



# **Brocade 7840 Extension Switch Hardware Installation Guide**

**Hardware Installation Guide  
5 June 2019**

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## About This Document

### 1.1 Supported software

This document includes information specific to the Brocade 7840 extension switch running Brocade Fabric OS 7.3.0 and later.

**Table 1: Power supply and fan assemblies**

Part number	Description	Introduced (OS)	Currently supported (OS)
XBR-1100WPSAC-F	1100W AC power supply with nonport-side exhaust airflow	Fabric OS 7.3.0	Yes
XBR-1100WPSAC-R	1100W AC power supply with nonport-side intake airflow	Fabric OS 7.3.0	Yes

**Table 2: Rack mount kits**

Part number	Description
XBR-R000294	Universal two-post mid-mount or flush-mount rack kit
XBR-R000296	Universal four-post fixed rack mount kit

### 1.2 What's new in this document

The following changes have been made since this document was last released:

- Indicated that SFPs and QSFPs are hot-swappable.
- Provided instructions on how to identify the integrated fans 4 and 5.
- Outlined how to earth-ground the Brocade G6520 Switch chassis.

### 1.3 Notes, Cautions, and Danger Notices

Notes, cautions, and danger statements may be used in this document.

**NOTE**

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



**CAUTION**

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



**DANGER**

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

### 1.4 Document Feedback

Quality is our first concern. We have made every effort to ensure the accuracy and completeness of this document. However, if you find an error or an omission or if you think that a topic needs further development, we want to hear from

you. Send your feedback to [documentation.pdl@broadcom.com](mailto:documentation.pdl@broadcom.com). Provide the publication title, publication number, topic heading, page number, and as much detail as possible.

# Device Overview

## 2.1 Overview of Brocade 7840 Extension Switch

The Brocade 7840 Extension Switch is intended as a platform for Fibre Channel over IP (FCIP). This enables transmission of Fibre Channel data over long distances by way of IP networks by wrapping Fibre Channel frames in IP packets. Each end of the FCIP communication path must be a compatible FCIP device.

The switch can operate independently or in a fabric containing multiple extension switches.

### 2.1.1 Brocade 7840 software features

The Brocade 7840 provides the following software features:

- Multiple logical FCIP tunnels with maximum tunnel bandwidth up to 20Gbps allow for scalable connectivity between sites. Note that the 7840 does not support FCIP connectivity with any other products including the Brocade 7800 and FX8-24.
- FCIP Trunking feature allows multiple IP source and destination address pairs (defined as FCIP circuits) via multiple 1/10GbE or 40GbE interfaces to provide high bandwidth FCIP tunnel and lossless failover resiliency. In addition, each FCIP circuit supports four QoS classes (Class-F, High, Medium and Low Priority), each as a TCP connection.
- ARL feature meets minimum bandwidth guarantee for each tunnel while making the full utilization of the available network bandwidth without adverse throughput performance impact at high traffic load.
- Hardware-based compression delivers the ability to maximize throughput over lower bandwidth links in the wide area network, optimizing the cost efficiencies of FCIP. The 7840 compresses FC frames before they are encapsulated into FCIP packets.
- Key protocol features are enabled in the FCIP implementation to optimize performance of Extension over IP networks, including FX8-24 and WAN Optimized TCP (WO-TCP), 9K jumbo frame and end-to-end Path MTU auto discovery.
- Hardware-based IPsec supports mix of secure and non-secure tunnels on the same Ethernet port, jumbo frames, and VLAN tagged connections. The Brocade 7840 IPsec function is capable of supporting both IPv4 and IPv6.
- FastWrite, Open Systems Tape Pipelining and Advanced Accelerator for FICON mitigate the latency effect of a long distance FCIP distance connection over IP WAN.
- FCIP HCL (Hot Code Load) provides In-service firmware upgrade for supporting 24/7 non-stop business operations
- Built-in WAN link tester generates traffic over an IP connection to test for maximum throughput, congestion, loss percentage, out of order deliver, latency, and other network conditions. It helps determine the health of a WAN link before deploying it for use.
- Fabric Vision advanced monitoring provides the following functions:
  - Policy based monitoring monitors FCIP connectivity and WAN anomalies using multi-layer metrics.
  - Flow monitoring reports IOPS and data rate of individual I/O flows of inter-DC replication and tape backup operations.
  - Flow generator generates FC frames for a defined flow with default or custom size and pattern and sent across FCIP tunnel to help validate end to end network setup and configuration.
- Brocade Fabric OS delivers distributed intelligence throughout the network and enables a wide range of value-added applications.

### 2.1.2 Brocade 7840 hardware features

The Brocade 7840 provides the following hardware features:

- 24 Fibre Channel ports with link speeds of 2, 4, 8, and 16 Gbps, compatible with short wavelength (SWL), long wavelength (LWL) and extended long wavelength (ELWL) SFP+ transceivers
- Rack-mountable 2U chassis
- Sixteen 1 GbE/10 GbE ports, compatible with copper, ultra short reach (USR), short reach (SR) and long reach (LR) SFP/SFP+ transceivers
- Two 40 GbE ports, compatible with short reach (SR) and long reach (LR) QSFP transceivers

**NOTE**

The SFPs and QSFPs are hot-swappable.

- One RJ-45 Ethernet management port with 10/100/1000 Mbps autonegotiating capability
- One USB port that provides storage for firmware updates, output of the `supportSave` command, and storage for configuration uploads and downloads
- Two redundant, hot-swappable 1100 W AC/DC power supply units (PSUs) with integral fans
- 3 port-side exhaust DC fan FRUs

**NOTE**

QSFPs used in the FC16-64 blades (and 8510 core blades) are not compatible with the Brocade 7840.

**DANGER**

Batteries used for RTC/NVRAM backup are not located in operator-access areas. There is a risk of explosion if a battery is replaced by an incorrect type. Dispose of used components containing batteries according to the local ordinance and regulations.

### 2.1.3 Brocade 7840 feature licensing

The Brocade 7840 provides the following licensing features:

- Tiered WAN throughput licensing provides coverage of multiple customer segments with one physical platform:

**NOTE**

The application throughput numbers shown in the following table assume that some degree of data compression is occurring. However, Brocade makes no promises, guarantees, or any indication that some level of compression is possible for customer-specific data. Some data is highly compressible and some data cannot be compressed. The amount of application throughput varies depending on data compressibility and the selected compression mode.

Product configuration	FC Ports	Ethernet Ports	WAN rate limiting	Approximate Application throughput
Base configuration	24 16-Gbps	16 1/10-GbE	5 Gbps	15 Gbps (see note above)
Medium configuration (Base + WAN Rate Upgrade 1)	24 16-Gbps	16 1/10-GbE	10 Gbps	30 Gbps (see note above)
Max configuration (Base + WAN Rate Upgrade 1 and WAN Rate Upgrade 2)	24 16-Gbps	16 1/10-GbE + 2 40-GbE	Unlimited	80 Gbps (see note above)

- Two base unit SKUs:
  - One SKU with SWL SFPs (Enterprise Bundle and Advanced Extension are included)
  - One SKU with LWL SFPs (Enterprise Bundle and Advanced Extension are included)
- Streamlined feature licensing:

- The Brocade 7840 uses common licenses with other midrange products (e.g. Brocade 6510) for IR and CUP.
- A new SKU for Advanced Acceleration for FICON license on the Brocade 7840 is introduced.
- All ports and interfaces on the switch are active except for the 40GE interfaces. The 40GE interfaces are enabled as part of WAN Rate Upgrade 2.

### 2.1.3.1 Available licenses

The following features are available with the purchase of a specific license key for the Brocade 7840:

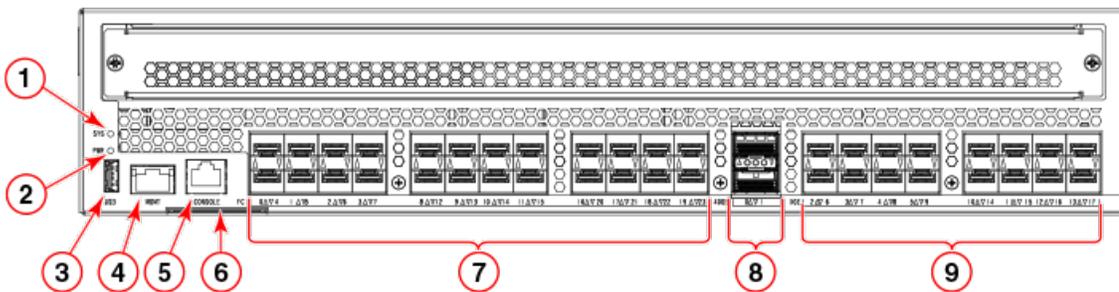
- Integrated Routing (IR)
- Advanced Acceleration for FICON
- FICON CUP
- WAN Rate Upgrade 1
- WAN Rate Upgrade 2

For information on these features, refer to the *Brocade Fabric OS Administration Guide*.

## 2.2 Port side of the switch

The following figures show the port side of the switch.

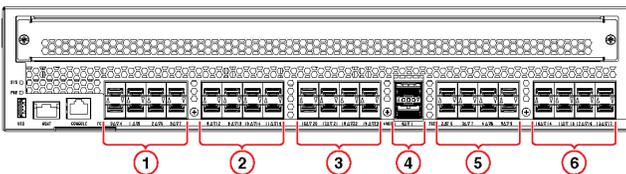
**Figure 1: Port side view of the Brocade 7840 Extension Switch**



- |                             |                                      |
|-----------------------------|--------------------------------------|
| 1. System Status LED        | 6. Serial number pull-out tab        |
| 2. Power Status LED         | 7. 16 Gbps FC ports (24)             |
| 3. USB port                 | 8. 40 Gbps/GbE FCIP ports (QSFP) (2) |
| 4. Ethernet Management port | 9. 1/10 GbE FCIP ports (16)          |
| 5. Console port (RJ-45)     |                                      |

The Fibre Channel ports are numbered from left to right on the faceplate, as shown in the following figure.

**Figure 2: Port numbering in the switch**



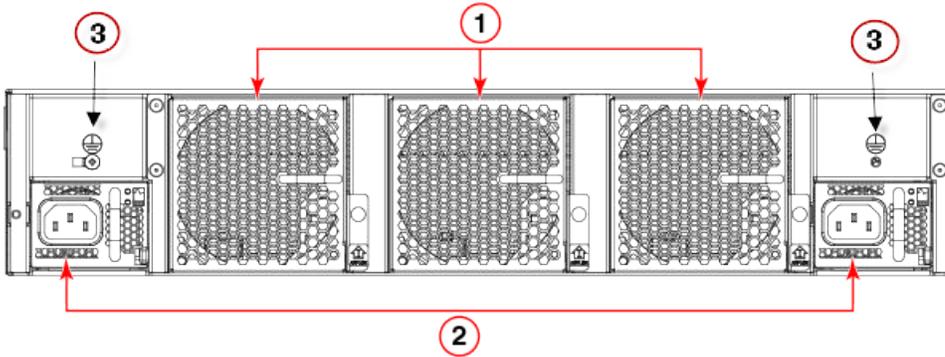
- |                                     |  |
|-------------------------------------|--|
| 1. FC ports (16 Gbps) 0 through 7   | 4. FCIP ports (40 Gbps/GbE) 0 and 1 (QSFP) |
| 2. FC ports (16 Gbps) 8 through 15  | 5. FCIP ports (1/10 GbE) 2 through 9       |
| 3. FC ports (16 Gbps) 16 through 23 | 6. FCIP ports (1/10 GbE) 10 through 17     |

You can have three Brocade Trunk groups on a fully licensed switch. Group 1 would consist of FC ports 0 through 7, group 2 would be ports 8 through 15, and group 3 would be ports 16 through 23.

## 2.3 Non-port side view

The following figure shows the nonport side of the switch, which contains two power supply FRUs and three fan FRUs.

**Figure 3: Nonport-side view**



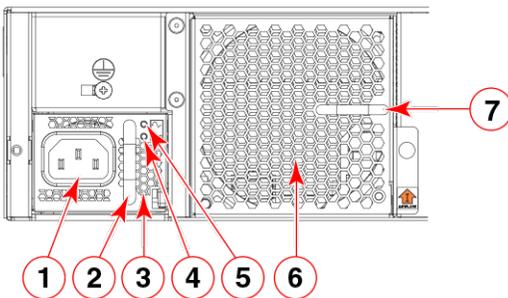
1. Fan FRUs (Fan 1, 2, and 3 from right to left)
2. Power supply FRUs with integral fans (PS 1 and 2 from right to left)
3. Threaded ground lug connection

### NOTE

Fan 4 is integrated with PS 1 and Fan 5 is integrated with PS 2.

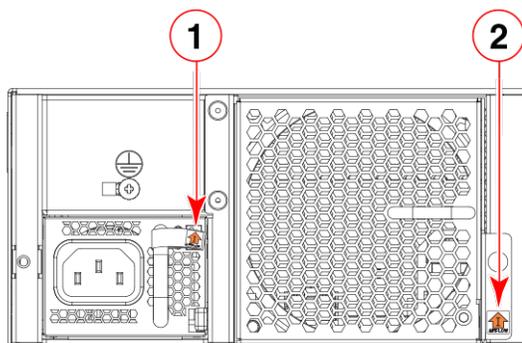
The following figure shows the components of the power supply and fan FRUs.

**Figure 4: Power supply and fan details**



- |                           |                        |
|---------------------------|------------------------|
| 1. AC power socket        | 5. AC input status LED |
| 2. Handle                 | 6. Fan air inlet       |
| 3. Integral fan air inlet | 7. Handle              |
| 4. DC output status LED   |                        |

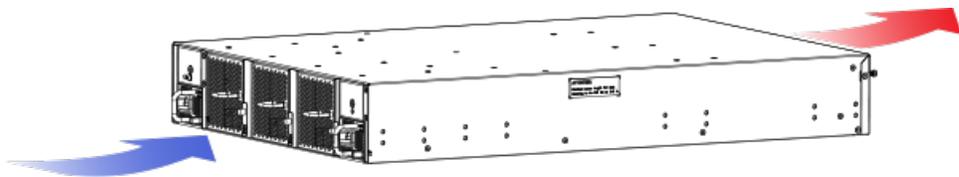
The following figure shows the airflow labels on the power supply and fan FRUs.

**Figure 5: Power supply and fan airflow labels**

1. Airflow label for PSU integral fan

2. Airflow label for fan FRU

The following figure shows the fan airflow (Intake only) for the device. Exhaust airflow fan is not supported in this release.

**Figure 6: Intake airflow fans**

## 2.4 Switch management

You can use the management functions built into the switch to monitor the fabric topology, port status, physical status, and other information to help you analyze switch performance and to accelerate system debugging.

For information about upgrading the version of Fabric OS installed on your switch, refer to the *Brocade Fabric OS Administration Guide*

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

**Table 3: Management options for the Brocade 7840**

Management tool	Out-of-band support
Command line interface (CLI) Up to two admin sessions and four user sessions simultaneously. For more information, refer to the <i>Brocade Fabric OS Administration Guide</i> and the <i>Brocade Fabric OS Command Reference</i> .	Ethernet (preferred) or console port connection
Brocade Network Advisor	Ethernet (preferred) or console port connection
Brocade Web Tools For information, refer to the <i>Brocade Web Tools Administration Guide</i> .	Ethernet (preferred) or console port connection
Standard SNMP applications You can download the Brocade-specific MIB files from the downloads area of the MyBrocade site under the applicable Fabric Operating System (FOS) release. For information about SNMP support in Fabric OS and how to use MIBs, refer to the <i>Fabric OS Administrator's Guide</i> . For release-specific SNMP enhancements, refer to the release notes. Distribution of standard MIBs has been stopped. Download the required standard MIBs from the <a href="http://www.oidview.com">www.oidview.com</a> or <a href="http://www.mibdepot.com">www.mibdepot.com</a> web sites.	Ethernet (preferred) or console port connection

**Table 3: Management options for the Brocade 7840 (Continued)**

Management tool	Out-of-band support
Management Server For information, refer to the <i>Brocade Fabric OS Administration Guide</i> and the <i>Brocade Fabric OS Command Reference</i> .	Ethernet (preferred) or console port connection

# Preparing for Installation

## 3.1 Installation and safety considerations

You can install the device in the following ways:

- As a standalone unit on a flat surface.
- In an EIA rack using the Universal Two-Post Rack Kit or Universal Four-Post Rack Kit.

To install and operate the device successfully, ensure that the following requirements are met:

- The primary AC input is 100-240 VAC (the device autosenses input voltage), 50-60 Hz. 200-240 VAC is recommended.
- The primary outlet is correctly wired, protected by a circuit breaker, and grounded in accordance with local electrical codes. The best practice is that each power supply obtains its power from a different protected and wired source.
- The supply circuit, line fusing, and wire size are adequate, as specified by the electrical rating on the device nameplate.

For power supply information, refer to [Power supplies fan assemblies](#).

To ensure adequate cooling, install the device with the nonport side, which contains the air intake vents, facing a cool-air aisle.

**CAUTION**

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

Verify that the ambient humidity remains between 20 and 85 percent while the device is operating.

**CAUTION**

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

If installing the device in a rack:

- The rack must be a standard EIA rack.
- Plan for a rack space that is 2U (8.89 cm; 3.5 in.) high, 48.3 cm (19 in.) wide, and at least 61 cm (24 in.) deep.
- Ground all equipment in the rack through a reliable branch circuit connection and maintain ground at all times. Do not rely on a secondary connection to a branch circuit, such as a power strip.
- Ensure that airflow and temperature requirements are met on an ongoing basis.
- Verify that the additional weight of the device does not exceed the rack's weight limits or unbalance the rack in any way.

**DANGER**

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

## 3.2 Installation precautions

Review all installation precautions before installing the device.

### 3.2.1 General precautions

**DANGER**

The procedures in this manual are for qualified service personnel.

**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.

**DANGER**

All fiber-optic interfaces use Class 1 lasers.

**DANGER**

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

## 3.2.2 Power precautions

This device might have more than one power cord. To reduce the risk of electric shock, disconnect both 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.

**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.

Connect the power cord only to a grounded outlet.

**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.

You must earth-ground the switch chassis using one of the following two methods.

- Through chassis rack ear mounts to a grounded data center rack.  
All equipment in the rack is grounded through a reliable branch circuit connection.
- Through an explicit ground cable  
The chassis is grounded via a ground cable using the threaded ground lug connection on the nonport side of the chassis. See item 3 in Figure 3.

This product is designed for an IT power system with phase-to-phase voltage of 230V. After operation of the protective device, the equipment is still under voltage if it is connected to an IT power system.

