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Brocade VDX 6740

Hardware Reference Manual

Supporting the Brocade VDX 6740, VDX 6740T, and VDX 6740T-1G

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Document History

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Brocade VDX 6740 Hardware Reference Manual	53-1002929-01	New document	July 2013
Brocade VDX 6740 Hardware Reference Manual	*53-1002829-02*	Revised with information for Brocade 6740T-1G	February 2014

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About This Document

In this chapter

How this document is organized

This document is organized to help you find the information that you want as quickly and easily as possible.

The document contains the following components:

- Chapter 1, "Brocade VDX 6740 Introduction" provides an overview of the Brocade VDX 6740 switch.
- Chapter 2, "Brocade VDX 6740 Installation" provides the information needed to install the switch into your network.
- Chapter 3, "Brocade VDX 6740 Configuration" lays out the tasks and commands necessary to get the switch up and running.
- Chapter 4, "Brocade VDX 6740 Operation" discusses the day-to-day operational procedures for using the switch.
- Chapter 5, "Brocade VDX 6740 FRU Replacement Procedures" provides procedures for removing and replacing the field-replaceable units (FRUs), including the fan assemblies and power supplies.
- Appendix A, "Brocade VDX 6740 Specifications" provides tables of physical, environmental, and general specifications.

Supported hardware and software

This document is specific to the Brocade VDX 6740, Brocade VDX 6740T, and Brocade VDX 6740T-1G under Network OS v4.1.0 and later.

Document conventions

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

Text formatting

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

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

Command syntax conventions

Command syntax in this manual follows these conventions:

command	Commands are printed in bold.
[ ]	Optional element.
variable	Variables are printed in italics. In the help pages, values are underlined or enclosed in angled brackets < >.
...	Repeat the previous element, for example “member[;member...]”
value	Fixed values following arguments are printed in plain font. For example, **show environment temp rbridge** 30
|	Boolean. Elements are exclusive. Example: **show environment fan** [**rbridge-id** {rbridge-id | **all**}]

Notes, cautions, and warnings

The following notices and statements are used in this manual. They are listed below in order of increasing severity of potential hazards.

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

ATTENTION
An Attention statement indicates potential damage to hardware or data.

CAUTION

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

DANGER

A danger calls your attention to a possible hazard that can cause injury or death.

Key terms

For definitions specific to Brocade and Fibre Channel, refer to the *Brocade Glossary*.

For definitions of SAN-specific terms, visit the Storage Networking Industry Association online dictionary at:

http://www.snia.org/education/dictionary

Notice to the reader

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Corporation	Referenced Trademarks and Products
Microsoft Corporation	Windows, Windows NT, Internet Explorer
Oracle Corporation	Sun, Solaris
Netscape Communications Corporation	Netscape
Red Hat, Inc.	Red Hat, Red Hat Network, Maximum RPM, Linux Undercover
Velcro Industries B.V.	Velcro

Additional information

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

Brocade resources

To get up-to-the-minute information, go to *http://my.brocade.com* to register at no cost for a user ID and password.

White papers, online demonstrations, and data sheets are available through the Brocade website at:

http://www.brocade.com/products-solutions/products/index.page

For additional Brocade documentation, visit the Brocade website:

http://www.brocade.com

Release notes are available on the MyBrocade website and are also bundled with the Network OS firmware.

Other industry resources

For additional resource information, visit the Technical Committee T11 website. This website provides interface standards for high-performance and mass storage applications for Fibre Channel, storage management, and other applications:

http://www.t11.org

For information about the Fibre Channel industry, visit the Fibre Channel Industry Association website:

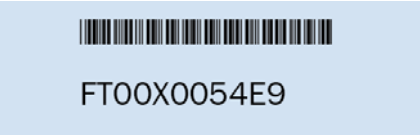
http://www.fibrechannel.org

Getting technical help

Contact your switch support supplier for hardware, firmware, and software support, including product repairs and part ordering. To expedite your call, have the following information available:

1. General Information
    - Switch model
    - Switch operating system version
    - Error numbers and messages received
    - Supportsave output
    - Detailed description of the problem, including the switch or fabric behavior immediately following the problem, and specific questions
    - Description of any troubleshooting steps already performed and the results
    - Serial console and Telnet session logs
    - syslog message logs
2. Switch Serial Number

    The switch serial number and corresponding bar code are provided on the serial number label, as illustrated below:

    The serial number label for the Brocade VDX 6740 switches is located on the switch ID pull-out tab located on the bottom left of the port side of the switch

Document feedback

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

documentation@brocade.com

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

Chapter

Brocade VDX 6740 Introduction

1

In this chapter

Brocade VDX 6740 overview

The Brocade VDX 6740 switches are top-of-rack, Gigabit Ethernet (GbE) line-rate, low latency, lossless Data Center Bridging (DCB) switches:

- The Brocade VDX 6740 offers SFP+ ports for its 1/10 GbE interfaces. Base models contain 24 Ethernet ports operating at 1 Gbps, 10 Gbps, or in auto-sensing mode. A 10G Port Upgrade license can add 1/10G ports in increments of 8, 16, and 24 ports. A 40G Port Upgrade license can be added for either two or four 40 GbE ports.
- The Brocade VDX 6740T offers 1/10G Base-T (RJ-45) ports and additional 40 GbE QSFP ports. Base models contain 24 Ethernet ports operating at 100 Mbps, 1 Gbps, 10 Gbps, or in auto-sensing mode. A 10G Port Upgrade license can add ports in increments of 8, 16, and 24 ports. A 40G Port Upgrade license can be added for either two or four 40 GbE ports.
- The Brocade VDX 6740T-1G offers 1G Base-T (RJ-45) ports and additional 40 GbE QSFP ports. Base models are fully populated with 48 Base-T ports operating at 100 Mbps, 1 Gbps, or in auto-sensing mode. A 10G Port Upgrade license enables RJ-45 port operation at 10 Gbps. This license can be applied in increments of 16, 32, and 48 ports. The Brocade VDX 6740T-1G ships standard with two 40 GbE ports. A 40G Port Upgrade license can be added for two additional 40 GbE ports.

Each 40 GbE port can be reconfigured as four 10 GbE ports in QSFP breakout mode. Thus, the Brocade VDX 6740 switches can be configured with as many as 64 10 GbE ports.

The Brocade VDX 6740 switches run on the Brocade Network Operating System (Network OS) v4.0.0 or later. The 100 Mbps speed for Base-T ports on Brocade VDX 6740T and Brocade VDX 6740T-1G switches is available with Brocade Network OS v4.1.0 and later. For details about Network OS, refer to the *Brocade Network OS Administrator's Guide*.

A key feature of the Brocade VDX 6740 switches is Brocade VCS™ technology, which includes virtual cluster switching, a new set of technologies that allows users to create flatter, virtualized, and converged data center networks. VCS fabrics are scalable, permitting users to expand at their own pace, and simplified, allowing users to manage the fabric as a single entity. VCS-based Ethernet fabrics are convergence-capable with technologies such as Fibre Channel over Ethernet (FCoE) for storage.

Platform components and capabilities

The Brocade VDX 6740 switches offer the following features and capabilities:

- A system motherboard that features a Reduced Instruction Set Computer (RISC) CPU running at 1.5 GHz with integrated peripherals
- An RJ-45 10/100/1000 Ethernet out-of-band management port
- An RJ-45-fronted serial (RS-232) port for terminal access and debugging
- A mini-USB-fronted serial (RS-232) port for terminal access and debugging (Brocade VDX 6740T and Brocade VDX 6740**T-1G** only)
- A USB port for firmware upgrades and system log downloads
- Up to 48 1/10 GbE optical or copper SFP+ ports in the Brocade VDX 6740 and 48 1/10G Base-T copper ports in the Brocade VDX 6740T
- Forty-eight 1G Base-T copper ports on the Brocade VDX 6740T-1G, which can be upgraded to 1/10G operation through 10G Port Upgrade licensing
- 100 Mbps operation on Brocade VDX 6740T and Brocade VDX 6740T-1G 1/10 Base-T ports (Network OS v4.1.0 and later).

NOTE
100 Mbps ports are intended for point to point connection to a management server and not as data ports.

- Up to four 40 GbE QSFP ports (can be configured into four 10 GbE ports each)
- Dual, hot-swappable 250W AC power supplies with three integrated cooling fans each (for the Brocade VDX 6740 only, can be ordered with front-to-back or back-to-front airflow)
- Dual, hot-swappable 500W AC power supplies and five separate, hot-swappable fan units (for the Brocade VDX 6740T only, can be ordered with front-to-back or back-to-front airflow)
- Support for short-range, long-range, extended range optical, and twinaxial copper SFP+ 10 GbE transceivers (Brocade VDX 6740)
- Support for 1, 3, and 5 meter 1G or 10G Base-T direct attach copper cables (Brocade VDX 6740T and Brocade VDX 6740T-1G)
- Support for short-range and long-range QSFP 40 GbE transceivers
- Support for optical or twinaxial breakout cable when 40 GbE ports are configured for 4x10 GbE
- Support for long-range and short-range SFP+ 10GbE transceivers
- Support for inter-switch link (ISL) Brocade Trunking (10 GbE ports only).
- A reduced-depth, rack-mount design using existing rail kits - four-post fixed or Telco flush and mid-mount rack mount kits (Brocade VDX 6740 only)
- New universal 4-post and 2-post rack mount kits (Brocade VDX 6740T only)
- Extensive diagnostics and system-monitoring capabilities for enhanced high Reliability, Availability, and Serviceability (RAS)
- Optimized airflow (a choice of front-to-back or back-to-front flow)
- A real-time clock (RTC) with battery
- SEEPROM for switch identification
- Voltage monitoring
- Fan monitoring

- Four temperature sensors (Brocade VDX 6740 only)
- Two temperature sensor (Brocade VDX 6740T only)
- I^2C interface to monitor and control environmental aspects

NOTE
Port numbering for the Brocade VDX 6740 switches begins with 1, not 0.

Software features

The Brocade VDX 6740 switches support the following features. For more details on these features, refer to the *Brocade Network OS Administrator's Guide*.

Layer 2 and Layer 3 features

- VLANs
- Spanning Tree Protocol (STP, RSTP, MSTP, and PVST+ and PVRST+)
- Support for unicast and multicast capabilities
- Support for IGMP snooping
- Layer 2 multi-path based on Transparent Interconnection of Lots of Links (TRILL)
- Layer 2 access control lists (ACLs)
- Switch Port Analyzer (SPAN) (also known as port mirroring - PM)
- Remote Switch Port Analyzer (RSPAN - SPAN across VCS)
- Layer 3 PIM multicast, ACL

Virtualization

- Automatic Migration of Port Profiles (AMPP)
- Support for VLAN, QoS, security, and FCoE port profiles

Link aggregation

- 802.3ad Link Aggregation Control Protocol (LACP) support
- Virtual Link Aggregation Group (vLAG) (a LAG that spans multiple physical switches)

QoS

- 802.1p marking
- Eight queues per port
- Scheduling: Strict priority (SP), Shaped Deficit Weighted Round-Robin (SDWRR)
- Ingress and egress policing

Management

- IPv4 or IPv6 management

- CLI management utilities on Network OS v4.1.0
- Out-of-band management
- sFlow
- TRILL Operations, Administration, and Management (OAM)

Licensing

- The VCS Fabric license to enable Ethernet fabric functionality is enabled by default.
- Fibre Channel over Ethernet (FCoE) license

  For the Brocade VDX 6740T-1G, you can only use this license after purchasing at least one 10G Port Upgrade licence.
- 10G Port Upgrade:
  - For Brocade VDX 6740 and Brocade VDX 6740T, this adds 10 GbE ports in increments of eight ports (8, 16, 24) per license.
  - For Brocade VDX 6740T-1G, this upgrades existing 1 GbE ports to 1/10 GbE operation in increments of 16 ports (16, 32, 48) per license.
  - Removal of a port reservation provisioned by this license is blocked if the port is in a configuration not allowed on 1 GbE port, such as Brocade Trunking or FCoE.
- 40G Port Upgrade:
  - For Brocade VDX 6740 and Brocade VDX 6740T, this is available in two-port increments per license to provide four total ports.
  - For Brocade VDX 6740T-1G, since the switch ships with two 40GbE ports, the license is available in a single two-port increment to provide four total ports.
- 10G and 40G Port Upgrade:
  - Removal of a 10G or 40G Port Upgrade license requires port reservations for non-base ports provisioned by the license to be released first.

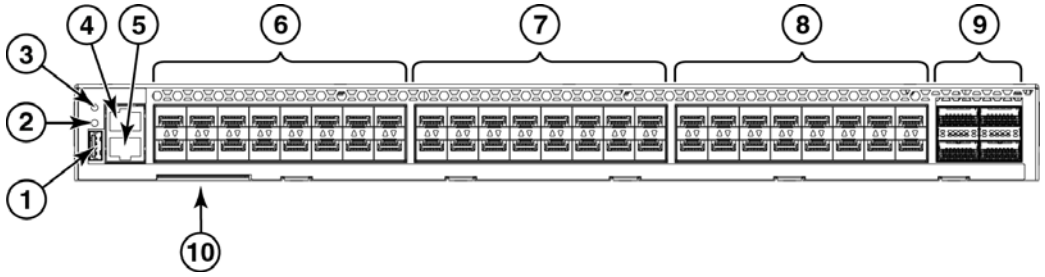
For more information on licensing, refer to the *Network OS Software Licensing Guide*.

NOTE
To upgrade 1 Gbps port speed to 10 Gbps on the Brocade VDX 6740T-1G when installing the 10G Port Upgrade License, refer to "Upgrading port speeds on the Brocade VDX 6740T-1G" on page 21.

Views of the Brocade VDX 6740 switches

The port side of the Brocade VDX 6740 switch includes the system LEDs, management ports and LEDs, USB port, and Gigabit Ethernet (GbE) ports and the corresponding port status LEDs.

Figure 1 shows the port side of the Brocade VDX 6740.



