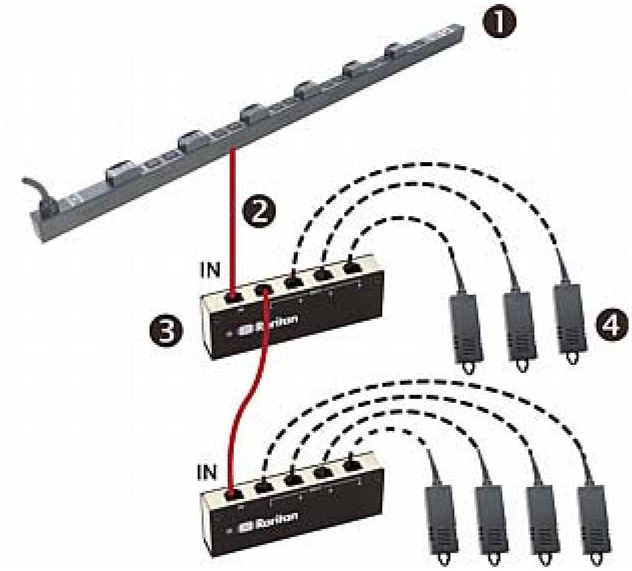
    a. Connect a second sensor hub to the first sensor hub:

        - Plug one end of the Raritan-provided phone cable to the IN port of the second sensor hub.
        - Plug the other end of the cable to one of the OUT ports of the first sensor hub.

    b. Repeat cascading sensor hubs as desired.

    c. Connect environmental sensors to any of available OUT ports on these cascaded hubs.

This diagram illustrates a configuration with cascaded sensor hubs connected.



❶	Dominion PX device
❷	Raritan-provided phone cable
❸	Sensor hub
❹	Environmental sensors

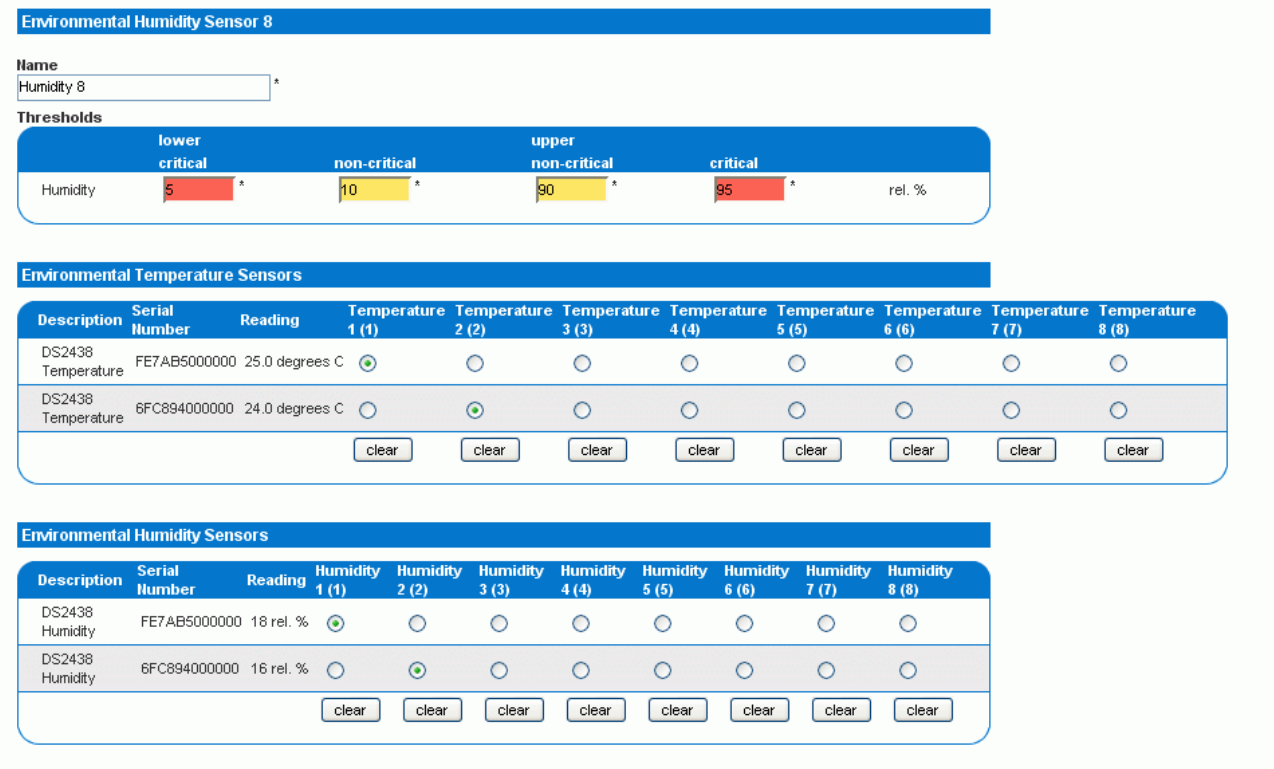
Note: The dual temperature and humidity sensors are compatible with both DPX and DPC models of Dominion PX.

Mapping Environmental Sensors

After environmental sensors are physically connected to the Dominion PX device, they must be mapped to its logical sensors before Dominion PX recognizes the readings from them.

▶ To map environmental sensors:

1. Choose Device Settings > Environmental Sensors. The Environmental Sensors window opens. The page lists the logical Temperature and Humidity sensors first.



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

2. When physical sensors are attached to Dominion PX, 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 message appears: *No sensors were detected*.

3. For each physical sensor (shown as a row) in the table, click a radio button under the logical sensor (shown as columns) you want to map it to. Dominion PX now tracks this sensor's readings and display it on the home page when configuration is finished.

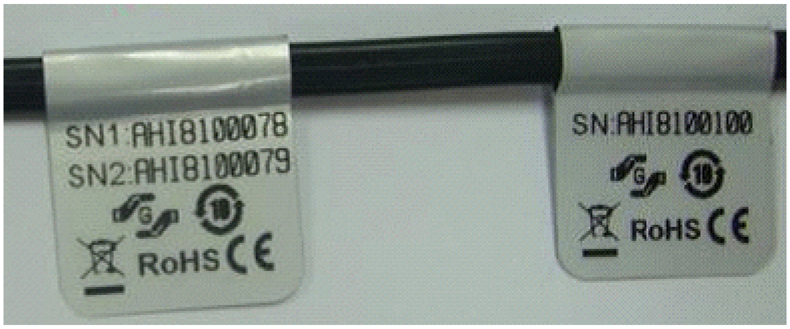
   If you do not want to track the readings of a particular sensor, leave that row blank.

4. To unmap a logical sensor from any physical sensor, click clear at the bottom of the column. That logical sensor are no longer associated with any of the physical sensors.

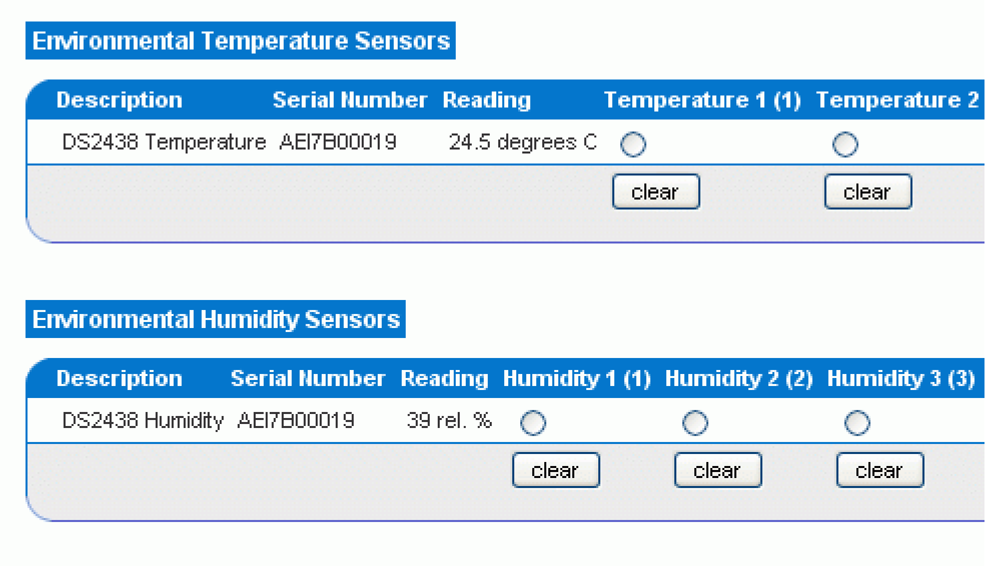
Note: It is possible (but not advisable) to map more than one logical sensor to a single physical sensor. You cannot map multiple physical sensors to a single logical one.

Identifying Environmental Sensors for Mapping

Each sensor includes a serial number tag on the sensor cable.



The serial number for each sensor also appears listed with each physical sensor detected by Dominion PX.



Environmental Temperature Sensors

Description	Serial Number	Reading	Temperature 1 (1)	Temperature 2
DS2438 Temperature	AEI7B00019	24.5 degrees C	○	○
			clear	clear

Environmental Humidity Sensors

Description	Serial Number	Reading	Humidity 1 (1)	Humidity 2 (2)	Humidity 3 (3)
DS2438 Humidity	AEI7B00019	39 rel. %	○	○	○
			clear	clear	clear

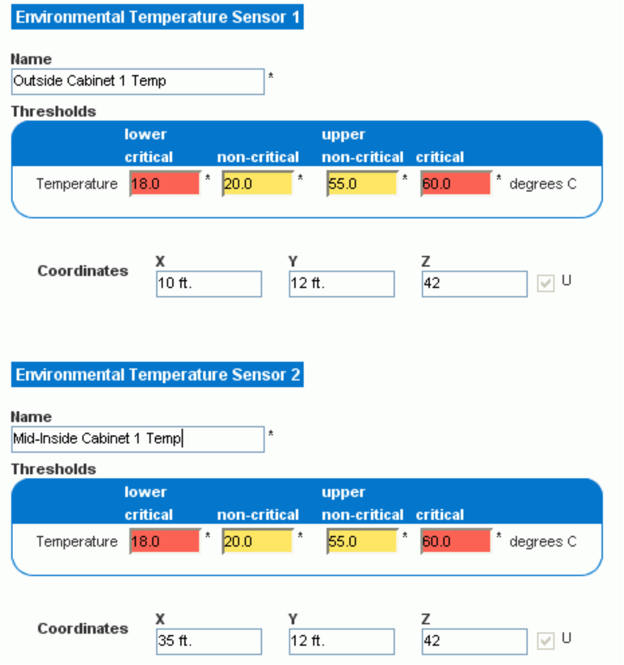
Match the serial number from the tag to the ones in the Environmental Sensor table in order to identify any different sensors, then map the physical sensor to the logical sensors and configure the thresholds appropriately.

Configuring Environmental Sensors and Thresholds

To make sensors more useful, rename the logical sensors that are in use and configure their threshold settings. Configuring thresholds for these sensors allows Dominion PX to generate an alert whenever environmental conditions detected by those sensors move outside of your ideal values.

▶ To configure environmental sensors in the web interface:

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



Environmental Temperature Sensor 1

Name

Outside Cabinet 1 Temp *

Thresholds

	lower		upper		
	critical	non-critical	non-critical	critical	
Temperature	18.0 *	20.0 *	55.0 *	60.0 *	degrees C

Coordinates	X	Y	Z	
	10 ft.	12 ft.	42	☑ U

Environmental Temperature Sensor 2

Name

Mid-Inside Cabinet 1 Temp *

Thresholds

	lower		upper		
	critical	non-critical	non-critical	critical	
Temperature	18.0 *	20.0 *	55.0 *	60.0 *	degrees C

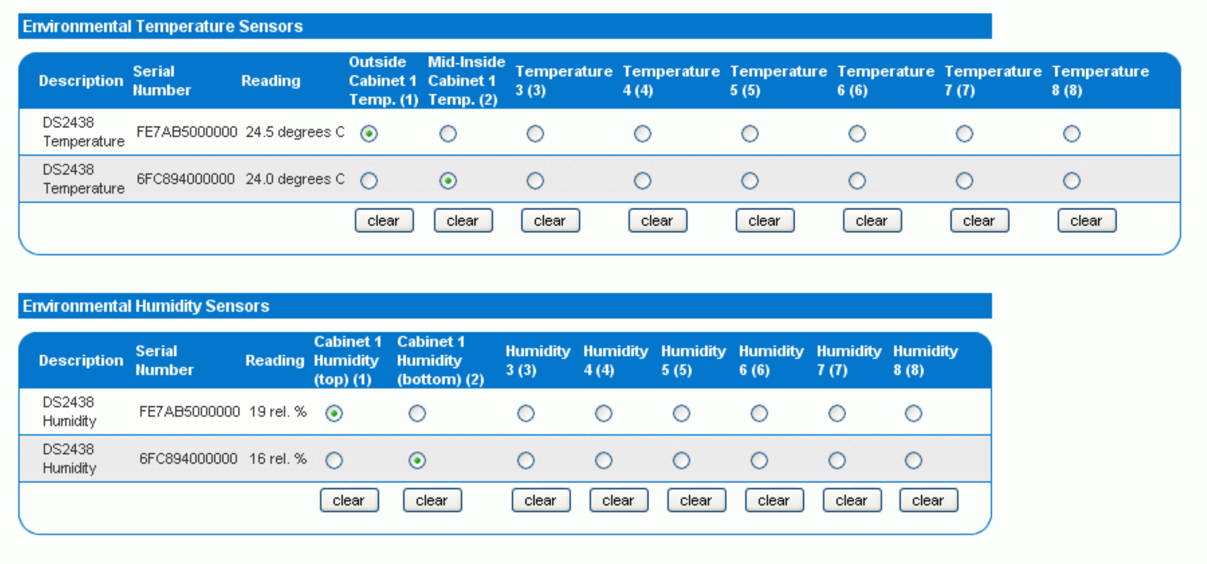
Coordinates	X	Y	Z	
	35 ft.	12 ft.	42	☑ U

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

   Note: Do NOT leave any Name field blank because sensor names are required for successfully saving sensor configurations.

3. Configure the upper and lower thresholds for each sensor in use.
   - The Upper Critical and Lower Critical values are points at which Dominion PX 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 Dominion PX considers the environment to be acceptable again.
4. Click Apply. The sensor name and threshold settings are saved.

When the configuration changes have been applied, the sensor readings are shown on the Home Page next to the outlet list, and the sensor names are updated. This updated name also appears 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.



Environmental Temperature Sensors

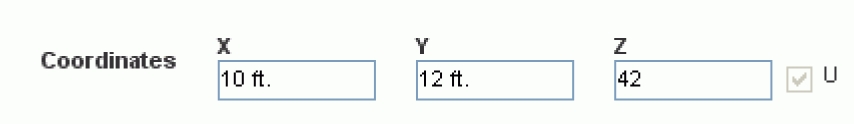
Description	Serial Number	Reading	Outside Cabinet 1 Temp. (1)	Mid-Inside Cabinet 1 Temp. (2)	Temperature 3 (3)	Temperature 4 (4)	Temperature 5 (5)	Temperature 6 (6)	Temperature 7 (7)	Temperature 8 (8)
DS2438 Temperature	FE7AB5000000	24.5 degrees C	●	○	○	○	○	○	○	○
DS2438 Temperature	6FC894000000	24.0 degrees C	○	●	○	○	○	○	○	○
			clear	clear	clear	clear	clear	clear	clear	clear

Environmental Humidity Sensors

Description	Serial Number	Reading	Cabinet 1 Humidity (top) (1)	Cabinet 1 Humidity (bottom) (2)	Humidity 3 (3)	Humidity 4 (4)	Humidity 5 (5)	Humidity 6 (6)	Humidity 7 (7)	Humidity 8 (8)
DS2438 Humidity	FE7AB5000000	19 rel. %	●	○	○	○	○	○	○	○
DS2438 Humidity	6FC894000000	16 rel. %	○	●	○	○	○	○	○	○
			clear	clear	clear	clear	clear	clear	clear	clear

Note: The recommended maximum ambient operating temperature for Dominion PX is 40 degrees Celsius.

Describing Environmental Sensor Location



	X	Y	Z	
Coordinates	10 ft.	12 ft.	42	☑ U

Optional: Use the X, Y and Z coordinates to describe each sensor's physical location. You can use these location values to track records of environmental conditions in fixed locations around your IT equipment. The X, Y and Z values act as additional attributes and are not tied to any specific measurement scheme. If you choose to, you can use non-measurement values such as: X -- Brown Cabinet Row, Y -- third rack, Z -- Top of Cabinet.

Values for the X, Y and Z coordinates may consist of:

- For X and Y: Any combination of alphanumeric characters. The value can be from 0 to 24 characters long.
- For Z when the U checkbox is deselected: Any combination of alphanumeric characters, from 0 to 24 characters long.
- For Z when the U checkbox is selected: Any numeric value from 0 to 60.

A selected U checkbox indicates that the height of the Z coordinate is measured in standard rack units, or U.

To configure and retrieve these coordinate values over SNMP, see the Dominion PX MIB.

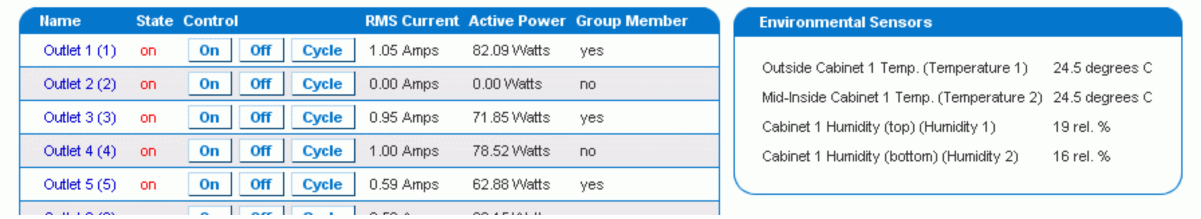
Using Rack Units for the Z Coordinate Value

▶ To use rack units for the Z coordinate value:

1. Select Device Settings > PDU setup. The PDU Setup page appears.
2. Select the Use Rack Unit Height checkbox.
3. Click Apply.

Viewing Sensor Readings

Mapped sensor readings appear beside the outlet list any time the Home page is open. To view the readings from any other page, click Home in the navigation path at the top of the window.



Name	State	Control			RMS Current	Active Power	Group Member
Outlet 1 (1)	on	On	Off	Cycle	1.05 Amps	82.09 Watts	yes
Outlet 2 (2)	on	On	Off	Cycle	0.00 Amps	0.00 Watts	no
Outlet 3 (3)	on	On	Off	Cycle	0.95 Amps	71.85 Watts	yes
Outlet 4 (4)	on	On	Off	Cycle	1.00 Amps	78.52 Watts	no
Outlet 5 (5)	on	On	Off	Cycle	0.59 Amps	62.88 Watts	yes

Environmental Sensors

Outside Cabinet 1 Temp. (Temperature 1)	24.5 degrees C
Mid-Inside Cabinet 1 Temp. (Temperature 2)	24.5 degrees C
Cabinet 1 Humidity (top) (Humidity 1)	19 rel. %
Cabinet 1 Humidity (bottom) (Humidity 2)	16 rel. %

Sensor Measurement Accuracy

Raritan environmental sensors are with the following factory specifications. You do NOT need to calibrate them.

- Temperature: +/-2%

- Humidity: +/-5%

Configuring and Using Alert Notifications

A benefit of Dominion PX's intelligence is its ability to notify you of and react to a change in conditions. This event notification is an "alert."

Components of an Alert

The alert is a condition statement: if "A" happens, then do "B". This condition statement describes what Dominion PX does in certain situations and is composed of multiple parts:

- Event: This is the "A" portion of an alert and describes Dominion PX (or part of it) meeting a certain condition. For example, a specific outlet's voltage exceeds the warning threshold.
- Policy: This is the "B" portion of an alert and describes the response to the event. For example, Dominion PX notifies the system administrator of the event and records the event in the log.
- Threshold: This is a condition met by the event. For example, a temperature warning level.
- Destination: This is a target of the policy. For example, a system administrator's e-mail address.

Thresholds are user-configurable and are adjusted on the appropriate setup page for the desired part of Dominion PX. Outlet-specific thresholds are assigned in the Outlet Setup Page. Unit-wide thresholds are assigned in the PDU Setup page. Environmental thresholds are assigned in the Environmental Sensors page.

Destinations are configured as part of the Alert creation process. E-mail alert destinations require that Dominion PX be set up for SMTP communication. See ***Configuring the SMTP Settings*** (see "Configuring SMTP Settings" on page 115).

How to Configure an Alert

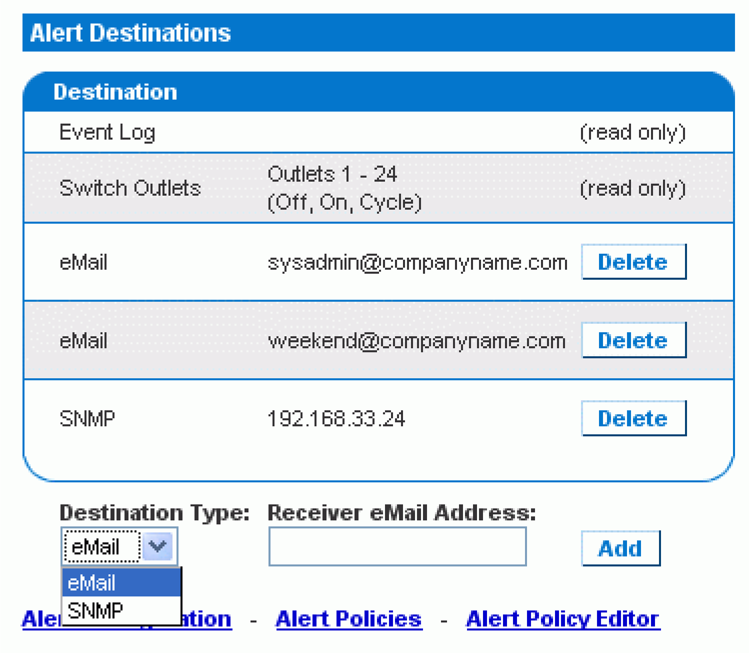
The best way to create a new set of alerts, in sequence, is:

- Create the necessary destinations.
- Create policies based on notifying these destinations.
- Create an alert that executes a policy.

By working in this order, you have destinations to choose from when creating a policy, and policies to chose from when creating an alert. If you try to create an alert and find you do not have a desired policy or destination available, you will have to interrupt the process to add the policy or destination, and then must create the alert again.

