ENVIROMUX® Series

IPDU-Sx

Secure Remote Power Reboot Switch
Installation and Operation Manual

Front and Rear View of IPDU-S2

Front and Rear View of IPDU-S8-P15

TRADEMARK

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CHANGES

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FIRMWARE VERSION

IPDU-S2   Version 1.1

IPDU-S4/8 Version 1.3

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You may obtain the complete open-source code free of charge from Network Technologies Inc (send email to tech-consult@ntigo.com) for more information.

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INTRODUCTION

The ENVIROMUX® IPDU-Sx Secure Remote Power Reboot Switch allows you to remotely reboot and control power (ON/OFF) or to schedule periodic power cycles to servers or other powered devices from any location via secure web interface, RS232, SSH, or Telnet.

Models Include:

Model	Decription	Model	Decription
IPDU-S2	2-Outlet	**IPDU-S8-P10**	8-Outlet, for Euro/UK
IPDU-S4-P10	4-Outlet, for Euro/UK	**IPDU-S8-P15**	8-Outlet, for US/Canada
IPDU-S4-P15	4-Outlet, for US/Canada		

-P10 models include IEC 320-C13 outlets
-P15 models include NEMA 5-15R outlets

Features:

- Supports Power ON or OFF in addition to Reboot.

- Three operating modes for power control:

  o Manual — user can power cycle an outlet for a configured time sequence or power an outlet ON or OFF.

  o Periodic — set a date, time, and duration of the power cycle. Power cycles can also be scheduled as recurring daily, weekly, or monthly.

  o Associated — power ON or OFF a device when a sensor exceeds a user-defined threshold, or power cycle if an IP device is unresponsive.

- Security: HTTPS, SSHv2, SSLv3, IP Filtering, LDAPv3, AES 256-bit encryption, 16-character username/password authentication, user account restricted access rights.

- Power Up Sequencing limits in-rush current.

- Monitor (ping) up to 8 IP network devices.

  o Configure the timeout and number of retries to classify a device as unresponsive.

  o Power cycle associated power outlets if devices are not responding.

  o Alerts are sent if devices are not responding.

- Outlets can be individually named (up to 80 characters).

- Monitor environmental conditions.

  o Supports two sensors, including: temperature, humidity, and water detection.

  o When a sensor goes out of range of a configurable threshold, the system will notify you via email, syslog, LEDs, web page, and network management (SNMP).

  o Powers up or down devices when sensors go out of range of user-defined thresholds.

- Operates on a hardened Linux system.

- Firmware upgradeable "in-field" through console port or Ethernet.

- Up to 17 units can be cascaded into a system of up to136 outlets controlled either locally via RS485 or remotely via web interface (models IPDU-S4 and IPDU-S8 only)

- Line Monitoring (IPDU-S4 and IPDU-S8 only)

  o Monitor outlet voltage

  o Monitor outlet current

  o Monitor outlet frequency

  o Monitor circuit breaker status

- Configurable events (IPDU can send alerts or control outlets as reaction to specific sensor readings) (models IPDU-S4 and IPDU-S8 only)

MATERIALS

Materials supplied with this kit:

- NTI IPDU-Sx Secure Remote Power Reboot Switch
- 1- IEC320-C13 Line cord, country specific (PS4162) (IPDU-S2 and IPDU-S4/8-P10 only)
- 1- IEC320-C14 Output cord (PS4163) (IPDU-S2 and IPDU-S4/S8-P10 only)
- 1- DB9 Female-to-RJ45 Female adapter (CT6182)
- 1- 5 foot RJ45-to-RJ45 CAT5 patch cable (CB4352)
- CD containing a pdf of this manual, a SNMP MIB file (2-outlet version and 4/8-outlet version), and the NTI Discovery Tool
- Rackmount Kit as detailed in the chart below:

Model	Mounting Brackets (X2)	Screws (X6)	Cage Nuts (x4)	#10-32 Screws (x4)
IPDU-S2	MP4040	HW5133	HW5118	HW5124
IPDU-S4-Pxx	MP4212	HW5133	HW5118	HW5124
IPDU-S8-Pxx	MP4210	HW5133	HW5118	HW5124

SUPPORTED WEB BROWSERS

Most modern web browsers should be supported. The following browsers have been tested:

- Microsoft Internet Explorer 6.0 or higher
- Netscape 7.2 or higher
- Mozilla FireFox 1.5 or higher
- Opera 9.0
- Google Chrome
- Safari 4.0 or higher for MAC and PC

FEATURES AND FUNCTIONS

Front View of IPDU-S2

Rear View of IPDU-S2
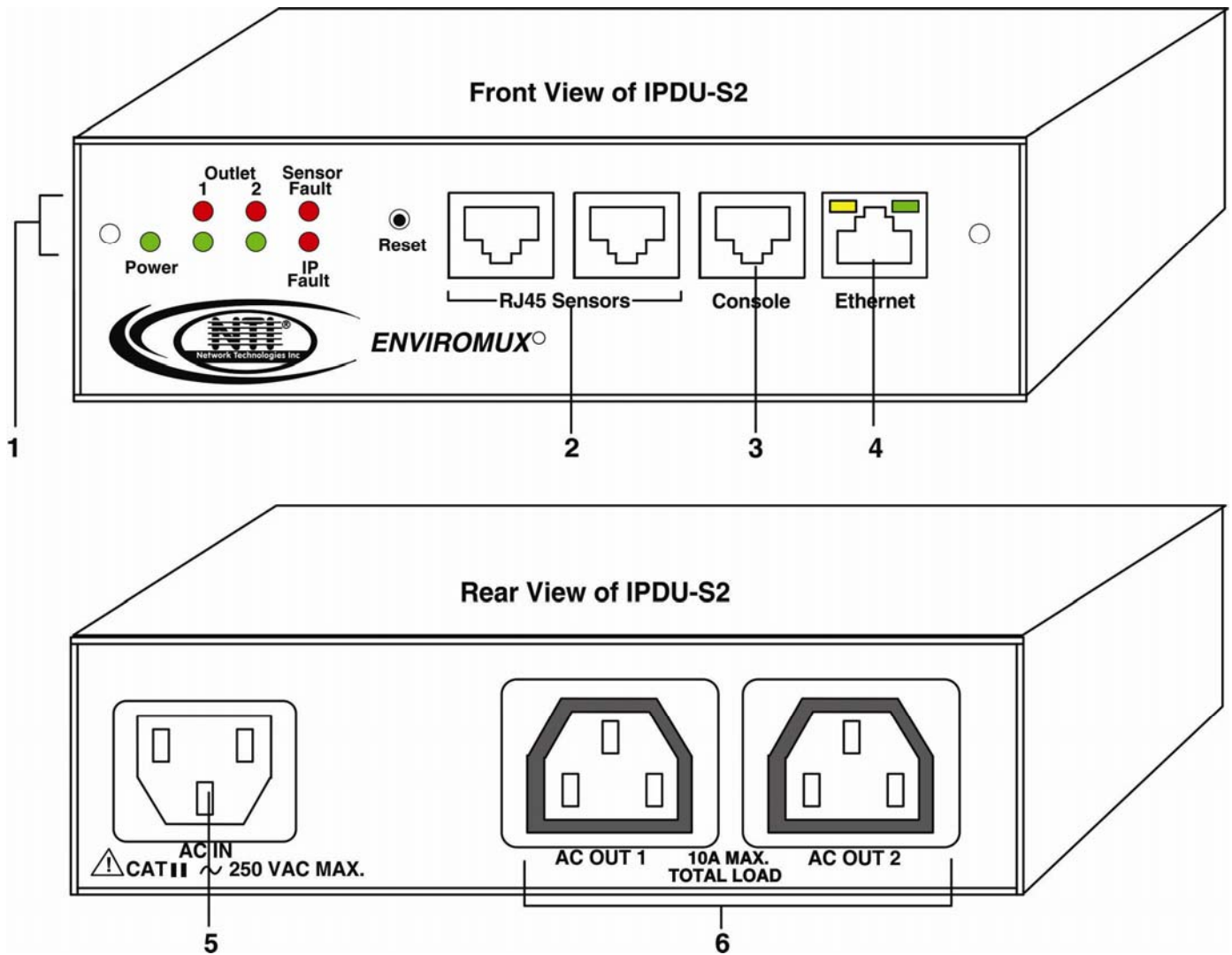
IPDU-S2

1. LED Indicators

- "POWER" (green) — indicates device is powered

- "OUTLET" (green / red) — outlet is ON (green) or OFF (red)

- "SENSOR FAULT" (red) — illuminates if a sensor goes out of range of a configurable threshold

- "IP FAULT" (red) — illuminates if an IP device is unresponsive

2. **RJ45 Sensors**- RJ45 female- for attachment of temperature, humidity, or liquid detection sensors

3. **Console**- RJ45 female- for connection to a terminal for local control

4. **Ethernet**- RJ45 female with LED indicators-   for connection to an Ethernet for remote multi-user control and monitoring

                Yellow LED- indicates 100Base-T activity when illuminated, 10Base-T activity when dark

                Green LED – illuminated when Ethernet link is present, strobing indicates activity on the Ethernet port

5. **AC IN**- IEC320-C14 socket- for connection of AC line cord

6. **AC OUT 1 & 2**- IEC320-C13 socket- for connection of load device cables

IPDU-S8 (FRONT VIEW)

IPDU-S8 (REAR VIEW)
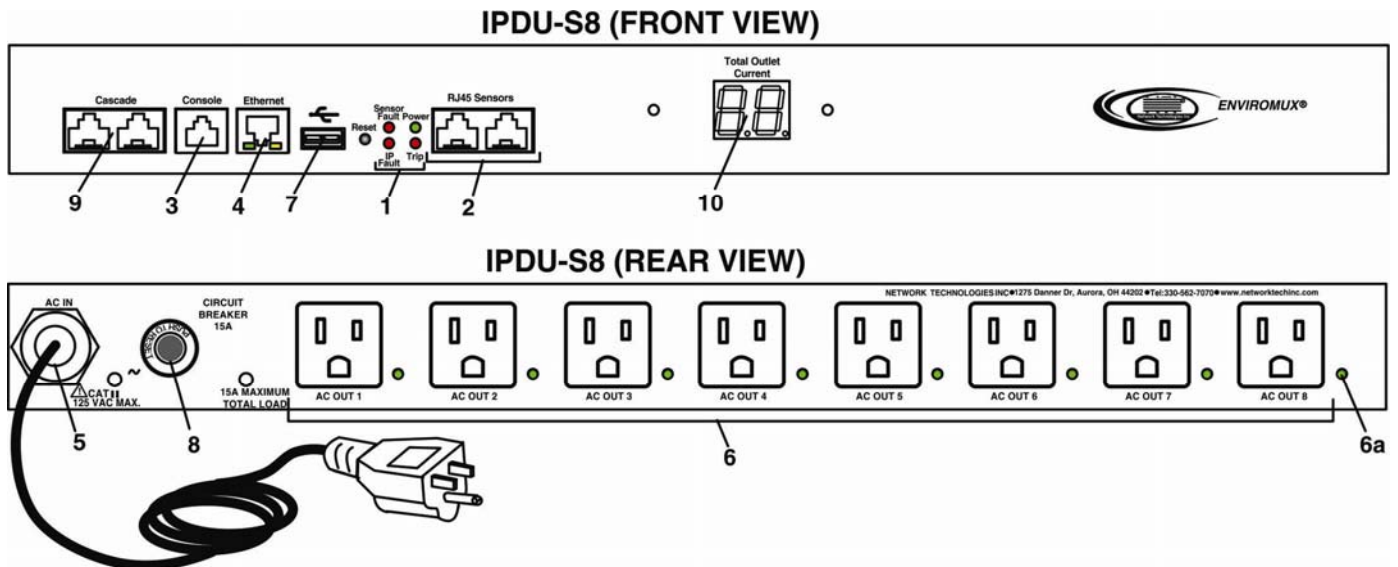
IPDU-S4 / IPDU-S8

1. LED Indicators

- "POWER" (green) — indicates device is powered

- "SENSOR FAULT" (red) — illuminates if a sensor goes out of range of a configurable threshold

- "IP FAULT" (red) — illuminates if an IP device is unresponsive

- "TRIP" (red) -illuminates if the circuit breaker on the rear of the unit trips OFF

2. **RJ45 Sensors**- RJ45 female- for attachment of temperature, humidity, or liquid detection sensors

3. **Console**- RJ45 female- for connection to a terminal for local control

4. **Ethernet**- RJ45 female with LED indicators-   for connection to an Ethernet for remote multi-user control and monitoring
        Yellow LED- indicates 100Base-T activity when illuminated, 10Base-T activity when dark
        Green LED – illuminated when Ethernet link is present, strobing indicates activity on the Ethernet port

5. **AC IN**- 120V AC line cord (15A maximum load (–P15 models only)
        The IPDU-S4/S8-P10 has a IEC320-C14 socket (item 5 on the IPDU-S2)

6. **AC OUT 1-8**- NEMA 5-15R outlets (-P15 models) or IEC 320-C13 outlets (-P10 models) - for connection of load device cables
    6a**. Green LED** - illuminates when associated outlet power is ON (1 per outlet)

7. **USB**- USB Type A port- for connection of a GSM modem for SMS communication and/or flash drive (USB 2.0 Full Speed
    supported) for logging data

8. **Circuit Breaker-** 15A Circuit breaker for protection of the devices powered by the IPDU-Sx

9. **Cascade**- RJ45 Female- for cascading multiple IPDU-S4 and IPDU-S8 units

10. **LED Display**- for displaying the total AC current being supplied by the AC outlets on the IPDU-Sx

INSTALLATION

Connect AC Power Cables

The IPDU-Sx may be connected to a 100-240VAC power supply. A 120V power cord with NEMA 5-15 connector is provided for connection to a power supply.   The AC outlets ("AC OUT 1" and "AC OUT 2") are rated for up to 10A @ 120/240VAC and the combined maximum load cannot exceed 10A for IPDU-S2, IPDU-S4/S8-P10, or 15A for IPDU-S4/S8-P15.
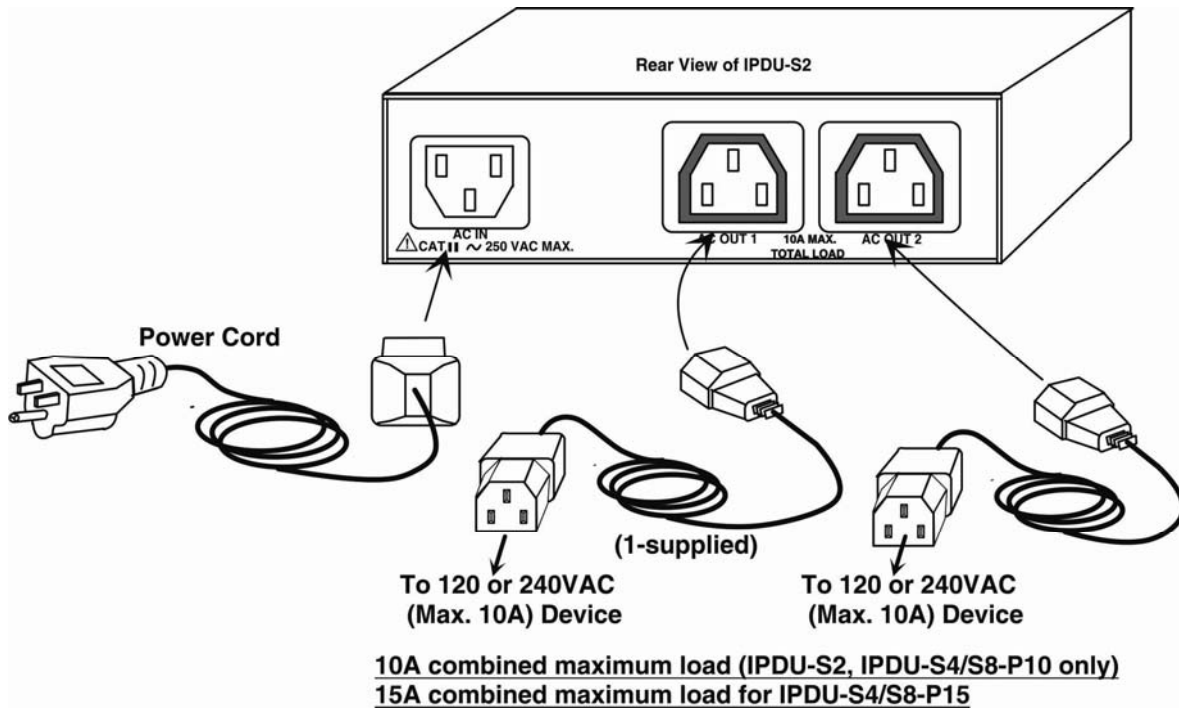
Figure 1- Connect power cords

Ethernet Connection

Connect a CAT5 patch cable (RJ45 connectors on each end wired pin 1 to pin 1, pin 2 to pin 2 etc) from the local Ethernet network connection to the connector on the IPDU-Sx marked "ETHERNET".
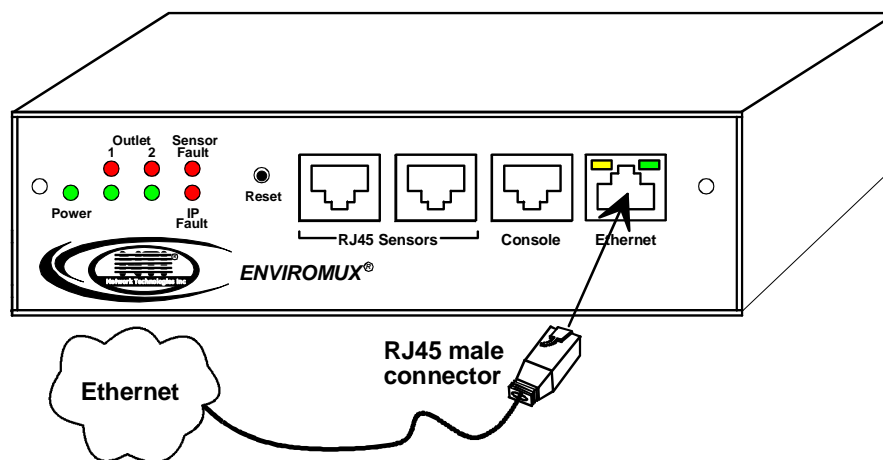
Figure 2- Connect IPDU-S2 to the Ethernet

Note: A direct Ethernet connection can be made with a PC using a crossover cable.   For the pinout of this cable, see page 104.

Terminal Connection for RS232

To make a direct serial connection to the IPDU-Sx from a terminal with HyperTerminal via RS232, an RJ45 female DCE port labeled "Console" is provided. Connect a CAT5 patch cable (supplied) between the port labeled "Console" and a PC with a terminal program (e.g. HyperTerminal). An adapter (supplied) may need to be used to connect the patch cable to the PC.
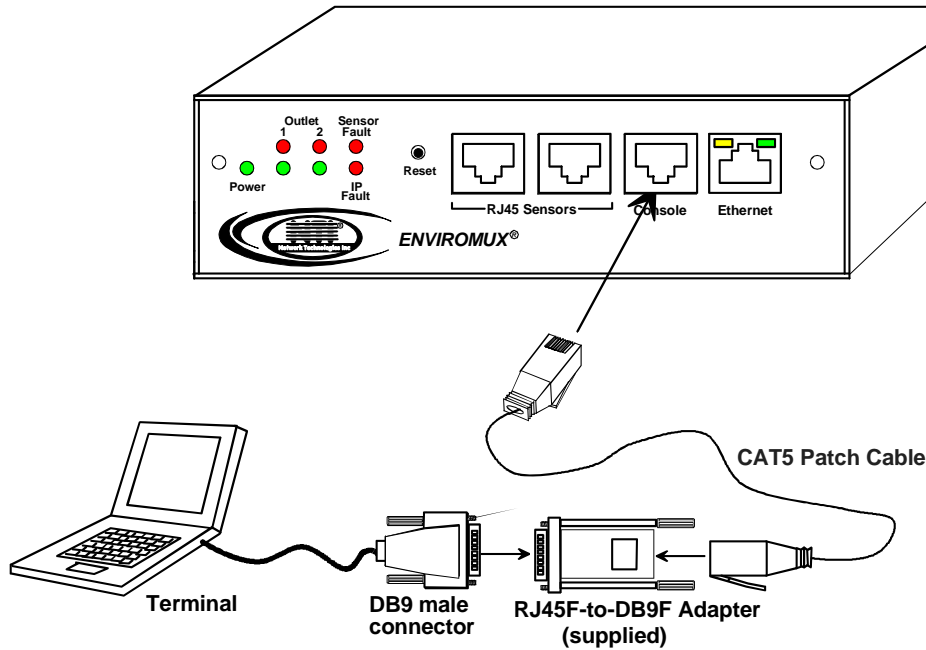
Figure 3- Connect IPDU-S2 to local terminal

Sensor Attachment

The IPDU-Sx is capable of sensing and reporting readings taken from ENVIROMUX temperature (ENVIROMUX-STS), humidity (ENVIROMUX-SHS), temperature/humidity (ENVIROMUX-STHS), wide range temperature/humidity (ENVIROMUX-STHS-99) and liquid detection (ENVIROMUX-LDTx-y) sensors. Any of these can be connected to the "RJ45 Sensors" ports and used to determine if connected devices should be powered ON or OFF based on readings taken. The maximum CAT5 cable length for attachment of sensors is 1000 feet. For the cable pinout, see page 104.
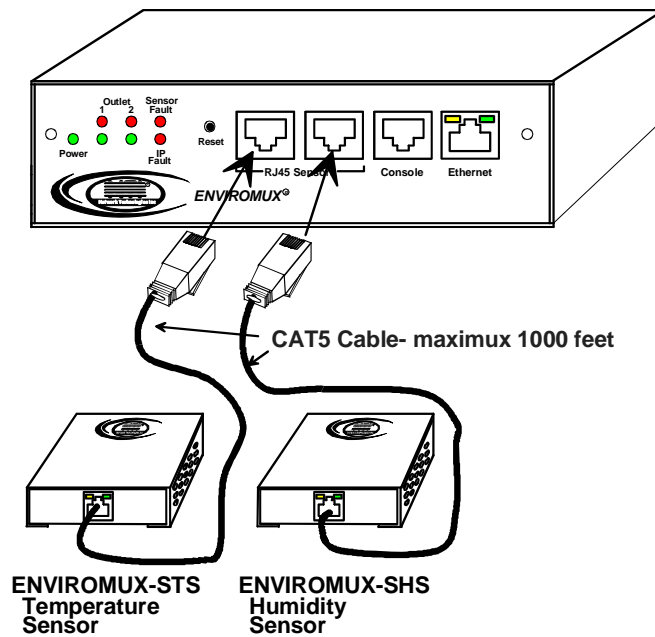
Figure 4- Connect sensors for environmental monitoring

Front Panel LEDs Indicate Status

With proper connections made, the IPDU-Sx is now ready to use. With the power cord attached and plugged into an AC outlet, the "Power" , "Outlet 1" and "Outlet 2" green LEDs should be illuminated on the front of the IPDU-S2.   The table below describes the function of each LED.

The IPDU-S4 and IPDU-S8 have a green LED adjacent to each outlet that will illuminate when power is ON to the outlet. (See page 4.)
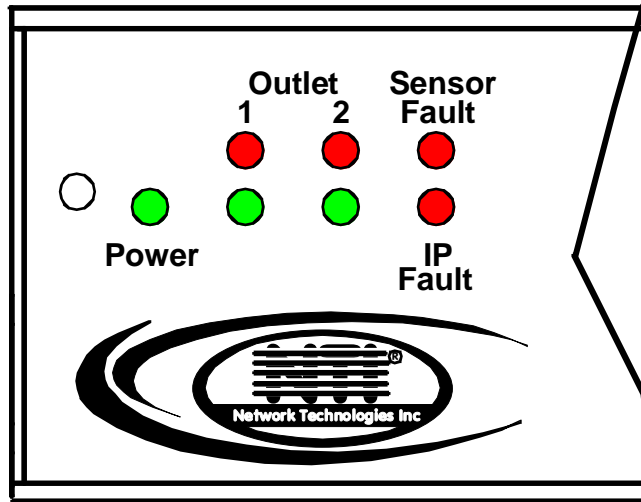
Figure 5- LEDs on front of IPDU-S2

LED	Description
Power-green	Indicates the power status of the IPDU-Sx
Outlet 1 and 2-red	Illuminates when the AC OUT (1 or 2) is powered OFF
Outlet 1 and 2-green	Illuminates when the AC OUT (1 or 2) is powered ON
Sensor Fault-red	Illuminates if the connected sensors are outside of their thresholds
IP Fault- red	Illuminates if there is an IP monitoring fault
Trip - red	Illuminates if the breaker on the IPDU-S4/8 trips
Total Outlet Current	Displays total current draw of all outlets (IPDU-S4/ -S8 only)
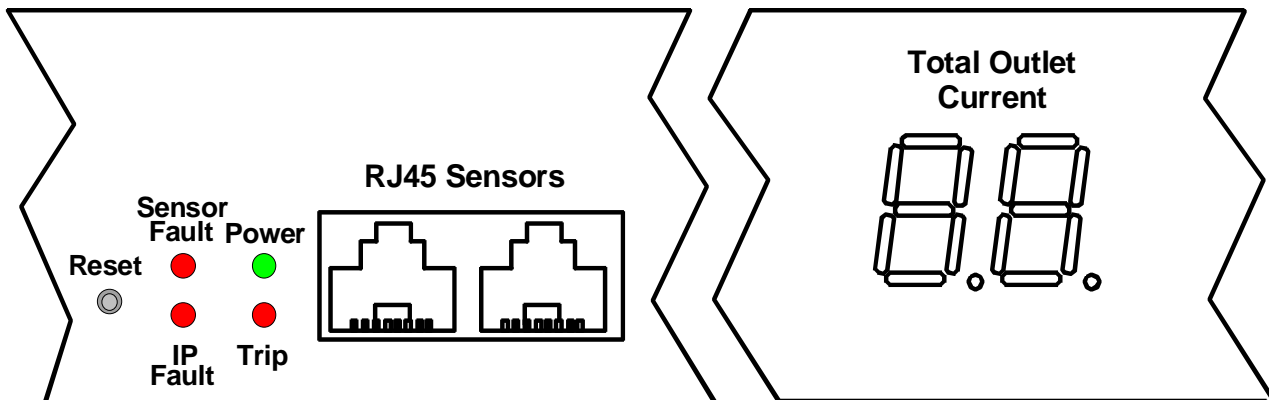
Figure 6- LEDs on front of IPDU-S4/S8

Cascaded Installation via RS485 Connection

Two RJ45 ports are provided on the front of models IPDU-S4 and IPDU-S8.   These are used when multiple units are connected together (cascaded) and controlled as one system using the RS485 Connect method (see page 8). Cascading enables the monitoring of all sensors and outlets from up to 17 IPDU-S4 or IPDU-S8 (or any combination of each model).   For an RS485 Connect installation, connect a CAT5/5e/6 patch cable with RJ45 male connectors on each end (wired straight thru, pin 1 to pin 1, pin 2 to pin 2, etc.) between the "Cascade" ports as shown in the image below. The maximum distance from the Master to the last Slave can be no more than 1000 feet.   With this properly connected and configured (pages 37 and 81) , the user can monitor the sensors and outlets of all systems from either a single connected terminal (page 6) or through the Web Interface.

IPDU-S8 MASTER with RS485 Slaves (FRONT VIEW)
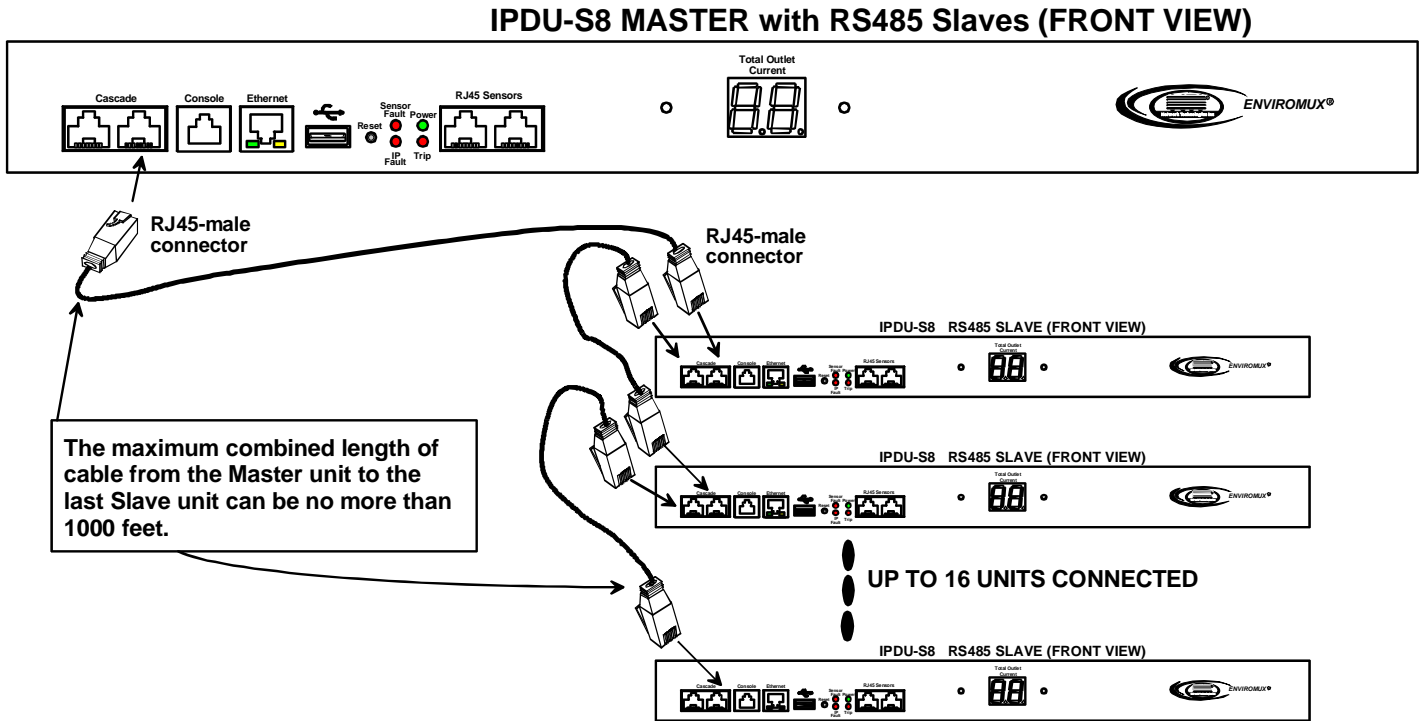
Figure 7- Cascade installation- RS485 Connection

GSM Modem Connection

(IPDU-S4 and IPDU-S8 Models only)

If alert notifications via SMS to a cell phone are desired, a GSM modem can be connected to the USB port on the IPDU-S4 / -S8 models. With a GSM modem connected, a user can receive SMS alert messages directly on their cell phone.   The external GSM modem is powered by the USB port.

A GSM modem that has been tested and is confirmed to be compatible with the IPDU-S4/ -S8 is the iCON 452. To order this modem, contact NTI and ask for the **ENVIROMUX-3GU**.
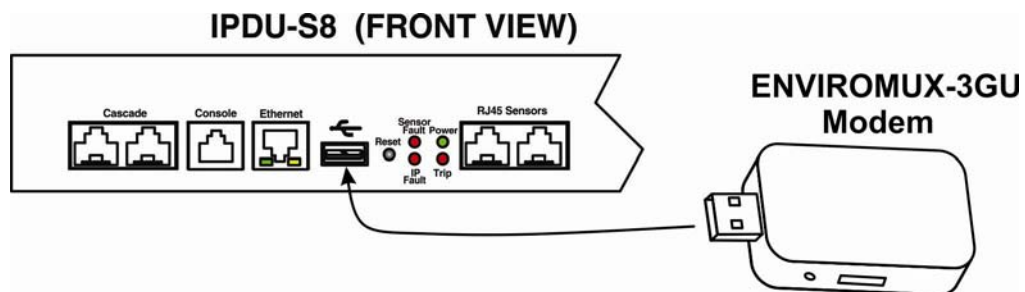
Figure 8- Connect a GSM modem

Note: The modem connected to the IPDU-Sx will send SMS messages only.   No access to the IPDU-Sx is possible through the modem.

Rack Mounting Instructions

The IPDU-S4R and IPDU-S8 were designed to be mounted in a rack. They include a rack mount kit to make attachment easy.

1. Attach the ears to the IPDU-Sx using the #6-32x3/16" flat Phillips-head screws (6) provided as shown in the illustration below.
2. The holes in the ears should line up with pre-threaded holes in the sides of the IPDU-Sx.   Tighten the screws securely.
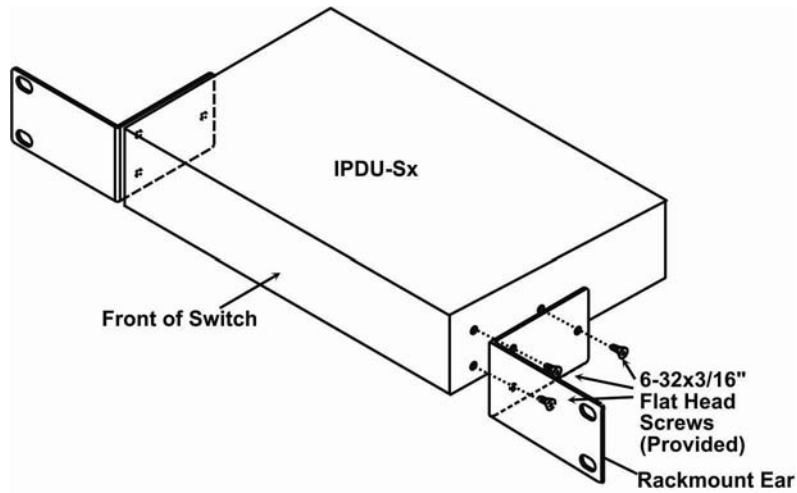
Figure 9- Secure rack mount ears to IPDU-Sx

3. Install 4 cage nuts to the rack in locations that line up with the holes in the mounting ears on the IPDU-Sx.
4. Secure the IPDU-Sx to the rack using four #10-32x3/4" screws and cage nuts (provided). Be sure to tighten all mounting screws securely.
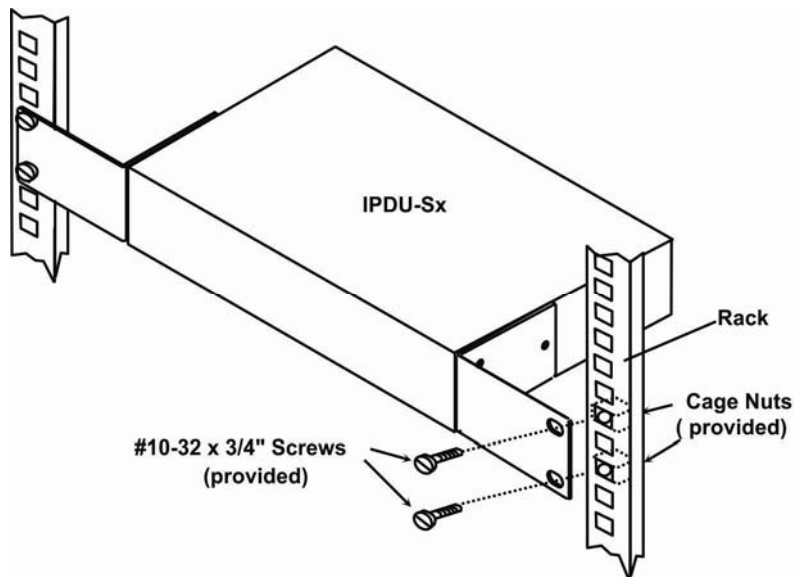
Figure 10- Secure IPDU-Sx to rack

5. Attach all cables securely to the IPDU-Sx and where necessary supply adequate means of strain relief for cables

OVERVIEW

Administration

The IPDU-Sx can be administered in any one of the following ways:
- Using a terminal program (e.g. HyperTerminal) via an RS232-Link, connected to Console Port.
- Using Telnet or SSH protocol via the Ethernet Port.
- Using the web interface (HTTP/HTTPS protocol) via the Ethernet Port.

