

**16/24-Port 10/100/1000Mbps  
802.3at PoE+ Ethernet Switch**

**GSW-1600HP/GSW-2620HP**

User's Manual

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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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This is a Class A product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.

## **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.

Without removing power cable, the device will still consuming power from the power source. In the view of Saving the Energy and reduce the unnecessary power consuming, it is strongly suggested to remove the power connection for the device if this device is not intended to be active.

## **WEEE Warning**



To avoid the potential effects on the environment and human health as a result of the presence of hazardous substances in electrical and electronic equipment, end users of electrical and electronic equipment should understand the meaning of the crossed-out wheeled bin symbol. Do not dispose of WEEE as unsorted municipal waste and have to collect such WEEE separately.

## **Revision**

PLANET 16/24-Port 10/100/1000Mbps 802.3at PoE+ Ethernet Switch User's Manual  
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# Table of Contents

1. Introduction .....	5
1.1 Package Contents .....	5
1.2 Product Description .....	6
1.3 Features .....	7
1.4 Specification .....	8
2. Hardware Description .....	10
2.1 Front Panel .....	10
2.1.1 LED Indicators .....	10
2.2 Rear Panel .....	11
3. Hardware Installation .....	13
3.1 Desktop Installation .....	14
3.2 Rack Mounting .....	15
3.3 Installing the SFP Transceiver (GSW-2620HP only) .....	16
3.4 Product Applications .....	18
3.5 Power over Ethernet Powered Devices .....	19
4. Power over Ethernet Overview .....	21
5. Troubleshooting .....	24
Appendix A Networking Connection .....	25
A.1 Switch's Data RJ45 Pin Assignments - 1000Mbps, 1000BASE-T .....	25
A.2 10/100Mbps, 10/100BASE-TX .....	25

# 1. Introduction

Thank you for purchasing PLANET 16/24-Port 10/100/1000Mbps 802.3at PoE+ Ethernet Switch, GSW-1600HP and GSW-2620HP. The descriptions of these models are shown below:

GSW-1600HP	16-Port 10/100/1000T 802.3at PoE+ Gigabit Ethernet Switch
GSW-2620HP	24-Port 10/100/1000T 802.3at PoE + 2-Port 1000X SFP Gigabit Ethernet Switch

**“802.3at PoE+ Switch”** mentioned in this Guide refers to the GSW-1600HP and GSW-2620HP.

## 1.1 Package Contents

Open the box of the 802.3at PoE+ Switch and carefully unpack it. The box should contain the following items:

- The 802.3at PoE+ Switch x 1
- User’s Manual x 1
- Power Cord x 1
- Rubber Feet x 4
- SFP Dust Cap x 2 (GSW-2620HP only)
- Two Rack-mounting Brackets with Attachment Screws x 8

If any of these pieces 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 **“802.3at PoE+ Switch”** means the switch devices, i.e., GSW-1600HP and GSW-2620HP; the term **“switch”** can be any third switches.

## 1.2 Product Description

### Centralized Power Management for Gigabit Ethernet PoE Networking

To facilitate high power PoE network applications with Gigabit speed transmission, the 802.3at PoE+ Switch features high-performance Gigabit **IEEE 802.3af PoE (up to 15.4W)** and **IEEE 802.3at High-power PoE (up to 30.8W)** capabilities on all ports. By offering reliable switching technology and advanced networking features, the 802.3at PoE+ Switch optimizes the installation and power management of network devices such as wireless access points (AP), VoIP phones, and security video cameras. It also eliminates time and cost of deployment by integrating power and data switching into one unit, and freeing network devices from restrictions of power outlet locations and the additional AC wiring.

### Perfect Integration Solution for PoE IP Surveillance

The 802.3at PoE+ Switch brings an ideal, secure surveillance system at a lower total cost. The 802.3at PoE+ Switch provides 16/24 10/100/1000Mbps 802.3at PoE ports able to feed sufficient PoE power for 14 IEEE 802.3af / 7 IEEE 802.3at PoE IP cameras at the same time. It is also able to connect with one 16-channel NVR or two 8-channel NVR systems, uplinked to the backbone switch and the monitoring center. With such high-performance switch architecture, the recorded video files from the PoE IP cameras can be saved in the NVR system to enable the administrators to control and monitor the surveillance images both in the local LAN and the remote sites.