## 3.3 Recommendations for cable management

Cables can be organized and managed in a variety of ways, such as by using cable channels or patch panels. Note the following recommendations:

- Plan cable management before installing the device in a rack.
- Leave at least 1 meter (3 feet) of slack for each port cable. This provides room to remove and replace the device, allows for inadvertent movement of the rack, and helps prevent the cables from being bent to less than the minimum bend radius.

**NOTE**

A 50-micron cable should not be bent to a radius less than 2 in. under full tensile load and 1.2 in. with no tensile load. Tie wraps are not recommended for optical cables because they are easily overtightened.

## 3.4 Items included with the switch

The following items are included with the standard shipment of the Brocade 7840:

- The Brocade 7840, containing two combined power supply FRUs with integral fans
- Three individual fan FRUs
- The following rack mount kits are available options:
  - Fixed rack mount kit, with installation instructions
  - Mid-mount kit, with installation instructions
- All Fibre Channel ports contain 16 Gbps SWL or LWL SFP transceivers
- One accessory kit, containing the following items:
  - China-ROHS Hazardous/Toxic Substance Content Chart
  - Documentation reference card (describes where to find relevant documentation)
  - 24 16 G Brocade branded SWL or LWL SFPs, depending on the switch SKU ordered
  - Network Advisor download insert
  - Rubber mounting feet (to be used when setting up the Extension Switch as a standalone unit)
  - Two grounded 6-ft. (approximately 1.83 m) power cords:
    - Power plug type: NEMA5-15
    - Power plug current/voltage rating: 15A/125V
    - Cordage type: SJT
    - Current rating/wire gauge: 13A/16AWG with a 105°C (221°F) temperature rating
    - Connector at system end of cordset: IEC 60320/C13
    - Two power cord retainers
  - One RJ-45 serial cable (10 ft. or approximately 3 m.). The Extension Switch uses an RJ-45 connector for the console port. An RJ-45 to DB-9 adapter is also provided with the switch.

## Mounting the Device

### 4.1 Setting up the device as a standalone unit

The device can be configured as a standalone unit, which means that it resides outside of a rack. Perform the following steps to configure the device as a standalone unit.

1. Unpack the device and verify that all ordered items are present.
2. Clean the four corner depressions on the bottom of the device and place a rubber foot in each one. This helps prevent the device from accidentally sliding off the supporting surface.
3. Place the device on a stable, flat surface.

### 4.2 Installing the Universal Two-Post Rack Kit (XBR-R000294)

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

You can mount the device in a two-post rack in two ways:

- With the port side flush with the front posts
- With the posts mounted to the mid-section of the device

Observe the following when mounting this device:

- Two people are required to install the device in a rack. One person should hold the device, while the other while the other screws in the front and rear brackets.
- Before mounting your device, review any specific installation and facility requirements in the hardware installation guide for the device.
- Hardware devices illustrated in these procedures are for reference only and may not depict the device that you are installing into the rack.

#### 4.2.1 Time and Items Required

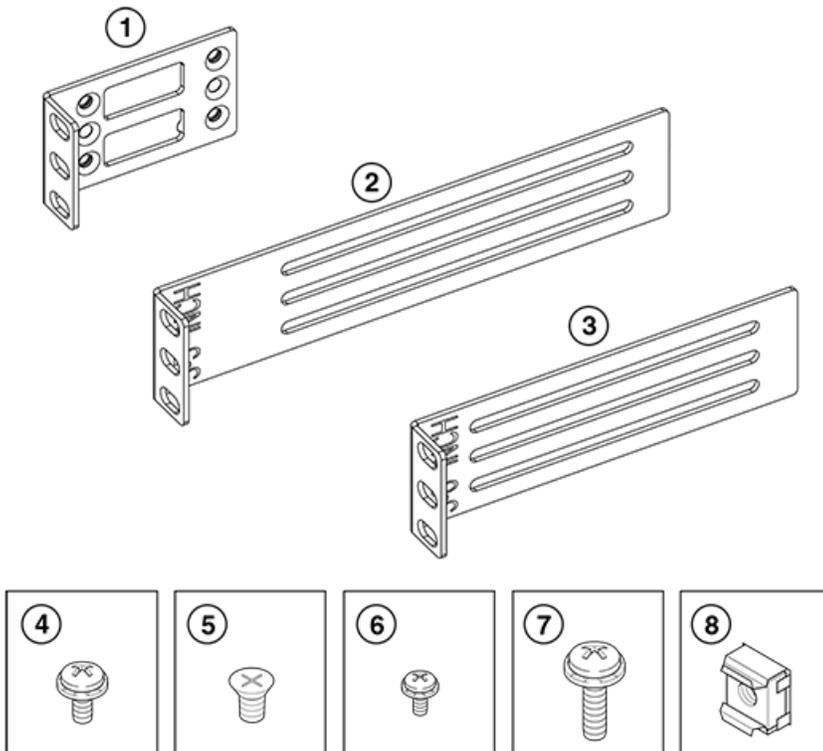
Allow 15 to 30 minutes to complete the installation.

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

- No. 2 Phillips torque screwdriver
- 1/4-in. slotted-blade torque screwdriver

#### 4.2.2 Parts List

The following parts are provided with the Universal Two-Post Rack Kit (XBR-R000294).

**Figure 7: Universal Two-Post Rack Kit Parts**

- |  |  |
|--|--|
| 1. Front Brackets (2)                          | 5. Screw, 8-32 x 5/16-in. Flathead Phillips (16) |
| 2. Rear Brackets, 5–6-in. Post (2)             | 6. Screw, 6-32 x 1/4-in. Panhead Phillips (8)    |
| 3. Rear Brackets, 3–5-in. Post (2)             | 7. Screw, 10-32 x 5/8-in. Panhead Phillips (8)   |
| 4. Screw, 8-32 x 5/16-in. Panhead Phillips (8) | 8. Retainer Nut, 10-32 (8)                       |

Ensure that the items listed and illustrated in the preceding figure are included in the kit.

**NOTE**

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

**4.2.3 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.

**CAUTION**

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

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

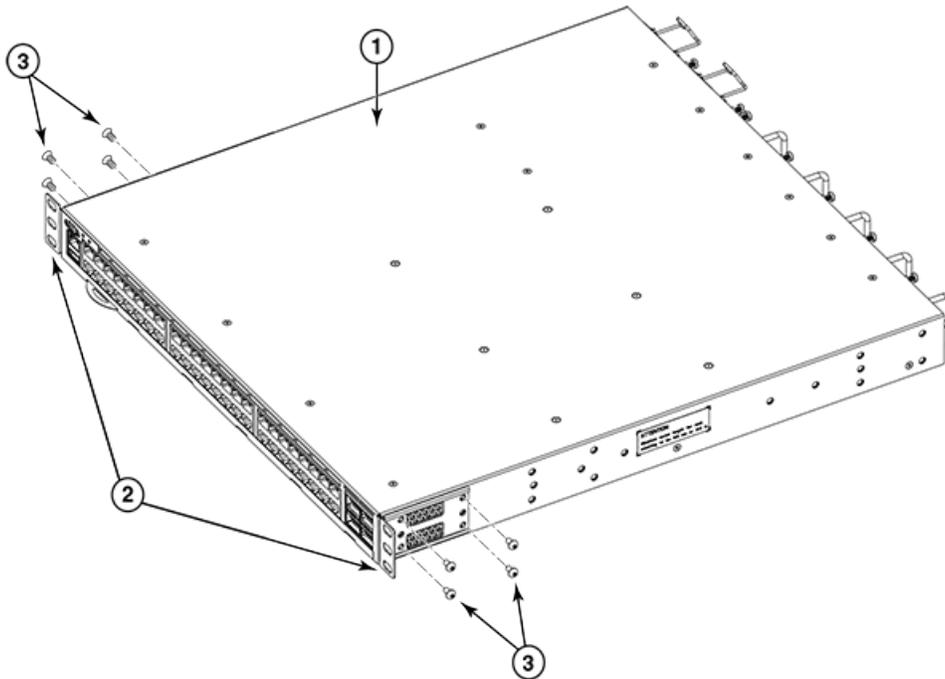
1. [Attaching the front brackets to the device](#)
2. [Attaching the Front Brackets to the Rack](#)
3. [Attaching the Rear Brackets to the Rack](#)
4. [Attaching the Rear Brackets to the Device](#)

### 4.2.3.1 Attaching the front brackets to the device

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

1. Position the right front bracket with the flat side against the right side of the device, as shown in [Figure 8: Attaching the front brackets](#).
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 8: Attaching the front brackets**



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

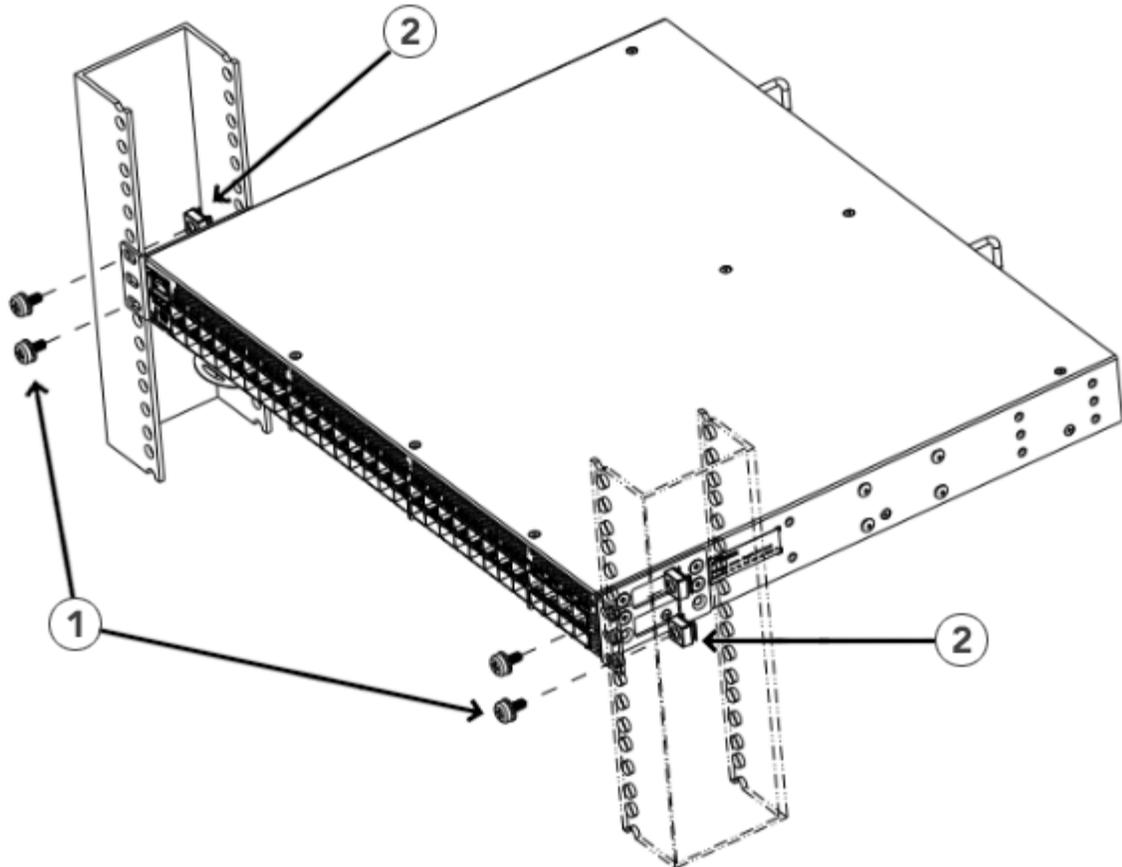
### 4.2.3.2 Attaching the Front Brackets to the Rack

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

1. Position the device in the rack, as shown in ([Figure 9: Attaching the Front Brackets to the Rack](#)), 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. Use the upper and lower holes in the bracket.

4. Tighten all the 10-32 x 5/8-in. screws to a torque of 29 cm-kG (25 in.-lb).

**Figure 9: Attaching the Front Brackets to the Rack**



1. Screws, 10-32 x 5/8-in. Panhead Phillips

2. Retainer Nuts, 10-32

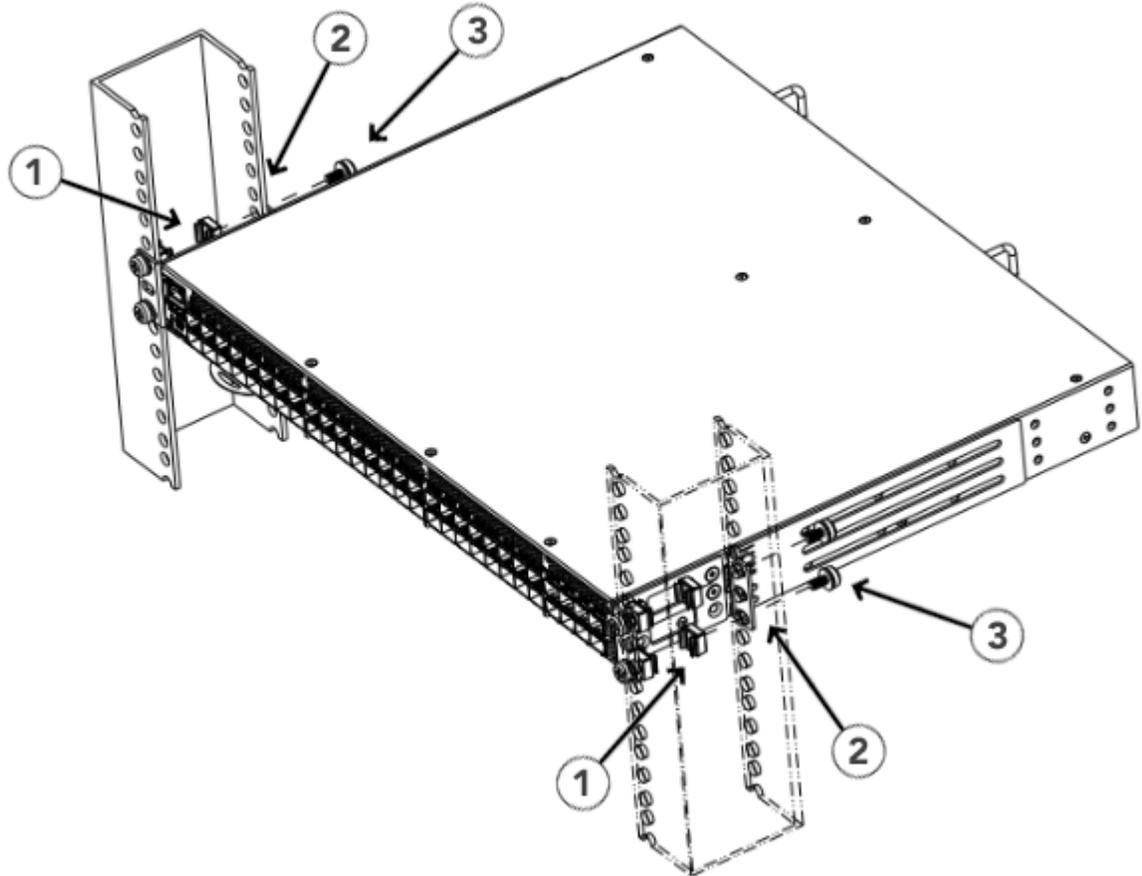
#### 4.2.3.3 Attaching the Rear Brackets to the Rack

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

1. Select the proper length bracket for your post width. If your posts are 3 inches to 5 inches wide, use the brackets marked 3-5 INCH. If your posts are 5 to 6 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 Steps 2 and 3 to attach the left rear bracket to the left rack upright.

- Tighten all the 10-32 x 5/8-in. screws to a torque of 29 cm·kg (25 in.-lb).

**Figure 10: Attaching the Rear Brackets to the Rack**



- Retainer Nuts, 10-32
- Rear Brackets

- Screws, 10-32 x 5/8-in. Panhead Phillips

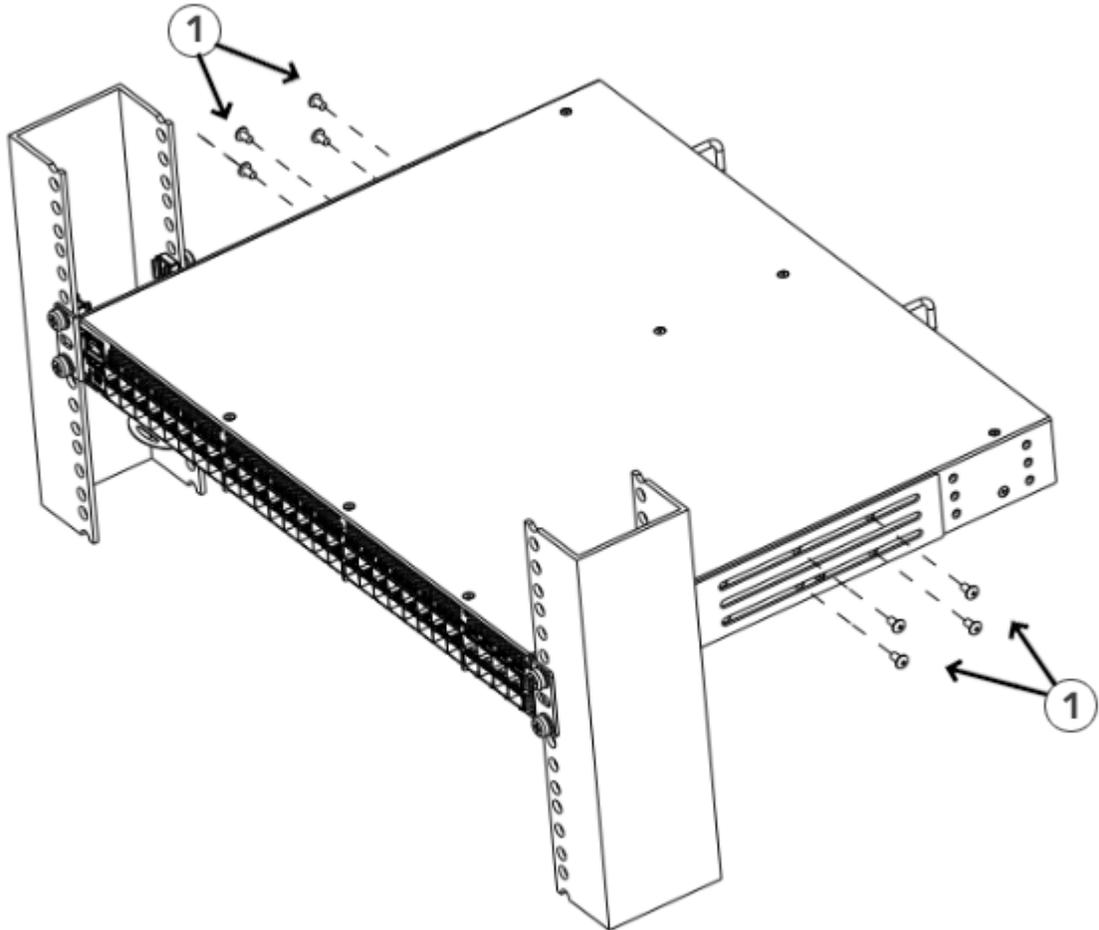
#### 4.2.3.4 Attaching the Rear Brackets to the Device

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

- 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 11: Attaching the Rear Brackets to the Device](#). Be sure to insert the screws through the upper and lower slots in the bracket.
- 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 17 cm·kg (15 in.-lb).