Creating Alert Destinations

To set up new Alerts, first create the necessary destinations in the Alert Destinations page. Choose Alerts > Alert Destinations to open the page.



Alert Destinations

Destination		
Event Log		(read only)
Switch Outlets	Outlets 1 - 24 (Off, On, Cycle)	(read only)
eMail	sysadmin@companyname.com	Delete
eMail	weekend@companyname.com	Delete
SNMP	192.168.33.24	Delete

Destination Type: eMail

Receiver eMail Address:

This table on the page lists the existing destinations configured on Dominion PX. Two destinations, Event Log and Switch Outlets, are always available as part of the system.

You can add and delete additional destinations. There are four destination types:

- Event Log: One of the system default destinations. Adding the event log destination to a policy causes Dominion PX to record alert notifications in the system log. This destination cannot be deleted and additional ones of this type cannot be created.
- Switch Outlets: One of the system default destinations. Adding the Switch Outlets destination to a policy allows Dominion PX to switch the power state of outlets in response to an event. This destination cannot be deleted and additional ones of this type cannot be created.
- eMail: A user-configurable destination. Adding an e-mail destination to a policy causes Dominion PX to send alert notifications to the specified e-mail address. Multiple e-mail destinations can be created.
- SNMP: A user-configurable destination. Adding an SNMP destinations to a policy causes an SNMP trap to be sent to the specified IP address. Multiple SNMP desintations can be created.

▶ To add an eMail destination:

1. Choose Alerts > Alert Destinations. The Alerts Destination window opens.
2. select eMail from the Destination Type drop-down list.
3. Type the address of the recipient in the Receiver eMail Address field.
4. Click Add.

Note: If an address is configured for SMTP logging and all event-types are selected, that address will already receive notifications for an event that triggers an alert. However, you can use eMail destinations to send notifications to additional addresses. Furthermore, these notifications can be limited to the events that are relevant to those recipients.

▶ To add an SNMP destination:

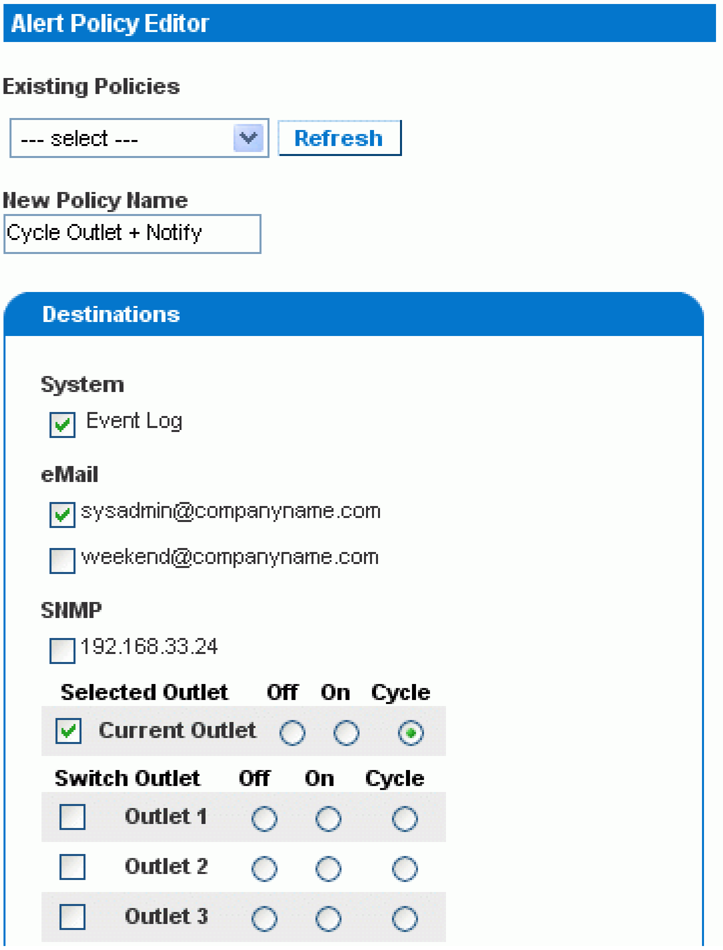
1. Choose Alerts > Alert Destinations. The Alerts Destination window appears.
2. Select SNMP from the Destination Type drop-down list.
3. Type the IP address of the SNMP manager in the Destination IP field. This must be a numeric IP address, DNS names are not allowed.
4. Type the SNMP community string for this trap in the Community String field.
5. Click Add.

Note: SNMP alert traps are distinct from PX-specific traps. PX-specific traps are used for event logging if SNMP is configured in the Event Logging page.
For SNMP alert destinations, Dominion PX sends IPMI-PET (platform event traps) traps to the SNMP manager. The traps are generated in the alert configuration and sent out in IPMI-specific formats containing raw data.
Details of these 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 at:* **http://download.intel.com/design/servers/ipmi/PET100.pdf** *(http://download.intel.com/design/servers/ipmi/pet100.pdf).*

Once added, your new destinations appear on the destinations table. To delete a destination from the system, click Delete next to the desired destination.

Creating Alert Policies

Once your destinations are created, you can create policies based on notifying these destinations. This is done on the Alert Policies Editor, which you can reach by choosing Alerts > Alert Policy Editor.



Alert Policy Editor

Existing Policies

--- select --- Refresh

New Policy Name

Cycle Outlet + Notify

Destinations

System

☑ Event Log

eMail

☑ sysadmin@companyname.com

□ weekend@companyname.com

SNMP

□ 192.168.33.24

Selected Outlet		Off	On	Cycle
☑	Current Outlet	○	○	●

Switch Outlet		Off	On	Cycle
□	Outlet 1	○	○	○
□	Outlet 2	○	○	○
□	Outlet 3	○	○	○

On this page, you can select an existing policy to modify, or create a new policy. The table on this page lists all the configured alert destinations available.

▸ To create an Alert Policy:

1. Choose Alerts > Alert Policy Editor.
2. Type a descriptive policy name in the New Policy Name field (or select an existing policy to modify from the Existing Policies drop-down list).
3. Check a destination in the Destinations table to add it to the policy. A single policy can notify multiple destinations. For example, you can record the alert in the event log AND e-mail a system administrator.

- Event Log: causes Dominion PX to record alert notifications in the system log.
- Addresses listed under eMail: causes Dominion PX to send alert notifications to the specified e-mail address.
- Addresses listed under SNMP: causes an SNMP trap to be sent to the specified IP address.
- Current Outlet: allows you to set the power state of the outlet that generated the alert. Choose to turn the outlet OFF or ON, or to cycle the power to the outlet.
- Outlets listed under Switch Outlet: allows you to set the power state of the selected outlets. Choose to turn the outlets OFF or ON, or to cycle power to the outlets.

4. Click Create to create the new policy, or click Modify if modifying an existing one.

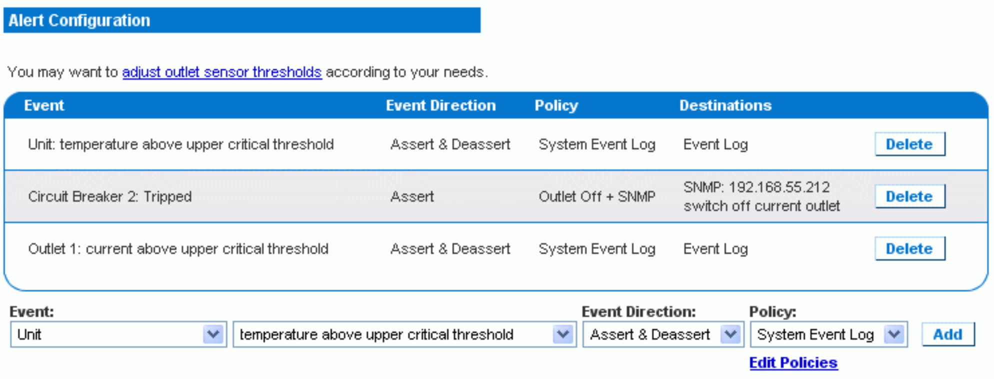
Note: For Dominion PX models without outlet switching, the Current Outlet and Switch Outlet destinations have no effect.

These policies are now available as a response when creating an Alert. When the alert is triggered, outlets are switched and alert notifications are sent to the event log, e-mail accounts, and SNMP managers as dictated by the selected policy.

When Event Log is set as a destination, alert events are sent to all logging services enabled on the Event Logs page. This can result in duplicate messages if the email and SNMP desintations for this Policy are the same as those used for event logging. In this case, select different SNMP and email destinations to avoid duplicate notices.

Creating Alerts

The Alert Configuration Page is where you specify how Dominion PX responds to certain events. First describe an event that triggers an alert and then select the policy Dominion PX should take in response.



Alert Configuration

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

Event	Event Direction	Policy	Destinations	
Unit: temperature above upper critical threshold	Assert & Deassert	System Event Log	Event Log	Delete
Circuit Breaker 2: Tripped	Assert	Outlet Off + SNMP	SNMP: 192.168.55.212 switch off current outlet	Delete
Outlet 1: current above upper critical threshold	Assert & Deassert	System Event Log	Event Log	Delete

Event: Unit | temperature above upper critical threshold

Event Direction: Assert & Deassert

Policy: System Event Log

To Create an Alert:

1. Choose Alerts > Alert Configuration. The Alert Configuration window opens.
2. Under the Event drop-down list, select the segment this event affects.
   - Unit: refers to the Dominion PX device. Temperature refers to the internal temperature as measured on the PCB board.
   - Line: refers to a current carrying line. Three-phase PDUs have three current lines, and single-phase PDUs only have one.
   - Outlet: refers to a specific, single outlet on the Dominion PX device.
   - Circuit Breaker: refers to an internal circuit breaker that governs current to a group of outlets.
   - Environmental Temperature: refers to the temperature as measured by external temperature probes. Dominion PX must have environmental temperature probes configured and connected to the PDU for this alert event to trigger.
   - Environmental Humidity: refers to the humidity as measured by external humidity probes. Dominion PX must have environmental humidity probes configured and connected to the PDU for this alert event to trigger.
3. If you selected a Line, Outlet, or Circuit Breaker segment, indicate the specific line, outlet, or circuit Breaker using the new drop-down list that appears.
4. Select an alert event that occurs to the specified segment. The list of events depends on the selected segment.
5. Pick an event direction. This describes how a threshold must be exceeded to trigger the alert.
   - Assert & Deassert: causes the alert to trigger when the measured value moves past a threshold in either direction.
   - Assert: causes this alert to trigger only when the measured value moves past the threshold -- either above an upper threshold or below a lower threshold. This means when the described event is TRUE.
   - Deassert: causes this alert to trigger only when the measured value returns towards "normal" from beyond the threshold -- either below an upper threshold or above a lower threshold. This means when the described event is FALSE.

For example, if you select "Environmental Temperature above upper critical threshold" and set the event direction to Assert & Deassert, the selected policy executes when the temperature of the cabinet exceeds the critical threshold. When the environment cools and the temperature drops below the critical threshold, the policy executes again.

6. Select a policy to execute from the Policy drop-down list. This list includes all of the alert policies created in the Alert Policy Editor.

7. Click Add.

Added alerts are now tracked by Dominion PX. When an alert's event conditions are met, the associated policy executes.

Note: If Environmental Temperature or Environmental Humidity is selected as part of the Event, an alert event is created for each logical Temperature or Humidity sensor. These event alerts can be deleted so that only the ones you want are present.

Note: It is possible for an alert to set the same outlet state twice. For example, a temperature threshold Alert is created with the Event Direction set to Assert & Deassert. This alert calls a policy that turns the outlet OFF. In such a scenario, the alert triggers the outlet OFF policy once when the temperature rises above the threshold, and once more when the temperature drops below the threshold. Any event logs recording the outlet state note that the power to this outlet was turned OFF twice in a row.

Sample Alerts

Sample Outlet-Level Alert

In this example, we want Dominion PX to notify us when the current draw on a specific outlet (Outlet 6) approaches the critical limit. To do that we would set up an alert like this:

- Event: Outlet; Outlet 6 (6); current above upper critical threshold
- Event Direction: Assert & Deassert
- Policy: Log + Notify

We select "Outlet" to indicate we are measuring at the outlet level. We then specify "Outlet 6 (6)" because that is the outlet in question and select "current above upper non-critical threshold" because we want to know when the PDU crosses into the warning range BEFORE the current draw is at critical levels.

The event direction is set to "Assert & Deassert." In this case, we want to know when the current on the outlet is higher than normal AND we want to know when it has returned to normal.

For the policy, we selected "Log + Notify." Our example policy has Event Log, the IP address of an SNMP manager, and the email address of the facilities manager checked. With these settings, Dominion PX records the alert in its internal Event Log, send a trap to an SNMP manager, and email the facilities manager each time the current rises above and falls below the non-critical threshold.

Sample Unit-Level Alert

In this example, we want Dominion PX to shut down most of its outlets if the Dominion PX device becomes too hot. However, since mission-critical servers are plugged in to Outlets 1 and 2, we want to leave them running. Our alert would look something like this:

- Event: Unit; Temperature Above Upper Non-Critical Threshold
- Event Direction: Assert
- Policy: Non-Essential OFF

Here, we have specified "Unit" since the whole Dominion PX is our concern. We have set the upper non-critical temperature as our "warning" mark, and so we want the temperature crossing that threshold to trigger the alert.

The event direction is set to "Assert" only, since we only want to take action when the temperature is past the Upper-Non-Critical Threshold.

Our example policy, "Non-Essential OFF," has the Switch Outlet destination selected and Outlet 1 and Outlet 2 set to ON. The remaining outlets are set to OFF to reduce the power draw through Dominion PX and the amount of heat expelled into the rack.

Sample Environmental Alert 1

In this example, our Dominion PX is equipped with environmental temperature sensors and we want to create an alert to address abnormally high ambient temperatures. For instance, if the ventilation system in the server room were to stop working. We would place our environmental temperature sensors outside of the rack to measure the room temperature. Then we would configure an alert to look something like this:

- Event: Environmental Temperature; Temperature above critical threshold
- Event Direction: Assert
- Policy: Outlets OFF + Facilities

Here, we have configured Dominion PX to monitor the "Environmental temperature" sensors and to trigger an alert when it measures a "Temperature above critical threshold."

The event direction is set to "Assert" only, since only want to take these actions when the temperature is above the critical threshold.

Our example policy, "Outlets OFF + Facilities," would have the following destinations checked: Switch Outlets, with all outlets set to OFF; e-mail for the system administrator and e-mail for the facilities manager. This way, all equipment powered through the Dominion PX device would power OFF to avoid damage and prevent from adding more heat to the room. The system admin and the facilities manager would both receive notification that the room temperature was too high.

Sample Environmental Alert 2

We can configure a complimentary alert that looks something like this:

- Event: Environmental Temperature; Temperature above non-critical threshold
- Event Direction: Deassert
- Policy: Outlets ON + Facilities

This powers on all the outlets again when the temperature is normal. Again, we are using the environmental temperature sensors to monitor the ambient temperature of the room. This time, it checks whether the temperature is above (or below) the non-critical threshold, which is generally set as a boundary between normal and warning states.

The event direction is set to "Deassert" only, since we only want to power ON the outlets again when the ambient temperature *stops* being above the non-critical threshold. This would indicate that the temperature has dropped below the warning level and is now normal again.

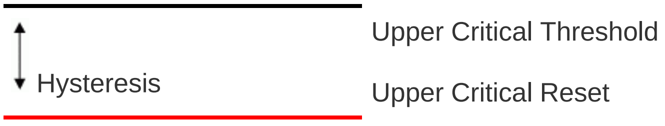
Our example policy, "Outlets ON + Facilities," would have the following destinations checked: Switch Outlets with all outlets set to ON; email for the system administrator and email for the facilities manager. This way, when the temperature returns to normal (for example, if the ventilation system works properly again), Dominion PX powers on all of its outlets. Additionally, the system administrator and the facilities manager receive e-mail notification stating that the room temperature dropped below the warning level.

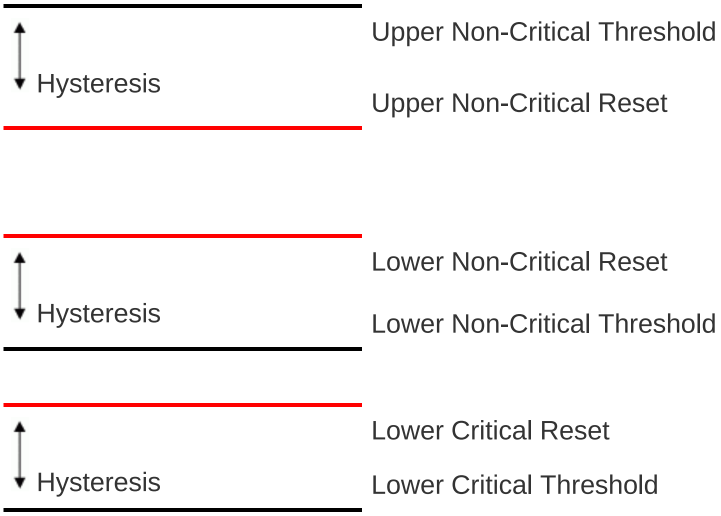
A Note about Untriggered Alerts

In some cases, a measurement exceeds a threshold causing Dominion PX to generate an alert. The measurement then returns to a value within the threshold, but Dominion PX does not generate an alert for the event Deassertion. Such scenarios can occur due to the hysteresis tracking Dominion PX uses.

What is Threshold Hysteresis?

The hysteresis setting determines when a threshold condition is reset. This diagram illustrates how hysteresis values relate to thresholds:



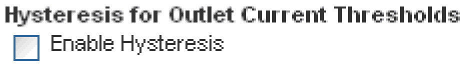


The hysteresis values define a reset threshold. For upper thresholds, the measurement must fall past this reset threshold before a de-assert event is generated. For lower thresholds, the measurement must rise above this reset threshold before a de-assert event is generated.

See ***Hysteresis Values for Thresholds*** (on page 187) to see the hysteresis values for each measurement type.

Disabling Outlet Current Hysteresis

By default, Dominion PX uses hysteresis values when choosing to Deassert a condition. You can disable the use of hysteresis values for outlet current measurements.



Hysteresis for Outlet Current Thresholds

□ Enable Hysteresis

To disable outlet current hysteresis

1. Choose Device Settings > PDU Setup. The PDU Setup window opens.
2. Deselect the checkbox labeled Enable Hysteresis.

This disables the use of hysteresis for outlet current measurements only. To re-enable hysteresis, select the Enable Hysteresis checkbox.

Example: When Hysteresis is Useful

This example demonstrates when enabling threshold hysteresis is useful.

The current critical threshold for Outlet 1 is set to 10 amps. The current draw rises to 11 amps, triggering a Current Critical alert. The current then continues to fluctuate between 9.8 amps and 11 amps.

With hysteresis, Dominion PX continues to indicate that the current on Outlet 1 is above critical. Without hysteresis enabled, Dominion PX would de-assert the condition each time the current dropped to 9.9 amps. The condition would re-assert the condition each time the current reached 10.0 amps or higher. With the fluctuating current, this could result in a number of repeating SNMP traps. With the fluctuating current, this could result in an e-mail account full of repeating alert notifications.

Example: When to Disable Hysteresis

This is an example of when you want to disable hysteresis for outlets.

The upper non-critical threshold for current in Outlet 2 is set to 8 amps. In normal usage, Outlet 2 draws 7.6 amps of current. A spike in demand causes the current to reach 9 amps, triggering an alert. The current then settles to the normal draw of 7.6 amps.

With hysteresis disabled, Dominion PX de-asserts the condition once the current drops to 7.9 amps. If hysteresis remained enabled and the current never dropped to 7.0 amps, the outlet would still be considered above non-critical. The condition would not de-assert, even if the current draw returned to normal.

Setting Up Event Logging

By default, Dominion PX 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.

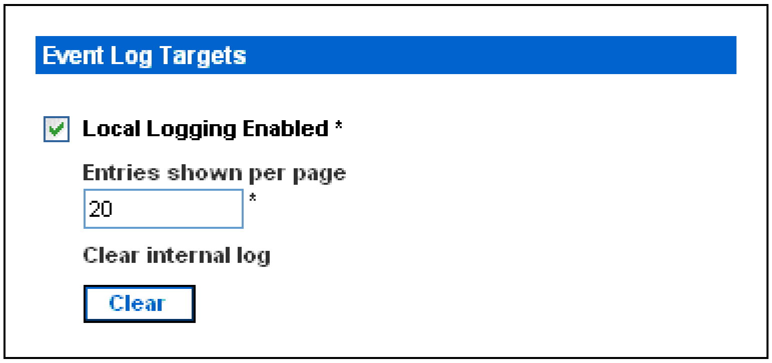
Note: When configuring Dominion PX to use more than one logging method, configure each method individually and apply the changes before configuring the next.

Configuring the Local Event Log

Follow this procedure to determine whether the local logging function is enabled and which types of events are logged in the local log.

To configure the local event log:

1. Choose Device Settings > Event Log. The Event Log Settings window opens. The Local Logging panel appears first. This panel controls the local event log.



Event Log Targets

☑ Local Logging Enabled *

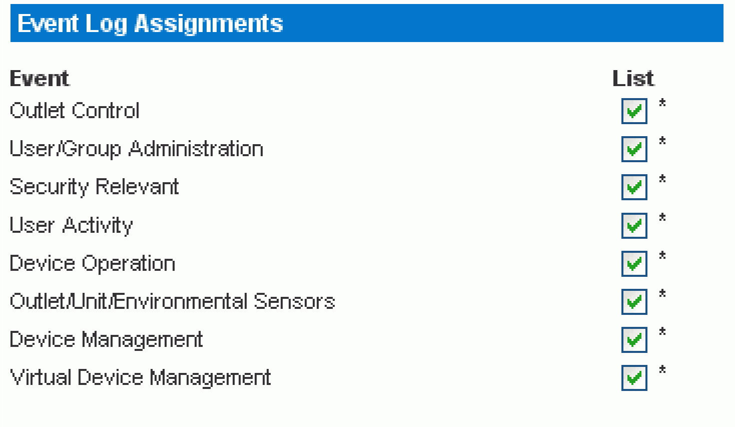
Entries shown per page

20 *

Clear internal log

2. The local event log is enabled by default. To turn it off, deselect the Local Logging Enabled checkbox.
3. By default, 20 log entries appear on each page of the local event log when it is displayed. To change this, type a different number in the Entries shown per page field.
4. To clear all events from the local event log:
   a. Click Clear. The button changes to Really Clear and you are prompted to click only if you really want to clear the log.
   b. 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 appear in the Event Log Assignments panel to the right. All are enabled by default. To disable any of these event types, deselect the appropriate checkboxes.



