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Brocade 6505

Hardware Installation Guide

BROCADE

Contents

Preface

Document conventions

The document conventions describe text formatting conventions, command syntax conventions, and important notice formats used in Brocade technical documentation.

Text formatting conventions

Text formatting conventions such as boldface, italic, or Courier font may be used in the flow of the text to highlight specific words or phrases.

Format	Description
bold text	Identifies command names
	Identifies keywords and operands
	Identifies the names of user-manipulated GUI elements
	Identifies text to enter at the GUI
italic text	Identifies emphasis
	Identifies variables
	Identifies document titles
`Courier font`	Identifies CLI output
	Identifies command syntax examples

Command syntax conventions

Bold and italic text identify command syntax components. Delimiters and operators define groupings of parameters and their logical relationships.

Convention	Description
bold text	Identifies command names, keywords, and command options.
italic text	Identifies a variable.
value	In Fibre Channel products, a fixed value provided as input to a command option is printed in plain text, for example, **--show** WWN.

Convention	Description
[ ]	Syntax components displayed within square brackets are optional. Default responses to system prompts are enclosed in square brackets.
{ **x** | **y** | **z** }	A choice of required parameters is enclosed in curly brackets separated by vertical bars. You must select one of the options. In Fibre Channel products, square brackets may be used instead for this purpose.
x | **y**	A vertical bar separates mutually exclusive elements.
< >	Nonprinting characters, for example, passwords, are enclosed in angle brackets.
...	Repeat the previous element, for example, *member*[*member*...].
\	Indicates a “soft” line break in command examples. If a backslash separates two lines of a command input, enter the entire command at the prompt without the backslash.

Notes, cautions, and warnings

Notes, cautions, and warning statements may be used in this document. They are listed in the 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 a stronger note, for example, to alert you when traffic might be interrupted or the device might reboot.

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

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

Brocade resources

Visit the Brocade website to locate related documentation for your product and additional Brocade resources.

You can download additional publications supporting your product at www.brocade.com. Select the Brocade Products tab to locate your product, then click the Brocade product name or image to open the individual product page. The user manuals are available in the resources module at the bottom of the page under the Documentation category.

To get up-to-the-minute information on Brocade products and resources, go to MyBrocade. You can register at no cost to obtain a user ID and password.

Release notes are available on MyBrocade under Product Downloads.

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

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As a Brocade customer, you can contact Brocade Technical Support 24x7 online, by telephone, or by e-mail. Brocade OEM customers contact their OEM/Solutions provider.

Brocade customers

For product support information and the latest information on contacting the Technical Assistance Center, go to http://www.brocade.com/services-support/index.html.

If you have purchased Brocade product support directly from Brocade, use one of the following methods to contact the Brocade Technical Assistance Center 24x7.

Online	Telephone	E-mail
Preferred method of contact for non-urgent issues: • My Cases through MyBrocade • Software downloads and licensing tools • Knowledge Base	Required for Sev 1-Critical and Sev 2-High issues: • Continental US: 1-800-752-8061 • Europe, Middle East, Africa, and Asia Pacific: +800-AT FIBREE (+800 28 34 27 33) • For areas unable to access toll free number: +1-408-333-6061 • Toll-free numbers are available in many countries.	support@brocade.com Please include: • Problem summary • Serial number • Installation details • Environment description

Brocade OEM customers

If you have purchased Brocade product support from a Brocade OEM/Solution Provider, contact your OEM/Solution Provider for all of your product support needs.

- OEM/Solution Providers are trained and certified by Brocade to support Brocade® products.
- Brocade provides backline support for issues that cannot be resolved by the OEM/Solution Provider.

- Brocade Supplemental Support augments your existing OEM support contract, providing direct access to Brocade expertise. For more information, contact Brocade or your OEM.
- For questions regarding service levels and response times, contact your OEM/Solution Provider.

Document feedback

To send feedback and report errors in the documentation you can use the feedback form posted with the document or you can e-mail the documentation team.

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. You can provide feedback in two ways:

- Through the online feedback form in the HTML documents posted on www.brocade.com.
- By sending your feedback to documentation@brocade.com.

Provide the publication title, part number, and as much detail as possible, including the topic heading and page number if applicable, as well as your suggestions for improvement.

About This Document

Supported hardware and software

This document includes information specific to the Brocade 6520 running Brocade Fabric OS version 7.1.0. and later.

What's new in this document

The following changes have been made:

- An illustration indicating the port numbers and the port groups is added.
- FL_Port type is removed since FL_Port type is not supported.
- All references to EIA cabinet have been changed to EIA rack since enclosed cabinets are not supported by Brocade products.
- The regulatory compliance statements are moved to a new chapter/appendix.
  - China CCC certification has been updated from "GB17625.1-2003 or latest" to "GB17625.1-2012 or latest".
  - Laser compliance statement is removed.
  - The Japan VCCI statement has been updated.
  - China RoHS compliance statements are removed and a reference to the latest independent China RoHS compliance document is added.
- A new chapter/appendix on cautions and danger notices is added with translation in multiple languages.

Brocade 6505 Introduction

Brocade 6505 overview

The Brocade 6505 is a 24-port auto-sensing 2, 4, 8, or 16 Gbps Fibre Channel (FC) switch that delivers the latest Brocade single-chip architecture for Fibre Channel Storage Area Networks (SANs). The Brocade 6505 is a small-to-midsize business-class switch that is designed to handle smaller-scale SAN requirements.

The Brocade 6505 provides up to 24 ports in a single height (1U) switch that enables the creation of very dense fabrics in a relatively small space.

The Brocade 6505 offers Ports on Demand (POD) licensing as well. "Base" models of the switch contain 12 ports, and an additional 12-port POD license can be purchased. The base model also offers a single power supply and fan module with a second module available as an upgrade for redundancy.

The Brocade 6505 supplies Reliability, Availability, and Serviceability (RAS) performance and the scalability requirements of an enterprise switch along with interoperability and ease-of-use advantages.

The Brocade 6505 can also be configured in Access Gateway (AG) mode that lets you configure your Enterprise fabric to handle additional N_Ports instead of domains. By reducing the number of domain IDs and ports, you simplify configuration and management in a large fabric.

Switches in AG mode are logically transparent to the host and the fabric. You can increase the number of hosts that have access to the fabric without increasing the number of switches.

Platform features

The Brocade 6505 offers the following features and capabilities:

- Up to 24 auto-sensing ports of high-performance 16-Gbps technology in a single domain.
- Ports on Demand scaling from 12 to 24 ports.
- 2, 4, 8, and 16 Gbps auto-sensing Fibre Channel switch and router ports.
  - 2, 4, and 8 Gbps performance is enabled by 8 Gbps SFP+ transceivers.
  - 4, 8, and 16 Gbps performance is enabled by 16 Gbps SFP+ transceivers.
- Universal ports self-configure as E, F, or M ports. D-port functionality is also available for diagnostics.
- Airflow is set for port side exhaust.
- Inter-Switch Link (ISL) Trunking, which allows up to eight ports (at 2, 4, 8, or 16 Gbps speeds) between a pair of switches combined to form a single, logical ISL with a speed of up to 128 Gbps (256 Gbps full duplex) for optimal bandwidth utilization and load balancing. The base model permits one eight-port trunk plus one four-port trunk.
- Dynamic Path Selection (DPS), which optimizes fabric-wide performance and load balancing by automatically routing data to the most efficient available path in the fabric.

