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Section 1 – System Overview

Intelligent Network Controller
The Panduit Monitored Input, Monitored & Switched, Monitored per Outlet, and
Monitored & Switched per Outlet PDUs have an integral, hot swappable Intelligent
Network Controller. The Intelligent Network Controller contains the OLED interface,
control buttons, the USB, Ethernet, Serial and Sensor ports, and recessed Reset
Button.

Reset Button
Pressing the Reset Button only reboots the Intelligent Network Controller. It does not
change the Energy (kWh) value and does not affect the output voltage.

Using the Reset Button
Press and hold the Reset Button for 8 seconds to recover from an Intelligent Network
Controller communication failure.

Connecting the PDU to a LAN Ethernet Port
The PDU is defaulted to DHCP. If you are connected to an Ethernet with a DHCP
server, the PDU automatically get an IP address and display it on the LCD screen. If
there is no DHCP server, the default IP address is 192.168.0.1, but again this will be
displayed on the PDU.

Connecting the PDU to a LAN provides communication through an Internet or Intranet
connection. You can monitor the PDU from any computer connected to the same
network. The PDU is set to use DHCP (Dynamic Host Configuration Protocol) by default
when delivered. If IP is successfully assigned, you will see the IP address shown on
OLED display.

1. Locate the Ethernet cable.

2. Connect one end of the cable to the Ethernet port on the PDU (see Figure 1).
   Connect the other end of the cable to the Ethernet port on the router (or another
   LAN device).
Connecting the PDU to a Computer Serial Port

If unable to connect to network, you can change the network setting using the serial interface.

To configure the network setting, perform the following steps:

1. Serial connect the PDU to a computer’s serial port. Set baud rate for a terminal emulation program.
2. Using a CLI command to enable DHCP or set a static IP.
3. Verify access to the Web interface. The Ethernet LED on the PDU front panel provides communication status by color and display activity. The recessed Reset button restarts the PDU (see Figure 2 below).
Setup Serial Communication
You may configure the network settings using the command line interface (CLI) with a serial connection. Users can connect serially using the optional RJ45-DB9 cable (or make your own cable by creating a unique pinout as described below in the “Serial Cable Pinout to Create Your Own Cable” in Section 4).

1. Verify that the computer has a serial port. If your computer does not have a DB9 serial connector, but does have a USB connector, obtain a USB-to-DB9 Adapter to convert the USB to a DB9 serial port.

2. Using the optional RJ45-DB9 cable, connect the RJ-45 end to the port labeled “Serial+RS485-1” on the front panel of your PDU model (see Figure 1). Connect the DB9 end of the cable to the computer.

3. Open the terminal emulation program (HyperTerminal or PuTTY) on the computer and select the serial port connection (such as COM1).

4. Set the communications port as follows:
   - Bits per second: 115200
   - Data bits: 8
- Parity: None
- Stop bits: 1
- Flow control: None

(See Port Settings example below)

Figure 3: Port Setup Settings

5. Use the default initial login indicated below. Note that the username and password are both case sensitive:
   - Username: admin
   - Password: 12345678 (or your new password)

6. The “Panduit>” prompt appears after you have logged in, ready to enter the CLI command.

7. To configure network settings, enter the appropriate “net” command and press Enter. All commands are case sensitive. You can type ? to access the commands.

8. To enable the IPv4 DHCP by default, run:
   - net tcpip dhcp
• Enter Y to confirm and the PDU’s Intelligent Network Controller will reboot.

9. To set a static IPv4 configuration, run:

   • `net tcpip static x.x.x.x (ipaddress) x.x.x.x (netmask) x.x.x.x (gateway)`
   • Example: `net tcpip static 192.168.1.100 255.255.255.0 192.168.1.1`
   • Enter Y to confirm and the PDU’s Intelligent Network Controller will reboot.
Section 2 – Web Graphical User Interface (GUI) Configuration

Internet Protocol (IP) Address
The PDU is by default configured Dynamic Host Configuration Protocol (DHCP). The PDU automatically obtains an IP address via a DHCP server when connected to a network. The IP address the PDU received is displayed on the OLED screen. After the PDU received the address, login to the Web interface to configure the PDU and assign a static IP address (if desired). If there is no DHCP server, the default IP address is 192.168.0.1, but again this will be displayed on the PDU.

If the network does not use a DHCP server, see the CONNECTING THROUGH A SERIAL CONNECTION section to configure a static IP address.

1. Connect a standard Ethernet patch cable to the Ethernet port on the PDU.
2. Connect the other end of the Ethernet cable to the LAN.
3. Make sure the Ethernet port on the PDU shows a solid green light on the left and a flashing yellow light on the right to indicate successful connectivity to the network.
4. Use the menu buttons to look up the IP address of the device on the OLED display by selecting Setup > Network > IPv4 or IPv6 as applicable.
5. In a standard web browser, enter the PDU IP address and proceed to configure the PDU as shown in the Web Configuration section.

Web Configuration

Supported Web Browsers
The supported Web browsers are Windows Firefox, Linux Firefox, Mozilla Firefox, Windows Internet Explorer Version 11, Microsoft Edge, and Google Chrome mobile and desktop.

Logging in to the Web Interface

Logging In
- Open a supported web browser and enter the IP address of the PDU.
  - If username and password were configured during the Network Configuration Setup: enter the username and password in the appropriate fields. Press Login or Enter.
If username and password were NOT configured during the Network Configuration Setup, use the default username: *admin* and password: *12345678*. For security purposes, change the password upon login.

**Introduction to the Web GUI**

**Login Page**

![Login Page](image)

*Figure 4: Login Page*
**Figure 5: Landing Page**

<table>
<thead>
<tr>
<th>Number</th>
<th>Icon</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>![Home Icon]</td>
<td>The home icon provides an overview of the PDU with access to the Dashboard, Identification, and Control &amp; Manage.</td>
</tr>
<tr>
<td>2</td>
<td>![Alarm Icon]</td>
<td>The Alarm icon provides details of the active critical alarms and active warning alarms.</td>
</tr>
<tr>
<td>3</td>
<td>![Language Icon]</td>
<td>This icon lets you select a Language. There are seven languages available to choose from: English, Chinese, French, Italian, German, Spanish, Korean and Japanese.</td>
</tr>
<tr>
<td>4</td>
<td>![Logs Icon]</td>
<td>This icon provides the logs of the PDU which can be viewed and downloaded.</td>
</tr>
<tr>
<td>Number</td>
<td>Icon</td>
<td>Description</td>
</tr>
<tr>
<td>--------</td>
<td>------</td>
<td>-------------</td>
</tr>
<tr>
<td>5</td>
<td><img src="image" alt="Gear Icon" /></td>
<td>The settings icon allows a user to setup the Network Settings, System Management, SNMP Manager, Email Setup, Event Notifications, Trap Receiver, and Thresholds.</td>
</tr>
<tr>
<td>6</td>
<td><img src="image" alt="Search Icon" /></td>
<td>The search icon allows you to input key words and search for the related results.</td>
</tr>
<tr>
<td>7</td>
<td><img src="image" alt="Question Mark Icon" /></td>
<td>Information about the PDU can be found using this icon. You also can click user guide and license to ask for help.</td>
</tr>
<tr>
<td>8</td>
<td><img src="image" alt="Admin Icon" /></td>
<td>This icon shows who is logged in (user or admin). Account passwords can be changed, and user accounts managed through this page.</td>
</tr>
</tbody>
</table>
### Menu Dropdowns

