Server Technology

Quality Rack Power Solutions

Smart Load Shedding

Installation and Operations Manual

Firmware Release 7.0

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, Server Technology does not recommend the use of any of its products in the following situations:

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

Server Technology will not knowingly sell its products for use in such applications unless it receives in writing assurances satisfactory to Server Technology that:

- the risks of injury or damage have been minimized,
- the customer assumes all such risks, and
- the liability of Server Technology 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.

Notices

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Chapter 1: Introduction

Getting Started

Server Technology's comprehensive **Smart Load Shedding** feature allows the continuous load shedding of Rack Power Distribution Units (PDUs) based on the following key operating parameters:

- UPS Condition (On-Battery)
- Temperature Level
- Humidity High-Threshold
- Current Load

When conditions are met with one or more of the above parameters, you can automatically load shed designated non-critical devices down to the outlet level. This load shedding practice ensures increased uptime and avoids equipment damage.

Before You Begin

To enable Smart Load Shedding, you'll need the following:

- Upgrade to firmware version 6.0 or later.
- Purchase of the Smart Load Shedding feature from Server Technology.
- The feature activation key provided with your purchase.

Quick Installation Checklist

The following steps show you the order in which you can quickly install and configure Smart Load Shedding for your Server Technology PDU.

1. Login as the Administrator.
2. Enable Smart Load Shedding:
   a. Enter the activation key.
   b. Restart the PDU.
3. Configure the UPS (Refer to your UPS manual).
4. Configure Smart Load Shedding:
   a. Configure outlet load shedding.
   b. Configure UPS settings.
   c. Configure sensor and infeed thresholds.

Connecting to the Unit

Serial (RS232) port

Server Technology PDUs are 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 about the connection and the Serial RS-232 port, see Appendix A.

Ethernet port

PDUs are equipped with an RJ45 10/100Base-T Ethernet port for attachment to an existing network. This connection allows access to the Switched CDU by Telnet or Web.

PDUS are also configured with the following network defaults to allow out-of-the-box unit configuration through Telnet or Web:

NOTE: When installed on a DHCP enabled network, the following network defaults do not apply because the CDU 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. A restart may be required for network reconfiguration to take effect.

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

Technical Support

Experience Server Technology's FREE Technical Support

Server Technology understands that there are often questions when installing and/or using a new product. Free Technical Support is provided from 8 a.m. to 5 p.m. PST, Monday through Friday.
After-hours service is provided to ensure your requests are handled quickly no matter what time zone or country you are located in.

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Chapter 2: Operations

Working with the User Interfaces

A Server Technology PDU has two interfaces: (1) the Web interface accessed by the HTTP-enabled Ethernet connections, and (2) the Command Line Interface (CLI) for serial and Telnet connections.

Outlet Naming and Grouping

Absolute Names for Models with a Single Power Input Feed

Absolute names for towers and outlets are formatted with a period (.) followed by a letter to represent the tower ("A" for a Switched master unit or "B" for an optional expansion unit), followed by the outlet number.

Examples:

Absolute name for outlet 1 on Switched master unit is .A1

Absolute name for outlet 8 on optional expansion unit is .B8

Absolute Names for Models with Multiple Power Input Feeds

Absolute names for towers, input feeds, and outlets are formatted with a period (.) followed by a letter to represent the tower ("A" for a Switched master unit or "B" for an optional expansion unit), followed by a letter to represent the input feed ("A" for first input feed and "B" for second input feed), followed by the outlet number.

Examples:

Absolute name for outlet 5 on input feed B of tower A is .AB5

Absolute name for outlet 3 on input feed A of tower B is .BA3

Factory Mapping of Firmware Default Names to Product Silkscreen

The firmware supports a factory naming convention that generates default firmware names for input feeds and outlets so these names are a one-for-one match to the same names/ numbers silkscreened on the hardware unit.

The factory default names:

- Support input feeds and outlets, as well as tower names.
- Are determined by product type and characteristics at factory assembly of new Switched and Smart PDU products.
- Display automatically in the Web interface pages.
- Can be accepted by the administrator as populated in the interface, or the names can be configured with the Web interface or Command Line Interface (CLI) as typically done.
- Can be user-edited, but if a "Factory Restart and Reset to Factory Defaults" option is performed on the unit, the user-edited names will be changed back to the factory default names.
- Ensure master units will not force the new naming convention on link units.
- Do not apply to -48V products.

For detailed information about the naming convention and to view the new default names for your product type, see Technical Note 303-9999-22, "Factory Mapping of Firmware Names for Input Feeds and Outlets to Product Silkscreen" at www.servertech.com

NOTE: The new factory naming convention applies to **new** PDU products only.

Usernames and Passwords

PDUs have one default administrative user account (username/password: **admn/admn**). A maximum of 112 defined user accounts is supported.

Valid usernames contain 1-16 characters; not case sensitive; spaces not allowed.

Passwords can contain up to 16 (case sensitive) characters.

NOTE: For security, Server Technology recommends removal of the default **admn** administrative user account after you have created a new user account with administrative access rights.

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

Web Interface

The Web interface provides web-based access to the firmware. The interface is designed with three major sections, illustrated below:

1. System Header: Shows device description, PDU 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.

NOTES:

- The blinking of the PDU location string (IP address) in the System Header section may not work with all web browsers
- This manual describes the functions and commands for the **Smart Load Shedding** feature only. For all other firmware installation and operations information, see the user manual for your specific product type, such as the Switched PDU or Smart PDU.

The following screen sample shows the **Outlet Control > Individual** page:

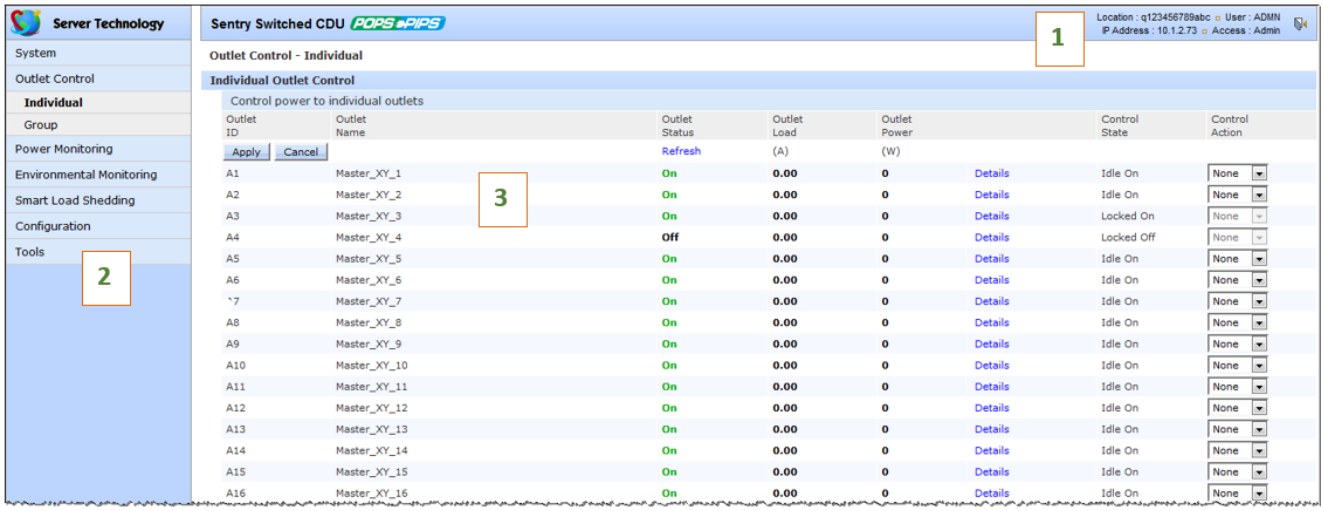


Figure 1. Example of Firmware Web Interface with Smart Load Shedding Option

Logging In

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

To log in by Web:

In the firmware Login window, provide a valid username and password, and click **OK**.

