Server Technology
A brand of legrand

stay powered. be supported. get ahead.

PRO1 Sentry Switched DC PDU

User Guide

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www.servertech.com

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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About Your User Guide

This **PRO1 Sentry Switched DC PDU** user guide was designed for data center staff and administrators who monitor power, control outlet actions, and direct equipment operations in the data center network using Server Technology's DC PDU product group.

Your user guide is a detailed resource for the PDU and its firmware user interfaces, providing:

- Interface pages, descriptions, usage, step-by-step instructions, and screen examples to assist you with using the firmware's **Web Interface (GUI)**.
- Interface commands, description, syntax, usage, parameters, variables, as well as providing command examples and results to assist you with using the firmware's **Command Line Interface (CLI)**.

More Resources

Visit www.servertech.com for a wide variety of information about the **PRO1 Sentry Switched DC PDU** product you have. Product support information from our power strategy experts, brochures, detailed specifications, and many more resources – such as the innovate **Build Your Own PDU** and **Product Selector** – are available on the Server Technology website to assist you with product knowledge, best product usage, and an easy ordering process.

Contact 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. Pacific Time, Monday through Friday.

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Chapter 1: Introducing the PRO1 Sentry Switched DC PDU

Server Technology's PRO1 Sentry Switched DC PDU provides industry-standard control of cabinet equipment at remote locations, including colocation facilities and network operations centers.

The PRO1 Sentry Switched DC PDU gives the ability to reboot locked-up remote servers around the clock. Features include individual outlet current outputs, measurements, and automated alerts for a number of low and high current needs for the specific environmental conditions.

Fused or Breaker Power Output Protection is a feature of the PDU, meaning each low and high current output is individually protected by its own over-current protection device, available in a variety of current capacities. Low current GMT fuses have a visual indicator that show when the fuses are blown.

Because the fuses are rated as disconnect switches, they can be hot-swapped without removing power to input-feeds. In addition, optional temperature and humidity probes with 10-ft. cords allow for multiple sensors in different locations for complete environmental monitoring

DC Products vs. AC Products

The following items list how Server Technology's DC PDUs differ from the AC PDUs:

- DC firmware is specific to the -48V DC product line.
- All units are Switched and have a minimum of two inputs.
- Input and output connections are terminal type, not common inlets/outlets.
- Each output terminal is individually protected by a fuse or circuit breaker rated for hot disconnect.
- Relays are normally-closed instead of normally open; there is no power-up sequencing.
- True input and output "On-Sense".
- Measures only current (amps) at each output (no input/aggregate measurements, no voltage measurement).
- Direct current (DC) is simpler than alternating current (AC); only need to know Watt's Law:

  Watts = Volts x Amps
  Volts = Watts / Amps
  Amps = Watts / Volts

Advantages of the PRO1 Sentry Switched DC PDU

The PRO1-based DC product line is based on Server Technology's PRO1 PDU platform and firmware, which offers:

- Faster processor and more memory
- Hot swap network card
- Network card swap with no re-programming (PCM)
- Features/functions can be added as needed
- Multi-linking (up to 4 linked units, 1 master unit and 3 link units)
- Power from link unit keeps network up if power from master unit goes down
- Sentry4-MIB allows additional alarm warning and threshold levels

Key Features

Several notable features of Server Technology's PRO1 Sentry Switched DC PDUs include:

	**Output Control**	Cycle power to individual outputs or groups of outputs to reboot servers or to power off unused terminals.
	**Output Current Monitoring**	Network monitoring provides access to current draw at each output and alerts when high usage risks a tripped circuit.
	**Disconnect Rated Circuit Protection**	Each output is protected by a fuse or circuit breaker and is rated for hot disconnect.
	**Temperature/Humidity Monitoring**	Master and Link units (select products) each support two external 10-ft (3m) T/H probes. Receive SNMP-based alerts and email notifications.
	**Network Monitoring**	Gain access to valuable data through connections, including HTTP(S), SSH, Telnet, SNMP, (S)FTP, SMPT, Syslog, LDAP(S), RS-232 serial, and more.
	**Linkable Expansion**	Connect an expansion rack PDU to a master rack PDU for power monitoring of separate power circuits from a single IP address.

Additional Features of DC Products:

- TCP/IP Control to configure/manage and remotely Power On, Power Off, or Reboot attached devices via:
- Web GUI and CLI access via network
- Out-of-Band access to CLI via serial/console port
- Current (amps) is measured at each individual output
- Multiple User Simultaneous Access
- Firmware flash-upgrade available by various methods
- Logging via internal log, Email/SMTP, and Syslog
- LDAP[S]/Active Directory, RADIUS, and TACACS+ Authentication and Authorization support
- Each model supports two (2) combination temperature & relative humidity environmental sensors Part numbers EMTH-2-10 (10 ft) and EMTH-2-20 (20 ft)
- Supports optional Environmental Monitor Control Unit (EMCU-1-1C)
- Supports StartUp Stick for configuration of initial network settings

- Unique Expansion Capability:

  One master PRO1 Sentry Switched DC PDU can be linked to up to three DC link units

  - Accommodates redundant setup with no single-point of failure
  - More than one link unit requires multi-link dongle (Part number KIT-PRO2LINK-01D)
  - Logical grouping of any outputs in the system (master and link units)
- Nominal operating range for voltage is -40V to -60V
- IMPORTANT: Requires a negative (-) DC system
- Server Technology JSON API Web Service (JAWS)
- Server Technology INI Configuration (STC) file format
- SNMP v2c and v3; same Sentry4.mib and OID Tree as with PRO Series AC products
- Most models rated for 0°C to 50°C operation
- Network Equipment-Building System (NEBS) Certification (certain models)

NEBS Certified

Chapter 2: The PRO1 Sentry Switched DC PDU Models

This chapter shows unit drawings, hardware specifications, terminal stud spacing diagrams, and fuse/circuit breaker information.

48DCWC-16-2X100-A0

- 2U height

48DCWC-16-2X100-A0 (master)

48DCWC-16-2X100-A0 (link)

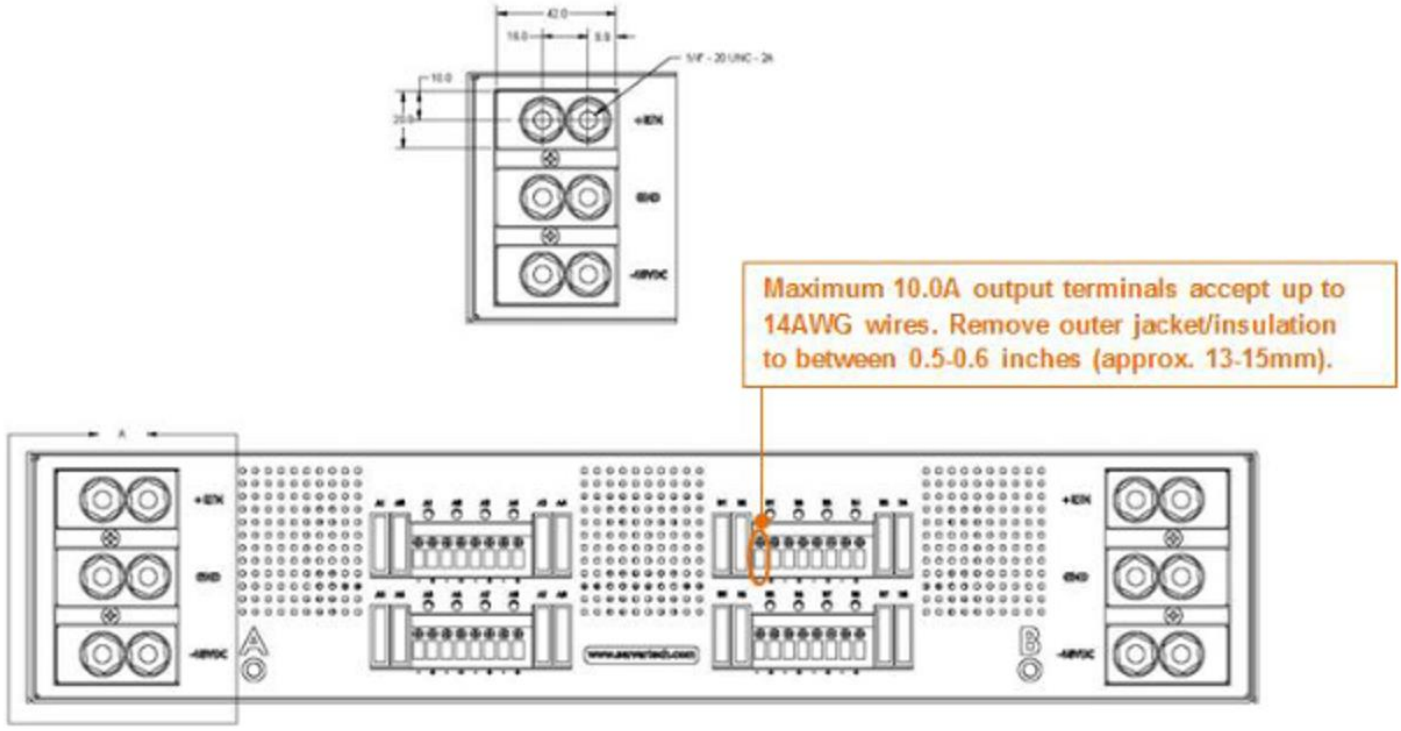
- **Power Inputs**
  Qty (2) 100A power inputs, 4.8 kW each @ -48V
- **Power Outputs**
  Qty (16) 10A max outputs protected by GMT fuses
- Includes quantity (16) 10A GMT fuses
- Includes quantity (16) GMT-X fuse covers

Fuses – Bussmann GMT

- Fast Acting Indicating Fuse
- Stocked fuse values (amps): 3/4, 1.0, 1.5, 2, 3, 5, 7.5, 10
- GMT-X fuse covers serve as install/removal tool
- Part #FUSE-GMT-*xxx*A/G (example: FUSE-GMT-7.5A/G)

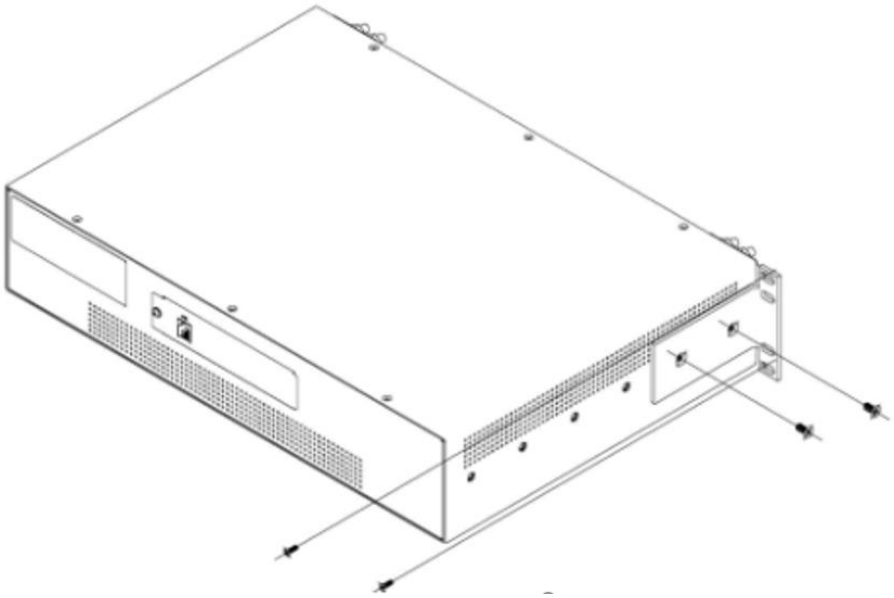
Terminal Stud Spacing

The 48DCWC-16-2X100-A0 terminal stud spacing:



Mounting Bracket

The 48DCWC-16-2X100-A0 mounting bracket:



48DCWC-04-2X100-D0NB

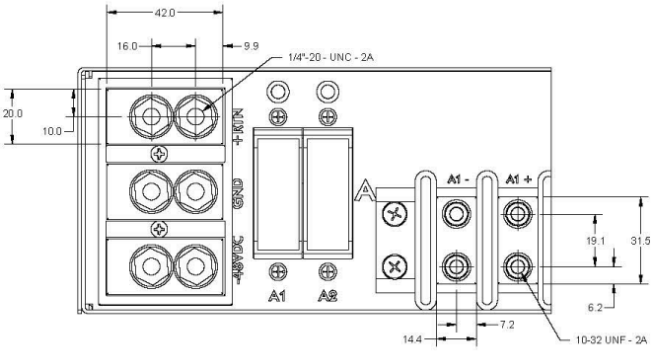
48DCWC-04-2X100-D0NB (master)

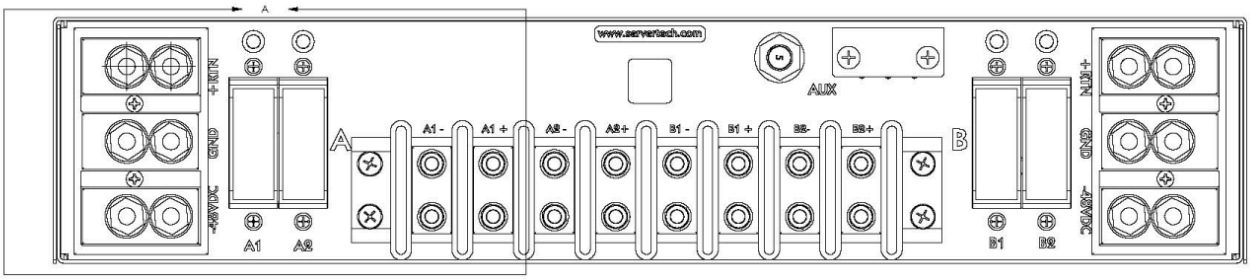
48DCXC-04-2X100-D0NB (link)

- **Power Inputs**
  Qty (2) 100A power inputs, 4.8 kW each @ -48V
- **Power Outputs**
  - Qty (4) 70A max outputs protected by TPC fuses
  - Qty (1) non-switched/non-measured auxiliary output protected by a 5A circuit breaker
- Quantity (4) TPC fuses supplied at no charge, 75A maximum.
- NEBS certified

Terminal Stud Spacing

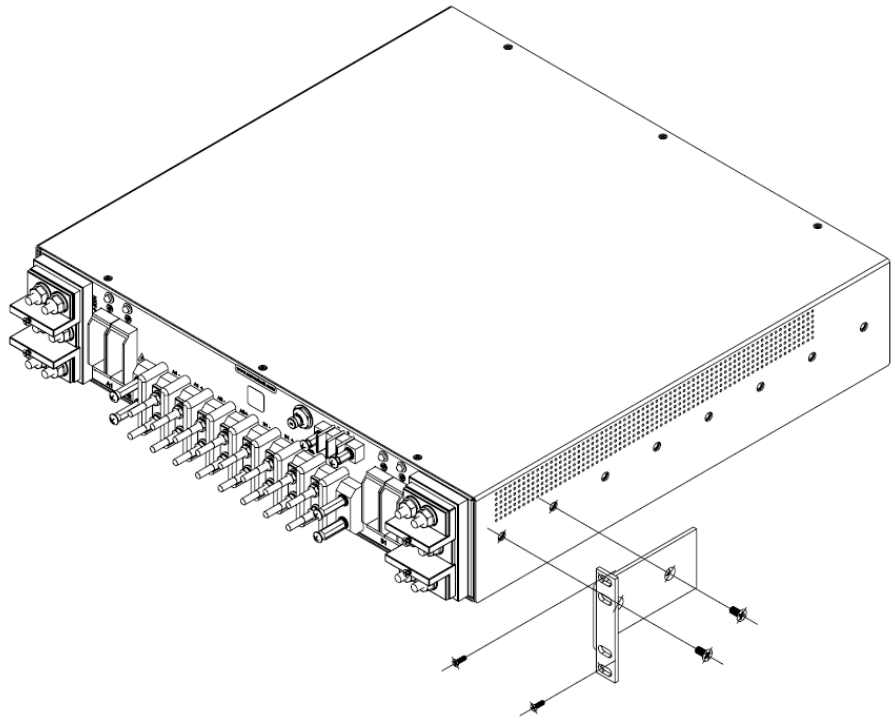
The 48DCWC-04-2X100-D0NB terminal stud spacing:





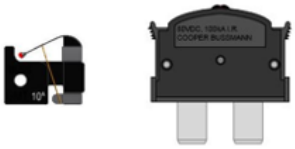
Mounting Bracket

The 48DCWC-04-2X100-D0NB mounting bracket:



48DCWC-12-2X100-A1NB

- 2U height



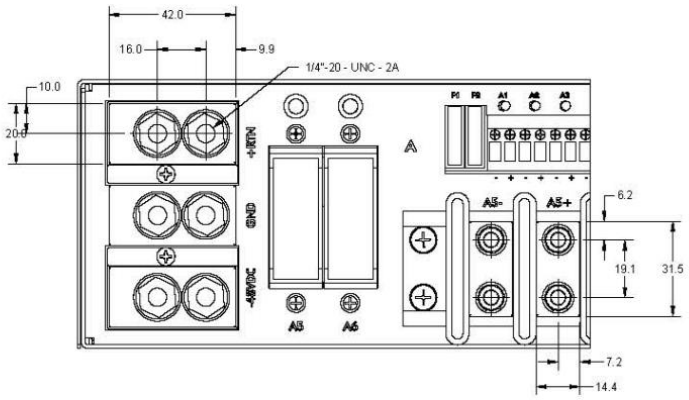
48DCWC-12-2X100-A1NB (master)

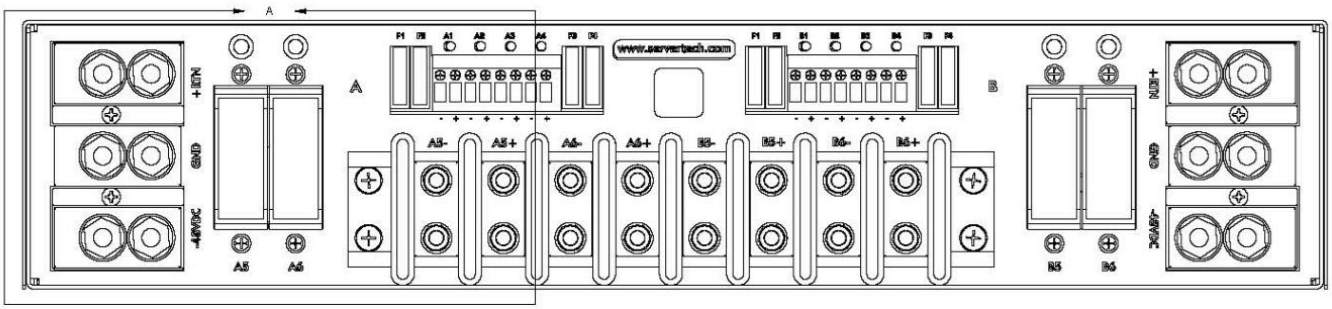
48DCXC-12-2X100-A1NB (link)

- **Power Inputs**
  Qty (2) 100A power inputs, 4.8 kW each @ -48V
- **Power Outputs**
  - Qty (8) 10A max outputs protected by GMT fuses
  - Qty (4) 70A max outputs protected by TPC fuses
- Includes quantity eight (8) 10A GMT fuses & (8) GMT-X
- Quantity (4) TPC fuses supplied at no charge, 75A maximum.
- NEBS certified

Terminal Stud Spacing

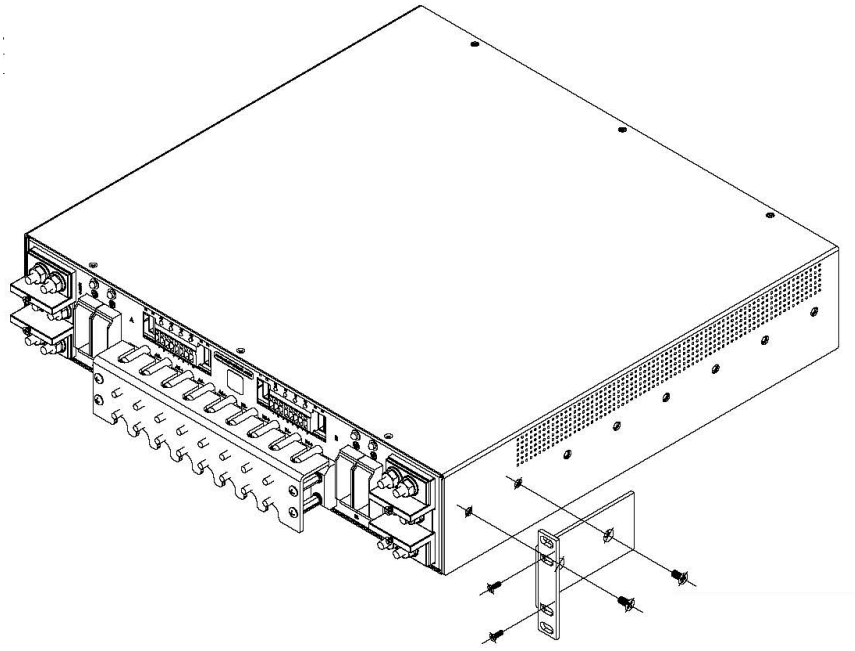
The 48DCWC-12-2X100-A1NB terminal stud spacing:





Mounting Bracket

The 48DCWC-12-2X100-A1NB mounting bracket:



48DCWC-08-2X100-B0NB

- 2U height

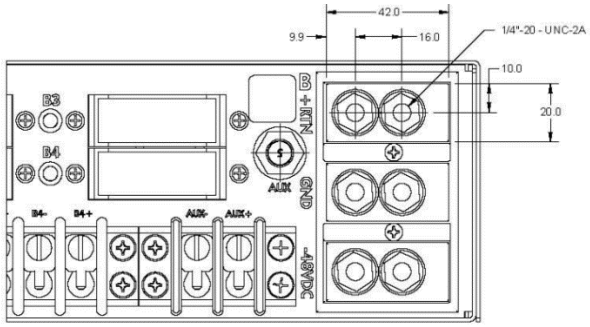
48DCWC-08-2X100-B0NB (master)

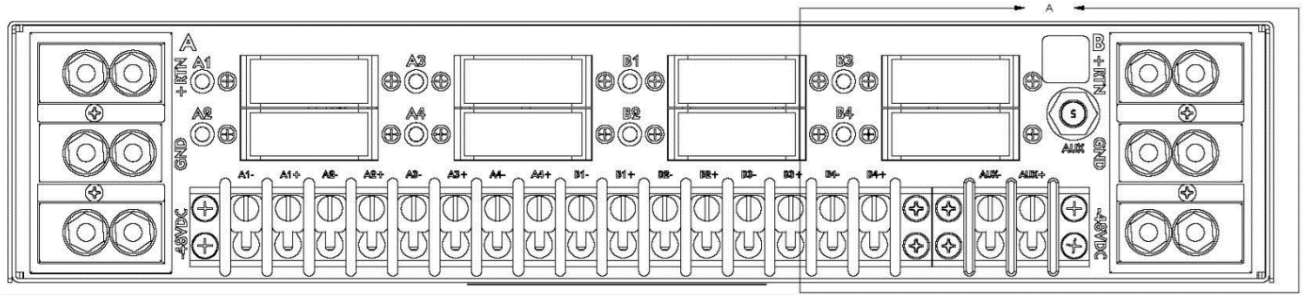
48DCXC-08-2X100-B0NB (link)

- **Power Inputs**
  Qty (2) 100A power inputs, 4.8 kW each @ -48V
- **Power Outputs**
  - Qty (8) 20A max outputs protected by TPC fuses
  - Qty (1) non-switched/non-measured auxiliary output protected by a 5A circuit breaker
- Quantity (8) TPC fuses supplied at no charge, 25A maximum.
- NEBS Certified

Terminal Stud Spacing

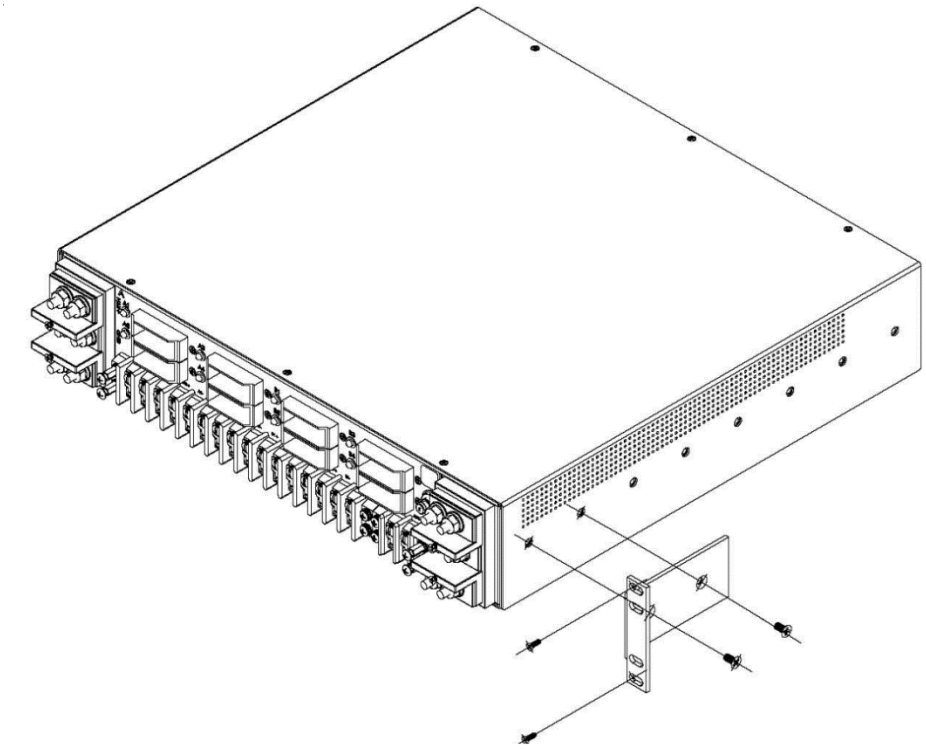
The 48DCWC-08-2X100-B0NB terminal stud spacing:





Mounting Bracket

The 48DCWC-08-2X100-B0NB mounting bracket:



48DCWC-04-4X070-D0NB

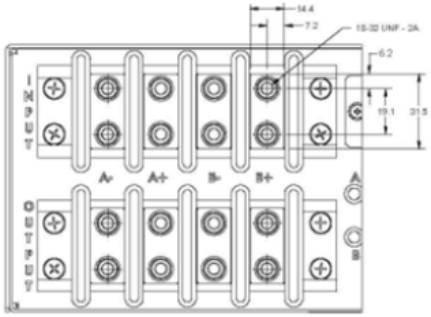
- 2.5U height
- 5U for pair

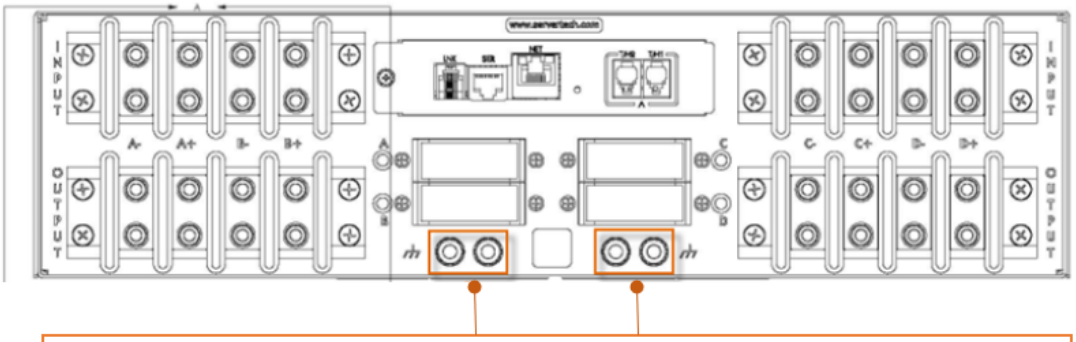
48DCWC-04-4X070-D0NB (master)
48DCXC-04-4X070-D0NB (link)

- **Power Inputs**
  Qty (4) 70A power inputs, 3.36 kW each @ -48V
- **Power Outputs**
  Qty (4) 70A max outputs protected by TPC fuses
- Does not distribute power; 1-in 1-out (x4) in-line remote power manager, 70A each channel.
- Quantity (4) TPC fuses supplied at no charge, 75A maximum.
- NEBS Certified

Terminal Stud Spacing

The 48DCWC-04-4X070-D0NB terminal stud spacing:

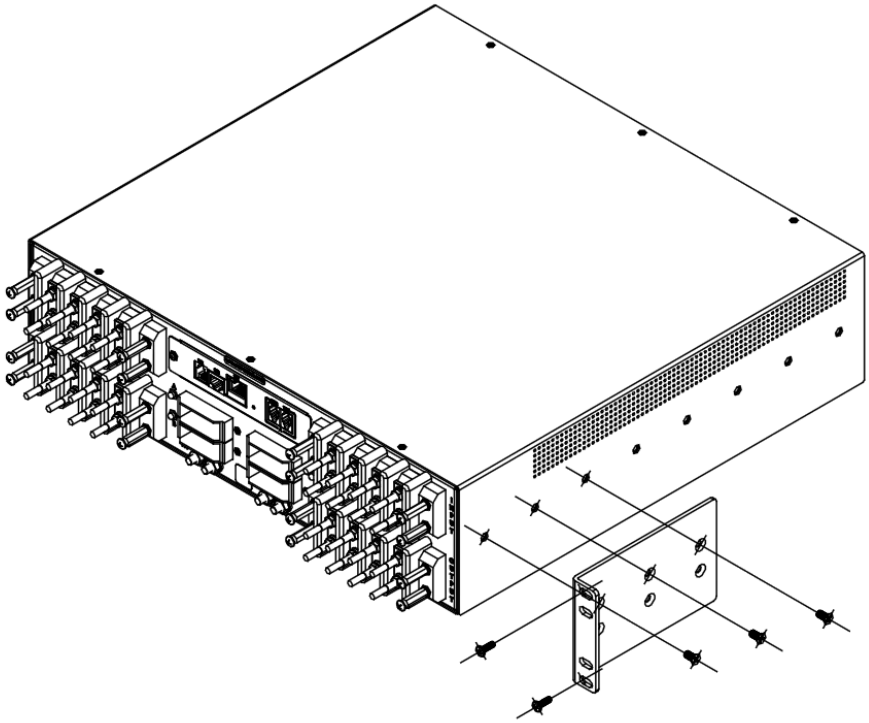




Highlighted are ground lug studs that are unique to the (master) 48DCWC-04-4X070-D0NB and (link) 48DCXC-04-4X070-D0NB units. The studs are Metric M6 standard pitch, and the studs are spaced by 5/8ths inch (0.625 inches; 15.875mm). The torque spec is 14-inch pounds.

Mounting Bracket

The 48DCWC-04-4X070-D0NB mounting bracket:



48DCWC-04-4X125-E0NB

- 2.5U height
- 5U for master/expansion pair

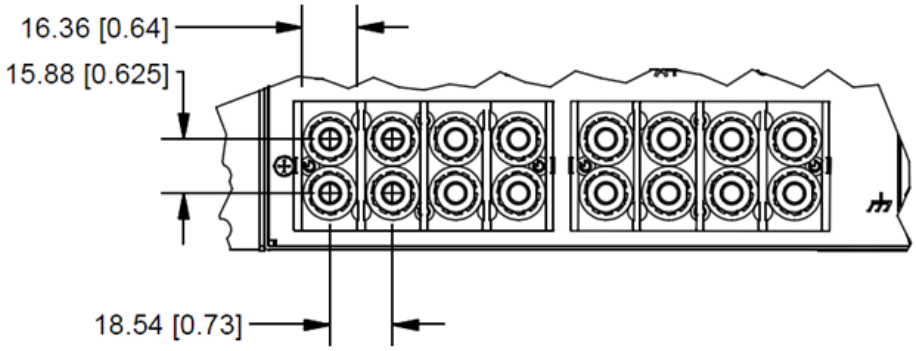
48DCWC-04-4X125-E0NB (master)

48DCXC-04-4X125-E0NB (link)

- **Power Inputs**
  Qty (4) 125A power inputs, 6.0 kW each @ -48V
- **Power Outputs**
  Qty (4) 125A max outputs protected by TPC fuses
- Does not distribute power; 1-in 1-out (x4) in-line remote power manager, 125A each channel
- Quantity (4) TPC fuses supplied at no charge, 125A maximum.
- NEBS Certified

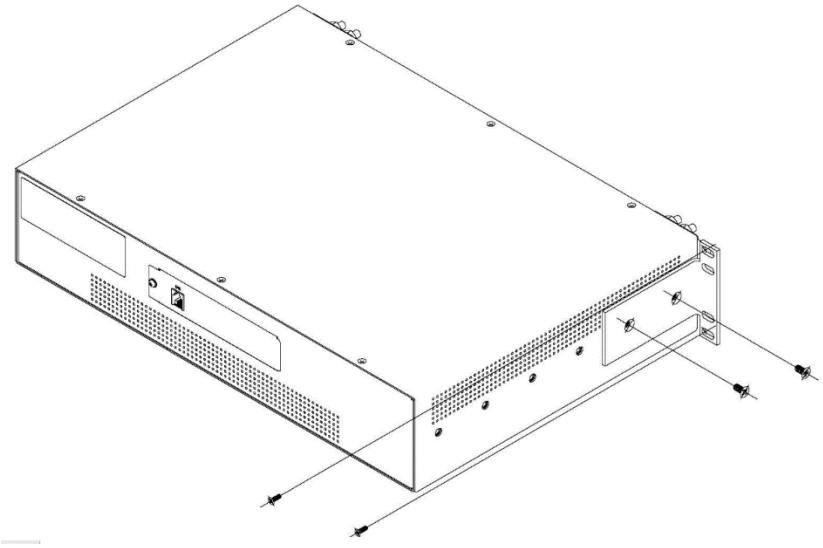
Terminal Stud Spacing

The 48DCWC-04-4X125-E0NB terminal stud spacing:



Mounting Bracket

The 48DCWC-04-4X125-E0NB mounting bracket:



48DCWC-10-2X300-E0NB

- 3U height

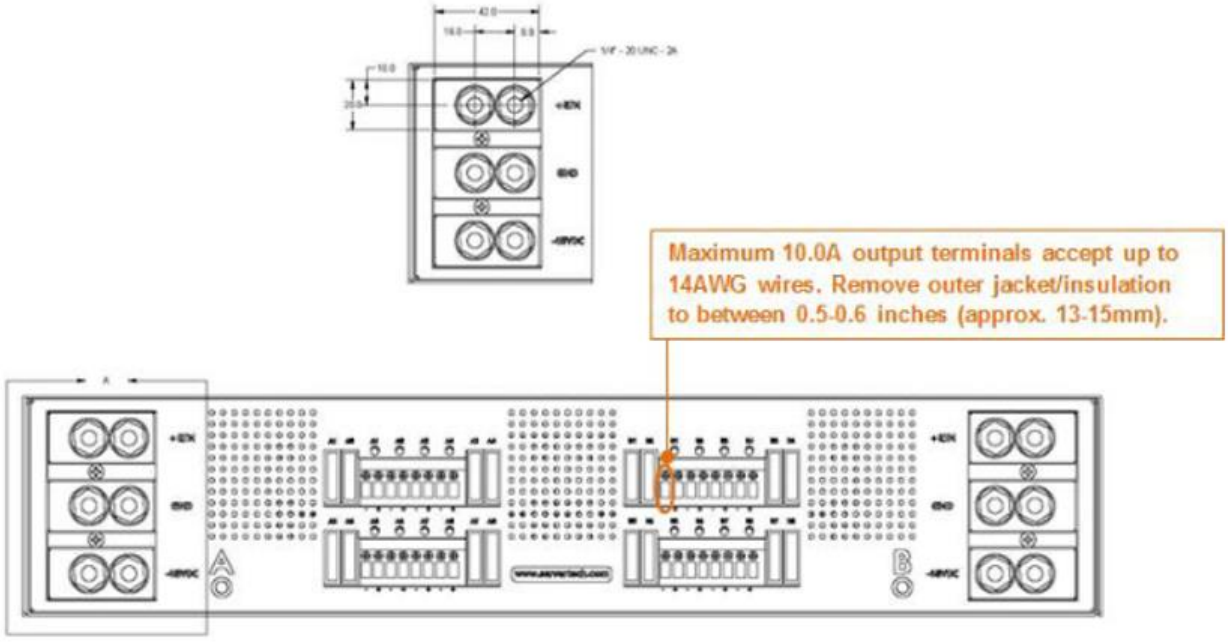
48DCWC-10-2X300-E0NB (master)

48DCXC-10-2X300-E0NB (link)

- **Power Inputs**
  Qty (2) 300A power inputs, 14.4 kW each @ -48V
- **Power Outputs**
  Qty (10) 125A max outputs protected by TPC fuses *or* bullet-style Circuit Breakers
- Each unit **requires** addition of either a Circuit Breaker Install Kit *or* a Fuse Install Kit:
  - `KIT-0063` (Circuit Breaker Mounting Kit)
  - `KIT-0064` (Fuse Mounting Kit)
- Circuit Breakers or Fuses all sold separately
- NEBS certified

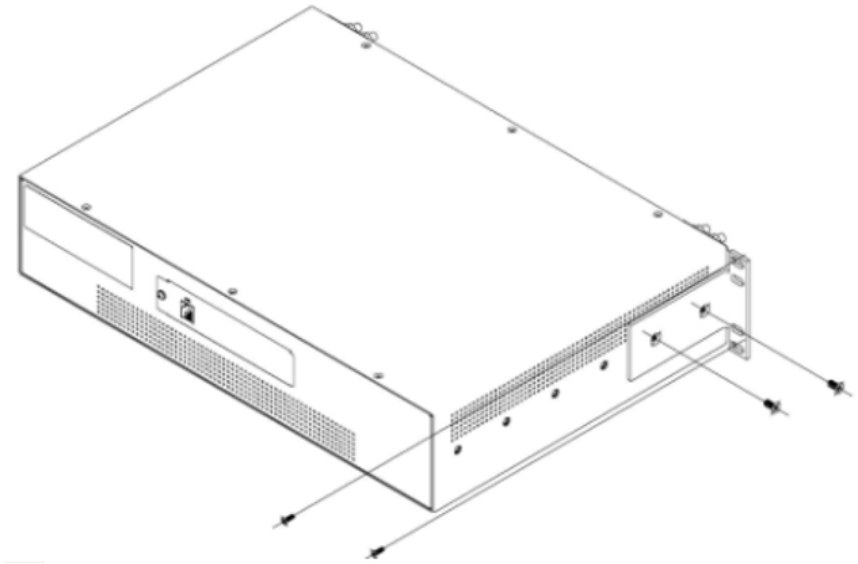
Terminal Stud Spacing

The 48DCWC-10-2X300-E0NB terminal stud spacing:



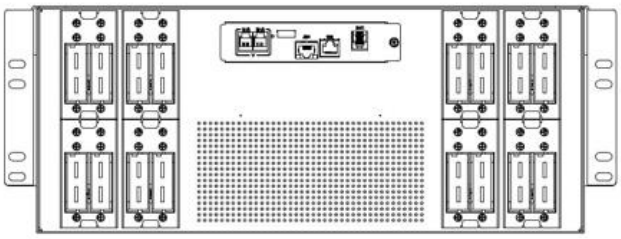
Mounting Bracket

The 48DCWC-10-2X300-E0NB mounting bracket:



48DCWC-16-2X600-E0

- 4U height



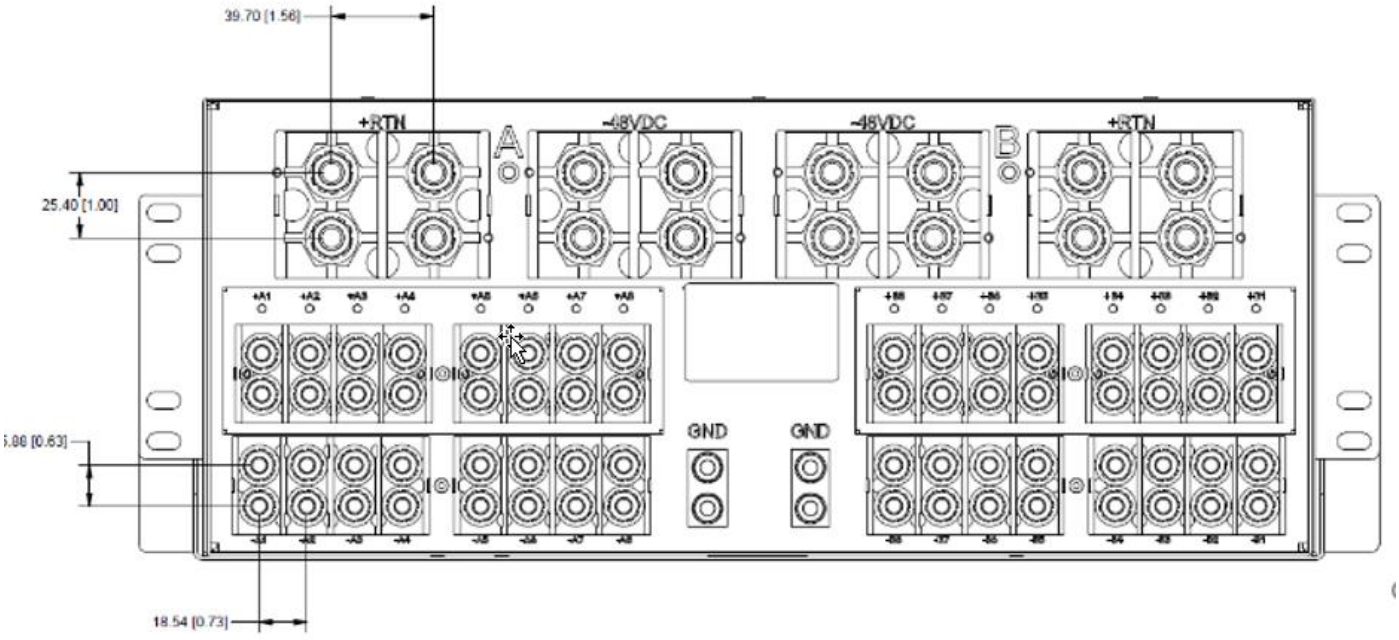
48DCWC-16-2X600-E0 (master)

48DCXC-16-2X600-E0 (link)

- **Power Inputs**
  Qty (2) 600A power inputs, 28.8 kW each @ -48V
- **Power Outputs**
  Qty 16 x 125A outputs protected by TPC fuses *or* bullet-style Circuit Breakers
- Each unit **requires** addition of either a Circuit Breaker Install Kit *or* a Fuse Install Kit:
  - KIT-0097 (Breaker Mounting Kit)
  - KIT-0094 (Fuse Mounting Kit)
- Circuit Breakers or Fuses all sold separately

Terminal Stud Spacing

The 48DCWC-10-2X600-E0 terminal stud spacing:



Terminal Block Tightening Torques

Per the manufacturer's data sheet specifications, use the following tightening torques for the terminal block on the 48DCWC-10-2X600-E0 unit.

Terminal Block Tightening Torques	
If the terminal stud size is …	**the recommended tightening torque is …**
3/8" - 16	192 in.-lb. (or 16 ft.-lbs.)
¼" - 20	50 in. -lbs.

IMPORTANT: Input Terminal Requirements

For 600A operation, connections to all input terminal block poles with properly sized cable and double hole terminal lugs are required. Otherwise, serious damage to the PDU and/or terminal block may occur.

Fuses – Bussmann TPC

Overview of the Bussmann TPC fuses for the PRO1 Sentry Switched DC PDU:

- DC Specific
- High interrupt rating (100,000 Amps)
- Time delay/current limiting
- Stocked fuse values (amps): 10, 15, 20, 25, 30, 40, 50, 60, 75, 100, 125

- Part #FUSE-TPC-*xxx*
  (example: FUSE-TPC-75)

Qty 10 = KIT-0064

Qty 8 = KIT-0094

Notes:

- Other GMT fuse values are available in the marketplace, never to exceed 10A for use with any Server Technology Switched -48V DC product.
- Other TPC fuse values are available in the marketplace, never to exceed 25A, 75A or 125A (depending on model of Server Technology Switched -48V DC product).

Fuses – Bussmann GMT

Overview of the Bussmann GMT fuses for the PRO1 Sentry Switched DC PDU:

About the Bussmann GMT Fuses:

- Fast Acting Indicating Fuse
- All models that accept GMT fuses include 10A fuses (part #FUSE-GMT-10A/G)
- All model that accept GMT fuse include fuse covers (part #GMT-X) that also act as a fuse removal and insert tool.
- Optional, sold separately, fuse values available from Server Technology (amps): 3/4, 1.0, 1.5, 2, 3, 5, 7.5, 10.

  Part numbers:

  FUSE-GMT-3/4/G

  FUSE-GMT-1.0A/G

  FUSE-GMT-1.5A/G

  FUSE-GMT-2A/G

  FUSE-GMT-3A/G

  FUSE-GMT-5A/G

  FUSE-GMT-7.5A/G

Circuit Breakers

Overview of circuit breakers for the PRO1 Sentry Switched DC PDU:

Available on models:

- 48DCW[X]C-10-2X300-E0NB using KIT-0063
- 48DCW[X]C-16-2X600-E0 using KIT-0097

Qty 10 = KIT-0063

Stocked values (amps):

- 20, 30, 50, 60, 70, 80, 100
- Part #CB-0005-*xxx*G (example: CB-0005-060G)

Qty 8 = KIT-0097

Note: Circuit breaker options have significantly longer lead times versus TPC fuses.

Current Measurement Specifications

Overview of current measurement specifications for the PRO1 Sentry Switched DC PDU:

48DCWC-16-2X100-A0 / 48DCXC-16-2X100-A0:
10A Outputs: • Minimum current required: 0.10 • Maximum current measured: 10.5 • Displayed resolution: Hundredths (0.01)

48DCWC-12-2X100-A1NB / 48DCXC-12-2X100-A1NB:
10A Outputs: • Minimum current required: 0.10 • Maximum current measured: 10.5 • Displayed resolution: Hundredths (0.01)
70A Outputs: • Minimum current required: 0.70 • Maximum current measured: 70.5 • Displayed resolution: Tenths (0.1)

48DCWC-08-2X100-B0NB / 48DCXC-08-2X100-B0NB:
20A Outputs: • Minimum current required: 0.20 • Maximum current measured: 20.5 • Displayed resolution: Hundredths (0.01)

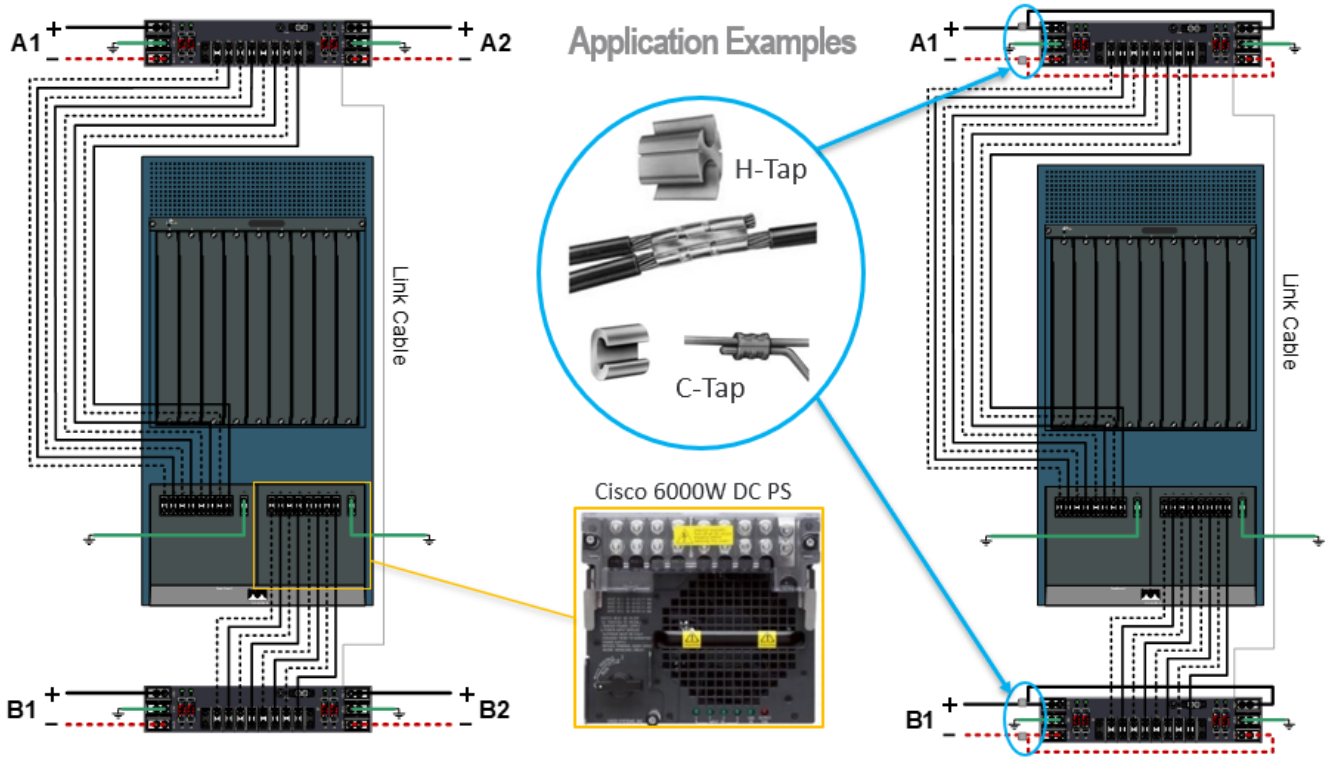
48DCWC-04-2X100-DONB / 48DCXC-04-2X100-DONB:
48DCWC-04-4X070-D0NB / 48DCXC-04-4X070-D0NB:
70A Outputs: • Minimum current required: 0.70 • Maximum current measured: 70.5 • Displayed resolution: Tenths (0.1)

48DCWC-04-4X125-E0NB / 48DCXC-04-4X125-E0NB:
48DCWC-10-2X300-E0NB / 48DCXC-10-2X300-E0NB:
48DCWC-16-2X600-E0 / 48DCXC-16-2X600-E0:
125A Outputs: • Minimum current required: 1.25 • Maximum current measured: 125.5 • Displayed resolution: Tenths (0.1)

Accuracy in all cases is ±5.0%. All values are in Amps.

