RAISECOM

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ISCOM3000X (A) Series
Product Description
(Rel_06)

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Notice

Preface

Objectives

This document describes the system structure, device installation, and technical specifications of the Layer 3 all-10 Gbit/s Ethernet ISCOM3000X series switch (hereinafter referred to as the ISCOM3000X series switch).

The appendix describes cables and SFP modules, and lists terms, acronyms, and abbreviations involved in this document.

Versions

The following table lists the product versions related to this document.

Product name	Hardware version	Software version
ISCOM3048XF-4Q	A	V3.50

Conventions

Symbol conventions

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

Symbol	Description
⚡ Warning	Indicate a hazard with a medium or low level of risk which, if not avoided, could result in minor or moderate injury.
⚠ Caution	Indicate a potentially hazardous situation that, if not avoided, could cause equipment damage, data loss, and performance degradation, or unexpected results.
✎ Note	Provide additional information to emphasize or supplement important points of the main text.

Symbol	Description
Tip	Indicate a tip that may help you solve a problem or save time.

General conventions

Convention	Description
Times New Roman	Normal paragraphs are in Times New Roman.
Arial	Paragraphs in Warning, Caution, Notes, and Tip are in Arial.
Boldface	Buttons and navigation path are in **Boldface**.
Italic	Book titles are in *italics*.
`Lucida Console`	Terminal display is in `Lucida Console`.
Book Antiqua	Heading 1, Heading 2, Heading 3, and Block are in Book Antiqua.

Change history

Updates between document versions are cumulative. Therefore, the latest document version contains all updates made to previous versions.

Issue 06 (2018-05-16)

Sixth commercial release

- Upgraded the software version to V3.50.
- Modified some features

Issue 05 (2017-09-16)

Fifth commercial release

- Upgraded the software features and modified some features.

Issue 04 (2017-01-11)

Fourth commercial release

- Modified the ordering information.
- Updated the software version to V3.41 and modified some features.

Issue 03 (2016-09-30)

Third commercial release

- Added descriptions about DC devices.
- Fixed known bugs.

Issue 02 (2016-06-27)

Second commercial release

- Modified known bugs.

Issue 01 (2016-03-17)

Initial commercial release

Contents

Figures

Tables

1 Overview

This chapter is an overview of the ISCOM3000X series switch, including the following sections:

- Introduction
- Features
- Networking applications
- Ordering information

1.1 Introduction

As an aggregation device, the Layer 3 all-10 GE Ethernet ISCOM3000X series switch (hereinafter referred to as the ISCOM3000X series switch) developed by Raisecom, is designed for MAN aggregation and the data center 10 Gbit/s top-of-rack (ToR) servers. It provides up to 40 Gbit/s uplink interfaces and 10 Gbit/s downlink interfaces.

The ISCOM3000X series switch combines advanced features, such as user authentication, access control, and bandwidth management, into one device. It features flexible networking, individualized Quality of Service (QoS), sound access control, complete network management, and high stability, thus fully meeting the requirements of carriers.

1.2 Features

Table 1-1 lists features of the ISCOM3000X series switch.

Table 1-1 Features

Feature	Description
Basic features	• Logging in to the device (Console/Telnet/SSHv2) • User management • CLI • File management (BootROM/system file/configuration file) • Loading and upgrading (automatic loading through TFTP, upgrading through BootROM, FTP, or TFTP) • Time management • Interface management • Basic information about the device (name, language mode, saving or deleting configurations, and restarting the device) • Task scheduling • Watchdog
ISF	Support virtualizing the ISF through the service interface.
Ethernet	• MAC management • Secure MAC address • VLAN (4094) • PVLAN • SuperVLAN • MAC and subnet-based VLAN • VLAN IF interface • Basic QinQ and selective QinQ • VLAN mapping • Loop detection • Port mirroring • Interface isolation • Interface backup • STP/RSTP/MRSTP • Transparent transmission of L2CP • Voice VLAN
Ring protection	G.8032
IP service	• ARP • IPv6 • NDP • DHCP Client • DHCP Server • DHCP Relay • DHCP Snooping • DHCP Option 82, DHCP Option 61, and IPv6 DHCP Option18 • DHCPv6 Client • DHCPv6 Relay • DHCPv6 Snooping • RA Snooping

Feature	Description
IP routing	• Static route (IPv4 and IPv6) • Route management • Policy routing • OSPF • OSPFv3 • BGP • RIP • RIPng • ISIS • ISISv6
QoS	• Priority mapping • Interface shaping • Queue scheduling • SRED • Filter • Traffic policy • Queue tag • CAR, CP CAR, and statistics
Multicast	• Static Layer 2 multicast • Route multicast management • IGMP • IGMP Snooping • IGMP MVR • IGMP filtering • IGMP Querier • MLD • MVR • VLAN-Copy
Security	• Port security MAC • ACL (IPv4 and IPv6) • Dynamic ARP detection • ARP anti-attacks • RADIUS authentication • TACACS+ • 802.1X • PPPoE+ • Storm control • CPU protection • IPSG • Interface protection
Reliability	• Link aggregation • VRRP • Link-state tracking • mLACP • ICCP
OAM	• IEEE802.3ah • BFD
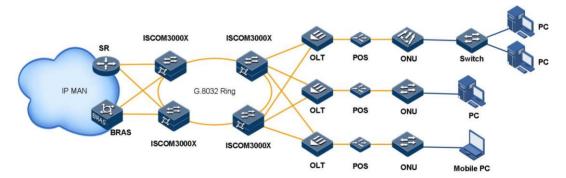
Feature	Description
System management	• SNMP (v2c and v3) • RMON • LLDP • Optical module DDM • System log • Alarm management • Fan monitoring • Hardware monitoring • CPU control • Dual system • Loopback • Ping and Traceroute • Performance statistics

1.3 Networking applications

1.3.1 MAN aggregation

As shown in Figure 1-1, in the Metropolitan Area Network (MAN), the ISCOM3000X series switches serve as aggregation devices and form a G.8032 ring network which supports ring network protection. The ISCOM3000X series switch is connected downstream to the Optical Line Terminals (OLTs) and form an optical network through ONUs which are connected to devices, such as VoIP telephones, computers, and Set Top Boxes (STBs), thus meeting the requirements of high bandwidth and multiple services access.

Figure 1-1 MAN aggregation

1.3.2 Large-scale campus aggregation

As shown in Figure 1-2, the ISCOM3000X series switch provides 40 Gbit/s backbone link bandwidth aggregation and 10 Gbit/s downlink bandwidth for campus with dense population. It supports Layer 3 data forwarding in the uplink, ACL, and QoS, thus ensuring data security and timeliness in residence network.
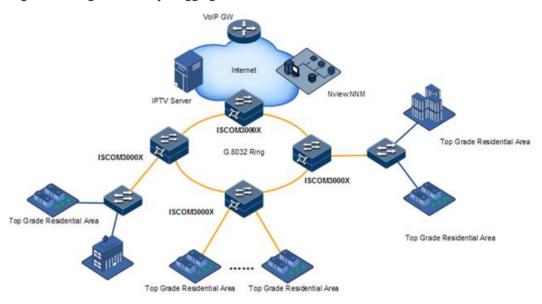
Figure 1-2 Large-scale campus aggregation

1.3.3 IDC

Internet Data Center (IDC) is a combination of the traditional data center and Internet. In addition to the features of traditional IDC, such as data centralization and reliable operation, it also features changeable access modes, 7×24 services, and fast response. IDC is a base providing outsourcing services and a sound equipment room excellent in security assurance, network bandwidth, number and performance of hosts, large storage space, software environment, and service performance.

IDC, as a base providing source outsourcing services, provides enterprises and various network websites with services, such as server host, space rent, network bandwidth wholesale, ASP, and EC. To put it simply, IDC, as an infrastructure which ensures the secure operation of various e-commerce, is a place for hosting enterprises, merchants, and network servers and a platform supporting enterprises or their business alliance (distributors, suppliers, and clients) to implement value chains. Figuratively speaking, IDC is a high-quality machine room meeting strict requirements in construction.

As shown in Figure 1-3, the ISCOM3000X series switch, as the core switch in the security monitoring cloud, provides service, heartbeat, and management channel and meanwhile controls access to the server through ACL.
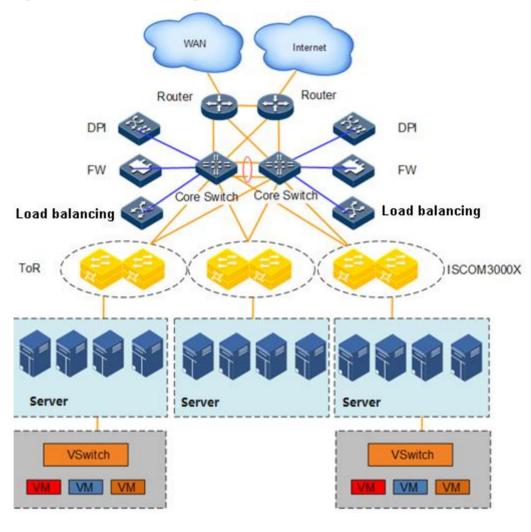
Figure 1-3 Data center networking

1.4 Ordering information

1.4.1 Naming convention

Naming convention of device

Figure 1-4 and Table 1-2 show the naming convention of the ISCOM3000X series switch.