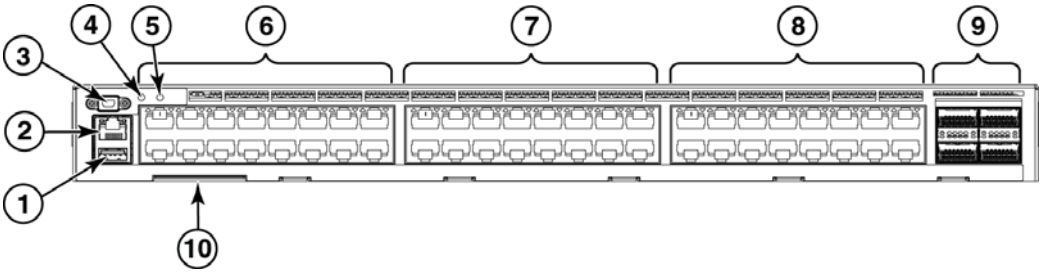
1	USB port	6	1/10 GbE SFP+ ports 1 through 16 with status LEDs above*
2	System power LED	7	1/10 GbE SFP+ ports 17 through 32 with status LEDs above*
3	System status LED	8	1/10 GbE SFP+ ports 33 through 48 with status LEDs above*
4	Serial console management port (RJ-45)	9	40 GbE QSFP ports 49 through 52
5	Ethernet port (RJ-45)	10	Switch ID pull-out tab

*Base ports on the VDX 6740T-1G operate at 1 Gbps and require Port Upgrade license to operate at 10 Gbps.

FIGURE 1 Port-side view of the Brocade VDX 6740

The port side of the Brocade VDX 6740T and Brocade VDX 6740T-1G switches includes the system LEDs, management ports and LEDs, USB port, and Base-T Ethernet ports and the corresponding port status LEDs.

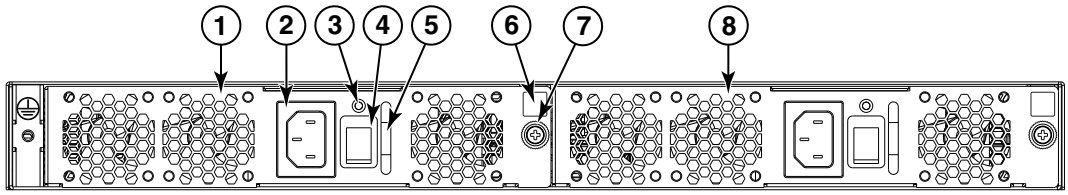
Figure 2 shows the port side of the Brocade VDX 6740T and Brocade VDX 6740T-1G.



1	USB port	6	10 GbE BaseT ports 1 through 16 with status LEDs above
2	Ethernet management port (RJ45)	7	10 GbE BaseT ports 17 through 32 with status LEDs above
3	Serial console port (mini-USB)	8	10 GbE BaseT ports 33 through 48 with status LEDs above
4	System status LED	9	40 GbE QSFP ports 49 through 52
5	System power LED	10	Switch ID pull-out tab

FIGURE 2 Port-side view of the Brocade VDX 6740T and Brocade VDX 6740T-1G

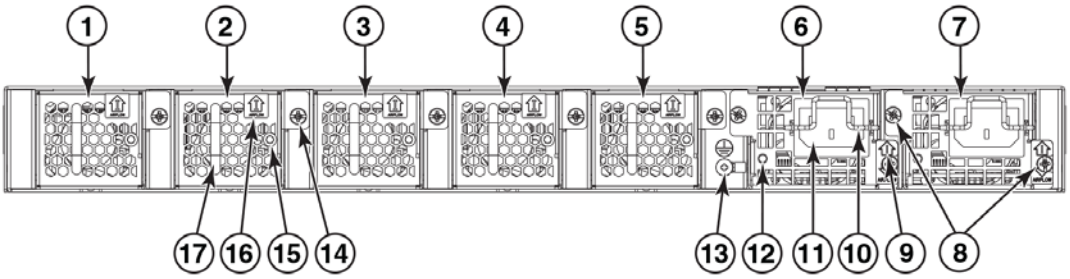
Figure 3 shows the non-port side of the Brocade VDX 6740, which contains the combined power supply and fan assemblies.



1	Power supply and fan assembly #2	5	Handle
2	Power cord receptacle	6	Airflow label
3	Power supply and fan status LED	7	Captive screw
4	On/off switch	8	Power supply and fan assembly #1

FIGURE 3 Non-port-side view of the Brocade VDX 6740

Figure 4 shows the non-port sides of the Brocade VDX 6740T and Brocade VDX 6740T-1G, which house the separate power supplies and fans.



1	Fan #1	10	Plug retainer
2	Fan #2	11	Plug receptacle
3	Fan #3	12	Status LED
4	Fan #4	13	Ground lug
5	Fan #5	14	Captive screw
6	Power supply #1	15	Status LED
7	Power supply #2	16	Airflow label
8	Captive screws	17	Handle
9	Airflow label		

FIGURE 4 Non-port-side view of the Brocade VDX 6740T and Brocade VDX 6740T-1G

Chapter

Brocade VDX 6740 Installation

2

In this chapter

Items included with the Brocade VDX 6740 switches

The following items are included with the standard shipment of a fully-configured Brocade VDX 6740. When you open the Brocade VDX 6740 packaging, verify that the items are included in the package and that no damage has occurred during shipping.

- The Brocade VDX 6740 switch, Brocade VDX 6740T switch, or Brocade VDX 6740T-1G switch
- Transceivers and cables as ordered
- One accessory kit, containing the following items:
  - Serial cable with an RJ-45 connector (Brocade VDX 6740) or a mini-USB connector (Brocade VDX 6740T and Brocade VDX 6740T-1G)
  - 6 ft. power cords (2)
  - Rubber feet, required for setting up the switch as a standalone unit
  - 2 GB USB drive
  - China RoHS hazardous/toxic substance content chart
  - EULA/Read-Me document
  - Web pointer card for documentation

Installation and safety considerations

You can install the Brocade VDX 6740T and Brocade VDX 6740T-1G switches in the following ways:

- As a standalone unit on a flat surface.
- For the Brocade VDX 6740:
  - In a four-post EIA rack using a port-side flush mount rack mount kit.
  - In a Telco rack using either a port-side flush mount or mid-mount rack kit.

- For the Brocade VDX 6740T and Brocade VDX 6740T-1G:
  - In a four-post EIA rack using a port-side flush mount or a non-port-side flush mount universal fixed-rail rack mount kit.
  - In a Telco rack using a port-side flush mount or mid-mount universal rack kit.

NOTE
For the Brocade VDX 6740T and Brocade VDX 6740T-1G, be sure to keep the vents on the sides near the front of the switch are unobstructed.

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

Electrical considerations

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

- The primary outlets are correctly wired, protected by a circuit breaker, and grounded in accordance with local electrical codes.
- The supply circuit, line fusing, and wire size are adequate, as specified by the electrical rating on the switch nameplate.
- The power supply standards are met. Refer to Table 12 for more information.

Environmental considerations

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

- Because the Brocade VDX 6740 switches can be ordered with fans that move air either front to back (exhaust) or back to front (intake), be sure to orient your switch with the airflow pattern of any other devices in the rack. All equipment in the rack should force air in the same direction to avoid intake of exhaust air.
- For the Brocade VDX 6740 - A maximum flow of 43.7 cubic meters/hour (25.7 cubic feet/minute) at the intake vents.
- For the Brocade VDX 6740T and Brocade VDX 6740T-1G - A maximum flow of 83.8 cubic meters/hour (49.3 cubic feet/minute) at the intake vents.
- The ambient air temperature does not exceed 40°C (104°F) while the switch is operating.

Rack considerations

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

- The rack must be a standard EIA rack.
- The rack space required is one rack unit (1U) 44.45 mm (1.75 in.) high and 482.60 mm (19 in.) wide.

- The equipment in the rack is grounded through a reliable branch circuit connection and maintains ground at all times. Do not rely on a secondary connection to a branch circuit, such as a power strip.
- Ensure that the rack mounting does not impede airflow or negatively affect temperature requirements, particularly if the switch is installed in a closed or multirack assembly. The Brocade VDX 6740T and Brocade VDX 6740T-1G have airflow openings on either side of the switch toward the front. Ensure that these openings are not obstructed.
- The additional weight of the switch does not exceed the rack's weight limits or unbalance the rack in any way.
- The rack is secured to ensure stability in case of unexpected movement, such as an earthquake.

Recommendations for cable management

The minimum radius to which a 50-micron cable can be bent under full tensile load is 5.1 cm (2 in.). For a cable under no tensile load, that minimum is 3.0 cm (1.2 in.).

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

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

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

Items required for installation

The following items are required for installing, configuring, and connecting the Brocade VDX 6740 switches for use in a network and fabric:

- A workstation with an installed terminal emulator, such as HyperTerminal.
- An unused IP address and corresponding subnet mask and gateway address.
- A serial cable (provided).
- An Ethernet cable.
- (Optional) Access to an FTP server or Brocade-branded USB device for backing up the switch configuration.
- If mounting in the iDataplex IBM 15.5-inch depth rack, the Brocade iDataplex rack mount kit.

Standalone installation for the Brocade VDX 6740 switches

Complete the following steps to install the Brocade VDX 6740 as a standalone unit.

1. Unpack the Brocade VDX 6740 switch and verify the items listed in "Items included with the Brocade VDX 6740 switches" on page 7 are present and undamaged.
2. Apply the adhesive rubber feet. Applying the rubber feet to the switch helps prevent the switch from sliding off the supporting surface.
   a. Clean the indentations at each corner of the bottom of the switch to ensure that they are free of dust or other debris that might lessen the adhesion of the feet.
   b. With the adhesive side against the chassis, place one rubber foot in each indentation and press into place.
3. Place the switch on a flat, sturdy surface.
4. Provide power to the switch as described in "Providing power to the switch" on page 10.

NOTE
Do not connect the switch to the network until the IP address is correctly set. For instructions on how to set the IP address, refer to "Setting the switch IP address" on page 15.

Rack installation options for the Brocade VDX 6740 switches

Follow the installation instructions shipped with the appropriate rack mount kit:

- *Mid-Mount Rack Kit (Switch) Installation Procedure* (*Brocade VDX 6740* only)
- *Two-post Flush Mount Installation Procedure* (*Brocade VDX 6740* only)
- *Slim Rail Rack Mount Kit Installation Procedure* (*Brocade VDX 6740* only)
- *1U-2U Universal 4-Post Rail Mount Kit* (*Brocade VDX 6740T* and *Brocade VDX 6740T-1G* only)
- *1U-2U Universal 2-Post Rail Mount Kit* (*Brocade VDX 6740T and Brocade VDX 6740T-1G* only)

Providing power to the switch

Perform the following steps to provide power to the Brocade VDX 6740 switches.

1. Connect the power cords to both power supplies, and then to power sources on *separate* circuits to protect against failure. Ensure that the power cords have a minimum service loop of 15.2 cm (6 in.) available and are routed to avoid stress.
2. For the Brocade VDX 6740, flip the switch on each power supply to **I**.

   For the Brocade VDX 6740T and Brocade VDX 6740T-1G, the power supplies power up as soon as they are plugged in.

   The power supply LEDs display green. The power LED on the front of the switch turns green as well. The system status LED on the front panel will be amber until POST completes and then it will turn green.

NOTE
Power is supplied to the switch as soon as the first power supply is connected and powered on.

3. After POST is complete, verify that the switch power and status LEDs on the port side of the switch are green.

Verifying operation

After you have powered the system on and POST is complete, verify that the switch is working properly.

1. Verify that the power supply LEDs are solid green. Refer to Figure 9 and Figure 10 for the location of these LEDs.
2. Verify that the system power LED and the system status LED is solid green. Refer to Figure 7 and Figure 7 and for the specific locations of these LEDs.
3. The port LEDs should be lit during POST activities. When POST is complete, only the LEDs for ports connected to other devices should be green. Refer to Figure 7 and Figure 7 for the specific locations of these LEDs.

Refer to Table 3 for more details on the LED patterns.

2 Verifying operation

Chapter

Brocade VDX 6740 Configuration 3

In this chapter

Configuration for the Brocade VDX 6740 switches

The Brocade VDX 6740 switches can be configured in VCS™ mode, which is enabled by default.

In VCS mode, the switch is part of an Ethernet fabric involving two or more VCS-enabled switches. VCS technology embodies the concepts of distributed intelligence and logical chassis. Distributed intelligence means that all configuration and destination information is automatically distributed to each member switch in the fabric. Distributed intelligence has three major characteristics:

- The fabric is self-forming. When two VCS-enabled switches are connected, the fabric is automatically created and the switches discover the common fabric configuration.
- The fabric is masterless. No single switch stores configuration information or controls fabric operations. Any switch can fail or be removed without causing disruptive fabric downtime or delayed traffic.
- The fabric is aware of all members, devices, and Virtual Machines (VMs). Automatic Migration of Port Profiles (AMPP) supports VM migration to another physical server. If the VM moves, it is automatically reconnected to all of its original resources.

Logical chassis means that the entire VCS fabric appears and can be managed as a single Layer 2 switch. There are three major characteristics to logical chassis:

- Each physical switch in the fabric can be managed as if it were a blade in a chassis. When a VCS-enabled switch is connected to the fabric, it inherits the configuration of the fabric and the new ports become available immediately.
- You can manage the entire fabric from any switch.
- You can manage the edge switches in the fabric as if they were a single switch.

Creating a serial connection

You perform all configuration tasks in this guide using a serial connection from a workstation or terminal to the switch.

Complete the following steps to create a serial connection to the switch.

1. Connect the serial cable to the serial port on the switch and to an RS-232 serial port on the workstation or terminal device.

   If the serial port on the workstation or terminal device is RJ45 instead of RS-232, remove the adapter on the end of the serial cable and insert the exposed RJ45 connector into the RJ45 serial port on the workstation.

2. Open a terminal emulator application (such as HyperTerminal on a PC, or TERM, TIP, or Kermit in a UNIX environment), and configure the application as follows:

   - In a Windows environment, enter the following values: 9600 bits per second, 8 databits, no parity, 1 stop bit, and no flow control.
   - 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.

The serial port is located on the port side of the Brocade VDX 6740 switches. The Brocade VDX 6740 uses an RJ-45 connector for the serial port. The Brocade VDX 6740T and Brocade VDX 6740T-1G use a mini-USB connector for the serial port. An RJ-45 to DB9 adapter is also provided with the switch. The cable supplied is a rollover cable.

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

The serial port can be used to connect to a workstation to configure the IP address for the Brocade VDX 6740 before connecting the switch to a fabric or IP network. The serial port's parameters are fixed at 9600 baud, 8 data bits, and no parity, with flow control set to None.

Table 1 lists the serial cable pinouts.

