

IBM Storage Networking SAN64B-6



Installation, Service, and User Guide

MTM Service information: 8960-F64, 8960-N64

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Before you use the information in this publication, be sure to read the general information under “Notices” on page 77.

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Contents

Figures	v
--------------------------	----------

Tables	vii
-------------------------	------------

Read this first	ix
----------------------------------	-----------

Getting help	ix
Accessibility features for the SAN64B-6	ix
How to send your comments	x

Safety and environmental notices	xi
---	-----------

Safety notices and labels	xi
Cautions	xi
Danger Notices	xiii
Safety labels	xiv
Attention notices	xv
ESD precautions	xvi
Rack safety	xvi
Rack installation	xvi
Rack relocation (19" rack)	xviii
Product recycling and disposal	xviii

About this document	xix
--------------------------------------	------------

Product documents	xix
Brocade documents	xix
IBM and Brocade product matrix	xx

Chapter 1. Introducing the SAN64B-6	1
--	----------

Hardware features	1
License options	1
Port-side view	1
Nonport-side view	2
Device management options	3

Chapter 2. Preparing for the installation	5
--	----------

Safety precautions	5
General precautions	5
ESD precautions	6
Power precautions	6
Lifting and weight-related precautions	8
Laser precautions	8
Site requirements	9
Quick installation checklist	9
Items included with the switch	12

Chapter 3. Mounting the switch	13
---	-----------

Mounting options	13
Precautions specific to mounting	13
Setting up the switch as a standalone unit	14
Installing the Universal Four-Post Rack Kit (XBR-R000296)	14
Installation requirements	15
Time and items required	15
Flush-front mounting	17
Flush-rear (recessed) mounting	22

Installing the Universal Two-Post Rack kit (XBR-R000294)	27
Installation requirements	28
Time and items required	28
Flush-front mounting	28
Mid-mounting	32

Chapter 4. Initial Setup and Verification	37
--	-----------

Items required	37
Providing power to the switch	37
Establishing a first-time serial connection	38
Configuring the IP address	39
Using DHCP to set the IP address	39
Setting a static IP address	39
Setting the date and time	39
Setting the time zone	40
Synchronizing local time with an external source	41
Customizing the chassis name and switch name	41
Establishing an Ethernet connection	41
Setting the domain ID	42
Verifying correct operation	42
Backing up the configuration	43
Powering down the device	44

Chapter 5. Installing transceivers and cables	45
--	-----------

Time and items required	45
Precautions specific to transceivers and cables	46
Cleaning the fiber-optic connectors	46
Managing cables	47
Installing an SFP+ transceiver	47
Replacing an SFP+ transceiver	48
Installing a QSFP transceiver	49
Replacing a QSFP transceiver	50
Verifying the operation of new transceivers	51

Chapter 6. Monitoring the Device	53
---	-----------

Interpreting port-side LEDs	53
System power LED	54
System status LED	54
FC port status LED	55
QSFP port status LED	55
Interpreting nonport-side LEDs	56
Power supply and fan assembly status LED	56
Interpreting the POST results	57
Interpreting the BOOT results	58
Running diagnostic tests	58

Chapter 7. Power Supply and Fan Assembly	59
---	-----------

Power supply and fan assembly overview	59
Precautions specific to the power supply and fan assemblies	60
Identifying the airflow direction	61

Power supply and fan assembly status LED	62
Power supply and fan assembly unit fault indicators	62
Power supply and fan assembly task guide.	62
Time and items required	63
Recording power supply and fan assembly critical information	63
Removing a power supply and fan assembly	64
Installing a new power supply and fan assembly.	65
Verifying the operation of the power supply and fan assemblies.	66
Removing the battery	67

Appendix. Product specifications 69

Notices 77

Trademarks	78
----------------------	----

Homologation statement	78
Electronic emission notices	78
BSMI statement (Taiwan).	79
Canadian requirements	79
CE statement	79
China ROHS	79
FCC warning (US only)	79
KCC statement (Republic of Korea)	80
Germany statement.	80

Index 81

Figures

1. Port-side view	2	16. Attaching front brackets to a rack	30
2. Nonport-side view with AC power supply and fan assembly units	2	17. Attaching the rear brackets to a rack	31
3. Items in the Universal Four-Post Rack Kit	16	18. Attaching the rear brackets to the device	32
4. Attaching the front brackets	18	19. Attaching the front brackets	33
5. Attaching the extension brackets to the device	19	20. Attaching front brackets to a rack	34
6. Positioning the device in the rack	20	21. Attaching the rear brackets to a rack	35
7. Attaching the rear brackets to the extensions	21	22. Attaching the rear brackets to the device	36
8. Attaching the rear brackets to the rack posts	22	23. Optical transceiver extraction tool	46
9. Attaching the front brackets to the rear of the device	23	24. Installing a 32-Gbps SFP+ transceiver into an upper port	48
10. Attaching the bracket extensions to the device	24	25. Replacing a 32-Gbps SFP+ optical transceiver	49
11. Positioning the device in the rack	25	26. Installing a 32-Gbps QSFP transceiver in an upper port	50
12. Attaching the rear brackets to the extensions at the front of the device	26	27. Replacing a QSFP optical transceiver	51
13. Attaching the short or long rear brackets to the extensions	26	28. SAN64B-6 port-side LEDs.	53
14. Attaching the rear brackets to the front rack posts	27	29. Nonport-side LEDs with AC power supplies	56
15. Attaching the front brackets	29	30. AC power supply and fan assembly	59
		31. AC power supply and fan assembly	64
		32. Install an AC power supply and fan assembly	66
		33. Location of battery holder.	67

Tables

1. Brocade and IBM product and model number matrix	xx	9. System status LED patterns during normal operation	54
2. Management options for the device	3	10. SFP+ FC port status LED patterns during normal operation.	55
3. Facility requirements	9	11. QSFP port status LED patterns during normal operation	55
4. Installation prerequisites	10	12. Power supply and fan assembly status LED patterns during normal operation	57
5. Installation and basic system configuration	10	13. Power supply and fan assembly status LED patterns during normal operation	62
6. Space requirements	15		
7. tsTimeZone command parameter selection for the US time zones	40		
8. System power LED patterns during normal operation	54		

Read this first

Summary of changes

This is the first edition of the IBM® System Networking SAN64B-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 SAN64B-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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Safety and environmental notices

This section contains information about:

- “Safety notices and labels”
- “Rack safety” on page xvi
- “Product recycling and disposal” on page xviii

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 xv:** These notices indicate potential damage to programs, devices, or data.
- **“Cautions”:** These statements indicate situations that can be potentially hazardous to you.
- **“Danger Notices” on page xiii:** 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 xiv may be attached to the product to warn of potential hazards.

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, sides, 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:

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, 18 AWG, marked VW-1, and rated minimum 90°C.



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, 18 AWG, marked VW-1, and rated minimum 90°C.



CAUTION:

For a DC system, use grounding wire of at least 6 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.

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.

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:



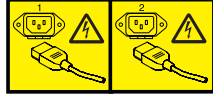
DANGER

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 67 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 SAN64B-6 (machine type-models 8960-F64 and 8960-N64 Switch). Throughout this document, the product is referred to as the *SAN64B-6*, or simply the *switch*.

This document has been created to include information specific to SAN64B-6 switches running on Fabric OS version 8.0.1 or later. This document does not support all Fabric OS versions. It is specific to Fabric OS v8.0.1 or later. Refer to the Fabric OS Release Notes for more information.

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 SAN64B-6 Installation, Service, and User Guide, SC27-8965* (this document)
- *IBM Storage Networking SAN64B-6 Quick Start Guide, GI13-4549*
- 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*

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 1 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.

Table 1. Brocade and IBM product and model number matrix.

Brocade product name	IBM product name	IBM machine type and model number
Brocade G620	SAN64B-6	8900 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 X24
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. Introducing the SAN64B-6

This chapter provides the following information:

- “Hardware features”
- “License options”
- “Port-side view”
- “Nonport-side view” on page 2
- “Device management options” on page 3

Hardware features

The IBM SAN64B-6 offers the following features and capabilities:

- Up to 48 auto-sensing ports supporting high-performance 32-Gbps SFP+ ports technology in a single domain.
- Up to four 128-Gbps (4 x 32-Gbps) QSFP ports to connect to the QSFP ports of another IBM SAN64B-6 device.
- Dynamic Ports on Demand (Dynamic-POD) scaling from a base configuration of 24 ports to 64 ports (two 12-port SFP+ PODs and one 16-port QSFP POD).
- 4-, 8-, 16-, and 32-Gbps auto-sensing Fibre Channel switch and router 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 transceiver at the other end of the link.

- 10-Gbps manually set capability on FC ports (requires the optional 10-Gigabit FCIP/Fibre Channel license).
 - 10-Gbps performance is enabled by 10-Gbps SFP+ transceivers.
 - Ports can be configured for 10-Gbps for metro connectivity.
- Universal ports self-configure as a E_Ports, F_Ports, M_Ports, or D_Ports. EX_Ports can be activated on a per-port basis with the optional Integrated Routing license.
 - A Diagnostic Port (D_Port) provides diagnostics, troubleshooting, and verification services for the physical media.

License options

The SAN64B-6 uses a capacity-based Ports on Demand (POD) license method. An Integrated Routing (IR) license is required to enable EX_Port on this device. Refer to the *Fabric OS Software Licensing Guide* for more details.

Port-side view

The following illustration shows the port-side view of the IBM SAN64B-6 Fibre Channel switch.

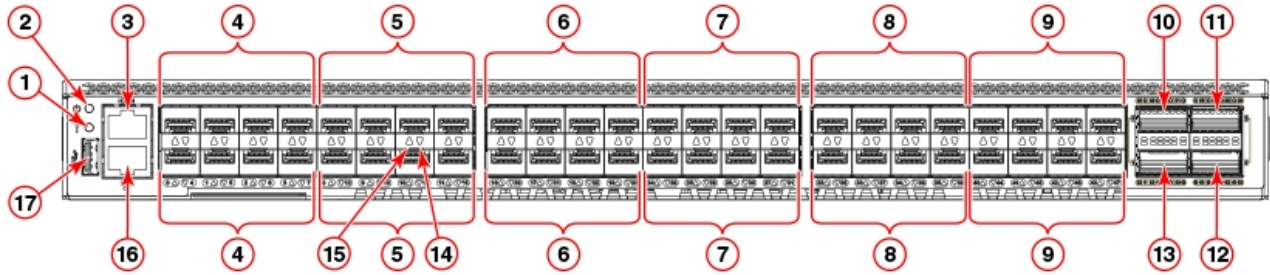


Figure 1. Port-side view

- 1 - System status LED
- 2 - System power LED
- 3 - UART RJ-45 serial console port
- 4 - SFP+ FC (four upper and four lower) ports 0-7
- 5 - SFP+ FC (four upper and four lower) ports 8-15
- 6 - SFP+ FC (four upper and four lower) ports 16-23
- 7 - SFP+ FC (four upper and four lower) ports 24-31
- 8 - SFP+ FC (four upper and four lower) ports 32-39
- 9 - SFP+ FC (four upper and four lower) ports 40-47
- 10 - QSFP port 0 (FC ports 48-51)
- 11 - QSFP port 2 (FC ports 56-59)
- 12 - QSFP port 3 (FC ports 60-63)
- 13 - QSFP port 1 (FC ports 52-55)
- 14 - SFP+ (lower) port 14 status LED
- 15 - SFP+ (upper) port 10 status LED
- 16 - 1000Base-T/100Base-TX/10Base-T RJ-45 Ethernet management port
- 17 - USB port

Note: All the ports are connected to a single ASIC.

Nonport-side view

The following illustration shows the nonport-side view of the IBM SAN64B-6 FC switch.

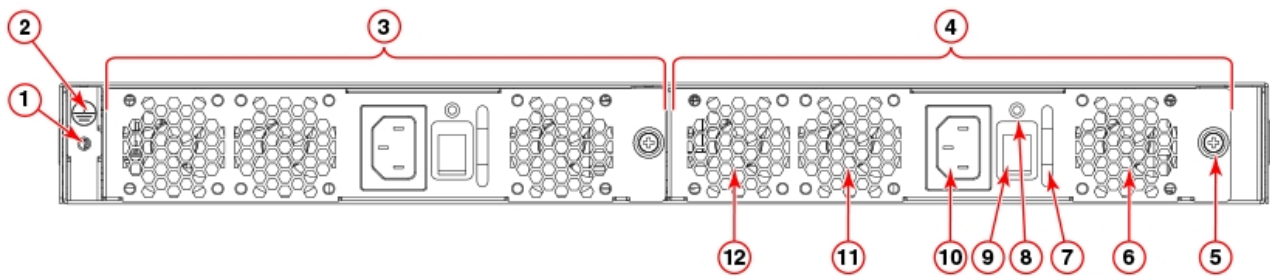


Figure 2. Nonport-side view with AC power supply and fan assembly units

- 1 - Ground sticker
- 2 - Ground cable connector
- 3 - Power supply and fan assembly 2

- 4 - Power supply and fan assembly 1
- 5 - Captive screw
- 6 - Fan 1
- 7 - Handle
- 8 - Power supply and fan assembly status LED
- 9 - Power-on switch
- 10 - Power supply receptacle
- 11 - Fan 2
- 12 - Fan 3

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 power-on self-test (POST) each time it is turned on. Any errors are recorded in the RASlog messages.

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

Table 2. Management options for the device

Management tool	Out-of-band support	In-band support	Reference documents
Command line interface (CLI) Up to two admin sessions and four user sessions simultaneously.	Ethernet or serial connection	IP over Fibre Channel	<i>Fabric OS Administrator's Guide</i> <i>Fabric OS Command Reference</i>
EZSwitchSetup EZSwitchSetup helps to complete the basic configuration for single-switch setup.	Ethernet or serial connection	IP over Fibre Channel	<i>EZSwitchSetup Software Installation Guide for IBM SAN64B-6</i> <i>EZSwitchSetup Administrator's Guide</i>
Web Tools	Ethernet or serial connection	IP over Fibre Channel	<i>Web Tools Administrator's Guide</i>
Standard SNMP applications	Ethernet or serial connection	IP over Fibre Channel	<i>Fabric OS MIB Reference</i>
Management Server	Ethernet or serial connection	Native in-band interface (over HBA only)	<i>Fabric OS Administrator's Guide</i> <i>Fabric OS Command Reference</i>
Network Advisor (BNA) BNA must be purchased separately.	Ethernet or serial connection	IP over Fibre Channel	Network Advisor documentation set

Chapter 2. Preparing for the installation

This chapter provides the following information:

- “Safety precautions”
- “General precautions”
- “ESD precautions” on page 6
- “Power precautions” on page 6
- “Lifting and weight-related precautions” on page 8
- “Laser precautions” on page 8
- “General precautions”
- “Site requirements” on page 9
- “Quick installation checklist” on page 9
- “Items included with the switch” on page 12

Safety precautions

When using this product, observe all danger, caution, and attention notices in this manual. The safety notices are accompanied by symbols that represent the severity of the safety condition

Refer to “Cautions” on page xi and “Danger Notices” on page xiii for translations of safety notices for this product.

General precautions



DANGER

The procedures in this manual are for qualified service personnel.



DANGER

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



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.



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:

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



CAUTION:

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



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:

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

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.



CAUTION:

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

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.



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.



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:

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.

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.



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.

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 825 and EN60825. Optical products that do not comply with these standards might emit light that is hazardous to the eyes.

Site requirements

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

Table 3. 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 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.• 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 switch comes online and is ready to be deployed. Completing all the tasks in the suggested order ensures successful installation. IBM 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 switches.

Table 4. Installation prerequisites

Task	Task details or additional information	Completed
Unpack the switch.	Take an inventory of the hardware components included in your shipment. Refer to “Items included with the switch” on page 12.	
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 switch,” on page 13 • Chapter 7, “Power Supply and Fan Assembly,” on page 59 • Chapter 5, “Installing transceivers and cables,” on page 45 	
Review the safety precautions.	Refer to “Safety and environmental notices” on page xi.	
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 “Mounting options” on page 13.	
Review and verify installation requirements.	Verify that the following requirements are met. Refer to “Site requirements” on page 9. <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 5. Installation and basic system configuration

Task	Task details or additional information	Completed
Mount the device.	Choose one of the following mounting options: <ul style="list-style-type: none"> • Mount the device as a standalone unit. Refer to “Setting up the switch as a standalone unit” on page 14. • Mount the device in a four-post rack. Refer to “Installing the Universal Four-Post Rack Kit (XBR-R000296)” on page 14. • Mount the device in a two-post rack. Refer to “Installing the Universal Two-Post Rack kit (XBR-R000294)” on page 27. 	
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” on page 61.	
Gather all components required for the initial setup.	Refer to “Items required” on page 37.	
Provide power to the device.	Refer to “Providing power to the switch” on page 37.	

