OSM6500 Installation Guide

OSM6500 Series User Manual

Document No. OSM6500_IG_12122005

FCC Warning

This device has been tested and confirmed to meet the limits for a Class A device, complying with Part 15 of the FCC Rules. These limits are placed to provide appropriate protection against harmful interference when the equipment is used 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 interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, and you will be required to correct the interference at your own expense.

Modifying the device not authorized by MRV Communications, Inc may result in the equipment no longer meeting FCC requirements for Class A devices. Therefore, your right to use the equipment may be impaired by FCC regulations, and you may be required to remove any interference to radio or television communications at your own expense.

You can determine whether your equipment is causing interference by turning it off. If the interference stops, it was probably caused by the MRV Communications, Inc equipment. Take appropriate measures to remove the interference if it happens.

Modifications to this product without MRV Communications, Inc's written authorization

could void the FCC approval and disqualify you to use the product.

User Warning

This is a Class A communication product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures to avoid disturbance to his/her normal life.

VCCI Warning

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How to Use This Manual

Target Readers

This manual is written for engineers who need to install OSM6500 series switch, and system administrators who need to configure and manage OSM6500 series switch. It assumes certain networking knowledge and experience of the readers.

Outline

This manual describes in details the hardware structure and installation methods for OSM6500 series switch. It also presents how to configure OSM6500-OS functions that are specific to the OSM6500 series switch, such as ACL, QoS, NAS, PPPoE, RADIUS etc…

Pleast note that this manual does not include the complete configuration information. For general information on configuration and commands, please refer to the corresponding **OSM6500-OS Configuration Manual** and **OSM6500-OS Command Reference**.

The OSM6500 Series User Manual consists of three parts:

Part 1 Hardware Installation Guide

It includes the following chapters:

Chapter	Title	Description
Chapter 1	Product Overview	Separately describes the characteristics and specifications of the OSM6500

		series switch.
Chapter 2	Product Hardware Architecture	Separately describes the chassis structure, slot structure, rack-type modules, power distribution system and fan box of the OSM6500 series switch.
Chapter 3	System Configuration List	Describes the basic configuration list of the OSM6500 series switch and the basic configuration of the optional modules.
Chapter 4	Safety Precautions	Includes safe electric and equipment operations and avoidance of static and laser damages.
Chapter 5	Environmental Requirements	Describes the environmental requirements.
Chapter 6	Unpacking inspection	Introduces the packaging box and the unpacking of the equipment as well as the procedure and precautions of acceptance.
Chapter 7	Equipment Installation	Details the method for installing equipment hardware, including the installation of switches into the cabinet and the rack-type modules as well as the connection of ground wires with the power cables.
Chapter 8	System Startup and Upgrading	Describes system startup and upgrading of the OSM6500 series switch.

Conventions

Conventions for icons are listed as follows:

Icon	Description
 Warning	Notifies users that improper operation may cause damage to human body or equipment, service disruption or data loss during the process of installation and service configuration.
 Caution	This icon alerts users to some precautions.

Note

This icon provides some text-related information and some guidance for users, and helps users understand the text better.

Table of Contents

1 Product Overview

1.1 Brief Introduction

MRV Communications, Inc launches the 10G-platform-based OSM6500 switch series: OSM6502 and OSM6508. With high performance, high reliability, high security, and high port-density, the OSM6500 is characterized by:

High-capacity and wire-speed switching capability

Based on a high-performance ASIC, the OSM6500 switch adopts an industry-leading switching matrix to overcome shortcomings of the shared bus switching fabric such as low bandwidth, low access efficiency and difficult expansion, thus enabling the whole system's switching capacity to be highly scalable.

Distributed routing/switching

It adopts the distributed structure widely applied in the high-end

switch in this industry. Compared with a centralized architecture, the distributed architecture makes great progress in product performance and stability, providing a higher-capacity access and convergence, and more efficient L2/L3/L4 forwarding.

High reliability design with dual MPs

The OSM6500 series switch supports the redundant backup of key components such as main control module and power supply and adopt the well-developed core equipment designing technique, fully ensuring high reliability and backup capability of devices.

Ultra high-density service interface

The OSM6500 switch series supports service modules of many types, provides flexible combination of diverse interfaces including 100M to 10G Ethernet, and POS, and can meet the requirements of users in different fields.

Perfect security mechanism

The OSM6500 supports the binding based on MAC address/address group and provides L2 security. The

quintuple-based ACL provides differentiated protection for users at higher levels. In addition, the diverse routing protocols supply multiple authentication methods such as plaintext authentication and MD5 for the higher level security protection. The black-hole routing technique adopts a dropping policy in the case of malicious attacks and can protect network stability to the largest extent.

Perfect network management

The OSM6500 supports Telnet network management and the SNMP Agent function to collect management information. MRV's MegaVision Pro management system is used to implement complete management, monitoring and maintenance of networks.

1.2 Product Specifications

Table 1-1 Specification of OSM6500 switch series

Product specifications		OSM6502	OSM6508
Dimensions (H) x (D) x (W) (mm)		175 x 427.7 x 436	619.5 x 450 x 436
Empty chassis weight		16 kg	39 kg
Number of slots		2	8
Slot depth (mm)		355.24	355.24
Power	AC input voltage	100? 240VAC	

Product specifications		OSM6502	OSM6508
supply	DC input voltage	-38? -58VDC	
	AC power supply frequency	50/60Hz	
	Maximum output power	195 W	800 W
Security features		Complying with the standards of EN 60950, UL 60950, CAN/CSA-C22.2 NO. 60950, GB 4943, IEC 60950, AS/NZS 60950	
Electromagnetic compatibility	EMI features	Complying with the standards of EN55022 Class A, ETSI EN 300 386, CISPR 22 class A, GB 9254 Class A, IEC 61000-3-2, IEC 61000-3-3 FCC Class A and VCCI Class A	
	EMS features	Complying with the standards of EN55024, ETSI EN 300 386, CISPR 24, GB/T 17626, GB/T 17618, IEC 61000-4	
Working environment	Temperature	0 °C ~40 °C	
	Humidity	5% - 95% RH (non-condensation)	
Interface type supported		10/100Base-T, 10/100/1000Base-T, 1000Base-SX, 1000Base-LX, 1000Base-LH, 1000Base-T, 10000BASE-LR, 10000BASE-ER	

2 Product Hardware Architecture

Because the OSM6500 support both AC and DC power, users should choose appropriate products depending on the power supply systems of the equipment room.

2.1 System Architecture

The OSM6500 switch series has an integrated chassis and modular architecture, which is convenient for maintenance and service expansion. The following details the system architectures of the OSM6502 and OSM6508.

2.1.1 Integrated Structure of OSM6502

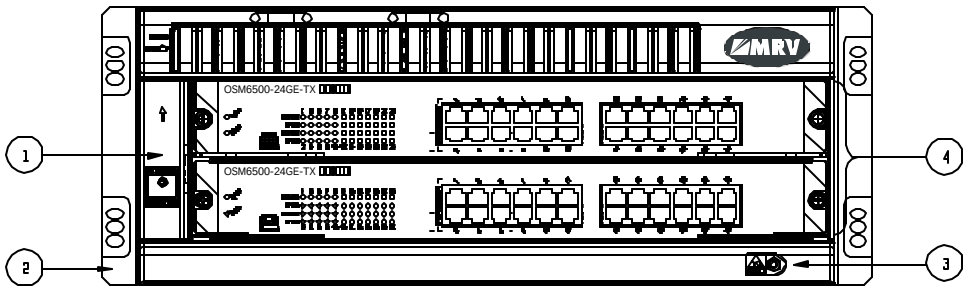
Caution

The appearances and architectures of the AC version and DC version of the OSM6502 are just the same except the power supply module.

1. The front architecture of the OSM6502 is as shown in the figure below:

- There are two horizontal slots on the front of the chassis for installing multiple rack-mounted modules. Each module offers flexible interface types. In addition, it is possible for users to assemble and disassemble the rack-mounted modules and connect interface cables on the front of the chassis, facilitating the centralized operation and maintenance of the equipment.
- The chassis also has a vertically-mounted fan frame, providing heat dissipation guarantee for the equipment operation.
- An anti-static wrist strap jack is installed on the lower right part of the front panel to avoid component damages caused by human body static electricity when swapping the modules.
- On each side of the chassis there are rack-mounting ears to install the chassis into a cabinet.

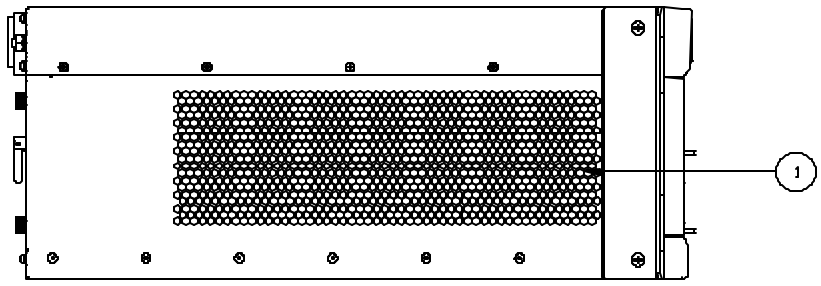
Figure 2-1 Front architecture of OSM6502



1. Fan frame	2. Rack-mounting ear
3. Anti-static wrist jack	4. Rack-mounted modules

2. The side architecture of the chassis is as shown in the figure below. A variety of vent holes on the side panel guarantee a good ventilation and heat dissipation of the chassis.

Figure 2-2 Side architecture of OSM6502

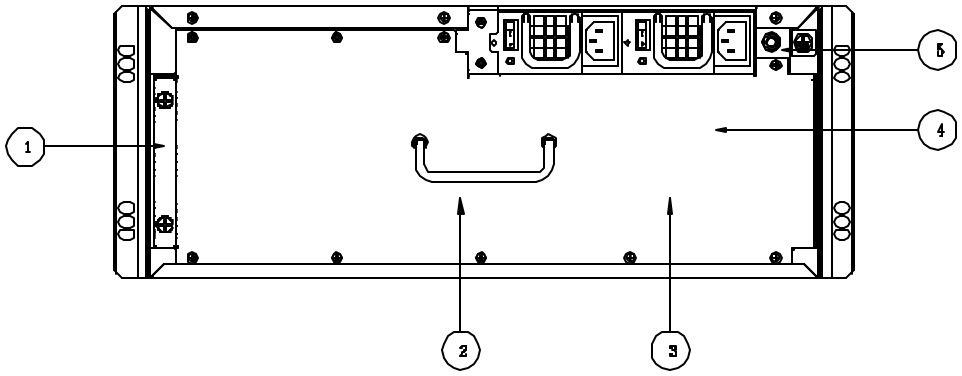


1. Venthole

3. On the rear of the chassis, there are two power module slots for installing an AC or DC power modules. Users can choose the corresponding power modules as required. The rear architecture of the AC version OSM6502 is as shown in the figure below:

- Two AC power modules provide components such as power switches, sockets, and indicators. The AC power module is described in detail in the following chapters.
- There is a vertically mounted dust-proof filter on the rear of the chassis to avoid the dust in the air from being drawn into the chassis. The dust-proof filter needs to be cleaned regularly lest the accumulated dust should affect the chassis ventilation.
- On the upper right part of the rear panel, there is a grounding rod marked with ⏚.
- There is a pulled handle on the rear of the chassis for users to disassemble the rear cover panel. To avoid damages, do not use these handles to move equipment.

Figure 2-3 Rear architecture of the AC version OSM6502



1. Dust-proof filter screen	2. Reverse pulled handle
3. Back cover panel	4. AC power module
5. Grounding rod	

The AC version and DC version of the OSM6502 only differ in their power modules. The DC version power module will be introduced in a later section.

2.1.2 Integrated Structure of OSM6508

Caution

The appearances and architectures of the AC version and DC version of the OSM6508 are just the same except the power distribution frame.

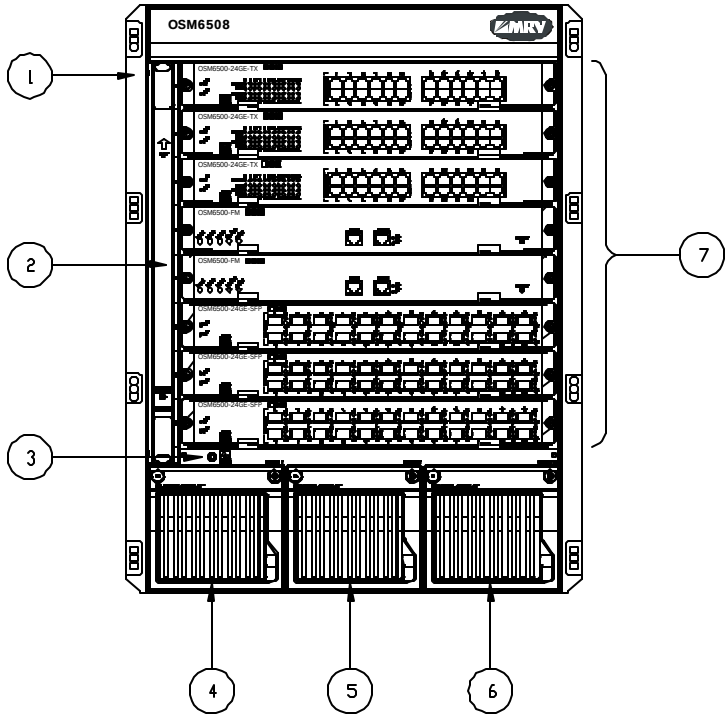
1. The front architecture of the OSM6508 is as shown in the figure below:

- There are 8 horizontal slots on the front of the chassis for installing multiple rack-mounted modules. Each module offers flexible interface types. In addition, it is possible for users to assemble and disassemble the

rack-mounted modules and connect interface cables on the front of the chassis, facilitating the centralized operation and maintenance of the equipment.