TABLE 1 Serial cable pinouts

PIN	Signal	Description
1	Not supported	NA
2	Not supported	NA
3	TXD	Transmit data
4	GND	Logic ground
5	Not supported	NA
6	RXD	Receive data
7	Not supported	NA
8	Not supported	NA

Permanent password assignment

When you log in for the first time, Brocade recommends that you change the passwords for the default accounts.

The factory-configured default accounts on the switch are admin, user, and root. Use the default administrative account as shown in Table 2 to log in to the switch for the first time and to perform the basic configuration tasks.

The root account is reserved for development and manufacturing. The user account is read-only and used primarily for system monitoring.

TABLE 2 Default administrative account names and passwords

Account type	Login name	Password
Administrative	admin	password
User account (read-only)	user	password

Changing the default account passwords

When you change the default account password after you log in for the first time, only the default password rule is in effect. The rule specifies a minimum password length of eight characters. For advanced user and role management, including setting password rules, refer to the Security chapter of the *Brocade Network OS Administrator's Guide*.

1. Enter the **configure terminal** command to enter global configuration mode.
2. Enter the **username** command followed by the account name and the password parameter.
3. When prompted, enter the new password. and press **Enter**.

```
Switch# configure terminal
Entering configuration mode terminal
switch(config)# username admin password
(<WORD>;;User password satisfying password-attributes):********
```

Setting the switch IP address

You can configure the Brocade VDX 6740 switches with a static IP address, or you can use a Dynamic Host Configuration Protocol (DHCP) server to set the IP address of the switch. DHCP is enabled by default. The Brocade VDX 6740 switches support both IPv4 and IPv6 format addresses.

Using DHCP to set the IP address

When using DHCP, the Brocade VDX 6740 switches obtain the IP address, subnet mask, and default gateway address from the DHCP server. The DHCP client can only connect to a DHCP server that is on the same subnet as the switch. If your DHCP server is not on the same subnet as the Brocade VDX 6740, use a static IP address.

To set an IPv4 IP address using DHCP, complete the following steps.

1. Log in to the switch using the admin account.
2. Configure the management interface with the following command:

```
switch(config)# interface Management 1/0
```

3. Configure the IP address using the following command:

```
switch(config-Management-1/0)# ip address dhcp
```

Setting a static IP address

Complete the following steps to set a static IP address.

1. Log in to the switch using the default password (the default password is *password*).
2. Use the **ip address** 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. You should also disable DHCP and enter a gateway address as well.

```
switch(config)# interface Management 1/0
switch(config-Management-1/0)# no ip address dhcp
switch(config-Management-1/0)# ip address 10.24.85.81/20
```

   To set up a default gateway, add an ip route in rbridge mode.

```
switch(config-rbridge-id-10)# ip route 0.0.0.0/0 10.24.80.1
switch# copy running-config startup-config
```

   If you are going to use an IPv6 address, enter the network information in semicolon-separated notation as prompted after the **ipv6 address** operand.

```
switch(config)# interface Management 1/0
switch(config-Management-1/0)# no ip address dhcp
switch(config-Management-1/0)# ipv6 address \
fd00;60;69bc;832;e61f;13ff;fe67;4b94/64
```

3. To display the configuration, use the **show running-config interface Management** command.

```
switch# show running-config interface Management 1/0
interface Management 1/0
 no ip address dhcp
 ip address 10.24.85.81/20
 ipv6 address fd00;60;69bc;832;e61f;13ff;fe67;4b94/64
 no ipv6 address autoconfig
!
```

Stateless IPv6 autoconfiguration

IPv6 allows assignment of multiple IP addresses to each network interface. Each interface is configured with a link local address in almost all cases, but this address is only accessible from other hosts on the same network. To provide for wider accessibility, interfaces are typically configured with at least one additional global scope IPv6 address. IPv6 autoconfiguration allows more IPv6 addresses, the number of which is dependent on the number of routers serving the local network and the number of prefixes they advertise.

When IPv6 autoconfiguration is enabled, the platform will engage in stateless IPv6 autoconfiguration. When IPv6 autoconfiguration is disabled, the platform will relinquish usage of any autoconfigured IPv6 addresses that it may have acquired while IPv6 autoconfiguration was enabled. This same enabled or disabled state also enables or disables the usage of a link local address for each managed entity (though a link local address will continue to be generated for each switch) because those link local addresses are required for router discovery.

The enabled or disabled state of autoconfiguration does not affect any static IPv6 addresses that may have been configured. Stateless IPv6 autoconfiguration and static IPv6 addresses can coexist.

Setting stateless IPv6 autoconfiguration

To configure stateless IPv6 autoconfiguration, complete the following steps.

1. Issue the **configure terminal** command to enter global configuration mode.
2. Take the appropriate action based on whether you want to enable or disable IPv6 autoconfiguration:
   - Enter the **ipv6 address autoconfig** command to enable IPv6 autoconfiguration for all managed entities on the target platform.
   - Enter the **no ipv6 address autoconfig** command to disable IPv6 autoconfiguration for all managed entities on the target platform.

Changing the RBridge ID

If you are going to have more than one switch in a fabric, each switch must have a unique RBridge ID. The default RBridge ID for any Brocade VDX 6740 is 1. Use the **vcs rbridge-id** *[rbridge-id]* command to change the default RBridge ID. You should be in privileged EXEC mode to run the command. If you have made any other configuration changes you want to persist, be sure to save your running configuration to the startup configuration before running the **vcs rbridge-id** command as this command reboots the switch.

Enter the **vcs rbridge-id** *[rbridge-id]* command.

```
switch# vcs rbridge-id 2
This operation will change the configuration to default and reboot the switch.
Do you want to continue? [y/n]:y
```

When the confirmation question appears, answer Y.

The reply to the command will include a line about the setting of the RBridge ID.

```
Successfully set rbridge-id.
```

Changing the VCS ID

If you are going to have more than one VCS fabric, each fabric must have a unique VCS ID. The default VCS ID for any VCS fabric is 1. Use the **vcs vcs-id** *[ID]* command to change the default VCS ID. You should be in privileged EXEC mode to run the command. If you have made any other configuration changes you want to persist, be sure to save your running configuration to the startup configuration before running the **vcs vcs-id** command as this command reboots the switch.

Enter the **vcs vcs-id** *[ID]* command.

```
switch# vcs vcs-id 2
This operation will change the configuration to default and reboot the switch.
Do you want to continue? [y/n]:y
```

When the confirmation question appears, answer Y.

The reply to the command will include a line about the setting of the VCS ID.

```
Successfully set vcs-id.
```

Date and time on the Brocade VDX 6740

The Brocade VDX 6740 switches maintain the current date and time inside a battery-backed real-time clock (RTC) circuit. Date and time are used for logging events. Switch operation does not depend on the date and time; a Brocade VDX 6740 switch with an incorrect date and time value functions properly. Because the date and time are used for logging, error detection, and troubleshooting, you should set them correctly.

Time zones

You can set the time zone for a switch by using the **clock TimeZone** command. The time zone setting has the following characteristics:

- The **clock TimeZone** setting automatically adjusts for Daylight Savings Time.
- Changing the time zone on a switch updates the local time zone setup and is reflected in local time calculations.
- By default, all switches are in the Greenwich Mean Time (GMT) time zone (0,0). If all switches in a fabric are in one time zone, it is possible for you to keep the time zone setup at the default setting.
- System services that have already started will reflect the time zone changes only after the next reboot.
- Time zone settings persist across failover for high availability.
- Time zone settings are not affected by Network Time Protocol (NTP) server synchronization.

The following regions are supported: Africa, America, Antarctica, Asia, Atlantic, Australia, Europe, Indian, and Pacific. One of these, along with a city name, establishes the time zone.

Time synchronization

To keep the time in your network current, it is recommended that the principal switch has its time synchronized with at least one external NTP server. The other switches in the fabric will automatically take their time from the principal switch.

All switches in the fabric maintain the current clock server value in nonvolatile memory. By default, this value is the local clock server of the principal switch. Changes to the clock server value on the principal switch are propagated to all switches in the fabric.

When a new switch enters the fabric, the time server daemon of the principal switch sends out the addresses of all existing clock servers and the time to the new switch.

The **ntp server** command accepts multiple server addresses in IPv4 format. When multiple NTP server addresses are passed, **ntp server** sets the first obtainable address as the active NTP server. If there are no reachable time servers, then the local switch time is the default time.

Synchronizing local time using NTP

Perform the following steps to synchronize the local time using NTP.

1. Log in to the switch using the default password (the default password is *password*).
2. Enter the **ntp server** *"IPv4 address"* command, where *IPv4 address* is the IP address of the first NTP server in IPv4 format, which the switch must be able to access. The *IPv4 address* variable is optional. By default, this value is LOCL, which uses the local clock of the principal switch as the clock server.

   ```
   switch:admin> ntp server "132.163.135.131"
   ```

   To display the NTP server IP address, use the **show ntp status** [**switchid** *switchid* | **all**] command.

   ```
   switch:admin> show ntp status switchid 132.163.135.131
   ```

   The request is for the local switch unless a switch ID is specified. Specify the **all** parameter to send the request to all switches in the cluster.

If you need to remove an NTP server, use the **no** form of the **ntp server** command.

```
switch:admin> no ntp server "132.163.135.131"
```

Setting the clock (date and time) manually

You should set the clock only if there are no NTP servers configured. Time synchronization from NTP servers overrides the local clock. Date values are limited to between January 1, 1970 and January 19, 2038.

1. Log in to the switch using the default password (the default password is *password*).
2. Enter the **clock set** *year-month-dayThours*:*minutes*:*seconds* command.

   The following example sets the clock to March 17, 2010, 15 minutes past noon:

   ```
   switch:admin > clock set 2010-03-17T12:15:00
   ```

3. To show the clock and time zone settings, use the **show clock [switchid** *switchid* | **all]** command.

   ```
   switch:admin > show clock switchid 1
   ```

Setting time zones

You must perform this procedure on *all* switches for which the time zone must be set. However, you only need to set the time zone once on each switch, because the value is written to nonvolatile memory. While not necessary for switch operation, setting a time zone is part of ensuring accurate logging and audit tracking. Time zone changes take effect after a reboot.

Use the **clock TimeZone** command to set the time zone.

1. Connect to the switch and log in using an account assigned to the admin role.
2. Enter the **clock TimeZone** *region/city* command.

   The following example changes the time zone to US/Pacific Standard Time:

   ```
   switch:admin > clock timezone America/Los_Angeles
   ```

3. Reboot the switch.

Network device connections

Please refer to Table 16 for a listing of supported cables for the Brocade VDX 6740 switches.

NOTE
Before plugging a cable to any port, be sure to discharge any static charge stored on the cable by touching the electrical contacts to a grounded surface.

Ethernet or Fast Ethernet hubs

For copper connections to Ethernet hubs, a 1000Base-T switch, or another Brocade device, a crossover cable is required. If the hub is equipped with an uplink port, it requires a straight-through cable instead of a crossover cable.

NOTE
The 802.3ab standard (automatic MDI or MDIX detection) calls for automatic negotiation of the connection between two 1000Base-T ports. Therefore, a crossover cable may not be required; a straight-through cable may work as well.

Workstations, servers, or routers

Straight-through UTP cabling is required for direct UTP attachment to workstations, servers, or routers using network interface cards (NICs).

Fiber cabling is required for direct attachment to Gigabit NICs or switches and routers through fiber ports.

Network device

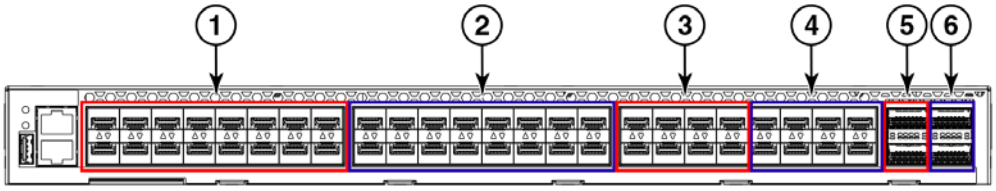
For direct attachment from the Brocade device to a Gigabit NIC, switch, or router, you can use either a fiber cabling with an LC connector or a copper cable with an RJ-45 connector.

Testing connectivity

After you install the network cables, you can test network connectivity to other devices by observing the LEDs related to network connection and performing trace routes. Refer to Table 3 on page 26 for a description of the port states.

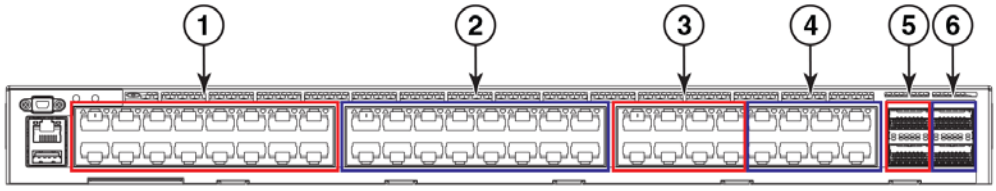
Brocade inter-switch link trunks

In VCS mode, unless specifically disabled, inter-switch link (ISL) Brocade trunking between adjacent switches is automatic. All ports must be in the same port group and must be configured at the same speed. There is a limit of sixteen ports per trunk group. No separate licensing is required. Refer to Figure 5 and Figure 6 below for the exact port groups. On the Brocade VDX 6740T and Brocade VDX 6740T-1G, ports in groups 3 and 3A, as well as port groups 4 and 4A, cannot be trunked together. However, these ports can be trunked on the Brocade VDX 6740 when the 40 GbE QSFP ports are configured in breakout mode. Brocade VDX 6740T-1G 1GbE ports cannot be trunked. For more information about Brocade trunking, refer to the *Brocade Network OS Administrator's Guide*.



1	Trunk Group 1 - 1/10 GbE SFP ports 1-16	4	Trunk group 4 - 1/10 GbE SFP ports 41-48
2	Trunk Group 2 - 1/10 GbE SFP ports 17-32	5	Trunk Group 3A - 40 GbE QSFP ports 49-50
3	Trunk Group 3 - 1/10 GbE SFP ports 33-40	6	Trunk Group 4A - 40 GbE QSFP ports 51-52

FIGURE 5 Port groups of the Brocade VDX 6740



1	Trunk Group 1 - 1/10 GbE BaseT ports 1-16	4	Trunk Group 4 - 1/10 GbE BaseT ports 41-48
2	Trunk Group 2 - 1/10 GbE BaseT ports 17-32	5	Trunk Group 3A - 40 GbE QSFP ports 49-50
3	Trunk Group 3 - 1/10 GbE BaseT ports 33-40	6	Trunk Group 4A - 40 GbE QSFP ports 51-52

FIGURE 6 Port groups of the Brocade VDX 6740T and Brocade VDX 6740T-1G

Upgrading port speeds on the Brocade VDX 6740T-1G

Using the 10G Port Upgrade License, you can enable RJ45 ports operating at 1 Gbps on the Brocade VDX 6740T-1G switch to also operate at 10 Gbps. The license is applied in increments of 16 ports. To upgrade the ports, use the following procedure.

