HARDWARE INSTALLATION GUIDE

Brocade ICX 6610 Stackable Switch Hardware Installation Guide

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Contents

Preface

Document conventions

The document conventions describe text formatting conventions, command syntax conventions, and important notice formats used in Brocade technical documentation.

Notes, cautions, and warnings

Notes, cautions, and warning statements may be used in this document. They are listed in the order of increasing severity of potential hazards.

NOTE
A Note provides a tip, guidance, or advice, emphasizes important information, or provides a reference to related information.

ATTENTION
An Attention statement indicates a stronger note, for example, to alert you when traffic might be interrupted or the device might reboot.

CAUTION
A Caution statement alerts you to situations that can be potentially hazardous to you or cause damage to hardware, firmware, software, or data.

DANGER
A Danger statement indicates conditions or situations that can be potentially lethal or extremely hazardous to you. Safety labels are also attached directly to products to warn of these conditions or situations.

Text formatting conventions

Text formatting conventions such as boldface, italic, or Courier font may be used to highlight specific words or phrases.

Format	Description
bold text	Identifies command names.
	Identifies keywords and operands.
	Identifies the names of GUI elements.
	Identifies text to enter in the GUI.
italic text	Identifies emphasis.
	Identifies variables.
	Identifies document titles.
`Courier font`	Identifies CLI output.

Format	Description
	Identifies command syntax examples.

Command syntax conventions

Bold and italic text identify command syntax components. Delimiters and operators define groupings of parameters and their logical relationships.

Convention	Description
bold text	Identifies command names, keywords, and command options.
italic text	Identifies a variable.
value	In Fibre Channel products, a fixed value provided as input to a command option is printed in plain text, for example, **--show** WWN.
[ ]	Syntax components displayed within square brackets are optional. Default responses to system prompts are enclosed in square brackets.
{ **x** | **y** | **z** }	A choice of required parameters is enclosed in curly brackets separated by vertical bars. You must select one of the options. In Fibre Channel products, square brackets may be used instead for this purpose.
x | **y**	A vertical bar separates mutually exclusive elements.
< >	Nonprinting characters, for example, passwords, are enclosed in angle brackets.
...	Repeat the previous element, for example, *member*[*member*...].
\	Indicates a "soft" line break in command examples. If a backslash separates two lines of a command input, enter the entire command at the prompt without the backslash.

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- Brocade Supplemental Support augments your existing OEM support contract, providing direct access to Brocade expertise. For more information, contact Brocade or your OEM.
- For questions regarding service levels and response times, contact your OEM/solution provider.

About This Document

Supported Software

For information about the features supported on a hardware platform, refer to the appropriate *Features and Standards Support Matrix* document.

What's new in this document

There are no enhancements in this edition.

ICX 6610 Overview

Hardware features

The following hardware platforms are described in this guide:

- ICX 6610-24 -- 24 10/100/1000 Mbps copper ports, eight 1/10 Gbps SFP ports, two 40 Gbps and two 4x10 Gbps stacking ports
- ICX 6610-24F -- 24 100/1000 Mbps SFP fiber ports, eight 1/10 Gbps SFP ports, two 40 Gbps and two 4x10 Gbps stacking ports
- ICX 6610-24P -- 24 10/100/1000 Mbps copper PoE ports, eight 1/10 Gbps SFP ports, two 40 Gbps and two 4x10 Gbps stacking ports
- ICX 6610-48 -- 48 10/100/1000 Mbps copper ports, eight 1/10 Gbps SFP ports, two 40 Gbps and two 4x10 Gbps stacking ports
- ICX 6610-48P -- 48 10/100/1000 Mbps PoE copper ports, eight 1/10 SFP Gbps ports, two 40 Gbps and two 4x10 Gbps stacking ports

The following sections describe the physical characteristics of the ICX 6610 models. For more details about physical dimensions, power supply specifications, and pinouts, refer to the Brocade ICX 6610 Switch Technical Specifications *on page 85*.

The following figures show the front and rear panels of the ICX 6610 models.

FIGURE 1 ICX 6610-24F front panel

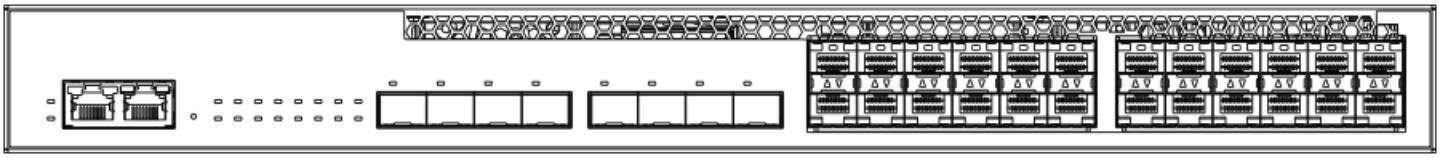


FIGURE 2 ICX 6610-24 and ICX 6610-24P front panels

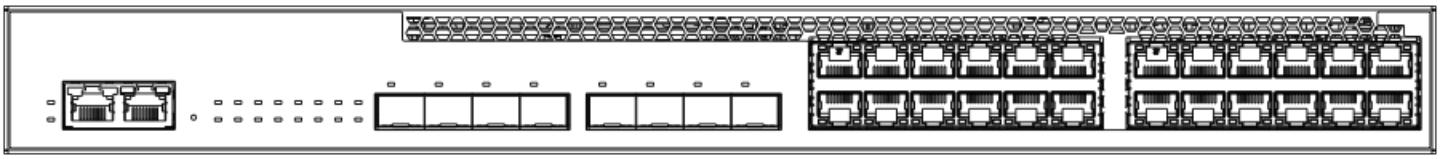


FIGURE 3 ICX 6610-24P rear panel

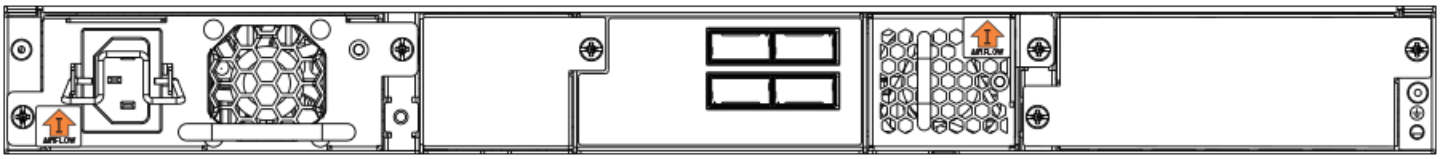


FIGURE 4 ICX 6610-48P rear panel with DC power supply

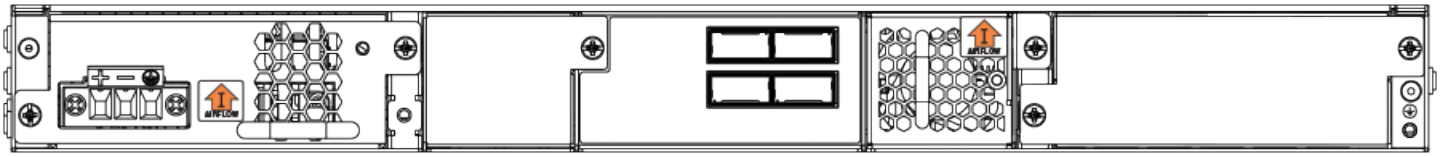


FIGURE 5 ICX 6610-48 and ICX 6610-48P front panels

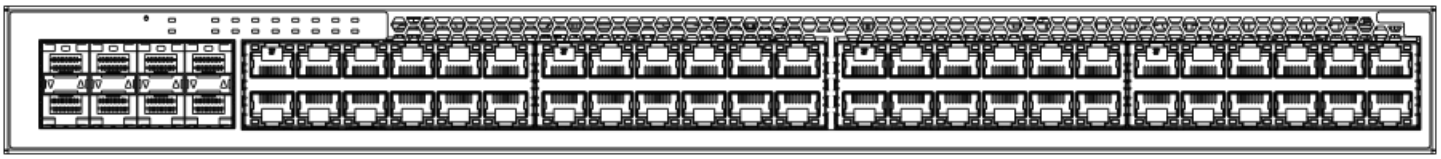


FIGURE 6 ICX 6610-48P rear panel

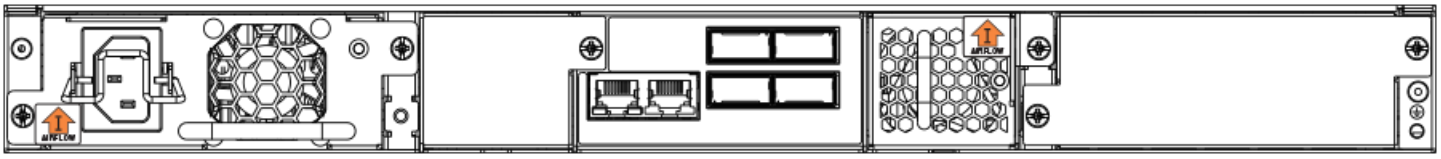


FIGURE 7 ICX 6610-24, ICX 6610-24F, and ICX 6610-48, rear panels

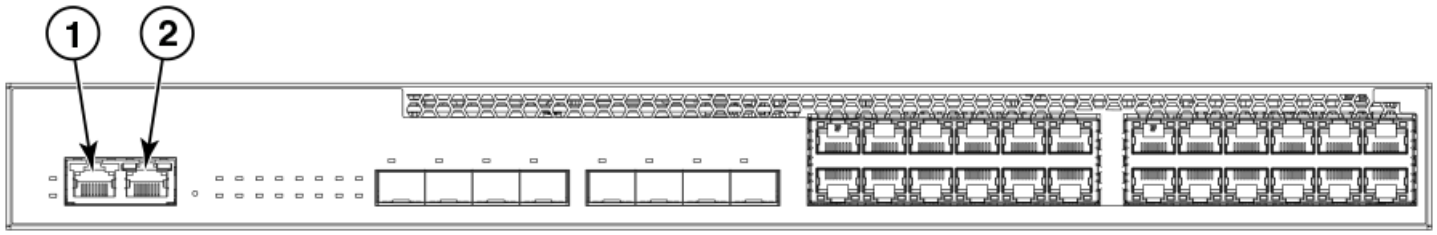
Management interfaces

Each ICX 6610 includes the following management interfaces:

- Console management interface (RJ-45 serial port)
- Out-of-band management Interface (RJ-45 port)
- Reset button

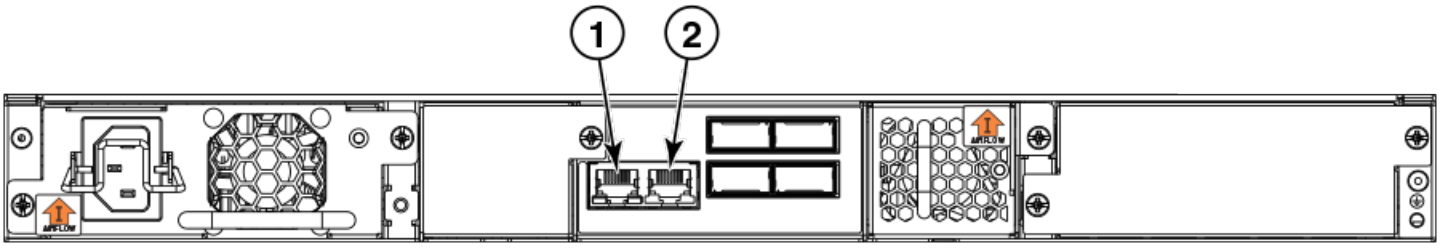
These RJ-45 management ports are located together on the left side of the front panel on 24-port models, and in the middle of the rear panel on 48P-port models.

FIGURE 8 Management interfaces on 24-port models



1. Console port
2. Out-of-band management port

FIGURE 9 Management interfaces on 48-port models



1. Out-of-band management port
2. Console port

Console management interface

The console management interface is an RJ-45 serial port that allows you to configure and manage the device using a third-party terminal emulation application from a directly connected PC.

Out-of-band management interface

The out-of-band management interface is an RJ-45 port that allows you to configure and manage the device from the network.

Reset button

The reset button allows you to restart the system without switching the power supplies off and on or using the CLI or Web Management Interface. When the reset button is pressed, the system resets and the software is reloaded. The reset button is located next to the PSU LED on both 24-port and 48-port models.

Network interfaces for the ICX 6610

ICX 6610-24, ICX 6610-24, ICX 6610-48, and ICX 6610-48P contain the following interfaces:

- 10/100/1000 Mbps ports with RJ-45 copper connectors
- SFP/SFP+ ports
- QSFP stacking ports

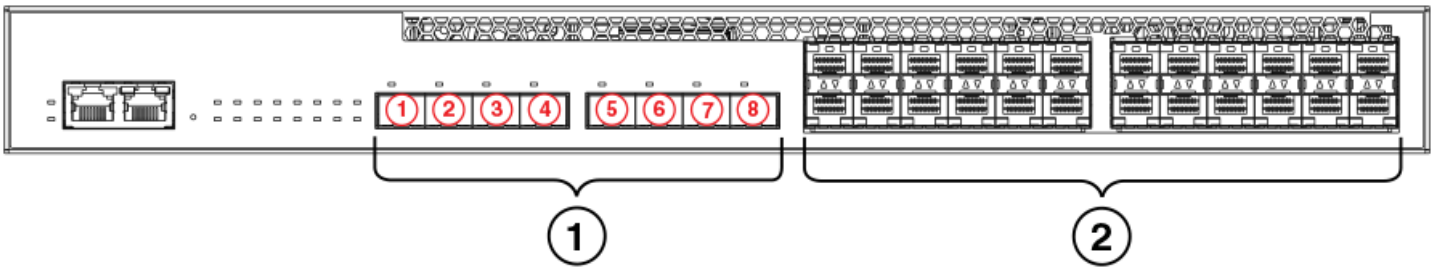
The ICX 6610-24F contains the following interfaces:

- 100/1000 SFP fiber ports
- SFP/SFP+ ports
- QSFP stacking ports

Slot locations

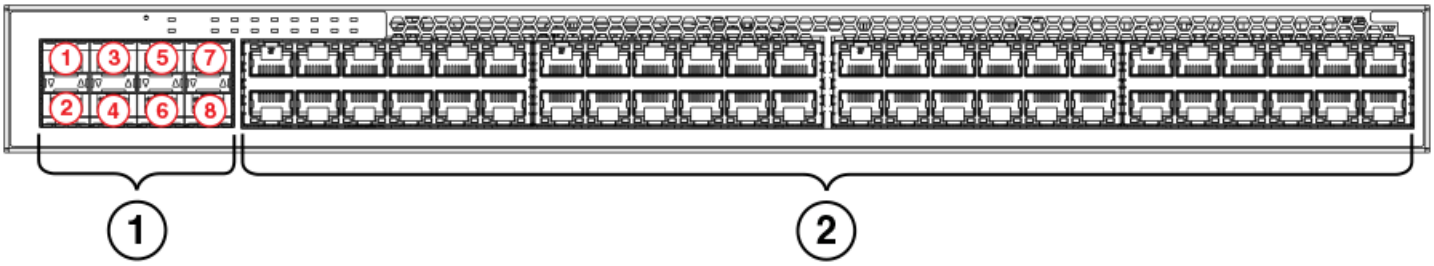
There are three slot locations on the ICX 6610: slots 3 and 1 on the front panel and slot 2 on the rear panel.

FIGURE 10 Slot locations on the front panel of the 24-port model of the ICX 6610



1	Slot 3, SFP/SFP+ ports	2	Slot 1, 10/100/1000 Mbps ports

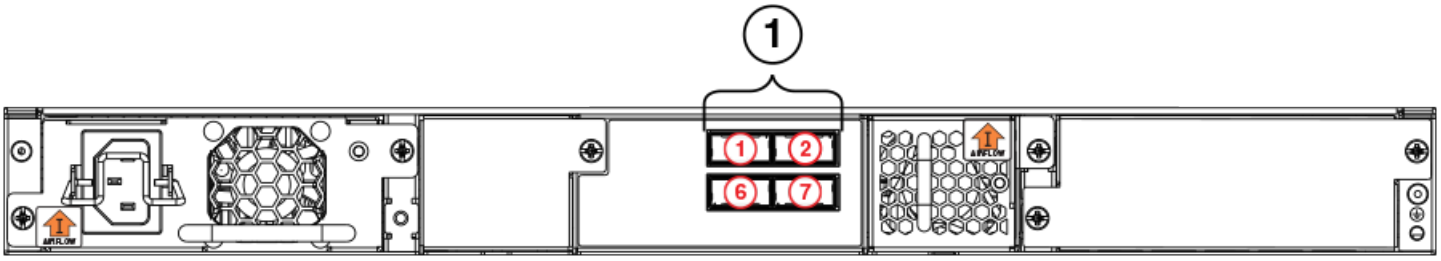
FIGURE 11 Slot locations on the front panel of the 48-port model of the ICX 6610



1	Slot 3, SFP/SFP+ ports	2	Slot 1, 10/100/1000 Mbps ports

The following figure shows slot 2 on the rear panel of the ICX 6610.

FIGURE 12 Slot location on the rear panel of the ICX 6610



1	Slot 2: Dedicated stacking ports 1, 2, 6, 7

Slot designations

The following table lists the slot designations for ICX 6610 models.

TABLE 1 Stack unit slots for ICX 6610 stackable devices

Device	Slot 1	Slot 2	Slot 3
ICX 6610-24	10/100/1000 Mbps ports 1-24	QSFP stacking ports 1, 2, 6, 7	SFP/SFP+ ports 1-8
ICX 6610-24F	100/1000 Mbps ports 1-24	QSFP stacking ports 1, 2, 6, 7	SFP/SFP+ ports 1-8
ICX 6610-24P	10/100/1000 Mbps ports 1-24	QSFP stacking ports 1, 2, 6, 7	SFP/SFP+ ports 1-8
ICX 6610-48	10/100/1000 Mbps ports 1-48	QSFP stacking ports 1, 2, 6, 7	SFP/SFP+ ports 1-8
ICX 6610-48P	10/100/1000 Mbps ports 1-48	QSFP stacking ports 1, 2, 6, 7	SFP/SFP+ ports 1-8

10/100/1000 BASE-T ports

All ICX 6610 copper devices provide 24 or 48 RJ-45 ports that operate at 10 Mbps or 100 Mbps half or full duplex, or at 1000 Mbps full duplex. In addition, ICX 6610 fiber models provide 24 SFP ports.

Because all ports support automatic MDI or MDI-X operation, you can use straight-through cables for all network connections to PCs or servers, or to other switches or hubs. In addition, it is ideal (and preferred) to use straight-through cables for switch-to-switch connections.

Each port supports auto-negotiation, so the optimum transmission mode (half or full duplex), and the data rate (10, 100, or 1000 Mbps) can be selected automatically. If a device connected to one of these ports does not support auto-negotiation, the communication mode of the port can be configured manually.

SFP interfaces

The following table describes the SFP network interfaces supported on ICX 6610 devices.

TABLE 2 Supported network interfaces

Interface	show media command description
1000Base-BX-D	M-GBXD
1000Base-BX-U	M-GBXU
1000Base-LHA	M-LHA
1000Base-LHB	M-LHB
1000Base-LX	M-LX
1000Base-SX	M-SX
1000Base-T	C
1000Base-TX	M-TX
100Base-FX	M-FX

40-Gbps QSFP interface stacking ports

ICX 6610 devices have two 40-Gbps QSFP stacking ports and two 4 x 10-Gbps QSFP stacking ports on the rear panel. These ports can perform data transmission directly through copper links of up to 5 meters.

Specifying a port address

You can specify a port address for a data port, stacking port, or a management port.

Specifying a data port

The port address format is *stack unit/slot/port,* where:

- *stack unit* --Specifies the stack unit ID. Range is from 1 to 8. If the device is not part of a stack, the stack unit ID is 1.
- *slot* --Specifies the slot number. Can be 1 or 3.
- *port* --Specifies the port number in the slot. Range is from 1 to 24 (24-port models) or 1 to 48 (48-port models).

This example shows how to specify port 2 in slot 1 of a device that is not part of a stack:

```
Brocade (config) # interface ethernet 1/1/2
```

Specifying a stacking port

The port address format is *stack unit/slot/port,* where:

- *stack unit* --Specifies the stack unit ID. Range is from 1 to 8.
- *slot* --Specifies the slot number. Stacking ports are in slot 2.
- *port* --Specifies the port number in the slot. Dedicated stacking ports are 1, 2, 6, and 7.

This example shows how to specify stacking port 2 in slot 2 of unit 3 in a stack:

```
Brocade (config) # interface ethernet 3/2/2
```

Specifying a management port

The management port number is always 1. This example shows how to specify the management port:

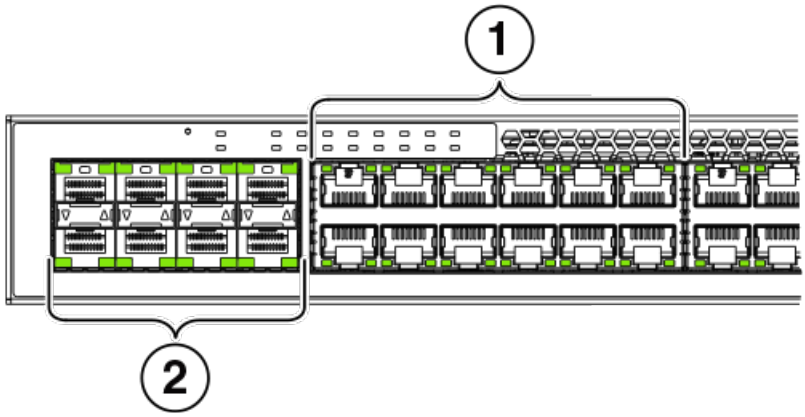
```
Brocade (config) # interface management 1
```

The Up Link and Down Link LEDs on the front panel indicate operational status. If the Up Link or Down Link LED is on, the port is connected. If the Up Link or Down Link LED is off, no connection exists, or the link is down.

Port, system, and power status LEDs

The ICX 6610 includes LEDs that indicate the status of device components. This section identifies and describes these LEDs.

FIGURE 13 Port status LEDs

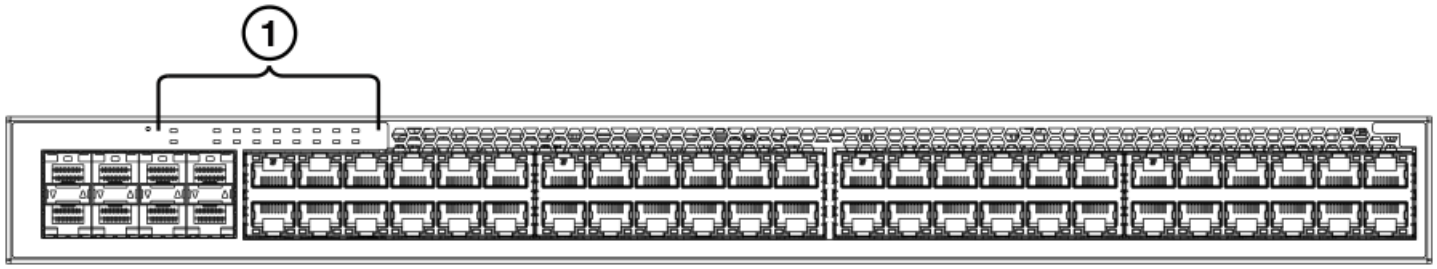


1 and 2: Port status LEDs

TABLE 3 Port status LEDs

LED	Condition	Status
Ethernet (1-24/48)	On/Flashing Green	The port has established a valid link at 1000 Mbps. Flashing indicates the port is transmitting and receiving user packets.
	On/Flashing Yellow	The port has established a valid link at 10 or 100 Mbps. Flashing indicates the port is transmitting and receiving user packets.
	Off	A link is not established with a remote port.
PoE (1-24/48)	On	The port is providing PoE power to a connected device.
	Off	The port is not providing PoE power.
SFP/SFP+ (1F-8F)	On/Flashing Green	The SFP port is operating at 10 Gbps. Flashing indicates the port is transmitting and receiving user packets.
	On/Flashing Yellow	The SFP port is operating at 1 Gbps. Flashing indicates the port is transmitting and receiving user packets.
	Off	A link is not established with a remote port.
Out-of-band management port (2 LEDs)	Off (both LEDs)	Offline
	On/Flashing (right side)	Link-up. Flashing indicates the port is transmitting and receiving user packets.
	Green (left side)	1000 Mbps Link-up
	Left LED off, right LED on or flashing	10/100 Mbps Link-up. Flashing indicates the port is transmitting and receiving user packets.

FIGURE 14 System status LEDs



1. System status LEDs

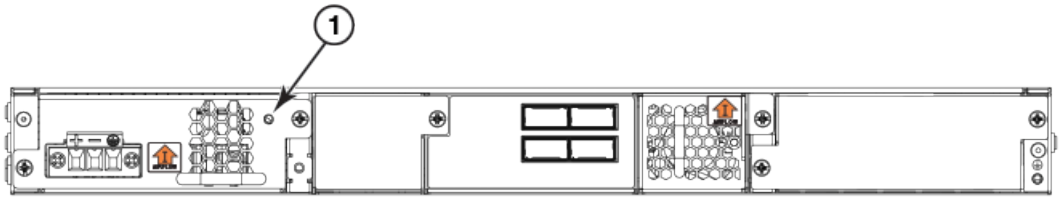
TABLE 4 System status LEDs

LED	Condition	Status
PS1 PS2 (Power Supply Status)	Green	Power supply is operating normally.
	Yellow	Power supply fault.
	Off	Power off or failure.
Diag (Diagnostic)	Flashing Green	System self-diagnostic test in progress.
	Green	System self-diagnostic test successfully completed.
	Yellow	System self-diagnostic test has detected a fault. (Blower, thermal or any interface fault.)
MS (Stacking configuration)	Green	The device is the Active controller. Flashing indicates the system is initializing.
	Yellow	Indicates the device is the Standby controller. Flashing indicates the system is in Master arbitration/selection state.
	Off	Device is operating as a stack member, or is in standalone mode.
XL1, XL2-XL5, XL6, XL7-XL10 (Stacking port status)	Green	Port is operating normally.
	Off	Link has failed or there is no link.
1-10+ (Stack ID)	Green	Indicates the device stack ID.

FIGURE 15 Power status LED on 48-port models with AC power

1. Power status LED with AC power supply installed

FIGURE 16 Power status LED on 48-port models with DC power

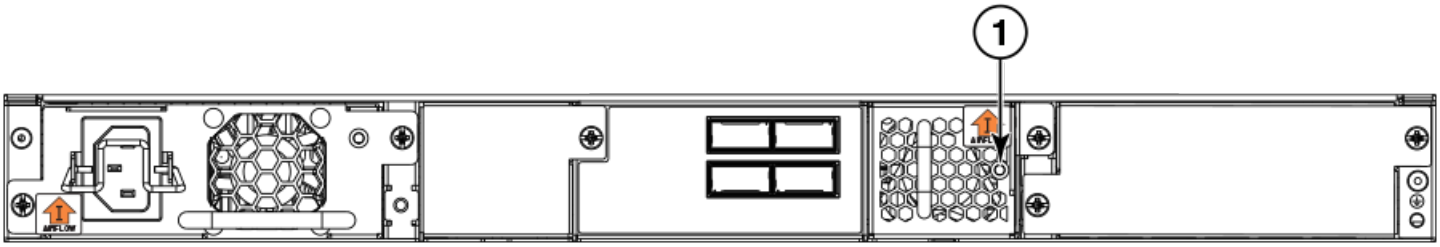


1. Power status LED with DC power supply installed

TABLE 5 Power status LED

LED	Condition	Status
Power status	Green (steady)	Nominal
	Off	No input power
	Flash	55 V out of range
	Flash	12 V out of range
	Off	Input power under voltage
	Flash	Fan fault
	Flash	OTP
	Flash	PSU disabled

FIGURE 17 Fan tray status LED on 48-port models



1. Fan tray LED

TABLE 6 Fan tray status LED

LED	Condition	Status
Fan Status	Green	Fan is operating normally
	Yellow	Fan failure

Fan trays

The device has two fan tray receptacles on the rear panel. Each device ships with one fan tray installed. A secondary fan tray can be installed. Fan trays can be hot swapped. For instructions on installing and replacing a fan tray refer to Installing or replacing fan trays *on page 61* section.

Power supplies

The device has two power supply receptacles on the rear panel. Each device ships with one AC power supply installed. Each power supply has one standard power receptacle for the AC power cable. A secondary AC power supply can be installed to provide backup power in case of a failure and for load-balancing when both power supplies are operational. AC power supplies can be hot swapped.

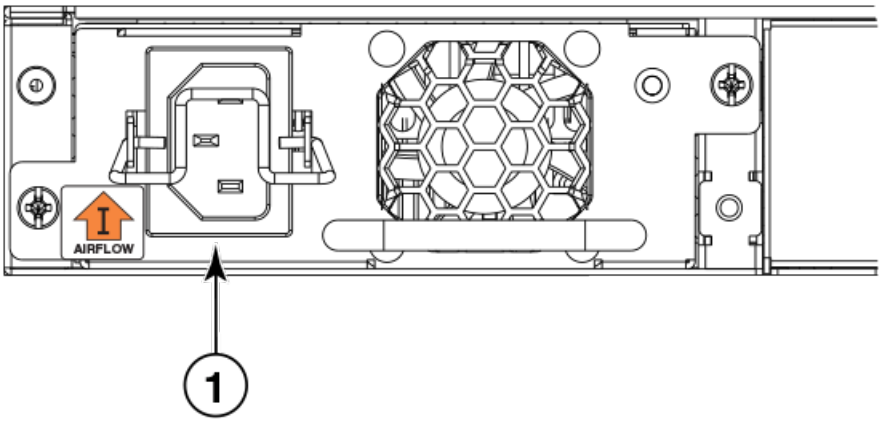
DC power supplies are available for the device. A secondary DC power supply can be installed for backup and load-balancing when both power supplies are operational. DC power supplies can also be hot swapped.

NOTE
AC and DC power supplies cannot be installed and used in the same device. Mismatched power supplies in the same device cause continual reboot on power up.

NOTE
Forward and reverse airflow power supplies cannot be installed in the same device.

