

Quidway S9300 Terabit Routing Switch V100R006C00

Hardware Description

Issue 03

Date 2011-10-01



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About This Document

Intended Audience

This document provides an overall description of the S9300, details about each chassis and board, cables available to the device, and lists of components.

This document describes hardware features of the S9300, which helps intended readers obtain detailed information about each chassis, board, and cable, and rapidly locate specific information through lists of components.

This document is intended for:

- Network planning engineers
- Hardware installation engineers
- Commissioning engineers
- On-site maintenance engineers
- System maintenance engineers

Symbol Conventions

The symbols that may be found in this document are defined as follows.

| Symbol | Description | |
|--|---|--|
| DANGER | Indicates a hazard with a high level of risk, which if not avoided, will result in death or serious injury. | |
| WARNING Indicates a hazard with a medium or low level of risk, if not avoided, could result in minor or moderate injur | | |
| Indicates a potentially hazardous situation, which avoided, could result in equipment damage, data 1 performance degradation, or unexpected results. | | |
| ©—ª TIP | Indicates a tip that may help you solve a problem or save time. | |
| NOTE | Provides additional information to emphasize or supplement important points of the main text. | |

Change History

Updates between document issues are cumulative. Therefore, the latest document issue contains all updates made in previous issues.

Changes in Issue 03 (2011-10-01)

Based on issue 02 (2011-07-15), the document is updated as follows:

The following information is added:

• 5.17 X16SFC-16-Port 10GE Optical Interface Card (FC, SFP+).

The following information is modified:

• 5.16.5 Interface Attributes.

Changes in Issue 02 (2011-07-15)

Based on issue 01 (2011-05-20), the document is updated as follows:

The following information is added:

• 5.28.3 Appearance.

Changes in Issue 01 (2011-05-20)

Initial commercial release.

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$\mathbf{1}$ Cabinets

About This Chapter

This chapter describes the N66E and N68E cabinets.

NOTE

- S9300The N68E and N66E cabinets are standard configurations. The cabinets facilitate maintenance and capacity expansion. In addition, two switches can be located in a cabinet side by side.
- In this document, the cabinets as shown in Figure of Combined N66E cabinets and Figure of
 Combined N68E cabinets are not equipped with side panels. When combining two cabinets, you must
 install side panels on the cabinets. Otherwise, heat dissipation of the S9300 is affected.

1.1 Introduction to the N66E Cabinet

This topic describes the appearance, technical specifications, components, operating environment, and structural features of the N66E cabinet.

1.2 Introduction to the N68E Cabinet

This section describes the appearance, technical specifications, components, and structural features of the N68E cabinet.

1.1 Introduction to the N66E Cabinet

This topic describes the appearance, technical specifications, components, operating environment, and structural features of the N66E cabinet.

1.1.1 Appearance of the N66E Cabinet

This topic describes the appearance of the N66E cabinet. Being compliant with the IEC 60297-2 standard, the N66E cabinet is designed with a modular structure, which facilitates expansion and maintenance. The surface of the cabinet and the rack is purplish grey.

Figure 1-1 shows the N66E cabinet.





1.1.2 Technical Specifications of the N66E Cabinet

This topic describes the technical specifications of the N66E cabinet, including the maximum installation height inside the cabinet, dimensions, and weight of an empty cabinet.

Table 1-1 lists the technical specifications of the N66E cabinet.

Table 1-1 Technical specifications of the N66 cabinet

| Cabinet Type | Maximum Installation Height Inside the Cabinet | Dimensions (W x D x H) | Weight of an Empty Cabinet |
|-----------------|--|---------------------------|----------------------------------|
| N66E | 46 U | 600 mm x 600 mm x 2200 mm | $73 \text{ kg} \pm 1 \text{ kg}$ |
| | | 24" x 24" x 87" | |

□ NOTE

- 1 U = 1.75 in. or 44.45 mm. and U is the height unit defined in the IEC 60297 standard.
- The weight of an empty cabinet consists of the weight of the front door, rear door, and side panels.

1.1.3 Components of the N66E Cabinet

This topic describes the components of the N66E cabinet. N66E cabinets are classified into front-serviceable cabinets and rear-serviceable cabinets. S9300s use rear-serviceable cabinets. A rear-serviceable cabinet consists of a front door, a rear door, two side panels, and a rack.

Figure 1-2 show the components of the rear-serviceable cabinet.

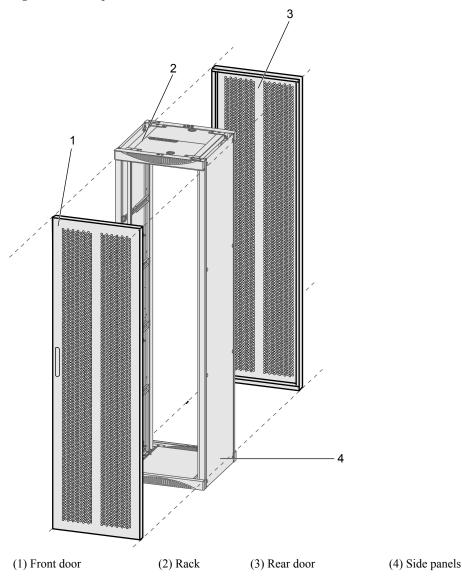


Figure 1-2 Components of the rear-serviceable N66E cabinet

1.1.4 Operating Environment of the N66E Cabinet

This topic describes the ambient temperature and relative humidity in the operating environment of the N66E cabinet.

To ensure long-term reliability of the equipment, the equipment room must have a stable temperature and humidity. **Table 1-2** lists the requirements for the operating environment of the N66E cabinet.

Table 1-2 Requirements for the operating environment of the N66E cabinet

| Ambient Temperature | Relative Humidity |
|---------------------|-------------------|
| -25°C to +55°C | 5% to 100% RH |

□ NOTE

The temperature and humidity of the equipment room refers to the values measured 1.5 m above the ground and 0.4 m in front of the equipment.

1.1.5 Structural Features of the N66E Cabinet

This topic describes the structural features of the N66E cabinet, including the cabinet material, cabling mode, heat dissipation, protection performance, ESD jack, installation scenarios, and cabinet combination.

Cabinet Material

The surface of the cabinet and the rack is purplish grey.

The N66E cabinet is made of welded electro-galvanized steel sheets and cold-rolled steel sheets. The fireproof performance of the internal materials complies with the Underwriter Laboratories (UL) standards.

Cabling Mode

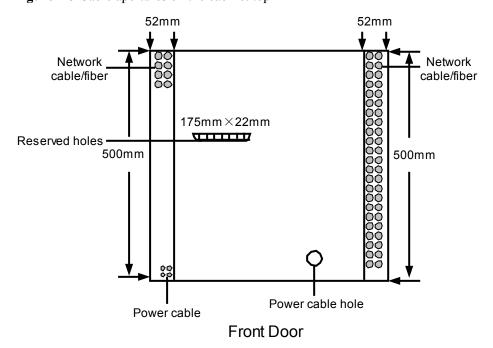
Cable apertures are reserved on the top and at the bottom of the N66E cabinet, so that the N66E cabinet supports overhead cabling and underfloor cabling:

- In the overhead cabling mode, external cables enter the cabinet through the top of the cabinet. **Figure 1-3** shows the cable apertures.
- In the underfloor cabling mode, external cables enter the cabinet through the bottom of the cabinet.

NOTE

S9300 is in the overhead cabling mode.

Figure 1-3 Cable apertures on the cabinet top



Heat Dissipation

The front door, rear door, and top plate of the N66E cabinet have high-density air vents. Therefore, the cabinet supports front air intake, rear air exhaust, and upper air exhaust and provides good heat dissipation performance.

\square NOTE

- The S9300 adopts an air channel from the left to the rear side of the equipment for heat dissipation.
- The airflow of S9300 in the cabinet is: front of the cabinet -> left side of the equipment -> inside the equipment -> rear of the equipment -> rear of the cabinet. This ensures good heat dissipation.

Protective Performance

The protection performance of the N66E cabinet is described as follows:

- The cabinet design takes full account of electromagnetic compatibility (EMC). Therefore, the N66E cabinet has excellent electromagnetic shielding performance.
- The air vents on the bottom plate of the cabinet are installed with air filters, which enhance the dust-proof capability of the N66E cabinet.
- The grounding resistance of the N66E cabinet is equal to or lower than 0.1 ohm.

ESD Jack

When wear an ESD-preventive wrist strap, ensure that the connector of the wrist strap is connected properly to the ESD jack in the middle of the N66E cabinet, as shown in **Figure** 1-4

Figure 1-4 ESD jack on the N66E cabinet



Installation Scenarios

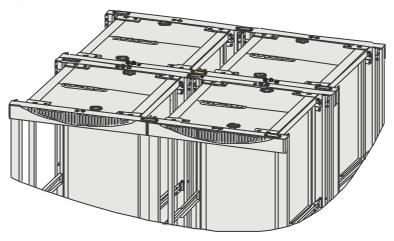
The installation scenarios of the N66E cabinet are as follows:

- The cabinet can be installed on the concrete floor.
- The cabinet can also be installed on the antistatic floor. In this case, the N6X series supports are required.

Cabinet Combination

The N66E cabinets can be installed side by side. When installing the cabinets side by side, connect them by using connecting plates, as shown in **Figure 1-5**.

Figure 1-5 Combined N66E cabinets



1.2 Introduction to the N68E Cabinet

This section describes the appearance, technical specifications, components, and structural features of the N68E cabinet.

1.2.1 Appearance of the N68E cabinet

The N68E cabinet complies with the requirement of the Dimensions of Mechanical Structures of the 482.6 mm (19 Inch) Series (IEC 60297-2 Standard). The N68E cabinet is designed with a modular structure, which facilitates expansion and maintenance. The surface of the cabinet and the rack is NC purplish grey.

Figure 1-6 shows the appearance of the N68E cabinet.



Figure 1-6 Appearance of the N68E cabinet

1.2.2 Technical Specifications of the N68E cabinet

The technical specifications of the N68E cabinet consist of the maximum installation height inside the cabinet, dimensions, and weight of an empty cabinet.

Table 1-3 lists the technical specifications of the N68E cabinet.

Table 1-3 Technical specifications of the N68E cabinet

| Cabinet Type | Maximum Installation Height Inside the Cabinet | Dimension (W x D x H) | Weight of an Empty Cabinet |
|-----------------|--|----------------------------|-------------------------------|
| N68E | 46U | 600 mm x 800 mm x 2,200 mm | 100kg |
| | | 24" x 31" x 87" | |

■ NOTE

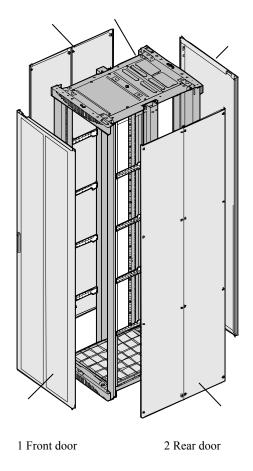
- 1 U = 1.75 in. or 44.45 mm. U is the height unit defined in the IEC 60297 standard.
- The weight of an empty cabinet includes the weight of the front door, rear door, left side panel, and right side panel.

1.2.3 Components of the N68E cabinet

The N68E cabinet consists of a front door, a rear door, two side panels, and a rack.

Figure 1-7 shows the structure of the N68E cabinet.

Figure 1-7 Structure of the N68E cabinet



1.2.4 Operating Environment of the N68E cabinet

The operating environment of the N68E cabinet is related to the ambient temperature and relative humidity.

3 Side panels

To ensure the normal operation of equipment, the equipment room must have a stable temperature and humidity.

Table 1-4 lists the requirements for the operating environment of the N68E cabinet.

4 Rack

Table 1-4 Requirements for the operating environment of the N68E cabinet

| Ambient Temperature | Relative Humidity | |
|-----------------------------|----------------------------|--|
| • Long term: 5°C to 40°C | • Long term: 5% to 85% RH | |
| • Short term: -5°C to +45°C | • Short term: 5% to 90% RH | |

□ NOTE

- The temperature and humidity of the equipment room refers to the values measured 1.5 m above the ground and 0.4 m in front of the equipment.
- The short term means that the operating time does not exceed 48 hours continuously or 15 days a year.

1.2.5 Structural Features of the N68E cabinet

The N68E cabinet has the following structural features: cabinet material, cabling mode, ESD jack, heat dissipation, protection performance, installation scenarios, cabinet combination.

Cabinet Material

The N68E cabinet is a cabinet with electro-galvanized steel sheets and cold-rolled steel sheets assembled by screws. The fireproof performance of internal materials complies with the standards of the Underwriter Laboratories (UL).

Cabling Mode

Cable apertures are reserved on the top and at the bottom of the N68E cabinet, so that the N68E cabinet supports overhead cabling and underfloor cabling:

- In the overhead cabling mode, external cables enter the cabinet through the top of the cabinet. **Figure 1-8** shows the cable apertures.
- In the underfloor cabling mode, external cables enter the cabinet through the bottom of the cabinet.

□ NOTE

S9300 is in the overhead cabling mode.

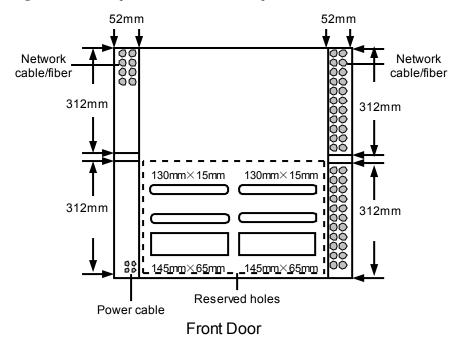


Figure 1-8 Cable apertures on the cabinet top

ESD Jack

Before installing the N68E cabinet, you must wear an ESD-preventive wrist strap and ensure that the connector of the ESD-preventive wrist strap is connected properly to the ESD jack in the middle of the N68E cabinet, as shown in **Figure 1-9**.



Figure 1-9 ESD jack in the middle of the N68E cabinet

Heat Dissipation

The front door, rear door, and bottom plate of the N68E cabinet have high-density air vents. Therefore, the N68E cabinet supports front air intake, back air exhaust, and upper air exhaust and provides good heat dissipation performance.

□ NOTE

- The S9300 adopts an air channel from the left to the rear side of the equipment for heat dissipation.
- The airflow of S9300 in the cabinet is: front of the cabinet -> left side of the equipment -> inside the equipment -> rear of the equipment -> rear of the cabinet. This ensures good heat dissipation.

Protection Performance

The protection performance of the N68E cabinet is described as follows:

- The cabinet design takes full account of electromagnetic compatibility (EMC). Therefore, the N68E cabinet has excellent electromagnetic shielding performance.
- The air vents on the bottom plate of the cabinet are installed with air filters. The same enhances the dust-proof capability of the N68E cabinet.
- The grounding resistance of the N68E cabinet does not exceed 0.1 ohm.

Installation Scenarios

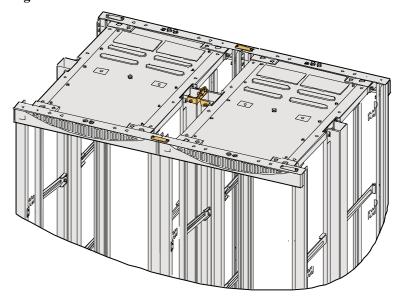
The installation scenarios of the N68E cabinet are as follows:

- The N68E cabinet can be installed on the cement floor.
- The N68E cabinet can also be installed on the antistatic floor. In such a case, the N6X series supports are required.

Cabinet Combination

The N68E cabinets can be installed side by side. When installing the N68E cabinets side by side, connect them by using connecting plates, as shown in **Figure 1-10**.

Figure 1-10 Combined N68E cabinets



2 Overview of the S9300

About This Chapter

This chapter describes the characteristics, structure, system parameters, and physical specifications of the S9300.

2.1 Introduction

This section describes the characteristics of the S9300.

2.2 Hardware Structure

This section describes the hardware structure of the S9300.

2.3 System Configuration and Physical Specifications

This section describes the system configuration and physical specifications of the S9300.

2.1 Introduction

This section describes the characteristics of the S9300.

Position

The S9300 is a high end Ethernet switch with large capacity and high performance. It mainly functions as an access node or aggregation node on the metropolitan area network (MAN) or a core switch on an enterprise network, providing Fast Ethernet (FE), Gigabit Ethernet (GE), and 10GE interfaces.

Types

Three types of S9300 products are available to meet requirements of different users, namely, S9312, S9306, and S9303.

- The Quidway S9303 switch (hereinafter referred to as the S9303) supports double Main Control Units (MCUs), three Line Processing Units (LPUs), and two AC or DC power supplies in 1+1 backup.
- The Quidway S9306 switch (hereinafter referred to as the S9306) supports double Switch Routing Units (SRUs), six LPUs, and DC power supplies in 1+1 backup or AC power supplies in 1+1 or 2+2 backup.
- The Quidway S9312 switch (hereinafter referred to as the S9312) supports double SRUs, twelve LPUs, and DC power supplies in 1+1 backup or AC power supplies in 1+1 or 2+2 backup.

The S9303, S9306, and S9312 have different capacities and structures but they use the same software platform, hardware platform, LPUs, and software. Two types of Main Processing Units (MPUs) are used for the S9300 series:

- SRU: used by the S9306 and the S9312
- MCU: used by the S9303, which integrates the functions of the Centralized Monitoring Unit (CMU) on the S9306 and S9312.

You can select the product type according to the networking requirements.

2.2 Hardware Structure

This section describes the hardware structure of the S9300.

2.2.1 S9312

The S9312 is 15 U (1 U = 44.45 mm) high, with dimensions of 442 mm x 476 mm x 663.95 mm (width x depth x height). Figure 2-1 and Figure 2-2 shows the appearance and components of the S9312. Figure 2-3 shows the layout of slots on the S9312.

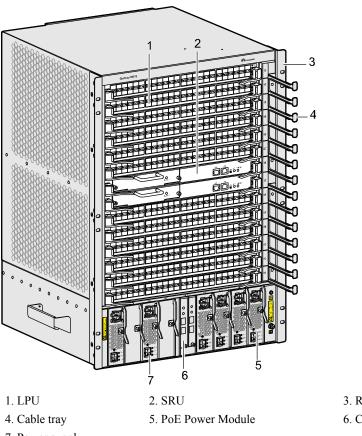


Figure 2-1 Appearance and components of the S9312 (1)

- 3. Rack-mounting ear
- 6. CMU

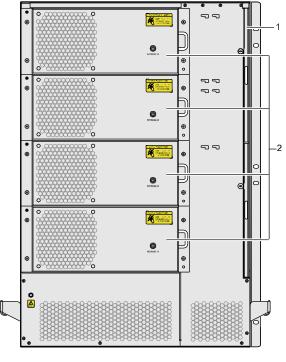


Figure 2-2 Appearance and components of the S9312 (2)

1. Air filter 2. Fan

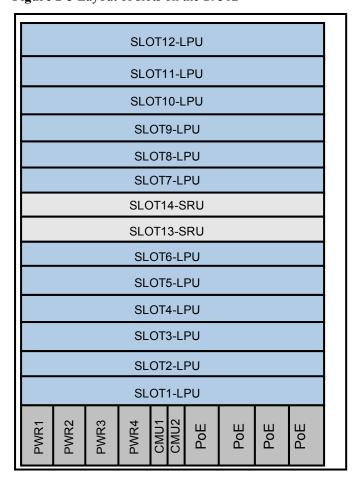


Figure 2-3 Layout of slots on the S9312

The S9312 uses an integrated chassis of which the main components are described in **Table 2-1**.

Table 2-1 Components of the S9312

| Component | Description | Reference |
|-----------|---|--|
| SRU | The SRUs are installed in slot 13 and slot 14 and work in 1:1 backup mode with the data switching units working in either 1+1 load balancing mode or 1:1 backup mode. The interval between slot 13 and slot 14 is 1.4 inches. | See 5.2 SRU - Main Control Unit. |
| LPU | The LPUs are installed in slots 1-12. The interval between each two slots is 1.4 inches. | See 5 Boards. |
| СМИ | The CMUs are installed in slots CMU1 and CMU2, working in 1:1 backup mode. | See 5.6 CMU - Centralized Monitoring Unit. |

| Component | Description | Reference |
|--------------|--|------------------------|
| Fan module | The fan modules are installed at the rear of the equipment. The equipment must be equipped with four fan modules. | See 4.2 Fan Module. |
| Power supply | The power supplies are installed in slots PWR1 to PWR4. The S9312 can use DC or AC power supplies. | See 3 Power Supply. |
| Cable tray | The cable distribution posts are located on the right side of the board cage of the S9312. | - |
| Cable | The cables of the S9312 include internal cables (such as power cables and signal cables), optical fibers, and external cables. | See 6 Cables. |

M NOTE

The S9300 does not provide dedicated PoE power supplies.

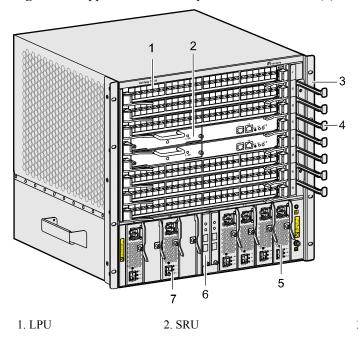
When an AC power supply is inserted into the PoE power slot, it is used as a PoE power supply, and provides power for powered devices (PDs) by using the Ethernet PoE electrical interface board.

When an AC power supply is inserted into slots PWR1 to PWR4, it provides power for the entire device.

2.2.2 S9306

The S9306 is 10 U (1 U = 44.45 mm) high, with dimensions of $442 \text{ mm} \times 476 \text{ mm} \times 441.7 \text{ mm}$ (width x depth x height). Figure 2-4 and Figure 2-5 shows the appearance and components of the S9306. Figure 2-6 shows the layout of slots on the S9306.

Figure 2-4 Appearance and components of the S9306 (1)

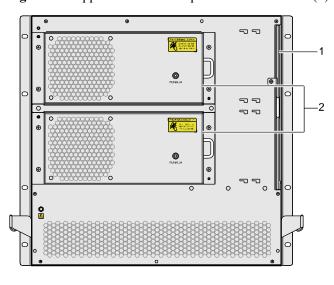


3. Rack-mounting ear

- 4. Cable tray
- 5. PoE Power Module
- 6. CMU

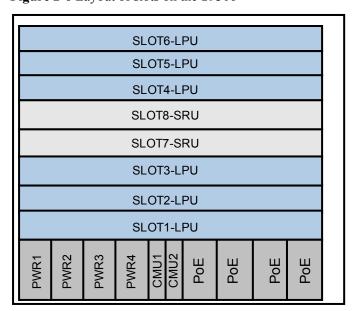
7. Power Supply

Figure 2-5 Appearance and components of the S9306 (2)



1. Air filter 2. Fan

Figure 2-6 Layout of slots on the S9306



The S9306 uses an integrated chassis of which the main components are described in **Table 2-2**.

Table 2-2 Components of the S9306

| Component | Description | Reference |
|--------------|---|--|
| SRU | The SRUs are installed in slot 7 and slot 8 and work in 1:1 backup mode with the data switching units working in either 1+1 load balancing mode or 1:1 backup mode. The interval between slot 7 and slot 8 is 1.4 inches. | See 5.2 SRU - Main Control Unit. |
| LPU | The LPUs are installed in slots 1-6. The interval between each two slots is 1.4 inches. | See 5 Boards. |
| CMU | The CMUs are installed in slots CMU1 and CMU2, working in 1:1 backup mode. | See 5.6 CMU - Centralized Monitoring Unit. |
| Fan module | The fan modules are installed at the rear of the equipment. The equipment must be equipped with two fan modules. | See 4.2 Fan Module. |
| Power supply | The power supplies are installed in slots PWR1 to PWR4. The S9306 can use DC or AC power supplies. | See 3 Power Supply. |
| Cable tray | The cable distribution posts are located on the right side of the board cage of the S9306. | - |
| Cable | The cables of the S9306 include internal cables (such as power cables and signal cables), optical fibers, and external cables. | See 6 Cables. |

Ⅲ NOTE

The S9300 does not provide dedicated PoE power supplies.

When an AC power supply is inserted into the PoE power slot, it is used as a PoE power supply, and provides power for powered devices (PDs) by using the Ethernet PoE electrical interface board.

When an AC power supply is inserted into slots PWR1 to PWR4, it provides power for the entire device.

2.2.3 S9303

The S9303 is 4 U (1 U = 44.45 mm) high, with dimensions of 442 mm x 476 mm x 175 mm (width x depth x height). Figure 2-7 and Figure 2-8 shows the appearance and components of the S9306. Figure 2-9 shows the layout of slots on the S9303.

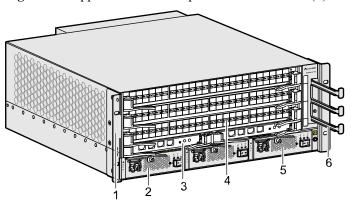


Figure 2-7 Appearance and components of the S9303 (1)

- 1. Rack-mounting ear
- 2. Power supply

3. MCU

4. LPU

- 5. PoE Power Module
- 6. Cable tray

Figure 2-8 Appearance and components of the S9303 (2)

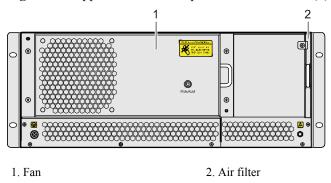
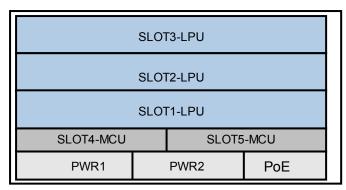


Figure 2-9 Layout of slots on the S9303



The S9303 uses an integrated chassis of which the main components are described in **Table 2-3**.

Table 2-3 Components of the S9303

| Component | Description | Reference |
|--------------|--|--------------------------------------|
| MCU | The MCUs are installed in slot 4 and slot 5 and work in 1:1 backup mode. The interval between slot 4 and slot 5 is 0.8 inches. | See 5.3 MCUA - Main Control Unit. |
| LPU | The LPUs are installed in slots 1-3. The interval between each two slots is 1.4 inches. | See 5 Boards. |
| Fan module | The fan modules are installed at the rear of the equipment. The equipment must be equipped with one fan module. | See 4.2 Fan Module. |
| Power supply | The power supplies are installed in slots PWR1 and PWR2. The S9303 can use DC or AC power supplies. | See 3 Power Supply. |
| Cable tray | The cable distribution posts are located on the right side of the board cage of the S9303. | - |
| Cable | The cables of the S9303 include internal cables (such as power cables and signal cables), optical fibers, and external cables. | See 6 Cables. |

■ NOTE

The S9300 does not provide dedicated PoE power supplies.

When an AC power supply is inserted into the PoE power slot, it is used as a PoE power supply, and provides power for powered devices (PDs) by using the Ethernet PoE electrical interface board.

When an AC power supply is inserted into slots PWR1 to PWR4, it provides power for the entire device.

2.3 System Configuration and Physical Specifications

This section describes the system configuration and physical specifications of the S9300.

2.3.1 System Configuration

This section describes the switching capacity, backplane capacity, and forwarding rate of the S9300.

Table 2-4 System configuration of the S9300

| Item | Configuratio n of the S9312 | Configuratio n of the S9306 | Configuratio n of the S9303 | Note |
|-----------|------------------------------------|------------------------------------|------------------------------------|------|
| Processor | 700 MHz (Dominant frequency) | 700 MHz (Dominant frequency) | 500 MHz (Dominant frequency) | - |

| Item | Configuratio n of the S9312 | Configuratio n of the S9306 | Configuratio n of the S9303 | Note |
|---|--------------------------------|--------------------------------|-----------------------------------|--|
| DDR2 SDRAM | 1 GB | 1 GB | 512 MB | - |
| NVRAM | 512 KB | 512 KB | 512 KB | Battery supply |
| Flash | 64 MB | 64 MB | 64 MB | - |
| CF card | 512 MB | 512 MB | 512 MB | The CF card serves as a mass storage device to save data files and logs. |
| Switching capacity | 2 Tbit/s | 2 Tbit/s | 720 Gbit/s | Bidirectional |
| Backplane capacity | 12 Tbit/s | 6 Tbit/s | 3 Tbit/s | Bidirectional |
| Forwarding capability | 1344 Mpps | 1152 Mpps | 540 Mpps | - |
| Number of slots for the LPUs | 12 | 6 | 3 | LPU (Optional) |
| Number of slots for the SRUs/ MCUs | 2 | 2 | 2 | S9306/S9312: SRU S9303: full mesh |
| Max transmissio n rate on a port of the LPU | 48GE, 40×10GE | 48GE, 40×10GE | 48GE, 40×10GE | - |

2.3.2 Physical Specifications

This section describes the dimensions, power consumption, weight, voltage, and working environment parameters of the S9300.

Table 2-5 Physical specifications of the S9300

| | Storage | Less than 5000 m |
|--|---------|------------------|
|--|---------|------------------|

| Item | | S9312 | S9306 | S9303 |
|---|---|---|---|--|
| Dimensions (width x depth x height, excluding the rack-mounting ears) | | 442 mm x 476 mm x 663.95 mm (15 U high) | 442 mm x 476 mm x 441.7 mm (10 U high) | 442 mm x 476 mm x 175 mm (4 U high) |
| Cabine | et | N66E or N68E | N66E or N68E | N66E or N68E |
| Maxim power | ıum | 1400 W (full configuration) | 800 W (full configuration) | 350 W (full configuration) |
| Noise a normal temper | | 64.6 dB | 61.6 db | 58.6 db |
| Weigh | t | 70 kg (full configuration) | 42 kg | 22 kg |
| DC input | Rated voltag e | -48 V/-60V DC | -48 V/-60 V DC | -48 V/-60 V DC |
| | Allow ed | -48 V: -38.4 V to -57.6 V DC | -48 V: -38.4 V to -57.6 V DC | -48 V:- 38.4 V to -57.6 V DC |
| | voltag e | -60 V: -48 V to -72 V DC | -60 V: -48 V to -72 V DC | -60 V:- 48 V to -72 V DC |
| AC input | Rated voltag e | 220 V AC, 50/60 Hz | 110/220 V AC, 50/60 Hz | 110/220 V AC, 50/60 Hz |
| | Allow ed voltag e | 200 V to 240 V AC, 50/60 Hz | 100 V to 120 V and 200 V to 240 V AC, 50/60 Hz | 100 V to 120 V and 200 V to 240 V AC, 50/60 Hz |
| РоЕ | Power input mode | Built-in. Only the AC power supply is supported. | Built-in. Only the AC power supply is supported. | Built-in. Only the AC power supply is supported. |
| | Redun dancy mode of power suppli es | The S9312 support the power supplies in 3+1, 2+2, or 4+0 (not backup) mode. | The S9306 support the power supplies in 3+1, 2+2, or 4+0 (not backup) mode. | The S9303 does not support the backup of AC power modules. |

| Item | | S9312 | S9306 | S9303 |
|---------------------|--|---------------------------------|-------------|--------|
| | Output power consu mptio n | 8800 W | 8800 W | 2200 W |
| Ambi ent | Long- term | 0°C to 45°C -5°C to 55°C | | |
| temp eratu re | Short- term | | | |
| | Storag e | -40°C to 70°C | | |
| Humi dity | Long- term | 5% RH to 85% RH, non-condensing | | |
| | Short- term | 0% RH to 95% RH, non | -condensing | |
| | Storag e | 0% RH to 95% RH, non-condensing | | |
| Altit ude | Long- term | < 3000 m | | |
| | Storag e | < 5000 m | | |

□ NOTE

- The temperature and humidity are measured 1.5 m above the floor and 0.4 m at the front of the cabinet. There should be no protection board at the front or back of the cabinet.
- Short-term means that the continuous operation time does not exceed 48 hours and the accumulated time per year does not exceed 15 days.

3 Power Supply

About This Chapter

This chapter describes the AC power supply and DC power supply of the S9300.

3.1 Introduction

This section provides an overview of the AC power supply and DC power supply of the S9300.

3.2 DC Power Supply

This section describes the panel, functions, and technical specifications of the DC power supply on the S9300.

3.3 800 W AC Power Supply

This section describes the appearance, panel, functions, and technical specifications of the 800 W AC power supply on the S9300.

3.4 2200 W AC Power Supply

This section describes the appearance, panel, functions, and technical specifications of the 2200 W AC power supply.

3.1 Introduction

This section provides an overview of the AC power supply and DC power supply of the S9300.



CAUTION

- Do not install DC power supply and AC power supply on the same S9300.
- Ensure that the S9300 is properly grounded before powering on it.
- Power off the S9300 before removing the power supplies.
- Do not operate the power supplies when the equipment is running.
- When powering off the S9300, shut down all the power supplies of the S9300.

3.1.1 Configuration and Operation Modes of the Power Supplies



This section describes the configuration of the power supplies that ensure the normal operation of the S9300.

S9312

The power supplies are located in the PWR1 to PWR4 slots of the S9312. The DC power supplies and AC power supplies are supported. PWR1 and PWR2 are in area A, and PWR3 and PWR4 are in area B. Area A and area B work in backup mode, as shown in **Figure 3-1**. PWR1 and PWR2 work in load balancing mode.

The DC power supply and the AC power supply cannot be located in the same area.

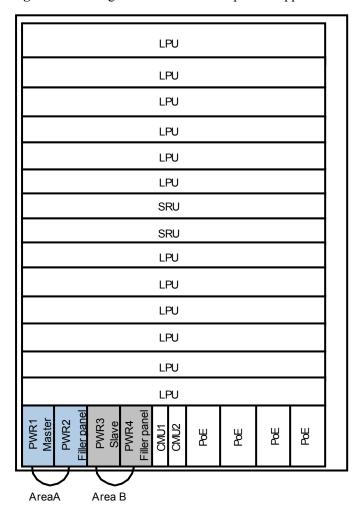


Figure 3-1 Configuration of the S9312 power supplies

You can use DC power supplies or AC power supplies on the S9312.

• DC power supplies, 1+1 configuration

Each power supply is configured in active area A and standby area B. The two power supplies work in backup mode, as shown in **Figure 3-1**. The filler panels are installed in other slots of area A and area B.

Example:

- Each DC power supply is configured in PWR1 and PWR3, and the filler panels are installed in PWR2 and PWR4.
- Each DC power supply is configured in PWR1 and PWR4, and the filler panels are installed in PWR2 and PWR3.
- Each DC power supply is configured in PWR2 and PWR3, and the filler panels are installed in PWR1 and PWR4.
- Each DC power supply is configured in PWR2 and PWR4, and the filler panels are installed in PWR1 and PWR3.
- Configuration of the S9312 AC power supplies

The S9312 can use two AC power supplies in 1+1 configuration or four AC power supplies in 2+2 configuration.

You can select the 1+1 configuration or 2+2 configuration according to the power supply requirements of the system.

- 1+1 configuration, 220 V AC power supplies (800 W)

The maximum power consumption is 800 W. This backup mode is adopted if the S9312 has a few LPUs and the total power consumption of the device is less than 800 W.

Each power supply is configured in active area A and standby area B; the filler panels are installed in other slots of area A and area B, as shown in **Figure 3-1**.

Example:

- Each AC power supply is configured in PWR1 and PWR3, and the filler panels are installed in PWR2 and PWR4.
- Each AC power supply is configured in PWR1 and PWR4, and the filler panels are installed in PWR2 and PWR3.
- Each AC power supply is configured in PWR2 and PWR3, and the filler panels are installed in PWR1 and PWR4.
- Each AC power supply is configured in PWR2 and PWR4, and the filler panels are installed in PWR1 and PWR3.
- 2+2 configuration, 220 V AC power supplies (1600 W)

The maximum power consumption is 1600 W. Four AC power supplies are configured in active area A and standby area B. The AC power supplies are installed in the PWR1 to PWR4 slots.

- The S9312 cannot use the 110 V AC input power.

Up to four PoE power supplies can be installed on an S9312. The PoE power supplies work in 3+1 or 2+2 backup mode, or do not work in backup mode.

- 800 W power supply unit
 - When the power supply units do not work in backup mode, a maximum of 3200 W power is provided.
 - When the power supply units work in 3+1 backup mode, a maximum of 2400 W power is provided, and PoE4 slot shown in **Figure 3-1** is used for backup PoE power supply.
 - When the power supply units work in 2+2 backup mode, a maximum of 1600 W power is provided, and PoE3 and PoE4 slots shown in Figure 3-1 is used for backup PoE power supply.
- 2200 W power supply unit
 - When the power supply units do not work in backup mode, a maximum of 8800 W power is provided.
 - When the power supply units work in 3+1 backup mode, a maximum of 6600 W power is provided, and PoE4 slot shown in **Figure 3-1** is used for backup PoE power supply.
 - When the power supply units work in 2+2 backup mode, a maximum of 4400 W power is provided, and PoE3 and PoE4 slots shown in Figure 3-1 is used for backup PoE power supply.

■ NOTE

The 2200 W power supply unit only provides PoE power, but does not provide power for the entire device.

S9306

The power supplies are located in the PWR1 to PWR4 slots of the S9306. The DC power supplies and AC power supplies are supported. PWR1 and PWR2 are in area A, and PWR3 and PWR4 are in area B. Area A and area B work in backup mode, as shown in **Figure 3-2**. PWR1 and PWR2 work in load balancing mode. PWR3 and PWR4 work in load balancing mode.