Application Examples

Two examples of the PRO1 Sentry Switched DC PDU in a data center application:



Left: Four (4) -48V DC feeds from two (A and B) upstream sources powering one Cisco 7609-S with dual-6000W DC power supplies.

Right: Two (2) -48V DC feeds from two (A and B) upstream sources powering one Cisco 7609-S with dual-6000W DC power supplies.

Torque Specifications

The torque specifications for the PRO1 Sentry Switched DC PDU products are listed below.

Inputs

70A Input Terminal Blocks, 10-32 Studs

- Products: 48DCWC-04-4X070-DONB and 48DCXC-04-4X070-DONB
- Torque: 14 inch-pounds (1.6 N-m)

100A Input Terminal Blocks, ¼" Studs

- Products: 48DCWC-*xx*-2X100-A0 and 48DCXC-*xx*-2X100-A0
- Torque: 40 inch-pounds (4.5 N-m)

125A Input Terminal Blocks, ¼"Studs

- Products: 48DCWC-04-4X125-E0NB and 48DCXC-04-4X125-E0NB
- Torque: 50 inch-pounds (5.6 N-m)

300A Input Terminal Blocks, 3/8" Studs

- Products: 48DCWC-10-2X300-E0NB and 48DCXC-10-2X300-E0NB
- Torque: 192 inch-pounds (21.7)

600A Input Terminal Blocks, 3/8" Studs

- Products: 48DCWC-16-2X600-E0 and 48DCXC-16-2X600-E0
- Torque: 192 inch-pounds (21.7 N-m)

Outputs

50A and 70A Output Terminal Blocks, 10-32 Studs

- Products: PDU400-0-2; PDU400-0-3; all part numbers starting 4850, 4870, 4805/35; all part numbers starting 48DCWC-04; all part numbers starting 48DCXC-04; 48DCWC-12-2X100-A1NB; 48DCXC-12-2X100-A1NB
- Torque: 14 inch-pounds

125A Output Terminal Blocks, ¼" Studs

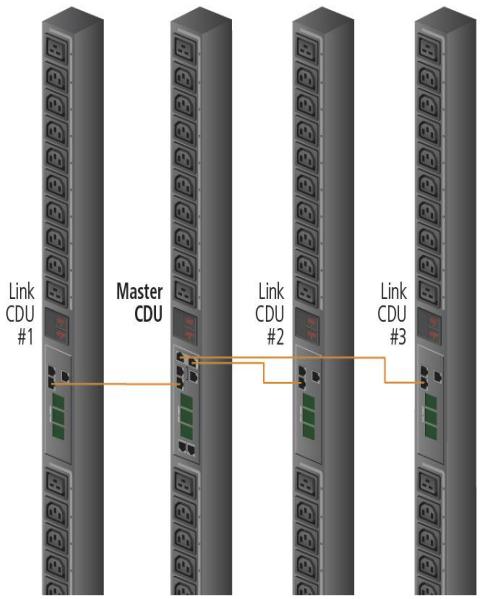
- Products: 48DCWC-10-2X300-E0, 48DCXC-10-2X300-E0, and 48DCWC-04-4X125-E0NB
- Torque: 50 inch-pounds

Star Linking Technology

Server Technology's Sentry DC product line provides Star Linking technology that supports the optional linking of up to three expansion (link) units per one master unit, allowing a single IP address for multiple cabinets.

Note: The Star Linking feature is available with PRO1 Sentry Switched DC PDUs and the PRO1/PRO2 AC PDUs.

The following illustrations (using PRO1/PRO2 PDUs in this example) show multi-linking between separate units and within the cabinet:



Multi-Linked PDUs

Multi-Linking View in the Equipment Cabinet

Redundant Power and Communication

The Star Linking arrangement is fault tolerant, with redundant power coming from the first link unit. The arrangement also offers significant cost reduction as the link units do not require a network card. Another significant advantage of Star Linking technology is that if power in the master unit is lost, communication will continue with the other link units, which is a major improvement over a daisy-chain linking configuration.

Outlet Grouping

The multi-link arrangement allows outlet grouping across the master and three link units.

Cable Length

The maximum cable length allowed from link unit to master unit is 21-feet (6.4 meters).

Multi-Link Dongle

In the Star Linking arrangement, the first link unit connects through the link port.

However, the second and third link units in this arrangement **attach to a dongle** that connects to the AUX port on the master unit through a 12-inch (30 cm) cable.

The optional multi-link feature is sold as a separate kit purchased from Server Technology. To use the multi-link feature, contact your sales representative to order dongle kit, described below.

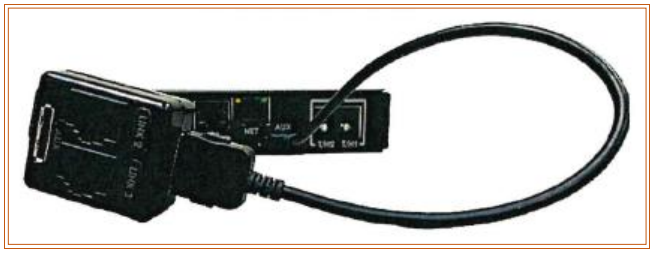
Multi-Linking Dongle Kit

Note: The dongle can be installed on any PRO1 Sentry Switched DC PDU.

Part number: KIT-PRO2LINK-01D.

The dongle kit contains:

- One dongle.
- Two link cables: each 21 ft. (6.4 meters).
- Two labels marked: LINK 2 and LINK 3.
- One link cable: 7 in. (178 mm).
- One mounting screw: M3x6mm.



Multi-Link Dongle

Dongle Connected to AUX Port

Unit Persistence

Unit Persistence is an internal PRO1 Sentry Switched DC PDU feature that works as follows:

If a link unit is connected to a master unit, and the link unit is disconnected (powered down or accidentally disconnected), and the master unit is restarted, the link unit will be reported as “Not Found” after the restart because the link unit is no longer physically connected to the master.

However, the association between the master/link units is retained to allow the continuation of alerts. If the disconnected link unit is physically re-connected to the master, the “Not Found” status will return to “Normal” status.

To intentionally remove a link unit from connection with a master unit, the link unit must be purged using the Purge function.

Unit persistence affects **all connected master/link units** whether or not they are connected in a multi-linking configuration.

Chapter 3: Installing the Sentry Switched DC PDU

Before installing your Sentry DC PDU, look over the following lists to make sure you have all the items shipped with the unit, as well as any other items needed for proper installation.

Standard Accessories

Mounting Hardware:

- Two removable flanges with M4 screws.

Cables/Adapters:

- RJ45 to RJ45 crossover cable.
- RJ45 to DB9F serial port adapter (for connection to standard DB9M DTE serial port).

Optional Accessories

- The Star-Link Dongle Kit (Part No. KIT-PRO2LINK-01D).
- Temperature/Humidity Sensors (Part No. EMTH-1-10 [10-ft] and EMTH-1-20 [20-ft]).

Additional Required Items

- Flathead and Phillip screwdrivers.
- Screws, washers, and nuts to attach the PDU to your equipment rack.

Safety Precautions

This section contains important safety/regulatory information that must be reviewed before installing and using the **PRO1 Sentry Switched DC PDU**.

	Only for installation and use in a Restricted Access Location in accordance with the following installation and use instructions. **This equipment should only be installed by trained personnel.**	Destiné à l'installation et l'utilisation dans le cadre de Restricted Access Location selon les instructions d'installation et d'utilisation. **Cet équipement est uniquement destiné à être installé par personnel qualifié.**	Nur für Installation und Gebrauch in eingeschränkten Betriebszonen gemäß der folgenden Installations-und Gebrauchsanweisungen. **Dieses Gerät ist nur für den Einbau durch Personal vorgesehen.**
	The 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. It is the customer's responsibility to provide adequate protection for the dedicated power circuit. Protection of capacity equal to the current rating of the PDU must be provided and must meet all applicable codes and regulations. In North America, protection must have a 10,000A interrupt capacity.	Le circuit spécialisé doit avoir un disjoncteur ou une protection de fusible. PDUs ont été conçus sans disjoncteur général ni fusible pour éviter que cela devient un seul endroit de panne. C'est la responsabilité du client de fournir une protection adéquate pour le circuit-alimentation spécialisé. Protection de capacité équivalant à la puissance de l'équipement, et respectant tous les codes et normes applicables. Les disjoncteurs ou fusibles destinés à l'installation en Amérique du Nord doivent avoir une capacité d'interruption de 10.000 A.	Der feste Stromkreis muss mit einem Schutzschalter oder einem Sicherungsschutz versehen sein. PDUs verfügt über keinen Hauptschutzschalter bzw. über keine Sicherung, damit kein einzelner Fehlerpunkt entstehen kann. Der Kunde ist dafür verantwortlich, den Stromkreis sachgemäß zu schützen. Der Kapazitätsschutz entspricht der aktuellen Stromstärke der Geräte und muss alle relevanten Codes und Bestimmungen erfüllen. Für Installation in Nordamerika müssen Ausschalter bzw. Sicherung über 10.000 A Unterbrechungskapazität verfügen.
	Do not block venting holes when installing this product. Allow for maximum airflow at all times.	Ne bloquez pas les orifices d'aération lors de l'installation de ce produit. Permettre une circulation d'air maximale à tout moment.	Achten Sie darauf, dass keine Belüftungslöcher bei der Installation dieses Produkts. Damit für maximalen Luftstrom zu allen Zeiten.
	Always disconnect the power supply cord before servicing to avoid electrical shock. For products with two input power cords, both must be disconnected before servicing.	Toujours débrancher le cordon d'alimentation avant de l'ouverture pour éviter un choc électrique. Pour les produits avec deux cordons d'alimentation d'entrée, les deux doivent être déconnectés avant l'entretien.	Trennen Sie das Netzkabel, bevor Sie Wartungsarbeiten Öffnung einen elektrischen Schlag zu vermeiden. Für Produkte mit zwei Eingangsstromkabel, sowohl, müssen vor der Wartung abgeschaltet werden.
	WARNING! High leakage current! Earth connection is essential before connecting supply!	ATTENTION! Haut fuite très possible! Une connection de masse est essentielle avant de connecter l'alimentation !	ACHTUNG! Hoher Ableitstrom! Ein Erdungsanschluss ist vor dem Einschalten der Stromzufuhr erforderlich!
	ATTENTION! Observe precautions for handling Electrostatic Sensitive Devices.	ATTENTION! Respecter les mesures de sécurité en manipulant des dispositifs sensibles aux décharges électrostatiques.	ACHTUNG! Vorsichtshinweise zur Handhabung elektrostatisch empfindlicher Geräte beachten.

NEBS Statements

NEBS GR-1089-Core Information: Models 48DCWC and 48DCXC

These products are intended to be installed in Network Communications Facilities and in locations where the NEC applies.

These products are suitable for installation in a Common Bonding Network (CBN).

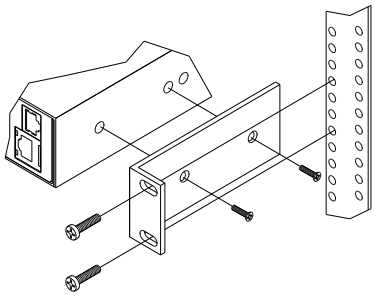
These products may be installed in either a (DC-C) or (DC-I) configuration.

In the DC-C configuration, the ampacity of the conductor connecting the equipment frame to the BR conductor **shall** be equal to, or greater than, the ampacity of the associated BR conductor.

"**WARNING:** The intra-building port(s) of the equipment or subassembly is suitable for connection to intra-building or unexposed wiring or cabling only. The intra-building port(s) of the equipment or subassembly **MUST NOT** be metallically connected to interfaces that connect to the OSP or its wiring.

These interfaces are designed for use as intra-building interfaces only (Type 2 or Type 4 ports as described in GR-1089-CORE, Issue 5), and require isolation from the exposed OSP cabling. The addition of Primary Protectors is not sufficient protection in order to connect these interfaces metallically to OSP wiring."

Mounting the Unit



The following instructions show you how to mount the Sentry DC PDU:

1. Select the appropriate bracket mounting points for proper mounting depth within the rack.
2. Attach the 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.

Note: A mounting bracket kit for 23" wide racks or cabinets is available. For more information, contact your Server Technology sales representative.

Attaching the Expansion Module

Connect the PRO1 Sentry Switched DC PDU with the provided RJ12 crossover cable at the Link port on the unit. The overall length of the RJ12 crossover cable should not exceed 10 feet.

Connecting to the Power Source

Note: Reverse polarity will damage the unit. Verify proper polarity before connecting to a power source.

1. Verify power source polarity and remove the fuses for all outlet terminal pairs.
2. Attach the appropriate input power cable(s) for your installation's operating voltage.
3. Attach the opposite end of the power cable(s) to the power source.

Connecting Devices

Always disconnect ALL power supply cords before opening to avoid electrical shock.

1. Keep the On/Off switch on the device in the off position until after it is plugged into the outlet.
2. Connect devices to the outlets on the Sentry Switched DC PDU.

Connecting to the Unit

Serial (RS232) port

The PRO1 Sentry Switched DC PDU 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.

Ethernet port

The PRO1 Sentry Switched DC PDU is equipped with an RJ45 10/100Base-T Ethernet port for attachment to an existing network. This connection allows access to the unit via Telnet or Web.

The DC PDU is also 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 networks, the following network defaults do not apply because the PRO1 Sentry Switched DC 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: For instructions about reconfiguring the network connection, contact your system administrator. A restart may be required for the reconfiguration of your network to take effect.

- IP address: 192.168.1.x (where x is 2-253)
- Subnet Mask: 255.255.255.

Modem port

The DC PDU Manager is equipped with a DB9 male modem serial port for connection to an external modem using the supplied DB9 female to DB25 male serial cable.

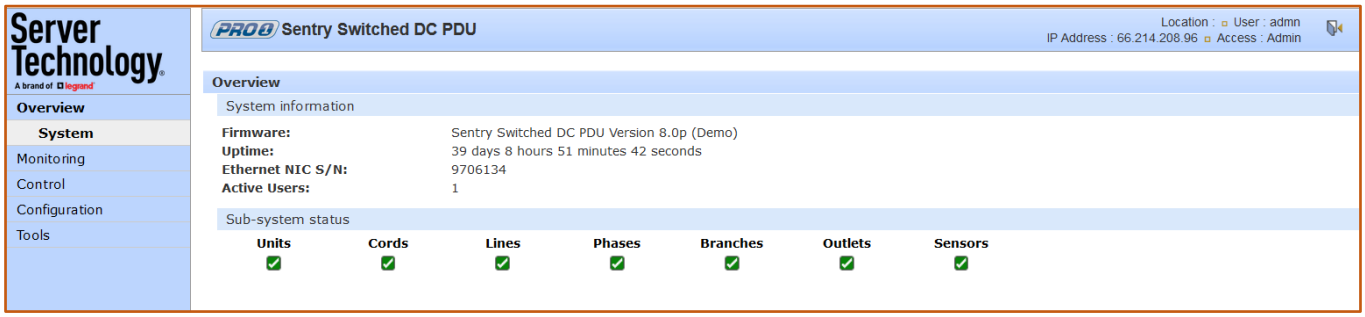
Chapter 4: Getting Started with the Firmware

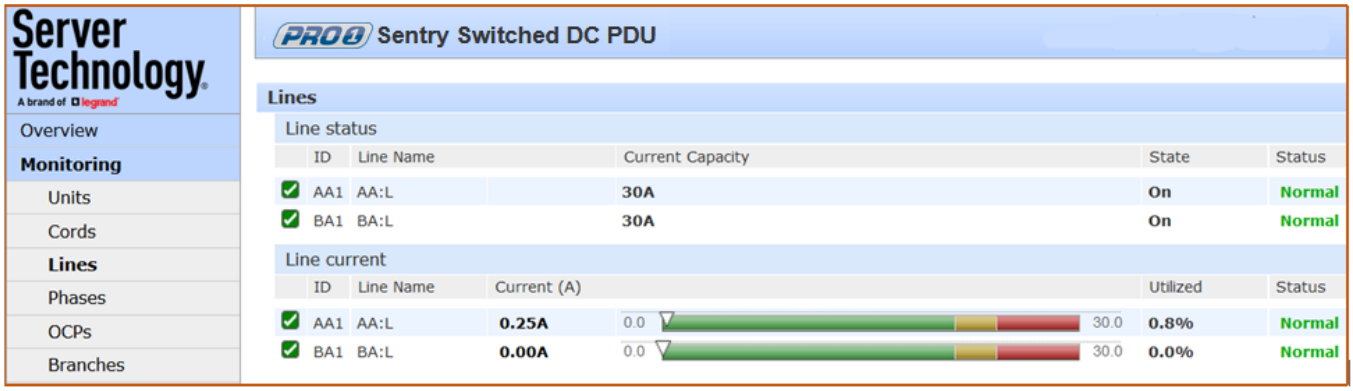
This chapter introduces several key features of the PRO1 Sentry Switched DC PDU firmware, version 8.0x, or later.

Sentry DC Dashboard View

The firmware **Overview > System** page provides a fast and high-level view of the overall condition of the Sentry DC PDU unit. The sub-system status view shows the current operational state of individual PDUs (units, cords, lines, etc.).

The color-coded status icon for each area is hot-linked to the corresponding monitoring page to show the operating details behind the status, for example, the Normal status: ✅





The User Interfaces

Server Technology's Sentry DC PDU has two user interfaces:

- Web interface (GUI) accessed by the HTTP(S)-enabled Ethernet connections
- Command Line Interface (CLI) for serial and Telnet connections.

Both interfaces allow power monitoring of data points, temperature/humidity measurements, system/network configuration, outlet control, user account management, and numerous other operations for the Sentry DC PDU.

Either interface can be used as preferred; most firmware operations can be performed on GUI screens or by CLI commands on the command line. When using either interface, the availability of firmware functions for your user login account depends on your current user access rights as granted by the system administrator.

Usernames and Passwords

The Sentry DC PDUs are shipped with one default administrative user account (username/password is admn/admn). **Note:** There is no "i" in the **admn** username or password.

Only an administrative user can manage user accounts, such as creating new user accounts, removing user accounts, and changing user passwords.

The PDU supports a maximum of 112 defined user accounts with the following restrictions:

User Account	Length	Case-Sensitive	Spaces Allowed
Usernames	1-32 characters	No	No
Passwords	1-32 characters	Yes	Yes

Note: For security, Server Technology recommends first creating a new user account with administrative rights, and then removing the default **admn** account.

User Access Rights

The following table defines the user rights granted by the administrative user for access to PDU operations using either the Web GUI or the Command Line interface (CLI). Only the options for which the user has access rights will be available in the firmware for the user.

User Access Level (highest to lowest)	Description
Administrator	Administrative user; full access for all configuration, user management, all outlet power control actions (On, Off, Reboot), status, and serial/pass-thru ports.
Power User	Full access for all outlet power control actions (On, Off, Reboot), status, and serial/pass-thru ports. **Note:** The Power User does not have access to user management.
User	Partial access for outlet power control actions (On, Off, Reboot), status, and pass-thru of assigned outlets, outlet groups, and serial/pass-thru ports.
Reboot-Only User	Partial access for outlet power control actions (Reboot), status, and pass-thru of assigned outlets, outlet groups, and serial/pass-thru ports.
On-Only User	Partial access for outlet power control actions (On), status, and pass-thru of assigned outlets, outlet groups, and serial/pass-thru ports.
View-Only User	Partial access for status and pass-thru of assigned outlets, outlet groups, and serial/pass-thru ports.

The administrative user can also grant administrative-level rights to other user accounts, allowing the PDU to have more than one administrative user.

Administrative access rights cannot be removed from the default **admn** user account until an administrative user grants administrative access rights to another user account.

To use administrative commands, the user must be granted administrative user access rights.

IPv4/IPv6 and Server Technology Products

Server Technology uses IPv6 “dual stack” support in the firmware of the PRO1 product lines. 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.

Notes:

- Throughout the Web and CLI firmware interfaces, both IPv4 and IPv6 formats are accepted wherever a hostname or IP address is provided.
- IPv6 allows authentication via RADIUS and LDAP.

Firmware – Protocol Support

IPv6 and IPv4 Protocols:

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

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

IPv4-Only Protocols:

The firmware supports the following network IPv4-only protocols:

- LDAP
- RADIUS
- TACACS+

* = may work with IPv6 addresses, but not tested.

Network-Enabled Modes

Descriptions for the network-enabled modes:

- 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.

Notes:

- For all network-enabled modes described above, 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”.

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:

```
Sentry Switched DC PDU Version 8.0t

Switched PDU: show network
Network Configuration
State:           Static IPv4       Network:         Dual IPv6/IPv4
Link:            Up                Negotiation:     Auto
Speed:           100 Mbps          Duplex:          Full
Ethernet MAC:    00-0A-9C-61-17-F6
AutoCfg IPv6:    FE80::20A:9CFF:FE61:17F6/64
Stateless DHCP6: 2600:6C24::3:20A:9CFF:FE61:17F6/64
IPv4 Address:    66.214.208.96     Subnet Mask:     255.255.255.0
IPv4 Gateway:    66.214.208.1
DNS1:            71.9.127.107
DNS2:            68.190.192.35
Static IP and DNS Settings
IPv6 Address:    ::/64
IPv6 Gateway:    ::
IPv4 Address:    66.214.208.96     Subnet Mask:     255.255.255.0
IPv4 Gateway:    66.214.208.1
DNS1:            71.9.127.107
DNS2:            68.190.192.35
DHCP Settings
DHCP:            disabled
FQDN:            enabled [sentry-6117f6]
Boot Delay:      disabled
Static Fallback: enabled
ZTP (0-Touch):   disabled (not provisioned)
Network Services
FTP Server:      enabled     Port:    21
FTP Updates:     disabled    Port:    21
SSH:             enabled     Port:    22   Auth: Password, Kb-Int
Telnet:          enabled     Port:    23
HTTP:            enabled     Port:    80
HTTPS:           enabled     Port:   443   Installed Cert: Factory
CA Cert:         disabled    (none)
Server Cert:     disabled    (none)        Passphrase: (none)
SNMPv1/2:        enabled     Port:   161   TrapPort:   162
SNMPv3:          disabled    Port:   161   TrapPort:   162
JSON API WebSvc: enabled
SPM Access:      enabled
```

Note: The fields IPv4 Address, IPv4 Subnet Mask, IPv4 Gateway, DNS1, and DNS2 are equivalent to existing PRO1 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. DNS addresses may be in IPv4 or IPv6 (based on RFC4291) format at this time.

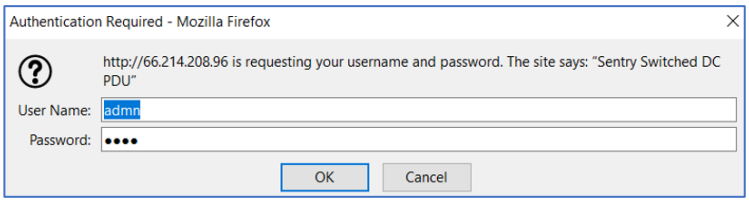
Chapter 5: Using the Web Interface (GUI)

This chapter shows how to work with the Web firmware GUI (version 8.p or later) for the Sentry DC PDU.

Logging In

Logging into the Web interface directs the Web client to the configured IP address of the Switched unit.

To login by Web interface:



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. Three attempts are given for a valid username/password combination, after which the session ends and a protected page will be displayed

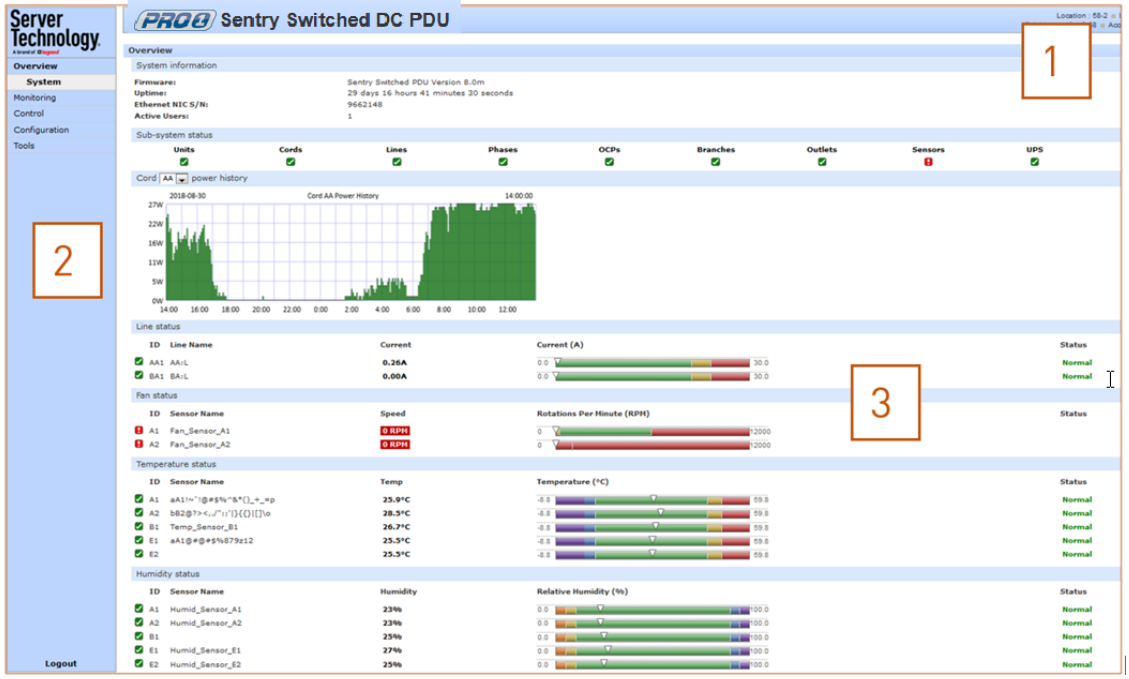
Note: The default firmware username/password is admn/admn. There is no "i" in admn.

Quick Tour of the GUI

Note: The GUI images shown in this manual were taken from a PRO1 Sentry Switched DC PDU. Some documented functionalities may not apply to the DC PDU you have.

The web interface provides web-based access to the firmware for the Switched unit. The interface is designed with three major screen sections shown in the following screen example:

1. System Header: Displays the PDU's description/location, IP address, and user/access level.
2. Navigation Bar: Provides access to the PDU's power monitoring, control actions, and configuration.
3. Details Window: Shows control/status information based on option selected in navigation bar.



Example of Firmware Web Interface: Overview > System Page

Note that the optional blinking location string (IP address) in the System Header may not work with all web browsers.

Summary of the GUI Options

Overview

The Overview > System option is the first stop for high-level and fast monitoring of major PDU operational areas. The page displays a quick view of color-coded icons showing current status of the units, cords, branches, lines, phases, sensors. Click an icon for the related monitoring page to view the metrics behind the status.

The System page also shows color-coded graphs for the operational status of line current and temperature/humidity sensor readings.

General system information displays on the page to show firmware version in use, uptime data, Ethernet NIC serial number, and current number of active users.

The System page dynamically updates status and threshold values with a full-screen refresh to reflect the latest PDU details for instant assessment and response.

Monitoring

The Monitoring option provides viewing of dynamically updated metrics for the PDU operational areas that have the highest power impact on the unit and the data center.

The design of the GUI monitoring pages follows the major areas in the hardware architecture of the PDU, providing a separate and detailed page for the overall status of units, cords, lines, branches, outlets, groups, and sensors.

Each system object for which a threshold can be configured – such as line current and phase voltage – has a corresponding monitor page that displays up-to-the-minute power metrics.

Many metrics are presented on the pages in color-coded graphs for at-a-glance monitoring. A regular full-page refresh dynamically updates theses details to reflect the current condition of the PDU, providing the opportunity for instant assessment and fast response to critical system issues.

Control

The Control option allows the issuing of control actions On, Off, and Reboot for all the PDU's individual outlets, global outlets, and named outlet groups.

Outlet details are also available by individual outlet to provide the outlet's general identification, socket type, capacity, operational state, power factor, as well as color-coded graphs for current and power.

A PRO1 PDU with Per Outlet Power Sensing (POPS) technology will also display values for current capacity used and reactance.

Configuration

The Configuration option allows administrative access to all options for setting PDU values. The pages are organized into three major areas of configuration:

- **System** (options for hardware areas)
- **Network** (options for setting up network protocols)
- **Access** (options for local/remote user access and management)

Network

The Network option provides network setup options for the protocols supported by PRO1 units: DHCP/IP, Email/SMTP, FTP/SFTP, HTTP/HTTPS, LDAP, RADIUS, SNMP, SNTP, Syslog, TACACS+, and Telnet/SSH. The **Network** option only allows the administrator to set up network protocol parameters. To configure how the user will access and use the network and system, see the **Access** option.

Access

The Access option determines how a user works with the network and system by configuring the options related to a user: authentication, privilege levels, user access to the unit, and additional functions for individual local users and user groups. The **Access** option only allows the administrator to configure how the user will access and use the network and system. To set up network protocol parameters, see the **Network** option.

Tools

The Tools option is a collection of several utility options for miscellaneous system actions: changing user password, pinging other network devices, viewing the system/debug log, and uploading new firmware versions. Also included are several options for rebooting the PDU, resetting the PDU to factory defaults, and restarting the PDU with user preferences.

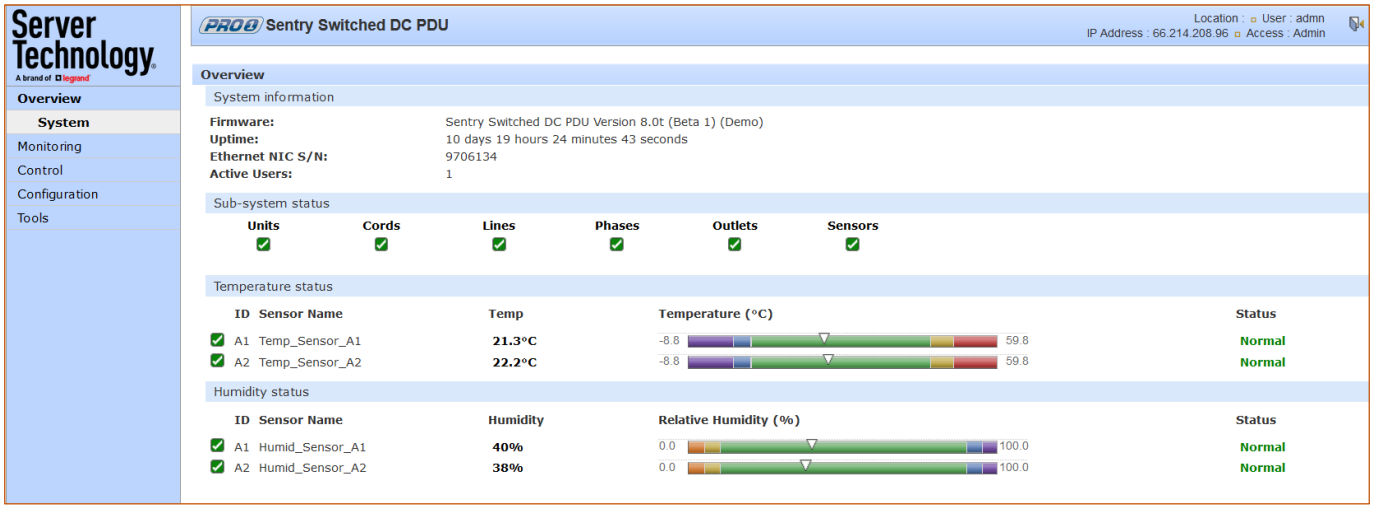
Overview (Viewing the System Dashboard)

The **System** page of the Web interface is the first stop for high-level and fast monitoring of major PRO1 operational areas. The page displays a quick view of color-coded icons showing current status of the units, cords, branches, lines, phases, sensors. Click an icon for the related monitoring page to view the metrics behind the status.

The System page also shows color-coded graphs for the operational status of line current and temperature/humidity sensor readings.

General system information displays on the page to firmware version in use, uptime data, Ethernet NIC serial number, and current number of active users.

The System page dynamically updates status and threshold values with a full-screen refresh to reflect the latest PDU details for instant assessment and response.



How to Read the Metrics

The color-coded status icons and graphs on the System page update dynamically (normal-green, warning-yellow, critical-red) with the latest metrics of the unit, line status, and temperature/humidity sensor status.

About Auto-Scaling

The displayed graphs reflect the internal function of *auto-scaling*. This means that if the threshold range of values changes for the graph, the graph will auto-scale to the appropriate range, allowing the graphs to still present relevant and consistent information.

What To Look For

The dynamic performance of the System page is essential for monitoring new PDU installation or watching for power distribution changes in hi-density environments. High-level status information on the System page gives the chance to correct of an operating condition before it affects the entire device network.

System administrators and power users can also view the System graphs to quickly identify thermal and humidity issues that might otherwise escalate to infrastructure repairs if left unchecked.

Overview > System Page Definitions

The System page uses the following fields and definitions:

Field	Description
ID	System-assigned internal name that cannot be changed.
Name	User-defined descriptive name for each line or temperature/humidity sensor.
Current, Temp, Humidity	Current state of the reported input load (in amps), current temperature (temperature scale °C °F, as configured), or current percent of relative humidity (%RH).
Low Limit	User-defined low limit of the load, temperature, or humidity graph. These values depend on the sensor limitation 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.
High Limit	Displays the high limit of the load, temperature, or humidity graph. For the temperature/humidity sensors, these values depend on the physical sensor limits and cannot be set by the user. For example, a 100ºC high limit would be displayed as 100 in the high limit in a (Celsius) temperature sensor graph.
Sensor Graph and Level Indicator	The horizontal sensor graph shows current operating conditions with color-coded icons, described in the following table, Status Icons and Descriptions". The level indicator  appears in the graph to indicate relative position of the current data value with respect to the minimum (low limit) and maximum (high limit) values displayed at the left end and right end of the graph.

Status Icons and Descriptions

The System page uses the following icons to report current operating conditions:

Icon	Status	Description
	Reading	Unit is reading a new or restored sensor.
	Normal	Normal operation.
	Low/High Warning	Current value outside user-configured threshold range.
	Low/High Alarm	Current value outside user-configured threshold range.
	Lost	Connection has been lost to a sensor that was previously detected.
	Read Error	Error polling data from the PDU.

Sensor Graph Color-Coding

The sensor graph colors change dynamically to communicate operating conditions:

For Line (Load) Status

Green = Normal

Yellow = low warning/high warning (threshold configured by user)

Red = low alarm/high alarm (threshold configured by user)

Configure line current thresholds and threshold hysteresis at **Configuration > System > Lines.**

For Temperature Status

Violet = coldest; low alarm (threshold configured by user)

Blue = cold; low warning (threshold configured by user)

Green = acceptable temperature range

Yellow – warm; high warning (threshold configured by user)

Red = hot; high alarm (threshold configured by user)

Configure low/high temperature thresholds and threshold hysteresis at **Configuration > System > Sensors.**

For Humidity Status

Violet = wettest; high alarm (threshold configured by user)

Blue = wet; high warning (threshold configured by user)

Green = acceptable percentage of relative humidity

Yellow = dry; low warning (threshold configured by user)

Red = driest; low alarm (threshold configured by user)

Configure low/high temperature thresholds and hysteresis at **Configuration > System > Sensors.**

System Information

This section of the Summary page provides general information:

- **Firmware:** Current firmware version
- **Uptime:** Cumulative time the PDU has been up and running since the last unit restarted. Shows continuous, real-time system updates with an approximate 5-second automatic refresh. A manual refresh is not required.
- **Ethernet NIC S/N:** The serial number of the PDU derived from the Ethernet NIC.

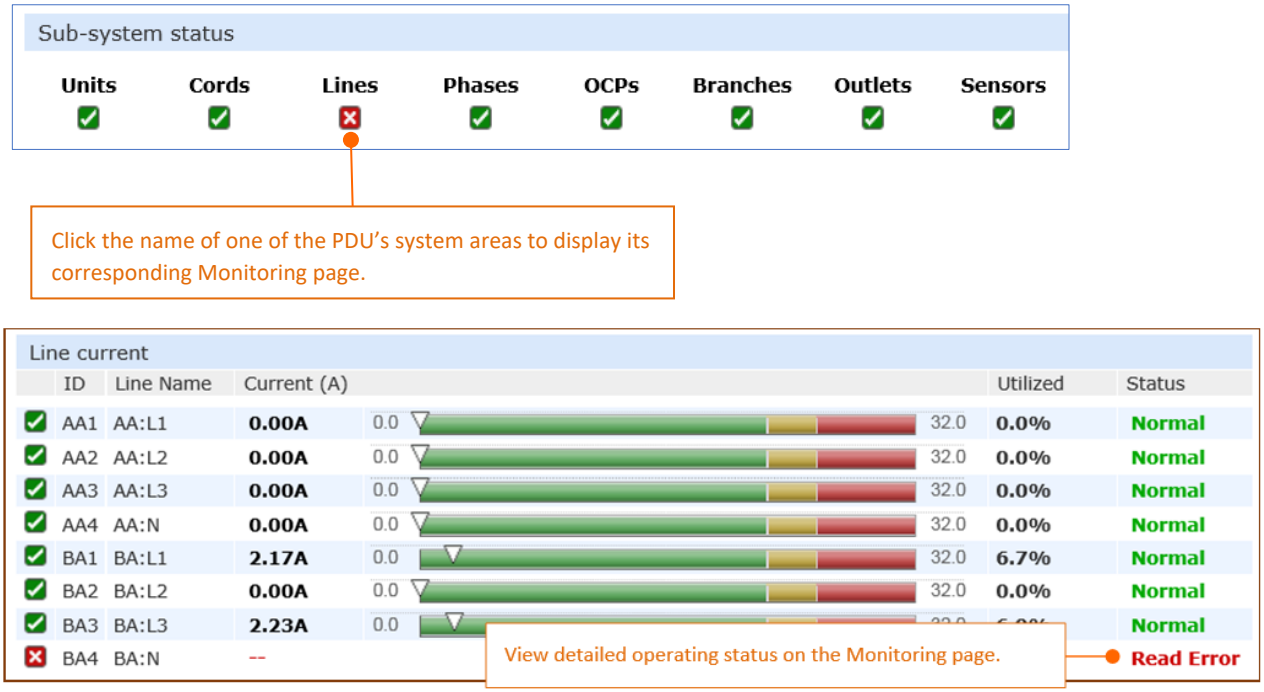
- **Active Users:** Number of active user sessions accessing the firmware. These sessions include serial, Telnet, SSH, and Web sessions. Also shows sessions that an unauthorized user may be attempting to access the system. The number changes instantly as the number of active user sessions changes. A total of 4 concurrent web user sessions are allowed (HTTPS or HTTPS).

  Note: Depending on the web browser, multiple web accesses from the same machine are often considered as one active user.

Sub-System Status

This Sub-System section of the Summary page provides a quick status view of the current operational state of major PDU areas (units, cords, branches, etc.) showing a color-coded status icon.

Also provided is a link from each of the sub-system areas to the related monitoring page:



Monitoring (Analyzing Metrics)

The **Monitoring** section of the Web interface provides viewing of dynamically updated metrics for the PDU operational areas that have the highest power impact on the unit and the data center.

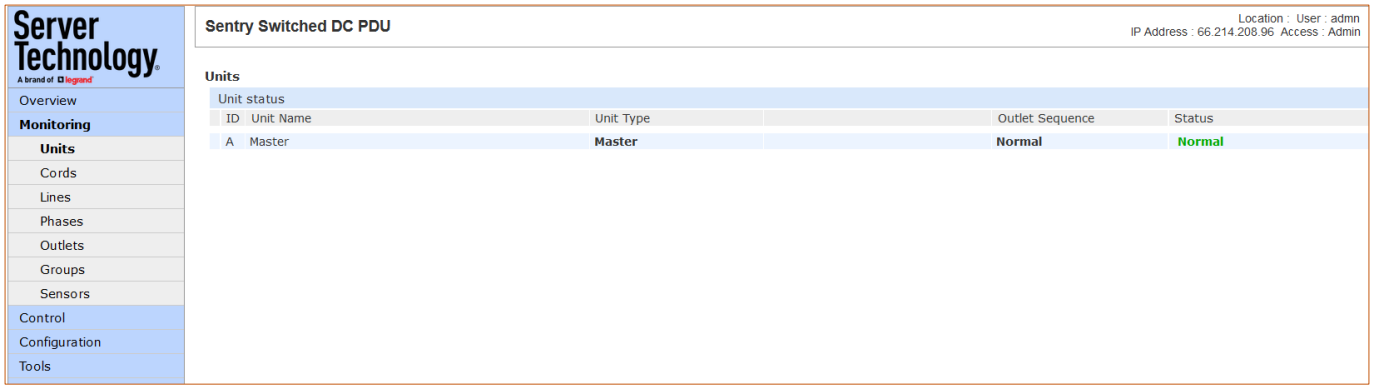
The design of the GUI monitoring pages follows the major areas in the hardware architecture of the PDU, providing a separate and detailed page for the overall status of units, cords, lines, branches, outlets, groups, and sensors.

Each system object for which a threshold can be configured – such as line current and phase voltage – has a corresponding monitor page that displays up-to-the-minute power metrics.

Many metrics are presented on the pages in color-coded graphs for at-a-glance monitoring. A regular full-page refresh dynamically updates theses details to reflect the current condition of the PDU, providing the opportunity for instant assessment and fast response to critical system issues.

Monitoring > Units

The **Units** page is a high-level quick reference for the PDUs units in the network, identifying the connected master/link units (and any connected external monitoring devices), and the operational status of the PDU.



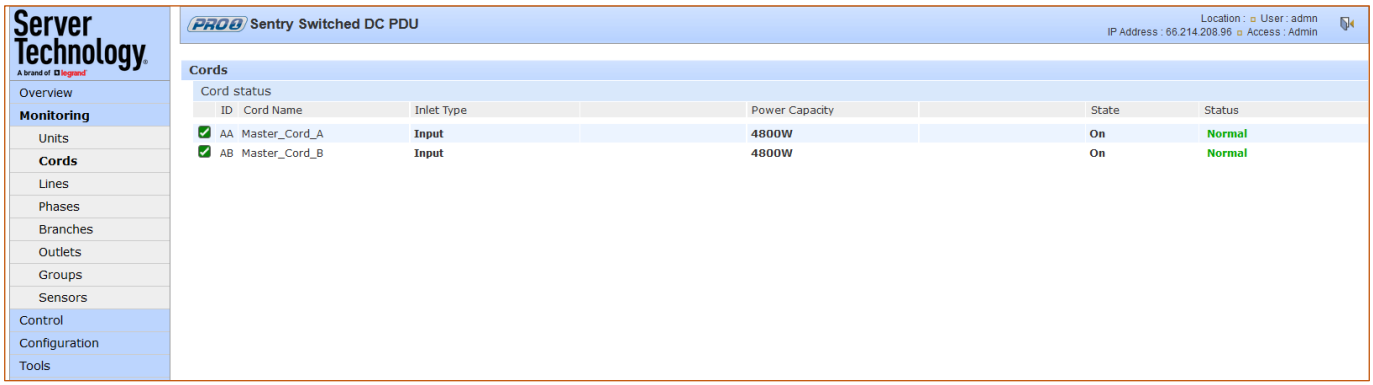
What to look for:

The operating status of all units (master and link) should be Normal (green). The Status field reports the overall health of the units and their connectivity, not an exceeded user-defined threshold. Depending on a yellow or red status message, basic troubleshooting will be needed to determine the best solution for the affected unit.

Monitoring > Cords

The **Cords** page displays cord hardware and operational information for inlet type, power capacity (W), state, and status.

Note: The inlet type was determined for the product at factory assembly and cannot be user-edited.



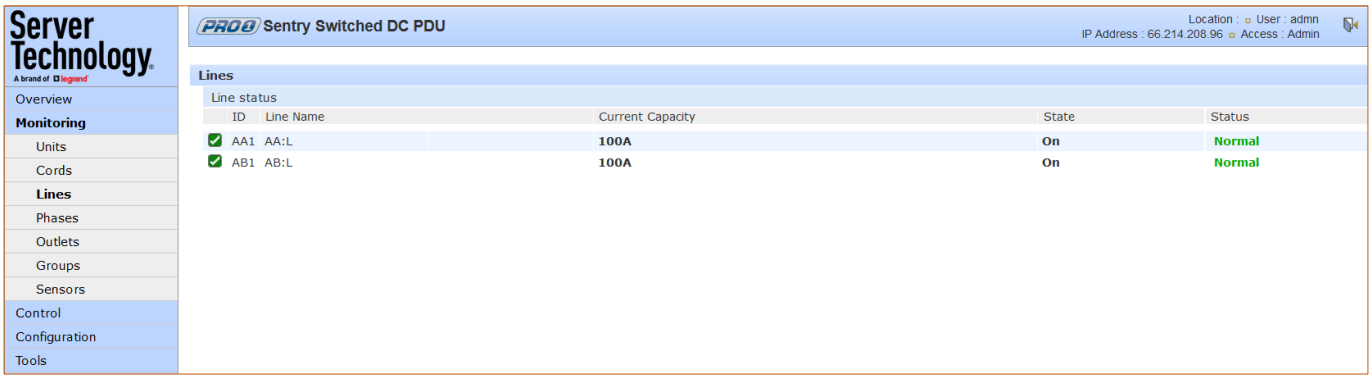
What to look for:

The cord power graphs display a blinking warning (yellow) when the total input load exceeds the user-defined threshold. If an overload occurs, a blinking error condition (red) is displayed. The unit continues to display yellow and red states until the condition changes or the issue has been resolved.

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

Cord power thresholds are user-defined **at Configuration > System > Cords**.

Monitoring > Lines



The **Lines** page shows overall line operational status, line load capacity, line state, and a color-coded graphic for the current used by each line.

What to look for:

The line status and line current status should be Normal, and the line current should be operating within defined thresholds.

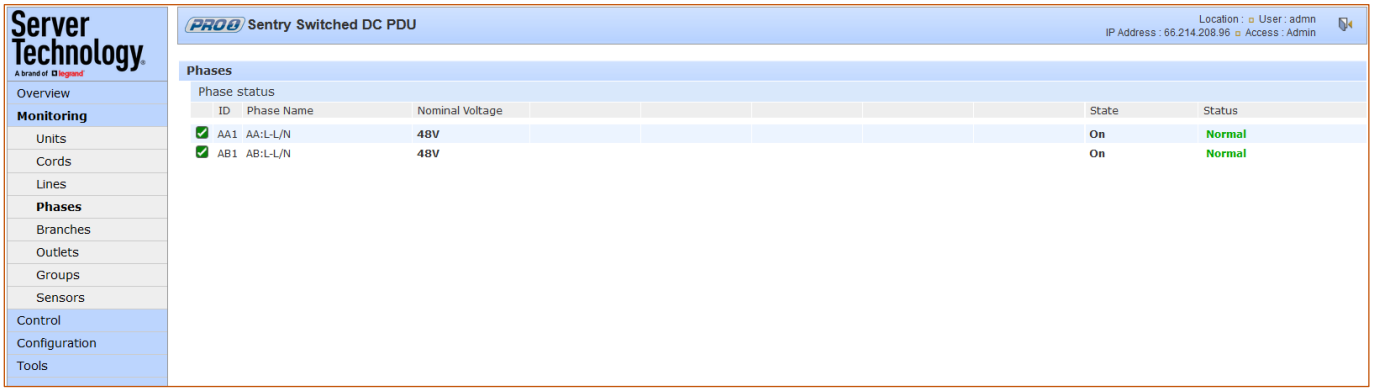
The line current graph displays a blinking warning (yellow) when the total input load on an infeed exceeds the user-defined threshold. If an overload occurs, a blinking error condition (red) is displayed. The unit continues to display yellow and red states until the condition changes or the issue has been resolved.

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

The line current thresholds are user-defined at **Configuration > System > Lines.**

Monitoring > Phases

The **Phases** page reports the current nominal voltage, state, and status of the PDU's phases.



What to look for:

The phase status, should be Normal.

The phase voltage graph displays a blinking warning (yellow) when the total input load on an infeed exceeds the user-defined set threshold. If an overload occurs, a blinking error condition (red) is displayed.

The unit continues to display yellow and red states until the condition changes or the issue has been resolved. The same color-coding applies to the phase power factor graph if the threshold is exceeded.

