

IBM Storage Networking SAN24B-6
MTM 8969-F24 Service Information

Installation, Service, and User Guide



Read Before Using

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Before you use the information in this publication, be sure to read the general information under [“Notices” on page 78](#).

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Read this first

Summary of changes

This is the first edition of the IBM® System Networking SAN24B-6 Installation, Service, and User Guide.

Getting help

For the latest version of your product documentation, visit the IBM Publications Center at www.ibm.com/shop/publications/order. Search by form number or title.

For more information about IBM Storage Networking products, go to www.ibm.com/systems/storage/san/.

IBM Redbooks® often provide in depth information about product best practices, configurations, and more technical information. For redbooks associated with this product, enter search terms on the following Web site: www.redbook.ibm.com.

For support information for this and other IBM products, see the IBM Support Portal www.ibm.com/supportportal. Search for the product Machine type or product name.

For Fabric OS Release Notes and access to Fabric OS firmware downloads, go to the IBM Support Portal www.ibm.com/supportportal. Search for the product Machine type or product name, and then follow links for **Downloads**. More detailed instructions are available through the **Accessing firmware updates and OS documentation updates** link on the product documentation CD that is shipped with this product.

You can also contact IBM within the United States at 1-800-IBMSERV (1-800-426-7378). For support outside the United States, you can find the service number through the IBM contacts directory website at www.ibm.com/planetwide/.

Visit the IBM contact website www.ibm.com/contact for contact information for your country or region.

For information about storage and networking industry standards, see the Storage Networking Industry Association (SNIA) website at www.snia.org/.

Accessibility features for the SAN24B-6

Accessibility features help users who have a disability, such as restricted mobility or limited vision, to use information technology products successfully.

Accessibility features

The following list includes the major accessibility features in this product:

- Light emitting diodes (LEDs) that flash at different rates, to represent the same information as the colors of the LEDs
- Industry-standard devices for ports and connectors
- Management of the product through management applications is available through Web and Graphical User Interface (GUI) options

Keyboard navigation

This product does not have an attached or integrated keyboard. Any keyboard navigation is provided through the management software and GUI.

Vendor software

This product includes certain vendor software that is not covered under the IBM license agreement. IBM makes no representation about the accessibility features of these products. Contact the vendor for the accessibility information about its products.

Related accessibility information

You can view the publications for this product in Adobe Portable Document Format (PDF) using the Adobe Acrobat Reader. The PDFs are provided on a product documentation CD-ROM that is packaged with the product. The CD-ROM also includes an accessible HTML version of this document.

IBM and accessibility

See the IBM Human Ability and Accessibility Center website at www.ibm.com/able/ for more information about the commitment that IBM has to accessibility.

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- Exact publication title
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Safety and environmental notices

This section contains information about:

- [“Safety notices and labels” on page xi](#)
- [“Rack safety” on page xv](#)
- [“Product recycling and disposal” on page xvi](#)

Safety notices and labels

When using this product, observe the danger, caution, and attention notices contained in this guide. The notices are accompanied by symbols that represent the severity of the safety condition. The danger and caution notices are listed in numerical order based on their IDs, which are displayed in parentheses, for example (D004), at the end of each notice. Use this ID to locate the translation of these danger and caution notices in the Safety Notices publication that is shipped with this product.

The following notices and statements are used in IBM documents. They are listed below in order of increasing severity of potential hazards. Follow the links for more detailed descriptions and examples of the danger, caution, and attention notices in the sections that follow.

- **Note:** These notices provide important tips, guidance, or advice.
- **“Attention notices” on page xiv:** These notices indicate potential damage to programs, devices, or data.
- **“Cautions” on page xii:** These statements indicate situations that can be potentially hazardous to you.
- **“Danger Notices” on page xi:** These statements indicate situations that can be potentially lethal or extremely hazardous to you. Safety labels are also attached directly to products to warn of these situations.
- In addition to these notices, [“Safety labels” on page xiii](#) may be attached to the product to warn of potential hazards.

Danger Notices

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

General dangers



DANGER: The procedures in this manual are for qualified service personnel.



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

Electrical dangers



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



DANGER: Make sure that the power source circuits are properly grounded, then use the power cord supplied with the device to connect it to the power source.



DANGER: Remove both power cords before servicing.



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



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



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

Dangers related to equipment weight



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

Laser dangers



DANGER: All fiber-optic interfaces use Class 1 lasers.

Cautions

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

General cautions



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.



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



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

Electrical cautions



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



CAUTION: Static electricity can damage the chassis and other electronic devices. To avoid damage, keep static-sensitive devices in their static-protective packages until you are ready to install them.



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



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



CAUTION: The power supply switch must be in the off position when you insert the power supply into the chassis. Damage to the switch can result if a live power supply is installed.



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



CAUTION: For the DC input circuit to the system, make sure there is a 10 Amp circuit breaker, maximum 60 VDC, double pole, on the input terminal block to the power supply. The input wiring for connection to the product should be copper wire, 16 AWG, marked VW-1, and rated minimum 90°C.



CAUTION: For a DC system, use grounding wire of at least 16 American Wire Gauge (AWG). The grounding wire should be attached to the DC input connector; the other end connects to the building ground.



CAUTION: DC return shall be isolated from the chassis ground (DC-I) when connections to the power supply are made.

Safety labels

As an added precaution, safety labels are often installed directly on products or product components to warn of potential hazards. These can be either danger or caution notices, depending upon the level of the hazard.

The actual product safety labels may differ from these sample safety labels:



DANGER: Hazardous voltage, current, or energy levels are present inside any component that has this label attached. Do not open any cover or barrier that contains this label. (L001)



DANGER: Rack-mounted devices are not to be used as a shelf or work space. (L002)



DANGER: Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)



DANGER: Hazardous voltage present. Voltages present constitute a shock hazard, which can cause severe injury or death. (L004)



CAUTION: Hazardous moving parts nearby. (L008)

Attention notices

An attention notice indicates the possibility of damage to a program, device, or system, or to data. An exclamation point symbol may accompany an attention notice, but is not required. A sample attention notice follows:



Attention: Do not bend a fibre cable to a radius less than 5 cm (2 in.); you can damage the cable. Tie wraps are not recommended for optical cables because they can be easily overtightened, causing damage to the cable.

ESD precautions



Attention: Many of the field replaceable units (FRUs) are sensitive to electrostatic discharge (ESD), and can potentially be damaged by improper handling. When working with any FRU, use correct ESD precautions:

- Attach ground to the indicated area on the chassis
- Wear a wrist grounding strap connected to chassis ground (if the switch is plugged in) or a bench ground.

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

- Store ESD-sensitive components in antistatic packaging

Rack safety

Rack installation



DANGER: Observe the following precautions when working on or around your IT rack system:

- Heavy equipment—personal injury or equipment damage might result if mishandled.
- Always lower the leveling pads on the rack cabinet.
- Always install stabilizer brackets on the rack cabinet.
- To avoid hazardous conditions due to uneven mechanical loading, always install the heaviest devices in the bottom of the rack cabinet. Always install servers and optional devices starting from the bottom of the rack cabinet.
- Rack-mounted devices are not to be used as shelves or work spaces. Do not place objects on top of rack-mounted devices.



- Each rack cabinet might have more than one power cord. Be sure to disconnect all power cords in the rack cabinet when directed to disconnect power during servicing.
- Connect all devices installed in a rack cabinet to power devices installed in the same rack cabinet. Do not plug a power cord from a device installed in one rack cabinet into a power device installed in a different rack cabinet.
- An electrical outlet that is not correctly wired could place hazardous voltage on the metal parts of the system or the devices that attach to the system. It is the responsibility of the customer to ensure that the outlet is correctly wired and grounded to prevent an electrical shock.

(R001 part 1 of 2)



CAUTION:

- Do not install a unit in a rack where the internal rack ambient temperatures will exceed the manufacturer's recommended ambient temperature for all your rack-mounted devices.
- Do not install a unit in a rack where the air flow is compromised. Ensure that air flow is not blocked or reduced on any side, front, or back of a unit used for air flow through the unit.
- Consideration should be given to the connection of the equipment to the supply circuit so that overloading of the circuits does not compromise the supply wiring or overcurrent protection. To provide the correct power connection to a rack, refer to the rating labels located on the equipment in the rack to determine the total power requirement of the supply circuit.
- (*For sliding drawers*) Do not pull out or install any drawer or feature if the rack stabilizer brackets are not attached to the rack. Do not pull out more than one drawer at a time. The rack might become unstable if you pull out more than one drawer at a time.
- (*For fixed drawers*) This drawer is a fixed drawer and must not be moved for servicing unless specified by the manufacturer. Attempting to move the drawer partially or completely out of the rack might cause the rack to become unstable or cause the drawer to fall out of the rack.

(R001 part 2 of 2)

Rack relocation (19" rack)



CAUTION: Removing components from the upper positions in the rack cabinet improves rack stability during relocation. Follow these general guidelines whenever you relocate a populated rack cabinet within a room or building:

- Reduce the weight of the rack cabinet by removing equipment starting at the top of the rack cabinet. When possible, restore the rack cabinet to the configuration of the rack cabinet as you received it. If this configuration is not known, you must complete these steps:
 - Remove all devices in the 32U position and above.
 - Ensure that the heaviest devices are installed in the bottom of the rack cabinet.
 - Ensure that there are no empty U-levels between devices installed in the rack cabinet below the 32U level.
 - If the rack cabinet you are relocating is part of a suite of rack cabinets, detach the rack cabinet from the suite.
 - Inspect the route that you plan to take when moving the rack to eliminate potential hazards.
 - Verify that the route that you choose can support the weight of the loaded rack cabinet. Refer to the documentation that came with your rack cabinet for the weight of a loaded rack cabinet.
 - Verify that all door openings are at least 760 x 2030 mm (30 x 80 in.).
 - Ensure that all devices, shelves, drawers, doors, and cables are secure.
 - Ensure that the four leveling pads are raised to their highest position.
 - Ensure that there is no stabilizer bracket installed on the rack cabinet during movement.
 - Do not use a ramp inclined at more than 10 degrees.
 - Once the rack cabinet is in the new location, do the following:
 - Lower the four leveling pads.
 - Install stabilizer brackets on the rack cabinet.
 - If you removed any devices from the rack cabinet, repopulate the rack cabinet from the lowest position to the highest position.
 - If a long distance relocation is required, restore the rack cabinet to the configuration of the rack cabinet as you received it. Pack the rack cabinet in the original packaging material, or equivalent. Also, lower the leveling pads to raise the casters off of the pallet and bolt the rack cabinet to the pallet.

(R002)

Product recycling and disposal

Refer to the *IBM Systems Environmental Notices and User Guide* (Z125-5823) for translated environmental statements and information regarding product recycling and disposal. This document may be provided either in printed version or on the product documentation CD. A more current version may be available through this link ftp://public.dhe.ibm.com/systems/support/warranty/envnotices/environmental_notices_and_user_guide.pdf

See “[Removing the battery](#)” on page 52 for instructions on how to remove the battery.

About this document

This document is intended for use by systems administrators and technicians experienced with networking, Fibre Channel, and storage area network (SAN) technologies. It describes how to install, service, and use the IBM Storage Networking SAN24B-6 (machine type-mode 8960-F24 Switch). Throughout this document, the product is referred to as the *SAN24B-6*, or simply the *switch*.

This document has been created to include information specific to SAN24B-6 switches running on Fabric OS version 8.1.0 or later. This document does not support all Fabric OS versions. It is specific to Fabric OS v8.1.0 or later. Refer to the Fabric OS Release Notes for more information.

Supported hardware and software

This document is applicable to the SAN24B-6 FC switch running Fabric OS 8.1.0 or later. The following table lists the rack mount kits supported with this device.

Table 1. Rack mount kits	
Part number	Description
XBR-R000070	Slide rack mount kit
XBR-R000162	Fixed-mount kit for four-post racks
XBR-000165	Mid-mount kit for two-post racks
XNA-000072	Non-port side fixed mount rack kit (15"-20") for four-post racks

Product documents

The following documents contain information related to this product. The documentation may be printed material or may be on the documentation CD that is shipped with the product.

- *IBM Storage Networking SAN24B-6 Installation, Service, and User Guide*, SC27-9201-00 (this document)
- *IBM Storage Networking SAN24B-6 Quick Start Guide*, GI13-4578-00
- Safety Notices
- *IBM Systems Environmental Notices and User Guide*, Z125-5823
- *Warranty Information*, 45W6626

Newer versions of product documentation may be available through the IBM Publications Center website www.ibm.com/shop/publications/order. Search by publication title or publication number.

Newer versions may also be available through the IBM Support Portal www.ibm.com/supportportal. Enter your product machine type (8960) or product name in the search field, and then select **Documentation** from the displayed page.

Brocade documents

IBM b-type switches use software licensed from Brocade Communications Systems, Inc. You can find information related to the software that supports the switch in the following documents on the CD-ROM supplied with this product:

Brocade Fabric OS

- *EZSwitchSetup Administrator's Guide*

- *Fabric OS Administrator's Guide*
- *Fabric OS Command Reference Manual*
- *Fabric OS MIB Reference Manual*
- *Fabric OS Message Reference Manual*
- *Fabric OS Troubleshooting and Diagnostics Guide*

Brocade Fabric OS optional features

- *Fabric Watch Administrator's Guide*
- *Web Tools Administrator's Guide*

IBM and Brocade product matrix

The product matrix provides a cross-reference between the comparable IBM and Brocade product models.

When you use any of the Brocade documents, such as Fabric Operating System (FOS) publications, you will notice that the model numbers reflect the corresponding Brocade products. [Table 2 on page xviii](#) provides a product matrix to correlate the Brocade products and models to the IBM product names and machine types and model numbers. Products withdrawn from marketing are not listed.

<i>Table 2. Brocade and IBM product and model number matrix</i>		
Brocade product name	IBM product name	IBM machine type and model number
Brocade G610	SAN24B-6	8969 Model F24
Brocade G620	SAN64B-6	8960 Models F64 and N64
Brocade X6-4 Director	SAN256B-6	8961 Model F04
Brocade X6-8 Director	SAN512B-6	8961 Model F08
Brocade 6520	SAN96B-5	2498 Models F96
Brocade 6505	SAN24B-5	2498 Model F24, 249824G
Brocade 6510	SAN48B-5	2498 Model F48
Brocade DCX 8510-4	SAN384B-2	2499 Model 416
Brocade DCX 8510-8	SAN768B-2	2499 Model 816
Brocade 7800	SAN06B-R	2498 Model R06
Brocade 7840	SAN42B-R	2498 Model R42
Brocade 300	SAN24B-4	2498 Models B24 and 24E

Chapter 1. Device Overview

The IBM Storage Networking SAN24B-6 is a 24-port auto-sensing 4, 8, 16, or 32 Gbps Fibre Channel (FC) switch ports.

The SAN24B-6 offers scalability from the base models of 8 ports to 24 ports through activation of optional 24-port Ports on Demand (POD) licenses. Port activation works through the Dynamic Ports on Demand (DPOD) process. With DPOD, ports are licensed as they come online. For instance, with a base model 8 port license, the first 8 ports to come online are licensed regardless of the port numbering. Once all 24 licenses have been assigned, you can manually move those licenses from one port to another if you choose.

Port speed is determined by the maximum speed supported by the optical transceivers at the either end of the link.

The SAN24B-6 is 30.64 cm (12.06 in) deep and offers four integrated fans (no fan FRUs) for cooling. This allows a single fan failure and permits switch functionality to continue in the event a fan fails. Only nonport-side intake airflow for cooling is supported.

Hardware features

The SAN24B-6 switch offers the following features and capabilities:

- Up to 24 auto-sensing ports supporting 32-Gbps SFP+ technology in a single domain.
- Dynamic Ports on Demand (Dynamic-POD) scaling from a base configuration of 8 ports to 24 ports (two 8-port SFP+ POD).
- 4-, 8-, 16-, and 32-Gbps auto-sensing Fibre Channel switch ports.
 - A 32-Gbps optical transceiver can auto-negotiate to 32 Gbps, 16 Gbps, or 8 Gbps.
 - A 16-Gbps optical transceiver can auto-negotiate to 16 Gbps, 8 Gbps, or 4 Gbps.

Note: The port speed is determined by the maximum speed supported by the optical transceivers at the either end of the link.

- Universal ports self-configure as a E_Ports, F_Ports, M_Ports, or D_Ports.
 - A Diagnostic Port (D_Port) provides diagnostics, troubleshooting, and verification services for the physical media.
- One built-in fixed power supply unit (not a FRU) with a port-side power inlet.
- Four integrated fans (no fan FRUs) for cooling the system. This allows a single fan failure and permits the switch to continue to function properly if a fan fails. Only nonport-side intake airflow for cooling is supported.
 - If one fan fails and the temperature is less than 56C, the fans run at high speed. If the temperatures increases more than 56C, a critical temperature warning is displayed and the device shuts down in two minutes.
 - If two fans fail and the temperature is less than 55C, the fans run at high speed. If the temperature increases more than 55C, a critical temperature warning is displayed and the device shuts down in two minutes.
 - If the third fans fails, a warning is displayed and the device is immediately shut down.
- Hardware-enabled input and output (I/O) latency statistics collection.
- Hardware-enabled VM support.
- 1U chassis that can be installed as a standalone unit or mounted in a standard Electronic Industries Association (EIA) 48.26cm (19 inches) cabinet or rack.

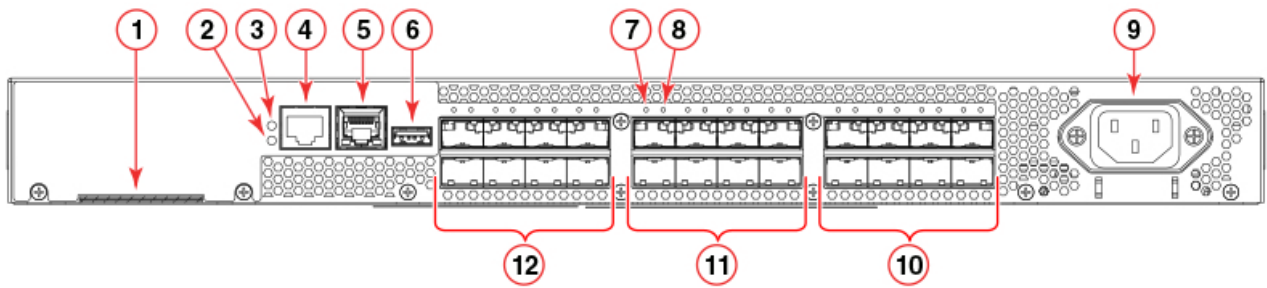
- Support for small form-factor pluggable plus (SFP+) optical transceivers in any combination of Short Wavelength (SWL), Long Wavelength (LWL), or Extended Long Wavelength (ELWL) optical media.
- Extended distance Fibre Channel to support long distance native FC connectivity.
- Port-to-port latency is minimized to 900 nanoseconds including FEC using cut-through frame switching at 32 Gbps.
- A dual-core T1022E processor operating at 1.2 GHz delivers high performance, scalability, and advanced Fabric Vision functionality.
- One 10BASE-T / 100BASE-TX / 1000BASE-T RJ45 connector Ethernet port for management. In conjunction with EZSwitchSetup, this port supports switch IP address discovery and configuration, eliminating the need to attach a serial cable to configure the switch IP address.
- A RS-232 3-wire (Tx, Rx, and Gnd) universal asynchronous receiver/transmitter (UART) serial port to BMC adapter with a RJ-45 connector for debugging initial switch setup (if not using EZSwitchSetup) and factory default restoration is included with the switch. Although there are LEDs in the adapter, they are not used.
- An internal e-USB module with 2 GB of persistent storage. This provides increased serviceability, and error logging functionality by facilitating easier firmware upgrades and downloads of the system log files.
- One external USB connector.
- 24 hot-pluggable SFP+ optical transceiver slots.
- 24 bicolor (green/amber) LEDs to indicate the status for each port.
- One green LED to indicate valid system power.
- One bicolor (green/amber) LED to indicate the system status.
- Two Ethernet LEDs: one bicolor (green/amber) LED to indicate link speed (1000/100/10 Mbps) and one green LED to indicate traffic activity.
- A Serial EEPROM for switch identification.
- Real-time fan monitoring.
- Real-time digital thermometers for temperature monitoring.
- Real-time clock (RTC) with battery.

License options

The SAN24B-6 uses a capacity-based Dynamic Ports on Demand (POD) license method and can be purchased with 8, 16, or 24 licensed ports. The first eight ports (0-7) are enabled by default. To enable the remaining sixteen ports, you need to purchase and install two 8-port POD license keys. Refer to the *Fabric OS Software Licensing Guide* for more details.

Port-side view

The following illustration shows the port-side view of the SAN24B-6 Fibre Channel switch.



1. Switch ID pull-out tab
2. System status LED
3. System power LED
4. System RS232 console port (RJ-45)
5. Ethernet port with two Ethernet status LEDs
6. USB port
7. SFP+ FC port 8 (upper) status LED
8. SFP+ FC port 12 (lower) status LED
9. AC power receptacle
10. Trunk port group 2 (SFP+ FC ports 16-23)
11. Trunk port group 1 (SFP+ FC ports 8-15)
12. Trunk port group 0 (SFP+ FC ports 0-7)

Figure 1. Port-side view

Nonport-side view

The nonport-side of the device is used solely for air flow.

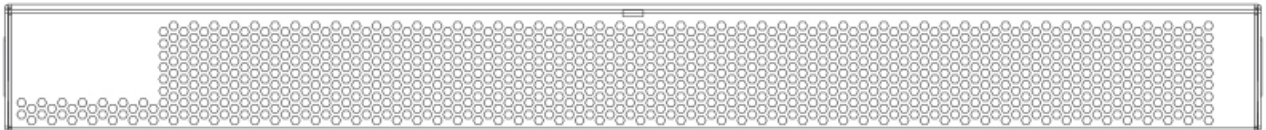


Figure 2. Nonport-side view

Device management options

You can use the management functions built into the device to monitor the fabric topology, port status, physical status, and other information to help you analyze switch performance and to accelerate system debugging. The device automatically performs a power-on self-test (POST) each time it is turned on. A RASlog message is generated for any detected startup errors.

You can manage the device using any of the management options listed in the following table.

Table 3. Management options for the device		
Management tool	Out-of-band support	Reference documents
Command line interface (CLI) Up to two admin sessions and four user sessions simultaneously.	Ethernet or serial connection	<i>Fabric OS Administrator's Guide</i> <i>Fabric OS Command Reference</i>

Table 3. Management options for the device (continued)

Management tool	Out-of-band support	Reference documents
EZSwitchSetup EZSwitchSetup helps to complete the basic configuration for single-switch setup.	Ethernet or serial connection	<i>EZSwitchSetup Software Installation Guide</i> <i>EZSwitchSetup Administrator's Guide</i>
Web Tools	Ethernet or serial connection	<i>Web Tools Administrator's Guide</i>
Standard SNMP applications	Ethernet or serial connection	<i>Fabric OS MIB Reference</i>
Management Server	Ethernet or serial connection	<i>Fabric OS Administrator's Guide</i> <i>Fabric OS Command Reference</i>
Network Advisor (NA) NA must be purchased separately.	Ethernet or serial connection	Network Advisor documentation set

Chapter 2. Preparing for the Installation

Safety precautions



DANGER: Use safe lifting practices when moving the product.



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



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



CAUTION: Use the screws specified in the procedure. Using longer screws can damage the device.



CAUTION: Never leave tools inside the chassis.



CAUTION: Do not use the port cover tabs to lift the module. They are not designed to support the weight of the module, which can fall and be damaged.



CAUTION: To prevent damage to the chassis and components, never attempt to lift the chassis using the fan or power supply handles. These handles were not designed to support the weight of the chassis.

General precautions



DANGER: The procedures in this manual are for qualified service personnel.



DANGER: Before beginning the installation, see the precautions in “Power precautions.”



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.



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



CAUTION: Never leave tools inside the chassis.



CAUTION: To protect the serial port from damage, keep the cover on the port when not in use.



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



CAUTION: The device must be installed only indoors because the Ethernet ports are not TNV-1 compliant and the device, the AC power adapter, and the cables are not designed for outdoor use.

ESD precautions



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



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



CAUTION: Static electricity can damage the chassis and other electronic devices. To avoid damage, keep static-sensitive devices in their static-protective packages until you are ready to install them.

Note: Wear a wrist grounding strap connected to the chassis ground (if the device is plugged in) or to a bench ground.

Power precautions



DANGER: Make sure that the power source circuits are properly grounded, then use the power cord supplied with the device to connect it to the power source.



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.



DANGER: This device might have more than one power cord. To reduce the risk of electric shock, disconnect all power cords before servicing.



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



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



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



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



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.

Note: Device control processors and management modules may contain batteries for RTC or NVRAM backup. Dispose of components containing batteries as required by local ordinances and regulations.

Lifting and weight-related precautions



DANGER: Use safe lifting practices when moving the product.



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



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



CAUTION: Do not use the port cover tabs to lift the module. They are not designed to support the weight of the module, which can fall and be damaged.

Laser precautions



DANGER: All fiber-optic interfaces use Class 1 lasers.



DANGER: Use only optical transceivers that are qualified by IBM and comply with the FDA Class 1 radiation performance requirements defined in 21 CFR Subchapter I, and with IEC 60825 and EN60825. Optical products that do not comply with these standards might emit light that is hazardous to the eyes.

Facility requirements

Before installing the device, be sure the following facilities requirements are met.

Table 4. Facility requirements	
Type	Requirements
Electrical	<ul style="list-style-type: none"> Adequate supply circuit, line fusing, and wire size, as specified by the electrical rating on the switch nameplate Circuit protected by a circuit breaker and grounded in accordance with local electrical codes <p>Refer to the Technical Specifications at the end of this guide for complete power supply specifications.</p>
Thermal	<ul style="list-style-type: none"> A minimum airflow of 79.8 cubic meters/hour (47 cubic ft/min.) available in the immediate vicinity of the switch <p>Note: Although this airflow may exceed the airflow maximum listed in the device Technical Specifications, the additional airflow is recommended to pressurize the inlet (cool isle) side of rack installations relative to the exhaust side to minimize recirculation of hot air back to the inlet side.</p> <ul style="list-style-type: none"> Ambient air temperature not exceeding 40°C (104°F) while the switch is operating
Rack (when rack-mounted)	<ul style="list-style-type: none"> One rack unit (1U) in a 48.3 cm (19-inch) rack All equipment in the rack grounded through a reliable branch circuit connection Additional weight of switch not to exceed the rack's weight limits Rack secured to ensure stability in case of unexpected movement

Quick installation checklist

This checklist provides a high-level overview of the basic installation process from the planning stage to the point where the device comes online and is ready to be deployed. Completing all the tasks in the suggested order ensures successful installation. Brocade recommends that you print this checklist and take it to the installation site.