Figure 1-4 Naming convention of the device
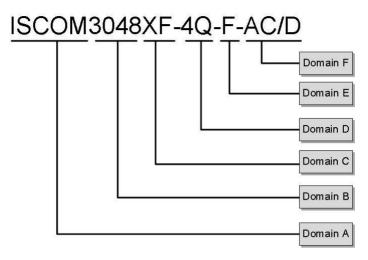
Table 1-2 Naming convention

Domain	Indication	Value	Description
A	Product ID	ISCOM	It belongs to Raisecom ISCOM series.
B	Subtype and number of interfaces	30	One of the ISCOM3000 series
		48	Provide 48 downlink interfaces.
C	Product property	X	It is an all-10GE product.
		F	Interfaces can be configured to optical interfaces.
D	Property and number of uplink interfaces	4	Support 4 uplink interfaces.
		Q	Support 40 Gbit/s uplink interfaces.
E	Airflow direction	–	Draw air at the interface side and exhaust air at the power side.
		F	Draw air at the power side and exhaust air at the interface side.
F	Power type	AC/D	Support dual AC power supplies (100–240 VAC).
		DC/D	Support dual DC power supplies (-36 to -72 VDC)
		AC_DC	Support one AC power supply (100–240 VAC) and one DC power supply (-36 to -72 VDC).

Naming convention of the AC power supply

Figure 1-5 and Table 1-3 show the naming convention of the AC power supply.

Figure 1-5 Naming convention of AC power supply

RPA1351-F-220S12

Domain C

Domain B

Domain A
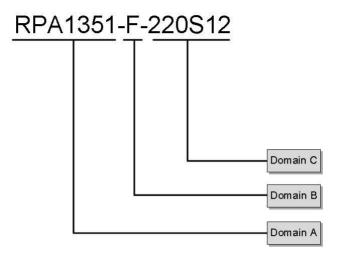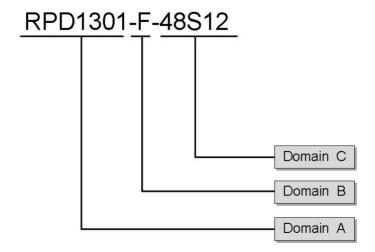
Table 1-3 Naming convention of AC power supply

Domain	Indication	Value	Description
A	Product ID	RPA1351	It belongs to the RPA1351 series.
B	Airflow direction	–	Draw air at the interface side and exhaust air at the power side.
		F	Draw air at the power side and exhaust air at the interface side.
C	Power input/output voltage	220S12	The power input and output voltage are 220 VAC and 12 VAC respectively.

Naming convention of the DC power supply

Figure 1-6 and Table 1-4 show the naming convention of the DC power supply.

Figure 1-6 Naming convention of DC power supply

RPD1301-F-48S12

Domain C

Domain B

Domain A

Table 1-4 Naming convention of DC power supply

Domain	Indication	Value	Description
A	Product ID	RPD1301	It belongs to the RPD1301 series.
B	Airflow direction	–	Draw air at the interface side and exhaust air at the power side.
		F	Draw air at the power side and exhaust air at the interface side.
C	Power input/output voltage	48S12	The power input and output voltage are 48 VDC and 12 VDC respectively.

Naming convention of the fan

Figure 1-7 and Table 1-5 show the naming convention of the fan.

Figure 1-7 Naming convention of the fan
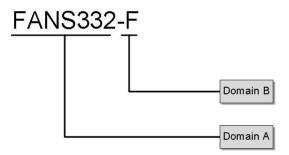
Table 1-5 Naming convention of the fan

Domain	Indication	Value	Description
A	Product ID	FANS332	It belongs to the FANS332 series.
B	Air exhaustion mode	–	Draw air at the interface side and exhaust air at the power side.
		F	Draw air at the power side and exhaust air at the interface side.

1.4.2 Ordering information about device

Table 1-6 lists ordering information about the ISCOM3000X series switch.

Table 1-6 Ordering information about device

Model	Description
ISCOM3048XF-4Q-AC/D	• Support forty-eight 10 Gbit/s SFP+ downlink interfaces, compatible with 1000 Mbit/s SFP. • Support four 40 Gbit/s QSFP+ uplink interfaces. • Provide the RJ45 Console interface. • Provide the SNMP interface which supports out-of-band management. • Support dual 220 VAC power supplies. • Draw air at the interface side and exhaust air at the power side.
ISCOM3048XF-4Q-F-AC/D	• Support forty-eight 10 Gbit/s SFP+ downlink interfaces, compatible with 1000 Mbit/s SFP. • Support four 40 Gbit/s QSFP+ uplink interfaces. • Provide the RJ45 Console interface. • Provide the SNMP interface which supports out-of-band management. • Support dual 220 VAC power supplies. • Draw air at the power side and exhaust air at the interface side.
ISCOM3048XF-4Q-DC/D	• Support forty-eight 10 Gbit/s SFP+ downlink interfaces, compatible with 1000 Mbit/s SFP. • Support four 40 Gbit/s QSFP+ uplink interfaces. • Provide the RJ45 Console interface. • Provide the SNMP interface which supports out-of-band management. • Support dual -48 VDC power supplies. • Draw air at the interface side and exhaust air at the power side.
ISCOM3048XF-4Q-F-DC/D	• Support forty-eight 10 Gbit/s SFP+ downlink interfaces, compatible with 1000 Mbit/s SFP. • Support four 40 Gbit/s QSFP+ uplink interfaces. • Provide the RJ45 Console interface. • Provide the SNMP interface which supports out-of-band management. • Support dual -48 VDC power supplies. • Draw air at the power side and exhaust air at the interface side.
ISCOM3048XF-4Q-AC_DC	• Support forty-eight 10 Gbit/s SFP+ downlink interfaces, compatible with 1000 Mbit/s SFP. • Support four 40 Gbit/s QSFP+ uplink interfaces. • Provide the RJ45 Console interface. • Provide the SNMP interface which supports out-of-band management. • Support one 220 VAC power supply and one -48 VDC power supply. • Draw air at the interface side and exhaust air at the power side.
ISCOM3048XF-4Q-F-AC_DC	• Support forty-eight 10 Gbit/s SFP+ downlink interfaces, compatible with 1000 Mbit/s SFP. • Support four 40 Gbit/s QSFP+ uplink interfaces. • Provide the RJ45 Console interface. • Provide the SNMP interface which supports out-of-band management. • Support one 220 VAC power supply and one -48 VDC power supply. • Draw air at the power side and exhaust air at the interface side.
FANS332	Draw air at the interface side and exhaust air at the power side.

Model	Description
FANS332-F	Draw air at the power side and exhaust air at the interface side.
RPA1351-220S12	AC power Draw air at the interface side and exhaust air at the power side.
RPA1351-F-220S12	AC power Draw air at the power side and exhaust air at the interface side.
RPD1301-48S12	DC power Draw air at the interface side and exhaust air at the power side.
RPD1301-F-48S12	DC power Draw air at the power side and exhaust air at the interface side.

✏️ Note

For the same device, the air flow direction of the fan and power supply should be the same.

1.4.3 Ordering information about auxiliary parts

The ISCOM3000X series switch can be equipped with the following auxiliary parts:

- 1000 Mbit/s SFP optical module
- 1000 Mbit/s SFP electrical module
- 10 Gbit/s SFP+ optical module
- 40 Gbit/s QSFP+ optical module

1000 Mbit/s SFP optical module

Table 1-7 lists ordering information about the 1000 Mbit/s SFP optical module.

Table 1-7 Ordering information about 1000 Mbit/s SFP optical module

Model	Description
USFP-Gb/M-D-R/SW	• Transmission rate: 1.25 Gbit/s • Transmission distance: 550 m • Tx wavelength: 850 nm • Dual-fiber MM SFP optical module
USFP-Gb/S1-D-R/ SW	• Transmission rate: 1.25 Gbit/s • Transmission distance: 15 km • Tx wavelength: 1310 nm • Dual-fiber SM SFP optical module
USFP-Gb/S2-D-R/ SW	• Transmission rate: 1.25 Gbit/s • Transmission distance: 40 km • Tx wavelength: 1550 nm • Dual-fiber SM SFP optical module

Model	Description
USFP-Gb/S3-D-R/ SW	• Transmission rate: 1.25 Gbit/s • Transmission distance: 100 km • Tx wavelength: 1550 nm • Dual-fiber SM SFP optical module

1000 Mbit/s SFP electrical module

Table 1-8 lists ordering information about the 1000 Mbit/s SFP electrical module.

Table 1-8 Ordering information about 1000 Mbit/s SFP electrical module

Model	Description
USFP-GE-R/SW	• Transmission rate: 1000 Mbit/s • Transmission distance: 100 m • Data interface: SerDes
USFP-GE/AN-R/SW	• Transmission rate: 10/100/1000 Mbit/s • Transmission distance: 100 m • Data interface: SGMII

10 Gbit/s SFP+ optical module

Table 1-9 lists ordering information about the 10 Gbit/s SFP+ optical module.