1. Install the PORT_10G_UPGRADE license. Use the following instructions in the Administering Licenses chapter of the *Network OS Administrator's Guide*:
   - Displaying the switch ID
   - Obtaining the license key

- Installing a license

2. Enter the **show dpod** command to verify the allowed reservation pool size and to determine 10G ports that are assigned to a 10G Port Upgrade license already.

```
switch# show dpod
```

3. Enter the **configure terminal** command to access global configuration mode

```
switch# configure terminal
```

4. Enter the shutdown command for the interface if not already in shutdown state.

```
switch(config)# interface gigabitethernet 1/0/1
switch(conf-if-gi-1/0/1)# shutdown
```

5. Enter the **dpod** command while in global configuration mode to reserve a license assignment for the port from the license pool.

```
switch(config)dpod 1/0/1 reserve
```

NOTE
To remove a license assignment for a port, use *release* instead of *reserve*.

6. Perform one of the following steps:

- Configure interface speed to 10000 using the **speed** command.

```
switch(config)# interface tengigabitethernet 1/0/1
switch(conf-if-int-1/0/1)# speed 10000
```

NOTE
This operation may fail as a result of limited available reservations.

- Configure the interface speed to *auto* to allow dynamic link speed selection up to 10 Gbps.

```
switch(config)# interface tengigabitethernet 1/0/1
switch(conf-if-int-1/0/1)# speed auto
```

7. Enable the 10G interface using the **no shutdown** command.

```
switch(config)# interface tengigabitethernet 1/0/1
switch(conf-if-te-1/0/1)# no shutdown
```

Chapter

4

Brocade VDX 6740 Operation

In this chapter

LED activity interpretation

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

There are three possible LED states: off (no light), a steady light, and a flashing light. Flashing lights may be slow, fast, or flickering. The LED colors are either green or amber. Refer to Table 3 on page 26 and Table 4 on page 28 for details on LED behavior.

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

Brocade VDX 6740 LEDs

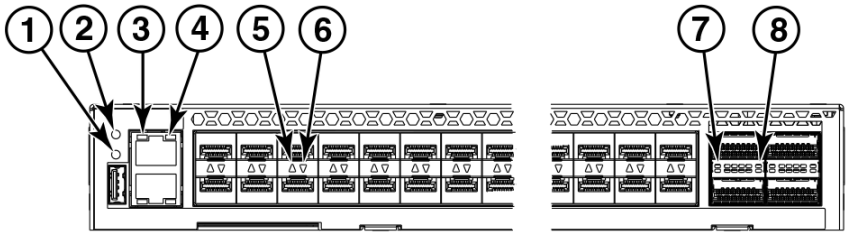
The Brocade VDX 6740 switches have the following LEDs:

- One bicolor system status LED (green and amber) on the port side.
- One power status LED (green) on the port side.
- Two Ethernet management port LEDs (green) for the Ethernet management port. The two LEDs show the status of the port link and the port activity.
- One triangle-shaped bicolor port status LED (green and amber) for each 10 GbE port on the switch. These LEDs are arrayed above each vertical pair of ports on the Brocade VDX 6740. The left LED corresponds to the upper port of the pair and the right LED corresponds to the lower port.
- One triangle-shaped bicolor port status LED (green and amber) for each 40 GbE port on the switch. These LEDs are arrayed between each vertical pair of 40 GbE ports on the Brocade VDX 6740 switches. The left LED corresponds to the upper port of the pair and the right LED corresponds to the lower port.
- One power supply and fan assembly LED (green) above the AC power switch on each combined power supply and fan assembly on the non-port side of the switch on the Brocade VDX 6740.

- One power supply LED (green) to the left of the AC power plug on each power supply on the non-port side of the switch on the Brocade VDX 6740T and Brocade VDX 6740T-1G.
- One bicolor fan status LED (green and amber) on each fan assembly on the non-port side of the switch on the Brocade VDX 6740T and Brocade VDX 6740T-1G.

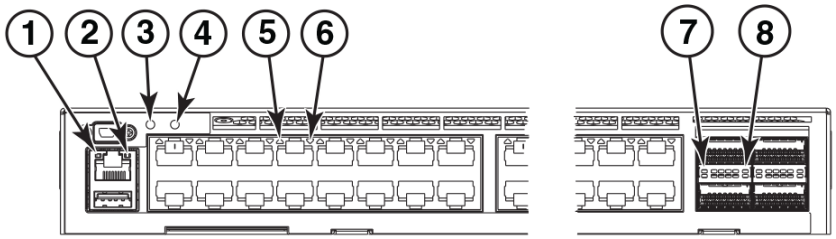
LED locations

Figure 7 shows the LEDs on the port side of the Brocade VDX 6740. On the Brocade VDX 6740, the port status LEDs for the 10 and 40 GbE ports are situated between the upper and lower ports of each pair. On the Brocade VDX 6740T, the port status LEDs for the 10 GbE ports are situated above the upper and lower ports of each pair. Refer to Figure 7. The port status LEDs for the 40 GbE ports are situated between the upper and lower ports of each pair as on the Brocade VDX 6740. Refer to Figure 1 on page 5 for the numbering and locations of the GbE ports.



1	System power LED	5	Upper 10 GbE SFP+ port status LED
2	System status LED	6	Lower 10 GbE SFP+ port status LED
3	Switch management Ethernet port link LED	7	Upper 40 GbE QSFP port status LED
4	Switch management Ethernet port activity LED	8	Lower 40 GbE QSFP port status LED

FIGURE 7 LEDs on the port side of the Brocade VDX 6740

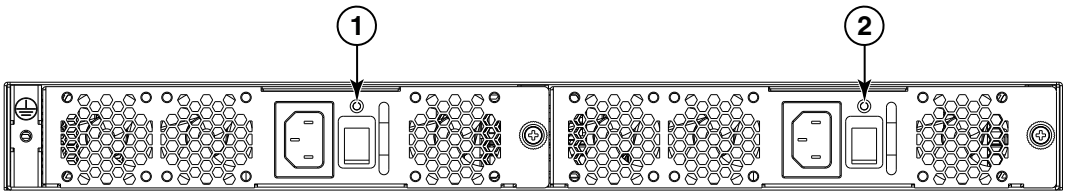


1	Switch management Ethernet port link LED	5	Upper 10G Base-T port status LED*
2	Switch management Ethernet port activity LED	6	Lower 10G Base-T port status LED*
3	System status LED	7	Upper 40 GbE QSFP port status LED*
4	System power LED	8	Lower 40 GbE QSFP port status LED*

* Base ports on the Brocade VDX 6740**T-1G operate at 1 Gbps unless port upgrade license is applied to allow 10 Gbps.**

FIGURE 8 LEDs on the port side of the Brocade VDX 6740T and Brocade VDX 6740T-1G

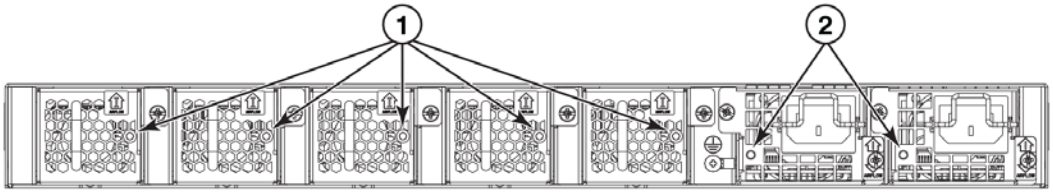
Figure 9 shows the LEDs on the non-port side of the Brocade VDX 6740.



1 Power supply and fan assembly #2 status LED 2 Power supply and fan assembly #1 status LED

FIGURE 9 LEDs on the non-port side of the Brocade VDX 6740

Figure 10 shows the LEDs on the non-port side of the Brocade VDX 6740T and Brocade VDX 6740T-1G.



1 Fan assembly status LEDs 2 Power supply status LEDs

FIGURE 10 LEDs on the non-port side of the Brocade VDX 6740T and Brocade VDX 6740T-1G

LED patterns

Table 3 describes the port-side LEDs and their behaviors.

TABLE 3 Port side LED patterns during normal operation

LED name	LED color	Status of hardware	Recommended action
System power (one LED [green])	Off (no light)	System is off or there is an internal power supply failure. Voltage may be dropping below specification.	Verify the system is powered on, the power cables are attached, and your power source is live. Contact your switch service provider.
	Steady green	System is on and power supplies are functioning properly.	No action required.
System status (one bicolor LED [green and amber])	Off (no light)	System is off or there is no power.	Verify the system is on.
	Steady green	System is on and functioning properly.	No action required.
	Blinking amber/green	Attention.	Most likely a power supply or fan assembly is faulted. Verify the status and check all messages.
	Steady amber (for more than 5 seconds)	A system fault has occurred or the switch is in an initialization state.	Check the management interface and the error log for details on the cause of the status. Contact your switch service provider.
Ethernet Link (Management port) (one LED [green])	Off (no light)	There is no link.	No action required.
	Steady green	Link is present.	No action required.
Ethernet Activity (Management port) (one LED [green])	Off (no light)	There is no activity.	No action required.
	Blinking green	There is activity (traffic).	No action required.

TABLE 3 Port side LED patterns during normal operation (Continued)

LED name	LED color	Status of hardware	Recommended action
Brocade VDX 6740 Ethernet ports			
All user ports - includes both 1/10GbE ports in either 1 GbE or 10 GbE mode and 40 GbE ports in either 40 GbE or 4x10 GbE mode	Off (no light)	Port is in no shut state and no cable or transceiver present, no link, 40 GbE port in 4x10G breakout mode has no cable, or license is not available for the port.	Insert SFP+ or QSFP with cable connected to another port in no shut state or connect cable to 40 GbE port.
	Steady amber	Protocol down or no sync or 40 GbE port in 40G mode has no cable.	Check the local port SFP+ or QSFP or peer port SFP+ or QSFP and cable.
	Slow blinking amber	Port is shut or chassis disabled or POST failed.	Enable the port.
	Fast blinking amber	Port is faulted, goes into shut state.	Check messages for fault reason and take necessary action.
	Steady green	Link is present, no activity.	No action required.
	Slow blinking green	Port is good except ISL is segmented.	No action required.
	Fast blinking green	Beaconing enabled.	No action required.
	Flickering green	Online, frames flowing through the port.	No action required.
Brocade VDX 6740T and Brocade VDX 6740T-1G Ethernet ports			
Ethernet ports in either 10 GbE or 1 GbE mode (one green LED per port)	Off (no light)	Port is shut, no link, or no license is available for this port.	Enable the port.
	Steady amber	Protocol down or no sync.	Check the local port SFP+ or QSFP or peer port SFP+ or QSFP and cable.
	Slow blinking amber	Port is shut or chassis disabled or POST failed.	Enable the port.
	Fast blinking amber	Port is faulted, goes into shut state.	Check messages for fault reason and take necessary action.
	Steady green	Link is present, no activity.	No action required.
	Slow blinking green	Port is good except ISL is segmented.	No action required.
	Fast blinking green	Beaconing enabled.	No action required.
	Flickering green	Online, frames flowing through the port.	No action required.

TABLE 3 Port side LED patterns during normal operation (Continued)

LED name	LED color	Status of hardware	Recommended action
40 GbE Ethernet ports (QSFP) in 40 GbE mode (one bicolor LED [green and amber] per port)	Off (no light)	Port is no shut and no QSFP is inserted.	Connect media and cable.
	Steady green	Link is present, no activity.	No action required.
	Blinking green	Beaconing enabled, online with frames flowing through the port.	No action required.
	Steady amber	QSFP is inserted but no fiber or link detected.	Insert cable or check cable on peer 40 GbE port.
	Flashing amber	Port is shut or chassis disabled or POST failed	Check messages.
40 GbE Ethernet ports (QSFP) in 4x10 GbE breakout mode (one bicolor LED [green and amber] per 40 GbE port)	Off (no light)	All of the enabled ports (no shut) have no media or cable or one, two, or three ports are shut.	Connect media and cable.
	Steady green	All no shut ports are online. Any unused ports must be shut.	No action required.
	Blinking green	Beaconing enabled, online with frames flowing through the port.	No action required.
	Steady amber	Some no shut ports are not connected.	Ensure that any unconnected ports are shut.
	Flashing amber	All four breakout ports are shut or chassis is disabled or POST failed.	Check messages.

Table 4 describes the LEDs on the non-port side of the switches.

TABLE 4 Non-port-side LED patterns during normal operation

LED name	LED color	Status of hardware	Recommended action
Power supply and fan assembly status (one LED [green] per power supply and fan assembly) Brocade VDX 6740	Off (no light)	Assembly is not receiving power or is turned off.	Verify the assembly is on and seated and the power cord is connected to a functioning power source.
	Steady green	Assembly is operating normally.	No action required.
	Blinking green	One of the following may have occurred: • Mismatched airflow on power supply and fan assembly. • One or more of the fans in the fan assembly has failed or the power supply has failed. • The power cord has been unplugged.	Take one of the following actions: • Replace power supply and fan assembly with a power supply and fan assembly that has correct airflow direction. • Replace the power supply and fan assembly. • Check the power plug.

TABLE 4 Non-port-side LED patterns during normal operation (Continued)

LED name	LED color	Status of hardware	Recommended action
Power supply status (one LED [green] per power supply) (Brocade VDX 6740T and Brocade VDX 6740T-1G)	Off (no light)	Power supply is not receiving power or is off.	Verify the power supply is on and seated and the power cord is connected to a functioning power source.
	Steady green	Power supply is operating normally. Also, airflow mismatch or fault may have been detected.	No action required. Check messages or use the **show environment** command to check the state of the power supply.
	Blinking green	Power supply is faulty.	Try the following: • Check the power cable connection. • Verify that the power supply is powered on. • Replace the power supply.
Fan status (one bicolor LED [green and amber] per fan assembly) (Brocade VDX 6740T and Brocade VDX 6740T-1G)	Off (no light)	Fan assembly is not receiving power.	Try the following: • Verify the fan assembly is seated correctly. • Verify the switch is powered on.
	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: • Mismatched airflow on fan assemblies. • One or more of the fans in the fan assembly has failed. • The fan assembly was disabled by the user. **NOTE:** When the switch is first powered on, the fan status LED will show amber until POST has completed.	Try the following: • Verify that the airflow symbol and part number on the replacement fan matches the fans in the chassis. Replace if necessary. • Replace the fan assembly. • Verify the fan assembly is enabled (use the **show environment fan** command). Re-enable if necessary.