Table 5. Installation and basic system configuration (continued)

Task	Task details or additional information	Completed
Attach a management station, establish a serial connection, and change the default passwords (optional).	Refer to “Establishing a first-time serial connection” on page 38. 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” on page 39.	
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. Refer to “Setting the date and time” on page 39 for more information.	
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. Refer to “Customizing the chassis name and switch name” on page 41 for more information.	
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 IBM Network Advisor. Refer to “Establishing an Ethernet connection” on page 41.	
Optional: Configure the DNS service.	Use the dnsconfig command to create DNS server entries. Refer to the <i>Fabric OS Administrator’s 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” on page 42 for more information.	
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 53 and “Interpreting nonport-side LEDs” on page 56. • 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 42 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 device” on page 44 for more information.	

Items included with the switch

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 IBM SAN64B-6 device
- An accessory kit containing the following items:
 - A serial cable
 - Two 6-ft. power cords
 - Power cord retainer clips
 - Rubber feet.
 - China-RoHS Hazardous/Toxic Substance statement
 - Network Advisor web pointer card.
 - EZSwitch web pointer card
 - IBM documentation web pointer card
- Inner foam

Chapter 3. Mounting the switch

This chapter provides the following information:

- “Mounting options”
- “Precautions specific to mounting”
- “Setting up the switch as a standalone unit” on page 14
- “Installing the Universal Four-Post Rack Kit (XBR-R000296)” on page 14
- “Installing the Universal Two-Post Rack kit (XBR-R000294)” on page 27

Mounting options

You can install the device in several ways:

- As a standalone unit on a flat surface, for example, a table top. Use the rubber feet included with the shipment to secure the device on the surface. No other equipment is required for desktop installation.
- In a four-post EIA rack: You will need a Universal Four-Post Rack Kit (XBR-R000296) to install devices in EIA racks that are between L-13.7 to 81.28 cm deep (L-5.0 to 32.0 in.), where L is the chassis depth.
- In a two-post Telco rack: You will need a Universal Two-Post Rack Kit (XBR-R000294) to install 1U and 2U devices in a two-post telecommunications (Telco) rack.

Note: Review “Safety precautions” on page 5 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, sides, 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.



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.

Setting up the switch as a standalone unit

About this task



Attention: Refer to “Safety notices and labels” on page xi before starting any installation procedure.

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

Procedure

1. Unpack the device and verify the items listed under “Items included with the switch” on page 12 are present and undamaged.
2. Apply the adhesive rubber feet to the underside of the device. The rubber feet help prevent the device from sliding off the supporting surface.
 - a. Clean the indentations at each corner of the bottom of the device to ensure that they are free of dust or other debris that might lessen the adhesion of the feet.
 - b. With the adhesive side against the chassis, place one rubber foot in each indentation and press into place.
3. Place the device on a sturdy flat surface.
4. Provide power to the device as described in “Providing power to the switch” on page 37.

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 39.

Installing the Universal Four-Post Rack Kit (XBR-R000296)

Use the following instructions to install a device in EIA racks that are between L-12.7 to 81.28 cm deep (L-5.0 to 32.0 in.), where L is the chassis depth, using the *Universal Four-Post Rack Kit (XBR-R000296)*.

There are two ways you can mount the device in a four-post rack:

- With the port side flush with the front posts
- With the nonport side flush with the rear posts in a recessed position

A recessed position allows a more gradual bend in the fiber-optic cables connected to the switch and less interference in the aisle at the front of the rack.

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

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

Provide space in an EIA rack with the following minimum and maximum distances between the front and back posts.

Note: For 1U and 2U devices, two people are required to install the device in a rack. One person holds the device, while the other screws in the front and rear "L" brackets.

Table 6. Space requirements

Chassis with port-side side vents	Notes	Chassis depth	Minimum rack depth	Maximum rack depth
No	Applicable to port-side and nonport-side flush mounts.	L	L-12.7 cm (L-5 in.)	81.28 cm (32 in.)
Yes	Applicable to port-side flush mounts.	L	L-12.7 cm (L-5 in.)	81.28 cm (32 in.)
Yes	Applicable to nonport-side flush mounts.	L	L	81.28 cm (32 in.)

Note that if chassis depth (L) is less than 40.64 cm (16 in.), the chassis will not fit into a rack with a maximum depth of 81.28 cm (32 in.) using the universal four-post rack kit. The maximum rack depth for a chassis less than 40.64 cm (16 in.) is 81.28 cm (32 in.) minus the difference between the chassis depth and 40.64 cm (16 in.). For example, a chassis with a depth (L) of 35.56 cm (14 in.) is 5.08 cm (2 in.) smaller than 40.64 cm (16 in.), so it will install into a rack with a maximum depth of 81.28 cm (32 in.) - 5.08 cm (2 in.) = 76.2 cm (30 in.).

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.

The following items are required to install the device using the Universal Four-Post Rack Kit:

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

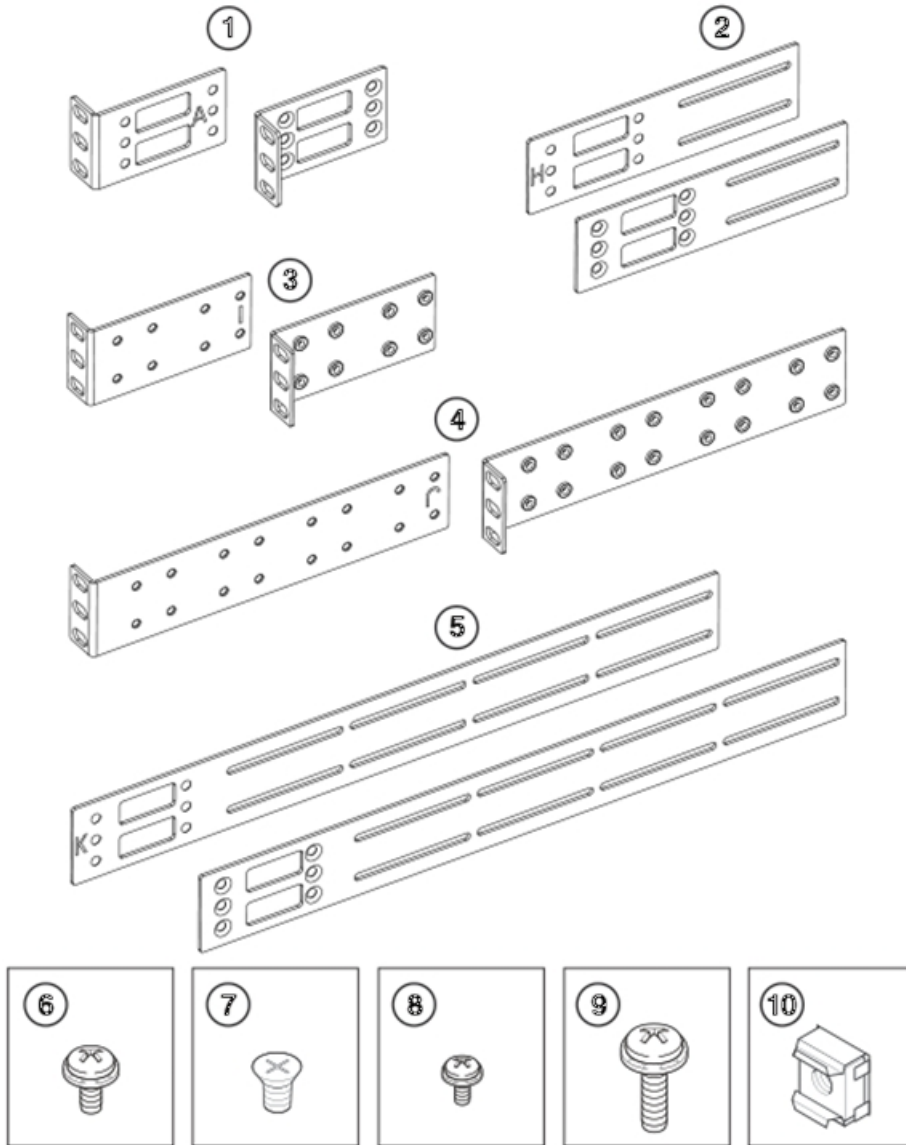


Figure 3. Items in the Universal Four-Post Rack Kit

- 1 - Front brackets (2)
- 2 - Extension brackets, medium (2)
- 3 - Rear brackets, short (2)
- 4 - Rear brackets, long (2)
- 5 - Extension brackets, long (2)
- 6 - Screw, 8-32 x 5/16-in., panhead Phillips (8)
- 7 - Screw, 8-32 x 5/16-in., flathead Phillips (16)
- 8 - Screw, 6-32 x 1/4-in., panhead Phillips (8)
- 9 - Screw, 10-32 x 5/8-in., panhead Phillips (8)
- 10 - Retainer nut, 10-32 (8)

Ensure that the items listed and illustrated in Figure 3 are included in the kit. Note that not all parts may be used with certain installations depending on the device type.



CAUTION:

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

Flush-front mounting



CAUTION:

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

Note: The illustrations in the rack installation procedures show a 1U device, but the instructions are the same for a 2U device. The illustrations in the rack installation procedures are for reference only and may not show the actual device.

Complete the following tasks to install the device in a four-post rack:

1. Attaching the front brackets
2. Attaching the bracket extensions to the device
3. Installing the device in the rack
4. Attaching the rear brackets to the extensions
5. Attaching the rear brackets to the rack posts

Attaching the front brackets

About this task

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

Procedure

1. Position the right front bracket with the flat side against the right side of the device at the front of the device, as shown in Figure 4 on page 18.
2. Insert four 8-32 x 5/16-in. flathead screws through the vertically aligned holes in the bracket and then into the holes on the side of the device. Use the upper and lower screw holes, leaving the center holes empty.
3. Repeat step 1 and step 2 to attach the left front bracket to the left side of the device.
4. Tighten all the 8-32 x 5/16-in. screws to a torque of 15 in-lb (17 cm-kg).

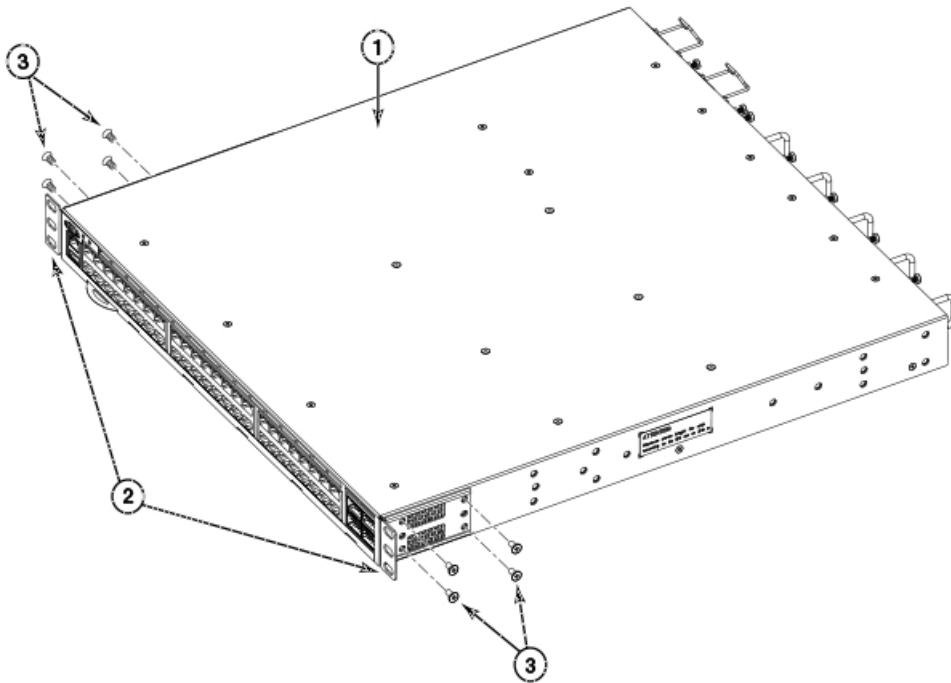


Figure 4. Attaching the front brackets

- 1 - The SAN64B-6 switch
- 2 - Front brackets
- 3 - Screws, 8-32 x 5/16-in., flathead Phillips

Attaching the extension brackets to the device

About this task

Complete the following steps to attach the extension brackets to the device. There are medium and long extension brackets that you can use for this step. Choose the correct extension bracket for the depth of your rack.

Procedure

1. Select the proper length extension bracket for your rack depth.
2. Position the right extension bracket along the side of the device as shown in Figure 5 on page 19.
3. Insert four 8-32 x 5/16-in. flathead screws through the vertically aligned holes in the extension bracket and then into the holes on the side of the device. Use the upper and lower screw holes, leaving the center holes empty.
4. Repeat step 1 and step 2 to attach the left extension 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-lb (17 cm-kg).

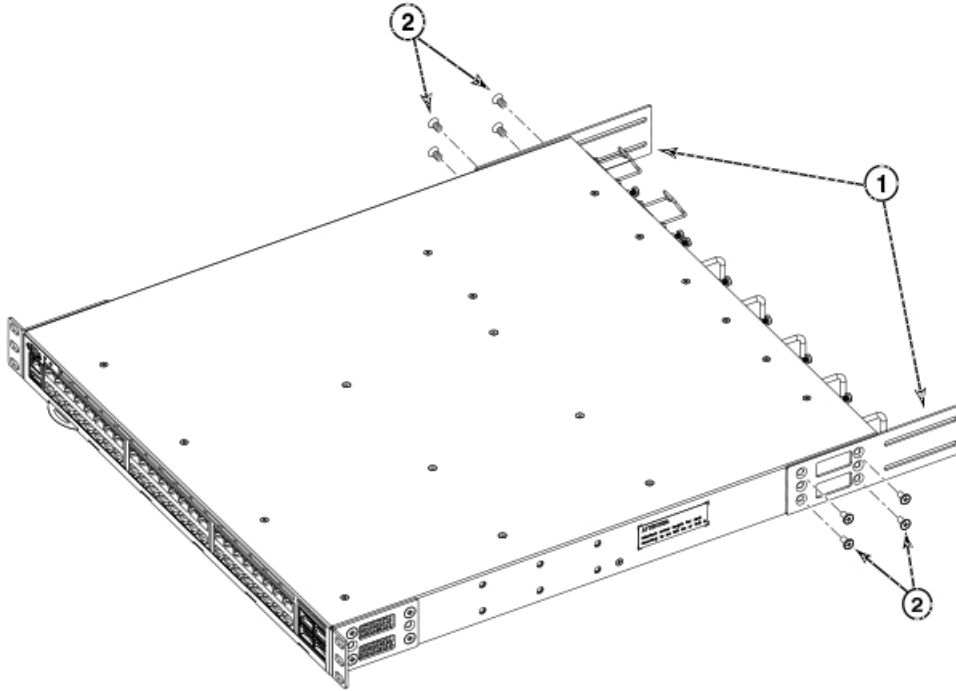


Figure 5. Attaching the extension brackets to the device

- 1 - Extension brackets
- 2 - Screws, 8-32 x 5/16-in., flathead Phillips

Installing the device in the rack

About this task

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

Procedure

1. Position the device in the rack, as shown in Figure 6 on page 20, 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. panhead screws and two retainer nuts. Use the upper and lower holes in the bracket.
3. Attach the left front bracket to the left front rack post using two 10-32 x 5/8-in. panhead screws and two retainer nuts. Use the upper and lower holes in the bracket.
4. Tighten all the 10-32 x 5/8-in. screws to a torque of 25 in-lb (29 cm-kg).

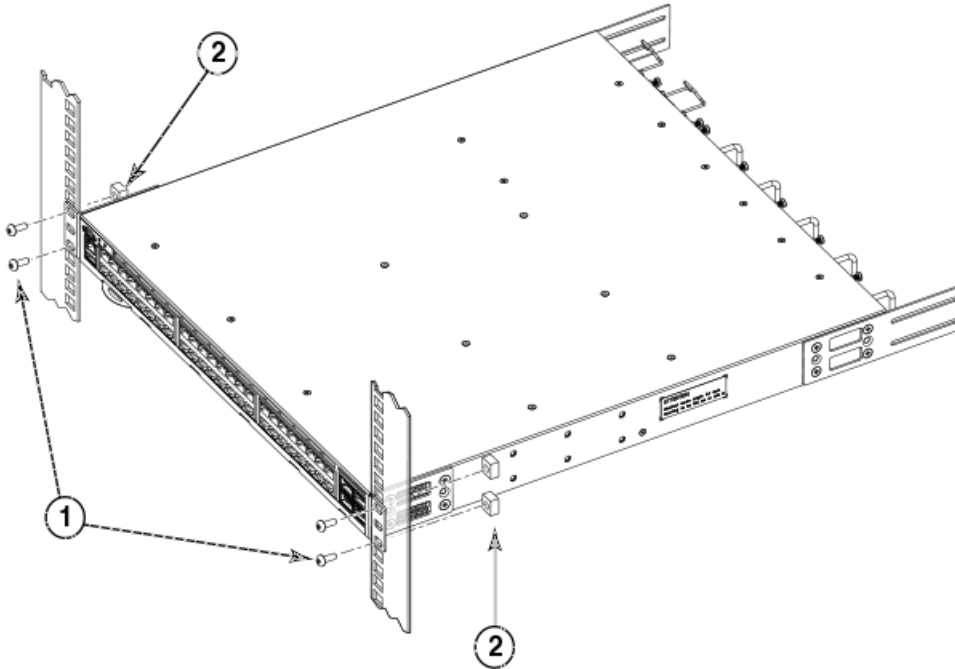


Figure 6. Positioning the device in the rack

- 1 - Screws, 10-32 x 5/8-in., panhead Phillips
- 2 - Retainer nuts, 10-32

Attaching the rear brackets to the extensions

About this task

Complete the following steps to attach the rear brackets to the extensions. There are short and long rear brackets that you can use for this step. Choose the correct bracket for the depth of your rack.