- Brocade-branded SFP+ optical transceivers that support any combination of Short Wavelength (SWL), Long Wavelength (LWL), and Extended Long Wavelength (ELWL) optical media among the switch ports.
- Extended distance support enables native Fibre Channel extension up to 7,500 km at 2 Gbps.
- Support for unicast traffic type.
- Brocade Fabric OS, which delivers distributed intelligence throughout the network and enables a wide range of value-added applications including Brocade Advanced Web Tools, Brocade Enhanced Group Management, and Brocade Zoning.
- Licensable fabric services include:
  - Adaptive Networking with QoS
  - Brocade Extended Fabrics
  - Brocade Fabric Watch
  - ISL Trunking
  - Advanced Performance Monitoring (APM)
  - Server Application Optimization (SAO)
- Support for Access Gateway configuration where server ports connected to the fabric core will be virtualized.
- Hardware zoning is accomplished at the port level of the switch and by World Wide Name (WWN). Hardware zoning permits or denies delivery of frames to any destination port address.
- Extensive diagnostics and system-monitoring capabilities for enhanced high Reliability, Availability, and Serviceability (RAS).
- The Brocade EZSwitchSetup wizard that makes SAN configuration a three-step point-and-click task.
- Real-time power monitoring enables users to monitor real-time power usage of the fabric at a switch level.
- Port-to-port latency minimized to 800 nanoseconds through the use of cut-through frame routing at 16 Gbps.

Platform components

- A system motherboard that features a PowerPC 440EPx Reduced Instruction Set Computer (RISC) CPU running at 667 MHz, with integrated peripherals.
- An RJ45 10/100 BaseT Ethernet system management port, in conjunction with Brocade EZSwitchSetup, that supports switch IP address discovery and configuration, eliminating the need to attach a serial cable to configure the switch IP address and greatly increasing the ease of use.
- One RS-232 serial port with an RJ45 connector for initial switch setup (if not using EZSwitchSetup) and factory default restoration.
- A USB 2.0 port that provides storage for firmware updates, output of the **supportSave** command, and storage for configuration uploads and downloads.
- One power supply and fan assembly in the base model. There are two fans per assembly. A second assembly is available for redundancy and hot-swap capability.
- One LED (green/amber) per FC port to indicate status.
- One LED (green) for system power.
- One LED (green/amber) for system status.
- Two Ethernet port LEDs (integrated with RJ45) for speed and port activity. (A green LED for port speed and an amber LED for port activity.)
- SEEPROM for switch identification.
- Voltage monitor.
- Fan monitor.
- Temperature monitor.
- Real-time clock (RTC) with battery.

Facility requirements

The following table provides the facilities requirements that must be met for the Brocade 6505.

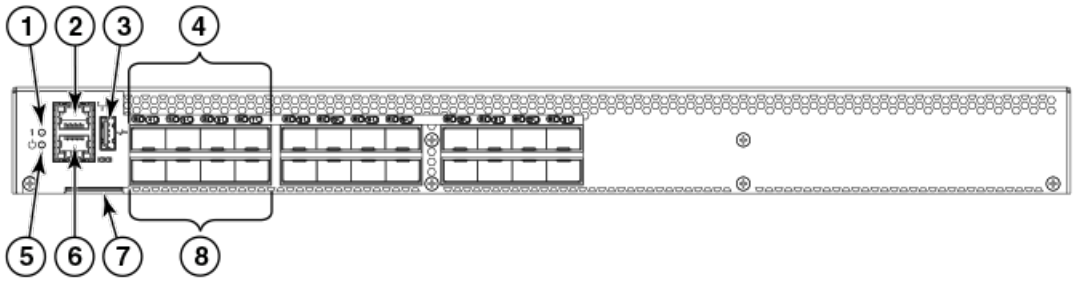
TABLE 1 Facility requirements

Type	Requirements
Electrical	• 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 Brocade 6505 Technical Specification on page 0 for complete power supply specifications.
Thermal	• A minimum airflow of 79.8 cubic meters/hour (47 cubic ft/min.) available in the immediate vicinity of the switch. • Ambient air temperature not exceeding 40 ° C (104 ° F) while the switch is operating.
Rack (when rack-mounted)	• One rack unit (1U) in a 48.3 cm (19-inch) rack. • All equipment in rack grounded through a reliable branch circuit connection. • Additional weight of switch not to exceed the rack's weight limits. • Rack secured to ensure stability in case of unexpected movement.

Port side of the Brocade 6505

The port side of the Brocade 6505 includes the system status LED, the console port, the Ethernet port and accompanying LEDs, the USB port, and the Fibre Channel ports and corresponding port status LEDs.

FIGURE 1 Port side of the Brocade 6505

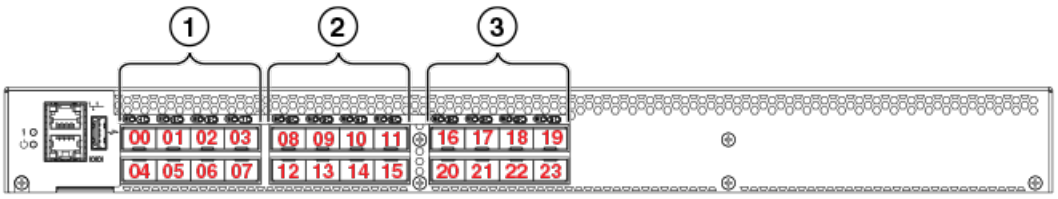


1. System status LED
2. Management Ethernet port with LEDs
3. USB port
4. FC ports 0-3 (all LEDs above)
5. System power LED
6. Serial console port

7. Switch ID pull-out tab
8. FC ports 4-7

NOTE
The two LEDs on the serial console port are non-functional.

FIGURE 2 Trunking port groups and port numbers of the Brocade 6505



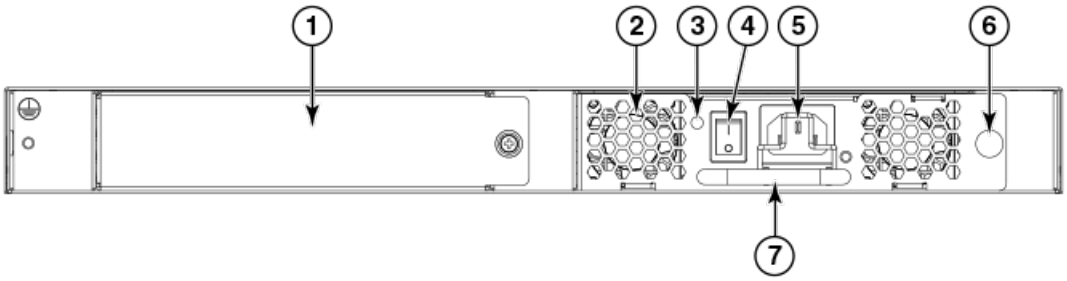
1. Trunking port group 1: FC ports 00-07
2. Trunking port group 2: FC ports 08-15
3. Trunking port group 3: FC ports 16-23

NOTE
You can also use port index and PIDs to identify a port. For more information, refer to the *Fabric OS Administrator's Guide*.

Nonport side of the Brocade 6505

The following figure shows the non-port side of the Brocade 6505, which contains the power supply (including the AC power receptacle and AC power switch) and fan assemblies. The base model configuration with a single assembly is shown.

FIGURE 3 Nonport side of the Brocade 6505



1. Filler panel
2. Power supply and fan assembly #1
3. Power supply and fan assembly LED
4. On/off switch
5. Power plug receptacle (with plug retainer)
6. Captive screw
7. Handle

Brocade 6505 Installation and Configuration

Items included with the Brocade 6505

The following items are included with the standard shipment of a fully-configured Brocade 6505. When you open the Brocade 6505 packaging, verify that these items are included in the package and that no damage has occurred during shipping:

- The Brocade 6505 switch, containing one combined power supply and fan assembly
- 16 Gbps or 8 Gbps SFP+ modules for the Fibre Channel ports (speed and quantity as ordered)
- One accessory kit, containing the following items:
  - Serial cable with an RJ45 connector
  - RJ45-to-DB9 adapter
  - One 6 foot power cord
  - Rubber feet, required for setting up the switch as a standalone unit
  - *Brocade 6505 EZSwitchSetup* poster
  - EZSwitchSetup CD

Installation and safety considerations

You can install the Brocade 6505 switch in the following ways:

- As a standalone unit on a flat surface.
- In an EIA rack using a slim rail rack mount kit. The rack mount kit can be ordered from your switch retailer.
- In an EIA rack using an optional mid-mount rack kit for switches. The optional mid-mount rack kit for switches can be ordered from your switch retailer.