Event Log Assignments

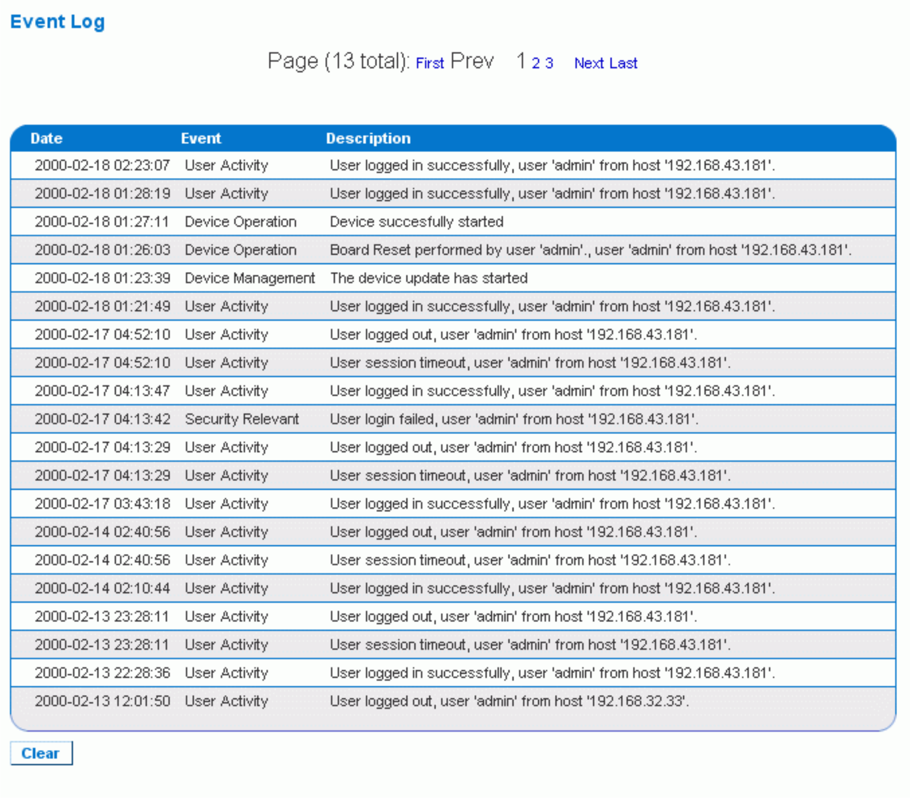
Event	List
Outlet Control	☑ *
User/Group Administration	☑ *
Security Relevant	☑ *
User Activity	☑ *
Device Operation	☑ *
Outlet/Unit/Environmental Sensors	☑ *
Device Management	☑ *
Virtual Device Management	☑ *

Note: See **Event Types** *(on page 186) for a more detailed explanation of these event types.*

6. When you are finished, click Apply. Local logging is configured.

Viewing Internal Event Log

To display the internal event log, choose Maintenance > View Event Log.



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 succesfully started
2000-02-18 01:26:03	Device Operation	Board Reset performed by user 'admin'., user 'admin' from host '192.168.43.181'.
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'.

Each event entry in the local log consists of:

- Date and time of the event
- Type of the event
- A 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.)

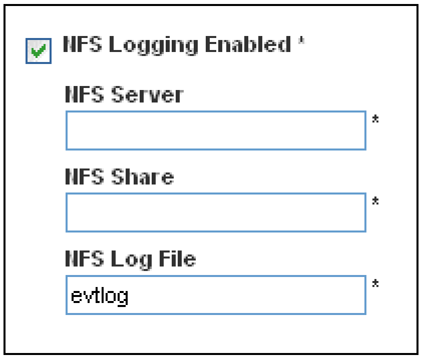
Note: By default, the local log displays 20 entries per page. See **Configuring the Local Event Log** *(on page 101) if you want to change this number.*

Configuring NFS Logging

This procedure describes how to enable the Network File System (NFS) logging function and determine which types of events are recorded in the NFS log file.

▶ To configure NFS logging:

1. Choose Device Settings > Event Log. The Event Log Settings window opens. The NFS Logging panel controls NFS logging.



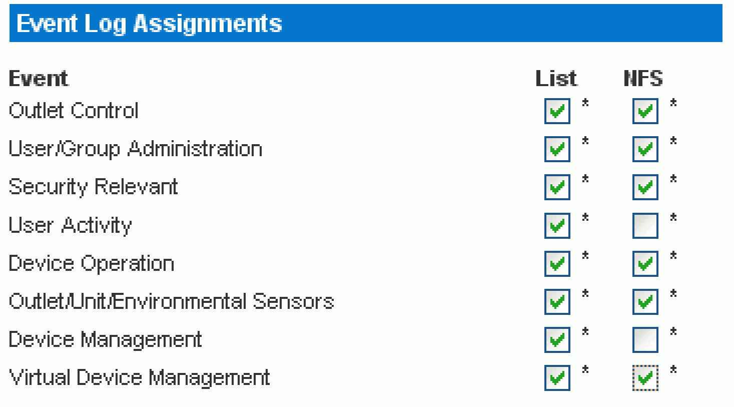
☑ NFS Logging Enabled *

NFS Server
*

NFS Share
*

NFS Log File
evtlog *

2. Select the NFS Logging Enabled checkbox.
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. Default is evtlog.
6. By default, when NFS logging is enabled, seven event types appear in the Event Log Assignments panel to the right. All are disabled by default. To enable any of these event types, select the corresponding checkboxes.



Event Log Assignments

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

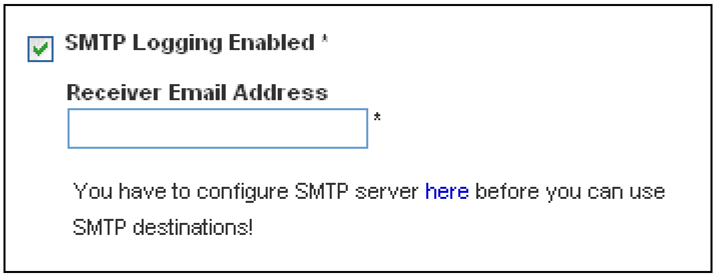
7. Click Apply. NFS logging is configured.

Configuring SMTP Logging

You can enable the Simple Mail Transfer Protocol (SMTP) logging function and determine which types of events are recorded in the SMTP log file.

▶ To configure SMTP logging:

1. Choose Device Settings > Event Log. The Event Log Settings window opens. The SMTP Logging panel controls SMTP logging.



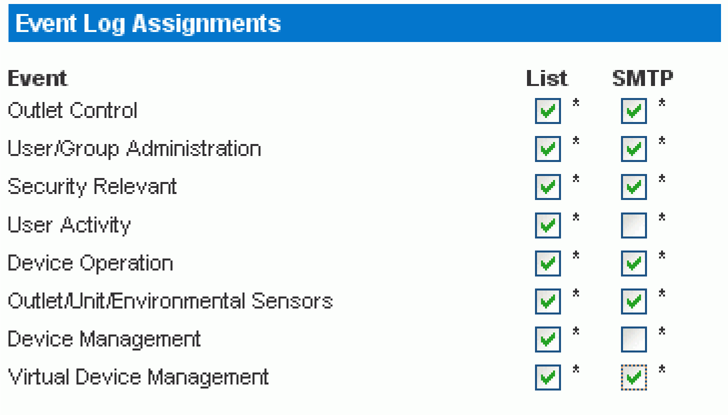
☑ SMTP Logging Enabled *

Receiver Email Address

______________ *

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

2. Select the SMTP Logging Enabled checkbox.
3. Type the receiver's email address in the Receiver Email Address field.
4. By default, when SMTP logging is enabled, seven event types appear in the Event Log Assignments panel to the right. All are disabled by default. To enable any of these event types, select the appropriate checkboxes.



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	☑ *	☑ *

5. Click Apply. SMTP logging is configured.

Note: You must configure the SMTP settings first, for SMTP logging to work. See **Configuring SMTP Settings** *(on page 115).*

Configuring SNMP Logging

Event logging can be performed by sending SNMP traps to a third-party SNMP manager. See ***Using SNMP*** (on page 163) for instructions on enabling SNMP Event Logging.

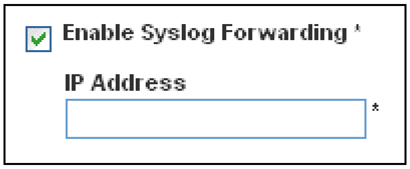
Configuring Syslog Forwarding

To make Dominion PX automatically forward events to a specific destination, enable the syslog forwarding function and determine which types of events should be logged in the syslog record.

Note: After enabling Syslog Forwarding, a "--MARK--" message may appear in the Syslog record every 20 minutes. This is a keep-alive method used by Dominion PX.

To configure Syslog Forwarding:

1. Choose Device Settings > Event Log. The Event Log Settings window opens. The Syslog Forwarding panel controls forwarding of system logs.

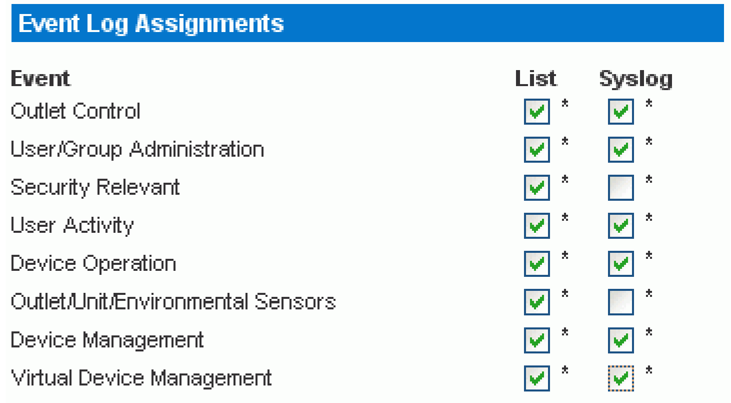


☑ Enable Syslog Forwarding *

IP Address

[ ] *

2. Select the Enable Syslog Forwarding checkbox.
3. Type an IP address in the IP Address field. This is the address to which syslog is forwarded.
4. By default, when Syslog Forwarding is enabled, seven event types appear in the Event Log Assignments panel to the right. All are disabled by default. To enable any of these event types, select the appropriate checkboxes.



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	☑ *	☑ *

5. Click Apply. Syslog Forwarding is configured.

Note: If you want to disable Syslog forwarding, deselect all checked event types under the Syslog column and click Apply. Then deselect Enable Syslog Forwarding. If event types are still selected in the Syslog column when you disable Syslog forwarding, you may be unable to deselect those event types from the internal event log list.

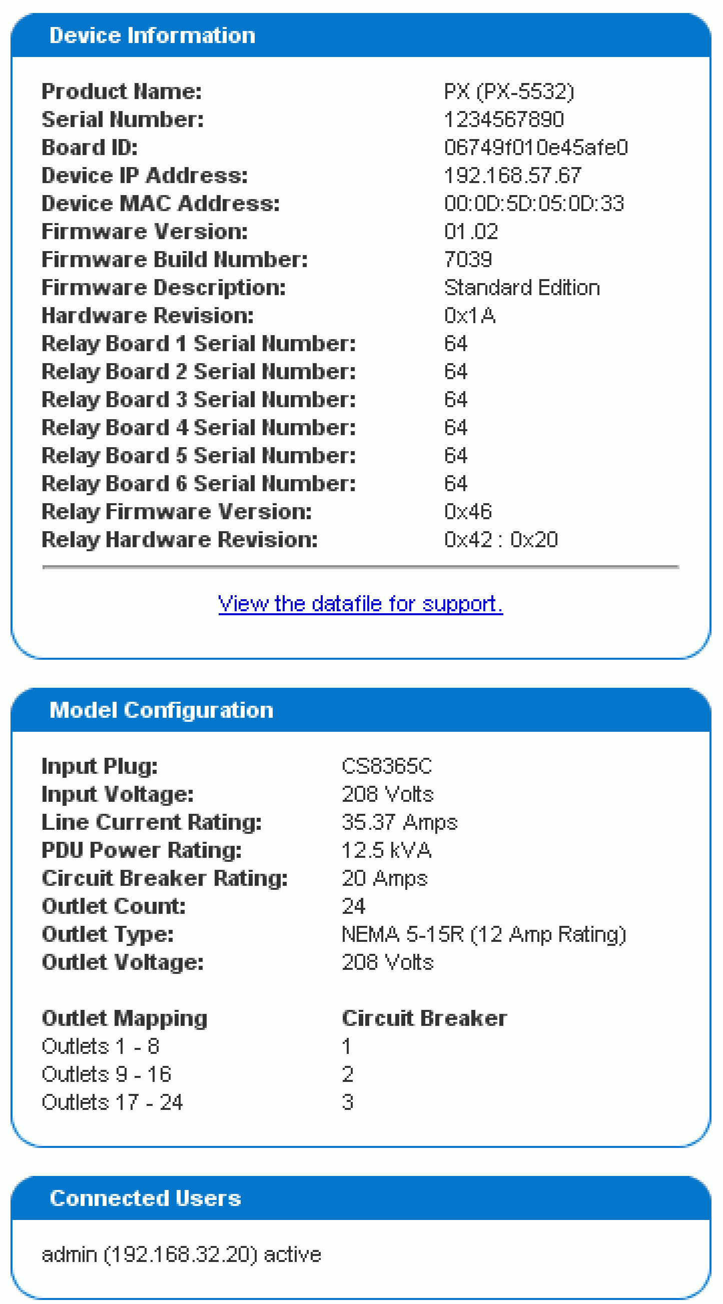
Managing Dominion PX

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

Displaying Basic Device Information

To display basic information about a Dominion PX device:

1. Choose Maintenance > Device Information. The Device Information window opens.



Device Information

Product Name:	PX (PX-5532)
Serial Number:	1234567890
Board ID:	06749f010e45afe0
Device IP Address:	192.168.57.67
Device MAC Address:	00:0D:5D:05:0D:33
Firmware Version:	01.02
Firmware Build Number:	7039
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 Board 6 Serial Number:	64
Relay Firmware Version:	0x46
Relay Hardware Revision:	0x42 : 0x20

View the datafile for support.

Model Configuration

Input Plug:	CS8365C
Input Voltage:	208 Volts
Line Current Rating:	35.37 Amps
PDU Power Rating:	12.5 kVA
Circuit Breaker Rating:	20 Amps
Outlet Count:	24
Outlet Type:	NEMA 5-15R (12 Amp Rating)
Outlet Voltage:	208 Volts

Outlet Mapping	**Circuit Breaker**
Outlets 1 - 8	1
Outlets 9 - 16	2
Outlets 17 - 24	3

Connected Users

admin (192.168.32.20) active

2. The Device Information panel displays the product name, serial number, and IP and MAC addresses of the Dominion PX device, as well as detailed information about the firmware running in the PDU.

3. To open or save an XML file providing details for Raritan Technical Support, click the "View the datafile for support" link.

Displaying Model Configuration Information

To display information about the specific model of the Dominion PX device that you are using, choose Maintenance > Device Information. The Device Information window opens. Information about your model is shown in the Model Configuration Panel below the Device Information panel.

This panel shows:

- The device's and board's maximum RMS current
- The outlet maximum RMS current and current thresholds sum restriction
- The outlets governed by each circuit breaker

Displaying Connected Users

To display a list of users currently connected to the Dominion PX device, choose Maintenance > Device Information. The Device Information window opens. A list of connected users is shown in the Connected Users Panel. See ***Displaying Basic Device Information*** (on page 107).

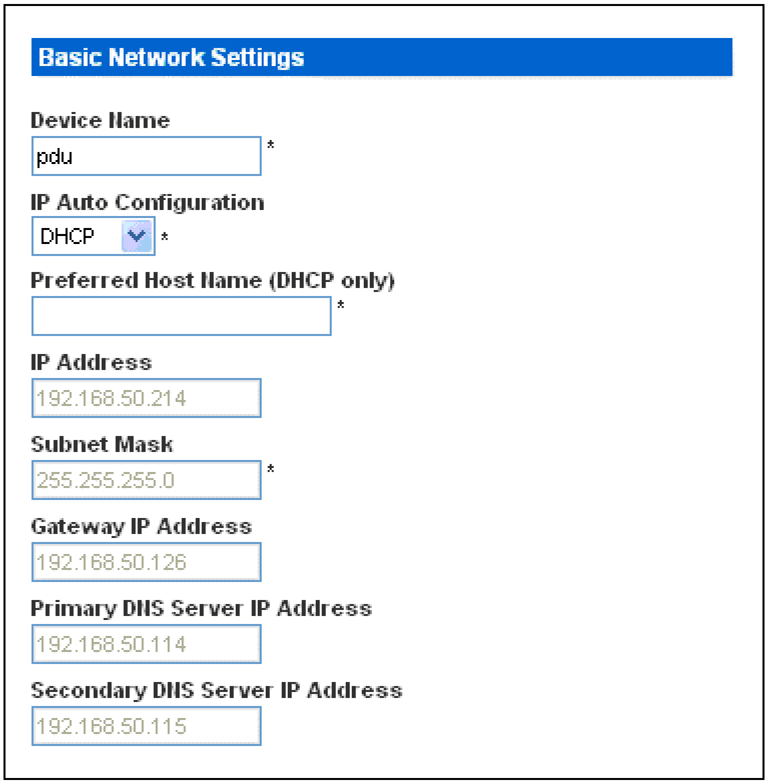
The panel shows the username and IP address of each user, and indicates whether or not the connection is active.

Naming the Dominion PX Device

By default, Dominion PX has a device name of pdu. You may want to give Dominion PX a more easily recognizable name to help identify it.

▶ To name the Dominion PX device:

1. Choose Device Settings > Network. The Network Settings window opens. The left side of the window consists of the Basic Network Settings panel, which contains the device name.



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

2. Type a new name in the Device Name field.
3. If DHCP is selected for IP configuration, the name entered in the field of Preferred Host Name (DHCP only) is registered with DNS and used on the assigned IPs by DHCP.
4. Click Apply. The Dominion PX device is renamed.

Tip: Device name shown in the web interface should be identical to the SNMP system name. However, the SNMP system name becomes inconsistent with the device name when the device name is changed. To make both names identical, you must restart the Dominion PX device or restart the SNMP agent after changing the device name in the web interface.

Modifying Network Settings

The Dominion PX device was configured for network connectivity during the installation and configuration process. See ***Installation and Configuration*** (on page 14). If necessary, you can modify any network settings using the web interface.

▶ To modify the network settings:

1. Choose Device Settings > Network. The Network Settings window opens. The left side of the window consists of the Basic Network Settings panel, which shows the current network settings. See ***Naming the Dominion PX Device*** (on page 110) for details on this panel.
2. Do either of the following:
   - Auto configuration: To auto-configure the Dominion PX device, select DHCP or BOOTP from the IP Auto Configuration drop-down list.

     - When selecting DHCP, you can enter a preferred DHCP host name, which is optional.
   - Static IP: To enter a static IP address, select None from the IP Auto Configuration drop-down list, and then enter:

     - IP address

     - Subnet mask

     - Gateway address

     - Primary and (optional) secondary DNS servers' addresses
3. When you are finished, click Apply. The network settings are modified.

Modifying Network Service Settings

Raritan Dominion PX supports these network communication services: HTTPS, HTTP, Telnet and SSH.

HTTPS and HTTP enable the access to the web interface of the Dominion PX device, and Telnet and SSH enable the access to the ***command line interface*** (see "Using the CLP Interface" on page 154).

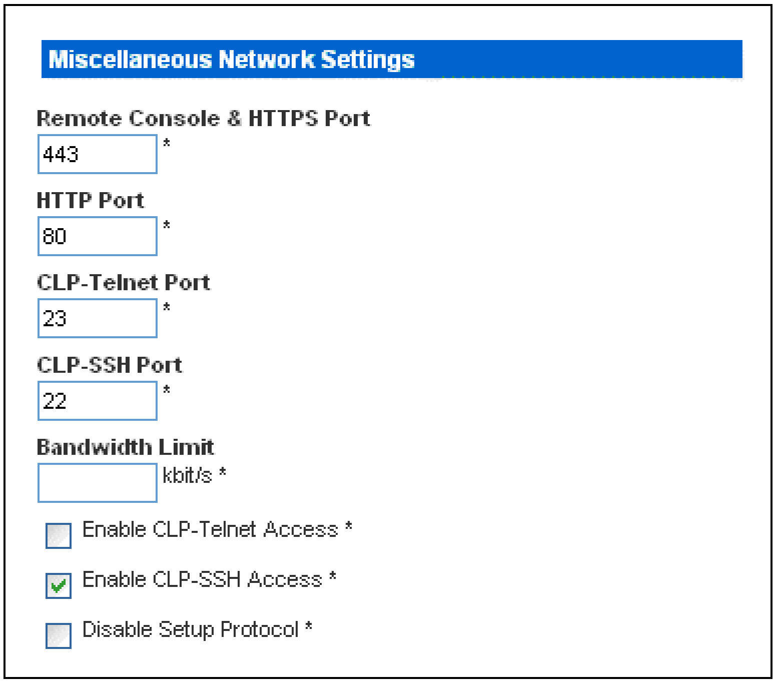
By default, SSH is enabled, Telnet is disabled, and all TCP ports for supported services are set to standard ports. You can change default settings if necessary.

Note: Telnet access is disabled by default because it communicates openly and is thus insecure.

You can also set a bandwidth limit, and enable or disable the Raritan Setup Protocol.

▶ To configure network communication services:

1. Choose Device Settings > Network. The Network Settings window opens. The Miscellaneous Network Settings panel on the top right contains the communications, port, and bandwidth settings.



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 *

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

3. To set an upper limit on the amount of bandwidth Telnet or SSH are allowed to use, type the number of kilobits per second in the Bandwidth Limit field.
4. To use a different port for HTTPS, HTTP, Telnet, or SSH service, type a new port number in the corresponding text box. Valid range is 1 to 65535.

Warning: Different network services cannot share the same TCP port.

5. Select the Disable Setup Protocol checkbox to disable it.

Note: No programs are currently available to use the Setup Protocol with Dominion PX. It is safe to leave this disabled.

