Switched Power Distribution Unit (PDU)

Installation and Operations Manual

Firmware Release 7.0

- SH081-1D1
- SH082-1C2
- SV161-1D1
- SV241-1D1
- SV242-1C2
- SV243-1F3
- SV243-1H4
- SV243-1J4
- SV243-1K4
- SV243-1L4
Safety Notices
This section contains important safety notices. Please read carefully as improper handling of the product may result in serious personal injury and/or termination of warranty.

WARNING - TO AVOID DEATH VIA ELECTROCUTION OR SERIOUS INJURY VIA SHOCK: Never open the product’s enclosure and never attempt to replace or repair and internal part! Any attempt to repair the product or install or replace components by an unauthorized person will cause the product warranty to be void. For help, please contact Leviton Technical Support at 1-800-824-3005.

Instructions
This symbol is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

Dangerous Voltage
This symbol is intended to alert the user to the presence of un-insulated dangerous voltage within the product’s enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

Protective Grounding Terminal
This symbol indicates a terminal that must be connected to earth ground prior to making any other connections to the equipment.

Life-Support Policy
As a general policy, it is not recommended that the products be used in the following situations:

- life-support applications where failure or malfunction of the Leviton product can be reasonably expected to cause failure of the life-support device or to significantly affect its safety or effectiveness.
- direct patient care.

Products will not knowingly be sold for use in such applications unless it receives in writing assurances satisfactory to Leviton that:

- the risks of injury or damage have been minimized,
- the customer assumes all such risks, and
- the liability of Leviton is adequately protected under the circumstances.

The term life-support device includes but is not limited to neonatal oxygen analyzers, nerve stimulators (whether used for anesthesia, pain relief or other purposes), auto-transfusion devices, blood pumps, defibrillators, arrhythmia detectors and alarms, pacemakers, hemodialysis systems, peritoneal dialysis systems, neonatal ventilator incubators, ventilators (for adults or infants), anesthesia ventilators, infusion pumps, and any other devices designated as “critical” by the U.S. FDA.

Please Recycle
Shipping materials are recyclable. Please save them for later use, or dispose of them appropriately.
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Chapter 1: Introduction

Quick Installation Checklist

The following instructions will help you quickly install and configure your Switched PDU for use in your data center equipment cabinet.

1. Mount the Switched PDU
2. Connect to the power source
3. Connect the devices
4. Connect the sensors
5. Connect to the Switched PDU
6. Configure the Switched PDU
   - Login as the predefined Administrator (admin/admin)
   - Configure the network settings
   - Create new administrative user account
   - Configure location and Switched PDU names
   - Configure sensor names
   - Configure new user account(s)
   - Remove the predefined Administrator
7. Connect the Switched PDU to the network.

Technical Support

For Product Support or Technical Issues:

- Network Solutions
- Mon-Fri 6:30 AM-5:00 PM Pacific Time
- Toll-free: 1-800-824-3005, select option #1
- Email appeng@leviton.com
- www.leviton.com

For International Customers:

- Mon-Fri 6:00 AM-5:00 PM Pacific Time
- Phone: 1-425-486-2222
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All other international inquiries:  international@leviton.com

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Installation and Operations Manual
**Equipment Overview**

1. The power inlet/cord(s) connect the PDU to the electrical power source.
2. The Input Current LED(s) displays the current load for each infeed or electrical phase per infeed.
3. Two RJ45 connectors for Serial (RS-232) and Ethernet connection.
4. Two mini RJ11 connectors for Temperature/Humidity sensors
   
   Each Branch Circuit / electrical phase is clearly labeled for easy identification.
   
   A number is printed above each outlet. These numbers may be used in commands that require an outlet name. See Outlet Naming and Grouping in Chapter 3: Operations for more information.

---

**Figure 1. Switched Power Distribution Unit (PDU)**
IPv6 and Switched Power Distribution Unit (PDU) Products

IPv6 has been designed to succeed IPv4 as the dominant communications protocol for internet traffic, to avoid depletions of the IPv4 address space, and to allow more IP address growth. Many devices already in use support IPv6.

IPv6 has several new operational methods:

- Static IPv6 Address: The IPv6 equivalent of Static IPv4.
- DHCPv6 Address: The IPv6 equivalent of a DHCP IPv4 address, also known as a “stateful” auto-configuration of DHCPv6.
- IPv6 Stateless Auto-Configured Address – (RFC 4862): An automatically-generated unique link-local IPv6 address used for client based configurations. This address is always present in the Server Technology dual stack and cannot be disabled.
- DHCPv6 Stateless Auto-Configured Address – (RFC 3736): A “stateless” Dynamic Host Configuration Protocol (DHCP) service for IPv6 (DHCPv6). This address is used by nodes to obtain configuration information, such as addresses of DNS recursive name servers that do not require the maintenance of any dynamic state for individual clients.

PDU Firmware – Protocol Support

IPv6 and IPv4 Protocols:

The PDU firmware supports the following network IPv6 and IPv4 protocols:

- DNS Ping
- FTP Server SNMPv1/2/3
- FTP Updates SNTP
- HTTP HTTPS
- SMTP
- Static IPv6 DHCPv6 (stateless and stateful)
- Syslog SNMPv1/2/3 Traps
- Telnet SSH

IPv4-Only Protocols:

The PDU firmware supports the following network IPv4-only protocols:

- Cisco EnergyWise
- LDAP
- Load Shedding *
- RADIUS *
- TACACS+

* = may work with IPv6 addresses, but not tested.
Network-Enabled Modes

NOTES:

- For all network-enabled modes described below, the PDU will set an auto-configured IPv6 address, and if IPv6 router announcements are active, a stateless DHCP IPv6 address will also be set. Further, in all network-enabled modes, at least one IPv4 or one IPv6 address will be active.
- For maximum backward compatibility, the default network mode is “IPv4 only”.

- Network disabled – No IPv4 or IPv6 addresses available.
- IPv4 only, DHCP disabled (static IPv4) – If the IPv4 Static Address and Net Mask of the PDU are valid, they will be set.
- IPv4 only, DHCP enabled (DHCP IPv4) – The PDU will try to resolve an IPv4 DHCP address. If a DHCP address cannot be obtained after 90 seconds, the PDU can: (1) optionally fall back to its static IPv4 settings, or (2) indefinitely wait to acquire an address based on DHCP configuration settings. This setting is the default.
- Dual IPv6/IPv4, DHCP disabled (static IPv6/IPv4) – If the IPv6 Static Address and prefix of the PDU are valid, they will be set. Otherwise, the PDU will attempt to use DHCPv6 to obtain an IPv6 address. In addition, if the IPv4 Static Address and Net Mask of the PDU are valid, they will be set.
- Dual IPv6/IPv4, DHCP enabled (DHCP IPv6/IPv4) – The PDU will try to resolve both its IPv6 and IPv4 addresses by DHCP. If both DHCP requests are answered, the primary DNS server of the PDU will become the primary IPv6 DNS server, and the secondary DNS server of the PDU will become the primary IPv4 DNS server.

If only one of the DHCP requests is answered, the DNS servers of the PDU will map to the primary and secondary DNS server from that request.

If a DHCP address cannot be obtained after 90 seconds, the PDU can: (1) optionally fall back to its static IPv4 and/or IPv6 settings, or (2) indefinitely wait to acquire an address based on DHCP configuration settings.
Viewing Network Status

You can obtain the IPv6 network status through the firmware Web Interface or Command Line Interface (CLI). For the CLI, use the `show network` command as follows:

Switched PDU: show network

Network Settings

- State: DHCP IPv6/IPv4
- Network: Dual IPv6/IPv4
- Link: Up
- Negotiation: Auto
- Speed: 100 Mbps
- Duplex: Full

AutoCfg
- IPv6: FE80::20A:9CFF:FE52:4104/64
- IPv4 Address: 10.1.6.230
- Subnet Mask: 255.255.0.0
- IPv4 Gateway: 10.1.1.1
- DNS1: FD01::A01:585
- DNS2: 10.1.5.133

Static IPv4/IPv6 Settings

- IPv6 Address: FD01::A01:353/64
- IPv4 Address: 10.1.2.253
- Subnet Mask: 255.255.0.0
- IPv4 Gateway: 10.1.1.1
- DNS1: 10.1.5.133
- DNS2: 10.1.5.134

DHCP Settings

- DHCP: Enabled
- FQDN: Enabled [sentry3-524104]
- Boot Delay: Enabled
- Static Fallback: Enabled

Network Services

- Telnet: Enabled Port: 23
- SSH: Enabled Port: 22 Auth: Password, Kb-Int
- HTTP: Enabled Port: 80
- SSL: Enabled Port: 443 Access: Optional
- SNMPv1/2: Enabled Port: 161 TrapPort: 162
- SNMPv3: Disabled Port: 161 TrapPort: 162
- FTP Server: Enabled Port: 21
- SPM Access: Enabled

Command successful

NOTE: The fields IPv4 Address, IPv4 Subnet Mask, IPv4 Gateway, DNS1, and DNS2 are equivalent to existing PDU IPv4 settings except that current network settings and static settings are displayed separately. This allows you to view both static configuration settings and active network settings that can be obtained using DHCP. The DNS addresses may be in IPv4 or IPv6 (based on RFC4291) format at this time.
Chapter 2: Installation

Before installing your Leviton Switched Power Distribution Unit (PDU), refer to the following lists to make sure you have all the items shipped with the unit, as well as other items needed for proper installation.

### Standard Accessories

- Mounting hardware:
  - **Vertical models** - Button mounts with M4 screws.
  - **Horizontal models** - Two removable L-brackets with M4 screws.

Please call Technical Support from 6:30AM to 4:30 PM, Monday–Friday, Pacific Time for additional information:
Tel: 1.800.824.3005

### Optional Accessories

- Temperature/Humidity sensors

### Additional Required Items

- Flathead and Phillips screwdrivers
- Screws, washers, and nuts to attach the PDU to your rack
### Safety Precautions

This section contains important safety and regulatory information that should be reviewed before installing and using the Power Distribution Unit (PDU). For input and output current ratings, see Power Ratings in Appendix C: Technical Specifications.

<table>
<thead>
<tr>
<th>Precaution</th>
<th>Spanish Translation</th>
<th>English Translation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>WARNING-TO AVOID DEATH VIA ELECTROCUTION OR SERIOUS INJURY VIA SHOCK:</strong> Always disconnect the power supply cord before opening.</td>
<td><strong>ATENCIÓN:</strong> NO DESCONECTE LA CORRIENTE A LA UNIDAD ANTES DE ABRIRLA.</td>
<td>Attempting to install or maintain the PDU without disconnecting power can result in electrocution or serious injury.</td>
</tr>
<tr>
<td><strong>WARNING! High leakage current!</strong> Earth connection is essential before connecting supply!</td>
<td><strong>ADVERTENCIA!</strong> La conexión al suelo es esencial antes de conectar la alimentación!</td>
<td>High leakage current can cause electrical shock.</td>
</tr>
<tr>
<td><strong>ATTENTION! Observe precautions for handling Electrostatic Sensitive Devices.</strong></td>
<td><strong>ATENCIÓN!</strong> Respete las medidas de seguridad al manejar dispositivos electrostáticos sensibles.</td>
<td>Handling Electrostatic Sensitive Devices (ESD) requires care to prevent damage to the equipment.</td>
</tr>
<tr>
<td>Only for installation and use in a Restricted Access Location in accordance with the following installation and use instructions.</td>
<td>Sólo para instalar y usar en áreas de acceso restringido de acuerdo con las siguientes instrucciones de instalación y uso.</td>
<td>Installation and use should only be performed by qualified personnel.</td>
</tr>
<tr>
<td><strong>This equipment should only be installed by trained personnel.</strong></td>
<td><strong>Este equipo sólo debe instalarse personal capacitado.</strong></td>
<td>Installation and use should only be performed by qualified personnel.</td>
</tr>
<tr>
<td>Dedicated circuit must have circuit breaker or fuse protection. PDUs have been designed without a master circuit breaker or fuse to avoid becoming a single point of failure. The customer’s responsibility to provide adequate protection for the dedicated power circuit. <strong>Protection of capacity equal to the current rating of the PDU must be provided and must meet all applicable codes and regulations.</strong></td>
<td><strong>Le circuit spécial doit avoir un disjoncteur ou une protection de fusible.</strong> PDUs ont été conçus sans disjoncteur général ni fusible pour éviter que cela devienne un seul endroit de panne. C’est la responsabilité du client de fournir une protection adéquate pour le circuit-alimentation spécialisé. <strong>Protection de capacité équivalant à la puissance de l’équipement, et respectant tous les codes et normes applicables.</strong></td>
<td>Installation and use should only be performed by qualified personnel.</td>
</tr>
<tr>
<td>Models with unterminated power inputs: Input connector must be installed by qualified service personnel. Input connector rating must be greater than or equal to the total current rating of the PDU and must meet all applicable codes and regulations.</td>
<td><strong>Modèles avec entrées d'alimentation non terminées:</strong> Le connecteur d’entrée doit être installé par un personnel qualifié. <strong>La consommation du connecteur d’entrée doit être supérieure ou égale à la consommation de courant totale de la PDU et doit respecter tous les codes et réglementations en vigueur.</strong></td>
<td>Installation and use should only be performed by qualified personnel.</td>
</tr>
<tr>
<td><strong>Installation Orientation:</strong> SVxxx-xxx units are designed to be installed in vertical orientation.</td>
<td><strong>Orientación de la instalación:</strong> Unidades SVxxx-xxx están diseñadas para ser instaladas en forma vertical.</td>
<td>Installation and use should only be performed by qualified personnel.</td>
</tr>
<tr>
<td><strong>Products rated for 240/415VAC may be fitted with a plug that is rated for a higher voltage. Caution must be taken to assure that the rating of the unit and the supply voltage match.</strong></td>
<td><strong>Productos de 240/415VCA de capacidad pueden caber en clavijas que están clasificadas para voltajes más altos. Se debe tener cuidado para asegurar que la capacidad de la unidad y el suministrador de alimentación tengan el mismo voltaje.</strong></td>
<td>Installation and use should only be performed by qualified personnel.</td>
</tr>
<tr>
<td><strong>Do not block venting holes when installing this product. Allow for maximum airflow at all times.</strong></td>
<td><strong>No bloquee las orificios de aérea antes de instalar este producto. Permite una circulación d'air maximale à tout moment.</strong></td>
<td>Installation and use should only be performed by qualified personnel.</td>
</tr>
</tbody>
</table>
Installing the Power Input Cord

Determine which Input Cord is required for the PDU:

Most Leviton PDUs with an input current of 20A require a modular power input cord. Modular cords include a self-locking IEC C19 feature.

PCORD-S51, PCORD-S52, PCORD-L52

If the PDU requires a Detachable Input Power Cord with a self-locking IEC C19, install it directly into the C20 inlet.

1. Verify a Retention Bracket Assembly is not installed.
   a. If an assembly is installed, remove the two screws attaching the bracket to the IEC 60320 C20 inlet to the enclosure.
   b. Remove the Retention Bracket Assembly.
   c. Re-attach the two screws to the IEC C20 and securely tighten.

2. Push the C19 from the Detachable Input Cord firmly into the C20 inlet to ensure it is properly seated.

Figure 2. C20 Inlet without Retention Bracket Assembly  Figure 3. Removing a Retention Bracket Assembly

Note: Only Leviton self-locking power cords are recommended for use with Leviton PDU’s
Mounting

**Horizontal/Rack**
1. Select the appropriate bracket mounting points for proper mounting depth within the rack.
2. Attach the L-brackets to these mounting points with two screws for each bracket.
3. Install the enclosure into your rack, using the slots in each bracket. The slots allow about ¼ inch of horizontal adaptability to align with the mounting holes of your rack.

**Vertical – Button Mounting**
1. Attach buttons to the back of the PDU. Most models have multiple attachment points to accommodate different applications.
2. Mount the PDU by inserting the buttons into the cabinet’s keyhole slots.
Vertical – Bracket Mounting

If the PDU is to be mounted to a 2-post or 4-post rack, or if the cabinet does not include keyhole slots, Leviton’s PDU Mounting Bracket Kit (PDURK-RMK) will required.

1. Attach the removable flanges to the mount points on the rear of the enclosure using M4 screws.
2. Attach the mounting L-brackets to the flanges with the supplied screws, washers and nut plates. The slots allow about 1½ inches of vertical adaptability.
3. Attach the top and bottom brackets to your rack.

Figure 6. Vertical Bracket Mounting

Connecting to the Power Source

On 30A units, the input power cord is attached to the base of the unit. On units with a total maximum output <30A, you must first attach the power cord to the unit before connecting the unit to the power source.

Connecting Devices

To avoid the possibility of noise due to arcing:

1. Keep the device’s on/off switch in the off position until after it is plugged into the outlet.
2. Connect devices to the PDU outlets.

NOTE: The recommendation is for an even distribution of attached devices across all available outlets to avoid exceeding the outlet, branch or phase limitations. For more information, see the “Power Ratings” section.

Always disconnect ALL power supply cords before opening to avoid electrical shock.
Afin d’égirier les chocs électriques, débranchez TOUTES les cables électrique avant d’ouvrir.
Vor dem Öfnnen immer Netzleitung abziehen um elektrischen Schlag zu vermeiden.

Connecting the Sensors

The Switched PDU is equipped with two mini RJ11 T/H ports for attachment of the Temperature/Humidity sensors. Attach the mini RJ11 plug of the sensor(s) to the appropriate T/H port.
Connecting to the Unit

Serial (RS232) port

The Switched Power Distribution Unit is equipped with an RJ45 Serial RS-232 port for attachment to a PC or networked terminal server using the supplied RJ45 to RJ45 crossover cable and RJ45 to DB9F serial port adapter as required. For more information on the serial RS-232 port, see the “Data Connections” section in Appendix C.

Ethernet port

The Switched Power Distribution Unit is equipped with an RJ45 10/100Base-T Ethernet port for attachment to an existing network. This connection allows access to the Switched PDU via Telnet or Web.

The Switched Power Distribution Unit is configured with the following network defaults to allow unit configuration out-of-the-box through either Telnet or Web:

NOTE: When installed on a DHCP enabled network, the following network defaults DO NOT apply as the PDU ships with DHCP support enabled.

- IP address: 192.168.1.254
- Subnet Mask: 255.255.255.0
- Gateway: 192.168.1.1

The local PC network connection must be configured as noted below:

NOTE: Contact your system administrator for instructions in reconfiguring the network connection. Reconfiguration of your network connection may require a restart to take effect.

- IP address: 192.168.1.x (where x is 2-253)
- Subnet Mask: 255.255.255.0
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**Interfaces**

The Switched Power Distribution Unit has two interfaces: (1) the Web interface accessed via the HTTP-enabled Ethernet connections, and (2) the Command Line for serial and Telnet connections.

**Outlet Naming and Grouping**

**Models with a Single Power Infeed**

Absolute names are specified by a period (.) followed by a tower letter and outlet number. The tower letter for the Switched Power Distribution Unit is A.

**Usernames and Passwords**

The Switched Power Distribution Unit has one predefined administrative user account (username/password: admn/admn), and supports a maximum of 112 defined user accounts.

**NOTE:** For security, it is recommended to create a new account with administrative rights and then remove the predefined administrative user account.

Only an administrative-level user may perform operations such as creating/removing user accounts and command privileges, changing passwords and displaying user information. An administrator may also view the status of all sensors and power inputs.

Usernames can contain from 1-16 characters and are not case sensitive; spaces are not allowed. Passwords may contain up to 16 characters, and are case sensitive.
The Web Interface provides web-based access to the Switched PDU firmware. The interface is designed with three major sections, illustrated below.

1. System Header: Shows PDU description and location, IP address, and user/access information.
2. Navigation Bar: Provides access to PDU configuration, control action, or status page.
3. Details Window: Current control/status information based on the page selected from the navigation bar.

**NOTE:** The blinking of the PDU location string (IP address) in the System Header section may not work with all web browsers.

This example shows the **Outlet Control > Individual** page:

![Web Interface Diagram](image)

**Figure 3. Switched PDU – Firmware Web Interface (Individual Outlet Control Page)**

**Logging In**

Logging in through Web requires directing the Web client to the configured IP address of the unit.

**To log in by Web interface:**

In the login window, enter a valid username and password and press OK.

If you enter an invalid username or password, you will be prompted again.

You are given three attempts to enter a valid username and password combination. If all three fail, the session ends and a protected page will be displayed.

**NOTE:** The default username/password is admn/admn.
System Summary

The System Summary is typically displayed as the default page at user login to the firmware Web Interface. If you do not have environmental monitor access for a PDU, your default page at login will be the Outlet Control page (shown in Figure 3.1 above).

Both the System Summary page and the Outlet Control page display automatically at login and do not require enabling.

The System Summary page contains general system, line, humidity, and temperature status information. The color-coded sensor graphs shown in the example below provide a quick and efficient real-time view for monitoring environmental conditions in your PDU network.

![Switched PDU System Summary](image)

Figure 4. Example of Switched PDU System Summary Page

The System Summary page displays precise current and system power consumption in your PDU network. Dynamic updates (without a full page refresh) allow you to assess critical system statistics with close to instantaneous feedback. This performance is useful for monitoring new installation or power distribution changes in high-density computing environments. Power system administrators can also quickly identify thermal and humidity concerns that might otherwise escalate into costly infrastructure repairs if left unchecked.

As long as the System Summary page is active, the sensor graphs are continually updating system statistics and threshold values. The data with the most impact on the system is displayed to reduce your analysis and troubleshooting time. You can quickly analyze and correct a PDU if a sudden operating condition affects your device network.

**NOTE:** Because the System Summary page continually requests updated status information from the PDU, the page does not time-out. You will need to navigate to another page or manually log off.

System Information

**Uptime:** Displays the cumulative time the PDU has been up and running since the last unit restarted. Uptime shows continuous, real-time system updates with an approximate 5-second automatic refresh. A manual refresh of the System Summary page is not required.

**Firmware Version:** Shows the current firmware version.

**Ethernet NIC S/N:** Displays the PDU serial number derived from the Ethernet NIC.

**Active Users:** Displays the number of active user sessions accessing the firmware. These sessions include serial, TELNET, SSH, and Web sessions. Active Users also shows sessions that an unauthorized user may be attempting to access. The number shown in Active Users changes instantly as the number of active user sessions change. A total of 4 concurrent web user sessions are allowed (HTTP or HTTPS).

**NOTE:** Depending on your web browser, multiple web accesses from the same machine are often treated as one user.
Total Power Consumption: Displays the total system power (in Watts) being distributed by the current PDU configuration.

Line Status

The Line Status graph displays a blinking warning (yellow), whenever the total input load on an infeed exceeds the present user set threshold. If an overload occurs, a blinking error condition (red) is displayed. The unit continues to display these yellow and red states until the condition changes or the problem has been resolved.

The default input feed high load threshold is 80% of the input feed maximum load capacity.

NOTE: The input feed high threshold is user-defined. You must configure this threshold value on the SNMP/Thresholds page or the Command Line Interface (CLI).

Temperature Status

The Temperature Status graph displays a blinking error whenever temperature exceeds the low or high threshold. The PDU will continue to display this state until the condition changes or the problem has been resolved.

For the temperature sensor, the default range of low/high temperature values is 5º-45º C (41º-115º F).

Up to four sets of dual temperature/humidity sensors can be displayed in this graph for a total of eight possible temperature sensor graphs. A thin blue line separates each set based on the tower or environmental monitor.

NOTE: The temperature threshold values are user-defined. You must configure these threshold values on the SNMP/Thresholds page or the Command Line Interface (CLI).

Humidity Status

The Humidity Status graph displays a blinking error whenever humidity exceeds the low or high threshold. The PDU will continue to display this state until the condition changes or the problem has been resolved.

For the humidity sensor, the default range of low/high humidity percentage is 0-100% (relative humidity).

Up to four sets of dual temperature/humidity sensors can be displayed in this graph for a total of eight possible humidity sensor graphs. A thin blue line separates each set based on the tower or environmental monitor.

NOTE: The humidity threshold values are user-defined. You must configure these threshold values on the SNMP/Thresholds page or the Command Line Interface (CLI).

Field Descriptions

The following fields and icons are viewed left to right for Line Status, Temperature Status, and Humidity Status:

Icon: Provides quick viewing of current operational state: Information ✔, Warning ✗ and Critical ❌.

ID: Device input feed or sensor identifier.

Name: Descriptive, user-defined name for each input infeed or sensor.

Load, Temp, Humidity: Current state of the reported input load (in amps), current temperature, or current percentage of relative humidity.

Low Limit: Displays the user-defined low limit of the load, temperature, or humidity graph. These values depend on the sensor limited and cannot be set by the user. For example, a 0ºC low limit would be displayed as 0 for a temperature sensor graph in Celsius.

Sensor Graph and Level Indicator: The horizontal sensor graph shows current operating conditions in color-coded segments. See the section below, “Sensor Graph Color Coding” for details. The level indicator appears across the graph to indicate the relative position of the current data value with respect to the minimum (low limit) and maximum (high limit) values displayed at the left and right of the graph.
**High Limit**: Displays the high limit of the load, temperature, or humidity graph. These values depend on the sensor limits are cannot be set by the user. For example, a 100°C high limit would be displayed as 🔴100 for a temperature sensor graph in Celsius.

**Status**: One of several operating conditions:

### System Summary – Status Descriptions

<table>
<thead>
<tr>
<th>Icon</th>
<th>Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Info]</td>
<td>Reading</td>
<td>Unit is reading a new or restored sensor.</td>
</tr>
<tr>
<td>![Check]</td>
<td>Normal</td>
<td>Indicates normal operation.</td>
</tr>
<tr>
<td>![Info]</td>
<td>Load High</td>
<td>Infeed current load exceeds present High threshold.</td>
</tr>
<tr>
<td>![X]</td>
<td>Over Load</td>
<td>Infeed current load exceeds the measurable range for the infeed.</td>
</tr>
<tr>
<td>![X]</td>
<td>Temp Low</td>
<td>Current temperature falls below present Low threshold.</td>
</tr>
<tr>
<td>![X]</td>
<td>Temp High</td>
<td>Current temperature exceeds present High threshold.</td>
</tr>
<tr>
<td>![X]</td>
<td>Humid Low</td>
<td>Current percentage of relative humidity falls below present Low threshold.</td>
</tr>
<tr>
<td>![X]</td>
<td>Humid High</td>
<td>Current percentage of relative humidity exceeds present High threshold.</td>
</tr>
<tr>
<td>![X]</td>
<td>Lost</td>
<td>The connection was lost to a sensor that was previously detected and the sensor is pulled from the original environment monitoring statistics. There is no data to report, the graph is meaningless, and the threshold settings remain displayed but are grayed.</td>
</tr>
</tbody>
</table>

**Sensor Graph Color-Coding**

The following colors change dynamically on the sensor graphs to communicate operating conditions:

**Line (Load) Status:**
- Green = Normal
- Yellow = High load (load configured by user)
- Red = Overload (based on device characteristics)

User configures load capacity at **Configuration > SNMP/Thresholds > Input Feed Traps and Thresholds**

**Temperature Status:**
- Blue = cold; low temperature (threshold configured by user)
- Green = acceptable temperature range
- Red = hot; high temperature (threshold configured by user)

User configures low/high temperature thresholds at **Configuration > SNMP/Thresholds > Sensor Traps and Thresholds**

**Humidity Status:**
- Blue = wet; high humidity (threshold configured by user)
- Green = acceptable percentage of relative humidity
- Yellow = dry; low humidity (threshold configured by user)

User configures low/high relative humidity thresholds at **Configuration > SNMP/Thresholds > Sensor Traps and Thresholds**
Logical Group Separators

Logical groups are separated by a thin blue line on the System Summary page as shown in the following example between Tower A_InfeedA and Tower B_InfeedA:

<table>
<thead>
<tr>
<th>ID</th>
<th>Input Feed Name</th>
<th>Load</th>
<th>RMS Current (Amps)</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>AA</td>
<td>TowerA_InfeedA</td>
<td>0.00 A</td>
<td>0</td>
<td>Normal</td>
</tr>
<tr>
<td>BA</td>
<td>TowerB_InfeedA</td>
<td>0.25 A</td>
<td>0</td>
<td>Normal</td>
</tr>
</tbody>
</table>

This grouping includes master/link units in addition to some branched units.

Up to three blue line dividers can be displayed on the System Summary page between all sensor groups.

Outlet Control

The Outlet Control section offers access to the Individual and Group outlet control pages. From the Individual and Group pages, the user can review and manipulate power control functions for all outlets and groups assigned to the current user. Both pages include the outlet’s absolute and descriptive names, the Outlet Status reported to the by the outlet, the current Control State being applied by the, and the outlet load in amperes.

Available outlet and group power states may be set to on, off or reboot.

Individual

The Individual outlet control page displays all outlets assigned to the current user. The user may apply on, off or reboot actions to individual, multiple or all accessible outlets.

To apply actions to individual or multiple outlets:

In the Individual Outlet Control section, select the desired action from the Control Action drop-down menu for each individual outlet to be changed, and click Apply.

To apply an action to all outlets:

In the Global Control section, select the desired action from the Control Action drop-down menu and click Apply.

Group

The Group outlet control page displays all groups assigned to the current user, as well as the outlets for each group.

To select a group:

Select the group name from the drop-down menu and press Select. The page will refresh to display all outlets associated to the selected group name.

To apply an action to a group:

Select the desired action from the drop-down menu and click Apply.
# Outlet State/Control State Field Values

<table>
<thead>
<tr>
<th>Outlet State</th>
<th>Control State</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>On</td>
<td>On</td>
<td>Outlet is on</td>
</tr>
<tr>
<td>Off</td>
<td>Off</td>
<td>Outlet is off</td>
</tr>
<tr>
<td>Off</td>
<td>Pend On</td>
<td>Outlet is off and about to turn on in response to a sequence timer</td>
</tr>
<tr>
<td>Off</td>
<td>Reboot</td>
<td>Outlet is off and a Reboot action has been initiated</td>
</tr>
<tr>
<td>On</td>
<td>Idle On</td>
<td>A restart has occurred – Last Control State has been maintained</td>
</tr>
<tr>
<td>Off</td>
<td>Idle Off</td>
<td>A restart has occurred – Last Control State has been maintained</td>
</tr>
<tr>
<td>On</td>
<td>Wake On</td>
<td>A power-loss has occurred – Wakeup State has been applied</td>
</tr>
<tr>
<td>Off</td>
<td>Wake Off</td>
<td>A power-loss has occurred – Wakeup State has been applied</td>
</tr>
<tr>
<td>On/Wait</td>
<td>Off</td>
<td>Outlet state in transition – Re-query of outlet status required</td>
</tr>
<tr>
<td>Off/Wait</td>
<td>On</td>
<td>Outlet state in transition – Re-query of outlet status required</td>
</tr>
<tr>
<td>On/Error</td>
<td>varies</td>
<td>Error State – Outlet should be off, but current is sensed at the outlet</td>
</tr>
<tr>
<td>Off/Error</td>
<td>varies</td>
<td>Error State – Outlet should be on, but no current is sensed at the outlet</td>
</tr>
<tr>
<td>Off/Fuse</td>
<td>On</td>
<td>Outlet should be on, but a blown fuse has been detected</td>
</tr>
<tr>
<td>On/Fuse</td>
<td>On</td>
<td>Outlet should be on, but a blown fuse has been detected downstream</td>
</tr>
<tr>
<td>No Comm</td>
<td>varies</td>
<td>Communication to the outlet has been lost*</td>
</tr>
</tbody>
</table>

* Control State will be applied when communication is re-established

## Power Monitoring

### Input Feeds

The Input Feeds page displays:
- The absolute and descriptive names of the infeed
- Infeed status
- Input/branch phase load in amperes
- Input Voltage
- Calculated power usage in Watts.

Monitor pages (like the Input Feeds page) refresh occasionally to reflect current PDU status.

### System

The System page displays:
- Calculated power usage for all input feeds in watts
- Configured total system area in square feet
- Calculated power usage in watts/square feet
- Tower monitoring – tower ID, tower name, and tower status

**NOTE:** For 3-phase systems, if the Out-of-Balance Alerting feature is enabled, and the system goes into a load out-of-balance condition, the Tower Status field will display the alert “3ph Out-of-Balance”, unless there is a higher priority tower error state to report.

Monitor pages (like the System page) refresh occasionally to reflect current PDU status.

### UPS

The UPS page displays the following information for each UPS device associated with the unit:
- Status
- Voltage
- Hostname/IP address

**NOTE:** The UPS page displays both IPv4 and IPv6 formats in the Hostname/IP field.

Monitor pages (like the UPS page) refresh occasionally to reflect current PDU status.
**Environmental Monitoring**

**Sensors**

The Sensors page displays:

- Absolute and descriptive names of the temperature/humidity sensor
- Temperature/humidity sensor readings and percentage of relative humidity

Monitor pages (like the Sensors page) refresh occasionally to reflect current PDU status.

