HUAWEI eKit

AR300 and AR700

Hardware Description

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HUAWEI TECHNOLOGIES CO., LTD.

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1 Version Support for Components

This document describes only the AR device models and modules supported by a version. To obtain accurate ordering information, visit **https://ekit.huawei.com/** or contact Huawei local sales offices. You can also pay attention to the product change notices (PCNs) and lifecycle management bulletins launched at this website.

For details about the device models supported by a version, see "1.1 Product Version" in the release notes of the corresponding version.

The appearances of devices and modules are subject to actually delivered products. The figures in this document are for reference only.

NOTE

The actual available memory and storage resources (including the flash memory and hard disks) of a device are less than the nominal values because the system software occupies some space.

Management network ports are classified into independent ports marked with the **Management** silkscreen and non-independent ports marked with the **MGMT** silkscreen. An independent management network port cannot transmit services and its interface type is displayed as **MEth** in related command outputs. A non-independent management network port can transmit services. Whether the management network port of a device can transmit services will not be mentioned in the description of ports on the device or SRU.

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2 Chassis

2.1 Naming Conventions
2.2 Interface Numbering Rules
2.3 AR300 Series
2.4 AR700 Series

2.1 Naming Conventions

AR300/AR700 Series

Figure1 AR300/AR700 series naming conventions shows naming conventions of the AR300/AR700 series routers. **Table 2-1** describes the meaning of each letter or digit.

Figure 2-1 AR300/AR700 series naming conventions

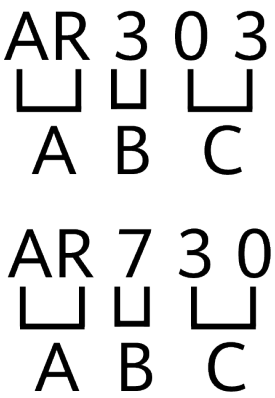

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Table 2-1 AR300/AR700 series naming conventions

Field	Meaning	Description
A	Product name	AR: application and access routers
B	Network location flag	• 3: Enterprise-level access routers • 7: Enterprise-level aggregation access routers
C	Product evolution flag	Indicates a new generation.

2.2 Interface Numbering Rules

On the AR router, interfaces are numbered in the format of *slot ID/subcard ID/interface sequence number*.

- Slot ID

  The slot ID identifies the slot in which a card is installed.

  – The SRU slot is 0.

  – When slots need to be combined into one slot, the larger slot ID is used as the new slot ID. For example, when slot 1 and slot 2 are combined, slot ID 2 is used as the new slot ID.

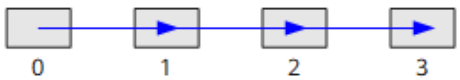
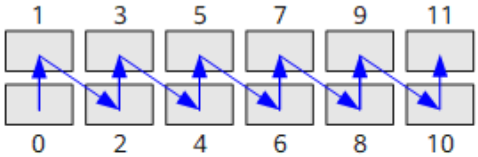
- Subcard ID

  The subcard ID specifies the ID of a subcard. The AR router does not support subcards. Therefore, the subcard ID of the AR router is always 0.

- Interface sequence number

  The interface sequence number indicates the number of each interface on a card.

Table 2-2 Port numbering conventions

Port Numbering Diagram	Description
	If there is only one row of interfaces on a card, these interfaces are numbered from left to right starting with 0.
	If there are two rows of interfaces on a card, these interfaces are numbered from bottom to top and left to right starting with 0.

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NOTE

The silkscreen is marked as the management network interface, and the interface number is MEth0/0/0.

Interfaces with different rates are numbered independently. For example, the first 100 Mbit/s interface is numbered Ethernet 0/0/0, the first GE interface is numbered GigabitEthernet 0/0/0, and the first 10GE interface is numbered XGigabitEthernet 0/0/0. Interfaces with the same rate are numbered in ascending order.

2.3 AR300 Series

2.3.1 AR303

Overview

Table 2-3 Basic information about the AR303

Item	Details
Description	AR303, 1*GE COMBO WAN, 4*GE LAN, 1*USB 2.0
Part Number	50010533
Model	AR303
First supported version	V300R021C00

Appearance

Figure 2-2 Appearance of the AR303

NOTE

This model has had changes to its appearance and branding, and devices delivered over different periods may have different appearances but have no differences in functions.

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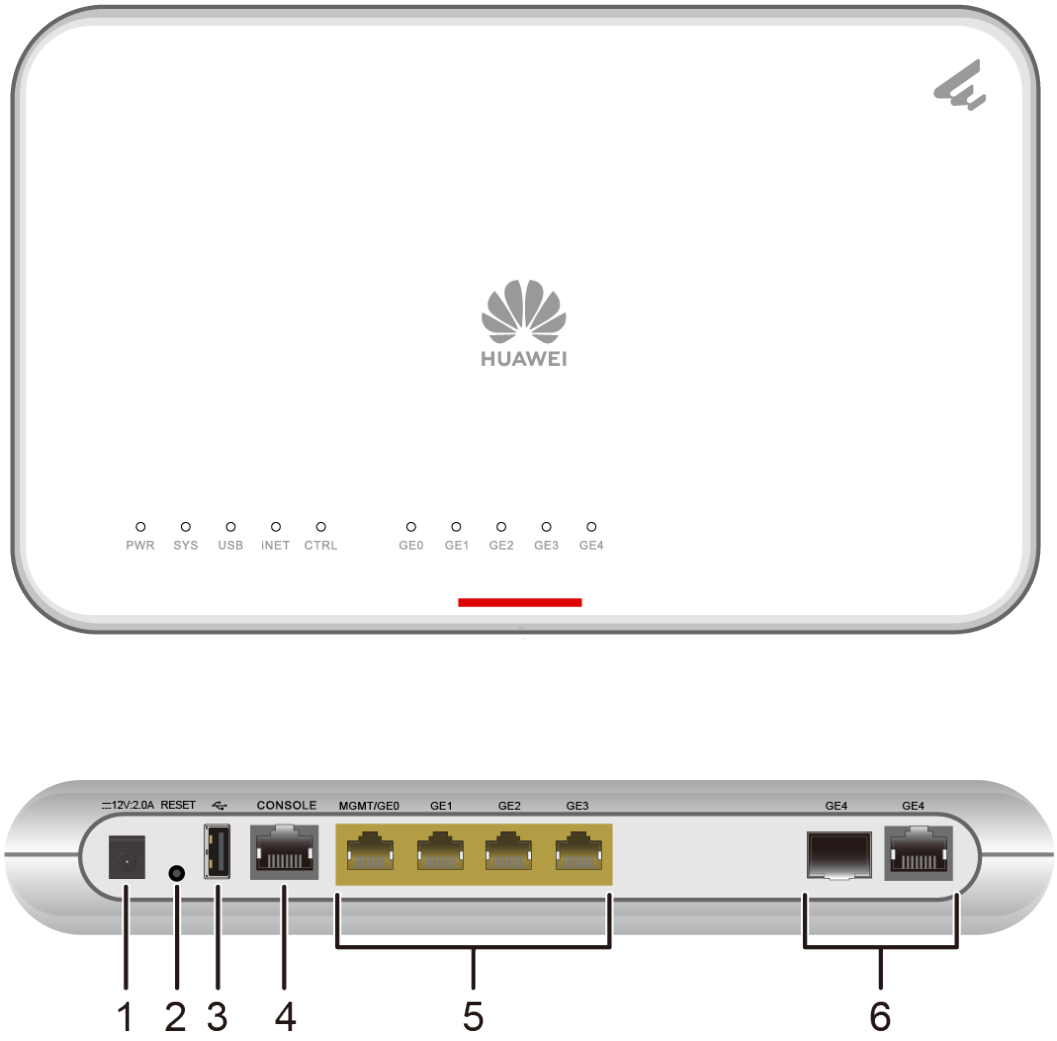
Components

Figure 2-3 Components of the AR303



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1. Power jack	2. RESET button **NOTE** This button is used to reset the router. • To restore the factory settings, hold down the button for at least 5 seconds. • To reset the router, hold down the button for less than 5 seconds. Resetting the router will interrupt services. Exercise caution when deciding to press this button. If needed, you can run the **factory-configuration prohibit** command in the system view to disable the function of restoring the factory settings by holding down the RESET button. To enable this function again, run the **undo factory-configuration prohibit** command.	3. USB interface 2.0 (host)
4. Console interface	5. LAN interfaces: four GE electrical interfaces	6. WAN interface: GE combo interface

Ports

Table 2-4 Ports on the AR303

Port	Connector Type	Description	Available Components
USB interface 2.0 (host)	USB 2.0 Type A	A USB interface provides up to 480 Mbit/s upload and download rates. • Standards compliance: USB 2.0 • Working mode: Host	USB 2.0-compliant USB flash drive

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Port	Connector Type	Description	Available Components
Console interface	RJ45	The console interface can connect to an operation terminal for onsite configuration. • Standards compliance: RS232 • Working mode: duplex Universal Asynchronous Receiver/ Transmitter (UART) • Data equipment type: Data Circuit-terminating Equipment (DCE)	Console cable

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Port	Connector Type	Description	Available Components
LAN interfaces: four GE electrical interfaces	RJ45	A GE electrical interface (10/100/1000 Mbit/s auto-sensing) transmits and receives services at 10 Mbit/s, 100 Mbit/s, or 1000 Mbit/s. • Standards compliance: IEEE802.3, IEEE802.3u, and IEEE802.3ab • Working mode: full-duplex (10/100/1000 Mbit/s auto-sensing) • Maximum distance: 100 m **NOTE** GE0 is a management interface and is used for web-based management and email-based deployment. All LAN-side GE interfaces can be configured as WAN-side interfaces.	**Ethernet cable**

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Port	Connector Type	Description	Available Components
WAN interfaces: GE combo interfaces	GE electrical interface: RJ45 GE optical interface: LC/PC	A GE combo interface consists of an optical Ethernet interface and an electrical Ethernet interface on the panel. The two interfaces have only one internal forwarding interface. The electrical and optical interfaces are multiplexed, and only either of them can work at a time. When either of the Ethernet interfaces is working, the other interface is shut down. • The GE electrical interface (10/100/1000 Mbit/s auto-sensing) transmits and receives services at 10 Mbit/s, 100 Mbit/s, or 1000 Mbit/s. • The GE optical interface (100/1000 Mbit/s auto-sensing) transmits and receives services at 100 Mbit/s or 1000 Mbit/s.	• GE electrical interface: Ethernet cable • GE optical interface: optical module The following optical modules are supported: **FE SFP&eSFP optical modules** **GE eSFP optical modules**

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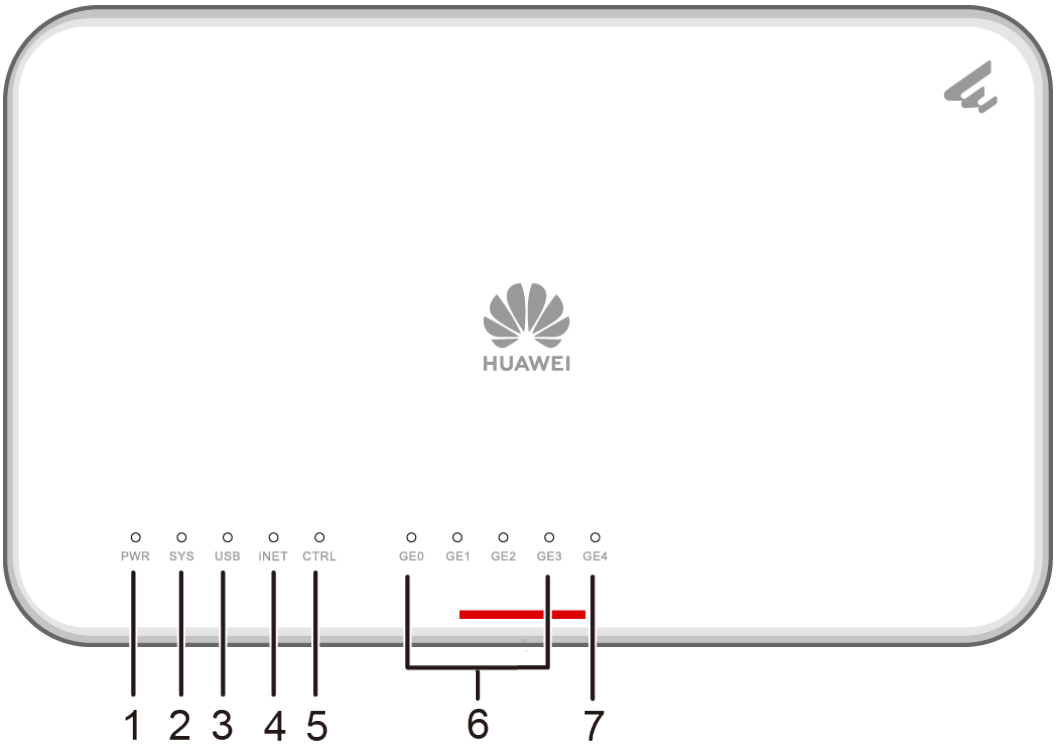
Port	Connector Type	Description	Available Components
		NOTE By default, a combo interface works in auto mode and automatically works as an optical or electrical interface.	

Indicators and Buttons

Figure 2-4 Indicators and buttons on the AR303



1. PWR indicator	2. SYS indicator	3. USB indicator
4. iNET indicator	5. CTRL indicator	6. LAN (GE0 to GE3) interface indicators
7. GE combo interface indicator (GE4)	-	-

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Table 2-5 Indicators on the AR303

Silkscreen	Name	Color	Status	Description
PWR	PWR indicator	Green	Steady on	The system power supply is normal.
		-	Off	The system power is off.
SYS	SYS indicator	Green	Slow blinking	The system is running properly.
		Green	Fast blinking	The system is being powered on or restarting.
		Red	Steady on	A fault that affects services has occurred. The fault cannot be rectified automatically and requires manual intervention.
		-	Off	The system software is not running or is resetting.
USB	USB indicator	Green	Steady on	The system has been upgraded or configured using a USB flash drive.
		Green	Blinking	The system is being upgraded or configured using a USB flash drive.
		Red	Steady on	The system fails to be upgraded or configured using a USB flash drive.

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Silkscreen	Name	Color	Status	Description
		-	Off	No USB flash drive is connected, the USB interface has failed, or the indicator has failed.
iNET	iNET indicator	Green	Steady on	The network service has been established.
		-	Off	The network service is unavailable.
CTRL	CTRL indicator	Green	Steady on	The device has been connected to the controller.
		-	Off	The device is not connected to the controller.
GE0 to GE3	LAN interface indicator (GE0 to GE3)	Green	Steady on	A link has been established on the corresponding LAN interface.
		Green	Off	Data is being transmitted or received on the corresponding LAN interface.
		Green	Blinking	No link is established on the corresponding LAN interface.

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Silkscreen	Name	Color	Status	Description
GE4	GE combo interface indicator (GE4)	Green	Steady on	A link has been established on the corresponding GE combo interface.
		Green	Blinking	Data is being transmitted or received on the corresponding GE combo interface.
		-	Off	No link is established on the corresponding GE combo interface.

Table 2-6 Buttons on the AR303

Silkscreen	Name	Description
RESET	RESET button	This button is used to reset the router. • To restore the factory settings, hold down the button for at least 5 seconds. • To reset the router, hold down the button for less than 5 seconds.Resetting the router will interrupt services. Exercise caution when deciding to press this button.

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Technical Specifications

Table 2-7 Technical specifications of the AR303

Item	Specification
Installation type	• Work bench • Against the wall
Chassis height [U]	1 U
Dimensions without packaging (H x W x D) [mm(in.)]	• Basic dimensions: 38.0 mm x 240.0 mm x 161.5 mm (1.5 in. x 9.45 in. x 6.36 in.) • Maximum dimensions: 41.4 mm x 240.0 mm x 161.5 mm (1.63 in. x 9.45 in. x 6.36 in.)
Dimensions with packaging (H x W x D) [mm(in.)]	90 mm x 370 mm x 297 mm (3.54 in. x 14.57 in. x 11.69 in.)
Weight with packaging [kg(lb)]	1.18 kg (2.60 lb)
Weight without packaging [kg(lb)]	0.58 kg (1.28 lb)
CPU	1.1 GHz, 2 Cores
Memory	1 GB
NAND Flash	1 GB
Console port	RJ45
RTC	Supported
LAN ports	4 x GE electrical interfaces
WAN ports	1 x GE Combo WAN
Number of service board slots	0
MIC slots (default/maximum)	0/0
SIC slots (default/maximum)	0/0
WSIC slots (default/maximum)	0/0
XSIC slots (default/maximum)	0/0
Redundant MPUs	Not supported
RPS input	Not supported
PoE	Not supported
IP rating	IP20
MTBF [years]	62.60 years

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Item	Specification
MTTR [hours]	2 hours
Availability	0.9999963529
Typical power consumption [W]	9 W
Maximum power consumption [W]	12 W
Power supply mode	AC power adapter
Number of power modules	1
Rated input voltage [V]	110 V to 220 V, 50 Hz/60 Hz
Input voltage range [V]	90 V to 270 V, 45 Hz to 65 Hz
Maximum input current [A]	0.8 A
Maximum output power [W]	24 W
Redundant power supply	Not supported
Types of fans	None
Number of fan modules	0
Heat dissipation mode	Natural heat dissipation
Airflow	Natural heat dissipation
Noise at normal temperature (acoustic power) [dB(A)]	0 (Natural heat dissipation)
Long-term operating temperature [°C(°F)]	0°C to 40°C (32°F to 104°F) **NOTE** When the altitude is 1800 m-5000 m (5906 ft.-16404.2 ft.), the highest operating temperature reduces by 1°C (1.8°F) every time the altitude increases by 220 m (722 ft.).
Long-term operating relative humidity [RH]	5% RH to 95% RH, non-condensing
Long-term operating altitude [m(ft.)]	< 5000 m (16404.2 ft.)
Storage temperature [°C(°F)]	-40°C to +70°C (-40°F to +158°F)
Overtemperature alarm	Supported

2.3.2 AR303W

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Overview

Table 2-8 Basic information about the AR303W

Item	Details
Description	AR303W, 1*GE COMBO WAN, 4*GE LAN, 1*USB 2.0, Wi-Fi 2.4G+5G
Part Number	50010534
Model	AR303W
First supported version	V300R021C00

Appearance

Figure 2-5 Appearance of the AR303W

NOTE

This model has had changes to its appearance and branding, and devices delivered over different periods may have different appearances but have no differences in functions.