Table 1-9 Ordering information about 10 Gbit/s SFP+ optical module

Model	Description
USFP+-192/M/SW	• Transmission rate: 10 Gbit/s • Transmission distance: 300 m • Tx wavelength: 850 nm • Dual-fiber MM SFP+ optical module
USFP+-192/S1/SW	• Transmission rate: 10 Gbit/s • Transmission distance: 10 km • Tx wavelength: 1310 nm • Dual-fiber SM SFP+ optical module
USFP+-192/S2/SW	SFP+ optical module • Rate: 10 Gbit/s • Tx wavelength: 1550 nm • Transmission distance: 40 km • Support DDM. • Meet RoHS requirements.
USFP+-192/S3/SW	SFP+ optical module • Rate: 10 Gbit/s • Tx wavelength: 1550 nm • Transmission distance: 80 km • Support DDM. • Meet RoHS requirements.

40 Gbit/s QSFP+ optical module

Table 1-10 lists ordering information about the 40 Gbit/s QSFP+ optical module and integrated cable.

Table 1-10 Ordering information about 40 Gbit/s QSFP+ optical module and integrated cable.

Material name	Description
UQSP-40G/S1/SW	QSFP+ optical module • Rate: 41.25 Gbit/s • Dual LC • Tx wavelength: CWDM wavelength (1271 nm/1291 nm/1311 nm/1331 nm) • Transmission distance: 10 km • DDM • Meeting RoHS requirements • Applicable to switches
UQSP-40G/M3/SW	QSFP+ optical module • Rate: 41.25 Gbit/s • Tx wavelength: multi-mode 850 nm • Transmission distance: 300 m • DDM • Meeting RoHS requirements • Applicable to switches
EQP-4/1-C	DAC integrated cable-40GE QSFP-1 m
EQP-4/2-C	DAC integrated cable-40GE QSFP-3 m
EQP-4/3-C	DAC integrated cable-40GE QSFP-5 m
EQP4-4/1-C	DAC integrated cable-40GE QSFP-to-4 10GE SFP+ -1 m
EQP4-4/2-C	DAC integrated cable-40GE QSFP-to-4 10GE SFP+ -3 m
EQP4-4/3-C	DAC integrated cable-40GE QSFP-to-4 10GE SFP+ -5 m

2 System structure

This chapter describes the system structure of the ISCOM3000X series switch, including the following sections:

- Panels
- Interfaces
- LEDs
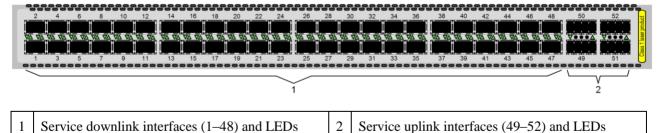
2.1 Panels

2.1.1 Front panel

ISCOM3048XF-4Q

Figure 2-1 shows the front panel of the ISCOM3048XF-4Q.

Figure 2-1 Front panel of ISCOM3048XF-4Q

1	Service downlink interfaces (1–48) and LEDs	2	Service uplink interfaces (49–52) and LEDs

2.1.2 Rear panel

ISCOM3048XF-4Q

Figure 2-2 shows the rear panel of the ISCOM3048XF-4Q with dual AC power supplies.

Figure 2-2 Rear panel of the ISCOM3048XF-4Q with dual AC power supplies

1	Power switch, AC power interface, and LEDs	2	Fan
3	SNMP interface and Console interface	4	USB interface
5	Fan, SNMP interface, and system LEDs	6	Ground terminal
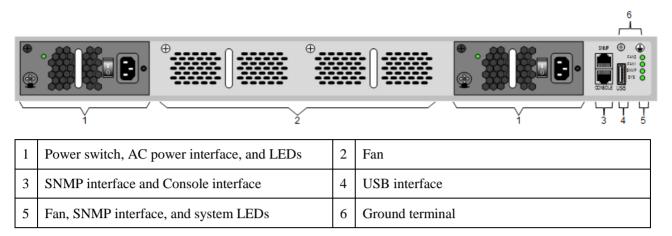
Figure 2-3 shows the rear panel of the ISCOM3048XF-4Q with dual DC power supplies.

Figure 2-3 Rear panel of the ISCOM3048XF-4Q with dual DC power supplies

1	Power switch, power interface, and LEDs	2	Fan
3	SNMP interface and Console interface	4	USB interface
5	Fan, SNMP interface, and system LEDs	6	Ground terminal
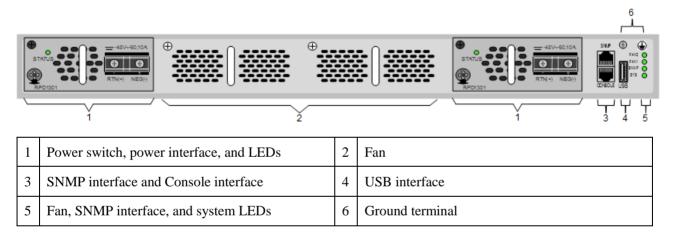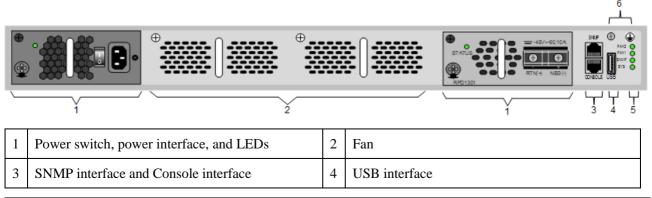
Figure 2-4 shows the rear panel of the ISCOM3048XF-4Q with one AC power supply and one DC power supply.

Figure 2-4 Rear panel of the ISCOM3048XF-4Q with one AC power supply and one DC power supply

1	Power switch, power interface, and LEDs	2	Fan
3	SNMP interface and Console interface	4	USB interface

5	Fan, SNMP interface, and system LEDs	6	Ground terminal

2.2 Interfaces

2.2.1 Interface types

ISCOM3048XF-4Q

Table 2-1 lists interfaces on the ISCOM3048XF-4Q.

Table 2-1 Interfaces on the ISCOM3048XF-4Q

Interface	Usage	Type	Description
Port 1 to Port 48	Service downlink interface	SFP+	10 Gbit/s SFP+ optical interfaces Support the 10GBASE-X SFP+ optical modules.
		SFP	• The 1000 Mbit/s SFP optical interfaces support the 1000BASE-X SFP optical modules. • The 1000 Mbit/s SFP electrical interfaces support the 1000BASE-T SFP electrical modules.
Port 49 to Port 52	Service uplink interface	QSFP	QSFP+ interfaces Support the 40GBASE-SR4 and 40GBASE-LR4 SFP optical modules.
SNMP	NMS interface	RJ45	10/100BASE-TX auto-negotiation electrical interface
CONSOLE	Console interface	RJ45	Connect the PC through DB9 serial cable.
USB	USB interface	USB	Reserved interface

2.2.2 Interface properties

40 Gbit/s QSFP+ interface

Table 2-2 lists parameters of the 40 Gbit/s QSFP+ interface.

Table 2-2 Parameters of 40 Gbit/s QSFP+ interface

Parameter	Description
Connector type	MPO/LC

Parameter	Description
Optical interface properties	Depend on the selected QSFP optical module.
Transmission rate	40 Gbit/s
Working mode	Full duplex

10 Gbit/s SFP+ optical interface

Table 2-3 lists parameters of the 10 Gbit/s SFP+ optical interface.

Table 2-3 Parameters of 10 Gbit/s SFP+ optical interface

Parameter	Description
Connector type	LC/PC
Optical interface properties	Depend on the selected SFP+ optical module.
Coding type	64B/66B
Transmission rate	10 Gbit/s
Working mode	Full duplex

1000 Mbit/s SFP interface

Table 2-4 lists parameters of the 1000 Mbit/s SFP interface.

Table 2-4 Parameters of 1000 Mbit/s SFP interface

Parameter	Description
Connector type	LC/PC
Optical interface properties	Depend on the selected SFP optical module.
Coding type	8B/10B
Working mode	Full duplex
Standard	IEEE 802.3-compliant
Supported network protocol	IP

1000 Mbit/s Ethernet electrical interface

Table 2-5 lists parameters of the 10/100/1000 Mbit/s Ethernet electrical interface.

Table 2-5 Parameters of the 10/100/1000 Mbit/s Ethernet electrical interface

Parameter	Description
Connector type	RJ45
Working mode	• Support 10/100/1000 Mbit/s rate auto-negotiation. • Support half/full duplex working mode and auto-negotiation.
Cable specification	• In the 10/100 Mbit/s mode, we recommend using the Cat 5 UTP cable. • In the 1000 Mbit/s mode, we recommend using the super Cat 5 UTP or STP cable.
Standard	IEEE 802.3-compliant
Supported network protocol	IP

Management interfaces

Table 2-6 lists description of management interfaces on the ISCOM3000X series switch.

Table 2-6 Management interfaces

Interface	Description	Quantity
RJ45 Console	Local management and control interface You can locally manage and configure the ISCOM3000X series switch on Hyper Terminal from this interface.	1
SNMP	10/100BASE-TX auto-negotiation electrical interface You can conduct out-of-band management over the ISCOM3000X series switch through it.	1

RJ45 Console interface

Table 2-7 lists parameters of the RJ45 Console interface.

