S8500 Installation Manual

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Chapter 1   Overview

For **convenience of description, S8500 switches are called as S8500.**

1.1 Introduction

In recent years, Internet users increase explosively. Users are not satisfied with communications based on the telephone network. They wish telecom carriers to provide multimedia services like audio, data and pictures. The traditional bandwidth access mode cannot meet the increasing requirements for telecom services. The bandwidth access technology can bring great changes to people's life and work.

Compared with ADSL and HFC, the Ethernet access mode has advantages like bandwidth and low cost. IP is the main service of the bandwidth MAN, while Ethernet is the direct mode to bear the IP service. No other specific devices need be added for the network and users, which reduces the cost of protocol transform. Meanwhile, the Ethernet access mode is much suitable to relatively-populated community users, which meets the access network optical trend. Hence, the Ethernet is widely applied to the bandwidth access field.

Facing this trend, we provides a business Ethernet solution, a kind of business-oriented Ethernet access solution. S8500 is a manageable bandwidth access aggregation device produced.

S8500 has the user management function and the multi-layer switching function. It provides large-capacity multilayer switching capability, the wire-speed user access management capacity and multiple charging modes. It provides carriers a mature and flexible operation mode.

S8500 can meet users' requirements to add single board and plug-ins.

S8500 supports the following services:

⌘   Internet broadband access ⌘   Large-capacity data exchange between

MAN enterprises or in the firm

1.2 Attributes of S8500

⌘   Parallel development of wire-speed L2/L3 switchover and wire-speed access

⌘ Flexibility and high performance obtained from ASIC wire-speed processing and the network processor ⌘ High active-passive redundancy without restarting ⌘ Proper switchover capacity and high port density

⌘ Coexistence of multiple access modes ⌘ Uniform user management ⌘ Flexible charging mechanism ⌘ RADIUS-based user broadband management and privilege control

⌘ Easy non-Ethernet module expansibility provided by the standard switchover frame

1.3 S8500 Appearance

S8500 series includes three models, S8503, S8506 and S8510, whose appearances will be displayed below respectively.
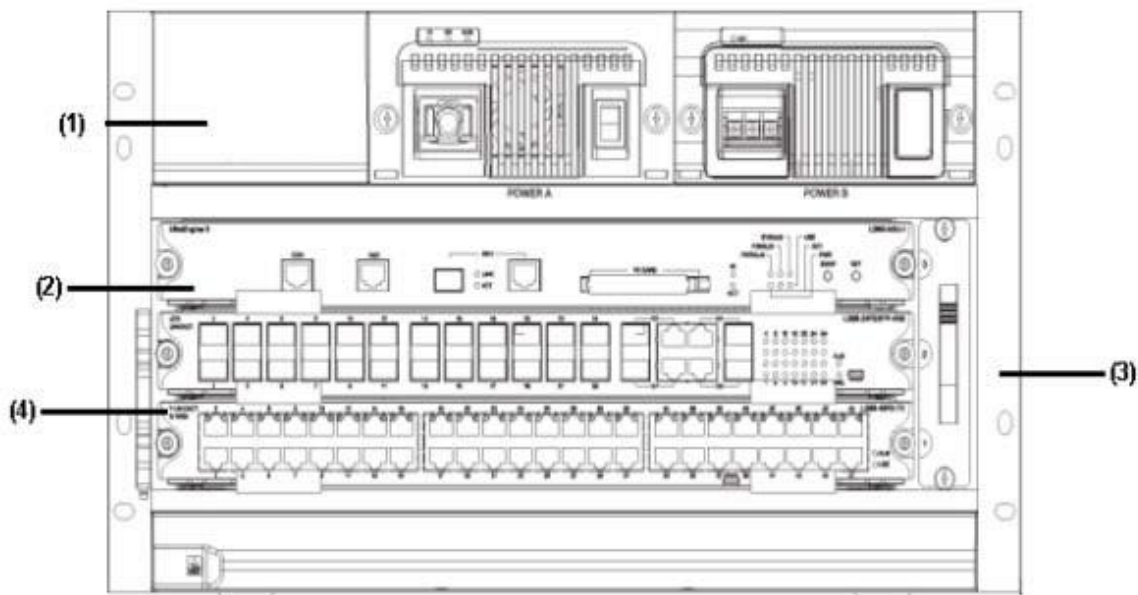
Figure 1-1 S8503 appearance

(1) Power source layer: The AC/DC power module can be configured on this layer.
(2) Functional module layer: Three single-board slots are provided and thus three functional modules can be supported, among which slot 3 can be inserted only the console module.
(3) Fan module layer: A slot for the fan module is provided.
(4) Line clip: It is used to fix the Ethernet line or the optical fiber on the front port.
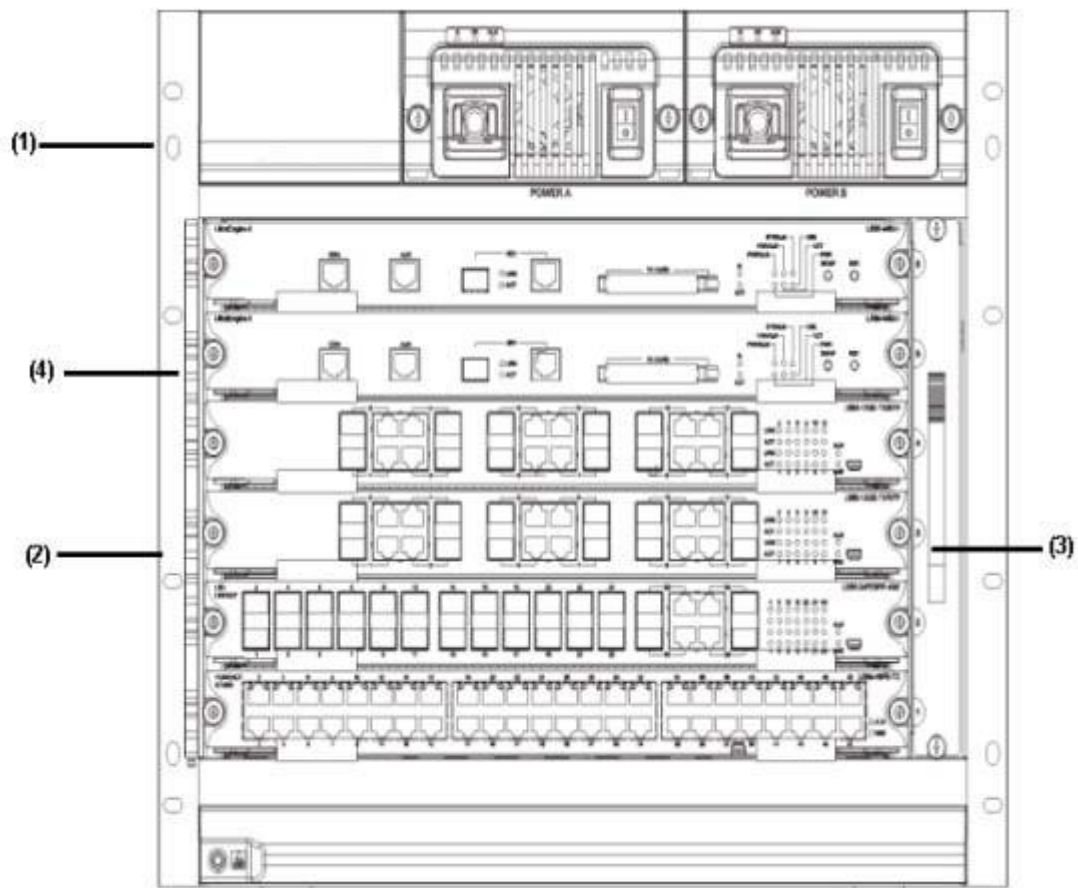
Figure 1-2 S8506 appearance

(1) Power source layer: The AC/DC power module can be configured on this layer.
(2) Functional module layer: Six single-board slots are provided and thus six functional modules can be supported, among which slot 5 and slot 6 are the backup slot each other and can be inserted only the console modules.
(3) Fan module layer: A slot for the fan module is provided.
(4) Line clip: It is used to fix the Ethernet line or the optical fiber on the front port.
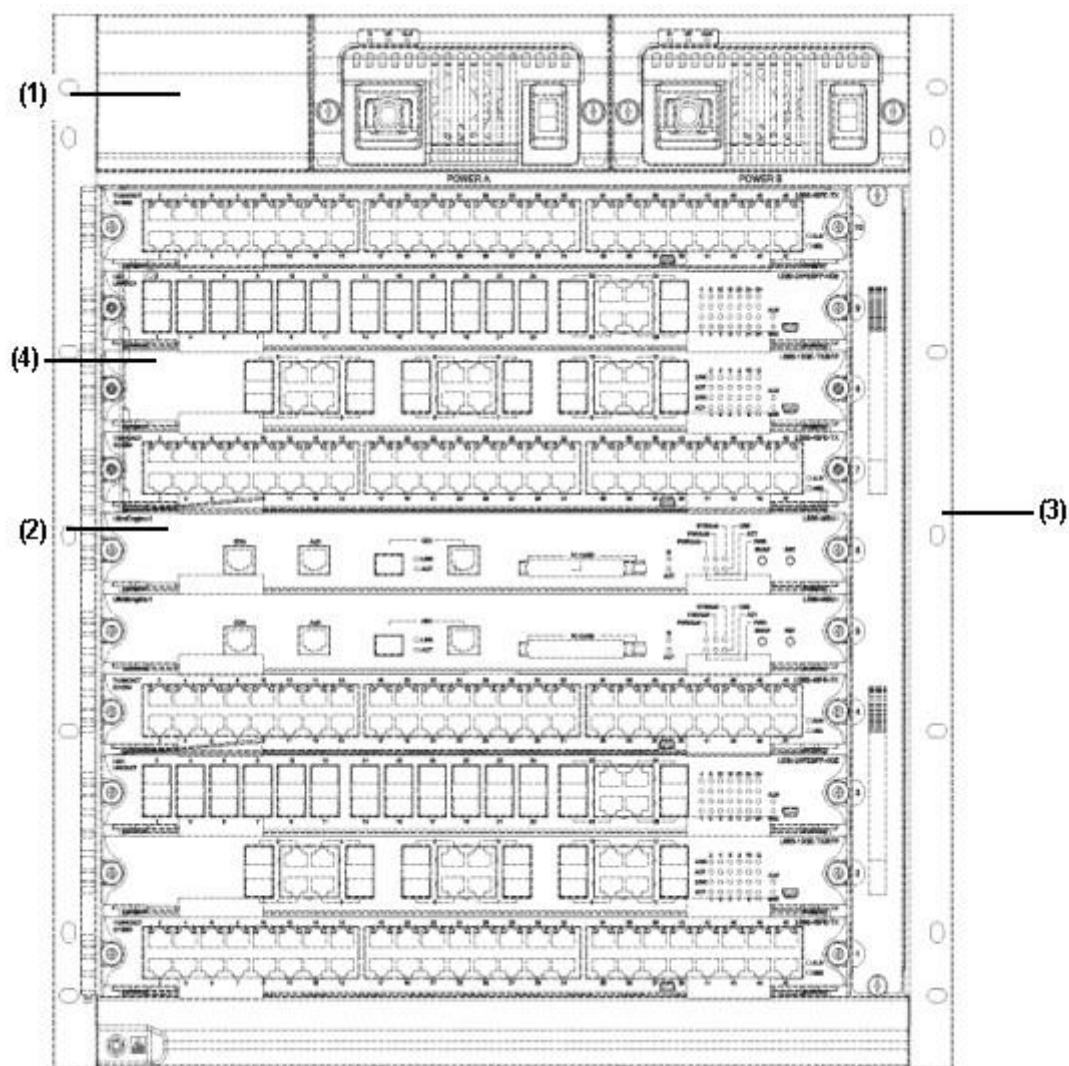
Figure 1-3 S8510 appearance

(1) Power source layer: The AC/DC power module can be configured on this layer.
(2) Functional module layer: Six single-board slots are provided and thus six functional modules can be supported, among which slot 5 and slot 6 are the backup slot each other and can be inserted only the console modules.
(3) Fan module layer: A slot for the fan module is provided.
(4) Line clip: It is used to fix the Ethernet line or the optical fiber on the front port.

1.4 ROHS Description

Parts	Toxic or harmful substances or elements					
	Pb	Hg	Cd	Cr(VI)	PBB	PBDE
Chasis	O	O	O	O	O	O
Rack	O	O	O	O	O	O
Baseboard	O	O	O	O	O	O
Module	O	O	O	O	O	O
Interface Card	O	O	O	O	O	O

O: The toxic or harmful substances' levels in each homogeneous materials of each part, are under the limitation of SJ/T 11363—2006 regulation

X: The toxic or harmful substances' levels at least in one homogeneous materials of one part, exceed the limitation of SJ/T 11363—2006 regulation

1.5 S8500 Hardware

The hardware system of S8500 consists of the machine box, power supply system, heat cooling system and systematic modules.

The machine box of S8503 has a net weight of 21.5 kg; the power module has a net weight of 1.7 kg; the single-board module has a net weight of 3 kg. When all modules of S8503 are inserted, the net weight of S8503 is 34 kg. The package box has a net weight of 13 kg and the accessory box (cable) weighs 1 kg. The packaged S8503 has a gross weight of 48 kg.

The machine box of S8506 has a net weight of 26 kg; the power module has a net weight of 1.7 kg; the single-board module has a net weight of 3 kg. When all modules of S8506 are inserted, the net weight of S8506 is 47.4 kg. The package box has a net weight of 13.6 kg and the accessory box (cable) weighs 1 kg. The packaged S8506 has a gross weight of 62 kg.

The machine box of S8510 has a net weight of 30.5 kg; the power module has a net weight of 1.7 kg; the single-board module has a net weight of 3 kg. When all modules of S8510 are inserted, the net weight of S8510 is 64 kg. The package box has a net weight of 16 kg and the accessory box (cable) weighs 1 kg. The packaged S8510 has a gross weight of 81 kg.

1.5.1 Cabinet

S8500 should be installed on the 19-inch standard cabinet. We can provided the standard 19-inch cabinet, which has the following different specifications: ⌘ 2.2m golden-plate cabinet (height*width*depth=2200*600mm*600mm) ⌘ 2.0m golden-plate cabinet (height*width*depth=20200*600mm*600mm) ⌘ 1.8m golden-plate cabinet (height*width*depth=1800*600mm*600mm) ⌘ 1.6m golden-plate cabinet (height*width*depth=1600*600mm*600mm)

1.5.2 Machine Box

S8500 adopts the 19-inch standard machine box, whose specification varies with different models:

⌘   S8503:   Height*Width*Depth=266.4mm×482.6mm×548mm ⌘

S8506:   Height*Width*Depth=399.7mm×482.6mm×548mm ⌘

S8510:   Height*Width*Depth=533.1mm×482.6mm×548mm

The machine box of S8500 series consists of the fan module layer, the functional module layer and the power supply layer.

The functional module layer is a single-board insertion box, which is the base to support each single board of S8500.

The power supply layer is at the top of the machine box, which can be inserted with two AC/DC power modules. The power module has its own fan and adopts the air exhaust mode. The front template of the power source has an air inlet, while the back template of the machine box has an air outlet.

The fan module layer lies on the right of the machine box. The fan is on the fan module layer and it takes the air exhaust mode. The fan module can be taken out from the front of the machine box for maintenance, clearance or replacement.

The air inlet is on the left of the machine box and has been installed with the dust-free net. It can be taken out from the back of the machine box for clearance or replacement.
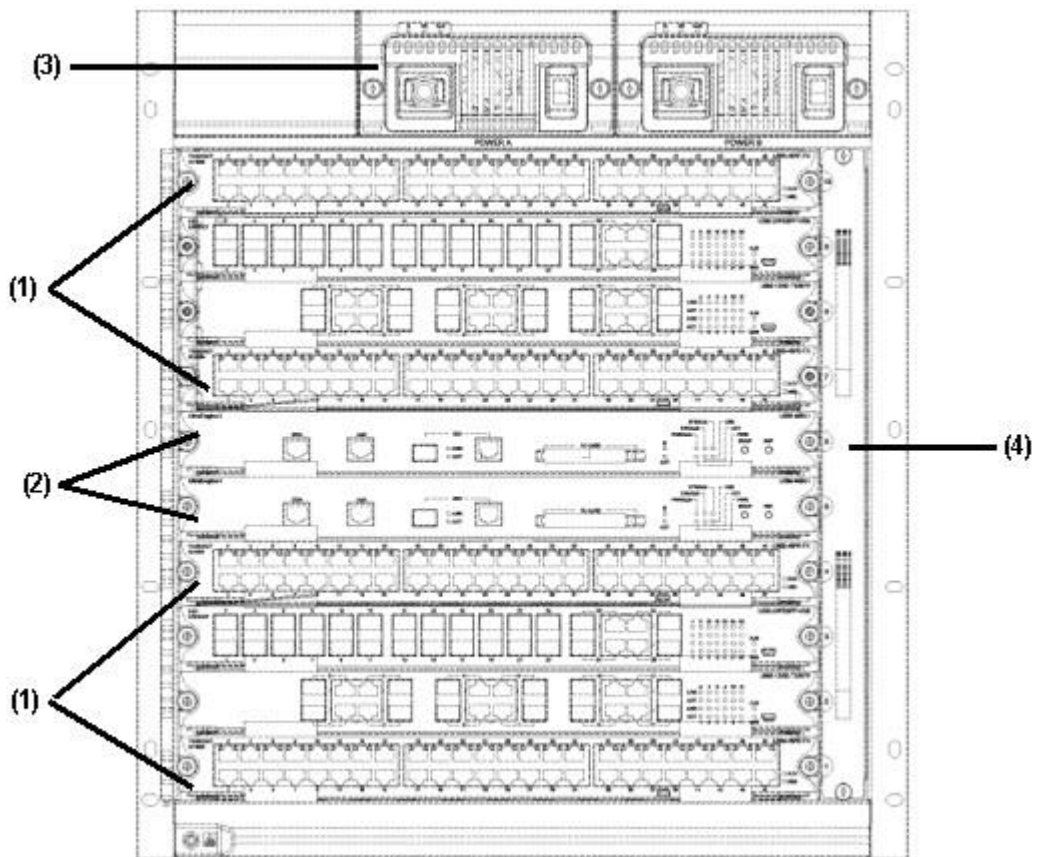
Figure 1-4 Front appearance of S8500