**Temperature/Humidity Sensor Status**

<table>
<thead>
<tr>
<th>Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Found</td>
<td>The PDU found the sensor and connection is established.</td>
</tr>
<tr>
<td>Not Found</td>
<td>On a fresh reboot, the PDU does not find a sensor.</td>
</tr>
<tr>
<td>Lost</td>
<td>The connection to a previously found sensor is now lost.</td>
</tr>
<tr>
<td>No Comm</td>
<td>Communication loss occurred due to a hardware issue (not loss of communication with the probes).</td>
</tr>
</tbody>
</table>

**Configuration**

The Configuration section offers access to all unit configuration options. This section is available to administrative level users only.

**System**

The System configuration page is used for reference of system information such as Ethernet NIC Serial Number, Ethernet MAC address and system firmware and hardware revisions as well as assignment and maintenance of other system wide configurations.

For descriptive names, up to 24 alphanumeric and other typed characters (ASCII 33-126 decimal) are allowed; spaces are not allowed.

**Creating a pre-login banner:**

Click the Login Banner link. On the subsequent Login Banner page, type pre-login banner text and click **Apply**.

**NOTE:** The pre-login banner can be up to 2069 characters in length and is displayed prior to the login prompt. If left blank, a system banner will not be displayed prior to the login prompt.

The Login Banner displays the following Characters Remaining box to show you in real-time as you type how many of the 2069 maximum characters are still available for you to complete your banner. The box adjusts dynamically as you type or delete characters.

If you reach the maximum 2069 characters, the box displays “-1”. To clear your entry and start over, press **Cancel**.

**Creating a descriptive system location name:**

Enter a descriptive name and click **Apply**.

**Configuring the Input Current LED display orientation:**

Select **Normal** or **Inverted** from the drop-down menu and click **Apply**.

**Configuring the LED display orientation:**

From the Display Orientation drop-down list, select **Normal** or **Inverted**, and click **Apply**.

**NOTES:**

- Only specific PDU models are equipped with an accelerometer chip that senses device orientation. If equipped, your PDU automatically aligns the LED display orientation (depending on its current direction), and the option "Auto" displays in the Display Orientation drop-down list by default. In addition, the actual mounting of the unit, such as "<Normal> or <Inverted>", appears to the right of the "Auto" option. However, even if your PDU model does have the sensor for device orientation, you can still select the Normal or Inverted option from the list to override the capability of the hardware.
Setting the outlet sequence order:
The PDU lets you configure the power-on sequence of outlets.
The Normal option powers-on outlets in ascending numeric order by outlet number, for example, from outlet 1-8. The Reversed option powers on outlets in descending order by outlet number; for example, from outlet 8-1.
The Reversed option is useful when the PDU is mounted with inverted orientation and the last outlet (in this example, outlet 8) is in the first position.
From the Outlet Sequence Order drop-down menu, select Normal or Reversed, and click Apply.

Enabling or disabling strong password requirements:
The PDU supports enforcement of strong passwords for enhanced security. When enabled, all new passwords must be a minimum of 8 characters in length with at least one uppercase letter, one lowercase letter, one number and one special character.

Acceptable strong passwords:
- n0tOnmyw@tch
- john2LEV?
- H3reUgo!

NOTE: Strong password requirements also enforce a minimum change of four character positions when defining new strong passwords.
Select Enabled or Disabled from the Strong Passwords drop-down menu and click Apply.

NOTE: The strong password requirement is applied against all new passwords.

Enabling or disabling the external reset button:
Select Enabled or Disabled from the Configuration Reset Button drop-down menu and click Apply.

Setting the temperature scale:
Select Celsius or Fahrenheit from the Temperature Scale drop-down menu and click Apply.

Setting the system area (footprint):
Enter a system area value in the Area (Footprint) field and click Apply.

Setting the system area unit of measure:
Select Square Feet or Square Meters from the Area (Footprint) drop-down menu and click Apply.

Setting the power factor:
The Power Factor value calculates the power usage displayed in the Power Monitoring pages.
Type a numeric value in the Power Factor field (from 0.50 to 1.00) and click Apply.

Setting the 3-phase load out-of-balance threshold:
The threshold (percentage) specified determines when the current on the lines of a 3-phase system are out-of-balance between the three phases of power. If the alerting feature is enabled, an alert will be sent when an out-of-balance condition occurs.
In the 3-Phase Load Out-of-Balance Threshold field, type a value from 0 to 100%, and click Apply.

Setting the 3-phase load out-of-balance alerting:
This setting enables/disables the sending of an alert when the current on the lines of a 3-phase system are past a pre-set threshold (percentage) and are out-of-balance between the three phases of power.
From the 3-Phase Load Out-of-Balance Alerting drop-down menu, select Enabled or Disabled, and click Apply.

NOTES:
- When a device with 3-phase input voltage is out-of-balance, efficiency is reduced and the unit is prevented from reaching maximum capacity. When an alert for the out-of-balance condition is received (if the alerting feature is enabled), it may be necessary to adjust distribution of the loads.
For 3-phase systems, if the Out-of-Balance Alerting feature is enabled, and the system goes into a load out-of-balance condition, the Tower Status field on the “Power Monitoring – System” web page will display the alert “3ph Out-of-Balance”, unless there is a higher priority tower error state to report.

**Configuring the Command Line Interface (CLI) session timeout:**

Enter a timeout period (in minutes) in the CLI Session Timeout field, and click **Apply**.

The valid timeout range is 1 to 1440 minutes (24 hours); the default is 5 minutes.

**Configuring the web session (Web Interface) timeout:**

Enter a timeout period (in minutes) in the Web Session Timeout field.

The valid timeout range is 1 to 1440 minutes (24 hours); the default is 5 minutes.

**Creating a descriptive unit name:**

Click on the **Tower Names** link.

On the subsequent Tower Names page, enter a descriptive name and click **Apply**.

**Creating a descriptive input feed name:**

Click on the **Input Feed Names** link.

On the subsequent Input Feed Names page, enter a descriptive name and click **Apply**.

**Creating a descriptive outlet name:**

Click on the **Outlet Names** link which will open the Outlets configuration page. For more information about creating descriptive outlet names, see the “Outlets” section.

**Creating a descriptive serial port name:**

Click on the **Serial Port Names** link which will open the Serial Ports configuration page. For more information about creating descriptive serial port names, see the “Serial Ports” section.

**Creating a descriptive Environmental Monitor name:**

Click on the **Environmental Monitor Names** link.

On the subsequent Environmental Monitor Monitor Names page, enter a descriptive name and click **Apply**.

**Creating descriptive sensor names:**

Click on the **Sensor Names** link.

On the subsequent Sensor Names page, enter a descriptive name and click **Apply**.
Network

The Network configuration page allows the administrator to maintain the network interface by determining IPv6 and IPv4 status, network state, IP address, gateway, subnet mask, primary/secondary DNS addresses, and the necessary settings and options for DHCP.

NOTE: For maximum backward compatibility, the default network mode is “IPv4 only”.

Network:

The Network drop-down menu determines the acquisition method used for the protocol stack, IPv4 address, and IPv6 address. From the Network drop-down menu, select the acquisition method for your network (Disabled, IPv4 only, or Dual IPv6/IPv4), and click Apply.

State:

The view-only State field shows the current IPv6/IPv4 network status and can display any of the following values:

<table>
<thead>
<tr>
<th>Current Network States</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Acquiring</td>
</tr>
<tr>
<td>• DCHP IPv4</td>
</tr>
<tr>
<td>• IPv4 Failed (Static IPv4 problem)</td>
</tr>
<tr>
<td>• Static IPv6</td>
</tr>
<tr>
<td>• Disabled</td>
</tr>
<tr>
<td>• DCHP IPv6</td>
</tr>
<tr>
<td>• IPv6 Failed (Static IPv6 problem)</td>
</tr>
<tr>
<td>• Static IPv6/IPv4 (both available)</td>
</tr>
<tr>
<td>• Disconnected</td>
</tr>
<tr>
<td>• DCHP IPv6/IPv4 (both available)</td>
</tr>
<tr>
<td>• Static IPv4</td>
</tr>
<tr>
<td>• Unknown</td>
</tr>
</tbody>
</table>

Additional network communication values are displayed for viewing only: Link, Speed, Duplex, and Negotiation. Also displayed for viewing are the IPv6 and IPv4 IP address, subnet mask, gateway, and primary/secondary DNS addresses.

Setting the IPv6 or IPv4 static IP address, gateway, subnet mask, or DNS address:

In the appropriate fields, type the IP address, gateway, subnet mask, or DNS address, and click Apply.

NOTE: IPv6 address formats are accepted in the IPv6 Address field and IPv6 Gateway field. IPv4 formats are accepted in the IPv4-named Address, Subnet Mask, and Gateway fields.

Enabling Dynamic Host Configuration Protocol (DHCP):

To enable DHCP, check the Enable checkbox. To disable DCHP, uncheck (clear) the checkbox.

Click Apply.

Setting the fully-qualified domain name (FQDN):

To enable FQDN, check the Enable checkbox and accept the default name (e.g. “pdu-0700e0”) or type a different name. To disable FQDN, uncheck (clear) the checkbox.

Click Apply.

Enabling the DHCP boot delay:

To enable the boot delay, check the Enable checkbox. To disable the boot delay, uncheck (clear) the checkbox.

Click Apply.

Enabling the Boot Delay option gives the PDU approximately 100-seconds to establish a connection through a DHCP server. This interval allows various network component activities to occur as the PDU powers up (such as obtaining SNTP time stamps for logging). This is the default state.

Disabling the Boot Delay option forces the PDU to boot after approximately 5-seconds regardless of the DHCP acquisition state. This speeds up a boot when a DHCP server is connected to one of the outlets in the PDU. In this configuration, SNMP traps, SNTP, and other protocols will not be available until a DHCP address has been resolved.

NOTES:
• The Boot Delay option executes only when DHCP is enabled.
• The firmware can detect network link integrity and will wait for network connection. This means that if the network is not currently connected, the enabled Boot Delay option will be ignored.
Enabling static address fallback:

NOTE: The Static Address Fallback option executes only when DHCP is enabled.

To enable static address fallback, check the Enable checkbox. To disable, uncheck (clear) the checkbox.

Click Apply.

Enabling the Static Address Fallback option informs the PDU to automatically fall back to a static address if a DHCP server does not respond after 100-seconds. This is the default state.

Disabling the Static Address Fallback option generates DHCP server requests until the PDU obtains a dynamic address.

NOTE: If the DHCP server boot time is excessive, you may need to disable the DHCP Static Address Fallback option.

PDU network defaults

The PDU is configured with the following network defaults to allow unit configuration out-of-the-box through either Telnet or Web:

- IP address: 192.168.1.254
- Subnet Mask: 255.255.255.0
- Gateway: 192.168.1.1

The initial local PC network connection must be configured as noted below:

NOTE: Contact your system administrator for instructions in reconfiguring the network connection. Reconfiguration of your network connection may require a restart to take effect.

- IP address: 192.168.1.x (where x is 2-253)
- Subnet Mask: 255.255.255.0

NOTE: The unit must be restarted after network configuration changes.

Setting the IP address, subnet mask, gateway, or DNS address:

In the appropriate field, enter the IP address, subnet mask, gateway address or DNS address and click Apply.

Telnet/SSH

The Telnet/SSH configuration page enables or disables Telnet and SSH support and configures the port number that the Telnet or SSH server watches.

Enabling or disabling Telnet or SSH support:

Select Enabled or Disabled from the appropriate Server drop-down menu and click Apply.

Changing the Telnet or SSH server port number:

In the appropriate Port field, enter the port number and click Apply.

Enabling or disabling SSH server authentication methods:

The SSH server supports the Password and the Keyboard-Interactive authentication methods for security.

Password is an authentication method in which the SSH client gathers username/password credentials and makes the authentication request to the SSH sever with the credentials. The Password method is controlled by the SSH client.

Keyboard-Interactive is an authentication method in which the SSH server controls an information field followed by one or more prompts requesting credential information from the SSH client. The client gathers credential information keyed-in by the user and sends it back to the server. The Keyboard-Interactive method is controlled by the SSH server.

Individual enabling and disabling of the Password and Keyboard-Interactive authentication methods are supported to allow an SSH client to be forced to use a specific method. Although both methods are available, by enabling the Keyboard-Interactive method and disabling the Password method, the SSH client is forced to used Keyboard-Interactive, which is required to display the login banner.

NOTE: At least one authentication method must be enabled.

Select the Password checkbox and/or the Keyboard-Interactive checkbox and click Apply.
HTTP/SSL

The HTTP/SSL page configures HTTP server options, SSL options, and determines settings for the Sentry Power Manager (SPM) enterprise software product.

Enabling or disabling HTTP or SSL support:

From the HTTP or SSL Server drop-down menu, select Enabled or Disabled, and click Apply.

NOTE: SSL-encrypted (HTTPS) must be used for secure website connections.

Setting SSL secure access:

SSL allows either optional or required connections. The default secure access is optional.

- Optional: Both non-secure (HTTP) and SSL-encrypted connections (HTTPS) are allowed access.
- Required: Only SSL-encrypted connections (HTTPS) are allowed access.

From the Secure Access drop-down menu, select Optional or Required, and click Apply.

Changing the HTTP server or SSL port number:

In the HTTP or SSL section of the page, in the Port field, type the port number, and click Apply. The HTTP default port number is 80; the SSL default port number is 443.
Serial Ports

The Serial Ports configuration page is used for maintenance of the serial port.

**NOTE:** Pass-Thru connections may only be initiated from the command line interface via a Telnet/SSH session.

**Setting the data-rate for all serial ports:**

Select the serial port data-rate from the drop-down menu and click **Apply**.

**Setting the serial port timeout value:**

The Serial Port Timeout Value sets the serial port inactivity timeout period for individual ports. The timeout period defines the maximum period of inactivity before automatically closing the Pass-Thru session.

The valid range for the timeout is 0 to 60 (in minutes). The default timeout is 5 minutes. Setting the timeout value to “0” disables the timeout.

Click the **Edit** link in the Action column next to the individual port to be configured.

Type the timeout minutes in the Connection Timeout field and click **Apply**.

**Creating a descriptive serial port name:**

Click on the **Edit** link in the Action column next to the port to be configured.

On the subsequent Serial Port Edit page, enter a descriptive name up to 24 alphanumeric and other typed characters (ASCII 33 to 126 decimal) are allowed; spaces are not allowed. Click **Apply**.

**Enabling or disabling serial port active signal checking:**

Click on the **Edit** link in the Action column next to the port to be configured.

On the subsequent Serial Port Edit page, select **On** or **Off** from the DSR Check drop-down menu and click **Apply**.

**Enabling or disabling the Command Line Interface (CLI):**

This option enables or disables availability of the CLI for issuing action commands to the PDU. If disabled, only the Sentry firmware Web user interface will be available.

Click on the **Edit** link in the Action column next to the port to be configured.

On the following Serial Ports Edit page, select **Enabled** or **Disabled** from the CLI drop-down menu and click **Apply**.

**Enabling or disabling the Serial Command Protocol (SCP):**

This option allows SCP functions to be enabled or disabled for a specific serial port.

Click on the **Edit** link in the Action column next to the port to be configured.

On the following Serial Ports Edit page, select **Enabled** or **Disabled** from the SCP drop-down menu and click **Apply**.

**NOTES:**

- Upon a coldboot of the system, if the Coldboot Alert feature is enabled, the system will send a ½ second RS-232 break out to any SCP-enabled serial ports.

- The SCP option must be enabled to use the Bluetooth Android solution.

**Enabling or disabling the Serial Command Protocol (SCP) emulation:**

This option notifies SCP of an MRV device on a specific serial port.

Click on the **Edit** link in the Action column next to the port to be configured.

On the following Serial Ports Edit page, select **None** or **MRV** from the SCP Emulation drop-down menu and click **Apply**.

**Towers**

The Towers configuration page is used for assignment and/or editing of:

- Descriptive names
- Serial and Model numbers
- Operation voltage types
NOTE: If set at the factory, the serial number, model number and voltage type WILL NOT be user-editable.

Creating a descriptive tower name:
In the Tower Name field, enter a descriptive name and click Apply.

Setting the tower serial number:
In the Serial Number field, enter the serial number of the unit and click Apply.

Setting the tower model number:
In the Model Number field, enter the model number of the unit and click Apply.

Setting the operational AC or DC voltage type:
From the AC/DC drop-down menu, select AC or DC, and click Apply.

Setting the operational AC voltage type:
From the 3-Phase drop-down menu, select yes or no, and click Apply.
**Input Feeds**

The Input Feeds configuration page is used for assignment and/or editing of input feed descriptive names, operational voltage and maximum load capacity.

**Creating a descriptive input feed name:**

In the Input Feed Name field, enter a descriptive name and click **Apply**.

**Setting the infeed operational voltage:**

In the Input Feed Voltage field, enter a value from 1 to 480 and click **Apply**.

**Setting the infeed maximum load capacity:**

In the Input Feed Load Capacity field, enter a value from 1 to 255 and click **Apply**.

**UPS**

The UPS Configuration page is used for adding a new UPS device and configuring the UPS devices connected to PDUs.

**To add a new UPS:**

Select the UPS manufacturer type from the Type drop-down list, type an IP address (or hostname) for the UPS, and click **Apply**.

**NOTE:** The UPS page accepts both IPv4 and IPv6 formats in the Hostname/IP field.

**To edit the UPS type:**

Under the Action heading, click the **Edit** link for the UPS to be configured. The Configuration UPS page reformats to an edit page where UPS device settings are configured and UPS devices are associated with an infeed.

**Selecting the UPS type:**

Select the UPS manufacturer type from the UPS Type drop-down list and click **Apply**.

**Editing the UPS Hostname/IP Address:**

In the Hostname/IP field, type an IP Address or Hostname and click **Apply**.

**Editing the UPS SNMP GET community string:**

In the SNMP GET Community String field, type the community string configured on the UPS device and click **Apply**.

**Enabling/Disabling UPS voltage polling:**

From the Poll UPS Voltage drop-down list, select **Enabled** or **Disabled** and click **Apply**.

**Editing the UPS SNMP port number:**

In the Port field, type the port number and click **Apply**.

**Associate the UPS with an infeed:**

Select the infeed(s) powered by the UPS and click **Apply**.

**To remove a UPS:**

On the Configuration UPS page, under the Action heading, click the **Remove** link for the UPS you want to remove.
Outlets

The Outlets configuration page is used for assignment and/or editing of outlet sequence and reboot timers, descriptive names and wakeup states.

Setting the outlet sequencing interval:

Enter the sequencing interval (in seconds) in the Sequence Interval field and click Apply.

Setting the outlet reboot delay:

Enter the reboot interval (in seconds) in the Reboot Delay field and click Apply.

Editing the outlet descriptive name:

Click on the Edit link in the Action column next to the outlet to be configured.

On the subsequent Outlet Edit page, enter a descriptive name. Up to 24 alphanumeric and other typed characters (ASCII 33 to 126 decimal) are allowed; spaces are not allowed. Click Apply.

Changing the outlet wakeup state:

Click on the Edit link in the Action column next to the outlet to be configured.

On the subsequent Outlet Edit page, select On, Off or Last from the Wakeup State drop-down menu and click Apply.

Setting the outlet post-on delay:

Click on the Edit link in the Action column next to the outlet to be configured.

On the subsequent Outlet Edit page, enter the outlet Post-On delay (in seconds) in the Post-On Delay field and click Apply.

Setting the outlet locked (no control) state:

The Outlet Locked feature protects against accidental switching off of critical equipment that should rarely, if ever, be relay-controlled. The feature also prevents unused outlets from being turned on, for example, when a circuit is at capacity and additional devices/loads should not be turned on.

Click the Edit link in the Action column next to the outlet to be configured.

On the subsequent Outlet edit page, check the Locked (No Control) checkbox to lock the outlet (or uncheck the box to unlock the outlet), and click Apply.

NOTE: Outlets can only be locked and unlocked individually by outlet name; there is no global outlet lock/unlock command action.

When an outlet is configured into the locked state, the outlet will lock at its current control state (On or Off). The outlet control state will then change to Locked On or Locked Off.

The locked control state (Yes or No) displays in the outlets list on the Outlets configuration page:

<table>
<thead>
<tr>
<th>Outlet ID</th>
<th>Outlet Name</th>
<th>Wakeup State</th>
<th>Post-On Delay</th>
<th>Locked (No Control)</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>A01</td>
<td>Texecut/FedE_Outlet1</td>
<td>On</td>
<td>0</td>
<td>No</td>
<td>Edit</td>
</tr>
<tr>
<td>A01</td>
<td>Texecut/FedE_Outlet1</td>
<td>On</td>
<td>0</td>
<td>Yes</td>
<td>Edit</td>
</tr>
<tr>
<td>A01</td>
<td>Texecut/FedE_Outlet1</td>
<td>On</td>
<td>0</td>
<td>No</td>
<td>Edit</td>
</tr>
</tbody>
</table>

Control actions for a locked outlet will not be available in the web interface, and the outlet will not be affected by group actions or Smart Load Shedding actions. SNMP and CLI control actions will be ignored for a locked outlet.
Groups

The Groups configuration page is used for creation and deletion of group and assignment of outlets to groups.

Creating a group:

Enter a descriptive group name in the Group Name field. Up to 24 alphanumeric and other typed characters (ASCII 33 to 126 decimal) are allowed; spaces are not allowed. Click Apply.

Removing a group:

Click on the Remove link in the Action column for the group to be removed and press Yes on the subsequent confirmation window.

Adding and deleting outlets from a group:

Press the Edit link in the Action column for the associated group.

On the subsequent Group Edit page, select or deselect outlets to be included in that group. Click Apply.

Users

The Users configuration page is used for creation and removal of usernames, assignment of accessible outlets and group, assignment of privilege levels and the changing of user passwords.

Creating a new user:

Enter a user name in the Username field. Up to 16 alphanumeric and other typed characters (ASCII 33 to 126 decimal) are allowed; spaces are not allowed.

Enter a password for the new user and verify in the Password and Verify Password fields. For security, password characters are not displayed. Click Apply.

Removing a user:

Click on the Remove link in the Action column for the user to be removed and press Yes on the subsequent confirmation window.

Changing a user password:

Click on the Edit link in the Action column for the associated user.

On the subsequent User Edit page, enter a password and verify the new password for the new user in the Password and Verify Password fields. For security, password characters are not displayed. Click Apply.

Changing a user's access privilege level:

The PDU has the following defined privilege levels:

- **Admin:** Full-access for all configuration, control (On, Off, Reboot), status and serial/Pass-Thru ports.
- **Power User:** Full-access for all control (On, Off, Reboot), status and serial/Pass-Thru ports.
- **User:** Partial-access for control (On, Off, Reboot), status and Pass-Thru of assigned outlets, groups and serial/Pass-Thru ports.
- **Reboot-Only:** Partial-access for control (Reboot), status and Pass-Thru of assigned outlets, groups and serial/Pass-Thru ports.
- **On-Only:** Partial-access for control (On), status and Pass-Thru of assigned outlets, groups and serial/Pass-Thru ports.
- **View-Only:** Partial-access for status and Pass-Thru of assigned outlets, groups and serial/Pass-Thru ports.

The administrator may also grant administrative privileges to other user accounts allowing the PDU to have more than one administrative-level user.

**NOTE:** You cannot remove administrative privileges from the Admn user unless another user has already been given administrative access level privileges created.

Click on the Edit link in the Action column for the associated user.

On the subsequent User Edit page, select Admin, Power-User, User, Reboot-only, On-only or View-only from the Access Level drop-down menu and click Apply.
Granting or removing environmental monitoring access:
Click on the Edit link in the Action column for the associated user.
On the subsequent User Edit page, select Yes or No from the Environmental Monitoring drop-down menu and click Apply.

NOTE: Granting access to environmental monitoring (temperature/humidity/sensors) to a non-admin user also grants that user access to power monitoring (outlets, infeeds, towers – all the environmental data of the PDU).

Adding and deleting outlet access:
Click on the Outlets link in the Access column for the associated user.
On the subsequent User Outlets page, select or deselect outlets to be accessed by the user and click Apply.

Adding and deleting group access:
Click on the Groups link in the Access column for the associated user.
On the subsequent User Groups page, select or deselect group to be accessed by the user and click Apply.

Adding and deleting serial port access:
Click on the Ports link in the Access column for the associated user.
On the subsequent User Ports page, select or deselect ports to be accessed by the user and click Apply.

FTP
The FTP configuration page is used for setup and maintenance of all settings required to perform an FTP firmware upload, configure automatic FTP updates or system configuration uploads/downloads. For more information about uploading firmware, see Appendix B.

NOTE: The FTP page accepts both IPv4 and IPv6 formats in the Host field.

Setting the FTP Host Address:
Enter the IP address or hostname in the Host field and click Apply.

Setting the FTP username:
Enter the FTP server username in the Username field, and click Apply.

Setting the FTP password:
Enter the FTP server password in the Password field, and click Apply.

Setting the filepath:
Enter the path of the file to be uploaded in the Directory field, and click Apply.

Setting the filename for upload:
Enter the filename of the file to be uploaded in the Filename field, and click Apply.

Testing the FTP upload configuration:
This test validates that the unit is able to contact and log onto the specified FTP server, download the firmware file, and verify that the firmware file is valid for the unit. Click Test.

Enabling or disabling automatic updates:
The PDU features the ability to schedule automatic firmware updates. When enabled and configured, the PDU will regularly check the FTP server for a new firmware image and upload it.
Select Enabled or Disabled from the drop-down menu and click Apply.

Setting the automatic update scheduled day:
Select the desired day for the automatic update from the drop-down menu and click Apply.

Setting the automatic update scheduled hour:
Select the desired hour for the automatic update from the drop-down menu and click Apply.
Enabling or disabling the FTP server:

The PDU features the ability to upload and download system configuration files to ease implementation across multiple units.

Select Enabled or Disabled from the drop-down menu and click Apply.

NOTE: The FTP server must be enabled for configuration upload or download.

SNTP/Syslog

The SNTP/Syslog page sets the options for the SNTP server, time zone, Daylight Savings Time (DST) automatic clock adjustment, and Syslog server.

About Daylight Savings Time (DST)

Support for DST is disabled by default. When enabled, the date and time are automatically adjusted forward one hour between the starting and ending dates and times (which can be configured).

NOTE: If DST is enabled, all system time displays will be shown with the current daylight savings time start/end date/time settings.

The default time zone is set for the United States until at least 2015.

The time zone format is: mo.w.d/h:m:s, as follows:

mo = month from January to December (1-12)
w = week number (1-4) or the last week (5)
d = day of week from Sunday to Saturday (0-6)
h = hour (0-23)
m = minute (0-59)
s = second (0-59)

Setting the local date/time:

The Date/Time (Local) field shows the current DST settings. To increment the settings – based on updates to the start/end day/time options – click Update

Setting the SNTP primary/secondary server address:

The Primary/Secondary Host fields contact the SNTP server; the fields are populated with the external NTP pool time zones “2.pool.ntp.org” and “1.pool.ntp.org” as default for new CDUs that have not yet been time set.

Enter the IP address or hostname in the Primary Host and/or Secondary Host field and click Apply.

Setting the Local GMT offset (hours):

Select the local offset from GMT value from the drop-down menu and click Apply.

Enabling or disabling Daylight Savings Time (DST):

Select Enabled or Disabled from the SNMPv3 Agent drop-down menu and click Apply.

Setting Daylight Savings Time (DST) start/end date/time options:

Select the week/day/month and hour/minute/second for the start date/time and end date/time from the drop-down menus and click Apply

Setting the Syslog server address:

Enter the IP address or hostname in the Primary and/or Secondary Host field and click Apply.

NOTE: Both IPv4 and IPv6 formats are accepted in the Primary/Secondary Host fields.

Changing the Syslog server port number:

In the Syslog Port field, enter the port number and click Apply.
SNMP/Thresholds

The SNMP/Thresholds configuration page allows setup and maintenance of all SNMP agent settings required to enable SNMP. The page also provides access to the trap configuration pages for towers, input feed, environmental monitor, and sensors.

NOTE: Traps are generated according to a hierarchical architecture; for example, if a tower status enters a trap condition, only the tower status trap is generated. Infeed and outlet status traps are suppressed until the tower status returns to normal.

About SNMP versions:

The firmware supports SNMP versions 1, 2, and 3.

SNMP version 3 supports authentication and encryption on a per user basis. Authentication types are None and MD5. Encryption types are None and DES. If you use authentication, you must use encryption.

Two SNMPv3 users are supported: one user with read-write (RW) access, and one user with read-only (RO) access. Both users have the same configuration parameters, and you can configure each user independently.

SNMPv2 and SNMPv3 can be enabled or disabled independently. You can have SNMPv2 and/or SNMPv3, or none.

Enabling or disabling SNMP v2 support:

Select Enabled or Disabled from the SNMPv2 Agent drop-down menu and click Apply.

NOTE: The default for SNMP support is Enabled. When products are shipped, the default SNMP configuration for the GET community string is set to “public” and the SET community string is left blank.

Setting the SNMP v2 community strings:

Enter the community string in the appropriate SNMPv2 GET/SET Community field and click Apply. Community strings can be 1 to 24 characters.

Enabling or disabling SNMP v3 support:

Select Enabled or Disabled from the SNMPv3 Agent drop-down menu and click Apply.

Setting the SNMPv3 read-write (RW) user or read-only (RO) user:

Enter the Read-Write User or Read-Only User username and click Apply. A valid username can be set to any value between 1-31 characters.

Configuring the SNMPv3 read-write (RW) user or read-only (RO) user authentication type:

From the Read-Write User or Read-Only User Authentication Type drop-down menu, select None or MD5, and click Apply. To clear the password, check Change Password.

Setting the SNMPv3 read-write (RW) user or read-only (RO) user authentication password:

Enter the Read-Write (RW) User or Read-Only (RO) User Password and, and click Apply. To clear the password, check Change Password. A valid authentication password can be set to any value between 1-39 characters. A blank password will clear the string.

Configuring the SNMPv3 read-write (RW) user or read-only (RO) user privacy type:

From the Read-Write User or Read-Only User Privacy Type drop-down menu, select None or DES, and click Apply. To clear the password, check Change Password.

Setting the SNMPv3 read-write (RW) user or read-only (RO) user privacy password:

Enter the Read-Write User or Read-Only User privacy password and, and click Apply. To clear the password, check Change Password. A valid password can be set to any value between 1-31 characters.

Setting the SNMPv3 trap username:

The optional trap username displays on SNMP activity logs to identify user actions.

Type a name in the Trap Username field and click Apply. The trap username can be 1-31 alphanumeric characters; spaces are allowed; and the name is case sensitive.
Configuring general parameters for any SNMP version:

Setting trap destinations:
Type an IP address or hostname as necessary in the trap destination field(s) and click **Apply**.

**NOTE:** Both IPv4 and IPv6 formats are accepted in the “Trap Destination 1” and “Trap Destination 2” fields.

Setting the error trap repeat time:
Type a time value in the Error Trap Repeat Time field and click **Apply**. The valid range is 1 to 65535 (in seconds).

Setting the SNMP Trap Format version:
The SNMP Trap Format configures the SNMP trap format version. The trap format can be SNMP v1, v2, or v3. The default is v1, regardless of the versions that are enabled for the agent.

From the Trap Format drop-down menu, select the v1, v2, or v3 option and click **Apply**.

Setting IP restrictions:
From the IP Restrictions drop-down menu, select the No Restrictions or Trap Destinations Only option and click **Apply**.

**NOTE:** When the Trap Destinations Only option is selected, SNMP Manager Get and Set requests are allowed only from the IP address of the defined trap destinations.
Configuring Temperature and Relative Humidity sensor thresholds:

Click the Sensor Traps and Thresholds link.

For temperature thresholds, type a low and high temperature value in the Low Temp and High temp fields and click Apply.

For relative humidity thresholds, type a low and high humidity percentage in the Low Humid and High Humid fields, and click Apply.

**NOTE:** For temperature thresholds, the valid range is 0 to 123 in degrees Celsius or 32 to 254 in degrees Fahrenheit. For relative humidity, the valid range is 0 to 100 (in percentage of relative humidity).

Configuring Temperature Recovery Delta:

Click the Sensor Traps and Thresholds link.

The Recovery Delta field allows configuration of the number of degrees of change needed to recover from a temperature alarm. After exceeding the high-temperature threshold, the temperature value must fall below the high-temperature threshold by the number of degrees specified in the Recovery Delta field before the sensor recovers.

For example, if the High Temp value is 80 degrees Fahrenheit, and the Recovery Delta field is 2 degrees Fahrenheit, the sensor will not recover until a temperature value of 78 degrees Fahrenheit is reported.

To configure a temperature recovery delta, type a value (in degrees) in the Recovery Delta field and click Apply.

**NOTE:** The acceptable value range for the Recovery Delta field is 0-10 degrees for Celsius and 0-18 degrees for Fahrenheit. The default value for the Recovery Delta field is 1 degree Celsius and 2 degrees Fahrenheit.

LDAP

The LDAP configuration page is used for setup and maintenance of all settings required to enable LDAP support.