The DC power supply and the AC power supply cannot be located in the same area.

LPU LPU LPU SRU SRU LPU LPU LPU ller panel iller panel CMU2 SMCI 씵 씵 쀭 岁

Figure 3-2 Configuration of the S9306 power supplies

You can use DC power supplies or AC power supplies on the S9306.

• DC power supplies, 1+1 configuration

AreaB

Each power supply is configured in active area A and standby area B. The two power supplies work in 1+1 configuration, as shown in **Figure 3-2**. The filler panels are installed in other slots of area A and area B.

Example:

AreaA

- Each DC power supply is configured in PWR1 and PWR3, and the filler panels are installed in PWR2 and PWR4.
- Each DC power supply is configured in PWR1 and PWR4, and the filler panels are installed in PWR2 and PWR3.
- Each DC power supply is configured in PWR2 and PWR3, and the filler panels are installed in PWR1 and PWR4.
- Each DC power supply is configured in PWR2 and PWR4, and the filler panels are installed in PWR1 and PWR3.
- Configuration of the S9306 AC power supplies
 - 1+1 configuration, 220 V AC power supplies (800 W)

The maximum power consumption is 800 W. Each power supply is configured in active area A and standby area B; the filler panels are installed in other slots of area A and area B, as shown in **Figure 3-2**.

Example:

- Each AC power supply is configured in PWR1 and PWR3, and the filler panels are installed in PWR2 and PWR4.
- Each AC power supply is configured in PWR2 and PWR3, and the filler panels are installed in PWR1 and PWR4.
- Each AC power supply is configured in PWR2 and PWR4, and the filler panels are installed in PWR1 and PWR3.
- Each AC power supply is configured in PWR1 and PWR4, and the filler panels are installed in PWR2 and PWR3.
- 2+2 configuration, 220 V AC power supplies (1600 W)

The maximum power consumption is 1600 W. Four AC power supplies are configured in active area A and standby area B. The AC power supplies are installed in the PWR1 to PWR4 slots.

- 2+2 configuration, 110 V AC power supplies (800 W)

One 110 V AC power supplies provide power of 400 W. To meet the power requirement of the S9306, the backup mode must be adopted for 110 V AC power supplies. The AC power supplies are installed in the PWR1 to PWR4 slots.

Up to four PoE power supplies can be installed on an S9306. The PoE power supplies work in 3+1 or 2+2 backup mode, or do not work in backup mode.

• 800 W power supply unit

- When the power supply units do not work in backup mode, a maximum of 3200 W power is provided.
- When the power supply units work in 3+1 backup mode, a maximum of 2400 W power is provided, and PoE4 slot shown in **Figure 3-1** is used for backup PoE power supply.
- When the power supply units work in 2+2 backup mode, a maximum of 1600 W power is provided, and PoE3 and PoE4 slots shown in Figure 3-1 is used for backup PoE power supply.

• 2200 W power supply unit

- When the power supply units do not work in backup mode, a maximum of 8800 W power is provided.
- When the power supply units work in 3+1 backup mode, a maximum of 6600 W power is provided, and PoE4 slot shown in **Figure 3-1** is used for backup PoE power supply.
- When the power supply units work in 2+2 backup mode, a maximum of 4400 W power is provided, and PoE3 and PoE4 slots shown in Figure 3-1 is used for backup PoE power supply.

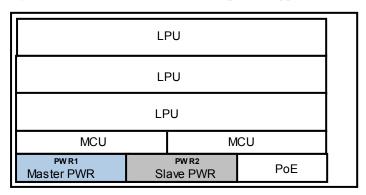
□ NOTE

The 2200 W power supply unit only provides PoE power, but does not provide power for the entire device. When the input voltage for an S9306 is 110 V, confirm with Huawei technical personnel to determine the power supply configuration.

S9303

The power supplies are located in the PWR1 to PWR2 slots of the S9303. The DC power supplies and AC power supplies are supported. PWR1 is in area A, and PWR2 is in area B. Area A and area B work in backup mode, as shown in **Figure 3-3**.

Figure 3-3 Configuration of the S9303 power supplies



The maximum power consumption of the S9303 is 350 W. You can use DC power supplies or AC power supplies on the S9303.

- DC power supplies, 1+1 configuration
 Each power supply is configured in active area A and standby area B. The two power supplies work in backup mode, as shown in Figure 3-3.
- Configuration of the S9303 AC power supplies
 - 1+1 configuration, 220 V AC power supplies (800 W)
 The maximum power consumption is 800 W. Each AC power supply is configured in active area A and standby area B, as shown in Figure 3-3.
 - 1+1 configuration, 110 V AC power supplies (400 W)
 Two 110 V AC power supplies provide power of 400 W. The total power consumption of the S9303 is less than 400 W; therefore, the S9303 can use two 110 V AC power supplies in backup mode, as shown in Figure 3-3.

Only one PoE power supply unit can be installed on an S9303. The PoE power supply units include:

- 800 W power supply unit
- 2200 W power supply unit

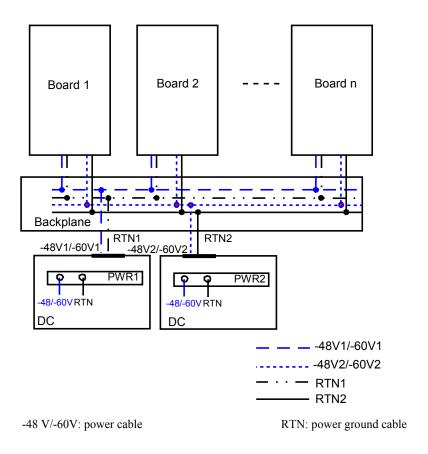
NOTE

The 2200 W power supply unit only provides PoE power, but does not provide power for the entire device. When the input voltage for an S9303 is 110 V, confirm with Huawei technical personnel to determine the power supply configuration.

3.1.2 Power Supply Principle

Figure 3-4 shows the principle of the DC power supplies on the S9300. **Figure 3-5** shows the principle of the AC power supplies.

Figure 3-4 Principle of the DC power supplies on the S9300



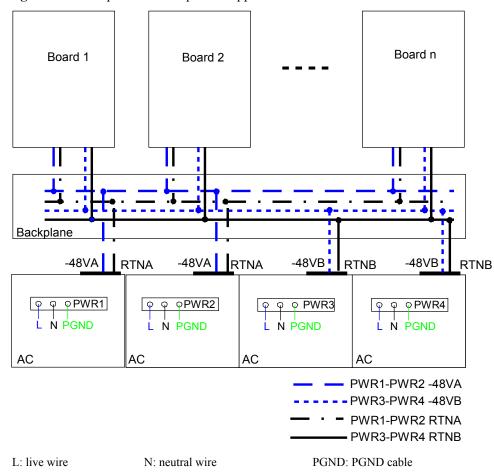


Figure 3-5 Principle of the AC power supplies on the S9300

3.2 DC Power Supply

This section describes the panel, functions, and technical specifications of the DC power supply on the S9300.

3.2.1 Appearance

The S9300 supports the DC power supplies working in 1+1 backup mode.

The power supplies are installed at the bottom of the chassis and are used for power input and power distribution.

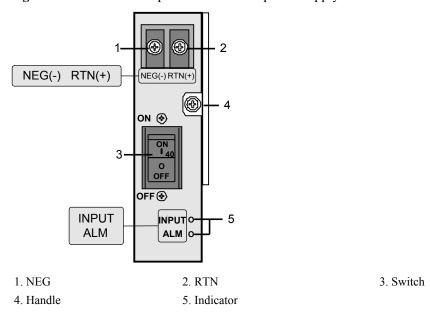
The -48 V or -60 V DC power supply adopts the standard structure. **Figure 3-6** shows the appearance of a DC power supply of the S9300.

Figure 3-6 Appearance of the DC power supply of the S9300

3.2.2 Panel

Figure 3-7 shows the panel of the DC power supply.

Figure 3-7 Panel and components of the DC power supply of the S9300



The indicators on the power supplies are shown on the panel through the light pipe. **Table 3-1** describes the indicators of the power supplies.

Table 3-1 Description of the indicators of the DC power supply

| Indicator | Color | Description |
|-----------|-------|---|
| ALM | Red | If the indicator is on, it indicates that the protection circuit fails. |
| | | If the indicator is off, the protection circuit is normal. |

| Indicator | Color | Description |
|-----------|-------|--|
| INPUT | Green | If the indicator is on, it indicates that the -48 V power input is normal. |
| | | If the indicator is off, it indicates that the -48 V power input is unavailable. |

Table 3-2 describes the relation between the DC power input cables and the terminals.

Table 3-2 Relation between the DC power input cables and the terminals

| Terminal Identifier | Cable | Cable Color | Connected Terminal |
|------------------------|--------------------|-------------|--------------------|
| RTN | Power ground cable | Black | OT crimp terminal |
| NEG | Power cable | Blue | |
| NOTE RTN: Return | | | |

3.2.3 Function Overview

The DC power supply provides output of -48 V or -60 V. It provides the following functions:

- EMC filtering, lightning proof, and short circuit protection.
- Various alarms, for example, no-input alarm, air breaker off alarm, invalid lightening-proof alarm, and input undervoltage alarm.

3.2.4 Technical Specifications

Table 3-3 describes the technical specifications of the DC power supply.

Table 3-3 Technical specifications of the DC power supply

| Item | Specification |
|-------------------------------------|--|
| Dimensions (height x depth x width) | 130mm x 393 mm x 41 mm |
| Input rated voltage | -48 V/-60V DC |
| Output voltage | -48 V:-38.4V to -57.6V DC -60V:-48 V to -72V DC |
| Output current | 40 A |
| Maximum input current | 40 A |

| Item | Specification |
|----------------------|---------------|
| Maximum output power | 1600 W |

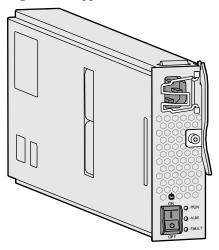
3.3 800 W AC Power Supply

This section describes the appearance, panel, functions, and technical specifications of the 800 W AC power supply on the S9300.

3.3.1 Appearance

The 800 W AC power supply adopts the standard structure with a height of 3 U. **Figure 3-8** shows the appearance of an 800 W AC power supply of the S9300.

Figure 3-8 Appearance of the 800 W AC power supply of the S9300



3.3.2 Panel

Figure 3-9 shows the panel of the 800 W AC power supply.

ON RUN ALM FAULT

Figure 3-9 Panel of the 800 W AC power supply

1. Power input 2. Handle 3. Switch 4. Indicator

Table 3-4 describes the indicators of the 800 W AC power supply.

Table 3-4 Description of the indicators of the 800 W AC power supply

| Indicator | Color | Description |
|-----------|--------|--|
| RUN | Green | If the indicator is on, it indicates that the AC power input is normal. |
| | | If the indicator is off and the FAULT indicator or ALM indicator is on, it indicates that a fault occurs or an alarm other than the over-current alarm is generated. |
| ALM | Yellow | If the indicator is on, it indicates a PS-off alarm, over-temperature alarm, over-voltage alarm, under-voltage alarm, or over-current alarm. |
| | | If the indicator blinks, it indicates that the communication is fault. |
| | | If the indicator is off, it indicates that the power supply is normal. |
| FAULT | Red | If the indicator is on, the power supply is faulty and the fault cannot be rectified. |
| | | If the indicator is off, it indicates that the power supply does not have any fault that cannot be rectified. |

3.3.3 Function Overview

The 220V AC power supply provides 800W power and the 110V power supply provides 400W power. In addition, the AC power supply supports EMC filtering and provides the following functions:

- Output over-current
- Output over-voltage
- Output under-voltage
- Input over-voltage
- Input under-voltage
- Over-temperature
- Short circuit
- Surge protection

3.3.4 Technical Specifications

Table 3-5 describes the technical specifications of the 800 W AC power supply.

Table 3-5 Technical specifications of the 800 W AC power supply

| Item | Specification |
|-------------------------------------|--|
| Dimensions (height x depth x width) | 130 mm x 393 mm x 41 mm |
| Weight | < 2.5 kg |
| Input rated voltage | 220 V AC/110 V AC; 50/60 Hz |
| Output voltage | 200 V AC to 240 V AC (220 V AC input)/100 V AC to 120 V AC(110 V AC input); 50/60 Hz |
| Maximum input current | 5 A |
| Maximum output current | 15 A (220 V AC input)/7.5 A (110 V AC input) |
| Maximum output power | 800 W (220 V AC input)/400 W (110 V AC input) |

3.4 2200 W AC Power Supply

This section describes the appearance, panel, functions, and technical specifications of the 2200 W AC power supply.

3.4.1 Appearance

The 2200 W AC power supply is 3 U high. **Figure 3-10** shows the appearance of an 2200 W AC power supply.

O RAN O AM O FAULT

Figure 3-10 Appearance of the 2200 W AC power supply

3.4.2 Panel

Figure 3-11 shows the panel of an 2200 W AC power supply.

Figure 3-11 Panel of an 2200 W AC power supply

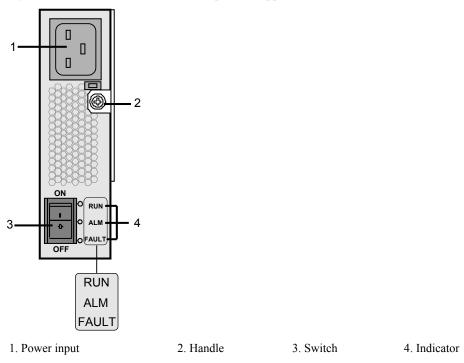


Table 3-6 describes the indicators on the 2200 W AC power supply.

Indicator Color Description RUN Green If the indicator is on, it indicates that the AC power input is in the normal range. If the indicator is off and the FAULT indicator or ALM indicator is on, it indicates that a fault occurs or an alarm other than the overcurrent alarm is generated. **ALM** Yellow If the indicator is on, it indicates that a PS-off alarm, overtemperature alarm, overvoltage alarm, undervoltage alarm, or overcurrent alarm is generated. If the indicator blinks, it indicates that communication is interrupted. If the indicator is off, the power supply works properly. **FAULT** Red If the indicator is on, the power supply is faulty and cannot be rectified. If the indicator is off, the power supply does not have any fault that cannot be rectified.

Table 3-6 Description of indicators on an AC power supply

3.4.3 Function Overview

The 220 V power supply provides 2200 W power and the 110 V power supply provides 1100 W power. In addition, the AC power supply supports EMC filtering and provides protection against:

- Output overcurrent
- Output overvoltage
- Output short circuit
- Output undervoltage
- Input overvoltage
- Input undervoltage
- Overtemperature
- Short circuit
- Lightning

3.4.4 Technical Specifications

Table 3-7 describes the technical specifications of the 2200 W AC power supply.

Table 3-7 Technical specifications of the AC power supply

| Item | Specification |
|-------------------------------------|--|
| Dimensions (height x depth x width) | 130 mm x 393 mm x 41 mm |
| Weight | < 6.0 kg |
| Rated input voltage | 220 V AC/110 V AC; 50/60 Hz |
| Input voltage range | 200 V AC to 240 V AC (220 V AC input)/100 V AC to 120 V AC(110 V AC input); 50/60 Hz |
| Maximum input current | 15.5 A |
| Maximum output current | 42 A (220 V AC input)/21 A (110 V AC input) |
| Maximum output power | 2000 W (220 V AC input)/1000 W (110 V AC input) |

4 Heat Dissipation System

About This Chapter

This chapter describes the heat dissipation system of the S9300, including fans and air filters.

4.1 Introduction

This section provides an overview of the heat dissipation system of the S9300.

4 2 Fan Module

This section describes the constitutions, panel and function of the fan module.

4.3 Air Filter

This section describes the air filters of the S9300.

4.4 Technical Specifications

This section describes the technical specifications of the fan module of the S9300.

4.1 Introduction

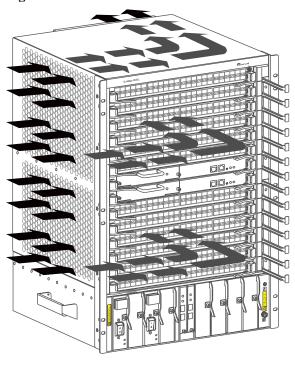
This section provides an overview of the heat dissipation system of the S9300.

4.1.1 Heat Dissipation System of the S9312

The heat dissipation system ensures that the S9312 operates in the normal temperature. For the temperature requirements, see **2.3.2 Physical Specifications**.

Figure 4-1 shows the airflow in the S9312.

Figure 4-1 Airflow in the S9312



4.1.2 Heat Dissipation System of the S9306

The heat dissipation system ensures that the S9306 operates in the normal temperature. For the temperature requirements, see **2.3.2 Physical Specifications**.

Figure 4-2 shows the airflow in the S9306.

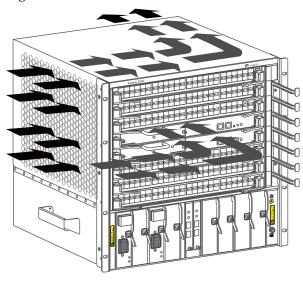
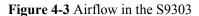


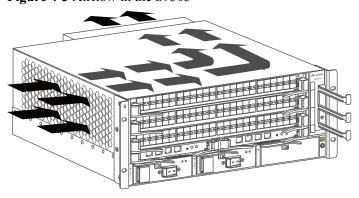
Figure 4-2 Airflow in the S9306

4.1.3 Heat Dissipation System of the S9303

The heat dissipation system ensures that the S9303 operates in the normal temperature. For the temperature requirements, see **2.3.2 Physical Specifications**.

Figure 4-3 shows the airflow in the S9303.





4.2 Fan Module

This section describes the constitutions, panel and function of the fan module.

4.2.1 Constitution of the Fan Module

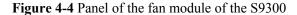
The S9300 uses the modularized fans. The S9303, S9306, and S9312 use the same type of fans. The difference lies in the number of fans used on them. Installed at the rear of the subrack of

the S9300, the fan modules are used to cool down the S9300. The fan modules support hot swapping and they can be exchanged.

The fan module consists of the fan tray, two layers of fans, and the fan control board (FCB). For the technical specifications of the fan modules, see **4.4.1 Technical Specifications of the Fan Modules on the S9300**.

4.2.2 Panel of the Fan Module

Figure 4-4 shows the panel of the fan module of the S9300.



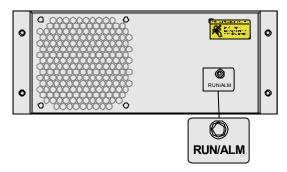


Table 4-1 describes the indicators on the panel of the fan module.

Table 4-1 Description of the indicators of the fan module

| Indicator | Color | Description |
|-----------|-------|---|
| RUN/ALM | Green | If the indicator blinks (0.5 Hz), it indicates that the fan modules work normally, and the communication is normal. |
| | | If the indicator blinks (4 Hz), it indicates that the fan modules work normally, but the communication is abnormal. |
| | Red | If the indicator blinks (0.5 HZ), an alarm is generated, but you cannot determine whether the fan module needs to be replaced. It is recommended that you observe the situation for a period of time. |
| | | If the indicator is on, it indicates that the fan module is faulty and you need to replace it. |

4.2.3 Fan Module Functions

The heat dissipation system of the S9300 is divided into several zones and fan speed can be dynamically adjusted.



S9300When a fan is faulty, a trap is reported. If all fans are faulty, shut down the device.

Each S9300 fan module serves a zone in the chassis and adopts the intelligent fan speed adjustment technology. The fan module monitors the temperature of key components and controls the temperature in each zone. If a sensitive component overheats, the fan speed increases; when the temperature falls back to its normal range, the fan speed decreases. The fan modules improve system reliability and reduce power consumption and noise.

Heat Dissipation Zones

The heat dissipation systems of S9306 and S9312 are divided into multiple zones. If there are empty slots in a zone, the fans corresponding to this zone operate at a low speed, thus reducing power consumption and noise.

As shown in **Figure 4-5**, the S9306 has two fan modules, serving two zones. Each zone contains four boards.

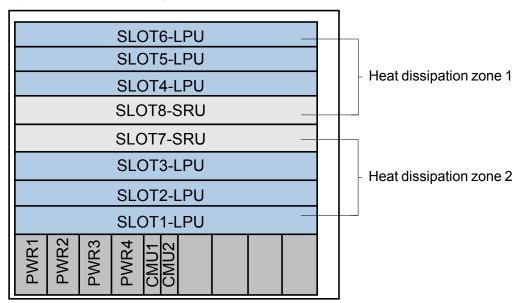


Figure 4-5 S9306 heat dissipation zones

As shown in **Figure 4-6**, the S9312 has four fan modules, serving four zones. Each zone contains four boards, in which the boards in slots 4 and 9 belong to two zones.

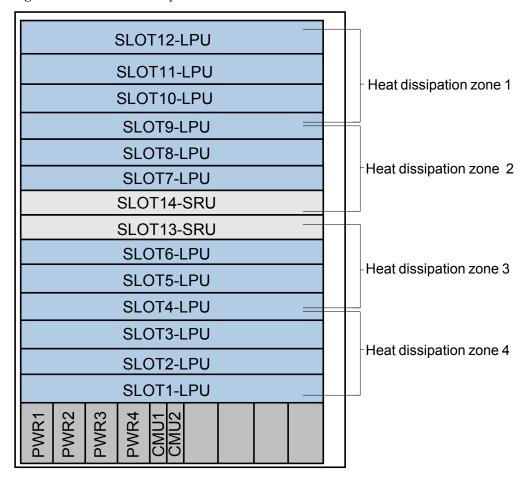


Figure 4-6 S9312 heat dissipation zones

Dynamic Fan Speed Adjustment

By default, the S9300 adjusts fan speed according to board temperature. The user can configure the S9300 to adjust fan speed according both board temperature and optical module temperature. When either of the board temperature or optical module temperature exceeds the limit, the S9300 increases fan speed. For example, when the board temperature reduces but the optical module temperature increases, the S9300 increases the fan speed.

4.3 Air Filter

This section describes the air filters of the S9300.

4.3.1 Air Filter of the S9312

The air filters and fan modules of the S9312 are installed separately. The S9312 has two air filters, which are inserted from the back of the equipment. **Figure 4-7** shows the appearance of an air filter of the S9312.

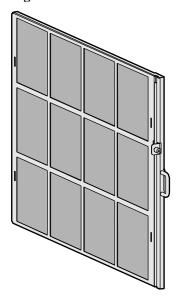
Figure 4-7 Air filter of the S9312

The air filters can be removed. For the method of removing and installing the air filters, see the *Quidway S9300 Terabit Routing Switch Parts Replacement*.

4.3.2 Air Filter of the S9306

The air filter and fan modules of the S9306 are installed separately. The S9306 has one air filter, which is inserted from the back of the equipment. **Figure 4-8** shows the appearance of the air filter of the S9306.



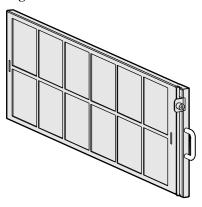


The air filter can be removed. For the method of removing and installing the air filter, see the *Quidway S9300 Terabit Routing Switch Parts Replacement*.

4.3.3 Air Filter of the S9303

The air filter and fan modules of the S9303 are installed separately. The S9303 has one air filter, which is inserted from the back of the equipment. **Figure 4-9** shows the appearance of the air filter of the S9303.

Figure 4-9 Air filter of the S9303



The air filter can be removed. For the method of removing and installing the air filter, see the *Quidway S9300 Terabit Routing Switch Parts Replacement*.

4.4 Technical Specifications

This section describes the technical specifications of the fan module of the S9300.

4.4.1 Technical Specifications of the Fan Modules on the S9300

Table 4-2 shows the technical specifications of the fan modules on the S9300.

Table 4-2 Technical specifications of the fan module

| Item | Specification |
|-------------------------------------|-------------------------------|
| Dimensions (width x height x depth) | 323.9 mm x 126.6 mm x 74.8 mm |
| Weight | 1140±20 g |
| Maximum power consumption | 31.6 W |
| Maximum wind pressure | 319 Pa |
| Maximum air volume | 163 CFM |

| Item | Specification |
|-------------------|------------------------|
| Maximum noise | 62 dB |
| Operating voltage | -38.4 V DC to -72 V DC |

5 Boards

About This Chapter

This chapter describes the boards supported by the S9300.

5.1 Introduction

This section provides an overview of the boards supported by the S9300, including board classification, slot distribution, relation between boards, board appearances, and interfaces on each board.

5.2 SRU - Main Control Unit

The SRU is the main control unit of the S9312 and S9306.

5.3 MCUA - Main Control Unit

The MCUA is the main control unit of the S9303.

5.4 FSUA - Enhanced Flexible Service Unit

The FSUA is an optional and pluggable unit installed on the SRU to enhance the functions of the SRU.

5.5 VSTSA - Stacking Card on the Main Control Board

This section describes the stacking card, including the functions and features, applicable devices, slots, panel, indicators, interfaces, and technical specifications.

5.6 CMU - Centralized Monitoring Unit

The CMU manages the power supplies and fans of the system uniformly.

5.7 SPU - VAMPA VAS Board

This section describes the VAMPA value-added service (VAS) board, including the appearance, functions and features, applicable devices, slots, panel, indicators, interfaces, and technical specifications.

5.8 G48S - 48-Port 100/1000BASE-X Interface Card (SFP)

This section describes the 48-Port 100/1000BASE-X Interface Card (EA, SFP), 48-Port 100/1000BASE-X Interface Card (EC, SFP), 48-Port 100/1000BASE-X Interface Card (ED, SFP) and 48-Port 100/1000BASE-X Interface Card (FA, SFP), including the appearance, functions and features, panel, interface attributes, and technical specifications.

5.9 G48SBC-48-Port 100/1000BASE-X Interface Card (BC, SFP)

This section describes the 48-Port 100/1000BASE-X Interface Card (BC, SFP), including the appearance, functions and features, applicable device, slot, panel, indicators, interfaces, and technical specifications.

5.10 G48T - 48-Port 10/100/1000BASE-T Interface Card (RJ45)

This section describes the 48-Port 100/1000BASE-T Interface Card (EA, RJ45), 48-Port 10/100/1000BASE-T Interface Card (EC, RJ45) 48-Port 10/100/1000BASE-T Interface Card (ED, RJ45) and 48-Port 1000BASE-T Interface Card (FA, RJ45), including the appearance, functions and features, panel, and technical specifications.

5.11 G48TBC-48-Port 10/100/1000BASE-T Interface Card (BC, RJ45)

This section describes the 48-Port 10/100/1000BASE-T Interface Card (BC, RJ45), including the appearance, functions and features, panel, and technical specifications.

5.12 G48VA - 48-Port 10/100/1000BASE-T POE Interface Card(EA,RJ45,POE)

This section describes the 48-Port 10/100/1000BASE-T POE Interface Card, including the appearance, functions and features, applicable device, slot, panel, indicators, interfaces, and technical specifications.

$5.13\ G48CEAT$ - $36\text{-Port}\ 10/100/1000BASE\text{-T}$ and $12\text{-Port}\ 100/1000BASE\text{-X}$ Interface Card (EA, RJ45/SFP)

This section describes the 36-Port 10/100/1000BASE-T and 12-Port 100/1000BASE-X Interface Card(EA,RJ45/SFP), including the appearance, functions and features, applicable devices, slots, panel, indicators, interfaces, and technical specifications.

5.14 F48S - 48-Port 100BASE-FX Interface Card (SFP)

This section describes the 48-Port 100BASE-FX Interface Card (EA, SFP) and 48-Port 100BASE-FX Interface Card (EC, SFP), including the appearance, functions and features, panel, interface attributes, and technical specifications.

5.15 F48T - 48-Port 10/100BASE-T Interface Card (RJ45)

This section describes the 48-Port 10/100BASE-T Interface Card (EA, RJ45), 48-Port 10/100BASE-T Interface Card (EC, RJ45) and 48-Port 10/100BASE-T Interface Card (FA, RJ45), including the appearance, functions and features, panel, and technical specifications.

5.16 X40SFC-40-Port 10GE Optical Interface Card (FC, SFP+)

This section describes the X40SFC-40-port 10GE optical interface card (FC, SFP+), including the functions and features, applicable device models and slots, panel, indicators, interface attributes, and technical specifications.

5.17 X16SFC-16-Port 10GE Optical Interface Card (FC, SFP+)

This section describes the X16SFC-16-port 10GE optical interface card (FC, SFP+), including the functions and features, applicable device models and slots, panel, indicators, interface attributes, and technical specifications.

$5.18\,G24CA$ - 24-Port 100/1000BASE-X and 8-Port 10/100/1000BASE-T Interface Card (SFP/RJ45)

This section describes the 24-Port 100/1000BASE-X and 8-Port 10/100/1000BASE-T Interface Card (SA, SFP/RJ45), including the appearance, functions and features, panel, interface attributes, and technical specifications.

5.19 G24CEAS - 24-Port 100/1000BASE-X and 8-Port 10/100/1000BASE-T Combo Interface Card(EA,SFP/RJ45,1588)

This section describes the 24-Port 100/1000BASE-X and 8-Port 10/100/1000BASE-T Combo Interface Card(EA,SFP/RJ45,1588), including the appearance, functions and features, applicable device (S9303, S9306, or S9312), slot, panel, indicators, interfaces, and technical specifications.

5.20 S24X - 24-Port 100/1000BASE-X and 2-Port 10GBASE-X Interface Card(SFP/XFP)

This section describes the 24-Port 100/1000BASE-X and 2-Port 10GBASE-X Interface Card (SFP/XFP), including the appearance, functions and features, panel, interface attributes, and technical specifications.

5.21 T24XA - 24-Port 10/100/1000BASE-T and 2-Port 10GBASE-X Interface Card(EA,RJ45/XFP)

This section describes the 24-Port 10/100/1000BASE-T and 2-Port 10GBASE-X Interface Card (EA,RJ45/XFP), including the appearance, functions and features, panel, interface attributes, and technical specifications.

5.22 G24S - 24-Port 100/1000BASE-X Interface Card (SA, SFP)

This section describes the 24-Port 100/1000BASE-X Interface Card (SFP), including the appearance, functions and features, panel, interface attributes, and technical specifications.

5.23 G24TFA-24-Port 10/100/1000BASE-T Interface Card(FA,RJ45)

This section describes the 24-Port 10/100/1000BASE-T Interface Card(FA,RJ45), including the appearance, functions and features, panel, interface attributes, and technical specifications.

5.24 X12SA - 12-Port 10GE Optical Interface Card (SA, SFP+)

This section describes the 12-port 10GE optical interface card (SA, SFP+), including the appearance, functions and features, applicable device, slot, panel, indicators, interfaces, and technical specifications.

5.25 E12GA - 12-Port EPON Interface and 12-Port 1000BASE-X Interface Card (SFP)

This section describes the 12-Port EPON Interface and 12-Port 1000BASE-X Interface Card (SFP), including the appearance, functions and features, panel, interface attributes, and technical specifications.

5.26 X4UX - 4-Port 10GBASE-X Interface Card (XFP)

This section describes the 4-Port 10GBASE-X Interface Card (EA, XFP) and 4-Port 10GBASE-X Interface Card (EC, XFP), including the appearance, functions and features, panel, interface attributes, and technical specifications.

5.27 X2UX - 2-Port 10GBASE-X Interface Card (XFP)

This section describes the 2-Port 10GBASE-X Interface Card (EA, XFP) and 2-Port 10GBASE-X Interface Card (EC, XFP), including the appearance, functions and features, panel, interface attributes, and technical specifications.

5.28 CKM - Clock Board

This section describes the CKM, including the appearance, functions and features, and technical specifications.

5.29 WMNPA-WAN Card

This section describes the WMNPA-WAN card, including the appearance, functions and features, panel, interface attributes, and technical specifications.

5.30 P4CF-4-Port OC-3c/STM-1c POS-SFP

This section describes the 4-port OC-3c/STM-1c POS-SFP, including the appearance, functions and features, panel, interface attributes, and technical specifications.

5.31 P4HF-4-Port OC-12c/STM-4c POS-SFP

This section describes the 4-port OC-12c/STM-4c POS-SFP, including the appearance, functions and features, panel, interface attributes, and technical specifications.

5.32 P1UF-1-Port OC-48c/STM-16c POS-SFP

This section describes the 1-port OC-48c/STM-16c POS-SFP, including the appearance, functions and features, panel, and technical specifications.

5.1 Introduction

This section provides an overview of the boards supported by the S9300, including board classification, slot distribution, relation between boards, board appearances, and interfaces on each board.

5.1.1 Board Classification

The supports main control boards and Line Processing Units (LPUs). The S9312 and S9306 use the Switch Routing Units (SRUs) as the main control boards, and the S9303 uses the Main Control Unit (MCU) as the main control board.

Table 5-1 lists the names, types, and description of the boards on the .

Table 5-1 Boards supported by the

| Board Type | Name | Description |
|---------------|-------|--|
| SRU | SRUA | Main control board applied to the S9312 and S9306. The unidirectional switching capacity is 256 Gbit/s |
| | SRUB | Main control board applied to the S9312 and S9306. The unidirectional switching capacity is 512 Gbit/s |
| MCU | MCUA | Main control board applied to the S9303. |
| CKM | CKMA | Clock Pinch Board-1588 |
| CMU | CMUA | Centralized Monitoring Unit, used to monitor the operation of the S9312 and S9306, providing two interfaces: RS485 and MON |
| SPU | VAMPA | Value-added service (VAS) board |
| FSU | FSUA | Flexible service subcard on the SRU, enhancing service processing capability on the SRU |
| VSU | VSTSA | Stack interface flexible pluggable card on the SRU, used to provide the switch stacking function |

| Board Type | Name | Description |
|---------------|---|--|
| LPU | G24CA G24SA X12SA G48SA G48SBC G48SC G48SFA F48SA F48SA F48SC G48TBC G48TBC G48TFA G48TB G48TFA G48TFA G48TFA G48TFA G48CEAT F48TA F48TA F48TA F48TA G24CEAS G24CEAS G24SC G24SD G24TFA E12GA X4UXA X4UXA X4UXC X4UXA X2UXC X16SFC WMNPA P1UF P4HF | NOTE The LPUs are classified into S series boards, E series boards, F series boards, B series boards, EPON boards, and POS boards: • The S series boards are SA boards, for example, 24-port 100M/1000M Ethernet optical LPU (SA, SFP)-32K MAC. • E series boards include EA, EC, and ED boards, for example, 48-port 100M Ethernet optical LPU (EA, SFP)-32K MAC. • F series boards include FA and FC boards, for example, 48-port 1000M Ethernet electrical LPU (FA, RJ45)-32K MAC. • B series boards are BC boards, for example, 48-port 100M/1000M Ethernet optical LPU (BC, SFP)-128K MAC. • An EPON board provides 12 1000M EPON optical interfaces and 12 100M/1000M optical interfaces (SFP). • A POS board consists of a WAN card and subcard such as P4CF, P4HF, or P1UF. For the LPU names, see 8.1 Boards Supported by the S9300. |

| Board Type | Name | Description |
|---------------|--------|-------------|
| | • P4CF | |

◯ NOTE

- The GE electrical interfaces do not support the Ethernet synchronization function.
- The Small Form-Factor Pluggable (SFP) is a hot pluggable optical module.
- The 10 Gigabit Small Form-Factor Pluggable (XFP) is a 10G hot pluggable optical module.
- The 10 Gigabit Small Form-Factor Pluggable (SFP+) is a 10G hot pluggable optical module. Its caliber is smaller than the caliber of the XFP optical module.

5.1.2 Slot Distribution and Board Dimensions

Slots

Figure 5-1, Figure 5-2, and Figure 5-3 show the slots of the S9300.

Figure 5-1 Slots of the S9312

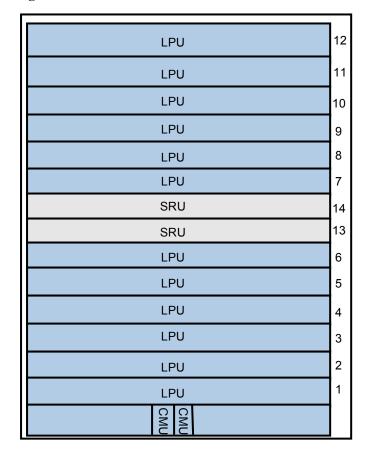


Figure 5-2 Slots of the S9306

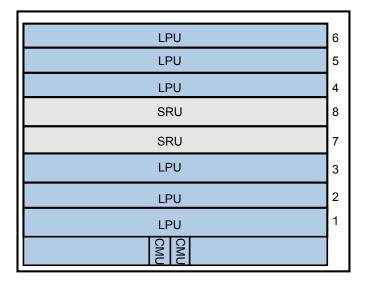


Figure 5-3 Slots of the S9303

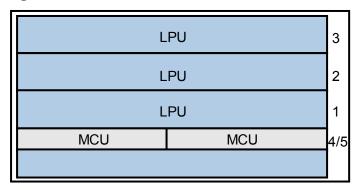


Table 5-2, Table 5-3, and Table 5-4 describe the slot distribution on the S9300.