The following administrative controls are available in the IPDU-Sx, thru the menu.
- View or modify the administrator & user parameters (passwords, outlet/sensor alert subscriptions, admin access, etc.)
- View or modify the network parameters (e.g. IP Address, Gateways, DNS, etc.)
- View and clear system event logs
- Clear, import, export and restore configuration parameters
- Firmware upgrades for the IPDU-Sx, thru Console port or over Ethernet
- View or modify sensor, IP device, and outlet configurations

Additional administrative controls available in IPDU-S4 and IPDU-S8 models include:
- Cascade configuration
- USB port enable/disable (for data logging)

General Functions

Manual Power Control
The user has the ability to power cycle either of the outlets by merely selecting the outlet and clicking on the appropriate action from the web interface or text menu.

Periodic Power Control
The user can schedule power cycles for each of the outlets by setting the date and time of the reboot, the duration of the power cycle (time ON or OFF), and whether the power cycle will be one-time, daily, weekly, or monthly. In the event that a user schedules a monthly reboot on a date which not all months have, (e.g.. the 31st of a month), the scheduled reboot will execute on the final day of the months with fewer days.

Associated Power Control
The user can configure an outlet to power cycle when a sensor exceeds a certain threshold or when an IP address is non-responsive.

Sensor Alerts
A high and low threshold limit can be set for each temperature or humidity sensor. When a sensor takes a reading that is outside a threshold, an alert notification is generated. The user can specify the frequency of alert notifications to match his or her schedule. Also, there will be some hysteresis involved with alert notifications. This means if a sensor's readings are moving in and out of the threshold boundaries within a configurable period of time, additional alert notifications will not be sent. After an alert is activated, it remains persistent even if the condition of the sensors returns back to normal, until the user acknowledges or dismisses that alert. The user has the option to set the unit to auto-clear the alert if the sensor's status returns to normal, and the user can be notified if the condition goes back to normal. Alert notifications will be provided through four main methods: visible notification via one of the user interfaces (red "Fault" LED on front panel, alert on webpage, alert in text menu), emails, syslog message and/or SNMP traps.

IP Monitoring & Alerts

The individual IP addresses of the devices connected to the "AC Out" ports can be monitored. The Remote Power Controller will ping each address, and if a response is received, the IP address status is considered to be "OK"'. The user will have the option to configure the IPDU-Sx to cycle power at the corresponding device's outlet if no response is received, and an alert will be logged and sent. The user can configure the timeout for a response and the number of retries before signaling an alert and power cycling. The IPDU-Sx can also be configured to monitor the IP addresses of the network switches and routers to which these devices are connected, so as to determine if the problem is due to a lack of response from the device or a network failure. Alert notifications will be provided through four main methods: visible notification via one of the user interfaces (red "Fault" LED on front panel, alert on webpage, alert in text menu), emails, syslog messages and/or SNMP traps.

Event Log

The IPDU-Sx maintains an event log. The event log includes power-ON, system, and alert notifications, as well as user login/logout, and user alert handling. The maximum number of log entries is 1000, and these entries are sorted in chronological order. The log can be viewed at any time through the web interface or text menu, and can be saved as a text file. Log entries can be removed individually or all at once. In the IPDU-S4 / -S8, the event log can be stored as a portable text file on a removable USB flash drive.

Data Log

The IPDU-Sx maintains a data log. The data log includes readings taken from sensors, IP devices, and power outlets being monitored. The maximum number of log entries is 1000, and these entries are sorted in chronological order. The log can be viewed at any time through the web interface or text menu, and can be saved as a text file. Log entries can be removed individually or all at once.   In the IPDU-S4 / -S8, the data log can be stored as a portable text file on a removable USB flash drive.

Email

The IPDU-Sx can access an SMTP server to send outgoing email. Outgoing email would contain pre-formatted alert notifications. SMTP server information can be configured using one of the interfaces. Email addresses can be configured through web pages or text menu. Each user can have their own email address.

The email messages sent by the Remote Power Controller have a fixed format. Alert emails contain 6 fields and will have a configurable title.   The title is configurable for each sensor, device, IP address, or outlet. The title is the "email subject" in all configuration pages.   A sample message is shown below:

```
ENTERPRISE: Enterprise name here
LOCATION: Danner Drive
CONTACT: John Smith
DESCRIPTION: Undefined #5
TYPE: Humidity
MESSAGE: Sensor value exceeded thresholds
```

SNMP

The IPDU-Sx can send alerts as SNMP traps when a sensor or IP device enters/leaves alert mode, when a power outlet changes state, and for all log events. Using SNMP network management software or a MIB browser, a user can monitor all sensor statuses and system IP settings.   The destination for SNMP traps can be configured for each user.

Note: The SNMP MIB file (ipdu-s2-v1-xx.mib for 2 port model, ipdu-s8-v1-xx.mib for 4 and 8 port models), for use with SNMP network management software or SNMP trap receiver, can be found on the manual CD.   Click on the link to open the file; then save the file to your hard drive to use with the SNMP MIB browser or SNMP trap receiver.

GSM Modem

An external GSM modem can be connected to allow the system to send alert notifications via SMS messages. When a power outlet changes state or a sensor crosses a threshold, an alert notification can be formatted to SMS message (see page 17) and the modem can transmit the message to the pre-specified cellular number of each user configured to receive SMS messages (page 44).

Security

User Settings
In order to configure and operate the IPDU-Sx, each user must login with a unique username and password. The Administrator can configure each user's settings as User or Administrator. An Administrator has access to all configurations and controls. A user can monitor sensors, outlets, and IP devices. A user can edit his/her own account. Users cannot configure the unit.

IP Filtering
The IPDU-Sx allows the administrator to block access to the device from certain IP addresses. The IPDU-Sx can accept or drop requests based on the IP filter settings. IP Filtering provides an additional mechanism for securing the IPDU-Sx. Access to the IPDU-Sx network services (SNMP, HTTP(S), SSH, Telnet) can be controlled by allowing or disallowing connections from various IP addresses, subnets, or networks.

Secure Connections
The Remote Power Controller supports secure connections using SSHv2 and HTTPS.

Authentications
The IPDU-Sx supports local authentication with up to 16 character usernames and passwords, and it also supports LDAPv3.

Encryption
The IPDU-Sx supports 256-bit AES encryption.

DEVICE DISCOVERY TOOL

In order to easily locate the IPDU-Sx on a network, the NTI Device Discovery Tool may be used. A link to the Discovery Tool is provided on the web page that appears when you insert the instruction manual CD provided into your CD ROM drive. Click on the link or browse the CD and click on the file *discover.html* . This will open your browser and display the Device Discovery Tool page.

Note: The Device Discovery Tool requires the Java Runtime Environment to operate. A link to the web page from which it can be downloaded and installed is provided on the CD.

Note: The computer using the Device Discovery Tool and the IPDU-S2 must be connected to the same physical network in order for the Device Discovery Tool to work.

Figure 11- Device Discovery Tool page

Use the Device Discovery Tool to display all NTI IPDU-S2 units on the network, along with their network settings. Follow the instructions on the Device Discovery Tool page to use the tool and to change the device settings if so desired.

OPERATION VIA WEB INTERFACE

A user may monitor and configure the settings of the IPDU-Sx, the outlets, and any sensor connected to it using the Web Interface via any web browser (see page 2 for supported web browsers). To access the Web Interface, connect the IPDU-S2 to the Ethernet (page 5). Use the Device Discovery Tool (page 13) to setup the network settings. Then, to access the web interface controls, the user must log in.

Log In and Enter Password

To access the web interface, type the current IP address into the address bar of the web browser. (The default IP address is shown below):

> http://192.168.1.22

Note: If "Allow HTTP Access" (page 33) is not checked to be enabled (disabled by default) , only an SSL-encrypted connection will be possible. The software will automatically redirect to an HTTPS (secure) connection. The user will likely see a warning about the SSL certificate and a prompt to accept the certificate. The IPDU-Sx uses a self-signed NTI certificate. Accept the NTI certificate.

A log in prompt requiring a username and password will appear:
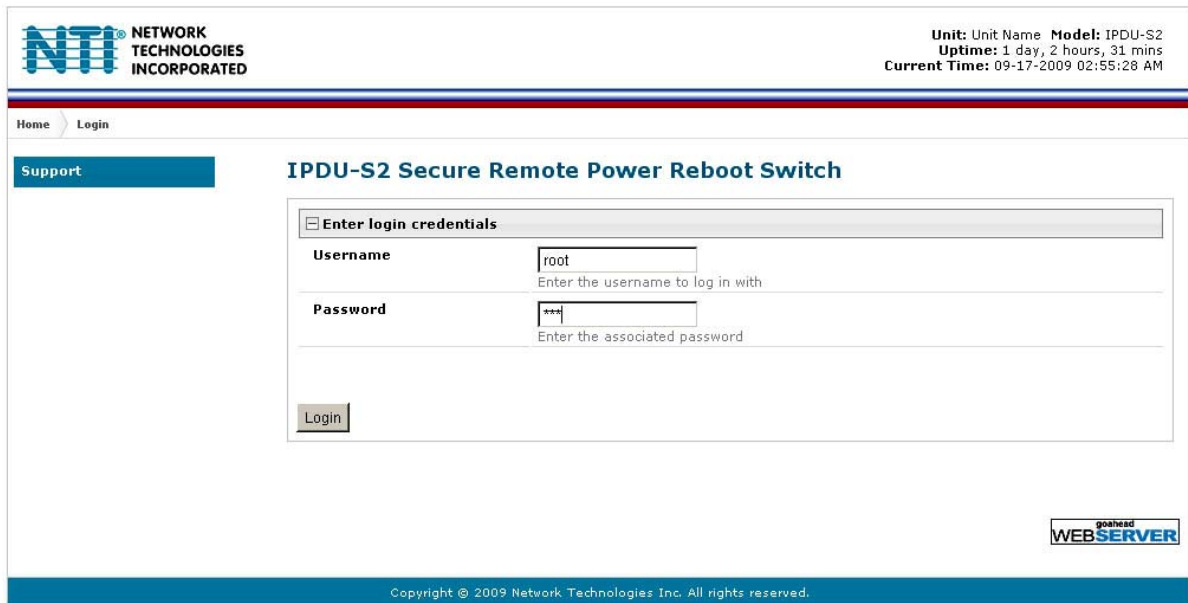
Figure 12- Login prompt to access web interface

Username = root

Password = nti

(lower case letters only)

Note: usernames and passwords are case sensitive

With a successful log in, the "Summary" page with a menu at left will appear on the screen:

Figure 13- Summary page

From this initial page, the user can use the menu to the left to manage all the functions of the IPDU-Sx.

Function	Description
MONITORING	Monitor the sensors, outlets, and IP devices of the IPDU-Sx (below)
ADMINISTRATION	**Configure all system, network, multi-user access, and security settings as well as upgrade firmware (page 30)**
LOG	View and configure the Event and Data Logs (page 50)
SUPPORT	Links for downloading a manual, the MIB file, or firmware upgrades
LOGOUT	Log the user out of the IPDU web interface

Monitoring

Under Monitoring, there are links to view the status of the sensors, outlets and IP Devices being monitored by the IPDU-Sx.

Link	Description
Summary	Lists all items being monitored, including their description, type, value, and status
Power Outlets	Provides a link to view the status of only the Power Outlets in the IPDU-Sx (page 17)
Line Monitor	Provides a link to view the status of the AC line supplying power to the outlets (IPDU-S4 and -S8 only)
Sensors	Provides a link to view the status of only the Sensors and a link to add them (page 22)
IP Devices	Provides a link to view the status of only the IP Devices and a link to add them (page 25)
Events	Provides a link to view the status of pre-configurable events that would generate alerts (page 28) (IPDU-S4 and -S8 only)

Figure 14- Summary page and the Monitoring menu

From the Summary page, the user can view the status of all power outlets, sensors, and the IP Devices being monitored by the IPDU-Sx. Each item listed has a link that when selected will open the status page for that item.

Figure 15- Status page for a power outlet

If the power outlet is in alert status, the user has the option to either **acknowledge** the alert or **dismiss** it.   If the user acknowledges the alert, no additional alert messages will be sent during that alert status cycle.   If the user dismisses the alert, another alert message will be sent once the "notify again after" time designated on the configuration page (page 23) elapses.

If the user wants to change the ON/OFF status of an outlet, an option to perform that function is provided.   Toggle the status desired in the window provided, and click **Apply Changes**.

A **Configure** button at the bottom of each page allows the user (<u>administrators only</u>) to configure parameters of the power outlet.

Configure a Power Outlet

The Power Outlet Configuration page allows the user to apply settings to control how or if alert messages are sent in the event the outlet changes state.   The user can open the Power Outlet Configuration page by clicking on the Configure button at the bottom of the Power Outlet Status page (page 16) or by clicking on Edit from the Summary page.

Figure 16- Power Outlet Configuration page

The Power Outlet Configuration page is broken into three sections; Power Outlet Settings, Notification Settings and Outlet Operation Settings. To explode the window to see Notification Settings or Outlet Operation Settings (Figure 17), click on the section heading (Figure 16).

Figure 17- More settings for Power Outlet Configuration

Power Outlet Settings	Description
Description	The description of the outlet that will be viewed in the Summary page and in the body of alert messages
Group	Assign the outlet to either group 1 or 2
Notification Settings	
Disable Notifications	Place a checkmark in the box to prevent notifications from being sent when this outlet's status changes
Enable Syslog Notifications	Place a checkmark in this box to have alert notifications sent via Syslog messages
Enable SNMP traps	Place a checkmark in this box to have alert notifications sent via SNMP traps (v2c)
Enable Email Notifications	Place a checkmark in this box to have alert notifications sent via Email
Email Subject	Enter the subject to be viewed when an email alert message is received
Enable SMS Alerts (IPDU-S4 / -S8 only)	Place a checkmark in this box to have alert notifications sent via SMS message (requires modem)
Outlet Operation Settings	
Operation Mode	Choose between Manual, Periodic, or Associated operating modes for the outlet
Manual Operation Changes Mode	Place a checkmark here if you want the operating mode to be forced into Manual mode if you manually override the outlet status from the Power Outlet Status page (page 16)
Cycle Duration	Time period (1-300 seconds) the outlet will remain OFF during a manual power cycle or an associated power cycle
Periodic Cycle Duration	Time period in minutes or hours the outlet will remain OFF during a periodic power cycle
Periodic Type	If the operation mode is set to periodic, choose the type of periodic schedule between one time, daily, weekly, monthly, or none
Periodic Hour	Choose which hour of the day for the periodic cycle to occur (00-23)
Periodic Minute	Choose the minute within the hour of the day for the periodic cycle to occur (00-59)
Periodic Day	Choose the day for the periodic cycle to occur (for one-time and monthly settings, enter a value between 1-31; for weekly setting, enter a value 1-7, Sun = 1, Mon=2 .....Sat = 7)
Periodic Month	Choose which month of the year for the periodic cycle to occur. This only applies when the Periodic Type is set to "one time".
Periodic Year	Enter the year for the periodic cycle to occur. This only applies when the Periodic Type is set to "one time".
Default outlet value	Choose the state of the outlet at power-On of the IPDU- Outlet ON or Off
Multiple Event Preferred Value	Choose the preferred outlet state when more than one event can control the outlet (if one event is configured to turn the outlet OFF, and another event to turn the outlet ON, this setting will decide the state of the outlet)

Note: Alerts are also indicated by illuminated LEDs on the front of the IPDU-Sx (page 7).

More about Groups

Groups are used to create a common relationship between sensors, IP devices, power outlets, etc. and their alert messages. All items being monitored are assigned to either group 1 or group 2. All users (a maximum number of 16 including the root user) can either receive alert messages from items in group 1, group 2, both groups, or neither.

Be sure to press the **Save** button to save the configuration settings.

More about Operation Modes

In Manual Mode, the outlet will only power cycle when it is performed through the Power Outlet Status page or through the text menu.

In Periodic Mode, the outlet will power cycle based on the settings configured as described in the table above.

In Associated Mode, the outlet can be controlled based on the alert status of a sensor or IP address. When configured to do so (page 24), the outlet can be powered ON or OFF when a sensor is in alert mode, and/or when it returns to normal state, or power cycled when an IP Device is in alert mode.

Note: An outlet configured for Associated or Periodic operating mode can be manually powered ON/OFF. If "Manual Operation Changes Mode" (above) is checked, manually changing the ON/OFF state of an outlet configured for Associated Mode or Periodic Mode will change the operating mode to Manual Mode until the outlet is reconfigured.

Line Monitor

The Line Monitor on the Summary Page provides a quick way to view the amount of power that is being used by the IPDU-S4 or IPDU-S8.   From the Summary Page the user will find displayed:

- **Line Voltage Status**- the value of the voltage being supplied
- **Total Outlet Current Status**- the total amount of current being used by all of the outlets combined (also viewed in the LED display on the front of the IPDU-S4 and IPDU-S8)
- **Line Frequency Status**- the frequency of the power being supplied
- **Circuit Breaker Status**- the status of the circuit breaker on the rear of the unit.
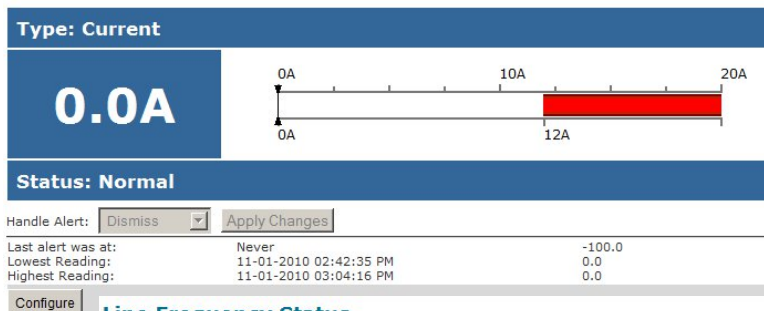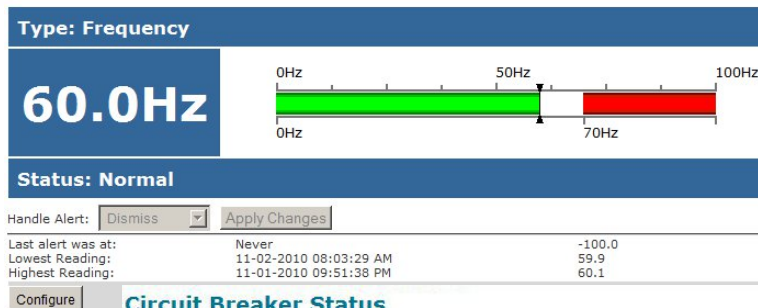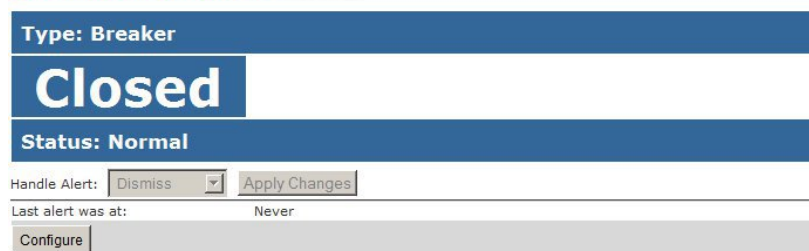
Figure 18- Line Monitor Categories

Each category of line monitoring is configurable much like sensors are configured. For more on configuration, see "Monitor and Configure Sensors" on next page.

Figure 19- Configuration Categories

Monitor and Configure Sensors

To view the graphic image showing the status of a sensor, click on the sensor description in the Summary page. From the sensor status page, the user can view a current reading, either dismiss or acknowledge an alert, or open the sensor configuration page (if the user has administrative privileges).
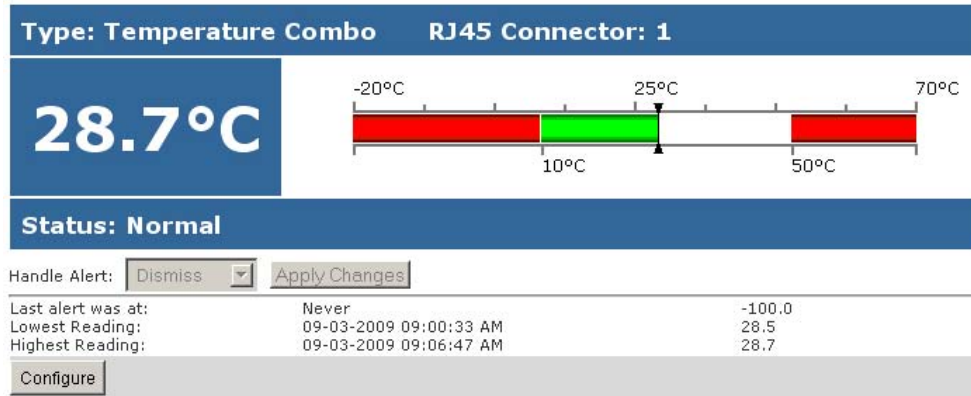
Figure 20- Sensor Status page

The administrative user can open the sensor configuration page by clicking on the **Configure** button at the bottom of the sensor status page (above) or by clicking on **Edit** from the Summary page. From the sensor configuration page the user can apply settings to control how or if alert messages are sent in the event the sensor is in alert status, threshold settings, data logging settings, and power outlet association.

Figure 21- Sensor Configuration page

The Sensor Configuration page is broken into four sections; Sensor Settings, Alert Settings and Data Logging, and Power Outlet Association. To explode the window to see settings for a section, click on the section heading (Figure 21).

Figure 22- Sensor Configuration- full view of settings

Sensor Settings	Description
Description	The description of the sensor that will be viewed in the Summary page and in the body of alert messages
Group	Assign the sensor to either group 1 or 2 (see also page 44)
Units	This lets the operator choose between Celsius and Fahrenheit as the temperature measurement unit.
Min. Level	Displays the minimum value that this sensor will report
Max. Level	Displays the maximum value that this sensor will report
Sampling Period	Determines how often the displayed sensor value is refreshed on the Sensor page. A numeric value and a measurement unit (minimum 1 seconds, maximum 999 minutes) should be entered.
Minimum Threshold	The user must define the lowest acceptable value for the sensors. If the sensor measures a value below this threshold, the sensor will move to alert status. The assigned value should be within the range defined by Minimum Level and Maximum Level and lower than the assigned Maximum Threshold value. If values out of the range are entered, and error message will be shown.
Maximum Threshold	The user must define the highest acceptable value for the sensors. If the sensor measures a value above this threshold, the sensor will move to alert status. The assigned value should be within the range defined by Minimum Level and Maximum Level and higher than the assigned Minimum Threshold value. If values out of the range are entered, and error message will be shown.
Alert Settings	
Disable Alerts	Place a checkmark in the box to prevent alerts from being sent when this sensor's status changes
Alert Delay	The alert delay is an amount of time the sensor must be in an alert condition before an alert is sent. This provides some protection against false alarms. The Alert Delay value can be set for 0-999 seconds or minutes.
Notify Again Time	Enter the amount of time in seconds, minutes, or hours (1-999) before an alert message will be repeated
Notify on Return to Normal	The user can also be notified when the sensor readings have returned to the normal range by selecting the "***Notify when return to normal***" box for a sensor.
Auto Acknowledge	Place a checkmark in this box to have alert notifications in the summary page return to normal state automatically when sensor readings return to normal.
Enable Syslog Alerts	Place a checkmark in this box to have alert notifications sent via Syslog messages
Enable SNMP traps	Place a checkmark in this box to have alert notifications sent via SNMP traps (v2c)
Enable Email Alerts	Place a checkmark in this box to have alert notifications sent via Email
Email Subject	Enter the subject to be viewed when an email alert message is received
Enable SMS Alerts (IPDU-S4 / -S8 only)	Place a checkmark in this box to have alert notifications sent via SMS messages (required modem)
Data Logging	
Add to data log	This is a check-box that lets the user decide if the data sampled should be recorded in the Data Log.
Logging Period	Enter the time period between logged measurements
Power Outlet Association	
Associated outlet	Select which outlet (if any) will be powered ON or OFF when the sensor is in an alert state. For this to take effect, the outlet must be configured for Associated Operation Mode (page 19)
Alert State	State the outlet should be in when the sensor enters an alert state
Normal State	State the outlet should be in when the sensor returns to normal state

Be sure to press the **Save** button to save the configuration settings.

Monitor IP Devices

IP devices such as servers, routers, cameras, etc. can be monitored to make sure network connections are open to them. In order to monitor an IP Device the devices must be added to the list of IP Devices being monitored. From the **Monitoring** section of the menu, click on **IP Devices.** A page listing IP Devices being monitored will open, with a link to add IP Devices. Click on **Add New IP Device**.

Figure 23- IP Devices listing-none monitored yet

The page shown below will open. Enter a description for the new IP Device and the IP Address of the device.

Figure 24- Add New IP Device page

With the address is entered in the block, click on the "**Add**" button.

The IP Device Configuration page will immediately open. Here you can configure the IPDU-Sx to ping the IP Device as often as desired and to react to a lack of response by sending alert messages and/or power-cycling a power outlet.

IP Device Configuration

IP Device Settings

Description	ENVIROMUX-MINI no.1
	Descriptive name for the IP Device
IP Address	10.0.1.15
	IP Address of the device to ping
Group	1
	Select which group the device belongs to
Ping Period	10 Min
	The frequency at which to ping the device
Timeout	2
	Duration, in seconds, to wait for a response to a ping
Retries	10
	The number of tries before device is considered in alarm

Alert Settings

Data Logging

Power Outlet Association

Save

Figure 25- IP Device Configuration page

IP Device Settings	Description
Description	The description of the IP Device that will be viewed in the Summary page and in the body of alert messages
IP Address	The IP address of the IP Device
Group	Assign the IP Device to either group 1 or 2
Ping Period	Enter the frequency in minutes or seconds that the IPDU-S2 should ping the IP Device
Timeout	Enter the length of time in seconds to wait for a response to a ping before considering the attempt a failure
Retries	Enter the number of times the IPDU-S2 should ping a non-responsive IP device before changing its status from normal to alarm and sending an alert

The alert settings and data logging are the same as for sensor configuration, described on page 24.   Under Power Outlet Association, if the IP device is connected to one of the power outlets on the IPDU-Sx, the IPDU-Sx can automatically cycle the power to the chosen outlet when the IP device is determined to be in a state of alarm.   The power cycle characteristics will be those configured under the power outlet configuration under "Outlet Operation Settings" (page 19).

Figure 26- Power Outlet Association for IP Device

With a couple of IP devices having been configured for monitoring, the IP Device list will provide links to them for viewing their status, editing their configuration, or deleting them from the list.

Figure 27- IP Device list with new devices added

To view the graphic image showing the status of an IP address, click on the IP Device description or click **View**. From the IP Device status page, the user can view the current status, either dismiss or acknowledge an alert, or open the IP Device configuration page (if the user has administrative privileges). If you have found the device to be in an alert state and have either dismissed or acknowledged it, be sure to click the **Apply Changes** button.

Figure 28- IP Device Status page

Monitor Events

The IPDU (models IPDU-S4 and IPDU-S8 only) can be configure to respond to predefined events. Once the criteria is set for what constitutes an event, an alert can be sent and/or devices connected to outlets can be controlled.   Up to 50 events can be configured.
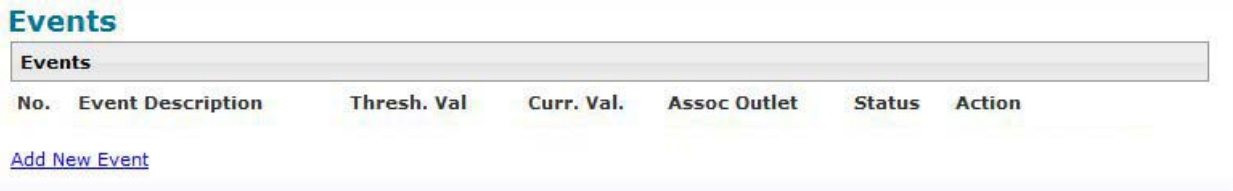
Figure 29- Event Monitoring

From the Events list, select "Add New Event".   A page with a drop-down list of available sensors to choose from is presented.

Select the sensor you want to use to send an alert if specific conditions are reached.
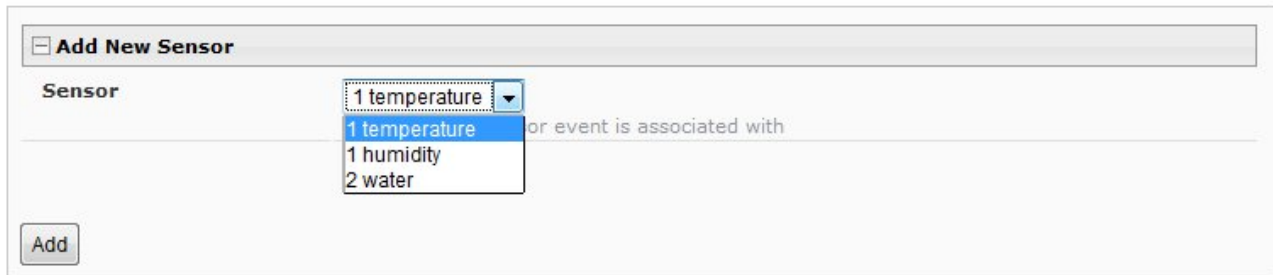
Figure 30- Add New Event

A configuration page will appear with fields for determining under what circumstances you should receive an alert from a sensor and what, if anything should be done about it.

The settings applied here have no bearing on the sensor configuration settings applied when the sensor is setup (page 23). These settings only apply to the event being configured.

Many of the same fields described in the sensor configuration page (page 24) are used for event configuration.

Event descriptions can be anything you want, up to 80 characters in length.   These descriptions will appear in the Event Log when events are recorded.

Note: Once you open the "New Event Configuration" page for an event, that event will be added to the list of events (next page). To remove the event, see next page.
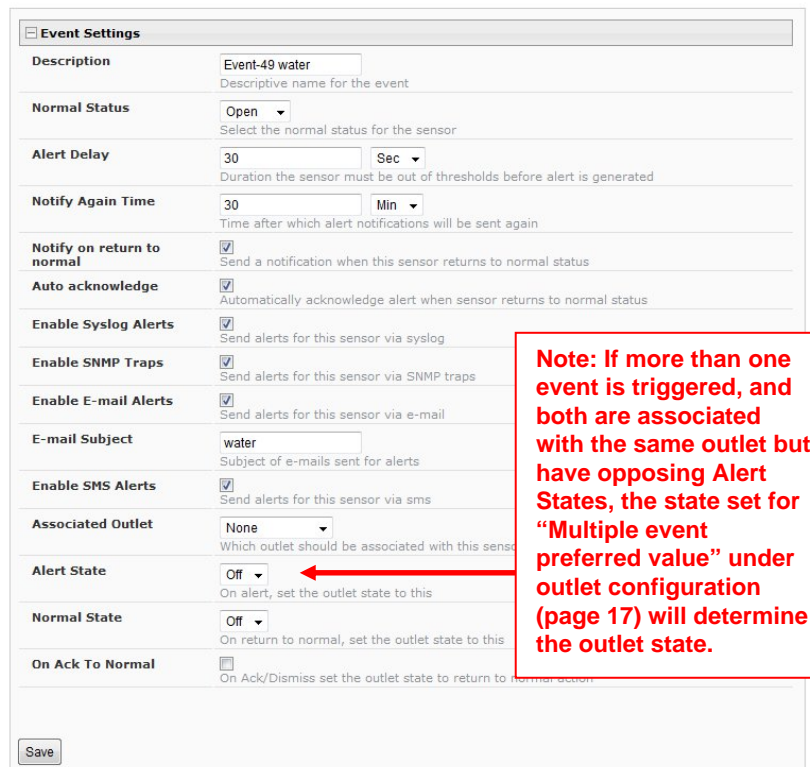
Note: If more than one event is triggered, and both are associated with the same outlet but have opposing Alert States, the state set for "Multiple event preferred value" under outlet configuration (page 17) will determine the outlet state.

Figure 31- Configure New Event

Once events are configured, they are listed and numbered for monitoring and easy adjustment.   Up to 50 can be configured.

Figure 32- List of Configured Event

If an event is triggered, the Status will change from "Normal" to "Alarm".   Whatever reaction that has been configured as a result of this event will be activated.

The user will have the option to either Acknowledge the alert, Dismiss it, or Delete the configuration of the event altogether.

If the user acknowledges the alert, no additional alert messages will be sent during that alert status cycle.   If the user dismisses the alert, another alert message will be sent once the "notify again after" time designated on the configuration page elapses.

To see the status page for a sensor, click on the link under "Curr. Val.".   To see the status of an associated outlet, click on the link under "Assoc Outlet".

To delete an event configuration, select "Delete" to the far right of the event number. That configuration will be removed and the one following it (if any) will move up to that event number.

Note: Removal of a sensor from the IPDU will also remove all configured events associated with that sensor.

Click on the description for an event to open the configuration page for editing.

Figure 33- Adjust settings for events

All settings for an event can be adjusted as needed. Be sure to click "Save" before exiting.