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

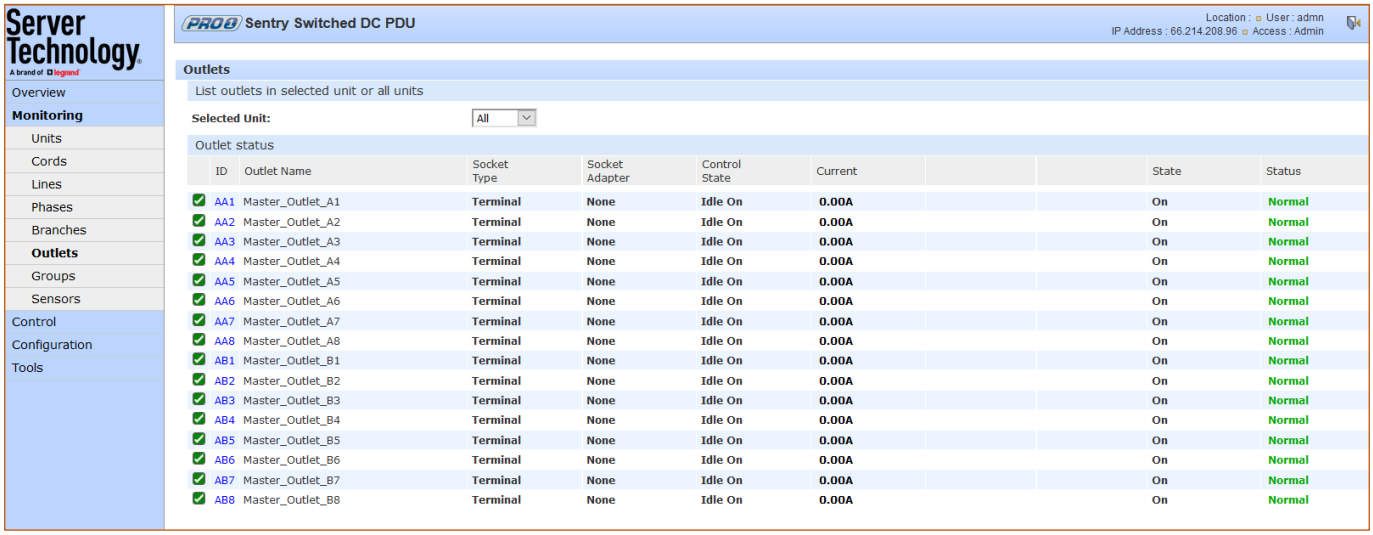
Phase voltage and power factor thresholds are user-defined at **Configuration > System > Phases.**

Monitoring > Outlets

The **Outlets** page lists the outlets in the DC PDU with a quick overview of general outlet information, including operational status based on user-configured thresholds for current, active power, and power factor.

Also displayed are the last user action (on, off, reboot) issued on the outlet (shown in the State column), and the outlet's last reported condition (shown in the Control State column).

The page allows a fast drill-down from the ID link for more operational data about a specific outlet in the list.



What to look for:

The operating status of all outlets should be Normal. If necessary, view operational details for an outlet. The ID and socket type are determined at factory assembly and cannot be user-configured.

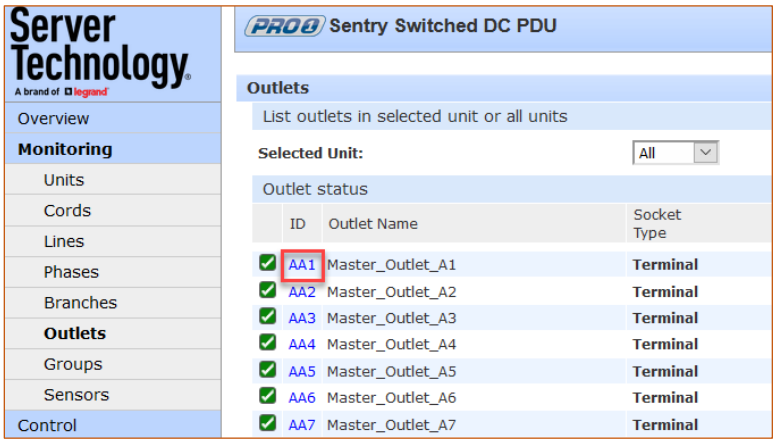
Each outlet has a unique number, and the numbering sequence of outlets is not associated with the unit's branch or phase number. For example, a 30-outlet PDU unit will have outlet numbers sequenced from 1 to 30.

The outlet status displays a blinking warning (yellow) and red (error condition) when an outlet exceeds the user-defined thresholds. The status continues to display yellow and red states until the condition changes or the issue has been resolved.

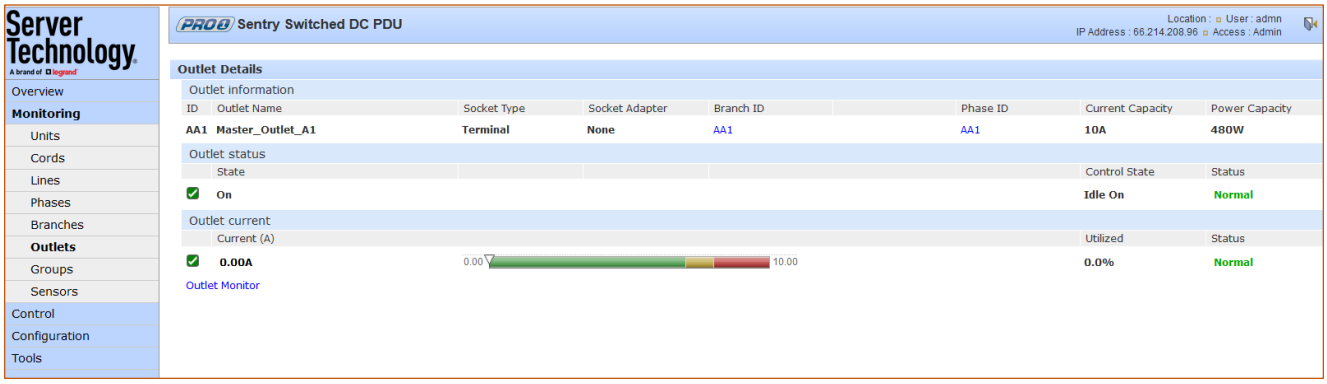
A descriptive text outlet name can be configured at **Configuration > System > Outlets**.

To view details for an outlet:

1. From the Control > Outlets page, click the ID link for any outlet in the list, such as AA1 in this example.



2. The Outlet Details page displays specific information about the selected outlet (AA1 in this example) that includes outlet current with current/power capacity and usage, as well as the outlet's operational status.

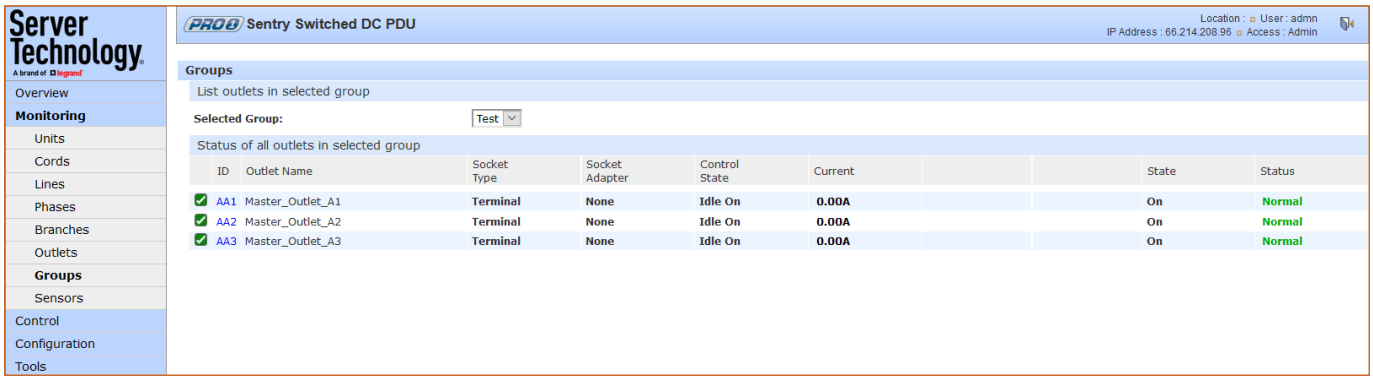


3. To return to the previous monitoring page, click the Outlet Monitor link.

Monitoring > Groups

The **Groups** page shows the status of all outlets in a user-defined outlet group. An outlet group is named group with a collection of PDU outlets assigned to the group.

The page also allows a fast drill-down by outlet ID for more details about the outlet.



What to look for:

From the Selected Group drop-down, choose the user-defined outlet group you want to view.

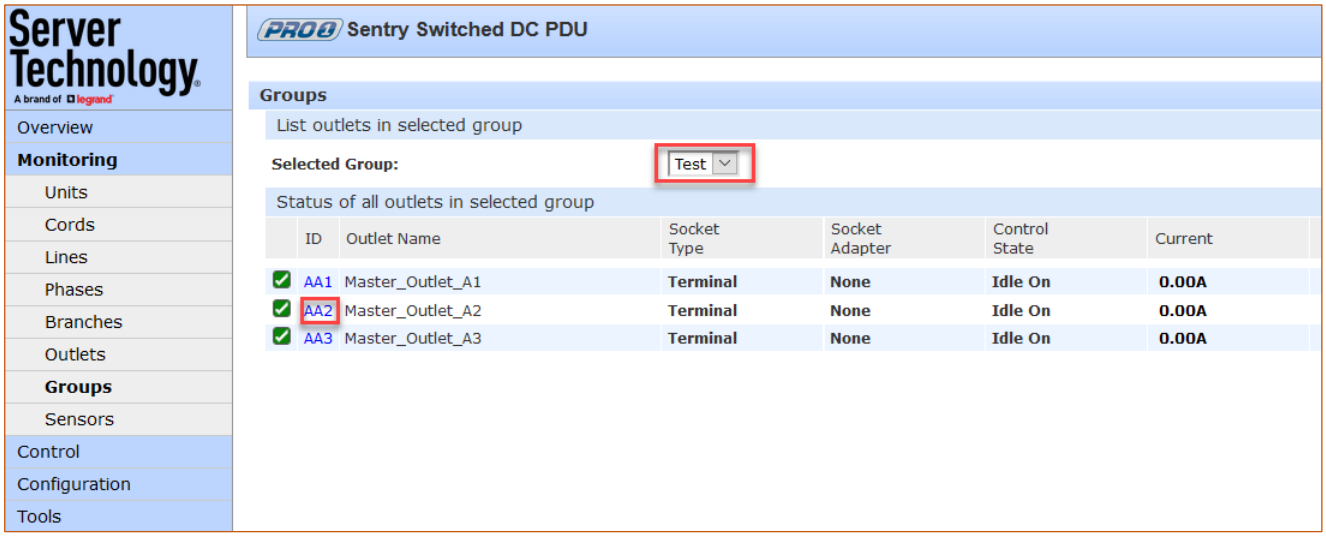
The operating status of all outlets within a selected group should be Normal. If necessary, view operational details for an outlet.

The outlet status for a group displays a blinking warning (yellow) and red (error condition) when an outlet exceeds the user-defined thresholds. The status continues to display yellow and red states until the condition changes or the issue has been resolved.

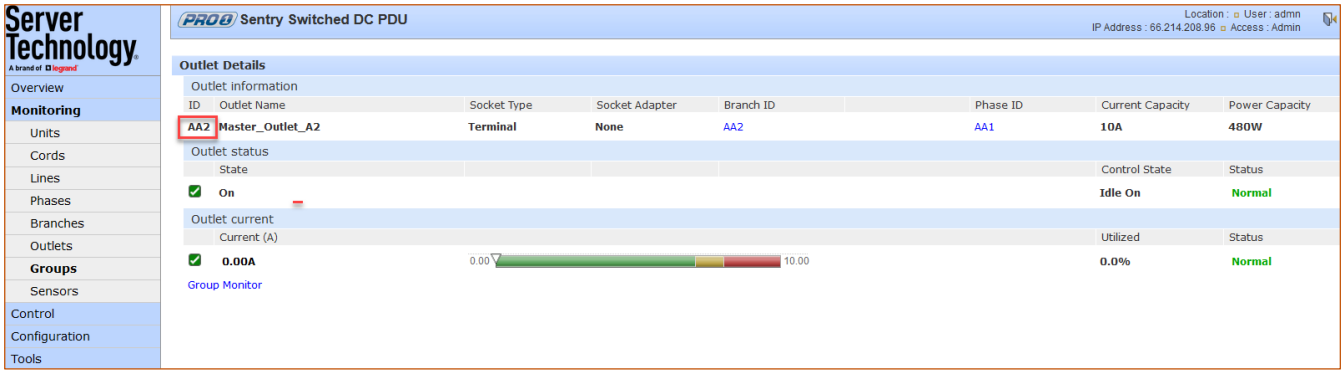
Creating an outlet group and assigning outlet access to the group is done at **System > Configuration > Groups**.

To view operational details for an outlet in an outlet group:

1. From the Groups page, select an outlet group from the drop down list, then click an outlet, like AA2 in this example.



2. When you click an outlet ID link in the list, the details page for that outlet displays:



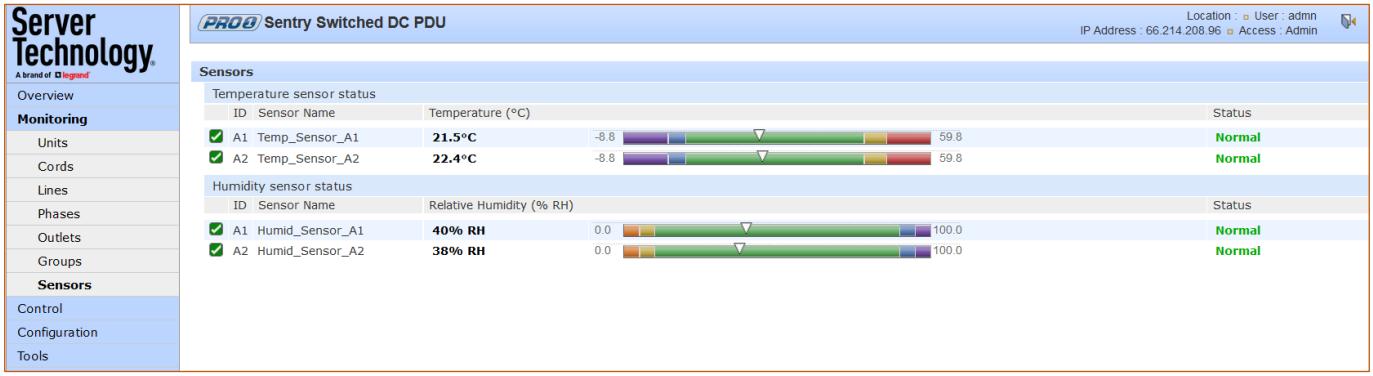
3. The Outlet Details page displays specific information for the selected outlet that includes current/power capacity and usage, and status graphs for outlet current (A), and outlet power (W).

4. To return to the previous monitoring page, click the Group Monitor link.

Monitoring > Sensors

The **Sensors** page provides a quick view and color-coded graphic showing the current temperature/humility operating values of environmental sensors.

Note: If a fan is present on the PDU, the fan can also be monitored on this page.



What to look for:

The operating status of all sensors (and fan, if present) should be Normal, and operating temperature or relative humidity should be within defined thresholds.

Temperature Status

The Temperature graph displays a blinking warning or critical error whenever temperature exceeds low or high threshold. The PDU continues to display the status until the condition changes or the issue has been resolved.

Temperature graph colors:

- Violet = coldest; low alarm (threshold configured by user)
- Blue = cold; low warning (threshold configured by user)
- Green = acceptable temperature range
- Yellow – warm; high warning (threshold configured by user)
- Red = hot; high alarm (threshold configured by user)

The default range of low/high temperature threshold values is -40 to 123(C°). Temperature threshold values are user-defined at **Configuration > System > Sensors**.

Humidity Status

The Humidity graph displays a blinking warning or critical error whenever humidity exceeds low or high threshold. The PDU continues to display the status until the condition changes or the issue has been resolved.

Humidity graph colors:

- Violet = wettest; high alarm (threshold configured by user)
- Blue = wet; high warning (threshold configured by user)
- Green = acceptable percentage of relative humidity
- Yellow = dry; low warning (threshold configured by user)
- Red = driest; low alarm (threshold configured by user)

The default range of low/high relative humidity threshold values is 0-100%RH. Humidity threshold values are user-defined at **Configuration > System > Sensors**.

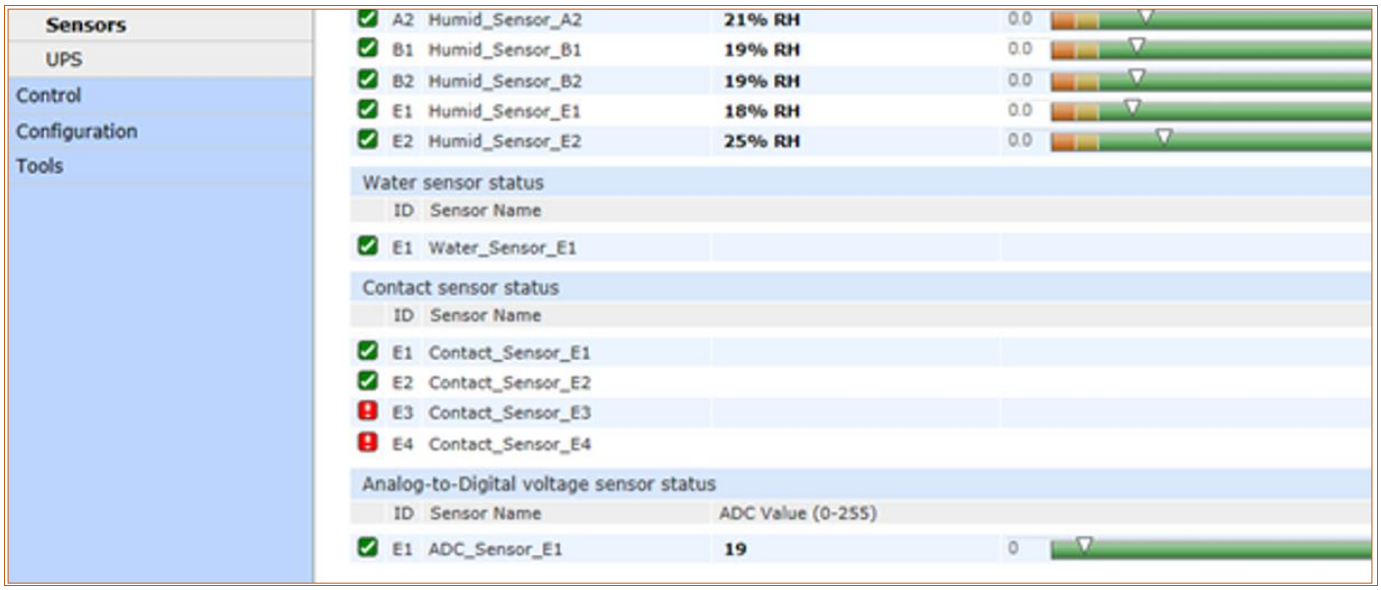
Temperature/Humidity Sensor Status

Status	Description
Found	The PDU found the sensor and connection is established.
Not Found	On a fresh reboot, the PDU does not find a sensor.
Lost	The connection to a previously found sensor is now lost.
No Comm	Communication loss occurred due to a hardware issue (not loss of communication with the probes).[1]

1 The ENV part of the sensor supports two temperature/humidity (T/H) probes as part of the master unit, two T/H probes as part of the link unit, and the optional EMCU-1-1C (which can support two T/H probes, four contact-closure monitoring points, and one water sensor). The “No Comm” sensor status is not loss of communication with the probes themselves.

Environmental Monitor (EMCU) Status

If an EMCU is connected to the PDU, the Sensors pages will also include monitoring of water, contact closures, and analog-to-digital (ADC) sensors.



What to look for:

The operating status of all sensors should be Normal and operating within defined thresholds. View the color-coded graph showing current operating range within thresholds for the ADC.

Water and contact closure sensors can have either Normal or Alarm status – there are no other states or value ranges.

The ADC sensors can be configured at **Configuration > System > Sensors**

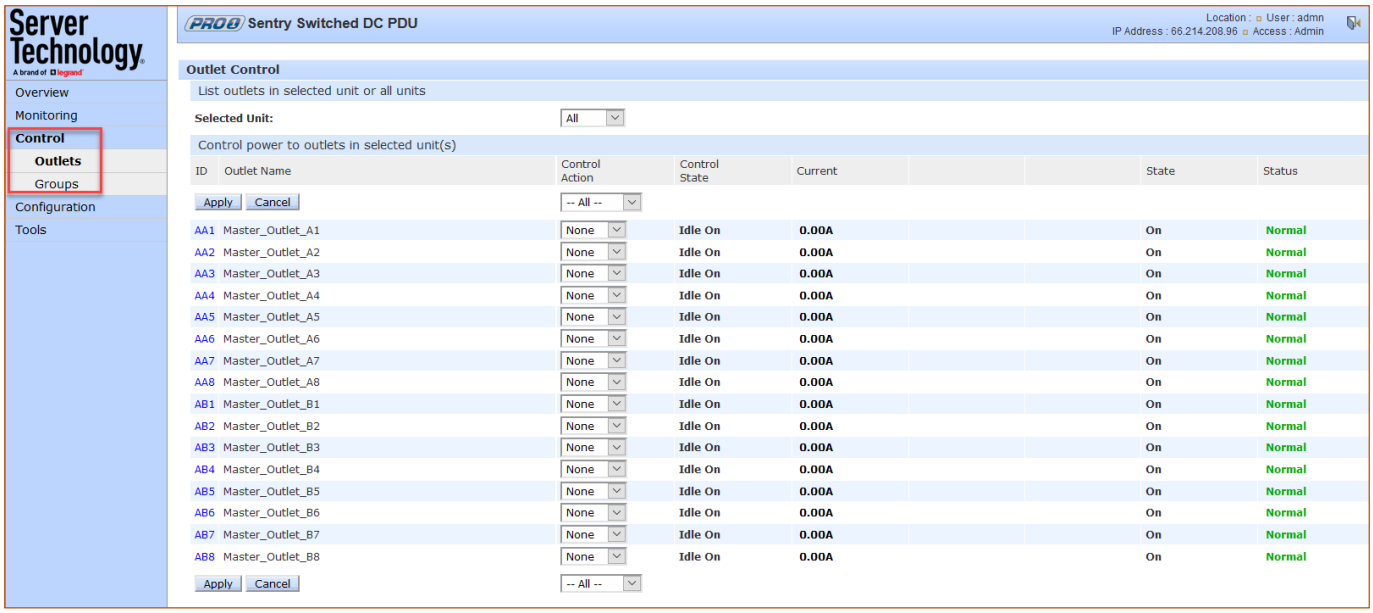
Control (Managing Outlets)

The **Control** section has two functional areas:

- ***Outlets:*** Allows the issuing of outlet control actions On, Off, and Reboot for individual outlets in a single master unit (or in all units), or issuing control actions for all outlets globally in a single master unit (or in all units). Outlet operational details for monitoring are the socket type/adapter, branch/phase ID, and current/power capacity, and outlet status/current.
- ***Groups:*** Allows the issuing of outlet control actions On, Off, and Reboot for outlets in a user-named outlet group for efficient control of multiple outlets.

Control > Outlets

The **Outlet Control** page displays outlets assigned to the current user:



What to look for:

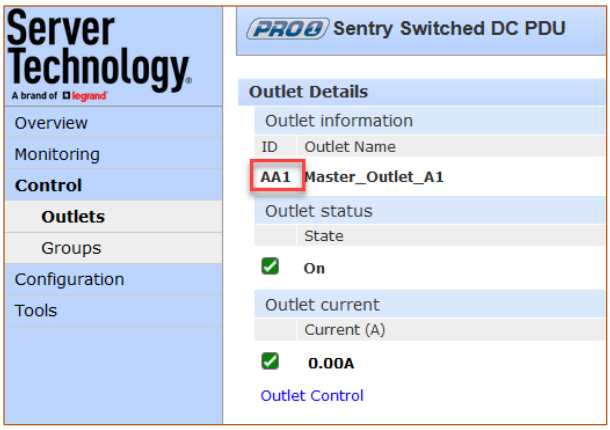
- Provides viewing of outlet current, power, power factor, current control state applied to the PDU, and status information.
- Includes an ID link for viewing detailed operational data about the outlet.
- Allows the issuing of outlet power control actions (On, Off, Reboot) on individual outlets or on all outlets globally, in a master unit or in all units.

To issue outlet control actions (globally on all outlets or on individual outlets):

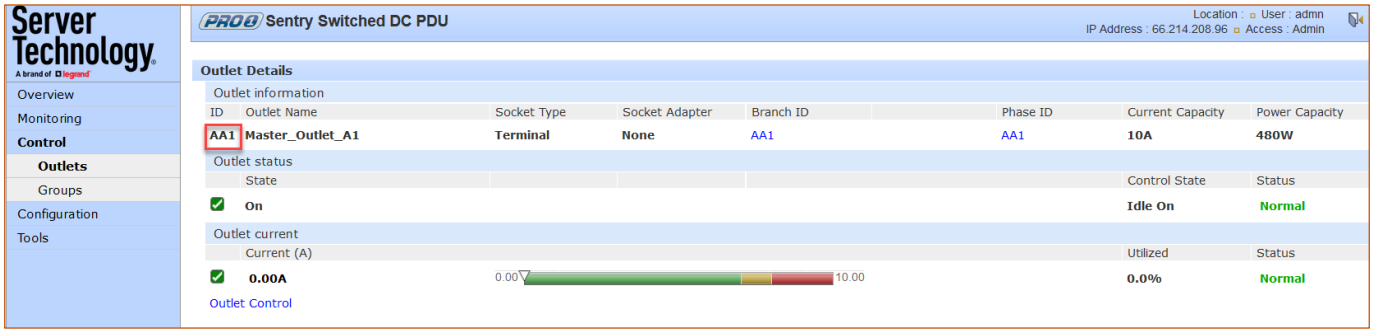
1. From the Selected Unit drop-down menu, choose All or Master. The page refreshes to show the outlets available for the selected unit.
2. To issue outlet control **globally** on all displayed outlets, from the Control Action drop-down menu, select All On, All Off, or All Reboot. To issue outlet control on one or more **individual** outlets, from the Control action drop-down menu for the individual outlet(s), select On, Off, or Reboot.
3. Click **Apply**. The command action is issued immediately on the specified outlet(s).

To view detailed operational details for an outlet:

1. From the Outlet Control page, click the Outlet ID link for any outlet in the list, such as AA1 in this example.



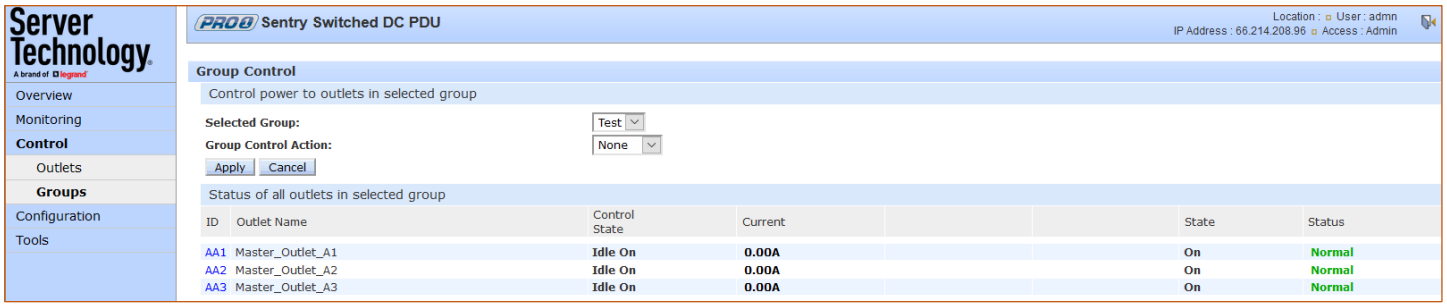
2. The Outlet Details page displays for outlet AA1 showing operational details like socket type, socket adapter, branch/phase ID, current/power capacity, and other operational information, such as outlet status/current.



Control > Groups

The **Control Groups** page displays outlet groups assigned to a current user and allows power control actions (On, Off, Reboot) to be applied to all outlets in a selected outlet group.

Note: An outlet group is a named collection of outlets in a PDU (up to four enclosures) with a single IP address.



To issue outlet control on a specific outlet group:

1. From the group drop-down menu, select the outlet group by name.
2. From the control action drop-down menu, select the outlet command On, Off, or Reboot.
3. Click **Apply**. The command is issued immediately on all outlets in the selected outlet group.

Outlet State/Control State Descriptions

The following table shows the differences between outlet state and control state

- The **outlet state** is the current operating state of the outlet.
- The **control state** is the last user-issued control action on the outlet.

Outlet State	Control State	Description
On	On	Outlet is on.
Off	Off	Outlet is off.
Off	Pend On	Outlet is off and about to turn on in response to a sequence timer.
Off	Reboot	Outlet is off and a Reboot action has been initiated.
On	Idle On	A restart has occurred – last control state has been maintained.
On	Idle Off	A restart has occurred – last control state has been maintained.
On	Wake On	A power-loss has occurred – wakeup state has been applied.
Off	Wake Off	A power-loss has occurred – wakeup state has been applied.
On/Wait	Off	Outlet state in transition – re-query of outlet status required.
Off/Wait	On	Outlet state in transition – re-query of outlet status required.
On/Error	(varies)	Error state – outlet should be off but current is sensed at the outlet.
Off/Error	(varies)	Error state – outlet should be on but no current is sensed at the outlet.
Off/Fuse	On	Outlet should be on but a blown fuse has been detected.
On/Fuse	On	Outlet should be on but a blown fuse has been detected downstream
No Comm	(varies)	Communication to the outlet has been lost – control state will be applied when communication is re-established.

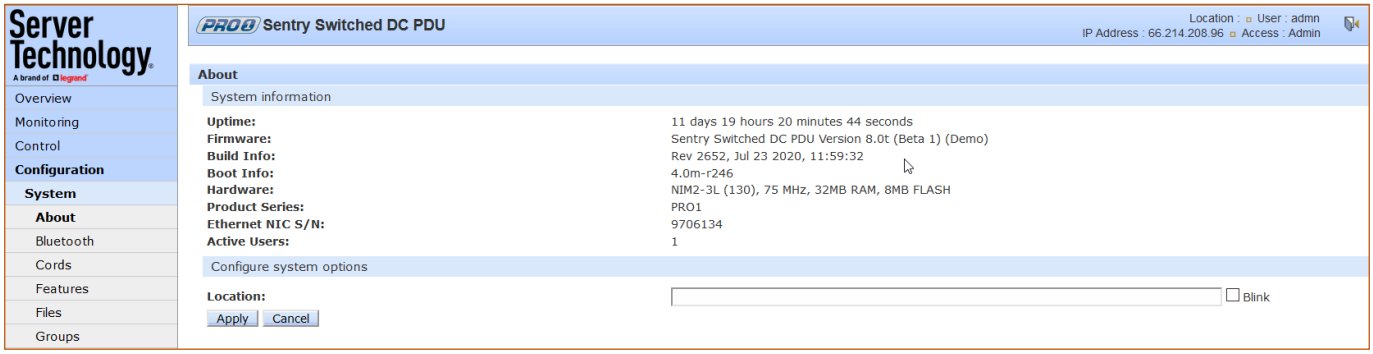
Configuration (Setting Values)

The **Configuration** section allows administrative access to all options for setting PDU values. The pages are organized into three major functional areas of configuration:

- **System:** Options for hardware areas
- **Network:** Options for setting up network protocols
- **Access:** Options for local/remote user access and management

Configuration > System > About

The **About** page allows: (1) reference for system-wide configuration data, (2) configuration of the system location, and (3) the option for a blinking system location on GUI monitoring pages.



Identifying the PDU and user:

The upper right corner of the page shows the Location string: PDU description/location, IP address, and username/access level.

Viewing system reference information:

- Uptime: Cumulative time the PDU has been up and running since the last unit restarted. Shows continuous, real-time system updates with an approximate 5-second automatic refresh. A manual refresh is not required.
- Firmware: Current firmware version.
- Build Info: Displays revision number and date/time of most recent firmware version build.
- Boot Info: Identification number from the system boot loader.
- Hardware: Displays information about the PCB used in the unit.
- Ethernet NIC S/N: The serial number of the unit derived from the Ethernet NIC.
- Active Users: Number of users currently logged in.

Setting the blink option:

The Blink checkbox determines if the Location string blinks on every Web interface page.

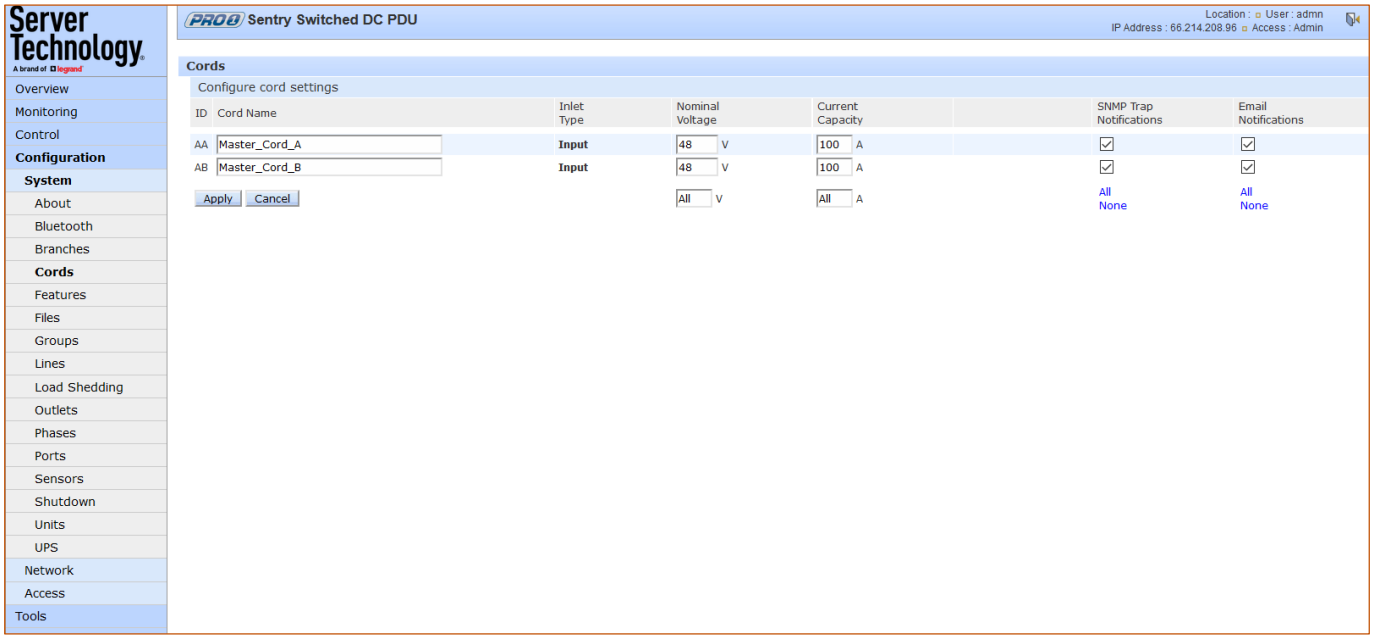
1. Type a descriptive PDU location name that appears in the system header section of every Web interface page (upper right corner).
2. (Optional) Check the Blink checkbox to enable blinking of the unit's location string (IP address) on the Web interface pages. Even if Blink is enabled, the blinking may not work with all web browsers.
3. Click **Apply**.

Configuration > System > Cords

The **Cords** page configures the single input power cord in the PDU hardware architecture that reports infeed data for the unit, allowing the cord name, and the setting of multiple cord nominal voltage, current capacity, SNMP trap notifications, and SNMP email notifications.

The value for *nominal voltage* – the point where an alert is received – is established on the **Cords** page.

For dynamic monitoring of cord status, related power data, and out-of-balance levels, see the separate **Monitoring > Cords** page.

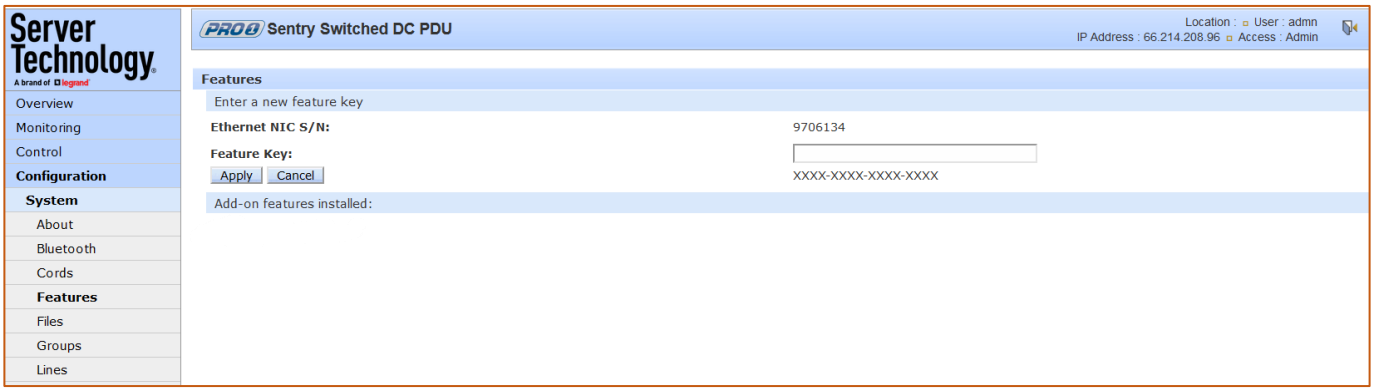


To configure cord settings:

1. In the Cord Name field, provide a descriptive text name, from 0-32 characters. The ID (such as AA, AB) is a system-assigned internal name and cannot be changed.
2. View the reported type of inlet displayed for the cord.
3. In the Nominal Voltage field, set the value (in Volts) to be the mid-point of the Monitoring graphs, so that nominal voltage is the point where you are alerted for an alarm. Range is 0-max (max is factory nominal voltage) in the **show cords** command.
4. Set the current load for the cord in the Current Capacity field. Range is 0-max (max is factory current capacity) in the **show cords** command.
5. For each cord listed, check (or uncheck) SNMP Trap Notifications and/or Email Notifications to enable/disable notifications for cord events.
6. Click **Apply**.

Configuration > System > Features

The **Features** page allows the activation of add-on features available from Server Technology.



To activate a feature:

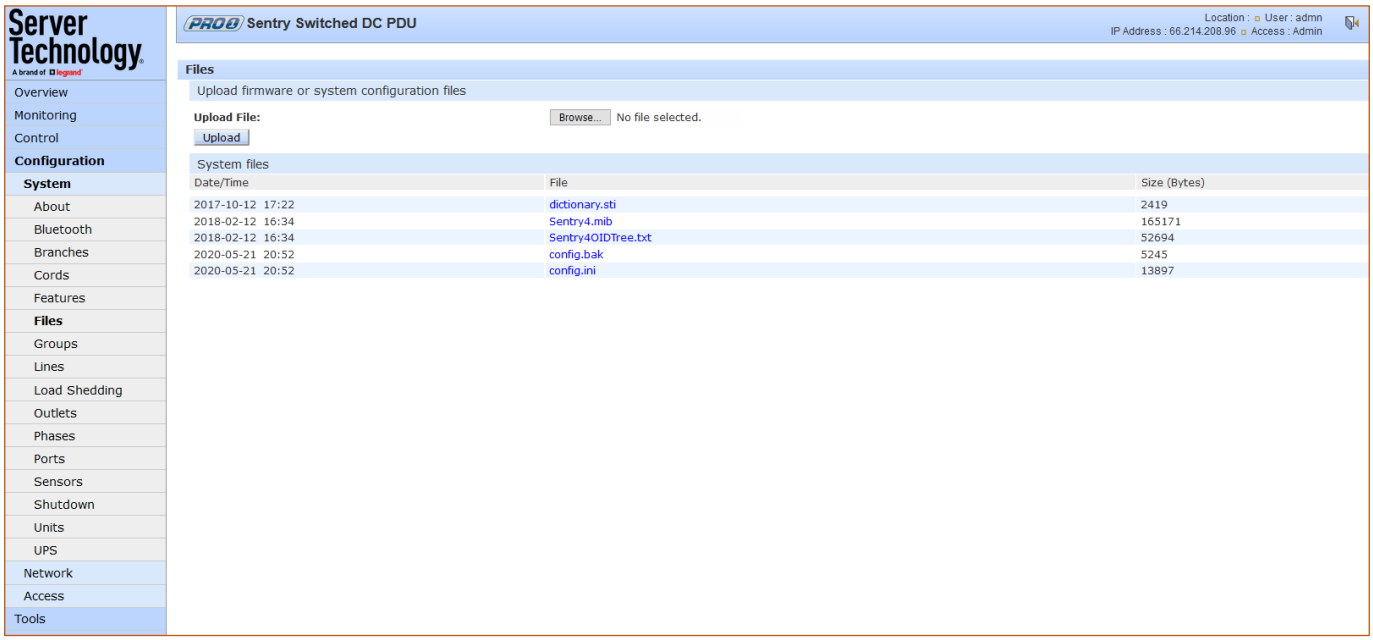
1. In the Feature Key field, type the key provided by Server Technology.
2. Click **Apply** (or press **Enter**). A restart of the unit is required after activating a feature.
3. Active features will be listed on the page.

Configuration > System > Files

The Files page provides a separate embedded file system to give quick access to system configuration files directly from the firmware GUI page, as well as the on-board and downloadable Sentry4-MIB and OID Tree for the PDU, eliminating website MIB/OID downloads.

Note: Legacy products continue to use the current Sentry3-MIB. The new Sentry4-MIB and its new OID tree are designed exclusively for the PRO1 Sentry DC PDU products, as well as for PRO2 products.

The page also allows GUI-based file uploads (without FTP) for system, configuration, and firmware versions. However, all PDU configuration/system files, MIB, and OID Tree can also be accessed via FTP at Configuration > Network > FTP.



dictionary.sti

This dictionary file contains the defined and formatted RADIUS vendor-specific attributes (VSA), generated by, and available from, Server Technology.

The PDU is configured to recognize and use the configuration values in the file as specified by the network administrator, indicating to the RADIUS server that the defined attributes are based on Server Technology's unique enterprise vendor code.

```
#
# dictionary.sti
#
VENDOR    STI    1718

#
# Attributes
#
ATTRIBUTE  STI-Access-Level  1  integer  STI
ATTRIBUTE  STI-Env-Mon       2  integer  STI
ATTRIBUTE  STI-Outlets       3  string   STI
ATTRIBUTE  STI-Groups        4  string   STI
ATTRIBUTE  STI-Ports         5  string   STI

    VALUE  STI-Access-Level  Admin        1
    VALUE  STI-Access-Level  Power-User   2
    VALUE  STI-Access-Level  User         3
    VALUE  STI-Access-Level  Reboot-Only  4
    VALUE  STI-Access-Level  On-Only      5
    VALUE  STI-Access-Level  View-Only    6

    VALUE  STI-Env-Mon  Yes  1
    VALUE  STI-Env-Mon  No   2
```

sentry4.mib

For SNMP network monitoring, values from the PDU are reported using the new Sentry4-MIB. (Note that earlier PDU products continue to use the current Sentry3-MIB). The new Sentry4-MIB and its new OID tree are designed exclusively for PRO1/PRO2 products, including the PRO1 Sentry Switched DC PDU.

Reported MIB objects in the Sentry4-MIB are identified with a new “st4” prefix as part of the object name. You may be familiar with MIB objects for the PDU, for example, outletWakeupState. However, when the SNMP monitoring system displays a value for the MIB object name, st4outletWakeupState, based on the “st4” prefix in the name, you will recognize that the reported value is coming from a PRO1/PRO2 unit (or PRO1 DC unit), not from an earlier PDU product.

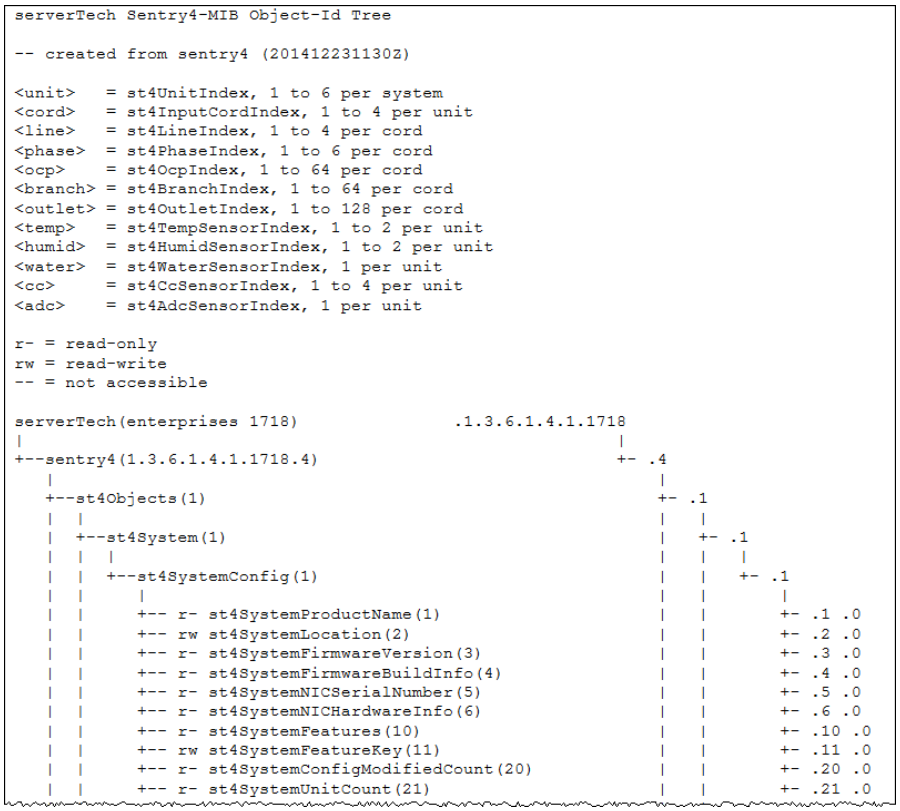
The Sentry4-MIB and OID tree for the PDU can be accessed on-board in the GUI via **Configuration > System > Files**, or accessed by using the Server Technology FTP site the same way as with the Sentry3-MIB and OID tree for the earlier PDU products.

```
--
--  Copyright(C) 2003-2014 Server Technology, Inc.
--

    Sentry4-MIB DEFINITIONS ::= BEGIN

    IMPORTS
        MODULE-IDENTITY, enterprises, Integer32,
        OBJECT-TYPE, NOTIFICATION-TYPE                    FROM SNMPv2-SMI
        OBJECT-GROUP, NOTIFICATION-GROUP, MODULE-COMPLIANCE FROM SNMPv2-CONF
        TEXTUAL-CONVENTION, DisplayString                 FROM SNMPv2-TC;


    sentry4 MODULE-IDENTITY
        LAST-UPDATED "201412231130Z" -- 23 December 2014
        ORGANIZATION "Server Technology, Inc."
        CONTACT-INFO
            "Server Technology, Inc.
             1040 Sandhill Road
             Reno, NV 89521
             Tel: (775) 284-2000
             Fax: (775) 284-2065
             Email: mibmaster@servertech.com"
        DESCRIPTION
            "This is the MIB module for the fourth generation of the
             Sentry product family.  This includes the PRO2 series of
             Smart and Switched Cabinet Distribution Unit (CDU) and
             Power Distribution Unit (PDU) products."
        REVISION "201412231130Z" -- 23 December 2014
        DESCRIPTION
            "Initial release."
        ::= { serverTech 4 }
```

sentry4OIDTree.txt

The Sentry4OIDTree is the new OID tree structure that identifies data objects for SNMP network monitoring. The Sentry4OIDTree is not backward-compatible with the Sentry3OIDTree.

Continue to use the Sentry3OIDTree for SNMP network monitoring of PDU products, and use the Sentry4OIDTree exclusively for PRO1/PRO2 products, including the PRO1 Sentry Switched DC PDU.



```
serverTech Sentry4-MIB Object-Id Tree

-- created from sentry4 (201412231130Z)

<unit>   = st4UnitIndex, 1 to 6 per system
<cord>   = st4InputCordIndex, 1 to 4 per unit
<line>   = st4LineIndex, 1 to 4 per cord
<phase>  = st4PhaseIndex, 1 to 6 per cord
<ocp>    = st4OcpIndex, 1 to 64 per cord
<branch> = st4BranchIndex, 1 to 64 per cord
<outlet> = st4OutletIndex, 1 to 128 per cord
<temp>   = st4TempSensorIndex, 1 to 2 per unit
<humid>  = st4HumidSensorIndex, 1 to 2 per unit
<water>  = st4WaterSensorIndex, 1 per unit
<cc>     = st4CcSensorIndex, 1 to 4 per unit
<adc>    = st4AdcSensorIndex, 1 per unit

r- = read-only
rw = read-write
-- = not accessible

serverTech(enterprises 1718)              .1.3.6.1.4.1.1718
|                                                        |
+--sentry4(1.3.6.1.4.1.1718.4)                           +- .4
   |                                                        |
   +--st4Objects(1)                                        +- .1
   |  |                                                    |   |
   |  +--st4System(1)                                     |   +- .1
   |  |  |                                                 |   |   |
   |  |  +--st4SystemConfig(1)                             |   |   +- .1
   |  |     |                                              |   |       |
   |  |     +-- r- st4SystemProductName(1)                 |   |       +- .1 .0
   |  |     +-- rw st4SystemLocation(2)                    |   |       +- .2 .0
   |  |     +-- r- st4SystemFirmwareVersion(3)             |   |       +- .3 .0
   |  |     +-- r- st4SystemFirmwareBuildInfo(4)           |   |       +- .4 .0
   |  |     +-- r- st4SystemNICSerialNumber(5)             |   |       +- .5 .0
   |  |     +-- r- st4SystemNICHardwareInfo(6)             |   |       +- .6 .0
   |  |     +-- r- st4SystemFeatures(10)                   |   |       +- .10 .0
   |  |     +-- rw st4SystemFeatureKey(11)                 |   |       +- .11 .0
   |  |     +-- r- st4SystemConfigModifiedCount(20)        |   |       +- .20 .0
   |  |     +-- r- st4SystemUnitCount(21)                  |   |       +- .21 .0
```

config.bak (or *.bak)

This configuration backup file (firmware version 8.0x or later), when uploaded, restores a unit, including network, SNTP, and FTP settings.