Enabling or disabling LDAP support:

Select Enabled or Disabled from the LDAP drop-down menu and click Apply.

Configuring the authentication order:

Select Remote -> Local or Remote Only from the drop-down menu and click Apply.

**NOTE:** Server Technology recommends not setting the authentication order to Remote Only until LDAP has been configured and tested.

Setting the LDAP server address:

Enter the IP address or hostname in the Primary and/or Secondary Host field and click Apply.

**NOTE:** Both IPv4 and IPv6 formats are accepted in the Primary/Secondary Host fields.

Changing the LDAP server port:

Enter the port number in the LDAP Port field and click Apply.

Setting the LDAP bind type:

The CDU supports three standard LDAP bind methods:

- **Simple:** Uses unencrypted delivery of username-password over the network to the LDAP server for authentication, showing user credentials in plain text.
- **TLS/SSL:** (LDAP over TLS/SSL) Uses a trusted authority certificate to provide encryption of LDAP authentication.
- **MD5:** Provides strong protection using 1-way hash encoding that does not transmit the username-password over the network.

From the Bind Type drop-down menu, select Simple, TLS/SSL, or MD5, and click Apply.

**NOTE:** If LDAP over TLS/SSL is enabled, MD5 binding is disabled.
Setting the search bind Distinguished Name (DN):
Enter the fully-qualified distinguished name (FQDN) in the Search Bind field and click Apply.

Setting the search bind password for Distinguished Name (DN):
Enter the Search Bind Password in the Search Bind Password field and click Apply.

Setting the user search base Distinguished Name (DN):
Enter the User Search Base DN in the User Search Base DN field and click Apply.

Setting the user search filter:
Enter the User Search Filter in the User Search Filter field and click Apply.

Setting the group membership attribute:
Enter the group membership attribute in the Group Membership Attribute field and click Apply.

Enabling or disabling group search:
Select Enabled or Disabled from the Group Search drop-down menu and click Apply.

Setting the group search base Distinguished Name (DN):
The Group Search Base DN indicates where the LDAP group search will start.
Enter the Base DN in the Group Search Base DN field and click Apply.

Setting the user membership attribute name:
The User Membership Attribute is a comma-delimited string of up to two attribute names whose values in the search results are the users that are members of the group. Maximum numbers of characters is 61.
Enter the user membership attribute name(s) in the User Membership Attribute field and click Apply.

NOTE: The user membership option allows the searching of directory entries of groups for a user membership attribute to find the groups for which the user is a member.

Configuring the authentication order:
Select Remote -> Local or Remote Only from the drop-down menu and click Apply.

NOTE: The recommendation is not setting the authentication order to Remote Only until the LDAP has been fully configured and tested.

Setting the DNS IP address:
For information about how to set the DNS IP address, see the “Network” section.

Configuring LDAP groups:
Click on the LDAP Groups link at the bottom of the page.

Creating an LDAP group:
Enter a descriptive group name in the LDAP Group Name field. Up to 24 alphanumeric and other typed characters (ASCII 33 to 126 decimal) are allowed; spaces are not allowed. Click Apply.

Removing an LDAP group:
Click on the Remove link in the Action column for the group to be removed and press OK on the subsequent confirmation window.

Changing an LDAP group’s access privilege level:
Click on the Edit link in the Action column for the associated LDAP Group.

On the subsequent LDAP Group - Edit page, select Admin, User, On-only or View-only from the Access Level drop-down menu and click Apply.
Granting or removing environmental monitoring viewing privileges:
Click on the Edit link in the Action column for the associated LDAP Group.
On the subsequent LDAP Group - Edit page, select Yes or No from the Environmental Monitoring drop-down menu and click Apply.

NOTE: Granting access to environmental monitoring (temperature/humidity/sensors) to a non-admin user also grants that user access to power monitoring (outlets, infeeds, towers – all the environmental data of the PDU).

Adding and Deleting outlet access:
Click on the Outlets link in the Access column for the associated LDAP Group.
On the subsequent LDAP Group - Outlets page, select or deselect outlets to be accessed by the LDAP Group and click Apply.

Adding and Deleting outlet group access:
Click on the Groups link in the Access column for the associated LDAP Group.
On the subsequent LDAP Group - Groups page, select or deselect outlet groups to be accessed by the LDAP Group and click Apply.

Adding and Deleting serial port access:
Click on the Ports link in the Access column for the associated LDAP Group.
On the subsequent LDAP Group - Ports page, select or deselect ports to be accessed by the LDAP Group and click Apply.
**TACACS+**

The TACACS+ configuration page is used for setup and maintenance of all settings required to enable TACACS+ support.

**Enabling or disabling TACACS+ support:**
Select **Enabled** or **Disabled** from the TACACS+ drop-down menu and click **Apply**.

**Setting the TACACS+ server address:**
Enter the IP address or hostname in the Primary and/or Secondary Host field and click **Apply**.

*NOTE:* Both IPv4 and IPv6 formats are accepted in the Primary/Secondary Host fields.

**Changing the TACACS+ server port:**
Enter the port number in the Port field and click **Apply**.

**Configuring the authentication order:**
Select **Remote > Local** or **Remote Only** from the drop-down menu and click **Apply**.

*NOTE:* The recommendation is NOT setting the authentication order to Remote Only until TACACS has been fully configured and tested.

**Setting the TACACS+ encryption key:**
Enter a key and verify the new key the Encryption Key and Verify Encryption Key fields. Click **Apply**. For security, key characters are not displayed.

**Configuring TACACS+ privilege levels:**
Click on the **TACACS+ Privilege Levels** link at the bottom of the page.

**Changing a TACACS+ Privilege Level’s access privilege level:**
Click on the **Edit** link in the Action column for the associated TACACS+ Privilege Level.

On the subsequent TACACS+ Privilege Level - Edit page, select **Admin**, **User**, **On-only** or **View-only** from the Access Level drop-down menu and click **Apply**.

**Granting or removing Environmental Monitoring viewing privileges:**
Click on the **Edit** link in the Action column for the associated TACACS+ privilege level.

On the subsequent TACACS+ Privilege Level - Edit page, select **Yes** or **No** from the Environmental Monitoring drop-down menu and click **Apply**.

*NOTE:* Granting access to environmental monitoring (temperature/humidity/sensors) to a non-admin user also grants that user access to power monitoring (outlets, infeeds, towers – all the environmental data of the PDU).

**Adding and deleting outlet access:**
Click on the **Outlets** link in the Access column for the associated TACACS+ Privilege Level.

On the subsequent LDAP Group - Outlets page, select or deselect outlets to be accessed by the TACACS+ Privilege Level and click **Apply**.

**Adding and deleting outlet group access:**
Click on the **Groups** link in the Access column for the associated TACACS+ Privilege Level.

On the subsequent LDAP Group - Groups page, select or deselect outlet groups to be accessed by the TACACS+ Privilege Level and click **Apply**.

**Adding and deleting serial port access:**
Click on the **Ports** link in the Access column for the associated TACACS+ Privilege Level.

On the subsequent LDAP Group - Ports page, select or deselect ports to be accessed by the TACACS+ Privilege Level and click **Apply**.
RADIUS

The Remote Authentication Dial-in User Service (RADIUS) configuration page is used for setup and maintenance of all settings required to enable RADIUS support.

Enabling or disabling RADIUS support:
Select Enabled or Disabled from the RADIUS drop-down menu and click Apply.

Configuring the authentication order:
Select Remote > Local or Remote Only from the drop-down menu and click Apply.

NOTE: The recommendation is not setting the authentication order to Remote Only until the RADIUS has been fully configured and tested.

Changing the RADIUS server address:
Enter the IP address or hostname in the Primary and/or Secondary Server field and click Apply.

NOTE: Both IPv4 and IPv6 formats are accepted in the Primary/Secondary Host fields.

Setting the RADIUS shared secret:
The shared secret is the RADIUS authentication key.
Enter the shared secret in the Primary and Secondary Shared Secret field. Up to 48 upper and lowercase alphanumeric and other typed characters (ASCII 33 to 126 decimal) and spaces are allowed; control characters are not allowed. Click Apply.
To change the shared secret, check the Change checkbox to clear the Shared Secret field, enter the new shared secret, and click Apply.

Changing the RADIUS server port:
This field specifies the port number used by the RADIUS server for incoming RADIUS authentication requests.
Enter the port number in the Primary and/or Secondary Port field and click Apply.
The valid port number range is 1-65535; default is 1812.

Setting the RADIUS server timeout value:
The Timeout field specifies the time interval (in seconds) to wait for a reply from the RADIUS server before resending an authentication request.
Enter the timeout value (in seconds) in the Primary and/or Secondary Timeout field and click Apply.
The valid timeout range is 1-30 seconds; default is 5 seconds.

Setting the number of RADIUS server retries:
The Set RADIUS Retries command specifies the number of times an authentication request is sent to the RADIUS server. The PDU will attempt authentication with the primary server until the number of retries is reached, then will attempt authentication with the secondary server. If the unit does not receive a response from these attempts, the authentication request will be rejected.

Setting the number of retries:
Type the number of retries in the Primary and/or Secondary Retries field and click Apply.
The valid retries range is 0-10; default is 2.
SMTP/Email
The SMTP/Email page allows the configuration of Simple Mail Transfer Protocol (SMTP) and Email options.

**Enabling or disabling Email support:**

Select **Enabled** or **Disabled** from the Email Notifications drop-down menu and click **Apply**.

**Setting the SMTP server address:**

Enter the IP address or hostname in the SMTP Host field and click **Apply**.

**NOTE:** Both IPv4 and IPv6 formats are accepted in the Host field.

**Changing the SMTP server port:**

Enter the port number in the SMTP Port field and click **Apply**.

**Setting the SMTP authentication type:**

**NOTES:**

- SMTP authentication allows the mail client in the PDU to login to the mail server during the process of sending a mail. The mail server may require this login to relay mail to another mail server.
- Supported SMTP authentication types are: None (default, no SMTP authentication); Digest-MD5; CRAM-MD5; Login; and Plain. SMTP authentication occurs with a configured username and password, or you can use the address in the ‘From’ Address field in place of the username.

From the SMTP Authentication drop-down menu, select an authentication method. From the “with” drop-down menu, select “SMTP Username” or “From Address”. Click **Apply**

**Setting the Email SMTP authentication username:**

In the Username field, type the desired Email SMTP username and click **Apply**.

**Setting the Email SMTP authentication password:**

The Set Email SMTP Password command sets the password for SMTP authentication with the username.

In the Password field, type a password of 1-16 alphanumeric and other characters (ASCII 33 to 126 decimal) are allowed; passwords are case sensitive. Click **Apply**.

To change the password, type over it, check the Change checkbox, and click **Apply**

**Setting the ‘From’ email address:**

Enter the ‘from’ email address in the ‘From’ Address field and click **Apply**.

**Setting the ‘Send To’ email address:**

Enter the ‘send to’ email address in the Primary or Secondary ‘Send To’ Address field and click **Apply**.

If the primary ‘send to’ address fails, the system then attempts to send the email to the secondary ‘send to’ address.

**Setting the subject ID:**

From the Subject ID drop-down menu, select the default “Sentry3_524640” option or the “Location” option to specify the email subject line. Click **Apply**.

**Enabling or disabling event type notifications:**

Select **Enabled** or **Disabled** from the Include…Messages drop-down menus and click **Apply**.

**Sending a test email:**

After providing information in the Email/SMTP web page, click the **Test** button to send a test email to the target email destinations.
Features

The Features configuration page is used for activation and maintenance of special purchased features. From this page an administrator may review all activated features as well as activate newly purchased features.

To activate a special feature:

In the Feature Key Value field, enter the activation key provided and click Apply.

NOTE: A restart of the PDU is required after activating new special features.

Tools

The Tools section contains access to rebooting the unit, uploading new firmware as well as resetting the unit to factory defaults. This section is available to administrative level users only.

Ping

The Ping feature may be used to test the ability of the PDU to contact another Ethernet enabled device’s IP address. For LDAP support, it may also be used to test the configuration of the Domain Name server IP address by testing for proper name resolution.

NOTE: Both IPv4 and IPv6 formats are accepted in the Ping Host Name/IP Address field.

Change Password

The Change Password feature allows users to change their own password.

NOTE: An administrator can always assign a new password.

Changing a password:

Enter the current password, enter a new password and verify the new password. Click Apply.

View Log

The View Log feature enables viewing of the internal system log. This features logs all authentication attempts, power actions, configuration changes and other system events. The system memory stores more than 4000 entries in a continuously aging log. For permanent off-system log storage, the Syslog protocol is supported.

NOTE: The system log is viewable only by users with administrative privileges.

Reviewing the system log:

Click on the Previous 100 entries or Next 100 entries link to navigate through the log.

Restart

Performing a warm boot:

Select the Restart from the Action drop-down menu and click Apply.

NOTE: System user/outlet/group configuration or outlet states are NOT changed or reset with this command.

Resetting to factory defaults:

For more information on resetting a PDU to factory defaults from the Web interface, see Appendix A.

Uploading new firmware:

For more information about uploading new firmware from the Web interface, see Appendix B.

Generating a new SSL X.509 certificate:

Select the Restart and generate a new X.509 certificate from the Action drop-down menu and click Apply.

Computing new SSH security keys:

Select the Restart and compute new SSH keys from the Action drop-down menu and click Apply.
Command Line Interface

**IMPORTANT:** The Command Line Interface (CLI) was modified to allow both IPv4 and IPv6 settings.

**Logging In**

Logging in through Telnet requires directing the Telnet client to the configured IP address of the unit.

Logging in through the Console (RS232) port requires the use of a terminal or terminal emulation software configured to support ANSI or VT100 and a supported data rate (300, 1200, 2400, 4800, 9600, 19200, 38400, 57600, or 115200 BPS) - 8 data bits-no parity-one stop bit and Device Ready output signal (DTR or DSR). The default data rate is 9600.

**To log in by RS-232 or Telnet:**

1. **Press Enter.** The following appears, where x.xx is the firmware version:
   
   Switched PDU Version x.xx
   Username:

   **NOTE:** Logging in by Telnet will automatically open a session. It is not necessary to press Enter.

2. **At the Username:** and Password: prompts, type a valid username and password, and press **Enter**.
   
   You are given three attempts to enter a valid username and password combination. If all three fail, the session ends.

   **NOTE:** The default PDU username/password is admn/admn.

When you enter a valid username and password, the command prompt (Switched PDU:) appears. If a location identifier was defined, it will be displayed before the Switched PDU: prompt.

Commands may be entered in any combination of uppercase and lowercase. All command characters must be entered correctly; there are no command abbreviations. A user must have administrative privileges to use the administration commands. The following tables list and briefly describe each command.

**Operations Command Summary**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connect</td>
<td>Connects to a serial/Pass-Thru port</td>
</tr>
<tr>
<td>Envmon</td>
<td>Displays the status of the integrated Environmental Monitor</td>
</tr>
<tr>
<td>IStat</td>
<td>Displays the status of the infeeds</td>
</tr>
<tr>
<td>List Group</td>
<td>Lists all assigned outlets for a group name</td>
</tr>
<tr>
<td>List Groups</td>
<td>Lists all accessible groups for the current user</td>
</tr>
<tr>
<td>List Outlets</td>
<td>Lists all accessible outlets for the current user</td>
</tr>
<tr>
<td>List Ports</td>
<td>Lists all accessible serial/Pass-Thru ports for the current user</td>
</tr>
<tr>
<td>Login</td>
<td>Ends the current session and brings up the Username: prompt</td>
</tr>
<tr>
<td>Logout</td>
<td>Ends a session</td>
</tr>
<tr>
<td>Off</td>
<td>Turns one or more outlets off</td>
</tr>
<tr>
<td>On</td>
<td>Turns one or more outlets on</td>
</tr>
<tr>
<td>Password</td>
<td>Changes the password for the current user</td>
</tr>
<tr>
<td>Quit</td>
<td>Ends a session</td>
</tr>
<tr>
<td>Reboot</td>
<td>Reboots one or more outlets</td>
</tr>
<tr>
<td>Status</td>
<td>Displays the on/off status of one or more outlets</td>
</tr>
<tr>
<td>UPSStat</td>
<td>Displays the status of the associated UPS</td>
</tr>
<tr>
<td>Add Grouptouser</td>
<td>Grants a user access to one or more groups</td>
</tr>
<tr>
<td>Add Outlettogroup</td>
<td>Adds an outlet to a group name</td>
</tr>
<tr>
<td>Add Outlettouser</td>
<td>Grants a user access to one or all outlets</td>
</tr>
<tr>
<td>Add Porttouser</td>
<td>Grants a user access to one or all serial/Pass-Thru ports</td>
</tr>
<tr>
<td>Create Group</td>
<td>Adds a group name</td>
</tr>
<tr>
<td>Create UPS</td>
<td>Adds a UPS association</td>
</tr>
</tbody>
</table>
**Administrative Command Summary**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create User</td>
<td>Adds a user account</td>
</tr>
<tr>
<td>Delete Group from user</td>
<td>Removes access to one or more groups for a user</td>
</tr>
<tr>
<td>Delete Outlet from group</td>
<td>Deletes an outlet from a group name</td>
</tr>
<tr>
<td>Delete Outlet from user</td>
<td>Removes access to one or all outlets for a user</td>
</tr>
<tr>
<td>Delete Port from user</td>
<td>Removes access to one or all serial/Pass-Thru ports</td>
</tr>
<tr>
<td>List User</td>
<td>Displays all accessible outlets/groups/ports for a user</td>
</tr>
<tr>
<td>List Users</td>
<td>Displays privilege levels for all users</td>
</tr>
<tr>
<td>Remove Group</td>
<td>Deletes a group name</td>
</tr>
<tr>
<td>Remove UPS</td>
<td>Deletes a UPS association</td>
</tr>
<tr>
<td>Remove User</td>
<td>Deletes a user account</td>
</tr>
<tr>
<td>Restart</td>
<td>Performs a warm boot</td>
</tr>
<tr>
<td>Set Banner</td>
<td>Set the pre-login banner text</td>
</tr>
<tr>
<td>Set DHCP</td>
<td>Enables or disables DHCP support</td>
</tr>
<tr>
<td>Set DHCP Boot Delay</td>
<td>Enables or disables a 100-second boot delay between PDU and DHCP server</td>
</tr>
<tr>
<td>Set DHCP Static Address Fallback</td>
<td>Enables or disables DHCP fallback to a static IP address</td>
</tr>
<tr>
<td>Set DNS</td>
<td>Sets the IP address of the Domain Name server</td>
</tr>
<tr>
<td>Set EnergyWise</td>
<td>Enables or disables the Cisco EnergyWise network</td>
</tr>
<tr>
<td>Set EnergyWise Domain</td>
<td>Sets the Cisco EnergyWise domain name</td>
</tr>
<tr>
<td>Set EnergyWise Port</td>
<td>Sets the Cisco EnergyWise port number</td>
</tr>
<tr>
<td>Set EnergyWise Refresh</td>
<td>Rate (in seconds) at which information is pushed to the EnergyWise manager</td>
</tr>
<tr>
<td>Set EnergyWise Secret</td>
<td>Sets the Cisco EnergyWise secret</td>
</tr>
<tr>
<td>Set Envmon Name</td>
<td>Specifies a descriptive field for the integrated Environmental Monitor</td>
</tr>
<tr>
<td>Set Envmon THS Name</td>
<td>Specifies a descriptive field for a temperature-humidity sensor</td>
</tr>
<tr>
<td>Set FTP Autoupdate Day</td>
<td>Sets the automatic FTP update day</td>
</tr>
<tr>
<td>Set FTP Autoupdate Hour</td>
<td>Sets the automatic FTP update hour</td>
</tr>
<tr>
<td>Set FTP Autoupdate</td>
<td>Enables or disables automatic FTP update support</td>
</tr>
<tr>
<td>Set FTP Directory</td>
<td>Specifies the directory for the file to be uploaded</td>
</tr>
<tr>
<td>Set FTP Filename</td>
<td>Specifies the file to be uploaded via FTP</td>
</tr>
<tr>
<td>Set FTP Host</td>
<td>Sets the FTP Host IP address or hostname</td>
</tr>
<tr>
<td>Set FTP Password</td>
<td>Sets the password for the FTP Host</td>
</tr>
<tr>
<td>Set FTP Test</td>
<td>Validates that the PDU can login to the FTP server and verify/download firmware file</td>
</tr>
<tr>
<td>Set FTP Server</td>
<td>Enables or disables the FTP server</td>
</tr>
<tr>
<td>Set FTP Username</td>
<td>Sets the username for the FTP Host</td>
</tr>
<tr>
<td>Set Gateway</td>
<td>Sets the Gateway of the PDU</td>
</tr>
<tr>
<td>Set HTTP</td>
<td>Enables or disables HTTP access and sets the HTTP target port.</td>
</tr>
<tr>
<td>Set HTTP Port</td>
<td>Specifies the target port for HTTP access</td>
</tr>
<tr>
<td>Set Infeed Loadmax</td>
<td>Specifies the maximum load capacity for the infeed</td>
</tr>
<tr>
<td>Set Infeed Name</td>
<td>Specifies a descriptive field for the infeed</td>
</tr>
<tr>
<td>Set Infeed Voltage</td>
<td>Specifies the nominal input voltage for the infeed</td>
</tr>
<tr>
<td>Set Ipaddress</td>
<td>Sets the IP address of the PDU</td>
</tr>
<tr>
<td>Set LDAP UseTLS</td>
<td>Enables or disables LDAP over TLS/SSL support</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Set Location</td>
<td>Specifies a descriptive field for the Web control screen and login banner</td>
</tr>
<tr>
<td>Set Net</td>
<td>Determines the acquisition method for the protocol stack and IPv4/IPv6 addresses</td>
</tr>
<tr>
<td>Set Option Button</td>
<td>Enables or disables the external configuration reset button</td>
</tr>
<tr>
<td>Set Option Coldboot Alert</td>
<td>Enables or disables the Coldboot Alert feature using a serial protocol</td>
</tr>
<tr>
<td>Set Option Display</td>
<td>Sets the LED orientation for external Current displays</td>
</tr>
<tr>
<td>Set Option More</td>
<td>Enables or disables the 'more' prompt</td>
</tr>
<tr>
<td>Set Option Outlet Sequence</td>
<td>Configures outlet power-on sequence order as normal or reversed</td>
</tr>
<tr>
<td>Set Option StrongPasswords</td>
<td>Enables or disables strong password requirements</td>
</tr>
<tr>
<td>Set Option Tempscale</td>
<td>Sets the Environmental Monitor temperature scale</td>
</tr>
<tr>
<td>Set Option CLI Timeout</td>
<td>Sets the Command Line Interface (CLI) session timeout period</td>
</tr>
<tr>
<td>Set Option Web Timeout</td>
<td>Sets the web session (Web Interface) timeout period</td>
</tr>
<tr>
<td>Set Outlet Locked</td>
<td>Locks or unlocks a single outlet (no control) in its current state</td>
</tr>
<tr>
<td>Set Outlet Name</td>
<td>Specifies a descriptive field for a device attached to an outlet</td>
</tr>
<tr>
<td>Set Outlet PostOnDelay</td>
<td>Sets the Post-On delay for an outlet</td>
</tr>
<tr>
<td>Set Outlet RebootDelay</td>
<td>Sets the reboot delay for all outlets</td>
</tr>
<tr>
<td>Set Outlet SeqInterval</td>
<td>Sets the sequencing interval for all outlets</td>
</tr>
<tr>
<td>Set Outlet Wakeup</td>
<td>Sets the wakeup state for an outlet</td>
</tr>
<tr>
<td>Set Port CLI</td>
<td>Enables or disables availability of the Command Line Interface (CLI)</td>
</tr>
<tr>
<td>Set Port DSR Check</td>
<td>Sets the DSR active signal checking for a serial/Pass-Thru port</td>
</tr>
<tr>
<td>Set Port Name</td>
<td>Specifies a descriptive field for a serial/Pass-Thru port</td>
</tr>
<tr>
<td>Set Port SCP</td>
<td>Enables or disables Serial Command Protocol (SCP) functions</td>
</tr>
<tr>
<td>Set Port SCP Emulate</td>
<td>Notifies the Serial Command Protocol (SCP) of an MRV device on a specific serial port</td>
</tr>
<tr>
<td>Set Port Speed</td>
<td>Set the connection speed for all serial/Pass-Thru ports</td>
</tr>
<tr>
<td>Set Port Timeout All</td>
<td>Sets the inactivity timeout period for all serial ports before closing the pass-thru session</td>
</tr>
<tr>
<td>Set Port RFTag</td>
<td>Enables or disables RF Code sensor tags for the wireless monitoring solution</td>
</tr>
<tr>
<td>Set SCPAuth</td>
<td>Enables or disables Serial Command Protocol (SCP) authentication</td>
</tr>
<tr>
<td>Set SCPAuth User</td>
<td>Sets the username and password for Serial Command Protocol (SCP) authentication</td>
</tr>
<tr>
<td>Set SNMP IP Restrict</td>
<td>Allows SNMP Get and Set requests only from defined trap destinations</td>
</tr>
<tr>
<td>Set SNTP</td>
<td>Sets the IP address or hostname of the SNTP servers</td>
</tr>
<tr>
<td>Set SNTP DST</td>
<td>Enables or disables Daylight Savings Time (DST)</td>
</tr>
<tr>
<td>Set SNTP DST End</td>
<td>Specifies the settings for DST day/time end parameters</td>
</tr>
<tr>
<td>Set SNTP DST Start</td>
<td>Specifies the settings for DST day/time start parameters</td>
</tr>
<tr>
<td>Set SNTP GMTOffset</td>
<td>Sets the local GMT offset applied to the SNTP date/time</td>
</tr>
<tr>
<td>Set SPM</td>
<td>Enables/disables secure access of Sentry Power Manager (SPM)</td>
</tr>
<tr>
<td>Set SPM Reset Password</td>
<td>Resets the SPM password on the CDU to its internal default password</td>
</tr>
<tr>
<td>Set Subnet</td>
<td>Sets the Subnet Mask of the PDU</td>
</tr>
<tr>
<td>Set System Area</td>
<td>Specifies to total system area for the system</td>
</tr>
<tr>
<td>Set System Area Unit</td>
<td>Specifies the system area (footprint) unit of measure</td>
</tr>
<tr>
<td>Set System Balance</td>
<td>Sets the percentage as load out-of-balance threshold for 3-phase systems</td>
</tr>
<tr>
<td>Set System Balance Alert</td>
<td>Enables-disables alert when out-of-balance threshold is reached for 3-phase systems</td>
</tr>
<tr>
<td>Set System PF</td>
<td>Sets the power factor used in the total system power calculation</td>
</tr>
<tr>
<td>Set Telnet Port</td>
<td>Sets the Telnet server port number</td>
</tr>
<tr>
<td>Set Telnet</td>
<td>Enables or disables Telnet access</td>
</tr>
<tr>
<td>Set Tower 3Phase</td>
<td>Specifies the AC voltage type for the tower</td>
</tr>
<tr>
<td>Set Tower Model</td>
<td>Specifies the model number for the tower</td>
</tr>
<tr>
<td>Set Tower Name</td>
<td>Specifies a descriptive field for the tower</td>
</tr>
</tbody>
</table>
Administrative Command Summary (continued...)

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set Tower ProdSN</td>
<td>Specifies the serial number for the tower</td>
</tr>
<tr>
<td>Set Tower</td>
<td>Specifies the AC or DC voltage type for the tower</td>
</tr>
<tr>
<td>Set UPS AddInfeed</td>
<td>Adds an infeed association to a UPS</td>
</tr>
<tr>
<td>Set UPS DelInfeed</td>
<td>Deletes an infeed association from a UPS</td>
</tr>
<tr>
<td>Set UPS GETComm</td>
<td>Sets the UPS 'get' community string</td>
</tr>
<tr>
<td>Set UPS Host</td>
<td>Sets the UPS Host IP address or hostname</td>
</tr>
<tr>
<td>Set UPS Port</td>
<td>Specifies the target port for a UPS</td>
</tr>
<tr>
<td>Set UPS Type</td>
<td>Sets the UPS type</td>
</tr>
<tr>
<td>Set UPS VPoll</td>
<td>Enables or disables UPS voltage polling</td>
</tr>
<tr>
<td>Set User Access</td>
<td>Sets the access level for a user</td>
</tr>
<tr>
<td>Set User Envmon</td>
<td>Grants or removes privileges to view input/environmental monitoring status</td>
</tr>
<tr>
<td>Set User Password</td>
<td>Changes the password for a user</td>
</tr>
<tr>
<td>Show EnergyWise</td>
<td>Displays Cisco EnergyWise network configuration information</td>
</tr>
<tr>
<td>Show FTP</td>
<td>Displays FTP configuration information</td>
</tr>
<tr>
<td>Show EnergyWise</td>
<td>Displays Cisco EnergyWise network configuration information</td>
</tr>
<tr>
<td>Show Infeeds</td>
<td>Displays infeed configuration information</td>
</tr>
<tr>
<td>Show Network</td>
<td>Displays network configuration information for all IPv4 and IPv6 settings</td>
</tr>
<tr>
<td>Show Options</td>
<td>Displays system option information</td>
</tr>
<tr>
<td>Show Outlets</td>
<td>Displays configuration information for all outlets</td>
</tr>
<tr>
<td>Show Ports</td>
<td>Displays serial/Pass-Thru port configuration information</td>
</tr>
<tr>
<td>Show SNTP</td>
<td>Displays SNTP configuration information</td>
</tr>
<tr>
<td>Show System</td>
<td>Displays system configuration information</td>
</tr>
<tr>
<td>Show System Status</td>
<td>Displays system status configuration information</td>
</tr>
<tr>
<td>Show Towers</td>
<td>Displays tower configuration information</td>
</tr>
<tr>
<td>Show UPS</td>
<td>Displays UPS configuration information</td>
</tr>
<tr>
<td>Version</td>
<td>Displays the firmware version</td>
</tr>
</tbody>
</table>

To display the names of commands that you can execute:

At the command prompt, press **Enter**. A list of valid commands for the current user appears.

Operations Commands

Operations commands manage outlet states, provide information about the environment and control session operations.

Turning outlets on:

The On command turns on one or more outlets. When the command completes, a display indicating all outlets affected and their current states will be displayed.

**To turn outlets on:**

At the Switched PDU: prompt, type **on**, followed by an outlet name, and press **Enter**, or

Type **on**, followed by a group name, and press **Enter**, or

Type **on all** and press **Enter**.

**Examples**

The following command turns the second outlet on, using the outlet’s absolute name:

```
Switched PDU: on .a2<Enter>
```

The following command turns on all the outlets in the group named ServerGroup_1:

```
Switched PDU: on ServerGroup_1<Enter>
```
Turning outlets off:
The Off command turns off one or more outlets. When the command completes, a display indicating all outlets affected and their current states will be displayed.

To turn outlets off:
At the Switched PDU: prompt, type off, followed by an outlet name, and press Enter, or
Type off, followed by a group name, and press Enter, or
Type off all and press Enter

Examples
The following command turns off the outlet named FileServer_1:
   Switched PDU: off FileServer_1<Enter>
The following command turns off all outlets:
   Switched PDU: off all<Enter>

Rebooting outlets:
The Reboot command reboots one or more outlets. This operation turns the outlet(s) off, delays for a user configurable period and then turns the outlet(s) on. When the command completes, a display indicating all outlets affected and their current states will be displayed.

NOTE: It is necessary to reissue the Status command to verify that the outlets have rebooted.

To reboot one or more outlets:
At the Switched PDU: prompt, type reboot, followed by an outlet name, and press Enter, or
Type reboot, followed by a group name, and press Enter, or
Type reboot all and press Enter.

Example
The following command reboots all the outlets in the group named ServerGroup_1:
   Switched PDU: reboot ServerGroup_1<Enter>
Displaying outlet status:

The Status command displays the on/off status of one or more outlets. The command displays the status of only those outlets for which the current username has power control access.

This display includes the outlet absolute and descriptive names, the Outlet State reported to the PDU by the outlet and the current Control State being applied by the unit. If you do not specify any parameter with this command, the status of all accessible outlets is displayed.

NOTE: If the user has access to more than 16 total outlets, the Status command will display the first 16 outlets with a prompt to view the remaining outlets.

To display on/off status of one or more outlets:

At the Switched PDU: prompt, type status, followed by an outlet name, and press Enter, or

Type status, followed by a group name, and press Enter, or

Type status and press Enter.

Examples

The following command displays the on/off status of the outlet named FileServer_1:

Switched PDU: status FileServer_1<Enter>

Outlet   Outlet   Outlet   Control
ID       Name       State   State
.A3      FileServer_1   On       On

The following command displays the on/off status of all accessible outlets:

Switched PDU: status<Enter>

Outlet   Outlet   Outlet   Control
ID       Name       State   State
.A1      DataServer_1   On       On
.A2      WebServer_1   On       On
.A3      FileServer_1   On       On
.A4      TowerA_Outlet4   On       On
.A5      TowerA_Outlet5   On       On
.A6      TowerA_Outlet6   On       On

The following command displays the on/off status for outlets in the group ServerGroup_1:

Switched PDU: status ServerGroup_1<Enter>

Group: ServerGroup_1
Outlet   Outlet   Outlet   Control
ID       Name       State   State
.A1      DataServer_1   On       On
.A2      WebServer_1   On       On
.A3      FileServer_1   On       On
Displaying accessible outlets:
The List Outlets command displays accessible outlets for the current user. The display includes the absolute and descriptive name of all outlets assigned to the current user.