<table>
<thead>
<tr>
<th>Overview</th>
<th>Alarms</th>
<th>Help</th>
<th>Language</th>
<th>Logs</th>
<th>Settings</th>
<th>Admin</th>
</tr>
</thead>
<tbody>
<tr>
<td>🏡 Dashboard</td>
<td>✅ Active Critical Alarms 9</td>
<td>📚 User Guide</td>
<td>🌐 English</td>
<td>📊 Event Log</td>
<td>🔄 Network Settings</td>
<td>admin</td>
</tr>
<tr>
<td></td>
<td>🔴 Active Warning Alarms 4</td>
<td>🍃 License</td>
<td>🇪🇸 Español</td>
<td>📊 Download Event Log</td>
<td>🔄 System Management</td>
<td></td>
</tr>
<tr>
<td>Identification</td>
<td></td>
<td></td>
<td>🇫🇷 Français</td>
<td>📊 Data Log</td>
<td>🔄 SNMP Manager</td>
<td></td>
</tr>
<tr>
<td>Control &amp; Manage</td>
<td></td>
<td></td>
<td>🇮🇹 Italiana</td>
<td>📊 Download Data Log</td>
<td>🔄 Email Setup</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>🇰🇷 한국어</td>
<td></td>
<td>🔄 Event Notifications</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>🇩🇪 Deutsch</td>
<td></td>
<td>🔄 Trap Receiver</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>🇪🇸 Español</td>
<td></td>
<td>🔄 Thresholds</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>🇯🇵 日本語</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Introduction to the Dashboard

Power Summary Page

Figure 6: Power Summary Page

Outlet Monitoring Page

Figure 7: Outlet Monitoring Page
Environmental Page

Figure 8: Environmental Page

Security Page

Figure 9: Security Page
Section 3 – Simple Network Management Protocol (SNMP)

SNMP Management Configuration

**Setup SNMP**

1. Access the Web interface and login.


3. The SNMP General includes SNMP Access and Version.

![SNMP General Configuration](image)

**Figure 10: SNMP Management**

3. The SNMP General includes SNMP Access and Version.
Figure 11: SNMP General

**Setup SNMP Port**

1. Access the Web interface and login.

2. Under SNMP Managers, select SNMP Port. The SNMP Port page displays.
3. Setup SNMP Port and SNMP Trap Port

![Figure 12: SNMP Port](image)

![Figure 13: Setup SNMP Port and Trap Port](image)
Define SNMP V1/V2c User

1. Access the Web interface and login.

2. Under SNMP Manager, select SNMP V1/V2c.

3. In the SNMP V1/V2c panel, select the SNMP V1/V2c manager to configure. Select the pencil icon in the last column.

![Figure 14: Define SNMP V1/V2c User](image)

4. The Edit panel pop up displaying the configurable options.

![Figure 15: Edit V1/2c Manager](image)
5. Set the following options

- **IP Address**: the IP address of the host for this SNMP V1/V2 manager. Only requests from this address will be acted upon.
  
  **Note**: An IP address configured to 0.0.0.0 will act as a wildcard and all requests will be acted upon.

- **Read Community**: the read-only community string to allow an SNMP V1/V2c manager to read a SNMP object.

- **Write Community**: the write-only community string to allow an SNMP V1/V2c manager to write an SNMP object.

6. Click **Enable** and **Save**.

### Configuring Users for SNMP v3 Communications

1. Access the Web interface and login.

2. Under SNMP Managers, select SNMP V3.

3. In the SNMP V3 panel, select the SNMP V3 manager to configure. Select the pencil icon in the last column.

![SNMP V3 Manager](image)

**Figure 16: SNMP V3 Manager**

4. The Edit panel pop up displaying the configurable options.
5. Configure the SNMP username
6. Choose a Security Level from the dropdown menu
   - NoAuthNoPriv: No authentication and no privacy. This is the default.
   - AuthNoPriv: Authentication and no privacy.
   - AuthPriv: Authentication and privacy.
7. Enter a new unique password to be used for authentication
8. Select the desired authentication algorithm.
   - MD5
   - SHA
9. Enter a new unique key for privacy algorithm

10. Select the desired privacy algorithm
   - DES
   - AES-128
   - AES-192
   - AES-256

11. Click Enable and Save.
Section 4 – Command Line Interface (CLI) Configuration

Connecting through CLI connection
The Command Line Interface (CLI) is an alternate method used to manage and control the PDU status and parameters, as well as basic admin functions. Through the CLI a user can:

- Reset the PDU
- Display PDU and network properties
- Configure the PDU and network settings
- Switch outlets on/off
- View user information

Connecting to the CLI requires a terminal emulation program such as HyperTerminal or PuTTY

Supported Commands
The PDU CLI command set for managing and monitoring the PDU includes the following commands:

- ? command: PDU help query
- sys command: PDU system configure and setting
- net command: PDU net application configure and setting
- usr command: PDU user operation
- dev command: PDU device setting
- pwr command: PDU power setting
NOTE: Command variables are represented in command input syntax surrounded by angle braces (< >). Optional parameters are represented in command input syntax surrounded by straight brackets ([ ]). For data of type array, the 'x' character as index of array in command input syntax means all indexes. You must be logged into the PDU before commands can be sent. See Appendix A for a list of all CLI commands.

Connecting to the CLI through the serial interface

Communicating through the serial port requires a specialized optional RJ45-DB9 cable or you can create your own cable as described in the “Serial Cable Pinout to Create Your Own Cable” section.

![Figure 18: Connect the RJ-45 end of the cable to the Serial+RS485-1 connector](image)

To connect the PDU to a computer:

Using the optional RJ45-DB9 cable, connect the RJ-45 end to the port labeled “Serial+RS485-1” on the front panel of your PDU model. Connect the DB9 end of the cable to the serial connector on the computer.
**Logging in with HyperTerminal**
To login through HyperTerminal, set the COM settings to the following parameters:

- Bits per second: 115200
- Data bits: 8
- Parity: None
- Stop bits: 1
- Flow control: None

**Serial Cable Pinout to Create Your Own Cable**
To make your own RJ45-to-DB9 Serial cable, the connections are wired as shown:

![Serial Cable Pinout](image)

**Figure 19: Serial Cable Pinout**

**Logging in with SSH via PuTTY**

1. Ensure SSH has been enabled: On GUI, go to Device Configuration > Network Service > SSH. Select the Enable SSH Access checkbox. Select OK.

2. Open an SSH client (PuTTY).

3. Enter the IP address in the Host Name field. Select the connection type: SSH
   - For SSH, enter 22 in the Port field.

4. Select Open.

5. Enter your Username. Press Enter.

6. Enter your password. Press Enter.
7. You are now logged into the SSH. Refer to the CLI Commands table below for available commands.

**NOTE:** SSH connection is not available when serial connection is enabled.
Section 5 – Local Display

OLED Display
The OLED provides information about the PDU and connected devices. The OLED display orientation can be changed using an OLED setting. The display can be rotated 0° and 180°. The PDU has a three-button, graphical OLED panel (see Figure 4). Use the buttons to change the screen display and retrieve specific performance data.

The OLED has two modes:

1. Screensaver mode: Screensaver mode cycles through a set sequence of screens that display current PDU values. Current values are refreshed every ten seconds. The user cannot select a custom sequence of screens. The screensaver displays automatically after 30 seconds of inactivity from the start-up screen, a menu, or a submenu. Values are refreshed every five seconds.
2. Menu mode (OLED main menu): The settings that display under each high level (main) menu depend on your PDU model.