Administration

From the Administration section there are several sub sections for configuring the IPDU-S2:

System	Fields for applying time zone, date, time, NTP server, and backup and restore configuration settings
Enterprise	Fields for assigning the unit name, address, contact person, the IPDU-S2 e-mail address, and phone number of a contact person
Network	Fields for providing all the network settings the IPDU-Sx including IP address, DNS, SMTP and SNMP settings
Cascade	Fields for configuring this IPDU to control multiple IPDUs or be controlled by another IPDU- (models IPDU-S4 and IPDU-S8 only)
Users	Fields for assigning users, access privileges, passwords, contact settings, and schedule settings
Security	Fields for setting authentication method and IP Filtering
System Information	For viewing IPDU-Sx system information
Firmware	For updating the firmware of the IPDU-Sx when improved software becomes available.
Reboot	Enables user to reboot the IPDU-Sx using the web interface

System Configuration

The System Configuration section is where all the settings necessary for proper time reporting within alert messages and log records are configured. To view the System Configuration page, click on **System** from the **Administration** section of the menu.

Figure 34- System Configuration page

The Date and Time of the IPDU-Sx can be either manually setup to use an onboard clock or set to be synchronized with an NTP server.   The configuration of the IPDU-Sx can also be easily backed up to a file on your PC and restored from that file as needed.

Time Settings	Description
Time Zone	Enter the appropriate time zone
Enable Daylight Saving	Apply a checkmark to have the time change according to Daylight Saving Time rules
Set Date	Enter the system date in MM-DD-YYYY format
Set Time	Enter the system time of day in hh:mm:ss format
Enable NTP	Place a checkmark to enable the IPDU-Sx to automatically sync up with a time server via NTP
NTP server	If the NTP is enabled, enter the IP address of the NTP server
NTP Frequency	Enter the frequency (in minutes) for the IPDU-Sx to query the NTP server (minimum is 5 minutes)
Configuration Backup & Restore	
Choose file	Browse for a saved configuration file to be restored to the IPDU-Sx. After selection, press the " "Save" button and the IPDU-Sx will restore the configuration settings and reboot. Allow 1 minute before trying to reconnect and log in again. *Note: The IP address will be set to the IP address in the file and may be different*
Download Configuration File	Click this button to save the configuration of the IPDU-Sx to a location on your PC. This file can be restored using the "Choose file" field in the event you wish to return the IPDU-Sx to a former state
Restore Defaults	Click this button to restore the IPDU-Sx to the configuration settings it had upon receipt from the factory. **Be careful!** This will erase all user configuration settings. Upon restoration, the IPDU-Sx will reboot. Allow 1 minute before trying to reconnect and log in again. **Confirmation is required**.

Note: If "Restore Defaults" is used, the IP address will also be restored to its default address of 192.168.1.22 with a login name "root" and password "nti".   To restore the root password to "nti" without having to restore all default settings, contact NTI for assistance.

To identify the IP address of the IPDU-Sx without restoring defaults, use the Discovery Tool (page 13).

Click on **Save** when finished with Time Setting changes.

Enterprise Configuration

The Enterprise Configuration page is used to enter basic company information to be applied to the body of alerts. To view the Enterprise Configuration, click on **Enterprise** from the **Administration** section of the menu. Enter in the blocks your unit name, location, the contact person that alert e-mails should refer to, the phone number to reach that person, and the e-mail address assigned to the IPDU-Sx.   Alert message sent via email, syslog and SNMP will include the information in these blocks.

The IPDU-S4 and IPDU-S8 additionally has a section for the GSM modem status. A GSM modem must be installed in order to send SMS messages.   If a GSM modem is properly installed (page 8), the type, status, IMEI number, and signal strength will be displayed. The modem will work with a signal strength between -111dBm (weak) and -51dBm (strong).   If a modem is not installed, the words "not available" will be displayed instead for the modem type.

Note: It may take several minutes for the GSM modem to be detected by the IPDU-Sx.

Figure 35- Enterprise Configuration

Network Configuration

From the Network Setup page the administrator can either choose to have the IP address and DNS information filled in automatically by the DHCP server, or manually fill in the fields (use a static address).   To view the Network Configuration page, click on **Network** from the **Administration** section of the menu.

Note: If you select "DHCP", make sure a DHCP server is running on the network the IPDU-Sx is connected to.

Figure 36- Network Configuration page

IP Settings	Description
Mode	Select between Static (manual) , or DHCP (automatic IP and DNS) settings
IP Address	Enter a valid IP address (default address shown above)
Subnet Mask	Enter a valid subnet mask (default value shown above)
Default Gateway	Enter a valid gateway (default gateway shown above)
Preferred DNS	Enter a preferred domain name server address
Alternate DNS	Enter an alternate domain name server address

For descriptions of SMTP, SNMP, and Server Settings, see page **Error! Bookmark not defined.**.   .

The Network Configuration page is broken into four sections; IP Settings, SMTP Settings, SNMP Settings, and Server Settings. To explode the window to see settings for a section, click on the section heading.

Figure 37- Network Configuration- more settings

More Network Settings (see Figure 37)

SMTP Settings	Description
SMTP Server	Enter a valid SMTP server name (e.g. yourcompany.com)
Port	Enter a valid port number (default port is 25)
Use SSL	Place a checkmark in the box if the SMTP server supports SSL
Use Authentication	Place a checkmark in the box if the SMTP server requires authentication to send email
Username	Enter a valid username to be used by the IPDU-Sx to send emails
Password	Enter a valid password assigned to the IPDU-Sx username
SNMP Settings	
Enable SNMP agent	Place a checkmark in the box to enable access to the SNMP agent
Enable SNMP traps	Place a checkmark in the box to allow SNMP traps to be sent
Read-**write** community name	Enter applicable name (commonly used- "private") **CASE SENSITIVE**
Read-**only** community name	Enter applicable name (commonly used- "public") **CASE SENSITIVE**
Server Settings	
Enable Telnet	Place a checkmark in the box to enable access to the IPDU-Sx via Telnet
Enable SSH	Place a checkmark in the box to enable access to the IPDU-Sx via SSH
Enabe HTTP access	Place a checkmark in the box to enable access to the IPDU-Sx via standard (non-secure) HTTP requests
HTTP Port	Port to be used for standard HTTP requests
HTTPS Port	Port to be used for HTTPS requests
Web Timeout	Number of minutes after which idle web uses will be logged-out (enter 0 to disable this feature)

If the administrator chooses to have the IP and DNS information filled in automatically via DHCP, the SMTP server and port number still need to be entered for email alerts to work. If the SMTP server requires a password in order for users to send emails, the network administrator must first assign a user name and password to the IPDU.

Note: The SMTP server port number is shown in Figure 37 as "25".   This is a common port number assigned, but not necessarily the port number assigned to your SMTP server.   For SMTP servers that support SSL, the common port number is 465.

The administrator may assign a different HTTP Server Port than is used by most servers (80).

Note: If the port number is changed and forgotten, to determine what it has been changed to connect the IPDU-SX for RS232 control (page 6) and review the Network Settings (page 33).

Read-Only Community Name
The SNMP Read-only community name enables a user to retrieve "read-only" information from the IPDU-Sx using SNMP network management software or a MIB browser and a MIB file.   This name must be present in the IPDU-Sx and in the proper field in the SNMP software. This name is **case sensitive** so be sure to enter it correctly in the IPDU-Sx as well as in the SNMP software.

Read-Write Community Name

Only applicable to IPDU-S4/S8- Firmware version 1.3 or later

The SNMP Read-Write community name enables a user to read information from the IPDU-Sx and to modify settings on the IPDU-Sx using SNMP network management software or a MIB browser and MIB file (MIB file version 1.01 or later). This name must be present in the IPDU-Sx **AND** in the proper field in the SNMP software. This name is **case sensitive** so be sure to enter it correctly in the IPDU-Sx as well as in the SNMP software.

This function is particularly useful if you want to control the state of the Output Relays (page 16) through SNMP.   With the IPDU-Sx and SNMP network management software properly configured for SNMP control (enable agent, enable traps, apply Read-only and Read-write Community Names), a SET command can be sent either from the SNMP software or MIB browser (Windows) or through command line (Linux) to change the outputRelay value state. See images on next page for example of setup.

Note: The Read-Write Community Name field is only functional in the IPDU-S4/S8 models.   It does not apply to the IPDU-S2.

Figure 38- Setup SNMP to control output relays

Cascade Configuration

The Cascade Configuration page is used (IPDU-S4 and IPDU-S8 only) to control multiple IPDU-Sx units, connecting them to one another to form a much larger system that can be administered and monitored from one central point.   Units can be cascade using either RS485 or Ethernet connection.   When using the RS485 Connection method for cascading the IPDU-Sx will be connected as shown on page 8.   If units will be controlled using the Ethernet Connection method, the IPDU-Sx will be connected to a network using the "ETHERNET" port.

In a cascaded configuration, one unit will be the "master" to which each unit is connected as a "slave".   Up to 16 slave units can be connected for a total system configuration of 136 controlled outlets.

If an IPDU-S4 or IPDU-S8 is going to be added to a cascaded system as a slave unit, then the only configuration settings that need to be applied to the slave unit before it can be enabled in the master unit include:

- Enterprise Name (on the Enterprise Configuration page (page 32)
- IP Settings (on the Network Configuration page (page 33) and only if the unit is an Ethernet slave
- Cascade Configuration for RS485 slave or Ethernet Slave (page 38)

Configure the Type

On the Cascade Configuration page the first setting to configure is the type.   Types include:

Type	Description
Master with No Slaves	Stand alone unit, not cascaded, no settings needed
RS485 Slave	Unit will be connected to a master using the "Cascade" ports
Ethernet Slave	Unit will be connected to a master using the Ethernet
RS485 Master	Unit will be the master in a RS485 connected configuration
Ethernet Master	Unit will be the master using the Ethernet

Figure 39- Cascading- Set the configuration type

RS485 Slave

If the type is **RS485 Slave**, an address number (1-255) must be entered to identify the unit to the master. Each slave on the system must have a unique address number.

Figure 40- Configure as RS485 Slave

Ethernet Slave

If the type is **Ethernet Slave**, the Ethernet address entered on the Network Configuration page (page 33) will be used by the master to communicate with this slave.   Each slave on the system must have a unique IP address.

Figure 41- Configure as Ethernet Slave

RS485 Master

If the type is **RS485 Master**, then the RS485 addresses for each slave (valid address range of 1-255) must be entered into the available blocks (up to 16) in order to communicate between the master and each slave.   Once an RS485 address has been entered, and the RS485 slave has been properly configured to be cascaded as part of this system, place a checkmark in the "Enable Slave" block.

Figure 42- Configure as RS485 Master

Ethernet Master

If the type is **Ethernet Master**, then the Slave IP Address Settings must be entered for each slave that will be controlled.   The IP address will be used by the master to locate and communicate with the slave. Once an IP address has been entered, and the Ethernet slave has been properly configured to be cascaded as part of this system, place a checkmark in the "Enable Slave" block.

Figure 43- Configure as Ethernet Master

Cascade Notification

In the event a slave goes offline from the system, the system can be set to notify those configured to receive messages from the master unit. In the Cascade menu under Administration, the "Cascade Notification Settings" menu provides a place to configure how frequent notifications will be repeated. Cascade Notification cannot be disabled.

Figure 44- Cascade Notification Settings

An example of the notification you will receive is:

```
11-12-2010 11:18:38 AM     Sensor Not Responding     --     Slave Unit #2 (Unit Name) not
responding
```

Suggestion: To avoid receiving unnecessary notifications, don't enable the slave (Figure 42 and Figure 43) when configuring the master until the slave has been fully configured first.

The default time period in which notifications will repeat is every 30 seconds.

The number value range for the time period is 1-99, and the units can be seconds (Sec), minutes (Min), or hours (Hr).

User Configuration

The Users page is a list of all configured users of the IPDU-Sx.   A maximum of 15 users (other than root) can be configured.

From this page the user can choose to add more users, go to the user configuration page to edit a user's access to the IPDU-Sx, or delete a user from the list.   To view the Users page, click on **Users** from the **Administration** section of the menu.

Figure 45- Users page

To add a user, click on the "Add New User" link.

To edit a user's configuration, either click on the listed username, or on the "Edit" link.

To delete a user and their configuration, click on "Delete" link.

When adding a new user, the Configure User page will open with the username "user*x"* assigned,   where x = the next consecutive number (up to 15) based on the quantity of users in the list (other than the root user).   You can either leave the name as "userx", or change it to what you would like to see listed.   With the name assigned, fill in the remaining information as needed.

Figure 46- Configure Users page

Figure 47- Configure User- more options

Account Settings	Description
Username	Enter the desired username for this user
Admin	Place a checkmark here if this user should have administrative privileges
Enabled	Place a checkmark here to enable this user to access the IPDU-Sx
Password	Enter a password that a user must use to login to the system **A password must be assigned for the user's login to be valid** **Passwords must be at least 1 keyboard character.**
Confirm	Re-enter a password that a user must use to login to the system
Title	Enter information as applicable
Department	Enter information as applicable
Company	Enter information as applicable

Contact Settings	
Group 1	Place a checkmark if the user should receive messages from sensors, IP devices and outlets in Group 1 (see also pages 24 and 26 for group assignments)
Group 2	Place a checkmark if the user should receive messages from sensors, IP devices and outlets in Group 2 (see also pages 24 and 26 for group assignments)
Email alerts	Place a checkmark if the user should receive messages via email
Email address	Enter a valid email address if this user should receive email alert messages
Syslog alerts	Place a checkmark if the user should receive alerts via syslog messages
SNMP traps	Place a checkmark if the user should receive alerts via SNMP traps
Syslog/SNMP IP address	Enter a valid syslog/SNMP IP address for the user to receive syslog/SNMP messages
SMS Alert	Place a checkmark if the user should receive alerts via SMS messages (IPDUS4/S8 only)
Phone Number	Enter a phone number for the GSM modem to call to alert the user via SMS message
Schedule Settings	
Schedule Type	**Always active**- user will receive messages at all hours of each day **Active during defined times**- user will only receive alert messages during times as outlined below
Start Day	First day of the week the user should begin receiving messages
End Day	Last day of the week the user should receive messages
Start Hour	First hour of the day the user should begin receiving messages
End Hour	Last hour of the day the user should receive messages

Note: Start Day and End Day must be different, or no messages will be sent.

More about User Privileges

The root user (or any user with administrator rights) can change the root password and configure how the root user will receive alert messages.   Users with administrative rights can change all configuration settings except for the root user name.

Users with user rights can only see the current readings of monitored items and change their own passwords.

Figure 48-Summary page for User without Admin privileges

Security

Security in the IPDU-Sx can be managed one of two ways; through the local settings (passwords assigned in user settings on page 43) or through an LDAP server.   If security is configured to use LDAP mode, then the passwords for users must be those found on a configured LDAP server. To view the Security Configuration page, select **Security** in the **Administration** section of the menu.

Figure 49- Security Configuration page

When in LDAP mode, usernames on the LDAP server must match those in the user settings of the IPDU-Sx or access will be denied.

Note: When in LDAP mode, if the LDAP server is not responding, local authentication will be tried.

User Authentication	
Mode	Select Local to use authentication based on passwords in the IPDU-Sx user configuration
	Select LDAP to use authentication based on passwords in an LDAP server
LDAP Primary Server	Enter Hostname or IP address of Primary LDAP Server
LDAP Secondary Server	Enter Hostname or IP address of Secondary LDAP Server (optional)
LDAP Server Type	Choose from drop down list:
	Generic LDAP server
	Novell Directory server
	Microsoft Active Directory
LDAP User Base DN	Enter the Base DN for users (ex: ou=People,dc=mycompany,dc=com)

Even though LDAP authentication is being used, each user must also have a local account. User permission level is established by the local account.

Included in the Security Configuration options is IP Filtering.   IP Filtering provides an additional mechanism for securing the IPDU-Sx. Access to the IPDU-Sx network services (SNMP, HTTP(S), SSH, Telnet) can be controlled by allowing or disallowing connections from various IP addresses, subnets, or networks.

Up to 16 IP Filtering rules can be defined to protect the IPDU-Sx from unwanted access from intruders. Each rule can be set as Enabled or Disabled. Rules can be set to explicitly drop attempts to connect, or to accept them.

Be sure to press **Save** after changes are made.

Figure 50- Security Configuration- IP Filtering Rules

More on IP Filtering

The most common approach is to only allow "whitelisted" IP addresses, subnets, or networks to access the device while blocking all others. The IP Filters are processed sequentially from top to bottom, so it is important to place the most precise rules at the top of the list and the most generic rules at the bottom of the list.

As an example, assume we wish to block all connections except those which come from the IP address 192.168.1.100. To allow connections from 192.168.1.100, we need to configure and enable an ACCEPT rule at the top of the list:

1   Enabled ▼   ACCEPT ▼   192.168.1.100

Then, to block all other IP addresses from connecting to the IPDU-Sx, we add a rule to drop all other connections.

16   Enabled ▼   DROP ▼   0.0.0.0/0

If the preceding "drop all connections" rule was placed in position one, no connections at all would be allowed to the unit. Remember: rules are processed from top to bottom. As soon as a rule matches, the processing stops and the matching rule is executed.

To match a particular IP address, simply enter in the desired IP address (e.g. 192.168.1.100).

To match a subnet, enter in the subnet with the associated mask (e.g. 192.168.1.0/24).

To match all IP address, specify a mask of 0 (e.g. 0.0.0.0/0).

System Information

The system information page displays the model name of the IPDU-Sx, the firmware version in the IPDU-Sx, the MAC address of the Ethernet port, the IP mode, and the network configuration. To view the System Information, select **System Information** in the **Administration** section of the main menu.

System Information

System Information	
Product:	IPDU-S2 Secure Power Reboot Switch
Revision:	1.0
Code Date:	10-01-2009 03:00:53 PM
MAC Address:	00:0C:82:05:00:04
IP Mode:	DHCP
IP Address:	192.168.3.119
Subnet Mask:	255.255.255.0
Default Gateway:	192.168.3.3
Primary DNS:	166.102.165.11
Secondary DNS:	

Figure 51- System Information page

Update Firmware

The Update Firmware page is used to change the firmware of the IPDU-Sx.   Occasionally new features or changes to existing features will be introduced and new firmware with these changes will be made available on the NTI website (**http://www.networktechinc.com/download/d-secure-power.html**). To view the Update Firmware page, select **Firmware** in the **Administration** section of the main menu. Once a user has downloaded the required file for firmware upgrade, this page will be used to upload it to the IPDU-Sx.

Figure 52- Update Firmware page

1. Download the most current firmware file from **http://www.networktechinc.com/download/d-secure-power.html** to a location on your PC.

2. Click on the "Browse" button and locate and select the firmware file for the IPDU-Sx (`webupdate-ipdu-sx-vx-x.bin, for example`).

3. Click on the "Update" button to perform the firmware update. The firmware update process will take approximately 5 minutes while the IPDU-Sx installs the firmware.   Once the update file has been installed, the unit will automatically reboot and the login screen will appear.

Reboot the System

The IPDU-Sx can be remotely rebooted by anyone with administrative privileges.   To view the Reboot System page, select **Reboot** in the **Administration** section of the main menu.   Click the **Reboot Now** button to cause the IPDU-Sx to reboot. This will disconnect any user and shut down all activity.

Figure 53- Reboot System page

The message "System is rebooting, please wait..... "   will appear and after approximately 45 seconds the login screen will appear. Log in to resume activity.

Figure 54- System is rebooting

Log

From the Log section there are three sub sections for configuring the IPDU-SX:

Monitoring
Administration
Log
View Event Log
View Data Log
Log Settings
Support
Logout

View Event Log	View a log listing the date and time of events such as startups, shut downs, outlet power cycling, user logins
View Data Log	View data readings from sensors and IP addresses
Log Settings	Configure how the logs handle reaching capacity, which users will be notified that it has reached capacity, and how they will be notified

View Event Log

The Event Log provides the administrative user with a listing of many events that occur within the IPDU-Sx.   The event log will record the date and time of:

- each IPDU startup,
- each power outlet cycling,
- each user login and logout time,
- any time an unknown user tries to login,
- sensor and IP device alerts
- an alert handled by a user

Event log

Jump to page: 1 ▼ Entries per page: 20 ▼

⊟ **Showing Entries 1-4 of 4   Event Log Free Space: 99.6%**

Select	Date/Time	Type	Value	Message
☐	09-08-2009 12:14:04 AM	Start-up	--	System start-up
☐	09-08-2009 12:14:05 AM	Power Outlet changed	On	Outlet: "Power Outlet 1" : Turned on by system boot
☐	09-08-2009 12:14:05 AM	Power Outlet changed	On	Outlet: "Power Outlet 2" : Turned on by system boot
☐	09-08-2009 12:21:30 AM	Login	--	User **root** logged in via web interface

Previous   Next

[Delete Selected] [Clear Log]

[Download Event Log]

Figure 55- Event Log page

From the Event Log page the administrative user can view the logs, select specific logs to be deleted or press **Clear Log** to delete them all.   The number of entries per page can be changed for the user's reading preference. Navigating between pages is as easy as clicking **Previous** or **Next** buttons, or jumping to a specific page if you know where the log entry you are interested in is listed.

To clear only specific log entries, place a checkmark in each line item to be deleted, and press **Delete Selected**.   Before deleting, the user may want to save the log for future reference and to make space for more logs by downloading the event log to a file on a PC. Press **Download Event Log** to save the log file before clearing it.

View Data Log

The Data Log provides the administrative user with a listing of all the readings taken by the IPDU-Sx pertaining to the sensors and IP Devices being monitored. The event log will record the date and time of each reading.

Figure 56- Data Log page

From the Data Log page the administrative user can view the logs, select specific logs to be deleted or press **Clear Log** to delete them all.   The number of entries per page can be changed for the user's reading preference. Navigating between pages is as easy as clicking **Previous** or **Next** buttons, or jumping to a specific page if you know where the log entry you are interested in is listed.

To clear only specific log entries, place a checkmark in each line item to be deleted, and press **Delete Selected**. Before deleting, the user may want to save the log for future reference and to make space for more logs by downloading the event log to a file on a PC. Press **Download Data Log** to save the log file before clearing it.

Log Settings

The Log Settings page (Figure 57) provides settings for how the IPDU-Sx will react when its Data and Event logs reach capacity.

Each log can be assigned to a group and any user that receives messages from that group can be notified when capacity is being reached.

The log can be set to either :

- Discontinue- stop logging information
- Clear and restart- delete all log entries and restart with new entries
- Wrap- continue logging but delete the oldest entries and new ones are recorded

The Data and/or Event log can be set to sent alerts to users via email, syslog, and/or SNMP traps once it has reached 90% of capacity, allowing them time to react.

Log Settings

Figure 57- Log Settings page

Record Logs to USB Flash

In the IPDU-S4 / -S8 models, the option to enable or disable the USB port on the IPDU is available.   The USB port can be used to connect either a GSM modem for receiving SMS messages (page 8), and/or to make the log file portable by connecting a USB flash drive.   The IPDU-S4 or IPDU-S8 will record event and data logs to a USB flash drive in addition to the internal IPDU-Sx memory when the feature is enabled.

Figure 58- Log to USB Flash Settings

To use the USB port, carefully follow the steps below.

1. **I**nsert a USB flash drive to the USB port.

2. Place a checkmark in the "Enable Log to Flash drive" box found on the Log Settings page (Figure 59).

Note: If the flash drive is not connected <u>before</u> enabling the feature, the IPDU-Sx will not recognize the flash drive.

3. The data and event logs will be recorded to both the USB flash drive and the IPDU-S4/ -S8 internal memory.

4. When removing the flash drive- <u>remove the checkmark</u> from the "Enable Log to Flash drive" <u>**before**</u> removing the flash drive from the USB port. **Removing the flash drive before disabling the feature may cause any file(s) on the flash drive to be corrupted.**

FYI: The USB port can also be enabled from the Text Menu (page 96).
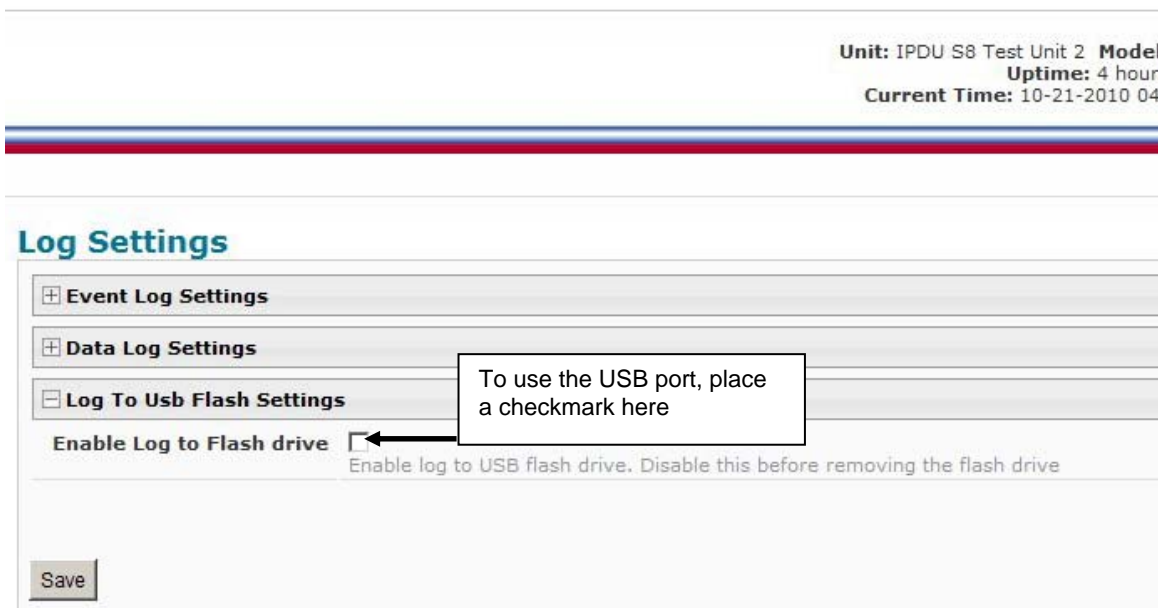
Figure 59- Enable USB Port

Support

The Support section of the menu includes two links, Manual and Downloads.

The Manual link will open the pdf manual for the IPDU-Sx on the NTI website.
You must have Adobe Reader installed on your PC to open this.

The Downloads link will take you to the Firmware Downloads page for the IPDU-Sx
on the NTI website.   All versions of firmware and MIB files for the IPDU-Sx will be found
 there, available for immediate download to your PC.
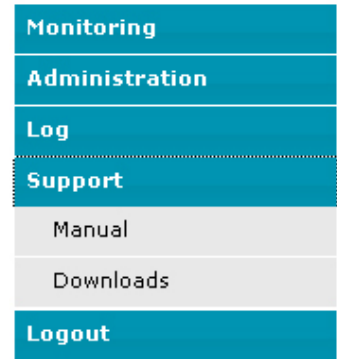
Figure 60- Support

Logout

To logout of the IPDU-Sx user interface, click on the "Logout" section in the menu.
A gray menu label will drop down.   Click on the gray label to be immediately
logged out.   The login screen will appear, at which you can close your browser
or log back in.
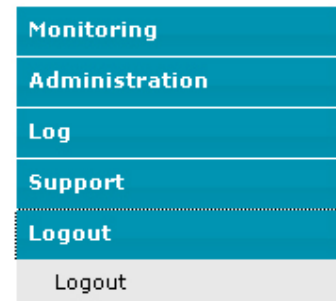
Figure 61- Logout

OPERATION VIA TEXT MENU- IPDU-SX

The IPDU-Sx can be controlled using a terminal program (e.g. HyperTerminal) via an RS232-Link, connected to Console Port (page 6) or using Telnet or SSH protocol via the Ethernet Port.   Either of these methods will work to access the IPDU-Sx text menu.   The text menu can be used to control all functions of the IPDU-Sx as an alternative to the Web Interface (page 14).

Connection Via Console Port

The following instruction will enable the user to quickly make connections using a terminal connected to the "CONSOLE" port.   For instruction to make quick connection using the Ethernet port and Web Interface, see page 14.

1.   Make sure the IPDU-Sx is turned OFF.
2.   Using the serial console device connected to the port labeled "CONSOLE", start the terminal program (e.g. Windows HyperTerminal) and configure it as follows:
    - direct connection (using the appropriate CPU local serial Com port)
    - 115200 bps
    - 8 bits
    - no parity
    - 1 stop bit
    - no flow control
    - VT100 terminal mode.

3.   Power ON the IPDU-Sx. Wait for the IPDU-SX login prompt.

4.   At "Username: " type <**root**> (all lowercase letters) and press <**Enter**>.

5.   At "Password" type <**nti**> (all lowercase letters) and press <**Enter**>.
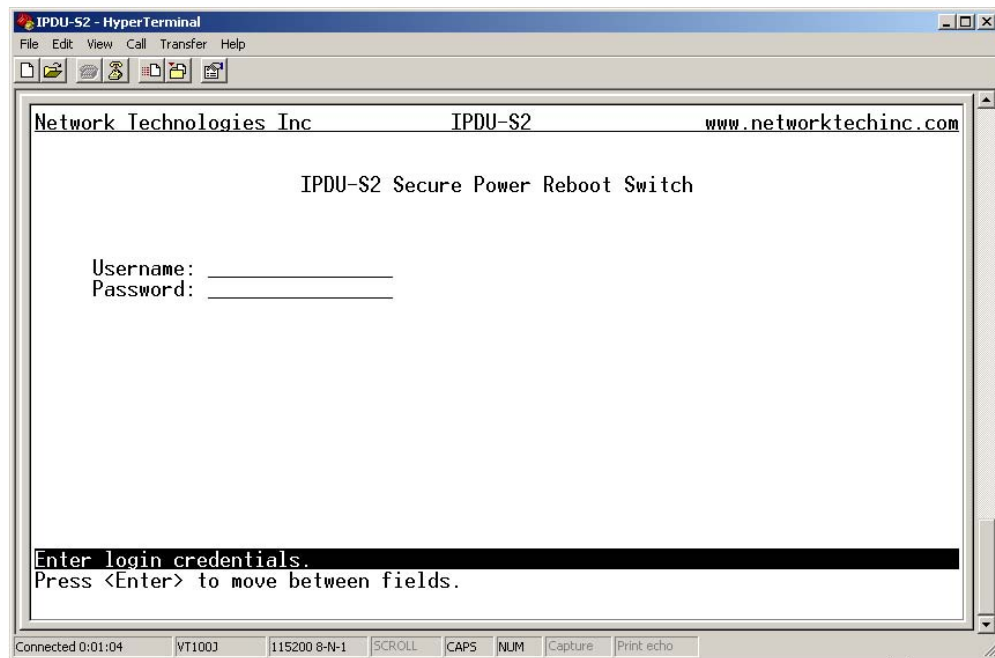
Figure 62- Text Menu Login screen

Note: User names and passwords are case sensitive.   It is important to know what characters must be capitalized and what characters must <u>not</u>.

Connect to IPDU-Sx from Command Line

To connect directly to a serial port from the command line, the IPDU-Sx must first be connected to the Ethernet (page 5).

Connect Via Telnet

To open a telnet session to the IPDU-Sx, Issue the following command from the command line:

telnet *<IPDU-Sx hostname or IP address>*

<IPDU-Sx hostname> is the hostname configured in the workstation where the telnet client will run (through /etc/hosts or DNS table). It can also be just the IP address of the IPDU-Sx.

The user will be prompted for username and password to connect to the IPDU-Sx.

Connect Via SSH

To open an SSH session to a serial port, issue the following command from the command line:

ssh -l *<Username> <IPDU-Sx hostname or IP address>*

<Username> is the user configured to access the IPDU-Sx (as defined in the list of users (page 42).

<IPDU-SX hostname> is the hostname configured in the workstation where the SSH client will run (through /etc/hosts or DNS table). It can also be just the IP address of the IPDU-Sx.

The user will be prompted for a password to connect to the IPDU-Sx.

The main menu of the Text Menu will be displayed whether you are connecting via the Console port, Telnet, or SSH.


```
Network Technologies Inc          IPDU-S2          www.networktechinc.com

                              Main Menu


          1. Monitoring
          2. System Configuration
          3. Enterprise Configuration
          4. Network Configuration
          5. User Configuration
          6. Security Configuration
          7. Event & Data Logs
          8. System Information
          9. Reboot




          [Logout]

Monitor and configure sensors, power outlets, and IP devices.
Press <Tab> to move between the menu and logout button. Press <Enter> to
select highlighted item.
```

Figure 63- Text Menu- Administrator Main Menu

Then main menu in the IPDU-S4 and IPDU-S8 has an additional category of "Cascade Configuration.   For more on Cascading, see page 81.

```
Network Technologies Inc          IPDU-Sx          www.networktechinc.com
                                  Main Menu


        1. Monitoring
        2. System Configuration
        3. Enterprise Configuration
        4. Network Configuration
        5. Cascade Configuration
        6. User Configuration
        7. Security Configuration
        8. Event & Data Logs
        9. System Information
       10. Reboot



        [Logout]

Monitor and configure sensors, power outlets, and IP devices.
Press <Tab> to move between the menu and logout button. Press <Enter> to
select highlighted item.
```

Extra feature only in the IPDU-S4 and IPDU-S8

Figure 64- Text Menu- Main Administrator Menu in IPDU-S4/-S8

If you are a user with only user privileges (no administrative privileges), the text menu will have more limited options.

```
Network Technologies Inc          IPDU-S2          www.networktechinc.com
                                  Main Menu


        1. Monitoring
        2. Account Settings








        [Logout]

Monitor and configure sensors, power outlets, and IP devices.
Press <Tab> to move between the menu and logout button. Press <Enter> to
select highlighted item.
```
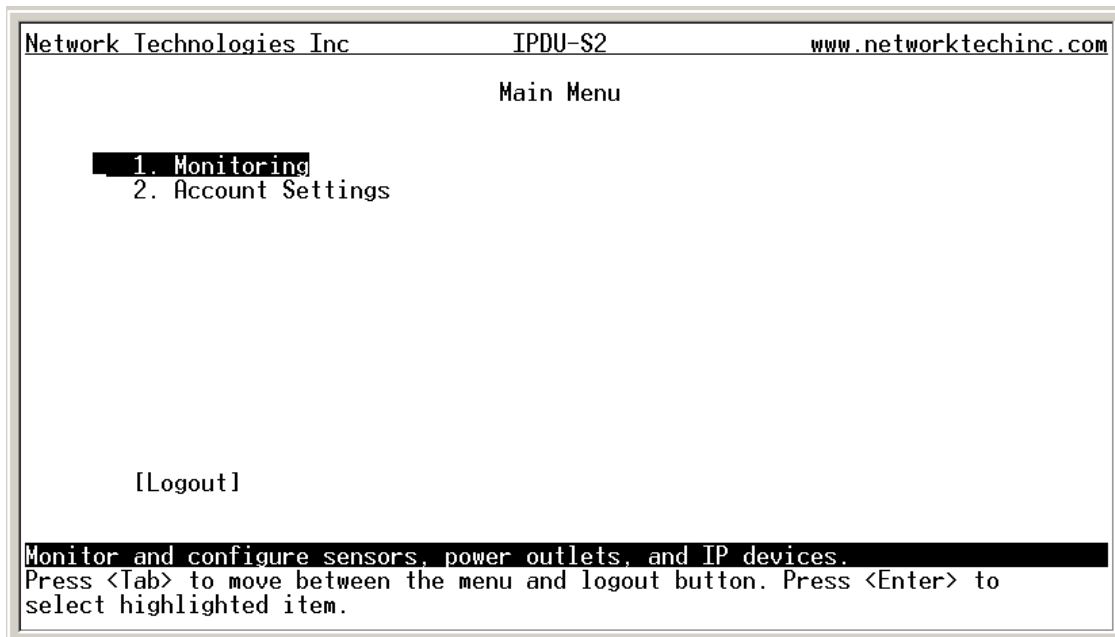
Figure 65- Text Menu- User Main Menu

For more on the Text Menu options for non-administrative users, see page 98.

