



Introducing Server Technology's PRO1 Rack Power Distribution Unit

Purpose

This technical note provides an introduction to the features of the PRO1 hardware and user interface.

What is the PRO1?

The PRO1 (Switched and Smart) is the latest design in Server Technology's reliable power distribution units (PDUs), providing flexibility for power management, cost savings, and advanced data center solutions.

What's Unique About the PRO1?

Server Technology's PRO1 design allows for PRO2 functionality in a CDU1 form factor.

The PRO1 uses the Sentry4-MIB and the PRO2 firmware, version 8.0.x, allowing PRO1 products to offer the latest features and functions of the PRO2 product family.



Equipment View of the PRO1 Unit

Key Product Features of the PRO1

The PRO1 offers many features for power management, including:

- PIPS[®], (or TRMS), and (optionally) POPS[®] high-accuracy measurements for current, voltage, power, and other key metrics.
- Single modular HDOT section with five available options.
- Auto-Flip LED display gives the proper display orientation no matter how the PRO1 is mounted in the cabinet.
- Outlet naming on all PRO1 products (for both Switched and Smart products).
- Hot-swappable network interface card (NIC) allows swapping the card in the field without causing a change in outlet state. The NIC can easily be replaced even when power is applied.
- Support for IPv6 address names and support for SNMPv3.
- Equipped for the mobile power monitoring solution using a Bluetooth[®] module (for either Google Android or Apple iOS), along with Server Technology's ST Eye mobile application.

- Several new levels of power monitoring for high-low warning-alarm thresholds and threshold hysteresis.
- If the master unit loses power, redundant power is provided to the master via the first linked unit, ensuring uptime.
- On-board firmware file system to allow direct GUI downloads of system files, firmware version updates, and MIB/OID tree files without using FTP.
- Intuitive and soft-mapped naming conventions used in both the PRO1 hardware and firmware to reflect the system hierarchy of units, cords, lines, phases, over-current protectors (OCPs), branches, outlets, outlet groups, and sensors.
- Server Technology's multi-linking technology that supports the optional linking of up to three expansion (link) units per one PRO1 master unit, allowing a single IP address for multiple cabinets.

Feature Comparison: PRO1 vs. PRO2

The PRO1 is similar to the PRO2 in hardware architecture, object mapping, user interfaces (GUI and CLI), firmware (version 8.0.x or later), and new Sentry4-MIB, but the PRO1 **does not** include the following PRO2 items:

- Branch Current Monitoring feature
- TRMS Current Input Monitoring (in some cases rather than PIPS)

The following table shows a detailed benefit comparison:

Product	Benefits
PRO1	CDU with NIM2/PRO2 Network Card: <ul style="list-style-type: none"> • Faster processor and more memory • Hot swap network card • Network card swap with no re-programming (PCM) • Features/functions can be added as needed • Multi-linking (up to 4 units) • Power from link unit keeps network up if power from master unit goes down • Sentry4-MIB allows additional alarm warning and threshold levels
PRO2	PRO2 Architecture with NIM2 Network Card: <ul style="list-style-type: none"> • PRO1 features, plus additional features • PIPS standard • Branch monitoring standard • Locking data and low voltage cables • Smart products with breaker/fuse branch circuit sensing • All products 60 degrees Celsius rated

PRO1 Hardware Architecture – What’s New?

The new hardware design of PRO1 products reflects the many possible combinations of power data that can occur within a hierarchy of units, cords, lines, phases, over-current protectors (OCPs), branches, outlets, outlet groups, and sensors.

The PRO1 firmware user interface (GUI and CLI) mirrors this fixed arrangement of system objects to support optimal monitoring and management of power metrics, and for user-configuration of PRO1 system values.