Procedure

1. Select the proper length rear bracket for your rack depth.
2. Slide the right rear bracket onto the right extension and attach to the extension by inserting four 6-32 x 1/4-in. panhead screws through the bracket holes. If possible, leave at least one empty vertical pair of holes between the screws for better support.
3. Repeat step 2 to attach the left rear bracket to the left extension.
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-lb (10 cm-kg).

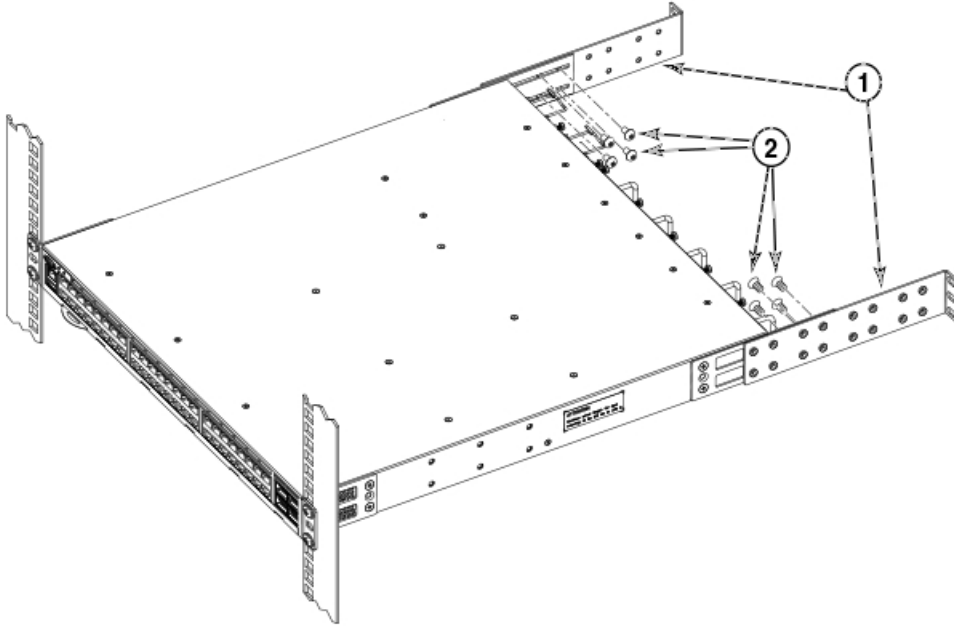


Figure 7. Attaching the rear brackets to the extensions

1 - Rear brackets

2 - Screws, 6-32 x 1/4-in., panhead Phillips

Attaching the rear brackets to the rack posts

About this task

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

Procedure

1. Attach the right rear bracket to the right rear rack post using two 10-32 x 5/8-in. panhead screws and two retainer nuts, as shown in Figure 8 on page 22. Use the upper and lower holes in the bracket.
2. Attach the left rear bracket to the left rear rack post using two 10-32 x 5/8-in. panhead screws and two retainer nuts. Use the upper and lower holes in the bracket.
3. Tighten all the 10-32 x 5/8-in. screws to a torque of 25 in-lb (29 cm-kg).

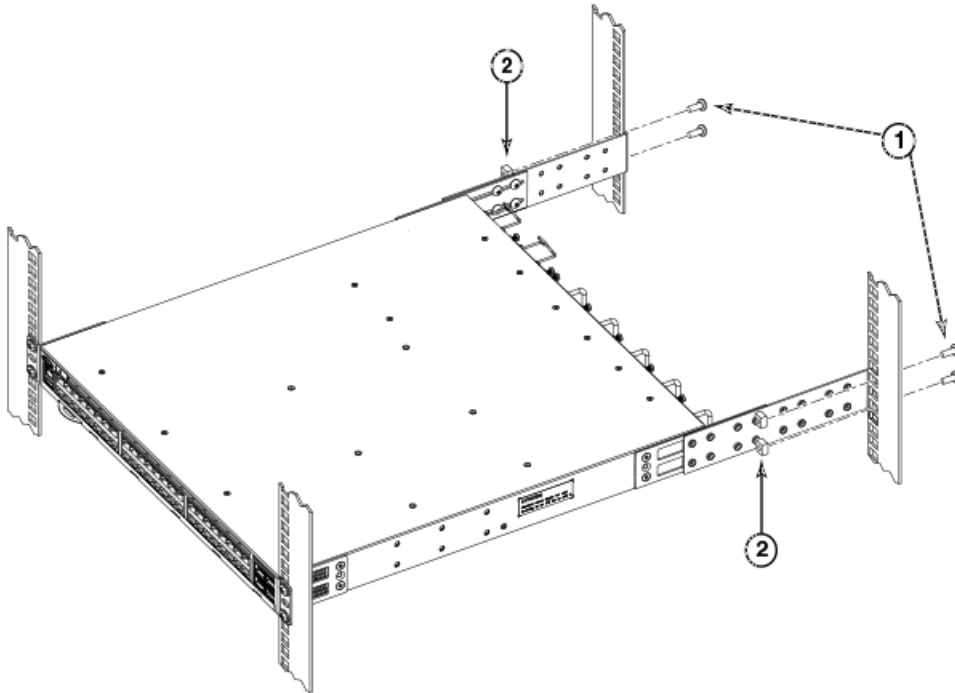


Figure 8. Attaching the rear brackets to the rack posts

- 1 - Screws, 10-32 x 5/8-in., panhead Phillips
- 2 - Retainer nuts, 10-32

Flush-rear (recessed) mounting

The flush-rear (recessed) mounting is similar to the flush-front mounting except that the brackets are reversed on the device.



CAUTION:

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

Note: The illustrations in the rack installation procedures show a 1U device, but the instructions are the same for a 2U device. The illustrations in the rack installation procedures are for reference only and may not show the actual device.

Complete the following tasks to install the device in an EIA rack:

1. Attaching the front brackets to the rear of the device
2. Attaching the extensions to the front of the device
3. Installing the device in the rack
4. Attaching the rear brackets to the extensions at the front of the device
5. Attaching the rear brackets to the front rack posts

Attaching the front brackets to the rear of the device

About this task

Note: In this installation, the brackets are named as listed in the parts list even though the installation of the brackets is reversed from the flush-front installation.

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

Procedure

1. Position the right front bracket with the flat side against the right rear side of the device, as shown in Figure 9.
2. Insert four 8-32 x 5/16-in. flathead screws through the vertically aligned holes in the bracket and then into the holes on the side of the device. Use the upper and lower screw holes, leaving the center holes empty.
3. Repeat step 1 and step 2 to attach the left rear bracket to the left side of the device.
4. Tighten all the 8-32 x 5/16-in. screws to a torque of 15 in-lb (17 cm-kg).

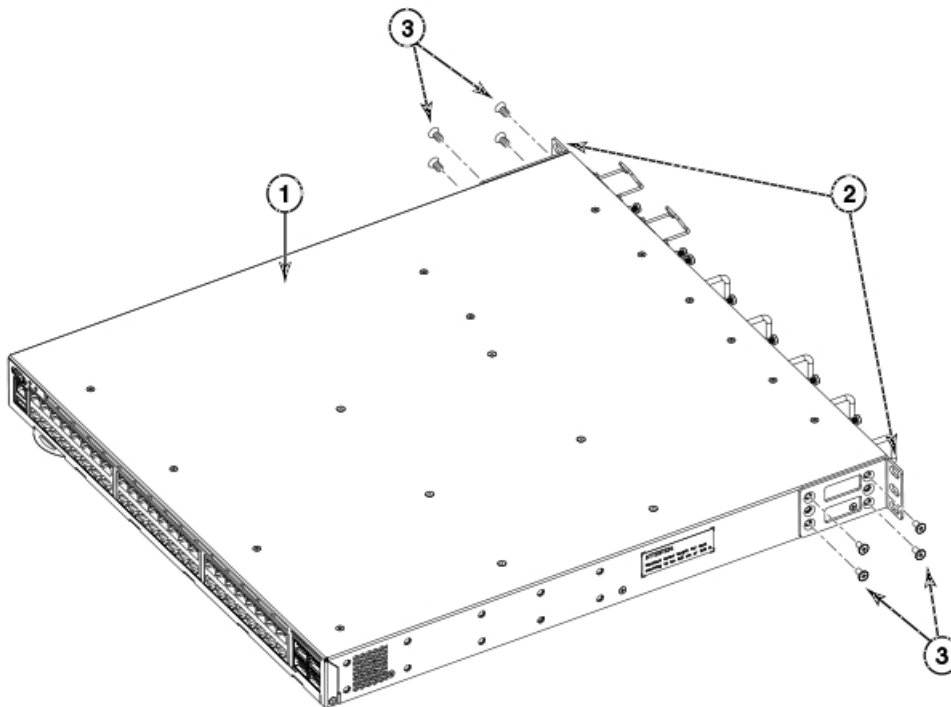


Figure 9. Attaching the front brackets to the rear of the device

- 1 - The SAN64B-6 switch
- 2 - Front brackets
- 3 - Screws, 8-32 x 5/16-in., flathead Phillips

Attaching the extensions to the front of the device

About this task

Complete the following steps to attach the extension brackets to the front of the device. There are medium and long extension brackets that you can use for this step. Choose the correct extension for the depth of your rack.

Procedure

1. Select the proper length extension bracket for your rack depth.
2. Position the right extension along the side of the device as shown in Figure 10 on page 24.
3. Attach the bracket using four 8-32 x 5/16-in. flathead screws.

4. Repeat step 1 and step 2 to attach the left front extension to the left side of the device.
5. Tighten all the 8-32 x 5/16-in. screws to a torque of 15 in-lb (17 cm-kg).

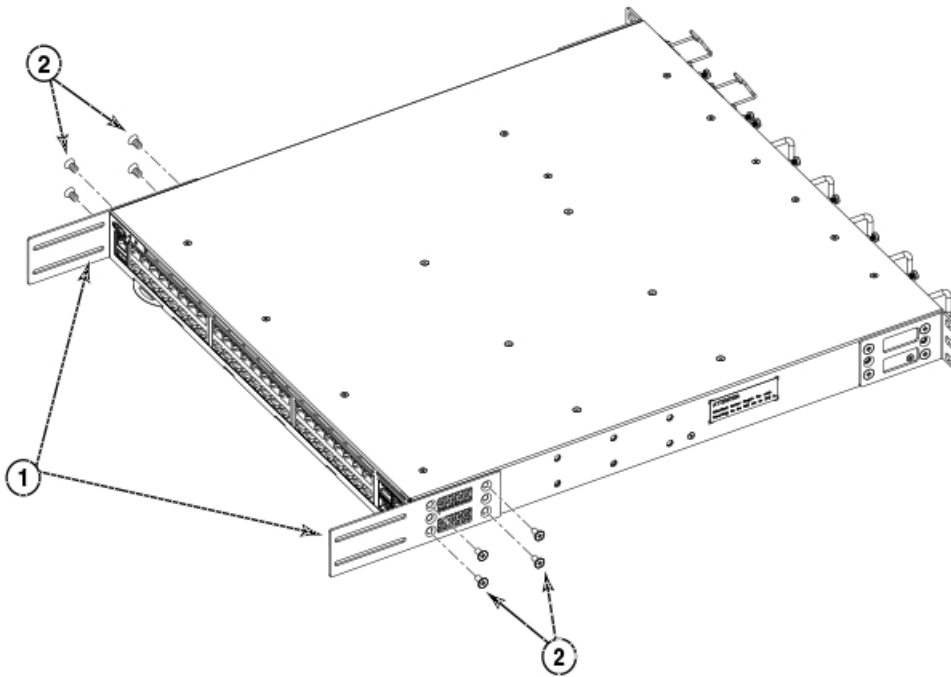


Figure 10. Attaching the bracket extensions to the device

- 1 - Extension brackets
- 2 - Screws, 8-32 x 5/16-in., flathead Phillips

Installing the device in the rack

About this task

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

Procedure

1. Position the device in the rack, as shown in Figure 11 on page 25, providing temporary support under the device until the rail kit is secured to the rack.
2. Attach the right front bracket to the right rear rack post using two 10-32 x 5/8-in. panhead screws and two retainer nuts. Use the upper and lower holes in the bracket.
3. Attach the left front bracket to the left rear rack post using two 10-32 x 5/8-in. panhead screws and two retainer nuts. Use the upper and lower holes in the bracket.
4. Tighten all the 10-32 x 5/8-in. screws to a torque of 25 in-lb (29 cm-kg).

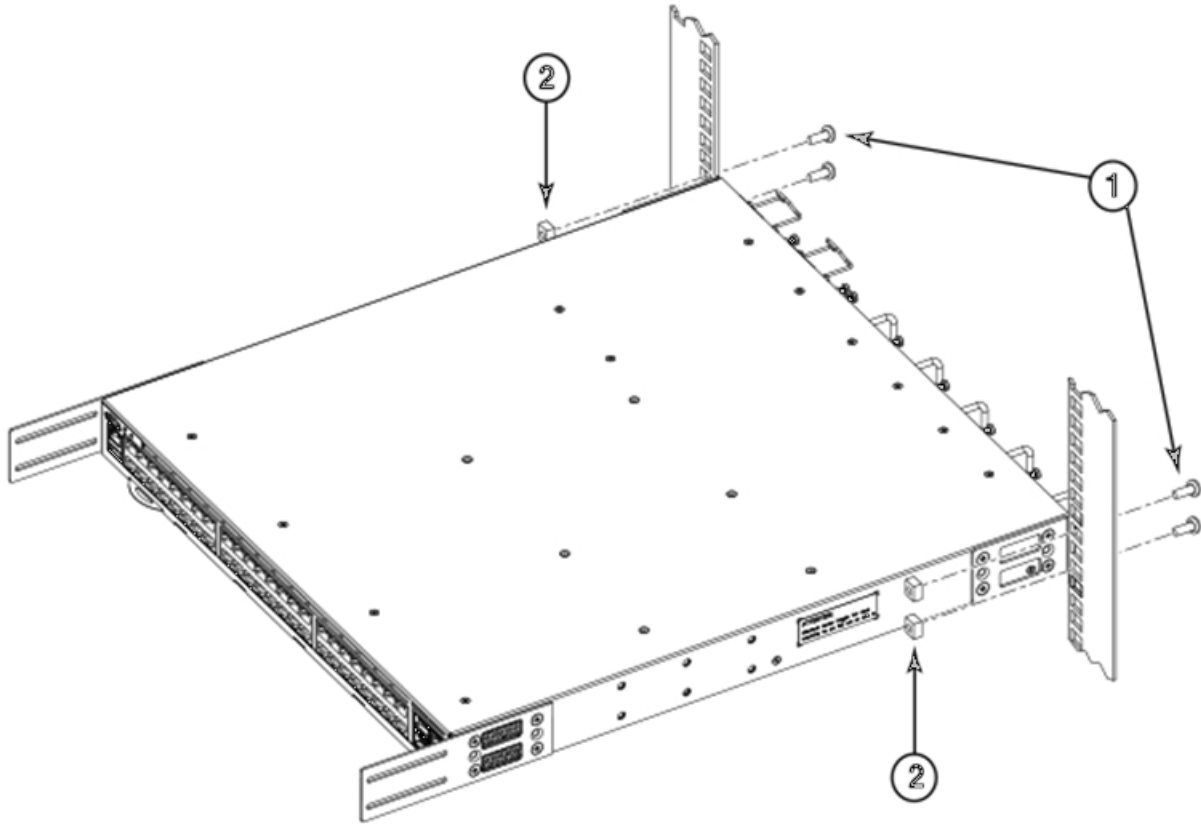


Figure 11. Positioning the device in the rack

- 1 - Screws, 10-32 x 5/8-in., panhead Phillips
- 2 - Retainer nuts, 10-32

Attaching the rear brackets to the extensions at the front of the device

About this task

Complete the following steps to attach the rear brackets to the extensions. There are short and long front brackets that you can use for this step. Choose the correct bracket for the depth of your rack.