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(1) Functional module layer: You can insert all types of service boards on this layer.
(2) Module control layer: The MSU board can be inserted on this layer.
(3) Power supply layer: The AC/DC power source can be installed on this layer.
(4) Fan module layer: The fan-module layer can be inserted on this layer.
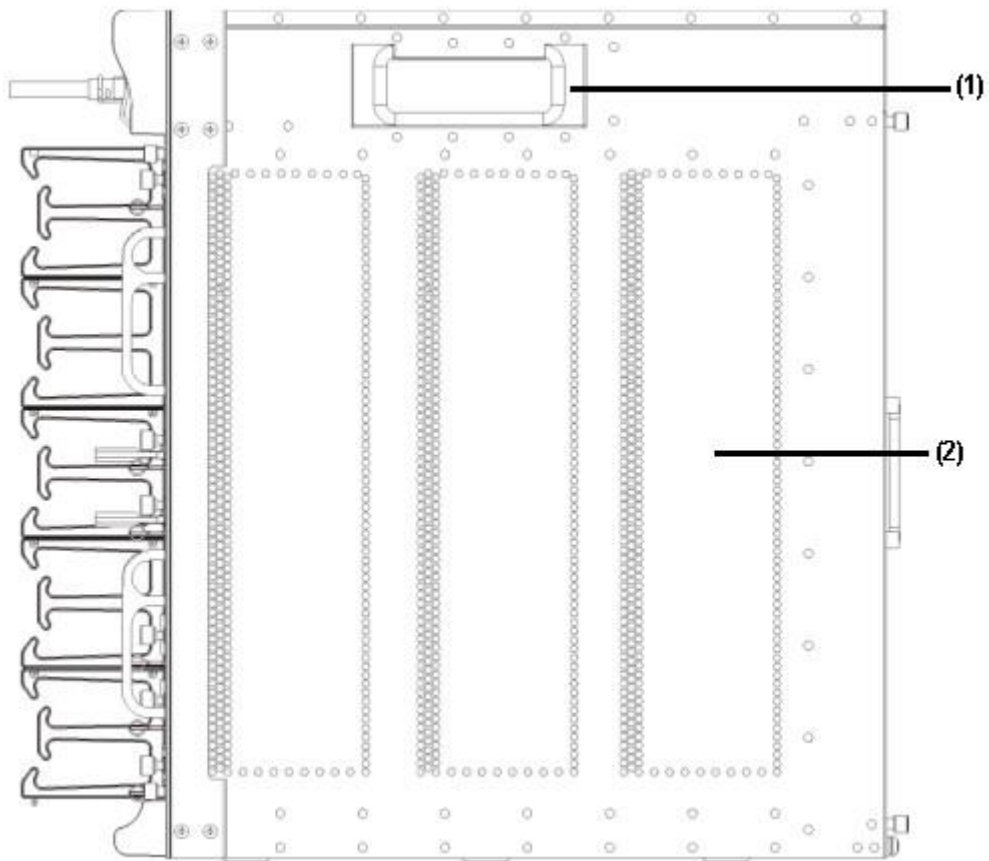
Figure 1-5 Side appearance of S8500

(1)   Removal handle: It is used to move S8500.
(2)   Air inlet/outlet layer: The left side is the cold air inlet of the system, while the right side is the hot air outlet of the system.
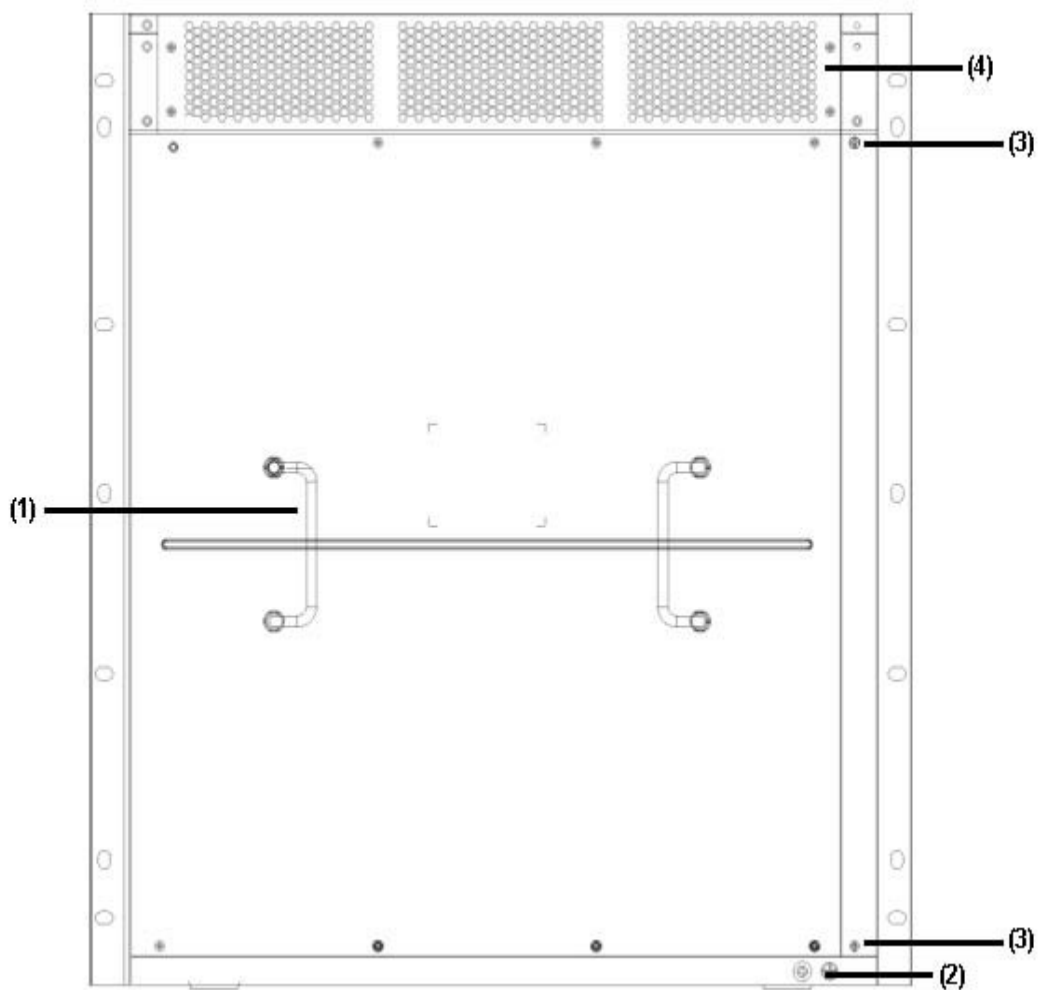
Figure 1-6 Back appearance of S8500

(1)   Handle: It is used to install the backplane.
(2)   Grounding column: It is the grounding column of the system.
(3)   Handle for installing the dust-free net: It is used to install the dust-free net for the air inlet of the system.
(4)   Air outlet of the power source: It is the air outlet of the power source which has a fan.

1.5.3 Single-Board Frame

The single-board frame consists of single-board slot and back template.

S8503 has three single-board slots and the space between slots is 40.6mm. Slot 3 can only be inserted with the LS85-MSU board. However, slot 1 and slot 2 can be inserted with different service boards.

S8506 has six single-board slots and the space between slots is 40.6mm. Slot 5 and slot 6 can only be inserted with the LS85-MSU board. However, slots 1, 2, 3 and 4 can be inserted with different service boards.

S8510 has ten single-board slots and the space between slots is 40.6mm. Slot 5 and slot 6 can only be inserted with the LS85-MSU board. However, the other slots can be inserted with different service boards.

The boards of S8500 are horizontally inserted, which is 437mm wide, 400.3mm deep and 43.2 high.

The backplane of S8500 realizes the hi-speed data link's interconnection between network board and interface card, or realizes the interconnection of the control signal.

The backplane capacity of S8503, S8506 and S8510 is 384Gbit/s, 785Gbit/s and 1.5Tbit/s respectively.

a.   Functions of the back template

⌘   Interconnecting all types of signals between single boards and providing the communication channel ⌘ The systematic back template is a non-resource back template.

⌘   Supporting the insertion and dial-out of all types of single-boards when it is powered ⌘ Supporting the master-slave exchange of the main control board ⌘ Supporting automatic identification of each slot ⌘ Realizing the distributive power supply ⌘ The fan and the signal monitor line of the power are provided.

b.   Explanation of Slot Number

As S8503 is fully configured, the single-board configuration in the single-board box is shown as follows: ⌘ The LS85-MSU board is inserted into slot 3.

⌘   Two single-boards are configured according to actual requirements which are inserted into slot 1 and slot 2 respectively.

The slot numbers of the single-board are listed from bottom to top to right.

As S8506 is fully configured, the single-board configuration in the single-board box is shown as follows:

⌘   Two LS85-MSU boards are backup boards each other and they are inserted into slot 5 and slot 6 respectively.

⌘   Two single-boards are configured according to actual requirements which are inserted into slots 1, 2, 3 and 4 respectively.

The slot numbers of the single-board are listed from bottom to top to right.

As S8510 is fully configured, the single-board configuration in the single-board box is shown as follows:

⌘   Two LS85-MSU boards are backup boards each other and they are inserted into slot 5 and slot 6 respectively.

⌘   Eight single-boards are configured according to actual requirements which are inserted into the other slots respectively.

The slot numbers of the single-board are listed from bottom to top to right.

1.5.4 Power Distribution

According to different environments, S8500 provides two kinds of power modules for power supply. The two kinds of power modules have similar appearance except a little difference in the front template.
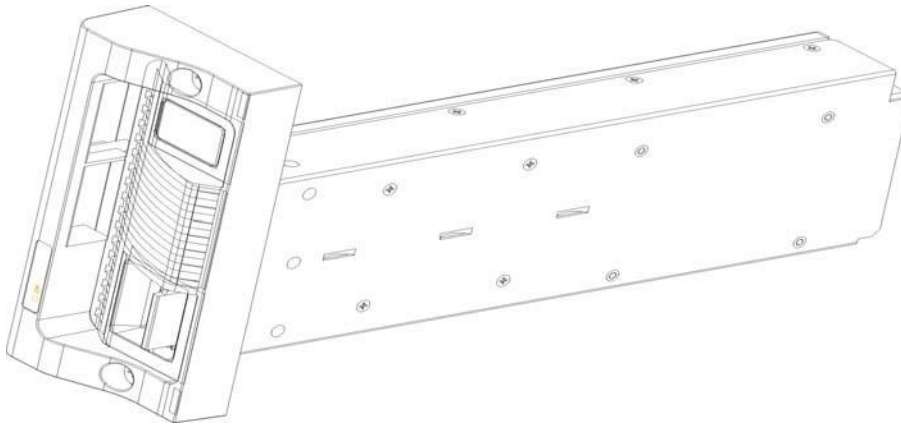
Figure 1-7 Appearance of the power module

a.   DC power supply

If the DC power is adopted, the DC power must be -48V. The maximum output power is 1000W.
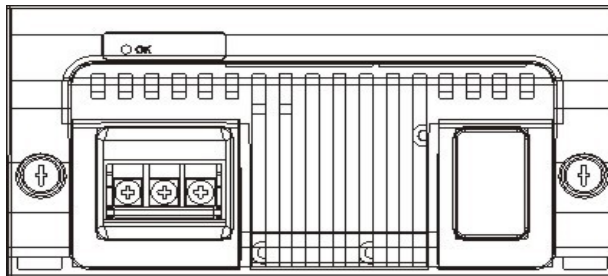
Figure 1-8 Front template of the DC power source

b.   AC power supply

If the AC power is used, the input voltage should be 220V. The voltage of the input power is allowed to fluctuate between 220V and 20%. The AC power modules have two types, one of which has the maximum output power, 600W, and is applied at S8503 and S8506, the other of which has the maximum output power, 1000W, and is applied at S8510.
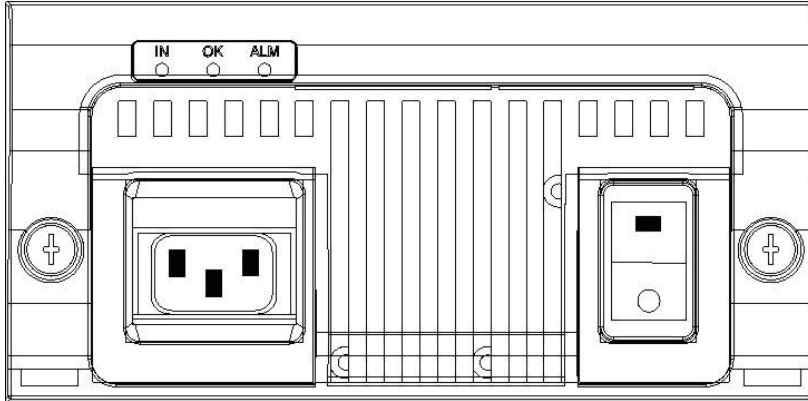
Figure 1-9 Front template of the AC power source

S8500 provides multiple power configuration resolutions which vary with different requirements: you can use one DC/AC power module, or two DC/AC power modules or one AC power module and one DC power module.

1.6 Ventilation and Cooling System

S8500 runs in a working temperature between 0 and 40℃. The appearance temperature of the device cannot exceed 50-80% of the highest temperature and the reliability demands of the device must be satisfied. Of course, security and maintenance ability must be considered at the same time.

The device adopts the fan for air exhaust and mandatory convection, ensuring the device to run normally in the regulated conditions. See figure 1-10 for the solution of the ventilation and cooling system.
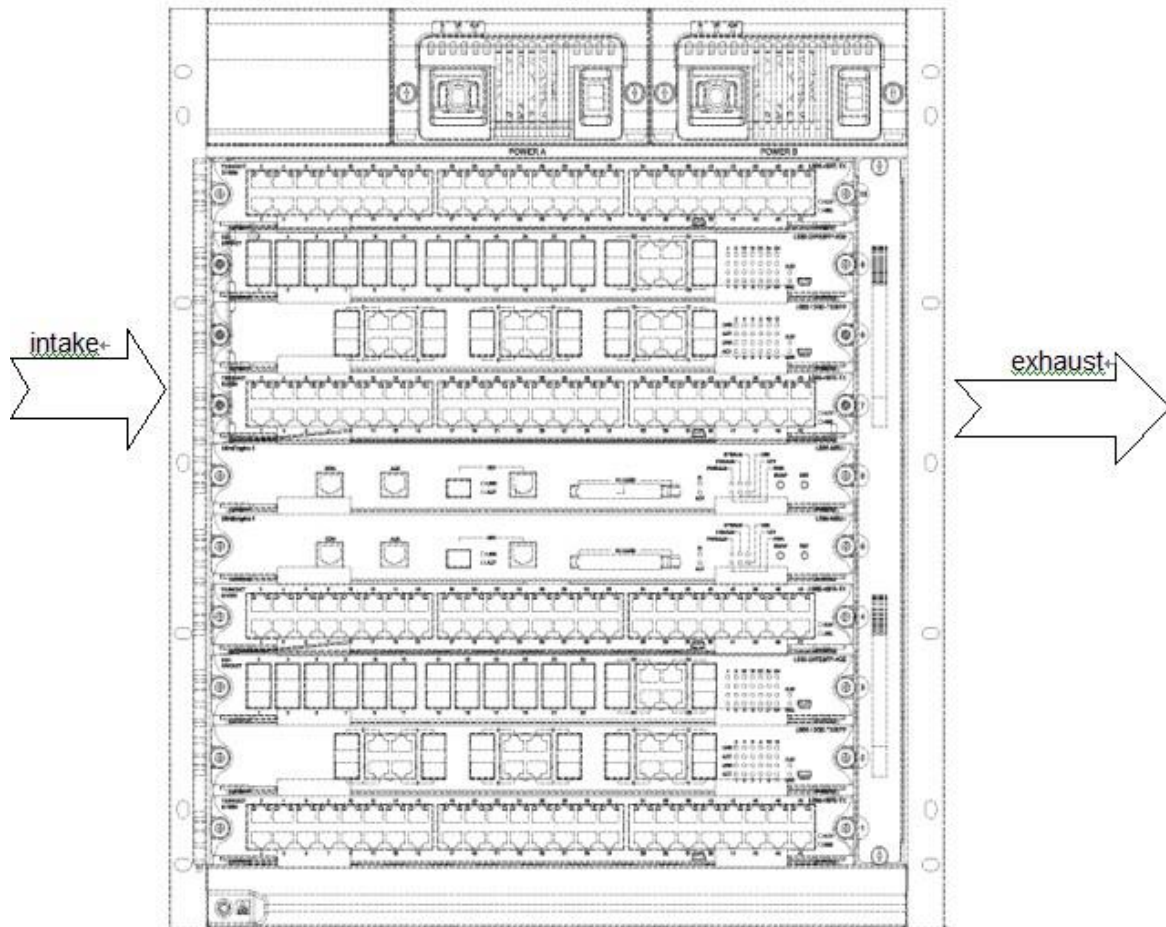
Figure 1-10 Ventilation and cooling system of S8500

S8500 has two tunnels for ventilation and cooling. One tunnel is for ventilation and heat cooling of the system's boards, where the fan board and the hot air outlet are on the right of the machine box and the cold air inlet is on the left of the machine box. One tunnel is for ventilation and heat cooling of the power module which has a fan and

adopts the air exhaust mode. The air inlet of the power module lies at the front template of the power source, while the air outlet lies at the backplane of the power source.

1.7 Introduction of S8500 Boards

S8500 has 29 types of boards which are described as follows:

⌘ Main control board (LS85-MSU I): It is the switchover & control center module of S8500, which is to conduct L2/L3 protocol processing, route management, user access control and management, network operation and maintenance. The LS85-MSU I board can be applied only to S8503 and S8506.

⌘   Main control board (LS85-MSU II): It is the switchover & control center module of S8500, which is to conduct L2/L3 protocol processing, route management, user

⌘
access control and management, network operation and maintenance. The LS85-MSU IV board can be applied to S8503, S8506 and S8510.

Main control board (LS85-MSU III): It is the switchover & control center module of S8500, which is to conduct L2/L3 protocol processing, route management, user access control and management, network operation and maintenance. The LS85-MSU IV board can be applied to S8503, S8506 and S8510.

⌘ Main control board (LS85-MSU IV): It is the switchover & control center module of S8500, which is to conduct L2/L3 protocol processing, route management, user access control and management, network operation and maintenance. The LS85-MSU IV board can be applied to S8503, S8506 and S8510.

⌘ 48-port 100M electric interface board (LS85-48FE-TX): It can support 48 100Base-TX electric Ethernet interfaces. The 100M electric port is the RJ45 interface, supporting 10/100Mbps. The LS85-32FE-4GE interface board can realize L2/L3 wire-speed switchover and routing; it connects the core layer or the access-layer device, realizing port QoS or user QoS.

⌘ 48-port 100M electric interface board (LS85-48FE-TXB): It can support 48 100Base-TX electric Ethernet interfaces. The 100M electric port is the RJ45 interface, supporting 10/100Mbps. The LS85-32FE-4GE interface board can realize L2/L3 wire-speed switchover and routing; it connects the core layer or the access-layer device, realizing port QoS or user QoS.