Installation precautions

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

NOTE
Refer to Cautions and Danger Notices on page 55 for translations of safety notices for this product.

ESD precautions

The Brocade 6505contains electrostatic discharge (ESD) sensitive FRUs. When working with any Brocade 6505 FRU, use correct ESD procedures.

CAUTION

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

CAUTION

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

Wear a wrist grounding strap connected to chassis ground (if the Brocade 6505 is plugged in) or a bench ground.

DANGER

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

Power precautions

To install and operate the switch successfully, ensure the following:

- The primary outlet is correctly wired, protected by a circuit breaker, and grounded in accordance with local electrical codes.
- Connect the power cord only to a grounded outlet.

DANGER

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

- The supply circuit, line fusing, and wire size are adequate, as specified by the electrical rating on the switch nameplate.
- This switch might have more than one power cord. To reduce the risk of electric shock, disconnect both power cords before servicing.

DANGER

Remove both power cords before servicing.

DANGER

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

- 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.

DANGER

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

- The power supply standards provided in Brocade 6505 Technical Specification on page 0 are met.

RTC battery

Do not attempt to replace the real-time clock (RTC) battery. There is a 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.

DANGER

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

Environmental considerations

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

- At a minimum, adequate cooling requires that you install the switch with the intake side, as indicated by the airflow direction of the fan assemblies, facing the cool-air aisle.
- All equipment in the rack should force air in the same direction to avoid intake of exhaust air.

CAUTION

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

- A maximum of 102 cubic meters/hour (60 cubic feet/minute) and a minimum of 74.8 cubic meters/hour (44 cubic feet/minute) of air flow is available for air intake.

CAUTION

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

- Ensure temperature requirements are met.

CAUTION

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

EIA rack installation considerations

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

- The rack must be a standard EIA rack.
- A rack space that is at least one rack unit (1U) high; 4.45 cm (1.75 inches) high and 48.3 cm (19 inches) wide.
- The two rack kit options for the Brocade 6505 use rails that are slimmer than standard rails to accommodate the slightly wider chassis. Be sure to use one of these kits. Do not use standard rails to install the in a rack; they will not fit with the switch.
- 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.
- Airflow and temperature requirements are met on an ongoing basis, particularly if the switch is installed in a closed or multi-rack assembly.

- 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.

DANGER

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

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, using cable channels on the sides of the rack or patch panels to minimize cable management. Following is a list of recommendations:

NOTE

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

CAUTION

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

- Plan for rack space required for cable management before installing the switch.
- Leave at least 1 m (3.28 ft) of slack for each port cable. This provides room to remove and replace the switch, allows for inadvertent movement of the rack, and helps prevent the cables from being bent to less than the minimum bend radius.
- If you are using Brocade ISL Trunking, consider grouping cables by trunking groups. The cables used in trunking groups must meet specific requirements, as described in the *Fabric OS Administrator's Guide* .
- For easier maintenance, label the fiber-optic cables and record the devices to which they are connected.
- Keep LEDs visible by routing port cables and other cables away from the LEDs.
- Use Velcro ® type straps to secure and organize fiber-optic cables.

Items required for installation

The following items are required for installing, configuring, and connecting the Brocade 6505 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) if not using EZSwitchSetup
- An Ethernet cable
- Brocade-branded SFP+ optical transcceivers and compatible cables (Brocade-branded 16 Gbps SFP+ optical transcceivers required for 16 Gbps performance), as required
- Access to an FTP server or USB device for backing up the switch configuration (optional)

Standalone installation for a Brocade 6505

Complete the following steps to install the Brocade 6505 as a standalone unit.

1. Unpack the Brocade 6505 and verify the items listed in Items included with the Brocade 6505 on page 15. Verify the items are present and undamaged.
2. Apply the adhesive rubber feet. Applying the rubber feet onto 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 19.

ATTENTION

Do not connect the switch to the network until the IP address is correctly set. For instructions on how to set the IP address, see Brocade 6505 configuration on page 19

Rack installation for a Brocade 6505

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

- To install the switch into a fixed-rail rack, refer to the *Slim Rail Rack Mount Kit Installation Procedure* .
- To install the switch into a 2-post Telco rack, refer to the *Flush Mount Rack Mount Kit Installation Procedure* .

Brocade 6505 configuration

Once you have set up the Brocade 6505 in a rack or as a standalone switch, it is time to apply power and a basic configuration. If you are going to use the Brocade 6505 in a single-switch setup, you can use EZSwitchSetup to complete the basic configuration.

See the EZSwitchSetup CD, included with the Brocade 6505 *EZSwitchSetup poster*.

If you do not want to use EZSwitchSetup, continue with the instructions in this section.

Providing power to the switch

Perform the following steps to provide power to the Brocade 6505.

1. Connect the power cord to the power supply, and then to a power source. If using two power supplies, be sure to connect the cords to power sources on separate circuits to protect against AC

failure. Ensure that the cords have a minimum service loop of 6 inches available and are routed to avoid stress.

2. Power on the power supplies by flipping both AC switches to the "I" symbol. The power supply LEDs display amber until power-on self-test (POST) is complete, and then change to green. The switch usually requires several minutes to boot and complete POST.

NOTE

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

3. After POST is complete, verify that the switch power and status LEDs on the left of the port side of the switch are green. See LED locations on page 30 for the specific location of the LEDs.

Creating a serial connection

NOTE
You will perform all configuration tasks in this guide using a serial connection.

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.

   If the serial port on the workstation 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, use 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 and enter the following string at the prompt:

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

Switch IP address

You can configure the Brocade 6505 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 6505 supports both IPv4 and IPv6.

Using DHCP to set the IP address

When using DHCP, the Brocade 6505 obtains its IP address, subnet mask, and default gateway address from the DHCP server. The DHCP client can only connect to a DHCP server that is on the same subnet as the switch. If your DHCP server is not on the same subnet as the Brocade 6505, use a static IP address.

Setting a static IP address

1. Log in to the switch using the default password (which is password).
2. Use the **ipaddrset** command to set the Ethernet IP address.

   If you are going to use an IPv4 IP address, enter the IP address in dotted decimal notation as prompted. As you enter a value and press **Enter** for a line in the following example, the next line appears.

   For instance, the Ethernet IP address appears first. When you enter a new IP address and press **Enter** or simply press **Enter** to accept the existing value, the Ethernet Subnetmask line appears.

   In addition to the Ethernet IP address itself, you can set the Ethernet subnet mask, the Gateway IP address, and whether to obtain the IP address by way of DHCP.

```
switch:admin> ipaddrset
Ethernet IP Address [192.168.74.102]:
Ethernet Subnetmask [255.255.255.0]:
Gateway IP Address [192.168.74.1]:
DHCP [Off]: off
```

   If you are going to use an IPv6 address, enter the network information in semicolon-separated notation as a standalone command.

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

Date and time settings

The Brocade 6505 maintains the current date and time inside a battery-backed real-time clock (RTC) circuit. Date and time are used for time stamping log events. Switch operation does not depend on the date and time; a Brocade 6505 with an incorrect date and time value still functions properly. However, 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 the switch by name. You can select continent, country, or time zone region names.

If the time zone is not set with the named options, the switch retains the offset time zone settings. This is a number of hours offset from Greenwich Mean Time (GMT). If you have set the time zone with a name, you can revert to the offset format if you choose. For more information about the **tsTimeZone** command, refer to the *Fabric OS Command Reference*.

You can set the time zone for a switch using the **tsTimeZone** command. The **tsTimeZone** command allows you to perform the following tasks:

- Display all of the time zones supported in the firmware
- Set the time zone based on a country and city combination or based on a time zone ID such as PST

The time zone setting has the following characteristics:

- You can view the time zone settings. However, only those with administrative permissions can set the time zones.
- The **tsTimeZone** 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 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.