**Figure 11: Attaching the Rear Brackets to the Device**



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

#### 4.2.4 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:

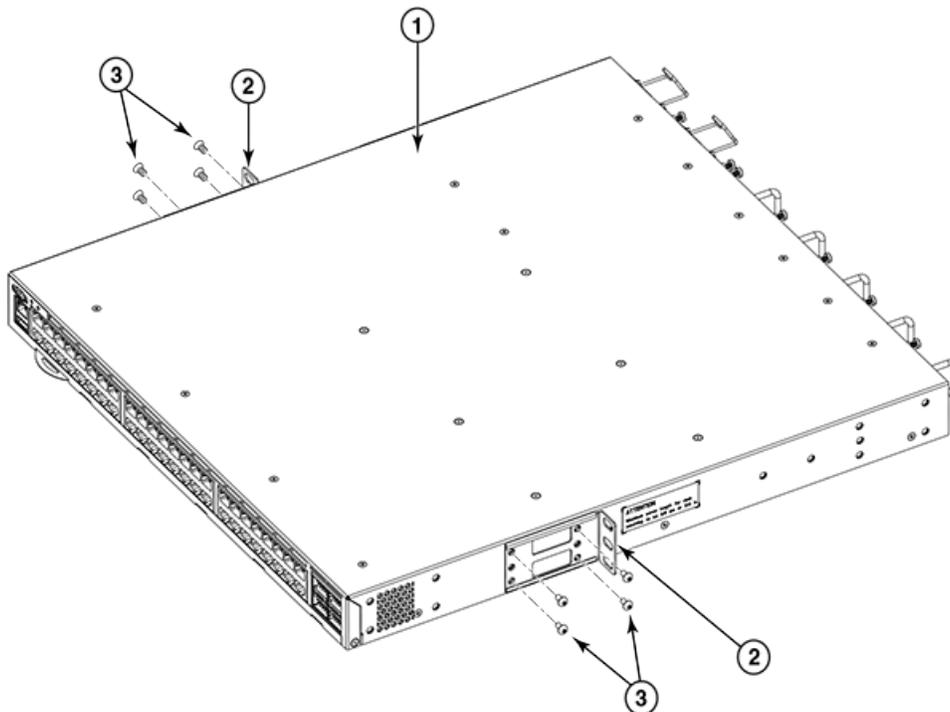
1. [Attaching the front brackets to the device](#)
2. [Attaching the Front Brackets to the Rack](#)
3. [Attaching the Rear Brackets to the Rack](#)
4. [Attaching the Rear Brackets to the Device](#)

#### 4.2.4.1 Attaching the front brackets to the device

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

1. Position the right front bracket with the flat side against the right side of the device, as shown in [Figure 12: Attaching the front brackets](#).
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 12: Attaching the front brackets**



- |                                   |   |
|-----------------------------------|---|
| 1. The Brocade device             | 3. Screws, 8-32 x 5/16-in., flathead Phillips |
| 2. Front brackets, right and left |   |

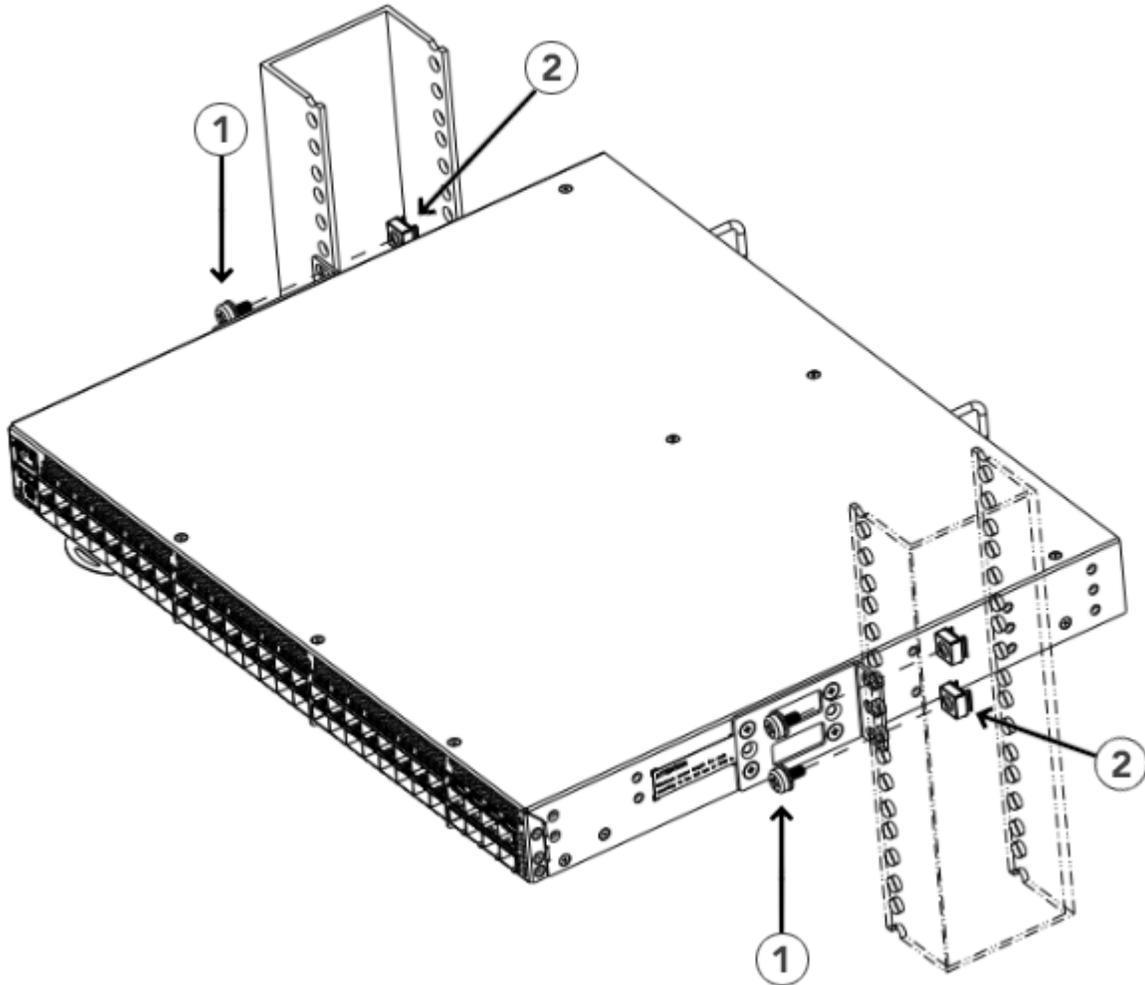
#### 4.2.4.2 Attaching the Front Brackets to the Rack

Complete the following steps to install the front brackets to the rack.

1. Position the device in the rack, as shown in [Figure 13: Attaching the Front Brackets to the Rack](#), 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.

- Tighten all 10-32 x 5/8-in. screws to a torque of 29 cm-kg (25 in.-lb).

**Figure 13: Attaching the Front Brackets to the Rack**



1. Screws, 10-32 x 5/8-in. Panhead Phillips

2. Retainer Nuts, 10-32

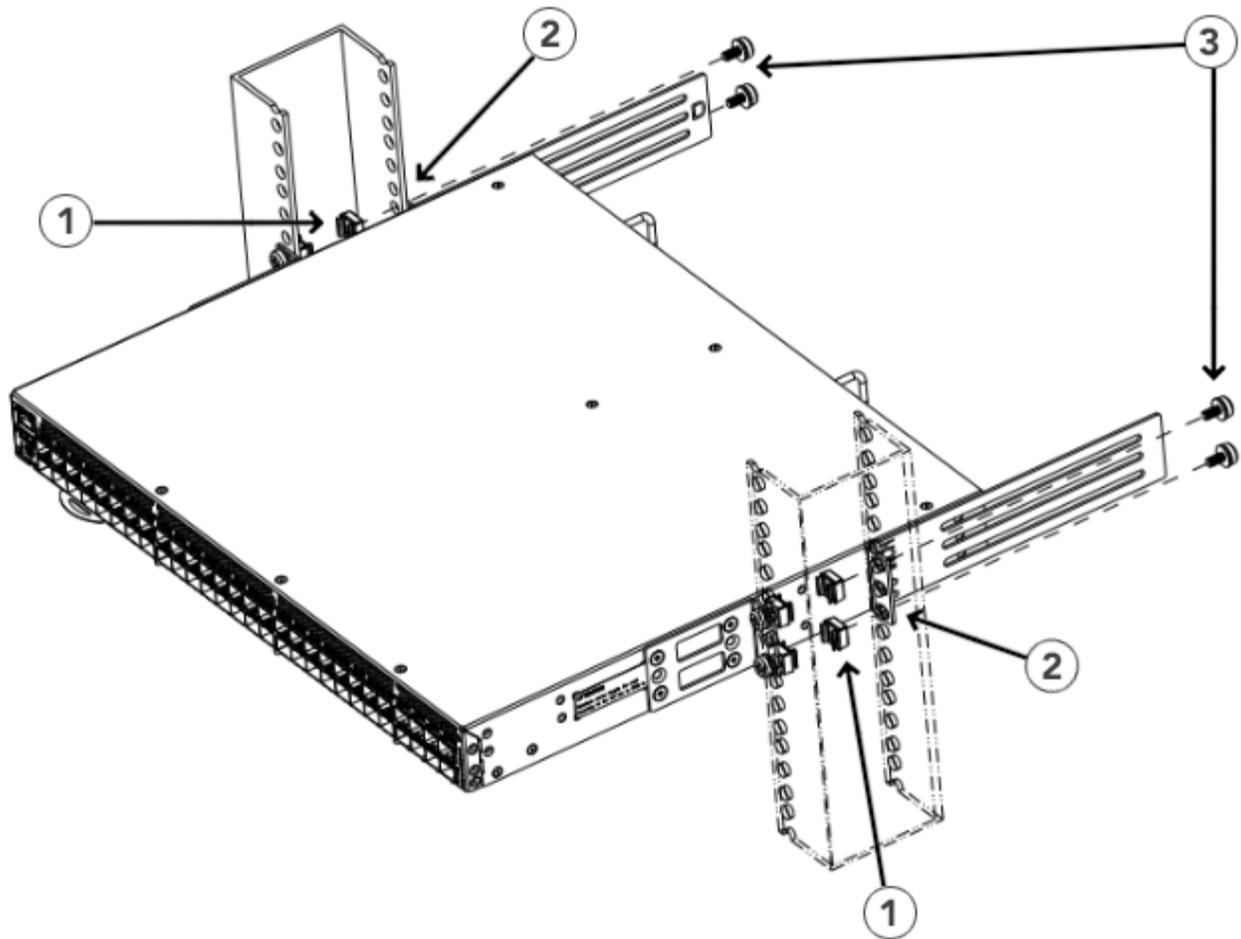
#### 4.2.4.3 Attaching the Rear Brackets to the Rack

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

- Select the proper length bracket for your post width. If your posts are 3 in. to 5 in. wide, use the brackets marked 3-5 INCH. If your posts are 5 in. to 6 in. wide, use the brackets marked 5-6 INCH.
- 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.
- Attach the brackets to the right rack upright using two 10-32 x 5/8-in. panhead screws and two retainer nuts.
- Repeat Step 2 and Step 3 to attach the left rear bracket to the left rack upright.

- Tighten all 10-32 x 5/8-in. screws to a torque of 29 cm-kg (25 in.-lb).

**Figure 14: Attaching the Rear Brackets to the Rack**



1. Retainer Nuts, 10-32

2. Rear Brackets (Right and Left)

3. Screws, 10-32 x 5/8-in. Panhead Phillips

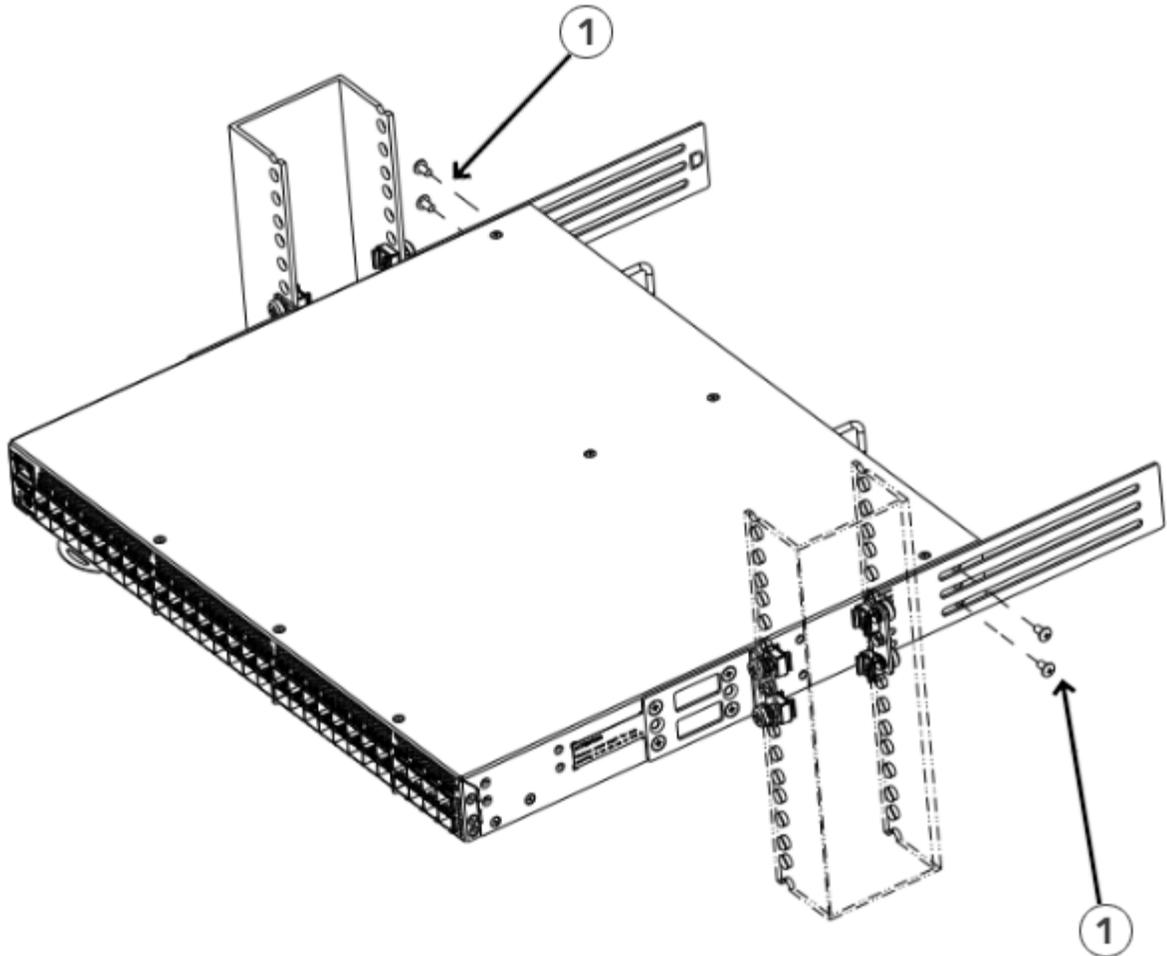
#### 4.2.4.4 Attaching the Rear Brackets to the Device

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

- 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 15: Attaching the Rear Brackets to the Device](#). Be sure to insert the screws through the upper and lower slots in the bracket.
- 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 8-32 x 5/16-in. screws to a torque of 17 cm·kg (15 in.-lb).

**Figure 15: Attaching the Rear Brackets to the Device**



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

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

Use the following instructions to install 1U and 2U devices in EIA racks that are from L-12.7 cm to 81.28 cm (L-5.0 in. to 32.0 in.) deep, where L is the chassis depth, using the Universal Four-Post Rack Kit (XBR-R000296).

You can mount the device in a four-post rack in two ways:

- 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.

**Table 4: 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.)

If the 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.), which equals 76.2 cm (30 in.).

Observe the following when mounting the device:

- 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 brackets.
- Before mounting your device, review any specific installation and facility requirements in the hardware installation guide for the device.
- Hardware devices illustrated in these procedures are for reference only and may not depict the device that you are installing into the rack.

