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Brocade ICX 6650

Hardware Installation Guide

BROCADE

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About This Document

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

Audience

This document is designed for system administrators with a working knowledge of Layer 2 and Layer 3 switching and routing.

If you are using a Brocade Layer 3 Switch, you should be familiar with the following protocols if applicable to your network: IP, RIP, OSPF, BGP, ISIS, PIM, and VRRP.

Supported hardware and software

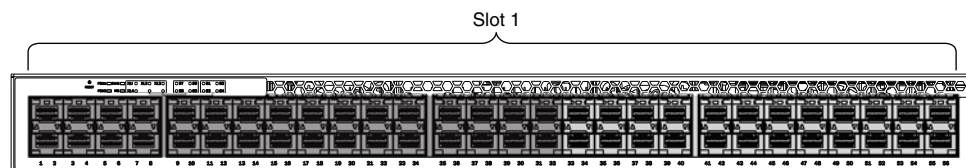
This document is specific to the Brocade ICX 6650 running FastIron 7.5.00.

Brocade ICX 6650 slot and Ethernet port numbering

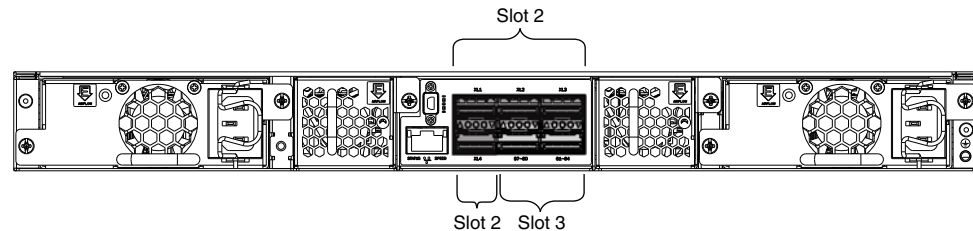
Many CLI commands require users to enter port numbers as part of the command syntax, and many **show** command outputs display port numbers. The port numbers are entered and displayed in stack-unit/slot number/port number format. In all Brocade ICX 6650 inputs and outputs, the stack-unit number is always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

The ICX 6650 contains the following slots and Ethernet ports:

- Slot 1 is located on the front of the ICX 6650 device and contains ports 1 through 56. Ports 1 through 32 are 10 GbE. Ports 33 through 56 are 1/10 GbE SFP+ ports. Refer to the following figure.



- Slot 2 is located on the back of the ICX 6650 device and contains ports 1 through 3 on the top row and port 4 on the bottom row. These ports are 2x40 GbE QSFP+. Refer to the following figure.



- Slot 3 is located on the back of the ICX 6650 device and contains ports 1 through 8. These ports are 4 x 10 GbE breakout ports and require the use of a breakout cable. Refer to the previous figure.

How this document is organized

The document contains the following components:

- [Chapter 1, “Brocade ICX 6650 Overview”](#) provides an overview of the Brocade ICX 6650.
- [Chapter 2, “Installing the Brocade ICX 6650”](#) provides the information needed to install the switch in your network.
- [Chapter 3, “Configuring the Brocade ICX 6650”](#) lays out the tasks and commands necessary to get the switch up and running.
- [Chapter 4, “Brocade ICX 6650 Operation”](#) discusses the day-to-day operational procedures for using the switch.
- [Chapter 5, “Managing the Brocade ICX 6650”](#) describes how to manage temperature settings, remove MAC addresses, and provides procedures for removing and replacing the field-replaceable units (FRUs), including the fan assemblies and power supplies.
- [Appendix A, “Brocade ICX 6650 Specifications”](#) provides tables of physical, environmental, and general specifications.
- [Appendix B, “Brocade ICX 6650 Regulatory Statements”](#) provides a list of the regulatory statements for safety compliance.
- [Appendix C, “Brocade ICX 6650 Cautions and Danger Notices”](#) provides a list of the international caution and danger statements for safety compliance.

Document conventions

This section describes text formatting conventions and important notice formats used in this document.

Text formatting

The narrative-text formatting conventions that are used are as follows:

bold text	Identifies command names Identifies the names of user-manipulated GUI elements Identifies keywords and operands Identifies text to enter at the GUI or CLI
<i>italic text</i>	Provides emphasis Identifies variables Identifies paths and Internet addresses Identifies document titles
code text	Identifies CLI output Identifies command syntax examples

For readability, command names in the narrative portions of this guide are presented in mixed lettercase: for example, **switchShow**. In actual examples, command lettercase is all lowercase.

Command syntax conventions

Command syntax in this manual follows these conventions:

command	Commands are printed in bold.
--option, option	Command options are printed in bold.
-argument, arg	Arguments.
[]	Optional elements appear in brackets.
<i>variable</i>	Variables are printed in italics. In the help pages, values are <u>underlined</u> or enclosed in angled brackets < >.
...	Repeat the previous element, for example “member[:member...]”
value	Fixed values following arguments are printed in plain font. For example, --show WWN
	Boolean. Elements are exclusive. Example: --show -mode egress ingress

Notes, cautions, and warnings

The following notices and statements are used in this manual. They are listed below in 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 potential damage to hardware or data.

**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.

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Oracle Corporation	Oracle, Java
Netscape Communications Corporation	Netscape
Mozilla Corporation	Mozilla Firefox
Sun Microsystems, Inc.	Sun, Solaris
Red Hat, Inc.	Red Hat, Red Hat Network, Maximum RPM, Linux Undercover

Related publications

The following Brocade documents supplement the information in this guide:

- *Brocade ICX 6650 Release Notes*
- *Brocade ICX 6650 Hardware Installation Guide New*
- *Brocade ICX 6650 Administration Guide*
- *Brocade ICX 6650 Platform and Layer 2 Configuration Guide*
- *Brocade ICX 6650 Layer 3 Routing Configuration Guide*
- *Brocade ICX 6650 Security Configuration Guide*
- *Brocade ICX 6650 IP Multicast Configuration Guide*

- *Brocade ICX 6650 Diagnostic Reference*
- *Unified IP MIB Reference*
- *Ports-on-Demand Licensing for the Brocade ICX 6650*

The latest versions of these guides are posted at <http://www.myBrocade.com/ethernetproducts>.

Additional information

This section lists additional Brocade and industry-specific documentation that you might find helpful.

Brocade resources

To get up-to-the-minute information, go to <http://www.myBrocade.com> to register at no cost for a user ID and password.

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Release notes are available on the MyBrocade website.

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Provide the title and version number of the document and as much detail as possible about your comment, including the topic heading and page number and your suggestions for improvement.

Brocade ICX 6650 slot and Ethernet port numbering

Brocade ICX 6650 Overview

In this chapter

- [Brocade ICX 6650 overview](#) 1
- [Views of the Brocade ICX 6650 switch](#) 2
- [Ports-on-Demand licensing](#)..... 3
- [Brocade ICX 6650 slot and Ethernet port numbering](#) 4
- [Supported transceivers and cables](#) 5
- [Breakout cables](#)..... 6

Brocade ICX 6650 overview

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

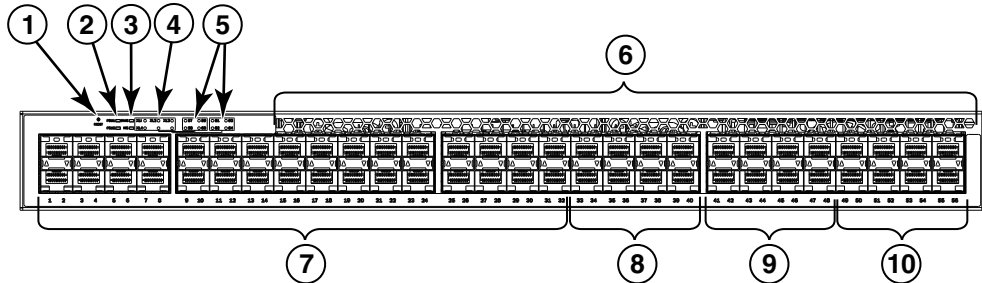
The device features:

- 56 SFP+ front-panel ports which support 1/10 GbE data rate
- Six QSFP+ rear-panel ports which support 10/40 GbE data rate
 - Four 40 GbE ports support optical QSFP+ module (SR only) up to 100 meters
 - Two 4x10 GbE ports that support QSFP-to-SFP breakout optical modules (SR) and QSFP-to-SFP breakout active copper 1-meter, 3-meter, and 5-meter cables
- SFP+ port support with Brocade 1-meter, 3-meter, 5-meter active copper cables and optical modules
- QSFP+ port support with Brocade 1-meter, 3-meter, 5-meter active copper QSFP-to-SFP breakout cables, standard SR4 optical modules, and 4x10 GbE SR4 optical modules
- Dual redundant, hot-swappable 250W AC power supplies available with Intake or Exhaust airflow
- Dual redundant, hot-swappable fan units available with Intake or Exhaust airflow
- One Gigabit Ethernet port (RJ45) and one serial management port to configure and manage the switch through the CLI.

Views of the Brocade ICX 6650 switch

Figure 1 shows the front view of the Brocade ICX 6650 switch.