Using the Text Menu

Text Menu Navigation

- To move up and down the numbered menu items, use the arrow keys.
- To jump from menu item to another quickly, press the numbered key above the QWERTY keys (the numberpad number keys are not used).
- To move from menu list to action key (such as "Logout" in Figure 65 above), press `<Tab>`.
- To exit an action or menu, press `<Esc>`.
- To select a highlighted item or move to another field in a configuration page, press `<Enter>`.
- Be sure to Tab to "**Save**" and press `<Enter>` when configuration changes are made.
- To return from "Save" back to a field on the configuration page, press `<Tab>`.

The Administrators Main Menu is broken into 9 categories:

Function	Description
Monitoring	Monitor and configure the sensors, outlets and IP devices
System Configuration	Set the IPDU-SX time settings or reset the unit to factory default settings
Enterprise Configuration	Configure system settings
Network Configuration	Configure network settings
Cascade Configuration	Configure cascade settings (IPDU-S4 and IPDU-S8 only)
User Configuration	Configure user access settings
Security Configuration	Configure security settings
Event and Data Logs	View and configure the Event and Data Logs (page 93)
System Information	View system and network settings
Reboot	Enables the user to reboot the IPDU-SX

Monitoring

The Monitoring menu lists choices for viewing the status of items monitored by the IPDU-Sx as well as for configuring how they are monitored and how or if alert messages will be sent.

```
Network Technologies Inc            IPDU-Sx              www.networktechinc.com
                                 Monitoring Menu



            1. View Power Outlets
            2. View Sensors
            3. View Line Monitor Parameters
            4. View IP Devices                     Items 3 and 7 only apply to
            5. Configure Power Outlets             IPDU-S4 and IPDU-S8
            6. Configure Sensors
            7. Configure Line Monitor Parameters
            8. Configure IP Devices




Monitor Power Outlets.
Press <Enter> to select highlighted item.
<Esc> exits to previous menu.
```

Figure 66- Text Menu-Monitoring Menu

View Power Outlets

The View Power Outlets selection will show the present status of the Power Outlets on the IPDU-Sx. The current operation mode of the outlet is shown, as well as its ON/OFF state. To change its state, select the outlet and press **<Enter>**. Use the **<Tab>** or **<Arrow>** keys to move between Cancel, Turn ON, Turn OFF, or Cycle to power cycle the IPDU-Sx. If Cycle is selected, the IPDU-Sx will power cycle the outlet based on the configuration settings found under Power Outlet Configuration.

```
Network Technologies Inc        IPDU-S2        www.networktechinc.com
                            Power Outlet Status

          DESCRIPTION                    MODE        STATUS

          ┌──────────────────────────────────────────────────────┐
          │ Power Outlet 1               Manual      On          ▓│
          │ Power Outlet 2               Manual      On          ▓│
          │                                                      ▓│
          │                                                      ▓│
          │                                                      ▓│
          │                                                       │
          │                                                       │
          │                                                       │
          └──────────────────────────────────────────────────────┘


Monitor Power Outlet status.
Press <Enter> to select highlighted item.
<Esc> exits to previous menu.
```
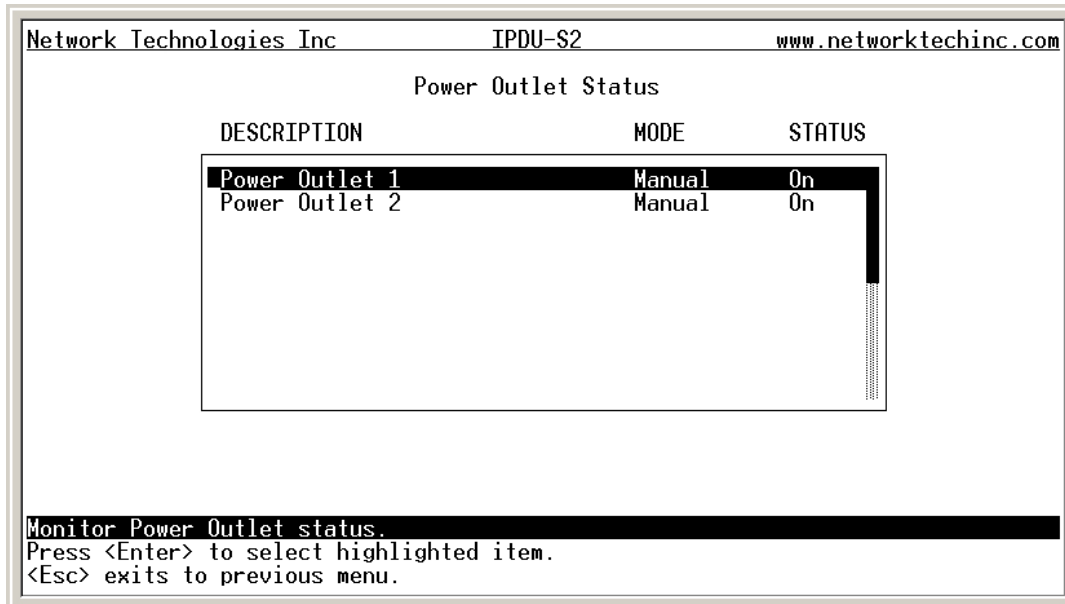
Figure 67- Text Menu-Power Outlet Status

View Sensors

The View Sensors selection will show the present status of each sensor connected to the IPDU-Sx.

The current value being reported by the sensor and the state (whether Normal or Alert) will be shown. If the sensor is in alert status, pressing the **<Enter>** key would provide the option to either **acknowledge** the alert or **dismiss** it.

```
Network Technologies Inc        IPDU-S2        www.networktechinc.com
                            Sensor Status

      TYPE            DESCRIPTION             VALUE     STATUS

      ┌──────────────────────────────────────────────────────┐
      │ Temperature Com  Undefined #1         24.9 0C  Normal ▓│
      │ Humidity Combo   Undefined #1         36.4 %   Normal ▓│
      │                                                       ▓│
      │                                                       ▓│
      │                                                        │
      │                                                        │
      │                                                        │
      │                                                        │
      └──────────────────────────────────────────────────────┘


Monitor sensor status.
Press <Enter> to select highlighted item.
<Esc> exits to previous menu.
```
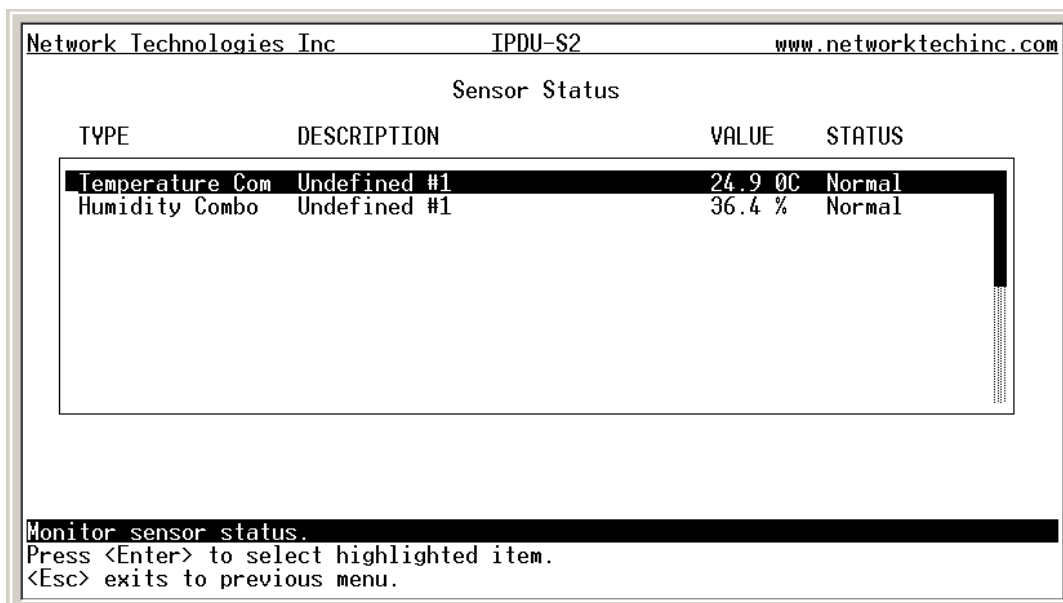
Figure 68- Text Menu-Sensor Status

View Line Monitor Parameters

The View Line Monitor Parameters selection (IPDU-S4 and IPDU-S8 only) will show the present status of each characteristic of the power being provided by   the IPDU-Sx to the outlets. In the image below, not only is the power through the master being monitored, but the power through each slave.   If the parameter is in alert status, pressing the **<Enter>** key would provide the option to either **acknowledge** the alert or **dismiss** it.

```
Network Technologies Inc          IPDU-Sx          www.networktechinc.com
                          Line Monitor Parameter Status

      NO.     TYPE            DESCRIPTION          VALUE     STATUS

      1       Voltage         Master Line Voltage      116.5V    Normal
      2       Current         Master Outlet Current    0.1  A    Normal
      3       Frequency       Master Line Frequency    60.0 Hz   Normal
      4       Breaker         Master Circuit Breaker St Closed    Normal
      5       Voltage         Slave 1 Line Voltage     114.2V    Normal
      6       Current         Slave 1 Outlet Current    0.0  A    Normal
      7       Frequency       Slave 1 Line Frequency   60.0 Hz   Normal
      8       Breaker         Slave 1 Circuit Breaker S Closed    Normal




Monitor sensor status.
Press <Enter> to select highlighted item.
<Esc> exits to previous menu.
```

Figure 69- Text Menu- Line Monitor Parameters

View IP Devices

The View Sensors selection will show the present status of each IP Device monitored by the IPDU-Sx.

The current value being reported by the IP Device and the state (whether Normal or Alert) will be shown. If the IP Device is in alert status, pressing the **<Enter>** key would provide the option to either **acknowledge** the alert or **dismiss** it.

```
Network Technologies Inc          IPDU-S2          www.networktechinc.com
                          IP Device Status

      DESCRIPTION                    VALUE          STATUS
      ENVIROMUX-MINI no.1            Responding     Normal
      ENVIROMUX-MINI no.2            Responding     Normal










Monitor IP Device status.
Press <Enter> to select highlighted item.
<Esc> exits to previous menu.
```

Figure 70- Text Menu-View IP Devices

Configure Power Outlets

The Configure Power Outlets menu lists the power outlets in the IPDU-Sx.   Press **<Enter>** to open the configuration menu for the selected Power Outlet.

```
Network Technologies Inc            IPDU-S2            www.networktechinc.com
                            Configure Power Outlets


                         1. Power Outlet 1
                         2. Power Outlet 2











Configure Power Outlets.
Press <Enter> to select highlighted item.
<Esc> exits to previous menu.
```
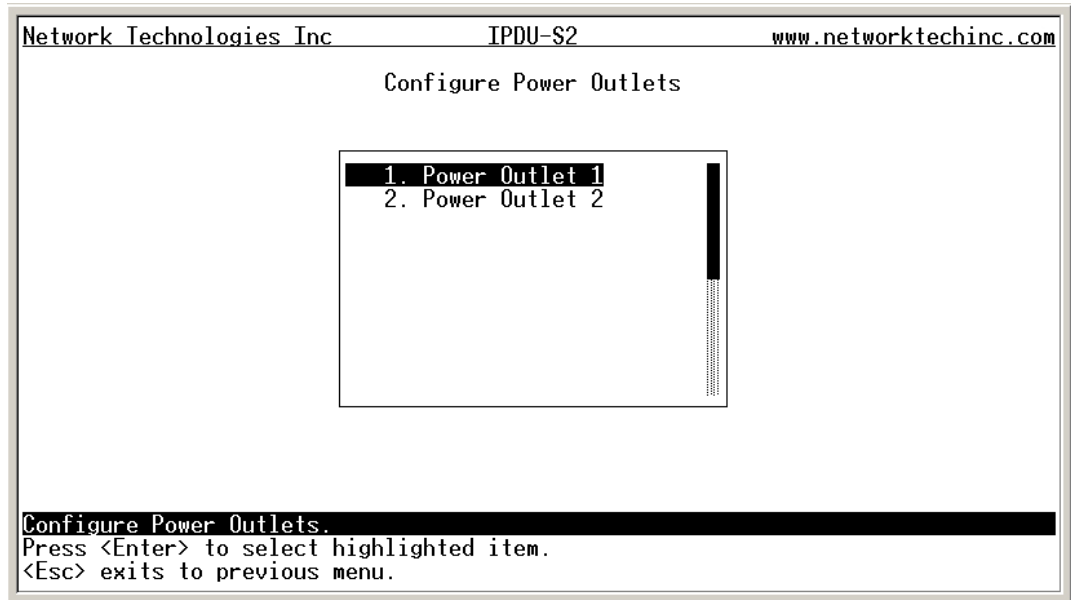
Figure 71- Text Menu-Configure Power Outlets

The configuration menu for the Power Outlet includes options to enter the Power Outlet Settings, Notification Settings, and Outlet Operation Settings.

```
Network Technologies Inc            IPDU-S2            www.networktechinc.com
                        Power Outlet: Power Outlet 1

            1. Power Outlet Settings
            2. Notification Settings
            3. Outlet Operation Settings











Configure general settings for this outlet.
Press <Enter> to select highlighted item.
<Esc> exits to previous menu.
```
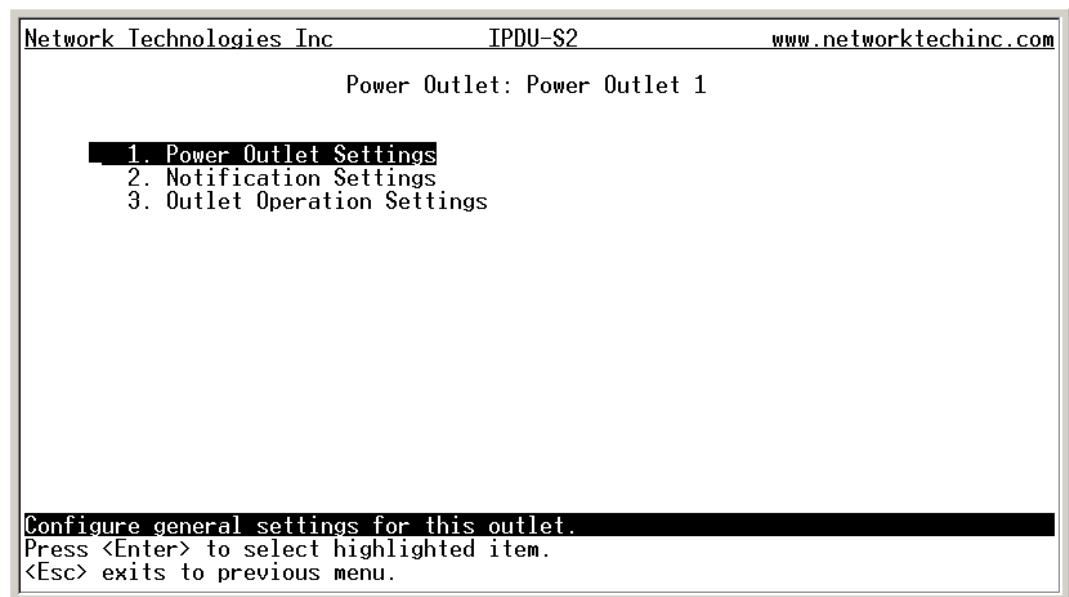
Figure 72- Text Menu-Power Outlet menu

Power Outlet Settings

From the Power Outlet Settings menu enter the Description for the outlet and select which sensor group the outlet should belong to (1 or 2).

```
Network Technologies Inc             IPDU-S2              www.networktechinc.com

                            Power Outlet Settings


        Description:        Power Outlet 1_____
        Group:              1












        [Save]
Power outlet description.
<Enter> moves between fields. <Tab> to reach Save button.
<Esc> exits to previous menu.
```
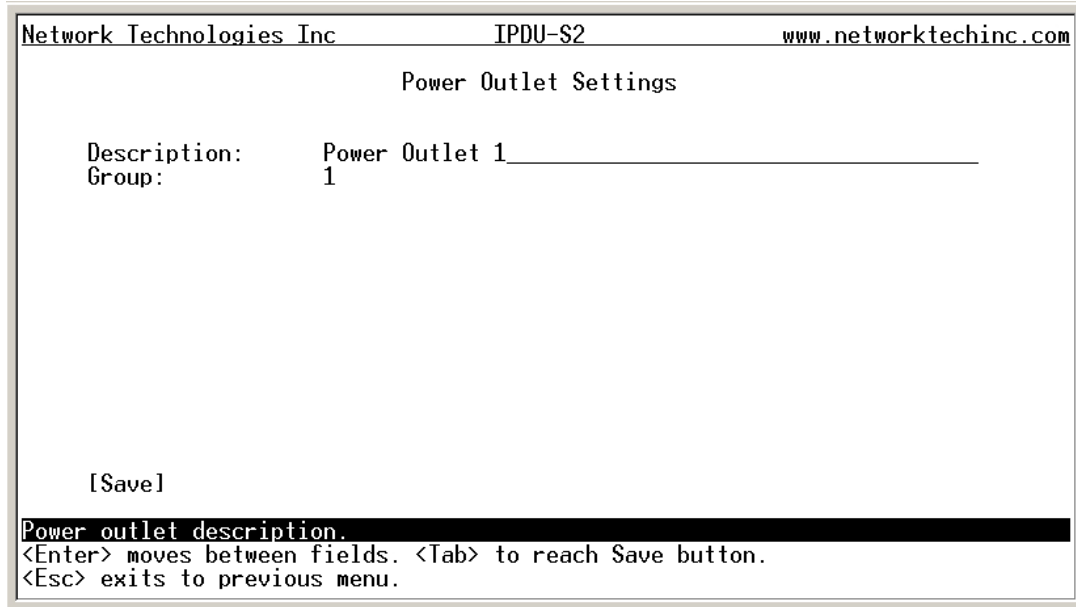
Figure 73- Text Menu-Power Outlet Settings

Power Outlet Notification Settings

From the Notification Settings menu, the user can enable/disable alert messages to be sent when the power outlet state changes and configure if and how alert messages are sent.

```
Network Technologies Inc             IPDU-Sx              www.networktechinc.com
                       Power Outlet: Power Outlet 3
                          Notification Settings
        Disable alerts:               No
        Enable e-mail notifications: No
        Enable syslog notifications: No
        Enable SNMP traps:            No
        Enable SMS Alerts:            No

        E-mail Subject: _____




        [Save]
Disable notifications for this outlet.
<Enter> moves between fields. <Tab> to reach Save button.
<Esc> exits to previous menu.
```
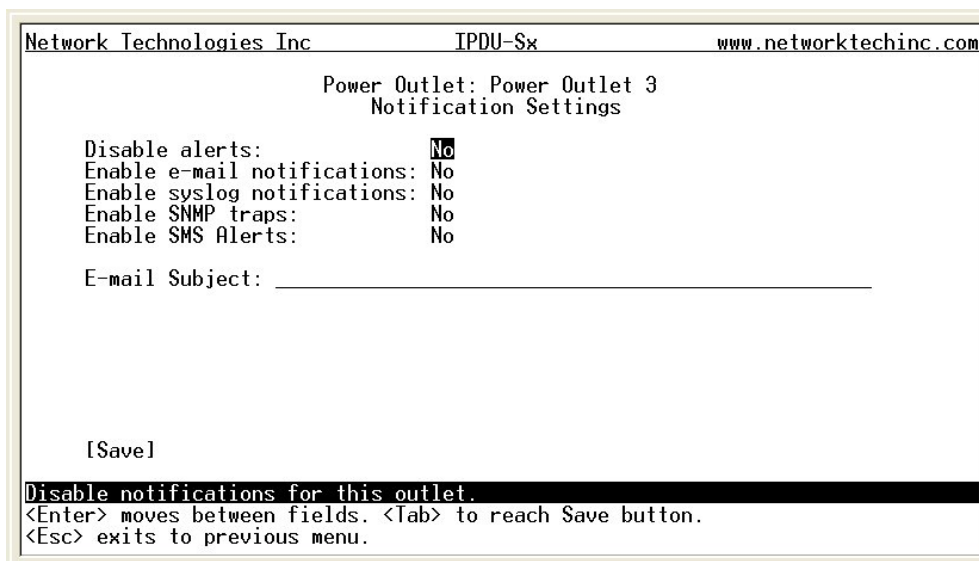
Figure 74- Text Menu-Power Outlet Notification Settings

Alert Settings	
Disable alerts	Change to "Yes" to prevent notifications from being sent when this outlet is in an alert state
Enable Email Alerts	Change to "Yes" to have alert notifications sent via Email
Enable Syslog Alerts	Change to "Yes" to have alert notifications sent via Syslog messages
Enable SNMP traps	Change to "Yes" to have alert notifications sent via SNMP traps (v2c)
Enable SMS Alerts	Change to "Yes" to have alert notifications sent via SMS (requires GSM modem)
Email Subject	Enter the subject to be viewed when an email alert message is received

Press <Tab> to highlight **Save** and press <Enter> to save before pressing <Esc> to exit.

Power Outlet Operation Settings

From the Outlet Operation Settings menu the user can configure the mode of operation for the outlet and how it will function when configured for Periodic mode.
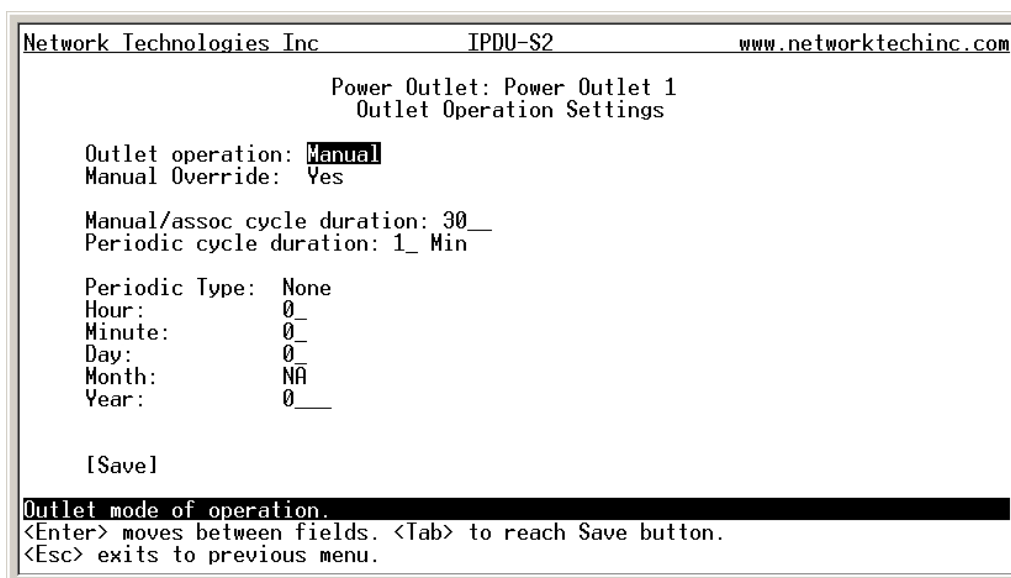
Figure 75- Text Menu-Power Outlet Operation Settings

Outlet Operation Settings	
Operation Mode	Choose between Manual, Periodic, or Associated operating modes for the outlet
Manual Operation Changes Mode	Change to "Yes" if you want the operating mode to be forced into Manual mode if you manually override the outlet status from the Power Outlet Status page (page 59)
Manual/Assoc Cycle Duration	Time period (1-300 seconds) the outlet will remain OFF during a manual power cycle or an associated power cycle
Periodic Cycle Duration	Time period in minutes or hours the outlet will remain OFF during a periodic power cycle
Periodic Type	If the operation mode is set to periodic, choose the type of periodic schedule between one time, daily, weekly, monthly, or none
Periodic Hour	Choose which hour of the day for the periodic cycle to occur (00-23)
Periodic Minute	Choose the minute within the hour of the day for the periodic cycle to occur (00-59)
Periodic Day	Choose the day for the periodic cycle to occur (for one-time and monthly settings, enter a value between 1-31; for weekly setting, enter a value 1-7, Sun = 1, Mon=2 .....Sat = 7)
Periodic Month	Choose which month of the year for the periodic cycle to occur. This only applies when the Periodic Type is set to "one time".
Periodic Year	Enter the year for the periodic cycle to occur. This only applies when the Periodic Type is set to "one time".

Press <Tab> to highlight **Save** and press <Enter> to save before pressing <Esc> to exit.

More about Operation Modes

In Manual Mode, the outlet will only power cycle when it is performed through the Power Outlet Status page (web interface) or through the text menu.

In Periodic Mode, the outlet will power cycle based on the settings configured as described in the table above.

In Associated Mode, the outlet can be controlled based on the alert status of a sensor or IP address. When configured to do so (page 24), the outlet can be powered ON or OFF when a sensor is in alert mode, and/or when it returns to normal state, or power cycled when an IP Device is in alert mode.

Note: An outlet configured for Associated or Periodic operating mode can be manually powered ON/OFF. If "Manual Override Mode is selected, manually changing the ON/OFF state of an outlet configured for Associated Mode or Periodic Mode will change the operating mode to Manual Mode until the outlet is reconfigured.

Configure Sensors

The Configure Sensors menu lists the sensors connected to the IPDU-Sx. Press **<Enter>** to open the configuration menu for the selected sensor.

```
Network Technologies Inc          IPDU-S2          www.networktechinc.com
                              Configure Sensors


                          1. Undefined #1
                          2. Undefined #1




                    [Add Sensor]    [Delete Sensor]
Configure sensor settings (thresholds, alerts, logging, etc).
Press <Enter> to select highlighted item.
<Esc> exits to previous menu.
```
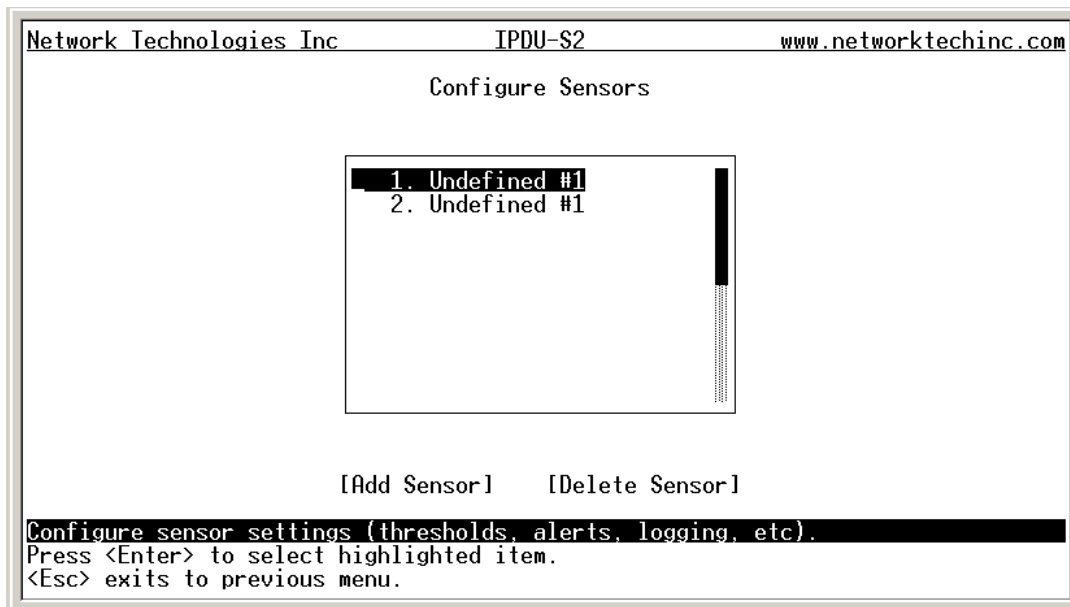
Figure 76- Text Menu-Configure Sensors list

The configuration menu for the sensor includes options to enter the Sensor Settings, Alert Settings, and Data Logging, Power Outlet Association Settings.

```
Network Technologies Inc          IPDU-S2          www.networktechinc.com

                   Type: Temperature Combo  RJ45 Connector: 1


           1. Sensor Settings
           2. Alert Settings
           3. Data Logging
           4. Power Outlet Association










Configure general settings for this sensor.
Press <Enter> to select highlighted item.
<Esc> exits to previous menu.
```
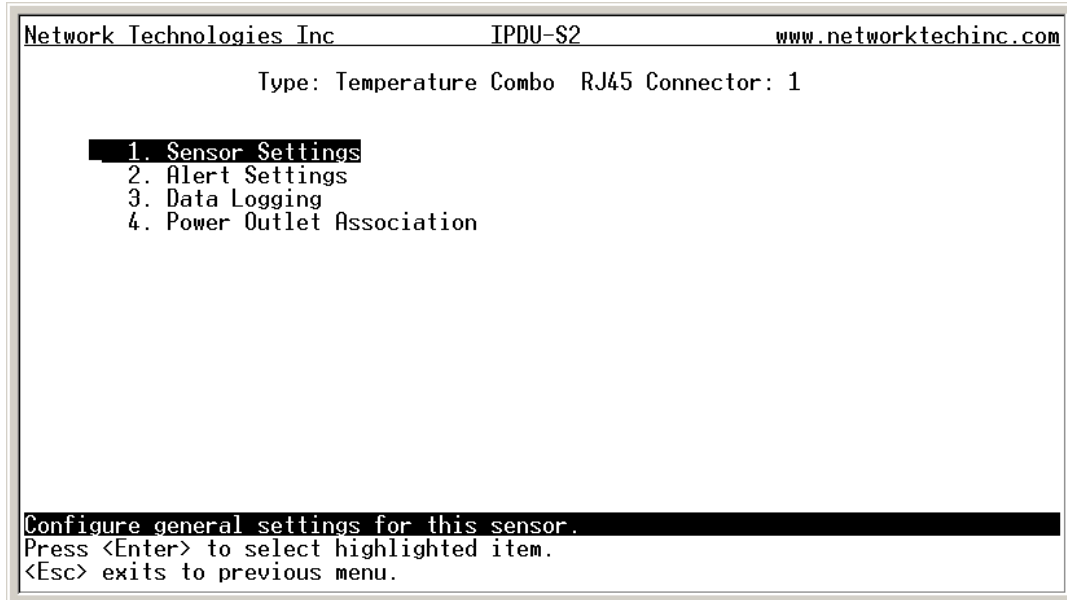
Figure 77- Text Menu-Configuration Menu for Sensor

From the Sensor Settings menu enter the Description for the sensor and select which sensor group the sensor should belong to (1 or 2).

```
Network Technologies Inc          IPDU-S2          www.networktechinc.com

                   Type: Temperature Combo  RJ45 Connector: 1
                              Sensor Settings

        Description:     Undefined #1_____
        Group:           1

        Units:           Deg. C
        Min. Level:      -20.0
        Max. Level:      70.0_
        Min. Threshold:  10.0_
        Max. Threshold:  50.0_

        Sampling Period: 10_ Sec




        [Save]
Descriptive name for this sensor.
<Enter> moves between fields. <Tab> to reach Save button.
<Esc> exits to previous menu.
```
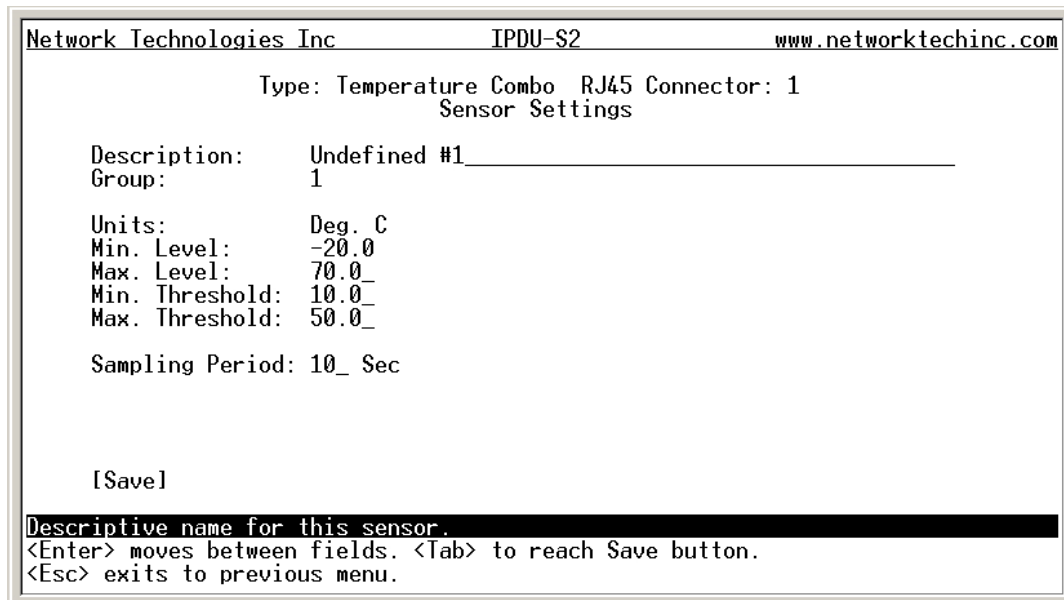
Figure 78- Text Menu-Sensor Settings

Sensor Settings	Description
Description	The description of the sensor that will be viewed in the Summary page and in the body of alert messages
Group	Assign the sensor to either group 1 or 2 (see also page 44)
Units	This lets the operator choose between Celsius and Fahrenheit as the temperature measurement unit.
Min. Level	Displays the minimum value that this sensor will report
Max. Level	Displays the maximum value that this sensor will report
Minimum Threshold	The user must define the lowest acceptable value for the sensors. If the sensor measures a value below this threshold, the sensor will move to alert status. The assigned value should be within the range defined by Minimum Level and Maximum Level and lower than the assigned Maximum Threshold value. If values out of the range are entered, an error message will be shown.
Maximum Threshold	The user must define the highest acceptable value for the sensors. If the sensor measures a value above this threshold, the sensor will move to alert status. The assigned value should be within the range defined by Minimum Level and Maximum Level and higher than the assigned Minimum Threshold value. If values out of the range are entered, an error message will be shown.
Sampling Period	Determines how often the displayed sensor value is refreshed on the Sensor page. A numeric value and a measurement unit (minimum 1 seconds, maximum 999 minutes) should be entered.

