

User's Manual



12/24-Port 802.3at/af PoE Injector Hub

- ▶ HPOE-1200G / HPOE-2400G
POE-1200G / POE-2400G



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This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the Instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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Energy Saving Note of the Device

This power required device does not support Standby mode operation. For energy saving, please remove the power cable to disconnect the device from the power circuit. In view of saving the energy and reducing the unnecessary power consumption, it is strongly suggested to remove the power connection for the device if this device is not intended to be active.

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Revision

PLANET IEEE 802.3at Power over Gigabit Ethernet Managed Injector Hub User's Manual
FOR MODELS: POE-1200G, POE-2400G, HPOE-1200G and HPOE-2400G

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1. INTRODUCTION

Thanks you for purchasing PLANET Multi-port IEEE 802.3at PoE+ Managed Injector Hub.

The description of this model is shown below:

POE-1200G	12-Port 802.3at PoE+ Managed Gigabit Injector Hub (220W)
HPOE-1200G	12-Port 802.3at PoE+ Managed Gigabit Injector Hub (360W)
POE-2400G	24-Port 802.3at PoE+ Managed Gigabit Injector Hub (440W)
HPOE-2400G	12-Port 802.3at PoE+ Managed Gigabit Injector Hub (720W)

1.1 Package Contents

Open the box of the PoE Web Smart Switch and carefully unpack it. The box should contain the following items:

- **PoE Injector Hub x 1**
- **Quick Installation Guide x 1**
- **Power Cord x 1**
- **Rubber Feet x 4**
- **Two Rack-mounting Brackets with Attachment Screw x 1 (set)**

If any of these are missing or damaged, please contact your dealer immediately; if possible, retain the carton including the original packing material, and use them again to repack the product in case there is a need to return it to us for repair.

In the following section,

- The term “**PoE Injector Hub**” means the Gigabit PoE Injector Hub devices, i.e. POE-1200G, POE-2400G, HPOE-1200G and HPOE-2400G
- The term “**injector**” means any single-port IEEE 802.3at/802.3af power injectors
- The term “**PD**” means IEEE 802.3at/802.3af powered device

1.2 Product Description

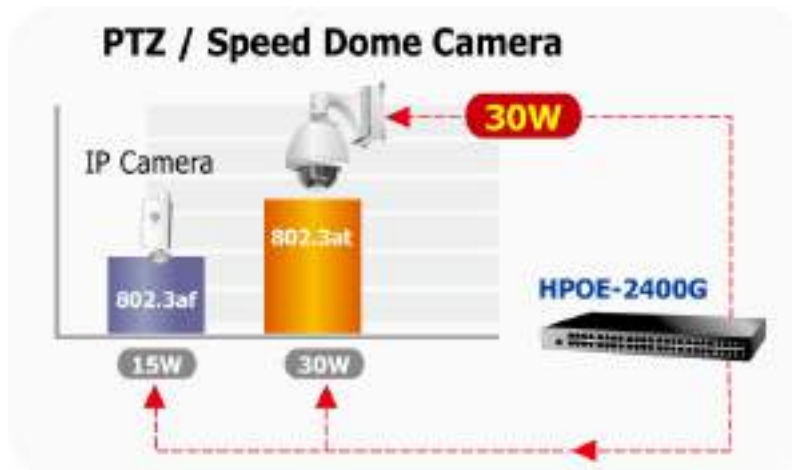
High Power PoE for Public Service PoE Applications

PLANET Managed PoE Injector Hub features multi-port Gigabit IEEE 802.3at PoE+ Web management, both IEEE 802.3af and IEEE 802.3at Power over Ethernet Plus (PoE+) that combine up to 30-watt power output and data per port over one Cat 5E/6 Ethernet cable.

It is designed specifically to satisfy the growing demand for higher power consuming network PDs (powered devices), such as PTZ (Pan, Tilt & Zoom)/speed dome network cameras, multi-channel (802.11a/b/g/n) wireless LAN access points and other network devices by providing double amount of PoE power, more than the conventional 802.3af PoE PSE.

IEEE 802.3at PoE Standard Compliance

Till today, the IEEE 802.3af Power over Ethernet Standard has become popular, yet the PoE demand for network-powered applications is on the increase. With many critical applications on the increase, the demand for higher power increases. Hence, the IEEE 802.3at Power over Ethernet Plus standard is defined to allow delivery of maximum up to 30-watt input power to each PoE device. Compliant with IEEE 802.3at, the PoE Injector Hub possesses stronger power capability than the existing 802.3af PoE PSE and is an ideal solution to meeting the high power requirements directly via the RJ45 interface.



Intelligent Powered Device Alive Check

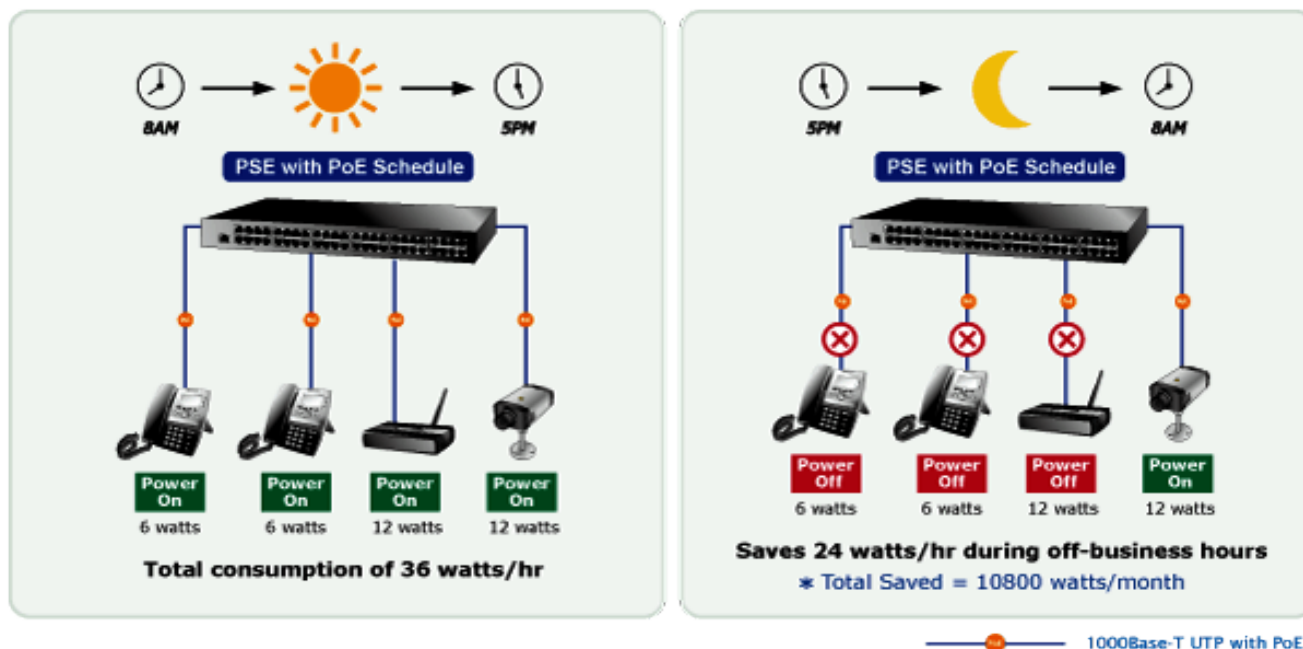
The PoE Injector Hub can be configured to monitor connected PD (Powered Device) status in real time via ping action. Once the PD stops working and is without response, the PoE Injector Hub will resume the PoE port power and bring the PD back to work. It will greatly enhance the network reliability through the PoE port resetting the PD's power source and reduce administrator management burden.

PoE PD Alive-checking



PoE Schedule for Energy Saving

Under the trend of energy saving worldwide and contributing to environment protection on the Earth, the PoE Injector Hub can effectively control the power supply besides its capability of giving high watts power. The "PoE Schedule" function provided by the PoE Injector Hub helps you to enable or disable PoE power feeding for each PoE port during specified time intervals and it is a powerful function to help SMBs or enterprises save power and money.



Advanced Power Management

To facilitate power management, the PoE Injector Hub comes with such powerful PoE management features as over temperature protection, usage threshold alert and auto power allocation to prevent power budget overloading. The PoE power budget can be allocated by priorities or classification and can send alert event logs when power usage reaches the defined threshold.

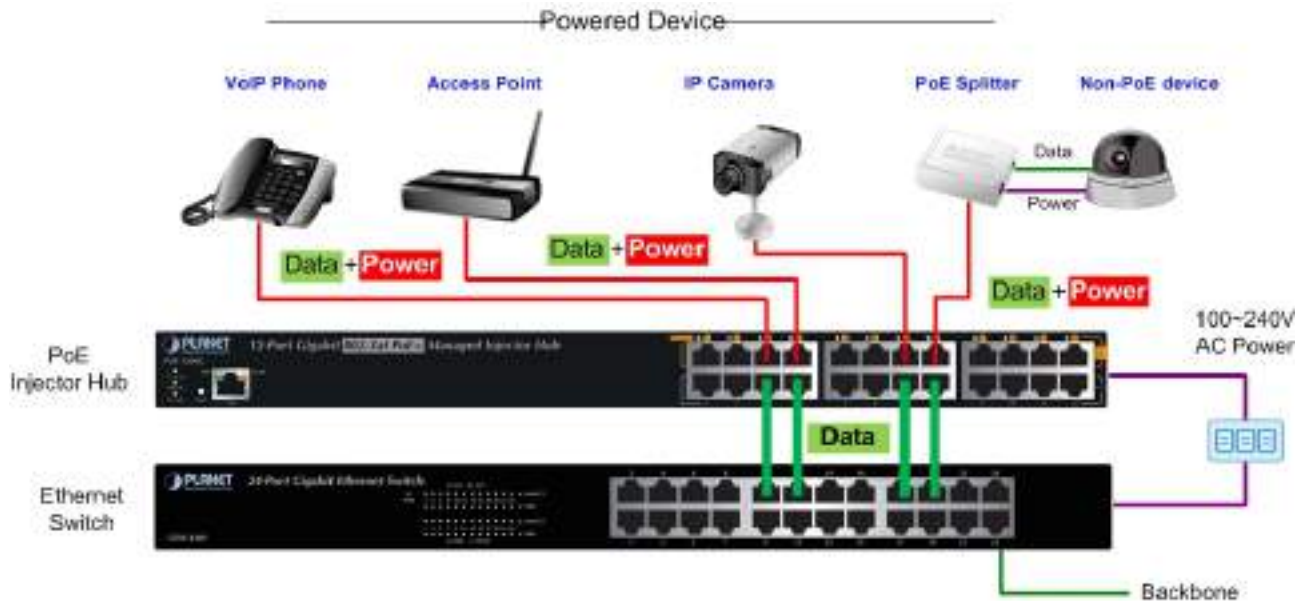
Quick and Easy PoE Network Deployment

The PoE Injector Hub complies with IEEE 802.3, IEEE 802.3u, IEEE 802.3ab, IEEE 802.3af and IEEE 802.3at standards. With 12 or 24 10/100/1000BASE-T Gigabit Ethernet ports, the PoE Injector Hub supports 52V DC power for any remote 802.3af/802.3at powered device (PD).

Easy Cabling Installation

The PoE Injector Hub is installed between a regular Ethernet Switch and the powered devices; it injects power to the PDs without affecting data transmission performance. It offers a cost-effective and quick solution to upgrading network system to IEEE 802.3af/IEEE 802.3at Power over Ethernet system without replacing the existing Ethernet Switch.

For example, there are 24 RJ45 STP ports on the front panel of the HPOE-1200G, of which the 12 ports on the lower stack function as "Data input" and the other 12 ports on the upper stack function as "PoE (Data and Power) output". The 12 "PoE output" ports are also the power injectors that transmit DC voltage to the Cat 5/5e/6 cable and transfer data and power simultaneously between the Ethernet Switch and the powered devices.



Friendly Web Management Interface

To efficiently manage the powered devices, the PoE Injector Hub provides simple Web management interface in which administrators can control the functions including port enable/disable, port priority, system configuration, change in user name and password, and smart features for powered devices. The PoE injector hub can automatically detect the power status of each port and show messages on its Web management interface. These features also provide users with a cost-effective way to manage the device via Internet whenever they are at work or at home.



1.3 How to Use This Manual

This User Manual is structured as follows:

- **Section 2, Installation**

It explains the functions of PoE Injector Hub and how to physically install the PoE Injector Hub.

- **Section 3, Management**

It contains information about the software function of the PoE Injector Hub.

- **Section 4, Web Configuration**

The section explains how to manage the PoE Injector Hub through Web interface.

- **Section 5, Power over Ethernet overview**

The section explains the Power over Ethernet theories.

- **Section 6, PoE Power Provision Process**

The section explains the PoE power provision process.

- **Section 7, Troubleshooting**

The section contains troubleshooting guide of the PoE Injector Hub.

- **Appendix A**

It contains cable information of PoE Injector Hub.

1.4 Product Features

➤ **Physical Port**

POE-1200G / HPOE-1200G

- **24-port RJ45**
 - 12-port 10/100/1000Mbps **"Data input"**
 - 12-port 10/100/1000Mbps **"Data + Power output"**
- 1-port 10/100/1000BASE-T management port
- Reset button for system management

POE-2400G / HPOE-2400G

- **48-port RJ45**
 - 24-port 10/100/1000Mbps **"Data input"**
 - 24-port 10/100/1000Mbps **"Data + Power output"**
- 1-port 10/100/1000BASE-T management port
- Reset button for system management

➤ **Power over Ethernet**

- Complies with IEEE 802.3, IEEE 802.3at and IEEE 802.3af Power over Ethernet Mid-span PSE
- Up to 12 / 24 IEEE 802.3at/802.3af devices powered
- Supports PoE power up to 30.8 watts/15.4 watts for each PoE port
- Automatically detects powered device (PD)
- Circuit protection prevents power interference between ports
- Remote power feeding up to 100m

➤ **PoE Management**

- Total PoE power budget control
- Per port PoE power schedule
- PoE function enable/disable
- Per port PoE function enable/disable
- PoE port power feeding priority
- PD classification detection
- Over temperature protection
- PD alive-check

➤ **Management**

- Web interface for remote management
- Supports Network Time Protocol (NTP)
- Firmware upgrade through Web interface
- PLANET Smart Discovery utility automatically finds PLANET devices on the network
- SNMP Trap for alarm notification of events
- System Log/Remote Syslog

➤ **Hardware**

- 19-inch rack mountable; 1U height
- Reset button for reset to default setting and system reboot
- LED indicators for PoE ready and PoE activity
- LED indicators for power alert and fan alert
- FCC Part 15 Class A, CE

