CONNECTION TECHNOLOGY SYSTEMS

EPS-3112

12-port L2 Managed Gigabit Fiber PoE Switch

User's Guide

Version: 1.0

Revision History

Version	Date	Changes
0.90	08/22/2017	First release
0.91	07/31/2018	Modify the serial console port settings
1.0	04/28/2020	Add the description of new features and CTS branches' contact information.

FCC Warning

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 this user's guide, 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 their own expense.

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Table of Contents

About this manual

In this user's guide, it will not only clearly introduce CTS EPS-3112 Managed Switch but tell you how to install this Managed Switch with detailed instructions.

Organization of the Manual

- Chapter 1 "Introduction" describes the features of the Managed Switch
- Chapter 2 "Installing the Managed Switch"
- Chapter 3 "Operation"
- Chapter 4 "Maintenance"

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Introduction

CTS's Managed Switch is designed to meet the emerging FTTX & Metro Ethernet requirements. Its low profile appearance with 1U height and the standard rack-mounted size achieve the highest density within a single rack. When massive fiber ports need to be deployed, the Managed Switch provides the best performance and price ratio.

1.1 Overview of EPS-3112

EPS-3112, a compact and rack mountable Managed PoE Ethernet Switch, has 8 10/100/1000Base-T up to 30W PoE ports + 4 combo uplink ports (10/100/1000Base-T and 100/1000Base-X SFP) in the front panel. This Managed Switch provides high performance, store and forward switching capability plus other advanced features such as QoS, VLAN, Spanning Tree, LACP and so on.

LED indicators located on the front panel ease the users' effort to monitor and manage the network status. The built-in management module also allows users to configure, control and monitor the system locally via console or remotely via SNMP_ based management system.

This Managed Switch is a typical SFP solution to Metro Ethernet application. Besides, it can be used as a stand-alone switch. With the height of 1U and the standard-size rack design in appearance, EPS-3112 can be used in closet wiring as well.

1.2 Key Features

- **Around 13-inch (33 cm), 1U high**
- **8 x 10/100/1000Base-T ports, Max.30W PoE/PSE**
  - IEEE 802.3/802.3u/802.3ab compliance
  - Support MDI/MDIX/Auto-Crossover
  - Support Auto-Negotiation
  - Support IEEE802.3af Power over Ethernet
  - Support IEEE802.3at Power over Ethernet Enhancements
  - RJ-45 Slot

- **4 x 10/100/1000Base-T, 100/1000Base-X Combo ports**
  - IEEE 802.3/802.3u/802.3ab/802.3z compliance
  - Support Auto-Negotiation (RJ-45)
  - Support MDI/MDIX/Auto-Crossover (RJ-45)
  - RJ-45 or SFP Slot

- **Switching Features**
  - Store & forward switching
  - Non-blocking switching fabric: 24Gbps
  - Mac address table:8K
  - Packet buffer total 512K bytes
  - VLANs support up to 2K VLAN Groups
  - 802.1Q Tunneling (QinQ)
  - VLAN Translation
  - Support jumbo frame on all ports up to 9K bytes size
  - QoS classification based on IEEE802.1p, TOS/DSCP
  - Rate limit control
  - NTP client
  - Static multicasting
  - IGMP v1/v2/v3 snooping
  - IGMP fast leave & query
  - MLD v1/v2 snooping
  - IGMP filtering via filtering profile
  - Multicast channel limitations per port
  - DHCP snooping
  - DHCP client and auto-provision
  - DHCP relay agent with option 82
  - Access Control List (ACL)
  - Rapid Spanning Tree Protocol (RSTP)
  - Link Layer Discovery Protocol (LLDP)
  - IEEE 802.1X Authentication
  - IPv6 over Ethernet
  - IPv6 Addressing Architecture
  - IPv6 Dual Stack
  - Storm Control
  - MAC Limiter
  - L2PT (Layer 2 Protocol Tunneling)
  - PoE Power Output: 30W max. (Per PoE port)

- Maximum PoE Power Budget: 130Watts
- Time Range for PoE
- Proprietary Fast Ring v2 (<50ms) and Chain (<1 second) redundancy protocols for fast redundancy after encountering connection issues