POST and boot specifications

When the switch is turned on or rebooted, the switch performs a power-on, self-test (POST). Total boot time with POST can be several minutes. POST can be omitted after subsequent reboots by using the **fastboot** command or entering the **no diag post** command to persistently disable POST.

For more information about these commands, refer to the *Brocade Network OS Command Reference*.

POST

The success or failure results of the diagnostic tests that run during POST can be monitored through LED activity, the error log, or the command line interface.

POST includes the following tasks:

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

Boot

In addition to POST, boot includes the following tasks after POST is complete:

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

Interpreting POST results

POST is a system check that is performed each time the switch is powered on, rebooted, or reset. During POST, the LEDs flash either amber or green. Any errors that occur during POST are listed in the error log.

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

1. Verify that the switch LEDs indicate that all components are healthy.

   Refer to Table 3 and Table 4 for descriptions and interpretations of LED patterns.

2. Verify that the switch prompt displays on the terminal of a computer workstation connected to the switch.

   If there is no switch prompt when POST completes, press **Enter**. If the switch prompt still does not display, try opening a Telnet session or accessing the switch through another management tool. If this is not successful, the switch did not successfully complete POST. Contact your switch supplier for repair.

3. Review the switch system log for errors. Any errors detected during POST are written to the system log, accessible through the **show logging raslog** command.

For information about all referenced commands, and on accessing the error log, refer to the *Brocade Network OS Administrator's Guide*. For information about error messages, refer to the *Brocade Network OS Message Reference*.

Powering off the Brocade VDX 6740 switches

To power off the Brocade VDX 6740, power off both power supplies by setting each power supply switch to 0..

To power off the Brocade VDX 6740T and VDX 6740T-1G, you must unplug both power supplies.

Brocade VDX 6740 maintenance

The Brocade VDX 6740 switches are designed for high availability and low failure; they do not require any regular physical maintenance. The SFP+ optical transceivers and diagnostic tests are described in the following sections.

Supported transceivers

The Brocade VDX 6740 supports only Brocade-branded SFP+ optical or copper transceivers. The Brocade VDX 6740T and Brocade VDX 6740T-1G support RJ-45 connectors for copper twisted-pair only in the 10G Base-T ports.

The optical SFP+ transceivers support both Short Reach (SR) and Long Reach (LR) modules.

The Brocade VDX 6740 switches both support optical QSFP transceivers with either standard cables or breakout (four 10 GbE connections) cables.

DANGER

All fiber optic interfaces use Class 1 lasers.

Installing an SFP+ transceiver

Only the Brocade VDX 6740 supports 10 GbE SFP+ transceivers. Complete the following steps to install an SFP+ transceiver.

1. Remove any protector plugs from the transceivers and the ports.
2. Making sure that the bail (wire handle) is in the unlocked position, place the SFP+ transceiver in the correctly oriented position on the port, as shown in Figure 11.
3. Slide the SFP+ transceiver into the port until you feel it click into place; then close the bail.
4. Insert your cable of choice. The cable is keyed to be installed correctly.

NOTE

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

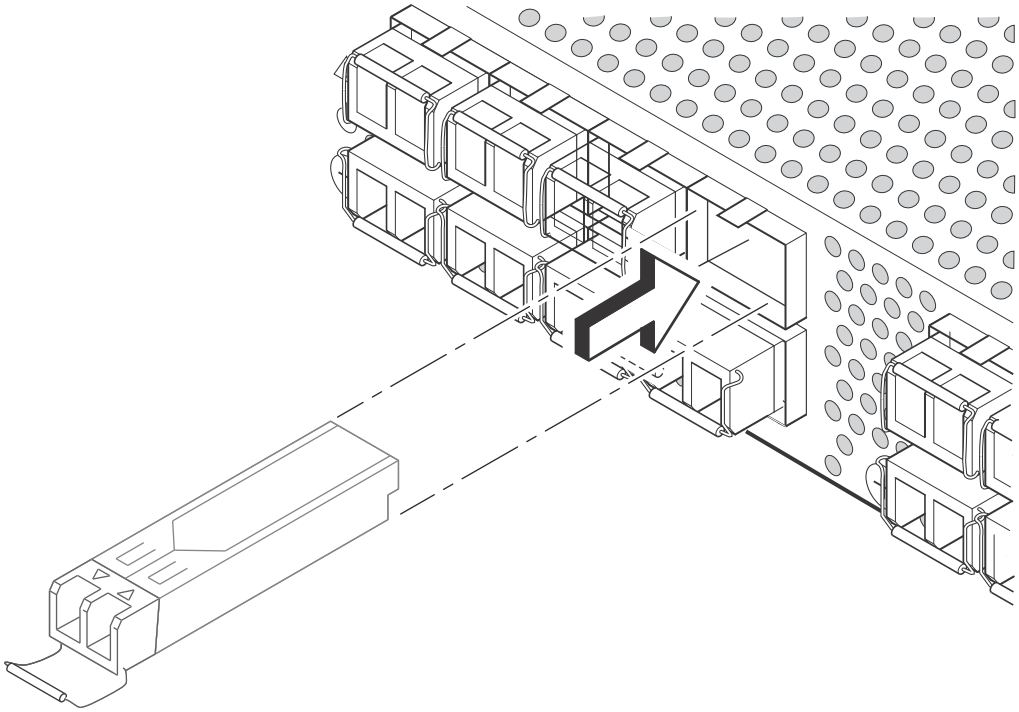


FIGURE 11 Installing an SFP+ transceiver in the upper row of port slots

Diagnostic tests

In addition to POST, the Network 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 console set up to the serial connection to the switch. 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. Refer to the *Brocade Network OS Administrator's Guide* and the *Brocade Network OS Command Reference Guide* for more details about diagnostic tests and commands.

Diagnostic tests run at link speeds of 1 or 10 Gbps depending on the speed of the link being tested and the type of port.

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

To monitor the transceivers, the **show media** command output shows the transceiver information for all interfaces on the switch. Any unqualified transceiver is disabled and a log message is generated.

Brocade VDX 6740 management

You can use the management functions built into the Brocade VDX 6740 switches 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 Network OS installed on your switch, refer to the *Brocade Network OS Administrator's Guide.*

You can manage Brocade VDX 6740 switches using any of the management options listed in Table 5.

TABLE 5 Management options for Brocade VDX 6740 switches

Management tool	Out-of-band support	In-band support
Command line interface (CLI) For more information, refer to the *Brocade Network OS Administrator's Guide* and the *Brocade Network OS Command Reference Guide*.	Ethernet or serial (console port) connection	In standalone mode only. Not available in VCS mode.
Standard SNMP applications For information, refer to the *Brocade Network OS Administrator's Guide* and the *Brocade Network OS MIB Reference*.	Ethernet or serial (console port) connection	N/A
Brocade Network Advisor For information, refer to the *Brocade Network Advisor SAN+IP User Manual*.	Ethernet (preferred) or serial (console port) connection	N/A

Chapter

Brocade VDX 6740 FRU Replacement Procedures 5

In this chapter

Before beginning the installation

The field-replaceable units (FRUs) in the Brocade VDX 6740 switches can be removed and replaced without special tools. The switches can continue operating during the FRU replacements if the conditions specified in the procedures are followed. switches.

NOTE
Read the "Installation and safety considerations" on page 7 before servicing.

CAUTION

This document describes how to change field-replaceable units (FRUs) for switches with either a port-side air exhaust or a port-side air intake. You must replace a failed FRU with a FRU of the same type. This applies to both power supplies and fan assemblies.
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.
The P/N ends in either -F (front-to-rear airflow or exhaust) or -R (rear-to-front airflow or intake). You must use a replacement FRU that has the same airflow designator with the part number.

DANGER

The procedures in this manual are for qualified service personnel.

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

- For a fan mismatch: [WARNING, Brocade VDX 6740, MISMATCH in FAN Air Flow direction. Replace FRU with fan air flows in same direction.
- For a power supply or combined power supply and fan mismatch: [WARNING, Brocade VDX 6740, MISMATCH in PSU-FAN FRUS Air Flow direction. Replace PSU with fan air flows in same direction.

You can use external labels as a guide. The combined power supply and fan assemblies are labeled with an airflow symbol on the faceplate to indicate whether the FRU takes in or exhausts air. The symbol also appears on the top of the FRU. All FRUs in a chassis must have the same label affixed so that airflow direction is consistent. Figure 12 illustrates examples of the airflow labels.

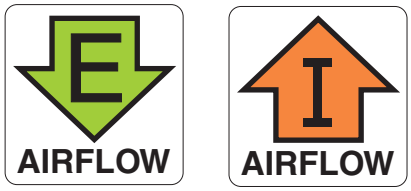


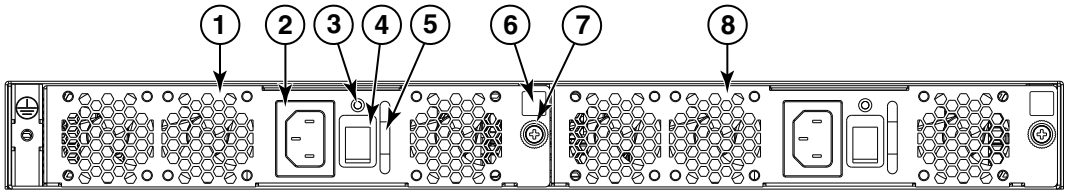
FIGURE 12 Examples of airflow symbols

The green **E** symbol indicates an exhaust FRU. This unit pulls air in from the port side of the switch and exhausts it out the non-port side. This is called front-to-back airflow or exhaust airflow. This symbol should appear on FRUs with part numbers ending with **-F.**

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

Combined FRU replacement in a Brocade VDX 6740

Figure 13 shows the two combined AC power supply and fan assemblies in the Brocade VDX 6740. The Network OS identifies the FRUs from left to right as power supply and fan assembly #2 and power supply and fan assembly #1.



1	Power supply and fan assembly #2	5	Handle
2	AC power cord receptacle	6	Airflow label
3	Status LED	7	Captive screw
4	On/off switch	8	Power supply and fan assembly #1

FIGURE 13 Brocade VDX 6740 AC power supply and fan assemblies on the non-port side

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

CAUTION

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

CAUTION

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

Table 6 describes the power supply and fan assembly status LED colors, behaviors, and actions required, if any.

TABLE 6 Brocade VDX 6740 LED behavior, descriptions, and required actions

LED color and behavior	Description	Action required
Off (no light)	Assembly is not receiving power or is turned off.	Verify the assembly is on and seated and the power cord is connected to a functioning power source.
Steady green	Assembly is operating normally.	No action required.
Blinking green	One of the following may have occurred: • Mismatched airflow on power supply and fan assembly. • The power supply and fan assembly was disabled by the user. • The power supply and fan assembly power switch has been turned off or the unit has been unplugged. • One or more of the fans in the fan assembly has failed or the power supply has failed.	Take one of the following actions: • Replace the power supply and fan assembly with one that has the correct airflow direction. • Verify that the power supply and fan assembly is enabled. • Check the power switch and plug. • Replace the power supply and fan assembly.

Time and items required

Replacing a combined power supply and fan assembly in the switch should take less than two minutes.

You need the following items to replace a power supply and fan assembly in a Brocade VDX 6740-:

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

Replacing the power supply and fan assembly

Remove a failed combined power supply and fan assembly, install a new combined FRU, and verify the replacement was successful.

CAUTION

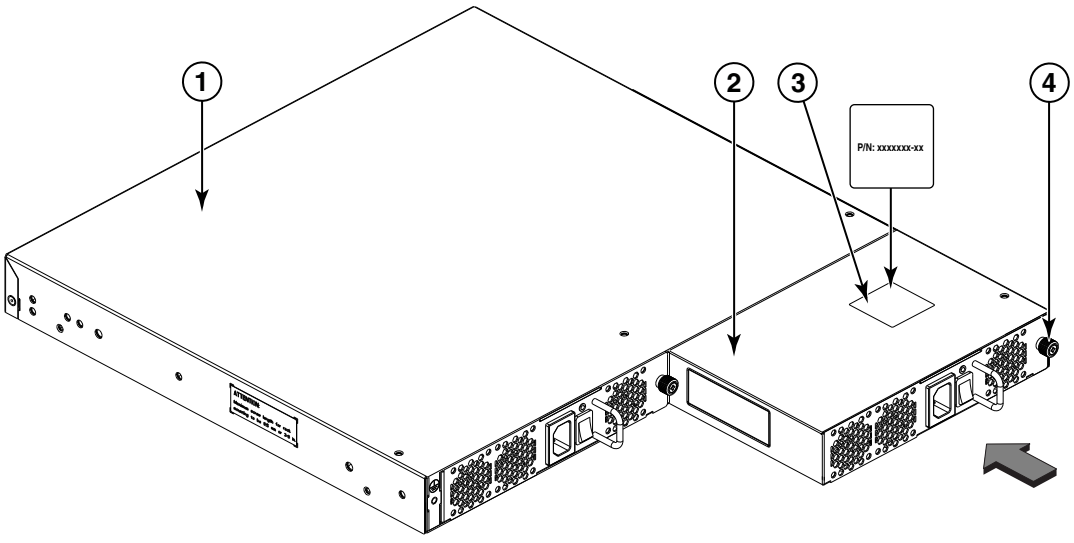
The power supply switch must be in the off position when inserting it in the chassis.

1. Unplug the power cord from the combined power supply and fan assembly you are replacing.
2. Unscrew the captive screw on the power supply and fan assembly you are replacing using the Phillips screwdriver.
3. Remove the power supply and fan assembly from the chassis by pulling the handle out and away from the chassis.
4. Ensure that the new power supply and fan assembly has the same part number as the FRU being replaced.
5. Install the new FRU in the chassis:
    a. Orient the new power supply and fan assembly with the captive screw on the right as shown in Figure 14.

CAUTION

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

    b. Gently push the power supply and fan assembly into the chassis until it is firmly seated.
    c. Using the Phillips screwdriver, secure the power supply and fan assembly to the chassis by tightening the captive screw.