### 4.3.1 Time and Items Required

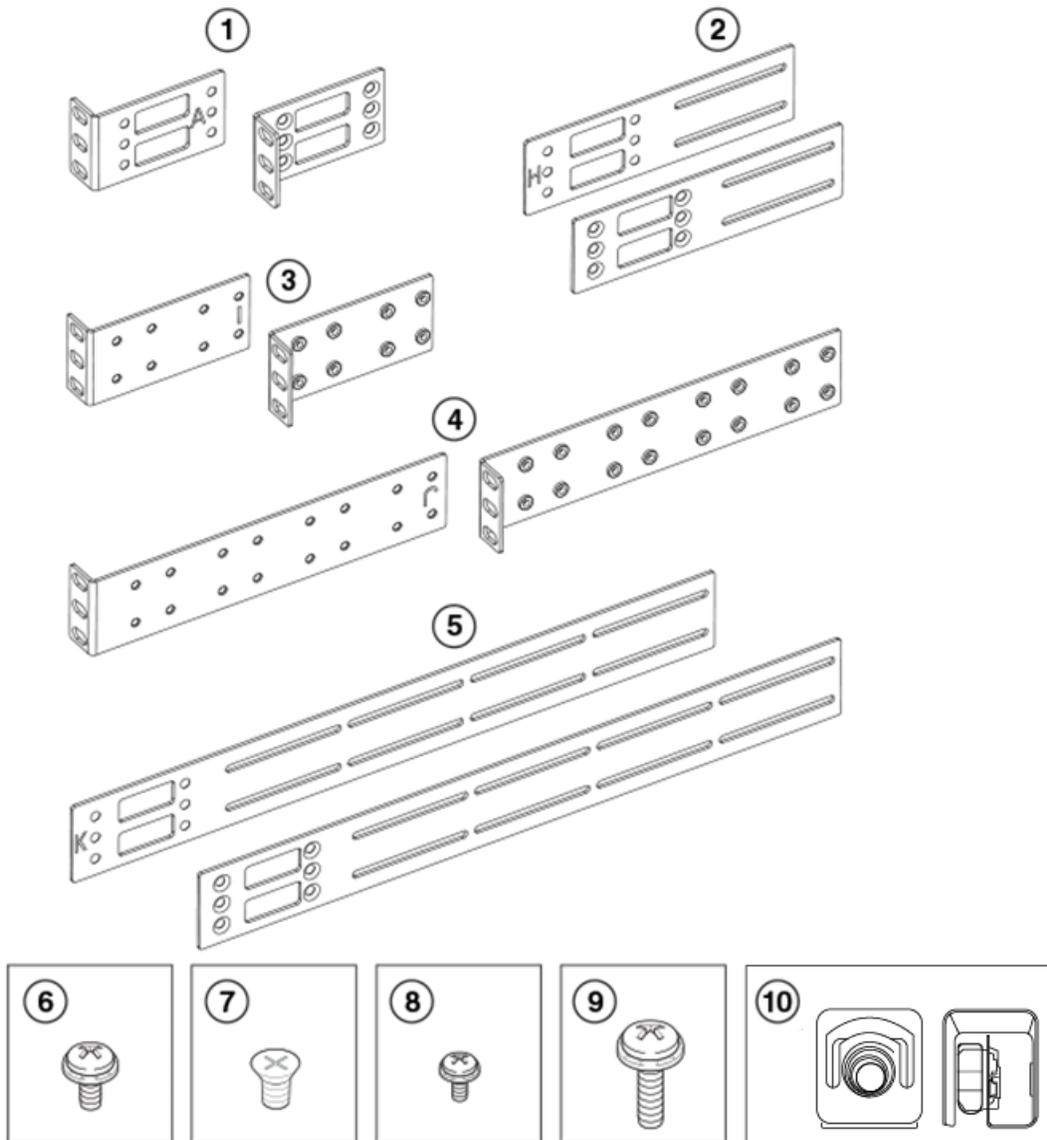
Allow 15 to 30 minutes to complete the installation.

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

- No. 2 Phillips torque screwdriver
- 1/4-in. slotted-blade torque screwdriver

### 4.3.2 Parts list

The following parts are provided with the 1U, 1.5U, and 2U Universal Kit for Four Post Racks Installation (XBR-R000296).

**Figure 16: Rack kit parts**

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

Ensure that the items listed and illustrated 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.

### 4.3.3 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 are for reference only and may not show the device that you are installing.

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](#)

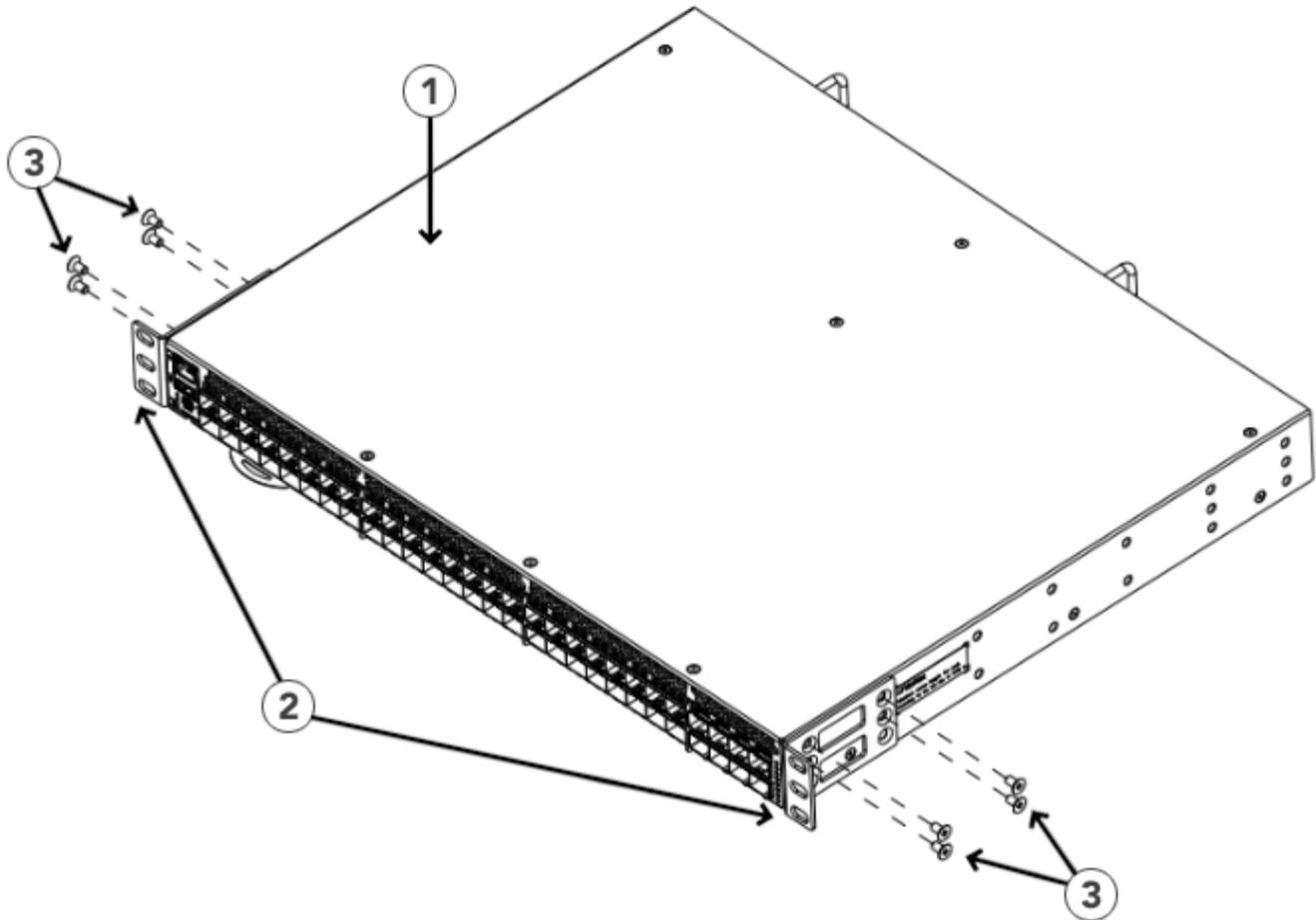
#### 4.3.3.1 Attaching the Front Brackets

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

1. Position the right front bracket with the flat side against the right side of the device at the front of the device, as shown in [Figure 17: Attaching the Front Brackets](#).
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.

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

**Figure 17: Attaching the Front Brackets**



- Brocade Device
- Front Brackets

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

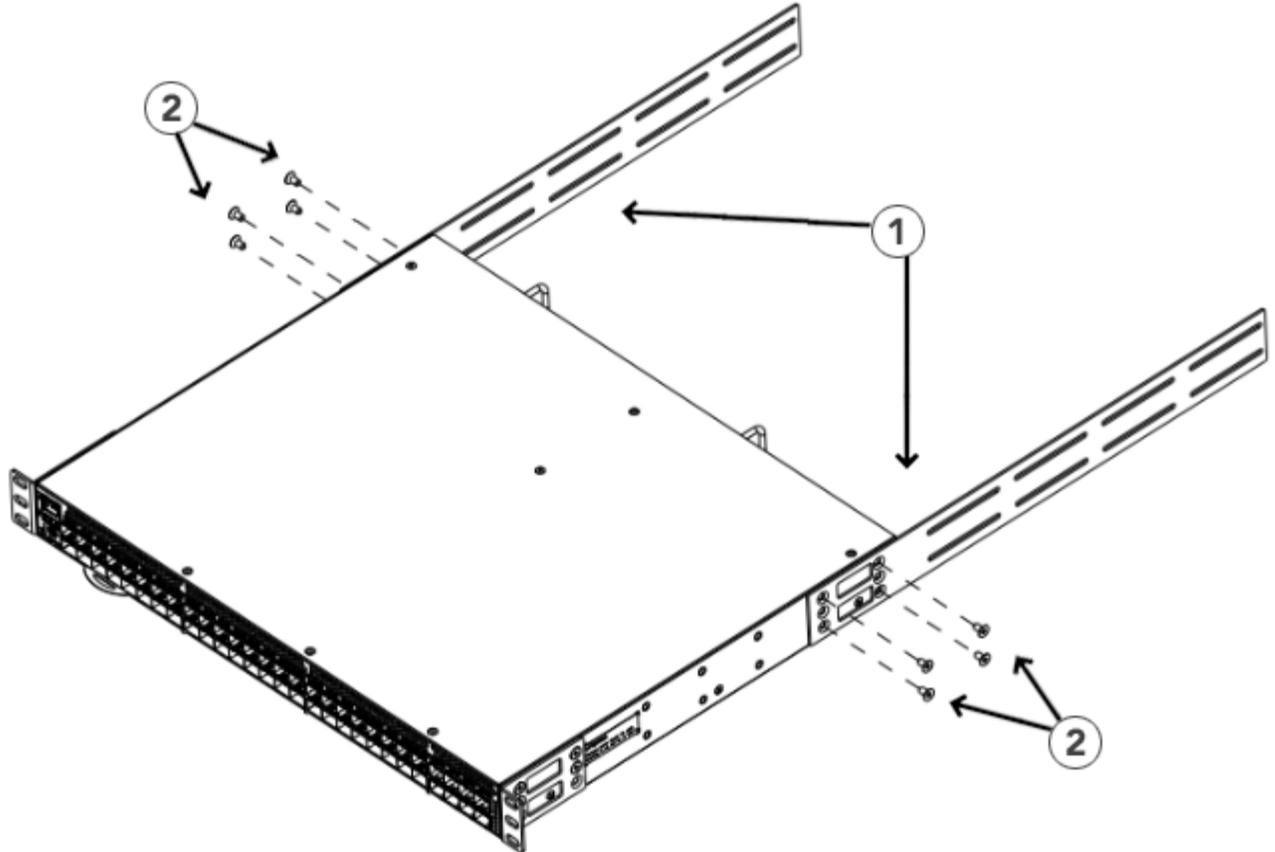
#### 4.3.3.2 Attaching the Extension Brackets to the Device

Complete the following steps to attach the extension brackets to the device. You can use medium and long extension brackets for this task.

- Select the proper length extension bracket for your rack depth.
- Position the right extension bracket along the side of the device as shown in [Figure 18: Attaching the Extension Brackets to the Device](#).
- Insert four 8-32 x 5/16-in. flathead screws through the vertically aligned holes in the bracket extension and then into the holes on the side of the device. Use the upper and lower screw holes, leaving the center holes empty.
- Repeat Steps 2 and 3 to attach the left extension bracket to the left side of the device.

5. Tighten all 8-32 x 5/16-in. screws to a torque of 17 cm-k $\ddot{g}$  (15 in.-lb).

**Figure 18: Attaching the Extension Brackets to the Device**



1. Extension Bracket

2. Screws, 8-32 x 5/16-in. Flathead Phillips

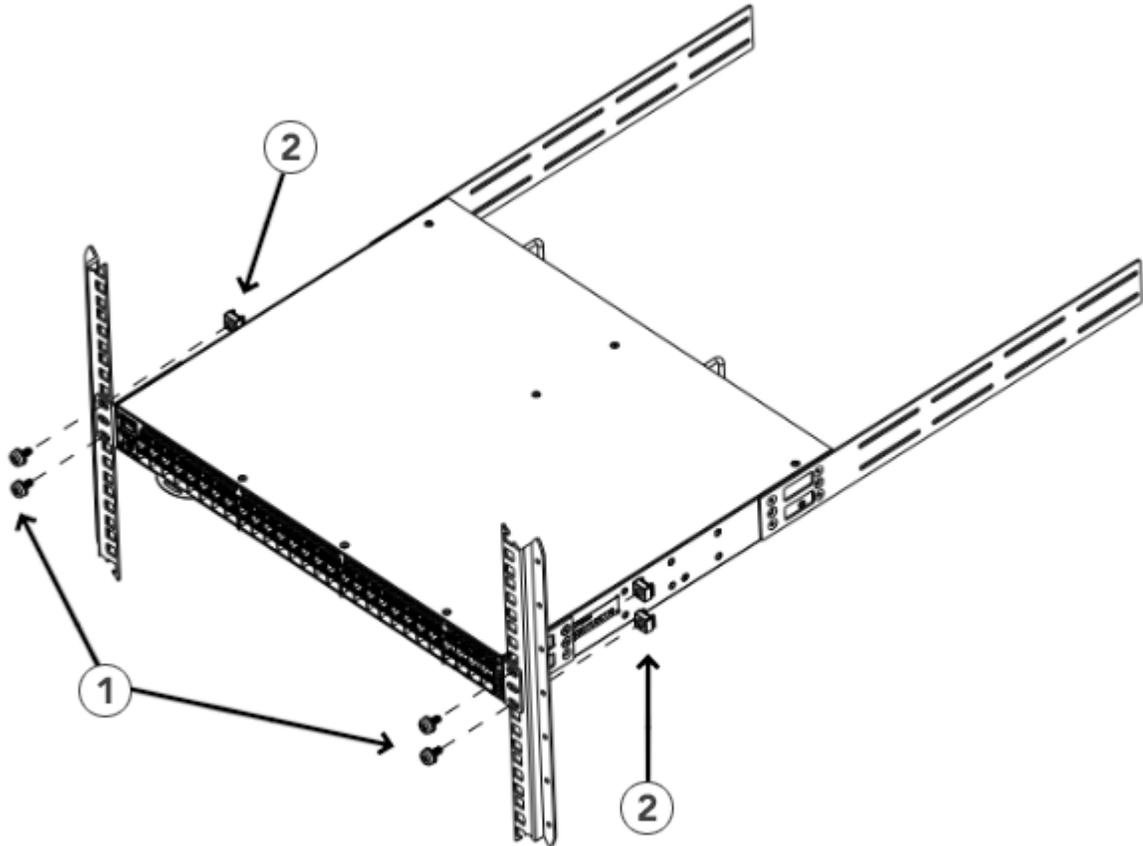
#### 4.3.3.3 Installing the Device in the Rack

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

1. Position the device in the rack, as shown in [Figure 19: Positioning the Device in the Rack](#). Provide temporary support under the device as you secure the rail kit 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.

- Tighten all 10-32 x 5/8-in. screws to a torque of 29 cm-k $g$  (25 in.-lb).

**Figure 19: Positioning the Device in the Rack**



1. Screws, 10-32 x 5/8-in. Panhead Phillips

2. Retainer Nuts, 10-32

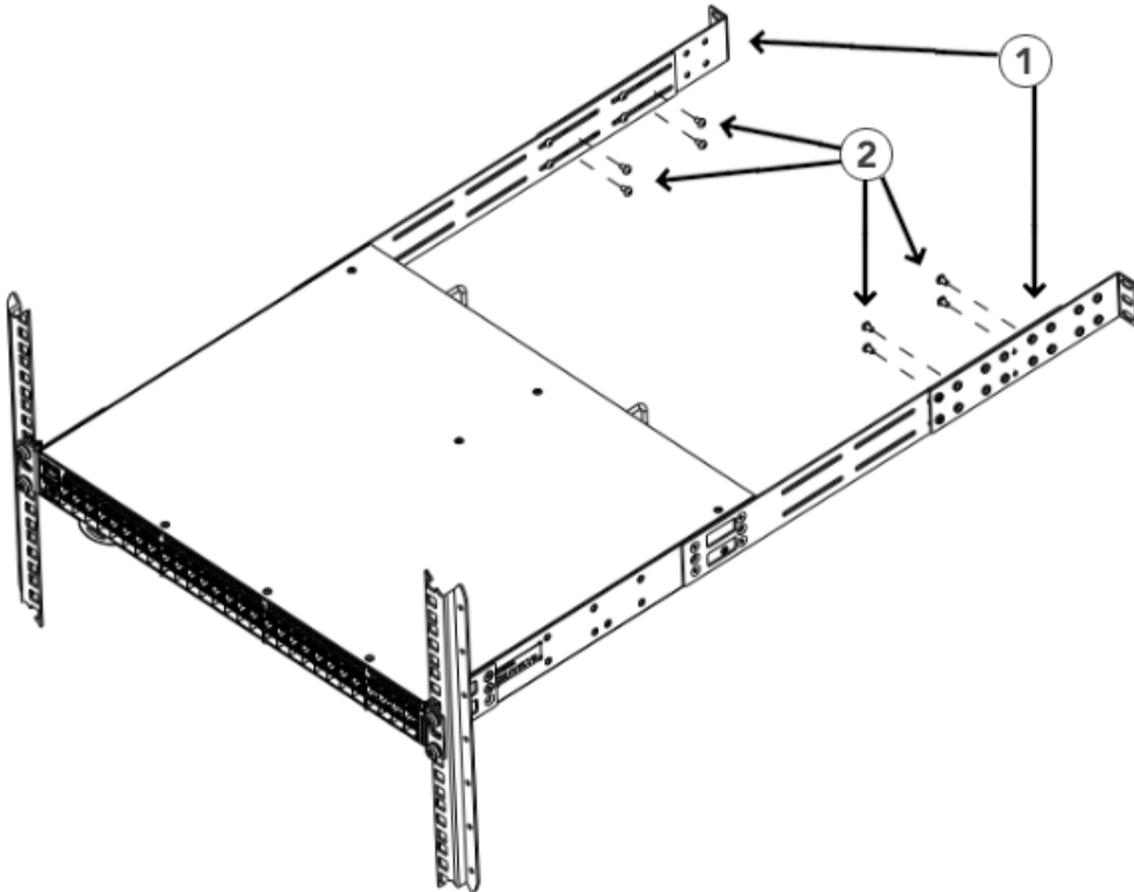
#### 4.3.3.4 Attaching the Rear Brackets to the Extensions

Complete the following steps to attach the rear brackets to the extensions. You can use short or long rear brackets for this task, depending on the depth of your rack.

- Select the proper length rear bracket for your rack depth.
- Slide the right rear bracket onto the right extension bracket, as shown in the following figure.
- Attach the brackets using four 6-32 x 1/4-in. panhead screws.  
If possible, leave at least one empty vertical pair of holes between the screws for better support.
- Repeat Step 2 and 3 to attach the left rear bracket to the left extension bracket.