■ **Management Functions**
- Console
- Telnet & SSH/CLI
- Web
- RADIUS for authentication
- SNMP v1/v2c/v3 and network management
- Private, RFC-1213, RMON MIBs
- Port mirroring
- FTP, TFTP, HTTP server and client firmware upgrade
- TACACS+ for authentication

■ **Operation Environment**
- Operating Temperature: 0ºC~50ºC

1.3 Front & Rear Panels

1.3.1 Front Panel

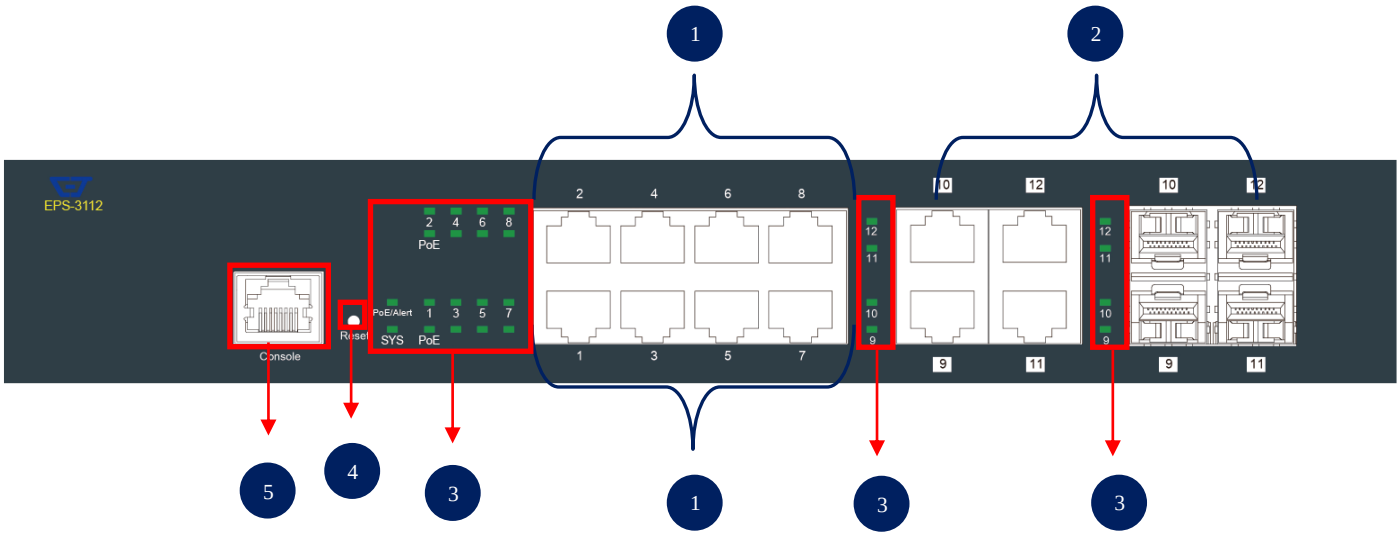


Figure 1-1. EPS-3112 Managed Switch Front Panel

The interfaces on the front panel of the Managed Switch are described below:

1. **8 x PoE+ 10/100/1000Base-T RJ-45 ports (Ports 1-8)**

2. **4 x Gigabit combo ports (Ports 9-12):**
   - 4 x 10/100/1000Base-T RJ-45 ports, or
   - 4 x 100/1000Base-X SFP ports
3. **LEDs:**
   - Includes Power LED, System LED, LEDs of TP 1~8 ports and LEDs of TP & Fiber 9~12 ports. For more details on LEDs description, please refer to Section 1.4 LED Definitions.
4. **Reset Button:**
   - Press the reset button for 5~10 seconds, then release it to restart the system.
   - Press the reset button for more than 10 seconds, then release it to reset the Managed Switch. The settings will be back to the factory defaults and restart the system.
5. **Console Port:**
   - An asynchronous serial console port supports the RS-232 electrical specification. The console port can be used to manage the device, and the serial console port settings should be configured as 9600(Default), 8, n, 1.

