



# **FOS-3148 Series**

**44 PORTS 100/1000BASE-X SFP WITH 4 COMBO  
PORTS (10/100/1000BASE-T, 100/1000BASE-X SFP)  
UPLINK MANAGEMENT SWITCH**

**User's Guide**

**Version 0.93**

## **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.

## **CE Mark Warning**

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## Revision History

Version	Date	Description
0.90	20141023	First release
0.91	20150212	Add Non-Blocking Switching Fabric Section 1.2 Add Battery Model 1.3 Revise LED Definition 3.1
0.92	20150602	Revise power AC input for battery model
0.93	20150715	Key Feature rearrangement

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# 1. INTRODUCTION

The Managed Switch is designed to meet the emerging FTTX & Metro Ethernet requirement. Its low profile appearance with 1U height and standard rack-mount size achieves 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 The Managed Switch

This Managed Switch is compact 19-inch, rack mountable, has 44 ports 100/1000Base-X SFP with 4 combo ports (10/100/1000Base-T, 100/1000Base-X SFP) in front panel. This Managed Switch provides high performance store and forward switching capability plus other advanced features such as QoS, VLAN, etc.

Clear, at-a-glance per-port LED indicators make users easier to control and manage network status. 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 suit for the SFP to Metro Ethernet application. Its low profile appearance with 1U height achieves the highest density and can be used in closet wiring or used as a desktop switch.

## 1.2 Key Features

- **19 inch, 1U high**
- **44 x 100/1000Base-X ports**
  - IEEE 802.3/802.3u/802.3ab/802.3z compliance
  - Support Auto-Sensing for fiber ports
  - Support MDI/MDIX/Auto-Crossover
  - SFP Slot
- **4 x 10/100/1000Base-T ,100/1000Base-X Combo ports**
  - IEEE 802.3ab/802.3z
  - Support Auto-Negotiation (RJ-45) and Auto-Sensing (SFP)
  - Support MDI/MDIX/Auto-Crossover
  - RJ-45 or SFP Slot
- **Switching Features**
  - Store & forward switching
  - Non-blocking switching fabric : 96Gbps
  - Mac address table:16K
  - Memory buffer total 1536K bytes
  - VLANs support up to 2K VLAN Groups
  - Support jumbo frame on all ports up to 9K bytes size
  - QoS classification based on IEEE802.1p, VID, TOS/DSCP, Ethertype and L4 port.
  - Q-in-Q VLAN double tag
  - Rate limit control
  - SNTP time server
  - Static multicasting
  - IGMP v1/v2 snooping
  - IGMP fast leave
  - IGMP filtering via filtering profile
  - Multicast channel limitations per port
  - Multicast VLAN Register (MVR) \*\*
  - DHCP snooping
  - DHCP client and auto-provision
  - DHCP relay agent with option 82
  - Access Control List (ACL)
- **Management Functions**
  - Console
  - Telnet
  - Web
  - RADIUS authentication
  - SNMP v1/v2 and network management
  - SNMP Power-Down Trap
  - Private, RFC-1213, RMON MIBs
  - Port mirroring
  - FTP, TFTP, HTTP server and client firmware upgrade

\*\*Coming Soon

## 1.3 Front & Rear Panel

This section is divided into two parts based on different model.

### 1.3.1 For General Model

#### Front Panel



The front panel is configured as follows:

- **44 x 100/1000Base-X SFP ports (Ports 1-44)**
- **4 x Gigabit combo ports (Ports 45-48) :**
  - 4 x 10/100/1000Base-T RJ-45 ports, or
  - 4 x 100/1000Base-X SFP ports
- **Reset Button:**
  - Pressing reset button for 2 seconds then release to restart the system.
  - Pressing reset button for 10 seconds then release to reset the Managed Switch back to factory settings and restart the system.
- **Console port:**
  - An asynchronous serial console port supporting the RS-232 electrical specification. The console port can be used to manage the device and the interface should be configured to 9600 , N , 8 , 1
- **LED:**
  - Please refer to chapter [3.1 LED Definitions](#)

#### Rear Panel

The Managed Switch provides one fixed power module or two power modules for redundancy purpose. Depending on your physical environment requirements, the type of power module is selectable and could be either AC input or DC input.