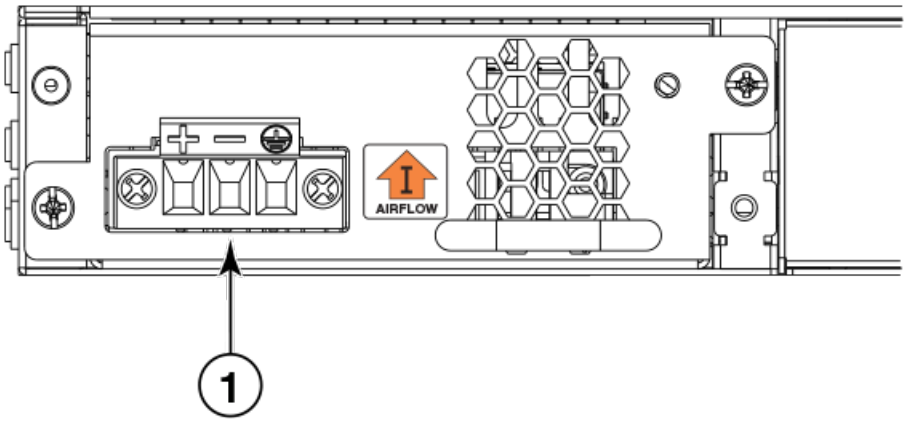
For instructions on installing and replacing a power supply refer to Installing and replacing a power supply unit *on page 55* section. For information on LED status refer to *Power status LEDs* table in the section Port, system, and power status LEDs *on page 18*.

FIGURE 18 ICX 6610 AC power supply receptacle on 48-port models



1. AC power receptacle

FIGURE 19 ICX 6610 DC power supply receptacle on 48-port models



1. DC power receptacle

PoE and PoE+ capacity on AC and DC power supplies

Several power options are available for the ICX 6610. All power supplies have the same overall form factor but differing power inlets. When a second power supply is installed in the same device for backup or increased capacity, it must be the same type.

Two AC power supplies are available, a 250 Watt unit and a 1000 Watt unit. The 1000 Watt AC power supply can be used for Power over Ethernet (PoE) applications.

A 510 Watt DC power supply is also available and can be used to supply PoE where DC power is required.

The following table shows capacity per individual power supply and indicates the number of individual devices that can be powered by each. A second matching power supply can be installed in the device to provide additional PoE power .

TABLE 7 AC and DC power supply capacity

	PSU wattage	System bus wattage	PoE bus wattage	Class 4 devices (30 W) per PSU
AC System PSU	250 W	250 W	N/A	N/A
AC PoE PSU	1000 W	250 W	750 W	25
DC PoE PSU	510 W	250 W	258 W	8

Installing the ICX 6610 Switch

DANGER

The procedures in this manual are for qualified service personnel.

DANGER

Before beginning the installation, see the precautions in "Power precautions."

Unpacking the device

The ICX 6610 ships with all of the items in the following list. Verify the contents of your shipping container. If any items are missing, contact the place of purchase.

Package contents

The following items are included in your shipping carton:

- ICX 6610 device
- AC power cable for North America (not included for models with DC power supply)
- Two 1-meter passive copper QSFP stacking cables (not included for models with DC power supply)
- Two mounting ears and screws
- 4 rubber feet
- Grounding terminal

General requirements

To manage the ICX 6610, you need a management station, such as a PC running a terminal emulation application. Connect the management station to the console serial port on the switch.

Use the serial connection to perform basic configuration tasks, including assigning an IP address and network mask to the system. This information is required to manage the system using the IronView Network Manager or using the CLI through Telnet or SSH.

Installation tasks

Details for the following tasks are documented in the sections of this document noted in the "Where To Find More Information" column.

TABLE 8 Installation tasks

Task number	Task	Where to find more information
1	Ensure that the physical environment that will host the device has the proper cabling and ventilation.	See the section Preparing the installation site *on page 28*.
2	Install any required optional modules into the device.	See the section Powering on the system *on page 55*.
3	Install the device on a desktop, or in an equipment rack.	See the section Installing the device on page 29.
4	Once the device is installed, plug the device into a nearby power source that adheres to the regulatory requirements outlined in this manual.	See the section Powering on the system *on page 55*.
5	Attach a terminal or PC to the device. This will enable you to configure the device through the Command Line Interface (CLI).	See the section Attaching a PC or terminal *on page 54*.
6	No default password is assigned to the CLI. For additional access security, assign a password.	See the section Assigning permanent passwords *on page 63*.
7	Before attaching equipment to the device, you need to configure an interface IP address to the subnet on which the device will be located. Initial IP address configuration is performed using the CLI with a direct serial connection. Subsequent IP address configuration can also be performed using the CLI through Telnet or SSH.	See the section Configuring IP addresses *on page 64*.
8	Once you power on the device, assign IP addresses to prepare the system for accepting network equipment.	See the section Configuring IP addresses *on page 64*.
9	Test IP connectivity to other devices by pinging them and tracing routes.	See the section Testing connectivity *on page 72*.
10	Continue configuring the device using the CLI through Telnet or SSH. You also can use IronView Network Manager to manage the device.	See the *FastIron Ethernet Switch Administration Guide*.
11	Secure access to the device.	See the *FastIron Ethernet Switch Security Configuration Guide*.

Installation precautions

Follow all precautions when installing a device.

General precautions

DANGER

Laser Radiation. Do Not View Directly with Optical Instruments. Class 1M Laser Products.

CAUTION
Do not install the device in an environment where the operating ambient temperature might exceed 45°C (113°F).

CAUTION
Make sure the airflow around the front, sides, and back of the device is not restricted.

CAUTION
Never leave tools inside the chassis.

DANGER
Risk of explosion if battery is replaced by an incorrect type. Dispose of used batteries according to the instructions.

Lifting precautions

DANGER
Make sure the rack housing the device is adequately secured to prevent it from becoming unstable or falling over.

DANGER
Mount the devices you install in a rack as low as possible. Place the heaviest device at the bottom and progressively place lighter devices above.

Power precautions

CAUTION
Use a separate branch circuit for each power cord, which provides redundancy in case one of the circuits fails.

DANGER
To avoid high voltage shock, do not open the device while the power is on.

CAUTION
Ensure that the device does not overload the power circuits, wiring, and over-current protection. To determine the possibility of overloading the supply circuits, add the ampere (amp) ratings of all devices installed on the same circuit as the device. Compare this total with the rating limit for the circuit. The maximum ampere ratings are usually printed on the devices near the input power connectors.

DANGER
Remove both power cords before servicing.

DANGER
Disconnect the power cord from all power sources to completely remove power from the device.

CAUTION
Before plugging a cable into to any port, be sure to discharge the voltage stored on the cable by touching the electrical contacts to ground surface.

DANGER

If the installation requires a different power cord than the one supplied with the device, make sure you use a power cord displaying the mark of the safety agency that defines the regulations for power cords in your country. The mark is your assurance that the power cord can be used safely with the device.

Preparing the installation site

Before installing the device, plan its location and orientation relative to other devices and equipment.

Cabling infrastructure

Make sure that the proper cabling is installed at the site. The following table lists the specifications for the cables used with 10 Gbps, 1 Gbps, 100 Mbps, and 10 Mbps ports. For information about supported transceivers, refer to the tables in the Fiber-optic transceivers on page 70.

NOTE

Cable installation and network configuration affect overall transmission capability. Industry guidelines on cable lengths and range are provided in the following table. For network-specific recommendations, consult your local Brocade reseller or system engineer.

TABLE 9 Cable length summary

	Cable type	Connector type	Core diameter (microns)	Modal bandwidth (MHz*km)	Range
10GBase-ER	SMF	LC	9 µ	n/a	40 km
10GBase-LR	SMF	LC	9 µ	n/a	10 km
10GBase-LRM	MMF	LC	62.5 µ	200 MHz*km	220 m
	MMF		50 µ	500 MHz*km	220 m
10GBase-SR	MMF	LC	50 µ	2000 MHz*km	300 m
10G SFP+	TWNX	SFP+	n/a	n/a	1, 3, and 5 m
1000Base-BXD	SMF	LC	9 µ	n/a	10 km
1000Base-BXU	SMF	LC	9 µ	n/a	10 km
1000Base-CWDM	SMF	LC	9 µ	n/a	80 km
1000Base-LHA	SMF	LC	9 µ	n/a	80 km
1000Base-LHB	SMF	LC	9 µ	n/a	120 km
1000Base-LX	MMF	LC	62.5 µ	500 MHz*km	2 - 550 m
	MMF		50 µ	400 MHz*km	2 - 550 m
	MMF		50 µ	500 MHz*km	2 - 550 m
	SMF		9 µ	n/a	2 - 10000 m
1000Base-SX	MMF	LC	62.5 µ	200 MHz*km	0 .5 - 275 m
	MMF		50 µ	400 MHz*km	0 .5 - 550 m
	MMF		50 µ	500 MHz*km	0 .5 - 550 m
	MMF		50 µ	1500 MHz*km	0 .5 - 550 m
	MMF		50 µ	2000 MHz*km	0 .5 - 550 m
1000Base-T	Copper	RJ-45	n/a	n/a	100 m
100Base-FX	MMF	LC	62.5 µ	500 MHz*km	2 km

TABLE 9 Cable length summary (continued)

	Cable type	Connector type	Core diameter (microns)	Modal bandwidth (MHz*km)	Range
100Base-FX-IR	SMF	LC	9 µ	n/a	15 km
100Base-FX-LR	SMF	LC	9 µ	n/a	40 km
40GBase	Copper	QSFP+	n/a	n/a	1 and 5 m
40GBase-SR4	MMF	MTP (MPO) 1×8 or 1×12 ribbon connector	50 µ	2000 MHz*km 4700 MHz*km	100 m 150 m

Installation location

Devices can be mounted in a standard 19-inch equipment rack or on a flat surface.

The site should meet the following requirements:

- Maintain the operating environment as specified in the section Environmental requirements on page 86.
- Operate at temperatures within 0° to 45° C (32° to 113° F) and humidity levels within 5% to 95%, non-condensing.
- Allow a minimum of 7.62 cm (3 in.) of space between the front and the back of the device and walls or other obstructions for proper airflow.
- Allow at least 7.62 cm (3 in.) of space at the front and back of the device for the twisted-pair, fiber-optic, and power cabling.
- The site should be accessible for installing, cabling, and maintaining the devices.
- Allow the status LEDs to be clearly visible.
- Allow for twisted-pair cable to be routed away from power lines, fluorescent lighting fixtures, and other sources of electrical interference, such as radios and transmitters.
- For a unit with AC power, allow for the unit to be connected to a separate grounded power outlet that provides 100 to 240 VAC, 50 to 60 Hz, is within 2 m (6.6 feet) of each device, and is powered from an independent circuit breaker. As with any equipment, a filter or surge suppressor is recommended.
- For a unit with DC power, allow for the unit to be connected to a separate grounded power outlet that provides 40 to 72 VDC, is within 2 m (6.6 feet) of each device, and is powered from an independent circuit breaker. As with any equipment, a filter or surge suppressor is recommended.
- Some combinations of intake and exhaust airflow may not be compatible with your environment. Consult your fan and power supply module field-replaceable unit (FRU) kit to determine the correct configuration.
- For a four-post rail mount configuration, order the appropriate mounting kit and refer to the kit documentation.

Installing the device

You can install the device on a desktop or in an equipment rack.

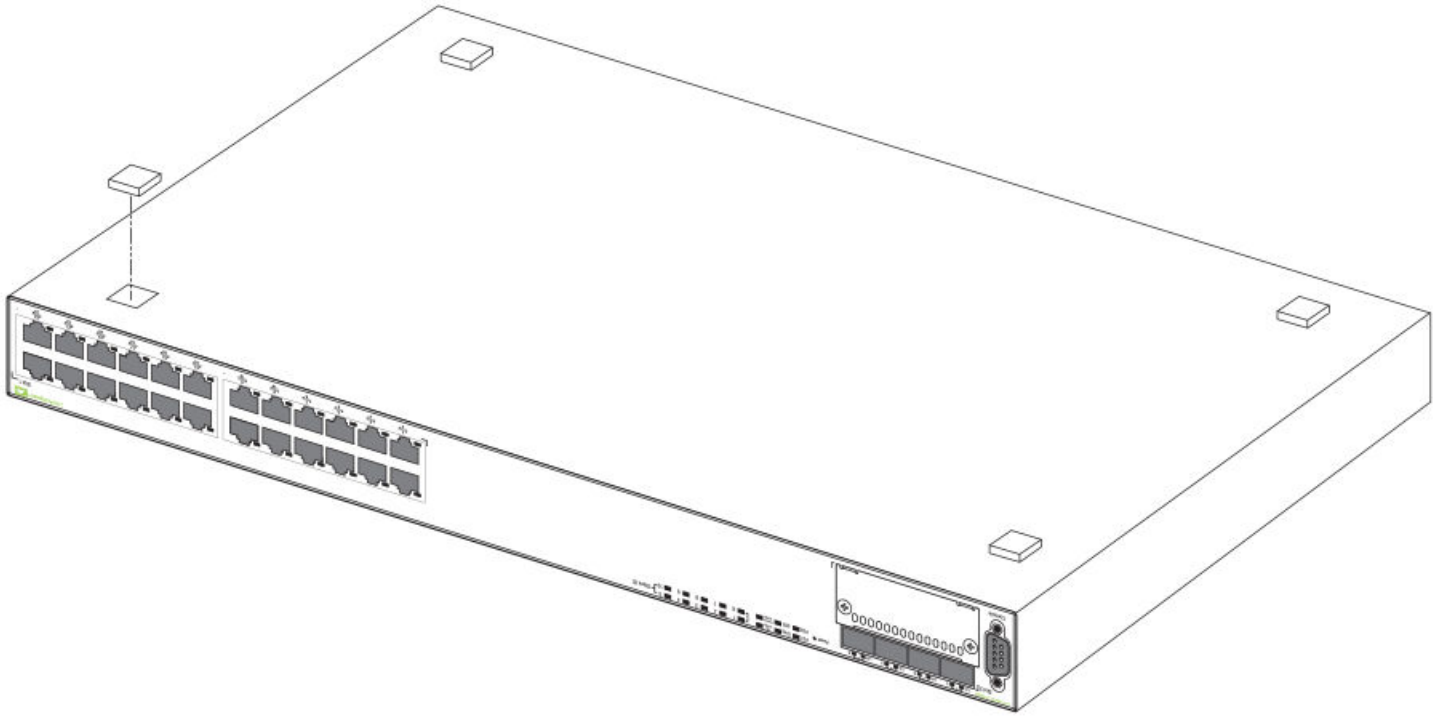
DANGER

Make sure the rack housing the device is adequately secured to prevent it from becoming unstable or falling over.

Desktop installation

Use the following steps to install the ICX 6610 on a desktop or other flat surface.

FIGURE 20 Attaching the adhesive feet



1. Attach the four adhesive feet to the bottom of the first switch. If installing multiple switches, attach the adhesive feet to each one. Place each device squarely on top of the one below.
2. Set the device on a flat desktop, table, or shelf near an AC or a DC power source, whichever is appropriate for your installation. Make sure that adequate ventilation is provided for the system. A 3 inch clearance is recommended on each side.
3. If installing a single switch only, refer to the section Powering on the system *on page 55*.

Rack mount installation

NOTE
You will need a Phillips screwdriver for installation.

Before mounting the switch in a rack, pay particular attention to the following factors:

- Temperature: Because the temperature within a rack assembly may be higher than the ambient room temperature, check that the rack-environment temperature is within the specified operating temperature range.
- Mechanical loading: Do not place any equipment on top of a rack-mounted unit.
- Circuit overloading: Be sure that the supply circuit to the rack assembly is not overloaded.
- Grounding: Rack-mounted equipment should be properly grounded. Be sure to check supply connections in addition to direct connections to the mains.

Two-post rack mount installation

NOTE

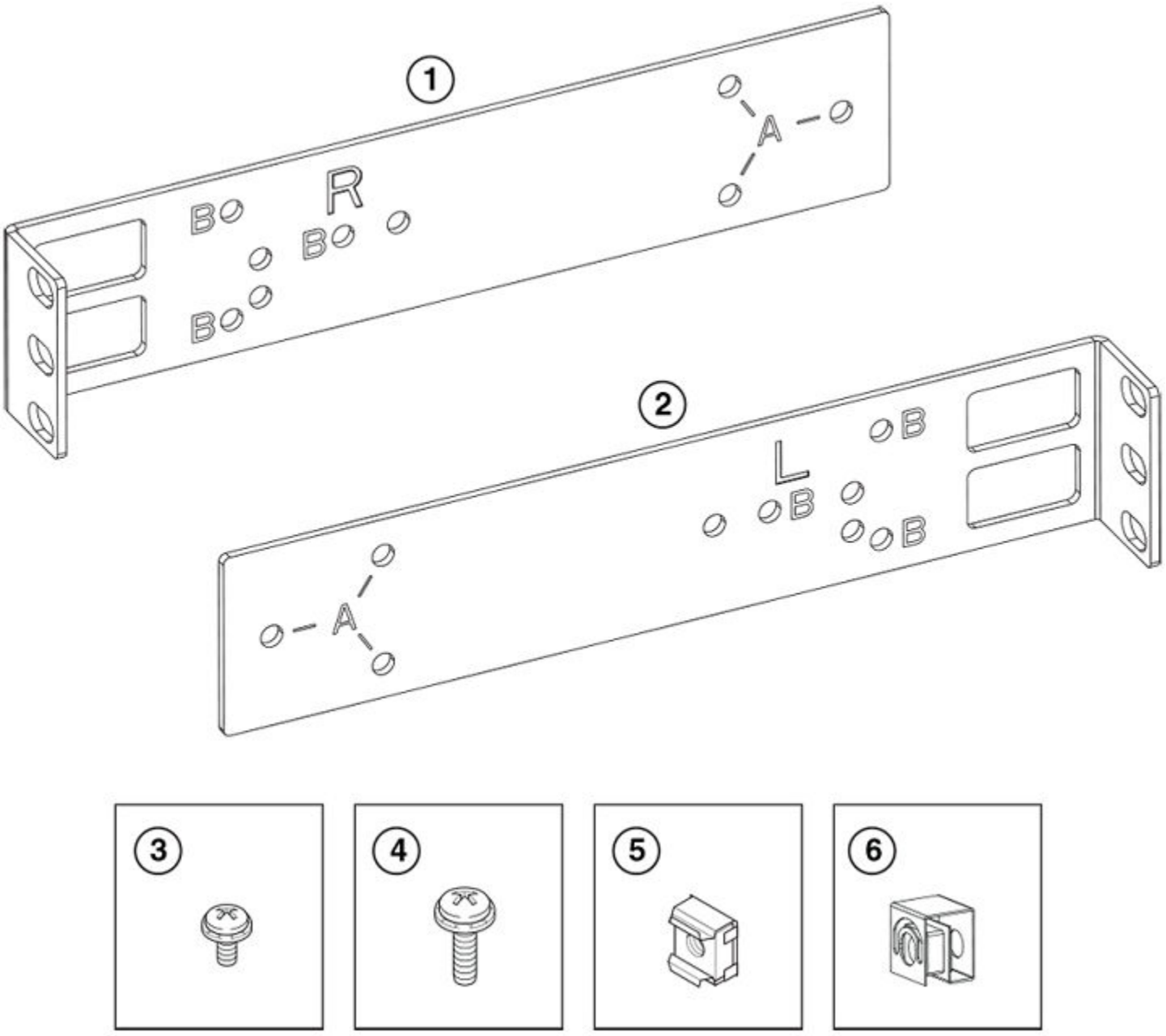
All ICX 6610 devices are shipped with a two-post rack mount kit to mount the switch into two-post Telco style racks only. If an ICX 6610 is to be installed into a standard four-post rack, please make sure that the correct rack mount kit is purchased.

Use the following procedure when installing the ICX 6610 in a two-post rack. For four-post racks, follow the procedures in the section Four-post rack mount installation *on page 36*.

Remove the rack mount kit from the shipping carton. The kit contains the following:

- Two L-shaped mounting brackets.
- Sixteen 8-32 x 3/8 in., panhead Phillips screws with patchlocks.
- Four 10-32 x 5/8 in., panhead Phillips screws
- Eight 10-32 retainer nuts (for square-hole rack rails)
- Eight 10-32 retainer nuts (for round-hole rack rails)

FIGURE 21 Two-post rack mount kit for the Brocade ICX 6610



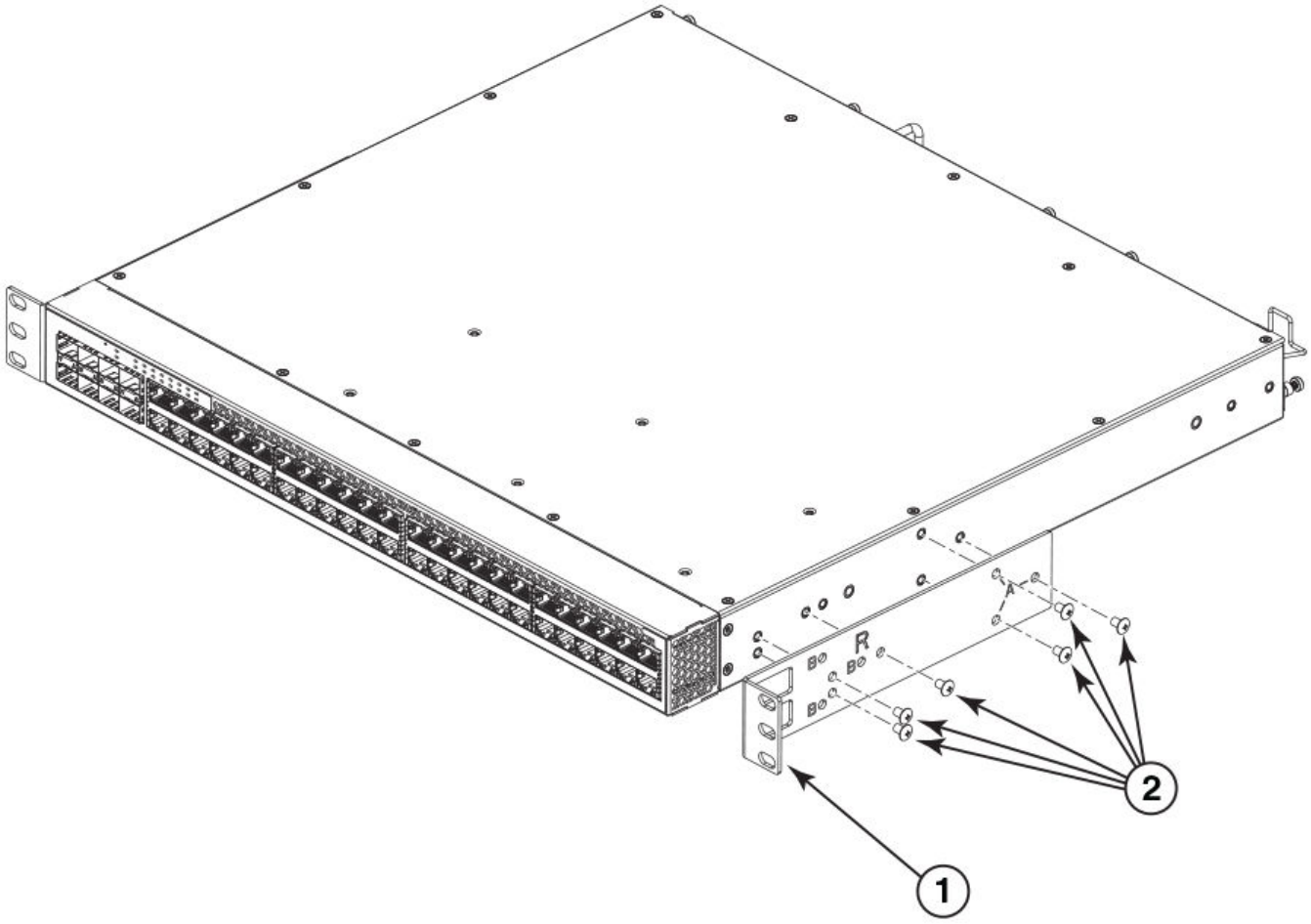
1. Bracket, front right
2. Bracket, front left
3. Screw, 8-32 x 3/8 in., panhead Phillips
4. Screw, 10-32 x 5/8 in., panhead Phillips
5. Retainer nut, 10-32, (for square-hole rack rails)
6. Retainer nut, 10-32, (for round-hole rack rails)

Use the following steps to mount devices in a two-post rack.

1. Attach the mounting brackets to the sides of the device using the 8-32 x 3/8 in. screws.

   There are two sets of holes, labeled "A" or "B." Use the holes labeled "A" if you want the device to be flush with the rack rails.

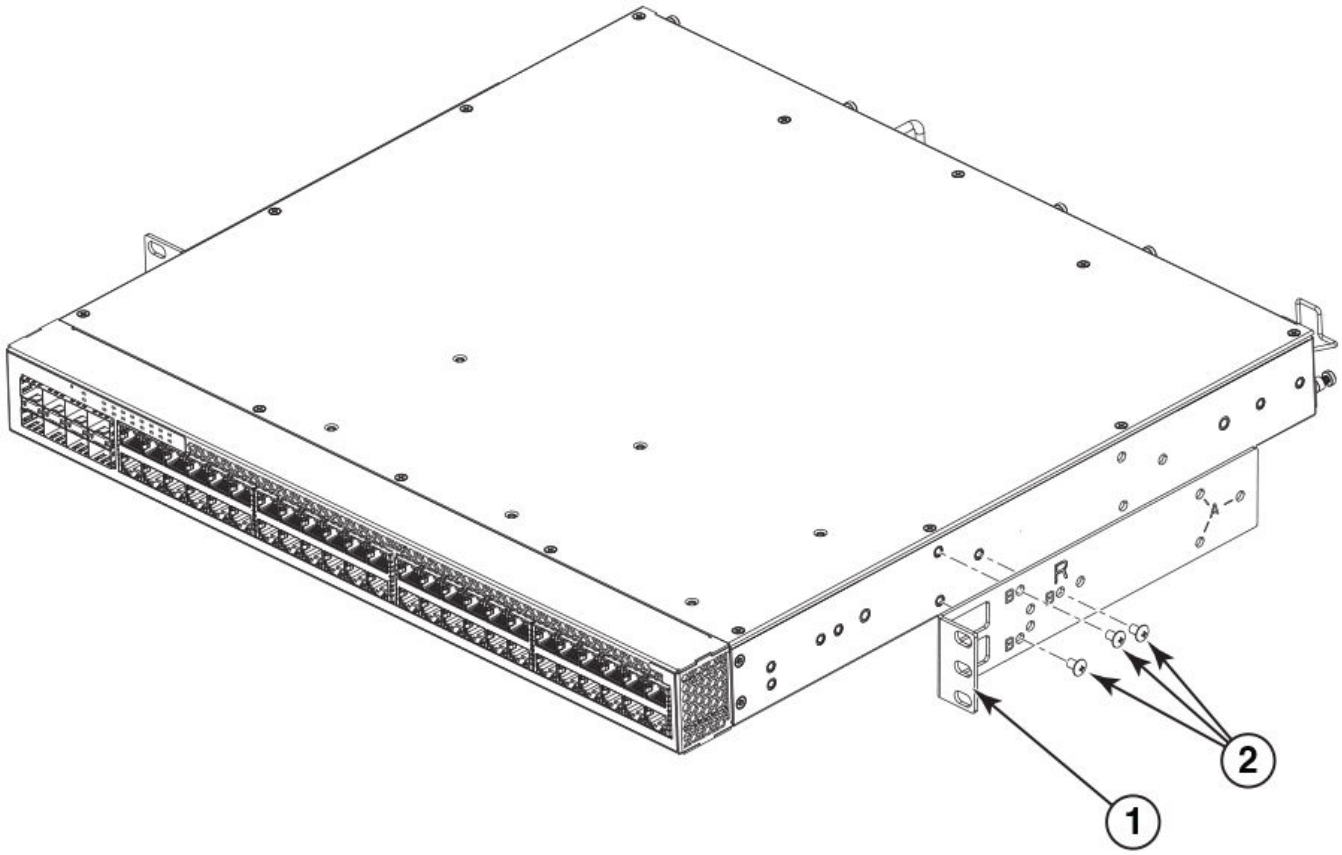
   FIGURE 22 Attaching the brackets on an ICX 6610, flush-rail mounting



1. Bracket
2. 32 x 3/8 in. screws

   Use the holes labeled "B" if you want the device to protrude 4-1/2 inches from the front of the rail rack.

FIGURE 23 Attaching the brackets on an ICX 6610, mid-rail mounting



1. Bracket
2. 8-32 x 3/8 in. screws

2. Position the switch in the cabinet, providing temporary support under the switch until the brackets are secured to the rack.

3. Attach the front right bracket to the rail rack using two 10-32 x 5/8 in. screws and the appropriate round or square retainer nuts.