1.5 Product Specifications

Product		POE-1200G	HPOE-1200G	POE-2400G	HPOE-2400G
Hardware					
Hardware Version		3	3	3	3
Interface	“Data” Input Ports	12 x RJ45	12 x RJ45	24 x RJ45	24 x RJ45
	“Data+Power” Output Ports	12 x RJ45	12 x RJ45	24 x RJ45	24 x RJ45
	Management Port	1 x RJ45; 10/100/1000BASE-T, auto-negotiation, auto-MDI / MDIX			
Data Rate		10/100/1000Mbps			
Dimensions (W x D x H)		440 x 300 x 44 mm (1U height)			
Weight		3.9kg	4.27kg	4.77kg	4.76kg
Power Requirements		100-240V AC, 50/60 Hz			
Power Consumption		250 watts max.	440 watts max.	500 watts max.	800 watts max.
Cooling		Fan x 2	Fan x 2	Fan x 3	Fan x 4
Operating Temperature		0 ~ 50 degrees C			
Storage Temperature		-10 ~ 70 degrees C			
Humidity		5 ~ 95% (non-condensing)			
Network Cable		10BASE-T: 4-pair UTP Cat. 5 up to 100m (328ft) 100BASE-TX: 4-pair UTP Cat. 5 up to 100m (328ft) 1000BASE-T: 4-pair UTP Cat. 5e, 6, up to 100m (328ft) EIA/TIA- 568 100-ohm STP (100m)			
Power over Ethernet					
PoE Power Supply Type		Mid-span			
PoE Power Output		Per Port DC 52V 30.8/15.4 watts			
Power Pin Assignment		4/5(-), 7/8(+)			
PoE Power Budget		220 watts	360 watts	440 watts	720 watts
Number of 802.3af PD Class 0, 1, 2, 3 can be powered		12	12	24	24
Number of 802.3at PD Class 1, 2, 3 can be powered		7	12	14	24
Number of 802.3at PD Class 0, 4 can be powered		7	12	14	24
Management					
Management Interface		Web, PLANET Smart Discovery Lite			
PoE Management		Power limit by consumption and classification mode PoE admin mode Per port power schedule Per port power enable/disable Power feeding priority Over temperature protection Current per port usage and status Total power consumption			
Management Feature		System/Management functions setup Web firmware upgrade			

	SNMP Trap for alarm notification of events
Standards Conformance	
Standards Compliance	IEEE 802.3 10BASE-T Ethernet IEEE 802.3u 100BASE-TX Fast Ethernet IEEE 802.3ab 1000BASE-T Gigabit Ethernet IEEE 802.3at High Power over Ethernet IEEE 802.3af Power over Ethernet
	RFC 768: UDP RFC 791: IP RFC 2068 HTTP RFC 1157: SNMP v1 RFC 1902: SNMP v2c RFC 5424: Syslog
Regulatory Compliance	FCC Part 15 Class A, CE

2. INSTALLATION

This section describes the hardware features and installation of these PoE Injector Hubs on the desktop or rack mount. For easier management and control of the PoE Injector Hub, familiarize yourself with its display indicators, and ports. Front panel illustrations in this chapter display the unit LED indicators. Before deploying the PoE Injector Hub, please read this chapter completely.

2.1 Hardware Description

The section describes the hardware of the PoE Injector Hub and gives a physical and functional overview.

2.1.1 Injector Front Panel

The unit front panel provides a simple interface monitoring the PoE Injector Hub. [Figure 2-1-1](#), [2-1-2](#), [2-1-3](#) & [2-1-4](#) show the front panel of the PoE Injector Hub.

■ Front Panel of POE-1200G

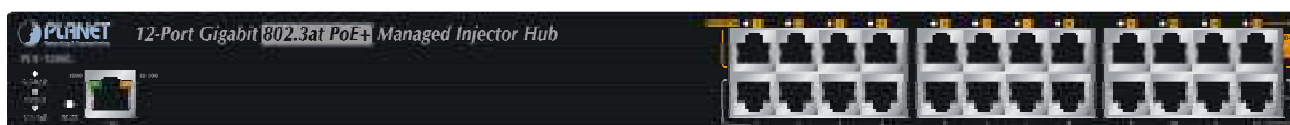


Figure 2-1-1: POE-1200G front panel

■ Front Panel of POE-2400G



Figure 2-1-2: POE-2400G front panel

■ Front Panel of HPOE-1200G

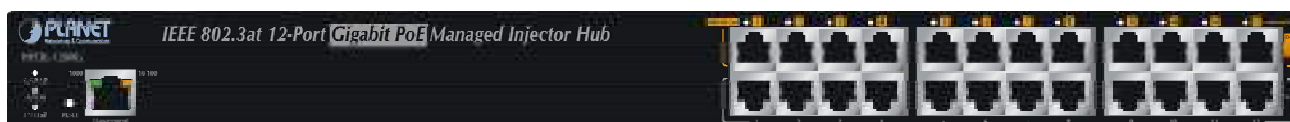


Figure 2-1-3: HPOE-1200G front panel

■ Front Panel of HPOE-2400G



Figure 2-1-4: HPOE-2400G front panel

Reset button

At the left of the front panel, the reset button is designed for rebooting the PoE Injector Hub without turning off and on the power.



Figure 2-1-5: Reset Button of PoE Injector Hub

The following is the summary table of reset button functions:

Reset Button Pressed and Released	Function
About 1 second	Reboot the PoE Injector Hub.
About 8 seconds	Reset the PoE Injector Hub to Factory Default configuration. The PoE Injector Hub will reboot and load the default IP settings as shown below.



Be sure that you back up the current configuration of PoE Injector Hub before resetting PoE Injector Hub or else the entire configuration will be erased when pressing the **"RESET"** button.

2.1.2 LED Indicators

The front panel LEDs indicate instant status of system power, management port Link/Active and PoE port links, thus helping administrator to monitor and troubleshoot when needed.

POE-1200G / HPOE-1200G

LED	Color	Function
SYS Power	Green	Lights to indicate power on.
PoE Failure	Red	Lights to indicate PoE module failure.
Fan Failure	Red	Lights to indicate fans have stopped.
PoE-in-use	Green	Lights to indicate that the port is in use and supplying 52V DC power.
Management Port	Green	Lights to indicate the link through that port is successfully established at 1000Mbps.
	Orange	Lights to indicate the link through that port is successfully established at 10/100Mbps.

POE-2400G / HPOE-2400G

LED	Color	Function
SYS Power	Green	Lights to indicate power on.
PoE1 Failure	Red	Lights to indicate 1st PoE module failure.
PoE2 Failure	Red	Lights to indicate 2nd PoE module failure.
Fan1 Failure	Red	Lights to indicate Fan1 has stopped.
Fan2 Failure	Red	Lights to indicate Fan2 has stopped.
PoE-in-use	Green	Lights to indicate that the port is in use and supplying 52V DC power.
Management Port	Green	Lights to indicate the link through that port is successfully established at 1000Mbps.
	Orange	Lights to indicate the link through that port is successfully established at 10/100Mbps.

2.1.3 Injector Rear Panel

The rear panel of the PoE Injector Hub indicates an AC inlet power socket, which accepts input power from 100 to 240V AC, 50/60Hz. [Figures 2-1-6 & 2-1-7](#) show the rear panel of the PoE Injector Hub.



Figure 2-1-6: POE-1200G/HPOE-1200G Rear Panel



Figure 2-1-7: POE-2400G/HPOE-2400G Rear Panel



The PoE Injector Hub is a power-required device, meaning PoE Injector Hub will not work till it is powered. If your networks should be active all the time, please consider using UPS (Uninterrupted Power Supply) for your device. It will prevent you from network data loss or network downtime.



In some areas, installing a surge suppression device may also help to protect your device from being damaged by unregulated surge or current to the PoE Injector Hub or the power adapter.

2.2 Installing the PoE Injector Hub

This section describes how to install your PoE Injector Hub and make connections to the PoE Injector Hub. Please read the following topics and perform the procedures in the order being presented. PLANET PoE Injector Hub does not need software configuration.

2.2.1 Desktop Installation

To install a PoE Injector Hub on a desktop or shelf, simply complete the following steps:

Step 1: Attach the rubber feet to the recessed areas on the bottom of the PoE Injector Hub.

Step 2: Place the PoE Injector Hub on a desktop or shelf near an AC power source.

Step 3: Keep enough ventilation space between the PoE Injector Hub and the surrounding objects.



When choosing a location, please keep in mind the environmental restrictions discussed in Chapter 1, Section 5, under Specifications.

Step 4: Connect your PoE Injector Hub to network 802.3at / 802.3af powered devices (PD) and Switch.

- A. Connect one end of a standard network cable to the upper stack 10/100/1000 RJ45 ports on the front of the PoE Injector Hub.
- B. Connect the other end of the cable to the 802.3at / 802.3af powered devices (PD) such as IP phone, wireless access point, IP camera, splitter, or switch etc.
- C. Connect one end of a standard network cable to the relative lower stack 10/100/1000 RJ45 port on the front of the PoE Injector Hub.
- D. Connect the other end of the cable to the port of Switch.



Connecting to the PoE Injector Hub requires UTP Category 5e / 6 network cabling with RJ45 tips. For more information, please see the Cabling Specification in Appendix A.

Step 5: Supply Power to the PoE Injector Hub.

- A. Connect one end of the power cable to the PoE Injector Hub.
- B. Connect the power plug of the power cable to a standard wall outlet.

When the PoE Injector Hub receives power, the Power LED should remain solid Green.

2.2.2 Rack Mounting

To install the PoE Injector Hub in a 19-inch standard rack, follow the instructions described below.

Step 1: Place your PoE Injector Hub on a hard flat surface, with the front panel positioned towards your front side.

Step 2: Attach a rack-mount bracket to each side of the PoE Injector Hub with supplied screws attached to the package.

[Figure 2-2-1](#) shows how to attach brackets to one side of the PoE Injector Hub.

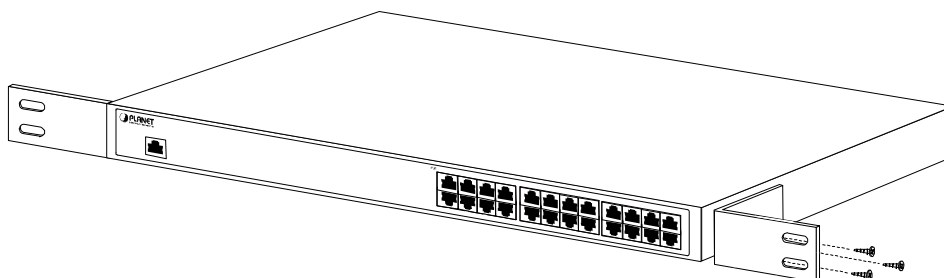


Figure 2-2-1: Brackets attaching to the PoE Injector Hub



You must use the screws supplied with the mounting brackets. Damage caused to the parts by using incorrect screws would invalidate the warranty.

Step 3: Secure the brackets tightly.

Step 4: Follow the same steps to attach the second bracket to the opposite side.

Step 5: After the brackets are attached to the Injector, use suitable screws to securely attach the brackets to the rack, as shown in [Figure 2-2-2](#).

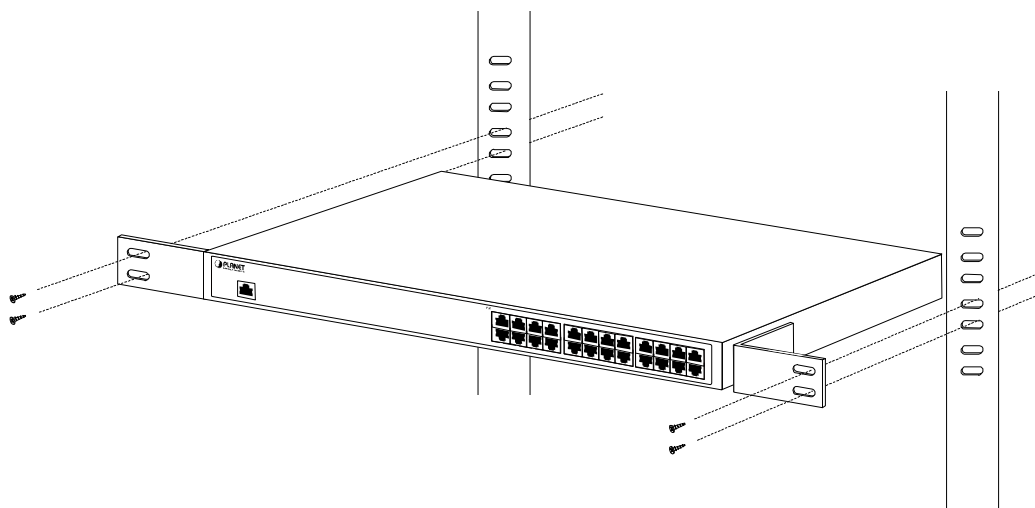


Figure 2-2-2: Mounting the PoE Injector Hub in a Rack

Step 6: Proceed with steps 4 and 5 of session **2.2.1 Desktop Installation** to connect the network cabling and supply power to your PoE Injector Hub.

2.2.3 Network Application Installation

The PoE Injector Hub is not an equipment with data switching function between data ports. To inject PoE power and transmit data packets to PDs, the PoE Injector Hub is usually linked to an Ethernet switch. Typically, the Mid-span Injector is installed between regular Ethernet switch and PDs, and mostly it is located close to the Ethernet switch side.

To install a PoE Injector Hub on a network environment, simply complete the following steps:

Step 1: Power on the PoE Injector Hub and connect the RJ45 cable from the “Data” port to the Ethernet switch port.

Step 2: Connect the RJ45 cable from the “Data + Power” ports to the PDs, such as VoIP phone and IP camera.

Step 3: Check the link status on both PD and Ethernet switch. Once the Injector starts to deliver 52V power over RJ45 cables to PDs, the PoE-in-Use LED of the PoE Injector Hub lights up.

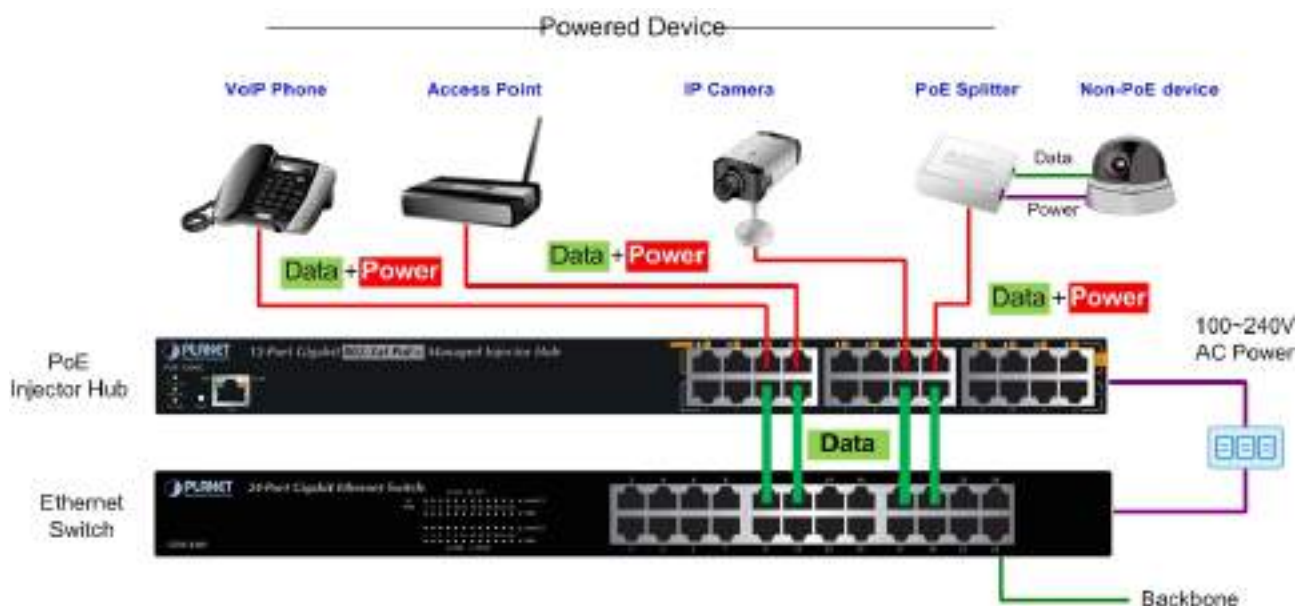








Figure 2-2-3: Network application installation

The PoE Injector Hub supports data passive mode, that is, even the PoE Injector Hub is manually powered off, the data between “DATA” port and “DATA & PWR” port can still be transmitted without data loss.