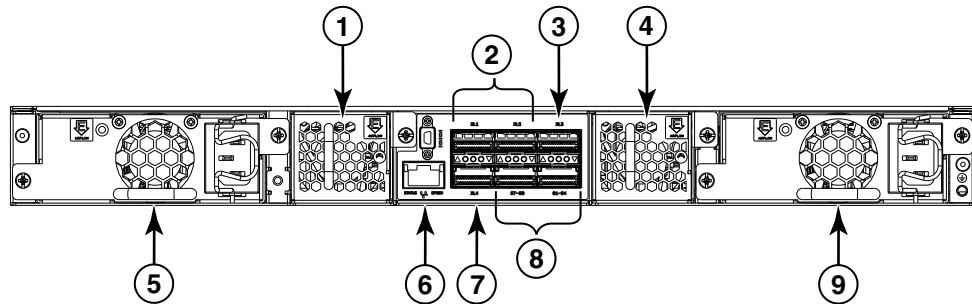
FIGURE 1 Front view of the Brocade ICX 6650



- | | | | |
|---|--|----|-------------------------|
| 1 | Push button reset | 6 | Air Intake/Exhaust |
| 2 | PSU1 and PSU2 status LEDs | 7 | Ports 1/1 through 1/32 |
| 3 | DIAG/MS status LEDs | 8 | Ports 1/33 through 1/40 |
| 4 | 1x40 GbE QSFP rear port status/activity LEDs | 9 | Ports 1/41 through 1/48 |
| 5 | 4x10 GbE QSFP-to-SFP breakout port status/activity LED | 10 | Ports 1/49 through 1/56 |

Figure 2 shows the back view of the Brocade ICX 6650 switch.

FIGURE 2 Back view of the Brocade ICX 6650



- | | | | |
|---|--------------|---|--------------------------|
| 1 | Fan unit | 2 | Ports 2/1 through 2/2 |
| 3 | Port 2/3 | 4 | Fan unit |
| 5 | Power supply | 6 | Ethernet management port |
| 7 | Port 2/4 | 8 | Ports 3/1 through 3/8 |
| 9 | Power supply | | |

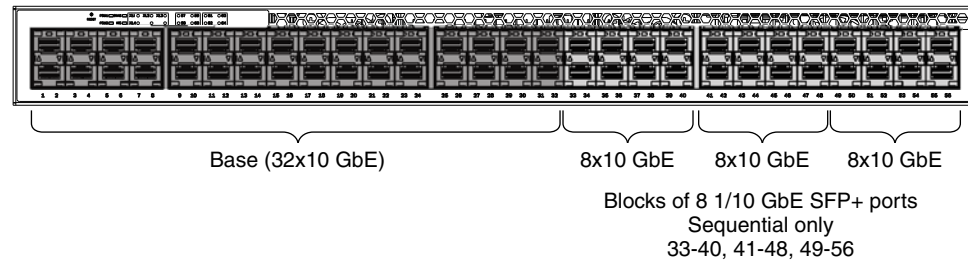
Ports-on-Demand licensing

The Brocade ICX 6650 device 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+ front-panel ports. These ports are sequential, enabling ports 33 through 40, 41 through 48, and 49 through 56. To enable additional front-panel ports requires purchasing and installing an ICX6650-8P10G-LIC-POD license. When you purchase the license, you specify 8, 16, or 24 port capacity so you purchase only the number of ports that you need. [Figure 3](#) shows the front-panel ports.

FIGURE 3 Brocade ICX 6650 front-panel ports

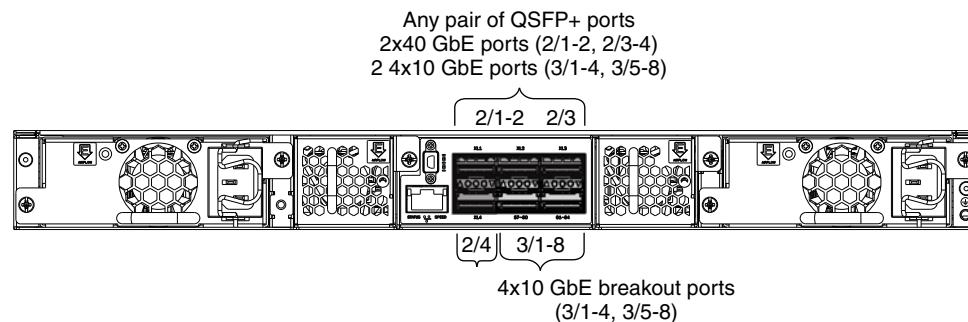


You can purchase and install up to three ICX6650-2P40G-LIC-POD licenses to enable pairs of 40 GbE ports or 4x10 GbE breakout ports on the rear panel. An ICX6650-2P40G-LIC-POD license can be applied to any of the following pairs of 40 GbE rear-panel ports or 4x10 GbE breakout ports:

- 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

[Figure 4](#) shows the rear-panel ports.

FIGURE 4 Brocade ICX 6650 rear-panel ports



1 Brocade ICX 6650 slot and Ethernet port numbering

The breakout ports support either:

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

NOTE

You can add a ICX6650-2P40G-LIC-POD license to any configuration. For example you can add a ICX6650-2P40G-LIC-POD license to a base 32 port configuration.

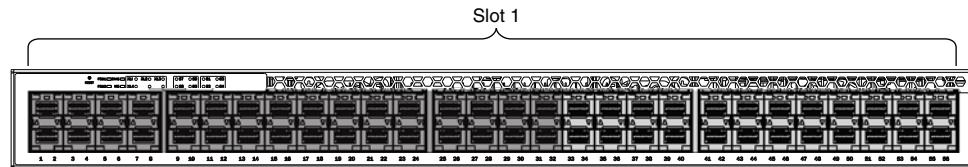
No trial licenses are available with Ports-on-Demand licensing.

Brocade ICX 6650 slot and Ethernet port numbering

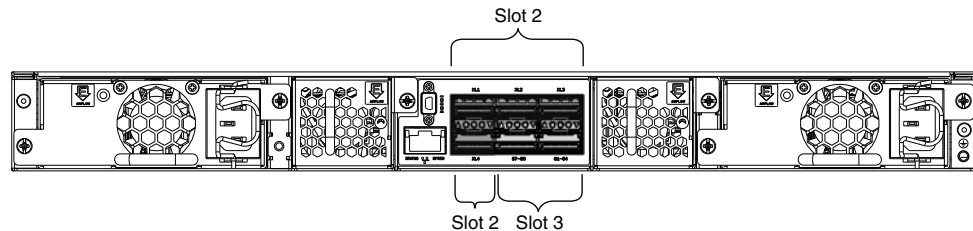
Many CLI commands require users to enter port numbers as part of the command syntax, and many **show** command outputs display port numbers. The port numbers are entered and displayed in stack-unit/slot number/port number format. In all Brocade ICX 6650 inputs and outputs, the stack-unit number is always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

The ICX 6650 contains the following slots and Ethernet ports:

- Slot 1 is located on the front of the ICX 6650 device and contains ports 1 through 56. Ports 1 through 32 are 10 GbE. Ports 33 through 56 are 1/10 GbE SFP+ ports. Refer to the following figure.



- Slot 2 is located on the back of the ICX 6650 device and contains ports 1 through 3 on the top row and port 4 on the bottom row. These ports are 2x40 GbE QSFP+. Refer to the following figure.



- Slot 3 is located on the back of the ICX 6650 device and contains ports 1 through 8. These ports are 4 x 10 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 Twinax copper (1 meter, 3 meter, and 5 meter)
- 40 GbE
 - Standard 40 GbE [SR4] transceiver without breakout
 - 40 GbE [SR4] QSFP+ transceiver with breakout to 4x10 GbE up to 100 meter on OM3 fiber
 - 40 GbE copper [D.A.C] breakout (1 meter, 3 meter, and 5 meter)

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

Breakout cables

The rear panel of the Brocade ICX 6650 device contains two 4x10 GbE ports which support the following:

- QSFP+ to 4 SFP+ (4 x 10 GbE) direct attach copper breakout cables (see [Figure 5](#))
- QSFP+ (MTP 1 x 8 or 1 x 12) optical breakout cables (see [Figure 6](#))

FIGURE 5 QSFP+ to 4 SFP+ (4 x 10 GbE) direct attach copper breakout cable

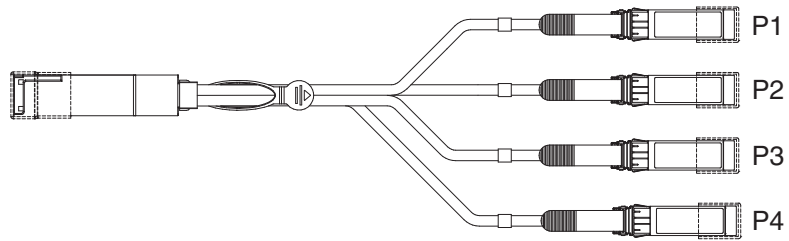
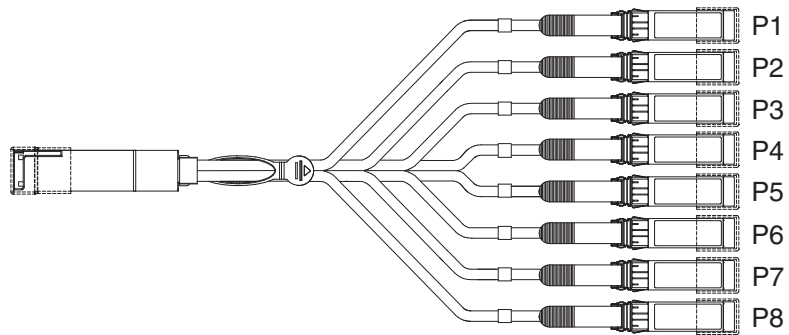


FIGURE 6 QSFP+ (MTP 1 x 8 or 1 x 12) optical breakout cable



Installing the Brocade ICX 6650

In this chapter

- Unpacking the device 7
- Installation and safety considerations 8
- Installation tasks 10
- Installation precautions 10
- Installing the device in a rack or cabinet 12
- Attaching a PC or terminal 17
- Powering on the system 17
- Installing an SFP+ transceiver 18

**CAUTION**

The procedures in this manual are intended for qualified service personnel.