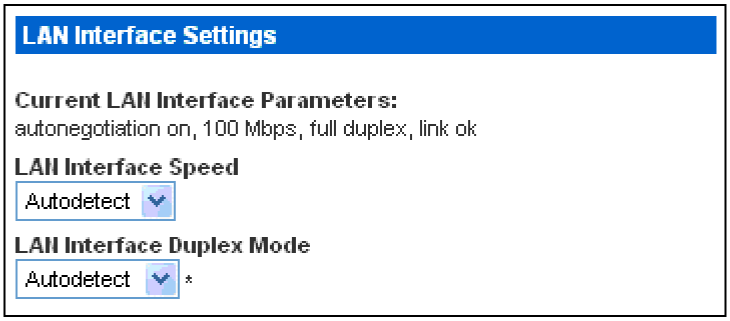
6. When you are finished, click Apply. The settings are modified.

Modifying LAN Interface Settings

The LAN interface speed and duplex mode were set during the installation and configuration process. See ***Initial Network Configuration*** (on page 17).

▶ To modify either setting:

1. Choose Device Settings > Network. The Network Settings window opens. The LAN Interface Settings panel on the bottom right shows the interface speed and duplex mode.



LAN Interface Settings

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

LAN Interface Speed
Autodetect

LAN Interface Duplex Mode
Autodetect *

2. To change the LAN speed, select a different option in the LAN Interface Speed field.
   - Autodetect: System selects the optimum LAN speed through auto-negotiation.
   - 10 Mbps: The LAN speed is always 10 Mbps.
   - 100 Mbps: The LAN speed is always 100 Mbps.
3. To change the duplex mode, select a different option in the LAN Interface Duplex Mode field.
   - Autodetect: Dominion PX selects the optimum transmission mode through auto-negotiation.

- Half duplex: Data is transmitted in one direction (to or from the Dominion PX device) at a time.
- Full duplex: Data is transmitted in both directions simultaneously.

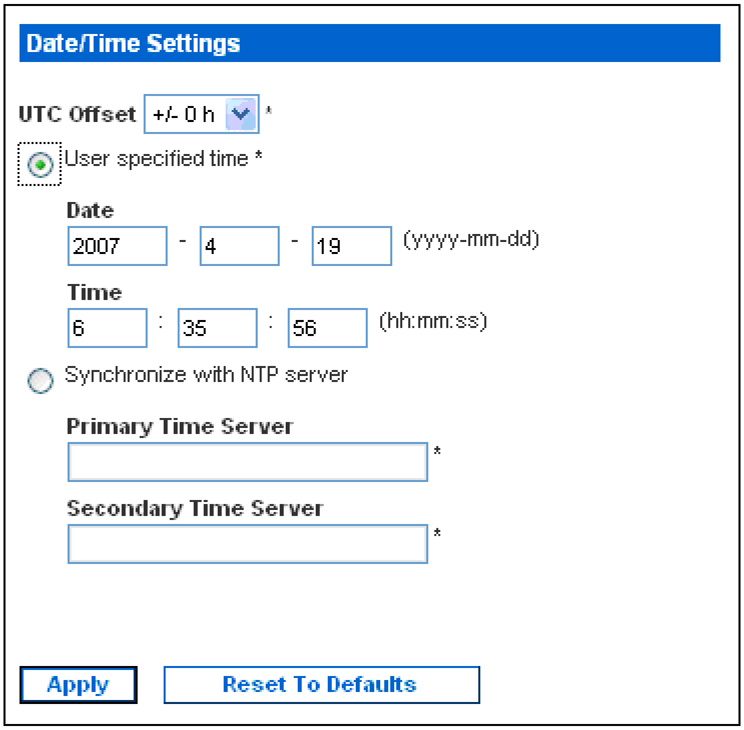
4. When you are finished, click Apply. The settings are modified.

Setting the Date and Time

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

▶ To set the date and time:

1. Choose Device Settings > Date/Time. The Date/Time Settings window opens.



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 *

2. Enter a time zone by selecting the appropriate Coordinated Universal Time (UTC) offset from the UTC Offset drop-down list. For example, US Eastern Standard Time is UTC-5.
3. Choose one of the methods to set the date and time:
   - To customize the date and time, select the User Specified Time radio button, and then enter the date and time in appropriate fields. Use the yyyy-mm-dd format for the date and the hh:mm:ss format for the time.

- To let an NTP server set the date and time, select the Synchronize with NTP Server radio button, and then enter the IP address or host name of the primary NTP server in the Primary Time Server field. A secondary NTP server is optional.

Note: If the Dominion PX device's IP address is assigned through DHCP, the NTP server addresses are automatically discovered, and you CANNOT enter any data in the fields of primary and secondary time server.

4. Click Apply. The date and time settings are applied.

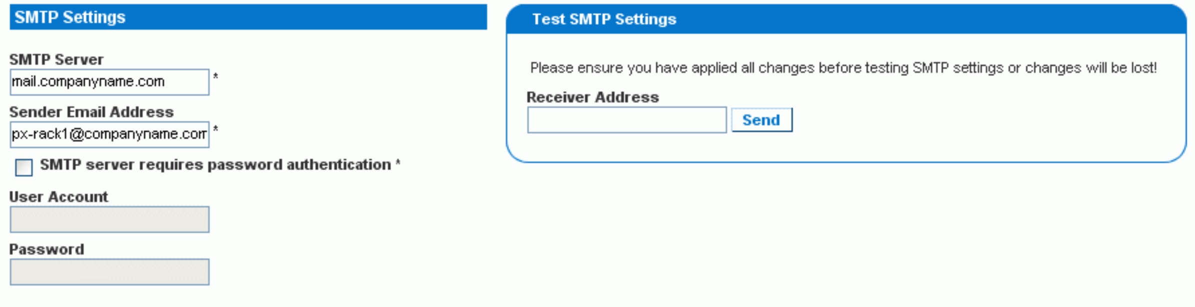
Configuring SMTP Settings

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

Note: See **Configuring and Using Alert Notifications** *(on page 88) for details on configuring alerts to send emails.*

To configure the SMTP settings:

1. Choose Device Settings > SMTP Settings. The SMTP Settings window opens.



SMTP Server: mail.companyname.com *

Sender Email Address: px-rack1@companyname.com *

□ SMTP server requires password authentication *

User Account:

Password:

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

Receiver Address:

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

Important: Do not test the SMTP settings until you have first applied

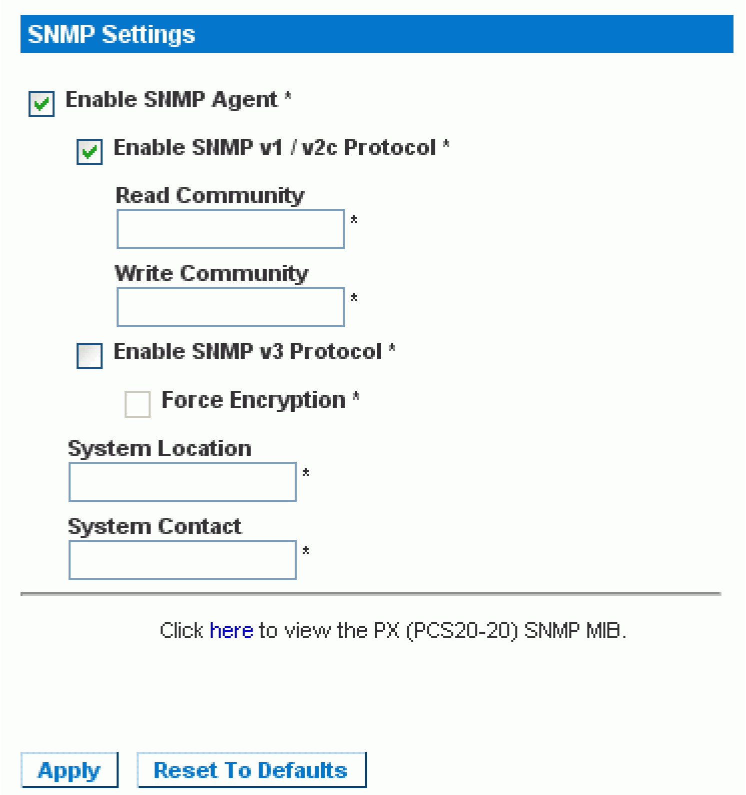
them. If you do, you will lose the settings and be forced to re-enter them.

Configuring SNMP Settings

You can enable or disable SNMP communication between an SNMP manager and the Dominion PX device. Enabling SNMP communication allows Dominion PX to send SNMP trap events to the manager, as well as allows the manager to retrieve and control the power status of each outlet.

▶ To configure SNMP communication:

1. Choose Device Settings > SNMP Settings. The SNMP Settings window opens.



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.

2. Select the Enable SNMP Agent checkbox to enable Dominion PX to communicate with external SNMP managers. A number of options become available.
3. Check SNMP v1 / v2c Protocol to enable communication with an SNMP manager using SNMP 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 the Enable SNMP v3 Protocol checkbox to enable communication with an SNMP manager using SNMP v3 protocol.
5. Type the System Location in the System Location field.
6. Type the System Contact in the System Contact field.
7. Click on the link at the bottom of the window to download an SNMP MIB for your Dominion PX to use with your SNMP manager.
8. Click Apply. The SNMP configuration is set.

Enabling Data Retrieval

The data retrieval feature allows the retrieval of Dominion PX data by an SNMP manager, such as the data of PDU, outlet, line, and circuit breaker. When enabled, Dominion PX measures all sensor data at regular intervals and stores these data samples for access over SNMP.

Dominion PX stores up to the last 120 measurements (samples) in the data log buffer.

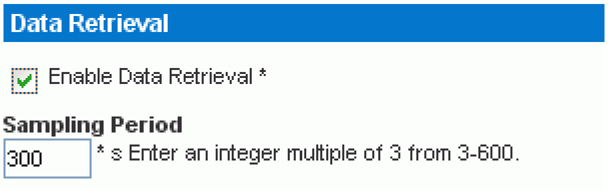
Configuring the delay between samples adjusts how often the sample measurements are made and stored for retrieval. The default delay is 300 seconds. Delays must be entered as multiples of 3 seconds.

Dominion PX's SNMP agent must be enabled for this feature to work. See ***Enabling SNMP*** (on page 164) for more details. In addition, using an NTP time server ensures accurately time-stamped measurements.

Note: By default, Data Retrieval is disabled. Users belonging to the Admin user group can enable or disable this feature.

To configure the data sample delay:

1. Choose Device Settings > PDU Setup. The PDU Setup page opens.



Data Retrieval

☑ Enable Data Retrieval *

Sampling Period

300 * s Enter an integer multiple of 3 from 3-600.

2. By default, Data Retrieval is disabled. Select the Enable Data Retrieval checkbox, and the Sampling Period field becomes configurable.
3. Type a number in the Sampling Period field, indicating how often (in seconds) Dominion PX stores data samples. Values in this field are restricted to multiples of 3 seconds, ranging from 3 to 600 seconds (10 minutes).
4. When you finish, click Apply. The retrieved data samples are stored immediately once this feature is enabled and the delay between samples is configured.

After data retrieval is enabled, an external manager or application (such as Power IQ) can access the stored Dominion PX data using SNMP. Download the Dominion PX MIB file to assist you in configuring third-party managers to retrieve data. See ***Using SNMP*** (on page 163) for more details.

Retrievable Data

The data retrieval feature makes the following types of data available:

- Time stamp indicating when data sample was collected in UTC format
- Unit Apparent Power
- Unit Active Power
- Data for each outlet, including:

  - Outlet Number

  - Outlet Up Time

    - Number of seconds since the outlet was last switched on

  - Outlet RMS current

  - Outlet Voltage

  - Outlet Power Factor
- Data for each circuit breaker, including:

  - Circuit breaker number

  - RMS current drawn
- Line Current data for each line, including:

  - Line identifier

  - RMS current
- Line Voltages data for each line, including:

  - Line identifier

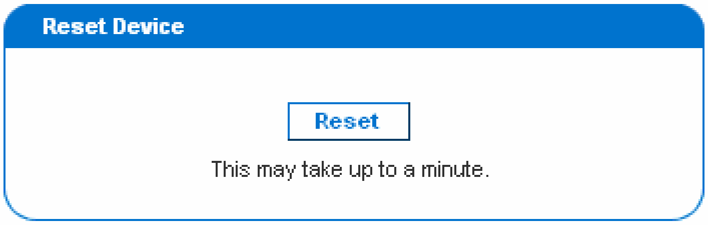
  - Line voltage

Resetting the Dominion PX Device

You can remotely reboot the Dominion PX device via the web interface.

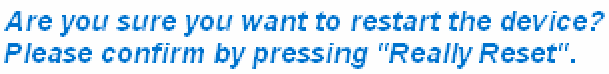
▶ To reset the Dominion PX device:

1. Choose Maintenance > Unit Reset. The Reset Operations window opens.

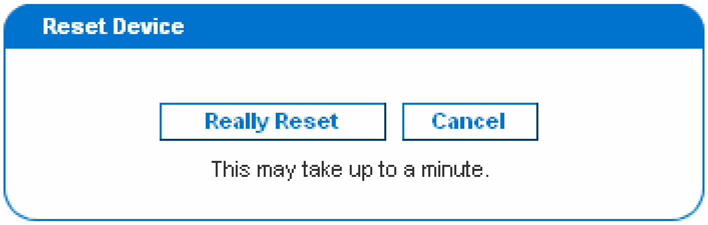


This may take up to a minute.

2. Click Reset. A Reset Confirmation window opens.

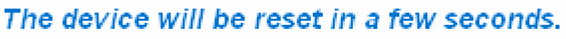


Are you sure you want to restart the device?
Please confirm by pressing "Really Reset".

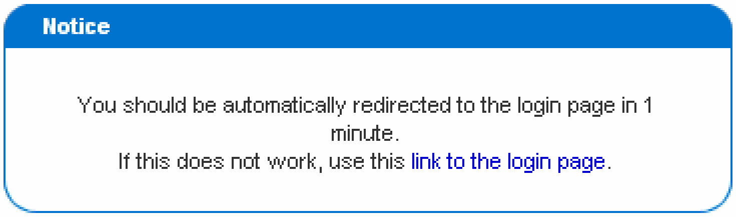


This may take up to a minute.

3. When you click Really Reset, the Dominion PX device reboots. If you change your mind, click Cancel to terminate the reset operation. If you choose to proceed with the reset, the window shown below opens and the reset takes place. The reset takes about one minute to complete.



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.

4. When the reset is complete, the Login page opens. Now you can log back in to the Dominion PX.

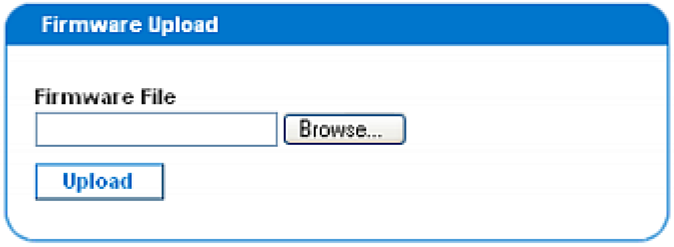
Updating the Firmware

Users must either use the admin account or have both the Firmware Update and Unit Reset privileges in order to successfully update Dominion PX firmware.

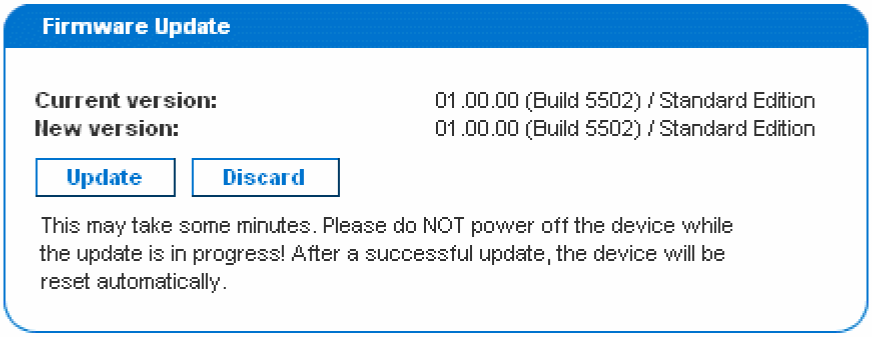
The Dominion PX firmware files are available on the Raritan website's ***Firmware and Documentation section*** (http://www.raritan.com/support/firmware-and-documentation/).

▶ To update firmware:

1. Choose Maintenance > Update Firmware. The Firmware Upload window opens.



2. In the Firmware File field, type the complete path to the firmware file on your computer, or click Browse and select the file.
3. Click Upload. The Firmware Update window opens. It shows the current firmware version and the new firmware version, and gives you a last chance to terminate the update.



Current version: 01.00.00 (Build 5502) / Standard Edition
New version: 01.00.00 (Build 5502) / Standard Edition

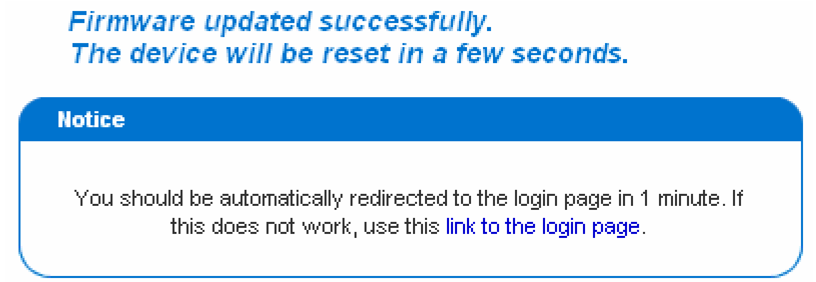
This may take some minutes. Please do NOT power off the device while the update is in progress! After a successful update, the device will be reset automatically.

> *Note: When upgrading a Dominion PX over a low bandwidth network, after beginning the upload of the firmware file, do NOT switch the browser to another page until the upload has completed. This may take several minutes depending on the network speed.*

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 off the Dominion PX device during the update. To indicate at the rack that an update is in progress, the outlet LEDs flash and the device's three-digit LED display shows "FuP".

5. When the update is complete, a message appears similar to the one shown below indicating the update was successful. The Dominion PX device resets, and the Login window re-appears. You can now log in and resume managing Dominion PX.



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

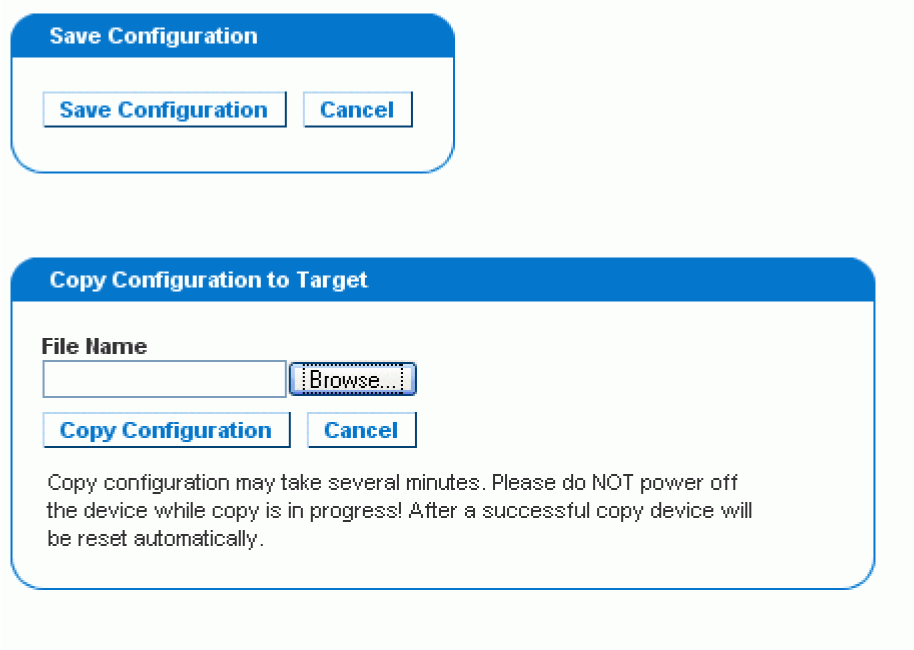
Notice

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

Note: If you are using Dominion PX with an SNMP manager, you should re-download the Dominion PX MIB after updating the firmware. This ensures your SNMP manager has the correct MIB for the release you are using. See **Using SNMP** *(on page 163) for details.*

Copying Configurations with Bulk Configuration

The Bulk Configuration feature lets you save the settings of a configured Dominion PX to your PC. This file can be used to copy that configuration to other PX units of the same model type. Users saving Dominion PX configurations require the Bulk Configuration system permission. Users copying configurations require both the Bulk Configuration and the Unit Reset permissions.



Copy configuration may take several minutes. Please do NOT power off the device while copy is in progress! After a successful copy device will be reset automatically.

Saving a Dominion PX Configuration

A source unit is an already configured Dominion PX device that is used to create a configuration file. This configuration file contains the settings that can be shared between Dominion PX devices, such as user and group configurations, thresholds, alert policies, the access control list, etc. This file does not contain device-specific information, including:

- Device Name
- System Name, System Contact and System Location
- Network settings (IP address, Gateway and Netmask)
- Local Time
- Outlet Names and Outlet Status
- External Sensor Names and Sensor Mappings
- Device Logs
- External Sensor Z, Y and Z location values
- Outlet Grouping Data
- Default Outlet State (at either the Unit level or Outlet level)

The Default Outlet State setting is not saved. This prevents accidentally leaving outlets OFF after the configuration has been copied. Also, while the Local Time is not copied, the UTC time zone offset and any NTP settings are saved. Users should exercise caution when distributing a configuration file to Dominion PX units in a different time zone than the source unit.

▶ To save a configuration file:

1. Choose Maintenance > Bulk Configuration. The Bulk Configuration window opens.
2. Click Save Configuration. Your web browser prompts you to save a file. Choose a suitable location and save the configuration file to your PC.

Copying a Dominion PX Configuration

A target unit is a Dominion PX device that loads another Dominion PX device's configuration file. Copying a Dominion PX configuration to a target unit adjusts that Dominion PX device's settings to match those of the source Dominion PX device. In order to successfully restore a Dominion PX configuration:

- The user must have the Bulk Configuration and Unit Reset system permission.
- The target Dominion PX must be the same model type as the source Dominion PX.
- The target Dominion PX must be running the same firmware version as the source Dominion PX.

▶ To copy a Dominion PX Configuration:

1. Log in to the target unit's web interface.
2. If the firmware version does not match that of the source Dominion PX, choose Maintenance > Update Firmware to update the firmware of the target Dominion PX.
3. Choose Maintenance > Bulk Configuration. The Bulk Configuration window opens.
4. Under the *Copy Configuration to Target* area, click Browse and select the configuration file on your PC.
5. Click Copy Configuration.