Procedure

1. Select the proper length rear bracket for your rack depth.
2. Slide the right rear bracket onto the right extension, as shown in Figure 12 on page 26.
The short rear brackets are shown. Use the first and third vertical pairs of holes for the screws.
Refer to Figure 13 on page 26 for the positioning of the short or long brackets and screws.
3. Attach the brackets using four 6-32 x 1/4-in. screws.
4. Repeat step 2 and step 3 to attach the left rear bracket to the left extension.
5. Adjust the brackets to the rack depth and tighten all the 6-32 x 1/4-in. screws to a torque of 9 in-lb (10 cm-kg).

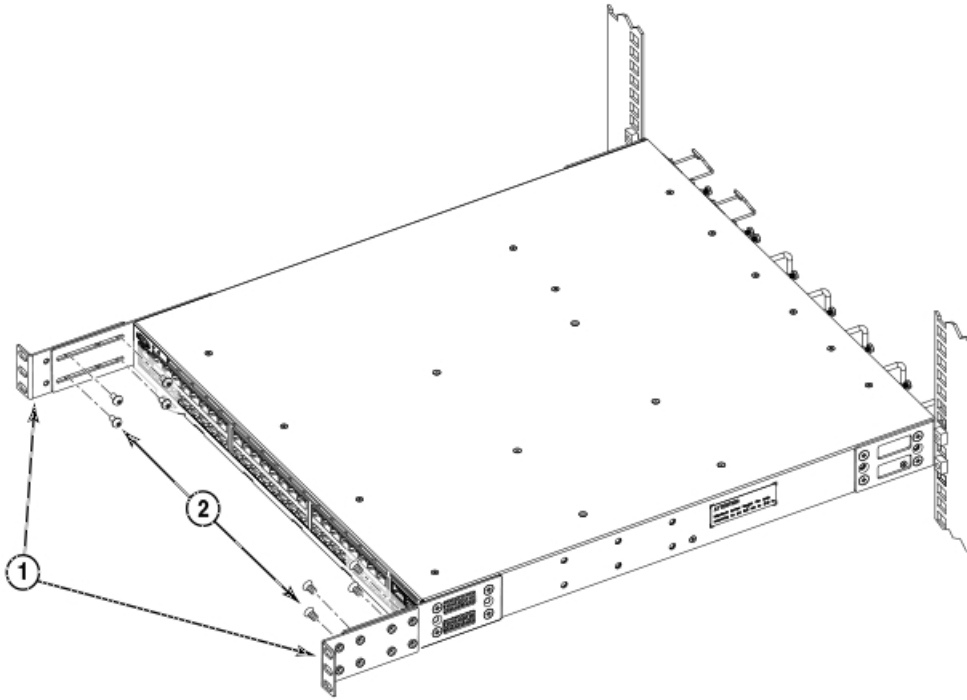


Figure 12. Attaching the rear brackets to the extensions at the front of the device

- 1 - Rear brackets, short
- 2 - Screws, 6-32 x 1/4-in., panhead Phillips

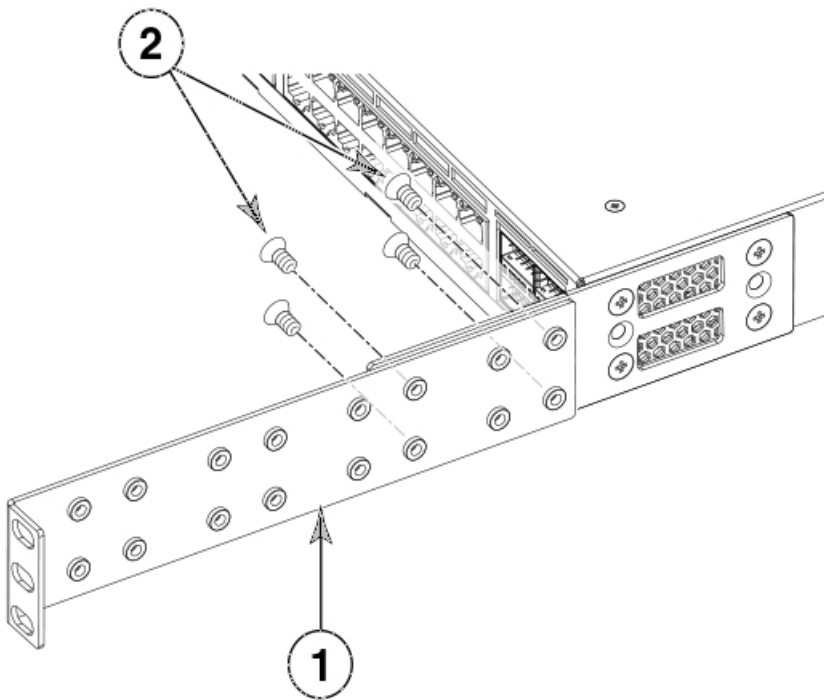


Figure 13. Attaching the short or long rear brackets to the extensions

- 1 - Rear brackets, short
- 2 - Screws, 6-32 x 1/4-in., panhead Phillips

Attaching the rear brackets to the front rack posts

About this task

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

Procedure

1. Attach the right rear bracket to the right front rack post using two 10-32 x 5/8-in. screws and two retainer nuts, as shown in Figure 14. Use the upper and lower holes in the bracket.
2. Attach the left rear bracket to the left front rack post using two 10-32 x 5/8-in. screws and two retainer nuts. Use the upper and lower holes in the bracket.
3. Tighten all the 10-32 x 5/8-in. screws to a torque of 25 in-lb (29 cm-kg).

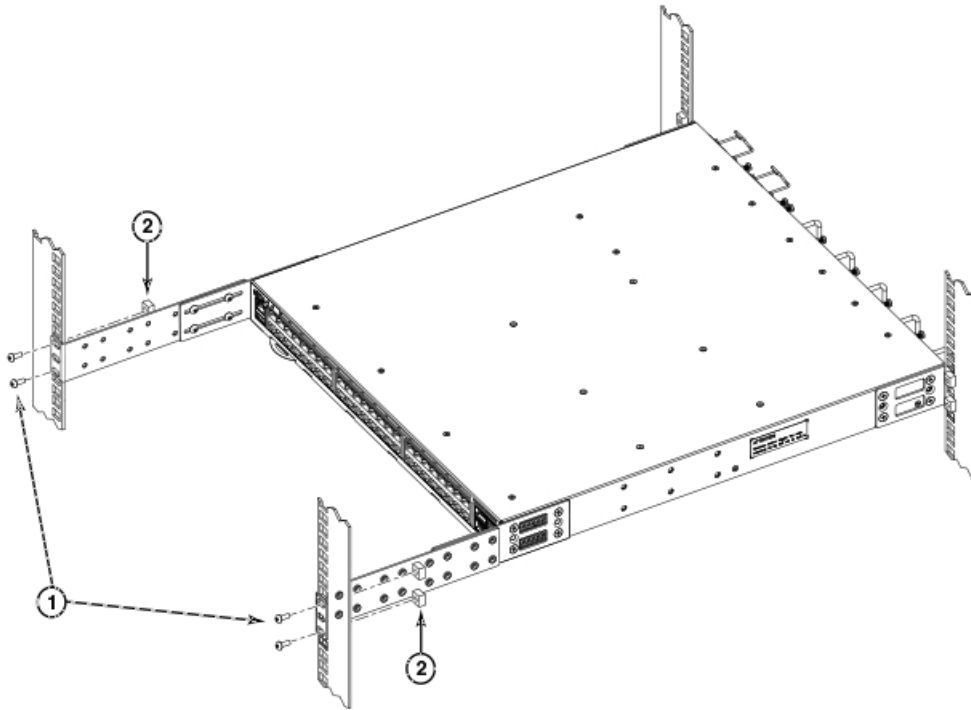


Figure 14. Attaching the rear brackets to the front rack posts

- 1 - Screws, 10-32 x 5/8-in., panhead Phillips
- 2 - Retainer nuts, 10-32

Installing the Universal Two-Post Rack kit (XBR-R000294)

Use the following instructions to install a Brocade 1U or 2U switch in a two-post telecommunications (Telco) rack using the *Universal Two-Post Rack Kit (XBR-R000294)*.

There are two ways you can mount the device in a two-post rack:

- With the port side flush with the front posts
- With the posts mounted to the midsection of 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.

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.

Lifting requirements

For 1U and 2U devices, two people are required to install the device in a rack. One person holds the device, while the other screws in the front and rear "L" brackets.

Time and items required

Allow 15 to 30 minutes to complete the installation.

The following items are required to install the device using the Universal Two-Post Rack Kit:

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



CAUTION:

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

Flush-front mounting

Observe the following notes when using this procedure:

- The device must be turned off and disconnected from the fabric during this procedure.
- The illustrations in this document show a 1U device, but the instructions are the same for a 2U device.
- The illustrations for this procedure show a two-post rack with narrow posts (3- to 5-inch) as an example.
- The illustrations in the rack installation procedures are for reference only and may not show the actual device.

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

1. "Attaching the front brackets to the device"
2. "Attaching the front brackets to the rack" on page 29
3. "Attaching the rear brackets to the rack" on page 30
4. "Attaching the rear brackets to the device" on page 31

Attaching the front brackets to the device

About this task

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

Procedure

1. Position the right front bracket with the flat side against the right side of the device, as shown in Figure 15 on page 29.
2. Insert four 8-32 x 5/16-in. flathead screws through the vertically aligned holes in the bracket and then into the holes on the side of the device. Use the upper and lower screw holes, leaving the center holes empty.
3. Repeat step 1 and step 2 to attach the left front bracket to the left side of the device.

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

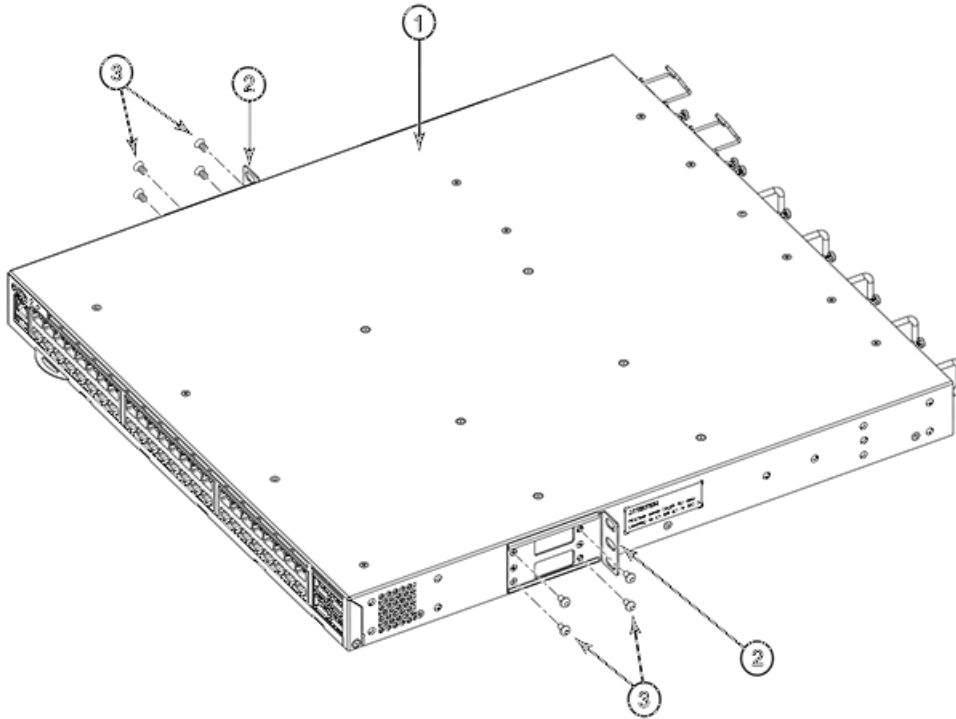


Figure 15. Attaching the front brackets

- 1 - The SAN64B-6 switch
- 2 - Front brackets, right and left
- 3 - Screws, 8-32 x 5/16-in., flathead Phillips

Attaching the front brackets to the rack

About this task

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

Procedure

1. Position the device in the rack, as shown in (Figure 16 on page 30), providing temporary support under the device until the rack kit is fully secured to the rack.
2. Attach the right front bracket to the right rack upright using two 10-32 x 5/8-in. panhead screws and two retainer nuts. Use the upper and lower holes in the bracket.
3. Attach the left front bracket to the left rack upright using two 10-32 x 5/8-in. panhead screws and two retainer nuts.
4. Use the upper and lower holes in the bracket. Tighten all the 10-32 x 5/8-in. screws to a torque of 25 in-lb. (29 cm-kg).

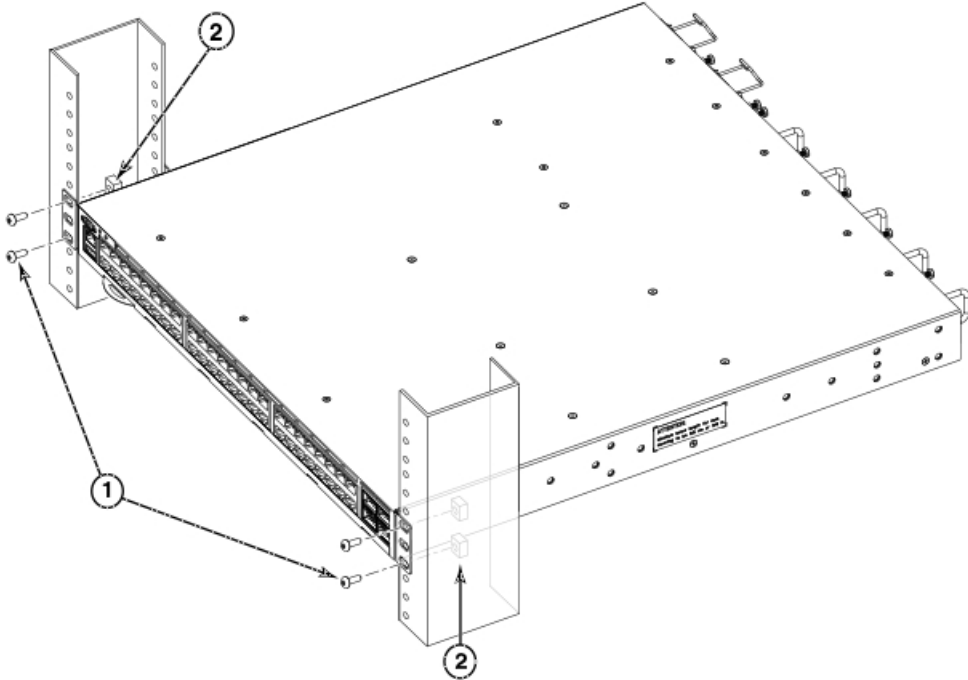


Figure 16. Attaching front brackets to a rack

- 1 - Screws, 10-32 x 5/8-in., panhead Phillips
- 2 - Retainer nuts, 10-32

Attaching the rear brackets to the rack

About this task

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

Procedure

1. Select the proper length bracket for your post width. If your posts are three to five inches wide, use the brackets marked 3-5 INCH. If your posts are five to six inches wide, use the brackets marked 5-6 INCH.
2. Position the right rear bracket in the right rear of the device, as shown in Attaching rear brackets to the rack.
3. Attach the bracket to the right rack upright using two 10-32 x 5/8-in. panhead screws and two retainer nuts. Use the upper and lower holes in the bracket.
4. Repeat step 2 and step 3 to attach the left rear bracket to the left rack upright.
5. Tighten all the 10-32 x 5/8-in. screws to a torque of 25 in-lb. (29 cm-kg).