⌘ An interface board with 24 100M-Ethernet optical interfaces and 2 1000M optical-electric-integrated interfaces (LS85-24FESFP-2GE): The 100M electric interfaces adopt the RJ45 interface mode, supporting the 10/100M rate and automatic duplex adaptation. The 1000M optical-electric-integrated interfaces adopt both the RJ45 interface mode and the SFP interface mode. The RJ45 interface supports the 10/100/1000BASE electric port, while the SFP module interface supports the gigabit optical SFP module or the gigabit electric SFP module. The RJ45 interface and the SFP interface are auto-adaptable. The two kinds of interfaces cannot run simultaneously. When the two interfaces are linked, the SFP interface is used. The LS85-32FE-4GE interface board can realize L2/L3 wire-speed switchover and routing; it connects the core layer or the access-layer device, realizing port QoS or user QoS.

⌘ LS85-24FESFP-4GE: a board combining 24 100M SFP interfaces and 4 1000M optical/electric interface. The gigabit SFP interface and the RJ45 interface supports 10/100/1000Mbps. For a gigabit port, only one SFP interface or only one RJ45 interface can be used at the same time. The SFP interface and the RJ45 interface support automatic adaptation. The LS85-32FE-4GE interface board can realize L2/L3 wire-speed switchover and routing; it connects the core layer or the access-layer device, realizing port QoS or user QoS.

⌘ 24-path 100M SFP interface board (LS85-24FE-SFPE): It provides 24 100M SFP optical interfaces. It supports the 100M SFP module. The LS85-8TE-XFP interface

⌘
board can realize L2/L3 wire-speed switchover and routing; it connects the core layer or the access-layer device, realizing port QoS or user QoS.

⌘   12-path 1000M optical/electric interface board (LS85-12GE-TX ／ SFP): It provides 12 1000M optical/electric interfaces. The gigabit SFP interface and the RJ45 interface supports 10/100/1000Mbps. For a gigabit port, only one SFP interface or only one RJ45 interface can be used at the same time. The SFP interface and the RJ45 interface support automatic adaptation. The LS85-8TE-XFP interface board can realize L2/L3 wire-speed switchover and routing; it connects the core layer or the access-layer device, realizing port QoS or user QoS.

12-path 1000M optical/electric interface board (LS85-12GE-TX ／ SFP B): It provides 12 1000M optical/electric interfaces. The gigabit SFP interface and the RJ45 interface supports 10/100/1000Mbps. For a gigabit port, only one SFP interface or only one RJ45 interface can be used at the same time. The SFP interface and the RJ45 interface support automatic adaptation. and realize L2/L3 wire-speed switchover and routing; it connects the core layer or the access-layer device, realizing the user QoS.

⌘   12-path 1000M optical/electric interface board (LS85-12GE-TX ／ SFPE): It provides 12 1000M optical/electric interfaces. The gigabit SFP interface and the RJ45 interface supports 10/100/1000Mbps. For a gigabit port, only one SFP interface or only one RJ45 interface can be used at the same time. The SFP interface and the RJ45 interface support automatic adaptation. and realize L2/L3 wire-speed switchover and routing; it connects the core layer or the access-layer device, realizing the user QoS.

⌘   12-path 1000M optical/electric interface board (LS85-12GE-TX ／ SFP-MPLS-E): It provides 12 1000M optical/electric interfaces. The gigabit SFP interface and the RJ45 interface supports 10/100/1000Mbps. For a gigabit port, only one SFP interface or only one RJ45 interface can be used at the same time. The SFP interface and the RJ45 interface support automatic adaptation. and realize L2/L3 wire-speed switchover and routing; it connects the core layer or the access-layer device, realizing the user QoS.

⌘   12-path 1000M optical/electric interface board (LS85—MFMC—12GE－TX/SFP): It provides 12 1000M optical/electric interfaces. It supports L2/L3 wire-speed switching, connects the core layer or the access layer, realizes the port QoS or the user QoS and conducts the NAT function.

⌘   24-path 1000M electric interface board (LS85-24GE-TX): The 1000M port is the RJ45 interface, supporting 10/100/1000Mbps. The LS85-8TE-XFP interface board can realize L2/L3 wire-speed switchover and routing; it connects the core layer or the access-layer device, realizing port QoS or user QoS.

⌘   24-path 1000M electric interface board (LS85-24GE-TXE): The 1000M port is the RJ45 interface, supporting 10/100/1000Mbps. The LS85-8TE-XFP interface board can realize L2/L3 wire-speed switchover and routing; it connects the core layer or the access-layer device, realizing port QoS or user QoS.

⌘

⌘ 24-path 1000M SFP interface board (LS85-24GE-SFP): The 1000M port is the RJ45 interface, supporting 10/100/1000Mbps. It supports the 1000M SFP module. The LS85-8TE-XFP interface board can realize L2/L3 wire-speed switchover and routing; it connects the core layer or the access-layer device, realizing port QoS or user QoS.

⌘ 24-path 1000M SFP interface board (LS85-24GE-SFPE): The 1000M port is the RJ45 interface, supporting 10/100/1000Mbps. It supports the 1000M SFP module. The LS85-8TE-XFP interface board can realize L2/L3 wire-speed switchover and routing; it connects the core layer or the access-layer device, realizing port QoS or user QoS.

⌘ 48-path 1000M electric interface board (LS85-48GE-TX): The 1000M port is the RJ45 interface, supporting 10/100/1000Mbps. The LS85-8TE-XFP interface board can realize L2/L3 wire-speed switchover and routing; it connects the core layer or the access-layer device, realizing port QoS or user QoS.

1-path XFP interface board (LS85-1TE-XFP): The LS85-1TE-XFP board provides a one-path 10000M XFP interface. It supports the 10000M XFP module. The LS85-8TE-XFP interface board can realize L2/L3 wire-speed switchover and routing; it connects the core layer or the access-layer device, realizing port QoS or user QoS.

⌘ 2-path XFP interface board (LS85-2TE-XFP): The LS85-2TE-XFP board provides 2 10000M XFP interfaces. It supports the 10000M XFP module. The LS85-8TE-XFP interface board can realize L2/L3 wire-speed switchover and routing; it connects the core layer or the access-layer device, realizing port QoS or user QoS.

⌘ 4-path XFP interface board (LS85-4TE-XFP): The LS85-4TE-XFP board provides a 4-path 10000M XFP interface. It supports the 10000M XFP module. The LS85-8TE-XFP interface board can realize L2/L3 wire-speed switchover and routing; it connects the core layer or the access-layer device, realizing port QoS or user QoS.

⌘ 8-path XFP interface board (LS85-8TE-XFP): The LS85-8TE-XFP board provides a 8-path 10000M XFP interface. It supports the 10000M XFP module. The LS85-8TE-XFP interface board can realize L2/L3 wire-speed switchover and routing; it connects the core layer or the access-layer device, realizing port QoS or user QoS.

⌘ LS85-4TE-XFP-MPLS-E: It supports the 10000M XFP module. The LS85-8TE-XFP interface board can realize L2/L3 wire-speed switchover and routing; it connects the core layer or the access-layer device, realizing port QoS or user QoS.TCAM can support a working frequency of up to 350MHz and its maximum capacity can be expanded to 32Mb.

⌘ LS85-4TE-XFP-MPLS-L: It supports the 10000M XFP module. The LS85-8TE-XFP interface board can realize L2/L3 wire-speed switchover and routing; it connects the core layer or the access-layer device, realizing port QoS or user QoS.TCAM can support a working frequency of up to 350MHz and its maximum capacity can be expanded to 16Mb.

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⌘ LS85-48GE-SFP-MPLS-E: The LS85-8TE-XFP interface board can realize L2/L3 wire-speed switchover and routing; it connects the core layer or the access-layer device, realizing port QoS or user QoS.TCAM can support a working frequency of up to 350MHz and its maximum capacity can be expanded to 32Mb.

⌘ LS85-48FE-TX-MPLS-E: The LS85-8TE-XFP interface board can realize L2/L3 wire-speed switchover and routing; it connects the core layer or the access-layer device, realizing port QoS or user QoS.TCAM can support a working frequency of up to 350MHz and its maximum capacity can be expanded to 32Mb.

⌘ LS85-48FE-SFP-MPLS-E: The LS85-8TE-XFP interface board can realize L2/L3 wire-speed switchover and routing; it connects the core layer or the access-layer device, realizing port QoS or user QoS.TCAM can support a working frequency of up to 350MHz and its maximum capacity can be expanded to 32Mb.

⌘ 48-path 1000M electric interface board (LS85-48GE-TX-MPLS-E): The LS85-8TE-XFP interface board can realize L2/L3 wire-speed switchover and

routing; it connects the core layer or the access-layer device, realizing port QoS or user QoS.TCAM can support a working frequency of up to 350MHz and its maximum capacity can be expanded to 32Mb.

1.7.1 Main Control Board (LS85-MSU I)

Figure 1-11 shows the basic appearance of the main control board (LS85-MSU I). The LS8500-MSU I board, which is to conduct the state control, route management, user access control and network maintenance. The switchover capacity is 96Gbit/s.

Figure 1-11 Basic appearance of the LS85-MSUI board

a. Interface

The LS85-MSU I board provides four kinds of interfaces:

⌘   The console serial interface: It is a serial interface for communication, using the RS-232 capacitance and the RJ45 connector. The console serial interface is used to connect the background terminal computer for systematic debugging, configuration, maintenance, management and software download.

⌘   The AUX serial interface: It is a serial interface for communication, using the RS-232 electric level and the RJ45 connector. The AUX serial interface is used to connect the Modem and the remote terminal computer through PSTN for systematic debugging, configuration, maintenance, management and software download.

⌘   GEO port: a 1000M Ethernet port, adopting the two-in-one mode for the RJ45 connector and the SFP interface. You can select either interface. If the two interfaces are both selected, the SFP interface comes first. The GEO port is used to connect the background computer for program downloading. The GEO port can also be used to connect the remote network manager workstation to realize the remote management.

When the remote device management is realized, you can select the standard network cable to connect to the HUB, then connect the HUB to the network management workstation on LAN; you can also connect the standard network cable to the router and then to the network management workstation on the WAN.

⌘   PC-CARD interface: This interface is used to expand the storage space of the main control board.

b. Indicator

The LS85-MSU I board provides eight LED indicators, the meanings of which is shown in the following table:

Table 1-1 Meaning of the LS85-MSU indicator

Name	Meaning
PWR	If the green indicator is on, the MSU board is normally powered. If the green indicator is off, the MSU board is not powered.
USE	If the green indicator is on, the MSU board runs normally. If the green indicator is off, you then can dial out the board.
ACT	When the green indicator is on, the MSU board is in main control state. When the green indicator is off, the MSU board is not in main control state.
PWRALM	If the red indicator is on, the alarm occurs in the power source of the system. If the red indicator is off, the power source of the system runs normally.
FANALM	If the red indicator is on, the alarm occurs in the fan of the system. If the red indicator is off, the fan of the system runs normally.
SYSALM	If the red indicator is on, the alarm occurs during the running of the system. If the red indicator is off, the system runs normally.
IN	If the green is on, the FLASH card is inserted into the PC-CARD slot. If the green is off, the FLASH card is not inserted into the PC-CARD slot.
ACT	When the green indicator flickers, the FLASH card is conducting the read-write operation. When the green indicator is off, the FLASH card does not conduct the read-write operation.
LINK	When the green indicator is on, the 1000M Ethernet port has established a link. When the green indicator is off, the 1000M Ethernet port has not established a link.
ACT	When the green indicator is on, the 1000M Ethernet port has data to forward. When the green indicator is off, the 1000M Ethernet port has no data to forward.

c. Description

Table 1-2 Keys of the LS85-MSU board

Name of the key	Description
RST	A reset key which is used to reset the LS85-MSU Iboard

SWAP	It is a SWAP key. It is a key to mandatorily shift between the active and standby LS85-MSU I boards during the running of the device. If you press the SWAP key of the active LS85-MSU I board, the active LS85-MSU I board will be shifted to the standby LS85-MSU I board; if you press the SWAP key of the standby LS85-MSU I board, the standby LS85-MSU I board will be shifted to the active LS85-MSU I board. After the previous operation is done, the SWAP indicator is on, meaning that the LS85-MSU I board can be plugged out from the system during the running of the system.

1.7.2 Main Control Board (LS85-MSU II)

Figure 1-12 shows the basic appearance of the main control board (LS85-MSU II). The LS8500-MSU II board, which is to conduct the state control, route management, user access control and network maintenance. The switchover capacity is 192Gbit/s.
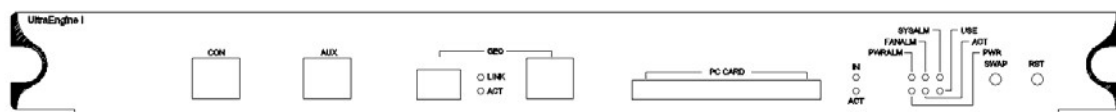

Figure 1-12 Basic appearance of the LS85-MSU II board

a. Interface

The LS85-MSU II board provides four kinds of interfaces:

⌘   The console serial interface: It is a serial interface for communication, using the RS-232 capacitance and the RJ45 connector. The console serial interface is used to connect the background terminal computer for systematic debugging, configuration, maintenance, management and software download.

⌘   The AUX serial interface: It is a serial interface for communication, using the RS-232 electric level and the RJ45 connector. The AUX serial interface is used to connect the Modem and the remote terminal computer through PSTN for systematic debugging, configuration, maintenance, management and software download.

⌘   GEO port: a 1000M Ethernet port, adopting the two-in-one mode for the RJ45 connector and the SFP interface. You can select either interface. If the two interfaces are both selected, the SFP interface comes first. The GEO port is used to connect the background computer for program downloading. The GEO port can also be used to connect the remote network manager workstation to realize the remote management.

When the remote device management is realized, you can select the standard network cable to connect to the HUB, then connect the HUB to the network

management workstation on LAN; you can also connect the standard network cable to the router and then to the network management workstation on the WAN.

⌘ PC-CARD interface: This interface is used to expand the storage space of the main control board.

b. Indicator

The LS85-MSU II board provides eight LED indicators, the meanings of which is shown in the following table:

Table 1-3 Meaning of the LS85-MSU indicator

Name	Meaning
PWR	If the green indicator is on, the MSU board is normally powered.
	If the green indicator is off, the MSU board is not powered.
USE	If the green indicator is on, the MSU board runs normally. If the green indicator is off, you then can dial out the board.
ACT	When the green indicator is on, the MSU board is in main control state.
	When the green indicator is off, the MSU board is not in main control state.
PWRALM	If the red indicator is on, the alarm occurs in the power source of the system.
	If the red indicator is off, the power source of the system runs normally.
FANALM	If the red indicator is on, the alarm occurs in the fan of the system.
	If the red indicator is off, the fan of the system runs normally.
SYSALM	If the red indicator is on, the alarm occurs during the running of the system.
	If the red indicator is off, the system runs normally.
IN	If the green is on, the FLASH card is inserted into the PC-CARD slot.
	If the green is off, the FLASH card is not inserted into the PC-CARD slot.
ACT	When the green indicator flickers, the FLASH card is conducting the read-write operation.
	When the green indicator is off, the FLASH card does not conduct the read-write operation.
LINK	When the green indicator is on, the 1000M Ethernet port has established a link.
	When the green indicator is off, the 1000M Ethernet port has not established a link.

ACT	When the green indicator is on, the 1000M Ethernet port has data to forward.
	When the green indicator is off, the 1000M Ethernet port has no data to forward.

c. Description

Table 1-4 Keys of the LS85-MSU board

Name of the key	Description
RST	A reset key which is used to reset the LS85-MSU II board
SWAP	It is a SWAP key. It is a key to mandatorily shift between the active and standby LS85-MSU II boards during the running of the device. If you press the SWAP key of the active LS85-MSU II board, the active LS85-MSU II board will be shifted to the standby LS85-MSU II board; if you press the SWAP key of the standby LS85-MSU II board, the standby LS85-MSU II board will be shifted to the active LS85-MSU II board. After the previous operation is done, the SWAP indicator is on, meaning that the LS85-MSU II board can be plugged out from the system during the running of the system.

1.7.3 Main Control Board (LS85-MSU III)

Figure 1-13 shows the basic appearance of the main control board (LS85-MSU III). The LS8500-MSU III board, which is to conduct the state control, route management, user access control and network maintenance. The switchover capacity is 384Gbit/s.

Figure 1-13 Basic appearance of the LS85-MSU III board

a. Interface

The LS85-MSU III board provides four kinds of interfaces:

⌘   The console serial interface: It is a serial interface for communication, using the RS-232 capacitance and the RJ45 connector. The console serial interface is used to connect the background terminal computer for systematic debugging, configuration, maintenance, management and software download.

⌘   The AUX serial interface: It is a serial interface for communication, using the RS-232 electric level and the RJ45 connector. The AUX serial interface is used to

connect the Modem and the remote terminal computer through PSTN for systematic debugging, configuration, maintenance, management and software download.

⌘ GEO port: a 1000M Ethernet port, adopting the two-in-one mode for the RJ45 connector and the SFP interface. You can select either interface. If the two interfaces are both selected, the SFP interface comes first. The GEO port is used to connect the background computer for program downloading. The GEO port can also be used to connect the remote network manager workstation to realize the remote management.

When the remote device management is realized, you can select the standard network cable to connect to the HUB, then connect the HUB to the network management workstation on LAN; you can also connect the standard network cable to the router and then to the network management workstation on the WAN.

⌘ PC-CARD interface: This interface is used to expand the storage space of the main control board.

b. Indicator

The LS85-MSU III board provides eight LED indicators, the meanings of which is shown in the following table:

Table 1-5 Meaning of the LS85-MSU indicator

Name	Meaning
PWR	If the green indicator is on, the MSU board is normally powered.
	If the green indicator is off, the MSU board is not powered.
USE	If the green indicator is on, the MSU board runs normally. If the green indicator is off, you then can dial out the board.
ACT	When the green indicator is on, the MSU board is in main control state. When the green indicator is off, the MSU board is not in main control state.
PWRALM	If the red indicator is on, the alarm occurs in the power source of the system. If the red indicator is off, the power source of the system runs normally.
FANALM	If the red indicator is on, the alarm occurs in the fan of the system. If the red indicator is off, the fan of the system runs normally.
SYSALM	If the red indicator is on, the alarm occurs during the running of the system. If the red indicator is off, the system runs normally.
IN	If the green is on, the FLASH card is inserted into the PC-CARD slot. If the green is off, the FLASH card is not inserted into the PC-CARD slot.

ACT	When the green indicator flickers, the FLASH card is conducting the read-write operation.
	When the green indicator is off, the FLASH card does not conduct the read-write operation.
LINK	When the green indicator is on, the 1000M Ethernet port has established a link.
	When the green indicator is off, the 1000M Ethernet port has not established a link.
ACT	When the green indicator is on, the 1000M Ethernet port has data to forward.
	When the green indicator is off, the 1000M Ethernet port has no data to forward.

c. Description

Table 1-6 Keys of the LS85-MSU board

Name of the key	Description
RST	A reset key which is used to reset the LS85-MSU III board
SWAP	It is a SWAP key. It is a key to mandatorily shift between the active and standby LS85-MSU III boards during the running of the device. If you press the SWAP key of the active LS85-MSU III board, the active LS85-MSU III board will be shifted to the standby LS85-MSU III board; if you press the SWAP key of the standby LS85-MSU III board, the standby LS85-MSU III board will be shifted to the active LS85-MSU III board. After the previous operation is done, the SWAP indicator is on, meaning that the LS85-MSU III board can be plugged out from the system during the running of the system.