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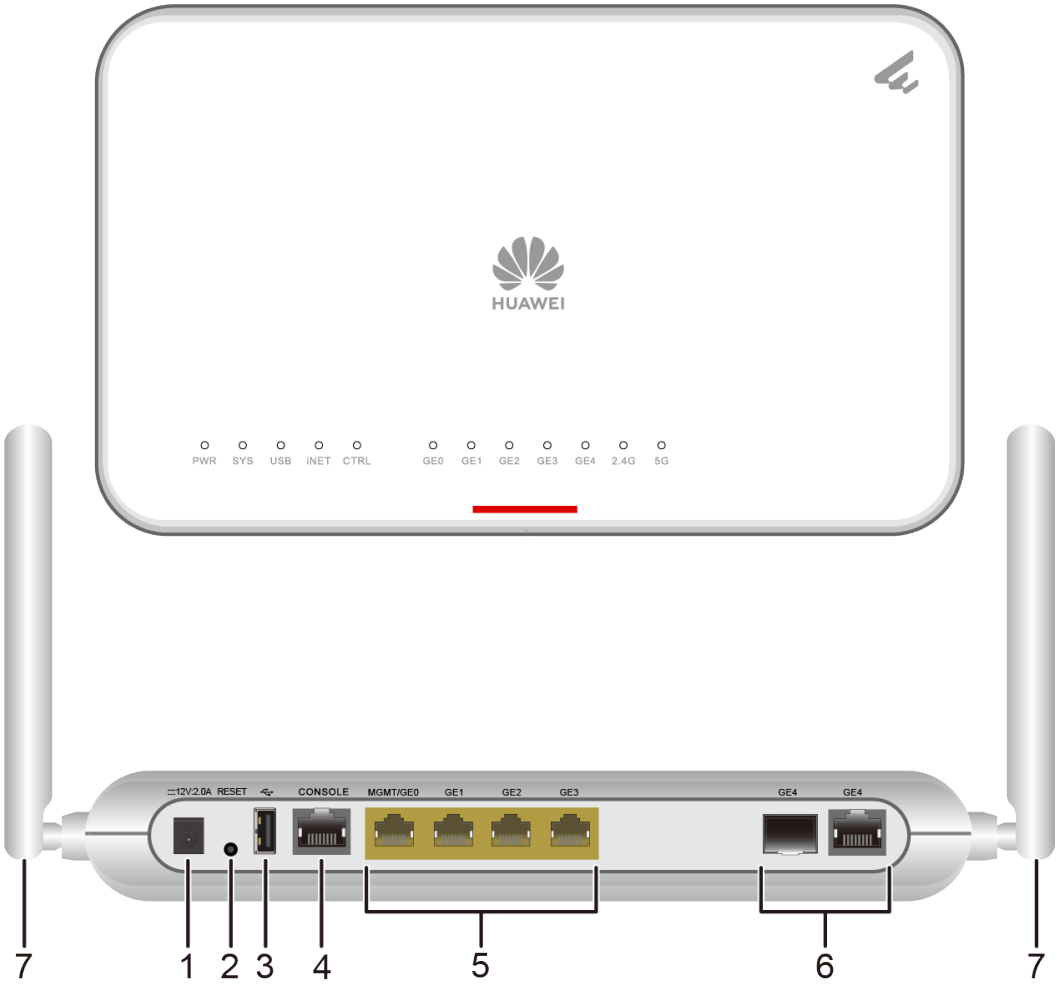
Components

Figure 2-6 Components of the AR303W



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1. Power jack	2. RESET button **NOTE** This button is used to reset the router. • To restore the factory settings, hold down the button for at least 5 seconds. • To reset the router, hold down the button for less than 5 seconds. Resetting the router will interrupt services. Exercise caution when deciding to press this button. If needed, you can run the **factory-configuration prohibit** command in the system view to disable the function of restoring the factory settings by holding down the RESET button. To enable this function again, run the **undo factory-configuration prohibit** command.	3. USB interface 2.0 (host)
4. Console interface	5. LAN interfaces: four GE electrical interfaces	6. WAN interface: GE combo interface
7. Two Wi-Fi antennas	-	-

Ports

Table 2-9 Ports on the AR303W

Port	Connector Type	Description	Available Components
USB interface 2.0 (host)	USB 2.0 Type A	A USB interface provides up to 480 Mbit/s upload and download rates. • Standards compliance: USB 2.0 • Working mode: Host	USB 2.0-compliant USB flash drive

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Port	Connector Type	Description	Available Components
Console interface	RJ45	The console interface can connect to an operation terminal for onsite configuration. • Standards compliance: RS232 • Working mode: duplex Universal Asynchronous Receiver/ Transmitter (UART) • Data equipment type: Data Circuit-terminating Equipment (DCE)	Console cable

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Port	Connector Type	Description	Available Components
LAN interfaces: four GE electrical interfaces	RJ45	A GE electrical interface (10/100/1000 Mbit/s auto-sensing) transmits and receives services at 10 Mbit/s, 100 Mbit/s, or 1000 Mbit/s. • Standards compliance: IEEE802.3, IEEE802.3u, and IEEE802.3ab • Working mode: full-duplex (10/100/1000 Mbit/s auto-sensing) • Maximum distance: 100 m **NOTE** GE0 is a management interface and is used for web-based management and email-based deployment. All LAN-side GE interfaces can be configured as WAN-side interfaces.	**Ethernet cable**

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Port	Connector Type	Description	Available Components
WAN interfaces: GE combo interfaces	GE electrical interface: RJ45 GE optical interface: LC/PC	A GE combo interface consists of an optical Ethernet interface and an electrical Ethernet interface on the panel. The two interfaces have only one internal forwarding interface. The electrical and optical interfaces are multiplexed, and only either of them can work at a time. When either of the Ethernet interfaces is working, the other interface is shut down. • The GE electrical interface (10/100/1000 Mbit/s auto-sensing) transmits and receives services at 10 Mbit/s, 100 Mbit/s, or 1000 Mbit/s. • The GE optical interface (100/1000 Mbit/s auto-sensing) transmits and receives services at 100 Mbit/s or 1000 Mbit/s.	• GE electrical interface: Ethernet cable • GE optical interface: optical module The following optical modules are supported: **FE SFP&eSFP optical modules** **GE eSFP optical modules**

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Port	Connector Type	Description	Available Components
		NOTE By default, a combo interface works in auto mode and automatically works as an optical or electrical interface.	
Two Wi-Fi antenna interfaces	RP-SMA-K (screw threads outside and a pin inside)	A Wi-Fi antenna interface connects to a Wi-Fi antenna to transmit and receive data. • Standards compliance: 802.11a/b/g/n/ac • Supported frequency bands: 2.4 GHz and 5 GHz • Supported rate: 866 Mbit/s • MIMO mode (Tx x Rx): 2 x 2 • Gain: 2.5 dBi/3.0 dBi • Supported services: Layer 2/Layer 3 wireless access, wireless encryption, and wireless security **NOTE** Wi-Fi antennas have been installed on Wi-Fi interfaces of a router before delivery and cannot be removed.	Wi-Fi antenna

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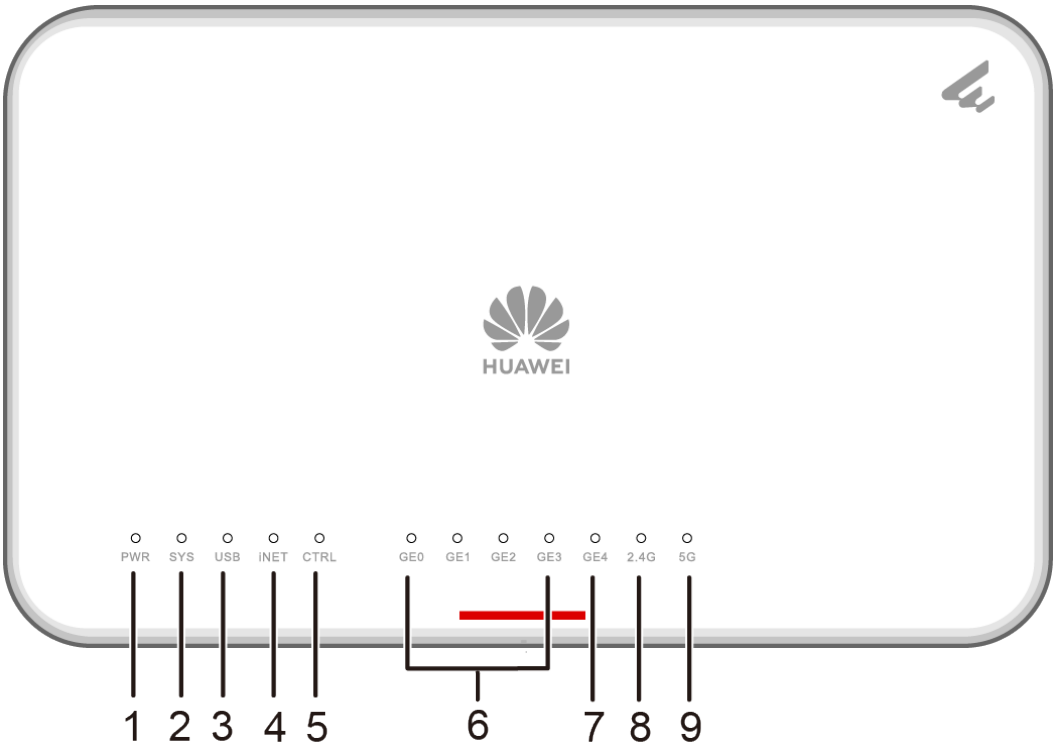
Indicators and Buttons

Figure 2-7 Indicators and buttons on the AR303W



1. PWR indicator	2. SYS indicator	3. USB indicator
4. iNET indicator	5. CTRL indicator	6. LAN (GE0 to GE3) interface indicators
7. GE combo interface indicator (GE4)	8. WLAN 2.4G (effective when working on the 2.4 GHz band)	9. WLAN 5G (effective when working on the 5 GHz band) indicator

Table 2-10 Indicators on the AR303W

Silkscreen	Name	Color	Status	Description
PWR	PWR indicator	Green	Steady on	The system power supply is normal.
		-	Off	The system power is off.
SYS	SYS indicator	Green	Slow blinking	The system is running properly.

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Silkscreen	Name	Color	Status	Description
		Green	Fast blinking	The system is being powered on or restarting.
		Red	Steady on	A fault that affects services has occurred. The fault cannot be rectified automatically and requires manual intervention.
		-	Off	The system software is not running or is resetting.
USB	USB indicator	Green	Steady on	The system has been upgraded or configured using a USB flash drive.
		Green	Blinking	The system is being upgraded or configured using a USB flash drive.
		Red	Steady on	The system fails to be upgraded or configured using a USB flash drive.
		-	Off	No USB flash drive is connected, the USB interface has failed, or the indicator has failed.

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Silkscreen	Name	Color	Status	Description
iNET	iNET indicator	Green	Steady on	The network service has been established.
		-	Off	The network service is unavailable.
CTRL	CTRL indicator	Green	Steady on	The device has been connected to the controller.
		-	Off	The device is not connected to the controller.
GE0 to GE3	LAN interface indicator (GE0 to GE3)	Green	Steady on	A link has been established on the corresponding LAN interface.
		Green	Off	Data is being transmitted or received on the corresponding LAN interface.
		Green	Blinking	No link is established on the corresponding LAN interface.
GE4	GE combo interface indicator (GE4)	Green	Steady on	A link has been established on the corresponding GE combo interface.

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Silkscreen	Name	Color	Status	Description
		Green	Blinking	Data is being transmitted or received on the corresponding GE combo interface.
		-	Off	No link is established on the corresponding GE combo interface.
2.4G	WLAN 2.4G indicator (effective when working on the 2.4 GHz band)	Green	Steady on	A WLAN link has been established on the corresponding interface.
		Green	Blinking	The WLAN link is transmitting data.
		-	Off	The WLAN link is shut down.
5G	WLAN 5G indicator (effective when working on the 5 GHz band)	Green	Steady on	A WLAN link has been established on the corresponding interface.
		Green	Blinking	The WLAN link is transmitting data.
		-	Off	The WLAN link is shut down.

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Table 2-11 Buttons on the AR303W

Silkscreen	Name	Description
RESET	RESET button	This button is used to reset the router. • To restore the factory settings, hold down the button for at least 5 seconds. • To reset the router, hold down the button for less than 5 seconds.Resetting the router will interrupt services. Exercise caution when deciding to press this button.

Technical Specifications

Table 2-12 Technical specifications of the AR303W

Item	Specification
Installation type	• Work bench • Against the wall
Chassis height [U]	1 U
Dimensions without packaging (H x W x D) [mm(in.)]	• Basic dimensions: 38.0 mm x 240.0 mm x 161.5 mm (1.5 in. x 9.45 in. x 6.36 in.) • Maximum dimensions: 41.4 mm x 278.6 mm x 161.5 mm (1.63 in. x 10.97 in. x 6.36 in.)
Dimensions with packaging (H x W x D) [mm(in.)]	90 mm x 370 mm x 297 mm (3.54 in. x 14.57 in. x 11.69 in.)
Weight with packaging [kg(lb)]	1.20 kg (2.64 lb)
Weight without packaging [kg(lb)]	0.6 kg (1.32 lb)
CPU	1.1 GHz, 2 Cores
Memory	1 GB
NAND Flash	1 GB
Console port	RJ45

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Item	Specification
RTC	Supported
LAN ports	4 x GE electrical, Wi-Fi 2.4G+5G
WAN ports	1 x GE combo
Number of service board slots	0
MIC slots (default/maximum)	0/0
SIC slots (default/maximum)	0/0
WSIC slots (default/maximum)	0/0
XSIC slots (default/maximum)	0/0
Redundant MPUs	Not supported
RPS input	Not supported
PoE	Not supported
IP rating	IP20
MTBF [years]	58.47 years
MTTR [hours]	2 hours
Availability	0.9999960950
Typical power consumption [W]	9 W
Maximum power consumption [W]	12 W
Power supply mode	AC power adapter
Number of power modules	1
Rated input voltage [V]	110 V to 220 V, 50 Hz/60 Hz
Input voltage range [V]	90 V to 270 V, 45 Hz to 65 Hz
Maximum input current [A]	0.8 A
Maximum output power [W]	24 W
Redundant power supply	Not supported
Types of fans	None
Number of fan modules	0
Heat dissipation mode	Natural heat dissipation
Airflow	Natural heat dissipation
Noise at normal temperature (acoustic power) [dB(A)]	0 (Natural heat dissipation)

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Item	Specification
Long-term operating temperature [°C(°F)]	0°C to 40°C (32°F to 104°F) **NOTE** When the altitude is 1800 m-5000 m (5906 ft.-16404.2 ft.), the highest operating temperature reduces by 1°C (1.8°F) every time the altitude increases by 220 m (722 ft.).
Long-term operating relative humidity [RH]	5% RH to 95% RH, non-condensing
Long-term operating altitude [m(ft.)]	< 5000 m (16404.2 ft.)
Storage temperature [°C(°F)]	-40°C to +70°C (-40°F to +158°F)
Overtemperature alarm	Supported

2.4 AR700 Series

2.4.1 AR720

Overview

Table 2-13 Basic information about the AR720

Item	Details
Description	AR720, 2*GE combo WAN, 8*GE LAN, 2*USB 2.0, 2*SIC
Part Number	02354GBG-001
Model	AR720
First supported version	V300R022C00

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Item	Details
Supported Patch Version	If you want to downgrade a device running V300R022C10SPC100 or a later version to V300R019C10SPC600, V300R019C13SPC200, or V300R021C00SPC200 after the component upgrade, downgrade the device to V300R022C00SPC100 first. If you want to downgrade a device to a version earlier than V300R022C00SPC100 after the component upgrade, set the patch for next startup to the start patch of the target version or a later patch. (The start patch of V300R019C10SPC600 is V300R019SPH380; the start patch of V300R019C13SPC200 is V300R019SPH380; the start patch of V300R021C00SPC200 is V300R021SPH180.)
Remarks	When configuring cards, ensure that the total power of the configured cards does not exceed 37 W or contact technical support engineers to obtain more suggestions.