Pre-installation tasks

Review all installation requirements ahead of time as part of your site preparation. Careful planning and site preparation ensures seamless installation, especially when installing multiple devices.

Table 5. Installation prerequisites		
Task	Task details or additional information	Completed
Unpack the device.	Take an inventory of the hardware components included in your shipment. Refer to “Shipping carton contents” on page 11.	
Gather necessary components and required tools.	Review the time and items required information at the beginning of each chapter to ensure you have gathered all necessary components required for the following installation tasks: <ul style="list-style-type: none">• Chapter 3, “Mounting the Device,” on page 12• Power Supply Assemblies• Fan Assemblies• Installing Transceivers and Cables	
Review the safety precautions.	Refer to “Safety precautions” on page 5. For translations, refer to “Cautions” on page xii at the end of this guide.	
Plan the installation.	Decide whether you want to install the unit on a flat surface or in a rack. For rack installation, obtain the appropriate rack mount kit. Refer to Chapter 3, “Mounting the Device,” on page 12.	
Review and verify installation requirements.	Verify that the following requirements are met. Refer to “Facility requirements” on page 8. <ul style="list-style-type: none">• Power requirements• Environmental requirements• Clearance for standalone or rack installation	
Gather network configuration parameters.	<ul style="list-style-type: none">• IP address:• Subnet mask:• Default gateway:• Domain ID:• Time zone:	

Installation and initial configuration

The initial setup includes mounting the device on a flat surface or in a rack and completing the configuration tasks necessary to bring the device online and verify the operation.

Table 6. Installation and basic system configuration

Task	Task details or additional information	Completed
Mount the device.	<p>Choose one of the following mounting options:</p> <ul style="list-style-type: none"> • Mount the device as a standalone unit. Refer to “Standalone installation” on page 13. • Mount the device in a four-post rack. Refer to Installing the Universal Four-Post Rack Kit. • Mount the device in a two-post rack. Refer to Installing the Universal Two-Post Rack Kit. 	
Check the airflow of the power supply and fan assembly	The airflow direction of the power supply and fan should match. The power supplies and fan trays are clearly labeled with either a green arrow with an "E", or an orange arrow with an "I." For more details, refer to Identifying the airflow direction .	
Gather all components required for the initial setup.	Refer to “Items required” on page 46.	
Provide power to the device.	Refer to Providing power to the device .	
Attach a management station, establish a serial connection, and change the default passwords (optional).	Refer to Establishing a first-time serial connection . After completing this task, log in to the serial port to configure the device.	
Set the IP address, subnet mask, and the default gateway IP address.	Use the ipaddrset command to configure a static device IP address, subnet mask, and gateway IP address, or you can use a DHCP server to obtain the information dynamically. Refer to Configuring the IP address .	
Set the date and time.	<ul style="list-style-type: none"> • Use the date command to display and set the date and time. • Use the tstimezone command to display and set the time zone. • Use the tsclockserver command to synchronize the time with an external NTP server. <p>Refer to Setting the date and time for more information.</p>	
Customize the switch name and chassis name.	<ul style="list-style-type: none"> • Use the switchname command to change the default switch name. • Use the chassisname command to change the default chassis name. <p>Refer to Customizing the chassis name and switch name for more information.</p>	
Establish an Ethernet connection.	By establishing an Ethernet connection, you can complete the device configuration using a serial session, Telnet, or management application, such as Brocade Network Advisor. Refer to Establishing an Ethernet connection .	
Optional: Configure the DNS service.	Use the dnsconfig command to create DNS server entries. Refer to the <i>Brocade Fabric OS Administration Guide</i> .	
Optional: Customize the domain ID.	Use the configure command to change the domain ID (default ID is 1). Refer to Setting the domain ID for more information.	

Table 6. Installation and basic system configuration (continued)		
Task	Task details or additional information	Completed
Verify that the device operates correctly.	<ul style="list-style-type: none"> • Check the LEDs to verify operation of functional parts. Refer to “Interpreting port-side LEDs” on page 58 and Nonport-side LED locations. • The following commands can be useful to establish an operational baseline for the device. Refer to the <i>Fabric OS Command Reference</i> for more information on these commands. <ul style="list-style-type: none"> – psshow – fanshow – tempshow – historyshow – errdump 	
Back up the configuration.	Use the interactive configupload command to back up the configuration. Refer to “ Verifying correct operation ” on page 50 for more information.	
Optional: Power off the devices.	Enter the shutdown command and wait for the device to power down, and then unplug the power cords. Refer to Powering Down the Switch for more information.	

Shipping carton contents

When unpacking the device, verify that the contents of the shipping carton is complete. Save the shipping carton and packaging in the event you need to return the shipment.

- The SAN24B-6 device
- An accessory kit containing the following items:
 - A serial cable
 - One 6-ft. power cord
 - Power cord retainer clip
 - China-RoHS Hazardous/Toxic Substance statement
 - EZSwitch web pointer card

Chapter 3. Mounting the Device

Mounting options

You can install the device in several ways:

- As a standalone unit on a flat surface, for example, a table top. No other equipment is required for desktop installation.
- In an EIA rack using the 1U Slide Rack Mount Kit. Round-hole and square-hole rack posts are supported. The optional slide-rail rack mount kit can be ordered from your switch retailer.
- In an EIA rack using the 1U Fixed-Mount Rack Kit for Four-Post Racks. The optional fixed-mount rack kit can be ordered from your switch retailer.
- In an EIA rack using the 1U Mid-Mount Kit for Two-Post Racks. The optional mid-mount rack kit can be ordered from your switch retailer.
- In an EIA rack using the 1U Non-Port Side Fixed-Mount Rack Kit (15"-20") for Four-Post Racks. The optional nonport-side fixed-mount rack kit can be ordered from your switch retailer.

Note: Review the Safety Precautions before mounting the device.

Precautions specific to mounting

The following precautions specifically apply to mounting the device.



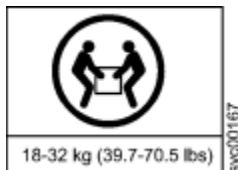
DANGER: Use safe lifting practices when moving the product.



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



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



CAUTION: Never leave tools inside the chassis.



CAUTION: Do not use the port cover tabs to lift the module. They are not designed to support the weight of the module, which can fall and be damaged.

Standalone installation

Complete the following steps to install the device as a standalone unit on a table.

1. Unpack the device and verify the items listed under the [“Shipping carton contents”](#) on [page 11](#) are present and undamaged.
2. Place the device on a sturdy flat surface.
3. Provide power to the device as described in [“Providing power to the device”](#) on [page 46](#).

Note: Do not connect the device to the network until the IP address is set correctly. For instructions on how to set the IP address, refer to [“Configuring the IP address”](#) on [page 47](#).

Installing the 1U, 1.5U, and 2U Mid-Mount Kit for Two-Post Racks

Use the following instructions to install a fixed-port device in a mid-mount configuration in a two-post rack using the 1U, 1.5U, and 2U Mid-Mount Kit for Two-Post Racks. Any updates to these instructions will be added to the hardware installation guide for your product.

Note: Hardware devices illustrated in these procedures are only for reference and may not depict the device you are installing into the rack.

Installation requirements

Review the installation and facility requirements for your product before mounting the device. Refer to the hardware installation guide for your product for more information.

Time and items required

Allow 15 to 30 minutes to complete the installation procedure.

The following items are required to install a device using the 1U, 1.5U, or 2U Mid-Mount Kit for Two-Post Racks.

- #2 Phillips torque screwdriver
- 1/4 inch slotted-blade torque screwdriver

Note: You may need two people to install the device, one to support the device, while the other secures it into the rack.



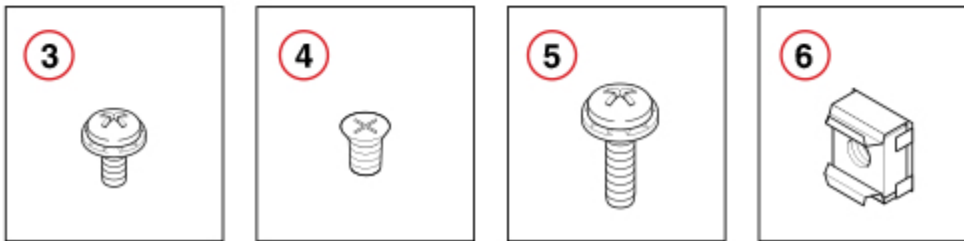
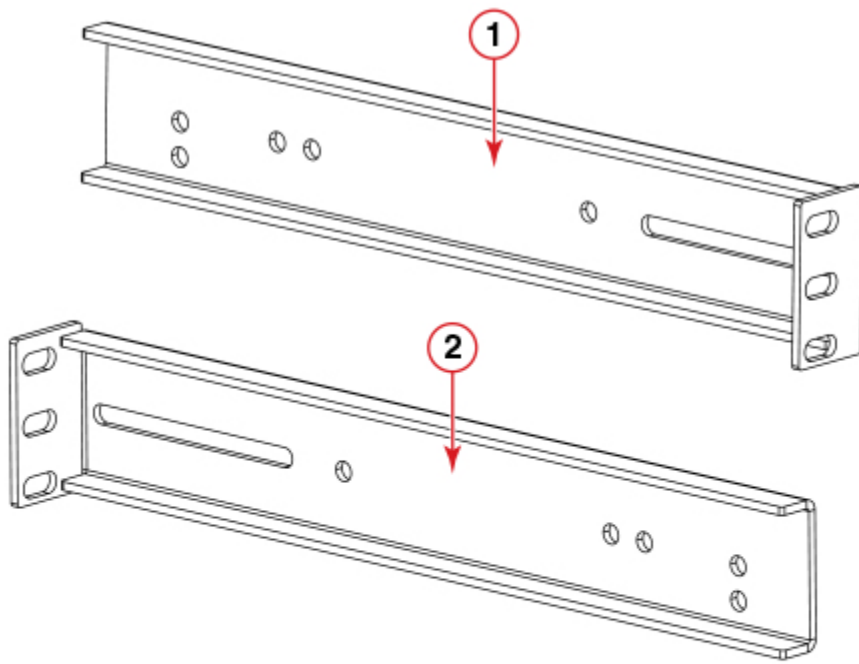
CAUTION: Use the screws specified in the procedure. Using longer screws can damage the device.

Parts list

The following parts are provided with the 1U, 1.5U, or 2U Mid-Mount Rack Kit for Two-Post Racks.

Note: Depending on the device type, not all parts may be used in an installation.

Note: Although this document describes how to install 1U, 1.5U, or 2U devices, the illustrations show a 2U device as a typical installation.



1. Bracket, front right and back left
2. Bracket, front left and back right
3. Screw, 8-32 x 5/16-in., panhead Phillips (12)
4. Screw, 6-32 x 1/4-in., flathead Phillips (8)
5. Screw, 10-32 x 5/8-in., panhead Phillips (8)
6. Retainer nut, 10-32 (8)

Figure 3. Rack kit parts

Attaching the front brackets to the device

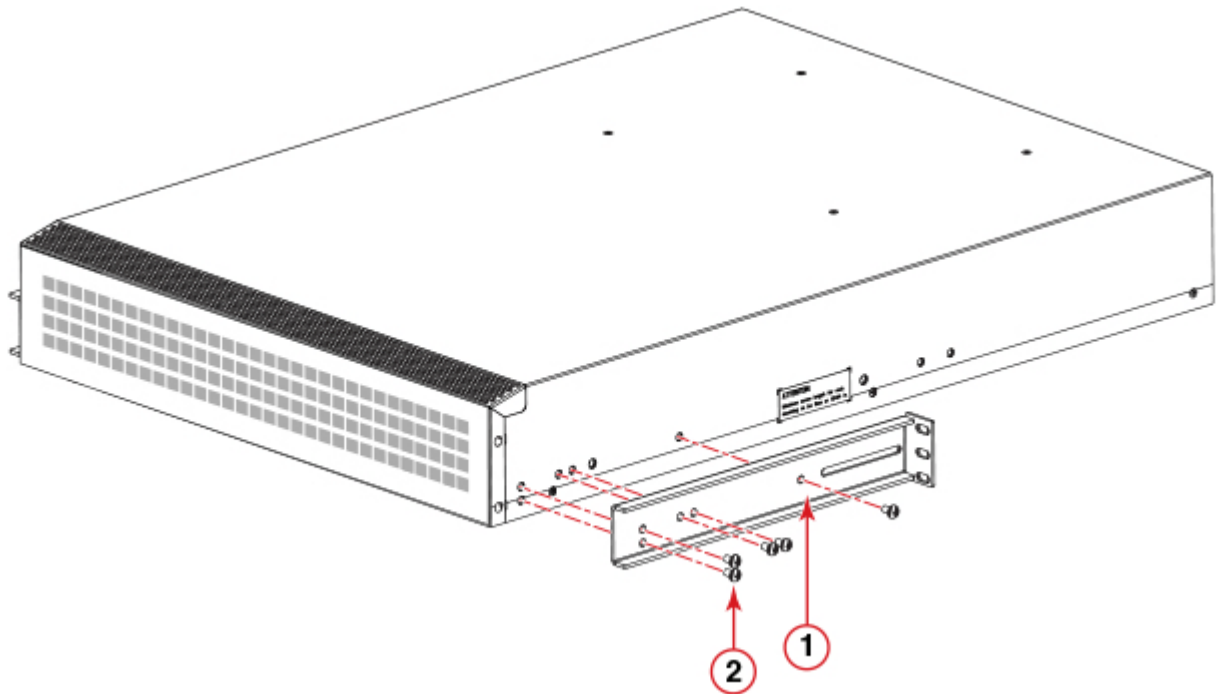


CAUTION: The device must be turned off and disconnected from the fabric during this procedure.

Complete the following steps to attach the front brackets to the device.

1. Position the right front bracket with the flat side against the right side of the device as shown in the following figure.
2. Insert two 8-32 x 5/16-in. screws into one of the pairs of vertically aligned holes in the bracket and then into the vertical pair of holes on the side of the device. To install the device in a recessed position in the rack, use the bracket holes that are set back from the end of the bracket.
3. Insert 8-32 x 5/16-in. screws through the rest of the holes in the bracket and into the corresponding holes in the device.
4. Repeat step 1 through step 3 to attach the left front bracket to the left side of the device.

5. Tighten all of the 8-32 x 5/16-in. screws to a torque of 15 in-lbs (17 cm-kgs).



1. Bracket, front right
2. Screw, 8-32 x 5/16-in., panhead Phillips

Figure 4. Attaching the front brackets

Note: Install the device with the airflow aligned with any other devices in the rack. Some devices have airflow running from port side to fan side and others have the opposite arrangement. Make sure that the airflow for all devices moves in the same direction to maximize cooling. Refer to the Hardware Installation Guide for your product for specific requirements.

Attaching the device to a rack

Complete the following steps to install the device in the rack.

1. Position the device in the rack as shown in the following figure, providing temporary support under the device until the rail kit is secured to the rack.
2. Attach the right front bracket to the right rack rail using three 10-32 x 5/8-in. screws and three 10-32 retainer nuts.
3. Attach the left front bracket to the left rack rail using three 10-32 x 5/8-in. screws and three 10-32 retainer nuts.
4. Tighten all the 10-32 x 5/8-in. screws to a torque of 25 in-lbs (29 cm-kgs)

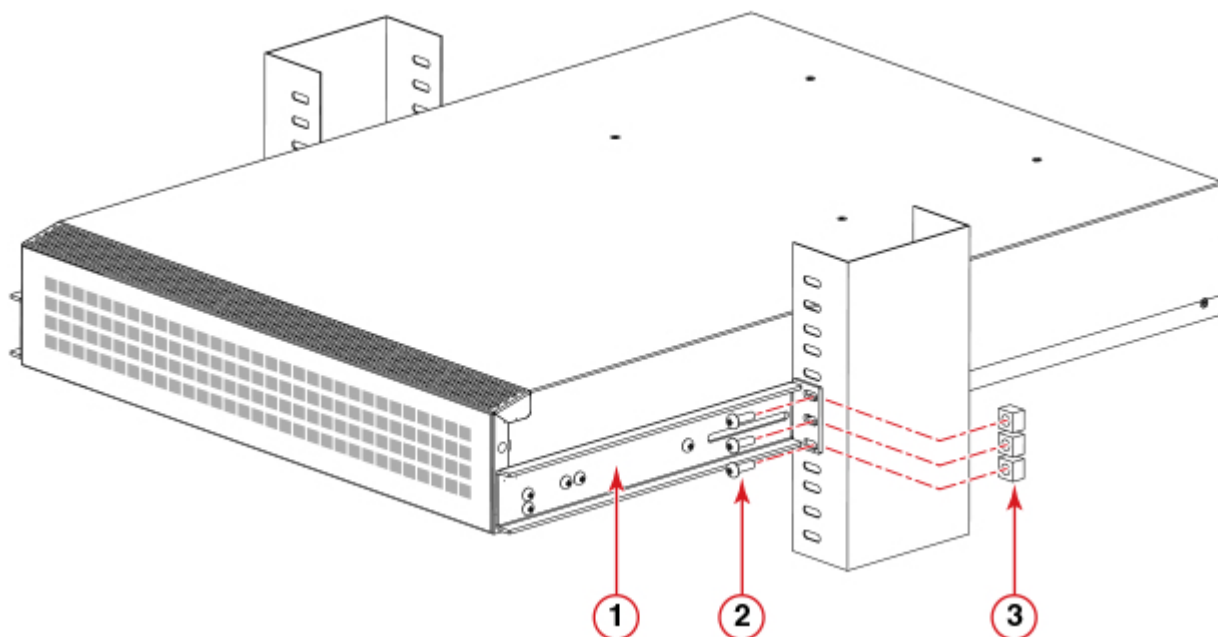


Figure 5. Attaching the device to a rack

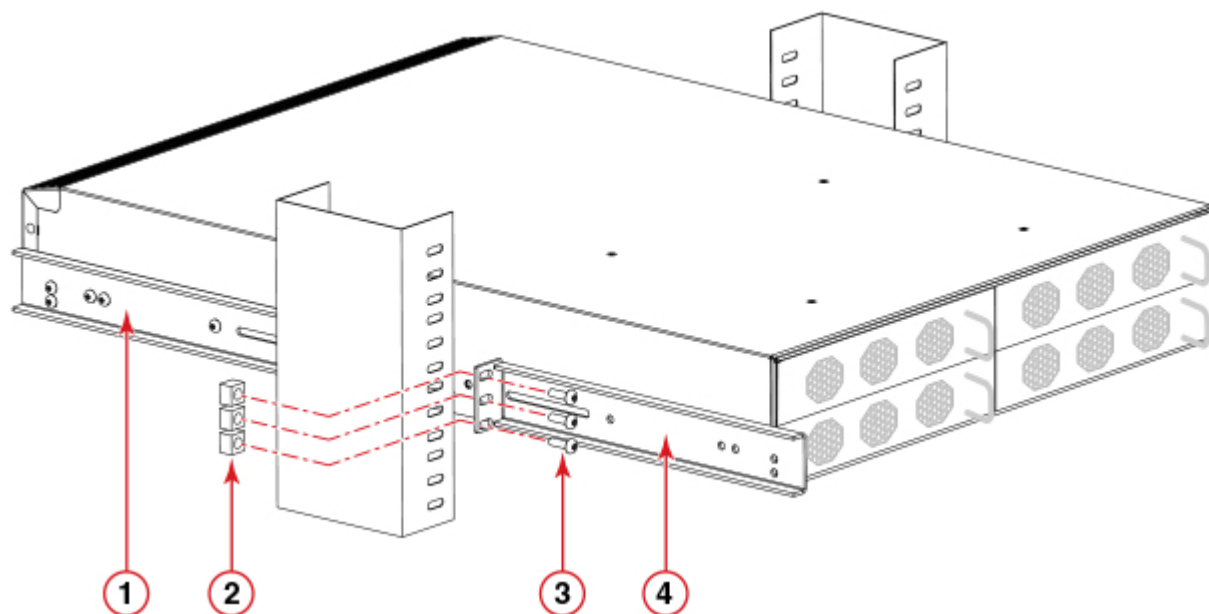
1. Bracket, front right
2. Screw, 10-32 x 5/8-in., panhead Phillips
3. Retainer nut, 10-32

Attaching the rear brackets to the rack

Note: Do not use the rear brackets for the SAN24B-5, SAN48B-5, or SAN96B-5 switches.

Complete the following steps to attach the rear brackets to the rack.

1. Position the right rear bracket in the right rear of the device as shown in the following figure.
2. Attach the brackets using three 10-32 x 5/8-in. screws and 10-32 retainer nuts.
3. Repeat step 1 and step 2 to attach the left rear bracket.
4. Adjust the brackets to the rack depth and tighten the screws to a torque of 25 in-lbs (29 cm-kgs).



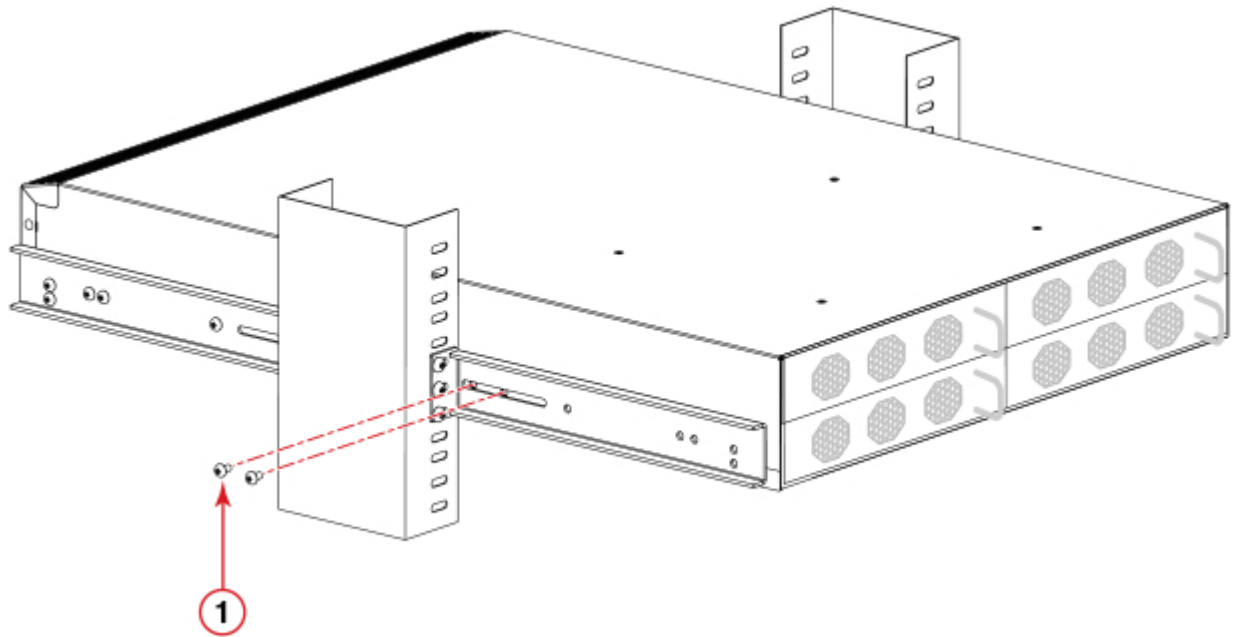
1. Bracket, front right
2. Retainer nut, 10-32
3. Screw, 10-32 x 5/8-in., flathead Phillips
4. Bracket, rear right

Figure 6. Attaching the rear brackets to a rack

Attaching the rear brackets to the device

Complete the following steps to attach the rear brackets to the device.

1. Align the right rear bracket to the right rear of the device and use two 8-32 x 5/16-in. screws to attach the bracket to the device as shown in the following figure.
2. Align the left rear bracket to the left rear of the device and use two 8-32 x 5/16-in. screws to attach the bracket to the device as shown in the following figure.
3. Tighten all the screws to a torque of 9 in-lbs (10 cm-kgs).



1. Screw, 8-32 x 5/16-in., panhead Phillips

Figure 7. Attaching the rear brackets to the device

Installing the 1U and 2U Fixed-Mount Rack Kit for Four-Post Racks

Installation requirements

Review the installation and facility requirements for your product before mounting the device. Refer to the hardware installation guide for your product for more information. Use Electronic Industries Association (EIA) standard racks.

Time and items required

Allow 15 to 30 minutes to complete the installation procedure.

The following items are required to install a device using the 1U and 2U Fixed-Mount Rack Kit for Four-Post Racks.

- #2 Phillips torque screwdriver
- 1/4-inch slotted-blade torque screwdriver

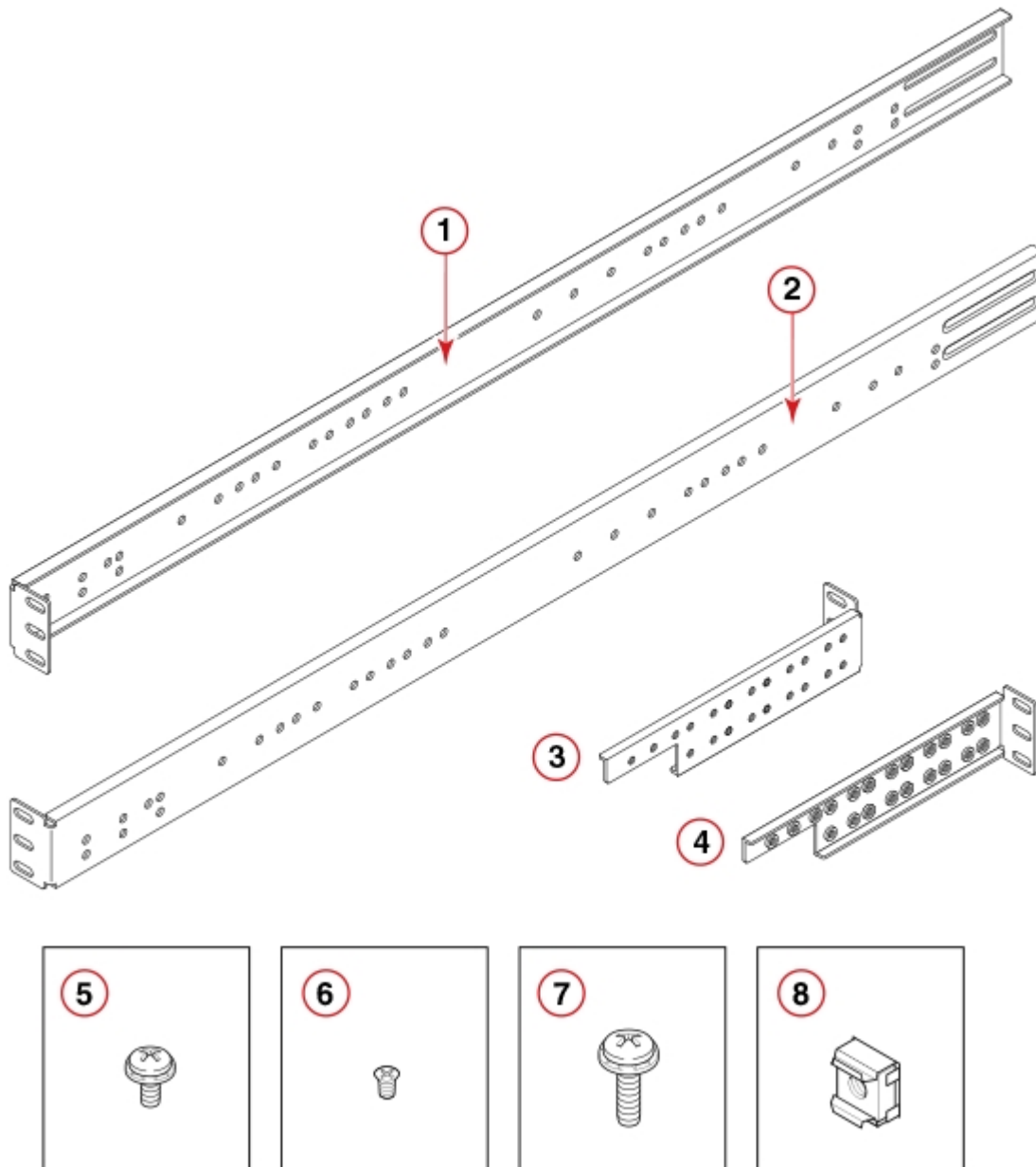
Note: You may need two people to install the device, one to support the device, while the other secures it into the rack.



