HARDWARE INSTALLATION GUIDE

Brocade ICX 6650 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.

Brocade resources

Visit the Brocade website to locate related documentation for your product and additional Brocade resources.

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Click the **Support** tab and select **Document Library** to access product documentation on MyBrocade or www.brocade.com. You can locate documentation by product or by operating system.

Release notes are bundled with software downloads on MyBrocade. Links to software downloads are available on the MyBrocade landing page and in the Document Library.

Document feedback

Quality is our first concern at Brocade, and we have made every effort to ensure the accuracy and completeness of this document. However, if you find an error or an omission, or you think that a topic needs further development, we want to hear from you. You can provide feedback in two ways:

- Through the online feedback form in the HTML documents posted on www.brocade.com
- By sending your feedback to documentation@brocade.com

Provide the publication title, part number, and as much detail as possible, including the topic heading and page number if applicable, as well as your suggestions for improvement.

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Brocade customers

For product support information and the latest information on contacting the Technical Assistance Center, go to www.brocade.com and select **Support**.

If you have purchased Brocade product support directly from Brocade, use one of the following methods to contact the Brocade Technical Assistance Center 24x7.

Online	Telephone
Preferred method of contact for non-urgent issues: • Case management through the MyBrocade portal. • Quick Access links to Knowledge Base, Community, Document Library, Software Downloads and Licensing tools	Required for Sev 1-Critical and Sev 2-High issues: • Continental US: 1-800-752-8061 • Europe, Middle East, Africa, and Asia Pacific: +800-AT FIBREE (+800 28 34 27 33) • Toll-free numbers are available in many countries. • For areas unable to access a toll-free number: +1-408-333-6061

Brocade OEM customers

If you have purchased Brocade product support from a Brocade OEM/solution provider, contact your OEM/solution provider for all of your product support needs.

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- Brocade provides backline support for issues that cannot be resolved by the OEM/solution provider.
- 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

What's new in this document

There are no enhancements in this edition.

Supported Software

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

Brocade ICX 6650 Overview

Brocade ICX 6650 features

The Brocade ICX 6650 is an Ethernet switch for campus LAN aggregation and classic Ethernet data center Top of Rack (ToR) environments.

The Brocade ICX 6650 is a high-density aggregation switch that offers both 1/10 and 10/40 Gigabit Ethernet (GbE) line rates, low latency cut-through switching, and 1600 Gbps switching capacity for campus LAN and classic Ethernet data center environments.

The Brocade ICX 6650 features:

- Comprehensive support for a range of 10GbE and 40GbE optics (refer to the *Brocade Ethernet Optics Family* datasheet on the Brocade website).
- Dual redundant, hot-swappable 250 W AC or 510 W DC power supplies available with intake or exhaust airflow.
- Dual redundant, hot-swappable fan units available with intake or exhaust airflow.
- One Gigabit Ethernet port (RJ-45) and one serial management port to configure and manage the switch through the CLI.

Brocade ICX 6650 orderable models

The Brocade ICX 6650 switches consists of these orderable models.

TABLE 1 Brocade ICX 6650 orderable switch models

Model	Description
ICX6650-32-ADV	Brocade ICX 6650 with 32 10 GbE SFP+ ports enabled. No power supplies or fan units (need to be ordered separately). Advanced software. Optional Ports on Demand (PoD) licenses to enable up to 56 10 GbE SFP+ ports and 6 QSFP+ ports can be ordered separately. No optics.
ICX6650-32-E-ADV	Brocade ICX 6650 with 32 10 GbE SFP+ ports enabled. Includes two 250 W AC power supplies and two fan units, power-supply-side exhaust (port-side intake) airflow. Advanced software. No optics.
ICX6650-48-E-ADV	Brocade ICX 6650 with 48 10 GbE SFP+ ports enabled. Includes two 250 W AC power supplies and two fan units, power-supply-side exhaust (port-side intake) airflow. Advanced software. No optics.
ICX6650-56-E-ADV	Brocade ICX 6650 with 56 10 GbE SFP+ ports enabled. Includes two 250 W AC power supplies and two fan units, power-supply-side exhaust (port-side intake) airflow. Advanced software. No optics.

Brocade ICX 6650 customizable models

After March 2014, you will no longer be able to order the following SKUs:

- ICX6650-32-I-ADV
- ICX6650-40-E-ADV
- ICX6650-40-I-ADV
- ICX6650-48-I-ADV
- ICX6650-56-I-ADV
- ICX6650-80-E-ADV
- ICX6650-80-I-ADV

However, you can build your own equivalent models by combining the ICX6650-32-ADV SKU with PoD license, power supply, and fan SKUs. The following table lists the models you can build by combining these components:

TABLE 2 Brocade ICX 6650 custom models

Model	Description	License, power supply, and fan SKUs needed	Quantity
ICX6650-32-I-ADV	Brocade ICX 6650 with 32 10-GbE SFP+ ports enabled. Includes two 250 W AC power supplies and two fan units, intake airflow. Advanced software. No optics.	RPS15-I	2
		XICX6650-FAN-I	2
ICX6650-40-E-ADV	Brocade ICX 6650 with 40 10-GbE SFP+ ports enabled. Includes two 250 W AC power supplies and two fan units, exhaust airflow. Advanced software. No optics.	ICX6650-8P10G-LIC-POD	1
		RPS15-E	2
		XICX6650-FAN-E	2
ICX6650-40-I-ADV	Brocade ICX 6650 with 40 10-GbE SFP+ ports enabled. Includes two 250 W AC power supplies and two fan units, intake airflow. Advanced software. No optics.	ICX6650-8P10G-LIC-POD	1
		RPS15-I	2
		XICX6650-FAN-I	2
ICX6650-48-I-ADV	Brocade ICX 6650 with 48 10-GbE SFP+ ports enabled. Includes two 250 W AC power supplies and two fan units, intake airflow. Advanced software. No optics.	ICX6650-8P10G-LIC-POD	2
		RPS15-I	2
		XICX6650-FAN-I	2
ICX6650-56-I-ADV	Brocade ICX 6650 with 56 10-GbE SFP+ ports enabled. Includes two 250 W AC power supplies and two fan units, intake airflow. Advanced software. No optics.	ICX6650-8P10G-LIC-POD	3
		RPS15-I	2
		XICX6650-FAN-I	2
ICX6650-80-E-ADV	Brocade ICX 6650 with 56 10-GbE SFP+ and 6 40-GbE ports enabled. Includes two 250 W AC power supplies and two fan units, exhaust airflow. Advanced software. No optics.	ICX6650-8P10G-LIC-POD	3
		ICX6650-2P40G-LIC-POD	3
		RPS15-E	2
		XICX6650-FAN-E	2
ICX6650-80-I-ADV	Brocade ICX 6650 with 56 10-GbE SFP+ and 6 40-GbE ports enabled. Includes two 250 W AC power supplies and two fan units, intake airflow. Advanced software. No optics.	ICX6650-8P10G-LIC-POD	3
		ICX6650-2P40G-LIC-POD	2
		RPS15-I	2
		XICX6650-FAN-I	2

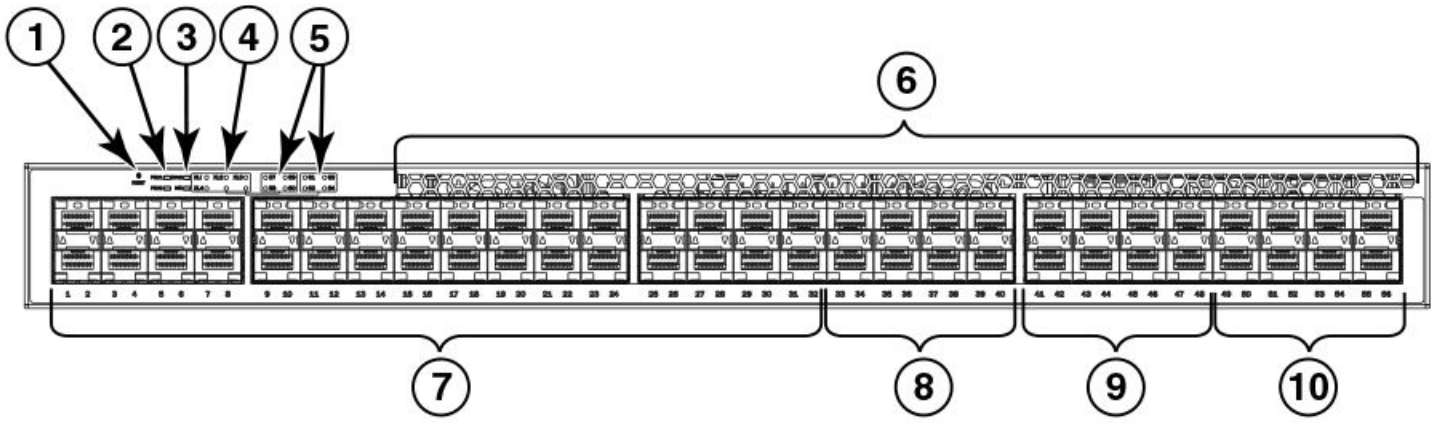
In addition to the models listed in the previous table, you can create other custom models by making different SKU combinations as described in the following table.

TABLE 3 SKUs for creating custom Brocade ICX 6650 switch models

SKU	Description
ICX6650-8P10G-LIC-POD	Ports on Demand license for Brocade ICX 6650, for 8×10 GbE SFP+ ports.
ICX6650-2P40G-LIC-POD	Ports on Demand license for Brocade ICX 6650, for two QSFP+ (40 GbE or 4×10 GbE) ports.
RPS15-E	250 W AC power supply; port-side exhaust airflow.
RPS15-I	250 W AC power supply; port-side intake airflow.
RPS16DC-E	510 W DC power supply; power-supply-side exhaust (port-side intake) airflow.
RPS16DC-I	510 W DC power supply; power-supply-side intake (port-side exhaust) airflow.
XICX6650-FAN-E	Brocade ICX 6650 fan unit, exhaust airflow.
XICX6650-FAN-I	Brocade ICX 6650 fan unit, intake airflow.

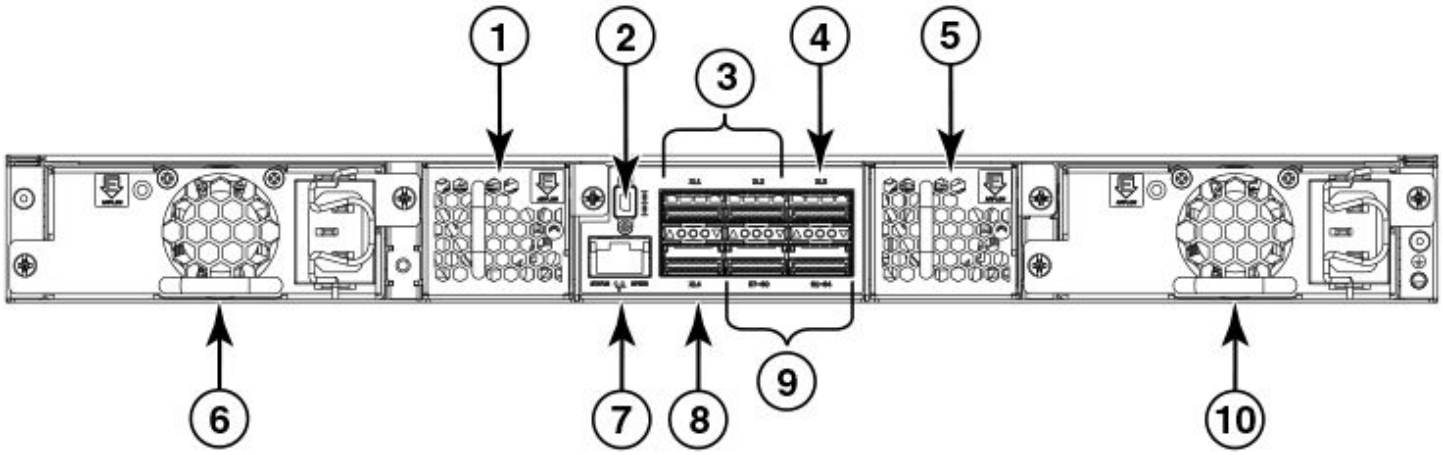
Views of the Brocade ICX 6650 switch

FIGURE 1 Front view of the Brocade ICX 6650



1. Push button reset
2. PSU1 and PSU2 status LEDs
3. DIAG and MS status LEDs
4. 40 GbE QSFP rear port status/activity LEDs
5. 10 GbE QSFP-to-SFP breakout port status/activity LED
6. Air intake/exhaust
7. Ports 1/1 through 1/32
8. Ports 1/33 through 1/40
9. Ports 1/41 through 1/48
10. Ports 1/49 through 1/56

FIGURE 2 Rear view of the Brocade ICX 6650



1. Fan unit
2. Mini-USB serial console port
3. Ports 2/1 through 2/2
4. Port 2/3
5. Fan unit
6. Power supply
7. Ethernet management port
8. Port 2/4
9. Ports 3/1 through 3/8
10. Power supply

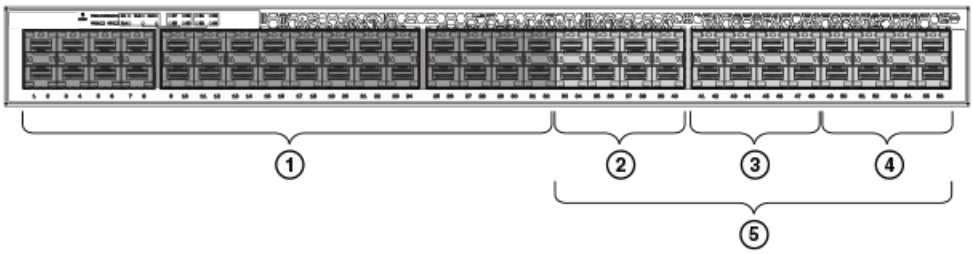
Ports on Demand licensing

The Brocade ICX 6650 features Ports on Demand licensing. With Ports on Demand licensing, software features do not require licenses and you can add port licenses as needed.

A fully populated device supports 56 front-panel, dual-speed 1/10 GbE SFP+ ports, 4 rear-panel 40 GbE QSFP+ ports, and 2 rear-panel 4x10 GbE QSFP+ breakout ports.

You can purchase and install Ports on Demand licenses in blocks of eight dual-speed 1/10 GbE SFP+ on the front-panel ports. These ports are grouped sequentially, enabling ports 33 through 40, 41 through 48, and 49 through 56. To enable the additional front-panel ports, you must purchase and install an ICX6650-8P10G-LIC-POD license.