2.2.4 Power over Ethernet Powered Device

 <p>3~5 Watts</p>	<p>Voice over IP phones</p> <p>Enterprise can install POE VoIP Phone, ATA and other Ethernet/non-Ethernet end-devices to the central where UPS is installed for un-interruptible power system and power control system.</p>
 <p>6~12 Watts</p>	<p>Wireless LAN Access Points</p> <p>Access Points can be installed in any location of Museum, Tourist Site, Airport, Hotel, Campus, Factory, Warehouse, etc.</p>
 <p>10~12 Watts</p>	<p>IP Surveillance</p> <p>IP cameras can be installed anywhere in Enterprise, Museum, Campus, Hospital, Bank, etc. without the need of AC sockets.</p>
 <p>3~12 Watts</p>	<p>PoE Splitter</p> <p>PoE Splitter splits PoE 52V DC over the Ethernet cable into 5/9/12V DC power output. It frees the device deployment from restrictions due to power outlet locations, which eliminate the costs for additional AC wiring and reduces the installation time.</p>
 <p>3~25 Watts</p>	<p>High Power PoE Splitter</p> <p>High PoE Splitter splits PoE 52V DC over the Ethernet cable into 5/9/12V DC power output. It frees the device deployment from restrictions due to power outlet locations, which eliminate the costs for additional AC wiring and reduces the installation time.</p>
 <p>30 Watts</p>	<p>High Power Speed Dome</p> <p>This state-of-the-art design is considerable to fit in various network environments like traffic centers, shopping malls, railway stations, warehouses, airports, and production facilities for the most demanding outdoor surveillance applications; electrician is not needed to install AC sockets.</p>

3 MANAGEMENT

This chapter describes how to manage the PoE Injector Hub with the following topics included:

- **Overview**
- **Management Method**
- **Logging on to the PoE injector Hub**

3.1 Overview

The PoE injector hub provides a user-friendly, Web interface where you can perform various device configuration and management activities, including:

- **System**
- **Power over Ethernet**
- **Tools**

3.2 Requirements

- **Network cables**
Use standard network (UTP) cables with RJ45 connectors.
- **Subscriber PC** is installed with Ethernet NIC (Network Card).
- **Workstations** running Windows 2000/XP, 2003, Vista/7/8, 2008, MAC OS9 or later, or Linux, UNIX, or other platforms compatible with **TCP/IP** protocols.
- The above PC is installed with Web browser and JAVA runtime environment plug-in.



It is recommended to use **Internet Explore 7.0** or above to access the PoE Injector Hub.

3.3 Management Method

User can manage the PoE injector Hub by Web Management via a network connection.

3.3.1 Web Management

The PoE Injector Hub can be configured through an Ethernet connection. The factory default IP address is **192.168.0.100** with subnet mask **255.255.255.0**, so please make sure the manager PC must be set on the same **IP subnet address**. For example, if POE Injector Hub IP address is set to factory default, then your manager PC should be set at **192.168.0.x** (where x is a number between 1 and 254, except 100) with a subnet mask of **255.255.255.0**.

1. Use Internet Explorer 7.0 or above Web browser. Enter IP address **http://192.168.0.100** to access the Web interface.



Figure 3-1-1: Web Management over Ethernet

2. When the following login screen appears, please enter the default username "**admin**" and password "**admin**" to login the main screen of PoE Injector Hub. The login screen in [Figure 3-1-2](#) appears.

Default IP Address: **192.168.0.100**

Default Account: **admin**

Default Password: **admin**



Figure 3-1-2: PoE Injector Hub Web Login Screen



1. For security reason, please change and memorize the new password after this first setup.
2. Only accept command in lowercase letter under Web interface.

3.3.2 PLANET Smart Discovery Utility

For easily listing the PoE Injector Hub in your Ethernet environment, Planet Smart Discovery Utility from user's manual CD-ROM is an ideal solution.

The following installation instructions guide you to running Planet Smart Discovery Utility.

Deposit Planet Smart Discovery Utility in administrator PC.

Run this utility and the following screen appears.

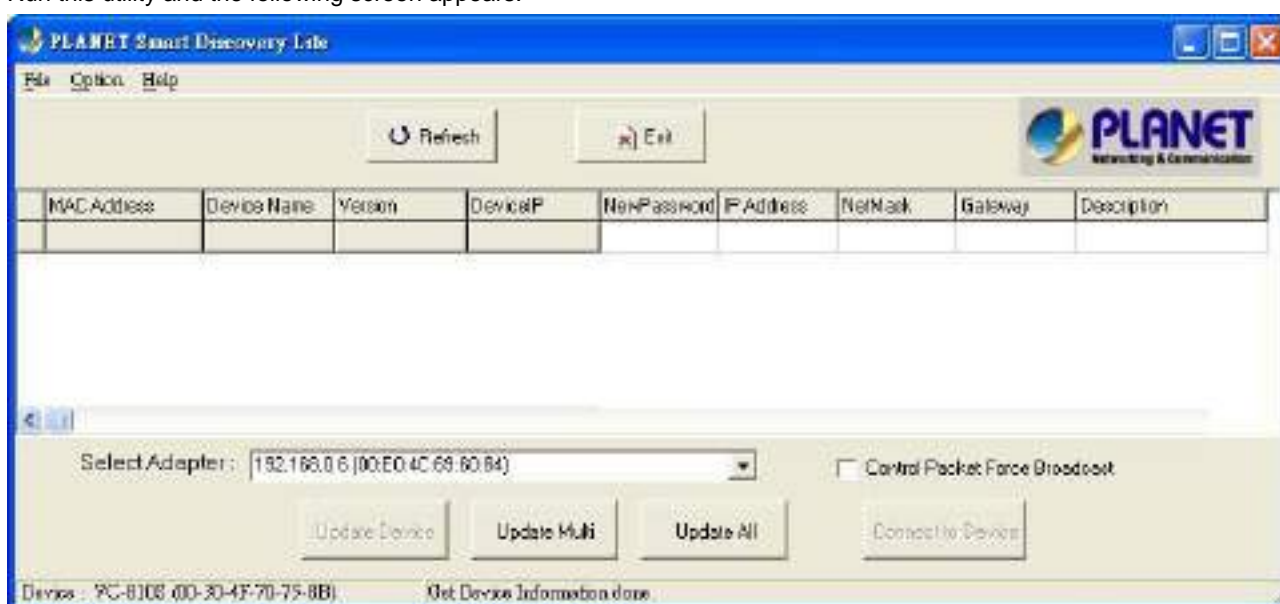


Figure 3-1-3: Planet Smart Discovery Utility Screen



If there are two LAN cards or above in the same administrator PC, choose a different LAN card by using the “**Select Adapter**” tool.

1. Press the **“Refresh”** button for the currently-connected devices in the discovery list and the screen is shown as follows:

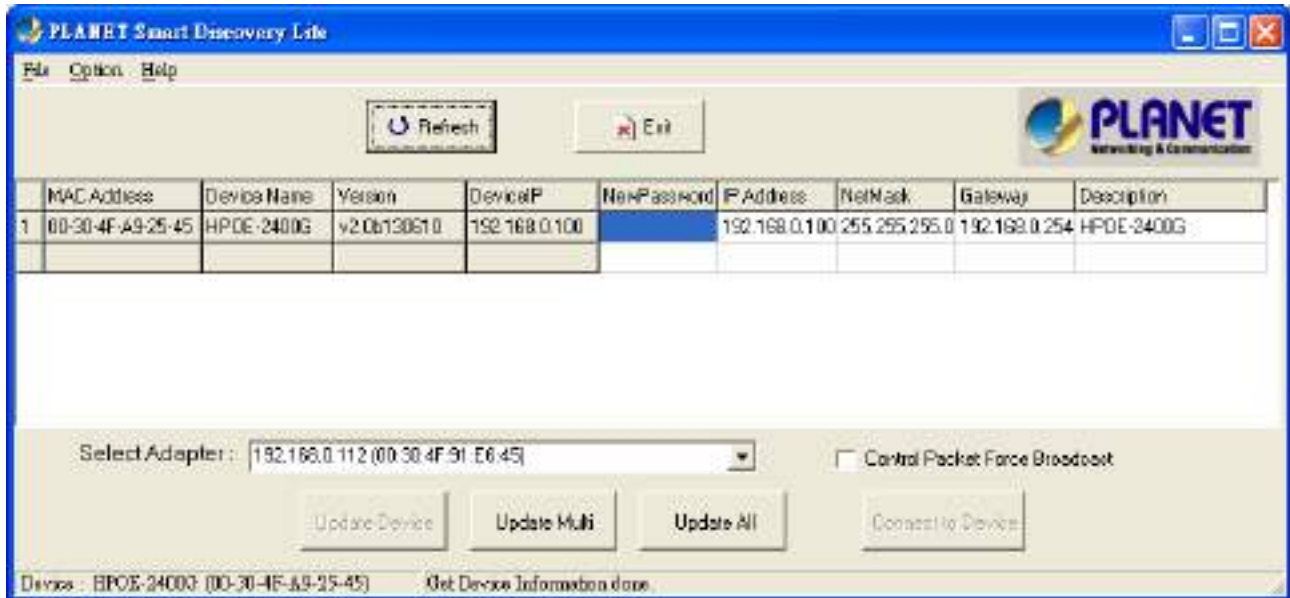


Figure 3-1-4: Planet Smart Discovery Utility Screen

This utility shows all necessary information from the devices, such as MAC address, device name, firmware version and device IP subnet address. It can also assign new password, IP subnet address and description of the devices.

After setup is completed, press the **“Update Device”**, **“Update Multi”** or **“Update All”** button to take effect. The meanings of the 3 buttons above are shown below:

Update Device: Use current setting on one single device.

Update Multi: Use current setting on multi-devices.

Update All: Use current setting on whole devices in the list.

The same functions mentioned above also can be found in **“Option”** tools bar.

By clicking the **“Control Packet Force Broadcast”** function, it allows you to assign new setting value to the PoE Injector Hub under a different IP subnet address.

Press the **“Connect to Device”** button and then the Web login screen appears in [Figure 3-1-2](#).

Press the **“Exit”** button to shut down Planet Smart Discovery Utility.

4 WEB CONFIGURATION

The PoE Injector Hub provides Web interface for PoE smart function configuration and makes the PoE Injector Hub operate more effectively. They can be configured through the Web browser. A network administrator can manage and monitor the PoE Injector Hub from the local LAN. This section indicates how to configure the PoE Injector Hub to enable its smart function.



The following screen is based on the HPOE-2400G, which is the same for the POE-1200G, POE-2400G and HPOE-1200G

4.1 Main Menu

After a successful login, the main screen appears. The main screen, as shown in [Figure 4-1-1](#), displays the product name, the function menu, and the main information in the center.



Figure 4-1-1: Web Main Menu screen

The descriptions of the four items are as follows:

Object	Description
■ System	Provides System information of PoE Injector Hub. Explained in section 4.3.
■ SNMP	Provides SNMP Trap information and system information. Explained in section 4.4.
■ PoE Configuration	Provides PoE Management configuration of PoE Injector Hub. Explained in section 4.5.
■ Logout	Provides Logout function of PoE Injector Hub. Explained in section 4.6.

4.2 Web Panel

At the top of the Web management page, the active panel displays the link status of management port and PoE ports.

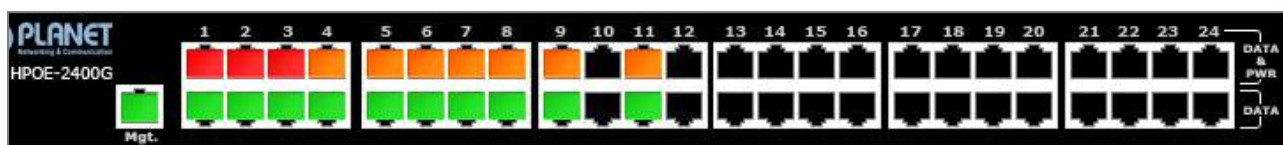


Figure 4-2-1: Web panel screen

- **Green** light indicates network data is sending or receiving.
- **Orange** light indicates the PoE is in use.
- **Red** light indicates the PoE port does not have enough power to enable. (It will happen only if user assigns lower power to PD in the Total Limit mode.)

4.3 System

The System function provides system information which also allows user to manage the PoE Injector Hub system as [Figure 4-2-2](#) is shown below:

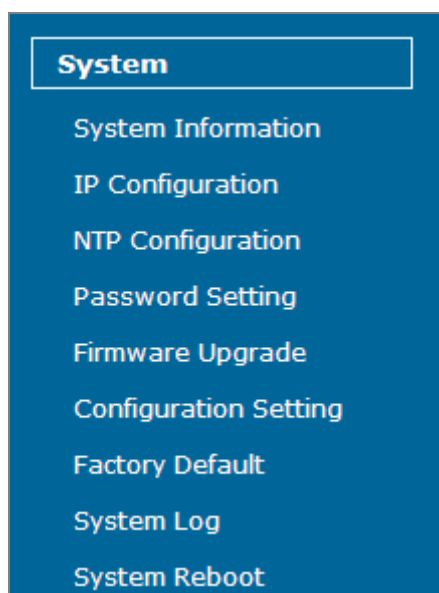


Figure 4-2-2: System Function Menu

The page includes the following information:

Object	Description
• System Information	Display the MAC address, Software Version, Hardware Version, IP Address, Subnet Mask, Gateway and Description. Explained in section 4.3.1.
• IP Configuration	Allow to change the IP subnet address of PoE Injector Hub. Explained in section 4.3.2.
• NTP Configuration	Allow to set system time by manual or synchronize system time from Internet NTP server. Explained in section 4.3.3.
• Password Setting	Allow to change the username and password of PoE Injector Hub. Explained in

	section 4.3.4.
• Firmware Upgrade	Allow to upgrade the latest firmware in the future. Explained in section 4.3.5.
• Configuration Setting	Allow to back up or restore system configuration. Explained in section 4.3.6.
• Factory Default	Allow to reset system to factory default setting. Explained in section 4.3.7.
• System Log	Allow to enable system log and to record system log. Explained in section 4.3.8.
• System Reboot	Allow to reboot system. Explained in section 4.3.9.

4.3.1 System Information

This section displays system information of PoE Injector Hub as the screen in [Figure 4-3-1](#) appears. [Table 4-3-1](#) describes the system information of the PoE Injector Hub.