**Menu Mode**
The table below summarizes how to use the control buttons on the OLED display.

<table>
<thead>
<tr>
<th>Button</th>
<th>When in Menu Mode</th>
<th>When in Screensaver Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Menu</td>
<td>Select from the four main menus.</td>
<td>Returns to the previous display screen before entering the screensaver mode.</td>
</tr>
<tr>
<td>Scroll</td>
<td>Scrolls down through the list of menu items. <strong>NOTE:</strong> A highlighted menu item is ready to be selected.</td>
<td>Returns to the previous display screen before entering the screensaver mode.</td>
</tr>
<tr>
<td>Select</td>
<td>Opens the selected menu.</td>
<td>Returns to the previous display screen before entering the screensaver mode.</td>
</tr>
</tbody>
</table>

**LED Unit Status**
The LED will change colors depending on the state of the PDU.

<table>
<thead>
<tr>
<th>LED State</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solid Green</td>
<td>Normal Operation</td>
</tr>
<tr>
<td>Solid Red</td>
<td>Critical or Warning Alarm</td>
</tr>
<tr>
<td>Flashing Orange</td>
<td>No network connection</td>
</tr>
</tbody>
</table>
OLED Menu Structure

Main Menu Selections
The PDU menu selection hierarchy consists of Setup, Alarms, Power, and Sensors. On the main menu, scroll down to highlight Setup. Press `Select`. Scroll down to select a submenu and press `Select` to display the submenu options. Press `Menu` to return to the previous menu.
Setup Menu
The Setup menu provides user configuration options including Network, Device, Screen, Language, USB, and Units.

Network Submenu
The Network submenu allows you to view IP address IPv4 or IPv6. On the Setup menu, scroll down to Network. Press Select to enter the Network Submenu. Scroll down to highlight the selected option from the menu. Press Select to display the screens that display the IP address. Press Menu to return to the previous menu.
Device Submenu

The Device submenu provides the SKU number, Serial number, MAC address and Firmware version. On the Setup menu, scroll down to highlight Device submenu. Press Select to enter the Device Submenu. Scroll down to the item you wish to display and press Select. Press Menu to return to the previous menu.
The Screen submenu allows you to customize settings for Contrast, Rotate, and Always on. On the Setup menu, scroll down to highlight Screen. Press **Select** to select the submenu. Press **Menu** to return to the previous menu.

**Screen Submenu**
The Language submenu allows you to select the language you need to use. On the Setup menu, scroll down to highlight Lang. Press **Select** to display the screens to select the submenu. After you select the values, press **Select** to set the values as displayed on the screen. Press **Menu** to return to the previous menu.
USB Submenu
The USB submenu allows you to upload firmware file and download event log or data log. On the Setup menu, scroll down to highlight USB. Press Select to enter the USB Submenu. The user will be asked to verify the want to the enter the USB operation and Configuration Mode. After you select Yes, the system will reset in to the USB operation and Configuration Mode, or Boot Loader mode.

Note 1: If an USB drive is not present in the USB slot the PDU will enter normal operation after the reset.

Note 2: If you are in USB mode and you want to exit USB mode, you must remove the USB drive before existing USB mode. Otherwise, the PDU will reset and re-enter USB mode.
Figure 28: USB Submenu

NOTE: once you select USB, INI will reboot in USB mode

NOTE: once you quit, unplug the USB and INI will boot in regular mode
Units Submenu
The Units submenu displays the temperature units. On the Setup menu, scroll down to highlight Units. Press Select to enter the Units Submenu. After you select the values, press Select to set the values as displayed on the screen. Press Menu to return to the previous menu.

Alarms Menu
The Alarms menu displays active alarms for the PDU. On the Main Menu, scroll down to highlight Alarms. Press Select to display the Alarm Screen. When you finish your review, press Menu to return to the main menu.
Power Menu

The Power menu manages device, phase, breaker and outlet. On the Main Menu, scroll down to highlight Power. Press Select. Scroll down to select a submenu and press Select to display the submenu options. Press Menu to return to the previous menu.
Device Submenu
The Device submenu is to display current, voltage and power. On the Power menu, scroll down to highlight Device. Press Select to display the power values for the entire PDU. Press Menu to return to the previous menu.

Phase Submenu
The Phase submenu is to display the status of 3-Phase. On the Power menu, scroll down to highlight Phase. Press Select to display the screens to set the values for the submenu. After you select the phase, press Select to display the values for that phase on the screen. Press Menu to return to the previous menu.
Figure 33: Phase Submenu

**Breaker Submenu**

The Breaker submenu is to display power values for the breakers. Press **Select** to display the values of the first breaker. To go to the next breaker, **Select** next. Press **Menu** to return to the previous menu.
Outlet Submenu

The Outlet submenu is to display voltage, current and power from outlet number 1 to number n. On the Power menu, scroll down to highlight Outlet. Press **Select** to display values for the first outlet. To go to the next outlet, **Select** next. Press **Menu** to return to the previous menu.
Sensors Menu

The Sensor menu is to display temperature, humidity, door switch, fluid leak etc. On the Main Menu, scroll down to highlight Sensor. Press Select. This will display the sensor data for the first sensor. To go to the next sensor, Select next. Press Menu to return to the previous menu.

Figure 35: Outlet Submenu
Figure 36: Sensors

NOTE: Maximum of 8 sensors are configured per PDU.
Section 6 – User Access

Changing Your Password
In initial login, change the password:

1. The Change Password window opens directly. Enter the current password and new password twice to confirm. By default, passwords must be between 8 and 32 characters.

2. Click Change Password to complete the password change.

After initial login, to change the password:

1. Go to User Name>Change Password.
2. The Change User Password window opens.

![Change User Password](image)

**Figure 39: Change User Password**

3. Enter the old password and then new password twice to confirm. By default, passwords must be between 8 and 32 characters.
4. Click **Change Password** to complete the password change.

**Logging Out**

Users should logout after each session to prevent unauthorized changes to the system.

1. Click the user name icon in the top right corner of the screen (see Introduction to the Web Menu).
2. Click **Log Out** in the drop-down menu.

**Access Types**

There are two levels of access privileges:

- Administrator Privileges
- Read Only

The Panduit PDU comes with a standard **Administrator Privileges** profile and a standard **Read Only** profile. The “Admin Role” is typically the system administrator and has the Administrator Privileges with full operating permissions. By default the User Role is a Read Only profile. All other users must be added by a user with administrator privileges. Users are defined by their unique login credentials and by their user role. The level of access privilege determines what the user will see and what actions the user can perform. The level of access privilege determines which menu
items the user can access or which fields display on individual setting and configuration dialogs. Before setting up users, determine the Roles that will be required. Each user must be given a Role. These Roles define the permissions granted to the user.

<table>
<thead>
<tr>
<th>Role</th>
<th>Default Permissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>admin</td>
<td>Full permissions that cannot be modified or deleted.</td>
</tr>
<tr>
<td>user</td>
<td>Read-only permissions. Can monitor the system but cannot change any configuration</td>
</tr>
<tr>
<td>manager</td>
<td>Full permissions that can be modified and deleted</td>
</tr>
</tbody>
</table>

**User Accounts**

Add a user:

1. Go to User Administration>User Accounts.
2. Select Add User to create a new user profile.
3. Use the Settings tab to enter the following information:
   - User Name (required)
   - Password (required)
   - Confirm Password (required)

**NOTE:** Set password requirements in the required field. By default, passwords must be 8-32 characters in length, and to have at least one numeric character, and at least one special character.

4. Use the Roles tab to set full or read only privileges.
5. Select “Add User” to save the new user profile.

Modify user profile:

1. Go to User Administration>Users.
2. Select the user name.
3. Select Edit. Make changes to the user profile.
4. Select Update.

Delete user profile:

1. Go to User Administration>Users.
2. Select the red X next to user name.

**Setting up the system for Radius Authentication**

1. Go to User Settings > in the admin menu.

![User Settings](image)

**Figure 41: User Settings**

2. Go to Radius Configuration and click the edit pencil.
3. Select the Enable button.

4. Enter Server IP address field, Port number field, and Secret field.

5. Click save and your Radius authentication is complete.

Configuring the system with LDAP Server Settings
To setup LDAP to access the Active Directory (AD) and provide authentication when logging into the PDU via the Web Interface:

1. Go to User Settings (under the ADMIN Menu) > LDAP Configuration.
2. Select the LDAP Enable checkbox.
3. Use the drop-down menu to choose the Type of LDAP Server. Choose Microsoft Active Directory.
4. Enter an IP Address of the domain controller/Active Directory (AD) Server.  
   i.e.: 192.168.1.101 (example)
5. Enter a Port.
**Note**: For Microsoft, this is typically 389.