### Energy-saving Design

The 802.3at PoE+ Switch uses new engine that incorporates two advanced Green Networking technologies:

- ◆ Idle Mode Link Down power saving
- ◆ Intelligent Scales Power based on cable length

The Idle Mode Link Down power saving of the 802.3at PoE+ Switch complies with IEEE 802.3az Energy Efficient Ethernet (EEE) standard to automatically lower power for a given port when it is not linked. The Intelligent Scale Power technology actively determines the appropriate power level based on the cable length. When connecting to the 802.3at PoE+ Switch with Ethernet cable shorter than 20m, a device can obtain maximum power saving because the 802.3at PoE+ Switch would automatically detect the Ethernet cable length and reduce power usage. The connected device can substantially reduce the overall power consumption, which makes a significant contribution to energy saving.

### Easy Installation and Cable Connection

Providing data transfer and High Power PoE in one unit, the 802.3at PoE+ Switch is able to reduce the need of extended cables and electrical outlets on the wall,

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ceiling or any unreachable place. It helps to lower the installation costs and simplify the installation effort. All RJ45 copper interfaces of the 802.3at PoE+ Switch support 10/100/1000Mbps auto-negotiation for optimal speed detection through RJ45 Category 6, 5 or 5e cables. It also supports standard auto-MDI/MDI-X that can detect the type of connection to any Ethernet device without requiring special straight-through or crossover cables.

### **Flexible Extension Solution (GSW-2620HP only)**

The two mini-GBIC slots built in the GSW-2620HP are compatible with the **1000BASE-SX/LX** SFP (Small Form-factor Pluggable) fiber transceiver to uplink to backbone switch and monitoring center in long distance. The distance can be extended from 550 meters (multi-mode fiber) to 10/20/30/40/50/60/70/120 kilometers (single-mode fiber or WDM fiber). They are well suited for applications within the enterprise data centers and distributions.

## **1.3 Features**

### ➤ Physical Port

- ◆ 16/24-port 10/100/1000BASE-T Gigabit RJ45 copper
- ◆ 2 1000BASE-X mini-GBIC/SFP slots (GSW-2620HP only)

### ➤ Power over Ethernet

- ◆ Complies with IEEE 802.3at High Power over Ethernet
- ◆ Complies with IEEE 802.3af Power over Ethernet
- ◆ Up to 16/24 ports of IEEE 802.3af/802.3at devices powered
- ◆ Supports PoE Power up to 30.8 watts for each PoE port
- ◆ Each port supports 52V DC power to PoE Powered Device
- ◆ 220-watt PoE budget
- ◆ Auto detects powered device (PD)
- ◆ Circuit protection prevents power interference between ports
- ◆ Remote power feeding up to 100m

### ➤ Switching

- ◆ Hardware based 10/100/1000Mbps auto-negotiation and auto MDI/MDI-X
- ◆ Flow control for full duplex operation and back pressure for half duplex operation
- ◆ Integrates address look-up engine, supporting 8K absolute MAC addresses
- ◆ 9K Jumbo frame supports all speeds (10/100/1000Mbps)
- ◆ IEEE 802.1Q VLAN transparency

- ◆ Automatic address learning and address aging
- ◆ Supports Energy-Efficient Ethernet (EEE) function (IEEE 802.3az)

➤ Hardware

- ◆ 19-inch desktop size, 1U height
- ◆ LED indicators for PoE ready and PoE activity
- ◆ Ethernet Link Energy-saving technology
  - Link down power saving
  - Intelligent scale power based on cable length

## 1.4 Specifications

Model	GSW-1600HP	GSW-2620HP
Hardware Specifications		
10/100/1000BASE-T Copper Ports	16 auto-MDI/MDI-X ports	24 auto-MDI/MDI-X ports
802.3af / 802.3at PoE Injector Port	16	24
1000BASE-X SFP/mini-GBIC Slots	NA	2
Switch Architecture	Store-and-Forward	
Switch Fabric	32Gbps/non-blocking	52Gbps/non-blocking
Switch Throughput@64 bytes	23.8Mpps@64 bytes	38.6Mpps@64 bytes
MAC Address Table	8K entries	
Jumbo Frame	9216 bytes	
Flow Control	IEEE 802.3x pause frame for full-duplex; back pressure for half-duplex	
LED	<b>System:</b> Power (Green) <b>10/100/1000T RJ45 Interfaces</b> 1000 LNK/ACT (Green), 10/100 LNK/ACT (Orange), PoE (Orange)	<b>System:</b> Power (Green) <b>10/100/1000T RJ45 Interfaces</b> 1000 LNK/ACT (Green), 10/100 LNK/ACT (Orange), PoE (Orange) <b>1000Mbps SFP Interfaces</b> 1000 LNK/ACT (Green)
Dimensions (W x D x H)	445 x 207 x 45 mm (1U height)	