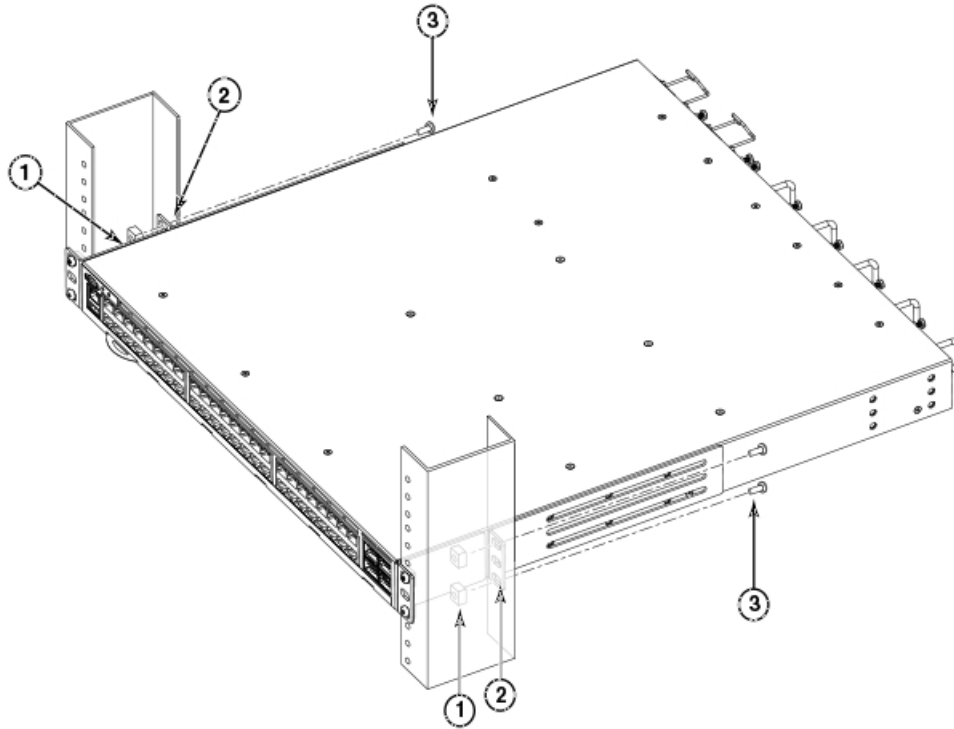


Figure 17. Attaching the rear brackets to a rack

- 1 - Retainer nuts, 10-32
- 2 - Rear brackets, right (left side similar)
- 3 - Screws, 10-32 x 5/8-in., panhead Phillips

Attaching the rear brackets to the device

About this task

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

Procedure

1. Align the right rear bracket to the right rear of the device and use four 8-32 x 5/16-in. panhead screws to attach the bracket to the device, as shown in Figure 18 on page 32. Be sure to insert the screws through the upper and lower slots in the bracket.
2. Align the left rear bracket to the left rear of the device and use four 8-32 x 5/16-in. panhead screws to attach the bracket to the device. Again, use the upper and lower slots in the bracket.
3. Tighten all the 8-32 x 5/16-in. screws to a torque of 15 in-lb (17 cm-kg).

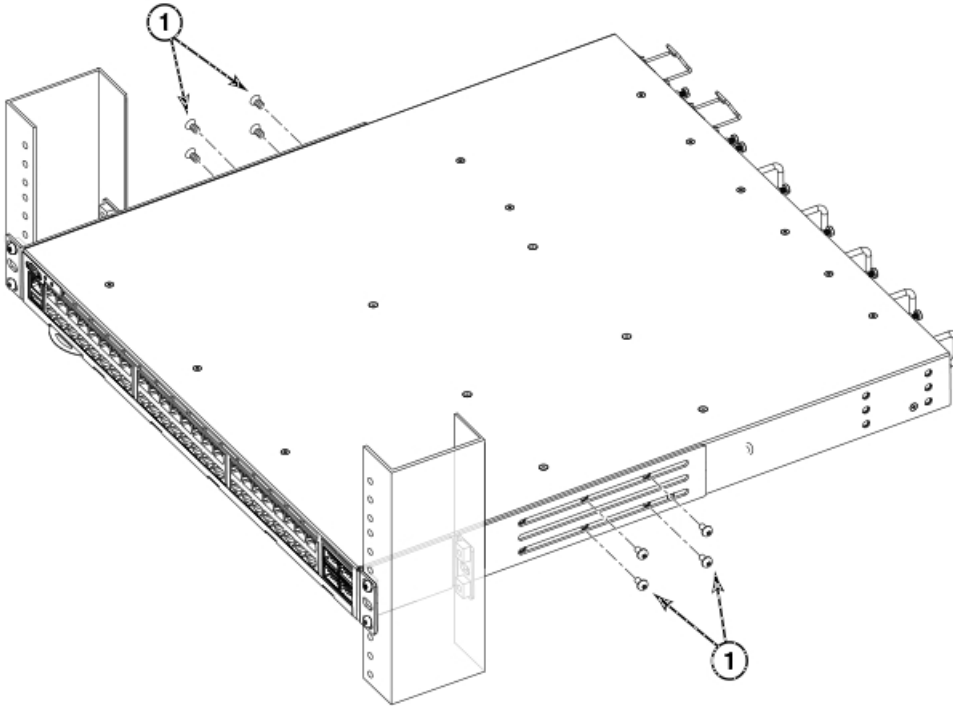


Figure 18. Attaching the rear brackets to the device

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

Mid-mounting

Observe the following notes when using this procedure:

- The device must be turned off and disconnected from the fabric during this procedure.
- The illustrations in this document show a 1U device, but the instructions are the same for a 2U device.
- The illustrations in the rack installation procedures are for reference only and may not show the actual device.

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

1. "Attaching the front brackets to the device"
2. "Attaching the front brackets to the rack" on page 33
3. "Attaching the rear brackets to the rack" on page 34
4. "Attaching the rear brackets to the device" on page 35

Attaching the front brackets to the device

About this task

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

Procedure

1. Position the right front bracket with the flat side against the right side of the device, as shown in Figure 19 on page 33.
2. Insert four 8-32 x 5/16-in. flathead screws through the vertically aligned holes in the bracket and then into the holes on the side of the device. Use the upper and lower screw holes, leaving the center holes empty.

3. Repeat step 1 and step 2 to attach the left front bracket to the left side of the device.
4. Tighten all the 8-32 x 5/16-in. screws to a torque of 15 in-lb (17 cm-kg).

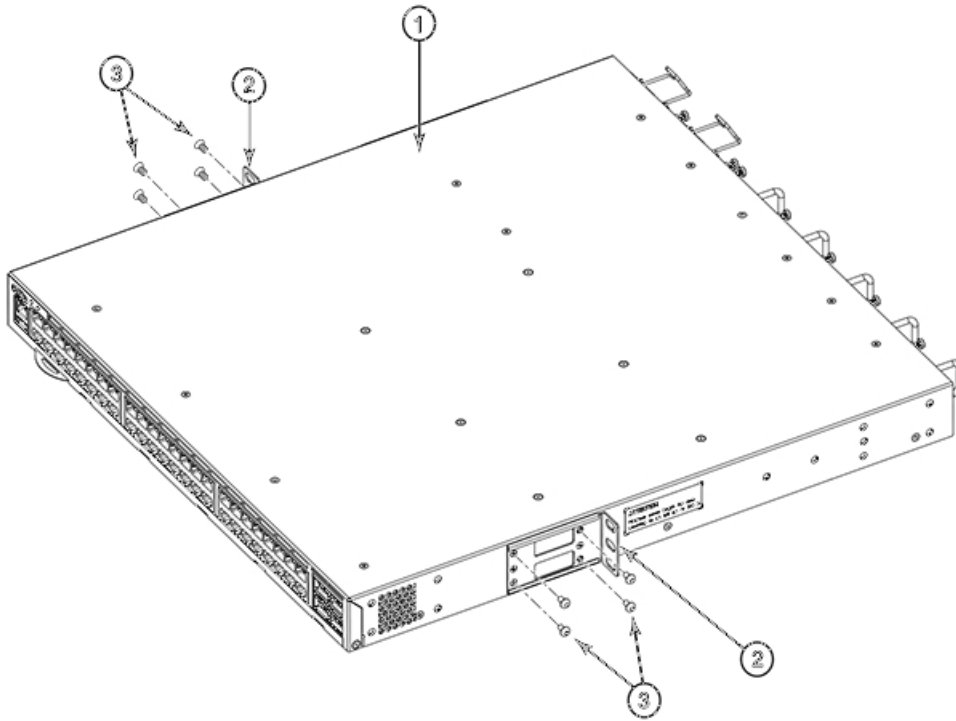


Figure 19. Attaching the front brackets

- 1 - The SAN64B-6 switch
- 2 - Front brackets, right and left
- 3 - Screws, 8-32 x 5/16-in., flathead Phillips

Attaching the front brackets to the rack **About this task**

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

Procedure

1. Position the device in the rack, as shown in Figure 20 on page 34, providing temporary support under the device until the rack kit is fully secured to the rack.
2. Attach the right front bracket to the right rack upright using two 10-32 x 5/8-in. screws and two retainer nuts. Use the upper and lower holes in the bracket.
3. Attach the left front bracket to the left rack upright using two 10-32 x 5/8-in. screws and two retainer nuts. Use the upper and lower holes in the bracket.
4. Tighten all the 10-32 x 5/8-in. screws to a torque of 25 in-lb (29 cm-kg).

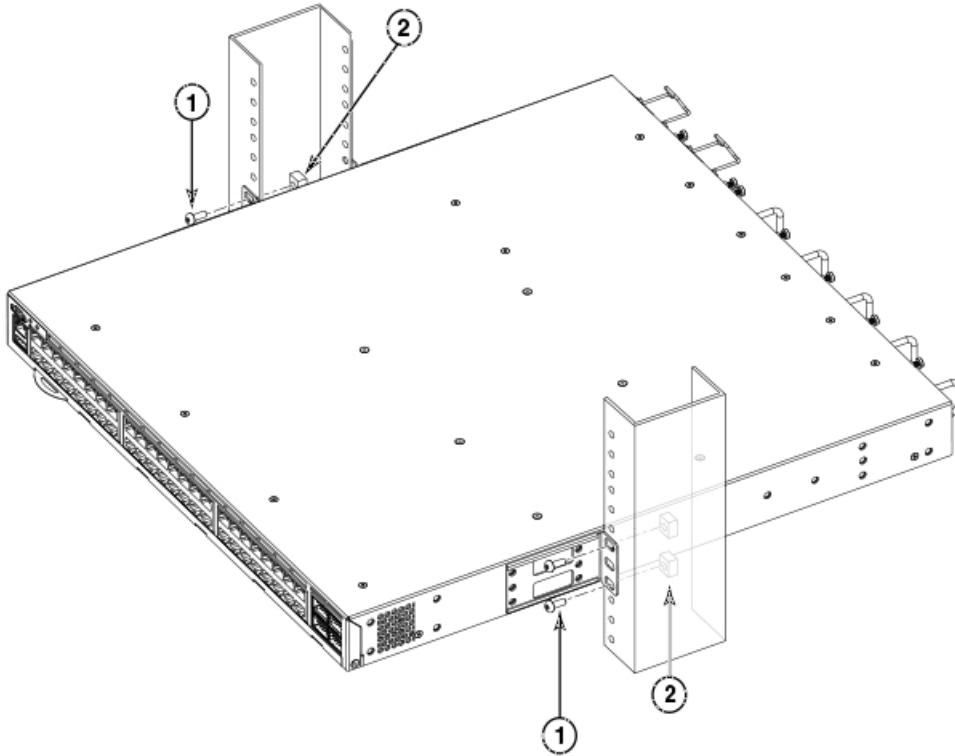


Figure 20. Attaching front brackets to a rack

- 1 - Screws, 10-32 x 5/8-in., panhead Phillips
- 2 - Retainer nuts, 10-32

Attaching the rear brackets to the rack

About this task

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

Procedure

1. Select the proper length bracket for your post width. If your posts are three to five inches wide, use the brackets marked 3-5 INCH. If your posts are five to six inches wide, use the brackets marked 5-6 INCH.
2. Position the right rear bracket in the right rear of the device, as shown in the following figure. Whether you are using the 3-5 inch or the 5-6 inch bracket, the rear end of the bracket will be flush with the back of the device.
3. Attach the brackets to the right rack upright using two 10-32 x 5/8-in. panhead screws and two retainer nuts.
4. Repeat step 2 and step 3 to attach the left rear bracket to the left rack upright.
5. Tighten all the 10-32 x 5/8-in. screws to a torque of 25 in-lb (29 cm-kg).

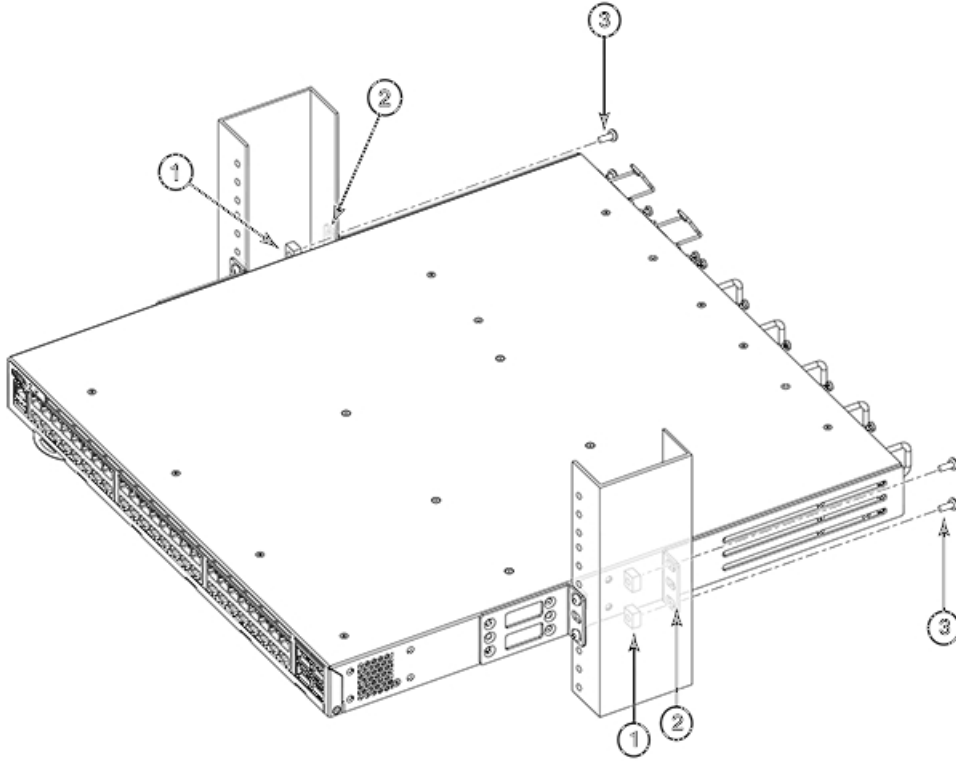


Figure 21. Attaching the rear brackets to a rack

- 1 - Retainer nuts, 10-32
- 2 - Rear brackets (right and left)
- 3 - Screws, 10-32 x 5/8-in., panhead Phillips

Attaching the rear brackets to the device

About this task

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

Procedure

1. Align the right rear bracket to the right rear of the device and use four 8-32 x 5/16-in. panhead screws to attach the bracket to the device, as shown in Figure 22 on page 36. Be sure to insert the screws through the upper and lower slots in the bracket.
2. Align the left rear bracket to the left rear of the device and use four 8-32 x 5/16-in. panhead screws to attach the bracket to the device. Again, use the upper and lower slots in the bracket.
3. Tighten all the 8-32 x 5/16-in. screws to a torque of 15 in-lb (17 cm-kg).

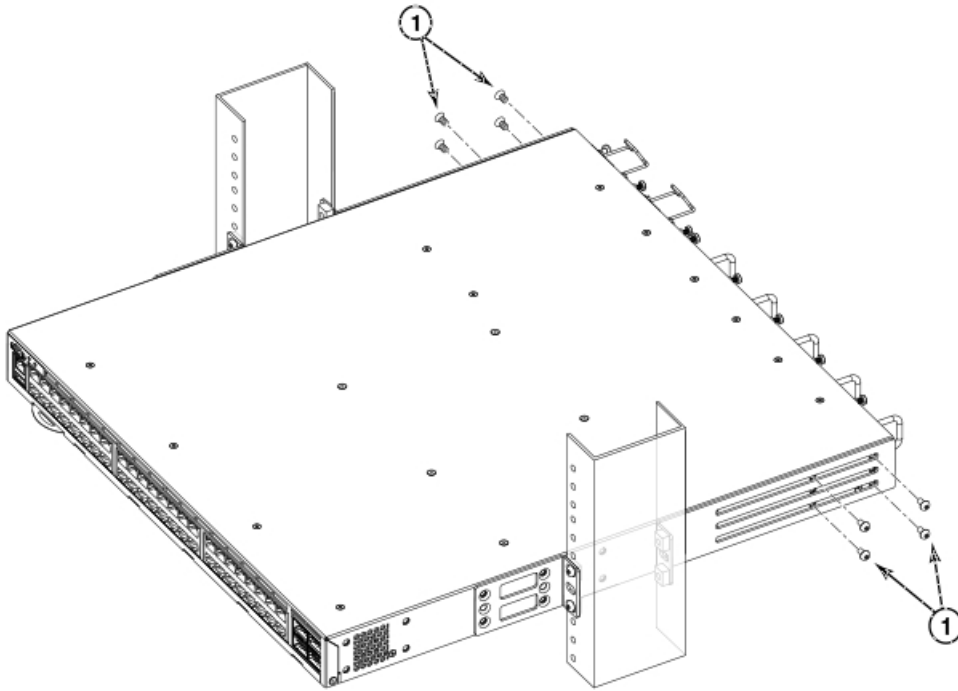


Figure 22. Attaching the rear brackets to the device

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

Chapter 4. Initial Setup and Verification

This chapter provides the following information:

- “Items required”
- “Providing power to the switch”
- “Establishing a first-time serial connection” on page 38
- “Configuring the IP address” on page 39
- “Setting the date and time” on page 39
- “Customizing the chassis name and switch name” on page 41
- “Establishing an Ethernet connection” on page 41
- “Setting the domain ID” on page 42
- “Backing up the configuration” on page 43
- “Powering down the device” on page 44

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 HyperTerminal for Windows
- An unused IP address with corresponding subnet mask and gateway address
- A serial cable with an RJ-45 connector
- RJ-45 to DB-9 adapter
- 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 switch

About this task

Perform the following steps to provide power to the switch.