System Information

System Information	
System Name	HPOE-2400G
MAC Address	00:30:4f:11:22:33
Software Version	v3.0b150522
Build Time	Fri May 29 13:14:44 CST 2015
Hardware Version	V 3.0
Attain IP Protocol	Fixed IP
IP Address	192.168.0.100
Subnet Mask	255.255.255.0
Gateway	192.168.0.254
Description	24-Port_GbE_HPoE_Injector_Hub
Time	
System Date	2015/ 5/29 13:16
System UpTime	0day:0h:1m:31s

Figure 4-3-1: System Information Web Page Screen

Object	Description
• System Name	Displays the PoE Injector Hub model name.
• MAC Address	Displays the MAC address of PoE Injector Hub.
• Software Version	Displays the current firmware version of PoE Injector Hub.
• Build Time	Displays the firmware build time.
• Hardware Version	Displays the hardware version of PoE Injector Hub.
• Attain IP Protocol	Displays the currently attained IP protocol of PoE Injector Hub.
• IP Address	Displays the current IP address of PoE Injector Hub.
• Subnet Mask	Displays the current subnet mask address of PoE Injector Hub.
• Gateway	Displays the current gateway address of PoE Injector Hub.
• Description	Displays the system description of PoE Injector Hub.
• System Date	Displays the current system date of PoE Injector Hub. The system date will be correct if NTP function is enabled and the Hub is connected to Internet.
• System UpTime	Displays when the system will start up.

Table 4-3-1: Descriptions of the System Information Objects Screen

4.3.2 IP Configuration

This section provides the IP Configuration of PoE Injector Hub as the screen in [Figure 4-3-2](#) appears. [Table 4-3-2](#) describes the IP Configuration object of PoE Injector Hub.

IP Configuration

DHCP Client	Disable ▼
IP Address	192.168.0.100
Subnet Mask	255.255.255.0
Default Gateway	192.168.0.254
Description:	24-Port_GbE_HPoE_Injector_Hub

Figure 4-3-2: IP Configuration Web Page Screen

Object	Description
• DHCP Client	Allows to disable or enable the DHCP Client function of PoE Injector Hub.
• IP Address	Allows to input new IP Address of PoE Injector Hub.
• Subnet Mask	Allows to input new Subnet Mask Address of PoE Injector Hub.
• Default Gateway	Allows to input new Default Gateway Address of PoE Injector Hub.
• Description	Allows to input new system description of PoE Injector Hub. The maximum length is 20 characters.
• Apply	Press this button to take effect.
• Reset	Press this button to reset IP Configuration to default mode.

Table 4-3-2: Descriptions of the IP Configuration Objects Screen



If PoE Injector Hub has not received IP address from DHCP server, then user still can connect to the IP address before changing to DHCP client mode, or user can use Smart Discovery Utility to find out what IP address set in the PoE Injector Hub is currently.

4.3.3 NTP Configuration

This section provides the NTP Configuration of PoE Injector Hub, the screen in [Figure 4-3-3](#) appears and [Table 4-3-3](#) describes the NTP Configuration object of PoE Injector Hub.

Time Zone Setting

Current Time:	YYYY <input type="text" value="2000"/> MM <input type="text" value="1"/> DD <input type="text" value="1"/> Hr <input type="text" value="0"/> Min <input type="text" value="13"/> Sec <input type="text" value="50"/>
Enable NTP client update	<input type="checkbox"/>
Time Zone Select	<input type="text" value="(GMT-08:00)Pacific Time (US & Canada); Tijuana"/> <input type="button" value="v"/>
NTP server	<input checked="" type="radio"/> <input type="text" value="192.5.41.41 - North America"/> <input type="button" value="v"/> <input type="radio"/> <input type="text" value=""/> (Manual IP Setting)

Figure4-3-3: NTP Configuration Web page screen

Object	Description
• Current Time	Allow input current time information of PoE Injector Hub.
• Enable NTP client update	Allow disable or enable time update from NTP server of PoE Injector Hub.
• Time Zone Select	Allow select the time zone according to current location of PoE Injector Hub.
• NTP Server	Allow choose one list NTP server or assign one NTP server IP address manually for PoE Injector Hub.
• Apply	Press this button to take effect.
• Refresh	Press this button to refresh current Web page.

Table 4-3-3: Descriptions of the NTP Configuration Web page screen Objects

4.3.4 Password Setting

This section provides the Password Setting of PoE Injector Hub as the screen in [Figure 4-3-4](#) appears. [Table 4-3-4](#) describes the Password Setting objects of PoE Injector Hub.



The screenshot shows a web page titled "Password Setting". It contains four input fields stacked vertically, each with a label to its left: "User Name", "Old Password", "New Password", and "Confirmed Password". Below these fields are two buttons: "Apply" and "Reset".

Figure 4-3-4: Password Setting Web Page Screen

Object	Description
• User Name	Allows to input current User Name of PoE Injector Hub.
• Old Password	Allows to input current Password of PoE Injector Hub.
• New Password	Allows to input new Password of PoE Injector Hub.
• Confirmed Password	Allows to input new Password again for confirmation of PoE Injector Hub.
• Apply	Press this button to take effect.
• Reset	Press this button to reset password setting to default mode.

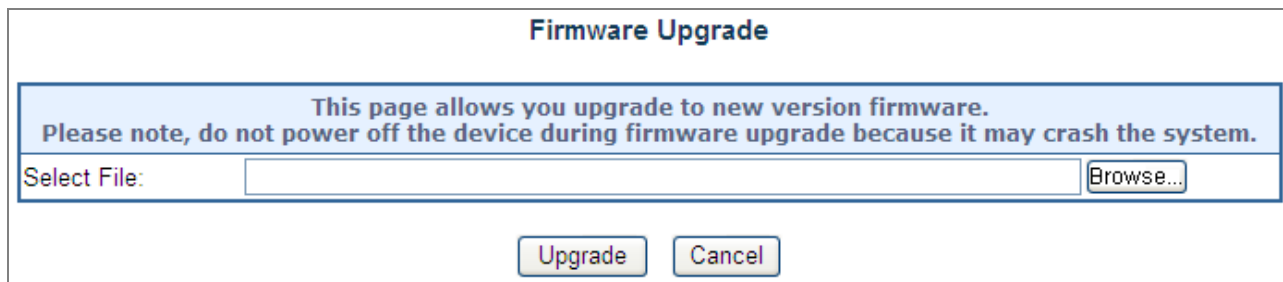
Table 4-3-4: Descriptions of the Password Setting Objects Screen.



1. For security reason, please change and memorize the new password after this first setup.
2. The maximum length is 15 characters.

4.3.5 Firmware Upgrade

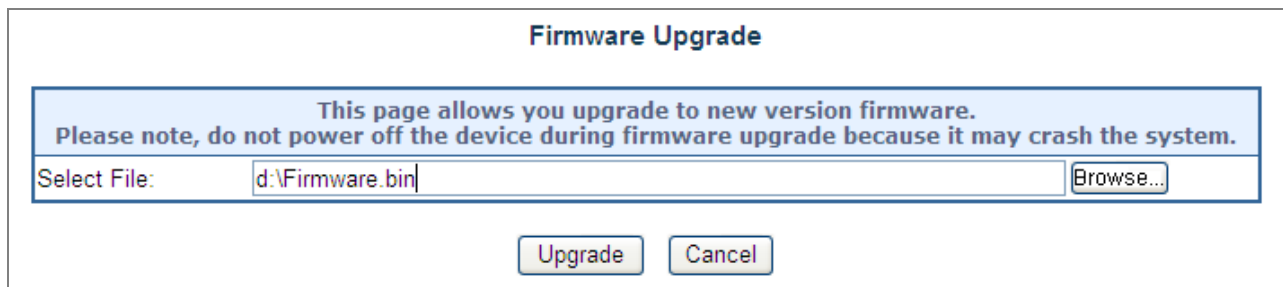
This section provides the firmware upgrade of PoE Injector Hub as the screen in [Figure 4-3-5](#) appears.



The screenshot shows a web page titled "Firmware Upgrade". It contains a blue box with the text: "This page allows you upgrade to new version firmware. Please note, do not power off the device during firmware upgrade because it may crash the system." Below this is a "Select File:" label, an empty text input field, and a "Browse..." button. At the bottom are "Upgrade" and "Cancel" buttons.

Figure 4-3-5: Firmware Upgrade Web Page Screen

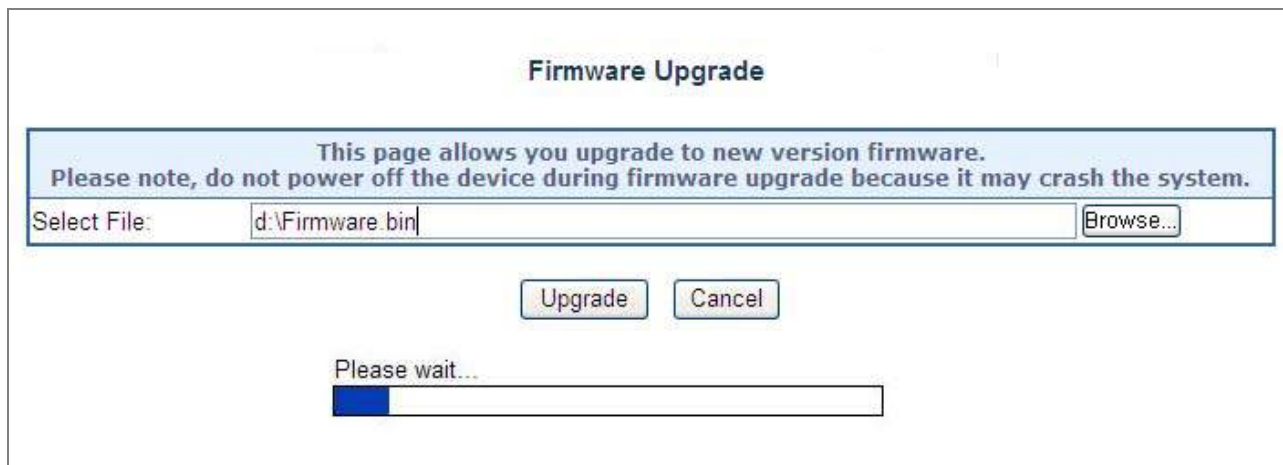
Please press "**Browse**" to locate the latest firmware of PoE Injector Hub that deposits in your PC. The screen in [Figure 4-3-6](#) appears.



The screenshot shows the same "Firmware Upgrade" web page as Figure 4-3-5, but the text input field now contains the file path "d:\Firmware.bin". The "Browse..." button is still present, along with the "Upgrade" and "Cancel" buttons at the bottom.

Figure 4-3-6: Firmware Upgrade Web Page Screen

Press "**Upgrade**" to start the firmware upgrade process as the screen in [Figure 4-3-7](#) appears.



The screenshot shows the "Firmware Upgrade" web page with the file path "d:\Firmware.bin" in the input field. The "Upgrade" button is highlighted, indicating it has been pressed. Below the buttons, there is a "Please wait..." label and a progress bar that is partially filled with blue, indicating the upgrade process is in progress.

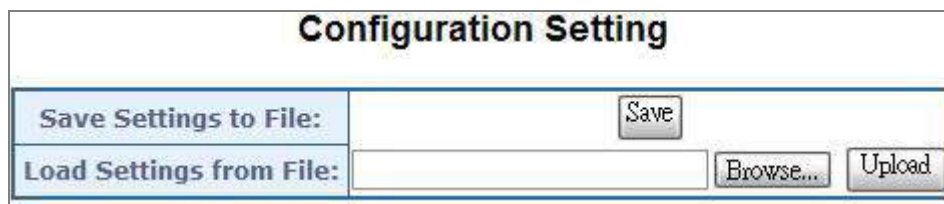
Figure 4-3-7: Firmware Upgrade Web Page Screen



1. The firmware upgrade process needs 30 seconds to complete and system will reboot automatically. After the PoE Injector Hub power on is completed, the latest firmware can be used.
2. Please do not power off the PoE Injector Hub during firmware upgrade process

4.3.6 Configuration Setting

This function allows output the current PoE Injector Hub configuration as a file, and upload it to other PoE injector Hub for quick multi-devices setting. The description of the procedure and screens in the following appears. The screen in [Figure 4-3-8](#) appears and [Table 4-3-5](#) describes the Configuration Setting object of PoE Injector Hub.



The screenshot shows a web interface titled "Configuration Setting". It contains two main sections: "Save Settings to File:" with a text input field and a "Save" button, and "Load Settings from File:" with a text input field, a "Browse..." button, and an "Upload" button.

Figure 4-3-8: Configuration Backup screen

Object	Description
• Save Settings to File	Allow to save system configuration to a file and download to manager workstation.
• Load Settings form File	Allow to restore system configuration to PoE Injector Hub.
• Browse...	Allow to specify the system configuration file locate path.
• Upload	Upload system configuration file to PoE Injector Hub.

Table 4-3-5: Descriptions of the Configuration Setting Objects Screen

■ Configuration Download

All current configurations (except IP Configuration) will output as a configuration file once the “**Save**” button is pressed. Save the current configuration in manager workstation and the screen in [Figure 4-3-9](#) to [Figure 4-3-11](#) appears.



The screenshot shows a file download dialog box. The text inside says "Do you want to open or save config.dat (4.86 KB) from 192.168.0.100?". There are four buttons: "Open", "Save" (with a dropdown arrow), "Cancel", and a close button (X).

Figure 4-3-9: File Download Screen



Figure 4-3-10: File Save Screen

■ Configuration Upload

Click the "Browse" button of the Configuration Setting Web page and the system would pop up the file selection screen to choose saved configuration. The screen in [Figure 4-3-11](#) appears.



Figure 4-3-11: Windows File Selection Screen

Select on the configuration file and then click "Upload". After system has uploaded, the screen in [Figure 4-3-12](#) appears.

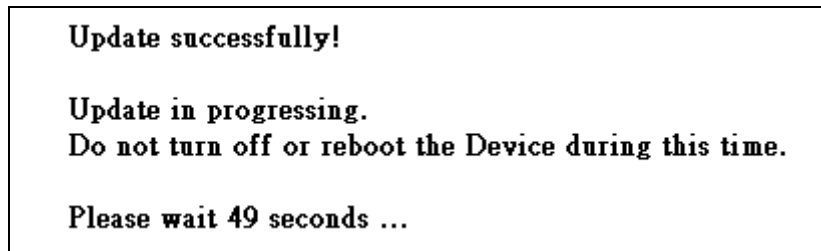


Figure 4-3-12: Configuration Upload Finished Screen

When configuration has been uploaded, please re-login in the system again.



Figure 4-3-13: System Login Screen

4.3.7 Factory Default

This section describes resetting the PoE Injector Hub to factory default mode; the screen appears in [Figure 4-3-14](#).

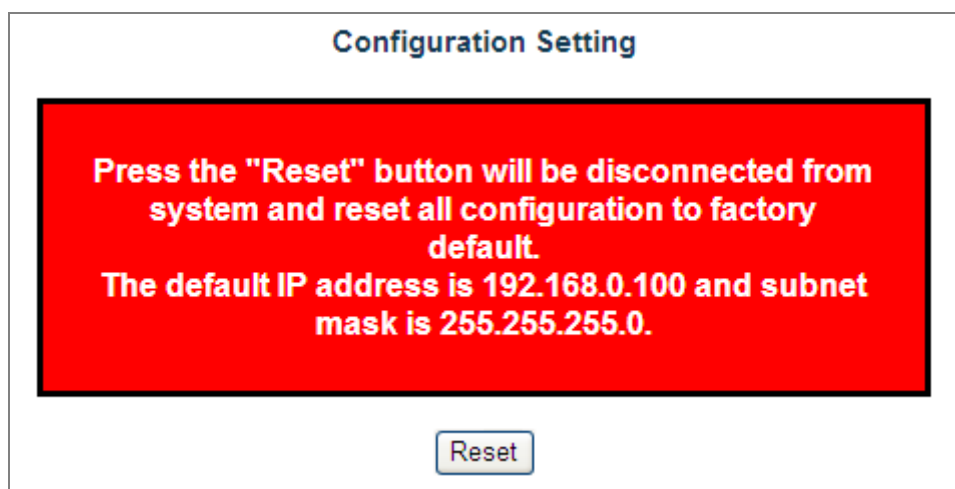


Figure 4-3-14: Factory Default Web Page Screen

Please press the **“Reset”** button to take effect and the **“Do you really want to reset the current settings to default?”** pop window appears. Please press the **“OK”** button to continue the factory default process. The screen appears in [Figure 4-3-15](#).