Enclosure	Metal	
Weight	2.54kg	2.85kg
Power Requirements	AC 100~240V, 50/60Hz, 3.5A max.	100~240V AC, 50/60Hz, 4A (max.)
Power Consumption/ Dissipation	Max. 260 watts/885 BTU	
Thermal Fan	2	
Power over Ethernet		
PoE Standard	IEEE 802.3af Power over Ethernet/PSE IEEE 802.3at Power over Ethernet Plus/PSE	
PoE Power Output	Per port 52V DC, 300mA. max. 15.4 watts (IEEE 802.3af) Per port 52V DC, 600mA. max. 30 watts (IEEE 802.3at)	
PoE Power Budget	220 watts	
Number of PDs, 7 watts	16	24
Number of PDs, 15.4 watts	14	14
Number of PDs, 30 watts	7	7
Standards Conformance		
Regulatory Compliance	FCC Part 15 Class A, CE	
Standards Compliance	IEEE 802.3 10BASE-T IEEE 802.3u 100BASE-TX IEEE 802.3ab Gigabit 1000BASE-T IEEE 802.3z Gigabit SX/LX IEEE 802.3x Flow control and back pressure IEEE 802.3af Power over Ethernet IEEE 802.3at High Power over Ethernet IEEE 802.3az Energy-Efficient Ethernet	
Environment		
Operating	Temperature: 0 ~ 50 degrees C Relative Humidity: 5 ~ 95% (non-condensing)	
Storage	Temperature: -10 ~ 70 degrees C Relative Humidity: 5 ~ 95% (non-condensing)	

## 2. Hardware Description

This product provides three different running speeds – 10Mbps, 100Mbps and 1000Mbps – in the same switch and automatically distinguishes the speed of incoming connection.

This section describes the hardware features of 802.3at PoE+ Switch. For easier management and control of the 802.3at PoE+ Switch, familiarize yourself with its display indicators and ports. Front panel illustrations in this chapter display the unit LED indicators. Before connecting any network device to the 802.3at PoE+ Switch, please read this chapter carefully.

### 2.1 Front Panel

The Front Panel of the 802.3at PoE+ Switch consists of 16/24 auto-sensing 10/100/1000Mbps Ethernet RJ45 ports. The LED Indicators are also located on the front panel of the 802.3at PoE+ Switch.



Figure 2-1: GSW-1600HP Switch Front Panel



Figure 2-2: GSW-2620HP Switch Front Panel

#### 2.1.1 LED Indicators

##### ■ System

LED	Color	Function
PWR	Green	Lights to indicate the Switch has power.

■ Per 10/100/1000BASE-T Port

LED	Color	Function
1000 LNK/ACT	Green	<b>Lights</b> to indicate the link through that port is successfully established at 1000Mbps. <b>Blinks</b> to indicate that the Switch is actively sending or receiving data over that port.
10/100 LNK/ACT	Orange	<b>Lights</b> to indicate the link through that port is successfully established at 10/100Mbps. <b>Blinks</b> to indicate that the Switch is actively sending or receiving data over that port.
PoE In Use	Orange	<b>Lights</b> to indicate the port is providing 52V DC in-line power.

■ Per 1000BASE-X SFP Interface (GSW-2620HP only)

LED	Color	Function
1000 LNK/ACT	Green	<b>Lights</b> To indicate the link through that port is successfully established at 1000Mbps.
		<b>Blinks</b> To indicate that the switch is actively sending or receiving data over that port.

## 2.2 Rear Panel

The rear panel of the 802.3at PoE+ Switch indicates an AC power socket, which accepts input power from 100 to 240V AC, 50-60Hz, 3.5A/4A.



Figure 2-3: GSW-1600HP Switch Rear Panel



Figure 2-4: GSW-2620HP Switch Rear Panel

## ■ AC Power Receptacle

For compatibility with electrical outlet standard in most areas of the world, the 802.3at PoE+ Switch's power supply automatically adjusts to line power in the range of 100-240V AC and 50/60Hz, 3.5A/4A.

Plug the female end of the power cord firmly into the receptacle on the rear panel of the 802.3at PoE+ Switch and the other end into an electrical outlet and the power will be ready.



### Power Notice

1. The device is a power-required device, which means it 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.
2. In some areas, installing a surge suppression device may also help to protect your 802.3at PoE+ Switch from being damaged by unregulated surge or current to the 802.3at PoE+ Switch or the power adapter.