**CAUTION**

Before beginning the installation, see the precautions in “Power precautions” on page 11.

Unpacking the device

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

Package contents

The following items are included in your shipping carton:

- A Brocade ICX 6650 device
- One accessory kit, containing the following items:
 - One power cord
 - One RJ45 to DB9F adaptor
 - One RJ45 crossover cable
 - One mini-USB (M)-DB9(F) cable
 - Two mounting ears and screws
 - Grounding terminal

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 ICX 6650 device.
- 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.

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. Be sure to follow the guidelines below when choosing a location.

The site should meet the following requirements:

- Maintain the operating environment as specified in the section [“Environmental considerations”](#) on page 45.
- Allow a minimum of 3 in. of space between the front and the back of the device and walls or other obstructions for proper air flow.
- 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 cable to be always 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 feet) of each device, and is powered from an independent circuit breaker. As with any equipment, a filter or surge suppressor is recommended.
- Some combinations of intake and exhaust airflows may not be compatible with your environment. Consult your fan and power supply module FRU kit to determine the correct configuration.
- For a 4-post rail mount configuration, order the appropriate mounting kit and refer to the kit documentation.

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:

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

Follow the steps listed in [Table 1](#) to install your device. Details for each of these steps are provided on the pages indicated.

TABLE 1 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 8
2	Install the device in an equipment rack.	“Installing the device in a rack or cabinet” on page 12
3	Attach a terminal or PC to the device. This will enable you to configure the device through the <i>Command Line Interface (CLI)</i> .	“Attaching a PC or terminal” on page 17
4	Plug the device into a nearby power source that adheres to the regulatory requirements outlined in this manual.	“Powering on the system” on page 17
5	No default password is assigned to the CLI. For additional access security, assign a password.	“Setting passwords” on page 21
6	Before attaching equipment to the device, you need to configure an interface IP address to the subnet on which the device will be located. Initial IP address configuration is performed using the CLI with a direct serial connection. Subsequent IP address configuration can be performed using the Web management interface.	“Configuring IP addresses” on page 22
8	Once you power on the device and assign IP addresses, the system is ready to accept network equipment.	“Devices running Layer 3 software” on page 23
9	Test IP connectivity to other devices by pinging them and tracing routes.	“Testing connectivity” on page 28
10	Continue configuring the device using the CLI or the Web management interface.	<i>Brocade ICX 6650 Administration Guide</i>
11	Secure access to the device.	<i>Brocade ICX 6650 Administration Guide</i>

Installation precautions

Follow all precautions when installing a device.

General precautions



CAUTION

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 air flow around the front and sides of the device is not restricted.

**CAUTION**

Never leave tools inside the device.

**CAUTION**

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

Lifting precautions

**CAUTION**

Make sure the rack or cabinet 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 AC power cord, which provides redundancy in case one of the circuits fails.

**CAUTION**

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

2 Installing the device in a rack or cabinet



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.



CAUTION

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



CAUTION

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



CAUTION

Make sure the rack or cabinet 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: Since 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. (Refer to “[Operating Environment](#)” on page 45.)
- 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

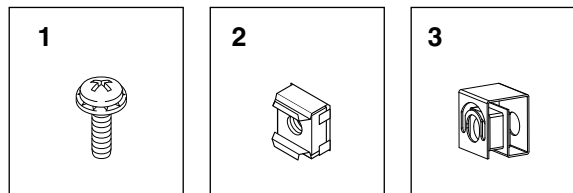
NOTE

Use the following procedure when installing the Brocade ICX 6650 device in a 2-post rack. For 4-post racks, follow the procedures in the section [“4-Post rack mount installation”](#) on page 14.

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). See item 1 in [Figure 7](#).
- Eight 32-10 retainer nuts (for square-hole rack rails). See item 2 in [Figure 7](#).
- Eight 32-10 retainer nuts (for round-hole rack rails) See item 3 in [Figure 7](#).

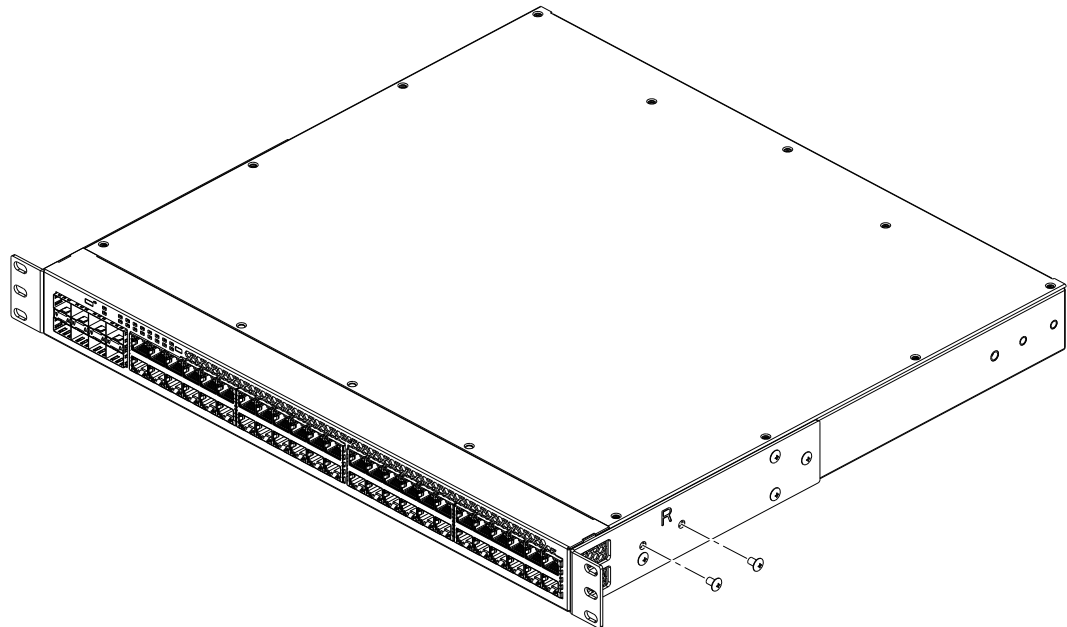
FIGURE 7 2-post screws and retainer nuts



Use the following steps to mount devices in a 2-post rack.

1. Attach the mounting brackets to the sides of the device as illustrated in [Figure 8](#) using the 8-32 x 5/16 in. screws.

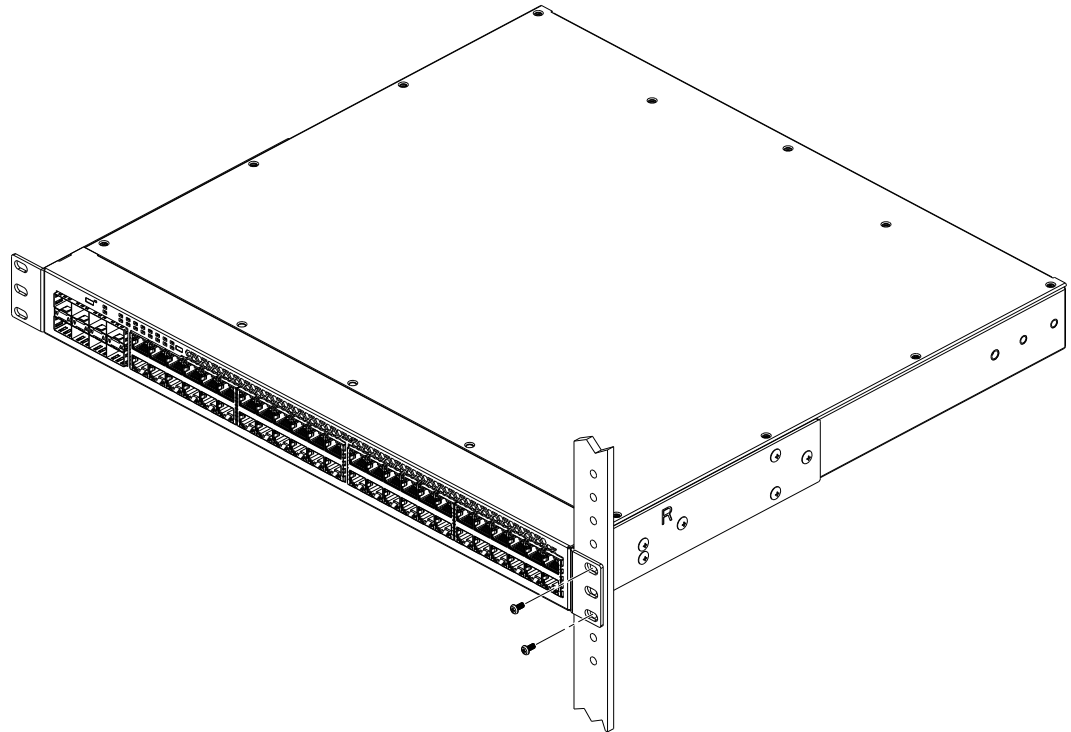
FIGURE 8 Attaching the brackets for Brocade ICX 6650 devices



2 Installing the device in a rack or cabinet

2. Position the switch in the cabinet, providing temporary support under the switch until the rail kit is secured to the cabinet.
3. Attach the front right bracket to the rail rack using two 10-32 x 5/8 in. screws and the appropriate round or square retainer nuts.
4. 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). See [Figure 9](#).