1	Brocade VDX 6740 chassis	3	Label with part number
2	AC power supply and fan assembly	4	Captive screw

FIGURE 14 Orientation of the AC power supply and fan assembly in the Brocade VDX 6740

6. Verify that the power supply and fan assembly status LED is steady green to indicate normal operation.

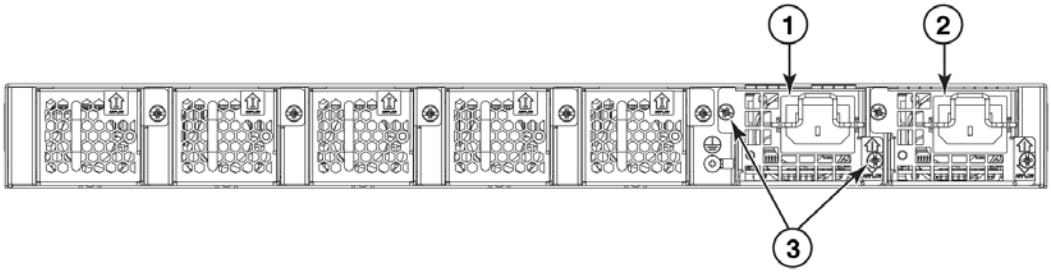
   You can refer to Table 6 for more LED information.

   You can display the power supply and fan assembly status using the following commands from the CLI:

   - **show system**
   - **show environment fan**
   - **show environment power**

Power supply replacement in a Brocade 6740T and 6740T-1G

The Brocade VDX 6740T and Brocade VDX 6740T-1G have two power supplies, as displayed in Figure 15. The Network OS identifies the power supplies from left to right on the non-port side as power supply #2 and power supply #1.



1 Power supply #1
2 Power supply #2
3 Captive screws

FIGURE 15 Brocade VDX 6740T and Brocade VDX 6740T-1G power supplies on the non-port side

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

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

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

Table 7 describes the power supply status LED colors, behaviors, and actions required, if any.

TABLE 7 Brocade VDX 6740T and Brocade VDX 6740T-1G power supply status LED behavior, description, and required actions

LED color and behavior	Description	Action required
Off (no light)	Power supply is not receiving power or is off.	Verify that the power supply is on and seated and the power cord is connected to a functioning power source.
Steady green	Power supply is operating normally.	No action is required.
Blinking green	Power supply cable is disconnected - blinking green for ~20 seconds, then off. The power supply has failed or the power supply airflow is different from system policy.	Check the power cable connection. Check the power supply airflow direction and replace the power supply.

Determining the need to replace a power supply

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

- Check the power supply status LED.
- Enter one of the following commands in the command line interface to display power supply status:
  - **show chassis**
  - **show environment power**
- Check the power supply status in the Web Tools application.

Time and items required

Replacing a power supply in the Brocade VDX 6740T and Brocade VDX 6740T-1G should take less than two minutes to complete.

You need the following items to replace a power supply in a Brocade VDX 6740T:

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

Replacing the power supply

Complete the following steps to replace a power supply in a Brocade VDX 6740T and Brocade VDX 6740T-1G.

1. To leave the Brocade VDX 6740T and Brocade VDX 6740T-1G 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 hasa steady green status LED.
2. Ensure that the replacement power supply has the same part number and airflow label as the power supply being replaced.
3. Unplug the power cord from the power supply that is being replaced.
4. Using the Phillips screwdriver, unscrew the two captive screws on the power supply.

5. Remove the power supply from the chassis by grasping the edges of the power supply and pulling it out from the chassis.
6. Install the new power supply in the chassis:
   a. Orient the power supply with the power plug receptacle on the right, as shown in Figure 16.

CAUTION

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

   b. Gently push the power supply into the chassis until it is firmly seated.
   c. Secure the power supply to the chassis by tightening the two captive screws using the Phillips screwdriver.

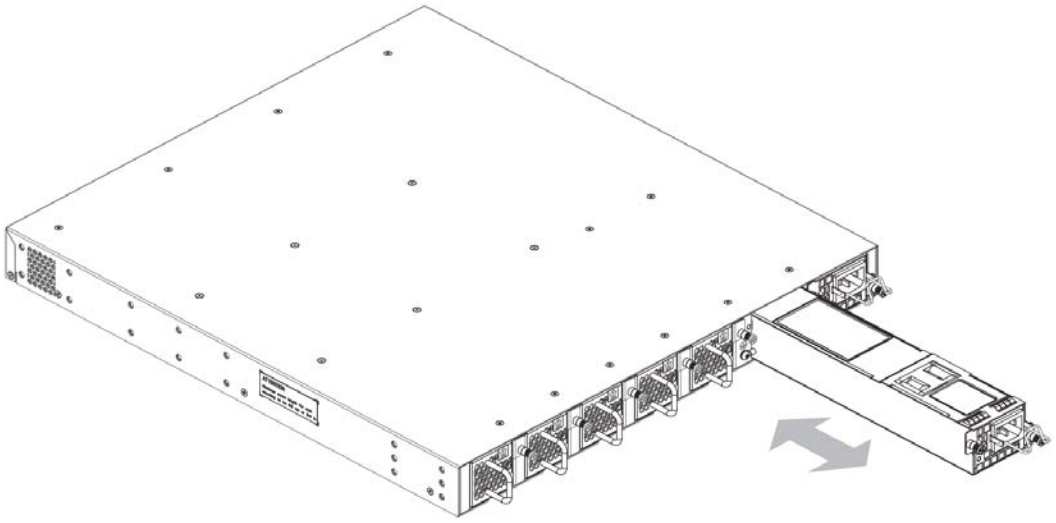


FIGURE 16 Inserting the power supply in the Brocade VDX 6740T and Brocade VDX 6740T-1G

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

   The power supply will immediately attempt to power up.

CAUTION

If you observe that the switch has powered down approximately two minutes after a power supply replacement, it is likely because the new power supply has a mismatched airflow. Check your console for error messages.

8. Verify that the LED on the new power supply displays steady green while the switch is operating (refer to Table 7).

   If the LED is not steady green, ensure that the power supply is securely installed and seated properly.

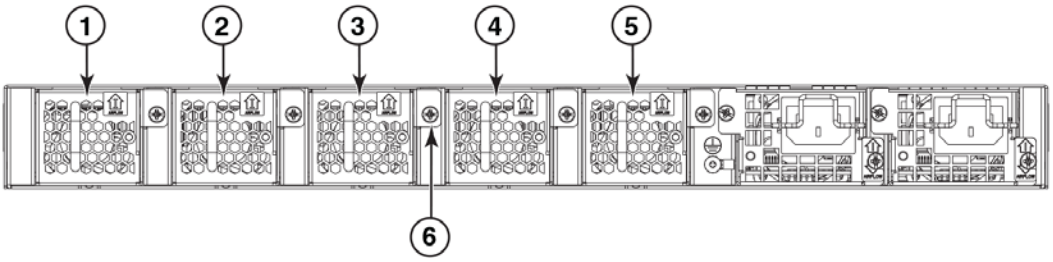
   You can enter one of the following commands at the command line prompt to display the power supply status:

- **show chassis**
- **show environment power**

The power supply status can also be viewed using the Web Tools application.

Fan replacement in a Brocade VDX 6740T and Brocade VDX 6740T-1G

The Brocade VDX 6740T and Brocade VDX 6740T-1G have five fans as displayed in Figure 17. The Network OS identifies the fan locations from left to right as fan #1, fan #2, fan #3, fan #4, and fan #5 when viewed from the non-port side of the switch.



1	Fan #1	4	Fan #4
2	Fan #2	5	Fan #5
3	Fan #3	6	Captive screw (same location for each fan)

FIGURE 17 Brocade VDX 6740T and Brocade VDX 6740T-1G fan assemblies on the non-port side

ATTENTION
Maintain all power supplies and fans in operational condition to provide redundancy.

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

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

Table 8 describes the fan assembly status LED colors, behaviors, and actions required, if any.

TABLE 8 Brocade VDX 6740T and Brocade VDX 6740T-1G fan assembly status LED behavior, description, and required actions

LED color and behavior	Description	Action required
Off (no light)	Fan assembly is not receiving power.	Verify that the fan assembly 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: • A fan assembly with mismatched airflow is present. • The fan assembly was disabled by the user. • One or more of the fans in the fan assembly has failed. **NOTE:** When the switch is first powered on, the fan assembly status LED will show amber until POST has completed.	Try one of the following: • Replace the mismatched fan assembly with one that has the correct airflow direction. • Re-enable the fan assembly. • Replace the faulty fan assembly.

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 on the face of the fan.
- Enter one of the following commands in the command line interface to display the fan status:
  - **show chassis**
  - **show environment fan**

Time and items required

Replacing a fan in the Brocade VDX 6740T and Brocade VDX 6740T-1G should take less than two minutes to complete.

You need the following items to replace a fan assembly in the Brocade VDX 6740T and Brocade VDX 6740T-1G:

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

Replacing the fan

Complete the following steps to replace a fan assembly in a Brocade VDX 6740T and Brocade VDX 6740T-1G.

1. Using the Phillips screwdriver, unscrew the captive screw on the fan assembly.
2. Ensure that the replacement fan assembly has the same part number and airflow label as the fan assembly being replaced.

3. Remove the fan assembly from the chassis by pulling the handle on the fan assembly out and away from the chassis.
4. Install the new fan assembly in the chassis:
   a. Orient the new fan assembly with the captive screw on the right, as shown in Figure 18.

CAUTION

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

   b. Gently push the fan assembly into the chassis until it is firmly seated.

      If the switch is powered up, the fan will immediately power up.

   c. Using the Phillips screwdriver, secure the fan assembly to the chassis by tightening the captive screw.

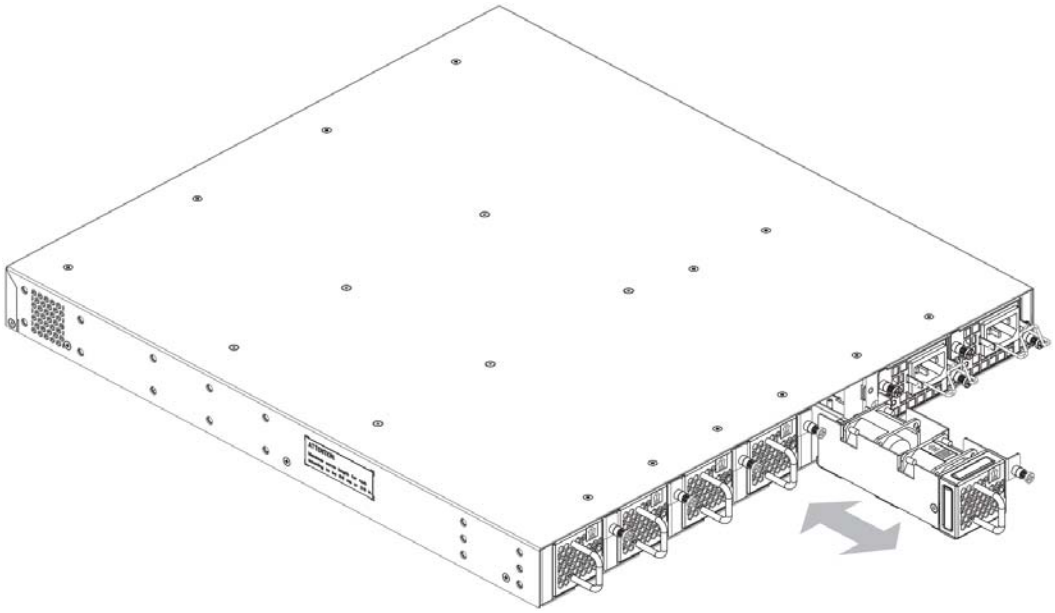


FIGURE 18 Inserting the fan assembly in the Brocade VDX 6740T and Brocade VDX 6740T-1G

5. Verify that the fan status LED is steady green to indicate normal operation (refer to Table 8).

   If the LED is not steady green, ensure that the fan is securely installed and seated properly.

   You can enter one of the following commands at the command line prompt to display fan status:

   - **show chassis**
   - **show environment fan**

   The fan status can also be viewed using the Web Tools application.

Appendix

Brocade VDX 6740 Specifications

A

In this appendix

General specifications

Table 9 lists the general specifications for the Brocade VDX 6740 switches.

TABLE 9 General specifications

Specification	Description
System architecture	Nonblocking shared-memory switch
System processor	1.5 GHz PowerPC
Aggregate switch I/O bandwidth	1280 Gbps
Port-to-port latency	850 nanoseconds - Brocade VDX 6740 3 microseconds - Brocade VDX 6740T

Weight and physical dimensions

Table 10 lists the weight and dimensions of the Brocade VDX 6740 switches.

TABLE 10 Physical specifications

Dimension	Value
Height	44.45 mm (1.75 in.) - Brocade VDX 6740 42.67 mm (1.68 in.) - Brocade VDX 6740T and Brocade VDX 6740T-1G
Depth	409.16 mm (16.14 in.) - Brocade VDX 6740 536.45 mm (21.12 in.) - Brocade VDX 6740T and Brocade VDX 6740T-1G
Width	439.93 mm (17.32 in.) - Brocade VDX 6740 437.38 mm (17.22 in.) - Brocade VDX 6740T and Brocade VDX 6740T-1G
Weight (with all power supplies and fan assemblies, and no transceivers installed)	8.66 kg (19.10 lb) - Brocade VDX 6740 10.82 kg (23.85 lb) - Brocade VDX 6740T and Brocade VDX 6740T-1G

Facility requirements

Table 11 provides the facilities requirements that must be met for the Brocade VDX 6740.

TABLE 11 Facility requirements

Type	Requirements
Electrical	• Primary AC input rated 100-240 VAC, operating input range 90-264 VAC (Brocade VDX 6740), 85-264 VAC (Brocade VDX 6740T), 50-60 Hz; switch autosenses input voltage • Adequate supply circuit, line fusing, and wire size, as specified by the electrical rating on the switch nameplate • Circuit protected by a circuit breaker and grounded in accordance with local electrical codes Refer to Table 12 on page 47 for complete power supply specifications.
Thermal	• Ambient air temperature not exceeding 40°C (104°F) while the switch is operating
Rack	• One rack unit (1U) in a 48.3 cm (19-inch) rack - Brocade VDX 6740 • All equipment in cabinet grounded through a reliable branch circuit connection • Additional weight of switch not to exceed the rack's weight limits • Rack secured to ensure stability in case of unexpected movement

Power supply specifications

The power supplies are universal and capable of functioning worldwide without voltage jumpers or switches. They meet IEC 61000-4-5 surge voltage requirements and are autoranging in terms of accommodating input voltages and line frequencies.