- On the rear of the chassis, there are three power module slots for installing AC or DC power modules. Users can choose the corresponding power modules as required. The model of the AC power supply module is OSM6500-PWR-AC, while the DC power supply module is OSM6500-PWR-DC.
- On the left side of the chassis, there is a horizontally mounted fan frame, which can provide a heat dissipation guarantee for the chassis.
- To avoid component damages caused by human body static electricity in plugging modules, an anti-static wrist strap jack is installed on each side of the front panel.
- On each side of the chassis there are rack-mounting ears to install the chassis into the cabinet.

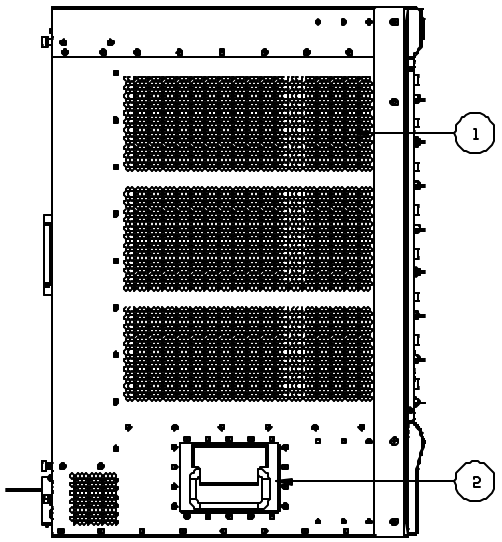
Figure 2-4 Front architecture of the AC version OSM6508



1. Rack-mounting ear	2. Fan frame
3. Anti-static wrist jack	4. Power supply module 1
5. Power supply module 2	6. Power supply module 3
7. Rack-mounted modules	

2. The side architecture of the chassis is as shown in the figure below. A variety of ventilation holes on the side panel guarantee a good ventilation and heat dissipation of the chassis. There is a fixed handle on each side of the chassis for users to move the chassis.

Figure 2-5 Side architecture of OSM6508

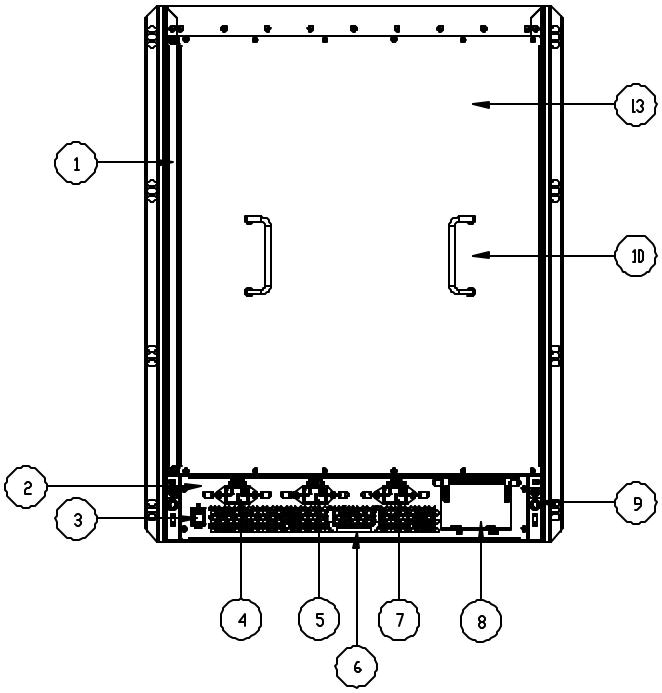


1. Ventholes	2. Reverse pulled handle

3. The rear architecture of the AC version OSM6508 is as shown in the figure below:

- An AC power distribution frame is located on the bottom of the equipment, providing necessary components such as a power switch, power sockets, and grounding rod for chassis power access. The AC power distribution frame is described in detail in the following chapters.
- On each side of the rear panel bottom there are grounding rods marked with ⏚. Any of the two grounding rods can be used for chassis grounding, and users can choose either of them.
- There are a detachable dust-proof filters on the rear of the chassis to prevent the dust in the air from coming into the chassis. The dust-proof filter needs to be cleaned regularly otherwise the accumulated dust might affect chassis ventilation.
- On the rear of the chassis, there are two reverse handles for users to disassemble the rear cover panel. To avoid damages, do not use these handles to move the chassis.

Figure 2-6 Rear architecture of the AC version OSM6508



1. Dust-proof filter screen	2. Power Distribution Frame
3. Power switch	4. Power socket 3
5. Power socket 2	6. Reverse pulled handle
7. Power socket 1	8. Reserved port
9. Grounding rod	10. Reverse pulled handle
11. Back cover panel	

Except for the power distribution frame, other parts of the DC-version OSM6508 rear architecture are the same as those of the AC-version product. The DC power distribution frame is described in detail in the following chapters.

2.2 Rack-Mounted Modules

2.2.1 Rack-Mounted Module Types and Installation Requirements

1. Rack-Mounted Module Types

OSM6500 switches adopt a modular architecture with multiple optional modules, to provide users with the flexibility in the choice of modules and expansion as required. These optional modules consist of one main control module and multiple service modules. The main control module is used only on the OSM6508, not on the OSM6502. The OSM6500 module types are shown below:

Table 2-1 Module types supported by and with which the OSM65 switch series are compatible

Item	Module	Module type
1	OSM6500-FM	Main control module
2	OSM6500-FM2	Main control module
3	OSM6500-48FE-TX	Service modules
4	OSM6500-24GE-TX	Service modules
5	OSM6500-24GE-SFP	Service modules
6	OSM6500-2x10G-XEN	Service modules
7	OSM6500-ESM	Service modules

Caution	The main control module is the basic configuration module of OSM6508, users can select two kinds of main control module, OSM6500-FM and OSM6500-FM2, and the latter of these two has a more powerful processing capability.

2. Installation Requirements

(1) OSM6502

Service modules can be installed in any slot on the OSM6502. Main control modules are not used in the OSM6502.

OSM6502		
	Slot 1	Service module
	Slot 2	Service module

(2) OSM6508

From top to bottom, slot numbers are sequential from 1 to 8 on the OSM6508. The requirements for module installation are as follows:

Figure 2-7 Slot requirements for module installation on OSM6508

OSM6508		
Slot 1	Service module	
Slot 2	Service module	
Slot 3	Service module	
Slot 4	Main control module	
Slot 5	Main control module	
Slot 6	Service module	
Slot 7	Service module	
Slot 8	Service module	

OSM6508		
Slot 1	Service module	
Slot 2	Service module	
Slot 3	Service module	
Slot 4	Main control module	
Slot 5	Service module	
Slot 6	Service module	
Slot 7	Service module	
Slot 8	Service module	

- If only one main control module is to be installed, it has to be in Slot 4, leaving the other slots for service modules or blank front panels.
- If two main control modules are to be installed, they have to be in Slots 4 and 5, leaving the other slots for service modules or blank front panels.

2.2.2 Master module of OSM6500-FM

Master module OSM6500-FM is the basic configuration module for OSM6508. OSM6508 can adopt one or two OSM6500-FMs to improve the reliability of the system. It is recommended to use two for redundancy.

OSM6508 stores all configuration information on the main control module for the chassis. OSM6508 supports the switchover between the active and standby main control

modules. The main control module has two working modes:

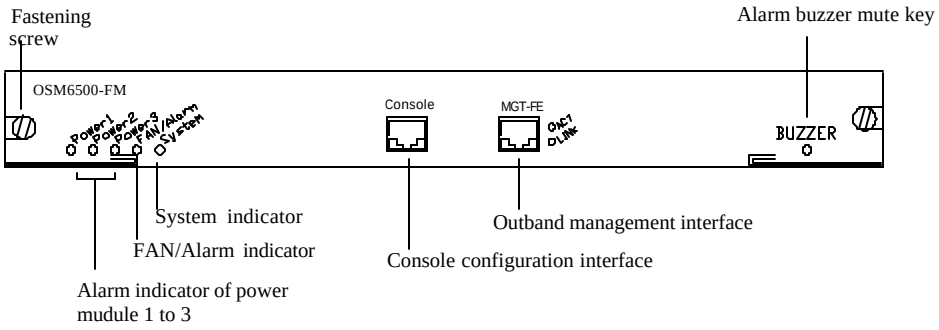
- Active mode: As the active main control module, it provides general configuration management for the chassis.
- Standby mode: As the hot backup of the active main control module, it is ready to take the place of the active one.

1. Structure of the OSM6500-FM module

The front panel of the OSM6500-FM module, as shown in the figure below, comprises the following parts:

- 1 Console port
- 1 MGT-FE outband management interface and the interface status indicators (labeled with “LINK/ACT”),
- 5 status indicators: Alarm indicator for power module 1, alarm indicator for power module 2, alarm indicator for power module 3, alarm indicator for the fans, and alarm indicator for system running status.
- 1 alarm buzzer mute key
- 2 ejector levers.

Figure 2-8 Front architecture of the OSM6500-FM module



Caution

Users need to configure the OSM6508 through the Console or MGT-FE port of the main control module.
For the OSM6502 that does not support the main control module, Users need to configure it through the Console port of the service module in Slot 1, or through the Reserved interface if no console port is available.

2. OSM6500-FM interface attributes

Table 2-2 Interface attributes of the OSM6500-FM module

Interface name	Quantity	Interface type	Interface attributes	Description
Console	1	RJ-45	RS-232	Used for configuration
MGT-FE	1	RJ-45	10/100Base-T	Used for out-band management

3. LED indicators of OSM6500-FM

Table 2-3 LED description of the OSM6500-FM module

LED indicator name		Color	Status	Description
POWER1: POWER2: POWER3:	Power supply alarm indicator	Green	Constantly on	The power supply is in position and in normal operation.
		Red	Constantly on	The power supply is in position but in abnormal operation with the output of either over-voltage or undervoltage
			Flashing slowly	Abnormal input of the AC power or the output of the DC power
			Flashing fast	The fan is working abnormally or the power supply is about to expire.
			Off	The power supply is not in position.
FAN/Alarm	Fan alarm indicator	Green	Constantly on	The fan operates normally.
		Red	Constantly on	Abnormal working fan or the fan frame is not in position.
System	System state indicator	Green	Constantly on	The system is starting or down.
			Flashing	The system runs normally.
			Off	No power-on
LINK	MGT-FE interface status indicator	Green	Constantly on	The port has established a reliable connection
			Off	Wrongly connected ports
ACT		Green	Flashing	Data is being received/transmitted on the port

2.2.3 Main Control Module of OSM6500-FM2

The main control module OSM6500-FM2 is also a kind of module for the OSM6508, and has been improved on the basis of OSM6500-FM, to enhance its performance and processing capability. The OSM6508 can adopt one or two OSM6500-FM2. It is recommended to use two for redundancy.

OSM6508 stores all configuration information on the main control module for management. OSM6508 supports the switchover between the active and standby main control modules. The main control module has two working modes:

- Active mode: As the active main control module, it provides general configuration management for the chassis.
- Standby mode: As the hot backup of the main control module, it is ready to take the place of the active one.

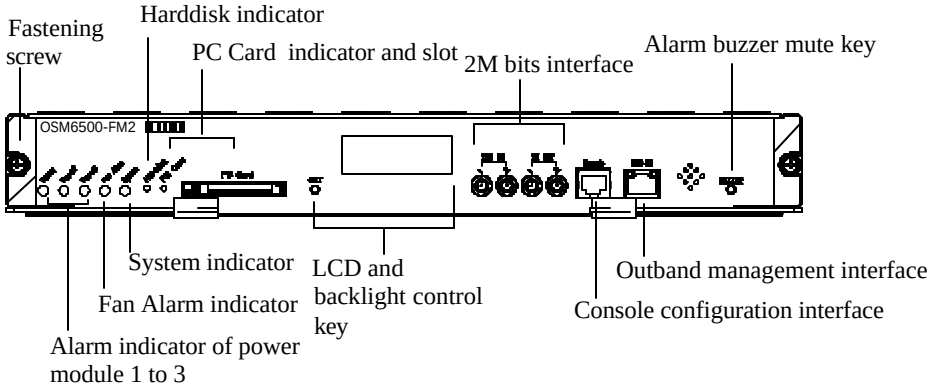
1. Structure of the OSM6500-FM2 module

The front panel of the OSM6500-FM2 module, as shown in the figure below, comprises the following parts:

- 1 Console port
- 1 MGT-FE out-band management interface
- 2M Bits clock signal input/output interface
- 7 status indicators: Alarm indicator for power module 1, alarm indicator for power module 2, alarm indicator for power module 3, alarm indicator for fans, alarm indicator for system running status, status indicator for the hard disk, and status indicator for the PC card.
- An alarm buzzer and buzzer mute key

- 1 LCD monitor and a backlight control key SET for the system information display
- 1 PC card slot and 1 PC card status indicator (labeled with “Active”), and
- 2 ejector levers.

Figure 2-9 Front architecture of the OSM6500-FM2



Caution

Users need to configure the OSM6508 through the Console or MGT-FE interface of the main control module.
For the OSM6502 that does not support the main control module, users need to configure it through the Console port of the service module in Slot 1, or through the Reserved interface if no console port is available.

Caution

Connect to the MGT-FE port with a crossover cable.

Caution

OSM6500-FM2 can receive and provide Level-3 clock signals for other equipment.

2. OSM6500-FM2 interface attributes

Table 2-4 OSM6500-FM2 interface attributes

Interface name	Quantity	Interface type	Interface attributes	Description
Console	1	RJ-45	RS-232	Used for configuration

MGT-FE	1	RJ-45	10/100Base-T	Used for out-band management
2M Bits	2 pairs	SMB	2M	Clock signal interfaces
PC card	1	CF card	----	Used for mobile storage with the CF card plugged in

3. LED indicators of OSM6500-FM2

Table 2-5 LED description of the OSM6500-FM2

LED indicator name		Color	Status	Description
POWER1: POWER2: POWER3:	Power supply alarm indicator	Green	Constantly on	The power supply is in position and in normal operation.
		Red	Constantly on	The power supply is in position but in abnormal operation with the output of either over-voltage or undervoltage
			Flashing slowly	Abnormal input of the AC power or the output of the DC power
			Flashing fast	The fan is working abnormally or the power supply is about to expire.
			Off	The power supply is not in position.
FAN/Alarm	Fan alarm indicator	Green	Constantly on	The fan runs normally.
		Red	Constantly on	Abnormal working fan or the fan frame is not in position.
System	System state indicator	Green	Constantly on	The system is starting or down.
			Flashing	The system runs normally.
			Off	No power-on
HardDisk	Hard disk status indicators	Green	Flashing	Reading or writing to the hard disk
			Off	No reading or writing to the hard disk
LINK	MGT-FE Interface status indicator	Green	Constantly on	The port has established a reliable connection
			Off	Wrongly connected interface
ACT		Green	Flashing	Data is being received/transmitted on the port
PC Card	PC Card status indicator	Green	Constantly on	The CF storage card is in normal operation.
			Off	The CF storage card is abnormal or not in position.