FIGURE 3 Brocade ICX 6650 front-panel ports



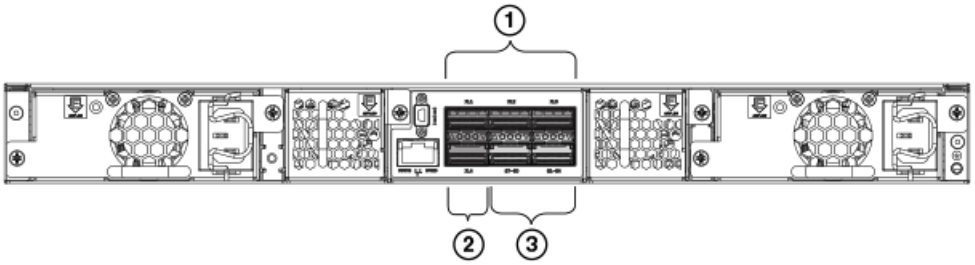
1. Base (32x10 GbE)
2. 8x10 GbE (33-40)
3. 8x10 GbE (41-48)
4. 8x10 GbE (49-56)
5. Blocks of 8x10 GbE SFP+ ports

You can purchase and install up to three ICX6650-2P40G-LIC-POD licenses to enable pairs of 40 GbE ports or 4x10 GbE breakout ports on the rear panel. An ICX6650-2P40G-LIC-POD license can be applied to any of the following pairs of 40 GbE rear-panel ports or 4x10 GbE breakout ports:

- 2/1 and 2/2 40 GbE rear-panel ports
- 2/3 and 2/4 40 GbE rear-panel ports
- 3/1-4 and 3/5-8 4x10 GbE rear-panel breakout ports

NOTE
You can add an ICX6650-2P40G-LIC-POD license to any configuration.

FIGURE 4 Brocade ICX 6650 rear-panel ports



1. 2/1-2: Any pair of QSFP+ ports—2x40 GbE ports (2/1-2, 2/3-4), 2 4x10 GbE ports (3/1-4,3/5-8)
2. 2/4
3. 3/1-8: 4x10 GbE breakout ports (3/1-4, 3/5-8)

The breakout ports support one of the following options:

- Direct-attached QSPF+ to 4 SFP+ copper breakout cables (Part number 40G-QSFP-4SFP-C-/0101/0301/0501)
- Breakout-capable SR4 QSPF+ optical transceiver (Part number 40G-QSFP-SR4-INT)

No trial licenses are available with Ports on Demand licensing.

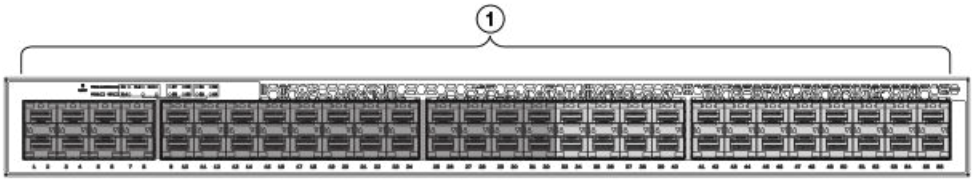
Brocade ICX 6650 slot and Ethernet port numbering

Many CLI commands require users to enter port numbers as part of the command syntax, and many **show** command outputs display port numbers. The port numbers are entered and displayed in *stack-unit/slot number/port number* format. In all Brocade ICX 6650 inputs and outputs, the stack-unit number is always 1.

The Brocade ICX 6650 contains the following slots and Ethernet ports:

- Slot 1 is located on the front of the Brocade ICX 6650 switch and contains ports 1 through 56, which are 1/10 GbE SFP+ ports. Refer to the following figure.

FIGURE 5 Brocade ICX 6650 front-panel ports

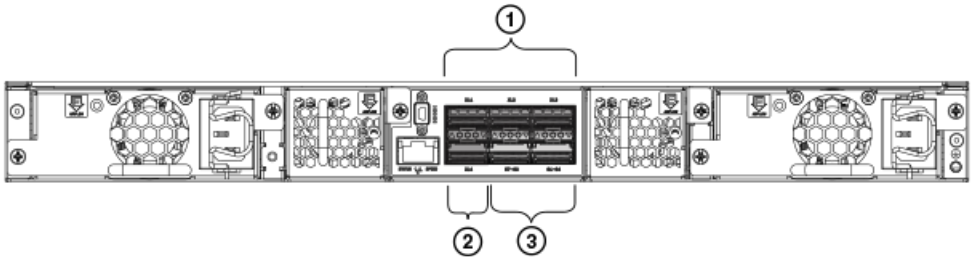


1. Slot 1

- Slot 2 is located on the rear of the Brocade ICX 6650 switch and contains ports 1 through 3 on the top row and port 4 on the bottom row. These ports are 40 GbE QSFP+ ports. Refer to the following figure.

  NOTE
  The QSFP+ 40 GbE LR4 optical transceiver is supported in ports 1 and 2 only. When the module is inserted into a stack-unit/slot number/port number combination that is not 1/2/1 or 1/2/2, the following error message displays: "QSFP LR-4 optics not supported on port *port-number*."

FIGURE 6 Brocade ICX 6650 rear-panel ports



1. Slot 2
2. Slot 2
3. Slot 3

- Slot 3 is located on the rear of the Brocade ICX 6650 switch and contains ports 1 through 8. These ports are 4x10 GbE breakout ports and require the use of a breakout cable. Refer to the previous figure.

Supported transceivers and cables

The Brocade ICX 6650 supports the following transceivers and cables:

- 1 GbE
  - SX
  - LX
  - Copper
- 10 GbE
  - SFP+: USR, Short Reach, Long Reach
  - Active twinaxial copper (1 meter, 3 meter, and 5 meter)
  - 10 GbE ER SFP+
- 40 GbE
  - Standard 40 GbE (SR4) transceiver without breakout

- 40 GbE (SR4) QSFP+ transceiver with breakout to 4x10 GbE up to 100 meters on OM3 fiber
- 40 GbE direct attach (DAC) copper breakout (1 meter, 3 meter, and 5 meter)
- 40 GbE QSFP to QSFP active twinaxial (1 meter, 3 meter, and 5 meter)
- 40 GbE (LR4) QSFP+ transceiver up to 10 km

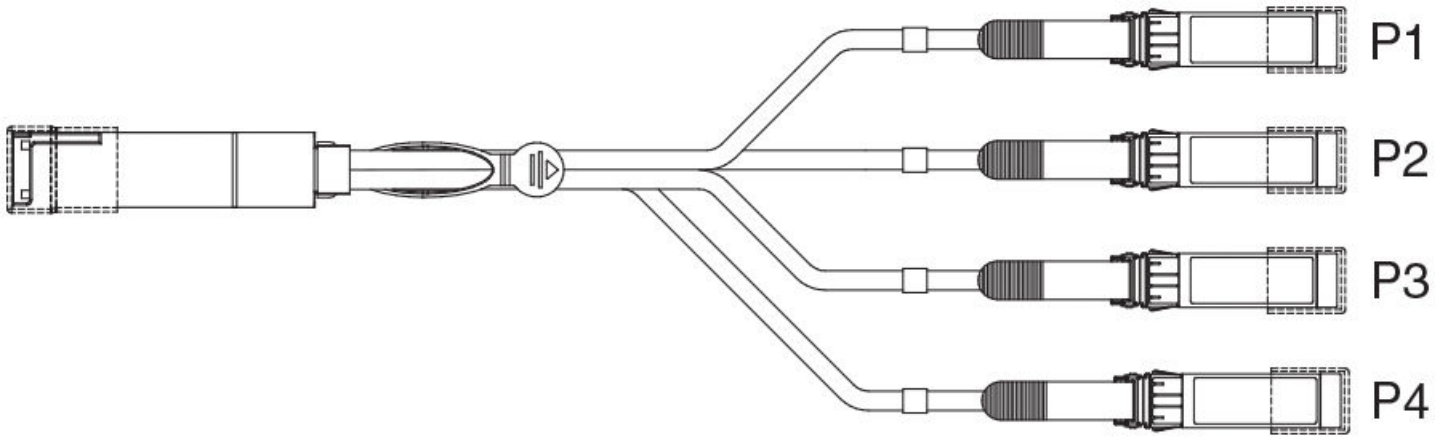
NOTE
Non-branded active twinaxial cables can be used, but Brocade does not support them.

Breakout cables

The rear panel of the Brocade ICX 6650 contains two 4 x 10 GbE ports which support QSFP+ to 4 SFP+ (4 x 10 GbE) direct-attach copper breakout cables. These cables are terminated with optical connectors and are available in 1m, 3m, 5m, and greater lengths. No additional connectors or cabling are required for these ports.

We do not support 40G passive (optical) cables.

FIGURE 7 QSFP+ to 4 SFP+ (4 x 10 GbE) direct-attach copper breakout cable



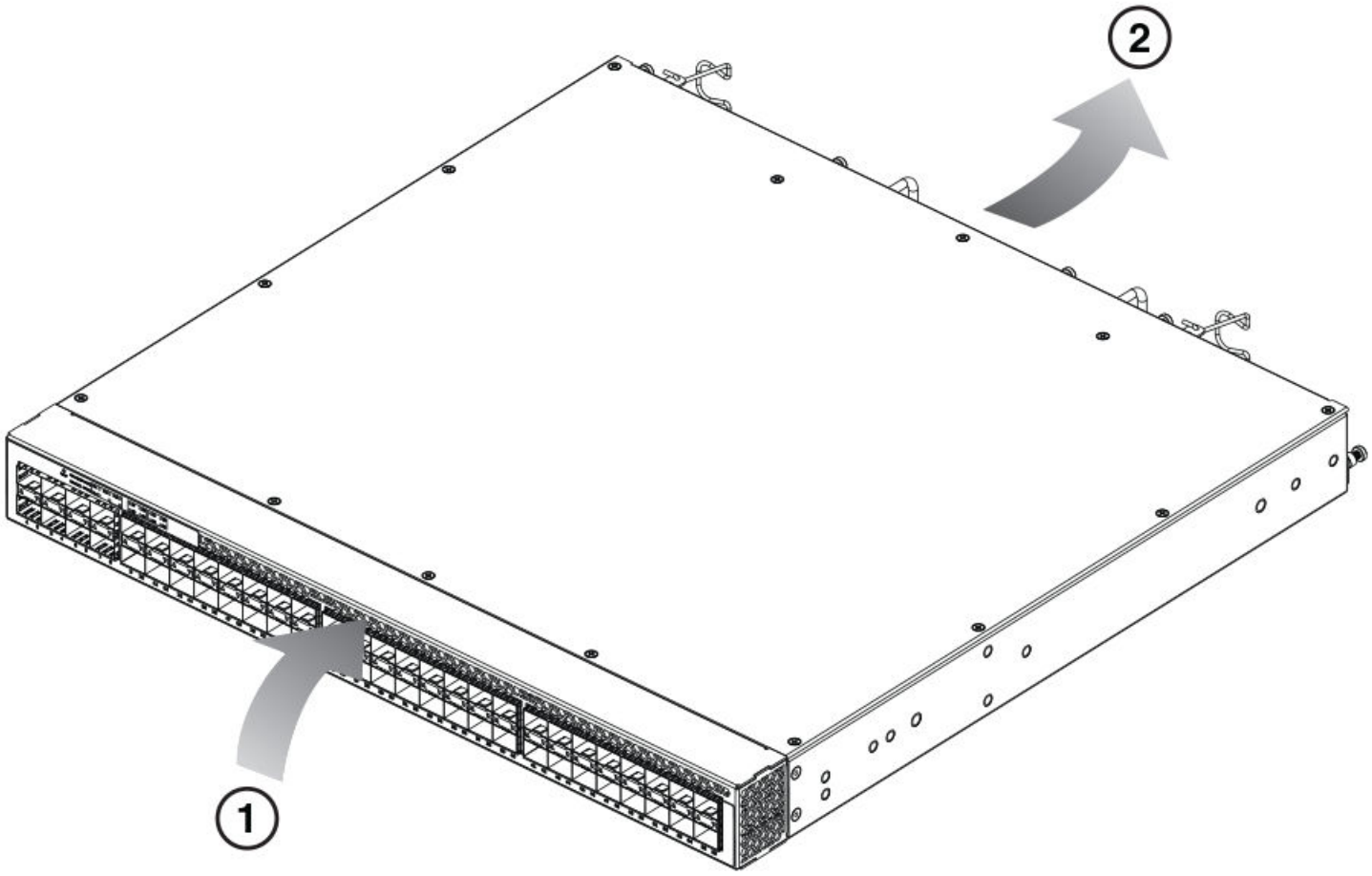
Cooling system and fans

The fans cool the CPU, main memory, and voltage regulators. For Brocade ICX 6650 switches, the fans use either:

- An exhaust airflow which moves air from front to back. Refer to the first figure below. Devices with exhaust airflow are labeled with a green arrow with an “E.”
- An intake airflow which moves air from back to front. Refer to the third figure below. Devices with intake airflow are labeled with an orange arrow with an “I.”

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."

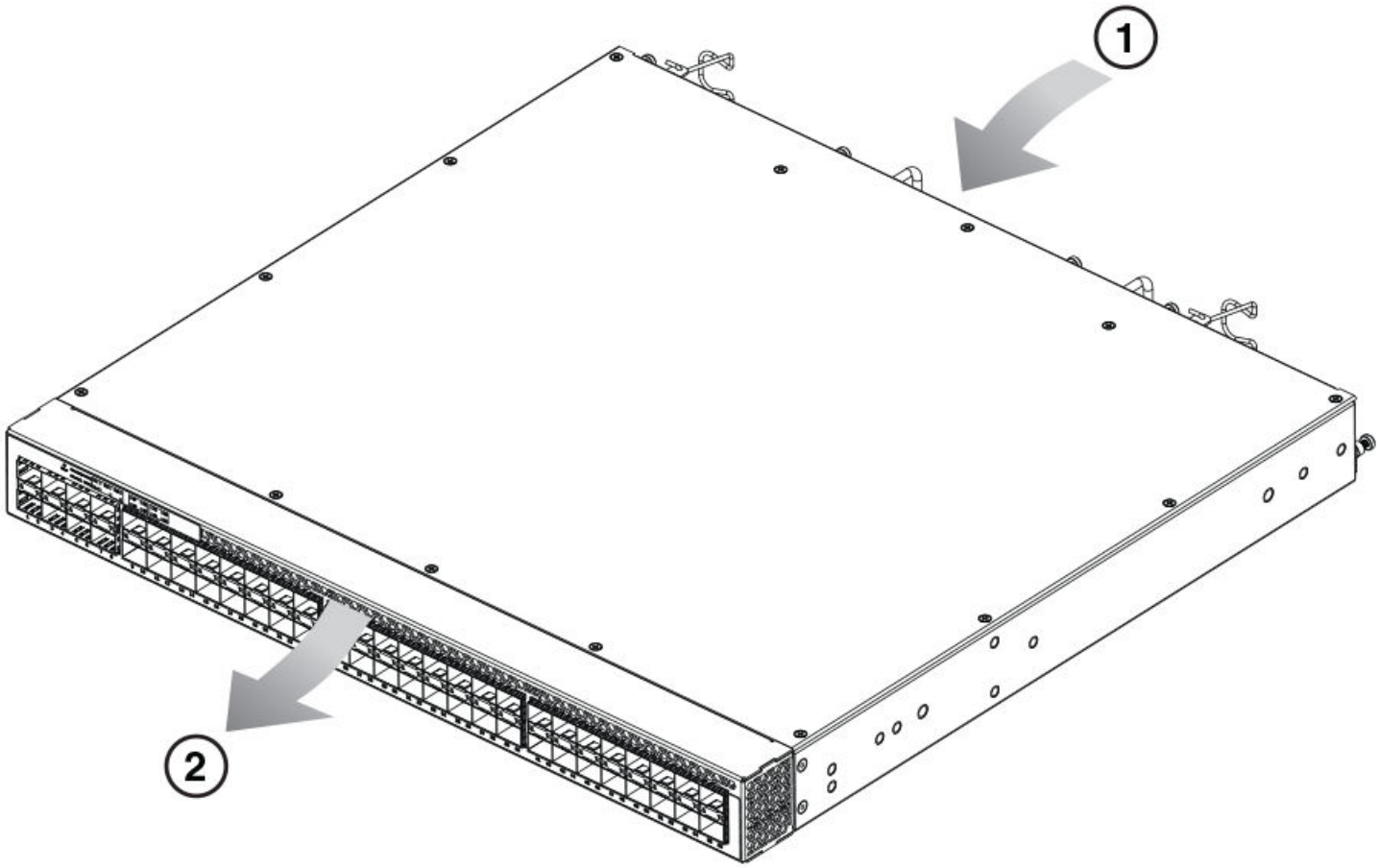
FIGURE 8 Brocade ICX 6650 airflow—front to back (with E-labeled power supply and fan tray)



1. Intake
2. Exhaust

FIGURE 9 Exhaust airflow label

FIGURE 10 Brocade ICX 6650 airflow—back to front (with I-labeled power supply and fan tray)



1. Intake
2. Exhaust

FIGURE 11 Intake airflow label

Installing the Brocade ICX 6650

Unpacking the device

The Brocade ICX 6650 ships with all of the items listed below. Verify the contents of your shipping container. If any items are missing, contact the place of purchase.