1.3.2 Rear Panel

The Managed Switch provides one fixed power module. The type of power module is AC input.

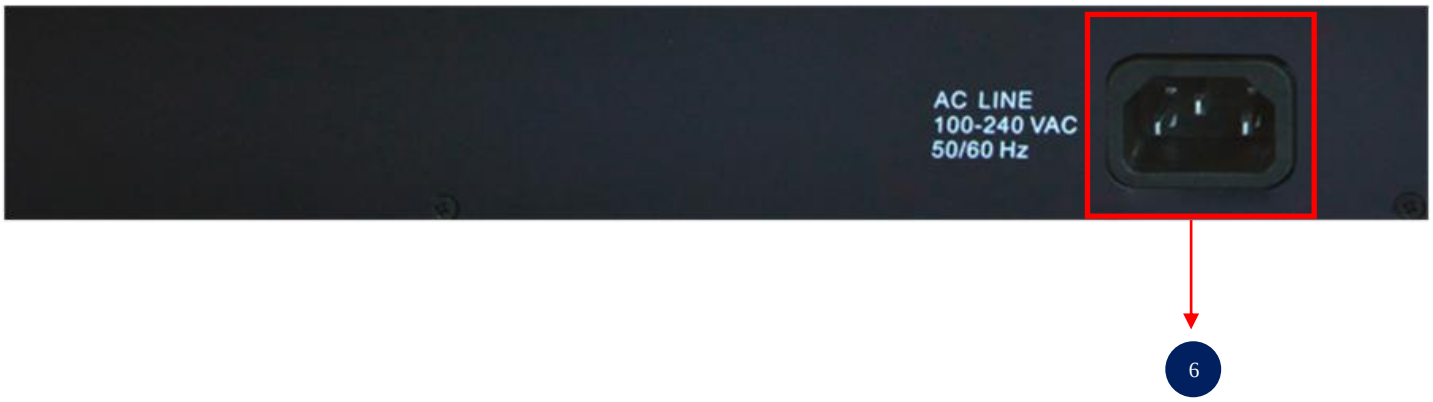


Figure 1-2. EPS-3112 Managed Switch Rear Panel

The interface on the rear panel of the Managed Switch is described below:

6. **Power module and Connector:**
   - AC power connection: 100-240V, 50/60Hz

1.4 LED Definitions

The Managed Switch is Plug & Play compliant. The real-time operational status can be monitored through a set of LED indicators located in the front panel.