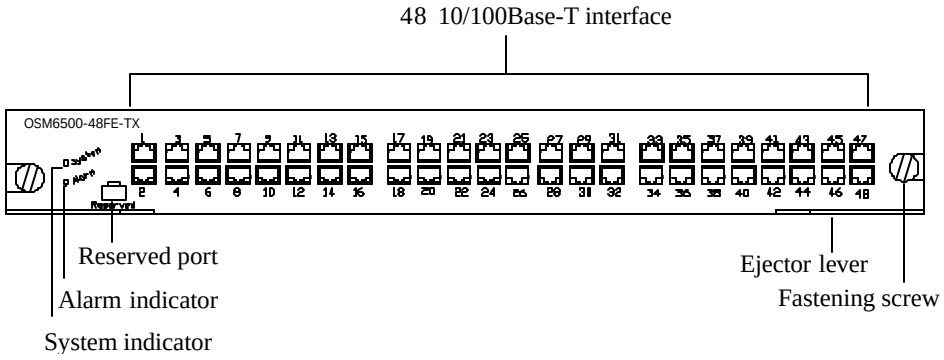
2.2.4 OSM6500-48FE-TX Module

1. Structure of the OSM6500-48FE-TX module

As shown in the figure below, the front panel of the OSM6500-48FE-TX module is composed of the following parts:

- 1 Reserved interface,
- 48 10/100M auto-adaptive Ethernet interfaces and 48 interface status indicators (labeled with “LINK/ACT” or “SPEED”),
- 2 status indicators, namely, 1 power supply/fan alarm indicator (labeled with “Alarm”) and 1 system status indicator (labeled with “System”), and
- 2 ejector levers.

Figure 2-10 Front panel of the OSM6500-48FE-TX module



Caution	Users need to configure the OSM6508 through the Console or MGT-FE port of the main control module. For the OSM6502 that does not support the main control module, users need to configure it through the Console port of the service module in Slot 1, or through the Reserved interface if no console port is available.

2. Interface attributes of the OSM6500-48FE-TX module

Table 2-6 Interface attributes of the OSM6500-48FE-TX module

Interface name	Quantity	Interface type	Interface attributes	Max. transmission distance
FE	48	RJ-45	10/100Base-T	100m

3. LED indicator description of the OSM6500-48FE-TX module

Table 2-7 Indicator description of the module

LED indicator name		Color	Status	Description
System	System status indicator	Green	Constantly on	The module is being enabled
			Off	The module is not powered on or works abnormally
			Flashing	The module is working normally
LINK/ ACT	FE port status indicator	Green	Constantly on	Stable connection to the port is established.
			Flashing	The port is receiving and transmitting data
			Off	The connection to the port is unavailable or abnormal
SPEED		Yellow	Constantly on	The port works in the 100Mbps mode
			Off	The port works in the 10Mbps mode

Caution

For the OSM6508, the functioning status of fans and power supply alarm is shown by the FAN/Alarm indicator of the main control module. The Alarm indicator of the service module is invalid.
For the OSM6502, it is shown by the Alarm indicator of the service module. If fans or power supply fails, the red alarm indicator will get on.

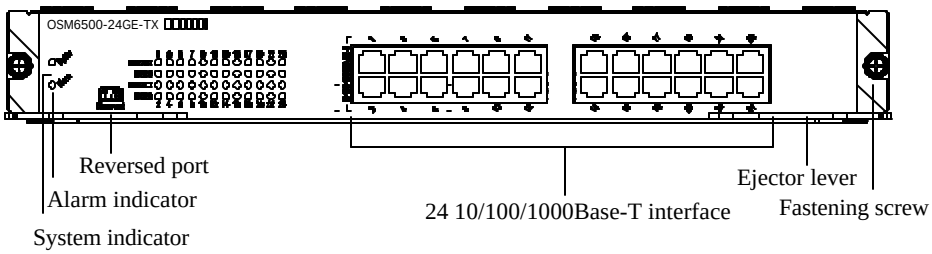
2.2.5 OSM6500-24GE-TX Module

1. Structure of the OSM6500-24GE-TX Module

As shown in the figure below, the front panel of the OSM6500-24GE-TX module is composed of the following parts:

- 1 Reserved interface,
- 24 10/100M auto-adaptive Ethernet interface and 48 interface status indicators (labeled with “LINK/ACT” or “SPEED”),
- 2 status indicators, namely, 1 power supply/fan alarm indicator (labeled with “Alarm”) and 1 system status indicator (labeled with “System”), and
- 2 ejector levers.

Figure 2-11 Front panel of the OSM6500-24GE-TX module



Caution	Users need to configure the OSM6508 through the Console or MGT-FE interface of the main control module. For the OSM6502 that does not support the main control module, users need to configure it through the Console port of the service module in Slot 1, or through the Reserved interface if no console port is available.

2. Interface attributes of the OSM6500-24GE-TX module

Table 2-8 Interface attributes of the OSM6500-24GE-TX module

Interface name	Quantity	Interface type	Interface attributes	Max. transmission distance
GE	24	RJ-45	10/100/1000Base-T	100m

3. LED indicator description of the OSM6500-24GE-TX module

Table 2-9 Indicator description of the module

LED indicator name		Color	Status	Description
System	System status indicator	Green	Constantly on	The module is being enabled
			Off	The module is not powered on or works abnormally
			Flashing	The module is working normally
LINK/ ACT	Interface status indicator	Green	Constantly on	Stable connection to the port is established.
			Flashing	The port is receiving and transmitting data
SPEED		Green	Constantly on	The port works in the 1000Mbps mode
			Off	The port works in the 10M/100Mbps mode

Caution	For the OSM6508, the functioning status of fans and power supply alarm is shown by the FAN/Alarm indicator of the main control module. The Alarm indicator of the service module is invalid. For the OSM6502, it is shown by the Alarm indicator of the service module. If fans or power supply fails, the red alarm indicator will get on.

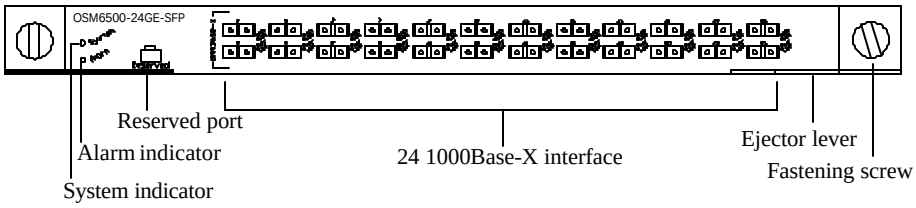
2.2.6 OSM6500-24GE-SFP Module

1. Structure of the OSM6500-24GE-SFP Module

As shown in the figure below, the front panel of the OSM6500-24GE-SFP module is composed of the following parts:

- 1 Reserved interface,
- 24 SFP interface slots and 24 interface status indicators (labeled with “LINK/ACT”),
- 2 status indicators, namely, 1 power supply/fan alarm indicator (labeled with “Alarm”) and 1 system status indicator (labeled with “System”), and
- 2 ejector levers.

Figure 2-12 Front panel of the OSM6500-24GE-SFP module



Caution	Users need to configure the OSM6508 through the Console or MGT-FE port of the main control module. For the OSM6502 that does not support the main control module, users need to configure it through the Console port of the service module in Slot 1, or through the Reserved interface if no console port is available.

2. Interface attributes of the OSM6500-24GE-SFP module

Table 2-10 Interface attributes of the OSM6500-24GE-SFP module

Interface name	Quantity	Interface type	Interface attributes	Max. transmission distance
GE	24	SFP	SFP-G-SX	550m
			SFP-G-MMX	2km
			SFP-G-LX	10km
			SFP-G-ELX	25km
			SFP-G-XD	50km
			SFP-G-ZX	80km
			SFP-G-EZX	120km

Note

For details about SFP interfaces, see the section "Optical (Electrical) Transceiving Module".

3. LED indicator description of the OSM6500-24GE-SFP module

Table 2-11 Indicator description of the module

LED indicator name		Color	Status	Description
System	System status indicator	Green	Constantly on	The module is being enabled
			Off	The module is not powered on or works abnormally
			Flashing	The module is working normally
LINK	SFP interface status indicator	Green	Constantly on	Stable connection to the port is established.
ACT		Green	Flashing	The port is receiving and transmitting data

Caution

For the OSM6508, the functioning status of fans and power supply alarm is shown by the FAN/Alarm indicator of the main control module. The Alarm indicator of the service module is invalid.
For the OSM6502, it is shown by the Alarm indicator of the service module.If fans or power supply fails, the red alarm indicator will get on.

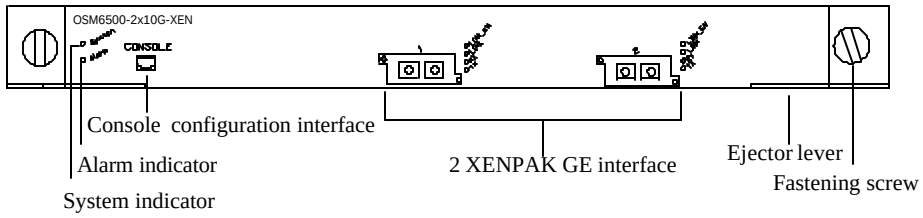
2.2.7 OSM6500-2x10G-XEN Module

1. Structure of the OSM6500-2x10G-XEN module

As shown in the figure below, the front panel of the OSM6500-2x10G-XEN module is composed of the following parts:

- 1 console configuration serial port,
- 2 XENPAK 10GE optical interface slots and 2 interface status indicators (labeled with “LINK_EN, LINK, RX and TX), and
- 2 status indicators, namely, 1 power supply/fan alarm indicator (labeled with “Alarm”) and 1 system status indicator (labeled with “System”), and
- 2 ejector levers.

Figure 2-13 Front panel of the OSM6500-2x10G-XEN module



Caution

Users need to configure the OSM6508 through the Console or MGT-FE port of the main control module.
For the OSM6502 that does not support the main control module, users need to configure it through the Console port of the service module in Slot 1, or through the Reserved interface if no console port is available.

2. Interface attributes of the OSM6500-2x10G-XEN module

Table 2-12 Interface attributes of the OSM6500-2x10G-XEN module

Interface name	Quantity	Interface type	Interface attributes	Max. transmission distance
Console	1	RJ-45	RS-232	Used for configuration
10GE	2	XENPAK	XEN-10G-SR	300m
			XEN-10G-LR	10km
			XEN-10G-ER	40km

Note

For details about XENPAK interfaces, see the section "Optical (Electrical) Transceiving Module".

3. LED indicator description of the OSM6500-2x10G-XEN module

Table 2-13 Indicator description of the module

LED indicator name		Color	Status	Description
System	System status indicator	Green	Constantly on	The module is being enabled
			Off	The module is not powered on or works abnormally
			Flashing	The module is working normally
LINK_EN	XENPAK interface status indicator	Green	Constantly on	The port is allowed to forward data
			Off	The port is prohibited to forward data

Caution

For the OSM6508, the functioning status of fans and power supply alarm is shown by the FAN/Alarm indicator of the main control module. The Alarm indicator of the service module is invalid.
For the OSM6502, it is shown by the Alarm indicator of the service module. If fans or power supply fails, the red alarm indicator will get on.

2.2.8 OSM6500-ESM Expanded Service Module

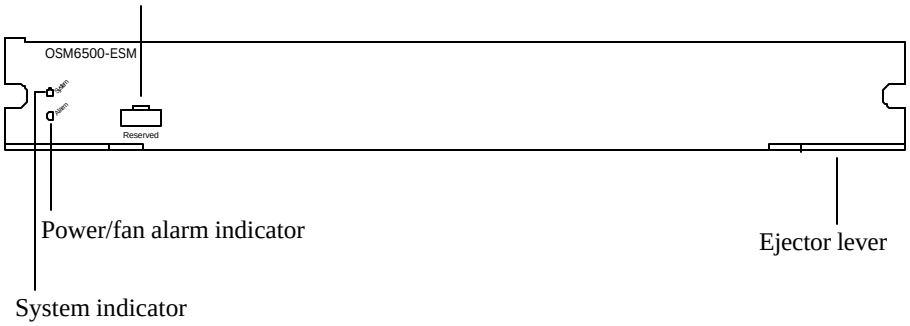
1. Structure of the OSM6500-ESM Expanded Service Module

The **OSM6500-ESM** module is for the expansion of user's service, providing advanced services such as MPLS and VPN and expanding the capacity of the routing table. The front panel

of the module comprises the following parts, as shown in the figure below:

- 1 Console port,
- 2 status indicators, namely, 1 power supply/fan alarm indicator (labeled with “Alarm”) and 1 system status indicator (labeled with “System”), and
- 2 ejector levers.

Figure 2-14 Front panel of OSM6500-ESM



Warning

Do not set the jumpers on the module circuit board at will; otherwise, the module will work abnormally or some other unexpected results will occur.

Caution

Users need to configure the OSM6508 through the Console or MGT-FE interface of the main control module.
For the OSM6502 that does not support the main control module, users need to configure it through the Console port of the service module in Slot 1, or through the Reserved interface if no console port is available.

Caution

The memory bar on the circuit board of a service module is an independent part from the circuit board. Users need to install the memory bar before installing the module. When installing the memory module, align its nick with the nick of the slot.