FIGURE 24 Installing the device, flush-rail mounting

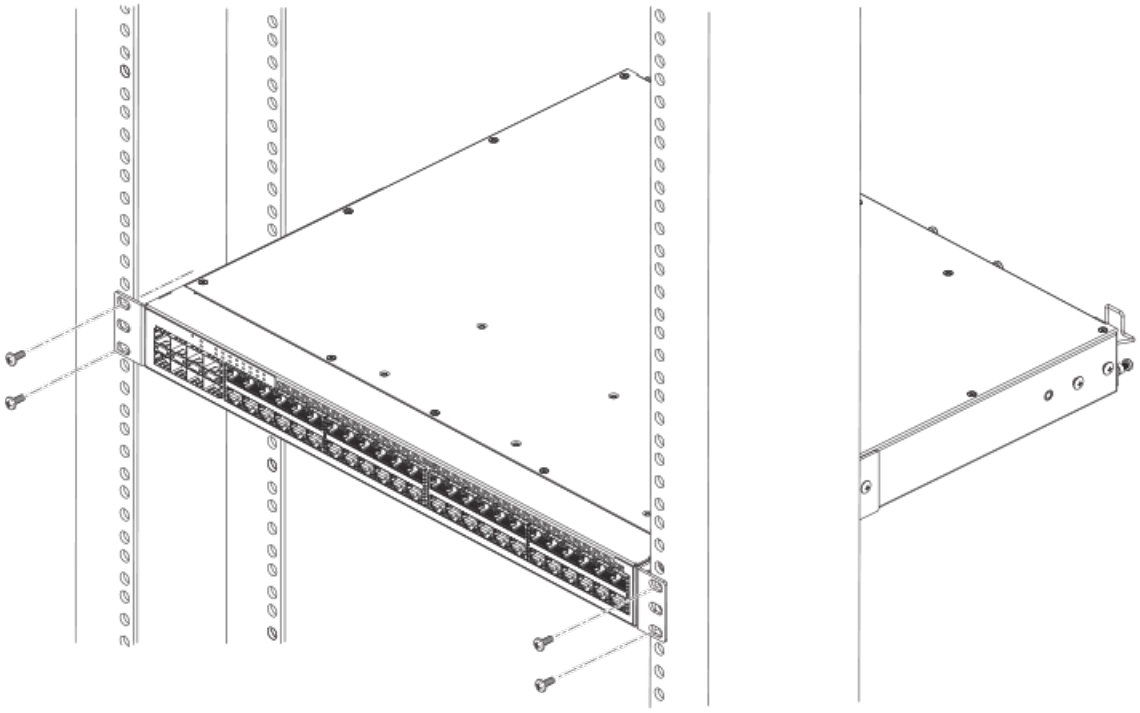
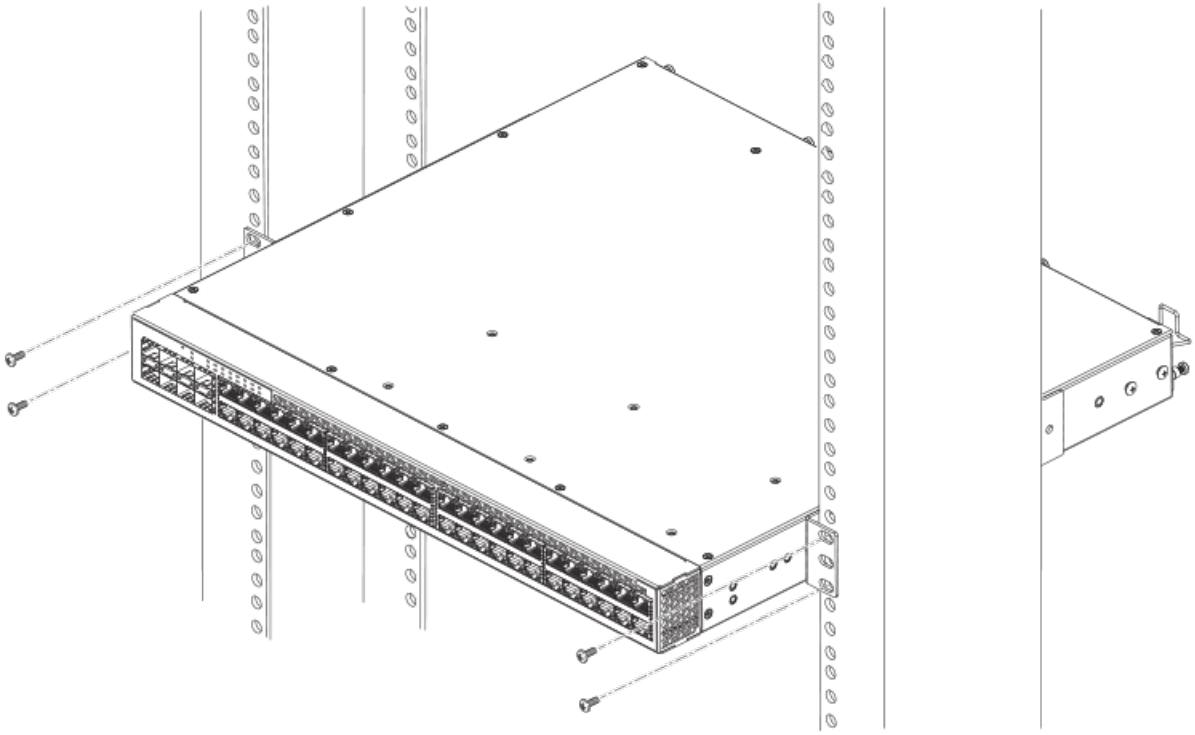


FIGURE 25 Installing the device, mid-rail mounting



4. Repeat Step 1 to Step 3 to attach the left front bracket to the left front rack rail and tighten all 10-32 x 5/8 in. screws to a torque of 25 in-lb (29 cm-kg).

Four-post rack mount installation

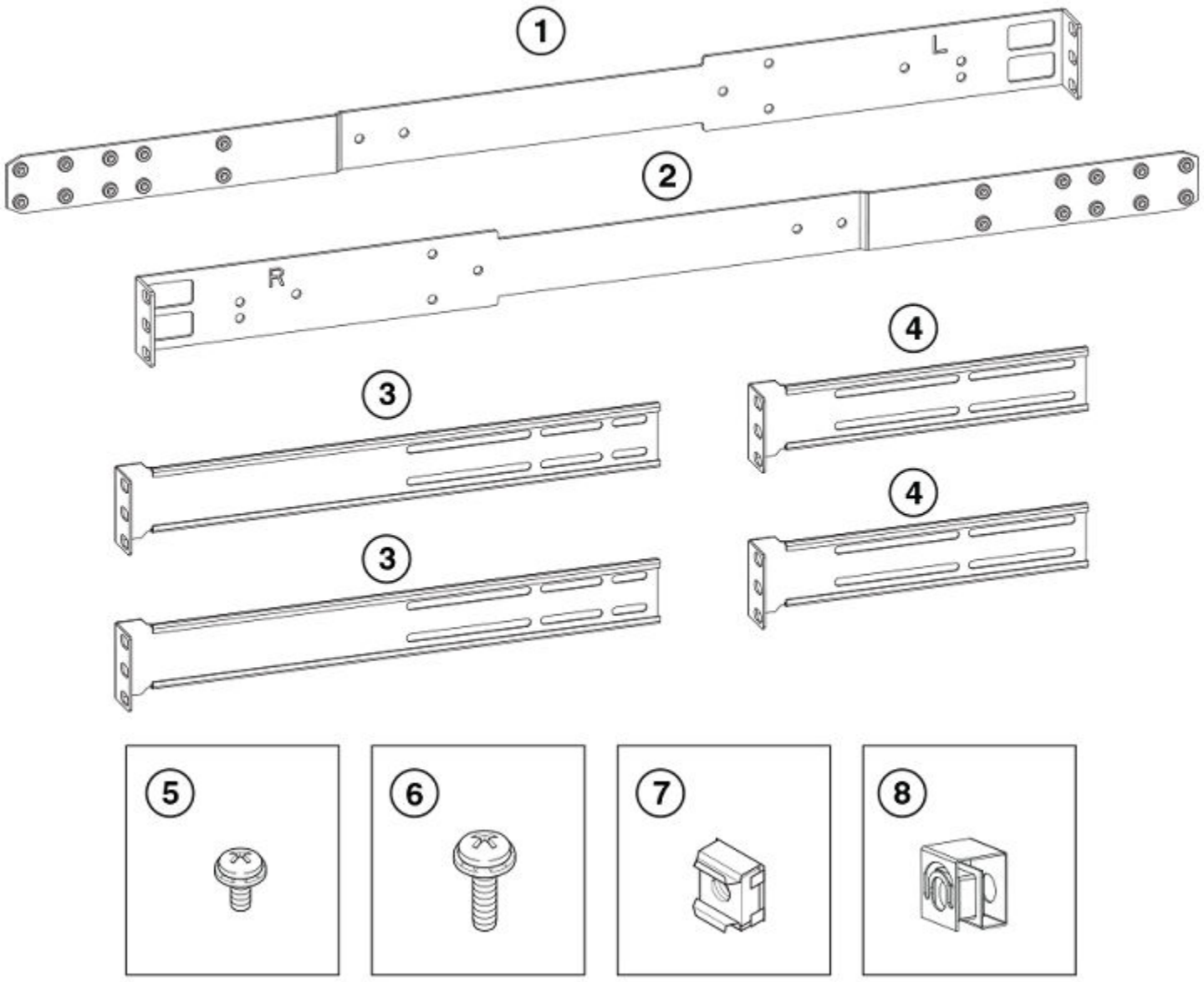
Kits for four-post rack mounting are not included in the shipping carton and must be ordered separately.

NOTE
Use the following procedure when installing the ICX 6610 in a four-post rack cabinet. For two-post cabinets, follow the procedures in the section Two-post rack mount installation *on page 31*.

Remove the rack mount kit from the shipping carton. The kit contains the following:

- Two mounting brackets
- Two pairs of extension brackets. Use the shorter pair for racks that are up to 27 inches deep. Use the longer pair for racks up to 32 inches deep.
- Thirty-two 8-32 x 3/8 in., panhead Phillips screws with patchlocks
- Eight 10-32 x 5/8 in., panhead Phillips screws
- Eight 32-10 retainer nuts (for square-hole rack rails)
- Eight 32-10 retainer nuts (for round-hole rack rails)

FIGURE 26 Four-post rail kit



1. Bracket, front right
2. Bracket, front left
3. Bracket extensions up to 34 in.
4. Bracket extensions, up to 27 in.
5. Screw, 8-32 x 3/8 in., panhead Phillips
6. Screw, 10-32 x 5/8 in., panhead Phillips
7. Retainer nut, 10-32, (for square-hole rack rails)
8. Retainer nut, 10-32, (for round-hole rack rails)

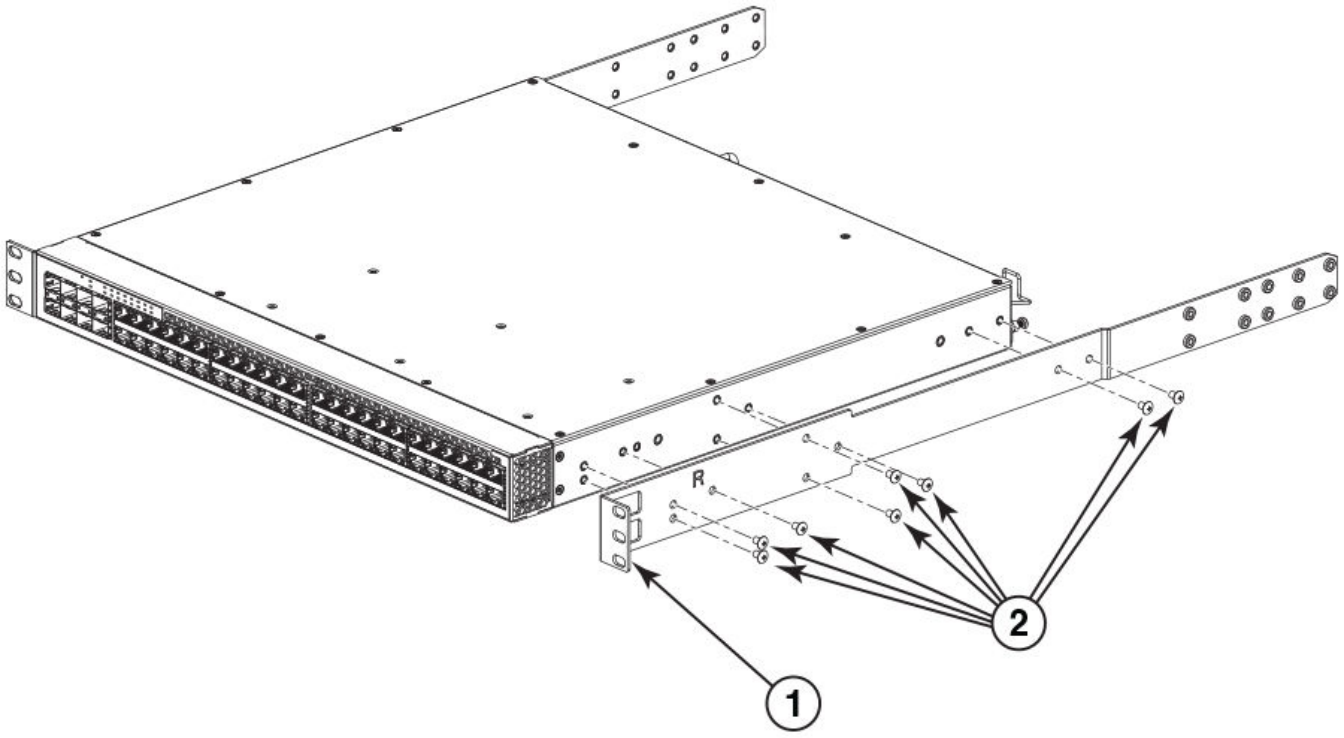
Use the following steps to mount devices in a four-post rack.

NOTE

Do not use the hardware supplied in a two-post rack mounting kit to mount an ICX 6610 in a four-post rack. Mounting the device in a four-post rack requires additional hardware to prevent possible flexing and distortion of the four-post rack when a device is not properly installed.

1. Attach the mounting brackets to the sides of the device using the 8-32 x 3/8 in. screws

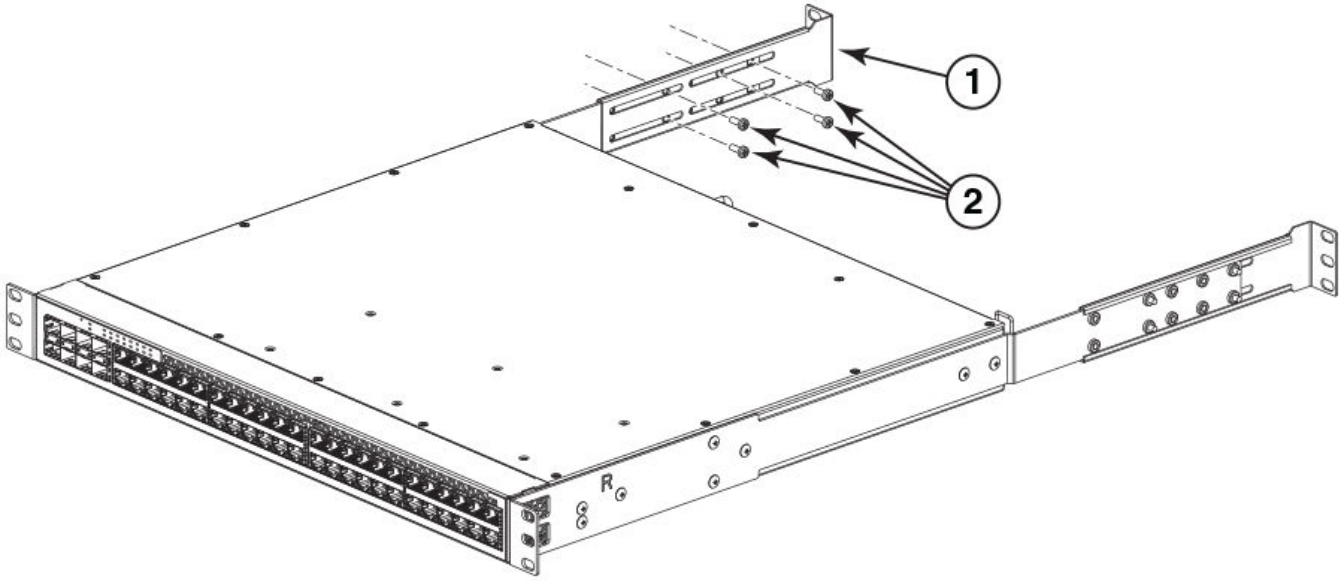
FIGURE 27 Attaching four-post brackets



1. Bracket
2. 8-32 x 3/8 in. screws

2. Attach the appropriate extensions as required for the type of rack in which you are installing the device.

FIGURE 28 Attaching bracket extensions

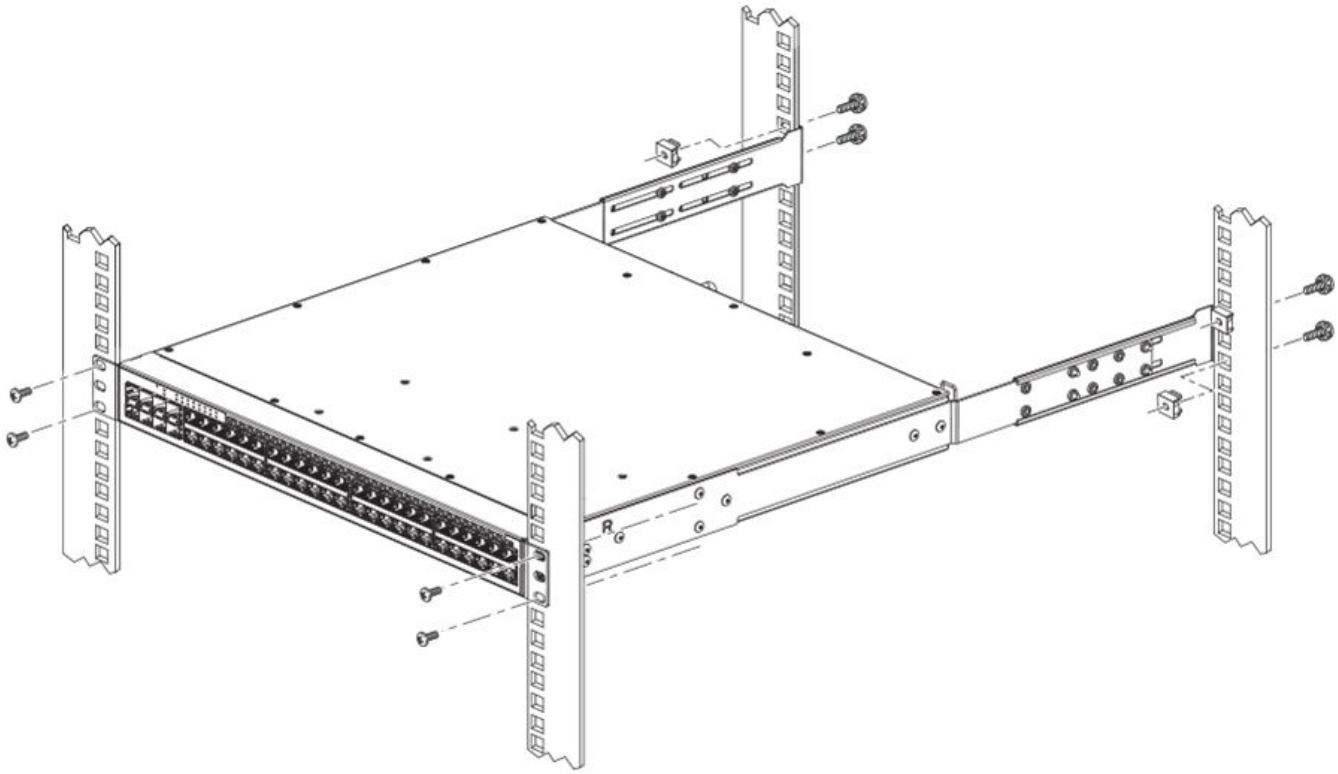


1. Bracket
2. 8-32 x 3/8 in. screws

3. Position the switch in the cabinet, providing temporary support under the switch until the brackets on the device are secured to the rack.

4. Attach the brackets to the front and back rails using the 10-32 x 5/8 in. screws and the appropriate round or square retainer nuts.

FIGURE 29 Attaching device to a four-post rack



Connecting devices in a traditional stack

The ICX 6610 can operate as a standalone device and also as a member of a traditional stack. A stack is a group of devices (Brocade stackable units and their connected stacking links) that are connected so that the stack is managed as a single entity. A traditional stack contains devices from only one model in a product family.

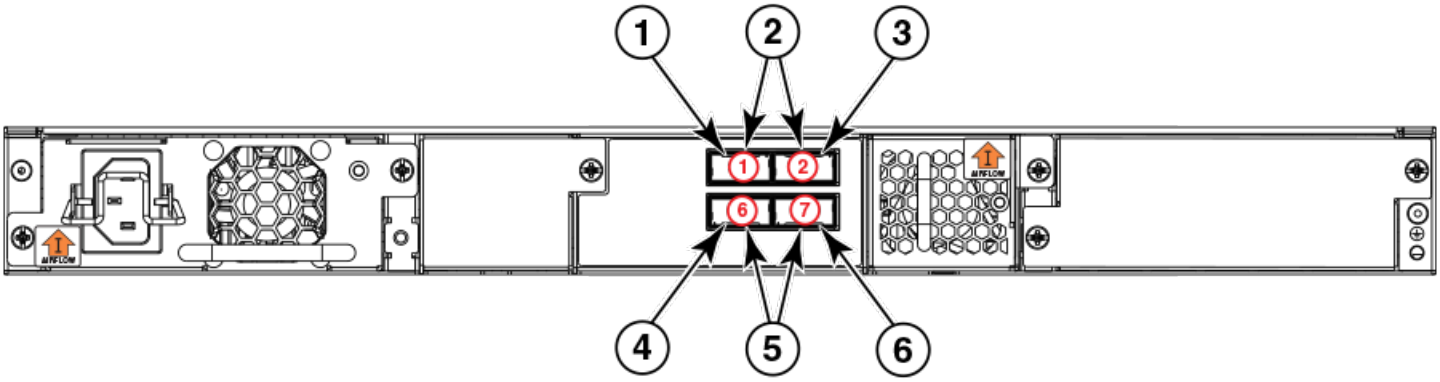
Stacking ports and trunks

The ICX 6610 contains four ports in slot 2 on the rear panel that are dedicated stacking ports. They cannot be used as data ports, even when stacking is not enabled. There are two 40 Gbps ports and two 4 x 10 Gbps ports arranged in two rows.

The stacking ports can be grouped into two trunks. Ports 1 and 2 on the top row can form trunk 0; ports 6 and 7 on the bottom row can form trunk 1.

You can trunk stacking ports by connecting one port of each type (40 Gbps or 4 x 10 Gbps) to ports of the same type on another ICX 6610 in the stack. The following figure shows the stacking ports and trunks.

FIGURE 30 Dedicated stacking ports and trunks in slot 2 on an ICX 6610



1. 1-Port 1, 40 Gbps
2. 2-Trunk 0
3. 3-Port 2, 4 x 10 Gbps
4. 4- Port 6, 40 Gbps
5. 5-Trunk 1
6. 6- Port 7, 4 x 10 Gbps

Trunking requirements

- You can connect one or both ports in a trunk. Connecting both ports in a trunk increases stacking bandwidth and provides resiliency.
- You must connect each port type (40 Gbps or 4x10 Gbps) to the same type of port on another device as shown in the following table.
- If you connect both ports in a trunk, both ports must connect to both ports of one trunk on another device.

TABLE 10 Port connections for trunking between ICX 6610 devices

Valid port connections		Invalid port connections	
Device 1	**Device 2**	**Device 1**	**Device 2**
Port 1 to	Port 1	Port 1 to	Port 2
Port 1 to	Port 6	Port 1 to	Port 7
Port 2 to	Port 2	Port 2 to	Port 1
Port 2 to	Port 7	Port 2 to	Port 6

Stacking configuration requirements

Before configuring the traditional stack using the CLI, physically connect the devices using stacking cables. For information about configuring a stack, refer to the *FastIron Ethernet Switch Stacking Configuration Guide*.

Stacking cables

Use 1 meter passive copper QSFP stacking cables or SFP+ fiber-optic cables to connect ICX 6610 devices in a traditional stack. The 40G-QSFP-SR4 optical transceiver is also supported.

Stack size

A traditional stack can contain a maximum of eight ICX 6610 devices.

Stacking topologies

Both linear and ring topologies are supported in a traditional stack. In a linear stack topology, there is a connection between each switch that carries two-way communications across the stack. This connection can use one port or two ports per trunk.

For example, in a four-unit stack using a linear topology, unit 1 connects to unit 2, unit 2 to unit 3, and unit 3 to unit 4.

In ring stack topology, there is an extra connection between the logical first and last devices to form a "ring" or "closed-loop." The closed-loop connection provides a redundant path for the stack link, so if one link fails, stack communications can be maintained.

For example, in a four-unit stack using a ring topology, unit 1 connects to unit 2, unit 2 to unit 3, unit 3 to unit 4, and unit 4 connects to unit 1.

You can connect stacking units using one port per trunk or both ports in a trunk. For maximum bandwidth and link redundancy, use both ports per trunk.

The following figures show supported stacking topologies:

- Linear stacking topology using both ports in each trunk
- Linear (top) and ring (bottom) stacking topologies using one port per trunk
- Ring stacking topology using both ports in each trunk

FIGURE 31 Linear stacking topology using both ports in each trunk

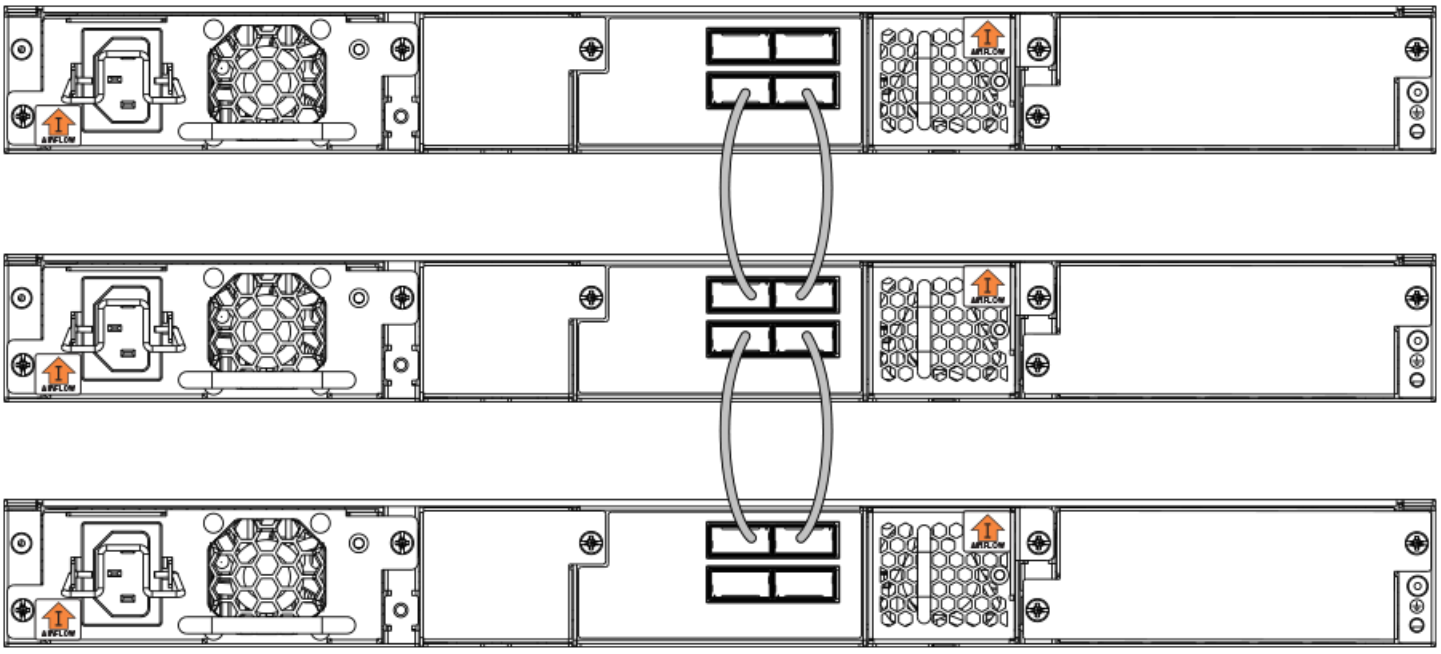


FIGURE 32 Linear and ring stacking topologies using one port per trunk

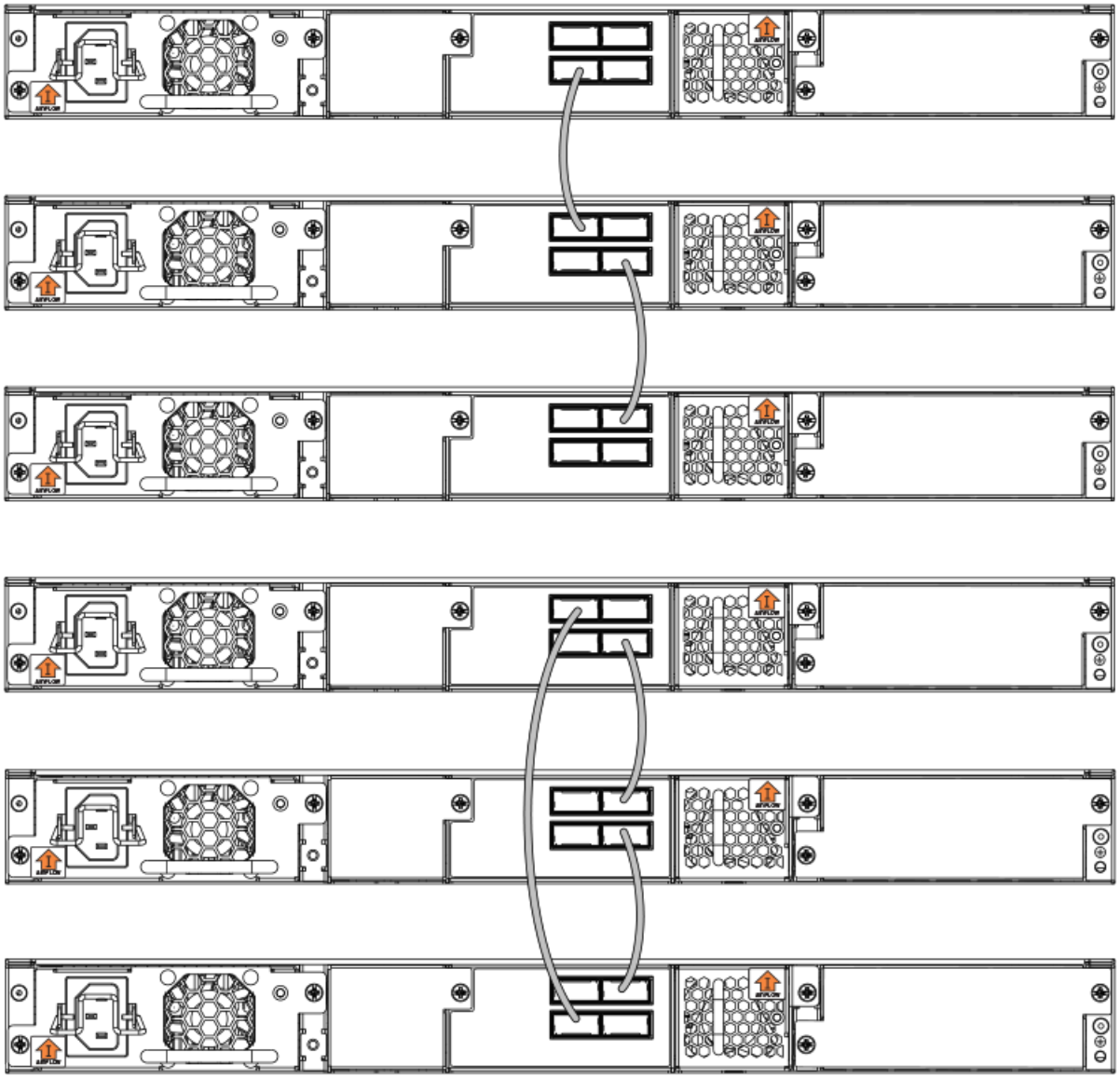
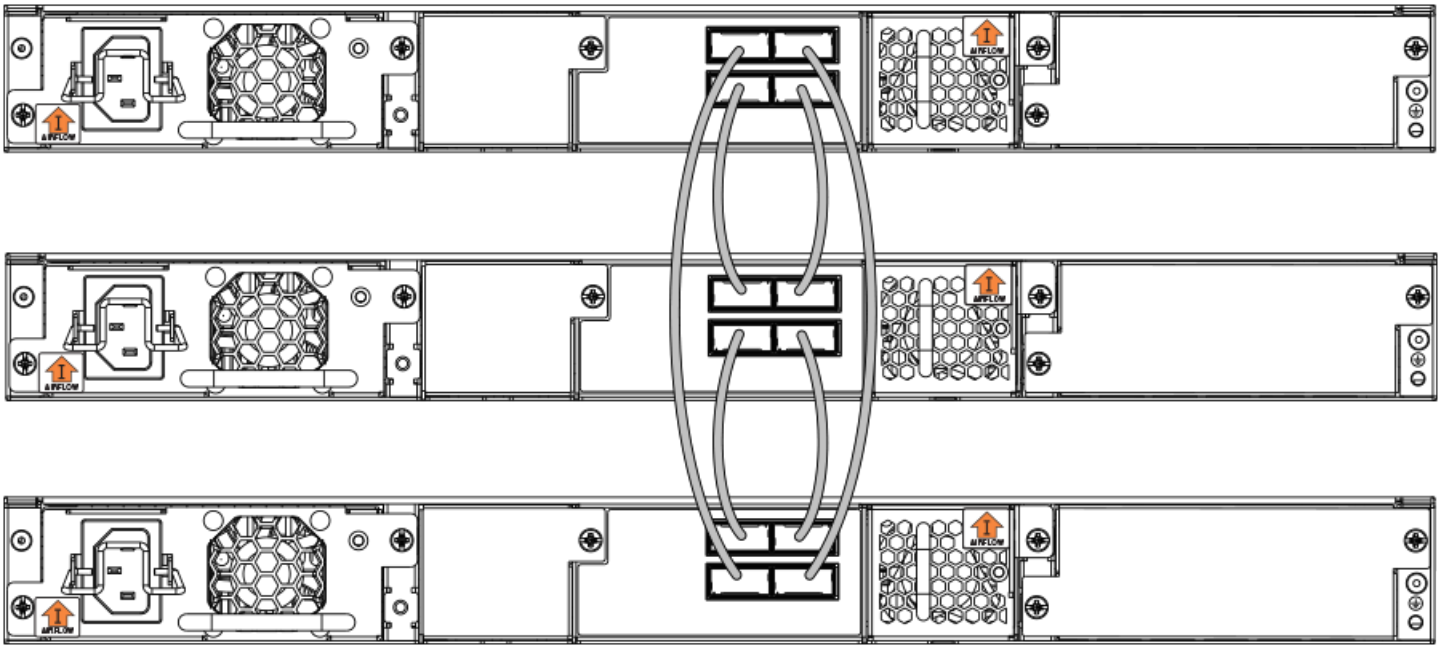


FIGURE 33 Ring stacking topology using both ports in each trunk



Connecting devices in a mixed stack

An ICX 6610 can operate as a standalone device or as a member of a mixed stack. A stack is a group of devices (Brocade stackable units and their connected stacking links) that are connected so that the stack is managed as a single entity.