Appearance

Figure 2-8 Appearance of the AR720

NOTE

This model has had changes to its appearance and branding, and devices delivered over different periods may have different appearances but have no differences in functions.

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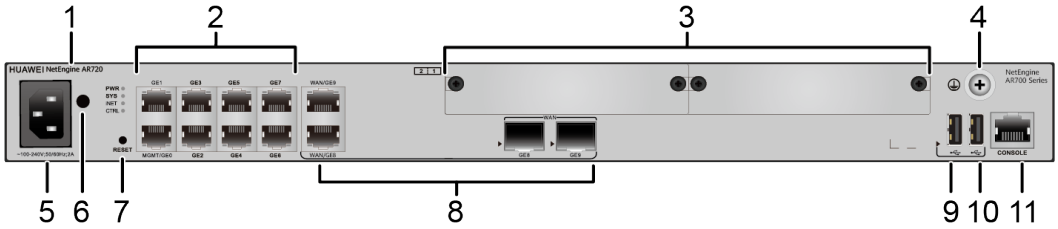
Components

Figure 2-9 Components of the AR720



1. Product model silkscreen	2. LAN interfaces: eight GE electrical interfaces	3. Two SIC slots
4. Ground point	5. AC power jack	6. Jack for power cable locking strap **NOTE** Insert a power cable locking strap in this jack to secure the power cable.
7. RESET button **NOTE** This button is used to reset the router. • To restore the factory settings, hold down the button for at least 5 seconds. • To reset the router, hold down the button for less than 5 seconds. Resetting the router will interrupt services. Exercise caution when deciding to press this button. If needed, you can run the **factory-configuration prohibit** command in the system view to disable the function of restoring the factory settings by holding down the RESET button. To enable this function again, run the **undo factory-configuration prohibit** command.	8. WAN interfaces: two GE combo interfaces	9. USB interface 2.0 (host)
10. USB interface 2.0 (host)	11. Console interface	-

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Slot Layout

Figure 2-10 Slot Layout of the AR720

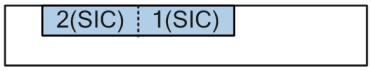
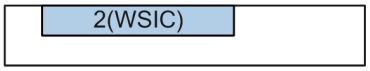
Device Model		Slot Distribution	Slot Combination
AR720	Front view	NA	NA
	Rear view		Two SIC slots are combined into one WSIC slot 

Table 2-14 Slots on the AR720

Slot Type	Slot ID	Slot Direction	Remarks
SIC	1	Transverse	Slot 1 and slot 2 are combined into new slot 2 (WSIC).
SIC	2	Transverse	Slot 1 and slot 2 are combined into new slot 2 (WSIC).

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Ports

Table 2-15 Ports on the AR720

Port	Connector Type	Description	Available Components
Console interface	RJ45	The console interface can connect to an operation terminal for onsite configuration. • Standards compliance: RS232 • Working mode: duplex Universal Asynchronous Receiver/ Transmitter (UART) • Data equipment type: Data Circuit-terminating Equipment (DCE)	Console cable

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Port	Connector Type	Description	Available Components
LAN interfaces: eight GE electrical interfaces	RJ45	A GE electrical interface (10/100/1000 Mbit/s auto-sensing) transmits and receives services at 10 Mbit/s, 100 Mbit/s, or 1000 Mbit/s. • Standards compliance: IEEE802.3, IEEE802.3u, and IEEE802.3ab • Working mode: full-duplex (10/100/1000 Mbit/s auto-sensing) • Maximum distance: 100 m **NOTE** GE0 is a management interface and is used for web-based management and email-based deployment. All LAN-side GE interfaces can be configured as WAN-side interfaces.	**Ethernet cable**

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Port	Connector Type	Description	Available Components
WAN interfaces: two GE combo interfaces	GE electrical interface: RJ45 GE optical interface: LC/PC	A GE combo interface consists of an optical Ethernet interface and an electrical Ethernet interface on the panel. The two interfaces have only one internal forwarding interface. The electrical and optical interfaces are multiplexed, and only either of them can work at a time. When either of the Ethernet interfaces is working, the other interface is shut down. • The GE electrical interface (10/100/1000 Mbit/s auto-sensing) transmits and receives services at 10 Mbit/s, 100 Mbit/s, or 1000 Mbit/s. • The GE optical interface (100/1000 Mbit/s auto-sensing) transmits and receives services at 100 Mbit/s or 1000 Mbit/s.	• GE electrical interface: Ethernet cable • GE optical interface: optical module The following optical modules are supported: **FE SFP&eSFP optical modules** **GE eSFP optical modules**

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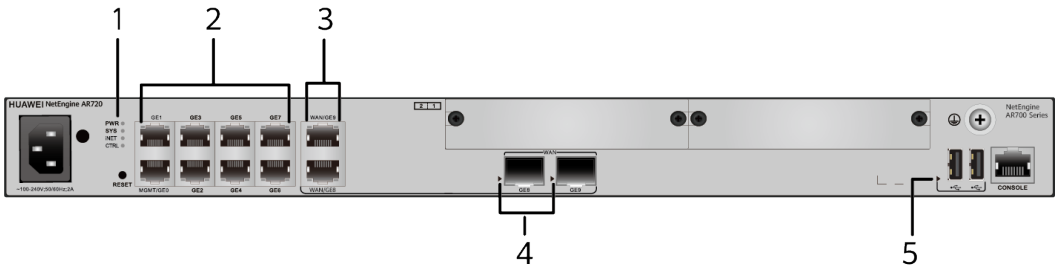
Port	Connector Type	Description	Available Components
		NOTE By default, a combo interface works in auto mode and automatically works as an optical or electrical interface.	
USB 2.0 ports (Host): two USB 2.0 ports	USB 2.0 Type A	A USB 2.0 interface provides up to 480 Mbit/s upload and download rates. • Standards compliance: USB 2.0 • Working mode: Host	USB 2.0-compliant USB flash drive

Indicators and Buttons

Figure 2-11 Indicators and buttons on the AR720



1. From top to bottom: • PWR indicator • SYS indicator • iNET indicator • CTRL indicator	2. GE electrical interface indicators (LAN)	3. GE electrical interface indicators (WAN)
4. GE optical interface indicator (WAN)	5. ACT (USB) indicator	-

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Table 2-16 Indicators on the AR720

Silkscreen	Name	Color	Status	Description
PWR	PWR indicator	Green	Steady on	The device is powered by the built-in power module normally.
		-	Off	The device is not powered on.
SYS	SYS indicator	Green	Slow blinking	The system is running properly.
		Green	Fast blinking	The system is being powered on or restarted.
		Red	Steady on	A fault that affects services has occurred. The fault cannot be rectified automatically and requires manual intervention.
		-	Off	The system software is not running or is resetting.
iNET	iNET indicator	Green	Steady on	The network service has been established.
		-	Off	The network service is unavailable.
CTRL	CTRL indicator	Green	Steady on	The device has been connected to the controller.

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Silkscreen	Name	Color	Status	Description
		-	Off	The device is not connected to the controller.
-	GE electrical interface indicators (LAN)	Green	Steady on	A link has been established.
		Green	Off	No link is established.
		Yellow	Blinking	Data is being transmitted or received.
		Yellow	Off	No data is being transmitted or received.
-	GE electrical interface indicators (WAN)	Green	Steady on	A link has been established.
		Green	Off	No link is established.
		Yellow	Blinking	Data is being transmitted or received.
		Yellow	Off	No data is being transmitted or received.
-	GE optical interface indicator (LAN)	Green	Steady on	A link has been established.
		Green	Blinking	Data is being transmitted or received.
		-	Off	No link is established.
-	GE optical interface indicator (WAN)	Green	Steady on	A link has been established.

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Silkscreen	Name	Color	Status	Description
		Green	Blinking	Data is being transmitted or received.
		-	Off	No link is established.
-	ACT (USB) indicators	Green	Steady on	The system has been upgraded or configured using a USB flash drive.
		Green	Blinking	The system is being upgraded or configured using a USB flash drive.
		Red	Steady on	The system fails to be upgraded or configured using a USB flash drive.
		-	Off	No USB flash drive is connected, the USB interface has failed, or the indicator has failed.

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Table 2-17 Buttons on the AR720

Silkscreen	Name	Description
RESET	RESET button	This button is used to reset the router. • To restore the factory settings, hold down the button for at least 5 seconds. • To reset the router, hold down the button for less than 5 seconds. Resetting the router will interrupt services. Exercise caution when deciding to press this button.

Technical Specifications

Table 2-18 Technical specifications of the AR720

Item	Specification
Installation type	• Rack • Work bench • Against the wall
Chassis height [U]	1 U
Dimensions without packaging (H x W x D) [mm(in.)]	• Basic dimensions (excluding the parts protruding from the body): 44.4 mm x 442.0 mm x 220.4 mm (1.75 in. x 17.4 in. x 8.68 in.) • Maximum dimensions (the depth is the distance from ports on the front panel to the handle on the rear panel): 44.4 mm x 442.0 mm x 225.2 mm (1.75 in. x 17.4 in. x 8.87 in.)
Dimensions with packaging (H x W x D) [mm(in.)]	90 mm x 570 mm x 390 mm (3.54 in. x 22.44 in. x 15.35 in.)
Weight with packaging [kg(lb)]	4.6 kg (10.12 lb)
Weight without packaging [kg(lb)]	3.2 kg (7.04 lb)
CPU	1.4 GHz, 4 Cores

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Item	Specification
Memory	4 GB
NAND Flash	1 GB
Console port	RJ45
RTC	Supported
LAN ports	8 x GE electrical interfaces
WAN ports	2 x GE combo
Number of service board slots	2
MIC slots (default/maximum)	0/0
SIC slots (default/maximum)	2/2
WSIC slots (default/maximum)	0/1
XSIC slots (default/maximum)	0/0
Redundant MPUs	Not supported
RPS input	Not supported
PoE	Not supported
IP rating	IP20
MTBF [years]	30.05 years
MTTR [hours]	2 hours
Availability	0.9999924012
Typical power consumption [W]	28 W
Maximum power consumption [W]	33 W
Power supply mode	AC built-in
Number of power modules	1
Rated input voltage [V]	100 V to 240 V, 50 Hz/60 Hz
Input voltage range [V]	90 V to 264 V, 47 Hz to 63 Hz
Maximum input current [A]	2 A
Maximum output power [W]	70 W
Redundant power supply	Not supported
Types of fans	Built-in
Number of fan modules	1
Heat dissipation mode	Air cooling

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Item	Specification
Airflow	Left-to-right airflow
Noise at normal temperature (acoustic power) [dB(A)]	52.3 dB(A)
Long-term operating temperature [°C(°F)]	0°C to 45°C (32°F to 113°F) **NOTE** When the altitude is 1800–5000 m (5906–16404 ft.), the highest operating temperature reduces by 1°C (1.8°F) every time the altitude increases by 220 m (722 ft.).
Long-term operating relative humidity [RH]	5% RH to 95% RH, non-condensing
Long-term operating altitude [m(ft.)]	< 5000 m (16404.2 ft.)
Storage temperature [°C(°F)]	-40°C to +70°C (-40°F to +158°F)
Overtemperature alarm	Supported

2.4.2 AR730

Overview

Table 2-19 Basic information about the AR730

Item	Details
Description	AR730, 2*GE combo WAN, 1*10GE(SFP+) WAN, 8*GE LAN, 1*GE combo LAN, 2*USB 2.0, 2*SIC
Part Number	02354GBM-001
Model	AR730
First supported version	V300R022C00

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Item	Details
Supported Patch Version	If you want to downgrade a device running V300R022C10SPC100 or a later version to V300R019C10SPC600, V300R019C13SPC200, or V300R021C00SPC200 after the component upgrade, downgrade the device to V300R022C00SPC100 first. If you want to downgrade a device to a version earlier than V300R022C00SPC100 after the component upgrade, set the patch for next startup to the start patch of the target version or a later patch. (The start patch of V300R019C10SPC600 is V300R019SPH380; the start patch of V300R019C13SPC200 is V300R019SPH380; the start patch of V300R021C00SPC200 is V300R021SPH180.)
Remarks	When configuring cards, ensure that the total power of the configured cards does not exceed 37 W or contact technical support engineers to obtain more suggestions.

Appearance

Figure 2-12 Appearance of the AR730

NOTE

This model has had changes to its appearance and branding, and devices delivered over different periods may have different appearances but have no differences in functions.

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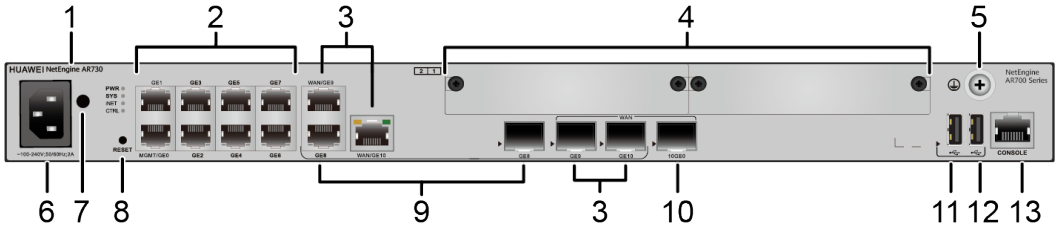
Components

Figure 2-13 Components of the AR730



1. Product model silkscreen	2. LAN interfaces: eight GE electrical interfaces	3. WAN interfaces: two GE combo interfaces
4. Two SIC slots	5. Ground point	6. AC power jack
7. Jack for power cable locking strap **NOTE** Insert a power cable locking strap in this jack to secure the power cable.	8. RESET button **NOTE** This button is used to reset the router. • To restore the factory settings, hold down the button for at least 5 seconds. • To reset the router, hold down the button for less than 5 seconds. Resetting the router will interrupt services. Exercise caution when deciding to press this button. If needed, you can run the **factory-configuration prohibit** command in the system view to disable the function of restoring the factory settings by holding down the RESET button. To enable this function again, run the **undo factory-configuration prohibit** command.	9. LAN interfaces: GE combo interface
10. WAN interface: one 10GE optical interface	11. USB interface 2.0 (host)	12. USB interface 2.0 (host)
13. Console interface	-	-

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Slot Layout

Figure 2-14 Slot Layout of the AR730

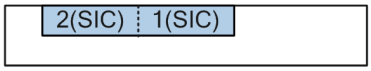
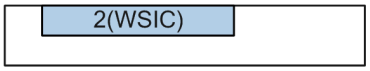
Device Model		Slot Distribution	Slot Combination
AR730	Front view	NA	NA
	Rear view		Two SIC slots are combined into one WSIC slot 

Table 2-20 Slots on the AR730

Slot Type	Slot ID	Slot Direction	Remarks
SIC	1	Transverse	Slot 1 and slot 2 are combined into new slot 2 (WSIC).
SIC	2	Transverse	Slot 1 and slot 2 are combined into new slot 2 (WSIC).

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Ports

Table 2-21 Ports on the AR730

Port	Connector Type	Description	Available Components
Console interface	RJ45	The console interface can connect to an operation terminal for onsite configuration. • Standards compliance: RS232 • Working mode: duplex Universal Asynchronous Receiver/ Transmitter (UART) • Data equipment type: Data Circuit-terminating Equipment (DCE)	Console cable

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Port	Connector Type	Description	Available Components
LAN interfaces: eight GE electrical interfaces	RJ45	A GE electrical interface (10/100/1000 Mbit/s auto-sensing) transmits and receives services at 10 Mbit/s, 100 Mbit/s, or 1000 Mbit/s. • Standards compliance: IEEE802.3, IEEE802.3u, and IEEE802.3ab • Working mode: full-duplex (10/100/1000 Mbit/s auto-sensing) • Maximum distance: 100 m **NOTE** GE0 is a management interface and is used for web-based management and email-based deployment. All LAN-side GE interfaces can be configured as WAN-side interfaces.	**Ethernet cable**

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Port	Connector Type	Description	Available Components
LAN interfaces: GE combo interface	GE electrical interface: RJ45 GE optical interface: LC/PC	A GE combo interface consists of an optical Ethernet interface and an electrical Ethernet interface on the panel. The two interfaces have only one internal forwarding interface. The electrical and optical interfaces are multiplexed, and only either of them can work at a time. When either of the Ethernet interfaces is working, the other interface is shut down. • The GE electrical interface (10/100/1000 Mbit/s auto-sensing) transmits and receives services at 10 Mbit/s, 100 Mbit/s, or 1000 Mbit/s. • The GE optical interface (100/1000 Mbit/s auto-sensing) transmits and receives services at 100 Mbit/s or 1000 Mbit/s.	• GE electrical interface: Ethernet cable • GE optical interface: optical module The following optical modules are supported: **FE SFP&eSFP optical modules** **GE eSFP optical modules**

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Port	Connector Type	Description	Available Components
		NOTE By default, a combo interface works in auto mode and automatically works as an optical or electrical interface. GE8 is the BootROM management network port on a device and is used to upgrade the device software through the BootROM menu. All GE combo LAN interfaces can be configured as WAN interfaces.	