Package contents (ICX6650-32-E-ADV, ICX6650-48-E-ADV, and ICX6650-56-E-ADV)

The following items are included in your shipping carton:

- A Brocade ICX 6650 device
- One accessory kit, containing the following items:
  - Two power cords
  - One RJ-45 to DB9F adapter
  - One RJ-45 crossover cable
  - One mini-USB (M)-DB9(F) cable
  - Two mounting ears and screws
  - Grounding terminal screw

Package contents (ICX6650-32-ADV)

The following items are included in your shipping carton:

- A Brocade ICX 6650 device
- One accessory kit, containing the following items:
  - One RJ-45 to DB9F adapter
  - One RJ-45 crossover cable
  - One mini-USB (M)-DB9(F) cable
  - Two mounting ears and screws
  - Grounding terminal screw
- Installed filler panels for the right power supply unit (PSU1) slot and left fan slot.

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.

Installation and safety considerations

You can install the Brocade ICX 6650 in the following ways:

- As a standalone unit on a flat surface.
- In an EIA cabinet using a fixed-rail rack mount kit. The optional fixed-rail rack mount kit can be ordered from your switch retailer. Both the 24"-28" rack depth kit and the 28"-32" rack depth kit will work with the Brocade ICX 6650.
- In a 2-post Telco rack using a flush mount rack kit. The optional flush mount rack kit for switches can be ordered from your switch retailer.
- In a 2-post Telco rack using a mid-mount rack kit. The optional mid-mount rack kit for switches can be ordered from your switch retailer.

Electrical considerations

To install and operate the switch successfully, ensure compliance with the following requirements:

- The primary outlet is correctly wired, protected by a circuit breaker, and grounded in accordance with local electrical codes.
- The supply circuit, line fusing, and wire size are adequate, as specified by the electrical rating on the switch nameplate.
- The power supply standards are met.

Environmental considerations

For successful installation and operation of the switch, ensure that the following environmental requirements are met:

- Because the Brocade ICX 6650 can be ordered with fans that move air either front to back or back to front, be sure to orient your switch with the airflow pattern of any other devices in the rack. All equipment in the rack should force air in the same direction to avoid intake of exhaust air.
- The ambient air temperature does not exceed 40° C (104° F) while the switch is operating.
- Some combinations of intake and exhaust airflows may not be compatible with your environment. Consult your fan and power supply module FRU kit to determine the correct configuration.

Location considerations

Before installing the device, plan its location and orientation relative to other devices and equipment. 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 Environmental considerations on page 24.
- Allow a minimum of 3 in. of space between the front and the back of the device and walls or other obstructions for proper airflow.
- Allow at least 3 in. of space at the front and back of the device for the twisted-pair, fiber-optic, and power cabling.
- Be accessible for installing, cabling, and maintaining the devices.

- Allow the status LEDs to be clearly visible.
- Allow for twisted-pair cables to be routed away from power lines, fluorescent lighting fixtures, and other sources of electrical interference, such as radios and transmitters.
- 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 ft) of each device, and is powered from an independent circuit breaker. As with any equipment, a filter or surge suppressor is recommended.

Cabinet considerations

For successful installation and operation of the switch in a cabinet, ensure the following cabinet requirements are met:

- The cabinet must be a standard EIA cabinet.
- The equipment in the cabinet is grounded through a reliable branch circuit connection and maintains ground at all times. Do not rely on a secondary connection to a branch circuit, such as a power strip.
- Airflow and temperature requirements are met on an ongoing basis, particularly if the switch is installed in a closed or multicabinet assembly.
- The additional weight of the switch does not exceed the cabinet's weight limits or unbalance the cabinet in any way.
- The cabinet is secured to ensure stability in case of unexpected movement, such as an earthquake.

Recommendations for cable management

Cables can be organized and managed in a variety of ways; for example, use cable channels on the sides of the cabinet or patch panels to reduce the potential for tangling the cables. The following list provides some recommendations for cable management:

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.

NOTE
You should not use tie wraps with optical cables because they are easily overtightened and can damage the optic fibers. Velcro-like wraps are recommended.

- Plan for the rack space required for cable management before installing the switch.
- Leave at least 1 m (3.28 ft) of slack for each port cable. This provides room to remove and replace the switch, allows for inadvertent movement of the rack, and helps prevent the cables from being bent to less than the minimum bend radius.
- For easier maintenance, label the cables and record the devices to which they are connected.
- Keep LEDs visible by routing port cables and other cables away from the LEDs.

Installation tasks

Perform the following steps to install your device. Details for each of these steps are provided on the pages indicated.

TABLE 4 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.	Environmental considerations on page 24

TABLE 4 Installation tasks (continued)

Task number	Task	Where to find more information
2	If customizing the ICX6650-32-ADV baseline chassis: 1. Install at least one power supply unit. 2. Install at least one fan. 3. Obtain and install a PoD license, as described in the *FastIron Ethernet Switch Administration Guide*.	Installing and replacing a power supply unit on page 35 Installing or replacing the fan assembly on page 65
3	Install the device in an equipment rack.	Installing the device in a rack or cabinet on page 27
4	Attach a terminal or PC to the device. This will enable you to configure the device through the command line interface (CLI).	Attaching a PC or terminal on page 33
5	Plug the device into a nearby power source that adheres to the regulatory requirements outlined in this manual.	Powering on the system on page 34
6	Assign a password for additional access security. No default password is assigned to the CLI.	Assigning permanent passwords on page 43
7	Before attaching equipment to the device, you must 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 be performed using the Web management interface.	Configuring IP addresses on page 44
8	Test IP connectivity to other devices by pinging them and tracing routes.	Testing connectivity on page 49
9	Continue configuring the device using the CLI or the Web management interface.	*FastIron Ethernet Switch Administration Guide*
10	Secure access to the device.	*FastIron Ethernet Switch Administration 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.

DANGER

All fiber-optic interfaces use Class 1 lasers.

CAUTION

Do not install the device in an environment where the operating ambient temperature might exceed 40°C (104°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.

Lifting precautions

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

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
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.

Installing the device in a rack or cabinet

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

NOTE
You need a #2 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. Particular attention should be given to supply connections other than direct connections to the mains.

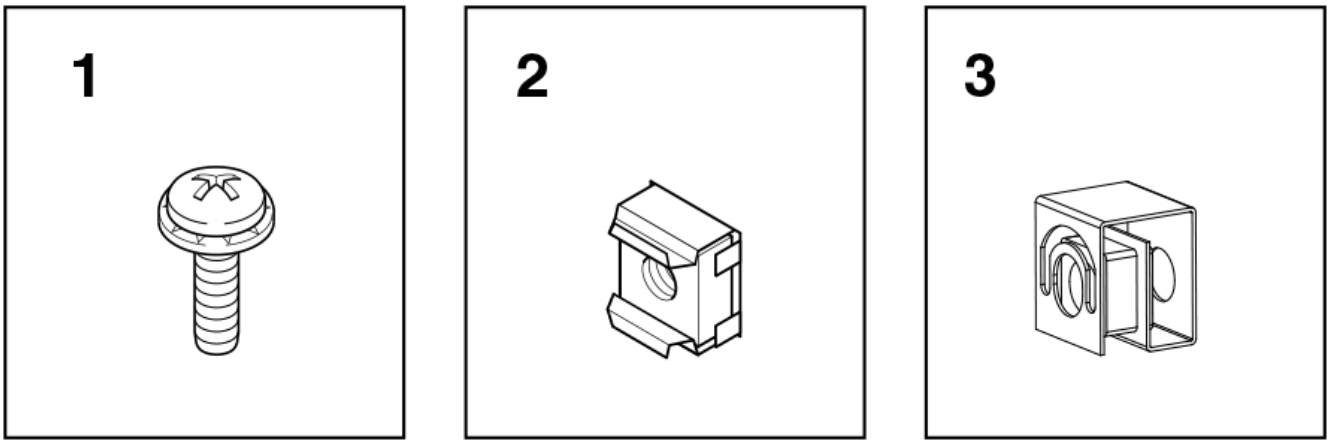
2-post rack mount installation

NOTE
The Brocade ICX 6650 is shipped with a 2-post rack mount kit to mount the switch into 2-post Telco style racks only. If the Brocade ICX 6650 is to be installed into a standard 4-post rack, make sure that you use the correct rack mount kit.

Use the following procedure when installing the Brocade ICX 6650 in a 2-post rack. For 4-post racks, follow the procedures in 4-post rack mount installation on page 30.

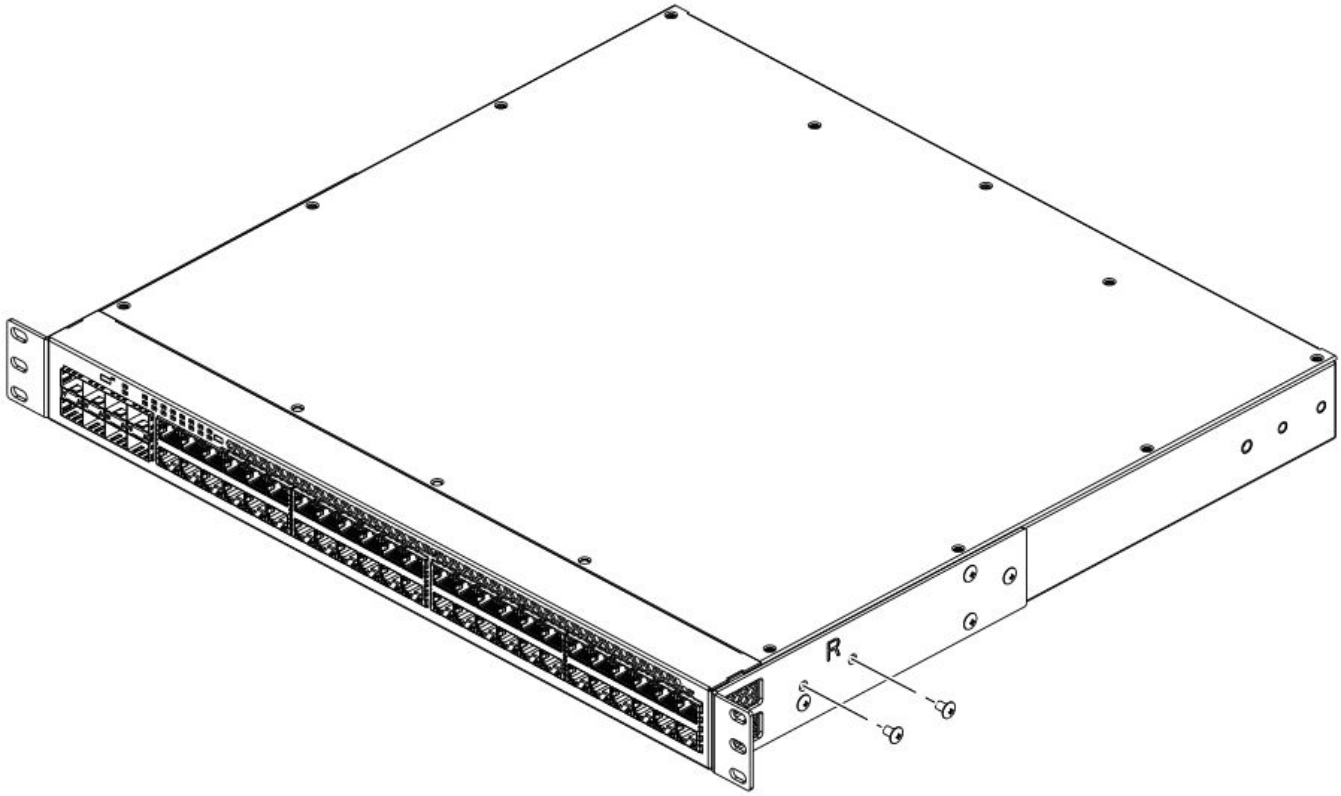
1. Remove the rack mount kit from the shipping carton. The kit contains the following:
   - Two L-shaped mounting brackets.
   - Sixteen 8-32 x 5/16 in., panhead Phillips screws with patchlocks.
   - Four 10-32 x 5/8 in., panhead Phillips screws (torque to 25 in-lb, 29 cm-kg). Refer to item 1 in the following figure.
   - Eight 32-10 retainer nuts (for square-hole rack rails). Refer to item 2 in the following figure.
   - Eight 32-10 retainer nuts (for round-hole rack rails). Refer to item 3 in the following figure.