CAUTION: Use the screws specified in the procedure. Using longer screws can damage the device.

Parts list

The following parts are provided with the 1U and 2U Fixed-Mount Rack Kit for Four-Post Racks.



1. Bracket, front right
2. Bracket, front left
3. Bracket, rear left
4. Bracket, rear right
5. Screw, 8-32 x 5/16-in., panhead Phillips (12)
6. Screw, 6-32 x 1/4-in., flathead Phillips (8)
7. Screw, 10-32 x 5/8-in., panhead Phillips (8)
8. Retainer nut, 10-32 (8)

Figure 8. Rack kit parts

Note: Not all parts may be used with certain installations depending on the device type.

Note: Although this document describes how to install single-height (1U) and double-height (2U) devices, the illustrations show a single-height device as a typical installation.

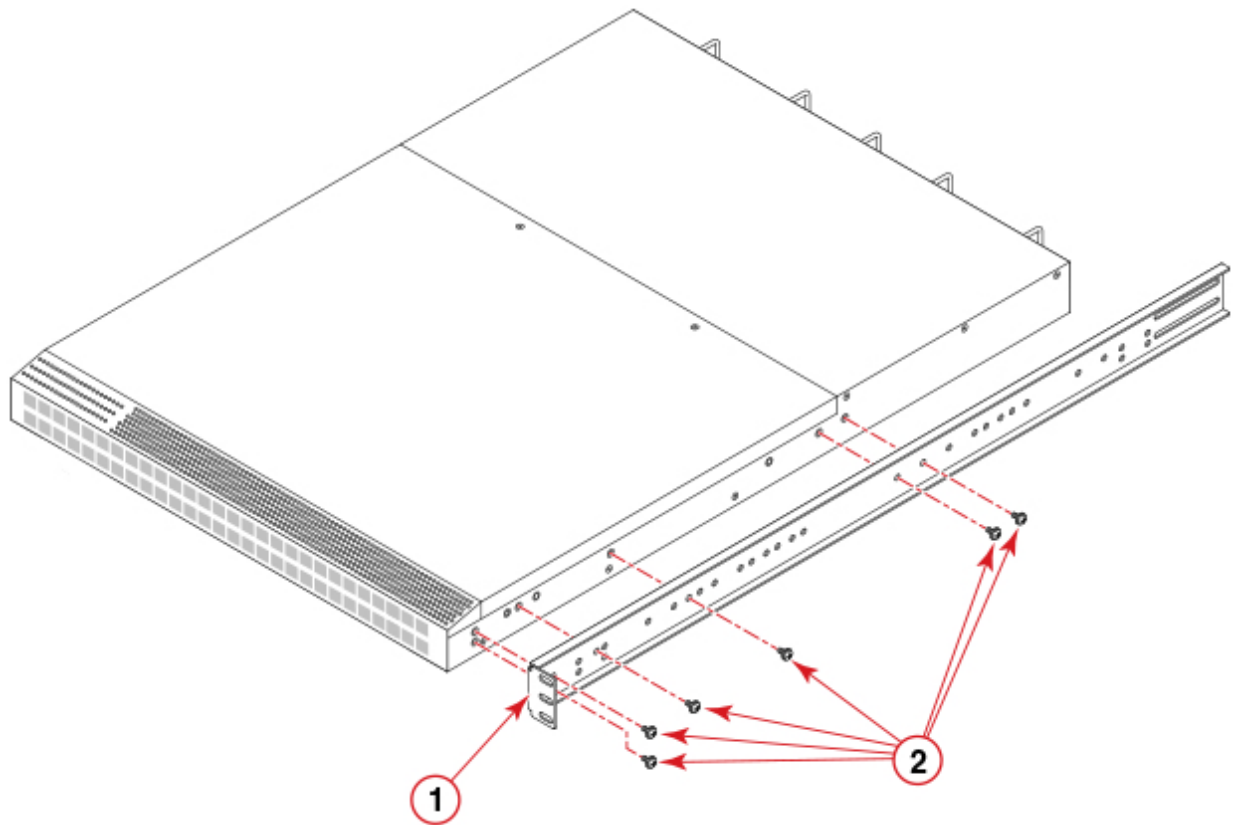
Attaching the front brackets



CAUTION: The device must be turned off and disconnected from the fabric during this procedure.

Complete the following steps to attach the front brackets to the device.

1. Position the right front bracket with the flat side against the right side of the device, as shown in the following figure.
2. Insert two 8-32 x 5/16-in. screws into one of the pairs of vertically aligned holes in the bracket and then into the pair of holes on the side of the device. To install the device in a recessed position in the rack, use the bracket holes that are set back from the end of the bracket.
3. Insert additional 8-32 x 5/16-in. screws through the holes in the bracket and into the corresponding holes in the device. The number of screws may vary depending on the device model.
4. Repeat step 1 through step 3 to attach the left front bracket to the left side of the device.
5. Tighten all the 8-32 x 5/16-in. screws to a torque of 15 in-lbs (17 cm-kgs).



1. Bracket, front right

2. Screw, 8-32 x 5/16-in., panhead Phillips

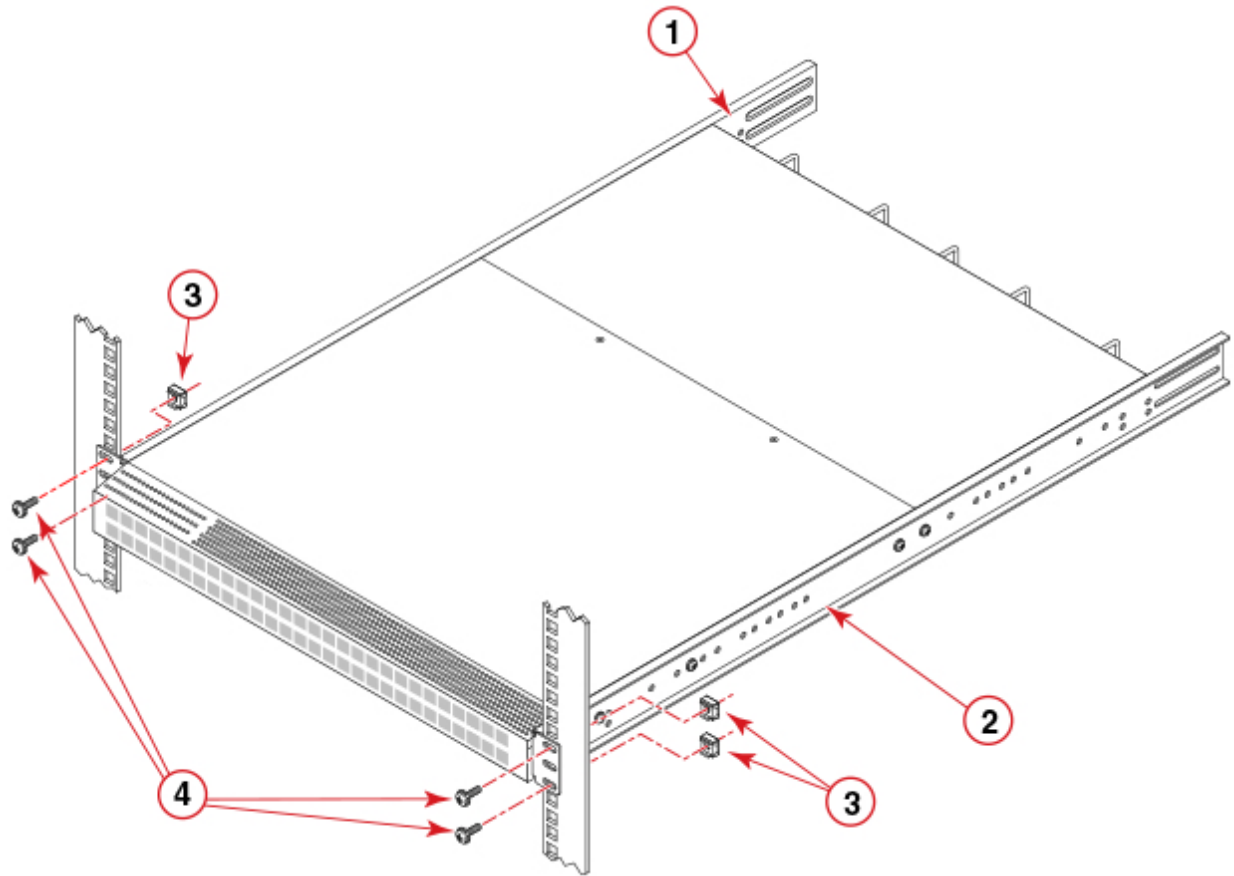
Figure 9. Attaching the front brackets

Installing the device in the rack

Complete the following steps to install the device in the rack.

1. Position the device in the rack, as shown in the following figure, providing temporary support under the device until the rail kit is secured to the rack.
2. Attach the right front bracket to the right front rack post using two 10-32 x 5/8-in. screws and two retainer nuts.

3. Attach the left front bracket to the left front rack post using two 10-32 x 5/8-in. screws and two retainer nuts.
4. Tighten all the 10-32 x 5/8-in. screws to a torque of 25 in-lbs (29 cm-kgs)



1. Bracket, front left
2. Bracket, front right
3. Retainer nut, 10-32
4. Screw, 10-32 x 5/8-in., panhead Phillips

Figure 10. Positioning the device in the rack

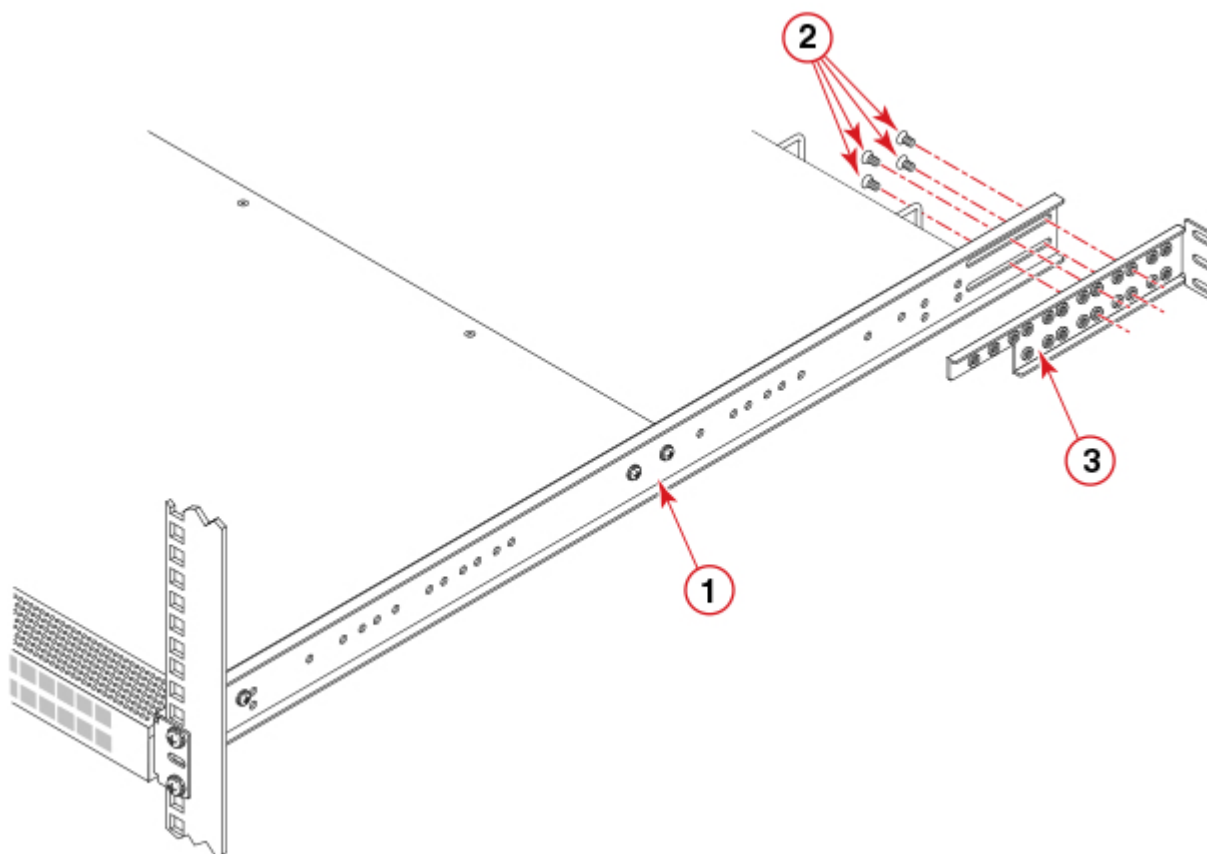
Note: The figure above is shown with a recessed mounting configuration on the left and a flush mounting configuration on the right. You can select either mounting option.

Note: Install the device with the airflow aligned with any other devices in the rack. Some devices have airflow running from port side to fan side and others have the opposite arrangement. Make sure that the airflow for all devices moves in the same direction to maximize cooling. Refer to the Hardware Installation Guide for your product for specific requirements.

Attaching the rear brackets to the front brackets

Complete the following steps to attach the rear brackets to the front brackets.

1. Position the right rear bracket inside the right front bracket, as shown in the following figure.
2. Attach the brackets using four 6-32 x 1/4-in. screws.
3. Repeat step 1 and step 2 to attach the left rear bracket to the left front bracket.
4. Adjust the brackets to the rack depth and tighten all the 6-32 x 1/4-in. screws to a torque of 9 in-lbs (10 cm-kgs).



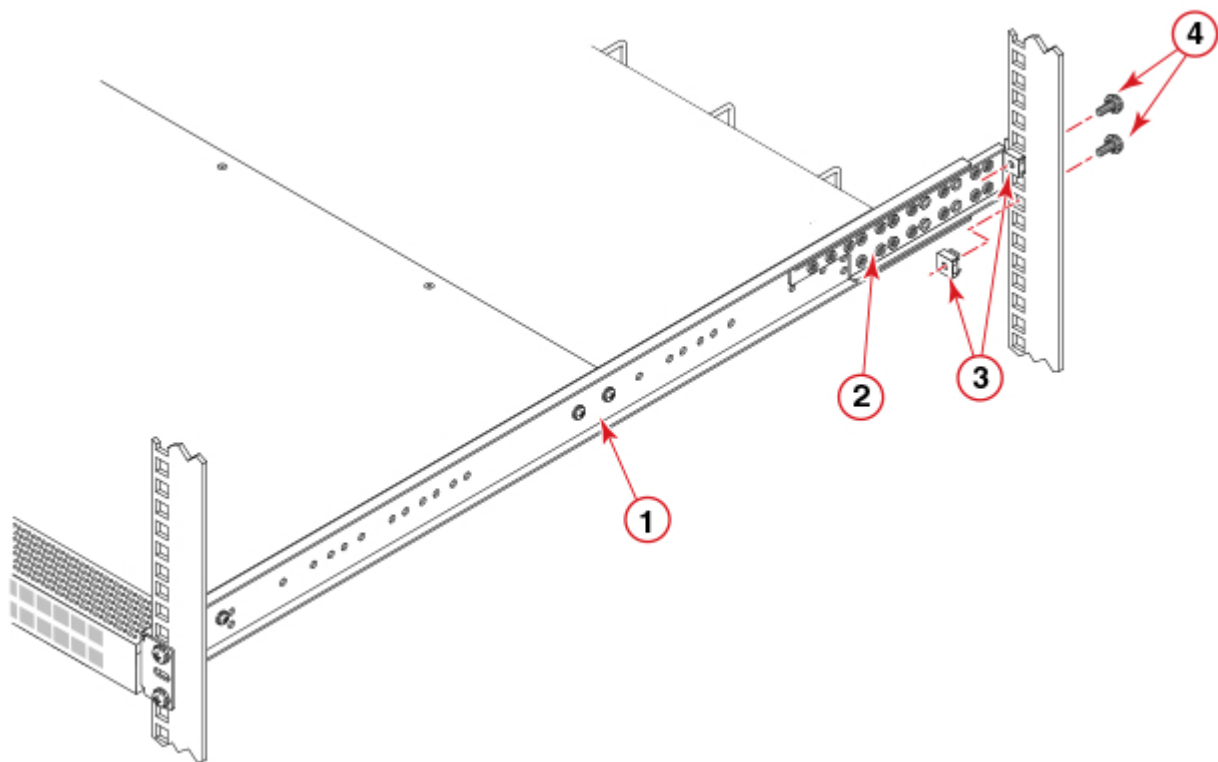
Bracket, front right
 Screw, 6-32 x 1/4-in., flathead Phillips
 Bracket, rear right

Figure 11. Attaching the rear brackets to the front brackets

Attaching the rear brackets to the rack posts

Complete the following steps to attach the rear brackets to the rack posts.

1. Attach the right rear bracket to the right rear rack post using two 10-32 x 5/8-in. screws and two retainer nuts, as shown in the following figure.
2. Attach the left rear bracket to the left rear rack post using two 10-32 x 5/8-in. screws and two retainer nuts.
3. Tighten all the 10-32 x 5/8-in. screws to a torque of 25 in-lbs (29 cm-kgs).



1. Bracket, front right
2. Bracket, rear right
3. Retainer nut, 10-32
4. Screw, 10-32 x 5/8-in., panhead Phillips

Figure 12. Attaching the rear bracket to the rack post

Slide Rack Mount Kit

Use the following instructions to install a 1U or 2U device in a 19-in. (48.3 cm) EIA rack using the Slide Rack Mount Kit. Round-hole and square-hole rack posts are supported.

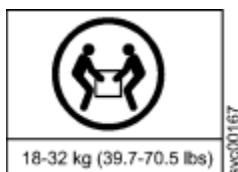
The device can be installed so that the port side is either flush with the front posts or recessed from the front posts. A recessed position allows a more gradual bend in the fiber optic cables connected to the device.

Note: Hardware devices illustrated in these procedures are only for reference and may not depict the device you are installing into the rack.

Safety precautions



DANGER: Use safe lifting practices when moving the product.



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



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



CAUTION: Use the screws specified in the procedure. Using longer screws can damage the device.



CAUTION: Never leave tools inside the chassis.



CAUTION: Do not use the port cover tabs to lift the module. They are not designed to support the weight of the module, which can fall and be damaged.



CAUTION: To prevent damage to the chassis and components, never attempt to lift the chassis using the fan or power supply handles. These handles were not designed to support the weight of the chassis.

Time and items required

Allow 15 to 30 minutes to complete this procedure.

The following tools are required to install a device using the Slide Rack Mount Kit:

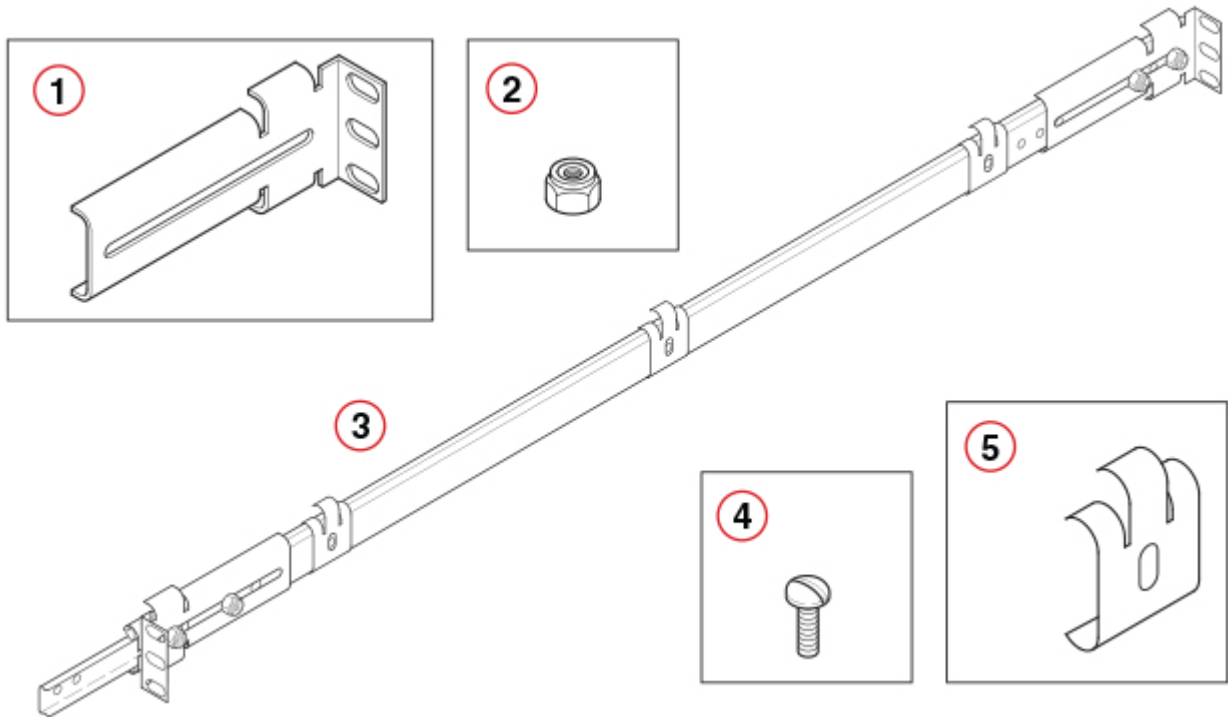
- #2 Phillips torque screwdriver
- 11/32-inch wrench
- 1/4-inch slotted-blade torque screwdriver

Parts list

The following parts are provided with the 1U and 2U Slide-Mount Rack Kit for Four-Post Racks.

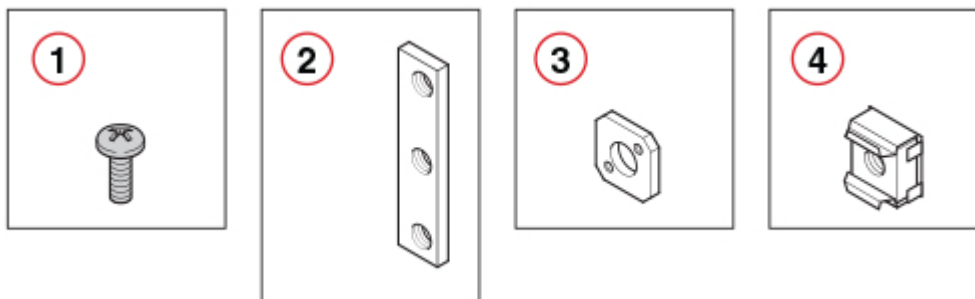
Note: Use the screws specified for use with the device. Longer screws can damage the device.

Note: Depending on the device type, not all parts may be used in an installation.



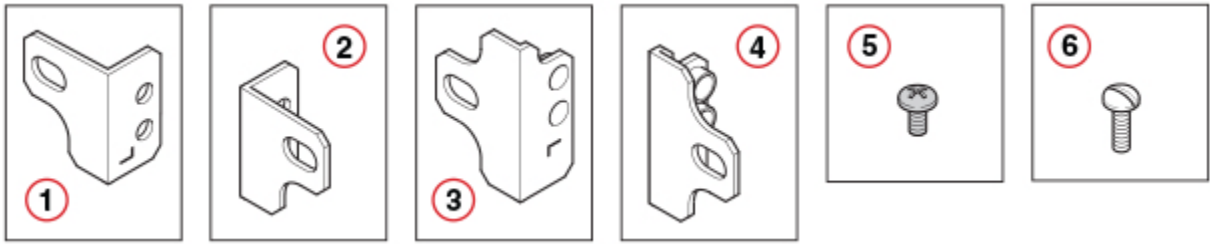
1. Three-hole slide mount L-bracket (4)
2. Locking hex nut, 8-32 (8)
3. Slide assembly, containing one inner and one outer slide rail, with Items 2, 3, 4, and 5 installed on the outer slide rail (each slide assembly is bagged separately) (2)
4. Slotted screw, 8-32 x 3/8 in., zinc (8)
5. Power cord clip (6)

Figure 13. Rack kit parts (1 of 4)



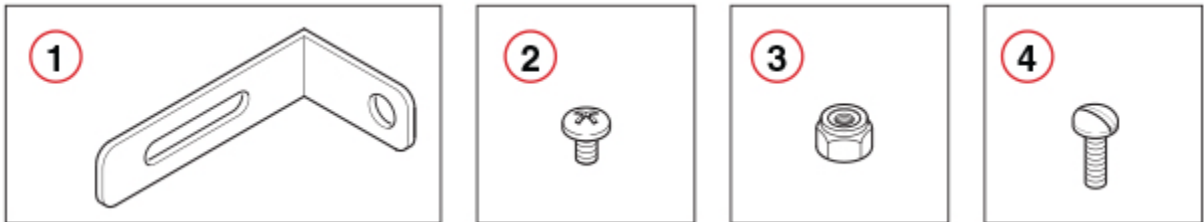
1. Phillips screw, 10-32 x 1/2 in., black (12)
2. Three-hole rack nut bar, 8-32 (4)
3. Alignment washer (12)
4. Retainer nut, 10-32 (12)

Figure 14. Rack kit parts (2 of 4)



1. Left rack mount bracket (unexpected movement safety bracket for port side) (1)
2. Right rack mount bracket (unexpected movement safety bracket for port side) (1)
3. Alternate left mount bracket (unexpected movement safety bracket for port side) (1)
4. Alternate right mount bracket (unexpected movement safety bracket for port side) (1)
5. Phillips screw, 8-32 x 1/4 in., black (4)
6. Slotted screw, 8-32 x 3/8 in., zinc (4)

Figure 15. Rack kit parts (3 of 4)



1. Back rack mount bracket (unexpected movement safety bracket for non-port side) (2)
2. Phillips screw, 8-32 x 3/16 in., zinc (12)
3. Locking hex nut, 8-32 (4)
4. Slotted screw, 8-32 x 3/8 in., zinc (4)

Figure 16. Rack kit parts (4 of 4)

Installing the device

Note: The device must be turned off and disconnected from the fabric during this procedure.