6. In the Base DN field, enter the account to be used to access AD.  
   *i.e. CN=myuser, CN=Users, DC=EMEA, DC=mydomain, DC=com*

7. Enter the password in the Bind Password and Confirm Password fields.

8. In the Search User DN field, *i.e. DC=subdomain, DC=mydomain, DC=com 10.*

9. In the Login Name Attribute field, enter sAMAccountName (typically)

10. In the User Entry Object Class field, enter person.

   With these LDAP settings configured, the Bind is complete. (see screen shot)

![Edit LDAP Configuration](image)

**Figure 43: LDAP Configuration**
Once LDAP is configured, the PDU must understand for which group authentication occurs. A role must be created on the PDU to reference a group within Active Directory (AD).

1. Within the Active Directory, create a group for the users that you wish to be PDU administrators. *i.e. admins*
2. Within the G5 PDU Web Interface, go to User Settings (under admin menu) > Roles. Enter the Role Name that was created in AD. *i.e. admins*
3. Enable role privileges as needed. (see screen shot)

![Edit Role Privileges](image)

4. LDAP authentication is ready to use. To test this, just click save, then click on “LDAP Configuration” again and type an Active Directory user name/password into the test box. Click Test LDAP Configuration. If a box pops up with all green “SUCCEEDED” (no X’s), the LDAP is successfully configured.
Test LDAP Configuration

Test Name
admin

Test Password

Test LDAP Configuration  Save

Figure 45: Test LDAP Configuration

Note: Be sure to login without a domain name.
Section 7 – Daisy Chain Configuration

Daisy-Chain Overview
In daisy chain mode, up to four (4) PDUs of the same SKU number can be connected via one (1) IP address. This allows users to gather information and data on all daisy-chained PDUs from the master PDU. The daisy chain functionality reduces network cost for PDUs. For example, a standard network switch used in a data center may contain 24 ports. Without using the daisy chain function, each port would supply network connection to one (1) PDU. However, if using the daisy chain features, a typical network switch with 24 ports can supply network connections for up to 96 PDUs.

Daisy-Chain Setup
1. After the initial PDU is configured, connect an Ethernet cord from the RS485-2 port on the configured PDU to the Serial+RS485-1 port on the second PDU in the daisy chain line.

2. Repeat step 2, connecting PDUs from the RS485-2 port to the Serial+RS485-1 port for up to 4 PDUs.

NOTE: The total length of the Ethernet cords connecting the PDUs must be less than 15m (49 ft.).

3. Go to the Web interface (or management software) to manage and control the PDUs in the daisy chain.

How to cable for daisy-chain:

1. Locate a CAT-5 cable. Connect one end of the cable to one PDU. Connect the other end of the cable to the other PDUs. See Figure 3 for the location on the front panel of each model type.
2. Monitor the PDUs with the Web interface or SNMP.

**RNA (Redundant Network Access) Functionality**

RNA allows for secure access of PDU data and statistics on 2 separate, private networks. RNA must be used with a redundant power delivery design including two rack PDUs for each IT rack. PDUs used in RNA applications must be the same SKU.

**How it Works**

- Using RNA, the main and expansion unit maintain two separate private networks that do not overlap.
- RNA works using a redundant power delivery design (i.e., two rack PDUs for each IT rack).
- Each PDU is separately connected to the expansion and main’s private communications network.
- The two PDUs are connected with a data communications bus to allow PDUs to share user-defined information.
- Each PDU acts like a main PDU to report PDU data to both networks.
RNA Setup
To setup RNA mode on two PDUs, the user must (1) configure the PDUs for RNA Mode (using CLI) and then (2) connect the LAN Network cords and Ethernet cords between PDUs.

To Configure RNA Mode in the CLI
1. Login to the CLI and enter the command 'dev daisy rna.'
2. The following message will appear:
   - Reboot Required for change to take effort.
   - System Reboot now, Are you sure? (Y/N)
3. Enter Y to confirm reboot.
4. After reboot, the PDU will be setup to RNA Mode.
5. Repeat this process for the second PDU.

To Connect the PDUs for RNA Setup
After the PDUs are configured for RNA:

1. Connect an Ethernet cable from the Landlord LAN Network to the Ethernet port of the first PDU. This will have limited access/permissions.
2. Connect an Ethernet cable from the Tenant LAN Network to the Ethernet port of the second PDU. This will have full access to both PDUs.
3. Connect an Ethernet cable from the Serial+Rs485-1 port on first PDU to the RS485-2 port on the second PDU.
4. Connect another Ethernet cable from the Rs485-2 port on the first PDU to the Serial+Rs485-1 port on the second PDU.
5. In RNA mode, the default account username is ‘landlord’ and password is ‘12345678’. This account is configured for proper access and control in RNA mode.
6. To enable this account, login to the CLI with admin credentials.
7. Enter the command ‘dev daisy rna init’.
8. The following message will appear to confirm the landlord account is enabled: SUCCESS.

9. RNA is now configured and enabled.
Section 8– Web GUI configuration

G5 iPDU Outlet Power Sequence Setup

1. From the PDU GUI Home menu select Control & Manage.

   ![Figure 47: Control & Manage PDU](image)

2. Select Outlet Control Enabled.
3. For each Outlet select the **Edit** pencil.

![Figure 49: Edit Outlets](image)

### SMARTZONE G5 USER MANUAL
4. In the Edit Outlet window enter the On-Delay time (0-7200 seconds) then select **Save**.

![Edit Outlet Window](image)

**Figure 50: One-Delay Time**

5. Your Outlet Power Sequence has been set.
Figure 51: Saved Sequence
Section 9 – Connecting and Configuring Optional Hardware

Accessory Hardware Overview
Panduit SmartZone G5 Monitored Input, Monitored Switched, Monitored per Outlet, and Monitored & Switched per Outlet PDUs can monitor environmental conditions of a rack with the addition of optional SmartZone G5 environmental sensors. Conditions such as temperature, humidity, leak detection, and intrusion can be monitored with the sensors. These are all vital aspects of maintaining an efficient-working data center atmosphere. Users and administrators can monitor the status, view reports, and alarms of specific conditions in and around a PDU, and server rack. (Note, only SmartZone G5 type sensors work with the SmartZone G5 iPDU controller)

The following sensors are available:

- SmartZone G5 Temperature Sensor
- SmartZone G5 Temperature + Humidity Sensor
- SmartZone G5 Three Temperature + Humidity Sensor
- SmartZone G5 Door Sensor
- SmartZone G5 Water Rope Sensor
- SmartZone G5 Sensor Hub
- SmartZone G5 Water Rope Sensor Extension

<table>
<thead>
<tr>
<th>Sensor</th>
<th>Description</th>
<th>Sensor Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature Sensor</td>
<td>Monitors the temperature in the rack.</td>
<td>1</td>
</tr>
<tr>
<td>Temperature + Humidity Sensor</td>
<td>Monitors the temperature and relative humidity in the rack.</td>
<td>2</td>
</tr>
<tr>
<td>Three Temperature + Humidity Sensor</td>
<td>Monitors the temperature in three areas using three separate probes and the relative humidity using one probe.</td>
<td>4</td>
</tr>
<tr>
<td>Sensor Port Hub</td>
<td>Allows for up to three environmental sensors to be connected to the PDU.</td>
<td>N/A</td>
</tr>
<tr>
<td>-----------------</td>
<td>-------------------------------------------------</td>
<td>-----</td>
</tr>
<tr>
<td>Leak Detection Sensor Extension</td>
<td>The kit includes one additional 6m length rope to pair with the leak detection sensor. A total of four extensions can be added to the leak detection sensor for a total length of 30m.</td>
<td>N/A</td>
</tr>
</tbody>
</table>

The optional environmental sensors can be installed before or after completing the PDU installation, startup, and can be installed without turning off power to the PDU or the devices connected. Panduit G5 Monitored Input, Monitored Switched, Monitored per Outlet, and Monitored & Switched per Outlet PDUs are designed to collect a maximum of eight environmental sensor measurements per PDU. For example, the Environmental Three Temperature + Humidity Sensor collects four sensor measurements. See the table above for the sensor measurement collected from each environmental sensor.