### 3. Hardware Installation

#### Start up

Please refer to the followings for your cabling:

#### 10/100/1000BASE-T

All 10/100/1000BASE-T ports come with Auto-Negotiation capability. They automatically support 1000BASE-T, 100BASE-TX and 10BASE-T networks. Users only need to plug a working network device into one of the 10/100/1000BASE-T ports, and then turn on the 802.3at PoE+ Switch. The port will automatically run in 10Mbps, 20Mbps, 100Mbps or 200Mbps and 1000Mbps or 2000Mbps after the negotiation with the connected device.

#### Cabling

Each 10/100/1000BASE-T port uses RJ45 sockets -- similar to phone jacks -- for connection of unshielded twisted-pair cable (UTP). The IEEE 802.3/802.3u/802.3ab Fast/Gigabit Ethernet standard requires Category 5 UTP for 100Mbps 100BASE-TX. 10BASE-T networks can use Cat.3, 4, 5 or 1000BASE-T uses 5/5e/6 UTP (see table below). Maximum distance is 100 meters (328 feet).

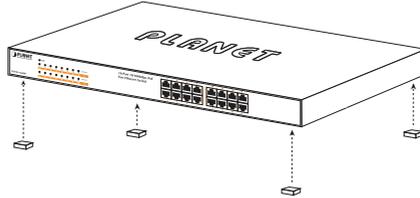
Port Type	Cable Type	Connector
10BASE-T	Cat.3, 4, 5, 2-pair	RJ45
100BASE-TX	Cat.5, 5e UTP, 4-pair	RJ45
1000BASE-T	Cat.5/5e/6 UTP, 4-pair	RJ45

Any Ethernet devices like hubs/PCs can connect to the 802.3at PoE+ Switch by using straight-through wires. The whole 10/100/1000Mbps ports are auto-MDI/MDI-X that can be used on straight-through or crossover cable.

## 3.1 Desktop Installation

To install the 802.3at PoE+ Switch on desktop, simply follow the following steps:

**Step1:** Attach the rubber feet to the recessed areas on the bottom of the 802.3at PoE+ Ethernet Switch, as shown in Figure 3-1.



**Figure 3-1:** Attaching the Rubber Feet to the 802.3at PoE+ Switch

**Step2:** Place the 802.3at PoE+ Switch on desktop near an AC power source.

**Step3:** Keep enough ventilation space between the 802.3at PoE+ Switch and the surrounding objects.



Note

When choosing a location, please keep in mind the environmental restrictions discussed in Chapter 1, Section 4, under Specifications.

**Step4:** Connect your 802.3at PoE+ Switch to 802.3af/802.3at complied Power Devices (PD) and other network devices.

- A.** Connect one end of a standard network cable to the 10/100/1000BASE-T RJ45 ports on the front panel of the 802.3at PoE+ Switch.
- B.** Connect the other end of the cable to the network devices such as printer servers, workstations or routers, etc.



Note

Connection to the Switch requires UTP Category 5, 5e, 6 network cabling with RJ45 tips. For more information, please see the Cabling Specification in Appendix A.

**Step5:** Supply power to the 802.3at PoE+ Switch.

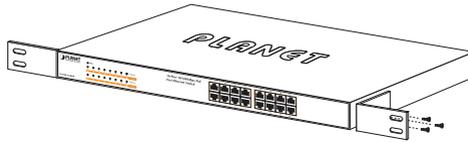
- A.** Connect one end of the power cable to the 802.3at PoE+ Switch.
- B.** Connect the power plug of the power cable to a standard wall outlet.

When the 802.3at PoE+ Switch receives power, the Power LED should remain solid Green.

## 3.2 Rack Mounting

To install the 802.3at PoE+ Switch in a 19-inch standard rack, follow the instructions described below.

- Step1:** Place your 802.3at PoE+ Switch on a hard flat surface, with the front panel positioned towards your front side.
- Step2:** Attach a rack-mount bracket to each side of the 802.3at PoE+ Switch with supplied screws attached to the package. Figure 3-2 shows how to attach brackets to one side of the 802.3at PoE+ Switch.