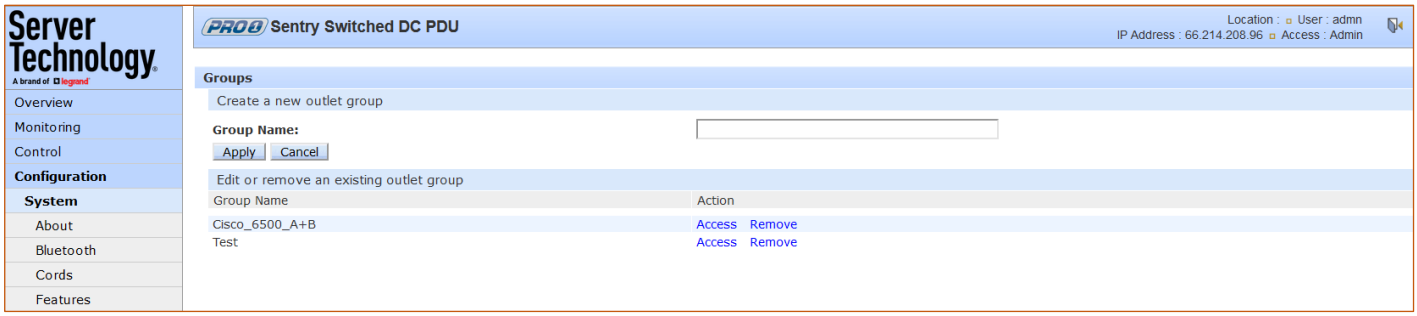
User-configuration values are restored, ***except***:

- DHCP/IP values in network settings
- SNAP password
- SNMP sysName (unless restoring to the same unit from which the backup came, based on NIC serial number, in which case the sysName is restored)
- User-loaded x-509 certificate and key
- Factory-configuration values, for example NIC serial number and profile, are not backed up or restored.

Configuration > System > Groups

An outlet group is named group with a collection of outlets assigned to the group. Outlet groups can be granted access to selected outlets by the administrative user, and outlet activity by group can be monitored on a separate Web interface page for outlet group monitoring.

The **Groups** page lets the administrator create and name a new outlet group and assign to the group access rights to individual (or all) outlets. For dynamic monitoring of outlets assigned to a group, see the separate **Monitoring > Groups** page.

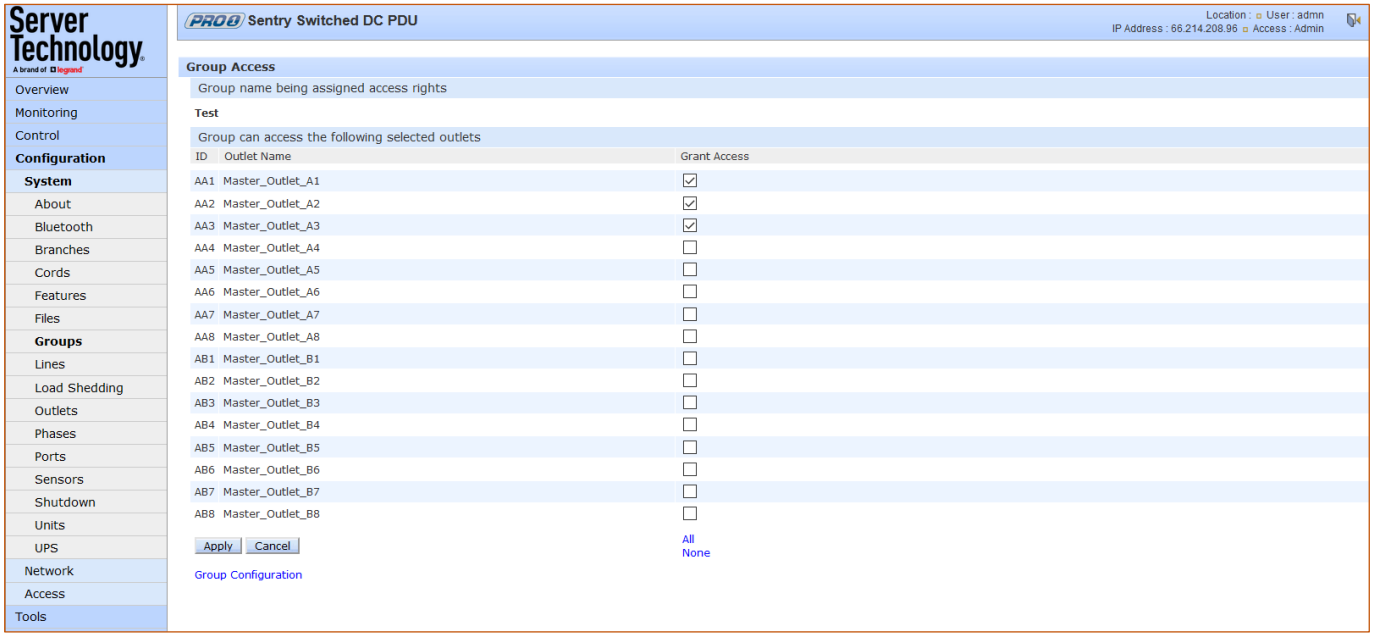


To create a new outlet group:

1. In the Group Name field, type the new name for the outlet group.
2. Click **Apply**. The newly added name displays in the lower part of the page in a list of group names for editing or removing.

To grant individual outlet access rights to an outlet group:

1. For the group name displayed in the list, click the Access link. The Group Access page displays to allow granting access rights to individual outlets by checking corresponding outlet checkboxes (or unchecking a checkbox to deny rights).
2. Click **Apply**. Access rights are applied to the outlets for the outlet group.



To grant access rights to all outlets for an outlet group:

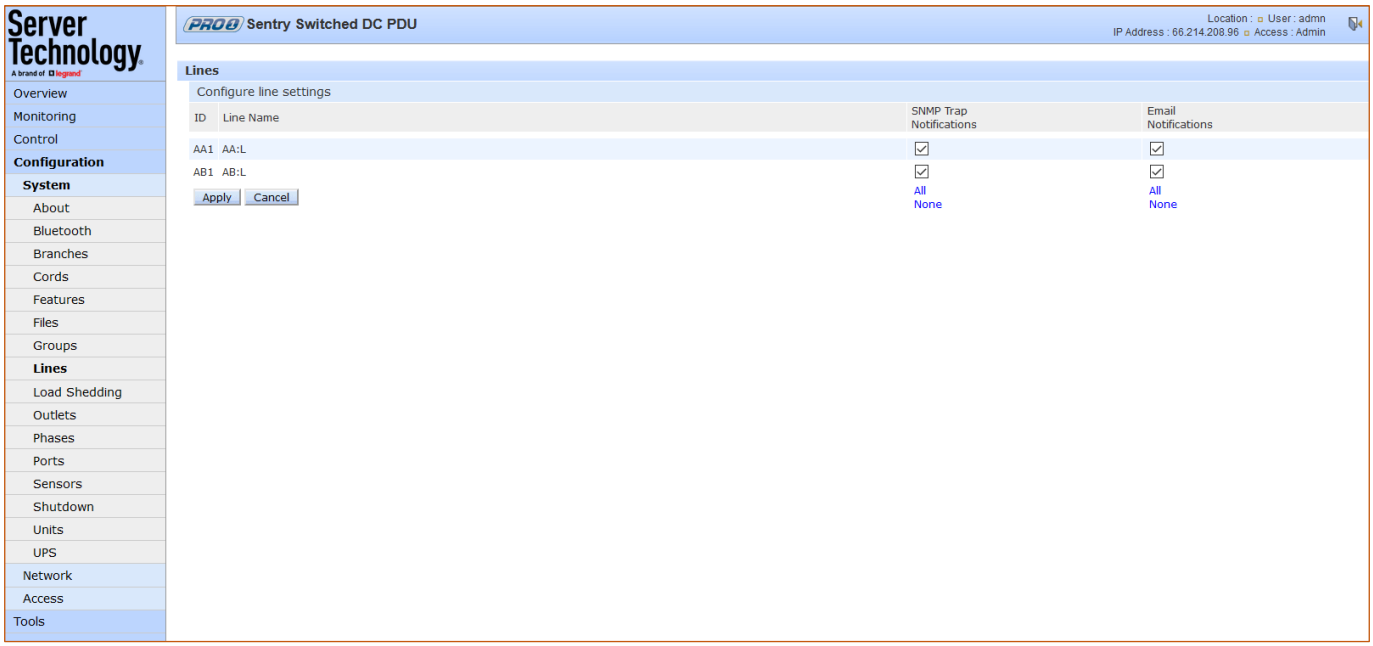
1. For the group name displayed in the list, click the Access link.

2. At the bottom of the Group Access page, click the All link to grant access to all outlets listed on the page (or click the None link to deny access to all outlets listed).
3. Click **Apply**.

Configuration > System > Lines

The Lines page configures the separate area of the PDU's cord architecture that reports current line load, allowing the setting of multiple line threshold levels, plus threshold hysteresis. The page also sets SNMP Trap and Email notifications for line events.

For dynamic monitoring of line status and current, see the separate **Monitoring > Lines** page.



To configure line settings:

1. For each line listed, check (or uncheck) SNMP Trap Notifications and/or Email Notifications to enable/disable notifications for line events. To enable (or disable) all lines for SNMP Trap or Email notifications, click All (or None).
2. Click **Apply**.

Note: The format of the Sentry DC PDU line names is a standard and fixed naming structure and cannot be edited.

Example of line names:

AA:L1, AA:L2, AA:L3, AA:N (Master unit: Lines 1, 2, 3, and Line N for neutral)

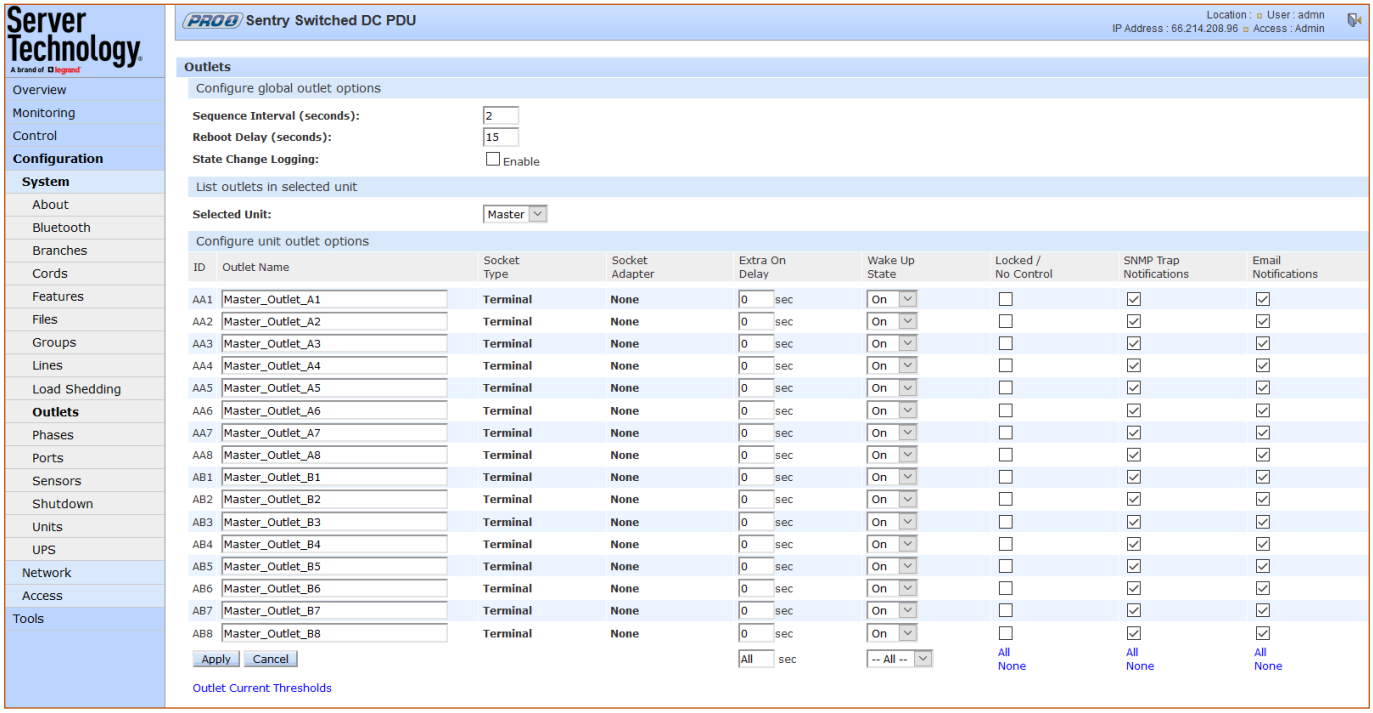
BA:L1, BA:L2, BA:L3, BA:N (Link unit: Lines 1, 2, 3, and Line N for neutral)

Configuration > System > Outlets

The **Outlets** page allows configuration of global outlet parameters and outlet shutdown options, including the setting of high/low threshold levels for outlet current. The page also sets SNMP Trap and Email notifications for outlet events.

For outlet management, this page allows the issuing of On, Off, and Reboot commands on individual outlets and all outlets globally.

For dynamic monitoring of outlet status assigned to a group, see the separate **Monitoring > Groups** page.



To configure outlet options:

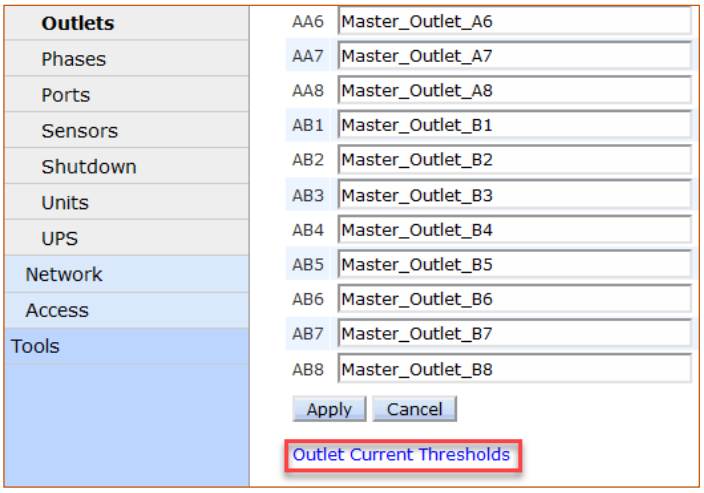
1. Set the Sequence Delay (in seconds) to determine the delay between turning on the outlets. Range is 0-15 seconds.
2. Set the Reboot Delay (in seconds) to set an extra on delay when rebooting an outlet.
3. Check to enable the State Change Logging feature. This option shows outlet state change as a reported event in all system/debug logs.
4. In the Outlet Name field, provide a descriptive text name, from 0-32 characters. The ID is a system-assigned internal name and cannot be changed
5. View the reported type of socket displayed for the outlet.
6. In the Extra On Delay field, for a specific outlet, set the value (in seconds) for an extra delay when turning on the outlet. Range is 0-900 seconds.
7. From the drop-down menu, select the On, Off, Last option for the wakeup state of the outlet. Wakeup state sets the default outlet control state after system power up. The option Last is the last known power state of the outlet.
8. For the Locked/No Control checkbox, check (to lock the outlet) or uncheck (to unlock the outlet). The Locked feature determines if control actions (on, off, reboot) are enabled/disabled for the outlet after the wakeup state is applied. When an outlet is configured in the locked state, the outlet locks at its current control state (on or off), and the outlet control state changes to Locked On or Locked Off.

   Notes:

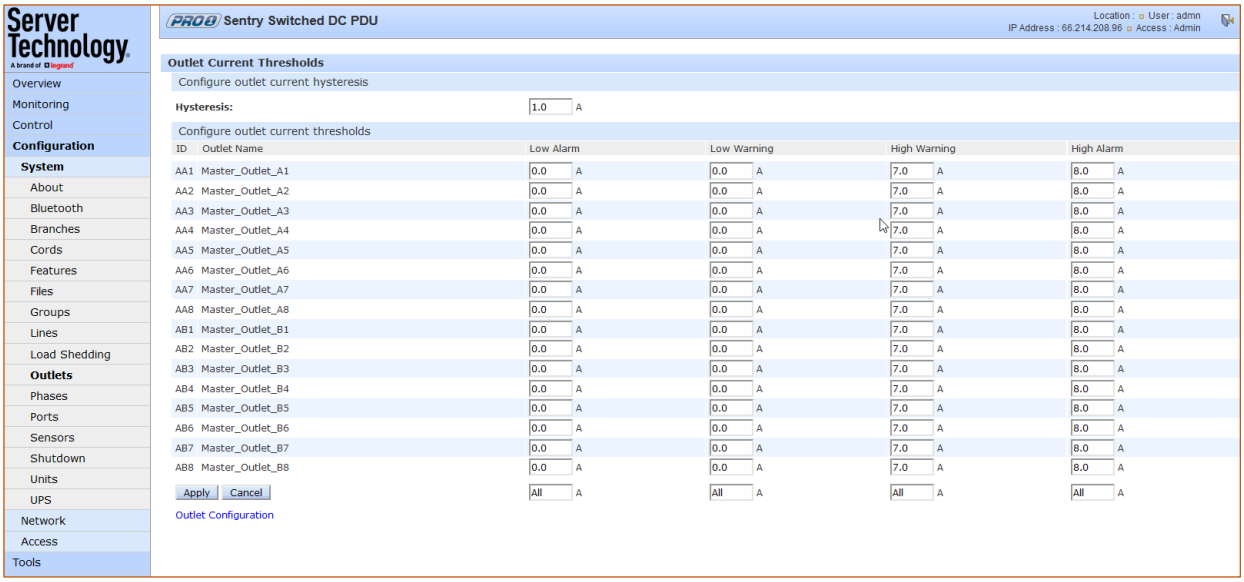
   - The locked outlet will not be affected by group actions.
   - SNMP and CLI control actions will be ignored for a locked outlet.
9. For each outlet listed, check (or uncheck) SNMP Trap Notifications and/or Email Notifications to enable (or disable) notifications for outlet events.
10. Click **Apply**.

Configuring Outlet Current Thresholds

1. Click the Outlet Current Thresholds link at the bottom of the Outlets page:



2. The configuration page displays:

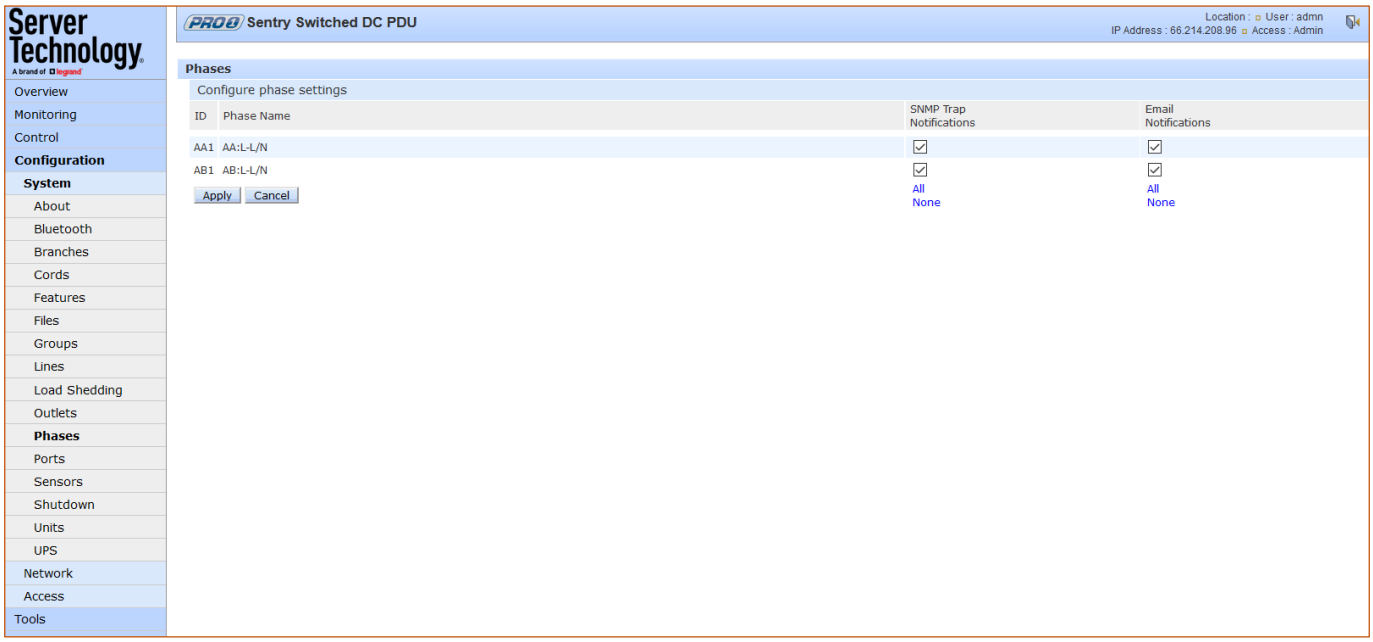


To set outlet current thresholds:

1. Provide threshold hysteresis between event state and recovery (A). the range is 0.0-10.0A; the default is 1.0A.
2. Set the low/high alarm and low/high warning threshold values (A) for outlet current load. The range is min 0.0A; max is max current shown in the **show outlets** command.
3. Click **Apply**.

Configuration > System > Phases

The **Phases** sets SNMP Trap and Email notifications for phase events. For dynamic monitoring of phase status, voltage, and power factor, see the separate **Monitoring > Phases** page.

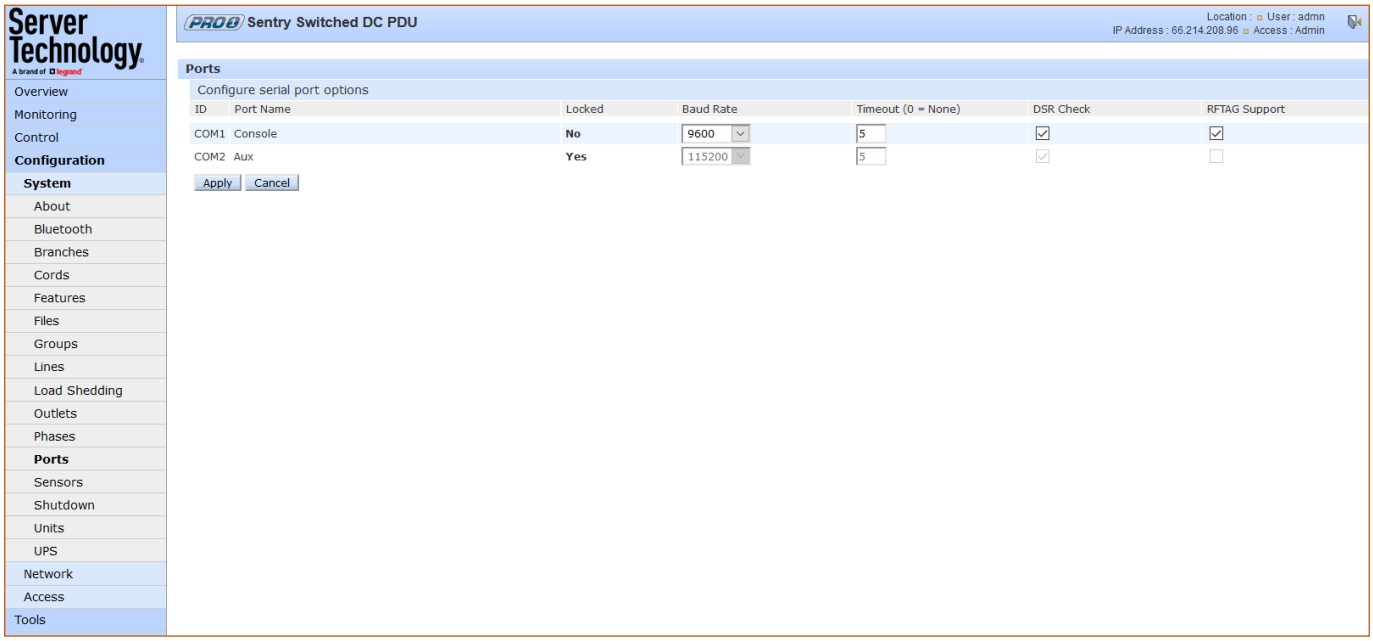


To set phase event notifications:

1. For each phase listed, check (or uncheck) SNMP Trap Notifications and/or Email Notifications to enable (or disable) notifications for phase events.
2. Click **Apply**.

Configuration > System > Ports

The **Ports** page configures options for the external serial port on the PDU.



To configure the serial port:

1. From the Baud Rate drop-down menu, select the data rate.
2. Set the Timeout value (in minutes) for the serial port inactivity timeout period. The timeout period defines the maximum period of inactivity before automatically closing the pass-thru session. Range is 0-60 (minutes); default is 5 minutes; setting the value to “0” disables the timeout.
3. From the DSR Check drop-down menu, select On or Off to enable or disable serial port active signal checking.
4. Check the RFTAG Support box to enable RF Code tag (RFTAG) support for the selected (and unlocked) port. If the port is locked, any attempts to change this setting will be ignored.
5. Click **Apply**.

Notes:

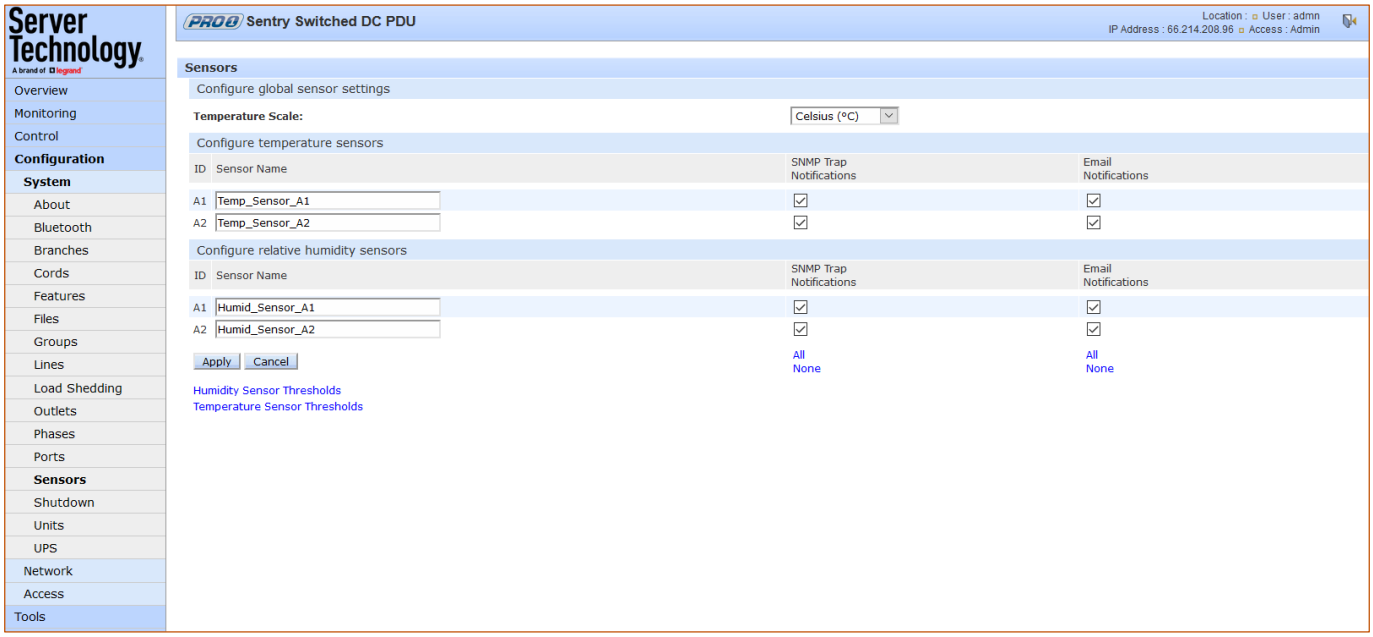
- Pass-Thru connections can only be initiated from the Command Line Interface (CLI) in a Telnet/SSH session.
- One concurrent Serial session is allowed. If the unit has two serial ports, then two simultaneous serial sessions will be supported.

Configuration > System > Sensors

The **Sensors** page configures multiple threshold levels for global temperature sensors and relative humidity sensors, plus threshold hysteresis. The page also determines the system-wide temperature scale and sets SNMP Trap and Email notifications for sensor events.

For dynamic monitoring of sensor temperature/humidity and operational status, see the separate **Monitoring > Sensors** page.

Note: If a fan is present on the PDU, the "Fan Sensor Thresholds" link will be displayed on this page to allow configuration of fan operating values. Fan hysteresis and thresholds will be rotations per minute (RPM).

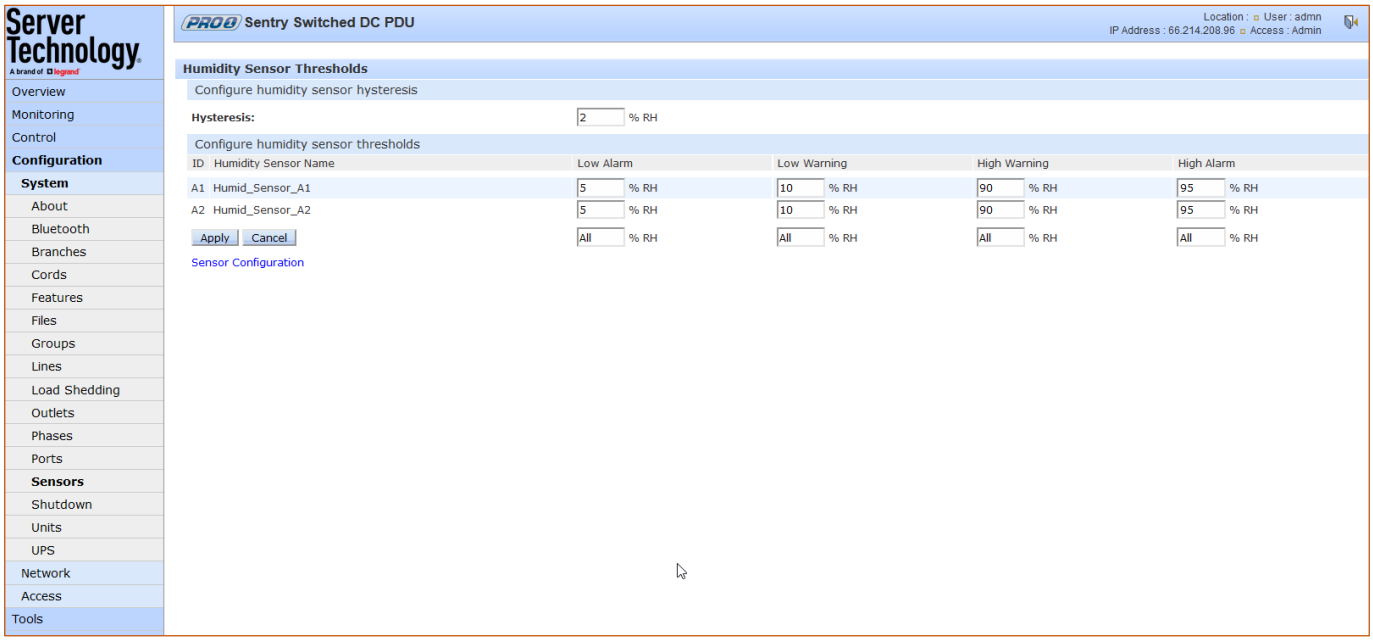


To configure global sensor settings:

1. From the Temperature Scale drop-down menu, select the desired system-wide scale as Celsius (°C) or Fahrenheit (°F).
2. In the Sensor Name field, provide a descriptive text name for individual temperature sensors and/or relative humidity sensors. The ID is a system-assigned internal name and cannot be changed.
3. For each sensor listed (and fan, if present), check (or uncheck) SNMP Trap Notifications and/or Email Notifications to enable (or disable) notifications for sensor events.
4. Click **Apply**.

Configuring Humidity Sensor Thresholds

Click **Humidity Sensor Thresholds** at the bottom of the Sensors page to display the configuration page:

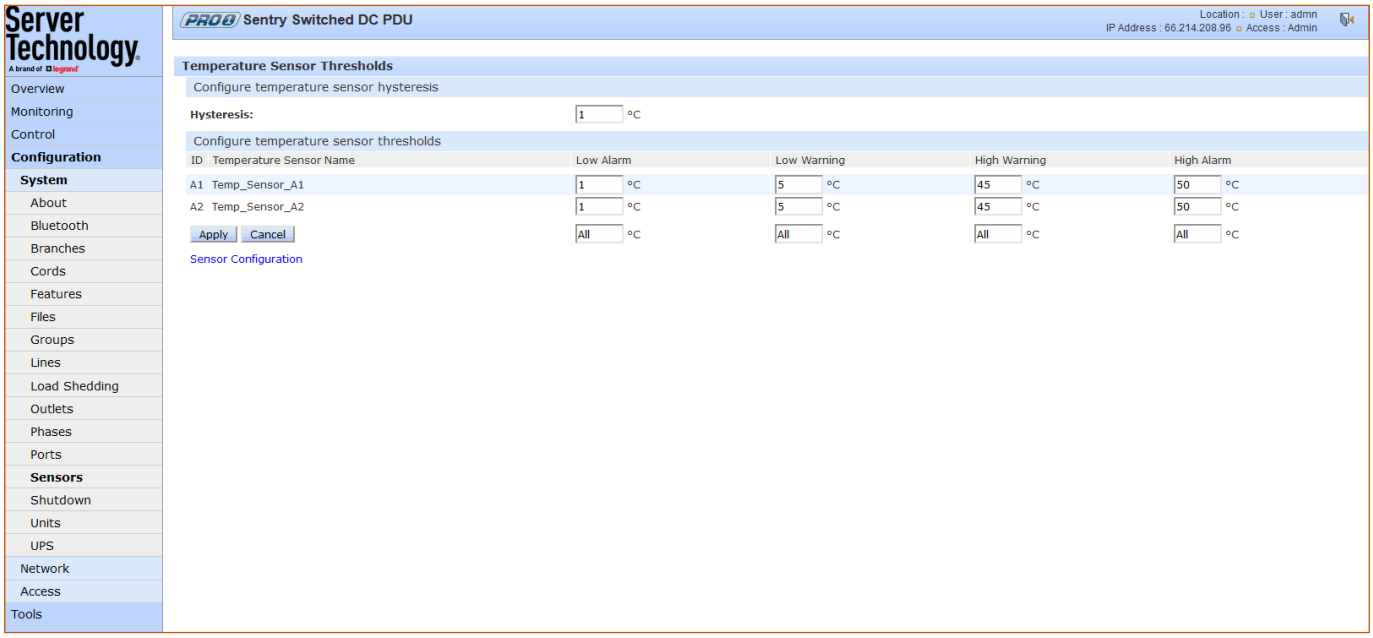


To set humidity sensor thresholds:

1. Provide the threshold hysteresis between event state and recovery(%RH). Range is 0-20%RH; default is 2%RH.
2. Set the low/high alarm and low/high warning threshold values for the humidity sensor(%RH). Range is min 0%RH, max100%RH.
3. Click **Apply**.

Configuring Temperature Sensors Thresholds

Click the Temperature Sensor Thresholds link at the bottom of the Sensors page to display this configuration page:



To set temperature sensor thresholds:

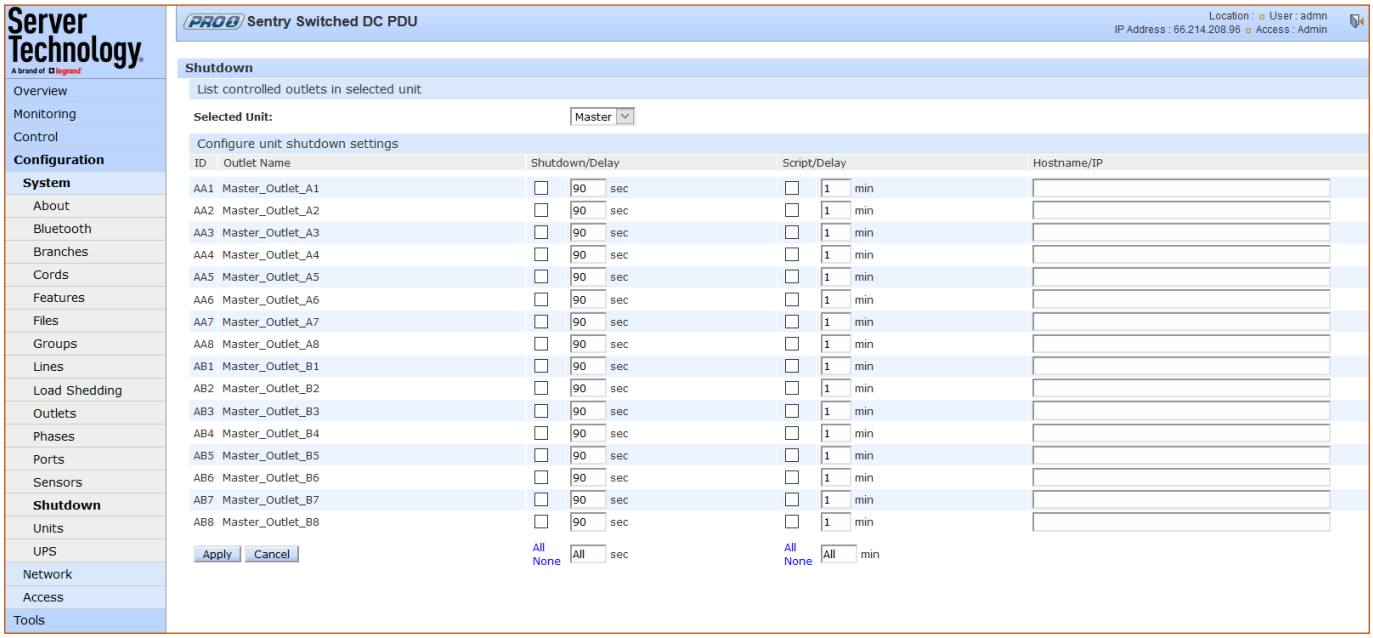
1. Provide the threshold hysteresis between event state and recovery temperature. Range is 0-30° Celsius, or 0-54° Fahrenheit; default is 1° Celsius or 2° Fahrenheit.
2. Set the low/high alarm and low/high warning threshold values for the temperature sensor(°). Range is minimum -40° to maximum 123° Celsius, or minimum -40° to maximum 253° Fahrenheit.
3. Click **Apply**.

Configuration > System > Shutdown

The **Shutdown** page configures the remote shutdown options for outlets (for Switched PRO1/PRO2 products only, including the PRO1 Sentry Switched DC PDU only).

The PDU supports the ability to initiate an orderly shutdown of a specific outlet or outlet group after performing a user-specified shutdown operation.

The shutdown also protects open application files prior to a server being powered down. Shutdown signaling is initiated over the existing TCP/IP network and requires the use of a remote shutdown agent.



To configure shutdown settings:

1. For an individual outlet in the list, type the desired Shutdown/Delay for the outlet (in seconds), or accept the 90-second default, and check the corresponding checkbox. The shutdown/delay sets the time to wait after the shutdown notification before changing outlet state; range is 1-900 seconds; default is 90 seconds.
2. For an individual outlet in the list, type the desired Script/Delay for the outlet (in minutes) to set the time to wait after the script has executed to change outlet state, and check the corresponding checkbox; range is 1-15 minutes; default is 1 minute.
3. Provide the hostname/IP address for the target server.
4. Click **Apply**.

About the Remote Shutdown Feature

When the Remote Shutdown Agent is installed on the server and the Shutdown feature is configured on the PDU, the following **shutdown process** occurs:

1. The Off or Reboot command is received by the PDU.
2. Shutdown signal is sent to the Remote Shutdown Agent on the target server.
3. The Remote Shutdown Agent initiates a systematic shutdown of the target server for all actions that remove power from the outlet (such as the Off and Reboot commands), and allows the execution of user-defined scripts to perform custom activities, like safely shutting down open databases.
4. The PDU removes power from the outlet.

Supported Operating Systems for Shutdown

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

Installing the Shutdown Agent

Note: For all operating systems shown below, if the IP address of the PDU is left blank in the last step of these installation instructions, any PRO1/PRO2 unit, or PRO1 DC unit, can send a shutdown signal to the server.

Windows

1. Browse to the location of the Remote Shutdown Agent installation files.
2. Run **setup.exe** by double-clicking the icon.
3. Reply to the standard installation prompts.
4. For additional security, when prompted, enter the IP address of the PDU that will be sending the shutdown signal.

Linux

1. Browse to the location of the Remote Shutdown Agent installation files.
2. Run **SetupRA**.
3. For additional security, when prompted enter the IP address of the PDU that will be sending the shutdown signal.

Unix

1. Browse to the location of the Remote Shutdown Agent installation files.
2. Run **Install**.
3. For additional security, when prompted enter the IP address of the PDU that will be sending the shutdown signal.

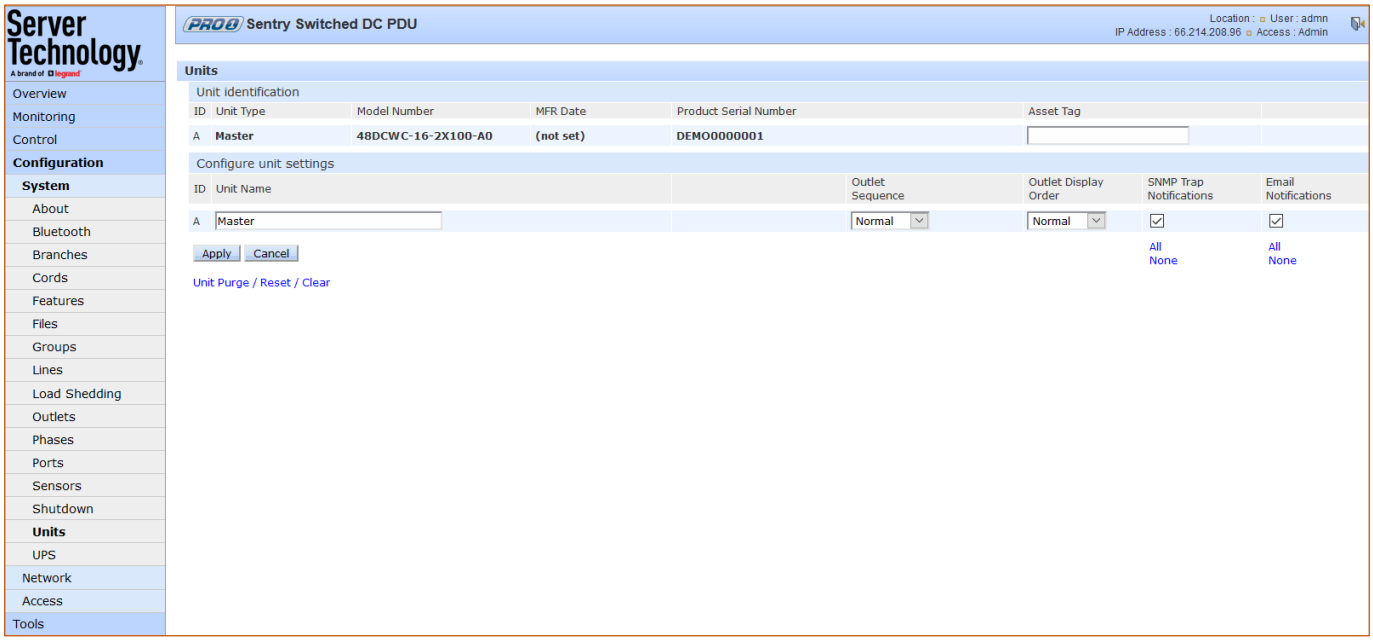
Novell Netware

1. Browse to the location of the Remote Shutdown Agent installation 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.

Configuration > System > Units

The **Units** page sets a descriptive system name for each PDU, configures asset management identification, determines outlet sequence, sets the display orientation of the mounted unit, and sets the Web GUI and CLI display order of the outlets. The page also sets SNMP Trap and Email notifications for unit events.

The Purge and Restore link on the Units page displays another page to allow the clearing of current values in non-volatile (NV) memory from individual units, and the resetting of those values back to factory defaults.



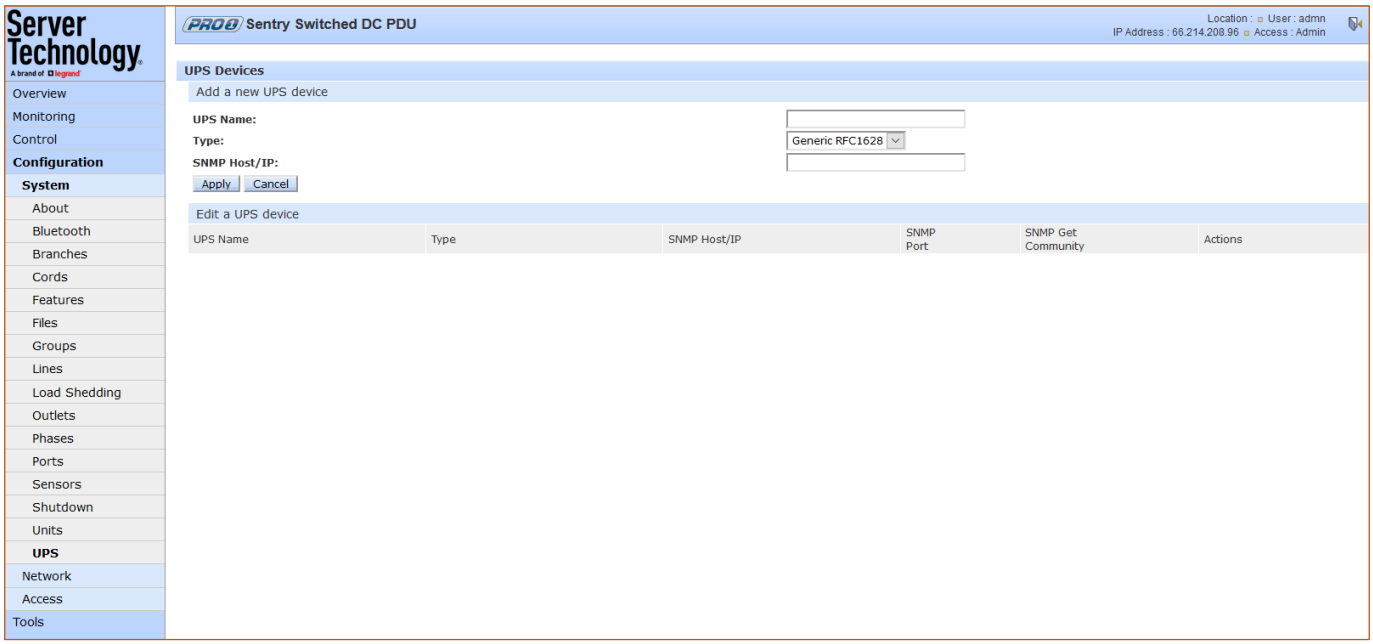
To configure the PDU:

1. (Optional) Provide an asset tag identification for listed master and/or link units, and check the Identity checkbox.
2. In the Unit Name field, provide a descriptive text name for the unit, from 0-32 characters. The ID is a system-assigned internal name and cannot be changed.
3. For Switched products, the PDU allows configuration of the power-on sequence of the outlets with the following available options. From the Outlet Sequence drop-down menu, select an option:
    - Normal: (Default) Powers on outlets in ascending numeric order by outlet number, for example, from outlet 1-8.
    - Reversed: Powers on outlets in descending order by outlet number; such as, from outlet 8-1.
4. For Switched products, from the Outlet Display Order drop-down menu, select an option to set the Web GUI or CLI outlet display order for the selected unit. Any attempt to change this setting on a device that does not have sequential switched outlets will be ignored:
    - Normal: (Default) Displays outlets in ascending numeric order by outlet number, for example, from outlet 1-8.
    - Reversed: Displays 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.

5. Check (or uncheck) the SNMP Trap Notifications and/or Email Notifications checkboxes to enable (or disable) unit event notification for a specific unit.
6. Click **Apply**.