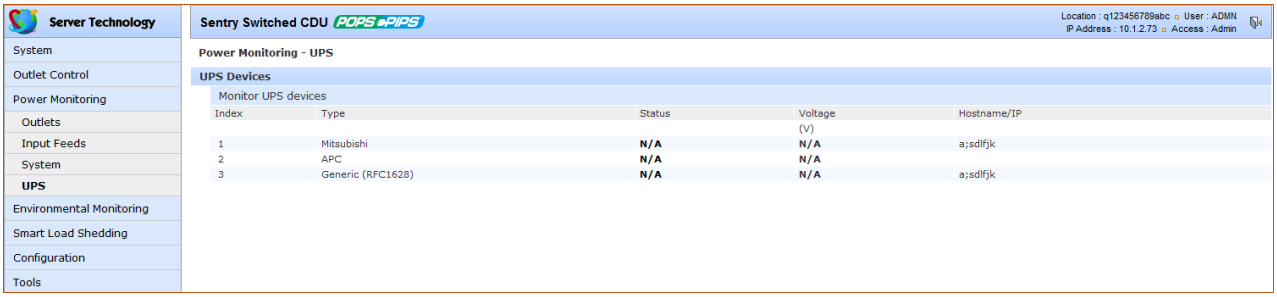
If you enter an invalid username or password, you will be prompted again. You are given three attempts to enter a valid username and password combination. If all three attempts fail, the session ends and a protected page will be displayed.

NOTE: The default administrative username/password is **admn/admn**. There is no "i" in admn.

Power Monitoring

UPS

When Smart Load Shedding is enabled, the UPS page is available at **Power Monitoring > UPS**, shown below.



The UPS page displays all available UPS devices associated with the CDU, showing index, type, utility power state (status), nominal voltage, and hostname/IP address.

Smart Load Shedding

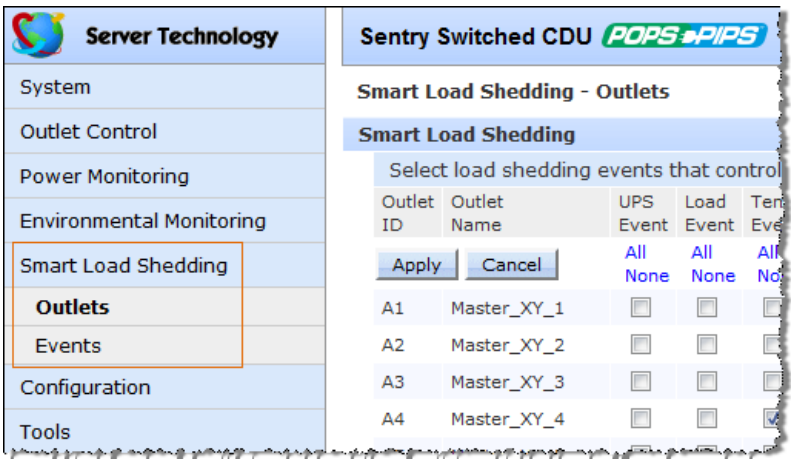
Smart Load Shedding is a separately-purchased and key-activated feature that allows load shedding to occur down to the outlet level, shutting down non-critical equipment whenever the UPS goes off main power to on-battery.

Various SNMP traps generate an event received by the firmware. The event notifies the administrative-user that a variable in the network environment has just changed, such as an exceeded threshold.

NOTE: SNMP and Smart Load Shedding share the same high-temperature threshold values.

When Smart Load Shedding is enabled, you can: (1) Configure the PDU to monitor the supplying power from the UPS to each infeed, and (2) Configure any outlet to respond to multiple Smart Load Shedding conditions (events), such as temperature/humidity sensors, humidity high-threshold, contact closures, and water sensors.

When key-activated and enabled, the Smart Load Shedding feature displays in the firmware Web interface as outlined below in the navigation pane:



The Smart Load Shedding feature provides two options:

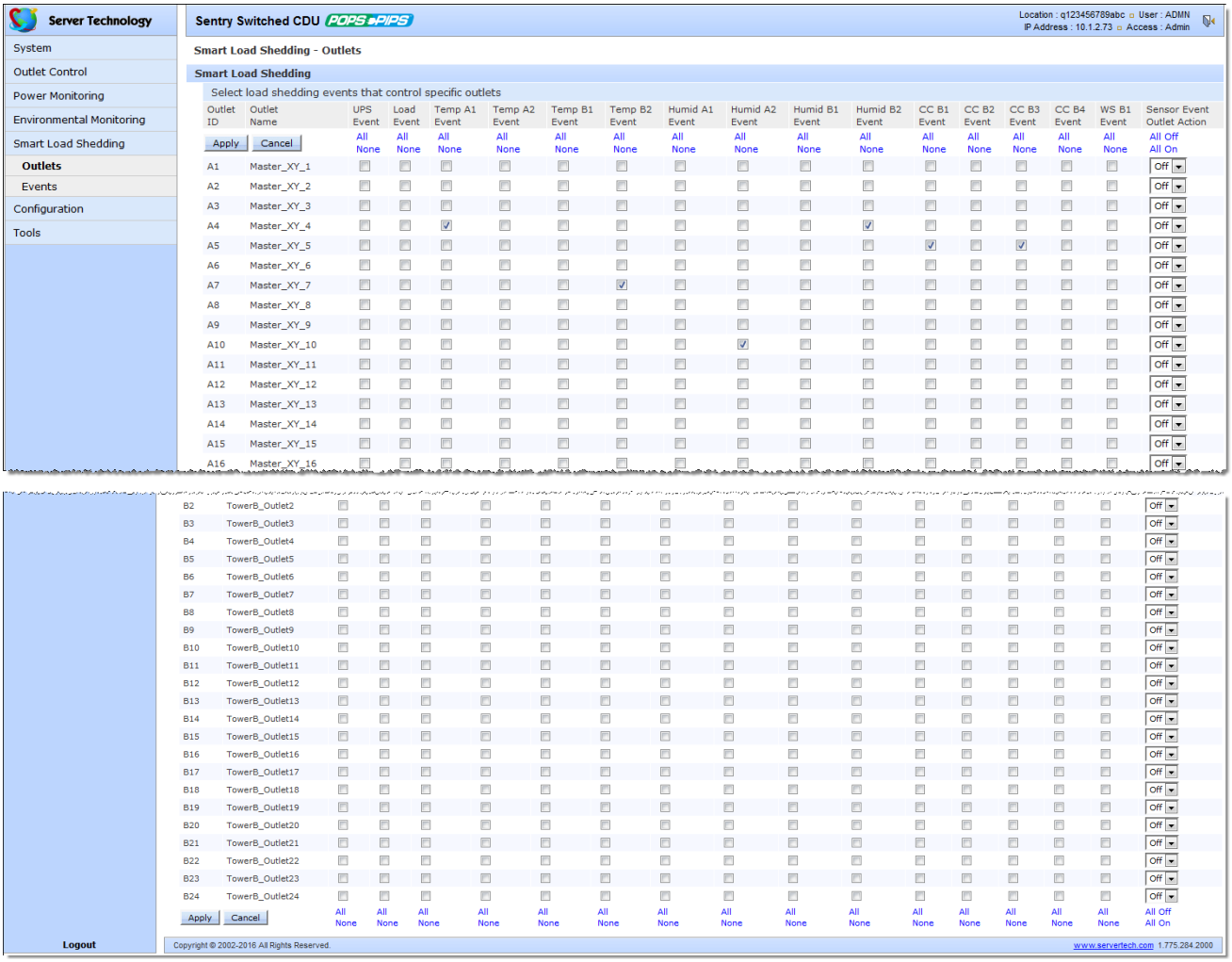
- **Outlets:** Displays the Outlets page page for configuration of the load shedding events that control specific outlets.
- **Events:** Displays the Event page for configuration of UPS events, such as temperature/humidity sensors, infeed high-loads, humidity high-threshold, contact closures, and water sensors.

Outlets Page

The Outlets page lists all outlets and allows configuration of the load shedding events (on the external EMCU) that control specific outlets.