Procedure

1. Connect the power cords to both power supplies, and then to power sources on separate circuits to protect against power failure. Ensure that the power cords have a minimum service loop of 6 inches available and are routed to avoid stress.
2. Power on the power supplies by flipping both switches to the on position (the "I" symbol). The power supply LEDs display 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.

Note: Power is supplied to the device as soon as the first power supply is connected and turned on.

- 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 53.

Establishing a first-time serial connection

About this task

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

Procedure

- 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.
- Disable any serial communication programs running on the workstation such as synchronization programs.
- Open a terminal emulator application such as HyperTerminal on a Windows PC, or TERM, TIP, or Kermit in a UNIX environment, and configure the application as follows:
 - In a Windows environment

Parameter	Value
Bits per second	9600
Databits	8
Parity	None
Stop bits	1
Flow control	None

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
```
- When the terminal emulator application stops reporting information, press **Enter** to display the login prompt.
 Switch Console Login:
- 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 switch 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 switch, use a static IP address.

Setting a static IP address

About this task

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

Procedure

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

About this task

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.

Procedure

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
Fri May 22 14:05:10 UTC 2015
device:admin> date "0522140615"
Fri May 22 14:06:00 UTC 2015
```

Setting the time zone

About this task

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.

Procedure

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

Table 7. *tsTimeZone* command parameter selection for the US time zones (continued)

Local time	tsTimeZone parameter (difference from UTC)
Alaskan Standard	-9,0
Alaskan Daylight	-8,0
Hawaiian Standard	-10,0

Synchronizing local time with an external source

About this task

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

Procedure

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

About this task

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 device 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.

Procedure

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

About this task

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

Procedure

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, by command line or by 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

About this task

Perform the following steps to set the switch domain ID.

Procedure

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

About this task

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

Procedure

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

Command	Description
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.

```
sb_70:admin> switchshow
switchName: sb_70
switchType: 162.0
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
FC Router: OFF
Fabric Name: abcfabric
Allow XISL Use: OFF
LS Attributes: [FID: 128, Base Switch: No, Default Switch: Yes, Address Mode 0]
```

```

Index Port Address Media Speed State Proto
=====
  0  0  460000 id N32 Online FC F-Port 20:05:00:11:0d:a8:01:00
  1  1  460100 id N32 Online FC F-Port 20:01:00:11:0d:bb:01:00
  2  2  460200 id N32 Online FC F-Port 20:03:00:11:0d:84:01:00
  3  3  460300 id N32 Online FC F-Port 20:07:00:11:0d:26:01:00
  4  4  460400 id N32 Online FC F-Port 10:00:8c:7c:ff:5c:c5:01
  5  5  460500 id N32 Online FC F-Port 10:00:8c:7c:ff:58:4c:00
  6  6  460600 id N32 Online FC F-Port 10:00:8c:7c:ff:5c:c9:01
  7  7  460700 id N32 Online FC F-Port 10:00:8c:7c:ff:5c:bd:00
  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

About this task

It is recommended that you back up the configuration on a regular basis to ensure that a complete configuration is available for downloading to a replacement switch.

Procedure

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.
```

Note: If Virtual Fabrics (VF) is enabled, you must enter **configUpload** for each VF separately.

Powering down the device

About this task

Complete the following steps to power down the device.

Procedure

1. Shutdown the Fabric OS software.
2. Identify the power-on switches in the nonport-side of the device.
3. Power off both power supplies by setting each power switch to the “O” position.
4. Unplug the power cables from the power source before servicing the device or FRUs.

Results

All devices are returned to their initial state the next time the switch is powered on.

Chapter 5. Installing transceivers and cables

The SAN64B-6 only supports IBM-branded transceivers. If the switch is shipped without transceivers already installed, complete these steps to first install the transceivers and then to connect the cables.

Attention: Use only transceivers that are supported for this product. Only transceivers purchased from IBM are supported. The use of transceivers that are not supported may cause data loss or cause the product to malfunction. For a listing of transceivers compatible with this product:

- Go to the IBM Support Portal www.ibm.com/supportportal.
- In the **Search** field, enter b-type supported transceiver.
- Alternatively, use this direct link: <http://www-01.ibm.com/support/docview.wss?uid=ssg1S1004421>.

This chapter provides the following information:

- “Time and items required”
- “Precautions specific to transceivers and cables” on page 46
- “Cleaning the fiber-optic connectors” on page 46
- “Managing cables” on page 47
- “Installing an SFP+ transceiver” on page 47
- “Replacing an SFP+ transceiver” on page 48
- “Installing a QSFP transceiver” on page 49
- “Replacing a QSFP transceiver” on page 50
- “Verifying the operation of new transceivers” on page 51

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 IBM-branded 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 23. 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 825 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, IBM strongly recommends cleaning 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.

It is recommended that you use a fiber-optic reel-type cleaner to clean the fiber cable connectors. 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 IBM 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

About this task

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.

Procedure

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.

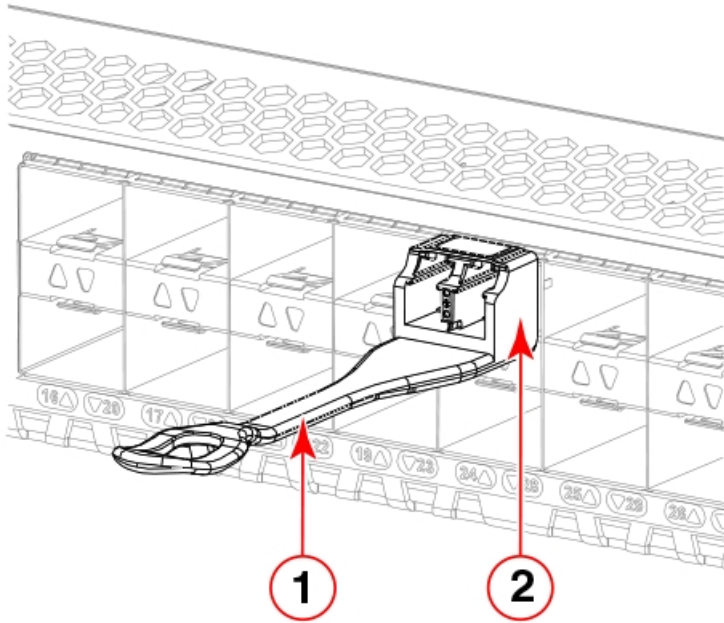


Figure 24. Installing a 32-Gbps SFP+ transceiver into an upper port

- 1 - Pull tab
 - 2 - Transceiver
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

About this task

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.

Procedure

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.

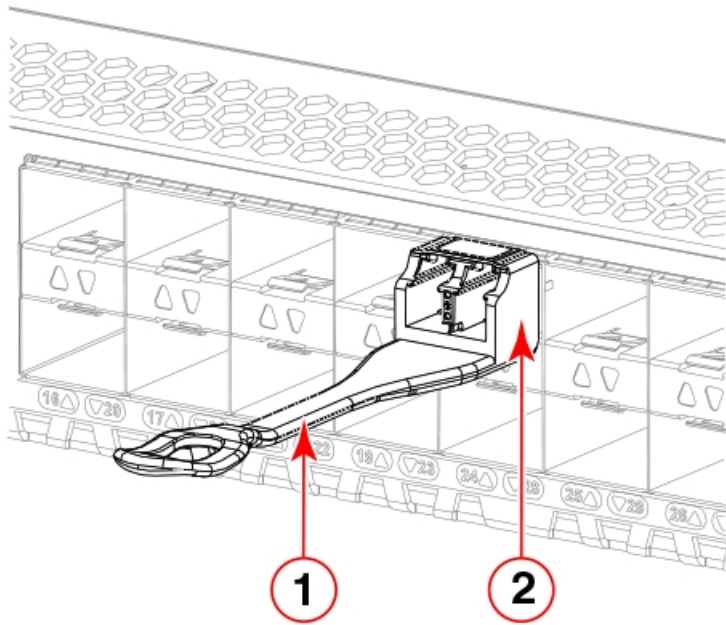


Figure 25. Replacing a 32-Gbps SFP+ optical transceiver

1 - Pull tab

2 - Transceiver

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.

Installing a QSFP transceiver

About this task

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 QSFP transceiver, complete the following steps:

Note: QSFP transceivers have pull tabs rather than bails. Always use the pull tab to insert or remove the QSFP transceivers, as the QSFP might be hot.

Procedure

1. Use the pull tab on these 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.

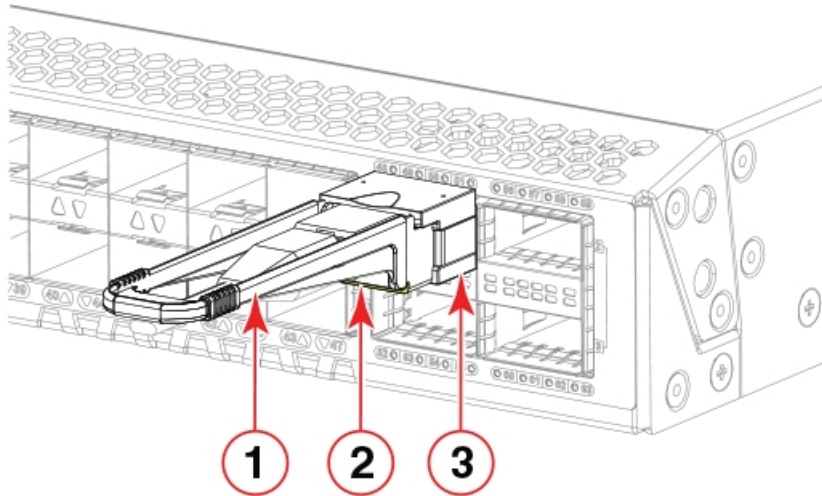


Figure 26. Installing a 32-Gbps QSFP transceiver in an upper port

- 1 - Pull tab
 - 2 - QSFP cable
 - 3 - QSFP transceiver
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 QSFP transceiver. You may damage the cable as well as the transceiver.

Replacing a QSFP transceiver

About this task

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

Note: QSFP transceivers have pull tabs rather than bails. Always use the pull tab to insert or remove the QSFP transceivers, as the QSFP might be hot.

Procedure

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

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

3. To insert the replacement transceiver, use the pull tab 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. Gently push the correctly oriented QSFP transceiver until the latching mechanism clicks.

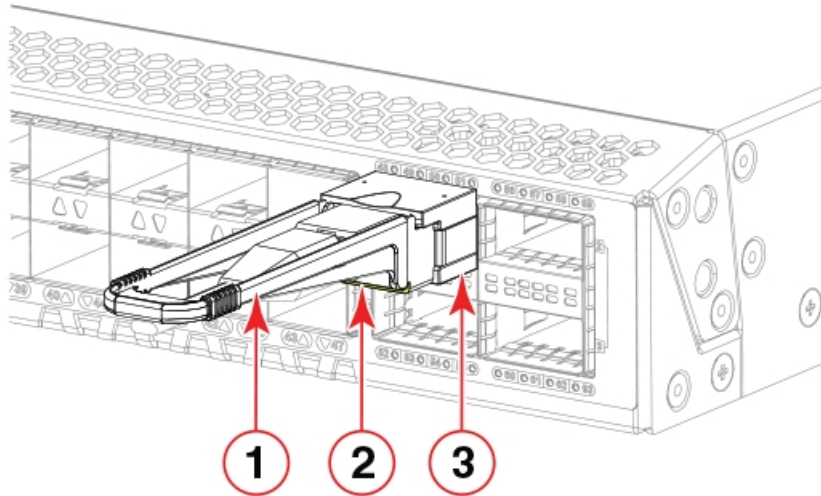


Figure 27. Replacing a QSFP optical transceiver

- 1 - Pull tab
- 2 - QSFP cable
- 3 - QSFP transceiver
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

About this task

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

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

Example

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

Chapter 6. Monitoring the Device

This chapter provides the following information:

- “Interpreting port-side LEDs”
- “Interpreting nonport-side LEDs” on page 56
- “Interpreting the POST results” on page 57
- “Interpreting the BOOT results” on page 58
- “Running diagnostic tests” on page 58

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 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.

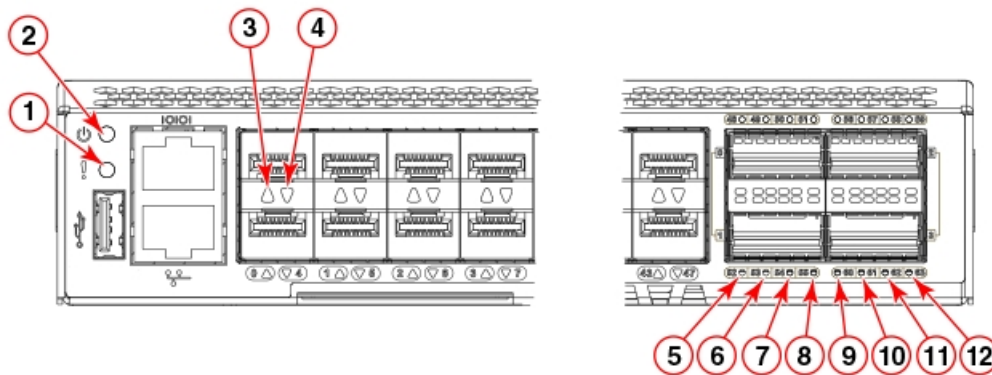


Figure 28. SAN64B-6 port-side LEDs

- 1 - System status LED
- 2 - System power LED
- 3 - SFP+ (upper) port 0 status LED
- 4 - SFP+ (lower) port 4 status LED
- 5 - FC port 52 (QSFP 1) status LED
- 6 - FC port 53 (QSFP 1) status LED
- 7 - FC port 54 (QSFP 1) status LED
- 8 - FC port 55 (QSFP 1) status LED
- 9 - FC port 60 (QSFP 3) status LED
- 10 - FC port 61 (QSFP 3) status LED
- 11 - FC port 62 (QSFP 3) status LED
- 12 - FC port 63 (QSFP 3) status LED

Note: The two LEDs on the serial console port are not used.

System power LED

Refer to the following table to interpret the system power status LED.

Table 8. System power LED patterns during normal operation

LED color	Status of hardware	Recommended action
No light	System is off or there is an internal power supply failure.	Verify that system is powered on, the power cables attached, and your power source is live. If the system power LED is not green, the unit may be faulty. Contact your solution provider.
Steady green	System is on and power supplies are functioning properly.	No action required.

System status LED

Refer to the following table to interpret the system status LED.

Table 9. System status LED patterns during normal operation

LED color	Status of hardware	Recommended action
No light	System is off or there is no power.	Verify that system is on and has completed booting.
Steady green	POST and initialization is completed. System is on and functioning properly.	No action required.
Steady amber (for more than five seconds—can take over a minute to complete POST)	System is going through the power-up process.	No action required.
Steady amber (for more than a few minutes)	Unknown state, boot failed, or the system is faulty. Note: Once POST completes and the switch has failed, steady amber may result.	Perform the following steps: 1. Connect a serial cable to the system. 2. Reboot the system. 3. Check the failure indicated on the system console 4. Contact your solution provider.
Flashing amber/green	Attention is required. A number of variables can cause this status, including a single power supply failure, a fan failure, or one or more environmental ranges have been exceeded.	Check the management interface and the error log for details on the cause of the status. Contact your solution provider.

FC port status LED

Refer to the following table to interpret the FC port status LEDs.

Table 10. SFP+ FC port status LED patterns during normal operation

LED color	Status of hardware	Recommended action
No light	Indicates one of the following: <ul style="list-style-type: none"> No signal or light carrier (media or cable) detected. Device may be currently initializing. Connected device is configured in an offline state. 	<ul style="list-style-type: none"> Verify the power LED is on, and check the SFP+ and cable. Verify the device is not currently being initialized. Verify the status of the connected device.
Steady green	Port is online (connected to external device) but has no traffic.	No action required.
Slow-flashing green (on 1/2 second; then off 1/2 second)	Port is online but segmented because of a loopback cable or incompatible device connection.	Verify that the correct device is attached to the switch.
Fast-flashing amber (on 1/4 second; then off 1/4 second)	Port is online and an internal loopback diagnostic test is running.	No action required.
Flickering green	Port is online and frames are flowing through the port.	No action required.
Steady amber	Port is receiving light or signal carrier, but it is not online yet.	No action required.
Slow-flashing amber (on 2 seconds; then off 2 seconds)	Port is disabled because of diagnostics or the <code>portDisable</code> command.	Reset the port. The <code>portCfgPersistentDisable</code> command is persistent across reboots.
Fast-flashing amber (on 1/2 second; then off 1/2 second)	SFP+ or port is faulty.	Reset the port. Replace the SFP+. Must be a IBM-branded SFP+.