Configuration > System > UPS

The **UPS** page manages UPS devices connected to a PRO1 DC PDU. A connected UPS device can be added to or deleted from the system. Several device options are available for configuration, including a configurable UPS name, and assignment of the PDU's lines to be powered by the UPS.

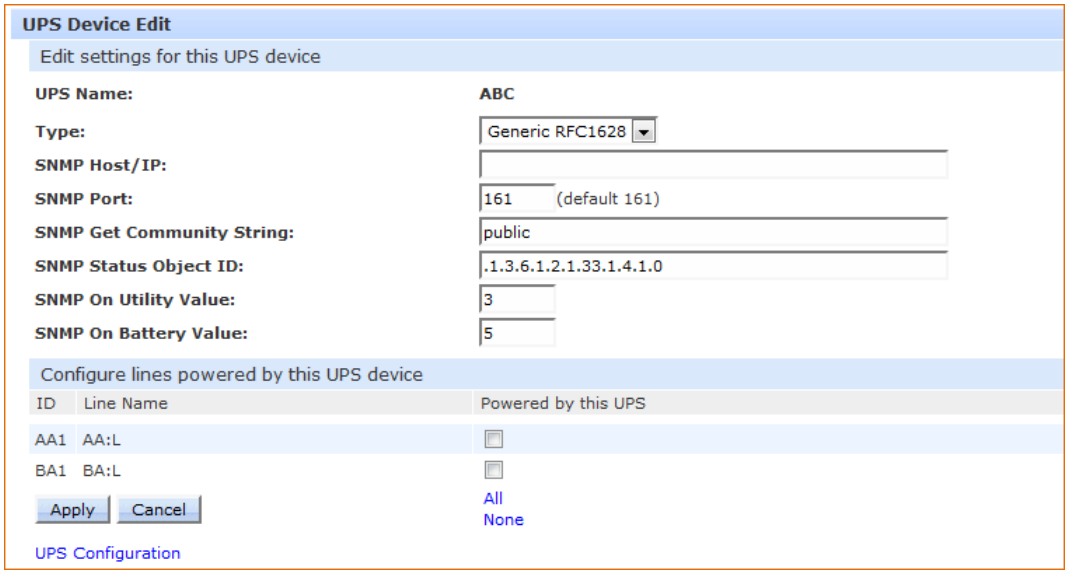


To add a new UPS:

1. Type a UPS name.
2. Select the UPS manufacturer from the Type drop-down menu.
3. Type an SNMP hostname/IP address in the field provided.
4. Click **Apply**. The new UPS displays in the list of UPS devices. The list displays in alphabetic order by UPS name.

Configuring a UPS:

For a UPS listed on the page, click the Edit link to display the edit window:



To configure a UPS:

1. From the Type drop-down list, select the UPS manufacturer.
2. Type the desired values for the SNMP-related fields or accept the defaults as shown on the page.
3. Check the corresponding checkboxes for the line(s) that are powered by the UPS. To select all lines for the UPS, click All (or click None to deselect all lines).
4. Click **Apply**.

To remove a UPS:

1. For a UPS listed, click the Remove link. You will be prompted to confirm the removal of the UPS.

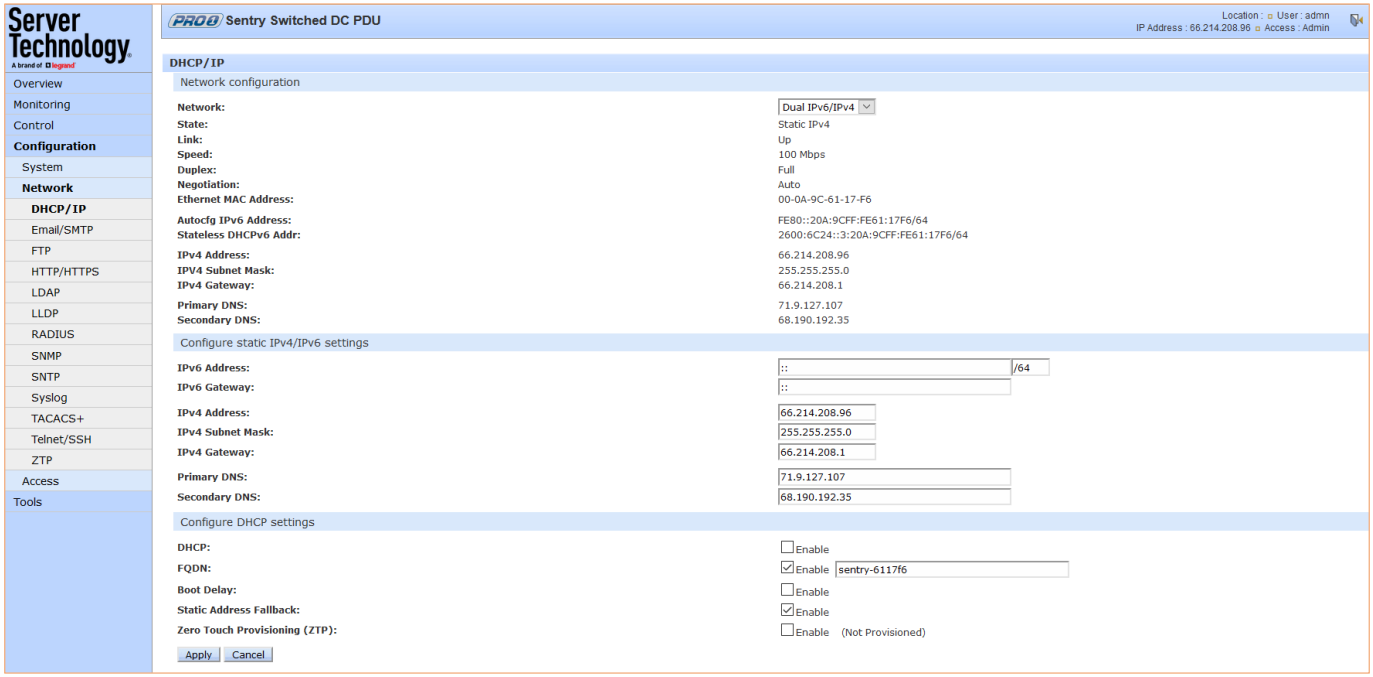
Network (Setting Up Network Protocols)

The Network section of the Web interface provides network setup options for the protocols supported by the PRO1/PRO2 PDU and PRO1 DC PDU: DHCP/IP, Email/SMTP, FTP, HTTP/HTTPS, LDAP, RADIUS, SNMP, SNTP, Syslog, TACACS+, and Telnet/SSH.

Note: The Network section only allows the administrator to set up network protocol parameters.
To configure how the PDU user will access and use the network and system, see the **Access** section.

Network > DHCP/IP

The **DHCP/IP** page allows configuration of the acquisition method for the protocol stack, viewing of current network communication settings, determining static IPv4/IPv6 address formats, and the enabling of DHCP options.



To configure DHCP/IP:

1. Network: Determines the acquisition method used for the protocol stack: “Disabled”, “Dual IPv6/IPv4”, or “IPv4 only”. For maximum backward compatibility, accept the default network mode “IPv4 only”.
2. View the fields in the next section of the page as a quick reference for current network parameters:

   For more information about how the PDU handles the network with IPv6/IPv4 options, see Network-Enabled Modes in this user guide.

To configure static IPv4/IPv6:

1. IPv4/IPv6 Address/Gateway: Provide the address for these fields in either IPv4 or IPv6 format.
2. IPv4 Subnet Mask: If IPv4 is used, supply the IP address for the subnet mask in IPv4 format.
3. Primary/Secondary DNS: Provide the IP address for the primary and secondary DNS hostnames.

To configure DHCP settings:

1. DHCP: Check or uncheck to enable/disable DHCP support. Default is disabled.
2. FQDN: Provide the fully-qualified domain name (FQDN) name and check Enable. Default is enabled.
3. Boot Delay: Check or uncheck to enable/disable Boot Delay with the following results:
    - Enable: The Boot Delay option gives the PDU approximately 100-seconds to establish a connection through a DHCP server. The interval allows various network component activities to occur as the unit powers up (such as obtaining SNTP time stamps for logging).
    - Disable: (Default) 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 unit. 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.

4. Static Address Fallback: Check or uncheck to enable/disable Static Address Fallback with the following results:
    - Enable: (Default) The Static Address Fallback option informs the unit to automatically fall back to a static address if a DHCP server does not respond after 90-seconds.
    - Disable: The Static Address Fallback option generates DHCP server requests until the unit obtains a dynamic address.

Notes:

- The Static Address Fallback option executes only when DHCP is enabled.
- If the DHCP server boot time is excessive, you may need to disable the DHCP Static Address Fallback option.
- The DHCP Static Address Failback option does not apply when WLAN is enabled.

5. Zero Touch Provisioning (ZTP): Check or uncheck to enable/disable ZTP with the following results:
    - Enable: The ZTP option allows automated configuration for PRO1 DC products. PDUs can be provisioned and configured automatically during the initial bootup, or whenever needed, to automate network setup, user permission updates, and other PDU modifications, as necessary.
    - Disable: (Default) The ZTP option is turned off and the “Non Provisioned” state displays.

To reset ZTP:

Reset is available only when ZTP is enabled. When reset to “Not Provisioned”, the PDU will attempt ZTP again after the next RESTART, behaving as it did prior to being provisioned.

After a PDU has been successfully provisioned by ZTP, to use the GUI to reset ZTP to re-provision the PDU again either after the next RESTART or next DHCP lease renewal, click the **Reset** button on the ZTP window.

Note that the PDU’s provisioned state (“provisioned” or, “not provisioned”) is not reset by disabling ZTP. When ZTP is re-enabled on a previously provisioned PDU, the state will still show as provisioned.

Note: For more information about the automatic provisioning methodology used with Sentry DC PDUs, see the Server Technology website www.servertech.com for Technical Note: 303-9999-44, "Zero Touch Provisioning".

Network Defaults

The PDU has the following network defaults to allow unit configuration through 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 follows:

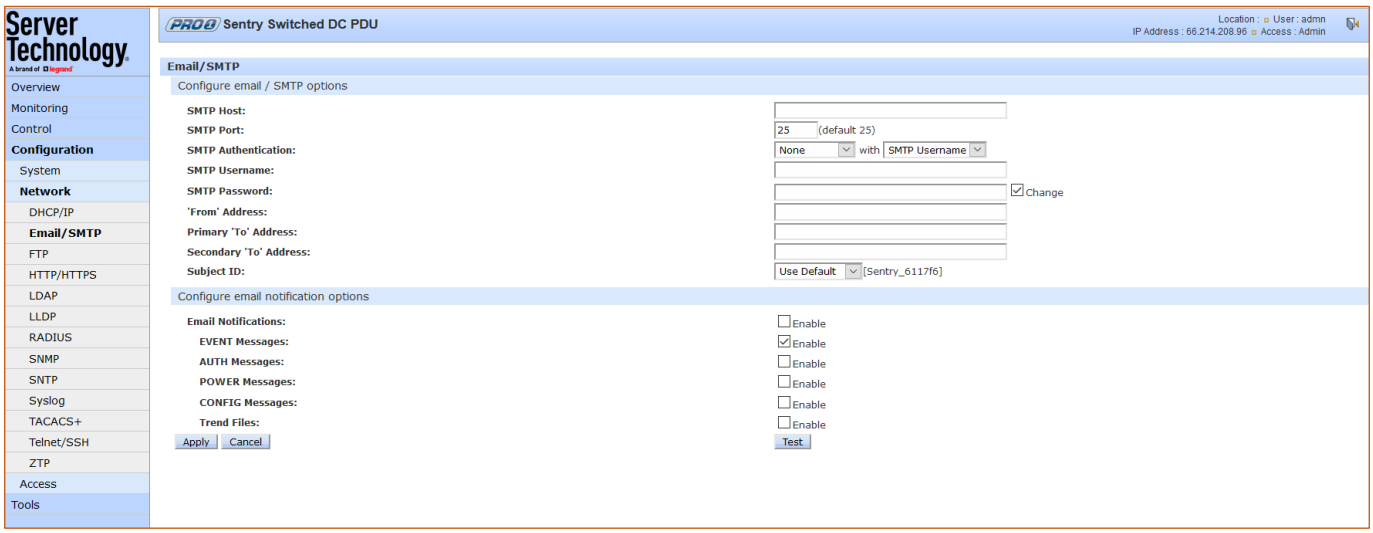
IP Address: 192.168.1.x (where x is 2-253).

Subnet Mask: 255.255.255.0

Note: The PDU must be restarted after network configuration changes.

Network > Email/SMTP

The **Email/SMTP** page allows configuration of the Email/SMTP protocol and email options.



Authentication Notes:	• SMTP authentication allows the mail client in the PDU to log into the mail server during the process of sending an email. The mail server may require this login to relay mail to another mail server. • The supported SMTP authentication types are: None (default, no SMTP authentication); Digest-MD5; CRAM-MD5, Login, Plain, and Any. SMTP authentication occurs with a configured username/password, or the address in the 'From' Address field with 'From' Address selected can be used in place of the username.

To configure SMTP protocol options:

1. Type the hostname/IP address in the SMTP Host field (either IPv4 or IPv6 format).
2. Provide the port number or accept the default as shown.
3. From the drop-down menu, select the authentication method, and from the "with" menu, select username or 'from' as described directly above in the notes.
4. Type the desired Email/SMTP username; spaces are not allowed.
5. Type the password for the username. The password sets the SMTP authentication with the username. Acceptable passwords are 1-32 alphanumeric characters, case-sensitive, and spaces are not allowed. To change the password, type over it, and check the Change box.
6. Provide the 'From' email address.
7. Provide the Primary/Secondary 'Send To' email address. If the primary 'send to' address fails, the system then attempts to send the email to the secondary 'send to' address.
8. From the Subject ID drop-down menu, select the "Sentry_nnnnnn" default option (where "nnnnnn" is the last 3 octets of the MAC address), or select the "Location" option to specify the email subject line.
9. Click **Apply**.

To configure Email notification options:

1. Check the Enable checkbox to enable Email notifications to be sent.
2. For the event notifications shown, check the corresponding Enable checkbox to enable an alert message via email. The events are:

   EVENT: System activity event

   AUTH: Authentication event

   POWER: Power event

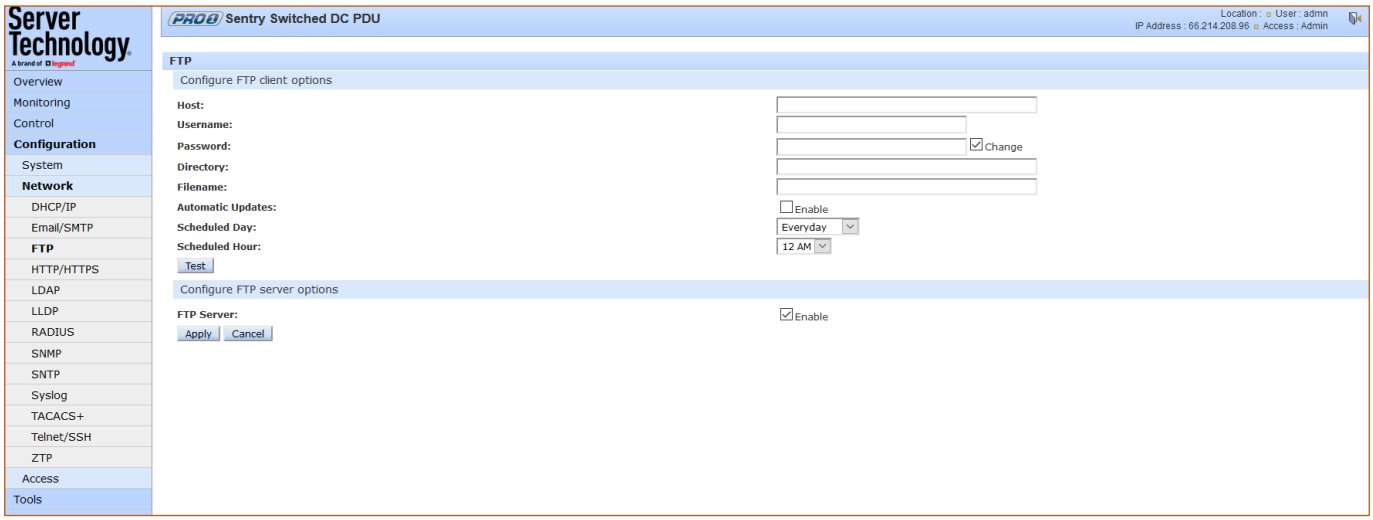
   CONFIG: System configuration event

   Trend Files: Sends the trend files via Email

3. Click **Apply**.

Network > FTP

The **FTP** configuration page allows configuring the settings required for the FTP client to perform FTP firmware uploads and automatic system uploads/downloads.



To configure FTP client options:

1. Type the hostname/IP addresses in the Host field (IPv4 or IPv6 format).
2. Type the FTP username in the Username field, 1-32 characters, spaces are allowed.
3. Provide a password for the FTP username. To change the password, check the Change box and type the new password.
4. Type the file path to be uploaded to the Directory field.
5. Type the filename to be uploaded in the Filename field.
6. The PDU is capable of scheduling automatic firmware updates. When enabled and configured, the PDU regularly checks the FTP server for a new firmware image and uploads the image. To enable Automatic Updates, check the Enable checkbox.
7. From the Scheduled Day and Scheduled Hour drop-down menus, select the desired day/hour for the automatic update to occur.
8. The FTP upload configuration validates that the unit is able to contact and log into the specified FTP server, download the firmware file, and verify that the firmware file is valid for the unit. To initiate the test, click the **Test** button.

To configure FTP server options:

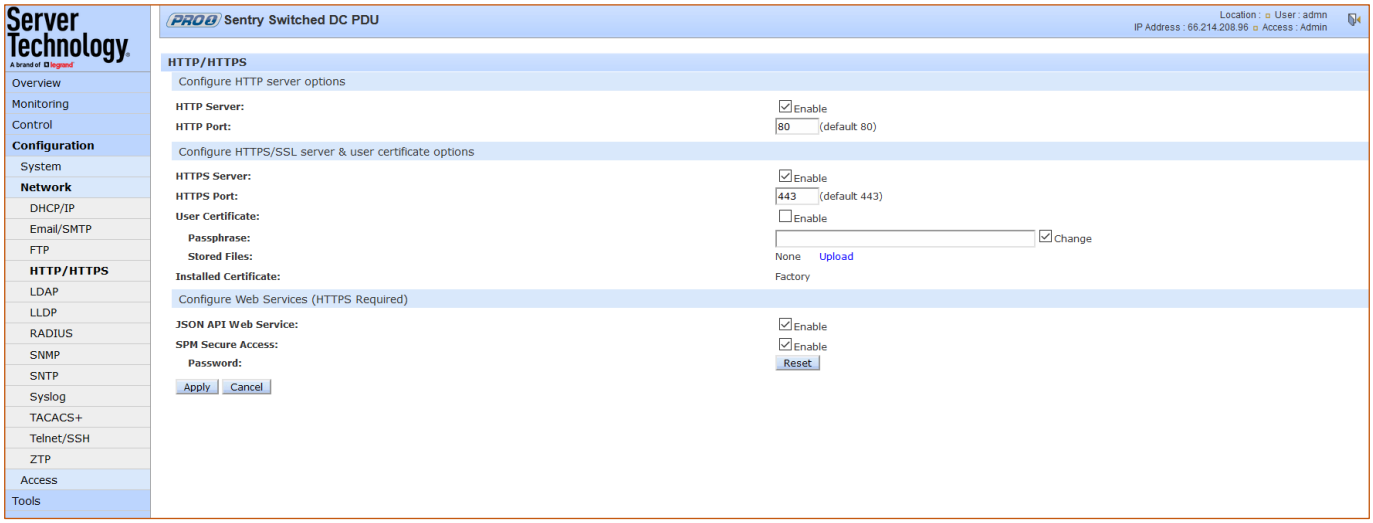
1. In the FTP Server area at the bottom of the page, check the **Enable** checkbox.

Notes:

- The FTP server must be enabled for configuration upload or download.
- Secure File Transport Protocol (SFTP) is also supported for encrypted SSH transport over the network.

Network > HTTP/HTTPS

The **HTTP/HTTPS** page configures server options for HTTP, HTTPS (secure web server), and SSL, including user-defined certificates. The page also determines secure access settings for the Sentry Power Manager (SPM) enterprise software product and for the Web services API.



To configure HTTP and HTTPS/SSL servers/ports:

1. Server: Check (or uncheck) the Enable checkboxes to enable/disable support for the HTTP and/or HTTPS/SSL server options.
2. Port: Type a port number or accept the default HTTP/HTTPS/SSL port numbers as displayed. The HTTP default port number is 80; the SSL default port number is 443.
3. Click **Apply**.

NOTES:	
	• SSL-encrypted (HTTPS) must be used for secure website connections. • A current web browser with TLS1.2 support is required. Current version of IE, Firefox, Chrome, Opera, and Safari are supported. • The HTTPS server uses the first matching cipher from the client preference list. For more information about PRO1 firmware-supported ciphers, go to www.servertech.com for the technical note: 303-9999-12, PDU Security. • With the support of TLS1.2, self-signed X.509 certificates now use a 2048-bit key and SHA256 as the signature hash algorithm. It is highly recommended (and may even be required by some web browsers), that old/weaker self-signed certificates be removed from certificate stores and new/stronger certificates be regenerated and accepted into certificate stores. • The number of concurrent HTTP/S sessions supported depends on the web browser in use.

To configure user certificate options:

1. User Certificate: Check (or uncheck) the Enable checkbox to enable/disable support for custom user certificates.
2. Passphrase: Provide a passphrase (0-63 characters) for the new user certificate. To change the passphrase, type a new passphrase and check the Change checkbox
3. Stored Files: This section displays a message (described in the following table) to confirm the upload status of the user certificate and its related public key.

Custom User Certificate Messages

Message	Description and Valid Values/Range
Cert & Key	Both the user certificate and its key were uploaded successfully.
Cert	User certificate was uploaded without a key.
No Cert	User certificate was not uploaded.
Factory Encrypted	User certificate was encrypted and uploaded at product assembly.
None	Neither the user certificate nor its key were uploaded.

4. Installed Certificate: Shows the type of certificate that was installed – Factory, User, Company.
5. Click **Apply**.

To configure web services:

Web Services API Option:

1. Check the JSON API Web Services checkbox to enable this service.

Sentry Power Manager (SPM) options:

The Sentry Power Manager (SPM) is Server Technology's enterprise management software product for the data center. The configuration options provided allow you to enable/disable SPM and reset the SPM password to its default.

1. SPM Secure Access: Check (or uncheck) the Enable checkbox to enable/disable SPM Secure Access. If your operation does not currently use SPM, you can disable this option. However, when the option is disabled, the PDU will not be able to use the secure network features or advanced remote configuration provided by SPM.
2. SPM Password: Each PRO1 unit has a unique default SPM password that communicates between SPM and the PDU. For added security, when SPM discovers a PRO1 PDU in the network, SPM changes the default password to a different (and unique) password and continues to manage or alter passwords as required for on-going system security. To reset the SPM password, click the **Reset** button.
3. Click **Apply**.

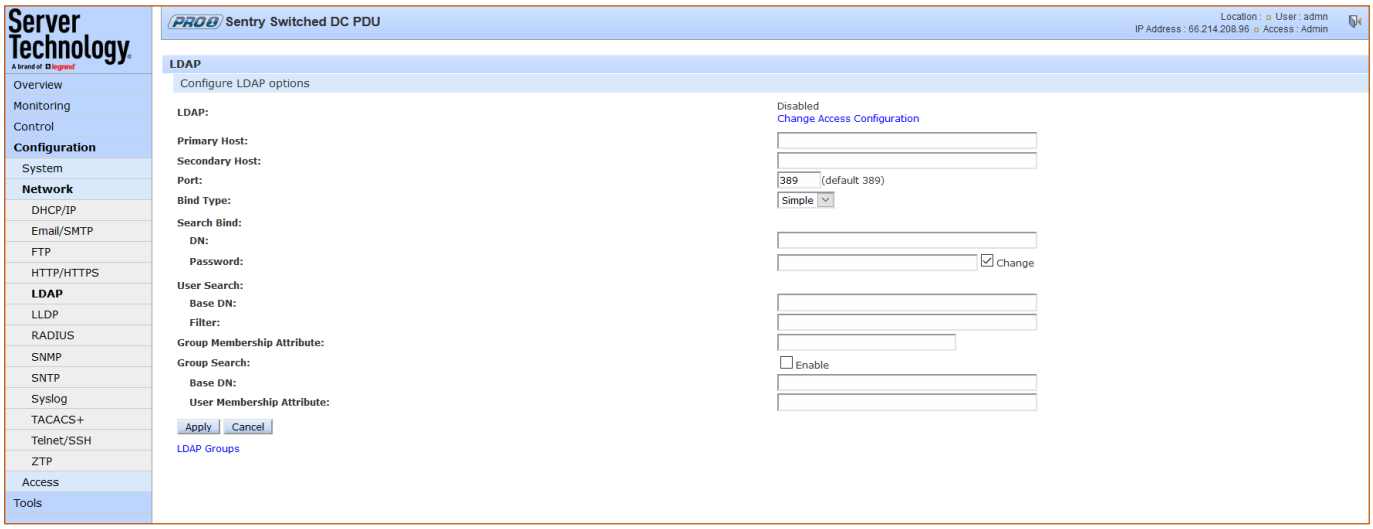
Notes:

- The SPM options apply only if you are currently using SPM.
- Both HTTP and HTTPS/SSL must be enabled or the SPM Secure Access will not be allowed. When allowed, the SPM Secure Access checkbox is enabled by default.
- Do not reset the SPM Password if SPM communication has already been established.

Network > LDAP

The **LDAP** page determines the protocol settings required to enable LDAP support.

Note: The **Network > LDAP** page is for LDAP network protocol management only. To manage LDAP user groups, see the **Access > LDAP Groups** page.



To configure LDAP:

1. LDAP**:** Enabled or Disabled displays on the page to show current LDAP status.
2. Primary/Secondary Host: Provide the hostname/IP address of the Directory Services server.
3. Port: Set the port number for the LDAP server, 1-65535 (Default is 389).
4. Bind Type: Sets the bind method for 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.
   - TLS: 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.

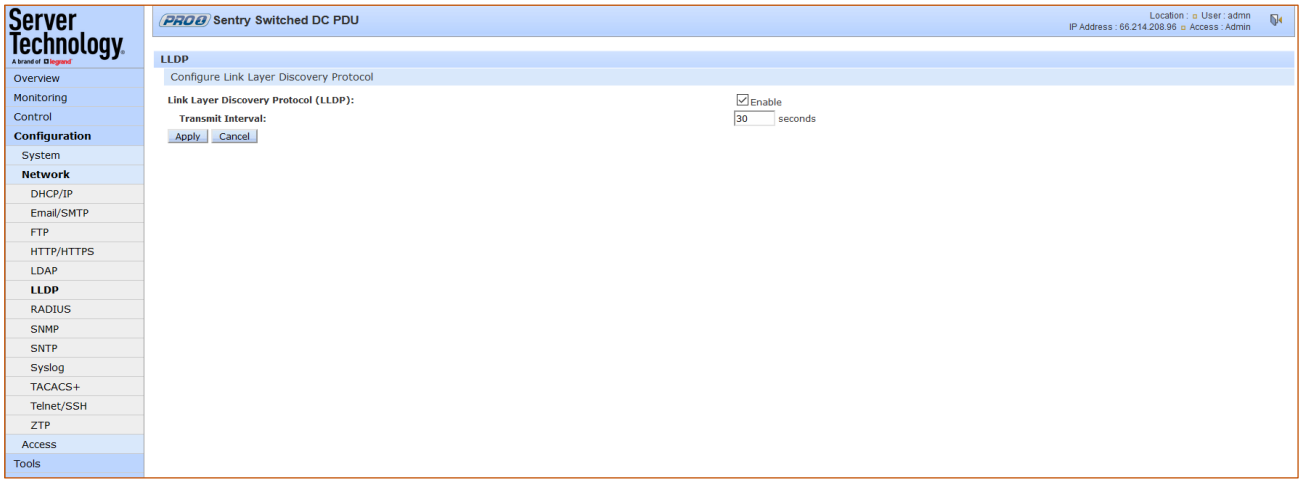
   From the Bind Type drop-down menu, select Simple, TLS, or MD5. If TLS is selected, MD5 binding is disabled.

   Note: IPv6 allows authentication via LDAP.
5. Search Bind: Provide the base distinguished name (DN) for the search bind and the Search Bind Password for the base DN. To change the password, type the new password, and check the Change checkbox.
6. User Search: Provide the distinguished name (DN) for the user search.
7. Filter: The User Search Filter sets the filter used for the username search at login.
8. Group Membership Attribute: Sets the user class distinguished name (DN) or names of groups a user is a member of.
9. Group Search: Click to enable the setting of the bind to search groups for the username (in addition to searching the usernames for its list of group memberships).

10. Base DN: Indicates where the LDAP group search will start.
11. User Membership Attribute: 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. Provide 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.
12. Click **Apply**.

Network > LLDP

The **LLDP** page provides configuration options for the Link Layer Discovery Protocol (LLDP). These options enable LLDP to standardize relationships across devices in a multi-vendor network so that device information can be advertised directly to connected peer-neighbor devices.



To configure LLDP:

1. Select the checkbox to enable LLDP.
2. Type the Transmit Interval. This time interval is how often the PDU advertises itself to any LLDP receivers on the network. The PDU acts as an LLDP transmitter only.
3. Click Apply.

The LLDP packet transmits the Chassis ID (the MAC address), the Port ID ("eth0"), the time to live (the transmit interval times four [by definition]).

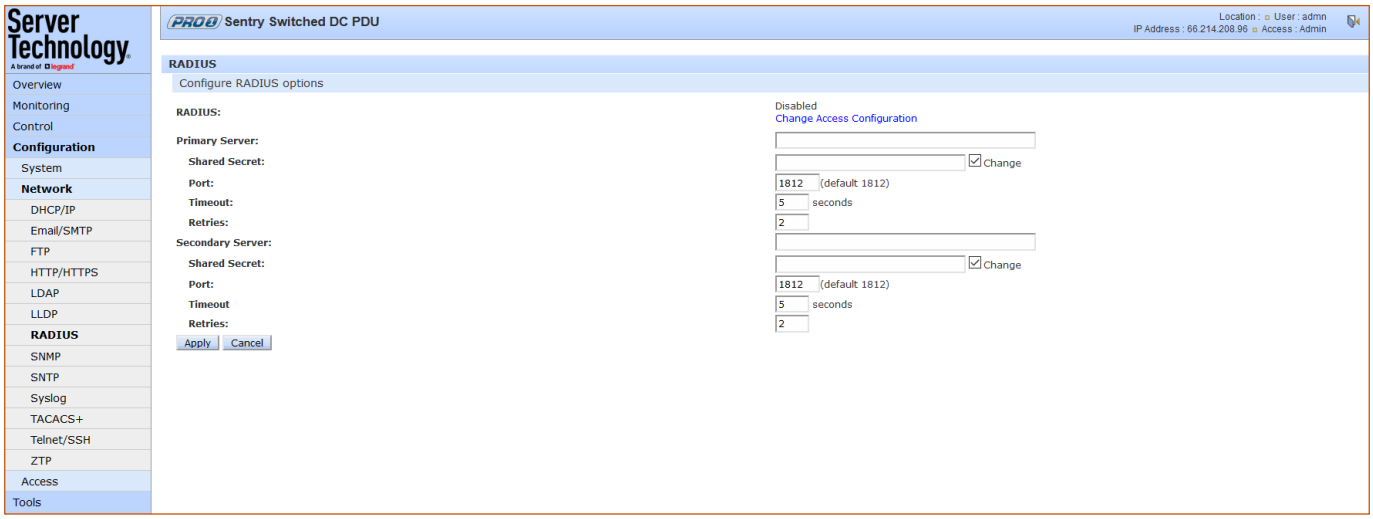
Also transmitted is the system name (the SNMP system name or the system name in "show SNMP"), and the system description (the STI production description [for example, "Sentry Switched CDU"]).

The table below shows the possible values included in the LLDP packet:

Type Length Values (TLV)		
TLV Type	**TLV Name**	**Usage in LLDPDU**
0	End of LLDPDU	Mandatory
1	Chassis ID	Mandatory
2	Port ID	Mandatory
3	Time To Live	Mandatory
4	Port Description	Optional
5	System Name	Optional
6	System Description	Optional
7	System Capabilities	Optional
8	Management Address	Optional
9–126	Reserved	Optional
127	Custom TLVs	Optional

Network > RADIUS

The **RADIUS** page provides configuration options for RADIUS server support.



To configure the RADIUS server:

1. RADIUS: Enabled or Disabled displays on the page to show current RADIUS status.
2. Sets the Primary/Secondary RADIUS server hostname/IP address used for RADIUS authentication requests. Maximum 63 characters.
3. Shared Secret: The RADIUS authentication key used for authentication requests. Up to 48 uppercase and lowercase alphanumeric and other typed characters (ASCII 33 to 126 decimal) are allowed; spaces are allowed; control characters are not allowed. To change the secret, edit the Shared Secret field (characters are not displayed) and check the Change checkbox.

   Notes:

   - The secret that was set for the primary server will not be cleared when setting the secret for the secondary server, and vice versa.
   - IPv6 allows authentication via RADIUS.

4. Port Number: Used by the RADIUS server for incoming RADIUS authentication requests. Provide a custom port number or accept the default port numbers as displayed. Valid range is 1-65535; default as shown on the screen is 1812.
5. Timeout: Specifies the time interval (in seconds) to wait for a reply from the RADIUS server before resending an authentication request. Provide the custom timeout value or accept the default timeout as displayed. Valid range is 1-30 seconds; default is 5 seconds.
6. Retries: Indicates the number of times an authentication request is sent to the RADIUS server. The PDU attempts authentication on the primary server until the number of retries is reached, then attempts authentication with the secondary server. If the PDU does not receive a response from the retry attempts, the authentication request will be rejected. Provide a number in the Retries field. Valid range is 0-10; default is 2.
7. Click **Apply**.

About RADIUS Vendor-Specific Attributes (VSA)

In addition to the protocol-required attributes, the RADIUS authentication process can be extended by using private vendor-specific attributes (VSA). This extension allows Server Technology to create its own proprietary attributes to support features and services using the PRO1 PDU in the RADIUS authentication process.

Server Technology has defined and formatted RADIUS vendor-specific attributes (VSA) in the dictionary.sti file, which is available from Server Technology. The PDU is configured to recognize and use the configuration values in the file as specified by the network administrator, indicating to the RADIUS server that the defined attributes are based on Server Technology's unique enterprise vendor code.

Using the format of the dictionary.sti file (located on the Server Technology FTP site at ftp.servertech.com), the PRO1 RADIUS implementation supports the following vendor-specific attributes:

Vendor-Specific Attribute (VSA) Descriptions

Attribute	Description
STI-Access-Level	Indicates user access level for the Switched PRO1; values are 1-6 as follows; a valid access level is required or access to the unit is denied. Valid Access Levels: 1 = Admin 2 = Power User 3 = User 4 = Reboot Only 5 = On Only 6 = View Only
STI-Env-Mon	Determines user access rights to environmental monitoring; values are Yes or No. For the STI-Access-Level value other than 1 (Admn), if STI-Env-Mon is not included for a user, default is no.
STI-Outlets	Specifies user access rights to outlets; values are space-delimited strings of absolute IDs, names, or the special keyword "ALL". String values are case-sensitive and limited to 253 characters. This attribute can be repeated to append strings that declare additional access rights. For STI-Access Level values other than 1 (Admn) and 2 (Power User), if STI-Outlets is not included for a user, the default is no outlet.
STI-Groups	Specifies user access rights to groups of outlets; values are space-delimited strings of absolute IDs, names, or the special keyword "ALL". String values are case-sensitive and limited to 253 characters. This attribute can be repeated to append strings that declare additional access rights. For STI-Access Level values other than 1 (Admn) and 2 (Power User), if STI-Groups is not included for a user, the default is no group.
STI-Ports	Specifies user access rights to ports; values are space-delimited strings of absolute IDs, names, or the special keyword "ALL". String values are case-sensitive and limited to 253 characters. This attribute can be repeated to append strings that declare additional access rights. For STI-Access Level values other than 1 (Admn) and 2 (Power User), if STI-Ports is not included for a user, the default is no ports.

Note: User access levels must be configured using the **dictionary.sti** file. If the administrator does not use the **dictionary.sti** file to configure a user, the user will not have access rights to the PDU.

Examples:

Administrator with full access and configuration rights:

```
sti-admin Auth-Type := Local, User-Password == "admin"
     STI-Access-Level = Admin
```

Power user with environmental monitoring allowed and full outlet/group/port access rights:

```
sti-power Auth-Type := Local, User-Password == "power"
     STI-Access-Level = Power-User,
     STI-Env-Mon = Yes
```

User with environmental monitoring not allowed and specific outlet/group/port access rights:

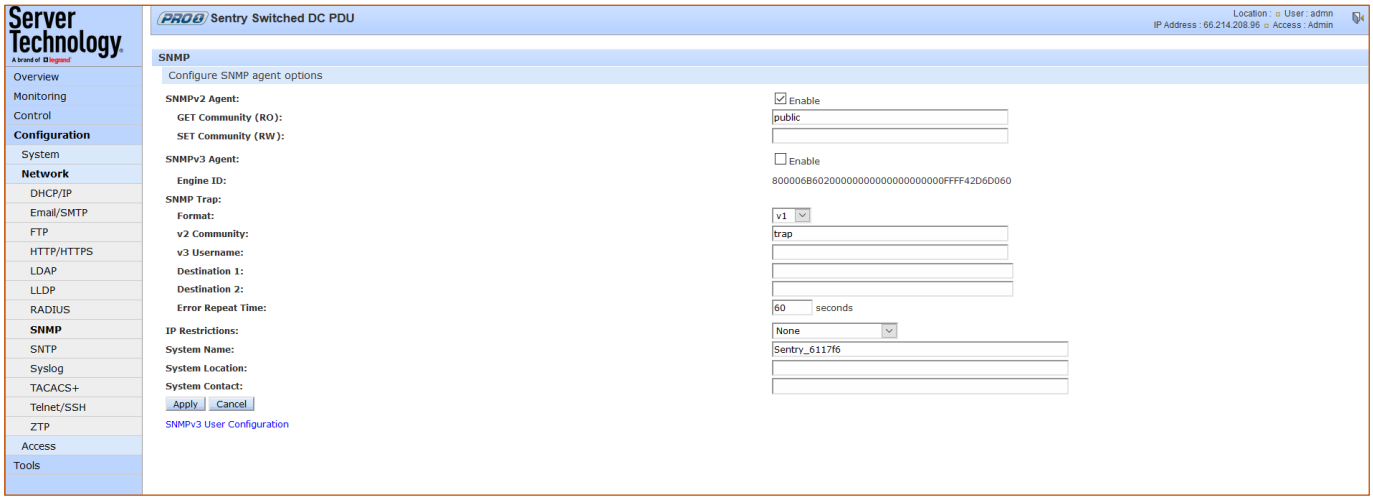
```
sti-user Auth-Type := Local, User-Password == "user"
     STI-Access-Level = User,
     STI-Env-Mon = No,
     STI-Outlets = ".A1 .A2 Rtr1 Rtr2 Srvr1 Srvr2",
     STI-Outlets += ".A3 .A4 Rtr3 Rtr4 Srvr3 Srvr4",
     STI-Groups = "Routers Servers",
     STI-Ports = "Console"
```

View-Only user with environmental monitoring allowed and all outlet and group access rights:

```
sti-view Auth-Type := Local, User-Password == "view"
    STI-Access-Level = View-Only,
    STI-Env-Mon = Yes,
    STI-Outlets = "ALL",
    STI-Outlets = “ALL”
```

Network > SNMP

The **SNMP** page provides the network protocol and agent configuration settings for SNMP support.



About Concurrent Sessions:

SNMP does not use sessions; therefore, multiple simultaneous manager operations are supported.

About SNMP Versions:

- The firmware supports SNMP v1, v2c, and v3.
- 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.
- Up to eight SNMPv3 users are supported. For each SNMPv3 user you can set access as read only, write only, read/write, or disabled. All eight users have the same configuration parameters, and you can configure each user independently.
- SNMPv2c and SNMPv3 can be enabled or disabled independently. You can have SNMPv2 and/or SNMPv3, or none.

To Configure the SNMP v2 Agent:

1. Check (or uncheck) the Enable checkbox to enable/disable SNMP v2 Agent support.
2. GET community (RO): Community strings for GET commands.
3. SET community (RW): Community strings for SET commands.
4. Click **Apply**.

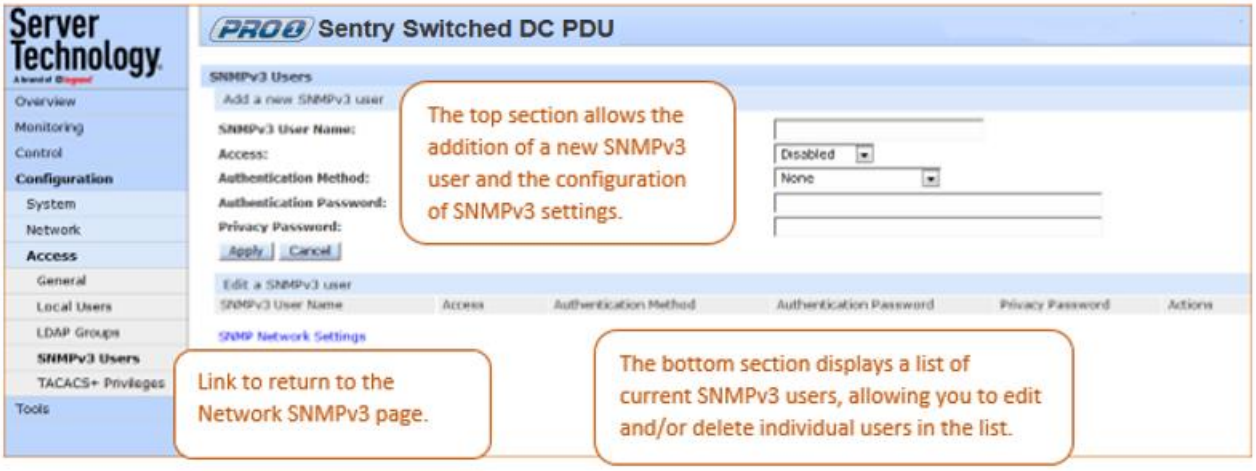
Note: The default for SNMP support is **Enabled**. When Server Technology products are shipped, the default SNMP configuration for the GET community string is set to "**public**" and the SET community string is left **blank**.

To Configure the SNMP Trap:

1. Format: Configures the SNMP trap format version. The trap format can be SNMP v1, v2c, or v3. The default is v1, regardless of the versions that are enabled for the agent.
2. v2 Community: SNMP trap community for the PDU.
3. v3 Username: (Optional). Provide a trap username to display on SNMP v3 activity logs to identify user actions. The trap username can be 1-31 alphanumeric characters; spaces are allowed; the name is case sensitive.
4. For Destination 1 and Destination 2: Provide first and second trap destinations as a hostname or IP address.
5. Error Repeat Time: Sets the SNMP trap repeat time for an object in an event condition. Provide a time value from 1 to 65535 (in seconds).
6. IP Restrictions: From the drop-down menu, select None (default) or Trap Destinations Only. If Trap Destinations Only is selected, SNMP Manager GET and SET requests are allowed only from the IP address of the defined trap destinations.
7. System Name/Location/Contact: (Optional) Type the system name, location, and contact string from 1-63 characters.
8. Click **Apply**.

To *Configure the* SNMPv3 Agent:

1. Check (or uncheck) the Enable checkbox to enable/disable SNMP v3 Agent support.
2. Engine ID: Unique system-assigned ID for each PRO1 DC PDU that cannot be user-edited.
3. Click the SNMPv3 User Configuration link at the bottom of the **Network > SNMP** page. The following user configuration page displays to allow you to add (or edit/delete) an SNMPv3 user.



To add a new user:

Note: Up to eight new users can be added to SNMPv3, each user with its own access rights.

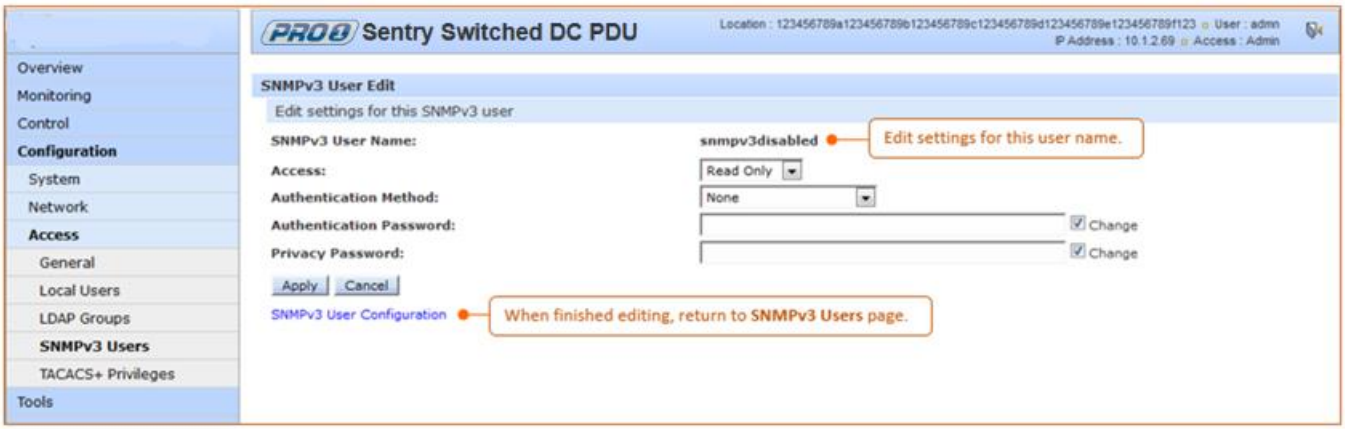
From the **SNMPv3 Users** page (at top of page):

1. In the SNMPv3 User Name field, provide a name (1-31 characters) for the new user.
2. From the Access drop-down menu, select an option to determine SNMPv3 access rights for the new user: Disabled (default), Read Only, Write Only, or Read/Write.
3. Select an Authentication Method from the drop-down menu: None (default), MD5 authentication only, or MD5 authentication and DES privacy.
4. Provide an authentication password (1-31 characters) for the new user.
5. Provide a privacy password (1-31 characters) for the new user.
6. Click **Apply**.

To edit an SNMP user:

From the **SNMPv3 Users** page (at bottom of page):

1. For an SNMPv3 user in the list, click the Edit link to display the following page:



2. Confirm that the user name selected is the one you want to edit.
3. Revise settings as needed for Access, Authentication Method, Authentication Password, and Privacy Password.
4. Click **Apply**.

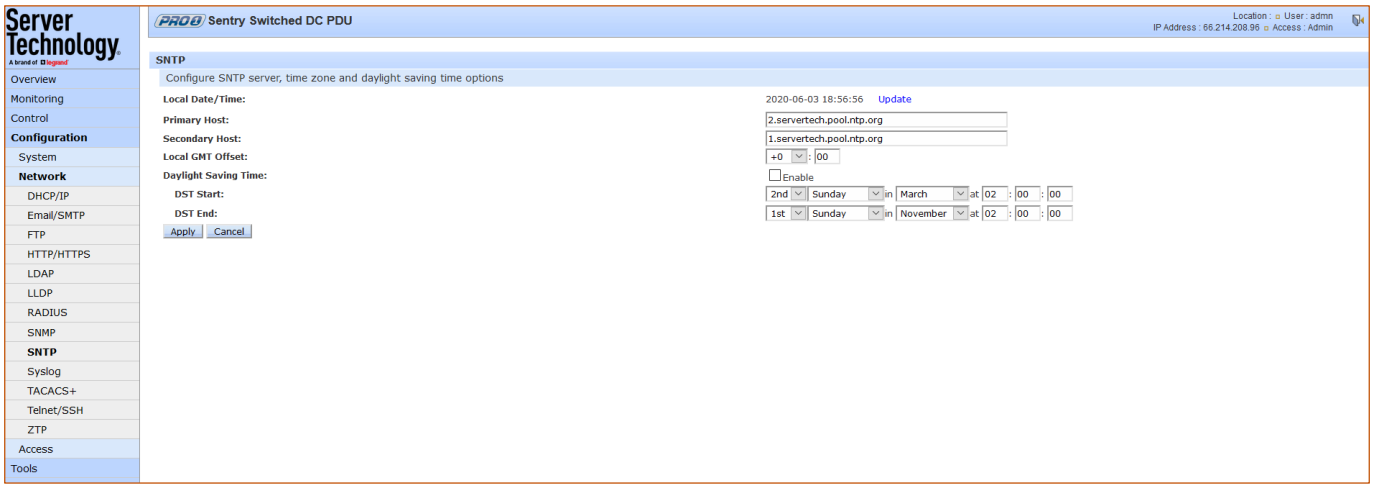
To delete an SNMP user:

From the **SNMPv3 Users** page (at bottom of page):

1. For an SNMPv3 user in the list, click the Remove link.
2. The prompt “Are you sure” displays to confirm or cancel the deletion. Click **OK** or **Cancel**. If OK, the user will be permanently removed from the SNMPv3 user list.