Press `<Tab>` to highlight **Save** and press `<Enter>` to save before pressing `<Esc>` to exit.

From the Alert Settings menu, the user can enable/disable alert messages to be sent when the sensor is in an alert state and configure when and how alert messages are sent.
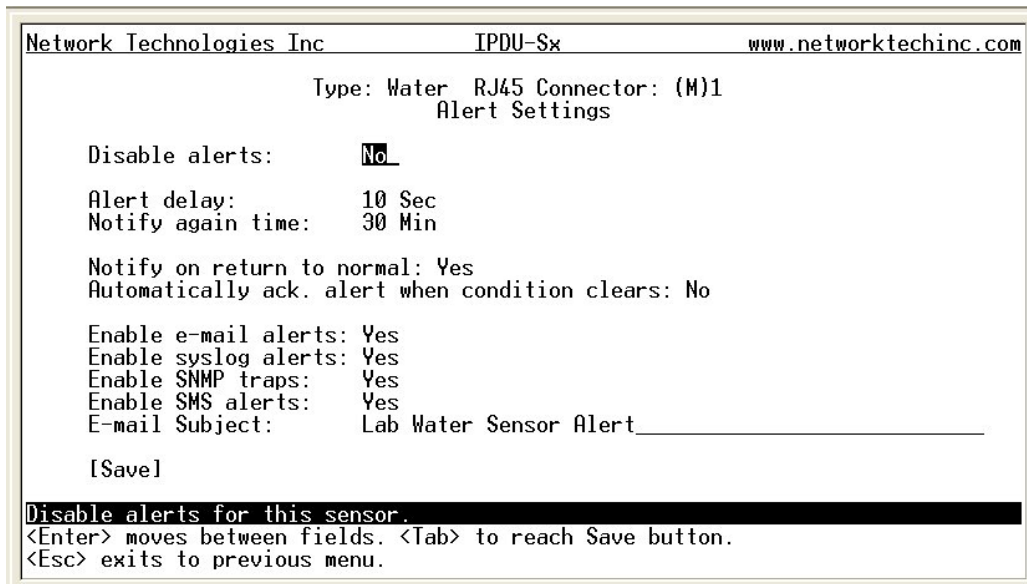
Figure 79- Text Menu-Sensor Alert Settings

Alert Settings	
Disable alerts	Change to "Yes" to prevent alerts from being sent when this sensor's status changes
Alert Delay	The alert delay is an amount of time the sensor must be in an alert condition before an alert is sent. This provides some protection against false alarms. The Alert Delay value can be set for 0-999 seconds or minutes.
Notify Again Time	Enter the amount of time in seconds, minutes, or hours (1-999) before an alert message will be repeated
Notify on Return to Normal	The user can also be notified when the sensor readings have returned to the normal range by changing to "Yes" for "*Notify on return to normal*" for a sensor.
Auto Acknowledge	Change to "Yes" to have alert notifications in the summary page return to normal state automatically when sensor readings return to normal.

Alert Settings	
Enable Email Alerts	Change to "Yes" to have alert notifications sent via Email
Enable Syslog Alerts	Change to "Yes" to have alert notifications sent via Syslog messages
Enable SNMP traps	Change to "Yes" to have alert notifications sent via SNMP traps (v2c)
Enable SMS Alerts	Change to "Yes" to have alert notifications sent via SMS (requires GSM modem)
Email Subject	Enter the subject to be viewed when an email alert message is received

Press <Tab> to highlight **Save** and press <Enter> to save before pressing <Esc> to exit.

From the Data Logging menu for the sensor, the user can decide if the data sampled should be recorded in the Data Log and how frequently.

```
Network Technologies Inc          IPDU-S2          www.networktechinc.com
                   Type: Temperature Combo  RJ45 Connector: 1
                                 Data Logging

        Add data to log file: No
        Add to log every:     10_Sec




        [Save]
Add reading to data log file.
<Enter> moves between fields. <Tab> to reach Save button.
<Esc> exits to previous menu.
```
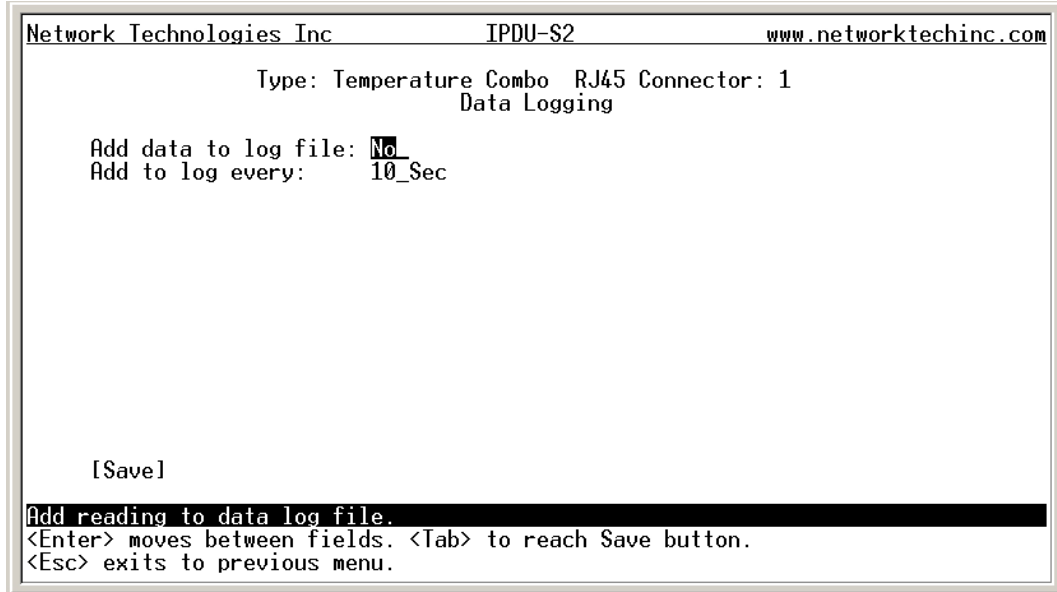
Figure 80- Text Menu-Sensor Data Logging

From the Power Outlet Association menu for the sensor, the user can configure the functionality of a power outlet associated with a sensor's operation.

```
Network Technologies Inc          IPDU-S2          www.networktechinc.com
                   Type: Temperature Combo  RJ45 Connector: 1
                             Power Outlet Association

        Associate power outlet: None
        On alert power outlet:  Off
        On normal power outlet: On




        [Save]
Associate sensor with the selected Power Outlet.
<Enter> moves between fields. <Tab> to reach Save button.
<Esc> exits to previous menu.
```
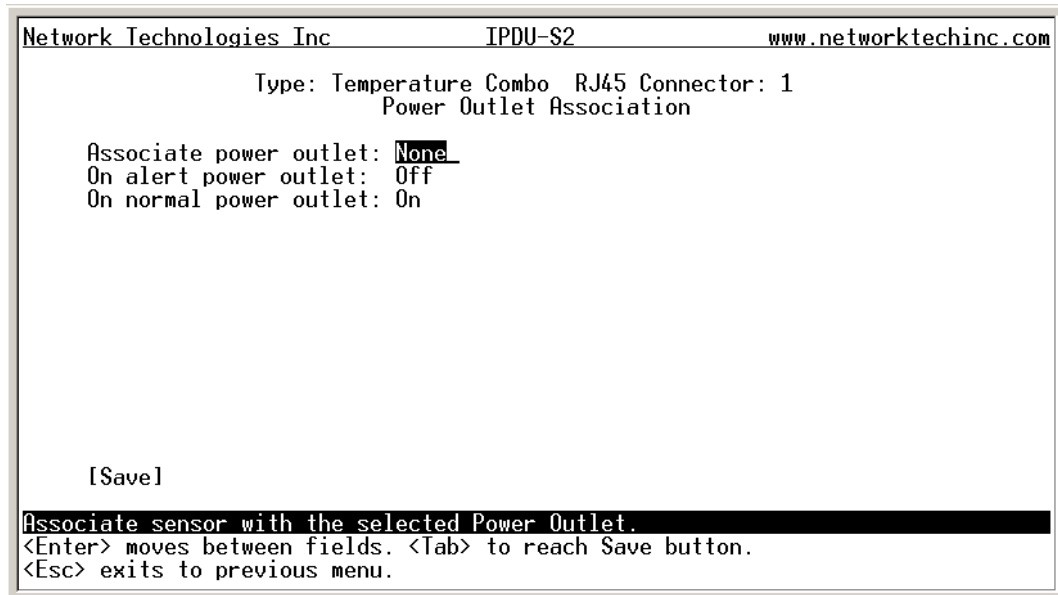
Figure 81- Text Menu- Sensor Power Outlet Association

Power Outlet Association	
Associated outlet	Select which outlet (if any) will be powered ON or OFF when the sensor is in an alert state.
	For this to take effect, the outlet must be configured for Associated Operation Mode (page 19)
Alert State	State the outlet should be in when the sensor enters an alert state
Normal State	State the outlet should be in when the sensor returns to normal state

Press <Tab> to highlight **Save** and press <Enter> to save before pressing <Esc> to exit.

Configure Line Monitor Parameters

Each of the line parameters for the power going through the outlets on the IPDU-Sx (IPDU-S4 and IPDU-S8 only) can be configured just as the sensors are configured (page 64) to send alerts, log data, and control power outlets.   With these tools you can be notified if any parameter goes outside the desired operating range.

The image below shows that the line parameters for each unit connected in a cascaded configuration (page 81) are monitored separately.

```
Network Technologies Inc          IPDU-Sx          www.networktechinc.com
                          Configure Line Monitor Parameters

                          NO.      DESCRIPTION

                          1     Master Line Voltage
                          2     Master Outlet Current
                          3     Master Line Frequency
                          4     Master Circuit Breaker St
                          5     Slave 1 Line Voltage
                          6     Slave 1 Outlet Current
                          7     Slave 1 Line Frequency
                          8     Slave 1 Circuit Breaker S

Configure line monitor parameters (thresholds, alerts, logging, etc).
Press <Enter> to select highlighted item.
<Esc> exits to previous menu.
```

Figure 82- Configure Line Monitor Parameters

```
Network Technologies Inc          IPDU-Sx          www.networktechinc.com
                          Type: Voltage  No: 0

              1. Sensor Settings
              2. Alert Settings
              3. Data Logging
              4. Power Outlet Association

Configure general settings for this sensor.
Press <Enter> to select highlighted item.
<Esc> exits to previous menu.
```
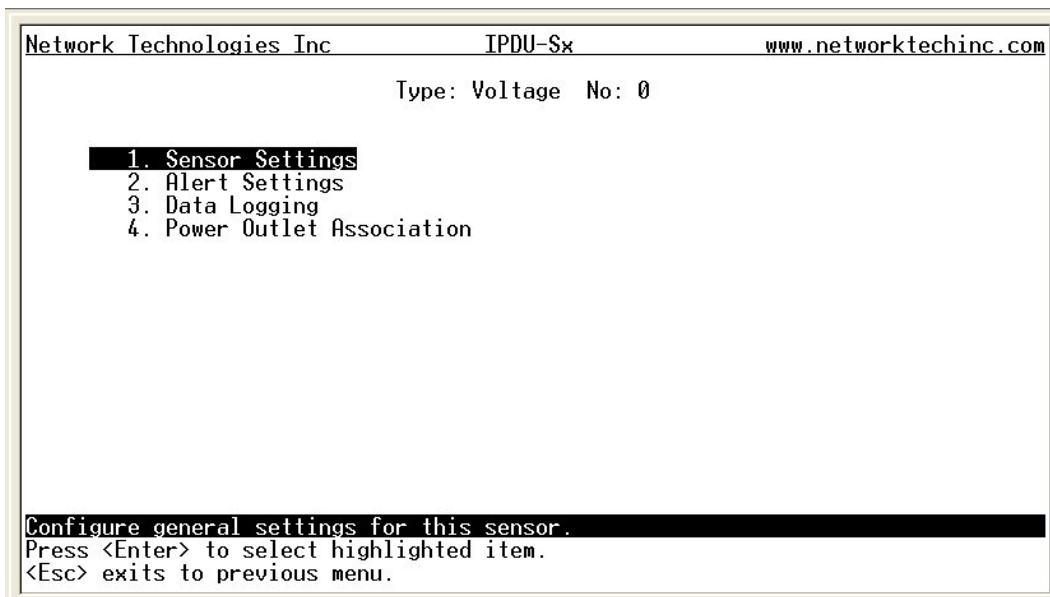
Figure 83- Configuration Menus

Configure IP Devices

The Configure IP Devices menu lists the IP Devices monitored by the IPDU-SX.   Press **<Enter>** to open the configuration menu for the selected IP Device.

```
Network Technologies Inc            IPDU-S2          www.networktechinc.com

                           IP Device Configuration



                          1. ENVIROMUX-MINI no.1
                          2. ENVIROMUX-MINI no.2










                      [Add Device]    [Delete Device]
Configure IP Device settings.
<Tab> to reach buttons. Press <Enter> to select highlighted item.
<Esc> exits to previous menu.
```
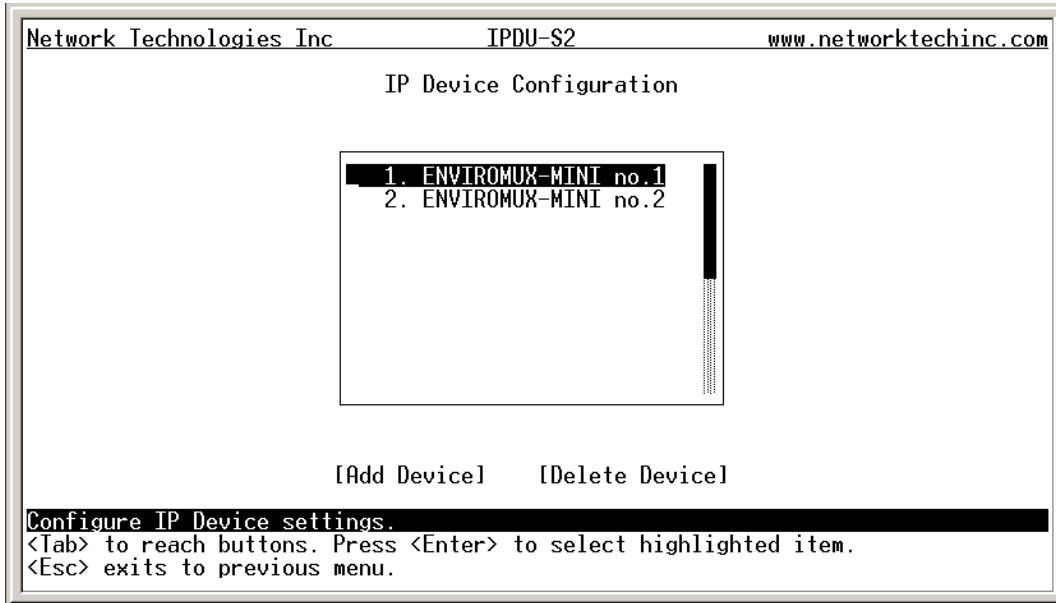
Figure 84- Text Menu-Configure IP Devices List

The configuration menu for the IP Device includes options to enter the IP Device Settings, Alert Settings, and Data Logging, Power Outlet Association Settings.

```
Network Technologies Inc            IPDU-S2          www.networktechinc.com

                      IP Device: ENVIROMUX-MINI-no.1


             1. IP Device Settings
             2. Alert Settings
             3. Data Logging
             4. Power Outlet Association












Configure general settings for this IP device.
Press <Enter> to select highlighted item.
<Esc> exits to previous menu.
```
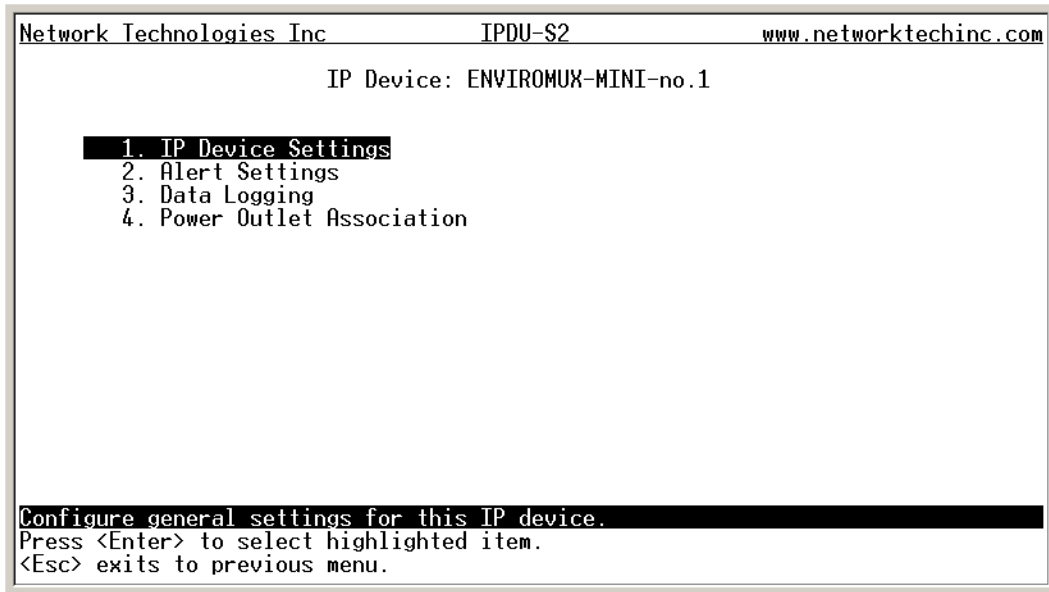
Figure 85- Text menu-Configuration Menu for IP Devices

From the IP Device Settings menu, the user can enter the name and address of the IP Device, assign a sensor group, and define how the IP Device will be monitored.

```
Network Technologies Inc          IPDU-S2          www.networktechinc.com
                              IP Device Settings


        Description: ENVIROMUX-MINI-no.1 _____
        Group:       1

        IP Address:  10.0.1.15_____

        Ping Period: 10_ Min

        Timeout:     2__
        Retries:     10_




        [Save]
Descriptive name for this IP device.
<Enter> moves between fields. <Tab> to reach Save button.
<Esc> exits to previous menu.
```
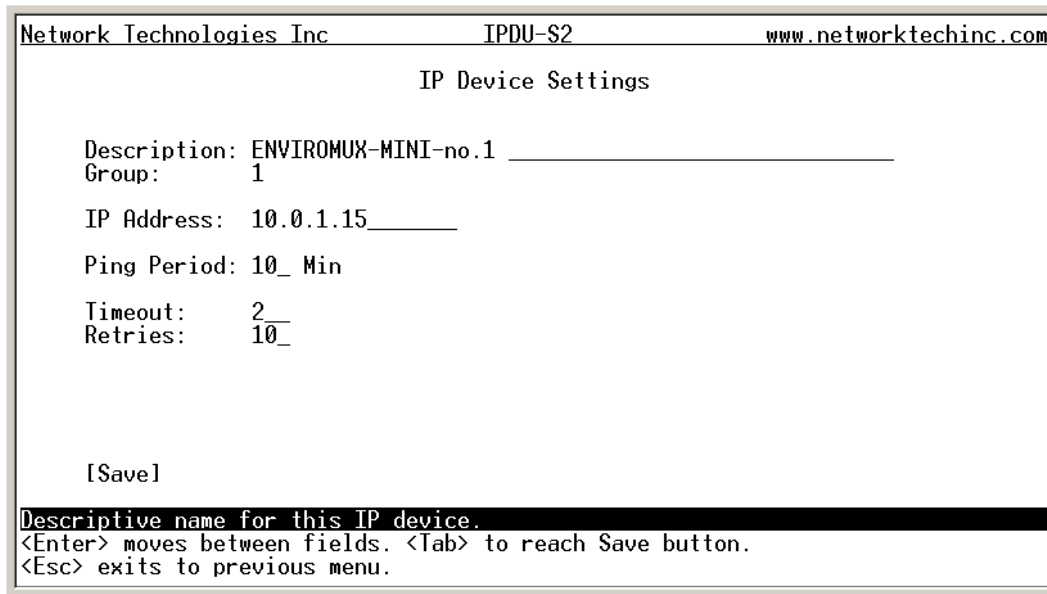
Figure 86-Text Menu-IP Device Settings

IP Device Settings	Description
Description	The description of the IP Device that will be viewed in the Summary page and in the body of alert messages
Group	Assign the IP device to either group 1 or 2
IP Address	The IP address of the IP Device
Ping Period	Enter the frequency in minutes or seconds that the IPDU-SX should ping the IP Device
Timeout	Enter the length of time in seconds to wait for a response to a ping before considering the attempt a failure
Retries	Enter the number of times the IPDU-SX should ping a non-responsive IP device before changing its status from normal to alarm and sending an alert

Press <Tab> to highlight **Save** and press <Enter> to save before pressing <Esc> to exit.

From the Alert Settings menu, the user can enable/disable alert messages to be sent when the IP Device is in an alert state and configure when and how alert messages are sent.   The alert settings and data logging are the same as for sensor configuration, described on page 66.   Under Power Outlet Association, if the IP device is connected to one of the power outlets on the IPDU-Sx, the IPDU-Sx can automatically cycle the power to the chosen outlet when the IP device is determined to be in a state of alarm. The power cycle characteristics will be those configured under the power outlet configuration under "Power Outlet Operation Settings" (page 63).

From the Alert Settings menu, the user can enable/disable alert messages to be sent when the IP Device is not responding and configure when and how alert messages are sent.

```
Network Technologies Inc           IPDU-Sx           www.networktechinc.com

                         IP Device: Bench Test E-MINI
                               Alert Settings

        Disable alerts:       No

        Notify again time:    60 Min

        Notify on return to normal: Yes
        Automatically ack. alert when condition clears: Yes

        Enable e-mail alerts: Yes
        Enable syslog alerts: Yes
        Enable SNMP traps:    No
        Enable SMS alerts: No
        E-mail Subject:       Bench Test E-MINI Alert_____


        [Save]

Disable alerts for this IP Device.
<Enter> moves between fields. <Tab> to reach Save button.
<Esc> exits to previous menu.
```

Figure 87- Text Menu-IP Device Alert Settings

Alert Settings	
Disable alerts	Change to "Yes" to prevent alerts from being sent when this IP Device's status changes
Alert Delay	The alert delay is an amount of time the IP Device must be in an alert condition before an alert is sent. This provides some protection against false alarms. The Alert Delay value can be set for 0-999 seconds or minutes.
Notify Again Time	Enter the amount of time in seconds, minutes, or hours (1-999) before an alert message will be repeated
Notify on Return to Normal	The user can also be notified when the IP Device's state has returned to the normal by changing to "Yes" for "*Notify on return to normal*" for a sensor.
Auto Acknowledge	Change to "Yes" to have alert notifications in the summary page return to normal state automatically when sensor readings return to normal.
Enable Email Alerts	Change to "Yes" to have alert notifications sent via Email
Enable Syslog Alerts	Change to "Yes" to have alert notifications sent via Syslog messages
Enable SNMP traps	Change to "Yes" to have alert notifications sent via SNMP traps (v2c)
Enable SMS Alerts	Change to "Yes" to have alert notifications sent via SMS (requires GSM modem) (IPDU-S4/S8 only)
Email Subject	Enter the subject to be viewed when an email alert message is received

Press <Tab> to highlight **Save** and press <Enter> to save before pressing <Esc> to exit.

From the Data Logging menu for the IP Device, the user can decide if the data sampled should be recorded in the Data Log and how frequently.

```
Network Technologies Inc          IPDU-S2          www.networktechinc.com
                        IP Device: ENVIROMUX-MINI-no.1
                                Data Logging

        Add data to log file: No
        Add to log every:     60_Min




        [Save]
Add reading to data log file.
<Enter> moves between fields. <Tab> to reach Save button.
<Esc> exits to previous menu.
```
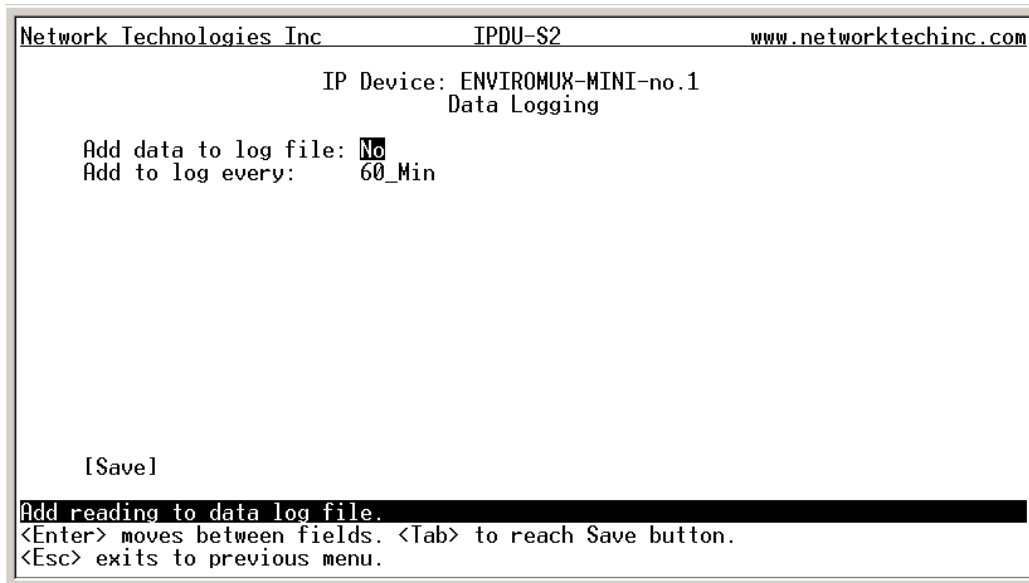
Figure 88- Text Menu-IP Device Data Logging

From the Power Outlet Association menu for the IP Device, the user can configure which power outlet is associated with a IP Device's operation. If the IP device is connected to one of the power outlets on the IPDU-Sx, the IPDU-Sx can automatically cycle the power to the chosen outlet when the IP device is determined to be in a state of alarm.   The power cycle characteristics will be those configured under the power outlet configuration under "Power Outlet Operation Settings" (page 63).

```
Network Technologies Inc          IPDU-S2          www.networktechinc.com
                        IP Device: ENVIROMUX-MINI-no.1
                            Power Outlet Association

        Associate power outlet: None_




        [Save]
Associate IP device with the selected Power Outlet.
<Enter> moves between fields. <Tab> to reach Save button.
<Esc> exits to previous menu.
```
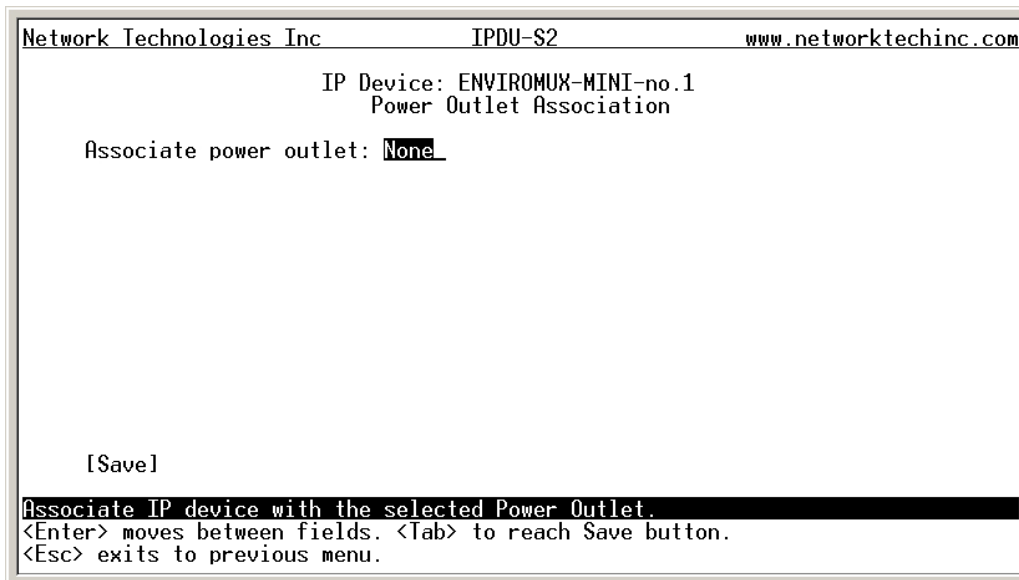
Figure 89- Text Menu-IP Device Power Outlet Association

System Configuration

Under System Configuration (from the Main Menu), select "Time Settings" to enter the time of day, time zone, enable daylight saving time, or NTP server settings.   Also, select "Restore Settings to Defaults" to clear all configuration and user settings and restore the IPDU-Sx to settings as received from the factory.

```
Network Technologies Inc          IPDU-S2          www.networktechinc.com
                              System Configuration


              1. Time Settings
              2. Restore Settings to Defaults















Configure system time settings.
Press <Enter> to select highlighted item.
<Esc> exits to previous menu.
```
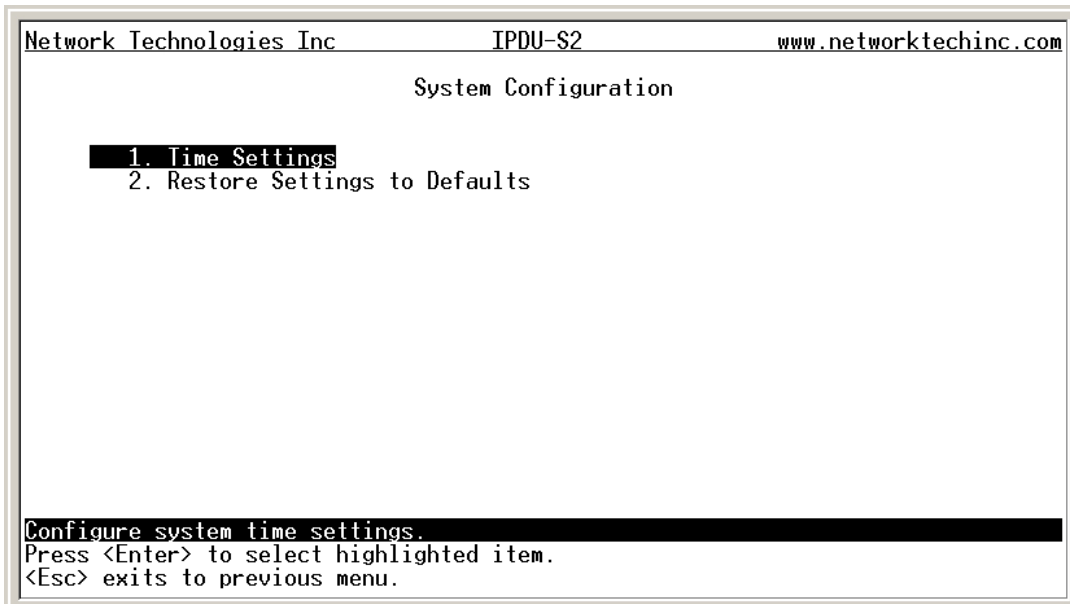
Figure 90- Text Menu- System Configuration

Time Settings

On the Time Settings menu, the user can designate what time zone the unit is associated with, set the date and time manually or configure the IPDU-Sx to get this information from an NTP server.

```
Network Technologies Inc          IPDU-S2          www.networktechinc.com
                                Time Settings


     Timezone: (GMT-05:00) Eastern Time (US & Canada)

     Daylight Saving: Disabled

     Set Date: _____
     Set Time: _____ AM

     Synchronize time with NTP: Disabled
     NTP Server:                _____
     NTP Frequency:             5__




     [Save]
Select timezone.
<Enter> moves between fields. <Tab> to reach Save button.
<Esc> exits to previous menu.
```
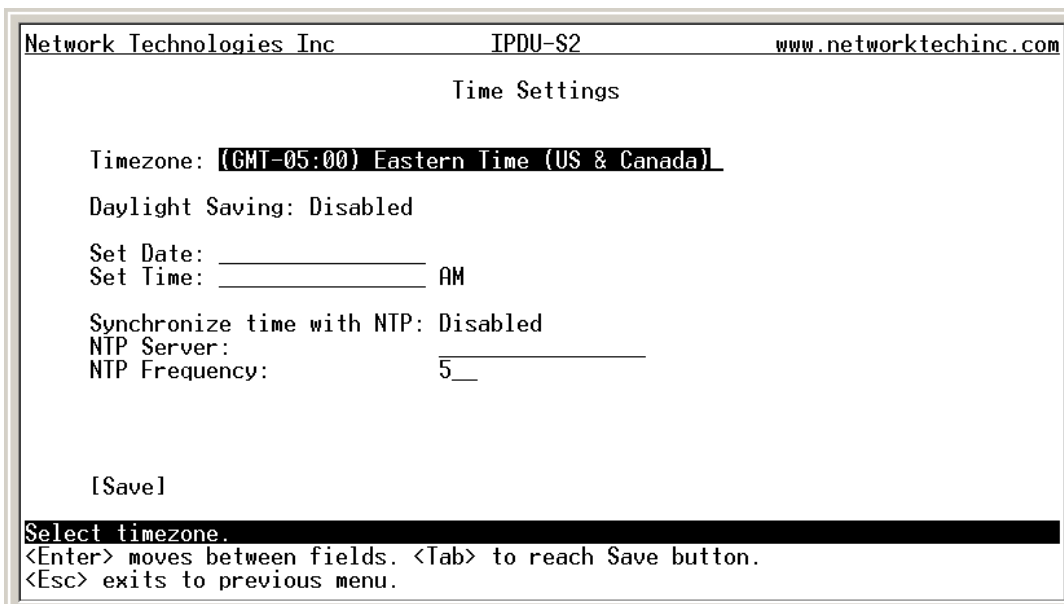
Figure 91- Text Menu-Time Settings menu

Time Settings	Description
Time Zone	Enter the appropriate time zone
Enable Daylight Saving	Change to "Yes" to have the time change in accordance Daylight Saving Time rules
Set Date	Enter the system date in MM-DD-YYYY format
Set Time	Enter the system time of day in hh:mm:ss format
Enable NTP	Change to "Enabled" to allow the IPDU-SX to automatically sync up with a time server via NTP
NTP server	If the NTP is enabled, enter the IP address of the NTP server
NTP Frequency	Enter the frequency (in minutes) for the IPDU-SX to query the NTP server (minimum is 5 minutes)

Press <**Tab**> to highlight **Save** and press <**Enter**> to save before pressing <**Esc**> to exit.