A mixed stack contains ICX 6610 devices and ICX 6450 devices. ICX 6610 devices form the backbone of the mixed stack. ICX 6450 devices are peripheral units that connect to the backbone and to other peripheral units.

The following table summarizes the ports used in mixed stacking.

TABLE 11 Stacking ports used in mixed stacking

Device	Stacking ports	Panel/slot	Ports	Speed	Connection type
ICX 6610	Dedicated stacking	Rear/2	1, 6, 2, 7	40 Gbps 4 x 10 Gbps	Backbone to backbone: ICX 6610 to ICX 6610
ICX 6610	SFP+	Front/3	1-8	10 Gbps	Backbone to peripheral: ICX 6610 to ICX 6450
ICX 6450	SFP+	Front/2	1-4	10 Gbps	Peripheral to backbone: ICX 6450 to ICX 6610 Peripheral to peripheral:

TABLE 11 Stacking ports used in mixed stacking (continued)

Device	Stacking ports	Panel/slot	Ports	Speed	Connection type
					ICX 6450 to ICX 6450

ICX 6610 stacking ports and trunks

This section discusses the ports you can use to connect the ICX 6610 in the backbone and to ICX 6450 devices.

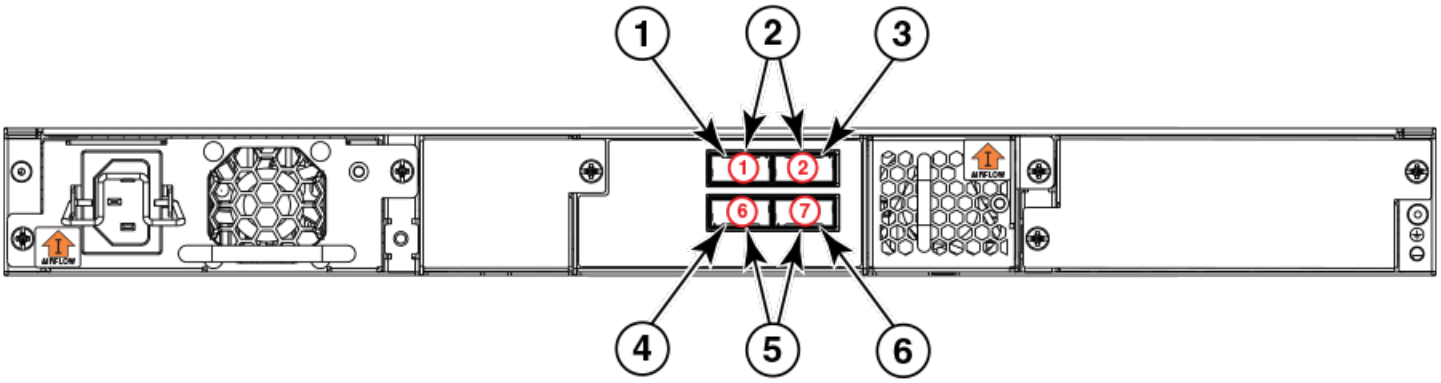
Ports used to connect ICX 6610 devices in the backbone

The ICX 6610 contains four ports in slot 2 on the rear panel that are dedicated stacking ports. They cannot be used as data ports, even when stacking is not enabled. There are two 40 Gbps ports and two 4 x 10 Gbps ports arranged in two rows.

The stacking ports can be grouped into two trunks. Ports 1 and 2 on the top row can form trunk 0; ports 6 and 7 on the bottom row can form trunk 1.

You can trunk stacking ports by connecting one port of each type (40 Gbps or 4 x 10 Gbps) to ports of the same type on another ICX 6610 in the stack. The following figure shows the stacking ports and trunks.

FIGURE 34 Dedicated stacking ports and trunks on the rear panel of an ICX 6610



1. 1-Port 1, 40 Gbps
2. 2-Trunk 0
3. 3-Port 2, 4 x 10 Gbps
4. 4-Port 6, 40 Gbps
5. 5-Trunk 1
6. 6-Port 7, 4 x 10 Gbps

Trunking requirements

- You can connect one or both ports in a trunk. Connecting both ports in a trunk increases stacking bandwidth and provides resiliency.
- You must connect each port type (40 Gbps or 4x10 Gbps) to the same type of port on another device as shown in the following table.

TABLE 12 Port connections for trunking between ICX 6610 devices

Valid port connections		Invalid port connections	
Device 1	**Device 2**	**Device 1**	**Device 2**
Port 1 to	Port 1	Port 1 to	Port 2

TABLE 12 Port connections for trunking between ICX 6610 devices (continued)

Valid port connections		Invalid port connections	
Port 1 to	Port 6	Port 1 to	Port 7
Port 2 to	Port 2	Port 2 to	Port 1

- If you connect both ports in a trunk, both ports must connect to both ports of one trunk on another device.

  NOTE
  If you use the Secure-Setup utility described in the *FastIron Ethernet Switch Stacking Configuration Guide* to set up a mixed stack, the stacking units (ICX 6610 devices and ICX 6450 devices) are automatically trunked.

Ports used to connect ICX 6610 devices to ICX 6450 devices

There are eight SFP+ ports in slot 3 on the front panel of an ICX 6610 device that are used to connect ICX 6610 devices to ICX 6450 devices in a mixed stack.

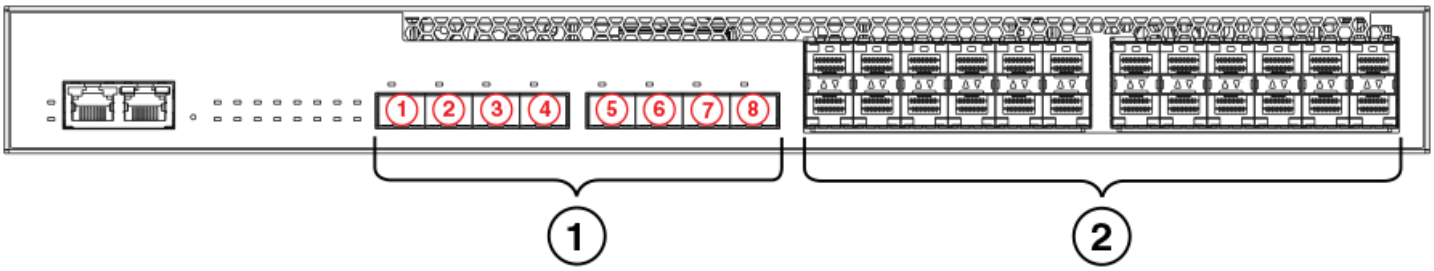
NOTE
Without a license at bootup, the SFP+ ports come up in 10 Gbps port speed in an error-disabled state. To enable the SFP+ ports to 10 Gbps port speed, you must purchase the ICX6610-10G-LIC-POD license for each ICX 6610 SFP+ port that connects to an ICX 6450 device.

Maximum number of ports you can use on an ICX 6610 to connect to ICX 6450 devices

Any one ICX 6610 supports a maximum of:

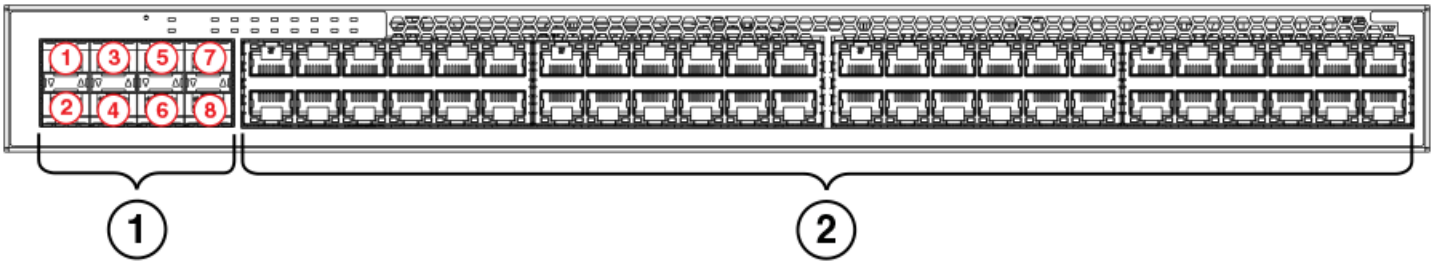
- Two trunk connections to ICX 6450 peripheral devices (four ports total).
- Two single (untrunked) port connections to ICX 6450 peripheral devices.

FIGURE 35 SFP+ ports on the front panel of the 24-port ICX 6610 model



1	Slot 3: 10 Gbps SFP+ ports 1-8	2	Slot 1: 10/100/1000 Mbps ports

FIGURE 36 SFP+ ports on the front panel of the 48-port ICX 6610 model

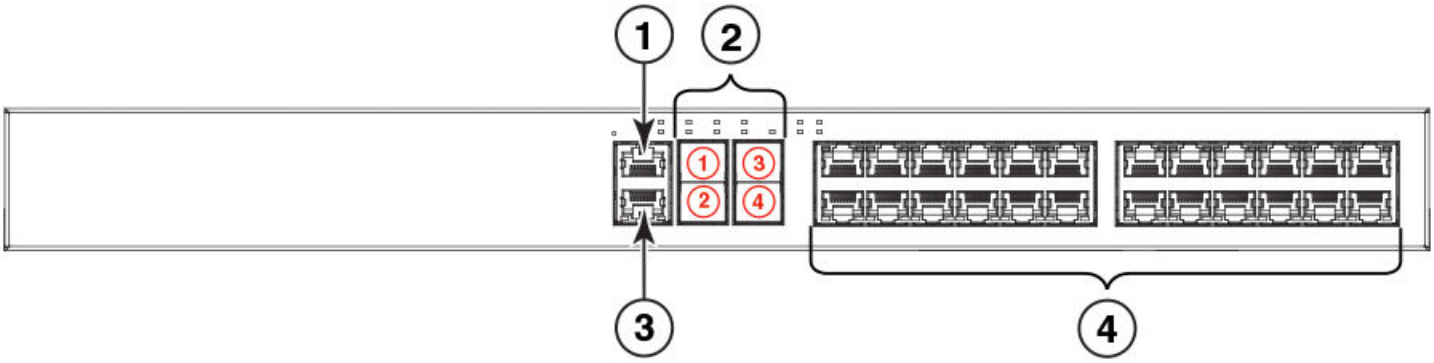


1	Slot 3: 10 Gbps SFP+ ports 1-8	2	Slot 1: 10/100/1000 Mbps ports

ICX 6450 stacking ports and trunks

The ICX 6450 contains four SFP+ ports in slot 2 on the front panel that can be used as uplink (data) ports or as stacking ports. The following figure shows the ports in slot 2. The top row consists of ports 1 and 3, and the bottom row consists of ports 2 and 4.

FIGURE 37 Stacking ports on the front panel of an ICX 6450



1. Console port
2. Slot 2 (SFP and SFP + uplink or stacking ports)
3. Out-of-band management port
4. Slot 1 (10/100/1000 Mbps ports)

Ports 1 and 3 are default stacking ports. Default stacking ports have the capability to accept special stacking packets during a CLI-initiated command sequence of the Secure-Setup utility. If ports 1 and 3 are not used as stacking ports, you can use them as data ports. Configuration is not required to use them as data ports.

All four ports in slot 2 can be used as stacking ports.

The stacking ports can be grouped into two trunks. Ports 1 and 2 can form a trunk. Ports 3 and 4 can form another trunk. By default, ICX 6450 devices are not configured for trunking.

On the ICX 6450, ports 1 and 3 are 10 Gbps ports.

> **NOTE**
> Without a license at bootup, ICX 6450 ports 2 and 4 come up in 10 Gbps port speed in an error disabled state. To enable ports 2 and 4 to 10 Gbps port speed, you must purchase the ICX6450-2X10G-LIC-POD license.

For more information about enabling ports 2 and 4 to 10 Gbps port speed, refer to the *FastIron Ethernet Switch Administration Guide*.

Trunking requirements

- You can connect one or both ports in a trunk. Connecting both ports in a trunk increases stacking bandwidth and provides resiliency.
- If you connect both ports in a trunk, both ports must connect to both ports of one trunk on another device.
- When configuring a trunk, the ports in the same column are always trunked (port 1 to port 2, port 3 to port 4). One or both of the two sets of stacking ports can be trunked (or untrunked).
- For ICX 6450 devices, all stacking ports must be configured to 10 Gbps port speed to enable trunking.

  NOTE
  If you use the Secure-Setup utility described in the *FastIron Ethernet Switch Stacking Configuration Guide* to set up a mixed stack, the stacking units (ICX 6610 devices and ICX 6450 devices) are automatically trunked.

Stacking configuration requirements

Before configuring the mixed stack, physically connect the devices using stacking cables.

Secure-Setup utility

To connect the SFP+ ports on the front of the ICX 6610 to ICX 6450 devices, configure the ports to 10 Gbps using the **speed** command as described in the Secure-Setup utility.

Refer to the *FastIron Ethernet Switch Stacking Configuration Guide* for a full description of using the Secure-Setup utility to connect the ICX 6610 in a mixed stack.

Automatic and manual configuration methods

To connect an ICX 6610 in the backbone to an ICX 6450 peripheral unit, use the **peri-port** command or **peri-trunk** command on the ICX 6610.

The ICX 6610 can be configured in a mixed stack manually, automatically, or using the Secure-Setup utility. For information on all configuration methods, refer to the *FastIron Ethernet Switch Stacking Configuration Guide*.

Stacking cables

The following table shows the cables to connect devices in a mixed stack.

TABLE 13 Cables to connect devices in a mixed stack

To connect this device	To this device	Use this cable
ICX 6610	ICX 6610	1 meter passive copper QSFP stacking cable 100 meter QSFP fiber-optic cable
ICX 6450	ICX 6450	SFP+ fiber-optic cable 10 Gbps copper stacking cable
ICX 6610	ICX 6450	SFP+ fiber-optic cable 10 Gbps copper stacking cable

Stack size

A mixed stack can contain one or two ICX 6610 devices. They form the backbone of the mixed stack. ICX 6450 devices are peripheral units. There can be one to six ICX 6450 devices in a mixed stack.

Peripheral devices can form one or more substacks. A substack is a topology that is formed by ICX 6450 devices. If ICX 6450 devices are separated by an ICX 6610 device, the ICX 6450 devices belong to different substacks.

Stacking topologies

Two basic ring topologies are supported in a mixed stack: single ring and dual ring.

In a linear stack topology, there is a connection between each switch that carries two-way communications across the stack. This connection can use one port or two ports per trunk.

In ring stack topology, there is an extra connection between the logical first and last devices to form a "ring" or "closed-loop." The closed-loop connection provides a redundant path for the stack link, so if one link fails, stack communications can be maintained.

For example, in a four-unit stack using a ring topology, unit 1 connects to unit 2, unit 2 to unit 3, unit 3 to unit 4, and unit 4 connects to unit 1.

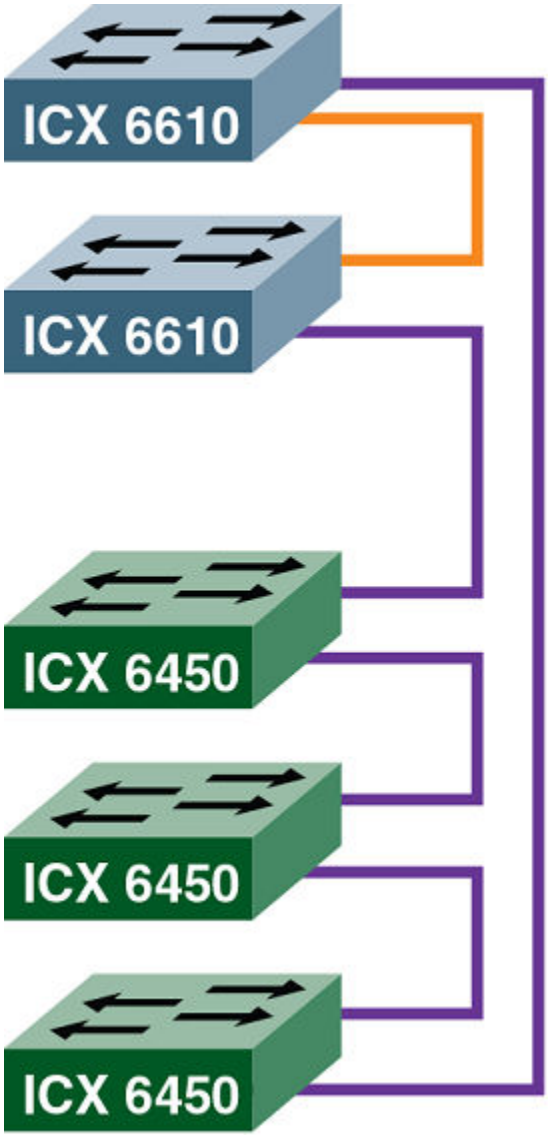
You can connect stacking units using one port per trunk or both ports in a trunk. For maximum bandwidth and link redundancy, use both ports per trunk on all stack units.

Topology 1: Single ring

In the following figure, two ICX 6610 devices form the backbone, and there are three ICX 6450 peripheral devices. There can be up to six ICX 6450 peripheral devices.

This is a single ring configuration in which the second ICX 6610 device is connected to the first ICX 6450 device, and the first ICX 6610 device is connected to the last ICX 6450 device. There is one substack that contains three peripheral devices.

FIGURE 38 Topology 1: Single ring



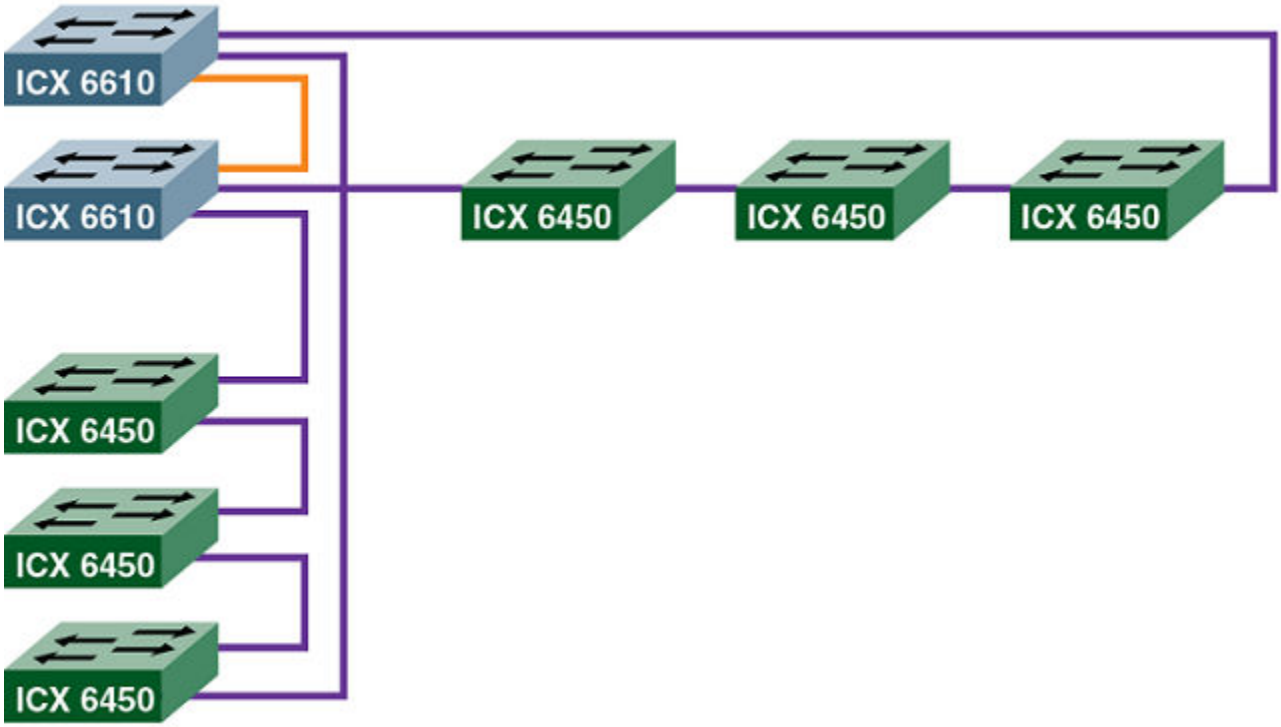
Topology 2: Dual ring

In the following figure, two ICX 6610 devices form the backbone, and there are six ICX 6450 peripheral devices in two rings. This is a dual ring configuration.

The first ICX 6610 device is connected to the last ICX 6450 device in the "vertical" ring. The backbone devices are also connected to the first and last ICX 6450 devices in the "horizontal" ring.

There are two substacks, each containing three peripheral devices.

FIGURE 39 Topology 2: Dual ring



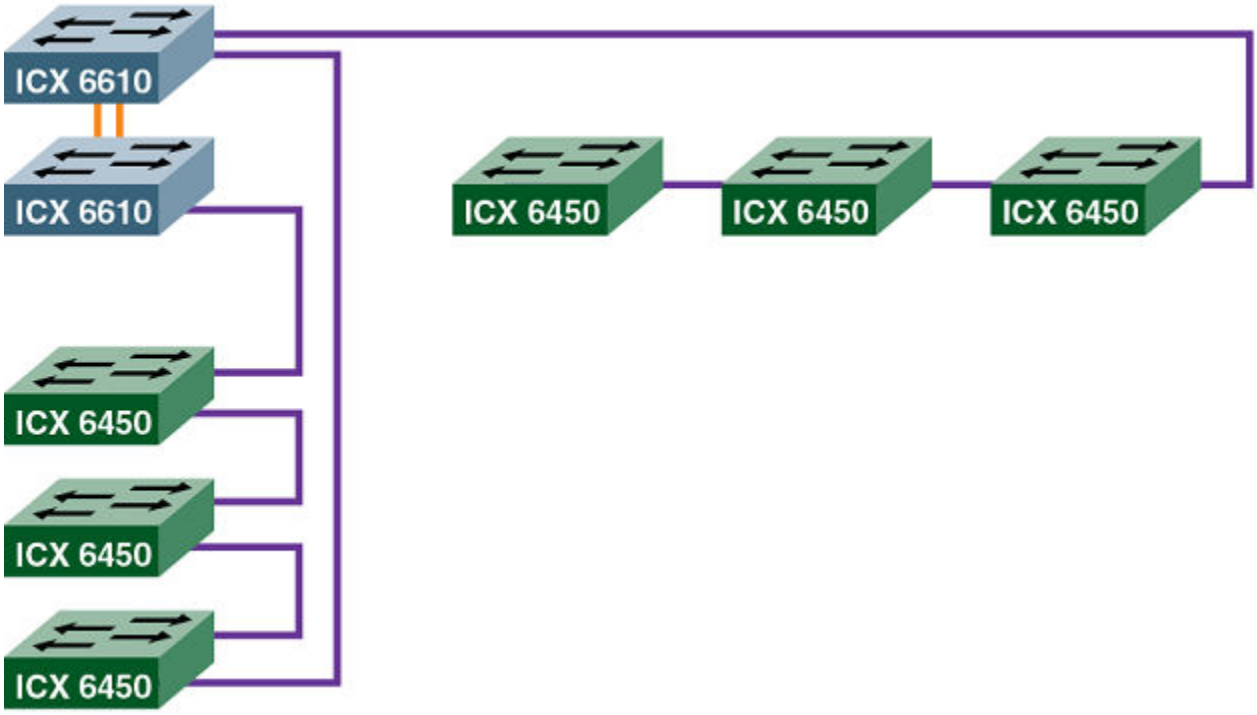
Topology 3: Linear and ring

In the following figure, two ICX 6610 devices form the backbone, and there are six ICX 6450 peripheral devices in two substacks. Each substack contains three peripheral devices.

One substack is connected to one ICX 6610 device to form a linear topology. The other substack is connected to each of the ICX 6610 devices to form a ring topology.

Topology 3 is almost identical to topology 2, except that the "horizontal" substack is not connected to the second ICX 6610 device, either by design or because the link is broken. This is still a valid topology.

FIGURE 40 Topology 3: Linear and ring

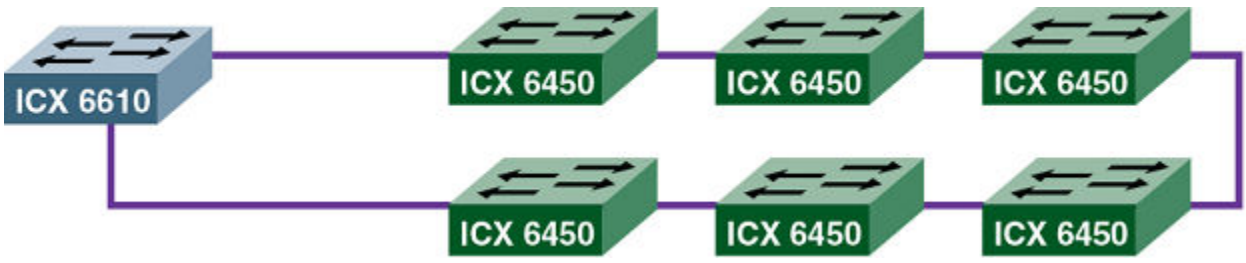


Topology 4: Ring with one backbone device

In the following figure, one ICX 6610 device forms the backbone, and there are six ICX 6450 peripheral devices in a ring topology. One substack that contains all six peripheral devices.

Topology 4 shows that you can have a mixed stack with only one ICX 6610 device, although this configuration does not provide high availability or resiliency for the stack because there is no standby controller.