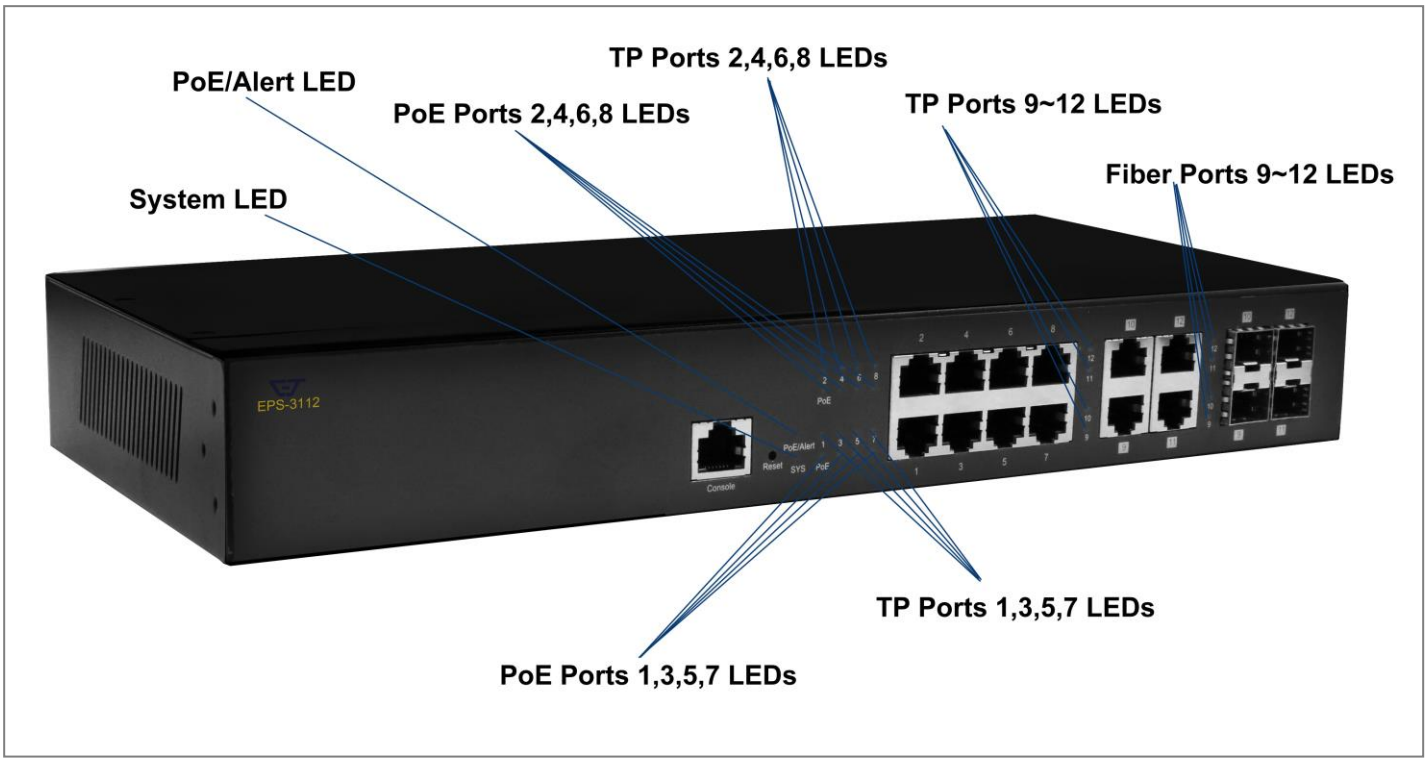


Figure 1-3. LEDs of EPS-3112 Managed Switch

LED	Definition	Color	Operation
SYS	System	OFF	Device is powered down.
		Green	Lit when the device is in normal operation.
			a. The LED indicator will blink for three times when device is ready. Then, LED indicator becomes lit. b. Slowly blinking when press the Reset button for 5~10 seconds and then release to restart the system. The LED indicator will blink for three times and become lit when the device is ready. c. Rapidly blinking when press the Reset button for more than 10 seconds and then release to reset (return to factory default settings) and restart the system.

PoE/Alert	Alarm	OFF	PoE function is disabled and no power is supplied. Or PoE power consumption is less than the power budget when PoE function is enabled.
		Green	Lit when PoE power consumption is over the power budget.
TP Port 1~12	Port Status	OFF	No connection exists.
		Green	Lit when TP 10/100Mbps port link is up. Blinking when TP port is receiving and transmitting data at the speed of 10/100Mbps.
		Orange	Lit when TP 1000Mbps port link is up. Blinking when TP port is receiving and transmitting data at the speed of 1000Mbps.
SFP Port 9~12	Port Status	OFF	No connection exists.
		Green	Lit when Fiber 100Mbps port link is up. Blinking when Fiber port is receiving and transmitting data at the speed of 100Mbps.
		Orange	Lit when Fiber 1000Mbps port link is up. Blinking when Fiber port is receiving and transmitting data at the speed of 1000Mbps.
PoE 1~8	PoE Status	OFF	PoE is disabled or no power is supplied with the PD when PoE is enabled.
		Green	Lit when PoE is enabled and starts supplying the power. Blinking when PoE works abnormally.

1.5 Cable Specifications

The following table contains various cable specifications for the Managed Switch. Please make sure that you use the proper cable when connecting the Managed Switch.