Local time synchronization

You can synchronize the local time of the principal or primary fabric configuration server (FCS) switch to a maximum of eight external Network Time Protocol (NTP) servers. To keep the time in your SAN current, it is recommended that the principal or primary FCS 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 or primary FCS switch.

All switches in the fabric maintain the current clock server IP address in non-volatile memory. By default, this value is LOCL, the local clock server of the Principal (when FCS not enabled) or Primary (when FCS is enabled) switch. Changes to the clock server value on the Principal or Primary switch are propagated to all switches in the fabric.

When a new switch enters the fabric, the time server daemon of the Principal or Primary switch sends out the addresses of all existing clock servers and the time to the new switch. If a switch with Fabric OS v5.3.0 or later has entered the fabric, it will be able to store the list of all the clock server addresses; switches running Fabric OS versions earlier than v5.3.0 will ignore the new list parameter in the payload and will update only the active server address.

If the active NTP server configured is IPv6, then distributing the IP address in the fabric will not be possible to switches earlier than Fabric OS v5.3.0 because IPv6 is supported for Fabric OS v5.3.0 and later. The default value LOCL will be distributed to switches earlier than Fabric OS v5.3.0.

The **tsClockServer** command accepts multiple server addresses in IPv4, IPv6, or DNS name formats. When multiple NTP server addresses are passed, **tsClockServer** sets the first obtainable address as the active NTP server. The rest are stored as backup servers that can take over if the active NTP server fails. The Principal or Primary switch synchronizes its time with the NTP server every 64 seconds.

Setting the date

1. Log in to the switch using the default password (which is password).
2. Enter the **date** command, using the following syntax:

   ```
   date "mmddHHMMyy"
   ```

   The values are:

   - mm is the month; valid values are 01 through 12.
   - dd is the date; valid values are 01 through 31.
   - HH is the hour; valid values are 00 through 23.
   - MM is minutes; valid values are 00 through 59.
   - yy is the year; valid values are 00 through 99 (values greater than 69 are interpreted as 1970 through 1999, and values less than 70 are interpreted as 2000 through 2069).

   ```
   switch:admin> date
   Fri Sep 29 17:01:48 UTC 2007
   switch:admin> date "0927123007"
   Thu Sep 27 12:30:00 UTC 2007
   switch:admin>
   ```

Setting time zones

You must perform the 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.

Use one of the two following procedures to set the time zone. The first procedure requires you to select the actual time zone and the second requires you to select the country location of the switch.

The following procedure describes how to set the current time zone to Central Standard time using timezonename mode.

1. Log in to the switch using the default password (which is password).
2. Enter the **tsTimeZone** command as follows:

   Use *timezonename* to set the time zone by time zone ID, such as PST or Country/City.

   The following example shows how to change the time zone to US/Central. The **tsTimeZone** command by itself display the current time zone.

```
switch:admin> tstimezone
Time Zone : US/Pacific
switch:admin> tstimezone US/Central
switch:admin> tstimezone
Time Zone : US/Central
```

   The following procedure describes how to set the current time zone to Pacific Standard Time using interactive mode.

   1. Enter the **tsTimeZone** command as follows:

```
switch:admin> tstimezone --interactive
```

      You are prompted to select a general location from a list.

```
Please identify a location so that time zone rules can be set correctly.
```

   2. Enter the appropriate number from the list that appears or **Ctrl-D** to quit.
   3. At the prompt, select a country location from the list.
   4. At the prompt, enter the appropriate number from the list to specify the time zone region or **Ctrl-D** to quit.

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(which is password).
2. Enter the **tsClockServer** command:

```
switch:admin> tsclockserver "<ntp1;ntp2>"
```

   In the syntax *ntp1* is the IP address or DNS name of the first NTP server, which the switch must be able to access. The value *ntp2* is the name of the second NTP server and is optional. The entire operand "*<ntp1;ntp2>*" is optional; by default, this value is LOCL, which uses the local clock of the principal or primary switch as the clock server.

```
switch:admin> tsclockserver
LOCL
switch:admin> tsclockserver "132.163.135.131"

switch:admin> tsclockserver
132.163.135.131
switch:admin>
```

The following example shows how to set up more than one NTP server using a DNS name:

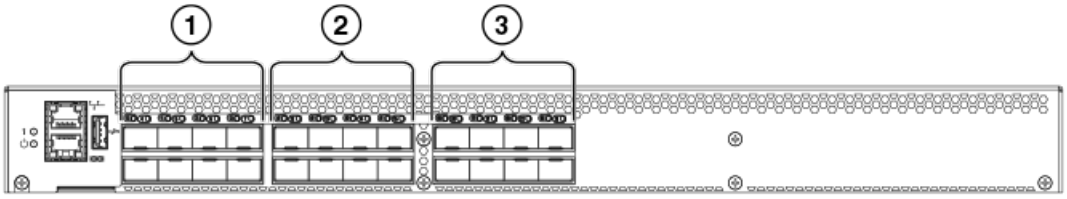
```
switch:admin> tsclockserver
 "10.32.170.1;10.32.170.2;ntp.localdomain.net"
Updating Clock Server configuration...done.
Updated with the NTP servers
```

Changes to the clock server value on the principal or primary FCS switch are propagated to all switches in the fabric.

Brocade Inter-Switch Link trunking

Brocade Inter-Switch Link (ISL) Trunking is optional software that allows you to create trunking groups of ISLs between adjacent switches. Up to eight ports within a port group on the Brocade 6505 can be used as a trunking group to achieve speeds up to 128 Gbps (256 Gbps full duplex) for optimal bandwidth utilization and load balancing.

FIGURE 4 Port groups of the Brocade 6505



1. FC ports 0-7
2. FC ports 8-15
3. FC ports 16-23

For more information about Brocade ISL Trunking, see the *Fabric OS Administrator's Guide*.

Brocade switchstatus policy

Brocade switchstatus policy is a feature that monitors different switch parameters such as power supplies, fan units, and so forth and provides switch status based on their health.

The switchstatus policy configuration can be updated using the **switchstatuspolicyset** command. The example shows the default settings of 2 and 0 for DOWN and MARGINAL units for both Bad PowerSupplies and Bad Fans.

```
switch:admin>switchstatuspolicyset
<some output skipped>
The minimum number of
Bad PowerSupplies contributing to DOWN status: (0..2) [2]
Bad PowerSupplies contributing to MARGINAL status: (0..2) [0]
<some output skipped>
Bad Fans contributing to DOWN status: (0..2) [2]
Bad Fans contributing to MARGINAL status: (0..2) [0]
<output truncated>
```

If a second power supply and fan assembly unit is installed in the switch, Brocade recommends changing the configuration to 2 and 1 for DOWN and MARGINAL for both the Bad PowerSupplies and Bad Fans. You can use the **switchStatusPolicyShow** command to see the results of your changes.

Fabric OS Native and Access Gateway modes

The Brocade 6505 can function in either Fabric OS Native mode or Brocade Access Gateway mode. The switch is shipped in Fabric OS Native mode by default.

- You can enable Access Gateway mode using Fabric OS commands or Web Tools.
- All additional POD licenses must be installed before you can enable Access Gateway mode.
- When you enable Access Gateway, you can use the default F_Port-to-N_Port mappings or change this mapping using the command line interface (CLI) or Web Tools (after you configure an IP address using instructions under Switch IP address on page 20).
- Access Gateway simplifies SAN deployment by using N_Port ID Virtualization (NPIV). NPIV provides Fibre Channel switch functions that improve switch scalability, manageability, and interoperability. For more information on Access Gateway, refer to the following:
  - For a list of F_Ports mapped to N_Ports by default, refer to Access Gateway default port mapping on page 25.
  - For general information and details on using Access Gateway, refer to the *Brocade Access Gateway Administrator's Guide*
  - For specific instructions to prepare the edge fabric before connecting it to Access Gateway (because Access Gateway relies on NPIV technology for its connection to the edge fabric), refer to the *Brocade Access Gateway Administrator's Guide* .

NOTE
Access Gateway cannot be connected directly into an array; it requires a fabric to support NPIV.