Note: Two people are required to install the device in a rack. One person can hold the device while the other attaches it to the rack.

Note: Although this document describes how to install 1U, 1.5U, or 2U devices, the illustrations show a 1.5U device.

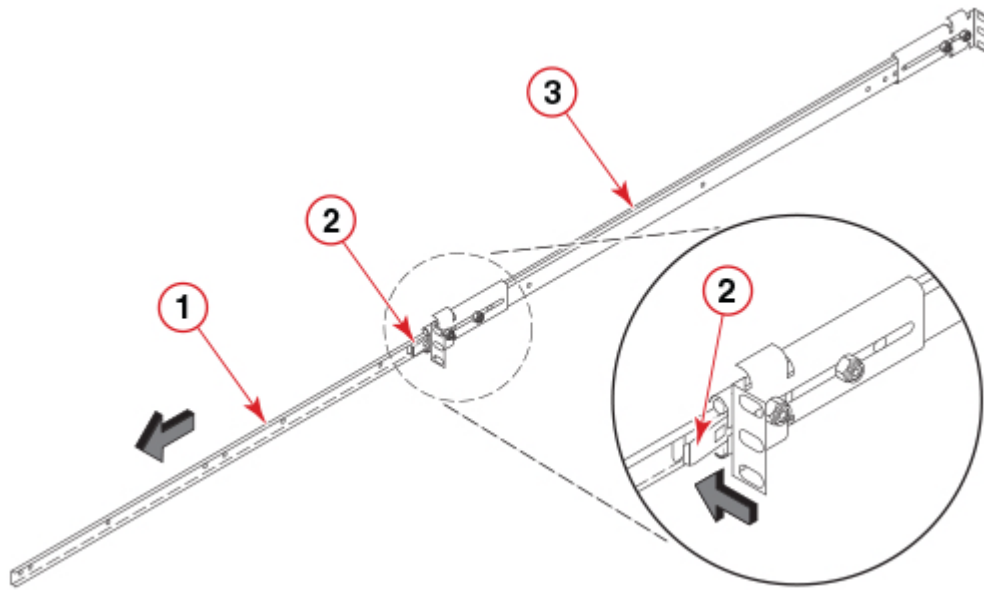
Complete the following tasks to install the device in a rack.

Preparing the slide assemblies

Perform the following steps to prepare both slide assemblies for installation.

1. Locate the slide assembly in the kit, as shown in the following figure. The slide assembly comes fully assembled and includes all of the parts shown in the figure.
2. Pull the inner slide rail out until the lock engages. Refer to the following figure.
3. Press the lock-release lever located inside the inner slide rail and pull the inner rail away from the outer rail.
4. Repeat these steps for the second slide assembly.

Note: The device must be turned off and disconnected from the fabric during the installation procedure.



1. Inner slide rail
2. Lock-release lever
3. Slide assembly

Figure 17. Pulling the slide rails apart

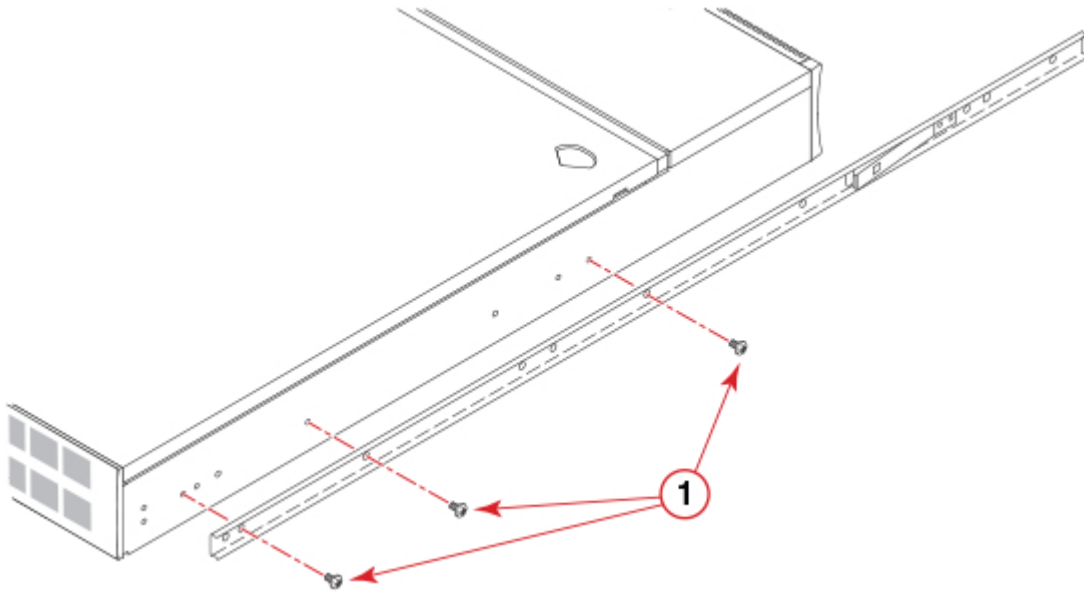
Attaching the inner slide rails to the device

Perform the following steps to attach the inner slide rails to the device.

1. Position an inner slide rail with the flat side against the device and the end containing the lock-release lever toward the non-port side of the device.
2. Align the rail holes with the holes drilled in the side of the device, as shown in the following figure.

Note: The hole pattern is identical for all 1U, 1.5U, and 2U devices.

3. Attach the rail using three Phillips 8-32 x 3/16-in. screws.
4. Tighten the screws to a torque of 15 in-lbs (17 cm-kgs).
5. Repeat these steps for the inner slide rail on the other side of the device.



1. Phillips screw, 8-32 x 3/16 in., zinc

Figure 18. Installing the inner rail to allow a device to slide out of the port side

Note: Two people are required to install the device in a rack. One person can hold the device while the other attaches it to the rack.

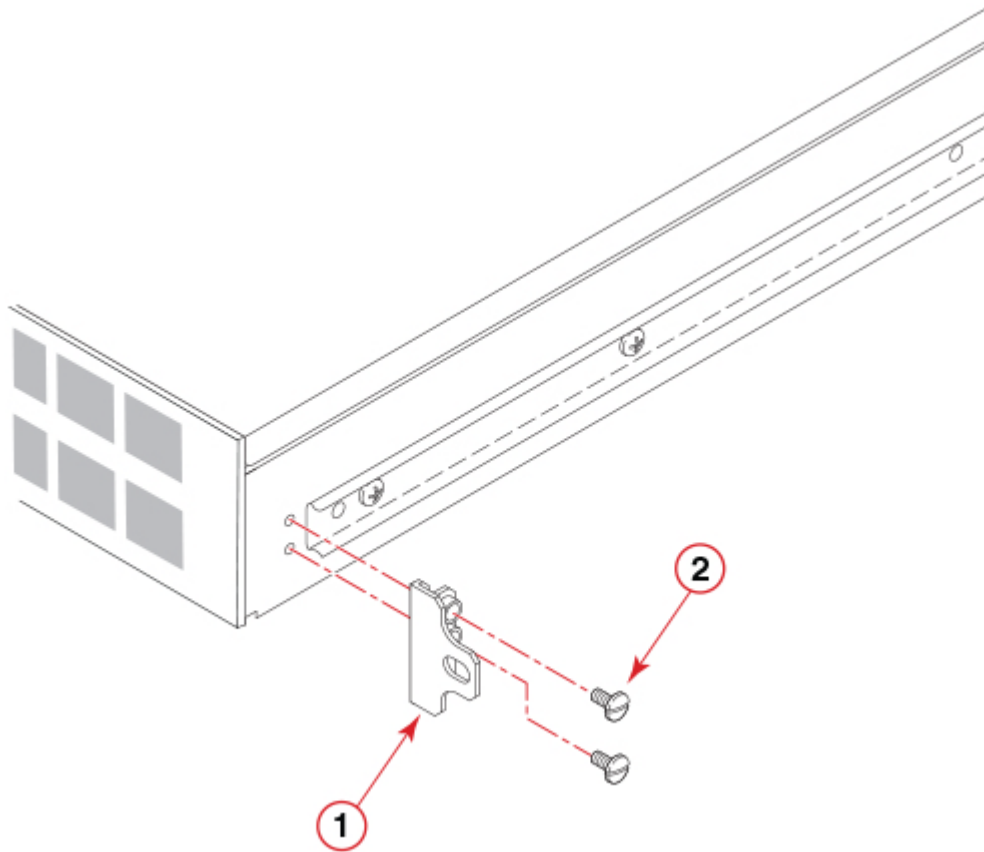
Attaching the rack mount brackets

Perform the following steps to attach the rack mount brackets.

1. Position the right rack mount bracket next to the right side of the device, as shown in the following figure.
2. Attach the right rack mount bracket to the device using two slotted-head 8-32 x 3/8 in. screws. You can use either the regular rack mount bracket or the alternate rack mount bracket. Be sure to be consistent on both sides of the device.

For recessed mounting, you can use the back rack mount brackets on the front instead of the left and right rack mount brackets.

3. Tighten the screws to a torque of 15 in-lbs (17 cm-kgs).
4. Repeat these steps for the left rack mount bracket.



1. Right rack mount bracket (use left rack mount bracket on opposite side)
2. Slotted screw, 8-32 x 3/8 in., zinc

Figure 19. Attaching a rack mount bracket

Attaching the L-brackets to the rack posts

Each slide assembly includes two L-brackets that attach to the rack posts (either round-hole or square-hole). The Slide Rack Mount Kit includes hardware compatible with both rack post types.

Note: Two methods are available for square-hole rack posts: one using retainer nuts (Method A), and one using alignment washers and three-hole nut bars (Method B).

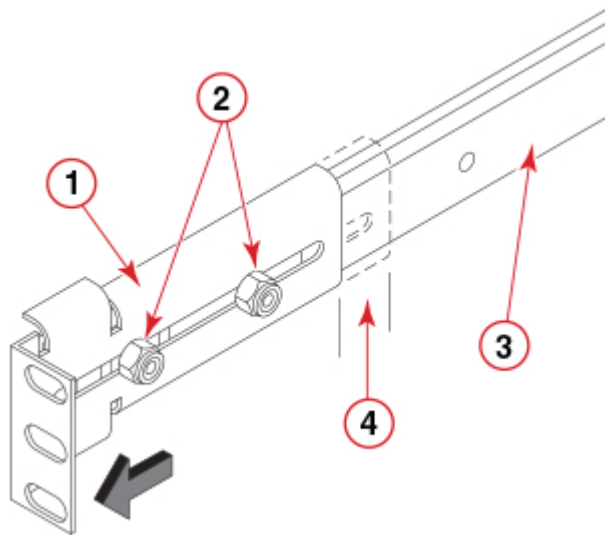
The following sections provide installation instructions for each type of rack posts.

Repositioning the port side L-bracket

Perform the following steps to reposition the port side L-bracket for correct mounting.

1. On the port side of the outer slide rail, using the 11/32-inch wrench, loosen the nuts securing the L-bracket, as shown in the following figure.
2. Extend the end of the bracket beyond the end of the slide rail by 5/8 inch.

Repositioning allows the rack mount brackets to align with the rack posts.



1. Three-hole slide mount L-bracket
2. Locking hex nut, 8-32
3. Outer slide rail
4. 5/8-inch reposition

Figure 20. Repositioning the L-brackets

Attaching the rail to round-hole rack posts

Perform the following steps to install the round-hole hardware.

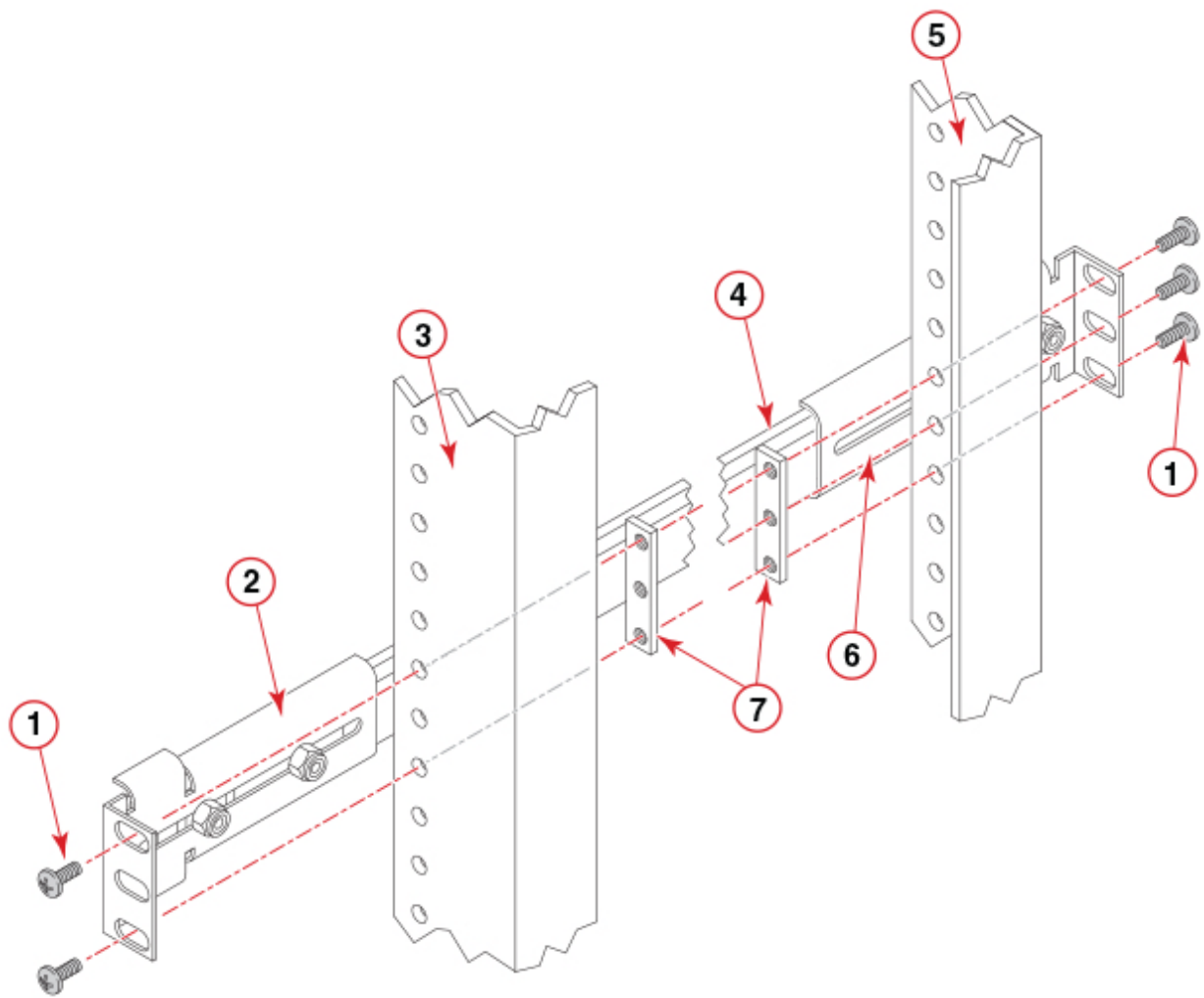
1. Position the outer slide rail inside the rack posts with the closed ends of the slide rail toward the non-port side of the rack, as shown in the following figure.
2. Loosen and adjust the position of the non-port side L-bracket as necessary.

Note: If side rack access is not available, measure the depth of the rack, loosen the L-bracket on the non-port side, and adjust the bracket position until the total rail length matches the rack depth.

3. Attach the L-brackets to the rack posts using five Phillips 10-32 x 1/2 in. screws and two of the three-hole rack nut bars.

Note: Leave the middle hole empty on the port side for securing the rack mount bracket later (refer to [“Inserting the device in the rack”](#) on page 33).

4. Tighten the screws to 15 in-lbs (17 cm-kgs).
5. Repeat these steps for the other rail.



1. Phillips screw, 10-32 x 1/2 in., black (5 each side)
2. Three-hole slide mount L-bracket (2 each side)
3. Rack post (port side)
4. Outer slide rail
5. Rack post (non-port side)
6. Three-hole slide mount L-bracket
7. Three-hole rack nut bar, 8-32 (2 each side)

Figure 21. Attaching outer slide rails to round-hole rack posts

Attaching the rail to square-hole rack posts (Method A)

Perform the following steps to install the square-hole hardware using Method A.

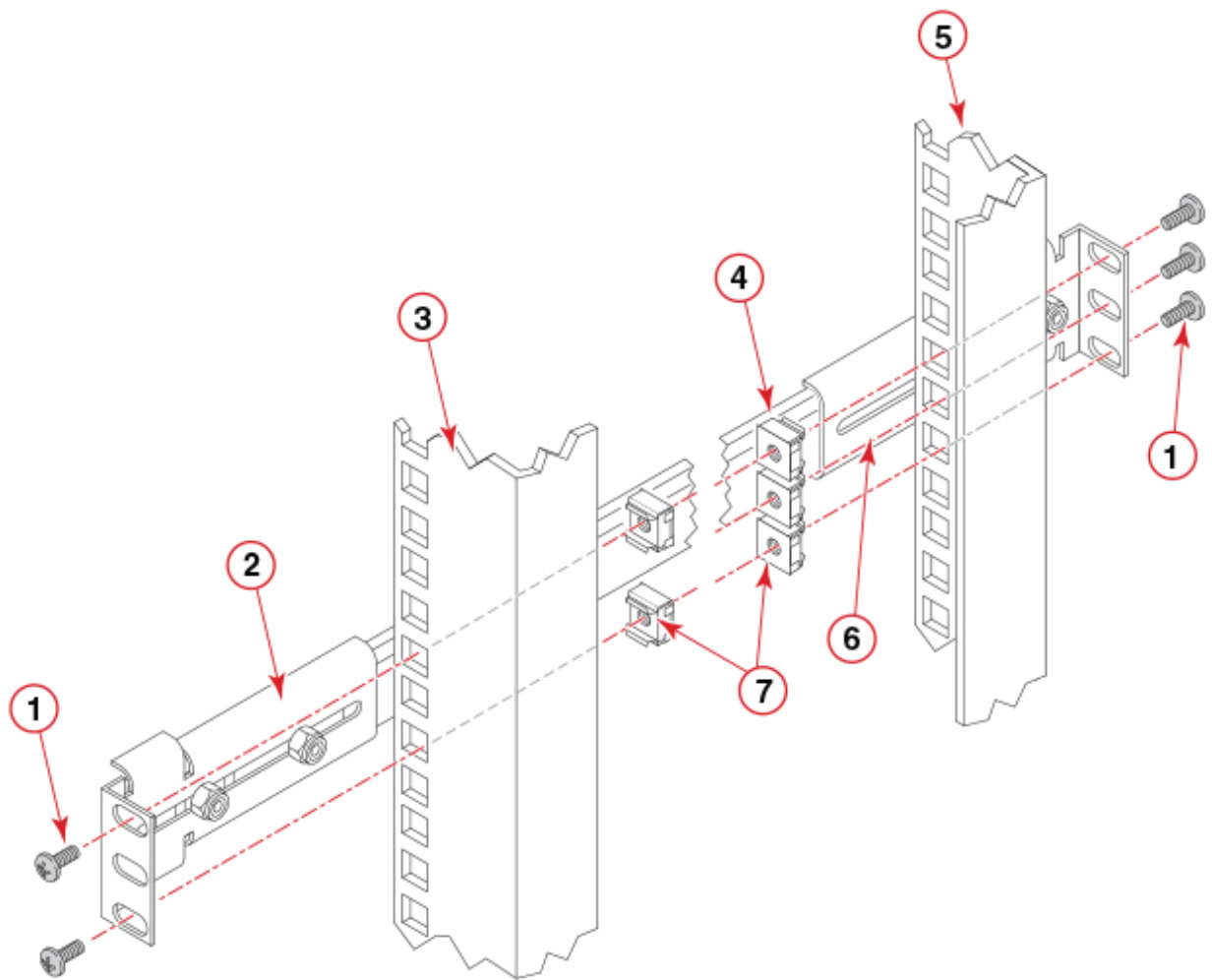
1. Position the outer slide rail inside the rack posts with the closed ends of the slide rail toward the non-port side of the rack, as shown in the following figure.
2. Loosen and adjust the position of the non-port side L-bracket as necessary.

Note: If side rack access is not available, measure the depth of the rack, loosen the L-bracket on the non-port side, and adjust the bracket position until the total rail length matches the rack depth.

3. Attach the L-brackets to the rack posts using five Phillips 10-32 x 1/2 in. screws and five retainer nuts.

Note: Leave the middle hole empty on the port side for securing the rack mount bracket later (refer to [Inserting the device in the rack](#)).

4. Tighten the screws to 15 in-lbs (17 cm-kgs).
5. Repeat these steps for the other rail.



1. Phillips screw, 10-32 x 1/2 in., black (5 each side)
2. Three-hole slide mount L-bracket (2 each side)
3. Rack post (port side)
4. Outer slide rail
5. Rack post (non-port side)
6. Three-hole slide mount L-bracket
7. Retainer nut, 10-32 (5 each side)

Figure 22. Method A for attaching outer slide rails to square-hole rack posts

Attaching the rail to square-hole rack posts (Method B)

Perform the following steps to install the square-hole hardware using Method B.

1. Position the outer slide rail inside the rack posts with the closed ends of the slide rail toward the non-port side of the rack, as shown in the following figure.
2. Loosen and adjust the position of the non-port side L-bracket as necessary.

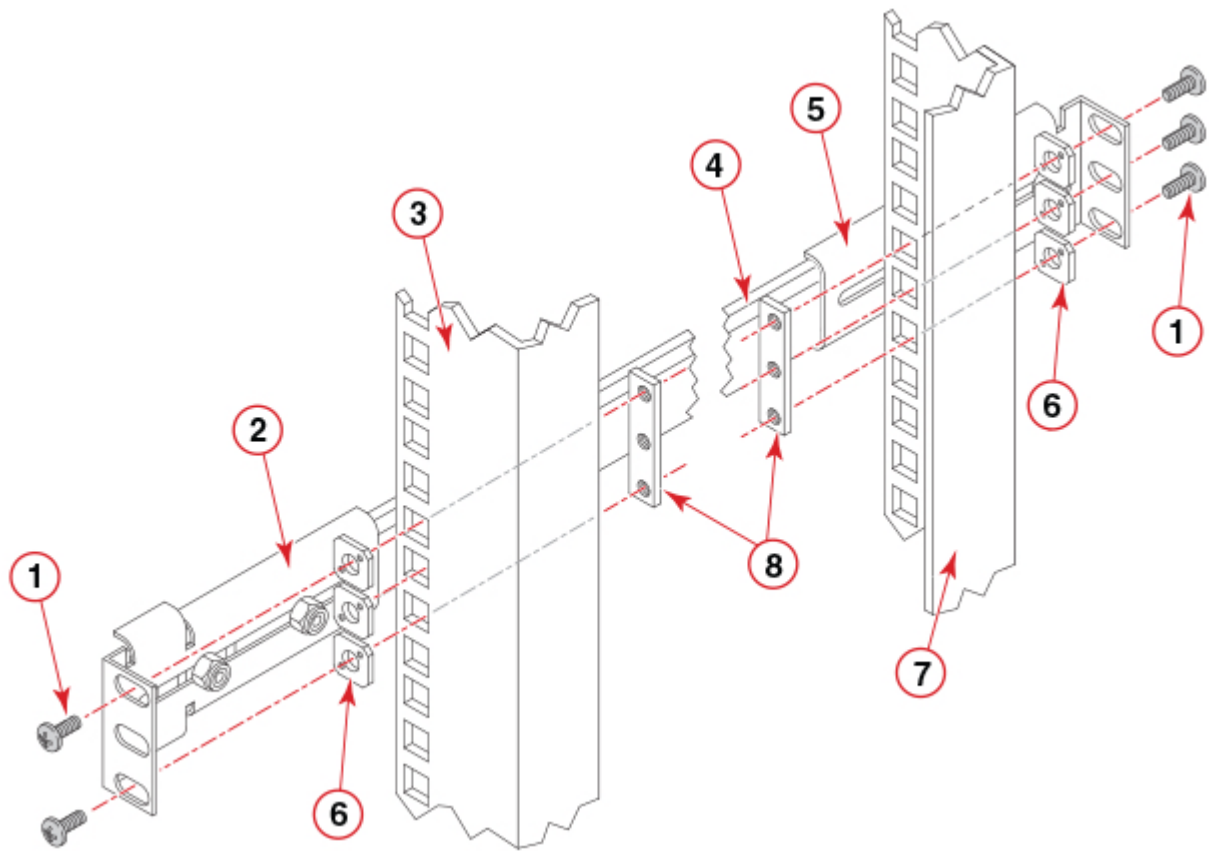
Note: If side rack access is not available, measure the depth of the rack, loosen the L-bracket on the non-port side, and adjust the bracket position until the total rail length matches the rack depth.

3. Attach the L-brackets to the rack posts using five Phillips 10-32 x 1/2 in. screws, six alignment washers, and two of the three-hole rack nut bars.

Note: Leave the middle hole empty on the port side for securing the rack mount bracket later (refer to [Inserting the device in the rack](#)); however, position an alignment washer between the L-bracket and the rack post.