FIGURE 12 2-post screws and retainer nuts



2. Attach the mounting brackets to the sides of the device using the 8-32 x 5/16 in. screws.

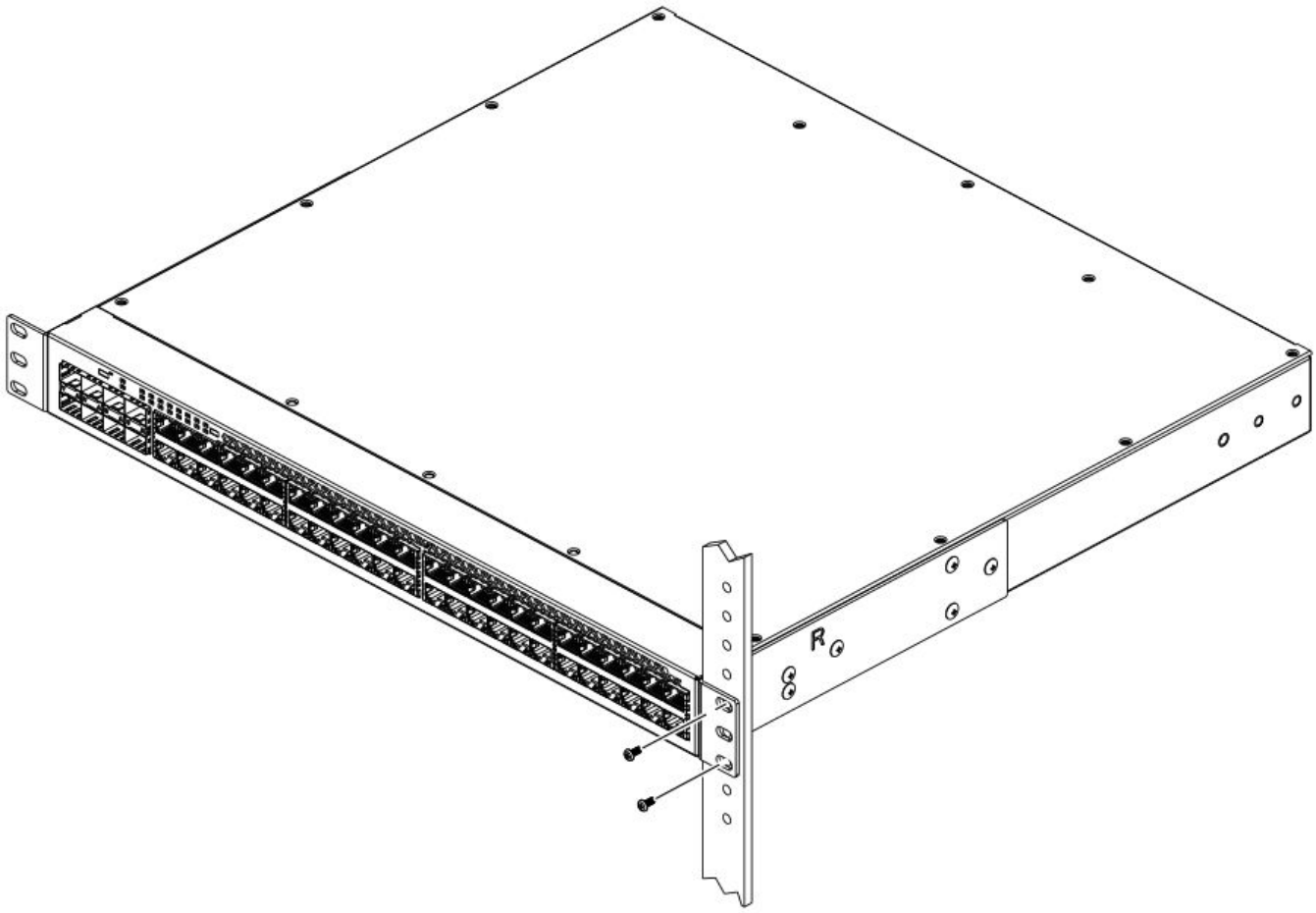
FIGURE 13 Attaching the mounting brackets for a Brocade ICX 6650



3. Position the device in the cabinet, providing temporary support under the switch until the rail kit is secured to the cabinet.

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

FIGURE 14 Installing the Brocade ICX 6650 in a 2-post rack



5. Repeat 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).
Proceed to Attaching a PC or terminal on page 33.

4-post rack mount installation

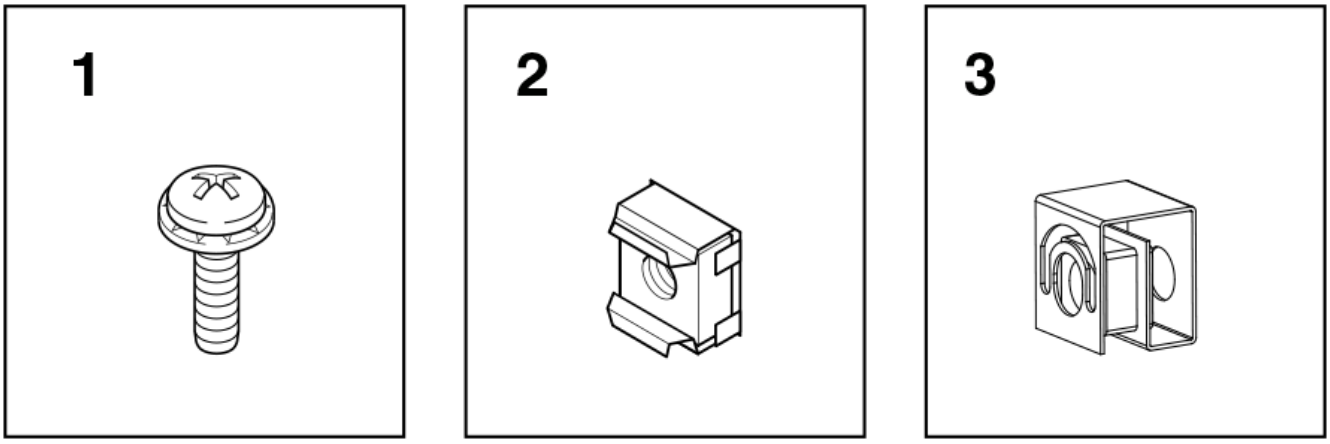
Kits for 4-post rack mounting are not included in the shipping carton and must be ordered separately.

NOTE
Use the following procedure when installing the Brocade ICX 6650 in a 4-post rack cabinet. For 2-post cabinets, follow the procedures in 2-post rack mount installation on page 28.

Use the following steps to mount the Brocade ICX 6650 in a 4-post rack.

1. Remove the rack mount kit from the shipping carton. The kit contains the following:
   - Two L-shaped mounting brackets.
   - Four rack mount rails: two for side attach and two for rear attach racks.
   - Thirty-two 8-32 x 5/16 in., panhead Phillips screws with patchlocks.
   - Eight 10-32 x 5/8 in., panhead Phillips screws (torque to 25 in-lb, 29 cm-kg). Refer to item 1 in the following figure.
   - Eight 32-10 retainer nuts (for square-hole rack rails). Refer to item 2 in the following figure.
   - Eight 32-10 retainer nuts (for round-hole rack rails). Refer to item 3 in the following figure.

   FIGURE 15 4-post screws and retainer nuts



   NOTE
   Do not use the hardware supplied in a 2-post rack mounting kit to mount a Brocade ICX 6650 in a 4-post rack. Mounting the device in a 4-post rack requires additional hardware to prevent drooping from possible flexing and distortion of the 4-post rack when a device is not properly installed.

2. Attach the mounting brackets to the sides of the device as illustrated in 2-post rack mount installation on page 28 using the 8-32 x 5/16 in. screws.

3. Attach the appropriate rails: either side attach or rear attach as determined by the type of rack in which you are installing the device.

   The following figures show exploded views of the optional 4-post rack mount kit.

   FIGURE 16 Optional 4-post rack mount kit, rear attachment

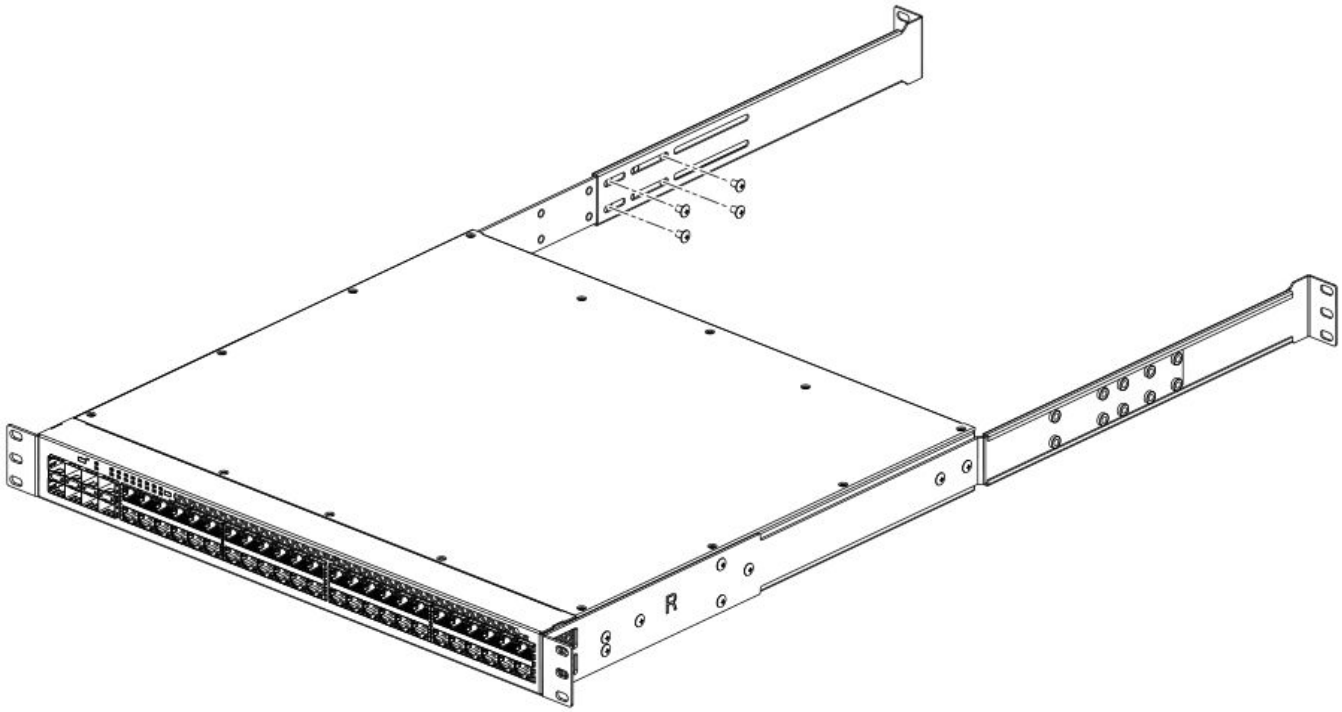
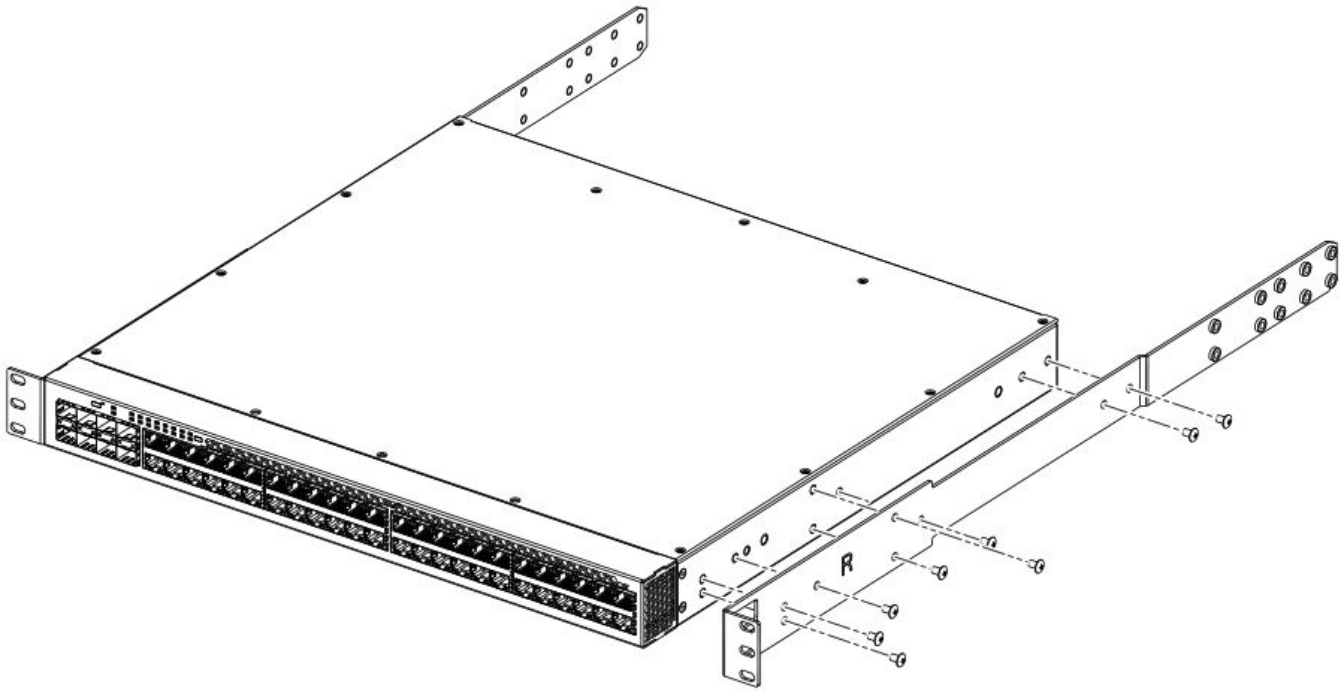


FIGURE 17 Optional 4-post rack mount kit, side attachment



4. Position the switch in the cabinet, providing temporary support under the switch until the rail kit is secured to the cabinet.
5. Attach the front right bracket to the rail rack using two 10-32 x 5/8 in. screws and the appropriate round-hole or square-hole retainer nuts.
6. Repeat step 5 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).
7. Attach the rear right bracket to the rail rack using two 10-32 x 5/8 in. screws and the appropriate round-hole or square-hole retainer nuts.
8. Repeat step 7 to attach the rear left bracket to the rail rack and tighten all 10-32 x 5/8 in. screws to a torque of 25 in-lb (29 cm-kg).
   Proceed to Attaching a PC or terminal on page 33.

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. The CLI is described in detail in the *FastIron Ethernet Switch Administration Guide*.

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

Use the following steps to attach a management station to the console port.

1. Connect a PC or terminal to the console management port on the rear of the Brocade ICX 6650 using the mini-USB serial console port cable (Part number 50-1000059-01).

   For port pinout information for the mini-USB serial console port, refer to the "Serial port specifications (pinout mini-USB)" section.

   NOTE
   You must 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.

Powering on the system

After you complete the physical installation, you can power on the system.

1. Remove the power cable from the shipping package container.
2. Attach the AC power cable to the AC connector on the rear panel.
3. Insert the power cable plug into a 100V-240V outlet.

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

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

Power supplies

Each Brocade ICX 6650 comes with two alternating-current (AC) power supplies. The Brocade ICX 6650 device also supports direct-current (DC) power supplies. The Brocade ICX 6650 is capable of running on one power supply and one fan. The second set provide redundancy.