System objects in the PRO1 hierarchy relate to each other in an overall fixed structure, top to bottom, as illustrated:

Unit For the PRO1, *unit* is the physical enclosure. In the CDU1, this is *tower*.

|___ **Cord** For the PRO1, there is only one cord per a PRO1 unit. PRO1 lines/phases are part of the one cord.

|___ **Line** PRO1 data for individual lines includes current (A), thresholds, capacity, hysteresis, and more.

|___ **Phase** Data for each phase of a multi-phase line includes (phase) voltage and power factor.

|___ **Over-Current Protectors (OCPs)** Reports failed OCPs for Switched/Smart units.

|___ **Outlets** Configure multiple low/high warning/alarm threshold levels.

|___ **Outlet Groups** Assign outlets to named outlet groups.

|___ **Sensors** Set low/high temp/humidity thresholds.

Using the PRO1 Firmware

The PRO1 products use the same PRO2 firmware (version 8.0x or later), providing a similar GUI and Command Line Interface (CLI) as available with the PRO2 products.



Note: Firmware, version 8.0, for the PRO1 product is not compatible with other Server Technology Rack Power Distribution Unit products. There is no upgrade path from earlier PDU products to PRO1 products.

The PRO1 firmware provides the following key features:

On-Board File System

The firmware Web Interface provides an embedded file system to give quick access to system configuration files, as well as the on-board and downloadable Sentry4-MIB and OID Tree for the PRO1, eliminating website MIB/OID downloads.

The page also allows GUI-based file uploads (without FTP) for system, configuration, and firmware versions. However, all PRO1 configuration/system files, MIB, and OID Tree can also be accessed via FTP/SFTP.

Intuitive and Consistent Terminology

The design of the firmware includes intuitive and soft-mapped naming conventions between the interfaces (Web and CLI) and the PRO1 product. For example, the firmware GUI areas (cords, lines, phases, over-current protectors, branches, outlets, sensors, etc.) match the same areas designed in the PRO1 hardware architecture.

Outlet numbers are named 1-n sequentially and the outlet name is not tied to infeeds or branches. Input cords are also simply named 1-n sequentially (like 1-24), no longer 1-n for each phase (like XY 1-8, YZ 1-8, ZX 1-8).

Also, firmware naming formats match the exact silkscreened names on the hardware unit.

Outlet Grouping

An outlet group is named group with a collection of PRO1 outlets assigned to the group. Outlet groups can be granted access to selected outlets by the administrative user (via the Web interface or CLI), and outlet activity by group can be monitored on a separate Web interface page for outlet group monitoring.

Setting Thresholds

When setting threshold values, the PRO1 firmware allows expanded alerting capabilities. Threshold values can be set by the administrative-user for multiple low/high warning/alarm levels (and threshold hysteresis), as listed below in the following PRO1 areas.

Every item shown in the following list – for which a threshold can be set – also has a corresponding Monitoring page for viewing the item's current threshold values and operational status.

- Cord power (low and high), cord apparent power (low and high), cord power factor (low), 3-phase out-of-balance (high).
- Line current (low and high).
- Outlet current (low and high), outlet power (low and high), outlet power factor (low).
- Phase voltage (low and high), phase power factor (low).
- Temperature sensor (low and high).
- Humidity sensor (low and high).
- Analog-to-Digital (ADC) sensor (low and high) – if an EMCU is connected to the PRO1 unit.

The User Interfaces

The PRO1 product offers two built-in user interfaces:

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

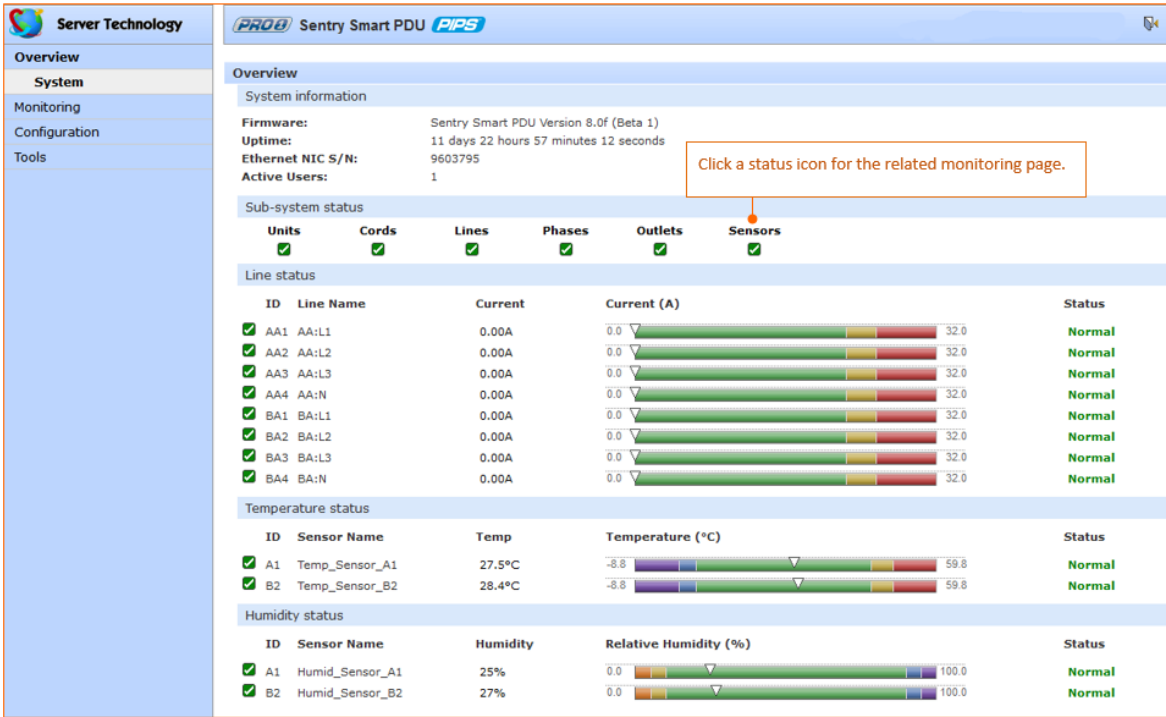
Both interfaces allow power monitoring of PIPS/POPS data points, temperature/humidity measurements, system/network configuration, outlet control, ST Eye Bluetooth® connection, user account management, and numerous other operations for PRO1 units.

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

PRO1 Dashboard View

The **Overview > System** page provides a fast and high-level view of the overall condition of the PRO1 unit. The sub-system status view shows the current operational state of individual PRO1 units, cords, lines, etc.

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



Summary of PRO1 User Interface Options

Overview

As described above, the Overview option (System page) provides monitoring of major PRO1 operational areas. The page displays a quick view of color-coded icons showing current status of the units, cords, branches, lines, phases, sensors. Click an icon for the related monitoring page to view the metrics behind the status. Also shows color-coded graphs for the operational status of line current and temperature/humidity sensor readings.

Monitoring

The Monitoring option provides viewing of dynamically updated metrics for the PRO2 operational areas that have the highest power impact on the unit and the data center.

The design of the GUI monitoring pages follows the major areas in the hardware architecture of the PRO2, providing a separate and detailed page for the overall status of units, cords, lines, OCPs, branches, outlets, groups, and sensors.

Control

For Switched PRO1 products only: The Control option allows the issuing of control actions On, Off, and Reboot for all PRO2 individual outlets, global outlets, and named outlet groups.

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

Configuration

The Configuration option allows administrative access to all options for setting PRO2 values. The pages are organized into three major areas of configuration:

- **System** (options for PRO1 hardware areas)
- **Network** (options for setting up network protocols)
- **Access** (options for local/remote user access and management)

Additional PRO1 Resources

For information about the specific PRO1 product models, visit the Server Technology website at www.servertech.com

Contact Technical Support



Experience Server Technology's FREE Technical Support

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

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