5. Adjust the brackets to the rack depth and tighten all 6-32 x 1/4-in. screws to a torque of 10 cm-kg (9 in.-lb).

**Figure 20: Attaching the Rear Brackets to the Extensions**



1. Rear Brackets

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

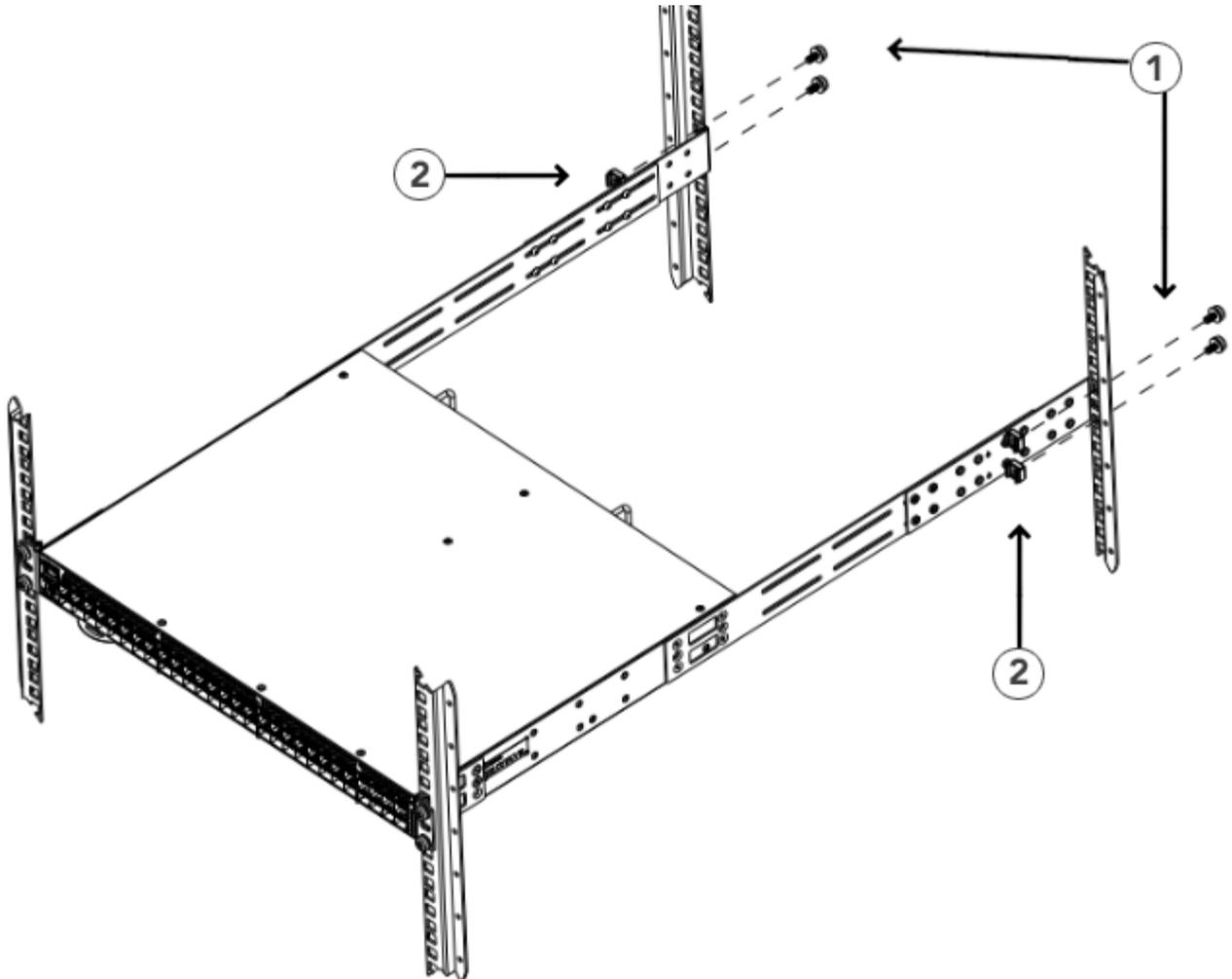
#### 4.3.3.5 Attaching the Rear Brackets to the Rack Posts

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

1. Attach the right rear bracket to the right rear rack post using two 10-32 x 5/8-in. panhead screws and two retainer nuts, as shown in [Figure 21: Attaching the Rear Brackets to the Rack Posts](#). 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.

- Tighten all 10-32 x 5/8-in. screws to a torque of 29 cm-kg (25 in.-lb).

**Figure 21: Attaching the Rear Brackets to the Rack Posts**



1. Screws, 10-32 x 5/8-in. Panhead Phillips

2. Retainer Nuts, 10-32

#### 4.3.4 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 a four-post 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](#)

#### 4.3.4.1 Attaching the Front Brackets to the Rear of the Device

##### NOTE

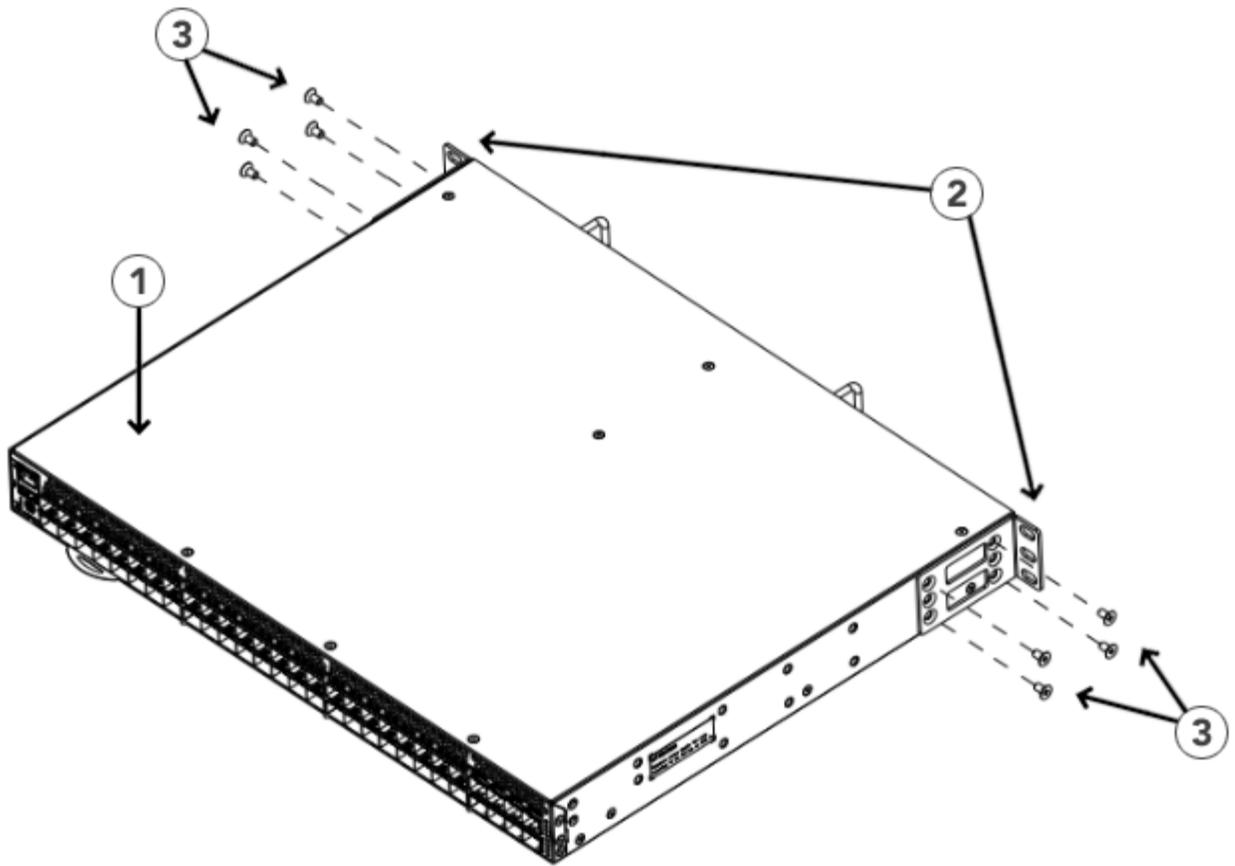
In this installation, the brackets are named as listed in the parts list even though the installation of the brackets is reversed from the flush-front installation.

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

1. Position the right front bracket with the flat side against the right rear side of the device, as shown in [Figure 22: Attaching the Front Brackets to the Rear of the Device](#).
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 Steps 1 and 2 to attach the left front bracket to the left side of the device.

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

**Figure 22: Attaching the Front Brackets to the Rear of the Device**



- Brocade Device
- Front Brackets

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

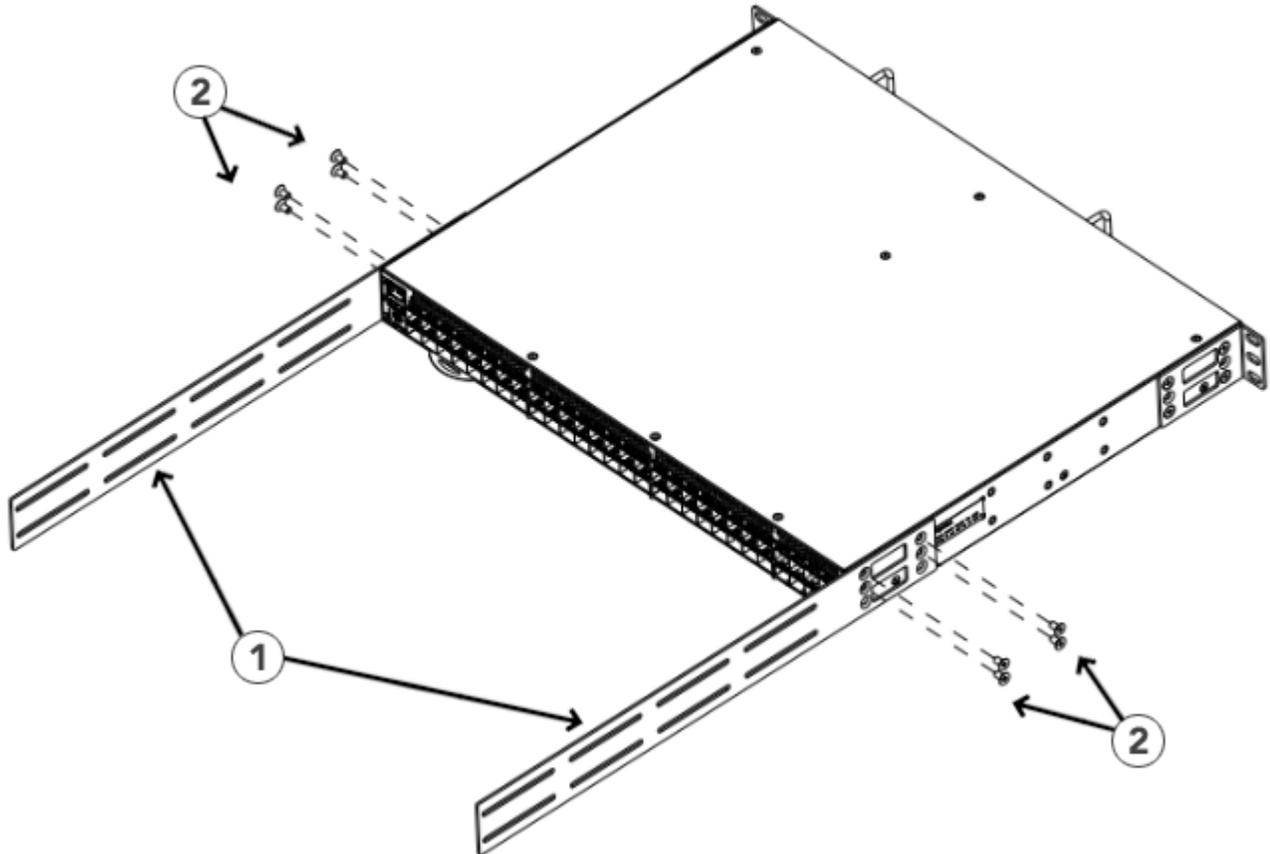
#### 4.3.4.2 Attaching the Extensions to the Front of the Device

Complete the following steps to attach the extension brackets to the front of the device. You can use medium or long extension brackets for this task, depending on your rack depth.

- Select the proper length extension bracket for your rack depth.
- Position the right extension bracket along the side of the device as shown in [Figure 23: Attaching the Extensions to the Device](#).
- Insert four 8-32 x 5/16-in. flathead screws through the vertically aligned holes in the extension brackets and then into the holes on the side of the device. Use the upper and lower screw holes, leaving the center holes empty.
- Repeat Steps 2 and 3 to attach the left front extension bracket to the left side of the device.

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

**Figure 23: Attaching the Extensions to the Device**



1. Extensions

2. Screws, 8-32 x 5/16-in. Flathead Phillips

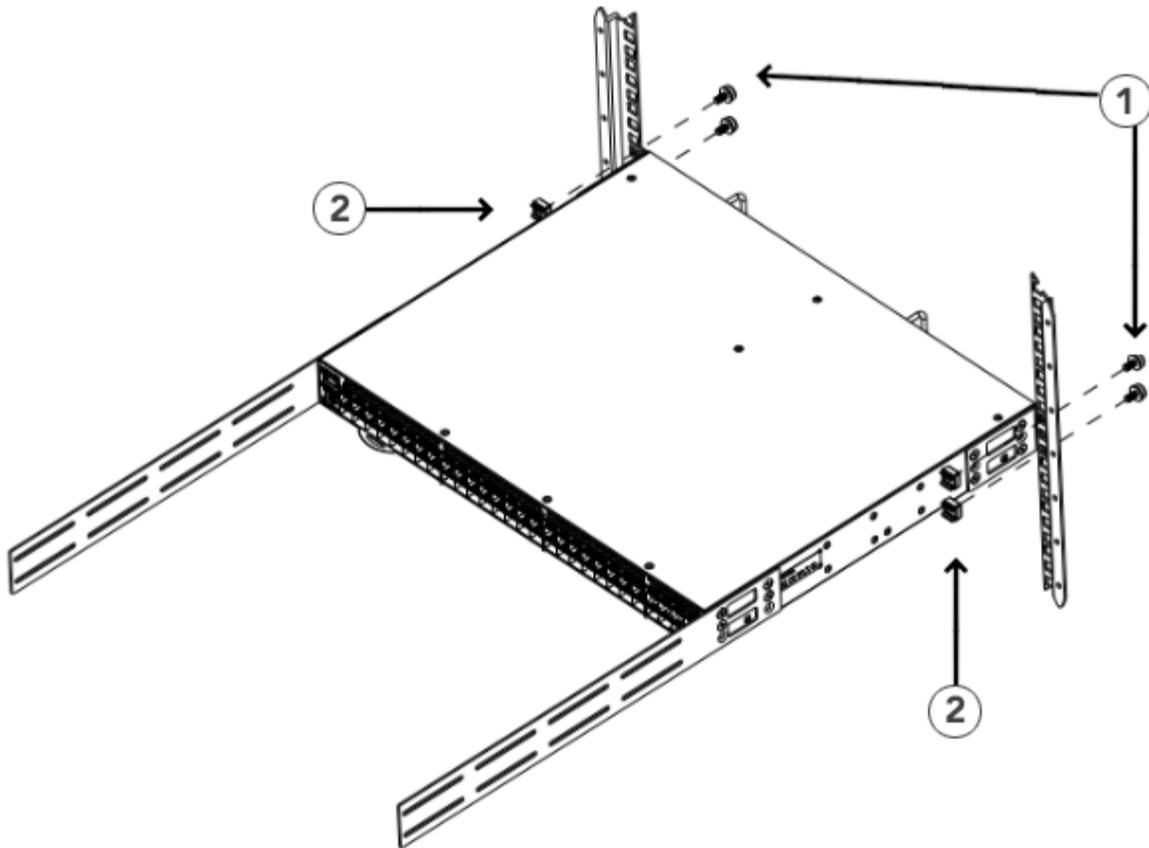
#### 4.3.4.3 Installing the Device in the Rack

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

1. Position the device in the rack, as shown in [Figure 24: Positioning the Device in the Rack](#), 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.

- Tighten all 10-32 x 5/8-in. screws to a torque of 29 cm-kg (25 in.-lb).

**Figure 24: Positioning the Device in the Rack**



1. Screws, 10-32 x 5/8-in. Panhead Phillips

2. Retainer Nuts, 10-32

#### 4.3.4.4 Attaching the Rear Brackets to the Extensions at the Front of the Device

Complete the following steps to attach the rear brackets to the extensions. Rack depth determines use of short or long brackets.

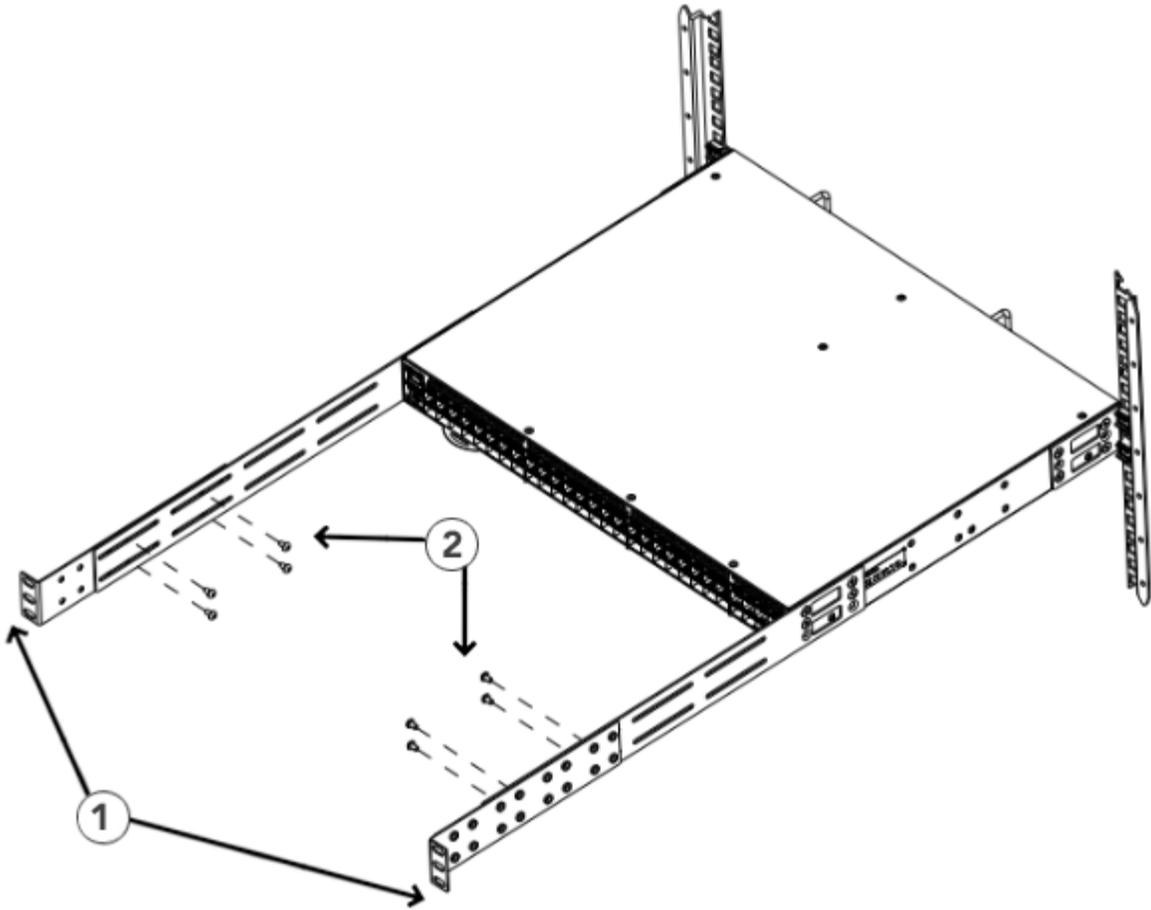
- Select the proper length rear bracket for your rack depth.
- Slide the right rear bracket onto the right extension.