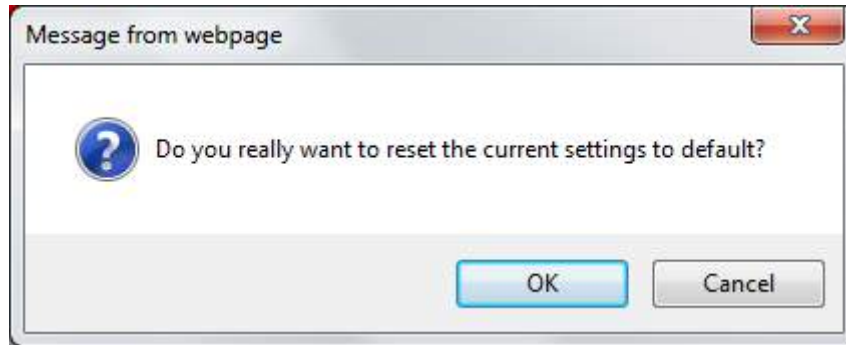


Figure 4-3-15: Factory Default Web Page Screen

Then the reboot screen appears in [Figure 4-3-16](#) and press the **“Reboot”** button for rebooting the PoE Injector Hub.

System Reboot



Figure 4-3-16: Factory Default Web Page Screen

The pop window with “Wait for 120 seconds while rebooting” appears; the screen in [Figure 4-3-17](#) appears.

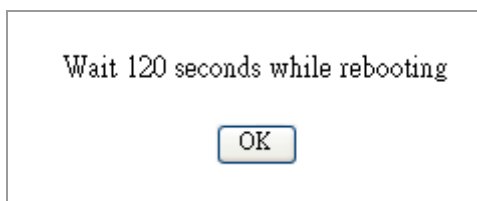


Figure 4-3-17: Factory Default Web Page Screen

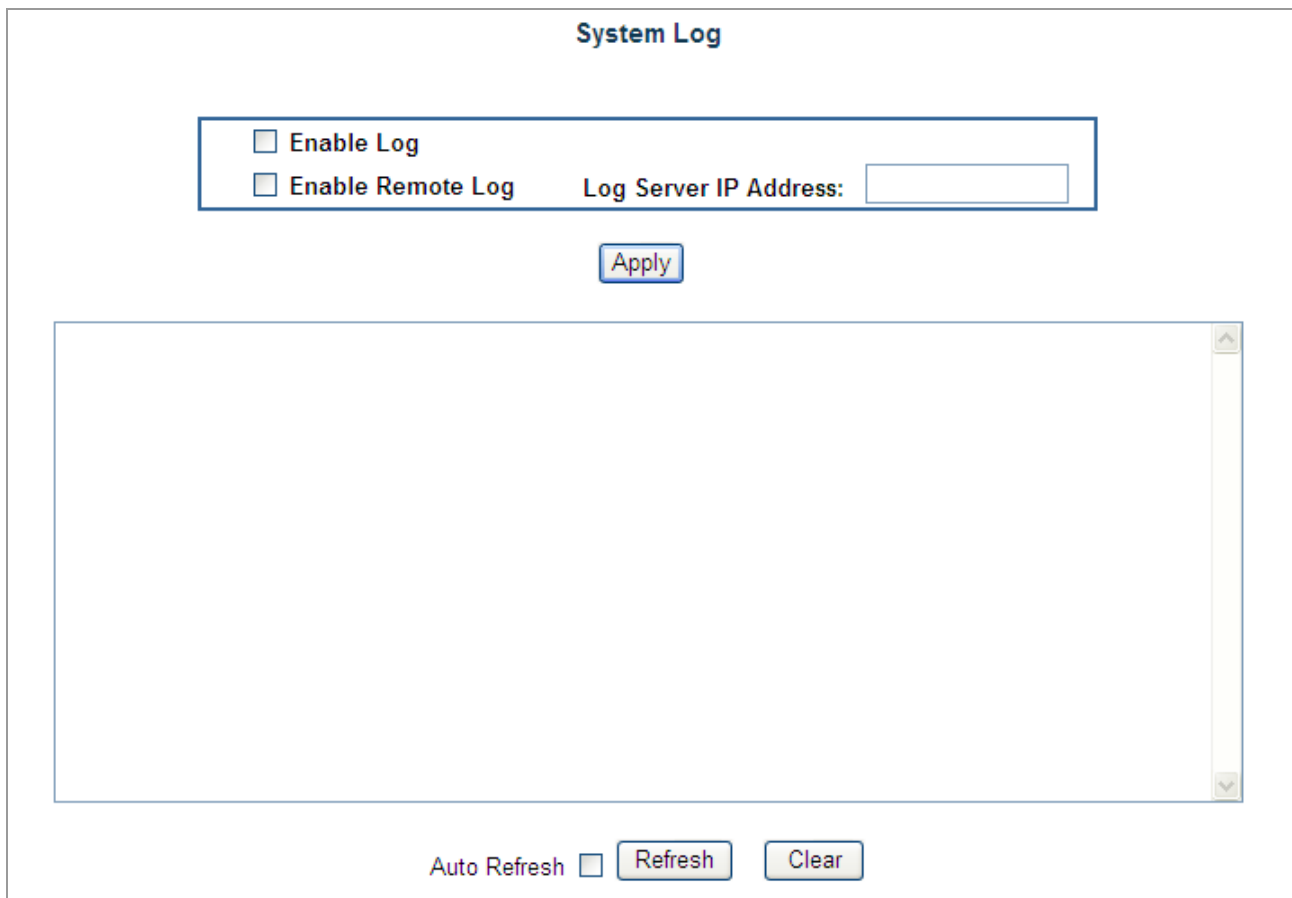
After 120 seconds, press the “OK” button and then the main menu Web page screen appears in [Figure 4-3-18](#).



Figure 4-3-18: Main Web Page Screen

4.3.8 System Log

This section provides the system log setting and information display of PoE Injector Hub; the screen in [Figure 4-3-19](#) appears. [Table 4-3-6](#) describes the system log setting object of PoE Injector Hub.



The screenshot shows the 'System Log' web page. At the top, there's a title 'System Log'. Below it, there's a section with two checkboxes: 'Enable Log' and 'Enable Remote Log'. To the right of these checkboxes is a text input field labeled 'Log Server IP Address:'. Below this section is an 'Apply' button. The main part of the page is a large, empty rectangular area with a vertical scrollbar on the right side, intended for displaying log entries. At the bottom, there's an 'Auto Refresh' checkbox followed by 'Refresh' and 'Clear' buttons.

Figure 4-3-19: System Log Web Page Screen

Object	Description
• Enable Log	Provide disable or enable the system log function of PoE Injector Hub.
• Enable Remote Log	Allow to send system log to remote log server.
• Log Server IP Address	Allow to set IP address of remote log server.
• Apply	Press this button to take effect.
• Auto-refresh <input type="checkbox"/>	Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.
• Refresh	Press this button to refresh current Web page.
• Clear	Press this button to clear system log information.

Table 4-3-6: Descriptions of the System Log Objects Screen

4.3.9 System Reboot

This section provides the system reboot function of PoE Injector Hub; the screen in [Figure 4-3-20](#) appears.

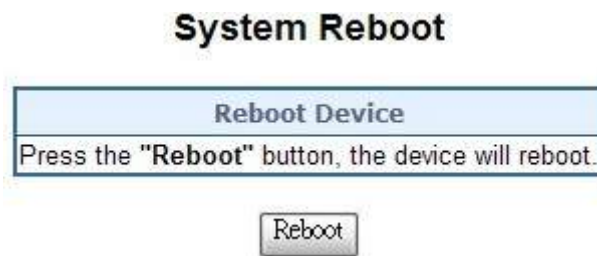


Figure 4-3-20: System Reboot Web Page Screen

Press the “**Reboot**” button to reboot the PoE Injector Hub; the screen in [Figure 4-3-21](#) appears

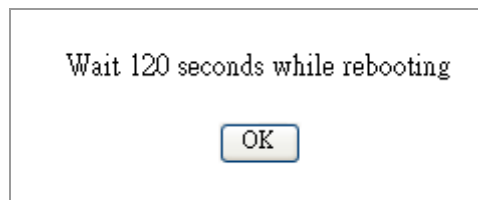


Figure 4-3-21: System Reboot Web Page Screen

Wait for 120 seconds for completing the reboot process of PoE Injector Hub.

4.3.10 Logout

This section provides logout function of PoE Injector Hub; the screen in [Figure 4-3-22](#) appears.

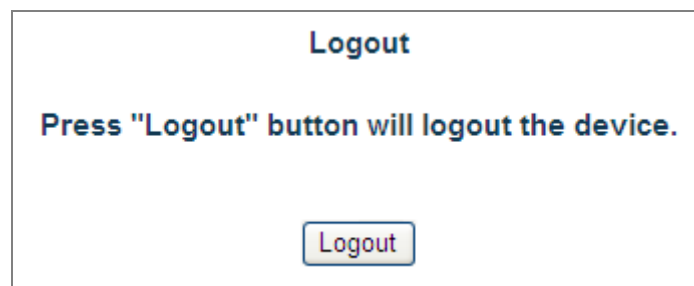


Figure 4-3-22: Logout Web Page Screen

Press the “**Logout**” button and then the pop window with re-login request appears; the screen in [Figure 4-3-23](#) appears.



Figure 4-3-23: Logout Web Page Screen

Please input the password for entering into Web main menu screen of PoE Injector Hub; the screen in [Figure 4-3-24](#) appears.



Figure 4-3-24: Main Web Page Screen

4.4 SNMP

The Simple Network Management Protocol (SNMP) is an application layer protocol that facilitates the exchange of management information between network devices. It is part of the Transmission Control Protocol/Internet Protocol (TCP/IP) protocol suit. SNMP enables network administrations to manage network performance, find and solve network problems, and plan for network growth.

The SNMP provides SNMP Management and SNMP Trap as shown in [Figure 4-4-1](#).



Figure 4-4-1: SNMP Function Menu

The page includes the following information:

Object	Description
<ul style="list-style-type: none"> SNMP management 	Allow to enable or disable SNMP Agent and Trap Receiver function. It provides user to manage system information and SNMP Trap destination IP address. Explained in section 4.4.1.

Table 4-4-1: Descriptions of the System Log Objects Screen

4.4.1 SNMP Management

This section provides SNMP setting of PoE Injector Hub; the screen in [Figure 4-4-2](#) appears and [Table 4-4-2](#) describes the SNMP object of PoE Injector Hub.

SNMP Management

System Community	
SNMP Agent	Disable ▼
SNMP Read Community	public
SNMP Write Community	private
System Option	
System Name	HPOE-2400G
System Location	PLANET
Contact	Support@planet.com.tw
Description	24-Port_GbE_HPoE_Injector_Hub
SNMP Trap Receiver Configuration	
SNMP Trap	Disable ▼
SNMP Trap Destination	192.168.0.99

Figure 4-4-2: SNMP Web Page Screen

Object	Description
• SNMP Agent	Provides disable or enable the SNMP Agent function of PoE Injector Hub.
• SNMP Read Community	Allow to input characters for SNMP Read Community of PoE Injector Hub. The maximum length is 30 characters.
• SNMP Write Community	Allows to input characters for SNMP Write Community of PoE Injector Hub. The maximum length is 30 characters.
• System Name	Allows to input characters for System Name of PoE Injector Hub. The maximum length is 30 characters.
• System Location	Allows to input characters for System Location of PoE Injector Hub. The maximum length is 30 characters.
• Contact	Allows to input characters for contact of PoE Injector Hub. The maximum length is 30 characters.
• Description	Allows to input characters for description of PoE Injector Hub. The maximum length is 30 characters.
• SNMP Trap	Allows to enable or disable SNMP Trap function.
• SNMP Trap Destination	Allows to send SNMP trap to an assigned workstation.

Table 4-4-2: Descriptions of the SNMP Objects Screen

4.5 Power over Ethernet

■ Power Management:

In a Power over Ethernet system, operating power is applied from a power source (PSU-power supply unit) over the LAN infrastructure to powered devices (PDs), which are connected to ports. Under some conditions, the total output power required by PDs can exceed the maximum available power provided by the PSU. The system may supervise the PSU to supply less power than the total potential power consumption of all the PoE ports in the system. In order to maintain the majority of ports activity, power management is implemented.

The PSU input power consumption is monitored by measuring voltage and current. The input power consumption is equal to the system's aggregated power consumption. The power management concept allows all ports to be active and activates additional ports, as long as the aggregated power of the system is lower than the power level at which additional PDs cannot be connected. When this value is exceeded, ports will be deactivated, according to user-defined priorities. The power budget is managed according to the following user-definable parameters: maximum available power, ports priority and maximum allowable power per port.

The Power over Ethernet provides PoE Configuration and PoE Schedule as shown in [Figure 4-5-1](#).

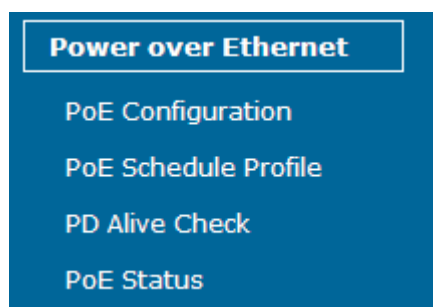


Figure 4-5-1: Power over Ethernet Function Menu

The page includes the following information:

Object	Description
• PoE Configuration	Allow to centralize management PoE power for PDs. Explained in section 4.5.1
• PoE Schedule	Allow to centralize management PoE power for providing schedule. Explained in section 4.5.2 .
• PD Alive Check	Allow to centralize management PoE power for checking PDs alive. Explained in section 4.5.5 .
• PoE Status	Display the current PoE usage. Explained in section 4.5.6 .

Table 4-5-1: Descriptions of the System Log Objects Screen

4.5.1 PoE Configuration

This section provides PoE (Power over Ethernet) Configuration and PoE output status of PoE Injector Hub; screen in Figure 4-5-2 appears. Table 4-5-2 describes the PoE Configuration object of PoE Injector Hub.