Cable Type	Description
10Base-T	UTP Category 3, 4, 5 (100 meters max.) EIA/TIA- 568 150-ohm STP (100 meters max.)
100Base-TX	UTP Cat. 5 (100 meters max.) EIA/TIA-568 150-ohm STP (100 meters max.)
1000Base-T	UTP Cat. 5e (100 meters max.) UTP Cat. 5 (100 meters max.) EIA/TIA-568B 150-ohm STP (100 meters max.)
100BASE-FX	Multi-mode fiber module(2km) / Single-mode fiber module
1000BASE-SX	Multi-mode fiber module (550m)
1000BASE-LX	Single-mode fiber module (10km)
1000BASE-LH	Single-mode fiber module (30km/50km)
1000BASE-ZX	Single-mode fiber module (80km)
SFP Transceiver	SFP Transceiver for 1000BASE-SX Multi-mode fiber module (550m) SFP Transceiver for 1000BASE-LX Single-mode fiber module (10km) SFP Transceiver for 1000BASE-LH Single-mode fiber module (30km/50km) SFP Transceiver for 1000BASE-ZX Single-mode fiber module (80km)

2

Installation

To properly install EPS-3112 Managed Switch, please follow the procedures listed below. These procedures will be respectively described in detail in the following sections.

- Installation Requirements
- Checking the Package Contents
- Installing the Managed Switch
- Powering on the Managed Switch
- Connecting the Managed Switch to the Network

2.1 Installation Requirements

Basic requirements for installation are as follows:

- Environmental conditions
  - One power outlet
  - Proper ventilation
  - Proper isolation to electrical noise, radio, etc.
  - UTP cables should not run in the same duct with power and phone line cables
- Required SFP Transceiver or UTP cables
- Rack mounting tools

2.2 Checking the Package Contents

Unpack the package carefully and check the package contents. The package should contain the following items:

- One set of the Managed Switch
- 19-inch rack-mount kit:
  - 2x mounting brackets
  - Screws
- Four rubber feet with adhesive backing
- Console RS-232 cable with RJ-45 connector
- Documentation CD
- AC power cord (For AC power module only)

If any item is found missing or damaged, please contact your local sales representative for support or replacement.

2.3 Installing the Managed Switch

You can install the EPS-3112 Managed Switch on a flat surface or mount it in a standard 19-inch network equipment rack.

CAUTION

To prevent any damage or failure of the Managed Switch, please DO NOT block the ventilation holes.

Use the following guidelines when choosing a place to install the switch:

- Firm and steady flat surface.
- Proper power outlet location, not too far from the device.
- Visually inspect the power cord and see that it is secured to the AC power connector.
- Make sure that there is proper heat dissipation from and adequate ventilation around the switch. Do not place heavy objects on the Managed Switch.

2.3.1 Desktop Installation

The switch can be placed in any flat and steady surface with proper air ventilation. Four rubber feet with adhesive backing are provided for this kind of installation.

Procedures

❶ Attach rubber feet on the bottom at each corner of the device.

❷ Select a flat and steady surface to place the switch.

❸ Allow adequate space for ventilation between the device and the objects around it.

2.3.2 Rack Installation

In the following section, we will take the EPS-3112 Managed Switch for example to install a 19-inch switch in a standard 19-inch network equipment rack.

WARNING!

Please mount the Switch firmly in rack, otherwise it may fall and cause the system damage and possible injury to personnel.

2.3.2.1 Install EPS-3112 Switch in a Rack

The Managed Switch can be mounted in an EIA standard-sized, 19-inch rack, which can be placed in a wiring closet with other equipment. Rack mounting brackets are provided to mount the Switch. Just follow the procedures listed below for step-by-step instructions to install your switch in this rack space:

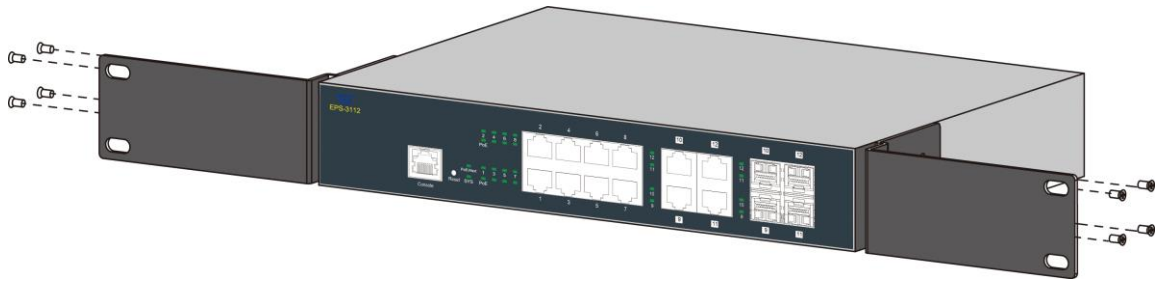
Step 1. Plan the rack position.