- Fabric OS features available to the Brocade 6505 depend on whether the switch is configured in Access Gateway or Fabric OS Native mode. For a list of available features for each mode, refer to the *Brocade Access Gateway Administrator's Guide*
- In Access Gateway mode, cascading is not available for the Brocade 6505. Refer to the *Brocade Access Gateway Administrator's Guide* for details on any other restrictions specific to the Brocade 6505.
- In Fabric OS Native mode, the switch provides up to 24 external Fibre Channel ports. These universal and self-configuring ports are capable of becoming one of the following port types:
  - F_Port (fabric enabled)
  - E_Port (expansion port)
  - M_Port (mirror port)
  - D_Port (diagnostic port)
- In Access Gateway mode, the switch provides up to 24 external Fibre Channel ports. However, these ports are configured as N_Ports, and you cannot reconfigure these as any other port type.

Access Gateway default port mapping

The following table lists the port mappings of F_Ports to N_Ports.

TABLE 2 Access Gateway default port mapping

Total ports	F_Ports	N_Ports	Default port mapping
24	0-15	16-23	• 0,1 mapped to 16 • 2,3 mapped to 17 • 4,5 mapped to 18 • 6,7 mapped to 19 • 8,9 mapped to 20 • 10,11 mapped to 21 • 12,13 mapped to 22 • 14,15 mapped to 23

Disabling and enabling Access Gateway mode

This section provides steps to disable and enable Access Gateway mode using Fabric OS commands. For more information on using these commands, refer to the *Brocade Access Gateway Administrator's Guide* or the *Brocade Fabric OS Administrator's Guide* .

NOTE
You can also disable and enable Access Gateway mode using Web Tools. Refer to the *Web Tools Administrator's Guide* for more information.

Enabling Access Gateway mode

Note the following when enabling Access Gateway mode:

- After you enable Access Gateway mode, some fabric information is erased, such as the zone and security databases.
- Enabling Access Gateway mode is disruptive because the switch is disabled and rebooted.
- Ensure that no zoning or Admin Domain (AD) transaction buffers are active. If any transaction buffer is active, enabling Access Gateway mode will fail with the error, "Failed to clear Zoning/Admin Domain configuration."

Use the following steps to enable Access Gateway mode using Fabric OS commands.

1. Before disabling a switch to enable Access Gateway mode, save the current configuration file using the **configupload** command in case you might need this configuration again.
2. Enter the **switchshow** command to verify the switch mode.
   - "Access Gateway Mode" displays for the switchMode value if the switch is in Access Gateway mode.
   - "Native" displays for the switchMode value if the switch is in Fabric OS Native mode.
3. Enter **switchDisable** to disable the switch. Access Gateway mode can only be enabled or disabled when the switch is in a disabled state.
4. Enter **ag -modeEnable** to enable Access Gateway mode.
5. Enter the **ag --modeshow** command to verify that Access Gateway mode is enabled.

```
switch:admin> ag --modeshow
Access Gateway mode is enabled.
```

Disabling Access Gateway mode

When you disable Access Gateway mode, the switch automatically reboots and comes back online using the fabric switch configuration. The Access Gateway parameters, such as F_Port-to-N_Port mapping, Failover, and Failback are automatically removed. When the switch reboots, it starts in Fabric OS Native mode. To rejoin the switch to the core fabric, refer to the *Brocade Access Gateway Administrator's Guide* .

Use the following steps to disable Access Gateway mode using Fabric OS commands.

1. Enter the **switchshow** command to verify the switch mode.
   - "Access Gateway Mode" displays if the switch is in Access Gateway mode.
   - "Native" displays if the switch is in Fabric OS Native mode.
2. Enter **switchDisable** to disable the switch. Access Gateway mode can only be disabled or enabled when the switch is in a disabled state.
3. Enter **ag --modeDisable** to disable Access Gateway mode.
4. Enter the **ag --modeshow** command to verify that Access Gateway mode is disabled.

```
switch:admin> ag --modeshow
Access Gateway mode is NOT enabled
```

Brocade 6505 Operation

Powering the Brocade 6505 on and off

Complete the following steps to power on the Brocade 6505. These steps apply to the base model of the switch which has a single power supply.

1. Connect the power cord to the power connector on the power supply and fan assembly.
2. Set the AC power switch to "**I**".

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

   The switch runs POST by default each time it is powered on; it can take up to several minutes to boot and complete POST.

Complete the following steps to power off the Brocade 6505.

1. Enter the **sysShutDown** command.

```
switch:admin> sysshutdown
This command will shutdown the operating systems on your
switch. You are required to power-cycle the switch in
order to restore operation.
Are you sure you want to shutdown the switch [y/n]? y
Broadcast message from root (ttyS0) Mon Sep 12 17: \
52:12 2005...
The system is going down for system halt NOW !!
INIT: Switching to runlevel:
INIT: Sending processes the TERM signal
switch:root> Unmounting all filesystems.
The system is halted
flushing ide devices: hda
Power down.
```

2. Set the AC power switches to **O**.

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

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: no light, a steady light, and a flashing light. Flashing LEDs may be slow, fast, or flickering. The LED colors are either green or amber.

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

Brocade 6505 LEDs

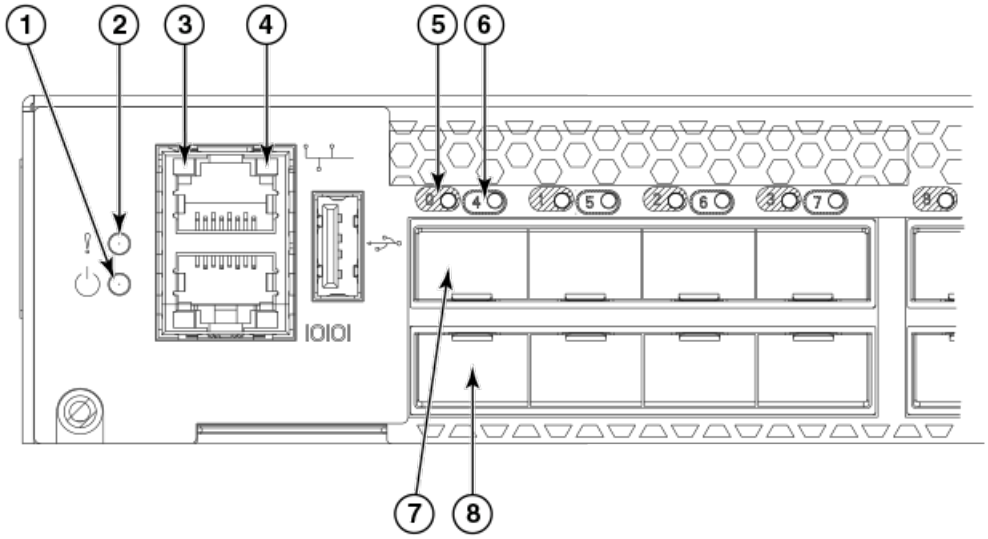
The Brocade 6505 has the following LEDs:

- One system status LED (upper) on the left side.
- One power status LED (lower) on the left side.
- Two Ethernet port LEDs (one amber, one green).
- One bicolor (green and amber) port status LED for each port on the switch. These LEDs are arrayed above each pair of Fibre Channel ports.
- One power supply and fan assembly LED above the AC power switch on each power supply on the non-port side of the switch.

LED locations

The following figure shows the LEd locations on the port side of the Brocade 6505. The port status LEDs for the FC ports are arranged left and right to correspond to the upper and lower ports respectively in each pair. Refer to Port side of the Brocade 6505 on page 13 for the locations of the FC ports.