1.7.4 Main Control Board (LS85-MSU IV)

Figure 1-14 shows the basic appearance of the main control board (LS85-MSU IV). The LS8500-MSU IV board, which is to conduct the state control, route management, user access control and network maintenance. The switchover capacity is 768Gbit/s.
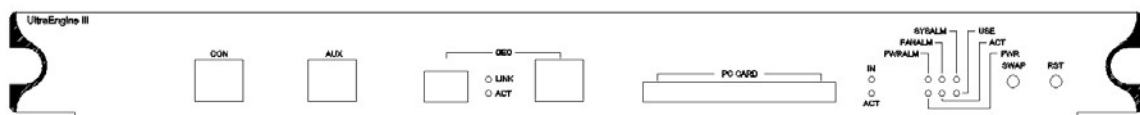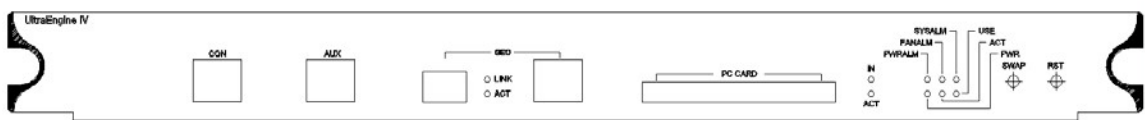

Figure 1-14 Basic appearance of the LS85-MSU IV board

a. Interface

The LS85-MSU IV board provides four kinds of interfaces:

⌘   The console serial interface: It is a serial interface for communication, using the RS-232 capacitance and the RJ45 connector. The console serial interface is used to connect the background terminal computer for systematic debugging, configuration, maintenance, management and software download.

⌘   The AUX serial interface: It is a serial interface for communication, using the RS-232 electric level and the RJ45 connector. The AUX serial interface is used to connect the Modem and the remote terminal computer through PSTN for systematic debugging, configuration, maintenance, management and software download.

⌘   GEO port: a 1000M Ethernet port, adopting the two-in-one mode for the RJ45 connector and the SFP interface. You can select either interface. If the two interfaces are both selected, the SFP interface comes first. The GEO port is used to connect the background computer for program downloading. The GEO port can also be used to connect the remote network manager workstation to realize the remote management.

     When the remote device management is realized, you can select the standard network cable to connect to the HUB, then connect the HUB to the network management workstation on LAN; you can also connect the standard network cable to the router and then to the network management workstation on the WAN.

⌘   PC-CARD interface: This interface is used to expand the storage space of the main control board.

b.   Indicator

The LS85-MSU IV board provides eight LED indicators, the meanings of which is shown in the following table:

Table 1-7 Meaning of the LS85-MSU indicator

Name	Meaning
PWR	If the green indicator is on, the MSU board is normally powered.
	If the green indicator is off, the MSU board is not powered.
USE	If the green indicator is on, the MSU board runs normally. If the green indicator is off, you then can dial out the board.
ACT	When the green indicator is on, the MSU board is in main control state. When the green indicator is off, the MSU board is not in main control state.
PWRALM	If the red indicator is on, the alarm occurs in the power source of the system. If the red indicator is off, the power source of the system runs normally.
FANALM	If the red indicator is on, the alarm occurs in the fan of the system. If the red indicator is off, the fan of the system runs normally.

SYSALM	If the red indicator is on, the alarm occurs during the running of the system.
	If the red indicator is off, the system runs normally.
IN	If the green is on, the FLASH card is inserted into the PC-CARD slot.
	If the green is off, the FLASH card is not inserted into the PC-CARD slot.
ACT	When the green indicator flickers, the FLASH card is conducting the read-write operation.
	When the green indicator is off, the FLASH card does not conduct the read-write operation.
LINK	When the green indicator is on, the 1000M Ethernet port has established a link.
	When the green indicator is off, the 1000M Ethernet port has not established a link.
ACT	When the green indicator is on, the 1000M Ethernet port has data to forward.
	When the green indicator is off, the 1000M Ethernet port has no data to forward.

c.   Description

Table 1-8 Keys of the LS85-MSU board

Name of the key	Description
RST	A reset key which is used to reset the LS85-MSU IV board
SWAP	It is a SWAP key. It is a key to mandatorily shift between the active and standby LS85-MSU IV boards during the running of the device. If you press the SWAP key of the active LS85-MSU IV board, the active LS85-MSU IV board will be shifted to the standby LS85-MSU IV board; if you press the SWAP key of the standby LS85-MSU IV board, the standby LS85-MSU IV board will be shifted to the active LS85-MSU IV board. After the previous operation is done, the SWAP indicator is on, meaning that the LS85-MSU IV board can be plugged out from the system during the running of the system.

1.7.5   48-Path 100M Electric Interface Board (LS85-48FE-TX)

Figure 1-15 shows the basic appearance of LS85-48FE-TX. LS85-48FE-TX is used to conduct L2/L3 wire-speed switching and 100M port trunking, connect the core layer or the access layer and realize port QoS or user QoS.
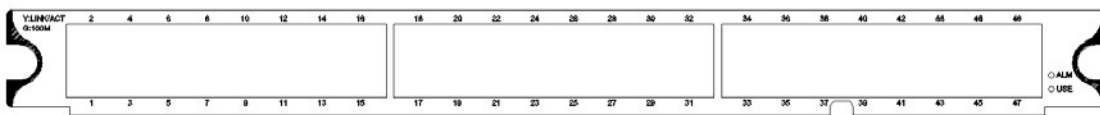
Fi

Figure 1-15 Basic appearance of LS85-48FE-TX

a.　Interface

⌘　LS85-48FE-TX can support 48 Ethernet 100M electric ports simultaneously. The RJ45 interface supports the rate of 10/100M and the duplex automatic adaptation.

⌘　The LS85-48FE-TX board provides a serial interface to debug the board, but it is not open to the user.

b.　Indicator

Table 1-9 Indicators of LS85-48FE-TX

Location	Name	Meaning
Top of the RJ45 interface	LINK/ACT	If the green indicator is on, the port and the peer device are correctly connected and the port is in UP mode. If the yellow indicator is off, the port is still in DOWN state. If the yellow indicator flickers, the port is receiving and transmitting data.
	100M	If the green indicator is on, the port runs in 100M mode. If the green indicator is off, the port runs in 10M mode.
Right side of the template	ALM	If the red indicator is on, the board works abnormally and the alarm occurs. If the green indicator is off, the board runs normally.
	USE	When the green indicator is on, the board is in working state. When the green indicator is off, the board is not in working state.

1.7.6　48-Path 100M Electric Interface Card (LS85-48FE-TXB)

Figure 1-16 shows the basic appearance of LS85-48FE-TXB. LS85-48FE-TXB is used to conduct L2/L3 wire-speed switching and port trunking, connect the core layer or the access layer and realize port QoS or user QoS.
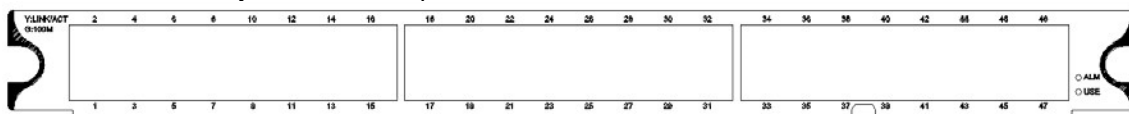
Figure 1-16 48-Path 100M Electric Interface Card (LS85-48FE-TXB)

a. Interface

⌘ The LS85-48FE-TXB board provides 48 100M electric interfaces.

⌘ The LS85-48FE-TXB board provides a serial interface to debug the board, but it is not open to the user.

b. Indicator

Table 1-10 Indicator of LS85-48FE-TXB

Location	Name	Meaning
Top of the template	LINK / ACT	If the green indicator is on, the port and the peer device are correctly connected and the port is in UP mode. When the green indicator is off, the port is in DOWN state. If the green indicator flickers, the port is receiving and transmitting the data.
Right side of the template	ALM	When the red indicator is on, the board works abnormally and the alarm occurs. If the red indicator is off, the board runs normally.
	USE	When the green indicator is on, the module is in working state. When the green indicator is off, the module is not in working state.

1.7.7 LS85-24FESFP-2GE

Figure 1-17 shows the basic appearance of LS85-24FESFP-2GE. LS85-24FESFP-2GE, having 24 100M optical SFP interfaces and 2 gigabit interfaces, is used to conduct L2/L3 wire-speed switching and port trunking, connect the core layer or the access layer and realize port QoS or user QoS.

Fi
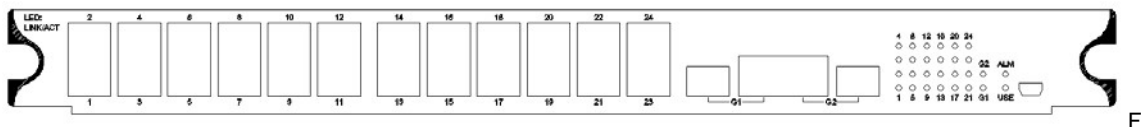
Figure 1-17 LS85-24FESFP-2GE

a. Interface

⌘ LS85-24FESFP-2GE provides 24 Ethernet 100M optical interfaces and 2 1000M optical/electric interfaces. The 100M optical interface adopts the RJ45 interface mode, supporting the rate of 10/100M and automatic duplex adaptation. The

1000M optical/electric interface provides the RJ45 interface mode and the SFP interface mode. The RJ45 interface supports the 10/100/1000BASE electric port, while the SFP module interface supports the 1000M SFP module or the 1000M electric SFP module. The RJ45 interface and the SFP interface are auto-adaptable. The two kinds of interfaces cannot run simultaneously. When the two interfaces are linked, the SFP interface is used.

⌘ The LS85-24FESFP-2GE board provides a serial interface to debug the board, but it is not open to the user.

b. Indicator

Table 1-11 Indicators of LS85-24FESFP-2GE

Location	Name	Meaning
Right side of the template	LINK / ACT	If the green indicator is on, the port and the peer device are correctly connected and the port is in UP mode. When the green indicator is off, the port is in DOWN state. If the green indicator flickers, the port is receiving and transmitting the data.
Right side of the template	ALM	When the red indicator is on, the board works abnormally and the alarm occurs. If the red indicator is off, the board runs normally.
	USE	When the green indicator is on, the module is in working state. When the green indicator is off, the module is not in working state.

1.7.8 LS85-24FESFP-4GE

Figure 1-18 shows the basic appearance of LS85-24FESFP-4GE.

LS85-24FESFP-4GE, having 24 100M optical SFP interfaces and 4 gigabit interfaces, is used to conduct L2/L3 wire-speed switching and port trunking, connect the core layer or the access layer and realize port QoS or user QoS.

Figure 1-18 LS85-24FESFP-4GE

a. Interface

⌘ LS85-24FESFP-4GE provides 24 Ethernet 100M optical interfaces and four 1000M optical/electric interfaces. The 100M optical interface adopts the RJ45 interface mode, supporting the rate of 10/100M and automatic duplex adaptation. The 1000M optical/electric interface provides the RJ45 interface mode and the SFP interface mode. The RJ45 interface supports the 10/100/1000BASE electric

port, while the SFP module interface supports the 1000M SFP module or the 1000M electric SFP module. The RJ45 interface and the SFP interface are auto-adaptable. The two kinds of interfaces cannot run simultaneously. When the two interfaces are linked, the SFP interface is used.

⌘   The LS85-24FESFP-4GE board provides a serial interface to debug the board, but it is not open to the user.

b.   Indicator

Table 1-12 Indicators of LS85-4FESFP-4GE

Location	Name	Meaning
Right side of the template	LINK / ACT	If the green indicator is on, the port and the peer device are correctly connected and the port is in UP mode.
		When the green indicator is off, the port is in DOWN state.
		If the green indicator flickers, the port is receiving and transmitting the data.
Right side of the template	ALM	When the red indicator is on, the board works abnormally and the alarm occurs.
		If the green indicator is off, the board runs normally.
	USE	When the green indicator is on, the module is in working state.
		When the green indicator is off, the module is not in working state.

1.7.9   24-Path 100M SFP Optical Interface Card (LS85-24FE-SFPE)

Figure 1-19 shows the basic appearance of LS85-24FE-SFPE, a 24-path 100m SFP optical interface card. LS85-24FE-SFPE is used to conduct L2/L3 wire-speed switching and port trunking, connect the core layer or the access layer and realize port QoS or user QoS.
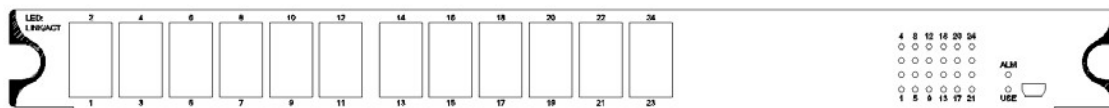

Figure 1-19 24-path 100M SFP optical interface card (LS85-24FE-SFPE) a.

Interface

⌘ The LS85-24FE-SFPE board provides 24 100M optical interfaces which adopt the SFP interface mode.

⌘ The LS85-24FE-SFPE board provides a serial interface to debug the board, but it is not open to the user.

b. Indicator

Table 1-13 Indicator of LS85-24FE-SFPE

Location	Name	Meaning
Right side of the template	LINK / ACT	If the green indicator is on, the port and the peer device are correctly connected and the port is in UP mode. When the green indicator is off, the port is in DOWN state. If the green indicator flickers, the port is receiving and transmitting the data.
Right side of the template	ALM	When the red indicator is on, the board works abnormally and the alarm occurs. If the red indicator is off, the board runs normally.
	USE	When the green indicator is on, the module is in working state. When the green indicator is off, the module is not in working state.

1.7.10 LS85-12GE-TX/SFP

Figure 1-20 shows the basic appearance of LS85-12GE-TX/SFP, a 12-path 1000M optical/electric interface board. LS85-12GE-TX/SFP is used to conduct L2/L3 wire-speed switching and port trunking, connect the core layer or the access layer and realize port QoS or user QoS.
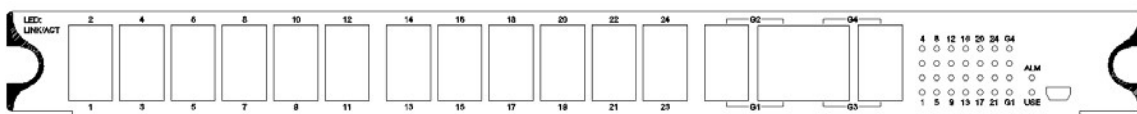

Figure 1-20 LS85-12GE-TX/SFP

a. Interface

⌘ LS85-12GE-TX/SFP provides 12 1000M optical/electric interfaces. The 1000M optical/electric interface provides the RJ45 interface mode and the SFP interface mode. The RJ45 interface supports the 10/100/1000BASE electric port, while the SFP module interface supports the 1000M optical SFP module or the 1000M electric SFP module. The RJ45 interface and the SFP interface are auto-adaptable. The two kinds of interfaces cannot run simultaneously. When the two interfaces are linked, the SFP interface is used.

⌘   The LS85-12GE-TX/SFP board provides a serial interface to debug the board, but it is not open to the user.

b.   Indicator

Table 1-14 Indicators of LS85-12GE-TX/SFP

Location	Name	Meaning
Right side of the template	LINK	If the green indicator is on, the port and the peer device are correctly connected and the port is in UP mode. When the green indicator is off, the port is in DOWN state.
	ACT	When the green indicator is off, the port has no data to forward. When the green indicator flickers, the port is receiving or transmitting the data.
Right side of the template	ALM	When the red indicator is on, the board works abnormally and the alarm occurs. If the green indicator is off, the board runs normally.
	USE	When the green indicator is on, the module is in working state. When the green indicator is off, the module is not in working state.

1.7.11 LS85-12GE-TX/SFP B

Figure 1-21 shows the basic appearance of LS85-12GE-TX/SFP B, a 12-path 1000M optical/electric interface board. LS85-12GE-TX/SFP B is used to conduct L2/L3 wire-speed switching and port trunking, connect the core layer or the access layer and realize port QoS or user QoS.


Figure 1-21 Appearance of LS85-12GE-TX/SFP B

a.   Interface

⌘   LS85-12GE-TX/SFP B provides 12 1000M optical/electric interfaces. The 1000M optical/electric interface provides the RJ45 interface mode and the SFP interface mode. The RJ45 interface supports the 10/100/1000BASE electric port, while the SFP module interface supports the 1000M optical SFP module or the 1000M electric SFP module. The RJ45 interface and the SFP interface are auto-adaptable. The two kinds of interfaces cannot run simultaneously. When the two interfaces are linked, the SFP interface is used.

⌘   The LS85-12GE-TX/SFP B board provides a serial interface to debug the board, but it is not open to the user.

b. Indicator

Table 1-15 Indicators of LS85-12GE-TX/SFP B

Location	Name	Meaning
Right side of the template	LINK	If the green indicator is on, the port and the peer device are correctly connected and the port is in UP mode. When the green indicator is off, the port is in DOWN state.
	ACT	When the green indicator is off, the port has no data to forward. When the green indicator flickers, the port is receiving or transmitting the data.
Right side of the template	ALM	When the red indicator is on, the board works abnormally and the alarm occurs. If the green indicator is off, the board runs normally.
	USE	When the green indicator is on, the module is in working state. When the green indicator is off, the module is not in working state.

1.7.12 LS85-12GE-TX/SFPE

Figure 1-22 shows the basic appearance of LS85-12GE-TX/SFPE, a 12-path 1000M optical/electric interface board. LS85-12GE-TX/SFPE is used to conduct L2/L3 wire-speed switching and port trunking, connect the core layer or the access layer and realize port QoS or user QoS.
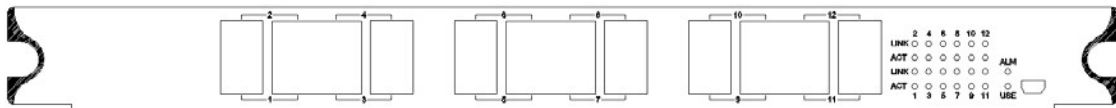

Figure 1-22 LS85-12GE-TX/SFPE

a. Interface

⌘ LS85-12GE-TX/SFPE provides 12 1000M optical/electric interfaces. The 1000M optical/electric interface provides the RJ45 interface mode and the SFP interface mode. The RJ45 interface supports the 10/100/1000BASE electric port, while the SFP module interface supports the 1000M optical SFP module or the 1000M electric SFP module. The RJ45 interface and the SFP interface are auto-adaptable. The two kinds of interfaces cannot run simultaneously. When the two interfaces are linked, the SFP interface is used.