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Port	Connector Type	Description	Available Components
WAN interfaces: two GE combo interfaces	GE electrical interface: RJ45 GE optical interface: LC/PC	A GE combo interface consists of an optical Ethernet interface and an electrical Ethernet interface on the panel. The two interfaces have only one internal forwarding interface. The electrical and optical interfaces are multiplexed, and only either of them can work at a time. When either of the Ethernet interfaces is working, the other interface is shut down. • The GE electrical interface (10/100/1000 Mbit/s auto-sensing) transmits and receives services at 10 Mbit/s, 100 Mbit/s, or 1000 Mbit/s. • The GE optical interface (100/1000 Mbit/s auto-sensing) transmits and receives services at 100 Mbit/s or 1000 Mbit/s.	• GE electrical interface: Ethernet cable • GE optical interface: optical module The following optical modules are supported: **FE SFP&eSFP optical modules** **GE eSFP optical modules**

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Port	Connector Type	Description	Available Components
		NOTE By default, a combo interface works in auto mode and automatically works as an optical or electrical interface.	
WAN interface: one 10GE optical interface	LC/PC	The 10GE optical interfaces (1/10 Gbit/s auto-sensing) can work in GE mode and can transmit and receive service traffic at 1 Gbit/s or 10 Gbit/s. • Optical interface attributes: The optical interface attributes vary according to the optical module used. • Standards compliance: IEEE 802.3ae	Optical module The following optical modules are supported: **GE eSFP optical modules** **10GE SFP+ optical modules** **GE SFP copper modules (supported in V300R023C00 and later versions)** **10GE SFP+ copper modules (supported in V300R023C10 and later versions)**
USB 2.0 ports (Host): two USB 2.0 ports	USB 2.0 Type A	A USB 2.0 interface provides up to 480 Mbit/s upload and download rates. • Standards compliance: USB 2.0 • Working mode: Host	USB 2.0-compliant USB flash drive

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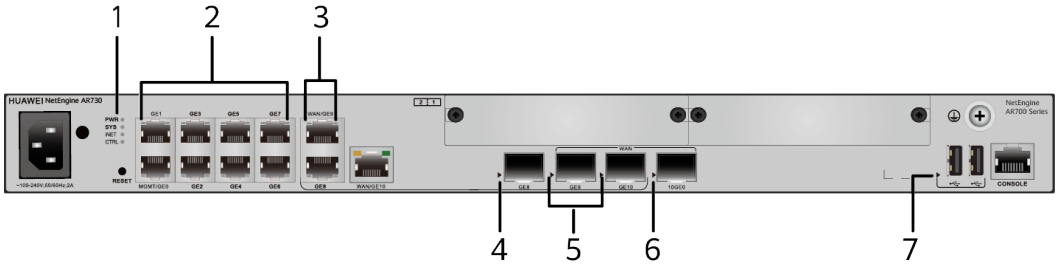
Indicators and Buttons

Figure 2-15 Indicators and buttons on the AR730



1. From top to bottom: • PWR indicator • SYS indicator • iNET indicator • CTRL indicator	2. GE electrical interface indicators (LAN)	3. GE electrical interface indicators (WAN)
4. GE optical interface indicator (LAN)	5. GE optical interface indicator (WAN)	6. 10GE optical interface indicator (WAN)
7. ACT (USB) indicator	-	-

Table 2-22 Indicators on the AR730

Silkscreen	Name	Color	Status	Description
PWR	PWR indicator	Green	Steady on	The device is powered by the built-in power module normally.
		-	Off	The device is not powered on.
SYS	SYS indicator	Green	Slow blinking	The system is running properly.
		Green	Fast blinking	The system is being powered on or restarted.

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Silkscreen	Name	Color	Status	Description
		Red	Steady on	A fault that affects services has occurred. The fault cannot be rectified automatically and requires manual intervention.
		-	Off	The system software is not running or is resetting.
iNET	iNET indicator	Green	Steady on	The network service has been established.
		-	Off	The network service is unavailable.
CTRL	CTRL indicator	Green	Steady on	The device has been connected to the controller.
		-	Off	The device is not connected to the controller.
-	GE electrical interface indicators (LAN)	Green	Steady on	A link has been established.
		Green	Off	No link is established.
		Yellow	Blinking	Data is being transmitted or received.
		Yellow	Off	No data is being transmitted or received.

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Silkscreen	Name	Color	Status	Description
-	GE electrical interface indicators (WAN)	Green	Steady on	A link has been established.
		Green	Off	No link is established.
		Yellow	Blinking	Data is being transmitted or received.
		Yellow	Off	No data is being transmitted or received.
-	GE optical interface indicator (LAN)	Green	Steady on	A link has been established.
		Green	Blinking	Data is being transmitted or received.
		-	Off	No link is established.
-	GE optical interface indicator (WAN)	Green	Steady on	A link has been established.
		Green	Blinking	Data is being transmitted or received.
		-	Off	No link is established.
-	10GE optical interface indicator (WAN)	Green	Steady on	A link has been established.
		Green	Blinking	Data is being transmitted or received.
		-	Off	No link is established.

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Silkscreen	Name	Color	Status	Description
-	ACT (USB) indicators	Green	Steady on	The system has been upgraded or configured using a USB flash drive.
		Green	Blinking	The system is being upgraded or configured using a USB flash drive.
		Red	Steady on	The system fails to be upgraded or configured using a USB flash drive.
		-	Off	No USB flash drive is connected, the USB interface has failed, or the indicator has failed.

Table 2-23 Buttons on the AR730

Silkscreen	Name	Description
RESET	RESET button	This button is used to reset the router. • To restore the factory settings, hold down the button for at least 5 seconds. • To reset the router, hold down the button for less than 5 seconds. Resetting the router will interrupt services. Exercise caution when deciding to press this button.

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Technical Specifications

Table 2-24 Technical specifications of the AR730

Item	Specification
Installation type	• Rack • Work bench • Against the wall
Chassis height [U]	1 U
Dimensions without packaging (H x W x D) [mm(in.)]	• Basic dimensions (excluding the parts protruding from the body): 44.4 mm x 442.0 mm x 220.4 mm (1.75 in. x 17.4 in. x 8.68 in.) • Maximum dimensions (the depth is the distance from ports on the front panel to the handle on the rear panel): 44.4 mm x 442.0 mm x 225.2 mm (1.75 in. x 17.4 in. x 8.87 in.)
Dimensions with packaging (H x W x D) [mm(in.)]	90 mm x 570 mm x 390 mm (3.54 in. x 22.44 in. x 15.35 in.)
Weight with packaging [kg(lb)]	4.6 kg (10.12 lb)
Weight without packaging [kg(lb)]	3.2 kg (7.04 lb)
CPU	1.4 GHz, 4 Cores
Memory	4 GB
NAND Flash	1 GB
Console port	RJ45
RTC	Supported
LAN ports	8 x GE electrical, 1 x GE combo
WAN ports	2 x GE combo, 1 x 10GE optical (SFP+)
Number of service board slots	2
MIC slots (default/maximum)	0/0
SIC slots (default/maximum)	2/2
WSIC slots (default/maximum)	0/1
XSIC slots (default/maximum)	0/0
Redundant MPUs	Not supported

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Item	Specification
RPS input	Not supported
PoE	Not supported
IP rating	IP20
MTBF [years]	30.05 years
MTTR [hours]	2 hours
Availability	0.9999924012
Typical power consumption [W]	28 W
Maximum power consumption [W]	33 W
Power supply mode	AC built-in
Number of power modules	1
Rated input voltage [V]	100 V to 240 V, 50 Hz/60 Hz
Input voltage range [V]	90 V to 264 V, 47 Hz to 63 Hz
Maximum input current [A]	2 A
Maximum output power [W]	70 W
Redundant power supply	Not supported
Types of fans	Built-in
Number of fan modules	1
Heat dissipation mode	Air cooling
Airflow	Left-to-right airflow
Noise at normal temperature (acoustic power) [dB(A)]	52.3 dB(A)
Long-term operating temperature [°C(°F)]	0°C to 45°C (32°F to 113°F) **NOTE** When the altitude is 1800–5000 m (5906–16404 ft.), the highest operating temperature reduces by 1°C (1.8°F) every time the altitude increases by 220 m (722 ft.).
Long-term operating relative humidity [RH]	5% RH to 95% RH, non-condensing
Long-term operating altitude [m(ft.)]	< 5000 m (16404.2 ft.)
Storage temperature [°C(°F)]	-40°C to +70°C (-40°F to +158°F)
Overtemperature alarm	Supported

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3 Power Supplies

NOTICE

- Do not use power modules of different power values in the same router.
- A router can use only supported power modules. Using unsupported power modules will bring unexpected risks.

3.1 Types of Power Supplies

3.2 HW-24-12AC8D (Adapter,0degC,40degC,100V,240V,12V/2A,C8 /2.1*5.5*9.5 H DC PLUG("L"),SABS/SASO)

3.1 Types of Power Supplies

Table 3-1 describes the types of power supplies supported by AR series routers. The actual power supplies applicable to a router vary depending on the product model.

Table 3-1 Types of power supplies

Power Supply Type	Description
Built-in power module	It is fixed in the chassis and has a power socket on the panel. Use a power cable to connect the power socket to a power source.
Power adapter	It is an external unit used to connect a router to a power source.
AC power module	It is installed in a power slot of a router. Two power modules can work in 1+1 redundancy mode. Use power cables to connect the power modules to a power source.

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Power Supply Type	Description
AC PoE power module	It is installed in a power slot of a router. Two AC PoE power modules can work in 1+1 redundancy mode. Use power cables to connect the power modules to a power source. Then the router can supply power to attached PDs.

3.2 HW-24-12AC8D (Adapter,0degC,40degC,100V,240V,12V/2A,C8 / 2.1*5.5*9.5 H DC PLUG("L"),SABS/SASO)

Overview

Table 3-2 Basic information about the HW-24-12AC8D

Item	Details
Description	Adapter,0degC,40degC,100V,240V,12V/2A,C8 /2.1*5.5*9.5 H DC PLUG("L"),SABS/SASO
Part Number	02220493
Model	HW-24-12AC8D

Appearance

Figure 3-1 Appearance of the HW-24-12AC8D

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Version Mapping

Table 3-3 Mappings between HW-24-12AC8D and product models

Product	Product Model	First Supported Version	Last Supported Version	Unsupported Version
AR300	AR303 (50010533)	V300R021C00	-	-
AR300	AR303W (50010534)	V300R021C00	-	-

Functions and Features

Table 3-4 Functions and features of the HW-24-12AC8D

Functions and Features	Description
Input overcurrent protection	In this protection state, the power adapter stops supplying power and cannot automatically resume power supply when the input current restores to the normal range.
Output current limiting protection	In this protection state, the power adapter supplies power intermittently. When the output current is limited within a range, the power adapter automatically resumes power supply.
Output overvoltage protection	In this protection state, the power adapter stops supplying power intermittently. When the output voltage restores to the normal range, the power adapter automatically resumes power supply.
Output short-circuit protection	In this protection state, the power adapter supplies power intermittently. When the short circuit is removed, the power adapter automatically resumes power supply.

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Technical Specifications

Table 3-5 Technical specifications of the HW-24-12AC8D

Item	Specification
Dimensions without packaging (H x W x D) [mm(in.)]	27 mm x 88 mm x 50 mm (1.06 in. x 3.46 in. x 1.97 in.)
Weight without packaging [kg(lb)]	0.1 kg (0.22 lb)
Rated input voltage [V]	100 V AC to 240 V AC, 50 Hz/60 Hz
Input voltage range [V]	90 V AC to 264 V AC, 47 Hz to 63 Hz
Maximum input current [A]	0.8 A
Rated output voltage [V]	12 V DC
Rated output power [W]	24 W
Power dissipation Mode	Natural heat dissipation
Hot swapping	Not supported

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4 Cables

4.1 Power Cables
4.2 Console Cable
4.3 Ethernet Cable
4.4 Ground Cable
4.5 Optical Fiber

4.1 Power Cables

4.1.1 AC Power Cable

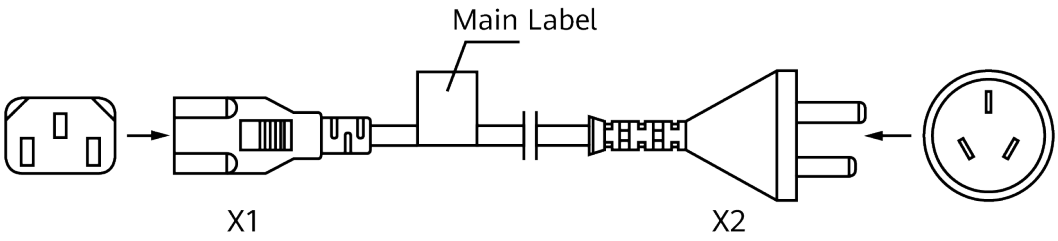
Connection

An AC power cable is connected as follows:

- The C13 straight female connector is connected to the AC power socket of a router.
- The PI straight male connector is connected to an external power source.

Appearance and Structure

Figure 4-1 Structure of the AC Power Cable



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NOTE

An AC power cable has a C13 connector at one end, and the connector on the other end is determined based on the standard in the country or region to which the cable is delivered. This section describes the AC power cable used in China.

Technical Specifications

Table 4-1 Technical specifications of the AC Power Cable

Description	Part Number	Model	Cable length	Connector type X1	Connector type X2
Power Cable, America AC Power Cable 125V10A, 3.0m, PBSM, 18SJT(3C), C13SF, Black	04020728	CC13NA300	3 m	C13	PB
Power Cable, Japan AC Power Cable 125V12A, 3.0m, PBSM, HVCTF-1.25mm^2(3C), C13SF, Black	04040887	CC13JP300	3 m	C13	PB
Power Cords Cable, Australia AC Power Cable 250V10A, 3.0m, PISM, H05VV-F-1.0mm^2(3C), C13SF, Black	04040888	CC13AU300	3 m	C13	PI

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Description	Part Number	Model	Cable length	Connector type X1	Connector type X2
Power cord,BS546 250V10A,3.0m,PM-IAM,H05VV-F-1.5mm^2(3C),C13SF,250V,10A, Black	04040889	CC13HK300	3 m	C13	PD
Power Cable, Britain AC Power Cable 250V10A, 3.0m, PGAM, H05VV-F-1.0mm^2(3C), C13SF, Black	04040890	CC13UK300	3 m	C13	PG
Power Cords Cable, Europe AC Power Cable 250V10A, 3m, PFSM, H05VVF 1.0^2(3C), C13SF, Black	04041056	CC13EU300	3 m	C13	PF
Power Cords Cable, China AC Power 250V10A, 3.0m, PISM, 227IEC53-1.0^2(3C), C13SF, Black	04041104	CPACH0301	3 m	C13	PI

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Description	Part Number	Model	Cable length	Connector type X1	Connector type X2
Power Cable, Switzerland AC Power Cable 250V10A, 3.0m, PJSM, H05VV-F-1.0mm^2(3C), C13SF, Black	04041119	CC13CH300	3 m	C13	PJ
Power Cable, Italy AC Power Cable 250V10A, 3.0m, PLSM, H05VV-F-1.0mm^2(3C), C13SF, Black	04041120	CC13IT300	3 m	C13	PL
Power Cords Cable, Argentina AC Power 250V10A, 3.0m, PISM, H05VV-F-1.0mm^2(3C), C13SF, Black	04047785	CC13AR300	3 m	C13	PI

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Description	Part Number	Model	Cable length	Connector type X1	Connector type X2
Power cord,India AC Power 250V6A,3m,PM-IIAM,IS 694-1.0^2(3C),C13 SF,250V,6A, Black	04051035	CC13ID300	3 m	C13	PD-I
Power Cords Cable, Korea AC Power 250V10A, 3m, PFSM, H05VV-F 3*1.0^2(3C), C13SF, Black	0405G028	CC13KO300	3 m	C13	PF
Power Cords Cable, Denmark AC Power 250V10A, 3m, PKSM, H05VV-F-3*1.0^2(3C), C13SF, Black	0405G02K	CC13DE300	3 m	C13	PK
Power Cords Cable, China AC Power 250V10A, 1.0m, PIAM, 227IEC53-1.0^2(3C), C13SF, Black	04150254	CPACH0303	3 m	C13	PI

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Description	Part Number	Model	Cable length	Connector type X1	Connector type X2
Power Cable, Brazil AC Power Cable 250V10A, 3.0m, PNSM, H05VV-F-1.0mm^2(3C), C13SF, Black	04150258	CC13BR300	3 m	C13	PJ

4.1.2 DC Power Cable

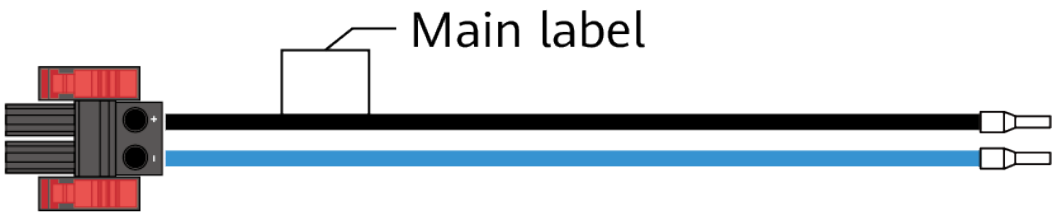
Connection

A DC power cable is connected as follows:

- One end is connected to the matching DC power terminal on the DC power module of a router.
- The other end is connected to an external power source.