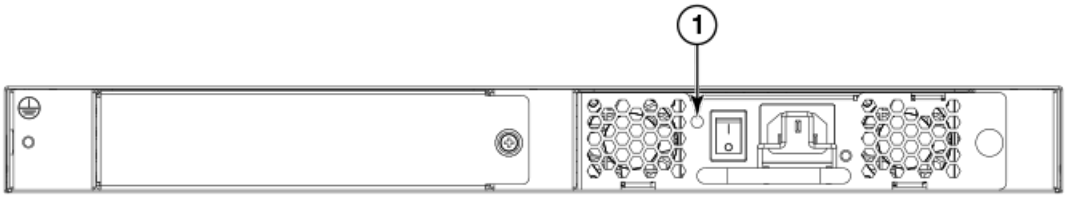
FIGURE 5 LEDs on the port side of Brocade 6505



1. System power LED (green)
2. System status LED green/amber)
3. Ethernet port activity LED (amber)
4. Ethernet port speed LED (green)
5. FC port status LED (port 0)
6. FC port status LED (port 4)
7. FC port 0
8. FC port 4

NOTE
The two LEDs on the serial console port are non-functional.

FIGURE 6 LEDs on the non-port side of Brocade 6505



1. Power supply and fan assembly #1 status LED

LED patterns

The following table describes the port side LEDs and their behavior.

TABLE 3 Port side LED patterns during normal operation

LED name	LED color	Status of hardware	Recommended action
Power Status (green)	No light	System is off or there is an internal power supply failure.	Verify the system is powered on (power supply switches to I), the power cables are attached, and your power source is live. Otherwise, contact your switch service provider.
	Steady green	System is on and power supplies are functioning properly.	No action required.
System Status (bicolor)	No light	System is off or there is no power.	Verify the system is on and has completed booting.
	Steady green	System is on and functioning properly.	No action required.
	Steady amber (for more than five seconds)	A system fault has occurred. This LED displays steady amber during POST; this is normal and does not indicate a fault.	Check the failure indicated on the system console. Contact your switch service provider.

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

LED name	LED color	Status of hardware	Recommended action
	Blinking amber	Attention is required. A number of factors can cause this status, including; • failure of a single power supply when two power supplies are installed • fan failure • left FRU bay (#1) empty (when looking at the port side of the switch) • one or more environmental ranges has been exceeded.	Check the management interface and the error log for details on the cause of status. Contact your switch service provider.
Ethernet Speed (green)	No light	Port speed is 10 Mbps.	No action required.
	Steady green	Port speed is 100 Mbps.	No action required.
Ethernet Activity/Link (amber)	No light	There is no link.	Verify that the Ethernet cable is connected correctly.
	Steady amber	There is a link.	No action required.
	Blinking amber	There is link activity (traffic).	No action required.
Optical media port status(one bicolor LED for each FC port)	Off	No light or signal carrier on the media interface.	Verify that the transceiver is installed correctly and that the cable is connected correctly.
	Steady amber	Receiving light or carrier, but not online.	No action required.
	Slow blinking amber (2 sec)	Disabled (by diagnostics or by **portDisable** command).	Verify that the diagnostic tests are not being run. Re-enable the port using the **portEnable** command.
	Fast blinking amber (1/2 sec)	Port failure.	Check the management interface and the error log for details on the cause of the failure. Contact Technical Support if necessary.
	Steady green	Online.	No action required.
	Slow blinking green (2 sec)	Online but segmented (loopback cable or incompatible switch).	No action required.
	Fast blinking green (1/2 sec)	Internal loopback (diagnostic).	No action required.
	Flickering green	Online, frames flowing through port.	No action required.

The following table describes the LEDs on the nonport side of the switch.

TABLE 4 Nonport side LED patterns during normal operation

LED name	LED color	Status of hardware	Recommended action
Power supply and fan assembly status (green)	No light	Power supply and fan assembly is not receiving power or is off.	Verify the power supply and fan assembly is on and seated and the power cord is connected to a functioning power source.
	Steady green	Power supply and fan assembly is operating normally.	No action required.
	Flashing green	Power supply and fan assembly is faulty. **Note:** When the switch is first powered on the power supply and fan assembly status LED will show flashing green until POST has completed.	Check the power cable connection. Verify that the power supply and fan assembly is powered on. Replace the power supply and fan assembly FRU.

POST and boot specifications

When the switch is turned on or rebooted, the switch performs 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 **diagDisablePost** command to persistently disable POST.

For more information about these commands, refer to the *Fabric OS Command Reference Manual* .

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 universal 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 LED patterns on page 31 for descriptions and interpretations of LED patterns. If one or more LEDs do not display a healthy state, verify that the LEDs on the switch are not set to "beacon" by entering the **switchShow** command to detect if beaconing is active.
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 error log for errors. Any errors detected during POST are written to the error log, accessible through the **errShow** command.

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

Brocade 6505 maintenance

The Brocade 6505 is designed for high availability and low failure; it does not require any regular physical maintenance. Maintenance includes running diagnostic tests and checking and replacing field-replaceable units, described in the following sections.

Installing an SFP+ transceiver

The Brocade 6505 only supports Brocade-branded 8 Gbps and 16 Gbps SFP+ optical transceivers. For the Fibre Channel connections, the Brocade 6505 uses SFP+ transceivers that support any combination of Short Wavelength (SWL), Long Wavelength (LWL), and Extended Long Wavelength (ELWL) optical media.

If you use an unqualified transceiver, the **switchShow** command output shows the port in a Mod_Inv state. Fabric OS also logs the issue in the system error log.

Complete the following steps to install an SFP+ transceiver.

1. Making sure that the bail (wire handle) is in the unlocked position, position the optical transceiver so that the key is oriented correctly to the port. Insert the transceiver into the port until it is firmly seated and the latching mechanism clicks; then close the bail.

   The 16 Gbps SFP+ transceivers do not have bails. Use the pull tab on the 16 Gbps SFP+ transceivers to help push the transceiver into the port. Do not push too hard on the tab itself becasue it can bend.

Transceivers are keyed so that they can only be inserted with the correct orientation. If a transceiver does not slide in easily, ensure that it is correctly oriented.

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

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

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

FIGURE 7 Installing a 16 Gbps SFP+ optical transceiver in the upper row port slot

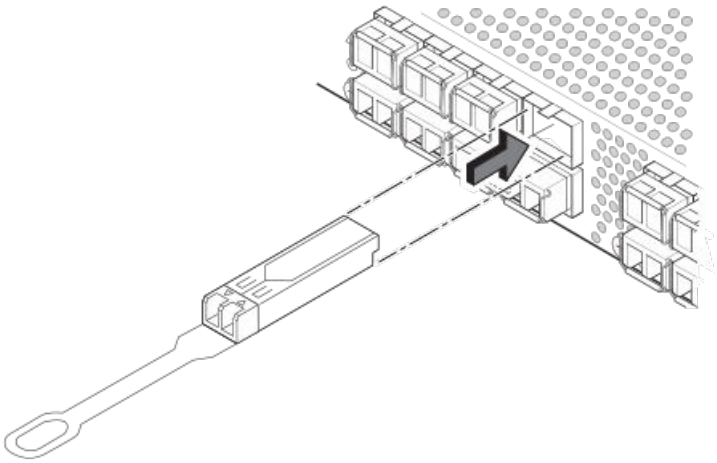
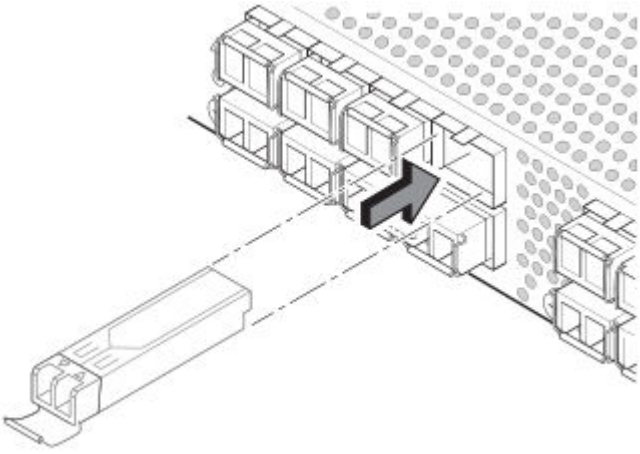


FIGURE 8 Installing an 8 Gbps SFP+ optical transceiver in the upper row port slot



Diagnostic tests

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

The tests are implemented by command, either through a Telnet session or through a 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.