AC input



DC input



AC input x 2



DC input x 2

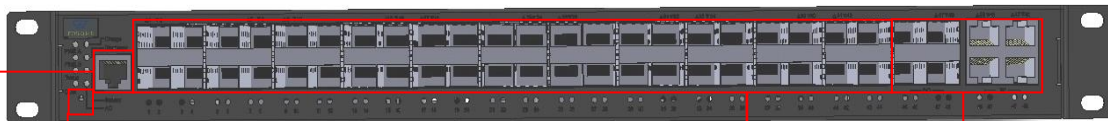
The rear panel is configured as follows:

- **Power module and Connector:**
  - AC power connection: 100-240V , 50/60Hz
  - DC power connection: 48VDC

### 1.3.2 For Battery Model

***Note:** Please be cautious that only **DC12V Back-up Battery** can be used. The followings are the instructions of installing and replacing back-up battery.*

#### Front Panel



The front panel is configured as follows:

- **44 x 100/1000Base-X SFP ports (Ports 1-44)**
- **4 x Gigabit combo ports (Ports 45-48) :**
  - 4 x 10/100/1000Base-T RJ-45 ports, or
  - 4 x 100/1000Base-X SFP ports
- **Reset Button:**
  - Pressing reset button for 2 seconds then release to restart the system.
  - Pressing reset button for 10 seconds then release to reset the Managed Switch back to factory settings and restart the system.
- **Console port:**
  - An asynchronous serial console port supporting the RS-232 electrical specification. The console port can be used to manage the device and the interface should be configured to 9600 , N , 8 , 1
- **LED:**
  - Please refer to chapter [3.1 LED Definitions](#)



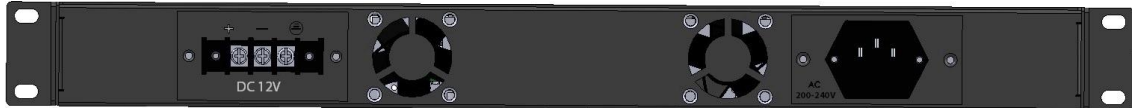
## Rear Panel

The Managed Switch provides one fixed power module and one battery modules for redundancy purpose. Depending on your physical environment requirements, the type of power module could be either AC input or DC input.

### Without AC Protector



### With AC Protector



#### I. Installing Back-up Battery

Step 1. Unplug AC power.

Step 2. Connect battery positive (+) to switch positive (+).

Step 3. Connect battery negative (-) to switch negative (-).

Step 4. Plug AC power.

#### II. Replacing Back-up Battery

Step 1. Unplug AC power.

Step 2. Disconnect battery negative (-) from switch negative (-).

Step 3. Disconnect battery positive (+) from switch positive (+).

Step 4. Replace the battery, and connect battery positive (+) to switch positive (+).

Step 5. Connect battery negative (-) to switch negative (-).

Step 6. Plug AC power.

The rear panel is configured as follows:

- **Power module and Connector:**

- **With AC Protector**

- AC power connection: 190-255V , 50/60Hz

- DC power connection: 12VDC

- **Without AC Protector**

- AC power connection: 115V/230V , 50/60Hz

- DC power connection: 12VDC

## 1.4 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.

<b>Cable Type</b>	<b>Description</b>
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)
Mini-GBIC	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)

## 1.5 Network Management

This Managed Switch is Plug & Play compliant. Real-time operational status can be monitored through a set of LED indicators located in the front panel. Built-in management module also allows users to configure, control and monitor the system remotely.

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 with Terminal Emulation program, to the Managed Switch RJ-45 port directly via RS-232 cable to configure, control and monitor the system. This is often referred as Out-Of-Band management.

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 network connection to manage is often referred to 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. Local console-type Web management, 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.

Please refer to the Network Management User's Manual for the detailed management functions and required installation and operation procedures.

## 2. INSTALLATION

To properly install the Managed Switch, please follow the procedures listed below. These procedures are described below in separate sections.

- Installation Requirements
- Unpacking the Managed Switch
- Installing the Managed Switch
- Power on the Managed Switch
- Connecting the Managed Switch to the network

### 2.1 Requirement

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:

- Standard
  - One Managed Switch
  - Mounting kit: 2 mounting brackets and screws (Fixed in the Managed Switch when shipped)
  - 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 Install the Managed Switch



### CAUTION

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

### 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 installation.

#### Procedure

1. Attach rubber feet on the bottom at each corner of the device.
2. Select a flat and steady surface and place the switch.
3. Allow adequate space for ventilation between the device and the objects around it.