FIGURE 9 Installing the device in a 2-post rack



5. Proceed to [“Attaching a PC or terminal”](#) on page 17.

4-Post rack mount installation

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

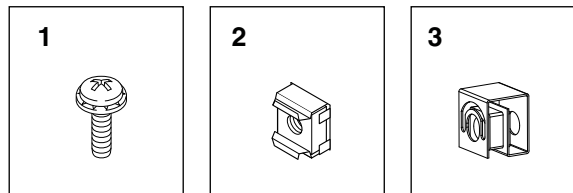
NOTE

Use the following procedure when installing the Brocade ICX 6650 device in a 4-post rack cabinet. For 2-post cabinets, follow the procedures in the section [“2-Post rack mount installation”](#) on page 13.

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). See item 1 in [Figure 10](#).
- Eight 32-10 retainer nuts (for square-hole rack rails). See item 2 in [Figure 10](#).
- Eight 32-10 retainer nuts (for round-hole rack rails) See item 3 in [Figure 10](#).

FIGURE 10 4-post screws and retainer nuts



Use the following steps to mount devices in a 4-post rack.



CAUTION

Do not use the hardware supplied in a 2-post rack mounting kit to mount a Brocade ICX 6650 device 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.

1. Attach the mounting brackets to the sides of the device as illustrated in [Figure 8](#) above using the 8-32 x 5/16 in. screws.
2. Attach the appropriate rails: either side attach or rear attach as determined by the type of rack in which you are installing the device.

[Figure 11](#) and [Figure 12](#) show exploded views of the optional 4-post rack mount kit.

2 Installing the device in a rack or cabinet

FIGURE 11 Optional 4-post Rack Mount Kit, Rear Attach

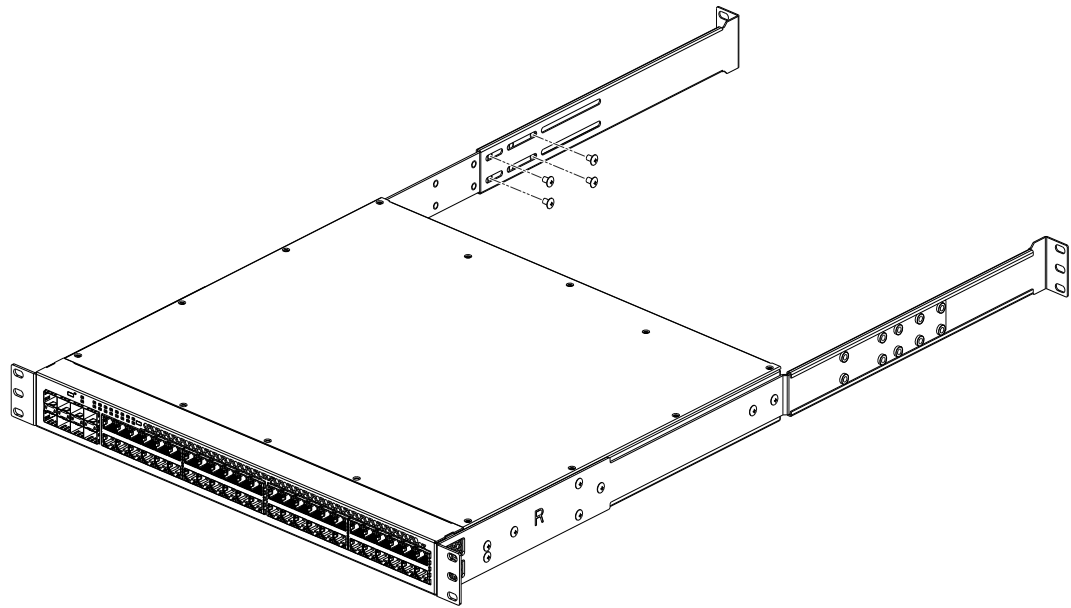
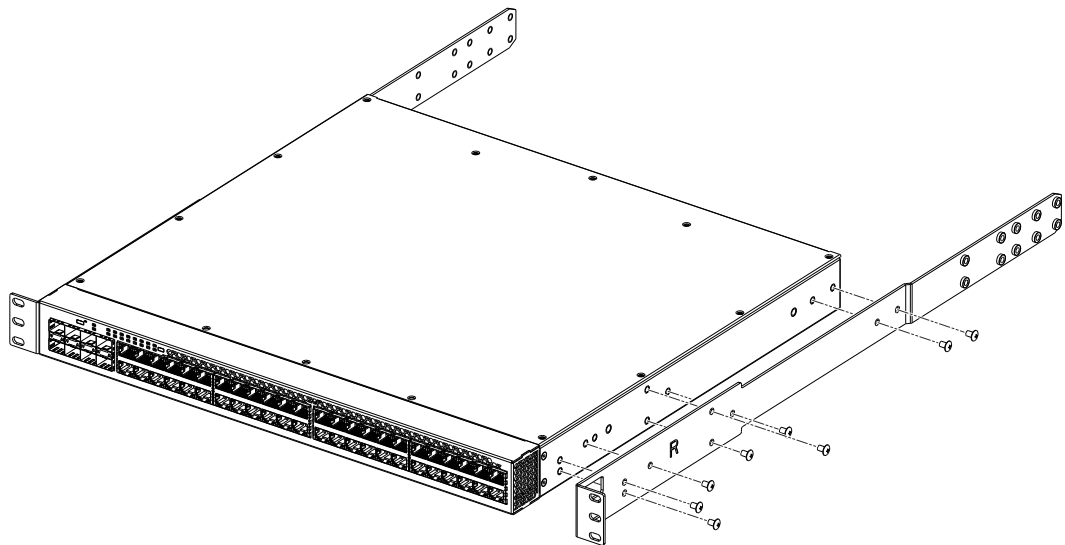


FIGURE 12 Optional 4-post Rack Mount Kit, Side Attach



3. Position the switch 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 or square retainer nuts.
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). See [Figure 9](#).

6. Attach the rear right bracket to the rail rack using two 10-32 x 5/8 in. screws and the appropriate round or square retainer nuts.
7. Repeat [step 6](#) 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).
8. Proceed to [“Attaching a PC or terminal”](#) on page 17.

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 *Brocade ICX 6650 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 back of the ICX 6650 device using the mini-USB serial console port cable (Part number 50-1000059-01).

For port pinout information for the mini-USB serial console port, see the section [“Pinouts and signalling”](#) on page 50.

NOTE

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

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

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

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.
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.

Installing an SFP+ transceiver

To monitor the transceivers, the **showmedia** command output shows the transceiver information for all interfaces on the switch. Third party transceivers are allowed. Brocade will provide support for such a system but may require that 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, as shown in [Figure 13](#).
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.

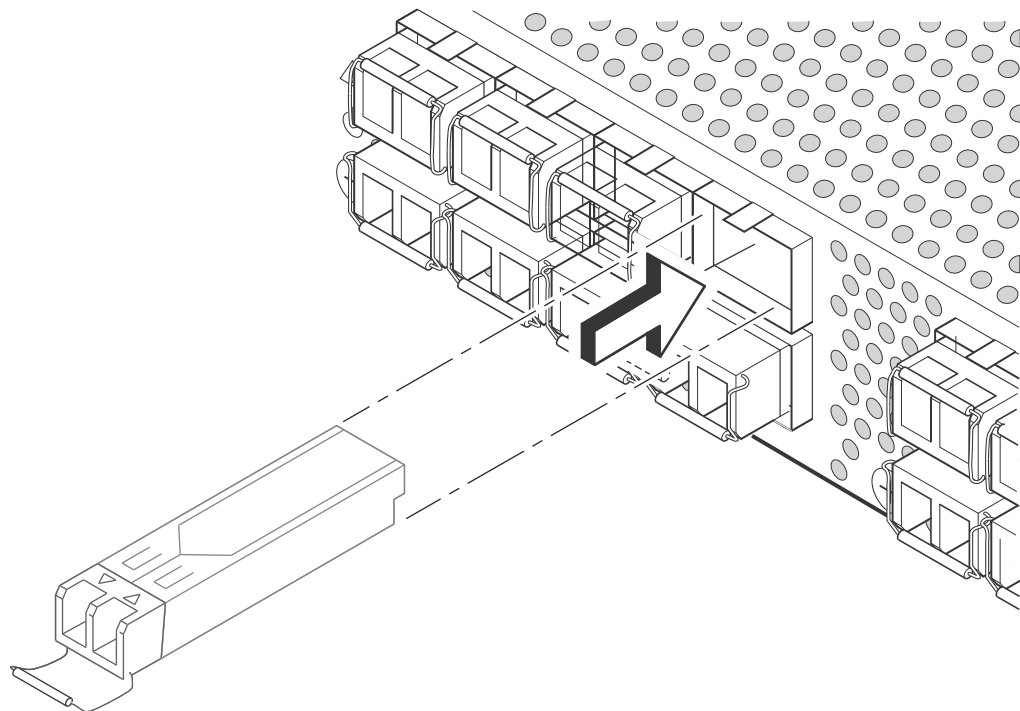


FIGURE 13 Installing an SFP+ transceiver in a port slot

Configuring the Brocade ICX 6650

In this chapter

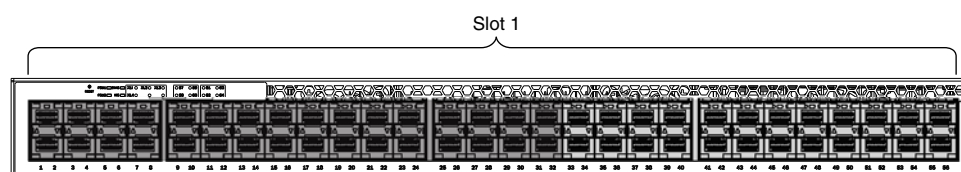
- Brocade ICX 6650 slot and Ethernet port numbering 19
- Assigning permanent passwords 20
- Configuring IP addresses 22
- Connecting network devices 26
- Testing connectivity 28
- Troubleshooting network connections 28

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.