FIGURE 41 Topology 4: Ring with one backbone device



Topology recommendations

Consider these factors when you implement a topology:

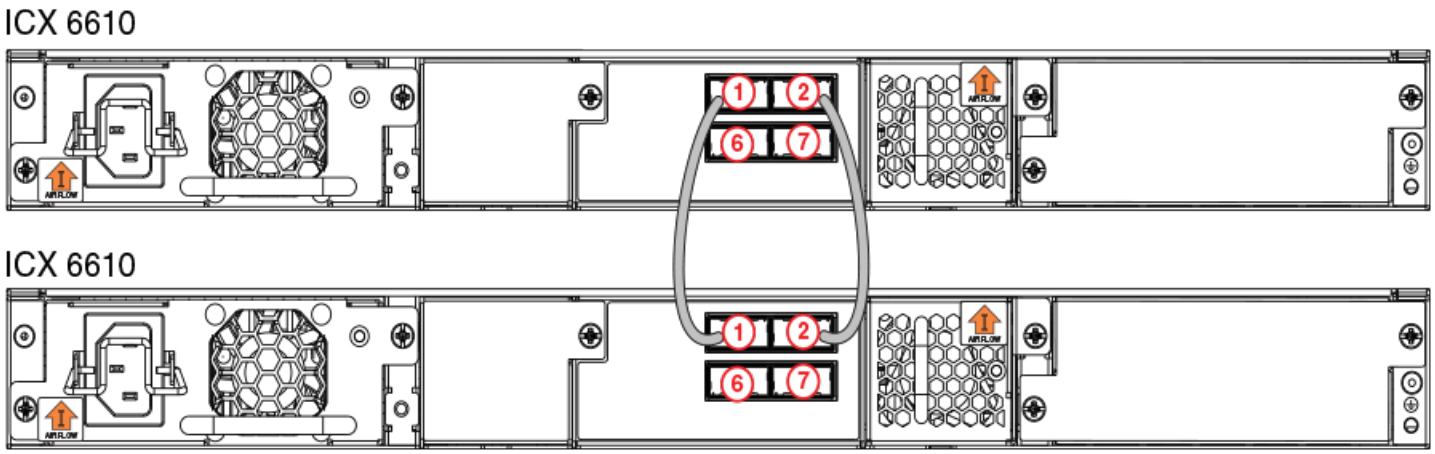
- Limit the number of VLANs with peripheral devices to reduce broadcast and multicast packets flooding to the peripheral devices.

- Broadcast and multicast packets from a VLAN are flooded to a substack if the substack has any ports in the VLAN. For this reason, you should limit (localize) VLAN association of substack ports. For example, substacks 1 and 2 have ports in VLAN 10, 11, 12, and 13. In this case, you should arrange the VLAN port association so that substack 1 ports are in VLAN 10, 11, and 12, and substack 2 ports are in VLAN 12 and 13. Such an arrangement avoids flooding packets in VLAN 13 to substack 1, and also avoids flooding packets in VLAN 10 and 11 to substack 2.
- A ring is a more resilient topology than a linear topology.
- If there are two backbone devices, link substacks to both backbone devices.
- To prevent traffic congestion and avoid potential latency issues, keep substacks small, especially in linear topologies.

Connecting ICX 6610 devices in the backbone

The following figure shows how to connect ICX 6610 devices in a mixed stack backbone using both ports (ports 1 and 2) in trunk 0 of each ICX 6610 device. Ports 1 and 2 in the top device connect to ports 1 and 2 in the bottom device, respectively.

FIGURE 42 Connecting ICX 6610 devices in the backbone



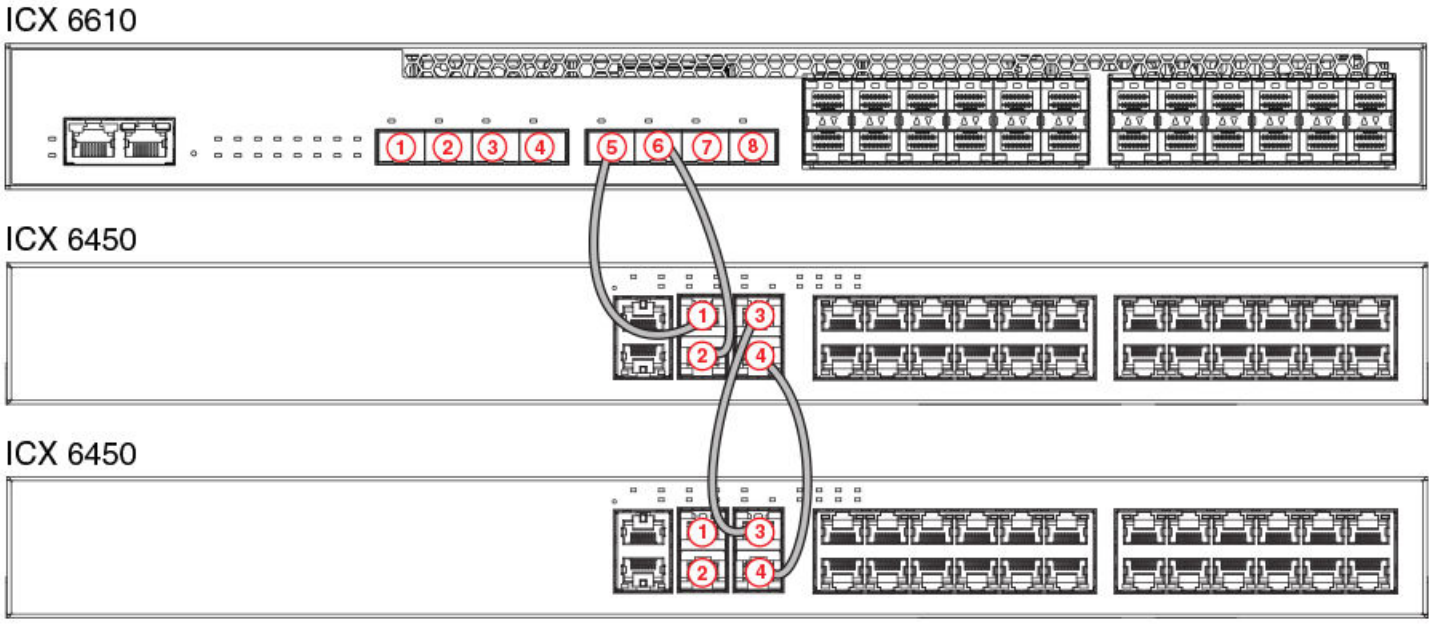
Connecting a peripheral device to an ICX 6610 and to another peripheral device

The following figure shows how to connect an ICX 6610 in the backbone to an ICX 6450 peripheral device. It also shows how to connect two ICX 6450 peripheral devices to each other. Both ports in each ICX 6450 trunk are used.

One trunk (ports 1 and 2) in the middle ICX 6450 device is used for the upstream link to the ICX 6610. The other trunk (ports 3 and 4) in the middle ICX 6450 is used for the downstream link to the second ICX 6450.

The set of ports or the trunk on an ICX 6610 that connects to a peripheral device are called peripheral ports or a peripheral trunk because they link to ICX 6450 peripheral devices. The first port in a peripheral trunk on a backbone device and the first port in a stack trunk on a peripheral device must be an odd-numbered port, for example, 1/3/1 or 3/2/1.

FIGURE 43 Connecting a peripheral device to an ICX 6610 and to another peripheral device



Extended distance stacking

Extended distance stacking allows stacking of devices in a distributed network environment. You can form a stack of co-located devices or devices located over an extended distance to form a distributed stack. Extended distance stacking provides resiliency, scalability, and ease of management whether the location of switches is in the same equipment rack or distributed across a network.

To set up extended distance stacking, use fiber-optic cables to connect the devices in a stack. Contact your Brocade representative for information about supported fiber-optic cables and distances.

Attaching a PC or terminal

To assign an IP address, you must have access to the command line interface (CLI). The CLI is a text-based interface that can be accessed through a direct serial connection to the device and through Telnet connections or SSH sessions.

Access the CLI by connecting to the console port. After you assign an IP address, you can access the system through Telnet or SSH, the Web management interface, or Brocade Network Advisor.

Complete the following steps to attach a management station to the console port:

1. Connect a PC or terminal to the console (RJ-45 serial port) of the device.

   To connect the console port to a DB-9 port, you need an RJ-45 to DB-9 adapter.

   For information about locating the serial port, refer to the section Management interfaces on page 14.

   The serial port has an RJ-45 connector. For port pinout information, refer to the section Serial port specifications (pinout RJ-45) on page 88.

   NOTE
   You need to run a terminal emulation program on the PC.

2. Launch the terminal emulation program and set the following session parameters:
   - Baud: 9600 bps
   - Data bits: 8
   - Parity: None
   - Stop bits: 1
   - Flow control: None

   The console serial communication port serves as a connection point for management by a PC or SNMP workstation.

Powering on the system

Complete the physical installation before you power on the system.

1. NOTE
   The socket should be installed near the equipment and should be easily accessible.

   Remove the power cable from the shipping container.
2. Attach the power cable to the power connector.
3. Insert the power cable plug into a 100V-240VAC outlet if your unit uses AC power or a 40-70VDC outlet if your unit uses DC power.

   NOTE
   To turn the system off, simply unplug the power cable or cables.

Power supplies for the Brocade ICX 6610

Each ICX 6610 ships by default with one alternating current (AC) power supply. A second power supply can be added. The ICX 6610 can also be ordered with direct current (DC) power supplies.

NOTE
AC and DC power supplies cannot be installed and used in the same device. Mismatched power supplies in the same device cause continual reboot on power up.

If a second power supply is installed and does not match the primary power supply, it will not be operational.

Installing and replacing a power supply unit

NOTE
Power supplies can be hot swapped with the following precautions.

CAUTION
Remove the power cord from a power supply before you install it in or remove it from the device. Otherwise, the power supply or the device could be damaged as a result. (The device can be running while a power supply is being installed or removed, but the power supply itself should not be connected to a power source.)

CAUTION

Ensure that the airflow direction of the power supply unit matches that of the installed fan tray. The power supplies and fan trays are clearly labeled with either a green arrow with an "E", or an orange arrow with an "I."

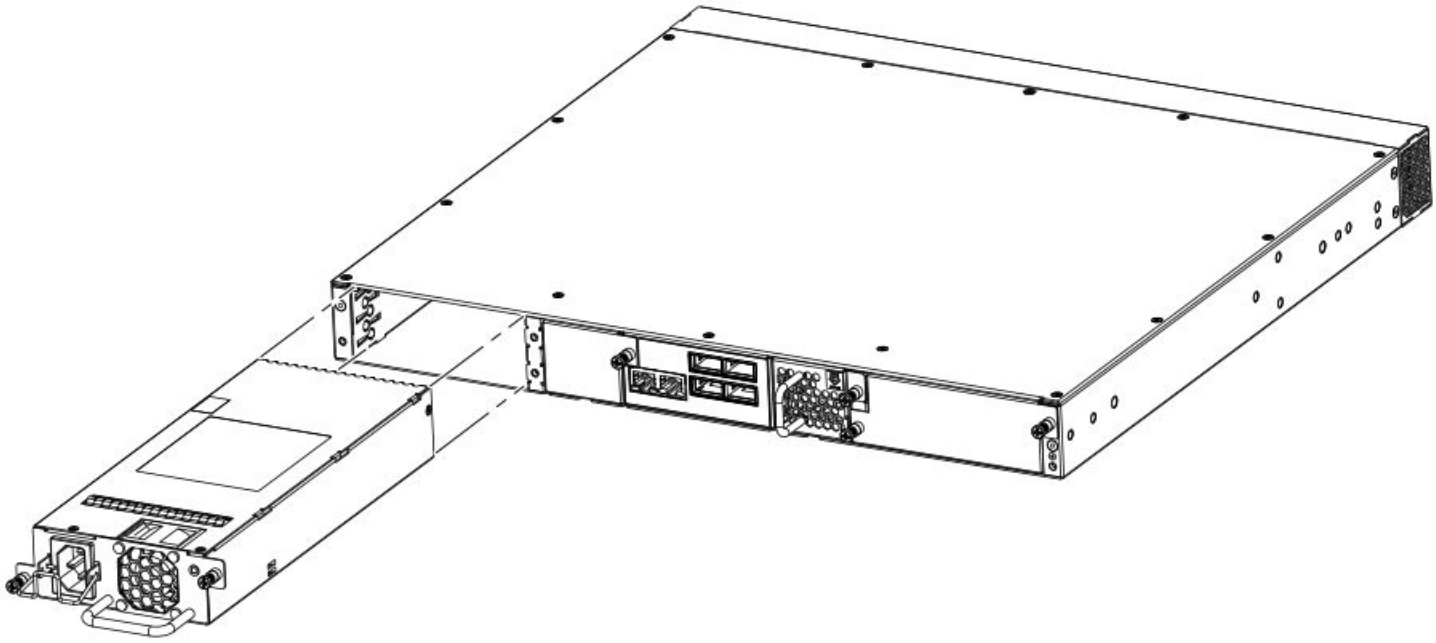
You can run the device with one or two power supply units installed. If you install a second power supply, it is recommended to install a second fan tray also.

Installing an AC power supply

You need a #2 Phillips screwdriver and a flat-head screwdriver for installation.

Brocade recommends using an ESD wrist strap during installation.

FIGURE 44 Installing an AC power supply unit



Use the following steps to install an AC power supply in the switch.

1. If replacing a power supply, remove the previously installed power supply from the appropriate slot by removing the two screws with a flat-head screwdriver.
2. If installing a new power supply into a slot covered with a filler panel:
   a) Using a Phillips screwdriver, unscrew the screws on the filler panel.
   b) Remove the filler panel.
3. Before opening the package that contains the power supply, touch the bag to the switch casing to discharge any potential static electricity.
4. Remove the power supply from the anti-static shielded bag.
5. Holding the power supply level, guide it into the carrier rails on each side and gently push it all the way into the slot, ensuring that it firmly engages with the connector.

6. When you are sure the power supply has properly engaged the connector, tighten the retainer screws to secure the power supply in the slot.

When the device is powered on, the AC or DC LEDs on the power supply back panel should light green to confirm that the power supply is correctly installed and supplying power.

You can also verify correct installation by running the **show chassis** command, as shown in this example:

```
Device#show chassis
The stack unit 1 chassis info:

Power supply 1 (AC - Regular) present, status ok
Model Number: 23-0000144-01
Serial Number: 028
Firmware Ver: A
Power supply 1 Fan Air Flow Direction: Front to Back
Power supply 2 not present
Fan 1 ok, speed (auto): [[1]]<->2
Fan 2 ok, speed (auto): [[1]]<->2

Fan controlled temperature: 37.5 deg-C

Fan speed switching temperature thresholds:
Speed 1: NM<----->70 deg-C
Speed 2: 65<-----> 85 deg-C (shutdown)

Fan 1 Air Flow Direction: Front to Back
Fan 2 Air Flow Direction: Front to Back
MAC-Back Temperature Readings:
Current temperature : 37.5 deg-C
MAC-Left Temperature Readings:
Current temperature : 34.0 deg-C
MAC-Right Temperature Readings:
Current temperature : 33.0 deg-C
MAC-Front Temperature Readings:
Current temperature : 33.0 deg-C
CPU Temperature Readings:
Current temperature : 37.5 deg-C
Center Temperature Readings:
Current temperature : 30.5 deg-C
sensor A Temperature Readings:
Current temperature : 37.5 deg-C
sensor B Temperature Readings:
Current temperature : 31.0 deg-C
sensor C Temperature Readings:
Current temperature : 34.5 deg-C
sensor D Temperature Readings:
Current temperature : 30.5 deg-C
Warning level.......: 45.0 deg-C
Shutdown level......: 85.0 deg-C
Boot Prom MAC : 748e.f893.eabe
Management MAC: 748e.f893.eabe
```

CAUTION

If you do not install a module or a power supply in a slot, you must keep the slot filler panel in place. If you run the chassis with an uncovered slot, the system will overheat.

Installing a DC power supply

CAUTION

For the DC input circuit to the system, make sure there is a 20 Amp circuit breaker, minimum 60 VDC, double pole, on the input terminal block to the power supply. The input wiring for connection to the product should be copper wire, 12 AWG, marked VW-1, and rated minimum 90°C.

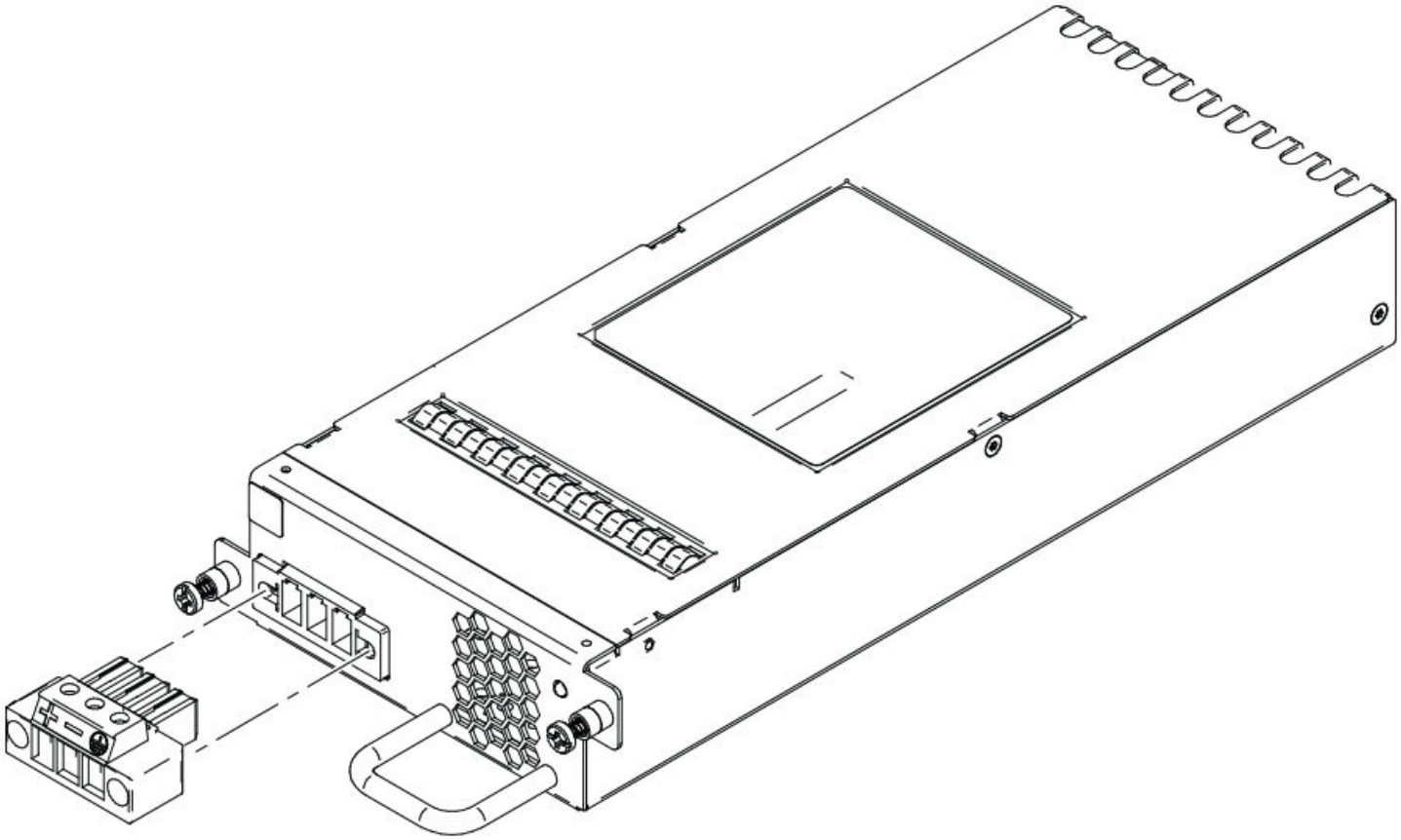
CAUTION

For a DC system, use grounding wire of at least 12 American Wire Gauge (AWG). The grounding wire should be attached to the DC input connector the other end connects to the building ground.

NOTE

AC and DC power supplies cannot be installed and used in the same device. Mismatched power supplies in the same device cause continual reboot on power up.

FIGURE 45 DC power supply unit



You need a #2 Phillips screwdriver and a flat-head screwdriver for installation.

Brocade recommends using an ESD wrist strap during installation.

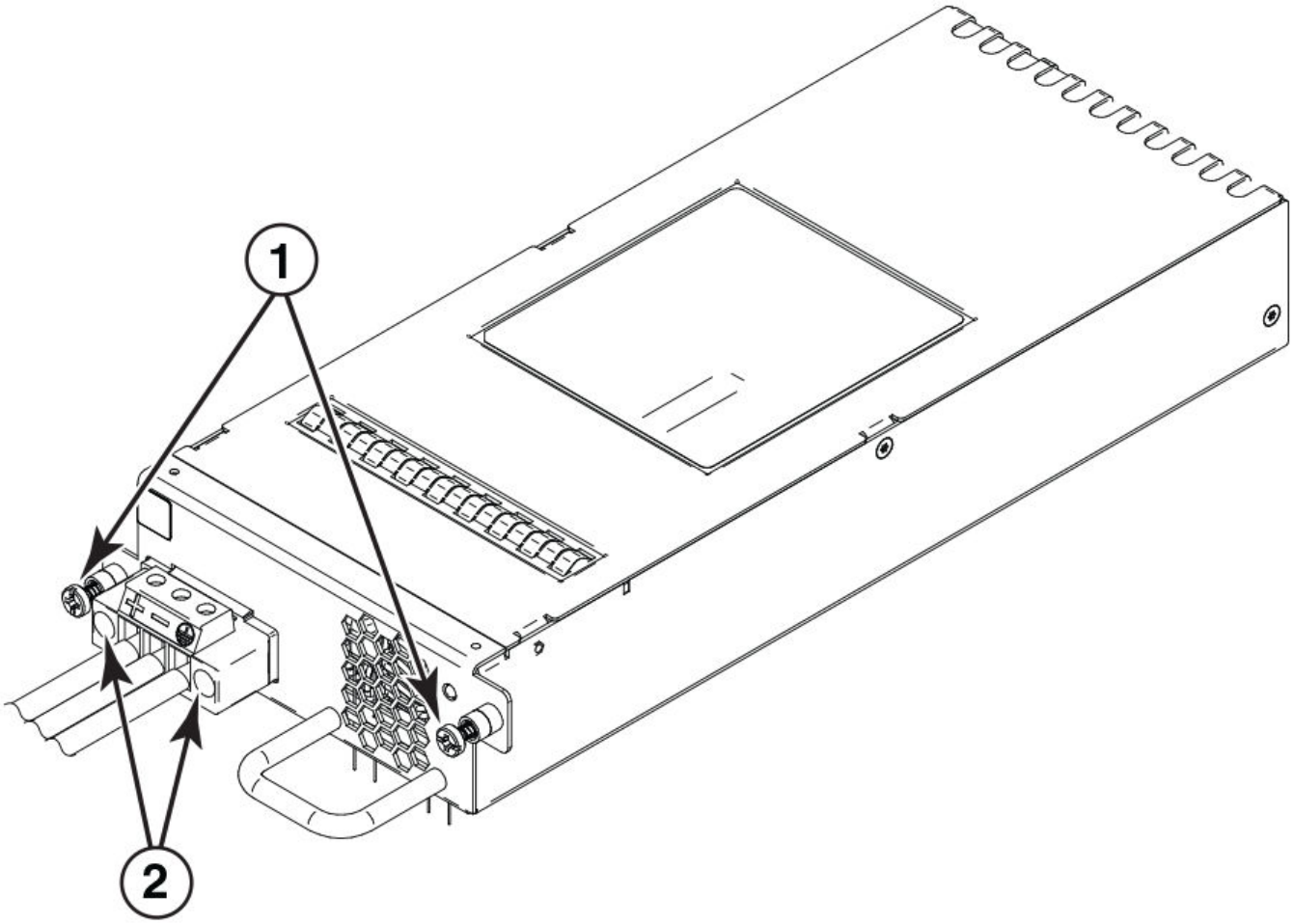
DANGER

For safety reasons, the ESD wrist strap should contain a series 1 megaohm resistor.

1. Ensure the power on the DC power supply is switched off.

2. Remove the previously installed power supply from the appropriate slot by removing the chassis attachment screws located in the upper right and lower left of the power supply unit using a flat-head screwdriver.

FIGURE 46 DC power supply screws

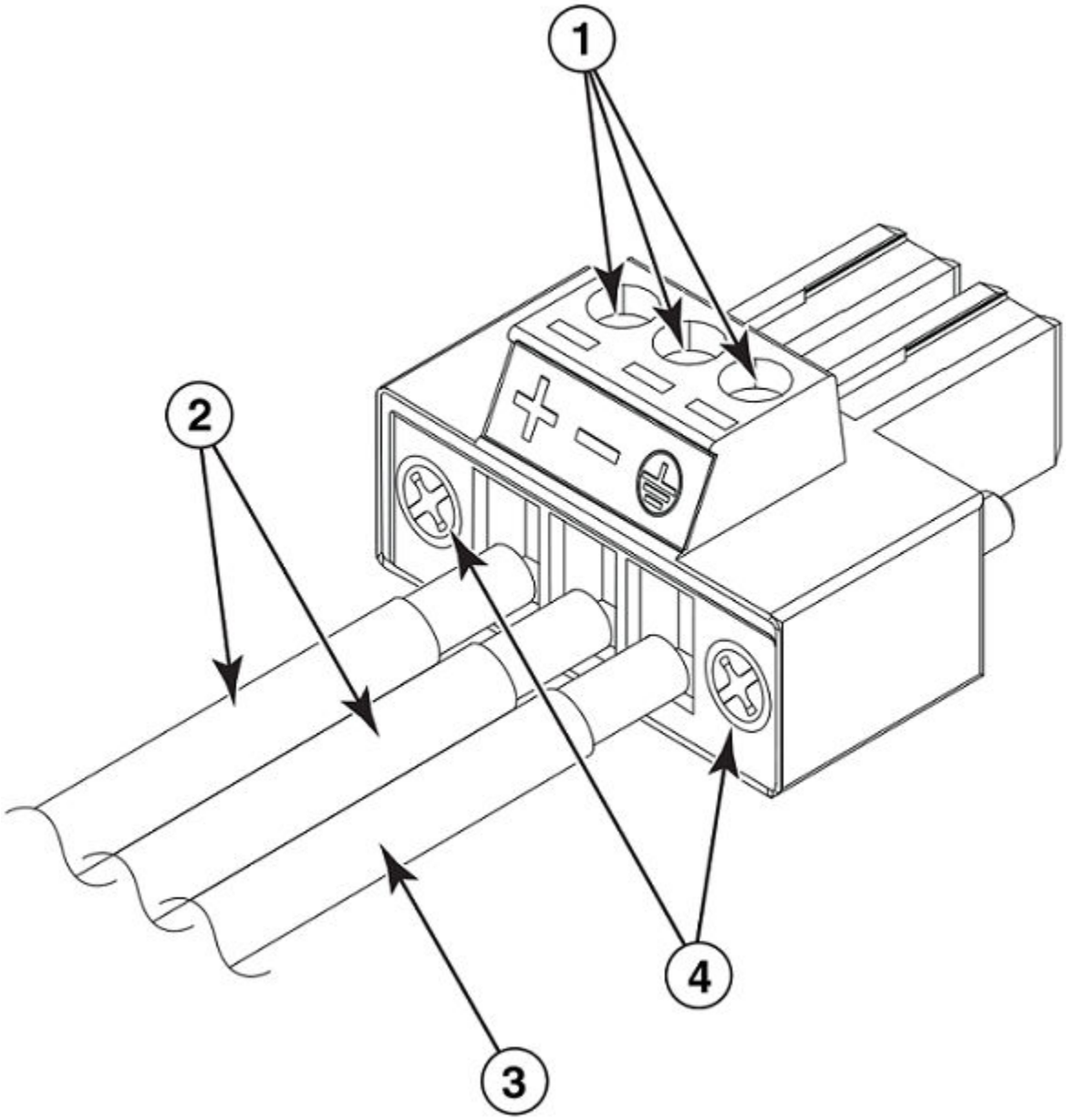


1 Chassis attachment screws
2 Assembly screws

3. Before opening the package that contains the DC power supply, touch the bag to the switch casing to discharge any potential static electricity.
4. Remove the DC power supply from the anti-static shielded bag.

5. Insert the DC power supply source wires into the DC wiring assembly, matching the terminals.

FIGURE 47 DC power supply wiring assembly



1 Wire tightening screws
2 DC power source wires
3 Earth ground wire
4 Assembly screws

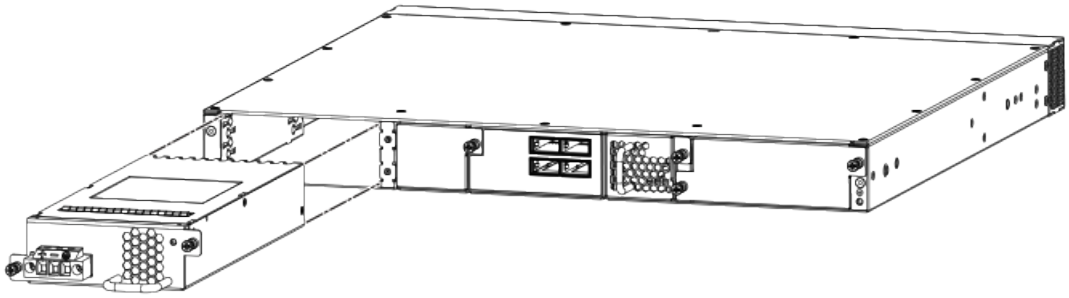
6. Use the wire tightening screws to secure the wires.

7. Insert the earth ground wire into the ground terminal on the DC wiring assembly.

   NOTE
   This equipment installation must meet NEC/CEC Code requirements. Consult local authorities for regulations.

8. Insert the DC power supply wiring assembly with the wires connected into the power supply and tighten the assembly screws.
9. Using the handle on the power supply, hold the power supply level and guide it into the carrier rails on each side of the power supply slot. Gently push the power supply all the way into the slot, ensuring that it firmly engages with the connector.

   FIGURE 48 Installing a DC power supply unit



10. When you are sure the power supply has properly engaged the connector, tighten the chassis attachment screws to secure the power supply in the slot.

When the device is powered on, the power LED on the device should turn green to confirm that the power supply is correctly installed and supplying power.