To display accessible outlets:
At the Switched PDU: prompt, type **list outlets** and press **Enter**.

**Example**
The follow command displays all accessible outlets for the current user:

```
Switched PDU: list outlets<Enter>
Outlet   Outlet
       ID   Name
     .A1 DataServer_1
     .A2 WebServer_1
```

Displaying accessible groups:
The List Groups command displays accessible groups for the current user.

To display accessible groups:
At the Switched PDU: prompt, type **list groups** and press **Enter**.

**Example**
The follow command displays all accessible groups for the current user:

```
Switched PDU: list groups<Enter>
Groups:
  ServerGroup_1
  RouterGroup_1
```

Displaying outlets assigned to a group:
The List Group command displays outlets assigned to the specified group name.

To display outlets assigned to a group:
At the Switched PDU: prompt, type **list group** followed by the group name and press **Enter**.

**Example**
The follow command displays the outlets assigned to the group ServerGroup_1:

```
Switched PDU: list group ServerGroup_1<Enter>
Group: ServerGroup_1
Outlet   Outlet
       ID   Name
     .A1 DataServer_1
     .A2 WebServer_1
     .A3 FileServer_1
```

Displaying accessible serial ports:
The List Ports command displays accessible serial ports for the current user.

To display accessible serial ports:
At the Switched PDU: prompt, type **list ports** and press **Enter**.

**Example**
The follow command displays all accessible serial ports for the current user:

```
Switched PDU: list ports<Enter>
Port   Port
       ID   Name
     Console Console
Displaying infeed status:
The istat command displays the status of one or more infeeds.
This display includes the infeed absolute and descriptive names and the Input Status and current Load reported to the PDU by the infeed, branch, or phase.

To display status of one or more infeeds:
Type istat and press Enter.

Examples
The following command displays the infeed status:

```
Switched PDU: istat
  Input  Input  Input  Input
  Feed ID  Feed Name  Status  Load
  .AA     Master     On     10.5 Amps
```

Connecting to a serial device:
The Connect command allows Pass-Thru serial connection to devices attached to the standard serial port (Console).

To connect to a serial device:
At the Switched PDU: prompt, type connect console and press Enter.

To disconnect from a serial device:
Type !*break and press Enter.

NOTE: The Connect command will not immediately disconnect when issued from an SSH session that was established while another Telnet or SSH session already existed.

Displaying the status of the environmental monitor:
The Envmon command displays the status of the integrated Environmental Monitor.

By default, only administrative user accounts are allowed access to the Envmon command. An administrator may user the Set User Envmon command to enable and disable access for other user accounts.

To display the status of the Environmental Monitor:
At the Switched PDU: prompt, type envmon and press Enter.

Example
The following command displays the status of the Environmental Monitor.

```
Switched PDU: envmon<Enter>
  Environmental Monitor .A
  Name: Florida_HQ_1       Status: Normal
  Temperature/Humidity Sensors
  ID     Name              Temperature  Humidity
  .A1    Temp_Humid_Sensor_A1  Not Found  Not Found
  .A2    T/H2_Florida_HQ_1  23.5 Deg. C  22 % RH
```

Changing a password:
The Password command changes the current user’s password. For security, when you type a password, the characters are not displayed on the screen.

To change a password:
At the Switched PDU: prompt, type password and press Enter.
At the Enter Current Password: prompt, type the current password and press Enter.
At the Enter New Password: prompt, type the new password and press Enter. Passwords can contain 1-16 characters.
At the Verify Password: prompt, retype the new password and press Enter.
Starting a new session:

The Login command activates the Username: prompt. The current session ends, allowing a user to log in and start a new session under a different username.

To start a new session:

At the Switched PDU: prompt, type login and press Enter. The Username: prompt appears.

Ending a session:

The Quit or Logout commands ends a session. A session ends automatically when no activity is detected for five minutes, or upon loss of connection.

To end a session:

At the Switched PDU: prompt, type quit and press Enter, or Type logout and press Enter.

Displaying UPS status:

The UPSStat command displays the status of one or more UPS devices associated with the PDU unit.

The display includes UPS index number, type, line/battery status, and reported voltage.

NOTE: Access to this command requires enabling user privileges for environmental monitoring using the Set User Envmon command.

To display status of one or more UPS devices:

At the Switched PDU: prompt, type upsstat and press Enter.

Example

The following command displays the UPS status:

Switched PDU: upsstat<Enter>

<table>
<thead>
<tr>
<th>UPS</th>
<th>Type</th>
<th>Status</th>
<th>Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Index</td>
<td>UPS</td>
<td>Status</td>
<td>Voltage</td>
</tr>
<tr>
<td>1</td>
<td>Generic(RFC1628)</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>2</td>
<td>Liebert</td>
<td>On Battery</td>
<td>120.0</td>
</tr>
<tr>
<td>3</td>
<td>MGE</td>
<td>On Utility</td>
<td>119.9</td>
</tr>
</tbody>
</table>

Administration Commands

Administration commands may only be issued by a user with administrative privileges, such as the predefined Admin user or another user who has been granted administrative privileges with the Set User Admnpriv command.

User Administration

Creating a user account:

The Create User command creates a user account with the specified username and password.

To create a user account:

At the Switched PDU: prompt, type create user, optionally followed by a 1-16 character username (Spaces are not allowed, and usernames are not case sensitive). Press Enter.

At the Password: prompt, type a password of 1-16 alphanumeric and other typed characters - (ASCII 33 to 126 decimal) are allowed; passwords are case sensitive. Press Enter.

At the Verify Password: prompt, retype the password. Press Enter.

Example

The following command creates the user account JaneDoe:

Switched PDU: create user JaneDoe<Enter>
Password: <Enter>
Verify New Password: <Enter>

For security, password characters are not displayed.
Removing a user account:
The Remove User command removes a user account.

NOTE: You can remove the default user account admin only if you have already granted administrative access to another user with the Set User Admnpriv command.

To remove a user account:
At the Switched PDU: prompt, type remove user, optionally followed by a username. Press Enter.

Changing a password:
The Set User Password command changes a user’s password. For security, when you type a password, the characters are not displayed on the screen. See Usernames and Passwords for more information.

To change a password:
At the Switched PDU: prompt, type set user password, followed by a username and press Enter.
At the Password: prompt, type the new password and press Enter. Passwords may contain 1-16 characters.
At the Verify Password: prompt, retype the new password and press Enter.

Example
The following command changes the password for the user JohnDoe:

Switched PDU: set user password johndoe<Enter>
Password: <Enter>
Verify Password: <Enter>

For security, password characters are not displayed.

Setting user access level privileges:
The Set User Access command sets the access level privileges for a user. The PDU has the following defined access privilege levels; Admin, Power User, User, Reboot-Only, On-Only and View-Only.

The administrator may also grant administrative privileges to other user accounts allowing the PDU to have more than one administrative-level user.

NOTE: You cannot remove administrative privileges from the Admin user unless another user has already been given administrative access level privileges created.

To set the access level privilege for a user:
At the Switched PDU: prompt, type set user access, followed by admin, poweruser, user, rebootonly, ononly or viewonly, optionally followed by a username and press Enter.

Examples
The following command sets the user access level for JohnDoe to Admin:

Switched PDU: set user access admin johndoe<Enter>

The following command sets the user access level for JaneDoe to User:

Switched PDU: set user access user janedoe<Enter>

Granting or removing environmental monitoring access:
The Set User Envmon command grants or removes access to environmental monitoring for a user.

To grant or remove environmental monitoring access for a user:
At the Switched PDU: prompt, type set user envmon followed by on or off, optionally followed by a username, and press Enter. If a user name is not provided on the Command Line, you will be prompted for a user name.

Example
The following command grants access to environmental monitoring for the user JohnDoe:

Switched PDU: set user envmon on johndoe<Enter>

NOTE: Granting access to environmental monitoring (temperature/humidity/sensors) to a non-admin user also grants that user access to power monitoring (outlets, infeeds, towers – all the environmental data of the PDU).
Granting and removing input load viewing privileges:

The Set User Envmon command grants or removes input status viewing privileges to/from a user.

To grant or remove input load viewing privileges for a user:

At the Switched PDU: prompt, type `set user envmon` followed by `on` or `off`, optionally followed by a username and press Enter.

**Example**

The following command grants input load privileges to the user JohnDoe:

```
Switched PDU: set user envmon on johndoe<Enter>
```

Displaying the access privilege levels:

The List Users command displays all defined users with their access privilege level.

To display user access privilege levels:

At the Switched PDU: prompt, type `list users` and press Enter.

**Example**

The following command displays all users with their access privilege level:

```
Switched PDU: list users<Enter>
```

<table>
<thead>
<tr>
<th>User</th>
<th>Privilege</th>
<th>Environmental Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>JANEDOE</td>
<td>Reboot-Only</td>
<td>Not Allowed</td>
</tr>
<tr>
<td>JOSEYDOE</td>
<td>On-Only</td>
<td>Not Allowed</td>
</tr>
<tr>
<td>JOEDOE</td>
<td>View-Only</td>
<td>Not Allowed</td>
</tr>
<tr>
<td>JILLDOE</td>
<td>Power-User</td>
<td>Allowed</td>
</tr>
<tr>
<td>JOHNDOE</td>
<td>Admin</td>
<td>Allowed</td>
</tr>
</tbody>
</table>

Adding outlet access to a user:

The Add OutletToUser command grants a user access to one or all outlets. To grant access for more than one outlet, but not all outlets, you must use multiple Add OutletToUser commands.

To grant outlet access to a user:

At the Switched PDU: prompt, type `add outlettouser`, optionally followed by an outlet name and a username. Press Enter, or

Type `add outlettouser all`, followed by a username and press Enter.

**Examples**

The following commands grant the user JaneDoe access to outlets A1 and Webserver_1:

```
Switched PDU: add outlettouser .a1 janedoe<Enter>
Switched PDU: add outlettouser WebServer_1 janedoe<Enter>
```

Deleting outlet access for a user:

The Delete OutletFromUser command removes a user’s access to one or all outlets. You cannot remove access to any outlet for an administrative level user.

To delete outlet access for a user:

At the Switched PDU: prompt, type `delete outletfromuser`, optionally followed by an outlet name and a username. Press Enter, or

Type `delete outletfromuser all`, followed by a username and press Enter.
Adding group access to a user:

The Add GroupToUser command grants a user access to a group. To grant access for more than one group, you must use multiple Add GroupToUser commands.

To grant group access to a user:

At the Switched PDU: prompt, type `add grouptouser`, optionally followed by a group name and a username. Press Enter.

Examples

The following commands grants to user JaneDoe access to the groups ServerGroup_1 and ServerGroup_2:

```
Switched PDU: add GroupToUser ServerGroup_1 janedoe<Enter>
Switched PDU: add GroupToUser ServerGroup_2 janedoe<Enter>
```

Deleting group access for a user:

The Delete GroupFromUser command removes a user’s access to a group. You cannot remove access to any group for an administrative level user.

To delete group access for a user:

At the Switched PDU: prompt, type `delete GroupFromUser`, optionally followed by a group name and a username. Press Enter.

Adding serial port access to a user:

The Add PortToUser command grants a user access to the serial port.

To grant serial port access to a user:

At the Switched PDU: prompt, type `add porttouser console` and a username. Press Enter.

Deleting serial port access for a user:

The Delete PortFromUser command removes a user’s access to the serial port. You cannot remove access to the serial port for an administrative level user.

To delete serial port access for a user:

At the Switched PDU: prompt, type `delete portfromuser console` and a username. Press Enter.

Displaying user outlet, group and serial port access:

The List User command displays all accessible outlets, groups and serial ports for a user.

To display user outlet, group and serial port access:

At the Switched PDU: prompt, type `list user`, optionally followed by a username. Press Enter.

Example

The following command displays information about the user JaneDoe:

```
Switched PDU: list user janedoe<Enter>
Username: JANEDOE
Outlet | Outlet | Name
ID     | Name    | Name
.A1    | DataServer_1
.A2    | WebServer_1
Groups:
   ServerGroup_1
   ServerGroup_2
More (Y/yes N/no): Y
Ports:
  Port | Port | Name
  ID   | Name | Name
  Console | Console

JaneDoe may access the following outlets, groups and serial ports: outlet A1 which has a descriptive name of DataServer_1, outlet A2 which has a descriptive name of WebServer_1, group ServerGroup_1 group ServerGroup_2, and Console serial port.
Outlet Administration

Setting the sequencing interval:

The Set Outlet SeqInterval commands sets the power on sequencing interval for all outlets.

To set the sequencing interval:

At the Switched PDU: prompt, type `set outlet seqinterval all`, followed by a value from 0 to 15 (in seconds) and press Enter.

Setting the reboot delay:

The Set Outlet RebootDelay commands sets the reboot delay for all outlets.

To set the sequencing interval:

At the Switched PDU: prompt, type `set outlet rebootdelay all`, followed by a value from 5 to 60 (in seconds) and press Enter.

Creating a descriptive outlet name:

The Set Outlet Name command assigns a descriptive name to an outlet. You can use this name in commands that require an outlet name as an alternative to using the outlet’s absolute name.

To create an outlet name:

At the Switched PDU: prompt, type `set outlet name` followed by the absolute outlet name, then a descriptive name of up to 24 alphanumeric and other typed characters - (ASCII 33 to 126 decimal) are allowed; spaces are not allowed; outlet names are not case sensitive. Press Enter.

Example

The following command adds the descriptive name DataServer_1 to outlet .a1:

```
Switched PDU: set outlet name .a1 DataServer_1<Enter>
```

Setting the outlet wakeup state:

The Set Outlet Wakeup command set the default wakeup state for that outlet. In the event of a system-wide power loss, this state will be applied to the outlet when power is restored.

The wakeup state may be set to On, Off or Last. Upon restoration of system power; If set to On, the PDU will apply power to that outlet. If set to Off, the PDU will not apply power to that outlet. If set to Last, the PDU will apply the last known power state.

To set the wakeup state:

At the Switched PDU: prompt, type `set outlet wakeup` followed by on, off or last and the outlet name. Press Enter.

Example

The following command sets the wakeup state for outlet .a1 to off:

```
Switched PDU: set outlet wakeup off .a1<Enter>
```

Setting the outlet post-on delay:

The Set Outlet PostOnDelay command is used set the Post-On delay for an outlet. This feature allows the administrator to manage boot dependencies during power-on sequencing or group commands by delaying the sequencing of subsequent outlets after an outlet has been powered on.

NOTE: This delay is applied in addition to the general sequencing interval.

To set the outlet post-on delay:

At the Switched PDU: prompt, type `set outlet postondelay`, followed by a value from 0 to 900 (in seconds) and press Enter.

Example

The following command set the post-on delay for outlet .a5 to 90 seconds:

```
Switched PDU: set outlet postondelay .a5 90<Enter>
```
Setting the outlet locked (no control) state:

The Outlet Locked feature protects against accidental switching off of critical equipment that should rarely, if ever, be relay-controlled. The feature also prevents unused outlets from being turned on, for example, when a circuit is at capacity and additional devices/loads should not be turned on.

Control actions for a locked outlet will not be available in the CLI interface, and the outlet will not be affected by group actions or Smart Load Shedding actions. SNMP control actions will be ignored for a locked outlet.

To set the outlet locked (no control) state:

At the Switched PDU: prompt, type `set outlet locked`, followed by an outlet name, followed by `yes`, and press Enter.

Example

The following command locks outlet TowerA_InfeedA_Outlet1:

```
Switched PDU: set outlet locked TowerA_InfeedA_Outlet1 yes<Enter>
```

When an outlet is configured into the locked state, the outlet will lock at its current control state (On or Off). The outlet control state will then change to Locked On or Locked Off.

The locked control state (Yes or No) displays in the outlets list using the Show Outlets command:

```
Switched PDU: show outlets<Enter>
Outlet   Outlet                Wakeup      Post-On     Locked
ID       Name                      State    Delay <sec>     <No Control>
.AA1     TowerA_InfeedA_Outlet1    On         0     Yes
.AB1     TowerA_InfeedB_Outlet1    On         1     Yes
.AC1     TowerA_InfeedB_Outlet1    On         567   No
.AD1     TowerA_InfeedD_Outlet1    On         899   No
```

To unlock a locked outlet:

At the Switched PDU: prompt, type `set outlet locked`, followed by a locked outlet name, followed by `no`, and press Enter.

Example

The following command unlocks outlet TowerA_InfeedA_Outlet1:

```
Switched PDU: set outlet locked TowerA_InfeedA_Outlet1 no<Enter>
```
Displaying outlet information:

The Show Outlets command displays information about all outlets. This information includes:

- Sequencing and reboot timer values
- Descriptive outlet name, if applicable
- Outlet wakeup state and post-on settings
- Current outlet locked status

To display outlet information:

At the Switched PDU: prompt, type `show outlets` and press Enter.

Example

The following command displays all outlet information:

Switched PDU: show outlets<Enter>

<table>
<thead>
<tr>
<th>Outlet ID</th>
<th>Outlet Name</th>
<th>Wakeup State</th>
<th>Post-On Delay (seconds)</th>
<th>Locked Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>.A1</td>
<td>DataServer_1</td>
<td>On</td>
<td>0</td>
<td>Yes</td>
</tr>
<tr>
<td>.A2</td>
<td>WebServer_1</td>
<td>On</td>
<td>0</td>
<td>Yes</td>
</tr>
<tr>
<td>.A3</td>
<td>FileServer_1</td>
<td>On</td>
<td>0</td>
<td>No</td>
</tr>
<tr>
<td>.A4</td>
<td>TowerA_Outlet4</td>
<td>On</td>
<td>0</td>
<td>No</td>
</tr>
<tr>
<td>.A5</td>
<td>TowerA_Outlet5</td>
<td>On</td>
<td>90</td>
<td>No</td>
</tr>
<tr>
<td>.A6</td>
<td>TowerA_Outlet6</td>
<td>On</td>
<td>0</td>
<td>Yes</td>
</tr>
<tr>
<td>.A7</td>
<td>TowerA_Outlet7</td>
<td>On</td>
<td>0</td>
<td>No</td>
</tr>
<tr>
<td>.A8</td>
<td>TowerA_Outlet8</td>
<td>On</td>
<td>0</td>
<td>No</td>
</tr>
<tr>
<td>.A9</td>
<td>TowerA_Outlet9</td>
<td>On</td>
<td>0</td>
<td>No</td>
</tr>
<tr>
<td>.A10</td>
<td>TowerA_Outlet10</td>
<td>On</td>
<td>0</td>
<td>No</td>
</tr>
<tr>
<td>.A11</td>
<td>TowerA_Outlet11</td>
<td>On</td>
<td>0</td>
<td>No</td>
</tr>
<tr>
<td>.A12</td>
<td>TowerA_Outlet12</td>
<td>On</td>
<td>0</td>
<td>No</td>
</tr>
<tr>
<td>.A13</td>
<td>TowerA_Outlet13</td>
<td>On</td>
<td>0</td>
<td>No</td>
</tr>
<tr>
<td>.A14</td>
<td>TowerA_Outlet14</td>
<td>On</td>
<td>0</td>
<td>No</td>
</tr>
<tr>
<td>.A15</td>
<td>TowerA_Outlet15</td>
<td>On</td>
<td>0</td>
<td>No</td>
</tr>
<tr>
<td>.A16</td>
<td>TowerA_Outlet16</td>
<td>On</td>
<td>0</td>
<td>No</td>
</tr>
</tbody>
</table>

More (Y/es N/o):

Outlet Options:
- Sequence Interval: 2 seconds
- Reboot Delay: 15 seconds

Input Feed Administration

Creating a descriptive infeed name:

The Set Infeed Name command assigns a descriptive name to an infeed. This descriptive name is displayed when the Show Traps command is issued.

To create a infeed name:

At the Switched PDU: prompt, type `set infeed name` followed by the absolute infeed name, then a descriptive name of up to 24 alphanumeric and other typed characters - (ASCII 33 to 126 decimal) are allowed; spaces are not allowed. Press Enter.

Example

The following command adds the descriptive name HQ_1_Infeed_A to the infeed on the Switched PDU:

Switched PDU: set infeed name .aa HQ_1_Infeed_A<Enter>

Setting the infeed operational voltage

The Set Infeed Voltage command is use to edit the input operational voltage.

To set the infeed operational voltage:

At the Switched PDU: prompt, type `set infeed voltage`, followed by the absolute infeed name, and a value from 1 to 480. Press Enter.

Example

The following commands sets the operational voltage for input .AA to 100V:

Switched PDU: set infeed voltage .aa 100<Enter>
Setting the infeed maximum load capacity

The Set Infeed LoadMax command is used to edit the input maximum load capacity.

To set the infeed maximum load capacity:

At the Switched PDU: prompt, type `set infeed loadmax`, followed by the absolute infeed name, and a value from 1 to 255 (in amperes). Press Enter.

Example

The following commands sets the maximum load capacity for input .AA to 15 amperes:

```
Switched PDU: set infeed loadmax .aa 15<Enter>
```

Displaying infeed information:

The Show Infeeds command displays information about all infeeds. This information includes the absolute and descriptive infeed names, operational voltages and maximum load capacities.

To display tower information:

At the Switched PDU: prompt, type `show infeeds` and press Enter.

Example

```
Switched PDU: show infeeds<Enter>
```

<table>
<thead>
<tr>
<th>Input ID</th>
<th>Input Name</th>
<th>Feed Voltage</th>
<th>Feed Capacity (Amps)</th>
</tr>
</thead>
<tbody>
<tr>
<td>.AA</td>
<td>HQ_1_Infeed_A</td>
<td>100</td>
<td>15</td>
</tr>
<tr>
<td>.AB</td>
<td>HQ_1_Infeed_B</td>
<td>120</td>
<td>20</td>
</tr>
<tr>
<td>.BA</td>
<td>HQ_2_Infeed_A</td>
<td>120</td>
<td>30</td>
</tr>
<tr>
<td>.BB</td>
<td>HQ_2_Infeed_B</td>
<td>120</td>
<td>30</td>
</tr>
</tbody>
</table>

Tower Administration

Creating a descriptive tower name:

The Set Tower Name command assigns a descriptive name to a tower. This descriptive name is displayed when the Show Traps command is issued.

To create a tower name:

At the Switched PDU: prompt, type `set tower name` followed by the absolute tower name, then a descriptive name of up to 24 alphanumeric and other typed characters - (ASCII 33 to 126 decimal) are allowed; spaces are not allowed. Press Enter.

Example

The following command adds the descriptive name Florida_HQ_1 to tower .a:

```
Switched PDU: set tower name .a Florida_HQ_1<Enter>
```

Setting the tower serial number:

The Set Tower ProdSN command is used to set the product serial number.

NOTE: If set at the factory, you cannot edit the serial number.

To set the tower serial number:

At the Switched PDU: prompt, type `set tower prodsn`, followed by the absolute tower name, and the tower serial number. Press Enter.

Example

The following command sets the serial number for tower .A to ‘AA06F011157’:

```
Switched PDU: set tower prodsn .a AA06F011157<Enter>
```
Setting the tower model number:
The Set Tower Model command is used to set the product model number.

**NOTE:** If set at the factory, you cannot edit the model number.

To set the tower model number:
At the Switched PDU: prompt, type `set tower model`, followed by the absolute tower name, and the tower model number. Press Enter.

**Example**
The following command sets the model number for tower .A to TEST:

```
Switched PDU: set tower prodsn .a test<Enter>
```

Setting the tower AC or DC voltage type:
The Set Tower command is used to set the product input AC or DC voltage type.

**NOTE:** If set at the factory, you cannot edit the voltage type.

To set the tower AC/DC voltage type:
At the Switched PDU: prompt, type `set tower`, followed by `ac` or `dc`, and the absolute tower name. Press Enter.

**Example**
The following command sets the AC/DC voltage type for tower .A to AC:

```
Switched PDU: set tower ac.a<Enter>
```

Setting the tower AC voltage type:
The Set Tower 3phase command is used to set the product input AC voltage type.

**NOTE:** If set at the factory, you cannot edit the voltage type.

To set the tower AC voltage type:
At the Switched PDU: prompt, type `set tower 3phase`, followed by `yes` or `no` and the absolute tower name. Press Enter.

**Example**
The following command sets the AC voltage type for tower .A to non-3-phase:

```
Switched PDU: set tower 3phase.a no<Enter>
```

Displaying tower information:
The Show Towers command displays information about the PDU. This information includes the absolute and descriptive PDU names, serial/model numbers, and voltage types.

To display tower information:
At the Switched PDU: prompt, type `show towers` and press Enter.

**Example**
```
Switched PDU: show towers<Enter>
Tower ID: .A
Name: TowerA
Product S/N: AA06F011157
Model No.: test
3-Phase: No
Power Type: AC
More (Y/es N/o):
```
Group Administration

Creating a group name:
The Create Group command creates a new group name.

To create a group name:
At the Switched PDU: prompt, type create group optionally followed by a descriptive name of up to 24 alphanumeric and other typed characters - (ASCII 33 to 126 decimal) are allowed; spaces are not allowed. Group names are not case sensitive. Press Enter.

Example
The following command creates group name ServerGroup_1:
Switched PDU: create group ServerGroup_1<Enter>

Removing a group name:
The Remove Group command removes a group name.

To remove a group name:
At the Switched PDU: prompt, type remove group, optionally followed by a username. Press Enter.

Example
The following command removes group name ServerGroup_1:
Switched PDU: remove group ServerGroup_1<Enter>

Adding an outlet to a group:
The Add OutletToGroup command adds an outlet to a group. To add more than one outlet, but not all outlets, you must use multiple Add OutletToGroup commands.

To add an outlet to a group:
At the Switched PDU: prompt, type add outlettogroup, optionally followed by an outlet name and group name. Press Enter, or Type add OutletToGroup, followed by all and the group name. Press Enter.

Examples
The following commands uses absolute outlet names to add outlets A1 and A2 to group name ServerGroup_1:
Switched PDU: add OutletToGroup .a1 ServerGroup_1<Enter>
Switched PDU: add OutletToGroup .a2 ServerGroup_1<Enter>
The following commands use the outlets’ descriptive names to add outlets DataServer_1 and WebServer_1 to group name ServerGroup_1:
Switched PDU: add OutletToGroup DataServer_1 ServerGroup_1<Enter>
Switched PDU: add OutletToGroup WebServer_1 ServerGroup_1<Enter>
The following command add all outlets to group name ServerGroup_1:
Switched PDU: add OutletToGroup<Enter>
Outletname: all<Enter>
Groupname: ServerGroup_1<Enter>

Deleting an outlet from a group:
The Delete OutletFromGroup command deletes an outlet from a group. To delete more than one outlet, but not all outlets, you must use multiple Delete OutletToGroup commands.

To delete an outlet from a group:
At the Switched PDU: prompt, type delete outletfromgroup, optionally followed by an outlet name and a group name. Press Enter, or Type delete outletfromgroup, followed by all then the group name. Press Enter.
Environmental Monitor Administration

Creating a descriptive Environmental Monitor name:

The Set Envmon Name command assigns a descriptive name to the integrated Environmental Monitor. This descriptive name is displayed when the Evnmon command is issued.

To create an Environmental Monitor name:

At the Switched PDU: prompt, type set envmon name followed by the absolute environmental monitor name, then the descriptive name of up to 24 alphanumeric and other typed characters - (ASCII 33 to 126 decimal) are allowed; spaces are not allowed. Press Enter.

Example

The following command adds the descriptive name Florida_HQ_1to the Environmental Monitor:

Switched PDU: set envmon name .a Florida_HQ_1<Enter>

Creating a descriptive temperature/humidity sensor name:

The Set Envmon THS Name command assigns a descriptive name to a temperature/humidity sensor. This descriptive name is displayed when the Evnmon command is issued.

To create an temperature/humidity sensor name:

At the Switched PDU: prompt, type set envmon ths name followed by the absolute name of the temperature/humidity sensor, then the descriptive name of up to 24 alphanumeric and other typed characters - (ASCII 33 to 126 decimal) are allowed; spaces are not allowed. Press Enter.

Example

The following command adds the descriptive name T/H2_Florida_HQ_1 to the second temperature/humidity sensor:

Switched PDU: set envmon ths name .a2 T/H2_Florida_HQ_1<Enter>

Serial Port Administration

Creating a descriptive serial port name:

The Set Port Name command assigns a descriptive name to a serial port. You can use this name in commands that require a port name as an alternative to using the port’s absolute name.

To create an port name:

At the Switched PDU: prompt, type set port name followed by the absolute outlet name, then a descriptive name of up to 24 alphanumeric and other typed characters - (ASCII 33 to 126 decimal) are allowed; spaces are not allowed; port names are not case sensitive. Press Enter.

Example

The following command adds the descriptive name Rack1 to Console port:

Switched PDU: set port name console Rack1<Enter>

Setting the serial ports data-rate:

The Set Port Speed command sets the default data-rate for the serial port. Valid data-rates are 1200, 2400, 4800, 9600, 19200, 38400, 57600 and 115200.

To set the serial port data-rate:

At the Switched PDU: prompt, type set port speed, follow by the data-rate and press Enter.

Example

The following command sets the serial ports data-rate to 38400 BPS:

Switched PDU: set port speed 38400<Enter>

Enabling or disabling active signal checking for serial connections:

The Set Port DSR Check command enables or disables active signal checking for serial connections to devices attached to any of the available serial ports.

To enable or disable active signal checking for serial connections:

At the Switched PDU: prompt, type set port dsrch check console, on or off, and press Enter.
Setting the serial port timeout value:

The Set Port Timeout command sets the serial port inactivity timeout period. The timeout period defines the maximum period of inactivity before automatically closing the Pass-Thru session.

The valid range for the timeout is 0 to 60 (in minutes). The default timeout is 5 minutes. The command can be used to set individual ports (by ID or name) or set all ports.

**NOTES:**
- Setting the timeout value to “0” disables the timer.
- Only a numeric value is accepted.

*To set the serial port timeout value for an individual port:*

At the Switched PDU: prompt, type `set port timeout`, followed by the port ID or name, followed by a timeout value from 0 to 60 (in minutes), and press Enter.

*To set the serial port timeout value for all ports:*

At the Switched PDU: prompt, type `set port timeout all`, followed by a timeout value from 0 to 60 (in minutes), and press Enter.

Enabling or disabling the Command Line Interface (CLI):

This option enables or disables availability of the CLI for issuing action commands to the PDU. If disabled, only the Sentry firmware Web user interface will be available.

*To enable or disable the CLI:*

At the Switched PDU: prompt, type `set port cli`, follow by the serial port name, followed by enabled or disabled, and press Enter.

Enabling or disabling the Serial Command Protocol (SCP):

This option allows SCP functions to be enabled or disabled for a specific serial port.

*To enable or disable the SCP:*

At the Switched PDU: prompt, type `set port scp`, follow by the serial port name, followed by enabled or disabled, and press Enter.

Enabling or disabling the Serial Command Protocol (SCP) emulation:

This option notifies SCP of an MRV device on a specific serial port.

*To enable or disable the SCP emulation:*

At the Switched PDU: prompt, type `set port scp`, followed by emulate, followed by none or MRV, and press Enter.

Displaying serial port information:

The Show Ports command displays information about all serial ports. This information includes:

- Serial port data rate
- Descriptive port name, if applicable
- DSR signal checking settings
- Bluetooth™ parameter settings, if applicable

*To display serial port information:*

At the Switched PDU: prompt, type `show ports` and press Enter.

**Example**

The following command displays all serial port information:

```
Switched PDU: show ports<Enter>
```

```
Serial Port Configuration
```
System Administration

Creating a pre-login banner:

The Set Banner command specifies text that appears prior to the login authentication. This feature allows administrators to configure a message up to 2069 characters for display of legal, disclaimer or other text as required by application. If left blank, the user will be taken directly to the login prompt.

NOTES:

For SSH sessions only:
• The “keyboard-interactive” authentication method must be used for the banner to display.
• Banner length is truncated to 1500 bytes in SSH packets to avoid failure of SSH connection when configured with a long login banner.

To create a pre-login banner:

At the Switched PDU: prompt, type set banner and press Enter. Type the desired pre-login banner text and when finished type Ctrl-z.

Creating a location description:

The Set Location command specifies text that appears in the Web control screen’s Location field. The text is also appended to a Welcome to banner that appears when a user successfully logs in serially or through a Telnet session.

If you do not issue this command, or if you issue this command without specifying any text, the control screen’s Location field will be blank and no Welcome to banner will be displayed.

To create a location description:

At the Switched PDU: prompt, type set location followed by a descriptive name of up to 24 alphanumeric and other typed characters - (ASCII 33 to 126 decimal) are allowed; spaces are allowed. Press Enter.