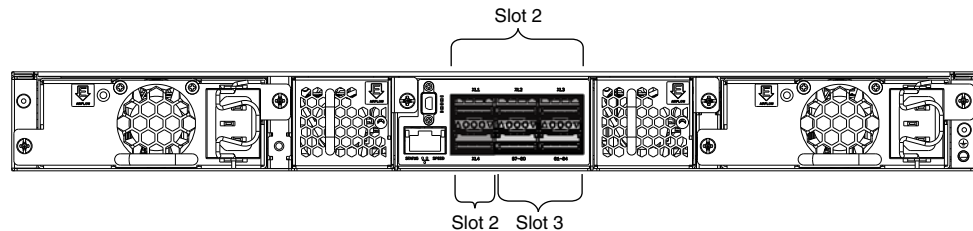
The ICX 6650 contains the following slots and Ethernet ports:

- Slot 1 is located on the front of the ICX 6650 device and contains ports 1 through 56. Ports 1 through 32 are 10 GbE. Ports 33 through 56 are 1/10 GbE SFP+ ports. Refer to the following figure.



3 Assigning permanent passwords

- Slot 2 is located on the back of the ICX 6650 device and contains ports 1 through 3 on the top row and port 4 on the bottom row. These ports are 2x40 GbE QSFP+. Refer to the following figure.



- Slot 3 is located on the back of the ICX 6650 device and contains ports 1 through 8. These ports are 4 x 10 GbE breakout ports and require the use of a breakout cable. Refer to the previous figure.

Assigning permanent passwords

By default, the CLI is not protected by passwords. To secure CLI access, Brocade strongly recommends assigning passwords. See the *Brocade ICX 6650 Administration Guide*.

The CLI contains the following access levels:

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

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 level of the EXEC mode:

```
Brocade> enable
```

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

```
Brocade# configure terminal
Brocade(config)#
```

3. Enter the following command to set the super user password:

```
Brocade(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:

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

NOTE

If you forget your super user password, refer to [“Recovering from a lost password”](#) on page 21.

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 someone has configured a password for the device but the password has been lost, you can regain super user access to the device using the following procedure.

NOTE

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

Use the following procedure to recover from a lost password.

1. Start a CLI session over the serial interface to the Brocade device.
2. Reboot the device.
3. While the system is booting, before the initial system prompt appears, enter **b** to enter the boot monitor mode.
4. Enter **no password** at the prompt. (You cannot abbreviate this command.)

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 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 (example: 255.255.255.0). You can change the display to the prefix format. See the *Brocade ICX 6650 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**.

```
Brocade> enable
```

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

```
Brocade# 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:

```
Brocade# configure terminalPrivileged EXEC Level
```

```
Brocade(config)# Global CONFIG Level
```

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

```
Brocade(config-if-e1000-2)# ip address 192.168.0.0 255.255.255.0
```

5. Set a default gateway address for the switch.

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

NOTE

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

Syntax: `enable` [*password*]

Syntax: `configure terminal`

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

or

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

Syntax: ip default-gateway *ip-addr*

Devices running Layer 3 software

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

```
Brocade> enable
```

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

```
Brocade# 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:

```
Brocade# configure terminalPrivileged EXEC Level
```

```
Brocade(config)# Global CONFIG Level
```

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

```
Brocade(config)# int e 1/1/1
```

```
Brocade(config-if-e1000-2)# ip address 192.168.0.0 255.255.255.0
```

NOTE

You can use the syntax **ip address *ip-addr/mask-bits*** if you know the subnet mask length. In the above example, you could enter **ip address 192.168.0.0/24**.

Syntax: enable [*password*]

Syntax: configure terminal

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

or

3 Configuring IP addresses

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

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

Configuring IP parameters for devices running Layer 3 software

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

Configuring IP addresses

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

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

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

NOTE

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

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 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.

```
Brocade(config)# interface ethernet 1/1/1
Brocade(config-if-1/1/1)# ip address 192.168.0.0 255.255.255.0
```

NOTE

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

```
Brocade(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.

NOTE

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

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

```
Brocade(config)# int loopback 1
Brocade(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 to 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. The maximum is listed in the System Parameters section, in the Current column of the virtual-interface row.

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.

This section describes how to configure an IP address on a virtual interface.

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.

```
Brocade(config)# vlan 2 name IP-Subnet_1.1.2.1/24
Brocade(config-vlan-2)# untag 1/1/1 to 1/1/4
Brocade(config-vlan-2)# router-interface ve1
Brocade(config-vlan-2)# interface ve1
Brocade(config-vif-1)# ip address 1.1.2.1/24
```

The first two commands in this example create a Layer 3 protocol-based VLAN name "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.

```
Brocade(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:

```
Brocade(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 “[Pinouts and signalling](#)” on page 50.

Connecting a network device to a fiber port

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

For information about transceivers supported on ICX 6650 devices, 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 do the following tasks:

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

The following sections describe these tasks.

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.

NOTE

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



CAUTION

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

Use the following steps to cable a fiber optic transceiver.

1. Remove the protective covering from the fiber-optic port connectors and store the covering for future use.
2. 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 27.
3. Gently insert the cable connector (a tab on each connector should face upward) into the transceiver connector until the tabs lock into place.
4. 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 29.

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 device can reach another device through the network, enter a command similar to the following at any level of the CLI.

```
Brocade# 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 on the device.

```
Brocade# traceroute 192.168.0.0
```

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

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 IronView Network Manager.
- If the other procedures don't resolve the problem, try using a different port or a different cable.

Brocade ICX 6650 Operation

In this chapter

- LED activity interpretation 29
- Brocade ICX 6650 front panel LEDs 29
- Brocade ICX 6650 rear panel LEDs 31
- LED patterns 32
- Brocade ICX 6650 maintenance 33
- Diagnostic tests and monitoring 33

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 either 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

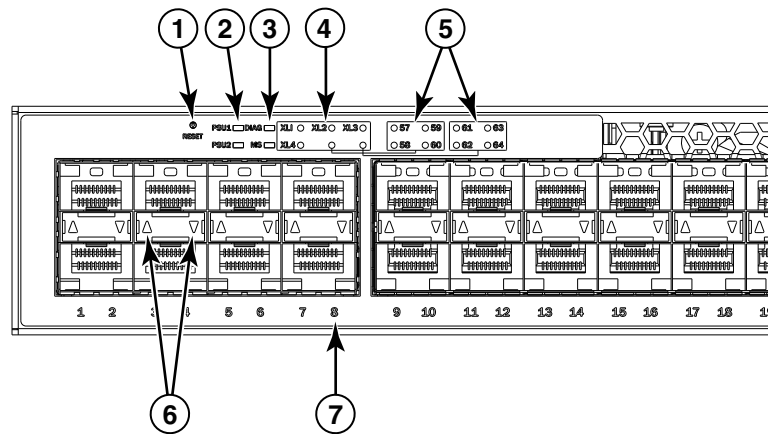
The Brocade ICX 6650 has the following LEDs on the front panel:

- Two Power Supply Unit (PSU) bicolor status LEDs (green and amber) labeled PSU1 and PSU2.
- One DIAG LED bicolor status LED (green and amber).
- Four 1x40 GbE QSFP port status 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 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 1/10 GbE mode of operation.

4 Brocade ICX 6650 front panel LEDs

Figure 14 shows the LEDs on the Brocade ICX 6650 front panel. The up-arrow port status LEDs for the 10/1 GbE ports correspond to the upper, odd numbered ports; the down-arrow port status LEDs correspond to the lower, even numbered ports

FIGURE 14 Brocade ICX 6650 front panel LEDs and port numbering



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

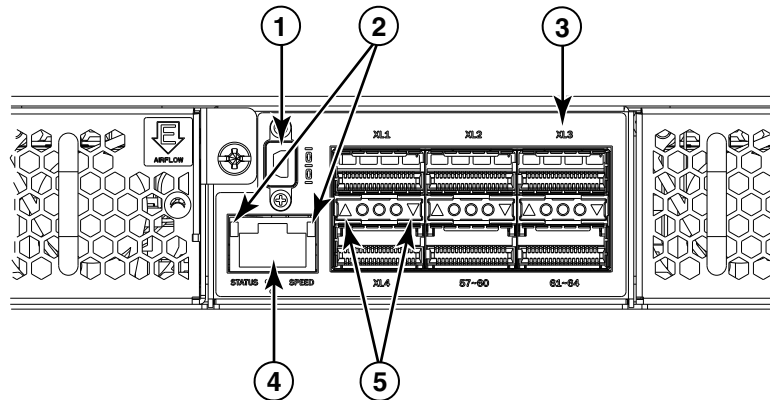
Brocade ICX 6650 rear panel LEDs

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 15 shows the LEDs on the rear panel of the Brocade ICX 6650.