Table 2-7 Parameters of the RJ45 Console interface

Parameter	Description
Connector type	RJ45
Working mode	Duplex UART
Electrical feature	RS-232
Baud rate	9600 baud Other baud rates are also supported.

SNMP interface

Table 2-8 lists parameters of the SNMP interface.

Table 2-8 Parameters of SNMP interface

Parameter	Description
Connector type	RJ45
Transmission rate	10/100BASE-TX, auto-negotiation
Wiring	Support adaption to the straight-through cable and crossover cable in host mode.
Standard	IEEE 802.3-compliant

AC power interface

Table 2-9 lists parameters of the AC power interfaces

Table 2-9 Parameters of the AC power interfaces

Parameter	Description
Connector type	3-pin C13 connector
Voltage	220 VAC
Voltage range	100–240 VAC
Frequency	50/60 Hz
Maximum input current	5 A

DC power interface

Table 2-10 describes the DC power interface.

Table 2-10 DC power interface

Interface	Type	Print	Usage
DC power interface	Barrier terminal	NEG (-)	GND power input terminal
		RTN (+)	-48 V power input terminal

Table 2-11 lists parameters of the DC power module.

Table 2-11 Parameters of the DC power module

Parameter	Description
Rated input voltage	-48 VDC
Voltage range	-36 to -72 VDC

2.3 LEDs

2.3.1 ISCOM3048XF-4Q

Table 2-12 lists LEDs on the ISCOM3048XF-4Q.

Table 2-12 LEDs on ISCOM3048XF-4Q

LED	Status	Description
LNK/ACT Port 1–Port 52	Green	Link working status LED • Green: the link is properly connected. • Blinking green: the link is sending or receiving data. • Off: the link is disconnected or connected but not working.
SPEED Port 1–Port 48	Green	Rate LED • Green: the SFP+ optical interface is working at 10 Gbit/s. • Off: the SFP+ optical interface is working at other speeds or stops working.
STATUS1/2	Green	Power LED • Green: the power module is powered on. • Off: the power module is not powered on or fails.
SYS	Green	System working LED • Green: the device is working improperly. • Blinking green: the device is working properly or the device is being started. • Off: the device is not started, being started, or working improperly.
SNMP	Green	SNMP interface working status LED • Green: the SNMP interface is properly connected. • Blinking green: the SNMP interface is transmitting data. • Off: the SNMP interface is disconnected or improperly connected.
FAN1/2	Green	Fan LED • Green: the fan is working normally. • Blinking green: the fan is working improperly. • Off: the fan module is not installed.

3 Device installation

This chapter describes how to install the ISCOM3000X series switch, including the following sections:

- Installing hardware
- Installing software

3.1 Installing hardware

3.1.1 Preparing for installation

Environment conditions

Table 3-1 lists requirements on the environment for installing the ISCOM3000X series switch.

Table 3-1 Requirements on operation environment

Parameter	Description
Operating temperature (altitude 0–1800 m)	0–45 ℃
Operating humidity	5%–95% RH (non-condensing)
Storage temperature	-25 to 60 ℃
Air pressure	86–106 kPa

Note

When the altitude is from 1800 m to 5000 m, the maximum operating temperature will decrease by 1°C every time the altitude increases by 220 m.

Power supply conditions

Table 3-2 lists power supply requirements on operating the ISCOM3000X series switch.

Table 3-2 Power supply requirements on operation

Parameter	Description
Power supply	AC power • Rated voltage: 220 VAC • Voltage range: 100–240 VAC DC power • Rated voltage: - 48 VDC • Voltage range: -36 to -72 VDC
Maximum power consumption	ISCOM3048XF-4Q: 240 W

![Warning]

The ISCOM3000X series switch is supplied by multiple power supplies. Do remember to disconnect all power inputs when powering off the device.

Grounding conditions

The ISCOM3000X series switch adopts common earthing mode with the ground resistance not greater than 1 Ω. Well grounding is an important guarantee for lightning protection and anti-interference.

3.1.2 Installing device

![Caution]
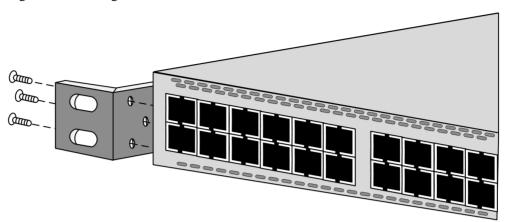
The device is heavy. The brackets, which cannot bear load independently, are for locating only. Therefore, you need to install the device to a slide or a tray which needs to be prepared by yourself.

The ISCOM3048XF-4Q supports being installed in the rack, with steps as below:
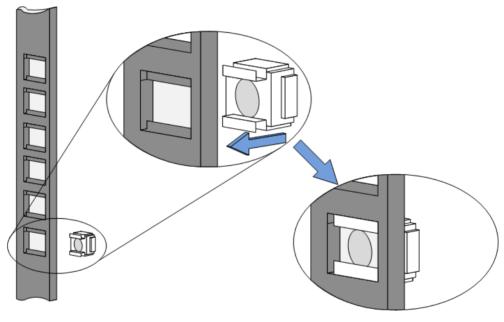
Step 1 Ensure that the rack is stable.

Step 2 Install two customized brackets on the two sides of the ISCOM3000X series switch respectively, and fix them with screws, as shown in Figure 3-1.

Figure 3-1 Installing brackets
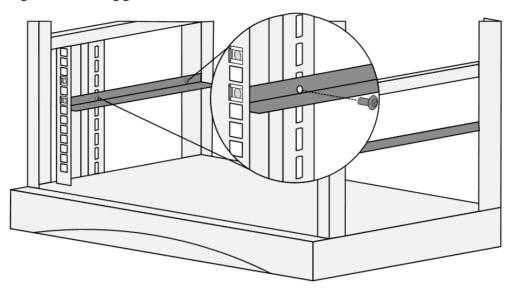
Step 3   Install floating nuts in the rack, as shown in Figure 3-2.

Figure 3-2 Installing floating nuts
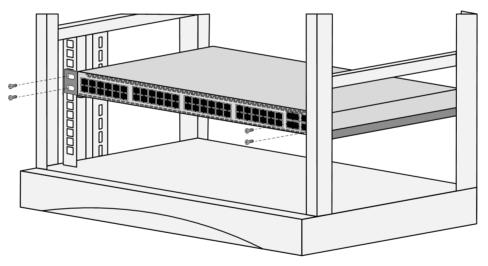
Step 4   Install guide rails in the rack, as shown in Figure 3-3.

Figure 3-3 Installing guide rails

Step 5   Use screws to fix two customized brackets to guide rail, and install the ISCOM3048XF-4Q horizontally in the rack, as shown in Figure 3-4.

Figure 3-4 Installing device horizontally in the rack

⚠ **Caution**

Do not lay heavy objects or covering objects on the ISCOM3000X series switch. The brackets are for position only, which cannot bear the weight of the ISCOM3000X series switch. Therefore, you need to install the ISCOM3000X series switch to a guide rail or tray. The guide rail or tray is not provided. You need to prepare it by yourself.

3.1.3 Connecting cables

Connecting fiber

⚠ Warning
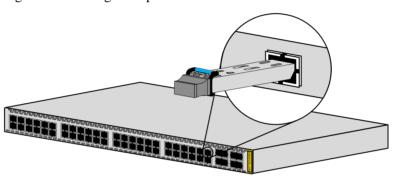
There is invisible laser which harms eyes inside the ISCOM3000X series switch. Do not directly stare into the optical interface, fiber connector, or breakage of fiber during installation.

Connect fiber as below:
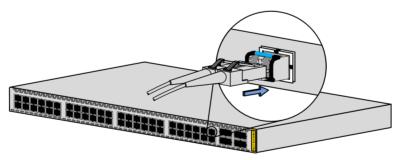
Step 1   Remove the dustproof cover from the SFP optical interface and SFP optical module, and insert the SFP optical module into the SFP optical interface on the ISCOM3000X series switch, as shown in Figure 3-5.

Figure 3-5 Inserting SFP optical module

Step 2   Remove the dustproof cover from the LC/PC fiber, align the fiber with the SFP optical interface, and insert the fiber slightly into the SFP optical interface, as shown in Figure 3-6.

Figure 3-6 Connecting fiber

✎ Note

When the optical interface is idle, cover it with the dustproof cover to prevent dust and dirt which may cause the ISCOM3000X series switch working improperly.

Connecting ground cable

![Warning]
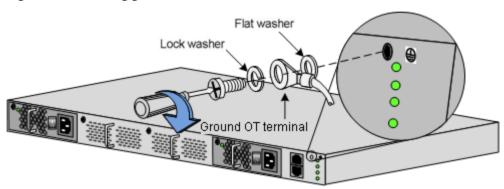
Connecting the ground cable properly is an important guarantee for lightning protection, shock proof, and anti-interference. When installing and using the device, ensure that the ground cable is properly connected; otherwise, personnel injury or equipment damage may occur.

Install the ground cable as below:

Step 1   Unscrew the ground terminal counterclockwise, and remove the screws and washers.

Step 2   Sheathe the flat washer, ground OT terminal, and lock washer in sequence over the screw.

Step 3   Reinstall the screw to the ground terminal, and tighten the screws clockwise, as shown in Figure 3-7.