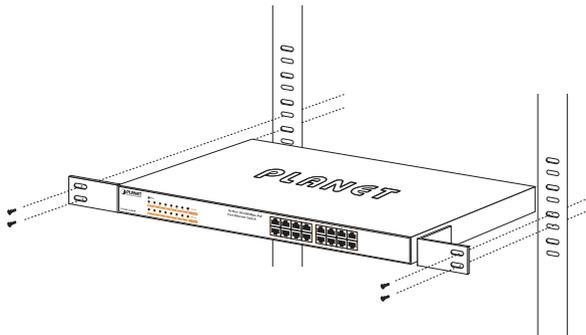


**Figure 3-2:** Attaching the Brackets to the 802.3at PoE+ Switch.



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

- Step3:** Secure the brackets tightly.
- Step4:** Follow the same steps to attach the second bracket to the opposite side.
- Step5:** After the brackets are attached to the 802.3at PoE+ Switch, use suitable screws to securely attach the brackets to the rack, as shown in Figure 3-3.



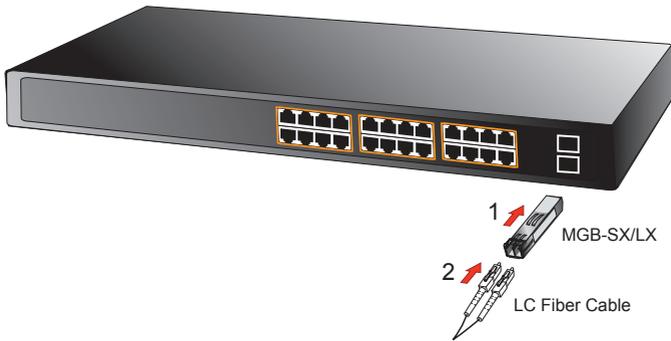
**Figure 3-3:** Mounting the 802.3at PoE+ Switch in a Rack

**Step6:** Proceed with Steps 4 and 5 of session 3.1 Desktop Installation to connect the network cabling and supply power to your Switch.

### 3.3 Installing the SFP Transceiver (GSW-2620HP only)

The sections describe how to insert an SFP transceiver into an SFP slot of the GSW-2620HP.

The SFP transceivers are hot-pluggable and hot-swappable. You can plug in and out the transceiver to/from any SFP port without having to power down the GSW-2620HP, as the [Figure 3-4](#) shows.



**Figure 3-4:** Plug In the SFP Transceiver

#### ■ Approved PLANET SFP Transceivers

PLANET GSW-2620HP supports both single mode and multi-mode SFP transceiver. The following list of approved PLANET SFP transceivers is correct at the time of publication:

##### Gigabit SFP Transceiver Modules

- MGB-GT SFP-Port 1000BASE-T Module
- MGB-SX SFP-Port 1000BASE-SX mini-GBIC module
- MGB-LX SFP-Port 1000BASE-LX mini-GBIC module - 10km
- MGB-L30 SFP-Port 1000BASE-LX mini-GBIC module - 30km
- MGB-L50 SFP-Port 1000BASE-LX mini-GBIC module - 50km
- MGB-L70 SFP-Port 1000BASE-LX mini-GBIC module - 70km
- MGB-L120 SFP-Port 1000BASE-LX mini-GBIC module - 120km

- MGB-LA10 SFP-Port 1000BASE-LX (WDM,TX:1310nm) - 10km
- MGB-LB10 SFP-Port 1000BASE-LX (WDM,TX:1550nm) - 10km
- MGB-LA20 SFP-Port 1000BASE-LX (WDM,TX:1310nm) - 20km
- MGB-LB20 SFP-Port 1000BASE-LX (WDM,TX:1550nm) - 20km
- MGB-LA40 SFP-Port 1000BASE-LX (WDM,TX:1310nm) - 40km
- MGB-LB40 SFP-Port 1000BASE-LX (WDM,TX:1550nm) - 40km



#### Note

It is recommended to use PLANET SFP on the GSW-2620HP. If you insert an SFP transceiver that is not supported, the GSW-2620HP will not recognize it.

1. Before we connect the GSW-2620HP to the other network device, we have to make sure both sides of the SFP transceivers are with the same media type, for example, 1000BASE-SX to 1000BASE-SX; 1000BASE-LX to 1000BASE-LX.
2. Check whether the fiber-optic cable type matches with the SFP transceiver requirement.
  - To connect to 1000BASE-SX SFP transceiver, please use the multi-mode fiber cable with one side being the male duplex LC connector type.
  - To connect to 1000BASE-LX SFP transceiver, please use the single-mode fiber cable with one side being the male duplex LC connector type.

### 3.4 Product Applications

#### Department/Workgroup PoE Switch:

Providing 16/24 PoE in-line power interfaces, the 802.3at PoE+ Switch can easily build a power that centrally controls IP phone system, IP camera system and wireless AP group for enterprises. Cameras can be installed around the corner in the company or campus for surveillance demands. Without the power-socket limitation, the Switch makes the installation of cameras more easily and efficiently.