Restore Default Settings

Select this option to restore the IPDU-Sx to the configuration settings it had upon receipt from the factory. **Be careful!** This will erase <u>all</u> user configuration settings. Upon restoration, the IPDU-Sx will reboot. Allow 1 minute before trying to reconnect and log in again.

```
Network Technologies Inc          IPDU-S2          www.networktechinc.com
                              System Configuration


       1. Time Settings
       2. Restore Settings to Defaults



              Restore all settings to defaults - are you sure?
                              [No]   [Yes]






Restore settings to factory defaults. Use with caution!
<Enter> moves between fields. <Tab> to reach Save button.
<Esc> exits to previous menu.
```
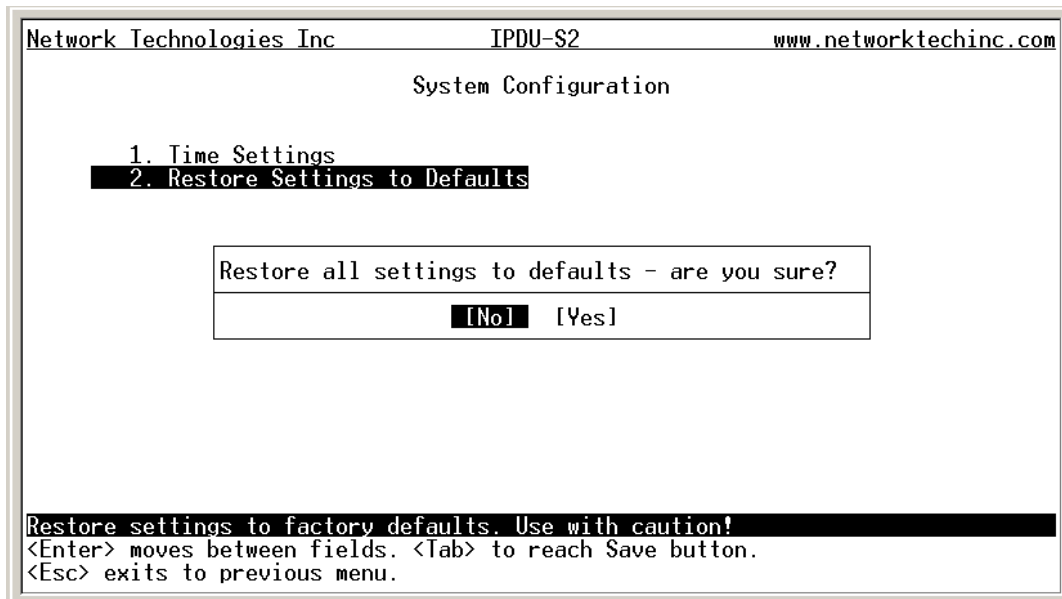
Figure 92- Text Menu-Restore Default Settings

Note: If "Restore Defaults" is used, the IP address will also be restored to its default address of 192.168.1.22 with a login name "root" and password "nti".   To restore the root password to "nti" without having to restore all default settings, contact NTI for assistance.

To identify the IP address of the IPDU-Sx without restoring defaults, use the Discovery Tool (page 13).

Enterprise Configuration

Under Enterprise Configuration (from the Main Menu), enter the unit name, location, the contact person emails should refer to and their phone number, and the email address of the IPDU-Sx to be used for outgoing alert messages.

```
Network Technologies Inc          IPDU-S2          www.networktechinc.com
                          Enterprise Configuration


     Enterprise Name:  Unit Name_____
     Location:         Unit Location___

     Contact:          Contact Person__
     Phone:            Phone No_____
     E-mail:           ipdus2@company.com_____




     [Save]
Set enterprise name.
<Enter> moves between fields. <Tab> to reach Save button.
<Esc> exits to previous menu.
```

Figure 93- Text Menu-Enterprise Configuration

Network Configuration

The Network Configuration menu (from the Main Menu) includes submenus for applying IP Settings, SMTP server settings, SNMP settings, and miscellaneous settings to enable services for SSH, Telnet, HTTP, HTTPS and Web Timeout.

```
Network Technologies Inc          IPDU-S2          www.networktechinc.com
                          Network Configuration


          1. IP Settings
          2. SMTP Settings
          3. SNMP Settings
          4. Misc. Service Settings















Configure IP settings.
Press <Enter> to select highlighted item.
<Esc> exits to previous menu.
```

Figure 94- Text Menu-Network Configuration

IP Settings

The IP Settings menu contains the network connection settings for the IPDU-Sx.

```
Network Technologies Inc         IPDU-S2         www.networktechinc.com

                              IP Settings


        IP Address Mode: DHCP

        IP Address:      192.168.1.22___
        Subnet Mask:     255.255.255.0__

        Default Gateway: 192.168.1.1____

        Preferred DNS:   192.168.1.2____
        Alternate DNS:   192.168.1.3____



        Warning: Changing network settings may disrupt connections.

        [Save]

Set IP address mode - static or DHCP.
<Enter> moves between fields. <Tab> to reach Save button.
<Esc> exits to previous menu.
```

Figure 95- Text Menu-IP Settings Menu

IP Settings	Description
Mode	Select between Static (manual) , or DHCP (automatic IP and DNS) settings
IP Address	Enter a valid IP address (default address shown above)
Subnet Mask	Enter a valid subnet mask (default value shown above)
Default Gateway	Enter a valid gateway (default gateway shown above)
Preferred DNS	Enter a preferred domain name server address
Alternate DNS	Enter an alternate domain name server address

If the administrator chooses to have the DNS and IP address information filled in automatically via DHCP,   the SMTP server and port number still need to be entered for email alerts to work. If the SMTP server requires a password in order for users to send emails, the network administrator must first assign a user name and password to the IPDU.

Press <Tab> to highlight **Save** and press <Enter> to save before pressing <Esc> to exit.

SMTP Settings

The SMTP Settings menu contains the SMTP server settings for the IPDU-Sx.

```
Network Technologies Inc          IPDU-S2          www.networktechinc.com

                              SMTP Settings


        SMTP Server:    _____
        SMTP Port:      25___

        Use SSL:        No

        Requires Auth: No
        SMTP User:      _____
        SMTP Password: _____




        [Save]
SMTP server for sending e-mail messages.
<Enter> moves between fields. <Tab> to reach Save button.
<Esc> exits to previous menu.
```

Figure 96- Text Menu-SMTP Server Settings

SMTP Settings	Description
SMTP Server	Enter a valid SMTP server name (e.g. yourcompany.com)
Port	Enter a valid port number (default port is 25)
Use SSL	Change to "Yes" if the SMTP server supports SSL
Use Authentication	Change to "Yes" if the SMTP server requires authentication to send email
Username	Enter a valid username to be used by the IPDU-SX to send emails
Password	Enter a valid password assigned to the IPDU-SX username

Note: The SMTP server port number is shown in Figure 94 as "25".   This is a common port number assigned, but not necessarily the port number assigned to your SMTP server.   For SMTP servers that support SSL, the common port number is 465.

SNMP Settings

The SNMP Settings menu contains the SNMP server settings for the IPDU-Sx.

```
Network Technologies Inc          IPDU-S2          www.networktechinc.com

                              SNMP Settings


        SNMP Agent: Disabled
        SNMP Traps: Disabled

        Read-write community name: private_____
        Read-only community name:  public_____








        [Save]

Enable/Disable SNMP agent
<Enter> moves between fields. <Tab> to reach Save button.
<Esc> exits to previous menu.
```
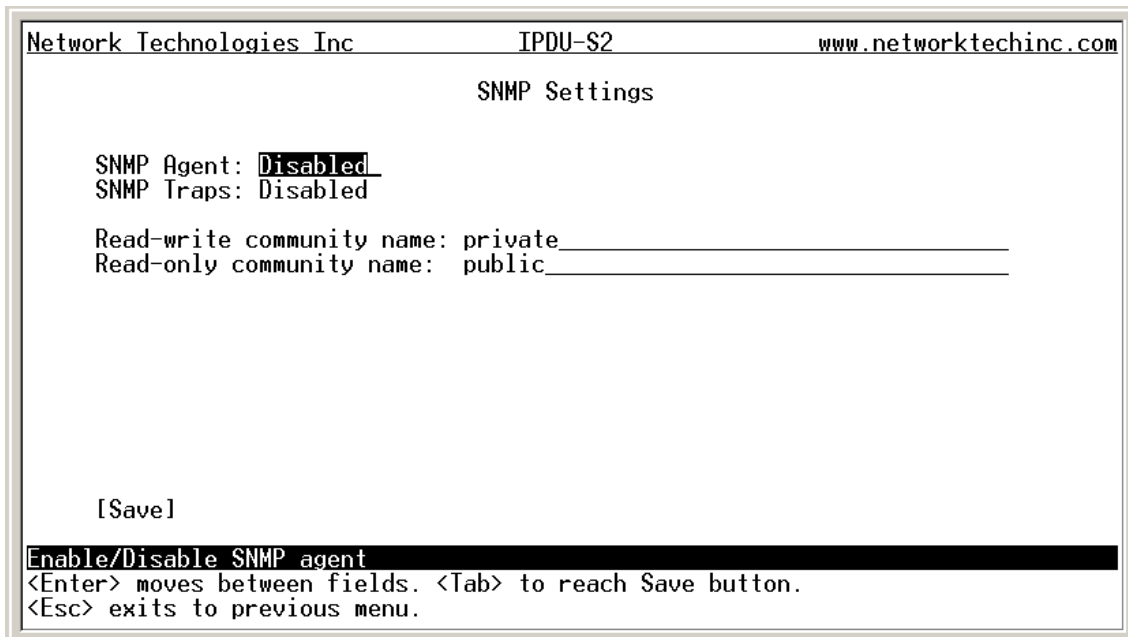
Figure 97- Text Menu-SNMP Server Settings

SNMP Settings	
Enable SNMP agent	Change to "Enabled" to enable access to the SNMP agent
Enable SNMP traps	Change to "Enabled" to enable SNMP traps to be sent
Read-write community name	Enter applicable name (commonly used- "private") **(not applicable as of this printing)**
Read-only community name	Enter applicable name (commonly used- "public")

Read-Only Community Name

The SNMP Read-only community name enables a user to retrieve "read-only" information from the IPDU-Sx using the SNMP browser and MIB file.   This name must be present in the IPDU-Sx and in the proper field in the SNMP browser.

Read-Write Community Name

(not applicable as of this printing)

The SNMP Read-Write community name enables a user to read information from the IPDU-Sx and to modify settings on the IPDU-Sx using the SNMP browser and MIB file. This name must be present in the IPDU and in the proper field in the SNMP browser.

Miscellaneous Service Settings

The Misc. Service Settings menu contains selections to configure services running on the IPDU-Sx.

```
Network Technologies Inc          IPDU-S2              www.networktechinc.com
                              Misc. Service Settings


        SSH Server:        Enabled
        Telnet Server:     Enabled
        Basic HTTP Access: Enabled
        HTTP Port:         80___
        HTTPS Port:        443__
        Web Timeout:       20___




        [Save]

Enable/Disable SSH server.
<Enter> moves between fields. <Tab> to reach Save button.
<Esc> exits to previous menu.
```
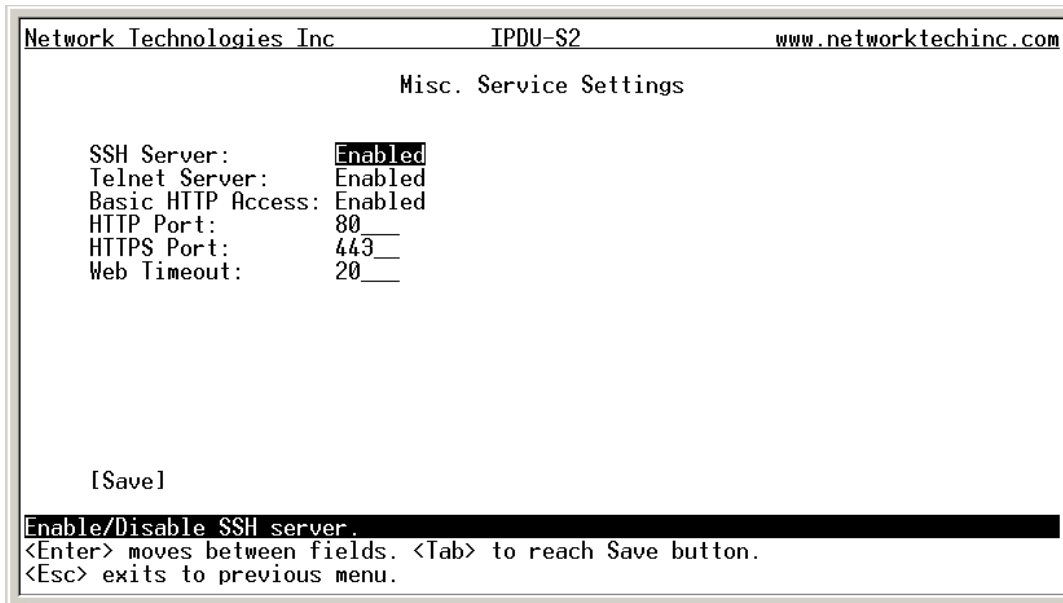
Figure 98- Text Menu-Misc. Service Settings menu

Server Settings	
Enable SSH	Enable this to allow access to the IPDU-SX via SSH
Enable Telnet	Enable this to allow access to the IPDU-SX via Telnet
Enabe HTTP access	Enable this to allow access to the IPDU-SX via standard (non-secure) HTTP requests
HTTP Port	Port to be used for standard HTTP requests
HTTPS Port	Port to be used for HTTPS requests
Web Timeout	Number of minutes after which idle web uses will be logged-out (enter 0 to disable this feature)

The administrator may assign a different HTTP Server Port than is used by most servers (80).

Note: If the port number is changed and forgotten, to determine what it has been changed to connect the IPDU-Sx for RS232 control (page 6) and review these settings.

Cascade Configuration

Select Cascade Configuration (from the Main Menu) if this feature will be used (IPDU-S4 and IPDU-S8 only). Use cascading to control multiple IPDU-Sx units, connecting them to one another to form a much larger system that can be administered and monitored from one central point.   Units can be cascaded using either RS485 or Ethernet connection.   When using the RS485 Connection method for cascading the IPDU-Sx will be connected as shown on page 8.   If units will be controlled using the Ethernet Connection method, the IPDU-Sx will be connected to a network using the "ETHERNET" port.

In a cascaded configuration, one unit will be the "master" to which each unit is connected as a "slave".   Up to 16 slave units can be connected for a total system configuration of 136 controlled outlets.

Configure the Type

In the Cascade Configuration menu the first setting to configure is the type.   Types include:

Type	Description
Master with No Slaves	Stand alone unit, not cascaded
RS485 Slave	Unit will be connected to a master using the "Cascade" ports
Ethernet Slave	Unit will be connected to a master using the Ethernet
RS485 Master	Unit will be the master in a RS485 connected configuration
Ethernet Master	Unit will be the master using the Ethernet
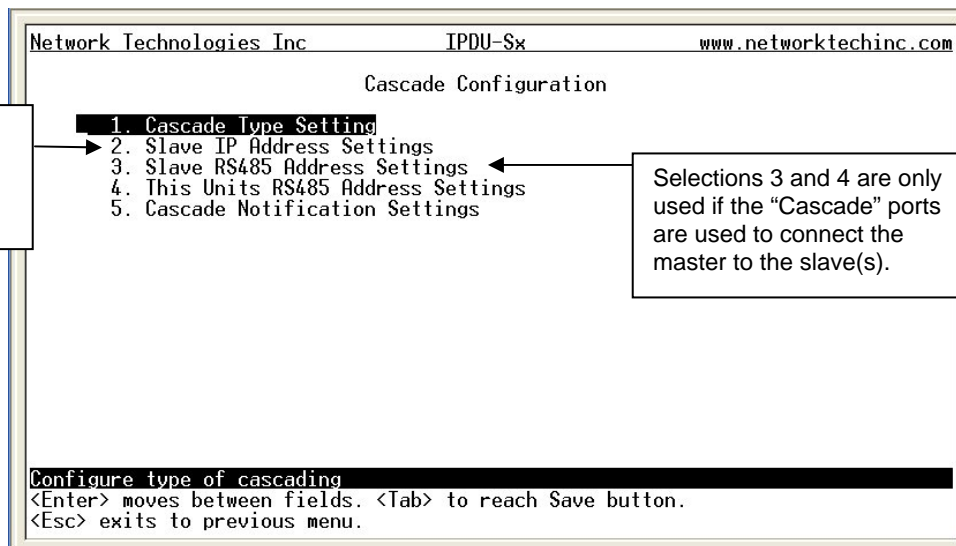
Figure 99- Text Menu- Type Setting for Cascading

RS485 Slave

If the type is <u>RS485 Slave</u>, an address number (1-255) must be entered to identify the unit to the master. Each slave on the system must have a unique address number.

```
Network Technologies Inc          IPDU-Sx          www.networktechinc.com
                            Cascade Configuration


      Units RS485 Address:  1_____







      [Save]
Set Units RS485 Address.
<Enter> moves between fields. <Tab> to reach Save button.
<Esc> exits to previous menu.
```
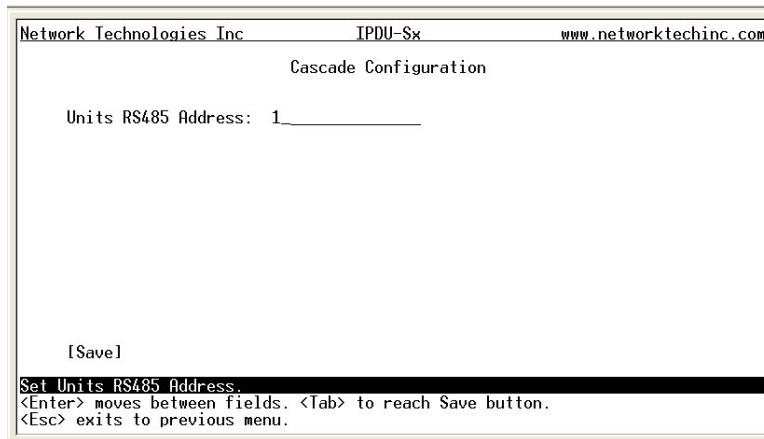
Figure 100- Text Menu- Unit RS485 Address

Ethernet Slave

If the type is <u>Ethernet Slave</u>, the Ethernet address entered on the Network Configuration page (page 33) will be used by the master to communicate with this slave.   There will be no "slave IP address settings" to enter.   Each slave on the system must have a unique IP address.

```
Network Technologies Inc          IPDU-Sx          www.networktechinc.com
                          Cascade Type Settings


      This unit is:            Ethernet slave











      [Save]
Select cascade configuration type for this unit.
<Enter> moves between fields. <Tab> to reach Save button.
<Esc> exits to previous menu.
```
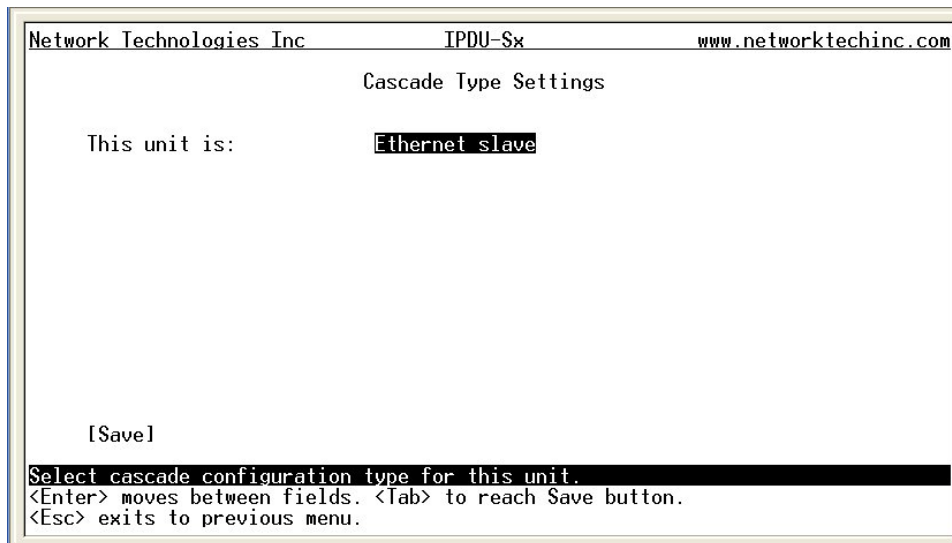
Figure 101- Text Menu- Type is Ethernet Slave

RS485 Master

If the type is <u>RS485 Master</u>, then the RS485 addresses for each slave (valid address range of 1-255) must be entered into the available slots (up to 16) in order to communicate between the master and each slave. The RS485 unit address and Slave IP address settings will not apply to this configuration. To configure a slave to be connected, select the desired slave number and press <Enter> to open the "Edit Slave Address" menu.

```
Network Technologies Inc            IPDU-Sx            www.networktechinc.com
                            Configure RS485 slave address

                        SLAVE    STATUS       ADDRESS

                    _    1. Disabled    1
                         2. Disabled    2
                         3. Disabled
                         4. Disabled
                         5. Disabled
                         6. Disabled
                         7. Disabled
                         8. Disabled
                         9. Disabled
                        10. Disabled



Configure RS485 slave address.
Press <Enter> to select highlighted item.
<Esc> exits to previous menu.
```
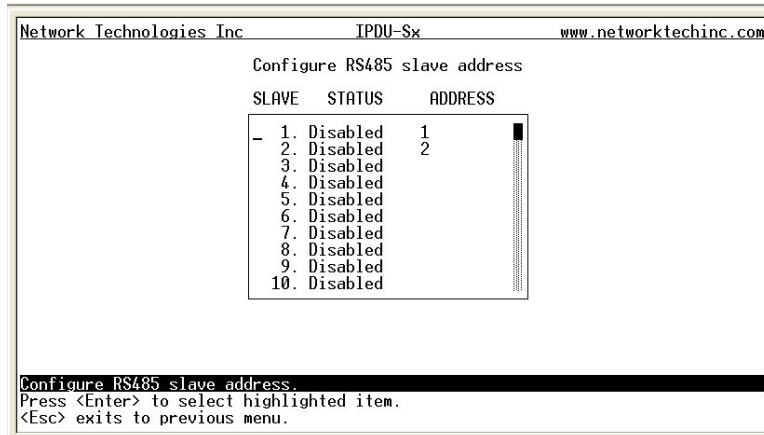
Figure 102- Text Menu- RS485 Master's slave list

In the "Edit Slave Address" menu, the slave can be either enabled (set to establish communication with the slave) or left disabled. If set to enable, be sure to enter a valid unique RS485 address (valid number range is 1-255).

Note: Address values entered outside the valid number range will be accepted by the master, but ignored.

```
Network Technologies Inc            IPDU-Sx            www.networktechinc.com
                            Edit Slave Address


        Enabled:    No
        Slave RS485 Address:    _____






        [Save]
Enable/disable the slave.
<Enter> moves between fields. <Tab> to reach Save button.
<Esc> exits to previous menu.
```
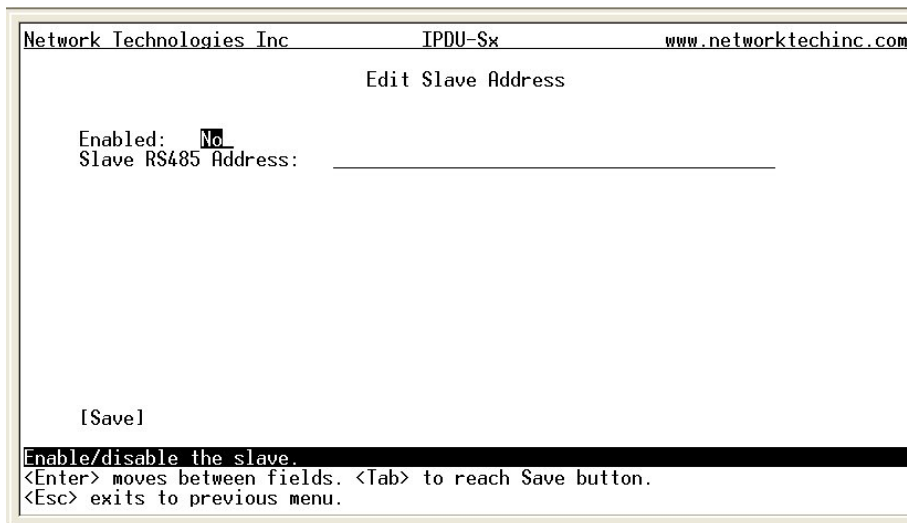
Figure 103- Text Menu- Edit RS485 Slave Address

Ethernet Master

If the type is **Ethernet Master**, then the Slave IP Address Settings (item 2 in the Cascade Configuration menu) must be entered for each slave that will be controlled.   RS485 address settings and the RS485 unit address will not apply. To configure a slave to be connected, select the desired slave number and press <Enter> to open the "Edit Slave Address" menu.

```
Network Technologies Inc            IPDU-Sx           www.networktechinc.com
                              Configure Slave IP Address

                           SLAVE    STATUS      ADDRESS

                       _  1. Disabled                      █
                          2. Disabled
                          3. Disabled
                          4. Disabled
                          5. Disabled
                          6. Disabled
                          7. Disabled
                          8. Disabled
                          9. Disabled
                         10. Disabled



Configure slave IP address.
Press <Enter> to select highlighted item.
<Esc> exits to previous menu.
```
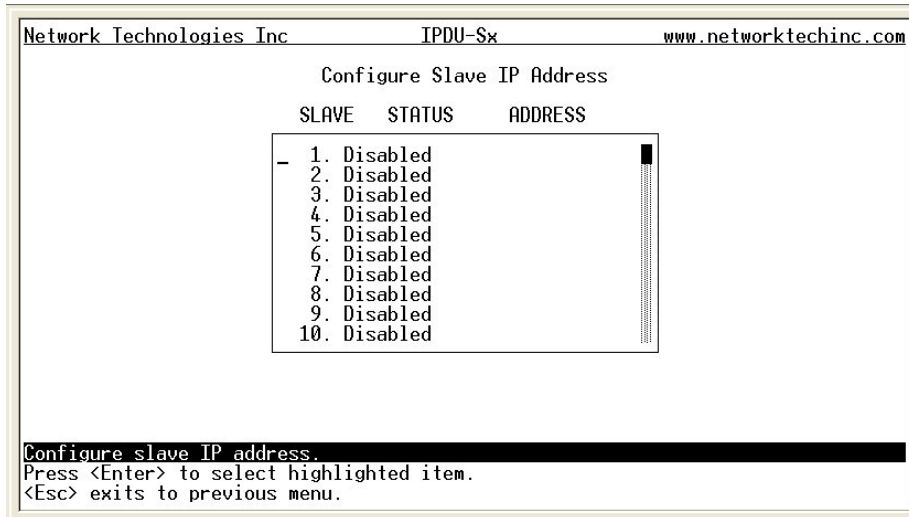
Figure 104- Text Menu- Ethernet Master's slave list

In the "Edit Slave Address" menu, the slave can be either enabled (set to establish communication with the slave) or left disabled. If set to enable, be sure to enter a valid unique IP address.

```
Network Technologies Inc                IPDU-Sx              www.networktechinc.com
                                  Edit Slave Address


        Enabled:    Yes
        Slave IP Address:   192.168.3.99_____








        [Save]
Enable/disable the slave.
<Enter> moves between fields. <Tab> to reach Save button.
<Esc> exits to previous menu.
```
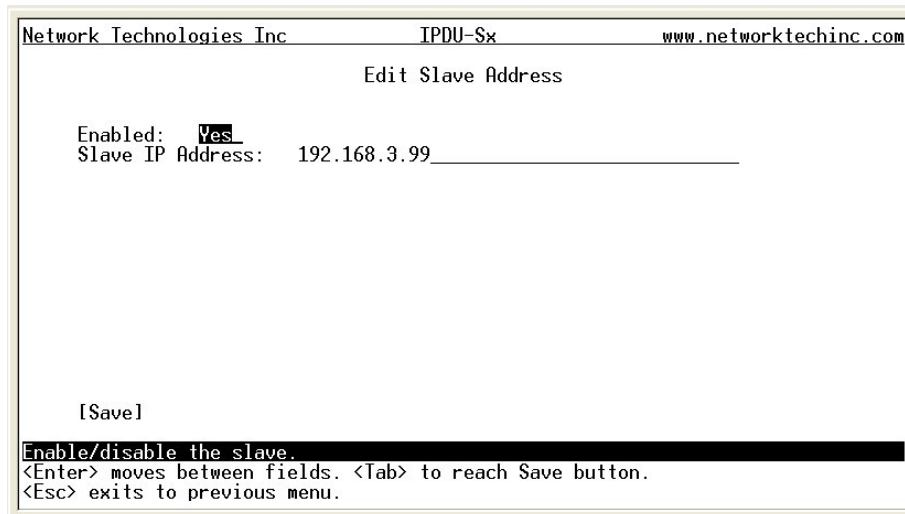
Figure 105-Text Menu- Edit Ethernet Slave Address

Cascade Notification

In the event a slave goes offline from the system, the system can be set to notify those configured to receive messages from the master unit. Selecting 5 from the "Cascade Configuration" menu will open the "Cascade Notification" menu where you can specify how frequent notifications will be repeated. Cascade Notification cannot be disabled.

```
Network Technologies Inc          IPDU-Sx          www.networktechinc.com
                              Cascade Configuration

        1. Cascade Type Setting
        2. Slave IP Address Settings
        3. Slave RS485 Address Settings
        4. This Units RS485 Address Settings
        5. Cascade Notification Settings









Configure Notification time for slave not responding
Press <Enter> to select highlighted item.
<Esc> exits to previous menu.
```
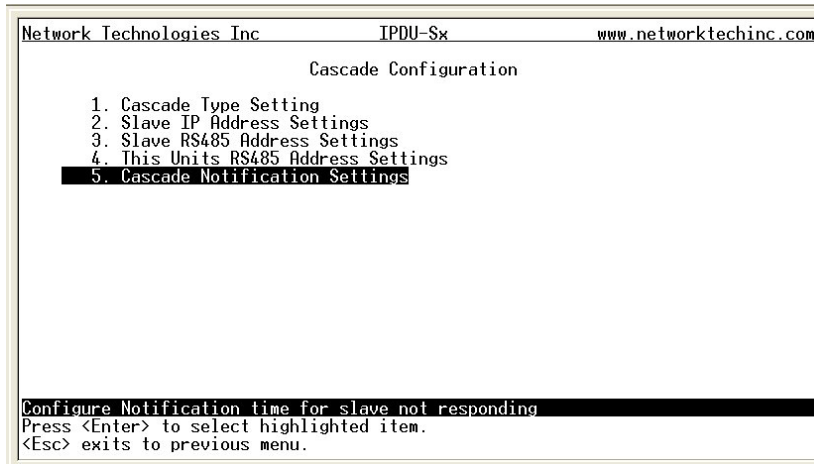
Figure 106- Text Menu-Cascade Notification Settings

An example of the notification you will receive is:

`11-12-2010 11:18:38 AM     Sensor Not Responding      --     Slave Unit #2 (`Unit Name`) not responding`

Suggestion: To avoid receiving unnecessary notifications, don't enable the slave (Figure 103 and Figure 105) when configuring the master until the slave has been fully configured first.

The default time period in which notifications will repeat is every 30 seconds.

To change the value:

1. While the number value is selected, press the **<Delete>** key to remove the value and type the desired value (range is 1-99). Press **<Enter>** to move to the units value.

2. Press an arrow key to toggle between seconds (Sec), minutes (Min), or hours (Hr). Press **<Enter>** again to move to "Save".