Figure 3-7 Connecting ground cable
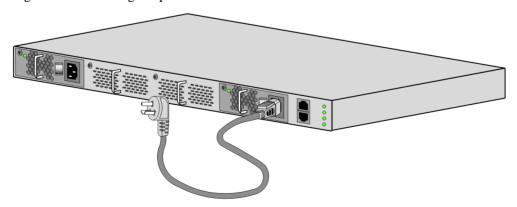
Connecting AC power cable

Install the AC power cable as below:

Step 1   Ensure that the ISCOM3000X series switch is well grounded. Insert the C13 connector of the AC power cable into the AC power interface on the rear panel tightly.

Step 2   Insert the power plug of the AC power cable into the AC power socket of the power sourcing equipment, as shown in Figure 3-8.

Figure 3-8 Connecting AC power cable
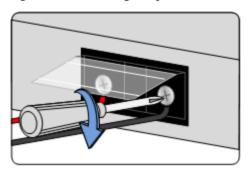
Connecting DC power cable

Install the DC power cable as below:

Step 1 Ensure that the ISCOM3000X series switch is well grounded.

Step 2 Open the front cover of the barrier terminal and loosen the screws counterclockwise.

Step 3 Put the U-type terminal of the DC cable under the screw (put the red cable under the screw corresponding to "+" and black cable under the screw corresponding to "-"). Tighten the screws clockwise, as shown in Figure 3-9.

Figure 3-9 Connecting DC power cable
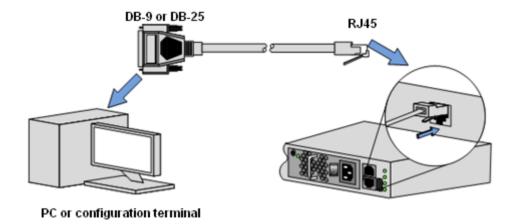
Step 4 Connect the other end of the DC cable to the power sourcing equipment in the machine room.

Connecting RJ45 Console cable

Connect the RJ45 Console cable as below:

Step 1 Insert the RJ45 connector of the serial cable into the Console interface on the ISCOM3000X series switch.

Step 2 Insert the other end of the serial cable into the RS-232 serial interface on a PC (or maintenance terminal), as shown in Figure 3-10.

Figure 3-10 Connecting RJ45 Console cable

3.2 Installing software

The ISCOM3000X series switch is installed with all necessary software before delivery so that it can be powered on immediately for use after hardware installation is complete.

For upgrading software of the ISCOM3000X series switch, see *ISCOM3000X (A) Series Configuration Guide*. For installing NView NNM software, see *NView NNM Operation Guide.*

4 Technical specifications

This chapter describes overall parameters, system parameters, card parameters, and technical specifications, including the following sections:

- Overall parameters
- Laser safety class
- Reliability specifications
- Safety standards
- Environmental requirements
- Standards and protocols

4.1 Overall parameters

Table 4-1 lists overall parameters of the ISCOM3000X series switch.

Table 4-1 Overall parameters

Parameter		Description
Dimensions		440 mm (Width) $\times$ 420 mm (Depth) $\times$ 43.6 mm (Height)
Overall maximum power consumption		240 W
Overall maximum weight		8.5 kg
Operating temperature (altitude 0–1800 m)		0–45 ℃
Operating humidity		5%−95% RH (non-condensing)
AC power	Rated voltage	220 VAC
	Voltage range	100–240 VAC
	Frequency	50/60 Hz
DC power	Rated voltage	-48 VDC

Parameter		Description
Lightning protection level	Voltage range	-36 to -72 VDC
	AC power interface	• 6 kV in differential mode • 6 kV in common mode
	DC power interface	• 1 kV in differential mode • 2 kV in common mode
	Ethernet electrical interface	1 kV in common mode

4.2 Laser safety class

According to the Tx power of Laser, the laser of the ISCOM3000X series switch is Class 1 in safety class.

In Class 1, the maximum Tx power on the optical interface is smaller than 10 dBm (10 mW).

⚠ Warning

The laser inside the fiber may hurt your eyes. Do not look into the optical interface directly during installation and maintenance.

4.3 Reliability specifications

Table 4-2 lists reliability specifications of the ISCOM3000X series switch.

Table 4-2 Reliability specifications

Parameter	Description
System availability	99.999%. The annual failure time for the ISCOM3000X series switch should be no longer than 5 minutes.
Annually system mean repair rate	< 1.5%
MTTR	< 2 hours

4.4 Safety standards

The ISCOM3000X series switch complies with the following safety standards:

- EN 60950
- UL 60950

4.5 Environmental requirements

The ISCOM3000X series switch complies with the following environmental requirements:

- NEBS GR-63-CORE: Network Equipment-Building System (NEBS) Requirements: Physical Protection
- European Telecommunication Standards Institute (ETSI) EN 300 019

4.5.1 Storage environment

Atmosphere environment

Table 4-3 lists environment requirements on the ISCOM3000X series switch during storage.

Table 4-3 Environment requirements during storage

Parameter	Description
Air pressure (kPa)	86–106
Temperature (℃)	-25 to 60
Relative humidity	5%–95%
Solar radiation (W/s ^{3})	≤ 1120
Heat radiation (W/s ^{3})	≤ 600
Wind speed (m/s)	≤ 20

Waterproof requirement

Requirements on the storage of customer devices: put them indoor.

Keep the ISCOM3000X series switch indoor with the following requirements:

- No ponding in the room
- No water dropping above
- Away from any water leakage area, such as the fire-fighting equipment or central heating facility

If you put the ISCOM3000X series switch outdoor, ensure the following four prerequisites:

- The package box is intact.
- Rainproof measures are taken so that rain will not leak into the package box.
- No ponding is around the package box.
- The package box is not directly exposed to the sun.

Biotic environment

Keep the ISCOM3000X series switch away from:

- Microorganism, such as fungus and mould

- Rodent animals, such as rats

Air environment

Ensure that the ISCOM3000X series switch is put in an environment without explosive, conductive, magnetic, and corrosive dust.

Table 4-4 lists concentration requirements on mechanical active substance.

Table 4-4 Concentration requirements on mechanical active substance

Mechanical active substance	Content
Suspended dust (mg/m³)	≤ 5.00
Degradable dust (mg/m²h)	≤ 20.0
Gravel (mg/m³)	≤ 300

Table 4-5 lists concentration requirements on chemical active substance.

Table 4-5 Concentration requirements on chemical active substance

Chemical active substance	Content
SO_2 (mg/m³)	≤ 0.30
H_2S (mg/m³)	≤ 0.10
NO_2 (mg/m³)	≤ 0.50
NH_3 (mg/m³)	≤ 1.00
Cl_2 (mg/m³)	≤ 0.10
HCl (mg/m³)	≤ 0.10
HF (mg/m³)	≤ 0.01
O_3 (mg/m³)	≤ 0.05

4.5.2 Transport environment

Atmosphere environment

Table 4-6 lists atmosphere requirements on the ISCOM3000X series switch during transportation.

Table 4-6 Atmosphere requirements during transportation

Parameter	Description
Air pressure (kPa)	86–106

Parameter	Description
Temperature (°C)	-25 to 60
Temperature change rate (°C/min)	≤ 1
Operating humidity	5%−95%
Solar radiation (W/s³)	≤ 1120
Heat radiation (W/s³)	≤ 600
Wind speed (m/s)	≤ 20

Waterproof environment

When transporting the ISCOM3000X series switch, ensure the following prerequisites:

- The package box is intact.
- Rainproof measures are taken so that rain will not leak into the package box.
- No ponding is inside the transport vehicle.

Biotic environment

Keep the ISCOM3000X series switch away from:

- Microorganism, such as fungus and mould
- Rodent animals, such as rats

Air environment

Ensure that the ISCOM3000X series switch is put in an environment without explosive, conductive, magnetic, and corrosive dust.

Table 4-7 lists concentration requirements on mechanical active substance.

Table 4-7 Concentration requirements on mechanical active substance

Mechanical active substance	Content
Suspended dust (mg/m³)	No requirement
Degradable dust (mg/m²h)	≤ 3.0
Gravel (mg/m³)	≤ 100

Table 4-8 lists concentration requirements on chemical active substance.

Table 4-8 Concentration requirements on chemical active substance

Chemical active substance	Content
SO_2 (mg/m³)	≤ 0.30

Chemical active substance	Content
H_2S (mg/m³)	≤ 0.10
NO_2 (mg/m³)	≤ 0.50
NH_3 (mg/m³)	≤ 1.00
Cl_2 (mg/m³)	≤ 0.10
HCl (mg/m³)	≤ 0.10
HF (mg/m³)	≤ 0.01
O_3 (mg/m³)	≤ 0.05

4.5.3 Operating environment

Atmosphere environment

Table 4-9 lists atmosphere requirements on the ISCOM3000X series switch during operation.

Note

The temperate and humidity referred to are measured 1.5 m above or 0.4 m in front of the ISCOM3000X series switch.