Load Shedding Outlet Events

Event	Description
UPS Event	Power supply changing event for the UPS, such as an on-battery condition
Load Event	Power overload event
Temp A1 Event	Event for temperature/humidity sensor A1
Temp A2 Event	Event for temperature/humidity sensor A2
Temp B1 Event	Event for temperature/humidity sensor B1
Temp B2 Event	Event for temperature/humidity sensor B2
Humid A1 Event	Event for high-humidity sensor A1
Humid A2 Event	Event for high-humidity sensor A2
Humid B1 Event	Event for high-humidity sensor B1
Humid B2 Event	Event for high-humidity sensor B2
CC B1 Event	Event for the contact closure sensor B1
CC B2 Event	Event for the contact closure sensor B2
CC B3 Event	Event for the contact closure sensor B3
CC B4 Event	Event for the contact closure sensor B4
WS B Event	Event for the water sensor B



To configure outlet events:

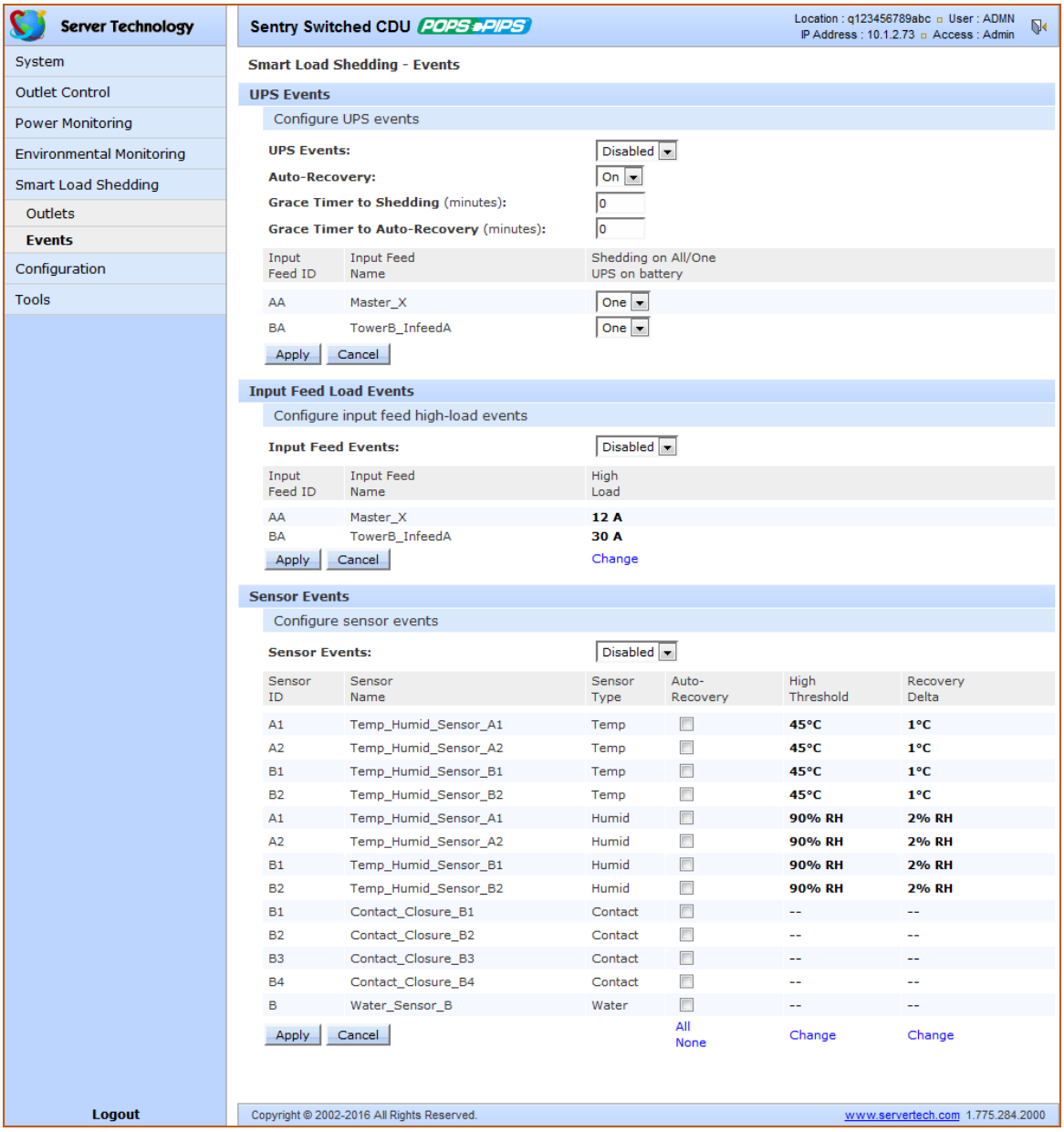
For each listed outlet you want to configure, do the following on the Smart Load Shedding – Outlets page:

1. Select the checkbox(es) for the type of load shed event shed you want to configure: UPS, load, temperature/humidity sensor, humidity high-threshold, contact closure, or water sensor.. To select a load shed event for all outlets on the page, click **All** for the event. To clear all outlets from an event, click **None** for the event.
2. From the Outlet Action drop-down menu, select On or Off to set the control action to be performed on the outlet if one of the temperature events (A1 or A2) is reached.
3. Click **Apply.**

NOTE: If you selected only one event (only one checkbox checked), and if conditions are met for the event to occur, the outlet will execute whatever control action (On, Off) you indicated.

Events Page

The Events page allows configuration of SNMP-generated events, such as UPS, input feed load, and sensor events for the Smart Load Shedding feature.



To configure UPS events:

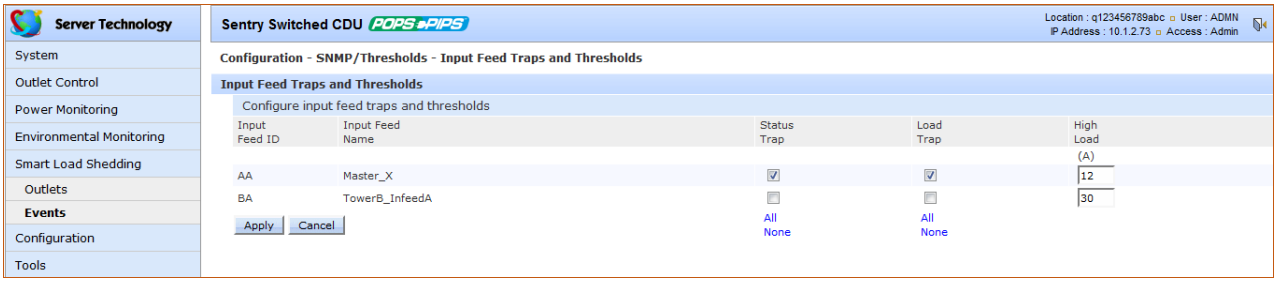
1. To enable UPS events, from the UPS Events drop-down menu, select Enabled.
2. From the Auto-Recovery drop-down menu, select On – if you want to restore power to the devices that were previously load shed. When a threshold is no longer exceeded or the UPS comes off-battery back to main power, Auto-Recovery set to On will automatically power up devices.
3. In the Grace Timer to Shedding field, type the number of minutes as the grace period the UPS will stay on-battery before Smart Load Shedding initiates powering down the UPS.
4. In the Grace Timer to Auto-Recovery field, type the number of minutes as the grace period the UPS will stays on main power before the outlets turn on as configured in the Outlets page.
5. From the drop-down menu for each of the two infeed names shown, select an option:
   - **One:** Only one UPS device needs to be on-battery for the UPS event to be executed.
   - **All:** All of the UPS devices need to be on-battery for the UPS event to be executed.
6. Click **Apply**.

NOTE: The Grace Timer field for Shedding and Grace Timer field for Auto-Recovery achieve a graceful shutdown before power is cut off, and ensure that equipment returns in good operating condition when power is restored. These grace timer fields also assist in shedding fewer critical devices to make sure power is available for critical applications.