3. Press **<Enter>** again to save the change, or press **<Tab>** to return to the number value.

```
Network Technologies Inc          IPDU-Sx          www.networktechinc.com
                              Cascade Notification


     Notify time:    10      Sec









     [Save]
Set the time for notifications of slave not responding alerts.
<Enter> moves between fields. <Tab> to reach Save button.
<Esc> exits to previous menu.
```
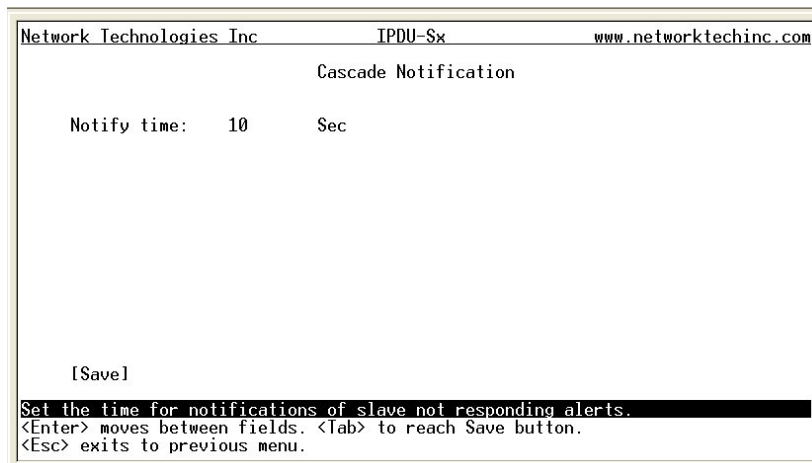
Figure 107- Cascade Notification Configuration

User Configuration

The User Configuration menu lists all configured user names of the IPDU-Sx. A maximum of 15 users (other than root) can be configured.   From this screen the administrative user can add users, go to the user configuration page to edit a user's access to the IPDU-Sx, or delete a user from the list.

```
Network Technologies Inc          IPDU-S2          www.networktechinc.com
                              Configure Users


                        ┌──────────────────────────┐ ┌─┐
                        │ 1. root                  │ │ │
                        │                          │ │ │
                        │                          │ │ │
                        │                          │ │ │
                        │                          │ │ │
                        │                          │ │ │
                        └──────────────────────────┘ └─┘


                        [Add User]        [Delete User]
 Configure user settings (name, password, host access, etc).
 <Tab> to reach buttons. Press <Enter> to select highlighted item.
 <Esc> exits to previous menu.
```
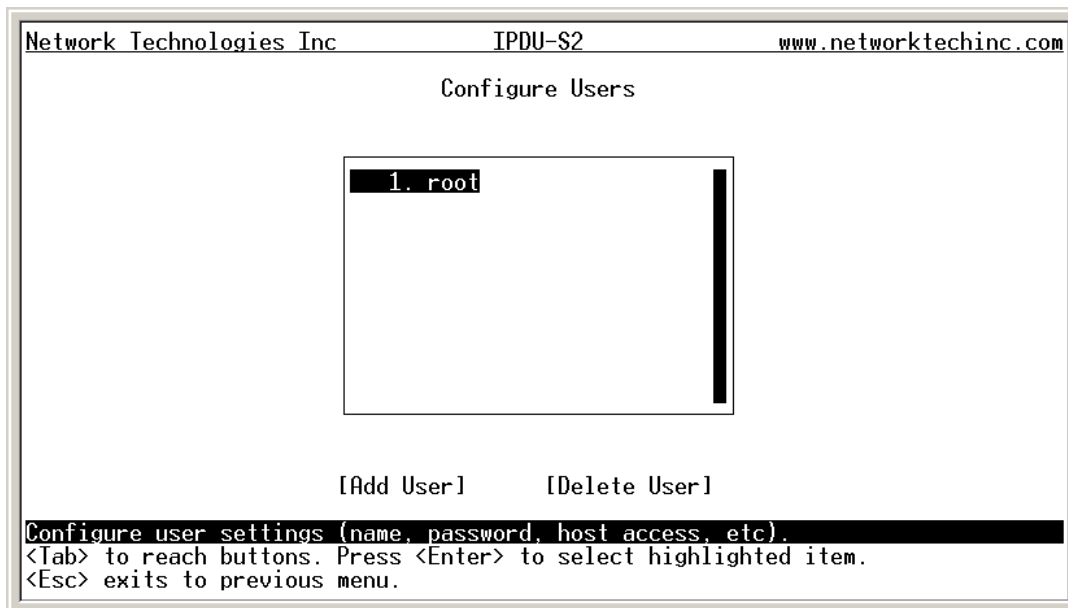
Figure 108- Text Menu-User Configuration

To add a user, Tab to "Add User" and press **<Enter>**.

To edit a user's configuration, select the listed username and press **<Enter>**

To delete a user and their configuration, select a listed username, Tab to "Delete User", and press **<Enter>**.   You will be prompted for confirmation before deleting the user and configuration.

When adding a new user, you will be prompted to confirm the addition of the user.   At that point, the Configure User menu will open a user settings list with the username "user*x"* assigned,   where x = the next consecutive number (up to 15) based on the quantity of users in the list (other than the root user).

```
Network Technologies Inc          IPDU-S2          www.networktechinc.com
                              Configure Users


                        ┌──────────────────────────┐ ┊ ┊
                        │ 1. root                  │ ┊ ┊
                        │ 2. user1                 │ ┊ ┊
                        ┌──────────────────────────┐
                        │ Add new user - are you sure? │
                        ├──────────────────────────┤
                        │        [No]   [Yes]       │
                        └──────────────────────────┘
                        │                          │ █
                        └──────────────────────────┘


                        [Add User]        [Delete User]
 Add a new user to the system.
 <Tab> to reach buttons. Press <Enter> to select highlighted item.
 <Esc> exits to previous menu.
```
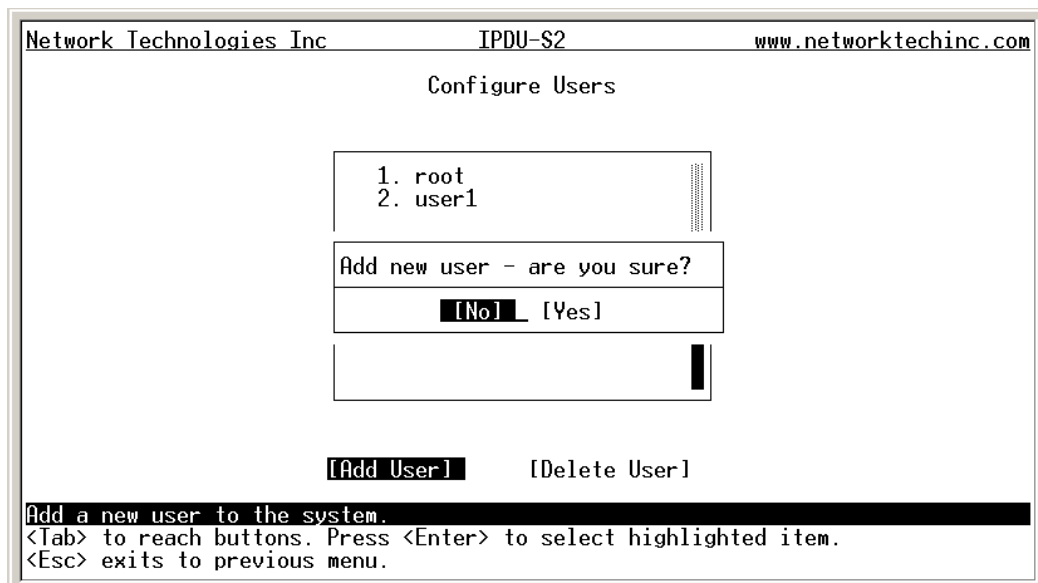
Figure 109- Text Menu-Confirm to add new user

```
Network Technologies Inc          IPDU-S2          www.networktechinc.com
                              User: user1


            1. Account Settings
            2. Contact Settings
            3. Schedule










Configure account settings for this user.
Press <Enter> to select highlighted item.
<Esc> exits to previous menu.
```
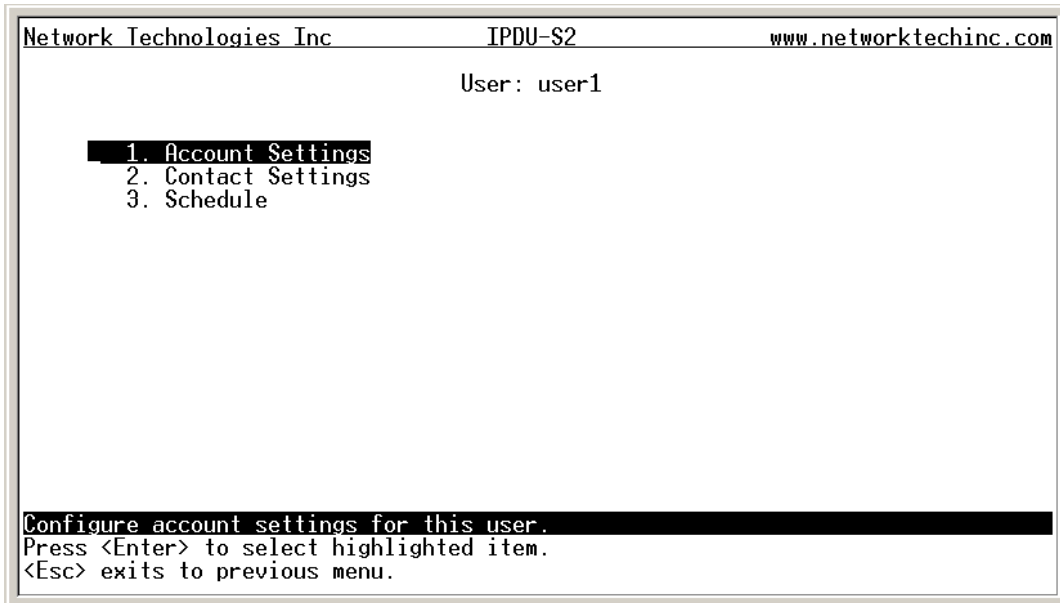
Figure 110- Text Menu-Configuration List for User

User Account Settings

Select "Account Settings" from the list and press **<Enter>**. A menu with the account settings for that specific user will open where you can either leave the name as "userx", or change it.   With the name assigned, fill in the remaining information as needed.

```
Network Technologies Inc          IPDU-S2          www.networktechinc.com
                              Account Settings


       Name:     user1_____
       Password: ******_____
       Confirm:  ******_____

       Enabled:  No
       Admin:    No

       Title:    _____
       Company:  _____
       Dept:     _____




       [Save]
Edit username for the current user.
<Enter> moves between fields. <Tab> to reach Save button.
<Esc> exits to previous menu.
```
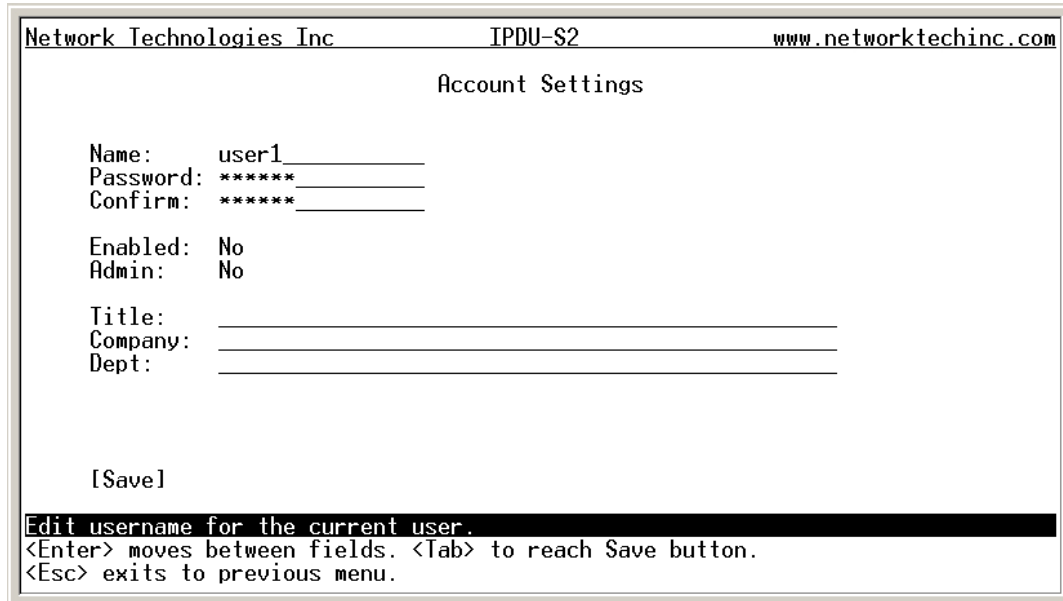
Figure 111- Text Menu-User Account Settings

Account Settings	Description
Username	Enter the desired username for this user
Password	Enter a password that a user must use to login to the system **A password must be assigned for the user's login to be valid** **Passwords must be at least 1 keyboard character.**
Confirm	Re-enter a password that a user must use to login to the system

Account Settings	Description
Enabled	Change to "Yes" to enable this user to access the IPDU-Sx
Admin	Change to "Yes" if this user should have administrative privileges
Title	Enter information as applicable (optional)
Department	Enter information as applicable (optional)
Company	Enter information as applicable (optional)

More about User Privileges

The root user (or any user with administrator rights) can change the root password and configure how the root user will receive alert messages.   Users with administrative rights can change all configuration settings except for the root user name.

User Contact Settings

Select "Contact Settings" from the list and press **<Enter>**. A menu with the contact settings for that specific user will open.

```
Network Technologies Inc          IPDU-Sx              www.networktechinc.com

                                   User: user1
                                 Contact Settings

        Group 1: No
        Group 2: No

        Enable e-mail: No
        E-mail Address: _____

        Enable sms: No
        Phone #: _____

        Enable Syslog: No
        Enable SNMP:   No
        Syslog/SNMP IP Address: _____


        [Save]
User receives alerts for group 1.
<Enter> moves between fields. <Tab> to reach Save button.
<Esc> exits to previous menu.
```
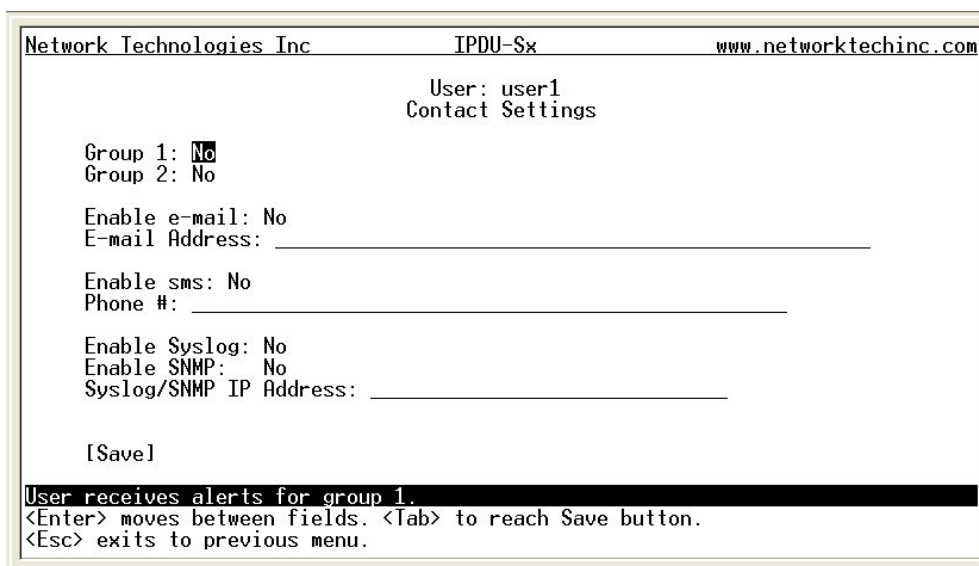
Figure 112- Text Menu-User Contact Settings

Contact Settings	
Group 1	Change to "Yes" if the user should receive messages from sensors, IP devices and outlets in Group 1
Group 2	Change to "Yes" if the user should receive messages from sensors, IP devices and outlets in Group 2
Enable Email	Change to "Yes" if the user should receive messages via email
Email address	Enter a valid email address if the user should receive email alert messages
Syslog alerts	Change to "Yes" if the user should receive alerts via syslog messages
SNMP traps	Change to "Yes" if the user should receive alerts via SNMP traps
Syslog/SNMP IP address	Enter a valid syslog/SNMP IP address for the user to receive syslog/SNMP messages

Press **<Tab>** to highlight **Save** and press **<Enter>** to save before pressing **<Esc>** to exit.

User Activity Schedule

Select "Schedule" from the list and press <**Enter**>. A menu with the user activity settings for that specific user will open.

```
Network Technologies Inc          IPDU-S2          www.networktechinc.com
                                 User: user1
                                  Schedule

      Schedule Type: Always active


      Day of Week     From: Sun         To: Sun

      Hour            From: 00:00        To: 00:00





      [Save]
User's schedule type.
<Enter> moves between fields. <Tab> to reach Save button.
<Esc> exits to previous menu.
```
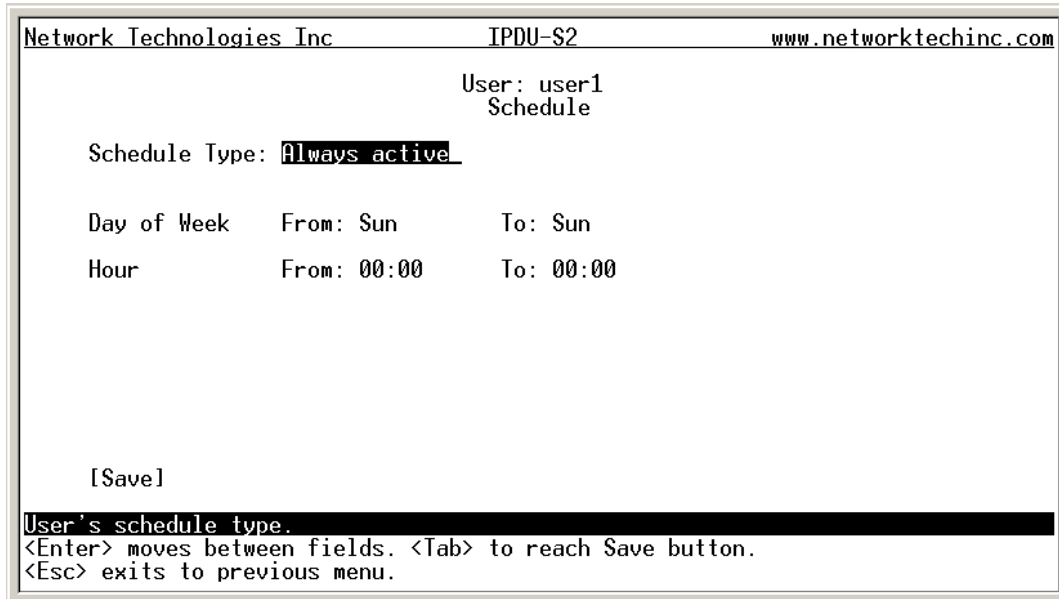
Figure 113- Text Menu-User Activity Schedule

Schedule Settings	
Schedule Type	**Always active**- user will receive messages at all hours of each day
	Active during defined times- user will only receive alert messages during times as outlined below
Day of Week-From:	First day of the week the user should begin receiving messages
Day of Week-To:	Last day of the week the user should receive messages
Hour From:	First hour of the day the user should begin receiving messages
Hour To:	Last hour of the day the user should receive messages

Security Configuration

The Security Configuration menu provides two submenus for setting local versus LDAP authentication methods and for applying IP filtering rules to prevent unwanted access to the IPDU-Sx.

```
Network Technologies Inc          IPDU-S2          www.networktechinc.com
                            Security Configuration


            1. Authentication Settings
            2. IP Filtering
















Configure Authentication settings.
Press <Enter> to select highlighted item.
<Esc> exits to previous menu.
```
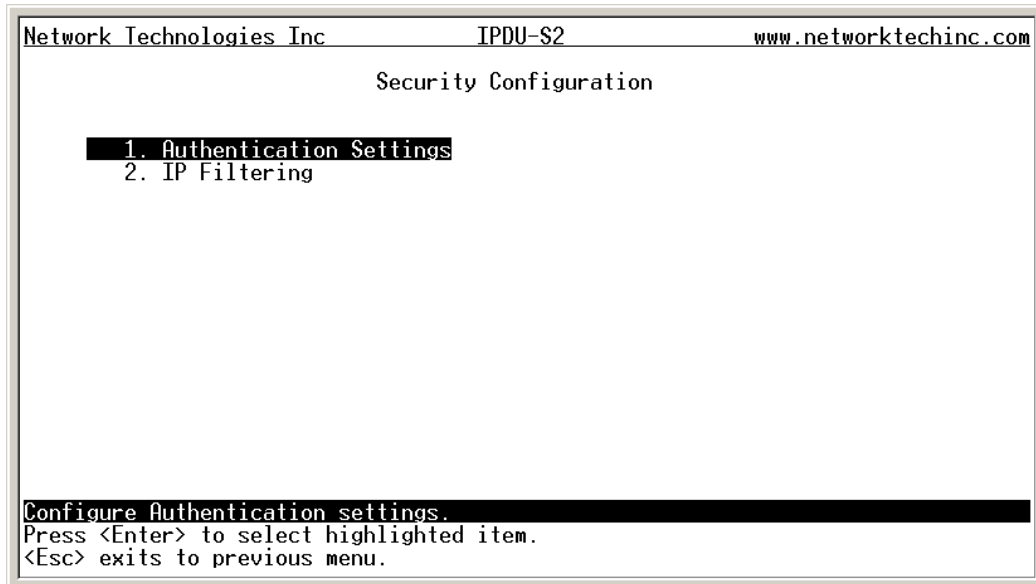
Figure 114- Text Menu-Security Configuration

Authentication Settings

Security in the IPDU-Sx can be managed one of two ways; through the local settings (passwords assigned in user settings on page 87) or through an LDAP server.   If security is configured to use LDAP mode, then the passwords for users must be those found on a configured LDAP server.

Select "Authentication Settings" from the list and press **<Enter>**. A menu providing an option to either user Local authentication or LDAP mode. When in LDAP mode, usernames on the LDAP server must match those in the user settings of the IPDU-Sx or access will be denied.

Note: When the root user logs with the IPDU-Sx in LDAP mode, if the LDAP server is not responding, local authentication will be tried.

```
Network Technologies Inc          IPDU-S2          www.networktechinc.com
                            Authentication Settings


        Authentication Mode:     Local

        Primary LDAP Server:    _____
        Secondary LDAP Server:  _____
        LDAP Server Type:       Generic LDAP server
        LDAP Service Base:      _____







        [Save]
User authentication method.
<Enter> moves between fields. <Tab> to reach Save button.
<Esc> exits to previous menu.
```
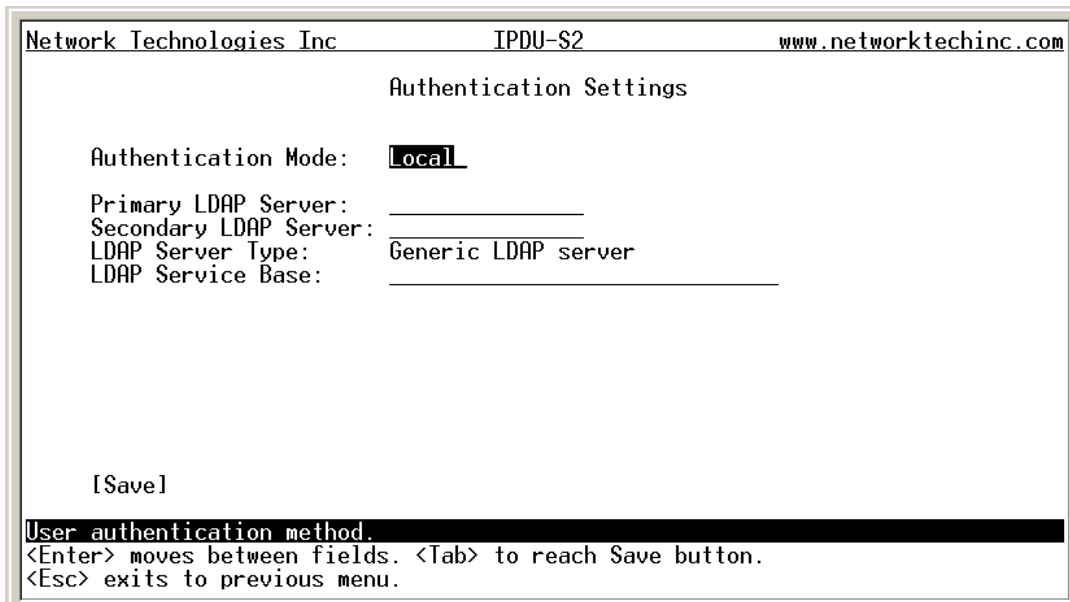
Figure 115- Text Menu-Authentication Settings

User Authentication	
Mode	Select Local to use authentication based on passwords in the IPDU-Sx user configuration
	Select LDAP to use authentication based on passwords in an LDAP server
Primary LDAP Server	Enter Hostname or IP address of Primary LDAP Server
Secondary LDAP Server	Enter Hostname or IP address of Secondary LDAP Server (optional)
LDAP Server Type	Tab to choose from the following:
	Generic LDAP server
	Novell Directory server
	Microsoft Active Directory
LDAP Service Base	Enter the Base DN for users (ex: ou=People,dc=mycompany,dc=com)

Even though LDAP authentication is being used, each user must also have a local account. User permission level is established by the local account.

Press <Tab> to highlight **Save** and press <Enter> to save before pressing <Esc> to exit.

IP Filtering

Included in the Security Configuration options is IP Filtering.   IP Filtering provides an additional mechanism for securing the IPDU-Sx. Access to the IPDU-Sx network services (SNMP, HTTP(S), SSH, Telnet) can be controlled by allowing or disallowing connections from various IP addresses, subnets, or networks.

Up to 16 IP Filtering rules can be defined to protect the IPDU-Sx from unwanted access from intruders. Each rule can be set as Enabled or Disabled. Rules can be set to explicitly drop attempts to connect, or to accept them.
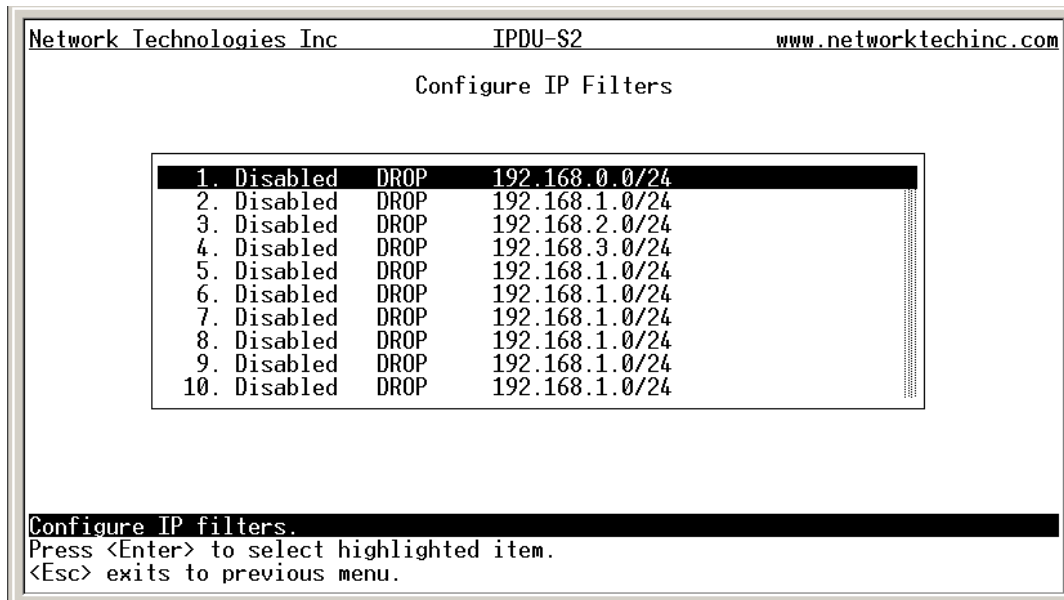
Figure 116- Text Menu-IP Filtering

To configure an IP Filter, select an IP Filter rule from the list and press `<Enter>`.

```
Network Technologies Inc            IPDU-S2              www.networktechinc.com

                               Edit IP Filter


        Enabled:    No
        Rule type: DROP
        IP/mask:    192.168.0.0/24_____






        [Save]
Enable/disable the current rule.
<Enter> moves between fields. <Tab> to reach Save button.
<Esc> exits to previous menu.
```
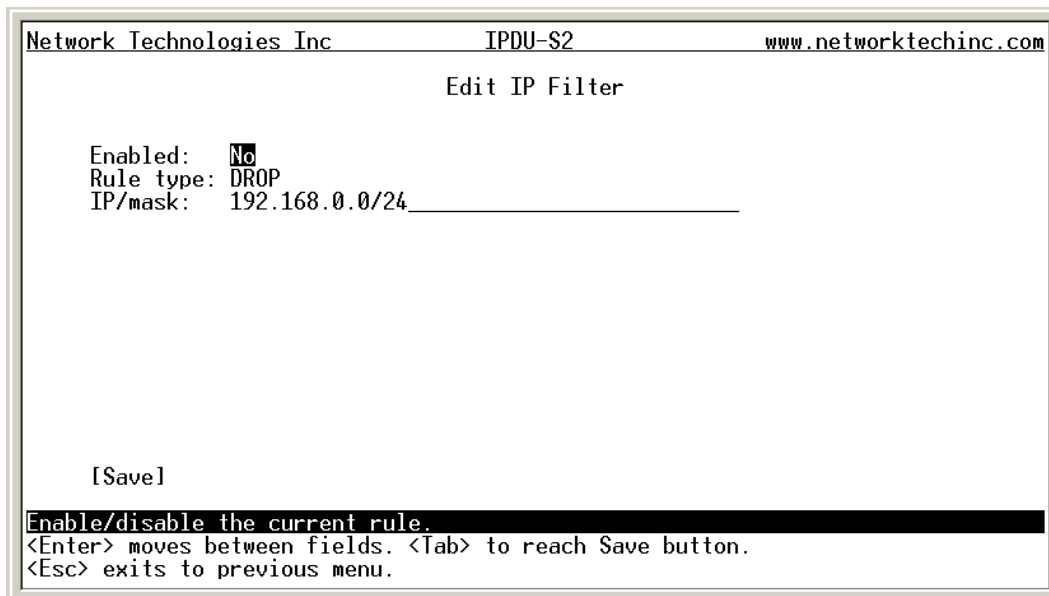
Figure 117- Text Menu-Configure IP Filter rule

The most common approach is to only allow "whitelisted" IP addresses, subnets, or networks to access the device while blocking all others. The IP Filters are processed sequentially from top to bottom, so it is important to place the most precise rules at the top of the list and the most generic rules at the bottom of the list.

As an example, assume we wish to block all connections except those which come from the IP address 192.168.1.100. To allow connections from 192.168.1.100, we need to configure and enable an ACCEPT rule at the top of the list:

(Rule 1)

```
Enabled: Yes
Rule type: ACCEPT
IP/mask:   192.168.1.100
```

Then, to block all other IP addresses from connecting to the IPDU-SX, we add a rule to drop all other connections.

(Rule 16)

```
Enabled: Yes
Rule type: DROP
IP/mask:   0.0.0.0/0
```

If the preceding "drop all connections" rule was placed in position one, no connections at all would be allowed to the unit. Remember: rules are processed from top to bottom. As soon as a rule matches, the processing stops and the matching rule is executed.

To match a particular IP address, simply enter in the desired IP address (e.g. 192.168.1.100).

To match a subnet, enter in the subnet with the associated mask (e.g. 192.168.1.0/24).

To match all IP address, specify a mask of 0 (e.g. 0.0.0.0/0).

Press `<Tab>` to highlight **Save** and press `<Enter>` to save before pressing `<Esc>` to exit.

Event and Data Logs

Under the Event and Data Logs menu find 4 submenus for viewing a log record of the events monitored by the IPDU-Sx and configuring how the IPDU-Sx will handle reaching the capacity of those logs.
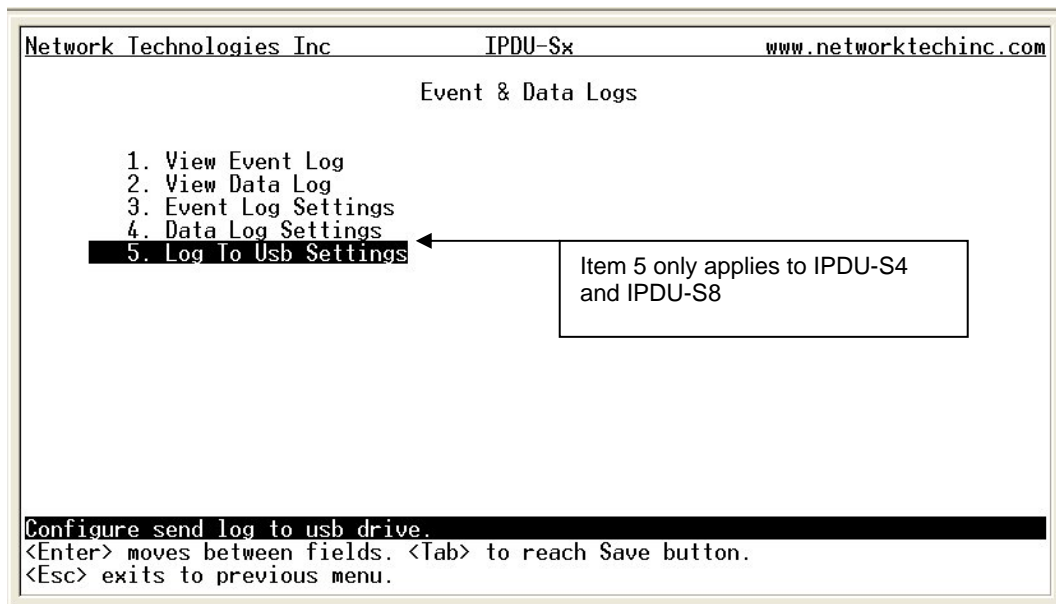
Figure 118- Text Menu-Event & Data Logs

View Event Log

The Event Log provides the administrative user with a listing of many events that occur within the IPDU-Sx.   The event log will record the date and time of:

- each IPDU startup,
- each power outlet cycling,
- each user login and logout time,
- any time an unknown user tries to login,
- sensor and IP device alerts
- an alert handled by a user
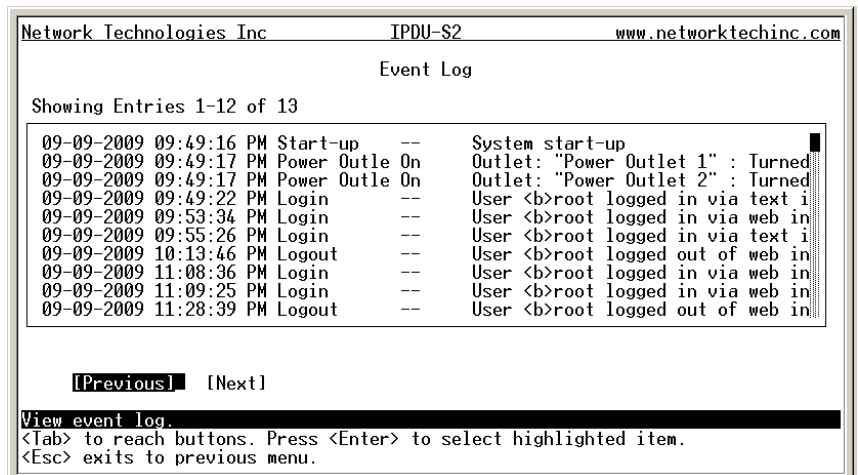
Figure 119- Text Menu-View Event Log

From the Event Log the administrative user can view the logs.   In order to clear specific logs, download log entries, or clear the entire log, use the Web Interface (see page 50). To navigate between pages of logs, pres `<Tab>` to move between **Previous** and **Next** and press `<Enter>`.

View Data Log

The Data Log provides the administrative user with a listing of all the readings taken by the IPDU-Sx pertaining to the sensors and IP Devices being monitored. The data log will record the date and time of each reading.

```
Network Technologies Inc          IPDU-S2          www.networktechinc.com

                                   Data Log

   Showing Entries 1-5 of 5

      09-10-2009 12:23:21 AM Humidity Co 36.4%   Undefined #1
      09-10-2009 12:23:31 AM Humidity Co 37.3%   Undefined #1
      09-10-2009 12:23:42 AM Humidity Co 36.4%   Undefined #1
      09-10-2009 12:23:49 AM Temperature 25.2C   Undefined #1
      09-10-2009 12:23:52 AM Humidity Co 37.3%   Undefined #1




         [Previous]     [Next]
   View data low.
   <Tab> to reach buttons. Press <Enter> to select highlighted item.
   <Esc> exits to previous menu.
```

Figure 120- Text Menu-View Data Log

From the Data Log the administrative user can view the logs.   In order to clear specific logs, download log entries, or clear the entire log, use the Web Interface (see page 51). To navigate between pages of logs, pres <**Tab**> to move between **Previous** and **Next** and press <**Enter**>.