2. OSM6500-ESM interface attributes

Table 2-14 Interface attributes of the OSM6500-ESM module

Interface name	Quantity	Interface type	Interface attributes	Description
Console	1	RJ-45	RS-232	Used for configuration

3. LED indicators of the OSM6500-ESM module

Table 2-15 Indicator description of the module

LED indicator name		Color	Status	Description
System	System status indicator	Green	Constantly on	The module is being enabled
			Off	The module is not powered on or works abnormally
			Flashing	The module is working normally

Caution

For the OSM6508, the functioning status of fans and power supply alarm is shown by the FAN/Alarm indicator of the main control module. The Alarm indicator of the service module is invalid.
For the OSM6502, it is shown by the Alarm indicator of the service module. If fans or power supply fails, the red alarm indicator will get on.

2.3 Optical (Electrical) Transceiving Module

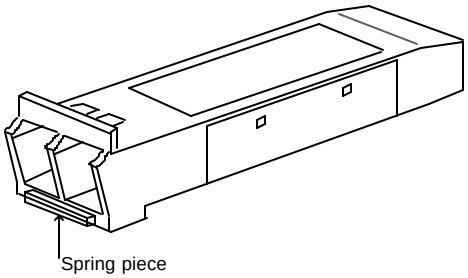
MRV Communications, Inc provides many kinds of optical (electrical) transceiving modules including SFP and XENPAK. Users can make a selection based on the configured service modules.

2.3.1 SFP

SFP is a small form-factor pluggable transceiving module. Small form increases the port density of the line interface

module, and the pluggable capability enables an easy module replacement, thus facilitating upgrade and maintenance of the equipment. The appearance of the SFP module is as shown in the figure below.

Figure 2-15 Appearance of the SFP module



SFP falls into the categories of the optical transceiving module and the electrical transceiving module according to different connection media.

- Currently, most SFPs are optical transceiving modules. The SFP optical transceiving module supports the LC optical interface and multiple rates such as GE and OC-3.
- The SFP electrical transceiving module supports the RJ-45 interface and Gigabit Ethernet.

MRV Communications, Inc provides many kinds of SFP transceiving modules to meet user's needs.

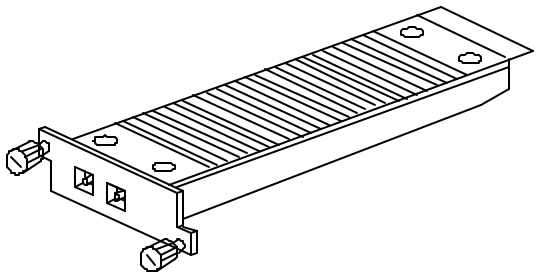
Table 2-16 SFP module type

SFP module type	Specification
SFP-G-SX	SFP 1000Base-SX, MM, 850nm, 0-550m
SFP-G-MMX	SFP 1000Base-SX, Extended MM, 1310nm, 0-2km
SFP-G-LX	SFP 1000Base-LX, SM 1310nm 10km
SFP-G-ELX	SFP 1000Base-ELX, SM 1310nm 25km
SFP-G-XD	SFP 1000Base-XD, SM 1550nm 50km
SFP-G-ZX	SFP 1000Base-ZX, SM 1550nm 80km
SFP-G-EZX	SFP 1000Base-EZX, SM 1550nm 120km

2.3.2 XENPAK

XENPAK refers to the 10G Ethernet cooperation. It is the optical transceiver MSA established jointly by Agilent and Agere, complying with the IEEE802.3ae 10G Ethernet standard. As one of the strictest MSA, it strictly regulates the standard of the 10G Ethernet optical transceiving module in terms of pins, functions and size. The appearance of the XENPAK 10G Ethernet optical transceiving module is as shown in the figure below.

Figure 2-16 Appearance of the XENPAK module



MRV Communications, Inc provides three kinds of XENPAK

interface module, as shown in the table below.

Table 2-17 XENPAK module type

XENPAK module type	Specification
XENPAK-10G-SR	XENPAK optical transceiving module-10 GbE-Multi mode-850 nm-10 km-SC optical connector-3.3 V-XAUI electrical interface
XENPAK-10G-LR	XENPAK optical transceiving module-10 GbE-Single mode-1310 nm-10 km-SC optical connector-3.3 V-XAUI electrical interface
XENPAK-10G-LR	XENPAK optical transceiving module-10 GbE-single mode-1550 nm-40 km-SC optical connector-3.3V-XAUI electrical interface

2.4 Power Distribution System

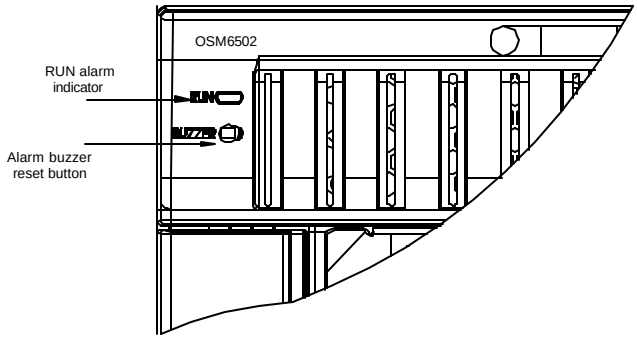
The OSM6508's power distribution system mainly consists of the power module and the power distribution frame. As the OSM6502 requires less power, it is designed in a simpler way. It's power distribution system only includes the power module. The OSM6500 series support two kinds of chassis: AC and DC, which differ in the structure of the power distribution system.

2.4.1 OSM6502 Power Distribution System

The power distribution system of the OSM6502 is in the 1+1 redundancy working mode. On the front panel of the chassis are the power indicator and the alarm buzzer mute key, which

are respectively labeled with RUN and BUZZER, as shown in the figure below. If the two power modules in 1+1 redundancy mode works normally, the buzzer will not issue alarms and the RUN indicator is green. If one module is abnormal, the RUN indicator turns orange and the buzzer sounds an alarm. The alarm generation stops after the user presses the BUZZER mute key.

Figure 2-17 Alarm indicators of the OSM6502



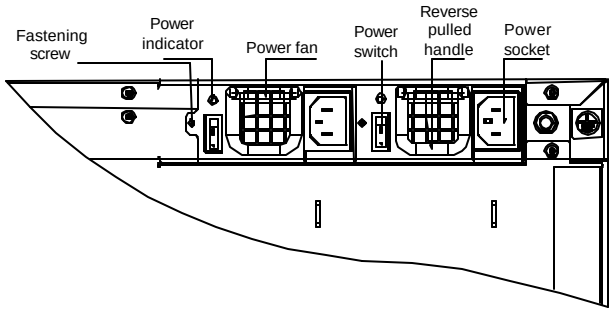
AC power module

The AC power module, on the upper part of the back of the chassis, has the structure as shown in the figure below.

- Each AC power module has one socket and one switch, which should be switched on in normal use.
- The power indicator indicates whether the power module is working normally. Once the power module works, the green indicator is lit on.

- The power fan is for the heat dissipation.
- The handle facilitates the disassembly of the power module.
- The fastening screw at the left side of the power module is to fix the module to the chassis.

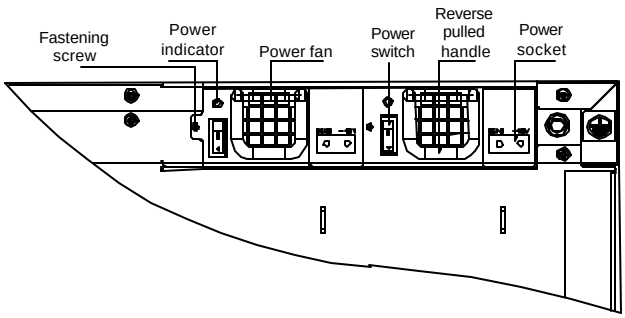
Figure 2-18 AC power module of the OSM6502



DC power module

The appearance of the DC power module is as shown in the figure below, which is almost the same as the AC power module but the socket.

Figure 2-19 DC power module of the OSM6502



2.4.2 OSM6508 Power Distribution System

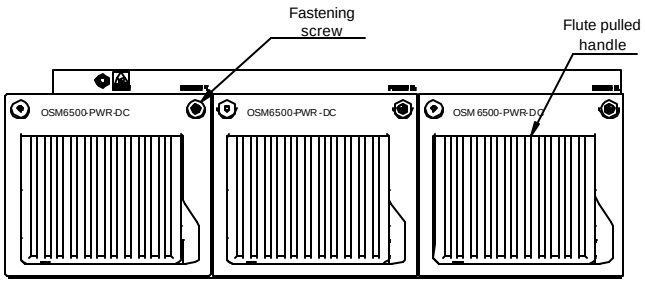
The power distribution system of the OSM6508 is composed of

the power module and the power distribution frame. A group of power modules are at the front of the chassis, and the power distribution frame is at the back of the chassis including the necessary power connection components such as power switches and sockets.

1. Power Module

The power supply module of OSM6508 is located below the front part of the chassis, and the appearance of the AC and the DC power supply modules are the same in addition to their models. The standard configuration of the OSM6508 is of two power modules, and its full configuration is of three power modules, as shown in the figure below. In normal situations, all the power modules work simultaneously to balance current automatically.

Figure 2-20 Power supply module of OSM6508



The power distribution system of the OSM6508 is in the 2+1 redundancy backup working mode. When three power modules are installed, the power distribution system of the OSM6508 supports backup and hot swap. If one power module fails, it can be hot-swapped. When two power modules are installed, hot swap is not supported and users must disconnect the power first and then replace the module.

If one power module fails, other power module(s) will automatically take the responsibility of supplying power to the whole chassis. Meanwhile the power indicator on the main control module turns red and the buzzer sounds an alarm. And when only one power module is installed, the Alarm indicator on the main control module turns red and the buzzer sounds. After pressing the BUZZER alarm mute key, the buzzer will stop sounding an alarm and the user should replace the faulty power module in a timely manner.

2. Power Distribution Frame

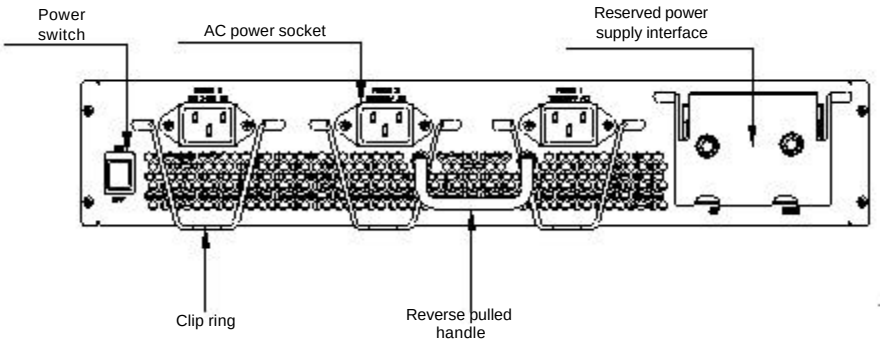
AC power distribution frame

The AC power distribution frame of the OSM6508 is located on

the bottom of the back panel of the chassis. Its structure is as shown in the figure below.

- The power distribution frame provides three AC power sockets to access three channels of AC power to the corresponding power modules. The clip ring at the bottom of the power socket is used to fix the power cable.
- Three power modules share one output control switch.
- The handle in the middle of the power distribution frame facilitates the disassembly of the AC power distribution frame.
- The ventilation hole on the panel of the power distribution frame is for the heat dissipation of the power supply.
- Reserved power supply interfaces are used for the further extension.

Figure 2-21 AC power distribution frame of OSM6508



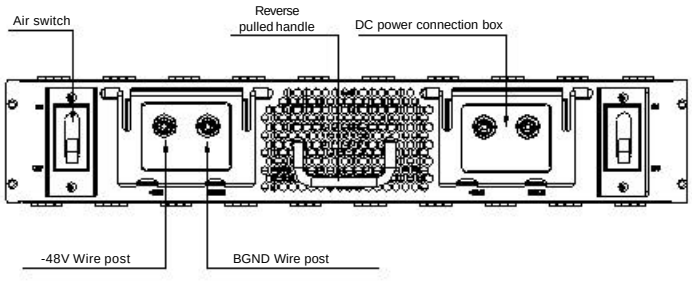
DC power distribution frame

The DC power distribution frame of the OSM6508 is on the bottom of the back panel of the chassis. Its structure is as shown in the figure below.

- Two channels of DC power are accessed through the two DC power connection boxes on the power distribution frame and the two channels of DC power have their own independent air switches. Each channel supplies power for the aforementioned three DC power modules. Hence, the redundancy backup can be implemented.

- The handle in the middle of the power distribution frame facilitates the disassembly of the DC power distribution frame.
- The ventilation hole on the panel of the power distribution frame is for the heat dissipation of the power supply.

Figure 2-22 DC power distribution frame of OSM6508



2.5 Fan Frame

1. Fan Frame Structure

The fan frame of the OSM6500 switch series isolates the fan module from the external environment for the sake of the human safety. The fans serve the purpose of heat dissipation when the chassis is running. The fan frame of the OSM6500 switches is located at the left side of the front panel of the chassis, and it is vertically inserted. The fan frame structure is as shown in the figure below.