Table 5-2 Slot distribution of the S9312

| Slot | Quant ity | Height | Note |
|--------|--------------|--------|-----------------------------------|
| 1-12 | 12 | 35 mm | Slots for LPUs |
| 13, 14 | 2 | 35 mm | Slots for SRUs in 1+1 backup mode |

Table 5-3 Slot distribution on the S9306

| Slot | Quant ity | Height | Note |
|------|-----------|--------|-----------------------------------|
| 1-6 | 6 | 35 mm | Slots for LPUs |
| 7, 8 | 2 | 35 mm | Slots for SRUs in 1+1 backup mode |

Table 5-4 Slot distribution on the S9303

| Slot | Quant ity | Height | Note |
|------|--------------|---------|-----------------------------------|
| 1-3 | 3 | 35 mm | Slots for LPUs |
| 4, 5 | 2 | 19.8 mm | Slots for MCUs in 1+1 backup mode |

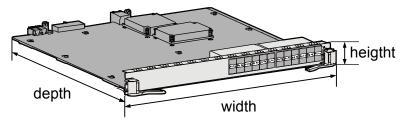
Board Dimensions

Table 5-5 provides the dimensions of each board of the S9300. For the definitions of depth, width, and height of a board, see **Figure 5-4**.

Table 5-5 Board dimensions

| Board Type | Dimensions (width x depth x height) |
|------------|-------------------------------------|
| MCU | 426.8 mm x 194.5 mm x 19.9 mm |
| SRU | 426.8 mm x 394.7 mm x 35.1 mm |
| FSU or VSU | 243.7 mm x 170.0 mm x 35.1 mm |
| CMU | 412.7 mm x 112.9 mm x 19.8 mm |
| LPU | 426.8 mm x 394.7 mm x 35.1 mm |
| CKM | 145.0 mm x 100.0 mm x 2.0 mm |

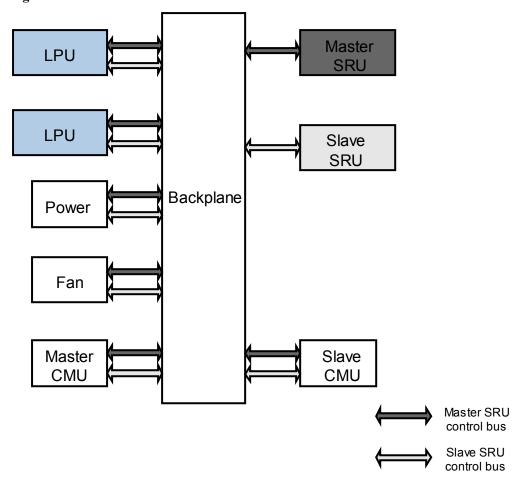
Figure 5-4 Dimensions diagram



5.1.3 Relation Between Boards

Figure 5-5 and Figure 5-6 show the relation between boards on the S9300.

Figure 5-5 Relation between boards on the S9312 and S9306



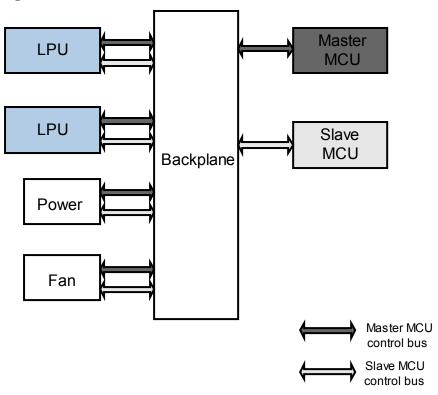


Figure 5-6 Relation between boards on the S9303

5.1.4 Interfaces on the Boards

All interfaces are integrated on the boards are accessible from the board panel. **Table 5-6** shows the distribution of the interfaces on the board.

Table 5-6 Distribution of interfaces on the boards

| Interface Category | Interface Name | Interface Attribute | Туре | Board |
|-----------------------|----------------------------|---------------------|-------|----------------|
| Optical interface | Ethernet optical interface | FE | LC/PC | F48SA F48SC |

| Interface Category | Interface Name | Interface Attribute | Туре | Board |
|-----------------------|----------------------|---------------------|-------|---------|
| | | GE | LC/PC | G48SA |
| | | | | G48SC |
| | | | | G48SD |
| | | | | G48SBC |
| | | | | G48SFA |
| | | | | G48CEAT |
| | | | | G24SA |
| | | | | G24SC |
| | | | | G24SD |
| | | | | G24CA |
| | | | | S24XA |
| | | | | S24XC |
| | | | | G24CEAS |
| | | | | E12GA |
| | | 10GE | LC/PC | X40SFC |
| | | | | X16SFC |
| | | | | S24XA |
| | | | | S24XC |
| | | | | T24XA |
| | | | | X12SA |
| | | | | X4UXA |
| | | | | X4UXC |
| | | | | X4UXD |
| | | | | X2UXA |
| | | | | X2UXC |
| | POS optical | 2.5GE | LC/PC | P1UF |
| 1 | interface | 622M | | P4HF |
| | | 155M | | P4CF |
| Electrical | Ethernet | FE | RJ45 | F48TA |
| interface | electrical interface | | | F48TFA |
| | 1111011400 | | | F48TC |

| Interface Category | Interface Name | Interface Attribute | Туре | Board |
|---|------------------------|---------------------------|------|--|
| Category | Name | GE | RJ45 | G48CEAT G48TFA G48TA G48TC G48TD G48TBC G48VA G24CEAS G24CA G24TFA |
| Maintenance electrical interface | Ethernet interface ETH | 10M/100M auto- sensing | RJ45 | T24XA SRU MCUA |
| | Console interface | - | RJ45 | SRU MCUA |
| Environment monitoring control interface | MON | - | RJ45 | MCUA CMUA |
| Management interface of external PoE power supplies | RS485 | - | RJ45 | MCUA CMUA |
| Time synchronization or clock synchronization interface | BITS | - | RJ45 | SRU MCUA |

☐ NOTE

- The VSTSA provides 16GE interfaces.
- Besides GE interfaces, the E12GA provides 12 GEPON interfaces.

5.2 SRU - Main Control Unit

The SRU is the main control unit of the S9312 and S9306.

5.2.1 Introduction

The SRU is the control and switching platform of the S9312 and the S9306. It integrates the control unit, system clock unit, switching unit, and system maintenance unit. The SRU is the core component for system control and management. In addition, as the clock source and maintenance unit of the system, the SRU is the control plane and maintenance plane of the system.

There are two types of SRUs, namely, SRUA and SRUB. The SRUA is divided into two types: LE02SRUA and LE03SRUA. The SRUB has only one type, that is, LE02SRUB. **Table 5-7** lists the types of the SRU.

Table 5-7 Lists of SRUs

| Name | Switching Capacity | Support Time and Clock Synchronization |
|----------|---------------------------|---|
| LE02SRUA | 512 Gbit/s, bidirectional | No |
| LE03SRUA | 512 Gbit/s, bidirectional | Yes |
| LE02SRUB | 1 Tbit/s, bidirectional | Yes |

5.2.2 Function and Application

Function Description

The SRU integrates the control and switching functions and provides the control plane, management plane, and switching plane.

- The control plane has such functions as protocol processing, service processing, route calculation, forwarding control, service scheduling, traffic statistics, and system security.
- The management plane is responsible for system monitoring, environment monitoring, log and alarm processing, system loading, and system upgrade.
- The switching plane provides high-speed and non-blocking data channels to implement service switching between service modules. The S9300 supports double SRUs in 1:1 backup mode with the data switching units working in either 1+1 load balancing mode or 1:1 backup mode. The SRU can be equipped with a Flexible Service Unit (FSU). The SRU provides 4 x 10G interfaces to FSU.

Based on the functions, the SRU consists of the following modules physically:

- Control module: functions as the control and management plane for the SRU and the entire system, implementing protocol processing, route calculation, forwarding control, system management, and system security.
- Switching module: functions as the service switching plane, providing high-speed service channels to implement service switching.
- Local clock module: provides the working clock for the chips of the control module, switching module, and equipment management and monitoring module.

- Equipment management and monitoring module: provides the controller area network bus (CANBUS) module to monitor the SRU and manage the CANbus modules on the LPUs.
- Power supply: provides power supply for the SRU, FSU, and clock pinch board.
- FSU: provides enhanced services such as centralized forwarding, network quality analysis (NQA), Ethernet operation, administration and maintenance (OAM), and NetFlow. It is an optional value-added service module.
- Clock pinch board: provides the stratum-3 clock and synchronization Ethernet clock and supports IEEE 1588v2. It is an optional clock module.
- Stacking card: enables two switches to form a stack. The stacking card is optional.

■ NOTE

- The SRU stores the configuration data, startup files, upgrade software, and logs.
- The SRUs work in 1:1 backup mode.
- The LE02SRUA does not support the clock module.
- The SRUs are hot pluggable. Before removing the active SRU, perform the active/standby switchover first

Application

The SRUs of the S9312 are installed in slot 13 and slot 14; the SRUs of the S9306 are horizontally installed in slot 7 and slot 8. The SRU slots are in the center of the subrack of the S9312 and S9306.

The S9312 or S9306 must have at least one SRU. You can install one or two SRUs. If only one SRU is installed, it can be installed in either of the SRU slots. To improve reliability of a key device, you can install double SRUs. When the master SRU fails, the slave SRU substitutes for the master SRU automatically to prevent service interruption.

M NOTE

The SRUA and SRUB cannot be installed on the same S9300.

5.2.3 Panel

Figure 5-7 and Figure 5-8 show the appearances of the SRU panels.

Figure 5-7 Appearance of the LE02SRUA panel

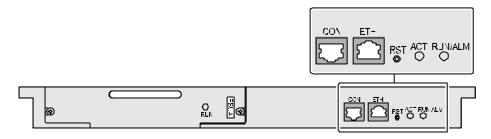
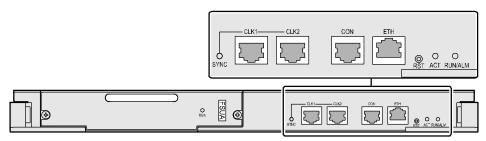


Figure 5-8 Appearance of the LE03SRUA and LE02SRUB panel



Buttons and Indicators on the SRU Panel

Table 5-8 describes the buttons and indicators on the SRU panel.

Table 5-8 Description of the buttons and indicators on the SRU panel

| Indicator/Button | Color | Description |
|------------------|--------|---|
| RUN/ALM | Green | If the indicator is on, it indicates that the SRU is powered on, but the software is not running. |
| | | If the indicator blinks every 2s (0.5 Hz), it indicates that the system is running normally. |
| | | If the indicator blinks every 0.25s (4 Hz), it indicates that the system is starting. |
| | Red | If the indicator is in red, it indicates that the SRU is faulty. |
| | Orange | If the indicator is in orange, it indicates that the SRU is installed, and the board is powered on. |
| ACT | Green | This indicator shows whether the SRU is the master SRU or slave SRU. |
| | | If the indicator is on, it indicates that the SRU is the master SRU. |
| | | If the indicator is off, it indicates that the SRU is the slave SRU. |
| RST | - | Press this button to reset the SRU. NOTE Resetting the SRU will cause the loss of service packets. Confirm the operation before you press the Reset button. |

| Indicator/Button | Color | Description |
|------------------|-------|--|
| SYNC | Green | If the indicator is on, it indicates that the device supports the time and clock synchronization and the clock board is installed on the SRU. |
| | | If the indicator is off, it indicates that the device supports the time and clock synchronization but the clock board is not installed on the SRU. |

5.2.4 Interfaces

Table 5-9 describes the types and functions of the interfaces on the SRU.

Table 5-9 Types and functions of the interfaces on the SRU

| Name | Quantity | Description |
|--|----------|--|
| ETH (10M/100M Base-TX auto- sensing) | 1 | Used to connected to the network interface of the configuration terminal or the network management workstation. The configuration environment thus can be established on site or remotely. |
| Console interface | 1 | Used to connect to the console to implement on-site system configuration of the S9300. |
| BITS interface | 2 | The CLK1 and CLK2 interfaces on the SRU map the BITS0 and BITS1 interfaces of the clock board. |
| | | The BITS interfaces are connected to the BITS device or connected to the BITS interfaces of other products to synchronize the time and clock. |

5.2.5 Interface Attributes

The following tables describe the attributes of the interfaces on the SRU.

• Table 5-10 describes the attributes of the 10M/100M Base-TX Ethernet interface.

Table 5-10 Attributes of the 10M/100M Base-TX Ethernet interface

| Attribute | Description |
|----------------|-------------|
| Connector type | RJ45 |

| Attribute | Description |
|---------------------|-------------|
| Compliance standard | IEEE 802.3 |

• Table 5-11 describes the attributes of the console interface.

Table 5-11 Attributes of the console interface

| Attribute | Description |
|---------------------|--|
| Connector type | RJ45 |
| Operation mode | Full duplex Universal Asynchronous Receiver/Transmitter (UART) |
| Compliance standard | RS-232 |
| Data equipment type | Data Circuit-terminating Equipment (DCE) |

• Table 5-12 describes the attributes of the BITS interfaces.

Table 5-12 Attributes of the BITS interfaces

| Attribute | Description | |
|---------------------|---|--|
| Connector type | RJ45 | |
| Operation mode | Clock synchronization mode: full duplex Time synchronization mode: half duplex | |
| Frame format | 1 pps + Time of Day (TOD) DC Level Shifter (DCLS) 2 MHz 2 Mbit/s: HDB3 code 1.544 Mbit/s: B8ZS code | |
| Compliance standard | 1 pps + TOD NMEA-0183 TOD standard of China Mobile DCLS: standard of DCLS signals 2 MHz: G.703 standard 2 Mbit/s G.703 standard 1.544 Mbit/s G.703 standard | |

| Attribute | Description |
|-----------|---|
| Cable | Time synchronization mode: time synchronization network cable, which is a common straight-through network cable with the RS422 interface level |
| | Clock synchronization mode: E1/T1 cable, which is a balanced cable with an impedance of 120 ohms. For details about cable, refer to 6.7 Clock Cable . |

5.2.6 Technical Specifications

Table 5-13 describes the technical specifications of the SRU.

Table 5-13 Technical specifications of the SRU

| Item | Specification |
|---|--|
| SRU dimensions (depth x width x height) | 426.8 mm x 394.7 mm x 35.1 mm Space for the FSU or VSU: 243.7 mm x 170.0 mm x 35.1 mm |
| Maximum power consumption | LE02SRUA: 81 W (including FSUA) LE03SRUA: 87 W (including FSUA and CKMA) SRUB: 105 W (including FSUA and CKMA) |
| Weight | LE02SRUA: 2.80 kg LE03SRUA: 2.90 kg SRUB: 2.90 kg |
| Long-term temperature | 0°C to 45°C |
| Short-term temperature | -5°C to 55°C |

5.3 MCUA - Main Control Unit

The MCUA is the main control unit of the S9303.

5.3.1 Introduction

The MCUA is the control and switching platform of the S9303. It integrates the control unit, system clock unit, and system maintenance unit. The MCUA is the core component for system control and management. In addition, as the clock source and maintenance unit of the system, the MCUA is the control plane and maintenance plane of the system.

There are two types of the MCUA boards, namely, LE02MCUA and LE03MCUA. The LE03MCUA has a clock board and supports time synchronization and clock synchronization.

5.3.2 Function and Application

Function Description

The MCUA of the S9303 has the following functions:

- Providing out-band communication channels between boards.
- Providing high-precision stratum-3 clock and synchronous Ethernet clock conforming to IEEE 1588: These clocks ensure synchronization of interfaces and transmission clocks between LPUs
- Monitoring system operation: The MCUA collects operation data of different units periodically. According to the running status of the units, the MCUA generates the control information used to check availability of boards, control the running status of the switching fabric, perform port switching, reset the forwarding engine, and increase the fan speed.
- Working as the proxy of the network management module: The MCUA can manage and maintain the S9303 through the open management interfaces (serial interfaces or network interfaces).
- Implementing data configuration: The MCUA stores the configuration data, startup file, accounting data, upgrade software, and running logs of the S9303. The MCUA provides a CF card to store data files.
- Working in 1:1 backup mode to improve reliability: The master and slave MCUAs monitor
 the status of each other. When the master MCUA fails, the slave MCUA substitutes for the
 master MCUA to ensure normal running of the system.
- Supporting the optional clock board: The LE03MCUA provides the stratum-3 clock and Ethernet clock synchronization functions and supports IEEE 1588v2.

M NOTE

The LE02MCUA does not support the clock module.

Application

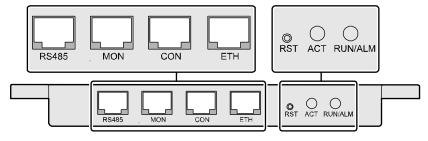
The MCUAs of the S9303 are installed in slot 4 and slot 5.

The S9303 must have at least one MCUA. You can install one or two MCUAs. If only one MCUA is installed, it can be installed in either of the MCUA slots. To improve reliability of a key device, you can install double MCUAs. When the master MCUA fails, the slave MCUA substitutes for the master MCUA automatically to prevent service interruption.

5.3.3 Panel

Figure 5-9 and Figure 5-10 show the appearances of the MCUA panels.

Figure 5-9 Appearance of the LE02MCUA panel



SYNC CLK1 CLK2 RS485 MON CON ETH RST ACT RUN/ALM

Figure 5-10 Appearance of the LE03MCUA panel

Buttons and Indicators on the Panel

Table 5-14 describes the buttons and indicators on the MCUA panel.

Table 5-14 Description of the buttons and indicators on the MCUA panel

| Indicator/Button | Color | Description |
|------------------|--------|--|
| RUN/ALM | Green | If the indicator is on, it indicates that the MCUA is powered on, but the software is not running. |
| | | If the indicator blinks every 2s (0.5 Hz), it indicates that the system is running normally. |
| | | If the indicator blinks every 0.25s (4 Hz), it indicates that the system is starting. |
| | Red | If the indicator is in red, it indicates that the MCUA is faulty. |
| | Orange | If the indicator is in orange, it indicates that the MCUA is installed, and the board is powered on. |
| ACT | Green | This indicator shows whether the MCUA is the master MCUA or the slave MCUA. |
| | | If the indicator is on, it indicates that the MCUA is the master MCUA. |
| | | If the indicator is off, it indicates that the MCUA is the slave MCUA. |
| RST | - | Press this button to reset the board. |

5.3.4 Interfaces

Table 5-15 describes the types and functions of the interfaces on the MCUA.

Table 5-15 Types and functions of the interfaces on the MCUA

| Name | Quantity | Description |
|--|----------|--|
| ETH (10M/100M Base-TX auto- sensing) | 1 | Used to connected to the network interface of the configuration terminal or the network management workstation. The configuration environment thus can be established on site or remotely. |
| Console interface | 1 | Used to connect to the console to implement on-site system configuration of the S9300. |
| MON interface | 1 | Environment monitoring control interface. |
| RS485 interface | 1 | Management interface of external PoE power supplies. |
| BITS interface | 2 | The CLK1 and CLK2 interfaces on the MCU map the BITS0 and BITS1 interfaces of the clock board. |
| | | The BITS interfaces are connected to the BITS device or connected to the BITS interfaces of other products to synchronize the time and clock. |

NOTE

Currently, the S9300 does not support external PoE power supplies.

5.3.5 Interface Attributes

This section describes the attributes of the interfaces on the MCUA.

• Table 5-16 describes the attributes of the 10M/100M Base-TX Ethernet interface.

Table 5-16 Attributes of the 10M/100M Base-TX Ethernet interface

| Attribute | Description |
|---------------------|-------------|
| Connector type | RJ45 |
| Compliance standard | IEEE 802.3 |

• Table 5-17 describes the attributes of the console interface.

Table 5-17 Attributes of the console interface

| Attribute | Description |
|---------------------|--|
| Connector type | RJ45 |
| Operation mode | Full duplex Universal Asynchronous Receiver/Transmitter (UART) |
| Compliance standard | RS-232 |
| Data equipment type | Data Circuit-terminating Equipment (DCE) |

• Table 5-18 describes the attributes of the RS485 interface.

Table 5-18 Attributes of the RS485 interface

| Attribute | Specification |
|---------------------|---------------|
| Connector type | RJ45 |
| Compliance standard | RS-485 |

• Table 5-19 describes the attributes of the MON interface.

Table 5-19 Attributes of the MON interface

| Attribute | Specification |
|---------------------|---------------|
| Connector type | RJ45 |
| Compliance standard | RS-232 |

• Table 5-20 describes the attributes of the BITS interfaces.

Table 5-20 Attributes of the BITS interfaces

| Attribute | Description |
|----------------|---|
| Connector type | RJ45 |
| Operation mode | Clock synchronization mode: full duplex |
| | Time synchronization mode: half duplex |

| Attribute | Description |
|--------------|--|
| Frame format | • 1 pps + time of day (TOD) |
| | DC Level Shifter (DCLS) |
| | • 2 MHz |
| | • 2 Mbit/s: HDB3 code |
| | • 1.544 Mbit/s: B8ZS code |
| Compliance | • 1 pps + TOD |
| standard | - NMEA-0183 |
| | - TOD standard of China Mobile |
| | DCLS: standard of DCLS signals |
| | • 2 MHz: G.703 standard |
| | • 2 Mbit/s G.703 standard |
| | • 1.544 Mbit/s G.703 standard |
| Cable | Time synchronization mode: time synchronization network cable, which is a common straight-through network cable with the RS422 interface level |
| | Clock synchronization mode: E1/T1 cable, which is a balanced cable with an impedance of 120 ohm. |
| | For details about cable, refer to 6.7 Clock Cable. |

5.3.6 Technical Specifications

Table 5-21 describes the technical specifications of the MCUA.

Table 5-21 Technical specifications of the MCUA

| Item | Specification |
|---|---|
| Board dimensions (depth x width x height) | 426.8 mm x 194.5 mm x 19.9 mm |
| Maximum power consumption | LE02MCUA: 18 W LE03MCUA: 26 W (including CKMA) |
| Weight | 0.90 kg |
| Long-term temperature | 0°C to 45°C |
| Short-term temperature | -5°C to 55°C |

5.4 FSUA - Enhanced Flexible Service Unit

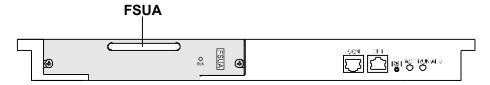
The FSUA is an optional and pluggable unit installed on the SRU to enhance the functions of the SRU.

5.4.1 Introduction

The FSUA is installed on the SRU shown in **Figure 5-11**. The FSUA provides the features such as OAM, BFD and security.

The FSUA is an optional subcard on the SRU. It does not provide any interface.

Figure 5-11 Position of FSU in SRU



5.4.2 Function and Application

Function Description

The FSUA provides the following functions:

- Enhancing Ethernet OAM and BFD
- Ensuring security of the CPU on the SRU and limiting the rate of packets sent to the CPU
- Storing and querying the board information

Application

The FSUA is installed on the SRU.

It is an optional subcard on the SRU of the S9312 and S9306, and can be removed and installed flexibly.

Users can choose to install the FSUA according to the service requirement, which improves the flexibility and expansibility of services.

MOTE

When the FSUA needs to be used, both the master and slave SRUs must be installed with an FSUA.

5.4.3 Panel

Figure 5-12 shows the appearance of the FSUA panel.

Figure 5-12 Appearance of the FSUA panel

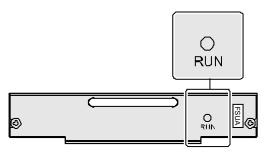


Table 5-22 describes the buttons and indicators on the FSUA panel.

Table 5-22 Description of the buttons and indicators on the FSUA panel

| Indicator/Button | Color | Description |
|------------------|-------|--|
| RUN | Green | If the indicator is on, it indicates that the FSUA is installed and is powered on. |
| | | If the indicator is off, it indicates that the FSUA is not installed. |

5.4.4 Technical Specifications

Table 5-23 describes the technical specifications of the FSUA.

Table 5-23 Technical specifications of the FSUA

| Item | Specification |
|---|-------------------------------|
| Board dimensions (depth x width x height) | 243.7 mm x 170.0 mm x 35.1 mm |
| Maximum power consumption | 20 W |
| Weight | 0.42 kg |
| Long-term temperature | 0°C to 45°C |
| Short-term temperature | -5°C to 55°C |

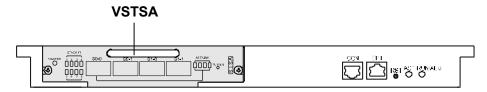
5.5 VSTSA - Stacking Card on the Main Control Board

This section describes the stacking card, including the functions and features, applicable devices, slots, panel, indicators, interfaces, and technical specifications.

5.5.1 Introduction

The stacking card supported by the S9300 is called VSTSA. The VSTSA can be installed on the SRU of the S9306 or S9312 to provide switch stacking function.

Figure 5-13 Position of VSTSA in SRU



5.5.2 Function and Application

Function Description

Each VSTSA provides four 16G electrical interfaces to implement data access and line-speed switching.

The switches connected through the interfaces on the VSTSA belong to a switching domain and are considered as a device. Users can manage all the switches in a stack on the master switch.

Application

The VSTSA can be installed on the SRU of the S9312 or S9306. When the stack is to be configured, both the SRU in the same chassis must be installed with the VSTSA.



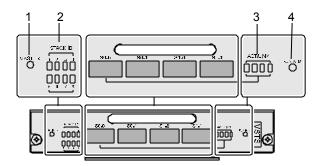
The FSUA and the VSTSA are installed in the subcard slots of the SRUs. The FSUA and the VSTSA cannot be installed in the same chassis.

The VSTSA can be installed on the LE02SRUA VER.A.

5.5.3 Panel

Figure 5-14 shows the appearance of the VSTSA panel.

Figure 5-14 Appearance of the VSTSA panel



1. Master state indicator

2. Stack ID indicator

3. ACT/LINK indicator

4. RUN/ALM indicator

Buttons and Indicators on the Panel

Table 5-24 describes the buttons and indicators on the VSTSA panel.

Table 5-24 Description of the buttons and indicators on the VSTSA panel

| Indicator/Button | Color | Description |
|------------------|-------|---|
| MASTER | Green | If the indicator is on, it indicates that the SRU where the VSTSA is installed is the master in the stack. |
| | | If the indicator is off, the SRU where the VSTSA is installed may be: |
| | | The standby SRU on the master switch |
| | | The active SRU on the slave switch |
| | | The standby SRU on the slave switch |
| STACK ID | Green | This indicator shows the ID of the stack. Currently, a stack can contain up to two switches; therefore, only the indicators of stack 1 and stack 2 may be on. |
| | | When both the two SRUs are installed with the VSTSA, the stack ID indicators must be the same. That is, the stack 1 indicators or stack 2 indicators are on. |
| ACT/LINK | Green | If the indicator is on, it indicates the state of link is UP. |
| | | If the indicator is on, it indicates that the state of link is DOWN. |

| Indicator/Button | Color | Description |
|------------------|-------|---|
| RUN/ALM | Green | If the indicator is on, it indicates that the board is powered on but the software is not running. |
| | | If the indicator blinks once every 2s (0.5 Hz), it indicates that the system is in normal state. |
| | | If the indicator blinks once every 0.25s (4 Hz), it indicates that the system is being powered on or being restarted. |
| | Red | If the indicator is on, it indicates that the board is faulty. |

5.5.4 Interfaces

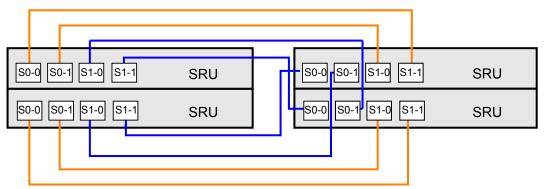
Table 5-25 describes the types and functions of the interfaces on the VSTSA.

Table 5-25 Types and functions of the interfaces on the VSTSA

| Name | Quantity | Description |
|---------------------------------|----------|---|
| 16G BASE-T electrical interface | 4 | The VSTSA provides four 16-Gbit/s electrical interfaces to transmit and receive services. |

The VSTSA provides four interfaces: S0-0, S0-1, S1-0, and S1-1. The S9300 currently supports the stack of up to two switches. When S9300A and S9300B are connected through VSTSAs, the interfaces are connected as **Figure 5-15** shows.

Figure 5-15 External cable connections of a stack



For details about stack cables, refer to 6.8 Stack Cables.

5.5.5 Technical Specifications

Table 5-26 describes the technical specifications of the VSTSA.

Table 5-26 Technical specifications of the VSTSA

| Item | Specification |
|---|-------------------------------|
| Board dimensions (depth x width x height) | 243.7 mm x 170.0 mm x 35.1 mm |
| Power consumption | 12 W |
| Weight | 1 kg |
| Long-term temperature | 0°C to 45°C |
| Short-term temperature | -5°C to 55°C |

5.6 CMU - Centralized Monitoring Unit

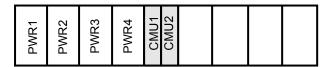
The CMU manages the power supplies and fans of the system uniformly.

5.6.1 Introduction

The CMU manages the power supplies and fans of the system uniformly.

The CMUs are installed in the right slots of PWR4, as shown in Figure 5-16.

Figure 5-16 Position of the CMUs



5.6.2 Function and Application

Function Description

The CMU consists of the following modules:

- Equipment management module: sends interface control signals for equipment management.
- Backplane interface module: sends all interface signals on the backplane to control the power supply, fans, and master/slave states of CMUA.

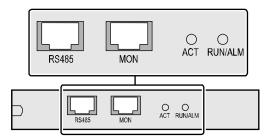
Application

The CMU is applied to the S9312 or S9306. There are two CMU slots on the subrack: one for the master CMU and the other for the slave CMU. You can install one or two CMUs as required.

5.6.3 Panel

Figure 5-17 shows the appearance of the CMU panel.

Figure 5-17 Appearance of the CMU



Buttons and Indicators on the Panel

Table 5-27 describes the buttons and indicators on the CMU panel.

Table 5-27 Description of the buttons and indicators on the CMU panel

| Indicator/Button | Color | Description |
|------------------|-------|--|
| RUN/ALM | Green | If the indicator blinks every 2s (0.5 Hz), it indicates that the system is running normally. |
| | | If the indicator blinks every 0.25s (4 Hz), it indicates that the system is unregistered. |
| | Red | If the indicator is on, it indicates that the CMU is faulty. |
| | | If the indicator blinks every 2s (0.5 Hz), it indicates that an alarm is generated because of a fault on the CMU, fans or power. |
| | | If the indicator blinks every 0.25s (4 Hz), it indicates that the input power is insufficient. |
| ACT | Green | This indicator shows whether the CMU is master CMU or the slave CMU. |
| | | If the indicator is on, it indicates that the CMU is the master CMU. |
| | | If the indicator is off, it indicates that the CMU is the slave CMU. |

5.6.4 Interfaces

Table 5-28 describes the types and functions of the interfaces on the CMU.

Table 5-28 Types and functions of the interfaces on the CMU

| Name | Quantity | Description |
|-----------------|----------|--|
| MON interface | 1 | Environment monitoring control interface. |
| RS485 interface | 1 | Management interface of external PoE power supplies. |

NOTE

Currently, the S9300 does not support external PoE power supplies.

5.6.5 Interface Attributes

This section describes the attributes of the interfaces on the CMU.

• Table 5-29 describes the attributes of the RS485 interface.

Table 5-29 Attributes of the RS485 interface

| Attribute | Specification |
|---------------------|---------------|
| Connector type | RJ45 |
| Compliance standard | RS-485 |

• Table 5-30 describes the attributes of the MON interface.

Table 5-30 Attributes of the MON interface

| Attribute | Specification |
|---------------------|---------------|
| Connector type | RJ45 |
| Compliance standard | RS-232 |

5.6.6 Technical Specifications

Table 5-31 describes the technical specifications of the CMU.

Item Specification Board dimensions 412.7 mm x 112.9 mm x 19.8 mm (depth x width x height) Maximum power 1 W consumption Weight 0.22 kg0°C to 45°C Long-term temperature Short-term -5°C to 55°C

Table 5-31 Technical specifications of the CMU

5.7 SPU - VAMPA VAS Board

temperature

This section describes the VAMPA value-added service (VAS) board, including the appearance, functions and features, applicable devices, slots, panel, indicators, interfaces, and technical specifications.

5.7.1 Introduction

Functioning as the value-added service (VAS) board of the S9300, the Service Process Unit (SPU) provides service functions such as load balancing, firewalls, Network Address Translation (NAT), IP Security (IPSec), and NetStream, thus meeting requirements of different application scenarios for diverse industry networks.

Currently, the SPU supports only one board, namely, VAMPA.

5.7.2 Function and Application

Function

The system transmits the packets to be processed to the SPU. Then the SPU processes the packets related to the VASs. The SPU is applicable to load balancing, NAT, firewall, IPSec, and NetSream solutions.

Application

The VAMPA can be installed in any LPU slot of the S9312, S9306, and S9303.

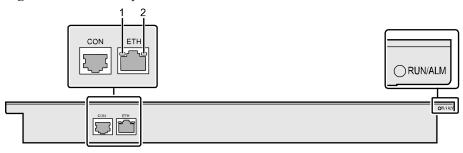
5.7.3 Panel

This topic describes the appearance of the SPU, including interfaces, indicators and the colors and blinking states of interface and board indicators.

Currently, the SPU supports only the VAMPA.

The VAMPA is installed horizontally. A serial interface (identified as CON) and an FE electrical interface (identified as ETH) are located on the panel. **Figure 5-18** shows the panel.

Figure 5-18 VAMPA panel



1. ACT indicator

2. LINK indicator

The board indicator RUN/ALM and interface indicators ACT and LINK are located on the VAMPA panel. **Table 5-32** describes the colors and blinking states of the indicators.

Table 5-32 Buttons and indicators on the VAMPA panel

| Indicator/Button | Color | Description |
|------------------|--------------|--|
| RUN/ALM | Green | If the indicator is on, it indicates that the board is powered on but the software is not running. |
| | | If the indicator blinks slowly (0.5 Hz), it indicates that the system runs normally. |
| | | If the indicator blinks quickly (4 Hz), it indicates that the system is being started. |
| | Red | If the indicator is on, it indicates that the board is faulty. |
| | Orange | If the indicator is on, it indicates that the board is installed in the slot and is powered on. |
| ACT | Amber | If the indicator blinks, it indicates that data is being transmitted or received. |
| | | If the indicator is off, it indicates that no data is being transmitted or received. |
| LINK | Green-yellow | If the indicator is on, it indicates that the link is connected. |
| | | If the indicator is off, it indicates that the link is blocked. |

NOTE

There are two labels on the SPU board:

- 03020RRN: indicates the BBOM or SBOM of the board.
- 781DBAA383F0-F2(3): indicates that there are three MAC addresses on the front panel of the board. Each board has two XGE interfaces, and each XGE interface has a MAC address. In addition, the management interface has a MAC address.

5.7.4 Description of Interfaces on the SPU

This topic describes types, quantity, and functions of interfaces on the SPU.

Table 5-33 describes types and functions of interfaces on the VAMPA.

Table 5-33 Interfaces on the VAMPA and their functions

| Interface | Quantity | Description |
|--------------------|----------|---|
| Console interface | 1 | Provides a serial interface. A user can log in to the local SPU by connecting the serial interface on the host and the console interface on the SPU through a cable to configure the SPU locally. |
| Ethernet interface | 1 | Provides an FE electrical interface. A user can log in to the SPU through Telnet to configure the SPU. |

5.7.5 Attributes of Interfaces on the SPU

This topic describes connector types, attributes, operation modes, and compliance standards of the interfaces on the panel.

Table 5-34 and Table 5-35 describe attributes of the interfaces on the panel.

Table 5-34 Serial interface attributes

| Attribute | Description |
|---------------------|-------------|
| Connector type | RJ45 |
| Interface attribute | RS232 |
| Compliance standard | EIA/TIA-232 |

Table 5-35 Ethernet interface attributes

| Attribute | Description | |
|---------------------|---------------------|--|
| Connector type | RJ45 | |
| Interface attribute | 10BASE-T/100BASE-TX | |
| Operation mode | Full duplex | |

| Attribute | Description |
|---------------------|-------------|
| Compliance standard | IEEE 802.3 |

5.7.6 Technical Specifications

This topic describes technical specifications of the SPU, such as board dimensions, panel dimensions, maximum power consumption, and weight.

Table 5-36 describes technical specifications of the VAMPA.

Table 5-36 Technical specifications of the VAMPA

| Parameter | Description |
|---------------------------|---|
| Board dimensions | 426.80 mm x 394.70 mm x 35.10 mm (width x depth x height) |
| Maximum power consumption | 153.27 w |
| Board weight | 2.6 kg |

5.8 G48S - 48-Port 100/1000BASE-X Interface Card (SFP)

This section describes the 48-Port 100/1000BASE-X Interface Card (EA, SFP), 48-Port 100/1000BASE-X Interface Card (EC, SFP), 48-Port 100/1000BASE-X Interface Card (ED, SFP) and 48-Port 100/1000BASE-X Interface Card (FA, SFP), including the appearance, functions and features, panel, interface attributes, and technical specifications.

5.8.1 Introduction

The 48-port GE optical interface card (SFP) of the S9300 is called G48S for short. The G48S boards are classified into the following types: (EA, SFP), (EC, SFP), (ED, SFP) and (FA, SFP).