Table 12 lists the power supply specifications for the Brocade VDX 6740 switches.

TABLE 12 Power supply specifications

Specification	Value
Input voltage	Range: 90-264 VAC Auto-volt, Nominal: 100-240 VAC, (VDX 6740-3.5A max, VDX 6740T and VDX 6740T-1G 6.0A max); switch autosenses input voltage Start-up: 80-87 VAC, Turn-off: 85-75 VAC
Input frequency	Range: 47-63 Hz; Nominal: 50-60 Hz
Inrush current	Brocade VDX 6740 (250 W power supply) - Limited to 50 A peak @ 240 VAC during cold startup at 25°C ambient Brocade VDX 6740T (500 W power supply) - Limited to 30 A peak @ 240 VAC during cold startup at 25°C ambient
Input line protection	Both AC lines are fused.
Maximum power supply output (each)	250 watts @ 12V DC - Brocade VDX 6740 500 watts @ 12V DC - Brocade VDX 6740T

Table 13, and Table 14 illustrate the power consumption of the switch as measured at maximum draw.

TABLE 13 VDX 6740 power consumption - maximum

MAX: Brocade VDX 6740 All ports configured with ELOAD, Traffic Running (mode 11), Fan Speed Max (8190 RPM), Room Temp					
AC voltage	**Input current (Amp) 1 PSU**	**Input watts 1 PSU AC measured**	**BTU/hr 1 PSU**	**Input watts 2 PSUs AC measured**	**BTU/hr 2 PSUs**
100 VAC	1.65	165.00	563.16	170.00	580.22
120 VAC	1.37	165.40	564.52	170.27	581.15
200 VAC	0.85	164.00	559.75	168.45	574.93
240 VAC	0.75	164.00	559.75	168.00	573.40

TABLE 14 VDX 6740T and VDX 6740T-1G power consumption - maximum

MAX: Brocade VDX 6740T All ports configured with ELOAD, Traffic Running (mode 11), Fan Speed Max (8190 RPM), Room Temp					
AC voltage	**Input current (Amp) 1 PSU**	**Input watts 1 PSU AC measured**	**BTU/hr 1 PSU**	**Input watts 2 PSUs AC measured**	**BTU/hr 2 PSUs**
100 VAC	4.90	488.00	1665.58	490.00	1672.41
120 VAC	4.53	482.00	1645.10	486.00	1658.76
200 VAC	2.44	474.00	1617.80	480.00	1638.28
240 VAC	2.05	473.00	1614.39	479.00	1634.87

Environmental requirements

Table 15 lists the acceptable environmental ranges for both operating and nonoperating (such as during transportation or storage) conditions.

TABLE 15 Environmental requirements

Condition	Acceptable during operation	Acceptable during non-operation
Ambient Temperature	0° to 40°C (32° to 104°F)	-25° to 70°C (-13° to 158°F)
Humidity	10% to 85% RH non-condensing, at 40°C (104°F)	10% to 90% RH non-condensing, at 70°C (158°F)
Altitude	0 to 3 km (9,842 feet) above sea level	0 to 12 km (39,370 feet) above sea level
Shock	20 G, 6 ms, half-sine wave	33 G, 11 ms, half-sine wave, 3/eg Axis
Vibration	0.5 G sine, 0.4 gms random, 5-500 Hz	2.0 G sine, 1.1 gms random, 5-500 Hz
Airflow	Brocade VDX 6740 (port side intake) Maximum - 43.7 cmh (25.7 cfm) Nominal - 19.5 cmh (11.5 cfm) Brocade VDX 6740T Maximum - 83.8 cmh (49.3 cfm) Nominal - 44.7 cmh (26.3 cfm)	N/A

Data transmission ranges

Table 16 provides the data transmission ranges for different cable types and port speeds for all ports.

TABLE 16 Data transmission ranges

Cable and connector type	Connector	Cable	Distance
Active copper direct-attach	SFP+ copper	Twinaxial	Up to 20 m (65.62 ft) [1 m (3.28 ft), 3 m (9.84 ft), and 5 m (16.40 ft) supported]
Active optical cable direct-attach (Laserwire)	SFP+ copper	Plastic optical fiber	Up to 30 m (98.43 ft)
10GE-SR SFP+	SFP+ MMF, SR	MM OM2 MM OM3	82 m (269.03 ft) 300 m (984.25 ft)
10GE-LR SFP+	SFP+ SMF, LR	SM	10 km (6.2 miles)

Cable and connector type	Connector	Cable	Distance
1G Base-T (VDX 6740T and 6740T-1G only)	RJ-45	CAT 5 CAT 5e CAT 6 UTP CAT 6 STP CAT 6A UTP CAT 7	Up to 100 m (328.08 ft) Up to 100 m (328.08 ft) Up to 100 m (328.08 ft) Up to 100 m (328.08 ft) Up to 100 m (328.08 ft) Up to 100 m (328.08 ft)
10GBase-T (VDX 6740T and 6740T-1G only)	RJ-45	CAT 5e CAT 6 UTP CAT 6 STP CAT 6A UTP CAT 7	Up to 55 m (180 ft) Up to 55 m (180 ft) Up to 55 m (180 ft) Up to 100 m (328.08 ft) Up to 100 m (328.08 ft)

Memory specifications

The Brocade VDX 6740 has three types of memory devices: boot flash, compact flash, and main memory. The size of each is listed in Table 17.

TABLE 17 Brocade VDX 6740 memory specifications

Type	Size
Boot flash	4 MB
Compact flash	8 GB
Main memory (DDR2 SDRAM)	8 GB

Regulatory compliance

This section describes the regulatory compliance requirements for the Brocade VDX 6740.

- "FCC warning (US only)"
- "Germany"
- "KCC statement (Republic of Korea)"
- "VCCI statement (Japan)"
- "Power cords (Japan DENAN)"
- "BSMI statement (Taiwan)"
- "CE statement"
- "Canadian requirements"
- "China statement"
- "Laser compliance"

FCC warning (US only)

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

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

Germany

Machine noise information regulation – 3. GPSGV, the highest sound pressure level value is 78.0 dB(A) in accordance with EN ISO 7779.

Maschinenlärminformations-Verordnung – 3 GPSGV, der höchste Schalldruckpegel beträgt 78.0 dB(A) gemäss EN ISO 7779.

KCC statement (Republic of Korea)

사용자 안내문 : A 급기기

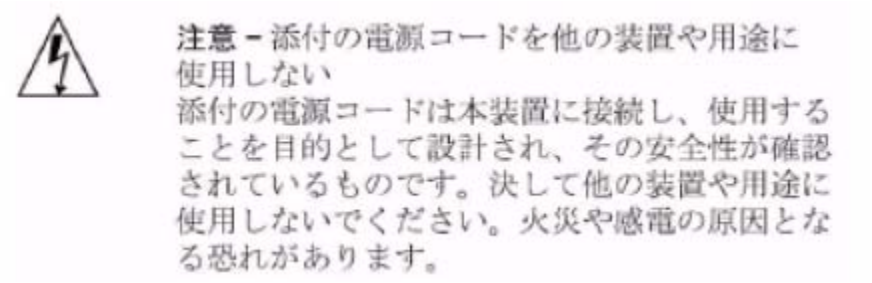
이 기기는 업무용으로 전자파 적합 등록을 받은 기기 이오니, 판매자 또는 사용자는 이점을 주의하시기 바라며, 만약 잘못 구입하셨을 때에는 구입한 곳에서 비업무용으로 교환하시기 바랍니다.

VCCI statement (Japan)

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.

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラス 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に要求されることがあります。

Power cords (Japan DENAN)



BSMI statement (Taiwan)

The BSMI Statement is applicable to Brocade VDX 6740 power supplies.

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.

CE statement

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

The standards compliance label on the Brocade VDX 6740 contains the CE mark which indicates that this system conforms to the provisions of the following European Council directives, laws, and standards:

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

Canadian requirements

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

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

China statement

China-CCC Warning statements

在维修的时候一定要断开所有电源 (English translation“disconnect all power sources before service”)

For non tropical use:

安全说明和标记	汉文	“仅适用于非热带气候条件下安全使用。”
	藏文	《ཉིན་གཅིག་ཐུང་ངུ་ཞིག་ཁྲུལ་སྣང་མེད་པའི་ནང་ལ་ཚད་ལྡན་ཡིན་ནོ།།》
	蒙古文	“ᠬᠦᠳᠠᠯᠳᠠᠨ᠎ᠠ᠎ᠪᠤᠰᠤ᠎ᠭᠠᠵᠠᠷ᠎ᠳᠤ᠎ᠪᠤᠯᠠᠭᠠᠨ᠎ᠤ᠎ᠭᠠᠵᠠᠷ᠎ᠳᠤ᠎ᠵᠥᠪᠬᠡᠨ᠎ᠡᠷᠬᠢᠮᠯᠡᠬᠦ᠎ᠪᠠᠢᠳᠠᠯ᠎ᠳᠤ᠎ᠪᠠᠢᠭᠠᠭᠤᠯᠤᠭᠳᠠᠵᠤ᠎ᠪᠤᠢ᠎ᠪᠠᠢᠳᠠᠯ᠎ᠳᠤ᠎ᠵᠥᠪᠬᠡᠨ᠎ᠡᠷᠬᠢᠮᠯᠡᠬᠦ᠎ᠪᠠᠢᠳᠠᠯ᠎ᠤᠨ᠎ᠵᠢᠭᠰᠠᠭᠠᠯᠲᠠ᠎ᠪᠠᠢᠨ᠎ᠠ᠃”
	壮文	Dan hab yungh youq gij dienheiq diuzgen mbouj dwg diegndat haenx ancienz sawjyungh.
	维文	غەيرى ئىسسىق بەلباغ ھاۋا كىلىماتى شارائىتىدىلا بىخەتەر ئىشلەتكىلى بولىدۇ

For altitude 2000 meter and below:

安全说明和标记	汉文	仅适用于海拔2000m以下地区安全使用。
	藏文	《2000m ཁ་ལས་ལྷག་མཐོ་ཁའི་ས་ཆ་ལ་ཚད་ལྡན་ཡིན་ནོ།།》
	蒙古文	“ᠭᠠᠳᠠᠷᠭᠤ᠎ᠨ᠎ᠠᠭᠤᠷ᠎ᠨᠢ᠎ᠲᠡᠩᠭᠢᠰ᠎ᠦᠨ᠎ᠥᠨᠳᠥᠷ᠎ᠢᠵᠢᠯ᠎ᠳᠡ᠎2000᠎ᠮᠧᠲᠷ᠎ᠦᠨ᠎ᠳᠤᠭᠠᠷ᠎ᠲᠤ᠎ᠪᠠᠢᠷᠢᠯᠰᠠᠨ᠎ᠤ᠎ᠭᠠᠵᠠᠷ᠎ᠳᠤ᠎ᠵᠥᠪᠬᠡᠨ᠎ᠡᠷᠬᠢᠮᠯᠡᠬᠦ᠎ᠪᠠᠢᠳᠠᠯ᠎ᠤᠨ᠎ᠵᠢᠭᠰᠠᠭᠠᠯᠲᠠ᠎ᠪᠠᠢᠨ᠎ᠠ᠃”
	壮文	Dan hab yungh youq gij digih haijbaz 2000m doxroengz haenx ancienz sawjyungh.
	维文	دېڭىز يۈزىدىن 2000 مېتر تۆۋەن رايونلاردىلا بىخەتەر ئىشلەتكىلى بولىدۇ

Warning for Class A:

声 明

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

English translation of above statement

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

Laser compliance

This equipment contains Class 1 laser products and complies with FDA Radiation Performance Standards, 21 CFR Subchapter I and the international laser safety standard IEC 825-2.

DANGER

Use only optical transceivers that are qualified by Brocade Communications Systems, Inc. and comply with the FDA Class 1 radiation performance requirements defined in 21 CFR Subchapter I, and with IEC 825-2. Optical products that do not comply with these standards might emit light that is hazardous to the eyes.

Regulatory certifications

Table 18 lists the regulatory compliance standards for which the Brocade VDX 6740 is certified.

TABLE 18 Regulatory compliance standards

Country	Standards		Agency certifications and markings	
	Safety	EMC	Safety	EMC
United States	Bi-Nat UL/CSA 60950-1 2nd Ed or latest	ANSI C63.4	cCSAus	FCC Class A and Statement
Canada	Bi-Nat UL/CSA 60950-1 2nd Ed or latest	ICES-003 Class A	cCSAus	ICES A and Statement
Japan		CISPR22 and JEIDA (Harmonics)		VCCI-A and Statement
European Union	EN60950-1 or latest	EN55022 and EN55024	TUV-GS	CE marking
Australia, New Zealand		EN55022 and CISPR22 or AS/NZS CISPR22		C-Tick mark
Argentina	IEC60950-1 or latest		“S” mark	
Russia	IEC60950-1 or latest	51318.22-99 and 51318.24-99 or latest	GOST mark	GOST mark
Korea		KN22 and KN24		KCC mark Class A
China	GB4943-2001 and GB9254-1998 or latest	GB17625.1-2003 or latest	CCC logo	CCC logo
Taiwan	CNS 14336(94) or latest	CNS 13438(95) or latest	BSMI mark	BSMI mark

Environmental regulation compliance

This section describes the "China RoHS" environmental regulatory compliance requirements for the Brocade VDX 6740 switch.

China RoHS

The contents included in this section are per the requirements of the People's Republic of China-Management Methods for Controlling Pollution by Electronic Information products.

遵守环境法规
中国 **RoHS**
本节中包含的内容都遵守了中华人民共和国《电子信息产品污染控制管理办法》的要求。

Environmental protection use period (EPUP) disclaimer

In no event do the EPUP logos shown on the product and FRUs alter or expand that warranty that Brocade provides with respect to its products as set forth in the applicable contract between Brocade and its customer. Brocade hereby disclaims all other warranties and representations with respect to the information contained in this documentation including the implied warranties of merchantability, fitness for a particular purposes and non-infringement.

The EPUP assumes that the product will be used under normal conditions in accordance with the operating manual of the product.