To configure infeed high-load events:

This Smart Load Shedding function protects against over-current conditions and exceeded threshold current levels.

1. To enable infeed load events, from the Input Feed Events drop-down menu, select Enabled.
2. Click the Change link to display the configuration page as follows:



3. For each displayed infeed, check the desired checkboxes to set status and/or load traps.
4. Type a maximum load value (A) for each infeed in the High Load field.
5. Click **Apply**.

NOTE: SNMP and Smart Load Shedding share the same infeed high-load threshold values

To configure sensor events:

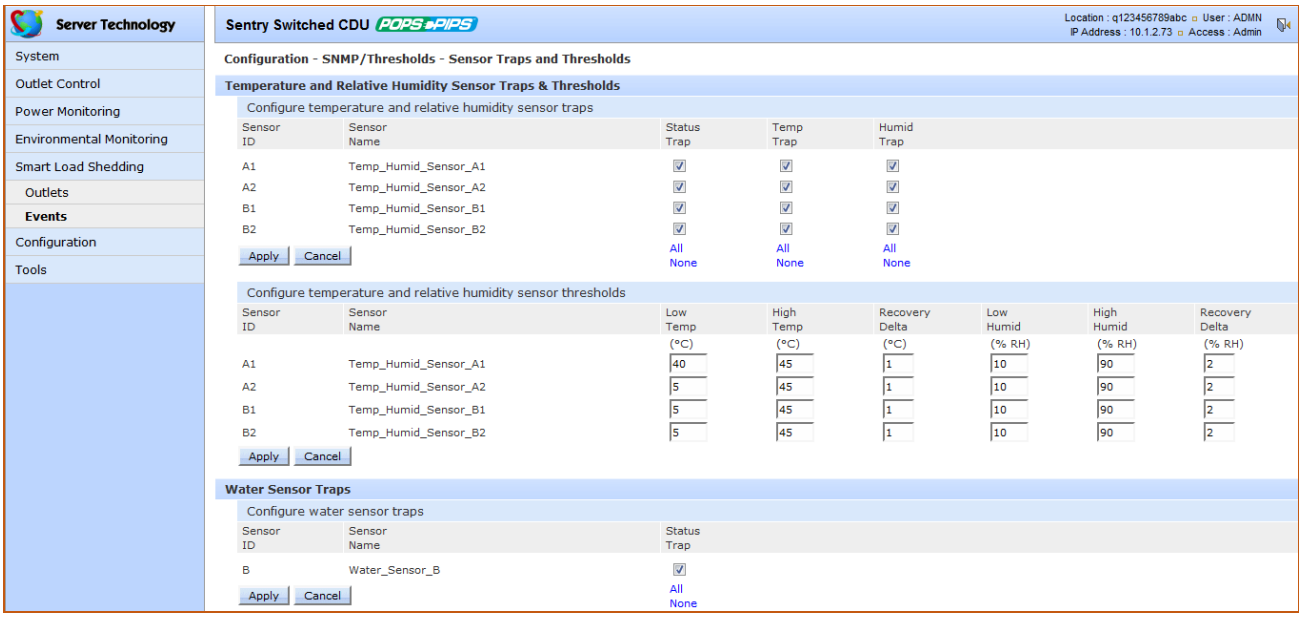
Smart Load Shedding provides sensor events to ensure uptime by protecting against cooling failures and avoiding equipment damage.

The High-Temperature Events function allows configuration of load shedding based on two different temperature sensor measurements (Temp A1 and Temp A2), located within 10-feet of the PDU.

The High-Temperature Events function also includes load shedding configuration based on two different high-humidity sensor measurements (Humid A1 and Humid A2), located within 10-feet of the PDU.

Up to eight temperature/humidity sensors are supported: A1, A2, B1, B2, C1, C2, D1, and D2.

1. To enable high-temperature events, from the Sensor Events drop-down box, select Enabled.
2. For each sensor displayed, if desired, check the Auto-Recovery checkbox. Auto-recovery associates the outlets with the threshold to be powered back on (or powered back off) automatically when the threshold is no longer exceeded.
3. Click the Change link to display the configuration page as follows:



4. For each sensor name displayed, do the following:
   a. Check the desired checkboxes for Status Trap, Temp Trap, and Humid Trap.
   b. Type a low/high threshold value for the temperature for each temperature/humidity sensor (in degrees based on the system-configured temperature scale, Celsius in this example).
   c. For the low/high temperature values, provide the percentage of relative humidity (% RH) in the Recovery Delta field. See "About the Recovery Delta" on the following page.
   d. For the low/high humidity values, provide the percentage of relative humidity (% RH) in the Recovery Delta field.
   e. Check the Status Trap checkbox for water sensors, if desired.
5. Click **Apply**.

About the Recovery Delta

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.

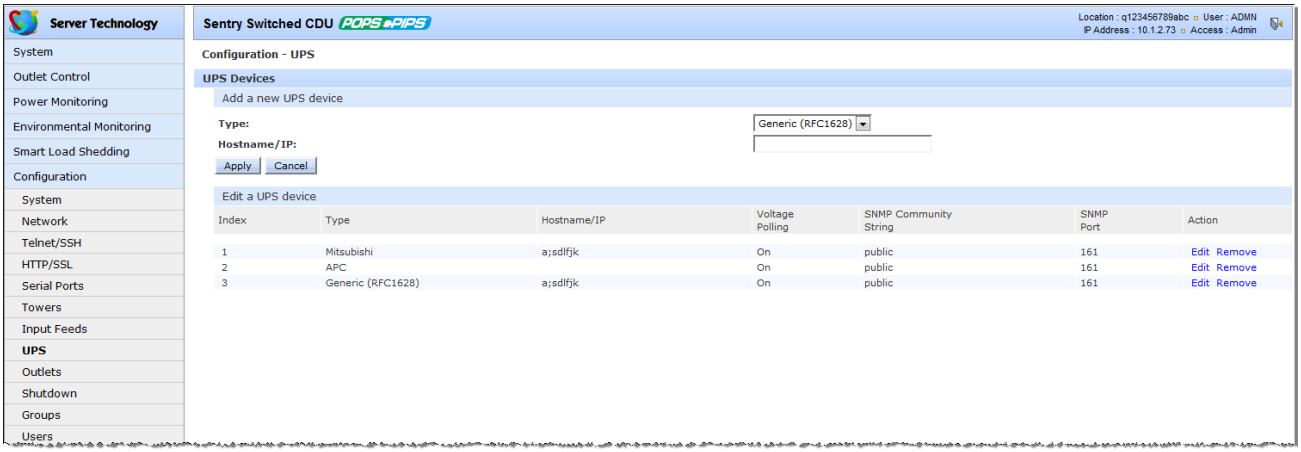
For example, if the high temperature value is 80 degrees Fahrenheit, and the Recovery Delta field is 2 degrees Fahrenheit, the sensor will not recover until a temperature value of 78 degrees Fahrenheit is reported.

NOTE: The acceptable value range for the Recovery Delta field is:

- For temperature: 0-30 degrees for Celsius and 0-54 degrees for Fahrenheit.
- For humidity: 0-20%
- The default value for the Recovery Delta field is 1 degree Celsius and 2 degrees Fahrenheit.

UPS

The UPS configuration page is used for maintenance of UPSs associated with the PDU.



From the UPS page, the administrator can associate a UPS to the input feed(s) of the PDU, and also configure the UPS Hostname/IP address, SNMP Get community string, UPS voltage polling, and UPS port.

Adding a UPS:

1. From the Type drop-down list, select the UPS.
2. Type a Hostname or IPaddress for the UPS.
3. Click **Apply**.

NOTE: Smart Load Shedding supports UPS devices from numerous manufacturers: APC, Liebert, MGE, Tripp Lite, HP, Minuteman, Mitsubishi, Powerware, and Toshiba. Also supported are any UPS devices that support the Generic RFC 1628 UPS SNMP Specification.

Editing the UPS configuration:

On the Configuration > UPS page, click the **Edit** link for the UPS listed.

Editing the UPS type:

From the Type drop-down list, select the UPS, and click **Apply**.