Table 4-9 Atmosphere requirements during operation

Parameter	Description
Air pressure (kPa)	86–106
Temperature (℃)	0–45
Relative humidity	5%−95% (non-condensing)
Temperature change rate (℃/min)	≤ 0.5
Solar radiation (W/s³)	≤ 700
Heat radiation (W/s³)	≤ 600
Wind speed (m/s)	≤ 5

Biotic environment

Keep the ISCOM3000X series switch away from:

- Microorganism, such as fungus and mould
- Rodent animals, such as rats

Air environment

Ensure that the ISCOM3000X series switch is put in an environment without explosive, conductive, magnetic, and corrosive dust.

Table 4-10 lists concentration requirements on mechanical active substance.

Table 4-10 Concentration requirements on mechanical active substance

Mechanical active substance	Content
Dust particles (particle/ m³)	$\leq 3 \times 10^5$
Suspended dust (mg/m³)	≤ 0.2
Degradable dust (mg/m²h)	≤ 15
Gravel (mg/m³)	≤ 100

Table 4-11 lists concentration requirements on chemical active substance.

Table 4-11 Concentration requirements on chemical active substance

Chemical active substance	Content
SO_2 (mg/m³)	≤ 0.30
H_2S (mg/m³)	≤ 0.10
NH_3 (mg/m³)	≤ 3.00
Cl_2 (mg/m³)	≤ 0.10
HCl (mg/m³)	≤ 0.10
HF (mg/m³)	≤ 0.01
O_3 (mg/m³)	≤ 0.05

4.6 Standards and protocols

The ISCOM3000X series switch complies with the following standards and protocols:

- IEEE802.1AB Station and Media Access Control Connectivity Discovery
- IEEE 802.1D-2004 Part 3: Media Access Control (MAC) Bridges
- IEEE 802.1Q-2005 - Standard for Local and Metropolitan Area Networks - Virtual Bridged Local Area Networks
- IEEE 802.1d
- IEEE 802.1s-2002 - Amendment to 802.1Q Virtual Bridged Local Area Networks: Multiple Spanning Trees
- IEEE 802.1w-Rapid Reconfiguration of Spanning Tree

- IEEE 802.3-2005 Part 3: Carrier sense multiple access with collision detection (CSMA/CD) access method and physical layer specifications
- IEEE 802.1ag: Virtual Bridged Local Area Networks   Amendment 5: Connectivity Fault Management
- IEEE 802.1ad Provider Bridges
- IEEE 802.1x -2004 - Port Based Network Access Control
- IEEE802.3ab 1000BASE-T
- IEEE802.3ad Link Aggregation
- IEEE802.3ae-2002, 10 Gb/s Ethernet
- IEEE802.3z Gigabit Ethernet
- IEEE802.3ah Ethernet in the First Mile
- MEF Technical Specification MEF 6.1 Ethernet Services Definitions - Phase 2
- MEF Technical Specification, MEF 9 Abstract Test Suite for Ethernet Services at the UNI
- MEF Technical Specification, MEF 10.2 Ethernet Services Attributes - Phase 2
- MEF Technical Specification, MEF 10.2.1 Performance Attributes Amendment to MEF 10.2
- MEF Technical Specification, MEF 11 User Network Interface (UNI) Requirements and Framework
- MEF Technical Specification, MEF 12.1 Carrier Ethernet Network Architecture Framework Part 2: Ethernet Services Layer - Basic Elements
- MEF Technical Specification, MEF 13 User Network Interface (UNI) Type 1 Implementation Agreement
- MEF Technical Specification, MEF 14 Abstract Test Suite for Traffic Management Phase 1
- MEF Technical Specification, MEF 16 Ethernet Local Management Interface
- MEF Technical Specification, MEF 17 Service OAM Requirements & Framework
- MEF Technical Specification, MEF 19 Abstract Test Suite for UNI Type 1
- MEF Technical Specification, MEF 20 User Network Interface (UNI) Type 2 Implementation Agreement
- MEF Technical Specification, MEF 21 Abstract Test Suite for UNI Type 2 Part 1 Link OAM
- MEF Technical Specification, MEF 23.1 Class of Service Phase 2 Implementation Agreement
- MEF Technical Specification, MEF 24 Abstract Test Suite for UNI Type 2 Part 2 E-LMI
- MEF Technical Specification, MEF 25 Abstract Test Suite for UNI Type 2 Part 3 Service OAM
- MEF Technical Specification, MEF 26.1 External Network Network Interface (ENNI)– Phase 2
- MEF Technical Specification, MEF30.1 Service OAM Fault Management Implementation Agreement Phase 2
- MEF Technical Specification, MEF33 Ethernet Access Services Definition
- MEF Technical Specification, MEF34 ATS for Ethernet Access Services
- MEF Technical Specification, MEF35 Service OAM Performance Monitoring Implementation Agreement

- MEF Technical Specification, MEF36 Service OAM SNMP MIB for Performance Monitoring
- MEF Technical Specification, MEF37 Abstract Test Suite for ENNI
- ITU-T Y.1541 Network Performance Objectives For IP-Based Services
- ITU-T Y.1731 OAM Functions and Mechanisms for Ethernet based networks
- ITU-T G.8031 Ethernet linear protection switching
- ITU-T G.8032 Ethernet ring protection switching
- RFC1349 Type of Service in the Internet Protocol Suite
- RFC2131 Dynamic Host Configuration Protocol
- RFC2132 DHCP Options and BOOTP Vendor Extensions
- RFC2819 Remote Network Monitoring Management Information Base
- RFC2863 The Interfaces Group MIB
- RFC2474 Definition of the Differentiated Services Field (DS Field) in the IPv4 and IPv6 Headers
- RFC2475 An Architecture for Differentiated Services
- RFC2678
- RFC2598 An Expedited Forwarding PHB
- RFC2698 A Two Rate Three Color Marker
- RFC4115 A Differentiated Service Two-Rate, Three-Color Marker with Efficient Handling of in-Profile Traffic
- RFC4363 Definitions of Managed Objects for Bridges with Traffic Classes, Multicast Filtering, and Virtual LAN Extensions
- SFF-8472

5 **Appendix**

The appendix lists cables, SFP modules, terms, acronyms, and abbreviations, including the following sections:

- Cables
- Optical modules
- Terms
- Acronyms and abbreviations

5.1 Cables

When connecting the ISCOM3000X series switch, you need to use the following cables:

- Fiber
- Ethernet cable
- Ground cable
- AC power cable
- DC power cable
- RJ45 Console cable

5.1.1 Fiber

Introduction

The ISCOM3000X series switch supports Single-mode Fiber (SMF) and Multi-mode Fiber (MMF).

Table 5-1 lists fiber connectors available for the ISCOM3000X series switch.

Table 5-1 Fiber connectors

Local connector	Remote connector	Fiber
LC/PC (SFP, SFP+ optical module, and	LC/PC	2-mm SMF
		2-mm MMF

Local connector	Remote connector	Fiber
QSFP+ optical module)	FC/PC	2-mm SMF
		2-mm MMF
	SC/PC	2-mm SMF
		2-mm MMF
MPO (QSFP+ optical module)	MPO	2-mm SMF
		2-mm MMF
	LC/PC	2-mm MMF
		2-mm MMF
	FC/PC	2-mm SMF
		2-mm MMF
	SC/PC	2-mm SMF
		2-mm MMF

![Note icon] **Note**
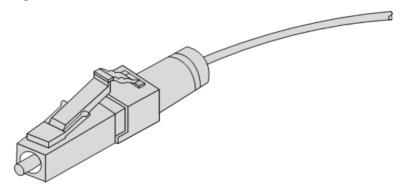
- Choose the fiber connector properly as required on site. Otherwise, more loss will be caused to the fiber, service transmission will be deteriorated, and even the fiber connector and interface may be damaged.
- One OSFP+ optical module can connect 4 interfaces. For example, one 40G QSFP+ interface can connect four 10G SFP+ interfaces. However, the connected QSFP+ module and SFP+ module must be the same in specifications (including center wavelength and fiber type) and the special MMF should be used.

Appearance

Figure 5-1 shows the LC/PC fiber connector used by the ISCOM3000X series switch.

Figure 5-1 LC/PC fiber connector
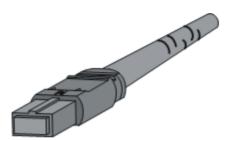
When connecting or removing the LC/PC optical connector, align the connector with the optical interface, and do not rotate the fiber. Operate the fiber as below:

- Align the head of the fiber jumper with the optical interface and insert the optical fiber into the interface gently.
- To remove the fiber, press the latch on the connector, press the fiber head inwards slightly, and pull the fiber out.

Figure 5-2 shows the MPO connector used by the ISCOM3000X series switch.

Figure 5-2 MPO connector

The QSFP+ optical module supports plastic latch or metal latch which is of the same function. Do as below:

- For QSFP+ optical module with plastic latch, insert it directly during installation. While removing the optical module, hold the plastic latch to pull out the optical module after pulling out the fiber. The function of the plastic latch is to unlock the optical module from the device.
- For QSFP+ optical module with metal latch, hold up the metal latch vertically and then insert the optical module during installation. While removing the optical module, pull the metal latch to the level position and then pull out the optical module. The function of pulling the metal latch to the level position is to unlock the optical module from the device.

Wiring

Table 5-2 lists wiring of the fiber.