The short rear brackets are shown in [Figure 25: Attaching the Rear Brackets to the Extensions at the Front of the Device](#). Use the first and third vertical pairs of holes for the screws.

See [Figure 26: Attaching the Short or Long Rear Brackets to the Extensions](#) for the positioning of the short or long brackets and screws.

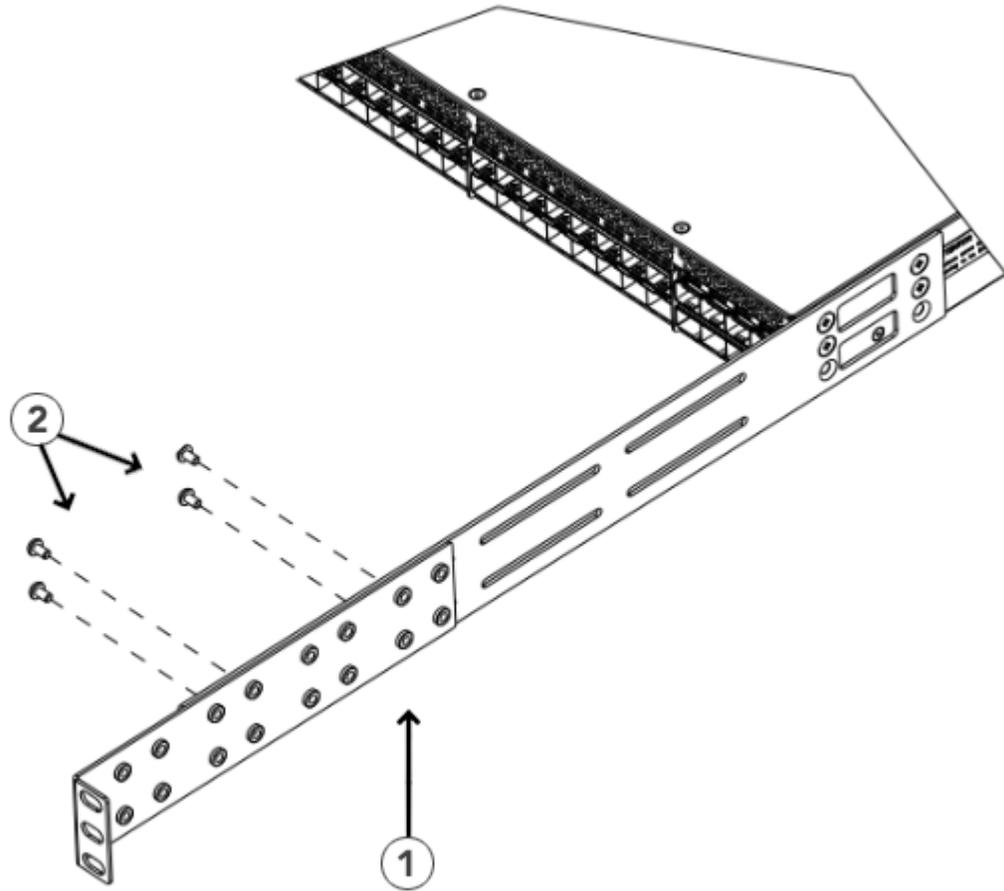
3. Attach the brackets using four 6-32 x 1/4-in. panhead screws.
4. Repeat Steps 2 and 3 to attach the left rear bracket to the left extension.
5. Adjust the brackets to the rack depth, and tighten all 6-32 x 1/4-in. screws to a torque of 10 cm-kg (9 in.-lb).

**Figure 25: 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 26: Attaching the Short or Long Rear Brackets to the Extensions**

1. Rear Bracket, Short or Long

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

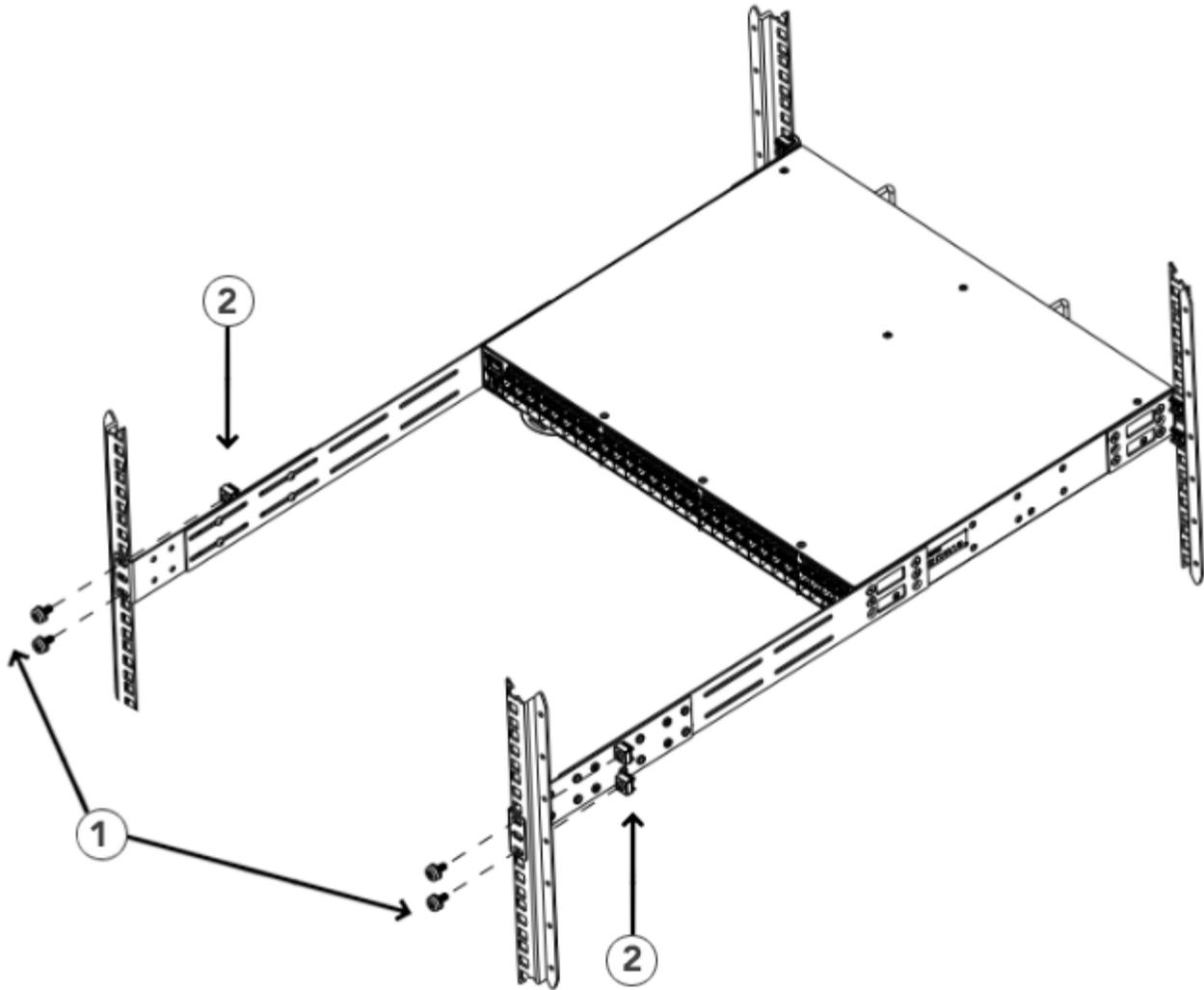
#### 4.3.4.5 Attaching the Rear Brackets to the Front Rack Posts

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

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 27: Attaching the Rear Brackets to the Front Rack Posts](#). 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 10-32 x 5/8-in. screws to a torque of 29 cm-k<sub>g</sub> (25 in.-lb).

**Figure 27: Attaching the Rear Brackets to the Front Rack Posts**



1. Screws, 10-32 x 5/8-in. Panhead Phillips

2. Retainer Nuts, 10-32

## Initial Setup and Verification

The switch must be configured correctly before it can operate within a network and fabric. For instructions on configuring the switch to operate in a fabric containing Extension Switches from other vendors, refer to the *Brocade Fabric OS Administration Guide*.

If you are going to use the switch in a single-switch setup, you can use EZSwitchSetup to complete the basic configuration. Go to the *my.brocade.com* website to download the *EZSwitchSetup* software and instructions. If you do not want to use EZSwitchSetup, refer to the following steps.

The following items are required for configuring and connecting the switch for use in a network and fabric:

- The switch, installed and connected to a power source
- A workstation computer that has a terminal emulator application (such as HyperTerminal for Windows)
- An unused IP address and corresponding subnet mask and gateway address
- The serial cable provided with the switch
- An Ethernet cable
- SFP transceivers and compatible fiber and copper cables, as required
- Access to an FTP server, for backing up (uploading) or downloading the switch configuration

Do not connect the switch to the network until the IP address is correctly set.

### 5.1 Providing power to the device

Perform the following steps to provide power to the device.

1. Connect the power cords to both power supplies and then to power sources on separate circuits to protect against AC failure. Ensure that the cords have a minimum service loop of 6 in. available and are routed to avoid stress.  
Connecting a power cord turns the device on. The power supply has two LEDs, one for AC input status and one for DC output status. Both LEDs go green within a second of power being applied. The power status LED on the port side is amber until Fabric OS is loaded, and then turns green as soon as either of the power supply LED is green. The power status LED is green while POST is running.
2. After POST is complete, verify that the device power and status LEDs of the device are green.

### 5.2 Establishing a serial connection

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

1. Verify that the device has completed POST. When POST is complete, the port status and device power and status LEDs return to a standard healthy state.
2. 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.
3. When the terminal emulator application stops reporting information, press **Enter** to display the login prompt.
4. Log in to the device as `admin`, using the default password: `password`. You are prompted to change the default password at initial login.
5. 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
```

## 5.3 Setting the device 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 device. DHCP is enabled by default. The device supports both IPv4 and IPv6.

### 5.3.1 Using DHCP to set the IP address

When using DHCP, the device 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 device. If your DHCP server is not on the same subnet as the device, use a static IP address.

### 5.3.2 Setting a static IP address

1. Log in to the device using the default password, which is password.
2. Use the `ipaddrset` command to set the Ethernet IP address.

If you are going to use an IPv4 IP 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
```

## 5.4 Changing the switch name and chassis name

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

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

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

```
device:admin> chassisname myChassis
```

3. Change the device name by using the `switchName` command.

```
device:admin> switchname mySwitch
```

## 5.5 Creating an Ethernet connection

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

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

### NOTE

At this point, the device can be accessed remotely, by command line or by Web Tools. Ensure that the device is not being modified from any other connections during the remaining tasks. The Ethernet management port also supports AutoMDI/MDIX.

## 5.6 Setting the domain ID

Perform the following steps to set the domain ID.

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

The default domain ID is 1.

The default domain ID is 150 and can range from 150 to 159.

If the device 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 device is automatically reset to a unique value. If the device 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 device 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
```

```
Domain: (150..159) [150] 151
```

- 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.

## 5.7 Setting the date and time

The date and time device settings are used for logging events. 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.

You can synchronize the local time of the principal or primary analytics monitoring platform (AMP) device to that of an external Network Time Protocol (NTP) server.

Perform the following steps to set the date and time of a device.

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 *mmddhhmm* 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 2016
device:admin> date "0522140616"
Fri May 22 14:06:00 UTC 2016
```

## 5.8 Synchronizing local time with an external source

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

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

1. Log in as `admin`.

2. Enter the `tsClockServer ipaddr` command.

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

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

## 5.9 Correcting the time zone

If the time of your device is off by hours (and not minutes), use the following procedure to set the time zone.

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

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

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

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

The default time zone for devices is Coordinated Universal Time (UTC), which is 8 hours ahead of Pacific Standard Time. Additional time zone conversions are listed in the following table.

The parameters listed do not apply if the time zone of the devices has already been changed from the default (8 hours ahead of Pacific Standard Time).

For more information about the command parameters, refer to the `tsTimeZone` command in the corresponding *Command Reference* document.

Setting the time zone needs to be done only once, because the value is stored in nonvolatile memory. For U.S. time zones, use the following table to determine the correct parameter for the **tsTimeZone** command.

**Table 5: tsTimeZone command parameter selection for the US time zones**

Local time	tsTimeZone parameter (difference from UTC)
Atlantic Standard	-4,0
Atlantic Daylight	-3,0
Eastern Standard	-5,0
Eastern Daylight	-4,0
Central Standard	-6,0
Central Daylight	-5,0
Mountain Standard	-7,0
Mountain Daylight	-6,0
Pacific Standard	-8,0
Pacific Daylight	-7,0
Alaskan Standard	-9,0
Alaskan Daylight	-8,0
Hawaiian Standard	-10,0

## 5.10 FCIP and Fibre Channel routing services configuration

The ports on the switch are initially set to persistently disabled.

If you want to enable the FC ports as a standard E\_Port or F\_Port, use the `portcfgpersistentenable` command to enable the ports.

If you are using the FC ports as EX\_Ports, you must configure the Fibre Channel Routing Services feature prior to enabling the ports.

Refer to the *Brocade Fabric OS Administration Guide* for detailed instructions on configuring the Fibre Channel router ports and GbE ports on the switch.

## 5.11 Installing transceivers and cables

Perform the following steps to install transceivers and cable the switch.

1. Install the transceivers in the Fibre Channel ports, as required.

The ports selected for use in trunking groups must meet specific requirements. For a list of these requirements, refer to the *Brocade Fabric OS Administration Guide*.

### NOTE

For current information on qualified transceivers supported by this device, refer to the *Brocade Fibre Channel Transceiver Platform Support Matrix* and *Brocade Transceiver Module Resources* on [www.brocade.com](http://www.brocade.com).

### NOTE

The device supports only Brocade-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.

- a. Remove the plug from the port to be used.
- b. Position a transceiver so that it is oriented correctly and insert it into a port until it is firmly seated and the latching mechanism clicks.

For instructions specific to the type of transceiver, refer to the transceiver manufacturer's documentation.

### NOTE

The transceivers are keyed to ensure correct orientation. If a transceiver does not install easily, ensure that it is correctly oriented.

- c. Repeat steps a and b for the remaining ports, as required.

2. Connect the cables to the transceivers.

The cables used in trunking groups must meet specific requirements. For a list of these requirements, refer to the *Brocade Fabric OS Administration Guide*.

### NOTE

A 50-micron cable should not be bent to a radius less than 2 in. under full tensile load and 1.2 in. with no tensile load. Tie wraps are not recommended for optical cables because they are easily overtightened.

- a. Orient a cable connector so that the key (the ridge on one side of the connector) aligns with the slot in the transceiver. Then, insert the cable into the transceiver until the latching mechanism clicks. For instructions specific to cable type, refer to the cable manufacturer's documentation.

### NOTE

The cable connectors are keyed to ensure correct orientation. If a cable does not install easily, ensure that it is correctly oriented.

- b. Repeat step a for the remaining cables as required.

## 5.12 Verifying correct operation and backing up the configuration

Perform the following steps to verify correct operation and back up the device configuration.

1. Check the LEDs to verify that all components are functional. For information about LED patterns, refer to [LED activity](#).
2. Enter the `portcfgpersistentenable` command to activate the FC ports for FC operation.
3. Verify the correct operation of the device by entering the `switchShow` command from the workstation.