Note: If configured, SNMP, SMTP and the local event log records that a configuration copy occurred on the target device, but NFS and Syslog servers do not.

Note: If the source Dominion PX is configured to "Force HTTPS for web access", and the target unit is not, users may not be automatically redirected to the login page after the configuration copy is complete. In this case, users should simply refresh the web browser after the copying is complete and the login page appears.

Outlet Grouping

Using the Outlet Grouping feature, you can combine outlets from separate Dominion PX devices into a single logical group, allowing control from a single Dominion PX. Outlets that are grouped together power on and power off together in unison, making outlet grouping ideal for servers with power supplies plugged into multiple Dominion PX devices.

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. Only locally authenticated users may perform actions on outlet groups.

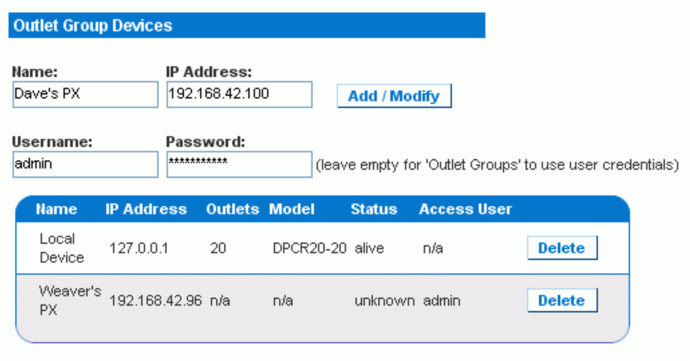
Note: Outlet Grouping supports adding outlets from up to four other Dominion PX devices. All PDUs must be accessible over IP and must be running firmware version 1.1 or higher.

Identifying Other Dominion PX Devices

To add outlets from other Dominion PX devices, you must first identify which Dominion PX devices are sharing their outlets.

To identify other Dominion PX devices:

1. Choose Outlet Groups > Outlet Group Devices. The Outlet Group Devices window opens.



Outlet Group Devices

Name: Dave's PX
IP Address: 192.168.42.100

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

Name	IP Address	Outlets	Model	Status	Access User	
Local Device	127.0.0.1	20	DPCR20-20	alive	n/a	Delete
Weaver's PX	192.168.42.96	n/a	n/a	unknown	admin	Delete

2. Type a name to identify the Dominion PX device you want to add in the Name field.
3. Type the IP Address of the Dominion PX device you want to add in the IP Address field.
4. Type the **admin** username and password in the Username and Password fields. Do NOT leave these fields blank as they can authenticate on the Dominion PX device being added.
5. Click Add/Modify. The new Dominion PX device is now available for outlet grouping.

To modify the name or the Username and Password used to access a participating Dominion PX device, retype the information for the same Dominion PX device and click Add/Modify again.

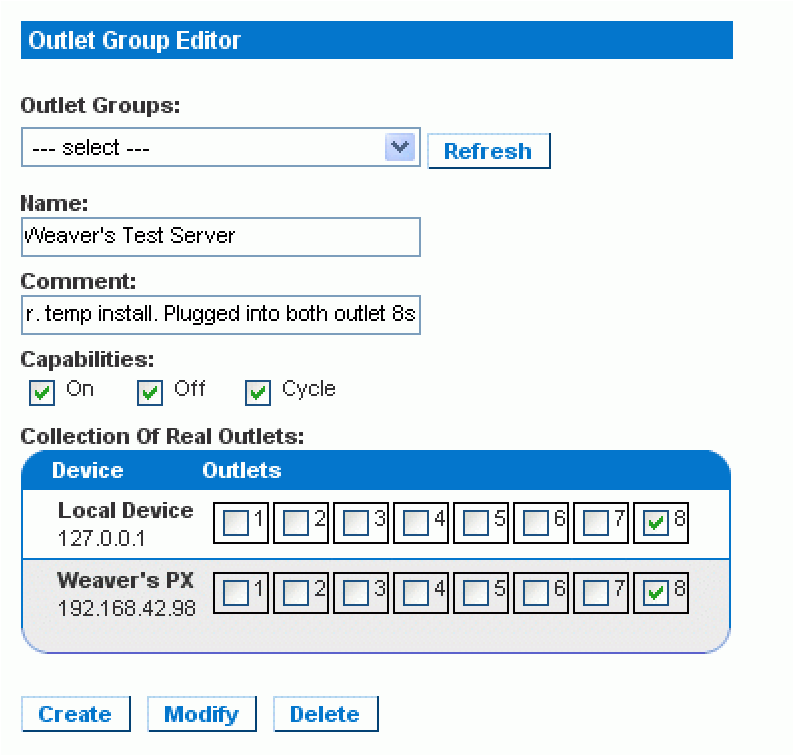
Note: You can re-add the Dominion PX device you are accessing (if you deleted it from the list) or modify its details by using the IP address 127.0.0.1.

Grouping Outlets Together

Once the participating Dominion PX devices have been added to list of outlet group devices, their individual outlets can be grouped together. Outlets that are grouped together power on and power off in unison, using a control panel from the Dominion PX device where the outlet group was created.

To group outlets together:

1. Choose Outlet Groups > Outlet Group Editor. The Outlet Group Editor window opens.



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

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.

Note: You cannot modify the name of an outlet group after the group is created.

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. Under the Capabilities field, check the boxes of the Power Control abilities you want available for this outlet.
5. A list of available Dominion PX devices and their outlets appears under Collection of Real Outlets. Select the checkbox representing the desired physical outlet to make it part of the outlet group. All outlets that are selected are 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.

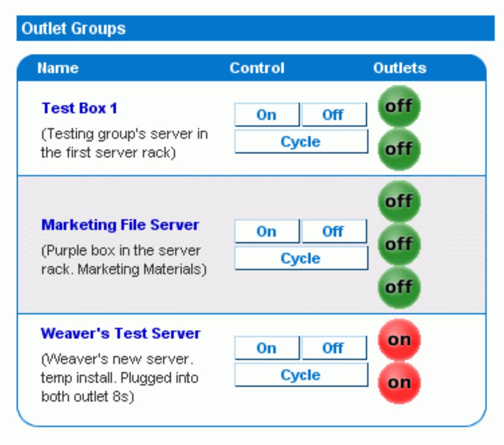
Grouped outlets are designed to be controlled together. Avoid doing anything to affect these outlets individually, such as turning one of the outlets ON or OFF, or unplugging one of the participating Dominion PX devices. Once grouped, power control to those outlets should be managed from the Outlet Groups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

Viewing and Controlling Outlet Groups

Any outlet groups created from this Dominion PX device appear in 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. Choose Outlet Groups > Outlet Group Details. The Outlet Groups List appears.



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

Note: Only outlet groups created through this specific Dominion PX device appear in this Outlet Groups list. Outlet groups created through another Dominion PX device do not appear here, even if they contain outlets from this device.

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 are 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 is ignored.

If you want to view or edit the composition of an outlet group, clicking on the name of the outlet group in the list takes you to the Outlet Group Editor for the selected outlet group.

Editing or Deleting Outlet Groups

1. Choose Outlet Groups > Outlet Group Editor. The Outlet Group Editor window opens.
2. Select the desired outlet group from the Outlet Groups drop-down list.
3. The details for the outlet group appear. Change the 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 remove the group from the outlet groups list.

Note: You cannot modify the name of an outlet group after the group is created.

Deleting Outlet Group Devices

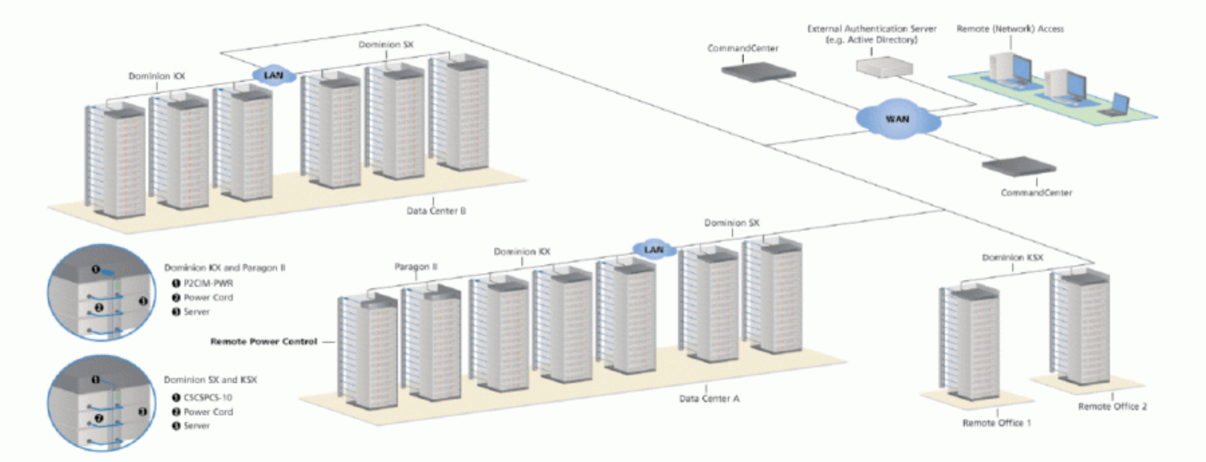
▶ To delete a Dominion PX device from outlet grouping when it is no longer available or in use:

1. Choose Outlet Groups > Outlet Group Devices. The Outlet Group Devices window opens, displaying a list of known Dominion PX devices.
2. Click Delete for the Dominion PX device you want to remove from outlet grouping.

Note: If you delete a Dominion PX device that still has outlets in a group, it removes the associated outlets from that group, but the group still exists. Remove the group itself using the Outlet Group Editor.

You should not delete the host device (the Dominion PX device 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 6 Integration



Product	Direct Access Interfaces		Access Through CC-SG Interfaces		Connectivity	Max # of PX Units Supported
	Association	Control	Association	Control		
Dominion SX	>= 3.1: SX GUI; < 3.1: None	RSC into PX serial port	CC GUI	CC GUI	CSCSPCS-1 or CSCSPCS-10	Max = number of serial ports

Product	Direct Access Interfaces		Access Through CC-SG Interfaces		Connectivity	Max # of PX Units Supported
	Association	Control	Association	Control		
Dominion KX-I	KX Manager	RRC/MPC	CC-GUI	CC-GUI	P2CIM-PWR	4; 8 in KX 1.3 or higher.
Dominion KX-II	KX GUI	RRC/MPC, JAC	CC-GUI	CC GUI	D2CIM-PWR	4; 8 in KX 1.3 or higher.
Dominion KX2-101	KX-GUI	RRC/MPC, JAC	CC-GUI	CC-GUI		1
Dominion KSX 2	KSX GUI	RRC/MPC, JAC	CC-GUI	CC-GUI / KSX GUI	Straight CAT5 cable	

Product	**Direct Access Interfaces**		**Access Through CC-SG Interfaces**		**Connectivity**	**Max # of PX Units Supported**
	Association	Control	Association	Control		
Paragon II (UST)	Paragon Manager, OSD	OSD	IP-Reach + OSD	IP-Reach + OSD	P2CIM-PWR	Max = number of channel ports
Paragon II (USTIP)	Paragon Manager, OSD	RRC, OSD	PIISC + Paragon Manager	CC GUI	P2CIM-PWR	Max = number of channel ports

Association: Associate the target with power outlet

Control: Power On/Off, and Power Recycle the device

CSCSPCS-1: An adapter which still needs a Cat5 straight through cable to connect

NOTE: Connecting any power CIM except the for the D2CIM-PWR (e.g. P2CIM-PWR) to the PX serial port switches all the outlets ON, even if they were previously OFF.

In This Chapter

Dominion KX I Power Strip Configuration

The Dominion KX (with the latest firmware) supports up to eight KX I devices, and requires P2CIM-PWR and straight CAT5 cable. You can associate up to four outlets to a target; all four outlets can be from separate PX devices, if needed.

Setup Preparation

You must have a power strip and the P2CIM-PWR Computer Interface Module (CIM). By default the P2CIM-PWR is *not* included with Raritan power strips.

To receive the P2CIM-PWR CIM with the power strip, you must order the power strip with a part number that ends in PK (for example, PCR8-15-PK). Alternatively, the CIM can be ordered separately from the power strip. Raritan devices must be ordered from Raritan or an authorized Raritan reseller.

Connecting the Power Strip

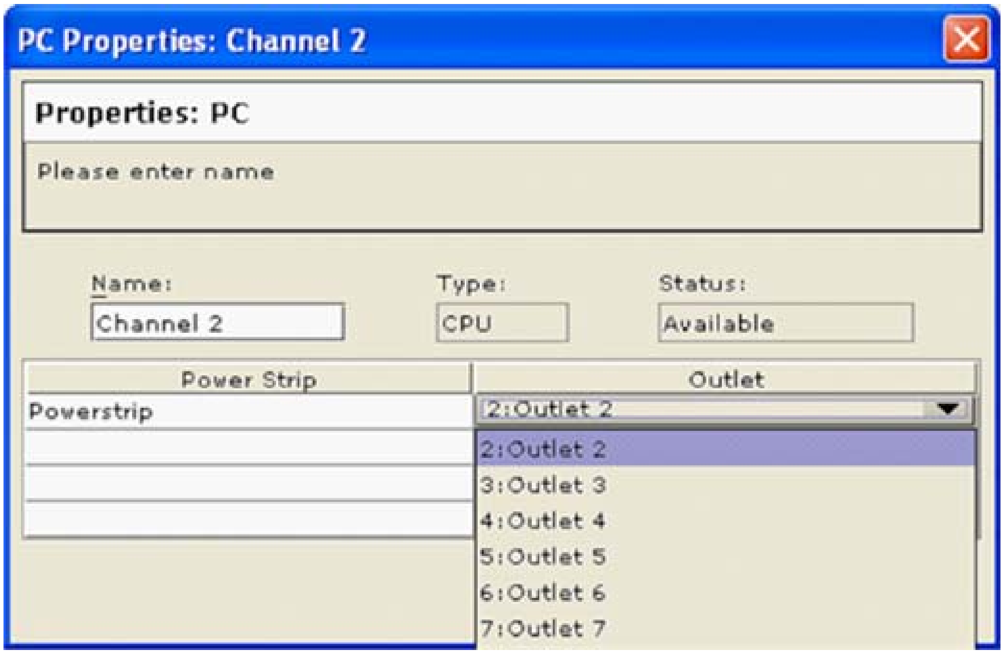
1. Connect the male RJ-45 of the P2CIM-PWR to the female RJ-45 connector on the serial port power strip.
2. Connect the female RJ-45 connector of the P2CIM-PWR to any of the available female system port connectors on the Dominion KX using a straight through Cat 5 cable.
3. Power on the power strip.
4. Power on the device.

Configuring the Power Strip

Once the power strip has been added, Dominion KX Manager will automatically recognize that it is connected. The Device Tree in the left panel of the window will change the appropriate target icon to indicate that a power strip is connected to that port.

1. Select the power strip icon, right-click on it, and then click Properties. When the Power Strip Properties dialog appears, type a name for the new power strip and click OK.

2. In the Devices Tree, select the target server(s) powered through the power strip. Right-click on the server icon and click Properties. The PC Properties window appears.



PC Properties: Channel 2

Properties: PC

Please enter name

Name: Channel 2

Type: CPU

Status: Available

Power Strip	Outlet
Powerstrip	2:Outlet 2

3. Click on one of the Power Strip rows in the table and a list of available power strips connected to the Dominion KX appears. Click on the appropriate power strip.

4. Click on the Outlet drop-down that is associated the selected power strip. A list of available outlets is displayed. Select the outlet to which the device is connected.

   Repeat these steps for all devices plugged into multiple outlets. Once outlets have been assigned, Remote Power Management to the associated server will be available in the associated client software (see Multi-Platform Client and Raritan Remote Client).

Note: Be sure to assign the correct outlets to each channel. If more than one outlet is physically associated with a different server, you could accidentally switch the wrong server off.

KX Manager Application

Use Raritan's KX Manager application to configure associations.

▶ **To configure associations:**

1. Select the target.

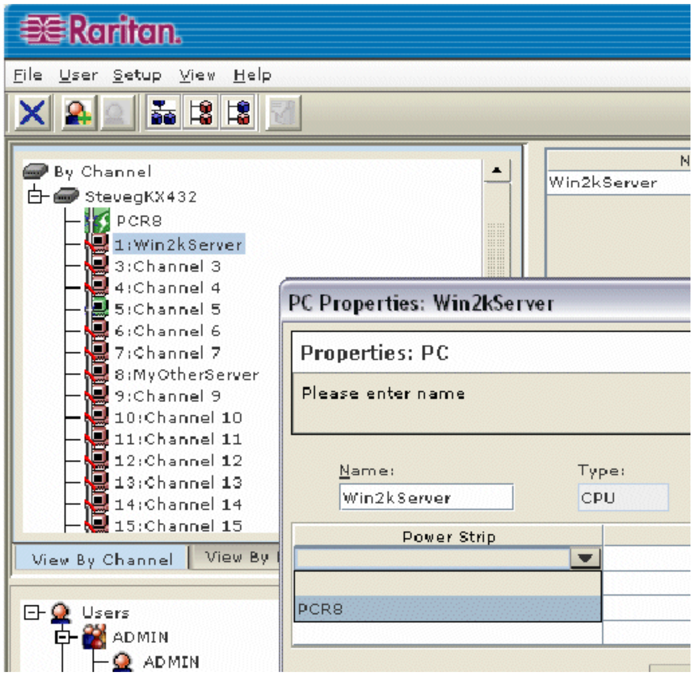
2. Edit the Properties and choose the outlets to associate. The outlets are automatically renamed to the associated target's name.

3. RRC for control.
4. Select the target.
5. Select On, Off, or Recycle power from the pop-up menu.

See the **KX User Guide** for details.

Associating Outlets with a Target

1. Select target, then select Properties from pop-up menu.
2. Select up to eight Dominion PX units from drop-down list.



Properties: PC

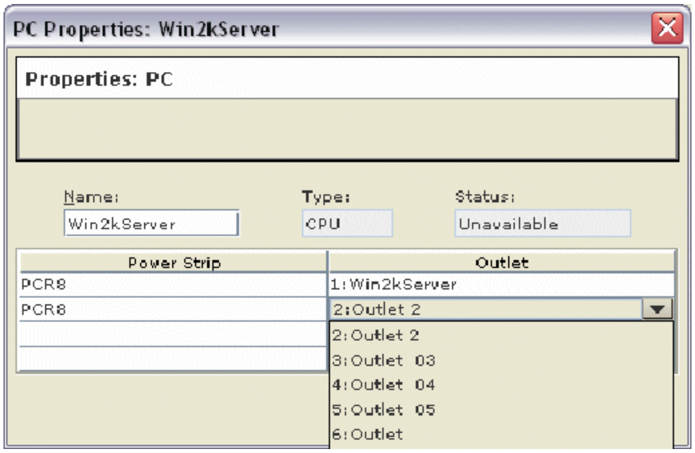
Please enter name

Name: Win2kServer

Type: CPU

Power Strip
PCR8

3. Select up to a total of four outlets from the PX units.



Properties: PC

Name: Win2kServer

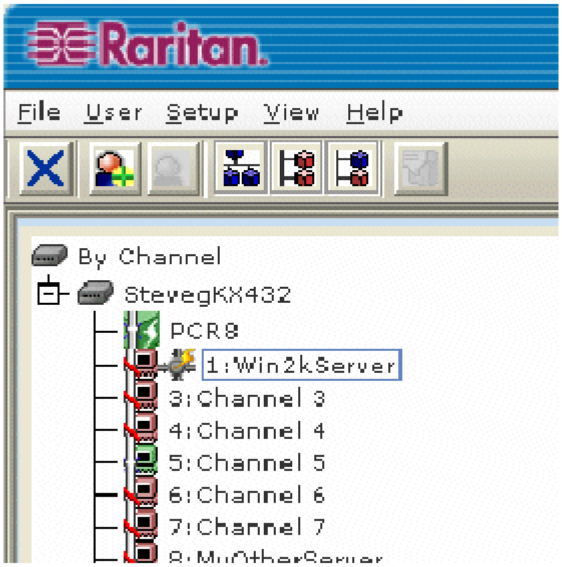
Type: CPU

Status: Unavailable

Power Strip	Outlet
PCR8	1:Win2kServer
PCR8	2:Outlet 2

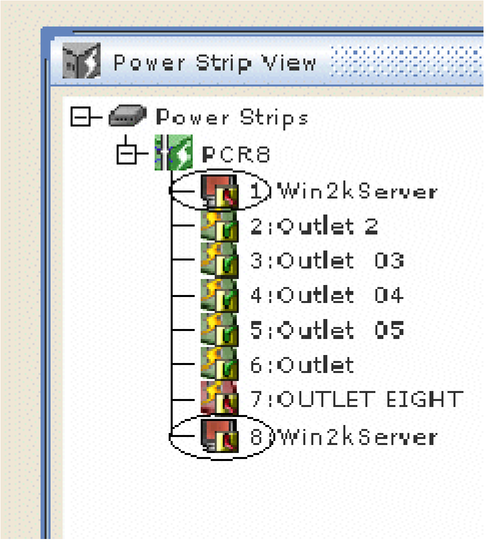
2:Outlet 2
3:Outlet 03
4:Outlet 04
5:Outlet 05
6:Outlet

4. Notice the target icon change to indicate power.



5. Notice the outlet icon change to indicate association.

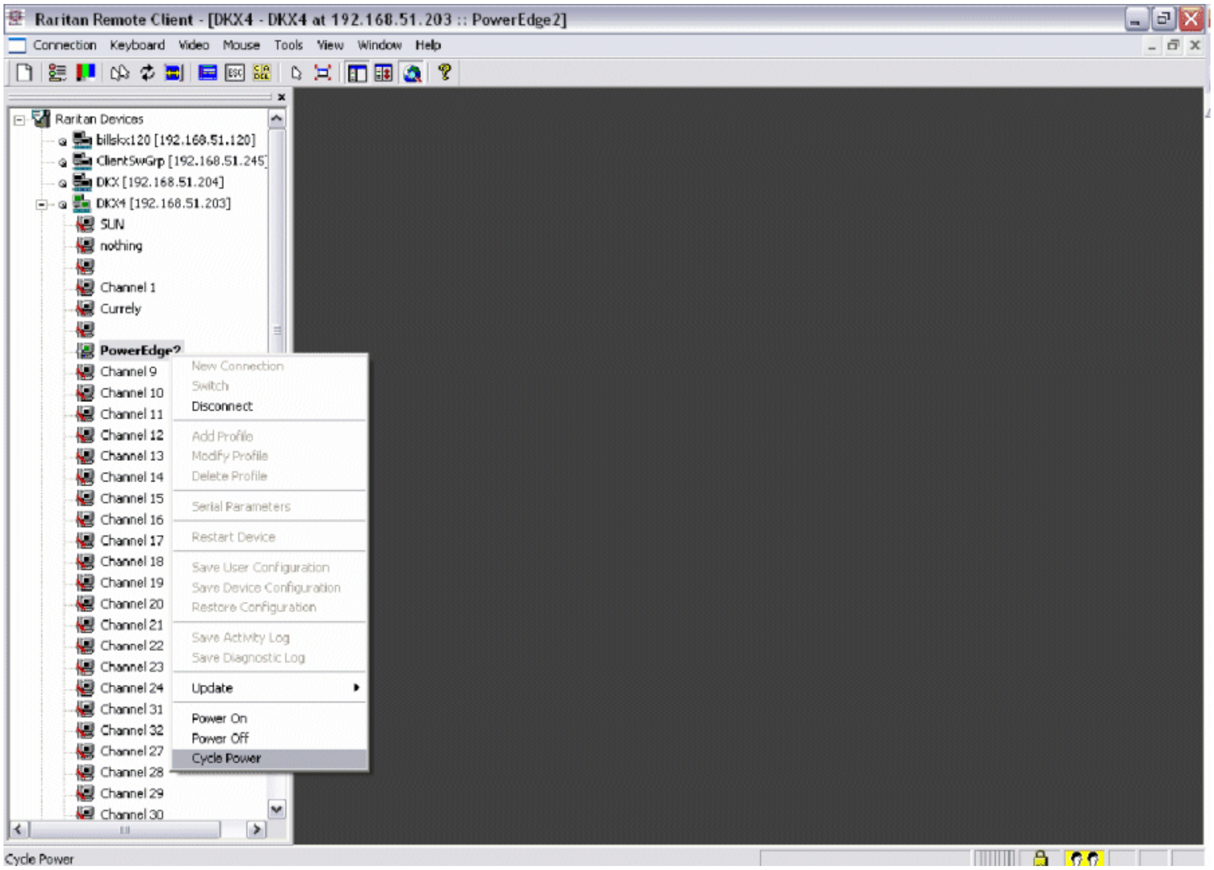
6. Notice the outlet name automatically changes to the target's name.