All Panduit G5 PDUs have two physical sensor ports, and each PDU can collect a total of eight sensor measurements (or readings). For example, if a PDU has a Door Sensor and an Environmental Three Temperature + Humidity Sensor connected, both physical sensor ports are used with a total of five sensor measurements recorded. Up to six physical sensors can be supported per PDU with the addition of the optional sensor hub.
Figure 52: Sensor Ports for vertical PDU

Figure 53: Sensor Ports for Horizontal PDU
Configuring Environmental Sensors
To configure the sensor location, alarms, notifications, and details, open the WEB Interface:

1. Open the Settings.
2. View the Threshold section on the Settings page. Select Threshold to configure sensors.
3. Go to external sensors.
4. Select **Edit** button to configure the desired sensors.
5. In the Edit dialog box, type value of up critical, up warning, low warning, and low critical.
6. Select **Save** to exit the sensor setup. Repeat this process for additional sensors.
Warranty and Regulatory Information

**Warranty Information**
(http://www.Panduit.com)

**Regulatory Information**

Safety and regulatory compliance

For important safety, environmental, and regulatory information, see *Safety and Compliance Information* at the Panduit website (http://www.Panduit.com).
Support and Other Resources

Accessing Panduit Support

- For live assistance, go to the Panduit.com website
- To access documentation and support services, go to the Panduit website.
Acronyms and Abbreviations

A
Amps/Ampere

AC
Alternating Current

AES
Advanced Encryption Standard

CLI
Command Line Interface

DES
Data Encryption Standard

DHCP
Dynamic Host Configuration Protocol

Gb
Gigabyte

GUI
Graphical User Interface

iNC
Intelligent Network Controller

IP
Internet Protocol

iPDU
Intelligent Power Distribution Unit
kVA
Kilo-Volt-Ampere

kW
Kilowatts

kWH
Kilowatt Hour

LAN
Local Area Network

LCD
Liquid-Crystal Display

LDAP
Lightweight Directory Access Protocol

OLED
Organic Light-Emitting Diode

PDU
Power Distribution Unit

QNA
Quad-Network Interface

RNA
Redundant Network Interface

SHA
Secure Hash Algorithms

SNMP
Simple Network Management Protocol
TCP/IP
Transmission Control Protocol/Internet Protocol

USB
Universal Serial Bus

V
Volts

W
Watts
Documentation Feedback

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## Appendix A: CLI Commands

### Help Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panduit&gt;?</td>
<td>List all available PDU CLI commands.</td>
<td>Panduit&gt;?</td>
</tr>
<tr>
<td>sys</td>
<td>PDU system configure and setting.</td>
<td>Panduit&gt;sys</td>
</tr>
<tr>
<td>net</td>
<td>PDU net application configure and setting.</td>
<td>Panduit&gt;net</td>
</tr>
<tr>
<td>usr</td>
<td>PDU user operation.</td>
<td>Panduit&gt;usr</td>
</tr>
<tr>
<td>dev</td>
<td>PDU device setting.</td>
<td>Panduit&gt;dev</td>
</tr>
<tr>
<td>pwr</td>
<td>PDU power setting.</td>
<td>Panduit&gt;pwr</td>
</tr>
</tbody>
</table>

### System Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>sys date [year-month-day]</td>
<td>Query or set system’s date.</td>
<td>Panduit&gt;sys date 2013-09-19 SUCCESS Panduit&gt;sys date SUCCESS Date: 2013-09-19 Time: 03:49:46</td>
</tr>
<tr>
<td>sys time [hour:min:sec]</td>
<td>Query or set system’s time.</td>
<td>Panduit&gt;sys time 14:35:34</td>
</tr>
<tr>
<td>sys ntp &lt;IP Address&gt;</td>
<td>Synchronize system date and time, with ntp server you set.</td>
<td>&gt;sys ntp 69.25.96.13 NOTE: IP Address must be a valid ntp, server address otherwise, executes, failed</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
<td>Example</td>
</tr>
<tr>
<td>-----------</td>
<td>-----------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| sys ver   | Query system’s version information including firmware, bootloader, and Web.   | Panduit>sys ver SUCCESS  
Firmware version: 0.41  
Bootloader version: 2.10  
LANGUAGE version: 3.01  
WEB version: 6.30                                           |
| sys def   | Recover PDU to default configuration.                                        | Panduit>sys def SUCCESS  
Recover  
Press any key to cancel                                       |
| sys rst   | Reset system.                                                               | Panduit>sys rst SUCCESS  
Reboot required for change to take effort.  
System Reboot now, Are you sure? (Y/N):Y                  |
| sys upd all | Update system’s firmware with existing pdu bin file.                 | Panduit>sys upd lan SUCCESS  
system will enter upgrade mode after reboot  
System Reboot now, Are you sure?(Y/N):Y              |
|           | **NOTE 1:** There must be a valid file named Panduit.bin existing under directory/fw.  |
|           | **NOTE 2:** If in daisy chain configuration, master will also upgrade its all slave’s firmware.  |
| sys upd boot | Update system’s bootloader.                                                | Panduit>sys upd boot SUCCESS  
system will enter upgrade mode after reboot  
System Reboot now, Are you sure?(Y/N):Y              |
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>sys upd conf</td>
<td>Update system’s configuration.</td>
<td>Panduit&gt;sys upd conf SUCCESS system will enter upgrade mode after reboot System Reboot now, Are you sure?(Y/N):Y</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>NOTE:</strong> There must be a valid file named boot.bin existing under directory/fw.</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>NOTE 2:</strong> If in daisy chain configuration, master will also upgrade its all slave’s bootloader.</td>
</tr>
<tr>
<td>sys log del event</td>
<td>Delete event log file.</td>
<td>Panduit&gt;sys log del event, SUCCESS</td>
</tr>
<tr>
<td>sys log edit data [on &lt;interval&gt;</td>
<td>off]</td>
<td>Configure data log collection parameters</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PANDUIT&gt;sys log edit data on 1 SUCCESS PANDUIT&gt;sys log edit data off SUCCESS</td>
</tr>
<tr>
<td>sys log del data</td>
<td>Delete data log file.</td>
<td>Panduit&gt;sys log del data, SUCCESS Panduit&gt;</td>
</tr>
</tbody>
</table>

**Network Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>net ssh [on/off]</td>
<td>Query or on/off SSH.</td>
<td>Panduit&gt;net ssh SUCCESS, SSH Port: 22 SSH Server is running</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
<td>Example</td>
</tr>
<tr>
<td>---------------</td>
<td>------------------------------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>net ftps [on/off]</td>
<td>Query or on/off FTPs.</td>
<td>Net ftps SUCCESS Ftps Port: 21 Service is running Is Ftps</td>
</tr>
<tr>
<td>net mac</td>
<td>Query MAC address.</td>
<td>Panduit&gt;net mac SUCCESS MAC Addr: C8-45-44-66-2B-26</td>
</tr>
<tr>
<td>net tcpip &lt;dhcp&gt;</td>
<td>Set network to dhcp mode.</td>
<td>Panduit&gt;net tcpip dhcp SUCCESS Network is reconfigured, Please reboot to validate System Reboot now, Are you sure?(Y/N): Y</td>
</tr>
<tr>
<td>net tcpip &lt;static ip, mask, gateway&gt;</td>
<td>Set static IP, mask and gateway.</td>
<td>Panduit&gt;net tcpip static 192.168.30.39 255.255.255.0</td>
</tr>
</tbody>
</table>
### User Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
</table>
| User List         | List all users account existing. | Panduit>usr list SUCCESS  
                      |                                                                                     |  
                      |                               | Usr  Role                                   |  
                      |                               | admin  admin                         |  
                      |                               | user  user                           |  
| User unlock<username> | Unlock specified user. | Panduit>usr unlock user SUCCESS  
                      |                       |                                            |  
                      |                       | Panduit>usr unlock admin SUCCESS |  
                      |                       |                                              |  
                      |                       | **NOTE:** 1. Account would be locked temporarily if login failure exceeds “Maximum number of failed logins”. Use this command to unlock it. |

