Server Technology ®

Quality Rack Power Solutions

-48 VDC Remote Power Manager:

48DCWB-10-2X300-E0NB and 48DCWB-16-2X600-E0

Firmware Release 7.0

- 48DCWB-10-2X300-E0NB
- 48DCXB-10-2X300-E0NB
- 48DCWB-16-2X600-E0
- 48DCXB-16-2X600-E0

Installation and Operations Manual

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.

Please Recycle

Shipping materials are recyclable. Please save them for later use, or dispose of them appropriately.

Table of Contents

Chapter 1: Introduction

Quick Installation Checklist

The following steps are recommended to quickly install and configure the your 48DCWB 10-2X300-E0NB Remote Power Manager (RPM) for use in your data center equipment cabinet:

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

Technical Support

Experience Server Technology's FREE Technical Support

Server Technology® understands that there are often questions when installing and using a new product. Free Technical Support is provided from 8:00 a.m. to 5:00 p.m. PST, Monday through Friday. After-hours service is provided to ensure your requests are handled quickly no matter what time zone or country you are located in.

Server Technology, Inc.

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About the -48 VDC Products

The following items have been designed into the current -48 VDC products covered in this user manual:

- Firmware version 7.0 is provided with all -48 VDC black units, and with all -48 VDC beige/ivory units with part numbers ending in "/Q".

- -48 VDC products with firmware version 7.0 more closely match the feature set of the Server Technology AC Switched PDUs.

- Generally, greater power distribution (greater than one output/outlet for each input/inlet) is provided.

- Remote power management (Switched outputs).

- Network and Serial RS-232 access.

- Per Outlet Current Sensing.

NOTE: The current sensing per outlet in the -48 VDC units is not the same as Per Outlet Power Sensing (POPS®) in the AC product firmware. The -48 VDC units only measure current (amps).

- For Environmental Monitoring, each master unit supports two combination temperature/humidity probes.

- Over-current protection is provided for each output:

  o TPC fuses for high-amp output up to 125A.

  o Circuit breaker protection up to 100A available (with one model).

Model 48DCWB-10-2X300-E0NB

Welcome to the **48DCWB-10-2X300-E0NB** intelligent PDU and Remote Power Manager!

Server Technology is a world-class leader in the delivery of *solutions for the data center equipment cabinet*, and your RPM provides a flexible and powerful solution for the remote power management of your data center.

This section describes the key features of your unit and shows a graphical equipment overview.

Key Features of the 48DCWB-10-2X300-E0NB

The design of the 48DCWB-10-2X300-E0NB includes the following features:

- Two (2) 300-AMP -48VDC inputs.

- Ten (10) switched 125-AMP -48VDC outputs.

- Circuit protection interface uses industry standard bullet terminal sockets. The interface accepts standard Telco Bullet circuit breakers or TPC fuses with Bullet terminal fuse holders.

- The RPM allows the installation of 10 circuit breakers or 10 fuses – or a mixture of both in the same unit. The maximum current rating for the circuit breaker available in this unit is 100-AMPS. The TPC fuse can be a maximum of 125-AMPS. The circuit breakers and the fuses are installed on the front of the unit and are interchangeable in the same sockets – fuse or breaker or both, depending on user preference.

- Buss bar technology allows the unit to operate cool under load increasing reliability, which reduces heat emissions.

- Web interface, Command Line Interface (CLI), controls, and additional features are the same with this unit as the other switched DC products offered by Server Technology.

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Unit Drawing

1. One RJ12 connector for connection to the Expansion Module.
2. Two RJ45 connectors for Serial (RS-232) and Ethernet connections.
3. Two mini RJ11 connectors for temperature/humidity sensors.
4. The power inlet/cords connect the unit to the electrical power sources.

Note that a number is printed above each terminal pair. These numbers may be used in commands that require an outlet name. The RPM has two firmware interfaces: (1) the Web interface accessed by the HTTP-enabled Ethernet connections, and (2) the Command Line Interface (CLI) for serial and Telnet connections.

Figure 1. Front and Rear View of the 48DCWB-10-2X300-E0NB Remote Power Manager

<u>**Terminal Stud Spacing**</u>

The following diagram illustrates the dimensions of the terminal block stud spacing (inputs and outputs) to assist with your purchase of the appropriate lugs.

Figure 2. Terminal Stud Spacing for the 48DCWB-10-2X300-E0NB Remote Power Manager

Terminal Block Tightening Torques

Per the manufacturer's data sheet specifications, use the following tightening torques for the terminal block on your 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.

.

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Model 48DCWB-16-2X600-E0

Welcome to the **48DCWB-16-2X600-E0** intelligent PDU and Remote Power Manager!

Server Technology is a world-class leader in the delivery of *solutions for the data center equipment cabinet*, and your RPM provides a flexible and powerful solution for the remote power management of your data center.

This section describes the key features of your unit and shows a graphical equipment overview.

Key Features of the 48DCWB-16-2X600-E0

The design of the **48DCWB-16-2X600-E0** includes the following features:

- Two (2) 600-AMP -48VDC inputs.

- Sixteen (16) switched 125-AMP -48VDC outputs.

- Sixteen (16) circuit breakers or fuses.

- Circuit protection interface uses industry standard bullet terminal sockets. The interface accepts standard Telco Bullet circuit breakers or TPC fuses with Bullet terminal fuse holders.

- The RPM allows the installation of 16 circuit breakers or 16 fuses – or a mixture of both in the same unit. The maximum current rating for the circuit breaker available in this unit is 100-AMPS. The TPC fuse can be a maximum of 125-AMPS. The circuit breakers and the fuses are installed on the front of the unit and are interchangeable in the same sockets – fuse or breaker or both, depending on user preference.

- Buss bar technology allows the unit to operate cool under load increasing reliability, which reduces heat emissions.

- Web interface, Command Line Interface (CLI), controls, and additional features are the same with this unit as the other switched DC products offered by Server Technology.

Unit Drawing

1. One RJ12 connector for connection to the Expansion Module.
2. Two RJ45 connectors for Serial (RS-232) and Ethernet connections.
3. Two mini RJ11 connectors for temperature/humidity sensors.
4. The power inlet/cords connect the unit to the electrical power sources.

Note that a number is printed above each terminal pair. These numbers may be used in commands that require an outlet name. The RPM has two firmware interfaces: (1) the Web interface accessed by the HTTP-enabled Ethernet connections, and (2) the Command Line Interface (CLI) for serial and Telnet connections.
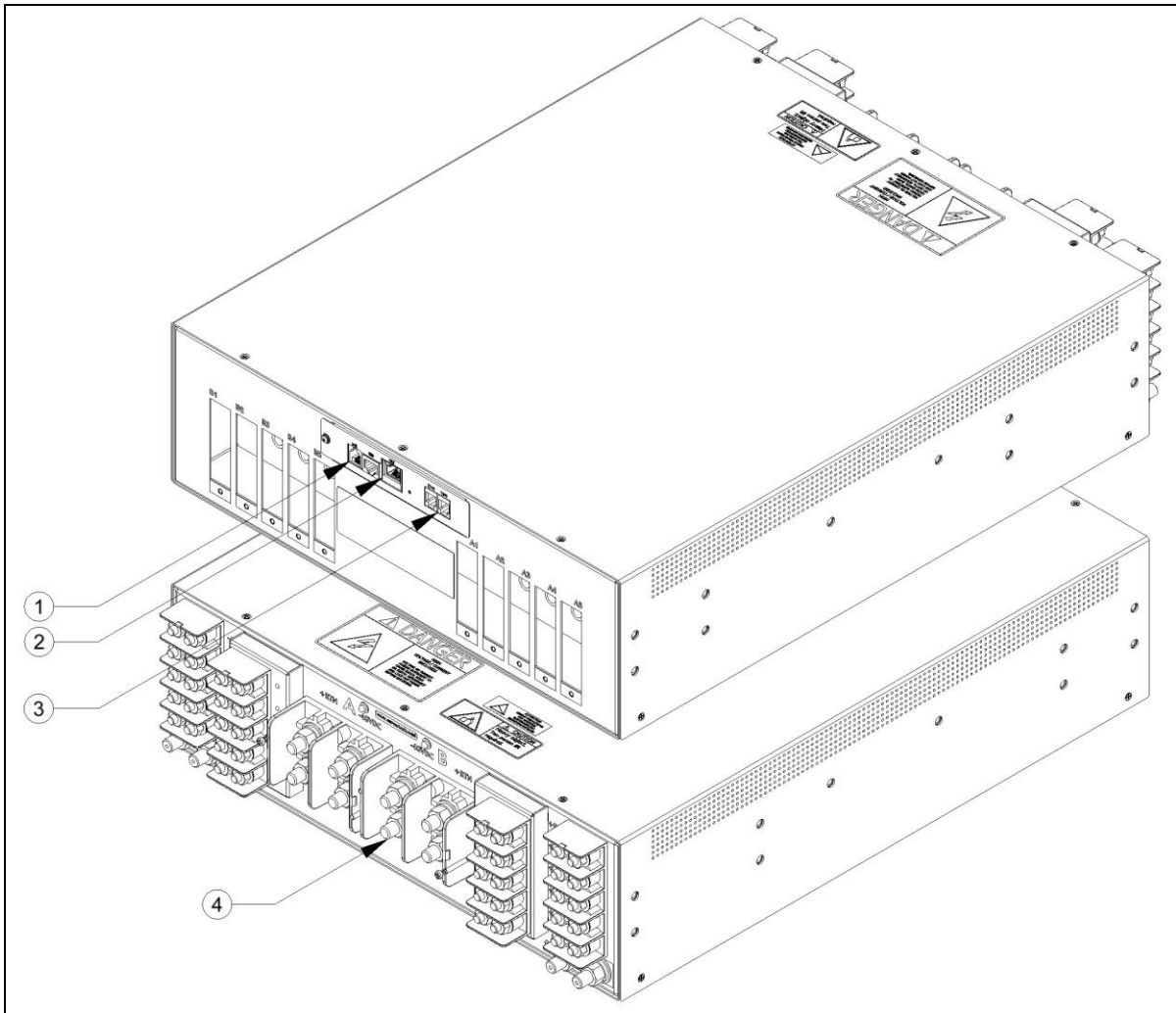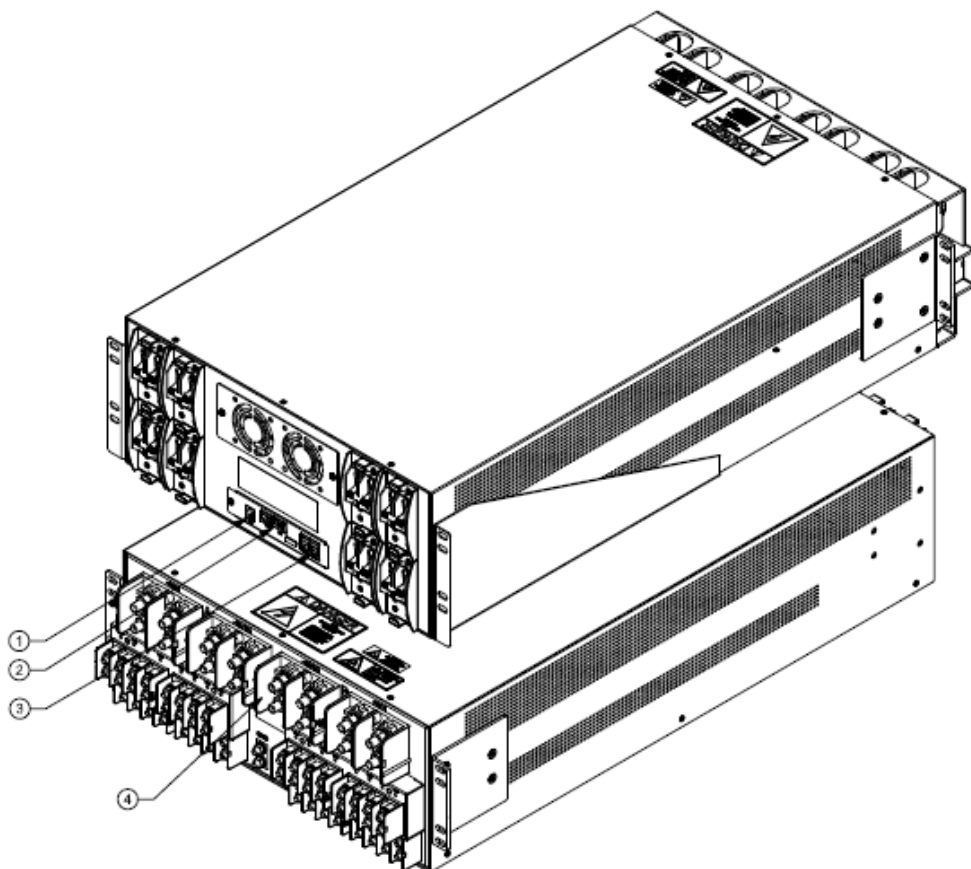

Figure 3. Front and Rear View of the 48DCWB-16-2X600-E0 Remote Power Manager

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Terminal Stud Spacing

The following diagram illustrates the dimensions of the terminal block stud spacing (inputs and outputs) to assist with your purchase of the appropriate lugs.
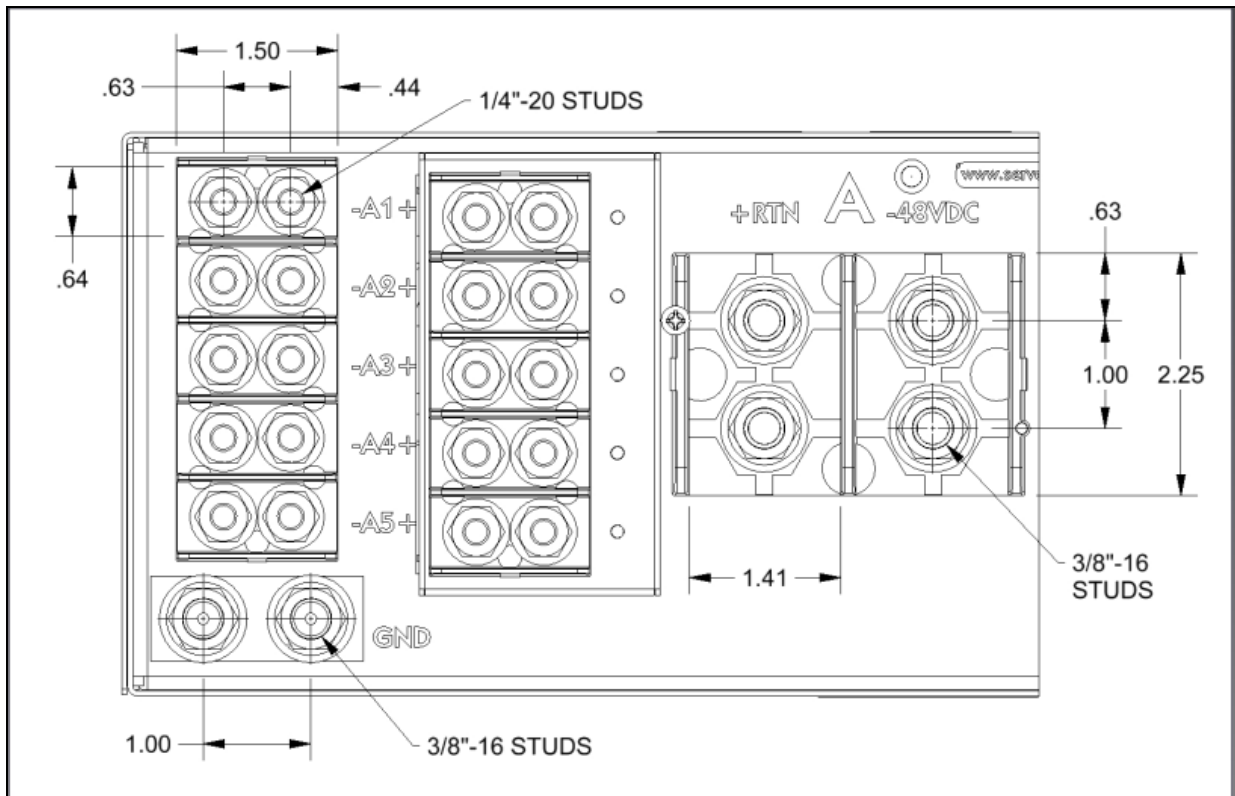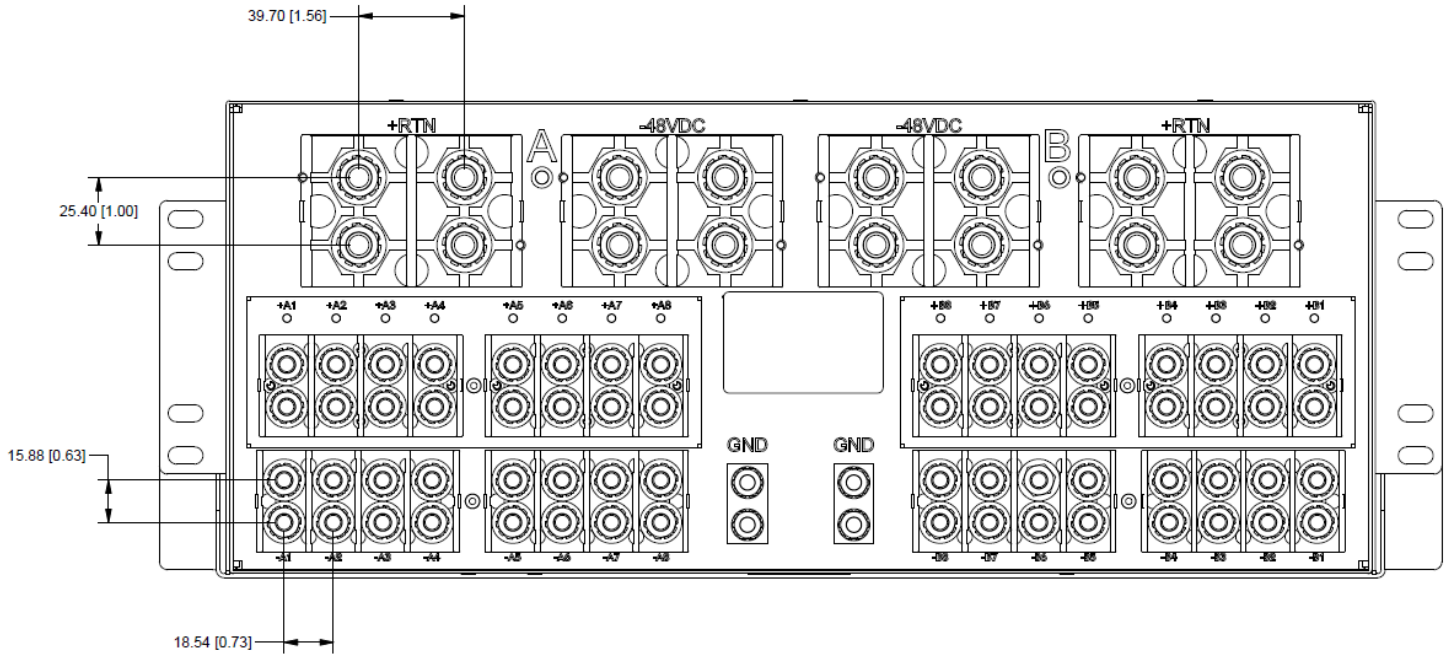

Figure 4. Terminal Stud Spacing for the 48DCWB-16-2X600-E0 Remote Power Manager

Terminal Block Tightening Torques

Per the manufacturer's data sheet specifications, use the following tightening torques for the terminal block on your 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.

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 unit/terminal block may occur.

IPv6 and Server Technology Products

Server Technology is introducing IPv6 "dual stack" support to the PDU product line. 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.

Firmware – Protocol Support

IPv6 and IPv4 Protocols:

The firmware supports the following network IPv6 <u>and</u> IPv4 protocols:

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

IPv4-Only Protocols:

The firmware supports the following network IPv4-only protocols:

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

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

Network-Enabled Modes

NOTES:

- For all network-enabled modes described below, the PDU will set an auto-configured IPv6 address, and if IPv6 router announcements are active, a stateless DHCP IPv6 address will also be set. Further, in <u>all</u> network-enabled modes, at least one IPv4 <u>or</u> one IPv6 address will be active.

- For maximum backward compatibility, the default network mode is "IPv4 only".

- Network disabled – No IPv4 or IPv6 addresses available.

- IPv4 only, DHCP disabled (static IPv4) – If the IPv4 Static Address and Net Mask of the PDU are valid, they will be set.

- IPv4 only, DHCP enabled (DHCP IPv4) – The PDU will try to resolve an IPv4 DHCP address. If a DHCP address cannot be obtained after 90 seconds, the PDU can: (1) optionally fall back to its static IPv4 settings, or (2) indefinitely wait to acquire an address based on DHCP configuration settings**. This setting is the default.**

- Dual IPv6/IPv4, DHCP disabled (static IPv6/IPv4) – If the IPv6 Static Address and prefix of the PDU are valid, they will be set. Otherwise, the PDU will attempt to use DHCPv6 to obtain an IPv6 address.

  In addition, if the IPv4 Static Address and Net Mask of the PDU are valid, they will be set.

- Dual IPv6/IPv4, DHCP enabled (DHCP IPv6/IPv4) – The PDU will try to resolve both its IPv6 and IPv4 addresses by DHCP. If both DHCP requests are answered, the **primary** DNS server of the PDU will become the **primary** IPv6 DNS server, and the **secondary** DNS server of the PDU will become the **primary** IPv4 DNS server.

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

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

Viewing Network Status

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

```
Switched -48 VDC: show network
Network Settings
    State:              DHCP IPv6/IPv4          Network:      Dual IPv6/IPv4
    Link:               Up                      Negotiation:  Auto
    Speed:              100 Mbps                Duplex:       Full

    AutoCfg IPv6:       FE80::20A:9CFF:FE52:4104/64
    IPv6 Address:       FD01::1:B51A:E03C/64
    IPv4 Address:       10.1.6.230 Subnet Mask: 255.255.0.0
    IPv4 Gateway:       10.1.1.1
    DNS1:               FD01::A01:585
    DNS2:               10.1.5.133

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

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


Network Services
    Telnet:     Enabled         Port: 23
    SSH:        Enabled         Port: 22         Auth: Password, Kb-Int
    HTTP:       Enabled         Port: 80
    SSL:        Enabled         Port: 443        Installed Cert: User Encrypted
      Access:   Optional                         Stored Files: Cert & Key
      User Cert: Enabled                         User Passphrase: <set>
    SNMPv1/2:   Enabled         Port: 161        TrapPort: 162
    SNMPv3:     Disabled        Port: 161        TrapPort: 162
    FTP Server: Enabled         Port: 21
    SPM Access: Enabled
Command successful
```

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

Chapter 2: Installation

Before installing your RPM, refer to the following lists to ensure that you have all the items shipped with the unit as well as all other items required for proper installation.

Standard Accessories

- Mounting hardware:
    Two L-shaped mounting brackets with M5 screws.
- Cables/Adapters (CWB Models):
    RJ45 to RJ45 crossover cable.
    RJ45 to DB9F serial port adapter (for connection to standard DB9M DTE serial port).
- Mounting tray

Optional Accessories

- Temperature/Humidity Sensors
- Environmental Monitor

Additional Required Items

- Flathead and Phillips screwdrivers
- Screws, washers, and nuts to attach the Remote Power Manager unit to your rack

Safety Precautions

This section contains important safety and regulatory information that **must be reviewed** before installing and using your **48DCWB 10-2X300-E0NB** or **48DCWB-16-2X600-E0** Remote Power Manager (RPM).

	English	Français	Deutsch
⚠	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.**
⚠	This equipment is designed to be installed on a dedicated circuit. The power supply cord shall be a minimum of 1.5m (4.9ft) and a maximum of 4.5m (15ft). If using an extension power cord, the total length shall also be no more than the maximum allowed. The plug is considered the disconnect device and must be easily accessible.	Cet équipement a été conçu pour être installé que un circuit dédié. Le cordon d'alimentation doit être d'au moins 1,5M et un maximum de 4,5m. Si vous utilisez un cordon de rallonge, la longueur totale est également plus que le maximum autorise. La prise est considérée comme un dispositif de coupure et doit être facilement accessible.	Die Geräte sind für eine Installation an einer fest zugeordneten Leitung ausgelegt. Die Stromzuleitung hat eine Mindestlänge von 1,5m, und hochstens 4,5m. Sollten Sie ein Verlangerrungsnetzkabel, der Gesamtlange auch nicht mehr als die maximal zulassige sein. Der Stecker dient zur Trennung vom Netz und muss einfach erreichbar sein.
⚡	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.
⚠	Models with unterminated power cords: Input connector must be installed by qualified service personnel. Input connector rating must meet all applicable codes and regulations.	Modèles avec cordons d'alimentation non terminées: Le connecteur d'entrée doit être installé par un personnel qualifié. Entrée cote de raccordement doit respecter tous les codes et règlements électriques applicables.	Modelle mit nicht abgeschlossenen Netzkabel: Der Eingangsstecker darf nur von qualifiziertem Wartungspersonal installiert werden. Eingangsanschluss Bewertung müssen alle geltenden und verbindlichen Normen und Vorschriften entsprechen.
⚠	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.
✲	WARNING! Rotating fan blades. Keep fingers clear!	ATTENTION! Les pales du ventilateur en rotation. Maintenir les doigts à l'écart.	ACHTUNG! Rotierende Lüfterflügel. Halten Sie die Finger.

NEBS GR-1089-Core Information

This NEBS information applies only to model **48DCWB 10-2X300-E0NB**:

This product is intended to be installed in Network Communications Facilities and in locations where the NEC applies.

This product is suitable for installation in a Common Bonding Network (CBN).

This product 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."

Attaching Safety Earth Ground Connection

Server Technology PDUs are supplied with an external safety ground connection to provide an alternate ground path for fault currents, and to maintain the same ground reference between it and the equipment rack.

NOTE: The auxiliary external ground location may vary. Most PDUs will have it located near the power cord entry located near the ⏚ symbol.

User-supplied materials:
- One 5 mm internal (or external) tooth star washer;
- One 4.0 mm^2 (10 AWG) wire with 5 mm ring terminal;
- One metric M5 x 6 mm coarse pitch screw.

Instructions:

1. Connect one end of the ground wire to the equipment cabinet or local ground.

2. Locate the PDU external ground near the ⏚ symbol.

3. Connect the other end with a ring terminal and a M5 screw to the PDU external ground. To ensure proper grounding to the chassis, use a star washer between the ring terminal and the PDU.
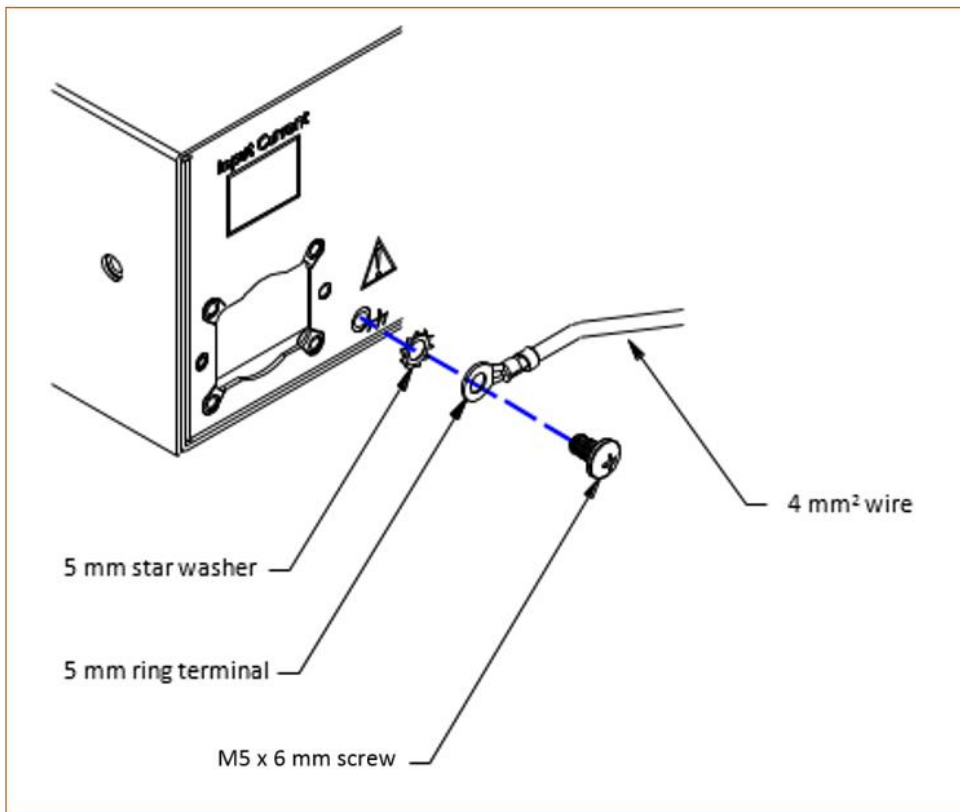
Mounting the 48DCWB 10-2X300-E0NB

⚠️ **WARNING! This unit weights 70 lbs. (32Kg), and requires 2 persons to lift and mount the unit.**

4-post rack mounting is required for this unit. 2-post telco-style rack mounting is not supported.

Proper mounting also requires the network/circuit protection side of the unit (front side) mounting TO BE DONE FIRST using the mounting tray, and the power terminal side (rear) mounting TO BE DONE SECOND using the L-brackets.

⚠️ **WARNING! Both front and rear mounting are required. UNIT MUST NOT BE CANTILEVERED!**

Network and Circuit Protection Support Bracket (Front Side)

⚠️ **WARNING! This mounting tray attaches to the rack first!**

This bracket was NOT designed to support the total weight of the unit.

The purpose of the mounting tray is to support the unit in conjunction with the L-brackets on the back side of the unit.

Attach the mounting tray to both the left and right rack posts using 4 screws per post.

Figure 5. 48DCWB 10-2X300-E0NB: Network and Circuit Protection Support Bracket (Front Side)

Power Mounting Bracket (Back Side)

⚠️ **WARNING! The mounting brackets attach to the rack after the mounting tray is secured to the rack!**

These brackets are NOT designed to support the total weight of the unit.

The L-brackets must be used in conjunction with the mounting tray on the front side of the unit.