Network > SNTP

The **SNTP** page provides configuration options for the SNTP server, time zone, and Daylight Saving Time (DST) automatic clock adjustment.



About Daylight Saving Time (DST)

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

Note: If DST is enabled, all system time displays will be shown with the current DST 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**, described as follows:

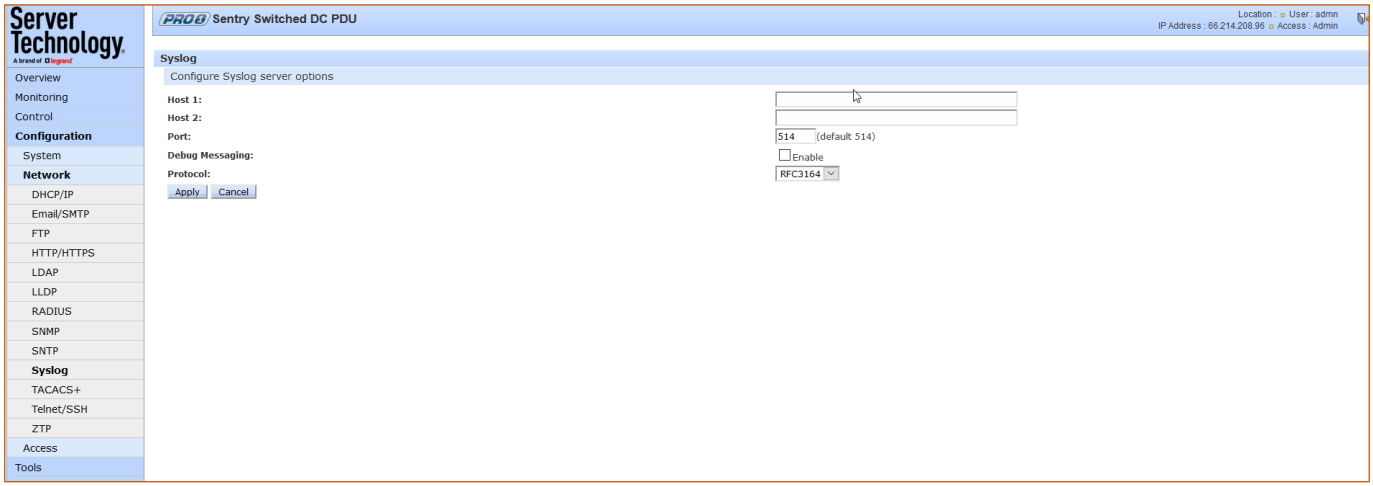
DST Parameter	Description	Value
mo	Both from January to December	1-12
w	Week number	1-4, or last week
d	Day of the week from Sunday to Saturday	0-6
h	Hour	0-23
m	Minute	0-59
s	Second	0-59

To configure the SNTP server:

1. Local Date/Time: Displayed to show the local and current DST settings. To increment the settings (based on updates to the options for DST Start/DST End and day/time), click the Update link.
2. The Primary/Secondary Host fields contact the SNTP server. The fields are populated with the external NTP pool time zones “2.servertech.pool.ntp.org” and “1.servertech.pool.ntp.org” as the default for new units that have not yet been time set. To edit the host fields, type the desired hostname/IP address in the Primary/Secondary Host fields.
3. From the Local GMT Offset drop-down menu, select the extended local offset hours and provide minutes. The GMT offset supports all standard international time zones from -12:59 to +14:59. The GMT offset can be set in minutes to accommodate partial-hour time zones.
4. To enable Daylight Saving Time (DST), check the Enable box.
5. From the DST Start/End drop-down menus, set the start/end date/time options.
6. Click **Apply**.

Network > Syslog

The **Syslog** page supports RFC3164 and RFC5424 compliance and the configuration for standard message logging to enable offline storage and viewing of firmware log messages and system events.

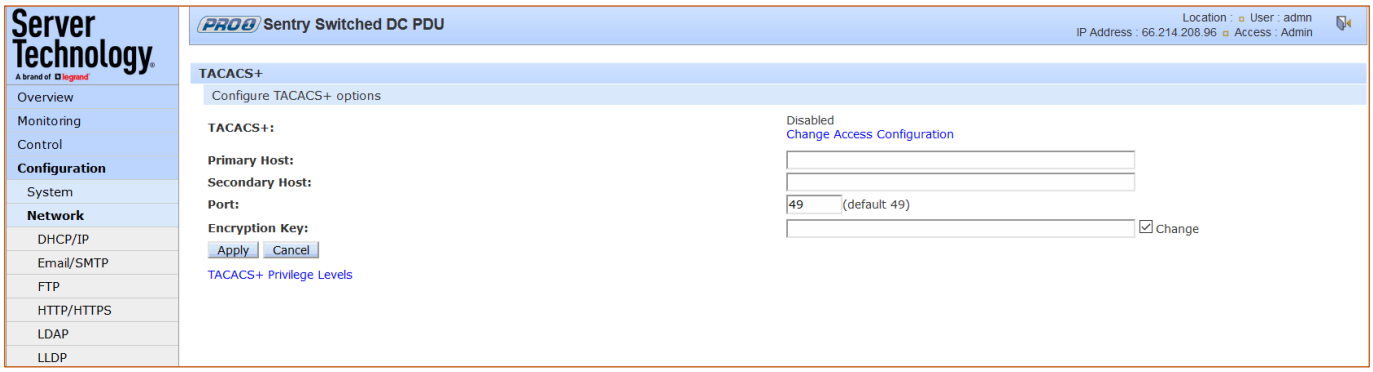


To configure the Syslog server:

1. Host 1/Host2: Set the Syslog server address by typing the hostname/IP address in the Host1 and/or Host2 field(s). Both IPv4 and IPv6 IP address formats are allowed.
2. Port: When Syslog support is enabled, the Syslog server responds to requests on the default Syslog port number 514 as displayed on the page. If necessary, edit the port number.
3. Debug Messaging: To enable debug messaging in the Syslog debug log, check the Enable box.
4. Protocol: From the drop-down menu, select the RFC protocol that determines behavior of the Syslog server and message transmission
5. Click **Apply**.

Network > TACACS+

The **TACACS+** page allows configuration for TACACS+ server options, encryption key, and user privilege levels.



To Configure TACACS+ Server Options:

1. Type the hostname/IP address in the Primary/Secondary Host fields (IPv4 or IPv6 format).
2. Type the new port number or accept the default 49 as shown in the screen example. The PDU uses the port number to send TACACS+ requests.
3. Click **Apply**.

About the TACACS+ Encryption Key:

The encryption key is used to encrypt all data packets between the PDU and the TACACS+ server:

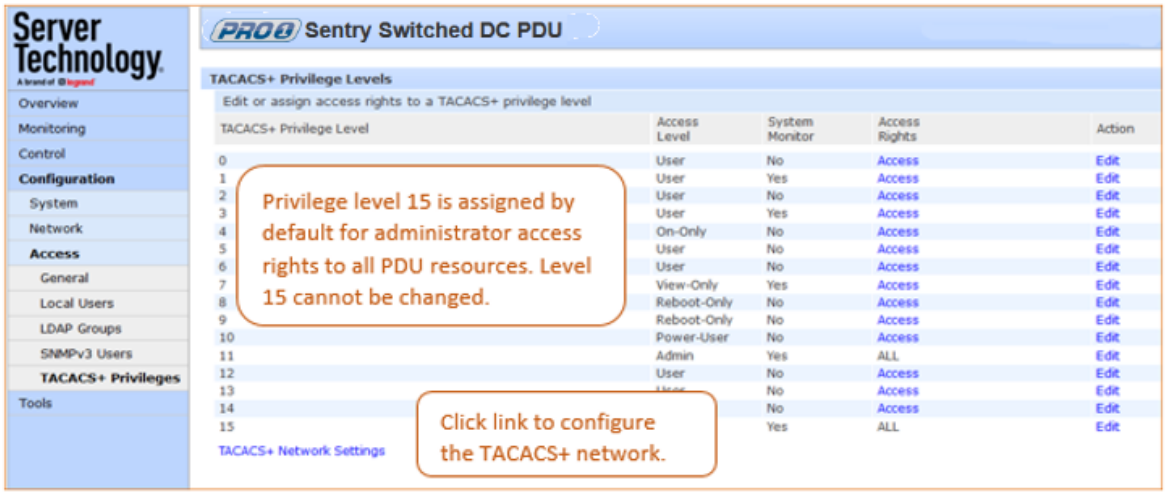
- The key must match the key configured on the TACACS+ server.
- The key can be up to 60 alphanumeric characters and is case sensitive.
- For security, characters in the key are not displayed.
- If you provide “0” for the key, the result may be that the key is not applied, as “0” may not be supported by the TACACS+ server. It is recommended for product environment and security not to enter “0” for the key.
- The Encryption Key Status field on the screen displays “(set)” or “(not set)” to indicate current status of the key.

To Configure the Encryption Key:

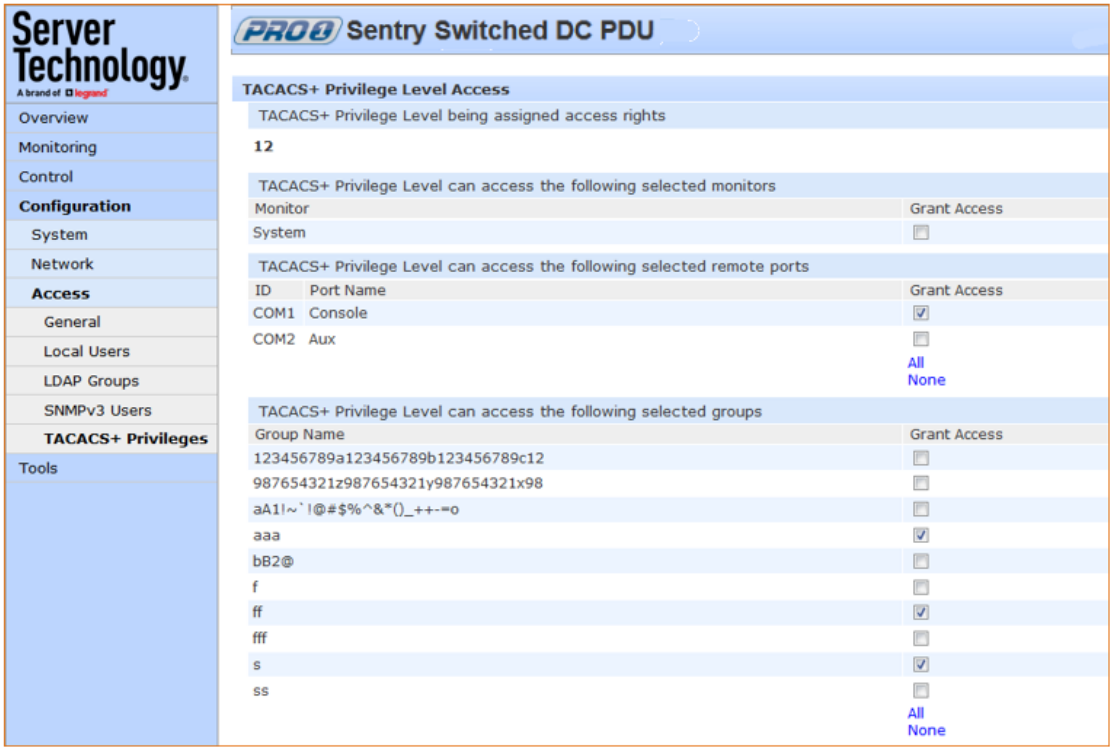
1. Type the New Encryption Key in the field provided.
2. Click **Apply**.

Assigning User Access Rights to TACACS+ Privilege Levels:

1. At the bottom of the TACACS+ screen, click the TACACS+ Privilege Levels link to display the following edit page which shows the current user access level for each TACACS+ privilege level.



2. For a privilege level shown in the above list, click **Access** to display the Privilege Level Access page:



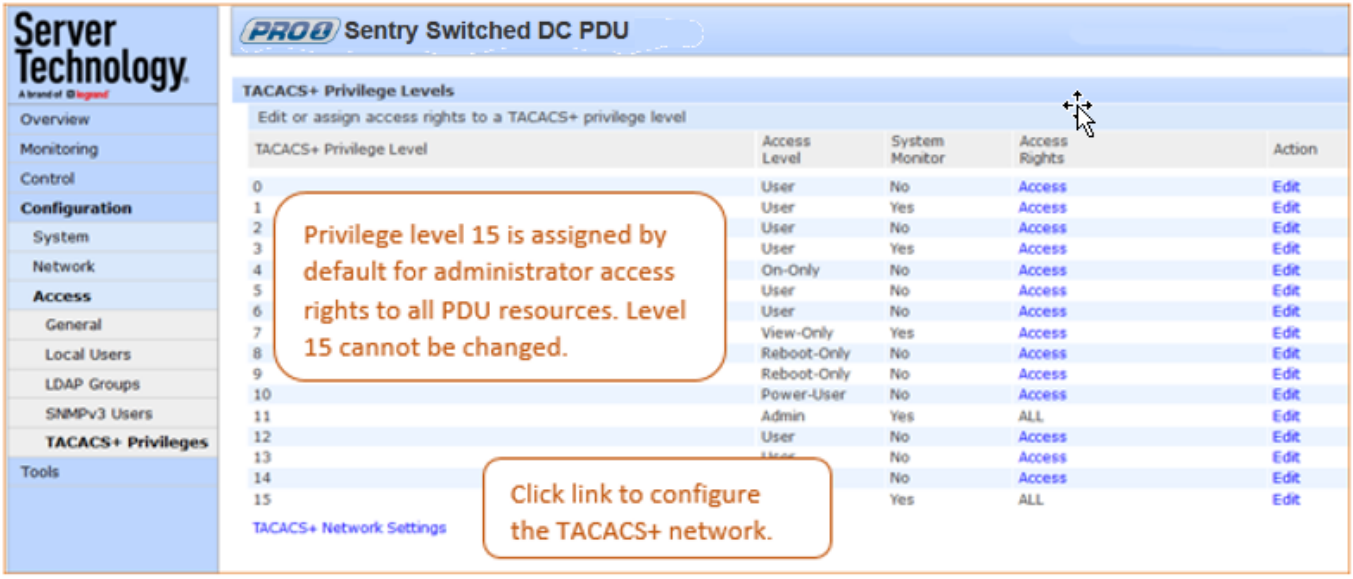
3. Check individual boxes to grant user access (or uncheck boxes to deny access) to specific system resources: monitors, remote ports, outlet groups, and individual outlets. To grant (or deny) access to all (or none) of the resources in a group, click All or None.

4. Click **Apply**.

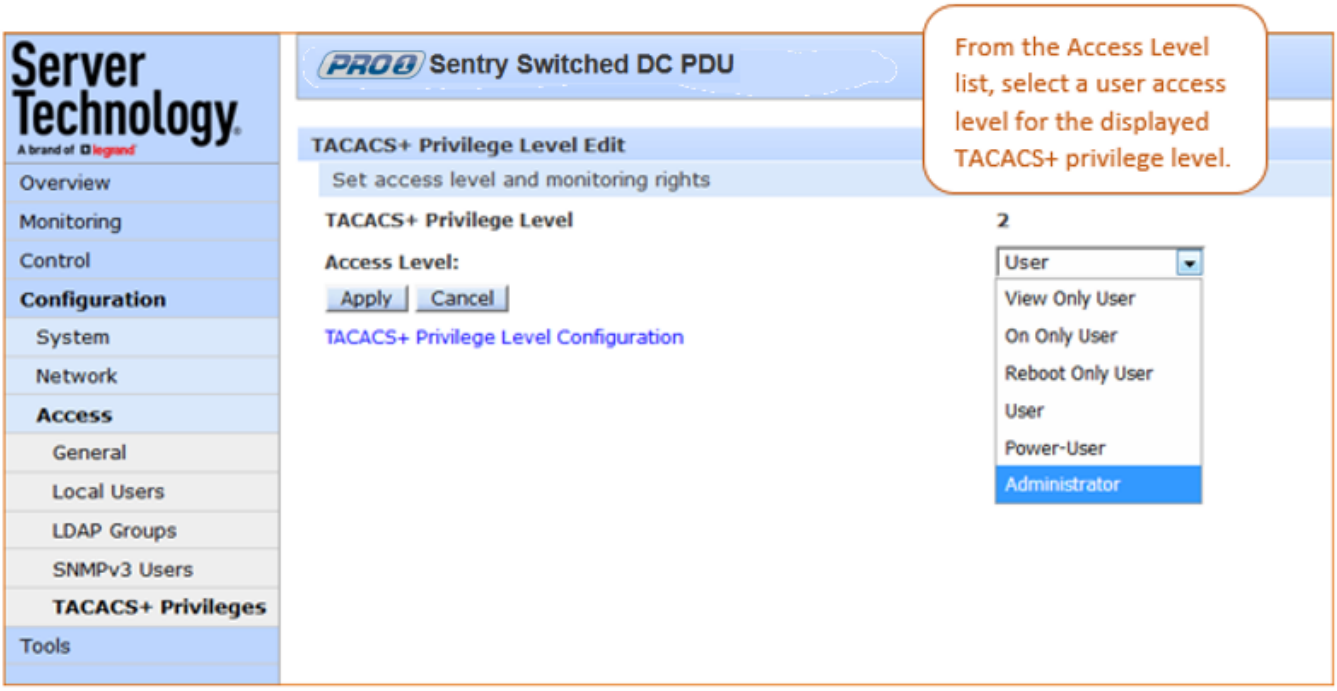
Configuring TACACS+ Privilege Levels:

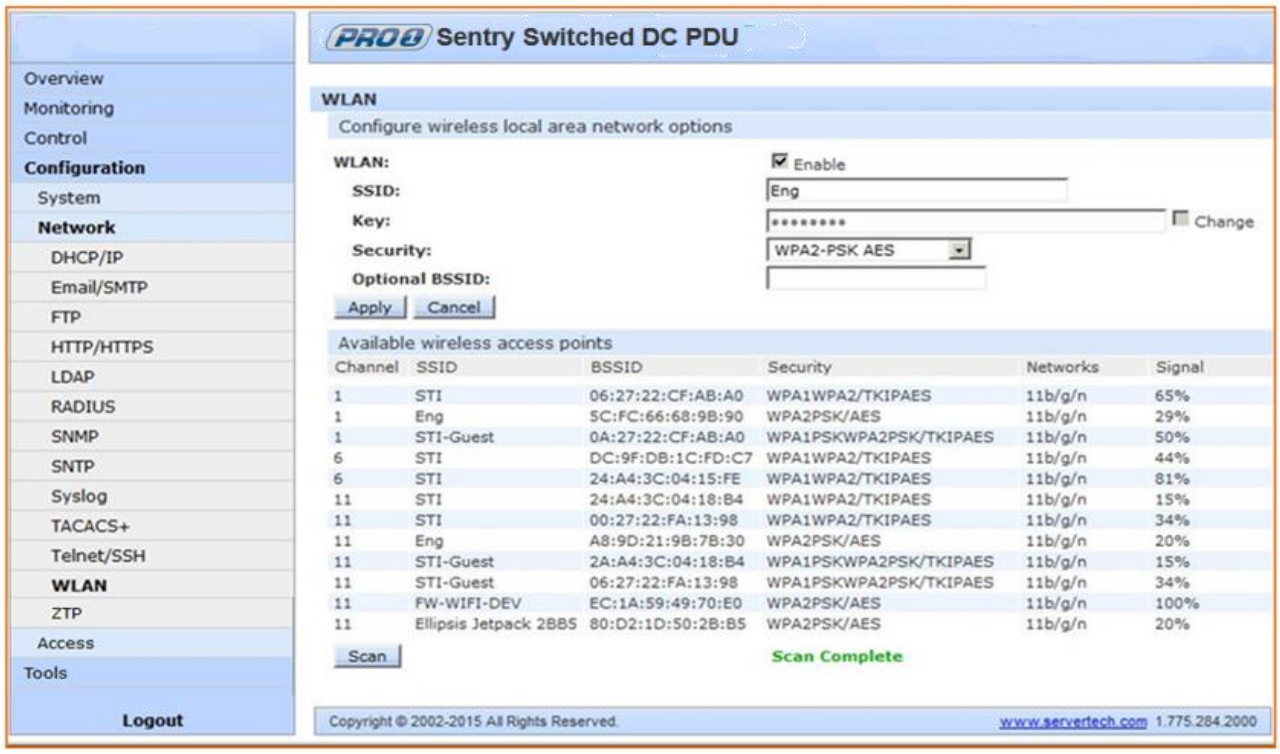
The PRO1 supports 16 different TACACS+ privilege levels. The administrative-level user can configure 15 privilege levels. One level is reserved by default for access to all PDU resources by the administrative-level user. Six defined user privilege levels are available: Admin, Power User, User, On-Only User, Reboot-Only User, and View-Only User.

1. At the bottom of the TACACS+ screen, click the TACACS+ Privilege Levels link to display the following edit page which shows the current user access level for each TACACS+ privilege level.



2. For a privilege level shown in the above list, click **Edit** to display the TACACS+ Privilege Level Edit page:





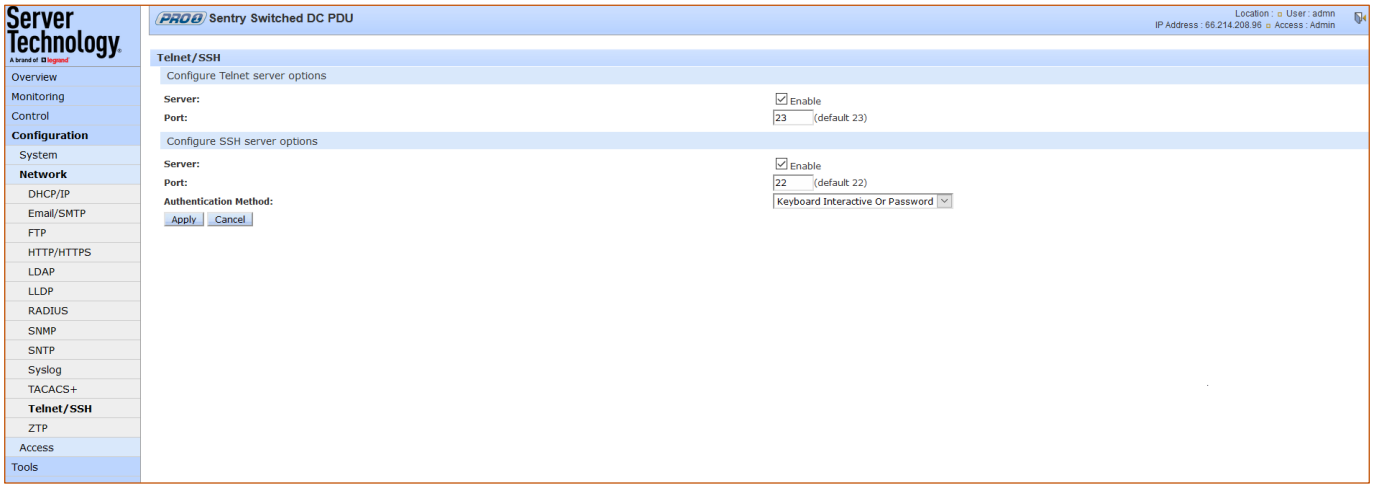
From the User Access Level drop-down menu, select a user access level for the displayed TACACS+ privilege level, as described:

User Access Level (highest to lowest)	**Description**
Administrator	Administrative user; full access for all configuration, all outlet power control actions (On, Off, Reboot), status, and serial/pass-thru ports.
Power User	Full access for all outlet power control actions (On, Off, Reboot), status, and serial/pass-thru ports. **Note:** The Power User does not have access to user management.
User	Partial access for outlet power control actions (On, Off, Reboot), status, and pass-thru of assigned outlets, outlet groups, and serial/pass-thru ports.
Reboot-Only User	Partial access for outlet power control actions (Reboot), status, and pass-thru of assigned outlets, outlet groups, and serial/pass-thru ports.
On-Only User	Partial access for outlet power control actions (On), status, and pass-thru of assigned outlets, outlet groups, and serial/pass-thru ports.
View-Only User	Partial access for status and pass-thru of assigned outlets, outlet groups, and serial/pass-thru ports.

3. Click **Apply**.

Network > Telnet/SSH

The **Telnet/SSH** page provides server, port, and authentication options for support of Telnet and SSH.



To configure the Telnet server and/or SSH server:

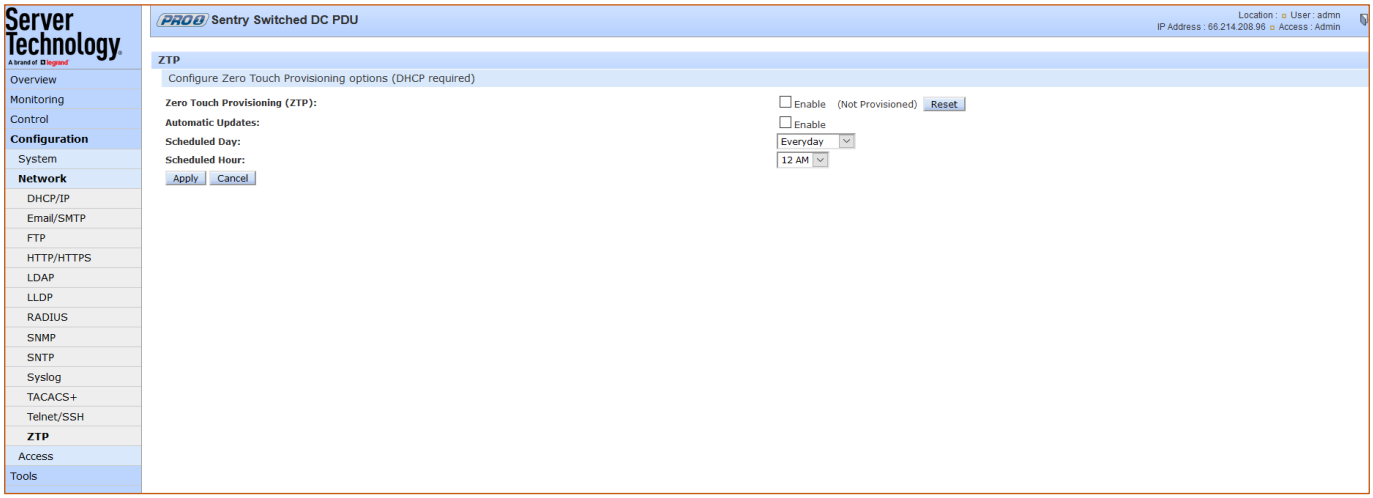
1. Server: Check (or uncheck) the Enable checkbox to enable/disable support for Telnet and/or SSH.
2. Port: Type a custom port number or accept the default port number 23 (for Telnet) or the default port number 22 (for SSH), as displayed on the page.
3. For SSH only – Authentication Method: The SSH server supports the following authentication methods.
    - Keyboard Interactive: 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 typed by the user and sends it back to the server. The Keyboard Interactive method is controlled by the SSH server.
    - Password: The SSH client gathers username/password credentials and makes the authentication request to the SSH server with the credentials. The Password method is controlled by the SSH client.
    - Keyboard Interactive or Password: (Default). Allows either method.
4. From the drop-down menu, select one of the security methods described above, or accept the default, as displayed
5. Click **Apply**.

Telnet/SSH Concurrent Sessions:

- For Telnet: 4 concurrent sessions allowed; also allowed are 4 Telnet **and** 4 SSH sessions simultaneously.
- For SSH: 4 concurrent sessions allowed; also allowed are 4 SSH **and** 4 Telnet sessions simultaneously.

Network > ZTP

The Network > ZTP page provides the settings for using the optional Zero Touch Provisioning (ZTP) feature. ZTP allows PDUs to be provisioned and configured automatically during the initial bootup, or whenever needed, to automate network setup, user permission updates, and other PDU modifications as necessary.



About Automatic Provisioning:

Automatic and continuous provisioning means you can revise the ZTP configuration file (config.ini) as needed and push the file down through the ZTP process multiple times. ZTP will recognize the latest revisions in the configuration file, giving you the flexibility of a ZTP process for maintenance as well as for initial provisioning.

Note: For more information about ZTP and the automatic provisioning methodology used with PRO1 products, see the Server Technology website www.servertech.com for Technical Note: 303-9999-44, "Zero Touch Provisioning".

Resetting ZTP:

Reset is available only when ZTP is enabled. When reset to "Not Provisioned", the PDU will attempt ZTP again after the next RESTART, behaving as it did prior to being provisioned.

After a PDU has been successfully provisioned by ZTP, to use the GUI to reset ZTP to re-provision the PDU again either after the next RESTART or next DHCP lease renewal, click the **Reset** button on the ZTP window.

Note that the PDU's provisioned state ("Provisioned" or, "Not Provisioned") is not reset by disabling ZTP. When ZTP is re-enabled on a previously provisioned PDU, the state will still show as provisioned.

To Configure Zero Touch Provisioning:

Note: ZTP is enabled "out of the box" by default for PDUs running firmware version 8.0g or later. The Automatic Updates option of ZTP is shipped disabled by default.

1. Zero Touch Provisioning (ZTP): Check or uncheck the checkbox to enable/disable ZTP with the following results:
   - Enable: The ZTP option allows automated configuration for PRO1 products.
   - Disable: (Default) The ZTP option is turned off and the "Non Provisioned" state displays.

   If necessary, click the **Reset** button. See "Resetting ZTP" above.
2. Automatic Updates: Check or uncheck to enable/disable the automatic updates option. When enabled, Automatic Updates takes priority over the "Provisioned" or "Not Provisioned" status.
3. Select the Scheduled Day of the week (or Everyday) for automatic updates to occur.
4. Select the Scheduled Hour of the day for automatic updates to occur.
5. Click the **Apply** button.

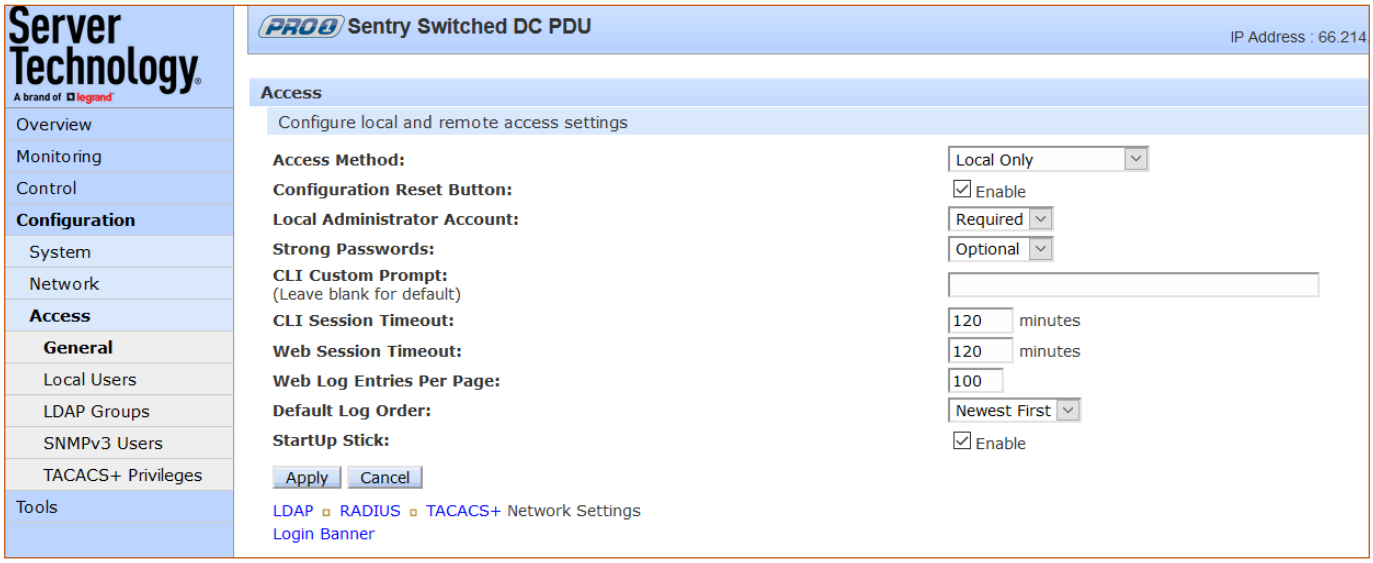
Access (Managing Users)

The **Access** section of the Web interface determines how a PRO1 PDU user works with the network and system by configuring the options related to a user: authentication, privilege levels, user access to the unit, and additional functions for individual local users and user groups.

Note: The **Access** section only allows the administrator to determine how the user will access and use the network and system. To set up network protocol parameters, see the **Network** section.

Access > General

The **General** page allows configuration of local and remote access settings.



To configure general system access:

Access Method: From the drop-down menu, select an option to enable one of several authentication methods to control user access to the PDU. Only one method can be enabled at a time: Local Only (default), LDAP Only, LDAP Then Local, RADIUS Only, RADIUS Then Local, TACACS+ Only, TACACS+ Then Local.

Button Configuration Reset: Check (or uncheck) the Enable checkbox to enable (or disable) physical access to the **Reset** button on the PRO1 hardware.

The PDU is designed with a reset button on the hardware unit that can be used when a forgotten firmware password prevents logging into the unit. The reset button sets all configuration values back to factory default settings, allowing the administrator to retrieve the admn/admn default administrator login.

To access the button on the unit, you need a non-conductive metallic tool that fits inside the recess. If you press and hold the **Reset** button on the unit for more than 15 seconds, the reset action will terminate.

Note: This method of physical access to the unit will not work if the reset button has already been disabled by the administrator through the firmware GUI at **Configuration > Access > General > Button Configuration Reset** (show in the screen example above) or through the firmware CLI with the **set access button** [**enabled/disabled**] command. For security, the administrator can choose to disable the button through firmware to inhiibit a user from causing a reset on the unit.

Local Administrator Account: Removes the last local administrator account when remote authentication (LDAP, TACACS+, or RADIUS) is in use. Only a remotely-authenicated administrator can remove the last local administrator account.

Accept the "Required" option (default), or select "Optional". Selecting "Optional" disables the restriction to remove the last local administrator, and also enables the Configuration Reset Button.

In turn, disabling the Configuration Reset Button automatically changes the Local Administrator Account to "Required". When this change occurs, if no local administrator accounts are present, the Configuration Reset Button will be set back to enabled.

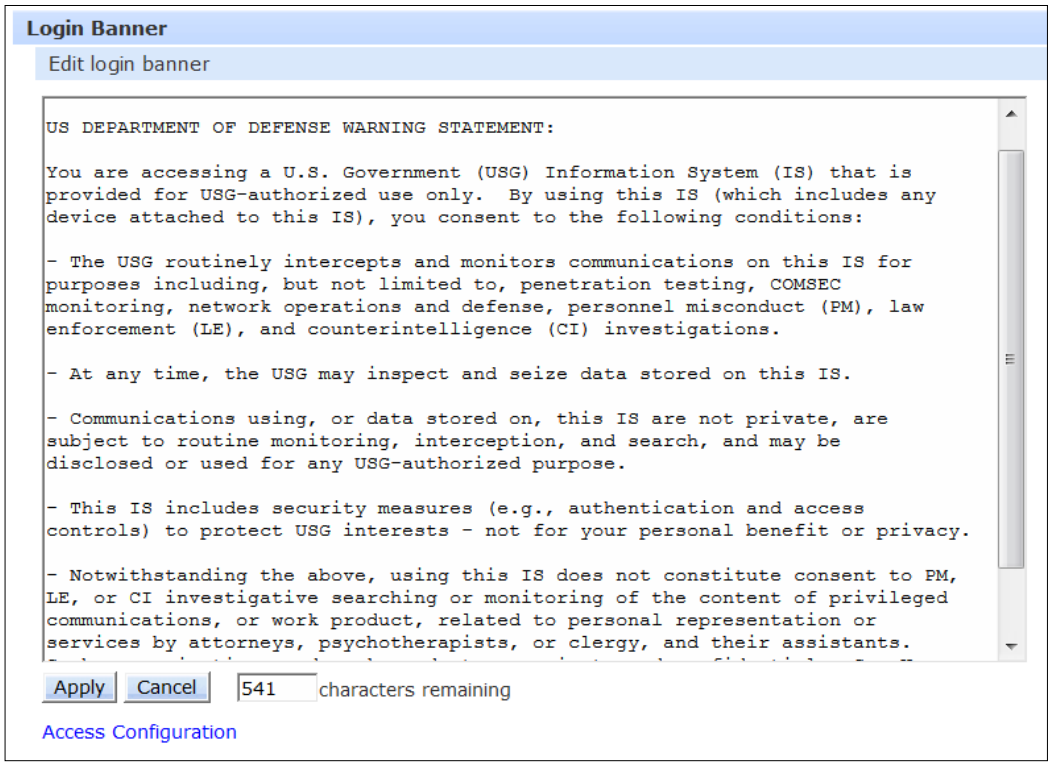
Both the Local Administrator Account drop-down and the Configuration Reset Button turn the other field on if one of them has an Optional setting or is unchecked (disabled).

Note: For PRO1 units only. If LDAP, TACACS+, or RADIUS is unreachable, or if LDAP, TACACS+, or RADIUS parameters have changed, you may not be able to log into the unit.

1. Strong Passwords: From the drop-down menu, select Optional or Required. The PRO1 supports strong passwords for enhanced system security. From the Strong Passwords drop-down menu, select Optional or Required. If Required, the strong password requirement is applied against all new passwords with the following rules:
   - Minimum of 8 characters long, at least one uppercase letter, at least one lowercase letter, one number, and one special character.
   - When a strong password is changed, a minimum of four characters positions must be changed to define the new password.
2. Custom CLI Prompt: Type a custom text string for the Command Line Interface (CLI) prompt, or leave blank for the default prompt "Switched PDU:"
3. CLI Session Timeout: Enter a timeout period (in minutes). The valid timeout range is 1 to 1440 minutes (24 hours); the default is 5 minutes.
4. Web Session Timeout: Enter a timeout period (in minutes). The valid timeout range is 1 to 1440 minutes (24 hours); the default is 5 minutes.
5. Web Log Entries Per Page: Set the number of entries displayed on the system log, from 10 to 250.
6. Default Log Order: From the drop-down menu, specify the order of the event entries on the system log – oldest events or newest events displayed first in the log.
7. StartUp Stick: Check (or uncheck) to enable (or disable) StartUp Stick®. StartUp Stick is a separate Server Technology tool for streamlining the mass configuration of PDU operating parameters.
8. Click **Apply.**

Login Banner:

Clicking the Login Banner link displays a blank banner edit window. The following example shows a custom message:



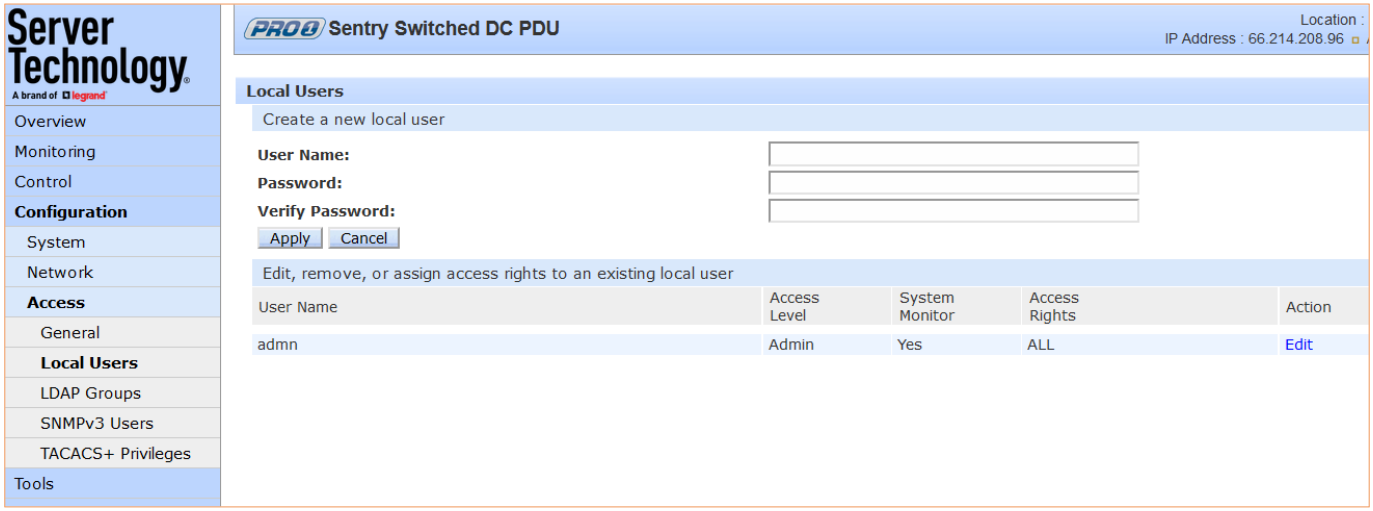
Type the banner text and click **Apply**. To clear the typed entry and start over, click **Cancel**.

Notes:

- The login banner can be up to 2070 characters long and will be displayed prior to the login prompt.
- If the login banner is left blank, the user will be taken directly to the login prompt.
- For an SSH connection, the banner length is truncated to 1500 bytes in SSH packets to avoid failure of the SSH connection when configured with a long text banner.

Access > Local Users

The **Local Users** page allows the administrator to manage options for local users, including creating new users, changing user passwords, setting user access level, and granting user access to various resources of the PDU.



To create a new local user:

1. In the User Name field, type a 1-32 character user name; no spaces; user names are not case-sensitive.
2. Type the user's password; type a 1-32 character password; ASCII 33 to 126 decimal characters are allowed; passwords are case-sensitive.
3. Verify the password.
4. Click **Apply**.

To grant access rights to a user:

1. For the user name displayed in the list, click the Access link. The Local User Access page displays to allow granting access rights to selected PDU monitors, remote ports, outlet groups, and individual outlets by checking corresponding checkboxes. To deny access to an individual resource, uncheck the related checkbox. To grant (or deny) access to all resources in a displayed group, click All or None.
2. Click **Apply**.

To set a user's access level:

1. For the user name displayed in the list, click the Edit link. The Local User Edit page displays.
2. From the Access Level drop-down menu, select the desired user access level as described in the table below.
3. Click **Apply**.

User Access Level (highest to lowest)	Description
Administrator	Administrative user; Full access for all configuration, all outlet power control actions (On, Off, Reboot), status, and serial/pass-thru ports.
Power User	Full access for all outlet power control actions (On, Off, Reboot), status, and serial/pass-thru ports. **Note:** The Power User does not have access to user management.
User	Partial access for outlet power control actions (On, Off, Reboot), status, and pass-thru of assigned outlets, outlet groups, and serial/pass-thru ports.
Reboot-Only User	Partial access for outlet power control actions (Reboot), status, and pass-thru of assigned outlets, outlet groups, and serial/pass-thru ports.
On-Only User	Partial access for outlet power control actions (On), status, and pass-thru of assigned outlets, outlet groups, and serial/pass-thru ports.
View-Only User	Partial access for status and pass-thru of assigned outlets, outlet groups, and serial/pass-thru ports.
System Monitor	Access to all "stat" commands on the Command Line Interface (CLI).

To change a user's password:

1. For the user name displayed in the list, click the Edit link. The Local User Edit page displays.
2. Type the user's new password; type a 1-32 character password; ASCII 33 to 126 decimal characters are allowed; passwords are case-sensitive.
3. Verify the new password.
4. Click **Apply**.

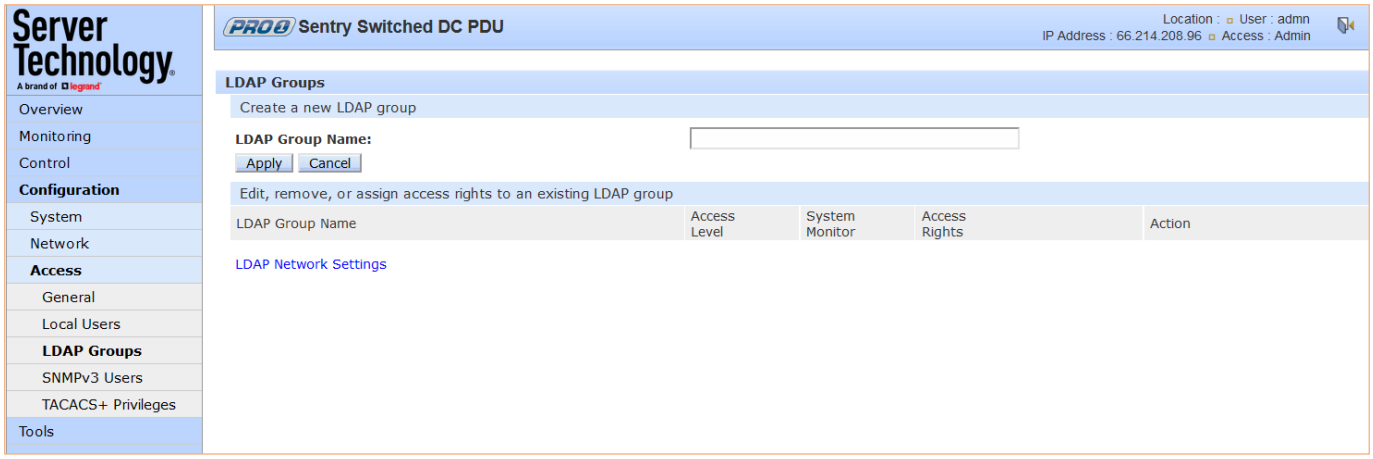
To delete a local user:

1. For the user name displayed in the list, click the Remove link. You will be prompted with a confirmation for the delete action.
2. Click **OK** or **Cancel**.

Note: The **admn** default administrator account cannot be removed unless administrative access has already been granted to another administrative account.

Access > LDAP Groups

The **LDAP Groups** page allows the administrator to manage options for LDAP user groups, including creating new LDAP groups, establishing the LDAP group access level, and granting LDAP group access to various resources of the PDU.



To create a new LDAP group:

1. In the LDAP Group Name field, type a 1-32 character LDAP group name; no spaces; LDAP group names are not case-sensitive.
2. Click **Apply**.

To grant access rights to an LDAP group:

1. For the LDAP group name displayed in the list, click the Access link. The LDAP Group Access page displays to allow granting access rights to selected PDU monitors, remote ports, outlet groups, and individual outlets by checking corresponding checkboxes. To deny access to an individual resource, uncheck the related checkbox. To grant (or deny) access to all resources in a displayed group, click All or None.
2. Click **Apply**.

To set an LDAP group's access level:

1. For the LDAP group name displayed in the list, click the Edit link. The LDAP Group Edit page displays.
2. From the Access Level drop-down menu, select the desired user access level as described in the table below.
3. Click **Apply**.

User Access Level (highest to lowest)	Description
Administrator	Administrative user; Full access for all configuration, all outlet power control actions (On, Off, Reboot), status, and serial/pass-thru ports.
Power User	Full access for all outlet power control actions (On, Off, Reboot), status, and serial/pass-thru ports. **Note:** The Power User does not have access to user management.
User	Partial access for outlet power control actions (On, Off, Reboot), status, and pass-thru of assigned outlets, outlet groups, and serial/pass-thru ports.
Reboot-Only User	Partial access for outlet power control actions (Reboot), status, and pass-thru of assigned outlets, outlet groups, and serial/pass-thru ports.
On-Only User	Partial access for outlet power control actions (On), status, and pass-thru of assigned outlets, outlet groups, and serial/pass-thru ports.
View-Only User	Partial access for status and pass-thru of assigned outlets, outlet groups, and serial/pass-thru ports.
System Monitor	Access to all "stat" commands on the Command Line Interface (CLI).

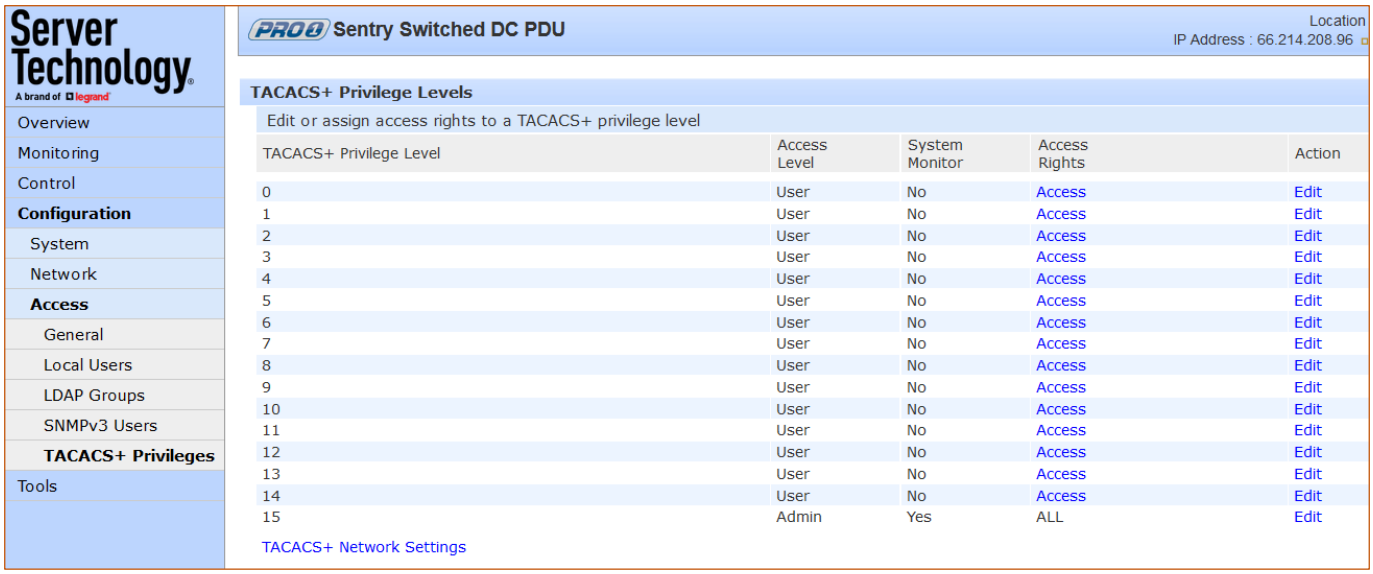
To delete an LDAP group:

1. For the LDAP group name displayed in the list, click the Remove link. You will be prompted with a confirmation for the delete action.
2. Click **OK** or **Cancel**.