Controlling a Target's Power

1. Select the target associated with outlets.

2. Select from Power On, Power Off, or Cycle Power options.



Dominion KX II Power Strip Configuration

Configuring Power Strip (Rack PDU) Targets

The KX II allows you to connect power strips (rack PDUs) to KX II ports. KX II power strip configuration is done from the KX II Port Configuration page.

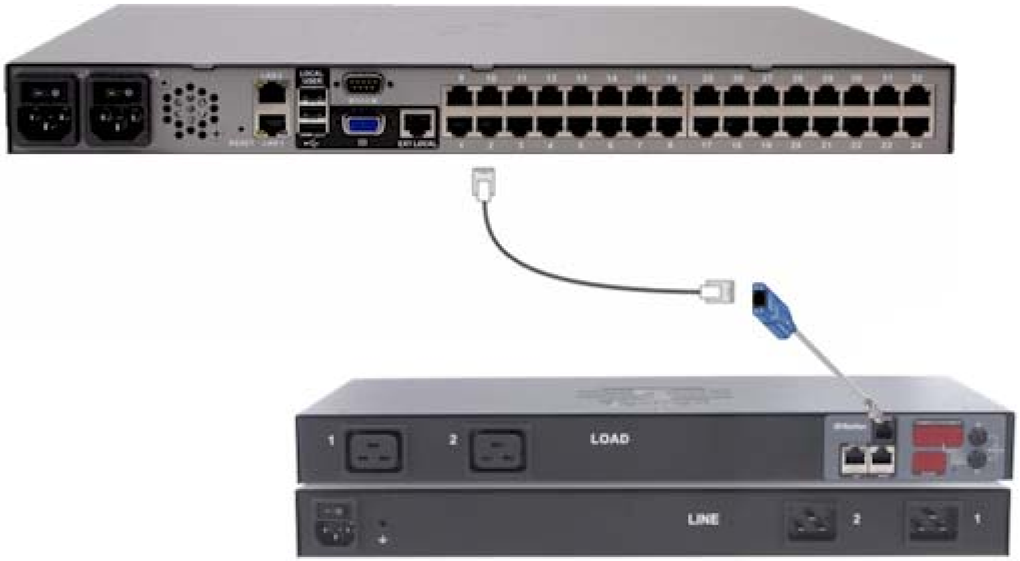
Connecting a Power Strip

Raritan PX series power strips are connected to the KX II using the D2CIM-PWR CIM.

▶ **To connect the power strip:**

1. Connect the male RJ-45 of the D2CIM-PWR to the female RJ-45 connector on the serial port of the power strip.

2. Connect the female RJ-45 connector of the D2CIM-PWR to any of the available female system port connectors on the KX II using a straight through Cat5 cable.
3. Attach an AC power cord to the target server and an available power strip outlet.
4. Connect the power strip to an AC power source.
5. Power on the device.



Naming the Power Strip in the KX II (Port Page for Power Strips)

Note: PX power strips can be named in the PX as well as in KX II.

The Port page opens when you select a port from the Port Configuration page that is connected to a Raritan remote power strip. The Type and the Name fields are prepopulated.

Note: The (CIM) Type cannot be changed.

The following information is displayed for each outlet in the power strip: [Outlet] Number, Name, and Port Association.

Use this page to name the power strip and its outlets. All names can be up to 32 alphanumeric characters and can include special characters.

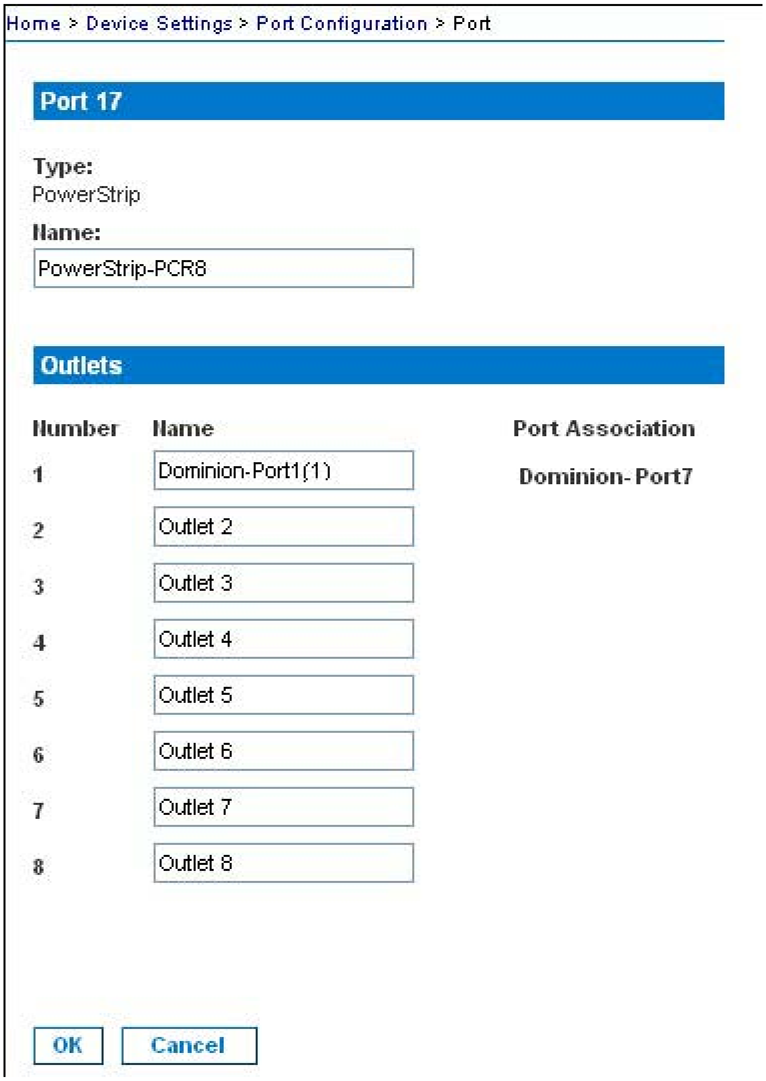
Note: When a power strip is associated with a target server (port), the outlet name is replaced by the target server name (even if you assigned another name to the outlet).

▶ To name the power strip (and outlets):

Note: CommandCenter Service Gateway does not recognize power strip names containing spaces.

1. Enter the Name of the power strip (if needed).
2. Change the [Outlet] Name if desired. (Outlet names default to the outlet #.)

3. Click OK.



Home > Device Settings > Port Configuration > Port

Port 17

Type:
PowerStrip

Name:
PowerStrip-PCR8

Outlets

Number	Name	Port Association
1	Dominion-Port1(1)	Dominion-Port7
2	Outlet 2	
3	Outlet 3	
4	Outlet 4	
5	Outlet 5	
6	Outlet 6	
7	Outlet 7	
8	Outlet 8	

Associating Outlets with Target Servers on KX II

The Port page opens when you click on a port on the Port Configuration page. From this page, you can make power associations, change the port name to something more descriptive, and update target server settings if you are using the D2CIM-VUSB CIM. The (CIM) Type and the (Port) Name fields are prepopulated; note that the CIM type cannot be changed.

A server can have up to four power plugs and you can associate a different power strip with each. From this page, you can define those associations so that you can power on, power off, and power cycle the server from the Port Access page.

To use this feature, you will need:

- Raritan remote power strip(s)
- Power CIMs (D2CIM-PWR)

▶ To make power associations (associate power strip outlets to KVM target servers):

Note: When a power strip is associated to a target server (port), the outlet name is replaced by the target server name (even if you assigned another name to the outlet).

1. Choose the power strip from the Power Strip Name drop-down list.
2. For that power strip, choose the outlet from the Outlet Name drop-down list.
3. Repeat steps 1 and 2 for all desired power associations.
4. Click OK. A confirmation message is displayed.

▶ To change the port name:

1. Type something descriptive in the Name field. For example, the name of the target server would be a likely candidate. The name can be up to 32 alphanumeric characters and can include special characters.
2. Click OK.

Removing Power Associations

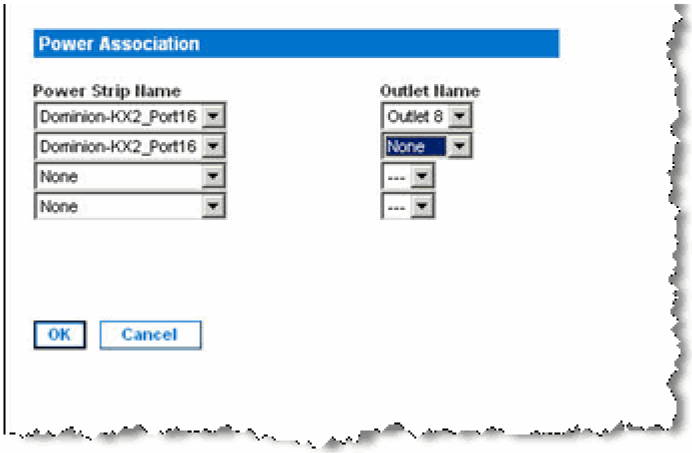
When disconnecting target servers and/or power strips from KXII, all power associations should first be deleted. When a target has been associated with a power strip and the target is removed from the KX II, the power association remains. When this occurs, you are not able to access the Port Configuration for that disconnected target server in Device Settings so that the power association can be properly remove.

▶ To remove a power strip association:

1. Select the appropriate power strip from the Power Strip Name drop-down list.
2. For that power strip, select the appropriate outlet from the Outlet Name drop-down list.
3. From the Outlet Name drop-down list, select None.
4. Click OK. That power strip/outlet association is removed and a confirmation message is displayed.

▶ To remove a power strip association if the power strip has been removed from the target:

1. Click Device Settings > Port Configuration and then click on the active target.
2. Associate the active target to the disconnected power port. This will break the disconnected target's power association.
3. Finally, associate the active target to the correct power port.



Power Association

Power Strip Name	Outlet Name
Dominion-KX2_Port16	Outlet 8
Dominion-KX2_Port16	None
None	---
None	---

Paragon II

Paragon II use requires P2CIM-PWR and straight CAT5 cable. You can associate up to four outlets to a target; all four outlets can be from separate Dominion PX units, if necessary.

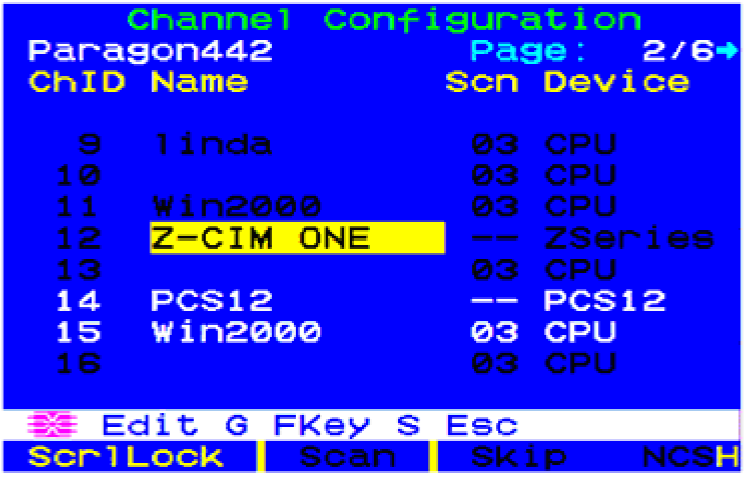
Paragon Manager Application

Use Raritan's Paragon Manager application to configure associations.

1. In Paragon Manager, select the target.
2. Click the target icon and drag-and-drop it on the desired outlets.
3. The outlets are renamed to the associated target's name.
4. To turn on, turn off, or recycle power to the target, click on the target and press the F3 key; select On, Off, or Recycle power from the drop-down menu.

Adding a Dominion PX in Paragon II

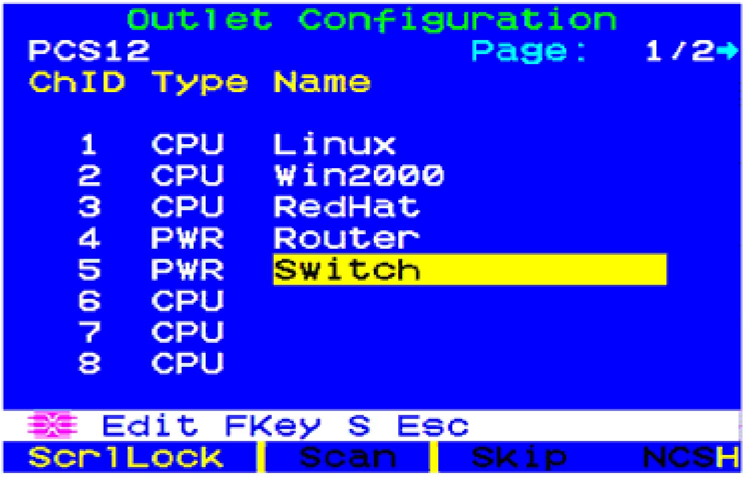
Add a Dominion PX exactly as you would add any second-tier device. Your Paragon II auto-detects the Dominion PX device and changes the device type to PCR8, PCS12, or PCS20. On the OSD screen, press F5 to enter the Channel Configuration page. Select the channel and change the channel name from the default name to an identifying name for the Dominion PX device.



```
          Channel  Configuration
 Paragon442                     Page:   2/6→
 ChID Name                    Scn Device

   9    linda                   03  CPU
  10                            03  CPU
  11    Win2000                 03  CPU
  12    Z-CIM ONE               --  ZSeries
  13                            03  CPU
  14    PCS12                   --  PCS12
  15    Win2000                 03  CPU
  16                            03  CPU

     Edit  G  FKey  S  Esc
 ScrlLock | Scan  | Skip     NCSH
```

Associating Outlets with a Target

On the OSD screen, press the F5 key to enter the Channel Configuration page and select the channel. Press G to enter the special second-tier screen (Outlet Configuration page).



```
        Outlet Configuration
 PCS12                     Page:   1/2→
 ChID Type Name

    1    CPU   Linux
    2    CPU   Win2000
    3    CPU   RedHat
    4    PWR   Router
    5    PWR   Switch
    6    CPU
    7    CPU
    8    CPU

     Edit FKey S Esc
 ScrlLock | Scan | Skip     NCSH
```

Controling a Target's Power

▶ To control a target's power:

1. From either the Channel Selection by Name OR the Channel Selection menus, press F3 to control power. The message X-Power Off; O-Power On; R-Recycle Power appears on the scrolling help line.
2. If no outlets are associated with the server, the message No power outlets appears.
3. If no permissions to outlets associated with the server exist, the message Permission denied appears.
4. Paragon automatically switches to the channel, so that the server is displayed in the background. If the switch fails, the message Switch fail appears.
5. If the switch is successful, all outlets associated with the server are displayed as shown on the left.
6. Select the outlet and presses X, O, or R:
7. If O, execute on command.
8. If X or R, “Are you sure (yes/no)?” displayed. User must type “yes” (case insensitive) in order for command to execute. Type the full word for command to execute.

Controling an Outlet's Power

Use the Channel Selection menus, except for Channel Selection by Name, to navigate to individual Dominion PX ports and control power.

Select an outlet and press X, O, or R:

- If there is no permission to the outlet, the message Permission denied appears.
- If O, executes on command

If X or R, “Are you sure (yes/no)?” displayed. User must type “yes” (case insensitive) in order for command to execute. Typing “Y” or “y” or “ye”, etc. is not acceptable. The full word, “yes” must be typed to execute the command.

Pressing Enter does nothing.

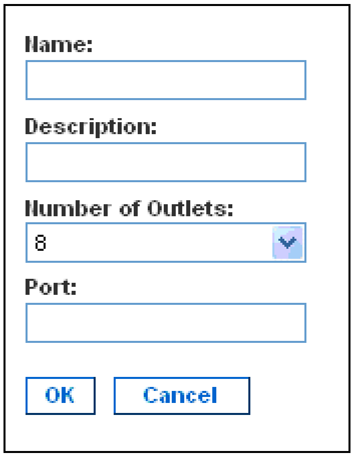
The message X-Power Off; O-Power On; R-Recycle Power should appear on the scrolling help line.

Dominion SX

By connecting to a Dominion SX, you can associate one or more outlets on a Dominion PX to specific DSX ports.

Configuring a Dominion PX on Dominion SX

1. Choose Setup > Power Strip Configuration.
2. Click Add. The Power Strip Configuration screen appears.



Name:

Description:

Number of Outlets: 8

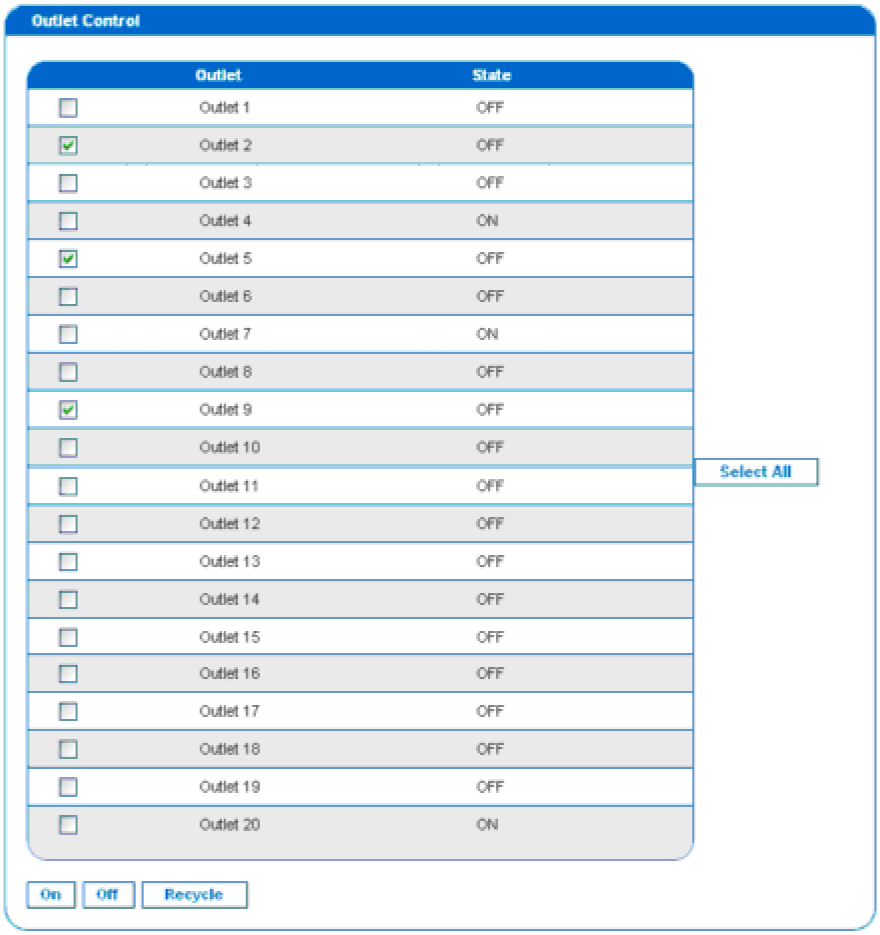
Port:

3. Type a name and description in the Name and Description fields.

4. Select the number of outlets from the Number of Outlets drop-down menu.
5. Type the port number in the Port field.
6. Click OK.

Power Control

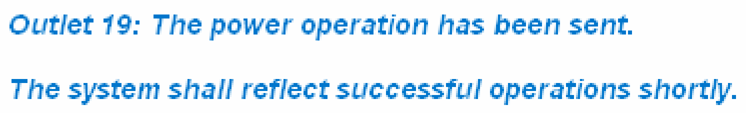
1. Choose Power Control > Power Strip Power Control. The Outlet Control screen appears.



Outlet Control

	Outlet	State
□	Outlet 1	OFF
☑	Outlet 2	OFF
□	Outlet 3	OFF
□	Outlet 4	ON
☑	Outlet 5	OFF
□	Outlet 6	OFF
□	Outlet 7	ON
□	Outlet 8	OFF
☑	Outlet 9	OFF
□	Outlet 10	OFF
□	Outlet 11	OFF
□	Outlet 12	OFF
□	Outlet 13	OFF
□	Outlet 14	OFF
□	Outlet 15	OFF
□	Outlet 16	OFF
□	Outlet 17	OFF
□	Outlet 18	OFF
□	Outlet 19	OFF
□	Outlet 20	ON

2. Check the box of outlet number you wish to control, and click On/Off buttons to power on/off the selected outlet(s).
3. A confirmation message appears, indicating successful operation.