To mount the L-brackets:

1. Attach the "L" mount brackets to the unit using the supplied screws. Five (5) screws are required for each bracket.

2. Slide the unit into the rack and onto the mounting tray previously installed.
3. Using four (4) screws per L-bracket, attach the left and right brackets to the rack.

Figure 6. 48DCWB 10-2X300-E0NB Power Mounting Bracket (Back Side)

Mounting the 48DCWB-16-2X600-E0

⚠ **WARNING! This unit weights 125 lbs. (57kg.), and requires 2 persons to lift and mount the unit.**

4-post rack mounting is required for this unit. 2-post telco-style rack mounting is not supported.

Proper mounting also requires the network/circuit protection side of the unit (front side) mounting TO BE DONE FIRST using the mounting tray, and the power terminal side (rear) mounting TO BE DONE SECOND using the L-brackets.

⚠ **WARNING! Both front and rear mounting are required. UNIT MUST NOT BE CANTILEVERED!**

Network and Circuit Protection Support Bracket (Front Side)

⚠ **WARNING! This mounting tray attaches to the rack first!**

This bracket was NOT designed to support the total weight of the unit.

The purpose of the mounting tray is to support the unit in conjunction with the L-brackets on the back side of the unit.

Attach the mounting tray to both the left and right rack posts using 4 screws per post.

Figure 7. 48DCWB-16-2X600-E0: Network and Circuit Protection Support Bracket (Front Side)

Power Mounting Bracket (Back Side)

<table>
<tr><td>⚠</td><td>**WARNING! The mounting brackets attach to the rack after the mounting tray is secured to the rack!**

These brackets are NOT designed to support the total weight of the unit.

The L-brackets must be used in conjunction with the mounting tray on the front side of the unit.</td></tr>
</table>

To mount the L-brackets:

1. Attach the "L" mount brackets to the unit using the supplied screws. Five (5) screws are required for each bracket.

2. Slide the unit into the rack and onto the mounting tray previously installed.
3. Using four (4) screws per L-bracket, attach the left and right brackets to the rack.

Figure 8. 48DCWB-16-2X600-E0: Power Mounting Bracket (Back Side)

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Attaching the Expansion Module

Connect the optional expansion (link) unit with the provided RJ12 crossover cable at the link port on the unit, as follows:

This optional link unit…	connects to this master unit…
48DCXB-10-2X3000-E0NB	48DCWB-10-2X3000-E0NB
48DCXB-16-2X600-E0	48DCWB-16-2X600-E0

NOTE: The overall length of the RJ12 crossover cable should not exceed 10 feet.

Connecting to the Power Source

⚠ **NOTE: Reverse polarity will damage the Remote Power Manager. Verify proper polarity before connecting to a power source.**

1. Verify power source polarity and remove the fuses/open circuit breakers 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

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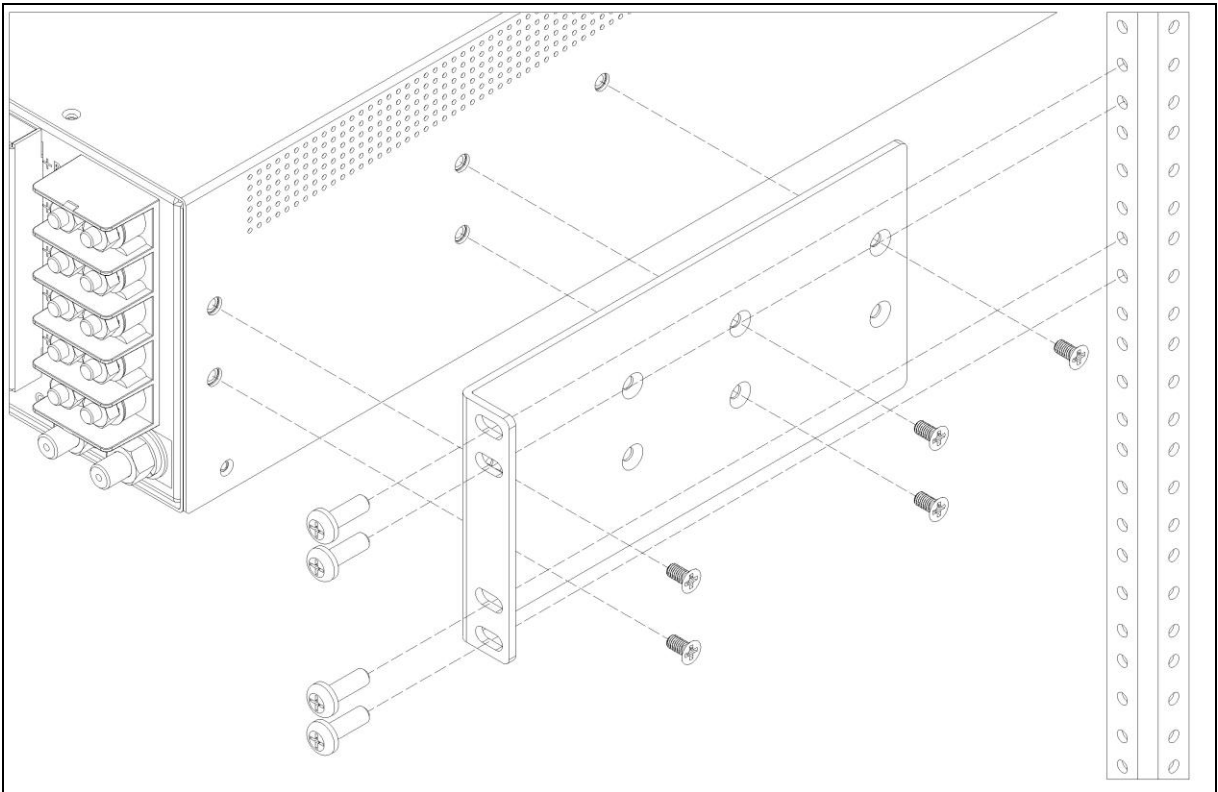2. Connect devices to the unit's outlets.

⚡⚠ Always disconnect ALL power supply cords before opening to avoid electrical shock.
Afin d'éviter les chocs électriques, débranchez TOUTES les cables électrique avant d'ouvrir.
Immer ALLE Netzleitungen auskuppeln vor den Aufmachen um elektrischen Schlag zu vermeiden.

Connecting to the Unit

Serial (RS232) port

The unit is equipped with an RJ45 Serial RS-232 port for attachment to a PC or networked terminal server using the supplied RJ45 to RJ45 crossover cable and RJ45 to DB9F serial port adapter as required.

Ethernet port

The unit 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 interface.

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

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

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

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

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

Chapter 3: Operations

Interfaces

The 48DCWB-10-2X3000-E0NB and 48DCWB-16-2X600-E0 Remote Power Manager (RPM) has two interfaces: the Web interface accessed by the HTTP enabled Ethernet connections, and the Command Line Interface (CLI) for serial and Telnet connections.

Outlet Naming and Grouping

For commands requiring an outlet name, you can specify it in one of two ways: a predefined absolute name or a descriptive name assigned by an administrator.

For units with multiple infeed connectors, absolute names are specified by a period (.) followed by the tower letter, the infeed letter and outlet number.

Example: The absolute name for outlet 8 on the B infeed of tower A is .AB8.

Outlets can also be included in one or more named groups of outlets, allowing you to issue a command that affects all outlets in a named group.

Usernames and Passwords

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

NOTE: For security, Server Technology recommends removal of the predefined administrative user account after a new account with administrative rights has been created.

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

Usernames can contain from 1-16 characters and are not case sensitive; spaces are not allowed. Passwords can contain up to 16 characters, and are case sensitive.

Web Interface

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

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

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

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

Figure 9. Example of Firmware Web Interface for the -48DCWB-10-2X3000-E0NB or 48DCWB-16-2X600-E0 Remote Power Manager

Logging In

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

To log in by Web Interface:

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

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

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

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

<u>System Summary</u>

The **System > Summary** page is typically displayed as the default page at user login to the firmware Web interface.

The System Summary page contains general temperature and humidity status information. The color-coded sensor graphs shown in the example provide a real-time view for monitoring environmental conditions in your device network.
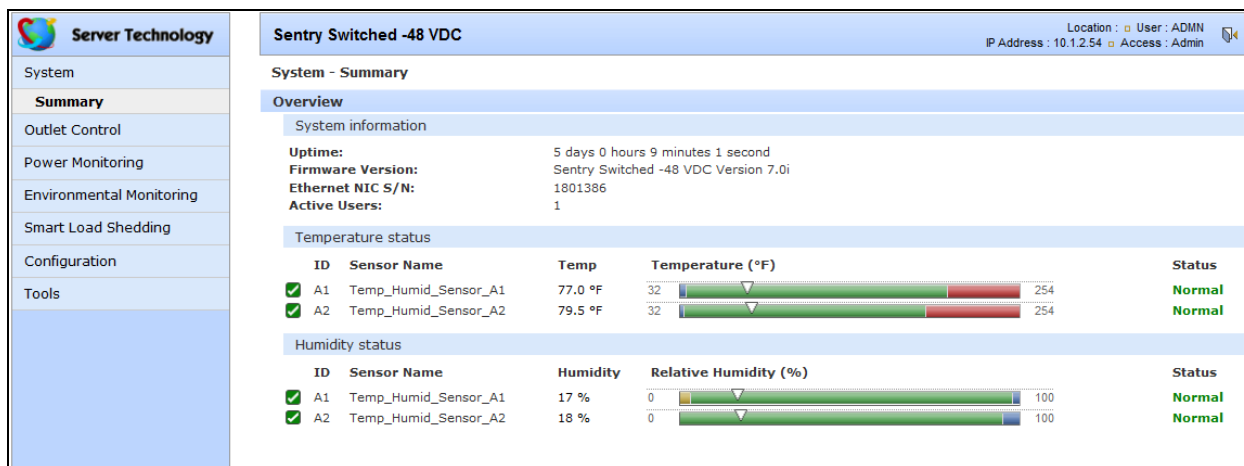
Figure 10. Example of System Summary Page for the -48 VDC Remote Power Manager

NOTE: The -48 VDC products do not have information on total power or input feed line status. The DC products also do not measure voltage (for watt calculation).

The System Summary page for the -48 VDC unit displays precise thermal and humidity readings and dynamic updates without a full page refresh.

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

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

System Information

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

Firmware Version: Shows the current firmware version.

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

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

NOTE: Depending on your web browser, multiple web accesses from the same machine are often treated as one user.

Temperature Status

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

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

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

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

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Humidity Status

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

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

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

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

Field Descriptions

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

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

ID: Device input feed or sensor identifier.

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

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

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

Sensor Graph and Level Indicator: The horizontal sensor graph shows current operating conditions in color-coded segments. See the section below, "Sensor Graph Color Coding" for details. The level indicator 🔽 appears across the graph to indicate the relative position of the current data value with respect to the minimum (low limit) and maximum (high limit) values displayed at the left and right of the graph.

High Limit: Displays the high limit of the load, temperature, or humidity graph. These values depend on the sensor limits are cannot be set by the user. For example, a 100ºC high limit would be displayed as ▪ 100 for a temperature sensor graph in Celsius.

Status: One of several operating conditions:

System Summary – Status Descriptions

Icon	Status	Description
⚠️	Reading	Unit is reading a new or restored sensor.
✅	Normal	Indicates normal operation.
⚠️	Load High	Infeed current load exceeds present High threshold.
❌	Over Load	Infeed current load exceeds the measurable range for the infeed.
❌	Temp Low	Current temperature falls below present Low threshold.
❌	Temp High	Current temperature exceeds present High threshold.
❌	Humid Low	Current percentage of relative humidity falls below present Low threshold.
❌	Humid High	Current percentage of relative humidity exceeds present High threshold.
❌	Lost	The connection was lost to a sensor that was previously detected and the sensor is pulled from the original environment monitoring statistics. There is no data to report, the graph is meaningless, and the threshold settings remain displayed but are grayed.

Sensor Graph Color-Coding

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

Temperature Status:

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

Green = acceptable temperature range

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

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

Humidity Status:

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

Green = acceptable percentage of relative humidity

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

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

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Outlet Control

The **Outlet Control** section provides access to the Individual and Group outlet control pages.

From the Individual and Group pages, power control functions for all outlets and groups assigned to the current user can be monitored and controlled with On, Off, and Reboot commands.

Individual

The **Outlet Control > Individual** page displays all outlets assigned to the current user. The user can apply on, off or reboot actions to individual, multiple or all accessible outlets.

To apply actions to individual or multiple outlets:

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

To apply an action to all outlets:

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

Group

The **Outlet Control > Group** page displays all groups assigned to the current user, as well as the outlets for each group that can be controlled with an action command.

To select a group:

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

To apply an action to a group:

Select the desired action from the drop-down menu and Click **Apply.**

Outlet State/Control State Field Values

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
Off	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 (See **NOTE** below.)
Off	Wake Off	A power-loss has occurred – Wakeup State has been applied (See **NOTE** below.)
On/Wait	Off	Outlet state in transition – Another query of outlet status is required
Off/Wait	On	Outlet state in transition – Another query of outlet status is 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
No Comm	(varies)	Communication to the outlet has been lost (control state will be applied when communication is re-established)

NOTE: Wakeup State is a legacy item that is not supported due to the -48 VDC units being built with normally-closed relays that ensure the highest level of fault tolerance.

Power Monitoring

Outlets

The **Power Monitoring > Outlets** page displays outlets by absolute/descriptive names and shows outlet status and outlet load.
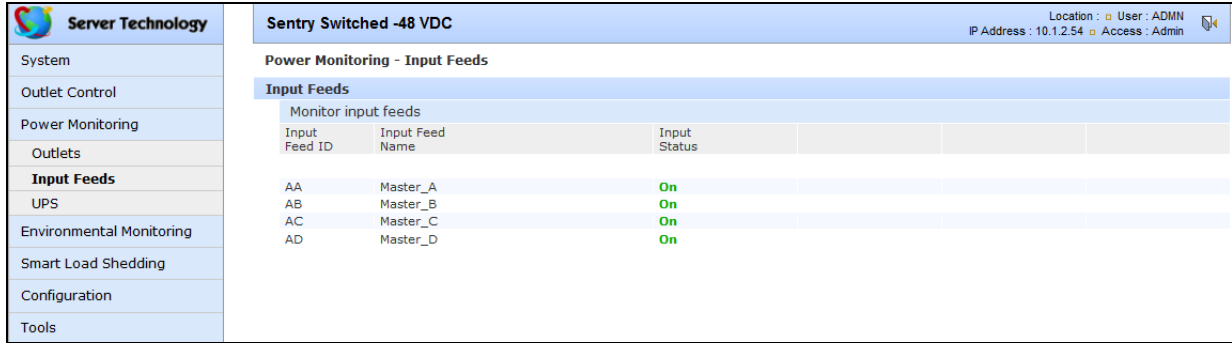
NOTE: For DC products, only the outlet current measurement (in amps) is provided for outlet monitoring.

Monitor pages (like the Outlets page) refresh occasionally to reflect current status of the unit.

Input Feeds

The **Power Monitoring > Input Feeds** page displays the absolute/descriptive names of the input feed and the input status.
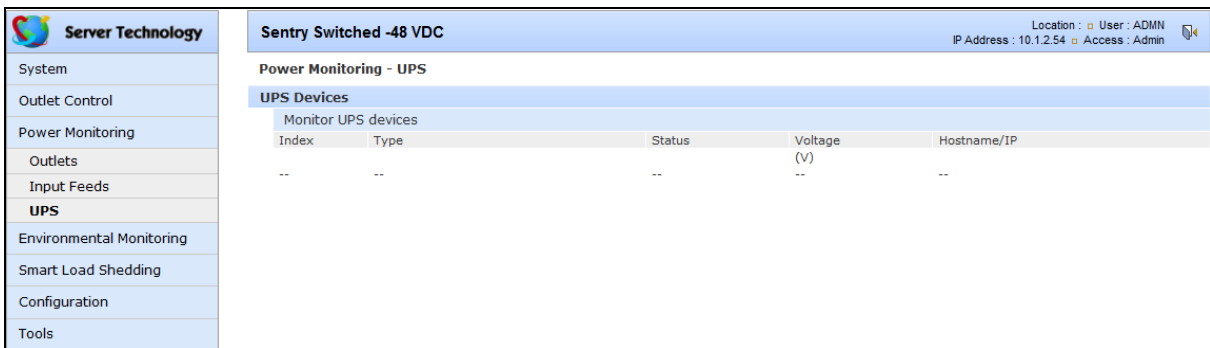
NOTE: Although the DC products cannot measure and provide full information about input feed, power, capacity, voltage and other readings, the line status can be detected and monitored as shown in the Input Status field.

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

UPS

The **Power Monitoring > UPS** page displays the index number, type, status, voltage, and hostname/IP address for each UPS device associated with the unit.
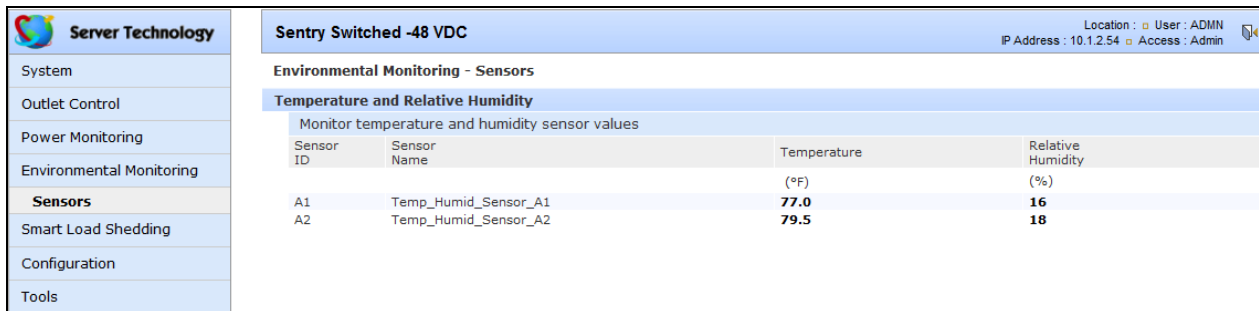
NOTE: The UPS page displays both IPv4 and IPv6 formats in the Hostname/IP field.

Monitor pages (like the UPS page) refresh occasionally to reflect current status of the unit.

Environmental Monitoring

Sensors

The **Environmental Monitoring > Sensors** page displays the absolute/descriptive names of the sensor, the sensor readings, and percentage of relative humidity.

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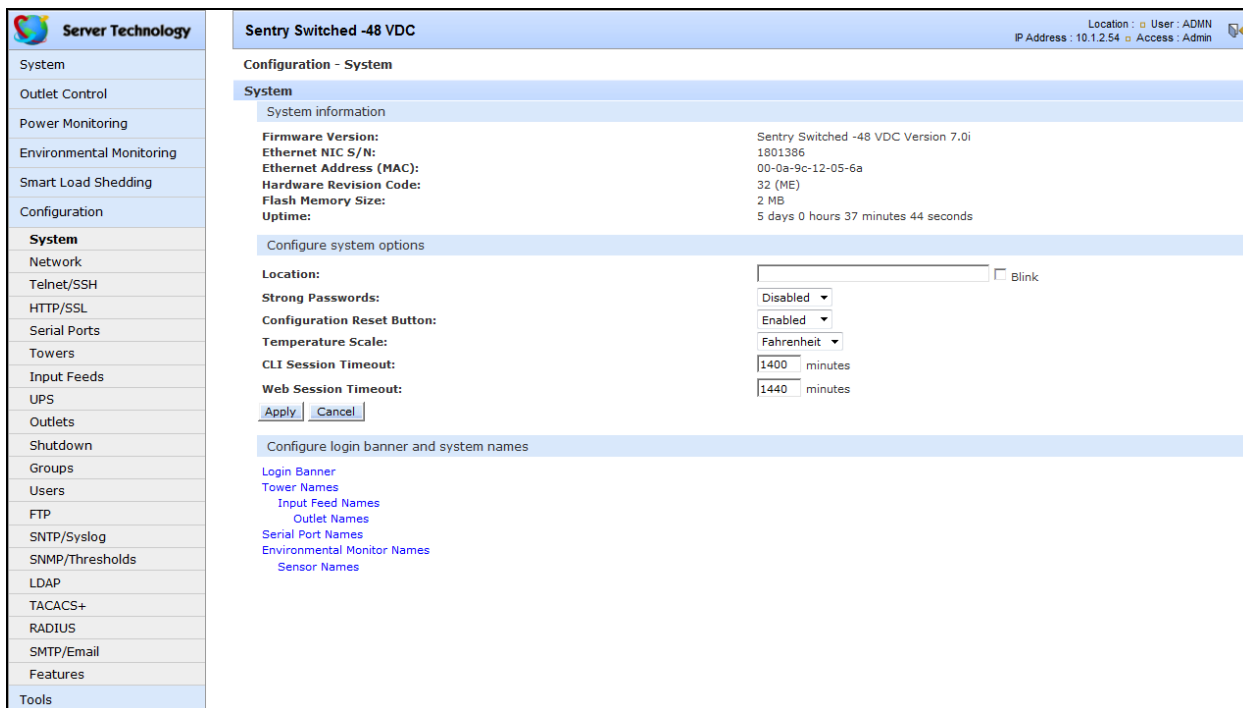
[1] = The ENV part of the sensor supports two Temperature/Humidity (T/H) probes as part of the master unit, two T/H probes as part of the link unit, and the optional EMCU-1-1 (which can support two T/H probes, four contact-closure monitoring points, and one water sensor). The "No Comm" sensor status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

Configuration

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

System

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

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

NOTE: You can use spaces only for the location description.

Creating a pre-login banner:

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

NOTES:

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

- 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 login banner.

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

```
|
2047    characters remaining.
Apply   Cancel
```
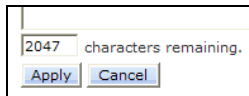
If you reach the maximum 2069 characters, the box displays "-1". To clear your entry and start over, press **Cancel**.

Creating a descriptive system location name:

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

Enabling or disabling strong password requirements:

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

Acceptable strong passwords:

```
n0tOnmyw@tch
john2STI?
H3reUgo!
```

NOTE: Strong password requirements also enforce a minimum change of four character positions when defining new strong passwords.

Select **Enabled** or **Disabled** from the Strong Passwords drop-down menu and Click **Apply.**

NOTE: The strong password requirement is applied against all <u>new</u> passwords.

Enabling or disabling the configuration reset button:

Select **Enabled** or **Disabled** from the Configuration Reset Button drop-down menu and click **Apply.**

Setting the temperature scale:

Select **Celsius** or **Fahrenheit** from the Temperature Scale drop-down menu and Click **Apply.**

Configuring the Command Line Interface (CLI) session timeout:

Enter a timeout period (in minutes) in the CLI Session Timeout field, and click **Apply.** The valid timeout range is 1 to 1440 minutes (24 hours); the default is 5 minutes.

Configuring the web session (Web Interface) timeout:

Enter a timeout period (in minutes) in the Web Session Timeout field. The valid timeout range is 1 minute to 1440 minutes (24 hours); the default web session timeout is 5 minutes.

Creating a descriptive unit name:

Click on the **Tower Names** link.

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

Creating a descriptive input feed name:

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

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

Creating a descriptive outlet name:

Click on the **Outlet Names** link which will open the Outlets configuration page.

Creating a descriptive serial port name:

Click on the **Serial Port Names** link which will open the Serial Ports configuration page.

Creating a descriptive Environmental Monitor name:

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

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

Creating descriptive sensor names:

Click on the **Sensor Names** link.

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

Network

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

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

Network:

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

State:

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

Current Network States

• Acquiring	• Disabled	• Disconnected
• DHCP IPv4	• DHCP IPv6	• DHCP IPv6/IPv4 (both available)
• IPv4 Failed (Static IPv4 problem)	• IPv6 Failed (Static IPv6 problem)	• Static IPv4
• Static IPv6	• Static IPv6/IPv4 (both available)	• Unknown

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

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

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

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

Enabling Dynamic Host Configuration Protocol (DHCP):

To enable DHCP, check the Enable checkbox. To disable DHCP, uncheck (clear) the checkbox, and click **Apply.**

Setting the Fully-Qualified Domain Name (FQDN):

To enable the FQDN, check the Enable checkbox and accept the default name "sentry3-521384" (or type a different name). To disable the FQDN, uncheck the checkbox. Click **Apply.**

Enabling the DHCP boot delay:

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

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

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

NOTES:
- The Boot Delay option executes only when DHCP is enabled.

- The firmware can detect network link integrity and will wait for network connection. This means that if the network is not currently connected, the enabled Boot Delay option will be ignored.

Enabling static address fallback:

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

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

Click **Apply.**

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

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

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

Network defaults

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

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

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

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

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

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

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Telnet/SSH

The **Configuration > Telnet/SSH** configuration page used to enable or disable Telnet and SSH support and configure the port number that the Telnet or SSH server watches.

Enabling or disabling Telnet or SSH support:

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

Changing the Telnet or SSH server port number:

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

Enabling or disabling SSH server authentication methods:

The SSH server supports two authentication methods for security and validation: Password and Keyboard-Interactive.

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

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

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

NOTE: At least one authentication method must be enabled.

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

HTTP/SSL

The **Configuration > HTTP/SSL** page configures HTTP server options, SSL options (including user-defined certificates), and determines settings for the Sentry Power Manager (SPM) enterprise software product.

Enabling or disabling HTTP or SSL support:

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

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

Setting SSL secure access:

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

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

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

Changing the HTTP server or SSL port number:

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

Uploading a custom user certificate:

Enabling and disabling user certificates:

In the User Certificate drop-down menu, select Enabled. Provide a passphrase (0-47 characters) for the new certificate. To change the passphrase, type a new passphrase and check the Change checkbox.

Click **Apply**.

The Stored Files section displays a message 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.

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Uploading the certificate:

NOTE: You can enable user certificates and provide a passphrase using either the firmware Web interface or the Command Line Interface (CLI). However, the uploading of a custom user certificate can only be done using the Web interface – there are no equivalent commands for uploading user certificates.

To upload a user certificate, click the **Upload** link. The Upload window displays. Type the certificate filename (or key filename) and click the **Upload** button. The upload status is displayed in the Stored Files section as described above.

Removing a certificate:

To remove a user certificate, click the **Remove** link. A message displays to confirm the removal of the certificate.

Setting the 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.

NOTE: The SPM options apply only if you are currently using Server Technology's SPM software.

SPM Secure Access:

If your operation does not currently use SPM software, you can disable SPM Secure Access. However, if disabled, the PDU will not be able to use the SPM suite of secure network capabilities or the advanced remote configuration.

Select **Enabled** or **Disabled** from the SPM Secure Access drop-down menu and click **Apply.**

NOTE: Both HTTP and SSL must be enabled or the SPM Secure Access option will not be permitted. When SPM Secure Access is permitted, the default is **Enabled**.

SPM Password:

Each PDU has a default unique SPM password that communicates between SPM and the PDU. When SPM discovers a PDU in the network, SPM changes this password into a different unique password for added security. The SPM then continues to manage or alter these passwords as required for system security.
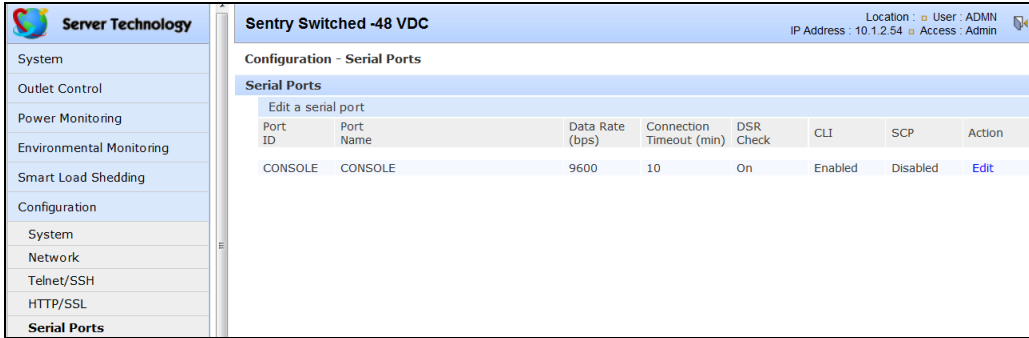
If a PDU is relocated or swapped from the system after a password was generated, SPM may not be able to re-establish a connection to the unit. The Set SPM Reset Password command allows you to reset to the internal default password of the PDU so SPM can re-discover the device and add it to the system. Once the unit has been acquired by SPM, no further action is necessary.

To reset the password, check SPM Password and click **Apply.**

NOTE: Do not reset the password if SPM communication has already been established.

Serial Ports
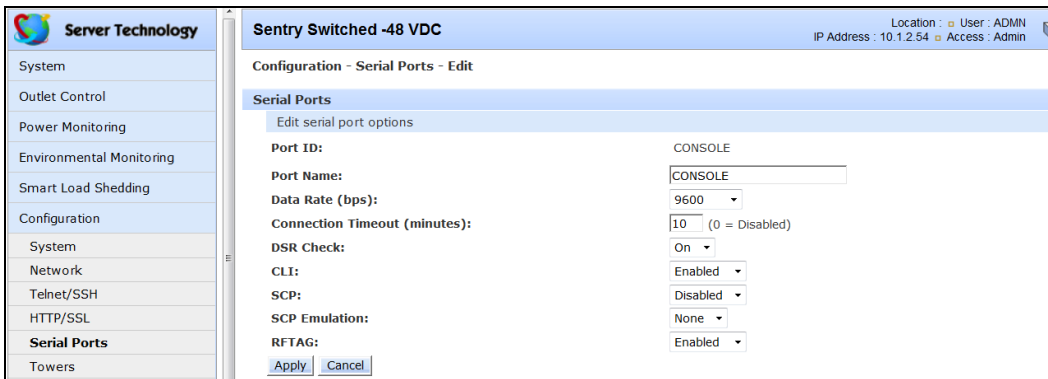
The **Configuration > Serial Ports** allows maintenance of the serial port.

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

A list of serial ports is displayed for viewing. To edit serial port values, click the Edit link in the Action column next to the serial port to be configured. The configuration page displays:

Creating a descriptive serial port name:

In the Port Name field, type a descriptive name up to 24 alphanumeric characters - (ASCII 33 to 126 decimal) are allowed; spaces are not allowed. Click **Apply.**

Setting the data rate for all serial ports:

From the drop-down menu, select the serial port data rate (in bps) and click **Apply.**

Setting the serial port connection timeout value:

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

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

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

Enabling or disabling serial port active signal checking:

From the DSR Check drop-down menu, select On or Off, and click **Apply.**

Enabling or disabling the Command Line Interface (CLI):

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

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

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

Enabling or disabling the Serial command Protocol (SCP):

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

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

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

NOTES:

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

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

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

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

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

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

Enabling or disabling the RFTAG option:

This option makes RF Code sensor tags available for the Server Technology wireless monitoring solution.