Access > TACACS+ Privileges

The **TACACS+ Privileges** page allows the administrator to manage options for TACACS+ user groups, including establishing TACACS+ privilege levels and granting TACACS+ privilege level access to various areas of the PRO1.

Note: The PDU supports 16 different TACACS+ privilege levels with 15 configurable levels and 1 level (“0”) reserved by default for administrator-level access to all PDU resources.



To set a TACACS+ privilege level:

1. For the TACACS+ Privilege Level displayed in the list, click the Edit link. The TACACS+ Privilege Level Edit page displays.
2. From the Access Level drop-down menu, select the desired user access level as described in the table below.
3. Click **Apply**.

TACACS User Access Level (highest to lowest)	Description
Administrator	Administrative user; Full access for all configuration, all outlet power control actions (On, Off, Reboot), status, and serial/pass-thru ports.
Power User	Full access for all outlet power control actions (On, Off, Reboot), status, and serial/pass-thru ports. **Note:** The Power User does not have access to user management.
User	Partial access for outlet power control actions (On, Off, Reboot), status, and pass-thru of assigned outlets, outlet groups, and serial/pass-thru ports.
Reboot-Only User	Partial access for outlet power control actions (Reboot), status, and pass-thru of assigned outlets, outlet groups, and serial/pass-thru ports.
On-Only User	Partial access for outlet power control actions (On), status, and pass-thru of assigned outlets, outlet groups, and serial/pass-thru ports.
View-Only User	Partial access for status and pass-thru of assigned outlets, outlet groups, and serial/pass-thru ports.
System Monitor	Access to all “stat” commands on the Command Line Interface (CLI).

To grant access rights to a TACACS+ privilege level:

1. For the TACACS+ Privilege Level displayed in the list, click the Access link. The TACACS+ Privilege Level Access page displays to allow granting access rights to selected PDU monitors, remote ports, outlet groups, and individual outlets by checking corresponding checkboxes. To deny access to an individual resource, uncheck the related checkbox. To grant (or deny) access to all resources in a displayed group, click All or None.
2. Click **Apply**.

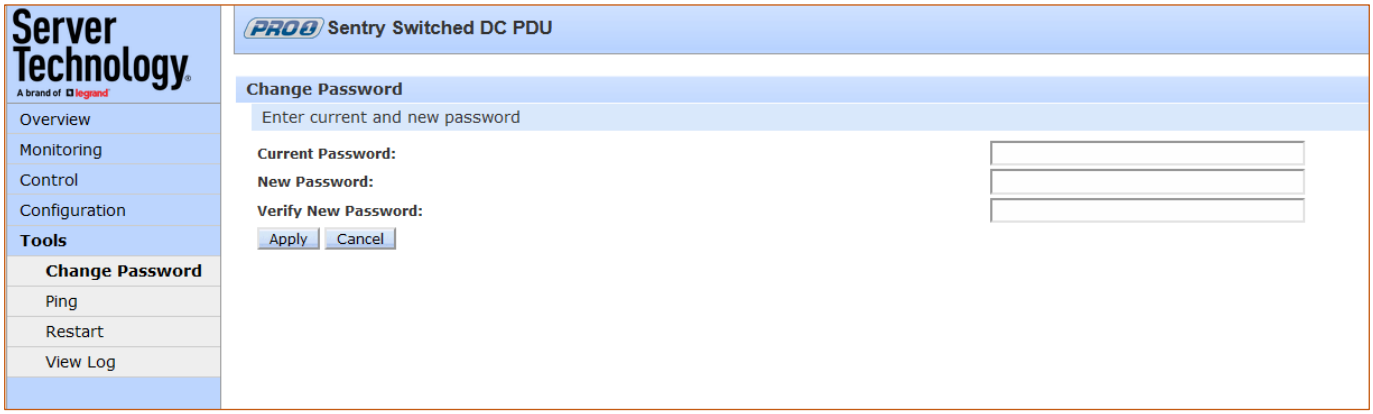
Tools (Using Support Functions)

The **Tools** section of the Web interface is a collection of several utility options for miscellaneous system actions: changing user password, pinging other network devices, viewing the system/debug log, and uploading new firmware versions.

Also included are several options for rebooting the PDU, resetting the PDU to factory defaults, and restarting the PDU with user preferences.

Tools > Change Password

This **Change Password** option allows firmware users to change their own passwords. The administrative user can assign a new password to another firmware user at any time.



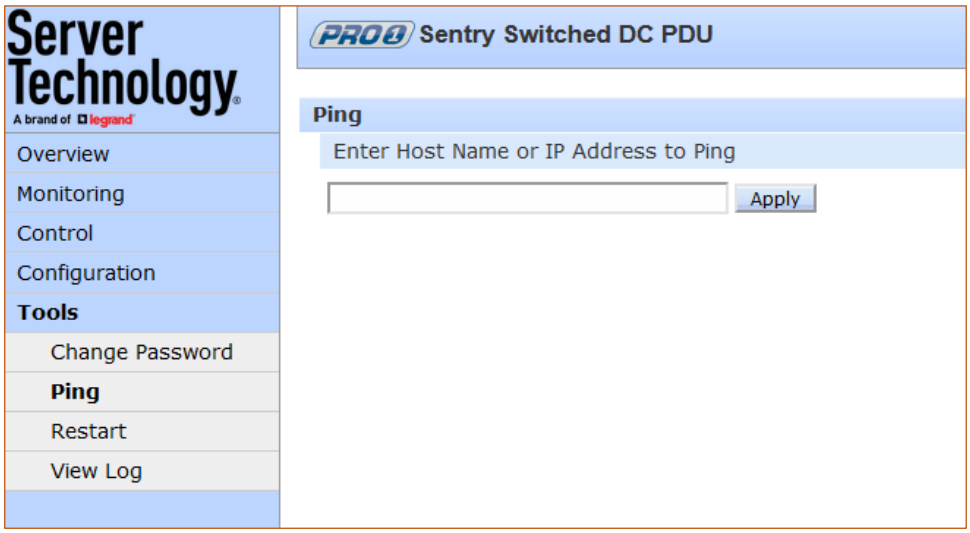
To change your password:

1. Type your current password, your new password, and verify the new password.
2. Click **Apply**.

Tools > Ping

The **Ping** option tests the ability of the PDU to contact the IP address of another Ethernet-enabled device.

For LDAP support, the Ping feature can test the configuration of the DNS IP address by testing for proper name resolution.



To issue a ping:

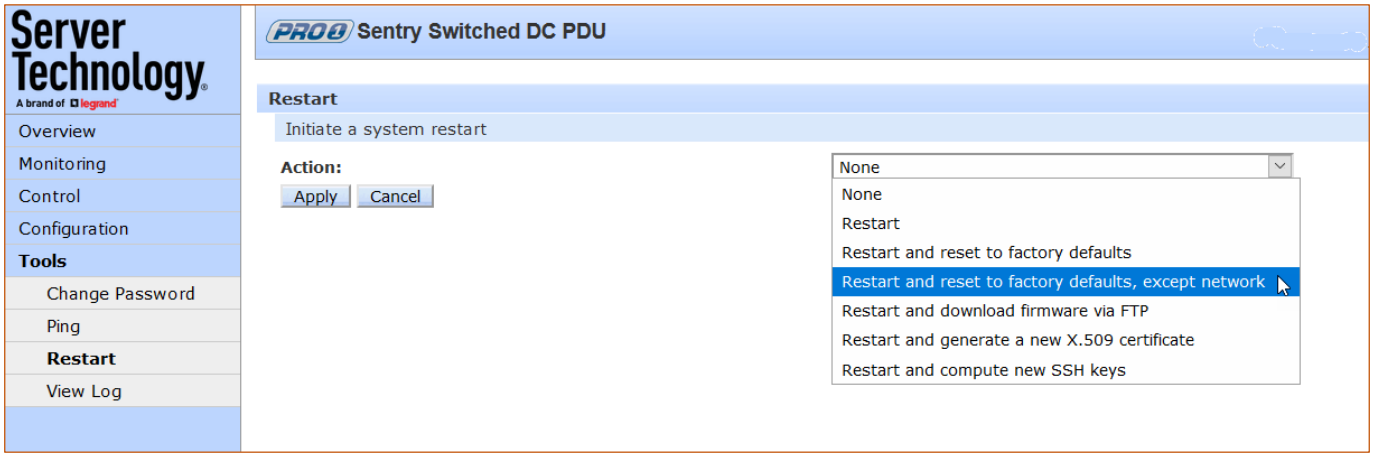
1. Type the hostname/IP address to ping (IPv4 or IPv6 format).
2. Click **Apply** (or press **Enter**).

   If the ping was successful, a responding message is displayed, similar to:

Tools > Restart

The **Restart** option offers several options for restarting the PDU.



To initiate a system restart:

1. From the Action drop-down menu, select a restart option as described in the table below.
2. Click **Apply**.

Restart Options for the Sentry DC PDU:

Note: About Unit Persistence:

The PRO1 products support unit persistence. This means that if a link unit is connected to a master unit, and the link unit is disconnected (powered down or accidentally disconnected), and the master unit is restarted, the link unit will be reported as "Not Found" after the restart because the link unit is no longer physically connected to the master.

However, the association between the master/link units is retained to allow the continuation of alerts. If the disconnected link unit is physically re-connected to the master, the "Not Found" status will return to "Normal" status.

To intentionally remove a link unit from connection with a master unit, the link unit must be purged using the Purge function.

Unit persistence affects **all connected master/link units** whether or not they are connected in a multi-linking configuration.

This restart option …	performs this action on the PRO1 …
Restart	Performs a warm boot; system user/outlet/outlet group configuration settings and outlet states are **not** changed or reset with the **restart** command.
Restart and reset to factory defaults	Resets the non-volatile RAM where configuration values are stored. This option clears all administrator-editabled fields and resets all CLI configurable options to their factory default values, including all user accounts. Resetting the PDU to factory default values also resets all TCP/IP and Telnet/Web configurations. Reconfiguring TCIP/IP and Telnet/Web settings is required.
Restart and reset to factory defaults, except network	Same action as "Restart and reset to factory defaults" described directly above, but network protocol settings are **not** changed.
Restart and download firmware via FTP	New versions of firmware can be uploaded using FTP. To begin an FTP upload session, you must first configure the FTP host address, username/password, filename, and file path. When initiating an FTP upload session, the PDU restarts and uploads the firmware file specified with the FTP filename command from the previously configured FTP host.
Restart and generate a new X.509 certificate	Generates a new X.509 certificate issued and signed by a certificate-authority.
Restart and compute new SSH keys	Generates new private and public SSH keys with the proper location and permisssion.

About the Reset Button on the Sentry DC PDU:

The PDU is designed with a **Reset** button on the hardware unit that can be used when a forgotten firmware password prevents logging into the unit. The **Reset** button sets all configuration values back to factory default settings, allowing the administrator to retrieve the admn/admn default administrator login.

To access the button on the unit, you need a non-conductive metallic tool that fits inside the recess. If you press and hold the **Reset** button on the unit for more than 15 seconds, the reset action will terminate.

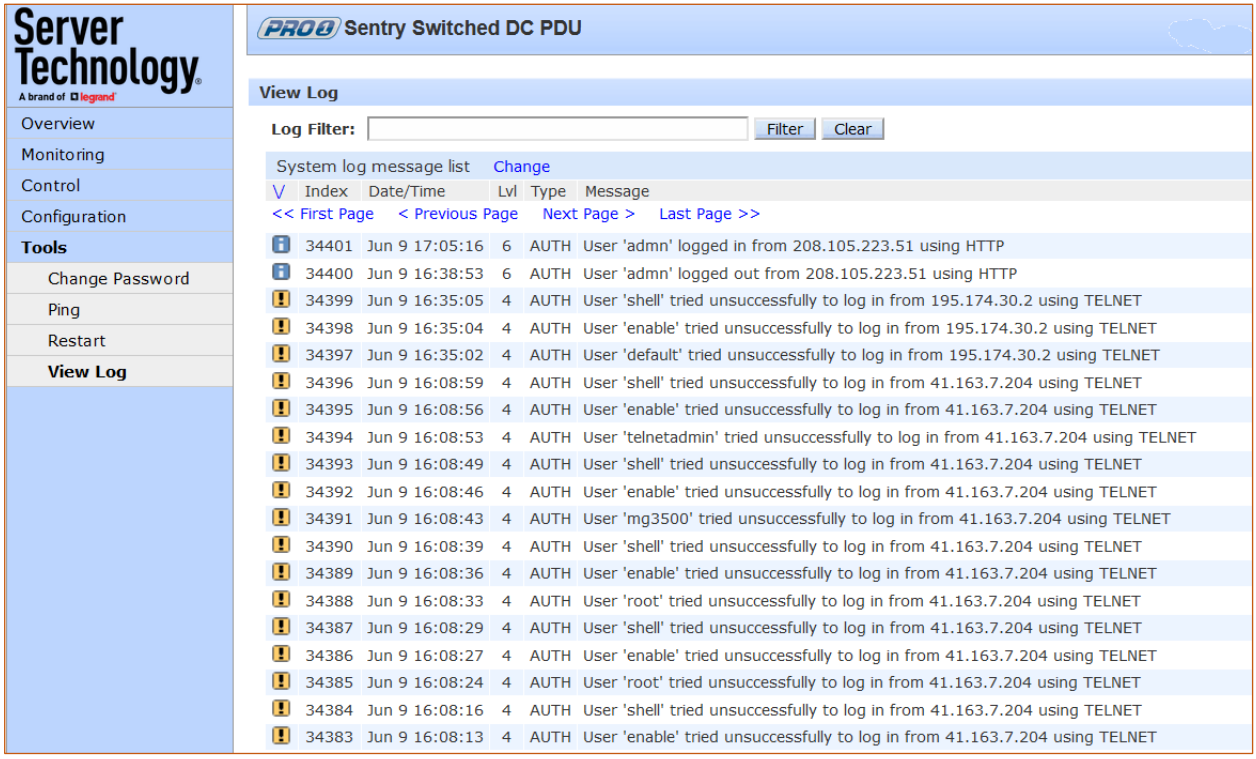
Note: This method of physical access to the unit will not work if the **Reset** button has already been disabled by the administrator through the firmware GUI at **Configuration > Access > General > Configuration Reset Button**, or through the firmware CLI with the **set access button** [**enabled/disabled**] command. For security, the administrator can choose to disable the button through firmware to inhiibit a user from causing a reset on the unit.

Tools > View Log

The View Log option displays the internal system log message list or debug log message list for viewing by the administrative user. System memory stores more than 4,000 entries in a continuously aging log. For permanent off-system log storage, the Syslog protocol is supported.

The System Log

The system log records all authentication attempts, power actions, configuration changes, and other system events, and also supports email notifications.

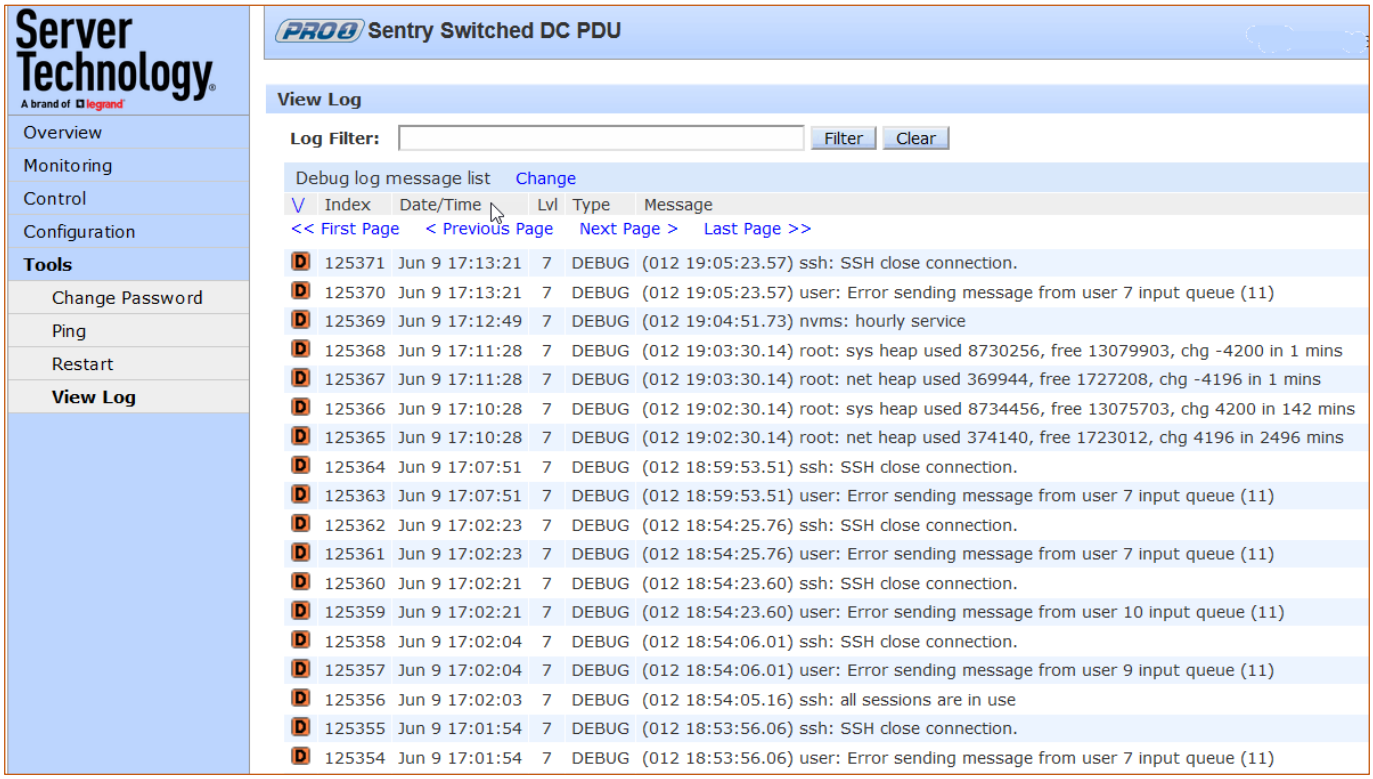


System Log Status Icons:

	Normal Status
	Configuration Change
	Low/High Warning
	Low/High Alarm
	No Communication

The Debug Log

The Debug log displays a record of debugging statements and activities.



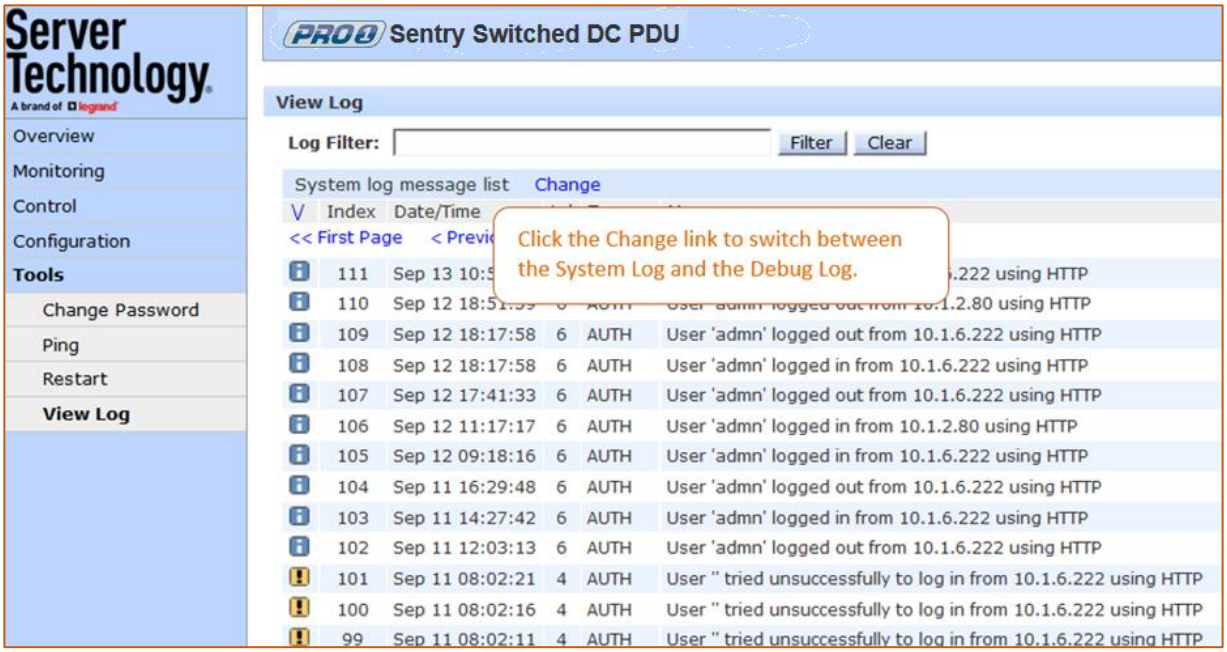
The Debug Log functions the same as the System log with the following exceptions:

- The only log type (noted in the Type column) is DEBUG.
- The only icon displayed on log entries indicates a debug entry: D.

Changing Log View

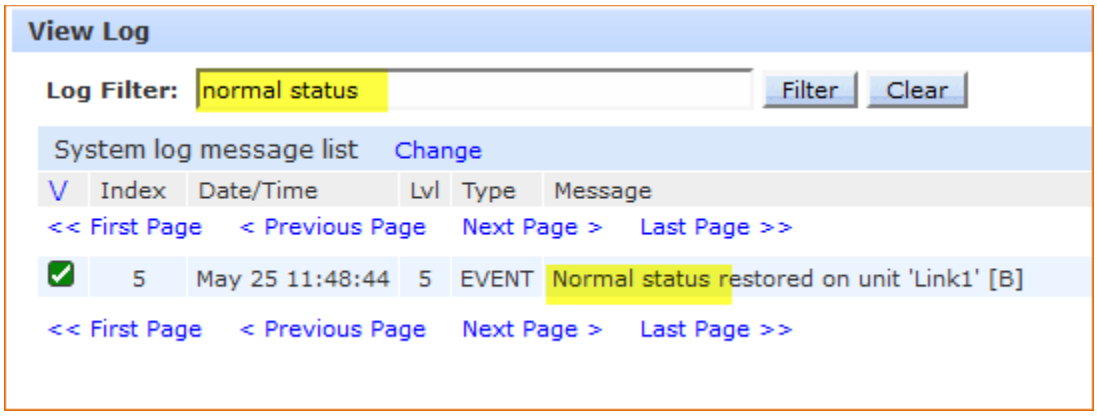
Either the System log or Debug log can be switched to the other log. To switch between logs, click the Change link as shown in the following example.

If you have a filter in place, such as “admn”, and you change log views, the “admn” filter will stay in place and continue to filter on the changed log.



Filtering Logs

You can filter the System Log and Debug log to list returned entries for a specific search.



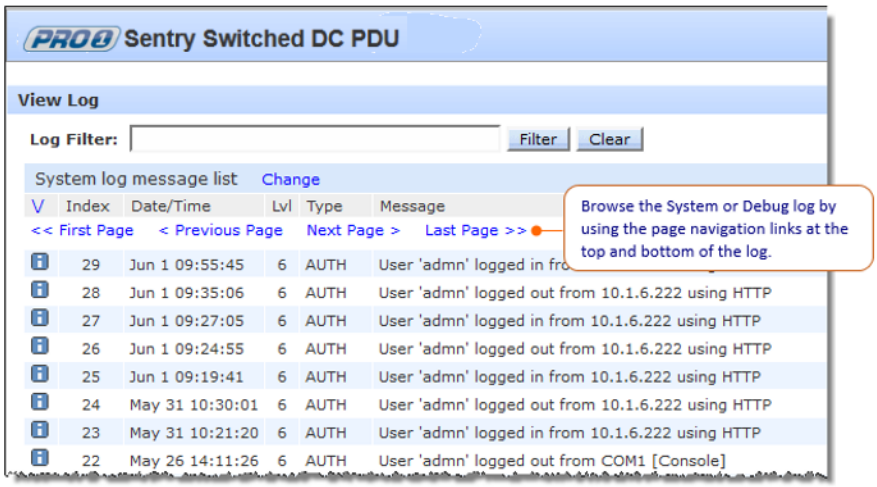
To filter a log:

1. Type a text string in the Log Filter box, such as “normal status” highlighted in the example above, and click the **Filter** button.
2. The log is searched by the entered text and displays only the matching entries. Note the highlighted “Normal status” returned in the filtered log.
3. To clear the filtered page and return to a full log, click the **Clear** button.

Log Filter Persistence: If you have a filter in place on either the System log or the Debug log, and you change views from one log to the other log using the Change link, your filter will stay in place on the changed log and will continue to filter. You can still change logs or clear the filter at any time.

Navigating the Logs

Navigation links for first, previous, next, and last page are available at the top and bottom of both logs.



Working with Log Headings

Sorting system log entries:

The entries in the System and Debug log can be displayed in ascending or descending order (based on the internal index number in the Index column) by clicking one of the following icons:

For ascending order, click  . For descending order, click  .

About the index:

The index number is assigned internally to control the sequence and identity of displayed System or Debug log entries. The Index cannot be user-edited.

Date/Time stamp:

The date and time stamp records the details of the system event timeframe. To display the date/time stamp, SNTP server support must be configured.

Level (Lvl):

Indicates the level of the status icons displayed in the System Log.

Type:

The System log supports the following types of event messages:

AUTH: All attempts to authenticate

CONFIG: All changes in system configuration

EVENT: All general system events, for example, exceeded threshold limits

POWER: All requests for a power state change

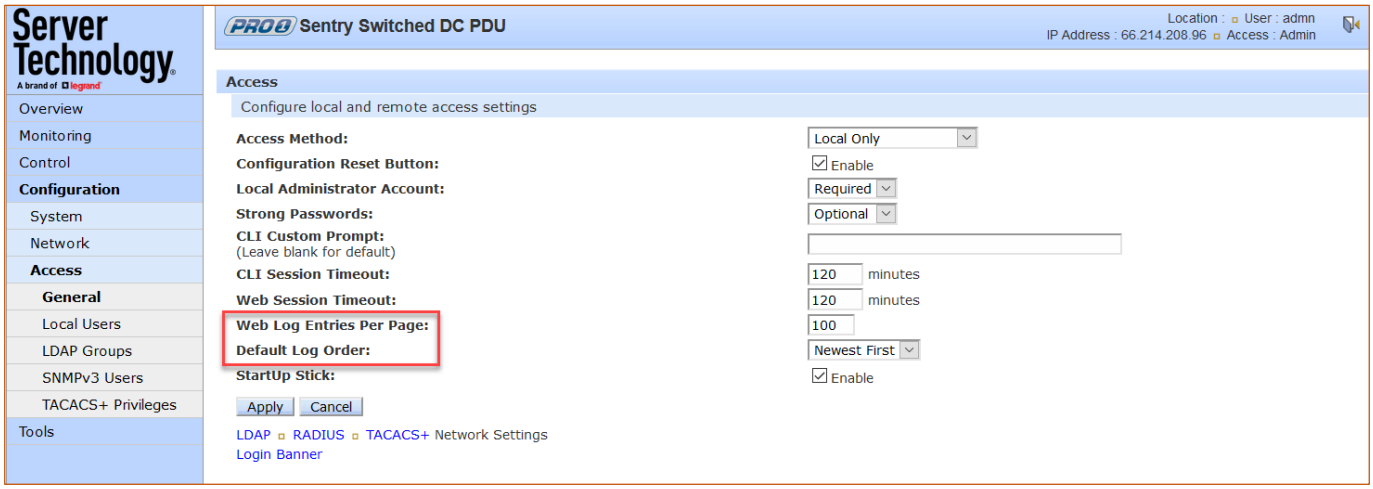
Note: The Debug log supports only one type of event message: DEBUG.

Message Text:

A text line that describes the detailed parameters of the event. For the System log, If the event is associated with a user, the user's name will be included in the message text.

Setting Options for Log Viewing

Viewing options for the System Log are set on the **Configuration > Access** page:



- **Web Log Entries Per Page**: Specifies the number of entries displayed on the System Log and the Debug Log. The maximum number of entries in the Debug Log can be set to 4,000. If the total number of entries exceed the maximum entries allowed, then Syslog will be used.
- **Default Log Order:** Sets the display of the Debug Log to the newest entry first or the oldest entry first.

Chapter 6: Using the Command Line Interface (CLI)

This chapter shows how to work with the firmware CLI, version 8.0p and later, for the Sentry DC PDU products

Note: Certain CLI commands documented in this chapter may not apply to a Smart PDU or to non-POPS PDUs.

Logging In

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

A login 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 of 300, 1200, 2400, 4800, 9699, 19200, 38400, 57600, or 115200 bps (default rate is 9600); 8 data bits-no parity, 1 stop bit, and device ready output signal (DTR or DSR).

To login by Telnet or RS232 (CLI):

At the command prompt, initiate a Telnet session (telnet [IP address]). The Telnet session automatically opens the login prompt, showing the current product and firmware version.

Quick Tour of the Command Line

The features and requirements of the command line are presented in this section.

Running Commands

To run a command, type the command, and while it is displayed on the command line, press **Enter**.

When a command is used to edit configuration settings, the values will be updated immediately.

Commands can be typed in any combination of uppercase and lowercase characters. All characters in the command must be entered correctly and command abbreviations are invalid.

If an invalid command or an incorrectly typed command is entered, one of the following messages displays:

- “Invalid parameter” with a display of the correct menu options, or
- “[command] is not recognized as an internal or external command, operable program, or batch file.”

Using the Escape (ESC) Feature

At any time during the typing of a command, press **ESC** to cancel and clear all typed characters from the command line.

Even when setting a user password or other command where a specific prompt has displayed, pressing **ESC** quickly cancels the displayed prompt and the typed command.

Using CTRL-C to Cancel Commands

CLI command operations can be cancelled by using the keys CTRL-C, where applicable.

Editing Commands

Several editing actions are available when typing a command:

This edit action…	does this on the command line…
Left Arrow ←	Moves cursor to the left to correct a typed character.
Right Arrow →	Moves cursor to the right to correct a typed character.
Backspace Key	Deletes typed command one character at a time.
Insert Key	Inserts a character in the command.
Delete Key	Deletes a character in the command.
Home Key	Moves to the first character of the command.
End Key	Moves to the last character of the command.
Esc	Clears typed characters from the command line.
CRTL-C	Cancels CLI operations, where applicable.

Retrieving Command History

The CLI provides a command history feature for the last X commands entered, using the **Up** and **Down** keys.

To display a previously entered command, press the ↑ arrow key. After the ↑ arrow key has been pressed, you can then press the ↓ arrow key to display a previously entered command in reverse order. Pressing the keys displays one command at a time.

To erase the command history, press **Esc**.

Displaying the Command Menu

The main menu of valid top-level commands can be displayed at any time during a CLI session.

At the command prompt, do one of the following:

- Type **help** and press **Enter**
- Type **?** and press **Enter**

Example:

```
Switched PDU: help

  Switched PDU commands:

    add  bstat  connect  create  cstat  delete  dir  list  login  logmon
    logout  lstat  off  on  ostat  password  ping  pstat  reboot
    remove  restart  senstat  set  show  shutdown  status  sysstat  upsstat
    ustat  version
```

Example:

```
Switched PDU: ?

  Switched PDU commands:

    add  bstat  connect  create  cstat  delete  dir  list  login  logmon
    logout  lstat  off  on  ostat  password  ping  pstat  reboot
    remove  restart  senstat  set  show  shutdown  status  sysstat  upsstat
    ustat  version
```

Displaying the Submenus

To view submenus of valid options for a command, type the main command and press **Enter**:

Example:

```
Switched PDU: set

  'set' menu options:

    access  banner branch  config  cord  dhcp  dns  email
    energywise  feature  ftp  http  https  ipv4  ipv6  ldap  ldapgroup  line
    loadshed  location  net outlet  phase  port  radius  sensor  snmp
    sntp  spm  ssh  syslog  tacacs  tacpriv  telnet  unit  ups  user
```

Example::

```
Switched PDU: show

  'show' menu options:

    access  branches  config  cords  email  energywise  features
    ftp  ldap  lines  loadshed  log  network  outlets  phases  ports
    radius  sensors  shutdown  snmp  sntp  syslog  system  tacacs  units  ups
```

Command Syntax Notes

The following conventions apply to the command syntax shown in the Command Details section:

[argument] mandatory argument that is not prompted for.

[*argument*] optional argument that is not prompted for.

<argument> argument that will be prompted for if not specified on the command line.

{argument} argument that can only be prompted for.

Example (for the SET ACCESS command):

set access

Sets user access configurations.

Command Syntax

set access button [disabled | enabled]
set access clitimeout <value>
set access localadmin [required | optional]
set access logorder [newest | oldest]
set access method [localonly | ldaponly | ldaplocal | radiusonly | radiuslocal | tacacsonly | tacacslocal]
set access prompt <prompt string>
set access strongpw [optional | required]
set access webloglen <value>
set access webtimeout <value>

List of Commands

Click a linked command name in the following table to display detailed information about using the command.

Command	Description
Add Commands	**The Add command group adds control access for outlets/outlet groups, and connection pass-thru to specified ports for LDAP, TACACS+, and local users.**
add grouptoldap	Adds control access for an outlet group to an LDAP group.
add grouptotacacs	Adds control access for an outlet group to a TACACS+ privilege level.
add grouptouser	Adds control access for an outlet group to a local user.
add outlettogroup	Adds control access for an outlet to an outlet group.
add outlettoldap	Adds control access for an outlet to an LDAP group.
add outlettotacacs	Adds control access for an outlet to a TACACS+ privilege level.
add outlettouser	Adds control access for an outlet to a local user.
add porttoldap	Adds access to use connection pass-thru to a specified port to an LDAP group.
add porttotacacs	Adds access to use a connection pass-thru to a specified port to a TACACS+ privilege level.
add porttouser	Adds access to use a connection pass-thru to a specified port to a local user.
bstat	Displays the latest status and metrics for all branches in the system.
connect	Redirects the current CLI session to the target port.
Create Commands	**The Create command group creates new outlet groups, LDAP groups, UPS devices, and local users.**
create group	Creates a new outlet group.
create ldapgroup	Creates a new LDAP group.
create snmpuser	Adds a new SNMPv3 user.
create ups	Creates a new uninterruptable power supply (UPS).
create user	Creates a new local user.
cstat	Displays the latest status and metrics for all cords in the system.
Delete Commands	**The Delete command group deletes access for outlets, outlet groups, and connection pass-thru to a specified port from LDAP groups, TACACS+ privilege levels, and local users.**
delete groupfromldap	Deletes control access for an outlet group from an LDAP group.
delete groupfromtacacs	Deletes control access for an outlet group from a TACACS+ privilege level.

Command	Description
delete groupfromuser	Deletes control access for an outlet group from a local user.
delete outletfromgroup	Deletes control access for an outlet from an outlet group.
delete outletfromldap	Deletes control access for an outlet from an LDAP group.
delete outletfromtacacs	Deletes control access for an outlet from a TACACS+ privilege level.
delete outletfromuser	Deletes control access for an outlet from a local user.
delete portfromldap	Deletes access to use a connection pass-thru to a specified port from an LDAP group
delete portfromtacacs	Deletes access to use a connection pass-thru to a specified port from a TACACS+ privilege level.
delete portfromuser	Deletes access to use a connection pass-thru to a specified port to a local user.
dir	Directory; displays the contents of the active working path in the file system.
List Commands	**The List command displays outlets in an outlet group, users, user groups, outlets, ports, and TACACS+ privileges.**
list group	Lists the outlets that are collected in an outlet group.
list groups	Lists all outlet groups.
list ldapgroup	Lists the access level of an LDAP group and any outlet groups, outlets, and ports assigned to that LDAP group.
list ldapgroups	Lists all LDAP groups.
list outlets	Lists all outlets.
list ports	Lists all ports.
list snmpuser	Lists all details for an SNMPv3 user (or all users).
list snmpusers	Lists access level and authentication method for all SNMPv3 users.
list tacpriv	Lists the access level of a TACACS+ privilege level and any outlet groups, outlets, and ports assigned to that TACACS+ privilege level.
list tacprivs	Lists all TACACS+ privilege levels.
list ups	Lists configurations for all UPS's.
list upss	Displays all UPS's.
list user	Lists the access level of a local user and any outlet groups, outlets, and ports assigned to that user.
list users	Lists all local users.

Command	Description
login	Performs system login and access verification.
logmon	Displays the system log (monitor) messages in the CLI session as they occur.
logout	Quits the current CLI session.
lstat	Displays the latest status and metrics for all lines in the system.
off	Turns off the specified outlet or outlet group.
on	Turns on the specified outlet or outlet group.
ostat	Displays the latest status and metrics for all outlets in the system.
password	Changes the password for the current local user.
ping	Tests the ability of the PDU to contact an IP address for another Ethernet-enabled device.
pstat	Displays the latest status and metrics for all phases in the system.
reboot	Turns off the specified outlet or outlet group, and then turns it back on after a delay.
Remove Commands	**The Remove command group removes outlet groups, LDAP groups, UPS devices, and local users from the system.**
remove group	Removes an outlet group from the system.
remove ldapgroup	Removes an LDAP group from the system.
remove snmpuser	Removes an SNMPv3 user from the system.
remove ups	Removes a UPS from the system.
remove user	Removes a local user from the system.
restart	Restarts the system.
senstat	Displays the latest status and metrics for all sensors in the system.
Set Commands	**The Set command group sets the configuration values for numerous system areas.**
set access	Sets user configuration access.
set branch	Sets branch configuration values.
set cord	Sets cord configuration values.
set feature	Enables new system features.

Command	Description
set ldapgroup	Sets configuration values for LDAP group access rights.
set line	Sets line configuration values.
set location	Sets the system location string.
set outlet	Sets outlet configuration values.
set phase	Sets phase configuration values.
set port	Sets serial port configuration values.
set sensor	Sets sensor configuration values.
set snmpuser	Sets SNMPv3 user configuration values.
set tacpriv	Sets TACACS+ configuration values for privilege level access rights.
set unit	Sets configuration values.
set ups	Sets UPS device configuration values.
set user	Sets configuration values for local user access rights.
Show Commands	**The Show command group displays the current configuration values in the system.**
show access	Shows user access configuration values.
show branches	Shows branch configuration values.
show cords	Shows cord configuration values.
show email	Shows email configuration values.
show features	Shows the enabled system features.
show ftp	Shows FTP configuration values.
show ldap	Shows LDAP configuration values.
show lines	Shows line configuration values.
show lldp	Show Link Layer Discovery Protocol (LLDP) configuration values.
show log	Shows the system event log.
show network	Shows network configuration values.
show outlets	Shows outlet configuration values.

Command	Description
show phases	Shows phase configuration values.
show ports	Shows port configuration values.
show radius	Shows Radius server configuration values.
show sensors	Shows sensor configuration values.
show shutdown	Shows outlet shutdown configuration values.
show snmp	Shows SNMP configuration values.
show sntp	Shows SNTP configuration values.
show syslog	Shows Syslog configuration values.
show system	Shows system uptime, firmware version, firmware build information, boot version, number of active users, and location string.
show tacacs	Shows TACACS+ configuration values.
show units	Shows configuration values.
show ztp	Displays the Zero Touch Provisioning (ZTP) network configurations.

Command Details

add grouptoldap

Adds control access for an outlet group to an LDAP group.

Command Syntax

add grouptoldap <group name | ALL> <LDAP group name>
add gtl <group name | ALL> <LDAP group name>

Command Access

Admin level only

add grouptotacacs

Adds control access for an outlet group to an TACACS+ privilege level.

Command Syntax

add grouptotacacs <group name | ALL> <TACACS+ privilege level>
add gtt <group name | ALL> <TACACS+ privilege level>

Command Access

Admin level only

add grouptouser

Adds control access for an outlet group to a local user.

Command Syntax

add grouptouser <group name | ALL> <local user name>
add gtu <group name | ALL> <local user name>

Command Access

Admin level only

add outlettogroup

Adds control access for an outlet to an outlet group.

Command Syntax

add outlettogroup <outlet name | id | ALL> <group name>
add otg <outlet name | id | ALL> <group name>

Command Access

Admin level only

add outlettoldap

Adds control access for an outlet to an LDAP group.

Command Syntax

add outlettoldap <outlet name | id | ALL> <LDAP group name>
add otl <outlet name | id | ALL> <LDAP group name>

Command Access

Admin level only

add outlettotacacs

Adds control access for an outlet to a TACACS+ privilege level.

Command Syntax

add outlettotacacs <outlet name | id | ALL> <TACACS+ privilege level>
add ott <outlet name | id | ALL> <TACACS+ privilege level>

Command Access

Admin level only

add outlettouser

Adds control access for an outlet to a local user.

Command Syntax

add outlettouser <outlet name | id | ALL> <local user name>
add otu <outlet name | id | ALL> <local user name>

Command Access

Admin level only

add porttoldap

Adds access to use a connection pass-thru to a specified port to an LDAP group.

Command Syntax

add porttoldap <port name | id | ALL> <LDAP group name>
add ptl <port name | id | ALL> <LDAP group name>

Command Access

Admin level only

add porttotacacs

Adds access to use a connection pass-thru to a specified port to a TACACS+ privilege level.

Command Syntax

add porttotacacs <port name | id | ALL> <TACACS+ privilege level>
add ptt <port name | id | ALL> <TACACS+ privilege level>

Command Access

Admin level only

add porttouser

Adds access to use a connection pass-thru to a specified port to a local user.

Command Syntax

add porttouser <port name | id | ALL> <local user name>
add ptu <port name | id | ALL> <local user name>

Command Access

Admin level only

bstat

Displays the latest status and metrics for all branches in the system.

Command Syntax

bstat

Command Access

System Monitor access

connect

Redirects the current CLI session to the target port.

Command Syntax

connect <target port>

Command Access

Any access level for command; for user level lower than admin, access must be granted to a port for successful connection.

create group

Creates a new outlet group.

Command Syntax

create group <name>

Command Access

Admin level only

create ldapgroup

Creates a new LDAP group.

Command Syntax

create ldapgroup <name>

Command Access

Admin level only

create ups

Creates a new uninterruptable power supply (UPS).

Command Syntax

create ups <name | ups type |> <hostname>

Parameters

The **create ups** command uses the following parameters:

hostname	Hostname or IP address of the UPS.
ups type	Selects UPS type from list of manufacturers. (1-11).

Command Access

Admin level only

create snmpuser

Adds a new SNMPv3 user.

Note: Up to eight new users can be added to SNMPv3, each user with its own access rights.

Command Syntax

create <snmpuser>

Command Access

Admin level only

list snmpuser

Lists all details for an SNMPv3 user (or all users).

Command Syntax

list <snmpuser> | ALL

Command Access

Admin level only

list snmpusers

Lists the access level and authentication method for all SNMPv3 users.

Command Syntax

list <snmpusers>

Command Access

Admin level only

create user

Creates a new local user.

Command Syntax

create user <name> {password} {verify password}

Command Access

Admin level only

cstat

Displays the latest status and metrics for all cords in the system.

Command Syntax

cstat

Command Access

System Monitor access

delete groupfromldap

Deletes control access for an outlet group from an LDAP group.

Command Syntax

delete groupfromldap <group name | ALL> <LDAP group name>
delete gfl <group name | ALL> <LDAP group name>

Command Access

Admin level only

delete groupfromtacacs

Deletes control access for an outlet group from a TACACS+ privilege level.

Command Syntax

delete groupfromtacacs <group name | ALL> <TACACS+ privilege level>
delete gft <group name | ALL> <TACACS+ privilege level>

Command Access

Admin level only

delete groupfromuser

Deletes control access for an outlet group from a local user.

Command Syntax

delete groupfromuser <group name | ALL> <local user name>
delete gfu <group name | ALL> <local user name>

Command Access

Admin level only

delete outletfromgroup

Deletes control access for an outlet from an outlet group.

Command Syntax

delete outletfromgroup <outlet name | id | ALL> <group name>
delete ofg <outlet name | id | ALL> <group name>

Command Access

Admin level only

delete outletfromldap

Deletes control access for an outlet from an LDAP group.

Command Syntax

delete outletfromldap <outlet name | id | ALL> <LDAP group name>
delete ofl <outlet name | id | ALL> <LDAP group name>

Command Access

Admin level only

delete outletfromtacacs

Deletes control access for an outlet from a TACACS+ privilege level.

Command Syntax

delete outletfromtacacs <outlet name | id | ALL> <TACACS+ privilege level>
delete oft <outlet name | id | ALL> <TACACS+ privilege level>

Command Access

Admin level only

delete outletfromuser

Deletes control access for an outlet from a local user.

Command Syntax

delete outletfromuser <outlet name | id | ALL> <local user name>
delete ofu <outlet name | id | ALL> <local user name>

Command Access

Admin level only

delete portfromldap

Deletes access to use a connection pass-thru to a specified port from an LDAP group.

Command Syntax

delete portfromldap <port name | id | ALL> <LDAP group name>
delete pfl <port name | id | ALL> <LDAP group name>

Command Access

Admin level only

delete portfromtacacs

Deletes access to use a connection pass-thru to a specified port from a TACACS privilege level.

Command Syntax

delete portfromtacacs <port name | id | ALL> <TACACS+ privilege level>
delete pft <port name | id | ALL> <TACACS+ privilege level>

Command Access

Admin level only

delete portfromuser

Deletes access to use a connection pass-thru to a specified port to a local user.

Command Syntax

delete portfromuser <port name | id | ALL> <local user name>
delete pfu <port name | id | ALL> <local user name>

Command Access

Admin level only

dir

(Directory) Displays the contents of the active working path in the file system.

Command Syntax

.
dir [.]
dir [path] [volume]

Parameters

The **dir** command uses the following parameters.

"."	Displays the current path.
path	Specifies a path.
volume	(FLASH0 | RAM0)

Command Access

Admin level only

list group

Lists the outlets that are contained in an outlet group.

Command Syntax

list group <group name | ALL>

Command Access

Any access level

list groups

Lists all outlet groups.

Command Syntax

list groups

Command Access

Any access level

list ldapgroup

Lists access level of an LDAP group and any outlet groups, outlets, and ports assigned to that LDAP group.

Command Syntax

list ldapgroup <LDAP group name>

Command Access

Admin level only

list ldapgroups

Lists all LDAP groups.

Command Syntax

list ldapgroups

Command Access

Admin level only

list outlets

Lists all outlets.

Command Syntax

list outlets

Command Access

Any access level

list ports

Lists all ports.

Command Syntax

list ports

Command Access

Any access level

list tacpriv

Lists access level of a TACACS+ privilege level and any outlet groups, outlets, and ports assigned to that TACACS+ privilege level.

Command Syntax

list tacpriv <TACACS+ privilege level>

Command Access

Admin level only

list tacprivs

Lists all TACACS+ privilege levels.

Command Syntax

list tacprivs

Command Access

Admin level only

list ups

Displays configurations for all UPS's.

Command Syntax

list ups <name | ALL>

Command Access

Admin level only

list upss

Displays all UPS's.

Command Syntax

list upss

Command Access

Admin level only

list users

Lists all local users.

Command Syntax

list users

Command Access

Admin level only

list users

Lists all local users.

Command Syntax

list users

Command Access

Admin level only

login

Performs system login and access verification.

Command Syntax

login

Command Access

Any access level

logmon

Log Monitor. Displays the system log (monitor) messages in the CLI session as they occur.

Command Syntax

logmon [filter]

Parameters

The **logmon** command uses the following parameter.

filter	Keyword filter for log entries.

Usage Guidelines

The log monitor command runs until ESC or RETURN is pressed.

Command Access

Admin level only

logout

Quits the current CLI session.

Command Syntax

logout

Command Access

Any access level

lstat

Displays the latest status and metrics for all lines in the system.

Command Syntax

lstat

Command Access

System monitor access

off

Turns off the specified outlet or outlet group.

Command Syntax

off <name | id | group | ALL>

Usage Guidelines

The **off** command is for Switched PRO1 products only.

Command Access

User level and above

on

Turns on the specified outlet or outlet group.

Command Syntax

on <name | id | group | ALL>

Usage Guidelines

The **on** command is for Switched PRO1 products only.

Command Access

On-Only users or User level and above

ostat

Displays the latest status and metrics for all outlets in the system.

Command Syntax

ostat <name | outlet | outlet id | group | ALL>

Command Access

System monitor access

password

Changes the password for the current local user.

Command Syntax

Password {password} {verify password}

Command Access

Any access level

ping

Tests the reachability of a host on the IP network.

Command Syntax

ping <hostname>

Parameters

The **ping** command uses the following parameter.

hostname	Specifies the host to ping, 0-63 characters.

Command Access

Any access level

pstat

Displays the latest status and metrics for all phases in the system.