This command provides information about device and port status.

```
sb_70:admin> switchshow
switchName:      sb_70
switchType:      148.0
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
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	N16	Online	FC	F-Port	20:05:00:11:0d:a8:01:00	
1	1	460100	id	N16	Online	FC	F-Port	20:01:00:11:0d:bb:01:00	
2	2	460200	id	N16	Online	FC	F-Port	20:03:00:11:0d:84:01:00	
3	3	460300	id	N16	Online	FC	F-Port	20:07:00:11:0d:26:01:00	
4	4	460400	id	N16	Online	FC	F-Port	10:00:8c:7c:ff:5c:c5:01	
5	5	460500	id	N16	Online	FC	F-Port	10:00:8c:7c:ff:58:4c:00	
6	6	460600	id	N16	Online	FC	F-Port	10:00:8c:7c:ff:5c:c9:01	
7	7	460700	id	N16	Online	FC	F-Port	10:00:8c:7c:ff:5c:bd:00	
8	8	460800	--	N16	No_Module	FC			
9	9	460900	--	N16	No_Module	FC			
10	10	460a00	--	N16	No_Module	FC			
11	11	460b00	--	N16	No_Module	FC			
12	12	460c00	--	N16	No_Module	FC			
13	13	460d00	--	N16	No_Module	FC			
14	14	460e00	--	N16	No_Module	FC			
15	15	460f00	--	N16	No_Module	FC			
16	16	461000	--	N16	No_Module	FC			
17	17	461100	--	N16	No_Module	FC			
18	18	461200	--	N16	No_Module	FC			
19	19	461300	--	N16	No_Module	FC			
20	20	461400	--	N16	No_Module	FC			
21	21	461500	--	N16	No_Module	FC			
22	22	461600	--	N16	No_Module	FC			
23	23	461700	--	N16	No_Module	FC			
24	24	461800	--	--	Online	VE	VE-Port	10:00:00:05:1e:65:77:04	"sb_71" (upstream)
25	25	461900	--	--	Offline	VE			

```

26 26 461a00 -- -- Offline VE
27 27 461b00 -- -- Offline VE
28 28 461c00 -- -- Offline VE
29 29 461d00 -- -- Offline VE Disabled (10VE Mode)
30 30 461e00 -- -- Offline VE Disabled (10VE Mode)
31 31 461f00 -- -- Offline VE Disabled (10VE Mode)
32 32 462000 -- -- Offline VE Disabled (10VE Mode)
33 33 462100 -- -- Offline VE Disabled (10VE Mode)
34 34 462200 -- -- Offline VE
35 35 462300 -- -- Offline VE
36 36 462400 -- -- Offline VE
37 37 462500 -- -- Offline VE
38 38 462600 -- -- Offline VE
39 39 462700 -- -- Offline VE Disabled (10VE Mode)
40 40 462800 -- -- Offline VE Disabled (10VE Mode)
41 41 462900 -- -- Offline VE Disabled (10VE Mode)
42 42 462a00 -- -- Offline VE Disabled (10VE Mode)
43 43 462b00 -- -- Offline VE Disabled (10VE Mode)
ge0 -- 40G Online FCIP
ge1 -- 40G No_Module FCIP
ge2 -- 10G No_Sync FCIP
ge3 -- 10G Online FCIP
ge4 -- 10G No_Module FCIP
ge5 -- 10G No_Sync FCIP
ge6 -- 10G Online FCIP
ge7 -- 10G Online FCIP
ge8 -- 10G Online FCIP
ge9 -- 10G Online FCIP
ge10 -- 10G Online FCIP
ge11 -- 10G Online FCIP
ge12 -- 10G Online FCIP
ge13 -- 10G No_Module FCIP
ge14 -- 10G No_Module FCIP
ge15 -- 10G No_Module FCIP
ge16 -- 10G Online FCIP
ge17 -- 10G Online FCIP

```

4. Verify the correct operation of the device in the fabric by entering the `fabricShow` command from the workstation.

This command provides general information about the fabric.

5. 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]:
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.

Brocade recommends backing up the configuration on a regular basis to ensure that a complete configuration is available for downloading to a replacement device. For specific instructions about how to back up the configuration, refer to the *Brocade Fabric OS Administration Guide*. The `switchShow`, `fabricShow`, and `configUpload` commands are described in detail in the *Brocade Fabric OS Command Reference*

# Monitoring the Device

## 6.1 LED activity

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

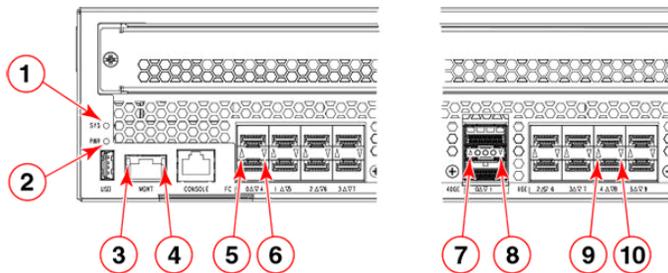
The status LEDs may display solid amber or flash during boot, POST, or other diagnostic tests. This is normal; it does not indicate a problem unless the LEDs do not indicate a healthy state after all boot processes and diagnostic tests are complete.

### 6.1.1 LEDs on the port side of the Extension Switch

The port side of the Extension Switch has the following LEDs:

- One system status LED
- One power status LED
- Management Ethernet port speed and activity LEDs
- One port status LED for each Fibre Channel port on the Extension Switch
- One port status LED for each optical 10/40 GbE port

**Figure 28: LEDs on port side**



1 System Status LED	6 FC Port 4 Status LED
2 System Power LED	7 40 GbE FCIP Port 0 Status LED
3 Ethernet Link LED	8 40 GbE FCIP Port 1 Status LED
4 Ethernet Status LED	9 1/10 GbE FCIP Port 4 Status LED
5 FC Port 0 Status LED	10 1/10 GbE FCIP Port 8 Status LED

The following table describes the LEDs and their actions on the port side of the Extension Switch.

**Table 6: Port side LED patterns during normal operation**

LED name	LED color	Status of hardware	Recommended action
Power Status	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 Extension Switch service provider.
	Steady green	System is on and power supplies are functioning properly.	No action required.
System Status	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. 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 Extension Switch service 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 has been exceeded.	Check the management interface and the error log for details on the cause of the status. Contact your Extension Switch service provider.
Ethernet Link	No light	There is no link.	Verify that the Ethernet cable is connected correctly.
	Steady green	There is a link.	No action required.
Ethernet Status/Activity	No light	No activity.	No action required.
	Flashing green	There is link activity (traffic).	No action required.

**Table 6: Port side LED patterns during normal operation (Continued)**

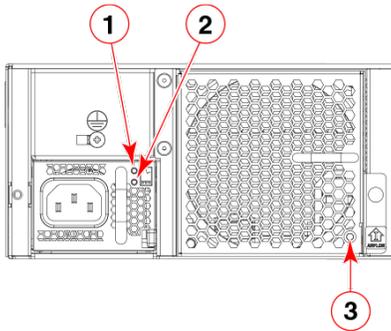
LED name	LED color	Status of hardware	Recommended action
FC Port Status	No light	Indicates one of the following: <ul style="list-style-type: none"> <li>No signal or light carrier (media or cable) detected.</li> <li>Blade may be currently initializing.</li> <li>Connected device is configured in an offline state.</li> </ul>	<ul style="list-style-type: none"> <li>Verify the power LED is on, and check the SFP and cable.</li> <li>Verify the blade is not currently being initialized.</li> <li>Verify the status of the connected device.</li> </ul>
	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 Extension Switch connection.	Verify that the correct device is attached to the switch.
	Fast-flashing green (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 <b>portDisable</b> command.	Reset the port. The <b>portCfgPersistentDisable</b> 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 Brocade-branded SFP.
10-GbE/40-GbE Ethernet Port Status	No light (LED is off)	Port is offline. No activity.	Verify that the power LED is on; check the transceiver and cable.
	Steady green	Port is online and active.	No action required.

## 6.1.2 LEDs on the nonport side

The nonport side of the device has the following LEDs:

- One LED per fan FRU
- One AC input status LED per PSU FRU
- One DC output status LED per PSU FRU

Refer to [Nonport side of the Brocade 7840](#) for a diagram of the nonport side of the device.

**Figure 29: LEDs on the nonport side**

1. Power supply AC input status LED
2. Power supply DC output status LED
3. Fan status LED

The following table describes the LEDs and their actions on the nonport side of the device.

**Table 7: Nonport-side LED patterns during normal operation**

LED name	LED color	Status of hardware	Recommended action
Power supply AC input status (one green LED)	No light	Power supply is not receiving AC input voltage or AC input voltage is below operational limit.	Verify that the power supply is properly seated and the power cord is connected to a functioning AC power source.
	Steady green	AC input voltage is within operational range.	No action required.
Power supply DC output status (one bi-color LED)	Flashing amber (1:1)	Output voltage is not enabled.	Verify that the power supply is fully seated and that the captive screw is secured.
	Flashing amber/green (2:1)	Over temperature warning.	Verify that ambient temperature is less than 40°C (104°F) and check for intake airflow blockage.
	Flashing amber/green (1:1)	Internal fan is out of regulation.	Replace the power supply.
	Steady amber	Power supply is faulty or not plugged in completely.	Check the power cord, current, voltage, and temperature to determine the problem.
	Steady green	DC output is OK.	No action required.
Fan assembly status (one bi-color LED)	No light (LED is off)	Fan assembly is not receiving power.	Verify that the fan FRU is seated correctly.
	Steady green	Fan assembly is operating normally.	No action required.
	Steady amber (for more than 5 seconds)	Fan fault for one of the following reasons: <ul style="list-style-type: none"> <li>■ A fan assembly with mismatched airflow is present.</li> <li>■ One or more of the fans in the fan assembly has failed.</li> </ul>	Try one of the following: <ul style="list-style-type: none"> <li>■ Replace the mismatched fan assembly with one that has the correct airflow direction.</li> <li>■ Replace the faulty fan assembly.</li> </ul>

## 6.2 Interpreting POST results

POST is a system check that is performed each time the device is powered on, rebooted, or reset, and during which the LEDs flash different colors.

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

1. Verify that the LEDs on the device indicate that all components are healthy (LED patterns are described in [LED activity](#)). 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). For information about how to turn beaconing on and off, refer to the corresponding *Administration Guide*.
  - b. Follow the recommended action for the observed LED behavior, as shown in [LED activity](#).
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 is viewed using the `errShow` command. For more information about this command, refer to the corresponding *Command Reference* document. For information about specific error messages, refer to the corresponding *Message Reference*.

## 6.3 Device maintenance

The device is designed for high availability and reliability; it does not require any regular physical maintenance. It includes diagnostic tests and field-replaceable units (FRUs).

### 6.3.1 Diagnostic tests

In addition to POST, the 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. For information about specific diagnostic tests, refer to the corresponding *Administration Guide*.

#### NOTE

Diagnostic tests may temporarily lock the transmit and receive speed of the links during diagnostic testing. Brocade recommends that you power-cycle the device after completing offline diagnostics tests.

### 6.3.2 Field-replaceable units

You can replace the power supply and fan assemblies on-site without the use of special tools. The field-replaceable units (FRUs) are keyed to ensure correct orientation during installation. Replacement instructions are provided with all FRUs ordered.



#### DANGER

Remove both power cords before servicing.



#### DANGER

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

### 6.3.2.1 Power supplies and fans

The two PSU FRUs are hot-swappable. They are identical and fit into either bay. They are keyed to prevent being inserted upside down. Each PSU has an input rated voltage of 100-240 V and a typical input operating range of 90-264 V. Output is 12 V which can drive up to a 1100 W load.

Fabric OS identifies the power supplies as follows (viewing the device from the nonport side):

- Power supply #1 on the right (integrated with Fan #4)
- Power supply #2 on the left (integrated with Fan #5)

Fabric OS identifies the fan assemblies as follows (viewing the device from the nonport side):

- Fan assembly #1 on the right
- Fan assembly #2 in the middle
- Fan assembly #3 on the left

Any of the following methods can be used to determine whether a FRU requires replacing:

- Check the AC input status and DC output status LEDs (refer to [LEDs on the nonport side of the Brocade 7840](#)). If the AC input status LED is off, verify that you are using the correct cord and power source. If the DC output status LED is off or flashing, then the FRU should be replaced. Refer to the table describing nonport side LED patterns during normal operation in [LEDs on the nonport side of the Brocade 7840](#) for information about power supply faulty states.
- In BNA, double-click the device icon to open Web Tools, and then click the **Power Status** icon. Enter the `psShow` command at the command prompt to display power supply status.
- In BNA, double-click the device icon to open Web Tools, then click the **Fan Status** icon. Enter the `fanShow` command at the command prompt.

## 6.4 Powering off the device

Perform the following steps to power off the device.

1. Enter the `sysShutdown` command.

This command not only shuts down the key processors but also powers off the device. All LEDs will turn off.

2. Unplug the AC power cords.

## 6.5 Removing and replacing transceivers

### NOTE

SFPs and QSFPs are hot swappable.

Use the following procedure to remove and replace an SFP+ transceiver.



### DANGER

All fiber-optic interfaces use Class 1 lasers.

### 6.5.1 Time and items required

The replacement procedure for one transceiver takes less than five minutes.

You should have the following items available:

- Replacement SFP+ transceiver
- Optical transceiver extraction tool (for 8 or 10 Gbps transceiver only)

Most Brocade devices and backbones come with a transceiver extraction tool and holster. The extraction tool is designed to remove transceivers from modules where space is limited.

**Figure 30: Optical transceiver extraction tool**



## 6.5.2 Removing an SFP+ transceiver

Complete the following steps to remove an SFP+ transceiver.

1. Remove any cables that are inserted into the transceiver. Use the extraction tool to open the cable latching mechanism.
2. Using the hooked end of the tool, pull the bail (wire handle) away from its pivot point and out, sliding the transceiver out of the device or module.

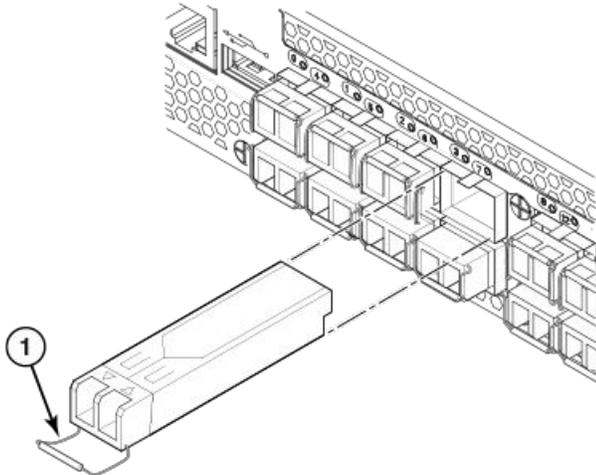
The 16 Gbps SFP+ transceivers have an attached pull tab. Instead of using the tool, simply grasp the pull tab and pull straight out to remove the 16 Gbps SFP+ transceiver from the device.

### 6.5.3 Replacing an SFP+ transceiver

Complete the following steps to replace an SFP+ transceiver.

1. Making sure that the bail (wire handle) on an 8 or 10 Gbps transceiver is in the unlocked or open position, position the optical transceiver so that the key is oriented correctly to the port. Insert the transceiver into the port until it is firmly seated and the latching mechanism clicks.

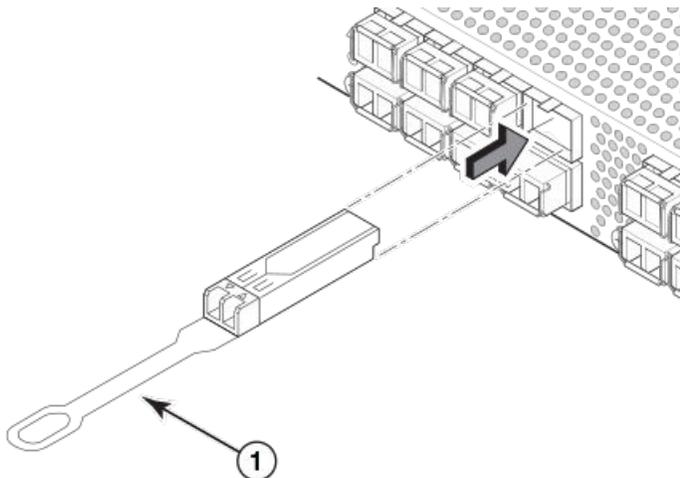
**Figure 31: Replacing an 8 Gbps SFP+ optical transceiver**



1. SFP+ bail

The 16 Gbps SFP+ transceivers do not have bails. Use the pull tab on the 16 Gbps SFP+ transceivers to carefully push the transceiver into the port. Grasp the tab near the body of the transceiver to reduce the chances of bending the tab.

**Figure 32: Replacing a 16 Gbps SFP+ optical transceiver**



1. Gbps SFP+ pull tab

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.

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.

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.

# Removal and Replacement of Power Supplies and Fans

## 7.1 Removal and replacement introduction

**DANGER**

The procedures in this manual are for qualified service personnel.

**NOTE**

Read the [Installation and safety considerations](#) before servicing the device.

The field-replaceable units (FRUs) in the device can be removed and replaced without special tools. The device can continue operating during the FRU replacement if the conditions specified in the procedures are followed.

### 7.1.1 Before beginning replacement

The field-replaceable units (FRU) have port-side air exhaust. You must replace a failed unit with the same type of unit. This applies to both power supplies and fans. A new FRU must have the same part number (P/N) as the FRU being replaced. The manufacturing P/N is located on the top of the FRU.

**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 an orange arrow with an "I."

Use the external labels as a guide. Both the PSU and fan FRUs are labeled with the **I** airflow symbol to indicate that they take in air.

**Figure 33: Airflow label**



The orange **I** symbol indicates a nonport-side intake unit. This unit pulls air in from the nonport side of the device and exhausts it out the port side. This is also called back-to-front airflow or reverse airflow. This symbol should appear on FRUs with part numbers ending with **-R**.

The `chassisShow` command indicates "reverse" airflow.

If one fan fails, the remaining fans go to high speed to maintain proper cooling until the failed fan is replaced.

If a mismatched power supply or fan is installed by mistake, a critical error message is sent to the console. The message will be similar to the following:

CRITICAL HIL-1611 MISMATCH in PSU/FAN Air Flow direction. Replace PSU with fan air flows in same direction. System will be shut down in 2 minutes.

## 7.2 Power supply removal and replacement

The device has two power supplies. The OS identifies the power supplies from left to right on the nonport side as power supply #2 and power supply #1.

**NOTE**

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

**NOTE**

Because the cooling system relies on pressurized air, do not leave either of the power supply slots empty longer than two minutes while the device is operating. If a power supply fails, leave it in the device until it can be replaced. Maintain both power supplies in operational condition to provide redundancy.

Refer to [LEDs on the nonport side of the Brocade 7840](#) for the power supply status LED colors, behaviors, and actions required, if any.

## 7.2.1 Determining the need to replace a power supply

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

- Check the power supply AC input status and DC output status LEDs. Both should be green (refer to [LEDs on the nonport side of the Brocade 7840](#)). If the DC output status LED is amber, there is no power on the cord.
- In Web Tools, click the **Power Status** icon.
- At the command prompt, enter the `psShow` command to display power supply status:

```
sb_70:admin> psshow
Power Supply #1 is OK
Airflow Direction : Non-portside Intake (Reverse)
Power Supply #2 is OK
Airflow Direction : Non-portside Intake (Reverse)
```

**DANGER**

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

## 7.2.2 Time and items required

Replacing a power supply should require less than two minutes to complete.

To replace a power supply, you need a new power supply that has the same part number and airflow label as the power supply being replaced.

## 7.2.3 Replacing a power supply

Complete the following steps to replace a power supply.

1. To leave the device in service while replacing a power supply, verify that the other power supply (the one not being replaced) has been powered on for at least four seconds and has a steady green status LED.
2. Unplug the power cord from the power supply that is being replaced.
3. Push the locking tab to the left and hold it there while using the handle on the power supply to pull it straight out and away from the chassis. Pull the power supply out slowly to avoid catching a finger on the locking tab.
4. Slide the new power supply into the chassis until the locking tab engages.

**NOTE**

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

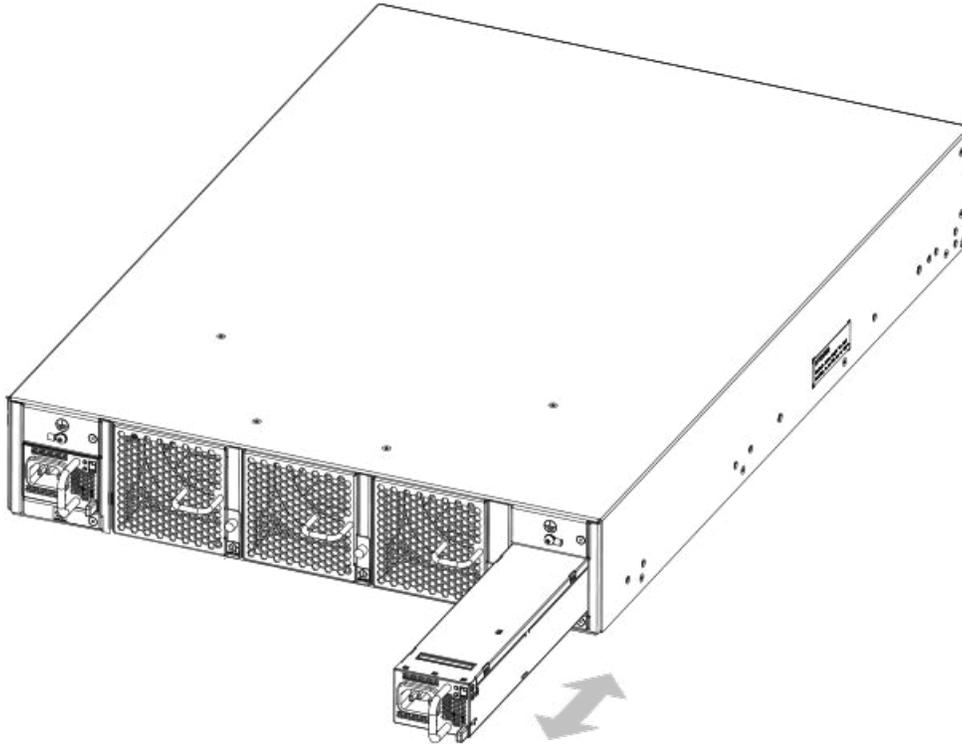
**NOTE**

If you observe that the device has powered down two minutes after a power supply replacement, it is likely because the new power supply has a mismatched airflow.

5. Plug the power cord into the power supply to power on the unit.

If the power circuit was on before the replacement, the power supply will immediately attempt to power up.

**Figure 34: Inserting the power supply**



6. Verify that the LEDs on the new power supply display steady green while the device is operating (refer to [LEDs on the nonport side of the Brocade 7840](#)). If the LEDs are not steady green, ensure that the power supply is securely installed and seated properly.

Optionally, if using the command line interface (CLI), enter the `psShow` command at the command line prompt to display the status. You can also use the `chassisShow` command. The power supply status can also be viewed using the Web Tools application.

## 7.3 Fan removal and replacement

The device has three fan FRUs. The OS identifies the fan locations from left to right as fan #3, fan #2, and fan #1.

**NOTE**

Disassembling any part of the fan voids the part warranty and regulatory certifications. There are no user-serviceable parts inside the fan. Because the cooling system relies on pressurized air, do not leave any of the fan slots empty longer than two minutes while the device is operating. If a fan fails, leave it in the device until it can be replaced. Maintain all three fans in operational condition to provide redundancy.

Refer to [LEDs on the nonport side of the Brocade 7840](#) for the fan status LED colors, behaviors, and actions required, if any.

## 7.3.1 Determining the need to replace a fan

Use one of the following methods to determine the status of the fans:

- Check the fan status LED (refer to [LEDs on the nonport side](#)).
- In Web Tools, click the **Fan Status** icon.
- Enter the `fanShow` command at the prompt to display fan status. The output of this command shows the status of five fans. Fans 1, 2, and 3 are the fan FRUs.

### NOTE

Fan 4 is integrated with Power Supply 1. Fan 5 is integrated with Power Supply 2. These two fans normally operate at around 12000 RPM, while the system fans typically operate around 4000 RPM. Refer to [Power supply removal and replacement](#) if there are any issues with those two fans.

```
sb_70:admin> fanshow
Fan 1 is Ok, speed is 4013 RPM
Fan 2 is Ok, speed is 3961 RPM
Fan 3 is Ok, speed is 3961 RPM
Fan 4 is Ok, speed is 12001 RPM
Fan 5 is Ok, speed is 11969 RPM
```

### NOTE

Fans increase their speed when FRUs are removed or environmental intake air temperature increases.

## 7.3.2 Time and items required

Replacing a fan should require less than two minutes to complete.

You need the following items to replace a fan:

- A new fan that has the same part number and airflow label as the fan being replaced.
- A #1 Phillips screwdriver

## 7.3.3 Replacing a fan

Complete the following steps to replace a fan.

1. Using the Phillips screwdriver, unscrew the captive screw on the fan.



### 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.

2. Remove the fan from the chassis by using the handle on the fan to pull it straight out and away from the chassis.
3. Install the new fan in the chassis:
  - a. Check to see that the airflow direction is the same as the fan you are replacing.
  - b. Orient the new fan with the captive screw on the right.

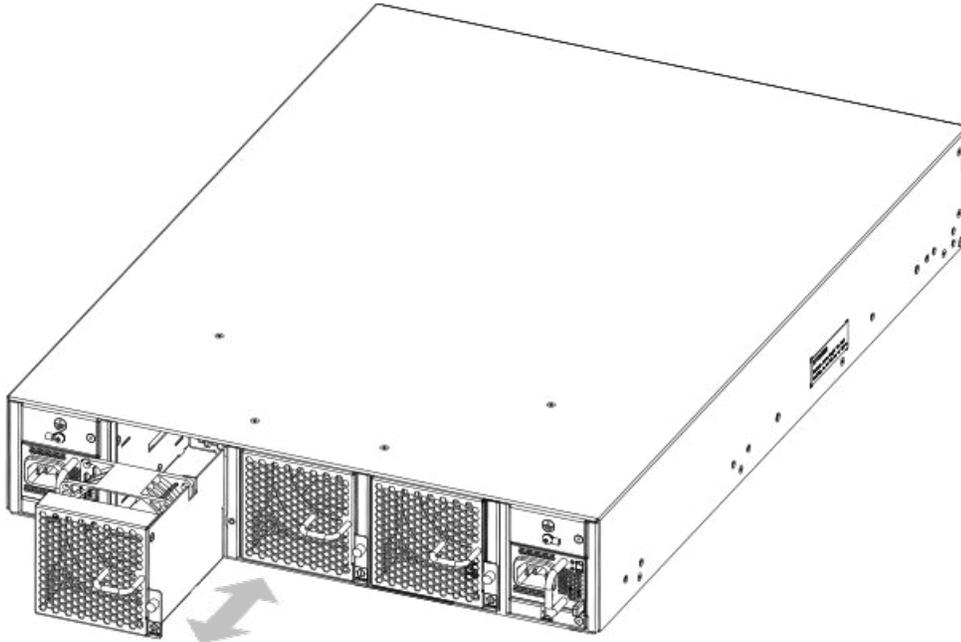
### NOTE

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

- c. Gently push the fan into the chassis until it is firmly seated.

- d. Using the Phillips screwdriver, secure the fan to the chassis by tightening the captive screw.

**Figure 35: Inserting the fan**



4. Verify that the fan status LED is steady green to indicate normal operation (refer to [LEDs on the nonport side of the Brocade 7840](#)).

Optionally, if using the command line interface (CLI), enter the `fanShow` command at the command line prompt to display the status. You can also use the `chassisShow` command. The fan status can also be viewed using the Web Tools application.

**NOTE**

If you observe that the device has powered down after two minutes after a fan replacement, it is likely because the new fan has a mismatched airflow.

# Brocade 7840 Extension Switch Technical Specifications

This document highlights the features and specifications for the Brocade 7840 Extension Switch.

## System specifications

System component	Description
Enclosure	2U chassis
System architecture	Nonblocking shared memory extension switch
System processors	Quadcore (P3041) Freescale (PowerPC) processor, 1.5 GHz Cavium 6880 for frame/packet processing Blitzer for Encryption and Compression (Xilinx Kintex-7) Condor-3 for FC Trident+ for 10/40 GbE/Gbps
Power supplies	Two universal AC input power supplies, one redundant (each power supply has an integral fan unit)
Fans	Three port-side exhaust 11000-RPM fan FRUs
Cooling	Forced-air cooling (air flows from the non-port side of the Extension Switch to the port side)

## Fibre Channel

System component	Description
Fibre Channel ports	Twenty-four 2, 4, 8, or 16 Gbps ports compatible with short wavelength (SWL), long wavelength (LWL), and extended long wavelength (ELWL) SFP+ transceivers (available wavelength options vary for 8 and 16 Gbps SFPs) and capable of auto-negotiating to maximum link speed
ANSI Fibre Channel protocol	Fibre Channel Physical and Signaling Interface standard (FC-PH)
Modes of operation	Fibre Channel Class 2 and Class 3
Fabric initialization	Complies with FC-SW-3 Rev. 6.6
FCIP (IP over Fibre Channel)	Complies with FC-IP 2.3 of FCA profile

## Ethernet

System component	Description
SFP GbE ports	Sixteen 1 or 10 GbE and two 40 GbE optical/copper ports compatible with ultra short reach (USR), short reach (SR), long reach (LR), and copper SFP/QSFP transceivers (available reach options vary for 1 GbE, 10 GbE, and 40 GbE)
Ethernet management port	One RJ-45 with 10/100/1000 Mbps auto-negotiating capability

**LEDs**

Component	Description
Switch status and management LEDs	One power status LED One system status LED One LED per FC port One LED per ETH port Two LEDs for Ethernet management port
Port status LEDs	Color-changing LEDs to indicate status

**Others**

Component	Description
Serial cable	One IEEE-compliant RJ-45 serial cable
RJ-45 to DB9 adapter	1
RJ-45 connector	One IEEE-compliant connector on the port side of the Extension Switch for use with a serial console and 10/100 Mbps Ethernet

**Weight and physical dimensions**

The Brocade 7840 includes all the fans and PSU FRUs, but not the transceivers or cables.

Model	Height	Width	Depth	Weight
Brocade 7840 Extension Switch	8.6 cm 3.39 in	44.0 cm 17.32 in	60.9 cm 24.00 in	18.23 kg 40.2 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)	5% to 93% at 40°C (104°F)	10% to 95% at 70°C (158°F)
Altitude (above sea level)	0 to 3,000 m (10,000 ft)	0 to 12,000 m (40,000 ft)
Shock	20 G, 11 ms, half-sine wave	20 G, 11 ms, half-sine wave, 3/eg axis
Vibration	1.0 G sine, 0.5 Grms random, 5-500 Hz	2.4 G sine, 1.1 Grms random, 5-500 Hz
Airflow	Maximum: 347 cmh (204 cfm)	N/A
Operating noise	48.0 dBA	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-1100WPSA C-R	1100 W	100 - 240 V (nominal) 90 - 264 V (range)	50 - 60 Hz (nominal)	12-5 A	Line Fused	40 A peak for any initial current surge at cold or warm start

**Power consumption (typical configuration)**

The Brocade 7840 Extension Switch does not support a DC power supply.

Model name	@100 VAC input	@200 VAC input	@-48 VDC input	Minimum number of power supplies	Notes
Brocade 7840	3.90 A 388 W 1524 BTU/hr	1.98 A 383 W 1307 BTU/hr	N/A	2 x AC 1100 W	SR optics, fans at nominal speed, 2 PSUs
Brocade 7840	4.24 A 422 W 1440 BTU/Hr	2.19 A 423 W 1444 BTU/Hr	N/A	2 x AC 1100 W	LR optics, fans at nominal speed, 2 PSUs

**Power consumption (maximum configuration)**

The Brocade 7840 Extension Switch does not support a -48 VDC power supply or a DC power supply.

Model name	@100 VAC input	@200 VAC input	Minimum number of power supplies	Notes
Brocade 7840	4.56 A 454 W 1550 BTU/hr	2.34 A 452 W 1536 BTU/hr	2 x AC 1100 W	SR optics, fans at high speed, 2 PSUs
Brocade 7840	4.94 A 492 W 1679 BTU/Hr	2.54 A 490 W 1672 BTU/Hr	2 x AC 1100 W	LR optics, fans at high speed, 2 PSUs

**Data port specifications (Ethernet)**

Model	Port Type	Number of ports	Description
Brocade 7840	40 GbE	2	Compatible with short range (SR) and long range (LR) optical QSFP+ transceivers
	10 GbE	16	Compatible with ultra short reach (USR), short reach (SR), and long reach (LR) optical SFP+ transceivers
	1 GbE	16	Compatible with -SX, -LX, and -CX (copper) SFP transceivers

**Fibre Channel data transmission ranges**

Port speed (Gbps)	Cable size (microns)	Short wavelength (SWL)	Long wavelength (LWL)	Extended long wavelength (ELWL)
2	50	300 m (984 ft) (OM2) 500 m (1,640 ft) (OM3)	N/A	N/A
	62.5	150 m (492 ft)	N/A	N/A
	9	N/A	10 km (6.2 miles)	25 km (15.5 miles)
4	50	150 m (492 ft) (OM2) 380 m (1,246 ft) (OM3)	N/A	N/A
	62.5	70 m (230 ft)	N/A	N/A
	9	N/A	10 km (6.2 miles)	25 km (15.5 miles)
8	50	50 m (164 ft) (OM2) 150 m (492 ft) (OM3)	N/A	N/A
	62.5	21 m (69 ft)	N/A	N/A
	9	N/A	10 km (6.2 miles)	25 km (15.5 miles)
16	50	35 m (115 ft) (OM2) 100 m (328 ft) (OM3) 125 m (410 ft) (OM4)	N/A	N/A
	62.5	15 m (49 ft)	N/A	N/A
	9	N/A	10 km (6.2 miles)	25 km (15.5 miles)

**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

**Serial port specifications (protocol)**

Parameter	Value
Baud	9600
Data bits	8
Parity	No
Flow control	None

**Memory specifications**

Memory	Type	Size
Boot	Flash	4 MB
Compact Flash	USB	8 GB
Control plane	DDR3 RDIMM SDRAM	8 GB
Data plane	DDR3 RDIMM SDRAM	128 GB

**Regulatory Compliance (EMC)**

- 2014/30/EU
- AS/NZS CISPR 55032 (Australia) (Class A)
- CISPR 32
- CNS 13438
- EN 300 386
- EN 55032/55024 (CE Mark) (Class A)
- EN 61000-3-2
- EN 61000-3-3
- FCC Part 15, Subpart B (Class A)
- GB 9254
- ICES-003 (Canada)
- KN 32
- KN 35
- TCVN 7189
- VCCI-32 (Japan)

**Regulatory Compliance (Safety)**

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

**Regulatory Compliance (Environmental)**

- 2011/65/EU – Restriction of the use of certain hazardous substances in electrical and electronic equipment (EU RoHS).
- 2012/19/EU – Waste electrical and electronic equipment (EU WEEE).
- 2006/66/EC – Batteries and accumulators and waste batteries and accumulators (EU battery directive).
- 30/2011/TT-BCT – Vietnam circular.
- 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.
- 94/62/EC – Packaging and packaging waste (EU).
- SJ/T 11364 – 2006 Marking for the Control of Pollution Caused by EIPs (China).
- SJ/T 11363 – 2006 Requirements for Concentration Limits for Certain Hazardous Substances in EIPs (China).

## Regulatory Statements

### 9.1 BSMI Statement (Taiwan)

警告使用者：

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

Warning:

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

### 9.2 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.

### 9.3 CE Statement

#### ATTENTION

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.

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 2014/30/EU
- Low Voltage Directive (LVD) 2014/35/EU
- EN 55032/EN 55024 (European Immunity Requirements)
  - EN61000-3-2/JEIDA (European and Japanese Harmonics Spec)
  - EN61000-3-3



## 9.6 Germany statement

Machine noise information regulation - 3. GPSGV, the highest sound pressure level value is 79.0 dB(A) in accordance with EN ISO 7779.

Maschinenlärminformations-Verordnung - 3. GPSGV, der höchste Schalldruckpegel beträgt 79.0 dB(A) gemäss EN ISO 7779.

## 9.7 KCC Statement (Republic of Korea)

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

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

## 9.8 VCCI Statement

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

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

# Cautions and Danger Notices

## 10.1 Cautions

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

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

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

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

### General cautions



#### CAUTION

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

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



#### CAUTION

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

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



#### CAUTION

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 an orange arrow with an "I."

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

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

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

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

**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.

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

## 10.2 Danger Notices

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

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

Un énoncé de danger indique des conditions ou des situations potentiellement mortelles ou extrêmement dangereuses. Des étiquettes de sécurité sont posées directement sur le produit et vous avertissent de ces conditions ou situations.

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

**General Dangers****DANGER**

The procedures in this manual are for qualified service personnel.

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

**DANGER**

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

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

**Electrical dangers****DANGER**

Remove both power cords before servicing.

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

**DANGER**

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

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

**DANGER**

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.

GEFAHR	Stellen Sie sicher, dass die Stromkreise ordnungsgemäß geerdet sind. Benutzen Sie dann das mit dem Gerät gelieferte Stromkabel, um es an die Stromquelle anzuschließen.
DANGER	Vérifiez que les circuits de sources d'alimentation sont bien mis à la terre, puis utilisez le cordon d'alimentation fourni avec le dispositif pour le connecter à la source d'alimentation.
PELIGRO	Verifique que circuitos de la fuente de corriente están conectados a tierra correctamente; luego use el cordón de potencia suministrado con el instrumento para conectarlo a la fuente de corriente

**Dangers related to equipment weight****DANGER**

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

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

**Laser Dangers****DANGER**

All fiber-optic interfaces use Class 1 lasers.

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

**DANGER**

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

GEFAHR	Verwenden Sie nur optische Transceiver, die von Broadcom zugelassen sind und die die Anforderungen gemäß FDA Class 1 Radiation Performance Standards in 21 CFR, Unterkapitel I, sowie IEC 60825 und EN60825 erfüllen. Optische Produkte, die diese Normen nicht erfüllen, können Strahlen aussenden, die für das menschliche Auge gefährlich sind.
DANGER	Utilisez uniquement des émetteurs-récepteurs optiques certifiés par Broadcom et conformes aux exigences sur la puissance de rayonnement de catégorie 1 de la FDA définies au sous-chapitre 21 CFR I et à les normes IEC 60825 et EN60825. Les produits optiques non-conformes à ces normes sont susceptibles d'émettre une lumière dangereuse pour les yeux.
PELIGRO	Utilice sólo transceptores ópticos aprobados por Broadcom y que cumplan con las normas IEC 60825 y EN60825, y con los estándares de rendimiento Clase 1 de FDA definidos en el subcapítulo I de 21 CFR. Los productos ópticos que no cumplan con estos estándares pueden emitir luz dañina para los ojos.