### Rack Installation



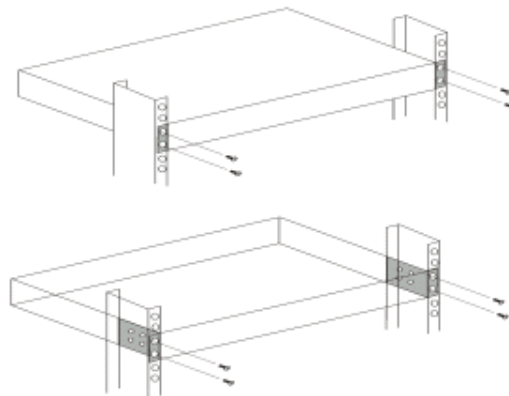
### WARNING!

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

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.

### **Procedure**

1. Plan the rack position.
2. Attach the mounting bracket on the switch's side panels (one on each side) and secure them with the screws provided.
3. Align the Switch with mounting bracket into the selected mounting rail position.
4. Then, use the screws provided with the equipment rack to mount the switch into the selected mounting rails position carefully and firmly.
5. Please ensure that the ventilation holes are not blocked.



## **2.4 Power ON**

The Managed Switch can be used with AC power supply 100-240 VAC, 50 – 60 Hz or DC power supply 48V. The power switch is located at the rear of the unit adjacent to the power connector.

After the Managed Switch is turned on, the Power LED indicators should light in green and the FAN should spin.

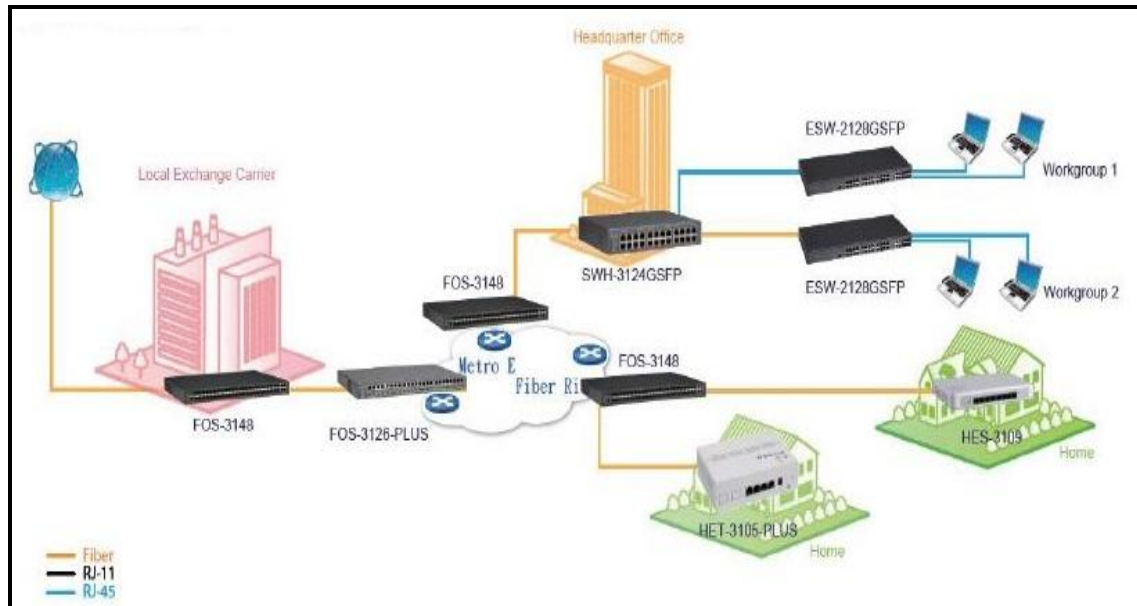
**Power Failure**

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 Connect the Switch to network

### Connect to Network

The Managed Switch has 44 SFP and 4 combo ports in front panel. These 44 SFP ports can be plugged with 155Mbps or 1.25Gbps SFP Fiber transceiver. Uplink combo ports 45-48 can be plugged with 155Mbps, 1.25Gbps SFP Fiber transceiver or 10/100/1000Base-T UTP connector. The connection of the fiber port must be matched, i.e. Transmitter to Receiver and vice versa.