Appearance and Structure

Figure 4-2 Structure of the DC Power Cable



NOTE

DC power cables for a router include a -48 V return ground cable (blue) and a -48 V power cable (black), which are connected to the RTN(+) and NEG(-) terminals on the router's DC power module respectively.

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Technical Specifications

Table 4-2 Technical specifications of the DC Power Cable

Item	Details
Part Number	04150368
Model	-
Description	Power Cable,3m,2.5mm^2,(TB2PIN +2*T2.5^2BL),(14UL3386B-I +14UL3386BL-I),LSZH
Connector type X1	TB2PIN

4.2 Console Cable

4.2.1 Console Cable

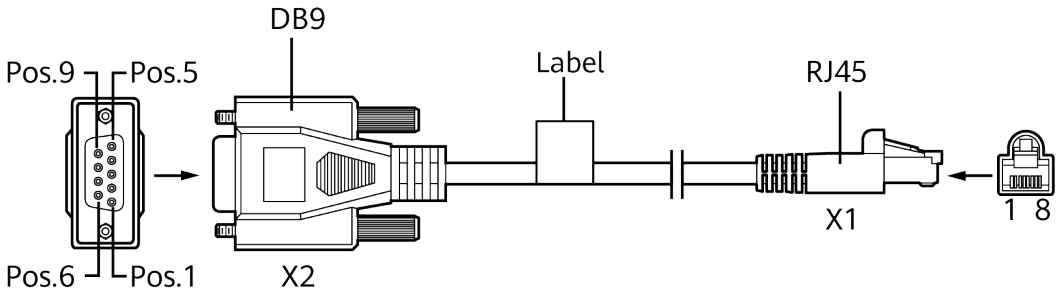
Connection

A console cable is connected as follows:

- The RJ45 connector is connected to the console interface of a router.
- The DB9 connector is connected to a maintenance terminal, generally a computer.

Appearance and Structure

Figure 4-3 Structure of the Console Cable



Pin Assignments

Table 4-3 lists the pin assignments of a console cable.

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Table 4-3 Pin assignments of a console cable

X1 (RJ45)	Signal	Direction	X2 (DB9)
3	TXD	→	2
5	GND	-	5
6	RXD	←	3

NOTE

- TXD and RXD are defined based on signal stream direction on the router, and the corresponding wires must be connected to the RXD and TXD wires on the remote device (computer).
- A console cable does not have an RTS, CTS, DSR, or DTR signal wire, and therefore does not support hardware-based flow control.
- Pins not listed in the table are not connected.

Technical Specifications

Table 4-4 Technical specifications of the Console Cable

Item	Details
Part Number	04051113
Model	A0602443039
Description	Serial Port Cable, 3m, D9 FM, CC2P0.32PWG1U, MP8-I
Cable length [m]	3m
Connector type X1	RJ45
Connector type X2	DB9

4.3 Ethernet Cable

4.3.1 Ethernet Cable

Connection

A straight-through cable can connect devices at different network layers in the following scenarios:

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- Connect a switch or hub to a router.
- Connect a computer (server or workstation) to a switch or hub.
- Connect a switch to an upper-layer switch through an uplink interface.

A crossover cable can connect devices at the same network layer in the following scenarios:

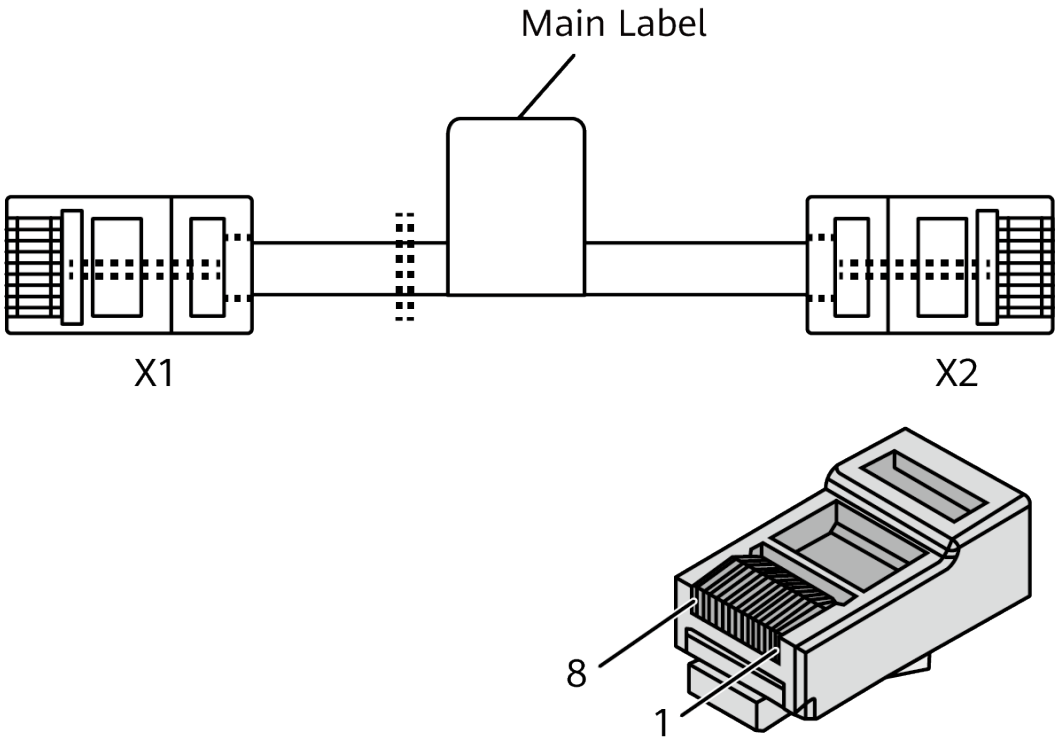
- Connect a computer to a router.
- Connect two switches at the same layer.
- Connect two hubs.
- Connect two computers.
- Connect two routers.
- Connect an Ethernet interface of an ADSL modem to the network interface of a computer.

NOTE

Most network devices support auto-negotiation on their interfaces. After auto-negotiation is enabled, the local and remote interfaces can automatically negotiate about communication parameters. In this case, the two interfaces can be connected by either a straight-through cable or a crossover cable.

Appearance and Structure

Figure 4-4 Structure of the Ethernet Cable



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NOTE

An Ethernet cable consists of twisted pairs and RJ45 connectors at both ends. Pin assignments in the RJ45 connectors comply with the T568A or T568B standard. Table 4-5 describes the two standards.

Table 4-5 T568A and T568B standards

T568A		T568B	
Pin	**Wire Color**	**Pin**	**Wire Color**
1	White and green	1	White and orange
2	Green	2	Orange
3	White and orange	3	White and green
4	Blue	4	Blue
5	White and blue	5	White and blue
6	Orange	6	Green
7	White and brown	7	White and brown
8	Brown	8	Brown

Pin Assignments

Depending on whether RJ45 connectors at both ends comply with the same standard, Ethernet cables are classified into two types:

- Straight-through cable: The RJ45 connectors at both ends comply with the T568B standard.

  Table 4-6 lists the pin assignments of a straight-through cable.

  Table 4-6 Pin assignments of a straight-through cable

X1 (RJ45)	Wire Color	X2 (RJ45)
1	White and orange	1
2	Orange	2
3	White and green	3
4	Blue	4
5	White and blue	5
6	Green	6
7	White and brown	7
8	Brown	8

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- Crossover cable: One RJ45 connector complies with the T568A standard, and the other RJ45 connector complies with the T568B standard.

  Table 4-7 lists the pin assignments of a crossover cable.

  Table 4-7 Pin assignments of a crossover cable

X1 (RJ45)	Wire Color	X2 (RJ45)
1	White and orange	3
2	Orange	6
3	White and green	1
4	Blue	4
5	White and blue	5
6	Green	2
7	White and brown	7
8	Brown	8

Technical Specifications

Table 4-8 Technical specifications of the Ethernet Cable

Description	Part Number	Model	Cable length	Connector type X1	Connector type X2
Single Cable, Straight Through Cable, 2.00m, MP8-I, CC4P0.5GY, MP8-I, Unshielded, DL3470d	04024336	S-8-0.4-RJ45-5	2 m	RJ45	RJ45
Signal Cable, Shielded Straight Through Cable, 3m, MP8-II, CC4P0.5GY(S), MP8-II, FTP	04070006	CSST00301	3 m	RJ45	RJ45

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Description	Part Number	Model	Cable length	Connector type X1	Connector type X2
Signal Cable, Shielded Crossover Network Cable, 3m, MP8-II,CC4P0.5GY(S), MP8-II, FTP	04070007	C00SCNC03	3 m	RJ45	RJ45
Signal Cable, Shielded Straight Through Cable, 2.0m, MP8-II, CC4P0.5GY(S), MP8-II, FTP	04070050	S-8-0.4-RJ45-2	2 m	RJ45	RJ45

NOTE

Select straight-through or crossover cables according to your network requirements. In an environment with severe electromagnetic interference, shielded Ethernet cables are recommended. If the cables need to be extended, configure one network interface connector (part number: 14080099) and one extension cable based on the number of the cables.

4.4 Ground Cable

4.4.1 Ground Cable

Connection

A ground cable is connected as follows:

- The M4 lug is connected to the ground point on a router.
- The M6 lug is connected to the ground point or equipotential terminal on a cabinet.

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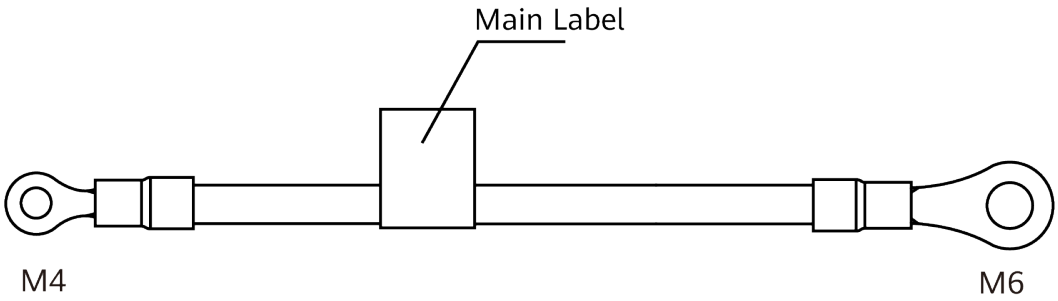
Appearance and Structure

Figure 4-5 Structure of the Ground Cable



NOTE

A ground cable grounds a router to protect it from lightning and electromagnetic interference.

Technical Specifications

Table 4-9 Technical specifications of the Ground Cable

Item	Details
Part Number	04150052
Model	CGND04600
Description	Power Cable, 0.4m, 6mm^2, Yellow&Green, OT6-4, H07Z-K-6^2G&Y, OT6-6, LSZH
Cable length [m]	0.4 m
Connector type X1	OT6-4
Connector type X2	OT6-6

4.5 Optical Fiber

4.5.1 Optical Fiber

Connection

An optical fiber is a carrier of optical signals and transmits optical signals over a short distance. An optical fiber is connected as follows:

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- One end is connected to an optical interface of router.
- The other end is connected to an optical distribution frame (ODF) or an optical interface of the upstream device or another device.

Appearance and Structure

Figure 4-6 shows the structure of an LC/PC single-mode optical fiber.

Figure 4-6 Structure of an LC/PC single-mode optical fiber

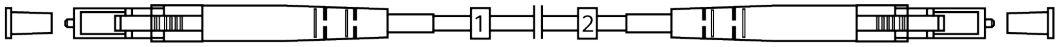


Figure 4-7 shows the structure of an SC/PC single-mode optical fiber.

Figure 4-7 Structure of an SC/PC single-mode optical fiber

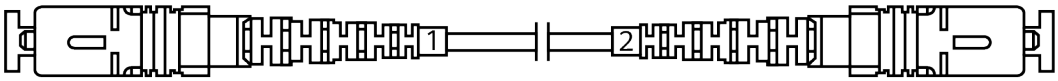
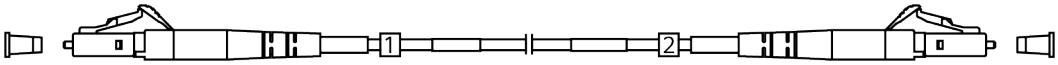


Figure 4-8 shows the structure of an LC/PC multimode optical fiber.

Figure 4-8 Structure of an LC/PC multimode optical fiber



Determine the type and number of optical fibers based on the optical modules used:

- Single-mode optical modules must be used with single-mode optical fibers.
- Multimode optical modules must be used with multimode optical fibers.
- PON optical modules must be used with 1SC/PC-1SC/PC single-mode optical fibers.
- Each optical module with separate Tx and Rx channels must be used with two optical fibers of the same type.
- Each single-fiber-bidirectional optical module is used with only one optical fiber.

NOTE

A single-mode optical fiber and a multimode optical fiber have the same appearance but different colors. A single-mode optical fiber is yellow and a multimode optical fiber is orange.

Pin Assignments

Table 4-10 lists the pin assignments of an optical fiber.

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Table 4-10 Pin assignments of an optical fiber

Terminal on the Local Device	Signal Direction	Terminal on the Remote Device
Optical interface Tx terminal	->	Optical interface Rx terminal
Optical interface Rx terminal	<-	Optical interface Tx terminal

Technical Specifications

Table 4-11 Technical specifications of the Optical Fiber

Description	Part Number	Model	Cable length	Connector type X1	Connector type X2
Adapter, FC-FC, 2, Silvery white, Shell:Metal, Sleeve:Zirconia, Round	14130001	SS-OP-AD-FC-FC	-	FC	FC
Patch Cord,SC/PC,SC/PC,Single-mode,5m,G.652D,3mm	14130098	SS-OP-D-SC-S-5	5 m	SC/PC	SC/PC
Patch Cord,SC/PC,SC/PC,Single-mode,15m,G.652D,3mm	14130126	SS-OP-D-SC-S-15	15 m	SC/PC	SC/PC
Adapter,SC,SC,2,Blue,Shell:Plastic,Sleeve:Zirconia,Square	14130134	QW1P0FIBER04	-	SC	SC

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Description	Part Number	Model	Cable length	Connector type X1	Connector type X2
Patch Cord,SC/PC,SC/PC,Single-mode,20m,G.652D,3mm	14130147	SS-OP-D-SC-S-20	20 m	SC/PC	SC/PC
Patch Cord,LC/PC,SC/PC,Single-mode,10m,G.652D,2mm	14130196	SS-OP-LC-SC-S-10	10 m	LC/PC	SC/PC
Patch Cord,LC/PC,FC/PC,Single-mode,10m,G.652D,2mm	14130197	SS-OP-LC-FC-S-10	10 m	LC/PC	FC/PC
Patch Cord,LC/PC,LC/PC,Single-mode,10m,G.652D,2mm	14130199	SS-OP-D-LC-S-10	10 m	LC/PC	LC/PC
Patch Cord,LC/PC,FC/PC,Multi-mode,10m,A1b,2mm	14130221	SS-OP-LC-FC-M-10	10 m	LC/PC	FC/PC
Patch Cord,LC/PC,LC/PC,Multi-mode,10m,A1B,2mm	14130222	SS-OP-D-LC-M-10	10 m	LC/PC	LC/PC

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Description	Part Number	Model	Cable length	Connector type X1	Connector type X2
Patch Cord,LC/PC,SC/PC,Multi-mode,10m,A1b,2mm	14130223	SS-OP-LC-SC-M-10	10 m	LC/PC	SC/PC
Patch Cord,SC/PC,SC/PC,Single-mode,10m,G.652D,3mm	14130230	SS-OP-D-SC-S-10	10 m	SC/PC	SC/PC
Adapter,LC/PC-LC/PC,2,Blue,Shell:Plastic,Sleeve:Zirconia,Square	14130248	QW1P0FIBER06	-	LC/PC	LC/PC
Patch Cord,LC/PC,LC/PC,Single-mode,20m,G.652D,2mm	14130251	SS-OP-D-LC-S-20	-	LC/PC	LC/PC
Patch Cord,FC/PC,SC/PC,Single-mode,10m,G.652D,3mm	14130253	SS-OP-FC-SC-S-10	10 m	FC/PC	SC/PC
Patch Cord,LC/PC,FC/PC,Multi-mode,20m,A1b,2mm	14130273	SS-OP-LC-FC-M-20	20 m	LC/PC	FC/PC