Log Settings Menus

The Log Settings menus (Figure 121 and Figure 122) provide settings for how the IPDU-Sx will react when its Data and Event logs reach capacity.

Each log can be assigned to a group and any user that receives messages from that group can be notified when capacity is being reached.

As a capacity overflow action the log can be set to either :

- Discontinue- stop logging information
- Clear and restart- delete all log entries and restart with new entries
- Wrap- continue logging but delete the oldest entries and new ones are recorded

The Data and/or Event log can be set to sent alerts to users via email, syslog, and/or SNMP traps once it has reached 90% of capacity, allowing them time to react.

```
Network Technologies Inc          IPDU-S2          www.networktechinc.com
                             Event Log Settings


     Group:        1

     Overflow Action:     Discontinue Log

     Enable e-mail alerts: No
     Enable syslog alerts: No
     Enable SNMP traps:    No






     [Save]
Select which group the event log belongs to.
<Enter> moves between fields. <Tab> to reach Save button.
<Esc> exits to previous menu.
```
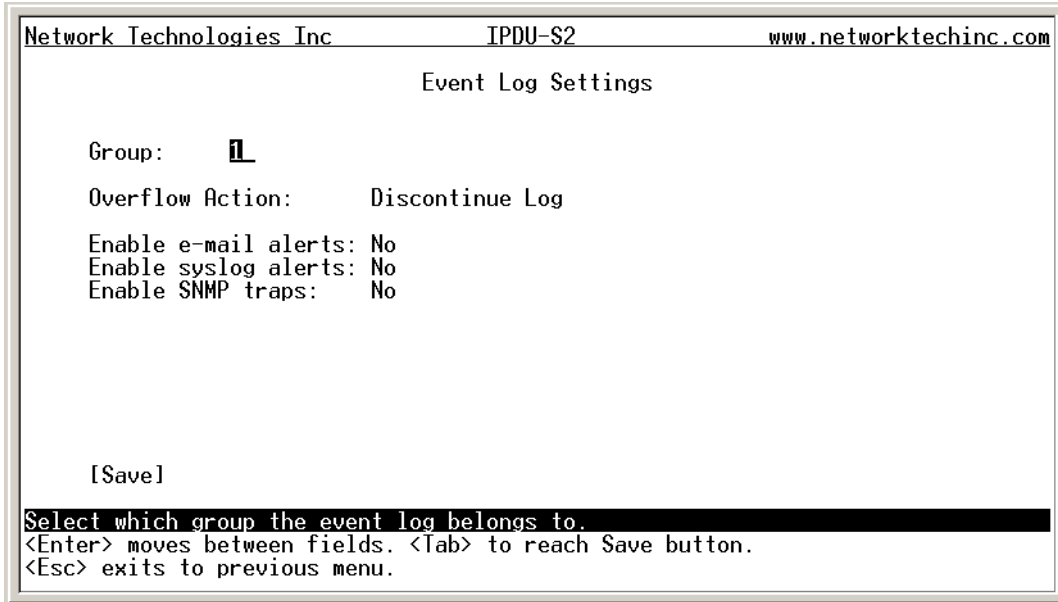
Figure 121- Text Menu-Event Log Settings

```
Network Technologies Inc          IPDU-S2          www.networktechinc.com
                             Data Log Settings


     Group:        1

     Overflow Action:     Discontinue Log

     Enable e-mail alerts: No
     Enable syslog alerts: No
     Enable SNMP traps:    No






     [Save]
Select which group the data log belongs to.
<Enter> moves between fields. <Tab> to reach Save button.
<Esc> exits to previous menu.
```
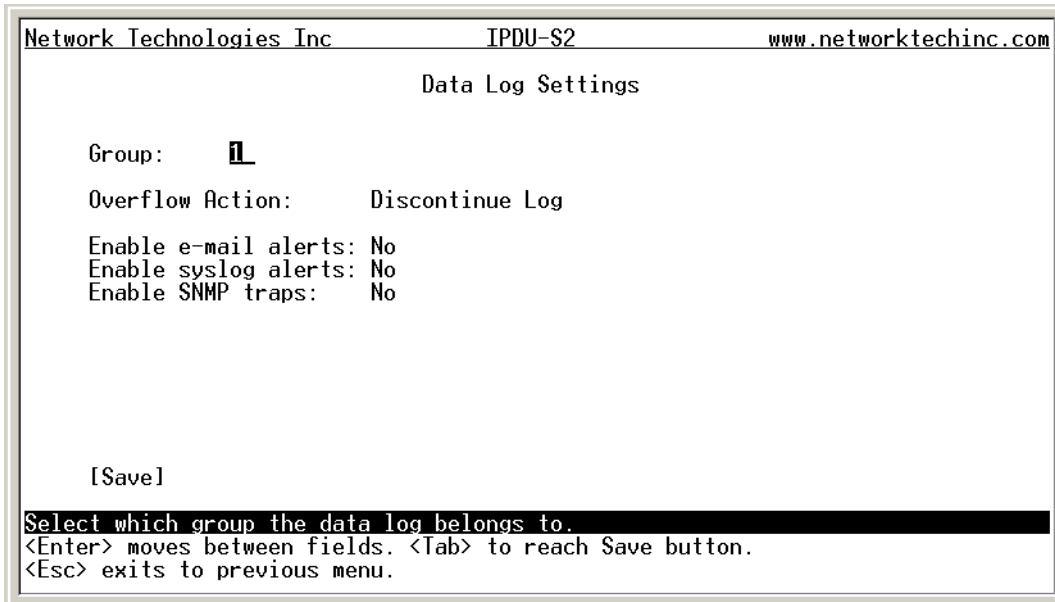
Figure 122-Text Menu-Data Log Settings

Log to USB

The USB Port found on the IPDU-S4 and IPDU-S8 enables the user to make the event and data log files portable.   The IPDU-Sx will record event and data logs to a USB flash drive in addition to the internal IPDU-Sx memory when the feature is enabled.   To use the USB port, carefully follow the steps below.

1.   Place a USB flash drive in the USB port.
2.   Toggle the "Enable Log to USB" option from "No" to "Yes".
3.   Press <**Tab**> to go to Save and press <**Enter**>.

```
Network Technologies Inc             IPDU-Sx            www.networktechinc.com
                            Log To USB Settings

        Enable Log to Usb: No

        [Save]
Enable log to be sent to USB flash drive. Disable this before removing the flash
<Enter> moves between fields. <Tab> to reach Save button.
<Esc> exits to previous menu.
```

Figure 123- Enable Log to USB

Note: If the flash drive is not connected before enabling the feature, the IPDU-Sx will not recognize the flash drive.

4.   The data and event logs will be recorded to both the USB flash drive and the IPDU-Sx internal memory.
5.   Toggle the "Enable Log to USB" option back to "No" before removing the flash drive from the USB port.
      Removing the flash drive before disabling the feature may cause any file(s) on flash drive to be corrupted.

System Information
The System Information page lists current firmware, time, and network settings for the IPDU-Sx.   It also lists the IPDU-SX MAC address.

```
Network Technologies Inc             IPDU-S2            www.networktechinc.com
                            System Information

        Product:         IPDU-S2 Secure Power Reboot Switch
        Revision:        1.0
        Code Date:       10-01-2009 03:00:53 PM
        MAC Address:     00:0C:82:05:00:04
        Current Time:    09-10-2009 12:26:24 AM

        IP Mode:         DHCP
        IP Address:      192.168.3.119
        Subnet Mask:     255.255.255.0
        Default Gateway: 192.168.3.3
        Primary DNS:     166.102.165.11
        Secondary DNS:

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View system information (firmware version, IP address, etc).
<Esc> exits to previous menu.
```

Figure 124-Text Menu-System Information

Reboot

From the Main Menu the administrative user can initiate a reboot of the IPDU-Sx.   By highlighting "Reboot" and pressing <**Enter**> (or <**9**> and <**Enter**>), you will be prompted to confirm that you want to reboot the IPDU-Sx.   Press <Enter> to cancel, or press the <**Tab**> or either <**arrow**> key to highlight "Yes" and <**Enter**> to reboot. The IPDU-Sx will reboot and a new connection must be initiated to reconnect, login, and resume operation.

```
Network Technologies Inc          IPDU-S2          www.networktechinc.com
                                  Main Menu

              1. Monitoring
              2. System Configuration
              3. Enterprise Configuration
              4. Network Configuration
              5. User Config
              6. Security Co │Reboot the unit - are you sure?
              7. Event & Dat │
              8. System Info │        [No]    [Yes]
              9. Reboot      │



              [Logout]


Reboot system.
Press <Tab> to move between the menu and logout button. Press <Enter> to
select highlighted item.
```
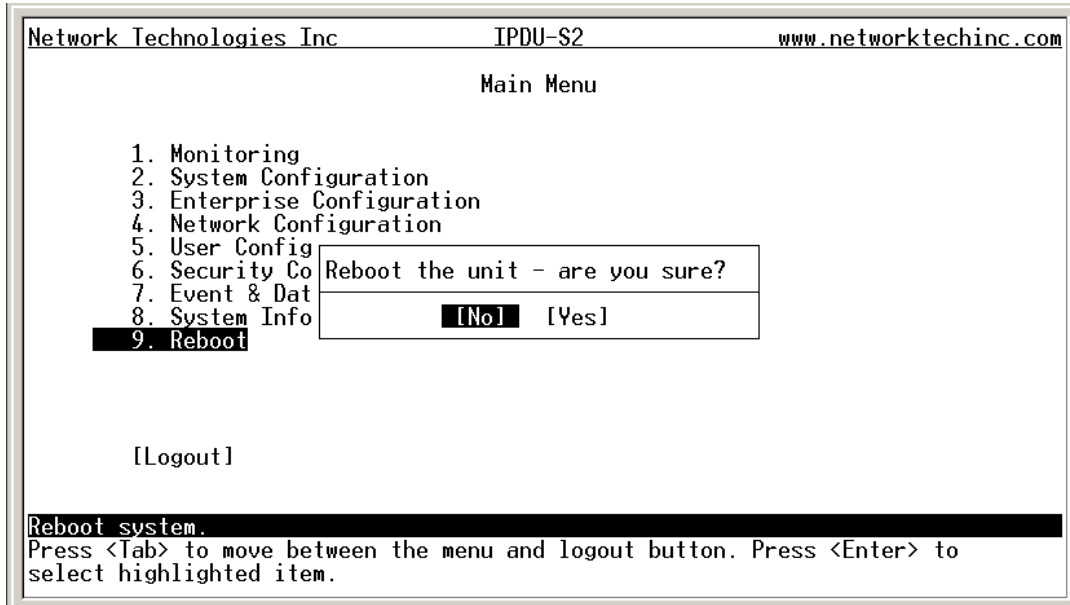
Figure 125- Text Menu-Reboot the IPDU-S2

Text Menu for Non-Administrative Users

Users without administrative privileges are able to view sensors, IP Devices, and power outlets and edit their own account settings.

```
Network Technologies Inc          IPDU-S2          www.networktechinc.com
                                  Main Menu


          1. Monitoring
          2. Account Settings









          [Logout]

Monitor and configure sensors, power outlets, and IP devices.
Press <Tab> to move between the menu and logout button. Press <Enter> to
select highlighted item.
```

Figure 126- Text Menu-User Main Menu

Monitoring

The Monitoring menu lists 3 options for viewing the status of the items monitored by the IPDU-Sx.

```
Network Technologies Inc          IPDU-S2          www.networktechinc.com
                                Monitoring Menu


          1. View Power Outlets
          2. View Sensors
          3. View IP Devices










Monitor Power Outlets.
Press <Enter> to select highlighted item.
<Esc> exits to previous menu.
```

Figure 127-Text Menu-User Monitoring Menu

```
Network Technologies Inc        IPDU-S2         www.networktechinc.com
                        Power Outlet Status
        DESCRIPTION                MODE      STATUS
        Power Outlet 1             Manual    On
        Power Outlet 2             Manual    On




Monitor Power Outlet status.
Press <Enter> to select highlighted item.
<Esc> exits to previous menu.
```
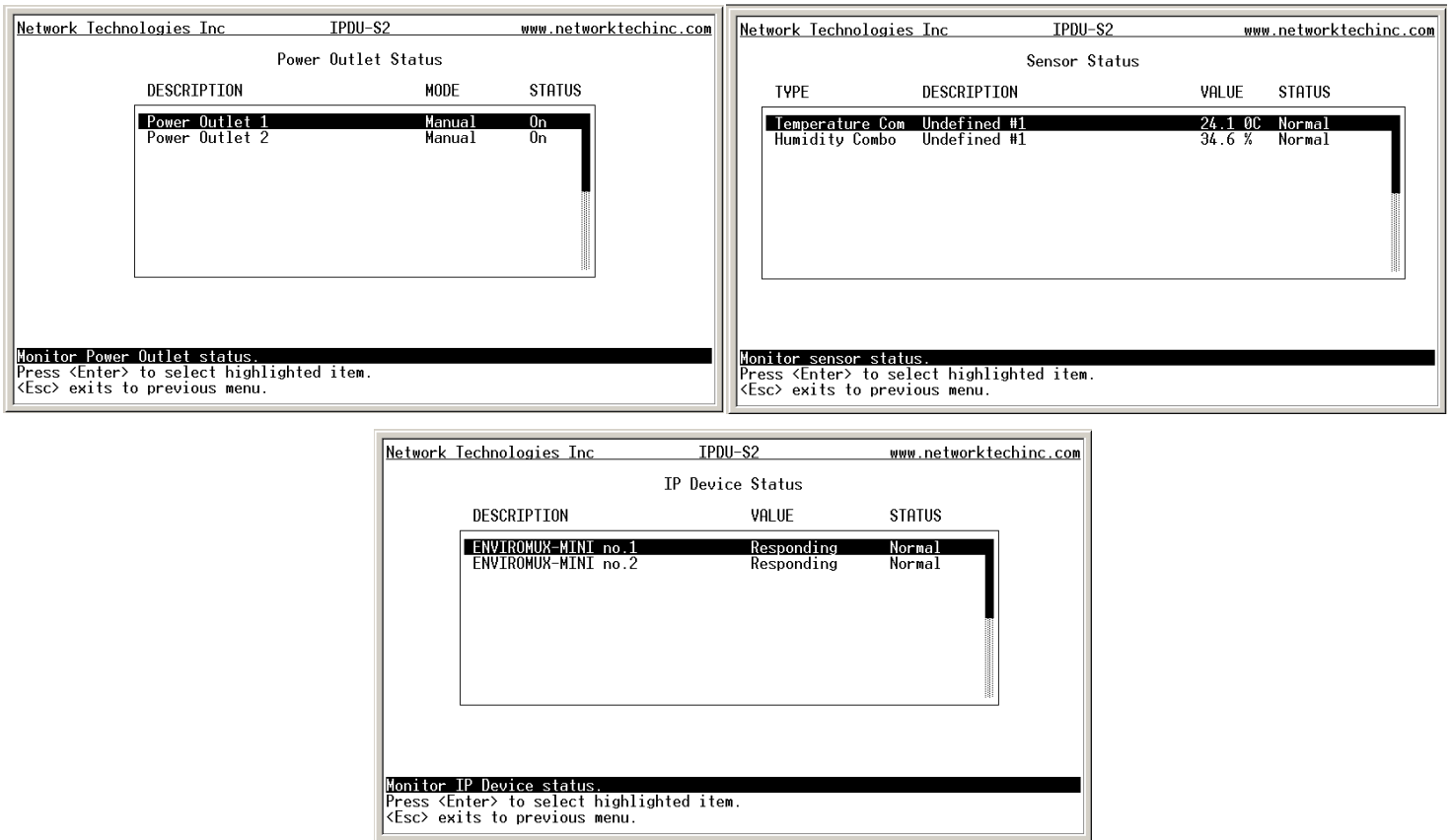
```
Network Technologies Inc        IPDU-S2         www.networktechinc.com
                        Sensor Status
        TYPE            DESCRIPTION              VALUE    STATUS
        Temperature Com Undefined #1             24.1 0C  Normal
        Humidity Combo  Undefined #1             34.6 %   Normal




Monitor sensor status.
Press <Enter> to select highlighted item.
<Esc> exits to previous menu.
```

```
Network Technologies Inc        IPDU-S2         www.networktechinc.com
                        IP Device Status
        DESCRIPTION                VALUE        STATUS
        ENVIROMUX-MINI no.1        Responding   Normal
        ENVIROMUX-MINI no.2        Responding   Normal




Monitor IP Device status.
Press <Enter> to select highlighted item.
<Esc> exits to previous menu.
```

Figure 128- Text Menu-User accessible status menus

If a monitored item is in alert status, the non-administrative user can enter a response to it.   By pressing the **<Enter>** key with the sensor selected, the user will have the option to either **acknowledge** the alert or **dismiss** it.   If the user acknowledges the alert, no additional alert messages will be sent during that alert status cycle.   If the user dismisses the alert, another alert message will be sent once the "notify again after" time designated on the configuration page (one example on page 23) elapses.

User Accessible Settings

The User without administrative privileges has access to setting for their own account.

```
Network Technologies Inc          IPDU-S2          www.networktechinc.com

                               User: user2


       ▌ 1. Account Settings
          2. Contact Settings
          3. Schedule











Configure account settings for this user.
Press <Enter> to select highlighted item.
<Esc> exits to previous menu.
```

Figure 129- Text Menu-User Accessible Settings

Account Settings

Under Account Settings, the non-administrative user can edit their password, title, company, or department settings.   Other settings are only accessible to the administrative user.

```
Network Technologies Inc          IPDU-S2          www.networktechinc.com
                              Account Settings


      Name:      user2_____
      Password: ******_____
      Confirm:  ******_____

      Enabled:  Yes
      Admin:    No

      Title:    _____
      Company:  _____
      Dept:     _____




      [Save]
Edit password for the current user.
<Enter> moves between fields. <Tab> to reach Save button.
<Esc> exits to previous menu.
```

Figure 130- Text Menu-User Account Settings

Contact Settings

Under Contact Settings, the non-administrative user can decide which sensor group messages they will receive and how.
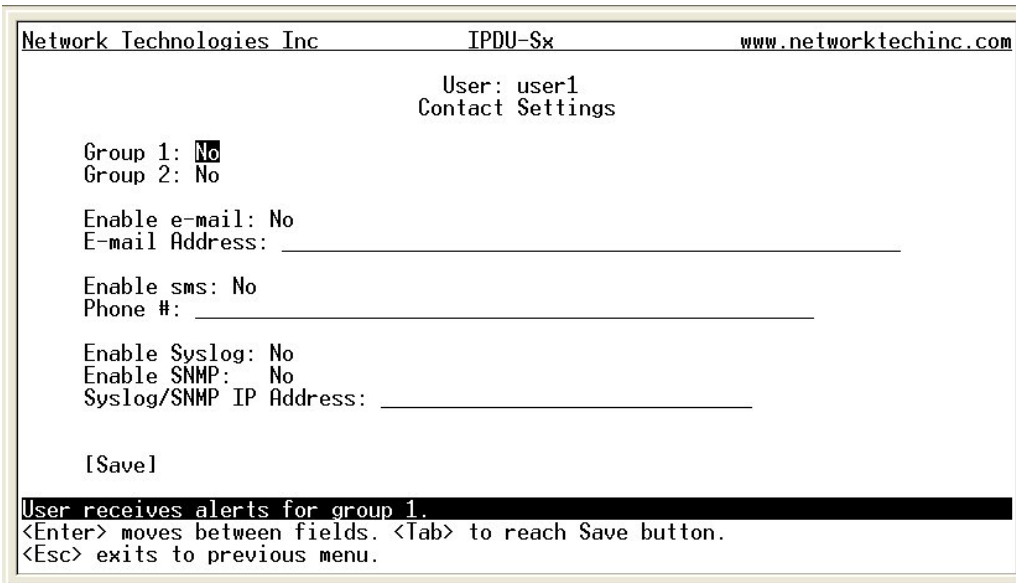
```
Network Technologies Inc            IPDU-Sx            www.networktechinc.com

                               User: user1
                              Contact Settings

          Group 1: No
          Group 2: No

          Enable e-mail: No
          E-mail Address: _____

          Enable sms: No
          Phone #: _____

          Enable Syslog: No
          Enable SNMP:   No
          Syslog/SNMP IP Address: _____


          [Save]
User receives alerts for group 1.
<Enter> moves between fields. <Tab> to reach Save button.
<Esc> exits to previous menu.
```

Figure 131- Text Menu-User Contact Settings

Contact Settings	
Group 1	Change to "Yes" to receive messages from sensors, IP devices and outlets in Group 1
Group 2	Change to "Yes" to receive messages from sensors, IP devices and outlets in Group 2
Enable Email	Change to "Yes" to receive messages via email
Email address	Enter a valid email address to receive email alert messages
Syslog alerts	Change to "Yes" to receive alerts via syslog messages
SNMP traps	Change to "Yes" to receive alerts via SNMP traps
Syslog/SNMP IP address	Enter a valid syslog/SNMP IP address to receive syslog/SNMP messages

Press <Tab> to highlight **Save** and press <Enter> to save before pressing <Esc> to exit.

Schedule

Under Schedule, the non-administrative user can edit their activity schedule to control when messages should be sent to them.
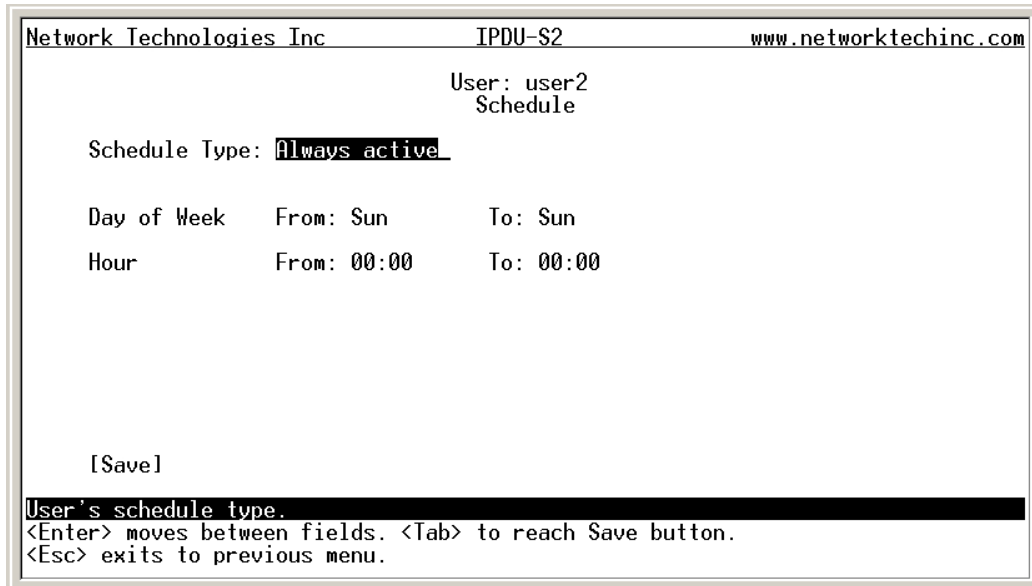
```
Network Technologies Inc          IPDU-S2          www.networktechinc.com

                                    User: user2
                                    Schedule

        Schedule Type: Always active


        Day of Week     From: Sun        To: Sun

        Hour            From: 00:00      To: 00:00






        [Save]

User's schedule type.
<Enter> moves between fields. <Tab> to reach Save button.
<Esc> exits to previous menu.
```

Figure 132- Text Menu-User Activity Schedule

Schedule Settings	
Schedule Type	**Always active**- user will receive messages at all hours of each day
	Active during defined times- user will only receive alert messages during times as outlined below
Day of Week-From:	First day of the week the user should begin receiving messages
Day of Week-To:	Last day of the week the user should receive messages
Hour From:	First hour of the day the user should begin receiving messages
Hour To:	Last hour of the day the user should receive messages

Press <Tab> to highlight **Save** and press <Enter> to save before pressing <Esc> to exit.

RESET BUTTON

A Reset push-button is on the front-panel and is recessed from the panel to prevent accidental use of the button. Pressing the Reset button will cause the IPDU-Sx to restart, just as if it were power-cycled. The Reset push-button has to be pressed and held for minimum of 7-10 seconds in order to activate the reset function. The reset button can be used at any time.
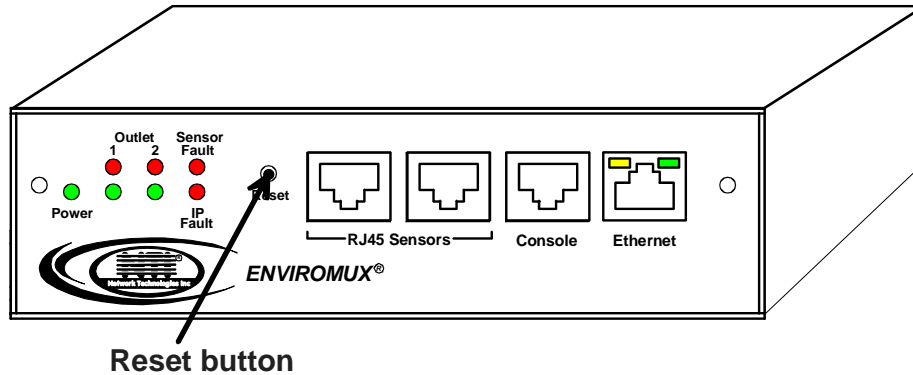

Figure 133- Location of Reset button

CIRCUIT BREAKER

The IPDU-S4-P15 and IPDU-S8-P15 are each equipped with a 15A circuit breaker (IPDU-S4-P10 and IPDU-S8-P10 have a 10A circuit breaker). The breaker offers protection against overloading the circuit supplying power to the connected devices. A red "Trip" LED is provided on the front of the unit (page 7) for visible indication of a tripped circuit breaker.

 In the event the breaker trips (the reset button will extend from the body of the breaker), identify the cause of the overload before resetting the breaker. With a momentary push, the breaker should reset and the button snap back to its pre-trip position.   If the button continues to extend from the breaker body, and it does not snap back to a reset after you press it

(the "Trip" LED on the front of the IPDU will still be illuminated), the cause of the overload still exists.
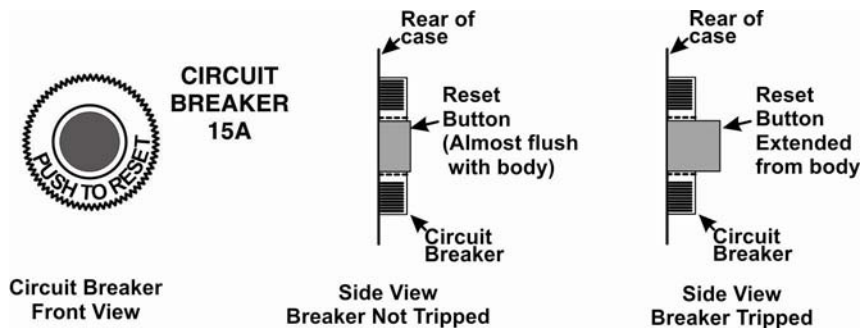

Figure 134- Circuit Breaker Protection

USB PORT

The IPDU-S4 and IPDU-S8 (-P10 and –P15) are each equipped with a USB Type A female port for connection of a USB flash drive or a GSM modem (page 8) for receiving alert messages via SMS. The port is compatible with USB 2.0 Full Speed flash drives. When enabled (page 52 and page 96) and with a USB flash drive connected, the Event and Data Logs will be written to a text file on the flash drive in addition to the memory in the IPDU.
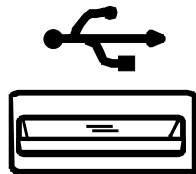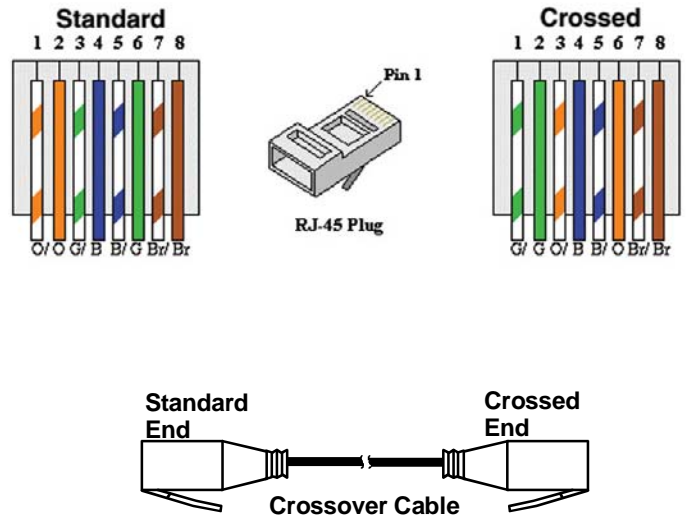

Figure 135- USB Flash Drive port

WIRING METHODS

PC-to IPDU-Sx Crossover Cable

In order to make a direct connection between a PC and the ETHERNET connector of the IPDU-Sx (all models), a crossover cable must be used. The cable is made with CAT5 cable terminated with RJ45 connectors and wired according to the chart below.

Pin assignment at Standard End	Wire Color	Pin assignment at Crossed End
1	White/Orange	3
2	Orange	6
3	White/Green	1
4	Blue	4
5	White/Blue	5
6	Green	2
7	White/Brown	7
8	Brown	8

RS485 Sensor Cable

The CAT5 connection cable between the IPDU and the external RS485 Sensors (page 6) is terminated with RJ45 connectors and must be wired according to the EIA/TIA 568 B industry standard.   Wiring is as per the table and drawing below.

Pin	Wire Color	Pair
1	White/Orange	2
2	Orange	2
3	White/Green	3
4	Blue	1
5	White/Blue	1
6	Green	3
7	White/Brown	4
8	Brown	4
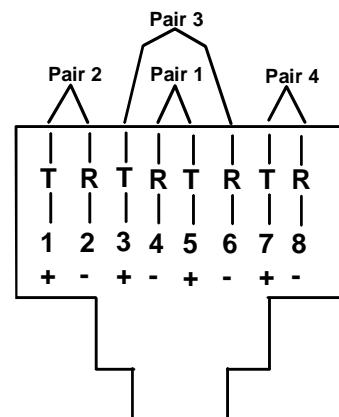
(View Looking into RJ45 Socket)

TECHNICAL SPECIFICATIONS

Sensor Inputs	Two RJ45 modular jacks for connecting NTI temperature, humidity, temperature/humidity, and liquid detection sensors.
Ethernet Port	One female RJ45 connector with LEDs. 10 BaseT Ethernet interface.
Console Port	One female RJ45 connector. Supports 3-wire interface (Tx, Rx, and GND)
AC Outlet connectors	IEC 320-C13 10A @ 120/240VAC
Maximum combined load on outlets	10A @ 120/240VAC (IPDU-S2, IPDU-S4-P10, IPDU-S8-P10) 15A @ 120/240VAC (IPDU-S4-P15, IPDU-S8-P15)
USB Port (IPDU-S4/-S8 only)	USB Type A Female- USB 2.0 Full Speed compatible
Compatible Sensor Types	Temperature, Humidity, Temp/Humidity, Temp/Wide Range Humidity, Liquid Detection
Max. Sensor Cable Length	1000 feet
Operating temperature	32°F to 122°F (0°C to 50°C)
Storage temperature	-13°F to 149°F (-25°C to 65°C)
Operating and Storage Relative Humidity	0 to 90% non-condensing RH
Power	85-265VAC, 47-63Hz via Line Cord
Protocols	HTTPS, SSHv2, SSLv3, IP Filtering, LDAPv3, AES 256-bit encryption, SNMPv2c
Size (In.) WxDxH IPDU-S2 IPDU-S4-Pxx IPDU-S8-Pxx	 6.1x5.6x1.7 13.5x6x1.75 w/o supplied Rackmount Kit 19x6x1.75 w/Rackmount Kit 17.4x6x1.75 w/o supplied Rackmount Kit 19x6x1.75 w/Rackmount Kit
Approvals	RoHS

TROUBLESHOOTING

Each and every piece of every product produced by Network Technologies Inc is 100% tested to exacting specifications.   We make every effort to insure trouble-free installation and operation of our products. If problems are experienced while installing this product, please look over the troubleshooting chart below to see if perhaps we can answer any questions that arise. If the answer is not found in the chart, a solution may be found in the knowledgebase on our website at **http://information.networktechinc.com/jive/kbindex.jspa** or please call us directly at (**800) 742-8324 (800-RGB-TECH)** or **(330) 562-7070** and we will be happy to assist in any way we can.

Problem	Cause	Solution
Cannot connect via telnet	telnet service not enabled	Enable telnet (page **Error! Bookmark not defined.**)
Terminal connection not working	connection settings not right	Check port configuration (page 6)
Cannot connect via web interface- no login screen	• wrong IP address • HTTP not enabled • HTTP moved from default (port 80)	• Use Discovery Tool to locate configured IP address (page 13) • Enable HTTP (page 33) • Identify port number assigned (page 33)
Cannot get Discovery Tool to work	Java not installed	Java Runtime Environment must be installed before the Discovery Tool can be used (page 13)
LDAP user cannot login	Login username and/or password does not match same in IPDU-SX user list	Make sure the username and password used in the LDAP server matches the username and password in the IPDU-SX user configuration (page 42)
Cannot login	cannot remember root password	Either restore default settings (page 75) or contact NTI for assistance
Cannot change state of output relays through SNMP **(applies to IPDU-S4/S8 only)**	• "Read-Only Community Name" and "Read-Write Community Name" fields are different in the IPDU configuration from what they are in the SNMP network management software • Old MIB file being used • Firmware outdated	• The "Read-Only Community Name" in the IPDU network configuration (page 33) should match the same/similar field in the SNMP network management software and the "Read-Write Community Name" in the IPDU should also match the same/similar field in the SNMP software • Download and install MIB file version 1.01 or later • Download and install Firmware version 1.3 or later

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WARRANTY INFORMATION

The warranty period on this product (parts and labor) is two (2) years from the date of purchase. Please contact Network Technologies Inc at **(800) 742-8324** (800-RGB-TECH) or **(330) 562-7070** or visit our website at **http://www.networktechinc.com** for information regarding repairs and/or returns. A return authorization number is required for all repairs/returns.

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