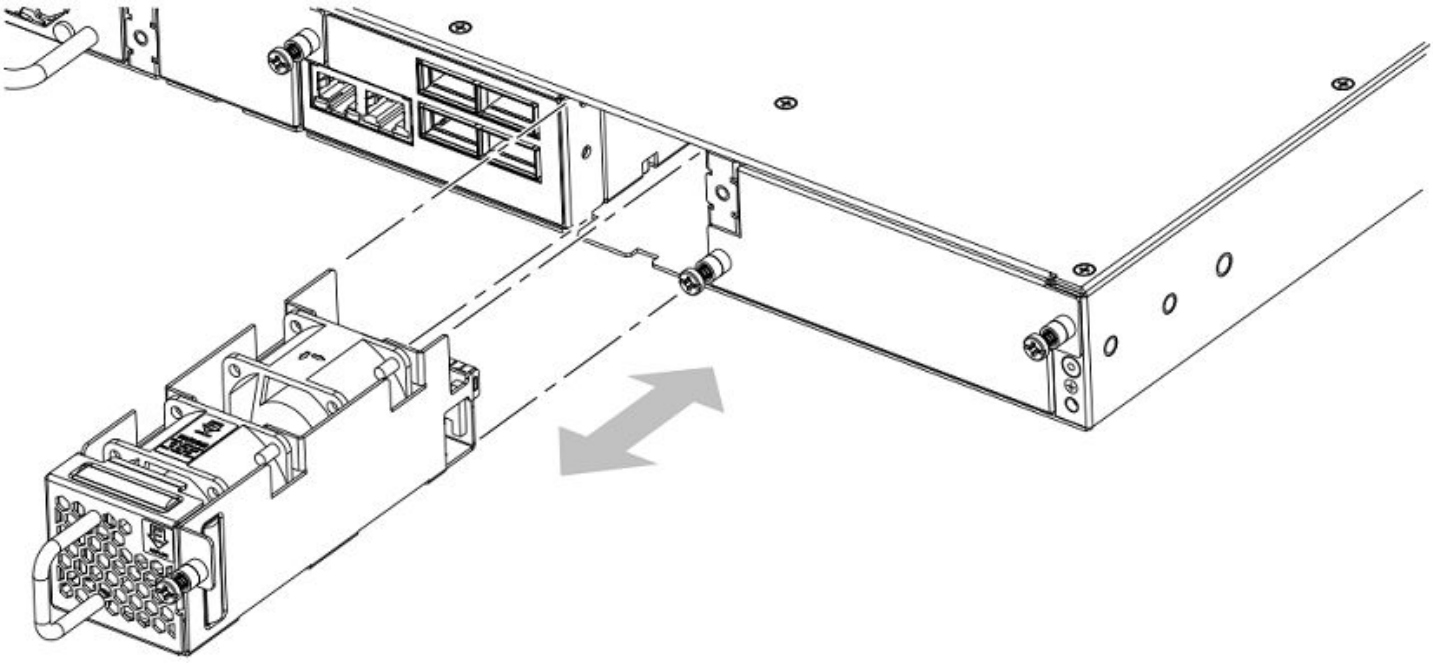
CAUTION
If you do not install a module or a power supply in a slot, you must keep the slot filler panel in place. If you run the chassis with an uncovered slot, the system will overheat.

Installing or replacing fan trays

CAUTION
Ensure that the airflow direction of the power supply unit matches that of the installed fan tray. The power supplies and fan trays are clearly labeled with either a green arrow with an "E", or an orange arrow with an "I."

You can run the device with one or two fan trays installed. If you install a second power supply, it is recommended that you install a second fan tray.

FIGURE 49 Installing a fan tray on an ICX 6610 (1000W)



Perform the following steps to install a fan tray in the switch.

NOTE
It is recommended that you wear an ESD wrist strap during installation.

DANGER
For safety reasons, the ESD wrist strap should contain a series 1 megaohm resistor.

1. Remove the installed fan tray from the slot by removing the retaining screw with a Phillips screwdriver.
2. Before opening the package that contains the new fan tray, touch the bag to the switch casing to discharge any potential static electricity.
3. Remove the fan tray from the anti-static shielded bag.
4. Holding the fan tray level, guide it into the carrier rails on each side and gently push it all the way into the slot, ensuring that it firmly engages with the connector.
5. When you are sure the fan tray has properly engaged the connector, tighten the retainer screw to secure the fan tray in the slot.

NOTE
The fans are controlled automatically by the device.

Checking Network Devices and Testing Connectivity

DANGER

The procedures in this manual are for qualified service personnel.

Assigning permanent passwords

By default, the CLI is not protected by passwords. To secure CLI access, Brocade strongly recommends assigning passwords. Refer to the *FastIron Ethernet Switch Administration Guide*.

NOTE

You can assign passwords using Brocade Network Advisor if an enable password for a Super User has been configured on the device.

The CLI contains the following access levels:

- User EXEC - The level you enter when you first start a CLI session. At this level, you can view some system information, but you cannot configure system or port parameters.
- Privileged EXEC - This level is also called the Enable level and can be secured by a password. You can perform tasks such as managing files on the flash module, saving the system configuration to flash, and clearing caches at this level.
- CONFIG - The configuration level. This level lets you configure the system IP address and configure switching and routing features. To access the CONFIG mode, you must already be logged in to the Privileged EXEC level.

You can set the following levels of Enable passwords:

- Super User - Allows complete read-and-write access to the system. This is generally for system administrators and is the only password level that allows you to configure passwords.

  NOTE

  You must set a Super User password before you can set other types of passwords.

- Port Configuration - Allows read-and-write access for specific ports but not for global (system-wide) parameters.
- Read Only - Allows access to the Privileged EXEC mode and CONFIG mode but only with read access.

Setting passwords

Perform the following steps to set passwords.

1. At the opening CLI prompt, enter the following command to change to the Privileged level of the EXEC mode:

```
device> enable
```

2. Access the CONFIG mode of the CLI by entering the following command:

```
device# configure terminal
device(config)#
```

3. Enter the following command to set the Super User password:

```
device(config)# enable super-user-password text
```

NOTE
You must set the Super User password before you can set other types of passwords.

4. Enter the following commands to set the port configuration and read-only passwords:

```
device(config)# enable port-config-password text
device(config)# enable read-only-password text
```

NOTE
If you forget your Super User password, refer to the task Recovering from a lost password on page 64.

Syntax: enable { **super-user-password** | **read-only-password** | **port-config-password**} *text*

Passwords can be up to 32 characters long.

Recovering from a lost password

By default, the CLI does not require passwords. However, if a password has been configured for the device, but the password has been lost, you can regain Super User access to the device using the following procedure.

NOTE
Recovery from a lost password requires direct access to the serial port and a system reset.

Use the following procedure to recover from a lost password.

1. Start a CLI session over the serial interface to the Brocade device.
2. Reboot the device.
3. While the system is booting, before the initial system prompt appears, enter **b** to enter the boot monitor mode.
4. Enter **no password** at the prompt. (You cannot abbreviate this command.)
5. Enter **boot system flash primary** at the prompt. This command causes the device to bypass the system password check.
6. After the console prompt reappears, assign a new password.

Configuring IP addresses

You must configure at least one IP address using the serial connection to the CLI before you can manage the system using the other management interfaces.

Brocade devices support both classical IP network masks (Class A, B, and C subnet masks, and so on) and Classless Interdomain Routing (CIDR) network prefix masks.

- To enter a classical IP network mask, enter the mask in IP address format. For example, enter 10.157.22.99 255.255.255.0 for an IP address with a Class C subnet mask.
- To enter a prefix number for a network mask, enter a forward slash (/) and the number of bits in the mask immediately after the IP address. For example, enter 10.157.22.99 /24 for an IP address that has a network mask with 24 significant ("mask") bits.

By default, the CLI displays network masks in classical IP address format (for example, 255.255.255.0). You can change the display to the prefix format.

Devices running Layer 2 software

Use the following procedure to configure an IP address on a device running Layer 2 software.

1. At the opening CLI prompt, enter **enable**.

```
device> enable
```

2. Enter the following command at the Privileged EXEC level, and then press **Enter**. This command erases the factory test configuration if it is still present:

```
device# erase startup-config
```

CAUTION

Use the erase startup-config command only for new systems. If you enter this command on a system you have already configured, the command erases the configuration. If you accidentally do erase the configuration on a configured system, enter the write memory command to save the running configuration to the startup-config file.

3. Access the global configuration level of the CLI by entering the following command:

```
device# configure terminal
device(config)#
```

4. Configure the IP address and mask for the switch.

```
device(config)# ip address 10.22.3.44 255.255.255.0
```

5. Set a default gateway address for the switch.

```
device(config)# ip default-gateway 10.22.3.1
```

NOTE

You do not need to assign a default gateway address for single subnet networks.

Syntax: enable [*password*]

Syntax: configure terminal

Syntax: [no] ip address { *ip-addr ip-mask* | *ip-addr*/*mask-bits* }

Syntax: [no] ip default-gateway *ip-addr*

Devices running Layer 3 software

Before attaching equipment to an ICX 6610, you must assign an interface IP address to the subnet on which the device will be located. You must use the serial connection to assign the first IP address. For subsequent addresses, you also can use the CLI through Telnet or SSH.

By default, you can configure up to 24 IP interfaces on each port, virtual interface, and loopback interface. You can increase this amount to up to 64 IP subnet addresses per port by increasing the size of the subnet-per-interface table.

The following procedure shows how to add an IP address and mask to a router port.

1. At the opening CLI prompt, enter **enable**.

```
device> enable
```

2. Enter the following command at the CLI Privileged EXEC level prompt, and then press **Enter**. This command erases the factory test configuration if still present:

```
device# erase startup-config
```

CAUTION

Use the erase startup-config command only for new systems. If you enter this command on a system you have already configured, the command erases the configuration. If you accidentally do erase the configuration on a configured system, enter the write memory command to save the running configuration to the startup-config file.

3. Access the global configuration level of the CLI by entering the following command:

```
device# configure terminal
device(config)#
```

4. Configure the IP addresses and mask addresses for the interfaces on the router.

```
device(config)# interface ethernet 1/1/2
device(config-if-e1000-1/1/2)# ip address 10.22.3.44 255.255.255.0
```

NOTE

You can use the command **ip address** *ip-addr*/*mask-bits* if you know the subnet mask length. In the previous example, you could enter **ip address 10.22.3.44/24**.

Syntax: [no] ip address [*ip-addr ip-mask* [**secondary**] | *ip-addr*/*mask-bits* [**secondary**]]

Use the **secondary** parameter if you have already configured an IP address within the same subnet on the interface.

Configuring IP parameters for devices running Layer 3 software

This section describes how to configure IP parameters for devices running Layer 3 software.

Configuring IP addresses

You can configure an IP address on the following types of Layer 3 switch interfaces:

- Ethernet port
- Virtual routing interface (also called a Virtual Ethernet or "VE")
- Loopback interface

By default, you can have up to 24 IP addresses on each interface, but you can increase this number to 128 IP addresses.

NOTE

Once you configure a virtual routing interface on a VLAN, you cannot configure Layer 3 interface parameters on individual ports in the VLAN. Instead, you must configure the parameters on the virtual routing interface itself.

Assigning an IP address to an Ethernet port

Enter the following commands to assign an IP address to port 1/1/1.

```
device(config)# interface ethernet 1/1/1
device(config-if-1/1/1)# ip address 10.45.6.1 255.255.255.0
```

You also can enter the IP address and mask in CIDR format, as follows:

```
device(config-if-1/1/1)# ip address 10.45.6.1/24
```

Syntax: [no] ip address [*ip-addr* | *ip-mask*]

or

Syntax: [no] ip address [*ip-addr*/*mask-bits*]

Assigning an IP address to a loopback interface

Loopback interfaces are always up, regardless of the states of physical interfaces. They can add stability to the network because they are not subject to route flap problems that can occur due to unstable links between a Layer 3 device and other devices. You can configure up to four loopback interfaces on a Layer 3 device.

You can add up to 24 IP addresses to each loopback interface.

> NOTE
> If you configure the device to use a loopback interface to communicate with a BGP4 neighbor, you must also configure a loopback interface on the neighbor and configure the neighbor to use that loopback interface to communicate with the Brocade device.

To add a loopback interface, enter commands such as those shown in the following example:

```
device(config)# exit
device(config)# interface loopback 1
device(config-lbif-1)# ip address 10.0.0.1/24
```

Syntax: interface loopback *num*

The *num* parameter specifies the virtual interface number. You can specify from 1 through the maximum number of virtual interfaces supported on the device. To display the maximum number of virtual interfaces supported on the device, enter the **show default values** command.

Assigning an IP address to a virtual routing interface

A virtual interface is a logical port associated with a Layer 3 Virtual LAN (VLAN) configured on a Layer 3 device. You can configure routing parameters on the virtual interface to enable the Layer 3 device to route protocol traffic from one Layer 3 VLAN to the other, without using an external router.

> NOTE
> The device uses the lowest MAC address on the device (the MAC address of port 1 or 1/1/1) as the MAC address for all ports within all virtual interfaces you configure on the device.

Enter commands similar to the following to add a virtual interface to a VLAN and configure an IP address on the interface.

```
device(config)# vlan 2 name IP-Subnet_10.1.2.1/24
device(config-vlan-2)# untag 1/1/1 to 1/1/4
device(config-vlan-2)# router-interface ve1
device(config-vlan-2)# interface ve1
device(config-vif-1)# ip address 10.1.2.1/24
```

The first two commands in this example create a Layer 3 protocol-based VLAN name "IP-Subnet_10.1.2.1/24" and add a range of untagged ports to the VLAN. The **router-interface** command creates virtual interface 1 as the routing interface for the VLAN. The last two commands change to the interface configuration level for the virtual interface and assign an IP address to the interface.

Syntax: router-interface ve *num*

Syntax: interface ve *num*

Deleting an IP address

Enter a command similar to the following to delete an IP address.

```
device(config-if-1/1/1)# no ip address 10.1.2.1
```

This command deletes IP address 10.1.2.1. You do not need to enter the subnet mask.

To delete all IP addresses from an interface, enter the following command:

```
device(config-if-1/1/1)# no ip address *
```

Syntax: [no] ip address [*ip-addr* | *]

Connecting network devices

Brocade devices support connections to other vendors' routers, switches, and hubs, as well other Brocade devices.

Connectors

For port pinouts, refer to the section "Pinouts and signalling" in the Hardware Specifications chapter.

Cables

Refer to the section Cabling infrastructure on page 28 for cable lengths and types.

Connecting to Ethernet or Fast Ethernet hubs

For copper connections to Ethernet hubs, a 10/100Base-TX or 1000Base-T switch, or another Brocade device, a crossover cable is required. If the hub is equipped with an uplink port, it requires a straight-through cable instead of a crossover cable.

> NOTE
> The 802.3ab standard (automatic MDI or MDIX detection) calls for automatic negotiation of the connection between two 1000Base-T ports. In this case, a straight-through cable may work just as well as a crossover cable. For more information about this feature, refer to the *FastIron Ethernet Switch Security Configuration Guide*.

FIGURE 50 Crossover cable

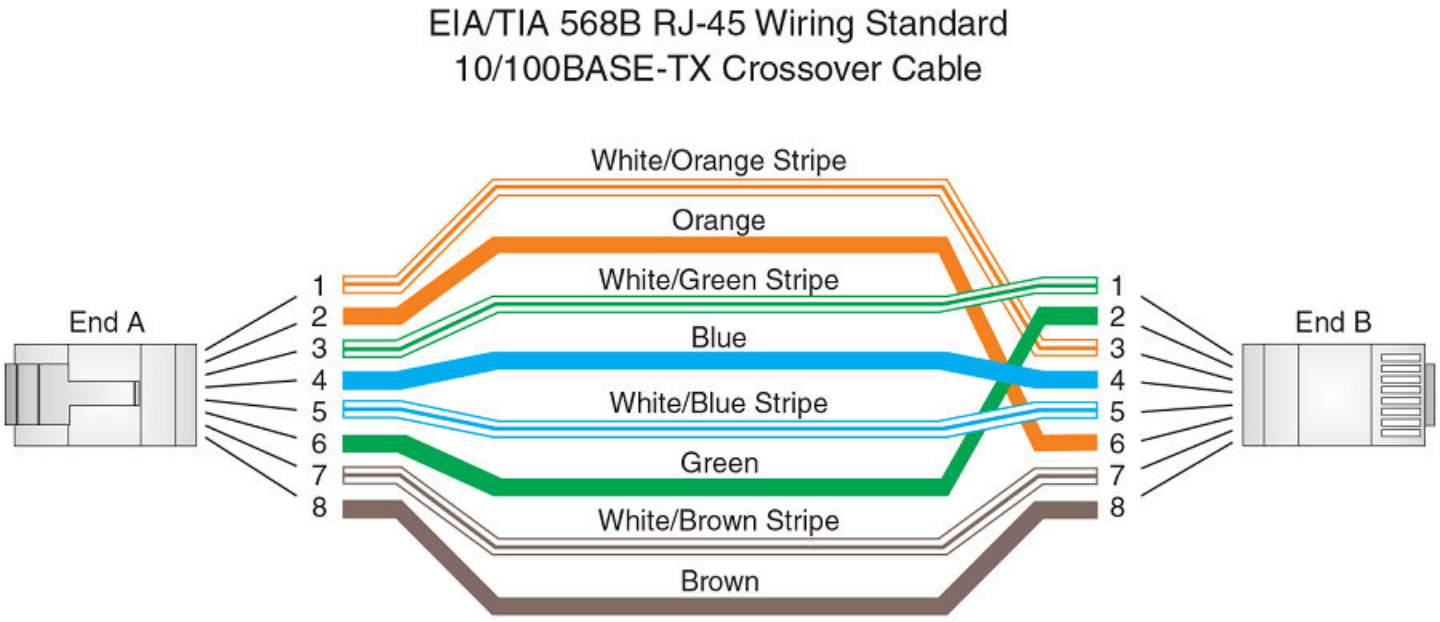
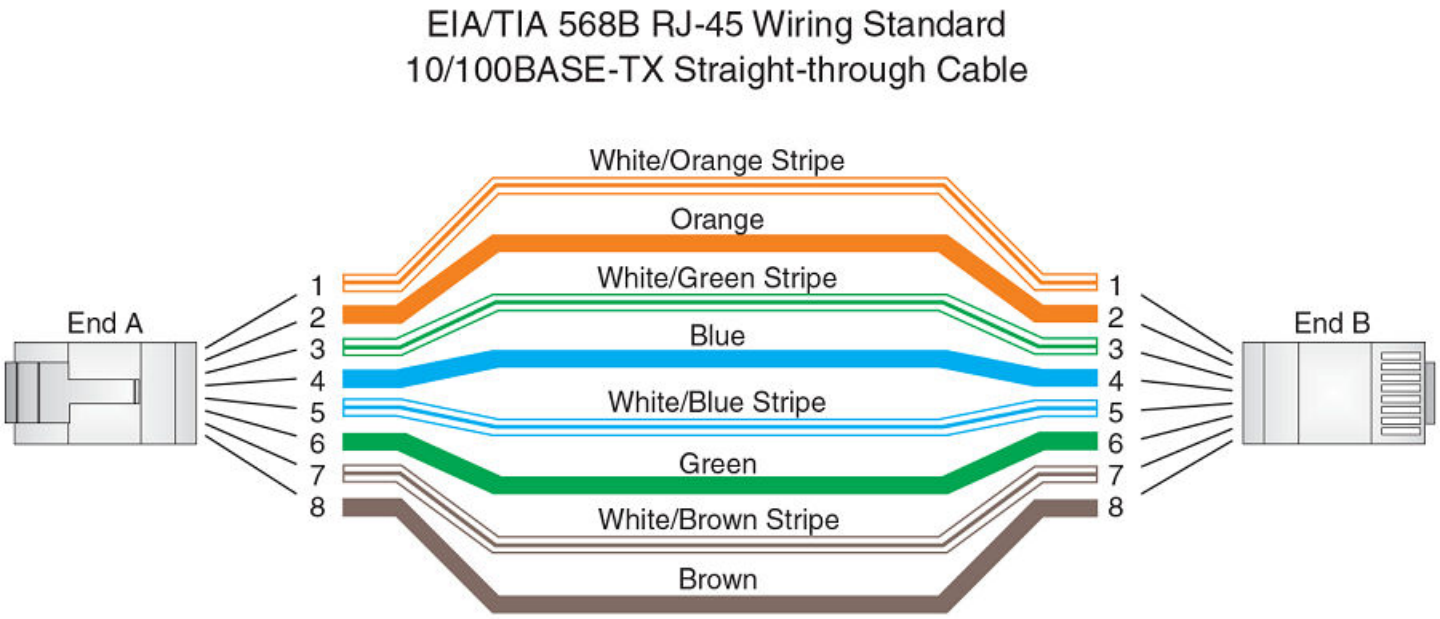


FIGURE 51 UTP straight-through cable



Connecting to workstations, servers, or routers

Straight-through UTP cabling is required for direct UTP attachment to workstations, servers, or routers using network interface cards (NICs).

Fiber cabling is required for direct attachment to Gigabit NICs or switches and routers through fiber ports. Refer to the section Connecting a network device to a fiber port on page 70.

Automatic MDI or MDIX detection

All 10/100 and 1,000 bps Ethernet copper ports on the devices support automatic Media Dependent Interface (MDI) and Media Dependent Interface Crossover (MDIX) detection. This feature is enabled on all 10/100 and 1,000 bps copper ports by default. For each port, you can disable auto-MDI or MDIX, designate the port as an MDI port, or designate the port as an MDIX port.

For more information about this feature and how configure it, refer to the *FastIron Ethernet Switch Security Configuration Guide*.

Connecting a network device to a fiber port

For direct attachment from the device to a Gigabit NIC, switch, or router using a fiber-optic transceiver, you will need fiber cabling with an LC connector.

To connect the device to another network device using a fiber port, you must perform the following tasks:

- Install a fiber-optic transceiver (SFP, or SFP+).
- Cable the fiber-optic transceiver.

Fiber-optic transceivers

The following tables list the supported 10 Gbps SFP+ transceivers and 1 Gbps and 100 Mbps SFP transceivers. For information about cabling for transceivers, refer to Table 9 on page 28.

TABLE 14 Supported 10 Gbps SFP+ transceivers

10 Gigabit Optic	Distance
10GBase-SR	300 m
10GBase-USR	100 m
10GBase-LR	10 km
10GBase-ER	40 km
10GBase-LRM	220 m
10G Twinax cables	1 m, 3 m, and 5 m

TABLE 15 Supported SFP transceivers

Optic	Distance
1000Base-SX	550 m
1000Base-LX	10 km
1000Base-LHA	70 km
1000Base-LHB	120 km
1000Base-CWDM	80 km
1000Base-BXU	10 km
1000Base-BXD	10 km
100Base-FX	2 km
100Base-FX-IR	15 km
100Base-FX-LR	40 km
10GSFPP-SR	300 m
10GSFPP-LR	10 km

Installing a transceiver

You can install a new transceiver in an SFP or SFP+ slot while the device is powered on and running.

While installing a transceiver, wear an ESD wrist strap with a plug for connection to a metal surface.

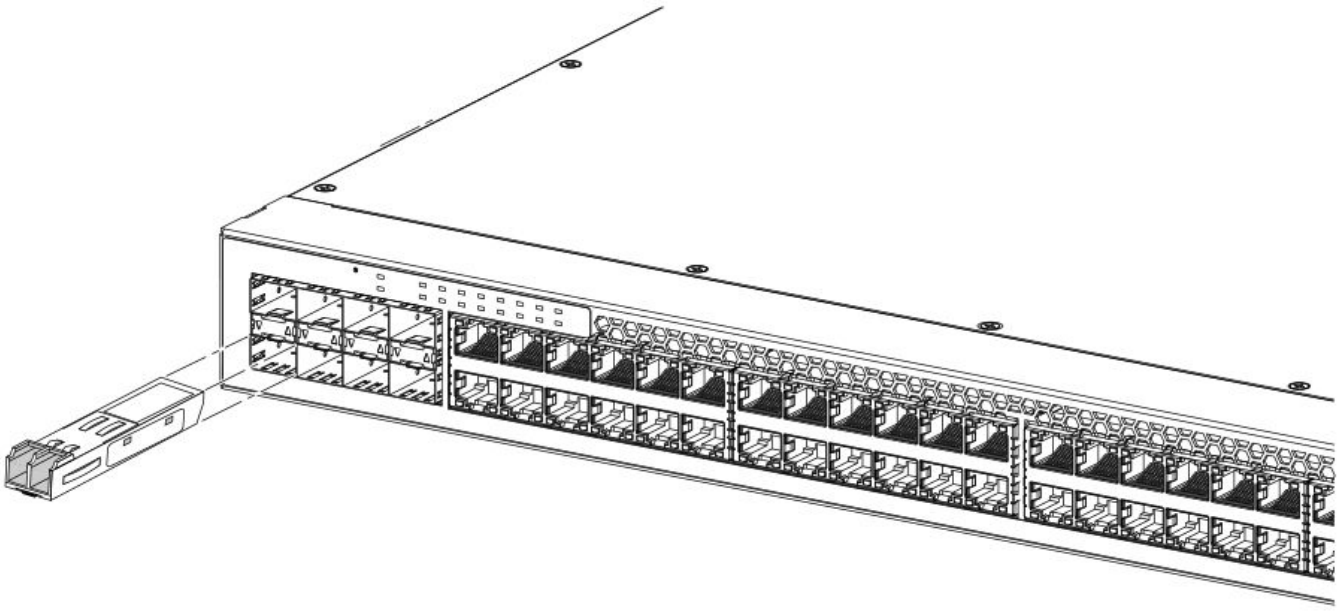
DANGER
For safety reasons, the ESD wrist strap should contain a series 1 megaohm resistor.

DANGER
Laser Radiation. Do Not View Directly with Optical Instruments. Class 1M Laser Products.

Use the following steps to install a transceiver:

1. Put on the ESD wrist strap and ground yourself by attaching the clip end to a metal surface (such as an equipment rack) to act as ground.
2. Remove the new transceiver from the protective packaging.
3. Gently insert the transceiver into the slot until it clicks into place. Transceivers are keyed to prevent incorrect insertion.

FIGURE 52 Installing a transceiver



Cabling a fiber-optic transceiver

Use the following steps to cable a fiber-optic transceiver.

1. Remove the protective covering from the fiber-optic port connectors and store the covering for future use.

NOTE
Before cabling a fiber-optic transceiver, Brocade strongly recommends cleaning the cable connectors and the port connectors. For more information, refer to Cleaning the fiber-optic connectors on page 72.

2. Gently insert the cable connector (a tab on each connector should face upward) into the transceiver connector until the tabs lock into place.
3. Observe the link and active LEDs to determine if the network connections are functioning properly. For more information about the LED indicators, refer to Observing LEDs on page 72.

Cleaning the fiber-optic connectors

To avoid problems with the connection between the fiber-optic transceiver (SFP or SFP+) and the fiber cable connectors, Brocade strongly recommends cleaning both connectors each time you disconnect and reconnect them. Dust can accumulate in the connectors and cause problems, such as reducing the optic launch power.

To clean the fiber cable connectors, Brocade recommends using a fiber-optic reel-type cleaner. When not using an SFP connector, make sure to keep the protective covering in place.

Testing connectivity

Test for connectivity by observing the LEDs related to network connection.

Pinging an IP address

To verify that an ICX 6610 can reach another device through the network, enter a command similar to the following at any level of the CLI.

```
device> ping 10.33.4.7
```

Syntax: ping *ip-addr* [**source** *ip-addr*] [**count** *num*] [**timeout** *msec*] [**ttl** *num*] [**verify**] [**no-fragment**] [**quiet**] [**data** *1-to-4 byte hex#, e.g., abcdef00*] [**numeric**] [**size** *byte*] [**brief** [**max-print-per-sec** *num, 0-2047*]]

NOTE
If you address the ping to the IP broadcast address, the device lists the first four responses.

Observing LEDs

After you install the network cables, you can observe certain LEDs to determine if the network connections are functioning properly. The following table outlines the LEDs related to the network connections, the desired state of each LED, possible abnormal states of each LED, and what to do if an LED indicates an abnormal state.

TABLE 16 Network connection-related LED states

LED	Desired state	Meaning	Abnormal state	Meaning or action
Ethernet (1-24/48)	On or flashing (Green or Yellow)	A link is established with the remote port and user packets are being transmitted or received.	Off	A link is not established with the remote port. You can do the following: • Verify that the connection to the other network device has been properly made. Also, make certain that the

TABLE 16 Network connection-related LED states (continued)

LED	Desired state	Meaning	Abnormal state	Meaning or action
				other network device is powered on and operating correctly. • Verify that the port has not been disabled through a configuration change. • If the other actions do not resolve the problem, try using a different port or a different cable.
PoE (1-24/48)	On (Green)	The port is providing PoE power.	Off	A link is not established with the PoE device. You can do the following: • Verify that the connection to the other network device has been properly made. • If the other actions do not resolve the problem, try using a different port or a different cable. • Show inline power (`show inline power` or `showinline power int e x/x/x`) • Check the Link/ Fault state and whether power was denied.
SFP/SFP+ (1F-8F)	On or flashing (Green or Yellow)	A link is established with the remote port.	Off	A link is not established with the remote port. You can do the following: • Verify that the connection to the other network device has been properly made. Also, make certain that the other network device is powered on and operating correctly.

TABLE 16 Network connection-related LED states (continued)

LED	Desired state	Meaning	Abnormal state	Meaning or action
				• Verify that the transmit port on the device is connected to the receive port on the other network device, and that the receive port on the device is connected to the transmit port on the other network device. If you are not certain, remove the two cable connectors from the port connector and reinsert them in the port connector, reversing their order. • Dust may have accumulated in the cable connector or port connector. For information about cleaning the connectors, refer to Cleaning the fiber-optic connectors on page 72. • Verify that the port has not been disabled through a configuration change. • If the other actions do not resolve the problem, try using a different port or a different cable.
SFP/SFP+ (1F-8F) Speed	On (Green or Yellow)	A link is established with the remote port.	Off	A link is not established with the remote port. You can do the following: • Check the Link LED to make sure the link is still established with the remote port. If not, take the actions described in the Meaning or

TABLE 16 Network connection-related LED states (continued)

LED	Desired state	Meaning	Abnormal state	Meaning or action
				Action column for the Link LED.

If a problem persists after taking these actions, contact Brocade Technical Support.

Tracing a route

To determine the path through which a Brocade device can reach another device, enter a command similar to the following at any level of the CLI on the device.

```
Brocade> traceroute 10.33.4.7
```

Syntax: traceroute *host-ip-addr* [**maxttl** *value*] [**minttl** *value*] [**numeric**] [**timeout** *value*] [**source-ip** *ipaddr*]

The CLI displays trace route information for each hop as soon as the information is received. Traceroute requests display all responses to a given TTL. In addition, if there are multiple equal-cost routes to the destination, the Brocade device displays up to two responses by default.