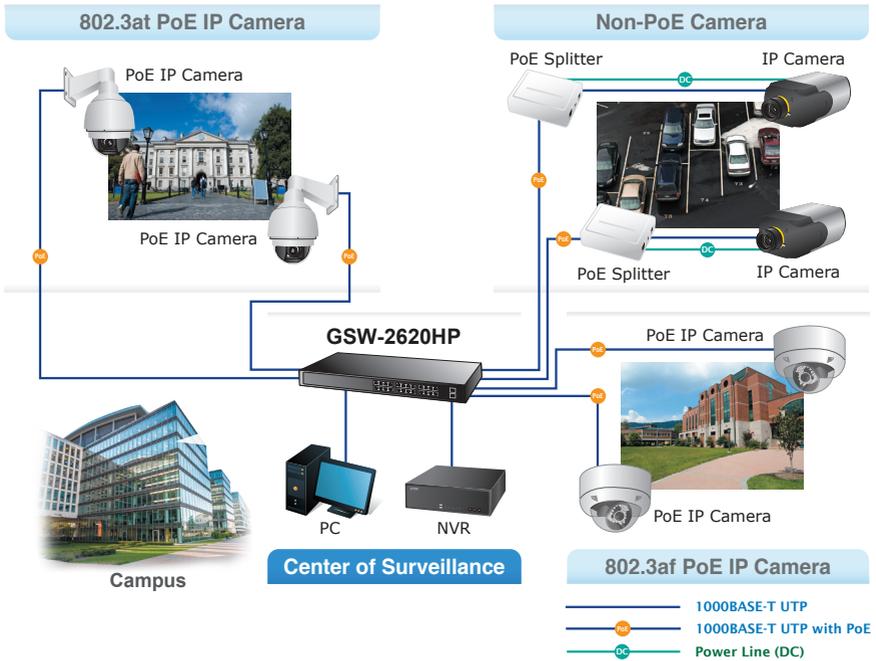


Figure 3-5: Department/Workgroup 802.3at PoE+ Switch Connection

### 3.5 Power over Ethernet Powered Devices

 <p>3~5 watts</p>	<p><b>Voice over IP Phones</b> As many as PoE VoIP phones, ATAs and other Ethernet/ non-Ethernet end-devices can be installed, but UPS is needed for uninterrupted power system and power control system.</p>
 <p>6~12 watts</p>	<p><b>Wireless LAN Access Points</b> Access points can readily be installed in museums, sightseeing sites, airports, hotels, campuses, factories and warehouses.</p>
 <p>10~12 watts</p>	<p><b>IP Surveillance</b> For the sake of security, install IP cameras around enterprises, museums, campuses, hospitals and bank without considering location and electrical outlets.</p>
 <p>3~12 watts</p>	<p><b>PoE Splitter</b> As PoE Splitter splits the PoE 48V DC over the Ethernet cable into 5/12V DC power output, network deployments can easily be made without worrying about power outlet locations, thus eliminating the costs for additional AC wiring and reducing the installation time.</p>
 <p>3~25 watts</p>	<p><b>High Power PoE Splitter</b> As PoE Splitter splits the PoE 52V DC over the Ethernet cable into 24/12V DC power output, network deployments can easily be made without worrying about power outlet locations, thus eliminating the costs for additional AC wiring and reducing the installation time.</p>



30 watts

### High Power Speed Dome

This state-of-the-art design fits very nicely 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.



### Note

Since each port of the 802.3at PoE+ Switch supports 52V DC PoE power output, please make sure the Powered Device's (PD) acceptable DC power range is from 52V DC. Otherwise, it will damage the Powered Device (PD).

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## 4. Power over Ethernet Overview

### What is PoE?

PoE is an abbreviation of Power over Ethernet. The PoE technology means a system safely transmits both power and data on Ethernet UTP cable. The IEEE standard for PoE technology requires Category 5 cable or higher for high power PoE levels, but can operate with Cat3 cable for low power levels. Power is supplied in common mode over two or more of the differential pairs of wires found in the Ethernet cables and comes from a power supply within a PoE-enabled network device such as an Ethernet switch or can be injected into a cable run with a mid-span power supply.

The original IEEE 802.3af-2003 PoE standard provides up to 15.4W of DC power (minimum 44V DC and 350mA) to each device. Only 12.95W is assured to be available at the powered device as some power is dissipated in the cable.