Table 5-2 Wiring of fiber

Wiring	Optical interface on local device	Direction of optical signals	Optical interface on peer device
Single-fiber wiring	Optical interface	<->	Optical interface
Dual-fiber wiring	Tx optical interface	->	Rx optical interface
	Rx optical interface	<-	Tx optical interface

5.1.2 Ethernet cable

Introduction

The Ethernet cable connects the Ethernet electrical interface and SFP electrical interface on the ISCOM3000X series switch.

The Ethernet interface and SFP interface on the ISCOM3000X series switch are adaptive to straight-through cable mode and crossover cable mode.

Appearance

Figure 5-3 shows the Ethernet cable.

Figure 5-3 Ethernet cable

Wiring

The Ethernet cables are divided into two types:

- Straight-through cable: used to connect devices of different type, such as between a PC and a switch, between a switch and a router

- Crossover cable: used to connect devices of the same type, such as between PCs, between switches, between routers, between a PC and a router (they are of the same type)

Table 5-3 lists wiring of EIA/TIA 568A and EIA/TIA 568B standards.

Table 5-3 Wiring of EIA/TIA 568A and EIA/TIA 568B standards

Connector (RJ45)	EIA/TIA 568A	EIA/TIA 568B
PIN 1	White/Green	White/Orange
PIN 2	Green	Orange
PIN 3	White/Orange	White/Green
PIN 4	Blue	Blue
PIN 5	White/Blue	White/Blue
PIN 6	Orange	Green
PIN 7	White/Brown	White/Brown
PIN 8	Brown	Brown
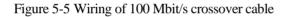
Both two RJ45 connectors of the 10/100/100 Mbit/s straight-through cable follow EIA/TIA568B standard wiring.

Figure 5-4 shows wiring of the 10/100/1000 Mbit/s straight-through cable.

Figure 5-4 Wiring of 10/100/100 Mbit/s straight-through cable

Figure 5-5 shows wiring of the 100 Mbit/s crossover cable.

Figure 5-5 Wiring of 100 Mbit/s crossover cable
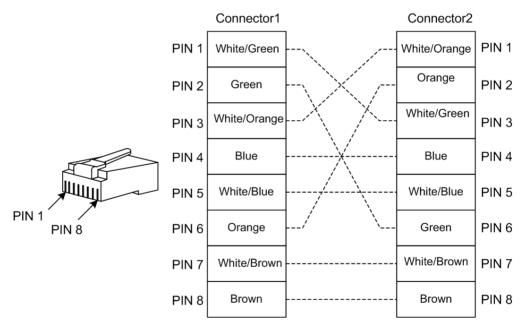
Figure 5-6 shows wiring of the 1000 Mbit/s crossover cable.
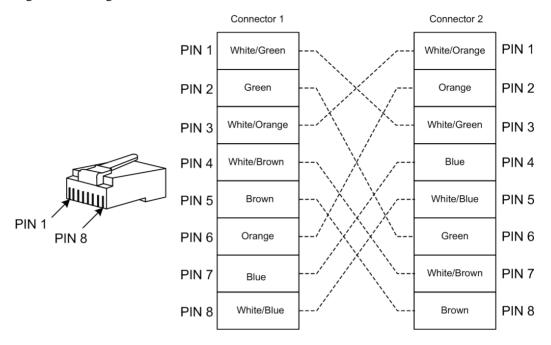
Figure 5-6 Wiring of 1000 Mbit/s crossover cable

Technical specifications

Table 5-4 lists technical specifications of the Ethernet cable.

Table 5-4 Technical specifications of Ethernet cable

Parameter	Description
Name	CBL-ETH-RJ45/RJ45-D
Connector	RJ45 crystal head
Model	The Cat 5 or better UTP (UTP-5 or UTP-5e) or Cat 5 STP cable
Number of cores	8
Length	The letter D is the length, indicating that the cable is customized. For example, if the customer requires 2-meter cables, they are named CBL-ETH-RJ45/RJ45-2m.

5.1.3 Ground cable

Introduction
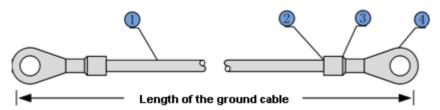
The ground cable is used to connect the ISCOM3000X series switch to the ground.

Appearance

The ground cable is composed of ground terminals and the coaxial cable. The ground terminal is usually an OT non-insulated terminal. The coaxial cable is a yellow/green copper soft
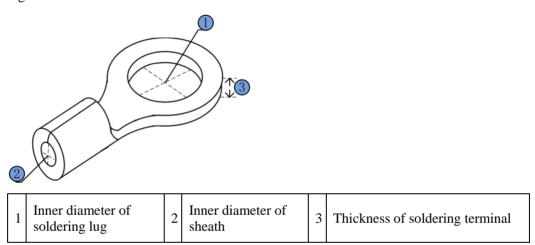
flame-retardant conducting wire. Figure 5-7 and Figure 5-8 show the ground cable and OT terminal.

Figure 5-7 Ground cable

1	Conducting wire	2	Stripped end (connected to the OT terminal)
3	Insulating sheath	4	OT terminal

Figure 5-8 OT terminal

1	Inner diameter of soldering lug	2	Inner diameter of sheath	3	Thickness of soldering terminal

Technical specifications

Table 5-5 lists technical specifications of the ground cable.

Table 5-5 Technical specifications of ground cable

Parameter	Description
Model (recommended)	PIL-ground cable-Φ4-1m.
Conducting wire	Yellow/Green multi-strand copper-core conducting wire 16 AWG (1.25 mm^2)
Model	Ground round pressed terminal (M4)
Cross-sectional area of the conducting wire	16–15AWG (1.2–1.5 mm^2)

Parameter	Description
Length	1 m

The ground cable cannot be longer than 30 m and should be as short as possible; otherwise, a ground bar should be used.

5.1.4 AC power cable

Introduction

The AC power cable transmits 220 VAC power to the power interface on the ISCOM3000X series switch, and supplies power for the whole device.

The AC power cables of the ISCOM3000X series switch vary with countries or regions, as lists in Table 5-6.
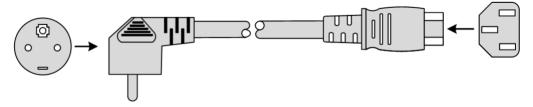
Table 5-6 AC power cable options

Regional standard	Cable
Europe	POL-AC-European-3-pin/C13 connector-0.75mm^2-1.5m/RoHS
America	POL-AC-American-3-pin/C13 connector-18AWG-1.5m/RoHS

Appearance
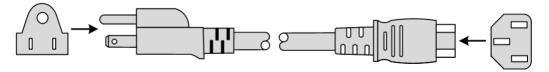
The AC power cable which meets European standard is composed of the European French mode 3-pin and C13 connector, as shown in Figure 5-9.

Figure 5-9 European AC power cable

The AC power cable which meets American standard is composed of the American 3-pin and C13 connector, as shown in Figure 5-10.

Figure 5-10 American AC power cable

Technical specifications

Table 5-7 lists specifications of the European AC power cable.

Table 5-7 Specifications of European AC power cable

Parameter		Description
Name		POL-AC-European-3-pin/C13 connector-0.75mm^2-1.5m/RoHS
Color	Outer	Black (PVC insulation layer)
	Inner	Blue (N), brown (L), and yellow/green stripe (E)
Connector 1		IEC60320-C13 connector
Connector 2		European 3-pin plug
Inner conductor cross-sectional area		3×0.75 mm^2
Length		1.5 m

Table 5-8 lists specifications of the American AC power cable.

Table 5-8 Specifications of American AC power cable

Parameter		Description
Name		POL-AC-American-3-pin/C13 connector-18AWG-1.5m/RoHS
Color	Outer	Black (PVC insulation layer)
	Inner	White (N), black (L), and green (E)
Connector 1		IEC60320-C13 connector
Connector 2		American 3-pin NEMA5-15
Inner conductor wire gauge		18 AWG
Length		1.5 m

5.1.5 DC power cable

Introduction

The DC power cable transmits -48 VDC power to the cable terminal connector of the switch from the DC power sourcing equipment, thus powering the entire device.

Appearance

Figure 5-11 shows the DC power cable.

Figure 5-11 DC power cable

Technical specifications

Table 5-9 lists technical specifications of the DC power cable.

Table 5-9 Technical specifications of the DC power cable

Parameter	Description
Name	POL-DC-OT terminal/stripped-16AWG-4m/RoHS
Color	• Red (+VIN) • Black (-VIN)
Stripped	Stripped end 5 mm tinned
U-shape terminal	22-16KT soldering lug
Wire gauge of the inner conductor	16 AWG
Cross-sectional area of the inner conductor	2×0.75 mm^2
Length	4 m

5.1.6 RJ45 Console cable

Introduction

The serial cable is used for connecting the ISCOM3000X series switch through the Console interface to the Console through the RS-232 interface, thus implementing data transmission. The console debugs and maintains the device through the Console interface.
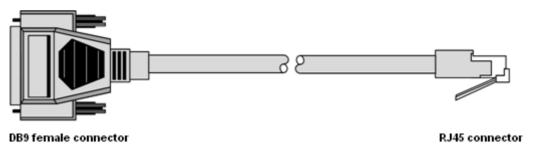
The connectors at the ends of the Console cable include the following two types:

- RJ45 connector: connected to the Console interface on the ISCOM3000X series switch
- DB9 female connector: connected to the serial interface on the console

Appearance

Figure 5-12 shows the RJ45 Console cable.
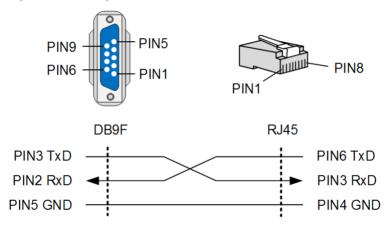
Figure 5-12 RJ45 Console cable

Wiring

Figure 5-13 shows wiring between the RS-232 serial interface and the RJ45 Console interface on the ISCOM3000X series switch.