Diagnostic tests run at link speeds of 2, 4, 8, or 16 Gbps depending on the speed of the link being tested and the type of port.

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

For information about specific diagnostic tests, see the *Fabric OS Troubleshooting and Diagnostics Guide* .

Brocade 6505 management

You can use the management functions built into the Brocade 6505 to monitor the fabric topology, port status, physical status, and other information to help you analyze switch performance and to accelerate system debugging.

The Brocade 6505 automatically performs power-on self-test (POST) each time it is turned on. Any errors are recorded in the system error log. For more information about POST, see POST and boot specifications on page 33.

For information about upgrading the version of Fabric OS installed on your switch, see the *Fabric OS Administrator's Guide*.

You can manage the Brocade 6505 using any of the management options listed in the following table. Refer to the *Fabric OS Command Reference Manual* for more information on the CLI commands.

TABLE 5 Management options for the Brocade 6505 switch

Management tool	Out-of-band support	In-band support
Command line interface (CLI) For more information, refer to the *Fabric OS Administrator's Guide* and the *Fabric OS Command Reference Manual* .	Ethernet or serial connection	IP over Fibre Channel
Brocade Web Tools For information, refer to the *Web Tools Administrator's Guide* .	Ethernet or serial connection	IP over Fibre Channel
Standard SNMP applications For information, refer to the *MIB Reference Manual* .	Ethernet or serial connection	IP over Fibre Channel

TABLE 5 Management options for the Brocade 6505 switch (Continued)

Management tool	Out-of-band support	In-band support
Management Server For information, refer to the *Fabric OS Administrator's Guide* and the *Fabric OS Command Reference Manual* .	Ethernet or serial connection	Native in-band interface(over HBA only)
Brocade Network Advisor For information, refer to the Brocade Network Advisor documentation set.	Ethernet or serial connection	IP over Fibre Channel

Removal and Replacement of Power Supplies and Fans

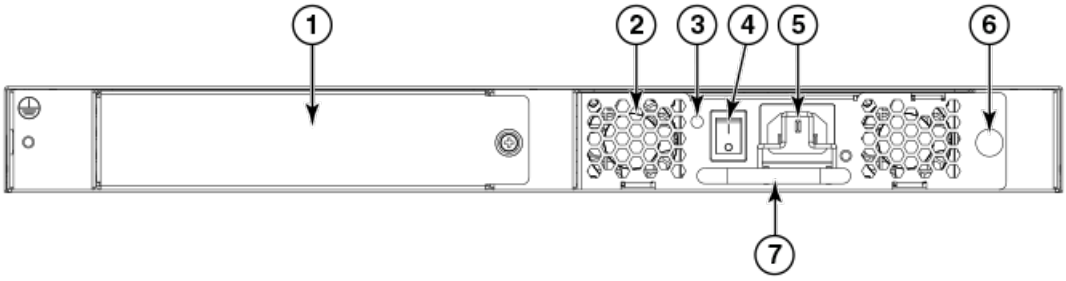
Power supply and fan assembly information

NOTE
Read the Installation and safety considerations on page 15 before servicing.

The field-replaceable units (FRUs) in the Brocade 6505 can be removed and replaced without special tools. The Brocade 6505 can continue operating during the FRU replacement if the conditions specified in the procedure are followed.

The base model Brocade 6505 has one power supply and fan assembly, as displayed in the following figure. Fabric OS identifies the assemblies from right to left on the nonport side. Even though they are contained within a single unit, the power supply and fan components are identified separately. In the **chassisShow** command they are identified as Power Supply Unit:1 and Fan Unit:1.

FIGURE 9 Non-port side of the Brocade 6505



1. Filler panel over FRU bay #2
2. Power supply and fan assembly #1
3. Power supply and fan assembly LED
4. On/off switch
5. Power plug receptacle (with plug retainer)
6. Thumbscrew
7. Handle

NOTE
The Brocade 6505 has a flexible fan policy. In a switch with two power supply and fan assemblies installed, if FRU #2 (on the left when viewed from the non-port side of the switch) is removed, the fan speed in FRU #1 does NOT accelerate to high speed. However, if FRU #1 is removed, the fan speed in FRU #2 DOES accelerate to high speed.

NOTE
Do not disassemble any part of the power supply or fan assembly. There are no user-serviceable parts inside the power supply and fan assembly.

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

NOTE
If you are using two power supply and fan assemblies, maintain both power supply and fan assemblies in operational condition to provide redundancy.

The cooling system relies on pressurized air; if you are using redundant power supply and fan assemblies, do not leave either of the power supply and fan assembly slots empty longer than two minutes when the Brocade 6505 is operating. If one power supply and fan assembly fails, leave the power supply and fan assembly in the Brocade 6505 until it can be replaced.

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

Removing and replacing a power supply and fan assembly

The Brocade 6505 fans are fixed inside the combined power supply and fan assembly to provide necessary airflow to cool the entire system. There are two fans located in each power supply and fan assembly. The system software sets fan speed and measures the speed through the tachometer interface.

The following table describes the power supply and fan assembly status LED colors, behaviors, and actions required, if any.

TABLE 6 Power supply and fan assembly status LED behavior, description, and required actions

LED color	Description	Action required
No light	Power supply and fan assembly is not receiving power, or is off.	Verify that the power supply and fan assembly is on and seated and the power cord is connected to a functioning power source.
Steady green	Power supply and fan assembly is operating normally.	No action is required.

TABLE 6 Power supply and fan assembly status LED behavior, description, and required actions (Continued)

LED color	Description	Action required
Flashing green (for more than 5 seconds)	Power supply and fan assembly is faulty for one of the following reasons: • The assembly is switched off - flashing for ~ 5 seconds, then off • The power cable is disconnected - flashing for ~ 5 seconds, then off • The power supply and fan assembly has failed NOTE: When the Brocade 6505 is first powered on, the power supply and fan assembly status LED will flash until POST has completed.	Try one of the following: • Check the power cable connection. • Verify that the assembly is powered on. • Replace the power supply and fan assembly.

Determining the need to replace a power supply and fan assembly

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

- Check the power supply and fan assembly status LED next to the on/off switch (refer to LED locations on page 30).
- In Web Tools, click the **Power Status** icon.
- Enter the **psShow** command at the prompt to display power supply and fan assembly status in the following example:

```
br6505:admin> psshow
Power Supply #1 is OK
Power Supply #2 is absent
br6505:admin>
```

Alternatively, you can enter the **fanShow** or **chassisShow** commands to determine the status of the power supply and fan assembly:

```
br6505:admin> fanshow
Fan 1 is OK, speed is 8653 RPM
Fan 2 is absent
br6505:admin>
br6505:admin> chassisshow
FAN  Unit: 1
Fan Direction:          Forward
Time Awake:             0 days

POWER SUPPLY  Unit: 1
Power Source:           AC
Time Awake:             0 days
Power Supply #1 is OK
Power Supply #2 is absent
<additional output truncated>
br6505:admin>
```

Time and items required

Replacing a power supply and fan assembly in the Brocade 6520 should require less than two minutes to complete.