The updated IEEE 802.3at-2009 PoE standard, also known as PoE+ or PoE plus, provides up to 25.5W of power. The 2009 standard prohibits a powered device from using all four pairs for power.

The 802.3af/802.3at define 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 transmit.

### 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 Cat5 cabling.

### Powered Source Equipment (PSE)

Power sourcing equipment (PSE) is a device such as a switch that provides (sources) power on the Ethernet cable. The maximum allowed for continuous output power per cable in IEEE 802.3af is 15.4W. A later specification, IEEE 802.3at, offers 25.50W. When the device is a switch, it is commonly called an end-span (although IEEE 802.3af refers to it as endpoint). Otherwise, if it is an

intermediary device between a non PoE capable switch and a PoE device, it is called a mid-span. An external PoE injector is a mid-span device.

### Powered Device

A powered device (PD) is a device powered by a PSE and thus consumes energy. Examples include wireless access points, IP phones, and IP cameras. Many powered devices have an auxiliary power connector for an optional, external power supply. Depending on the PD design, some, none, or all power can be supplied from the auxiliary port, with the auxiliary port sometimes acting as backup power in case of PoE supplied power failure.

### How Power is Transferred through Cable

A standard Cat5 Ethernet cable has four twisted pairs, but only two of these are used for 10BASE-T and 100BASE-TX. The specification allows two options for using these cables for power, shown in Figure 1 and Figure 2:

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

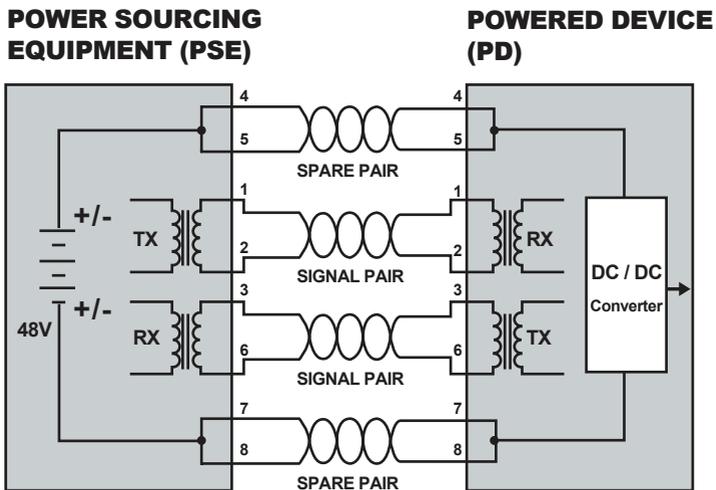


Figure 1 - Power Supplied over the Spare Pins

The data pairs are used. Since Ethernet pairs are transformers coupled at each end, it is possible to apply DC power to the center tap of the isolated 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.

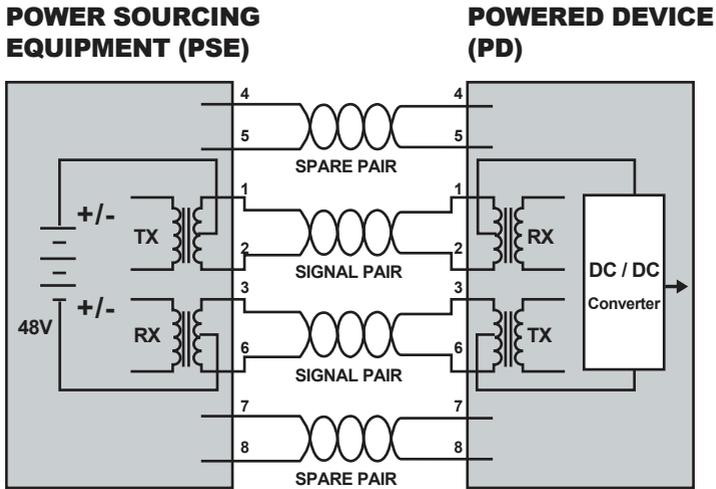


Figure 2 - Power Supplied over the Data Pins

### 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 a 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.

## 5. Troubleshooting

This chapter contains information to help you solve issues. If the 802.3at PoE+ Switch is not functioning properly, make sure the 802.3at PoE+ Switch was set up according to instructions in this manual.

### **The Link LED is not lit.**

#### **Solution:**

Check the cable connection and also try to swap one new cable.

### **100BASE-T port link LED is lit, but the traffic is irregular.**

#### **Solution:**

Check that the attached device is not set to dedicate full duplex. Some devices use a physical or software switch to change duplex modes. Auto-negotiation may not recognize this type of full-duplex setting.