Figure 2-23 Fan frame structure of the OSM6502

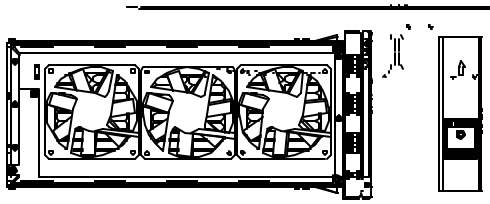
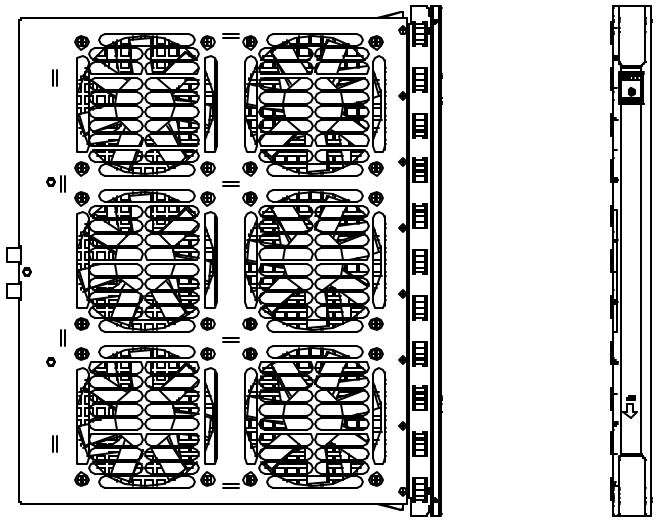


Figure 2-24 Fan frame structure of the OSM6508



2. Ventilation Mode

The heat-sink inside the chassis takes the form of transverse ventilation of fans, to form a level wind channel. In normal situation, air is drawn into the equipment through the air intake vents at the side of the chassis, then passes through the dust-proof filter to reach the slots of the rack-mounted modules in the chassis, and finally comes out from air exhaust vents. The following figures illustrate the air deflection of the

OSM6502 and OSM6508.

Figure 2-25 Air deflection of the OSM6502

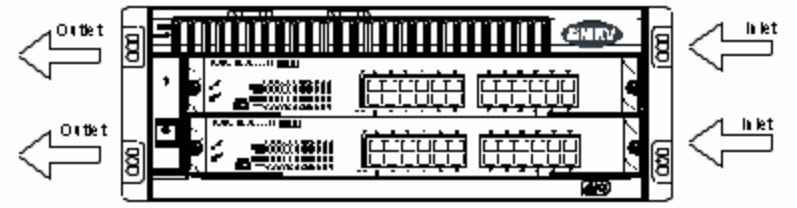
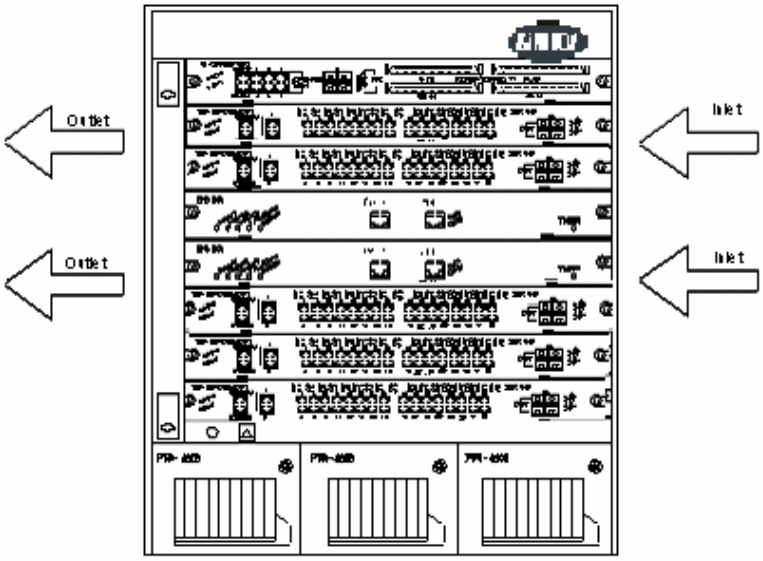


Figure 2-26 Air deflection of the OSM6508



Warning

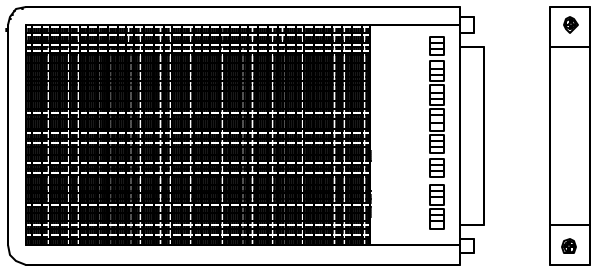
It is forbidden to touch the fan blades with hands.

Caution	The OSM6500 switch series cannot run for a long time without fans. Replace the faulty fan as soon as possible (the fan frame supports hot swap) or disconnect the power to the chassis, before replacing the fan (if the fan replacement should take a long time)

2.6 Dust-Proof Filter

The dust-proof filter is used to prevent the dust in the air from being absorbed in the chassis, serving the purpose of protecting the chassis. The location of the dust-proof filter on the chassis is shown in the rear structure diagram. The dust-proof filter is a copper weaving net and should be cleaned regularly. The dust-proof filters used by the OSM6500 switch series are of a similar structure but different sizes, as shown in the figure below.

Figure 2-27 Dust-proof filter



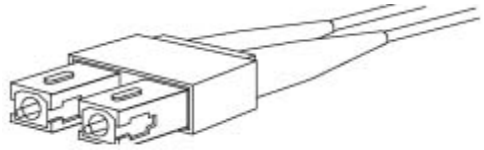
2.7 Optional Component List

2.7.1 Optical Fiber Connector

1. SC-type optical fiber connector

The TX and RX optical fibers of an SC optical fiber connector can be separated or assembled together. The following figure illustrates the optical fiber connector whose two fibers are assembled.

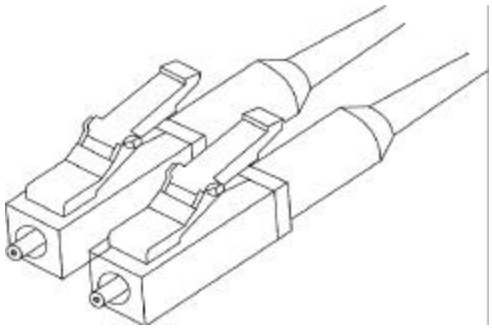
Figure 2-28 Appearance of an SC-type optical fiber connector



2. LC-type optical fiber connector

The LC-type optical fiber connector is square, as shown in the figure below:

Figure 2-29 LC-type optical fiber connector



Precautions for optical fiber usage:

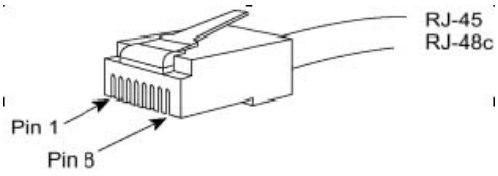
- The invisible radiation may be sent from the optical interface in the case that the optical connecter is disconnected and the dust-proof cap is removed. Therefore, do not directly stare at the optical interface.
- If the optical interface is not connected to the optical connector, be sure to cover the optical connector with a dust-proof cap and ensure the cleanness of the optical fiber interface.
- Before making an optical fiber connection, make sure that the type of optical connector matches the type of optical fiber.
- Make sure that the optical fibers are not over bent during the connection process.
- Make sure that the TX pins of the module interface connect to the peer RX pins and the RX pins to the peer TX pins.

2.7.2 Making of Gigabit (100 M) Network Cable

1. RJ-45 Connector

The appearance of the RJ-45 connector and its pin sequence are as shown in the figure below.

Figure 2-30 RJ-45 connector



The following two tables show the functions of the RJ-45 connector pins in MDI mode, and in MDIX mode respectively.

Table 2-18 Pin allocation of the RJ-45 in MDI mode

Pin number	Signal	Function
1	TxData+	Transmit data
2	TxData-	Transmit data
3	RxData+	Receive data
4	Reserved	
5	Reserved	
6	RxData-	Receive data

7	Reserved
8	Reserved

Table 2-19 Pin allocation of the RJ-45 in MDIX mode

Pin number	Signal	Function
1	RxData+	Receive data
2	RxData-	Receive data
3	TxData+	Transmit data
4	Reserved	
5	Reserved	
6	TxData-	Transmit data
7	Reserved	
8	Reserved	

2. Making the network cable to the Gigabit electrical interface

A Category 5 twisted pair is made up of 8-core thin wires. Two twisted wires are identified by the color of the external insulation layer of the thin wires. In general, a single color and a single color plus white are used to identify a twisted pair, and sometimes two matching colors are used for pair identification. Here the former way is adopted.

The following two figures show respectively the arranging and connection methods of a straight-through cable and a Gigabit crossover cable. Selection shall be based on the application requirements. In the figure, “SIDE1” and “SIDE2” indicate the two ends of the network cable respectively.

Figure 2-31 Making a straight-through network cable

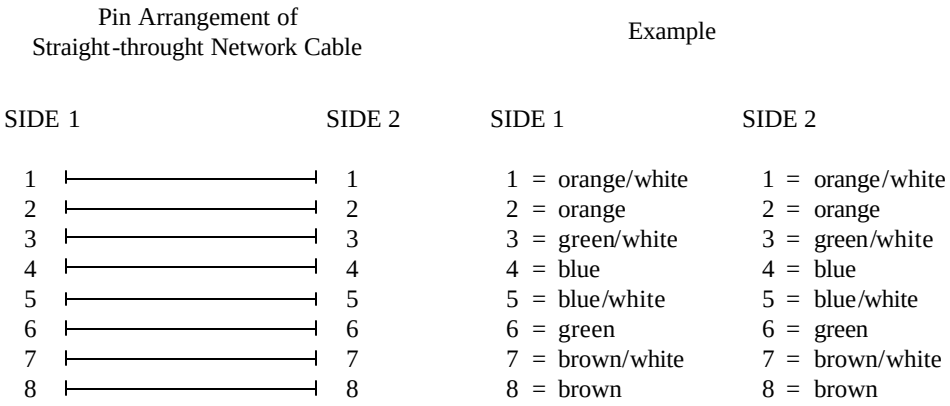
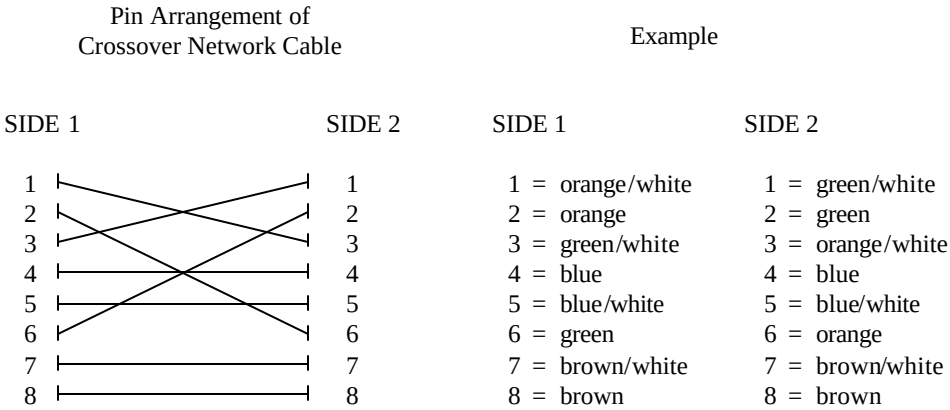


Figure 2-32 Making the gigabit electrical interface category-5 unshielded crossover twisted pair



Caution

It is suggested that the Gigabit electrical interface of the OSM6500 switch series uses the super Category 5 or Category 6 twisted pairs for connection.

2.Making the network cable to the 100 M electrical interface

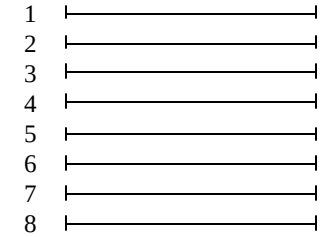
A Category 5 twisted pair is made up of 8-core thin wires. Two

twisted wires are identified by the color of the external insulation layer of the thin wires. In general, a single color and a single color plus white are used to identify a twisted pair, or two matching colors are sometimes used for pair identification. According to this method of identification, the eight-core thin wires of a Category 5 twisted pair can be divided into four pairs: Orange - orange/white, blue - blue/white, green - green/white, brown - brown/white.

Usually there are two kinds of Ethernet cables for connecting two Ethernet devices, which are the straight-through cable and the crossover cable respectively. The following figures show respectively the connection methods of a straight-through cable and a crossover cable. Selection shall be based on the application requirements. In the figures, "SIDE1" and "SIDE2" indicate the two ends of the network cable respectively while numbers "1 ~ 8" represent the line sequence at the two ends.

Figure 2-33 Make the straight-through cable

Pin Arrangement of Straight-throught Network Cable



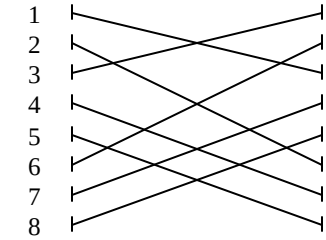
SIDE 1	SIDE 2
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8

Example

SIDE 1	SIDE 2
1 = orange/white	1 = orange/white
2 = orange	2 = orange
3 = green/white	3 = green/white
4 = blue	4 = blue
5 = blue/white	5 = blue/white
6 = green	6 = green
7 = brown/white	7 = brown/white
8 = brown	8 = brown

Figure 2-34 Make the cross-over cable

Pin Arrangement of Gigabit Electrical Interface Class-5 unshielded twisted wire



SIDE 1	SIDE 2
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8

Example

SIDE 1	SIDE 2
1 = orange/white	1 = green/white
2 = orange	2 = green
3 = green/white	3 = orange/white
4 = blue	4 = brown/white
5 = blue/white	5 = brown
6 = green	6 = orange
7 = brown/white	7 = blue
8 = brown	8 = blue/white

3 System Configuration List

3.1 Basic Configuration List

Table 3-1 OSM6502 basic configuration list

Item	Part name	OSM6502 (AC) configuration	OSM6502 (DC) configuration
1	Chassis	1 PCS	1 PCS
2	power module	2 PCS	2 PCS
3	Anti-static wrist strap	1 PCS	1 PCS
4	Console cable	1 PCS	1 PCS
5	Power cable	2 PCS	2 pairs
6	Grounding cable	____	1 PCS

Table 3-2 OSM6508 basic configuration list

Item	Part name	OSM6508 (AC) configuration	OSM6508 (DC) configuration
1	Chassis	1 PCS	1 PCS
2	OSM6500-FM or OSM6500-FM2	1 or 2 PCS	1 or 2 PCS
3	power module	2 or 3 PCS	2 or 3 PCS
4	Anti-static wrist strap	1 PCS	1 PCS
5	Console cable	1 PCS	1 PCS
6	Power cable	2 or 3 PCS	2 pairs
7	Grounding cable	____	1 PCS

3.2 Optional component list

Table 3-3 Optional component list

Item	Part name	maximum configurations	
		OSM6502	OSM6508
1	OSM6500-48FE-TX	2	6 or 7
2	OSM6500-24GE-TX	2	6 or 7
3	OSM6500-24GE-SFP	2	6 or 7
4	OSM6500-2x10G-XEN	2	6 or 7
5	OSM6500-ESM	1	5 or 6

4 Safety Precautions

In operation, users must observe the safety precautions and indications of relevant equipment and products, and the precautions described in this manual only serve as supplements.