FIGURE 15 Brocade ICX 6650 rear panel LEDs and port number



- | | | | |
|---|---------------------------------|---|-----------------------------|
| 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

The following sections describe the Brocade ICX 6650 LED patterns.

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

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 reboot and clears back to off.	No action required.
Steady amber	System self-diagnostic test has detected a fault.	Contact support.

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

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 GSFP+ 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 GSFP+ 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 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 Network OS includes diagnostic tests to help you troubleshoot the hardware. System diagnostic software is designed to fulfill the purpose of off-line diagnostics. In off-line diagnostics, you have to turn ON/OFF the diagnostic flags to execute diagnostic tests during the next boot-up.

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.

4 Diagnostic tests and monitoring

Managing the Brocade ICX 6650

In this chapter

- Managing temperature settings 35
- Removing MAC address entries 38
- Displaying Brocade ICX 6650 CPU usage 38
- Hardware maintenance schedule 38
- Replacing a copper or fiber optic module 39
- FRU removal and replacement procedures 40
- Replacing a power supply unit 41
- Replacing fan trays 43



CAUTION

The procedures in this chapter are for qualified service personnel.

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

This temperature reflects the temperature of the board inside the device.

```
ICX6650-64 Router#sh chas
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 methods describe how to view the system log on the device. If you have configured the device to use a Syslog server or SNMP trap receiver, see the documentation for the server or receiver.

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

```
Brocade# 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:

```
Brocade# temperature warn 85
```

Syntax: `temperature warn value`

The *value* is the temperature warning level, in Celsius degrees. You cannot set this level higher than the temperature 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:

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

Syntax: `chassis poll-time value`

The *value* can be 0 – 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:

```
Brocade# 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:

```
Brocade# 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.

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

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
- Installing a new copper or fiber optic module
- Cabling a fiber optic module

Removing a copper or fiber optic module

You can remove a copper or fiber SFP, 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.



CAUTION

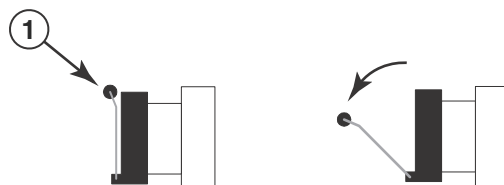
For safety reasons, the ESD wrist strap should contain a series 1 megohm resistor.

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.

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

FIGURE 16 Unlocking the bail latch



- 1 Bail Latch

NOTE

The bail latch may be attached to either the top or the bottom of the mini-GBIC.

5 FRU removal and replacement procedures

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

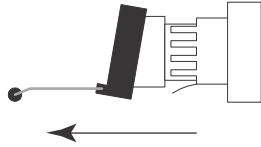


FIGURE 17 Remove fiber optic module

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

Cabling a fiber optic module

For instructions on cabling a fiber optic module refer to [“Cabling a fiber optic transceiver”](#) on page 34.

Cleaning the fiber optic connectors

For instructions on cleaning a fiber optic module refer to [“Cleaning the fiber optic connectors”](#) on page 35.

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.



CAUTION

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 18](#) illustrates examples of the airflow labels.

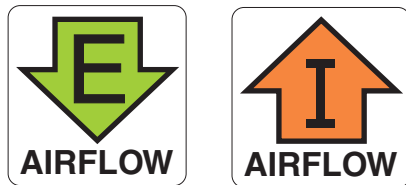


FIGURE 18 Examples of airflow symbols

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.

The **show chas** 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

For the Brocade ICX 6650 devices, be sure 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."

ATTENTION

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



CAUTION

Because the cooling system relies on pressurized air, do not leave any of the power supply and fan assembly slots empty longer than two minutes while the switch is operating. If a power supply or fan assembly fails, leave it in the switch until it can be replaced.



CAUTION

Disassembling any part of the power supply and fan assembly voids the warranty and regulatory certifications. There are no user-serviceable parts inside the power supply and fan assembly.

Table 2 describes the Brocade ICX 6650 power supply status LED colors, behaviors, and actions required, if any.

TABLE 2 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 (see Table 2).
- 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.

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.
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 (see [Table 2](#)). If the LED is not steady green, ensure that the power supply is securely installed and seated properly.

You can enter the **show chassis** command at the command line prompt to display power supply status.



CAUTION

Do not force the installation. If the power supply does not slide in easily, ensure that the power supply is correctly oriented before continuing.

Replacing fan trays



CAUTION

For the Brocade ICX 6650 devices, be sure that the airflow direction of the fan tray matches that of the installed power supply unit. 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 Brocade ICX 6650 includes two redundant, hot-swappable fan units.

ATTENTION

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



CAUTION

Because the cooling system relies on pressurized air, do not leave any of the power supply and fan assembly slots empty longer than two minutes while the switch is operating. If a power supply or fan assembly fails, leave it in the switch until it can be replaced.



CAUTION

Disassembling any part of the power supply and fan assembly voids the warranty and regulatory certifications. There are no user-serviceable parts inside the power supply and fan assembly.

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 [Figure 18](#) on page 41 for the location of the airflow label)
- A #1 Phillips screwdriver

Replacing the fan assembly

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

1. Using the Phillips screwdriver, unscrew the captive screw on the fan assembly.
2. 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.
3. Remove the fan tray from the anti-static shielded bag.
4. Ensure that the replacement fan assembly has the same part number and airflow label as the fan assembly being replaced.
5. Remove the fan assembly from the chassis by pulling the handle on the fan assembly out and away from the chassis.
6. 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.
7. When you are sure the fan tray has properly engaged the connector, tighten the retainer screws to secure the fan tray in the slot.



CAUTION

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

NOTE

The fans are controlled automatically by the device.

Brocade ICX 6650 Specifications

In this appendix

- [Weight and physical dimensions](#) 45
- [Environmental considerations](#) 46
- [Cooling system and fans](#) 46
- [Power supply specifications](#) 49
- [General specifications](#) 49
- [Supported media types](#) 50
- [Pinouts and signalling](#) 50
- [Memory specifications](#) 50

Weight and physical dimensions

[Table 3](#) lists the weight and dimensions of the Brocade ICX 6650.

TABLE 3 Physical specifications

Dimension	Value
Height	44 mm (1.732 in)
Depth	406.4 mm (16.00 in)
Width	429 mm (16.88 in)
Weight (with all power supplies and fan assemblies, and no transceivers installed)	8.41 kg (18.5 lb)

Environmental considerations

Table 4 lists the acceptable environmental ranges for both operating and nonoperating (such as during transportation or storage) conditions.

TABLE 4 Environmental requirements

Condition	Acceptable during operation	Acceptable during non-operation
Ambient Temperature	0° to 40°C (32° to 104°F)	-25° to 70°C (-23° to 158°F)
Humidity	10% to 95% RH non-condensing, at 40°C (104°F)	5% to 80% RH non-condensing, at 70°C (158°F)
Altitude	0 to 3 km (9,842 feet) above sea level	0 to 12 km (39,370 feet) above sea level
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

Cooling system and fans

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. See [Figure 19](#). Devices with exhaust airflow are labeled with a green arrow with “E.” See [Figure 20](#).
- An intake airflow which moves air from back to front. See [Figure 21](#). Devices with intake airflow are labeled with an orange arrow with “I.” See [Figure 22](#).



CAUTION

Be sure 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” for exhaust, or an orange arrow with an “I” for intake.