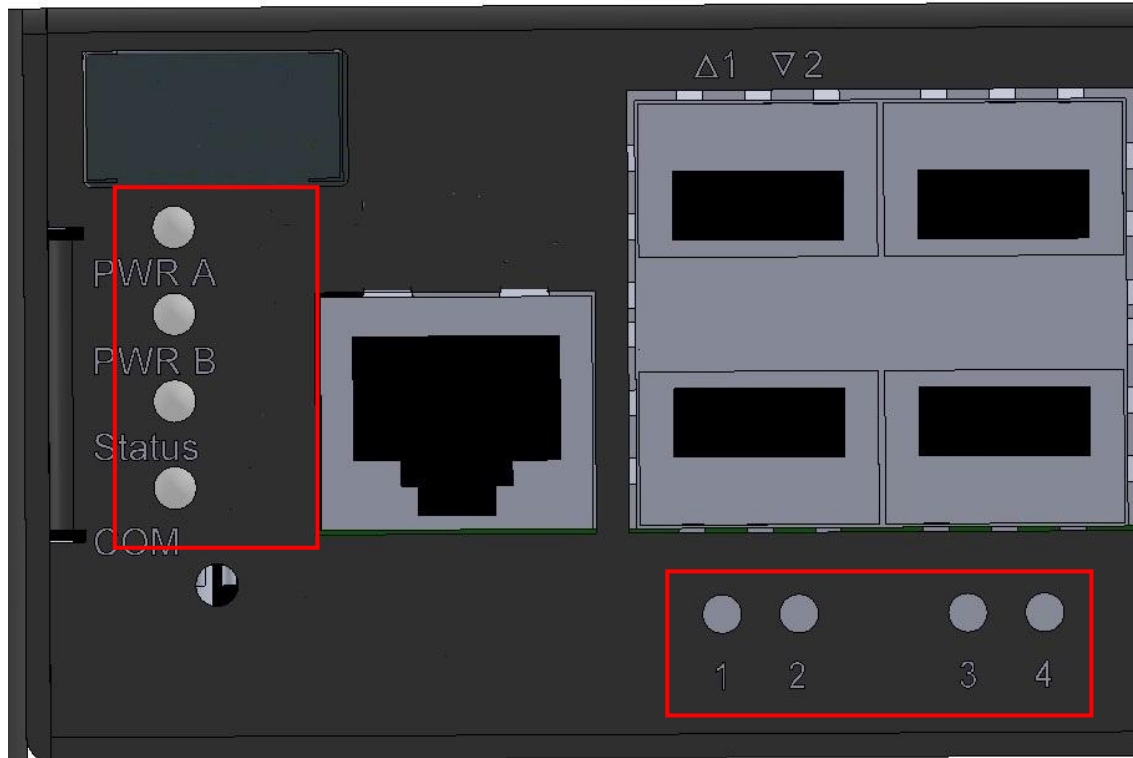




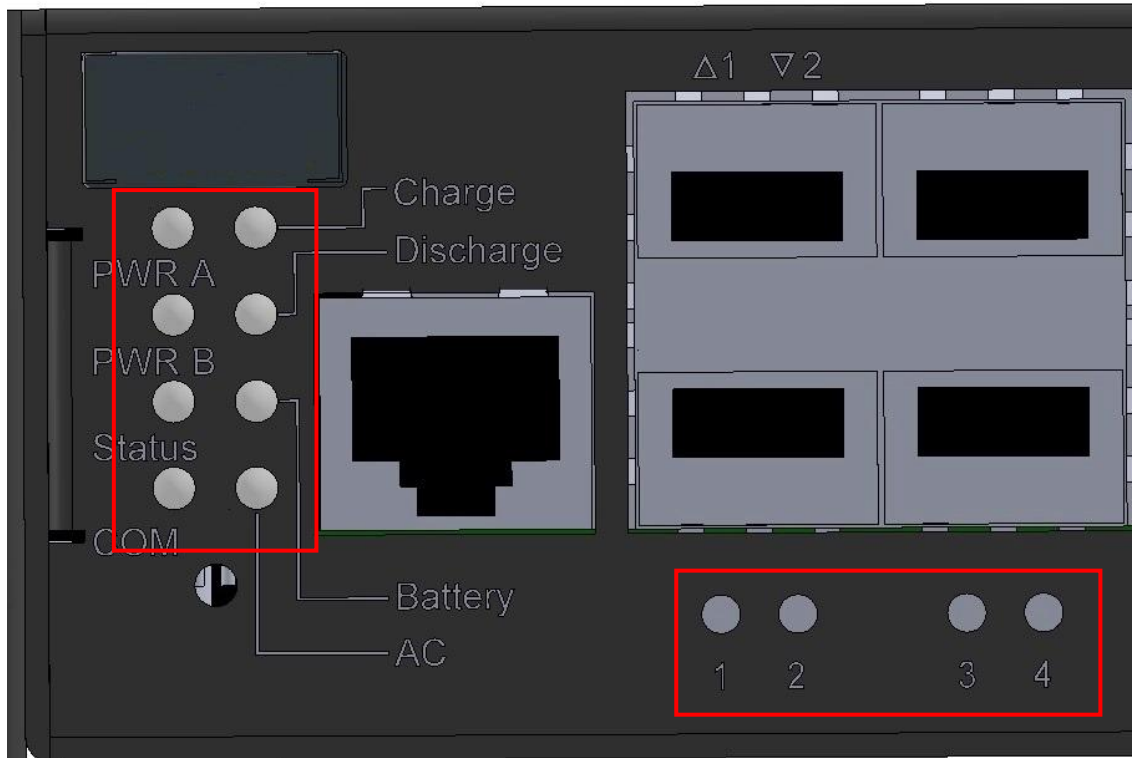
### 3. OPERATION

The Managed Switch is Plug & Play compliant. Real-time operational status can be monitored through a set of LED indicators located in the front panel. A built-in management module provides users flexible interfaces to configure, control and monitor the complete system remotely.

#### 3.1 LED Definitions



**Front Panel (For General Model)**



**Front Panel (For Battery Model)**

**Power A/B LED**

The Power A/B has two LED indicators. The upper one is for internal Power A and lower one is for internal power B.

LED	Color	Operation
PWR A/B	Off	Without fixed-in power module or power is off.
	Green	Power module is in normal operation.
	Orange	Fixed-in Power module is no longer receiving power or DC output fails.

**Status LED**

The Managed Switch status is indicated by the Status LED on the front panel of the device.

LED	Color	Operation
Status	Green	The device is in normal operation.
	Orange	The device is booting up.
	Green Blinking	Press the Reset button for 3 seconds and then release to restart the system. The LED indicator will blink in green for three times.
	Orange Blinking	Press the Reset button for 10 seconds and then release to reset (back to factory settings) and restart the system. The LED indicator will blink in orange for three times.

**COM LED**

The console status is indicated by the Console LED on the front panel of the device.

LED	Color	Operation
COM	Off	Out-of-band management via console port is activated.
	Green	When Console port is connected.

#### Port LED 1~44

LED	Color	Operation
Link/ACT/Speed	Off	No connection
	Green	The link is up and the speed is in 100Mbps
	Orange	The link is up and the speed is in 1000Mbps.
	Blinking Green/Orange	Traffic is present.

#### TP & F/O LED 45~48

LED	Media Type	Color	Operation