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Description	Part Number	Model	Cable length	Connector type X1	Connector type X2
Patch Cord,LC/PC,FC/PC,Single-mode,20m,G.652D,2mm	14130274	SS-OP-LC-FC-S-20	20 m	LC/PC	FC/PC
Patch Cord,LC/PC,SC/PC,Multi-mode,30m,A1b,2mm	14130275	SS-OP-LC-SC-M-30	30 m	LC/PC	SC/PC
Patch Cord,LC/PC,SC/PC,Single-mode,30m,G.652D,2mm	14130276	SS-OP-LC-SC-S-30	30 m	LC/PC	SC/PC
Patch Cord,LC/PC,FC/PC,Multi-mode,30m,A1b,2mm	14130277	SS-OP-LC-FC-M-30	30 m	LC/PC	FC/PC
Patch Cord,LC/PC,FC/PC,Single-mode,30m,G.652D,2mm	14130278	F000OPS01	30 m	LC/PC	FC/PC
Patch Cord,LC/PC,SC/PC,Multi-mode,20m,A1b,2mm	14130279	SS-OP-LC-SC-M-20	20 m	LC/PC	SC/PC

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Description	Part Number	Model	Cable length	Connector type X1	Connector type X2
Patch Cord,LC/PC,SC/PC,Single-mode,20m,G.652D,2mm	14130280	SS-OP-LC-SC-S-20	20 m	LC/PC	SC/PC
Patch Cord,LC/PC,LC/PC,Single-mode,30m,G.652D,2mm	14130282	SS-OP-D-LC-S-30	30 m	LC/PC	LC/PC
Patch Cord,LC/PC,LC/PC,Multi-mode,30m,A1b,2mm	14130294	SS-OP-D-LC-M-30	30 m	LC/PC	LC/PC
Patch Cord,LC/PC,LC/PC,Multi-mode,20m,A1b,2mm	14130295	SS-OP-D-LC-M-20	20 m	LC/PC	LC/PC

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5 Pluggable Modules for Interfaces

5.1 Important Notes About Using Optical Modules Certified for Huawei Routers
5.2 Understanding Optical Modules
5.3 Understanding Copper Modules
5.4 FE SFP&eSFP Optical Modules
5.5 GE eSFP Optical Modules
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5.8 10GE SFP+ Copper Modules

5.1 Important Notes About Using Optical Modules Certified for Huawei Routers

5.1.1 How to Identify Huawei-Certified Optical Modules

NOTICE

- Huawei routers must use Huawei-certified optical modules. Non-Huawei-certified optical modules cannot ensure transmission reliability and may affect service stability. Huawei is not responsible for any problem caused by the use of non-Huawei-certified optical modules and will not fix such problems.
- The methods provided here are only for reference. To confirm whether optical modules you use have been certified by Huawei, contact technical support personnel.

If the optical modules you use are delivered after July 1, 2013, use either of the following methods to determine whether they have been certified by Huawei.

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Method 1: Check for "HUAWEI" on the Label

If an optical module has been certified by Huawei, its label contains "HUAWEI", as shown in **Figure 5-1**.

Figure 5-1 "HUAWEI" on the label of a Huawei-certified optical module

Method 2: Run the display transceiver Command

If an optical module meets the following conditions, it has been certified by Huawei. Otherwise, the optical module is not a Huawei-certified one.

- In the **display elabel** command output, the **Manufactured** field displays a date later than 2013-07-01.
- In the **display version** command output, the display version is V200R001C00 or later.
- In the **display transceiver** command output, the **Manufacturing Date** field displays a date later than 2013-07-01, and the **Vendor Name** field displays **HUAWEI**.

```
<Huawei> display transceiver
XGigabitEthernet2/0/0 transceiver information:
----------------------------------------------------------------
Common information:
  Transceiver Type             :XFP-STM64-LX-SM1310
  Connector Type               :LC
  Wavelength(nm)               :1310
  Transfer Distance(m)         :100000(9um)
  Digital Diagnostic Monitoring  :YES
  Vendor Name                  :HUAWEI
  Vendor Part Number           :02315208
  Ordering Name                :
----------------------------------------------------------------
Manufacture information:
  Manu. Serial Number          :210231520810E4000803
  Manufacturing Date           :2013-09-11
  Vendor Name                  :HUAWEI
```

5.1.2 Risks of Using Non-Huawei-Certified Optical Modules

During certification of optical modules for Huawei routers, Huawei completes comprehensive functionality verification to ensure quality of optical modules. The verified items include optical module plug/unplug, transmit optical power, receive optical power, signal transmission quality, data reading, error tolerance, compatibility, electromagnetic compatibility (EMC), and environmental parameters.

Non-Huawei-certified optical modules may cause the following problems:

- Non-standard structure and size cause failures to install optical modules on adjacent optical interfaces.

  Structures or sizes of some non-Huawei-certified optical modules do not comply with the Multi-Source Agreement (MSA). When such an optical module is installed on an optical interface, the size of this optical module hinders optical module installation on adjacent optical interfaces.

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- Data bus defects cause suspension of a router's data bus.

  Some non-Huawei-certified optical modules have defects in data bus designs. Using such an optical module on a router causes suspension of the connected data bus on the router. As a result, data on the suspended bus cannot be read.
- Improper edge connector size damages electronic devices of optical interfaces.

  If a non-Huawei-certified optical module with improper edge connector size is used on an optical interface, electronic devices of the optical interface will be damaged by short circuits.
- Non-standard temperature monitoring causes incorrect alarms.

  The temperature monitoring systems of some non-Huawei-certified optical modules do not comply with industry standards and report temperature values higher than the real temperature. When such optical modules are used on a router, the system will report incorrect temperature alarms.
- Improper register settings cause errors or failures in reading parameters or diagnostic information.

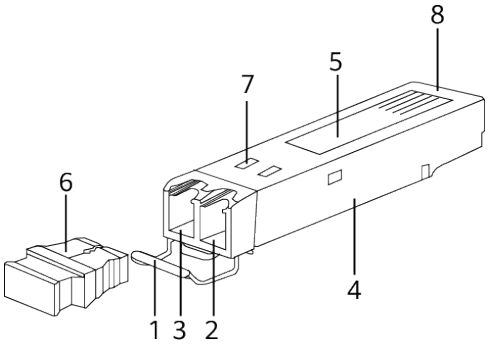
  Some non-Huawei-certified optical modules have improper A0 register values, which can cause errors or failures when the system attempts to read parameters or diagnostic information from a data bus.
- Some non-Huawei-certified optical modules are not designed in compliance with EMC standards and have low anti-interference capability. Additionally, they bring electromagnetic interference to nearby devices.
- The operating temperature ranges of non-Huawei-certified optical modules cannot meet service requirements. When they are used under relatively high temperature, the optical power decreases, resulting in service interruption.

5.2 Understanding Optical Modules

5.2.1 What Is an Optical Module

On an optical network, a sender needs to convert electrical signals into optical signals before sending them to a receiver, and the receiver needs to convert received optical signals into electrical signals. An optical module is a component that completes electrical/optical conversion on an optical network. **Figure 5-2** shows the structure of an optical module.

Figure 5-2 Structure of an optical module



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1. Handle	2. Receiver	3. Transmitter
4. Shell	5. Label	6. Dust plug
7. Spring	8. Connector	-

5.2.2 Types of Optical Modules

Optical modules are available in various types to meet diversified requirements.

- **Classified by transmission rates**

  Depending on transmission rates, optical modules are classified into FE, GE, 10GE, and 40GE optical modules.
- **Classified by encapsulation types**

  The higher transmission rate an optical module provides, the more complex structure it has. Optical modules are encapsulated in different modes to provide different structures. Huawei routers support optical modules of the following encapsulation types: SFP, eSFP, SFP+, XFP, and QSFP+.
  - SFP: small form-factor pluggable. SFP optical modules support LC fiber connectors and are hot swappable.
  - eSFP: enhanced small form-factor pluggable. An eSFP module is an SFP module that supports monitoring of voltage, temperature, bias current, transmit optical power, and receive optical power. Sometimes, eSFP is also called SFP.
  - SFP+: small form-factor pluggable plus, SFP with a higher rate. SFP+ optical modules are more sensitive to electromagnetic interference (EMI) because they have a higher rate. To reduce EMI, SFP+ optical modules have more springs than SFP optical modules and the cages for SFP+ modules on a card are tighter.
  - XFP: 10 Gigabit small form-factor pluggable. X is the Roman numeral 10, meaning that all XFP optical modules provide a 10 Gbit/s transmission rate. XFP optical modules support LC fiber connectors and are hot swappable. They are wider and longer than SFP+ optical modules.
  - QSFP+: quad small form-factor pluggable. QSFP+ optical modules support MPO fiber connectors and are larger than SFP+ optical modules.
- **Classified by physical layer standards**

  Different physical layer standards are defined to allow data transmission in different modes. Therefore, different types of optical modules are produced to comply with these standards. The **Standard** column of **Table 5-1** lists the physical layer standards.
- **Classified by modes**

  Optical fibers are classified into single-mode and multimode fibers. Therefore, optical modules are also classified into single-mode and multimode modules to support different optical fibers.
  - Single-mode optical modules are used with single-mode fibers. Single-mode fibers support a wide band and large transmission capacity, and are used for long-distance transmission.

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- Multimode optical modules are used with multimode fibers. Multimode fibers have lower transmission performance than single-mode fibers because of modal dispersion, but their costs are also lower. They are used for small-capacity, short-distance transmission.

Table 5-1 provides optical module classification based on different factors.

Table 5-1 Optical module classification

Encapsulation Type	Rate	Standard	Description
SFP	FE	100BASE-FX (IEEE 802.3u)	Uses one Rx multimode fiber and one Tx multimode fiber to transmit data at 100 Mbit/s over a distance within 2 km.
	GE	1000BASE-BX (IEEE 802.3ah)	Uses one single-mode fiber for bidirectional transmission at 1 Gbit/s over a distance within 10 km.
eSFP	FE	100BASE-LX (IEEE 802.3ah)	Uses one Rx single-mode fiber and one Tx single-mode fiber to transmit data at 100 Mbit/s over a distance within 80 km.
		100BASE-BX (IEEE 802.3ah)	Uses one single-mode fiber for bidirectional transmission at 100 Mbit/s over a distance within 15 km.
	GE	1000BASE-SX (IEEE 802.3z)	Uses one single-mode fiber for bidirectional transmission at 1 Gbit/s over a distance within 1 km.
		1000BASE-LX (IEEE 802.3z) 1000BASE-LX10 (IEEE 802.3ah)	Uses one Rx single-mode fiber and one Tx single-mode fiber to transmit data at 1 Gbit/s over a distance within 40 km.
		1000BASE-EX	Uses one Rx single-mode fiber and one Tx single-mode fiber to transmit data at 1 Gbit/s over a distance within 40 km.
		1000BASE-ZX	Uses one Rx single-mode fiber and one Tx single-mode fiber to transmit data at 1 Gbit/s over a distance within 100 km.

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Encapsulation Type	Rate	Standard	Description
		1000BASE-BX10 (IEEE 802.3ah)	Uses one single-mode fiber for bidirectional transmission at 1 Gbit/s over a distance within 40 km.
		CWDM	Coarse wavelength division multiplexing, which uses one single-mode fiber to transmit signals on multiple channels. It transmits data at 1 Gbit/s over a distance within 80 km.
		DWDM	Dense wavelength division multiplexing, which uses one single-mode fiber to transmit signals on multiple channels. It transmits data at 1 Gbit/s over a distance within 120 km.
SFP+	10GE	10GBASE-USR	Uses one Rx multimode fiber and one Tx multimode fiber to transmit data at 10 Gbit/s over a distance within 100 m.
		10GBASE-BX	Uses one single-mode fiber for bidirectional transmission at 10 Gbit/s over a distance within 10 km.
• SFP+ • XFP	10GE	10GBASE-SR (IEEE 802.3ae)	Uses one Rx multimode fiber and one Tx multimode fiber to transmit data at 10 Gbit/s over a distance within 400 m.
		10GBASE-LR (IEEE 802.3ae)	Uses one Rx single-mode fiber and one Tx single-mode fiber to transmit data at 10 Gbit/s over a distance within 10 km.
		10GBASE-ER (IEEE 802.3ae)	Uses one Rx single-mode fiber and one Tx single-mode fiber to transmit data at 10 Gbit/s over a distance within 40 km.
		10GBASE-ZR	Uses one Rx single-mode fiber and one Tx single-mode fiber to transmit data at 10 Gbit/s over a distance within 80 km.

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Encapsulation Type	Rate	Standard	Description
QSFP+	40GE	40GBASE-SR4 (IEEE 802.3ba)	Uses one Rx multimode fiber and one Tx multimode fiber to transmit data at 40 Gbit/s over a distance within 400 m.
		40GBASE-LR4 (IEEE 802.3ba)	Uses one Rx single-mode fiber and one Tx single-mode fiber to transmit data at 40 Gbit/s over a distance within 10 km.

5.2.3 Parameter Description

Transmit optical power: Output optical power of an optical module when it is working properly. When two optical modules are connected, the transmit optical power of one end must be within the range of receive optical power on the other end.

Receive optical power: Average input optical power that the receiver of an optical module can receive within a range of bit error rate (BER = 10^{-12}). The upper limit of this parameter is the overload optical power and the lower limit is the maximum receiver sensitivity. When two optical modules are connected, the receive optical power on one end determines the range of transmit optical power on the other end.

Maximum receiver sensitivity: Minimum average input optical power that the receiver of an optical module can receive within a range of bit error rate (BER = 10^{-12}). When two optical modules are connected, the maximum receiver sensitivity on one end determines the minimum value of transmit optical power on the other end.

Overload optical power: Maximum average input optical power that the receiver of an optical module can receive within a range of bit error rate (BER = 10^{-12}). When two optical modules are connected, the overload optical power on one end determines the maximum transmit optical power on the other end.

Extinction ratio: Minimum ratio of the average optical power with signals transmitted against the average optical power without signals transmitted in complete modulation mode. The extinction ratio indicates the capability of an optical module to identify signal 0 and signal 1. This parameter is a quality indicator for optical modules. Optical modules with a large extinction ratio may not have good quality. Qualified optical modules should have an extinction ratio complying with IEEE 802.3.

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Fiber mode	Mode of optical fibers defined based on core diameters and features of optical fibers. Optical fibers are classified into single-mode and multimode fibers. Generally, multi-mode fibers have large core diameters and severe dispersion, so they transmit optical signals over short distances. Single-mode fibers have small dispersion and can transmit optical signals over long distances.
Modal bandwidth	Bandwidth measured at a point with transmit power several dB lower than that of the point with the peak center wavelength. Modal bandwidth reflects spectrum characteristics of multimode fibers. The higher modal bandwidth a multimode fiber has, the longer transmission distance the fiber supports.
Fiber diameter	Diameter of the core of a fiber. According to international standards for optical fibers, the diameter of a multimode fiber is 62.5 μm or 50 μm, and the diameter of a single-mode fiber is 9 μm. Select optical fibers with diameters supported by the optical modules.
Fiber class	The following fiber classes are defined: multimode fiber (G.651), common single-mode fiber (G.652), shifted dispersion fiber (G.653), and non-zero shifted dispersion fiber (G.655). G.651 and G.652 are commonly used fiber classes. Optical fibers of higher classes support longer transmission distances. When selecting optical fibers for optical modules, determine the classes of fibers based on the required transmission distances.
Connector type	Type of the interface on an optical module to accommodate a fiber. Commonly used connector types are LC (applicable to all the SFP, SFP+, and XFP modules), SC, and MPO (applicable to 150 m QSFP+ and CXP modules). Select optical fibers with connectors supported by the optical modules.
Transmission distance	Maximum distance over which optical signals can transmit. Optical signals sent from different types of sources can transmit over different distances because they have different dispersion and attenuation. When connecting optical interfaces, select optical modules and fibers according to the longest signal transmission distance.
Interface rate	Maximum rate of electrical signals that an optical component can transmit without bit errors. The interface rates defined in Ethernet standards include 125 Mbit/s, 1.25 Gbit/s, 10.3125 Gbit/s, and 41.25 Gbit/s. When connecting optical interfaces, select optical modules and fibers based on the maximum signal transmission rate.
Center wavelength	Wavelength measured at the midpoint of the half-amplitude line in the transmit spectrum. Two connected optical modules must have the same center wavelength.
MSA	Multi-Source Agreement, a non-profit organization jointly established by optical module manufacturers. This agreement defines the structure and dimensions of optical transceivers by referring to Optical Internetworking Forum (OIF) and International Telecommunication Union (ITU) standards.

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5.2.4 How to View Optical Module Parameters

Viewing the Hardware Description

If you know the model or type of an optical module, you can view the section "Pluggable Modules for Interfaces" in the *Hardware Description* to look up parameters of the optical module, including the center wavelength, transmission distance, fiber types supported, receive optical power, and transmit optical power.

Using a Command

If an optical module is installed in a running router, you can run the **display transceiver** command to view parameters of the optical module, including the center wavelength, transmission distance, fiber types supported, receive optical power, and transmit optical power.