Editing the UPS Hostname/IP address:

In the Hostname/IP field, type the edited name or address, 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, and click **Apply**.

Enabling/disabling UPS voltage polling:

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

Editing the UPS SNMP port number:

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

Associating the UPS with an infeed:

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

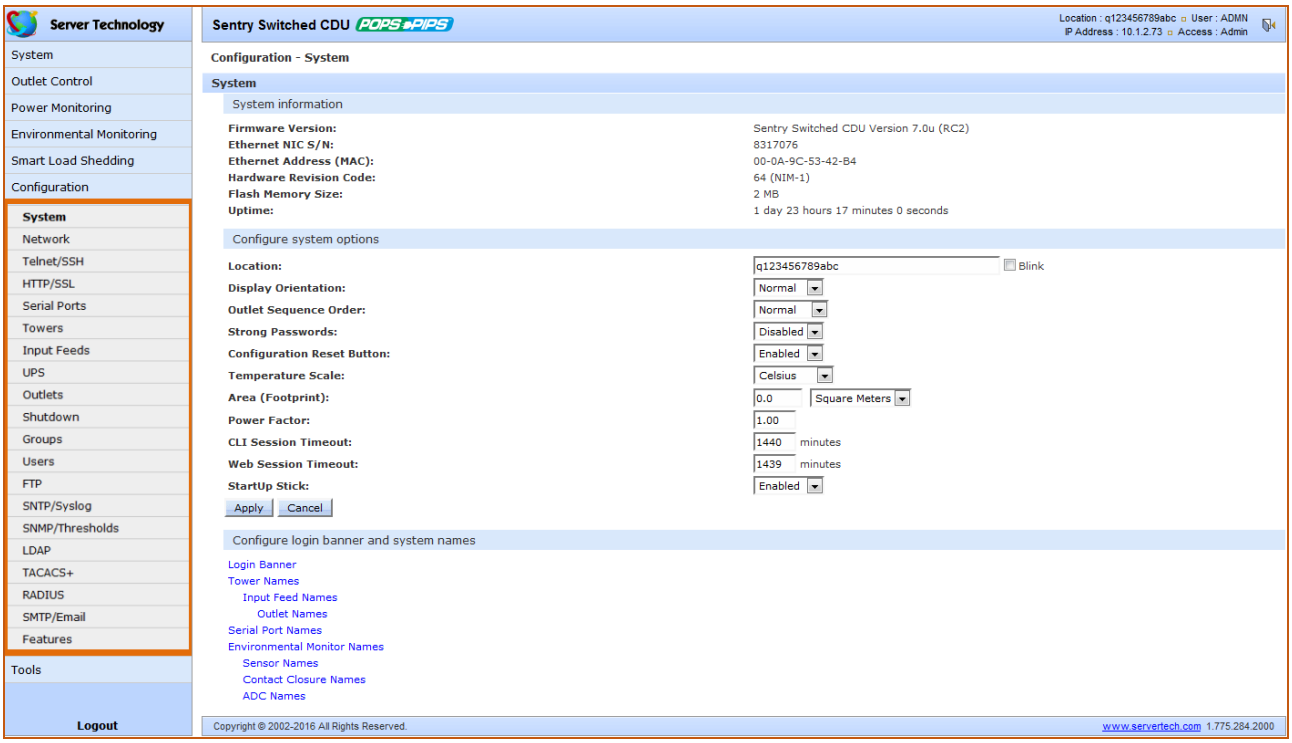
Removing a UPS:

On the Configuration > UPS page, click the **Remove** link for the UPS listed.

Configuration

The Configuration option in the navigation bar gives the administrative-level user access to all configuration settings needed for setting the operational parameters of the the PDU.

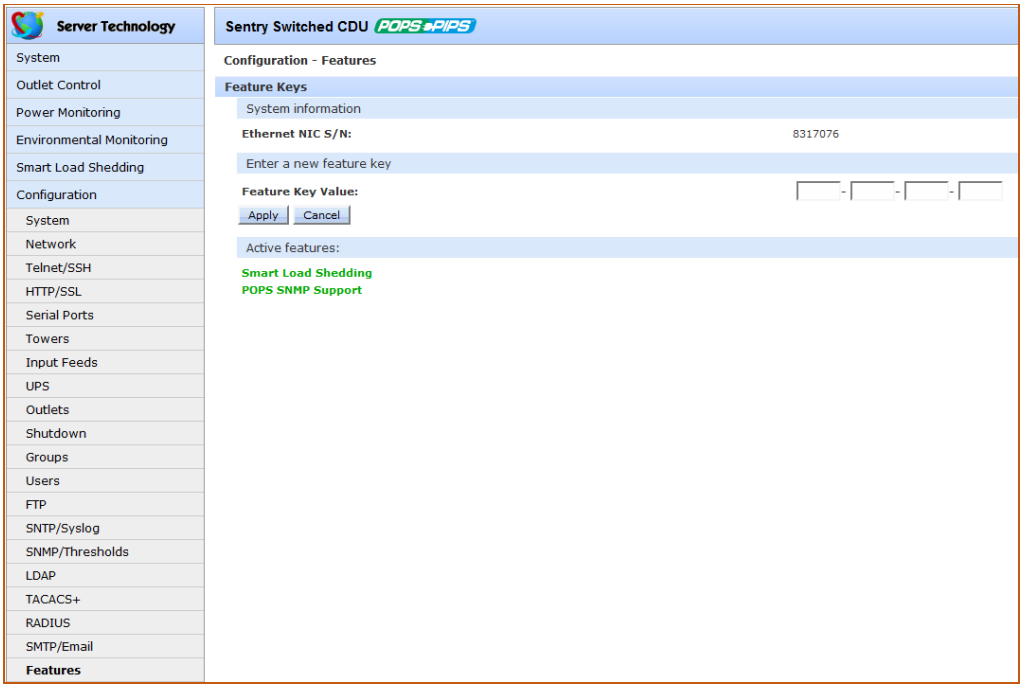
The configuration areas are outlined in the left-pane navigation bar in the following example, showing the System page selected.



Features

The Features option allows the administrative-level user to license-key-activate system features purchased separately from Server Technology. Activated features are displayed for viewing, such as Smart Load Shedding and POPS SNMP Support shown in the following example.

The Features page also displays the system's Ethernet NIC Serial Number.



To activate a feature:

In the Feature Key Value field, type the activation key provided by Server Technology, and click **Apply**.

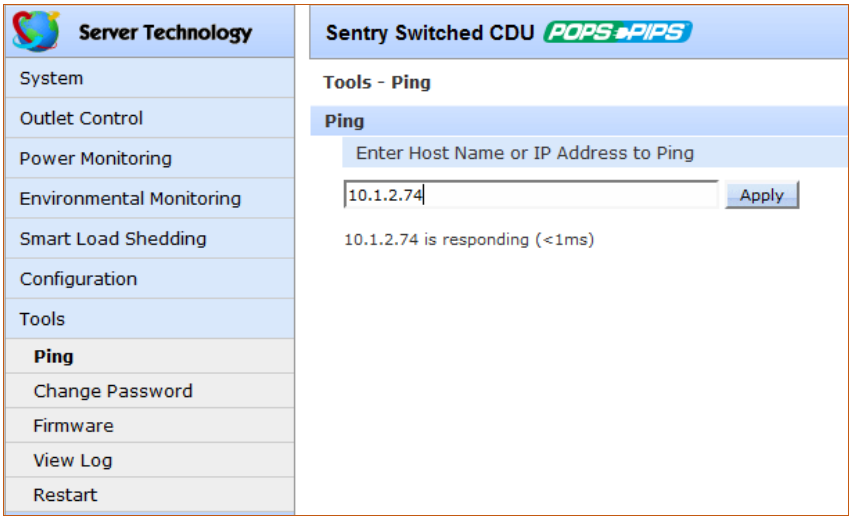
NOTE: A restart of the PDU is required after activating new features.