Troubleshooting network connections

- For the indicated port, verify that both ends of the cabling (at the device and the connected device) are snug.
- Verify that the device and the connected device are both powered on and operating correctly.
- Verify that you have used the correct cable type for the connection:
  - For twisted-pair connections to an end node, use straight-through cabling.
  - For fiber-optic connections, verify that the transmit port on the device is connected to the receive port on the connected device, and that the receive port on the device is connected to the transmit port on the connected device.
- Use the CLI to verify that the port has not been disabled through a configuration change. If you have configured an IP address on the device, you also can use the Web management interface or Brocade Network Advisor.
- If the other procedures don't resolve the problem, try using a different port or a different cable.

Digital optical monitoring

You can configure your device to monitor optical transceivers in the system, either globally or by specified port. When this feature is enabled, the system monitors the temperature and signal power levels for the optical transceivers in the specified ports. Console messages and syslog messages are sent when optical operating conditions fall below or rise above the SFP and SFP+ manufacturer's recommended thresholds. For more information about digital optical monitoring, refer to the *FastIron Ethernet Switch Security Configuration Guide*.

Virtual cable testing

Most FastIron devices support Virtual Cable Test (VCT) technology. VCT technology enables the diagnosis of a conductor (wire or cable) by sending a pulsed signal into the conductor, then examining the reflection of that pulse. This method of cable analysis is referred to as Time Domain Reflectometry (TDR). By examining the reflection, the Brocade device can detect and report cable statistics such as local and remote link pair, cable length, and link status.

Virtual Cable Testing configuration notes

- VCT is supported on copper ports only. It is not supported on fiber ports.
- VCT is only supported when Ethernet port speed is configured to Auto. VCT does not work on ports with fixed speeds.
- VCT is not supported on the following:
  - ICX 6610-24F
  - SX-FI24GPP
  - SX-FI48GPP
  - SX-FI2XG
  - SX-FI8XG
  - SX-FI24HF
- The port to which the cable is connected must be enabled when you issue the command to diagnose the cable. If the port is disabled, the command is rejected.
- If the port is operating at 100 Mbps half-duplex, the TDR test on one pair will fail.
- If the remote pair is set to forced 100 Mbps, any change in MDI/MDIX may cause the device to interpret the Multilevel Threshold-3 (MLT-3) as a reflected pulse, in which case, the device will report a faulty condition. In this scenario, it is recommended that you run the TDR test a few times, clearing the registers before each test, for accurate results.

Virtual Cable Test command syntax

To diagnose a cable using TDR, enter commands such as the following at the Privileged EXEC level of the CLI.

```
device# phy cable-diagnostics tdr 1/1/1
```

The **clear-diag tdr** command clears results of any previous TDR test from test registers for port 1/1/1 (port 1 on slot 1 on device 1).

> **NOTE**
> It is recommended that you clear the TDR test registers before each test.

```
device# clear cable-diagnostics tdr 1/1/1
```

The command in the previous example diagnoses the cable attached to port 1/1/1.

When you issue the **phy cable-diagnostics** command, the command brings the port down for a second or two, and then immediately brings the port back up.

Syntax: clear cable-diagnostics tdr *stackid/slot/port*

Syntax: phy cable-diagnostics tdr *stackid/slot/port*

Viewing the results of the cable analysis

To display the results of the cable analysis, enter a command such as the one shown in the following examples at the Privileged EXEC level of the CLI.

In the first example, the command displays TDR test results for port 1, slot 1 on device 1 in the stack. The results indicate that the port is down or the cable is not connected.

```
device>show cable-diagnostics tdr 1/1/1
Port      Speed Local pair Pair Length Remote pair Pair status
--------- ----- ---------- ----------- ----------- -----------
--        ----- -------     -----       ------      ----------
01        UNKWN              Pair A      <=3 M                  Open
                             Pair B      <=3 M                  Open
                             Pair C      <=3 M                  Open
                             Pair D      <=3 M                  Open
```

In the second test example, the TDR test results for the same port show details for an active port.

```
device>show cable-diagnostics tdr 1/1/1
Port      Speed Local pair Pair Length Remote pair Pair status
--------- ----- ---------- ----------- ----------- -----------
01        1000M            Pair A     <50M        Pair B            Terminated
                           Pair B     <50M        Pair A            Terminated
                           Pair C     <50M        Pair D            Terminated
                           Pair D     <50M        Pair C            Terminated
```

Syntax: show cable-diagnostics tdr *stackid/slot/port*

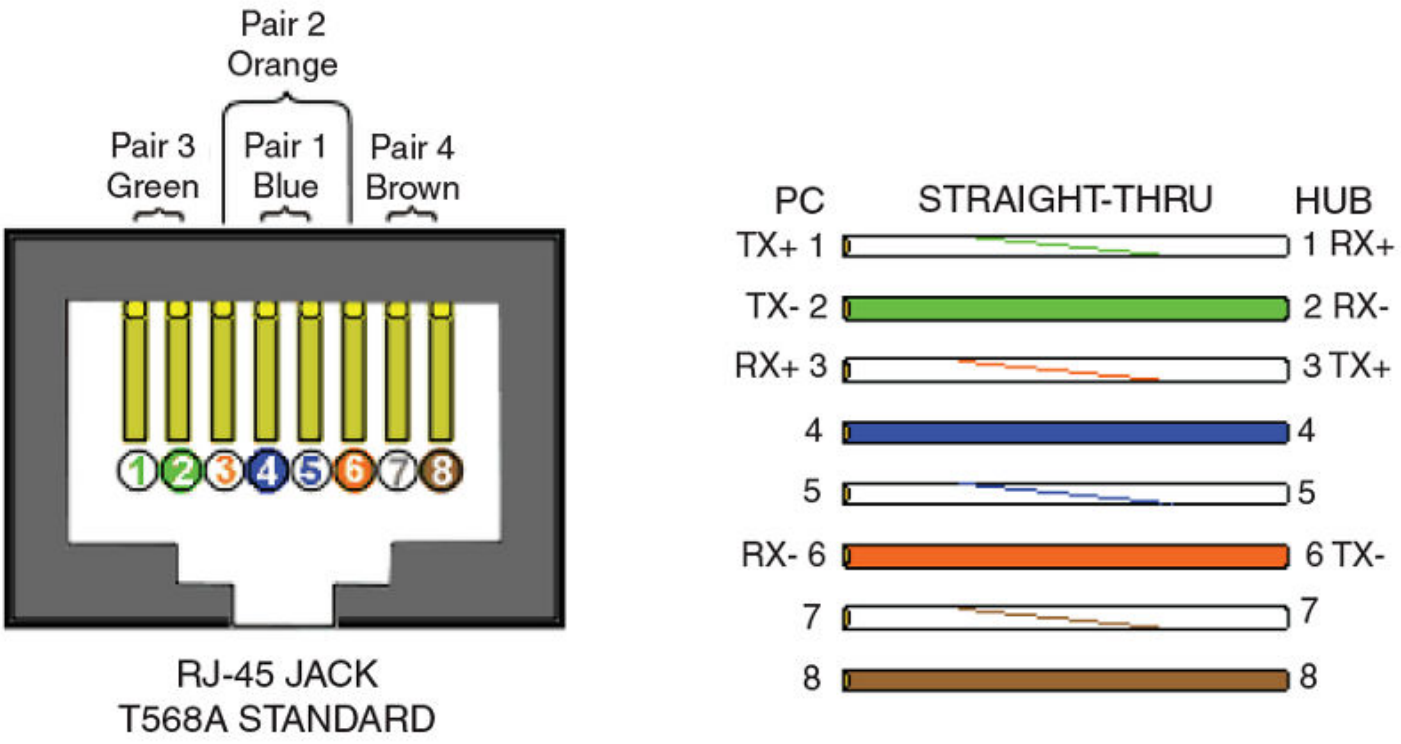
In the output shown, "Local pair" indicates the assignment of wire pairs from left to right, where Pair A is the left-most pair. The following table shows the "Local pair" mapping to the T568A pin/pair and color assignment from the TIA/EIA-568-B standard.

TABLE 17 Local pair definition

Local pair	T568A pair and color assignment
Pair A	Pair 3 (green)
Pair B	Pair 2 (orange)
Pair C	Pair 1 (blue)
Pair D	Pair 4 (brown)

The following figure illustrates the T568A pin/pair assignment.

FIGURE 53 T568A pin/pair assignment



The following table describes the fields shown in the **show cable-diagnostics** *port* command output.

TABLE 18 Cable statistics

Field	Meaning
Port	The port that was tested.
Speed	The port current line speed.
Local pair	The local link name. Refer to the previous local pair definition table.
Pair Length	The cable length when terminated, or the distance to the point of fault when the line is not up.
Remote pair	The remote link name.
Pair status	The status of the link. This field displays one of the following: • Terminated: The link is up. • Shorted: A short is detected in the cable. • Open: An opening is detected in the cable. • ImpedMis: The impedance is mismatched. • Failed: The TDR test failed.

Managing the ICX 6610 Hardware

DANGER

The procedures in this manual are for qualified service personnel.

Managing temperature settings

This section describes how to display temperature settings on the device and how to change the temperature warning and shutdown levels.

Using the temperature sensor

The device contains temperature sensors that the software reads based on a configurable device poll time. To protect the device from overheating, the following temperature threshold levels exist:

- The warning level is the temperature at which the device generates a Syslog message and SNMP trap. It is configurable.
- The shutdown level is the temperature at which the device reboots. It is set by the device and is not configurable.
- The fan speed settings are set by the device, and are not configurable.

Displaying the temperature

To display the temperature of a device, enter the **show chassis** command at any level of the CLI.

NOTE

The displayed temperature reflects the temperature of the board inside the device.

```
device#show chassis
The stack unit 1 chassis info:
Power supply 1 not present
Power supply 2 (NA - AC - Regular) present, status ok
Power supply 2 Fan Air Flow Direction:  Front to Back
Fan 1 ok, speed (auto): [[1]]<->2
Fan 2 not present
Fan controlled temperature: 53.5 deg-C
Fan speed switching temperature thresholds:
                Speed 1: NM<----->80       deg-C
                Speed 2:       75<-----> 85 deg-C (shutdown)
Fan 1 Air Flow Direction:  Front to Back
MAC 1 Temperature Readings:
        Current temperature : 32.5 deg-C
MAC 2 Temperature Readings:
        Current temperature : 46.5 deg-C
CPU Temperature Readings:
```

```
        Current temperature : 39.5 deg-C
sensor A Temperature Readings:
        Current temperature : 28.5 deg-C
sensor B Temperature Readings:
        Current temperature : 45.0 deg-C
sensor C Temperature Readings:
        Current temperature : 33.0 deg-C
stacking card Temperature Readings:
        Current temperature : 53.5 deg-C
        Warning level.......: 75.0 deg-C
        Shutdown level......: 85.0 deg-C
Boot Prom MAC : 001b.0387.0124
Management MAC: 001b.0387.0124
```

Syntax: show chassis

Displaying syslog messages for temperature

The software sends a syslog message and an SNMP trap if the temperature crosses the warning or shutdown thresholds. The following methods describe how to view the system log on the device. If you have configured the device to use a syslog server or SNMP trap receiver, see the documentation for the server or receiver.

To display the system log, enter the **show log** command at any CLI level.

```
device# show log
Syslog logging: enabled (0 messages dropped, 0 flushes, 0 overruns)
Buffer logging: level ACDMEINW, 8 messages logged
level code: A=alert C=critical D=debugging M=emergency E=error
I=informational N=notification W=warning
Static Log Buffer:
Dynamic Log Buffer (50 entries):
at 0 days 0 hours 2 minutes 0 seconds, level alert
Temperature 48.0 C degrees, warning level 45.0 C degrees, shutdown level 55.0 C degrees
at 0 days 0 hours 1 minutes 0 seconds, level alert
Temperature 40.0 C degrees, warning level 35.0 C degrees, shutdown level 45.0 C degrees
```

Changing the temperature warning level

To change the temperature at which the device sends a syslog message and an SNMP trap, enter a command similar to the following at the Privileged EXEC level of the CLI:

```
device# temperature warning 1 83
```

Syntax: temperature warning *stack-id value*

The *stack-id* can be a value from 1 through 8.

The *value* variable is the temperature warning level in Celsius. The maximum value of the temperature warning level is 5 degrees below the shutdown level, which is automatically set by the device.

If you change the device hardware configuration (for example, by adding a fan tray), the device may change the temperature shutdown level the next time it boots. This can result in the temperature warning level being higher than the temperature shutdown level. If this happens, a warning message is displayed during bootup.

Information on incorrect temperature warning levels also appears when you enter the **show chassis** command to display chassis status as shown in the following example.

```
device#show chassis
The stack unit 1 chassis info:
Power supply 1 not present
Power supply 2 (AC - Regular) present, status ok
        Model Number:   23-0000144-01
        Serial Number:  02E
```

```
        Firmware Ver:    B
Power supply 2 Fan Air Flow Direction:  Front to Back
Fan 1 ok, speed (auto): [[1]]<->2
Fan 2 not present
Fan controlled temperature: 61.0 deg-C
Fan speed switching temperature thresholds:
                Speed 1: NM<----->80       deg-C
                Speed 2:       75<-----> 87 deg-C (shutdown)
Fan 1 Air Flow Direction:  Front to Back
MAC 1 Temperature Readings:
        Current temperature : 55.0 deg-C
CPU Temperature Readings:
        Current temperature : 59.0 deg-C
sensor A Temperature Readings:
        Current temperature : 38.5 deg-C
sensor B Temperature Readings:
        Current temperature : 47.5 deg-C
sensor C Temperature Readings:
        Current temperature : 31.0 deg-C
sensor D Temperature Readings:
        Current temperature : 27.0 deg-C
stacking card Temperature Readings:
        Current temperature : 61.0 deg-C
        Warning level.......: 82.0 deg-C
        Shutdown level......: 87.0 deg-C
Boot Prom MAC : 748e.f8dc.952a
Management MAC: 748e.f8dc.952a
device#temp warn 1 87
Bad value: warning level on this unit can have value from 0 to 84
ICX6610-24 Switch#temp warn 84
Incomplete command.
ICX6610-24 Switch#temp warn 1
  DECIMAL   Number
ICX6610-24 Switch#temp warn 1 86
Bad value: warning level on this unit can have value from 0 to 84
ICX6610-24 Switch#temp warn 84
Incomplete command.
device#temp warn 1 84
ICX6610-24 Switch#show chas
The stack unit 1 chassis info:
Power supply 1 not present
Power supply 2 (AC - Regular) present, status ok
        Model Number:   23-0000144-01
        Serial Number:  02E
        Firmware Ver:    B
Power supply 2 Fan Air Flow Direction:  Front to Back
Fan 1 ok, speed (auto): [[1]]<->2
Fan 2 not present
Fan controlled temperature: 61.5 deg-C
Fan speed switching temperature thresholds:
                Speed 1: NM<----->80       deg-C
                Speed 2:       75<-----> 87 deg-C (shutdown)
Fan 1 Air Flow Direction:  Front to Back
MAC 1 Temperature Readings:
        Current temperature : 55.5 deg-C
CPU Temperature Readings:
        Current temperature : 59.0 deg-C
sensor A Temperature Readings:
        Current temperature : 39.0 deg-C
sensor B Temperature Readings:
        Current temperature : 47.5 deg-C
sensor C Temperature Readings:
        Current temperature : 31.0 deg-C
sensor D Temperature Readings:
        Current temperature : 27.0 deg-C
stacking card Temperature Readings:
        Current temperature : 61.5 deg-C
        Warning level.......: 84.0 deg-C
        Shutdown level......: 87.0 deg-C
Boot Prom MAC : 748e.f8dc.952a
Management MAC: 748e.f8dc.952a
```

Changing the temperature poll time

By default, the software polls the temperature sensor every 60 seconds to get the current temperature. This poll rate is controlled by the device poll time, which also controls how often the software polls other system components.

To change the poll time, enter a command similar to the following at the global CONFIG level.

```
device(config)# chassis poll-time 200
```

Syntax: chassis poll-time *value*

The *value* variable can be from 0 through 65535 seconds.

Removing MAC address entries

You can remove the following types of learned MAC address entries from the system MAC address table:

- All MAC address entries
- All MAC address entries for a specified Ethernet port
- All MAC address entries for a specified VLAN
- A specified MAC address entry in all VLANs

For example, to remove entries for the MAC address 0000.0080.00d in all VLANs, enter the following command at the Privileged EXEC level of the CLI.

```
device# clear mac-address 0000.0080.00d
```

Syntax: clear mac-address [*mac-address* | **ethernet** *port-num* | **vlan** *number*]

If you enter the **clear mac-address** command without any parameters, the software removes all MAC entries.

Use the *mac-address* variable to remove a specified MAC address from all VLANs. Specify the MAC address in the following format: HHHH.HHHH.HHHH.

Use the **ethernet** *port-num* parameter to remove all MAC addresses for a specified Ethernet port.

Use the **vlan** *number* parameter to remove all MAC addresses for a specified VLAN.

Displaying ICX 6610 CPU usage

You can display the amount of the CPU in use. To do so, enter the **show cpu** command at any level of the CLI.

```
device# show cpu
31 percent busy, from 3248 sec ago
1   sec avg:  10 percent busy
5   sec avg:  10 percent busy
60  sec avg:  10 percent busy
300 sec avg:  10 percent busy
```

Syntax: show cpu

Hardware maintenance schedule

ICX 6610 switch hardware components require minimal maintenance. Brocade recommends cleaning the fiber-optic connectors on a fiber-optic port and the connected fiber cable each time you disconnect the cable.

You can replace the copper and fiber-optic modules (SFPs).

Removing a copper or fiber-optic module

You can remove a copper or fiber SFP transceiver from a slot while the ICX 6610 is powered on and running.

While removing a copper or fiber-optic module, be sure to wear an ESD wrist strap with a plug that can be inserted in the ESD connector on the ICX 6610.

DANGER

For safety reasons, the ESD wrist strap should contain a series 1 megaohm resistor.

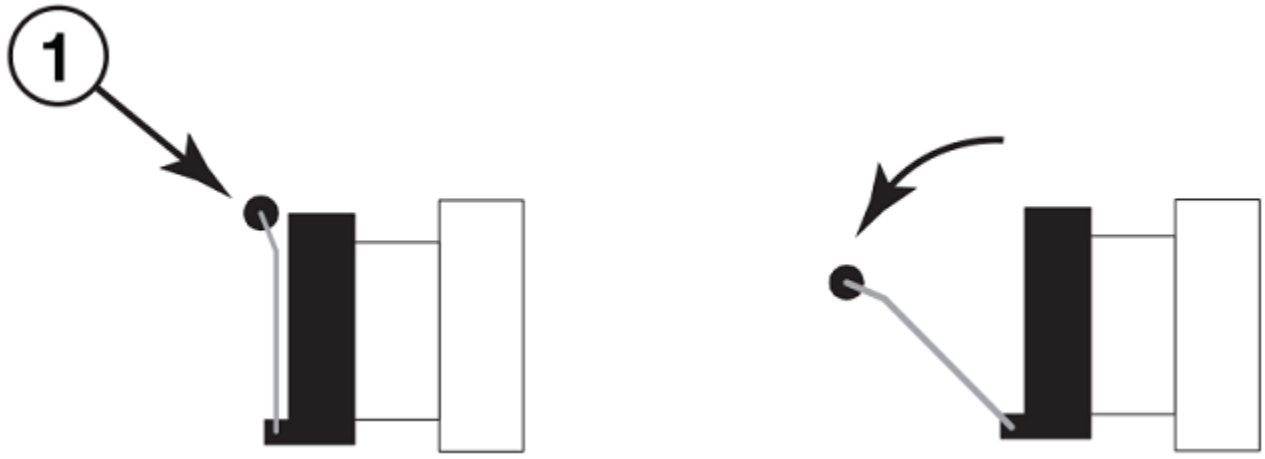
To remove a copper or fiber-optic module from an SFP slot, do the following.

1. Put on the ESD wrist strap, and ground yourself by attaching the clip end to a metal surface (such as an equipment rack).
2. Disconnect the copper or fiber cable connector from the port connector.
3. Unlock the copper or fiber-optic module by pulling the bail latch forward, away from the front panel of the module.

NOTE

On 1000BaseSX ports, the bail latch is enclosed in a black sleeve, and on 1000BaseLX ports, the bail latch is enclosed in a blue sleeve.

FIGURE 54 Unlocking the bail latch



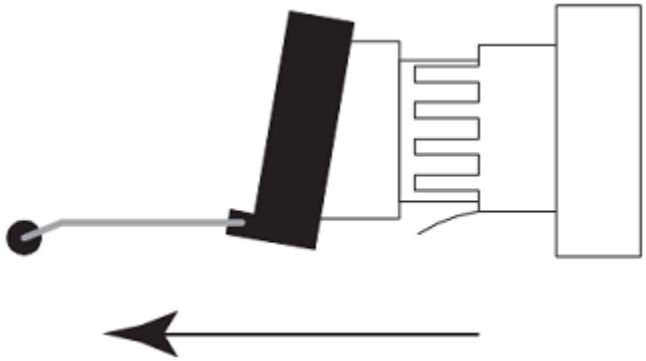
1. Bail Latch

NOTE

The bail latch may be attached to either the top or the bottom of the SFP transceiver.

4. Grasp the bail latch and pull the copper or fiber-optic module out of the port.

FIGURE 55 Remove fiber-optic module



5. Store the copper or fiber-optic module in a safe, static-free place or in an anti-static bag.
6. Install a new copper or fiber-optic module in the port.

Cabling a fiber-optic module

For instructions on cabling a fiber-optic module, refer to the section Cabling a fiber-optic transceiver on page 71.

Cleaning the fiber-optic connectors

For instructions on cleaning a fiber-optic module, refer to the section Cleaning the fiber-optic connectors on page 72.

Brocade ICX 6610 Switch Technical Specifications

This document highlights the features and specifications for the Brocade ICX 6610 switch.

System specifications

System component	Description
Enclosure	1U, stackable, standard 19-inch rack compliant or on a flat surface
Power inlet	C14
Power supplies	Up to two internal, redundant, field-replaceable, load-sharing AC or DC power supplies with dedicated system and PoE power
Fans	Two
Cooling	Front to back (reversible)
System architecture	Nonblocking stackable switching

Ethernet

System component	Description
GbE ports	Standard 40 GbE ports
SFP GbE ports	Up to 384 1-GbE and 64 10-GbE ports per stack Up to eight dual-mode 1 GbE/10 GbE SFP/SFP+ ports
Ethernet management port	Console serial RJ-45 management port Out-of-band management Interface (RJ-45 port)

LEDs

System component	Description
Port	Four port status LEDs (flashing green or flashing yellow)
System	Five system status LEDs (flashing green, green, or yellow)
Power	One power status LED (green)
Fan	One fan status LED (green or yellow)

Other

System component	Description
Serial cable	Console serial RJ-45 management port
RJ-45 connector	10/100/1000 Mbps RJ-45 Ethernet port

Weight and physical dimensions

Model	Height	Width	Depth	Weight
ICX 6610-24	4.4 cm 1.7 inches	42.9 cm 16.89 inches	40.64 cm 16 inches	6.35 kg 13.97 lb
ICX 6610-24F	4.4 cm 1.7 inches	42.9 cm 16.89 inches	40.64 cm 16 inches	6.48 kg 14.26 lb
ICX 6610-24P	4.4 cm 1.7 inches	42.9 cm 16.89 inches	40.64 cm 16 inches	7.24 kg 15.93 lb
ICX 6610-48	4.4 cm 1.7 inches	42.9 cm 16.89 inches	40.64 cm 16 inches	6.77 kg 14.90 lb
ICX 6610-48P	4.4 cm 1.7 inches	42.9 cm 16.89 inches	40.64 cm 16 inches	7.55 kg 16.60 lb

Environmental requirements

Condition	Operational	Non-operational
Ambient temperature	0°C to 45°C (32°F to 113°F)	-25° C to 70° C (-13° F to 158° F)
Relative humidity (non-condensing)	10% to 93% at 50°C (120°F)	95% maximum
Altitude (above sea level)	0 to 3000 m (10,000 ft)	0 to 4500 m (15,000 ft)
Airflow	Front to back (reversible)	N/A
Operating noise	39.6 dB to 48.7 dB	N/A

Power supply specifications (per PSU)

Power supply model	Maximum output power rating (DC)	Input voltage	Input line frequency	Maximum input current	Input line protection	Maximum inrush current
RPS15-E RPS15-I	250 W	100 - 240 VAC	50/60 Hz	4.0 A - 2.0 A	Line & Neutral Fused	35 A peak for <10 ms, 10 ms - 150 ms <25 A peak, >150 ms the AC input current will be less than the rating of the input fuses and other

Power supply model	Maximum output power rating (DC)	Input voltage	Input line frequency	Maximum input current	Input line protection	Maximum inrush current
						components within the power supply
RPS16-E RPS16-I	1000 W	100 - 240 VAC	50/60 Hz	11.8 A - 4.9 A	Line & Neutral Fused	35 A peak for <10 ms, 10 ms - 150 ms <25 A peak, >150 ms the AC input current will be less than the rating of the input fuses and other components within the power supply
RPS16DC-E RPS16DC-I	510 W	40 - 60 VDC	N/A	15.5 A	Positive input fused	40 A peak

Power consumption (maximum configuration)

AC and DC power consumption specifications (single and dual PSU and fan, without PoE). AC input power draw is available for one and two PSUs installed, but only one measurement for 100 - 240 VAC. DC input power is measured at -48 VDC.

Model name	@100 VAC input	@200 VAC input	@-48 VDC input	Minimum number of power supplies	Notes
ICX 6610-24F	125 W 427 BTU/hr	N/A	125 W 427 BTU/hr	1	
	145 W 495 BTU/hr	N/A	145 W 495 BTU/hr	2	
ICX 6610-24P ICX 6610-24	120 W 409 BTU/hr	N/A	120 W 409 BTU/hr	1	
	140 W 478 BTU/hr	N/A	140 W 478 BTU/hr	2	
ICX 6610-48P ICX 6610-48	165 W 563 BTU/hr	N/A	120 W 409 BTU/hr	1	
	185 W 631 BTU/hr	N/A	140 W 478 BTU/hr	2	

Data port specifications (Ethernet)

Model	Port type	Number of ports	Description
ICX 6610-24	10/100/1000 Mbps	24	RJ-45 ports
ICX 6610-48	10/100/1000 Mbps	48	RJ-45 ports
ICX 6610-24F	100/1000 Mbps	24	SFP ports

Model	Port type	Number of ports	Description
	1/10 GbE 40 Gbps	8 4	Dual-mode SFP/SFP+ ports QSFP stacking ports
ICX 6610-24P	10/100/1000 (PoE+)	24 (one power supply)	Maximum PoE Class 3 ports Maximum PoE+ ports
ICX 6610-48P	10/100/1000 (PoE+)	48 (one power supply) 48 (two power supplies)	Maximum PoE Class 3 ports Maximum PoE+ ports

Serial port specifications (pinout RJ-45)

Pin	Signal	Description
1	Not supported	N/A
2	Not supported	N/A
3	UART0_TXD	Transmit data
4	GND	Logic ground
5	GND	Logic ground
6	UART0_RXD	Receive data
7	Not supported	N/A
8	Not supported	N/A

Serial port specifications (protocol)

Parameter	Value
Baud	9600 bps
Data bits	8
Parity	None
Stop bits	1
Flow control	None

Regulatory compliance (EMC)

- FCC Part 15, Subpart B (Class A)
- EN 55022 (CE mark) (Class A)
- EN 55024 (CE mark) (Immunity) for Information Technology Equipment
- ICES-003 (Canada) (Class A)
- AS/NZ 55022 (Australia) (Class A)
- VCCI (Japan) (Class A)
- EN 61000-3-2

- EN 61000-3-3
- EN 61000-6-1

Regulatory compliance (safety)

- CAN/CSA-C22.2 No. 60950-1-07/UL60950-1 - Safety of Information Technology Equipment
- EN 60825-1 Safety of Laser Products - Part 1: Equipment Classification, Requirements and User's Guide
- EN 60825-2 Safety of Laser Products - Part 2: Safety of Optical Fibre Communications Systems
- EN 60950-1, IEC 60950-1 Safety of Information Technology Equipment

Regulatory compliance (environmental)

- 2011/65/EU - Restriction of the use of certain hazardous substance in electrical and electronic equipment (EU RoHS)
- 2012/19/EU - Waste electrical and electronic equipment (EU WEEE)
- 94/62/EC - packaging and packaging waste (EU)
- 2006/66/EC - batteries and accumulators and waste batteries and accumulators (EU battery directive)
- 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (EU REACH)
- Section 1502 of the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 - U.S. Conflict Minerals
- 30/2011/TT-BCT - Vietnam circular
- SJ/T 11363-2006 Requirements for Concentration Limits for Certain Hazardous Substances in EIPs (China)
- SJ/T 11364-2006 Marking for the Control of Pollution Caused by EIPs (China)

Troubleshooting

Diagnosing switch indicators

FIGURE 56 Location of power status LED

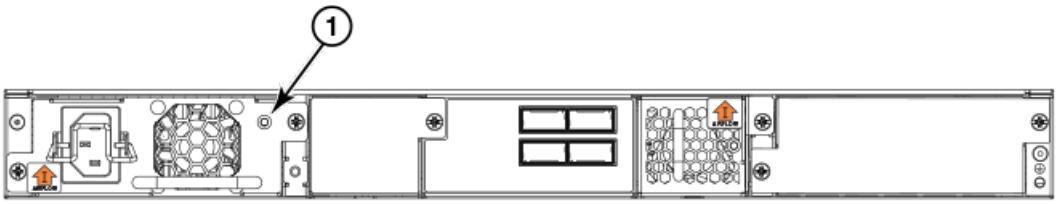


FIGURE 57 Location of port LEDs

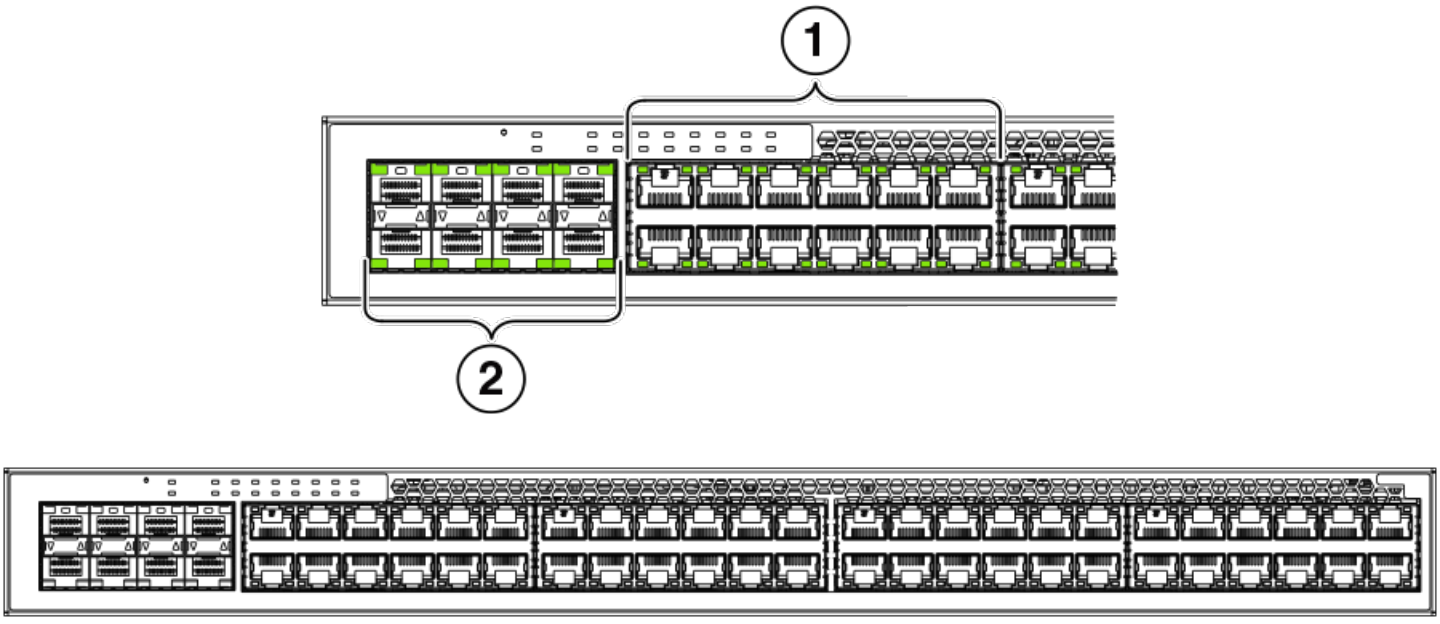


TABLE 19 Troubleshooting chart

Symptom	Meaning	Action
Power LED is Off	No power is detected. Internal power supply may be disconnected.	• Check connections between the switch, the power cord, and the wall outlet. • Contact Technical Support.
Power LED is Yellow	Internal power supply has failed.	Contact Technical Support.