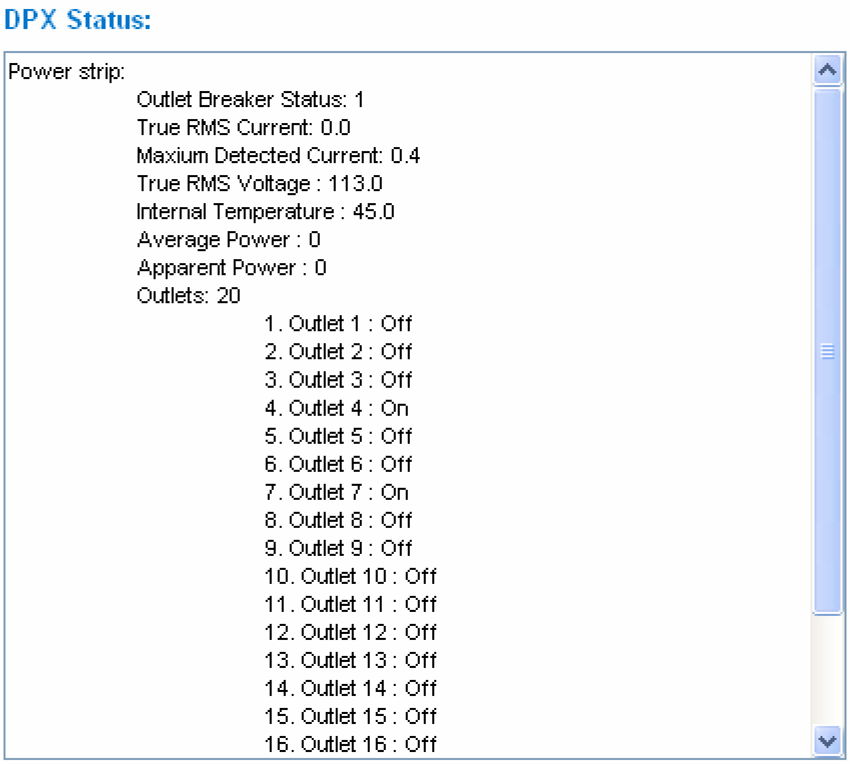


Outlet 19: The power operation has been sent.

The system shall reflect successful operations shortly.

Checking Power Strip Status

1. Choose Power Control > Power Strip Status.



DPX Status:

```
Power strip:
                 Outlet Breaker Status: 1
                 True RMS Current: 0.0
                 Maxium Detected Current: 0.4
                 True RMS Voltage : 113.0
                 Internal Temperature : 45.0
                 Average Power : 0
                 Apparent Power : 0
                 Outlets: 20
                                  1. Outlet 1 : Off
                                  2. Outlet 2 : Off
                                  3. Outlet 3 : Off
                                  4. Outlet 4 : On
                                  5. Outlet 5 : Off
                                  6. Outlet 6 : Off
                                  7. Outlet 7 : On
                                  8. Outlet 8 : Off
                                  9. Outlet 9 : Off
                                  10. Outlet 10 : Off
                                  11. Outlet 11 : Off
                                  12. Outlet 12 : Off
                                  13. Outlet 13 : Off
                                  14. Outlet 14 : Off
                                  15. Outlet 15 : Off
                                  16. Outlet 16 : Off
```

2. A status box appears, displaying details of the controlled Dominion PX, including power state of each outlet on the device.

Dominion KSX

Dominion KSX does not support connectivity with Dominion PX. However, Dominion PX can be managed as a serial target on one of KSX's serial ports, interacting through CLP interface.

Dominion KSX 2 supports Dominion PX integration.

CommandCenter Secure Gateway

You can manage a Dominion PX from a CommandCenter Secure Gateway (CC-SG) if it is connected through any of the following Raritan products:

- Dominion SX
- Dominion KX
- Paragon II

See the **CC-SG Administrators Guide** for more details.

Note: If you have to reboot or power OFF the Dominion PX device while it is integrated with a Raritan product under CC-SG management you should PAUSE MANAGEMENT of the integrated product until the Dominion PX device fully powers ON again. Failure to do so may result in the outlets being deleted from CC-SG's view and your power associations becoming lost when the Dominion PX device is back online.

Direct Control from CC-SG 4.0

CommandCenter Secure Gateway 4.0 can discover Dominion PX units on the local network and can provide direct control over their outlet states (ON, OFF, and recycle).

Appendix A Specifications

In This Chapter

Environmental Specifications

Specification	Measure
Max Ambient Temperature	40 degrees Celsius

Dominion PX Serial RJ-45 Port Pinouts

RJ-45 Pin/signal definition			
Pin No.	Signal	Direction	Description
1	DTR	Output	Reserved
2	GND	—	Signal Ground
3	+5V	—	Power for CIM (200mA, fuse protected)
4	TxD	Output	Transmit Data (Data out)
5	RxD	Input	Receive Data (Data in)
6	N/C	N/C	No Connection
7	GND	—	Signal Ground
6	DCD	Input	Reserved

Dominion PX Feature RJ-12 Port Pinouts

RJ-12 Pin/signal definition			
Pin No.	Signal	Direction	Description
1	+12V	—	Power (500mA, fuse protected)
2	GND	—	Signal Ground
3	RS485 (Data +)	bi-directional	Data Line +
4	RS485 (Data -)	bi-directional	Data Line -
5	GND	—	Signal Ground
6	1-wire		Used for Feature Port

Appendix B Equipment Setup Worksheet

Dominion PX Series Model ______________

Dominion PX Series Serial Number ______________

OUTLET 1	OUTLET 2	OUTLET 3
MODEL	MODEL	MODEL
SERIAL NUMBER	SERIAL NUMBER	SERIAL NUMBER
USE	USE	USE
OUTLET 4	OUTLET 5	OUTLET 6
MODEL	MODEL	MODEL
SERIAL NUMBER	SERIAL NUMBER	SERIAL NUMBER
USE	USE	USE

OUTLET 7	OUTLET 8	OUTLET 9
MODEL	MODEL	MODEL
SERIAL NUMBER	SERIAL NUMBER	SERIAL NUMBER
USE	USE	USE
OUTLET 10	OUTLET 11	OUTLET 12
MODEL	MODEL	MODEL
SERIAL NUMBER	SERIAL NUMBER	SERIAL NUMBER
USE	USE	USE
OUTLET 13	OUTLET 14	OUTLET 15
MODEL	MODEL	MODEL
SERIAL NUMBER	SERIAL NUMBER	SERIAL NUMBER
USE	USE	USE

OUTLET 16	OUTLET 17	OUTLET 18
MODEL	MODEL	MODEL
SERIAL NUMBER	SERIAL NUMBER	SERIAL NUMBER
USE	USE	USE
OUTLET 19	OUTLET 20	OUTLET 21
MODEL	MODEL	MODEL
SERIAL NUMBER	SERIAL NUMBER	SERIAL NUMBER
USE	USE	USE

OUTLET 22	OUTLET 23	OUTLET 24
MODEL	MODEL	MODEL
SERIAL NUMBER	SERIAL NUMBER	SERIAL NUMBER
USE	USE	USE

Types of adapters

____

Types of cables

____

Name of software program

____

Appendix C Using the CLP Interface

This section explains how to use the Command Line Protocol (CLP) interface to administer a Dominion PX device.

In This Chapter

About the CLP Interface

Dominion PX provides a command line interface that enables data center administrators to perform some basic management tasks.

The interface is based on the Systems Management Architecture for Server Hardware (SMASH) Command Line Protocol (CLP).

Using this interface, you can do the following:

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

You can access the interface over a serial connection using a terminal emulation program such as HyperTerminal, or via a Telnet or SSH client such as PuTTY.

Note: Telnet access is disabled by default because it communicates openly and is thus insecure. To enable Telnet, see **Modifying Network Service Settings** *(on page 112).*

Logging in to the CLP interface

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

With HyperTerminal

You can use any terminal emulation programs for local access to the command line interface.

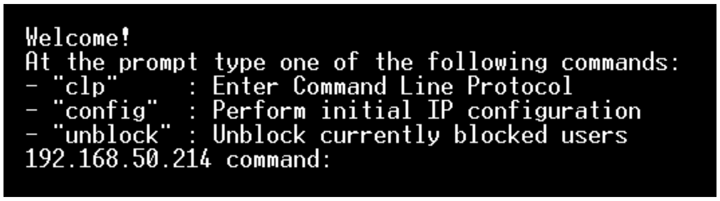
This section illustrates HypterTerminal, which is part of Windows operating systems prior to Windows Vista.

▶ To log in using HyperTerminal:

1. Connect your computer to the serial port on the Dominion PX device via a serial cable.
2. Launch HyperTerminal on your computer and open a console window. When the window first opens, it is blank.

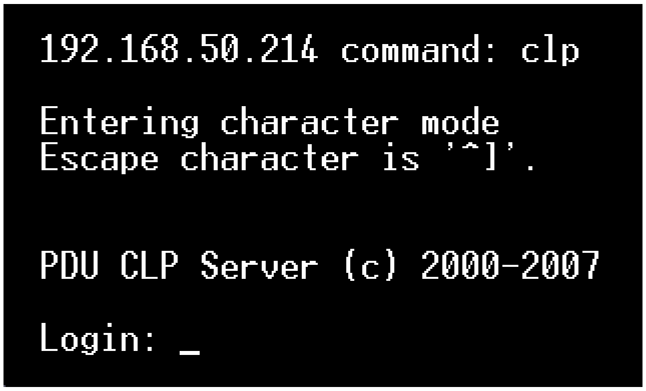
   Make sure serial port settings use this configuration:

   - Bits per second = 9600
   - Data bits = 8
   - Stop bits = 1
   - Parity = None
   - Flow control = None
3. Press Enter. A command prompt appears.



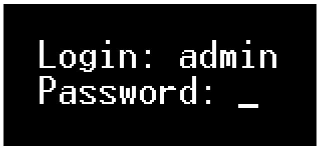
```
Welcome!
At the prompt type one of the following commands:
- "clp"      : Enter Command Line Protocol
- "config"   : Perform initial IP configuration
- "unblock"  : Unblock currently blocked users
192.168.50.214 command:
```

4. At the `command` prompt, type `clp` and press Enter. You are prompted to enter a login name.



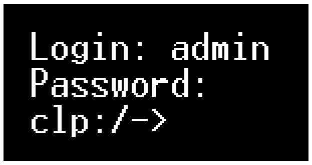
```
192.168.50.214 command: clp

Entering character mode
Escape character is '^]'.


PDU CLP Server (c) 2000-2007

Login: _
```

5. Type a name and press Enter. The login name is case-sensitive, so make sure you capitalize the correct letters. Then you are prompted to enter a password.



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

6. Type a password and press Enter. The password is case sensitive, so make sure you capitalize the correct letters. After properly entering the password, the `clp:/->` system prompt appears.



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

7. You are now logged in to the command line interface and can begin administering the Dominion PX device.

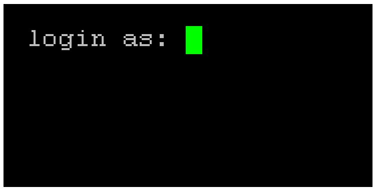
With SSH or Telnet

You can remotely log in to the command line interface using an SSH or Telnet client, such as PuTTY.

Note: PuTTY is a free program you can download from the Internet. See PuTTY's documentation for details on configuration.

To log in using SSH or Telnet:

1. Launch an SSH or Telnet client and open a console window. A login prompt appears.

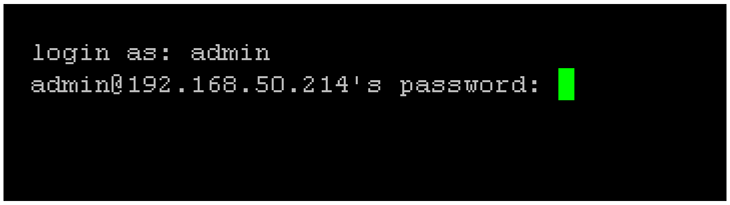


```
login as:
```

2. Type a name and press Enter. The login name is case-sensitive, so make sure you capitalize the correct letters.

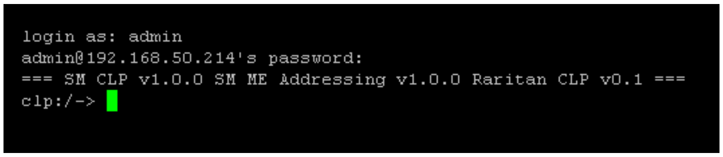
   Note: If using the SSH client, the name must NOT exceed 25 characters. Otherwise, the login fails.

Then you are prompted to enter a password.



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

3. Type a password and press Enter. The password is case sensitive, so make sure you capitalize the correct letters. After properly entering the password, the `clp:/->` system prompt appears.



```
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:/->
```

4. You are now logged in to the command line interface and can begin administering the Dominion PX device.

Closing a Serial Connection

Close the window or terminal emulation program when you finish accessing a Dominion PX device over the serial connection.

When accessing or upgrading multiple Dominion PX PDUs, do not transfer the serial cable from PDU to PDU without closing the serial connection window first.

Showing Outlet Information

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

Note: When displaying outlet information, the outlet names are returned as OUTLET1, OUTLET2, and so on. The CLP interface does not reflect the names assigned to the outlets from the web interface.

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 wildcard 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>
```

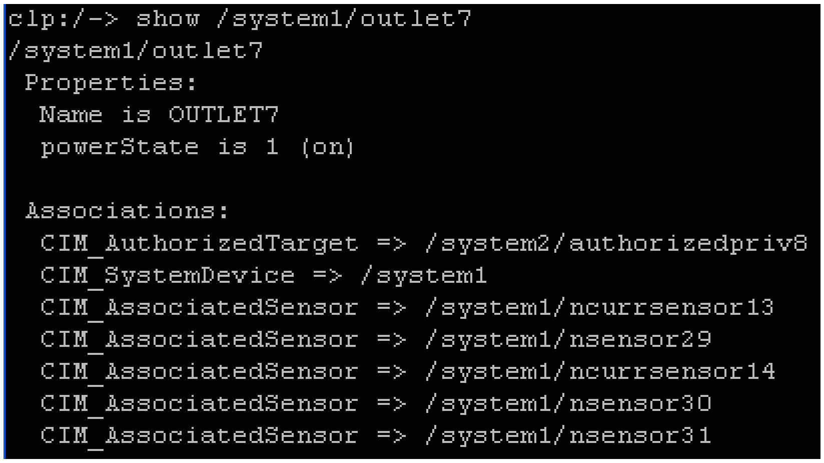
where <outlet number> is the number of the outlet. In both cases, the outlet number can also be a wildcard asterisk (*).

Examples

The following are examples of the show command.

Example 1 - No Attributes

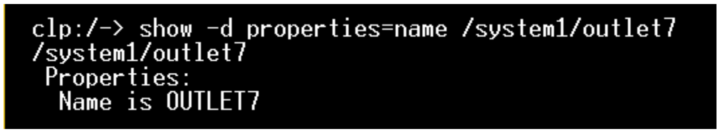
The diagram shows the output of the show command without any attributes entered.



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

 Associations:
  CIM_AuthorizedTarget => /system2/authorizedpriv8
  CIM_SystemDevice => /system1
  CIM_AssociatedSensor => /system1/ncurrsensor13
  CIM_AssociatedSensor => /system1/nsensor29
  CIM_AssociatedSensor => /system1/ncurrsensor14
  CIM_AssociatedSensor => /system1/nsensor30
  CIM_AssociatedSensor => /system1/nsensor31
```

Example 2 - Name Attribute

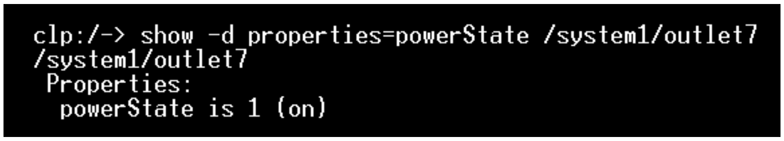
The diagram shows the output of the show command with the name attribute.



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

Example 3 - powerState Attribute

The diagram shows the output of the show command with the powerState attribute.



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

Showing In-Depth Outlet Information

Use the show command to display the RMS Current, Power Factor, Max Current, Active Power and Apparent Power of a specific outlet.

▶ To show in-depth outlet information:

1. Perform the show command on an outlet. This displays the sensors associated with the designated outlet.

2. Perform the show command on sensors associated with the outlet.

Outlet Sensor Properties

When you perform the show command on an outlet sensor, several properties appear.

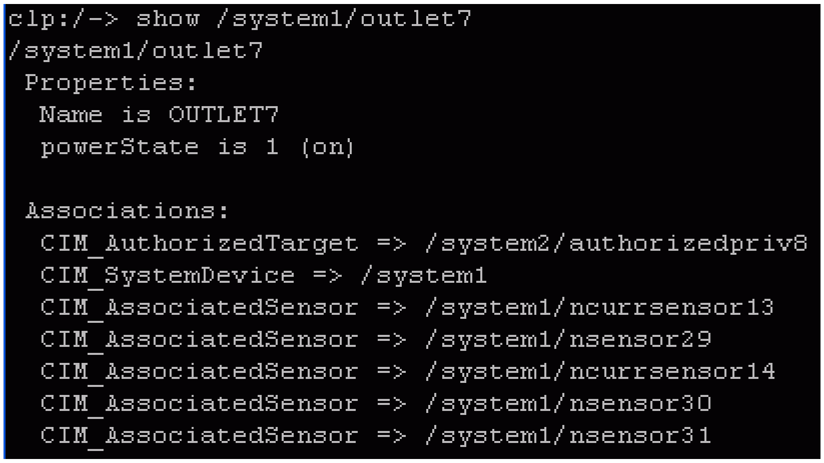
- Name
- Threshold state
- Measurement taken by the sensor

The Name property identifies what a sensor measures.

If the name contains:	The sensor measures:
Current	RMS Current
PwrFactor	Power Factor
Max Curr	Maximum Current
Act. Power	Active Power
Apt. Power	Apparent Power

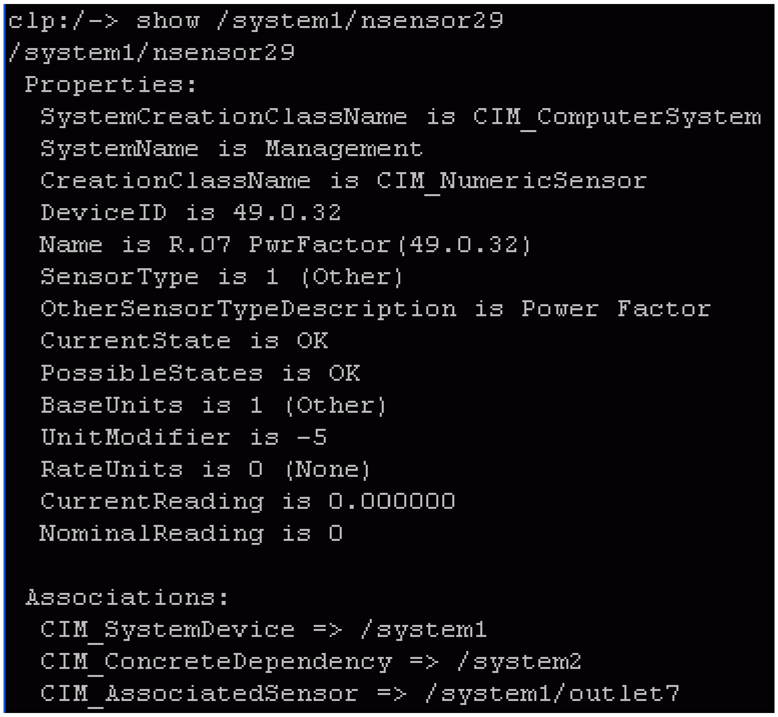
Examples of Showing In-Depth Outlet Information

1. Perform the show command on the outlet without additional attributes.



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

 Associations:
  CIM_AuthorizedTarget => /system2/authorizedpriv8
  CIM_SystemDevice => /system1
  CIM_AssociatedSensor => /system1/ncurrsensor13
  CIM_AssociatedSensor => /system1/nsensor29
  CIM_AssociatedSensor => /system1/ncurrsensor14
  CIM_AssociatedSensor => /system1/nsensor30
  CIM_AssociatedSensor => /system1/nsensor31
```

2. Perform the show command on the associated sensors.



```
clp:/-> show /system1/nsensor29
/system1/nsensor29
 Properties:
  SystemCreationClassName is CIM_ComputerSystem
  SystemName is Management
  CreationClassName is CIM_NumericSensor
  DeviceID is 49.0.32
  Name is R.07 PwrFactor(49.0.32)
  SensorType is 1 (Other)
  OtherSensorTypeDescription is Power Factor
  CurrentState is OK
  PossibleStates is OK
  BaseUnits is 1 (Other)
  UnitModifier is -5
  RateUnits is 0 (None)
  CurrentReading is 0.000000
  NominalReading is 0

 Associations:
  CIM_SystemDevice => /system1
  CIM_ConcreteDependency => /system2
  CIM_AssociatedSensor => /system1/outlet7
```

Switching an Outlet

The set command turns an outlet on or off.

Turning an Outlet On

Using the keyword on turns the outlet on.

```
clp:/->   set /system1/<outlet number> powerState=on
```

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

Turning an Outlet Off

Using the keyword `off` turns the outlet off.

```
clp:/->   set /system1/<outlet number> powerState=off
```

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

Querying an Outlet Sensor

The show command with the keyword *Antecedent* queries an outlet's sensors.

```
clp:/->    Show -d properties=Antecedent /system1/outlet<outlet
           number>=>CIM_AssociatedSensor
```

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

Setting the Sequence Delay

The set command can change the sequence delay for all outlets.

```
clp:/->    set /system1 powerOnDelay=X
```

where X represents the number in the time scale of 100ms. For example, `powerOnDelay=2` means the sequence delay is set to 200ms, and `powerOnDelay=10` means the sequence delay is set to 1000ms (1 second).

Resetting the Dominion PX Device

The reset command restarts the Dominion PX management application only. The power state of individual outlets remains unchanged.

This command is not a factory reset.