Table 5-37 provides the full name of the boards and capacities of the MAC address tables.

Table 5-37 Lists of G48S

| Full Name | Short Name | Capacity of MAC Address Table |
|---|------------|----------------------------------|
| 48-Port 100/1000BASE-X Interface Card (EA, SFP) | G48SA | 32K |
| 48-Port 100/1000BASE-X Interface Card (EC, SFP) | G48SC | 128K |

| Full Name | Short Name | Capacity of MAC Address Table |
|---|------------|----------------------------------|
| 48-Port 100/1000BASE-X Interface Card (ED, SFP) | G48SD | 512K |
| 48-Port 100/1000BASE-X Interface Card (FA, SFP) | G48SFA | 32K |

Both the G48SA and G48SFA support 32K MAC addresses. The power consumption of the G48SFA is smaller than that of the G48SA.

5.8.2 Function and Application

Function Description

The G48S provides 48 GE optical interfaces to implement data access and wire-speed switching.

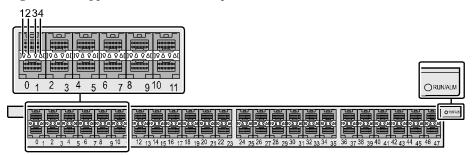
Application

The G48S can be installed in any LPU slot on the S9312, S9306, or S9303.

5.8.3 Panel

Figure 5-19 shows the appearance of the G48S panel.

Figure 5-19 Appearance of the G48S panel



- lower optical interfaces
- 1. ACT indicators of the 2. ACT indicators of the upper optical interfaces
- 3. Link indicators of the lower optical interfaces
- 4. Link indicators of the upper optical interfaces

Buttons and Indicators on the Panel

Table 5-38 describes the buttons and indicators on the G48S panel.

Indicator/Button Color Description RUN/ALM Green If the indicator is on, it indicates that the LPU is powered on, but the software is not running. If the indicator blinks every 2s (0.5 Hz), it indicates that the system is running normally. If the indicator blinks every 0.25s (4 Hz), it indicates that the system is starting. If the indicator is in red, it indicates that the Red LPU is faulty. Orange If the indicator is in orange, it indicates that

the LPU is installed, and the board is powered

If the indicator is on, it indicates that the link

If the indicator blinks, the data is being

transmitted or received.

is connected.

Table 5-38 Description of buttons and indicators on the G48S panel

5.8.4 Interfaces

ACT

LINK

Interfaces

Table 5-39 describes the types and functions of the interfaces on the G48S.

Table 5-39 Types and functions of the interfaces on the G48S

Amber

Green-yellow

| Name | Quantity | Description |
|---|----------|---|
| 100M/1000M BASE- X optical interface | 48 | The G48S provides 48 Ethernet optical interfaces (100M/1000M auto sensing) to transmit and receive Ethernet services. |

5.8.5 Interface Attributes

The G48S has only the data interfaces. Each interface has an optical module.

Table 5-40 Interface attributes of the GE optical LPU (100M/1000M Base-SFP)

| Attribute | Description |
|----------------|-------------|
| Connector type | LC/PC |

| Attribute | Description |
|-----------------------------|---|
| Optical interface attribute | Depending on the SFP optical module. |
| Compliance standard | IEEE 802.3z |
| Frame format | Ethernet_II, Ethernet_SAP, or Ethernet_SNAP |
| Network protocol | IP |

Table 5-41 Attributes of the SFP optical module (100M/1000M bit/s)

| Attri bute | Descript | ion | | | | | | |
|--------------------------------------|-------------------------------|-------------------------------|--|--|-------------------------|-------------------------|------------------------------|----------------------|
| Tran smiss ion dista nce | 500 m | 10 km | 10 km (si mode bid fiber) | ngle- irectional | 40 km | 40 km | 80 km | 100 km |
| Cent er wave lengt h | 850 nm | 1310 nm | Tx: 1310 nm Rx: 1490 nm | Tx: 1490 nm Rx: 1310 nm | 1310 nm | 1550 nm | 1550 nm | 1550 nm |
| Tran smitt ing powe r | -9.5 dBm to -2.5 dBm | -9.0 dBm to -3.0 dBm | -9.0 dBm to -3.0 dBm | -9.0 dBm to -3.0 dBm | -5.0 dBm to 0 dBm | -5.0 dBm to 0 dBm | -2.0 dBm to 5.0 dBm | 0 dBm to 5 dBm |
| Rece iver sensi tivity | -17.0 dBm | -20.0 dBm | -19.5 dBm | -19.5 dBm | -23 dBm | -22 dBm | -23.0 dBm | -30.0 dBm |
| Over load optic al powe r | 0 dBm | -3.0 dBm | -3.0 dBm | -3.0 dBm | -3.0 dBm | -3.0 dBm | -3.0 dBm | -9.0 dBm |
| Extin ction ratio | 9 dB | 9 dB | 6 dB | 6 dB | 9 dB | 8.5 dB | 9 dB | 8 dB |

| Attri bute | Descript | tion |
|---------------|----------------|-------------|
| Fiber type | Multi- mode | Single-mode |

Table 5-42 Attributes of 100M/1000M colorized optical modules

| Attrib ute | Descrip | tion | | | | | | |
|----------------------------------|------------------|------------|------------|------------|------------|------------|------------|------------|
| Transm ission distanc e | 80 km | | | | | | | |
| Center wavele ngth | 1471 nm | 1491 nm | 1511 nm | 1531 nm | 1551 nm | 1571 nm | 1591 nm | 1611 nm |
| Transm itting power | 0 dBm to 5.0 dBm | | | | | | | |
| Receiv er sensitiv ity | -28.0 dBm | | | | | | | |
| Overlo ad optical power | -9.0 dBm | 1 | | | | | | |
| Extinct ion ratio | 8.5 dB | | | | | | | |

Table 5-43 Attributes of optical/electrical modules

| Attribute | Description |
|----------------------|---|
| Connector | RJ45 |
| Standards compliance | IEEE802.3z |
| Frame format | Ethernet_II, Ethernet_SAP, or Ethernet_SNAP |
| Network protocol | IP |

5.8.6 Technical Specifications

Table 5-44 describes the technical specifications of the G48S.

Table 5-44 Technical specifications of the G48S

| Item | Specification |
|---|-------------------------------|
| Board dimensions (depth x width x height) | 426.8 mm x 394.7 mm x 35.1 mm |
| Maximum power | G48SA: 75 W |
| consumption | G48SC: 92 W |
| | G48SD: 110 W |
| | G48SFA: 65 W |
| Weight | G48SA: 2.54 kg |
| | G48SC: 2.66 kg |
| | G48SD: 2.66 kg |
| | G48SFA: 2.60 kg |
| Long-term temperature | 0°C to 45°C |
| Short-term temperature | -5°C to 55°C |

5.9 G48SBC-48-Port 100/1000BASE-X Interface Card (BC, SFP)

This section describes the 48-Port 100/1000BASE-X Interface Card (BC, SFP), including the appearance, functions and features, applicable device, slot, panel, indicators, interfaces, and technical specifications.

5.9.1 Introduction

The 48-Port 100/1000BASE-X Interface Card (BC, SFP) is called G48SBC for short. The G48SBC provides 48 high-density 100M/1000M interfaces. It supports 128K MAC address entries.

5.9.2 Function and Application

Function

The G48SBC provides forty-eight 100M/1000M optical interfaces to implement data access and line-speed switching and supports 50 Gbit/s traffic management.

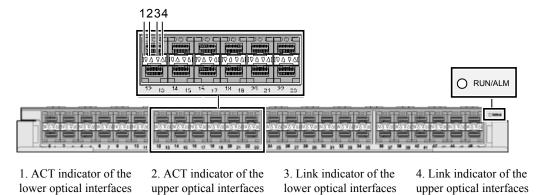
Application

The G48SBC can be installed in any LPU slot of the S9312, S9306, and S9303.

5.9.3 Panel

Figure 5-20 shows the appearance of the G48SBC panel.

Figure 5-20 Appearance of the G48SBC panel



Buttons and Indicators on the Panel

Table 5-45 describes the indicators on the G48SBC panel.

Table 5-45 Description of indicators on the G48SBC panel

| Indicator | Color | Description |
|-------------------------------------|--------|---|
| RUN/ALM | Green | • If the indicator is on, it indicates that the board is powered on, but the software is not running. |
| | | • If the indicator blinks once every 2s (0.5 Hz), it indicates that the system is in normal state. |
| | | • If the indicator blinks once every 0.25s (4 Hz), it indicates that the system is being powered on or being restarted. |
| | Red | If the indicator is on, it indicates that the board is faulty. |
| | Orange | If the indicator is in orange, it indicates that the board is installed in a slot and is powered on. |
| ACT indicator of optical interfaces | Amber | If the indicator blinks, data is being transmitted or received. |

| Indicator | Color | Description |
|--------------------------------------|--------------|--|
| Link indicator of optical interfaces | Green-yellow | If the indicator is on, it indicates that the link is connected. |

5.9.4 Interfaces

Table 5-46 describes the types and functions of the interfaces on the G48SBC.

Table 5-46 Types and functions of the interfaces on the G48SBC

| Name | Quantity | Description |
|-------------------------------------|----------|--|
| 100M/1000M BASE-X optical interface | 48 | The G48SBC provides forty-eight 100M/1000M Ethernet optical interfaces to transmit and receive services. |

5.9.5 Interface Attributes

The G48SBC provides only data interfaces. An optical interface can be connected to an optical module.

Table 5-47 Interface attributes of the GE optical LPU (100M/1000M Base-SFP)

| Attribute | Description |
|-----------------------------|---|
| Connector type | LC/PC |
| Optical interface attribute | Depending on the SFP optical module. |
| Compliance standard | IEEE 802.3z |
| Frame format | Ethernet_II, Ethernet_SAP, or Ethernet_SNAP |
| Network protocol | IP |

Table 5-48 Attributes of the SFP optical module (100M/1000M bit/s)

| Attri bute | Description | | | | | | | |
|--------------------------------------|-------------------------------|-------------------------------|--|--|-------------------------|-------------------------|------------------------------|----------------------|
| Tran smiss ion dista nce | 500 m | 10 km | 10 km (single- mode bidirectional fiber) | | 40 km | 40 km | 80 km | 100 km |
| Cent er wave lengt h | 850 nm | 1310 nm | Tx: 1310 nm Rx: 1490 nm | Tx: 1490 nm Rx: 1310 nm | 1310 nm | 1550 nm | 1550 nm | 1550 nm |
| Tran smitt ing powe r | -9.5 dBm to -2.5 dBm | -9.0 dBm to -3.0 dBm | -9.0 dBm to -3.0 dBm | -9.0 dBm to -3.0 dBm | -5.0 dBm to 0 dBm | -5.0 dBm to 0 dBm | -2.0 dBm to 5.0 dBm | 0 dBm to 5 dBm |
| Rece iver sensi tivity | -17.0 dBm | -20.0 dBm | -19.5 dBm | -19.5 dBm | -23 dBm | -22 dBm | -23.0 dBm | -30.0 dBm |
| Over load optic al powe r | 0 dBm | -3.0 dBm | -3.0 dBm | -3.0 dBm | -3.0 dBm | -3.0 dBm | -3.0 dBm | -9.0 dBm |
| Extin ction ratio | 9 dB | 9 dB | 6 dB | 6 dB | 9 dB | 8.5 dB | 9 dB | 8 dB |
| Fiber type | Multi- mode | Single-mode | | | | | | |

Table 5-49 Attributes of 100M/1000M colorized optical modules

| Attrib ute | Description |
|-------------------------|-------------|
| Transm ission distanc e | 80 km |

| Attrib ute | Description | | | | | | | |
|----------------------------------|------------------|------------|------------|------------|------------|------------|------------|------------|
| Center wavele ngth | 1471 nm | 1491 nm | 1511 nm | 1531 nm | 1551 nm | 1571 nm | 1591 nm | 1611 nm |
| Transm itting power | 0 dBm to 5.0 dBm | | | | | | | |
| Receiv er sensitiv ity | -28.0 dBm | | | | | | | |
| Overlo ad optical power | -9.0 dBm | | | | | | | |
| Extinct ion ratio | 8.5 dB | | | | | | | |

Table 5-50 Attributes of optical/electrical modules

| Attribute | Description |
|----------------------|---|
| Connector | RJ45 |
| Standards compliance | IEEE802.3z |
| Frame format | Ethernet_II, Ethernet_SAP, or Ethernet_SNAP |
| Network protocol | IP |

5.9.6 Technical Specifications

Table 5-51 describes the technical specifications of the G48SBC.

Table 5-51 Technical specifications of the G4G48SBC

| Item | Specification |
|-------------------------------------|-------------------------------|
| Dimensions (depth x width x height) | 426.8 mm x 394.7 mm x 35.1 mm |
| Maximum power consumption | 185 W |

| Item | Specification |
|------------------------|--|
| Weight | 2.90 kg (excluding the optical module) |
| Long-term temperature | 0°C to 45°C |
| Short-term temperature | -5°C to 50°C |

5.10 G48T - 48-Port 10/100/1000BASE-T Interface Card (RJ45)

This section describes the 48-Port 100/1000BASE-T Interface Card (EA, RJ45), 48-Port 10/100/1000BASE-T Interface Card (EC, RJ45) 48-Port 10/100/1000BASE-T Interface Card (ED, RJ45) and 48-Port 1000BASE-T Interface Card (FA, RJ45), including the appearance, functions and features, panel, and technical specifications.

5.10.1 Introduction

The 48-port GE electrical interface card (RJ45) of the S9300 is called G48T for short. The G48T boards are classified into the following types: (EA, RJ45), (EC, RJ45), (ED, RJ45) and (FA, RJ45).

Table 5-52 provides the full name of the boards and capacities of the MAC address tables.

Table 5-52 Lists of G48T

| Full Name | Short Name | Capacity of MAC Address Table |
|--|------------|----------------------------------|
| 48-Port 10/100/1000BASE-T Interface Card (EA, RJ45) | G48TA | 32K |
| 48-Port 10/100/1000BASE-T Interface Card (EC, RJ45) | G48TC | 128K |
| 48-Port 10/100/1000BASE-T Interface Card (ED, RJ45) | G48TD | 512K |
| 48-Port 10/100/1000BASE-T Interface Card (FA, RJ45) | G48TFA | 32K |

Both the G48TA and G48TFA support 32K MAC addresses. The power consumption of the G48TA is smaller than that of the G48TA.

5.10.2 Function and Application

Function Description

The G48T provides 48 GE electrical interfaces to implement data access and wire-speed switching.

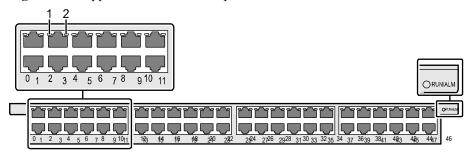
Application

The G48T can be installed in any LPU slot on the S9312, S9306 or S9303.

5.10.3 Panel

Figure 5-21 shows the appearance of the G48T panel.

Figure 5-21 Appearance of the G48T panel



- 1. Link/ACT indicators of the upper electrical interfaces
- 2. Link/ACT indicators of the lower electrical interfaces

Buttons and Indicators on the Panel

Table 5-53 describes the buttons and indicators on the G48T panel.

Table 5-53 Description of buttons and indicators on the G48T panel

| Indicator/Button | Color | Description |
|------------------|--------|---|
| RUN/ALM | Green | If the indicator is on, it indicates that the LPU is powered on, but the software is not running. |
| | | If the indicator blinks every 2s (0.5 Hz), it indicates that the system is running normally. |
| | | If the indicator blinks every 0.25s (4 Hz), it indicates that the system is starting. |
| | Red | If the indicator is in red, it indicates that the LPU is faulty. |
| | Orange | If the indicator is in orange, it indicates that the LPU is installed, and the board is powered on. |

| Indicator/Button | Color | Description |
|------------------|-------|---|
| Link/ACT | Green | If the indicator is on, it indicates that the link is connected. |
| | | If the indicator blinks, the data is being transmitted or received. |

5.10.4 Interfaces

Table 5-54 describes the types and functions of the interfaces on the G48T.

Table 5-54 Types and functions of the interfaces on the G48T

| Name | Quantity | Description |
|--|----------|--|
| 10M/100M/1000M BASE-T electrical interface | 1 | The G48T provides 48 Ethernet electrical interfaces (10M/100M/1000M auto sensing) to transmit and receive Ethernet services. |

5.10.5 Interface Attributes

Table 5-55 Attributes of the 10M/100M/1000M Base-T Ethernet interface

| Attribute | Description |
|---------------------|--|
| Connector type | RJ45 |
| Compliance standard | IEEE 802.3z |
| Frame format | Ethernet_II, Ethernet_SAP, Ethernet_SNAP |
| Network protocol | IP |

5.10.6 Technical Specifications

Table 5-56 describes the technical specifications of the G48T.

Table 5-56 Technical specifications of the G48T

| Item | Specification |
|---|-------------------------------|
| Board dimensions (depth x width x height) | 426.8 mm x 394.7 mm x 35.1 mm |

| Item | Specification |
|------------------------|-----------------|
| Maximum power | G48TA: 62 W |
| consumption | G48TC: 68 W |
| | G48TD: 98 W |
| | G48TFA: 48 W |
| Weight | G48TA: 2.50 kg |
| | G48TC: 2.66 kg |
| | G48TD: 2.66 kg |
| | G48TFA: 2.50 kg |
| Long-term temperature | 0°C to 45°C |
| Short-term temperature | -5°C to 55°C |

5.11 G48TBC-48-Port 10/100/1000BASE-T Interface Card (BC, RJ45)

This section describes the 48-Port 10/100/1000BASE-T Interface Card (BC, RJ45), including the appearance, functions and features, panel, and technical specifications.

5.11.1 Introduction

The 48-Port 10/100/1000BASE-T Interface Card (BC, RJ45) is called 48TBC for short. The 48TBC provides 48 high-density 10M/100M/1000M Ethernet interfaces. It supports 128K MAC address entries.

5.11.2 Function and Application

Function

The G48TBC provides forty-eight 10M/100M/1000M Ethernet electrical interfaces to implement data access and line-speed switching and supports 50 Gbit/s traffic management.

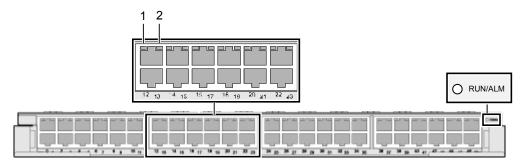
Application

The G48TBC can be installed in any LPU slot of the S9312, S9306, and S9303.

5.11.3 Panel

Figure 5-22 shows the appearance of the G48TBC panel.

Figure 5-22 Appearance of the G48TBC panel



- 1. Link/ACT indicators of the upper electrical interfaces
- 2. Link/ACT indicators of the lower electrical interfaces

Table 5-57 describes the indicators on the G48TBC panel.

Table 5-57 Description of indicators on the G48TBC panel

| Indicator | Color | Description |
|--|--------|---|
| RUN/ALM | Green | • If the indicator is on, it indicates that the board is powered on, but the software is not running. |
| | | If the indicator blinks once every 2s (0.5 Hz), it indicates that the system is in normal state. |
| | | If the indicator blinks once every 0.25s (4 Hz), it indicates that the system is being powered on or being restarted. |
| | Red | If the indicator is on, it indicates that the board is faulty. |
| | Orange | If the indicator is in orange, it indicates that the board is installed in a slot and the CBUS is powered on. |
| ACT/Link indicators of electrical interfaces | Green | If the indicator blinks, data is being transmitted or received. If the indicator is on, it indicates that the link is connected. |

5.11.4 Interfaces

Table 5-58 describes the types and functions of the interfaces on the G48TBC.

Table 5-58 Types and functions of the interfaces on the G48TBC

| Name | Quantity | Description |
|--|----------|--|
| 10M/100M/1000M BASE-T electrical interface | 48 | The G48TBC provides 48 Ethernet electrical interfaces (10M/100M/1000M auto-sensing) to transmit and receive Ethernet services. |

5.11.5 Interface Attributes

The G48TBC provides only data interfaces.

Table 5-59 Attributes of the 10M/100M/1000M Base-T Ethernet interface

| Attribute | Description |
|---------------------|--|
| Connector type | RJ45 |
| Compliance standard | IEEE 802.3z |
| Frame format | Ethernet_II, Ethernet_SAP, Ethernet_SNAP |
| Network protocol | IP |

5.11.6 Technical Specifications

Table 5-60 describes the technical specifications of the G48TBC.

Table 5-60 Technical specifications of the G48TBC

| Item | Specification |
|-------------------------------------|-------------------------------|
| Dimensions (depth x width x height) | 426.8 mm x 394.7 mm x 35.1 mm |
| Maximum power consumption | 160 W |
| Weight | 2.90 kg |
| Long-term temperature | 0°C to 45°C |
| Short-term temperature | -5°C to 50°C |

5.12 G48VA - 48-Port 10/100/1000BASE-T POE Interface Card(EA,RJ45,POE)

This section describes the 48-Port 10/100/1000BASE-T POE Interface Card, including the appearance, functions and features, applicable device, slot, panel, indicators, interfaces, and technical specifications.

5.12.1 Introduction

The 48-port 10/100M/1000M Ethernet PoE electrical interface card (EA, RJ45, PoE) is called G48VA for short.

The G48VA is a GE electrical interface card. It supports the power over Ethernet (PoE) function.

The G48VA provides 48 GE interfaces and such functions as the data switching unit and PoE management unit. The G48VA has the following functions:

- Implementing data access and line-speed switching on GE electrical interfaces
- Providing data signals and DC power for the directly connected devices such as the IP phone, access point (AP) of the wireless local area network (WLAN), and Web camera

5.12.2 Function and Application

Function

The G48VA of the S9300 consists of the following functional units:

- Data switching unit: consists of the CPU, LAN switch, and physical layer (PHY).
- PoE management unit: consists of the CPU and the Dual Inline Memory Module (DIMM).

The functions of the G48VA are as follows:

- Implementing data access and line-speed switching on 48 GE electrical interfaces
- Providing the PoE function

Application

The G48VA can be installed in any LPU slot of the S9303, S9306 or S9312.

The G48VA can provide the PoE function only when the chassis supports the PoE function.

5.12.3 Panel

Figure 5-23 shows the appearance of the G48VA panel.

Figure 5-23 Appearance of the G48VA panel

- 1. Link/ACT indicators of the upper electrical interfaces
- 2. Link/ACT indicators of the lower electrical interfaces

Table 5-61 describes the buttons and indicators on the G48VA panel.

Table 5-61 Description of buttons and indicators on the G48VA panel

| Indicator/Button | Color | Meaning | | | | |
|------------------|--|--|--|--|--|--|
| RUN/ALM | Green | If the indicator is on, it indicates that the board is powered on but the software is not running. | | | | |
| | | If the indicator blinks once every 2s (0.5 Hz), it indicates that the system is in normal state. | | | | |
| | If the indicator blinks once every 0.25s it indicates that the system is being sta | | | | | |
| | Red | If the indicator is in red, it indicates that the board is faulty. | | | | |
| | Orange If the indicator is in orange, i the board is installed in the slo on. | | | | | |
| Link/ACT | Green | If the indicator is on, it indicates that the link is connected. | | | | |
| | | If the indicator blinks, it indicates that data is being transmitted. | | | | |

5.12.4 Interfaces

Table 5-62 describes the types and functions of the interfaces on the G48VA.

Table 5-62 Types and functions of the interfaces on the G48VA

| Name | Quantity | Description |
|--|----------|--|
| 10M/100M/1000M BASE-T electrical interface | 48 | The G48VA provides 48 Ethernet electrical interfaces (10M/100M/1000M auto sensing) to transmit and receive Ethernet services. |
| | | The G48VA provides the PoE function and can provide DC power for the directly connected devices such as the IP phone, WLAN AP, and Web camera. |

5.12.5 Interface Attributes

Table 5-63 Attributes of the 10M/100M/1000M Base-T Ethernet interface

| Attribute | Description |
|---------------------|--|
| Connector type | RJ45 |
| Compliance standard | IEEE 802.3z |
| Frame format | Ethernet_II, Ethernet_SAP, Ethernet_SNAP |
| Network protocol | IP |

5.12.6 Technical Specifications

Table 5-64 describes the technical specifications of the G48VA.

Table 5-64 Technical specifications of the G48VA

| Item | Specification |
|---|--|
| Board dimensions (depth x width x height) | 426.8 mm x 394.7 mm x 35.1 mm |
| Maximum power consumption | 64 W (excluding PoE power consumption) |
| Weight | 2.60 kg |
| Maximum output power | Interface: 37 W Board: 1776 W |
| Long-term temperature | 0°C to 45°C |

| Item | Specification |
|------------------------|---------------|
| Short-term temperature | -5°C to 55°C |

5.13 G48CEAT - 36-Port 10/100/1000BASE-T and 12-Port 100/1000BASE-X Interface Card(EA, RJ45/SFP)

This section describes the 36-Port 10/100/1000BASE-T and 12-Port 100/1000BASE-X Interface Card(EA,RJ45/SFP), including the appearance, functions and features, applicable devices, slots, panel, indicators, interfaces, and technical specifications.

5.13.1 Introduction

The 36-Port 10/100/1000BASE-T and 12-Port 100/1000BASE-X Interface Card(EA,RJ45/SFP) supported by the S9300 is called G48CEAT. The G48CEAT supports 32K MAC addresses.

5.13.2 Function and Application

Function

The G48CEAT provides 36-port 10M/100M/1000M Ethernet electrical interfaces and 12-port 100M/1000M Ethernet optical interfaces to implement data access and line-speed switching.

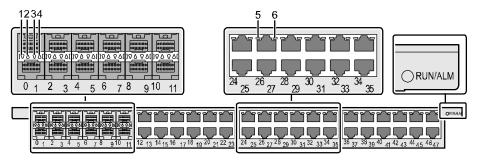
Application

The G48CEAT can be installed in any LPU slot of the S9312, S9306, and S9303.

5.13.3 Panel

Figure 5-24 shows the appearance of the G48CEAT panel.

Figure 5-24 Appearance of the G48CEAT panel



1. ACT indicator of the lower optical interfaces

2. ACT indicator of the upper optical interfaces

3. Link indicator of the lower optical interfaces

4. Link indicator of the upper optical interfaces

5. Link/ACT indicators of the upper electrical the lower electrical interfaces interfaces

Buttons and Indicators on the Panel

Table 5-65 describes the buttons and indicators on the G48CEAT panel.

Table 5-65 Description of buttons and indicators on the G48CEAT panel

| Indicator/Button | Color | Description | | | | |
|--------------------------------------|--------------|---|--|--|--|--|
| RUN/ALM | Green | If the indicator is on, it indicates that the board is powered on but the software is not running. | | | | |
| | | If the indicator blinks once every 2s (0.5 Hz), it indicates that the system is in normal state. | | | | |
| | | If the indicator blinks once every 0.25s (4 Hz), it indicates that the system is being powered on or being restarted. | | | | |
| | Red | If the indicator is on, it indicates that the board is faulty. | | | | |
| | Orange | If the indicator is on, it indicates that the board is installed in a slot and the CBUS is powered on. | | | | |
| ACT indicator of optical interfaces | Amber | If the indicator blinks, it indicates that data is being transmitted. | | | | |
| Link indicator of optical interfaces | Green-yellow | If the indicator is on, it indicates that the link is connected. | | | | |
| ACT/Link indicators of | Green | If the indicator blinks, it indicates that data is being transmitted. | | | | |
| electrical interfaces | | If the indicator is on, it indicates that the link is connected. | | | | |

5.13.4 Interfaces

Table 5-66 describes the types and functions of the interfaces on the G48CEAT.

Table 5-66 Types and functions of the interfaces on the G48CEAT

| Name Quantity | | Description | | | | |
|-------------------------------------|----|--|--|--|--|--|
| 100M/1000M BASE-X optical interface | 12 | The G48CEAT provides 12 100M/1000M optical interfaces to transmit and receive GE services. | | | | |

| Name | Quantity | Description |
|--|----------|---|
| 10M/100M/1000M BASE-T electrical interface | 36 | The G48CEAT provides 36 10M/100M/1000M electrical interfaces to transmit and receive GE services. |

5.13.5 Interface Attributes

The G48CEAT provides only data interfaces. An optical interface can be connected to an optical module.

Table 5-67 Interface attributes of the GE optical LPU (100M/1000M Base-SFP)

| Attribute | Description |
|-----------------------------|---|
| Connector type | LC/PC |
| Optical interface attribute | Depending on the SFP optical module. |
| Compliance standard | IEEE 802.3z |
| Frame format | Ethernet_II, Ethernet_SAP, or Ethernet_SNAP |
| Network protocol | IP |

Table 5-68 Attributes of the SFP optical module (100M/1000M bit/s)

| Attri bute | Description | | | | | | | |
|--------------------------------------|-------------------------------|-------------------------------|--|--|-------------------------|-------------------------|------------------------------|----------------------|
| Tran smiss ion dista nce | 500 m | 10 km | 10 km (single- mode bidirectional fiber) | | 40 km | 40 km | 80 km | 100 km |
| Cent er wave lengt h | 850 nm | 1310 nm | Tx: 1310 nm Rx: 1490 nm | Tx: 1490 nm Rx: 1310 nm | 1310 nm | 1550 nm | 1550 nm | 1550 nm |
| Tran smitt ing powe r | -9.5 dBm to -2.5 dBm | -9.0 dBm to -3.0 dBm | -9.0 dBm to -3.0 dBm | -9.0 dBm to -3.0 dBm | -5.0 dBm to 0 dBm | -5.0 dBm to 0 dBm | -2.0 dBm to 5.0 dBm | 0 dBm to 5 dBm |

| Attri bute | Description | | | | | | | |
|---------------------------------|----------------|--------------|--------------|--------------|-------------|-------------|--------------|--------------|
| Rece iver sensi tivity | -17.0 dBm | -20.0 dBm | -19.5 dBm | -19.5 dBm | -23 dBm | -22 dBm | -23.0 dBm | -30.0 dBm |
| Over load optic al powe r | 0 dBm | -3.0 dBm | -3.0 dBm | -3.0 dBm | -3.0 dBm | -3.0 dBm | -3.0 dBm | -9.0 dBm |
| Extin ction ratio | 9 dB | 9 dB | 6 dB | 6 dB | 9 dB | 8.5 dB | 9 dB | 8 dB |
| Fiber type | Multi- mode | Single-mode | | | | | | |

Table 5-69 Attributes of 100M/1000M colorized optical modules

| Attrib ute | Descrip | tion | | | | | | | |
|----------------------------------|------------|------------------|--|--|--|--|--|--|--|
| Transm ission distanc e | 80 km | 80 km | | | | | | | |
| Center wavele ngth | 1471 nm | | | | | | | | |
| Transm itting power | 0 dBm to | 0 dBm to 5.0 dBm | | | | | | | |
| Receiv er sensitiv ity | -28.0 dB | -28.0 dBm | | | | | | | |
| Overlo ad optical power | -9.0 dBm | | | | | | | | |
| Extinct ion ratio | 8.5 dB | | | | | | | | |

Table 5-70 Attributes of optical/electrical modules

| Attribute | Description |
|----------------------|---|
| Connector | RJ45 |
| Standards compliance | IEEE802.3z |
| Frame format | Ethernet_II, Ethernet_SAP, or Ethernet_SNAP |
| Network protocol | IP |

Table 5-71 Attributes of the 10M/100M/1000M Base-T Ethernet interface

| Attribute | Description |
|---------------------|--|
| Connector type | RJ45 |
| Compliance standard | IEEE 802.3z |
| Frame format | Ethernet_II, Ethernet_SAP, Ethernet_SNAP |
| Network protocol | IP |

5.13.6 Technical Specifications

Table 5-72 describes the technical specifications of the G48CEAT.

Table 5-72 Technical specifications of the G48CEAT

| Item | Specification |
|---|-------------------------------|
| Board dimensions (depth x width x height) | 426.8 mm x 394.7 mm x 35.1 mm |
| Power consumption | 62 W |
| Weight | 2.50 kg |
| Long-term temperature | 0°C to 45°C |
| Short-term temperature | -5°C to 55°C |

5.14 F48S - 48-Port 100BASE-FX Interface Card (SFP)

This section describes the 48-Port 100BASE-FX Interface Card (EA, SFP) and 48-Port 100BASE-FX Interface Card (EC, SFP), including the appearance, functions and features, panel, interface attributes, and technical specifications.

5.14.1 Introduction

The 48-port FE optical interface card (SFP) of the S9300 is called F48S for short. The F48S boards are classified into the following types: (EA, SFP) and (EC, SFP).

Table 5-73 provides the full name of the boards and capacities of the MAC address tables.

Table 5-73 Lists of F48S

| Full Name | Short Name | Capacity of MAC Address Table |
|---|------------|----------------------------------|
| 48-Port 100BASE-FX Interface Card (EA, SFP) | F48SA | 32K |
| 48-Port 100BASE-FX Interface Card (EC, SFP) | F48SC | 128K |

5.14.2 Function and Application

Function Description

The F48S provides 48 FE optical interfaces to implement data access and wire-speed switching.

Application

The F48S can be installed in any LPU slot on the S9312, S9306, or S9303.

5.14.3 Panel

Figure 5-25 shows the appearance of the F48S panel.

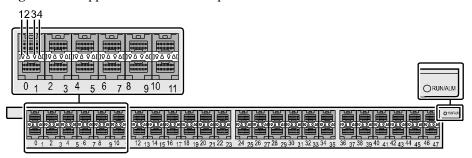


Figure 5-25 Appearance of the F48S panel

- 1. ACT indicators of the lower optical interfaces
- 2. ACT indicators of the upper optical interfaces
- 3. Link indicators of the lower optical interfaces
- 4. Link indicators of the upper optical interfaces

Table 5-74 describes the buttons and indicators on the F48S panel.

Table 5-74 Description of buttons and indicators on the F48S panel

| Indicator/Button | Color | Description |
|------------------|--------------|--|
| RUN/ALM | Green | If the indicator is on, it indicates that the LPU is powered on, but the software is not running. |
| | | If the indicator blinks every 2s (0.5 Hz), it indicates that the system is in normal state. |
| | | If the indicator blinks every 0.25s (4 Hz), it indicates that the system is starting. |
| | Red | If the indicator is in red, it indicates that the board is faulty. |
| | Orange | If the indicator is in orange, it indicates that the board is inserted in the subrack and is installed, and the board is powered on. |
| ACT | Amber | If the indicator blinks, the data is being transmitted or received. |
| LINK | Green-yellow | If the indicator is on, it indicates that the link is connected. |

5.14.4 Interfaces

Table 5-75 describes the types and functions of the interfaces on the F48S.

Table 5-75 Types and functions of the interfaces on the F48S

| Name | Quantity | Description |
|--------------------------------|----------|---|
| 100M BASE-FX optical interface | 48 | The F48S provides 48 Ethernet optical interfaces (100 Mbit/s) to transmit and receive 100 Mbit/s Ethernet services. |

5.14.5 Interface Attributes

The interface of the F48S has only the data interfaces. Each interface has an optical module. **Table 5-76** and **Table 5-77** show the attributes of the interface and the optical module.

Table 5-76 Interface attributes of the FE optical interface card (100M Base-SFP)

| Attribute | Description |
|-----------------------------|--|
| Connector type | LC/PC |
| Optical interface attribute | Depending on the SFP optical module. For details about the attributes of the optical module, see Table 5-77 . |
| Compliance standard | IEEE 802.3u |
| Frame format | Ethernet_II, Ethernet_SAP, or Ethernet_SNAP |
| Network protocol | IP |

Table 5-77 Attributes of the SFP optical module (100 Mbit/s)

| Attrib ute | Description | | | | | |
|--------------------------|------------------------------|-----------------------------|----------------------------------|----------------------------------|----------------------|----------------------|
| Transm ission distanc e | 2 km | 15 km | 15 km (singl bidirectional | | 40 km | 80 km |
| Center wavele ngth | 1310 nm | 1310 nm | Tx: 1310 nm Rx: 1550 nm | Tx: 1550 nm Rx: 1310 nm | 1310 nm | 1550 nm |
| Transm itting power | -19.0 dBm to -14.0 dBm | -15.0 dBm to -8.0 dBm | -15.0 dBm to -8.0 dBm | -15.0 dBm to -8.0 dBm | -5.0 dBm to 0 dBm | -5.0 dBm to 0 dBm |

| Attrib ute | Description | | | | | |
|----------------------------------|----------------|-------------|-----------|-----------|-----------|-----------|
| Receiv er sensitiv ity | -30.0 dBm | -31.0 dBm | -32.0 dBm | -32.0 dBm | -37.0 dBm | -37.0 dBm |
| Overlo ad optical power | -14.0 dBm | -8.0 dBm | -8.0 dBm | -8.0 dBm | -10.0 dBm | -10.0 dBm |
| Extincti on ratio | 10 dB | 8.2 dB | 8.5 dB | 8.5 dB | 10.5 dB | 10.5 dB |
| Fiber type | Multi- mode | Single-mode | | | | |

5.14.6 Technical Specifications

Table 5-78 describes the technical specifications of the F48S.