### Device Commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
</table>
| dev usb [on|off]   | Query or on/off USB.          | Panduit>dev usb SUCCESS  
                      |                                                                                     |  
                      |                                                                                     | Panduit>dev usb off SUCCESS  
                      |                                                                                     |  
                      |                                                                                     | Panduit>dev usb on SUCCESS  
<p>| |
|                                                                                     |</p>
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
</table>
| dev daisy [rna|qna] | Query or set daisy chain mode.                   | Panduit>dev daisy
SUCCESS
daisy chain unit number: 1
daisy chain address list: 000
Daisy Mode: RNA
Panduit>dev daisy qna
SUCCESS
System Reboot now, Are you sure?(Y/N): N |
| dev daisy <rna|qna> init | Initialize daisychain.                             | Panduit>dev daisy qna init
SUCCESS
System Reboot now, Are you sure?(Y/N): N |
| dev outlet <PUID> status | Query all outlets’ status with specified PUID. | Panduit>Dev outlet 1 status
SUCCESS
Relay Outlet Status
Outlet#1: Close Outlet#2: Close Outlet#3: Close Outlet#4: Close Outlet#5: Close Outlet#6: Close Outlet#7: Close Outlet#8: Close Outlet#9: Close Outlet#10: Close Outlet#11: Close Outlet#12: Close |

**NOTE 1:** For M pdu, this command is in valid.

**NOTE 2:** PDUID index from 1; if in daisy chain, the master's PDUID is 1, others is 2,3,

<p>| dev outlet &lt;PUID&gt; &lt;outlet index&gt; [on|off] | Query or set specified PUID and outlet-index's outlet status. | Panduit&gt; dev outlet 1 1 off SUCCESS |</p>
<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>dev sensor</td>
<td>List all sensors equipped.</td>
<td>Panduit&gt; dev sensor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SUCCESS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sensor count 4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-----------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Name Type, SN Value</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-----------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>T1,TEMP 012345678 27.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>T3,TEMP 012345678 27.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>T2,TEMP 012345678 27.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RH HUMI 012345678 44</td>
</tr>
</tbody>
</table>

**NOTE:** For Monitored PDUs, this command is invalid.

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>dev ver &lt;slipaddr&gt;</td>
<td>Query sensor/power/delay's firmware version.</td>
<td>Panduit&gt; dev ver 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Panduit&gt; dev ver 15</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Panduit&gt; dev ver 35</td>
</tr>
</tbody>
</table>

**NOTE:** relay: start from 1
power: start from 15
sensor: start from 35

---

**Power Commands**

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>pwr unit [idx]</td>
<td>Query device information, Query specified index unit’s electric information.</td>
<td>Panduit&gt; pwr unit SKU: P9S20A , , , , Serial: , , , , FuncType: PDU Monitored Rating :220-240V, 16A, 3.5-3.8kVA, 50/60Hz Mac :C8:45:44:66:2B:26 Tcpip :192:168:30:38 SUCCESS PDU UNIT 1 power Feature</td>
</tr>
<tr>
<td>Command</td>
<td>Description</td>
<td>Example</td>
</tr>
<tr>
<td>------------------</td>
<td>------------------------------------------</td>
<td>-------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>voltage: 0V current: 0.0A active power: 0W apparent power: 0W power factor: 0.00 energy: 0.000kWh</td>
</tr>
<tr>
<td>pwr phase &lt;idx&gt;</td>
<td>Query specified phase’s electric information.</td>
<td>Panduit&gt; pwr phase 1 SUCCESS PDU PHASE 1 power Feature voltage: 0V current: 0.0A active power: 0W apparent power: 0W power factor: 0.00 energy: 0.000kWh</td>
</tr>
<tr>
<td>pwr cb &lt;idx&gt;</td>
<td>Query specified circuit breaker’s Electric information.</td>
<td>Panduit&gt; pwr cb 1 SUCCESS PDU CB 1 power Feature voltage: 0V current: 0.0A active power: 0W apparent power: 0W power factor: 0.00 energy: 0.000kWh</td>
</tr>
<tr>
<td>pwr outlet &lt;idx&gt;</td>
<td>Query specified outlet’s electric information.</td>
<td>Panduit&gt; pwr outlet 1 SUCCESS PDU OUTLET 1 power Feature voltage: 0V current: 0.0A active power: 0W apparent power: 0W</td>
</tr>
</tbody>
</table>

**NOTE**: For Monitored PDUs, this command is invalid.
Appendix B: Firmware Update Procedure

USB Method
1. Go to www.Panduit.com and download the most recent Firmware version, ‘Panduit.FW’. Save this file to a USB drive.

2. Insert the USB drive into the USB port of the Intelligent Network Controller.

3. Enter USB mode on the PDU: Press Select. Go to Setup>USB>Yes. Select Yes to confirm entering USB mode.

4. Select F/W Up>Yes to upload the new Firmware.

5. The OLED will show the Firmware update progress.

6. When the update is complete, remove the USB.

7. From the USB Menu, select Quit to exit USB mode. Select Yes to confirm exit.

8. The PDU will automatically reboot.

9. To confirm that the Firmware was uploaded successfully, go to Setup>Device>Firmware.

Web Interface Method
1. Open the User interface in a web browser by entering the PDU IP address.

2. Login to with Administration credentials.

3. Go to System Management >Update Firmware.

4. In the Firmware Update dialog box, browse to Panduit.FW firmware file.
Figure 54: Upload Firmware

NOTE: the firmware file must be named Panduit.FW.

5. Select Upload. The system will update the newest firmware to the Intelligent Network Controller.
6. When the upload is finished, the system will reboot automatically.

**FTPfs Method**

To access a PDU using a FTPfs program, FTPfs must be enabled through the PDU Web Interface or CLI. In the Web Interface, go to Network Settings >SSH/FTPfs Configuration. Select the check box to enable FTPfs Access. In the CLI, login as an administrator and use the command net tcpip FTPfs open

1. Login to a FTPfs program with a role with administration privileges.
2. Transfer the updated Panduit.fw file to the folder labeled fw. Close the FTPfs.
3. Connect to the PDU via SSH using a program such as HyperTerm or PuTTY.
4. Login using a role with administration privileges.
5. Enter the command **sys upd all**.
6. It will show the message: System will enter upgrade mode after reboot, System Reboot now, Are you sure? (Y/N).
7. Enter Y.

8. When the upload is finished, the system will reboot automatically. It is not always required to update Web or Bootloader files when the Firmware is updated. However, a user can upload these file types in SSH:

   a. Login to a FTPs program.

   b. Overwrite the outdated files with the updated web files (found on the customer login at www.Panduit.com or from your regional sales manager).