环保使用期限 **(EPUP)** 免责声明：
EPUP 标志不会出现在产品和 FRU 的改装产品中，也不会对 Brocade 所提供的相关产品保修条款（该保修条款在 Brocade 及其客户间达成的适用合同中列出）进行增补。对于此 CD 上包含的相关信息，如适销性、针对特定用途的适用性和非侵权性的暗示保证，Brocade 在此郑重声明本公司对于与上述信息相关的所有其他保证和陈述概不负责。EPUP 假设在“产品操作手册”中注明的常规条件下使用该产品。

TS/HS dual language sheet

In accordance with China's Management Measures on the Control of Pollution caused by Electronic Information products (Decree No. 39 by the Ministry of Information Industry), the information in Table 19 is provided regarding the names and concentration level of Hazardous substances (HS) which may be contained in this product.

TABLE 19 China ROHS hazardous substances/toxic substances (HS/TS) concentration chart

Name of the component	Hazardous/Toxic Substance/Elements					
	Lead (PB)	Mercury (Hg)	Cadium (CD)	Hexavalent Chromium (CR6+)	Polybrominated Biphenyl (PBB)	Polybrominated Diphenyl Ether (PBDE)
Ethernet Switch	X	O	O	O	O	O
Fan, Blower assemblies	X	O	O	O	O	O
PCBA cards	X	O	O	O	O	O
Power Supply kit	X	O	O	O	O	O
SFPs (SFP+ optical cable connectors)	X	O	O	O	O	O
Sheet Metal	X	O	O	O	O	O
Chassis Assembly	X	O	O	O	O	O
Mechanical brackets and Slides	X	O	O	O	O	O
Slot Filler	X	O	O	O	O	O
Cable management tray	X	O	O	O	O	O
Cable Comb	O	O	O	O	O	O
Cables and power cords	O	O	O	O	O	O
Replacement Doors	X	O	O	O	O	O
Software/ Documentation CDs	O	O	O	O	O	O

X indicates that the concentration of such hazardous/toxic substance in all the units of homogeneous material of such component is higher than the SJ/T11363-2006 Requirements for Concentration Limits.

O indicates that no such substances are used or that the concentration is within the aforementioned limits.

CHINA ROHS 有害物质/有毒物质(HS/TS)限量列表

有毒与有害物质或元素的名称及含量

根据中国的<<电子信息产品污染控制管理办法>>(信息产业部第 39 号令)，本公司提供以下有关产品中可能含有的有害物质(HS)的名称及含量水平的信息。

主要部件名称	有害/有毒物质或元素					
	铅（Pb）	汞（Hg）	镉（Cd）	六价铬（CR6+）	多溴联苯（PBB）	多溴二苯醚（PBDE）
光纤通道交换机	X	O	O	O	O	O
风扇/冷却组装件	X	O	O	O	O	O
线路板部件	X	O	O	O	O	O
USB 闪存器	O	O	O	O	O	O
电源	X	O	O	O	O	O
SFP（光纤接头）	X	O	O	O	O	O
钣金件	X	O	O	O	O	O
机箱部件	X	O	O	O	O	O
机械支架及滑轨	X	O	O	O	O	O
插槽填充物	X	O	O	O	O	O
电缆整理盘	X	O	O	O	O	O
梳状线缆	O	O	O	O	O	O
线束及电源线	O	O	O	O	O	O
替换门	X	O	O	O	O	O
软件/文档光盘	O	O	O	O	O	O

X 表示此类部件内同质材料中的有害/有毒含量高于 SJ/T11363-2006 的限量要求。

O 表示未使用此类物质或其含量低于上述限量要求。

Appendix

Caution and Danger Notices

B

In this appendix

Caution notices

The cautions that appear in this manual are listed in this section in English, German, French, and Spanish.

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

"Vorsicht" weist auf eine mögliche Beschädigung des Geräts hin. Sie finden die folgenden Vorsichtshinweise in diesem Handbuch.

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

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

CAUTION	This document describes how to change field-replaceable units (FRUs) for units with either a port-side air exhaust or a port-side air intake. You must replace a failed FRU with a FRU of the same type. This applies to both power supplies and fan assemblies. 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. The P/N ends in either -F (front-to-rear airflow) or -R (rear-to-front airflow). You must use a replacement FRU that has the same airflow designator with the part number.
VORSICHT	Das vorliegende Dokument erläutert, wie Austauschkomponenten (FRUs) in Geräten ersetzt werden, bei denen entweder der Luftauslass oder der Lufteinlass auf der Portseite liegt. Ausgefallene FRUs müssen stets durch FRUs desselben Typs ersetzt werden. Dies gilt sowohl für Netzteile als auch für Lüftereinheiten. Neue FRUs müssen stets dieselbe Teilenummer wie die ersetzten FRUs aufweisen. Die Hersteller-Teilenummer befindet sich auf der Oberseite der FRU. Die Teilenummer endet entweder auf „-F“ (Luftstrom von der Vorderseite des Geräts zur Rückseite) oder auf „-R“ (Luftstrom von der Rückseite des Geräts zur Vorderseite). Austauschteile müssen stets Teilenummern mit demselben Kennbuchstaben für den Luftstrom wie das auszutauschende Teil aufweisen.
MISE EN GARDE	Ce document décrit comment changer les pièces détachées des unités qui comportent un refroidissement par une entrée ou une sortie d'air côté port. Vous devez remplacer une pièce détachée défectueuse par une autre du même type. Cela s'applique aux blocs d'alimentation et aux ventilateurs. La pièce détachée doit avoir la même référence que l'ancienne. La référence du fabricant se trouve sur le dessus de la pièce détachée. La référence se termine par -F (flux d'air de l'avant vers l'arrière) ou par -R (flux d'air de l'arrière vers l'avant). Vous devez utiliser une pièce détachée dont l'indicatif de flux d'air est le même.
PRECAUCIÓN	Este documento describe cómo cambiar las unidades reemplazables sobre el terreno (FRU, por sus siglas en inglés) por unidades con salida o entrada de aire por el lado de los puertos. La unidad FRU averiada debe cambiarse por otra del mismo tipo. Esto aplica a las fuentes de alimentación y a los módulos de ventilación. La nueva unidad FRU debe tener el mismo número de parte (P/N) que la unidad FRU que se va a sustituir. El P/N de fabricación se encuentra en la parte superior de la unidad FRU. El P/N termina en -F (flujo de aire de adelante hacia atrás) o -R (de atrás hacia adelante). Debe utilizar una unidad FRU de repuesto que tenga la misma designación de flujo de aire que el número de parte reemplazado.

CAUTION	Because the cooling system relies on pressurized air, do not leave any of the power supply and fan assembly slots empty longer than two minutes while the switch is operating. If a power supply orand fan assembly fails, leave it in the switch until it can be replaced.
VORSICHT	Das Kühlsystem beruht auf Überdruck. Lassen Sie die Einschübe für Netzteile und Lüfter daher nicht länger als zwei Minuten unbelegt, während der Switch in Betrieb ist. Falls ein Netzteil oder ein Lüfter ausfällt, belassen Sie die Komponente im Switch, bis sie ausgetauscht werden kann.
MISE EN GARDE	Comme le système de refroidissement repose sur l'air pressurisé, ne laissez aucun logement du bloc d'alimentation ou du ventilateur vide plus de deux minutes, lorsque le commutateur est utilisé. Si un bloc d'alimentation ou un ventilateur est défectueux, laissez-le dans le commutateur jusqu'à ce qu'il puisse être remplacé.
PRECAUCIÓN	Como el sistema de refrigeración depende del aire presurizado, no deje ninguna de las ranuras de los módulos de fuente de alimentación y ventiladores vacías durante más de dos minutos mientras el conmutador esté funcionando. Si se produce una avería en el módulo de fuente de alimentación y ventiladores deje el dispositivo en cuestión en el conmutador hasta que lo pueda cambiar.

CAUTION	Disassembling any part of the power supply and fan assembly voids the warranty and regulatory certifications. There are no user-serviceable parts inside the power supply and fan assembly.
VORSICHT	Das Zerlegen von Netzteilen oder Lüftereinheiten macht die Garantie und die gesetzlichen Zertifizierungen ungültig. Die Netzteile und Lüftereinheiten enthalten keine Teile, die vom Benutzer gewartet werden können.
MISE EN GARDE	Le démontage d'une pièce du bloc d'alimentation ou du ventilateur annule la garantie et les certificats de conformité. Aucune pièce du bloc de l'alimentation ou du ventilateur ne peut être réparée par l'utilisateur.
PRECAUCIÓN	Si se desmonta cualquier pieza del módulo de fuente de alimentación y ventiladores, la garantía y las certificaciones normativas quedan anuladas. En el interior del módulo de fuente de alimentación y ventiladores no hay piezas que pueda reparar el usuario.

CAUTION	The power supply switch must be in the off position when inserting it in the chassis.
VORSICHT	Der Schalter des Netzteils muss in der Stellung „Aus“ stehen, wenn das Netzteil in das Gehäuse eingesetzt wird.
MISE EN GARDE	Le commutateur d'alimentation doit être en position d'arrêt lorsque vous l'insérez dans le châssis.
PRECAUCIÓN	El conmutador de la fuente de alimentación debe estar en la posición de apagado en el momento de introducirla en el chasis.

CAUTION	If you observe that the switch has powered down approximately two minutes after a power supply replacement, it is likely because the new power supply has a mismatched airflow. Check your console for error messages.
VORSICHT	Falls Sie feststellen, dass der Switch ca. 2 Minuten nach Austausch des Netzteils heruntergefahren wird, ist die mögliche Ursache, dass das neue Netzteil für einen Luftstrom in der falschen Richtung ausgelegt ist. Prüfen Sie auf der Konsole, ob Fehlermeldungen vorliegen.
MISE EN GARDE	Si vous remarquez que le commutateur s'éteint deux minutes après le remplacement d'un bloc d'alimentation, il est probable que le nouveau bloc d'alimentation ait un flux d'air différent de l'ancien. Vérifiez que la console n'affiche aucun message d'erreur.
PRECAUCIÓN	Si observa que el conmutador se ha apagado aproximadamente dos minutos después del cambio de la fuente de alimentación, es posible que se deba a que la nueva fuente de alimentación tenga un flujo de aire incompatible. Revise la consola para ver si hay mensajes de error.

CAUTION	Do not force the installation. If the power supply and fan assembly does not slide in easily, ensure that it is correctly oriented before continuing.
VORSICHT	Wenden Sie beim Einbau keine Gewalt an. Wenn sich ein Netzteil oder eine Lüftereinheit nicht einfach einsetzen lässt, überprüfen Sie zunächst, ob die Ausrichtung korrekt ist.
MISE EN GARDE	Ne forcez pas l'installation. Si le bloc d'alimentation ou le ventilateur ne glisse pas facilement dans leur logement, assurez-vous qu'il soit correctement orienté avant de continuer.
PRECAUCIÓN	No fuerce la instalación. Si el módulo de fuente de alimentación y ventiladores no se deslizan con facilidad hacia el interior, asegúrese de que la orientación sea correcta antes de continuar.

CAUTION	Connect the power cord only to a grounded outlet.
VORSICHT	Schließen Sie das Netzkabel nur an eine geerdete Steckdose an.
MISE EN GARDE	Le cordon d'alimentation ne doit être raccordé qu'à une prise de courant mise à la terre.
PRECAUCIÓN	Conecte el cable de alimentación únicamente a una toma de corriente con conexión a tierra.

CAUTION	Do not attempt to replace the real-time clock (RTC) battery. There is danger of explosion if the battery is incorrectly replaced or disposed of. Contact your switch supplier if the real-time clock begins to lose time.
VORSICHT	Versuchen Sie nicht, die RTC-Batterie (Echtzeituhr) auszutauschen. Bei unsachgemäßer Handhabung der Batterie besteht Explosionsgefahr. Wenden Sie sich an Ihren Switch-Lieferanten, wenn Sie anhand der Echtzeituhr feststellen, dass die Batterieleistung allmählich nachlässt.
MISE EN GARDE	N'essayez pas de remplacer la pile RTC. Une explosion est susceptible de se produire si la pile est remplacée de façon incorrecte ou jetée . Contactez le fournisseur de votre commutateur si l'horloge temps réel commence à prendre du retard.
PRECAUCIÓN	No intente reemplazar la batería del reloj de tiempo real (RTC). Hay peligro de explosión si se reemplaza o se desecha la batería de forma incorrecta. Póngase en contacto con el proveedor de su conmutador si el reloj comienza a atrasarse.

CAUTION	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.
VORSICHT	Dieses Produkt ist für die Stromversorgung über ein IT-Stromversorgungssystem mit einer Netzspannung von 230 V Phase zu Phase konzipiert. Bei einem Anschluss an ein IT-Stromversorgungssystem steht das Gerät selbst dann unter Spannung, wenn die Schutzvorrichtung ausgelöst wurde.
MISE EN GARDE	Ce produit est conçu pour un système d'alimentation électrique avec une tension de 230 V en mono-phase. Après fonctionnement du dispositif de protection, l'équipement est toujours sous tension s'il est connecté à un système d'alimentation électrique.
PRECAUCIÓN	Este es un producto diseñado para sistemas de alimentación informático con un voltaje de fase a fase de 230 V. Después de haber utilizado el dispositivo de protección, el equipo sigue teniendo voltaje si está conectado a un sistema de alimentación informático.

Danger notices

The dangers that appear in this manual are listed in this section in English, German, French, and Spanish.

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

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

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

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

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

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

DANGER	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	Use only optical transceivers that are qualified by Brocade Communications Systems, Inc. and comply with the FDA Class 1 radiation performance requirements defined in 21 CFR Subchapter I, and with IEC 825-2. 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 Brocade Communications Systems zugelassen sind und die die Anforderungen gemäß FDA Class 1 Radiation Performance Standards in 21 CFR, Unterkapitel I, und IEC 825-2 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 Brocade Communications Systems, Inc. et conformes aux exigences sur la puissance de rayonnement de catégorie 1 de la FDA définies au sous-chapitre 21 CFR I et à la norme IEC 825-2. 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 Brocade Communications Systems, Inc. y que cumplan con la norma IEC 825-2 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.

Electrical cautions

This section lists electrical cautions for this product.

RTC battery

CAUTION

Do not attempt to replace the real-time clock (RTC) battery. There is danger of explosion if the battery is incorrectly replaced or disposed of. Contact your switch supplier if the real-time clock begins to lose time.

Electrical safety

DANGER

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

CAUTION

Connect the power cord only to a grounded outlet.

CAUTION

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.

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