QSFP port status LED

Refer to the following table to interpret the QSFP port status LEDs.

Table 11. QSFP port status LED patterns during normal operation

LED color	Status of hardware	Recommended action
No light	Indicates one of the following: <ul style="list-style-type: none"> No signal or light carrier (media or cable) detected. Device may be currently initializing. Connected device is configured in an offline state. 	<ul style="list-style-type: none"> Verify the power LED is on, and check the QSFP and cable. Verify the device is not currently being initialized. Verify the status of the connected device.

Table 11. QSFP port status LED patterns during normal operation (continued)

LED color	Status of hardware	Recommended action
Steady green	Port is online (connected to external device) but has no traffic.	No action required.
Slow-flashing green (on 1/2 second; then off 1/2 second)	Port is online but segmented because of a loopback cable or incompatible device connection.	Verify that the correct device is attached to the switch.
Fast-flashing amber (on 1/4 second; then off 1/4 second)	Port is online and an internal loopback diagnostic test is running.	No action required.
Flickering green	Port is online and frames are flowing through the port.	No action required.
Steady amber	Port is receiving light or signal carrier, but it is not online yet.	No action required.
Slow-flashing amber (on 2 seconds; then off 2 seconds)	Port is disabled because of diagnostics or the portDisable command.	Reset the port. The portCfgPersistentDisable command is persistent across reboots.
Fast-flashing amber (on 1/2 second; then off 1/2 second)	QSFP or port is faulty.	Reset the port. Replace the QSFP. Must be a IBM-branded QSFP.

Note: For the QSFP ports, if the port is configured as individual SFP+ FC ports on the other end using break-out cables, then the four individual port status LEDs for each QSFP should be monitored.

Interpreting nonport-side LEDs

Each field-replaceable power supply and fan assembly unit contains a status LED.

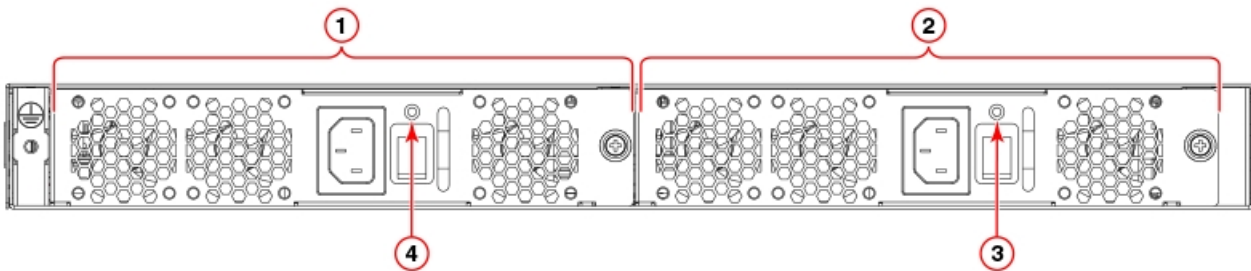


Figure 29. Nonport-side LEDs with AC power supplies

- 1 - Power supply and fan assembly 2
- 2 - Power supply and fan assembly 1
- 3 - Power supply and fan assembly 1 status LED
- 4 - Power supply and fan assembly 2 status LED

Power supply and fan assembly status LED

Refer to the following table to interpret the power supply and fan assembly status LED during normal operation.

Table 12. Power supply and fan assembly status LED patterns during normal operation

LED color	Description	Action required
No light	Power supply and fan assembly is not receiving power, or is off.	Verify that the power supply and fan assembly is on and seated and the power cord is connected to a functioning power source.
Steady green	Power supply and fan assembly is operating normally.	No action is required.
Flashing green (for more than 5 seconds)	<p>Power supply and fan assembly is faulty for one of the following reasons:</p> <ul style="list-style-type: none"> • The assembly is switched off (flashing for ~ 5 seconds, then off). • The power cable is disconnected (flashing for ~ 5 seconds, then off). • The power supply and fan assembly has failed. <p>Note: When the device is first powered on, the power supply and fan assembly status LED flashes until POST has completed.</p>	<p>Try one of the following:</p> <ul style="list-style-type: none"> • Check the power cable connection. • Verify that the assembly is powered on. • Replace the power supply and fan assembly.

Interpreting the POST results

About this task

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.

Procedure

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

About this task

BOOT includes the following tasks after POST is complete.

Procedure

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

About this task

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.

What to do next

It is recommended that you power-cycle the device after completing offline diagnostics tests.

Chapter 7. Power Supply and Fan Assembly

This chapter provides the following information:

- “Power supply and fan assembly overview”
- “Precautions specific to the power supply and fan assemblies” on page 60
- “Identifying the airflow direction” on page 61
- “Power supply and fan assembly status LED” on page 56
- “Power supply and fan assembly unit fault indicators” on page 62
- “Power supply and fan assembly task guide” on page 62
- “Time and items required” on page 63
- “Recording power supply and fan assembly critical information” on page 63
- “Removing a power supply and fan assembly” on page 64
- “Installing a new power supply and fan assembly” on page 65
- “Verifying the operation of the power supply and fan assemblies” on page 66

Power supply and fan assembly overview

The power supply and fan assembly units in the SAN64B-6 chassis can be removed and replaced without special tools. The device can continue operating during the replacement.

The device supports the following types of power supplies.

- AC power supply with nonport-side air exhaust. This unit moves the air from the port-side to the nonport-side of the device.
- AC power supply with nonport-side air intake. This unit moves the air from the nonport-side to the port-side of the device

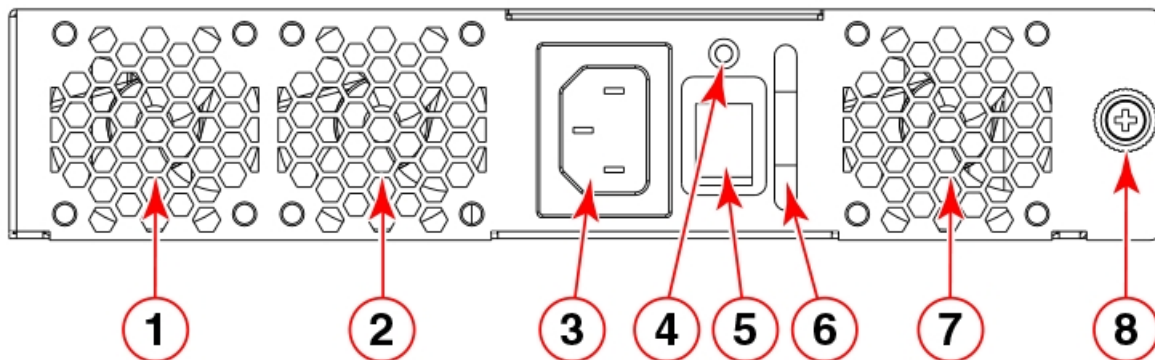


Figure 30. AC power supply and fan assembly

- 1 - Fan 3
- 2 - Fan 2
- 3 - AC power cable receptacle
- 4 - Power supply and fan assembly status LED
- 5 - Power-on switch
- 6 - Power supply and fan assembly handle

- 7 - Fan 1
- 8 - Captive screw

Notes:

- The two power supply and fan assemblies concurrently installed in the chassis must be of the same power type, model (airflow direction), and part number. If the airflow directions are different, an error is generated on the console.
- The power supply and fan assembly units are hot-swappable if they are replaced one at a time. They are identical and fit into either slot.
- The device can operate all the ports with one power supply and fan assembly unit if you do not require redundancy.

The device fans are fixed inside the combined power supply and fan assemblies to provide necessary airflow to cool the whole system. There are three fans located in each unit. The system software sets fan speed and measures fan speed through the tachometer interface.

Precautions specific to the power supply and fan assemblies



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.



CAUTION:

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



CAUTION:

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



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:

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



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.

Notes:

- The equipment installation must meet NEC/CEC code requirements. Consult local authorities for regulations.
- If the ambient temperature is above the recommended operational limits, the power supply units shutdown, which in turn shuts down the device without any warning message.

Identifying the airflow direction

The power supply and fan assemblies are identified by the following airflow directions:

- **Intake power supply and fan assembly with an orange "I" label or without any label:** Pulls air from the nonport-side of the switch and exhausts it out the port side.



- Nonport-side air intake
- Port-side air exhaust
- Back-to-front (nonport-side to port-side) airflow
- Part numbers ending with **-R**

- **Exhaust power supply and fan assembly with a green "E" label:** Pulls air from the port side of the switch and exhausts it out the nonport-side.



- Nonport-side air exhaust
- Port-side air intake
- Front-to-back (port-side to nonport-side) airflow
- Part numbers ending with **-F**

Power supply and fan assembly status LED

Refer to the following table to interpret the power supply and fan assembly status LED during normal operation.

Table 13. Power supply and fan assembly status LED patterns during normal operation

LED color	Description	Action required
No light	Power supply and fan assembly is not receiving power, or is off.	Verify that the power supply and fan assembly is on and seated and the power cord is connected to a functioning power source.
Steady green	Power supply and fan assembly is operating normally.	No action is required.
Flashing green (for more than 5 seconds)	Power supply and fan assembly is faulty for one of the following reasons: <ul style="list-style-type: none">• The assembly is switched off (flashing for ~ 5 seconds, then off).• The power cable is disconnected (flashing for ~ 5 seconds, then off).• The power supply and fan assembly has failed. Note: When the device is first powered on, the power supply and fan assembly status LED flashes until POST has completed.	Try one of the following: <ul style="list-style-type: none">• Check the power cable connection.• Verify that the assembly is powered on.• Replace the power supply and fan assembly.

Power supply and fan assembly unit fault indicators

Use one of the following methods to determine the status of the power supply and fan assemblies:

- Check the power supply and fan assembly status LED.
- In Web Tools, click the Power Status icon.
- Enter the **psShow** command at the prompt to display power supply and fan assembly status, as shown in the following example:

```
Device:admin> psshow
Power Supply #1 is OK
Power Supply #2 is OK
```

Power supply and fan assembly task guide

You can perform an easy set of steps to install or replace a power supply and fan assembly or to replace both power supply and fan assemblies. By default, both of the power supply and fan assemblies are installed in the device.

Installing an additional power supply and fan assembly (hot-install)

If your device is up and running with a single power supply and fan assembly and you want to install an additional power supply, complete the following steps.

1. Remove the existing filler panel.
2. Insert the new power supply and fan assembly.
3. Power on the power supply and an assembly.
4. Verify the power supply and fan assembly status LED.

Replacing a power supply and fan assembly (hot-swap)

If your device is up and running with two power supply and fan assemblies, but one of them has failed, complete the following steps.

1. Power down the old or failed power supply and fan assembly.
2. Remove the old or failed power supply and fan assembly.
3. Insert the new power supply and fan assembly.
4. Power on the power supply and fan assembly.
5. Verify the power supply and fan assembly status LED.

Replacing both power supply and fan assemblies (cold-swap)

If your device is up and running with both power supply and fan assemblies, but you want to replace both of them, complete the following steps.

1. Shut down the system using the `sysShutDown` command.
2. Power down the device/both FRUs.
3. Remove the old/failed FRUs.
4. Insert the new FRUs.
5. Power on the FRUs.
6. Verify the FRU status LEDs.

Time and items required

Installing or removing and replacing a power supply and fan assembly should require less than five minutes to complete.

The following items are required to replace a power supply and fan assembly:

- New power supply and fan assembly (must have the same airflow direction as the power supply and fan assembly being replaced)
- #1 Phillips-head screwdriver

Recording power supply and fan assembly critical information

About this task

You can use the following commands to record the power supply and fan assembly configuration and operations information:

- `chassisshow`
- `fanshow`
- `psshow`
- `historyshow`

- tempshow
- sensorshow

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

Removing a power supply and fan assembly

About this task

Complete the following steps to remove a faulty power supply and fan assembly.



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.

Procedure

1. To leave the device in service while replacing a power supply and fan assembly, verify that the other power supply and fan assembly (the one not being replaced) has been powered on for at least four seconds and has a steady green LED.

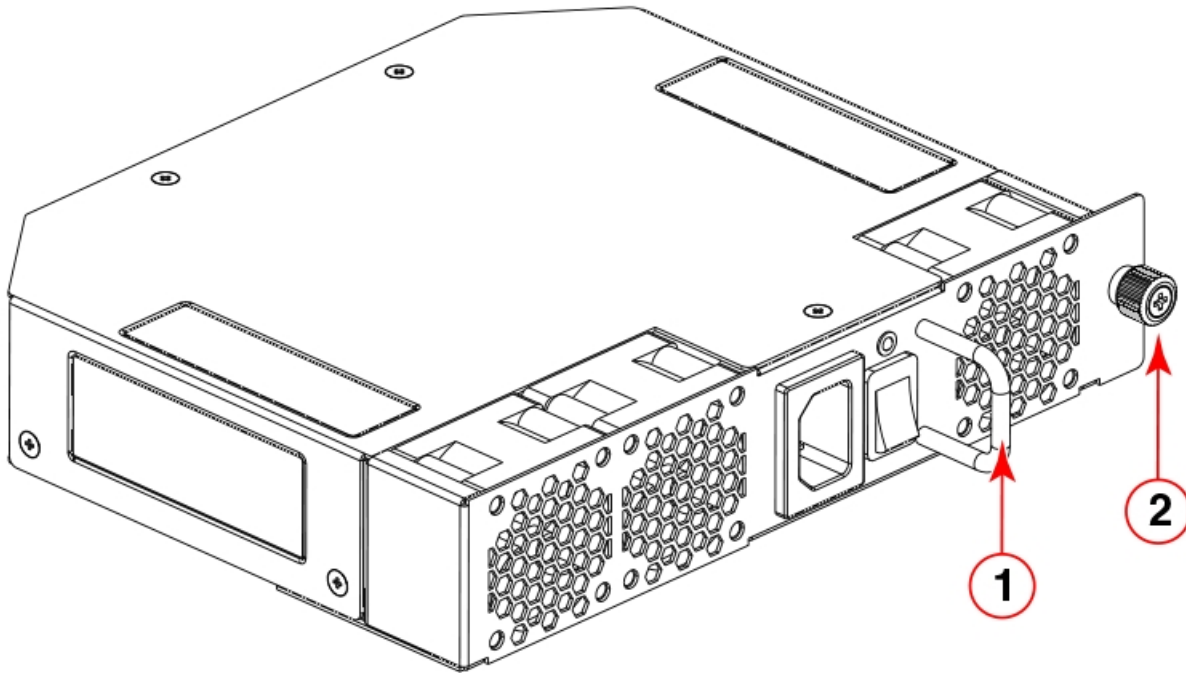


Figure 31. AC power supply and fan assembly

- 1 - Power supply and fan assembly handle
 - 2 - Captive screw
2. Power off the power supply to be replaced by flipping the AC power switch to the off position (the “O” symbol). The fans in the other power supply will automatically switch to high speed to maintain adequate cooling.
 3. Unplug the power cord from the power supply and fan assembly that is being replaced.
 4. Using a Phillips screwdriver, unscrew the captive screw.

5. Remove the power supply and fan assembly from the chassis by pulling the handle out and away from the chassis.

Installing a new power supply and fan assembly

Before you begin

The new power supply and fan assembly must have the same part number and airflow label (or lack thereof) as the power supply and fan assembly already installed.

About this task

Complete the following steps to install a new power supply and fan assembly into the chassis.



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.

Procedure

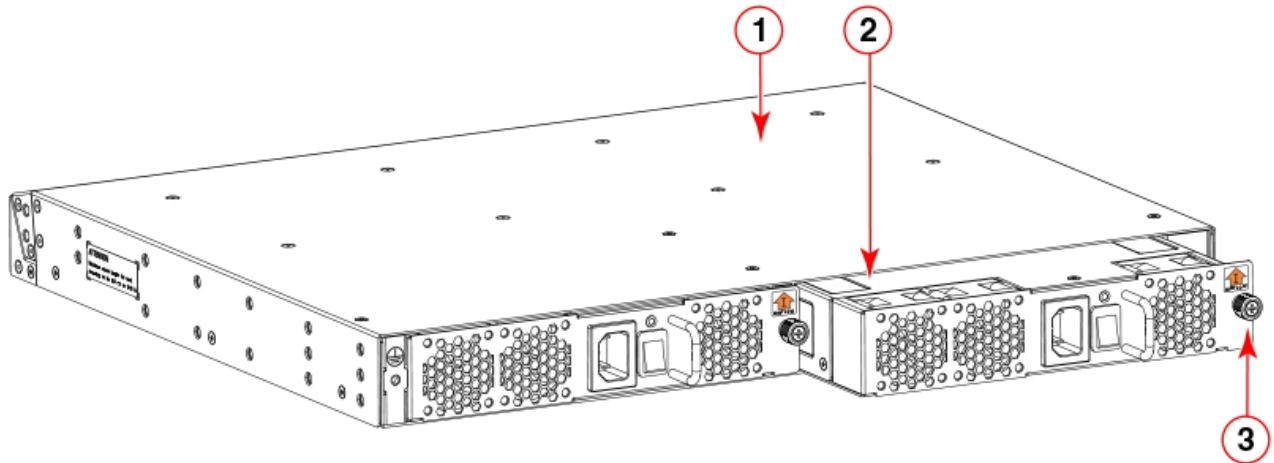
1. To leave the device in service while installing a power supply and fan assembly, verify that the other power supply and fan assembly (the one already installed) has been powered on for at least four seconds and has a steady green LED.
2. Using a Phillips screwdriver, unscrew the captive screw of the filler panel that is located in the empty power supply and fan assembly slot.
3. Orient the new power supply and fan assembly with the captive screw on the right, as shown in the figure.