**Bootloader Mode**

1. Go to www.Panduit.com and download the most recent Firmware version, ‘Panduit.bin’. Save this file to a USB drive.

2. Insert the USB drive into the USB port of the Intelligent Network Controller.

3. Enter USB mode on the PDU: Press Select. Go to Setup>USB>Yes. Select Yes to confirm entering USB mode.

4. Select F/W Up>Yes to upload the new Firmware.

5. The OLED will show the Firmware update progress.

6. When the update is complete, remove the USB.

7. From the USB Menu, select Quit to exit USB mode. Select Yes to confirm exit.

8. The PDU will automatically reboot.

9. To confirm that the firmware was uploaded successfully, go to Setup>Device>Firmware.

**Firmware Recovery with Bootloader Mode**

Firmware, configuration files, and bootloader files can be updated following the steps above, but each update type must be done separately. Web files can be updated in conjunction with any of the other updates. I.e., a user can update Firmware and Web files in a single step. But firmware and configuration files must be done separately.
Appendix C: System Recovery

Upgrade Configuration with Bootloader Mode
To make the PDU accessible through the USB port on the unit, you must:

1. Go to Device Configuration > USB Settings.
2. Select the Enable USB Access Checkbox.

To upload configuration, you must:

1. Copy conf.ini to USB.
2. Insert USB to PDU.
3. Enter USB mode in OLED device.
4. Select Conf up.
5. After the operation is completed, remove USB, and quit USB mode.
## Appendix D: PDU Alarms

<table>
<thead>
<tr>
<th>Component</th>
<th>Alarm Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PDU Unit</strong></td>
<td>PDU Unit Active Power Above upper critical</td>
</tr>
<tr>
<td></td>
<td>PDU Unit Active Power Above upper warning</td>
</tr>
<tr>
<td></td>
<td>PDU Unit Active Power Below lower warning</td>
</tr>
<tr>
<td></td>
<td>PDU Unit Active Power Below Lower critical</td>
</tr>
<tr>
<td><strong>Input Phase</strong></td>
<td>Input Phase X Voltage Above upper critical</td>
</tr>
<tr>
<td></td>
<td>Input Phase X Voltage Above upper warning</td>
</tr>
<tr>
<td></td>
<td>Input Phase X Voltage Below lower warning</td>
</tr>
<tr>
<td></td>
<td>Input Phase X Voltage Below lower critical</td>
</tr>
<tr>
<td></td>
<td>Input Phase X Current Above upper critical</td>
</tr>
<tr>
<td></td>
<td>Input Phase X Current Above upper warning</td>
</tr>
<tr>
<td></td>
<td>Input Phase X Current Below lower warning</td>
</tr>
<tr>
<td></td>
<td>Input Phase X Current Below lower critical</td>
</tr>
<tr>
<td><strong>Circuit Breaker</strong></td>
<td>Circuit Breaker X Current Above upper critical</td>
</tr>
<tr>
<td></td>
<td>Circuit Breaker X Current Above upper warning</td>
</tr>
<tr>
<td></td>
<td>Circuit Breaker X Current Below lower warning</td>
</tr>
<tr>
<td></td>
<td>Circuit Breaker X Current Below lower critical</td>
</tr>
<tr>
<td></td>
<td>Circuit Breaker Status ON</td>
</tr>
<tr>
<td></td>
<td>Circuit Breaker Status OFF</td>
</tr>
<tr>
<td><strong>Outlet</strong></td>
<td>Outlet X Active Power Above upper critical</td>
</tr>
<tr>
<td></td>
<td>Outlet X Active Power Above upper warning</td>
</tr>
<tr>
<td></td>
<td>Outlet X Active Power Below lower warning</td>
</tr>
<tr>
<td></td>
<td>Outlet X Active Power Below lower critical</td>
</tr>
<tr>
<td></td>
<td>Outlet X Immediate ON</td>
</tr>
<tr>
<td>----------</td>
<td>------------------------</td>
</tr>
<tr>
<td></td>
<td>Outlet X Delayed ON</td>
</tr>
<tr>
<td></td>
<td>Outlet X Immediate OFF</td>
</tr>
<tr>
<td></td>
<td>Outlet X Delayed OFF</td>
</tr>
<tr>
<td></td>
<td>Outlet X Immediate REBOOT</td>
</tr>
<tr>
<td></td>
<td>Outlet X Delayed REBOOT</td>
</tr>
<tr>
<td></td>
<td>Outlet X Cancel Pending Command</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>External Sensor</th>
<th>External Sensor X (numerical) Above upper critical</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>External Sensor X (numerical) Above upper warning</td>
</tr>
<tr>
<td></td>
<td>External Sensor X (numerical) Below lower warning</td>
</tr>
<tr>
<td></td>
<td>External Sensor X (numerical) Below lower critical</td>
</tr>
<tr>
<td></td>
<td>External Sensor X (state) Alarmed</td>
</tr>
<tr>
<td></td>
<td>External Sensor X (state) Communication Lost</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>System</th>
<th>System Event log Cleared</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>System Data log Cleared</td>
</tr>
<tr>
<td></td>
<td>System PDU configuration file Imported</td>
</tr>
<tr>
<td></td>
<td>System PDU configuration file Exported</td>
</tr>
<tr>
<td></td>
<td>System Firmware update completed</td>
</tr>
<tr>
<td></td>
<td>System Firmware update failed</td>
</tr>
<tr>
<td></td>
<td>System Firmware update started</td>
</tr>
<tr>
<td></td>
<td>System Firmware Validation failed</td>
</tr>
<tr>
<td></td>
<td>System an LDAP error occurred</td>
</tr>
<tr>
<td></td>
<td>System Network interface link state is up</td>
</tr>
<tr>
<td></td>
<td>System Sending SMTP message failed</td>
</tr>
<tr>
<td></td>
<td>System Intelligent Network Controller reset</td>
</tr>
<tr>
<td></td>
<td>System Intelligent Network Controller start</td>
</tr>
<tr>
<td></td>
<td>System Communication Lost</td>
</tr>
<tr>
<td></td>
<td>Daisy Chain state changed</td>
</tr>
<tr>
<td></td>
<td>USB Port</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>User Activity</th>
<th>User Activity User X Authentication failure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>User Activity User X User logged in</td>
</tr>
<tr>
<td></td>
<td>User Activity User X Session timeout</td>
</tr>
<tr>
<td></td>
<td>User Activity User X User blocked</td>
</tr>
</tbody>
</table>

### SMARTZONE G5 USER MANUAL
User Administration

- User Administration Password changed
- User Administration Password settings changed
- User Administration User added
- User Administration User deleted
- User Administration User modified

Smart Rack Access

- Smart Rack Access Door Open
- Smart Rack Access Door Closed
- Smart Rack Access User Card Swiped
- Smart Rack Access Door Autolocked

**Trap Codes assigned to Alarms List**

Trap codes assigned for critical alarms:

<table>
<thead>
<tr>
<th>Trap Class</th>
<th>Trap Code</th>
<th>Trap Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical</td>
<td>1</td>
<td>The PDU unit active power is ABOVE critical threshold value.</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>The PDU unit active power is BELOW critical threshold value.</td>
</tr>
<tr>
<td></td>
<td>3-5</td>
<td>The phase (1-3) voltage is ABOVE critical threshold value.</td>
</tr>
<tr>
<td></td>
<td>6-8</td>
<td>The phase (1-3) voltage is BELOW critical threshold value.</td>
</tr>
<tr>
<td></td>
<td>9-11</td>
<td>The phase (1-3) current is ABOVE critical threshold value.</td>
</tr>
<tr>
<td></td>
<td>12-14</td>
<td>The phase (1-3) current is BELOW critical threshold value</td>
</tr>
<tr>
<td></td>
<td>15-26</td>
<td>The circuit breaker (1-12) current is ABOVE critical threshold value</td>
</tr>
<tr>
<td></td>
<td>27-38</td>
<td>The circuit breaker (1-12) current is BELOW critical threshold value</td>
</tr>
<tr>
<td></td>
<td>39-50</td>
<td>The circuit breaker (1-12) is in OFF state</td>
</tr>
<tr>
<td></td>
<td>51-98</td>
<td>The outlet (1-48) active power is ABOVE critical threshold value</td>
</tr>
</tbody>
</table>
The outlet (1-48) active power is BELOW critical threshold value

The sensor (1-8) temperature/humidity is ABOVE critical threshold value

The sensor (1-8) temperature/humidity is BELOW critical threshold value

The sensor (1-8) contact state is in alarm.