Table 5-78 Technical specifications of the F48S

| Item | Specification |
|---|----------------------------------|
| Board dimensions (depth x width x height) | 426.8 mm x 394.7 mm x 35.1 mm |
| Maximum power consumption | F48SA: 64 W F48SC: 76 W |
| Weight | F48SA: 2.54 kg F48SC: 2.66 kg |
| Long-term temperature | 0°C to 45°C |
| Short-term temperature | -5°C to 55°C |

5.15 F48T - 48-Port 10/100BASE-T Interface Card (RJ45)

This section describes the 48-Port 10/100BASE-T Interface Card (EA, RJ45), 48-Port 10/100BASE-T Interface Card (EC, RJ45) and 48-Port 10/100BASE-T Interface Card (FA, RJ45), including the appearance, functions and features, panel, and technical specifications.

5.15.1 Introduction

The 48-port FE electrical interface card (RJ45) of the S9300 is called F48T for short. The F48T boards are classified into the following types: (EA, RJ45), (EC, RJ45) and (FA, RJ45).

Table 5-79 provides the full name of the boards and capacities of the MAC address tables.

Table 5-79 Lists of F48T

| Full Name | Short Name | Capacity of MAC Address Table |
|--|------------|----------------------------------|
| 48-Port 10/100BASE-T Interface Card (EA, RJ45) | F48TA | 32K |
| 48-Port 10/100BASE-T Interface Card (EC, RJ45) | F48TC | 128K |
| 48-Port 10/100BASE-T Interface Card (FA, RJ45) | F48TFA | 32K |

Both the F48TA and F48TFA support 32K MAC addresses. The power consumption of the F48TFA is smaller than that of the F48TA.

5.15.2 Function and Application

Function Description

The F48T provides 48 FE electrical interfaces to implement data access and wire-speed switching.

Application

The F48T can be installed in any LPU slot on the S9312, S9306, or S9303.

5.15.3 Panel

Figure 5-26 shows the appearance of the F48T panel.

1 2 0 1 2 3 4 5 6 7 8 9 10 11 ORUNALM 0 1 2 3 4 5 6 7 8 9 10 11

Figure 5-26 Appearance of the F48T panel

- 1. Link/ACT indicators of the upper electrical interfaces
- 2. Link/ACT indicators of the lower electrical interfaces

Table 5-80 describes the buttons and indicators on the F48T panel.

Table 5-80 Description of buttons and indicators on the F48T panel

| Indicator/Button | Color | Description |
|------------------|--------|--|
| RUN/ALM | Green | If the indicator is on, it indicates that the LPU is powered on, but the software is not running. |
| | | If the indicator blinks every 2s (0.5 Hz), it indicates that the system is in normal state. |
| | | If the indicator blinks every 0.25s (4 Hz), it indicates that the system is starting. |
| | Red | If the indicator is in red, it indicates that the board is faulty. |
| | Orange | If the indicator is in orange, it indicates that the board is inserted in the subrack and is installed, and the board is powered on. |
| Link/ACT | Green | If the indicator is on, it indicates that the link is connected. |
| | | If the indicator blinks, the data is being transmitted or received. |

5.15.4 Interfaces

Table 5-81 describes the types and functions of the interfaces on the F48T.

Table 5-81 Types and functions of the interfaces on the F48T

| Name | Quantity | Description |
|--------------------------------------|----------|---|
| 10M/100M BASE-T electrical interface | 48 | The F48T provides 48 Ethernet electrical interfaces (10Mbit/s or 100 Mbit/s) to transmit and receive Ethernet services. |

5.15.5 Interface Attributes

Table 5-82 describes the attributes of the 100M Base-T Ethernet interface.

Table 5-82 Attributes of the 10M/100M Base-T Ethernet interface

| Attribute | Description |
|---------------------|---|
| Connector type | RJ45 |
| Compliance standard | IEEE 802.3 |
| Frame format | Ethernet_II, Ethernet_SAP, or Ethernet_SNAP |
| Network protocol | IP |

5.15.6 Technical Specifications

Table 5-83 describes the technical specifications of the F48T.

Table 5-83 Technical specifications of the F48T

| Item | Specification |
|---|---|
| Board dimensions (depth x width x height) | 426.8 mm x 394.7 mm x 35.1 mm |
| Maximum power consumption | F48TA: 59 W F48TC: 70 W F48TFA: 40 W |
| Weight | F48TA: 2.50 kg F48TC: 2.66 kg F48TFA: 2.30 kg |
| Long-term temperature | 0°C to 45°C |

| Item | Specification |
|------------------------|---------------|
| Short-term temperature | -5°C to 55°C |

5.16 X40SFC-40-Port 10GE Optical Interface Card (FC, SFP +)

This section describes the X40SFC-40-port 10GE optical interface card (FC, SFP+), including the functions and features, applicable device models and slots, panel, indicators, interface attributes, and technical specifications.

5.16.1 Introduction

The 40-port 10GE optical interface card (FC, SFP+) is called X40SFC for short. The X40SFC provides 40 high-density 10GE interfaces. It supports 128K MAC address entries.

5.16.2 Function and Application

Function

The X40SFC provides 40 10GE optical interfaces to implement data access and wire-speed switching.

Application

The X40SFC can be installed in any LPU slot of the S9312, S9306, and S9303.

5.16.3 Panel

Figure 5-27 shows the appearance of the X40SFC panel.

Figure 5-27 Appearance of the X40SFC panel

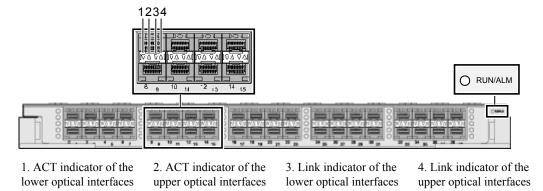


Table 5-84 describes the indicators on the X40SFC panel.

Table 5-84 Description of indicators on the X40SFC panel

| Indicator | Color | Description |
|-----------|--------------|--|
| RUN/ALM | Green | • If the indicator is on, it indicates that the board is powered on, but the software is not running. |
| | | If the indicator blinks once every 2s (0.5 Hz), it indicates that the system is in normal state. |
| | | If the indicator blinks once every 0.25s (4 Hz), it indicates the system is being powered on or being restarted. |
| | Red | If the indicator is on, it indicates that the board is faulty. |
| | Orange | If the indicator is in orange, it indicates that the board is installed in a slot and the CBUS is powered on. |
| ACT | Amber | If the indicator blinks, data is being transmitted or received. |
| Link | Green-yellow | If the indicator is on, it indicates that the link is connected. |

5.16.4 Interfaces

Table 5-85 describes the types and functions of the interfaces on the X40SFC.

Table 5-85 Types and functions of the interfaces on the X40SFC

| Name | Quantity | Description |
|------------------------------|----------|--|
| 10G BASE-X optical interface | 40 | The X40SFC provides forty 10 Gbit/s optical interfaces to transmit and receive Ethernet services at 10 Gbit/s. |

5.16.5 Interface Attributes

The X40SFC provides only data interfaces. An optical interface can be connected to an optical module. **Table 5-86** and **Table 5-87** describe the attributes of the optical interfaces and the optical modules on the X40SFC.

Table 5-86 Attributes of the 10G Base-SFP Ethernet optical interface

| Attribute | Description |
|-----------------------------|---|
| Connector type | LC/PC |
| Optical interface attribute | Depending on the SFP+ optical module. For details about the attributes of the optical module, see Table 5-87 . |
| Standards compliance | IEEE 802.3ae |
| Frame format | Ethernet_II, Ethernet_SAP, Ethernet_SNAP |
| Network protocol | IP |

Table 5-87 Attributes of the SFP+ optical module (10 Gbit/s)

| Attribute | Description | | |
|------------------------|-------------------------|----------------------|---------------------|
| Transmission distance | 220 m | 300 m | 10 km |
| Center wavelength | 1310 nm | 850 nm | 1310 nm |
| Transmitting power | -6.5 dBm to -0.5 dBm | -7.3 dBm to -1.0 dBm | -8.2 dBm to 0.5 dBm |
| Receiver sensitivity | -6.5 dBm | -11.1 dBm | -12.6 dBm |
| Overload optical power | 1.5 dBm | -1.0 dBm | 0.5 dBm |
| Extinction ratio | 3.5 dB | 3 dB | 3.5 dB |
| Fiber type | OM1/OM2, multi- mode | OM3, multi-mode | Single-mode |

5.16.6 Technical Specifications

Table 5-88 describes the technical specifications of the X40SFC.

Table 5-88 Technical specifications of the X40SFC

| Item | Specification |
|-------------------------------------|-------------------------------|
| Dimensions (depth x width x height) | 426.8 mm x 394.7 mm x 35.1 mm |

| Item | Specification |
|---------------------------|---------------|
| Maximum power consumption | 183 W |
| Weight | 2.90 kg |
| Long-term temperature | 0°C to 45°C |
| Short-term temperature | -5°C to 45°C |

5.17 X16SFC-16-Port 10GE Optical Interface Card (FC, SFP +)

This section describes the X16SFC-16-port 10GE optical interface card (FC, SFP+), including the functions and features, applicable device models and slots, panel, indicators, interface attributes, and technical specifications.

5.17.1 Introduction

The 16-port 10GE optical interface card (FC, SFP+) is called X16SFC for short. The X16SFC provides 16 high-density 10GE interfaces. It supports 128K MAC address entries.

5.17.2 Function and Application

Function

The X16SFC provides 16 10GE optical interfaces to implement data access and wire-speed switching.

Application

The X16SFC can be installed in any LPU slot of the S9312, S9306, and S9303.

M NOTE

The X16SFC is only used in V100R006C00SPC800 and later versions.

5.17.3 Panel

Figure 5-28 shows the appearance of the X16SFC panel.

1. ACT indicator of the lower optical interfaces

2. ACT indicator of the upper optical interfaces

3. Link indicator of the lower optical interfaces

4. Link indicator of the upper optical interfaces

Figure 5-28 Appearance of the X16SFC panel

Table 5-89 describes the indicators on the X16SFC panel.

Table 5-89 Description of indicators on the X16SFC panel

| Indicator | Color | Description |
|-----------|--------------|--|
| RUN/ALM | Green | • If the indicator is on, it indicates that the board is powered on, but the software is not running. |
| | | • If the indicator blinks once every 2s (0.5 Hz), it indicates that the system is in normal state. |
| | | • If the indicator blinks once every 0.25s (4 Hz), it indicates the system is being powered on or being restarted. |
| | Red | If the indicator is on, it indicates that the board is faulty. |
| | Orange | If the indicator is in orange, it indicates that the board is installed in a slot and the CBUS is powered on. |
| ACT | Amber | If the indicator blinks, data is being transmitted or received. |
| Link | Green-yellow | If the indicator is on, it indicates that the link is connected. |

5.17.4 Interfaces

Table 5-90 describes the types and functions of the interfaces on the X16SFC.

Table 5-90 Types and functions of the interfaces on the X16SFC

| Name | Quantity | Description |
|------------------------------|----------|--|
| 10G BASE-X optical interface | 16 | The X16SFC provides sixteen 10 Gbit/s optical interfaces to transmit and receive Ethernet services at 10 Gbit/s. |

5.17.5 Interface Attributes

The X16SFC provides only data interfaces. An optical interface can be connected to an optical module. **Table 5-91** and **Table 5-92** describe the attributes of the optical interfaces and the optical modules on the X16SFC.

Table 5-91 Attributes of the 10G Base-SFP Ethernet optical interface

| Attribute | Description |
|-----------------------------|---|
| Connector type | LC/PC |
| Optical interface attribute | Depending on the SFP+ optical module. For details about the attributes of the optical module, see Table 5-92 . |
| Standards compliance | IEEE 802.3ae |
| Frame format | Ethernet_II, Ethernet_SAP, Ethernet_SNAP |
| Network protocol | IP |

Table 5-92 Attributes of the SFP+ optical module (10 Gbit/s)

| Attribute | Description | | |
|------------------------|----------------------|----------------------|---------------------|
| Transmission distance | 220 m | 300 m | 10 km |
| Center wavelength | 1310 nm | 850 nm | 1310 nm |
| Transmitting power | -6.5 dBm to -0.5 dBm | -7.3 dBm to -1.0 dBm | -8.2 dBm to 0.5 dBm |
| Receiver sensitivity | -6.5 dBm | -11.1 dBm | -12.6 dBm |
| Overload optical power | 1.5 dBm | -1.0 dBm | 0.5 dBm |
| Extinction ratio | 3.5 dB | 3 dB | 3.5 dB |

| Attribute | Description | | | | |
|------------|-------------------------|-----------------|-------------|--|--|
| Fiber type | OM1/OM2, multi- mode | OM3, multi-mode | Single-mode | | |

5.17.6 Technical Specifications

Table 5-93 describes the technical specifications of the X16SFC.

Table 5-93 Technical specifications of the X16SFC

| Item | Specification |
|-------------------------------------|-------------------------------|
| Dimensions (depth x width x height) | 426.8 mm x 394.7 mm x 35.1 mm |
| Maximum power consumption | 150 W |
| Weight | 2.60 kg |
| Long-term temperature | 0°C to 45°C |
| Short-term temperature | -5°C to 45°C |

5.18 G24CA - 24-Port 100/1000BASE-X and 8-Port 10/100/1000BASE-T Interface Card (SFP/RJ45)

This section describes the 24-Port 100/1000BASE-X and 8-Port 10/100/1000BASE-T Interface Card (SA, SFP/RJ45), including the appearance, functions and features, panel, interface attributes, and technical specifications.

5.18.1 Introduction

The 24-Port 100/1000BASE-X and 8-Port 10/100/1000BASE-T Combo Interface Card (SA, SFP/RJ45) is called G24CA for short. This board provides 8 electrical interfaces and 24 optical interfaces. Among the 24 optical interfaces, the first eight optical interfaces and all the electrical interfaces form eight Combo interfaces.

5.18.2 Function and Application

Function Description

The G24CA provides 16 GE optical interfaces and 8 combo interfaces. The combo interfaces can function as either optical interfaces or electrical interfaces.

By default, a combo interface works in the auto mode. In the auto mode, if the electrical interface is connected to a network cable first, the combo interface works as an electrical interface to transmit data; if the optical interface is connected to a fiber first, the combo interface works as an optical interface to transmit data.

□ NOTE

On the G24CA, at most 24 interfaces, including the GE interfaces and combo interfaces, can work at the same time.

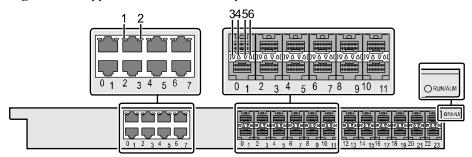
Application

G24CA can be installed in any LPU slot on the S9312, S9306, or S9303.

5.18.3 Panel

Figure 5-29 shows the appearance of the G24CA panel.

Figure 5-29 Appearance of the G24CA panel



- 1. Link/ACT indicators of the upper 2. Link/ACT indicators of the lower 3. ACT indicators of the lower electrical interfaces electrical interfaces optical interfaces
- 4. ACT indicators of the upper optical interfaces
- 5. Link indicators of the lower optical interfaces
- 6. Link indicators of the upper optical interfaces

Buttons and Indicators on the Panel

Table 5-94 describes the buttons and indicators on the G24CA panel.

Table 5-94 Description of buttons and indicators on the G24CA panel

| Indicator/Button | Color | Description |
|------------------|-------|---|
| RUN/ALM | Green | If the indicator is on, it indicates that the LPU is powered on, but the software is not running. |
| | | If the indicator blinks 2s (0.5 Hz), it indicates that the system is running normally. |
| | | If the indicator blinks every 0.25s (4 Hz), it indicates that the system is starting. |

| Indicator/Button | Color | Description |
|------------------|--------------|---|
| | Red | If the indicator is in red, it indicates that the LPU is faulty. |
| | Orange | If the indicator is in orange, it indicates that the LPU is installed, and the board is powered on. |
| ACT | Amber | If the indicator blinks, the data is being transmitted or received. |
| LINK | Green-yellow | If the indicator is on, it indicates that the link is connected. |
| Link/ACT | Green | If the indicator is on, it indicates that the link is connected. |
| | | If the indicator blinks, the data is being transmitted or received. |

5.18.4 Interfaces

Table 5-95 describes the types and functions of the interfaces on the G24CA.

Table 5-95 Types and functions of the interfaces on the G24CA

| Name | Quantity | Description |
|---------------------------------------|----------|--|
| 100/1000M BASE-T electrical interface | 8 | The G24CA provides 8 Ethernet electrical interfaces (100M/1000M auto sensing) to transmit and receive 1000 Mbit/s Ethernet services. |
| 100/1000M BASE-X optical interface | 24 | The G24CA provides 24 Ethernet optical interfaces (100M/1000M auto sensing) to transmit and receive 1000 Mbit/s Ethernet services. |

□ NOTE

A Combo interface works as either an optical interface or an electrical interface. You can run the **comboport** $\{$ **auto** | **copper** | **fiber** $\}$ command to set the mode of the Combo interface.

5.18.5 Interface Attributes

The G24CA provides only data interfaces. Each optical interface uses an optical module.

Table 5-96 Interface attributes of the GE optical LPU (100M/1000M Base-SFP)

| Attribute | Description |
|-----------------------------|---|
| Connector type | LC/PC |
| Optical interface attribute | Depending on the SFP optical module. |
| Compliance standard | IEEE 802.3z |
| Frame format | Ethernet_II, Ethernet_SAP, or Ethernet_SNAP |
| Network protocol | IP |

Table 5-97 Attributes of the SFP optical module (100M/1000M bit/s)

| Attri bute | Descript | Description | | | | | | |
|--------------------------------------|-------------------------------|-------------------------------|--|--|-------------------------|-------------------------|------------------------------|----------------------|
| Tran smiss ion dista nce | 500 m | 10 km | 10 km (single- mode bidirectional fiber) | | 40 km | 40 km | 80 km | 100 km |
| Cent er wave lengt h | 850 nm | 1310 nm | Tx: 1310 nm Rx: 1490 nm | Tx: 1490 nm Rx: 1310 nm | 1310 nm | 1550 nm | 1550 nm | 1550 nm |
| Tran smitt ing powe r | -9.5 dBm to -2.5 dBm | -9.0 dBm to -3.0 dBm | -9.0 dBm to -3.0 dBm | -9.0 dBm to -3.0 dBm | -5.0 dBm to 0 dBm | -5.0 dBm to 0 dBm | -2.0 dBm to 5.0 dBm | 0 dBm to 5 dBm |
| Rece iver sensi tivity | -17.0 dBm | -20.0 dBm | -19.5 dBm | -19.5 dBm | -23 dBm | -22 dBm | -23.0 dBm | -30.0 dBm |
| Over load optic al powe r | 0 dBm | -3.0 dBm | -3.0 dBm | -3.0 dBm | -3.0 dBm | -3.0 dBm | -3.0 dBm | -9.0 dBm |

| Attri bute | Descript | Description | | | | | | |
|-------------------|----------------|-------------|------|------|------|--------|------|------|
| Extin ction ratio | 9 dB | 9 dB | 6 dB | 6 dB | 9 dB | 8.5 dB | 9 dB | 8 dB |
| Fiber type | Multi- mode | Single-mo | ode | | | | | |

Table 5-98 Attributes of 100M/1000M colorized optical modules

| Attrib ute | Descrip | tion | | | | | | |
|----------------------------------|------------|------------------|------------|------------|------------|------------|------------|------------|
| Transm ission distanc e | 80 km | | | | | | | |
| Center wavele ngth | 1471 nm | 1491 nm | 1511 nm | 1531 nm | 1551 nm | 1571 nm | 1591 nm | 1611 nm |
| Transm itting power | 0 dBm to | 0 dBm to 5.0 dBm | | | | | | |
| Receiv er sensitiv ity | -28.0 dB | -28.0 dBm | | | | | | |
| Overlo ad optical power | -9.0 dBm | 1 | | | | | | |
| Extinct ion ratio | 8.5 dB | | | | | | | |

 Table 5-99 Attributes of optical/electrical modules

| Attribute | Description |
|----------------------|---|
| Connector | RJ45 |
| Standards compliance | IEEE802.3z |
| Frame format | Ethernet_II, Ethernet_SAP, or Ethernet_SNAP |

| Attribute | Description |
|------------------|-------------|
| Network protocol | IP |

Table 5-100 Attributes of the 10M/100M/1000M Base-T Ethernet interface

| Attribute | Description | |
|---------------------|--|--|
| Connector type | RJ45 | |
| Compliance standard | IEEE 802.3z | |
| Frame format | Ethernet_II, Ethernet_SAP, Ethernet_SNAP | |
| Network protocol | IP | |

5.18.6 Technical Specifications

Table 5-101 describes the technical specifications of the G24CA.

Table 5-101 Technical specifications of the G24CA

| Item | Specification |
|---|-------------------------------|
| Board dimensions (depth x width x height) | 426.8 mm x 394.7 mm x 35.1 mm |
| Maximum power consumption | 67 W |
| Weight | 2.26 kg |
| Long-term temperature | 0°C to 45°C |
| Short-term temperature | -5°C to 55°C |

5.19 G24CEAS - 24-Port 100/1000BASE-X and 8-Port 10/100/1000BASE-T Combo Interface Card(EA,SFP/RJ45,1588)

This section describes the 24-Port 100/1000BASE-X and 8-Port 10/100/1000BASE-T Combo Interface Card(EA,SFP/RJ45,1588), including the appearance, functions and features, applicable device (S9303, S9306, or S9312), slot, panel, indicators, interfaces, and technical specifications.

5.19.1 Introduction

The 24-Port 100/1000BASE-X and 8-Port 10/100/1000BASE-T Combo Interface Card (EA,SFP/RJ45,1588) is called G24CEAS for short. The G24CEAS provides 8 electrical interfaces and 24 optical interfaces. Among the 24 optical interfaces, there are eight Combo interfaces.

5.19.2 Function and Application

Function Description

The G24CEAS provides 16 GE optical interfaces and 8 combo interfaces. The combo interfaces can function as either optical interfaces or electrical interfaces. All these interfaces implement line-speed switching and support Ethernet clock synchronization and IEEE 1588 time synchronization. When the combo interfaces are functioned as electrical interfaces, Ethernet clock synchronization and IEEE 1588 time synchronization cannot be configured on these electrical interfaces.

This board implements 16-channel line-speed switching on GE optical interfaces and 8-channel line-speed switching on GE combo interfaces. The combo interface can work in optical or electrical mode. The 100 Mbit/s optical/electrical interfaces and GE optical interfaces of the G24CEAS support the Ethernet synchronization and 1588 clock synchronization functions. When the combo interface works as a GE electrical interface, it supports 1588 clock synchronization, but does not support Ethernet synchronization.

By default, a combo interface works in the auto mode. In the auto mode, if the electrical interface is connected to a network cable first, the combo interface works as an electrical interface to transmit data; if the optical interface is connected to a fiber first, the combo interface works as an optical interface to transmit data.

On the G24CEAS, at most 24 interfaces, including the GE optical interfaces and Combo interfaces, can work at the same time.

Application

The G24CEAS can be installed in any LPU slot of the S9312, S9306 and S9303.

5.19.3 Panel

Figure 5-30 shows the appearance of the G24CEAS panel.

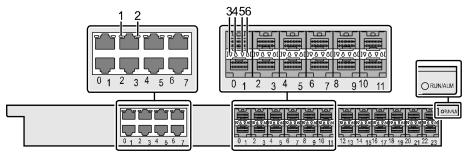


Figure 5-30 Appearance of the G24CEAS panel

- 1. Link/ACT indicators of the upper 2. Link/ACT indicators of the lower 3. ACT indicators of the lower electrical interfaces electrical interfaces optical interfaces
- 4. ACT indicators of the upper optical interfaces
- 5. Link indicators of the lower optical interfaces
- 6. Link indicators of the upper optical interfaces

Table 5-102 describes the buttons and indicators on the G24CEAS panel.

Table 5-102 Description of buttons and indicators on the G24CEAS panel

| Indicator/Button | Color | Description | | |
|-------------------|--------|--|--|--|
| RUN/ALM | Green | If the indicator is on, it indicates that the board is powered on but the software is not running. | | |
| | | If the indicator blinks once every 2s (0.5 Hz), it indicates that the system is in normal state. | | |
| | | If the indicator blinks once every 0.25s (4 Hz), it indicates that the system is being started. | | |
| | Red | If the indicator is on, it indicates that the boar is faulty. | | |
| | Orange | If the indicator is on, it indicates that the board is installed in the slot and is powered on. | | |
| ACT | Amber | If the indicator blinks, it indicates that data is being transmitted. | | |
| LINK Green-yellow | | If the indicator is on, it indicates that the link is connected. | | |
| LINK/ACT Green | | If the indicator is on, it indicates that the link is connected. | | |
| | | If the indicator blinks, it indicates that data is being transmitted. | | |

5.19.4 Interfaces

Table 5-103 describes the types and functions of the interfaces on the G24CEAS.

Table 5-103 Types and functions of the interfaces on the G24CEAS

| Name | Quantity | Description |
|--|----------|--|
| 10M/100M/1000M BASE-T electrical interface | 8 | The G24CEAS provides 8 Ethernet electrical interfaces (10M/100M/1000M auto sensing) to transmit and receive 1000 Mbit/s Ethernet services. |
| 100M/1000M BASE- X optical interface | 24 | The G24CEAS provides 24 Ethernet optical interfaces (100M/1000M auto sensing) to transmit and receive 1000 Mbit/s Ethernet services. |

□ NOTE

A Combo interface works as either an optical interface or an electrical interface. You can run the **comboport** { **auto** | **copper** | **fiber** } command to set the mode of the Combo interface.

5.19.5 Interface Attributes

The G24CEAS provides only data interfaces. Each optical interface uses an optical module.

Table 5-104 Interface attributes of the GE optical LPU (100M/1000M Base-SFP)

| Attribute | Description |
|-----------------------------|---|
| Connector type | LC/PC |
| Optical interface attribute | Depending on the SFP optical module. |
| Compliance standard | IEEE 802.3z |
| Frame format | Ethernet_II, Ethernet_SAP, or Ethernet_SNAP |
| Network protocol | IP |

Table 5-105 Attributes of the SFP optical module (100M/1000M bit/s)

| Attri bute | Description | | | | | | |
|--------------------------------------|-------------|-------|--|-------|-------|-------|--------|
| Tran smiss ion dista nce | 500 m | 10 km | 10 km (single- mode bidirectional fiber) | 40 km | 40 km | 80 km | 100 km |

| Attri bute | Descript | Description | | | | | | |
|-----------------------------------|-------------------------------|-------------------------------|--|--|-------------------------|-------------------------|------------------------------|----------------------|
| Cent er wave lengt h | 850 nm | 1310 nm | Tx: 1310 nm Rx: 1490 nm | Tx: 1490 nm Rx: 1310 nm | 1310 nm | 1550 nm | 1550 nm | 1550 nm |
| Tran smitt ing powe r | -9.5 dBm to -2.5 dBm | -9.0 dBm to -3.0 dBm | -9.0 dBm to -3.0 dBm | -9.0 dBm to -3.0 dBm | -5.0 dBm to 0 dBm | -5.0 dBm to 0 dBm | -2.0 dBm to 5.0 dBm | 0 dBm to 5 dBm |
| Rece iver sensi tivity | -17.0 dBm | -20.0 dBm | -19.5 dBm | -19.5 dBm | -23 dBm | -22 dBm | -23.0 dBm | -30.0 dBm |
| Over load optic al powe r | 0 dBm | -3.0 dBm | -3.0 dBm | -3.0 dBm | -3.0 dBm | -3.0 dBm | -3.0 dBm | -9.0 dBm |
| Extin ction ratio | 9 dB | 9 dB | 6 dB | 6 dB | 9 dB | 8.5 dB | 9 dB | 8 dB |
| Fiber type | Multi- mode | Single-m | ode | | | | | |

Table 5-106 Attributes of 100M/1000M colorized optical modules

| Attrib ute | Descrip | tion | | | | | | |
|--------------------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Transm ission distanc e | 80 km | | | | | | | |
| Center wavele ngth | 1471 nm | 1491 nm | 1511 nm | 1531 nm | 1551 nm | 1571 nm | 1591 nm | 1611 nm |
| Transm itting power | 0 dBm to | 5.0 dBm | | | | | • | |

| Attrib ute | Description |
|----------------------------------|-------------|
| Receiv er sensitiv ity | -28.0 dBm |
| Overlo ad optical power | -9.0 dBm |
| Extinct ion ratio | 8.5 dB |

Table 5-107 Attributes of optical/electrical modules

| Attribute | Description |
|----------------------|---|
| Connector | RJ45 |
| Standards compliance | IEEE802.3z |
| Frame format | Ethernet_II, Ethernet_SAP, or Ethernet_SNAP |
| Network protocol | IP |

Table 5-108 Attributes of the 10M/100M/1000M Base-T Ethernet interface

| Attribute | Description |
|---------------------|--|
| Connector type | RJ45 |
| Compliance standard | IEEE 802.3z |
| Frame format | Ethernet_II, Ethernet_SAP, Ethernet_SNAP |
| Network protocol | IP |

5.19.6 Technical Specifications

Table 5-109 describes the technical specifications of the G24CEAS.

Table 5-109 Technical specifications of the G24CEAS

| Item | Specification |
|---|-------------------------------|
| Board dimensions (depth x width x height) | 426.8 mm x 394.7 mm x 35.1 mm |
| Maximum power consumption | 75 W |
| Weight | 2.7 kg |
| Long-term temperature | 0°C to 45°C |
| Short-term temperature | -5°C to 55°C |

5.20 S24X - 24-Port 100/1000BASE-X and 2-Port 10GBASE-X Interface Card(SFP/XFP)

This section describes the 24-Port 100/1000BASE-X and 2-Port 10GBASE-X Interface Card (SFP/XFP), including the appearance, functions and features, panel, interface attributes, and technical specifications.

5.20.1 Introduction

The S9300 supports S24X cards, including the S24XA-24-Port 100/1000BASE-X and 2-Port 10GBASE-X Interface Card(EA,SFP/XFP), and the S24XC-24-Port 100/1000BASE-X and 2-Port 10GBASE-X Interface Card(EC,SFP/XFP).

Table 5-110 provides the full name of the boards and capacities of the MAC address tables.

Table 5-110 S24X card list

| Card Name | Short Name | Supported MAC Addresses |
|--|------------|-------------------------|
| S24XA-24-Port 100/1000BASE-X and 2- Port 10GBASE-X Interface Card(EA,SFP/XFP) | S24XA | 32K |
| S24XA-24-Port 100/1000BASE-X and 2- Port 10GBASE-X Interface Card(EC,SFP/XFP) | S24XC | 128K |

M NOTE

Note: The appearances of S24XA and S24XC are the same.

5.20.2 Function and Application

Function

The S24X provides 24 GE optical interfaces and two 10GE optical interfaces to implement data access and line-speed switching.

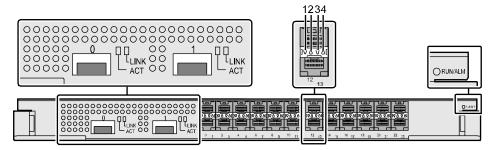
Application

The S24X can be installed in any LPU slot of the S9312, S9306, and S9303.

5.20.3 Panel

Figure 5-31 shows the appearance of the S24XA panel.





- 1. ACT indicators of the lower optical interfaces
- 2. ACT indicators of the upper optical interfaces
- 3. Link indicators of the lower optical interfaces
- 4. Link indicators of the upper optical interfaces

Buttons and Indicators on the Panel

Table 5-111 describes the buttons and indicators on the S24XA panel.

Table 5-111 Description of buttons and indicators on the S24X panel

| Indicator/Button | Color | Meaning |
|------------------|-------|---|
| RUN/ALM | Green | If the indicator is on, it indicates that the board is powered on but the software is not running. |
| | | If the indicator blinks once every 2s (0.5 Hz), it indicates that the system is in normal state. |
| | | If the indicator blinks once every 0.25s (4 Hz), it indicates that the system is being powered on or being restarted. |
| | Red | If the indicator is in red, it indicates that the board is faulty. |

| Indicator/Button | Color | Meaning |
|------------------|--------------|---|
| | Orange | If the indicator is in orange, it indicates that the board is installed in the slot and the CBUS is powered on. |
| ACT | Amber | If the indicator blinks, it indicates that data is being transmitted. |
| LINk | Green-yellow | If the indicator is on, it indicates that the link is connected. |

5.20.4 Interfaces

Table 5-112 describes the types and functions of the interfaces on the S24X.

Table 5-112 Types and functions of the interfaces on the S24X

| Name | Quantity | Description |
|-------------------------------------|----------|--|
| 100M/1000M BASE-X optical interface | 24 | The S24X provides 24 Ethernet optical interfaces (100M/1000M auto sensing) to transmit and receive Ethernet services at 1000 Mbit/s. |
| 10G BASE-X optical interface | 2 | The S24X provides two 10GE optical interfaces to transmit and receive Ethernet services at 10 Gbit/s. |

5.20.5 Interface Attributes

The S24X provides only data interfaces. Each interface has an optical module. The S24X provides GE optical interfaces and 10GE optical interfaces.

• The attributes of the GE interfaces and the connected optical modules.

Table 5-113 Interface attributes of the GE optical LPU (100M/1000M Base-SFP)

| Attribute | Description | |
|-----------------------------|---|--|
| Connector type | LC/PC | |
| Optical interface attribute | Depending on the SFP optical module. | |
| Compliance standard | IEEE 802.3z | |
| Frame format | Ethernet_II, Ethernet_SAP, or Ethernet_SNAP | |

| Attribute | Description |
|---------------------|-------------|
| Network protocol | IP |

Table 5-114 Attributes of the SFP optical module (100M/1000M bit/s)

| Attr ibut e | Descrip | tion | | | | | | |
|--------------------------------------|-------------------------------|-------------------------------|---|--|-------------------------|-------------------------|------------------------------|----------------------|
| Tran smis sion dista nce | 500 m | 10 km | 10 km (s mode bidirection fiber) | _ | 40 km | 40 km | 80 km | 100 km |
| Cent er wav elen gth | 850 nm | 1310 nm | Tx: 1310 nm Rx: 1490 nm | Tx: 1490 nm Rx: 1310 nm | 1310 nm | 1550 nm | 1550 nm | 1550 nm |
| Tran smitt ing pow er | -9.5 dBm to -2.5 dBm | -9.0 dBm to -3.0 dBm | -9.0 dBm to -3.0 dBm | -9.0 dBm to -3.0 dBm | -5.0 dBm to 0 dBm | -5.0 dBm to 0 dBm | -2.0 dBm to 5.0 dBm | 0 dBm to 5 dBm |
| Rece iver sensi tivit y | -17.0 dBm | -20.0 dBm | -19.5 dBm | -19.5 dBm | -23 dBm | -22 dBm | -23.0 dBm | -30.0 dBm |
| Over load optic al pow er | 0 dBm | -3.0 dBm | -3.0 dBm | -3.0 dBm | -3.0 dBm | -3.0 dBm | -3.0 dBm | -9.0 dBm |
| Exti nctio n ratio | 9 dB | 9 dB | 6 dB | 6 dB | 9 dB | 8.5 dB | 9 dB | 8 dB |
| Fibe r type | Multi- mode | Single-m | node | | | | | |

Table 5-115 Attributes of 100M/1000M colorized optical modules

| Attrib ute | Descrip | otion | | | | | | |
|--------------------------------------|------------------|------------|------------|------------|------------|------------|------------|------------|
| Trans missio n distanc e | 80 km | | | | | | | |
| Center wavele ngth | 1471 nm | 1491 nm | 1511 nm | 1531 nm | 1551 nm | 1571 nm | 1591 nm | 1611 nm |
| Trans mittin g power | 0 dBm to 5.0 dBm | | | | | | | |
| Receiv er sensiti vity | -28.0 dBm | | | | | | | |
| Overlo ad optical power | -9.0 dBm | | | | | | | |
| Extinc tion ratio | 8.5 dB | | | | | | | |

Table 5-116 Attributes of optical/electrical modules

| Attribute | Description |
|----------------------|---|
| Connector | RJ45 |
| Standards compliance | IEEE802.3z |
| Frame format | Ethernet_II, Ethernet_SAP, or Ethernet_SNAP |
| Network protocol | IP |

• The attributes of the 10GE interfaces and the connected optical modules.

Table 5-117 Interface attributes of the optical interface card (10G Base-XFP)

| Attribute | Description |
|-----------------------------|---|
| Connector type | LC/PC |
| Optical interface attribute | Depending on the SFP optical module. For details about the attributes of the optical module, see Table 5-118 . |
| Compliance standard | IEEE 802.3ae |
| Frame format | Ethernet_II, Ethernet_SAP, or Ethernet_SNAP |
| Network protocol | IP |

Table 5-118 Attributes of the XFP optical module (10 Gbit/s)

| Attribute | Description | | | | |
|------------------------------|----------------------|----------------------|---------------------|----------------|--|
| Transmissi on distance | 300 m | 10 km | 40 km | 80 km | |
| Center wavelength | 850 nm | 1310 nm | 1550 nm | 1550 nm | |
| Transmitti ng power | -7.3 dBm to -1.3 dBm | -6.0 dBm to -1.0 dBm | -1.0 dBm to 2.0 dBm | 0 dBm to 4 dBm | |
| Receiver sensitivity | -7.5 dBm | -11.0 dBm | -15.0 dBm | -24.0 dBm | |
| Overload optical power | -1.0 dBm | 0.5 dBm | -1.0 dBm | -7.0 dBm | |
| Extinction ratio | 3.0 dB | 6.0 dB | 8.2 dB | 9.0 dB | |
| Fiber type | Multi-mode | Single-mode | | | |

5.20.6 Technical Specifications

Table 5-119 describes the technical specifications of the S24X.