Tools

The Tools option in the navigation bar provides the administrative-level user with several utility functions, described as follows:

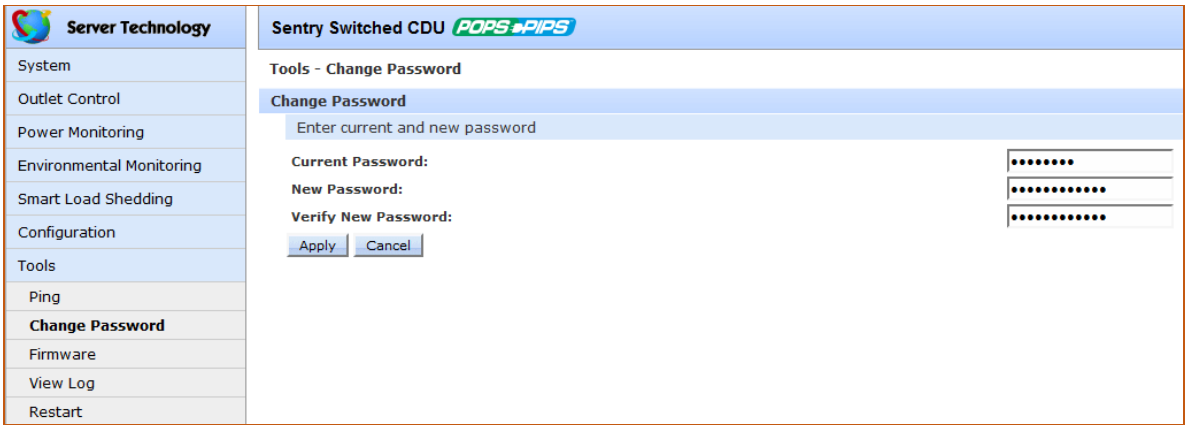
Ping

The Ping option allows you to enter a hostname (or IP address) to ping and then shows the device's response:



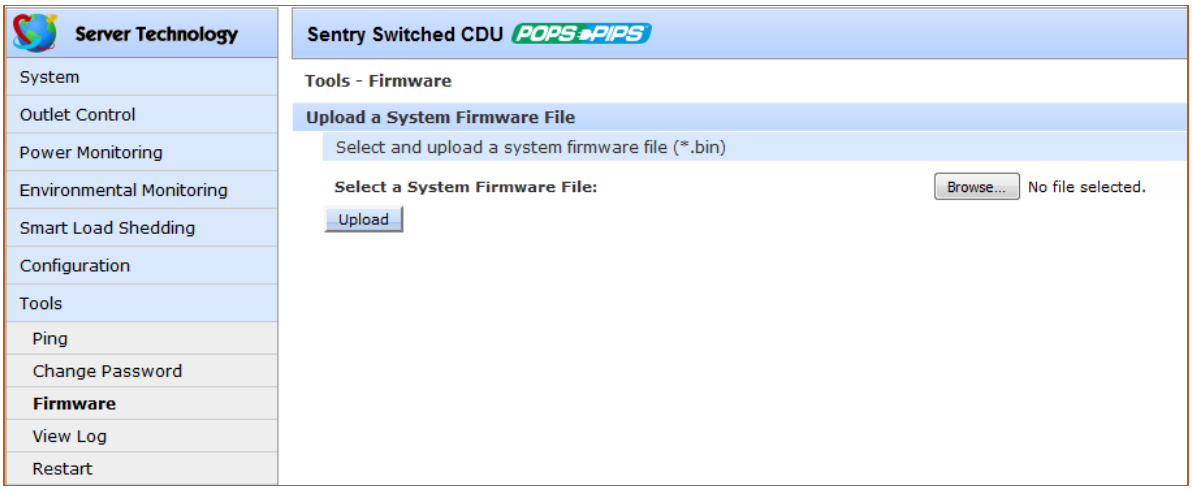
Change Password

This option provides the change and verification of a new system password:



Firmware

The Firmware option allows the uploading of a system firmware (.bin) file.

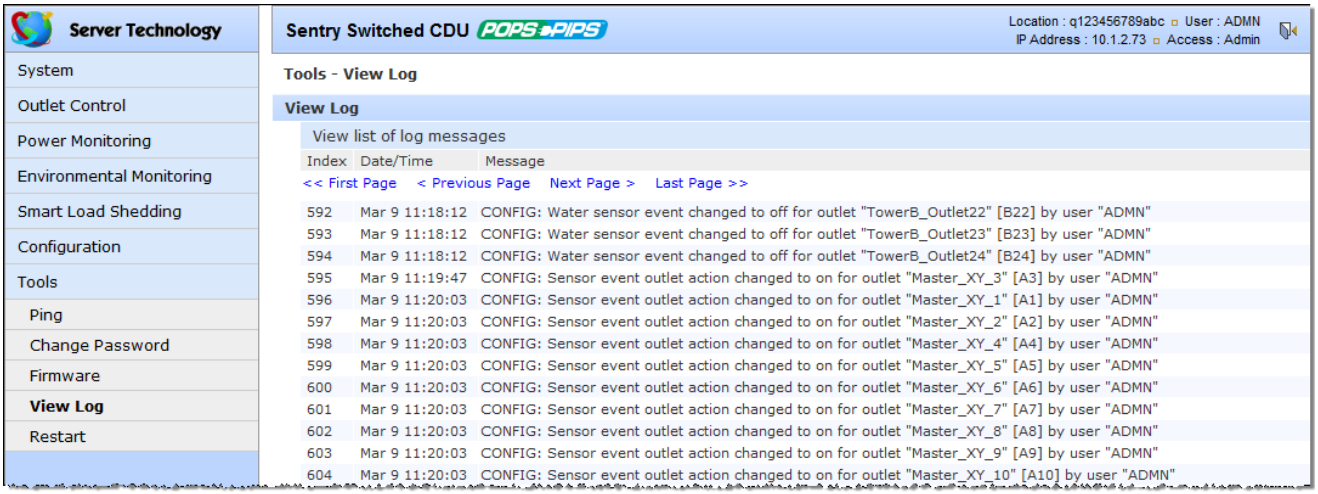


To locate the .bin firmware file, click **Browse**, select a file, and then click **Upload**.

A confirmation message will be displayed.

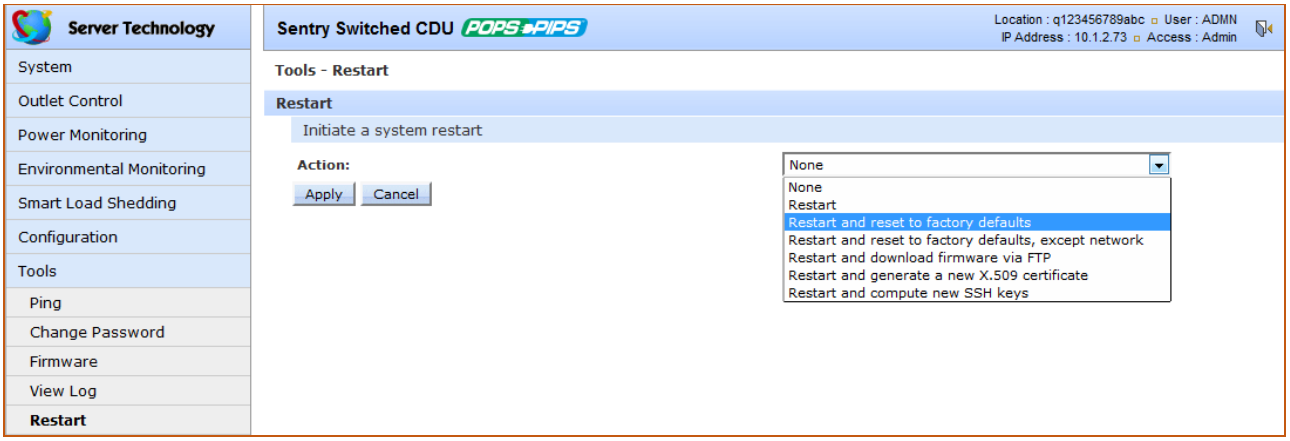
View Log

The View Log option displays system activity messages in detailed line entries:



Restart

Allows several reboot methods, including a warm boot.