4. Tighten the screws to 15 in-lbs (17 cm-kgs).

5. Repeat these steps for the other rail.



1. Phillips screw, 10-32 x 1/2 in., black (5 each side)
2. Three-hole slide mount L-bracket (2 each side)
3. Rack post (port side)
4. Outer slide rail
5. Three-hole slide mount L-bracket
6. Alignment washer (6 each side)
7. Rack post (non-port side)
8. Three-hole rack nut bar, 8-32 (2 each side)

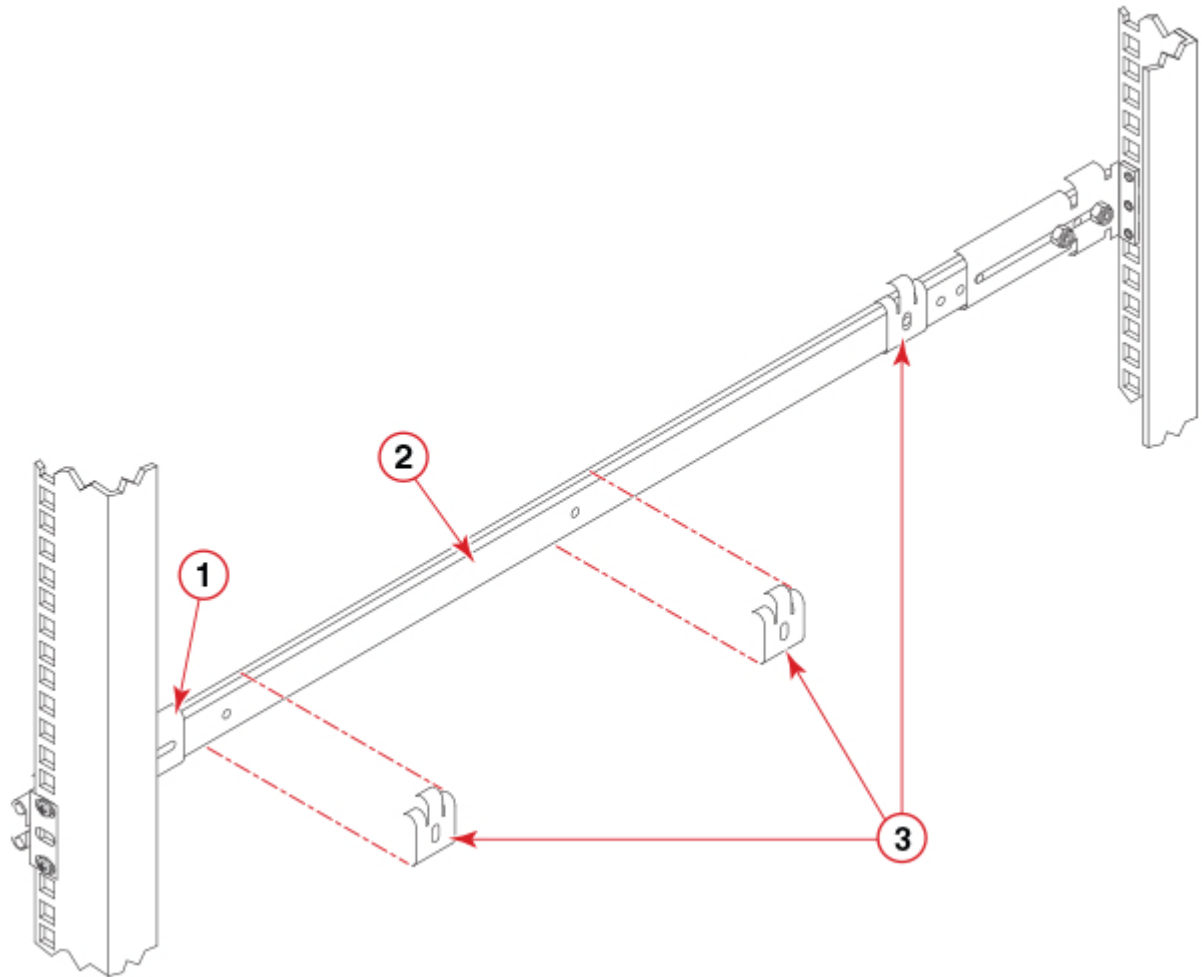
Figure 23. Method B for attaching outer slide rails to square-hole rack posts

Inserting the device in the rack

Perform the following steps to install the device in the rack.

1. Position the power cord clips on the outer surface of both outer slide rails, as shown in the following figure.

Ensure that the clips do not interfere with the movement of the rails. Position all the clips either with the tabs above or with the tabs below the rail.



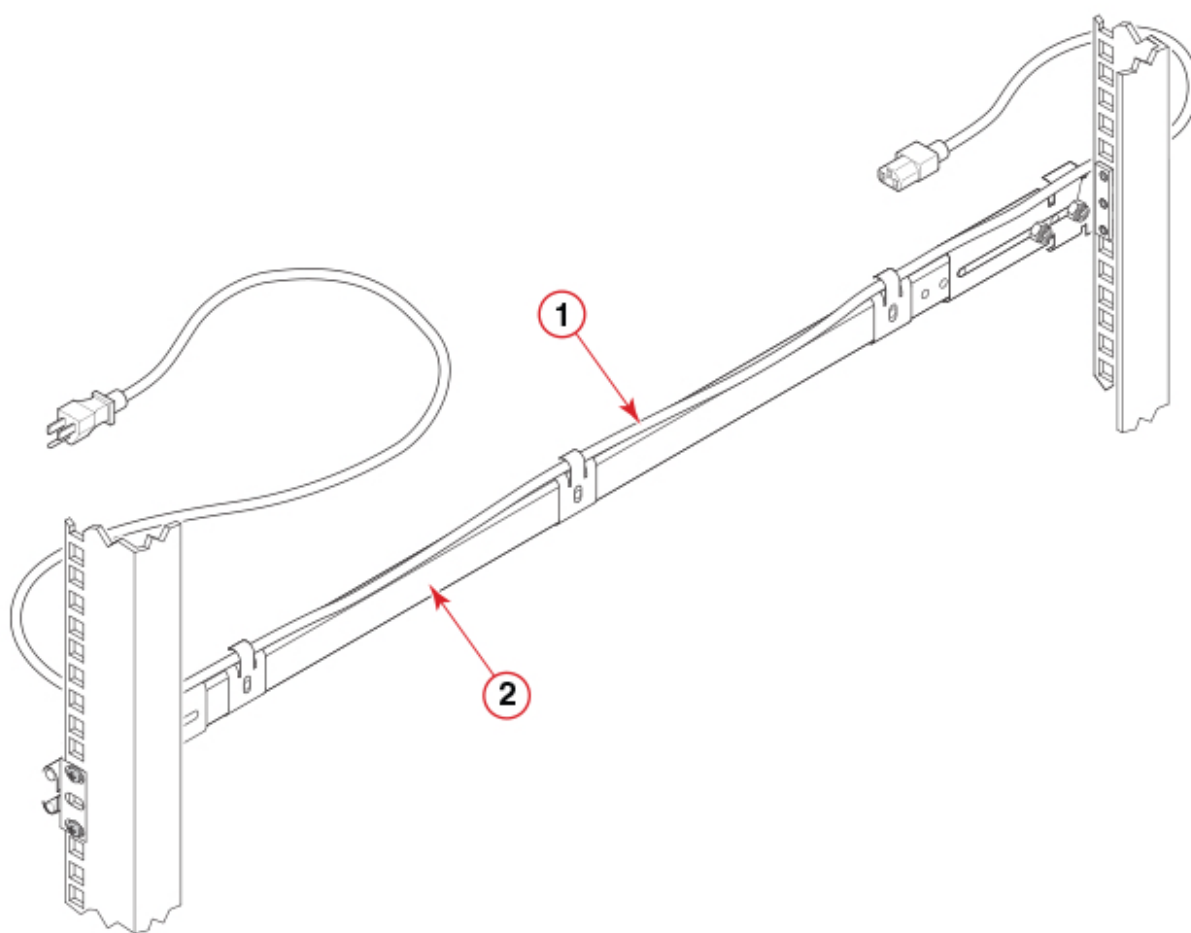
1. Three-hole slide mount L-bracket
2. Slide assembly
3. Power cord clips (3 each side)

Figure 24. Attaching the power cord clips

2. Insert the power cords into the power cord clips, with the power cord prongs pointing toward the power source, as shown in the following figure.

Note: Allow a minimum service loop of six inches at the device to ensure freedom to plug and unplug the power cords. Ensure that the power cords route completely outside of the slide rails.

Note: Ensure that the power cords align in the clips and do not fall inside the slide rails. To prevent the cords from being pulled out of the clips, unplug the cords from the device before moving the device on the slide rails.

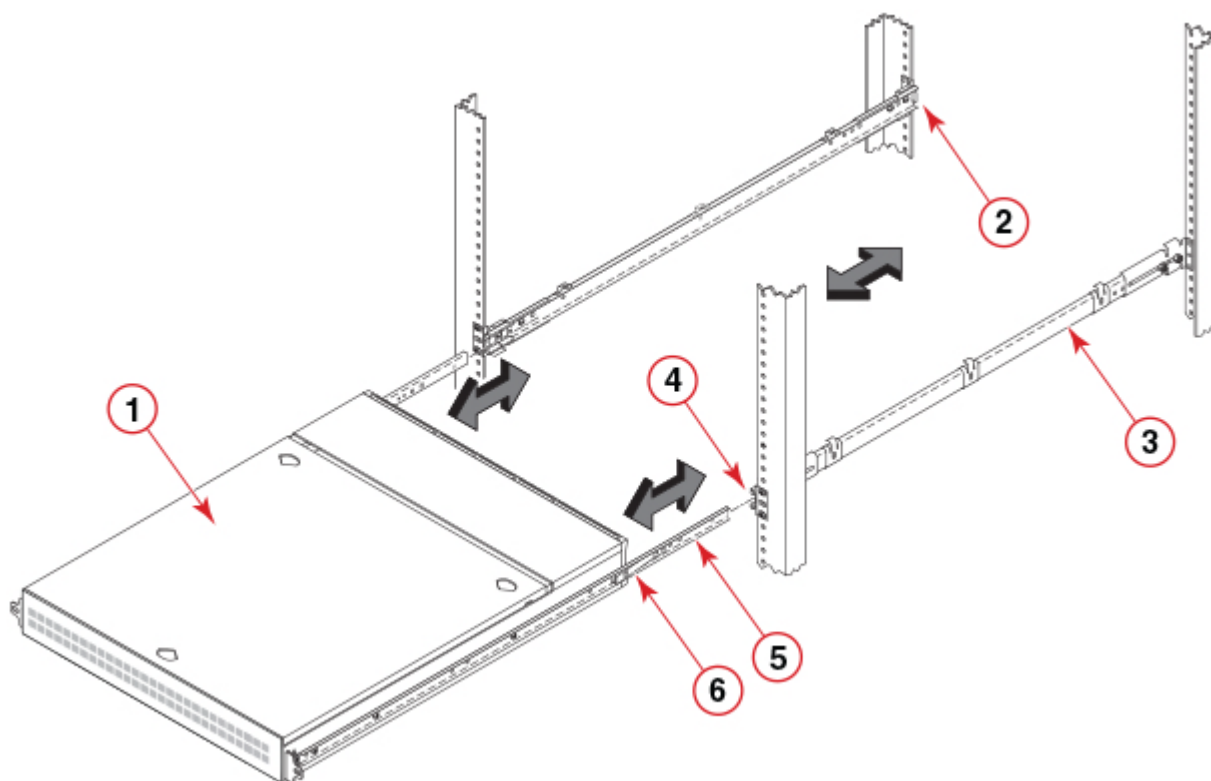


- 1. Power cord
- 2. Slide assembly

Figure 25. Inserting the power cords in clips

- 3. Position the device next to the rack; align and insert the inner rails inside the outer rails, as shown in the following figure.
- 4. Gently slide the device into the rack. If there is any resistance, pull the device out of the rack and realign the slide rails.

Note: Check the rail alignment by sliding the device out and back into the rack.



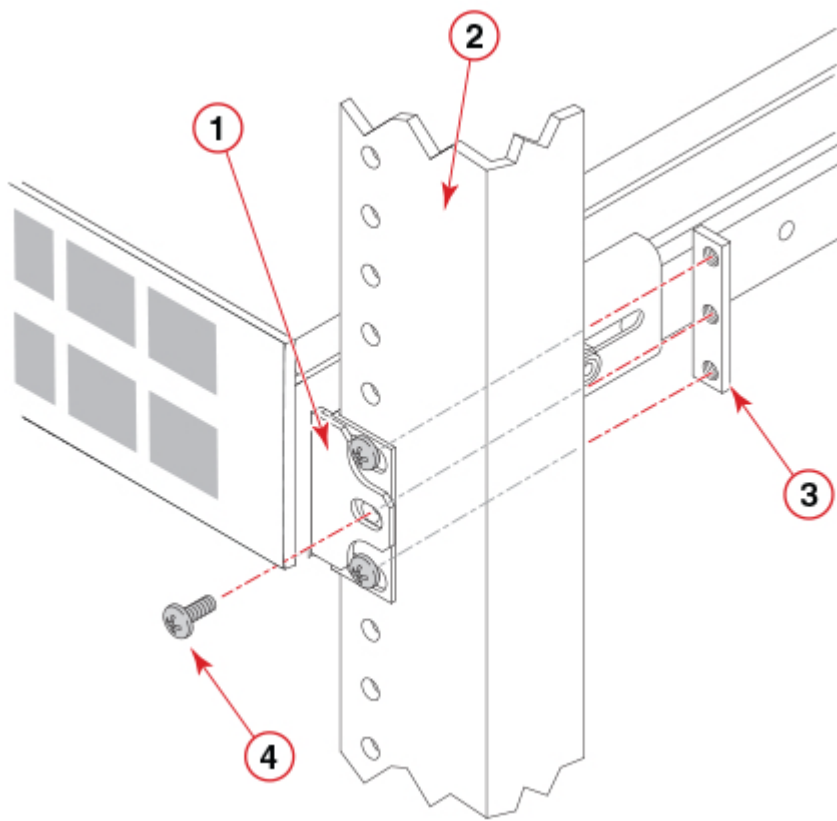
1. Device
2. Slide assembly closed end
3. Outer slide rail
4. Slide assembly open end
5. Inner slide rail
6. Lock-release lever

Figure 26. Inserting the device

5. Secure the rack mount brackets to the rack posts using one Phillips 10-32 x 1/2 in. screw per bracket and tighten the screws to a torque of 25 in-lbs (29 cm-kgs).

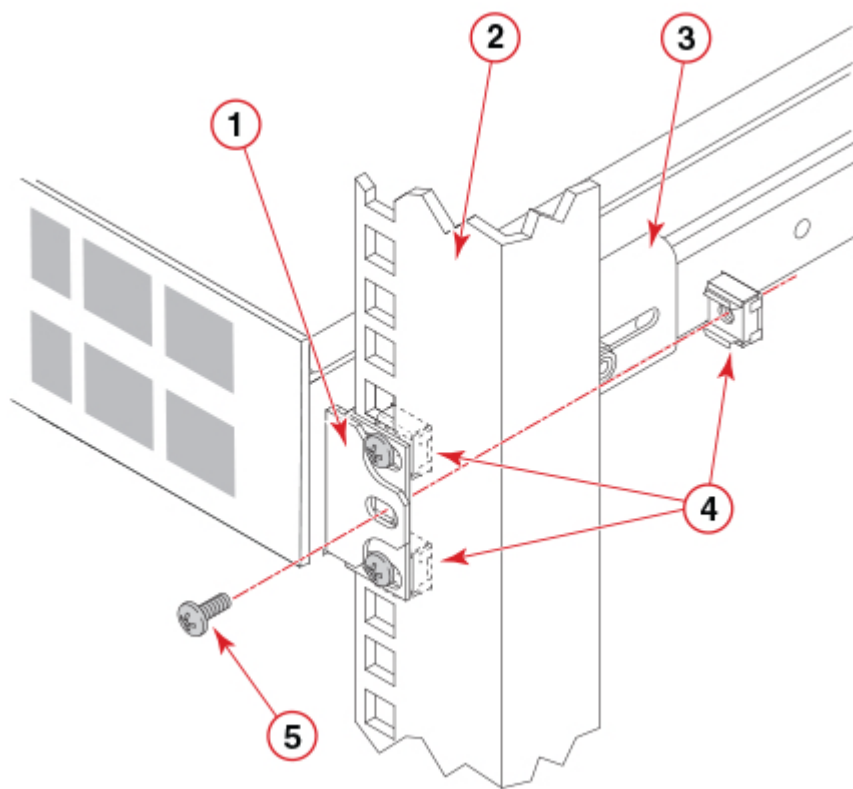
For square-hole rack post Method A installations, use the remaining retainer nut to secure the screw.

Refer to [Figure 27 on page 37](#) for a round-hole rack post; refer to [Figure 28 on page 38](#) (Method A) or [Figure 29 on page 39](#) (Method B) for a square-hole rack post.



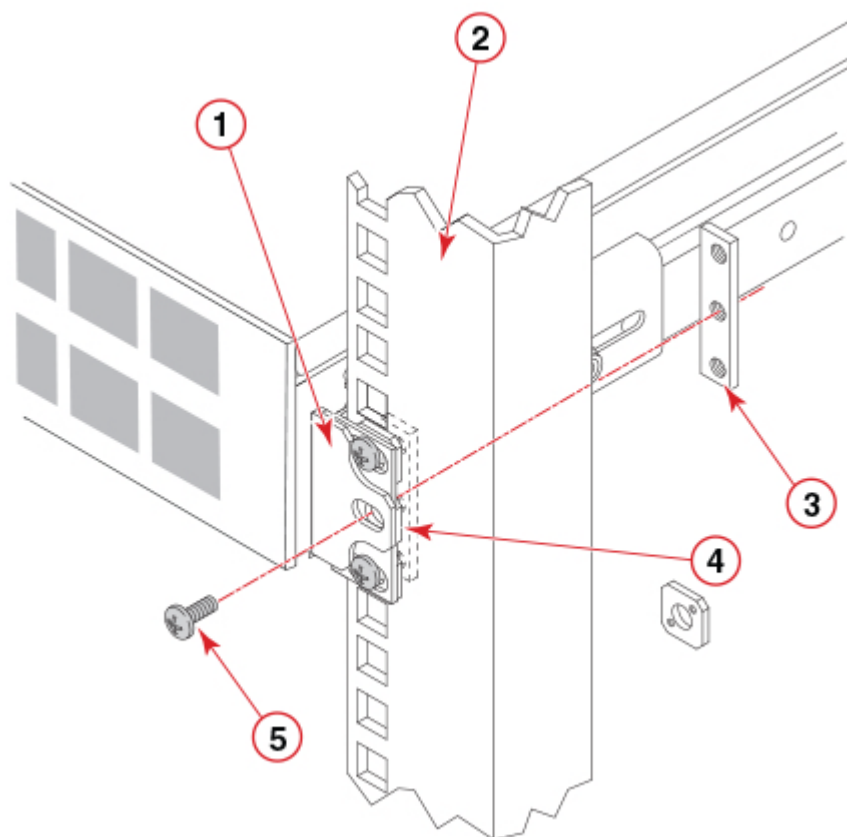
1. Right rack mount bracket
2. Rack post
3. Three-hole rack nut bar, 8-32
4. Phillips screw, 10-32 x 1/2 in., black

Figure 27. Securing rack mount brackets for round-hole rack posts



1. Right rack mount bracket
2. Rack post
3. Three-hole slide mount L-bracket
4. Retainer nut, 10-32
5. Phillips screw, 10-32 x 1/2 in., black

Figure 28. Method A for securing rack mount brackets for square-hole rack posts



1. Right rack mount bracket
2. Rack post
3. Three-hole rack nut bar, 8-32
4. Alignment washer (previously installed)
5. Phillips screw, 10-32 x 1/2 in., black

Figure 29. Method B for securing rack mount brackets for square-hole rack post

Installing the 1U and 2U Non-Port Side Fixed-Mount Rack Kit (15"-20") for Four-Post Racks

Use the following instructions to install a fixed-port device in a 19-inch (48.3 cm) EIA rack using the 1U and 2U Non-port Side Fixed Rack Mount Kit (15"-20") for Four-Post Racks. Any updates to these instructions will be added to the hardware installation guide for your product.

The rack kit is designed so that the device is installed with the non-port side flush with the front posts of the rack.

Note: Hardware devices illustrated in these procedures are only for reference and may not depict the device you are installing into the rack.

Installation requirements

Review the installation and facility requirements for your product before mounting the device. Refer to the hardware installation guide for your product for more information.

Use Electronic Industries Association (EIA) standard racks. Provide space in a 19-inch (48.3 cm) EIA rack, as required for the device type, with a minimum distance of 24 in. (60.96 cm) and a maximum distance of 32 in. (81.28 cm) between the front and back posts.

Time and items required

Allow 15 to 30 minutes to complete this procedure.

The following items are required to install a device using the Non-port Side Fixed Rack Mount Kit (15"-20"):

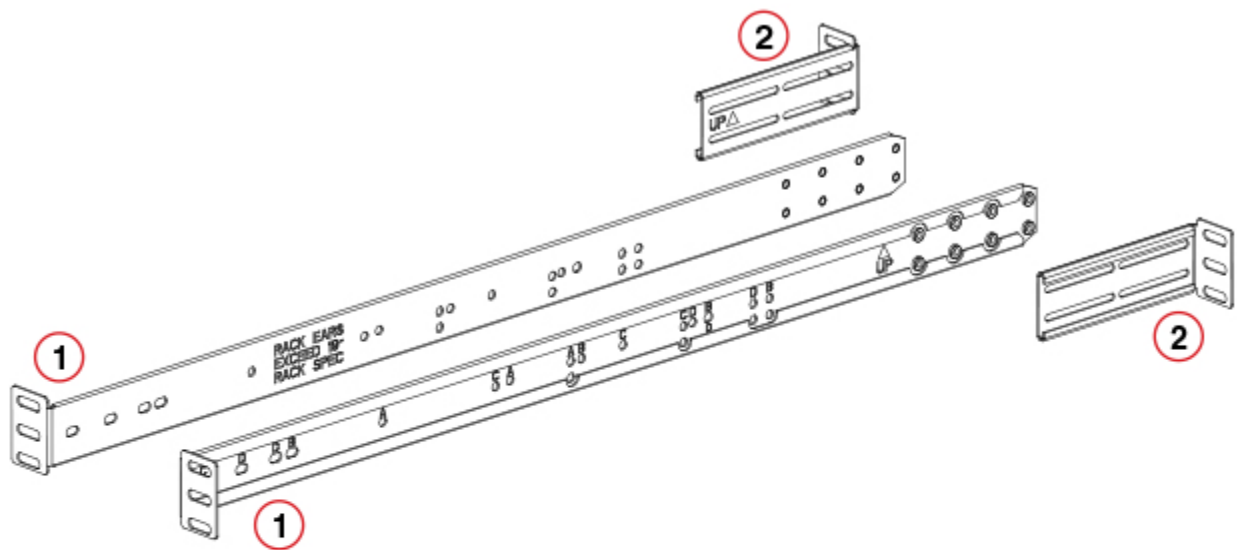
- Rack mount kit
- #2 Phillips screwdriver with torque capability



CAUTION: Use the screws specified in the procedure. Using longer screws can damage the device.

Parts list

The following parts are provided with the 1U and 2U Non-Port Side Fixed-Mount Rack Kit (15"-20") for Four-Post Racks.



1. Brackets, front (2)
2. Brackets, rear short (2)
3. Screws, 8-32 x 5/16-in., panhead Phillips with patchlock (10)
4. Screws, 6-32 x 1/4-in., panhead Phillips with patchlock (8)
5. Screws, 10-32 x 5/8-in., panhead Phillips (8)
6. Retainer nuts, 10-32, for square-hole rack posts (8)
7. Clip nuts, 10-32, for round-hole rack posts (8)

Figure 30. Rack kit parts

Note: The brackets in the kit are labeled UP with an upward pointing arrowhead to reduce confusion in mounting.

Note: Depending on the device type , not all parts may be used in an installation.

Attaching the front brackets



CAUTION: The device must be turned off and disconnected from the fabric during this procedure.

Complete the following steps to attach the front brackets to the device.

Note: Pay particular attention to the labeling on the brackets.

Refer the following figure. There are four pairs of vertically aligned holes in the brackets. Each pair is labeled with a letter as are a number of single holes along the length of the bracket. Each letter corresponds to a specific device's mounting holes.

For the SAN24B-6 use the holes marked with the letter 'A'.

Note: Example illustrations in the following procedures may show the screws inserted in holes designated for devices other than the device that you are installing. Be sure to use holes designed for installing your device.

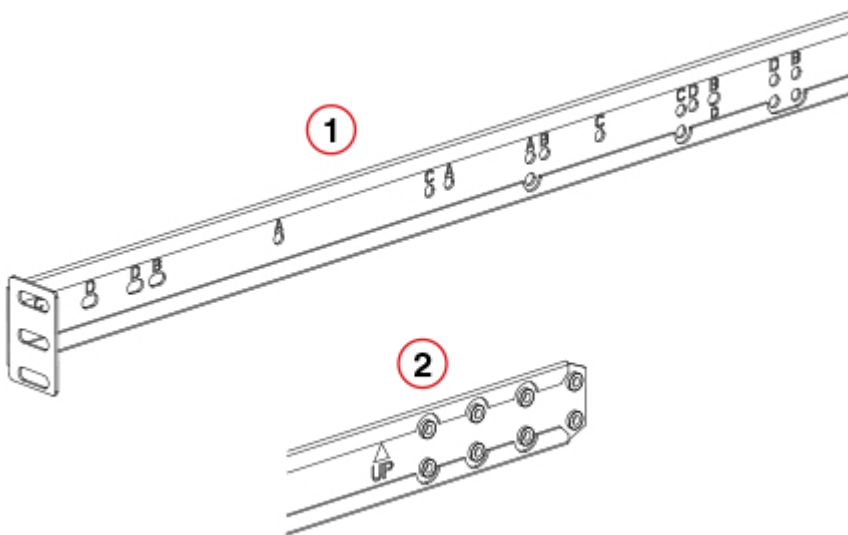
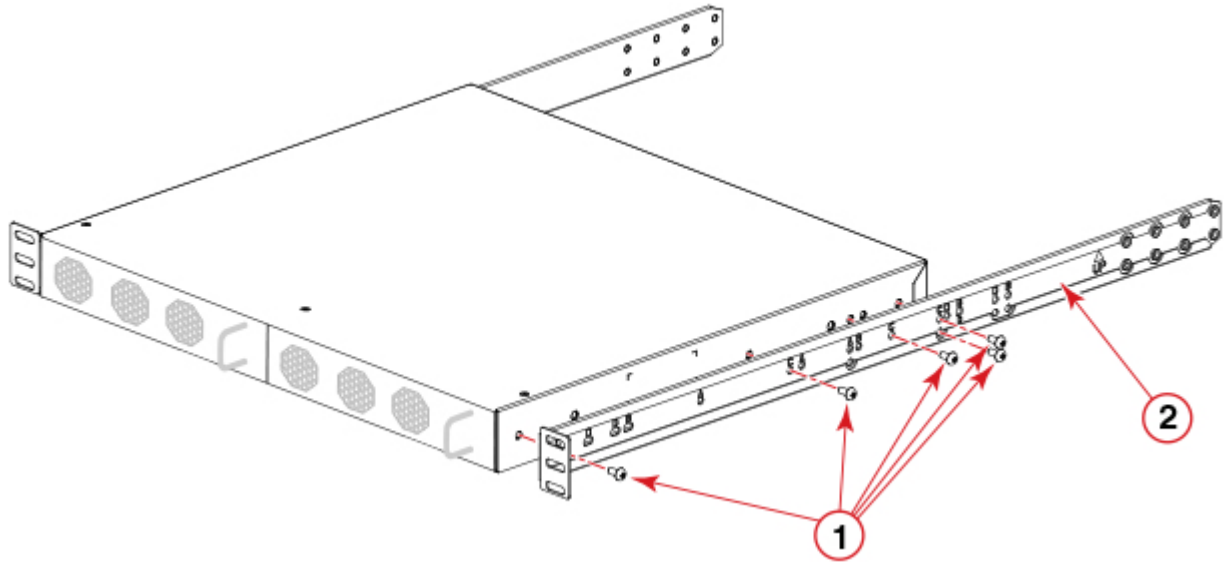


Figure 31. Enlarged view of the front right bracket showing labels

1. Position the right front bracket with the flat side against the right side of the device as shown in the following figure. Be sure that the arrowhead is pointing upward when mounted.
2. Insert two 8-32 x 5/16-in. screws into one of the pairs of vertically aligned holes in the bracket and then into the pair of holes on the side of the device.
3. Insert each of three additional 8-32 x 5/16-in. screws through the holes in the bracket and into the corresponding holes in the device as shown in the following figure. Be sure to use holes with the same label. Tighten all 8-32 x 5/16-in. screws to a torque of 15 in-lb (17 cm-kg).
4. Repeat step 1 through step 3 to attach the left front bracket to the left side of the device. Again, be sure that the arrowhead is pointing upward when mounted and that you are using the holes with the same labels as you used on the right side.