If the second power supply and fan slots are unused, you must cover them with filler panels.

NOTE
When running two power supplies, they must be of the same type: either two alternating-current (AC) power supplies or two direct-current (DC) power supplies. AC and DC units cannot be mixed in a device.

Installing and replacing a power supply unit

When installing or replacing a power supply unit, keep in mind the following:

- Power supplies can be swapped in or out while the device is running. The remaining power supply provides enough power for the device.
- The airflow direction of the power supply must match that of the installed fan tray. All must be either exhaust or intake.

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

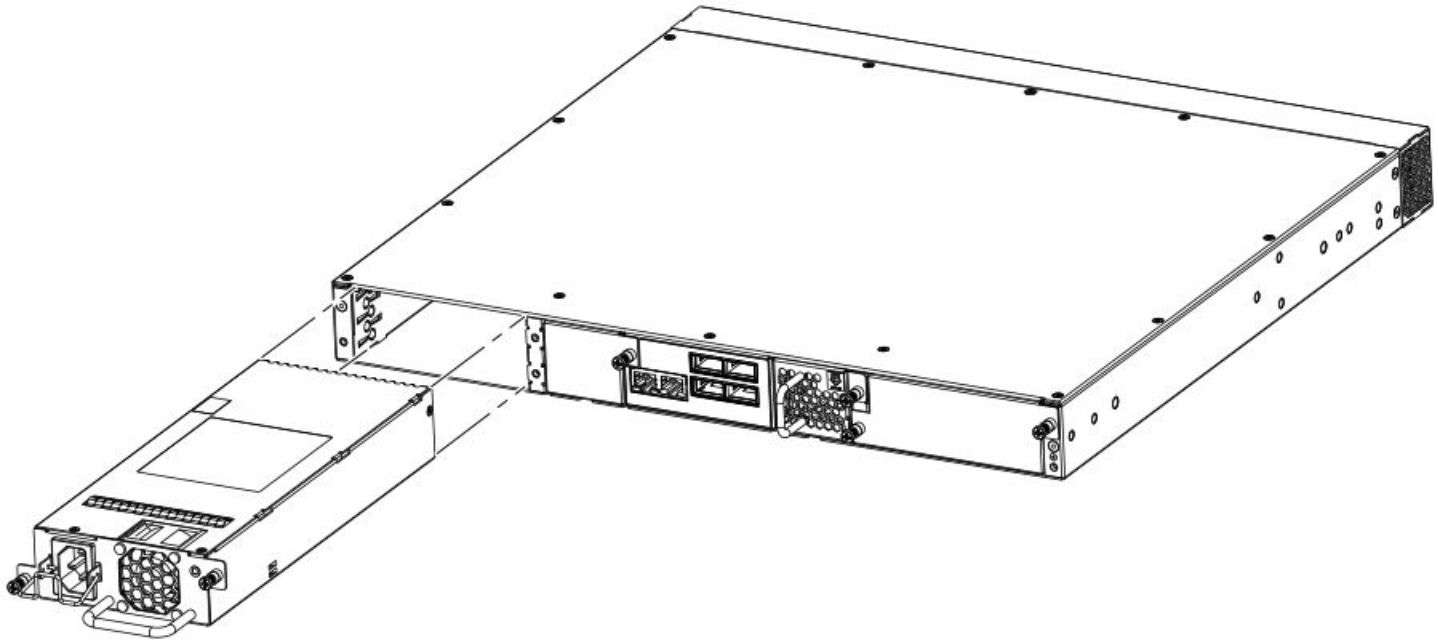
Ensure that the airflow direction of the power supply unit matches that of the installed fan tray. The power supplies and fan trays are clearly labeled with either a green arrow with an "E", or an orange arrow with an "I."

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 18 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.

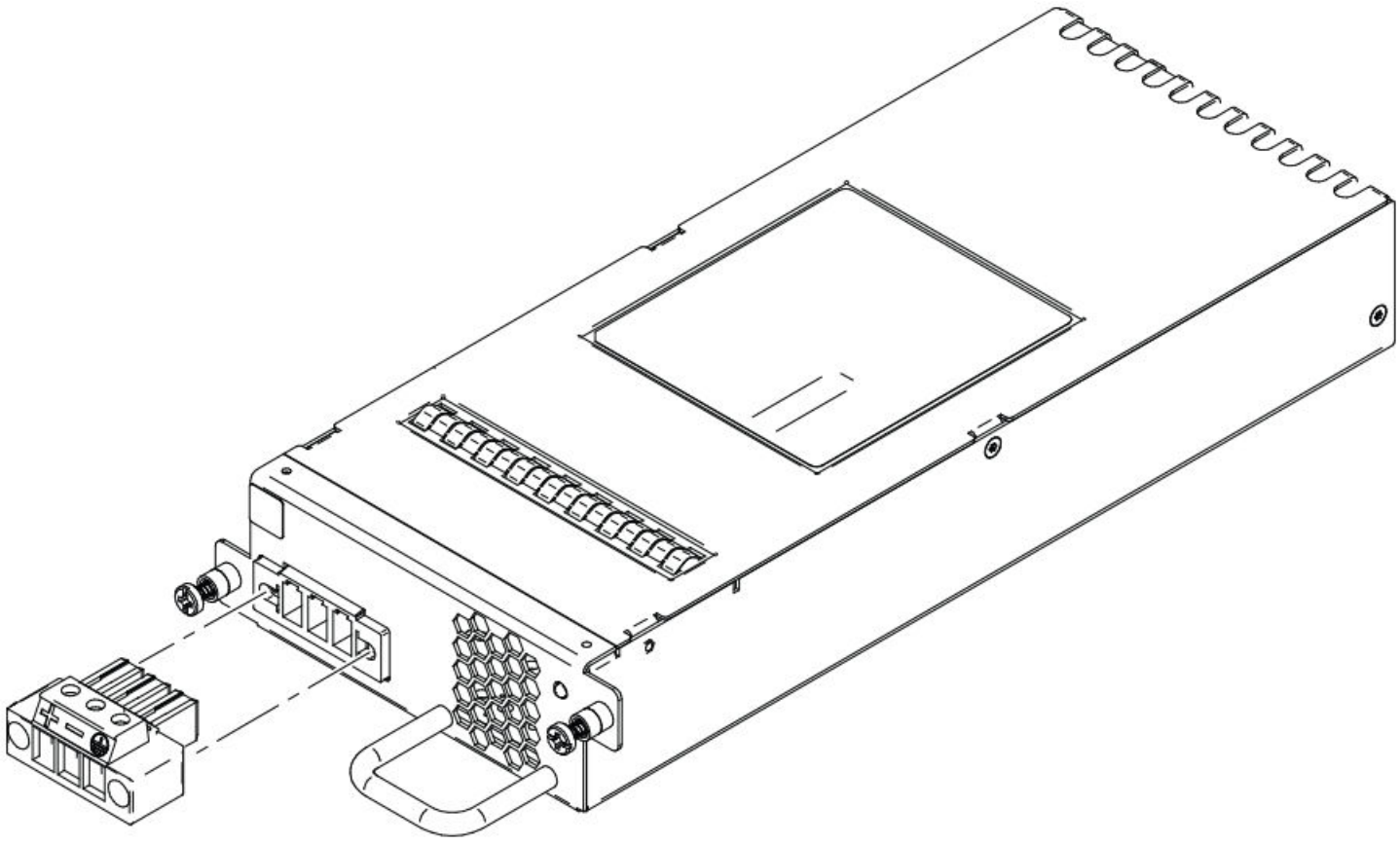
Installing a DC power supply

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 19 DC power supply unit



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

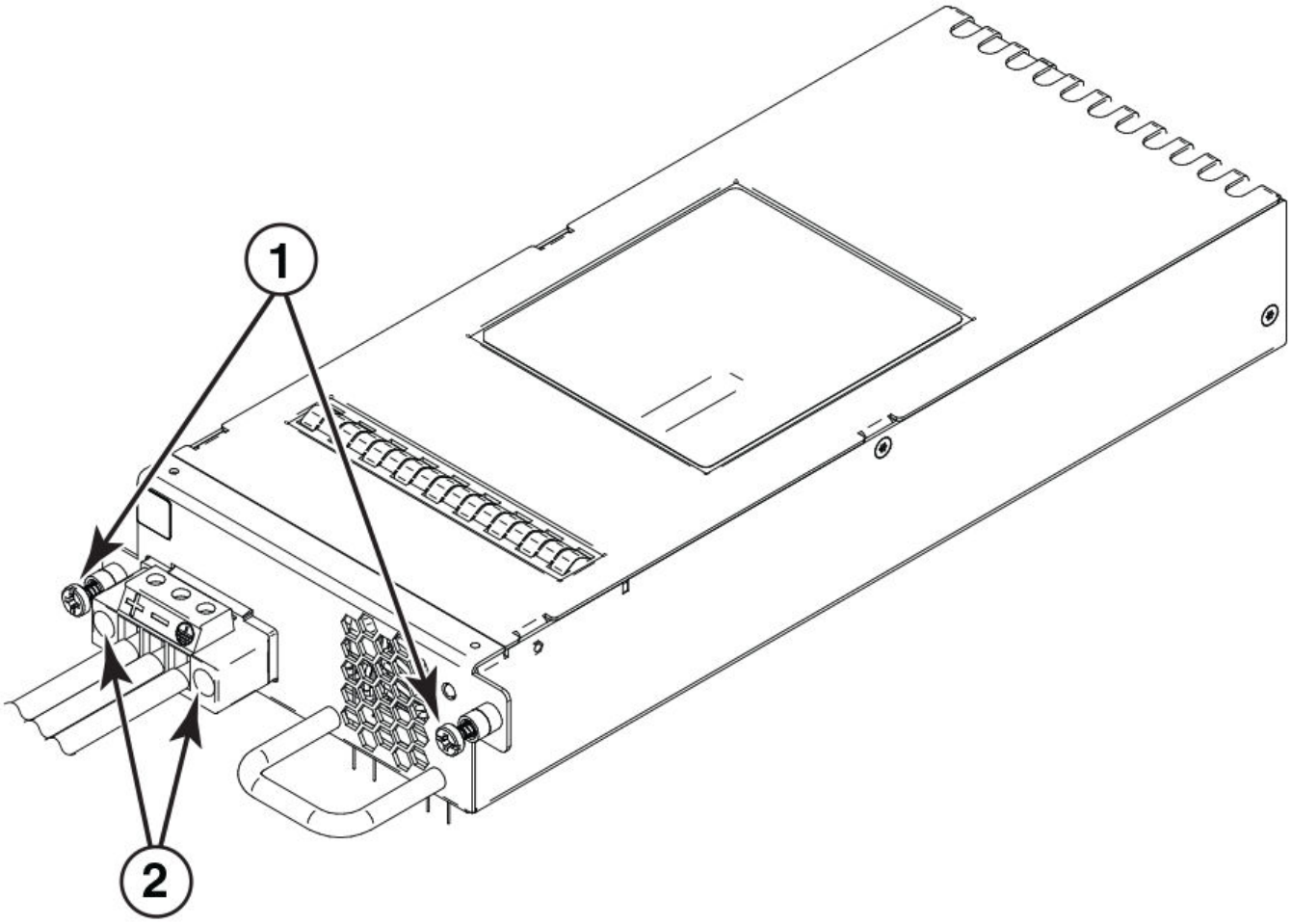
Brocade recommends using an ESD wrist strap during installation.

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 20 DC power supply screws

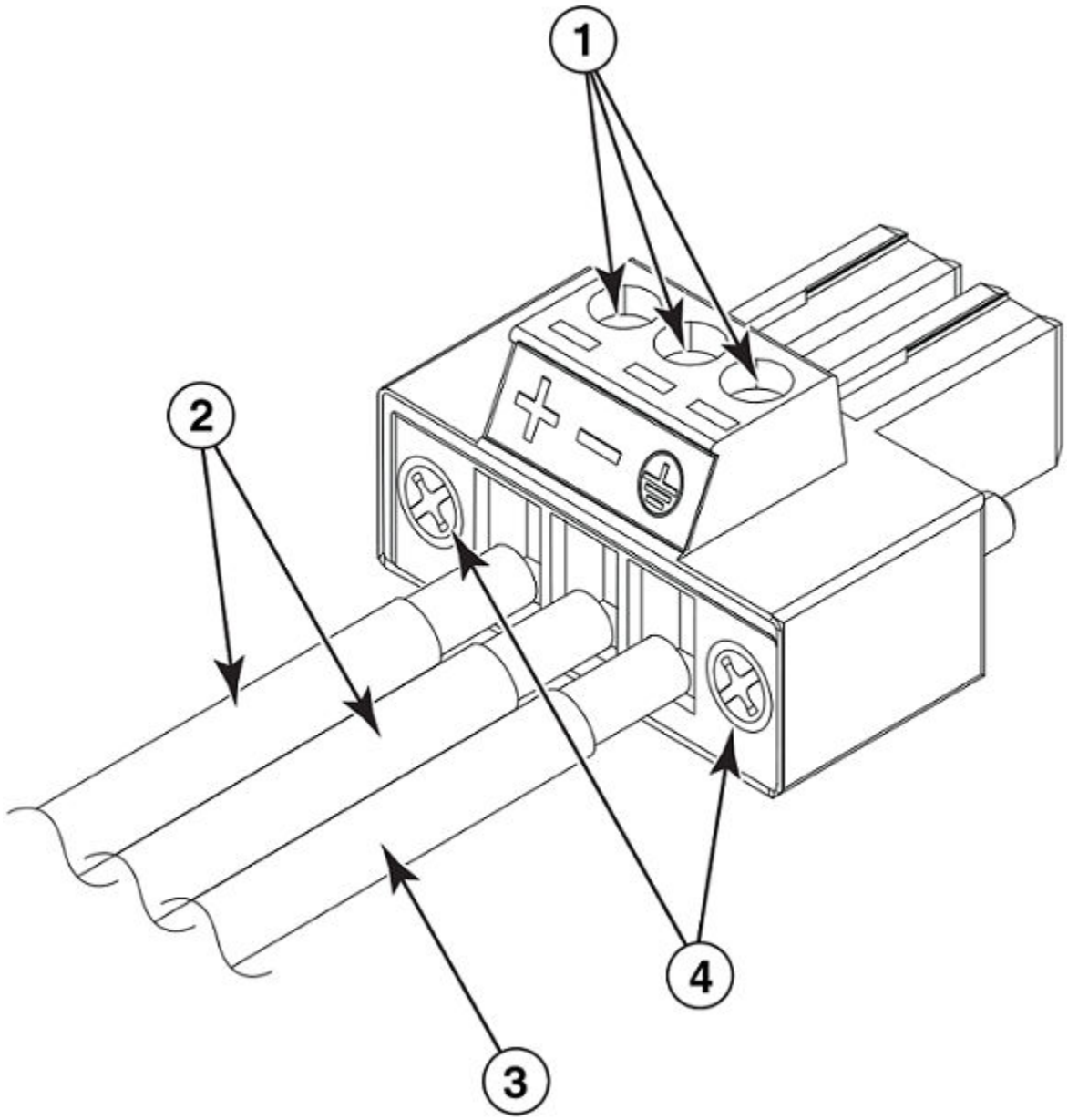


1 Chassis attachment screws
2 Assembly screws

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 21 DC power supply wiring assembly



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

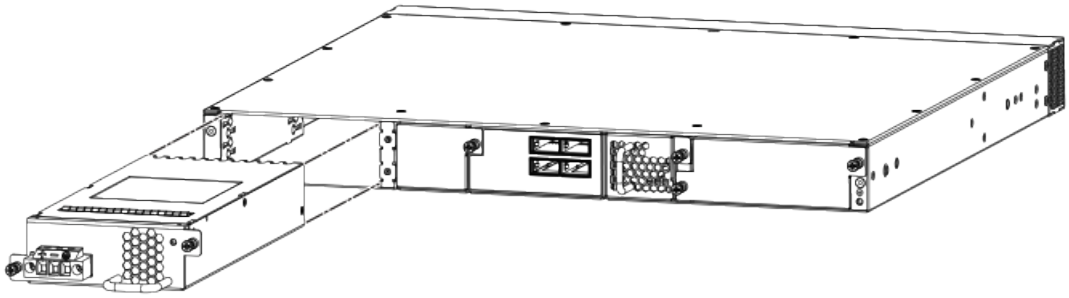
6. Use the wire tightening screws to secure the wires.