### **Why the Switch doesn't connect to the network**

#### **Solution:**

Check the LNK/ACT LED on the 802.3at PoE+ Switch. Try another port on the 802.3at PoE+ Switch. Make sure the cable is installed properly. Make sure the cable is the right type. Turn off the power. After a while, turn on the power again.

### **Why the GSW-1600HP/GSW-2620HP, connected to PoE device, cannot be powered on?**

#### **Solution:**

1. Please check the cable type of the connection from GSW-1600HP/GSW-2620HP to the other end. The cable should be an 8-wire UTP, Category 5 or above and EIA568 cable within 100 meters. A cable with only 4-wire, short loop or over 100 meters will affect the power supply.
2. Please make sure the device is fully complied with IEEE 802.3af/IEEE 802.3at standard.

### **What is the power output of each PoE port?**

#### **Solution:**

1. Each PoE port supports 52V DC, 600mA and a maximum of 30 watts of power output. Detect and inject by the standard of IEEE 802.3at.
2. Each PoE port supports 52V DC, 300mA and a maximum of 15.4 watts of power output. Detect and inject by the standard of IEEE 802.3af.

## Appendix A Networking Connection

### A.1 Switch's Data RJ45 Pin Assignments - 1000Mbps, 1000BASE-T

PIN NO	MDI	MDI-X
1	BI_DA+	BI_DB+
2	BI_DA-	BI_DB-
3	BI_DB+	BI_DA+
4	BI_DC+	BI_DD+
5	BI_DC-	BI_DD-
6	BI_DB-	BI_DA-
7	BI_DD+	BI_DC+
8	BI_DD-	BI_DC-

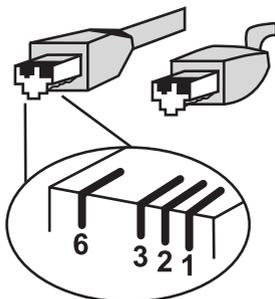
Implicit implementation of the crossover function within a twisted-pair cable, or at a wiring panel, while not expressly forbidden, is beyond the scope of this standard.

### A.2 10/100Mbps, 10/100BASE-TX

When connecting Switch to another Fast Ethernet switch, a straight-through or crossover cable might be necessary. Each port of the Switch supports auto-MDI/MDI-X detection, meaning you can directly connect the Switch to any Ethernet devices without making a crossover cable. The following table and diagram show the standard RJ45 receptacle/connector and their pin assignments:

RJ-45 Connector pin assignment		
Contact	MDI Media Dependent Interface	MDI-X Media Dependent Interface-Cross
1	Tx + (transmit)	Rx + (receive)
2	Tx - (transmit)	Rx - (receive)
3	Rx + (receive)	Tx + (transmit)
4, 5	Not used	
6	Rx - (receive)	Tx - (transmit)
7, 8	Not used	

The standard cable, RJ45 pin assignment



The standard RJ45 receptacle/connector

There are 8 wires on a standard UTP/STP cable and each wire is color-coded. The following shows the pin allocation and color of straight-through cable and crossover cable connection:

<b><u>Straight-through Cable</u></b>		<b><u>SIDE 1</u></b>	<b><u>SIDE 2</u></b>
1	2	1 = White/Orange	1 = White/Orange
2	3	2 = Orange	2 = Orange
3	4	3 = White/Green	3 = White/Green
4	5	4 = Blue	4 = Blue
5	6	5 = White/Blue	5 = White/Blue
6	7	6 = Green	6 = Green
7	8	7 = White/Brown	7 = White/Brown
8		8 = Brown	8 = Brown
1	2		
2	3		
3	4		
4	5		
5	6		
6	7		
7	8		
8			
<b><u>Crossover Cable</u></b>		<b><u>SIDE 1</u></b>	<b><u>SIDE 2</u></b>
1	2	1 = White/Orange	1 = White/Green
2	3	2 = Orange	2 = Green
3	4	3 = White/Green	3 = White/Orange
4	5	4 = Blue	4 = Blue
5	6	5 = White/Blue	5 = White/Blue
6	7	6 = Green	6 = Orange
7	8	7 = White/Brown	7 = White/Brown
8		8 = Brown	8 = Brown
1	2		
2	3		
3	4		
4	5		
5	6		
6	7		
7	8		
8			

**Figure A-1:** Straight-through and Crossover Cable

Please make sure your connected cables are with same pin assignment and color as the above picture before deploying the cables into your network.