4.1 Safe Electrical Operations

Warning	1. Directly contact or indirectly contacting the high-voltage electric supply through moist objects may be fatal. 2. The high-voltage operations that are not standard and correct may result in accidents such as fire and electric shock, and even fatal.

- Please observe the local safety specification in the electrical operations. The relevant personnel must be qualified to conduct high voltage and AC power operations.
- In the operation of AC power supply equipment and cables, such electricity-conductive objects as watches, bracelets and rings are prohibited to wear.
- The equipment must be kept dry and the power supply must be immediately turned off once if it becomes wet.
- In electric operations, special tools must be applied.

4.2 Prevention from Static Damage

The static electricity generated from the human body can damage the static-sensitive components of the equipment. Before contacting the equipment, an anti-static wrist strap must be worn, and the other end of the wrist strap must be properly grounded.

4.3 Prevention from Laser Damages

To prevent lasers from damaging your eyes, it is prohibited to closely or directly look at optical fiber egress.

4.4 Equipment Safety Operations

4.4.1 Drills

It is prohibited to drill a cabinet by your self, as it may destroy the connection lines and cables inside the cabinet, and damage the electromagnetic shielding performance of the cabinet. The metal arising from the drilling may enter the cabinet and result in the short-circuit of the circuit board.

4.4.2 Handling Facilities

The equipment must be handled carefully due to its heavy weight. When handling, care should be taken, so as to prevent the equipment from being damaged or resulting in accidents.

4.4.3 Rack-Mounted Modules

Before contacting the rack-mounted modules, an anti-static wrist strap must be worn, and the other end of the wrist strap must be properly grounded. Do not touch the module circuit, components, connectors and wiring slot when holding a rack-mounted module.

- Do not plug the board with too much force lest that the pins on the motherboard should be slanted.
- Plug the rack-mounted module squarely into the slot and make sure the circuit boards do not contact with each other to avoid short circuiting.

5 Environmental Requirements

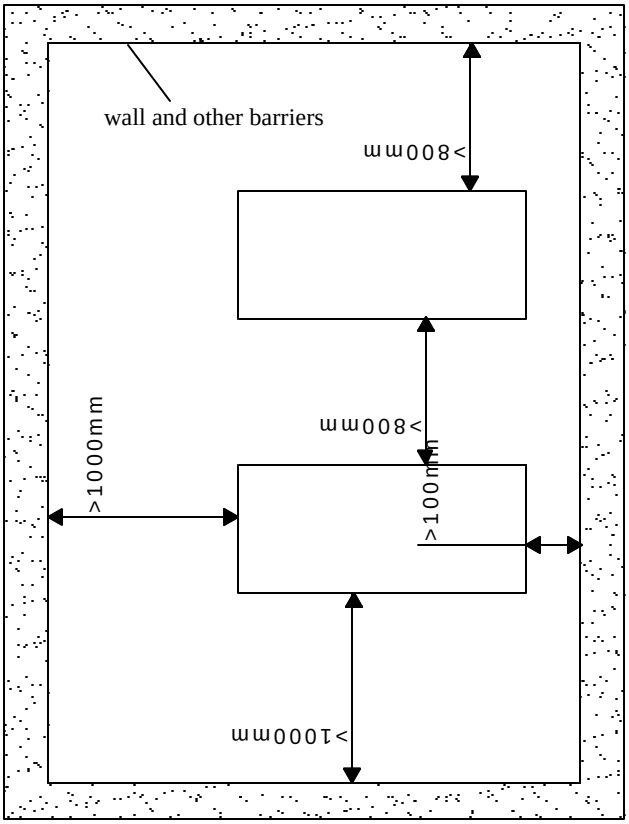
5.1 Requirements on the Space of the Equipment Room

The top view of the equipment room is shown in Figure 5-1 . The side of the rack shall not be less than 0.1m away from the wall surface, and the back of the cabinet shall keep a space of more than 0.8 m wide from the wall surface and other obstacles (including the operation console chair) to facilitate the heat dissipation and maintenance. The distance between the adjacent two rows of cabinets should not be less than 0.8 m.

Do not place the computer monitor on the console close to the window or door to avoid reflection. A 1m space shall be kept between the last row of chairs and the wall surface or other equipment for the convenience of walking and avoid affecting other equipment.

In terms of the height of the equipment room, the net height from the installation surface at the bottom of the equipment to the beam or the ventilation pipe should not be less than 3 m.

Figure 5-1 Top view of the equipment room



5.2 Requirements on the Floor of the Equipment Room

- Check whether the equipment room floor is solid enough to ensure that cabinets can be firmly installed.
- The floor of the equipment room should meet the bearing requirements:

1} The bearing capability of the floor should be more than 450kg/m^2. With regard to the weight of the lead-acid battery, the load bearing of the floor in the battery room should be more than 500kg/m^2 when equipped with the battery below 500AH and more than 600kg/m^2 when equipped with the battery above 800AH.

The load bearing of other places except for the equipment room should not be lower than 300kg/m^2.The loading capability of corridors and stairs should be above 560kg/m^2.

In case of old buildings, the load bearing capability should be improved if the indices do not meet the requirements.

- The floor of the equipment room should be dust-proof, fire-proof, insulated and wearable, and it can be the ground in the forms of varnished cloth, perchloroethylene, cold coating or anti-static raised floor. The floor pieces shall be laid down firmly and seamed well, with the tolerance of less than 2mm/m^2.The ground or floor must be grounded in static terms, and the resistance value of the unit raised floor system should meet the ***Technical Conditions for Computer Room Raised Floor***, the system can be connected with the grounding device through the current-limiting resistor and connection lines.

5.3 Requirements on the Power Supply System of the Equipment Room

- DC power distribution equipment meets the needs of the switch and has a stable voltage, and the output value is within the specified range. When using the DC power supply of –48V rated input voltage, measure the voltage of the DC input terminal of each cabinet, and the permitted voltage fluctuation ranges from –58V ~ -40V.
- For the –48V power supply, the full-range voltage drop of the DC discharge loop should not be more than 3.2V in the selection of the leads for the DC discharge loop to meet the voltage requirements, and the core diameter of the DC power cable should not be less than 25mm^2.
- Check whether there are some batteries with enough capacity.

5.4 Requirements for the DC Power Supply System

- The reliable and stable AC electric supply should be the choice, and its power should meet the requirements. The 220V single-phase 3-wire system is used after the conversion through the power supply conversion equipment.

- The specifications of power cables should be calculated basing on the quantity and power consumption of equipment, which meets the relevant specification requirements with sufficient safety coefficients involved.
- In general, the standby power should be available, and a Diesel generator or UPS with enough capacity or DC/AC inverter must be equipped.
- The AC distribution system should have an AC safety ground.

5.5 Requirements on the Grounding System of the Equipment Room

The grounding system of the equipment room must meet the following basic requirements:

- The measures for grounding should be proper and perfect, and the grounding resistance is less than 2 ohm.
- The protection grounding should be in position with a core diameter of not more than 20mm^2 and a length of less than 30m.

In addition, the grounding system of the equipment room should also meet the following requirements:

- The grounding wire should be lead into the equipment room by the horizontal grounding bus of the vertical grounding bus in the composite grounding device. The grounding wire of each cabinet is led into the horizontal grounding bus in the closest position.
- The DC power supply working ground of each cabinet should be connected from the grounding bus.
- All communication equipment in the equipment room, except the grounding wire close to the sub-bus, are not allowed to form the electrical connection by means of installing the fastening bolts touching the steel reinforcement in the building.
- The grounding terminals must go through the antisepsis and rustproof processing, they shall be screwed tightly and well contacted in the mechanical mode;
- Do not lay down the grounding wires and signal lines in parallel or in a twisted manner to reduce the interference.

- When the equipment is powered in AC terms, the supply socket with the connector of protection point must be applied, as shown in the figure below, and the protection point of the power supply should be reliably grounded in the building.

Caution

The switch cabinet equipment of the OSM6500 series is grounded in working terms, while the shell and cabinet should be grounded in protective terms.

5.6 Requirements for the Working Environment

The environment for running equipment should meet the following requirements:

- The air-conditioning system blows wind evenly and stably.
- Temperature range: 0°C to 40°C; Relative humidity range: 40%-65%. It is recommended to install a temperature and humidity monitoring system.
- The lighting condition in the equipment room should meet the requirements for equipment maintenance, and the room should be brightly lit with a recommended 500-700 lumen/m^2. The routine lighting, standby lighting and accident lighting systems should be available.
- The supports should be firm and reliable without rocking. The standard cabinet is recommended.
- The working environment should be dust-proof, and the density of particles in the air should be less than 180mg/m^3. The printers and the duplicating machines should be placed far from the equipment, so as to prevent the wastepaper and ink powder from sucking into the chassis.
- There should be proper ventilation, and the distance from the fans should be 100mm at least.
- Check whether the water supply and drainage system meets the requirements for normal water supply and fire fighting.
- Other safety measure should be taken for moisture and burglarly.

5.7 Checking Other Facilities

5.7.1 Anti-static Requirements

The OSM6500 switch series have several anti-static measures,

but the static electricity in the environment is still easy to damage circuits and even the whole equipment if it exceeds a certain tolerance, so it is necessary to involve the anti-static consideration in the design of the equipment room environment. And the following are the anti-static requirements that the equipment room should meet:

- Ground the equipment and the floor properly;
- The equipment room is dust-proof;
- Appropriate temperature and humidity conditions should be maintained;
- If the circuit board is to be touched, anti-static wrist straps and an anti-static suit must be worn.

5.7.2 Anti-Interference Requirements

Any interference sources from the outside or inside of the equipment affect the equipment in the capacitance coupling, inductance coupling, electromagnetic wave radiation, common resistance (including the grounding system) and the conduction mode of conducting wire (power supply line, signaling line and output wire).

And the following are the anti-interference requirements that the equipment room should meet:

- The effective anti-interference measures of the electrical network should be taken for the power supply system.
- The working ground had better not be used together with the grounding device or the lightening-protection grounding device of the electrical equipment and the distance be as long as possible.
- Keep far away from powerful radio transmitting stations, radar transmitting stations and high frequency strong current equipment.
- When necessary, electromagnetic shielding measures should be taken.

5.7.3 Requirements for Lightning Protection

- The height of the equipment room should comply with the anti-lightning requirements for the second-category civil buildings and constructions when it is above 15m.
- The equipment room should have measures against direct strike lightning. In lightning-stricken areas, protective measures against side strike lightning should be available. For example, connect the metal external window frame to the lightning protection ground wire; along the height of building, metal lightning-protection bands should be set in a definite spacing on the face of the outside wall.
- The following lightning protection measures are to be taken for the main building. In building positions prone to suffer from lightning strikes, users should install lightning arrester nets or lightning arrester bands. Objects protruding on top of the building such as chimneys, antennas etc. aerial lightning prevention wire or lightning rods should be installed on the top for protection. The grounding wire of lightning-protection device should not be smaller than $2mm^2$, and its spacing should not be larger than 30 meters.
- The grounding resistance of the building lightning protection grounding device should be no more than 10 ohm. Before external cables and metal pipes etc. are introduced into the building, they should be grounded. When outdoor aerial cables directly enter a room, the lightning arrester should be installed at the entrance. At the top of chimneys or antennas etc., lightning rods or lightning protection rings should be installed. For buildings and structures, it is advisable to use the steel reinforcement of the reinforced concrete building slabs, beams, pillars and foundation as the discharge line for lightning-protection devices.
- If the lightning-protection grounding cannot be separated from the grounding of the telecommunication and power supply system due to the small place occupied by buildings, the joint grounding system should be adopted. The joint grounding system connects the operating ground and protection ground for telecom use and the lightning protection ground of the building as well as the ground of the industrial frequency AC power supply system together. The grounding resistance value for joint grounding should be determined as required by the minimum resistance value of the grounding devices.
- It is advisable that the metal structure of the building (e.g. reinforcement in walls and pillars) be used as down lead for lightning-protection grounding. The down lead should be linked electrically to equalize the electric potential within the building.

5.7.4 Anti-seismic requirements

The quakeproof intensity of the telecom equipment building should be designed one degree higher than the local construction intensity. Those equipment buildings in short of quakeproof intensity requirements have to be strengthened. The construction departments should be invited to join the design and its execution.

OSM6500 uses the following measures in the installation to stand a Richter 7 earthquake.

- The cabinet of OSM6500 uses a light and strong aluminum structure. There are locking devices to fix the circuit boards in the cabinets.
- When combining sever cabinets together in the installation, lock the top between the two cabinets by two cabinet-combining board. Row several cabinets together.
- The cabinet is fastened with the ground through the adjustment foot and supports. The cabinet is fastened with the sunshade to enable itself to be integrated into the building.

5.7.5 Requirements for Fire

The fire-proof design of the equipment room should meet the stipulations in the Code for Fire Protection Design of Buildings, and the buildings for communication should be placed on the

top of the fire-protection units list, the design of them should be secondly and firstly graded (for tall buildings). The equipment room should be equipped with the emergency extinguishing equipment, and an automatic fire alarm system is recommended.

6 Unpacking for Inspection

Caution

In the transport of the OSM6500, waterproof and shake-proof measures should be taken. After the equipment arrives at the destination, it should not be handled roughly, and should be kept away from sunlight and rain.