FIGURE 19 Brocade ICX 6650 airflow — front to back (with E-labeled power supply and fan tray)

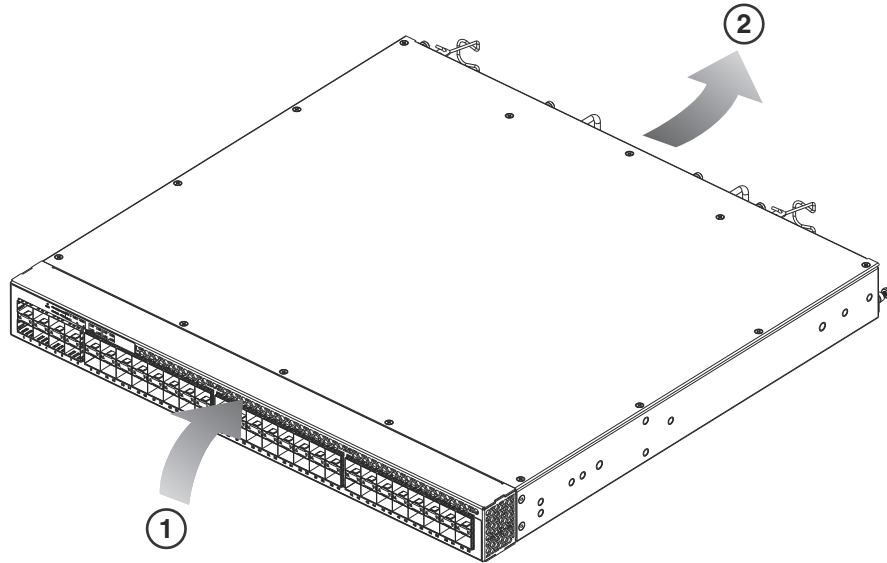


FIGURE 20 Exhaust airflow label



A Cooling system and fans

FIGURE 21 Brocade ICX 6650 airflow — back to front (with I-labeled power supply and fan tray)

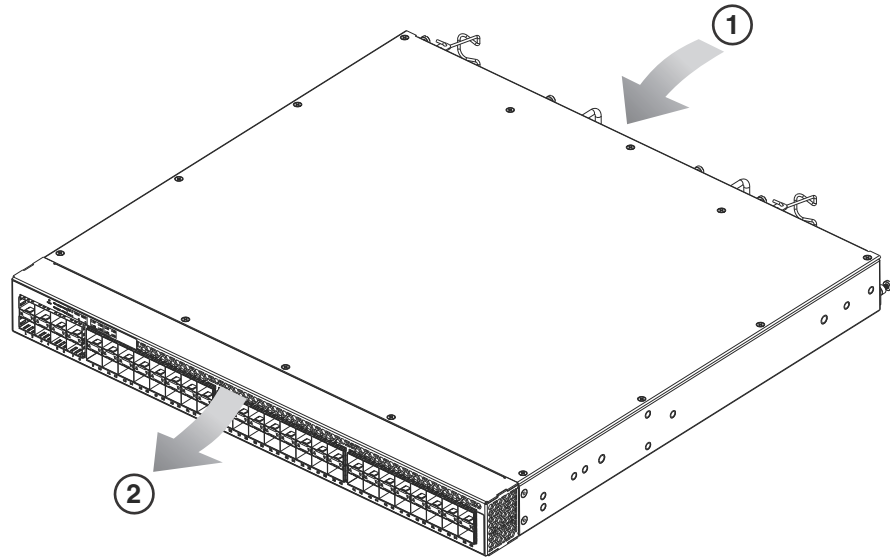


FIGURE 22 Intake airflow label



For a complete list of regulatory compliances refer to [“Regulatory compliance”](#) on page 55.

Power supply specifications

All units ship with two RPS15 redundant, load sharing, and hot swappable power supplies. The power supplies are universal and capable of functioning worldwide without voltage jumpers or switches. They meet IEC 61000-4-5 surge voltage requirements and are autoranging in terms of accommodating input voltages and line frequencies.

Table 6 lists the power state definitions for the Brocade ICX 6650.

TABLE 5 Power state definitions

Power State	Definition
Idle	All ports down, no optics or cables connected.
Typical	56x10 GbE, 4x40 GbE, and 4x4x10 GbE ports linked and UP. 10% traffic with 64-byte packets. Fans at normal speed.
Maximum	All ports connected with optics to draw maximum power per MSA Optics Specification. Traffic at full rate or 100% throughput. Fans at full speed.

Table 6 lists the power supply specifications for the Brocade ICX 6650.

TABLE 6 System power specifications

AC Voltage	Input Watts	BTU's/hr	Power State
120 VAC	114.6	391.14	Idle
120 VAC	154.6	527.66	Typical
120 VAC	230	785.01	Maximum

Inrush current should be limited to 35A peak for any initial current surge or spike of 10ms or less at either cold or warm start. Any additional inrush current surges or spikes in the form of AC cycles or multiple AC cycles greater than 10ms and less than 150ms must not exceed 25A peak. After 150ms the AC input current will be less than the rating of input fuses and the other components within the power supply.

General specifications

Table 7 lists the general specifications for the Brocade ICX 6650.

TABLE 7 General specifications

Specification	Description
System architecture	Nonblocking shared-memory switch
System processor	800 MHz PowerPC
Switch bandwidth	1600 Gbps
Forwarding bandwidth (data rate, full duplex)	1190 Mpps

Supported media types

The Brocade ICX 6650 supports the following media types:

- 10000BASE-TX SFP, RJ45 (Cat5, 6, Cat6a/7)
- 10000BASE-SX SFP
- 10000BASE-LX SFP
- SFP+ Direct Attach Copper cable, 10 GbE (1, 3, and 5 meter Twinax)
- 10GBASE-USR SFP+ (MMF Ultra-Short Reach)
- 10GBASE-SR SFP+ (MMF Short Reach)
- 10GBASE-LR SFP+ (SMF10 km Reach)
- 40GBASE-SR4 QSFP+ (MTP 1x8 or 1x12), MMF 100 meter
- 40GBASE-SR4 QSFP+ (MTP 1x8 or 1x12), MMF 100 meter (10GBASE-SR compatible, breakout)
- QSFP+ to 4 SFP+ Direct Attach Copper breakout cable (1, 3, and 5 meter)

Pinouts and signalling

Pinout information for the rear panel mini-USB RJ45 console connector is provided in [Table 8](#).

TABLE 8 Mini-USB serial RJ45 management port pinouts

Pin number	Definition	Notes
1	+5V	Not used
2	UART0_TX	Debug port
3	UART0_RX	Console Port
4	IN	Not used
5	GND	GND

Memory specifications

The Brocade ICX 6650 has two types of memory devices: boot flash, and main memory. The size of each is listed in [Table 9](#).

TABLE 9 Brocade ICX 6650 memory specifications

Type	Size
Boot flash	64MB NOR flash
Main memory - DDR2-400 SDRAM with ECC (RDIMM)	1GB

Brocade ICX 6650 Regulatory Statements

In this appendix

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• Europe and Australia (CISPR 22 Class A Warning)	52
• Germany (Noise Warning)	52
• Japan (VCCI)	52
• Japan power cord	53
• Korea	53
• China	54
• BSMI statement (Taiwan)	55
• Regulatory compliance	55

USA (FCC CFR 47 Part 15 Warning)

This equipment has been tested and found to comply with the limits for a Class A digital 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, may 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 his own expense.



CAUTION

Changes or modifications made to this device which are not expressly approved by Brocade could void the user's authority to operate the equipment.

Industry Canada statement

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

English Translation of above statement

This Class A digital apparatus complies with Canadian ICES-003.

B Europe and Australia (CISPR 22 Class A Warning)

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.

Germany (Noise Warning)

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.

Japan (VCCI)



English translation of above statement

This is 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 may arise. When such trouble occurs, the user may be required to take corrective actions.

Japan power cord



English translation of above statement

ATTENTION: Never use the power cord packed with your equipment for other products.

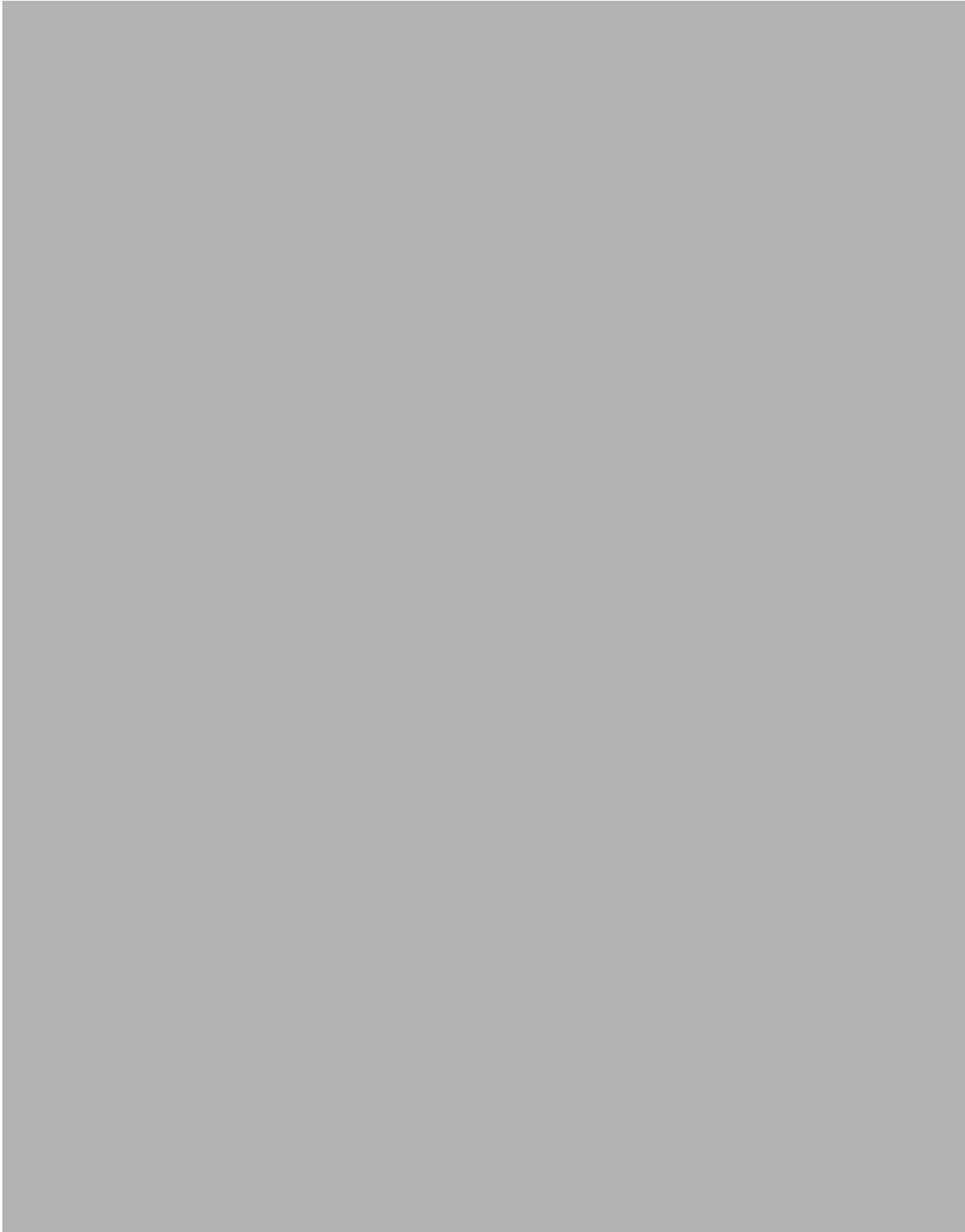
Korea

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

English translation of above statement

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.