Step 2. Attach the supplied rack mounting brackets to the switch (See Figure 2-1):

2.1. Attach the supplied mounting bracket to one side of the switch that you would like to install in the rack.

2.2. Attach the other supplied mounting bracket to the other side of the switch.

Figure 2-1. EPS-3112 Switch Mounting



Step 3. Insert the screws provided in the rack-mount kit through each bracket and into the bracket mounting holes in the switch. Then, tighten the screws with the screwdriver to secure each bracket. (See Figure 2-1)

Step 4. Align the mounting holes in the brackets with the desired holes in the rack, and insert screws through each bracket and into the rack. (See Figure 2-2)

Step 5. Then, tighten the screws with the screwdriver to secure mounting brackets to the rack.

Step 6. Please ensure that the ventilation holes are not blocked.

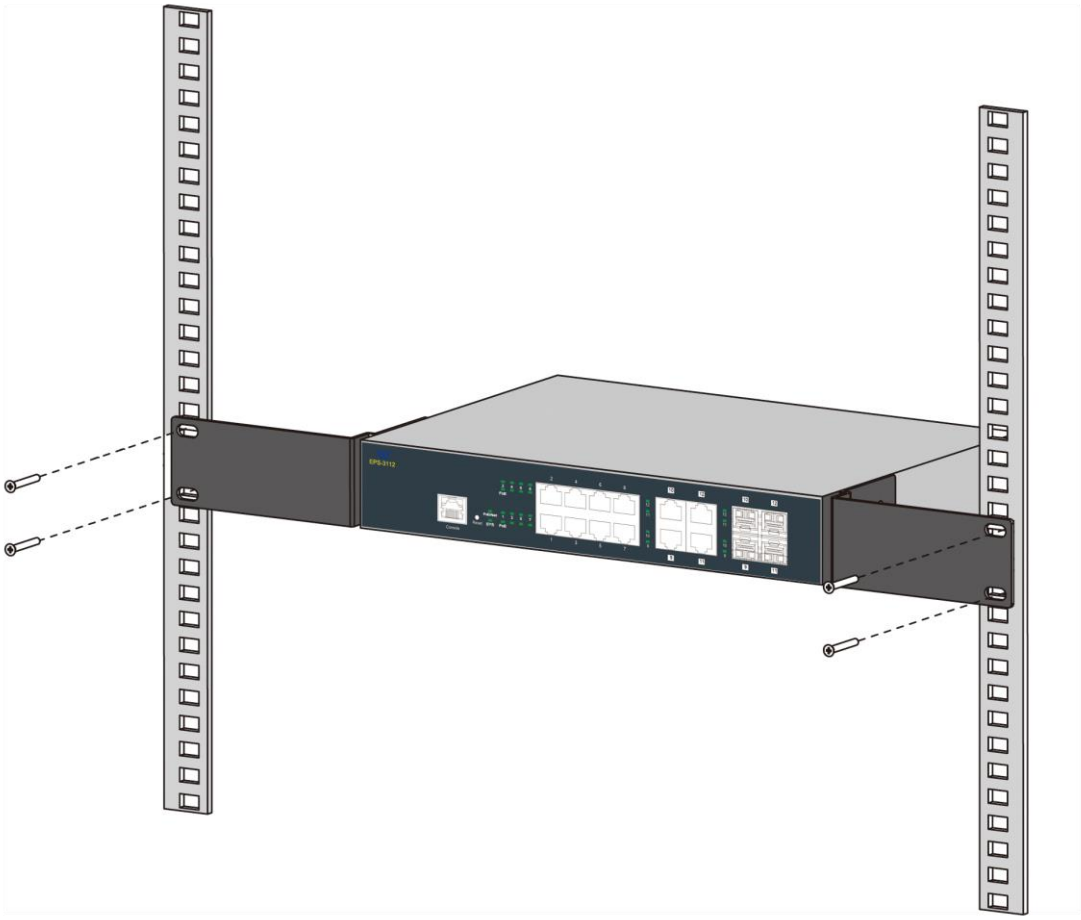


Figure 2-2. EPS-3112 Switch Rack-mounting

2.4 Powering on the Managed Switch

The Managed Switch can be used with AC power supply 100-240 V, 50–60 Hz. After the Managed Switch is turned on, the Power LED indicator should light in green color. For more details about the power LED description, please refer to Section 1.4 LED Definitions.