5.2.5 Rules for Optical Module Interoperation

Interoperation Rules

Optical modules with the same standards can interoperate with each other. The standards define the rate, wavelength, and transmission distance of optical modules, but not their encapsulation modes (two interoperated optical modules can have different encapsulation modes).

If you need to achieve interoperability between optical modules with different standards, contact technical support personnel.

When connecting this product to other products, comply with the preceding optical module interoperation rules.

Standards Description

The following describes the standards, using 1000BASE-LX10 as an example:

- 1000 indicates the rate (1000 Mbit/s, in this case). Other rates include 10 Mbit/s, 100 Mbit/s, 10 Gbit/s, 40 Gbit/s, 100 Gbit/s, 200 Gbit/s and 400 Gbit/s.
- BASE indicates baseband transmission.
- L represents a center wavelength of the laser. Currently, the following center wavelengths are available: S (short wavelength: 850 nm), L (long wavelength: 1310 nm), E (extra long wavelength: 1550 nm), and B (single-fiber bidirectional long wavelength).
- X represents the encoding format. The encoding formats include T (twisted pair), X (8B/10B), R (64B/66B), and W (WIS).
- 10 indicates the number of channels. Currently, the value can be 4 or 10. If there is no number, the value is 1.

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NOTE

This example provides the definitions in IEEE standards, which are not applicable to all optical modules, for example, non-standard optical modules.

The following organizations or agreements define standards related to optical modules:

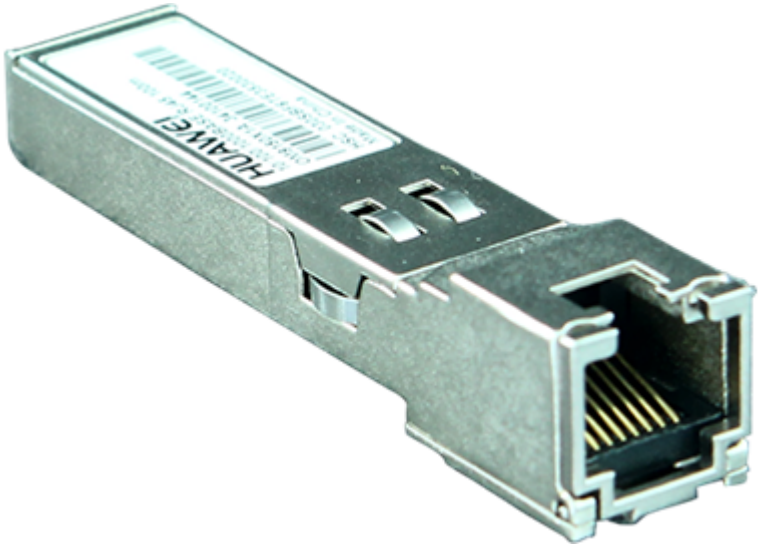
- IEEE 802.3, which defines MAC and PHY standards
- Small Form Factor (SFF) committee or Multi-Source Agreements (MSAs), which define optical module hardware, software, and structure standards

5.3 Understanding Copper Modules

Copper modules are also called RJ45 modules. Unlike optical modules, copper modules do not perform electrical-optical conversion. When two optical interfaces have copper modules installed, the interfaces can be connected using a copper cable. Currently, Huawei offers GE copper modules and 10GE copper modules with RJ45 interfaces. GE copper modules work with Category 5 network cables, comply with 1000BASE-T (IEEE 802.3ab), and support a maximum transmission distance of 100 m.

Figure 5-3shows a GE SFP copper module.

Figure 5-3 Appearance of a GE SFP copper module



5.4 FE SFP&eSFP Optical Modules

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5.4.1 S-SFP-FE-LH40-SM1310

Table 5-2 S-SFP-FE-LH40-SM1310 specifications

Item	Value
Basic Information	
Module name	S-SFP-FE-LH40-SM1310
Part Number	02317344
Model	S-SFP-FE-LH40-SM1310
Form factor	eSFP
Application standard	100BASE-LX
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	100Mbit/s
Target transmission distance [km]	Single-mode fiber: 40 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1310 nm
Maximum Tx optical power [dBm]	0 dBm
Minimum Tx optical power [dBm]	-5.0 dBm
Minimum extinction ratio [dB]	10.5 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-37.0 dBm
Overload power [dBm]	-10.0 dBm

5.4.2 SFP-FE-LX-SM1310-BIDI

Table 5-3 SFP-FE-LX-SM1310-BIDI specifications

Item	Value
Basic Information	
Module name	SFP-FE-LX-SM1310-BIDI

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Item	Value
Part Number	02315203
Model	SFP-FE-LX-SM1310-BIDI
Form factor	eSFP
Application standard	100base-BX
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
Transmission rate [bit/s]	100Mbit/s
Target transmission distance [km]	Single-mode fiber: 15 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1550(RX) 1310(TX)
Maximum Tx optical power [dBm]	-8.0 dBm
Minimum Tx optical power [dBm]	-15.0 dBm
Minimum extinction ratio [dB]	8.5 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-32.0 dBm
Overload power [dBm]	-8.0 dBm

5.4.3 SFP-FE-LX-SM1550-BIDI

Table 5-4 SFP-FE-LX-SM1550-BIDI specifications

Item	Value
Basic Information	
Module name	SFP-FE-LX-SM1550-BIDI
Part Number	02315202
Model	SFP-FE-LX-SM1550-BIDI
Form factor	eSFP
Application standard	100BASE-BX
Connector type	LC

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Item	Value
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	100Mbit/s
Target transmission distance [km]	Single-mode fiber: 15 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1310(RX) 1550(TX)
Maximum Tx optical power [dBm]	-8.0 dBm
Minimum Tx optical power [dBm]	-15.0 dBm
Minimum extinction ratio [dB]	8.5 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-32.0 dBm
Overload power [dBm]	-8.0 dBm

5.4.4 eSFP-FE-LX-SM1310

Table 5-5 eSFP-FE-LX-SM1310 specifications

Item	Value
Basic Information	
Module name	eSFP-FE-LX-SM1310
Part Number	02315205
Model	eSFP-FE-LX-SM1310
Form factor	eSFP
Application standard	100BASE-LX
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported

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Item	Value
Transmission rate [bit/s]	- 100Mbit/s - 155Mbit/s
Target transmission distance [km]	Single-mode fiber: 15 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1310 nm
Maximum Tx optical power [dBm]	-8.0 dBm
Minimum Tx optical power [dBm]	-15.0 dBm
Minimum extinction ratio [dB]	8.2 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-31.0 dBm
Overload power [dBm]	-8.0 dBm

5.5 GE eSFP Optical Modules

5.5.1 LE2MGSC40DE0

Table 5-6 LE2MGSC40DE0 specifications

Item	Value
Basic Information	
Module name	LE2MGSC40DE0
Part Number	02310KVV
Model	LE2MGSC40DE0
Form factor	eSFP
Application standard	1000BASE-BX
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	1Gbit/s
Target transmission distance [km]	Single-mode fiber: 40 km

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Item	Value
Transmitter Optical Characteristics	
Center wavelength [nm]	1490(RX) 1310(TX)
Maximum Tx optical power [dBm]	3.0 dBm
Minimum Tx optical power [dBm]	-2.0 dBm
Minimum extinction ratio [dB]	9.0 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-23.0 dBm
Overload power [dBm]	-3.0 dBm

NOTE

4GE-2S and 4GEW-S cards are not supported.

5.5.2 LE2MGSC40ED0

Table 5-7 LE2MGSC40ED0 specifications

Item	Value
Basic Information	
Module name	LE2MGSC40ED0
Part Number	02310KVU
Model	LE2MGSC40ED0
Form factor	eSFP
Application standard	1000BASE-BX10
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	1Gbit/s
Target transmission distance [km]	Single-mode fiber: 40 km
Transmitter Optical Characteristics	

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Item	Value
Center wavelength [nm]	1310(RX) 1490(TX)
Maximum Tx optical power [dBm]	3.0 dBm
Minimum Tx optical power [dBm]	-2.0 dBm
Minimum extinction ratio [dB]	9.0 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-23.0 dBm
Overload power [dBm]	-3.0 dBm

5.5.3 S-SFP-GE-LH40-SM1310

Table 5-8 S-SFP-GE-LH40-SM1310 specifications

Item	Value
Basic Information	
Module name	S-SFP-GE-LH40-SM1310
Part Number	02317346
Model	S-SFP-GE-LH40-SM1310
Form factor	eSFP
Application standard	1000BASE-LX/LH
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	1Gbit/s
Target transmission distance [km]	Single-mode fiber: 40 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1310 nm
Maximum Tx optical power [dBm]	0 dBm
Minimum Tx optical power [dBm]	-5.0 dBm
Minimum extinction ratio [dB]	9.0 dB

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Item	Value
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-23.0 dBm
Overload power [dBm]	-3.0 dBm

5.5.4 S-SFP-GE-LH40-SM1550

Table 5-9 S-SFP-GE-LH40-SM1550 specifications

Item	Value
Basic Information	
Module name	S-SFP-GE-LH40-SM1550
Part Number	02317347
Model	S-SFP-GE-LH40-SM1550
Form factor	eSFP
Application standard	1000BASE-LX/LH
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	1Gbit/s
Target transmission distance [km]	Single-mode fiber: 40 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1550 nm
Maximum Tx optical power [dBm]	0 dBm
Minimum Tx optical power [dBm]	-5.0 dBm
Minimum extinction ratio [dB]	8.5 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-22.0 dBm
Overload power [dBm]	-3.0 dBm

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5.5.5 S-SFP-GE-LH80-SM1550

Table 5-10 S-SFP-GE-LH80-SM1550 specifications

Item	Value
Basic Information	
Module name	S-SFP-GE-LH80-SM1550
Part Number	02317348
Model	S-SFP-GE-LH80-SM1550
Form factor	eSFP
Application standard	1000BASE-ZX
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	1Gbit/s
Target transmission distance [km]	Single-mode fiber: 80 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1550 nm
Maximum Tx optical power [dBm]	5.0 dBm
Minimum Tx optical power [dBm]	-2.0 dBm
Minimum extinction ratio [dB]	9.0 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-23.0 dBm
Overload power [dBm]	-3.0 dBm

5.5.6 SFP-GE-LX-SM1310

Table 5-11 SFP-GE-LX-SM1310 specifications

Item	Value
Basic Information	
Module name	SFP-GE-LX-SM1310

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Item	Value
Part Number	02315200
Model	SFP-GE-LX-SM1310
Form factor	eSFP
Application standard	1000BASE-LX/LH
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	1Gbit/s
Target transmission distance [km]	Single-mode fiber: 10 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1310 nm
Maximum Tx optical power [dBm]	-3.0 dBm
Minimum Tx optical power [dBm]	-9.0 dBm
Minimum extinction ratio [dB]	9.0 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-20.0 dBm
Overload power [dBm]	-3.0 dBm

5.5.7 SFP-GE-LX-SM1310-BIDI

Table 5-12 SFP-GE-LX-SM1310-BIDI specifications

Item	Value
Basic Information	
Module name	SFP-GE-LX-SM1310-BIDI
Part Number	02315285
Model	SFP-GE-LX-SM1310-BIDI
Form factor	eSFP
Application standard	1000BASE-BX
Connector type	LC

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Item	Value
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	1Gbit/s
Target transmission distance [km]	Single-mode fiber: 10 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1490(RX) 1310(TX)
Maximum Tx optical power [dBm]	-3.0 dBm
Minimum Tx optical power [dBm]	-9.0 dBm
Minimum extinction ratio [dB]	6.0 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-19.5 dBm
Overload power [dBm]	-3.0 dBm

5.5.8 SFP-GE-LX-SM1490-BIDI

Table 5-13 SFP-GE-LX-SM1490-BIDI specifications

Item	Value
Basic Information	
Module name	SFP-GE-LX-SM1490-BIDI
Part Number	02315286
Model	SFP-GE-LX-SM1490-BIDI
Form factor	eSFP
Application standard	1000BASE-BX
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	1Gbit/s

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Item	Value
Target transmission distance [km]	Single-mode fiber: 10 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1310(RX) 1490(TX)
Maximum Tx optical power [dBm]	-3.0 dBm
Minimum Tx optical power [dBm]	-9.0 dBm
Minimum extinction ratio [dB]	6.0 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-19.5 dBm
Overload power [dBm]	-3.0 dBm

5.5.9 eSFP-GE-SX-MM850

Table 5-14 eSFP-GE-SX-MM850 specifications

Item	Value
Basic Information	
Module name	eSFP-GE-SX-MM850
Part Number	02315204
Model	eSFP-GE-SX-MM850
Form factor	eSFP
Application standard	1000BASE-SX
Connector type	LC
Optical fiber type	MMF
Working case temperature [°C(°F)]	-20°C to 85°C (-4°F to 185°F)
DDM options	Supported
Transmission rate [bit/s]	1Gbit/s

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Item	Value
Target transmission distance [km]	- Multimode fiber (with modal bandwidth of 160 MHz*km and diameter of 62.5 μm): 0.22 km - Multimode fiber (OM1): 0.275 km - Multimode fiber (with modal bandwidth of 400 MHz*km and diameter of 50 μm): 0.5 km - Multimode fiber (OM2): 0.55 km - Multimode fiber (OM3): 1 km
Transmitter Optical Characteristics	
Center wavelength [nm]	850 nm
Maximum Tx optical power [dBm]	-2.5 dBm
Minimum Tx optical power [dBm]	-9.5 dBm
Minimum extinction ratio [dB]	9.0 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-17.0 dBm
Overload power [dBm]	0 dBm

5.5.10 OGSM01880 (Industry-Grade)

Table 5-15 OGSM01880 specifications

Item	Value
Basic Information	
Module name	OGSM01880
Part Number	02310LJG
Model	OGSM01880
Form factor	eSFP
Application standard	1000BASE-SX
Connector type	LC
Optical fiber type	MMF
Working case temperature [°C(°F)]	-40°C to +85°C (-40°F to +185°F)
DDM options	Supported

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Item	Value
Transmission rate [bit/s]	1 Gbit/s
Target transmission distance [km]	Multimode fiber (with modal bandwidth of 160 MHz*km and diameter of 62.5 μm): 0.22 km Multimode fiber (OM1): 0.275 km Multimode fiber (with modal bandwidth of 400 MHz*km and diameter of 50 μm): 0.5 km Multimode fiber (OM2): 0.55 km
Transmitter Optical Characteristics	
Center wavelength [nm]	850 nm
Maximum Tx optical power [dBm]	-2.5 dBm
Minimum Tx optical power [dBm]	-10 dBm
Minimum extinction ratio [dB]	9 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-17.0 dBm
Overload power [dBm]	0 dBm

NOTE

This module can only be used on a device running V300R023C00 or a later version.

5.5.11 SFP-GE-EX-C

Table 5-16 SFP-GE-EX-C specifications

Item	Value
Basic Information	
Module name	SFP-GE-EX-C
Part Number	02312UUD
Model	SFP-GE-EX-C
Form factor	eSFP
Application standard	1000BASE-EX (non-standard)
Connector type	LC
Optical fiber type	SMF

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Item	Value
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	1 Gbit/s
Target transmission distance [km]	Single-mode fiber: 40 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1310 nm
Maximum Tx optical power [dBm]	0 dBm
Minimum Tx optical power [dBm]	-5.0 dBm
Minimum extinction ratio [dB]	9 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-23 dBm
Overload power [dBm]	-3.0 dBm

NOTE

This module can only be used on a device running V300R023C00 or a later version.

5.5.12 SFP-GE-LX10-C

Table 5-17 SFP-GE-LX10-C specifications

Item	Value
Basic Information	
Module name	SFP-GE-LX10-C
Part Number	02312UUC
Model	SFP-GE-LX10-C
Form factor	eSFP
Application standard	1000BASE-LX10/LH
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	1 Gbit/s

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Item	Value
Target transmission distance [km]	Single-mode fiber: 10 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1310 nm
Maximum Tx optical power [dBm]	-3.0 dBm
Minimum Tx optical power [dBm]	-9.0 dBm
Minimum extinction ratio [dB]	9 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-20.0 dBm
Overload power [dBm]	-3.0 dBm

NOTE

This module can only be used on a device running V300R023C00 or a later version.

5.5.13 SFP-GE-SX-C

Table 5-18 SFP-GE-SX-C specifications

Item	Value
Basic Information	
Module name	SFP-GE-SX-C
Part Number	02312UUB
Model	SFP-GE-SX-C
Form factor	eSFP
Application standard	1000BASE-SX
Connector type	LC
Optical fiber type	MMF
Working case temperature [°C(°F)]	-20°C to +85°C (-4°F to +185°F)
DDM options	Supported
Transmission rate [bit/s]	1 Gbit/s

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Item	Value
Target transmission distance [km]	Multimode optical fiber (modal bandwidth: 160 MHz*km; diameter: 62.5 μm): 0.22 km Multimode optical fiber (OM1): 0.275 km Multimode optical fiber (modal bandwidth: 400 MHz*km; diameter: 50 μm): 0.5 km Multimode optical fiber (OM2): 0.55 km Multimode optical fiber (OM3): 1 km
Transmitter Optical Characteristics	
Center wavelength [nm]	850 nm
Maximum Tx optical power [dBm]	-2.5 dBm
Minimum Tx optical power [dBm]	-9.5 dBm
Minimum extinction ratio [dB]	9 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-17.0 dBm
Overload power [dBm]	0 dBm

NOTE

This module can only be used on a device running V300R023C00 or a later version.