⌘ The LS85-12GE-TX/SFPE board provides a serial interface to debug the board, but it is not open to the user.

b. Indicator

Table 1-16 Indicators of LS85-12GE-TX/SFPE

Location	Name	Meaning
Right side of the template	LINK	If the green indicator is on, the port and the peer device are correctly connected and the port is in UP mode. When the green indicator is off, the port is in DOWN state.
	ACT	When the green indicator is off, the port has no data to forward. When the green indicator flickers, the port is receiving or transmitting the data.
Right side of the template	ALM	When the red indicator is on, the board works abnormally and the alarm occurs. If the green indicator is off, the board runs normally.
	USE	When the green indicator is on, the module is in working state. When the green indicator is off, the module is not in working state.

1.7.13 LS85-12GE-TX／SFP-MPLS-E

Figure 1-23 shows the basic appearance of LS85-12GE-TX/SFP-MPLS-E, a 12-path 1000M optical/electric interface board. LS85-12GE-TX/SFP-MPLS-E is used to conduct L2/L3 wire-speed switching and port trunking, connect the core layer or the access layer and realize port QoS or user QoS.
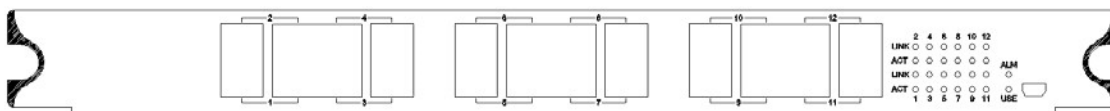

Figure 1-23 LS85-12GE-TX/SFP-MPLS-E

a. Interface

⌘ LS85-12GE-TX/SFP-MPLS-E provides 12 1000M optical/electric interfaces. The 1000M optical/electric interface provides the RJ45 interface mode and the SFP interface mode. The RJ45 interface supports the 10/100/1000BASE electric port, while the SFP module interface supports the 1000M optical SFP module or the 1000M electric SFP module. The RJ45 interface and the SFP interface are auto-adaptable. The two kinds of interfaces cannot run simultaneously. When the two interfaces are linked, the SFP interface is used.

⌘ The LS85-12GE-TX/SFP-MPLS-E board provides a serial interface to debug the board, but it is not open to the user.

b. Indicator

Table 1-17 Indicators of LS85-12GE-TX/SFP-MPLS-E

Location	Name	Meaning
Right side of the template	LINK	If the green indicator is on, the port and the peer device are correctly connected and the port is in UP mode. When the green indicator is off, the port is in DOWN state.
	ACT	When the green indicator is off, the port has no data to forward. When the green indicator flickers, the port is receiving or transmitting the data.
Right side of the template	ALM	When the red indicator is on, the board works abnormally and the alarm occurs. If the green indicator is off, the board runs normally.
	USE	When the green indicator is on, the module is in working state. When the green indicator is off, the module is not in working state.

1.7.14 LS85-MFMC-12GE-TX/SFP

Figure 1-24 shows the basic appearance of LS85-MFMC-12GE-TX/SFP, a 12-path 1000M optical/electric interface board. LS85-MFMC-12GE-TX/SFP is used to conduct L2/L3 wire-speed switching and port trunking, connect the core layer or the access layer and realize port QoS or user QoS.
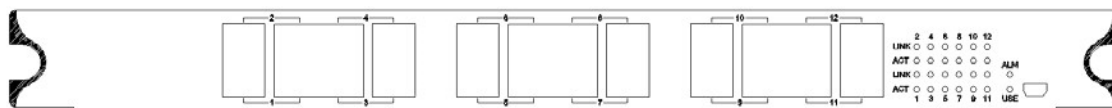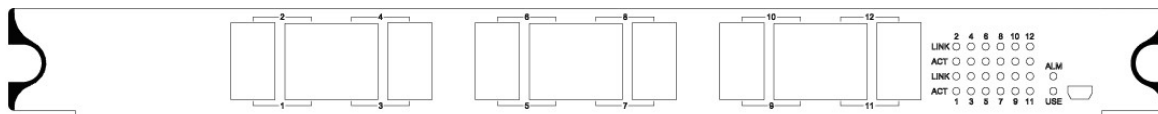

Figure 1-24 LS85-MFMC-12GE-TX/SFP

a. Interface

⌘ LS85--MFMC-12GE-TX/SFP provides 12 1000M optical/electric interfaces. The 1000M optical/electric interface provides the RJ45 interface mode and the SFP interface mode. The RJ45 interface supports the 10/100/1000BASE electric port, while the SFP module interface supports the 1000M optical SFP module or the 1000M electric SFP module. The RJ45 interface and the SFP interface are auto-adaptable. The two kinds of interfaces cannot run simultaneously. When the two interfaces are linked, the SFP interface is used.

⌘ The LS85--MFMC-12GE-TX/SFP board provides a serial interface to debug the board, but it is not open to the user.

b. Indicator

Table 1-18 Indicators of LS85-12GE-TX/SFP

Location	Name	Meaning

Right side of the template	LINK	If the green indicator is on, the port and the peer device are correctly connected and the port is in UP mode. If the green indicator is off, the port is still in Down mode.
	ACT	When the green indicator is off, the port has no data to forward. When the green indicator flickers, the port is receiving or transmitting the data.
Right side of the template	ALM	When the red indicator is on, the board works abnormally and the alarm occurs. If the green indicator is off, the board runs normally.
	USE	When the green indicator is on, the module is in working state. When the green indicator is off, the module is not in working state.

1.7.15 24-Path 1000M Electric Interface Board (LS85-24GE-TX)

Figure 1-25 shows the basic appearance of LS85-24GE-TX, a 24-path 1000m electric interface board. LS85-24GE-TX is used to conduct L2/L3 wire-speed switching and port trunking, connect the core layer or the access layer and realize port QoS or user QoS.

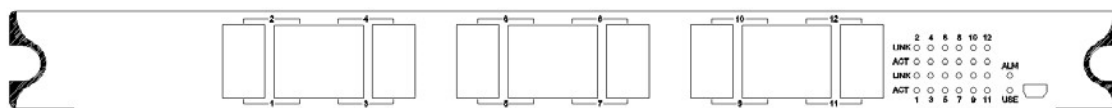Figure 1-25 24-path 1000M electric interface board (LS85-24GE-TX)

a. Interface

⌘ LS85-24GE-TX provides 24 Ethernet 1000M electric interfaces; the 1000M electric interface provides the RJ45 interface mode and supports the 10/100/1000BASE electric port.

⌘ The LS85-24GE-TX board provides a serial interface to debug the board, but it is not open to the user.

b. Indicator

Table 1-19 Indicators of LS85-12GE-TX

Location	Name	Meaning
	LINK	If the green indicator is on, the port and the peer device are correctly connected and the port is in UP mode. When the green indicator is off, the port is in DOWN state.

Right side of the template	ACT	When the green indicator is off, the port has no data to forward. When the green indicator flickers, the port is receiving or transmitting the data.
Right side of the template	ALM	When the red indicator is on, the board works abnormally and the alarm occurs. If the green indicator is off, the board runs normally.
	USE	When the green indicator is on, the module is in working state. When the green indicator is off, the module is not in working state.

1.7.16 24-Path 1000M SFP Optical Interface Board (LS85-24GE-SFP)

Figure 1-26 shows the basic appearance of LS85-24GE-SFP, a 24-path 1000m SFP optical interface board. LS85-24GE-SFP is used to conduct L2/L3 wire-speed switching and port trunking, connect the core layer or the access layer and realize port QoS or user QoS.


Figure 1-26 24-path 1000M SFP optical interface board (LS85-24GE-SFP) a.

Interface

⌘ LS85-24GE-SFP provides 24 Ethernet 1000M interfaces. The 1000M interface provides the SFP interface mode and supports the 1000M SFP optical module or the SFP electric module.

⌘ The LS85-24GE-SFP board provides a serial interface to debug the board, but it is not open to the user.

b. Indicator

Table 1-20 Indicators of LS85-24GE-SFP

Location	Name	Meaning
	LINK	If the green indicator is on, the port and the peer device are correctly connected and the port is in UP mode. When the green indicator is off, the port is in DOWN state.

Right side of the template	ACT	When the green indicator is off, the port has no data to forward.
		When the green indicator flickers, the port is receiving or transmitting the data.
Right side of the template	ALM	When the red indicator is on, the board works abnormally and the alarm occurs.
		If the green indicator is off, the board runs normally.
	USE	When the green indicator is on, the module is in working state.
		When the green indicator is off, the module is not in working state.

1.7.17 24-Path 1000M SFP Optical Interface Board (LS85-24GE-SFPE)

Figure 1-27 shows the basic appearance of LS85-24GE-SFPE, a 24-path 1000m SFP optical interface board. LS85-24GE-SFPE is used to conduct L2/L3 wire-speed switching and port trunking, connect the core layer or the access layer and realize port QoS or user QoS.
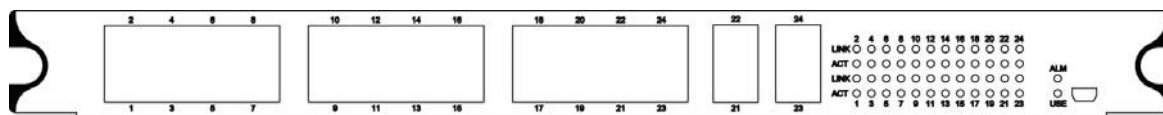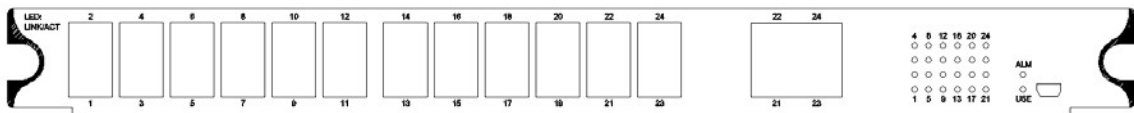

Figure 1-27 24-path 1000M SFP optical interface board (LS85-24GE-SFPE) a.

Interface

⌘ LS85-24GE-SFPE provides 24 Ethernet 1000M interfaces. The 1000M interface provides the SFP interface mode and supports the 1000M SFP optical module or the SFP electric module.

⌘ The LS85-24GE-SFPE board provides a serial interface to debug the board, but it is not open to the user.

b. Indicator

Table 1-21 Indicators of LS85-24GE-SFPE

Location	Name	Meaning
	LINK	If the green indicator is on, the port and the peer device are correctly connected and the port is in UP mode.
		When the green indicator is off, the port is in DOWN state.

Right side of the template	ACT	When the green indicator is off, the port has no data to forward.
		When the green indicator flickers, the port is receiving or transmitting the data.
Right side of the template	ALM	When the red indicator is on, the board works abnormally and the alarm occurs.
		If the green indicator is off, the board runs normally.
	USE	When the green indicator is on, the module is in working state.
		When the green indicator is off, the module is not in working state.

1.7.18 24-Path 1000M Electric Interface Board (LS85-24GE-TXE)

Figure 1-28 shows the basic appearance of LS85-24GE-TXE, a 24-path 1000m electric interface board. LS85-24GE-TXE is used to conduct L2/L3 wire-speed switching and port trunking, connect the core layer or the access layer and realize port QoS or user QoS.
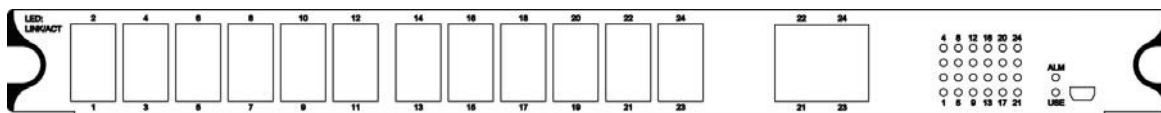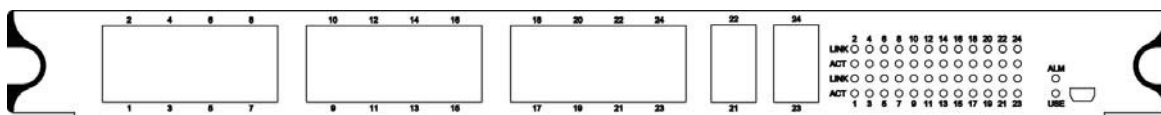

Figure 1-28 24-path 1000M electric interface board (LS85-24GE-TXE)

a.   Interface

⌘   LS85-24GE-TXE provides 24 Ethernet 1000M electric interfaces; the 1000M electric interface provides the RJ45 interface mode and supports the 10/100/1000BASE electric port.

⌘   The LS85-24GE-TXE board provides a serial interface to debug the board, but it is not open to the user.

b.   Indicator

Table 1-22 Indicators of LS85-24GE-TXE

Location	Name	Meaning
Right side of the template	LINK	If the green indicator is on, the port and the peer device are correctly connected and the port is in UP mode.
		When the green indicator is off, the port is in DOWN state.
	ACT	When the green indicator is off, the port has no data to forward.
		When the green indicator flickers, the port is receiving or transmitting the data.
	ALM	When the red indicator is on, the board works abnormally and the alarm occurs.

Right side of the template		If the green indicator is off, the board runs normally.
	USE	When the green indicator is on, the module is in working state. When the green indicator is off, the module is not in working state.

1.7.19 48-Path 1000M Electric Interface Board (LS85-48GE-TX)

Figure 1-29 shows the basic appearance of LS85-48GE-TX, a 48-path 1000m electric interface board. LS85-48GE-TX is used to conduct L2/L3 wire-speed switching and port trunking, connect the core layer or the access layer and realize port QoS or user QoS.
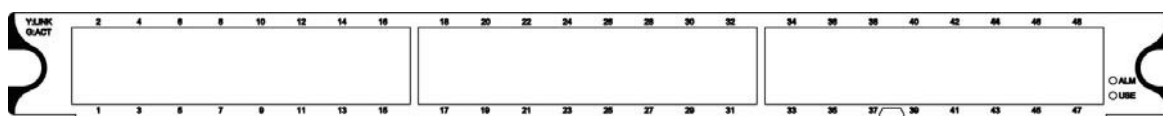

Figure 1-29 48-path 1000M electric interface board (LS85-48GE-TX)

a.   Interface

⌘   LS85-48GE-TX provides 48 Ethernet 1000M electric interfaces; the 1000M electric interface provides the RJ45 interface mode and supports the 10/100/1000BASE electric port.

⌘   The LS85-48GE-TX board provides a serial interface to debug the board, but it is not open to the user.

b.   Indicator

Table 1-23 Indicators of LS85-48GE-TX

Location	Name	Meaning
Top of the RJ45 interface	LINK	If the yellow indicator is on, the port and the peer device are correctly connected and the port is in UP mode. When the yellow indicator is off, the port is in DOWN state.
	ACT	When the green indicator is off, the port has no data to forward. When the green indicator flickers, the port is receiving or transmitting the data.
	ALM	When the red indicator is on, the board works abnormally and the alarm occurs. If the green indicator is off, the board runs normally.

| Right side of the template | USE | When the green indicator is on, the module is in working state. |
| | | When the green indicator is off, the module is not in working state. |

1.7.20   1-Path 10000M XFP Optical Interface Board (LS85-1TE-XFP)

Figure 1-30 shows the basic appearance of LS85-1TE-XFP, a 1-path 10000M XFP optical interface board. LS85-1TE-XFP is used to conduct L2/L3 wire-speed switching and port trunking, connect the core layer or the access layer and realize port QoS or user QoS.


Figure 1-30 1-Path 10000M XFP Optical Interface Board (LS85-1TE-XFP) a.

Interface

⌘   LS85-1TE-XFP provides a 1-path 10000M XFP interface. It supports the 10000M XFP module.

⌘   The LS85-1TE-XFP board provides a serial interface to debug the board, but it is not open to the user.

b. Indicator

Table 1-15 Indicators of LS85-1TE-XFP

Location	Name	Meaning
Beside the XFP interface	LINK-EN	If the green indicator is on, the port can be used. If the green indicator is off, the port is shut down.
	LINK	If the indicator is on, the link is established. If the indicator is off, the link is not established.
	RX	If the indicator is on, the port is receiving the data. If the port is off, the port is not receiving the data currently.
	TX	If the indicator is on, the port is transmitting the data. If the port is off, the port is not transmitting the data currently.
Right side of the template	ALM	When the red indicator is on, the board works abnormally and the alarm occurs.
		If the green indicator is off, the board runs normally.
	USE	When the green indicator is on, the module is in working state.
		When the green indicator is off, the module is not in working state.

1.7.21 2-Path 10000M XFP Optical Interface Board (LS85-2TE-XFP)

Figure 1-31 shows the basic appearance of LS85-2TE-XFP, a 2-path 10000M XFP optical interface board. LS85-2TE-XFP is used to conduct L2/L3 wire-speed switching and port trunking, connect the core layer or the access layer and realize port QoS or user QoS.


Figure 1-31 2-Path 10000M XFP Optical Interface Board (LS85-2TE-XFP) a.

Interface

⌘   LS85-2TE-XFP provides one 10000M XFP interface. It supports the 10000M XFP module.

⌘   The LS85-2TE-XFP board provides a serial interface to debug the board, but it is not open to the user.

b. Indicator

Table 1-15 Indicators of LS85-2TE-XFP

Location	Name	Meaning
Beside the XFP interface	LINK-EN	If the green indicator is on, the port can be used. If the green indicator is off, the port is shut down.
	LINK	If the indicator is on, the link is established. If the indicator is off, the link is not established.
	RX	If the indicator is on, the port is receiving the data. If the port is off, the port is not receiving the data currently.
	TX	If the indicator is on, the port is transmitting the data. If the port is off, the port is not transmitting the data currently.
Right side of the template	ALM	When the red indicator is on, the board works abnormally and the alarm occurs. If the green indicator is off, the board runs normally.
	USE	When the green indicator is on, the module is in working state. When the green indicator is off, the module is not in working state.

1.7.22   4-Path 10000M XFP Optical Interface Board (LS85-4TE-XFP)

Figure 1-32 shows the basic appearance of LS85-4TE-XFP, a 4-path 10000M XFP optical interface board. LS85-4TE-XFP is used to conduct L2/L3 wire-speed switching and port trunking, connect the core layer or the access layer and realize port QoS or user QoS.
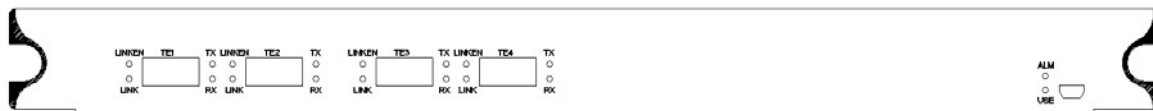
Figure 1-32   4-path 10000M XFP optical interface board (LS85-4TE-XFP) a.

Interface

⌘   LS85-4TE-XFP provides a 4 10000M XFP interfaces. It supports the 10000M XFP module.