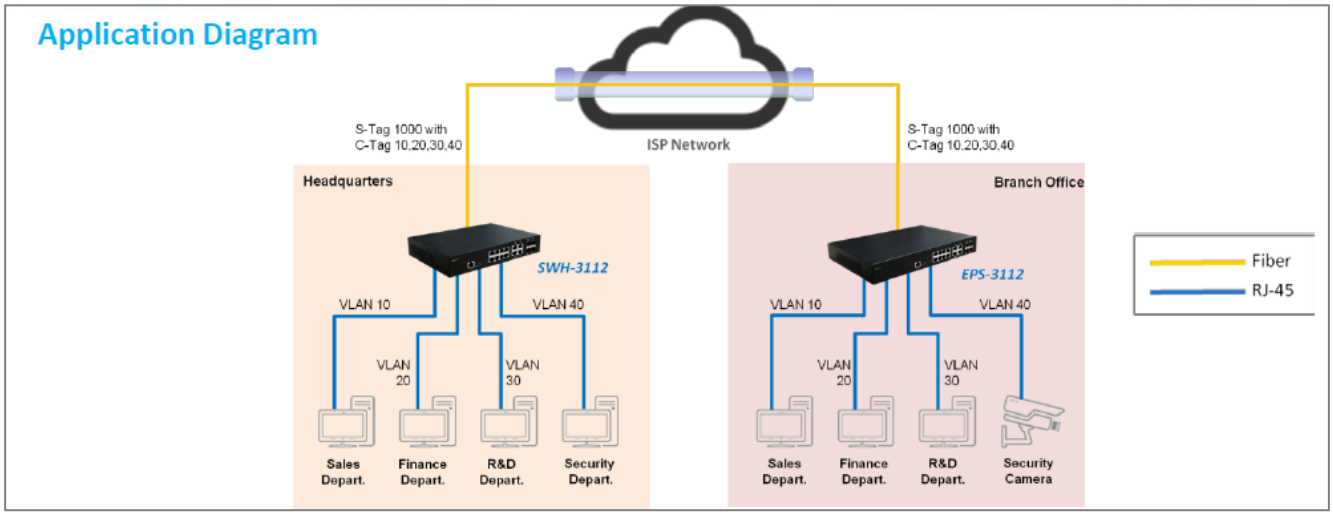
Power Failure

In the event of power failure, unplug the power that is plugged into the switch at the back of the device. When power is resumed, plug the power back to the switch.

2.5 Connecting the Managed Switch to the Network

Connect to Network

The Managed Switch has 8 10/100/1000BASE-T RJ-45 ports and 4 combo ports in the front panel. These 8 RJ-45 ports can be plugged with 10/100/1000Base-T UTP cable. Uplink combo ports 9-12 can be plugged with 100Base-FX, 1000Base-X SFP Fiber transceiver or 10/100/1000Base-T UTP cable. The connection of the fiber port must be matched, i.e. Transmitter to Receiver, and vice versa.



2.6 Installing and Removing SFP Modules

2.6.1 Installing SFP Modules

To connect the fiber transceiver and LC/SC cable, use the following guidelines:

1. Position the SFP transceiver with the handle on top.
2. Locate the triangular marking in the slot and align it with the bottom of the transceiver.
3. Insert the SFP transceiver into the slot until it clicks into place.
4. Make sure the module is seated correctly before sliding the module into the slot. A click sounds when it is locked in place.