1. Screws, 8-32 x 5/16 in., panhead Phillips (5 per side)
2. Bracket, front right

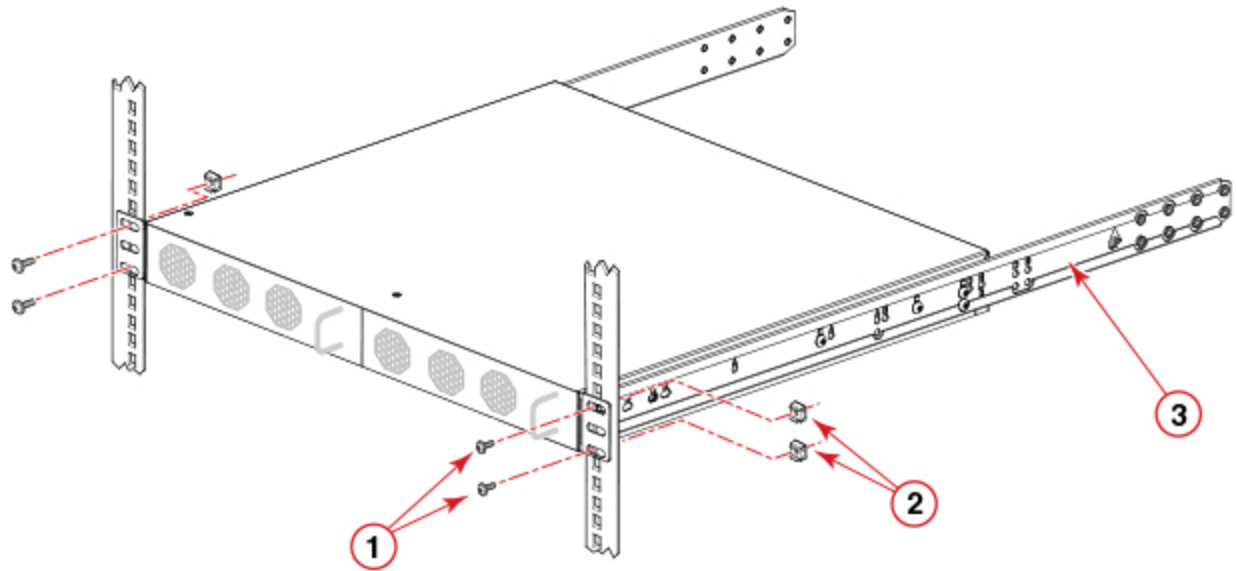
Figure 32. Attaching the front bracket

Installing the device in the rack

Note: Two people are required to install the device in a rack. One person can hold the device while the other attaches it to the rack.

Complete the following steps to install the device in the rack.

1. Position the device in the rack as shown in the following figure, providing temporary support under the device until the device is secured to the rack.
2. Attach the right front bracket to the right front rack post using two 10-32 x 5/8-in. screws and two retainer nuts. Select the correct nuts for either square or round holes in the rack posts.
3. Attach the left front bracket to the left front rack post using two 10-32 x 5/8-in. screws and two nuts and tighten all 10-32 x 5/8-in. screws to a torque of 25 in-lb (29 cm-kg).



1. Screws, 10-32 x 5/8 in., panhead Phillips
2. Retainer nuts, 10-32, square or round hole as needed
3. Bracket, front right

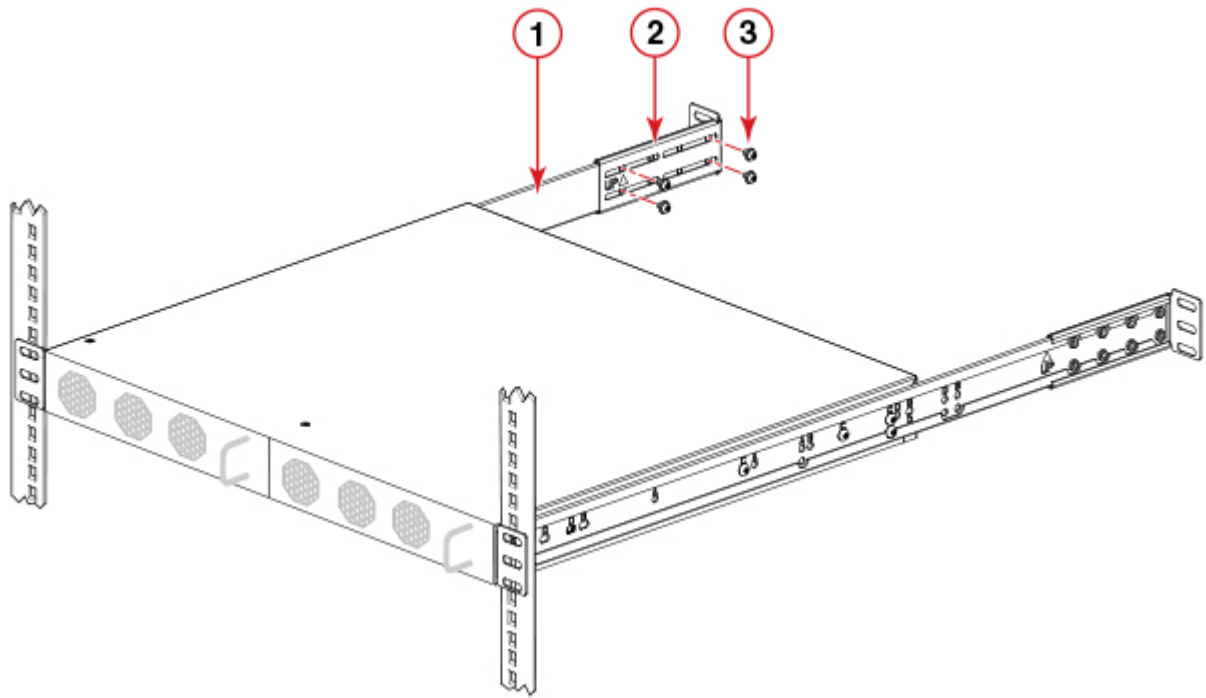
Figure 33. Positioning the device in the rack

Attaching the rear brackets to the front brackets

Note: The rear brackets in the kit are also labeled UP with an upward pointing arrowhead to reduce confusion in mounting.

Complete the following steps to attach the rear brackets to the front brackets.

1. Position the right rear bracket inside the right front bracket.
2. Attach the brackets using four 6-32 x 1/4-in. screws as shown in the following figure.
3. Adjust the brackets to the rack depth and tighten the 6-32 x 1/4-in. screws to a torque of 9 in-lb (10 cm-kg).
4. Repeat step 1 through step 3 to attach the left rear bracket to the left front bracket.



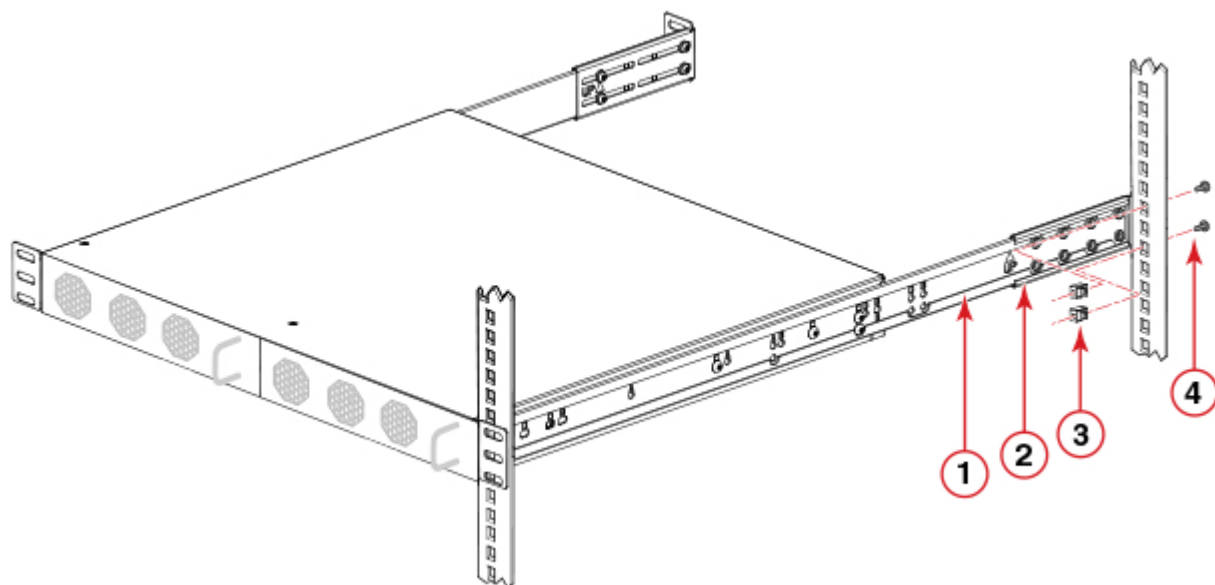
1. Bracket, front left
2. Bracket, rear left
3. Screws, 6-32 x 1/4 in., panhead Phillips (4 per side)

Figure 34. Attaching the rear brackets to the front brackets

Attaching rear brackets to the rack posts

Complete the following steps to attach the rear brackets to the rack posts.

1. Attach the right rear bracket to the right rear rack post using two 10-32 x 5/8-in. screws and two retainer nuts as shown in the following figure. Select the correct retainer nuts for either square or round holes in the rack posts.
2. Attach the left rear bracket to the left rear rack post using two 10-32 x 5/8-in. screws and two retainer nuts and tighten all the 10-32 x 5/8-in. screws to a torque of 25 in-lb (29 cm-kg).



1. Bracket, front right
2. Bracket, rear right
3. Retainer nuts, 10-32, square or round holes as needed
4. Screws, 10-32 x 5/8 in., panhead Phillips

Figure 35. Attaching the rear bracket to the rack post

Chapter 4. Initial Setup and Verification

Items required

The following items are required for initial setup and verification of the device:

- The device, mounted and installed with the required power supply and fan assemblies, transceivers, and cables; and connected to a power source
- A workstation computer with a terminal emulator application installed, such as PuTTY, XShell or SecureCRT on Windows
- An unused IP address with corresponding subnet mask and gateway address
- A serial cable with an RJ-45 connector
- An Ethernet cable
- Access to an FTP server or USB device for backing up (uploading) or downloading the device configuration (optional)

Providing power to the device

Perform the following steps to provide power to the device.

1. Connect the power cord to the power supply, and then to the power source. Ensure that the power cord has a minimum service loop of 6 inches available and routed to avoid stress.
The system power supply LED displays amber until power-on self-test (POST) is complete, and then change to green. The switch usually requires several minutes to boot and complete POST.
2. After POST is complete, verify that the switch power and switch status LEDs are green.
For more information about how to interpret POST, BOOT, and diagnostics tests, refer to [Chapter 6, “Monitoring the Device,”](#) on page 58.

Establishing a first-time serial connection

Perform the following steps to log in to the device through the serial connection.

1. Connect the serial cable to the serial port on the device and to an RS-232 serial port on the workstation.
If the serial port on the workstation is RJ-45 instead of RS-232, remove the adapter on the end of the serial cable and insert the exposed RJ-45 connector into the RJ-45 serial port on the workstation.
2. Disable any serial communication programs running on the workstation such as synchronization programs.
3. Open a terminal emulator application such as PuTTY, XShell, or SecureCRT on a Windows PC, or TERM, TIP, or C-Kermit in a LINUX environment, and configure the application as follows:
 - In a Windows environment, use the following values:

Parameter	Value
Bits per second	9600
Databits	8
Parity	None

Parameter	Value
Stop bits	1
Flow control	None (must be disabled on the host side)

Note: Flow control is not supported on the serial connection when attached to a remote terminal and must be disabled on the customer-side remote terminal server in addition to the host-side clients.

- In a UNIX environment using TIP, enter the following string at the prompt:

```
tip /dev/ttyb -9600.
```

If ttyb is already in use, use ttya instead and enter the following string at the prompt:

```
tip /dev/ttya -9600
```

4. When the terminal emulator application stops reporting information, press **Enter** to display the login prompt.

```
Switch Console Login:
```

5. Log in to the device as admin, using the default password: password. You are prompted to change the default admin and user passwords at initial login. Make sure to write down the new passwords and keep this information in a secure location.

```
Fabric OS (swDir)
swDir login: admin
Password:
Please change your passwords now.
Use Control-C to exit or press 'Enter' key to proceed.
swDir:admin>
```

6. (Optional) Modify passwords. To skip modifying the password, press **Ctrl+C**.

Note: Passwords can be 8 to 40 characters long. They must begin with an alphabetic character. They can include numeric characters, the period (.), and the underscore (_) only. Passwords are case-sensitive, and they are not displayed when you enter them on the command line.

Configuring the IP address

You can configure the device with a static IP address, or you can use a Dynamic Host Configuration Protocol (DHCP) server to set the IP address of the switch. DHCP is enabled by default. The device supports both IPv4 and IPv6 addresses.

Using DHCP to set the IP address

When using DHCP, the SAN24-B6 obtains its IP address, subnet mask, and default gateway address from the DHCP server. The DHCP client can only connect to a DHCP server that is on the same subnet as the switch. If your DHCP server is not on the same subnet as the SAN24-B6, use a static IP address.

Setting a static IP address

To set a static IP address for the device, complete the following steps.

1. Log in to the device as admin.
2. Use the **ipaddrset** command to set the Ethernet IP address.
 - If you are going to use an IPv4 address, enter the IP address in dotted decimal notation as prompted.

```
Ethernet IP Address: [192.168.74.102]
```

- If you are going to use an IPv6 address, enter the network information in colon-separated notation as prompted.

```
device:admin> ipaddrset -ipv6 --add 1080::8:800:200C:417A/64  
IP address is being changed...Done.
```

3. Complete the rest of the network information as prompted. (IPv4 format shown):

```
Ethernet Subnetmask: [255.255.255.0]  
Ethernet IP Address: [192.168.74.102]  
Gateway IP Address: [192.168.74.1]
```

4. Enter **off** to disable DHCP when prompted.

```
DHCP [OFF]: off
```

Setting the date and time

The date and time settings are used for logging events, error detection, and troubleshooting. However, device operation does not depend on the date and time; a device with incorrect date or time values still functions properly.

You can synchronize the local time of the principal or primary fabric configuration server (FCS) device to that of an external Network Time Protocol (NTP) server.

Perform the following steps to set the date and time.

1. Log in to the device as admin.
2. Enter the **date**["*newdate*"] command at the command line.

The *newdate* variable specifies the new date and time enclosed in double quotation marks. The operand is optional; if omitted, the current date and time is displayed. Date and time are specified as a string in the *mmddhhmmyy* format:

- *mm*: Specifies the month. Valid values are 01 to 12.
- *dd*: Specifies the date. Valid values are 01 to 31.
- *hh*: Specifies the hour. Valid values are 00 to 23.
- *mm*: Specifies the minutes. Valid values are 00 to 59.
- *yy*: Specifies the year, valid values are 00 to 37 and 70 to 99. Year values from 70 to 99 are interpreted as 1970 to 1999; year values from 00 to 37 are interpreted as 2000 to 2037.

```
device:admin> date  
Thu Dec 22 14:05:10 UTC 2016  
device:admin> date "1222140616"  
Thu Dec 22 14:06:00 UTC 2016
```

Setting the time zone

The default time zone is Coordinated Universal Time (UTC). The time zone must be set only once because the value is stored in nonvolatile memory. Use the following procedure to set the time zone.

1. Log in as admin.
2. Use the **tsTimeZone --interactive** command and follow the prompts, or enter the **tsTimeZone [houroffset [, minuteoffset]]** command as follows:

For Pacific Standard Time, enter **tsTimeZone -8,0**.

For Central Standard Time, enter **tsTimeZone -6,0**.

For Eastern Standard Time, enter **tsTimeZone -5,0**.

Table 7. tsTimeZone command parameter selection for the US time zones	
Local time	tsTimeZone parameter (difference from UTC)
Atlantic Standard	-4,0
Atlantic Daylight	-3,0
Eastern Standard	-5,0
Eastern Daylight	-4,0
Central Standard	-6,0
Central Daylight	-5,0
Mountain Standard	-7,0
Mountain Daylight	-6,0
Pacific Standard	-8,0
Pacific Daylight	-7,0
Alaskan Standard	-9,0
Alaskan Daylight	-8,0
Hawaiian Standard	-10,0

Synchronizing local time with an external source

Perform the following steps to synchronize the local time of the principal or primary FCS device with that of an external NTP server.

1. Log in as admin.
2. Enter the **tsClockServer ipaddr** command.

The *ipaddr* variable represents the IP address of the NTP server that the device can access. This argument is optional; by default, the value is "LOCL".

```
switch:admin> tsclockserver 192.168.126.60
Updating Clock Server configuration...done.
Updated with the NTP servers
```

Customizing the chassis name and switch name

Changing the chassis and switch names is important for distinguishing and identifying the device uniquely and for accurate tracking of logs and errors. The messages that appear in the log are labeled with the switch name or chassis name, which makes tracking the errors much easier. Specify an easily understandable and meaningful name for the chassis and switch names.

Perform the following steps to change the chassis name and then the switch name.

1. Log in to the device through Telnet using the admin account.
2. Change the chassis name by using the **chassisName** command.

```
device:admin> chassisname Chassis_001
```

3. Change the switch name by using the **switchName** command.

```
device:admin> switchname Switch_001
Committing configuration...
Done
Switch name has been changed.
Please re-login to the switch for the change to applied
```

Establishing an Ethernet connection

Perform the following steps to establish an Ethernet connection to the device.

1. Remove the plug from the Ethernet port.
2. Connect an Ethernet cable to the device Ethernet port and to the workstation or to an Ethernet network containing the workstation.

Note: At this point, the device can be accessed remotely, using either command line or Web Tools. Ensure that the device is not being modified from any other connections during the remaining tasks in this chapter. The Ethernet management port also supports Auto MDI/MDIX.

Setting the domain ID

Perform the following steps to set the switch domain ID.

1. Log in to the switch through Telnet using the admin account.
2. Modify the domain ID if required.

The default domain ID is 1. If the switch is not powered on until after it is connected to the fabric and the default domain ID is already in use, the domain ID for the new switch is automatically reset to a unique value. If the switch is connected to the fabric after it has been powered on and the default domain ID is already in use, the fabric segments. To find the domain IDs that are currently in use, enter the **fabricShow** command on another switch in the fabric.

Perform the following steps to modify the domain ID.

- a) Disable the switch by entering the **switchDisable** command.
- b) Enter the **configure** command. The command prompts display sequentially; enter a new value or press **Enter** to accept each default value.
- c) Enter y after the "Fabric param" prompt.

```
Fabric param (yes, y, no, n): [no] y
```

- d) Enter a unique domain ID (such as the domain ID used by the previous switch, if still available).

```
Domain: (1..239) [1] 3
```

- e) Complete the remaining prompts or press **Ctrl+D** to accept the remaining settings without completing all the prompts.
- f) Re-enable the switch by entering the **switchEnable** command.

Verifying correct operation

Perform the following steps to verify correct operation of the device.

1. Check the LEDs to verify that all components are functional.
2. Verify the correct operation of the device by entering the following commands from the workstation.

Command	Description
psShow	Displays power supply status and information
fanShow	Displays fans status and information
switchShow	Displays switch status and information
tempShow	Displays temperature status and information
historyShow	Displays the device history
errDump	Displays any errors

The **switchShow** command provides the following information about the device and ports status.

```
device#> switchshow
switchName:      sb_70
switchType:      170.0
switchState:     Online
switchMode:      Native
switchRole:      Subordinate
switchDomain:    70
switchId:        fffc46
switchWwn:       10:00:00:05:1e:65:79:04
zoning:          ON (PERF_CFG)
switchBeacon:    OFF
Fabric Name:     abcfabric
HIF mode:        OFF
```

Index	Port	Address	Media	Speed	State	Proto
0	0	460000	id	N32	Online	FC
1	1	460100	id	N32	Online	FC
2	2	460200	id	N32	Online	FC
3	3	460300	id	N32	Online	FC
4	4	460400	id	N32	Online	FC
5	5	460500	id	N32	Online	FC
6	6	460600	id	N32	Online	FC
7	7	460700	id	N32	Online	FC
8	8	460800	--	N32	No_Module	FC
9	9	460900	--	N32	No_Module	FC
10	10	460a00	--	N32	No_Module	FC
11	11	460b00	--	N32	No_Module	FC
12	12	460c00	--	N32	No_Module	FC
13	13	460d00	--	N32	No_Module	FC
14	14	460e00	--	N32	No_Module	FC
15	15	460f00	--	N32	No_Module	FC
16	16	461000	--	N32	No_Module	FC
17	17	461100	--	N32	No_Module	FC
18	18	461200	--	N32	No_Module	FC
19	19	461300	--	N32	No_Module	FC
20	20	461400	--	N32	No_Module	FC
21	21	461500	--	N32	No_Module	FC
22	22	461600	--	N32	No_Module	FC
23	23	461700	--	N32	No_Module	FC

<Output truncated>

Backing up the configuration

IBM recommends backing up the configuration following the installation of a new switch and then on a regular basis to ensure that a complete configuration is available for downloading to a replacement switch.

1. Log in to the device as the admin user.
2. Back up the device configuration to an FTP server by entering the **configUpload** command and following the prompts.

```
sb_70:admin> configupload
Protocol (scp, ftp, local) [ftp]:
Server Name or IP Address [host]: 192.168.0.100
User Name [user]: anonymous
Path/Filename [<home dir>/config.txt]: /dumps/supportsave/pz/switch85/G20-1.txt
Section (all|chassis|switch [all]): all
configUpload complete: All selected config parameters are uploaded
```

This command uploads the device configuration to the server, making it available for downloading to a replacement device if necessary.

Powering down the device

Complete the following steps to power down the device.

1. Shut down the Fabric OS software using the **sysShutdown** command.
2. Unplug the power cable from the power source before servicing the device.

Removing the battery



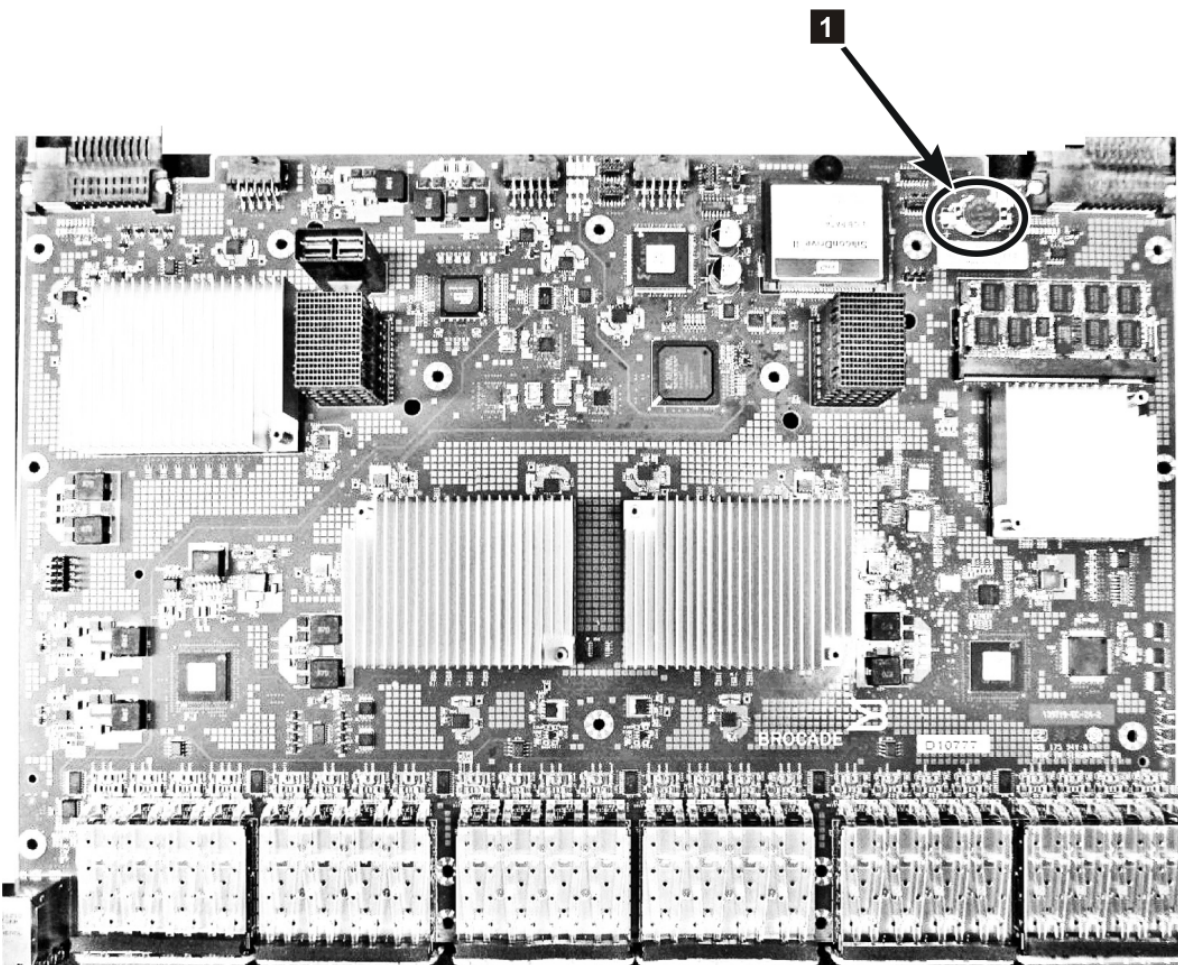
CAUTION: The battery contains lithium. To avoid possible explosion, do not burn or charge the battery. Do not:

- Throw or immerse into water
- Heat to more than 100°C (212°F)
- Repair or disassemble

Exchange only with the IBM-approved part. Recycle or discard the battery as instructed by local regulations. In the United States, IBM has a process for the collection of this battery. For information, call 1-800-426-4333. Have the IBM part number for the battery unit available when you call. (C003)

Local regulations may require removing the battery prior to disposing of or recycling this product. Complete these steps to remove the battery.