Omitting any characters after typing ‘set location’ deletes any previously specified text.

Examples

The following command specifies Florida HQ as the descriptive location for the control screen and the login banner:

Switched PDU: set location Florida HQ<Enter>

The following command deletes any previously specified location description:

Switched PDU: set location<Enter>

In this case, the control screen’s Location field will be blank, and no Welcome to banner will be displayed after a successful login.

Setting the system area:

The Set System Area command is used to set the total area for the system. This value is used for total system power calculations.

To set the system area:

At the Switched PDU: prompt, type set system area, followed by the system area (in square feet) and press Enter.

Example

The following command sets the total system area to 6.3 square feet:

Switched PDU: set system area 6.3<Enter>
Setting the system area unit of measure:
The Set System Area Unit command sets the value for the system area footprint in either square meters or square feet. The default unit of area is a square meter.

To set the system area unit of measure:
At the Switched PDU prompt, type `set system areaunit`, followed by `squaremeter` or `squarefoot`, and press Enter.

Setting the power factor:
The Set System PF command sets the power factor used in the total system power calculation. The valid range is .50 to 1.00.

To set the power factor:
At the Switched PDU prompt, type `set system pf`, followed by the power factor, and press Enter.

Setting the 3-phase load out-of-balance threshold:
The Set System Balance command determines when the current on the lines of a 3-phase system are out-of-balance between the three phases of power.

To set the 3-phase load out-of-balance threshold:
At the Switched PDU prompt, type `set system balance`, followed by the load out-of-balance threshold (in percent), and press Enter.

Example:
The following command sets the 3-phase load out-of-balance threshold to 20%.

```
Switched PDU: set system balance 20<Enter>
```

Setting the 3-phase load out-of-balance alert:
The Set System Balance Alert command enables or disables the sending of an alert when the current on the lines of a 3-phase system are past a pre-set threshold (percentage) and are out-of-balance between the three phases of power.

At the Switched PDU prompt, type `set system balancealert`, followed by `enabled` or `disabled`, and press Enter.

Example:
The following command enables the load out-of-balance alert:

```
Switched PDU: set system balancealert enabled<Enter>
```

NOTES:

- When a device with 3-phase input voltage is out-of-balance, efficiency is reduced and the unit is prevented from reaching maximum capacity. When an alert for the out-of-balance condition is received (if the alerting feature is enabled), it may be necessary to adjust distribution of the loads.
- For 3-phase systems, if the Out-of-Balance Alerting feature is enabled, and the system goes into a load out-of-balance condition, the System Status command will display the alert “3ph Out-of-Balance” in the Tower Status section, unless there is a higher priority tower error state to report.

Displaying system configuration information:
The Show System command displays all system configuration information.

- Firmware version
- NIC module serial number and MAC address
- Hardware revision code and Flash size
- Uptime since last system restart
- System location description
- Area (footprint) and power factor
- 3-phase load out-of-balance threshold and alert status
To display system configuration information:
At the Switched PDU: prompt, type `show system` and press Enter.

**Example**

System Information

- F/W Version: Switched PDU Version 7.0a
- NIC S/N: 1600001
- MAC Address: 00-0a-9c-10-00-01
- H/W Rev Code: 0
- Flash Size: 2 MB
- Uptime: 0 days 6 hours 14 minutes 1 second
- Location: Florida HQ
- Area <Footprint>: 6.3 square feet
- Power Factor: 0.80

3-Phase Load Out-of-Balance
  Threshold: 20 percent
  Alerting: Enabled

**Displaying system power status:**

The System Status command displays system power and tower information.

**To display system power status:**

At the Switched PDU: prompt, type `sysstat` and press Enter.

**Example**

```
Switched PDU: sysstat
```

**System Power Status**

```
  Total Power Consumption:    170 Watts
  Area <Footprint>:           100.0 Square Meters
  Watts Per Area Unit:        2 Watts Per Square Meter
```

**Tower Status**

<table>
<thead>
<tr>
<th>Tower ID</th>
<th>Tower Name</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>.A</td>
<td>TowerA</td>
<td>Normal</td>
</tr>
<tr>
<td>.B</td>
<td>TowerB</td>
<td>Normal</td>
</tr>
</tbody>
</table>

Command successful

---

**NOTE:** For 3-phase systems, if the Out-of-Balance Alerting feature is enabled, and the system goes into a load out-of-balance condition, the System Status command will display the alert “3ph Out-of-Balance” in the Tower Status section, unless there is a higher priority tower error state to report.

**Configuring the LED display orientation:**

The Set Option Display command configures the LED display orientation.

**To configure the LED display orientation:**

At the Switched PDU: prompt, type `set option display`, followed by `normal`, `inverted`, or `auto`, and press Enter.

**Example**

The following sets the LED display orientation to Inverted:

```
Switched PDU: set option display inverted<Enter>
```

---

**NOTES:**

- Only specific PDU models are equipped with an accelerometer chip that senses device orientation. If equipped, your PDU automatically aligns the LED display orientation according to its current direction, and “Auto” will display in the Show Options command by default. In addition, the actual mounting of the unit, such as Normal or Inverted, appears to the right of the “Auto” option when you issue the Show Options command. However, even if your PDU model does have the sensor for device orientation, you can still issue the Set Option Display command with either the Normal or Inverted option to override the capability of the hardware.

- If your PDU model does not have the accelerometer chip, you will need to configure the LED display orientation by entering the Normal or Inverted option.
Enabling or disabling strong passwords:
The Set Option Strong Password command is used to enable or disable the requirements for strong passwords. When enabled, all new passwords must be a minimum of 8 characters in length with at least one uppercase letter, one lowercase letter, one number and one special character.

To enable or disable strong passwords:
At the Switched PDU: prompt, type set option strong password, followed by enabled or disabled and press Enter.

Enabling or disabling the external configuration reset button:
The Set Option Button command enables or disables the external configuration reset button. This feature can enhance system security by protecting the PDU configurations from being reset locally.

NOTE: If this feature has been enabled and the administrative account username/password has been lost, then the PDU must be returned to the factory for non-warranty reset of the configuration.

To enable or disable the configuration reset button:
At the Switched PDU: prompt, type set option button, followed by enabled or disabled and press Enter.

Enabling or disabling the ‘more’ prompt:
The Set Option More command enables or disables the ‘more’ prompt for display of data larger than the terminal window.

To enable or disable ‘more’:
At the Switched PDU: prompt, type set option more, followed by enabled or disabled and press Enter.

Setting the outlet sequence order:
The PDU lets you configure the power-on sequence of outlets.

The Normal option powers-on outlets in ascending numeric order by outlet number, for example, from outlet 1-8. The Reversed option powers on outlets in descending order by outlet number; for example, from outlet 8-1.

The Reversed option is useful when the PDU is mounted with inverted orientation and the last outlet (in this example, outlet 8) is in the first position.

At the Switched PDU: prompt, type set option outletsequence, followed by normal or reversed, and press Enter.

Setting the temperature scale:
The Set Option TempScale command sets the temperature scale that the PDU will report in.

To set the temperature scale:
At the Switched PDU: prompt, type set option tempscale, followed by celsius or fahrenheit and press Enter.

Configuring the Command Line Interface (CLI) session timeout:
The Set Option CLI Timeout command configures the CLI session timeout in minutes.

The valid timeout range is 1 to 1440 minutes (24 hours). The default session timeout is 5 minutes.

To configure the CLI Session Timeout:
At the Switched PDU: prompt, type set option clitimeout, followed by the session timeout (in minutes), and press Enter.

Example:
The following command sets the CLI session timeout to 15 minutes:

    Switched PDU: set option clitimeout 15<Enter>
Configuring the web session (Web Interface) timeout:
The Set Option Web Timeout command configures the Web session timeout in minutes.
The valid timeout range is 1 to 1440 minutes (24 hours). The default session timeout is 5 minutes.

To configure the web session timeout:
At the Switched PDU: prompt, type `set option webtimeout`, followed by the session timeout (in minutes), and press Enter.

Example:
The following command sets the web session (Web Interface) timeout to 10 minutes:
```
Switched PDU: set option webtimeout 10<Enter>
```

To enable or disable coldboot alert:
Upon a coldboot of the system (if the Coldboot Alert feature is enabled), the system sends a ½ second RS-232 break out on any serial ports that are also enabled.
The Set Option Coldboot Alert command enables or disables the Coldboot Alert feature.

To enable or disable coldboot alert:
At the Switched PDU: prompt, type `set option cbalert`, followed by `enabled` or `disabled`, and press Enter.

To enable or disable the Serial Command Protocol (SCP) authentication:
The Set SCP Authentication command enables or disables SCP Authentication.

To enable or disable SCP:
At the Switched PDU: prompt, type `set scpauth`, followed by `enabled` or `disabled`, and press Enter.

To set the Serial Command Protocol (SCP) authentication user:
The Set SCPAuth User command sets the username and password for SCP Authentication.

To set SCP username:
At the Smart PDU: prompt, type `set scpauth user`, followed by user name, and press Enter. You will be prompted to enter and verify a password.

Displaying system options:
The Show Options command displays settings for all system options.

To display system option information:
At the Switched PDU: prompt, type `show options` and press Enter.

Example:
```
Switched PDU: show options
System Options
  Display Orientation: AUTO <Normal>
  Outlet Sequence Order: NORMAL
  Strong Passwords: DISABLED
  Configuration Reset Button: ENABLED
  More Prompt: ENABLED
  Temperature Scale: CELSIUS
  CLI Session Timeout: 1000 minutes
  Web Session Timeout: 1000 minutes
  Coldboot Alert <SCP>: ENABLED
```

NOTE: The display of "<SCP>" after the Coldboot Alert parameter in the Show Options command (as indicated above) shows a relationship between the Serial Command Protocol (SCP) and the Coldboot Alert feature. Upon a coldboot of the system, if the Coldboot Alert feature is enabled, the system will send a ½ second RS-232 break out to to any SCP-enabled serial ports.
Displaying the firmware version:
The Version command displays the firmware version of the PDU.

To display the firmware version:
At the Switched PDU prompt, type `version` and press Enter.

Performing a warm boot:
The Restart command performs a warm boot of the PDU.

NOTE: System user/outlet/group/port configuration or outlet states are NOT changed or reset with this command.

To perform a warm boot:
At the Switched PDU prompt, type `restart` and press Enter.

Enabling or disabling the Cisco EnergyWise network:

NOTE: Only commands through the CLI are supported for the Cisco EnergyWise network. There is no firmware web-based interface for EnergyWise. Enabling EnergyWise requires a system restart.

The Set EnergyWise command enables or disables the EnergyWise network support:

To enable or disable EnergyWise:
At the Switched PDU prompt, type `set energywise`, followed by `enabled` or `disabled`, and press Enter.

Example
Switched PDU: set energywise enabled

Command successful -- restart required

Setting up PDUs in the Cisco EnergyWise network:

NOTE: To use EnergyWise, you must first configure domain name, port, and secret.

The Set EnergyWise Domain command configures the EnergyWise domain the PDU belongs to. The limit of the Domain Name is 64 characters.

To set the EnergyWise domain name:
At the Switched PDU prompt, type `set energywise domain`, followed by the domain name, and press Enter.

Example
Switched PDU: set energywise domain 10.1.2.120

Command successful

To set the EnergyWise port:
The default port number is 43440; the valid range for port numbers is 1-65535.

At the Switched PDU prompt, type `set energywise port`, followed by the port number, and press Enter.

Example
Switched PDU: set energywise port
Port [666]: 700

Command successful

To set the EnergyWise secret:
The limit of the Secret field is 64 characters. A blank secret is also acceptable.

At the Switched PDU prompt, type `set energywise secret`, then verify the secret, and press Enter.

Example
Switched PDU: set energywise secret
Secret: ********
VerifySecret: ********
Command successful

To set a blank EnergyWise secret:

A blank secret is acceptable.

At the Switched PDU: prompt, type set energywise secret, do not type in the Secret field, and press Enter twice (to bypass the Secret field and then VerifySecret field.)

Example of a blank secret

Switched PDU: show energywise
  EnergyWise Configuration
     Endpoint:     Enabled *
     Port:        666
     Domain:      (undefined)
     Refresh Rate: 60
     Secret:      (Blank)

Command successful

To set the EnergyWise refresh rate:

The EnergyWise refresh rate is the rate (in seconds) at which new information is pushed to the EnergyWise manager. Valid range is 30-600 seconds; default is new data sent to the EnergyWise manager every 3 minutes.

At the Switched PDU: prompt, type set energywise refresh, followed by a rate (in seconds) from 30-600, and press Enter.

Viewing Cisco EnergyWise network parameters:

NOTE: A change in any value (shown in the example below) requires a restart of the system.

To view EnergyWise network parameters:

At the Switched PDU: prompt, type show energywise, and press Enter.

Example

Switched PDU: show energywise
  EnergyWise Configuration
     Endpoint:     Enabled*
     Port:        666
     Domain:      dominion
     Refresh Rate: 55
     Secret:      ********
*Value changed – restart required

Command successful
TCP/IP Administration

NOTE: A restart of the PDU is required after setting or changing any TCP/IP configurations.

Enabling or disabling DHCP support:

The Set DHCP command enables or disables DHCP support.

To enable or disable DHCP support:

At the Switched PDU: prompt, type set dhcp, followed by enabled or disabled, and press Enter.

Enabling or disabling DHCP boot delay:

NOTE: DHCP must be enabled to activate the DHCP Boot Delay option.

The Set DHCP Boot Delay command enables or disables the DHCP boot delay option.

Enabling the Boot Delay option gives the PDU approximately 100-seconds to establish a connection through a DHCP server. This interval allows various network component activities to occur as the PDU powers up (such as obtaining SNTP time stamps for logging or allowing SNMP traps to be sent as switched outlets power up). This is the default state.

Disabling the Boot Delay option forces the PDU to boot after approximately 5-seconds regardless of the DHCP acquisition state. This speeds up a boot when a DHCP server is connected to one of the PDU’s outlets. In this configuration, SNMP traps, SNTP and other protocols will not be available until a DHCP address has been resolved.

To enable the boot delay:

At the Switched PDU: prompt, type set dhcp, followed by bootdelay, followed by enabled or disabled, and press Enter.

NOTES:
- The Boot Delay option executes only when DHCP is enabled.
- The firmware can detect network link integrity and will wait for network connection. This means that if the network is not currently connected, the enabled Boot Delay option will be ignored.

Enabling or disabling DHCP static address fallback:

NOTE: DHCP must be enabled to activate the DHCP Static Address Fallback option.

The Set DHCP Static Address Fallback command enables or disables the DHCP static address fallback option.

Enabling the Static Address Fallback option informs the PDU to automatically fall back to a static address if a DHCP server does not respond after 100-seconds. This is the default state.

Disabling the Static Address Fallback option generates periodic DHCP server requests until the PDU obtains a dynamic address.

To enable the static address fallback:

At the Switched PDU: prompt, type set dhcp, followed by staticfallback, followed by enabled or disabled, and press Enter.

NOTE: If the DHCP server boot time is excessive, you may need to disable the DHCP Static Address Fallback option.

Setting the network acquisition method:

The Set Net command determines the acquisition method used for the protocol stack and IPv4/IPv6 address.

For a detailed description of the Disabled, IPv4 only, and Dualv6v4 options, see Network-Enabled Modes.

At the Smart PDU prompt: type set net; followed by disabled, ipv4only, or dualv6v4; and press Enter.
Setting the IP address:
The Set Ipaddress command sets the TCP/IP address of the network interface controller.

To set the IP address:
At the Switched PDU: prompt, type set ipaddress, followed by the IP address and press Enter.

NOTE: Both IPv4 and IPv6 IP address formats are accepted.

Example
The following command sets the IP address to 12.34.56.78:

Switched PDU: set ipaddress 12.34.56.78<Enter>

Setting the subnet mask:
The Set Subnet command sets the subnet mask for the network the PT40 will be attached to.

To set the subnet mask:
At the Switched PDU: prompt, type set subnet, followed by the subnet mask and press Enter.

Example
The following command sets the subnet mask to 255.0.0.0

Switched PDU: set subnet 255.0.0.0<Enter>

Setting the gateway:
The Set Gateway command sets the IP address of the default gateway the PDU uses to access external networks.

To set the gateway IP address:
At the Switched PDU: prompt, type set gateway, followed by the gateway IP address and press Enter.

Example
The following command sets the gateway IP address to 12.34.56.1:

Switched PDU: set gateway 12.34.56.1<Enter>

Setting the DNS IP address:
The Set DNS command sets the TCP/IP address of the Domain Name server (DNS).

To set the DNS IP address:
At the Switched PDU: prompt, type set, followed by dns1 or dns2 and the Domain Name server’s IP address. Press Enter.

NOTE: Both IPv4 and IPv6 formats are accepted for DNS IP address.

Example
The following command sets the primary Domain Name server IP address to 98.76.54.254:

Switched PDU: set dns1 98.76.54.254<Enter>
Displaying network configuration information:

The Show Network command displays TCP/IP, Telnet, SSH, Web, SSL, SNMP, and DHCP options (when DHCP is enabled) configuration information. The Show Network command also displays all IPv4 and IPv6 settings.

- Network configuration: IP address, subnet mask, gateway and DNS IP addresses (both IPv4 and IPv6 formats are displayed).
- Enabled-disabled status and port numbers for Telnet, SSH, HTTP, SSL, SNMP, and FTP Server support.
- Network status: Link, speed, duplex, and negotiation.
- DHCP boot delay and DHCP static address fallback options (when DHCP is enabled).
- Enabled-disabled status of Sentry Power Manager (SPM).

To display network configuration information:

At the Switched PDU: prompt, type **show network** and press **Enter**.

**Example**

The following command displays the network configuration information:

```
Switched PDU: show network<Enter>
```

**Network Settings**

Link: Up  Negotiation: Auto
Speed: 100 Mbps  Duplex: Full

AutoCfg IPv6: FE80::20A:9CFF:FE52:4104/64
IPv6 Address: FD01::1:B51A:E03C/64
IPv4 Address: 10.1.6.230  Subnet Mask: 255.255.0.0
IPv4 Gateway: 10.1.1.1
DNS1: FD01::A01:585
DNS2: 10.1.5.133

**Static IPv4/IPv6 Settings**

IPv6 Address: FD01::A01:35/64
IPv6 Gateway: ::
IPv4 Address: 10.1.2.253  Subnet Mask: 255.255.0.0
IPv4 Gateway: 10.1.1.1
DNS1: 10.1.5.133
DNS2: 10.1.5.134

**DHCP Settings**

DHCP: Enabled
FQDN: Enabled [sentry3-524104]
Boot Delay: Enabled
Static Fallback: Enabled

**Network Services**

Telnet: Enabled Port: 23
SSH: Enabled Port: 22  Auth: Password, Kb-Int
HTTP: Enabled Port: 80
SSL: Enabled Port: 443  Access: Optional
SNMPv1/2: Enabled Port: 161  TrapPort: 162
SNMPv3: Disabled Port: 161  TrapPort: 162
FTP Server: Enabled Port: 21
SPM Access: Enabled

Command successful

**NOTE:** The fields IPv4 Address, IPv4 Subnet Mask, IPv4 Gateway, DNS1, and DNS2 are equivalent to existing PDU IPv4 settings except that current network settings and static settings are displayed separately. This allows you to view both static configuration settings and active network settings that can be obtained using DHCP. The DNS addresses can be IPv4 or IPv6 format at this time (based on RFC4291).
HTTP Administration

**NOTE:** A restart is required after setting or changing any Telnet/Web configurations.

**Enabling and disabling HTTP support:**

The Set HTTP command is used to enable or disable HTTP support.

*To enable or disable HTTP support:*

At the Switched PDU: prompt, type `set http`, followed by `enabled` or `disabled` and press Enter.

**Changing the HTTP server port:**

With HTTP support enabled, the HTTP server watches and responds to requests on the default HTTP port number 80. This port number may be changed using the Set HTTP Port command.

*To change the HTTP port:*

At the Switched PDU: prompt, type `set http port`, followed by the port number and press Enter.

**Example**

The following changes the HTTP port number to 2048:

```
Switched PDU: set HTTP port 2048<Enter>
```
Telnet Administration

NOTE: A restart of the PDU is required after setting or changing ANY Telnet/Web configurations.

Enabling and disabling Telnet support:
The Set Telnet command is used to enable or disable Telnet support.

To enable or disable Telnet support:
At the Switched PDU: prompt, type set telnet, followed by enabled or disabled and press Enter.

Changing the Telnet port:
With Telnet support enabled, the Telnet server watches and responds to requests on the default Telnet port number 23. This port number may be changed using the Set Telnet Port command.

To change the Telnet socket:
At the Switched PDU: prompt, type set telnet port, followed by the port number and press Enter.

Example
The following changes the Telnet port number to 7001:

Switched PDU: set telnet port 7001<Enter>

FTP Administration

You can upload new versions of firmware into the PDU using File Transfer Protocol (FTP). This allows access to new firmware releases for firmware improvements and new features additions. The following commands are used to configure the unit for an FTP firmware upload. For more information about initiating an FTP firmware upload, see Appendix B.

Setting the FTP host address:
The Set FTP Host command sets the FTP host IP address or hostname allowing for firmware file uploads.

To set the FTP Host address:
At the Switched PDU: prompt, type set ftp host, followed by the IP address or hostname and press Enter.

NOTE: Both IPv4 and IPv6 formats are accepted for IP address or hostname.

Examples
The following command sets the FTP host IP address to 12.34.56.99:

Switched PDU: set ftp host 12.34.56.99<Enter>

The following command sets the FTP hostname to ftp.[yourname].com:

Switched PDU: set ftp host ftp.[yourname].com<Enter>

Setting the FTP username:
The Set FTP Username command sets the username as required by the FTP Host.

To set the FTP username:
At the Switched PDU: prompt, type set ftp username, followed by the FTP username and press Enter.

Example
The following command sets the FTP username to Guest:

Switched PDU: set ftp username guest<Enter>

Setting the FTP Password:
The Set FTP Password command sets the password as required by the FTP Host.

To set the FTP password:
At the Switched PDU: prompt, type set ftp password, followed by the FTP password and press Enter.

Example
The following command sets the FTP password to test1:

Switched PDU: set ftp password test1<Enter>
Setting the filename to be uploaded:
The Set FTP Filename command sets the filename of the firmware file to be uploaded.

*To set the FTP filename:*
At the Switched PDU: prompt, type `set ftp filename`, followed by the firmware filename and press Enter.

**Example**
The following command sets the FTP filename to snb_s50a.bin:
```
Switched PDU: set ftp filename swPDU-v60g.bin<Enter>
```

Setting the directory for the file to be uploaded:
The Set FTP Directory command sets the directory for the firmware file to be uploaded.

*To set the FTP directory:*
At the prompt, type `set ftp directory`, followed by the directory and press Enter.

**Example**
The following command sets the FTP directory to ftp://snb_s50a:
```
Switched PDU: set ftp directory ftp://snb_s50a<Enter>
```

Enabling or disabling automatic updates:
The Set FTP Autoupdate command is used to enable or disable automatic firmware update support.

*To enable or disable automatic updates:*
At the Switched PDU: prompt, type `set ftp autoupdate`, followed by enabled or disabled and press Enter.

Setting the automatic update scheduled day:
The Set FTP Autoupdate Day command is used to set the day when automatic updates occur.

*To set the automatic update day:*
At the Switched PDU: prompt, type `set ftp autoupdate day`, followed by a day of the week or everyday and press Enter.

**Example**
The following command sets the automatic update day to Sunday:
```
Switched PDU: set ftp autoupdate day sunday<Enter>
```

Setting the automatic update scheduled hour:
The Set FTP Autoupdate Hour command sets the hour of the day when automatic updates occur.

*To set the automatic update hour:*
At the Switched PDU: prompt, type `set ftp autoupdate hour`, followed by an hour of the day and press Enter.

**Examples**
The following command sets the automatic update hour to 12 AM:
```
Switched PDU: set ftp autoupdate hour 12am<Enter>
```
The following command sets the automatic update hour to 3 PM:
```
Switched PDU: set ftp autoupdate hour 3pm<Enter>
```

Testing the FTP upload configuration:
The Set FTP Test command validates that the PDU can login to the FTP server and verify/download the firmware file.

*To test the FTP upload configuration:*
At the Switched PDU: prompt, type `set ftp test`, and press Enter.
Displaying FTP configuration information:
The Show FTP command displays all FTP configuration information.

- FTP Host IP address
- FTP Host username and password
- Firmware directory and filename
- Configuration of automatic updates

To display FTP configuration information:
At the Switched PDU prompt, type `show ftp` and press Enter.

Example
The following command displays the FTP configuration information:

```
Switched PDU: show ftp<Enter>
FTP Configuration
    Host:       10.1.2.100
    Username:  djones
    Password:  *******
    Directory: /firmware/7.0d
    Filename:  smpdu-v70d.bin
FTP Automatic Updates Configuration
    Automatic Updates:   Disabled
    Scheduled Day:       Everyday
    Scheduled Hour:      1 PM
```
SNTP Administration

The firmware supports the use of a network time service to provide a synchronized time reference.

About Daylight Savings Time (DST)

Support for DST is disabled by default. When enabled, the date and time are automatically adjusted forward one hour between the starting and ending dates and times (which can be configured).

**NOTE:** If DST is enabled, all system time displays will be shown with the current daylight savings time start/end date/time settings.

The default time zone is set for the United States until at least 2015.

The time zone format is: mo.w.d/h:m:s, as follows:

- **mo** = month from January to December (1-12)
- **w** = week number (1-4) or the last week (5)
- **d** = day of week from Sunday to Saturday (0-6)
- **h** = hour (0-23)
- **m** = minute (0-59)
- **s** = second (0-59)

**Setting the SNTP server address:**

The Set SNTP command is used to set the primary and secondary SNTP server addresses.

**To set the SNTP server address:**

At the Switched PDU: prompt, type `set sntp`, followed by `primary` or `secondary`, and the SNTP server IP address or hostname. Press Enter.

**NOTES:**

- The primary/secondary IP addresses contact the SNTP server; these addresses are populated with the external NTP pool time zones “2.pool.ntp.org” and “1.pool.ntp.org” as default for new PDU’s that have not yet been time set.
- Both IPv4 and IPv6 formats are accepted for primary/secondary IP address or hostname.

**Examples**

The following command sets the primary SNTP server address to 204.152.184.72:

```
Switched PDU: set sntp primary 204.152.184.72<Enter>
```

The following command sets the secondary SNTP server address to cuckoo.nevada.edu:

```
Switched PDU: set sntp secondary cuckoo.nevada.edu<Enter>
```

**Setting the local GMT offset:**

The Set SNTP GMTOffset command is used to set the offset from GMT for the date/time returned by SNTP. The offset can be configured in whole hours between -12 and 12 hours.

**NOTE:** The PDU does not support automatic adjustment for Daylight Savings Time (DST).

**To set the local GMT offset:**

At the Switched PDU: prompt, type `set sntp gmtoffset`, followed by the offset value, and press Enter.

**Examples**

The following command sets the local GMT offset to -12:

```
Switched PDU: set sntp gmtoffset -12<Enter>
```

**Enabling or disabling Daylight Savings Time (DST):**

The Set SNTP DST command enables or disables daylight savings time.

**To set daylight savings time:**

At the Switched PDU: prompt, type `set sntp dst`, followed by `enabled` or `disabled`, and press Enter.
Configuring start day/time Daylight Savings Time (DST):

The Set SNTP DST Start command sets the DST start day/time in the format m.w.d/h:m:s, as follows:

- **mo** = month from January to December (1-12)
- **w** = week number (1-4) or the last week (5)
- **d** = day of week from Sunday to Saturday (0-6)
- **h** = hour (0-23)
- **m** = minute (0-59)
- **s** = second (0-59)

### To set daylight savings start day/time:

At the Switched PDU: prompt, type **set sntp dst start**, followed by [formatted m.w.d/h:m:s as described above], and press **Enter**.

**Examples**

The following command sets the DST start day/time parameters:

```
Switched PDU: set sntp dst start 4.1.3/5:10:6<Enter>
```

Displaying SNTP configuration information:

The Show SNTP command displays all SNTP configuration information.

### To display SNTP configuration information

At the Switched PDU: prompt, type **show sntp** and press **Enter**.

**Example**

The following command displays the SNTP configuration information:

```
Switched PDU: show sntp <Enter>
```

```
Date/Time: 2013-04-13 15:21:18
Primary Host: 204.152.184.72
Secondary Host: 1.pool.ntp.org
Local GMT Offset: -8
Use DST: Enabled
Start Date: 1st Wednesday in April
Start Time: 04:18:06
End Date: 1st Sunday in November
End Time: 02:00:00
```
**UPS Administration**

**Creating a UPS record:**

The Create UPS command adds a new UPS device to the PDU.

*To create a UPS record:*

At the Switched PDU: prompt, type `create UPS` and press **Enter**.

At the prompt, type the corresponding number from the list of the UPS types and press **Enter**.

At the Host Name: prompt, type the UPS’s IP address or hostname and press **Enter**.

**NOTE:** Both IPv4 and IPv6 formats are accepted for IP address or hostname.

**Example**

The following command creates a UPS record for a Toshiba UPS with the hostname ‘DC1Toshiba1’:

```
Switched PDU: create ups<Enter>
UPS types:
  1 -- Generic <RFC1628>
  2 -- Liebert
  3 -- MGE
  4 -- Tripp Lite
  5 -- APC
  6 -- HP
  7 -- Minuteman
  8 -- Mitsubishi
  9 -- Powerware
 10 -- Toshiba
 11 -- Falcon Electric
Select type(1-11): 10<Enter>
Host/IP: DC1Toshiba1<Enter>
```

**Removing a UPS record:**

The Remove UPS command removes a UPS record.

*To remove a UPS record:*

At the Switched PDU: prompt, type `remove ups` and press **Enter**.

At the prompt, type the index number of the UPS to be removed and press **Enter**.

**Example**

The following command removes the UPS record at index 3:

```
Switched PDU: remove ups<Enter>
  1 Type:  Liebert
        Host/IP: DC1Liebert1
  2 Type:  Powerware
        Host/IP: DC1Powerware1
  3 Type:  Toshiba
        Host/IP: DC1Toshiba1
Select UPS(1-8): 3<Enter>
```
Changing the UPS type:
The Set UPS Type command is used to change the type of UPS for each UPS record.

To change a UPS record:
At the Switched PDU: prompt, type set ups type and press Enter.
At the prompt, type the index number for the UPS record to be changed and press Enter.
At the prompt, type the corresponding number from the list of the UPS types and press Enter.

Example
The following command changes UPS type for the record at index number 2 to ‘MGE’:

```
Switched PDU: set ups type<Enter>
1   Type:    Liebert
   Host/IP: DC1Liebert1
2   Type:    Powerware
   Host/IP: DC1Powerware1
Select UPS(1-8): 2<Enter>
UPS types:
  1 -- APC
  2 -- Liebert
  3 -- MGE
  4 -- Tripp Lite
  5 -- Generic (RFC1628)
  6 -- Hewlett Packard
  7 -- Minuteman
  8 -- Mitsubishi
  9 -- Powerware
 10 -- Toshiba
 11 -- Falcon Electric
```
Select type(1-11): 3<Enter>

Changing the UPS host address:
The Set UPS Host command is used to change the IP address or hostname for each UPS record. Hostnames may be up to 60 characters long.

To change a UPS host address:
At the Switched PDU: prompt, type set ups host and press Enter.
At the prompt, type the index number for the UPS record to be changed and press Enter.
At the prompt, type IP address or hostname for the UPS and press Enter.

Example
The following command changes UPS hostname for the record at index number 2 to ‘DC1MGE1’:

```
Switched PDU: set ups host<Enter>
1   Type:    Liebert
   Host/IP: DC1Liebert1
2   Type:    MGE
   Host/IP: DC1Powerware1
Select UPS(1-8): 2<Enter>
Host/IP: DC1MGE1<Enter>
```
Changing the UPS SNMP port:

With a UPS record configured, the PDU sends data requests to the default UPS SNMP port number 161. This port number may be changed using the Set UPS Port command.

*To change the UPS SNMP port:*

At the Switched PDU: prompt, type `set ups port` and press *Enter*.

At the prompt, type the index number for the UPS record to be changed and press *Enter*.

At the prompt, type the desired port number and press *Enter*.

*Example*

The following command changes port for the UPS record at index number 1 to ‘162’:

```
Switched PDU: set ups port<Enter>
UPS     UPS
Index   Type         Port
1       Liebert      161
2       MGE          161
Select UPS(1-8): 1<Enter>
Port: 162<Enter>
```

Changing the UPS SNMP Get community string:

With a UPS record configured, the CDI sends data requests to the UPS using the default Get community string of ‘public’. You can change this string using the Set UPS Commstr command.

**NOTE:** The Get community string configured on the PDU must match the read-only community string configured on the UPS.

*To change a UPS SNMP community string record:*

At the Switched -48 VDC: prompt, type `set ups commstr` and press *Enter*.