Command Line Interface

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:
   ```
   Sentry Version x.xx
   Username:
   ```

   NOTE: Logging in by Telnet will automatically open a session. You will not need to press Enter.

2. At the Username: and Password: prompts, enter 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 username/password is admn/admn.

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

You can enter commands in any combination of uppercase and lowercase characters. All command characters must be exact and correct – there are no command abbreviations. Administrative access must be granted to use the administrative commands. The following tables briefly describe each command.

Operations Command Summary

Command	Description
UPSStat	Displays the status of the associated UPSs

Administrative Command Summary

Command	Description
Create UPS	Adds a UPS association
Remove UPS	Deletes a UPS association
Restart	Performs a warm boot
Set Event InfeedLoad Autorecover	Enables or disables outlet auto-recovery from high load events
Set Event InfeedLoad LoadHigh	Sets the Infeed Load trap high limit
Set Event Iload	Enables or disables infeed load (iload) events
Set Event Iload Loadhigh	Sets the high load values for an infeed (iload) event
Set Event Temp Autorecovery	Enables or disables outlet auto-recovery from high temperature events
Set Event Temp TempHigh	Sets a temperature/humidity sensor Temp trap high limit
Set Event UPSPower Autorecover	Enables or disables outlet auto-recovery from UPS “on battery” events
Set Event Sensor Humiddelta	Sets the humidity sensor recovery delta
Set Event Sensor Humidhigh	Sets the humidity sensor high-threshold limit
Set Event Sensor Humidrecovery	Sets the humidity sensor auto recovery
Set Event Sensor Tempdelta	Sets the temperature sensor recovery delta
Set Event Sensor Temphigh	Sets the temperature sensor high-threshold limit
Set Event Sensor Temprecovery	Sets the temperature sensor auto recovery
Set Event Sensor WSrecovery	Sets the water sensor auto recovery
Set Event UPS	Enables or disables UPS events
Set Event UPS Autorecovery	Enables or disables UPS auto-recovery from UPS “on battery” events
Set Event UPS Graceoff	Sets the minutes for the grace timer to shed UPS “on battery” events
Set Event UPS Graceon	Sets the minutes for the grace timer to auto-recovery UPS “on battery” events
Set Event UPS ManyUPS	Sets all UPS devices to be on-battery for the UPS event to be executed
Set Outlet Humidevent	Enables or disables humidity-sensor high-threshold events
Set Outlet Loadevent	Enables or disables load shedding on high load conditions

Set Outlet TempEvent	Enables or disables load shedding on high temperature conditions
Set Outlet UPS Event	Enables or disables load shedding on UPS “on battery” conditions
Set UPS AddInfeed	Add an infeed association to a UPS
Set UPS Commstr	Set the UPS community string
Set UPS DelInfeed	Deletes an infeed association from a UPS
Set UPS Host	Sets the UPS Host IP address or hostname
Set UPS OnBattery	Sets the UPS on-battery value.
Set UPS Port	Specifies the target port for a UPS
Set UPS OnUtility	Specifies the UPS on-utility value.
Set UPS Type	Sets the UPS type
Set UPS OIDSPoll	Sets the UPS status (s) poll OID
Set UPS OIDVPoll	Sets the UPS voltage (v) poll OID
Show Events	Displays Smart Load Shedding configuration information
Show Features	Displays activated special features
Show Loadshed	Displays Smart Load Shedding outlet configuration information
Show UPS	Displays UPS configuration information

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

Displaying UPS status:

The UPSStat command displays the status of one or more UPSs.

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 UPSs:

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

Example

The following command displays the UPS status:

```
Switched CDU: upsstat<Enter>
   UPS      UPS           UPS             UPS
   Index    Type          Power Status    Voltage
   1        Liebert       On Utility      119.9
   2        Powerware     On Battery      120.0
```

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 CDU: prompt, type **restart** and press **Enter**.

Administration Commands

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

UPS Administration

Creating a UPS record:

The Create UPS command creates a UPS record for use with Smart Load Shedding.

To create a UPS record:

At the Switched CDU: 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**.

Example

The following command creates a UPS record for a Toshiba UPS with the hostname 'DC1Toshiba1':

```
Switched CDU: create ups<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): 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 CDU: 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 CDU: 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>
```

Modifying the UPS type:

The Set UPS Type command is used to modify the type of UPS for each UPS record.

To modify a UPS record:

At the Switched CDU: prompt, type **set ups type** and press **Enter**.

At the prompt, type the index number for the UPS record to be modified and press **Enter**.

At the prompt, type the corresponding number from the list of the UPS types and press **Enter**.

Example

The following command modifies UPS type for the record at index number 2 to 'MGE':

```
Switched CDU: 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>
```

Modifying the UPS host address:

The Set UPS Host command is used to modify the IP address or hostname for each UPS record. Hostnames can be up to 60 characters in length.

To modify a UPS host address:

At the Switched CDU: prompt, type **set ups host** and press **Enter**.

At the prompt, type the index number for the UPS record to be modified and press **Enter**.

At the prompt, type IP address or hostname for the UPS and press **Enter**.

Example

The following command modifies UPS hostname for the record at index number 2 to 'DC1MGE1':

```
Switched CDU: 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. You can change this port number by using the Set UPS Port command.

To change the UPS SNMP port:

1. At the Switched CDU: prompt, type **set ups port** and press **Enter**.
2. At the prompt, type the index number for the UPS record to be modified and press **Enter**.
3. At the prompt, type the desired port number and press **Enter**.

Example

The following command modifies port for the UPS record at index number 1 to '162':

```
Switched CDU: 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 PDU sends data requests to the UPS using the default Get community string of "public". This string can be changed using the Set UPS Port command.

NOTE: The GET community string configured on the PDU **must** match the read-only community string configured on the UPS.

To modify a UPS record:

At the Switched CDU: prompt, type **set ups getcomm** and press **Enter**.

At the prompt, type the index number for the UPS record to be modified and press **Enter**.

At the prompt, type the Get community string for the UPS and press **Enter**.

Example

The following command modifies Get community string for the record at index number 2 to 'readonly':

```
Switched CDU: set ups getcomm<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. You can enable or disable this feature using the Set UPS VPoll command.

To enable/ disable UPS voltage polling:

At the Switched CDU: prompt, type **set ups vpoll** and press **Enter**.

At the prompt, enter the index number for the UPS record to be modified 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 CDU: 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 CDU: prompt, type **set ups addinfeed** and press **Enter**.

At the prompt, enter the index number for the UPS record to be modified 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 CDU: 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 CDU: prompt, type **set ups delinfeed** and press **Enter**.

At the prompt, enter the index number for the UPS record to be modified 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 CDU: 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 UPSs.

- 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 CDU: prompt, type **show ups** and press **Enter**.

Example

The following command displays UPS configuration information:

```
Switched CDU: 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
   More (Y/es N/o):
```

Outlet Administration

The following commands are for configuration of the triggers on which outlets will load-shed.

Enabling/disabling load shedding on high temperature condition:

The Set Outlet TempEvent command is used to enable/disable outlet load shedding triggered by high temperature sense by one of the temperature/humidity sensors.

NOTE: Temperature/humidity probes are an optional accessory and must be purchased separately.
For more information, please contact your Server Technology Sales Representative.

To enable/disable high-temperature load shedding:

At the Switched CDU: prompt, type **set outlet tempevent**, followed by the outlet ID, T/H sensor ID, and **on** or **off**. Press **Enter**.

Example

The following command enables load shedding for outlet .a1 upon a high temperature condition on temperature/humidity sensor .a2:

```
Switched CDU: set outlet tempevent .a1 .a2 on<Enter>
```

Enabling/disabling load shedding on high load condition:

The Set Outlet Load Event command is used to enable/disable outlet load shedding triggered by high load conditions.

To enable/disable high-load load shedding:

At the Switched CDU: prompt, type **set outlet loadevent**, followed by the outlet ID, and **on** or **off**. Press **Enter**.

Example

The following command enables load shedding for outlet .a2 upon a high load condition:

```
Switched CDU: set outlet loadevent .a2 on<Enter>
```

Enabling/disabling load shedding on UPS on-battery condition:

The Set Outlet UPS Event command is used to enable/disable outlet load shedding triggered by UPS On-Battery conditions.

To enable/disable UPS On-Battery load shedding:

At the Switched CDU: prompt, type **set outlet upsevent**, followed by the outlet ID, and **on** or **off**. Press **Enter**.

Example

The following command enables load shedding for outlet .a3 upon a UPS On-Battery condition:

```
Switched CDU: set outlet upsevent .a3 on<Enter>
```

Displaying outlet load shedding configuration:

The Show Loadshed command displays information about all outlet load-shed configurations.

- UPS Type and Host/IP address
- UPS SNMP port and community string
- SNMP Objects OID values and expected return values

To display outlet load shedding configuration information:

At the Switched CDU: prompt, type **show loadshed** and press **Enter**.

This example needs to be updated to show humidity load-shed configuration.

Example

The following command displays outlet load shedding configuration information:

```
Switched CDU: show loadshed<Enter>
   Outlet   Outlet                    Enabled Conditions
   ID       Name                      UPS     Load    TempA1  TempA2
   .A1      Master_1                  -       -       -       X
   .A2      Master_2                  -       X       -       -
   .A3      Master_3                  X       -       -       -
   .A4      Master_4                  -       -       -       -
   .A5      Master_5                  -       -       -       -
   .A6      Master_6                  -       -       -       -
   .A7      Master_7                  -       -       -       -
   .A8      Master_8                  -       -       -       -
```

Event Administration

Setting the Infeed Load limit:

The Set Event InfeedLoad Loadhigh command is used to set the upper load limits for an input feed.

NOTE: SNMP and Load shedding use the **same** infeed threshold value. The Set Event InfeedLoad Loadhigh command is equivalent to the SNMP command Set Trap Infeed Loadhigh.

To set the infeed load limit:

At the Switched CDU: prompt, type **set event infeedload loadhigh**, followed by the infeed, followed by a value from 0 to 255 (in amperes), and press **Enter**.

Example

The following command sets the infeed load limit for the first infeed on the first tower to 25 amperes, using the absolute name of the infeed:

```
Switched CDU: set event infeedload loadhigh .aa 25<Enter>
```

Enabling or Disabling Infeed Auto-recovery:

The Set Event InfeedLoad Autorecover command enables or disable auto-recovery of previously shed outlets when the infeed load returns to levels below the configured upper limit.

To enable or disable infeed auto-recovery:

At the Switched CDU: prompt, type **set event infeedload autorecover**, followed by **on** or **off**, and press **Enter**.

Example

The following command enables infeed load auto-recovery:

```
Switched CDU: set event infeedload autorecovery on<Enter>
```

Setting the Temperature sensor threshold limit:

The Set Event Temp TempHigh command is used to set the upper threshold limits for the Temperature sensor.

NOTE: SNMP and Load shedding utilize the same temperature high threshold value.
The Set Event Temp Temphigh command is equivalent to the SNMP command Set Trap THS Temphigh.

To set the Temperature threshold limits:

At the Switched CDU: prompt, type **set event temp temphigh**, followed by the sensor name, followed by a value from 0 to 127 (in degrees Celsius), and press **Enter**.

Example

The following command sets the second temperature high threshold limit to 95:

```
Switched CDU: set event temp temphigh .a2 95<Enter>
```

Enabling or Disabling Temperature Auto-recovery:

The Set Event Temp Autorecover command enables or disables auto-recovery of previously shed outlets when the temperature returns to levels below the configured upper limit.

To enable or disable temperature auto-recovery:

At the Switched CDU: prompt, type **set event infeedload autorecover**, followed by the sensor name, followed by **on** or **off,** and press **Enter**.

Example

The following command enables temperature auto-recovery for temperature/humidity sensor .A2:

```
Switched CDU: set event infeedload autorecovery .a2 on<Enter>
```

Enabling or Disabling UPS Auto-recovery:

The Set Event UPS Power command enables or disables auto-recovery of previously shed outlets when the UPS returns to an 'on utility' state.

To enable or disable UPS auto-recovery:

At the Switched CDU: prompt, type **set event upspower autorecover**, followed by **on** or **off**, and press **Enter**.

Example

The following command enables UPS auto-recovery:

```
Switched CDU: set event upspower autorecovery on<Enter>
```

Displaying load shedding event configuration:

The Show Events command displays information about all load-shed event configurations.

- Infeed ID, name, high load threshold, and auto-recovery configuration
- Temperature/Humidity sensor ID, name, high temperature threshold, and auto-recovery configuration.
- UPS auto-recovery configuration

To display UPS configuration information:

At the Switched CDU: prompt, type **show events** and press **Enter**.

Example

This example needs to be updated to show humidity load-shed configuration.

The following command displays UPS configuration information:

```
Switched CDU: show events<Enter>
   Input feed load event configuration:
      Input    Input                    High         Auto
      Feed ID  Feed Name                Thresh       Recover
      .AA      Master                    25 A         OFF
   More (Y/es N/o): y
   Temperature event configuration:
      Sensor   Sensor                   High         Auto
      ID       Name                    Thresh       Recover
      .A1      Temp_Humid_Sensor_A1    123 Deg. C   OFF
      .A2      Temp_Humid_Sensor_A2    95 Deg. C    ON
   UPS power event configuration:
      Auto Recover: ON
```

Feature Administration

Activating special features:

The Set Feature command is used to activate special features purchased from Server Technology.

To activate a special feature:

At the Switched CDU: prompt, type **set feature**, followed by the activation key provided by Server Technology, and press **Enter**.

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

Example

The following command activates the special feature with the activation key '1234-abcd-5678-efgh':

```
Switched CDU: set feature 1234-abcd-5678-efgh<Enter>
```

Displaying activated special features:

The Show Features command displays all activated special features for the device.

To display activated special features:

At the Switched CDU: prompt, type **show features** and press **Enter**.

Example

The following command displays all activated special features:

```
Switched CDU: show features<Enter>
   Activated Features:
      Smart Load Shedding
```

Performing a warm boot:

The Restart command performs a warm boot of the CDU.

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 CDU: prompt, type **restart** and press **Enter**.

Chapter 3: Appendices

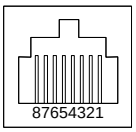
Appendix A: Technical Specifications

Data Connections

RS-232 port

Cabinet Distribution Units are equipped standard with an RJ45 DTE RS-232c serial port. This connector can 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.

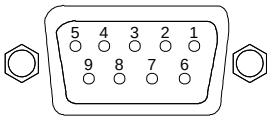
Pin	DTE Signal Name		Input/Output
1	Request to Send	RTS	Output
2	Data Terminal Ready	DTR	Output
3	Transmit Data	TD	Output
4	Signal Ground		
5	Signal Ground		
6	Receive Data	RD	Input
7	Data Set Ready	DSR	Input
8	Clear to Send	CTS	Input



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 pinouts below reflect use of the adapter with the provided RJ45 crossover cable.

Pin	DCE Signal Name		Input/Output
1			
2	Receive Data	RD	Output
3	Transmit Data	TD	Input
4	Data Terminal Ready	DTR	Input
5	Signal Ground		
6	Data Set Ready	DSR	Output
7	Request to Send	RTS	Input
8	Clear to Send	CTS	Output



Appendix B: Product Support Information

Warranty

For Server Technology product warranty information, visit our website: www.servertech.com

Technical Support

Experience Server Technology's FREE Technical Support

Server Technology understands that there are often questions when installing and/or using a new product. Free Technical Support is provided from 8 a.m. to 5 p.m. PST, Monday through Friday. After-hours service is provided to ensure your requests are handled quickly no matter what time zone or country you are located in.

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Return Merchandise Authorization

If you have a unit that is not functioning properly and is in need of technical assistance or repair, please review Server Technology's **Return Merchandise Authorization** process on our website at www.servertech.com

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