6.1 Preparations

6.1.1 Checking the Packing Case

Before unpacking, check the condition of the packing case, and the consistency of the packing information with your purchase contract.

Caution

If the packing case is damaged or the packing information is incorrect, keep them as they are and contact your local MRV representative.

6.1.2 Environmental Requirements

There should be basically no vibrations and no strong electromagnetic interference. There should also be good

anti-static capability and spacious ground with low dust density.

Note

It's recommended to unpack inside the equipment room or near it, so as to avoid difficulty of handling or damaging the equipment.

6.2 Unpacking and Checking the Equipment

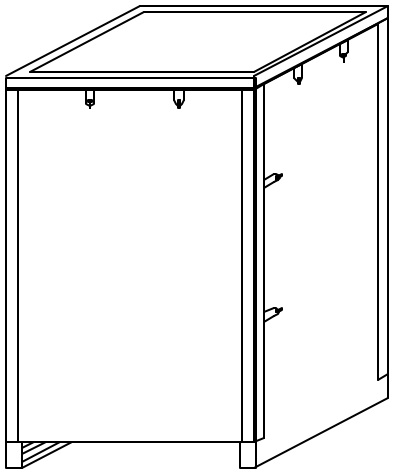
6.2.1 Chassis Unpacking Operation

1. Structure of Packing Case

The packing case for the OSM6500 switch series uses the assembled wooden box fastened with plastic buckles, as shown in Figure 6-1 . The case contains such packing materials as foam bolsters, plastic bags and desiccant. The chassis is contained in a plastic bag and protected with foam bolsters in its upper and lower part as well as its four edges, and the foam bolsters are firmed by the connection of paperboard.

First, place the packing cases by the marks on the case body. After unpacking, take out the equipment and accessories from the case and dismantle the packing materials.

Figure 6-1 Packing case for chassis



2. Working Procedure

1) Remove the external packing materials and the accessory box.

Place the packing cases by the marks on the case body, and dismantle the plastic buckles around the top cover panel with a claw hammer or a screwdriver to open the upper cover panel, and take out the accessory box and the foam bolster at the top of the chassis.

2) Remove the packing materials of the equipment

Remove such packing materials as foam bolsters from the

equipment and carefully drag out the OSM6500. And then remove the packing bags.

Caution	When the OSM6500 is moved from a dry place at lower temperature to a wet place at high temperature, do not unpack the bags until 30 minutes later, otherwise the moisture will get condensed on the OSM6500 surface and possibly damage the equipment. The OSM6500 must be handled carefully due to its heavy weight.

3) Take out the accessories.

Take the accessories out of the accessory box and remove the plastic packing bags.

6.2.2 Operation of Unpacking Rack-Mounted Modules

The unpacking case of the rack-mounted modules is generally a cardboard box, in which such packing materials as foam bolsters, anti-static plastic bags and desiccants are contained. After unpacking the box, anti-static wrist straps should be worn when the rack-mounted modules are taken out of the anti-static protective bags.

Caution

When taking out the rack-mounted module, users must wear anti-static wrist strips, to prevent damaging the equipment.

6.3 Acceptance of Equipment

6.3.1 Acceptance Procedure

After the unpacking, the procedure of acceptance as required by the contract and the packing list is as follows:

- Appearance check: The equipment should have no defects, looseness or damages.
- Integrity check: The components and accessories required in the installation of equipment are complete or not.
- The equipment and devices with vulnerable electric features should be checked by the engineering personnel (network engineers or representatives from MRV Communications, Inc).
- In the occurrence of problems, the engineering personnel should be responsible for filling in the feedback form.

6.3.2 Signature for Confirmation

After acceptance, the user and the engineering personnel (network engineers or representatives from MRV Communications, Inc) jointly affix their signatures on the packing list for confirmation.

7 Equipment Installation

7.1 Configuration List of Installation Tools

The tools for installation include:

- Cross screwdriver
- Flathead screwdriver
- Anti-static wrist strap

7.2 Installation of Chassis into the Cabinet

It is recommended that users choose the 19-inch standard cabinet. The specific method for installing the OSM6500 series into the cabinet is as follows:

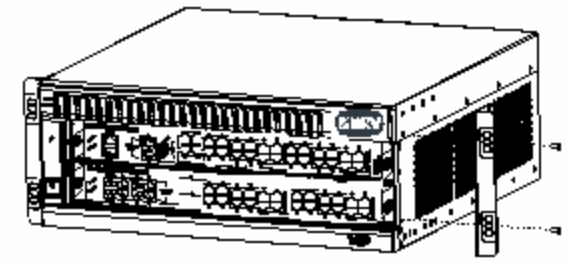
Note

If the chassis has been installed with the rack-mounting ear, users may skip Step 1 and start from Step 2 directly.

Step: First, the direction of the rack-mounting ears connected to

the chassis should be correct before installation, or else, the chassis may not be able to be installed into the standard cabinet. Use the screws among the accessories to fix the rack-mounting ear onto the chassis, as shown in the figure below (OSM6502 for example).

Figure 7-1 Fixing the rack-mounting ear onto the chassis of OSM6502



Step 2: Measure out an appropriate hole location on the cabinet in accordance with the hole diameter provided by the figure below, to ensure each group of bolt holes on the ear to have at least one bolt hole on the corresponding cabinet. And then make some marks near the bolt holes on the corresponding cabinet.

Figure 7-2 Hole distance of the OSM6502 rack-mounting ears

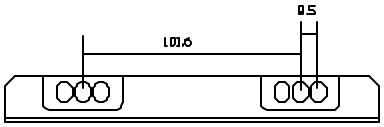
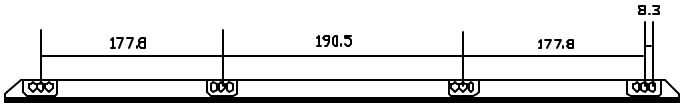


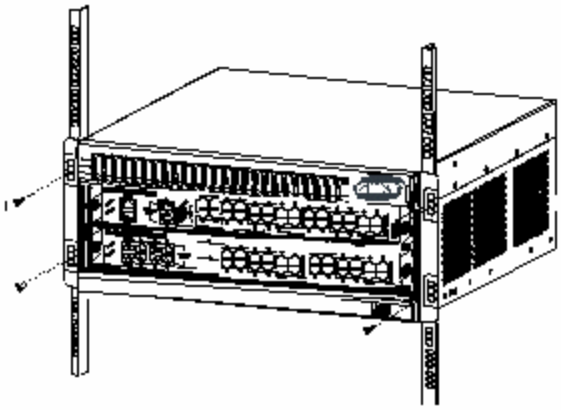
Figure 7-3 Hole distance of the OSM6508 rack-mounting ears



Step 3: The installation personnel should hand the two sides of the chassis, and slowly push it inside in the direction of the front of the cabinet along the guide slot, they may adjust the equipment according to the marks near the bolt holes, until the bolt holes of the rack-mounting ear and the cabinet are aligned.

Step 4: Use the M6 screws to fix the rack-mounting ears onto the cabinet, to ensure the stability of equipment. The operation is shown as follows (OSM6502 for example):

Figure 7-4 Installing OSM6502 into the cabinet



7.3 Connection of Grounding Wire and Power Cable

7.3.1 Connecting the Grounding Wire

Caution	For the OSM6500-AC, the AC input power cable can be used for safe grounding in normal cases. But in the case that the power cable does not meet the conditions for grounding or the grounding protection is not perfect, it is recommended to use the grounding bar on the chassis. For the OSM6500-AC, MRV Communications, Inc provides the OT terminals and grounding rods only. The grounding cables are not provided.

To guarantee safe running, the equipment should be grounded properly. The backpanel of the chassis of the OSM6500 switch series provides grounding rods marked with ⏚. Take the following steps for connection.

Step 1: Loosen the fastening screw of the grounding rod.

Step 2: Sheath one end of the grounding wire that has been press-fit with the OT terminal on the grounding rod, and tighten the screws.

Step 3: Connect the other end of the grounding wire with the grounding terminal.

Figure 7-5 Grounding Wire Connection for the OSM6502-AC

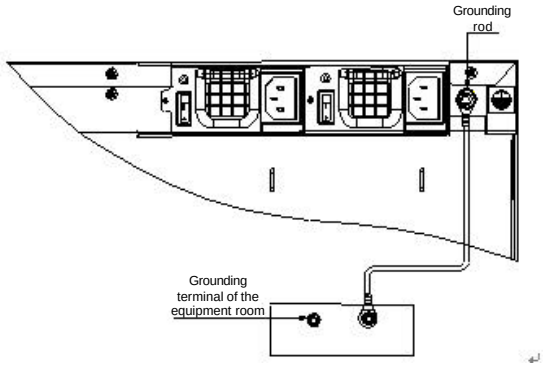


Figure 7-6 Grounding wire connection for the OSM6502-DC

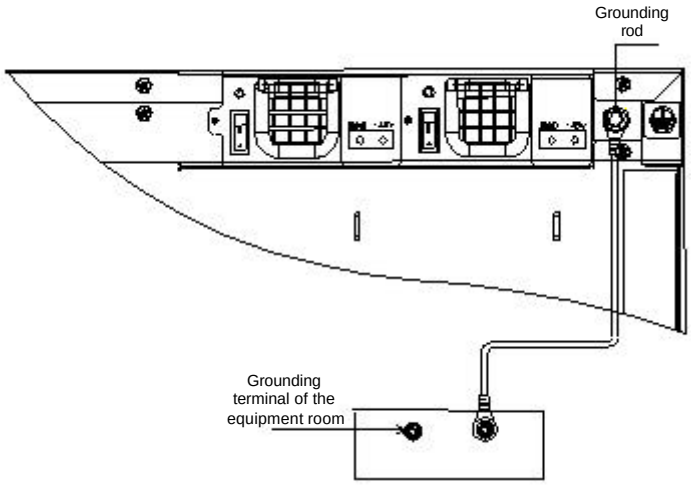


Figure 7-7 Grounding wire connection for the OSM6508-AC

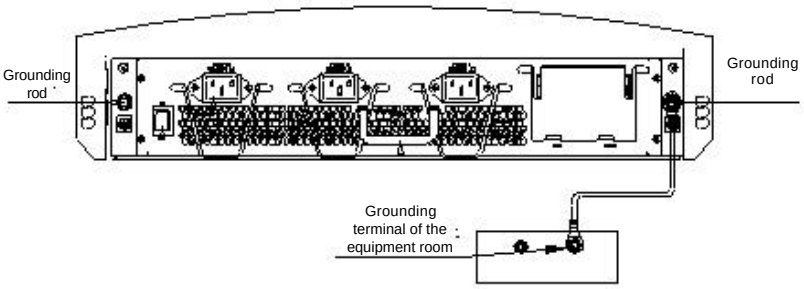
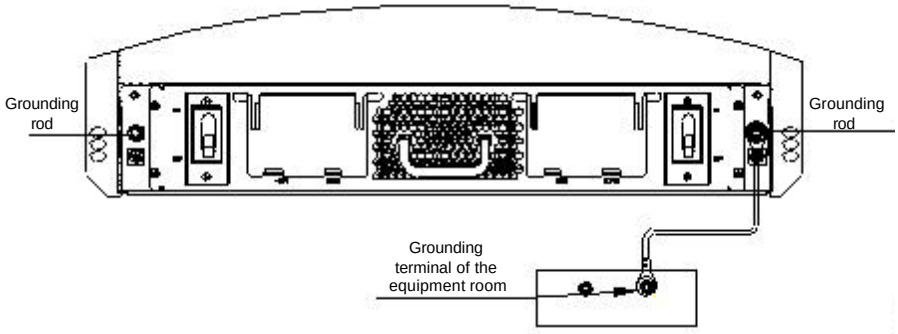


Figure 7-8 Grounding wire connection for the OSM6508-AC



Caution

For OSM6508, users can select any one of the two grounding rods.

7.3.2 Connecting the AC Power Cables

The power input of the AC version OSM6500 switch series

ranges from 100? 240VAC. Before the connection of the power supply, please verify the specifications of the power supply to ensure the correct power is accessed, to prevent the equipment from being damaged. The procedure for connecting the AC power cables is as follows:

Step 1: Confirm that the power switches of the equipment are in the OFF status.

Step 2: Plug one end of the attached power cable to the power socket on the back panel of the chassis. The OSM6508 is equipped with clip rings that can be used to fix the power cables.

Step 3: Plug the other end of the power cable to the AC power socket provided for the switch.

Figure 7-9 AC power cable connection of OSM6502

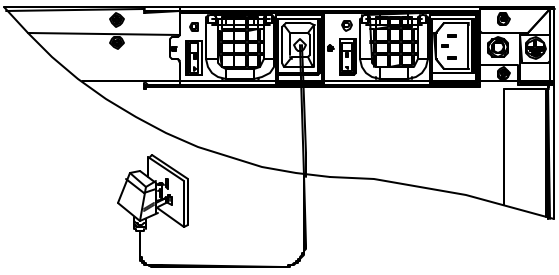
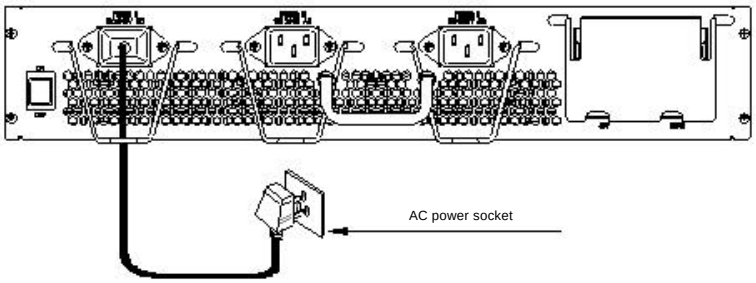


Figure 7-10 AC power cable connection of OSM6508



Step 4: Repeat Step 2 and 3, and connect the power cables of other power modules.