At the prompt, type the index number for the UPS record to be changed and press *Enter*.

At the prompt, type the Get community string for the UPS and press *Enter*.

*Example*

The following command changes Get community string for the record at index number 2 to ‘readonly’:

```
Switched PDU: set ups commstr<Enter>
UPS     UPS     Community
Index   Type   String
1       Liebert public
2       MGE    public
Select UPS(1-8): 2<Enter>
Community String: readonly<Enter>
```

Enabling/disabling UPS voltage polling:

With a UPS record configured, the PDU by default enables voltage polling of the UPS. This feature may be enabled or disabled using the Set UPS VPoll command.

*To enable/disable UPS voltage polling:*

At the Switched PDU: prompt, type `set ups vpoll` and press *Enter*.

At the prompt, enter the index number for the UPS record to be changed and press *Enter*.

At the prompt, type on or off, and press *Enter*.

*Example*

The following command disables voltage polling for the record at index number 2:

```
Switched PDU: set ups vpoll<Enter>
UPS     UPS     Voltage
Index   Type   Polling
1       Liebert  On
2       MGE     On
Select UPS(1-8): 2<Enter>
Voltage Polling: Off<Enter>
```
Adding an infeed to a UPS:
The Set UPS AddInfeed command adds a logical association of an infeed to a UPS.

To add an infeed to a UPS:
At the Switched PDU: prompt, type `set ups addinfeed` and press Enter.
At the prompt, enter the index number for the UPS record to be changed and press Enter.
At the prompt, type the absolute infeed ID of the desired infeed, and press Enter.

Example
The following command associates infeed .aa to UPS record at index number 1:

```
Switched PDU: set ups addinfeed<Enter>
UPS    UPS    Infeed
Index  Type  IDs
 1      Liebert
 2      MGE    .AA
Select UPS(1-8): 1<Enter>
Infeed ID: .aa<Enter>
```

Removing an infeed from a UPS:
The Set UPS DelInfeed command removes a logical association of an infeed from a UPS.

To remove an infeed from a UPS:
At the Switched PDU: prompt, type `set ups delinfeed` and press Enter.
At the prompt, enter the index number for the UPS record to be changed and press Enter.
At the prompt, type the absolute infeed ID of the desired infeed, and press Enter.

Example
The following command removes the association of infeed .aa from UPS record at index number 2:

```
Switched PDU: set ups addinfeed<Enter>
UPS    UPS    Infeed
Index  Type  IDs
 1      Liebert .AA
 2      MGE    .AA
Select UPS(1-8): 2<Enter>
Infeed ID: .aa<Enter>
```
Displaying UPS configuration:
The Show UPS command displays information about all UPS devices.

- UPS Type and Host/IP address
- UPS SNMP port and community string
- SNMP Objects OID values and expected return values

To display UPS configuration information:
At the Switched PDU: prompt, type show ups and press Enter.

Example
The following command displays UPS configuration information:

```
Switched PDU: show ups<Enter>
  1 Type: Liebert
  Host/IP: DC1Liebert1
  Voltage Polling: ON
  SNMP Configuration
    Community String: public
    SNMP Port: 162
    SNMP Objects/Expected Values
      Voltage: .1.3.6.1.2.1.33.1.4.4.1.2.1
      Utility Status: .1.3.6.1.2.1.33.1.4.1.0
      On Battery: 0x5
      On Utility: 0x3
```

Feature Administration
Displaying activated special features:
The Show Features command displays all activated special features for the device.

To display activated special features:
At the Switched PDU: prompt, type show features and press Enter.

Example
The following command displays all activated special features:

```
Switched PDU: show features<Enter>
  Activated Features:
    Smart Load Shedding
```

NOTE: A restart of the PDU is required after activating new special features.
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Secure Socket Layers (SSL) version 3 enables secure Web sessions between a Remote Power Manager and a remote user. SSL provides two chief features designed to make TCP/IP (Internet) transmitted data more secure:

- **Authentication** – The connecting client is assured of the identity of the server.
- **Encryption** – All data transmitted between the client and the server is encrypted rendering any intercepted data unintelligible to any third party.

SSL uses the public-and-private key encryption system by RSA, which also requires the use of digital certificates. An SSL Certificate is an electronic file uniquely identifying individuals or websites and enables encrypted communication; SSL Certificates serve as a kind of digital passport or credential. The SSL Certificate enables the client to verify the authenticity of the PDU and to communicate with the unit securely via an encrypted session, protecting confidential information from interception and hacking.

### SSL Command Summary

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### Enabling and Setting up SSL Support

**NOTE:** A restart of the PDU is required after setting or changing any SSL configurations.

**Enabling or disabling SSL support:**

The Set SSL command is used to enable or disable SSL support.

*To enable or disable SSL support:*

At the Switched PDU: prompt, type `set ssl`, followed by `enabled` or `disabled` and press Enter.

**Setting SSL access level:**

The Set SSL Access command is used to assign use of SSL as optional or required. The default access level is set to optional.

*To change the access level:*

At the Switched PDU: prompt, type `set ssl access`, followed by `optional` or `required`, and press Enter.

**Example**

The following changes the access level to required:

```
Switched PDU: set ssl access required<Enter>
```

**Setting the SSL port:**

The Set SSL Port command configures the SSL port number. The valid range of values for port number is 1-65535; the SSL default port number is 443.

*To change the port number:*

At the Switched PDU: prompt, type `set ssl port`, optionally followed by a port number, and press Enter. If you do not provide a port number on the Command Line, you will be prompted for a port number.

**Example**

The following changes the SSL port number to 443:

```
Switched PDU: set ssl port 443<Enter>
```
SSL Technical Specifications

Secure Socket Layer (SSL) version 3
Transport Layer Security (TLS) version 1 (RFC 2246)
SSL/TLS-enabled HTTPS server (RFC 2818)
Self-Signed X.509 Certificate version 3 (RFC 2459)

Asymmetric Cryptography:
1024-bit RSA Key Exchange

Symmetric Cryptography Ciphers:

- TLS_RSA_WITH_AES_256_CBC_SHA
- TLS_RSA_WITH_AES_128_CBC_SHA
- TLS_RSA_WITH_3DES_EDE_CBC_SHA
- TLS_RSA_WITH_DES_CBC_SHA
Secure Shell (SSH) version 2 enables secure network terminal sessions between a Remote Power Manager and a remote user over insecure network. SSH provides an encrypted terminal sessions with strong authentication of both the server and client, using public-key cryptography and is typically used as a replacement for unencrypted Telnet. In addition to enabling secure network terminal sessions to the PDU for configuration and power management, the SSH session may be used for secure Pass-Thru connections to attached devices.

SSH requires the configuration and use of a client agent on the client PC. There are many freeware, shareware or for-purchase SSH clients available. Two examples are the freeware client PuTTY and the for-purchase client SecureCRT® by VanDyke® Software. For configuration and use of these clients, please refer to the applicable software documentation.

### SSH Command Summary

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</table>

#### Enabling and Setting up SSH Support

**NOTE:** A restart of the PDU is required after setting or changing any SSH configurations.

**Enabling or disabling SSH support:**

The Set SSH command is used to enable or disable SSH support.

*To enable or disable SSH support:*

At the Switched PDU: prompt, type `set ssh`, followed by `enabled` or `disabled` and press Enter.

**Changing the SSH server port:**

With SSH support enabled, the SSH server watches and responds to requests on the default SSH port number 22. This port number may be changed using the Set SSH Port command.

*To change the SSH port:*

At the Switched PDU: prompt, type `set ssh port`, followed by the port number and press Enter.

**Example**

The following changes the SSH port number to 65535:

```
Switched PDU: set ssh port 65535<Enter>
```

**Enabling or disabling SSH server authentication methods:**

The Set SSH Authentication Method command is used to set the method of SSH server authentication. The SSH server supports two authentication methods for security and validation: Password and Keyboard-Interactive.

*To enable the SSH authentication methods:*

At the Switched PDU: prompt, type `set ssh authmethod`, followed by `password` or `kbint`, followed by `enabled` or `disabled`, and press Enter.

**Example**

The following example sets the SSH authentication method to keyboard-interactive:

```
Switched PDU: set ssh authmethod kbint enabled<Enter>
```
**SSH Technical Specifications**

Secure Shell (SSH) version 2

Asymmetric Cryptography:
- Diffie-Hellman DSA/DSS 512-1024 (random) bits per NIST specification

Symmetric Cryptography:
- AES256-CBC
- AES192-CBC
- AES128-CBC
- RIJNDAEL256-CBC
- RIJNDAEL192-CBC
- RIJNDAEL128-CBC
- 3DES-192-CBC
- BLOWFISH-128-CBC
- ARCFOUR-128

Message Integrity:
- HMAC-SHA1-160
- HMAC-SHA1-96
- HMAC-MD5-128
- HMAC-MD5-96

Authentication:
- Username/Password

Session Channel Break Extension (for RS232 Break)
**SNMP Thresholds**

The Smart and Switched family of products supports the Simple Network Management Protocol (SNMP). This allows network management systems to use SNMP requests to retrieve information and control power for the individual outlets.

**NOTE:** The default for SNMP support is Enable. When Server Technology products are shipped, the default SNMP configuration for the GET community string is set to “public” and the SET community string is left blank.

### About SNMP Versions

The firmware supports SNMP versions 1, 2, and 3.

SNMP version 3 supports authentication and encryption on a per user basis. Authentication types are None and MD5. Encryption types are None and DES. If you use authentication, you must use encryption.

Two SNMPv3 users are supported: one user with read-write (RW) access, and one user with read-only (RO) access. Both users have the same configuration parameters, and you can configure each user independently.

SNMPv2 and SNMPv3 can be enabled or disabled independently. You can have SNMPv2 and/or SNMPv3, or none.

**SNMP CLI Commands:**

- All SNMP v3 specific configuration settings use the CLI command SET SNMP V3.
- All SNMP v1/v2 specific configuration settings use the CLI command SET SNMP V2.
- All SNMP configuration settings common to any SNMP version use the CLI command SET SNMP.

**NOTES:**

- If you use SNMP v1 or SNMP v2, all SET SNMP CLI commands (and the SHOW command) require the “V2” keyword.
- SNMP v1/v2 CLI commands are documented immediately below in this section showing the required “V2” keyword. All CLI commands that follow the SNMP v1/v2 section in this manual assume SNMP v3.

### SNMP v1/v2 Command Summary

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<td>Set SNMP Trap Format</td>
<td>Configures the SNMP trap format version</td>
</tr>
<tr>
<td>Set SNMP V2</td>
<td>Enables or disables SNMP v1/v2 support</td>
</tr>
<tr>
<td>Set SNMP V2 Getcomm</td>
<td>Sets the ‘get’ community string</td>
</tr>
<tr>
<td>Set SNMP V2 Setcomm</td>
<td>Sets the ‘set’ community string</td>
</tr>
<tr>
<td>Show SNMP</td>
<td>Displays all SNMP configuration information</td>
</tr>
</tbody>
</table>

### Enabling and Setting Up SNMP v1/v2 Support

SNMP v1/v2 support must be enabled and configured for access to Sentry3 MIB objects and generation of all Sentry3 traps.

**Enabling/disabling SNMP support:**

The SNMP Set command is used to enable or disable SNMP v1/v2 support.

**To enable SNMP v1/v2 support:**

At the Switched PDU: prompt, type `set snmp v2`, followed by `enabled` or `disabled` and press Enter.

**NOTE:** A restart of the PDU is required after enabling or disabling SNMP support.
Setting the Get/Set community strings:

**NOTE:** The default for SNMP support is **Enabled**. When products are shipped, the default SNMP configuration for the GET community string is set to “**public**” and the SET community string is left **blank**.

The firmware supports two SNMP community strings (SET and GET) that provide varying levels of access to objects defined in the Sentry3 MIB. Valid community strings are 1 to 24 characters.

**Set Community String:**

The Setcomm string provides read-write access to sentry3 MIB objects. The default Setcomm string is blank.

**To set the Setcomm community string:**

At the Switched PDU: prompt, type `set snmp v2 setcomm`, followed by the string, and press **Enter**.

**Get Community String:**

The Getcomm string provides read-only access to sentry3 MIB objects. The default Getcomm string is “public”.

**To set the Getcomm community string:**

At the Switched PDU: prompt, type `set snmp v2 getcomm`, followed by the string, and press **Enter**.

**Displaying SNMP v1/v2 configuration information:**

The Show SNMP V2 command displays all SNMP v1/v2 configuration information, including:

- SNMP support status
- SNMP community strings
- Trap timer value
- Trap destinations (both IPv4 and IPv6 formats can be displayed.)

**To display SNMP v1/v2 configuration information:**

At the Switched PDU: prompt, type `show snmp v2` and press **Enter**.

**Example**

The following command displays the SNMP configuration information:

```
Switched PDU: show snmp v2<Enter>
SNMP Configuration
SNMPv2:                           Enabled
     GET Community String:          ABC
     SET Community String:          DEF
SNMPv3:                            Disabled
     V3 RW Username:                (undefined)
     V3 RW Auth Type:               None <password not set>
     V3 RW Privacy Type:            None <password not set>
     V3 RO Username:                (undefined)
     V3 RO Auth Type:               None <password not set>
     Trap Destination 1 :           (undefined)
     Trap Destination 2 :           (undefined)
     Trap format                    v1
     IP Restrictions:               No Restrictions
     Error Trap Repeat Time :       60 seconds
     SysName:                       Sentry3_524640
     SysLocation:                   No Location
     SysContact:                    No Contact
Command successful
```
### SNMP v3 Command Summary

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set SNMP IP Restrict</td>
<td>Allows SNMP Get and Set requests from defined trap destinations only</td>
</tr>
<tr>
<td>Set SNMP Trap Format</td>
<td>Configures the SNMP trap format version</td>
</tr>
<tr>
<td>Set SNMP V3</td>
<td>Enables or disables SNMP v3 support</td>
</tr>
<tr>
<td>Set SNMP V3 RO Username</td>
<td>Sets the SNMP V3 read-only username.</td>
</tr>
<tr>
<td>Set SNMP V3 RO Auth Type</td>
<td>Sets the SNMP V3 read-only authentication type</td>
</tr>
<tr>
<td>Set SNMP V3 RO Auth Password</td>
<td>Sets the SNMP V3 read-only authentication password</td>
</tr>
<tr>
<td>Set SNMP V3 RO Priv Type</td>
<td>Sets the SNMP V3 read-only privacy type</td>
</tr>
<tr>
<td>Set SNMP V3 RO Priv Password</td>
<td>Sets the SNMP V3 ready-only privacy password</td>
</tr>
<tr>
<td>Set SNMP V3 RW Username</td>
<td>Sets the SNMP V3 read-write username</td>
</tr>
<tr>
<td>Set SNMP V3 RW Auth Type</td>
<td>Sets the SNMP V3 read-write authentication type</td>
</tr>
<tr>
<td>Set SNMP V3 RW Auth Password</td>
<td>Sets the SNMP V3 read-write authentication password</td>
</tr>
<tr>
<td>Set SNMP V3 RW Priv Type</td>
<td>Sets the SNMP V3 ready-write privacy password</td>
</tr>
<tr>
<td>Set SNMP V3 Trap Username</td>
<td>Sets the SNMP V3 trap username for display on SNMP activity logs</td>
</tr>
<tr>
<td>Show SNMP</td>
<td>Displays all SNMP configuration information</td>
</tr>
</tbody>
</table>

### Enabling and Setting up SNMP Support

The SNMP support must be enabled and configured for access to Sentry3 MIB objects and generation of all Sentry3 traps.

**Enabling/disabling SNMP support:**

The SNMP command is used to enable or disable SNMP support.

**To enable SNMP support:**

At the Switched PDU: prompt, type `set snmp v3`, followed by `enabled` or `disabled` and press Enter.

**NOTE:** A restart of the PDU is required after enabling or disabling SNMP support.

**Setting the SNMP v3 read-only (RO) username:**

The Set SNMP RO Username command sets the read-only username for SNMP v3. A valid username can be set to any value between 1-32 characters.

**To set the RO username:**

At the Switched PDU: prompt, type `set snmp v3 rousername`, and press Enter.

**NOTE:** You can set a blank username but doing so will clear the string and disallow any read-only user access.

**Setting the SNMP v3 read-only (RO) authentication type:**

The Set SNMP RO Auth Type command sets the SNMP v3 RO authentication type.

**To set the RO authentication type:**

At the Switched PDU: prompt, type `set snmp v3 roauthtype`, followed by `none` or `md5`, and press Enter.

**Setting the SNMP v3 read-only (RO) authentication password:**

The Set SNMP RO Auth Password command sets the SNMP v3 RO authentication password. A valid authentication password can be set to any value between 1-40 characters. A blank password will clear the string.

**To set the RO authentication password:**

At the Switched PDU: prompt, type `set snmp v3 roauthpass`, and press Enter.
Setting the SNMP v3 read-only (RO) privacy type:
The Set SNMP RO Priv Type command sets the SNMP v3 RO privacy type.

To set the RO privacy type:
At the Switched PDU: prompt, type `set snmp v3 roprivtype`, followed by `none` or `des`, and press Enter.

Setting the SNMP v3 read-only (RO) privacy password:
The Set SNMP RO Priv Password command sets the SNMP v3 RO privacy password. A valid privacy password can be set to any value between 1-32 characters. A blank password will clear the string

To set the RO privacy password:
At the Switched PDU: prompt, type `set snmp v3 roprivpass`, and press Enter

Setting the SNMP v3 read-write (RW) username:
The Set SNMP RW Username command sets the read-write username for SNMP v3. A valid username can be set to any value between 1-32 characters.

To set the RW username:
At the Switched PDU: prompt, type `set snmpv3 rwusername`, and press Enter.

NOTE: You can set a blank username but doing so will clear the string and disallow any read-write user access.

Setting the SNMP v3 read-write (RW) authentication type:
The Set SNMP RW Auth Type command sets the SNMP v3 RW authentication type.

To set the RW authentication type:
At the Switched PDU: prompt, type `set snmp v3 rwauthtype`, followed by `none` or `md5`, and press Enter.

Setting the SNMP v3 read-write (RW) authentication password:
The Set SNMP RW Auth Password command sets the SNMP v3 RW authentication password. A valid authentication password can be set to any value between 1-40 characters. A blank password will clear the string

To set the RW authentication password:
At the Switched PDU: prompt, type `set snmp v3 rwauthpass`, and press Enter.

Setting the SNMP v3 read-write (RW) privacy type:
The Set SNMP RW Priv Type command sets the SNMP v3 RW privacy type. A valid password can be set to any value between 1-40 characters.

To set the RW privacy type:
At the Switched PDU: prompt, type `set snmp v3 rwprivtype`, followed by `none` or `des`, and press Enter.

Setting the SNMP v3 read-write (RW) privacy password:
The Set SNMP RW Priv Password command sets the SNMP v3 RW privacy password. A valid privacy password can be set to any value between 1-32 characters. A blank password will clear the string

To set the RW privacy password:
At the Switched PDU: prompt, type `set snmp v3 rwprivpass`, and press Enter.

Setting the SNMP v3 trap username:
The Set SNMP Trap Username command sets an optional username for display on SNMP activity logs to identify user actions.

At the Switched PDU: prompt, type `set snmp v3 trapusername`, and press Enter. The trap username can be 1-31 alphanumeric characters; spaces are allowed; and the name is case sensitive.
Setting the error trap repeat timer:
The Set SNMP Traptime command sets the timer period between repeated error condition traps. The valid range is 1 to 65535 (in seconds). The default is 60 seconds.

To set the error trap repeat timer:
At the Switched PDU: prompt, type `set snmp traptime`, followed by the timer period, and press Enter.

Example
The following sets the timer period to 180 seconds:

```
Switched PDU: set snmp traptime 180<Enter>
```

Setting the SNMP trap format version:
The SNMP Trap Format configures the SNMP trap format version. The trap format can be SNMP v1, v2, or v3.

To set the trap format version:
At the Switched PDU: prompt, type `set snmp trapformat`, followed by 1, 2, or 3, and press Enter. The default is v1, regardless of the versions that are enabled for the agent.

Example
The following sets the trap format version to SNMP v3:

```
Switched PDU: set snmp trapformat 3<Enter>
```

Setting IP Restrictions:
The Set SNMP IP Restrictions command supports SNMP Manager Get and Set requests to only be allowed from the IP address of the defined trap destinations.

To set SNMP IP restrictions:
At the Switched PDU: prompt, type `set snmp iprestrict trapdests` and press Enter.

To remove SNMP IP restrictions:
At the Switched PDU: prompt, type `set snmp iprestrict none` and press Enter.

Setting the Get/Set community strings:
The PDU supports two SNMP community strings that provide varying levels of access to objects defined in the MIB.

Community strings may be 1 to 24 characters.

Setcomm:
The Setcomm string provides read-write access to MIB objects. The default Setcomm string is “private”.

To set the Setcomm community string:
At the Switched PDU: prompt, type `set snmp setcomm`, followed by the string and press Enter.

Getcomm:
The Getcomm string provides read-only access to MIB objects. The default Getcomm string is “public”.

To set the Getcomm community string:
At the Switched PDU: prompt, type `set snmp getcomm`, followed by the string and press Enter.

Setting the SNMP SysName:
The Set SNMP SysName command is used to set the SNMP MIB-II SysName object.

To set the SysName object:
At the Switched PDU: prompt, type `set snmp sysname`, followed by the object name and press Enter.
Setting the SNMP SysLocation:
The Set SNMP SysLocation command is used to set the SNMP MIB-II SysLocation object.

To set the SysLocation object:
At the Switched PDU: prompt, type `set snmp syslocation`, followed by the object location and press `Enter`.

Setting the SNMP SysContact:
The Set SNMP SysContact command is used to set the SNMP MIB-II SysContact object.

To set the SysContact object:
At the Switched PDU: prompt, type `set snmp syscontact`, followed by the object contact and press `Enter`.

Displaying SNMP configuration information:
The Show SNMP command displays all SNMP configuration information.

- SNMP version (v2/v3) support status (enabled/disabled)
- SNMP community strings
- Read-Only (RO) or Read-Write (RW) username, authentication type, privacy type (if SNMPv3)
- Trap username
- Trap destination(s)
- IP restrictions setting
- Error trap repeat time (in seconds)
- Sysname, syslocation, and syscontact

To display SNMP configuration information:
At the Switched PDU: prompt, type `show snmp` and press `Enter`.

Example
The following command displays the SNMP configuration information:

Switched PDU: show snmp<Enter>
SNMP Configuration
SNMPv2:                            Enabled
    GET Community <RO>:            public
    SET Community <RW>:            <undefined>
    TRAP Community:                trap
SNMPv3:                            Disabled
    V3 RW Username:                <undefined>
    V3 RW Auth Type:               None <password not set>
    V3 RW Privacy Type:            None <password not set>
    V3 RO Username:                (undefined)
    V3 RO Auth Type:               None <password not set>
    V3 RW Privacy Type:            None <password not set>
    V3 Trap Username               <undefined>
    Trap Destination 1:            <undefined>
    Trap Destination 2:            <undefined>
    Trap format:                   v3
    IP Restrictions:               No Restrictions
    Error Trap Repeat Time:        60 seconds
    SysName:                       Sentry3_524640
    SysLocation:                   No Location
    SysContact:                    No Contact
Command successful
SNMP Traps

The Switched PDU supports five types of SNMP traps. Traps are enabled at the Tower (T), Infeed (I), outlet (O), Environmental Monitor (E) or sensor (S) level.

<table>
<thead>
<tr>
<th>Name</th>
<th>Level(s)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status</td>
<td>T, I, O, E, S</td>
<td>Operational status change</td>
</tr>
<tr>
<td>Change</td>
<td>O</td>
<td>Control status change</td>
</tr>
<tr>
<td>Load</td>
<td>I</td>
<td>Input load out of limit</td>
</tr>
<tr>
<td>Temp</td>
<td>S</td>
<td>Temperature is out of range</td>
</tr>
<tr>
<td>Humid</td>
<td>S</td>
<td>Relative Humidity is out of range</td>
</tr>
</tbody>
</table>

All traps include the Location of the PDU as defined with the Set Location command.

### Status trap

A Status trap is generated when an error condition occurs on a tower, infeed, Environmental Monitor or individual sensor. Status traps include the reported Status, the Location of the PDU and identifier and name of the affected tower, infeed, outlet, environmental monitor, or sensor.

Any error state generates a Status trap and triggers the trap timer. A new trap is generated at the end of every timer period until the Status returns to a non-error status. All status traps are enabled by default.

#### Tower Status traps

<table>
<thead>
<tr>
<th>Status</th>
<th>Error</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td></td>
<td>Tower is working correctly</td>
</tr>
<tr>
<td>NoComm</td>
<td>x</td>
<td>Communication to the tower has been lost</td>
</tr>
</tbody>
</table>

#### Infeed Status traps

<table>
<thead>
<tr>
<th>Status</th>
<th>Error</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>On</td>
<td></td>
<td>Infeed is on</td>
</tr>
<tr>
<td>OffError</td>
<td>x</td>
<td>Infeed should be on but no current is sensed at the infeed</td>
</tr>
<tr>
<td>NoComm</td>
<td>x</td>
<td>Communication to the infeed has been lost</td>
</tr>
</tbody>
</table>

#### Outlet Status traps

<table>
<thead>
<tr>
<th>Status</th>
<th>Error</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>On</td>
<td></td>
<td>Outlet is on</td>
</tr>
<tr>
<td>Off</td>
<td></td>
<td>Outlet is off</td>
</tr>
<tr>
<td>OnWait</td>
<td></td>
<td>Outlet Status in transition</td>
</tr>
<tr>
<td>OffWait</td>
<td></td>
<td>Outlet Status in transition</td>
</tr>
<tr>
<td>OnError</td>
<td>x</td>
<td>Outlet should be off but current is sensed at the outlet</td>
</tr>
<tr>
<td>OffError</td>
<td>x</td>
<td>Outlet should be on but no current is sensed at the outlet</td>
</tr>
<tr>
<td>OffFuse</td>
<td>x</td>
<td>Outlet should be on but a blown fuse has been detected</td>
</tr>
<tr>
<td>OnFuse</td>
<td></td>
<td>Outlet should be on but a blown fuse has been detected downstream</td>
</tr>
<tr>
<td>NoComm</td>
<td>x</td>
<td>Communication to the outlet has been lost</td>
</tr>
</tbody>
</table>

#### Environmental Monitor Status traps

<table>
<thead>
<tr>
<th>Status</th>
<th>Error</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td></td>
<td>Environmental Monitor is working correctly</td>
</tr>
<tr>
<td>NoComm</td>
<td>x</td>
<td>Communication to the Environmental Monitor has been lost</td>
</tr>
</tbody>
</table>

---

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Temperature/Humidity Sensor Status Traps

<table>
<thead>
<tr>
<th>Status</th>
<th>Error</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Found</td>
<td></td>
<td>The PDU found the sensor and connection is established.</td>
</tr>
<tr>
<td>NotFound</td>
<td></td>
<td>On a fresh reboot, the PDU does not find a sensor.</td>
</tr>
<tr>
<td>Lost</td>
<td>x</td>
<td>The connection to a previously found sensor is now lost.</td>
</tr>
<tr>
<td>NoComm</td>
<td>x</td>
<td>Communication loss occurred due to a hardware issue (not loss of communication with the probes).</td>
</tr>
</tbody>
</table>

**Change trap**

The Change trap is generated for all outlet status changes between any on/off conditions. Change traps include the outlet status, location of the PDU, identifier, and name of the affected outlet. For descriptions of the outlet status types, please refer to the prior table.

**Load Trap**

The Load trap is generated whenever the total input load on an infeed exceeds a preset threshold. Load traps include the reported input load, load status, location of the PDU, identifier, and name of the affected infeed.

Any error state generates a Load trap and triggers the trap timer. A new trap is generated at the end of every timer period until the Load returns to a non-error status.

**Load traps**

<table>
<thead>
<tr>
<th>Status</th>
<th>Error</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td></td>
<td>Infeed is on and within preset thresholds</td>
</tr>
<tr>
<td>NotOn</td>
<td></td>
<td>Infeed is off</td>
</tr>
<tr>
<td>Reading</td>
<td></td>
<td>Non-error state – Load status currently being read</td>
</tr>
<tr>
<td>LoadHigh</td>
<td>x</td>
<td>Infeed current load exceeds preset threshold</td>
</tr>
<tr>
<td>OverLoad</td>
<td>x</td>
<td>Infeed current load exceeds the measurable range for the infeed</td>
</tr>
<tr>
<td>ReadError</td>
<td>x</td>
<td>Unable to read Load status</td>
</tr>
<tr>
<td>NoComm</td>
<td>x</td>
<td>Communication to the infeed has been lost</td>
</tr>
</tbody>
</table>

**Temp Trap**

The Temp trap is generated whenever the temperature on a temperature/humidity sensor is beyond preset thresholds. Temp traps include the reported temperature, temp status, location of the PDU, identifier, and name of the affected sensor.

Any error state generates a Temp trap and triggers the trap timer. A new trap is generated at the end of every timer period until the Temp returns to a non-error status.

**Temp traps**

<table>
<thead>
<tr>
<th>Status</th>
<th>Error</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td></td>
<td>The sensor is working correctly and the temperature is within preset thresholds</td>
</tr>
<tr>
<td>NotFound</td>
<td></td>
<td>No sensor has been detected</td>
</tr>
<tr>
<td>Reading</td>
<td></td>
<td>Temp status currently being read</td>
</tr>
<tr>
<td>TempLow</td>
<td>x</td>
<td>Temperature at the sensor below preset low threshold</td>
</tr>
<tr>
<td>TempHigh</td>
<td>x</td>
<td>Temperature at the sensor exceeds preset high threshold</td>
</tr>
<tr>
<td>ReadError</td>
<td>x</td>
<td>Unable to read Temp status</td>
</tr>
<tr>
<td>Lost</td>
<td>x</td>
<td>Sensor initially detected but communication to the sensor has been lost</td>
</tr>
<tr>
<td>NoComm</td>
<td>x</td>
<td>Communication to the sensor has been lost</td>
</tr>
</tbody>
</table>
Humidity Trap

The Humidity trap is generated whenever the humidity on a temperature/humidity sensor is beyond preset thresholds. Humidity traps include the reported relative humidity, humidity status, location of the PDU, identifier, and name of the affected sensor.

Any error state generates a Humidity trap and triggers the trap timer. A new trap is generated at the end of every timer period until the Humidity returns to a non-error status.

Humidity traps

<table>
<thead>
<tr>
<th>Status</th>
<th>Error</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td></td>
<td>The sensor is working correctly and the relative humidity is within preset thresholds</td>
</tr>
<tr>
<td>NotFound</td>
<td></td>
<td>No sensor has been detected</td>
</tr>
<tr>
<td>Reading</td>
<td></td>
<td>Humidity status currently being read</td>
</tr>
<tr>
<td>HumidLow</td>
<td>x</td>
<td>Relative humidity at the sensor below preset low threshold</td>
</tr>
<tr>
<td>HumidHigh</td>
<td>x</td>
<td>Relative humidity at the sensor exceeds preset high threshold</td>
</tr>
<tr>
<td>ReadError</td>
<td>x</td>
<td>Unable to read Humidity status</td>
</tr>
<tr>
<td>Lost</td>
<td>x</td>
<td>Sensor initially detected but communication to the sensor has been lost</td>
</tr>
<tr>
<td>NoComm</td>
<td>x</td>
<td>Communication to the sensor has been lost</td>
</tr>
</tbody>
</table>

Configuring Traps

SNMP Trap Command Summary

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set Trap Tower Status</td>
<td>Enables or disables the Tower Status trap</td>
</tr>
<tr>
<td>Set Trap Infeed Status</td>
<td>Enables or disables the Infeed Status trap off</td>
</tr>
<tr>
<td>Set Trap Infeed Load</td>
<td>Enables or disables the Infeed Load trap</td>
</tr>
<tr>
<td>Set Trap Infeed HighThreshold</td>
<td>Sets the Infeed Load trap high limit</td>
</tr>
<tr>
<td>Set Trap Outlet Change</td>
<td>Enables or disables the Outlet Change trap</td>
</tr>
<tr>
<td>Set Trap Outlet Status</td>
<td>Enables or disables the Outlet Status trap</td>
</tr>
<tr>
<td>Set Trap EM Status</td>
<td>Enables or disables the Environmental Monitor Status trap</td>
</tr>
<tr>
<td>Set Trap THS Status</td>
<td>Enables or disables a temperature/humidity sensor Status trap</td>
</tr>
<tr>
<td>Set Trap THS Temp</td>
<td>Enables or disables a temperature/humidity sensor Temp trap</td>
</tr>
<tr>
<td>Set Trap THS Tempdelta</td>
<td>Sets temperature recovery delta</td>
</tr>
<tr>
<td>Set Trap THS TempHigh</td>
<td>Sets a temperature/humidity sensor Temp trap high limit</td>
</tr>
<tr>
<td>Set Trap THS TempLow</td>
<td>Sets a temperature/humidity sensor Temp trap low limit</td>
</tr>
<tr>
<td>Set Trap THS Humid</td>
<td>Enables or disables a temperature/humidity sensor Humid trap</td>
</tr>
<tr>
<td>Set Trap THS Humiddelta</td>
<td>Sets humidity recovery delta</td>
</tr>
<tr>
<td>Set Trap THS HumidHigh</td>
<td>Sets a temperature/humidity sensor Humid trap high limit</td>
</tr>
<tr>
<td>Set Trap THS HumidLow</td>
<td>Sets a temperature/humidity sensor Humid trap low limit</td>
</tr>
<tr>
<td>Show Traps</td>
<td>Displays trap configurations</td>
</tr>
</tbody>
</table>
Enabling or Disabling a Status trap:
The Set Trap … Status command is used to enable or disable Status traps for a Tower, Infeed or Outlet.