5.5.14 SFP-GE-LX10-eKit

Table 5-19 SFP-GE-LX10-eKit specifications

Item	Value
Basic Information	
Module name	SFP-GE-LX10-eKit
Part Number	02315HNQ
Model	SFP-GE-LX10-eKit
Form factor	eSFP
Application standard	1000BASE-LX/LH
Connector type	LC

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Item	Value
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	1Gbit/s
Target transmission distance [km]	Single-mode fiber: 10 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1310 nm
Maximum Tx optical power [dBm]	-3.0 dBm
Minimum Tx optical power [dBm]	-9.0 dBm
Minimum extinction ratio [dB]	9.0 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-20.0 dBm
Overload power [dBm]	-3.0 dBm

5.5.15 SFP-GE-SX-eKit

Table 5-20 SFP-GE-SX-eKit specifications

Item	Value
Basic Information	
Module name	SFP-GE-SX-eKit
Part Number	02315HNY
Model	SFP-GE-SX-eKit
Form factor	eSFP
Application standard	1000BASE-SX
Connector type	LC
Optical fiber type	MMF
Working case temperature [°C(°F)]	-20°C to 85°C (-4°F to 185°F)
DDM options	Supported
Transmission rate [bit/s]	1Gbit/s

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Item	Value
Target transmission distance [km]	- Multimode fiber (with modal bandwidth of 160 MHz*km and diameter of 62.5 μm): 0.22 km - Multimode fiber (OM1): 0.275 km - Multimode fiber (with modal bandwidth of 400 MHz*km and diameter of 50 μm): 0.5 km - Multimode fiber (OM2): 0.55 km - Multimode fiber (OM3): 1 km
Transmitter Optical Characteristics	
Center wavelength [nm]	850 nm
Maximum Tx optical power [dBm]	-2.5 dBm
Minimum Tx optical power [dBm]	-9.5 dBm
Minimum extinction ratio [dB]	9.0 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-17.0 dBm
Overload power [dBm]	0 dBm

5.6 GE SFP Copper Modules

5.6.1 SFP-1000BaseT (02314171)

Table 5-21 SFP-1000BaseT specifications

Item	Value
Basic Information	
Module name	SFP-1000BaseT
Part Number	02314171
Model	SFP-1000BaseT
Form factor	SFP
Application standard	1000Base-T
Connector type	RJ45
Optical fiber type	-

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Item	Value
DDM options	Supported
Target transmission distance [km]	Ethernet cable: 0.1 km
Transmitter Optical Characteristics	
Minimum extinction ratio [dB]	-
Receiver Optical Characteristics	
Overload power [dBm]	-

NOTE

In versions earlier than V300R023C00, only the 4GE-2S and 4GEW-S support this optical module.

In V300R023C00 and later versions, AR300 series, AR700 series, 4GE-2S and 4GEW-S support this optical module.

When a GE SFP copper module is used, the interface can work only at the rate of 1000 Mbit/s but not 100 Mbit/s or 10 Mbit/s. The interface can only be used as a GE electrical interface and does not support other electrical interface functions.

5.6.2 SFP-1000BaseT-G2

Table 5-22 SFP-1000BaseT-G2 specifications

Item	Value
Basic Information	
Module name	SFP-1000BaseT-G2
Part Number	02314BDD
Model	SFP-1000BaseT-G2
Application standard	1000BASE-T
Connector type	RJ45
Optical fiber type	-
Transmission rate [bit/s]	10 Mbit/s 100 Mbit/s 1 Gbit/s
Target transmission distance [km]	Ethernet cable: 0.1 km
Transmitter Optical Characteristics	
Center wavelength [nm]	-
Maximum Tx optical power [dBm]	-

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Item	Value
Minimum Tx optical power [dBm]	-
Minimum extinction ratio [dB]	-
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-
Overload power [dBm]	-
NOTE The supported rate depends on the interface. Surge protection specifications: ±1 kV in common mode	

NOTE

This module can only be used on a device running V300R023C00 or a later version.

When a GE SFP copper module is used, the interface can work only at the rate of 1000 Mbit/s but not 100 Mbit/s or 10 Mbit/s. The interface can only be used as a GE electrical interface and does not support other electrical interface functions.

5.6.3 SFP-GE-T-eKit

Table 5-23 SFP-GE-T-eKit specifications

Item	Value
Basic Information	
Module name	SFP-GE-T-eKit
Part Number	02315HPA
Model	SFP-GE-T-eKit
Form factor	SFP
Application standard	1000Base-T
Connector type	RJ45
Optical fiber type	-
DDM options	Supported
Target transmission distance [km]	Ethernet cable: 0.1 km
Transmitter Optical Characteristics	
Minimum extinction ratio [dB]	-
Receiver Optical Characteristics	
Overload power [dBm]	-

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5.7 10GE SFP+ Optical Modules

5.7.1 OMXD30000 (02318169)

Table 5-24 OMXD30000 specifications

Item	Value
Basic Information	
Module name	OMXD30000
Part Number	02318169
Model	OMXD30000
Form factor	SFP+
Application standard	10GBASE-SR
Connector type	LC
Optical fiber type	MMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10Gbit/s
Target transmission distance [km]	- Multimode fiber (OM1): 0.033 km - Multimode fiber (OM2): 0.082 km - Multimode fiber (OM3): 0.3 km
Transmitter Optical Characteristics	
Center wavelength [nm]	850 nm
Maximum Tx optical power [dBm]	-1.0 dBm
Minimum Tx optical power [dBm]	-7.3 dBm
Minimum extinction ratio [dB]	3.0 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-9.9 dBm
Overload power [dBm]	-1.0 dBm

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5.7.2 OMXD30000 (02312UUE)

Table 5-25 OMXD30000 specifications

Item	Value
Basic Information	
Module name	OMXD30000
Part Number	02312UUE
Model	SFP-10G-SR-C
Form factor	SFP+
Application standard	10GBASE-SR
Connector type	LC
Optical fiber type	MMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10Gbit/s
Target transmission distance [km]	- Multimode fiber (OM1): 0.033 km - Multimode fiber (OM2): 0.082 km - Multimode fiber (OM3): 0.3 km
Transmitter Optical Characteristics	
Center wavelength [nm]	850 nm
Maximum Tx optical power [dBm]	-1.0 dBm
Minimum Tx optical power [dBm]	-7.3 dBm
Minimum extinction ratio [dB]	3.0 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-9.9 dBm
Overload power [dBm]	-1.0 dBm

NOTE

This module can only be used on a device running V300R023C00 or a later version.

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5.7.3 OSX010000

Table 5-26 OSX010000 specifications

Item	Value
Basic Information	
Module name	OSX010000
Part Number	02318170
Model	OSX010000
Form factor	SFP+
Application standard	10GBASE-LR
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10Gbit/s
Target transmission distance [km]	Single-mode fiber: 10 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1310 nm
Maximum Tx optical power [dBm]	0.5 dBm
Minimum Tx optical power [dBm]	-8.2 dBm
Minimum extinction ratio [dB]	3.5 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-12.6 dBm
Overload power [dBm]	0.5 dBm

5.7.4 OSX040N01

Table 5-27 OSX040N01 specifications

Item	Value
Basic Information	
Module name	OSX040N01

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Item	Value
Part Number	02310CNF
Model	OSX040N01
Form factor	SFP+
Application standard	10GBASE-ER
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10Gbit/s
Target transmission distance [km]	Single-mode fiber: 40 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1550 nm
Maximum Tx optical power [dBm]	4.0 dBm
Minimum Tx optical power [dBm]	-4.7 dBm
Minimum extinction ratio [dB]	3.0 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-14.1 dBm
Overload power [dBm]	-1.0 dBm

5.7.5 SFP-10G-ZR

Table 5-28 SFP-10G-ZR specifications

Item	Value
Basic Information	
Module name	SFP-10G-ZR
Part Number	02310SNN
Model	SFP-10G-ZR
Form factor	SFP+
Application standard	10GBASE-ZR
Connector type	LC

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Item	Value
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10Gbit/s
Target transmission distance [km]	Single-mode fiber: 80 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1550 nm
Maximum Tx optical power [dBm]	4.0 dBm
Minimum Tx optical power [dBm]	0 dBm
Minimum extinction ratio [dB]	9.0 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-24.0 dBm
Overload power [dBm]	-7.0 dBm

5.7.6 SFP-10G-ER-SM1270-BIDI

Table 5-29 SFP-10G-ER-SM1270-BIDI specifications

Item	Value
Basic Information	
Module name	SFP-10G-ER-SM1270-BIDI
Part Number	02311BJC
Model	SFP-10G-ER-SM1270-BIDI
Application standard	10GBASE-BX
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode fiber: 40 km
Transmitter Optical Characteristics	

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Item	Value
Center wavelength [nm]	1330 nm (RX) 1270 nm (TX)
Maximum Tx optical power [dBm]	5 dBm
Minimum Tx optical power [dBm]	0 dBm
Minimum extinction ratio [dB]	3.5 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-18 dBm
Overload power [dBm]	-9 dBm
NOTE Supports the single-fiber bidirectional function. Single-fiber bidirectional (BIDI) optical modules must be used in pairs. For example, SFP-10G-ER-SM1270-BIDI must be used with SFP-10G-ER-SM1330-BIDI.	

NOTE

This module can only be used on a device running V300R023C00 or a later version.

5.7.7 SFP-10G-ER-SM1330-BIDI

Table 5-30 SFP-10G-ER-SM1330-BIDI specifications

Item	Value
Basic Information	
Module name	SFP-10G-ER-SM1330-BIDI
Part Number	02311BJB
Model	SFP-10G-ER-SM1330-BIDI
Application standard	10GBASE-BX
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode fiber: 40 km
Transmitter Optical Characteristics	

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Item	Value
Center wavelength [nm]	1270 nm (RX) 1330 nm (TX)
Maximum Tx optical power [dBm]	5 dBm
Minimum Tx optical power [dBm]	0 dBm
Minimum extinction ratio [dB]	3.5 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-18 dBm
Overload power [dBm]	-9 dBm
NOTE The single-fiber bidirectional function is supported. Single-fiber bidirectional (BIDI) optical modules must be used in pairs. For example, SFP-10G-ER-SM1330-BIDI must be used with SFP-10G-ER-SM1270-BIDI.	

NOTE

This module can only be used on a device running V300R023C00 or a later version.

5.7.8 SFP-10G-LR-C

Table 5-31 SFP-10G-LR-C specifications

Item	Value
Basic Information	
Module name	SFP-10G-LR-C
Part Number	02312UUG
Model	SFP-10G-LR-C
Application standard	10GBASE-LR
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode fiber: 10 km
Transmitter Optical Characteristics	

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Item	Value
Center wavelength [nm]	1310 nm
Maximum Tx optical power [dBm]	0.5 dBm
Minimum Tx optical power [dBm]	-8.2 dBm
Minimum extinction ratio [dB]	3.5 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-12.6 dBm
Overload power [dBm]	0.5 dBm

NOTE

This module can only be used on a device running V300R023C00 or a later version.

5.7.9 SFP-10G-iLR

Table 5-32 SFP-10G-iLR specifications

Item	Value
Basic Information	
Module name	SFP-10G-iLR
Part Number	02311BJJ
Model	SFP-10G-iLR
Application standard	10GBASE-iLR (non-standard)
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	-40°C to +85°C (-40°F to +185°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode optical fiber: 1.4 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1310 nm
Maximum Tx optical power [dBm]	0.5 dBm
Minimum Tx optical power [dBm]	-8.2 dBm
Minimum extinction ratio [dB]	3.5 dB

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Item	Value
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-14.4 dBm
Overload power [dBm]	0.5 dBm

NOTE

This module can only be used on a device running V300R023C00 or a later version.

5.7.10 SFP-10G-iLR-C

Table 5-33 SFP-10G-iLR-C specifications

Item	Value
Basic Information	
Module name	SFP-10G-iLR-C
Part Number	02312UUF
Model	SFP-10G-iLR-C
Application standard	10GBASE-iLR (non-standard)
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	-40°C to +85°C (-40°F to +185°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode optical fiber: 1.4 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1310 nm
Maximum Tx optical power [dBm]	0.5 dBm
Minimum Tx optical power [dBm]	-8.2 dBm
Minimum extinction ratio [dB]	3.5 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-14.4 dBm
Overload power [dBm]	0.5 dBm

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NOTE

This module can only be used on a device running V300R023C00 or a later version.

5.7.11 SFP-10G-BXD1

Table 5-34 SFP-10G-BXD1 specifications

Item	Value
Basic Information	
Module name	SFP-10G-BXD1
Part Number	02310QDT
Model	SFP-10G-BXD1
Application standard	10GBASE-BX
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	-40°C to +85°C (-40°F to +185°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode fiber: 10 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1270 nm (RX) 1330 nm (TX)
Maximum Tx optical power [dBm]	0.5 dBm
Minimum Tx optical power [dBm]	-8.2 dBm
Minimum extinction ratio [dB]	3.5 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-14.4 dBm
Overload power [dBm]	0.5 dBm
NOTE Supports the single-fiber bidirectional function. Single-fiber bidirectional (BIDI) optical modules must be used in pairs. For example, SFP-10G-BXD1 must be used with SFP-10G-BXU1.	

NOTE

This module can only be used on a device running V300R023C00 or a later version.

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5.7.12 SFP-10G-BXU1

Table 5-35 SFP-10G-BXU1 specifications

Item	Value
Basic Information	
Module name	SFP-10G-BXU1
Part Number	02310QBJ
Model	SFP-10G-BXU1
Application standard	10GBASE-BX
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	-40°C to +85°C (-40°F to +185°F)
DDM options	Supported
Transmission rate [bit/s]	10 Gbit/s
Target transmission distance [km]	Single-mode fiber: 10 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1330 nm (RX) 1270 nm (TX)
Maximum Tx optical power [dBm]	0.5 dBm
Minimum Tx optical power [dBm]	-8.2 dBm
Minimum extinction ratio [dB]	3.5 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-14.4 dBm
Overload power [dBm]	0.5 dBm
NOTE Supports the single-fiber bidirectional function. Single-fiber bidirectional (BIDI) optical modules must be used in pairs. For example, SFP-10G-BXU1 must be used with SFP-10G-BXD1.	

NOTE

This module can only be used on a device running V300R023C00 or a later version.

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5.7.13 SFP-10G-SR-eKit

Table 5-36 SFP-10G-SR-eKit specifications

Item	Value
Basic Information	
Module name	SFP-10G-SR-eKit
Part Number	02315HNN
Model	SFP-10G-SR-eKit
Form factor	SFP+
Application standard	10GBASE-SR
Connector type	LC
Optical fiber type	MMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10Gbit/s
Target transmission distance [km]	- Multimode fiber (OM1): 0.033 km - Multimode fiber (OM2): 0.082 km - Multimode fiber (OM3): 0.3 km
Transmitter Optical Characteristics	
Center wavelength [nm]	850 nm
Maximum Tx optical power [dBm]	-1.0 dBm
Minimum Tx optical power [dBm]	-7.3 dBm
Minimum extinction ratio [dB]	3.0 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-9.9 dBm
Overload power [dBm]	-1.0 dBm

5.7.14 SFP-10G-LR-eKit

Table 5-37 SFP-10G-LR-eKit specifications

Item	Value
Basic Information	

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Item	Value
Module name	SFP-10G-LR-eKit
Part Number	02315HNR
Model	SFP-10G-LR-eKit
Form factor	SFP+
Application standard	10GBASE-LR
Connector type	LC
Optical fiber type	SMF
Working case temperature [°C(°F)]	0°C to 70°C (32°F to 158°F)
DDM options	Supported
Transmission rate [bit/s]	10Gbit/s
Target transmission distance [km]	Single-mode fiber: 10 km
Transmitter Optical Characteristics	
Center wavelength [nm]	1310 nm
Maximum Tx optical power [dBm]	0.5 dBm
Minimum Tx optical power [dBm]	-8.2 dBm
Minimum extinction ratio [dB]	3.5 dB
Receiver Optical Characteristics	
Rx sensitivity [dBm]	-12.6 dBm
Overload power [dBm]	0.5 dBm

5.8 10GE SFP+ Copper Modules

5.8.1 SFP-10GBaseT-SR

Table 5-38 SFP-10GBaseT-SR specifications

Item	Value
Basic Information	
Module name	SFP-10GBaseT-SR
Part Number	02314PHV
Model	SFP-10GBaseT-SR

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Item	Value
Form factor	SFP+
Application standard	10GBASE-T
Connector type	RJ45
Optical fiber type	-
DDM options	Supported
Target transmission distance [km]	Ethernet cable: 0.03 km Note: Cat6A or higher shielded twisted pair cables are required.
Transmitter Optical Characteristics	
Minimum extinction ratio [dB]	-
Receiver Optical Characteristics	
Overload power [dBm]	-

NOTE

This module can only be used on a device running V300R023C10 or a later version.

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