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



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.



- 1 - The device
- 2 - AC power supply and fan assembly
- 3 - Captive screw

Figure 32. Install an AC power supply and fan assembly

4. Gently push the power supply and fan assembly into the chassis until it is firmly seated.
5. Using the Phillips screwdriver, secure the power supply and fan assembly to the chassis by tightening the captive screw.
6. Plug the power cord into the power supply and fan assembly and power on the unit by flipping the PSU power switch to the on position (the "I" symbol).
7. Verify that the LED on the new power supply and fan assembly displays a steady green light while the device is operating. If the LED is not a steady green, ensure that the power supply is securely installed and seated properly.
8. Optional: Enter `psshow` to display the PSU status. The power supply and fan assembly status can also be viewed using Web Tools.

Verifying the operation of the power supply and fan assemblies

About this task

You can use the following commands to verify that the power supply and fan assemblies are operational:

- `psShow`
- `fanShow`
- `switchShow`
- `errDump`

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

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 33 and remove the BR1225 battery from the holder.

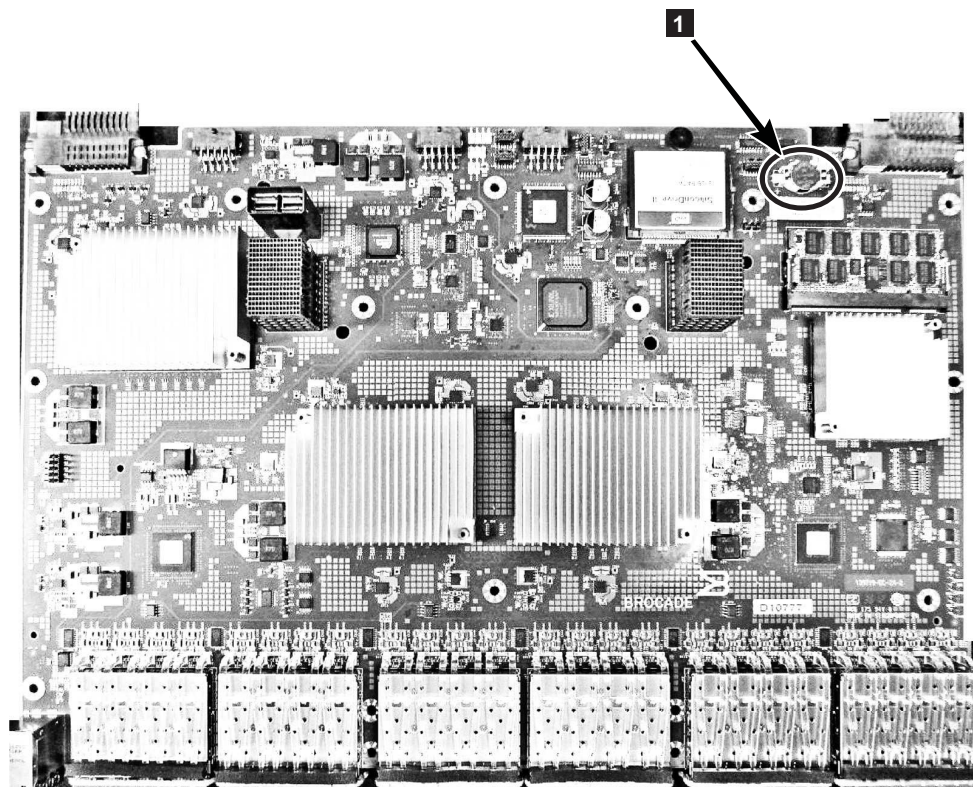


Figure 33. Location of battery holder

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.

Appendix. Product specifications

This appendix provides the specifications for the SAN64B-6 switch.

- “System specifications”
- “Fibre Channel” on page 70
- “LEDs” on page 70
- “Weight and physical dimensions” on page 71
- “Environmental requirements” on page 71
- “Power supply specifications (per PSU)” on page 72
- “Data port specifications (Fibre Channel)” on page 73
- “Serial port specifications (pinout RJ-45)” on page 74
- “Memory specifications” on page 74
- “Regulatory compliance (EMC)” on page 75
- “Regulatory compliance (safety)” on page 75
- “Regulatory compliance (environmental)” on page 75

System specifications

System component	Description
Enclosure	1U, nonport-side front-to-back exhaust airflow, power from back
Power inlet	C14
Power supplies	Dual, hot-swappable redundant power supplies with integrated system cooling fans
Fans	Three fans per power supply and fan assembly unit
Cooling	Port side to the nonport-side of the switch (nonport-side exhaust) and nonport-side to the port side (port-side exhaust)
System architecture	Nonblocking shared memory switch
System processors	Freescale T1022 CPU
Port-to-port latency	< 70 nanoseconds with no contention (destination port is free)

Fibre Channel

System component	Description
Fibre Channel ports	<p>48 SFP+ ports that support any combination of Short Wavelength (SWL) and Long Wavelength (LWL) or Extended Long Wavelength (ELWL) optical media.</p> <p>4 QSFP ports that support 32-Gbps QSFP transceivers.</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 is minimum of 4 Gbps speed. • 8-, 16-, and 32-Gbps performance is enabled by 32-Gbps SFP+ transceivers provided the other end of the connection is minimum of 8 Gbps speed. <p>Note: 2- and 4-Gbps transceivers are not supported.</p>
ANSI Fibre Channel protocol	FC-PH (Fibre Channel Physical and Signaling Interface standard)
Modes of operation	Fibre Channel Class 2 and Class 3
Fabric initialization	Complies with FC-SW-3 Rev. 6.6
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 1000Base-X / 100Base-TX port / 10Base-T
USB port	One external USB port

LEDs

System component	Description
System power LED	One green system power status LED (upper) on the port side.
System status LED	One bicolor (green/amber) system status LED (lower) on the port side.
Ethernet port link LED	One link LED on the left of the RJ45 connector. Glows green for 1000 Mbps and amber for 100/10 Mbps.
Ethernet port activity LED	One activity LED on the right of the RJ45 connector.
Serial console port LED	The serial console port LEDs remain off at all times, even when a cable is inserted and the link is active.
FC port status LED	64 bicolor (green/amber) port status LEDs. One for each SFP+ port and four for each QSFP port on the switch.

System component	Description
Power supply and fan assembly status LED	One green power supply and fan assembly status LED on each power supply and fan assembly on the nonport-side of the switch.

Other

System component	Description
Serial cable	RJ-45 console cable
RJ-45 to DB9 adapter	RJ-45 to DB9 for console cable
RJ-45 connector	Uses an RJ-45 connector for the serial port

Weight and physical dimensions

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

Model	Height	Width	Depth	Weight (empty)	Weight (fully loaded)
SAN64B-6 switch	4.39 cm	44.00 cm	35.56 cm	7.71 kg	8.53 kg
	1.73 inches	17.32 inches	14.00 inches	17.00 lb	18.80 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)
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: 71.36 cmh (42 cfm) Nominal: 59.47 cmh (35 cfm)	N/A
Heat dissipation	Refer to the Power consumption table	N/A
Operating noise	Maximum: 65 dB	N/A

Power supply specifications (per PSU)

Power supply model	Maximum output power rating (DC)	Input voltage	Input line frequency	Maximum input current	Input line protection	Maximum inrush current
XBR-G250WPSAC-F	250 W	100 - 240 VAC (nominal) 90 - 264 VAC (range)	50/60 Hz (nominal) 47 - 63 Hz (range)	3.5 A	Line fused	50 A peak @ 240 VAC for <0ms, 10 ms - 150 ms, <15A peak. 50 A peak @ 240 VAC at cold start for <10ms. 15 A peak for cycles 10 ms - 150 ms. <3.5 A peak for >150 ms
XBR-G250WPSAC-R	250 W	100 – 240 VAC (nominal) 90 – 264 VAC (range)	50/60 Hz (nominal) 47 – 63 Hz (range)	3.5 A	Line Fused	50 A peak @ 240 VAC for <10 ms, 10 ms - 150 ms, <15 A peak. 50 A peak @ 240 VAC at cold start for <10 ms. 15 A peak for cycles 10 ms - 150 ms. <3.5 A peak for >150 ms

Power consumption (typical configuration)

Model name	@100 VAC input	@200 VAC input	@48 VDC input	Minimum number of power supplies	Notes
SAN64B-6 switch	1.93 A 192 W 655 BTU/hr	0.97 A 190 W 649 BTU/hr	N/A	1 (But, input current is for 1 PSU. Watts and BTUs/hr are with 2 PSUs).	Fully configured all ports with 25% traffic rate, fans at high speed, and input power +/- 5% tolerance.

Power consumption (maximum configuration)

Model name	@100 VAC input	@200 VAC input	@48 VDC input	Minimum number of power supplies	Notes
SAN64B-6 switch	2.07 A 204 W 696 BTU/hr	1.03 A 202 W 690 BTU/hr	N/A	2 (But, input current is for 1 PSU. Watts and BTUs/hr are with 2 PSUs).	Fully configured all ports with 100% traffic rate, fans at high speed, and input power +/- 5% tolerance.

Power consumption (idle configuration)

Model name	@100 VAC input	@200 VAC input	@48 VDC input	Minimum number of power supplies	Notes
SAN64B-6 switch	1.54 A 155 W 529 BTU/hr	0.77 A 154 W 526 BTU/hr	N/A	1 (But, input current is for 1 PSU. Watts and BTUs/hr are with 2 PSUs).	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)

Name	Port Numbers	Media Type	Description
SAN64B-6 switch	0 to 47	10-, 16-, or 32-Gbps SFP+ optical ports	Can be an F_Port, N_Port, E_Port, or EX_Port
	48 to 63	4 x 16-Gbps (64 Gbps) or 4 x 32-Gbps (128 Gbps) QSFP optical ports	Can be an E_Port or EX_Port

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)	N/A	N/A	
		380 m (1,264 ft) (OM3)			
		400 m (1,312 ft) (OM4)			
8	50	50 m (164 ft) (OM2)	N/A	N/A	
		150 m (492 ft) (OM3)			
		190 m (623 ft) (OM4)			
10	50	82 m (269 ft) (OM2)	N/A	N/A	
		300 m (984 ft) (OM3)			
		550 m (1,804 ft) (OM4)			
4	62.5	70 m (229 ft)	N/A	N/A	
		N/A			30 km (18.6 miles)
		N/A			10 km (6.2 miles)
8	62.5	21 m (68 ft)	N/A	N/A	
		N/A			10 km (6.2 miles)
		N/A			10 km (6.2 miles)
10	62.5	33 m (108 ft)	N/A	N/A	
		N/A			10 km (6.2 miles)
		N/A			10 km (6.2 miles)

Port speed (Gbps)	Cable size (microns)	Short wavelength (SWL)	Long wavelength (LWL)	Extended long wavelength (ELWL)
16	50	35 m (115 ft) (OM2)	N/A	N/A
		100 m (328 ft) (OM3)		
		125 m (410 ft) (OM4)		
32	62.5	15 m (49 ft)	N/A	N/A
	9	N/A	10 km (6.2 miles)	N/A
	50	70 m (230 ft) (OM3)	N/A	N/A
100 m (328 ft) (OM4)				
62.5		N/A	N/A	N/A
32	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_RXD	Receive data
4	GND	Logic ground
5	GND	Logic ground
6	UART2_TXD	Transmit data
7	Not supported	N/A
8	Not supported	N/A

Note: These specifications are for connector on IBM platform only.

Serial port specifications (protocol)

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

Memory specifications

Memory	Type	Size
Main Memory	DDR3L SDRAM with 8-bit ECC, SORDIMM package, operating at 1200 MT/s	4 GB, 64-bit
Boot Flash	Parallel NOR flash embedded memory	8 MB
eUSB Module	-	2 GB

Regulatory compliance (EMC)

- FCC Part 15, Subpart B (Class A)
- EN 55022 (CE mark) (Class A)
- EN 55024 (CE mark) (Immunity) for Information Technology Equipment
- ICES-003 (Canada) (Class A)
- AS/NZ 55022 (Australia) (Class A)
- VCCI (Japan) (Class A)
- EN 61000-3-2
- EN 61000-3-3
- EN 61000-6-1

Regulatory compliance (safety)

- CAN/CSA-C22.2 No. 60950/UL 60950
- EN 60825 Safety of Laser Products
- EN 60950/IEC 60950 Safety of Information Technology Equipment

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).

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Warning:

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

Canadian requirements

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

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

CE statement

Attention: This is a Class A product. In a domestic environment, this product might cause radio interference, and the user might be required to take corrective measures.

The standards compliance label on this device contains the CE mark which indicates that this system conforms to the provisions of the following European Council directives, laws, and standards:

- Electromagnetic Compatibility (EMC) Directive 2004/108/EEC
- Low Voltage Directive (LVD) 2006/95/EC
- EN50082-2/EN55024:1998 (European Immunity Requirements)
 - EN61000-3-2/JEIDA (European and Japanese Harmonics Spec)
 - EN61000-3-3

China ROHS

Refer to the latest revision of the China ROHS document (P/N 53Δ1000428Δxx) which ships with the product.

FCC warning (US only)

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

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

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Germany statement

Machine noise information regulation - 3. GPSGV, the highest sound pressure level value is 64.2 dB(A) in accordance with EN ISO 7779.

Maschinenlärminformations-Verordnung - 3. GPSGV, der höchste Schalldruckpegel beträgt 64.2 dB(A) gemäss EN ISO 7779.

Index

A

about this document xix
accessibility ix
 features ix
address
 IBM x
attention notices xv

B

battery
 disposal 67
 location 67
 recycling 67
 removal 67
Brocade
 documents xix
 equivalent product models xx
BSMI statement (Taiwan) 79

C

Canadian requirements 79
CE statement 79
comments
 sending to IBM x

D

data transmission ranges 69
director of licensing, address 77
documentation xix
 Brocade xix
 Fabric Operating System (FOS) xix
 updates xix

E

electrostatic discharge
 precautions xvi
environmental
 notices xi, xviii
 product recycling and disposal xviii
environmental requirements
 battery 67
ESD
 precautions xvi

F

Fabric Operating System (FOS)
 documents xix
Fabric OS
 documentation
 updates ix
 Release Notes ix
 updates ix
Fabric OS version xix

fan
 location 2
FCC warning (US only) 79
Fibre Channel ports
 location 1

G

getting help ix

H

help ix

I

IBM
 address x
 notices 77
 trademarks 78
IBM contacts ix
IBM Publications Center ix, xix
IBM Support Portal ix, xix
installation
 stand-alone unit 14
intellectual property 77
intended audience xix

L

labels
 safety xiv
license, for patents 77

M

management Ethernet port
 location 1
memory
 specifications 69

N

non-port side
 components 2
 features 2
notices
 attention xv
 environmental xi, xviii
 general 77
 IBM 77
 patents 77
 safety xi
 types xi

P

patents 77

port side
 components 1
 features 1
ports
 Ethernet management 1
 Fibre Channel 1
 serial 1
 USB 1
power supply
 location 2
 specifications 69
precautions
 ESD xvi
 rack installation xvi
 rack relocation xvi
product
 accessibility ix
 documentation xix
 models xix
 specifications 69
 support ix
product disposal xviii
product models
 Brocade xx
 IBM xx
product recycling xviii
product specifications
 FC port 69
 memory 69
 physical dimensions 69
 power supply 69
 serial port 69
 weight 69
providing feedback x
publication
 feedback x

R

rack
 safety precautions xvi
rack relocation
 safety xviii
read this first ix
recycle
 battery 67
Redbooks ix
removal
 battery 67

S

safety
 notices xi
 rack installation xvi
 rack relocation xviii
safety labels xiv
SAN64B-6
 specifications 69
 stand-alone unit 14

- serial port
 - location 1
- stand-alone unit
 - installation 14
- support ix
- switch
 - documentation xix
 - non-port side 2
 - port side 1
- switch ID tab
 - location 1

T

- trademarks 78

U

- USB port
 - location 1

V

- VCCI statement 80

W

- Web sites ix



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