To Enable or Disable a Status trap:
At the Switched PDU: prompt, type set trap (tower, infeed, outlet, em or ths) status, followed by the tower, infeed or outlet name, and on or off. Press Enter, or

Type set trap (tower, infeed, outlet, em or ths) Status all, followed by on or off and press Enter.

Examples
The following command enables the Status trap for the first tower, using the tower’s absolute name:

Switched PDU: set trap tower status .a on<Enter>

The following command enables the Status trap for the tower named Florida_HQ_1:

Switched PDU: set trap tower status Florida_HQ_1 on<Enter>

NOTE: Enabling lower hierarchical traps automatically enables traps of higher hierarchical value: i.e. enabling an Outlet Status trap automatically enables the Infeed and Tower Status traps for that outlet. Conversely, if a Tower Status trap is disabled, all associated Infeed Status & Load and Outlet Status traps will be disabled.

Enabling or Disabling a Load trap:
The Set Trap Infeed Load command is used to enable or disable an Infeed Load trap.

To Enable or Disable a Load trap:
At the Switched PDU: prompt, type set trap infeed load, followed by the infeed name, and on or off. Press Enter, or

Type set trap infeed load all, followed by on or off and press Enter.

Examples
The following command enables the Load trap for second infeed on the first tower, using the absolute name of the infeed.

Switched PDU: set trap infeed load .AB on<Enter>

The following command disables the Load trap for all infeeds:

Switched PDU: set trap infeed load all off<Enter>

NOTE: Enabling lower hierarchical traps automatically enables traps of higher hierarchical value: i.e. enabling an Infeed Load trap automatically enables the Infeed and Tower Status traps for that infeed.

Setting the Infeed Load limit:
The Set Trap Infeed Loadhigh command is used to set the upper load limits for an input feed.

To set the infeed load limit:
At the Switched PDU: prompt, type set trap infeed loadhigh, followed by the infeed name, and a value from 0 to 255 in amperes. Press Enter.

Example
The following command sets the infeed load limit for the second infeed on the first tower to 25 amperes, using the absolute name of the infeed:

Switched PDU: set trap infeed loadhigh .ab 25<Enter>

Enabling or Disabling a Change trap:
The Set Trap Outlet Change command is used to enable or disable an Outlet Change trap.

To Enable or Disable a Change trap:
At the Switched PDU: prompt, type set trap outlet change, followed by the outlet name and on or off. Press Enter, or

Type set trap outlet change all, followed by on or off and press Enter.

Example
The following command enables the Change trap for the third outlet on the first infeed of the second tower, using the outlet’s absolute name:
Enabling or Disabling the Temp trap:
The Set Trap THS Temp command is used to enable or disable the Temp trap.

To Enable or Disable the Temp trap:
At the Switched PDU prompt, type `set trap ths temp`, followed by the sensor name and on or off. Press Enter.

Example
The following command enables the Temp trap for the first temperature-humidity sensor:

```
Switched PDU: set trap ths temp .a1 on<Enter>
```

Setting the Temperature sensor threshold limits:
The Set Trap THS Templow and Set Trap THS Temphigh commands are used to set the lower and upper threshold limits for the Temperature sensor.

To set the Temperature threshold limits:
At the Switched PDU prompt, type `set trap ths templow` or `temphigh`, followed by the sensor name and a value from 0 to 123 in degrees Celsius. Press Enter.

Example
The following command sets the second temperature high threshold limit to 95:

```
Switched PDU: set trap ths temphigh .a2 95<Enter>
```

Configuring Temperature Recovery Delta:
The Temperature Recovery Delta command allows configuration of the number of degrees of change needed to recover from a temperature alarm.

To configure the temperature recovery delta:
At the Switched PDU prompt, type `set trap ths tempdelta`, followed by the sensor name, the number of degrees for the recovery delta, and press Enter.

Example
The following command configures the recovery delta at 2 degrees Fahrenheit for temperature/humidity sensor .A1:

```
Switched PDU: set trap ths tempdelta temp_humid_sensor_A1 2<Enter>
```

Configuring Humidity Recovery Delta (Hysteresis):
The Humidity Recovery Delta command allows configuration of the percentage of change needed to recover from a humidity alarm.

NOTE: After exceeding a low or high humidity threshold (thus entering an error condition), the humidity value must return past the threshold by the configured recovery delta amount to clear the error condition. Default of humidity recovery delta is 2% relative humidity.

To configure the humidity recovery delta:
At the Switched PDU prompt, type `set trap ths humiddelta`, followed by the sensor name, the percentage for the recovery delta, and press Enter.

Example
The following command configures the recovery delta at 2 relative humidity for temperature/humidity sensor .A1:

```
Switched PDU: set trap ths humiddelta temp_humid_sensor_A1 2<Enter>
```
Enabling or Disabling the Humid trap:
The Set Trap THS Humid command is used to enable or disable the Humid trap.

To Enable or Disable the Humid trap:
At the Switched PDU: prompt, type `set trap ths humid`, followed by the sensor name and `on` or `off`. Press `Enter`.

Example
The following command enables the Humid trap for the first temperature-humidity sensor:

```
Switched PDU: set traps ths humid .a1 on<Enter>
```

Setting the Humidity sensor threshold limits:
The Set Trap THS Humidlow and Set Trap THS Humidhigh commands are used to set the lower and upper threshold limits for the Humidity sensor.

To set the Humidity threshold limits:
At the Switched PDU: prompt, type `set trap ths`, `humidlow` or `humidhigh`, followed by the sensor name and a value from 0 to 100 in percentage of relative humidity. Press `Enter`.

Example
The following command sets the first humidity sensor low threshold limit to 5:

```
Switched PDU: set trap ths humidlow .a1 5<Enter>
```
Displaying trap configuration information:

The Show Traps command displays information about all traps.

To display trap information:

At the Switched PDU: prompt, type `show traps` and press Enter.

**Example**

The following command requests trap configuration information:

```
Switched PDU: show traps <Enter>
```

**Tower trap configuration:**

<table>
<thead>
<tr>
<th>Tower</th>
<th>Name</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>.A</td>
<td>Florida_HQ_1</td>
<td>ON</td>
</tr>
<tr>
<td>.B</td>
<td>Florida_HQ_2</td>
<td>ON</td>
</tr>
</tbody>
</table>

More (Y/es N/o): y

**Input feed trap configuration:**

<table>
<thead>
<tr>
<th>Input</th>
<th>Name</th>
<th>Status</th>
<th>Load</th>
</tr>
</thead>
<tbody>
<tr>
<td>HA</td>
<td>HQ_1_Infeed_A</td>
<td>ON</td>
<td>255 A</td>
</tr>
<tr>
<td>BA</td>
<td>HQ_2_Infeed_A</td>
<td>ON</td>
<td>255 A</td>
</tr>
</tbody>
</table>

More (Y/es N/o): y

**Outlet trap configuration:**

<table>
<thead>
<tr>
<th>Outlet</th>
<th>Name</th>
<th>Stats</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>AA1</td>
<td>DataServer_1</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>AA2</td>
<td>WebServer_1</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>AA3</td>
<td>FileServer_1</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>AA4</td>
<td>ON</td>
<td>OFF</td>
<td></td>
</tr>
<tr>
<td>AA5</td>
<td>ON</td>
<td>OFF</td>
<td></td>
</tr>
<tr>
<td>AA6</td>
<td>ON</td>
<td>OFF</td>
<td></td>
</tr>
<tr>
<td>AA7</td>
<td>ON</td>
<td>OFF</td>
<td></td>
</tr>
<tr>
<td>AA8</td>
<td>ON</td>
<td>OFF</td>
<td></td>
</tr>
<tr>
<td>AB1</td>
<td>ON</td>
<td>OFF</td>
<td></td>
</tr>
<tr>
<td>AB2</td>
<td>ON</td>
<td>OFF</td>
<td></td>
</tr>
<tr>
<td>AB3</td>
<td>ON</td>
<td>OFF</td>
<td></td>
</tr>
<tr>
<td>AB4</td>
<td>ON</td>
<td>OFF</td>
<td></td>
</tr>
<tr>
<td>AB5</td>
<td>ON</td>
<td>OFF</td>
<td></td>
</tr>
<tr>
<td>AB6</td>
<td>ON</td>
<td>OFF</td>
<td></td>
</tr>
<tr>
<td>AB7</td>
<td>ON</td>
<td>OFF</td>
<td></td>
</tr>
<tr>
<td>AB8</td>
<td>ON</td>
<td>OFF</td>
<td></td>
</tr>
</tbody>
</table>

More (Y/es N/o): y

**Environmental Monitor .A trap configuration:**

<table>
<thead>
<tr>
<th>Name: Florida_HQ_1</th>
<th>Status Trap: ON</th>
</tr>
</thead>
</table>

**Temperature/Humidity Sensor .A1**

<table>
<thead>
<tr>
<th>Name: Temp_Humid_Sensor_A1</th>
<th>Status Trap: ON</th>
</tr>
</thead>
</table>

**Temperature/Humidity Sensor .A2**

<table>
<thead>
<tr>
<th>Name: T/H2_Florida_HQ_1</th>
<th>Status Trap: ON</th>
</tr>
</thead>
</table>

```
Low: 31 Deg.F  Low: 32 Deg.F
High: 253 Deg.F High: 253 Deg.F
Delta: 5 Deg.F  Delta: 2 Deg.F
Low: 5 % RH     Low: 0 % RH
High: 100 % RH  High: 100 % RH
Delta: 2 % RH   Delta: 2 % RH
```
LDAP

The PDU supports Lightweight Directory Access Protocol (LDAP) Version 3. This support enables authentication with LDAP servers; user accounts do not need to be individually created locally on each device.

This allows administrators to pre-define and configure (in each PDU and in the LDAP server) a set of necessary LDAP Groups, and access rights for each. User’s access rights can then be assigned or revoked simply by making the user a member of one-or-more pre-defined PDU LDAP Groups. User accounts can be added, deleted, or changed in the LDAP server without any changes needed on individual PDUs.

LDAP support has been tested in the following environments:

- Microsoft Active Directory (MSAD)
- Novell eDirectory (eDir)
- OpenLDAP

**LDAP Command Summary**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add GrouptoLDAP</td>
<td>Grants an LDAP group access to one or more groups</td>
</tr>
<tr>
<td>Add OutlettoLDAP</td>
<td>Grants an LDAP group access to one or more outlets</td>
</tr>
<tr>
<td>Add PorttoLDAP</td>
<td>Grants an LDAP group access to one or more serial ports</td>
</tr>
<tr>
<td>Create LDAPGroup</td>
<td>Adds an LDAP group name</td>
</tr>
<tr>
<td>Delete GroupfromLDAP</td>
<td>Removes access to one or more groups for an LDAP group</td>
</tr>
<tr>
<td>Delete OutlettoLDAP</td>
<td>Removes access to one or more outlets for an LDAP group</td>
</tr>
<tr>
<td>Delete PortfromLDAP</td>
<td>Removes access to one or more serial ports for an LDAP group</td>
</tr>
<tr>
<td>List LDAPGroup</td>
<td>Displays all accessible outlet/groups/ports for an LDAP group</td>
</tr>
<tr>
<td>List LDAPGroups</td>
<td>Displays privilege levels for all LDAP groups</td>
</tr>
<tr>
<td>Ping</td>
<td>Verifies proper DNS configuration by name resolution</td>
</tr>
<tr>
<td>Remove LDAPGroup</td>
<td>Deletes an LDAP group name</td>
</tr>
<tr>
<td>Set Authorder</td>
<td>Specifies the authentication order for each new session attempt</td>
</tr>
<tr>
<td>Set DNS</td>
<td>Sets the IP address of the Domain Name server</td>
</tr>
<tr>
<td>Set LDAP Bind</td>
<td>Specifies the LDAP bind request password type</td>
</tr>
<tr>
<td>Set LDAP BindDN</td>
<td>Specifies the user account Fully-Qualified Distinguished Name (FQDN) for binds</td>
</tr>
<tr>
<td>Set LDAP BindPW</td>
<td>Specifies the user account password for binds</td>
</tr>
<tr>
<td>Set LDAP GroupAttr</td>
<td>Specifies user distinguished name (DN) or group names in which user is a member</td>
</tr>
<tr>
<td>Set LDAP GroupType</td>
<td>Specifies the data type for the Set LDAP GroupAttr command</td>
</tr>
<tr>
<td>Set LDAP Host</td>
<td>Sets the IP address or hostname of the Directory Services server</td>
</tr>
<tr>
<td>Set LDAP Port</td>
<td>Sets the LDAP server port number</td>
</tr>
<tr>
<td>Set LDAP UserBaseDN</td>
<td>Sets the base distinguished name (DN) for the username search at login</td>
</tr>
<tr>
<td>Set LDAP UserFilter</td>
<td>Sets the filter used for the username search at login</td>
</tr>
<tr>
<td>Set LDAP UseTLS</td>
<td>Enables/disables LDAP over TLS/SSL support</td>
</tr>
<tr>
<td>Set LDAP</td>
<td>Enables/disables LDAP support</td>
</tr>
<tr>
<td>Set LDAPGroup Access</td>
<td>Sets the access level for an LDAP group</td>
</tr>
<tr>
<td>Set LDAPGroup Envmon</td>
<td>Grants or removes access to environmental monitoring</td>
</tr>
<tr>
<td>Show LDAP</td>
<td>Displays LDAP configurations</td>
</tr>
<tr>
<td>Show Network</td>
<td>Displays network configuration information for all IPv4 and IPv6 settings</td>
</tr>
</tbody>
</table>
Enabling and Setting up LDAP Support

There are a few configuration requirements for properly enabling and setting up LDAP support. Below is an overview of the minimum requirements.

Directory Services server configuration requirements:

1. Define at least one LDAP group.
2. Assign users to that LDAP group.

PDU configuration requirements:

1. Enable LDAP support.
2. Define the IP address and domain component of at least one Directory Services server.
3. Set the LDAP bind request method being utilized by the Directory Services server.
4. Define the IP address of at least one DNS server.
5. Test DNS server configuration using PDU ping support.
6. Define at least one LDAP group and assign access rights for that group.

NOTE: LDAP group names on the Directory Service server and the PDU must match.

Enabling and disabling LDAP support:

The Set LDAP command is used to enable or disable LDAP support.

To enable or disable LDAP support:

At the Switched PDU: prompt, type set ldap, followed by enabled or disabled and press Enter.

Setting the LDAP host address:

The Set LDAP Host command sets the TCP/IP address of the Directory Services server.

NOTE: Both IPv4 and IPv6 formats are accepted for hostname.

To set the LDAP host address:

At the Switched PDU: prompt, type set ldap, followed by host1 or host2 and the Directory Services server’s IP address or hostname. Press Enter.

Examples

The following command sets the primary Directory Services server IP address to 98.76.54.32:

Switched PDU: set ldap host1 98.76.54.32<Enter>

The following command sets the secondary Directory Services server hostname to ldap.companyname.com:

Switched PDU: set ldap host2 ldap.companyname.com<Enter>

Changing the LDAP server port:

The Set LDAP Port command sets the port to which the PDU sends LDAP requests on the previously defined LDAP server. The default port is 389.

To change the LDAP server port:

At the Switched PDU: prompt, type set ldap port, followed by the port number and press Enter.

Example

The following command sets the LDAP server port number to 8888:

Switched PDU: set ldap port 8888<Enter>

Enabling and disabling LDAP over TLS/SSL support:

The Set LDAP UseTLS command is used to enable or disable LDAP over TLS/SSL support.

To enable or disable LDAP over TLS/SSL support:

At the Switched PDU: prompt, type set ldap useslts, followed by yes or no and press Enter.

NOTE: If LDAP Over TLS/SSL is enabled, MD5 binding is disabled.
Setting the LDAP bind type:

The Set LDAP Bind command specifies the LDAP bind request that authenticates a client with the LDAP server.

The PDU supports three standard LDAP bind methods:

**Simple:** Uses unencrypted delivery of username-password over the network to the LDAP server for authentication, showing user credentials in plain text.

**LDAP over TLS/SSL:** Uses a trusted authority certificate to provide encryption of LDAP authentication.

**MD5:** Provides strong protection using 1-way hash encoding that does not transmit the username-password over the network.

*To set the bind type:*

At the Switched PDU: prompt, type `set ldap bind`, followed by `simple`, `TLS`, or `md5`, and press Enter.

**NOTE:** If MD5 binding is enabled, LDAP over TLS/SSL is disabled.

Setting the search bind Distinguished Name (DN):

The Set LDAP BindDN command is used to set the fully-qualified distinguished name (FQDN) for user accounts to bind with. This is required for directory services that do not support anonymous binds. This field is used ONLY with Simple Binds.

Maximum string length is 124 characters.

*NOTE:* If left blank, then an anonymous bind will be attempted. This field is used ONLY with Simple binds.

*To set the search bind DN:*

At the Switched PDU: prompt, type `set ldap binddn`, and press Enter. At the following prompt, type the FQDN and press Enter.

**Example**

The following sets the FQDN for MSAD to `cn=guest,cn=Users,dc=companyname,dc=com`:

```
Switched PDU: set ldap binddn<Enter>
Enter Search Bind DN (Max characters 124): cn=guest,cn=Users,dc=companyname,dc=com<Enter>
```

Setting the search bind Distinguished Name (DN) password:

The Set LDAP BindPW command is used to set the password for the user account specified in the Search Bind DN.

Maximum password size is 20 characters.

*To set the Bind Password DN:*

At the Switched PDU: prompt, type `set ldap bindpw` and press Enter. At the following prompt, type the bind password and press Enter.

Setting the group membership attribute:

The Set LDAP GroupAttr command is used to specify the name of user class attributes that lists distinguished names (DN), or names of groups that a user is a member of. Maximum string length is 30 characters.

*To set Group Membership Attribute:*

At the Switched PDU: prompt, type `set ldap groupattr` and press Enter. At the following prompt, type the group membership attribute and press Enter.

**Example**

The following sets the group membership attribute for MSAD to `memberof`:

```
Switched PDU:  set ldap groupattr<Enter>
Enter Group Member Attr (Max character 30): memberof<Enter>
```
Setting the group membership value type:

The Set LDAP GroupType command is used to specify whether the values of Group Membership Attribute represent the Distinguished Name (DN) of a group or just the name of the group.

**To set group membership value type:**

At the Switched PDU: prompt, type `set ldap grouptype` followed by **DN** or **Name** and press **Enter**.

**Example**

The following sets group membership value to DN

```
Switched PDU: set ldap grouptype DN<Enter>
```

Setting the user membership attribute:

The User Membership Attribute is a comma-delimited string of up to two attribute names whose values in the search results are the users that are members of the LDAP group. Maximum number of characters is 61.

**NOTE:** The user membership attribute option allows the searching of group directory names by a user membership attribute to find the groups for which the user is a member.

**To set user membership attribute:**

At the Switched PDU: prompt, type `set ldap groupsearch userattr` and press **Enter**.

Then at the following prompt, type the group membership attribute and press **Enter**.

**Example**

The following sets the user membership attribute to Test

```
Switched PDU: set ldap groupsearch userattr<Enter>
Enter Group Member Attribute  <61 character max>: Test<Enter>
```

Setting the user search base Distinguished Name (DN):

The Set LDAP UserBaseDN command is used to set the base (DN) for the login username search. This is where the search will start, and will include all subtrees. Maximum size is 100 characters.

**To set the user search base DN:**

At the Switched PDU: prompt, type `set ldap userbasedn` and press **Enter**. At the following prompt, type the search base DN and press **Enter**.

**Example**

The following sets the DN user search base for MSAD to ‘cn=Users,dc=companyname,dc=com’:

```
Switched PDU: set ldap userbasedn<Enter>
Enter User Search Base DN (Max characters 100): cn=Users,dc=companyname,dc=com<Enter>
```
Setting the user search filter:
The Set LDAP UserFilter command is used to set the search filter for the username entered at the login prompt.
The search filter must be entered within parenthesis and adhere to the following format:

(searchfilter=%s)

where ‘searchfilter’ is the name of the attribute in the user class which has a value that represents the user’s login name. In this string, the ‘%s’ will be replaced by the entered username. Maximum string length is 100 characters.

To set the user search filter:
At the Switched PDU: prompt, type set ldap userfilter and press Enter. At the following prompt, type the User Search Filter and press Enter.

Example
The following sets the user search filter for MSAD to ‘samaccountname’:

Switched PDU: set ldap userfilter<Enter>
Enter User Search Filter (Max characters 100):
(samaccountname=%s)<Enter>

Setting the authentication order:
The Set Authorder command sets the authentication order for remote authentication sessions. The PDU supports two methods for authentication order - Remote -> Local and Remote Only.
The Remote -> Local method first attempts authentication with the Active Directory server and if unsuccessful with the local user database on the PDU device.
The Remote Only method attempts authentication only with the Active Directory server and if unsuccessful, access is denied.

NOTE: With the Remote Only method, if authentication fails due to a communication failure with the Active Directory server automatic authentication fallback will occur to authenticate with the local user data base on the PDU.

To set the authentication order:
At the Switched PDU: prompt, type set authorder, followed by remotelocal or remoteonly and press Enter.

NOTE: The recommendation is not setting the authentication order to Remote Only until the LDAP has been configured and tested.

Displaying LDAP configuration information:
The Show LDAP command displays LDAP configuration information.

- Enabled-disabled status of LDAP support
- Directory Services server IP address and port
- Bind request password type and remote authentication order
- Search bind distinguished name and password
- User search base distinguished name and filter
- Group membership attribute and type
To display the LDAP configuration information:
At the Switched PDU: prompt, type `show ldap` and press Enter.

Example
The following command displays the LDAP configuration information:

```
Switched PDU: show ldap
LDAP Configuration
LDAP:       Enabled
Host 1:      98.76.54.32
Host 2:      ldap.companyname.com
Port:        8888
TLS/SSL:     Yes
Bind Type:   MD5
Auth Order:  Remote->Local
Search Bind
  DN: cd=guest,cn=Users,dc=companyname,dc=com
  Password: test1
User Search
  Base DN: cn=Users,dc=companyname,dc=com
  Filter: (samaccountname=%s)
Group Membership
  Attribute: memberof
  Value Type: DN
```

Setting the DNS IP address:
The Set DNS command sets the TCP/IP address of the Domain Name server (DNS).

NOTE: LDAP requires the definition of at least one Domain Name Server (DNS).

To set the DNS IP address:
At the Switched PDU: prompt, type `set`, followed by `dns1` or `dns2` and the Domain Name server’s IP address. Press Enter.

NOTE: Both IPv4 and IPv6 formats are accepted for IP address.

Example
The following command sets the primary Domain Name server IP address to 98.76.54.254:

```
Switched PDU: set dns1 98.76.54.254<Enter>
```

Verifying the DNS configuration:
The Ping command may be used to verify the configuration of the DNS IP address.

To verify the DNS configuration:
At the Switched PDU: prompt, type `ping`, followed by the domain component of the Directory Services server previously configured and press Enter.

Example
The following command verifies the DNS configuration:

```
Switched PDU: ping [yourname].com
Pinging [yourname].com [98.76.54.32] with 64 bytes of data:
Reply from 98.76.54.32: bytes=64 pseq=0 triptime=0
Reply from 98.76.54.32: bytes=64 pseq=1 triptime=0
Reply from 98.76.54.32: bytes=64 pseq=2 triptime=0
Reply from 98.76.54.32: bytes=64 pseq=3 triptime=0
Reply from 98.76.54.32: bytes=64 pseq=4 triptime=0
```
Configuring LDAP Groups

Creating an LDAP group:

The Create LDAPGroup command creates an LDAP group.

*To create an LDAP group:*

At the Switched PDU: prompt, type `create ldapgroup`, optionally followed by a 1-16 character group name (Spaces are not allowed, and LDAP group names are not case sensitive). Press Enter.

*Example*

The following command creates the LDAP group PowerUser:

```
Switched PDU: create ldapgroup PowerUser<Enter>
```

Removing an LDAP group:

The Remove LDAPGroup command removes an LDAP group.

*To remove an LDAP group:*

At the Switched PDU: prompt, type `remove ldapgroup`, optionally followed by a group name. Press Enter.

Setting LDAP group access level privileges:

The Set LDAPGroup Access command sets the access level privileges for an LDAP group. The PDU has four defined access privilege levels: Admin, User, On-Only and View-Only.

*To set the access level privilege for an LDAP group:*

At the Switched PDU: prompt, type `set ldapgroup access`, followed by `admin`, `user`, `ononly` or `viewonly`, optionally followed by a LDAP group name and press Enter.

*Examples*

The following command sets the LDAP group access level for LDAPAdmin to Admin:

```
Switched PDU: set ldapgroup access admin ldapadmin<Enter>
```

The following command sets the LDAP group access level for PowerUser to User:

```
Switched PDU: set ldapgroup access user poweruser<Enter>
```

Granting and removing access to environmental monitoring:

The Set LDAPGroup Envmon command grants or removes input status viewing privileges to/from an LDAP group.

*To grant or remove input status viewing privileges for an LDAP group:*

At the Switched PDU: prompt, type `set ldapgroup envmon` followed by `on` or `off`, optionally followed by a group name and press Enter.

*Example*

The following command grants input status viewing privileges to the LDAP group PowerUser:

```
Switched PDU: set ldapgroup envmon on poweruser<Enter>
```

**NOTE:** Granting access to environmental monitoring (temperature/humidity/sensors) to a non-admin user also grants that user access to power monitoring (outlets, infeeds, towers – all the environmental data of the PDU).
Granting and removing input status viewing privileges:

The Set LDAPGroup Envmmon command grants or removes input status viewing privileges to/from an LDAP group.

To grant or remove input status viewing access for an LDAP group:

At the Switched PDU: prompt, type `set ldapgroup envmon` followed by `on` or `off`, optionally followed by a group name and press Enter.

Example

The following command grants input status viewing privileges to the LDAP group PowerUser:

```
Switched PDU: set ldapgroup envmon on poweruser<Enter>
```

Displaying the LDAP access levels:

The List LDAPGroups command displays all defined LDAP group with their access level.

To display LDAP group access privilege levels:

At the Switched PDU: prompt, type `list ldapgroups` and press Enter.

Example

The following command displays all LDAP groups with their access privilege level:

```
Switched PDU: list ldapgroups<Enter>
```

<table>
<thead>
<tr>
<th>LDAP Group Name</th>
<th>Access Level</th>
<th>Environmental Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>LDAPAdmin</td>
<td>Admin</td>
<td>Allowed</td>
</tr>
<tr>
<td>PowerUser</td>
<td>User</td>
<td>Allowed</td>
</tr>
<tr>
<td>User</td>
<td>On-Only</td>
<td>Not Allowed</td>
</tr>
<tr>
<td>Guest</td>
<td>View-Only</td>
<td>Not Allowed</td>
</tr>
</tbody>
</table>

Adding outlet access to an LDAP group:

The Add OutletToLDAP command grants an LDAP group access to one or all outlets. To grant access for more than one outlet, but not all outlets, you must use multiple Add OutletToLDAP commands.

To grant outlet access to an LDAP group:

At the Switched PDU: prompt, type `add outlettoldap`, optionally followed by an outlet name and a group name. Press Enter, or

Type `add outlettoldap all`, followed by a group name and press Enter.

Examples

The following commands grant the LDAP group PowerUser access to outlets A1 and Webserver_1:

```
Switched PDU:add outlettoldap .a1 poweruser<Enter>
Switched PDU:add outlettoldap WebServer_1 poweruser<Enter>
```
Deleting outlet access for an LDAP group:
The Delete OutletFromLDAP command removes an LDAP group’s access to one or all outlets. You cannot remove access to any outlet for an administrative level group.

To delete outlet access for an LDAP group:
At the Switched PDU: prompt, type `delete outletfromldap`, optionally followed by an outlet name and a group name. Press Enter, or

Type `delete outletfromldap all`, followed by a group name and press Enter.

Adding outlet group access to an LDAP group:
The Add GroupToLDAP command grants an LDAP group access to an outlet group. To grant access for more than one outlet group, you must use multiple Add GroupToLDAP commands.

To grant outlet group access to an LDAP Group:
At the Switched PDU: prompt, type `add grouptoldap`, optionally followed by an outlet group name and an LDAP group name. Press Enter.

Examples
The following commands grants to LDAP group PowerUser access to the outlet groups ServerGroup_1 and ServerGroup_2:

```
Switched PDU: add grouptoldap servergroup_1 poweruser<Enter>
Switched PDU: add grouptoldap servergroup_2 poweruser<Enter>
```

Deleting outlet group access for an LDAP group:
The Delete GroupFromLDAP command removes an LDAP group’s access to a outlet group. You cannot remove access to any group for an administrative level group.

To delete outlet group access for an LDAP group:
At the Switched PDU: prompt, type `delete groupfromldap`, optionally followed by an outlet group name and an LDAP group name. Press Enter.

Adding serial port access to an LDAP group:
The Add PortToLDAP command grants an LDAP group access to the serial port.

To grant serial port access to an LDAP group:
At the Switched PDU: prompt, type `add porttoldap console` and a group name. Press Enter.

Deleting serial port access for an LDAP group:
The Delete PortFromLDAP command removes an LDAP group’s access to the serial port. You cannot remove access to the serial port for an administrative level group.

To delete serial port access for a user:
At the Switched PDU: prompt, type `delete portfromldap console` and a group name. Press Enter.
Displaying LDAP Group access:

The List LDAPGroup command displays all access rights for an LDAP group.

To display LDAP Group access:

At the Switched PDU: prompt, type `list ldapgroup`, optionally followed by a group name. Press Enter.

Example

The following command displays information about the LDAP group PowerUser:

```
Switched PDU: list ldapgroup poweruser<Enter>
Username: PowerUser
Outlet  Outlet
   ID    Name
   .A1   DataServer_1
   .A2   WebServer_1
Groups:
   ServerGroup_1
   ServerGroup_2
More (Y/es N/o): Y
Ports:
   Port  Port
   ID    Name
   Console  Console
```

Members of the PowerUser LDAP group may access the following outlets, outlet groups and serial ports: outlet A1 which has a descriptive name of DataServer_1, outlet A2 which has a descriptive name of WebServer_1, group ServerGroup_1 group ServerGroup_2 and Console serial port.
**LDAP Technical Specifications**

**LDAP Authentication Process**

### Simple Bind Authentication Process

- **Client**: Initiate Sentry session
- **LDAP Server**: Prompt for login credentials
- **Sentry**: Simple bind using Search Bind DN & Password
- **Username found?**: Attribute match?
- **Group match?**: Access Granted
- **Access Denied**: Username groups access rights compared against Sentry LDAP groups

### MD5 Bind Authentication Process

- **Client**: Initiate Sentry session
- **LDAP Server**: Prompt for login credentials
- **Sentry**: SASL-Digest-MD5 bind using uppercase username & entered password
- **Username found?**: Attribute name compared to Group Membership Attribute
- **Attribute match?**: Access Granted
- **Group match?**: Access Denied

**LDAPS (LDAP-over-TLS/SSL) Client Specifications**

- Secure Sockets Layer (SSL) version 3
- Transport Layer Security (TLS) version 1 (RFC 2246)
- x.509 version 3 Server Certificates (RFC 2459) with RSA key sizes up to 4096 bits
- Symmetric Cryptography Ciphers:
  - TLS_RSA_WITH_3DES_EDE_CBC_SHA (168-bit)
  - TLS_RSA_WITH_DES_CBC_SHA (56-bit)
  - TLS_RSA_WITH_AES_128_CBC_SHA (128-bit)
  - TLS_RSA_WITH_AES_256_CBC_SHA (256-bit)
- Server certificates are accepted and used on-the-fly
- A NULL client certificate is sent to the server if a client certificate is requested
Logging

The PDU supports logging of system events both internally and externally. An internal log of more than 4000 events is automatically maintained and is reviewable by administrative users. For permanent/long-term log storage, the PDU supports the Syslog protocol. And for immediate notification, the PDU supports Email notifications.

Log entries include a sequential entry number, a date/time stamp and an event message. The event message is preceded with a message type heading and if the event is tied to a user, the username will be included.

**NOTE:** For date/time stamp support, SNTP server support must be configured.

The PDU supports the following event message headers:

- **AUTH:** All authentication attempts.
- **POWER:** All power state change requests.
- **CONFIG:** All system configuration changes.
- **EVENT:** All general system events. Example: over/under threshold event.