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 22 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 an SFP+ transceiver

To monitor the transceivers, the **show media** command output shows the transceiver information for all interfaces on the switch. Third-party transceivers are allowed. Brocade provides support for third-party transceivers, but may require a Brocade transceiver be used for troubleshooting.

Support will not be provided if there is an issue with the third-party transceiver.

Complete the following steps to install an SFP+ transceiver.

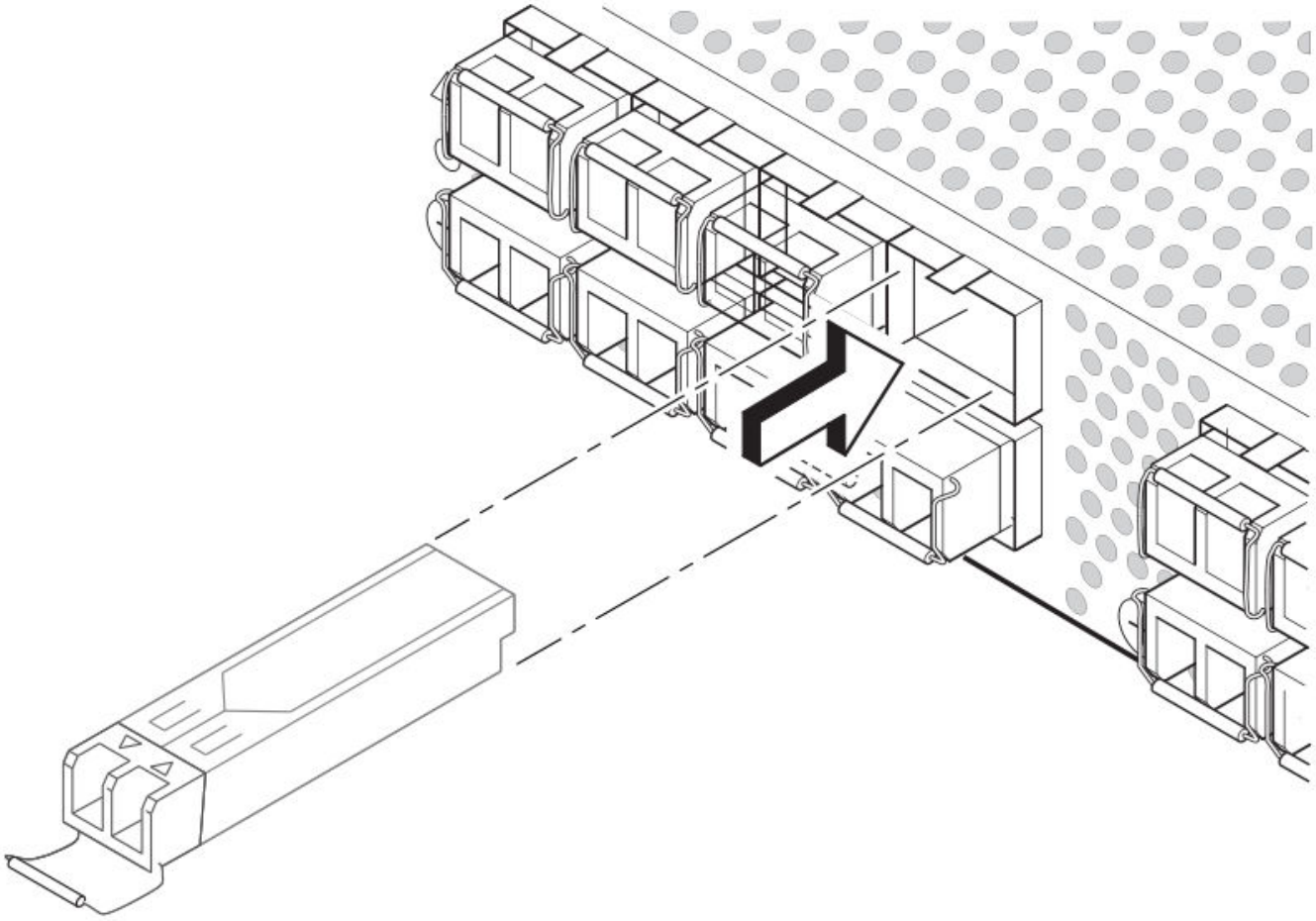
1. Remove any protector plugs from the transceivers and the ports.
2. Making sure that the bail (wire handle) is in the unlocked position, place the SFP+ transceiver in the correctly oriented position on the port.

   NOTE
   The QSFP+ 40 GbE LR4 optical transceiver is supported in ports 1 and 2 only. When the module is inserted into a stack-unit/slot number/port number combination that is not 1/2/1 or 1/2/2, the following error message displays: "QSFP LR-4 optics not supported on port *port-number*."

3. Slide the SFP+ transceiver into the port until you feel it click into place; then close the bail.

NOTE
Each SFP+ transceiver has a 10-pad gold-plated edge connector on the bottom. The correct position to insert an SFP+ transceiver in the upper row of ports is with the gold-plated edge down. The correct position to insert an SFP+ transceiver in the lower row of ports is with the gold-plated edge up.

FIGURE 23 Installing an SFP+ transceiver in a port slot



Configuring the Brocade ICX 6650

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*.

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

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

   ```
   device> enable
   ```

2. Access the CONFIG level 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 Recovering from a lost password on page 44.

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.

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**. (You cannot abbreviate this command.)

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 "209.157.22.99 255.255.255.0" 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 "209.157.22.99/24" 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. Refer to the *FastIron Ethernet Switch Administration Guide*.

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 prompt, 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 configuration level of the CLI by entering the following command:

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

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

```
device(config)# ip address 192.168.0.0 255.255.255.0
```

5. Set a default gateway address for the switch.

```
device(config)# ip default-gateway 192.168.0.0
```

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

Devices running Layer 3 software

Before attaching equipment to a Brocade ICX 6650, you must assign an interface IP address to the subnet on which the router connected to the switch 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 the Web management interface.

By default, you can configure up to 24 IP addresses 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 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 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 e 1/1/1
device(config)# ip address 192.168.0.0 255.255.255.0
```

NOTE
You can use the **ip address** *ip-addr /mask-bits* command if you know the subnet mask length. In the example in step 4, you could enter **ip address 192.168.0.0/24**.

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.

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 "209.157.22.99 255.255.255.0" for an IP address with a Class C subnet mask.
- To enter a prefix network mask, enter a forward slash (/) and the number of bits in the mask immediately after the IP address. For example, enter "209.157.22.99/24" for an IP address that has a network mask with 24 significant bits (ones).

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

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 192.168.0.0 255.255.255.0
```

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

```
device(config-if-1/1/1)# ip address 192.168.0.0/24
```

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 switch and other devices. You can configure up to four loopback interfaces on a Layer 3 switch.

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

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

```
device(config)# interface loopback 1
device(config-lbif-1)# ip address 192.168.0.0/24
```

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 switch. You can configure routing parameters on the virtual interface to enable the Layer 3 switch to route protocol traffic from one Layer 3 VLAN to the other, without using an external router.

> NOTE
> The switch 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_1.1.2.1/24
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 1.1.2.1/24
```

The first two commands in this example create a Layer 3 protocol-based VLAN named "IP-Subnet_1.1.2.1/24" 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 1.1.2.1
```

This command deletes IP address 1.1.2.1. 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 "Serial port specifications (pinout mini-USB)" section.

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 need fiber cabling with an LC connector.

For information about transceivers supported on the Brocade ICX 6650, refer to the following Brocade website:

http://www.myBrocade.com/downloads/documents/data_sheets/product_data_sheets/Optics_DS.pdf

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.

Installing a transceiver

You can install a new transceiver in an 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
All fiber-optic interfaces use Class 1 lasers.

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.

Cabling a fiber-optic transceiver

Perform 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 62.

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 LED activity interpretation on page 51.

Cleaning the fiber-optic connectors

To avoid problems with the connection between the fiber-optic transceiver (SFP, SFP+, or QSFP+) 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 a Brocade ICX 6650 can reach another device through the network, enter a command similar to the following at any level of the CLI.

```
device# ping 192.168.0.0
```

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.

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.

```
Brocade# traceroute 192.168.0.0
```

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 do not resolve the problem, try using a different port or a different cable.

Brocade ICX 6650 Operation

LED activity interpretation

System activity and status can be determined through the activity of the LEDs on the switch.

There are three possible LED states: off (no light), a steady light, and a flashing light. Flashing lights may be slow, fast, or flickering. The LED colors are blue, green, or amber.

Sometimes, the LEDs flash either of the colors during boot, POST, or other diagnostic tests. This is normal; it does not indicate a problem unless the LEDs do not indicate a healthy state after all boot processes and diagnostic tests are complete.

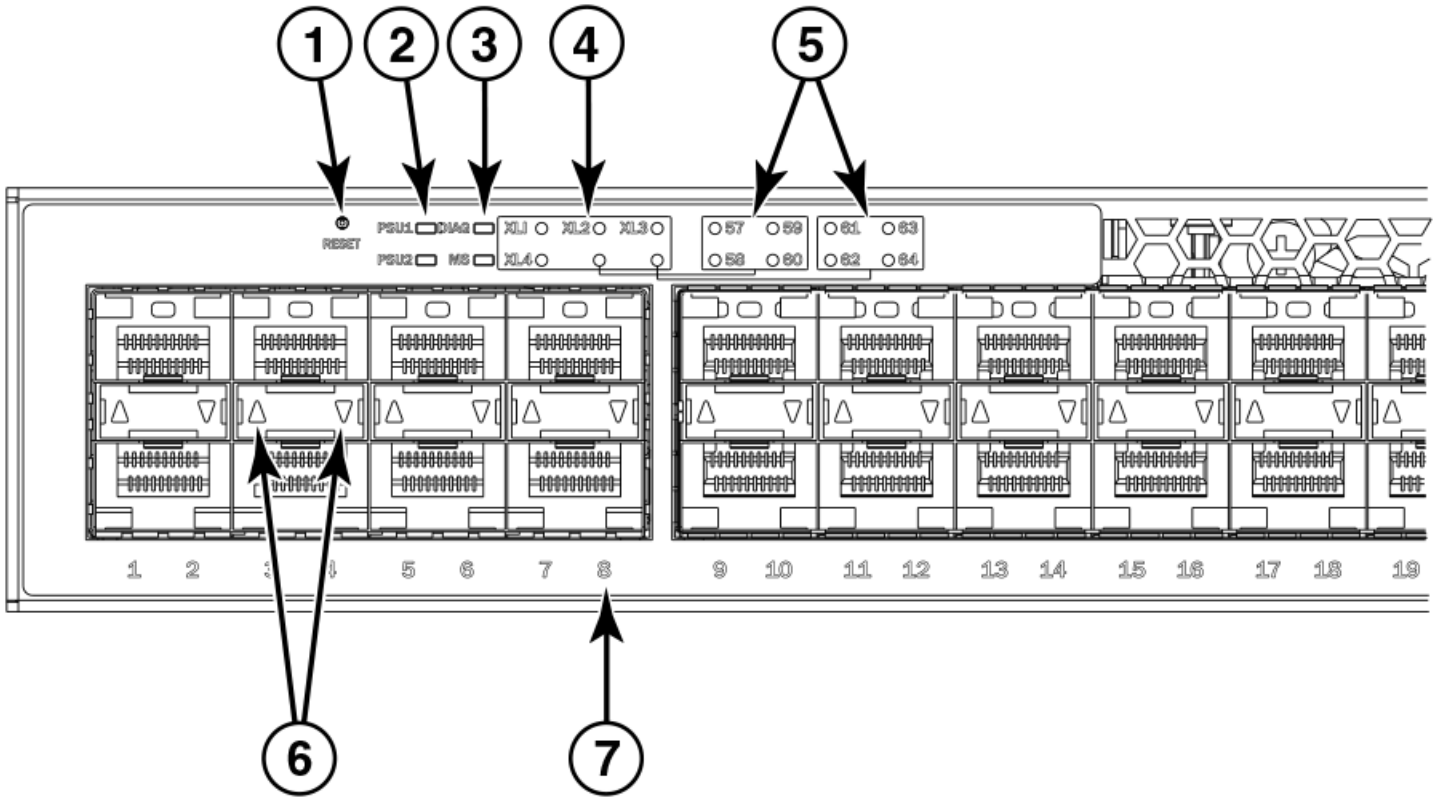
Brocade ICX 6650 front panel LEDs

The Brocade ICX 6650 has the following LEDs on the front panel:

- Two power supply unit (PSU) bicolor status LEDs (green and amber) labeled PSU1 and PSU2
- One DIAG status LED (green and amber)
- One MS status LED (green and amber)
- Four 1x40 GbE QSFP port status and activity LEDs (blue) which indicate the status of the 40 GbE ports located on the rear panel
- Eight 4x10 GbE QSFP-to-SFP breakout port status and activity LEDs (green) which indicate the status of the 4x10 GbE breakout ports located on the rear panel
- 56 10 GbE bicolor status LEDs (green for 10 GbE and amber for 1 GbE) which indicate the mode of operation

In the following figure, the up-arrow port status LEDs for the 1/10 GbE ports correspond to the upper, odd-numbered ports; the down-arrow port status LEDs correspond to the lower, even-numbered ports.