Note: *If you are attaching fiber optic cables to the transceiver, continue with the following step. Otherwise, repeat the previous steps to install the remaining SFP transceivers in the device.*

1. Remove the protective plug from the SFP transceiver.

Note: *Do not remove the dust plug from the transceiver if you are not installing the fiber optic cable at this time. The dust plug protects hardware from dust contamination.*

2. Insert the fiber cable into the transceiver. The connector snaps into place and locks.
3. Repeat the previous procedures to install any additional SFP transceivers in the switch. The fiber port is now set up.

2.6.2 Removing SFP Modules

To disconnect an LC/SC connector, use the following guidelines:

1. Press down and hold the locking clips on the upper side of the optic cable.
2. Pull the optic cable out to release it from the transceiver.
3. Hold the handle on the transceiver and pull the transceiver out of the slot.

2.7 Connecting the Switch to Console Port

The switch supports a secondary means of management. By connecting the RJ45 to RS232 serial cable between a COM port on your PC (9-pin D-sub female) and the switch's RJ45 (RJ45) port, a wired connection for management can be established.

3

Operation

A built-in management module of Managed Switch provides users flexible interfaces to configure, control and monitor the system remotely and locally. To know the further information about the operation of Managed Switch, please refer to EPS-3112 Network Management User's Manual for the detailed management functions and required installation and operation procedures.

3.1 Network Management

The following is a list of management options available in this Managed Switch:

- Local Console Management
- Telnet Management
- SNMP Management
- Web Management

Local Console Management

Users may connect a Terminal or PC running the Terminal Emulation program (such as Putty or Tera Term) with the following serial console port settings, to the Managed Switch console port directly via RS-232 cable to configure , control and monitor the system. This is often referred to as Out-Of-Band management.

Baud rate:	9600(Default)
Data bits:	8
Parity:	none
Stop bits:	1
Flow control:	none

Console management is useful when there is no network connection to the Switch, for instance configuring the Managed Switch for the first time.

Telnet Management

Telnet is done through the network. Once there is a network connection to the Managed Switch, users can use Telnet to configure, control and monitor the system. Using the network connection to manage is often referred to as In-Band-Management.

SNMP Management

SNMP is also In-Band-Management and requires a network connection to the Managed Switch. The Managed Switch private Management Information Bases (MIB) is provided for SNMP-based network management program to configure, control and monitor the system.

Web Management

Web Management is done over the network. Once the Managed Switch is available on the network, you can login and monitor the status of it through a web browser remotely or locally. Web management in the local site, especially for the first time use of the Managed Switch to set up the needed IP, can also be done through one of the 10/100/1000Base-T 8-pin RJ-45 ports located on the front panel of the Managed Switch. Direct RJ-45 LAN cable connection between a PC and the Managed Switch is required for this management.

4

Maintenance

This Managed Switch is easy to maintain. The procedures are suggested when you would like to identify faults, perform hardware replacement and firmware upgrade.

4.1 Fault Identification

Identifying faults can greatly reduce the times required to find problem and solution. Users may perform local check or remote check to find the problems.

4.1.1 Local Check

Users can perform local check by observing LED indicators status or check system setup and configuration through console connection.

- When the whole system fails to function,

    1. Check Power LED status
    2. Check Power connection
    3. Reset power

- When certain network link fails to function,

    1. Locate the port of the switch
    2. Check LINK/ACT/Speed LED of the port
    3. Check Status LED of the port
    4. Check cable connection between the port and the connected device
    5. Reset power

- When local Console fails to function,

    1. Check COM LED status
    2. Check Console port connection
    3. Check Console configuration
    4. Reset power

4.1.2 Remote Check

Users may check the Managed Switch through SNMP manager remotely. For detailed procedures, please refer to the Network Management User's Manual.

4.2 Hardware Replacement Procedures

WARNING!

The Managed Switch contains no user-serviceable parts. DO NOT, UNDER ANY CIRCUMSTANCES, open and attempt to repair it.

Failure to observe this warning could result in personal injury or death from electrical shock.

Failure to observe the above warning will immediately void any Warranty.

4.3 Firmware Upgrade

This Managed Switch may perform the firmware upgrade when required. The latest firmware can be obtained from your sales representative. For the detailed upgrade procedures, please refer to EPS-3112 Network Management User's Manual.

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