Figure 5-13 Wiring between DB9 female connector and RJ45 Console interface

Technical specifications

Table 5-10 lists technical specifications of the RJ45 Console cable.

Table 5-10 Technical specifications of RJ45 Console cable

Parameter	Description
Name	CBL-RS232-DB9F/RJ45-2m/RoHS
Color	White
Model	Cat 3 UTP cable
Connector	RJ45 connector and DB9 female connector
Number of cores	4
Length	2 m

5.2 Optical modules

The ISCOM3000X series switch supports the following SFP modules:

- 1000 Mbit/s SFP optical module
- 1000 Mbit/s SFP electrical module
- 10 Gbit/s SFP+ optical module
- 40 Gbit/s QSFP+ optical module

1000 Mbit/s SFP optical module

Table 5-11 lists parameters of the 1000 Mbit/s SFP optical module.

Table 5-11 Parameters of 1000 Mbit/s SFP optical module

Model	Wavelength (nm) (laser type)	Rx type	Tx optical power (dBm)	Minimum overload point (dBm)	Extinction ratio (dB)	Rx sensitivity (dBm)	Transmission distance (km)
USFP-Gb/M-D-R/SW	850 (VCSEL)	PIN	-9.5 to -3	0	9	-17	0.55
USFP-Gb/S1-D-R/SW	1310 (FP)	PIN	-10 to -3	-3	9	-21	15
USFP-Gb/S2-D-R/SW	1550 (DFB)	PIN	-3 to 2	-3	9	-21	40
USFP-Gb/S3-D-R/SW	1550 (DFB)	APD	-3 to 2	-9	9	-30	80

1000 Mbit/s SFP electrical module

Table 5-12 lists parameters of the 1000 Mbit/s SFP electrical module.

Table 5-12 Parameters of 1000 Mbit/s SFP electrical module

Model	Application code	Auto-negotiation	Data interface	LOS alarm	Transmission distance (m)
USFP-GE-R/SW	1000BASE-T	Not supported	SerDes	Supported	100

10 Gbit/s SFP+ optical module

Table 5-13 lists parameters of the 10 Gbit/s SFP+ optical module.

Table 5-13 Parameters of 10 Gbit/s SFP+ optical module

Model	Wavelength (nm)	Rx type	Tx optical power (dBm)	Maximum optical power	Extinction ratio (dB)	Rx sensitivity	Maximum transmission distance
USFP+-192/M/SW	850	PIN	-7.3 to -1.0	-1.0	3.0	-11.1	0.3
USFP+-192/S1/SW	1310	PIN	-8.2 to 0.5	0.5	3.5	-12.6	10
USFP+-192/S2/SW	1550	PIN	-3.5 to 4.0	4.0	6.0	-16.0	40
USFP+-192/S3/SW	1550	PIN	-1.0 to 4.0	4.0	9.0	-23.0	80

40 Gbit/s QSFP+ optical module

Model	Wavelength (nm)	Rx type	Tx optical power (dBm)	Maximum optical power	Extinction ratio (dB)	Rx sensitivity	Maximum transmission distance
UQSP-40G/S1/SW	1310	PIN	-7.0 to 2.3	1.0	3.5	-12.6	10
UQSP-40G/M3/SW	850	PIN	-7.6 to 2.4	1.0	3.0	-9.9	0.3

5.3 Terms

A

Access Control List (ACL) — A series of ordered rules composed of permit | deny sentences. These rules are based on the source MAC address, destination MAC address, source IP address, destination IP address, interface ID, etc. The device decides to receive or refuse the packets based on these rules.

Auto-negotiation	The interface automatically chooses the rate and duplex mode according to the result of negotiation. The auto-negotiation process is: the interface adapts its rate and duplex mode to the highest performance according to the peer interface, that is, both ends of the link adopt the highest rate and duplex mode they both support after auto-negotiation.

B

Bracket	It is a component at the flank side of the device, used for installing the chassis into the rack.

D

Dynamic ARP Inspection (DAI)	A security feature that can be used to verify the ARP data packets in the network. With DAI, the administrator can intercept, record, and discard ARP packets with invalid MAC address/IP address to prevent common ARP attacks.

F

Frame	It is a data transmission unit, composed of several parts, each of which has different functions.
Full duplex	In a communication link, both parties can receive and send data concurrently.

G

Ground cable	It is generally a yellow-and-green coaxial cable used for connecting the device to the ground.

H

Half duplex	In a communication link, both parties can receive or send data at a time.

L

Link Aggregation	With link aggregation, multiple physical Ethernet interfaces are combined to form a logical aggregation group. Multiple physical links in one aggregation group are taken as a logical link. Link aggregation helps share traffic among member interfaces in an aggregation group. In addition to effectively improving the reliability on links between devices, link aggregation can help gain greater bandwidth without upgrading hardware.

Link-state tracking	Link-state tracking provides an interface linkage scheme, extending the range of link backup. Through monitoring uplinks and synchronizing downlinks, faults of the upstream device can be transferred quickly to the downstream device, and primary/backup switching is triggered. In this way, it avoids traffic loss because the downstream device does not sense faults of the upstream link.
M	
MMF	In this fiber, multi-mode optical signals are transmitted.
Q	
Quality of Service (QoS)	A network security mechanism, used to solve problems of network delay and congestion. When the network is overloaded or congested, QoS can ensure that packets of important services are not delayed or discarded and the network runs high efficiently. Depending on the specific system and service, it may relate to jitter, delay, packet loss ratio, bit error ratio, and signal-to-noise ratio.
R	
RS232	It is an Asynchronous Transfer Mode (ATM), which does not contain hand-shaking signals. It can carry on point-to-point communication with RS232 and RS422 of other stations, featuring transparent transmission, with a maximum rate of 19.2 Kbit/s. Generally, the form of RS232 interface is DB9 or DB25.
Remote Authentication Dial In User Service (RADIUS)	RADIUS refers to a protocol used to authenticate and account users in the network. RADIUS works in client/server mode. The RADIUS server is responsible for receiving users' connection requests, authenticating users, and replying configurations required by all clients to provide services for users.
S	
SMF	In this fiber, single-mode optical signals are transmitted.

5.4 Acronyms and abbreviations

A	
AC	Alternating Current
ACL	Access Control List

AN	Access Node
APS	Automatic Protection Switching
ARP	Address Resolution Protocol

C

CFM	Connectivity Fault Management
CoS	Class of Service
CPU	Central Processing Unit
CSMA/CD	Carrier Sense Multiple Access/Collision Detection

D

DAI	Dynamic ARP Inspection
DC	Direct Current
DFB	Distributed Feed Back
DHCP	Dynamic Host Configuration Protocol
DiffServ	Differentiated Service
DS	Differentiated Services
DSCP	Differentiated Services Code Point

E

EFM	Ethernet in the First Mile
ELPS	Ethernet Linear Protection Switching
EMC	Electro Magnetic Compatibility
ERPS	Ethernet Ring Protection Switching
ETS	European Telecommunications Standards
ETSI	European Telecommunications Standards Institute

F

| FE | Fast Ethernet |
| FTP | File Transfer Protocol |

G

| GE | Gigabit Ethernet |

I

IEEE	Institute of Electrical and Electronics Engineers
IGMP	Internet Group Management Protocol
IP	Internet Protocol
ITU-T	International Telecommunications Union - Telecommunication Standardization Sector

L

LLDP	Link Layer Discovery Protocol
LOS	Loss of Signal

M

MAC	Medium Access Control
MEF	Metro Ethernet Forum
MTBF	Mean Time Between Failure
MVR	Multicast VLAN Registration

N

NNM	Network Node Management
NView NNM	NView Network Node Management

O

OAM	Operation
OSPF	Open Shortest Path First

P

PC	Personal Computer
PHB	Per-Hop Behavior
PPPoE	PPP over Ethernet
PVC	Permanent Virtual Circuit

Q

QoS	Quality of Service

R

RADIUS   Remote Authentication Dial In User Service

RH   Relative Humidity

RMON   Remote Network Monitoring

S

SFP   Small Form-factor Pluggable

SLA   Service Level Agreement

SNMP   Simple Network Management Protocol

SSHv2   Secure Shell v2

STP   Spanning Tree Protocol

T

TACACS+   Terminal Access Controller Access Control System

TFTP   Trivial File Transfer Protocol

U

UART   Universal Asynchronous Receiver/Transmitter

UL   Underwriter Laboratories

UNI   User Network Interface

V

VLAN   Virtual Local Area Network

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