TABLE 19 Troubleshooting chart (continued)

Symptom	Meaning	Action
Diag LED is Yellow	The switch self test has detected a fault.	• Power cycle the switch to try and clear the condition. If the condition persists, contact Technical Support.
Link LED is Off	No power is detected on the link.	• Verify that the switch and attached device are powered on. • Be sure the cable is plugged into both the switch and the corresponding device. • Verify that the proper cable type is used and its length does not exceed specified limits. • Check the adapter on the attached device and cable connections for possible defects. Replace the defective adapter or cable if necessary.

Power and cooling problems

If the power LED does not turn on when the power cord is plugged in, you may have a problem with the power outlet, power cord, or internal power supply. However, if the unit powers off after running for a while, check for loose power connections, power losses, or surges at the power outlet, and verify that the fans on the unit are unobstructed and running prior to shutdown. You can also check whether fans are obstructed using the **show chassis** CLI command.

If the device is continuously rebooting, check the temperature of the system. If you have dual power supplies installed, be sure that they match. DC and AC power supplies installed in the same unit will cause continuous rebooting.

If you still cannot isolate the problem, the internal power supply may be defective. In this case, contact Technical Support for assistance.

Installation

Verify that all system components have been properly installed. If one or more components appear to be malfunctioning (such as the power cord or network cabling), test them in an alternate environment where you are sure that all the other components are functioning properly.

In-band access

You can access the management agent in the switch from anywhere within the attached network using Telnet, SSH, or other network management software. However, you must first configure the switch with a valid IP address, subnet mask, and default gateway. If you have trouble establishing a link to the management agent, check to see if you have a valid network connection. Then verify that you entered the correct IP address. Also be sure the port through which you are connecting to the switch has not been disabled. If it has not been disabled, then check the network cabling that runs between your remote location and the switch.

Regulatory Statements

BSMI statement (Taiwan)

警告使用者：
這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，
在這種情況下，使用者會被要求採取某些適當的對策。

Warning:

This is Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Canadian requirements

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations, ICES-003 Class A.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

China CC statement

China-CCC Warning statements

在维修的时候一定要断开所有电源 (English translation"disconnect all power sources before service")

For non tropical use:

安全说明和标记	汉文	"仅适用于非热带气候条件下安全使用。"
	藏文	
	蒙古文	"ᠵᠦᠬᠡᠨᠳᠦ ᠬᠡᠷᠡᠭᠯᠡᠭᠡᠳᠡᠢ ᠶᠡᠬᠡ ᠭᠠᠵᠠᠷ ᠤᠯᠠᠨ ᠤᠯᠤᠰ ᠤᠨ ᠭᠠᠵᠠᠷ ᠳᠤ ᠠᠮᠤᠷ ᠲᠤᠭᠠᠢ ᠬᠡᠷᠡᠭᠯᠡᠭᠡᠨᠳ ᠬᠡᠷᠡᠭᠯᠡᠭᠡᠨᠢ ᠵᠥᠪ ᠪᠠᠢᠳᠠᠯ ᠳᠤ ᠬᠡᠷᠡᠭᠯᠡᠭᠡᠨᠡ᠃"
	壮文	Dan hab yungh youq gij dienheiq diuzgen mbouj dwg diegndat haenx ancienz sawjyungh.
	维文	غەيرى ئىسسىق بەلباغ ھاۋا كىلىمانى شارائىتىدىلا بىخەتەر ئىشلەتكىلى بولىدۇ

For altitude 2000 meter and below:

安全说明和标记	汉文	仅适用于海拔2000m以下地区安全使用。
	藏文	
	蒙古文	"ᠲᠤᠭᠠᠭᠠᠨ ᠳᠡᠭᠦ ᠠᠯᠪᠠ ᠨᠤᠭᠤᠳ ᠳᠤ 2000ᠮ ᠳᠤᠤᠷᠠᠬᠢ ᠭᠠᠵᠠᠷ ᠳᠤ ᠠᠮᠤᠷ ᠲᠤᠭᠠᠢ ᠬᠡᠷᠡᠭᠯᠡᠭᠡᠨᠳ ᠬᠡᠷᠡᠭᠯᠡᠭᠡᠨᠢ ᠵᠥᠪ ᠪᠠᠢᠳᠠᠯ ᠳᠤ ᠬᠡᠷᠡᠭᠯᠡᠭᠡᠨᠡ᠃"
	壮文	Dan hab yungh youq gij digih haijbaz 2000m doxroengz haenx ancienz sawjyungh.
	维文	دېڭىز يۈزىدىن 2000 مېتر تۆۋەن رايونلاردىلا بىخەتەر ئىشلەتكىلى بولىدۇ

Warning for Class A:

声 明

此为 A 级产品，在生活环境中，该产品可能会造成无线电干扰。在这种情况下，可能需要用户对其干扰采取切实可行的措施。

English translation of above statement

This is a Class A product. In a domestic environment this product may cause radio interference, in which case the user may be required to take adequate measures.

Europe and Australia (CISPR 22 Class A Warning)

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

FCC warning (US only)

This equipment has been tested and complies with the limits for a Class A computing device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, might cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at the user's own expense.

Germany

Machine noise information regulation - 3. GPSGV, the highest sound pressure level value is 53.0 dB(A) in accordance with EN ISO 7779.

Maschinenlärminformations-Verordnung - 3. GPSGV, der höchste Schalldruckpegel beträgt 53.0 dB(A) gemäss EN ISO 7779.

KCC statement (Republic of Korea)

A급 기기 (업무용 방송통신기기): 이 기기는 업무용(A급)으로 전자파적합등록을 한 기기이오니 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

Class A device (Broadcasting Communication Device for Office Use): This device obtained EMC registration for office use (Class A), and may be used in places other than home. Sellers and/or users need to take note of this.

VCCI statement

この装置は、クラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。 VCCI－A

This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio disturbance might arise. When such trouble occurs, the user might be required to take corrective actions.

Cautions and Danger Notices

Cautions

A Caution statement alerts you to situations that can be potentially hazardous to you or cause damage to hardware, firmware, software, or data.

Ein Vorsichthinweis warnt Sie vor potenziellen Personengefahren oder Beschädigung der Hardware, Firmware, Software oder auch vor einem möglichen Datenverlust

Un message de mise en garde vous alerte sur des situations pouvant présenter un risque potentiel de dommages corporels ou de dommages matériels, logiciels ou de perte de données.

Un mensaje de precaución le alerta de situaciones que pueden resultar peligrosas para usted o causar daños en el hardware, el firmware, el software o los datos.

General cautions

CAUTION
Do not install the device in an environment where the operating ambient temperature might exceed 45°C (113°F).

VORSICHT	Das Gerät darf nicht in einer Umgebung mit einer Umgebungsbetriebstemperatur von über 45°C (113°F) installiert werden.
MISE EN GARDE	N'installez pas le dispositif dans un environnement où la température d'exploitation ambiante risque de dépasser 45°C (113°F).
PRECAUCIÓN	No instale el instrumento en un entorno en el que la temperatura ambiente de operación pueda exceder los 45°C (113°F).

CAUTION
Make sure the airflow around the front, sides, and back of the device is not restricted.

VORSICHT	Stellen Sie sicher, dass an der Vorderseite, den Seiten und an der Rückseite der Luftstrom nicht behindert wird.
MISE EN GARDE	Vérifiez que rien ne restreint la circulation d'air devant, derrière et sur les côtés du dispositif et qu'elle peut se faire librement.
PRECAUCIÓN	Asegúrese de que el flujo de aire en las inmediaciones de las partes anterior, laterales y posterior del instrumento no esté restringido.

CAUTION
Ensure that the airflow direction of the power supply unit matches that of the installed fan tray. The power supplies and fan trays are clearly labeled with either a green arrow with an "E", or an orange arrow with an "I."

VORSICHT	Vergewissern Sie sich, dass die Luftstromrichtung des Netzteils der eingebauten Lüftereinheit entspricht. Die Netzteile und Lüftereinheiten sind eindeutig mit einem grünen Pfeil und dem Buchstaben "E" oder einem orangefarbenen Pfeil mit dem Buchstaben "I" gekennzeichnet.
MISE EN GARDE	Veillez à ce que le sens de circulation de l'air du bloc d'alimentation corresponde à celui du tiroir de ventilation installé. Les blocs d'alimentation et les tiroirs de ventilation sont étiquetés d'une flèche verte avec un "E " ou d'une flèche orange avec un " I ".

PRECAUCIÓN	Asegúrese de que la dirección del flujo de aire de la unidad de alimentación se corresponda con la de la bandeja del ventilador instalada. Los dispositivos de alimentación y las bandejas del ventilador están etiquetadas claramente con una flecha verde y una "E" o con una flecha naranja y una "I".

CAUTION

Never leave tools inside the chassis.

VORSICHT	Lassen Sie keine Werkzeuge im Chassis zurück.
MISE EN GARDE	Ne laissez jamais d'outils à l'intérieur du châssis
PRECAUCIÓN	No deje nunca herramientas en el interior del chasis.

CAUTION

Changes or modifications made to this device that are not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

VORSICHT	Falls dieses Gerät verändert oder modifiziert wird, ohne die ausdrückliche Genehmigung der für die Einhaltung der Anforderungen verantwortlichen Partei einzuholen, kann dem Benutzer der weitere Betrieb des Gerätes untersagt werden.
MISE EN GARDE	Les éventuelles modifications apportées à cet équipement sans avoir été expressément approuvées par la partie responsable d'en évaluer la conformité sont susceptibles d'annuler le droit de l'utilisateur à utiliser cet équipement.
PRECAUCIÓN	Si se realizan cambios o modificaciones en este dispositivo sin la autorización expresa de la parte responsable del cumplimiento de las normas, la licencia del usuario para operar este equipo puede quedar anulada.

CAUTION

Use the erase startup-config command only for new systems. If you enter this command on a system you have already configured, the command erases the configuration. If you accidentally do erase the configuration on a configured system, enter the write memory command to save the running configuration to the startup-config file.

VORSICHT	Verwenden Sie den Befehl **Erase startup-config** (Löschen Startup-Konfig) nur für neue Systeme. Wenn Sie diesen Befehl in ein bereits konfiguriertes System eingeben, löscht der Befehl die Konfiguration. Falls Sie aus Versehen die Konfiguration eines bereits konfigurierten Systems löschen, geben Sie den Befehl**Write Memory** (Speicher schreiben) ein, um die laufende Konfiguration in der Startup-Konfig-Datei zu speichern.
MISE EN GARDE	N'utilisez la commande **erase startup-config** que pour les nouveaux systèmes. Si vous entrez cette commande sur un système que vous avez déjà configuré, elle efface la configuration. Si vous effacez la configuration par accident sur un système configuré, entrez la commande **write memory** pour enregistrer la configuration actuelle dans le fichier startup-config.
PRECAUCIÓN	Use el comando **erase startup-config** (borrar configuración de inicio) para sistemas nuevos solamente. Si usted introduce este comando en un sistema que ya ha configurado, el comando borrará la configuración. Si usted borra accidentalmente la configuración en un sistema ya configurado, introduzca el comando **write memory** (escribir memoria) para guardar la configuración en ejecución en el archivo startup-config.

Electrical cautions

CAUTION

All devices with DC power supplies are intended for installation in restricted access areas only. A restricted access area is where access can be gained only by service personnel through the use of a special tool, lock and key, or other means of security, and is controlled by the authority responsible for the location.

VORSICHT	Alle Geräte mit DC-Netzteil sind nur für die Installation in Bereichen mit beschränktem Zugang gedacht. Ein Bereich mit beschränktem Zugang ist ein Bereich, zu dem nur Wartungspersonal mit Spezialwerkzeug, Schlüssel oder anderen Sicherheitsvorrichtungen Zugang hat. Dieser Zugang wird von für den Bereich zuständigen Personen überwacht.
MISE EN GARDE	Tous les dispositifs avec bloc d'alimentation C.C. sont conçus pour l'installation dans des zones à accès réglementé uniquement. Une zone à accès réglementé est une zone dont l'accès n'est possible qu'au personnel de service utilisant un verrou, une clé ou un outil spécial, ou d'autres moyens de sécurité, et qui est contrôlée par les autorités responsables du site.

PRECAUCIÓN	Todos los instrumentos con suministros de corriente continua han sido diseñados únicamente para instalación en áreas restringidas. Se entiende como área de acceso restringido un lugar al que solo puede acceder personal de servicio mediante el uso de una herramienta especial, llave y cerrojo u otro medio de seguridad similar, y que esté controlado por la autoridad responsable de esa ubicación.

CAUTION

Use a separate branch circuit for each power cord, which provides redundancy in case one of the circuits fails.

VORSICHT	Es empfiehlt sich die Installation eines separaten Stromkreiszweiges für jede Elektroschnur als Redundanz im Fall des Ausfalls eines Stromkreises.
MISE EN GARDE	Utilisez un circuit de dérivation différent pour chaque cordon d'alimentation ainsi, il y aura un circuit redondant en cas de panne d'un des circuits.
PRECAUCIÓN	Use un circuito derivado separado para cada cordón de alimentación, con lo que se proporcionará redundancia en caso de que uno de los circuitos falle.

CAUTION

Ensure that the device does not overload the power circuits, wiring, and over-current protection. To determine the possibility of overloading the supply circuits, add the ampere (amp) ratings of all devices installed on the same circuit as the device. Compare this total with the rating limit for the circuit. The maximum ampere ratings are usually printed on the devices near the input power connectors.

VORSICHT	Stromkreise, Verdrahtung und Überlastschutz dürfen nicht durch das Gerät überbelastet werden. Addieren Sie die Nennstromleistung (in Ampere) aller Geräte, die am selben Stromkreis wie das Gerät installiert sind. Somit können Sie feststellen, ob die Gefahr einer Überbelastung der Versorgungsstromkreise vorliegt. Vergleichen Sie diese Summe mit der Nennstromgrenze des Stromkreises. Die Höchstnennströme (in Ampere) stehen normalerweise auf der Geräterückseite neben den Eingangsstromanschlüssen.
MISE EN GARDE	Assurez-vous que le dispositif ne risque pas de surcharger les circuits d'alimentation, le câblage et la protection de surintensité. Pour déterminer le risque de surcharge des circuits d'alimentation, additionnez l'intensité nominale (ampères) de tous les dispositifs installés sur le même circuit que le dispositif en question. Comparez alors ce total avec la limite de charge du circuit. L'intensité nominale maximum en ampères est généralement imprimée sur chaque dispositif près des connecteurs d'entrée d'alimentation.
PRECAUCIÓN	Verifique que el instrumento no sobrecargue los circuitos de corriente, el cableado y la protección para sobrecargas. Para determinar la posibilidad de sobrecarga en los circuitos de suministros, añada las capacidades nominales de corriente (amp) de todos los instrumentos instalados en el mismo circuito que el instrumento. Compare esta suma con el límite nominal para el circuito. Las capacidades nominales de corriente máximas están generalmente impresas en los instrumentos, cerca de los conectores de corriente de entrada.

CAUTION

Before plugging a cable into to any port, be sure to discharge the voltage stored on the cable by touching the electrical contacts to ground surface.

VORSICHT	Bevor Sie ein Kabel in einen Anschluss einstecken, entladen Sie jegliche im Kabel vorhandene elektrische Spannung, indem Sie mit den elektrischen Kontakten eine geerdete Oberfläche berühren.
MISE EN GARDE	Avant de brancher un câble à un port, assurez-vous de décharger la tension du câble en reliant les contacts électriques à la terre.
PRECAUCIÓN	Antes de conectar un cable en cualquier puerto, asegúrese de descargar la tensión acumulada en el cable tocando la superficie de conexión a tierra con los contactos eléctricos.

CAUTION

Remove the power cord from a power supply before you install it in or remove it from the device. Otherwise, the power supply or the device could be damaged as a result. (The device can be running while a power supply is being installed or removed, but the power supply itself should not be connected to a power source.)

VORSICHT	Nehmen Sie vor dem Anschließen oder Abtrennen des Geräts das Stromkabel vom Netzteil ab. Ansonsten könnten das Netzteil oder das Gerät beschädigt werden. (Das Gerät kann während des Anschließens oder Annehmens des Netzteils laufen. Nur das Netzteil sollte nicht an eine Stromquelle angeschlossen sein.)
MISE EN GARDE	Enlevez le cordon d'alimentation d'un bloc d'alimentation avant de l'installer ou de l'enlever du dispositif. Sinon, le bloc d'alimentation ou le dispositif risque d'être endommagé. (Le dispositive peut être en train de fonctionner lorsque vous installez ou enlevez un bloc d'alimentation, mais le bloc d'alimentation lui-même ne doit pas être connecté à une source d'alimentation.)
PRECAUCIÓN	Retire el cordón de corriente del suministro de corriente antes de instalarlo o retirarlo del instrumento. De no hacerse así, el suministro de corriente o el instrumento podrían resultar dañados. (El instrumento puede estar encendido mientras se instala o retira un suministro de corriente, pero el suministro de corriente en sí no deberá conectado a la corriente).

CAUTION

If you do not install a module or a power supply in a slot, you must keep the slot filler panel in place. If you run the chassis with an uncovered slot, the system will overheat.

VORSICHT	Falls kein Modul oder Netzteil im Steckplatz installiert wird, muss die Steckplatztafel angebracht werden. Wenn ein Steckplatz nicht abgedeckt wird, läuft das System heiß.
MISE EN GARDE	Si vous n'installez pas de module ou de bloc d'alimentation dans un slot, vous devez laisser le panneau du slot en place. Si vous faites fonctionner le châssis avec un slot découvert, le système surchauffera.
PRECAUCIÓN	Si no instala un módulo o un fuente de alimentación en la ranura, deberá mantener el panel de ranuras en su lugar. Si pone en funcionamiento el chasis con una ranura descubierta, el sistema sufrirá sobrecalentamiento.

CAUTION

For the DC input circuit to the system, make sure there is a 20 Amp circuit breaker, minimum 60 VDC, double pole, on the input terminal block to the power supply. The input wiring for connection to the product should be copper wire, 12 AWG, marked VW-1, and rated minimum 90°C.

VORSICHT	Für den Eingangs-Gleichstromkreis zum System ist ein 20 A maximum -60 V DC, doppelpoliger Stromkreisunterbrecher am Eingang zur Reihenklemme zu installieren. Bei der Eingangsverdrahtung zum Anschluss des Produkts sollte es sich um einen 12 AWG-Kupferdraht (VW-1) und einer Mindestnenntemperatur von 90° C handeln.
MISE EN GARDE	Pour le circuit d'alimentation C.C du système, assurez-vous de la présence d'un disjoncteur de 20 ampères, maximum -60 V C.C., double coupure, sur l'entrée vers le bloc d'alimentation. Les câbles d'alimentation pour le produit doivent être en fils de cuivre, 12 AWG (American Wire Gauge), marqués VW-1 et classés 90 degrés Celsius.
PRECAUCIÓN	Para el circuito de entrada de CC al sistema, verifique que existe un cortacircuitos catalogado de 20 amperios, como máximo, -60 VCC, bipolar, en la entrada al bloque terminal. El cableado de entrada para la conexión al producto deberá ser de cable de cobre catalogado, 12 AWG, marcado con VW-1, y tener una capacidad nominal mínima para 90 grados centígrados.

CAUTION

For a DC system, use grounding wire of at least 12 American Wire Gauge (AWG). The grounding wire should be attached to the DC input connector the other end connects to the building ground.

VORSICHT	Für ein Gleichstromsystem verwenden Erdungskabel von mindestens 12AWG(3.31 mm2) (amerikanische Norm für Drahtquerschnitte). Der Erdungsdraht sollte DC-Eingang angeschlossen werden, das andere Ende verbindet sich mit dem Baugrund.
MISE EN GARDE	Pour les systèmes d'alimentation courant continu (C.C), utilisez un fil de mise à terre d'au moins de 12 AWG (ou 3.31mm2). Le fil de mise à terre doit être relié au connecteur du circuit d'alimentation; l'autre extrémité se connecte à la prise terre du batiment.
PRECAUCIÓN	Para un sistema de CC, usar alambre de puesta a tierra de por lo menos 12 AWG (American Wire Gauge). El cable de tierra debe ser conectada a enchufe DC el otro extremo se conecta a la tierra del edificio.

Danger Notices

A Danger statement indicates conditions or situations that can be potentially lethal or extremely hazardous to you. Safety labels are also attached directly to products to warn of these conditions or situations.

Ein Gefahrenhinweis warnt vor Bedingungen oder Situationen die tödlich sein können oder Sie extrem gefährden können. Sicherheitsetiketten sind direkt auf den jeweiligen Produkten angebracht um vor diesen Bedingungen und Situationen zu warnen.

Un paragraphe Danger indique des conditions ou des situations potentiellement mortelles ou extrêmement dangereuses. Des labels de sécurité sont posés directement sur le produit et vous avertissent de ces conditions ou situations

Una advertencia de peligro indica condiciones o situaciones que pueden resultar potencialmente letales o extremadamente peligrosas. También habrá etiquetas de seguridad pegadas directamente sobre los productos para advertir de estas condiciones o situaciones.

General dangers

DANGER

The procedures in this manual are for qualified service personnel.

GEFAHR	Die Vorgehensweisen in diesem Handbuch sind für qualifiziertes Servicepersonal bestimmt.
DANGER	Les procédures décrites dans ce manuel doivent être effectuées par un personnel de maintenance qualifié.
PELIGRO	Los procedimientos de este manual deben llevarlos a cabo técnicos cualificados.

Electrical dangers

DANGER

Before beginning the installation, see the precautions in "Power precautions."

GEFAHR	Vor der Installation siehe Vorsichtsmaßnahmen unter "Power Precautions" (Vorsichtsmaßnahmen in Bezug auf elektrische Ablagen).
DANGER	Avant de commencer l'installation, consultez les précautions décrites dans "Power Precautions" (Précautions quant à l'alimentation).
PELIGRO	Antes de comenzar la instalación, consulte las precauciones en la sección "Power Precautions" (Precauciones sobre corriente).

DANGER

Disconnect the power cord from all power sources to completely remove power from the device.

GEFAHR	Ziehen Sie das Stromkabel aus allen Stromquellen, um sicherzustellen, dass dem Gerät kein Strom zugeführt wird.
DANGER	Débranchez le cordon d'alimentation de toutes les sources d'alimentation pour couper complètement l'alimentation du dispositif.
PELIGRO	Para desconectar completamente la corriente del instrumento, desconecte el cordón de corriente de todas las fuentes de corriente.

DANGER

If the installation requires a different power cord than the one supplied with the device, make sure you use a power cord displaying the mark of the safety agency that defines the regulations for power cords in your country. The mark is your assurance that the power cord can be used safely with the device.

GEFAHR	Falls für die Installation ein anderes Stromkabel erforderlich ist (wenn das mit dem Gerät gelieferte Kabel nicht passt), müssen Sie sicherstellen, dass Sie ein Stromkabel mit dem Siegel einer Sicherheitsbehörde verwenden, die für die Zertifizierung von

	Stromkabeln in Ihrem Land zuständig ist. Das Siegel ist Ihre Garantie, dass das Stromkabel sicher mit Ihrem Gerät verwendet werden kann.
DANGER	Si l'installation nécessite un cordon d'alimentation autre que celui fourni avec le dispositif, assurez-vous d'utiliser un cordon d'alimentation portant la marque de l'organisation responsable de la sécurité qui définit les normes et régulations pour les cordons d'alimentation dans votre pays. Cette marque vous assure que vous pouvez utiliser le cordon d'alimentation avec le dispositif en toute sécurité.
PELIGRO	Si la instalación requiere un cordón de corriente distinto al que se ha suministrado con el instrumento, verifique que usa un cordón de corriente que venga con la marca de la agencia de seguridad que defina las regulaciones para cordones de corriente en su país. Esta marca será su garantía de que el cordón de corriente puede ser utilizado con seguridad con el instrumento.

DANGER

For safety reasons, the ESD wrist strap should contain a series 1 megaohm resistor.

GEFAHR	Aus Sicherheitsgründen sollte ein EGB-Armband zum Schutz von elektronischen gefährdeten Bauelementen mit einem 1 Megaohm-Reihenwiderstand ausgestattet sein.
DANGER	Pour des raisons de sécurité, la dragonne ESD doit contenir une résistance de série 1 méga ohm.
PELIGRO	Por razones de seguridad, la correa de muñeca ESD deberá contener un resistor en serie de 1 mega ohmio.

DANGER

Risk of explosion if battery is replaced by an incorrect type. Dispose of used batteries according to the instructions.

GEFAHR	Es besteht Explosionsgefahr, wenn ein unzulässiger Batterietyp eingesetzt wird. Verbrauchte Batterien sind entsprechend den geltenden Vorschriften zu entsorgen.
DANGER	Risque d'explosion en cas de remplacement de la pile par un modèle incorrect. Débarrassez-vous des piles usagées conformément aux instructions.
PELIGRO	Riesgo de explosión si se sustituye la batería por una de tipo incorrecto. Deshágase de las baterías usadas de acuerdo con las instrucciones.

DANGER

Remove both power cords before servicing.

GEFAHR	Trennen Sie beide Netzkabel, bevor Sie Wartungsarbeiten durchführen.
DANGER	Retirez les deux cordons d'alimentation avant toute maintenance.
PELIGRO	Desconecte ambos cables de alimentación antes de realizar reparaciones.

DANGER

To avoid high voltage shock, do not open the device while the power is on.

GEFAHR	Das eingeschaltete Gerät darf nicht geöffnet werden, da andernfalls das Risiko eines Stromschlags mit Hochspannung besteht.
DANGER	Afin d'éviter tout choc électrique, n'ouvrez pas l'appareil lorsqu'il est sous tension.
PELIGRO	Para evitar una descarga de alto voltaje, no abra el dispositivo mientras esté encendido.

Dangers related to equipment weight

DANGER

Make sure the rack housing the device is adequately secured to prevent it from becoming unstable or falling over.

GEFAHR	Stellen Sie sicher, dass das Gestell für die Unterbringung des Geräts auf angemessene Weise gesichert ist, so dass das Gestell oder der Schrank nicht wackeln oder umfallen kann.
DANGER	Vérifiez que le bâti abritant le dispositif est bien fixé afin qu'il ne devienne pas instable ou qu'il ne risque pas de tomber.
PELIGRO	Verifique que el bastidor que alberga el instrumento está asegurado correctamente para evitar que pueda hacerse inestable o que caiga.

DANGER

Mount the devices you install in a rack as low as possible. Place the heaviest device at the bottom and progressively place lighter devices above.

GEFAHR	Montieren Sie die Geräte im Gestell so tief wie möglich. Platzieren Sie das schwerste Gerät ganz unten, während leichtere Geräte je nach Gewicht (je schwerer desto tiefer) darüber untergebracht werden.
DANGER	Montez les dispositifs que vous installez dans un bâti aussi bas que possible. Placez le dispositif le plus lourd en bas et le plus léger en haut, en plaçant tous les dispositifs progressivement de bas en haut du plus lourd au plus léger.
PELIGRO	Monte los instrumentos que instale en un bastidor lo más bajos posible. Ponga el instrumento más pesado en la parte inferior y los instrumentos progresivamente más livianos más arriba.

Laser dangers

DANGER

Laser Radiation. Do Not View Directly with Optical Instruments. Class 1M Laser Products.

GEFAHR	Laserstrahlung! Schauen Sie nicht direkt mit optischen Instrumenten in den Laserstrahl herein. Klasse 1M Laserprodukte.
DANGER	Rayonnement de laser. Ne regardez pas directement avec des instruments optiques. Produits de laser de classe 1M.
PELIGRO	Radiacion de Laser. No vea directamente con Instrumentos Opticos. Clase 1M de Productos de Laser.
警告	レーザ放射 光学器具で直接ビームを見ないこと クラス 1 M レーザ製品