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

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

Towers

The **Configuration > Towers** page allows assignment and/or editing of descriptive names, serial and model numbers, and operation voltage types.

NOTE: If set at the factory, you cannot edit the serial number, model number, or voltage type.

Creating a descriptive tower name:

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

Setting the tower serial number:

In the Serial Number field, enter the serial number of the unit and click **Apply.**

Setting the tower model number:

In the Model Number field, enter the model number of the unit and click **Apply.**

Setting the operational AC voltage type:

From the 3-Phase drop-down menu, select **yes** or **no**, and click **Apply**

Setting the operational AC or DC voltage type:

From the AC/DC drop-down menu, select **AC** or **DC**, and click **Apply.**

Input Feeds

The **Configuration > Input Feeds** page allows the configuration of input feed name, voltage, and input feed load capacity.

Editing the input feed name:

In the Input Feed Name field, type the new descriptive name and click **Apply.**

Setting the Input Feed Voltage:

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

Setting the Input Feed Load Capacity:

In the Input Feed Load Capacity field, type a value from 1 to 300 and click **Apply**

UPS

The **Configuration > UPS** page allows adding a new UPS device and configuring the UPS devices connected to the –48 VDC unit.

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

To add a new UPS:

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

To edit the UPS type:

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

Selecting the UPS type:

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

Editing the UPS Hostname/IP Address:

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

Editing the UPS SNMP GET community string:

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

Enabling/Disabling UPS voltage polling:

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

Editing the UPS SNMP port number:

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

Associate the UPS with an infeed:

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

To remove a UPS:

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

Outlets

The **Configuration > Outlets** page configures options for all outlets and outlet shutdown settings.

Setting the outlet reboot delay:

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

Editing the outlet descriptive name:

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

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

Changing the outlet wakeup state:

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

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

NOTE: Wakeup State is a legacy item that is not supported due to the -48 VDC units being built with normally-closed relays that ensure the highest level of fault tolerance.

Setting the outlet post-on delay:

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

On the subsequent Outlet edit page, type the outlet post-on delay (in seconds) in the Post-On Delay field, and click **Apply.**

Setting the outlet locked (no control) state:

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

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

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

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

When an outlet is configured into the locked state, the outlet will lock at its current control state (On or Off). The outlet control state will then change to Locked On or Locked Off.
The locked control state (Yes or No) displays in the outlets list on the Outlets configuration page:

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

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Shutdown

The **Configuration > Shutdown** page allows the setup of settings required to enable and support the Remote Shutdown feature for the orderly shutdown of outlets.

Enabling/disabling remote shutdown for an individual outlet:

Check the Shutdown/Delay checkbox for the individual outlet name to enable remote shutdown support and click **Apply**. To disable remote shutdown for the outlet, clear the checkbox.

Setting the remote shutdown delay for an individual outlet:

Type the number of seconds (valid range is 30 to 900 seconds) for shutdown delay for the individual outlet name and click **Apply.**

Enabling/disabling the remote shutdown script delay for an individual outlet:

Check the Script/Delay checkbox to for the individual outlet name to enable shutdown script support and click **Apply**. To disable the script delay for the outlet, clear the checkbox.

Setting the remote shutdown script delay for an individual outlet:

Type the number of minutes (valid range is 30 to 900 minutes) for shutdown script delay for the individual outlet name and click **Apply.**

Set the target server host:

Provide the hostname or IP address for the target server and click **Apply**.

NOTE: For global control of all outlets, do the following:

- To enable remote shutdown for all outlets, click Shutdown/Delay **All**.

- To disable remote shutdown for all outlets, click Shutdown/Delay **None**.

- To enable script delay for all outlets, click Script/Delay **All**.

- To disable script delay for all outlets, click Script/Delay **None**.

Groups

The Configuration > Groups allows the creation and deletion of group and assignment of outlets to groups.
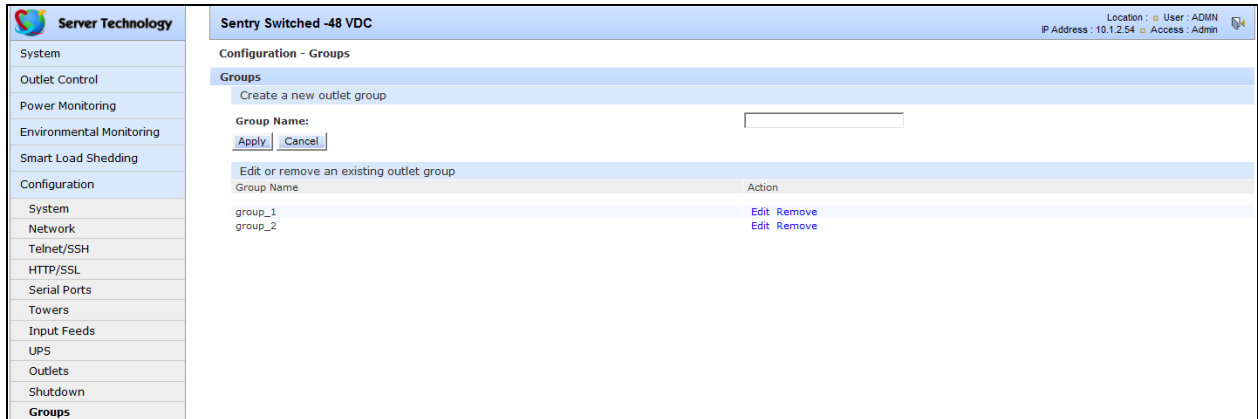
Creating a group:

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

Removing a group:

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

Adding and Deleting outlets from a group:

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

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

Users

The **Configuration > Users** page creates and removes usernames, assignment of accessible outlets and group, assignment of access levels, and the changing of user passwords.
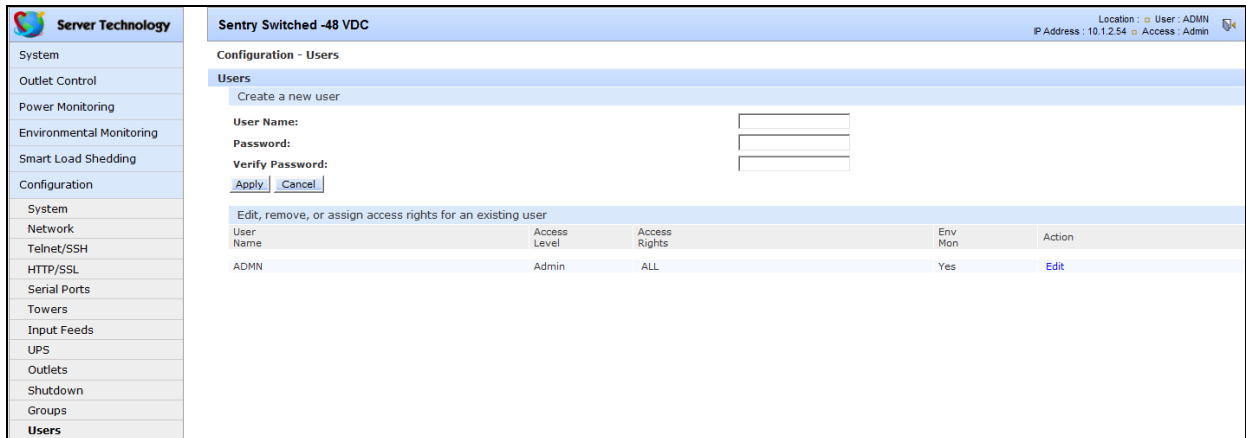
Creating a new user:

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

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

Removing a user:

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

Changing a user password:

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

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

Changing a user's access level:

The RPM has the following defined access levels:

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

The administrator can also grant administrative access to other user accounts, which allows the unit to have more than one administrative-level user.

NOTE: You cannot remove administrative access from the default **admn** user unless you have already granted administrative access to another user account.

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

On the subsequent User Edit page, select **Admin**, **Power-User**, **User**, **Reboot-only**, **On-only** or **View-only** from the Access Level drop-down menu and Click **Apply.**

Granting or removing environmental monitoring access:

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

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

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

Adding and deleting outlet access:

Click on the **Outlets** link in the Access column for the associated user.

On the subsequent User Outlets page, select or deselect outlets to be accessed by the user and Click **Apply.**

Adding and deleting group access:

Click on the **Groups** link in the Access column for the associated user.

On the subsequent User Groups page, select or deselect group to be accessed by the user and Click **Apply.**

Adding and deleting serial port access:

Click on the **Ports** link in the Access column for the associated user.

On the subsequent User Ports page, select or deselect ports to be accessed by the user and Click **Apply.**

FTP

The **Configuration > FTP** page manages the settings required to perform an FTP firmware upload, configure automatic FTP updates, or system configuration uploads/downloads.

Setting the FTP Host Address:

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

Setting the FTP username:

Enter the FTP server username in the Username field, and Click **Apply.**

Setting the FTP password:

Enter the FTP server password in the Password field, and Click **Apply.**

Setting the filepath:

Enter the path of the file to be uploaded in the Directory field, and Click **Apply.**

Setting the filename for upload:

Enter the filename of the file to be uploaded in the Filename field, and Click **Apply.**

Testing the FTP upload configuration:

This test validates that the unit is able to contact and log onto the specified FTP server, download the firmware file and verify that the firmware file is valid for this unit.

Press **Test**.

Enabling or disabling automatic updates:

The unit features the ability to schedule automatic firmware updates. When enabled and configured, the unit will regularly check the FTP server for a new firmware image and upload it.

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

Setting the automatic update scheduled day:

Select the desired day for the automatic update from the drop-down menu and Click **Apply.**

Setting the automatic update scheduled hour:

Select the desired hour for the automatic update from the drop-down menu and Click **Apply.**

Enabling or disabling the FTP server:

The RPM has the capability to upload and download system configuration files to ease implementation across multiple units.

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

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

SNTP/Syslog

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

About Daylight Saving Time (DST)

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

NOTE: If Daylight Saving Time (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 Stated until at least 2015.
The time zone format is: **mo.w.d/h:m:s**, as follows:

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

Setting the local date/time:

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

Setting the SNTP primary/secondary server address:

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

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

Setting the Local GMT offset (hours/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.

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

Enabling or disabling Daylight Saving Time (DST):

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

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

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

Setting the Syslog server address:

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

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

Changing the Syslog server port number:

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

SNMP/Thresholds

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

About SNMP versions:

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

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

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

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

Enabling or disabling SNMP v3 support:

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

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

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

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

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

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

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

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

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

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

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

Setting the SNMPv3 trap username:

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

Type a name in the Trap Username field and click **Apply.** The trap username can be 1-31 alphanumeric characters; spaces are allowed; and the name is case sensitive.

Configuring general parameters for any SNMP version:

Setting trap destinations:

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

NOTES:

- Both IPv4 and IPv6 formats are accepted in the "Trap Destination 1" and "Trap Destination 2" fields.

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

Setting the error trap repeat time:

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

Setting the trap format version:

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

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

Setting IP restrictions:

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

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

Setting the SNMP SysName, SysLocation or SysContact objects:

In the appropriate field, enter the SysName, SysLocation or SysContact objects and click **Apply.**

Enabling or disabling tower traps:

Click on the **Tower Traps** link.

On the subsequent Tower Traps page, select or deselect the desired traps and click **Apply.**

Configuring input feed traps and thresholds:

Click on the **Input Feed Traps and Thresholds** link.

On the subsequent Input Feed Traps page, select or deselect the desired traps and click **Apply.**

For Load traps, enter a maximum load value for the infeed in the High Load Threshold field and click **Apply.** The default input feed high load threshold is 80% of the input feed maximum load capacity.

Configuring outlet traps:

Click on the **Outlet Traps and Thresholds** link.

On the subsequent Outlet Traps and Thresholds page, select or deselect the desired traps and click **Apply.**

Enabling or disabling Environmental Monitor traps:

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

On the subsequent page, select or deselect the desired traps and click **Apply.**

Configuring Temperature and Relative Humidity sensor traps:

Click the **Sensor Traps and Thresholds** link.

On the subsequent Sensor Traps and Thresholds page, select or deselect the desired trap checkboxes and click **Apply.**

Configuring Temperature and Relative Humidity sensor thresholds:

Click the **Sensor Traps and Thresholds** link.

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

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

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

Configuring Temperature and Humidity Recovery Delta (Hysteresis):

Click the **Sensor Traps and Thresholds** link.

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

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

To configure a <u>temperature</u> recovery delta (hysteresis), in the Recovery Delta field for "Temp", type a value (in degrees) and click **Apply**. Valid range is 0-30 Celsius or 0-54 Fahrenheit.

To configure a <u>humidity</u> recovery delta (hysteresis), in the Recovery Delta field for "Humid", type a value (in percent) and click **Apply**. Valid range is 0-20%.

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

LDAP

The **Configuration > LDAP** page allows the setup and maintenance of settings required to enable LDAP support.

Enabling or disabling LDAP support:

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

Configuring the authentication order:

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

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

Setting the LDAP server address:

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

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

Changing the LDAP server port:

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

Setting the LDAP bind type:

The 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/SSL: (LDAP over TLS/SSL) Uses a trusted authority certificate to provide encryption of LDAP authentication.

MD5: Provides strong protection using 1-way hash encoding that does not transmit the username-password over the network.

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

NOTE: If LDAP over TLS/SSL is enabled, MD5 binding is disabled.

Setting the search bind Distinguished Name (DN):

Enter the distinguished name (DN) in the Search Bind field and click **Apply.**

Setting the search bind password for Distinguished Name (DN):

Enter the Search Bind Password in the Search Bind Password field and click **Apply.**

Setting the user search base Distinguished Name (DN):

Enter the User Search Base DN in the User Search Base DN field and click **Apply.**

Setting the user search filter:

Enter the User Search Filter in the User Search Filter field and click **Apply.**

Setting the group membership attribute:

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

Enabling or disabling group search:

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

Setting the group search base Distinguished Name (DN):

The Group Search Base DN indicates where to start the search. Enter the Base DN in the Group Search Base DN field and click **Apply.**

Setting the user membership attribute:

The User Membership Attribute is a comma-delimited string of up to two attribute names whose values in the search results are the users that are members of the group. Maximum number of characters is 61.

Enter the user membership attribute name(s) in the User Membership Attribute field and click **Apply.**

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

Configuring LDAP groups:

Click on the **LDAP Groups** link at the bottom of the page.

Creating an LDAP group:

Enter a descriptive group name in the LDAP Group Name field. Up to 16 alphanumeric and other typed characters (ASCII 33 to 126 decimal) are allowed; spaces are not allowed. Click **Apply.**

Removing an LDAP group:

Click on the **Remove** link in the Action column for the group to be removed and click **OK** on the subsequent confirmation window.

Changing an LDAP group's access level:

Click on the **Edit** link in the Action column for the associated LDAP Group.

On the subsequent LDAP Group - Edit page, select **Admin**, **User**, **On-only, View-only, Reboot-only, Power User** from the Access Level drop-down menu and click **Apply.**

Granting or removing environmental monitoring viewing:

Click on the **Edit** link in the Action column for the associated LDAP Group.

On the subsequent LDAP Group - Edit page, select **Yes** or **No** from the Environmental Monitoring drop-down menu and click **Apply.**

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

Adding and deleting outlet access:

Click on the **Outlets** link in the Access column for the associated LDAP Group.

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

Adding and deleting outlet group access:

Click on the **Groups** link in the Access column for the associated LDAP Group.

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

Adding and deleting serial port access:

Click on the **Ports** link in the Access column for the associated LDAP Group.

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

TACACS+

The **Configuration > TACACS**+ page allows the setup and maintenance of settings required to enable TACACS+ support.

Enabling or disabling TACACS+ support:

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

Setting the TACACS+ server address:

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

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

Changing the TACACS+ server port:

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

Configuring the authentication order:

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

NOTE: It is recommended **not** to set the authentication order to Remote Only until TACACS has been fully configured and tested.

Setting the TACACS+ encryption key:

Enter a key and verify the new key the Encryption Key and Verify Encryption Key fields. Click **Apply.**

For security, key characters are not displayed.

Configuring TACACS+ access levels:

Click on the **TACACS**+ **Privilege Levels** link at the bottom of the page.

Changing a TACACS+ access level:

Click on the **Edit** link in the Action column for the associated TACACS+ Privilege Level.

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

Granting or removing environmental monitoring viewing:

Click on the **Edit** link in the Action column for the associated TACACS+ access level.

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

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

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Adding and deleting outlet access:

Click on the **Outlets** link in the Access column for the associated TACACS+ Privilege Level.

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

Adding and deleting outlet group access:

Click on the **Groups** link in the Access column for the associated TACACS+ Privilege Level.

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

Adding and deleting serial port access:

Click on the **Ports** link in the Access column for the associated TACACS+ Privilege Level.

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

RADIUS

The **Configuration > RADIUS** page allows the setup and maintenance of settings required to enable support for the Remote Authentication Dial-In Service (RADIUS).

Enabling or disabling RADIUS support:

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

Configuring the authentication order:

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

For more information about remote authentication order, see the "Setting the authentication order" section.

NOTE: It is recommended **not** to set the authentication order to Remote Only until the RADIUS has been fully configured and tested.

Changing the RADIUS server address:

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

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

Setting the RADIUS shared secret:

The shared secret is the RADIUS authentication key.

Enter the shared secret in the Primary and Secondary Shared Secret field. Up to 48 upper and lowercase alphanumeric and other typed characters (ASCII 33 to 126 decimal) and spaces are allowed; control characters are not allowed. Click **Apply.**

To change the shared secret, check the Change checkbox to clear the Shared Secret field, enter the new shared secret, and click **Apply.**

Changing the RADIUS server port:

This field specifies the port number used by the RADIUS server for incoming RADIUS authentication requests.

Enter the port number in the Primary and/or Secondary Port field and click **Apply.**

The valid port number range is 1-65535; default is 1812.

Setting the RADIUS server timeout value:

The Timeout field specifies the time interval (in seconds) to wait for a reply from the RADIUS server before resending an authentication request.

Type the timeout value (in seconds) in the Primary and/or Secondary Timeout field and click **Apply.**

The valid timeout range is 1-30 seconds; default is 5 seconds.

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Setting the number of RADIUS server retries:

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

Setting the number of retries:

Type the number of retries in the Primary and/or Secondary Retries field and click **Apply.**

The valid retries range is 0-10; default is 2.

SMTP/Email

The **Configuration > SMTP/Email** page allows the setup and maintenance of settings required to enable support for both the Simple Mail Transfer Protocol (SMTP) and Email.

Enabling or disabling Email support:

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

Setting the SMTP server address:

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

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

Changing the SMTP server port:

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

Setting the SMTP authentication type:

NOTES:

• SMTP authentication allows the mail client in the PDU to login to the mail server during the process of sending a mail. The mail server can require this login to relay mail to another mail server.

• Supported SMTP authentication types are: None (default, no SMTP authentication); Digest-MD5; CRAM-MD5; Login; and Plain. SMTP authentication occurs with a configured username and password, or you can use the address in the 'From' Address field in place of the username.

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

Setting the Email SMTP authentication username:

In the Username field, type the desired Email SMTP username and click **Apply.** Spaces are not allowed.

Setting the Email SMTP authentication password:

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

In the Password field, type a password of 1-32 alphanumeric and other characters (ASCII 33 to 126 decimal) are allowed; passwords are case sensitive. Click **Apply.**

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

Setting the 'From' email address:

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

Setting the 'Send To' email address:

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

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

Setting the subject ID:

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

Enabling or disabling event type notifications:

Check the type of event message to enable, and click **Apply.** Options are Event Messages, Authentication Messages, power Messages, and Configuration Messages.

Sending a test email:

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

Features

The Configuration > Features page allows the activation and maintenance of the individual features purchased separately from Server Technology. From the Features page, you can review all activated features and activate new features.

To activate a special feature:

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

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

Tools

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

Ping

The Ping feature tests the ability of the PDU to contact an IP address for another Ethernet-enabled device. For LDAP support, Ping tests the configuration of the Domain Name Server (DNS) IP address by testing for proper name resolution.

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

Change Password

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

NOTE: An administrator can always assign a new password.

Changing a password:

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

View Log

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

For permanent off-system log storage, the Syslog protocol is supported.

NOTE: Only system administrators can view the system log.

Reviewing the system log:

Click on the **Previous Page** or **Next Page** link to navigate through the log.

Restart

Performing a warm boot:

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

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

Resetting to factory defaults:

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

Uploading new firmware:

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

Generating a new SSL X.509 certificate:

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

Computing new SSH security keys:

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

Command Line Interface

Logging In

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

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

Logging in by RS-232 or Telnet:

1. Press **Enter**. The following appears, where **x.xx** is the firmware version:
   ```
   Sentry Switched -48 VDC Version x.xx
   Username:
   ```

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

2. At the Username: and Password: prompts, enter a valid username and password. And press **Enter**.

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

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

When you enter a valid username and password, the command prompt -48 VDC: displays. If a location identifier was defined, it will be displayed before the prompt.

Creating a pre-login banner:

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

NOTES: *For SSH sessions only:*

- The "keyboard-interactive" authentication method must be used for the banner to display.

- Banner length is truncated to 1500 bytes in SSH packets to avoid failure of SSH connection when configured with a long login banner.

To create a pre-login banner:

At the Switched Switched -48 VDC: prompt, type **set banner** and press **Enter**. Type the desired pre-login banner text. When finished, press Ctrl-z.

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

Operations Command Summary

Command	Description
On	Turns one or more outlets on
Off	Turns one or more outlets off
Reboot	Reboots one or more outlets
Status	Displays the on/off status of one or more outlets
IStat	Displays the status of the infeeds
Envmon	Displays the status of the integrated Environmental Monitor
Connect	Connects to a serial port
Login	Ends the current session and brings up the Username: prompt
Logout	Ends a session
OStat	Shows the outlet status(A), voltage(V), and power(W) for individual, group, or all outlets
Password	Changes the password for the current user
Ping	Tests the ability of the PDU to contact an IP address for another Ethernet-enabled device
Quit	Ends a session
List Outlets	Lists all accessible outlets for the current user
List Ports	Lists all accessible serial ports for the current user
List Group	Lists all assigned outlets for a group name
List Groups	Lists all accessible groups for the current user
UPSStat	Displays the status of the associated UPS

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Administrative Command Summary

Add Grouptouser	Grants a user access to one or more groups
Add Outlettogroup	Adds an outlet to a group name
Add Outlettouser	Grants a user access to one or all outlets
Add Porttouser	Grants a user access to one or all serial ports
Create Group	Adds a group name
Create UPS	Adds a UPS association
Create User	Adds a user account
Delete Groupfromuser	Removes access to one or more groups for a user
Delete Outletfromgroup	Deletes an outlet from a group name
Delete Outletfromuser	Removes access to one or all outlets for a user
Delete Portfromuser	Removes access to one or all serial ports
List User	Displays all accessible outlets/groups/ports for a user
List Users	Displays access levels for all users
Remove Group	Deletes a group name
Remove UPS	Deletes a UPS association
Remove User	Deletes a user account
Restart	Performs a warm boot
Restart Factory	Performs a warm boot and resets to factory settings
Restart Factory Keep Net	Performs a warm boot and keeps network settings
Restart FTPLoad	Initiates an FTP firmware upload session
Restart NewSSHKey	Starts a new SSH session
Restart NewX509Cert	Starts a new session for certificate services
Set Banner	Set the pre-login banner text
Set DHCP	Enables or disables DHCP support
Set DHCP Boot Delay	Enables or disables a 100-second boot delay between PDU and DHCP server
Set DHCP Static Address Fallback	Enables or disables DHCP fallback to a static IP address
Set DNS1/DNS2	Sets the IP address of the Domain Name Server
Set EnergyWise	Enables or disables the Cisco EnergyWise network
Set EnergyWise Domain	Sets the Cisco EnergyWise domain name
Set EnergyWise Port	Sets the Cisco EnergyWise port number
Set EnergyWise Refresh	Rate (in seconds) at which information is pushed to the EnergyWise manager
Set EnergyWise Secret	Sets the Cisco EnergyWise secret
Set Envmon Name	Specifies a descriptive field for the integrated environmental monitor
Set Envmon THS Name	Specifies a descriptive field for a temperature-humidity sensor
Set FTP Autoupdate	Enables or disables automatic FTP update support
Set FTP Autoupdate Day	Sets the automatic FTP update day
Set FTP Autoupdate Hour	Sets the automatic FTP update hour
Set FTP Directory	Specifies the directory for the file to be uploaded
Set FTP Filename	Specifies the file to be uploaded via FTP
Set FTP Host	Sets the FTP Host IP address or hostname
Set FTP Password	Sets the password for the FTP Host
Set FTP Test	Validates that the PDU can login to the FTP server and verify/download the firmware file
Set FTP Username	Sets the username for the FTP HostA
Set FTP Server	Enables or disables the FTP server
Set Gateway	Sets the gateway of the unit
Set HTTP	Enables or disables HTTP access
Set HTTP Port	Specifies the target port for HTTP access

Set Infeed Loadmax	Specifies the maximum load capacity for the infeed
Set Infeed Voltage	Specifies the nominal input voltage for the infeed
Set Infeed Name	Specifies a descriptive field for the infeed
Set IPAddress	Sets the IP address of the unit
Set Location	Specifies a descriptive field for the HTML control screen and login banner
Set Net	Determines the acquisition method for the protocol stack and IPv4/IPv6 addresses
Set Modem Inits	Enables or disables Modem port initialization strings
Set Modem	Specifies Modem port initialization strings
Set Option Button	Enables or disables the external configuration reset button
Set Option CBAlert	Enables or disables the Coldboot Alert feature for RS-232 serial ports
Set Option CLI Timeout	Sets the Command Line Interface (CLI) session timeout period
Set Option Web Timeout	Sets the web session (Web Interface) timeout period
Set Option More	Enables or disables the 'more' prompt
Set Option Prompt	Configures a custom CLI prompt
Set Option StrongPasswords	Enables or disables strong password requirements
Set Option Tempscale	Sets the Environmental Monitor temperature scale
Set Outlet Locked	Locks or unlocks a single outlet (no control) in its current state
Set Outlet Name	Specifies a descriptive field for a device attached to an outlet
Set Outlet RebootDelay	Sets the reboot delay for all outlets
Set Outlet Wakeup	Sets the wakeup state for an outlet **Note:** Wakeup State is a legacy item that is not supported due to the -48 VDC units being built with normally-closed relays that ensure the highest level of fault tolerance.
Set Port CLI	Enables or disables availability of the Command Line Interface (CLI)
Set Port DSR Check	Sets the DSR active signal checking for a serial port
Set Port Name	Specifies a descriptive field for a serial port
Set Port SCP	Enables or disables Serial Command Protocol (SCP) functions
Set Port SCP Emulate	Notifies the Serial Command Protocol (SCP) of an MRV device on a specific serial port
Set Port Speed	Set the connection speed for all serial ports
Set Port Timeout	Sets the inactivity timer for Pass-Thru sessions
Set Port Timeout All	Sets the inactivity timeout period for **all** serial ports before closing the pass-thru session
Set SCP Authentication	Enables or disables Serial Command Protocol (SCP) authentication
Set SCP Authentication User	Sets the username and password for Serial Command Protocol (SCP) authentication
Set SNMP SysContact	Sets the SNMP MIB-II SysContact object
Set SNMP SysLocation	Sets the SNMP MIB-II SysLocation object
Set SNMP SysName	Sets the SNMP MIB-II SysName object
Set SNMP Trap Destination1	Sets the IP address or hostname for SNMP station receiving traps in first destination
Set SNMP Trap Destination2	Sets the IP address or hostname for SNMP station receiving traps in second destination
Set SNMP Trap Time	Sets the timer period between repeated error condition traps
Set SNTP	Sets the IP address or hostname of the SNTP servers
Set SNTP GMTOffset	Sets the local GMT offset applied to the SNTP date/time
Set SPM	Enables/disables secure access of Sentry Power Manager (SPM)
Set SPM ResetPW	Resets the SPM password on the PDU to its internal default password
Set SSH	Enables or disables SSH support
Set SSH AuthMethod	Enables or disables the SSH server authentication methods
Set SSH Port	Sets the SSH server port number
Set Subnet	Sets the subnet mask of the unit
Set Telnet	Enables or disables Telnet access

Set Telnet Port	Sets the Telnet server port number

Administrative Command Summary (continued…)

Set Tower 3Phase	Specifies the tower ID for a 3-phase system
Set Tower AC	Specifies AC voltage for the tower
Set Tower DC	Specifies DC voltage for the tower
Set Tower Model	Specifies the model number for the tower
Set Tower Name	Specifies a descriptive field for the tower
Set Tower ProdSN	Specifies the serial number for the tower
Set UPS AddInfeed	Adds an infeed association to a UPS
Set UPS Commstr	Changes the UPS default Get community string
Set UPS DelInfeed	Deletes an infeed association from a UPS
Set UPS Host	Sets the UPS Host IP address or hostname
Set UPS Port	Specifies the target port for a UPS
Set UPS Type	Sets the UPS type
Set UPS Vpoll	Enables or disables UPS voltage polling
Set User Access	Sets the access level for a user
Set User Envmon	Grants or removes user access to environmental monitoring
Set User Password	Changes the password for a user
Show Energywise	Displays Cisco EnergyWise network configuration information
Show Features	Displays all activated special features for the device
Show FTP	Displays FTP configuration information
Show Infeeds	Displays infeed configuration information
Show Network	Displays network configuration information
Show Options	Displays system option information
Show Outlets	Displays configuration information for all outlets
Show Ports	Displays serial port configuration information
Show SNTP	Displays SNTP configuration information
Show System Status	Displays system configuration information
Show Towers	Displays tower configuration information
Show UPS	Displays UPS configuration information
Version	Displays the firmware version

To display the names of commands that you can execute:

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

Operations Commands

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

Turning outlets on:

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

To turn outlets on:

At the Switched -48 VDC: prompt, type **on**, followed by an outlet name, and press **Enter**, or

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

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

Examples

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

```
Switched -48 VDC: on .aa2<Enter>
```

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

```
Switched -48 VDC: on ServerGroup_1<Enter>
```

Turning outlets off:

The Off command turns off one or more outlets. When the command completes, all outlets affected and their current states will be displayed.