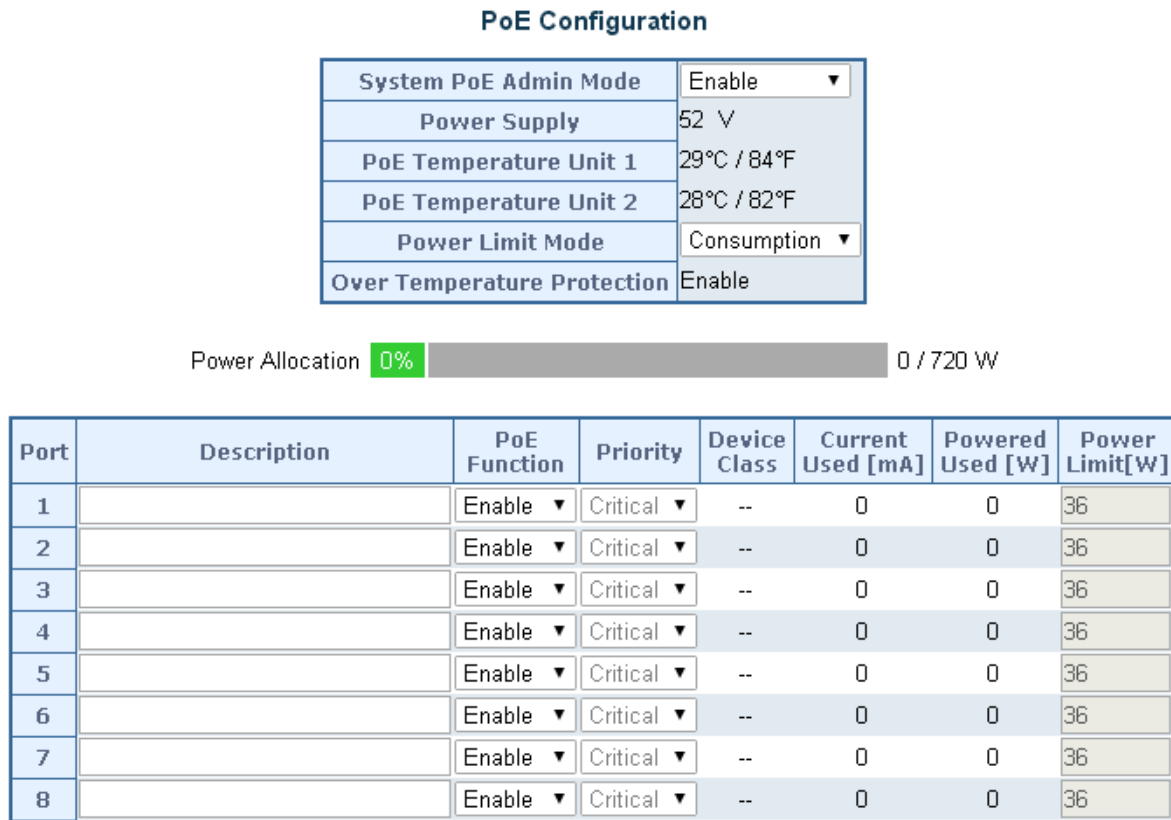


Figure 4-5-2: PoE Configuration Web Page Screen

Object	Description
• System PoE Admin Mode	Allows user to disable / enable PoE function.
• Power Supply	Displays PoE power supply status.
• POE Temperature Unit 1	Displays the current operating temperature of PoE chip unit 1.
• POE Temperature Unit 2	Displays the current operating temperature of PoE chip unit 2.
• Power Limit Mode	<p>Allows user to configure power limit mode, which can be chosen.</p> <p>Consumption: Based on the real device power consumption where PoE power is delivered as system default setting is in this mode.</p> <p>Classification: Based on port priority setting and device class where PoE power is delivered.</p>
• Over Temperature Protection	<p>Prevent system from being too hot that may cause damage. When PoE unit temperature rises over the temperature threshold value, PoE power budget will be reduced.</p> <p>Please refer to the table below for knowing the OTP level:</p>

		POE-1200G	POE-2400G	HPOE-1200G	HPOE-2400G
	OTP1	52 PoE Budget 210 watts	53 PoE Budget 410 watts	60 PoE Budget 345 watts	53 PoE Budget 690 watts
	OTP2	57 PoE Budget 200 watts	60 PoE Budget 380 watts	65 PoE Budget 330 watts	60 PoE Budget 660 watts
• Power Allocation	Displays the current total power consumption status.				
• Description	This function provides input per port description and the available letters is 30. NOTE: The total maximum letters are only 800. Some of special words will count as 5 per word, like ' , " , \ , < and >.				
• PoE Function	Allows user to disable or enable per port PoE function.				
• Priority	Allows user to set PoE port priority. There are 3 levels that could be configured and they are Critical, High and Low. The Critical is the highest priority and Low is the lowest priority. This function is worked under Priority power limit mode only.				
• Device Class	Displays PoE class level. The IEEE 802.3af standard offers PoE class level from 1 to 3 and IEEE 802.3at standard offers the class from 1 to 4 .				
• Current Used [mA]	Displays PoE device current.				
• Power Used [W]	Displays PoE device power consumption.				
• Power Limit [W]	Allows user to custom-power for port. This function is worked under Total Limit power limit mode. This function is also related to Power Mode . If Power mode is 802.3af, then user can allocate to 15.4 watts at the maximum; otherwise, user can allocate to 30 watts.				
• Apply	Press this button to take effect.				
• Refresh	Press this button to refresh the current Web page.				

Table 4-5-2: Descriptions of the PoE Configuration Objects Screen

■ PD Classifications


A PD may be classified by the PSE based on the classification information provided by the PD. The intent of PD classification is to provide information about the maximum power required by the PD during operation. Class 0 is the default for PDs. However, to improve power management at the PSE, the PD may opt to provide a signature for Class 1 to 4.

The PD is classified based on power. The classification of the PD is the maximum power that the PD will draw across all input voltages and operational modes.

A PD will return to Class 0 to 4 in accordance with the maximum power draw as specified by [Table 4-5-3](#).

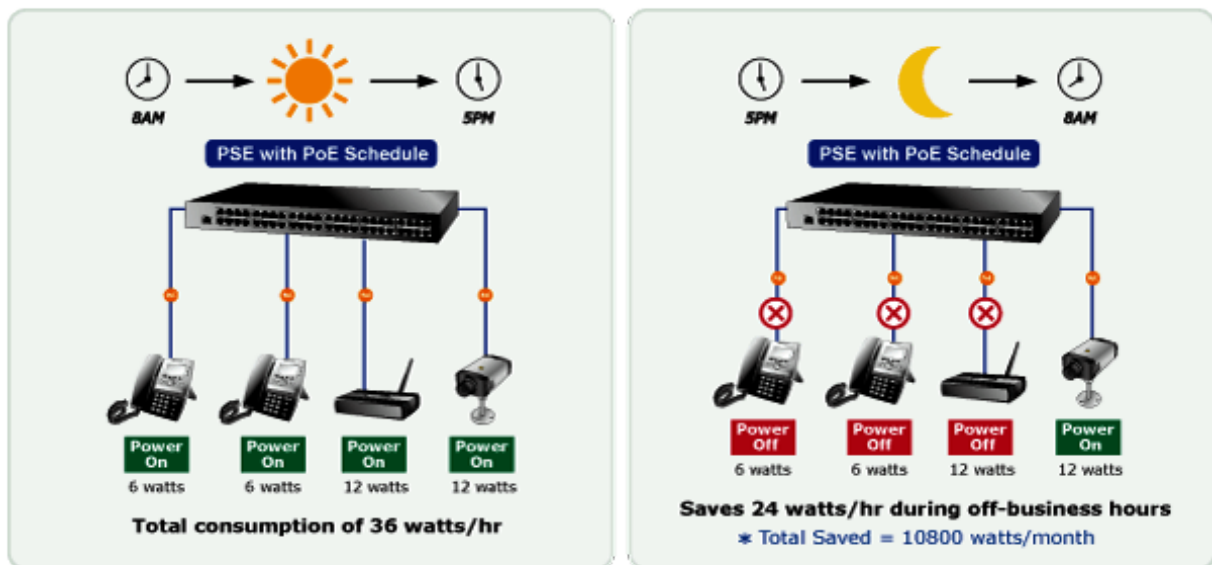
Class	Usage	Range of maximum power used by the IEEE 802.3af PD	Range of maximum power used by the IEEE 802.3at PD
0	Default	0.44 to 15.4 watts	0.44 to 32 watts
1	Optional	0.44 to 4 watts	0.44 to 4 watts
2	Optional	4 to 7 watts	4 to 7 watts
3	Optional	7 to 15.4 watts	7 to 15.4 watts
4	Optional	Reserved for Future Use	15.4 to 32 watts

Table 4-5-3: Device class

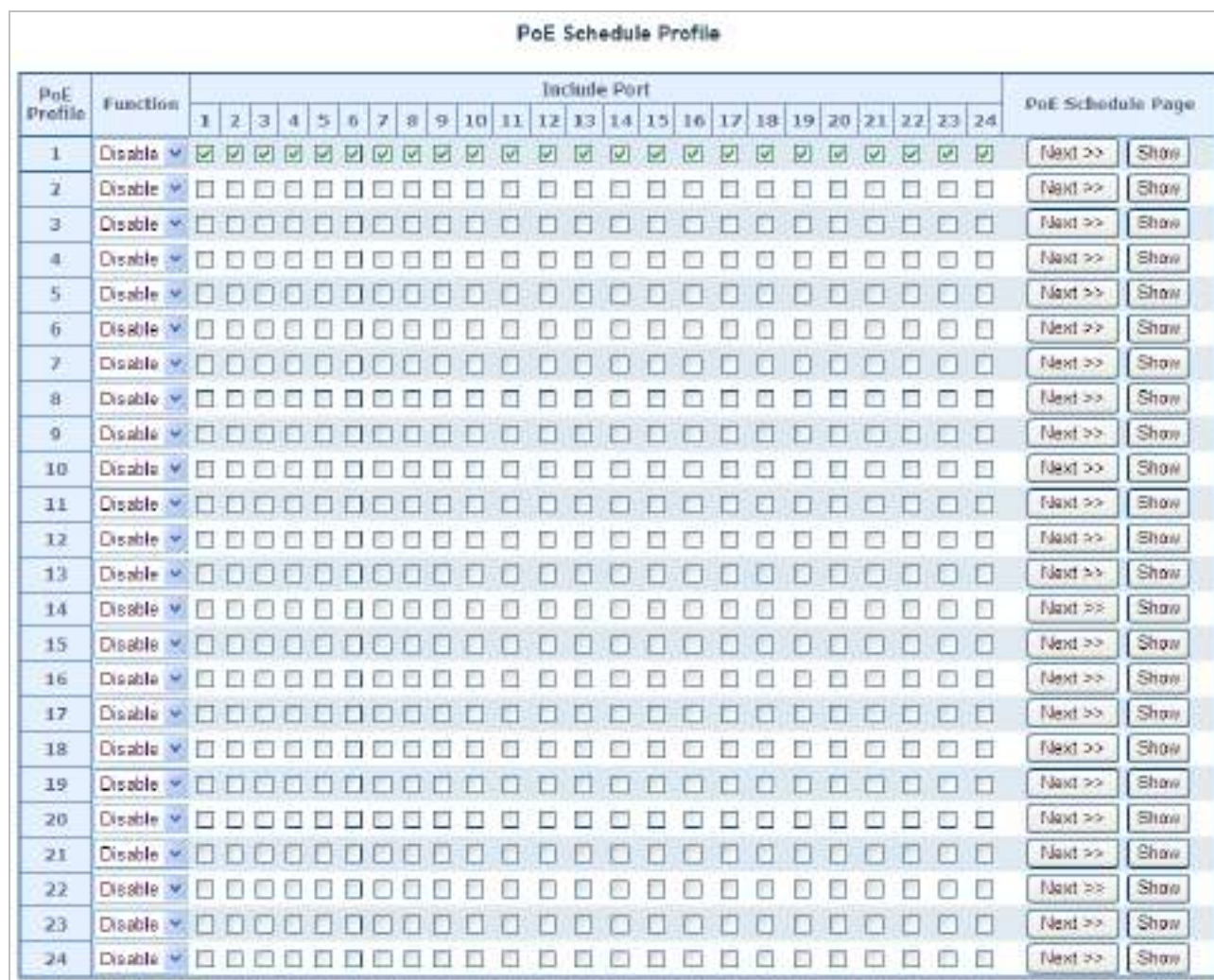
	As Table 4-5-4 is a real testing result, it's not just following IEEE 802.3af / IEEE 802.3at standard.
---	--

4.5.2 PoE Schedule Profile

This section provides user to configure PoE schedule. The “**PoE schedule**” helps you to enable or disable PoE power feeding for PoE ports during specified time intervals and it is a powerful function to help SMBs or enterprises save power and money.



The PoE Schedule Profile Web Screens are shown in [Figure 4-5-3](#) and [Table 4-5-4](#).



The screenshot shows the 'PoE Schedule Profile' configuration page. It features a table with 24 rows, each representing a PoE profile. The first column is 'PoE Profile' (1-24). The second column is 'Function', with a 'Disable' dropdown menu. The third column is 'Include Port', which is a grid of 24 checkboxes (ports 1-24). The last two columns are 'PoE Schedule Page', with 'Next >>' and 'Show' buttons. Profile 1 is selected, and its 'Include Port' grid shows all 24 ports checked.

Figure 4-5-3: PoE Configuration Web Page Screen

The page includes the following information:

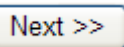


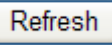
Object	Description
• Power Profile	This PoE hub offers totally 24 profiles for user to configure PoE schedule.
• Function	Allows user to enable or disable the profile.
• Include Port	Provides user to select which PoE port he wants to apply to the profile.
•  button	Go to the PoE schedule page.
•  button	Displays PoE schedule profile information.
•  button	Saves the current configuration.
•  button	Refreshes the Web page and the current configuration if user doesn't save it.

Table 4-5-4: Descriptions of the PoE Schedule Profile Objects Screen

4.5.3 PoE Schedule

PoE Schedule user can configure a duration time for PoE port as default value does not provide power; screen in [Figure 4-5-4](#) and [Table 4-5-5](#) show.

PoE Schedule

PoE Schedule 2																								
Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Sun.																								
Mon.																								
Tue.																								
Wed.																								
Thu.																								
Fri.																								
Sat.																								

<< Profile
Apply
Refresh

Figure 4-5-4: PoE Schedule Web Page Screen

The page includes the following information:

Object	Description
<ul style="list-style-type: none"> Hour 	Allows user to configure PoE port open or close from hour 0 to 23.
<ul style="list-style-type: none"> Sun. to Sat. 	Allows user to configure PoE port open or close for a week. Sun.: Sunday. Mon.: Monday. Tue.: Tuesday. Wed.: Wednesday. Thu.: Thursday. Fri.: Friday. Sat.: Saturday.
<ul style="list-style-type: none"> << Profile button 	Go to PoE schedule profile page.
<ul style="list-style-type: none"> Apply button 	Saves current configuration.
<ul style="list-style-type: none"> Refresh button 	Refreshes the Web page and the current configuration if user doesn't save it.

Table 4-5-5: Descriptions of the PoE Schedule Objects Screen

4.5.4 PoE Schedule Profile Configuration Example

Please enable NTP and correct PoE hub system time first and make sure System PoE Admin Mode is enabled; otherwise, you cannot configure PoE Schedule profile. You may see an error message as a screen shot is shown below. Screen in Figure 4-5-5 shows.

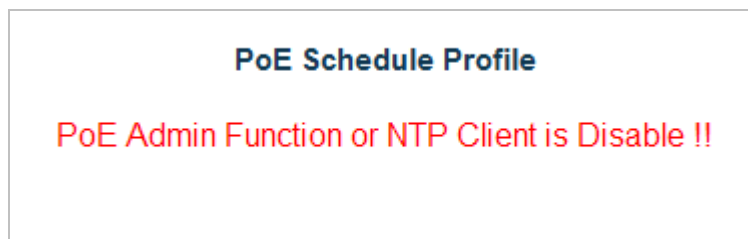


Figure 4-5-5: Error Message of PoE Schedule Profile

As default value, all PoE Schedule Profile functions are disabled, but you can configure it anyway, and please enable the function after you have finished all configurations.