```
clp:/->    reset /system1
```

Appendix D Using SNMP

This SNMP section helps you set up Dominion PX for use with an SNMP manager. Dominion PX 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.

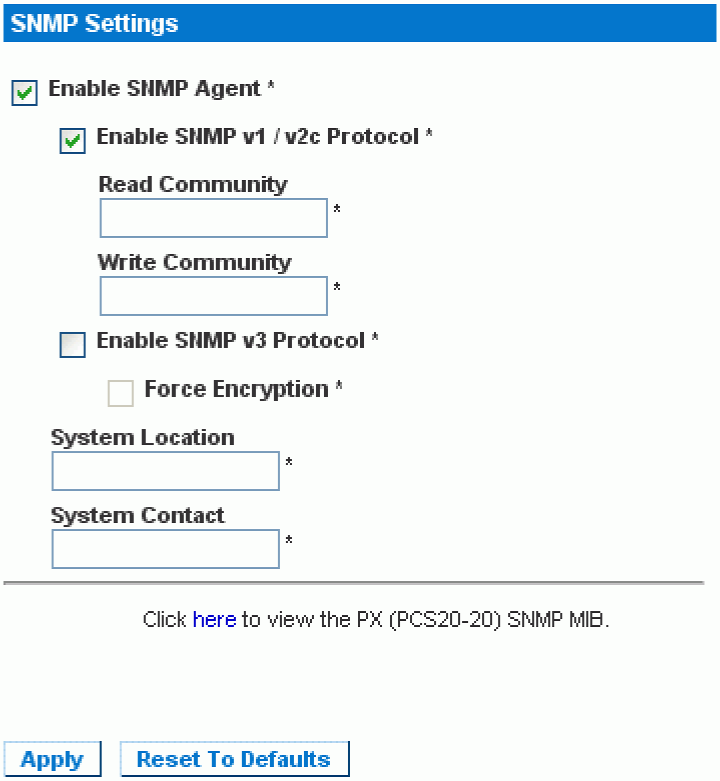
In This Chapter

Enabling SNMP

To communicate with an SNMP manager, you must first enable the SNMP agent on the Dominion PX device.

▶ To enable SNMP:

1. Choose Device Settings > SNMP Settings. The SNMP Settings window opens.



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.

2. Select the Enable SNMP Agent checkbox to enable Dominion PX to communicate with external SNMP managers. A number of options become available.
3. Select the Enable SNMP v1 / v2c Protocol checkbox to enable communication with an SNMP manager using SNMP v1 or v2c protocol. 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 the Enable SNMP v3 Protocol checkbox to enable communication with an SNMP manager using SNMP v3 protocol.
   - Additionally, select the Force Encryption checkbox to force using encrypted SNMP communication.

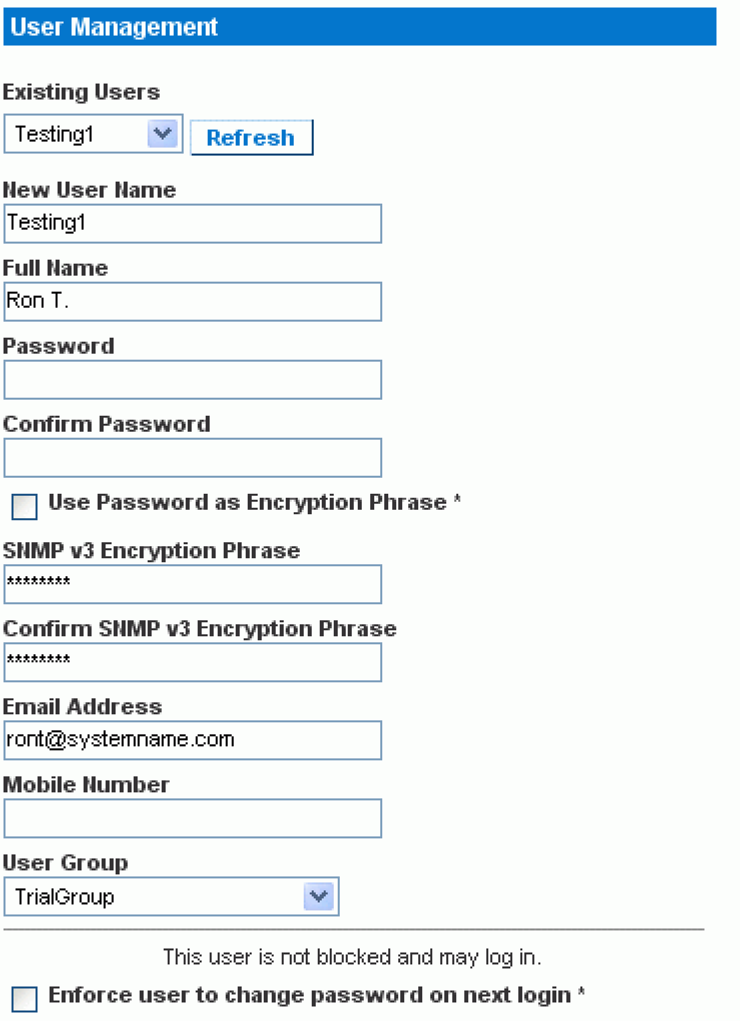
5. Type the SNMP MIBII sysLocation value in the System Location field.
6. Type the SNMP MIBII sysContact value in the System Contact field.
7. Click on the link at the bottom of the window to download an SNMP MIB for your Dominion PX to use with your SNMP manager.
8. Click Apply. The SNMP configuration 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 an Encryption Phrase, which acts as a shared secret between them and Dominion PX. This encryption phrase can be set in the User Management page.

▶ To configure users for SNMP v3 encrypted communication:

1. Choose User Management > Users & Groups. The User/Group Management window opens.



User Management

Existing Users

Testing1 ▾ Refresh

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 *

2. Select the user profile you want to modify from the drop-down list in the Existing Users field.

3. Type a new password for the user if necessary. The user password must be at least 8 characters long to use SNMP v3.

4. To use the user's password as the Encryption Phrase, select the Use Password as Encryption Phrase checkbox.
5. To specify a different encryption phrase, deselect this checkbox. Type a new phrase in the SNMP v3 Encryption Phrase field, then type it again in the Confirm SNMP v3 Encryption Phrase field. The SNMP v3 Encryption phrase must be at least 8 characters long.
6. Click Modify. The user is now set up for encrypted SNMP v3 communication.

Note: The admin user is the only member of the Admin group to have SNMP v3 access. All other users must be added to a different user group with SNMP v3 Access permissions in order to have SNMP v3 access.

Restarting the SNMP Agent after Adding Users

If you have just added or re-configured a user for SNMP v3 access, you must restart the Dominion PX SNMP agent before the user can log in with SNMP v3 access.

▶ **To restart the SNMP agent after adding users:**

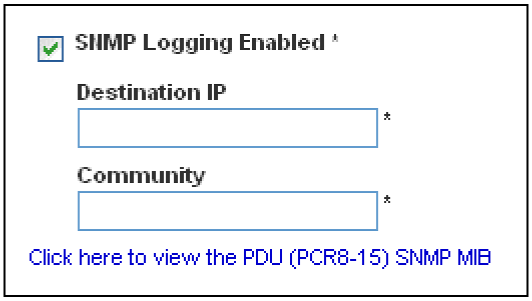
1. Choose Device Settings > SNMP Settings. The SNMP Settings window opens.
2. De-select the Enable SNMP Agent checkbox.
3. Click Apply to disable the SNMP agent.
4. Select the Enable SNMP Agent checkbox.
5. Click Apply to re-enable the SNMP agent.

Configuring SNMP Traps

Dominion PX automatically keeps an internal log of events that occur. See ***Setting Up Event Logging*** (on page 100). These events can also be used to send SNMP traps to a third party manager.

▶ **To configure Dominion PX 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

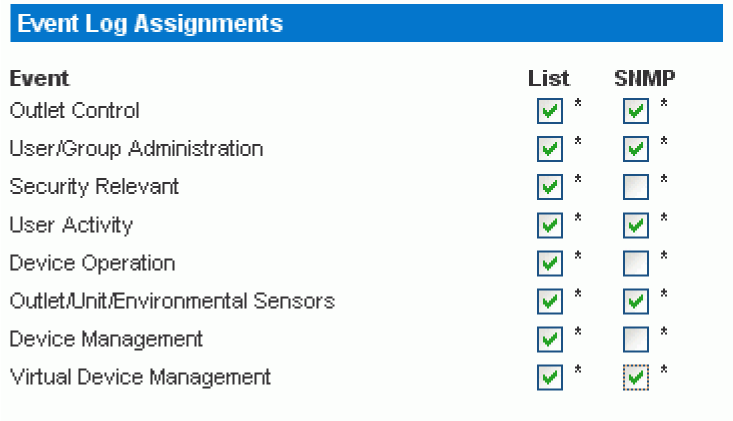
[ ] *

Community

[ ] *

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

2. Select the SNMP Logging Enabled checkbox.
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 Dominion PX and all SNMP management stations.
5. To take a look at the Management Information Base (MIB), click the link labeled 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 appear in the Event Log Assignments panel to the right. All are disabled by default. To enable any of these event types, select the appropriate checkboxes.



Event Log Assignments

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

7. Click Apply. SNMP logging is configured.
8. From the Maintenance tab, select Unit Reset to reset the Dominion PX device. You must reset Dominion PX when enabling SNMP logging or changing the Destination IP address. If you do not, traps are not sent to the Destination IP address.

Note: You should update the MIB used by your SNMP manager when updating to a new Dominion PX release. This ensures your SNMP manager has the correct MIB for the release you are using.

SNMP Gets and Sets

In addition to sending traps, Dominion PX is able to receive SNMP get and set requests from third-party SNMP managers.

- Get requests are used to retrieve information about Dominion PX, such as the system location, and the current on a specific outlet.
- Set requests are used to configure a subset of the information, such as the SNMP system name.

Note: The SNMP system name is the Dominion PX device name. When you change the SNMP system name, the device name shown in the web interface is also changed.

You must target only one item at a time with SNMP set requests. Any attempt to configure multiple targets with a single set request results in all targets receiving the last assigned value. For example, if you use SNMP to set the status of Outlet 1 to ON and Outlet 4 to OFF, both Outlet 1 and Outlet 4 are set to OFF.

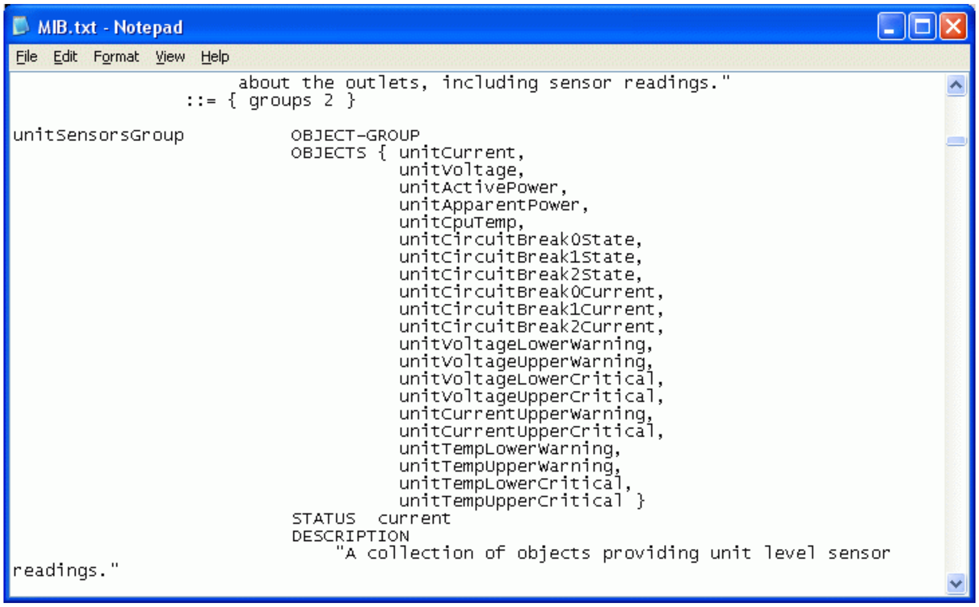
Valid objects for these requests are limited to those found in the SNMP MIB-II System Group and the custom Dominion PX MIB.

The Dominion PX MIB

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

Layout

Opening the MIB reveals the custom objects that describe the Dominion PX 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 appear 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
readings."
```

For example, the unitSensorsGroup group contains objects for sensor readings of the Dominion PX 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 Dominion PX. 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).

SNMP Sets and Thresholds

Some objects can be configured from the SNMP manager using SNMP set commands. Objects that can be configured have a MAX-ACCESS level of "read-write" in the MIB. These objects include threshold objects, causing Dominion PX to generate a warning and send an SNMP trap when certain parameters are exceeded. See ***Setting up Outlets and Power Thresholds*** (on page 73) for a description of how thresholds work.

Note: When configuring the thresholds via SNMP set commands, ensure the value of upper critical threshold is higher than that of upper non-critical threshold.

Disabling Outlet Switching

Using the SNMP SET command, you can disable the switching of outlet states on your Dominion PX device.

For any Dominion PX device not implemented with the outlet switching function, such as an in-line monitor, you should always disable the switching function.

Refer to the Dominion PX MIB for more details.

This feature is configurable through SNMP only. Firmware upgrade does not affect this setting.

Retrieving Energy Usage

You can discover how much energy an IT device consumes by retrieving the Active Energy for the outlet this IT device is plugged into. An SNMP manager can send an SNMP get request for an outlet's outletWattHours value. The value returned is the number of WattHours consumed by the target outlet.

Appendix E Using the IPMI Tool Set

The IPMI tool set is command-line that allows users to display channel information, print sensor data, and set LAN configuration parameters. The following explains the available IPMI commands.

Note: The open source IPMI tool can be downloaded from sourceforge, and compiled on Linux system .Then users can interact with Dominion PX via 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

In This Chapter

Channel Commands

authcap <channel number> <max priv>

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

1. Callback level
2. User level
3. Operator level
4. Administrator level
5. OEM Proprietary level

Example

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

See **IPMI Privileges Levels** for additional information about IPMI privileges.

info [channel number]

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

Example

```
$ ipmitool -I lan -H 192.168.51.58 -U admin -a channel
info
```

getaccess <channel number> [userid]

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

Example

```
$ ipmitool -I lan -H allen-dpxpcr20-20 -U admin -P
raritan1 channel getaccess 14 63
```

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

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

Example

```
$ ipmitool -I lan -H allen-dpxpcr20-20 -U admin -P
raritan1 channel setaccess 14 63 privilege=5
```

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

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

Example

```
$ ipmitool -I lan -H allen-dpxpcr20-20 -U admin -P
raritan1 channel getciphers ipmi 14
```

Event Commands

The Event commands allow you to send pre-defined events to a Management Controller.

<predefined event number>

Sends a pre-defined event to the System Event Log. The Currently supported values for are:

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

Note: These pre-defined events usually do not produce "accurate" SEL records for a particular system because they will not be correctly tied to a valid sensor number. However, they are sufficient to verify correct operation of the SEL.

Example

```
$ ipmitool -I lan -H allen-dpxpcr20-20 -U admin -P
raritan1 event 1
```

file <filename>

Event log records specified in filename is 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>

Prints the current configuration for the given channel.

set <channel> <parameter>

Sets the given parameter on the given channel. Valid parameters are:

- *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 userids for a given channel).
- *access <on|off>* Set LAN channel access mode.
- *ipsrc* Ses 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.
- *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 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

Lists sensors and thresholds in a wide table format.

Example

```
$ ipmitool -I lan -H allen-dpxpcr20-20 -U admin -a sensor
list
```

get <id> ... [<id>]

Prints information for sensors specified by name.

Example

```
$ ipmitool -I lan -H allen-dpxpcr20-20 -U admin -P
raritan1 sensor get "R.14 Current"
```

thresh <id> <threshold> <setting>

This allows you to set 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
- *lnc* Lower Non-Critical
- *lcr* Lower Critical
- *lnr* Lower Non-Recoverable

Example

```
$ ipmitool -I lan -H allen-dpxpcr20-20 -U admin -P
raritan1 sensor thresh "R.14 Current" unr 10.5
```

OEM Commands

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

OEM Net-Fn is as defined below:

```
#define IPMI_NETFN_OEM_PP       0x3C
```

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

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

A Note About Group Commands

When sending Group commands, a valid group number (0 through 23, or 255) must be used. Only the group number itself can be sent, alpha-numeric expressions for group numbers are incorrect, and cause the command to be ignored.

For example, sending the following is incorrect:

```
#ipmitool -H 192.168.80.43 -U admin -P pass raw 0x3c 0x14
grp2 0
```

Dominion PX ignores this command.

Set Power On 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 receptacle is switched on after a previous receptacle has been switched on.
Response Data	1	Completion Code

Get Power On Delay Command

Request Data	-	-
Response Data	1	Completion Code
	2	delay in 1/10 seconds

Set Receptacle State Command

This command is used to switch on/off and recycle individual receptacles.

Request Data	1	# of receptacle [7 - 5] reserved [4 - 0] # of receptacle, 0 based, highest valid # depends on device model
	2	new state [7 - 2] reserved [1] 1b = recycle, ignoring [0], 0b = get new state from [0] [0] 1b = power on, 0b = power off
Response Data	1	Completion Code

Get Receptacle State Command

Request Data	1	# of receptacle [7 - 5] reserved [4 - 0] # of receptacle, 0 based, highest valid # depends on device model
Response Data	1	Completion Code
	2	current receptacle state and visual state

Request Data	1	# of receptacle [7 - 5] reserved [4 - 0] # of receptacle, 0 based, highest valid # depends on device model
		[7] reserved [6] 1b = blinking, 0b = steady [5] 1b = LED green on, 0b = off [4] 1b = LED red on, 0b = off [3] 1b = enqueued to be switched on, 0b = not enqueued [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

Get Receptacle State and Data Command

Request Data	1	# of receptacle [7 - 5] reserved [4 - 0] # of receptacle, 0 based, highest valid # depends on device model
Response Data	1	Completion Code
	2	current receptacle 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 = enqueued to be switched on, 0b = not enqueued [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
	3	Number of bytes of data = 2 or 6
	4	Apparent Power
	5	Active Power

Request Data	1	# of receptacle [7 - 5] reserved [4 - 0] # of receptacle, 0 based, highest valid # depends on device model
	6-9	Active Energy, LSB First

Set Group State Command

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

Request Data	1	# of group [7 - 5] reserved [4 - 0] group #, valid numbers: 0 - 23, 255
	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	# of group [7 - 5] reserved [4 - 0] group #, valid numbers: 0 - 23, 255
	2	[7 - 1] reserved [0] 1b = enable group, 0b = disable group
	3	[7] 1b = receptacle 7 belongs to group ... [0] 1b = receptacle 0 belongs to group

Request Data	1	# of group [7 - 5] reserved [4 - 0] group #, valid numbers: 0 - 23, 255
	4	[7] 1b = receptacle 15 belongs to group ... [0] 1b = receptacle 8 belongs to group
	5	[7] 1b = receptacle 23 belongs to group ... [0] 1b = receptacle 16 belongs to group
Response Data	1	Completion Code

Get Group Membership Command

Request Data	1	# of group [7 - 5] reserved [4 - 0] group #, valid numbers: 0 - 23, 255
Response Data	1	Completion Code
	2	[7 - 1] reserved [0] 1b = group is enabled, 0b = group is disabled
	3	[7] 1b = receptacle 7 belongs to group ... [0] 1b = receptacle 0 belongs to group
	4	[7] 1b = receptacle 15 belongs to group ... [0] 1b = receptacle 8 belongs to group
	5	[7] 1b = receptacle 23 belongs to group ... [0] 1b = receptacle 16 belongs to group

Set Group Power On Delay Command

Request Data	1	# of group [7 - 5] reserved [4 - 0] group #, valid numbers: 0 - 23, 255

Request Data	1	# of group [7 - 5] reserved [4 - 0] group #, valid numbers: 0 - 23, 255
	2	delay in 1/10 seconds This delay overwrites the global delay for all receptacles in that group. The delay applies not only when using the Set Group State Command but also when using Set Receptacle State Command.
Response Data	1	Completion Code

Get Group Power On Delay Command

Request Data	1	# of group [7 - 5] reserved [4 - 0] group #, valid numbers: 0 - 23, 255
Response Data	1	Completion Code
	2	delay in 1/10 seconds

Set Receptacle ACL

ACLs define who is authorized to change the state of a receptacle. ACLs are stored for each individual outlet. A single ACL entry defines whether a certain user id or privilege level is allowed or denied to issue control commands for the outlet. ACL are evaluated top to bottom, hence order of ACL entries is important. If there is no ACL entry at all, receptacle ACLs are disabled, i.e. any user id has access.

Request Data	1	# of receptacle
	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 Receptacle ACL

Request Data	1	# of receptacle

Request Data	1	# of receptacle
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]

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	# of receptacle (0xFF for global unit delay)
	2	Delay (seconds), 1-255 for unit and receptacle, 0 fallback to unit delay (receptacle only)
Response Data	1	Completion Code

Get Power Cycle Delay Command

Request Data	1	# of receptacle (0xFF for global unit delay)
Response Data	1	Completion Code
	2	Delay (seconds), 1-255, 0 if not set (receptacle only)

Note: Values greater than 255 cannot be sent to Dominion PX via IPMI. To set the Power Cycle Delay to longer than 255 seconds, use the web interface.

IPMI Privilege Levels

The IPMI privilege level that you select determines:

	IPMI Privilege Level:					
	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 Setting	No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
SNMP Setting	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

	IPMI Privilege Level:					
	No Access	**Callback**	**User**	**Operator**	**Administrator**	**OEM**
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

Appendix F 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 non-critical 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

Appendix G Hysteresis Values for Thresholds

This table describes the hysteresis values for each type of measurement. Values must recede past the threshold by the given value before Dominion PX de-asserts the condition. When Hysteresis is disabled, all values continue to apply except for Outlet Current.

Measurement	Lower Critical	Lower Non-Critical	Upper Critical	Upper Non-Critical
Outlet RMS Current (Amps)	+1	+1	-1	-1
Unit/Line RMS Voltage (Volts)	+5	+5	-5	-5
Unit/Line RMS Current (Amps)	-	-	-1	-1
Circuit Breaker Current (Amps)	-	-	-1	-1
PDU Temperature (Degrees Celsius)	+1	+1	-1	-1
Environmental Temperature (Degrees Celsius)	+2	+2	-2	-2
Environmental Humidity (%)	+1	+1	-1	-1

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