To turn outlets off:

At the Switched -48 VDC: prompt, type **off**, followed by an outlet name, and press **Enter**, or

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

Type **off all** and press **Enter**

Examples

The following command turns off the outlet named FileServer_1:

```
Switched -48 VDC: off FileServer_1<Enter>
```

The following command turns off all outlets:

```
Switched -48 VDC: off all<Enter>
```

Rebooting outlets:

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

NOTE: You will have to reissue the Status command to verify that the outlets have rebooted.

To reboot one or more outlets:

1. At the Switched -48 VDC: prompt, type **reboot**, followed by an outlet name, and press **Enter**, or

2. Type **reboot**, followed by a group name, and press **Enter**, or

3. Type **reboot all** and press **Enter**.

Example

The following command reboots all the outlets in the group named ServerGroup_1:

```
Switched -48 VDC: reboot ServerGroup_1<Enter>
```

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Displaying outlet status:

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

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

NOTE: If you have access to more than 16 total outlets, the Status command displays the first 16 outlets with a prompt to allow you to view the remaining outlets.

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

At the Switched -48 VDC: prompt, type **status**, followed by an outlet name, and press **Enter**, or

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

Type **status** and press **Enter**.

Examples

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

```
Switched -48 VDC: status FileServer_1<Enter>
   Outlet   Outlet                    Outlet   Control
   ID       Name                      State    State
   .AA3     FileServer_1              On       On
```

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

```
Switched -48 VDC: status<Enter>
   Outlet   Outlet                    Outlet   Control   Outlet
   ID       Name                      State    State     Load
   .AA1     DataServer_1              On       On          5.0 Amps
   .AA2     WebServer_1               On       On          2.5 Amps
   .AB1     FileServer_1              On       On          9.5 Amps
   .AB2                               On       On          0.0 Amps
```

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

```
Switched -48 VDC: status ServerGroup_1<Enter>
   Group: ServerGroup_1

     Outlet   Outlet                    Outlet   Control   Outlet
     ID       Name                      State    State     Load
     .AA1     DataServer_1              On       On          5.0 Amps
     .AA2     WebServer_1               On       On          2.5 Amps
     .AB1     FileServer_1              On       On          9.5 Amps
```

Displaying accessible outlets:

The List Outlets command displays accessible outlets for the current user. The display includes the absolute and descriptive name of all outlets assigned to the current user.

To display accessible outlets:

At the Switched -48 VDC: prompt, type **list outlets** and press **Enter**.

Example

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

```
Switched -48 VDC: list outlets<Enter>
   Outlet   Outlet
   ID       Name
   .AA1      DataServer_1
   .AA2      WebServer_1
```

Displaying accessible groups:

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

To display accessible groups:

At the Switched -48 VDC: prompt, type **list groups** and press **Enter**.

Example

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

```
Switched -48 VDC: list groups<Enter>
   Groups:
       ServerGroup_1
       RouterGroup_1
```

Displaying outlets assigned to a group:

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

To display outlets assigned to a group:

At the Switched -48 VDC: prompt, type **list group**, followed by the group name and press **Enter**.

Example

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

```
Switched -48 VDC: list group ServerGroup_1<Enter>
   Group: ServerGroup_1
       Outlet    Outlet
       ID        Name
       .AA1       DataServer_1
       .AA2       WebServer_1
       .AB1       FileServer_1
```

Displaying accessible serial ports:

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

To display accessible serial/Pass-Thru ports:

At the Switched -48 VDC: prompt, type **list ports** and press **Enter**.

Example

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

```
Switched -48 VDC: list ports<Enter>
   Port      Port
   ID        Name
   Console   Console
   Modem     Modem
```

Displaying infeed status:

The Istat command displays the status of one or more infeed.

This display includes the infeed absolute and descriptive names and the Input Status reported to the unit by the infeed.

To display status of one or more infeeds:

Type **istat** and press **Enter**.

Example

The following command displays the infeed status:

```
Switched -48 VDC: istat

   Input    Input                      Input
   Feed ID  Feed Name                  Status

   .AA      HQ_1_Infeed_A              On
   .AB      HQ_1_Infeed_B              On
```

Connecting to a serial device:

The Connect command allows Pass-Thru serial connection to devices attached to one of the two standard serial ports (Console, Modem,) or a Pass-Thru port.

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

To connect to a serial device:

At the Switched -48 VDC: prompt, type **connect**, followed by the serial port name and press **Enter**.

Example

The follow command connects to the serial device connected to the Modem port:

```
    Switched -48 VDC: connect modem<Enter>
```

To disconnect from a serial device:

Type **!*break** and press **Enter**.

Displaying the status of the Environmental Monitor

The Envmon command displays the status of the integrated Environmental Monitor.

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

To display the status of the Environmental Monitor:

At the Switched -48 VDC: prompt, type **envmon** and press **Enter**.

Example

The following command displays the status of the Environmental Monitor.

```
    Switched -48 VDC: envmon<Enter>
Environmental Monitor .A
   Name: Florida_HQ_1                 Status: Normal
   Temperature/Humidity Sensors

     ID    Name                       Temperature    Humidity
     .A1   Temp_Humid_Sensor_A1       Not Found      Not Found
     .A2   T/H2_Florida_HQ_1          23.5 Deg. C    22 % RH
```

Changing a password:

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

To change a password:

At the Switched -48 VDC: prompt, type **password** and press **Enter**.

At the Enter Current Password: prompt, type the current password and press **Enter**.

At the Enter New Password: prompt, type the new password and press **Enter**. Passwords can contain 1-16 characters.

At the Verify Password: prompt, retype the new password and press **Enter**.

Starting a new session:

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

To start a new session:

At the Switched -48 VDC: prompt, type **login** and press **Enter**. The Username: prompt appears.

Ending a session:

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

To end a session:

At the Switched -48 VDC: prompt, type **quit** and press **Enter**, or

Type **logout** and press **Enter**.

Administration Commands

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

User Administration

Creating a user account:

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

To create a user account:

At the Switched -48 VDC: prompt, type **create user**, optionally followed by a 1-16 character username (Spaces are not allowed, and usernames are not case sensitive). Press **Enter**.

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

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

Example

The following command creates the user account JaneDoe:

```
Switched -48 VDC: create user JaneDoe<Enter>
Password: <Enter>
Verify New Password: <Enter>
```

For security, password characters are not displayed.

Removing a user account:

The Remove User command removes a user account.

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

To remove a user account:

At the Switched -48 VDC: prompt, type **remove user**, optionally followed by a username. Press **Enter**.

Changing a password:

The Set User Password command changes a user's password.   For security, when you type a password, the characters are not displayed on the screen.

To change a password:

At the Switched -48 VDC: prompt, type **set user password**, followed by a username and press **Enter**.

At the Password: prompt, type the new password and press **Enter**. Passwords can contain 1-16 characters.

At the Verify Password: prompt, retype the new password and press **Enter**.

Example

The following command changes the password for the user JohnDoe:

```
Switched -48 VDC: set user password johndoe<Enter>
   Password: <Enter>
   Verify Password: <Enter>
```

For security, password characters are not displayed.

Setting user access level:

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

The administrator can also grant administrative access to other user accounts allowing the unit to have more than one administrative-level user.

NOTE: You cannot remove administrative access from the default **admn** user unless you have already granted administrative access to another user account.

To set the access level for a user:

At the Switched -48 VDC: prompt, type **set user access**, followed by **admin**, **poweruser**, **user**, **rebootonly**, **ononly** or **viewonly**, optionally followed by a username and press **Enter**.

Examples

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

```
Switched -48 VDC: set user access admin johndoe<Enter>
```

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

```
Switched -48 VDC: set user access user janedoe<Enter>
```

Granting or removing environmental monitoring access:

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

To grant or remove environmental monitoring access for a user:

At the Switched -48 VDC: prompt, type **set user envmon** followed by **on** or **off**, optionally followed by a username, and press **Enter**. If a user name is not provided on the Command Line, you will be prompted for a user name.

Example

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

```
Switched -48 VDC: set user envmon on johndoe<Enter>
```

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

Displaying the access levels:

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

To display user access levels:

At the Switched -48 VDC: prompt, type **list users** and press **Enter**.

Example

The following command displays all users with their access level:

```
Switched -48 VDC: list users<Enter>
   User              Privilege     Environmental
   Name              Level         Monitoring
   JOHNDOE           Admin         Allowed
   JILLDOE           Power-User    Allowed
   JANEDOE           User          Allowed
   JAKEDOE           Reboot-Only   Not Allowed
   JOSEYDOE          On-Only       Not Allowed
   JOEDOE            View-Only     Not Allowed
```

Adding outlet access to a user:

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

To grant outlet access to a user:

At the Switched -48 VDC: prompt, type **add outlettouser**, optionally followed by an outlet name and a username. Press **Enter**, or

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

Examples

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

```
Switched -48 VDC:add outlettouser .a1 janedoe<Enter>
Switched -48 VDC:add outlettouser WEBServer_1 janedoe<Enter>
```

Deleting outlet access for a user:

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

To delete outlet access for a user:

At the Switched -48 VDC: prompt, type **delete outletfromuser**, optionally followed by an outlet name and a username. Press **Enter**, or

Type **delete outletfromuser all**, followed by a username and press **Enter**.

Adding group access to a user:

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

To grant group access to a user:

At the Switched -48 VDC: prompt, type **add grouptouser**, optionally followed by a group name and a username. Press **Enter**.

Examples

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

```
Switched -48 VDC:add GroupToUser ServerGroup_1 janedoe<Enter>
Switched -48 VDC:add GroupToUser ServerGroup_2 janedoe<Enter>
```

Deleting group access for a user:

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

To delete group access for a user:

At the Switched -48 VDC: prompt, type **delete GroupFromUser**, optionally followed by a group name and a username. Press **Enter**.

Adding serial port access to a user:

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

To grant serial port access to a user:

At the Switched -48 VDC: prompt, type **add porttouser console** and a username. Press **Enter**.

Deleting serial port access for a user:

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

To delete serial port access for a user:

At the Switched -48 VDC: prompt, type **delete portfromuser console** and a username. Press **Enter**.

Displaying user outlet, group and serial port access:

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

To display user outlet, group and serial port access:

At the Switched -48 VDC: prompt, type **list user**, optionally followed by a username. Press **Enter**.

Example

The following command displays information about the user JaneDoe:

```
Switched -48 VDC: list user janedoe<Enter>
   Username: JANEDOE
      Outlet    Outlet
      ID        Name
      .AA1       DataServer_1
      .AA2       WebServer_1
      Groups:
         ServerGroup_1
         ServerGroup_2
   More (Y/es N/o): Y
      Ports:
         Port      Port
         ID        Name
         Console   Console
         Modem     Modem
```

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

Outlet Administration

Setting the reboot delay:

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

To set the sequencing interval:

At the Switched -48 VDC: prompt, type **set outlet rebootdelay all**, followed by a value from 5 to 600 (in seconds) and press Enter.

Creating a descriptive outlet name:

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

To create an outlet name:

At the Switched -48 VDC: prompt, type **set outlet name** followed by the absolute outlet name, then a descriptive name of up to 24 alphanumeric and other typed characters - (ASCII 33 to 126 decimal) are allowed; spaces are not allowed; outlet names are not case sensitive. Press **Enter**.

Example

The following command adds the descriptive name DataServer_1 to outlet .aa1:

```
Switched -48 VDC: set outlet name .aa1 DataServer_1<Enter>
```

Setting the outlet wakeup state:

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

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

To set the wakeup state:

At the Switched -48 VDC: prompt, type **set outlet wakeup**, followed by **on**, **off** or **last** and the outlet name. Press **Enter**.

Example

The following command sets the wakeup state for outlet .aa1 to off:

```
Switched -48 VDC: set outlet wakeup off .aa1<Enter>
```

NOTE: Wakeup State is a legacy item that is not supported due to the -48 VDC units being built with normally-closed relays that ensure the highest level of fault tolerance.

Setting the outlet locked (no control) state:

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

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

To set the outlet locked (no control) state:

At the Switched -48 VDC: prompt, type **set outlet locked**, followed by an outlet name, followed by **yes**, and press **Enter**.

Example

The following command locks outlet TowerA_InfeedA_Outlet1:

```
Switched -48 VDC:  set outlet locked TowerA_InfeedA_Outlet1 yes<Enter>
```

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

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

```
Switched -48 VDC: show outlets<Enter>
   Outlet   Outlet                    Wakeup      Post-On       Locked
   ID       Name                      State       Delay <sec>   <No Control>
   .AA1     TowerA_InfeedA_Outlet1    On          0             Yes
   .AB1     TowerA_InfeedB_Outlet1    On          1             Yes
   .AC1     TowerA_InfeedB_Outlet1    On          567           No
   .AD1     TowerA_InfeedD_Outlet1    On          899           No
```

To unlock a locked outlet:

At the Switched -48 VDC: prompt, type **set outlet locked**, followed by a locked outlet name, followed by **no**, and press **Enter**.

Example

The following command unlocks outlet TowerA_InfeedA_Outlet1:

```
Switched -48 VDC:  set outlet locked TowerA_InfeedA_Outlet1 no<Enter>
```

Displaying outlet information

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

- Reboot timer values
- Descriptive outlet name, if applicable
- Outlet wakeup state (See Note below.)
- Current outlet locked status

NOTE: Wakeup State is a legacy item that is not supported due to the -48 VDC units being built with normally-closed relays that ensure the highest level of fault tolerance.

To display outlet information:

At the Switched -48 VDC: prompt, type **show outlets** and press **Enter**.

Example

The following command displays all outlet information:

```
Switched -48 VDC: show outlets<Enter>
   Outlet    Outlet                  Wakeup    Locked
   ID        Name                    State     <No Control>
   .A1       DataServer_1            On        Yes
   .A2       WebServer_1             On        Yes
   .A3       FileServer_1            On        No
   .A4       TowerA_Outlet4          On        No
   .A5       TowerA_Outlet5          On        No
   .A6       TowerA_Outlet6          On        Yes
   .A7       TowerA_Outlet7          On        No
   .A8       TowerA_Outlet8          On        No
   .A9       TowerA_Outlet9          On        No
   .A10      TowerA_Outlet10         On        No
   .A11      TowerA_Outlet11         On        No
   .A12      TowerA_Outlet12         On        No
   .A13      TowerA_Outlet13         On        No
   .A14      TowerA_Outlet14         On        No
   .A15      TowerA_Outlet15         On        No
   .A16      TowerA_Outlet16         On        No

   More (Y/es N/o):

   Outlet Options:
      Reboot Delay:      15 seconds


   Command successful
```

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Input Feed Administration

Creating a descriptive infeed name:

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

To create an infeed name:

At the Switched -48 VDC: prompt, type **set infeed name** followed by the absolute infeed name, then a descriptive name of up to 24 alphanumeric and other typed characters - (ASCII 33 to 126 decimal) are allowed; spaces are not allowed. Press **Enter**.

Example

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

```
Switched -48 VDC: set infeed name .aa HQ_1_Infeed_A<Enter>
```

Setting the infeed operational voltage

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

To set the infeed operational voltage:

At the Switched -48 VDC: prompt, type **set infeed voltage**, followed by the absolute infeed name, and a value from 1 to 480. Press **Enter**.

Example

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

```
Switched -48 VDC: set infeed voltage .aa 100<Enter>
```

Setting the infeed maximum load capacity

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

To set the infeed maximum load capacity:

At the Switched -48 VDC: prompt, type **set infeed loadmax**, followed by the absolute infeed name, and a value from 1 to 255 (in amperes). Press **Enter**.

Example

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

```
Switched -48 VDC: set infeed loadmax .aa 15<Enter>
```

Displaying infeed information:

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

To display tower information:

At the Switched -48 VDC: prompt, type **show infeeds** and press **Enter**.

Example

```
Switched -48 VDC: show infeeds<Enter>
   Input    Input                       Input         Input
   Feed ID  Feed Name                   Feed Voltage  Feed Capacity (Amps)


   .AA      HQ_1_Infeed_A               100           15
   .AB      HQ_1_Infeed_B               120           20
   .BA      HQ_2_Infeed_A               120           30
   .BB      HQ_2_Infeed_B               120           30
```

Tower Administration

Creating a descriptive tower name:

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

To create a tower name:

At the Switched -48 VDC: prompt, type **set tower name** followed by the absolute tower name, then a descriptive name of up to 24 alphanumeric and other typed characters - (ASCII 33 to 126 decimal) are allowed; spaces are not allowed. Press **Enter**.

Example

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

```
Switched -48 VDC: set tower name .a Florida_HQ_1<Enter>
```

Setting the tower serial number:

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

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

To set the tower serial number:

At the Switched -48 VDC: prompt, type **set tower prodsn**, followed by the absolute tower name, and the tower serial number. Press **Enter**.

Example

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

```
Switched -48 VDC: set tower prodsn .a AA06F011157<Enter>
```

Setting the tower model number:

The Set Tower Model command is use to set the product model number.

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

To set the tower model number:

At the Switched -48 VDC: prompt, type **set tower model**, followed by the absolute tower name, and the tower model number. Press **Enter**.

Example

The following command sets the model number for tower .A to 'CW-8H1-C20':

```
Switched -48 VDC: set tower model .a CW-8H1-C20<Enter>
```

Setting the tower AC or DC voltage type:

The Set Tower command sets the product input AC or DC voltage type.

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

To set the tower AC/DC voltage type:

At the Switched -48 VDC: prompt, type **set tower**, followed by **ac** or **dc**, and the absolute tower name. Press **Enter**.

Example

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

```
Switched -48 VDC: set tower ac.a<Enter>
```

Setting the tower AC voltage type:

The Set Tower 3phase command sets the product input AC voltage type.

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

To set the tower AC voltage type:

At the Switched -48 VDC: prompt, type **set tower 3phase**, followed by the absolute tower name and **yes** or **no**. Press **Enter**.

Example

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

```
Switched -48 VDC: set tower 3phase.a no<Enter>
```

Displaying tower information:

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

To display tower information:

At the Switched -48 VDC: prompt, type **show towers** and press **Enter**.

Example

```
Switched -48 VDC: show towers<Enter>

   Tower ID:      .A
     Name:        TowerA
     Product S/N: AA06F011157
     Model No.:   CW-8H1-C20
     Power Type:  DC
     3-Phase:     No

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

Group Administration

Creating a group name:

The Create Group command creates a new group name.

To create a group name:

At the Switched -48 VDC: prompt, type **create group** optionally followed by a descriptive name of up to 24 alphanumeric and other typed characters - (ASCII 33 to 126 decimal are allowed); spaces are not allowed; group names are not case sensitive. Press **Enter**.

Example

The following command creates group name ServerGroup_1:

```
Switched -48 VDC: create group ServerGroup_1<Enter>
```

Removing a group name:

The Remove Group command removes a group name.

To remove a group name:

At the Switched -48 VDC: prompt, type **remove group**, optionally followed by a group name. Press **Enter**.

Example

The following command removes group name ServerGroup_1:

```
Switched -48 VDC: remove group ServerGroup_1<Enter>
```

Adding an outlet to a group:

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

To add an outlet to a group:

At the Switched -48 VDC: prompt, type **add outlettogroup**, optionally followed by an outlet name and group name. Press **Enter**, or

Type **add OutletToGroup**, followed by **all** and the group name. Press **Enter**.

Examples

The following commands uses absolute outlet names to add outlets A1 and A2 to group name ServerGroup_1:

```
Switched -48 VDC:add OutletToGroup .aa1 ServerGroup_1<Enter>
Switched -48 VDC:add OutletToGroup .aa2 ServerGroup_1<Enter>
```

The following commands use the outlets' descriptive names to add outlets DataServer_1 and WEBServer_1 to group name ServerGroup_1:

```
Switched -48 VDC:add OutletToGroup DataServer_1 ServerGroup_1<Enter>
Switched -48 VDC:add OutletToGroup WEBServer_1 ServerGroup_1<Enter>
```

The following command add all outlets to group name ServerGroup_1:

```
Switched -48 VDC: add OutletToGroup<Enter>
Outletname: all<Enter>
Groupname: ServerGroup_1<Enter>
```

Deleting an outlet from a group:

The Delete Outlet From Group command deletes an outlet from a group. To delete more than one outlet, but not all outlets, you must issue multiple Delete Outlet To Group commands.

To delete an outlet from a group:

At the Switched -48 VDC: prompt, type **delete outletfromgroup**, optionally followed by an outlet name and a group name. Press **Enter**, or

Type **delete outletfromgroup**, followed by **all** then the group name. Press **Enter**.

Environmental Monitor Administration

Creating a descriptive Environmental Monitor name:

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

To create an Environmental Monitor name:

At the Switched -48 VDC: prompt, type **set envmon name** followed by the absolute environmental monitor name, then a descriptive name of up to 24 alphanumeric and other typed characters - (ASCII 33 to 126 decimal) are allowed; spaces are not allowed. Press **Enter**.

Example

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

```
Switched -48 VDC: set envmon name .a Florida_HQ_1<Enter>
```

Creating a descriptive temperature/humidity sensor name:

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

To create a temperature/humidity sensor name:

At the Switched -48 VDC: prompt, type **set envmon ths name** followed by the absolute name of the temperature/humidity sensor, then a descriptive name of up to 24 alphanumeric and other typed characters - (ASCII 33 to 126 decimal) are allowed; spaces are not allowed. Press **Enter**.

Example

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

```
Switched -48 VDC: set envmon ths name .a2 T/H2_Florida_HQ_1<Enter>
```

Serial Port Administration

Creating a descriptive serial port name:

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

To create a port name:

At the Switched -48 VDC: prompt, type **set port name** followed by the absolute outlet name, then a descriptive name of up to 24 alphanumeric and other typed characters - (ASCII 33 to 126 decimal) are allowed; spaces are not allowed; port names are not case sensitive. Press **Enter**.

Example

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

```
Switched -48 VDC: set port name console Rack1<Enter>
```

Setting the serial ports data-rate:

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

To set the serial port data-rate:

At the Switched -48 VDC: prompt, type **set port speed**, follow by the data-rate and press **Enter**.

Example

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

```
Switched -48 VDC: set port speed 38400<Enter>
```

Enabling or disabling active signal checking for serial connections:

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

To enable or disable active signal checking for serial connections:

At the Switched -48 VDC: prompt, type **set port dsrcheck console**, **on** or **off,** and press **Enter**.

Setting the serial port timeout value:

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

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

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

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

At the Switched -48 VDC: prompt, **type set port timeout**, followed by the port ID or name, followed by a timeout value from 0 to 60 (in minutes), and press **Enter**.

To set the serial port timeout value for all ports:

At the Switched -48 VDC: prompt, type **set port timeout all**, followed by a timeout value from 0 to 60 (in minutes), and press **Enter.**

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

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

To enable or disable the SCP emulation:

At the Switched -48 VDC: prompt, type **set port scp**, followed by **emulate**, followed by **none** or **MRV**, and press **Enter**.

Enabling or disabling the RFTAG option:

This option makes RF Code sensor tags available for the Server Technology wireless monitoring solution.

To enable or disable the RF Code sensor options:

At the Switched -48 VDC: prompt, type **set port rftag**, follow by the serial port name, followed by **enabled** or **disabled**, and press **Enter**.

Displaying serial port information:

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

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

To display serial port information:

At the Switched -48 VDC: prompt, type **show ports** and press **Enter**.

Example

The following command displays all serial port information:

```
Switched -48 VDC: show ports<Enter>
   Serial Port Configuration
     Port ID: Console        Port Name: CONSOLE
        DSR Check:  ON           CLI: Enabled   SCP: Disabled   RFTAG: Enabled
        Data Rate: 9600          Connection Timeout: 10 minute<s>
Command successful
```

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Creating a pre-login banner:

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

NOTES:

For SSH sessions only:

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

To create a pre-login banner:

At the Switched -48 VDC: prompt, type **set banner** and press **Enter**. Type the desired pre-login banner text and when finished type **Ctrl-z**.

Creating a location description:

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

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

To create a location description:

At the Switched -48 VDC: prompt, type **set location** followed by a descriptive name of up to 32 alphanumeric and other typed characters - (ASCII 33 to 126 decimal) are allowed; spaces are allowed. Press **Enter**.

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

Examples

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

```
Switched -48 VDC: set location Florida HQ<Enter>
```

The following command deletes any previously specified location description:

```
Switched -48 VDC: set location<Enter>
```

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

Displaying system configuration information:

The Show System command displays all system configuration information.

- Firmware version
- NIC module serial number and MAC address
- Hardware revision code and Flash size
- Uptime since last system restart
- System location description

To display system configuration information:

At the Switched -48 VDC: prompt, type **show system** and press **Enter**.

Example

```
System Information
    F/W Version:   Sentry Version 5.2b
    NIC S/N:       1600001
    MAC Address:   00-0a-9c-10-00-01
    H/W Rev Code:  0
    Flash Size:    1 MB
    Uptime:        0 days 6 hours 14 minutes 1 second
    Location:      Bldg1
```

Enabling or disabling strong passwords:

The Set Option Strong Password command enables or disables the requirements for strong passwords. When enabled, all new passwords must be a minimum of 8 characters in length with at least one uppercase letter, one lowercase letter, one number and one special character.

To enable or disable strong passwords:

At the Switched -48 VDC: prompt, type **set option strongpasswords**, followed by **enabled** or **disabled** and press **Enter**.

Enabling or disabling the external configuration reset button:

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

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

To enable or disable the configuration reset button:

At the Switched -48 VDC: prompt, type **set option button**, followed by **enabled** or **disabled** and press **Enter**.

Enabling or disabling the 'more' prompt:

The Set Option More command enables or disables the 'more' prompt for display of data larger than the terminal window.

To enable or disable 'more':

At the Switched -48 VDC: prompt, type **set option more**, followed by **enabled** or **disabled** and press **Enter**.

Setting the temperature scale:

The Set Option TempScale command sets the temperature scale that the unit will report in.

To set the temperature scale:

At the Switched -48 VDC: prompt, type **set option tempscale**, followed by **celsius** or **fahrenheit** and press **Enter**.

Configuring the Command Line Interface (CLI) session timeout:

The Set Option CLI Timeout command configures the CLI session timeout in minutes.

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

To configure the CLI Session Timeout:

At the Switched -48 VDC: prompt, type **set option clitimeout**, followed by the session timeout (in minutes), and press **Enter**.

Example:

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

```
Switched -48 VDC: set option clitimeout 15<Enter>
```

Configuring the web session (Web Interface) timeout:

The Set Option Web Timeout command configures the Web session timeout in minutes.

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

To configure the web session timeout:

At the Switched -48 VDC: prompt, type **set option webtimeout**, followed by the session timeout (in minutes), and press **Enter**.

Example:

The following command sets the web session (Web Interface) timeout to 10 minutes:

```
Switched -48 VDC: set option webtimeout 10<Enter>
```

Customizing the CLI prompt:

The Set Option Prompt command customizes the CLI prompt.

To customize the CLI prompt:

At the Switched CDU: prompt, type **set option prompt** and press **Enter**. Then type the custom prompt and press **Enter**.

To reset the custom prompt to the default prompt, type **set option prompt** and press **Enter**. When prompted, leave blank and press **Enter**.

The maximum length of the custom prompt is 31 characters. Spaces and special characters are allowed.

Example:

The following command sets the default CLI prompt to "My Prompt":

```
Switched CDU: set option prompt<Enter>
 Custom prompt <blank for default>: My Prompt:
 Command successful
My Prompt:
```

Enable or disable coldboot alert:

Upon a coldboot of the system (if the Coldboot Alert feature is enabled), the system sends a ½ second RS-232 break out on any serial ports that are also enabled.

The Set Option Coldboot Alert command enables or disables the Coldboot Alert feature.

To enable or disable coldboot alert:

At the Switched -48 VDC: prompt, type **set option cbalert**, followed by **enabled** or **disabled**, and press **Enter**.

To enable or disable the Serial Command Protocol (SCP) authentication:

The Set SCP Authentication command enables or disables SCP Authentication.

To enable or disable SCP:

At the Switched -48 VDC: prompt, type **set scpauth**, followed by **enabled** or **disabled**, and press **Enter**.

To set the Serial Command Protocol (SCP) authentication user:

The Set SCPAuth User command sets the username and password for SCPAuthentication.

To set SCP username:

At the Switched -48 VDC: prompt, type **set scpauth user**, followed by user name, and press **Enter**. You will be prompted to enter and verify a password.

Displaying system options:

The Show Options command displays all system option information.

To display system option information:

At the Switched -48 VDC: prompt, type **show options** and press **Enter**.

Example

```
Switched -48 VDC: show options
   System Options
      Strong Passwords:          Disabled
      Configuration Reset Button: Enabled
      More Prompt:               Enabled
      Temperature Scale:         Fahrenheit
      CLI Custom Prompt:         '-48 VDC:'
      CLI Session Timeout:       1400 minutes
      Web Session Timeout:       1440 minutes
      Coldboot Alert <SCP>:      Enabled
Command successful
```

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

Creating a descriptive tower name:

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

To create a tower name:

At the Switched -48 VDC: prompt, type **set tower name** followed by the absolute tower name, then a descriptive name of up to 24 alphanumeric and other typed characters - (ASCII 33 to 126 decimal) are allowed; spaces are not allowed. Press **Enter**.

Example

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

```
Switched -48 VDC: set tower name .a Florida_HQ_1<Enter>
```

Displaying tower information:

The Show Towers command displays information about the -48 VDC unit. This information includes the absolute and descriptive unit names.

To display tower information:

At the Switched -48 VDC: prompt, type **show towers** and press **Enter**.

Example

```
Switched -48 VDC: show towers<Enter>
   Tower    Tower
   ID       Name
   .A       Florida_HQ_1
```

Creating a descriptive infeed name:

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

To create an infeed name:

At the Switched -48 VDC: prompt, type **set infeed name** followed by the absolute infeed name, then a descriptive name of up to 24 alphanumeric and other typed characters - (ASCII 33 to 126 decimal) are allowed; spaces are not allowed. Press **Enter**.

Example

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

```
Switched -48 VDC: set infeed name .aa HQ_1_Infeed_A<Enter>
```

Displaying infeed information:

The Show Infeeds command displays information about all infeeds. This information includes the absolute and descriptive infeed names.

To display tower information:

At the Switched -48 VDC: prompt, type **show infeeds** and press **Enter**.

Example