⌘   The LS85-4TE-XFP board provides a serial interface to debug the board, but it is not open to the user.

b. Indicator

Table -26   Indicators of LS85-4TE-XFP

Location	Name	Meaning
Beside the XFP interface	LINK-EN	If the green indicator is on, the port can be used. If the green indicator is off, the port is shut down.
	LINK	If the indicator is on, the link is established. If the indicator is off, the link is not established.
	RX	If the indicator is on, the port is receiving the data. If the port is off, the port is not receiving the data currently.
	TX	If the indicator is on, the port is transmitting the data. If the port is off, the port is not transmitting the data currently.
Right side of the template	ALM	When the red indicator is on, the board works abnormally and the alarm occurs. If the green indicator is off, the board runs normally.
	USE	When the green indicator is on, the module is in working state. When the green indicator is off, the module is not in working state.

1.7.23   8-Path 10000M XFP Optical Interface Board (LS85-8TE-XFP)

Figure 1-33 shows the basic appearance of LS85-8TE-XFP, a 8-path 10000M XFP optical interface board. LS85-8TE-XFP is used to conduct L2/L3 wire-speed switching and port trunking, connect the core layer or the access layer and realize port QoS or user QoS.
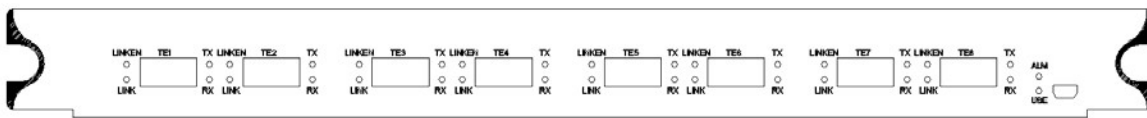
Figure 1-33 8-path 10000M XFP optical interface board (LS85-8TE-XFP) a.

Interface

⌘   LS85-8TE-XFP provides a 8-path 10000M XFP interface. It supports the 10000M XFP module.

⌘   The LS85-8TE-XFP board provides a serial interface to debug the board, but it is not open to the user.

b. Indicator

Table 1-15 Indicators of LS85-8TE-XFP

Location	Name	Meaning
Beside the XFP interface	LINK-EN	If the green indicator is on, the port can be used. If the green indicator is off, the port is shut down.
	LINK	If the indicator is on, the link is established. If the indicator is off, the link is not established.
	RX	If the indicator is on, the port is receiving the data. If the port is off, the port is not receiving the data currently.
	TX	If the indicator is on, the port is transmitting the data. If the port is off, the port is not transmitting the data currently.
Right side of the template	ALM	When the red indicator is on, the board works abnormally and the alarm occurs. If the green indicator is off, the board runs normally.
	USE	When the green indicator is on, the module is in working state. When the green indicator is off, the module is not in working state.

1.7.24   LS85-4TE-XFP-MPLS-E

Figure 1-34 shows the basic appearance of LS85-4TE-XFP-MPLS-E, a 4-path 10000M XFP optical interface board. LS85-4TE-XFP-MPLS-E is used to conduct L2/L3 wire-speed switching and port trunking, connect the core layer or the access layer and realize port QoS or user QoS.TCAM can support a working frequency of up to 350MHz and its maximum capacity can be expanded to 32Mb.

Figure 1-34 LS85-4TE-XFP-MPLS-E

a.   Interface

⌘   LS85-4TE-XFP-MPLS-E provides a 4-path 10000M XFP interface. It supports the 10000M XFP module.

⌘   The LS85-4TE-XFP-MPLS-E board provides a serial interface to debug the board, but it is not open to the user.

b.   Indicator

Table 1-28 Indicators of LS85-4TE-XFP-MPLS-E

Location	Name	Meaning
Beside the XFP interface	LINK-EN	If the green indicator is on, the port can be used. If the green indicator is off, the port is shut down.
	LINK	If the indicator is on, the link is established. If the indicator is off, the link is not established.
	RX	If the indicator is on, the port is receiving the data. If the port is off, the port is not receiving the data currently.
	TX	If the indicator is on, the port is transmitting the data. If the port is off, the port is not transmitting the data currently.
Right side of the template	ALM	When the red indicator is on, the board works abnormally and the alarm occurs. If the green indicator is off, the board runs normally.
	USE	When the green indicator is on, the module is in working state. When the green indicator is off, the module is not in working state.

1.7.25   LS85-48GE-SFP-MPLS-E

Figure 1-35 shows the basic appearance of LS85-48GE-SFP-MPLS-E. LS85-48GE-SFP-MPLS-E is used to conduct L2/L3 wire-speed switching and port trunking, connect the core layer or the access layer and realize port QoS or user QoS.TCAM can support a working frequency of up to 350MHz and its maximum capacity can be expanded to 32Mb.

Figure 1-35 LS85-48GE-SFP-MPLS-E

a. Interface

⌘
LS85-48GE-SFP-MPLS-E provides 48 Ethernet 1000M interfaces. The 1000M interface provides the SFP interface mode and supports the 1000M SFP optical module or the SFP electric module.

⌘ The LS85-48GE-SFP-MPLS-E board provides a serial interface to debug the board, but it is not open to the user.

b. Indicator

Table 1-29 Indicators ofLS85-48GE-SFP-MPLS-E

Location	Name	Meaning
Top of SFP port	LINK	If the green indicator is on, the port and the peer device are correctly connected and the port is in UP mode. If the port is in Link Down mode, it is off.
	ACT	When the green indicator is off, the port has no data to forward. When the green indicator flickers, the port is receiving or transmitting the data.
Right side of the template	ALM	When the red indicator is on, the board works abnormally and the alarm occurs. If the green indicator is off, the board runs normally.
	USE	When the green indicator is on, the module is in working state. When the green indicator is off, the module is not in working state.

1.7.26 48-Path 100M Electric Interface Board (LS85-48FE-TX-MPLS-E)

Figure 1-36 shows the basic appearance of LS85-48FE-TX-MPLS-E. LS85-48FE-TX-MPLS-E is used to conduct L2/L3 wire-speed switching and port trunking, connect the core layer or the access layer and realize port QoS or user QoS.TCAM can support a working frequency of up to 350MHz and its maximum capacity can be expanded to 32Mb.
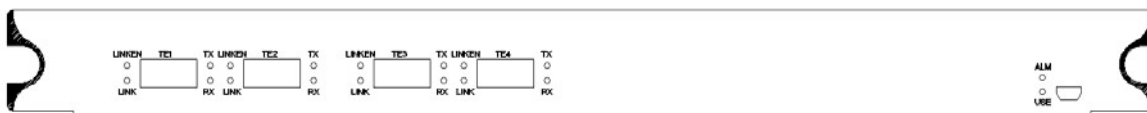
a. Interface

Figure 1-36 LS85-48FE-TX-MPLS-E

LS85-48FE-TX-MPLS-E provides 48 Ethernet 1000M electric interfaces; the 1000M electric interface provides the RJ45 interface mode and supports the 10/100BASE electric port.

⌘ The LS85-48FE-TX-MPLS-E board provides a serial interface to debug the board, but it is not open to the user.

b. Indicator

Table 1-30 Indicators of LS85-48FE-TX-MPLS-E

Location	Name	Meaning
Top of the RJ45 port	LINK	If the green indicator is on, the port and the peer device are correctly connected and the port is in UP mode. If the port is in Link Down mode, it is off.
	ACT	When the green indicator is off, the port has no data to forward. When the green indicator flickers, the port is receiving or transmitting the data.
Right side of the template	ALM	When the red indicator is on, the board works abnormally and the alarm occurs. If the green indicator is off, the board runs normally.
	USE	When the green indicator is on, the module is in working state. When the green indicator is off, the module is not in working state.

a. Interface

⌘

1.7.27   LS85-48FE-SFP-MPLS-E

Figure 1-37 shows the basic appearance of LS85-48FE-SFP-MPLS-E, a 48-path 100m SFP optical interface card. LS85-48FE-SFP-MPLS-E is used to conduct L2/L3 wire-speed switching and port trunking, connect the core layer or the access layer and realize port QoS or user QoS.TCAM can support a working frequency of up to 350MHz and its maximum capacity can be expanded to 32Mb.
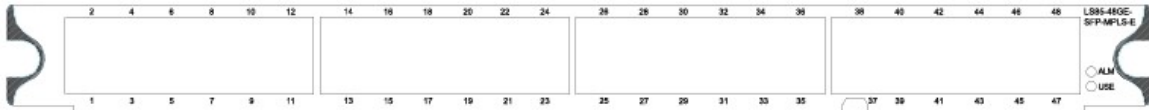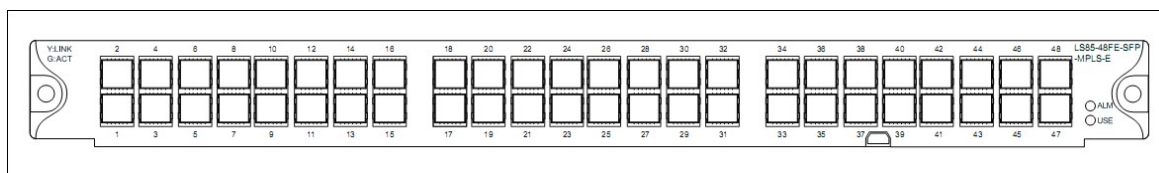

Figure 1-37 LS85-48FE-SFP-MPLS-E

LS85-48FE-SFP-MPLS-E provides 48 Ethernet 1000M interfaces. The 1000M interface provides the SFP interface mode and supports the 1000M SFP optical module or the SFP electric module.

⌘ The LS85-48FE-SFP-MPLS-E board provides a serial interface to debug the board, but it is not open to the user.

b. Indicator

Table 1-31 Indicators of LS85-48FE-SFP-MPLS-E

Location	Name	Meaning
Top of the sfp port	LINK	If the green indicator is on, the port and the peer device are correctly connected and the port is in UP mode. If the port is in Link Down mode, it is off.
	ACT	When the green indicator is off, the port has no data to forward. When the green indicator flickers, the port is receiving or transmitting the data.
	ALM	When the red indicator is on, the board works abnormally and the alarm occurs. If the green indicator is off, the board runs normally.

a. Interface

⌘

| Right side of the template | USE | When the green indicator is on, the module is in working state. |
| | | When the green indicator is off, the module is not in working state. |

1.7.28　48-Path 1000M Electric Interface Board (LS85-48GE-TX-MPLS-E)

Figure 1-38 shows the basic appearance of LS85-48GE-TX-MPLS-E, a 48-path 1000m electric interface board. LS85-48GE-TX-MPLS-E is used to conduct L2/L3 wire-speed switching and port trunking, connect the core layer or the access layer and realize port QoS or user QoS.TCAM can support a working frequency of up to 350MHz and its maximum capacity can be expanded to 32Mb.
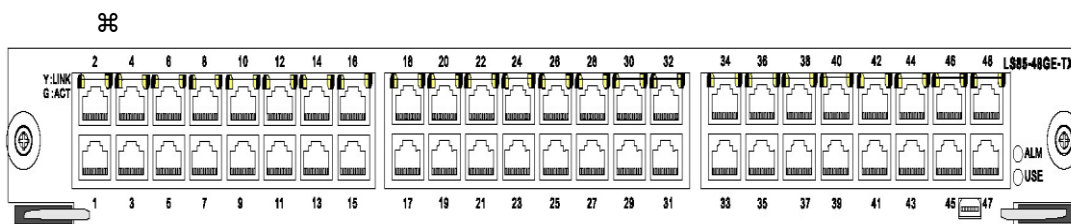

Figure 1-38　48-path 1000M electric interface board (LS85-48GE-TX-MPLS-E) a.

Interface

⌘　　LS85-48GE-TX-MPLS-E provides -48 Ethernet 1000M electric interfaces; the 1000M electric interface provides the RJ45 interface mode and supports the 10/100/1000BASE electric port.

⌘ The LS85-48GE-TX-MPLS-E board provides a serial interface to debug the board, but it is not open to the user.

b. Indicator

Table 1-32 Indicators of LS85-48GE-TX-MPLS-E

Location	Name	Meaning
Top of the RJ45 port	LINK	If the green indicator is on, the port and the peer device are correctly connected and the port is in UP mode. If the port is in Link Down mode, it is off.
	ACT	When the green indicator is off, the port has no data to forward. When the green indicator flickers, the port is receiving or transmitting the data.
Right side of the template	ALM	When the red indicator is on, the board works abnormally and the alarm occurs. If the green indicator is off, the board runs normally.
	USE	When the green indicator is on, the module is in working state. When the green indicator is off, the module is not in working state.

1.7.29 LS85-4TE-XFP-MPLS-L

Figure 1-39 shows the basic appearance of LS85-4TE-XFP-MPLS-L, a 4-path 10000M XFP optical interface board. LS85-4TE-XFP-MPLS-L is used to conduct L2/L3 wire-speed switching and port trunking, connect the core layer or the access layer and realize port QoS or user QoS.TCAM can support a working frequency of up to 350MHz and its maximum capacity can be expanded to 16Mb.
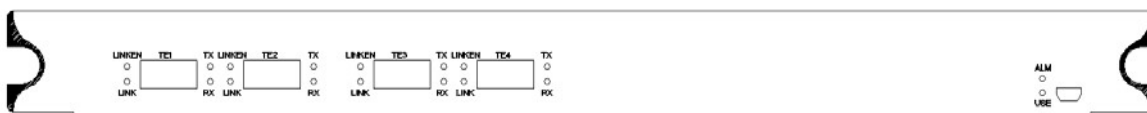

Figure 1-39 LS85-4TE-XFP-MPLS-L

a. Interface

⌘ LS85-4TE-XFP-MPLS-L provides a 4-path 10000M XFP interface. It supports the 10000M XFP module.

⌘ The LS85-4TE-XFP-MPLS-L board provides a serial interface to debug the board, but it is not open to the user.

b. Indicator

Table 1-32 Indicators of LS85-4TE-XFP-MPLS-L

Location	Name	Meaning
Beside the XFP interface	LINK-EN	If the green indicator is on, the port can be used. If the green indicator is off, the port is shut down.
	LINK	If the indicator is on, the link is established. If the indicator is off, the link is not established.
	RX	If the indicator is on, the port is receiving the data. If the port is off, the port is not receiving the data currently.
	TX	If the indicator is on, the port is transmitting the data. If the port is off, the port is not transmitting the data currently.
Right side of the template	ALM	When the red indicator is on, the board works abnormally and the alarm occurs. If the green indicator is off, the board runs normally.
	USE	When the green indicator is on, the module is in working state. When the green indicator is off, the module is not in working state.

Chapter 2   Installation Preparation

2.1 Safety Advice

To prevent personnel and devices from harms, read safety advices in the manual before you install the S8500.

The ⌘ following safety advices do not cover all potential dangers.

Notes

2.1.1   Safety Advices for System Installation

⌘   Keep the machine box clean and dustless. ⌘ Do not put the device at the

walking area.

⌘   Do not wear loose clothes or other things that may be tumbled by the machine box during installation and maintenance.

⌘   Before dismantling the machine box, please shut down all powers and dial out all power sources and cables.

2.1.2   Safety Advices for Removal

Because S8500 has a large volume and weighs heavy, please follow the following requirements during carrying S8500: ⌘ Do not remove S8500 frequently. ⌘ At least two persons are needed if S8500 requires to be moved. ⌘ When you move the device, do not hurt your feet or your waist. ⌘ Before moving the device, cut off all power sources and dial out all cables.
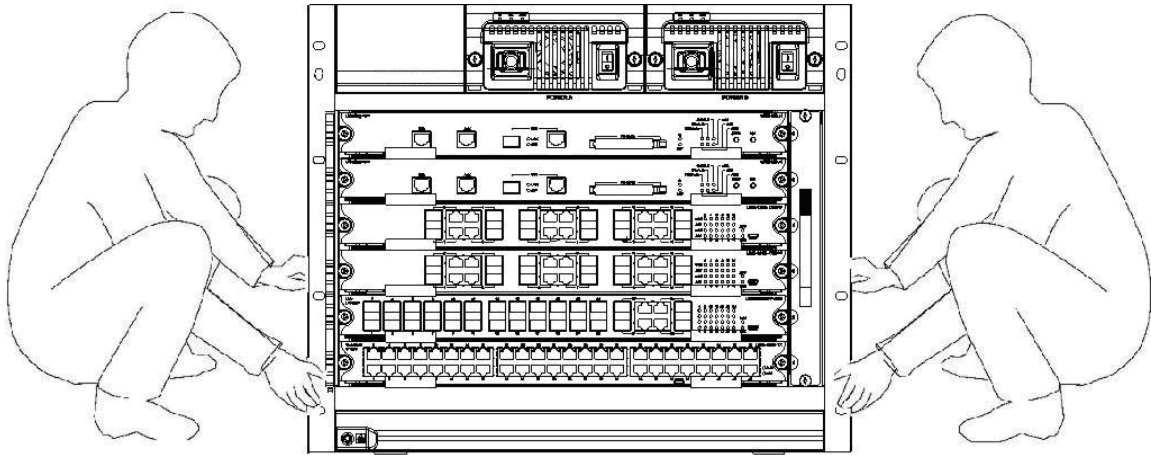
Figure 2-1 Moving S8500 correctly

⚠ **When moving the device, do not hold the template, power handle or ventilation hole.**

2.1.3 Electricity Security

⌘   Check potential dangers in the working area, such as ungrounded power source, unreliable power grounding and wet ground.

⌘   Before installation, know the location of the emergency power switch indoors. If trouble occurs, cut off the power.

⌘   Try to avoid to maintain the devices alone. ⌘ When the power is cut off, check

the devices carefully.

⌘   Do not put the device in moist environment or let liquid substance into the machine box.

⌘   Follow instructions to connect the positive/negative line before the DC power is used.

2.1.4 Static Discharge Prevention

Although many measures are taken on S8500 for preventing the static, the static still has bad effect on the circuits and devices when the static reaches a certain volume.

The following are the main resources of the static when S8500 connects the communication network:

⌘ Outside electric fields like outdoor hi-voltage wire and thunder ⌘

Inside systems such as the floor materials and the architecture of

machines **To prevent the static's damage, do as follows:** ⌘ **The**

device and the floor is well grounded.

⌘ **Prevent the dust indoors.**

⌘ **Keep proper humidity.**

⌘ **Wear the static-free armguard before you touch the circuit board.**

Do as follows when the board is replaced or installed:

⌘ **Before installing all kinds of parts, especially the circuit board, wear the static-free armguard.**

⌘ **When you have to hold the circuit board, hold its edges. Forbid to touch the elements and the printing circuit.**

⌘ **Prevent clothes from touching the circuit board. The static-free armguard can only prevent the static in the body from damaging the circuit board, while it cannot prevent the static in the clothes.**

2.1.5 Laser Security

⌘ When the optical-fiber transceiver works, you should make sure that the port connects the optical-fiber cable and that the port is stuffed by the anti-dust lid.