FIGURE 24 Brocade ICX 6650 front panel LEDs and port numbering



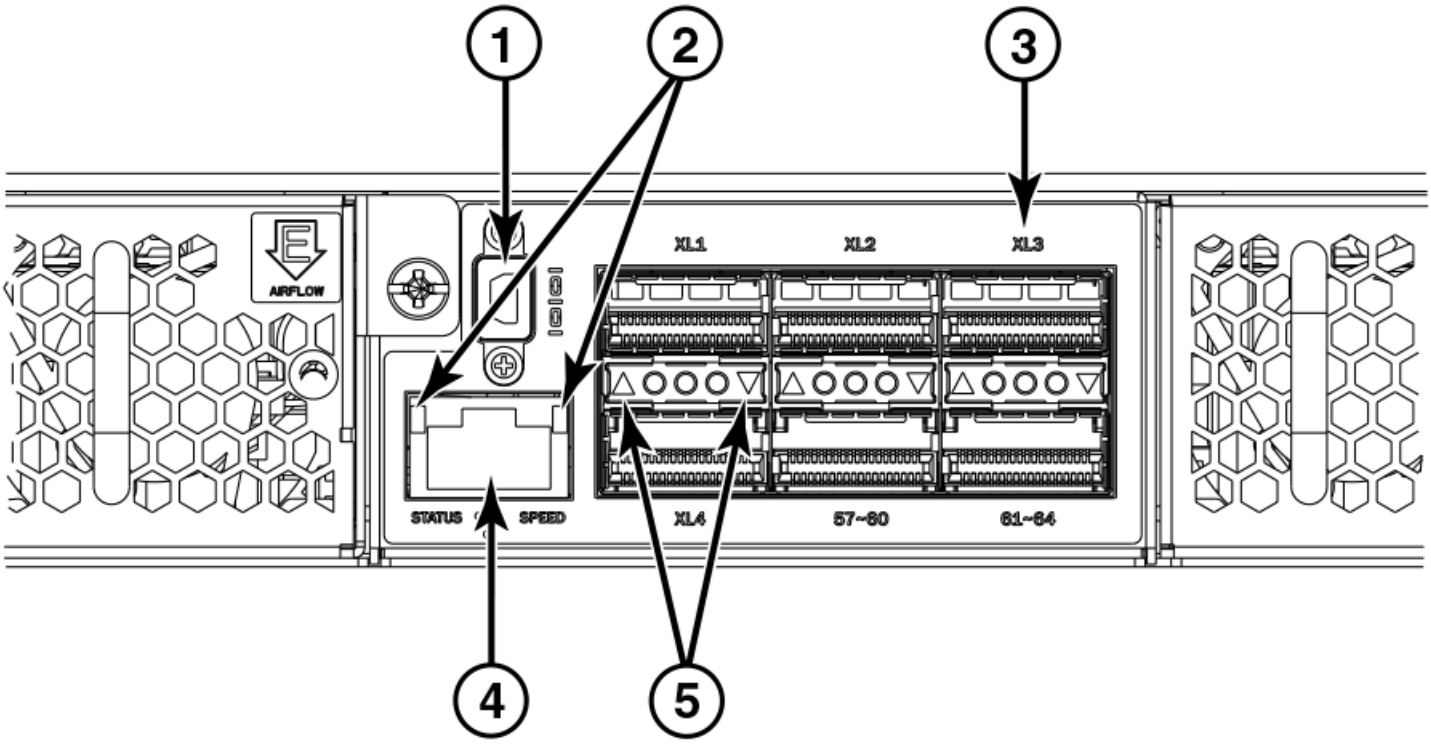
1. Push button reset
2. PSU1 and PSU2 status LEDs
3. DIAG and MS status LEDs
4. 40 GbE QSFP rear port status/activity LEDs
5. 4x10 GbE QSFP-to-SFP breakout port status/activity LEDs
6. 1/10 GbE port status LEDs
7. Port numbering (odd-numbered port at top, even-numbered port at bottom)

Brocade ICX 6650 rear panel LEDs

The Brocade ICX 6650 has the following LEDs on the rear panel:

- Six 40 GbE QSFP+ port status LEDs (green)
- One DIAG LED bicolor status LED (green and amber)
- Two Management port status LEDs

FIGURE 25 Brocade ICX 6650 rear panel LEDs and ports



1. Mini-USB connector console port
2. Management port status LEDs
3. 40 GbE ports
4. Ethernet management port
5. 40 GbE port status LEDs

LED patterns

This section describes the Brocade ICX 6650 LED patterns.

PSU 1 and PSU2

TABLE 5 PSU 1 and PSU2

LED State	Status of hardware	Recommended action
Off (no light)	System is off or there is no power.	Verify the system is on and has completed booting.
Steady green	PSU is on and functioning properly.	No action required.
Steady amber	PSU is in faulty state or missing power.	Replace power supply.

DIAG LED

TABLE 6 DIAG LED

LED State	Status of hardware	Recommended action
Off (no light)	Diagnostic is off.	No action required.
Blinking green	System self-diagnostic test is in progress.	No action required.
Steady green	System self-diagnostic test is successfully completed. Device reboots and clears back to off.	No action required.
Steady amber	System self-diagnostic test has detected a fault.	Contact support.

Management port status LED

TABLE 7 Management port status LED

LED State	Status of hardware	Recommended action
Off (no light)	Not cabled.	No action required
Blinking	There is traffic and packets are being transmitted or received.	No action required.
Steady	No traffic being transmitted, but link is up.	No action required.

1/10 GbE SFP+ port LEDs

TABLE 8 1/10 GbE SFP+ port LEDs

LED State	Status of hardware	Recommended action
Green	Link is up in 10 GbE mode.	No action required.
Blinking green	There is 10 GbE activity (traffic) and packets are being transmitted or received.	No action required.
Amber	Link is up in 1 GbE mode.	No action required.
Blinking amber	There is 1 GbE activity (traffic) and packets are being transmitted or received.	No action required.

40 GbE QSFP+ rear port LEDs on front panel

TABLE 9 40 GbE QSFP+ rear port LEDs on front panel

LED State	Status of hardware	Recommended action
Off (no light)	Not enabled.	No action required.
Blue	Link is up in 40 GbE mode.	No action required.
Blinking blue	Indicates activity, and packets are being transmitted or received.	No action required.

4x10 GbE QSFP+ rear port LEDs on front panel

TABLE 10 4x10 GbE QSFP+ rear port LEDs on front panel

LED State	Status of hardware	Recommended action
Off (no light)	Not enabled.	No action required.
Green	Link is up in 10 GbE mode.	No action required.
Blinking green	Indicates activity, and packets are being transmitted or received.	No action required.

Brocade ICX 6650 maintenance

The Brocade ICX 6650 is designed for high availability and low failure; it does not require any regular physical maintenance. Supported transceivers and diagnostic tests are described in the following sections.

Diagnostic tests and monitoring

Brocade FastIron software includes diagnostic tests to help you troubleshoot the hardware. System diagnostic software is designed to fulfill the purpose of offline diagnostics. In offline diagnostics, you must turn on or off the diagnostic flags to execute diagnostic tests during the next bootup.

The CLI commands for system diagnostic tests are **dm diag** and **dm alt-diag**. These diagnostic tests verify all available hardware components including:

- I2C devices
- EEPROMS
- CPU packet
- Test MAC alignment
- Line rate

During system diagnostic testing, the system is completely under the control of the diagnostic software. All hardware components are verified, and results are displayed on the console. In cases where a failure is detected, results and corrective actions will be displayed. After the system diagnostic testing is complete, the system exits from the diagnostic mode and reloads the system for normal operation.

System diagnostic testing runs at link speeds 10 Gbps and 40 Gbps (QSFP ports) depending on the speed of the link being tested and the type of port.

Managing the Brocade ICX 6650

Managing temperature settings

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 temperature displayed by the **show chassis** command reflects the temperature of the board inside the device.

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

Power supply 1 (NA - AC - Regular) present, status ok
Power supply 1 Fan Air Flow Direction: Back to Front
Power supply 2 (NA - AC - Regular) present, status ok
Power supply 2 Fan Air Flow Direction: Back to Front

Fan 1 ok, speed (auto): [[1]]<->2
Fan 2 ok, speed (auto): [[1]]<->2

Fan controlled temperature: 47.5 deg-C

Fan speed switching temperature thresholds:
                    Speed 1: NM<----->68 deg-C
                    Speed 2: 63<-----> 85 deg-C (shutdown)

Fan 1 Air Flow Direction: Back to Front
Fan 2 Air Flow Direction: Back to Front
MAC-Back Temperature Readings:
Current temperature : 41.5 deg-C
MAC-Left Temperature Readings:
                Current temperature : 42.0 deg-C
MAC-Right Temperature Readings:
                Current temperature : 42.5 deg-C
MAC-Front Temperature Readings:
                Current temperature : 44.5 deg-C
CPU Temperature Readings:
```

```
                Current temperature : 41.0 deg-C
Center Temperature Readings:
                Current temperature : 26.0 deg-C
sensor A Temperature Readings:
                Current temperature : 34.5 deg-C
sensor B Temperature Readings:
                Current temperature : 35.5 deg-C
sensor C Temperature Readings:
                Current temperature : 47.5 deg-C
sensor D Temperature Readings:
                Current temperature : 39.5 deg-C
                Warning level.......: 68.0 deg-C
                Shutdown level......: 85.0 deg-C

Boot Prom MAC : 00.00.00
Management MAC: 00-00-00
```

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 method describes how to view the system log on the device. If you have configured the device to use a syslog server or SNMP trap receiver, refer to 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 warn 85
```

Syntax: temperature warn *value*

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.

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.

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 00.00.00 in all VLANs, enter the following command at the Privileged EXEC level of the CLI.

```
device# clear mac-address 00.00.00
```

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* parameter 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 Brocade ICX 6650 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

Brocade ICX 6650 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.

Replacing a copper or fiber-optic module

You can remove an SFP+ or QSFP+ transceiver from a slot and replace it with a new one while the Brocade ICX 6650 is powered on and running.

This section provides information about the following tasks:

- Removing a copper or fiber-optic module
- Cabling a fiber-optic module
- Cleaning the fiber-optic connectors

Removing a copper or fiber-optic module

You can remove a copper or fiber SFP+ or QSFP+ transceiver from a slot while the Brocade ICX 6650 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 Brocade ICX 6650.

DANGER

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

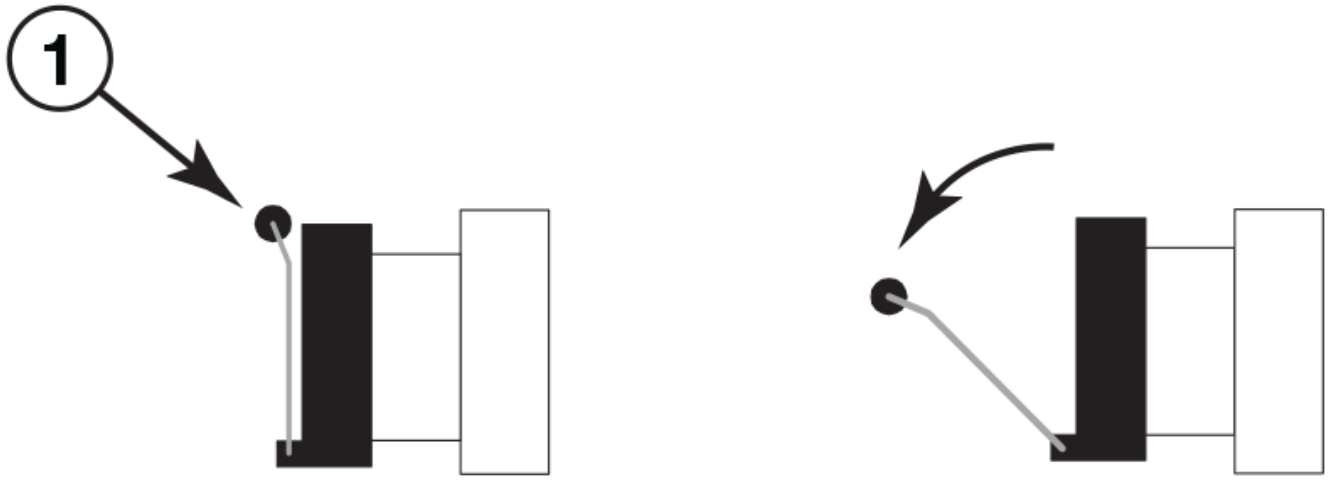
To remove a copper or fiber-optic module from an SFP slot, do the following.

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, as shown in the following figure.

   NOTE
   On 1000Base-SX ports, the bail latch is enclosed in a black sleeve, and on 1000Base-LX ports, the bail latch is enclosed in a blue sleeve.

FIGURE 26 Unlocking the bail latch

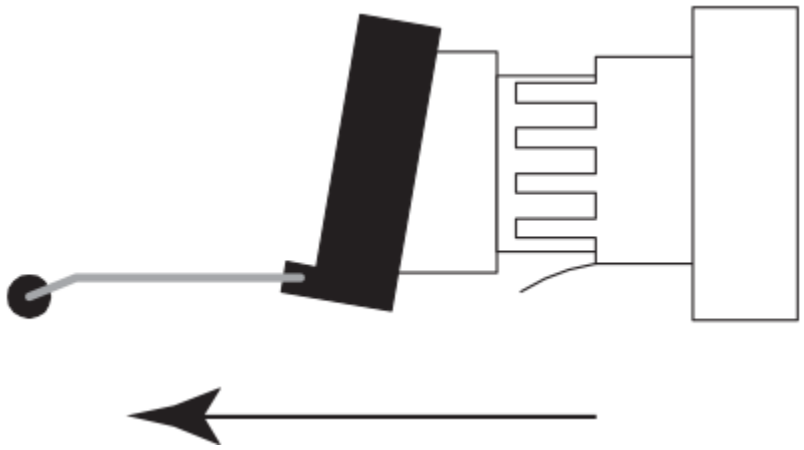


1. Bail Latch

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

4. Grasp the bail latch and pull the copper or fiber-optic module out of the port, as shown in the following figure.

FIGURE 27 Removing the 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 Cabling a fiber-optic transceiver on page 48.

Cleaning the fiber-optic connectors

For instructions on cleaning a fiber-optic module, refer to Cleaning the fiber-optic connectors on page 49.

FRU removal and replacement procedures

The field-replaceable units (FRUs) in the Brocade ICX 6650 can be removed and replaced without special tools. The switches can continue operating during the FRU replacement if the conditions specified in these procedures are followed. This covers both the power supply unit (PSU) FRUs and fan FRUs.

> NOTE
> This document describes how to change FRUs for units with either an air intake or air exhaust. You must replace a failed FRU with a FRU of the same type. This applies to both power supplies and fans. A new FRU must have the same part number (P/N) as the FRU being replaced. The manufacturing P/N is located on the top of the FRU.

If a mismatched power source or fan assembly is installed by mistake, a warning is sent to the console. The warning messages will be similar to the following:

- For a fan mismatch: WARNING, Brocade ICX 6650, MISMATCH in Fan Air Flow direction. Replace FRU with fan air flows in the same direction.
- For a power supply: WARNING, Brocade ICX 6650, MISMATCH in PSU Air Flow direction. Replace PSU with air flows in the same direction

You can use external labels as a guide. The power supplies and fan assemblies are labeled with an airflow symbol on the faceplate to indicate whether the assembly takes in or exhausts air. The symbol also appears on the top of the FRU. All FRUs in a chassis must have the same label affixed so that airflow direction is consistent.