Command Syntax

pstat

Command Access

System monitor access

reboot

Turns off the specified outlet or outlet group and then turns it back on after a delay.

Command Syntax

reboot <name | id | group | ALL>

Usage Guidelines

The Reboot command is for Switched PRO1 products only.

Command Access

Reboot-Only users or User level and above

remove group

Removes an outlet group from the system.

Command Syntax

remove group <name>

Command Access

Admin level only

remove ldapgroup

Removes an LDAP group from the system.

Command Syntax

remove ldapgroup <name>

Command Access

Admin level only

remove snmpuser

Removes an SNMPv3 user from the system.

Command Syntax

remove snmpuser <name>

Command Access

Admin level only

remove ups

Removes an uninterruptable power supply (UPS) from the system.

Command Syntax

remove ups <name>

Command Access

Admin level only

remove user

Removes a local user from the system.

Command Syntax

remove ups <name>

Command Access

Admin level only

restart

Restarts the system.

Command Syntax

restart [factkeepnet | factory | ftpload | newx509cert | newsshkeys | normal]

Parameters

The **restart** command uses the following parameters.

Note: None of the parameters in the following table performs a normal system restart.

factkeepnet	Removes all system configurations except network configuration.
factory	Removes all system configurations.
ftpload	Performs a system update through an FTP load.
newx509cert	Creates a new self-signed SSL X509 certificate.
newsshkeys	Creates a new set of public and private SSH keys.
normal	Performs a normal system restart.

Command Access

Admin level only; no access in Demo mode

senstat

Displays the latest status and metrics for all sensors (and fan, when present) in the system.

Command Syntax

senstat

Command Access

System monitor access

set access

Sets user access configurations.

Command Syntax

set access button [disabled | enabled]
set access clitimeout <value>
set access localadmin [required | optional]
set access logorder [newest | oldest]
set access method [localonly | ldaponly | ldaplocal | radiusonly | radiuslocal | tacacsonly | tacacslocal]
set access prompt <prompt string>
set access startupstick [disabled | enabled]
set access strongpw [optional | required]
set access webloglen <value>
set access webtimeout <value>

Parameters

The **set access** command uses the following parameters:

button	Sets if the Configuration Reset button can reset the system configuration.
clitimeout	Set the CLI session idle time before automatic logout [1-1440 minutes].
localadmin	Removes the restriction to not allow the last local administrator to be removed when remote authentication (LDAP, TACACS+, or RADIUS) is in use.
logorder	Sets the default order of the system log when displayed.
method	Sets the allowed access methods for users.
prompt	Sets the system CLI prompt (0-32 characters).
startupstick	Enables/disables the Startup Stick tool for mass PDU configuration.
strongpw	Sets if strong passwords are required for local users.
webloglen	Sets the number of log entries per page when viewing the log on the Web [10-250 entries].
webtimeout	Sets the Web session idle time before automatic logout [1-1440 minutes].

Sub-Parameters

The **set access** command uses the following sub-parameters:

localonly	Local authentication only.
ldaponly	Authentication using only the configured LDAP servers.
ldaplocal	Authentication using the configured LDAP servers, then locally if no LDAP match is found.
radiusonly	Authentication using only the configured Radius servers.
radiuslocal	Authentication using the configured Radius servers, then locally if no Radius match is found.
tacacsonly	Authentication using only the configured TACACS servers.
tacacslocal	Authentication using the configured TACACS+ servers, then locally if no TACACS+ match is found.

Command Access

Admin level only

set branch

Sets branch configuration values.

Command Syntax

set branch email [disabled | enabled] <name | id | ALL>
set branch load [alarmhi | alarmlo | warnhi | warnlow] <name | id | ALL> <value>
set branch load hyst <value>
set branch snmpt [disabled | enabled] <name | id | ALL>

Parameters

The **set branch** command uses the following parameters:

email	Email notifications for branch events.
hyst	Hysteresis between event state and recovery (0.0 to 10.0).
load	Current load for a branch. min=0A; max (max current) in **show branches** command; hyst=0.0-10.0A; default-1.0A.
snmpt	SNMP trap notifications for branch events.

Sub Parameters

The **set branch** command uses the following sub-parameters:

alarmhi	High alarm value.
alarmlo	Low alarm value.
warnhi	High warning alarm.
warnlo	Low warning alarm.

Usage Guidelines

min <= alarmlo <= warnlo <= warnhi <= alarmhi <= max

Command Access

Admin level only

set cord

Sets cord configuration values.

Command Syntax

set cord email [disabled | enabled] <name | id | ALL>
set cord loadmax <name | id | ALL> <value>
set cord name <name | id> <name string>
set cord nomvolts <name | id | ALL> <value>
set cord outofbal [alarmhi | warnhi] <name | id | ALL> <value>
set cord outofbal hyst <value>
set cord pf [alarmlo | warnlo] <name | id | ALL> <value>
set cord pf hyst <value>
set cord snmpt [disabled | enabled] <name | id | ALL>
set cord va [alarmhi | alarmlo | warnhi | warnlo] <name | id | ALL> <value>
set cord va hyst <value>
set cord watts [alarmhi | alarmlo | warnhi | warnlo] <name | id | ALL> <value>
set cord watts hyst <value>

Parameters

The **set cord** command uses the following parameters:

email	Email notifications for cord events.
hyst	Hysteresis between event state and recovery.
loadmax	Maximum current load for a cord. 1-max factory current in **show cords** command.
name	Name for the cord. 0-32 characters.
nomvolts	Nominal voltage for the cord. 0-max factory voltage in **show cords** command.
outofbal	Out-of-balance; the percent power difference between phases of a cord. min 0%, max 200%, hyst 0-10% (default 2%).
pf	Power factor. min 0.00, max 1.00, hyst 0.0-0.20 (default 0.02).
snmpt	SNMP trap notifications for cord events.
va	Power (with power factor included). min 0VA, max (power capacity) in **cstat** command, hyst 0-1000VA (default 100VA).
watts	Power (without power factor included). Min 0W, max (power capacity) in **cstat** command, hyst 0-1000W (default 100W).

Sub-Parameters

The **set cord** command uses the following sub-parameters:

alarmhi	High alarm value.
alarmlo	Low alarm value.
warnhi	High warning alarm.
warnlo	Low warning alarm.

Usage Guidelines min <=alarmlo <=warnlo <=warnhi <=alarmhi <=max

Command Access Admin level only

set feature

Enables new system features.

Command Syntax

set feature <feature key>

Parameters

The **set feature** command uses the following parameter:

feature key	Key for unlocking system features (XXXX-XXXX-XXXX-XXXX), where X = 0-9 or A-Z.

Command Access

Admin level only

set ldapgroup

Sets configuration values for LDAP group access rights.

Command Syntax

set ldapgroup access [admin }| admin | ononly | poweruser | rebootonly | user | viewonly] <groupname>

set ldapgroup sysmon [disabled | enabled] <groupname>

Parameters

The **set ldap group** command uses the following parameters:

access	Sets the access type of an LDAP group. **Note:** On-Only, Reboot-Only, and View-Only are available for Switched PRO1 products.
sysmon	Sets system monitor access for an LDAP group.

Sub-Parameters

The **set ldap group** command uses the following sub-parameter:

groupname	Name of the LDAP group to change access rights. 0-32 characters.

Command Access

Admin level only

set line

Sets line configuration values.

Command Syntax

set line email [disabled | enabled] <name | id | ALL>
set line load [alarmhi | alarmlo | warnhi | warnlo] <name | id | ALL> <value>
set line load hyst <value>
set line snmpt [disabled | enabled] <name | id | ALL>

Parameters

The **set line** command uses the following parameters:

Email	Email notification for line events.
Hyst	Hysteresis between event state and recovery.
Load	Current load for a line. min = 0A, max (current limit) in **show lines** command, hyst 0.0-10.0A (default 1.0A).
SNMPT	SNMP trap notifications for line events.

Sub-Parameters

The **set line** command uses the following sub-parameters:

alarmhi	High alarm value.
alarmlo	Low alarm value.
warnhi	High warning alarm.
warnlo	Low warning alarm.

min <= alarmlo <= warnlo <= warnhi <= alarmhi <= max

Command Access

Admin level only

set location

Sets the system location string.

Command Syntax

set location <location string>

Parameters

The **set location** command uses the following parameter:

location string	Location string text for system location. 0-63 characters.

Command Access

Admin level only

set outlet

Sets outlet configuration values.

Command Syntax

set outlet branchevent [disabled | enabled] <name | id | ALL>
set outlet chglogging [disabled | enabled]
set outlet email [disabled | enabled] <name | id | ALL>
set outlet load [alarmhi | alarmlo | warnhi | warnlo] <name | id | ALL> <value>
set outlet load hyst <value>
set outlet name <name | id> <new name>
set outlet snmpt [disabled | enabled] <name | id | ALL>
set outlet watts [alarmhi | alarmlo | warnhi | warnlo] <name | id | ALL> <value>
set outlet watts hyst <value>

Parameters

The **set outlet** command uses the following parameters:

chglogging	Sets logging for system outlet state changes
email	Sets email notifications for outlet events.
extondelay	Sets an extra on delay when turning on an outlet. 0-900 seconds.
host	Sets the hostname for an outlet for script or shutdown actions. 0-63 characters.
hyst	Sets the hysteresis between event state and recovery.
load	Sets the current load for an outlet. min 0.0A, max (max current) in **show outlets** command, hyst 1.0-10.0A (default 1.0A)
lock	Sets if control actions are disabled for an outlet after wakeup state is applied.
pf	Sets the power factor. min 0.00, max 1.00, hyst 0.0-0.20 (default 0.02)
rebootdelay	Sets an extra on delay when rebooting an outlet (5-600 seconds).
script	Sets to additionally send request to have shutdown agent run a script before shutting down the host.

seqdelay	Sets the delay between turning on outlets. 0-15 seconds.
shutdown	Sets if notification of pending off state of outlet is sent to outlet host before changing state.
shutdown delay	Sets the remote shutdown delay for an outlet. 1-900 seconds.
snmpt	Sets if SNMP trap notifications for outlet events.
wakeup	Sets the default outlet control state after system power up.
watts	Sets the power (without power factor). min 0W, max (power capacity) in **ostat details**, hyst 0-1000W (default 10W).

Parameters

The **set outlet** command uses the following sub-parameters:

script delay	Sets the time to wait after the script has executed to outlet state change. 1-15 seconds.
shutdown delay	Sets the time to wait after the shutdown notification to host before outlet state change. Valid range is 1-900 seconds.
on	Sets outlet to sequence on after system boot.
off	Sets outlet to remain off after system boot.
last	Sets outlet to match its last state prior to system boot after system boot.
alarmhi	Sets high alarm value.
alarmlo	Sets low alarm value.
warnhi	Sets high warning value.
warnlo	Sets low warning value.

min <= alarmlo <= warnlo <= warnhi <= alarmhi <= max

Command Access

Admin level only

set phase

Sets phase configuration values.

Command Syntax

set phase email [disabled | enabled] <name | id | ALL>
set phase pf [alarmlo | warnlo] <name | id | ALL> <value>
set phase snmpt [disabled | enabled] <name | id | ALL>
set phase volts [alarmhi | alarmlo | warnhi | warnlo] <name | id | ALL> <value>
set phase volts hyst <value>

Parameters

The **set phase** command uses the following parameters:

email	Sets email notifications for phase events.
hyst	Sets hysteresis between event state and recovery.
pf	Sets power factor. min 0.00, max 1.00, hyst 0.0-0.20 (default 0.02).
snmpt	Sets SNMP trap notifications for phase events.
volts	Sets voltage. min and max vary by product*, hyst 0.0-20 (default 0.02). * For the min-max range, issue **set cord nomvolts all** command (press ESC to quit command).

Sub-Parameters

The **set phase** command uses the following sub-parameters:

alarmhi	Sets high alarm value.
alarmlo	Sets low alarm value.
warnhi	Sets high warning value.
warnlo	Sets low warning value.

Command Access

Admin level only

set port

Sets serial port configuration values.

Command Syntax

set port [baud | speed] [1200 | 2400 | 4800 | 9600 | 19200 | 38400 | 57600 | 115200] <name | id >
set port dsrcheck [disabled | enabled] <name | id >
set port timeout <name | id > <timeout>

Parameters

The **set port** command uses the following parameters:

baud/speed	Sets the number of symbols per second of the serial port.
dsrcheck	Sets to use DSR before making a serial connection.
rftag	Sets RF Code tag (RFTAG) support for selected **unlocked** port. **Note:** If port is locked, any attempts to change this setting will be ignored.
timeout	Sets the connection idle timeout for pass-thru connections to this port. 0-60 minutes (default 5 minutes).

Command Access

Admin level only

set sensor

Sets sensor configuration values.

Command Syntax

set sensor adc [alarmhi | alarmlo | warnhi | warnlo] <name | id | ALL> <value>
set sensor adc email [disabled | enabled] <name | id | ALL>
set sensor adc hyst <value>
set sensor adc name <name | id> <name>
set sensor adc snmpt [disabled | enabled] <name | id | ALL>
set sensor contact email [disabled | enabled] <name | id | ALL>
set sensor contact name <name | id> <name>
set sensor contact snmpt [disabled | enabled] <name | id | ALL>
set sensor fan [alarmlo | alarmhi | email | hyst | name | snmpt | warnlo | warnhi]
set sensor humid [alarmhi | alarmlo | warnhi | warnlo] <name | id | ALL> <value>
set sensor humid email [disabled | enabled] <name | id | ALL>
set sensor humid hyst <value>
set sensor humid name <name | id> <name>
set sensor humid snmpt [disabled | enabled] <name | id | ALL>
set sensor temp [alarmhi | alarmlo | warnhi | warnlo] <name | id | ALL> <value>
set sensor temp email [disabled | enabled] <name | id | ALL>
set sensor temp hyst <value>
set sensor temp name <name | id> <name>
set sensor temp snmpt [disabled | enabled] <name | id | ALL>
set sensor water email [disabled | enabled] <name | id | ALL>
set sensor water name <name | id> <name>
set sensor water snmpt [disabled | enabled] <name | id | ALL>
set sensor temp scale [celsius | fahrenheit]

Parameters

The **set sensor** command uses the following parameters:

adc	Sets the analog-to-digital converter sensor. min 0, max 255, hyst 0-20 (default 1).
contact	Sets the contact closure sensor.
fan	Sets the fan values when a fan is present.
humid	Sets the humidity sensor. min 0%RH, max 100%RH, hyst 0-20%RH (default 2%RH).
temp	Sets temperature sensor. For Celsius: min -40°, max 123°, hyst 0-30°, default 1°; For Fahrenheit: min -40°, max 253°, hyst 0-54°, default 2°.
water	Sets the water sensor.
email	Sets the email notifications for sensor events.
hyst	Sets the hysteresis between event state and recovery.
name	Sets the name of the sensor.
snmpt	SNMP trap notifications for sensor events.
scale	Sets temperature scale.

Sub-Parameters

The **set sensor** command uses the following sub-parameters:

alarmhi	Sets high alarm value.
alarmlo	Sets low alarm value.
warnhi	Sets high warning value.
warnlo	Sets low warning value.

min <= alarmlo <= warnlo <= warnhi <= alarmhi <= max

Command Access

Admin level only

set snmpuser

Sets SNMPv3 user configuration values.

Command Syntax

set snmpuser access [disabled | readonly | writeonly | readwrite]
set snmpuser authmode [MD5 | MD5DES | none]
set snmpuser authpass
set snmpuser privpass

Parameters

The **set snmpuser** command uses the following parameters:

access	Sets
authmode	Sets
authpass	Sets
privpass	Sets

Sub-Parameters

The **set snmpuser** command uses the following sub-parameters:

disabled	Disables access to the the SNMPv3 user
readonly	Sets read only access for an SNMPv3 user.
writeonly	Sets write only access for an SNMPv3 user.
readwrite	Sets read/write access for an SNMPv3 user.
MD5	Sets Digest MD5 for SNMPv3 user authentication.
MD5DES	Sets MD5DES for SNMPv3 user authentication.
none	Uses no authentication method for an SNMPv3 user.
authpass	Sets the authentication password for an SNMPv3 user. 0-39 characters.
privpass	Sets the privacy password for an SNMPv3 user. 0-31 characters.

set tacpriv

Sets TACACS+ configuration values for privilege level access rights.

Command Syntax

set tacpriv access [admin | ononly | poweruser | rebootonly | user | viewonly] <priv level>
set tacpriv sysmon [disabled | enabled] <priv level>

Parameters

The **set tacpriv** command uses the following parameters:

access	Sets the access type for a level. **Note:** On-Only, Reboot-Only, and View-Only are available for Switched PRO1 products.
sysmon	Sets the system monitor access for a level.

Sub-Parameters

The **set tacpriv** command uses the following sub-parameter:

priv level	The ID of the TACACS+ privilege level to change access rights (0-15).

Command Access

Admin level only

set unit

Sets PRO1 configuration values.

Command Syntax

set unit assettag <name | id> <asset tag>
set unit display [auto | inverted | normal] <name | id | ALL>
set unit email [disabled | enabled] <name |id | ALL>
set unit identify [disabled | enabled] <name | id | ALL>
set unit name <name | id> <new name>

Confirmation required:

set unit purge <name | id | ALL>
set unit snmpt [disabled | enabled] <name | id | ALL>

Parameters

The **set unit** command uses the following parameters:

assettag	The asset tag value of the unit. 0-32 characters.
display	Sets the orientation of the displays on a unit.
email	Email notifications for an event.
identify	Set to enable/disable flashing display.
name	The name of the unit. 0-32 characters.
odisporder	Sets the Web GUI and CLI outlet display order for a unit. **Note:** The unit must have sequential switched outlets or this parameter will be ignored.
osequence	Sets the outlet sequence order for a unit.
purge	Removes all stored information for a unit.
snmpt	SNMP trap notifications for unit events.

Sub-Parameters

The **set unit** command uses the following sub-parameters:

auto	Set automatic display orientation using internal orientation sensor.
Inverted	Set display to be upside down.
normal	Set display to be right-side up; set outlet sequencing to be 1 to n.
reversed	Set outlet sequencing to be n to 1.

Command Access

Admin level only

set ups

Sets UPS device configuration values.

Command Syntax

set ups addline <UPS#> <line name | id | ALL>
set ups commstr <UPS#> <get community string>
set ups delline <UPS#> <line name | id | ALL>
set ups host <UPS#> <hostname>
set ups oidspoll <UPS#> <oid>
set ups onbattery <UPS#> <value>
set ups onutility <UPS#> <value>
set ups port <UPS#> <port>
set ups type <UPS#> <value>

Parameters

The **set ups** command uses the following parameters:

UPS#	The number of the UPS to change. 1-8.
addline	Adds the specified line to be protected by the UPS.
commstr	Sets the community string for polling the UPS by SNMP. 0-32 characters.
delline	Removes the specified line from a UPS.
host	Hostname for polling the UPS by SNMP. 0-63 characters.
oidspoll	The OID for getting the “on battery”/“on utility” value when polling the UPS by SNMP.
onbattery	Value of the OID when the UPS is in an “on battery” state. 1-65535.
onutility	Value of the OID when the UPS is in an “on utility” state. 1-65535.
port	Port number for polling the UPS by SNMP. 1-65535 (default 161).
type	Sets the type of the UPS; sets default commstr, oidspoll, onbattery, onutility, and port. 1-11.

Sub-Parameters

The **set ups** command uses the following sub-parameter:

oid	The OID string with sequences of a dot and a number. 1-65535.

Command Access

Admin level only

set user

Sets configuration values for local user access rights.

Command Syntax

set user access [admin | ononly | poweruser | rebootonly | user | viewonly] <username>
set user password <username> {password} {verify password}
set user sysmon [disabled | enabled] <username>

Parameters

The **set user** command uses the following parameters:

access	Sets the access type of a local user. **Note:** On-Only, Reboot-Only, and View-Only are available for Switched PRO1 products.
password	Sets the password for a local user.
sysmon	Sets system monitor access for a local user.

Sub-Parameters

The **set user** command uses the following sub-parameter:

username	The ID of the local user to change access rights. 0-32 characters.

Command Access

Admin level only

show access

Shows user access configuration values.

Command Syntax

show access

Command Access

Admin level only

Example

```
Switched PDU: show access

  Access Configuration

    Access Method:                LDAP then local
    Configuration Reset Button:   enabled
    Local Administrator Account:  required
    Strong Passwords:             optional
    CLI Custom Prompt:            <none>
    CLI Timeout:                  5 minute<s>
    Web Timeout:                  5 minute<s>
    Web Log Entries:              100 <per page>
    Default Log Order:            newest first
    StartUp Stick:                enabled
```

show branches

Shows branch configuration values.

Command Syntax

show branches

Command Access

Admin level only

Example

```
Switched PDU: show branches

  ID    Branch Name
  --    -----------
  AA1   AA:Branch_1
  AA2   AA:Branch_2
  AA3   AA:Branch_3
  BA1   BA:Branch_1
  BA2   BA:Branch_2
  BA3   BA:Branch_3

        SNMP        Email       Max         Current  Current  Current  Current
  ID    Notif.      Notif.      Current     Lo-Alrm  Lo-Warn  Hi-Warn  Hi-Alrm
  --    ------      ------      -------     -------  -------  -------  -------
  AA1   enabled     enabled     20A         0.0A     0.0A     14.0A    16.0A
  AA2   enabled     enabled     20A         0.0A     0.0A     14.0A    16.0A
  AA3   enabled     enabled     20A         0.0A     0.0A     14.0A    16.0A
  BA1   enabled     enabled     20A         0.0A     0.0A     14.0A    16.0A
  BA2   enabled     enabled     20A         0.0A     0.0A     14.0A    16.0A
  BA3   enabled     enabled     20A         0.0A     0.0A     14.0A    16.0A

  Common Branch Settings

    Branch Current Hysteresis:          1.0A
```

show cords

Shows cord configuration values.

Command Syntax

show cords

Command Access

Admin level only

Example

```
Switched PDU: show cords


ID    Cord Name
--    ---------
AA    Master_Cord_A
BA    Link_Cord_A

      SNMP      Email     User  / Factory    User  / Factory
ID    Notif.    Notif.    Current Capacity   Nominal Voltage
--    ------    ------    ----------------   ---------------
AA    enabled   enabled   100A   / 100A      48V    / 48V
BA    enabled   enabled   100A   / 100A      48V    / 48V


%
```

show email

Shows email configuration values.

Command Syntax

show email

Command Access

Admin level only

Example

```
Switched PDU: show email

  Email/SMTP Configuration

    SMTP Host:           (not set)
    SMTP Port:           25
    SMTP Authentication: None with SMTP Username
    SMTP Username:
    SMTP Password:       (not set)
    'From' Addr:
    'To' Address 1:
    'To' Address 2:
    Subject ID:          [Sentry_60000a]


    Email Notifications: disabled
      EVENT Messages:    enabled
      AUTH Messages:     disabled
      POWER Messages:    disabled
      CONFIG Messages:   disabled
      Trend Files:       disabled
```

show features

Shows the enabled system features.

Command Syntax

show features

Command Access

Admin level only

Example

```
Switched PDU: show features

  Add-on features installed on this system:
```

show ftp

Shows FTP configuration values.

Command Syntax

show ftp

Command Access

Admin level only

Example

```
Switched PDU: show ftp

  FTP Client Configuration

   Host:          10.1.2.230
   Username:      swcdu8
   Password:      <not set>
   Directory:
   Filename:      firmware.bin

   Auto Upgrades: disabled
   Update Day:    Everyday
   Update Hour    12 AM

 FTP Server Configuration

  Server:          enabled
```

show ldap

Shows LDAP configuration values.

Command Syntax

show ldap

Command Access

Admin level only

Example

```
Switched PDU: show ldap

  LDAP Configuration

    LDAP:             disabled
    Primary Host:     <not set>
    Secondary Host:   <not set>
    Port:             389
    Bind Type:        Simple

    Search Bind
      DN:
      Password:       <not set>

    User Search
      Base DN:
      Filter:

    Group Membership
      Attribute:

    Group Search:      disabled
      Base DN:
      User Member
      Attribute:
```

show lines

Shows line configuration values.

Command Syntax

show lines

Command Access

Admin level only

Example

```
Switched PDU: show lines

  ID    Line Name
  --    ---------
  AA1   AA:L1
  CA1   CA:L1
  DA1   DA:L1

        SNMP        Email       Max         Current  Current  Current  Current
  ID    Notif.      Notif.      Current     Lo-Alrm  Lo-Warn  Hi-Warn  Hi-Alrm
  --    ------      ------      -------     -------  -------  -------  -------
  AA1   enabled     enabled     30A         0.0A     0.0A     21.0A    24.0A
  CA1   enabled     enabled     30A         0.0A     0.0A     21.0A    24.0A
  DA1   enabled     enabled     30A         0.0A     0.0A     21.0A    24.0A

  Common Line Settings

    Line Current Hysteresis:            1.0A
```

show lldp

Shows Link Layer Discovery Protocol (LLDP) configuration values.

Command Syntax

show lldp

Command Access

Admin level only

Example

```
Switched PDU: show lldp

LLDP Configuration

  LLDP:              enabled
  Transmit Interval: 30 second(s)
```

show log

Shows the system event log.

Command Syntax

show log [*filter*]

Parameters

The **show log** command uses the following parameter:

filter	Keyword filter for long entries.

Command Access

Admin level only

Example

```
Switched PDU: show log

There are 8 messages in the system log (#1-#8)

[1] L6 EVENT: Network stack started

[2] L6 EVENT: System boot complete

[3] L2 EVENT: High alarm (temperature 22.9C) detected on temperature sensor 'Temp_Sensor_C2' [C2]

[4] L5 EVENT: Normal temperature restored on temperature sensor 'Temp_Sensor_C2'[C2]

[5] May  5 13:54:56 L2 EVENT: High alarm (power 1W) detected on outlet 'Master_Outlet_30' [AA30]

[6] May  5 13:54:56 L2 EVENT: Low alarm (power factor 0.03) detected on outlet 'Master_Outlet_30'
[AA30]

[7] May  5 13:54:56 L5 EVENT: Normal power factor restored on outlet 'Master_Outlet_30' [AA30]

[8] May  5 14:38:34 L6 AUTH: User 'admn' logged in from 10.1.7.30 using TELNET
```

show network

Shows network configuration values.

Command Syntax

show network

Command Access

Admin level only

Example

```
Switched PDU: show network

  Network Configuration

    State:           Static IPv4       Network:         IPv4 only
    Link:            Up                Negotiation:     Auto
    Speed:           100 Mbps          Duplex:          Full
    Ethernet MAC:    00-0A-9C-60-00-0A
    AutoCfg IPv6:    FE80::20A:9CFF:FE60:A/64
    IPv4 Address:    10.1.2.205        Subnet Mask:     255.255.0.0
    IPv4 Gateway:    10.1.1.1
    DNS1:            10.1.5.133
    DNS2:            10.1.5.134

  Static IPv4/IPv6 Settings

    IPv6 Address:    FD01::A01:305/64
    IPv6 Gateway:    FD01::A01:585
    IPv4 Address:    10.1.2.205        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:            disabled
    FQDN:            enabled [sentry-ffffff]
    Boot Delay:      disabled
    Static Fallback: enabled
    ZTP (0-Touch):   enabled (not provisioned)

  Network Services

    FTP Server:  enabled     Port:    21
    FTP Updates: disabled    Port:    21
    SSH:         enabled     Port:    22   Auth:      Password, Kb-Int
    Telnet:      enabled     Port:    23
    HTTP:        enabled     Port:    80
    HTTPS:       enabled     Port:   443   Installed Cert: Factory
      User Cert: enabled

                                           SSL User Certificates:   enabled
                                           User Passphrase: <none>
                                           Uploaded Files: None
    SNMPv1/2:    enabled     Port:   161   TrapPort:  162
    SNMPv3:      disabled    Port:   161   TrapPort:  162
    Web Svc API: enabled
    SPM Access:  enabled
```

show outlets

Shows outlet configuration values.

Command Syntax

show outlets

Command Access

Admin level only

Example

```
Switched PDU: show outlets

                                          SNMP        Email       Max
ID    Outlet Name                         Notif.      Notif.      Current
--    -----------                         ------      ------      -------
AA1   Master_Outlet_1                     enabled     enabled     20A
AA2   Master_Outlet_2                     enabled     enabled     15A
AA3   Master_Outlet_3                     enabled     enabled     15A

      Extra On    Wakeup      Locked                PF       PF
ID    Delay       State       No-Ctl                Lo-Alrm  Lo-Warn
--    --------    ------      ------                -------  -------
AA1   0 sec       On          No                    0.70     0.80
AA2   0 sec       On          No                    0.70     0.80
AA3   0 sec       On          No                    0.70     0.80

      Current  Current  Current  Current  Power    Power    Power    Power
ID    Lo-Alrm  Lo-Warn  Hi-Warn  Hi-Alrm  Lo-Alrm  Lo-Warn  Hi-Warn  Hi-Alrm
--    -------  -------  -------  -------  -------  -------  -------  -------
AA1   0.0A     0.0A     14.0A    16.0A    0W       0W       2912W    3328W
AA2   0.0A     0.0A     10.5A    12.0A    0W       0W       2184W    2496W
AA3   0.0A     0.0A     10.5A    12.0A    0W       0W       2184W    2496W

Common Outlet Settings

  Sequence Delay:                     2 second(s)
  Reboot Delay:                       15 second(s)
  Outlet State Change Logging:        disabled
  Outlet Current Hysteresis:          1.0A
  Outlet Power Hysteresis:            10W
  Outlet Power Factor Hysteresis:     0.02
```

show phases

Shows phase configuration values.

Command Syntax

show phases

Command Access

Admin level only

Example

```
Switched PDU: show phases

  ID    Phase Name
  --    ----------
  AA1   AA:L1-L2
  AA2   AA:L2-L3
  AA3   AA:L3-L1

        SNMP         Email        Nominal
  ID    Notif.       Notif.       Voltage
  --    ------       ------       -------
  AA1   enabled      enabled      208V
  AA2   enabled      enabled      208V
  AA3   enabled      enabled      208V

        Voltage  Voltage  Voltage  Voltage  PF       PF
  ID    Lo-Alrm  Lo-Warn  Hi-Warn  Hi-Alrm  Lo-Alrm  Lo-Warn
  --    -------  -------  -------  -------  -------  -------
  AA1   187.2V   197.6V   218.4V   228.8V   --       --
  AA2   187.2V   197.6V   218.4V   228.8V   --       --
  AA3   187.2V   197.6V   218.4V   228.8V   --       --

  Common Phase Settings

    Phase Voltage Hysteresis:            2.0V
    Phase Power Factor Hysteresis:       0.02
```

show ports

Shows port configuration values.

Command Syntax

show ports

Command Access

Admin level only

Example

```
Switched PDU: show ports

  ID    Port Name          Locked    Baud     Timeout    DSR Chk     RFTAG
  --    ---------          ------    ----     -------    -------     -----
  COM1  Console            No        9600     5 min      enabled     enabled
  COM2  Aux                No        115200   5 min      enabled     disabled
```

show radius

Shows Radius server configuration values.

Command Syntax

show radius

Command Access

Admin level only

Example

```
Switched PDU: show radius

  RADIUS Configuration

  RADIUS:          disabled

  Primary
    Server:        (not set)
    Shared Secret: (not set)
    Port:          1812
    Timeout:       5 second(s)
    Retries:       2

  Secondary
    Server:        (not set)
    Shared Secret: (not set)
    Port:          1812
    Timeout:       5 second(s)
    Retries:       2
```

show sensors

Shows sensor (and fan, when present) configuration values.

Command Syntax

show sensors

Command Access

Admin level only

Example

```
Switched PDU: show sensors

   Sensor  ID  Sensor Name
   ------  --  -----------
   Temp    A1  Temp_Sensor_A1
   Temp    A2  Temp_Sensor_A2
   Temp    C1  Temp_Sensor_C1
   Temp    C2  Temp_Sensor_C2
   Humid   A1  Humid_Sensor_A1
   Humid   A2  Humid_Sensor_A2
   Humid   C1  Humid_Sensor_C1
   Humid   C2  Humid_Sensor_C2
   Contact C1  Contact_Sensor_C1
   Contact C2  Contact_Sensor_C2
   Contact C3  Contact_Sensor_C3
   Contact C4  Contact_Sensor_C4
   Water   C1  Water_Sensor_C1
   ADC     C1  ADC_Sensor_C1


               SNMP        Email
   Sensor  ID  Notif.      Notif.      Lo-Alrm  Lo-Warn  Hi-Warn  Hi-Alrm
   ------  --  ------      ------      -------  -------  -------  -------
   Temp    A1  enabled     enabled     1C       5C       45C      50C
   Temp    A2  enabled     enabled     1C       5C       45C      50C
   Temp    C1  enabled     enabled     1C       5C       45C      50C
   Temp    C2  enabled     enabled     1C       5C       45C      50C
   Humid   A1  enabled     enabled     5% RH    10% RH   90% RH   95% RH
   Humid   A2  enabled     enabled     5% RH    10% RH   90% RH   95% RH
   Humid   C1  enabled     enabled     5% RH    10% RH   90% RH   95% RH
   Humid   C2  enabled     enabled     5% RH    10% RH   90% RH   95% RH
   Contact C1  enabled     enabled     --       --       --       --
   Contact C2  enabled     enabled     --       --       --       --
   Contact C3  enabled     enabled     --       --       --       --
   Contact C4  enabled     enabled     --       --       --       --
   Water   C1  enabled     enabled     --       --       --       --
   ADC     C1  disabled    disabled    0        0        255      255

   Common Sensor Settings

     Temperature Scale:                  Celsius
     Temperature Sensor Hysteresis:      1C
     Humidity Sensor Hysteresis:         2% RH
     ADC Sensor Hysteresis:              1
```

show shutdown

Shows outlet shutdown configuration values.

Command Syntax

show shutdown

Command Access

Admin level only

Example

```
Switched PDU: show shutdown

  ID    Outlet Name                    Shutdown/Delay   Script/Delay
  --    -----------                    --------------   ------------
  AA1   Master_Outlet_1                Off / 90 sec     Off / 1 min
  AA2   Master_Outlet_2                Off / 90 sec     Off / 1 min
  AA3   Master_Outlet_3                Off / 90 sec     Off / 1 min
  AA4   Master_Outlet_4                Off / 90 sec     Off / 1 min
  AA5   Master_Outlet_5                Off / 90 sec     Off / 1 min
  AA6   Master_Outlet_6                Off / 90 sec     Off / 1 min

  ID    Outlet Hostname/IP
  --    ------------------
  AA1   (not set)
  AA2   (not set)
  AA3   (not set)
  AA4   (not set)
  AA5   (not set)
  AA6   (not set)
```

show snmp

Shows SNMP configuration values.

Command Syntax

show snmp

Command Access

Admin level only

Example

```
Switched PDU: show snmp

  SNMP Configuration

  SNMPv2 Agent:            enabled

    Get Community <RO>:    public
    Set Community <RW>:

  SNMPv3 Agent:            disabled

    Engine ID:             8000006B602

    RW User Name:          <not set>
    RW User Auth Method:   none
    RW User Auth Password: <not set>
    RW User Privacy Pass:  <not set>
    RO User Name:          <not set>
    RO User Auth Method:   none
    RO User Auth Password: <not set>
    RO User Privacy Pass:  <not set>

  SNMP Trap:

    Format:               v1
    v2 Community:    trap
    v3 Username:     <not set>
    Destination 1:
    Destination 2:
    IP Restrictions:      No Restrictions
    Error Repeat Time:    60 second(s)

  SNMP SysName:           Sentry_60000a
  SNMP SysLocation:       FIRMWARE PIPS-POPS Switched 3P
  SNMP SysContact:
```

show sntp

Shows SNTP configuration values.

Command Syntax

show sntp

Command Access

Admin level only

Example

```
Switched PDU: show sntp

  SNTP Configuration

    Local Date/Time:       2014-05-06  14:30:41 (DST)
    Primary Host:          2.servertech.pool.ntp.org
    Secondary Host:        1.servertech.pool.ntp.org
    Local GMT Offset:      -8:00 hours

    Daylight Saving Time: enabled
      DST Start:           2nd Sunday in March at 02:00:00
      DST End:             1st Sunday in November at 02:00:00
```

show syslog

Shows Syslog configuration values.

Command Syntax

show syslog

Command Access

Admin level only

Example

```
Switched PDU: show syslog

  SYSLOG Configuration

    Host 1:          <not set>
    Host 2:          <not set>
    Port:            514
    Protocol:        RFC3164
    Debug Messaging: disabled
```

show system

Shows system uptime, firmware version, firmware build information, boot version, hardware version, number of active users, and location string.

Command Syntax

show system

Command Access

Admin level only

Example

```
Switched PDU: show system

  System Information

    Uptime:       1 day 20 hours 0 minutes 13 seconds
    Firmware:     Sentry Switched PDU Version 8.0a
    Build Info:   Rev 1032, January 7 2015, 10:52:42
    Boot Info:    4.0d-r139
    Hardware:     NIM2-1L (129), 75 MHz, 16MB RAM, 4MB FLASH
    NIC S/N:      9600165
    Active Users: 1

    Location:     PIPS-POPS Switched
```

show tacacs

Shows TACACS+ configuration values.

Command Syntax

show tacacs

Command Access

Admin level only

Example

```
Switched PDU: show tacacs

  TACACS+ Configuration

    TACACS+:        disabled
    Primary Host:   <not set>
    Secondary Host: <not set>
    Port:           49
    Key:            <not set>
```

show units

Shows PDU configuration values.

Command Syntax

show units

Command Access

Admin level only

Example

```
Switched PDU: show units

  Unit Name:          Master <A>
  Type:               Master
  Model Number:       STV-6503K
  Product S/N:        STVU0000118
  Asset Tag:          testtag1asdf
  Display Orient:     Auto <Normal>
  Outlet Sequence:    Normal
  SNMP Notif.:        enabled
  Email Notif.:       enabled

  Unit Name:          Link <B>
  Type:               Link
  Model Number:       SEV-4503K
  Product S/N:        <not set>
  Asset Tag:          AGHWERAFSasdf
  Display Orient:     Auto <Normal>
  Outlet Sequence:    Normal
  Outlet Dsp Order:   Normal
  SNMP Notif.:        enabled
  Email Notif:        enabled
```

show ztp

Description:

Displays the Zero Touch Provisioning (ZTP) network configurations.

Command Syntax:

show ztp

Command Access:

Admin level only

Example

```
Switched PDU: show ztp


 Zero Touch Provisioning Configuration <DHCP required>


 ZTP:            enabled <not provisioned>

 Auto Updates:   disabled

 Update Day:     Everyday

 Update Hour:    12 AM
```

status

Displays the latest status and control state for a specified outlet or outlet group.

Command Syntax

status <name | id | group | ALL>

Usage Guidelines

Command Access

Any access level

Example

```
Switched PDU: status all

  ID    Outlet Name                    Control State  State  Status
  --    -----------                    -------------  -----  ------
  AA1   Master_Outlet_1                Idle On        On     Normal
  AA2   Master_Outlet_2                Idle On        On     Normal
  AA3   Master_Outlet_3                Idle On        On     Normal
  AA4   Master_Outlet_4                Idle On        On     Normal
  AA5   Master_Outlet_5                Idle On        On     Normal
  AA6   Master_Outlet_6                Idle On        On     Normal
```

sysstat

Displays the count of all system objects (by type), the latest status of the objects, and the count of objects currently in an event condition.

Command Syntax

sysstat

Command Access

System Monitor access

Example

```
Switched PDU: sysstat

  Qty   Sub-System                    Status         Events
  ---   ----------                   ------         ------
  2     Units                        Normal         0
  1     Cords                        Normal         0
  3     Lines                        Normal         0
  3     Phases                       Normal         0
  3     Branches                     Normal         0
  30    Outlets                      Normal         0
  14    Sensors                      Normal         0
  1     UPS                          Normal         0
```

upsstat

Displays the latest status and metrics for all UPS devices in the system.

Command Syntax

upsstat

Command Access

System Monitor access

Example

```
Switched PDU: upsstat

  ID    UPS Type                          Status
  --    --------                          ------
  1     Generic RFC1628                   Not Found
```

ustat

Displays the latest status and metrics for all PDUs in the system.

Command Syntax

ustat

Command Access

System Monitor access

Example

```
Switched PDU: ustat
  ID    Unit Name                   Type   Status
  --    ---------                   -----  ------
  A     Master                      Master Normal

  ID    Display Orientation
  --    -------------------
  A     Auto <Inverted>
```

version

Displays the current firmware version.

Command Syntax

version

Command Access

Any access level

Example

```
Switched PDU: version
Sentry Switched PDU Version 8.0
```

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 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 access to issue the command. Using the reset button can 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 Interface (CLI)

At the Switched -48 VDC: 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.

Insert the tool in the recess, then depress and hold the reset button for at least ten seconds.

Notes:

- This method will **not** work if you disable the **Reset** button.
- 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 Interface

At the Switched -48 VDC: prompt, type **restart factory keepnet** and press Enter.

Appendix B: Uploading Firmware

You can upload new versions of firmware using File Transfer Protocol (FTP) and Secure File Transfer Protocol (SFTP). These methods allow access to new firmware releases for firmware improvements and new feature additions.

Note: To begin an FTP upload session, you must first configure the FTP Host address, username/password, filename, and file path.

You can initiate an FTP upload session by issuing a command or from the Web interface. Upon initiating an FTP upload session, the unit will restart and upload the firmware file specified with the FTP Filename command from the previously configured FTP Host. You must have administrator-level access to initiate an upload.

Initiate an FTP Upload Session from the Web Interface

On the Restart page in the Tools section of the Web interface, select “Restart and download firmware via FTP” from the drop-down menu and click Apply.

Initiate an FTP Upload Session from the Command Line Interface (CLI)

To initiate an FTP firmware upload session:

At the Switched -48 VDC: prompt, type **restart ftpload** and press Enter.

Appendix C: Technical Specifications

Data Connections

Although not provided with your PDU when shipped, the RJ45 rolled cable and the RJ45 to DB9F serial port adapter still work together to allow access to the serial CLI interface from a terminal with a standard DB9M serial port.

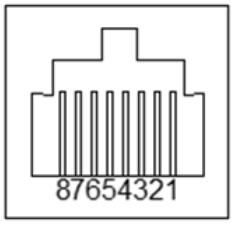
You can order the cable and adapter from Server Technology using the following part numbers:

- RJ45 to RJ45 Rolled Patch Cable: Part# CAB-1205
- RJ45 to DB9F Serial Port Adapter: Part# ADP-0019

RS-232 Port

The PRO1 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.

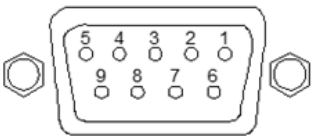
Pin	DTE Signal Name	Input/Output
1	Request to Send (RTS)	Output
2	Data Terminal Ready (DTR)	Output
3	Transmit Data (TD)	Output
4	Signal Ground	---
5	Signal Ground	---
6	Receive Data (RD)	Input
7	Data Set Ready (DSR)	Input
8	Clear to Send (CTS)	Input



RJ45 to DB9F Serial Port Adapter

In addition, an RJ45 to DB9F serial port adapter can be used in conjunction with the RJ45 rolled cable to connect to a PC DB9M DCE serial port. The pinouts below show the use of the serial port adapter with the RJ45 rolled 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



LED Indicators

Outlets

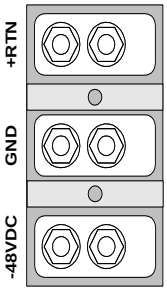
Units are equipped with a status LED for each power receptacle. A lit (on) LED indicates that power is being supplied at the port and a dim (off) LED indicates that there is no power at the port.

Inlet Connections

The PRO1 Sentry Switched DC PDU is equipped with two input blocks, each containing three clearly labeled terminal positions. Connections are made using two-hole copper compression lugs for dual-stud blocks.

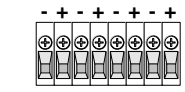
WARNING: Reverse polarity will damage the PRO1 Sentry Switched DC PDU! Verify proper polarity before connecting to a power source!

Two-Hole Copper Compression Lugs				
Cable Size (AWG)	Stud Size	Color Code	Thomas&Betts Model	Grainger Stock
6 str.	¼"	Blue	54205	3LL91
#4 str	¼"	Gray	54206	3LL92
#2 str	¼"	Brown	54207	3LL93
#1 str	¼"	Green	54208	3LL94

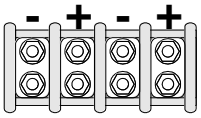


Outlet Connections

The PRO1 Sentry Switched DC PDU is equipped with four to sixteen terminal outlet pairs each containing clearly labeled terminal positions. Connections are made using two-hole copper compression lugs for dual-stud blocks, and bare stripped wire for high-density screw-down blocks. For the dual stud lugs, please reference the table above.



Screw -down Terminal



Dual Stud Terminal

Appendix D: LED Indicators

The following input current LED indicators can be displayed on the Sentry DC PDU products:

Behavior/Indicator	Description	Comments/User Action
"--" (flashing double dashes)	Occurs during normal boots, restarts, and firmware flash updates but should revert to displaying amperage values upon completion. Internal communication bus error is indicated if behavior is endless.	If the behavior is endless, contact Server Technology Technical Support at: 1-800-835-1515 or support@servertech.com
(flashing amperage value)	The current exceeds user-defined "high load" threshold (default setting is 80% of maximum input feed capacity).	Unit blinks a half-second on, half-second off.
"bE"	Breaker Error. The PDU has detected an error with the circuit-breaker Branch Circuit Protection.	Display alternates between showing amperage value for two seconds and flashing "bE" three times. Check to see if the breaker was tripped.
"FE"	Fuse Error. The PDU has detected an error with the fused Branch Circuit Protection.	Display alternates between showing amperage value for two seconds and flashing "FE" three times. Check to see if the fuse was blown or removed.
"oL" (flashing)	Overload.	Current exceeds the input feed capacity.
"UA", "Ub", "UC", "Ud"	Occurs when you select the **Configuration > Units > Identify** option.	Not an error code; no user action required. Display alternates between showing amperage value for two seconds and flashing "UA", "Ub", "UC", or "Ud" three times. If unit is a master, "UA" (unit A) flashes. If unit is one of up-to-three possible link types, these indicators flash: "Ub" (unit B), "UC" (unit C), or "Ud" (unit D).

Appendix E: Regulatory Compliance

Product Safety

Units have been safety tested and certified to the following standards:

- USA/Canada UL 60950-1:2007 R10.14 and CAN/CSA 22.2 No. 60950-1-07 +A1+A2
- European Union EN 60950-1:2006 + A11 +A1 + A12 + A2

This product is also designed for Norwegian IT power system with phase-to phase voltage 230V.

Notifications

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 the user's own expense.

Modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment under FCC rules.

Canadian Notification

This Class A digital apparatus complies meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigencies du Règlement sur le matériel brouilleur du Canada.

European Union Notification

WARNING: This equipment is compliant with Class A of CISPR 32. In a residential environment this equipment may cause radio interference.

Products with CE Marking comply with the EMC Directive (2014/30/EU), Low Voltage Directive (2014/35/EU) and RoHS 2 Directive (2011/65/EU) issued by the Commission of the European Community.

Compliance with the following harmonized standards demonstrate conformity with the EMC and Low Voltage Directives.

- EN 55032
- EN 55024
- EN 60950-1

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

部件名称 (Parts)	有毒有害物质或元素 (Hazardous Substance)					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr (VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
机箱子组件 (Chassis Subassembly)	O	O	O	O	O	O
印刷板组件 (PCAs)	X	O	O	O	O	O

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一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.

Product Recycling

Recycling

Server Technology Inc. encourages the recycling of its products. Disposal facilities, environmental conditions and regulations vary across local, state and country jurisdictions, so Server Technology encourages consultation with qualified professional and applicable regulations and authorities within your region 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 F: Product Support

Warranty

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

Contact 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. Pacific Time, Monday through Friday.

Server Technology, Inc. (a brand of Legrand)

1040 Sandhill Road	Tel:	1-800-835-1515	Web:	www.servertech.com
Reno, Nevada 89521 USA	Fax:	775-284-2065	Email:	support@servertech.com

Return Merchandise Authorization (RMA)

If you have a product that is not functioning properly and needs technical assistance or repair, see the Server Technology **Return Merchandise Authorization** process at: www.servertech.com

About Server Technology®

Server Technology, a brand of Legrand, is leading the engineering and manufacturing of customer-driven, innovative and exceptionally reliable power, access and control solutions for monitoring and managing critical IT assets for continual availability.

Server Technology's power strategy experts are trusted to provide Rack PDU solutions for data centers worldwide ranging from small technology startups to Fortune 100 powerhouses. Because power is all we do, Server Technology can be found in the best cloud and colocation providers, forward thinking labs, and telecommunications operations.

Server Technology customers consistently rank us as providing the highest quality PDUs, the best customer support, and most valuable innovation. We have over 12,000 PDU configurations to fit every data center need and most of our PDUs are shipped within 10 days.

Rack PDU Buying Guide
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servertech.com/rack-pdu-buying-guide

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Over 2000 standard configurations
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Build Your Own PDU
Build an HDOT or HDOT Cx PDU in 4 easy steps
byopdu.servertech.com

Speak to a Power Expert
Get free technical support
servertech.com/support

How to Buy
Tools to simplify the PDU buying process
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