```
Switched -48 VDC: show infeeds<Enter>
   Input    Input
   Feed ID  Feed Name
   .AA      HQ_1_Infeed_A
   .AB      HQ_1_Infeed_B
   .BA      HQ_2_Infeed_A
   .BB      HQ_2_Infeed_B
```

Displaying the firmware version:

The Version command displays the firmware version.

To display the firmware version:

At the Switched -48 VDC: prompt, type **version** and press **Enter**.

Performing a warm boot:

The Restart command performs a warm boot of the unit.

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

To perform a warm boot:

At the Switched -48 VDC: prompt, type **restart** and press **Enter**.

Enabling or disabling the Cisco EnergyWise network:

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

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

To enable or disable EnergyWise:

At the Switched -48 VDC: prompt, type **set energywise**, followed by **enabled** or **disabled**, and press **Enter**.

Example

```
Switched -48 VDC: set energywise enabled
        Command successful -- restart required
```

Setting up PDUs in the Cisco EnergyWise network:

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

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

To set the EnergyWise domain name:

At the Switched -48 VDC: prompt, type **set energywise domain**, followed by the domain name, and press **Enter**.

Example

```
Switched -48 VDC: set energywise domain 10.1.2.120
    Command successful
```

To set the EnergyWise port:

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

At the Switched -48 VDC: prompt, type **set energywise port**, followed by the port number, and press **Enter**.

Example

```
Switched -48 VDC: set energywise port
    Port [666]: 700
    Command successful
```

To set the EnergyWise secret:
The limit of the Secret field is 64 characters. A blank secret is also acceptable.

At the Switched -48 VDC: prompt, type **set energywise secret**, then verify the secret, and press **Enter**.

Example

```
Switched -48 VDC: set energywise secret
    Secret: ********
    VerifySecret: ********

    Command successful
```

To set a blank EnergyWise secret:

A blank secret is acceptable.

At the Switched -48 VDC: prompt, type **set energywise secret**, do not type in the Secret field, and press **Enter** twice (to bypass the Secret field and then VerifySecret field.)

Example of a blank secret

```
Switched -48 VDC: show energywise
   EnergyWise Configuration
      Endpoint:       Enabled *
      Port:           666
      Domain:         (undefined)
      Refresh Rate:   60
      Secret:         (Blank)
   Command successful
```

To set the EnergyWise refresh rate:

The EnergyWise refresh rate is the rate (in seconds) at which new information is pushed to the EnergyWise manager. Valid range is 30-600 seconds; default is new data sent to the EnergyWise manager every 3 minutes.

At the Switched -48 VDC: prompt, type **set energywise refresh**, followed by a rate (in seconds) from 30-600, and press **Enter**.

Viewing Cisco EnergyWise network parameters:

NOTE: A change in any value (shown in the example below) requires a restart of the system.

To view EnergyWise network parameters:

At the Switched -48 VDC: prompt, type **show energywise**, and press **Enter**.

Example

```
Switched -48 VDC: show energywise
   EnergyWise Configuration
      Endpoint:       Enabled

      Port:           43440
      Domain:         <undefined>
      Refresh Rate:   180

      Secret:         <Blank>
   Command successful
```

NOTE: A restart of the PDU is required after setting or changing <u>any</u> TCP/IP configurations.

Enabling or disabling DHCP support:

The Set DHCP command enables or disables DHCP support.

To enable or disable DHCP support:

At the Switched -48 VDC: prompt, type **set dhcp**, followed by **enabled** or **disabled**, and press **Enter**.

Enabling or disabling DHCP boot delay:

The Set DHCP Boot Delay command enables or disables the DHCP boot delay option.

<u>Enabling</u> the Boot Delay option gives the PDU approximately 100-seconds to establish a connection through a DHCP server This interval allows various network component activities to occur as the PDU powers up (such as obtaining SNTP time stamps for logging or allowing SNMP traps to be sent as switched outlets power up). This is the default state.

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

To enable the boot delay:

At the Switched -48 VDC: prompt, type **set dhcp**, followed by **bootdelay**, followed by **enabled** or **disabled**, and press **Enter**.

NOTES:

- The Boot Delay option executes only when DHCP is enabled.

- The firmware can detect network link integrity and will wait for network connection. This means that if the network is not currently connected, the enabled Boot Delay option will be ignored.

Enabling or disabling DHCP static address fallback:

NOTE: DHCP must be enabled to activate the DHCP Static Address Fallback option.

The Set DHCP Static Address Fallback command enables or disables the DHCP static address fallback option.

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

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

To enable the static address fallback:

At the Switched -48 VDC: prompt, type **set dhcp**, followed by **staticfallback**, followed by **enabled** or **disabled**, and press **Enter**.

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

Setting the network acquisition method:

The Set Net command determines the acquisition method used for the protocol stack and IPv4/IPv6 address.

For a detailed description of the Disabled, IPv4 only, and Dualv6v4 options, see <u>Network-Enabled Modes.</u>

At the Switched -48 VDC prompt: type **set net**; followed by disabled, ipv4only, or dualv6v4; and press **Enter**.

Setting the IP address:

The Set Ipaddress command sets the TCP/IP address of the network interface controller.

To set the IP address:

At the Switched -48 VDC: prompt, type **set ipaddress**, followed by the IP address and press **Enter**.

NOTE: Both IPv4 and IPv6 IP address formats are accepted.

Example

The following command sets the IP address to 12.34.56.78:

```
Switched -48 VDC: set ipaddress 12.34.56.78<Enter>
```

Setting the subnet mask:

The Set Subnet command sets the subnet mask for the network the PT40 will be attached to.

To set the subnet mask:

At the Switched -48 VDC: prompt, type **set subnet**, followed by the subnet mask and press **Enter**.

Example

The following command sets the subnet mask to 255.0.0.0

```
Switched -48 VDC: set subnet 255.0.0.0<Enter>
```

Setting the gateway:

The Set Gateway command sets the IP address of the default gateway the PDU uses to access external networks.

To set the gateway IP address:

At the Switched -48 VDC: prompt, type **set gateway**, followed by the gateway IP address and press **Enter**.

Example

The following command set the gateway IP address to 12.34.56.1:

```
Switched -48 VDC: set gateway 12.34.56.1<Enter>
```

Setting the DNS IP address:

The Set DNS command sets the TCP/IP address of the Domain Name server (DNS).

To set the DNS IP address:

At the Switched -48 VDC: prompt, type **set**, followed by **dns1** or **dns2** and the Domain Name server's IP address. Press **Enter**.

NOTE: Both IPv4 and IPv6 formats are accepted for DNS IP address.

Example

The following command sets the primary Domain Name server IP address to 98.76.54.254:

```
Switched -48 VDC: set dns1 98.76.54.254<Enter>
```

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Displaying network configuration information:

The Show Network command displays TCP/IP, Telnet, SSH, Web, SSL, SNMP, and DHCP options (when DHCP is enabled) configuration information. The Show Network command also displays all IPv4 and IPv6 settings.

- Network configuration: IP address, subnet mask, gateway and DNS IP addresses (both IPv4 and IPv6 formats are displayed).
- Enabled-disabled status and port numbers for Telnet, SSH, HTTP, SSL, SNMP, and FTP Server support.
- Network status: Link, speed, duplex, and negotiation.
- DHCP boot delay and DHCP static address fallback options (when DHCP is enabled).
- Enabled-disabled status of Sentry Power Manager (SPM).

To display network configuration information:

At the Switched -48 VDC: prompt, type **show network** and press **Enter**.

Example

The following command displays the network configuration information:

```
Switched -48 VDC: show network<Enter>
   Network Settings
      State:            DHCP IPv6/IPv4         Network:      Dual IPv6/IPv4
      Link:             Up                     Negotiation:  Auto
      Speed:            100 Mbps               Duplex:       Full

    AutoCfg IPv6: FE80::20A:9CFF:FE52:4104/64
      IPv6 Address: FD01::1:B51A:E03C/64
      IPv4 Address: 10.1.6.230 Subnet Mask: 255.255.0.0
      IPv4 Gateway: 10.1.1.1
      DNS1: FD01::A01:585
      DNS2: 10.1.5.133

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

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

  Network Services
              Telnet:      Enabled           Port: 23
              SSH:         Enabled           Port: 22          Auth: Password, Kb-Int
              HTTP:        Enabled           Port: 80
              SSL:         Enabled           Port: 443          Installed Cert: User
Encrypted
              Access:    Optional                              Stored Files: Cert & Key
              User Cert: Enabled                               User Passphrase: <set>
        SNMPv1/2:      Enabled         Port: 161               TrapPort: 162
        SNMPv3:        Disabled        Port: 161               TrapPort: 162
        FTP Server:  Enabled           Port: 21
        SPM Access:    Enabled

      Command successful
```

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

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HTTP Administration

> **NOTE:** A restart is required after setting or changing any Telnet/Web configurations.

Enabling and disabling HTTP support:

The Set HTTP command enables or disables HTTP support.

To enable or disable HTTP support:

At the Switched -48 VDC: prompt, type **set http**, followed by **enabled** or **disabled** and press **Enter**.

Changing the HTTP server port:

With HTTP support enabled, the HTTP server watches and responds to requests on the default HTTP port number 80. You can change this port number using the Set HTTP Port command.

To change the HTTP port:

At the Switched -48 VDC: prompt, type **set http port**, followed by the port number and press **Enter**.

Example

The following changes the HTTP port number to 2048:

```
Switched -48 VDC: set HTTP port 2048<Enter>
```

Sentry Power Manager (SPM) Administration

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.

> **NOTE:** The SPM options apply only if you are currently using Server Technology's SPM software product.

Enabling and disabling SPM Secure Access:

The Set SPM command enables or disables support for Sentry Power Manager (SPM). If your operation does not currently use SPM software, you can disable SPM Secure Access. However, if disabled, the PDU will not be able to use the SPM suite of secure network capabilities or the advanced remote configuration.

To enable or disable SPM support:

At the Switched -48 VDC: prompt, type **set spm**, followed by **enabled** or **disabled** and press **Enter**.

> **NOTE:** Both HTTP and SSL must be enabled or the SPM Secure Access option will not be permitted. When SPM Secure Access is permitted, the default is Enabled.

Resetting the SPM Password:

The Set SPM Reset Password command resets the SPM password on the PDU to its internal default password.

Each PDU has a default unique SPM password used to communicate between SPM and the PDU. When SPM discovers a PDU in the network, SPM changes this password into a different unique password for added security. The SPM then continues to manage or alter these passwords as required for system security.

If a PDU is relocated or swapped from the system after a password was generated, SPM cannot be able to re-establish a connection to the unit. The Set SPM Reset Password command allows you to reset to the internal default password of the PDU so SPM can re-discover the device and add it to the system. Once the unit has been acquired by SPM, no further action is necessary.

To reset the SPM password:

At the Switched -48 VDC: prompt, type **set spm**, followed by **resetpw** and press **Enter**.

> **NOTE:** Do not reset the password if SPM communication has already been established.

Telnet Administration

NOTE: A restart of the PDU is required after setting or changing **any** Telnet/Web configurations.

Enabling and disabling Telnet support:

The Set Telnet command enables or disable Telnet support.

To enable or disable Telnet support:

At the Switched -48 VDC: prompt, type **set telnet**, followed by **enabled** or **disabled** and press **Enter**.

Changing the Telnet port:

With Telnet support enabled, the Telnet server watches and responds to requests on the default Telnet port number 23. You can change this port number using the Set Telnet Port command.

To change the Telnet socket:

At the Switched -48 VDC: prompt, type **set telnet port**, followed by the port number and press **Enter**.

Example

The following changes the Telnet port number to 7001:

```
Switched -48 VDC: set telnet port 7001<Enter>
```

FTP Administration

You can upload new versions of firmware into the PDU using File Transfer Protocol (FTP). This allows access to new firmware releases for firmware improvements and new features additions. The following commands are used to configure the PDU for an FTP firmware upload. For more information about initiating an FTP firmware upload, see Appendix B.

NOTE: Secure File Transport Protocol (SFTP) is also supported for encrypted SSH transport over the network.

Setting the FTP host address:

The Set FTP Host command sets the FTP host IP address or hostname allowing for firmware file uploads.

To set the FTP Host address:

At the Switched -48 VDC: prompt, type **set ftp host**, followed by the IP address or hostname and press **Enter**.

NOTE: Both IPv4 and IPv6 formats are accepted for IP address or hostname.

Examples

The following command sets the FTP host IP address to 12.34.56.99:

```
Switched -48 VDC: set ftp host 12.34.56.99<Enter>
```

The following command sets the FTP hostname to ftp.servertech.com:

```
Switched -48 VDC: set ftp host ftp.servertech.com<Enter>
```

Setting the FTP username:

The Set FTP Username command sets the username as required by the FTP Host.

To set the FTP username:

At the Switched -48 VDC: prompt, type **set ftp username**, followed by the FTP username and press **Enter**.

Example

The following command sets the FTP username to Guest:

```
Switched -48 VDC: set ftp username guest<Enter>
```

Setting the FTP Password:

The Set FTP Password command sets the password as required by the FTP Host.

To set the FTP password:

At the Switched -48 VDC: prompt, type **set ftp password**, followed by the FTP password and press **Enter**.

Example

The following command sets the FTP password to Test1:

```
Switched -48 VDC: set ftp password Test1<Enter>
```

Setting the filename to be uploaded:

The Set FTP Filename command sets the filename of the firmware file to be uploaded.

To set the FTP filename:

At the Switched -48 VDC: prompt, type **set ftp filename**, followed by the firmware filename and press **Enter**.

Example

The following command sets the FTP filename to snb_s50a.bin:

```
Switched -48 VDC: set ftp filename swCDU-v60g.bin<Enter>
```

Setting the directory for the file to be uploaded:

The Set FTP Directory command sets the directory for the firmware file to be uploaded.

To set the FTP directory:

At the Switched -48 VDC: prompt, type **set ftp directory**, followed by the directory and press **Enter**.

Example

The following command sets the FTP directory to ftp://Sentry:

```
Switched -48 VDC: set ftp directory ftp://sentry<Enter>
```

Enabling or disabling automatic updates:

The Set FTP Autoupdate command enables or disables automatic firmware update support.

To enable or disable automatic updates:

At the Switched -48 VDC: prompt, type **set ftp autoupdate**, followed by **enabled** or **disabled** and press **Enter**.

Setting the automatic update scheduled day:

The Set FTP Autoupdate Day command sets the day when automatic updates occur.

To set the automatic update day:

At the Switched -48 VDC: prompt, type **set ftp autoupdate day**, followed by a day of the week or **everyday** and press **Enter**.

Example

The following command sets the automatic update day to Sunday:

```
Switched -48 VDC: set ftp autoupdate day sunday<Enter>
```

Setting the automatic update scheduled hour:

The Set FTP Autoupdate Hour command sets the hour of the day when automatic updates occur.

To set the automatic update hour:

At the Switched -48 VDC: prompt, type **set ftp autoupdate hour**, followed by an hour of the day and press **Enter**.

Examples

The following command sets the automatic update hour to 12 AM:

```
Switched -48 VDC: set ftp autoupdate hour 12am<Enter>
```

The following command sets the automatic update hour to 3 PM:

```
Switched -48 VDC: set ftp autoupdate hour 3pm<Enter>
```

Testing the FTP upload configuration:

The Set FTP Test command validates that the PDU can login to the FTP server and verify/download the firmware file.

To test the FTP upload configuration:

At the Switched -48 VDC: prompt, type **set ftp test**, and press **Enter**.

Displaying FTP configuration information:

The Show FTP command displays all FTP configuration information.

- FTP Host IP address
- FTP Host username and password
- Firmware filepath and filename
- Configuration of automatic updates

To display FTP configuration information:

At the Switched -48 VDC: prompt, type **show ftp** and press **Enter**.

Example

The following command displays the FTP configuration information:

```
Switched -48 VDC: show ftp<Enter>
   FTP Configuration
      Host:      10.1.2.100
      Username:  djones
      Password:  *******
      Directory: /firmware/7.0d
      Filename:  smCDU-v70d.bin
   FTP Automatic Updates Configuration
      Automatic Updates:  Disabled
      Scheduled Day:      Everyday
      Scheduled Hour:     1 PM
```

SNTP Administration

The firmware supports the use of a network time service to provide a synchronized time reference.

About Daylight Saving Time (DST)

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

NOTE: If Daylight Saving Time (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 Stated until at least 2015.

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

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

Setting the SNTP server address:

The Set SNTP command sets the primary and secondary SNTP server addresses.

To set the SNTP server address:

At the Switched -48 VDC: prompt, type **set sntp**, followed by **primary** or **secondary**, and the SNTP server IP address or hostname. Press **Enter**.

Examples

The following command sets the primary SNTP server address to 204.152.184.72:

```
Switched -48 VDC: set sntp primary 204.152.184.72<Enter>
```

The following command sets the secondary SNTP server address to cuckoo.nevada.edu:

```
Switched -48 VDC: set sntp secondary cuckoo.nevada.edu<Enter>
```

Setting the local GMT offset:

The Set SNTP GMToffset command sets the offset from GMT for the date/time returned by SNTP.

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.

The offset can be configured in whole hours between -12 and 12 hours.

NOTE: The PDU does not support automatic adjustment for Daylight Saving Time (DST).

To set the local GMT offset:

At the Switched -48 VDC: prompt, type **set sntp gmtoffset**, followed by the offset value, and press **Enter**.

Examples

The following command sets the local GMT offset to -12:

```
Switched -48 VDC: set sntp gmtoffset -12<Enter>
```

Displaying SNTP configuration information:

The Show SNTP command displays all SNTP configuration information.

To display SNTP configuration information

At the Switched -48 VDC: prompt, type **show sntp** and press **Enter**.

Example

The following command displays the SNTP configuration information:

```
Switched -48 VDC: show sntp <Enter>
    Date/Time:       2013-04-13  15:21:18
  Primary Host:      204.152.184.72
  Secondary Host:    1.servertech.pool.ntp.org
  Local GMT Offset:  -8
  Use DST:           Enabled
     Start Date:     1st Wednesday in April
     Start Time:     04:18:06
     End Date:       1st Sunday in November
     End Time:       02:00:00
```

UPS Administration

Creating a UPS record:

The Create UPS command adds a new UPS device to the PDU.

To create a UPS record:

At the Switched -48 VDC: prompt, type **create UPS** and press **Enter**.

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

At the Host Name: prompt, type the UPS's IP address or hostname and press **Enter**.

NOTE: Both IPv4 and IPv6 formats are accepted for IP address or hostname.

Example

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

```
Switched -48 VDC: create ups<Enter>
   UPS types:
       1 -- Generic <RFC1628>
       2 -- Liebert
       3 -- MGE
       4 -- Tripp Lite
       5 -- APC
       6 -- HP
       7 -- Minuteman
       8 -- Mitsubishi
       9 -- Powerware
      10 -- Toshiba
      11 -- Falcon Electric
    Select type(1-11): 10<Enter>
   Host/IP: DC1Toshiba1<Enter>
```

Removing a UPS record:

The Remove UPS command removes a UPS record.

To remove a UPS record:

At the Switched -48 VDC: prompt, type **remove ups** and press **Enter**.

At the prompt, type the index number of the UPS to be removed and press **Enter**.

Example

The following command removes the UPS record at index 3:

```
Switched -48 VDC: remove ups<Enter>
   1   Type:    APC
       Host/IP: DC1APC1
   2   Type:    Powerware
       Host/IP: DC1Powerware1
   3   Type:    Toshiba
       Host/IP: DC1Toshiba1
   Select UPS (1-11): 3<Enter>
```

Changing the UPS type:

The Set UPS Type command changes the type of UPS for each UPS record.

To change a UPS record:

At the Switched -48 VDC: prompt, type **set ups type** and press **Enter**.

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

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

Example

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

```
Switched -48 VDC: set ups type<Enter>
   UPS     UPS
   Index   Type

   1       APC
   2       Liebert

   Select UPS (1-11): 2<Enter>
```

Changing the UPS host address:

The Set UPS Host command changes the IP address or hostname for each UPS record. Hostnames can be up to 60 characters long.

To change a UPS host address:

At the Switched -48 VDC: prompt, type **set ups host** and press **Enter**.

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

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

Example

The following command changes UPS hostname for the record at index number 2 to 'DC1Liebert1':

```
Switched -48 VDC: set ups host<Enter>
   1   Type:    APC
       Host/IP: DC1APC
   2   Type:    Liebert
       Host/IP: DC1Liebert
   Select UPS (1-11): 2<Enter>
   Host/IP: DC1Liebert1<Enter>
```

Changing the UPS SNMP port:

With a UPS record configured, the PDU sends data requests to the default UPS SNMP port number 161. You can change this port number using the Set UPS Port command.

To change the UPS SNMP port:

At the Switched -48 VDC: prompt, type **set ups port** and press **Enter**.

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

At the prompt, type the desired port number and press **Enter**.

Example

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

```
Switched -48 VDC: set ups port<Enter>
   UPS     UPS
   Index   Type        Port
   1       APC         161
   2       Liebert     161
   Select UPS (1-11): 1<Enter>
   Port: 162<Enter>
```

Changing the UPS SNMP Get community string:

With a UPS record configured, the CDI sends data requests to the UPS using the default Get community string of 'public'. You can change this string using the Set UPS Commstr command.

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

To change a UPS SNMP community string record:

At the Switched -48 VDC: prompt, type **set ups commstr** and press **Enter**.

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

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

Example

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

```
Switched -48 VDC: set ups commstr<Enter>
   UPS     UPS           Community
   Index   Type          String
   1       APC           public
   2       Liebert       public
   Select UPS (1-11): 2<Enter>
   Community String: readonly<Enter>
```

Enabling/disabling UPS voltage polling:

With a UPS record configured, the PDU by default enables voltage polling of the UPS. This feature can be enabled or disabled using the Set UPS VPoll command.

To enable/ disable UPS voltage polling:

At the Switched -48 VDC: prompt, type **set ups vpoll** and press **Enter**.

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

At the prompt, type **on** or **off**, and press **Enter**.

Example

The following command disables voltage polling for the record at index number 2:

```
Switched -48 VDC: set ups vpoll<Enter>
   UPS     UPS          Voltage
   Index   Type         Polling
   1       Liebert      On
   2       MGE          On
   Select UPS (1-11): 2<Enter>
   Voltage Polling: Off<Enter>
```

Adding an infeed to a UPS:

The Set UPS AddInfeed command adds a logical association of an infeed to a UPS.

To add an infeed to a UPS:

At the Switched -48 VDC: prompt, type **set ups addinfeed** and press **Enter**.

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

At the prompt, type the absolute infeed ID of the desired infeed, and press **Enter**.

Example

The following command associates infeed .aa to UPS record at index number 1:

```
Switched -48 VDC: set ups addinfeed<Enter>
   UPS     UPS          Infeed
   Index   Type         IDs
   1       APC
   2       Liebert      .AA
   Select UPS (1-11): 1<Enter>
   Infeed ID: .aa<Enter>
```

Removing an infeed from a UPS:

The Set UPS DelInfeed command removes a logical association of an infeed from a UPS.

To remove an infeed from a UPS:

At the Switched -48 VDC: prompt, type **set ups delinfeed** and press **Enter**.

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

At the prompt, type the absolute infeed ID of the desired infeed, and press **Enter**.

Example

The following command removes the association of infeed .aa from UPS record at index number 2:

```
Switched -48 VDC: set ups addinfeed<Enter>
   UPS     UPS          Infeed
   Index   Type         IDs
   1       APC          .AA
   2       Liebert      .AA
   Select UPS (1-11): 2<Enter>
   Infeed ID: .aa<Enter>
```

Displaying UPS status:

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

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

To display status of one or more UPS devices:

At the Switched -48 VDC: prompt, type **upsstat** and press **Enter**.

Example

The following command displays the UPS status:

```
Switched -48 VDC: upsstat<Enter>
  UPS      UPS            UPS         UPS
  Index    Type           Status      Voltage
  1        APC            N/A         N/A
  2        Liebert        On Battery  120.0
  3        MGE            On Utility  119.9
```

Showing UPS configuration:

The Show UPS command displays information about all UPS devices, such as:

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

To display UPS configuration information:

At the Switched -48 VDC: prompt, type **show ups** and press **Enter**.

Example

The following command displays UPS configuration information:

```
Switched -48 VDC: show ups<Enter>
  1   Type:    APC
      Host/IP: DC1APC1
      Voltage Polling:     ON
      SNMP Configuration
         Community String: public
         SNMP Port:        162
         SNMP Objects/Expected Values
            Voltage:         .1.3.6.1.2.1.33.1.4.4.1.2.1
            Utility Status:  .1.3.6.1.2.1.33.1.4.1.0
               On Battery:   0x5
               On Utility:   0x3
      More (Y/es N/o):
```

Feature Administration

Displaying activated special features:

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

To display activated special features:

At the Switched -48 VDC: prompt, type **show features** and press **Enter**.

Example

The following command displays all activated special features:

```
Switched -48 VDC: show features<Enter>
   Activated Features:
      Smart Load Shedding
```

Chapter 4: Advanced Operations

SSL

Secure Socket Layers (SSL) version 3 enables secure Web sessions between a Remote Power Manager and a remote user. SSL provides two chief features designed to make TCP/IP (Internet) transmitted data more secure:

- Authentication – The connecting client is assured of the identity of the server.
- Encryption – All data transmitted between the client and the server is encrypted rendering any intercepted data unintelligible to any third party.

SSL uses the public-and-private key encryption system by RSA, which also requires the use of digital certificates. An SSL Certificate is an electronic file uniquely identifying individuals or websites and enables encrypted communication; SSL Certificates serve as a kind of digital passport or credential.

The SSL Certificate for the -48 VDC product enables the client to verify the authenticity of the unit and to communicate with the unit securely via an encrypted session, which protects confidential information from interception.

SSL Command Summary

Command	Description
Set SSL	Enables/disables SSL support
Set SSL Access	Sets SSL access as optional or required
Set SSL Port	Configures the SSL port number
Set SSL User Certificate	Enables/disables custom user certificates
Set SSL User Passphrase	Passphrase to control login access for user certificates

Enabling and Setting up SSL Support

NOTE: A restart of the unit is required after setting or changing **any** SSL configurations.

Enabling or disabling SSL support:

The Set SSL command enables or disables SSL support.

To enable or disable SSL support:

At the Switched -48 VDC: prompt, type **set ssl**, followed by **enabled** or **disabled** and press **Enter**.

Setting SSL access level:

The Set SSL Access command assigns use of SSL as optional or required. The default access level is set to optional.

To change the access level:

At the Switched -48 VDC: prompt, type **set ssl access**, followed **optional** or **required**, and press **Enter**.

Example

The following changes the access level to Required:

```
Switched -48 VDC: set ssl access required<Enter>
```

Setting the SSL port:

The Set SSL Port command configures the SSL port number. The valid range of values for port number is 1-65535; the SSL default port number is 443.

To change the port number:

At the Switched -48 VDC: prompt, type **set ssl port**, optionally followed by a port number, and press **Enter**. If you do not provide a port number on the Command Line, you will be prompted for a port number.

Example

The following changes the SSL port number to 443:

```
Switched -48 VDC: set ssl port 443<Enter>
```

Enabling or disabling custom user certificates:

The Set SSL User Certificate command enables or disables uploading of custom user certificates.

To enable or disable user certificates:

At the Switched -48 VDC: prompt, type **set ssl usercert**, followed by **enabled** or **disabled**, and press **Enter**.

Setting the custom user certificate passphrase:

The Set SSL User Passphrase command sets the user-defined passphrase for authentication of uploaded custom user certificates.

To set the user certificate passphrase:

At the Switched -48 VDC: prompt, type **set ssl userpass** and press **Enter**. You will be prompted to provide the passphrase. Press **Enter**.

NOTE: A restart of the PDU is required after setting the user certificate passphrase.

SSL Technical Specifications

Secure Socket Layer (SSL) version 3

Transport Layer Security (TLS) version 1 (RFC 2246)

SSL/TLS-enabled HTTPS server (RFC 2818)

Self-Signed X.509 Certificate version 3 (RFC 2459)

Asymmetric Cryptography:
    1024-bit RSA Key Exchange

Symmetric Cryptography Ciphers:
    TLS_RSA_WITH_AES_256_CBC_SHA   TLS_RSA_WITH_3DES_EDE_CBC_SHA
    TLS_RSA_WITH_AES_128_CBC_SHA   TLS_RSA_WITH_DES_CBC_SHA

SSH

Secure Shell (SSH) version 2 enables secure network terminal sessions between a Remote Power Manager and a remote user over insecure network. SSH provides an encrypted terminal sessions with strong authentication of both the server and client, using public-key cryptography and is typically used as a replacement for unencrypted Telnet. In addition to enabling secure network terminal sessions to the unit for configuration and power management, the SSH session can be used for secure Pass-Thru connections to attached devices.

SSH requires the configuration and use of a client agent on the client PC. There are many freeware, shareware or for-purchase SSH clients available. Two examples are the freeware client PuTTY and the for-purchase client SecureCRT® by VanDyke® Software. For configuration and use of these clients, refer to the applicable software documentation.

SSH Command Summary

Command	Description
Set SSH	Enables/disables SSH support
Set SSH Port	Sets the SSH server port number

Enabling and Setting up SSH Support

NOTE: A restart of the unit is required after setting or changing **any** SSH configurations.

Enabling or disabling SSH support:

The Set SSH command enables or disables SSH support.

To enable or disable SSH support:

At the Switched -48 VDC: prompt, type **set ssh**, followed by **enabled** or **disabled** and press **Enter**.

Changing the SSH server port:

With SSH support enabled, the SSH server watches and responds to requests on the default SSH port number 22. This port number can be changed using the Set SSH Port command.

To change the SSH port:

At the Switched -48 VDC: prompt, type **set ssh port**, followed by the port number and press **Enter**.

Example

The following changes the SSH port number to 65535:

```
Switched -48 VDC: set ssh port 65535<Enter>
```

SSH Technical Specifications

Secure Shell (SSH) version 2

Asymmetric Cryptography:
    Diffie-Hellman DSA/DSS 512-1024 (random) bits per NIST specification

Symmetric Cryptography:

AES256-CBC	RIJNDAEL256-CBC	3DES-192-CBC
AES192-CBC	RIJNDAEL192-CBC	BLOWFISH-128-CBC
AES128-CBC	RIJNDAEL128-CBC	ARCFOUR-128

Message Integrity:

HMAC-SHA1-160	HMAC-SHA1-96
HMAC-MD5-128	HMAC-MD5-96

Authentication:
    Username/Password

Session Channel Break Extension (for RS232 Break)

SNMP/Thresholds

The -48 VDC family of products supports the Simple Network Management Protocol (SNMP). This allows network management systems to use SNMP requests to retrieve information and control power for the individual outlets.

The unit includes an SNMP v2c agent supporting standard MIB I and MIB II objects. A private enterprise MIB extension (Sentry3 MIB) is also supported to provide remote power control.

NOTE: For security SNMP support is disabled by default.

About SNMP Versions

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

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

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

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

SNMP CLI Commands:

- All SNMP v3 specific configuration settings use the CLI command SET SNMP V3.
- All SNMP v1/v2 specific configuration settings use the CLI command SET SNMP V2.
- All SNMP configuration settings common to any SNMP version use the CLI command SET SNMP.

NOTES:
- If you use SNMP v1 or SNMP v2, all SET SNMP CLI commands (and the SHOW command) require the "V2" keyword.
- SNMP v1/v2 CLI commands are documented immediately below in this section showing the required "V2" keyword. All CLI commands that follow the SNMP v1/v2 section in this manual assume SNMP v3.

SNMP v1/v2 Command Summary

Command	Description
Set SNMP IPRestrict	Allows SNMP Get and Set requests only from defined trap destinations
Set SNMP Trap Format	Configures the SNMP trap format version
Set SNMP V2	Enables or disables SNMP v1/v2 support
Set SNMP V2 Getcomm	Sets the 'get' community string
Set SNMP V2 Setcomm	Sets the 'set' community string
Show SNMP	Displays all SNMP configuration information

Enabling and Setting Up SNMP v1/v2 Support

SNMP v1/v2 support must be enabled and configured for access to Sentry3 MIB objects and generation of all Sentry3 traps.

Enabling/disabling SNMP support:

The SNMP Set command enables or disables SNMP v1/v2 support.

To enable SNMP v1/v2 support:

At the Switched -48 VDC: prompt, type **set snmp v2**, followed by **enabled** or **disabled** and press **Enter**.

NOTE: A restart of the PDU is required after enabling or disabling SNMP support.

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Setting the Get/Set community strings:

The PDU supports two SNMP community strings (Set and Get) that provide varying levels of access to objects defined in the Sentry3 MIB. Valid community strings are 1 to 24 characters.

Set Community String:

The Setcomm string provides read-write access to sentry3 MIB objects. The default Setcomm string is blank.

To set the Setcomm community string:

At the Switched -48 VDC: prompt, type **set snmp v2 setcomm**, followed by the string, and press **Enter**.

Get Community String:

The Getcomm string provides read-only access to sentry3 MIB objects. The default Getcomm string is "public".

To set the Getcomm community string:

At the Switched -48 VDC: prompt, type **set snmp v2 getcomm**, followed by the string, and press **Enter**.

Displaying SNMP v1/v2 configuration information:

The Show SNMP V2 command displays all SNMP v1/v2configuration information, including:

- SNMP support status
- SNMP community strings
- Trap timer value
- Trap destinations (both IPv4 and IPv6 formats can be displayed.)

To display SNMP v1/v2 configuration information:

At the Switched -48 VDC: prompt, type **show snmp v2** and press **Enter**.

Example

The following command displays the SNMP configuration information:

```
Switched -48 VDC: show snmp v2<Enter>
   SNMP Configuration

      SNMPv2 Agent                    Enabled

          GET Community <RO>:         public
          SET Community <RW>:         <undefined>
          TRAP Community:               trap


      SNMPv3 Agent:                   Disabled

          Engine ID:                 800006B602000000000000000000000000FFFF42D6D0B4

          V3 RW Username:            (undefined)
          V3 RW Auth Type:           None <password not set>
          V3 RW Privacy Type:        None <password not set>

          V3 RO Username:            (undefined)
          V3 RO Auth Type:           None <password not set>

          V3 Trap Username           djones

      Trap Destination 1 :           (undefined)
      Trap Destination 2 :           (undefined)
      Trap format                    v1


      IP Restrictions:               No Restrictions
      Error Trap Repeat Time :       60 seconds

      SysName:                       Sentry3_524640
      SysLocation:                   No Location
      SysContact:                    No Contact

   Command successful
```

SNMP v3 Command Summary

Command	Description
Set SNMP IPRestrict	Allows SNMP Get and Set requests from defined trap destinations only
Set SNMP Trap Format	Configures the SNMP trap format version
Set SNMP V3	Enables or disables SNMP v3 support
Set SNMP V3 RO Username	Sets the SNMP V3 read-only username.
Set SNMP V3 RO Auth Type	Sets the SNMP V3 read-only authentication type
Set SNMP V3 RO Auth Password	Sets the SNMP V3 read-only authentication password
Set SNMP V3 RO Priv Type	Sets the SNMP V3 read-only privacy type
Set SNMP V3 RO Priv Password	Sets the SNMP V3 ready-only privacy password
Set SNMP V3 RW Username	Sets the SNMP V3 read-write username
Set SNMP V3 RW Auth Type	Sets the SNMP V3 read-write authentication type
Set SNMP V3 RW Auth Password	Sets the SNMP V3 read-write authentication password
Set SNMP V3 Trap Username	Sets the SNMP V3 trap username for display on SNMP activity logs
Set SNMP V3 RW Priv Type	Sets the SNMP V3 read-write privacy type
Set SNMP V3 RW Priv Password	Sets the SNMP V3 ready-write privacy password
Show SNMP	Displays all SNMP configuration information

MIB, OID, and Support

The SNMP MIB and OID are available on the Server Technology website:

ftp://ftp.servertech.com/pub/SNMP/sentry3

Technical support is available 8:00AM to 5:00 PM Pacific Time, Monday-Friday.

For SNMP Support, email: mibmaster@servertech.com

Enabling and Setting up SNMP Support

SNMP support must be enabled and configured for access to Sentry3 MIB objects and generation of all Sentry3 traps.

Enabling/disabling SNMP support:

The SNMP command enables or disables SNMP support.

To enable SNMP support:

At the Switched -48 VDC: prompt, type **set snmp v3**, followed by **enabled** or **disabled** and press **Enter**.

NOTE: A restart of the PDU is required after enabling or disabling SNMP support.

SNMPv3 Engine ID:

The local engine ID is the unique identifier for the SNMPv3 engine and is displayed for viewing.

Setting the SNMP v3 read-only (RO) username:

The Set SNMP RO Username command sets the read-only username for SNMP v3. A valid username can be set to any value between 1-31 characters.

To set the RO username:

At the Switched -48 VDC: prompt, type **set snmp v3 rousername**, and press **Enter**.

NOTE: You can set a blank username but doing so will clear the string and disallow any read-only user access.

Setting the SNMP v3 read-only (RO) authentication type:

The Set SNMP RO Auth Type command sets the SNMP v3 RO authentication type.

To set the RO authentication type:

At the Switched -48 VDC: prompt, type **set snmp v3 roauthtype**, followed by **none** or **md5**, and press **Enter**.

Setting the SNMP v3 read-only (RO) authentication password:

The Set SNMP RO Auth Password command sets the SNMP v3 RO authentication password. A valid authentication password can be set to any value between 1-39 characters. A blank password will clear the string.

To set the RO authentication password:

At the Switched -48 VDC: prompt, type **set snmp v3 roauthpass**, and press **Enter**.

Setting the SNMP v3 read-only (RO) privacy type:

The Set SNMP RO Priv Type command sets the SNMP v3 RO privacy type.

To set the RO privacy type:

At the Switched -48 VDC: prompt, type **set snmp v3 roprivtype**, followed by **none** or **des**, and press **Enter**.

Setting the SNMP v3 read-only (RO) privacy password:

The Set SNMP RO Priv Password command sets the SNMP v3 RO privacy password. A valid privacy password can be set to any value between 1-31 characters. A blank password will clear the string

To set the RO privacy password:

At the Switched -48 VDC: prompt, type **set snmp v3 roprivpass**, and press **Enter**

Setting the SNMP v3 read-write (RW) username:

The Set SNMP RW Username command sets the read-write username for SNMP v3. A valid username can be set to any value between 1-31 characters.

To set the RW username:

At the Switched -48 VDC: prompt, type **set snmp v3 rwusername**, and press **Enter**.

NOTE: You can set a blank username but doing so will clear the string and disallow any read-write user access.

Setting the SNMP v3 read-write (RW) authentication type:

The Set SNMP RW Auth Type command sets the SNMP v3 RW authentication type.

To set the RW authentication type:

At the Switched -48 VDC: prompt, type **set snmp v3 rwauthtype**, followed by **none** or **md5**, and press **Enter**.

Setting the SNMP v3 read-write (RW) authentication password:

The Set SNMP RW Auth Password command sets the SNMP v3 RW authentication password. A valid authentication password can be set to any value between 1-39 characters. A blank password will clear the string

To set the RW authentication password:

At the Switched -48 VDC: prompt, type **set snmp v3 rwauthpass**, and press **Enter**.

Setting the SNMP v3 read-write (RW) privacy type:

The Set SNMP RW Priv Type command sets the SNMP v3 RW privacy type.

To set the RW privacy type:

At the Switched -48 VDC: prompt, type **set snmp v3 rwprivtype**, followed by **none** or **des**, and press **Enter**.

Setting the SNMP v3 read-write (RW) privacy password:

The Set SNMP RW Priv Password command sets the SNMP v3 RW privacy password. A valid privacy password can be set to any value between 1-32 characters. A blank password will clear the string

To set the RW privacy password:

At the Switched -48 VDC: prompt, type **set snmp v3 rwprivpass**, and press **Enter**.

Setting the SNMP v3 trap username:

The Set SNMP Trap Username command sets an optional username for display on SNMP activity logs to identify user actions.

At the Switched -48 VDC: prompt, type **set snmp v3 trapusername**, and press **Enter**. The trap username can be 1-31 alphanumeric characters; spaces are allowed; and the name is case sensitive.

Setting the error trap repeat timer:

The Set SNMP Traptime command sets the timer period between repeated error condition traps.
The valid range is 1 to 65535 (in seconds). The default is 60 seconds.

To set the error trap repeat timer:

At the Switched -48 VDC: prompt, type **set snmp traptime**, followed by the timer period, and press **Enter**.

Example

The following sets the timer period to 180 seconds:

```
Switched -48 VDC: set snmp traptime 180<Enter>
```

Setting the SNMP trap format version:

The SNMP Trap Format configures the SNMP trap format version. The trap format can be SNMP v1, v2, or v3.

To set the trap format version:

At the Switched -48 VDC: prompt, type **set snmp trapformat**, followed by **1**, **2**, or **3**, and press **Enter**. The default is v1, regardless of the versions that are enabled for the agent.

Example

The following sets the trap format version to SNMP v3:

```
Switched -48 VDC: set snmp trapformat 3<Enter>
```

Setting IP restrictions:

The Set SNMP IP Restrictions command supports SNMP Manager Get and Set requests to only be allowed from the IP address of the defined trap destinations.

To set SNMP IP restrictions:

At the Switched -48 VDC: prompt, type **set snmp iprestrict trapdests** and press **Enter**.

To remove SNMP IP restrictions:

At the Switched -48 VDC: prompt, type **set snmp iprestrict none** and press **Enter.**

Setting trap destinations:

The Set SNMP Trapdest1 and Trapdest2 commands are used to set the IP addresses or hostname of SNMP management stations receiving all traps. The PDU supports a maximum of two trap destinations; one must be defined to enable trap generation.

To set the trap destination:

At the Switched -48 VDC: prompt, type **set snmp, trapdest1** or **trapdest2**, the Ipaddress or hostname and press **Enter**.

Examples

The following sets the trap destination 1 to 64.42.31.208:

```
Switched -48 VDC: set snmp trapdest1 64.42.31.208<Enter>
```

The following sets the trap destination 2 to snmp.servertech.com:

```
Switched -48 VDC: set snmp trapdest2 snmp.servertech.com<Enter>
```

To reset the trap destination:

At the Switched -48 VDC: prompt, type **set snmp, trapdest1** or **trapdest2, 0.0.0.0** and press **Enter**.

Setting the Get/Set community strings:

The PDU supports two SNMP community strings that provide varying levels of access to objects defined in the Sentry3 MIB. Community strings can be 1 to 24 characters.

Setcomm:

The Setcomm string provides read-write access to sentry3 MIB objects.
The default Setcomm string is "private"

To set the Setcomm community string:

At the Switched -48 VDC: prompt, type **set snmp setcomm**, followed by the string and press **Enter**.

Getcomm:

The Getcomm string provides read-only access to sentry3 MIB objects.
The default Getcomm string is "public".

To set the Getcomm community string:

At the Switched -48 VDC: prompt, type **set snmp getcomm**, followed by the string and press **Enter**.

Setting the SNMP SysName:

The Set SNMP SysName command sets the SNMP MIB-II SysName object.

To set the SysName object:

At the Switched -48 VDC: prompt, type **set snmp sysname**, followed by the object name and press **Enter**.

Setting the SNMP SysLocation:

The Set SNMP SysLocation command sets the SNMP MIB-II SysLocation object.

To set the SysLocation object:

At the Switched -48 VDC: prompt, type **set snmp syslocation**, followed by the object location and press **Enter**.

Setting the SNMP SysContact:

The Set SNMP SysContact command sets the SNMP MIB-II SysContact object.

To set the SysContact object:

At the Switched -48 VDC: prompt, type **set snmp syscontact**, followed by the object contact and press **Enter**.

Displaying SNMP configuration information:

The Show SNMP command displays all SNMP configuration information.

- SNMP version (v2/v3) support status (enabled/disabled); SNMP community strings
- Read-Only (RO) or Read-Write (RW) username, authentication type, privacy type (if SNMPv3)
- Trap username and trap destination(s)
- IP restrictions setting
- Error trap repeat time (in seconds)
- Sysname, syslocation, and syscontact

To display SNMP configuration information:

At the Switched -48 VDC: prompt, type **show snmp** and press **Enter**.

Example

The following command displays the SNMP configuration information:

```
Switched -48 VDC: show snmp<Enter>
   SNMP Configuration

     SNMPv2 Agent                Enabled

         GET Community <RO>:        public
         SET Community <RW>:        <undefined>
         TRAP Community:              trap

     SNMPv3 Agent:               Disabled

         Engine ID:                800006B602000000000000000000000000FFFF42D6D0B4

         V3 RW Username:           <undefined>
         V3 RW Auth Type:          None <password not set>
         V3 RW Privacy Type:       None <password not set>

         V3 RO Username:           (undefined)
         V3 RO Auth Type:          None <password not set>
         V3 RO Privacy Type:       None <password not set>

         V3 Trap Username          <undefined>

     Trap Destination 1:           <undefined>
     Trap Destination 2:           <undefined>
     Trap format:                  v3

     IP Restrictions:              No Restrictions
     Error Trap Repeat Time:       60 seconds

     SysName:                      Sentry3_524640
     SysLocation:                  No Location
     SysContact:                   No Contact
```

Status Trap

A Status trap is generated when an error condition occurs on a tower, infeed, Environmental Monitor or individual sensor. Status traps include the reported status; location of the unit; identifier and name of the affected tower, infeed, outlet, environmental monitor, and sensor.

Any error state generates a status trap and triggers the trap timer. A new trap is generated at the end of every timer period until the status returns to a non-error status. All status traps are enabled by default.

Tower Status Traps

Status	Error	Description
Normal		Tower is working correctly
NoComm	x	Communication to the tower has been lost

Infeed Status Traps

Status	Error	Description
On		Infeed is on
OffError	x	Infeed should be on but no current is sensed at the infeed
NoComm	x	Communication to the infeed has been lost

Outlet Status Traps

Status	Error	Description
On		Outlet is on
Off		Outlet is off
OnWait		Outlet Status in transition
OffWait		Outlet Status in transition
OnError	x	Outlet should be off but current is sensed at the outlet
OffError	x	Outlet should be on but no current is sensed at the outlet
OffFuse	x	Outlet should be on but a blown fuse has been detected
OnFuse	x	Outlet should be on but a blown fuse has been detected downstream
NoComm	x	Communication to the outlet has been lost

Environmental Monitor Status Traps

Status	Error	Description
Normal		The Environmental Monitor is working correctly
NoComm	x	Communication to the Environmental Monitor has been lost

Temperature/Humidity Sensor Status Traps

Status	Error	Description
Found		The PDU found the sensor and connection is established.
NotFound		On a fresh reboot, the PDU does not find a sensor.
Lost	x	The connection to a previously found sensor is now lost.
NoComm	x	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-1-1 (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 probes themselves.

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

Change Trap

The Change trap is generated for all outlet status changes between any on/off conditions. Change traps include the outlet status, location of the unit, and identifier/name of the affected outlet. For descriptions of the outlet status types, refer to the previous table.

Load Trap

The Load trap is generated whenever the total load on an outlet exceeds a preset threshold. Load traps include the reported load, load status, location of the unit, and identifier/name of the affected outlet.

Any error state generates a load trap and triggers the trap timer. A new trap is generated at the end of every timer period until the load returns to a non-error status.

Load Traps

Status	Error	Description
Normal		Outlet is on and within preset thresholds
NotOn		Outlet is off
Reading		Non-error state – Load status currently being read
LoadHigh	x	Outlet current load exceeds preset threshold
OverLoad	x	Outlet current load exceeds the measurable range for the infeed
ReadError	x	Unable to read Load status
NoComm	x	Communication to the infeed has been lost

Temp Trap

The Temp trap is generated whenever the temperature on a temperature/humidity sensor is beyond preset thresholds. Temp traps include the reported temperature, temp status, location of the unit, and identifier/name of the affected sensor.

Any error state generates a temp trap and triggers the trap timer. A new trap is generated at the end of every timer period until the temp returns to a non-error status.

Temp Traps

Status	Error	Description
Normal		The sensor is working correctly and the temperature is within preset thresholds
NotFound		No sensor has been detected
Reading		Temp status currently being read
TempLow	x	Temperature at the sensor below preset low threshold
TempHigh	x	Temperature at the sensor exceeds preset high threshold
ReadError	x	Unable to read Temp status
Lost	x	Sensor initially detected but communication to the sensor has been lost
NoComm	x	Communication to the sensor has been lost

Humidity Trap

The Humidity trap is generated whenever the humidity on a temperature/humidity sensor is beyond preset thresholds. Humidity traps include the reported relative humidity, humidity status, location of the unit, and identifier/name of the sensor.

Any error state generates a humidity trap and triggers the trap timer. A new trap is generated at the end of every timer period until the humidity returns to a non-error status.

Humidity Traps

Status	Error	Description
Normal		The sensor is working correctly and the relative humidity is within preset thresholds
NotFound		No sensor has been detected
Reading		Humidity status currently being read
HumidLow	x	Relative humidity at the sensor below preset low threshold
HumidHigh	x	Relative humidity at the sensor exceeds preset high threshold
ReadError	x	Unable to read Humidity status
Lost	x	Sensor initially detected but communication to the sensor has been lost
NoComm	x	Communication to the sensor has been lost

Configuring Traps

SNMP Trap Command Summary

Command	Description
Set Trap EM Status	Enables or disables the Environmental Monitor Status trap
Set Trap Infeed Status	Enables or disables the Infeed Status trap off
Set Trap THS Status	Enables or disables a temperature/humidity sensor Status trap
Set Trap THS Temp	Enables or disables a temperature/humidity sensor Temp trap
Set Trap THS Tempdelta	Sets temperature recovery delta
Set Trap THS Temphigh	Sets a temperature/humidity sensor Temp trap high limit
Set Trap THS Templow	Sets a temperature/humidity sensor Temp trap low limit
Set Trap THS Humid	Enables or disables a temperature/humidity sensor Humid trap
Set Trap THS Humiddelta	Sets humidity recovery delta
Set Trap THS Humidhigh	Sets a temperature/humidity sensor Humid trap high limit
Set Trap THS Humidlow	Sets a temperature/humidity sensor Humid trap low limit
Set Trap Tower Status	Enables or disables the Tower Status trap
Set Trap Outlet Change	Enables or disables the Outlet Change trap
Set Trap Outlet Status	Enables or disables the Outlet Status trap
Set Trap Outlet Load	Enables or disables the Outlet Load trap
Set Trap Outlet LoadHigh	Sets the Outlet Load trap high limit
Set Trap Outlet LoadLow	Sets the Outlet Load trap low limit
Show Traps	Displays trap configurations

Enabling or Disabling a Status trap

The Set Trap … Status command enables or disables Status traps for a tower, infeed, or outlet.

To Enable or Disable a Status trap:

At the Switched -48 VDC: prompt, type **set trap** (**tower**, **infeed**, **outlet, em, ths**) **status**, followed by the tower, infeed or outlet name, and **on** or **off**. Press **Enter**, or

Type **set trap** (**tower**, **infeed**, **outlet, em, and ths**) **status all**, followed by **on** or **off** and press **Enter**.

Examples

The following command enables the Status trap for the first tower, using the tower's absolute name:

```
Switched -48 VDC: set trap tower status .a on<Enter>
```

The following command enables the Status trap for the tower named Florida_HQ_1:

```
Switched -48 VDC: set trap tower status Florida_HQ_1 on<Enter>
```

NOTE: Enabling lower hierarchical traps automatically enables traps of higher hierarchical value: i.e. enabling an Outlet Status trap automatically enables the Infeed and Tower Status traps for that outlet. Conversely, if a Tower Status trap is disabled, all associated Infeed Status, Load, and Outlet Status traps will be disabled.

Enabling or Disabling an Outlet Load trap

The Set Trap Outlet Load command enables or disables an Outlet Load trap.

To Enable or Disable a Load trap:

At the Switched -48 VDC: prompt, type **set trap outlet load**, followed by the Outlet name, and **on** or **off**. Press **Enter**, or

Type **set trap outlet load all**, followed by **on** or **off** and press **Enter**.

Examples

The following command enables the Load trap for second Outlet on infeed A, using the Outlet's absolute name:

```
Switched -48 VDC: set trap outlet load .aa2 on<Enter>
```

The following command disables the Load trap for all Outlets:

```
Switched -48 VDC: set trap outlet load all off<Enter>
```

NOTE: Enabling lower hierarchical traps automatically enables traps of higher hierarchical value: i.e. enabling an Infeed Load trap automatically enables the Infeed and Tower Status traps for that infeed.

Setting the Outlet Load High limit

The Set Trap Outlet LoadHigh command sets the upper load limits for an outlet.

To set the Outlet load high limit:

At the Switched -48 VDC: prompt, type **set trap outlet loadhigh**, followed by the Outlet name, and a value from 0 to 1 in amperes. Press **Enter**.

Example

The following command sets the Outlet load high limit for the second Outlet on infeed A to 25 amperes, using the Outlet's absolute name:

```
Switched -48 VDC: set trap outlet loadhigh .aa2 25<Enter>
```

Setting the Outlet Load Low limit

The Set Trap Outlet LoadLow command sets the lower load limits for an outlet.

To set the Outlet load low limit:

At the Switched -48 VDC: prompt, type **set trap outlet loadlow**, followed by the Outlet name, and a value from 0 to 254 in amperes. Press **Enter**.

Example

The following command sets the Outlet load low limit for the second Outlet on infeed A to 5 amperes, using the Outlet's absolute name:

```
Switched -48 VDC: set trap outlet loadlow .aa2 5<Enter>
```

Enabling or Disabling a Change trap

The Set Trap Outlet Change command enables or disables an Outlet Change trap.

To Enable or Disable a Change trap:

At the Switched -48 VDC: prompt, type **set trap outlet change**, followed by the outlet name and **on** or **off**. Press **Enter**, or

Type **set trap outlet change all**, followed by **on** or **off** and press **Enter**.

Example

The following command enables the Change trap for the third outlet on the first infeed of the second tower, using the outlet's absolute name:

```
Switched -48 VDC: set trap outlet change .ba3 on<Enter>
```

Enabling or Disabling the Temperature trap

The Set Trap THS Temp command enables or disables the Temperature trap.

To Enable or Disable the Temperature trap:

At the Switched -48 VDC: prompt, type **set trap ths temp**, followed by the sensor name and **on** or **off**. Press **Enter**.

Example

The following command enables the Temp trap for the first temperature-humidity sensor:

```
Switched -48 VDC: set trap ths temp .a1 on<Enter>
```

Setting the Temperature sensor threshold limits

The Set Trap THS Templow and Set Trap THS Temphigh commands are used to set the lower and upper threshold limits for the Temperature sensor.

To set the Temperature threshold limits:

At the Switched -48 VDC: prompt, type **set trap ths**, **templow** or **temphigh**, followed by the sensor name and a value, and press **Enter**.

Example

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

```
Switched -48 VDC: set trap ths temphigh .a2 95<Enter>
```

The low and high ranges for the **templow** and **temphigh** fields are different, depending on the whether the tempscale is set to Celsius or Fahrenheit. The following table defines the acceptable low and high ranges for each field.

	Celsius		Fahrenheit	
Field	**Low**	**High**	**Low**	**High**
TempLow	0	122	32	253
TempHigh	1	123	33	254

Enabling or Disabling the Humid trap

The Set Trap THS Humid command enables or disables the Humid trap.

To Enable or Disable the Humid trap:

At the Switched -48 VDC: prompt, type **set trap ths humid**, followed by the sensor name and **on** or **off**. Press **Enter**.

Example

The following command enables the Humid trap for the first temperature-humidity sensor:

```
Switched -48 VDC: set traps ths humid .a1 on<Enter>
```

Setting the Humidity sensor threshold limits

The Set Trap THS Humidlow and Set Trap THS Humidhigh commands are used to set the lower and upper threshold limits for the Humidity sensor.

To set the Humidity threshold limits:

At the Switched -48 VDC: prompt, type **set trap ths**, **humidlow** or **humidhigh**, followed by the sensor name and a value from 0 to 100 in percent relative humidity. Press **Enter**.

Example

The following command sets the first humidity sensor low threshold limit to 5:

```
Switched -48 VDC: set trap ths humidlow .a1 5<Enter>
```

The acceptable low and high ranges for the **humidlow** and **humidhigh** fields are defined in following table:

Field	Humidity	
	Low	**High**
HumidLow	0	99
HumidHigh	1	100

Configuring Temperature Recovery Delta (Hysteresis):

The Temperature Recovery Delta command allows configuration of the number of degrees of change needed to recover from a temperature alarm.

To configure the temperature recovery delta:

At the Switched -48 VDC: prompt, type **set trap ths tempdelta**, followed by the sensor name, the number of degrees for the recovery delta, and press **Enter**. Valid range is 0-30 C or 0-54 F.

Example

The following command configures the recovery delta at 2 degrees Fahrenheit for temperature/humidity sensor .A1:

```
Switched -48 VDC: set trap ths tempdelta temp_humid_sensor_A1 2<Enter>
```

Configuring Humidity Recovery Delta (Hysteresis):

The Humidity Recovery Delta command allows configuration of the percentage of change needed to recover from a humidity alarm.

NOTE: After exceeding a low or high humidity threshold (thus entering an error condition), the humidity value must return past the threshold by the configured recovery delta amount to clear the error condition. Default of humidity recovery delta is 2% relative humidity.

To configure the humidity recovery delta:

At the Switched -48 VDC: prompt, type **set trap ths humiddelta**, followed by the sensor name, the percentage for the recovery delta, and press **Enter**. Valid range is 0-20%.

Example

The following command configures the recovery delta at 2 relative humidity for temperature/humidity sensor .A1:

```
Switched -48 VDC: set trap ths humiddelta temp_humid_sensor_A1 2<Enter>
```

Displaying trap configuration information

The Show Traps command displays information about all traps.

To display trap information:

At the Switched -48 VDC: prompt, type **show traps** and press **Enter**.

Example

The following command requests trap configuration information:

```
Switched -48 VDC: show traps <Enter>
Tower trap configuration:
  Tower    Tower                Status
  ID       Name                 Trap
  .A       Florida_HQ_1         ON
  More (Y/es N/o): y
Input feed trap configuration:
  Input    Input                Status
  Feed ID  Feed Name            Trap
  .AA      HQ_1_Infeed_A        ON
  .AB      HQ_2_Infeed_A        ON
  More (Y/es N/o): y
Outlet trap configuration:
  Outlet   Outlet          Status  Change  Load     Low      High
  ID       Name            Trap    Trap    Trap   Thresh    Thresh
  .AA1     DataServer_1    ON      OFF     ON       0 A     255 A
  .AA2     WebServer_1     ON      OFF     ON       5 A      25 A
  .AB1     FileServer_1    ON      OFF     ON       0 A     255 A
  .AB2                     ON      OFF     ON       0 A     255 A
  More (Y/es N/o): y
Environmental Monitor .A trap configuration:
  Name: Florida_HQ_1
  Status Trap: ON
  Temperature/Humidity Sensor .A1    Temperature/Humidity Sensor .A2
    Name: Temp_Humid_Sensor_A1        Name: T/H2_Florida_HQ_1
    Status Trap: ON                   Status Trap: ON
     Temp Trap: ON                     Temp Trap: ON
          Low: 0   Deg.C                    Low: 0   Deg.C
          High: 127 Deg.C                   High: 95  Deg.C
    Humid Trap: ON                    Humid Trap: ON
          Low: 5   % RH                     Low: 0   % RH
          High: 100 % RH                    High: 100 % RH
          Delta: 2   % RH                   Delta: 2   % RH
```

LDAP

The -48 VDC products support Lightweight Directory Access Protocol (LDAP) Version 3. This support enables authentication with LDAP servers; user accounts do not need to be individually created locally on each unit.

This allows administrators to pre-define and configure (in each product and in the LDAP server) a set of necessary LDAP Groups, and access rights for each. A user's access rights can then be assigned or revoked simply by making the user a member of one-or-more pre-defined LDAP groups. User accounts can be added, deleted, or changed in the LDAP server without any changes needed on individual products.

LDAP support has been tested in the following environments:

- Microsoft Active Directory (MSAD)
- Novell eDirectory (eDir)
- OpenLDAP

LDAP Command Summary

Command	Description
Add GrouptoLDAP	Grants an LDAP group access to one or more groups
Add OutlettoLDAP	Grants an LDAP group access to one or more outlets
Add PorttoLDAP	Grants an LDAP group access to one or more serial ports
Create LDAPGroup	Adds an LDAP group name
Delete GroupfromLDAP	Removes access to one or more groups for an LDAP group
Delete OutlettoLDAP	Removes access to one or more outlets for an LDAP group
Delete PortfromLDAP	Removes access to one or more serial ports for an LDAP group
List LDAPGroup	Displays all accessible outlet/groups/ports for an LDAP group
List LDAPGroups	Displays privilege levels for all LDAP groups
Ping	Verifies proper DNS configuration by name resolution
Remove LDAPGroup	Deletes an LDAP group name
Set Authorder	Specifies the authentication order for each new session attempt
Set DNS	Sets the IP address of the Domain Name server
Set LDAP Bind	Specifies the LDAP bind request
Set LDAP BindDN	Specifies the user account Fully-Qualified Domain Name (FQDN) for binds
Set LDAP BindPW	Specifies the user account password for binds
Set LDAP GroupAttr	Specifies the user class distinguished name (DN) or names of groups a user is a member of
Set LDAP GroupType	Specifies the data type for the Set LDAP GroupAttr command
Set LDAP Host	Sets the IP address or hostname of the Directory Services server
Set LDAP Port	Sets the LDAP server port number
Set LDAP UserBaseDN	Sets the base distinguished name (DN) for the username search at login
Set LDAP UserFilter	Sets the filter used for the username search at login
Set LDAP UseTLS	Enables/disables LDAP over TLS/SSL support
Set LDAP	Enables/disables LDAP support
Set LDAPGroup Access	Sets the access level for an LDAP group
Set LDAPGroup Envmon	Grants or removes access to environmental monitoring
Show LDAP	Displays LDAP configurations
Show Network	Displays network configuration information for all IPv4 and IPv6 settings

Enabling and Setting up LDAP Support

There are a few configuration requirements for properly enabling and setting up LDAP support. Below is an overview of the minimum requirements.

Directory Services server configuration requirements:

- Define at least one LDAP group.
- Assign users to that LDAP group.

Configuration requirements:

- Enable LDAP support.
- Define the IP address and domain component of at least one Directory Services server.
- Set the LDAP bind request method being utilized by the Directory Services server.
- Define the IP address of at least one DNS server.
- Test DNS server configuration using Ping support.
- Define at least one LDAP group and assign access rights for that group.

NOTE: LDAP group names on the Directory Service server and the unit must match.

Enabling and disabling LDAP support:

The Set LDAP command enables or disables LDAP support.

To enable or disable LDAP support:

At the Switched -48 VDC: prompt, type **set ldap**, followed by **enabled** or **disabled** and press **Enter**.

Setting the LDAP host address:

The Set LDAP Host command sets the TCP/IP address of the Directory Services server.

To set the LDAP host address:

At the Switched -48 VDC: prompt, type **set ldap**, followed by **host1** or **host2** and the Directory Services server's IP address or hostname. Press **Enter**.

Examples

The following command sets the primary Directory Services server IP address to 98.76.54.32:

```
Switched -48 VDC: set ldap host1 98.76.54.32<Enter>
```

The following command sets the secondary Directory Services server hostname to ldap.servertech.com:

```
Switched -48 VDC: set ldap host2 ldap.servertech.com<Enter>
```

Changing the LDAP server port:

The Set LDAP port command sets the port where the unit sends LDAP requests for the previously defined LDAP server. The default port is 389.

To change the LDAP server port:

At the Switched -48 VDC: prompt, type **set ldap port**, followed by the port number and press **Enter**.

Example

The following command sets the LDAP server port number to 8888:

```
Switched -48 VDC: set ldap port 8888<Enter>
```

Setting the LDAP bind type:

The Set LDAP Bind command specifies the LDAP bind request that authenticates a client with the LDAP server.

The PDU supports three standard LDAP bind methods:

Simple: Uses unencrypted delivery of username-password over the network to the LDAP server for authentication, showing user credentials in plain text.

LDAP over **TLS/SSL:** Uses a trusted authority certificate to provide encryption of LDAP authentication.

MD5: Provides strong protection using 1-way hash encoding that does not transmit the username-password over the network.

To set the bind type:

At the Switched -48 VDC prompt: type **set ldap bind**, followed by **simple**, **TLS**, or **md5**, and press **Enter**.

NOTE: If MD5 binding is enabled, LDAP over TLS/SSL is disabled.

Setting the search bind Distinguished Name (DN):

The Set LDAP BindDN command sets distinguished name (DN) for user accounts to bind with. This is required for directory services that do not support anonymous binds. This field is used only with Simple binds. Maximum string length is 124 characters.

NOTE: If left blank, then an anonymous bind will be attempted. This field is used **only** with Simple binds.

To set the search bind DN:

At the Switched -48 VDC: prompt, type **set ldap binddn**, and press **Enter**. At the following prompt, type the DN and press **Enter**.

Example

The following sets the DN for MSAD to 'cn=guest,cn=Users,dc=servertech,dc=com':

```
Switched -48 VDC: set ldap binddn<Enter>
Enter Search Bind DN (Max characters 124):
cn=guest,cn=Users,dc=servertech,dc=com<Enter>
```

Setting the search bind Distinguished Name (DN) password:

The Set LDAP BindPW command sets the password for the user account specified in the Search Bind DN. Maximum password size is 20 characters.

To set the Bind Password DN:

At the Switched -48 VDC: prompt, type **set ldap bindpw** and press **Enter**. At the following prompt, type the bind password and press **Enter**.

Setting the group membership attribute:

The Set LDAP GroupAttr command specifies the name of user class attributes that lists distinguished names (DN), or names of groups that a user is a member of. Maximum string length is 30 characters.

To set Group Membership Attribute:

At the Switched -48 VDC: prompt, type **set ldap groupattr** and press **Enter**. At the following prompt, type the group membership attribute and press **Enter**.

Example

The following sets the group membership attribute for MSAD to 'memberof':

```
Switched -48 VDC:  set ldap groupattr<Enter>
Enter Group Member Attr (Max character 30):
memberof<Enter>
```

Setting the user membership attribute:

The User Membership Attribute is a comma-delimited string of up to two attribute names whose values in the search results are the users that are members of the LDAP group. Maximum number of characters is 61.

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

To set user membership attribute:

At the Switched -48 VDC: prompt, type **set ldap groupsearch userattr** and press **Enter**.

Then at the following prompt, type the group membership attribute and press **Enter**.

Example

The following sets the user membership attribute to Test

```
Switched -48 VDC:  set ldap groupsearch userattr<Enter>
Enter Group Member Attribute <61 character max>:
Test<Enter>
```

Setting the user search base Distinguished Name (DN):

The Set LDAP UserBaseDN command sets the base (DN) for the login username search. This is where the search will start, and will include all sub-trees. Maximum size is 100 characters.

To set the user search base DN:

At the Switched -48 VDC: prompt, type **set ldap userbasedn** and press **Enter**. At the following prompt, type the search base DN and press E**nter.**

Example

The following sets the DN user search base for MSAD to 'cn=Users,dc=servertech,dc=com':

```
Switched -48 VDC: set ldap userbasedn<Enter>
Enter User Search Base DN (Max characters 100):
cn=Users,dc=servertech,dc=com<Enter>
```

Enabling or disabling group search:

The Set LDAP Group Search command enables or disables LDAP group searching.

To enable or disable LDAP group search support:

At the Switched -48 VDC: prompt, type **set ldap groupsearch**, followed by **enabled** or **disabled** and press **Enter**.

Setting the group search base Distinguished Name (DN):

The Group Search Base DN indicates where the LDAP group search will start.

To set the DN:

At the Switched -48 VDC: prompt, type **set ldap groupsearch basedn**, and press **Enter**. At the following prompt, type the name string and press **Enter**.

Setting the user membership attribute:

The User Membership Attribute is a comma-delimited string of up to two attribute names whose values in the search results are the users that are members of the group. Maximum numbers of characters is 61.

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

To set User Membership Attribute:

At the Switched -48 VDC: prompt, type **set ldap groupsearch userattr** and press **Enter**. At the following prompt, type the group membership attribute and press **Enter**.

Example

The following sets the user membership attribute to Test:

```
Switched -48 VDC:  set ldap groupsearch userattr<Enter>
Enter Group Member Attribute <61 character max>:
Test<Enter>
```

Granting and removing access to environmental monitoring:

The Set LDAPGroup Envmon command grants or removes input status viewing to/from an LDAP group.

To grant or remove input status viewing for an LDAP group:

At the Switched -48 VDC: prompt, type **set ldapgroup envmon** followed by **on** or **off**, optionally followed by a group name and press **Enter**.

Example

The following command grants input status viewing to the LDAP group PowerUser:

```
Switched -48 VDC: set ldapgroup envmon on poweruser<Enter>
```

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

Setting the user search filter:

The Set LDAP UserFilter command sets the search filter for the username entered at the login prompt.

The search filter must be entered within parenthesis and adhere to the following format:

(searchfilter**=%s)**

where 'searchfilter' is the name of the attribute in the user class which has a value that represents the user's login name. In this string, the '%s' will be replaced by the entered username. Maximum string length is 100 characters.

To set the user search filter:

At the Switched -48 VDC: prompt, type **set ldap userfilter** and press **Enter**. At the following prompt, type the User Search Filter and press **Enter**.

Example

The following sets the user search filter for MSAD to 'samaccountname':

```
Switched -48 VDC:  set ldap userfilter<Enter>
Enter User Search Filter (Max characters 100):
(samaccountname=%s)<Enter>
```

Setting the authentication order:

The Set Authorder command sets the authentication order for remote authentication sessions. The unit supports two methods for authentication order - Remote > Local and Remote Only.

The Remote > Local method first attempts authentication with the Active Directory server and if unsuccessful with the local user database on the unit.

The Remote Only method attempts authentication only with the Active Directory server and if unsuccessful, access is denied.

NOTE: With the Remote Only method, if authentication fails due to a communication failure with the Active Directory server automatic authentication fallback will occur to authenticate with the local user data base on the unit.

To set the authentication order:

At the Switched -48 VDC: prompt, type **set authorder**, followed by **remotelocal** or **remoteonly** and press **Enter**.

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

Displaying LDAP configuration information:

The Show LDAP command displays LDAP configuration information, including:

- Enabled-disabled status of LDAP support
- Directory Services server IP address and port
- Bind request password type and remote authentication order
- Search bind distinguished name and password
- User search base distinguished name and filter
- Group membership attribute and type

To display the LDAP configuration information:

At the Switched -48 VDC: prompt, type **show ldap** and press **Enter**.

Example

The following command displays the LDAP configuration information:

```
Switched -48 VDC: show ldap
   LDAP Configuration

     LDAP:      Enabled

     Host 1:    98.76.54.32
     Host 2:    ldap.servertech.com
     Port:      8888
     TLS/SSL:   Yes
     Bind Type: MD5
     Auth Order: Remote->Local

     Search Bind
        DN: cd=guest,cn=Users,dc=servertech,dc=com
        Password: OpenSesame
     User Search
        Base DN: cn=Users,dc=servertech,dc=com
        Filter: (samaccountname=%s)
     Group Membership
        Attribute: memberof
        Value Type: DN
```

Setting the DNS IP address:

The Set DNS command sets the TCP/IP address of the Domain Name server (DNS).

NOTE: LDAP requires the definition of at least one Domain Name server.

To display the DNS configuration information, use the Show Network command as described on page 94.

To set the DNS IP address:

At the Switched -48 VDC: prompt, type **set**, followed by **dns1** or **dns2** and the Domain Name server's IP address. Press **Enter**.

Example

The following command sets the primary Domain Name server IP address to 98.76.54.254:

```
Switched -48 VDC: set dns1 98.76.54.254<Enter>
```

Verifying the DNS configuration:

The Ping command can be used to verify the configuration of the DNS IP address.

To verify the DNS configuration:

At the Switched -48 VDC: prompt, type **ping**, followed by the domain component of the Directory Services server previously configured and press **Enter**.

Example

The following command verifies the DNS configuration:

```
Switched -48 VDC:  ping servertech.com
   Pinging servertech.com [98.76.54.32] with 64 bytes of data:
   Reply from 98.76.54.32: bytes=64 pseq=0 triptime=0
   Reply from 98.76.54.32: bytes=64 pseq=1 triptime=0
   Reply from 98.76.54.32: bytes=64 pseq=2 triptime=0
   Reply from 98.76.54.32: bytes=64 pseq=3 triptime=0
   Reply from 98.76.54.32: bytes=64 pseq=4 triptime=0
```

Configuring LDAP Groups

Creating an LDAP group:

The Create LDAPGroup command creates an LDAP group.

To create an LDAP group:

At the Switched -48 VDC: prompt, type **create ldapgroup**, optionally followed by a 1-16 character group name (Spaces are not allowed, and LDAP group names are not case sensitive). Press **Enter**.

Example

The following command creates the LDAP group PowerUser:

```
Switched -48 VDC: create ldapgroup PowerUser<Enter>
```

Removing an LDAP group:

The Remove LDAPGroup command removes an LDAP group.

To remove an LDAP group:

At the Switched -48 VDC: prompt, type **remove ldapgroup**, optionally followed by a group name. Press **Enter**.

Setting LDAP group access level:

The Set LDAPGroup Access command sets the access level for an LDAP group. The unit has four defined access levels; Admin, User, On-Only and View-Only.

To set the access level for an LDAP group:

At the Switched -48 VDC: prompt, type **set ldapgroup access**, followed by **admin**, **user**, **ononly, viewonly, reboot-only,** or **power user,** optionally followed by a LDAP group name and press **Enter**.

Examples

The following command sets the LDAP group access level for LDAPAdmin to Admin:

```
Switched -48 VDC: set ldapgroup access admin ldapadmin<Enter>
```

The following command sets the LDAP group access level for PowerUser to User:

```
Switched -48 VDC: set ldapgroup access user poweruser<Enter>
```

Granting and removing input status viewing:

The Set LDAPGroup Envmon command grants or removes input status viewing to/from an LDAP group.

To grant or remove input status viewing for an LDAP group:

At the Switched -48 VDC: prompt, type **set ldapgroup envmon** followed by **on** or **off**, optionally followed by a group name and press **Enter**.

Example

The following command grants input status viewing to the LDAP group PowerUser:

```
Switched -48 VDC: set ldapgroup envmon on poweruser<Enter>
```

Displaying the LDAP access levels:

The List LDAPGroups command displays all defined LDAP group with their access level.

To display LDAP group access levels:

At the Switched -48 VDC: prompt, type **list ldapgroups** and press **Enter**.

Example

The following command displays all LDAP groups with their access level:

```
Switched -48 VDC: list ldapgroups<Enter>

    LDAP              Access        Environmental
    Group Name        Level         Monitoring

    LDAPAdmin         Admin         Allowed
    PowerUser         User          Allowed
    User              On-Only       Not Allowed
    Guest             View-Only     Not Allowed
```

Adding outlet access to an LDAP group:

The Add OutletToLDAP command grants an LDAP group access to one or all outlets. To grant access for more than one outlet, but not all outlets, you must use multiple Add OutletToLDAP commands.

To grant outlet access to an LDAP group:

At the Switched -48 VDC: prompt, type **add outlettoldap**, optionally followed by an outlet name and a group name. Press **Enter**, or

Type **add outlettoldap all**, followed by a group name and press **Enter**.

Examples

The following commands grant the LDAP group PowerUser access to outlets A1 and Webserver_1:

```
Switched -48 VDC:add outlettoldap .aa1 poweruser<Enter>
Switched -48 VDC:add outlettoldap WEBServer_1 poweruser<Enter>
```

Deleting outlet access for an LDAP group:

The Delete OutletFromLDAP command removes an LDAP group's access to one or all outlets. You cannot remove access to any outlet for an administrative level group.

To delete outlet access for an LDAP group:

At the Switched -48 VDC: prompt, type **delete outletfromldap**, optionally followed by an outlet name and a group name. Press **Enter**, or

Type **delete outletfromldap all**, followed by a group name and press **Enter**.

Adding outlet group access to an LDAP group:

The Add GroupToLDAP command grants an LDAP group access to an outlet group. To grant access for more than one outlet group, you must use multiple Add GroupToLDAP commands.

To grant outlet group access to an LDAP Group:

At the Switched -48 VDC: prompt, type **add grouptoldap**, optionally followed by an outlet group name and an LDAP group name. Press **Enter**.

Examples

The following commands grants to LDAP group PowerUser access to the outlet groups ServerGroup_1 and ServerGroup_2:

```
Switched -48 VDC:add grouptoldap servergroup_1 poweruser<Enter>
Switched -48 VDC:add grouptoldap servergroup_2 poweruser<Enter>
```

Deleting outlet group access for an LDAP group:

The Delete GroupFromLDAP command removes an LDAP group's access to an outlet group. You cannot remove access to any group for an administrative level group.

To delete outlet group access for an LDAP group:

At the Switched -48 VDC: prompt, type **delete groupfromldap**, optionally followed by an outlet group name and an LDAP group name. Press **Enter**.

Adding serial port access to an LDAP group:

The Add PortToLDAP command grants an LDAP group access to the serial port.

To grant serial port access to an LDAP group:

At the Switched -48 VDC: prompt, type **add porttoldap console** and a group name. Press **Enter**.

Deleting serial port access for an LDAP group:

The Delete PortFromLDAP command removes an LDAP group's access to the serial port. You cannot remove access to the serial port for an administrative level group.

To delete serial port access for a user:

At the Switched -48 VDC: prompt, type **delete portfromldap console** and a group name. Press **Enter**.

Displaying LDAP Group access:

The List LDAPGroup command displays all access rights for an LDAP group.

To display LDAP Group access:

At the Switched -48 VDC: prompt, type **list ldapgroup**, optionally followed by a group name. Press **Enter**.

Example

The following command displays information about the LDAP group PowerUser:

```
Switched -48 VDC: list ldapgroup poweruser<Enter>
   Username: PowerUser
     Outlet    Outlet
     ID        Name
     .AA1       DataServer_1
     .AA2       WebServer_1
     Groups:
        ServerGroup_1
        ServerGroup_2
   More (Y/es N/o): Y
     Ports:
        Port      Port
        ID        Name
        Console   Console
```

Members of the PowerUser LDAP group can access the following outlets, outlet groups and serial ports: outlet A1 which has a descriptive name of DataServer_1, outlet A2 which has a descriptive name of WebServer_1, group ServerGroup_1 group ServerGroup_2 and Console serial port.

LDAP Technical Specifications

Simple Bind Authentication Process

Client	LDAP Server	Sentry

- Initiate Sentry session
- Prompt for login credentials
- Authentication request with Usename/Password
- Simple bind using Search Bind DN & Password
- Successful Bind?
- Subtree search starting from User Search Base DN with User Search Filter
- Username found?
- Simple Bind using User FQDN and login password
- Successful Bind?
- Subtree search starting from User Search Base DN with User Search Filter
- Access Denied
- Username found?
- Attribute name compared to Group Membership Attribute
- Attribute match?
- Username groups access rights compared against Sentry LDAP groups
- Group match?
- Access Granted

MD5 Bind Authentication Process

Client	LDAP Server	Sentry

- Initiate Sentry session
- Prompt for login credentials
- Authentication request with Usename/Password
- SASL Digest-MD5 bind using uppercase username & entered password
- Successful Bind?
- Subtree search starting from User Search Base DN with User Search Filter
- Username found?
- Attribute name compared to Group Membership Attribute
- Access Denied
- Attribute match?
- Username groups access rights compared against Sentry LDAP groups
- Group match?
- Access Granted

LDAPS (LDAP-over-TLS/SSL) Client Specifications

Secure Sockets Layer (SSL)
Transport Layer Security (TLS) version 1 (RFC 2246)
x.509 version 3 Server Certificates (RFC 2459) with RSA key sizes up to 4096 bits
Symmetric Cryptography Ciphers:
    TLS_RSA_WITH_3DES_EDE_CBC_SHA (168-bit)
    TLS_RSA_WITH_DEX_CBC_SHA (56-bit)
    TLS_RSA_WITH_AES_128_CBC_SHA (128-bit)
    TLS_RSA_WITH_AES_256_CBC_SHA (256-bit)
Server certificates are accepted and used on –the-fly
A NULL client certificate is sent to the server if a client certificate is requested.

TACACS+

The -48 VDC products support the Terminal Access Controller Access Control System (TACACS+) protocol. This enables authentication and authorization with a central TACACS+ server; user accounts do not need to be individually created locally on each unit.

This allows administrators to pre-define and configure (in each product and in the TACACS+ server) a set of necessary TACACS+ levels, and user's access rights for each. User's access rights can then be assigned or revoked simply by making the user a member of one-or-more pre-defined TACACS+ access levels. User account rights can be added, deleted, or changed within TACACS+ without any changes needed on individual products.

The unit supports 16 different TACACS+ levels; 15 are entirely configurable by the system administrator (1 is reserved for default Admin level access to all resources on the unit).

TACAC+ Command Summary

Command	Description
Set Authorder	Specifies the authentication order for each new session attempt
Set TACACS	Enables/disables TACACS support
Set TACACS Host	Sets the IP address or hostname of the TACACS server
Set TACACS Key	Sets the TACACS encryption key
Set TACACS Port	Sets the TACACS server port number
Show TACACS	Displays TACACS configurations
Add GrouptoTACACS	Grants a TACACS account access to one or more groups
Add OutlettoTACACS	Grants a TACACS account access to one or more outlets
Add PorttoTACACS	Grants a TACACS account access to one or more serial ports
Delete GroupfromTACACS	Removes access to one or more groups for a TACACS account
Delete OutlettoTACACS	Removes access to one or more outlets for a TACACS account
Delete PortfromTACACS	Removes access to one or more serial ports for a TACACS account
Set TacPriv Access	Sets the access level for a TACACS account
Set TacPriv Envmon	Grants or removes user access to environmental monitoring
List TacPrivs	Displays access levels for all TACACS accounts
List TacPriv	Displays all accessible outlet/groups/ports for a TACACS account

Enabling and Setting up TACACS+ Support

There are a few configuration requirements for properly enabling and setting up TACACS+ support. The following list shows the minimum requirements:

- Enable TACACS+ support.
- Define the IP address and domain component of at least one TACACS+server.
- Set the TACACS+ key configured on the supporting TACACS+server.

Enabling and disabling TACACS+ support:

The Set TACACS command enables or disables TACACS+ support.

To enable or disable TACACS+ support:

At the Switched -48 VDC: prompt, type **set tacacs**, followed by **enabled** or **disabled** and press **Enter**.

Setting the TACACS+ server address:

The Set TACACS Host command sets the IP address or hostname of the TACACS+ server.

To set the TACACS+ server address:

At the Switched -48 VDC: prompt, type **set tacacs**, followed by **host1** or **host2** and the TACACS+ server's IP address or hostname. Press **Enter**.

Examples

The following command sets the primary TACACS+ server address to 98.76.54.32:

```
Switched -48 VDC: set tacacs host1 98.76.54.32<Enter>
```

The following command sets the secondary TACACS+ server address to tacacs.servertech.com:

```
Switched -48 VDC: set tacacs host2 tacacs.servertech.com<Enter>
```

Setting the TACACS+ encryption key:

The Set TACACS Key command sets the encryption key used to encrypt all data packets between the unit and the TACACS+ server. This key must match the key configured on the TACACS+ server.

To set the encryption key:

At the Switched -48 VDC: prompt, type **set tacacs key** and press **Enter**.

At the TACACS+ Key: prompt, type an encryption key. Up to 60 alphanumeric and other typed characters (ASCII 33 to 126 decimal) are allowed; encryption keys are case sensitive. Press **Enter**. To specify no password, press **Enter**.

At the Verify TACACS+ Key: prompt, retype the key. Press **Enter**. To verify no password, press **Enter** at the prompt.

Example

```
Switched -48 VDC: set tacacs key<Enter>
   TACACS+ Key: <Enter>
   Verify TACACS+ Key: <Enter>
```

For security, key characters are not displayed.

NOTE: A key size of zero results in no encryption being applied which cannot be supported by the TACACS+ server and is not recommended for a production environment.

Changing the TACACS port:

With TACACS support enabled, the unit sends TACACS requests to the default TACACS port number 49. This port number can be changed using the Set TACACS Port command.

To change the TACACS port:

At the Switched -48 VDC: prompt, type **set tacacs port**, followed by the port number and press **Enter**.

Example

The following changes the TACACS port number to 50:

```
Switched -48 VDC: set tacacs port 50<Enter>
```

Setting the authentication order:

The Set Authorder command sets the authentication order for remote authentication sessions. The unit supports two methods for authentication order: Remote > Local and Remote Only.

The Remote > Local method first attempts authentication with the TACACS+ server and if unsuccessful with the local user database on the unit device.

The Remote Only method attempts authentication only with the TACACS+ server and if unsuccessful, access is denied.

NOTE: With the Remote Only method, if authentication fails due to a communication failure with the TACACS+ server automatic authentication fallback will occur to authenticate with the local user data base on the unit.

To set the authentication order:

At the Switched -48 VDC: prompt, type **set authorder**, followed by **remotelocal** or **remoteonly** and press **Enter**.

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

Displaying TACACS+ configuration information:

The Show TACACS command displays TACACS+ configuration information.

To display the TACACS configuration information:

At the Switched -48 VDC: prompt, type **show tacacs** and press **Enter**.

Example

The following command displays the TACACS configuration information:

```
Switched -48 VDC: show tacacs<Enter>
   TACACS+ Configuration
      TACACS+:       Enabled
      Host 1:        98.76.54.32
      Host 2:        tacacs.servertech.com
      Port:          50
      TACACS+ Key:   (Set)
      Auth Order:    Remote->Local
```

Configuring TACACS+ Access Levels

Setting TACACS+ account access levels:

The Set TacPriv Access command sets the access level for a TACACS+ account. The unit has four defined access levels; Admin, User, On-Only and View-Only.

To set the access level for a TACACS+ account:

At the Switched -48 VDC: prompt, type **set tacpriv access**, followed by **admin**, **user**, **ononly, viewonly, reboot-only**, or **power user**, optionally followed by a TACACS+ account number and press **Enter**.

Examples

The following command sets the TACACS+ account access level for account 14 to Admin:

```
Switched -48 VDC: set tacpriv access admin 14<Enter>
```

The following command sets the TACACS+ account access level for account 5 to User:

```
Switched -48 VDC: set tacpriv access user 5<Enter>
```

Granting and removing input status viewing:

The Set TacPriv Envmon command grants or removes input status viewing to/from a TACACS+ account.

To grant or remove input status viewing for a TACACS+ account:

At the Switched -48 VDC: prompt, type **set tacpriv envmon**, followed by **on** or **off**, optionally followed by a TACACS+ account number and press **Enter**.

Example

The following command grants input status viewing to the TACACS+ account 5:

```
Switched -48 VDC: set tacpriv envmon on 5<Enter>
```

Displaying the TACACS+ access levels:

The List TacPrivs command displays all TACACS+ accounts with their access levels.

To display TACACS+ account access levels:

At the Switched -48 VDC: prompt, type **list tacprivs** and press **Enter**.

Example

The following command displays all TACACS+ account with their access level:

```
Switched -48 VDC: list tacprivs<Enter>
   TACACS            Access         Environmental
   Account Name      Level          Monitoring

   TACAdmin          Admin          Allowed
   PowerUser         User           Allowed
   User              On-Only        Not Allowed
   Guest             View-Only      Not Allowed
```

Granting and removing access to environmental monitoring:

The Set TacPriv Envmon command grants or removes input status viewing to/from a TACACS+ account.

To grant or remove input status viewing for a TACACS+ account:

At the Switched -48 VDC: prompt, type **set tacpriv envmon**, followed by **on** or **off**, optionally followed by a TACACS+ account number and press **Enter**.

Example

The following command grants input status viewing to the TACACS+ account 5:

```
Switched -48 VDC: set tacpriv envmon on 5<Enter>
```

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

Adding outlet access to a TACACS+ account:

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

To grant outlet access to a TACACS+ account:

At the Switched -48 VDC: prompt, type **add outlettotacacs**, optionally followed by an outlet name and a TACACS+ account number. Press **Enter**, or

Type **add outlettotacacs all**, followed by a TACACS+ account number and press **Enter**.

Examples

The following commands grant the TACACS+ account 5 access to outlets A1 and Webserver_1:

```
Switched -48 VDC:add outlettotacacs .aa1 5<Enter>
Switched -48 VDC:add outlettotacacs WEBServer_1 5<Enter>
```

Deleting outlet access for a TACACS+ account:

The Delete OutletFromTACACS command removes a TACACS+ account's access to one or all outlets. You cannot remove access to any outlet for an administrative level account.

To delete outlet access for a TACACS+ account:

At the Switched -48 VDC: prompt, type **delete outletfromtacacs**, optionally followed by an outlet name and a TACACS+ account number. Press **Enter**, or

Type **delete outletfromtacacs all**, followed by a TACACS+ account number and press **Enter**.

Adding outlet group access to a TACACS+ account:

The Add GroupToTACACS command grants a TACACS+ account access to an outlet group. To grant access for more than one outlet group, you must use multiple Add GroupToTACACS commands.

To grant outlet group access to a TACACS+ account:

At the Switched -48 VDC: prompt, type **add grouptotacacs**, optionally followed by an outlet group name and a TACACS+ account number. Press **Enter**.

Examples

The following commands grants to a TACACS+ account number 5 access to the outlet groups ServerGroup_1 and ServerGroup_2:

```
Switched -48 VDC:add grouptotacacs servergroup_1 5<Enter>
Switched -48 VDC:add grouptotacacs servergroup_2 5<Enter>
```

Deleting outlet group access for a TACACS+ account:

The Delete GroupFromTACACS command removes a TACACS+ account's access to an outlet group. You cannot remove access to any group for an administrative level account.

To delete outlet group access for a TACACS+ account:

At the Switched -48 VDC: prompt, type **delete groupfromtacacs**, optionally followed by an outlet group name and a TACACS+ account number. Press **Enter**.

Adding serial port access to a TACACS+ account:

The Add PortToTACACS command grants a TACACS+ account access to the serial port.

To grant serial port access to a TACACS+ account:

At the Switched -48 VDC: prompt, type **add porttotacacs console** and a TACACS+ account number. Press **Enter**.

Deleting serial port access for a TACACS+ account:

The Delete PortFromTACACS command removes a TACACS+ account's access to the serial port. You cannot remove access to the serial port for an administrative level account.

To delete serial port access for a TACACS+ account:

At the Switched -48 VDC: prompt, type **delete portfromtacacs console** and a TACACS+ account number. Press **Enter**.

Displaying TACACS account access:

The List TacPriv command displays all access rights for a TACACS+ account.

To display TACACS account access:

At the Switched -48 VDC: prompt, type **list tacpriv**, optionally followed by a TACACS+ account. Press **Enter**.

Example

The following command displays information about the TACACS+ account 1:

```
Switched -48 VDC: list tacpriv 1<Enter>
   TACACS+ Privilege Level: 1
      Outlet   Outlet
      ID       Name
      .AA1      DataServer_1
      .AA2      WebServer_1
      Groups:
         ServerGroup_1
         ServerGroup_2
   More (Y/es N/o): Y
Ports:
         Port ID   Port Name
         Console   Console
```

Members of the TACACS access level 1 account can access the following outlets, outlet groups and serial ports: outlet A1 which has a descriptive name of DataServer_1, outlet A2 which has a descriptive name of WebServer_1, group ServerGroup_1 group ServerGroup_2 and Console serial port.

TACACS+ Technical Specifications

Authentication START Packet includes:

action = 1 (TAC_PLUS_AUTHEN_LOGIN)
priv_lvl = 0 (TAC_PLUS_PRIV_LVL_MIN)
authen_type = 1 (TAC_PLUS_AUTHEN_TYPE_ASCII)
service = 1 (TAC_PLUS_AUTHEN_SVC_LOGIN)
user = (entered username)
port = (access path into the unit)
rem_addr = 'Sentry3_xxxxxx' (xxxxxx is last six digits of MAC address)
data = ' ' (null)

NOTE: The password is sent in a CONTINUE packet.

Authorization REQUEST Packet includes:

authen_method = 6 (TAC_PLUS_AUTHEN_METH_TACACSPLUS)
priv_lvl = 0 (TAC_PLUS_PRIV_LVL_MIN)
authen_type = 1 (TAC_PLUS_AUTHEN_TYPE_ASCII)
authen_service = 1 (TAC_PLUS_AUTHEN_SVC_LOGIN)
user = (entered username)
port = (access path into the unit)
rem_addr = 'Sentry3_*xxxxxx*' (xxxxxx is last six digits of Ethernet MAC address)
service = 'shell' (for exec)
cmd = ' ' (null)

NOTE: The access paths into the unit which support TACACS+ are 'Console', 'Telnet', 'SSH', 'HTTP' and 'HTTPS'. In the case of 'Console' and 'Modem', an administrator is allowed to rename these ports in which case the assigned name is used.

RADIUS

The -48 VDC products support the Remote Authentication Dial-in User Service (RADIUS) protocol. RADIUS provides a centralized network protocol to enable remote authentication and authorization, such as user names and passwords. With a central RADIUS server, user accounts do not need to be individually created locally on each PDU. This allows administrators to pre-define and configure (in each product and in the RADIUS server), a set of necessary RADIUS privilege levels and user access rights for each level.

RADIUS is also used in enterprise-wide networks because it provides the administrator with high performance, less memory usage, less CPU cycles on routers and switches, and an open standard that is easily interoperable within the network.

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 PDU in the RADIUS authentication process.

RADIUS Command Summary

Command	Description
Set Authorder	Specifies the authentication order for each new session attempt
Set RADIUS	Enables or disables RADIUS support
Set RADIUS…Server	Configures the address of the RADIUS server
Set RADIUS…Secret	Sets the shared secret for the RADIUS server
Set RADIUS…Port	Sets the port number of the RADIUS server
Set RADIUS…Timeout	Configures the timeout interval for the RADIUS server
Set RADIUS…Retries	Sets the number of retries for the RADIUS server
Show RADIUS	Displays RADIUS configuration settings

Enabling and Setting Up RADIUS Support

The following configuration tasks are required to properly enable and set up RADIUS support on the primary and secondary RADIUS servers.

Enabling and disabling RADIUS support:

The Set RADIUS command enables or disables RADIUS support.

To enable or disable RADIUS support:

At the Switched -48 VDC: prompt, type **set radius**, followed by **enabled** or **disabled**, and press **Enter**.

Setting the authentication order:

The Set Authorder command sets the authentication order for remote authentication sessions. The PDU supports two methods for authentication order: Remote > Local and Remote Only.

The Remote > Local method first attempts authentication with the RADIUS server, and, if unsuccessful, then attempts authentication with the local user database on the PDU.

The Remote Only method attempts authentication only with the RADIUS server, and, if unsuccessful, access is denied.

NOTE: With the Remote Only method, if authentication fails due to a communication failure with the RADIUS server, automatic authentication fallback will occur to authenticate with the local user data base on the PDU.

To set the authentication order:

At the Switched -48 VDC: prompt, type **set authorder**, followed by **remotelocal** or **remoteonly** and press **Enter**.

NOTE: It is recommended **not** to set the authentication order to Remote Only until the RADIUS has been fully configured and tested.

Setting the RADIUS server address:

The Set RADIUS Server command sets the IP address or hostname of the primary or secondary server used for RADIUS authentication requests.

NOTE: Both IPv4 and IPv6 formats are accepted for primary/secondary IP address or hostname.

To set the RADIUS server address:

At the Switched -48 VDC: prompt, type **set radius**, followed by **primary** or **secondary**, followed by **server**, and the IP address of the RADIUS or hostname (maximum 63 characters). Press **Enter**.

Examples

The following command sets the primary RADIUS server address to 98.76.54.32:

```
Switched -48 VDC: set radius primary server 98.76.54.32<Enter>
```

The following command sets the secondary RADIUS server address to radius.servertech.com:

```
Switched -48 VDC: set radius secondary server radius.servertech.com<Enter>
```

Setting the RADIUS secret:

The Set RADIUS Secret command sets the shared secret for the server used for RADIUS authentication requests.

To set the shared secret:

At the Switched -48 VDC: prompt, type **set radius**, followed by **primary** or **secondary**, and followed by **secret**. Press **Enter**.

Enter the shared secret and press **Enter**. For security, shared secret characters are not displayed.

The secret that was set for the primary server will not be cleared when setting the secret for the secondary server, and vice versa.

Changing the RADIUS port number:

The Set RADIUS Port command sets the server port number for RADIUS authentication requests.

To change the port number:

At the Switched -48 VDC: prompt, type **set radius**, followed by **primary** or **secondary**, followed by **port**, and the port number (1-65535). Press **Enter**. The default is 1812.

Example

The following command sets the secondary RADIUS server port number to 1855:

```
Switched -48 VDC: set radius secondary port 1855<Enter>
```

Setting the RADIUS timeout value:

The Set RADIUS Timeout command sets the time interval to wait for a reply from the RADIUS server before resending the authentication request.

To set the timeout value:

At the Switched -48 VDC: prompt, type **set radius**, followed by **primary** or **secondary**, followed by **timeout**, and the time interval in seconds (1-30). Press **Enter**.

Examples

The following command sets the primary RADIUS server timeout value to 15 seconds:

```
Switched -48 VDC: set radius primary timeout 15<Enter>
```

The following command sets the secondary RADIUS server timeout value to 5 seconds:

```
Switched -48 VDC: set radius secondary timeout 5<Enter>
```

Setting the number of RADIUS server retries:

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

To set the number of retries:

At the Switched -48 VDC: prompt, type **set radius**, followed by **primary** or **secondary**, followed by **retries**, followed by the number of retries, and press **Enter**.

The valid retries range is 0-10; default is 2.

Examples

The following command sets the retries for the primary RADIUS server to 5:

```
Switched -48 VDC: set radius primary retries 5<Enter>
```

The following command sets the retries for the secondary RADIUS server to 2:

```
Switched -48 VDC: set radius secondary retries 2<Enter>
```

Displaying RADIUS configuration information:

The Show RADIUS command displays RADIUS configuration information.

To display the RADIUS configuration information:

At the Switched -48 VDC prompt, type **show radius** and press **Enter**.

Example

The following command displays the RADIUS configuration information:

```
Switched -48 VDC: show radius<Enter>
   RADIUS Configuration

      RADIUS:          Enabled
      Auth Order:      Remote->Local
      Primary Server:
        Shared Secret: ****
        Port:          1812
        Timeout:       15 seconds
        Retries:       5

      Secondary Server:
        Shared Secret:
        Port:          1855
        Timeout:       5 seconds
        Retries:       2
```

<u>**Vendor-Specific Attributes (VSA):**</u>

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 PDU RADIUS implementation supports the following vendor-specific attributes:

Vendor-Specific Attribute (VSA) Descriptions

Attribute	Description
STI-Access-Level	Indicates user access level for the PDU; values are 1-6 as follows; a valid access level is required or access to the PDU 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"
```

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Logging

The -48 VDC products support logging of system events both internally and externally. An internal log of more than 4000 events is automatically maintained and is reviewable by administrative users. For permanent/long-term log storage, the unit supports the Syslog protocol. For immediate notification, the unit supports Email notifications.

Log entries include a sequential entry number, a date/time stamp and an event message. The event message is preceded with a message-type heading and if the event is tied to a user, the username will be included.

NOTE: For date/time stamp support, SNTP server support must be configured.

The unit supports the following event message headers:

- Auth: All authentication attempts.
- Power: All power state change requests.
- Config: All system configuration changes.
- Event: All general system events. *Example*: over/under threshold event.

Internal System Log

The internal system log is stored in the local memory and has support for up to 4097 continuously aging entries.

Viewing the internal system log:

The Show Log command allows users with administrative access to view the internal system log.

To view the internal system log:

At the Switched -48 VDC: prompt, type **show log**, and press **Enter**.

Example

```
Switched -48 VDC: show log
    [1] EVENT: System boot complete
    [2] EVENT: TCP/IP stack has started
    [3] Jul 24 18:45:52 AUTH: User "ADMN" logged in -- connection source 10.1.2.80
        using HTTP
    [4] Jul 24 18:50:26 AUTH: User "ADMN" logged in -- connection source 10.1.2.80
        using TELNET
    [5] Jul 24 18:50:51 CONFIG: Silkscreen to UI mapping changed to 2 for tower
        "Master"[A] by user "ADMN"
    [6] Jul 24 18:54:00 CONFIG: Silkscreen to UI mapping changed to 3 for tower
        "Master" [A] by user "ADMN"

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

NOTE: To terminate from the Show Log command, press <Esc>.

Syslog

The Syslog support is RFC3164-compliant and enables off-unit viewing and storage of log messages. The unit supports external logging to up to two Syslog servers.

Syslog Command Summary

Command	Description
Set Syslog HostIP1/HostIP2	Sets the IP address of the Syslog server
Set Syslog Port	Sets the Syslog server port number
Show Syslog	Displays all Syslog configuration information

Setting the Syslog server IP address:

The Set Syslog HostIP command sets the TCP/IP address of the Syslog server.

To set the Syslog server IP address:

At the Switched -48 VDC: prompt, type **set syslog**, followed by **hostip1** or **hostip2** and the Syslog server's IP address. Press **Enter**.

Example

The following command sets the primary Syslog server IP address to 56.47.38.29:

```
Switched -48 VDC: set syslog hostip1 56.47.38.29<Enter>
```

Changing the syslog server port:

With Syslog support enabled, the Syslog server watches and responds to requests on the default Syslog port number 514. This port number can be changed using the Set Syslog Port command.

To change the syslog port:

At the Switched -48 VDC: prompt, type **set syslog port**, followed by the port number and press **Enter**.

Example

The following changes the Syslog port number to 411:

```
Switched -48 VDC: set syslog port 411<Enter>
```

Displaying Syslog configuration information:

The Show Syslog command displays Syslog configuration information.

To display the Syslog configuration information:

At the Switched -48 VDC: prompt, type **show syslog** and press **Enter**.

Example

The following command displays the Syslog configuration information:

```
Switched -48 VDC: show syslog<Enter>
   SYSLOG Configuration
      Primary Syslog Server IP Address:     56.47.38.29
      Secondary Syslog Server IP Address:   0.0.0.0
      Syslog Server Port:                   411
```

Email

Email Command Summary

Command	Description
Set Email	Enables or disables Email notification support
Set Email SMTP Host1/Host2	Sets the SMTP Host IP address or hostname
Set Email SMTP Port	Sets the SMTP server port number
Set Email From	Sets the email 'From' address
Set Email PrimaryTo	Sets the primary recipient email address
Set Email SecondaryTo	Sets the secondary recipient email address
Set Email Event	Enables or disables notification of general system events
Set Email Auth	Enables or disables notification of all authentication attempts
Set Email Power	Enables or disables notification of power state change requests
Set Email Config	Enables or disables notification of configuration changes
Show Email	Displays all Email configuration information

Enabling or disabling Email notification support:

The Set Email command enables or disables Email notification support.

To enable or disable Email notification support:

At the Switched -48 VDC: prompt, type **set email**, followed by **enabled** or **disabled** and press **Enter**.

Setting the SMTP server address:

The Set Email Host command sets the IP address or hostname of the SMTP server.

To set the SMTP server address:

At the Switched -48 VDC: prompt, type **set email smtp host**, followed by the SMTP server's IP address or hostname and press **Enter**.

Examples

The following command sets the SMTP server address to 55.55.55.55:

```
Switched -48 VDC: set email smtp 55.55.55.55<Enter>
```

The following command sets the SMTP server address to email.servertech.com:

```
Switched -48 VDC: set email smtp email.servertech.com<Enter>
```

Changing the SMTP server port:

With SMTP support enabled, the unit sends SMTP requests to the default SMTP port number 25. This port number can be changed using the Set Email SMTP Port command.

To change the TACACS port:

At the Switched -48 VDC: prompt, type **set email smtp port**, followed by the port number and press **Enter**.

Example

The following changes the SMTP port number to 5555:

```
Switched -48 VDC: set email smtp port 5555<Enter>
```

Setting the 'From' email address:

The Set Email From command sets the 'from' email address. By default, this is set to 'Sentry3_' plus the last three octets of the unit's MAC address. Example: 'Sentry3_510c90@'

To set the 'From' email address:

At the Switched -48 VDC: prompt, type **set email from**, followed by the originating email address and press **Enter**.

Example

The following command sets the 'from' email address to Rack14CDU1@servertech.com:

```
Switched -48 VDC: set email from Rack14CDU1@servertech.com<Enter>
```

Setting the 'To' email address:

The Set Email PrimaryTo and Set Email SecondaryTo commands set the recipient email addresses.

To set the 'To' email address:

At the Switched -48 VDC: prompt, type **set email**, followed by **primaryto** or **secondaryto** and the destination email address. Press **Enter**.

Examples

The following command sets the primary 'to' email address to DayAdmin@servertech.com:

```
Switched -48 VDC: set email primaryto DayAdmin@servertech.com<Enter>
```

The following command sets the secondary 'to' email address to NiteAdmin@servertech.com:

```
Switched -48 VDC: set email secondaryto NiteAdmin@servertech.com<Enter>
```

Enabling or disabling event notification types:

The Set Email Event, Set Email Auth, Set Email Power and Set Email Config commands enable or disable email notification of the event types as described on page 143.

To enable or disable event notification types:

At the Switched -48 VDC: prompt, type **set email**, followed by **event**, **auth**, **power** or **config** and **enabled** or **disabled**. Press **Enter**.

Examples

The following command sets the enables email notification general system events:

```
Switched -48 VDC: set email event enabled<Enter>
```

The following command sets the disables email notification authentications attempts:

```
Switched -48 VDC: set email auth disabled<Enter>
```

Displaying Email configuration information:

The Show Email command displays Email configuration information.

To display the Email configuration information:

At the Switched -48 VDC: prompt, type **show email** and press **Enter**.

Example

The following command displays the Email configuration information:

```
Switched -48 VDC: show email
   Email Configuration
      Email Notifications:        Enabled
      SMTP Host:                  email.servertech.com
      SMTP Port:                  5555
      'From' Address:             Rack14CDU1@servertech.com
      Primary 'Send To' Address:  DayAdmin@servertech.com
      Secondary 'Send To' Address: NiteAdmin@servertech.com
      Include EVENT Messages:     Enabled
      Include AUTH Messages:      Disabled
      Include POWER Messages:     Disabled
      Include CONFIG Messages:    Disabled
```

Upload/Download

The -48 VDC products support the ability to upload and download system configurations using a standard FTP client. This feature enables for backup and restoration of system configuration as well as upload of template configurations to ease large initial equipment deployments.

Upload/Download Command Summary

Command	Description
Set FTP Server	Enables or disables the FTP server
Show FTP	Displays FTP configuration information

Integrated FTP Server

The unit supports an integrated FTP Server which must be enabled for Upload/Download support. The FTP Server supports a single user at a time. Once an administrative user has authenticated with the FTP Server, standard FTP client commands can be used to upload or download unit configurations.

NOTE: The integrated FTP Server does **not** support web browser FTP file transfers. A non-web-browser is required for all Upload/Download requests.

Enabling and disabling the FTP server:

The Set FTP Server command enables or disables the integrated FTP server.

To enable or disable the FTP server:

At the Switched -48 VDC: prompt, type **set ftp server**, followed by **enabled** or **disabled** and press **Enter**.

FTP Configuration Files

The FTP server supports upload/download of two configuration files: CONFIG.BIN and NETWORK.INI. These files can be uploaded or downloaded using FTP PUT and GET operations.

- CONFIG.BIN   This file contains the entire configuration of the unit **excluding** TCP/IP settings, serial/factory-only configurations, the x.509 certificate (SSL) and SSH keys. This file in encoded to keep all data (including usernames, passwords etc.) out of plain view. **This file is NOT editable.**

- FTP.INI   This file contains **only** the FTP settings (FTP Host, username, password, filepath, filename and automatic updates support). This file is user readable and editable 'plain text' file.

- NETWORK.INI   This file contains **only** the TCP/IP settings (IP address, subnet mask, gateway, DNS1 and DNS2). This file is user readable and editable 'plain text' file.

- SNTP.INI   This file contains **only** the SNTP settings (SNTP Hosts and GMT offset). This file is user readable and editable 'plain text' file.

NOTE: The CONFIG.BIN file while encoded is not encrypted and is susceptible to decoding using simple tools. Server Technology recommends the secure storage of CONFIG.BIN backup images.

Upload/Download Process

GETting a configuration file (Download):

1. Open the FTP client.
   In a Windows environment, in the Run window type **ftp** and press **Enter**.

2. At the prompt, type **open**, followed by the IP address of the unit and press **Enter**.

   ```
   FTP> open 12.34.56.78<Enter>
   ```

3. Authenticate with the appropriate administrative username and password.

4. At the prompt, type **get**, followed by the filename and press **Enter**.

   ```
   FTP> get config.bin<Enter>
   ```

5. At the prompt, type **close** to close the connection to the unit.

   ```
   FTP> close
   ```

PUTting a configuration file (Upload):

NOTE: Uploading the CONFIG.BIN file takes considerably longer than the NETWORK.INI file. When uploading both, Server Technology recommends uploading the NETWORK.INI file first.

1. Open the FTP client.
   *In a Windows environment, in the Run window type **ftp** and press **Enter**.*

2. At the prompt, type **open**, followed by the IP address of the unit and press **Enter**.

   ```
   FTP> open 12.34.56.78<Enter>
   ```

3. Authenticate with the appropriate administrative username and password.

4. At the prompt, type **put**, followed by the filename and press **Enter**.

   ```
   FTP> put network.ini<Enter>
   ```

5. At the prompt, type **close** to close the connection to the unit and force a restart of the device.

   ```
   FTP> close
   ```

Remote Shutdown

The -48 VDC products an orderly shutdown of remote servers, protecting open application files prior to the server being powered down. Shutdown signaling is initiated over the existing TCP/IP network and requires the use of a Remote Shutdown Agent.

With the Remote Shutdown Agent installed on the server and Shutdown configured on the unit, an orderly shutdown of the server is initiated for all actions that would remove power from the outlet such as Off and Reboot commands.

1. Off or Reboot command received by the unit.
2. Shutdown signal is sent to the Remote Shutdown Agent on the target server.
3. Remote Shutdown Agent initiates a graceful shutdown of the target server and includes the ability to execute user-defined scripts to perform custom activities, such as safely shutting down open databases.
4. The unit removes power from the outlet.

NOTE: Remote Shutdown is also supported by the extended feature set of Smart Load Shedding. Graceful shutdown is initiated by Smart Load-Shedding events such as high temperature, high infeed load, and UPS 'On Battery' conditions. For more information about Smart Load-Shedding, contact your Server Technology sales representative.

Supported Operating Systems

Remote Shutdown Agents are available for the following operating systems:

- Windows   2000, 2003, XP
- Linux   Red Hat 7.3, 8.0
                 Red Hat Enterprise 2.1 ES (update 5), 3.0 ES (update 4)
                 Novell SUSE Linux Enterprise Server
- Unix   HP-UX 11.0, 11i v1, 11i v2
                 IBM AIX 4.3, 5.3
                 Sun Solaris 8, 9, 10
- Novell Netware   6

Shutdown Agent Installation

Windows

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

NOTE: If left blank, any PDU can send a shutdown signal to the server.

Linux

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

NOTE: If left blank, any PDU can send a shutdown signal to the server.

Unix

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

NOTE: If left blank, any PDU device can send a shutdown signal to the server.

Netware

1. Browse to the location of the Remote Shutdown Agent install files.
2. From the NetWare system console, load the configuration module (**pmconfig.nlm**) using the default path.
3. For additional security, when prompted enter the IP address of the PDU that will be sending the shutdown signal.

NOTE: If left blank, any PDU can send a shutdown signal to the server.

Remote Shutdown Command Summary

Command	Description
Set Outlet Host	Sets the target server Host IP address or hostname
Set Outlet Shutdown	Enables or Disables Remote Shutdown
Set Outlet Shutdown Delay	Sets the outlet Remote Shutdown delay
Set Outlet Script	Enables or disables shutdown script delays
Set Outlet Script Delay	Sets the outlet shutdown script delay
Show Shutdown	Displays Remote Shutdown configuration information

Enabling or disabling Remote Shutdown support:

The Set Outlet Shutdown command enables or disables Remote Shutdown support for an outlet.

To enable or disable Remote Shutdown support:

At the Switched -48 VDC: prompt, type **set outlet shutdown**, followed by **enabled** or **disabled**, and the outlet ID. Press **Enter**.

Example

The following command enables Remote Shutdown from outlet .a1:

```
Switched -48 VDC: set outlet shutdown enabled .a1<Enter>
```

Setting the Remote Shutdown delay:

The Set Outlet Shutdown Delay command sets the Remote Shutdown delay for an outlet.

To set the Remote Shutdown delay:

At the Switched -48 VDC: prompt, type **set outlet shutdown delay**, followed by the outlet ID, and a value from 1 to 900 (in seconds). Press **Enter**.

Example

The following command sets the Remote Shutdown delay for outlet .a2 to 120 seconds:

```
Switched -48 VDC: set outlet shutdown delay .a2 120<Enter>
```

Setting the outlet host address:

The Set Outlet Host command set the IP address or hostname for an outlet. Hostnames can be up to 63 characters long.

To set the outlet host address:

At the Switched -48 VDC: prompt, type **set outlet host**, followed by the outlet ID, and the IP address or hostname. Press **Enter**.

Example

The following command set the hostname for outlet .a1 to 'Windows2003':

```
Switched -48 VDC: set outlet host .a1 Windows2003<Enter>
```

Enabling or disabling shutdown script support:

The Set Outlet Script command enables or disables shutdown script support for an outlet.

To enable or disable shutdown script support:

At the Switched -48 VDC: prompt, type **set outlet script**, followed by **enabled** or **disabled**, and the outlet ID. Press **Enter**.

Example

The following command enables Remote Shutdown from outlet .a1:

```
Switched -48 VDC: set outlet script enabled .a1<Enter>
```

Setting the shutdown script delay:

The Set Outlet Script Delay command sets the shutdown script delay for an outlet.

To set the shutdown script delay:

At the Switched -48 VDC: prompt, type **set outlet script delay**, followed by the outlet ID, and a value from 1 to 15 (in minutes), and press **Enter**.

Example

The following command sets the shutdown script delay for outlet .a1 to 10 minutes:

```
Switched -48 VDC: set outlet shutdown delay .a1 10<Enter>
```

Displaying Remote Shutdown information:

The Show Shutdown command displays all shutdown configuration information, including:

- Outlet ID and descriptive name
- Remote Shutdown settings
- Shutdown script setting

To display shutdown information:

At the Switched -48 VDC: prompt, type **show shutdown** and press **Enter**.

Example

The following command displays all shutdown information:

```
Switched -48 VDC: show shutdown
```

Outlet ID	Outlet Name & Hostname/IP	Shutdown/ Delay (sec)	Script/ Delay (min)
.A1	DataServer_1 Windows2003	Yes /90	Yes /10
.A2	WebServer_1 <not set>	No /120	No /1
.A3	FileServer_1 <not set>	No /90	No /1
.A4	TowerA_Outlet4 <not set>	No /90	No /1
.A5	TowerA_Outlet5 <not set>	No /90	No /1
.A6	TowerA_Outlet6 <not set>	No /90	No /1
.A7	TowerA_Outlet7 <not set>	No /90	No /1
.A8	TowerA_Outlet8 <not set>	No /90	No /1

Chapter 5: Appendices

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.

NOTE: This method will **not** work if you disable the **Reset** button.

Insert the tool in the recess, then depress and hold the reset button for at least ten seconds.

NOTE: If you press and hold the **Reset** button for more than 15 seconds, the reset will terminate.

Reset to Factory Defaults (except network settings)

From the Web Interface

On the Restart page in the Tools section of the Web interface, select **Restart and reset to factory defaults, except network** from the drop-down menu and click **Apply.**

From the Command Line 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). This allows access to new firmware releases for firmware improvements and new features additions.

NOTE: To begin an FTP upload session, you must first configure the FTP Host address, username/password, filename, and filepath.

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**.

Data Connections

RS-232 port

Server Technology PDUs are equipped standard with an RJ45 DTE RS-232c serial port. This connector can be used for direct local access or from other serial devices such as a terminal server. An RJ45 crossover cable is provided for connection to an RJ45 DCE serial port.

Pin	DTE Signal Name	Input/Output
1	Request To Send (RTS)	Output
2	Data Terminal Ready (DTR)	Output
3	Transmit Data (TD)	Output
4	Signal Ground (SG)	n/a
5	Signal Ground (SG)	n/a
6	Receive Data (RD)	Input
7	Data Set Ready (DSR)	Input
8	Clear To Send (CTS)	Input
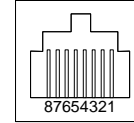
RJ45 to DB9F Serial Port Adapter

Additionally, an RJ45 to DB9F serial port adapter is provided for use in conjunction with the RJ45 crossover cable to connect to a PC DB9M DCE serial port. The adapter pinouts below reflect use of the adapter with the provided RJ45 crossover cable.

Pin	DCE Signal Name	Input/Output
1	No Connection (NC)	n/a
2	Receive Data (RD)	Output
3	Transmit Data (TD)	Input
4	Data Terminal Ready (DTR)	Input
5	Signal Ground (SG)	n/a
6	Data Set Ready (DSR)	Output
7	Request to Send (RTS)	Input
8	Clear to Send (CTS)	Output
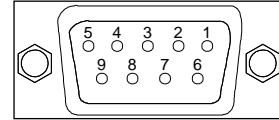
LED Indicators

Outlets

Units are equipped with a status LED for each power receptacle. A lit (on) LED indicates that power is supplied at the port and a dim (off) LED indicates no power at the port.

Inlets

Units are equipped with a status LED for each input. A lit (on) LED indicates that power is present in the input, and a dim (off) LED indicates no power is present.
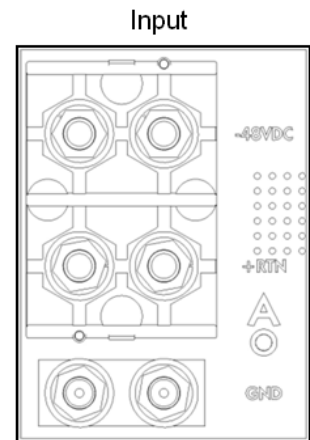
Inlet Connections

The RPM 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 Remote Power Manager! Verify proper polarity before connecting to a power source!**

Two-Hole Copper Compression Ground Lugs for Inlet Terminals

| Cable Size(AWG)	Stud Size	Color Code	Thomas&Betts Model
#4/0	3/8″	Purple	54212
#3/0	3/8″	Orange	54211
#2/0	3/8″	Black	54210
#1/0	3/8″	Pink	54209

Outlet Connections

The RPM is equipped with 4 to 16 terminal outlet pairs, each containing clearly labeled terminal positions. Connection are made using 2-hole copper compression lugs for dual-stud blocks. For the dual stud lugs, please refer to the table directly above.

Two-Hole Copper Compression Lugs for Outlet Terminals

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

Grainger catalog #390 (1999-2000)
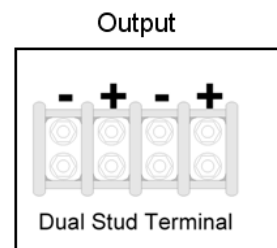
Regulatory Compliance

Product Safety

Units have been safety tested and certified to the following standards:

- USA/Canada   UL 60950-1:2007 and CAN/CSA 22.2 No. 60950-1-07
- European Union   EN 60950-1:2006 + A11 +A1 + A12

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 operated 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

Products with the CE Marking comply with both the EMC Directive (89/336/EEC) and the Low Voltage Directive (73/23/EEC) issued by the Commission of the European Community.

Compliance with these directives implies conformity to the following European Norms:

- EN55022   Electromagnetic Interference
- EN55024   Electromagnetic Immunity
- EN60950-1   Product Safety
- EN61000-3   Harmonics and Flicker

Products with the following mark comply with the RoHS Directive (2002/95/EC) issued by the Commission of the European Community.

Japanese Notification

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

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 D: Product Support Information

Warranty

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

Technical Support

Experience Server Technology's FREE Technical Support

Server Technology understands that there are often questions when installing and/or using a new product. Free Technical Support is provided from 8:00 AM to 5:00 PM, PST, Monday-Friday. After hours service is provided to ensure your requests are handled quickly no matter what time zone or country you are located in.

Server Technology, Inc.

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Return Merchandise Authorization

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

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