Table 5-119 Technical specifications of the S24X

| Parameter | Description |
|---|-------------------------------|
| Board dimensions (depth x width x height) | 426.8 mm x 394.7 mm x 35.1 mm |

| Parameter | Description |
|------------------------|--|
| Power consumption | S24XA: 65 WS24XC: 81 W |
| Weight | S24XA: 2.4 kg S24XC: 2.5 kg |
| Long-term temperature | 0°C to 45°C |
| Short-term temperature | -5°C to 55°C |

5.21 T24XA - 24-Port 10/100/1000BASE-T and 2-Port 10GBASE-X Interface Card(EA,RJ45/XFP)

This section describes the 24-Port 10/100/1000BASE-T and 2-Port 10GBASE-X Interface Card (EA,RJ45/XFP), including the appearance, functions and features, panel, interface attributes, and technical specifications.

5.21.1 Introduction

The 24-Port 10/100/1000BASE-T and 2-Port 10GBASE-X Interface Card(EA,RJ45/XFP) is called T24XA for short. The T24XA provides 24 GE electrical interfaces and two 10GE optical interfaces.

5.21.2 Function and Application

Function

The T24XA provides 24 GE electrical interfaces and two 10GE optical interfaces to implement data access and line-speed switching.

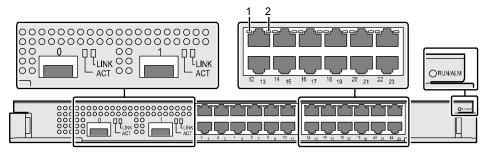
Application

The T24XA can be installed in any LPU slot of the S9312, S9306, and S9303.

5.21.3 Panel

Figure 5-32 shows the appearance of the S24XA panel.

Figure 5-32 Appearance of the T24XA panel



1. Link/ACT indicators of the upper electrical interfaces

2. Link/ACT indicators of the lower electrical interfaces

Buttons and Indicators on the Panel

Table 5-120 describes the buttons and indicators on the T24XA panel.

Table 5-120 Description of buttons and indicators on the T24XA panel

| Indicator/Button | Color | Meaning |
|------------------|--------------|---|
| RUN/ALM | Green | If the indicator is on, it indicates that the board is powered on but the software is not running. |
| | | If the indicator blinks once every 2s (0.5 Hz), it indicates that the system is in normal state. |
| | | If the indicator blinks once every 0.25s (4 Hz), it indicates that the system is being powered on or being restarted. |
| | Red | If the indicator is in red, it indicates that the board is faulty. |
| | Orange | If the indicator is in orange, it indicates that the board is installed in the slot and the CBUS is powered on. |
| ACT | Amber | If the indicator blinks, it indicates that data is being transmitted. |
| LINk | Green-yellow | If the indicator is on, it indicates that the link is connected. |
| Link/ACT | Green | If the indicator is on, it indicates that the link is connected. |
| | | If the indicator blinks, it indicates that data is being transmitted. |

5.21.4 Interfaces

Table 5-121 describes the types and functions of the interfaces on the T24XA.

Table 5-121 Types and functions of the interfaces on the T24XA

| Name | Quantity | Description |
|--|----------|--|
| 10M/100M/1000M BASE-X electrical interface | 24 | The T24XA provides 24 Ethernet electrical interfaces (10M/100M/1000M auto sensing) to transmit and receive Ethernet services at 1000 Mbit/s. |
| 10G BASE-X optical interface | 2 | The T24XA provides two 10GE optical interfaces to transmit and receive Ethernet services at 10 Gbit/s. |

5.21.5 Interface Attributes

The T24XA provides only data interfaces. Each interface has an optical module. The T24XA provides GE electrical interfaces and 10GE optical interfaces.

• Table 5-122 lists the attributes of the 10M/100M/1000M Base-T electrical interface.

Table 5-122 Attributes of the 10M/100M/1000M Base-T Ethernet interface

| Attribute | Description |
|---------------------|---|
| Connector type | RJ45 |
| Compliance standard | IEEE 802.3z |
| Frame format | Ethernet_II, Ethernet_SAP, or Ethernet_SNAP |
| Network protocol | IP |

• Table 5-123 and Table 5-124 describe the attributes of the 10GE interfaces and the connected optical modules.

Table 5-123 Attributes of the 10G Base-XFP optical interface

| Attribute | Description |
|-----------------------------|---|
| Connector type | LC/PC |
| Optical interface attribute | Depending on the SFP optical module. For details about the attributes of the optical module, see Table 5-124 . |
| Compliance standard | IEEE 802.3ae |
| Frame format | Ethernet_II, Ethernet_SAP, or Ethernet_SNAP |

| Attribute | Description |
|---------------------|-------------|
| Network protocol | IP |

Table 5-124 Attributes of the XFP optical module (10 Gbit/s)

| Attribute | Description | | | |
|------------------------------|----------------------|----------------------|---------------------|----------------|
| Transmissi on distance | 300 m | 10 km | 40 km | 80 km |
| Center wavelength | 850 nm | 1310 nm | 1550 nm | 1550 nm |
| Transmitti ng power | -7.3 dBm to -1.3 dBm | -6.0 dBm to -1.0 dBm | -1.0 dBm to 2.0 dBm | 0 dBm to 4 dBm |
| Receiver sensitivity | -7.5 dBm | -11.0 dBm | -15.0 dBm | -24.0 dBm |
| Overload optical power | -1.0 dBm | 0.5 dBm | -1.0 dBm | -7.0 dBm |
| Fiber type | Multi-mode | Single-mode | • | • |

5.21.6 Technical Specifications

Table 5-125 describes the technical specifications of the T24XA.

Table 5-125 Technical specifications of the T24XA

| Item | Specification |
|---|-------------------------------|
| Board dimensions (depth x width x height) | 426.8 mm x 394.7 mm x 35.1 mm |
| Power consumption | 53 W |
| Weight | 2.30 kg |
| Long-term temperature | 0°C to 45°C |
| Short-term temperature | -5°C to 55°C |

5.22 G24S - 24-Port 100/1000BASE-X Interface Card (SA, SFP)

This section describes the 24-Port 100/1000BASE-X Interface Card (SFP), including the appearance, functions and features, panel, interface attributes, and technical specifications.

5.22.1 Introduction

The 24-port 100M/1000M optical interface card (SFP) of the S9300 is called G24S for short. The G24S boards are classified into the following types: (SA, SFP), (EC, SFP), and (ED, SFP).

Table 5-126 provides the full name of the boards and capacities of the MAC address tables.

Table 5-126 Lists of G24S

| Full Name | Short Name | Capacity of MAC Address Table |
|---|------------|----------------------------------|
| 24-Port 100/1000BASE-X Interface Card (SA, SFP) | G24SA | 32K |
| 24-Port 100/1000BASE-X Interface Card (EC, SFP) | G24SC | 128K |
| 24-Port 100/1000BASE-X Interface Card (ED, SFP) | G24SD | 512K |

□ NOTE

The G24SC and the G24SD have the same appearance.

5.22.2 Function and Application

Function Description

The G24S provides 24 GE optical interfaces to implement data access and wire-speed switching.

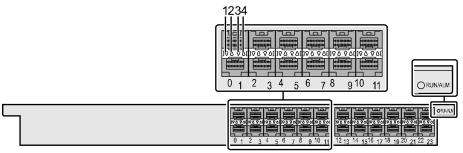
Application

The G24S can be installed in any LPU slot on the S9312, S9306, or S9303.

5.22.3 Panel

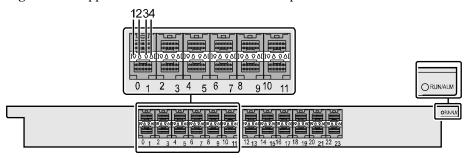
Figure 5-33 and Figure 5-34 show the appearances of the G24S panels.

Figure 5-33 Appearance of the G24SA panel



- 1. ACT indicators of the lower optical interfaces
- 2. ACT indicators of the upper optical interfaces
- 3. Link indicators of the lower optical interfaces
- 4. Link indicators of the upper optical interfaces

Figure 5-34 Appearance of the G24SC or G24SD panel



- 1. ACT indicators of the lower optical interfaces
- 2. ACT indicators of the upper optical interfaces
- 3. Link indicators of the lower optical interfaces
- 4. Link indicators of the upper optical interfaces

Buttons and Indicators on the Panel

Table 5-127 describes the buttons and indicators on the G24S panel.

Table 5-127 Description of buttons and indicators on the G24S panel

| Indicator/Button | Color | Description |
|------------------|--------|---|
| RUN/ALM | Green | If the indicator is on, it indicates that the LPU is powered on, but the software is not running. |
| | | If the indicator blinks every 2s (0.5 Hz), it indicates that the system is running normally. |
| | | If the indicator blinks every 0.25s (4 Hz), it indicates that the system is starting. |
| | Red | If the indicator is in red, it indicates that the LPU is faulty. |
| | Orange | If the indicator is in orange, it indicates that the LPU is installed, and the board is powered on. |

| Indicator/Button | Color | Description |
|------------------|--------------|---|
| ACT | Amber | If the indicator blinks, the data is being transmitted or received. |
| LINK | Green-yellow | If the indicator is on, it indicates that the link is connected. |

5.22.4 Interfaces

Table 5-128 describes the types and functions of the interfaces on the G24S.

Table 5-128 Types and functions of the interfaces on the G24S

| Name | Quantity | Description |
|----------------------------------|----------|---|
| 100/1000BASE-X optical interface | 24 | The G24S provides 24 Ethernet optical interfaces (100M/1000M auto sensing) to transmit and receive 1000 Mbit/s Ethernet services. |

5.22.5 Interface Attributes

The G24S has only the data interfaces. Each interface has an optical module.

Table 5-129 Interface attributes of the GE optical LPU (100M/1000M Base-SFP)

| Attribute | Description |
|-----------------------------|---|
| Connector type | LC/PC |
| Optical interface attribute | Depending on the SFP optical module. |
| Compliance standard | IEEE 802.3z |
| Frame format | Ethernet_II, Ethernet_SAP, or Ethernet_SNAP |
| Network protocol | IP |

Table 5-130 Attributes of the SFP optical module (100M/1000M bit/s)

| Attri bute | Descript | cription | | | | | | |
|--------------------------------------|-------------------------------|-------------------------------|--|--|-------------------------|-------------------------|------------------------------|----------------------|
| Tran smiss ion dista nce | 500 m | 10 km | 10 km (single- mode bidirectional fiber) | | 40 km | 40 km | 80 km | 100 km |
| Cent er wave lengt h | 850 nm | 1310 nm | Tx: 1310 nm Rx: 1490 nm | Tx: 1490 nm Rx: 1310 nm | 1310 nm | 1550 nm | 1550 nm | 1550 nm |
| Tran smitt ing powe r | -9.5 dBm to -2.5 dBm | -9.0 dBm to -3.0 dBm | -9.0 dBm to -3.0 dBm | -9.0 dBm to -3.0 dBm | -5.0 dBm to 0 dBm | -5.0 dBm to 0 dBm | -2.0 dBm to 5.0 dBm | 0 dBm to 5 dBm |
| Rece iver sensi tivity | -17.0 dBm | -20.0 dBm | -19.5 dBm | -19.5 dBm | -23 dBm | -22 dBm | -23.0 dBm | -30.0 dBm |
| Over load optic al powe r | 0 dBm | -3.0 dBm | -3.0 dBm | -3.0 dBm | -3.0 dBm | -3.0 dBm | -3.0 dBm | -9.0 dBm |
| Extin ction ratio | 9 dB | 9 dB | 6 dB | 6 dB | 9 dB | 8.5 dB | 9 dB | 8 dB |
| Fiber type | Multi- mode | Single-m | ode | • | | , | , | |

Table 5-131 Attributes of 100M/1000M colorized optical modules

| Attrib ute | Description |
|-------------------------|-------------|
| Transm ission distanc e | 80 km |

| Attrib ute | Descrip | tion | | | | | | |
|----------------------------------|------------|------------------|------------|------------|------------|------------|------------|------------|
| Center wavele ngth | 1471 nm | 1491 nm | 1511 nm | 1531 nm | 1551 nm | 1571 nm | 1591 nm | 1611 nm |
| Transm itting power | 0 dBm to | 0 dBm to 5.0 dBm | | | | | | |
| Receiv er sensitiv ity | -28.0 dB | -28.0 dBm | | | | | | |
| Overlo ad optical power | -9.0 dBm | | | | | | | |
| Extinct ion ratio | 8.5 dB | | | | | | | |

 Table 5-132 Attributes of optical/electrical modules

| Attribute | Description |
|----------------------|---|
| Connector | RJ45 |
| Standards compliance | IEEE802.3z |
| Frame format | Ethernet_II, Ethernet_SAP, or Ethernet_SNAP |
| Network protocol | IP |

5.22.6 Technical Specifications

Table 5-133 describes the technical specifications of the G24S.

Table 5-133 Technical specifications of the G24S

| Item | Specification |
|---|-------------------------------|
| Board dimensions (depth x width x height) | 426.8 mm x 394.7 mm x 35.1 mm |

| Item | Specification |
|------------------------|----------------|
| Maximum power | G24SA: 45 W |
| consumption | G24SC: 63 W |
| | G24SD: 75 W |
| Weight | G24SA: 2.22 kg |
| | G24SC: 2.66 kg |
| | G24SD: 2.66 kg |
| Long-term temperature | 0°C to 45°C |
| Short-term temperature | -5°C to 55°C |

5.23 G24TFA-24-Port 10/100/1000BASE-T Interface Card (FA,RJ45)

This section describes the 24-Port 10/100/1000BASE-T Interface Card(FA,RJ45), including the appearance, functions and features, panel, interface attributes, and technical specifications.

5.23.1 Introduction

The 24-Port 10/100/1000BASE-T Interface Card(FA,RJ45) is called G24TFA for short. The G24TFA provides twenty-four 10M/100M/1000M Ethernet electrical interfaces. It supports 32K MAC address entries.

5.23.2 Function and Application

Function

The G24TFA provides twenty-four 10M/100M/1000M Ethernet electrical interfaces to implement data access and line-speed switching.

G24TFA complies with Energy Efficient Ethernet (EEE), so it supports dynamic energy saving according to network traffic volume.

Application

The G24TFA can be installed in any LPU slot of the S9312, S9306, and S9303.

5.23.3 Panel

Figure 5-35 shows the appearance of the G24TFA panel.

Figure 5-35 Appearance of the G24TFA panel



1. Link/ACT indicators of the upper electrical interfaces

2. Link/ACT indicators of the lower electrical interfaces

Buttons and Indicators on the Panel

Table 5-134 describes the indicators on the G24TFA panel.

Table 5-134 Description of indicators on the G24TFA panel

| Indicator | Color | Description |
|-----------|--------|---|
| RUN/ALM | Green | • If the indicator is on, it indicates that the board is powered on, but the software is not running. |
| | | If the indicator blinks once every 2s (0.5 Hz), it indicates that the system is in normal state. |
| | | • If the indicator blinks once every 0.25s (4 Hz), it indicates that the system is being powered on or being restarted. |
| | Red | If the indicator is on, it indicates that the board is faulty. |
| | Orange | If the indicator is in orange, it indicates that the board is installed in a slot and the CBUS is powered on. |
| ACT/Link | Green | If the indicator blinks, data is being transmitted or received. If the indicator is on, it indicates that the link is connected. |

5.23.4 Interfaces

Table 5-135 describes the types and functions of the interfaces on the G24TFA.

Table 5-135 Types and functions of the interfaces on the G24TFA

| Name | Quantity | Description |
|---|----------|---|
| 10M/100M/1000M BASE-T Ethernet electrical interface | 24 | The G24TFA provides 24 10M/100M/1000M BASE-T Ethernet electrical interfaces to transmit and receive Ethernet services at 1000 Mbit/s. |

5.23.5 Interface Attributes

The G24TFA provides only data interfaces.

Table 5-136 Attributes of the 10M/100M/1000M Base-T Ethernet interface

| Attribute | Description |
|---------------------|--|
| Connector type | RJ45 |
| Compliance standard | IEEE 802.3z, IEEE802.3AZ |
| Frame format | Ethernet_II, Ethernet_SAP, Ethernet_SNAP |
| Network protocol | IP |

5.23.6 Technical Specifications

Table 5-137 describes the technical specifications of the G24TFA.

Table 5-137 Technical specifications of the G24TFA

| Item | Specification |
|-------------------------------------|-------------------------------|
| Dimensions (depth x width x height) | 426.8 mm x 394.7 mm x 35.1 mm |
| Maximum power consumption | 32 W |
| Weight | 2.20 kg |
| Long-term temperature | 0°C to 45°C |
| Short-term temperature | -5°C to 55°C |

5.24 X12SA - 12-Port 10GE Optical Interface Card (SA, SFP +)

This section describes the 12-port 10GE optical interface card (SA, SFP+), including the appearance, functions and features, applicable device, slot, panel, indicators, interfaces, and technical specifications.

5.24.1 Introduction

The 12-port 10GE optical interface card (SA, SFP+) is called X12SA for short. The X12SA features high interface density, providing 12 10GE interfaces.

5.24.2 Function and Application

Function

The X12SA provides 12 10GE optical interfaces to implement data access and line-speed switching.

Application

The X12SA can be installed in any LPU slot of the S9312, S9306 and S9303.

NOTE

The X12SA can implement line-speed switching when it is installed in any LPU slot of the S9303 or S9306. On the S9312, it implements line-speed switching only when it is installed in slot 6 or 7.

5.24.3 Panel

Figure 5-36 shows the appearance of the X12SA panel.

Figure 5-36 Appearance of the X12SA panel



Buttons and Indicators on the Panel

Table 5-138 describes the buttons and indicators on the X12SA panel.

 Table 5-138 Description of buttons and indicators on the X12SA panel

| Indicator/Button | Color | Meaning |
|------------------|--------------|---|
| RUN/ALM | Green | If the indicator is on, it indicates that the board is powered on but the software is not running. |
| | | If the indicator blinks once every 2s (0.5 Hz), it indicates that the system is in normal state. |
| | | If the indicator blinks once every 0.25s (4 Hz), it indicates that the system is being powered on or being restarted. |
| | Red | If the indicator is in red, it indicates that the board is faulty. |
| | Orange | If the indicator is in orange, it indicates that the board is installed in the slot and the CBUS is powered on. |
| ACT | Amber | If the indicator blinks, it indicates that data is being transmitted. |
| LINk | Green-yellow | If the indicator is on, it indicates that the link is connected. |

5.24.4 Interfaces

Table 5-139 describes the types and functions of the interfaces on the X12SA.

Table 5-139 Types and functions of the interfaces on the X12SA

| Name | Quantity | Description |
|------------------------------|----------|---|
| 10G BASE-X optical interface | 12 | The X12SA provides 12 10GE optical interfaces to transmit and receive Ethernet services at 10 Gbit/s. |

5.24.5 Interface Attributes

Table 5-140 and **Table 5-141** describe the attributes of the 10GE interfaces and the connected optical modules.

Table 5-140 Attributes of the 10G Base-XFP optical interface

| Attribute | Description |
|----------------|-------------|
| Connector type | LC/PC |

| Attribute | Description |
|-----------------------------|---|
| Optical interface attribute | Depending on the SFP optical module. For details about the attributes of the optical module, see Table 5-141 . |
| Compliance standard | IEEE 802.3ae |
| Frame format | Ethernet_II, Ethernet_SAP, or Ethernet_SNAP |
| Network protocol | IP |

Table 5-141 Attributes of the SFP+ optical module (10 Gbit/s)

| Attribute | Description | | |
|------------------------|--------------------|---------------------|---------------------|
| Transmission distance | 300 m | 10 km | 40 km |
| Center wavelength | 850 nm | 1310 nm | 1550 nm |
| Transmitting power | -7.3 dBm to -1 dBm | -8.2 dBm to 0.5 dBm | -4.7 dBm to 4.0 dBm |
| Receiver sensitivity | -11.1 dBm | -12.6 dBm | -14.1 dBm |
| Overload optical power | -1.0 dBm | 0.5 dBm | -1.0 dBm |
| Extinction ratio | 3 dB | 3.5 dB | 3 dB |
| Fiber type | Multi-mode | Single-mode | |

5.24.6 Technical Specifications

Table 5-142 describes the technical specifications of the X12SA.

Table 5-142 Technical specifications of the X12SA

| Item | Specification |
|---|-------------------------------|
| Board dimensions (depth x width x height) | 426.8 mm x 394.7 mm x 35.1 mm |
| Power consumption | 85 W |
| Weight | 2.30 kg |

| Item | Specification |
|------------------------|---------------|
| Long-term temperature | 0°C to 45°C |
| Short-term temperature | -5°C to 55°C |

5.25 E12GA - 12-Port EPON Interface and 12-Port 1000BASE-X Interface Card (SFP)

This section describes the 12-Port EPON Interface and 12-Port 1000BASE-X Interface Card (SFP), including the appearance, functions and features, panel, interface attributes, and technical specifications.

5.25.1 Introduction

The 12-Port EPON Interface and 12-Port 1000BASE-X Interface Card (SFP) is called E12GA. The E12GA provides 12 GE optical interfaces and 12 Gigabit Ethernet Passive Optical Network (GEPON) interfaces.

5.25.2 Function and Application

Function Description

The E12GA provides 12 GE optical interfaces and 12 GEPON optical interfaces to implement data access and wire-speed switching. Each GEPON interface can be connected to a maximum of 64 optical network units (ONUs). The entire E12GA supports a maximum of 768 ONUs.

Application

The E12GA can be installed in any LPU slot of the S9312, S9306, and S9303. The S9300 installed with the E12GA can be used as the optical line terminal (OLT) to connect to the ONU through an EPON interface.

5.25.3 Panel

Figure 5-37 shows the appearance of the E12GA panel.

The 12 interfaces on the left of the panel are the EPON optical interfaces and the 12 interfaces on the right of the panel are the ordinary GE interfaces.

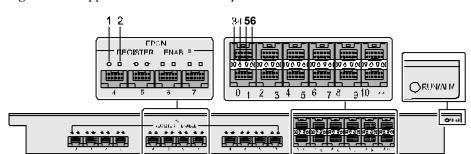


Figure 5-37 Appearance of the E12GA panel

- the EPON interfaces
- the EPON interfaces
- 1. REGISTER indicator of 2. ENABLE indicator of 3. ACT indicator of the lower optical interfaces
- 4. ACT indicator of the upper optical interfaces

5. Link indicator of the lower 6. Link indicator of the optical interfaces upper optical interfaces

Buttons and Indicators on the Panel

Table 5-143 describes the buttons and indicators on the E12GA panel.

Table 5-143 Description of buttons and indicators on the E12GA panel

| Indicator/Button | Color | Description |
|------------------|--------------|--|
| RUN/ALM | Green | If the indicator is on, it indicates that the board is powered on but the software is not running. |
| | | If the indicator blinks once every 2s (0.5 Hz), it indicates that the system is in normal state. |
| | | If the indicator blinks once every 0.25s (4 Hz), it indicates that the system is being started. |
| | Red | If the indicator is in red, it indicates that the board is faulty. |
| | Orange | If the indicator is on, it indicates that the board is installed in the slot and is powered on. |
| ACT | Amber | If the indicator blinks, it indicates that data is being transmitted. |
| LINK | Green-yellow | If the indicator is on, it indicates that the link is connected. |
| REGISTER | Green-yellow | If the indicator is on, it indicates that at least one ONU has been registered. |
| ENABLE | Green-yellow | If the indicator is on, it indicates that the interface is enabled. |
| | | If the indicator is off, it indicates that the interface is disabled. |

5.25.4 Interfaces

Table 5-144 describes the types and functions of the interfaces on the E12GA.

Table 5-144 Types and functions of the interfaces on the E12GA

| Name | Quantity | Description |
|------------------------------------|----------|---|
| 100/1000M BASE-X optical interface | 12 | The E12GA provides 12 100M/1000M Ethernet optical interfaces to transmit and receive GE services. |
| 1000M BASE-PX20 optical interface | 12 | The E12GA provides 12 1000M EPON optical interfaces to transmit and receive EPON services. |

5.25.5 Interface Attributes

The E12GA provides only data interfaces. Each interface has an optical module.

Table 5-145 Attributes of the 1000M Base-PX20-SFP GEPON optical interface

| Attribute | Description |
|-----------------------------|---|
| Connector type | SC |
| Optical interface attribute | Depending on the optical module |
| Compliance standard | IEEE 802.3ah-2004 |
| Frame format | Ethernet_II, Ethernet_SAP, or Ethernet_SNAP |
| Network protocol | IP |

Table 5-146 Attributes of the GEPON optical module (1000 Mbit/s)

| Attribute | Description |
|-----------------------|---|
| Transmission distance | 20 km (single-mode bidirectional fiber) |
| Center wavelength | Tx1490nm Rx1310 nm |
| Transmitting power | 2 dBm to 7 dBm |
| Receiver sensitivity | -27 dBm |

| Attribute | Description |
|------------------------|-------------|
| Overload optical power | -6.0 dBm |
| Extinction ratio | 9 dB |
| Fiber type | Single-mode |

Table 5-147 Interface attributes of the GE optical LPU (100M/1000M Base-SFP)

| Attribute | Description |
|-----------------------------|---|
| Connector type | LC/PC |
| Optical interface attribute | Depending on the SFP optical module. |
| Compliance standard | IEEE 802.3z |
| Frame format | Ethernet_II, Ethernet_SAP, or Ethernet_SNAP |
| Network protocol | IP |

Table 5-148 Attributes of the SFP optical module (100M/1000M bit/s)

| Attri bute | Description | | | | | | | |
|--------------------------------------|-------------------------------|-------------------------------|--|--|-------------------------|-------------------------|------------------------------|----------------------|
| Tran smiss ion dista nce | 500 m | 10 km | 10 km (si mode bid fiber) | ngle- irectional | 40 km | 40 km | 80 km | 100 km |
| Cent er wave lengt h | 850 nm | 1310 nm | Tx: 1310 nm Rx: 1490 nm | Tx: 1490 nm Rx: 1310 nm | 1310 nm | 1550 nm | 1550 nm | 1550 nm |
| Tran smitt ing powe r | -9.5 dBm to -2.5 dBm | -9.0 dBm to -3.0 dBm | -9.0 dBm to -3.0 dBm | -9.0 dBm to -3.0 dBm | -5.0 dBm to 0 dBm | -5.0 dBm to 0 dBm | -2.0 dBm to 5.0 dBm | 0 dBm to 5 dBm |

| Attri bute | Description | | | | | | | |
|---------------------------------|----------------|--------------|--------------|--------------|-------------|-------------|--------------|--------------|
| Rece iver sensi tivity | -17.0 dBm | -20.0 dBm | -19.5 dBm | -19.5 dBm | -23 dBm | -22 dBm | -23.0 dBm | -30.0 dBm |
| Over load optic al powe r | 0 dBm | -3.0 dBm | -3.0 dBm | -3.0 dBm | -3.0 dBm | -3.0 dBm | -3.0 dBm | -9.0 dBm |
| Extin ction ratio | 9 dB | 9 dB | 6 dB | 6 dB | 9 dB | 8.5 dB | 9 dB | 8 dB |
| Fiber type | Multi- mode | Single-me | ode | | | | | |

Table 5-149 Attributes of 100M/1000M colorized optical modules

| Attrib ute | Descrip | tion | | | | | | |
|----------------------------------|------------|------------------|------------|------------|------------|------------|------------|------------|
| Transm ission distanc e | 80 km | | | | | | | |
| Center wavele ngth | 1471 nm | 1491 nm | 1511 nm | 1531 nm | 1551 nm | 1571 nm | 1591 nm | 1611 nm |
| Transm itting power | 0 dBm to | 0 dBm to 5.0 dBm | | | | | | |
| Receiv er sensitiv ity | -28.0 dB | -28.0 dBm | | | | | | |
| Overlo ad optical power | -9.0 dBm | 1 | | | | | | |
| Extinct ion ratio | 8.5 dB | | | | | | | |

Table 5-150 Attributes of optical/electrical modules

| Attribute | Description |
|----------------------|---|
| Connector | RJ45 |
| Standards compliance | IEEE802.3z |
| Frame format | Ethernet_II, Ethernet_SAP, or Ethernet_SNAP |
| Network protocol | IP |

5.25.6 Technical Specifications

Table 5-151 describes the technical specifications of the E12GA.

Table 5-151 Technical specifications of the E12GA

| Item | Specification |
|---|-------------------------------|
| Board dimensions (depth x width x height) | 426.8 mm x 394.7 mm x 35.1 mm |
| Maximum power consumption | 86 W |
| Weight | 2.54 kg |
| Long-term temperature | 0°C to 45°C |
| Short-term temperature | -5°C to 55°C |

5.26 X4UX - 4-Port 10GBASE-X Interface Card (XFP)

This section describes the 4-Port 10GBASE-X Interface Card (EA, XFP) and 4-Port 10GBASE-X Interface Card (EC, XFP), including the appearance, functions and features, panel, interface attributes, and technical specifications.

5.26.1 Introduction

The 4-port 10GE optical interface card (XFP) of the S9300 is called X4UX for short. The X4UX boards are classified into the following types: (EA, XFP) (EC, XFP) and (ED, XFP).

Table 5-152 provides the full name of the boards and capacities of the MAC address tables.

Table 5-152 Lists of X4UX

| Full Name | Short Name | Capacity of MAC Address Table |
|---|------------|----------------------------------|
| 4-Port 10GBASE-X Interface Card (EA, XFP) | X4UXA | 32K |
| 4-Port 10GBASE-X Interface Card(EC, XFP) | X4UXC | 128K |
| 4-Port 10GBASE-X Interface Card(ED, XFP) | X4UXD | 512K |

5.26.2 Function and Application

Function Description

The X4UX provides four 10GE optical interfaces to implement data access and wire-speed switching.

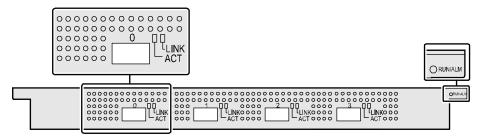
Application

The X4UX can be installed in any LPU slot on the S9312, S9306, or S9303.

5.26.3 Panel

Figure 5-38 shows the appearance of the X4UX panel.

Figure 5-38 Appearance of the panel of the X4UX



Buttons and Indicators on the Panel

Table 5-153 describes the buttons and indicators on the X4UX panel.

Indicator/Button Color Description RUN/ALM Green If the indicator is on, it indicates that the LPU is powered on, but the software is not running. If the indicator blinks every 2s (0.5 Hz), it indicates that the system is running normally. If the indicator blinks every 0.25s (4 Hz), it indicates that the system is starting. Red If the indicator is in red, it indicates that the LPU is faulty. Orange If the indicator is in orange, it indicates that the LPU is installed, and the board is powered ACT Amber If the indicator blinks, the data is being transmitted or received. LINK Green-yellow If the indicator is on, it indicates that the link

is connected.

Table 5-153 Description of buttons and indicators on the X4UX panel

5.26.4 Interfaces

Table 5-154 describes the types and functions of the interfaces on the X4UX.

Table 5-154 Types and functions of the interfaces on the X4UX

| Name | Quantity | Description |
|------------------------------|----------|--|
| 10G BASE-X optical interface | 4 | The X4UX provides four 10GE BASE-X optical interfaces to transmit and receive 10 Gbit/s Ethernet services. |

5.26.5 Interface Attributes

The X4UX has only the data interfaces. Each interface has an optical module. **Table 5-155** and **Table 5-156** show the attributes of the interfaces and the optical modules on the X4UX.

Table 5-155 Attributes of the 10G Base-XFP optical interface

| Attribute | Description |
|-----------------------------|---|
| Connector type | LC/PC |
| Optical interface attribute | Depending on the XFP optical module. For details about the attributes of the optical module, see Table 5-156 . |

| Attribute | Description |
|---------------------|---|
| Compliance standard | IEEE 802.3ae |
| Frame format | Ethernet_II, Ethernet_SAP, or Ethernet_SNAP |
| Network protocol | IP |

Table 5-156 Attributes of the XFP optical module (10 Gbit/s)

| Attribute | Description | | | |
|------------------------|----------------------|----------------------|---------------------|----------------|
| Transmissio n distance | 300 m | 10 km | 40 km | 80 km |
| Center wavelength | 850 nm | 1310 nm | 1550 nm | 1550 nm |
| Transmittin g power | -7.3 dBm to -1.3 dBm | -6.0 dBm to -1.0 dBm | -1.0 dBm to 2.0 dBm | 0 dBm to 4 dBm |
| Receiver sensitivity | -7.5 dBm | -11.0 dBm | -15.0 dBm | -24.0 dBm |
| Overload optical power | -1.0 dBm | 0.5 dBm | -1.0 dBm | -7.0 dBm |
| Extinction ratio | 3.0 dB | 6.0 dB | 8.2 dB | 9.0 dB |
| Fiber type | Multi-mode | Single-mode | | |

5.26.6 Technical Specifications

Table 5-157 describes the technical specifications of the X4UX.

Table 5-157 Technical specifications of the X4UX

| Item | Specification |
|---|---|
| Board dimensions (depth x width x height) | 426.8 mm x 394.7 mm x 35.1 mm |
| Maximum power consumption | X4UXA: 64 W X4UXC: 75 W X4UXD: 76 W |

| Item | Specification |
|------------------------|--|
| Weight | X4UXA: 2.16 kg X4UXC: 2.28 kg X4UXD: 2.30 kg |
| Long-term temperature | 0°C to 45°C |
| Short-term temperature | -5°C to 55°C |

5.27 X2UX - 2-Port 10GBASE-X Interface Card (XFP)

This section describes the 2-Port 10GBASE-X Interface Card (EA, XFP) and 2-Port 10GBASE-X Interface Card (EC, XFP), including the appearance, functions and features, panel, interface attributes, and technical specifications.

5.27.1 Introduction

The 2-port 10GE optical interface card (XFP) of the S9300 is called X2UX for short. The X2UX boards are classified into the following types: (EA, XFP) and (EC, XFP).

Table 5-158 provides the full name of the boards and capacities of the MAC address tables.

Table 5-158 Lists of X2UX

| Full Name | Short Name | Capacity of MAC Address Table |
|---|------------|----------------------------------|
| 2-Port 10GBASE-X Interface Card (EA, XFP) | X2UXA | 32K |
| 2-Port 10GBASE-X Interface Card (EC, XFP) | X2UXC | 128K |

5.27.2 Function and Application

Function Description

The X2UX provides two 10GE optical interfaces to implement data access and wire-speed switching.

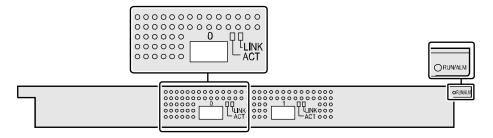
Application

The X2UX can be installed in any LPU slot on the S9312, S9306, or S9303.

5.27.3 Panel

Figure 5-39 shows the appearance of the X2UX panel.

Figure 5-39 Appearance of the panel of the X2UX



Buttons and Indicators on the Panel

Table 5-159 describes the buttons and indicators on the X2UX panel.

Table 5-159 Description of buttons and indicators on the X2UX panel

| Indicator/Button | Color | Description |
|------------------|--------------|---|
| RUN/ALM | Green | If the indicator is on, it indicates that the LPU is powered on, but the software is not running. |
| | | If the indicator blinks every 2s (0.5 Hz), it indicates that the system is running normally. |
| | | If the indicator blinks every 0.25s (4 Hz), it indicates that the system is starting. |
| | Red | If the indicator is in red, it indicates that the LPU is faulty. |
| | Orange | If the indicator is in orange, it indicates that the LPU is installed, and the board is powered on. |
| ACT | Amber | If the indicator blinks, the data is being transmitted or received. |
| LINK | Green-yellow | If the indicator is on, it indicates that the link is connected. |

5.27.4 Interfaces

Table 5-160 describes the types and functions of the interfaces on the X2UX.

Table 5-160 Types and functions of the interfaces on the X2UX

| Name | Quantity | Description |
|------------------------------|----------|---|
| 10G BASE-X optical interface | 2 | The X2UX provides two 10GE BASE-X optical interfaces to transmit and receive 10 Gbit/s Ethernet services. |

5.27.5 Interface Attributes

The X2UX has only the data interfaces. Each interface has an optical module. **Table 5-161** and **Table 5-162** show the attributes of the interfaces and the optical modules on the X2UX.