1. Disconnect all power and communication cables.
2. Remove all transceivers.
3. Remove the power supplies and fans.
4. Unscrew the fasteners and remove the sheetmetal cover from the chassis.
5. On the main circuit board, go to location **1** shown in [Figure 36 on page 53](#) and remove the BR1225 battery from the holder.



b965006

Figure 36. Location of battery holder

6. Recycle the battery as appropriate, following local regulations.

Refer to the *Environmental Notices and User Guide* shipped with the product for more information on battery recycling and disposal.

Chapter 5. Installing Transceivers and Cables

Time and items required

The installation or replacement procedure for one transceiver takes less than five minutes. Ensure that the following items are available:

- Required number of compatible power cables
- Required number of supported transceivers

Refer to the *Fabric OS Release Notes* for the list of supported transceivers and cables.

- Required number of compatible fiber-optic cables
- Optical transceiver extraction tool (for 10-Gbps transceiver only)

Note: Most IBM switches, backbones, and directors come with a transceiver extraction tool and holster. The extraction tool is designed to remove transceivers from modules where the space is limited.

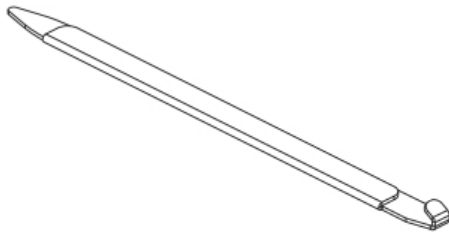


Figure 37. Optical transceiver extraction tool

Precautions specific to transceivers and cables



DANGER: All fiber-optic interfaces use Class 1 lasers.



DANGER: Use only optical transceivers that are qualified by IBM and comply with the FDA Class 1 radiation performance requirements defined in 21 CFR Subchapter I, and with IEC 60825 and EN60825. Optical products that do not comply with these standards might emit light that is hazardous to the eyes.



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

Cleaning the fiber-optic connectors

To avoid problems with the connection between the fiber-optic transceiver (SFP+ or QSFP) and the fiber cable connectors, it is strongly recommended that you clean both connectors each time you disconnect and reconnect them. Dust can accumulate on the connectors and cause problems such as reducing the optic launch power.

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

Managing cables

The minimum bend radius for a 50 micron cable is 2 inches under full tensile load and 1.2 inches with no tensile load. Cables can be organized and managed in a variety of ways, for example, using cable channels on the sides of the rack or patch panels to minimize cable management. Follow these recommendations:

Note: You should not use tie wraps with optical cables because they are easily overtightened and can damage the optic fibers.



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

- Plan for 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.
- If you are using ISL Trunking, consider grouping cables by trunking groups. The cables used in trunking groups must meet specific requirements, as described in the *Fabric OS Administrator's Guide*.
- For easier maintenance, label the fiber-optic cables and record the devices to which they are connected.
- Keep LEDs visible by routing port cables and other cables away from the LEDs.
- Use hook and loop style straps to secure and organize fiber-optic cables.

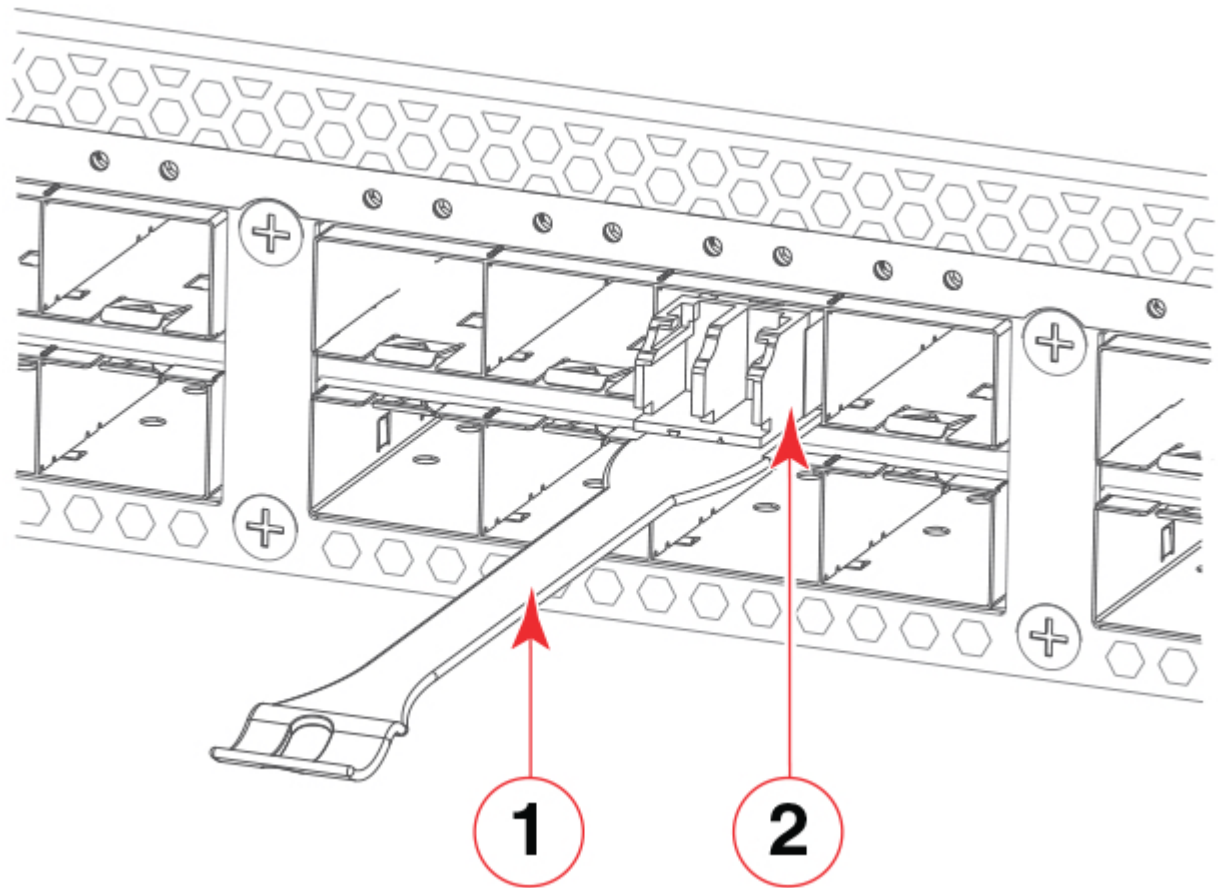
Installing an SFP+ transceiver

The device supports only IBM-qualified transceivers. If you use an unqualified transceiver, the **switchshow** command output shows the port in a Mod_Inv state. Fabric OS also logs the issue in the system error log. To insert an SFP+ transceiver, complete the following steps:

Note: The 16- and 32-Gbps SFP+ transceivers do not have bails. Always use the pull tab to insert or remove the transceivers, as the SFP might be hot.

1. Use the pull tab on the 16- and 32-Gbps SFP+ transceivers to help push the transceiver into the port. Transceivers are keyed so that they can only be inserted with the correct orientation. If a transceiver does not slide in easily, ensure that it is correctly oriented. Push the correctly oriented transceiver into the port until it is firmly seated and the latching mechanism clicks.

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



1. Pull tab
2. Transceiver

Figure 38. Installing a 32-Gbps SFP+ transceiver into an upper port

2. Position a cable so that the key (the ridge on one side of the cable connector) is aligned with the slot in the transceiver. Insert the cable into the transceiver until the latching mechanism clicks.

Note: Cables are keyed so that they can be inserted in only one way. If a cable does not slide in easily, ensure that it is correctly oriented. Do not insert any unsupported cable intended for an other type of transceiver into a regular SFP+ transceiver. You may damage the cable as well as the transceiver.

Replacing an SFP+ transceiver

Complete the following steps to remove and then install a new SFP+ transceiver.

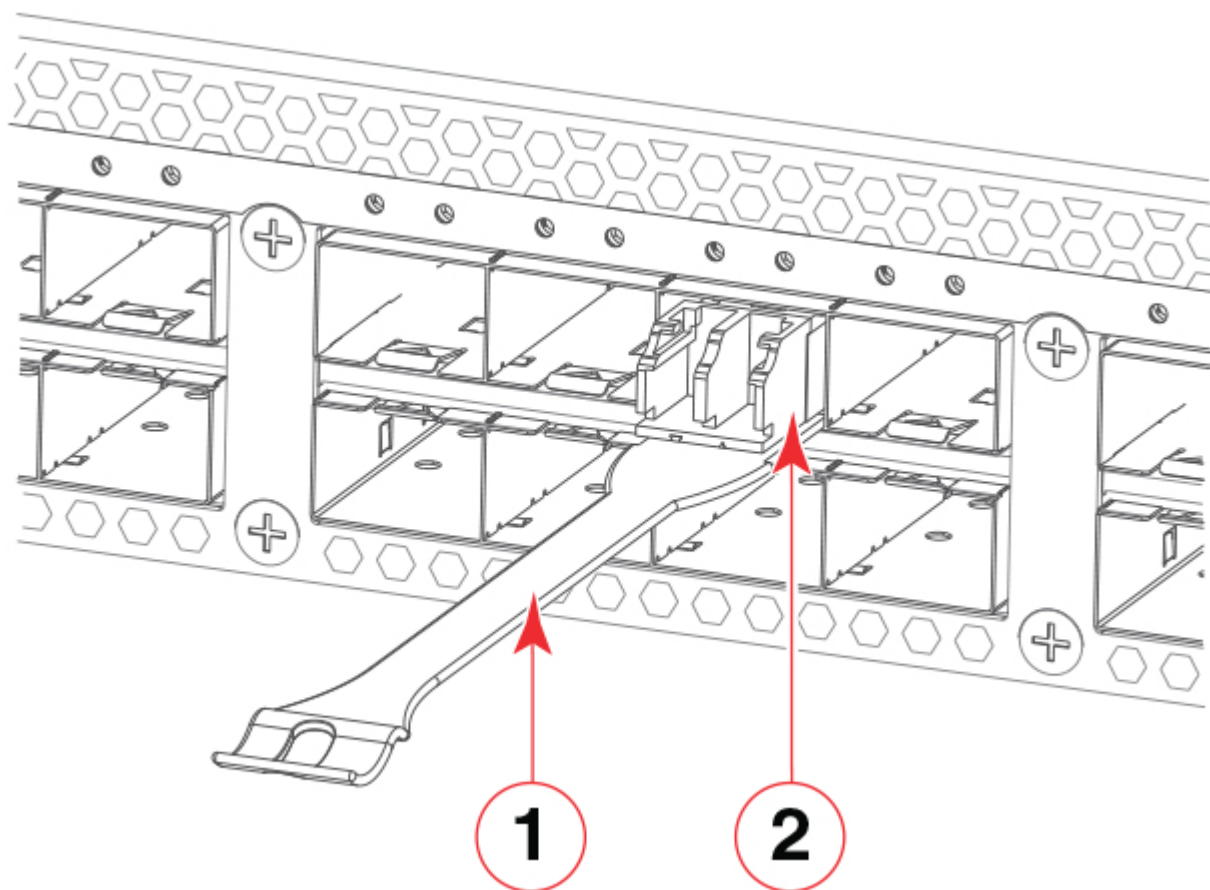
Note: 16- and 32-Gbps SFP+ transceivers have pull tabs instead of bails. Always use the pull tab to insert or remove the SFP+ transceivers, as the SFP might be hot.

1. Remove any cables that are inserted into the transceiver.
2. Grasp the SFP+ transceiver pull tab and pull the tab straight out.

Note: Grasp the tab near the body of the transceiver to reduce the chances of bending the pull tab. As the SFP may be hot, avoid touching it.

3. To insert the replacement transceiver, use the pull tab on the SFP+ transceiver to carefully push the transceiver into the port. Transceivers are keyed so that they can only be inserted with the correct orientation. If a transceiver does not slide in easily, ensure that it is correctly oriented.

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



1. Pull tab
2. Transceiver

Figure 39. Replacing a 32-Gbps SFP+ transceiver in a upper port

4. Position a cable so that the key (the ridge on one side of the cable connector) is aligned with the slot in the transceiver. Insert the cable into the transceiver until the latching mechanism clicks.

Cables are keyed so that they can be inserted in only one way. If a cable does not slide in easily, ensure that it is correctly oriented.

Verifying the operation of new transceivers

You can use the following commands to verify if the transceivers are working correctly:

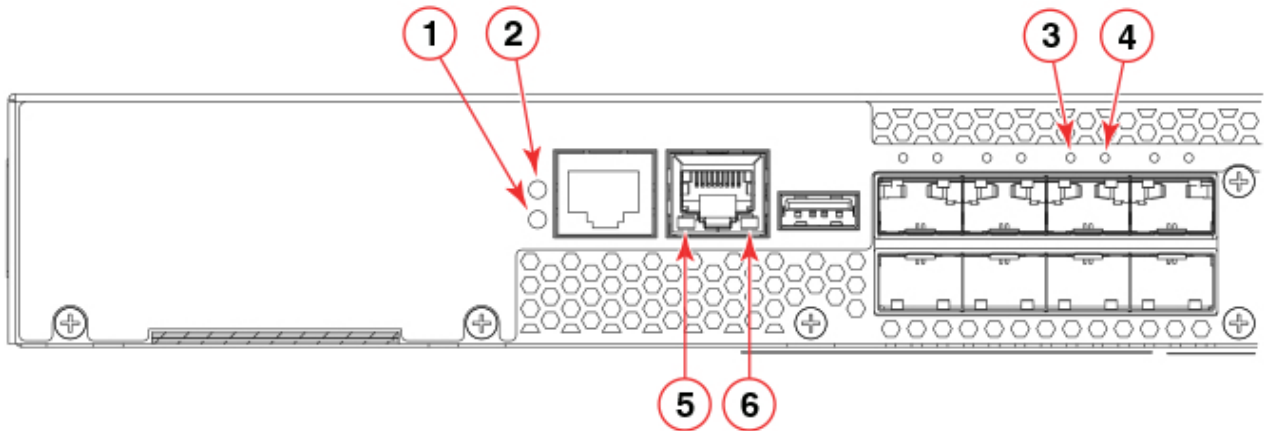
- **sfpShow**
- **switchShow**
- **errDump**
- **fabricShow**

Refer to the *Fabric OS Command Reference* for output examples and descriptions.

Chapter 6. Monitoring the Device

Interpreting port-side LEDs

System activity and status can be determined through the activity of the LEDs on the switch. There are three possible LED states: no light, a steady light, and a flashing light. Flashing lights may be slow, fast, or flickering. The lights are green or amber. Sometimes, the LEDs may 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.



1. System status LED
2. System power LED
3. SFP+ (upper) port 2 status LED
4. SFP+ (lower) port 6 status LED
5. Eth port Link/Speed LED
6. Eth port Activity LED

Figure 40. SAN24B-6 port-side LEDs

Note: There are four built-in fans in SAN24B-6. The device continues to run even if two fans fail. However, if the third fan fails, the device will shut down.

Interpreting the POST results

Each time the switch is powered on, rebooted, or reset, the switch performs a power-on self-test (POST). Total boot time with the POST can be several minutes. The POST can be omitted after subsequent reboots by using the **fastboot** command or entering the **diagDisablePost** command to persistently disable the POST. The success or failure results of the diagnostic tests that run during POST can be monitored through LED activity, the error log, or the command line interface. During the POST, the LEDs flash different colors.

The POST includes the following tasks:

- Conducts preliminary POST diagnostics.
- Initializes the operating system.
- Initializes hardware.
- Runs diagnostic tests on several functions, including circuitry, port functionality, memory, statistics counters, and serialization.

Perform the following steps to determine whether POST completed successfully and whether any errors were detected.

1. Verify that the LEDs on the device indicate that all components are healthy. If one or more LEDs do not display a healthy state:
 - a) Verify that the LEDs are not set to "beacon" (this can be determined through the **switchShow** command or Web Tools).
 - b) Follow the recommended action for the observed LED behavior.
2. Verify the **diagShow** command displays that the diagnostic status for all ports in the device is OK.
3. Review the system log for errors. Errors detected during POST are written to the system log, which can be viewed by using the **errShow** command.

Interpreting the BOOT results

BOOT includes the following tasks after POST is complete.

1. Performs universal port configuration.
2. Initializes links.
3. Analyzes the fabric. If any ports are connected to other switches, the switch participates in a fabric configuration.
4. Obtains a domain ID and assigns port addresses.
5. Constructs unicast routing tables.
6. Enables normal port operation.

Running diagnostic tests

In addition to the POST, Fabric OS includes diagnostic tests to help you troubleshoot the hardware and firmware. This includes tests of internal connections and circuitry, fixed media, and the transceivers and cables in use.

The tests are implemented by command, either through a Telnet session or through a terminal set up for a serial connection to the device. Some tests require the ports to be connected by external cables to allow diagnostics to verify the serializer/deserializer interface, transceiver, and cable. Some tests require loopback plugs.

Diagnostic tests are run at supported link speeds depending on the speed of the link being tested and the type of port.

Note: Diagnostic tests may temporarily lock the transmit and receive speed of the links during diagnostic testing.

IBM recommends that you power-cycle the device after completing offline diagnostics tests.

Chapter 7. Chassis replacement

The SAN24B-6 chassis is highly reliable and unlikely to fail. However, the chassis is available as a FRU and can be replaced using the following basic tasks. Since chassis replacement is a collaborative process between customers and SSRs please review the information provided in [“Customer replacement responsibilities”](#) on page 60 and [“IBM service replacement responsibilities”](#) on page 68 to gain an understanding of your specific responsibilities for this procedure.

1. [“Determining the need to replace the chassis”](#) on page 60
2. [“Chassis replacement overview”](#) on page 60
3. [“Preparing for replacement”](#) on page 61
4. [“Recording critical device and SAN information”](#) on page 61
5. [“Powering down the switch”](#) on page 65
6. [“Disconnecting the cables”](#) on page 68
7. [“Remove the old switch chassis and install the new switch chassis”](#) on page 68
8. [“Reconnecting system to the network and fabric”](#) on page 65
9. [“Downloading the configuration”](#) on page 65
10. [“Verifying correct operation of system”](#) on page 66
11. [“Verifying correct configuration of the fabric”](#) on page 67

Customer replacement responsibilities

Chassis replacement is a combined effort between the customer and the IBM System Services Representative (SSR). Before the IBM SSR can perform the physical replacement and labeling procedures, you must prepare your environment for chassis replacement by performing the following tasks:

- [“Determining the need to replace the chassis”](#) on page 60
- [“Preparing for replacement”](#) on page 61
- [“Recording critical device and SAN information”](#) on page 61
- [“Powering down the switch”](#) on page 65
- [“Disconnecting the cables”](#) on page 68
- [“Reconnecting system to the network and fabric”](#) on page 65
- [“Downloading the configuration”](#) on page 65
- [“Verifying correct operation of system”](#) on page 66
- [“Verifying correct configuration of the fabric”](#) on page 67

Determining the need to replace the chassis

Before replacing the chassis, verify that the replacement is necessary. Ensure that the components are firmly seated when troubleshooting. Contact IBM if you have any questions about whether the chassis should be replaced. Any of the following events might indicate that the chassis requires replacement:

- One or more components do not function properly.
- The **psShow** or **fanShow** commands continue to show a faulty component even though the component has been replaced.

Chassis replacement overview

Use the following information to help prepare for a chassis replacement. Do not remove components without following procedures in this section exactly as you will need to save critical device and SAN

information for these components before disconnecting the chassis from the network, fabric, and power to begin removal procedures. After you reinstall components in the new chassis, follow exact procedures to reconnect to the network, fabric and power, and then download firmware if necessary and verify system operation and configuration.

Before beginning these procedures, perform the following tasks:

- Place the replacement chassis in close proximity to the old chassis.
- Provide a surface on which to place the old chassis, such as a second lift or the pallet originally provided with the chassis.
- Obtain all tools and other materials listed below.



Attention: Refer to “Safety notices and labels” on page xi and “ESD precautions” on page xiv before performing any removal or installation procedures.

Time and items required

The chassis replacement procedure takes approximately 1 hour to complete, depending on number of SFPs and cables installed.

The following items are required for the chassis replacement procedure:

- Replacement chassis
- ESD grounding strap
- Phillips #2 screwdriver
- 1/4 in. straight slot screwdriver

Preparing for replacement

Before beginning replacement procedures you must run a series of Fabric OS commands and record device information for safekeeping that may be required for installing and configuring the new chassis. This includes information on licenses, IP address, WWN, serial numbers, switch ID, location of configuration files, and fabric details. It also includes information that might be required by Technical Support. “[Recording critical device and SAN information](#)” on page 61 instructs you to run the following commands and record specific output:

- supportShow
- configUpload
- configupload -vf
- ipAddrShow
- chassisShow
- nsShow
- nsAllShow
- switchShow
- fabricShow
- licenseShow

Before beginning replacement, you must also properly shut down the device and disconnect from the fabric and power using procedures under “[Powering down the switch](#)” on page 65.

Recording critical device and SAN information

Perform the following steps. All commands must be entered from a CLI session (telnet or serial) to the active CP blade unless otherwise indicated.

1. Run **supportShow**, which includes most of the information in the following table and more. Be sure to record the location of the .txt files that you create in this procedure that are not called out in the **supportShow** results.

For detailed information about Fabric OS commands, refer to the *Fabric OS Command Reference*. Use a checklist to ensure that all required information is recorded.

Table 8. Critical information checklist		
Checked?	Data	Notes
Configuration information		
	Location of "config-switch.txt" file	
	Location of "config-miscinfo.txt" file	
	IP address, subnet mask	
	WWN for the device	
SAN profile		
	Location of "SANbefor.txt" file	
	Notes regarding nsshow output	
	Notes regarding nsallshow output	
	Notes regarding switchshow output	
	Notes regarding fabricshow output	
Output from chassisshow command		
Important: The information displayed for Part Num and Serial Num are critical when replacing a chassis. This information allows the replacement chassis to assume the identity of the old chassis.		
Output from licenseshow command		
	License keys and other licensing data for licensed products enabled on device.	
Output from supportshow command		
	Location of "spptshow.txt" file	
	Notes regarding supportshow output	

Table 8. Critical information checklist (continued)		
Checked?	Data	Notes
Information about the new chassis		
	New factory serial number	
	New serial number (if available)	

- Open a telnet session and log into the device as **admin**. The default password is *password*. Enable the logging function on your telnet or serial console connection.
- Back up the current configuration by entering **configUpload**. Enter the requested information at the prompts.

Note: If you are using the Virtual Fabric feature, run **configupload -vf** before running the **configupload** command to save the logical switch configuration.

This **configUpload** command uploads the device configuration to the customer-defined FTP server, making it available for downloading. Alternatively, you can save the configuration file to a USB device. For more information about this command, refer to the *Fabric OS Command Reference*.

```
switch:admin> configupload
Protocol (scp, ftp, sftp, local) [ftp]: ftp
Server Name or IP Address [host]: 123.123.123.123
User Name [user]: Admin24
Path/Filename [<home dir>/config.txt]: config-switch0.txt
Section (all|chassis|switch [all]): all
Password:
Upload complete
switch: admin>
```

- Record the WWN value: Enter **wwn**, and then copy the command output into a file named config-miscinfo.txt.

```
switch:admin> wwn
10:00:00:60:69:00:00:0a
```

- Enter **ipAddrShow**, and then copy the command output into the config-miscinfo.txt file.

```
switch:admin> ipaddrshow

SWITCH
Ethernet IP Address: 14.25.60.14
Ethernet Subnetmask: 255.55.0.0
Gateway IP Address: 14.25.43.1
DHCP: Off
```

- Display and record the manufacturer serial numbers.

Enter **chassisShow**, and then copy the command output into the config-miscinfo.txt file.

"Factory Serial Num" and "Serial Num" are listed under "Chassis/WWN Unit 1" and "Chassis/WWN Unit 2". If the current WWN cards are the original cards, the factory serial number listed is the same as the chassis serial number.

```
CHASSIS/WWN Unit: 1
Header Version:      2
Power Usage:         -288W
Factory Part Num:    40-1000864-11
Factory Serial Num:  CWA2551K00V
Manufacture:         Day: 1 Month: 11 Year: 2014
Update:              Day: 29 Month: 6 Year: 2017
Time Alive:          774 days
Time Awake:          17 days
ID:                  IBM0000CA
```

```
Part Num:          0024980000R42
Serial Num:        10450TC
```

7. Create a SAN "profile" by entering and recording the information provided by the following commands:

- **nsShow**
- **nsAllShow**
- **switchShow**
- **fabricShow**

Copy the command output into a text file named "SANbefor.txt." After the device is restored to the fabric, this information can be used to verify that no unintentional changes have occurred to the fabric.

```
switch:admin> nsshow
Enter Pid COS PortName NodeName TTL
<output truncated>
switch:admin> nsallshow
12 Nx_Ports in the Fabric
<output truncated>
switch:admin> switchshow
switchName: switch
<output truncated>
switch:admin> fabricshow
Switch ID Worldwide Name Enet IP Addr FC IP Addr Name
<output truncated>
switch:admin>
```

8. Enter **licenseShow**, and then copy the command output into a text file named "licenseshow.txt."

```
switch:admin> licenseshow
S9bddb9SQbTAceeC:
Fabric license
eezeRRySff0fSe:
Remote Switch license
bzbzRcbcSc0c0SY:
Remote Fabric license
dSeR9RcSeeTfSAq:
Extended Fabric license
RyeSzRScycTzft09:
Entry Fabric license
RyeSzRScycazft0G:
Trunking license
RyeSzRScycS0ft09:
4 Domain Fabric license
```

9. Enter **supportShow**; then copy the command output into a text file named "spptshow.txt."

Note: The **supportShow** command has a very long output and time for completion. It may last 20 minutes or longer depending on the size of the SAN.

This file provides a backup of all the information that might be required by Technical Support. The information can be used after the device is restored to the fabric to verify that no unintentional changes have occurred to the fabric.

```
switch:admin> supportshow
version: 8.0.1
<output truncated>
switch:admin>
```

10. Record the cable connections between the chassis and the target device and ports.
11. Run **supportSave** on the active CP blade. The information recorded can be very important in case you have difficulties during the replacement process.