⌘ Do not watch the laser interface directly.

2.2 Requirements for Location Place

S8500 must be installed indoors. To secure its normal running and expand its lifespan, the following requirements for the installation place must be satisfied:

2.2.1 Requirements for Stand Installation

To install S8500 in a stand, make sure that the machine box meets the following requirements:

⌘ Try to install it in an open stand. If it is installed in a closed stand, make sure that the ventilation of the stand is good.

⌘ Make sure that the stand is strong enough to support S8500 and its accessories.

⌘ Make sure that the size of the machine box is proper so that there is certain space for heat cooling after S8500 is installed.

⌘ The machine box is well grounded.

2.2.2 Ventilation Requirements

The ventilation of the device must guarantee a space reservation at the ventilation hole, enabling the cooling system to works normally. After all types of cables are connected, you should bind them together to prevent them from stuffing the ventilation hole.
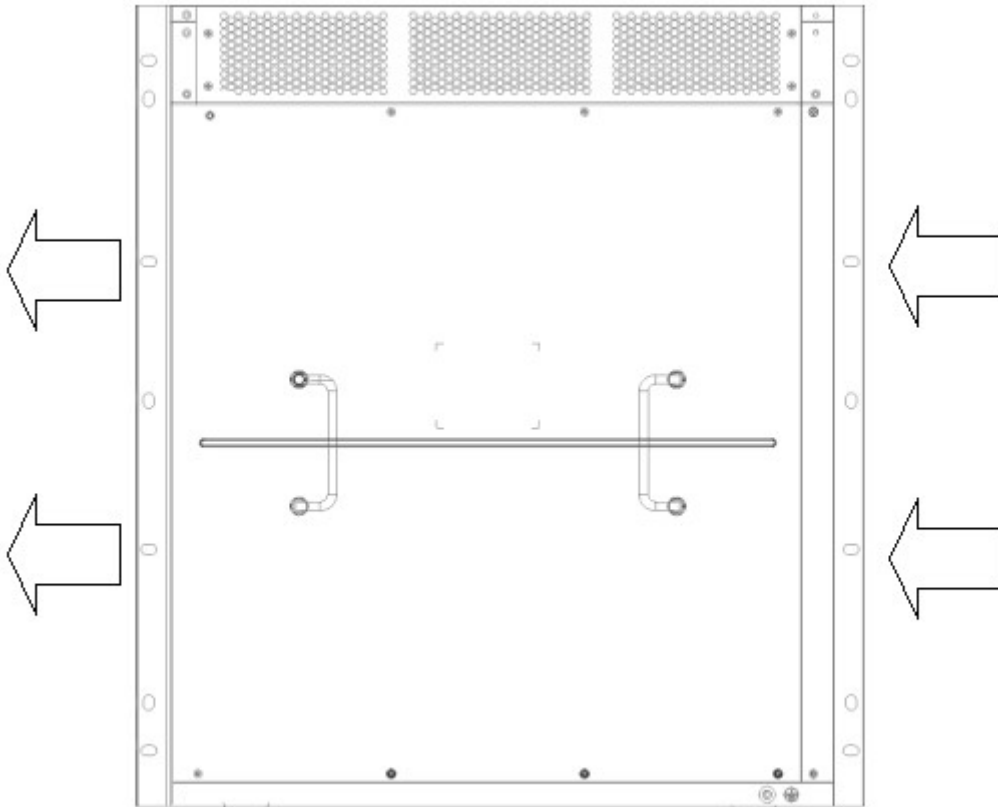
Figure 2-2 Ventilation mode of S8500

2.2.3 Temperature and Humidity

To guarantee the normal function and lifespan of S8500, you should maintain a certain temperature and humidity in the machine room.

If the temperature and humidity in the machine room is unsuitable for a long time, the device may get damaged.

⌘ In a relatively high humid environment, the insulation material may not insulate well, or even have current leakage. In some cases, the mechanic performance of the material and mental parts' erosion may occur.

⌘ In a relatively low humid environment, the insulation slice may be dried, shrink and easily generate static; hence, the circuits on the device may get damaged.

⌘ The higher the temperature is, the higher the danger is. The reliability of the router, hence, will greatly affected and the aging process of the router will greatly accelerate.

The router's requirements for temperature and humidity are shown in table 2-1:

Table 2-1 S8500's requirements for temperature and humidity

Temperature		Relative Humidity	
Long-term function	Short-term function	Long-term function	Short-term function
15ºC-30ºC	0ºC-60ºC	40%-65%	10%-90%

⌘ **The measurement should be taken at 1.5m high and 0.4m ahead of the front template when the bracket has no shield panes.**

⌘ **The short-term function means that the router cannot continuously run over 48 hours or 15 days discontinuously each year.**

⌘ **The extremely bad working environment means the temperature and humidity when trouble occurs in the air-conditioning system. The router takes five years to restore.**

2.2.4 Cleanness Requirements

Dust is a danger for device's function. If there are lots of dusts in the router's machine box, the static may be absorbed and therefore the metal pointer may not be well touched, especially when the indoor humidity is relatively high. The dust volume and particle diameter in the machine room are shown in table 2-2.

Table 2-2 Dust volume and particle diameter in the machine room

Maximum diameter (μm)	0.5	1	3	5

Maximum thickness (particle/m^3)	1.4 x 10	7 x 10	2.4 x 10	1.3 x 10

Besides the dust, the device has severe demands for the salt/acid/sulfide percentage in the air. These vicious substances will accelerate metal's erosion and the aging process of some parts. Hence, vicious gases (SO_2, H_2S, NO_2, and CL_2) must be prevented from entering the computer room. The details about the maximum vicious gas percentage in the air are shown in table 2-3.

Table 2-3 Average/maximum vicious gas ratio in the air

Gas	Average ratio (mg/m)	Average ratio (mg/m)
SO_2	0.2	1.5
H_2s	0.006	0.03
NO_2	0.04	0.15
NH_3	0.05	0.15
CL_2	0.01	0.3

2.2.5 Power Requirements

⌘   When S8500 adopts the AC power, the following conditions must be met:

Input AC voltage: 220V±20%，50Hz±10%

Power: 300W ⌘   When S8500 adopts the DC power, the following

conditions must be met:

Voltage for input DC current: -DC－48 V

Power: 300W

the   **Notes**   **The device provides the function of power source backup. You are suggested to adopt the multi-path power supply so as to guarantee continuous running of the device, preventing sudden power shutdown.**

2.3 Grounding Requirements for the System

The nice grounding system is a solid base for S8500 to function reliably, and a prima premise for thunder attack prevention and anti-jamming. Please carefully check the grounding conditions of the installation site according to the requirements of grounding regulations, and get the grounding well done according to actual situation.

2.3.1 Safe Grounding

The AC-adopted device must be grounded through the yellow-green grounding line, or the electric shock may occur when the insulation resistance between power source and machine box gets small.

2.3.2 Thunder Grounding

The anti-thunder system is an independent system among facilities, consisting of the lightning rod, the underground conductor and the connector for the grounding system. The grounding system is used together with the grounding device for the yellow-green safety grounding line. The lightning discharge grounding is just for facilities, not for devices.

2.3.3 Electromagnetic-Compatible Grounding

The groundings which are oriented for electromagnetic compatibility include the shielded grounding, filter grounding, noise/interruption limitation and level reference. The grounding resistance must be less than 1Ω.

The hull of S8500 has two grounding columns reserved. See figure 2-3.
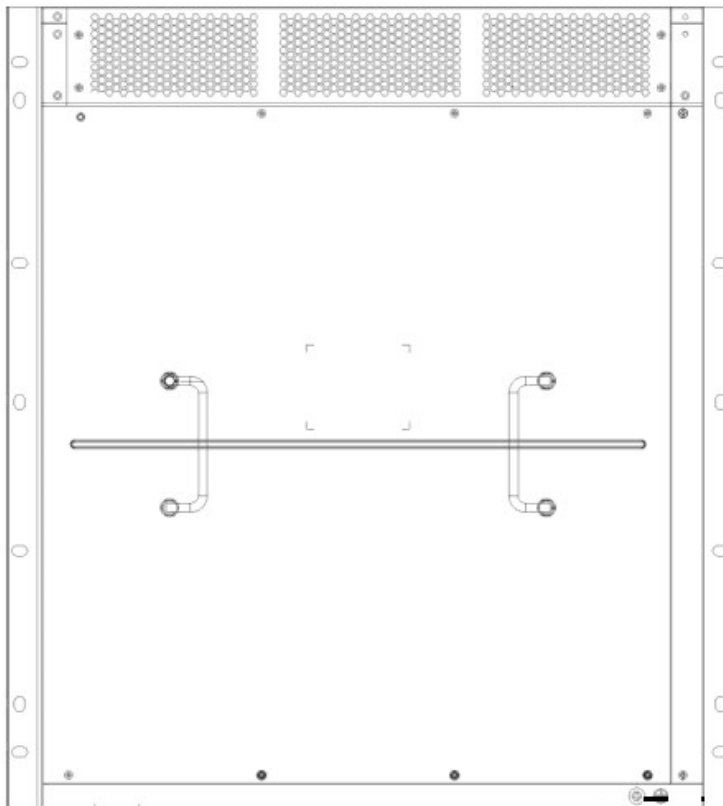
Figure 2-3 Grounding column of S8500

The system connection is to guarantee the normal running of all devices. Please read the following before you connect all devices in the system.

2.3.4 EMI Precautions

All kinds of interference sources, no matter they are from the devices, the outside of the application system or the inner system, have effect on the devices through different conduction modes such as capacitance coupling, inductance coupling and electromagnetic wave radiation.

The electromagnetic interference is classified into two types: radiation interference and conduction interference, which is decided by the type of the diffuseness path.

The process that an energy ejected by a device (it is always the radio energy) reaches a sensor through space is called the radiation interference. The interference source can be a part of the disturbed system, or be a unit which is wholly isolated from electrical devices. The reason why the conduction interference generates is that the interference source connects the sensor through the electromagnetic line or the signal cable and the interference is conducted from one unit to another. The conduction interference always affects the power system of the device. Thus, the wave filter is required to stop the conduction interference from affecting the power system. The radiation interference can affect any signal path in the device, while the way to shield the radiation interference is difficult.

⌘ **Effective measures must be taken to prevent the grid from disturbing the power supply system.**

⌘ **You'd better not put the grounding device of electrical equipment and the anti-thunder device on the ground where the router lies. Try to keep a long distance between grounding/anti-thunder device and router.**

⌘ **Keep far away from the powerful wireless emission station, radar emission station or hi-frequency electric device.**

⌘ **The static-shielding method must be taken.**

2.3.5 Precautions for Optical Fiber Connection

Before connecting the optical fiber, make clear that the type of the optical connector and the type of the optical fiber comply with the adopted optical interface's type.

2.4 Installation Tools

Table 2-4 Tools

Regular tools	Crossing screwdriver, screwdriver, spanner (10~12), related cable and optical cable, bolts, welder, pincer, enlacement strip

Specific tools	Static-proof tools
Apparatus	millimeter

S8500 has no accessory toolkit and users need prepare for these tools.

2.5 Requirements for Unpacking & Goods Examination

The routers are delivered according to the order contract, so the buyer has to unpack and check the routers according to the order contract.

2.5.1 Goods Custom Clearance

Package box for device and machine box

⌘   Check whether all kinds of templates of the device are installed and debugged or not.

⌘   Check whether the power source module of the device is the required AC/DC module.

⌘   Check the power line and the grounding line of the device.
⌘   Configure the cable and optical cable. ⌘   Check the random documents. ⌘

Check the packing list.

Package box for the template

It contains the backup templates of S8500.

The example above is a normal case for goods clearance. The actual goods clearance may differ. In this case, follow the requirements of the contract. Please check your goods according to the packing list and the order contract. If having problem, please contact the dealer.

Checking the shipping container

The package method of the shipping container is shown in figure 2-4. After the shipping container is opened, check as follows: ⌘ Check whether the shipping container has the required shock-free foam.

⌘ Check whether the paper box in the shipping container is fine and whether the sealing is good.
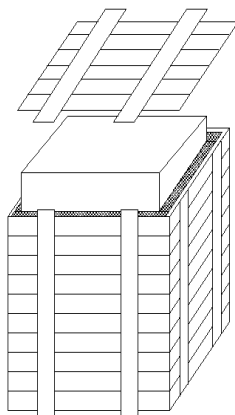
Figure 2-4 Package method for the shipping container

2.5.2 Recording the On-Site Log

After all containers are checked, put labels on the shipping containers and make corresponding records.

Each device must be prepared with an on-site log that should contain the following information: production date, debugging record, software/hardware version number, production line number.

Note:
1)   When you plug or dial out the power line, keep the power line horizontal with the power socket.

2)   When the lifetime of our products ends, handle them according to national laws and regulations, or send these products to our company for collective processing.

Chapter 3   S8500 Installation

⌘ **Before installing S8500, read this chapter and Chapter 2 first.   ⌘**

Requirements described in chapter 2 have been met.

3.1 Installation Procedure

```
        Prepartion
         before
         install
            |
            v
       Install rack
            |
            v
        Install
        on rack
            |
            v
     Grounding switch
            |
            v
        Connect
         power
       supply(AC/
          DC)
         /        \
        v          v
  Connect AC    Connect DC
    power         power
```

```
            Connect NSU
              cable
                |
                v
           Plug info module
                |
                v
           Plug cable on
              module
                |
                v
            Bind cable
                |
                v
            Post-check
                |
                v
         Install finished
```
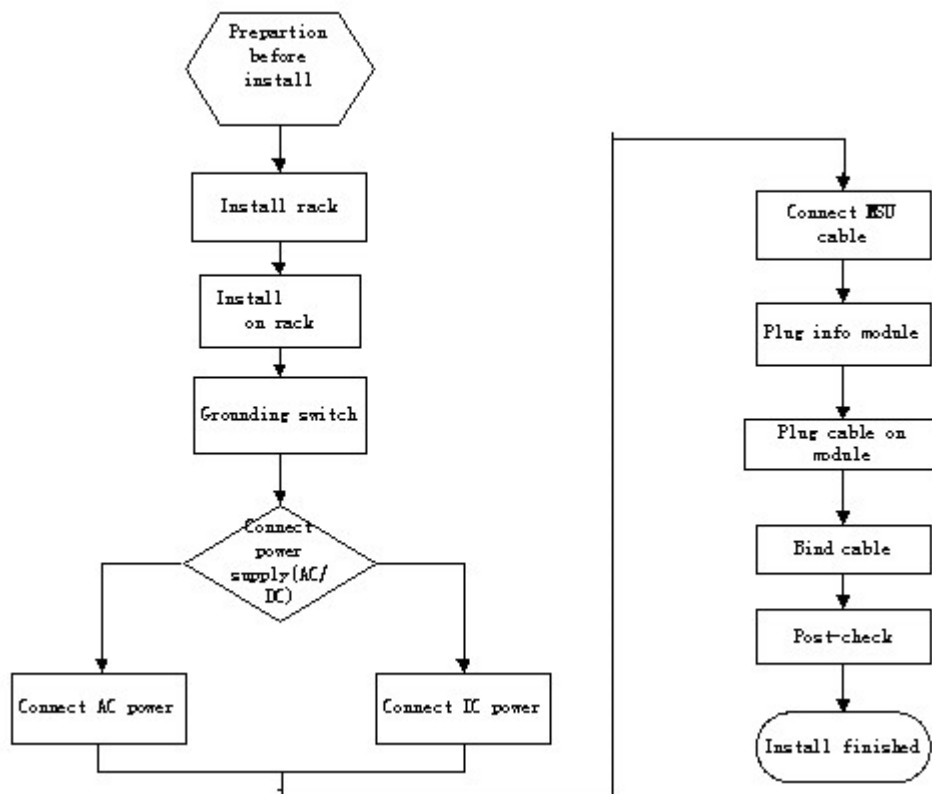
3.2 Preparation Before Installation

Before installing S8500, you must have ideas in mind, ideas about the location site, networking mode, power supply and lining.

Do as follows before installing S8500:

⌘   Check whether the power source and the air flow at the installation site are prepared according to corresponding requirements.

⌘   Check whether the cables are prepared well for the power source and relative network.

⌘   Decide whether to select the AC power or the DC power and check whether the rated power can be obtained.

3.3 Installing the Router's Machine Box

3.3.1 Precautions

Note the following things when you install the cabinet:

⌘   All bolts to fix the cabinet to the ground is well installed. You need wrench the bolt according to the order from bottom to top: flat pad, spring pad and nut.

⌘   The cabinet is stable after installed. ⌘ The cabinet should be vertical with the ground after installed.

⌘   The cabinets installed in the machine room should be on a line. The error should be less than 5mm.

⌘   The front door and the rear door of the cabinet should be convenient for opening or closing. The lock is fine and the keys are prepared.

⌘   There are no redundant and abnormal labels in the cabinet or on each board. ⌘

         The fake handle should be installed well.

⌘   The screws for fixing each device in the cabinet should be firm, complete and matched with the type of the bolt.

⌘   Each board should be firmly installed and the screws to fix the templates are firmly wrenched.

⌘   All cord outlets at the bottom or top of the cabinet need be installed with the rat prevention net. The diameter of the left leak cannot be more than 1.5cm, preventing rats or other little animals to enter the cabinet.

⌘   The static-free armguard must be installed in the cabinet.

3.3.2 Installation Procedure

(1)   Make a layout for space before installing the cabinet. Reserve much room for the front and rear doors of the cabinets for maintenance and operation.

(2)   Install the 19-inch machine box on the designated location according to the layout and then fix it well.

(3)   Install corresponding cable troughs and connection lines.

(4)   Install corresponding salvers and the wire-start layer.

3.4 Installing S8500 on the Cabinet

3.4.1 Precautions

Before installing S8500 on the cabinet, check whether the front and rear fixing brackets of the cabinet is properly located. If the fixing brackets are not in a proper location, the front template of the device may be too close to the front door. The front door of the cabinet may not be closed after the network cable is plugged. Make sure of a distance of 10mm between the front door and the front template after S8500 is installed.

Additionally, the following things need be checked before installation:

The cabinet is well fixed and each module in the machine box has been installed. There are no barriers in the machine box or beside the machine box affecting the installation. The to-be-installed device is prepared well and moved to a place near the cabinet for easy removal.

3.4.2 Installation Procedure

(1)   Two people horizontally hold the edges of S8500 and slowly carry it before the machine box.

(2)   Two people move S8500 horizontally to a position slightly higher than the tray of the cabinet or the slide way and then insert it to the cabinet.

(3)   Install the fixed bolts to fix S8500 to the inside of the cabinet.

3.5 Connecting the System and the Ground

There is Protection Ground (PGND) on the back of S8500. First, you connect PGND and the grounding column of the cabinet and then connect the grounding column and the grounding bar of the machine room.

3.5.1 Precautions

⌘   The side size of the grounding line can be calculated through the passed maximum current load. The fine conductor and conduction line should be used.