Internal System Log

The internal system log is stored in the local memory and has support for up to 4097 continuously aging entries. The internal system log is only available to administrative users.

Internal System Log

The internal system log is stored in the local memory and has support for up to 4097 continuously aging entries.

**Viewing the internal system log:**

The Show Log command allows users with administrative access to view the internal system log.

*To view the internal system log:*

At the Switched PDU: prompt, type **show log**, and press **Enter**.

**Example**

Switched PDU: show log

[1] EVENT: System boot complete
[2] EVENT: TCP/IP stack has started
[6] Jul 24 18:54:00 CONFIG: Silkscreen to UI mapping changed to 3 for tower "Master" [A] by user "ADMIN"

More (Y/Es N/o):

**NOTE:** To terminate from the Show Log command, press <Esc>.
**Syslog**

The Syslog support is RFC3164-compliant and enables off-PDU viewing and storage of log messages. The PDU supports external logging to up to two Syslog servers.

### Syslog Command Summary

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set Syslog HostIP</td>
<td>Sets the IP address of the Syslog server</td>
</tr>
<tr>
<td>Set Syslog Port</td>
<td>Sets the Syslog server port number</td>
</tr>
<tr>
<td>Show Syslog</td>
<td>Displays all Syslog configuration information</td>
</tr>
</tbody>
</table>

#### Setting the Syslog server IP address:

The Set Syslog HostIP command sets the TCP/IP address of the Syslog server.

**To set the Syslog server IP address:**

At the Switched PDU: prompt, type `set syslog hostip1` or `hostip2` and the Syslog server’s IP address. Press **Enter**.

**Example**

The following command sets the primary Syslog server IP address to 56.47.38.29:

```
Switched PDU: set syslog hostip1 56.47.38.29<Enter>
```

#### Changing the Syslog server port:

With Syslog support enabled, the Syslog server watches and responds to requests on the default Syslog port number 514. This port number may be changed using the Set Syslog Port command.

**To change the Syslog port:**

At the Switched PDU: prompt, type `set syslog port` followed by the port number and press **Enter**.

**Example**

The following changes the Syslog port number to 411:

```
Switched PDU: set syslog port 411<Enter>
```

#### Displaying Syslog configuration information:

The Show Syslog command displays Syslog configuration information.

**To display the Syslog configuration information:**

At the Switched PDU: prompt, type `show syslog` and press **Enter**.

**Example**

The following command displays the Syslog configuration information:

```
Switched PDU: show syslog<Enter>
SYSLOG Configuration
    Primary Syslog Server IP Address:      56.47.38.29
    Secondary Syslog Server IP Address:    0.0.0.0
    Syslog Server Port:                    411
```
## Email Command Summary

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set Email</td>
<td>Enables or disables Email notification support</td>
</tr>
<tr>
<td>Set Email Auth</td>
<td>Enables or disables notification of all authentication attempts</td>
</tr>
<tr>
<td>Set Email Config</td>
<td>Enables or disables notification of configuration changes</td>
</tr>
<tr>
<td>Set Email Event</td>
<td>Enables or disables notification of general system events</td>
</tr>
<tr>
<td>Set Email From</td>
<td>Sets the email 'From' address</td>
</tr>
<tr>
<td>Set Email Power</td>
<td>Enables or disables notification of power state change requests</td>
</tr>
<tr>
<td>Set Email PrimaryTo</td>
<td>Sets the primary recipient email address</td>
</tr>
<tr>
<td>Set Email SecondaryTo</td>
<td>Sets the secondary recipient email address</td>
</tr>
<tr>
<td>Set Email Test</td>
<td>Sends a test email to the target email destinations</td>
</tr>
<tr>
<td>Set Email SMTP Port</td>
<td>Sets the SMTP server port number</td>
</tr>
<tr>
<td>Set Email SMTP AuthType</td>
<td>Determines the SMTP authentication type</td>
</tr>
<tr>
<td>Set Email SMTP Host</td>
<td>Sets the SMTP Host IP address or hostname</td>
</tr>
<tr>
<td>Set Email SMTP Password</td>
<td>Sets the password for SMTP authentication with username</td>
</tr>
<tr>
<td>Set Email SMTP Use ‘From’ Address</td>
<td>Uses the SMTP ‘From’ address for SMTP authentication</td>
</tr>
<tr>
<td>Set Email SMTP Username</td>
<td>Sets the username for SMTP authentication</td>
</tr>
<tr>
<td>Set Email SMTP Useusername</td>
<td>Uses the SMTP username/password for SMTP authentication</td>
</tr>
<tr>
<td>Show Email</td>
<td>Displays all Email configuration information</td>
</tr>
</tbody>
</table>

### Enabling or disabling Email notification Support:

The Set Email command enables or disables Email notification support.

**To enable or disable Email notification support:**

At the Switched PDU: prompt, type `set email`, followed by **enabled** or **disabled** and press **Enter**.

### Setting the SMTP server address:

The Set Email Host command sets the IP address or hostname of the SMTP server.

**NOTE:** Both IPv4 and IPv6 formats are accepted for IP address or hostname.

**To set the SMTP server address:**

At the Switched PDU: prompt, type `set email smtp host`, followed by the SMTP server’s IP address or hostname and press **Enter**.

### Examples

The following command sets the SMTP server address to 55.55.55.55:

```
Switched PDU: set email smtp 55.55.55.55<Enter>
```

The following command sets the SMTP server address to email.companyname.com:

```
Switched PDU: set email smtp email.companyname.com<Enter>
```
Changing the SMTP server port:

With SMTP support enabled, the PDU sends SMTP requests to the default SMTP port number 25. This port number may be changed using the Set Email SMTP Port command.

To change the TACACS port:

At the Switched PDU: prompt, type set email smtp port, followed by the port number and press Enter.

Example

The following changes the SMTP port number to 5555:

```
Switched PDU: set email smtp port 5555<Enter>
```

Setting the SMTP authentication type:

NOTES:

- SMTP authentication allows the mail client in the PDU to login to the mail server during the process of sending a mail. The mail server may require this login to relay mail to another mail server.

- Supported SMTP authentication type are: None (default, no SMTP authentication); Digest-MD5; CRAM-MD5; Login; and Plain. SMTP authentication occurs with a configured username and password, or you can use the “From” address in place of the username.

To determine the SMTP authentication type:

At the Switched PDU: prompt, type set email smtp authtype, followed by the authentication method, and press Enter.

Examples

The following sets the SMTP authentication type to Digest-MD5:

```
Switched PDU: set email smtp authtype DIGESTMD5<Enter>
```

The following sets the SMTP authentication type to CRAM-MD5:

```
Switched PDU: set email smtp authtype CRAMMD5<Enter>
```

Setting the ‘From’ email address:

The Set Email From command sets the ‘from’ email address. By default, this is set to ‘Sentry3_’ plus the last three octets of the unit’s MAC address. Example: ‘Sentry3_510c90@’

To set the ‘From’ email address:

At the Switched PDU: prompt, type set email from, followed by the originating email address and press Enter.

Example

The following command sets the ‘from’ email address to Rack14PDU1@companyname.com:

```
Switched PDU: set email from Rack14PDU1@companyname.com<Enter>
```

Setting the ‘Send To’ email address:

The Set Email PrimaryTo and Set Email SecondaryTo commands set the recipient email addresses.

To set the ‘Send To’ email address:

At the Switched PDU: prompt, type set email, followed by primaryto or secondaryto and the destination email address. Press Enter.

If the primary ‘send to’ address fails, the system then attempts to send the email to the secondary ‘send to’ address.

Examples

The following command sets the primary ‘to’ email address to DayAdmin@companyname.com:

```
Switched PDU: set email primaryto DayAdmin@companyname.com<Enter>
```

The following command sets the secondary ‘to’ email address to NiteAdmin@companyname.com:

```
Switched PDU: set email secondaryto NiteAdmin@companyname.com<Enter>
```
Setting the Email SMTP authentication username:

The Set Email SMTP Username command sets the username for SMTP authentication.

At the Smart PDU prompt, type `set email smtp username`, followed by the SMTP username, and press Enter.

Setting the Email SMTP authentication password:

The Set Email SMTP Password command sets the password for SMTP authentication with username.

At the Smart PDU prompt, type `set email smtp password`, followed by the SMTP password, and press Enter.

Setting the Email SMTP Use Username :

The Set Email SMTP Useusername command uses the SMTP username for SMTP authentication.

At the Smart PDU prompt, type `set email smtp useusername`, followed by the username, and press Enter.

Setting the Email SMTP Use ‘From’ Address:

The Set Email SMTP Usefromaddr command uses the SMPT ‘From’ address for SMTP authentication.

At the Smart PDU prompt, type `set email smtp usefromaddr`, and press Enter.

Enabling or disabling event notification types:

The Set Email Event, Set Email Auth, Set Email Power and Set Email Config commands enable or disable email notification of the system event types.

To enable or disable event notification types:

At the Switched PDU: prompt, type `set email`, followed by `event`, `auth`, `power` or `config` and `enabled` or `disabled`. Press Enter.

Examples

The following command sets the enables email notification general system events:

```
Switched PDU: set email event enabled<Enter>
```

The following command sets the disables email notification authentications attempts:

```
Switched PDU: set email auth disable<Enter>
```

Sending a test email:

The Set Email Test command sends a test email to the target email destinations.

At the Switched PDU: prompt, type `set email test`, and press Enter.
**Displaying Email configuration information:**

The Show Email command displays Email configuration information.

*To display the Email configuration information:*

At the Switched PDU: prompt, type `show email` and press Enter.

**Example**

The following command displays the Email configuration information:

```
Switched PDU: show email
   Email/SMTP Configuration
   Email Notifications:          Enabled
   SMTP
      Host:                      email.leviton.com
      Port:                      25
      Authentication Type:       Any
      Authenticate With:         'From' Address
      Username:                  djones
      Password:                  ********
      'From' Address:             Sentry3_50e021@
      Primary 'Send To' Addr:    appeng@leviton.com
      Secondary 'Send To' Addr:  
      Subject ID:                [Sentry3_5246401]
   EVENT Messages:       Enabled
   AUTH Messages:        Disabled
   POWER Messages:       Disabled
   CONFIG Messages:      Disabled
```
Upload/Download

The PDU family of products supports the ability to upload and download system configurations using a standard FTP client. This feature enables for backup and restoration of system configuration as well as upload of 'template' configurations to ease large initial equipment deployments.

Upload/Download Command Summary

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set FTP Server</td>
<td>Enables or disables the FTP server</td>
</tr>
<tr>
<td>Show FTP</td>
<td>Displays FTP configuration information</td>
</tr>
</tbody>
</table>

Integrated FTP Server

The PDU supports an integrated FTP Server which must be enabled for Upload/Download support. The FTP Server supports a single user at a time. Once an administrative user has authenticated with the FTP Server, standard FTP client commands can be used to upload or download PDU configurations.

**NOTE:** The integrated FTP Server does NOT support web browser FTP file transfers. A non-web-browser is required for all Upload/Download requests.

Enabling and disabling the FTP server:

The Set FTP Server command is used to enable or disable the integrated FTP server.

**To enable or disable the FTP server:**

At the Switched PDU prompt, type `set ftp server`, followed by `enabled` or `disabled` and press Enter.

FTP Configuration Files

The FTP server supports upload/download of two configuration files: CONFIG.BIN and NETWORK.INI. These files may be uploaded or downloaded using FTP PUT and GET operations.

- **CONFIG.BIN**
  This file contains the entire configuration of the PDU **excluding** TCP/IP settings, serial/factory-only configurations, the x.509 certificate (SSL) and SSH keys. This file is encoded to keep all data (including usernames, passwords etc.) out of plain view. **This file cannot be edited.**

- **FTP.INI**
  This file contains only the FTP settings (FTP Host, username, password, filepath, filename and automatic updates support). This file is user readable and editable 'plain text' file.

- **NETWORK.INI**
  This file contains only the TCP/IP settings (IP address, subnet mask, gateway, DNS1 and DNS2). This file is user readable and editable 'plain text' file.

- **SNTP.INI**
  This file contains **only** the SNTP settings (SNTP Hosts and GMT offset). This file is user readable and editable 'plain text' file.

**NOTE:** The CONFIG.BIN file while **encoded** is not encrypted and susceptible to decoding using simple tools. The recommendations is for a secure storage of CONFIG.BIN backup images.
Upload/Download Process

Getting a configuration file (GET Download):

1. Open the FTP client.
   *In a Windows environment, in the Run window type ftp and press Enter.*

2. At the prompt, type open, followed by the IP address of the PDU and press Enter.
   FTP> open 12.34.56.78<Enter>

3. Authenticate with the appropriate administrative username and password.

4. At the prompt, type get, followed by the filename and press Enter.
   FTP> get config.bin<Enter>

5. At the prompt, type close to close the connection to the PDU.
   FTP> close

Putting a configuration file (PUT Upload):

**NOTE:** Uploading the CONFIG.BIN file takes considerably longer than the NETWORK.INI file. When uploading both, the recommendation is for uploading the NETWORK.INI file first.

1. Open the FTP client.
   *In a Windows environment, in the Run window type ftp and press Enter.*

2. At the prompt, type open, followed by the IP address of the PDU and press Enter.
   FTP> open 12.34.56.78<Enter>

3. Authenticate with the appropriate administrative username and password.

4. At the prompt, type put, followed by the filename and press Enter.
   FTP> put network.ini<Enter>

5. At the prompt, type close to close the connection to the PDU and force a restart of the device.
   FTP> close
Remote Shutdown

The Switched PDU product supports the ability to initiate an orderly shutdown of remote servers, protecting open application files prior to the server being powered down. Shutdown signaling is initiated over the existing TCP/IP network and requires the use of a Remote Shutdown Agent.

With the Remote Shutdown Agent installed on the server and Shutdown configured on the PDU, the PDU will initiate an orderly shutdown of the server for all actions that would remove power from the outlet such as Off and Reboot commands.

1. Off or Reboot command received by the PDU.
2. Shutdown signal is sent to the Remote Shutdown Agent on the target server.
3. Remote Shutdown Agent initiates a graceful shutdown of the target server and includes the ability to execute user-defined scripts to perform custom activities, such as safely shutting down open databases.
4. The PDU removes power from the outlet.

**NOTE:** Remote Shutdown is also supported by the extended feature set of Smart Load Shedding. Graceful shutdown is initiated by Smart Load-Shedding events such as high temperature, high infeed load and UPS ‘On Battery’ conditions.

Figure 5. Diagram of Remote Shutdown
Supported Operating Systems

Remote Shutdown Agents are available for the following operating systems:

- **Windows** 2000, 2003, XP
- **Linux** Red Hat 7.3, 8.0
  Red Hat Enterprise 2.1 ES (update 5), 3.0 ES (update 4)
  Novell SUSE Linux Enterprise Server
- **Unix** HP-UX 11.0, 11i v1, 11i v2
  IBM AIX 4.3, 5.3
  Sun Solaris 8, 9, 10
- **Novell Netware** 6

Shutdown Agent Installation

**Windows**

1. Browse to the location of the Remote Shutdown Agent install files.
2. Run **Setup.exe** by double-clicking on the icon.
3. Reply to the standard installation prompts.
4. For additional security, when prompted enter the IP address of the PDU device that will be sending the shutdown signal.

**NOTE:** If left blank, any PDU can send a shutdown signal to the server.

**Linux**

1. Browse to the location of the Remote Shutdown Agent install files.
2. Run **SetupRA**.
3. For additional security, when prompted enter the IP address of the PDU that will be sending the shutdown signal.

**NOTE:** If left blank, any PDU can send a shutdown signal to the server.

**Unix**

1. Browse to the location of the Remote Shutdown Agent install files.
2. Run **Install**.
3. For additional security, when prompted, enter the IP address of the PDU that will be sending the shutdown signal.

**NOTE:** If left blank, any PDU can send a shutdown signal to the server.

**Netware**

1. Browse to the location of the Remote Shutdown Agent install files.
2. From the NetWare system console, load the configuration module (**pmconfig.nlm**) using the default path.
3. For additional security, when prompted enter the IP address of the PDU that will be sending the shutdown signal.

**NOTE:** If left blank, any PDU can send a shutdown signal to the server.
Enabling and Setting up Remote Shutdown Support

Remote Shutdown Command Summary

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set Outlet Host</td>
<td>Sets the target server Host IP address or hostname</td>
</tr>
<tr>
<td>Set Outlet Shutdown</td>
<td>Enables or Disables Remote Shutdown</td>
</tr>
<tr>
<td>Set Outlet Shutdown Delay</td>
<td>Sets the outlet Remote Shutdown delay</td>
</tr>
<tr>
<td>Set Outlet Script</td>
<td>Enables or disables shutdown script delays</td>
</tr>
<tr>
<td>Set Outlet Script Delay</td>
<td>Sets the outlet shutdown script delay</td>
</tr>
<tr>
<td>Show Shutdown</td>
<td>Displays Remote Shutdown configuration information</td>
</tr>
</tbody>
</table>

Enabling or disabling Remote Shutdown support:

The Set Outlet Shutdown command enables or disables Remote Shutdown support for an outlet.

To enable or disable Remote Shutdown support:

At the Switched PDU: prompt, type `set outlet shutdown`, followed by `yes` or `no`, and the outlet ID. Press Enter.

Example

The following command enables Remote Shutdown from outlet .a1:

Switched PDU: set outlet shutdown yes .a1<Enter>

Setting the Remote Shutdown delay:

The Set Outlet Shutdown Delay command sets the Remote Shutdown delay for an outlet.

To set the Remote Shutdown delay:

At the Switched PDU: prompt, type `set outlet shutdown delay`, followed by the outlet ID, and a value from 30 to 900 (in seconds). Press Enter.

Example

The following command sets the Remote Shutdown delay for outlet .a2 to 120 seconds:

Switched PDU: set outlet shutdown delay .a2 120<Enter>

Setting the outlet host address:

The Set Outlet Host command set the IP address or hostname for an outlet. Hostnames may be up to 60 characters long.

To set the outlet host address:

At the Switched PDU: prompt, type `set outlet host`, followed by the outlet ID, and the IP address or hostname. Press Enter.

Example

The following command set the hostname for outlet .a1 to ‘Windows2003’:

Switched PDU: set outlet host .a1 Windows2003<Enter>

Enabling or disabling shutdown script support:

The Set Outlet Script command enables or disables shutdown script support for an outlet.

To enable or disable shutdown script support:

At the Switched PDU: prompt, type `set outlet script`, followed by `yes` or `no`, and the outlet ID. Press Enter.

Example

The following command enables Remote Shutdown from outlet .a1:

Switched PDU: set outlet script yes .a1<Enter>
**Setting the shutdown script delay:**

The Set Outlet Script Delay command sets the shutdown script delay for an outlet.

**To set the shutdown script delay:**

At the Switched PDU: prompt, type `set outlet script delay`, followed by the outlet ID, and a value from 1 to 15 (in minutes). Press Enter.

**Example**

The following command sets the shutdown script delay for outlet .a1 to 10 minutes:

Switched PDU: `set outlet shutdown delay .a1 10<Enter>`

**Displaying Remote Shutdown information:**

The Show Shutdown command displays all shutdown configuration information.

- Outlet ID and descriptive name
- Remote Shutdown settings
- Shutdown script setting

**To display shutdown information:**

At the Switched PDU: prompt, type `show shutdown` and press Enter.

**Example**

The following command displays all shutdown information:

```
Switched PDU: show shutdown

Outlet   Outlet Name & Hostname/IP  Shutdown/ Delay (sec)  Script/ Delay (min)
        ID                     Delay (sec) Delay (min)
.A1      DataServer_1                   Yes/90  Yes/10
         Windows2003                   
.A2      WebServer_1                    No/120  No/1
.A3      FileServer_1                   No/90  No/1
.A4      TowerA_Outlet4                 No/90  No/1
.A5      TowerA_Outlet5                 No/90  No/1
.A6      TowerA_Outlet6                 No/90  No/1
.A7      TowerA_Outlet7                 No/90  No/1
.A8      TowerA_Outlet8                 No/90  No/1

```

**Outlet Control Inhibit**

The Outlet Control Inhibit feature is a key-activated feature to disable all outlet control.

With the Outlet Control Inhibit feature activated, outlets will sequence on after power-up and recovery from a downed branch (fuse/breaker), but all control capability is disabled.
Appendix A: Resetting to Factory Defaults

You can reset the non-volatile RAM that stores all configurable options. This clears all administrator-editable fields and resets all command line configurable options to their default values, including all user accounts.

You can also reset the unit to factory defaults from the command line or the Web interface, or by pressing the reset button. You must have administrator-level privileges to issue the command. Using the reset button may be necessary when a forgotten password prevents administrator login. Each of the methods updates the current working configuration to the factory defaults.

Reset to factory defaults

NOTE: Resetting the unit resets all TCP/IP and Telnet/Web configurations. Reconfiguring the TCP/IP and Telnet/web settings will be required.

From the Web interface

On the Restart page in the Tools section of the Web interface, select Restart and reset to factory defaults from the drop-down menu and click Apply.

From the command line

At the Switched PDU: prompt, type restart factory and press Enter.

Using the reset button

Locate the recessed reset button directly beside the Serial & Ethernet ports. You will need a non-conductive, non-metallic tool that fits inside the recess.

NOTE: This method will not work if you disable the Reset button.

Insert the tool in the recess, then depress and hold the reset button for at least ten seconds.

NOTE: If you press and hold the Reset button for more than 15 seconds, the reset will terminate.

Reset to factory defaults, except network settings

From the Web interface

On the Restart page in the Tools section of the Web interface, select Restart and reset to factory defaults, except network from the drop-down menu and click Apply.

From the command line

At the Switched PDU: prompt, type restart factory keepnet and press Enter.
Appendix B: Uploading Firmware

Accessing Updates from the website

Periodically software and firmware updates are required. To check for or perform a software or firmware update, first download the required file(s) from the Leviton website www.leviton.com/pdu.
### Appendix C: Technical Specifications

#### Domestic Models

#### Switched PDU

##### Horizontal

<table>
<thead>
<tr>
<th>Model</th>
<th>Rated Voltage</th>
<th>Input Cordset and Plug</th>
<th>Outlets</th>
</tr>
</thead>
<tbody>
<tr>
<td>SH081-1D1</td>
<td>120V/20A/2.4Kw</td>
<td>IEC C20 (modular plug)</td>
<td>(8) 5-20R</td>
</tr>
<tr>
<td>SH082-1C2</td>
<td>208V/30A/6.24Kw</td>
<td>L6-30P</td>
<td>(8) IEC C13</td>
</tr>
</tbody>
</table>

##### Vertical

<table>
<thead>
<tr>
<th>Model</th>
<th>Rated Voltage</th>
<th>Input Cordset and Plug</th>
<th>Outlets</th>
</tr>
</thead>
<tbody>
<tr>
<td>SV161-1D1</td>
<td>120V/20A/2.4Kw</td>
<td>IEC C20 (modular plug)</td>
<td>(16) 5-20R</td>
</tr>
<tr>
<td>SV241-1D1</td>
<td>120V/20A/2.4Kw</td>
<td>IEC C20 (modular plug)</td>
<td>(24) 5-20R</td>
</tr>
<tr>
<td>SV242-1C2</td>
<td>208V/30A/6.24Kw</td>
<td>L6-30P</td>
<td>(24) IEC C13</td>
</tr>
<tr>
<td>SV243-1F3</td>
<td>208V/30A/10.81Kw</td>
<td>L21-30P</td>
<td>(18) IEC C13, (6) C19, (1)5-20R</td>
</tr>
<tr>
<td>SV243-1H4</td>
<td>208V/30A/10.81Kw</td>
<td>L15-30P</td>
<td>(18) IEC C13, (6) C19</td>
</tr>
<tr>
<td>SV243-1J4</td>
<td>208V/50A/18.01Kw</td>
<td>CS8365C</td>
<td>(18) IEC C13, (6) C19</td>
</tr>
<tr>
<td>SV243-1K4</td>
<td>208V/60A/21.62Kw</td>
<td>460P9</td>
<td>(18) IEC C13, (6) C19</td>
</tr>
</tbody>
</table>
Physical Specifications

<table>
<thead>
<tr>
<th></th>
<th>Operating</th>
<th>Storage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>0° to 50° C (32° to 122° F)</td>
<td>-40° to 85° C (-40° to 185° F)</td>
</tr>
<tr>
<td>Relative Humidity</td>
<td>8 to 90%, non-condensing</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dimensions (H x W x D)</th>
<th>Weight (shipping)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SH081-1D1</td>
<td>1.75 x 17.2 x7.0 (44 x 437 x 178 mm)</td>
</tr>
<tr>
<td>SH082-1C2</td>
<td>1.75 x 17.2 x7.1 (44 x 437 x 181 mm)</td>
</tr>
<tr>
<td>SV161-1D1</td>
<td>1.75 x 44.5 x 2.25 (44 x 1130 x 57 mm)</td>
</tr>
<tr>
<td>SV241-1D1</td>
<td>1.75 x 65.5 x 2.25 (44 x 1664 x 57 mm)</td>
</tr>
<tr>
<td>SV242-1C2</td>
<td>1.75 x 69.0 x 2.25 (44 x 1753 x 57 mm)</td>
</tr>
<tr>
<td>SV243-1F3</td>
<td>1.75 x 69.0 x 2.25 (44 x 1753 x 57 mm)</td>
</tr>
<tr>
<td>SV243-1H4</td>
<td>1.75 x 69.0 x 2.25 (44 x 1753 x 57 mm)</td>
</tr>
<tr>
<td>SV243-1J4</td>
<td>1.75 x 70.0 x 3.5 (44 x 1778 x 89 mm)</td>
</tr>
<tr>
<td>SV243-1K4</td>
<td>1.75 x 70.0 x 3.5 (44 x 1778 x 89 mm)</td>
</tr>
<tr>
<td>SV243-1L4</td>
<td>1.75 x 70.0 x 3.5 (44 x 1778 x 89 mm)</td>
</tr>
</tbody>
</table>

Branch Circuit Protection

Always disconnect ALL power supply cords before opening to avoid electrical shock.
Afin d’éviter les chocs électriques, débranchez TOUTES les cables électrique avant d’ouvrir.
Vor dem Offnen immer Netzleitung abziehen um elektrischen Schlag zu vermeiden.

Switched PDUs feature Branch Circuit protection on all outlets in the form of internal fuses. These fuses meet the strict safety requirements of UL/CSA 60950-1 for Branch Circuit Protection.

Time-Delay Fuses – Class G

<table>
<thead>
<tr>
<th>Amperes</th>
<th>Bussman Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>SC-20</td>
</tr>
</tbody>
</table>

CooperBussman product data-sheet #1024

NOTE: Outlet Relay Inrush Specification: Switched PDU relays are rated with an inrush up to 110A.
Data Connections

RS-232 port

Switched PDUs are equipped standard with an RJ45 DTE RS-232c serial port. This connector may be used for direct local access or from other serial devices such as a terminal server. An RJ45 crossover cable is provided for connection to an RJ45 DCE serial port.

<table>
<thead>
<tr>
<th>Pin</th>
<th>DTE Signal Name</th>
<th>Input/Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Request to Send</td>
<td>RTS</td>
</tr>
<tr>
<td>2</td>
<td>Data Terminal Ready</td>
<td>DTR</td>
</tr>
<tr>
<td>3</td>
<td>Transmit Data</td>
<td>TD</td>
</tr>
<tr>
<td>4</td>
<td>Signal Ground</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Signal Ground</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Receive Data</td>
<td>RD</td>
</tr>
<tr>
<td>7</td>
<td>Data Set Ready</td>
<td>DSR</td>
</tr>
<tr>
<td>8</td>
<td>Clear to Send</td>
<td>CTS</td>
</tr>
</tbody>
</table>

RJ45 to DB9F serial port adapter

Additionally, an RJ45 to DB9F serial port adapter is provided for use in conjunction with the RJ45 crossover cable to connect to a PC DB9M DCE serial port. The adapter pin-outs below reflect use of the adapter with the provided RJ45 crossover cable.

<table>
<thead>
<tr>
<th>Pin</th>
<th>DCE Signal Name</th>
<th>Input/Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Receive Data</td>
<td>RD</td>
</tr>
<tr>
<td>3</td>
<td>Transmit Data</td>
<td>TD</td>
</tr>
<tr>
<td>4</td>
<td>Data Terminal Ready</td>
<td>DTR</td>
</tr>
<tr>
<td>5</td>
<td>Signal Ground</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Data Set Ready</td>
<td>DSR</td>
</tr>
<tr>
<td>7</td>
<td>Request to Send</td>
<td>RTS</td>
</tr>
<tr>
<td>8</td>
<td>Clear to Send</td>
<td>CTS</td>
</tr>
</tbody>
</table>

LED Indicators

Input/Branch/Phase Current

Units are equipped with 7-segment LEDs for reporting of input, branch or phase current loading. Loading is reported in amperes and is displayed in $\frac{1}{8}$, $\frac{1}{2}$, or 0.1A increments under 10A and whole amp increments at and above 10A, depending on the internal input current measurement hardware. Additionally, the LED may display codes for events detected by the system for immediate local notification.

<table>
<thead>
<tr>
<th>Behavior/Code</th>
<th>Event description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blinking</td>
<td>The unit blinks half-second on, half-second off when the current exceeds the user-defined “high load” or factory default threshold (80% of maximum Input Feed Capacity).</td>
</tr>
<tr>
<td>“oL”</td>
<td>Flashes “oL” when the current exceeds the Input Feed Capacity.</td>
</tr>
<tr>
<td>FE</td>
<td>The PDU has detected an error with the Branch Circuit Protection. For units with a fuse, check to see if the fuse was blown or removed; for units with a circuit breaker, check to see if the breaker was tripped.</td>
</tr>
</tbody>
</table>

Outlets

Units are equipped with a status LED for each power receptacle. A lit/on LED indicates that power is being supplied at the port and a darkened/off LED indicates that there is no power at the port.
Regulatory Compliance

Product Safety

Units have been safety tested and certified to the following standards:

- USA/Canada  UL 60950-1:2007 and CAN/CSA 22.2 No. 60950-1-07
- European Union  EN 60950-1:2006 + A11 +A1 + A12

This product is also designed for Norwegian IT power system with phase-to-phase voltage 230V.

USA Notification

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Modifications not expressly approved by the manufacturer could void the user's authority to operated the equipment under FCC rules.

Canadian Notification

This Class A digital apparatus complies meets all requirements of the Canadian Interference-Causing Equipment Regulations.

European Union Notification

Products with the CE Marking comply with both the EMC Directive (89/336/EEC) and the Low Voltage Directive (73/23/EEC) issued by the Commission of the European Community.

Compliance with these directives implies conformity to the following European Norms:

- EN55022  Electromagnetic Interference
- EN55024  Electromagnetic Immunity
- EN60950-1  Product Safety
- EN61000-3  Harmonics and Flicker

[RoHS logo here] Products with this mark comply with the RoHS Directive (2002/95/EC) issued by the Commission of the European Community.

Japanese Notification

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。

本製品に同梱または付属しております電源コードは、本製品専用です。本製品以外の製品ならびに他の用途に使用しないで下さい。

Chinese Notification

关于符合中国《电子信息产品污染控制管理办法》的声明

产品中有毒有害物质的名称及含量

<table>
<thead>
<tr>
<th>部件名称 (Parts)</th>
<th>有毒有害物质或元素 (Hazardous Substance)</th>
</tr>
</thead>
<tbody>
<tr>
<td>机箱子组件 (Chassis Subassembly)</td>
<td>铅 (Pb)</td>
</tr>
<tr>
<td>印刷板组件 (PCAs)</td>
<td>X</td>
</tr>
</tbody>
</table>

O 表示该有毒有害物质在该部件所有均质材料中的含量均在SJ/T 11363-2006 标准规定的限量要求以下。

Indicates that this hazardous substance contained in all homogeneous materials of this part is below the limit requirement in SJ/T 11363-2006.

X 表示该有毒有害物质至少在该部件的某均质材料中的含量超出SJ/T 11363-2006 标准 规定的限量要求。

Indicates that this hazardous substance contained in at least one of the homogeneous materials of this part is above the limit requirement in SJ/T 11363-2006.
Recycling

Recycling of products is encouraged. Disposal facilities, environmental conditions and regulations vary across local, state and country jurisdictions, so the consultation with qualified professional and applicable regulations and authorities within your region are encouraged to ensure proper disposal.

Waste Electrical and Electronic Equipment (WEEE)

In the European Union, this label indicates that this product should not be disposed of with household waste. It should be deposited at an appropriate facility to enable recovery and recycling.

Appendix D: Warranty, Product Registration, and Support

Warranty

For information regarding Leviton’s product warranty go to www.leviton.com/warranty

Technical Support

For Product Support or Technical Issues:

- Network Solutions
- Mon-Fri 6:30 AM-5:00 PM Pacific Time
- Toll-free: 1-800-824-3005, select option #1
- Email appeng@leviton.com
- www.leviton.com