A situation that enterprise wants PoE port1 to port 12 to be connected to VoIP phone and provide power for working from 8am to 5pm, five days a week. PoE port13 to 20 are connected to PoE wireless AP and provide power for working from 8pm to 11pm five days a week. The other PoE port is connected to PoE camera, so it has to provide power 24 hours a day.

So, we can use 3 schedule profiles to meet the enterprise requirements as the following screen in Figure 4-5-6 shows:

PoE Schedule Profile																									
PoE Profile	Function	Include Port																							
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Disable	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	Disable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	Disable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4	Disable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	Disable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 4-5-6: PoE Schedule Profile Configuration

Press the **Next >>** button to set profile1 of PoE schedule, screen in [Figure 4-5-7](#) appears.

PoE Schedule Profile		Include Port																								PoE Schedule Page	
PoE Profile	Function	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1	Disable																									Next >>	Show
2	Disable																									Next >>	Show
3	Disable																									Next >>	Show
4	Disable																									Next >>	Show
5	Disable																									Next >>	Show

Figure 4-5-7: PoE Schedule Profile Configuration

Please use mouse to click on the block about what time you want to supply power for PoE port. Then press the **Apply** button to save configuration. Please press the **<< Profile** button back to the PoE schedule profile configuration page to go on to the next profile setting; screen in [Figure 4-5-8](#) shows.

PoE Schedule

PoE Schedule 1																								
Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Sun.																								
Mon.																								
Tue.																								
Wed.																								
Thu.																								
Fri.																								
Sat.																								

<< Profile
Apply
Refresh

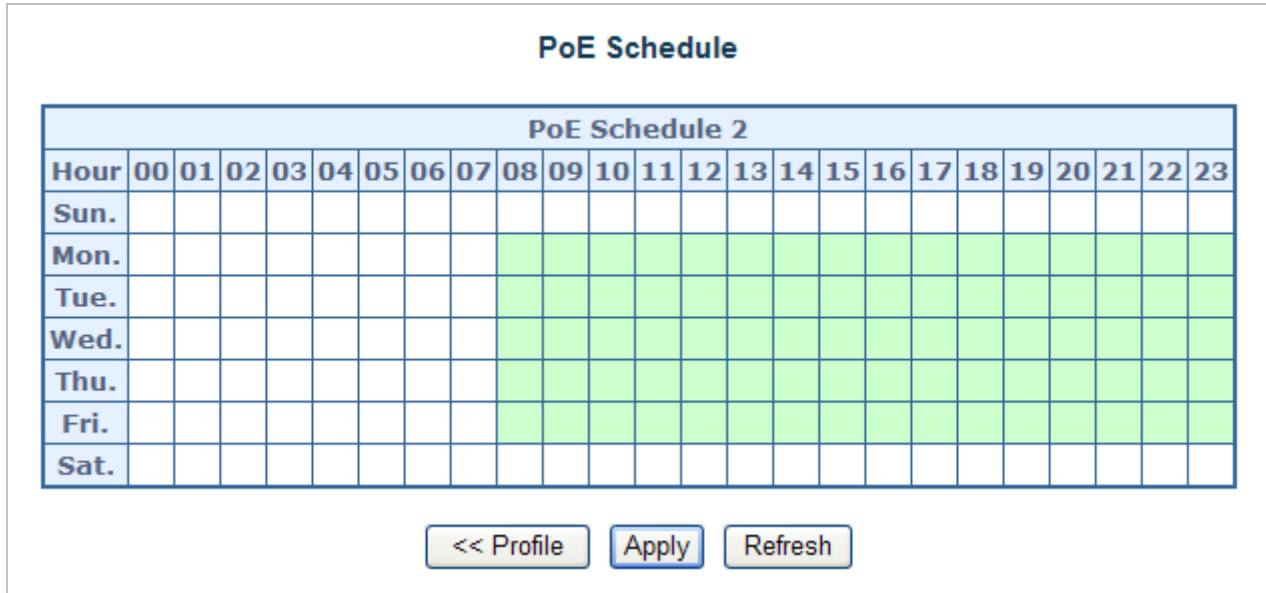
Figure 4-5-8: PoE Schedule of VoIP Phone Configuration

Please press the **Next >>** button to set profile2 of PoE schedule; screen in [Figure 4-5-9](#) appears.

PoE Schedule Profile		Include Port																								PoE Schedule Page	
PoE Profile	Function	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1	Disable																									Next >>	Show
2	Disable																									Next >>	Show
3	Disable																								Next >>	Show	
4	Disable																								Next >>	Show	
5	Disable																								Next >>	Show	

Figure 4-5-9: PoE Schedule Profile Configuration

Please use mouse to click on the block about what time you want to supply power for PoE port and then press the **Apply** button to save configuration. Please press the **<< Profile** button back to the PoE schedule profile configuration page to go on to the next profile setting; screen in Figure 4-5-10 shows.



PoE Schedule

PoE Schedule 2																								
Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Sun.																								
Mon.																								
Tue.																								
Wed.																								
Thu.																								
Fri.																								
Sat.																								

Figure 4-5-10: PoE Schedule of PoE Wireless AP Configuration

Please press the **Next >>** button to set profile2 of PoE schedule; screen in Figure 4-5-11 shows.



PoE Schedule Profile

PoE Profile	Function	Include Port																								PoE Schedule Page			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24				
1	Disable	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Next >>	Show
2	Disable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Next >>	Show
3	Disable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Next >>	Show
4	Disable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Next >>	Show
5	Disable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Next >>	Show

Figure 4-5-11: PoE Schedule Profile Configuration

Please use mouse to click on the block about what time you want to supply power for PoE port, and then press the **Apply** button to save configuration. Please press the **<< Profile** button back to the PoE schedule profile configuration page to go on to the next profile setting; screen in Figure 4-5-12 appears.

PoE Schedule

PoE Schedule 3																								
Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Sun.																								
Mon.																								
Tue.																								
Wed.																								
Thu.																								
Fri.																								
Sat.																								

<< Profile
Apply
Refresh

Figure 4-5-12: PoE Schedule of PoE Camera Configuration

User can press the **Show** button to display the current PoE schedule setting.

PoE Schedule Profile

PoE Profile	Function	Include Port																								PoE Schedule Page	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1	Disable	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Next >>	Show
2	Disable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Next >>	Show
3	Disable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Next >>	Show

PoE Schedule Information - Windows Internet Explorer

http://192.168.0.103/poe_sch_info.asp?poSch=1

PoE Schedule 1 Information

Include Port Number																							
01	02	03	04	05	06	07	08	09	10	11	12												
13	14	15	16	17	18	19	20	21	22	23	24												

PoE Schedule 1																								
Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Sun.																								
Mon.																								
Tue.																								
Wed.																								
Thu.																								
Fri.																								
Sat.																								

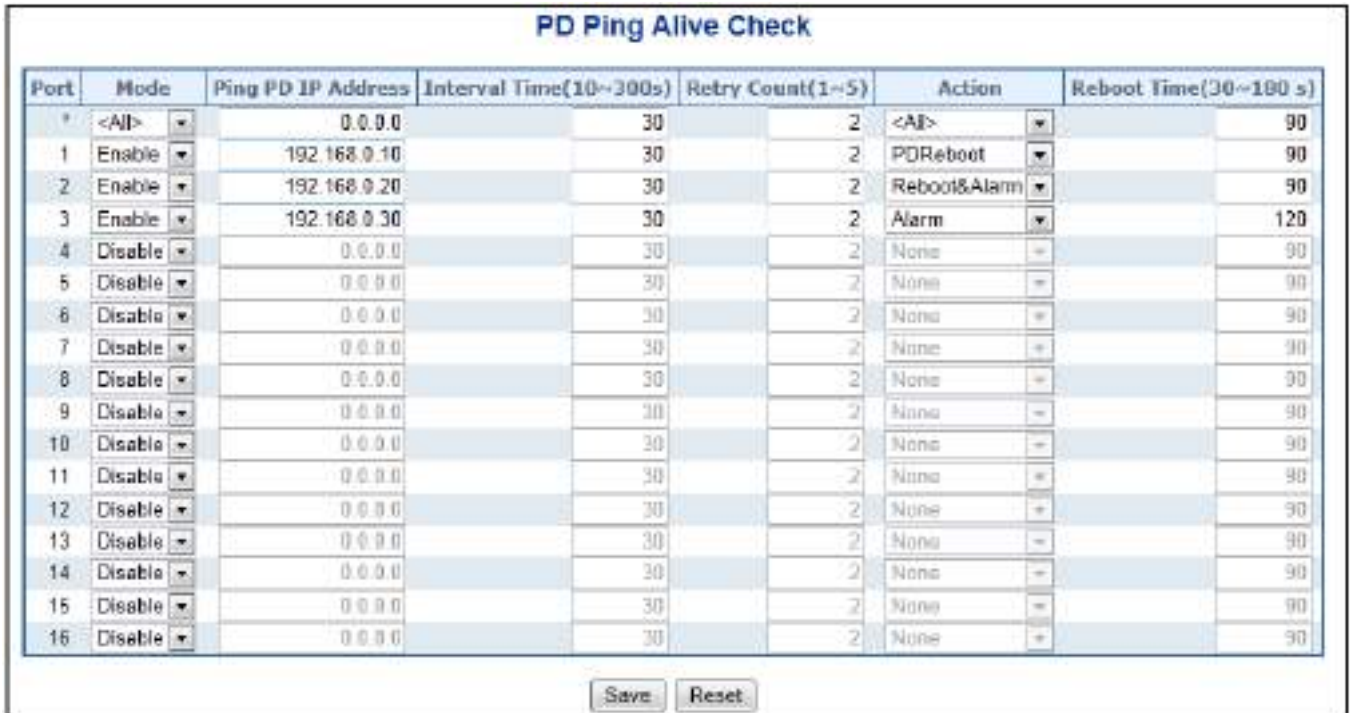
Close

Figure 4-5-13: PoE Schedule Screen

4.5.5 PoE Alive Check Configuration

The HPOE-1200G/2400G and POE-1200G/2400G PoE Switch can be configured to monitor connected PD's status in real-time via ping action. Once the PD stops working and without response, the HPOE-1200G/2400G and POE-1200G/2400G PoE switches are going to restart PoE port power, and bring the PD back to work. It will greatly enhance the reliability and reduces administrator management burden.

This page provides you how to configure PD Alive Check as the screen in Figure 4-15-14 appears.



The screenshot shows the 'PD Ping Alive Check' configuration page. It features a table with 8 columns: Port, Mode, Ping PD IP Address, Interval Time(10~300s), Retry Count(1~5), Action, and Reboot Time(30~180 s). The table lists 16 ports. Ports 1-3 are 'Enable' with IP addresses 192.168.0.10, 192.168.0.20, and 192.168.0.30 respectively. Ports 4-16 are 'Disable' with IP address 0.0.0.0. The 'Interval Time' is 30 for all, and 'Retry Count' is 2. The 'Action' column has dropdown menus with options like 'PDReboot', 'Reboot&Alarm', 'Alarm', and 'None'. The 'Reboot Time' is 90 for ports 1-3 and 120 for port 4, and 90 for ports 5-16. At the bottom, there are 'Save' and 'Reset' buttons.

Port	Mode	Ping PD IP Address	Interval Time(10~300s)	Retry Count(1~5)	Action	Reboot Time(30~180 s)
* <All>	<All>	0.0.0.0	30	2	<All>	90
1	Enable	192.168.0.10	30	2	PDReboot	90
2	Enable	192.168.0.20	30	2	Reboot&Alarm	90
3	Enable	192.168.0.30	30	2	Alarm	120
4	Disable	0.0.0.0	30	2	None	90
5	Disable	0.0.0.0	30	2	None	90
6	Disable	0.0.0.0	30	2	None	90
7	Disable	0.0.0.0	30	2	None	90
8	Disable	0.0.0.0	30	2	None	90
9	Disable	0.0.0.0	30	2	None	90
10	Disable	0.0.0.0	30	2	None	90
11	Disable	0.0.0.0	30	2	None	90
12	Disable	0.0.0.0	30	2	None	90
13	Disable	0.0.0.0	30	2	None	90
14	Disable	0.0.0.0	30	2	None	90
15	Disable	0.0.0.0	30	2	None	90
16	Disable	0.0.0.0	30	2	None	90

Save Reset

Figure 4-15-14: PD Alive Check Configuration Screenshot

The page includes the following fields:

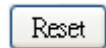
Object	Description
• Mode	Allows user to enable or disable per port PD Alive Check function. All ports are disabled as default value.
• Remote PD IP Address	This column allows user to set PoE device IP address here for system making ping to the PoE device. Please note that the PD's IP address must be set to the same network segment as the HPOE-1200G/HPOE-2400G PoE switch.
• Interval Time (10~300s)	This column allows user to set how long system should issue a ping request to PD for detecting whether PD is alive or dead. Interval time range is from 10 seconds to 300 seconds.
• Retry Count (1~5)	This column allows user to set how many times system wants to retry ping to PD. For example, if we set count 2, the meaning is that if system retry ping to the PD and the PD doesn't response continuously, the PoE port will be reset.
• Action	Allows user to set which action will be apply if the PD is without any response. The HPOE-1200G/HPOE-2400G PoE Switch offers 3 actions as follows: <ul style="list-style-type: none"> ➤ PD Reboot: It means system will reset the PoE port that is connected to the PD. ➤ Reboot & Alarm: It means system will reset the PoE port and issue an alarm message via Syslog, SMTP.

	➤ Alarm: It means system will issue an alarm message via Syslog, SMTP.
• Reboot Time (30~180s)	<p>This column allows user to set the PoE device rebooting time. As there are so many kinds of PoE devices on the market, they have different rebooting times. The PD Alive-check is not a defining standard, so the PoE device on the market doesn't report reboots done information to the HPOE-1200G/HPOE-2400G PoE switch. So user has to make sure how long the PD will be finished to boot, and then set the time value to this column.</p> <p>System is going to check the PD again according to the reboot time. If you cannot make sure precise booting time, we suggest you set it longer.</p>

Buttons



: Click it to save changes.



: Click it to reset configuration which doesn't have to be saved yet.