⌘   The unshielded conduction lines are forbidden to use. ⌘

The grounding resistance value should be less than 1

ohm.

3.5.2 Grounding Procedure

(1)   Loose the six-angle screw on the rear grounding column.

(2)   Lock the terminal of the grounding line to the grounding column.

(3)   Wrench the six-angle screw with the spanner.
(4)   Connect the corresponding terminals through the previous steps according to the connection map.

3.5.3 Connecting the DC Power Source to the Power Source Module

According to identifiers and location requirements on the template of the power source module, connect the corresponding DC power line. For details, see figure 3-1.
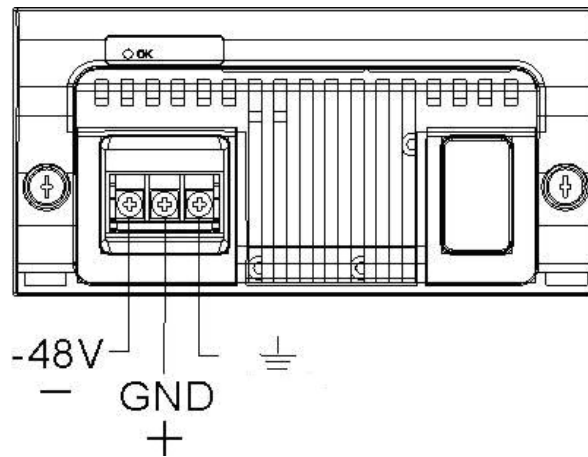
Figure 3-1 Connecting DC power

3.5.4 Precautions

⌘   Before connecting the power source, check whether the provided outside power source matches up with the power source module installed in S8500.

⌘   Check whether the switch of the power source module is in shutdown state or not before connecting the power line.

⌘   Connect the power line and the wire post according to the same color. ⌘

Make sure that the connected power line is well conducted.

3.5.5 Connection Procedure

(1)   Lock the power line to the corresponding post according to identifiers and then wrench the bolt.

(2)   Connect the other end of the power line to the corresponding socket or connector.

3.6 Connecting the AC Power Source to the Power Source Module

According to identifiers and location requirements on the template of the power source module, connect the corresponding DC power line. For details, see figure 3-2.
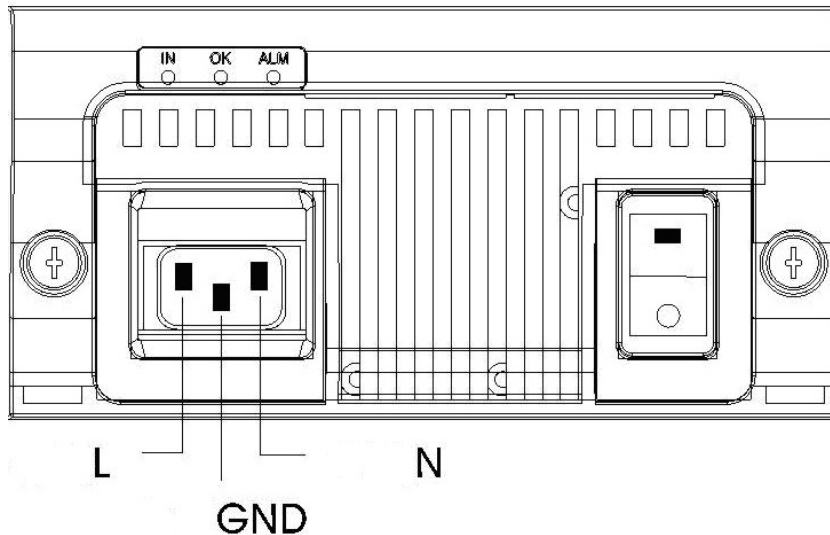
Figure 3-2 Connecting AC power

3.6.1 Precautions

⌘   Before connecting the power source, check whether the provided outside power source matches up with the power source module installed in S8500.

⌘   Check whether the switch of the power source module is in shutdown state or not before connecting the power line.

⌘   Connect the power line and the wire post according to the same color. ⌘

Make sure that the connected power line is well conducted.

3.6.2 Connection Procedure

(1)   Directly insert the plug of the power line into the power source module.

(2)   Connect the other end of the power line to the corresponding socket or connector.

3.7 Connecting the Cable of the Main Control Board

3.7.1 Connection Procedure

(1) Connect the RJ45 end of the Ethernet cable to the Ethernet interface of the LS85-MSU board and then connect the other end of the Ethernet cable to the network manager device or the terminal control device.

(2) Connect the RJ45 end of the RS-232 serial cable to the RS-232 serial interface of the LS85-MSU board and then connect the other end of the Ethernet cable to the network manager device or the terminal control device.

3.8 Removing a Board Away from S8500

3.8.1 Procedure for Removing a Board away

(1) Plug out all optical fibers and cables from the template.

(2) Loose the two bolts on the template.

(3) Plug out the insertion board. See figure 3-3.

⌘ **When you conduct the previous procedure, please wear the static-free armguard and shut down the corresponding power first.**

⌘ **Do not hold the edges of PCB or collide components of PCB.**
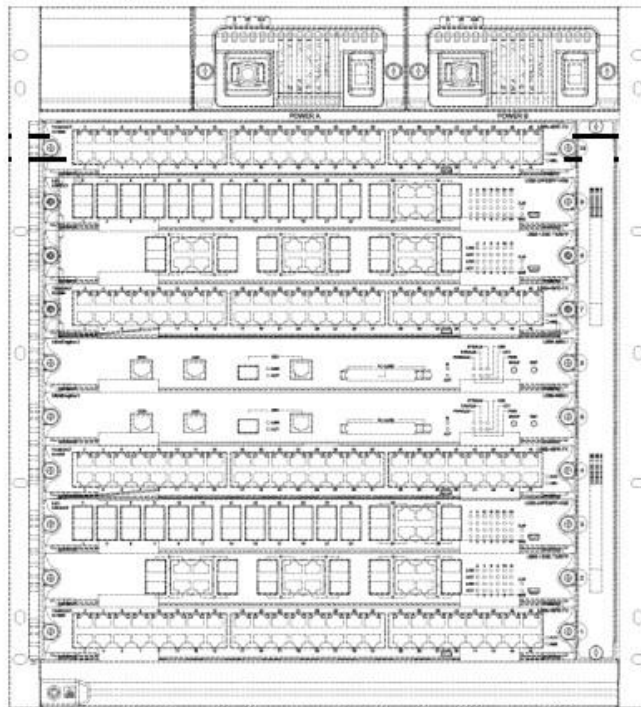
Figure 3-3 Components at the edge of the board

3.9 Reinstalling a Board on S8500

3.9.1 Procedure for Reinstalling a Board

(1) Remove the card of the corresponding part according to actual requirements.

(2) Replace with the corresponding card and put it into the right slide way.

(3) Wrench the corresponding two screws after the card is pushed to the right position.

⌘ **Do not hold the edges of PCB or collide components of PCB.**

⌘ **Use the corresponding tools when inserting or dialing out the PCB module. Here the harsh operation is forbidden.**

3.10 Connecting the Cables of the Outside Interface

3.10.1 Precautions

⌘ Tell the single-mode or multi-mode optical fiber from the interface. ⌘

Prevent the connector from being abruptly curved.

3.10.2 Connection Procedure

Connect the RJ45 end of the Ethernet cable to the Ethernet interface of the device board and then connect the other end of the Ethernet cable to the network manager device or the terminal control device.

Connect the RJ45 end of the serial cable to the serial interface of the device board and then connect the other end of the Ethernet cable to the network manager device or the terminal control device.

According to the identifiers on the template, insert the single-mode or multi-mode optical fiber into the corresponding interface.

3.11 Packing the Cable

3.11.1 Precautions

- ⌘   Pay attention to the beauty when you pack the power lines and the cables.

- ⌘   When packing the optical fiber, prevent the connector of the optical fiber from being curved.

- ⌘   Do not pack optical fibers and cables too tightly to shorten their lifespan or weaken the transmission ability.

3.11.2 Packing Procedure

(1)   Pack the drooped parts of optical fibers and cables and lead them to the two sides of the machine box conveniently.

(2)   On the two sides of the machine box, fix optical fibers and cables to the wire slots.
(3)   When packing the power lines, pack them tightly to the bottom of the machine box and keep them in a line.

3.12 Checking After Installation

3.12.1 Checking the Cabinet

- ⌘   Check whether outside power supply matches up with the switchboard of the cabinet.

- ⌘   After the router is installed, check whether the front/reel cabinet doors can be closed.

- ⌘   Make sure that the cabinet is so fixed that it cannot be removed or fall down.

- ⌘   Make sure that the router has been installed and fixed well in the cabinet and that all cables are also fixed on the cabinet.

3.12.2 Checking Cable Connection

- ⌘ Make sure that the optical-fiber cable and the cable match the ports. ⌘

  Check whether the cables are bound correctly.

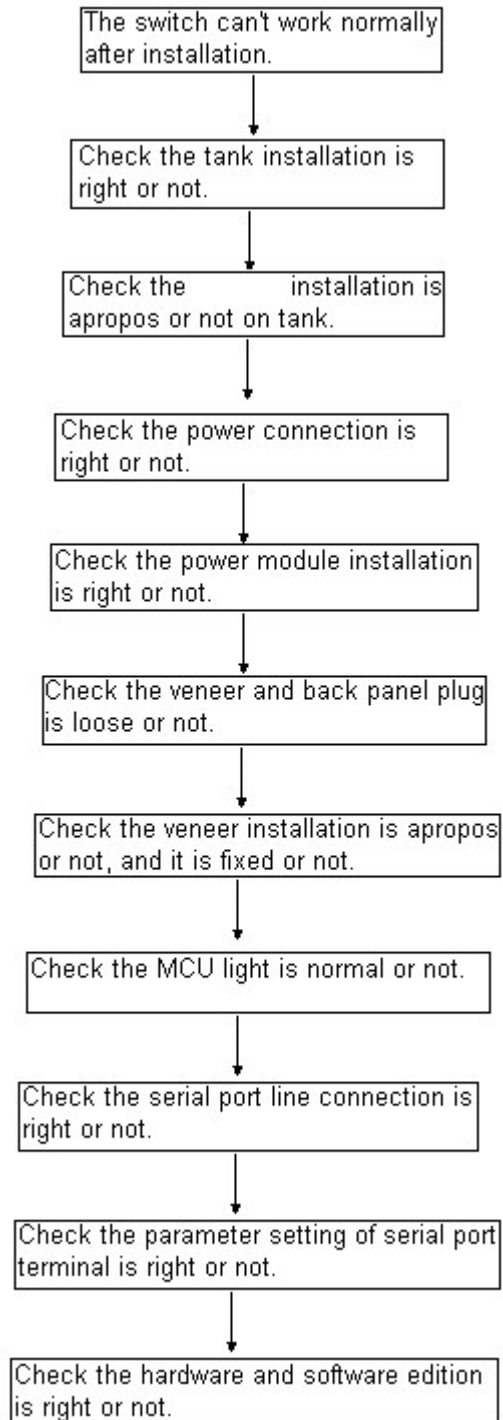### 3.12.3 Checking the Power Source

- 72 -

⌘   Check whether the power line is well touched and complies with the security requirements.

⌘   Make sure that the power source module is wrenched tightly through two bolts on a template.

⌘   Open the switch of the power source and check whether the power module works normally.

Chapter 4   Handling Common Installation Troubles

4.1 General Procedure for Removing Troubles During Installation

```
┌─────────────────────────────────┐
│ The switch can't work normally  │
│ after installation.             │
└─────────────────────────────────┘
                 │
                 ▼
┌─────────────────────────────────┐
│ Check the tank installation is  │
│ right or not.                   │
└─────────────────────────────────┘
                 │
                 ▼
┌─────────────────────────────────┐
│ Check the          installation is│
│ apropos or not on tank.         │
└─────────────────────────────────┘
                 │
                 ▼
┌─────────────────────────────────┐
│ Check the power connection is   │
│ right or not.                   │
└─────────────────────────────────┘
                 │
                 ▼
┌─────────────────────────────────┐
│ Check the power module installation│
│ is right or not.                │
└─────────────────────────────────┘
                 │
                 ▼
┌─────────────────────────────────┐
│ Check the veneer and back panel plug│
│ is loose or not.                │
└─────────────────────────────────┘
                 │
                 ▼
┌─────────────────────────────────┐
│ Check the veneer installation is apropos│
│ or not, and it is fixed or not. │
└─────────────────────────────────┘
                 │
                 ▼
┌─────────────────────────────────┐
│ Check the MCU light is normal or not.│
└─────────────────────────────────┘
                 │
                 ▼
┌─────────────────────────────────┐
│ Check the serial port line connection is│
│ right or not.                   │
└─────────────────────────────────┘
                 │
                 ▼
┌─────────────────────────────────┐
│ Check the parameter setting of serial port│
│ terminal is right or not.       │
└─────────────────────────────────┘
                 │
                 ▼
┌─────────────────────────────────┐
│ Check the hardware and software edition│
│ is right or not.                │
└─────────────────────────────────┘
```

4.2 Handling Hardware Installation Troubles

4.2.1 Handling the Troubles of the Power Source Module

Trouble 1: The AC power module cannot be powered.

【Trouble description】

The PWR indicator of each board is not on. The green indicator of the power module is off. The fan cannot run.

【Method of resolving this trouble】

First push all switches of the power source module to the OFF state. Then check whether the lines in the cabinet are correctly connected. Then check whether the lines in the cabinet are correctly connected. If necessary, dial out the power source module to check whether the plug-ins of the power system are loosen.

Trouble 2: The DC power module cannot be powered.

【Trouble description】

The PWR indicator of each board is not on. The green indicator of the power module is off. The fan cannot run.

【Method of resolving this trouble】

First push all switches of the power source module to the OFF state. Then check whether the lines in the cabinet are correctly connected. Then check whether the lines in the cabinet are correctly connected. If necessary, dial out the power source module to check whether the plug-ins of the power system are loosen.

4.2.2 Board Installation Troubles

Trouble 1: The indicator is abnormal after the board is powered.

【Trouble description】

The SYS indicator is always off, while the SWAP indicator is always on. The LINK indicator of the board is always on though the network cables or the optical fibers are not inserted into it.

【Method of resolving this trouble】

Check whether the board is inserted tightly. If the board is not inserted tightly, reinstall the board, insert it tightly and then wrench fixed screws tightly. If the board cannot run after it is inserted tightly, check whether the plug-in on the slot-corresponding backplane is loosen. If the plug-in is loosen, you can put the board on other slots for re-test. If the trouble is not related with the slot and the installation itself, return the board to its manufacturer for repair.

Trouble 2: The indicator is abnormal after the board runs a certain period of time.

【Trouble description】

The SYS indicator is always off, while the SWAP indicator is always on. The LINK indicator of the board is always on though the network cables or the optical fibers are not inserted into it. The trouble still exists after rebooting.

【Method of resolving this trouble】

Check whether the board is loosen. If the board is not inserted tightly, reinstall the board, insert it tightly and then wrench fixed screws tightly. If the board cannot run after it is inserted tightly, check whether the plug-in on the slot-corresponding backplane is loosen and whether the slide track of this slot is deformed. If the plug-in is loosen, you can put the board on other slots for re-test. If the trouble is not related with the slot and the installation itself, return the board to its manufacturer for repair.

Chapter 5   Appendix

5.1 Identifier, Package, Transmission and Storage of S8500 Products

5.1.1   Identifier of S8500

⌘   Product identifier: S8500

5.1.2 Identifiers on the Outside Package

⌘   Product identifier: S8500

⌘   Package identifier: comply with GB191-1990 *Icons and Identifiers of Package & Storage*.

⌘ Delivery No. 5.1.3

Product Type

Network products

5.1.4 Package

Note: The glossaries must comply with related regulations in *Electronic Product Protection, Package and Package Level* (SJ/Z3216-1989).

5.1.5 Basic Package Requirements

The package must comply with the regulations described in GB3873-1983 *General Technical Conditions for Communications Product Package*.

5.1.6 Package Materials

The inner package material of the device is plastic bag. At the two sides of the package box are EPE cascading foam plastics. The outside package material is corrugated paper box. Outside of the paper box, the wood box is used to strengthen the package. The EPE cascading foam plastics is used between the wood box and the paper box to prevent shocks. See figure 5-1.
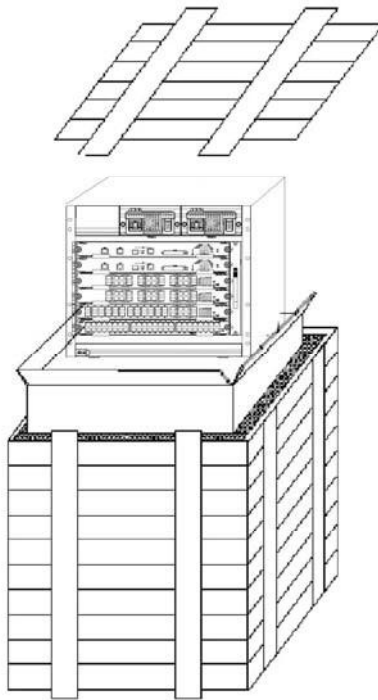
Figure 5-1 Device package

5.1.7 Shipping

⌘ The products can be shipped by transportation tools such as the ship, the plane or the automobile.

⌘ The canopy is used to prevent rains during transportation. ⌘

Load or unload the products gently.

5.1.8 Storage

⌘ Storage field:

Warehouse ⌘

Storage conditions

Temperature: $-25^0C \sim 55^0C$

Humidity: 40%~90%

The air in the warehouse cannot contain caustic gases. ⌘

Storage requirements

The outside package boxes can be piled with three layers.

⌘ Storage period
The products can be stored for three years, while the stored products need be checked every two quarters.

5.2 Tools for Opening or Closing the Package Box

⌘ Tools for opening the package box

Pries and knife ⌘ Tools for

loading the package box

Knife, transparent glue, nail, hammer, packing strap, packer

5.3 Others

5.3.1 Accessory Files

Table 5-1 Accessory files

File Name	Content of the File
Product documents for users	*S8500 Command Manual*, *S8500 Configuration Manual* and *S8500 Installation Manual*.
Certificates	The delivery date, the signature or seal of the checker (it can be presented by the No. of the checker)
Maintenance card	The product's maintenance card includes the following content: 1. Maintenance conditions and maintenance period for free maintenance 2. Maintenance period (It is calculated by month or by year according to the conditions of the product. It also synchronize with the maintenance period of the maintenance office) 3. Maintenance regulations for those products that cannot be taken to the maintenance office 4. Charge maintenance regulations for those products that exceed the maintenance conditions and the maintenance period 5. A list of product service centers and maintenance offices 6. Maintenance record (maintenance date, maintenance content and maintenance result) 7. No. of the maintenance card and information registration

5.3.2 Accessory Cables

Control cables and power lines are packaged with the plastics bag.