China



BSMI statement (Taiwan)



English translation of above statement

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.

Regulatory compliance

[Table 10](#) lists the Electromagnetic Compatibility (EMC), Immunity standards, and safety agency approvals for the FastIron family of switches.

TABLE 10 Regulatory Compliance and Safety Approvals

Certifications

Electromagnetic:

- FCC Part 15, Subpart B, Class A
- ICES-003: 2004
- VCCI-Technical Requirement (V-3/2011.04)/Class A
- EN 55022: 2006+A1: 2007 Class A
- EN 61000-3-2: 2006+A1: 2009+A2: 2009 Class A
- EN 61000-3-3: 2008
- EN 61000-6-1: 2007
- EN 61000-6-3: 2007
- EN 55024: 1998+A1: 2001+A2: 2003
- EN 300 386 (V1.4.1): 2008
- IEC 61000-4-2: 2008 ED. 2.0
- IEC 61000-4-3: 2006+A1: 2007+A2: 2010 ED. 3.2
- IEC 61000-4-4: 2004+A1: 2010 ED. 2.0
- IEC 61000-4-5: 2005 ED. 2.0
- IEC 61000-4-6: 2008 ED. 3.0
- IEC 61000-4-8: 2009 ED. 2.0
- IEC 61000-4-11: 2004 ED. 2.0

Environmental:

- RoHS-compliant (6 of 6); WEEE-compliant

B Regulatory compliance

Brocade ICX 6650 Cautions and Danger Notices

In this appendix

- [Cautions](#) 57
- [Danger notices](#) 62

Cautions

A caution calls your attention to a possible hazard that can damage equipment.

“Vorsicht” weist auf die Gefahr einer möglichen Beschädigung des Gerätes in.

Une mise en garde attire votre attention sur un risque possible d'endommagement de l'équipement. Ci-dessous, vous trouverez les mises en garde utilisées dans ce manuel.

C Cautions

Un mensaje de precaución le advierte sobre un posible peligro que pueda dañar el equipo. Las siguientes son precauciones utilizadas en este manual.

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 45° C (113° F) installiert werden.
MISE EN GARDE	N'installez pas le dispositif dans un environnement où la température d'exploitation ambiante risque de dépasser 45° C (113° F).
PRECAUCIÓN	No instale el instrumento en un entorno en el que la temperatura ambiente de operación pueda exceder los 45° C (113° F).

CAUTION	Make sure the air flow 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	Use a separate branch circuit for each AC power cord, which provides redundancy in case one of the circuits fails.
VORSICHT	Es empfiehlt sich die Installation eines separaten Stromkreisweiges für jede Wechselstrom-Elektroschnur als Redundanz im Fall des Ausfalls eines Stromkreises.
MISE EN GARDE	Utilisez un circuit de dérivation différent pour chaque cordon d'alimentation C.A. 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 de CA, 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	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.

C Cautions

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	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 dispositif 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 conectarse a la corriente).

CAUTION	Risk of explosion if battery is replaced by an incorrect type. Dispose of used batteries according to the instructions.
VORSICHT	Es besteht Explosionsgefahr, wenn ein unzulässiger Batterietyp eingesetzt wird. Verbrauchte Batterien sind entsprechend den geltenden Vorschriften zu entsorgen.
MISE EN GARDE	Risque d'explosion en cas de remplacement de la pile par un modèle incorrect. Débarrassez-vous des piles usagées conformément aux instructions.
PRECAUCIÓN	Riesgo de explosión si se sustituye la batería por una de tipo incorrecto. Deshágase de las baterías usadas de acuerdo con las instrucciones.

CAUTION	To avoid high voltage shock, do not open the device while the power is on.
VORSICHT	Das eingeschaltete Gerät darf nicht geöffnet werden, da andernfalls das Risiko eines Stromschlags mit Hochspannung besteht.
MISE EN GARDE	Afin d'éviter tout choc électrique, n'ouvrez pas l'appareil lorsqu'il est sous tension.
PRECAUCIÓN	Para evitar una descarga de alto voltaje, no abra el dispositivo mientras esté encendido.

C Danger notices

CAUTION	For the ICX 6650 devices, be sure 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 bei den ICX 6650-Geräten, dass die Luftstromrichtung des Netzteils der 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	Pour les équipements de type ICX 6650, 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	En el caso de dispositivos ICX 6650, 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	For the ICX 6650 devices, be sure that the airflow direction of the fan tray matches that of the installed power supply unit. 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 bei den ICX 6650-Geräten, dass die Luftstromrichtung der Lüftereinheit der des eingebauten Netzteils 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	Pour les équipements de type ICX 6650, veillez à ce que le sens de circulation de l'air du tiroir de ventilation corresponde à celui du bloc d'alimentation 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	En el caso de dispositivos ICX 6650, asegúrese de que la dirección del flujo de aire de la bandeja del ventilador se corresponda con la de la unidad de alimentación. 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	If you do not install a power supply in a slot, you must keep the slot panel in place. If you run the device with an uncovered slot, the system will overheat.
VORSICHT	Wenn Sie in einem Einschub kein Netzteil einsetzen, müssen Sie die Blende im Einschub lassen. Der Betrieb des Geräts mit einem offenen Einschub kann zur Überhitzung des Systems führen.
MISE EN GARDE	Si vous n'installez pas de bloc d'alimentation dans un emplacement, vous devez laisser le cache de protection en place. Si vous faites fonctionner l'équipement avec un emplacement vide, sans cache, le système risque de surchauffer.
PRECAUCIÓN	Si no hay ninguna fuente de alimentación instalada en una ranura, debe dejar la tapa correspondiente puesta en la ranura. Si pone en funcionamiento el dispositivo con una ranura descubierta, el sistema se sobrecalentará.

Danger notices

A danger notification calls your attention to a possible hazard that can cause injury or death. The following are the warnings used in this manual.

"Gefahr" weist auf eine mögliche Gefährdung hin, die zu Verletzungen oder Tod führen können. Sie finden die folgenden Warnhinweise in diesem Handbuch:

Un danger attire votre attention sur un risque possible de blessure ou de décès. Ci-dessous, vous trouverez les avertissements utilisés dans ce manuel.

Una señal de peligro le llama la atención sobre cualquier posible peligro que pueda ocasionar daños personales o la muerte. A continuación se dan las advertencias utilizadas en este manual.

DANGER	The procedures in this manual are for qualified service personnel.
GEFAHR	Die Verfahren in diesem Handbuch sind nur für qualifiziertes Wartungspersonal gedacht.
DANGER	Les procédures décrites dans ce manuel doivent être effectuées par le personnel de service qualifié uniquement.
PELIGRO	Los procedimientos de este manual se han hecho para personal de servicio cualificado.

DANGER	Before beginning the installation, see the precautions in " Installation precautions " on page 10.
GEFAHR	Vor der Installation siehe Vorsichtsmaßnahmen unter "Power Precautions" (Vorsichtsmaßnahmen in Bezug auf elektrische Ablagen) auf den Seiten 3-4.
DANGER	Avant de commencer l'installation, consultez les précautions décrites dans "Power Precautions" (Précautions quant à l'alimentation), pages 3-4.
PELIGRO	Antes de comenzar la instalación, consulte las precauciones en la sección " Power Precautions" (Precauciones sobre corriente) que se encuentra en las páginas 3-4.

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.

DANGER	Make sure the rack or cabinet housing the device is adequately secured to prevent it from becoming unstable or falling over.
GEFAHR	Stellen Sie sicher, dass das Gestell oder der Schrank 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 ou le support 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 o armario que alberga el instrumento está asegurado correctamente para evitar que pueda hacerse inestable o que caiga.

C Danger notices

DANGER	Mount the devices you install in a rack or cabinet as low as possible. Place the heaviest device at the bottom and progressively place lighter devices above.
GEFAHR	Montieren Sie die Geräte im Gestell oder Schrank 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 ou support 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 o armario lo más bajos posible. Ponga el instrumento más pesado en la parte inferior y los instrumentos progresivamente más livianos más arriba.

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 réglementations 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 meg ohm 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 mégohm.
PELIGRO	Por razones de seguridad, la correa de muñeca ESD deberá contener un resistor en serie de 1 mega ohmio.

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

C Danger notices

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