Table 5-161 Attributes of the 10G Base-XFP optical interface

| Attribute | Description |
|-----------------------------|---|
| Connector type | LC/PC |
| Optical interface attribute | Depending on the XFP optical module. For details about the attributes of the optical module, see Table 5-162 . |
| Compliance standard | IEEE 802.3ae |
| Frame format | Ethernet_II, Ethernet_SAP, or Ethernet_SNAP |
| Network protocol | IP |

Table 5-162 Attributes of the XFP optical module (10 Gbit/s)

| Attribute | Description | | | |
|------------------------|----------------------|----------------------|---------------------|----------------|
| Transmissio n distance | 300 m | 10 km | 40 km | 80 km |
| Center wavelength | 850 nm | 1310 nm | 1550 nm | 1550 nm |
| Transmittin g power | -7.3 dBm to -1.3 dBm | -6.0 dBm to -1.0 dBm | -1.0 dBm to 2.0 dBm | 0 dBm to 4 dBm |
| Receiver sensitivity | -7.5 dBm | -11.0 dBm | -15.0 dBm | -24.0 dBm |
| Overload optical power | -1.0 dBm | 0.5 dBm | -1.0 dBm | -7.0 dBm |
| Extinction ratio | 3.0 dB | 6.0 dB | 8.2 dB | 9.0 dB |

| Attribute | Description | |
|------------|-------------|-------------|
| Fiber type | Multi-mode | Single-mode |

5.27.6 Technical Specifications

Table 5-163 describes the technical specifications of the X2UX.

Table 5-163 Technical specifications of the X2UX

| Item | Specification |
|---|----------------------------------|
| Board dimensions (depth x width x height) | 426.8 mm x 394.7 mm x 35.1 mm |
| Maximum power consumption | X2UXA: 52 W X2UXC: 61 W |
| Weight | X2UXA: 2.14 kg X2UXC: 2.26 kg |
| Long-term temperature | 0°C to 45°C |
| Short-term temperature | -5°C to 55°C |

5.28 CKM - Clock Board

This section describes the CKM, including the appearance, functions and features, and technical specifications.

5.28.1 Introduction

Currently, only one type of clock board is available: CKMA. CKMA is a subcard of the main control board of the S9312, S9306, or S9303. It provides the functions of clock synchronization and time synchronization and has Building Integrated Timing Supply System (BITS) interfaces.

5.28.2 Function and Application

Function

The CKM consists of the following functional units:

• Clock synchronization unit, that is synchronizing the Ethernet clock.

• Time synchronization unit, that is the IEEE 1588 functional module

The functions of the CKM are as follows:

- Providing the 19.44 MHz system clock and providing external clock signals. The output clock signal complies with the ITU-T G.813 standard.
- Implementing the IEEE 1588 protocol through the logic to ensure synchronization of time on the network. The time is accurate to 0.1 us, which complies with the 1588v2 protocol.

Application

The CKM is a pinch board and can be used on the LE03SRUA and LE02SRUB of the S9306 and S9312 and the LE03MCUA of the S9303.

□ NOTE

When the clock pinch board needs to be used, both the master and slave MPUs must be installed with a clock pinch board.

5.28.3 Appearance

Figure 5-40 shows the clock board appearance.

Figure 5-40 Clock board appearance



5.28.4 Interfaces

The CLM has two BITS interfaces, corresponding to the CLK1 and CLK2 interfaces on the main control board. **Table 5-164** describes the types and functions of the two BITS interfaces.

Table 5-164 Types and functions of the BITTS interfaces

| Name | Quantity | Description |
|--|----------|--|
| BITS0 Corresponds to | 1 | The BITS0 interface can be configured as the input or output interface. |
| the CLK1 interface on the main control board. | | When functioning as the input interface, the BITS0 interface can receive the 2.048 MHz clock signal, 2.048 Mbit/s clock signal, 1 pulse per second (pps) clock signal, or DC level shift (DCLS) code stream from the upstream device and generate the 19.44 MHz clock signal for the system. The BITS0 interface can also obtain the time information and provide the time information for LPUs. When functioning as the output interface, the BITS0 interface can send the 2.048 MHz clock signal, 2.048 Mbit/s clock signal, 1 pps clock signal, or DC level shift (DCLS) code stream to the downstream device. |
| BITS1 Corresponds to the CLK2 interface on the main control board. | 1 | The functions are similar to the functions of the BITS0 interface. |

5.28.5 Interface Attributes

Table 5-165 describes the attributes of the BITS interfaces.

Table 5-165 Attributes of the BITS interfaces

| Attribute | Description |
|---------------------|--|
| Connector type | RJ45 |
| Operation mode | Transmission rate: Clock frequency synchronization: 2 MHz, 2 Mbit/s, 1.544 Mbit/s. Time synchronization: 9600 bit/s Supports full-duplex mode. |
| Compliance standard | Clock frequency synchronization: E1 and T1 Time synchronization: DCLS and Time of Day (TOD) |

5.28.6 Technical Specifications

Table 5-166 describes the technical specifications of the CKM.

Table 5-166 Technical specifications of the CKM

| Item | Specification |
|---|-----------------------------|
| Board dimensions (depth x width x height) | 145.0 mm × 100.0 mm ×2.0 mm |
| Power consumption | 6 W |
| Weight | 0.1 kg |
| Long-term temperature | 0°C to 45°C |
| Short-term temperature | -5°C to 55°C |

5.29 WMNPA-WAN Card

This section describes the WMNPA-WAN card, including the appearance, functions and features, panel, interface attributes, and technical specifications.

5.29.1 Introduction

The WAN card of the S9300 is called WMNPA.

As an LPU, the WMNPA provides the following types of interfaces by using subcards: (1) 2.5 Gbit/s POS optical interfaces; (2) 622 Mbit/s POS optical interfaces; (3) 155 Mbit/s POS optical interfaces (in compliance with T1 and E1 standards)

M NOTE

- When using the WMNPA, insert the CKM into the MPU. If the S9300 uses two MPUs, the CKMs must be installed on both the MPUs.
- When using the WMNPA, insert at least one subcard; otherwise, the WMNPA does not function properly.
- The WMNPA does not support hot swapping of subcards.

The WMNPA provides two subcard slots. Different types of subcards can be inserted into one WMNPA. **Table 5-167** provides the names, port quantities, and types of three types of subcards.

Table 5-167 Subcard list

| Name | Port Quantity |
|------|-----------------------|
| P1UF | 1-port OC-48c POS-SFP |
| P4HF | 4-port OC-12c POS-SFP |

| Name | Port Quantity |
|------|----------------------|
| P4CF | 4-port OC-3c POS-SFP |

5.29.2 Function and Application

Function

The WMNPA has 10GE line-speed forwarding and switching capability. It supports flexible combination of the P1UF subcard, P4HF subcard, and P4CF subcard.

The WMNPA is the LPU providing WAN interfaces. It has 10GE line-speed forwarding and switching capability, and supports three types of subcards:

- P1UF: provides one 2.5 Gbit/s POS interface
- P4HF: provides four 622 Mbit/s POS interfaces
- P4CF: provides four 155 Mbit/s POS interfaces

Any two types of subcards can be used together.

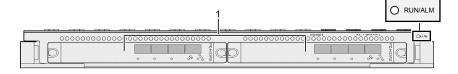
Application

The WMNPA can be installed in any LPU slot of the S9312, S9306, and S9303.

5.29.3 Panel

Figure 5-41 shows the appearance of the WMNPA panel.

Figure 5-41 Appearance of the WMNPA panel



1. Subcard

Buttons and Indicators on the Panel

Table 5-168 describes the indicators on the WMNPA panel.

Table 5-168 Description of indicators on the WMNPA panel

| Indicator | Color | Description |
|-----------|--------------|---|
| RUN/ALM | Green | • If the indicator is on, it indicates that the board is powered on, but the software is not running. |
| | | • If the indicator blinks once every second (1 Hz), it indicates that the system is in normal state. |
| | | If the indicator blinks once every 0.25s (4 Hz), it indicates that the system is being powered on or being restarted. |
| | Red | If the indicator is on, it indicates that the board is faulty. |
| | Orange | If the indicator is in orange, it indicates that the board is installed in a slot and is powered on. |
| STATUS | Green-yellow | • If the indicator blinks once every second (1 Hz), the subcard is in normal state. |
| | | • If the indicator blinks every 0.25s (4 Hz), the subcard is not registered. |
| ACT | Amber | If the indicator blinks, data is being transmitted or received. |
| LINK | Green-yellow | If the indicator is on, it indicates that the link is connected. |

5.29.4 Technical Specifications

Table 5-169 describes the technical specifications of the WMNPA.

Table 5-169 Technical specifications of the WMNPA

| Item | Specification | |
|-------------------------------------|--|--|
| Dimensions (depth x width x height) | 426.8 mm x 394.7 mm x 35.1 mm | |
| Maximum power consumption | With two P1UF subcards: 84 W With two P4HF subcards: 91 W With two P4CF subcards: 86 W | |
| Weight | 3.80 kg (with a firewall card and two P1UF subcards) | |
| Long-term temperature | 0°C to 45°C | |

| Item | Specification |
|------------------------|---------------|
| Short-term temperature | -5°C to 55°C |

5.30 P4CF-4-Port OC-3c/STM-1c POS-SFP

This section describes the 4-port OC-3c/STM-1c POS-SFP, including the appearance, functions and features, panel, interface attributes, and technical specifications.

5.30.1 Introduction

The 4-port OC-3c/STM-1c POS-SFP provides 155 Mbit/s optical interfaces. This subcard is applicable to the aggregation layer of MPLS networks.

5.30.2 Function and Application

Function

Table 5-170 describes the functions of the 4-port OC-3c/STM-1c POS-SFP.

Table 5-170 Technical specifications of the 4-port OC-3c/STM-1c POS-SFP FPIC

| Feature | Description |
|--------------------------------|---|
| Supported protocol and service | PPP, HDLC |
| Interface type | SFP |
| Reliability and usability | Hot swappable hardware |
| Network management | Enhanced command-line management interface SNMP and MIB |

Application

The 4-port OC-3c/STM-1c POS-SFP is an optional subcard which can be installed on the WMNPA.

Users can choose to install this subcard according to the service requirement, which improves service flexibility and expansibility.

5.30.3 Panel

Figure 5-42 shows the appearance of the 4-port OC-3c/STM-1c POS-SFP panel.

ENDANCE PROPERTY OF SOLUTION O

Figure 5-42 Appearance of the 4-port OC-3c/STM-1c POS-SFP panel

Buttons and Indicators on the Panel

Table 5-171 describes the indicators on the 4-port OC-3c/STM-1c POS-SFP panel.

Table 5-171 Description of indicators on the 4-port OC-3c/STM-1c POS-SFP panel

| Indicator | Description |
|------------------|---|
| STATUS (green) | If the indicator blinks once every 2s (0.5 Hz), it indicates that the system is running properly. If the indicator blinks once every 0.5s (2 Hz), it indicates that the system is in the alarm state. |
| LINK/ACT (green) | If the indicator is on, the link functions properly. If the indicator blinks, data is being transmitted or received. If the indicator is off, it indicates that the link is Down. |

5.30.4 Interfaces

Table 5-172 describes the types and functions of the interfaces on the 4-port OC-3c/STM-1c POS-SFP FPIC.

Table 5-172 Types and functions of the interfaces on the 4-port OC-3c/STM-1c POS-SFP

| Name | Qua ntity | Description |
|--|--------------|--|
| OC-3c/STM-1c POS-SFP optical interface | 4 | The 4-port OC-3c/STM-1c POS-SFP FPIC provides four 155 Mbit/s optical interfaces to transmit and receive services. |

5.30.5 Interface Attributes

Table 5-173 describes the attributes of the interfaces on the 4-port OC-3c/STM-1c POS-SFP FPIC.

Table 5-173 Attributes of interfaces on the 4-port OC-3c/STM-1c POS-SFP FPIC

| Attribute | Description |
|-----------------------------|---|
| Connector type | LC/PC |
| Optical interface attribute | Depending on the SFP optical module. For details about the attributes of the optical module, see Table 5-174 . |
| Operation mode | Full duplex |
| Link protocol | PPP, HDLC |
| Network protocol | IP |

Table 5-174 Attributes of the 155 Mbit/s SFP optical module

| Attribute | Description | | | |
|----------------------------------|-------------|-----------|----------|----------|
| Transmission distance | 2 km | 15 km | 40 km | 80 km |
| Center wavelength | 1310 nm | 1310 nm | 1310 nm | 1550 nm |
| Minimum transmitting power | -19.0 dBm | -15.0 dBm | -5.0 dBm | -5.0 dBm |
| Maximum transmitting power | -14.0 dBm | -8.0 dBm | 0 dBm | 0 dBm |

| Attribute | Description | | | |
|------------------------|-------------|-------------|-------------|-------------|
| Receiver sensitivity | -30.0 dBm | -31.0 dBm | -37.0 dBm | -37.0 dBm |
| Overload optical power | -14.0 dBm | -8.0 dBm | -10.0 dBm | -10.0 dBm |
| Fiber type | Multi-mode | Single-mode | Single-mode | Single-mode |

5.30.6 Technical Specifications

Table 5-175 describes the technical specifications of the 4-port OC-3c/STM-1c POS-SFP FPIC.

Table 5-175 Technical specifications of the 4-port OC-3c/STM-1c POS-SFP FPIC

| Item | Specification |
|---|-------------------------|
| Silkscreen | FPIC-4xOC3-POS |
| Typical power consumption | 14 W |
| Heat dissipation | 58 BTU/hour |
| Weight | 0.50 kg |
| Dimensions (width x depth x height) | 145 mm x 185 mm x 20 mm |
| Connector type | LC |
| Long-term temperature | 0°C to 45°C |
| Short-term temperature | -5°C to 55°C |

5.31 P4HF-4-Port OC-12c/STM-4c POS-SFP

This section describes the 4-port OC-12c/STM-4c POS-SFP, including the appearance, functions and features, panel, interface attributes, and technical specifications.

5.31.1 Introduction

The 4-port OC-12c/STM-4c POS-SFP provides 622 Mbit/s optical interfaces. This subcard is applicable to the aggregation layer of MPLS networks.

5.31.2 Function and Application

Function

Table 5-176 describes the functions of the 4-port OC-12c/STM-4c POS-SFP.

Table 5-176 Functions of the 4-port OC-12c/STM-4c POS-SFP FPIC

| Function | Description |
|--------------------------------|---|
| Supported protocol and service | PPP, HDLC |
| Interface type | SFP |
| Reliability and usability | Hot swappable hardware |
| Network management | Enhanced command-line management interface SNMP and MIB |

Application

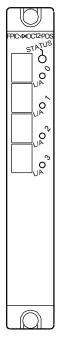
The 4-port OC-12c/STM-4c POS-SFP is an optional subcard installed on the WMNPA.

Users can choose to install this subcard according to the service requirement, which improves service flexibility and expansibility.

5.31.3 Panel

Figure 5-43 shows the appearance of the 4-port OC-12c/STM-4c POS-SFP FPIC panel.

Figure 5-43 Appearance of the 4-port OC-12c/STM-4c POS-SFP FPIC panel



Buttons and Indicators on the Panel

Table 5-177 describes the indicators on the 4-port OC-12c/STM-4c POS-SFP FPIC panel.

Table 5-177 Description of the indicators on the 4-port OC-12c/STM-4c POS-SFP FPIC panel

| Indicator | Description |
|------------------|---|
| STATUS (green) | If the indicator blinks once every 2s (0.5 Hz), it indicates that the system is running properly. If the indicator blinks once every 0.5s (2 Hz), it indicates that the system is in the alarm state. |
| LINK/ACT (green) | If the indicator is on, the link functions properly. If the indicator blinks, data is being transmitted or received. If the indicator is off, it indicates that the link is Down. |

5.31.4 Interfaces

Table 5-178 describes the types and functions of the interfaces on the 4-port OC-12c/STM-4c POS-SFP FPIC.

Table 5-178 Types and functions of the interfaces on the 4-port OC-12c/STM-4c POS-SFP FPIC

| Name | Qua ntity | Description |
|---|--------------|---|
| OC-12c/STM-4c POS-SFP optical interface | 4 | The 4-port OC-12c/STM-4c POS-SFP FPIC provides four 622 Mbit/s optical interfaces to transmit and receive services. |

5.31.5 Interface Attributes

Table 5-179 describes the attributes of the interfaces on the 4-port OC-12c/STM-4c POS-SFP FPIC.

Table 5-179 Attributes of the interfaces on the OC-12c/STM-4c POS-SFP FPIC

| Attribute | Description |
|-----------------------------|---|
| Connector type | LC/PC |
| Optical interface attribute | Depending on the SFP optical module. For details about the attributes of the optical module, see Table 5-180 . |

| Attribute | Description |
|---------------------|-------------|
| Operation mode | Full duplex |
| Link protocol | PPP, HDLC |
| Network protocol | IP |

Table 5-180 Attributes of the 622 Mbit/s SFP optical module

| Attribute | Description | | |
|----------------------------------|-------------|-------------|-------------|
| Transmission distance | 15 km | 40 km | 80 km |
| Center wavelength | 1310 nm | 1310 nm | 1550 nm |
| Minimum transmitting power | -15.0 dBm | -3.0 dBm | -3.0 dBm |
| Maximum transmitting power | -8 dBm | 2.0 dBm | 2.0 dBm |
| Receiver sensitivity | -31.0 dBm | -30.0 dBm | -30.0 dBm |
| Overload optical power | -8.0 dBm | -8.0 dBm | -8.0 dBm |
| Fiber type | Single-mode | Single-mode | Single-mode |

5.31.6 Technical Specifications

Table 5-181 describes the technical specifications of the 4-port OC-12c/STM-4c POS-SFP FPIC.

Table 5-181 Technical specifications of the 4-port OC-12c/STM-4c POS-SFP FPIC

| Item | Specification |
|---------------------------|-----------------|
| Silkscreen | FPIC-4xOC12-POS |
| Typical power consumption | 15 W |
| Heat dissipation | 65 BTU/hour |

| Item | Specification |
|-------------------------------------|-------------------------|
| Weight | 0.50 kg |
| Dimensions (width x depth x height) | 145 mm x 185 mm x 20 mm |
| Connector type | LC |
| Long-term temperature | 0°C to 45°C |
| Short-term temperature | -5°C to 55°C |

5.32 P1UF-1-Port OC-48c/STM-16c POS-SFP

This section describes the 1-port OC-48c/STM-16c POS-SFP, including the appearance, functions and features, panel, and technical specifications.

5.32.1 Introduction

The 1-port OC-48c/STM-16c POS-SFP provides 2.5 Gbit/s optical interfaces. This subcard is applicable to the aggregation layer of MPLS networks.

5.32.2 Function and Application

Function

Table 5-182 describes the functions of the 1-port OC-48c/STM-16c POS-SFP.

Table 5-182 Functions of the 1-port OC-48c/STM-16c POS-SFP

| Function | Description |
|--------------------------------|---|
| Supported protocol and service | PPP, HDLC |
| Interface type | SFP |
| Reliability and usability | Hot swappable hardware |
| Network management | Enhanced command-line management interface SNMP and MIB |

Application

The 1-port OC-48c/STM-16c POS-SFP is an optional subcard installed on the WMNPA.

Users can choose to install this subcard according to the service requirement, which improves service flexibility and expansibility.

5.32.3 Panel

Figure 5-44 shows the appearance of the 1-port OC-48c/STM-16c POS-SFP FPIC panel. **Table 5-183** describes the indicators on the 1-port OC-48c/STM-16c POS-SFP FPIC panel.

Figure 5-44 Appearance of the 1-port OC-48c/STM-16c POS-SFP FPIC panel



Buttons and Indicators on the Panel

Table 5-183 Description of indicators on the 1-port OC-48c/STM-16c POS-SFP FPIC panel

| Indicator | Description |
|------------------|---|
| STATUS (green) | If the indicator blinks once every 2s (0.5 Hz), it indicates that the system is running properly. If the indicator blinks once every 0.5s (2 Hz), it indicates that the system is in the alarm state. |
| LINK/ACT (green) | If the indicator is on, the link functions properly. If the indicator blinks, data is being transmitted or received. If the indicator is off, it indicates that the link is Down. |

5.32.4 Interfaces

Table 5-184 describes the types and functions of the interfaces on the 1-port OC-48c/STM-16c POS-SFP FPIC panel.

Table 5-184 Attributes of interfaces on the 1-port OC-48c/STM-16c POS-SFP FPIC

| Name | Qua ntity | Description |
|--|--------------|--|
| OC-3c/STM-1c POS-SFP optical interface | 1 | The 1-port OC-48c/STM-16c POS-SFP FPIC provides one 2.5 Gbit/s optical interface to transmit and receive services. |

5.32.5 Interface Attributes

Table 5-185 describes the attributes of the interfaces on the 1-port OC-48c/STM-16c POS-SFP FPIC.

Table 5-185 Attributes of interfaces on the 1-port OC-48c/STM-16c POS-SFP FPIC

| Attribute | Description |
|-----------------------------|--|
| Connector type | LC/PC |
| Optical interface attribute | Determined by the selected SFP optical module For details about the attributes of the optical module, see Table 5-186 . |
| Operation mode | Full duplex |
| Frame format | PPP, HDLC |
| Network protocol | IP |

Table 5-186 Attributes of the 2.5 Gbit/s SFP optical module

| Attribute | Description | | | |
|----------------------------------|-------------|----------|----------|----------|
| Transmission distance | 2 km | 15 km | 40 km | 80 km |
| Center wavelength | 1310 nm | 1310 nm | 1310 nm | 1550 nm |
| Minimum transmitting power | -10.0 dBm | -5.0 dBm | -2.0 dBm | -2.0 dBm |
| Maximum transmitting power | -3.0 dBm | 0 dBm | 3.0 dBm | 3.0 dBm |

| Attribute | Description | | | |
|------------------------|-------------|-------------|-------------|-------------|
| Receiver sensitivity | -21.0 dBm | -21.0 dBm | -30.0 dBm | -30.0 dBm |
| Overload optical power | -3.0 dBm | 0 dBm | -9.0 dBm | -9.0 dBm |
| Fiber type | Single-mode | Single-mode | Single-mode | Single-mode |

5.32.6 Technical Specifications

Table 5-187 describes the technical specifications of the 1-port OC-48c/STM-16c POS-SFP FPIC.

Table 5-187 Technical specifications of the 1-port OC-48c/STM-16c POS-SFP FPIC

| Item | Specification |
|-------------------------------------|-------------------------|
| Silkscreen | FPIC-1xOC48-POS |
| Typical power consumption | 12 W |
| Heat dissipation | 49 BTU/hour |
| Weight | 0.5 kg |
| Dimensions (width x depth x height) | 145 mm x 185 mm x 20 mm |
| Connector type | LC |
| Long-term temperature | 0°C to 45°C |
| Short-term temperature | -5°C to 55°C |

6 Cables

About This Chapter

This chapter describes the DC power cables and AC power cables of the S9300, including the structures and technical specifications of DC power cables and AC power cables.

6.1 DC Power Cable

This section describes the structure and technical specifications of the DC power cables.

6.2 AC Power Cable

This section describes the structure and technical specifications of the AC power cables.

6.3 Ground Cable

This section describes the structure and technical specifications of the ground cables.

6.4 Console Cable

This section describes the structure and technical specifications of the Console cable.

6.5 Ethernet Cable

This section describes the structure and technical specifications of the Ethernet cables.

6.6 Optical Fiber

This section describes the structure and technical specifications of the optical fibers.

6.7 Clock Cable

This section describes the structure and technical specifications of the clock cables.

6.8 Stack Cables

This section describes the structure and technical specifications of the stack cables.

6.1 DC Power Cable

This section describes the structure and technical specifications of the DC power cables.

6.1.1 Introduction

The power cables of the S9300 consist of the power cables in the cabinet and power cables out of the cabinet. The external power cables connect the power distribution cabinet to the power distribution box, and the internal power cables connect the power distribution box to the S9300 in the cabinet.

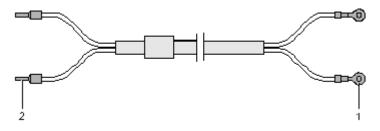
The internal DC power cable consists of a -48 V power cable and a power ground cable RTN. One end that connects to the power modules is the OT terminal, and the other end that connects to the power distribution box is the cord end terminal.

The external DC power cable consists of a -48 V power cable and a power ground cable RTN. One end that connects to the power distribution box is the OT terminal, the other end that connects to the power distribution cabinet is generally the OT terminal.

6.1.2 Structure

Figure 6-1 shows the internal DC power cable that connects the power distribution box to the DC power supplies in the chassis.

Figure 6-1 Internal DC power cable



1. OT bare crimping terminal

2. Single-line cord end terminal

The terminals of the external DC power cable are determined according to the site survey.

6.1.3 Technical Specifications

Technical Specifications of the DC Power Cables in the Cabinet

Table 6-1 Technical specifications of the DC power cables in the cabinet

| Item | Specification |
|---|--|
| -48 V power cable | Electronic and electrical cable-600 V-UL3386-5.2 mm^2-10AWG-Blue-48 A-Low-fume, halogenless and flame-retardant cable |
| RTN power cable | Electronic and electrical cable-600 V-UL3386-5.2 mm^2-10AWG-Black-48 A-Low-fume, halogenless and flame-retardant cable |
| Terminal connecting to the power modules of the S9300 | Bare crimping terminal-OT-6 mm^2-M4-Tin plating-Round pre- Insulated terminal-12-10 AWG-Yellow |
| Terminal connecting to the power distribution box | Common terminal-Single-line cord end terminal-6 mm^2-0.02 m-30 A-Insert depth 12 mm-Black |

Technical Specifications of the DC Power Cables Out of the Cabinet

Table 6-2 List of external DC power cables in different cabinet configuration schemes

| Total Power Consum ption | Descripti | on | | |
|-----------------------------------|--|---|---|---|
| Less than 1600 W | Power distance | 35.6 m | 55.6 m | 77.8 m |
| | Cross-sectional area of the conducto r | 16 mm^2 | 25 mm^2 | 35 mm^2 |
| | Power cable | Electronic and electrical cable-227IEC02 (RV)-16 mm^2-(blue, black, red, or green-yellow) | Electronic and electrical cable-227IEC02 (RV)-25 mm^2-(blue, black, red, or green-yellow) | Electronic and electrical cable-227IEC02 (RV)-35 mm^2-(blue, black, red, or green-yellow) |
| | Terminal | 16 mm^2 power cable terminal | 25 mm^2 power cable terminal | 35 mm ² power cable terminal |
| Less than 2400 W | Power distance | 23.7 m | 37.0 m | 51.8 m |

| Total Power Consum ption | Descripti | on | | |
|-----------------------------------|--|---|---|---|
| | Cross-sectional area of the conducto r | 16 mm^2 | 25 mm^2 | 35 mm^2 |
| | Power cable | Electronic and electrical cable-227IEC02 (RV)-16 mm^2-(blue, black, red, or green-yellow) | Electronic and electrical cable-227IEC02 (RV)-25 mm^2-(blue, black, red, or green-yellow) | Electronic and electrical cable-227IEC02 (RV)-35 mm^2-(blue, black, red, or green-yellow) |
| | Terminal | 16 mm^2 power cable terminal | 25 mm^2 power cable terminal | 35 mm^2 power cable terminal |
| Less than 3200 W | Power distance | - | 27.7 m | 38.8 m |
| | Cross-sectional area of the conducto r | - | 25 mm^2 | 35 mm^2 |
| | Power cable | - | Electronic and electrical cable-227IEC02 (RV)-25 mm^2-(blue, black, red, or green-yellow) | Electronic and electrical cable-227IEC02 (RV)-35 mm^2-(blue, black, red, or green-yellow) |
| | Terminal | - | 25 mm^2 power cable terminal | 35 mm^2 power cable terminal |

6.2 AC Power Cable

This section describes the structure and technical specifications of the AC power cables.

6.2.1 Introduction

The power cables of the S9300 include:

• Internal power cables, which are in the chassis

• External power cables, which are outside the chassis

An external power cable transmit power from the user's power distribution frame to the power distribution box in the cabinet, and then an internal power cable transmits power from the power distribution box to the S9300 in the cabinet.

Internal power cables are classified into:

- AC power cables for 800 W power supply units
- AC power cables for 2200 W power supply units

Each internal or external AC power cable consists of the live wire, neutral wire, and ground cable.

6.2.2 Structure

NOTE

The appearances of the power cables for 800 W power supply unit and 2200 W power supply unit are the same, but the connectors of the cables are different:

- The power cables for the 800 W power supply units use the C13-straight-female connectors.
- The power cables for the 2200 W power supply units use the C19-straight-female connectors.

Figure 6-2 shows the appearance of the internal AC power cables.

Figure 6-2 Appearance of the internal AC power cables



The terminals of the external AC power cables are determined according to the site survey.

6.2.3 Technical Specifications

Table 6-3, **Table 6-4** and **Table 6-5** show the technical specifications of the AC power cables of the S9300.

Table 6-3 Technical specifications of the power cables for 800 W AC power supply units

| Item | Description |
|-------------|---------------------------|
| Power cable | 220 V 10 A AC power cable |

| Item | Description |
|------------------------------------|-----------------------|
| Connector | C13-straight-female |
| Color | Black |
| Cable length | 3 meters |
| Conductor cross- sectional area | 3*1.0 mm ² |
| Cable type | 227 IEC 53-1.0^2(3C) |

Table 6-4 Technical specifications of the power cables for 2200 W AC power supply units

| Item | Description | |
|--------------|---------------------------|--|
| Power cable | 220 V 16 A AC power cable | |
| Connector | C19-straight-female | |
| Color | Black | |
| Cable length | 3 meters | |
| Cable type | 227 IEC 53-2.5^2(3C) | |

Table 6-5 Technical specifications of the AC power cables out of the cabinet

| Item | Description |
|-------------|--|
| Power cable | Electronic and electrical cable-300 V-227IEC10(BVV)-6 mm^2-Black jacket (core: blue, brown, yellow/green)-36 A-3 cores with equal cross sections |
| Terminal | 35 mm ² power cable terminal |

6.3 Ground Cable

This section describes the structure and technical specifications of the ground cables.

6.3.1 Introduction

The ground cables connect the S9300 and cabinet to the ground. The ground cables in the front, rear, and side panels of the cabinet have been properly connected before delivery.

6.3.2 Structure

The appearance of ground cable terminals and the DC power cable terminals is the same.

6.3.3 Technical Specifications of the S9300 Ground Cables

Table 6-6 shows the technical specifications of the ground cables of the cabinet.

Table 6-6 Technical specifications of the S9300 ground cables

| Item | Specification |
|----------|--|
| Cable | Electronic and electrical cable-450V/750V-H07Z-K-6 mm^2-Yellow-green-Low-fume, halogenless and flame-retardant cable |
| Terminal | Bare crimping terminal-OT-6 mm^2-M6-Tin plating-Round pre- insulated terminal-12 to 10 AWG-Yellow |

6.4 Console Cable

This section describes the structure and technical specifications of the Console cable.

6.4.1 Introduction

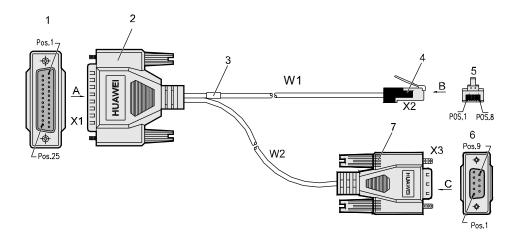
The Console cable is used to connect the S9300 Console port to the serial port of the Console to transmit the configuration data of the S9300.

You can select the shielded cable or unshielded cable according to the actual situation. One end of the cable is an RJ45 connector that is connected to the Console port of the main control board, and the other end that is connected to the serial port of the computer has a DB9 connector and a DB25 connector. Either of the two connectors can be selected to connect to the serial port according to the actual situation.

6.4.2 Structure

Figure 6-3 shows the Console cable, and Table 6-7 shows the connection of the Console cable.

Figure 6-3 Console cable



- 1. Direction A
- 2. DB25 plug
- 3. Label
- 4. Network port connector RJ45

- 5. Direction B
- 6. Direction C
- 7. DB9 plug
- W1 and W2 communication cables

Table 6-7 Pin assignments of the Console cable

| RJ45 | Direction | DB25 | DB9 | Signal |
|------|-----------|------|-----|---------------------------|
| 1 | > | 5 | 8 | Clear to Send (CTS) |
| 2 | > | 6 | 6 | Data Set Ready (DSR) |
| 3 | > | 3 | 2 | Receive Data (RXD) |
| 4 | - | 7 | 5 | GND |
| 5 | - | 7 | 5 | GND |
| 6 | < | 2 | 3 | Transmit Data (TXD) |
| 7 | < | 20 | 4 | Data Terminal Ready (DTR) |
| 8 | < | 4 | 7 | Request to Send (RTS) |

6.4.3 Technical Specifications

Table 6-8 describes the technical specifications of the Console cable.

Table 6-8 Technical specifications of the Console cable

| Item | Specification |
|-----------------|------------------------------------|
| Connector X1 | Cable connector-D style-25PIN-Plug |

| Item | Specification |
|---------------------|---|
| Connector X2 | Network interface connector-Crystal connector-8PIN-8 bits-Connector |
| Connector X3 | Cable connector-D style-9PIN-Plug |
| Fire- resistance | СМ |

6.5 Ethernet Cable

This section describes the structure and technical specifications of the Ethernet cables.

6.5.1 Introduction

Ethernet cables are classified into the straight-through cable and the crossover cable.

Straight-through Cable

The straight-through cable is used to connect the Ethernet interfaces between the following devices:

- Router and hub
- Router and LAN switch
- PC and LAN switch
- PC and hub

Crossover Cable

The crossover cable is used to connect the Ethernet interfaces between the following devices:

- Router and router
- Router and PC
- Hub and hub
- Hub and switch
- Switch and switch
- PC and PC

6.5.2 Structure

The straight-through cable and the crossover cable are standard unshielded network cables. They adopt the RJ45 connectors, and **Figure 6-4** shows the structure of an RJ45 connector.

Figure 6-4 Structure of RJ45

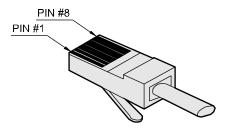


Table 6-9 describes pin assignments of the straight-through cable. **Table 6-10** describes pin assignments of the crossover cable.

Table 6-9 Pin assignments of the straight-through cable

| Connector X1 | Connector X2 | Color | Relation |
|--------------|--------------|--------------|----------|
| X1.2 | X2.2 | Orange | Pair |
| X1.1 | X2.1 | White/Orange | |
| X1.6 | X2.6 | Green | Pair |
| X1.3 | X2.3 | White/Green | |
| X1.4 | X2.4 | Blue | Pair |
| X1.5 | X2.5 | White/Blue | |
| X1.8 | X2.8 | Brown | Pair |
| X1.7 | X2.7 | White/Brown | |

Table 6-10 Pin assignments of the crossover cable

| Connector X1 | Connector X2 | Color | Relation |
|--------------|--------------|--------------|----------|
| X1.6 | X2.2 | Orange | Pair |
| X1.3 | X2.1 | White/Orange | |
| X1.2 | X2.6 | Green | Pair |
| X1.1 | X2.3 | White/Green | |
| X1.4 | X2.4 | Blue | Pair |
| X1.5 | X2.5 | White/Blue | |
| X1.8 | X2.8 | Brown | Pair |

| Connector X1 | Connector X2 | Color | Relation |
|--------------|--------------|-------------|----------|
| X1.7 | X2.7 | White/Brown | |

6.5.3 Technical Specifications

Table 6-11 describes the technical specifications of the straight-through cable. **Table 6-12** describes the technical specifications of the crossover cable.

Table 6-11 Technical specifications of the straight-through cable

| Item | Specification |
|-----------------|---|
| Connector X1/X2 | Network interface connector-Crystal connector-8PIN-8 bits-Shield-Plug-24 to 26 AWG-CAT 6/SFTP network cable |
| Power cable | Communication cable-100±15 non-shield enhanced 5 types-CAT5E SFTP 24 AWG-8-core PANTONE 445 U |
| Number of cores | 8 cores |
| Fire-resistance | СМ |
| Length | 5 m, 10 m, 20 m, or 30m |

Table 6-12 Technical specifications of the crossover cable

| Item | Specification |
|---------------------|---|
| Connector X1/X2 | Network interface connector-Crystal connector-8PIN-8 bits-Shield-Plug-24 to 26 AWG-CAT 6/SFTP network cable |
| Power cable | Communication cable-100±15 non-shield enhanced 5 types-CAT5E SFTP 24 AWG-8-core PANTONE 646 U |
| Number of cores | 8 cores |
| Fire- resistance | СМ |
| Length | 5 m or 30 m |

6.6 Optical Fiber

This section describes the structure and technical specifications of the optical fibers.

6.6.1 Introduction

Table 6-13 provides the types of optical fibers used by the S9300.

Table 6-13 Types of the optical fibers

| No. | Cable and Use | Local Connector | Remote Connector | Cables |
|-----|---|--------------------|---------------------|---------------------------|
| 1 | Fiber connecting the local LPU to the ODF | LC/PC | FC/PC | Single mode |
| 2 | Fiber connecting to the local LPUs | LC/PC | LC/PC | Single mode/ multimode |
| 3 | Fiber connecting the local LPU to the other equipment | LC/PC | SC/PC or LC/ PC | Single mode/ multimode |

■ NOTE

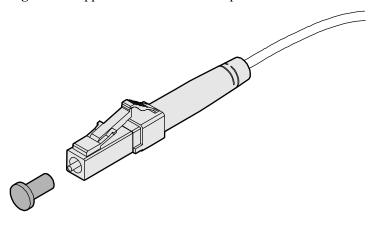
The optical transmission module of the multi-longitudinal mode needs to be connected to the multimode fiber or the single-mode fiber. The optical transmitting module of the single-longitudinal mode needs to be connected to the single-mode fiber.