Powering down the switch

If the switch is functioning at all, it must be disconnected from the network and fabric. To disconnect the switch from the network and fabric shut down the system by entering the **sysShutdown** command.

Reconnecting system to the network and fabric

Complete the following steps to reconnect the device to the network and fabric.

1. Connect the switch to the local area network.

- a) Insert the appropriate Ethernet cables into the Ethernet port.
- b) Connect the other ends to an appropriate Ethernet LAN, if not already connected.

Note: The device can be accessed by remote connection using any of the available management tools, such as Telnet or Web Tools. Ensure that the device is not modified using other connections during the rest of this procedure.

2. Reconnect the transceivers and cables to the port.

Note: The ports and cables used in trunking groups must meet specific requirements. For a list of these requirements, refer to the *Fabric OS Administrator's Guide*.

- a) Position one of the transceivers so that the key is oriented correctly to the port and insert the transceiver into the port until it is firmly seated and the latching mechanism clicks.
- b) Select the cable that corresponds to the port and position it so that the key (the ridge on one side of the cable connector) is aligned with the slot in the transceiver. Insert the cable into the transceiver until the latching mechanism clicks.
- c) Repeat step a and step b for the remaining ports.
- d) Organize the cables as required.

Note: Do not route cables in front of the air exhaust vents.

Allow the customer to “[Downloading the configuration](#)” on page 65 and “[Verifying correct operation of system](#)” on page 66 and then proceed with “[Reconnecting system to the network and fabric](#)” on page 65.

Downloading the configuration

Once the chassis and its various components have been reassembled and powered back on, use the **configDownload** command to restore the original configuration. The **configDownload** command can be entered through a Telnet or serial session, but the device must have an Ethernet connection to the server name or IP address of the host for the download process to complete. For more information, refer to the **help configdownload** command or the *Fabric OS Command Reference*.

Complete the following steps to download the configuration.

1. Log in to the device as admin.

```
switch:admin> login
login: admin
password: xxxxxxxx
switch:admin>
```

Note: If you are using the Virtual Fabric feature, you must run **configdownload -vf** before running the **configdownload** command to restore the logical switch configuration.

2. Enter the **chassisDisable** command.
3. Enter the **configDownload** command.

```
switch:admin> configdownload
Protocol (scp, ftp, sftp, local) [ftp]: ftp
Server Name or IP Address [host]: 123.123.123.123
User Name [user]: Admin24
```

```
Path/Filename [<home dir>/config.txt]: config-switch.txt
Section (all|chassis|switch [all]): all
```



CAUTION: This command is used to download a back-up configuration for a specific switch. If you use a file from a different switch, its configuration settings will override current switch settings. Downloading a configuration file that was uploaded from a different type of switch, can cause this switch to fail.

Reboot the system for the configuration to take effect.

```
configDownload operation may take several minutes to complete for large files.
Do you want to continue [y/n]: y
Password:
```

4. Reboot the device.
5. Enter the **chassisEnable** command to enable all user ports and enable a virtual fabric-aware chassis.

Verifying correct operation of system

Complete the following steps to verify the correct operation of the device.

1. Log in to the device as admin.

```
switch:admin> login
login: admin
password: xxxxxxxx
switch:admin>
```

2. Enter the **chassisShow** command to verify that airflow direction set on WWN cards matches airflow direction for fans in fan and power supply assemblies installed in device.

Airflow direction of fans and power supplies displays as "Fan Direction" under each fan or power supply unit. System airflow direction displays as "System AirFlow" under the WWN card unit. The following example shows mismatch of system airflow and airflow direction in installed fan and power supply.

```
POWER SUPPLY Unit: 1
Power Source:      AC
Fan Direction:     Non-portside Intake
...
FAN Unit: 2
Fan Direction:     Non-portside Intake
...
WWN Unit: 1
System AirFlow:    Non-portside Exhaust
...
WWN Unit: 2
System AirFlow:    Non-portside Exhaust
```

The WWN units should indicate "Non-portside Intake." If there is a mismatch of airflow direction, RAS log messages will indicate a mismatch between system airflow direction and airflow direction of fan in power supply or fan assembly refer to the Hardware Installation Guide for your product for more details.

3. Verify that the device is functioning correctly by entering **switchShow** or **switchStatusShow**.

This **switchShow** command displays the device and port status information.

```
switch0:admin> switchshow
switchName:      sw0
switchType:      165.0
switchState:     Online
switchMode:      Native
switchRole:      Principal
switchDomain:     130
switchId:        fffc82
switchWwn:       10:00:00:05:31:03:2c:00
zoning:          ON (ZONE_CONFIG_NAME)
```

```

switchBeacon: OFF
FC Router: OFF
HIF Mode: OFF
Allow XISL Use: OFF
LS Attributes: [FID: 128, Base Switch: No, Default Switch: Yes,
Address Mode 0]
Index Slot Port Address Media Speed State Proto
=====
64 4 0 014000 -- N32 Online FC F-Port 10:00:00:05:1e:f8:a0:b4
65 4 1 014100 -- N32 Online FC F-Port 10:00:00:05:33:26:0e:65
66 4 2 014200 -- N32 Online FC F-Port 10:00:00:05:33:48:5e:f5
67 4 3 014300 -- N32 Online FC F-Port 10:00:00:05:1e:f8:a0:b3
68 4 4 014400 -- N32 Online FC F-Port 10:00:00:05:1e:f8:a0:b6
(output truncated)

```

4. Verify that all the IP address information is correct by entering **ipAddrShow** and checking the results against the IP information recorded in the config-miscinfo.txt file.

```

switch:admin> ipaddrshow

SWITCH
Ethernet IP Address: 14.25.60.14
Ethernet Subnetmask: 255.55.0.0
Gateway IP Address: 14.25.43.1
DHCP: Off

```

Verifying correct configuration of the fabric

Copying the command outputs from this section into a file is recommended. You must be logged in with Admin privileges.

1. Create an "after" SAN profile by entering the following commands and copying the output to a text file named SANafter.txt:

- **nsShow**
- **nsAllShow**
- **switchShow**
- **fabricShow**
- **lscfg --show** (if using the Virtual Fabric feature)

```

switch:admin> nsshow
Type Pid COS PortName NodeName TTL(sec)
N 020f00; 3;10:00:00:01:73:00:29:46;10:00:00:01:73:00:29:46; na
Fabric Port Name: 20:0f:00:60:69:90:03:f0
<output truncated>
switch:admin> nsallshow
{
020f00 021fda 021fdc 021fe0 021fe1
5 Nx_Ports in the Fabric}
switch:admin> switchshow
switchName: rs18-st03-01
<output truncated>
switch:admin> fabricshow
Switch ID Worldwide Name Enet IP Addr FC IP Addr Name
<output truncated>
switch:admin> lscfg --show
Created switches: 128(ds) 1 2(bs)
Port 0 1 2 3 4 5 6 7 8 9
-----
FID 1 | 1 | 1 | 1 | 1 | 128 | 128 | 128 | 128 | 128 |
<output truncated>
switch:admin>

```

2. Determine any differences between the information in the SANafter.txt file and the information in the SANbefor.txt file created earlier. In particular, look for differences in the following:
 - Device types
 - Number of devices

- ISL and port states
 - Number of switches in the fabric
3. Resolve any issues or unintentional changes to the device or fabric:
 - If there are any mechanical problems, try reseating the associated component.
 - If the configuration information is not correct for the device, modify as required.
 - If other issues exist, contact your support provider.

IBM service replacement responsibilities

IBM System Services Representatives (SSR) are responsible for the physical replacement and labeling of the chassis. The SSR performs the following tasks during the replacement:

1. [“Disconnecting the cables” on page 68](#)
2. [“Remove the old switch chassis and install the new switch chassis” on page 68](#)

Disconnecting the cables

1. Power off the chassis by disconnecting both power cords from the power supplies and the power sources. Set the cords aside for use with the new installation.
2. After ensuring that the cables are properly labeled, and the port connection information is recorded (see [Appendix B, “Cable routing table,” on page 76](#)), disconnect the cables and transceivers from the ports. Use the pull tab on the 16 Gbps SFP+ transceivers to remove the fiber cable and the attached SFP+ at the same time (see [“Installing an SFP+ transceiver” on page 55](#)).
3. Group the cables together and position them safely away from the switch to avoid damage during the chassis replacement process.

Remove the old switch chassis and install the new switch chassis

Follow these steps to remove the switch chassis from the cabinet. The rack mount hardware from the old chassis will be used for installing the new chassis in the cabinet. Depending on how the switch chassis was installed, you will need to complete the appropriate instructions in reverse to remove the chassis from the cabinet and the rack mounting kit hardware from the old chassis. Then complete the appropriate instructions from the beginning to attach the rack mounting kit hardware to the new chassis and install it into the cabinet. Refer to [Chapter 3, “Mounting the Device,” on page 12](#) for more information.

Complete these steps after the new chassis is installed in the cabinet.

1. Reconnect all transceivers and fiber cables, using the information recorded in [Table 9 on page 76](#) to ensure that connections are made to the correct ports.
2. Connect the two power cables to the power sources. The switch will begin to power up and start the POST as soon as the first power cable is connected.
3. Once POST has completed, the switch is ready to restore the saved configurations. Refer to the *Fabric OS Command Reference* for more information on the CLI commands.

Work with the customer to perform the steps for [“Reconnecting system to the network and fabric” on page 65](#).

Appendix A. Product specifications

This document highlights the features and specifications for the SAN24B-6 switch.

System specifications

System component	Description
Enclosure	1U, nonport-side intake airflow, port-side power inlet
Power inlet	C13; power from port side
Power supplies	Single, fixed power supply
Fans	Four built-in fans
Cooling	Nonport-side to the port side
System architecture	Nonblocking shared memory switch
System processors	Freescall T1022E CPU
Port-to-port latency	<900 nanoseconds with no contention (destination port is free) including FEC using cut-through frame switching.

Fibre Channel

System component	Description
Fibre Channel ports	<p>24 SFP+ ports (8-port increments through capacity-based Ports on Demand (PoD) licenses) that support any combination of Short Wavelength (SWL) and Long Wavelength (LWL) or Extended Long Wavelength (ELWL) optical media.</p> <p>The SFP+ ports are capable of auto-negotiating to 4, 8, 16, or 32 Gbps speed depending on the SFP+ model and the minimum supported speed of the optical transceiver at the other end of the link.</p> <ul style="list-style-type: none">• 4-, 8-, and 16-Gbps performance is enabled by 16-Gbps SFP+ transceivers provided the other end of the connection has a minimum of 4 Gbps speed set on the port.• 8-, 16-, and 32-Gbps performance is enabled by 32-Gbps SFP+ transceivers provided the other end of the connection has a minimum of 8 Gbps speed set on the port. <p>Note: 2-, 4-, and 8-Gbps transceivers are not supported.</p>
ANSI Fibre Channel protocol	Fibre Channel Physical and Signaling Interface standard (FC-PH)
Modes of operation	Fibre Channel Class 2 and Class 3
Fabric initialization	Complies with FC-SW-3 Rev. 6.6

System component	Description
FCIP (IP over Fibre Channel)	Complies with FC-IP 2.3 of FCA profile
Port Status	Bicolor LED (amber/green)

Other

System component	Description
Serial console port	One three-wire (Tx, Rx, Gnd) UART serial port
Ethernet management port	One 1000/100/10 Base-T port
USB port	One external USB port

LEDs

System component	Description
System power LED	One green system power status LED (upper) on the left side.
System status LED	One bicolor (green/amber) system status LED (lower) on the left side.
Ethernet port link LED	One link LED on the left of the RJ45 connector. This glows green for 1000 Mbps and amber for 100/10 Mbps.
Ethernet port activity LED	One green activity LED on the right of the RJ45 connector.
FC port status LED	24 bicolor (green/amber) port status LEDs. There is one LED for each SFP+ port on the switch.

Note: All the LEDs are on the port-side view of the device.

Weight and physical dimensions

Empty weight refers to the device with built-in power supply and fan assemblies but no SFP+ or QSFP transceivers.

Height	Width	Depth	Weight (empty)	Weight (fully loaded)
4.29 cm 1.69 inches	42.88 cm 16.88 inches	30.64 cm 12.06 inches	4.2 kg 9.30 lb	5.75 kg 12.65 lb

Environmental requirements

Condition	Operational	Non-operational
Ambient temperature	0°C to 40°C (32°F to 104°F)	-25°C to 70°C (-13°F to 158°F)

Condition	Operational	Non-operational
Relative humidity (non-condensing)	10% to 85% at 40°C (104°F)	10% to 90% (Non-condensing)
Altitude (above sea level)	0 to 3000 m (9,842 feet)	0 to 12000 m (39,370 feet)
Shock	20.0 G, 6 ms, half-sine wave	33.0 G, 11 ms, half-sine wave, 3G 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: 54.5 cmh (32.1 cfm) Nominal: 36.35 cmh (21.4 cfm)	N/A
Heat dissipation	Refer to the Power consumption sections.	N/A
Operating noise	Maximum: 64 dBA Normal: 57 dBA	N/A

Power supply specifications

Maximum output power rating (DC)	Input voltage	Input line frequency	Maximum input current	Maximum inrush current
150 W	100 – 240 VAC (nominal) 90 – 264 VAC (range)	50/60 Hz (nominal) 47 – 63 Hz (range)	2.2 A	50 A

Power consumption (typical configuration)

@100 VAC input	@200 VAC input	@48 VDC input	Notes
0.62 A 63.15 W 215.54 BTU/hr	0.33 A 61.40 W 209.56 BTU/hr	N/A	Fully configured all ports with 25% traffic rate, max port speed at 32G, fans at nominal speed, and input power +/- 5% tolerance.

Power consumption (maximum configuration)

@100 VAC input	@200 VAC input	@48 VDC input	Notes
0.75 A 76.52 W 261.17 BTU/hr	0.39 A 74.40 W 253.93 BTU/hr	N/A	Fully configured all ports with 100% traffic rate, max port speed at 32G, fans at high speed, and input power +/- 5% tolerance.

Power consumption (idle configuration)

@100 VAC input	@200 VAC input	@48 VDC input	Notes
0.55 A 55.83 W 190.55 BTU/hr	0.30 A 54.30 W 185.33 BTU/hr	N/A	All optics loaded but not initialized and the system completed boot up, fans at nominal speed, and input power +/- 5% tolerance.

Data port specifications (Fibre Channel)

Port Numbers	Media Type	Description
0 to 23	16- or 32-Gbps SFP+ optical ports	Switch mode (default): 8-, 16-, and 24-port configurations (8-port increments through Ports on Demand [PoD] licenses); can be an F_Port, N_Port, or E_Port. Access Gateway default port mapping: 16 F_Ports, 8 N_Ports.

Fibre Channel data transmission ranges

Port speed (Gbps)	Cable size (microns)	Short wavelength (SWL)	Long wavelength (LWL)	Extended long wavelength (ELWL)
4	50	150 m (492 ft) (OM2) 380 m (1,264 ft) (OM3) 400 m (1,312 ft) (OM4)	N/A	N/A
	62.5	70 m (229 ft)	N/A	N/A
	9	N/A	30 km (18.6 miles)	N/A
8	50	50 m (164 ft) (OM2) 150 m (492 ft) (OM3) 190 m (623 ft) (OM4)	N/A	N/A
	62.5	21 m (68 ft)	N/A	N/A
	9	N/A	10 km (6.2 miles) 25 km (15.5 miles)	N/A
16	50	35 m (115 ft) (OM2) 100 m (328 ft) (OM3) 125 m (410 ft) (OM4)	N/A	N/A
	62.5	15 m (49 ft)	N/A	N/A
	9	N/A	10 km (6.2 miles) 25 km (15.5 miles)	N/A

Port speed (Gbps)	Cable size (microns)	Short wavelength (SWL)	Long wavelength (LWL)	Extended long wavelength (ELWL)
32	50	70 m (230 ft) (OM3) 100 m (328 ft) (OM4)	N/A	N/A
	62.5	N/A	N/A	N/A
	9	N/A	10 km (6.2 miles)	N/A

Serial port specifications (pinout RJ-45)

Pin	Signal	Description
1	Not supported	N/A
2	Not supported	N/A
3	UART1_TXD	Transmit data
4	GND	Logic ground
5	GND	Logic ground
6	UART1_RXD	Receive data
7	Not supported	N/A
8	Not supported	N/A

Note: These specifications are for connectors on IBM platforms only.

Serial port specifications (protocol)

Parameter	Value
Baud	9600
Data bits	8
Parity	None
Flow control	None (must be disabled at the host)
Stop bits	1

Memory specifications

Memory	Type	Size
Main Memory	DDR3L SDRAM with 8-bit ECC, SODIMM package, operating at 1200 MT/s	2 GB, 64-bit
Boot Flash	Parallel NOR flash embedded memory	8 MB

Memory	Type	Size
eUSB Module	-	2 GB

Regulatory compliance (EMC)

- FCC Part 15, Subpart B
- EN 55024
- EN 55032
- ICES-003
- VCCI
- EN 300 386
- CNS 13438
- KN 32
- KN 35
- TCVN 7189 / TCVN 7317
- EN 61000-3-2
- EN 61000-3-3
- 51318.24-99
- GB 9254
- CISPR 22
- 2014/30/EU

Regulatory compliance (safety)

- EN/UL 60825
- EN/UL/CSA/IEC 60950-1
- GB 4943.1
- CNS 14336-1
- 2014/35/EU
- 51318.22-99

Regulatory compliance (environmental)

- 2014/35/EU and 2014/30/EU
- 2011/65/EU - Restriction of the use of certain hazardous substance in electrical and electronic equipment (EU RoHS).
- 2012/19/EU - Waste electrical and electronic equipment (EU WEEE).
- 94/62/EC - packaging and packaging waste (EU).
- 2006/66/EC - batteries and accumulators and waste batteries and accumulators (EU battery directive).
- 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (EU REACH).
- Section 1502 of the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 - U.S. Conflict Minerals.
- 30/2011/TT-BCT - Vietnam circular.
- SJ/T 11363-2006 Requirements for Concentration Limits for Certain Hazardous Substances in EIPs (China).

- SJ/T 11364-2006 Marking for the Control of Pollution Caused by EIPs (China).

Appendix B. Cable routing table

If the information is not already available, have the customer use [Table 9 on page 76](#) to record cable routing information.

Table 9. Cable routing table for SAN24B-6				
Port	Cable labels		Connected device	Slot/Port of the device
	Switch end	Device end		
0				
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				

Table 9. Cable routing table for SAN24B-6 (continued)

Port	Cable labels		Connected device	Slot/Port of the device
28				
29				
30				
31				
32				
33				
34				
35				
36				
37				
38				
39				
40				
41				

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Homologation statement

This product may not be certified in your country for connection by any means whatsoever to interfaces of public telecommunications networks. Further certification may be required by law prior to making any such connection. Contact an IBM representative of reseller for any questions.

Electronic emission notices

This section contains the electronic emission notices or statements for the United States and other countries.

Federal Communications Commission Statement

This explains the Federal Communications Commission's (FCC's) statement.

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, might cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. IBM is not responsible for any radio or television interference caused by using other than recommended cables and connectors, or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device might not cause harmful interference, and (2) this device must accept any interference received, including interference that might cause undesired operation.

Industry Canada Compliance Statement

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

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

Australia and New Zealand Class A Statement

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

European Union Electromagnetic Compatibility Directive

This product is in conformity with the protection requirements of European Union (EU) Council Directive 2014/30/EU on the approximation of the laws of the Member States relating to electromagnetic compatibility. IBM cannot accept responsibility for any failure to satisfy the protection requirements resulting from a non-recommended modification of the product, including the fitting of non-IBM option cards.

Attention: This is an EN 55022 Class A product. In a domestic environment this product might cause radio interference in which case the user might be required to take adequate measures.

European community contact:

IBM Deutschland GmbH
Technical Regulations, Department M372
IBM-Allee 1, 71139 Ehningen, Germany
Tele: +49 (0) 800 225 5423 or +49 (0) 180 331 3233
Email: halloibm@de.ibm.com

Germany Electromagnetic Compatibility Directive

Deutschsprachiger EU Hinweis:

Hinweis für Geräte der Klasse A EU-Richtlinie zur Elektromagnetischen Verträglichkeit

Dieses Produkt entspricht den Schutzanforderungen der EU-Richtlinie 2014/30/EU zur Angleichung der Rechtsvorschriften über die elektromagnetische Verträglichkeit in den EU-Mitgliedsstaaten und hält die Grenzwerte der EN 55022 / EN 55032 Klasse A ein. Um dieses sicherzustellen, sind die Geräte wie in den Handbüchern beschrieben zu installieren und zu betreiben. Des Weiteren dürfen auch nur von der IBM empfohlene Kabel angeschlossen werden. IBM übernimmt keine Verantwortung für die Einhaltung der Schutzanforderungen, wenn das Produkt ohne Zustimmung von IBM verändert bzw. wenn Erweiterungskomponenten von Fremdherstellern ohne Empfehlung von IBM gesteckt/eingebaut werden.

EN 55022 / EN 55032 Klasse A Geräte müssen mit folgendem Warnhinweis versehen werden:

"Warnung: Dieses ist eine Einrichtung der Klasse A. Diese Einrichtung kann im Wohnbereich Funk-Störungen verursachen; in diesem Fall kann vom Betreiber verlangt werden, angemessene Maßnahmen zu ergreifen und dafür aufzukommen."

Deutschland: Einhaltung des Gesetzes über die elektromagnetische Verträglichkeit von Geräten

Dieses Produkt entspricht dem "Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG)." Dies ist die Umsetzung der EU-Richtlinie 2014/30/EU in der Bundesrepublik Deutschland.

Zulassungsbescheinigung laut dem Deutschen Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG) (bzw. der EMC Richtlinie 2014/30/EU) für Geräte der Klasse A Dieses Gerät ist berechtigt, in Übereinstimmung mit dem Deutschen EMVG das EG-Konformitätszeichen - CE - zu führen.

Verantwortlich für die Einhaltung der EMV-Vorschriften ist der Hersteller:

International Business Machines Corp.
New Orchard Road
Armonk, New York 10504
Tel: 914-499-1900

Der verantwortliche Ansprechpartner des Herstellers in der EU ist:

IBM Deutschland GmbH
Technical Relations Europe, Abteilung M456
IBM-Allee 1, 71139 Ehningen, Germany
Tel: +49 800 225 5426
e-mail: halloibm@de.ibm.com

Generelle Informationen:

Das Gerät erfüllt die Schutzanforderungen nach EN 55024 und EN 55022 / EN 55032 Klasse A.

Deutschsprachiger EU Hinweis: Hinweis für Geräte der Klasse B EU-Richtlinie zur Elektromagnetischen Verträglichkeit

Dieses Produkt entspricht den Schutzanforderungen der EU-Richtlinie 2014/30/EU zur Angleichung der Rechtsvorschriften über die elektromagnetische Verträglichkeit in den EU-Mitgliedsstaaten und hält die Grenzwerte der EN 55022/ EN 55032 Klasse B ein. Um dieses sicherzustellen, sind die Geräte wie in den Handbüchern beschrieben zu installieren und zu betreiben. Des Weiteren dürfen auch nur von der IBM empfohlene Kabel angeschlossen werden. IBM übernimmt keine Verantwortung für die Einhaltung der Schutzanforderungen, wenn das Produkt ohne Zustimmung von IBM verändert bzw. wenn Erweiterungskomponenten von Fremdherstellern ohne Empfehlung von IBM gesteckt/eingebaut werden.

Deutschland: Einhaltung des Gesetzes über die elektromagnetische Verträglichkeit von Geräten

Dieses Produkt entspricht dem "Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG)". Dies ist die Umsetzung der EU-Richtlinie 2014/30/EU in der Bundesrepublik Deutschland.

Zulassungsbescheinigung laut dem Deutschen Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG) (bzw. der EMC Richtlinie 2014/30/EU) für Geräte der Klasse B

Dieses Gerät ist berechtigt, in Übereinstimmung mit dem Deutschen EMVG das EG-Konformitätszeichen - CE - zu führen.

Verantwortlich für die Einhaltung der EMV-Vorschriften ist der Hersteller:

International Business Machines Corp.
New Orchard Road
Armonk, New York 10504
Tel: 914-499-1900

Der verantwortliche Ansprechpartner des Herstellers in der EU ist:

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Tel: +49 800 225 5426
e-mail: halloibm@de.ibm.com

Generelle Informationen:

Das Gerät erfüllt die Schutzanforderungen nach EN 55024 und EN 55022/ EN 55032 Klasse B.

People's Republic of China Class A Statement

中华人民共和国“A类”警告声明

声明

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

Taiwan Class A Statement

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

Taiwan Contact Information

This topic contains the product service contact information for Taiwan.

IBM Taiwan Product Service Contact Information:
IBM Taiwan Corporation
3F, No 7, Song Ren Rd., Taipei Taiwan
Tel: 0800-016-888

台灣IBM 產品服務聯絡方式：
台灣國際商業機器股份有限公司
台北市松仁路7號3樓
電話：0800-016-888

12c00790

Japan Voluntary Control Council for Interference Class A Statement

This explains the Japan Voluntary Control Council for Interference (VCCI) statement.

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

VCCI-A

Japan Electronics and Information Technology Industries Association Statement

This statement explains the Japan JIS C 61000-3-2 product wattage compliance.

(一社) 電子情報技術産業協会 高調波電流抑制対策実施
要領に基づく定格入力電力値： Knowledge Centerの各製品の
仕様ページ参照

This statement explains the Japan Electronics and Information Technology Industries Association (JEITA) statement for products less than or equal to 20 A per phase.

高調波電流規格 JIS C 61000-3-2 適合品

This statement explains the JEITA statement for products greater than 20 A, single phase.

高調波電流規格 JIS C 61000-3-2 準用品

本装置は、「高圧又は特別高圧で受電する需要家の高調波抑制対策ガイドライン」対象機器（高調波発生機器）です。

- 回路分類：6（単相、P F C回路付）
- 換算係数：0

This statement explains the JEITA statement for products greater than 20 A per phase, three-phase.

高調波電流規格 JIS C 61000-3-2 準用品

本装置は、「高圧又は特別高圧で受電する需要家の高調波抑制対策ガイドライン」対象機器（高調波発生機器）です。

- 回路分類：5（3相、P F C回路付）
- 換算係数：0

Korean Communications Commission Class A Statement

This explains the Korean Communications Commission (KCC) statement.

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Russia Electromagnetic Interference Class A Statement

This statement explains the Russia Electromagnetic Interference (EMI) statement.

ВНИМАНИЕ! Настоящее изделие относится к классу А.
В жилых помещениях оно может создавать радиопомехи, для снижения которых необходимы дополнительные меры

RUZ001

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Part Number: 03GM537

P23884



(1P) P/N: 03GM537