Link/ACT/Speed	TP	Off	No connection or the port link speed is in 10Mbps.
		Green	The link is up and the speed is in 100Mbps.
		Orange	The link is up and the speed is in 1000Mbps.
		Blinking Green/Orange	Traffic is present.
	F/O	Off	No connection.
		Green	The link is up and the speed is in 100Mbps.
		Orange	The link is up and the speed is in 1000Mbps.
		Blinking Green/Orange	Traffic is present.

#### Battery LED (For Battery Model Only)

LED	Color	Operation
Charge	Off	Battery is disconnected.
	Green	1. Power module is in normal operation. 2. Back-up battery fully charged.
	Green Flashing	Back-up battery is charging.
Discharge	Orange	1. The Managed Switch is booting up. 2. Reverse Positive (+) and negative (-) wires.
	Orange Flashing	Back-up battery is discharging.
Battery	Off	Battery is disconnected.
	Orange	Reverse Positive (+) and negative (-) wires.

#### Note:

- \* For BAT models, please be cautious of the following situations.
1. If "COM" LED shows steady orange, please reverse positive (+) and negative (-) wires.
  2. Reverse indication only works when AC power is unplugged.
  3. Never change battery while AC Power is plugged, or the charging circuit may be damaged.

#### AC Protector LED (For AC Protector Model Only)

LED	Color	Operation
AC	Off	Power is disconnected.
	Orange	AC Protector is activated.
	Green	Power module is in normal operation.

## 4. MAINTENANCE

This Managed Switch is easy to maintain. The procedures are suggested when you want 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.

#### 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

#### 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 Firmware upgrade when required. New Firmware can be obtained from your sales representative. Please check the Network Management User's Manual for the detailed upgrade procedures.