User authentication failed.

Power or relay communication lost to main board

Firmware update failed.

Trap codes assigned for warning alarms:

<table>
<thead>
<tr>
<th>Trap Class</th>
<th>Trap Code</th>
<th>Trap Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warning</td>
<td>200</td>
<td>The PDU unit active power is ABOVE warning threshold value.</td>
</tr>
<tr>
<td></td>
<td>201</td>
<td>The PDU unit active power is BELOW warning threshold value.</td>
</tr>
<tr>
<td></td>
<td>202-204</td>
<td>The phase (1-3) voltage is ABOVE warning threshold value.</td>
</tr>
<tr>
<td></td>
<td>205-207</td>
<td>The phase (1-3) voltage is BELOW warning threshold value.</td>
</tr>
<tr>
<td></td>
<td>208-210</td>
<td>The phase (1-3) current is ABOVE warning threshold value.</td>
</tr>
<tr>
<td></td>
<td>211-213</td>
<td>The phase 1 current is BELOW warning threshold value.</td>
</tr>
<tr>
<td></td>
<td>214-225</td>
<td>The circuit breaker (1-12) current is ABOVE warning threshold value.</td>
</tr>
</tbody>
</table>
The circuit breaker (1-12) current is BELOW warning threshold value.

The circuit breaker (1-12) is in OFF state.

The outlet (1-48) active power is ABOVE warning threshold value.

The outlet (1-48) active power is BELOW warning threshold value.

The sensor (1-8) temperature/humidity is ABOVE warning threshold value.

The sensor (1-8) temperature/humidity is BELOW warning threshold value.

### Trap codes assigned for information alarms:

<table>
<thead>
<tr>
<th>Trap Class</th>
<th>Trap Code</th>
<th>Trap Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Informational</td>
<td>380-391</td>
<td>The circuit breaker (1-12) is in ON state.</td>
</tr>
<tr>
<td>Informational</td>
<td>392-439</td>
<td>The outlet (1-48) IMMEDIATE ON occurred.</td>
</tr>
<tr>
<td>Informational</td>
<td>440-487</td>
<td>The outlet (1-48) DELAYED ON occurred.</td>
</tr>
<tr>
<td>Informational</td>
<td>488-535</td>
<td>The outlet (1-48) IMMEDIATE OFF occurred.</td>
</tr>
<tr>
<td>Informational</td>
<td>536-583</td>
<td>The outlet (1-48) DELAYED OFF occurred.</td>
</tr>
<tr>
<td>Informational</td>
<td>584-631</td>
<td>The outlet (1-48) IMMEDIATE REBOOT occurred.</td>
</tr>
<tr>
<td>Informational</td>
<td>632-679</td>
<td>The outlet (1-48) DELAYED REBOOT occurred.</td>
</tr>
<tr>
<td>Informational</td>
<td>680-727</td>
<td>The outlet (1-48) Cancel Pending Commands occurred.</td>
</tr>
<tr>
<td>Informational</td>
<td>728-735</td>
<td>The sensor (1-8) contact state is in cleared.</td>
</tr>
<tr>
<td>Informational</td>
<td>740</td>
<td>Event log Cleared.</td>
</tr>
<tr>
<td>741</td>
<td>Data log Cleared.</td>
<td></td>
</tr>
<tr>
<td>-----</td>
<td>----------------------------</td>
<td></td>
</tr>
<tr>
<td>742</td>
<td>PDU configuration file Imported.</td>
<td></td>
</tr>
<tr>
<td>743</td>
<td>PDU configuration file Exported.</td>
<td></td>
</tr>
<tr>
<td>744</td>
<td>Firmware update completed.</td>
<td></td>
</tr>
<tr>
<td>745</td>
<td>Firmware update started.</td>
<td></td>
</tr>
<tr>
<td>746</td>
<td>An LDAP error occurred.</td>
<td></td>
</tr>
<tr>
<td>747</td>
<td>Network interface link state is up.</td>
<td></td>
</tr>
<tr>
<td>748</td>
<td>Communication Module reset.</td>
<td></td>
</tr>
<tr>
<td>749</td>
<td>Communication Module start.</td>
<td></td>
</tr>
<tr>
<td>750</td>
<td>Daisy Chain state changed.</td>
<td></td>
</tr>
<tr>
<td>751</td>
<td>USB Port Enabled</td>
<td></td>
</tr>
<tr>
<td>752</td>
<td>User xxx logged in.</td>
<td></td>
</tr>
<tr>
<td>753</td>
<td>User xxx session timeout.</td>
<td></td>
</tr>
<tr>
<td>754</td>
<td>User xxx blocked.</td>
<td></td>
</tr>
<tr>
<td>755</td>
<td>User xxx password changed.</td>
<td></td>
</tr>
<tr>
<td>756</td>
<td>User password settings changed.</td>
<td></td>
</tr>
<tr>
<td>757</td>
<td>User xxx added.</td>
<td></td>
</tr>
<tr>
<td>758</td>
<td>User xxx deleted.</td>
<td></td>
</tr>
<tr>
<td>759</td>
<td>User xxx modified.</td>
<td></td>
</tr>
<tr>
<td>761</td>
<td>Smart Rack Access Door Opened</td>
<td></td>
</tr>
<tr>
<td>762</td>
<td>Smart Rack Access Door Closed</td>
<td></td>
</tr>
<tr>
<td>763</td>
<td>Smart Rack Access User Card Swiped</td>
<td></td>
</tr>
<tr>
<td>764</td>
<td>Smart Rack Access Door Autolocked</td>
<td></td>
</tr>
</tbody>
</table>
Trap codes assigned for information alarms:

<table>
<thead>
<tr>
<th>Trap Class</th>
<th>Trap Code</th>
<th>Trap Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clear</td>
<td>770</td>
<td>The PDU unit active power is alarm clear.</td>
</tr>
<tr>
<td></td>
<td>771-773</td>
<td>The phase (1-3) voltage alarm cleared</td>
</tr>
<tr>
<td></td>
<td>774-776</td>
<td>The phase (1-3) current alarm cleared</td>
</tr>
<tr>
<td></td>
<td>777-788</td>
<td>The circuit breaker (1-12) current alarm cleared</td>
</tr>
<tr>
<td></td>
<td>789-836</td>
<td>The outlet (1-48) active power current alarm cleared.</td>
</tr>
<tr>
<td></td>
<td>837-844</td>
<td>The sensor (1-8) temperature/humidity alarm cleared.</td>
</tr>
</tbody>
</table>
Appendix E: Horizontal Intelligent Network Controller Replacement

1. Unscrew the left and right captive nuts on the Intelligent Network Controller by turning them counter clockwise.

Figure 56: Unscrew Intelligent Network Controller
2. Pull out the Intelligent Network Controller from the PDU.

Figure 57: Remove Intelligent Network Controller from PDU
3. Insert the new Intelligent Network Controller.

![Figure 58: Inserting New Intelligent Network Controller](image)

4. Align the Intelligent Network Controller and tighten the captive nuts by turning them clockwise.
Appendix F: Vertical Intelligent Network Controller Replacement

1. Use a T10 Torx screwdriver to remove the top and bottom screws from the Intelligent Network Controller.

Figure 59: Removing Top and Bottom Screw from Intelligent Network Controller
2. Disconnect the existing signal wire from the Intelligent Network Controller. Connect the signal wire to the new Intelligent Network Controller.

![Image of Intelligent Network Controller]

**Figure 60: Disconnecting and Reconnecting the Intelligent Network Controller**

3. Replace and tighten the two screws on the replacement Intelligent Network Controller into the PDU.