4.5.6 PoE Status

This page allows user to see the usage of individual PoE Port. The screen in Figure 4-15-15 appears

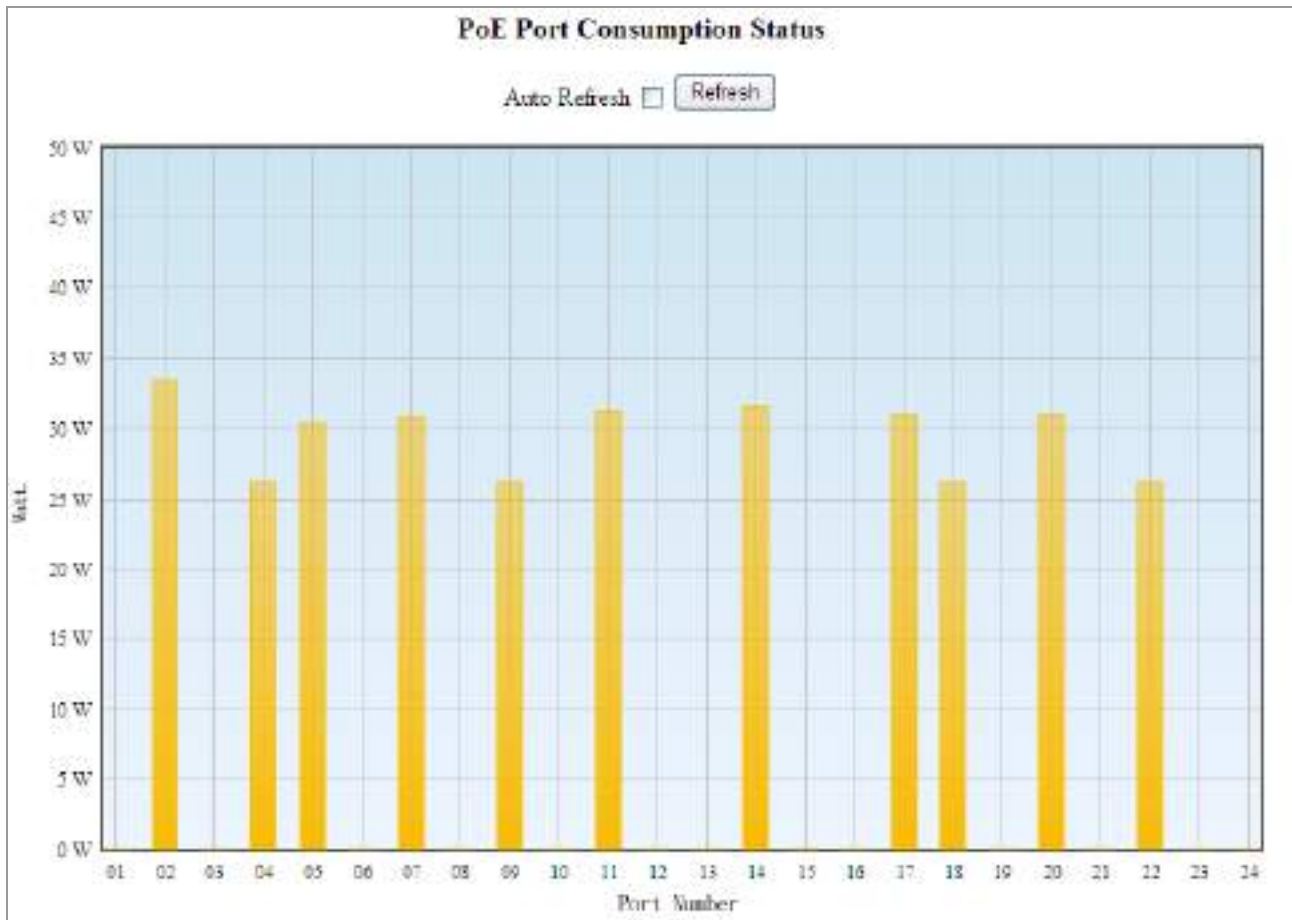


Figure 4-15-15: PoE Status Screenshot

Buttons

Auto Refresh ☐ : Check this box to refresh the page automatically. Automatic refresh occurs every 3 seconds.

Refresh : Refreshes the Web page and the current configuration if user doesn't save it.

5. POWER OVER ETHERNET OVERVIEW

What is PoE?

Based on the global standard IEEE 802.3af, PoE is a technology for wired Ethernet, the most widely installed local area network technology adopted today. PoE allows the electrical power necessary for the operation of each end-device to be carried by data cables rather than by separate power cords. New network applications, such as IP Cameras, VoIP Phones, and Wireless Networking, can help enterprises improve productivity. It minimizes wires that must be used to install the network for offering lower cost, and less power failures.

IEEE802.3af, also called Data Terminal equipment (DTE) power via Media dependent interface (MDI), is an international standard to define the transmission for power over Ethernet. The IEEE 802.3af also defines two types of source equipment: Mid-Span and End-Span.

■ Mid-Span

Mid-Span device is placed between legacy switch and the powered device. Mid-Span taps the unused wire pairs 4/5 and 7/8 to carry power; the other four are for data transmission

■ End-Span

End-Span device is directly connected with power device. End-Span could also tap the wire 1/2 and 3/6.

PoE system architecture

The specification of PoE typically requires two devices: the Powered Source Equipment (PSE) and the Powered Device (PD). The PSE is either an End-Span or a Mid-Span, while the PD is a PoE-enabled terminal, such as IP Phones, Wireless LAN, etc. Power can be delivered over data pairs or spare pairs of standard CAT-5e cabling.

How power is transferred through the cable

A standard Cat5e Ethernet cable has four twisted pairs, but only two of these are used for 10BASE-T, 100BASE-T and 1000BASE-T. The specification allows two options for using these cables for power as shown in [Figure 5-1-1](#) and [Figure 5-1-2](#).

The spare pairs are used. [Figure 5-1-1](#) shows the pair on pins 4 and 5 are connected together and form the positive supply, and the pair on pins 7 and 8 are connected and form the negative supply. (In fact, a late change to the spec allows either polarity to be used).

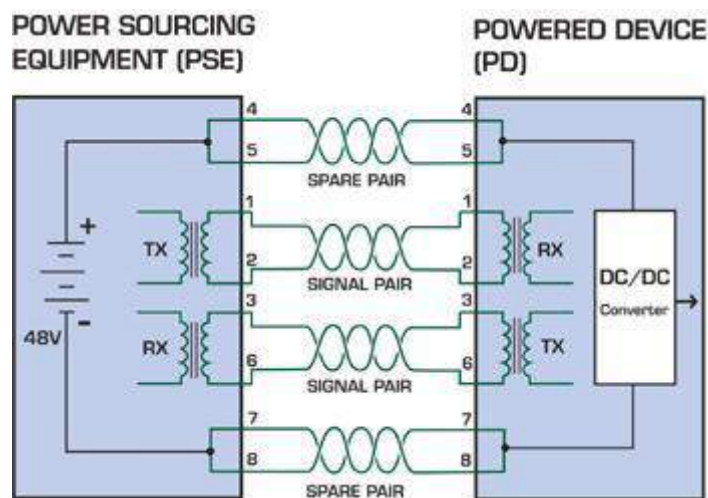


Figure 5-1-1 - Power Supplied over the Spare Pins

The data pairs are used. Since Ethernet pairs are transformer coupled at each end, it is possible to apply DC power to the center tap of the isolation transformer without upsetting the data transfer. In this mode of operation the pair on pins 3 and 6 and the pair on pins 1 and 2 can be of either polarity.

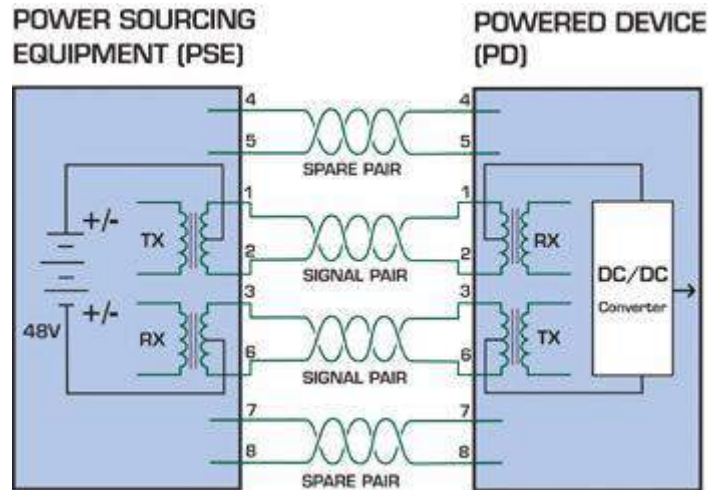


Figure 5-1-2 - Power Supplied over the Data Pins

When to install PoE?

Consider the following scenarios:

- You're planning to install the latest VoIP Phone system to minimize cabling building costs when your company moves into new office next month.
- The company staff has been clamoring for a wireless access point in the picnic area behind the building so they can work on their laptops through lunch, but the cost of electrical power to the outside is not affordable.
- Management asks for IP Surveillance Cameras and business access systems throughout the facility, but they would rather avoid another electrician's payment.

6. THE POE PROVISION PROCESS

While adding PoE support to networked devices is relatively painless, it should be realized that power cannot simply be transferred over existing Cat5e cables. Without proper preparation, doing so may result in damage to devices that are not designed to support provision of power over their network interfaces.

The PSE is the manager of the PoE process. At the beginning, only small voltage level is induced on the port's output till a valid PD is detected during the Detection period. The PSE may choose to perform classification to estimate the amount of power to be consumed by this PD. After a time-controlled start-up, the PSE begins supplying the 52V DC level to the PD till it is physically or electrically disconnected. Upon disconnection, voltage and power shut down.

Since the PSE is responsible for the PoE process timing, it is the one generating the probing signals prior to operating the PD and monitoring the various scenarios that may occur during operation.

All probing is done using voltage induction and current measurement in return.

Stages of powering up a PoE link

Stage	Action	Volts specified		Volts managed by chipset
		802.3af	802.3at	
Detection	Measure whether powered device has the correct signature resistance of 15–33 kΩ	2.7-10.0		1.8–10.0
Classification	Measure which power level class the resistor indicates	14.5-20.5		12.5–25.5
Startup	Where the powered device will startup	>42	>37.2	>38
Normal operation	Supply power to device	44-57	50-57	25.0–60.0

6.1 Line Detection

Before power is applied, safety dictates that it must first be ensured that a valid PD is connected to the PSE's output. This process is referred to as "line detection", and involves the PSE seeking a specific, 25 KΩ signature resistor. Detection of this signature indicates that a valid PD is connected, and that provision of power to the device may commence.

The signature resistor lies in the PD's PoE front-end, isolated from the rest of the PD's circuitries till detection is certified.

6.2 Classification

Once a PD is detected, the PSE may optionally perform classification, to determine the maximal power a PD is to consume. The PSE induces 15.5-25.5V DC, limited to 600 mA, for a period of 10 to 75 ms responded by a certain current consumption by the PD, indicating its power class.

The PD is assigned to one of 5 classes: 0 (default class) indicates that full 15.4 watts should be provided, 1-3 indicate various required power levels and 4 is instead of reserved has a power range of 12.95 – 25.5 watts. PDs that support classification are assigned to class 0. Special care must be employed in the definition of class thresholds, as classification may be affected by cable losses.

Classifying a PD according to its power consumption may assist a PoE system in optimizing its power distribution. Such a system typically suffers from lack of power resources, so that efficient power management based on classification results may reduce total system costs.

6.3 Start-up

Once line detection and optional classification stages are completed, the PSE must switch from low voltage to its full voltage capacity (44-57 Volts) over a minimal amount of time (above 15 microseconds).

A gradual startup is required, as a sudden rise in voltage (reaching high frequencies) would introduce noise on the data lines.

Once provision of power is initiated, it is common for inrush current to be experienced at the PSE port, due to the PD's input capacitance. A PD must be designed to cease inrush current consumption (of over 350 mA / 600mA) within 50 ms of power provision startup.

6.4 Operation

During normal operation, the PSE provides 44-57 VDC, able to support a minimum of 15.4watt / 25.5-watt power.

Power Overloads

The IEEE 802.3af / IEEE 802.3at standard defines handling of overload conditions. In the event of an overload (a PD drawing a higher power level than the allowed 12.95 watts / 25.5 watts), or an outright short circuit caused by a failure in cabling or in the PD, the PSE must shut down power within 50 to 75 milliseconds, while limiting current drain during this period to protect the cabling infrastructure. Immediate voltage drop is avoided to prevent shutdown due to random fluctuations.

6.5 Power Disconnection Scenarios

The IEEE 802.3af / IEEE 802.3at standard requires that devices powered over Ethernet be disconnected safely (i.e. power needs to be shut down within a short period of time following disconnection of a PD from an active port).

When a PD is disconnected, there is a danger that it will be replaced by a non-PoE-ready device while power is still on. Imagine disconnecting a powered IP phone utilizing 52 VDC, and then inadvertently plugging the powered Ethernet cable into a non-PoE notebook computer. What's sure to follow is not a pretty picture.

The standard defines two means of disconnection, DC Disconnect and AC Disconnect, both of which provide the same functionality - the PSE shuts down power to a disconnected port within 300 to 400ms. The upper boundary is a physical human limit for disconnecting one PD and reconnecting another.

DC Disconnect

DC Disconnect detection involves measurement of current. Naturally, a disconnected PD stops consuming current, which can be inspected by the PSE. The PSE must therefore disconnect power within 300 to 400 ms from the current flow stop. The lower time boundary is important to prevent shutdown due to random fluctuations.

AC Disconnect

This method is based on the fact that when a valid PD is connected to a port, the AC impedance measured on its terminals is significantly lower than in the case of an open port (disconnected PD).

AC Disconnect detection involves the induction of low AC signal in addition to the 52 VDC operating voltage. The returned AC signal amplitude is monitored by the PSE at the port terminals. During normal operation, the PD's relatively low impedance lowers the returned AC signal while a sudden disconnection of this PD will cause a surge to the full AC signal level and will indicate PD disconnection.

APPENDIX A

A.1 MDI Settings

The Medium-Dependent Interface (MDI or RJ45) serves as the data/power interface between Ethernet elements. As such, it has two optional connection methods to carry the power. Named Alternative A & B, Table 1 details the two power feeding alternatives.

Pin	Alternative A	Alternative B
1	Vport Negative	
2	Vport Negative	
3	Vport Positive	
4		Vport Positive
5		Vport Positive
6	Vport Positive	
7		Vport Negative
8		Vport Negative

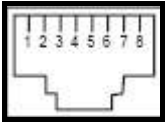
Table -1 Alternative Table

Delivering power through an RJ45 connector's center tap ("Phantom Feeding") guarantees that bi-directional data flow is maintained, regardless of a module's power status.

A.2 Power Device Classification Values

Class	PD Current – Classification Period [mA]	PD Power – Operation Period [W]	Note
0	0 – 4	0.44 – 12.95	Default
1	9 – 12	0.44 – 3.84	Optional
2	17 -20	3.84 – 6.49	Optional
3	26 – 30	6.49 – 12.95	Optional
4	36 - 44	12.95 - 25	Optional

A.3 DATA OUT PoE Injector RJ45 Port Pin Assignments

	PIN NO	RJ45 SIGNAL ASSIGNMENT
	1	Output Transmit Data +
	2	Output Transmit Data -
	3	Receive Data +
	4	Power -
	5	Power -
	6	Receive Data -
	7	Power +
	8	Power +

A.4 RJ45 pin assignment of non-802.3af / 802.3at standard PD with PD with Mid-span PoE Mid-span RJ45 assignment

Pin out of Cisco non-802.3af standard PD

PIN NO	SIGNAL
1	RX+
2	RX-
3	TX+
4	VCC-
5	VCC-
6	TX-
7	VCC+
8	VCC+

Pin out of POE Mid-span

PIN NO	SIGNAL
1	RX+
2	RX-
3	TX+
4	VCC-
5	VCC-
6	TX-
7	VCC+
8	VCC+

Before you power PD, please check whether the RJ45 connector pin assignment follows IEEE 802.3af / IEEE 802.3at standard; otherwise, you may need to change one of the RJ45 connector pin assignments, which is attached with the UTP cable.