6.6.2 Optical Connector

The S9300 uses the LC/PC optical connector.

Figure 6-5 shows the appearance of the LC/PC optical connector.

Figure 6-5 Appearance of the LC/PC optical connector





CAUTION

The plugging/unplugging of the LC/PC optical interface needs only an axial operation instead of a rotation. The operation procedures and precautions are as follows:

- Align the head of the fiber jumper with the optical interface on the optical board and exert proper force to push the fiber inside.
- Press the clip before pulling out the fiber. Push in the fiber connector inward slightly, and then pull out the connector.

6.6.3 Technical Specifications

Table 6-14 describes the technical specifications of the optical fiber.

Table 6-14 Technical specifications of the optical fiber

| Item | Specification |
|-------------------------|-----------------------|
| Fiber transmission mode | Single mode/multimode |
| Connector | LC/PC |
| Outer diameter | 2 mm |

6.7 Clock Cable

This section describes the structure and technical specifications of the clock cables.

6.7.1 Introduction

The external synchronization interface of the S9300 is used for clock and time synchronization.

The S9300 can be connected to the external clock source or clock source device through the clock cable.

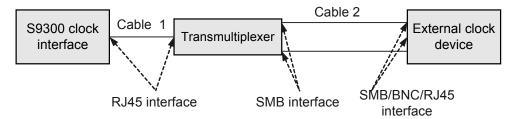
The clock cable is used to connect the S9300 with the clock interface of the external equipment. With the cable, the S9300 can receive 2-channel 2.048 MHz or 2.048 Mbit/s synchronous clock signals provided by the upstream device. The S9300 can also offer 2-channel 2.048 MHz or 2.048 Mbit/s synchronous clock signals to the downstream device.

When the S9300 is connected to the clock interface of the external equipment through the clock cable, the S9300 can receive the 2-channel TOD or DCLS synchronous clock signals provided by the upstream device. The S9300 can also offer 2-channel TOD or DCLS synchronous clock signals to the downstream device.

One end of the clock cable is the RJ45 connector, which is connected to the BITTS interface on the SRU or MCU of the S9300. The other end of the clock cable is connected to the external clock device. The connector type depends on the type of the external clock device. The external

clock device connected to the S9300 can be the SubMiniature version B (SMB) clock source, Boyonet Neil Councilman (BNC) clock source, RJ45 clock source, and RJ45 time source.

Figure 6-6 Clock cable connections



According to the functions and interface types of the external clock device connected to the S9300, the following cables can be selected:

- If the connected device is the clock source and the RJ45 interface is used: Cable 1 can be the RJ48 cable. The transmultiplexer or cable 2 is not required.
- If the connected device is the clock source and the SMB interface is used:
 Cable 1 can be the RJ45 cable, and cable 2 can be the SMB/SMB trunk cable. The transmultiplexer is required.
- If the connected device is the clock source and the SMB interface is used:

 Cable 1 can be the RJ45 cable, and cable 2 can be the SMB/SMB trunk cable. The transmultiplexer is required.
- If the connected device is the time source and the RJ45 interface is used: Cable 1 can be the RJ45 cable. The transmultiplexer or cable 2 is not required.

NOTE

Both the RJ48 cables and RJ45 cables must be shielded cables.

6.7.2 Structure

RJ48 Cable

The RJ48 cable supported by the S9300 is the 120Ω trunk cable (shielded cable), as shown in **Figure 6-7**.

Figure 6-7 Structure of the 120Ω trunk cable



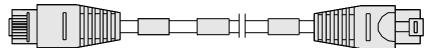
M NOTE

When the connected device is RJ45 clock source, the RJ48 cables are used for the connection of S9300 and the RJ45 clock source.

RJ45 Cable

The RJ45 cable supported by the S9300 is the straight-through cable (shielded cable), as shown in **Figure 6-8**.

Figure 6-8 Structure of the straight-through cable



NOTE

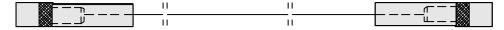
When the connected device is RJ45 time source, the RJ45 cables is used for the connection of S9300 and the RJ45 time source.

When the connected device is SMB clock source or BNC clock source, the RJ45 cable is used for the connection of S9300 and transmultiplexer.

SMB/SMB Trunk Cable

The SMB/SMB trunk cable is the 75Ω trunk cable with the SMB connectors, as shown in **Figure** 6-9.

Figure 6-9 SMB/SMB trunk cable



SMB/BC Trunk Cable

The SMB/BNC trunk cable is the 75 Ω trunk cable with the SMB connector and BNC connector, as shown in **Figure 6-10**.

Figure 6-10 SMB/BNC trunk cable



6.7.3 Technical Specifications

120 Ω trunk cable

| Cable Description | Length |
|---|--------|
| Trunk cable-3.00 m-120 ohm-1E1-0.4 mm-(8-bit network interface-II)-(120CC4P0.4P430U(S))-(8-bit network interface-II)-Expert | 3 m |

| Cable Description | Length |
|--|--------|
| Trunk cable-15 m-120 ohm-1E1-0.4 mm-(8-bit network interface-II)-(120CC4P0.4P430U(S))-(8-bit network interface-II) | 15 m |
| Trunk cable-30.00 m-120 ohm-1E1-0.4 mm-(8-bit network interface-II)-(120CC4P0.4P430U(S))-(8-bit network interface-II)-Expert | 30 m |
| Trunk cable-60.00 m-120 ohm-1E1-0.4 mm-(8-bit network interface-II)-(120CC4P0.4P430U(S))-(8-bit network interface-II)-Expert | 60 m |
| Trunk cable-80.00 m-120 ohm-1E1-0.4 mm-(8-bit network interface-II)-(120CC4P0.4P430U(S))-(8-bit network interface-II)-Expert | 80 m |

Straight-Through Cable

| Cable Description | Length |
|---|--------|
| Single cable-MEM board network card-straight-through cable connecting Hub and computer-0.20 m-(8-bit network interface-I)-(CC4P0.5 gray)-(8-bit network interface-I)-C&C08B, DL2015 | 0.2 m |
| Single cable-straight-through network cable-0.50 m-(8-bit network interface-I)-(CC4P0.5 gray)-(8-bit network interface-I)-ONU-160B, DL5042 | 0.5 m |
| Single cable-straight-through cable-1 m-(8-bit network interface-I)-(CC4P0.5 gray)-(8-bit network interface-I) | 1 m |
| Single cable-straight-through cable-1.50 m-(8-bit network interface-I)-(CC4P0.5 gray)-(8-bit network interface-I) | 1.5 m |
| Single cable-straight-through cable-2.00 m-(8-bit network interface-I)-(CC4P0.5 gray)-(8-bit network interface-I), DL3470 | 2 m |
| Single cable-straight-through cable-3.00 m-(8-bit network interface-I)-(CC4P0.5 gray)-(8-bit network interface-I) | 3 m |
| Single cable-straight-through cable-5.00 m-(8-bit network interface-I)-(CC4P0.5 gray)-(8-bit network interface-I), DL4538 | 5 m |
| Single cable-straight-through cable-10.00 m-(8-bit network interface-I)-(CC4P0.5 gray)-(8-bit network interface-I), DL2761 | 10 m |
| Single cable-straight-through cable-30.00 m-(8-bit network interface-I)-(CC4P0.5 gray)-(8-bit network interface-I), DL4217 | 30 m |
| Single cable-straight-through cable connecting Hub and computer-40.00 m-(8-bit network interface-I)-(CC4P0.5 gray)-(8-bit network interface-I)-PDH-HONET, DL4218 | 40 m |
| Single cable-straight-through cable connecting Hub and computer-60 m-(8-bit network interface-I)-(CC4P0.5 gray)-(8-bit network interface-I)-HONET, DL3702 | 60 m |

SMB/SMB Trunk Cable

The type of the SMB/SMB trunk cable is: Trunk cable-2.00 m-75 ohm-2.2 mm-(SMB75SF-V)-(SYFVZ75-1.2/0.25)-(SMB75SF-V)-HONET, DL4362. The two ends of the cable are SMB connectors. The cable length is 2 m.

SMB/BNC Trunk Cable

The type of the SMB/BNC trunk cable is: Trunk cable-10.00 m-75 ohm-2.2 mm-(SMB75SF-V)-(SYFVZ75-1.2/0.25)-(BNC75SF-V)-STP. One end of the cable is the SMB connector, and the other end is the BNC connector. The cable length is 10 m.

6.8 Stack Cables

This section describes the structure and technical specifications of the stack cables.

6.8.1 Introduction

The stack cables of the S9300 are the QSFP high-speed cables, which interconnect the interfaces on the VSTSA cards. The S9306s or S9312s are connected through the stack cables to form a logical switch, thus implementing packet forwarding.

NOTE

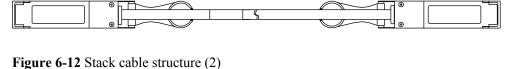
The two ends of a stack cable must be covered by the ESD caps.

The Quad Small Form-Factor Pluggable (QSFP) is a 4-channel small hot pluggable optical module.

6.8.2 Structure

Figure 6-11 and Figure 6-12 show the structures of the stack cables.

Figure 6-11 Stack cable structure (1)



6.8.3 Technical Specifications

Table 6-15 shows the technical specifications of the stack cables.

Table 6-15 Technical specifications of the stack cables

| Item | Description |
|-----------------|---|
| Cable | QSFP high-speed cable-Indoor-(QSFP 38 male)-(QSFP 38 male)-(CC8P0.5 black (S))-15 m |
| Connector X1/X2 | QSFP-38PIN-male |

| Item | Description |
|-----------------|--|
| Fire-resistance | UL VW-1 (UL758) or CM (UL444) or CL2 (UL13) or FT4 |
| Color | Black or Blue |
| Number of cores | 8 |
| Length | 10 m |
| Bend radius | 75 mm |

Z List of Indicators

About This Chapter

This chapter describes the status and meanings of the indicators on the S9300, including the indicators of boards, fan modules, and power supplies.

7.1 Fan Module Indicators

This section describes the fan module indicators.

7.2 Power Supply Indicators

This section describes the power supply indicators.

7.3 SRU Indicators

This section describes the SRU indicators.

7.4 MCUA Indicators

This section describes the MCU indicators.

7.5 LPU Indicators

This section describes the LPU indicators.

7.6 CMU Indicators

This section describes the CMU indicators.

7.1 Fan Module Indicators

This section describes the fan module indicators.

Table 7-1 describes the fan module indicators.

Table 7-1 Description of the fan module indicators

| Name | Color | Description |
|-----------|-------|---|
| Status Gr | Green | If the indicator blinks (0.5 Hz), it indicates that the fan module works normally, and the communication is normal. |
| | | If the indicator blinks (4 Hz), it indicates that the fan module works normally, but the communication is abnormal. |
| | Red | If the indicator blinks (0.5 Hz), it indicates that an alarm is generated, but you cannot determine whether to replace the fan module. It is recommended that you check the situation for certain time. |
| | | If the indicator is on, it indicates that the fan module is faulty and you need to replace them. |

7.2 Power Supply Indicators

This section describes the power supply indicators.

The DC power supply indicators are displayed on the panel of the DC power supplies through the lamp guide. **Table 7-2** describes the indicators of the DC power supplies.

Table 7-2 Description of the DC power supply indicators

| Indicator | Color | Description |
|-----------|-------|--|
| ALM | Red | If the indicator is on, it indicates that the protection circuit fails. |
| | | If the indicator is off, it indicates that the protection circuit is normal. |
| INPUT | Green | If the indicator is on, it indicates that the -48 V power input is normal. |
| | | If the indicator is off, it indicates that the -48 V power input is unavailable. |

Table 7-3 describes the AC power supply indicators.

Table 7-3 Description of the AC power supply indicators

| Indicator | Color | Description |
|-----------|--------|--|
| RUN | Green | If the indicator is on, it indicates that the AC power input is normal. |
| | | If the indicator is off and the FAULT indicator or ALARM indicator is on, it indicates that a fault occurs or an alarm other than the over-current alarm is generated. |
| ALARM | Yellow | If the indicator is on, it indicates a PS-off alarm, over-temperature alarm, over-voltage alarm, under-voltage alarm, or over-current alarm. |
| | | If the indicator blinks, it indicates that the communication is fault. |
| | | If the indicator is off, it indicates that the power supply is normal. |
| FAULT | Red | If the indicator is on, it indicates that the power supply is faulty and cannot be rectified. |
| | | If the indicator is off, it indicates that the power supply does not have any fault that cannot be rectified. |

7.3 SRU Indicators

This section describes the SRU indicators.

Table 7-4 describes the SRU indicators.

Table 7-4 Description of the buttons and indicators on the SRU panel

| Indicator/Button | Color | Meaning |
|------------------|--------|--|
| RUN/ALM | Green | If the indicator is on, it indicates that the SRU is powered on, but the software is not running. |
| | | If the indicator blinks once every 2s (0.5 Hz), it indicates that the system is in normal state. |
| | | If the indicator blinks once every 0.25s (4 Hz), it indicates that the system is being started. |
| | Red | If the indicator is in red, it indicates that the board is faulty. |
| | Orange | If the indicator is in orange, it indicates that the board is installed in the slot and is powered on. |

| Indicator/Button | Color | Meaning |
|------------------|-------|---|
| ACT | Green | This indicator shows whether the SRU is the master SRU or slave SRU. |
| | | If the indicator is on, it indicates that the SRU is the master SRU. |
| | | If the indicator is off, it indicates that the SRU is the standby SRU. |
| RST | - | Press this button to reset the board. NOTE Resetting the board will cause the loss of service packets. Confirm the operation before you press the Reset button. |
| SYNC | Green | If the indicator is on, it indicates that the device supports the time and clock synchronization and the clock board is installed on the SRU. |
| | | If the indicator is off, it indicates that the device supports the time and clock synchronization but the clock board is not installed on the SRU. |

7.4 MCUA Indicators

This section describes the MCU indicators.

Table 7-5 describes the MCU indicators.

Table 7-5 Description of the MCU indicators

| Indicator/Button | Color | Description |
|------------------|--------|--|
| RUN/ALM | Green | If the indicator is on, it indicates that the MCU is powered on, and the software is not run. |
| | | If the indicator blinks every 2s (0.5 Hz), it indicates that the system is in normal state. |
| | | If the indicator blinks every 0.25s (4 Hz), it indicates that the system is starting. |
| | Red | If the indicator is in red, it indicates that the board is faulty. |
| | Orange | If the indicator is in orange, it indicates that the board is inserted in the subrack and is installed, and the board is powered on. |

| Indicator/Button | Color | Description |
|------------------|-------|---|
| ACT | Green | Indicates the active MCU or the standby MCU. |
| | | If the indicator is on, it indicates that the MCU is the active one. |
| | | If the indicator is off, it indicates that the MCU is the standby one. |
| RST | - | Press this button to reset the board. |
| SYNC | Green | If the indicator is on, it indicates that the device supports the time and clock synchronization and the clock board is installed on the MCUA. |
| | | If the indicator is off, it indicates that the device supports the time and clock synchronization but the clock board is not installed on the MCUA. |

7.5 LPU Indicators

This section describes the LPU indicators.

Indicators on the Panel

Table 7-6 describes the indicators on the panel of the LPU.

Table 7-6 Description of the indicators on the panel of the LPU

| Indicator/Button | Color | Description |
|------------------|--------|--|
| RUN/ALM | Green | If the indicator is on, it indicates that the LPU is powered on, but the software is not running. |
| | | If the indicator blinks every 2s (0.5 Hz), it indicates that the system is in normal state. |
| | | If the indicator blinks every 0.25s (4 Hz), it indicates that the system is starting. |
| | Red | If the indicator is in red, it indicates that the board is faulty. |
| | Orange | If the indicator is in orange, it indicates that the board is inserted in the subrack and is installed, and the board is powered on. |

Interface Indicators of the Optical LPU

Each interface provides two indicators. The left is the ACT indicator, and the right is the Link indicator. **Table 7-7** describes the meanings of the indicators.

Table 7-7 Interface indicators of the optical LPU

| Indicator/Button | Color | Description |
|------------------|--------------|---|
| ACT | Amber | If the indicator blinks, the data is being transmitted or received. If the indicator is off, it indicates that no data is being transmitted or received. |
| LINK | Green-yellow | If the indicator is on, it indicates that the link is connected. If the indicator is off, it indicates that the link is broken or faulty. |

Interface Indicators of the Electrical LPU

Each interface provides a green indicator. If the indicator is on, it indicates that it is the Link indicator; if the indicator blinks, it is the ACT indicator. For each group of interface numbers, the one on the left maps the upper interface, and the one on the right maps the lower interface. **Table 7-8** describes the indicators.

Table 7-8 Interface indicators of the electrical LPU

| Indicator/Button | Color | Description |
|------------------|-------|--|
| Link/ACT | Green | If the indicator is on, it indicates that the link is connected. |
| | | If the indicator blinks, the data is being transmitted or received. |
| | | If the indicator is off, it indicates that the link is broken or faulty. |

7.6 CMU Indicators

This section describes the CMU indicators.

Table 7-9 describes the CMU indicators.

 Table 7-9 Description of the CMU indicators

| Indicator/Button | Color | Description |
|------------------|-------|--|
| RUN/ALM | Green | If the indicator blinks every 2s (0.5 Hz), it indicates that the system is in normal state. |
| | | If the indicator blinks every 0.25s (4 Hz), it indicates that the system is unregistered. |
| | Red | If the indicator is on, it indicates that the board is faulty. |
| | | If the indicator blinks every 2s (0.5 Hz), it indicates that an alarm is generated because of a fault on the CMU, fans or power. |
| | | If the indicator blinks every 0.25s, the output power is insufficient. |
| ACT | Green | Indicates the active CMU or the standby CMU. |
| | | If the indicator is on, it indicates that the CMU is the active one. |
| | | If the indicator is off, it indicates that the CMU is the standby one. |

8 List of Boards

About This Chapter

This chapter describes the types and technical specifications of the boards.

8.1 Boards Supported by the S9300

This section describes the boards supported by the S9300.

8.2 Power Consumption and Weight

This section describes the power consumption and weight of boards.

8.1 Boards Supported by the S9300

This section describes the boards supported by the S9300.

M NOTE

The LPUs are classified into S series boards, E series boards, F series boards, B series boards, EPON boards, and POS boards:

- The S series boards are SA boards, for example, 24-port 100M/1000M Ethernet optical LPU (SA, SFP)-32K MAC.
- E series boards include EA, EC, and ED boards, for example, 48-port 100M Ethernet optical LPU (EA, SFP)-32K MAC.
- F series boards include FA and FC boards, for example, 48-port 1000M Ethernet electrical LPU (FA, RJ45)-32K MAC.
- B series boards are BC boards, for example, 48-port 100M/1000M Ethernet optical LPU (BC, SFP)-128K MAC.
- An EPON board provides twelve 1000M EPON optical interfaces and twelve 100M/1000M optical interfaces (SFP).
- A POS board consists of a WAN card and subcard such as P4CF, P4HF, or P1UF.

The following tables list the boards supported by the S9300.

Table 8-1 Main control boards and subcards

| Name | Description |
|-------|--|
| SRUA | Main control board applied to the S9312 and S9306. The unidirectional switching capacity is 256 Gbit/s |
| SRUB | Main control board applied to the S9312 and S9306. The unidirectional switching capacity is 512 Gbit/s |
| MCUA | Main control board applied to the S9303. The unidirectional switching capacity is 256 Gbit/s |
| FSUA | Flexible service subcard on the SRU, enhancing service processing capability on the SRU |
| VSTSA | Stack interface flexible pluggable card on the SRU, used to provide the switch stacking function |
| CKMA | Clock Pinch Board-1588 |

Table 8-2 CMU

| Name | Description |
|------|--|
| CMUA | Centralized Monitoring Unit, used to monitor the operation of the S9312 and S9306, providing two interfaces: RS485 and MON |

Table 8-3 service boards

| Name | Description |
|-------|---------------------------------|
| VAMPA | Value-added service (VAS) board |

Table 8-4 Ethernet LPUs

| Name | Description | | |
|---------|---|--|--|
| G24CA | 24-port 100/1000BASE-X and 8-port 10/100/1000BASE-T interface card (SA, SFP/RJ45) | | |
| G24SA | 24-port 100/1000BASE-X interface card (SA, SFP)-32K MAC | | |
| X12SA | 12-port 10GBASE-X interface card (SA, SFP+) | | |
| G48SA | 48-port 100/1000BASE-X interface card (EA, SFP)-32K MAC | | |
| G48SC | 48-port 100/1000BASE-X interface card (EC, SFP)-128K MAC | | |
| G48SD | 48-port 100/1000BASE-X interface card (ED, SFP)-512K MAC | | |
| G48SBC | 48-Port 100/1000BASE-X Interface Card(BC,SFP)-128K MAC | | |
| G48SFA | 48-port 100/1000BASE-X interface card (FA, SFP)-32K MAC | | |
| F48SA | 48-port 100BASE-FX interface card (EA, SFP)-32K MAC | | |
| F48SC | 48-port 100BASE-FX interface card (EC, SFP)-128K MAC | | |
| G48TA | 48-port 10/100/1000BASE-T interface card (EA, RJ45)-32K MAC | | |
| G48TC | 48-port 10/100/1000BASE-T interface card (EC, RJ45)-128K MAC | | |
| G48TD | 48-port 10/100/1000BASE-T interface card (ED, RJ45)-512K MAC | | |
| G48TBC | 48-port 10/100/1000BASE-T Ethernet electrical interface card (BC, RJ45)-128K MAC | | |
| G48TFA | 48-port 10/100/1000BASE-T interface card (FA, RJ45)-32K MAC | | |
| G48CEAT | 36-Port 10/100/1000BASE-T and 12-Port 100/1000BASE-X Interface Card(EA,RJ45/SFP)–32K MAC | | |
| G48VA | 48-port 10/100/1000BASE-T PoE interface card (EA, RJ45, PoE)-32K MAC | | |
| F48TA | 48-port 10/100BASE-T interface card (EA, RJ45)-32K MAC | | |
| F48TC | 48-port 10/100BASE-T interface card (EC, RJ45)-128K MAC | | |
| F48TFA | 48-port 10/100BASE-T interface card (FA, RJ45)-32K MAC | | |
| X40SFC | 40-port 10GE Ethernet optical interface card (FC, SFP+) | | |
| X16SFC | 16-port 10GE Ethernet optical interface card (FC, SFP+) | | |

| Name | Description | |
|---------|---|--|
| S24XA | 24-port 100/1000BASE-X and 2-port 10GBASE-X interface card (EA, SFP/XFP)-32K MAC | |
| S24XC | 24-Port 100/1000BASE-X and 2-Port 10GBASE-X Interface Card (EC,SFP/XFP)-128K MAC | |
| T24XA | 24-port 10/100/1000BASE-T and 2-port 10GBASE-X interface card (EA, RJ45/XFP)-32K MAC | |
| G24CEAS | 24-port 100/1000BASE-X and 8-port 10/100/1000BASE-T Combo interface card (EA, SFP/RJ45, 1588)-32K MAC | |
| G24SC | 24-port 100/1000BASE-X interface card (EC, SFP)-128K MAC | |
| G24SD | 24-port 100/1000BASE-X interface card (ED, SFP)-512K MAC | |
| G24TFA | 24-Port 10/100/1000BASE-T Interface Card(FA,RJ45)-32K MAC | |
| X4UXA | 4-port 10GBASE-X interface card (EA, XFP)-32K MAC | |
| X4UXC | 4-port 10GBASE-X interface card (EC, XFP)-128K MAC | |
| X4UXD | 4-port 10GBASE-X interface card (EC, XFP)-512K MAC | |
| X2UXA | 2-port 10GBASE-X interface card (EA, XFP)-32K MAC | |
| X2UXC | 2-port 10GBASE-X interface card (EC, XFP)-128K MAC | |

Table 8-5 EPON LPUs

| Name | Description |
|-------|--|
| E12GA | 12-port 1000M EPON optical and 12-port 100M/1000M Ethernet optical LPU (SFP) |

Table 8-6 POS LPUs

| Name | Description |
|-------|--|
| WMNPA | WAN service card |
| P4CF | 4-port OC-3c/STM-1c POS-SFP card (Installed in WAN service card) |
| P4HF | 4-port OC-12c/STM-4c POS-SFP card (Installed in WAN service card) |
| P1UF | 1-port OC-48c/STM-16c POS-SFP card (Installed in WAN service card) |

■ NOTE

- Small Form-Factor Pluggable (SFP) is a hot pluggable optical module.
- The 10 Gigabit Small Form-Factor Pluggable (XFP) is a 10G hot pluggable optical module.
- The 10 Gigabit Small Form-Factor Pluggable (SFP+) is a 10G hot pluggable optical module. Its caliber is smaller than the caliber of the XFP optical module.
- By default, the transmission rate of an optical interface is 1000M and the 100M/1000M auto-negotiation is not supported. To use the 100M optical interface, you must set it manually.

8.2 Power Consumption and Weight

This section describes the power consumption and weight of boards.

Table 8-7 shows the power consumption and weight of the boards on the S9300. Suppose that the temperature in the equipment room is 25°C.

Table 8-7 Power consumption and weight of boards

| Board | Maximum Power Weight Consumption | |
|----------|----------------------------------|---------|
| LE02SRUA | 81 W (including FSUA) | 2.80 kg |
| LE03SRUA | 87 W (including CKMA and FSUA) | 2.80 kg |
| LE02MCUA | 18 W | 0.90 kg |
| LE03MCUA | 26 W (including CKMA) | 0.92 kg |
| SRUB | 105 W (including CKMA and FSUA) | 2.90 kg |
| CMUA | 1 W | 0.22 kg |
| VAMPA | 120 W | 3.1 kg |
| FSUA | 20 W | 0.42 kg |
| VSTSA | 12 W | 1 kg |
| G48SA | 75 W | 2.54 kg |
| G48SC | 92 W | 2.66 kg |
| G48SD | 110 W | 2.66 kg |
| G48SBC | 185 W | 2.90 kg |
| G48SFA | 65 W | 2.60 kg |
| G48TA | 62 W | 2.50 kg |
| G48TC | 68 W | 2.62 kg |
| G48TD | 98 W | 2.62 kg |
| G48TBC | 160 W | 2.90 kg |

| Board | Maximum Power Consumption | Weight |
|---------|--|---------|
| G48TFA | 48 W | 2.50 kg |
| G48CEAT | 62 W | 2.50 kg |
| G48VA | 64 W (excluding PoE power consumption) | 2.6 kg |
| F48SA | 64 W | 2.54 kg |
| F48SC | 76 W | 2.66 kg |
| F48TA | 59 W | 2.50 kg |
| F48TC | 70 W | 2.62 kg |
| F48TFA | 40 W | 2.30 kg |
| X40SFC | 183 W | 2.90 kg |
| X16SFC | 150 W | 2.60 kg |
| S24XA | 65 W | 2.4 kg |
| S24XC | 81 W | 2.5 kg |
| G24CEAS | 70 W | 2.7 kg |
| G24CA | 67 W | 2.26 kg |
| G24SA | 45 W | 2.22 kg |
| G24SC | 63 W | 2.66 kg |
| G24SD | 75 W | 2.66 kg |
| G24TFA | 32 W | 2.20 kg |
| T24XA | 53 W | 2.3 kg |
| X12SA | 85 W | 2.3 kg |
| E12GA | 86 W | 2.54 kg |
| X4UXA | 64 W | 2.16 kg |
| X4UXC | 75 W | 2.28 kg |
| X4UXD | 76 W | 2.30 kg |
| X2UXA | 52 W | 2.14 kg |
| X2UXC | 61 W | 2.26 kg |

| Board | Maximum Power Consumption | Weight |
|-------|--|--|
| WMNPA | With two P1UF subcards: 84 W With two P4HF subcards: 91 W With two P4CF subcards: 86 W | 3.80 kg (with a firewall card and two P1UF subcards) |
| P4CF | 14 W | 0.50 kg |
| P4HF | 15 W | 0.50 kg |
| P1UF | 12 W | 0.50 kg |

9 List of Interface Attributes

About This Chapter

This chapter describes the attributes of interfaces supported by the S9300.

9.1 Electrical Interface Attributes

This section describes the attributes of electrical interfaces.

9.2 10GE Optical Interface Attributes

This section describes the attributes of 10GE optical interfaces.

9.3 GE Optical Interface Attributes

This section describes the attributes of GE optical interfaces.

9.4 FE Optical Interface Attributes

This section describes the attributes of FE optical interfaces.

9.1 Electrical Interface Attributes

This section describes the attributes of electrical interfaces.

Table 9-1 lists the attributes of electrical interfaces.

Table 9-1 Attributes of the 10M/100M/1000M Base-T Ethernet interface

| Attribute | Description |
|---------------------|--|
| Connector type | RJ45 |
| Compliance standard | IEEE 802.3z |
| Frame format | Ethernet_II, Ethernet_SAP, Ethernet_SNAP |
| Network protocol | IP |

9.2 10GE Optical Interface Attributes

This section describes the attributes of 10GE optical interfaces.

Each interface of the 10GE optical LPU has an optical module. **Table 9-2**, **Table 9-3** and **Table 9-4** show the attributes of the interface and the optical module.

M NOTE

- The SFP+ and the XFP are 10G hot-pluggable optical modules. Compared with the XFP, the SFP+ has smaller width.
- The 10G SFP+ and XFP optical modules support LAN access and WAN access functions.

Table 9-2 Interface attributes of the 10GE optical LPU

| Attribute | Description | |
|-----------------------------|--|--|
| Connector type | LC/PC | |
| Optical interface attribute | Depending on the SFP+ or XFP optical module. For details about the attributes of the optical module, see Table 9-3 and Table 9-4 . | |
| Compliance standard | IEEE 802.3ae | |
| Frame format | Ethernet_II, Ethernet_SAP, or Ethernet_SNAP | |
| Network protocol | IP | |

Table 9-3 Attributes of the SFP+ optical module (10 Gbit/s)

| Attribute | Description | | |
|------------------------|-------------------------|--------------------|---------------------|
| Transmission distance | 220 m | 300 m | 10 km |
| Center wavelength | 1310 nm | 850 nm | 1310 nm |
| Transmitting power | -6.5 dBm to -0.5 dBm | -7.3 dBm to -1 dBm | -8.2 dBm to 0.5 dBm |
| Receiver sensitivity | -6.5 dBm | -11.1 dBm | -12.6 dBm |
| Overload optical power | 1.5 dBm | -1.0 dBm | 0.5 dBm |
| Extinction ratio | 3.5 dB | 3 dB | 3.5 dB |
| Fiber type | OM1/OM2, multi- mode | OM3, multi-mode | Single-mode |

Table 9-4 Attributes of the XFP optical module (10 Gbit/s)

| Attribute | Description | | | |
|------------------------------|----------------------|----------------------|---------------------|----------------|
| Transmissio n distance | 300 m | 10 km | 40 km | 80 km |
| Center wavelength | 850 nm | 1310 nm | 1550 nm | 1550 nm |
| Transmittin g power | -7.3 dBm to -1.3 dBm | -6.0 dBm to -1.0 dBm | -1.0 dBm to 2.0 dBm | 0 dBm to 4 dBm |
| Receiver sensitivity | -7.5 dBm | -11.0 dBm | -15.0 dBm | -24.0 dBm |
| Overload optical power | -1.0 dBm | 0.5 dBm | -1.0 dBm | -7.0 dBm |
| Fiber type | Multi-mode | Single-mode | | |

9.3 GE Optical Interface Attributes

This section describes the attributes of GE optical interfaces.

Each interface of the GE optical LPU has an optical module. **Table 9-5**, **Table 9-6**, **Table 9-7** and **Table 9-8** show the attributes of the interface and the optical module.

Table 9-5 Interface attributes of the GE optical LPU (100M/1000M Base-SFP)

| Attribute | Description | |
|-----------------------------|---|--|
| Connector type | LC/PC | |
| Optical interface attribute | Depending on the SFP optical module. | |
| Compliance standard | IEEE 802.3z | |
| Frame format | Ethernet_II, Ethernet_SAP, or Ethernet_SNAP | |
| Network protocol | IP | |

Table 9-6 Attributes of the SFP optical module (100M/1000M bit/s)

| Attri bute | Description | | | | | | | | |
|--------------------------------------|-------------------------------|-------------------------------|--|--|-------------------------|-------------------------|------------------------------|----------------------|--|
| Tran smiss ion dista nce | 500 m | 10 km | 10 km (single- mode bidirectional fiber) | | 40 km | 40 km | 80 km | 100 km | |
| Cent er wave lengt h | 850 nm | 1310 nm | Tx: 1310 nm Rx: 1490 nm | Tx: 1490 nm Rx: 1310 nm | 1310 nm | 1550 nm | 1550 nm | 1550 nm | |
| Tran smitt ing powe r | -9.5 dBm to -2.5 dBm | -9.0 dBm to -3.0 dBm | -9.0 dBm to -3.0 dBm | -9.0 dBm to -3.0 dBm | -5.0 dBm to 0 dBm | -5.0 dBm to 0 dBm | -2.0 dBm to 5.0 dBm | 0 dBm to 5 dBm | |
| Rece iver sensi tivity | -17.0 dBm | -20.0 dBm | -19.5 dBm | -19.5 dBm | -23 dBm | -22 dBm | -23.0 dBm | -30.0 dBm | |
| Over load optic al powe r | 0 dBm | -3.0 dBm | -3.0 dBm | -3.0 dBm | -3.0 dBm | -3.0 dBm | -3.0 dBm | -9.0 dBm | |

| Attri bute | Description | | | | | | | |
|-------------------|----------------|-------------|------|------|------|--------|------|------|
| Extin ction ratio | 9 dB | 9 dB | 6 dB | 6 dB | 9 dB | 8.5 dB | 9 dB | 8 dB |
| Fiber type | Multi- mode | Single-mode | | | | | | |

Table 9-7 Attributes of 100M/1000M colorized optical modules

| Attrib ute | Descrip | tion | | | | | | |
|----------------------------------|------------------|------------|------------|------------|------------|------------|------------|------------|
| Transm ission distanc e | 80 km | | | | | | | |
| Center wavele ngth | 1471 nm | 1491 nm | 1511 nm | 1531 nm | 1551 nm | 1571 nm | 1591 nm | 1611 nm |
| Transm itting power | 0 dBm to 5.0 dBm | | | | | | | |
| Receiv er sensitiv ity | -28.0 dB | -28.0 dBm | | | | | | |
| Overlo ad optical power | -9.0 dBm | | | | | | | |
| Extinct ion ratio | 8.5 dB | | | | | | | |

Table 9-8 Attributes of optical/electrical modules

| Attribute | Description |
|----------------------|---|
| Connector | RJ45 |
| Standards compliance | IEEE802.3z |
| Frame format | Ethernet_II, Ethernet_SAP, or Ethernet_SNAP |

| Attribute | Description |
|------------------|-------------|
| Network protocol | IP |

9.4 FE Optical Interface Attributes

This section describes the attributes of FE optical interfaces.

Each interface of the FE optical LPU has an optical module. **Table 9-9** and **Table 9-10** show the attributes of the interface and the optical module.

Table 9-9 Interface attributes of the FE optical LPU (100M Base-SFP)

| Attribute | Description |
|-----------------------------|--|
| Connector type | LC/PC |
| Optical interface attribute | Depending on the SFP optical module. For details about the attributes of the optical module, see Table 9-10 . |
| Compliance standard | IEEE 802.3u |
| Frame format | Ethernet_II, Ethernet_SAP, or Ethernet_SNAP |
| Network protocol | IP |

Table 9-10 Attributes of the SFP optical module (100 Mbit/s)

| Attrib ute | Description | | | | | | |
|---------------------------------|------------------------------|-----------------------------|----------------------------------|----------------------------------|----------------------|----------------------|--|
| Transm ission distanc e | 2 km | 15 km | 15 km (singl bidirectional | | 40 km | 80 km | |
| Center wavele ngth | 1310 nm | 1310 nm | Tx: 1310 nm Rx: 1550 nm | Tx: 1550 nm Rx: 1310 nm | 1310 nm | 1550 nm | |
| Transm itting power | -19.0 dBm to -14.0 dBm | -15.0 dBm to -8.0 dBm | -15.0 dBm to -8.0 dBm | -15.0 dBm to -8.0 dBm | -5.0 dBm to 0 dBm | -5.0 dBm to 0 dBm | |
| Receiv er sensitiv ity | -30.0 dBm | -31.0 dBm | -32.0 dBm | -32.0 dBm | -37.0 dBm | -37.0 dBm | |

| Attrib ute | Description | | | | | | |
|----------------------------------|----------------|-------------|----------|----------|-----------|-----------|--|
| Overlo ad optical power | -14.0 dBm | -8.0 dBm | -8.0 dBm | -8.0 dBm | -10.0 dBm | -10.0 dBm | |
| Extincti on ratio | 10 dB | 8.2 dB | 8.5 dB | 8.5 dB | 10.5 dB | 10.5 dB | |
| Fiber type | Multi- mode | Single-mode | : | | | | |