FIGURE 28 Examples of airflow symbols

The green **E** symbol indicates an exhaust FRU. This unit pulls air in from the front of the switch and exhausts it out the rear side. This is called front-to-back airflow or forward airflow.

The orange **I** symbol indicates an intake FRU. This unit pulls air in from the rear side of the switch and exhausts it out the front side. This is called back-to-front airflow or reverse airflow.

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."

The **show chassis** command displays a device's airflow direction: Front-to-Back or Back-to-Front.

Replacing a power supply unit

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."

NOTE
Maintain all power supply and fan assemblies in operational condition to provide redundancy.

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.

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.

The following table describes the Brocade ICX 6650 power supply status LED colors, behaviors, and actions required, if any.

TABLE 11 Power supply status LED behavior, description, and required actions

LED color and behavior	Description	Action required
Off (no light)	Power supply is not receiving power.	Verify that the power supply is on and seated and the power cord is connected to a functioning power source.
Steady green	Power supply is operating normally.	No action is required.
Steady amber	Power supply cable is disconnected or the power supply has failed.	Check the power cable connection. Replace the power supply

Determining the need to replace a power supply

Use one of the following methods to determine the status of the power supplies:

- Check the power supply status LED (refer to Replacing a power supply unit on page 63).

- Enter the **show chassis** command at the prompt to display power supply status.

Time and items required

Replacing a power supply in the Brocade ICX 6650 should take less than two minutes to complete.

You need the following items to replace a power supply in a Brocade ICX 6650:

- A new power supply (must have the same part number and the same airflow label as the power supply being replaced)
- A #1 Phillips screwdriver

Replacing a power supply

Complete the following steps to replace a power supply in a Brocade ICX 6650.

NOTE
To display power supply status, you can enter the **show chassis** command at the command line prompt.

1. To leave the Brocade ICX 6650 in service while replacing a power supply, verify that the other power supply (the one not being replaced) has been powered on for at least four seconds and has a steady green status LED.
2. Before opening the package that contains the power supply, touch the bag to the switch casing to discharge any potential static electricity. Brocade recommends using an ESD wrist strap during installation.
3. Remove the power supply from the anti-static shielded bag.
4. Ensure that the replacement power supply has the same part number and airflow label as the power supply being replaced.
5. Unplug the power cord from the power supply that is being replaced.
6. Using the Phillips screwdriver, unscrew the two captive screws on the power supply.
7. Remove the power supply from the chassis by pulling the handle on the power supply out and away from the chassis.
8. 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.

CAUTION
Carefully follow the mechanical guides on each side of the power supply slot and make sure the power supply is properly inserted in the guides. Never insert the power supply upside down.

9. When you are sure the power supply has properly engaged the connector, tighten the retainer screws to secure the power supply in the slot.
10. Plug the power cord into the power supply to power on the unit.

    The power supply will immediately attempt to power up.
11. Verify that the LED on the new power supply displays steady green while the Brocade ICX 6650 is operating (refer to Replacing a power supply unit on page 63). If the LED is not steady green, ensure that the power supply is securely installed and seated properly.

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."

Orderable Brocade ICX 6650 models include two redundant, hot-swappable fan units. However, it can run on one power supply and one fan. In that case, the empty power supply and fan slots must be covered using the filler panels.

NOTE
Maintain all power supply and fan assemblies in operational condition to provide redundancy.

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.

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.

Determining the need to replace a fan assembly

Enter the **show chassis** command in the command line interface to display fan status.

Time and items required

Replacing a fan assembly in the Brocade ICX 6650 should take less than two minutes to complete.

You need the following items to replace a fan assembly in the Brocade ICX 6650 switch:

- A new fan assembly (must have the same part number and the same airflow label as the fan assembly being replaced; refer to FRU removal and replacement procedures on page 62 for the location of the airflow label)
- A #1 Phillips screwdriver

Installing or replacing the fan assembly

Complete the following steps to install or replace a fan assembly in a Brocade ICX 6650.

1. If replacing a fan assembly:
   a) Using a Phillips screwdriver, unscrew the captive screw on the fan assembly.
   b) Remove the fan assembly from the chassis by pulling the handle on the fan assembly out and away from the chassis.
   c) Ensure that the replacement fan assembly has the same part number and airflow label as the fan assembly being replaced.
2. If installing a new fan assembly into a slot covered with a filler panel:
   a) Using a Phillips screwdriver, unscrew the captive screw on the filler panel.
   b) Remove the filler panel.
3. Before opening the package that contains the new fan tray, touch the bag to the switch casing to discharge any potential static electricity. It is recommended that you wear an ESD wrist strap during installation.

4. Remove the fan tray from the anti-static shielded bag.

CAUTION
Do not force the installation. If the fan assembly does not slide in easily, ensure that it is correctly oriented before continuing.

5. 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.
6. When you are sure the fan tray has properly engaged the connector, tighten the captive screw to secure the fan tray in the slot.

NOTE
The fans are controlled automatically by the device .

7. Verify correct installation by running the **show chassis** command, as shown in the following 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.

Brocade ICX 6650 Switch Technical Specifications

This document highlights the features and specifications for the Brocade ICX 6650 switch.

System specifications

System component	Description
Enclosure	1U EIA-compliant; power from non-port side; reversible airflow
Power inlet	C14
Power supplies	Two internal, redundant, load-sharing, and hot-swappable power supplies
Fans	Two
Cooling	An exhaust airflow which moves air from front to back An intake airflow which moves air from back to front
System architecture	Nonblocking shared memory
System processors	800 MHz PowerPC
Switch bandwidth	1600 Gbps
Forwarding bandwidth (data rate, full duplex)	1190 Mbps

Ethernet

System component	Description
SFP GbE ports	56 ports 10GBASE-X SFP+ (dual-speed 1/10 GbE) 2-ports 4×10GBASE-X QSFP+ (10 GbE) 4-ports 40GBASE-X QSFP+ (40 GbE)
Ethernet management port	One Gigabit Ethernet port (RJ-45)

LEDs

System component	Description
Power	Tri-color LEDs (blue, green, or amber) indicating the status and healthiness of the system power supplies.
Diag	Bi-color LEDs (green or amber) indicating indicating the status of the system diagnostic testing.
Management port	A single LED indicating the status of the link connectivity and traffic.
1/10 GbE SFP+ port	Bi-color LEDs (green or amber) indicating the 1 GbE or 10 GbE link status and port activity.
40 GbE QSFP+ rear port	A single LED (blue) indicating the 40 GbE link status and port activity.
4x10 GbE QSFP+ rear port	A single LED (green) indicating the 4x10 GbE link status and port activity.

Other

System component	Description
RJ-45 to DB9 adapter	1
RJ-45 crossover cable	1
Mini-USB(M)-DB9(F) cable	1

Weight and physical dimensions

Fully loaded includes all power supplies and fan assemblies, and no transceivers.

Model	Height	Width	Depth	Fully loaded weight
ICX 6650	4.4 cm 1.73 inches	42.9 cm 16.88 inches	40.64 cm 16 inches	8.41 kg 18.5 lb

Environmental requirements

Condition	Operational	Non-operational
Ambient temperature	0°C to 40°C (32°F to 104°F)	-25°C to 70°C (-23°F to 158°F)
Relative humidity (non-condensing)	10% to 95% at 40°C (104°F)	5% to 80% at 70°C (158°F)
Altitude (above sea level)	0 to 3000 m (10,000 feet)	0 to 12000 m (39,000 feet)
Shock	20 G, 6 ms, half-sine wave	33 G, 11 ms, half-sine wave, 3/eg Axis
Vibration	0.5 G sine, 0.4 gms random, 5-500 Hz	2.0 G sine, 1.1 gms random, 5-500 Hz
Airflow	Maximum - 90.1 cmh (53 cfm) Nominal - 59.5 cmh (35 cfm)	N/A
Heat dissipation	478 BTU/hr	N/A
Operating noise	46.7 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	250 W	100-240 VAC	50-60 Hz	4.0 A	Line & Neutral Fused	35 A
RPS15-I	250 W	100-240 VAC	50-60 Hz	4.0 A	Line & Neutral Fused	35 A
RPS16DC-E	510 W	40-60 VDC	N/A	15.5 A	Positive Input Fused	40 A
RPS16DC-I	510 W	40-60 VDC	N/A	15.5 A	Positive Input Fused	40 A

Power consumption (typical configuration)

56 10-BbE ports, 4 40-GbE ports, and 4 4x10 GbE ports linked and up. 10% traffic with 64-byte packets. Fans at normal speed.

Model name	100 - 240 VAC input	Minimum number of power supplies	Notes
ICX 6650	154.6 W 527.66 BTU/hr	1	

Power consumption (maximum configuration)

All ports connected with optics to draw maximum power per MSA Optics Specification. Traffic at full rate or 100% throughput. Fans at full speed.

Model name	100 - 240 VAC input	Minimum number of power supplies	Notes
ICX 6650	230 W 785.01 BTU/hr	2	

Data port specifications (Ethernet)

Model	Port type	Number of ports	Description
ICX 6650	1/10 GbE	Ports 1 through 56	SFP+ ports in slot 1 located on the front of the switch.
	40 GbE	Ports 1 through 3 (top row) Port 4 (bottom row)	QSFP+ ports in slot 2 located on the rear of the switch. The QSFP+ 40 GbE LR4 optical transceiver is supported in ports 1 and 2 only.

Serial port specifications (pinout mini-USB)

Pin	Signal	Description
1	+5V	Not used
2	UART0_TX	Debug port
3	UART0_RX	Console port
4	IN	Not used
5	GND	Ground

Serial port specifications (protocol)

Parameter	Value
Baud	9600 bps

Parameter	Value
Data bits	8
Parity	None
Stop bits	1
Flow control	None

Memory specifications

Memory	Type	Size
Boot Flash	NOR flash	64 MB
Compact Flash	DDR2-400 SDRAM with ECC (RDIMM)	1 GB

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)

Brocade ICX 6650 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	"ᠬᠦᠳᠥᠷᠢᠨ᠋ᠠᠭᠤᠯᠭᠤᠢᠳᠠᠨ᠋ᠠᠭᠠᠷᠢᠭᠠᠨ᠋ᠤᠷᠢᠨ᠋ᠠᠭᠤᠯᠭᠤᠢᠴᠢᠨᠠᠷ ᠵᠥᠪᠬᠡᠨ ᠠᠵᠢᠯᠯᠠᠬᠤ ᠪᠠᠢᠳᠠᠯ"
	壮文	Dan hab yungh youq gij dienheiq diuzgen mbouj dwg diegndat haenx ancienz sawjyungh.
	维文	غەيرى ئىسسىق بەلباغ ھاۋا كىلىمائى 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	"ᠲᠤᠰᠬᠠᠢ ᠳᠡᠭᠡᠰ ᠠᠯᠢᠪᠠ ᠵᠠᠢᠯᠠᠨ ᠳᠡᠭᠡᠷ᠋ᠡᠬᠢ 2000ᠮ ᠳᠤᠤᠷᠠᠬᠢ ᠭᠠᠵᠠᠷ ᠳᠤᠭᠤᠷ᠋ᠠᠬᠢ ᠪᠦᠰ ᠨᠤᠲᠠᠭ ᠳᠤᠤ ᠠᠵᠢᠯᠯᠠᠬᠤ ᠪᠠᠢᠳᠠᠯ"
	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.

China ROHS

Refer to the latest revision of the China ROHS document (P/N 53-1000428-xx) which ships with the product.

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.

Brocade ICX 6650 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 40°C (104°F).

VORSICHT	Das Gerät darf nicht in einer Umgebung mit einer Umgebungsbetriebstemperatur von über 40°C (104°F) installiert werden.
MISE EN GARDE	N'installez pas le dispositif dans un environnement où la température d'exploitation ambiante risque de dépasser 40°C (104°F).
PRECAUCIÓN	No instale el instrumento en un entorno en el que la temperatura ambiente de operación pueda exceder los 40°C (104°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
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

Ensure that adequate ventilation is provided for the system. A 3 cm clearance is recommended above the device and 8 cm clearance is recommended on each side.

VORSICHT	Stellen Sie sicher, dass das System ausreichend belüftet wird. Über dem Gerät wird 3 cm Freiraum, auf beiden Seiten jeweils 8 cm Freiraum empfohlen.
MISE EN GARDE	Assurez-vous que le circuit est correctement ventilé. Il est recommandé de conserver un espace de 3 cm au-dessus du dispositif, et de 8 cm sur chaque côté.
PRECAUCIÓN	Asegúrese de proporcionar una ventilación adecuada al sistema. Se recomienda dejar 3 cm de espacio libre por encima del dispositivo y 8 cm a cada lado.

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

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

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

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

Carefully follow the mechanical guides on each side of the power supply slot and make sure the power supply is properly inserted in the guides. Never insert the power supply upside down.

VORSICHT	Beachten Sie mechanischen Führungen an jeder Seite des Netzteils, das ordnungegemäß in die Führungen gesteckt werden muss. Das Netzteil darf niemals umgedreht eingesteckt werden.
MISE EN GARDE	Suivez attentivement les repères mécaniques de chaque côté du slot du bloc d'alimentation et assurez-vous que le bloc d'alimentation est bien inséré dans les repères. N'insérez jamais le bloc d'alimentation à l'envers.
PRECAUCIÓN	Siga cuidadosamente las guías mecánicas de cada lado de la ranura del suministro de energía y verifique que el suministro de energía está insertado correctamente en las guías. No inserte nunca el suministro de energía de manera invertida.

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).

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.

DANGER

Be careful not to accidently insert your fingers into the fan tray while removing it from the chassis. The fan may still be spinning at a high speed.

GEFAHR	Die Finger dürfen nicht versehentlich in das Ventilatorblech gesteckt werden, wenn dieses vom Gehäuse abgenommen wird. Der Ventilator kann sich unter Umständen noch mit hoher Geschwindigkeit drehen.
DANGER	Faites attention de ne pas accidentellement insérer vos doigts dans le boîtier du ventilateur lorsque vous l'enlevez du châssis. Il est possible que le ventilateur tourne encore à grande vitesse
PELIGRO	Procure no insertar los dedos accidentalmente en la bandeja del ventilador cuando esté desmontando el chasis. El ventilador podría estar girando a gran velocidad.

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

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 les instruments optiques. Produits de laser de la 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

DANGER

All fiber-optic interfaces use Class 1 lasers.

GEFAHR	Alle Glasfaser-Schnittstellen verwenden Laser der Klasse 1.
DANGER	Toutes les interfaces en fibres optiques utilisent des lasers de classe 1.
PELIGRO	Todas las interfaces de fibra óptica utilizan láser de clase 1.