7.3.3 Connecting the DC Power Cable

The power input of the DC version OSM6500 switch series ranges from -38? -58VDC. Before the connection of the power supply, please verify the specifications of the power supply to ensure the correct power is accessed, to prevent the equipment from being damaged. Connect the DC power cable following the procedures below:

Step 1: Confirm that the power switches of the equipment are in the OFF status.

Step 2: Cut out two pieces of power cable with the same length,

one end of them is connected to the positive/negative terminal of the DC power distribution cabinet provided by the equipment room.

Step 3: Drag the other end of these cables to the rear of the chassis, and connect the related power terminals by positive/negative pole.

Figure 7-11 DC power cable connection of OSM6502

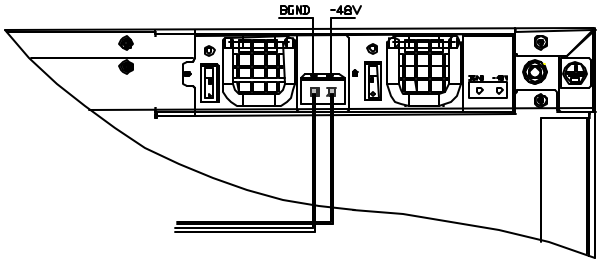
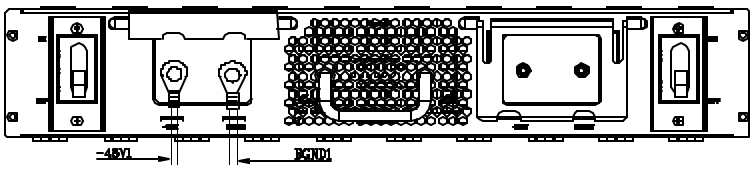


Figure 7-12 DC power cable connection of OSM6508



Step 4: Repeat Step 2 and 3, and connect the DC power cable at the other side.

7.3.4 Power-on Test

To ensure the normal power supply of the chassis, the no-load power-on test must be done to the chassis to check the running of power supply and fans before the main-control module and service modules are formally installed. If they are not running normally, check whether the installation and connections are correct. Once they are running normally, switch off and go on to the following installation steps.

7.4 Rack-Mounted Modules

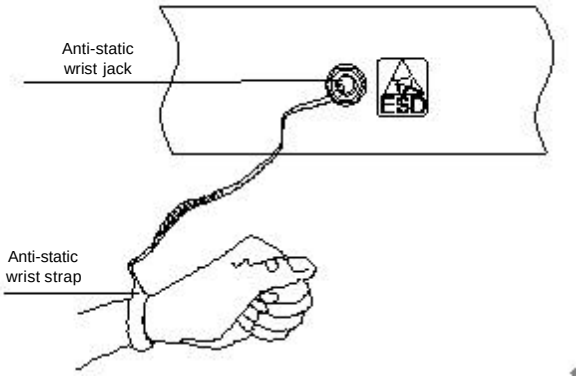
To avoid damage to the components on the rack-mounted modules caused by the static electricity from the human body, users must wear anti-static wrist straps and keep themselves away from the components on the circuit boards as far as possible before the installation. The steps for wearing the anti-static wrist straps are as follows:

Step 1: Stretch your hands into the straps.

Step 2: Tighten the snap closed and confirm that the anti-static wrist straps contact your skin properly.

Step 3: Insert the other end of the wrist straps into the anti-static plughole marked ESD on the front panel of the chassis.

Figure 7-13 Wearing an anti-static wrist strap



Caution

The main control module and service modules are hot swappable, but users must wait for at least 60 seconds before re-inserting the modules after they are pulled out.

7.4.2 Installing Service Modules

The steps for installing the main control modules of the OSM6500 switch series are as follows:

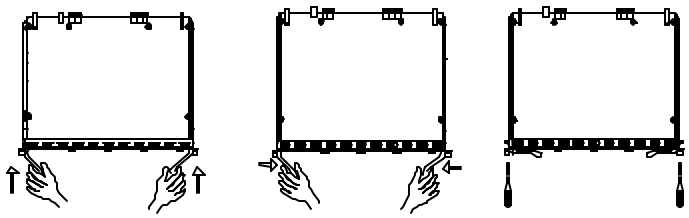
Step 1: Confirm that the grounding rods are properly grounded.

Step 2: Wear an anti-electrostatic wrist strap. Before contacting the circuit board, wear the anti-static wrist straps, and confirm that it is properly connected to the ESD connectors on the front panel of the chassis.

Step 3: Remove the blank front panel. Unscrew counter-clockwise the screws of the blank front panel until they loosen, and then remove it.

Step 4: Install the main control module. As shown in the figure below, align the main control module with the egress of the slot and push it slowly inside along the internal slide. Evenly press the two ejector levers at the right and left sides on the front panel. When it comes near the connectors on the back panel, press the connectors of the main control module into the connectors of the back panel, then fasten the screws at both sides of the modules. Once the module has been installed, do not touch the circuit board.

Figure 7-14 Installation of main control module



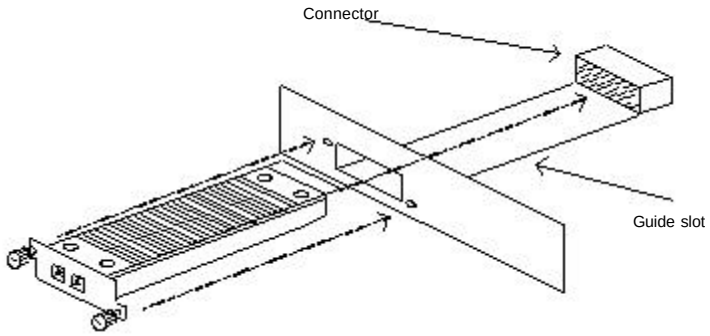
7.4.3 Installing Service Modules

The service module is consistent with the main control module in size and structure, and the interfaces of the connectors on the back panel are the same, so the method for installing them are identical, and the service module should be installed in the same way as the main control module.

7.4.4 Optical (Electrical) Transceiving Module

Upon installing the service module, users should install appropriate transceiving modules for different service modules, the figure below describes the installation of the XENPAK module:

Figure 7-15 Installation of the XENPAK module



Step 1: To prevent damage by the static electricity, users should wear the anti-static wrist straps.

Step 2: Push the transceiving module into the slot along the guide slot on the circuit board of the service module.

Step 3: When the plug of the XENPAK module contacts the connector on the circuit board, users may push it inside with even force until this module is completely inserted into the connector.

Step 4: Tighten the screws at both sides to fix the module.

The SFP module can be installed in a similar way to the XENPAK module, except the last step. When the SFP module is totally inserted into the connector, a spring piece on the

module will automatically spring up, which prevents the module from jumping out when swapping the optical fiber. Upon uninstalling the module, users must press the spring piece first to pull out the module.

7.4.5 Installing Blank Front Panel

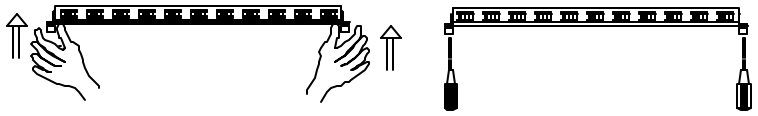
Slots without modules should be installed with the blank front panel, to form a complete wind channel in the chassis. It will also ensure reliable heat-sinking capability of the system and dust-proofing requirements for the chassis. As shown in the figure below, is the procedure of installing blank front panels:

Step 1: Use your hands to hold the screws at both sides of the blank front panel, and place it in the empty slot.

Step 2: Use your hands to press the blank front panel in the empty slot with even force, with the screws at both sides aiming at the screw holes at both sides of the slot.

Step 3: Tighten the screws at both sides of the blank front panel to complete the installation.

Figure 7-16 Installation of blank front panel



7.5 Connecting the Configuration Cables

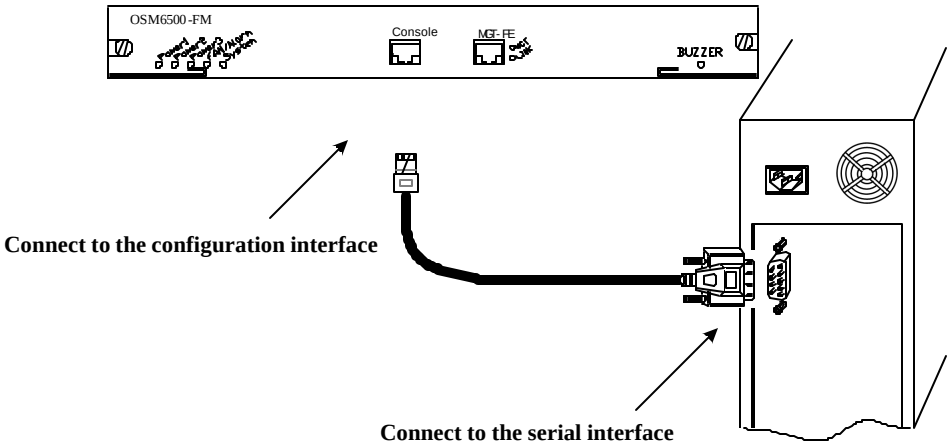
Before power-on and configuration management of the system, the configuration cables are needed to connect the chassis to a terminal console PC. Follow the steps below for connection:

Step 1: Connect the end of the configuration cable with the RJ-45 connector with the configuration interface on the rack-mounted module.

Caution	Users need to configure the OSM6508 through the Console or MGT-FE interface of the main control module. For the OSM6502 that does not support the main control module, users need to configure it through the Console port of the service module in Slot 1, or through the Reserved interface if no console port is available.

Step 2: Connect the DB-9 plug at the other end of the configuration cable with the serial port of the terminal console PC.

Figure 7-17 Connection of configuration cable



8 Startup and Upgrading of the System

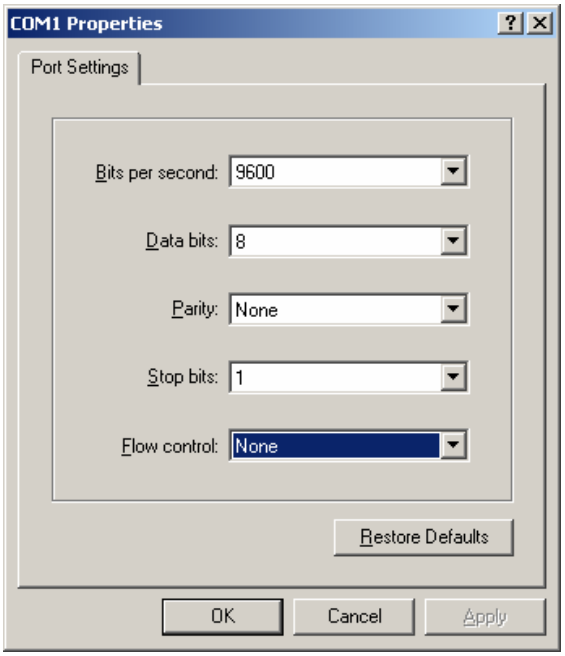
8.1 Setting up the Configuration Environment

Step1	Run the HyperTerminal program on the PC, enter the name of the new connection (for example “OSM6508”) in the “Connection Description” interface

Figure 8-1 Connection Description interface of HyperTerminal

Step2	Select the actual serial port to be used (for example COM1) for connection in the “Connect To” interface.
Step3	Set the terminal parameters as follows:

Figure 8-2 Parameter settings of HyperTerminal



Step4	Enter the HyperTerminal interface:
Step5	Press “  ” to enter the properties setting window and then set the terminal simulation as VT100. Then click OK.

8.2 Power-on and Startup of OSM6500

Before powering on the OSM6500, users should make sure:

- The power cable is correctly connected and the chassis is properly grounded. The power supply voltage complies with the switch requirements.
- The cable of the configuration interface is correctly connected, the terminal for configuring the equipment has been enabled, and the terminal parameters have been correctly configured.

The switch can be powered on after the above installation and checks. The system enters the self-test phase after power-on

and the following will normally occur

The “System” indicator is constantly on and then quickly flashes for several seconds, and after that, it will be constantly on for several seconds, finally, this indicator will continually flash, which shows that the system has been reset and enters the normal status.

Boot-up messages, such as serial No. and software/hardware versions, will appear on the HyperTerminal window on the PC, and then the prompt for the logon will appear after the completion of the self-test. Press Enter to log on to the system, and the command prompt appears, e.g. “OSM6502>”.

The OSM6500 switch series provides a wide variety of online help information, to help users to input the commands:

- Enter <help> in any command m ode to get a brief description of the help system.
- There is a built-in syntax help in the command line interface. If users are uncertain about the syntax of a command, enter the preceding part of this command that users know, and key in “?”, in this case, the command line will prompt users about the meaning or function of this command, and if users enter “Space +” behind the command, the command line will prompt users about the command list possibly appearing behind the part of the commands users have entered. Users can continue to input the commands according to the prompt until the “<cr> Just Press Enter to Execute command!” appears.
- It shows that the command has been completely input. Press Enter to execute it.

Note

For the detailed introduction of the configuration commands and methods, refer to the relevant software configuration manual and command reference manual.

8.3 Upgrading the System Software

The OSM6500 switch series supports software upgrading using TFTP. Users can use TFTP to upgrade the version of the OSM6500 or configure the file management with the related commands provided on the chassis. The method for downloading files from the TFTP server is as follows:

Step 1: Select an Ethernet interface from the OSM6500 for downloading the files. Both the management interface on the main control module of the OSM6500 switch series and the Ethernet interface on the service module can be used to connect the TFTP server to download files.

Step 2: Configure the IP address on the VLAN of the Ethernet interface used for downloading files and that of the TFTP server. These two IP addresses should be on the same network segment. Here, the supposed IP address of the TFTP server is 192.168.1.1/24.

Step 3: Run the TFTP Server program on the TFTP server.

Step 4: Key in the command, "`download tftpos 192.168.1.1os.binall`", to start to download of the file. "os.bin" is the filename.

After the completion of downloading, the system displays the following information:

Connecting to server: 192.168.1.1

Downloading file from server...

```
Receiving data...
Writing flash...
```

Step 5: Key in the `reboot` command to restart the equipment and to make the new software effective.