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

- New power supply and fan assembly
- A #1 Phillips screwdriver

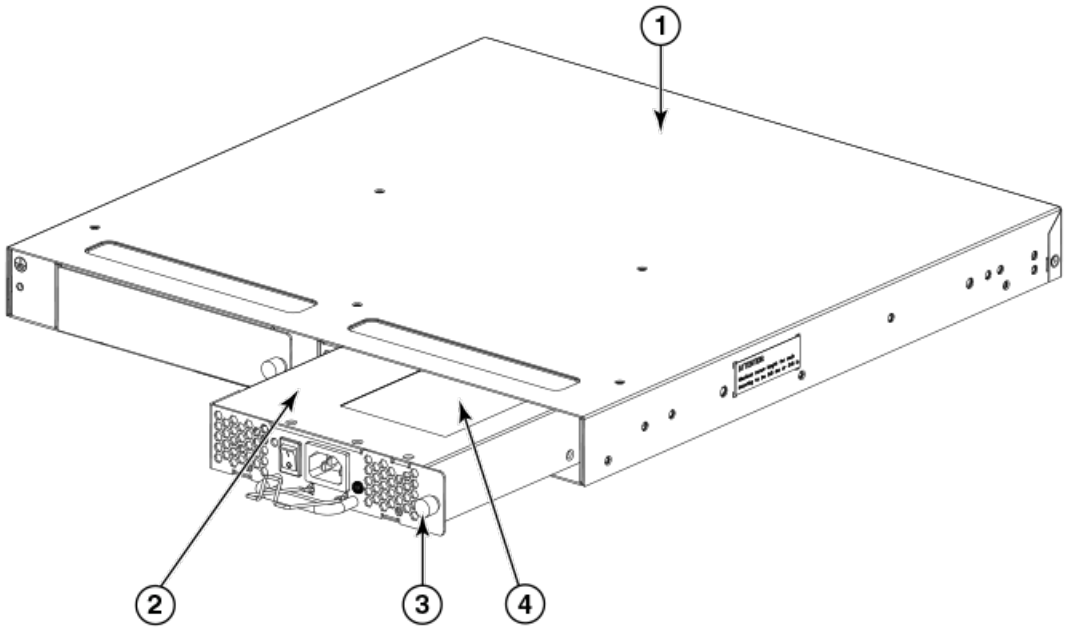
Removing a power supply and fan assembly

Complete the following steps to remove a combined power supply and fan assembly from a Brocade 6505.

1. If the Brocade 6505 has only one power supply and fan assembly, then the switch must be powered off prior to replacing the assembly. If the Brocade 6505 has two power supply and fan assemblies installed, verify that the other power supply and fan assembly (the one not being replaced) has been powered on for at least four seconds and has a steady green LED.
2. If the Brocade 6505 has two power supply and fan assemblies, skip to step 3. If the Brocade 6505 has only one power supply and fan assembly, enter the **sysShutDown** command before powering off the assembly to maintain the reliability of the system.
3. Power off the assembly to be replaced by switching the AC power switch to the **O** symbol.

   If the Brocade 6505 has two power supply and fan assemblies,the fans in the second power supply will automatically switch to high speed to maintain adequate cooling.
4. Unplug the power cord from the power supply and fan assembly that is being replaced.
5. Using a Phillips screwdriver, unscrew the captive screw.
6. Remove the power supply and fan assembly from the chassis by pulling the handle out and away from the chassis.
7. Note the part number on the assembly just removed.

FIGURE 10 Inserting the power supply and fan assembly into the switch



1. Brocade 6505 chassis
2. Power supply and fan assembly
3. Captive screw
4. Product labels

Replacing a power supply and fan assembly

Complete the following steps to replace a combined power supply and fan assembly in a Brocade 6505.

CAUTION

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

1. Ensure that the new power supply and fan assembly has the same part number as the power supply and fan assembly being replaced.
2. Orient the new power supply and fan assembly with the captive screw on the right, as shown in the figure.

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

CAUTION

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

3. Gently push the power supply and fan assembly into the chassis until it is firmly seated.
4. Using the Phillips screwdriver, secure the power supply and fan assembly to the chassis by tightening in the captive screw.
5. Plug the power cord into the power supply and fan assembly and power on the unit by switching the AC power switch to the I symbol.
6. Verify that the LED on the new power supply and fan assembly displays a steady green light while the Brocade 6520 is operating. If the LED is not a steady green, ensure that the power supply is securely installed and seated properly.
7. Optionally, if using the command line interface (CLI), enter the **psShow** command at the command line prompt to display the status. You can also use the **fanShow** or **chassisShow** commands. Power supply and fan assembly status can also be viewed using the Web Tools application.

Adding a second power supply and fan assembly in a Brocade 6505

Since the base model of the Brocade 6505 has only one power supply and fan assembly, you can add a second assembly to provide power and cooling redundancy.

Time and items required

Replacing a power supply and fan assembly in the Brocade 6505 should require less than two minutes to complete.

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

- New power supply and fan assembly
- A #1 Phillips screwdriver

Installing a second power supply and fan assembly

Complete the following steps to install a second power supply and fan assembly in a Brocade 6505.

1. Using the #1 Phillips screwdriver, remove the filler panel covering the second bay on the non-port side of the switch.
2. Orient the new power supply and fan assembly with the captive screw on the right, as shown in Removing a power supply and fan assembly on page 42. The figure shows the installation of the assembly in bay 1 of the switch which is similar to installing it in bay 2.

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

CAUTION

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

3. Gently push the power supply and fan assembly into the chassis until it is firmly seated.
4. Using the Phillips screwdriver, secure the power supply and fan assembly to the chassis by tightening in the captive screw.
5. Plug the power cord into the power supply and fan assembly and into the socket of your power source.
6. Power on the unit by switching the AC power switch to the **I** symbol.
7. Verify that the LED on the new power supply and fan assembly displays a steady green light while the Brocade 6505 is operating. If the LED is not a steady green, ensure that the power supply is securely installed and seated properly.
8. Optionally, if using the command line interface (CLI), enter the **psShow** command at the command line prompt to display the status. You can also use the **fanShow** or **chassisShow** commands. Power supply and fan assembly status can also be viewed using the Web Tools application.
9. After installing the second power supply and fan assembly, Brocade recommends that you change the *switchstatus* policy settings for power supplies and fans to the following in order to enable the call home feature if one power supply goes down:

```
switch.status.policy.PowerSupplies.down = 1
switch.status.policy.PowerSupplies.marginal = 0
switch.status.policy.Fans.down:1
switch.status.policy.Fans.marginal:0
```

   For more details on executing the **switchStatusPolicyShow** and **switchStatusPolicySet** commands,please refer to the *Brocade Fabric OS Command Reference Manual* .

Brocade 6505 Switch Technical Specifications

This document highlights the features and specifications for the Brocade 6505 switch.

System specifications

System component	Description
Enclosure	1U, back-to-front airflow (port-side exhaust), power from back
Power inlet	C14
Power supplies	Base switch includes a single, hot-swappable power supply with integrated system cooling fans; optional dual redundant hot-swappable power supply
Fans	Two fans per FRU
Cooling	Integrated system cooling; back-to-front airflow (port-side exhaust)
System architecture	Nonblocking shared memory switch
System processors	PowerPC 440EPx @ 667 MHz

Fibre Channel

System component	Description
Fibre Channel ports	Switch mode (default): 12- and 24-port configurations (12-port increment through Ports on Demand [PoD] license); E, F, M, D ports. Brocade Access Gateway default port mapping: 16 F_Ports, 8 N_Ports
ANSI Fibre Channel protocol	FC-PH (Fibre Channel Physical and Signalling Interface standard)
Modes of operation	Fibre Channel Class 2 and Class 3
Fabric initialization	Complies with FC-SW-3 Rev. 6.6
FCIP (IP over Fibre Channel)	Complies with FC-IP 2.3 of FCA profile
Port Status	Bicolor LED (green/amber)

Ethernet

System component	Description
Ethernet management port	RJ-45

LEDs

System component	Description
System power LED	One power status LED (lower) on the left side.
System status LED	One system status LED (upper) on the left side.
Ethernet port LED	Two Ethernet port LEDs (one amber, one green).
FC port status LED	One bicolor (green and amber) port status LED for each port on the switch. These LEDs are arrayed above each pair of Fibre Channel ports.
Fan assembly LED	One power supply and fan assembly LED above the AC power switch on each power supply on the non-port side of the switch.

Weight and physical dimensions

Fully loaded Brocade 6505 switch: One power supply and fan assembly, and no SFP+ transceivers installed.

Model	Height	Width	Depth	Weight
Brocade 6505 switch	4.3 cm	43.8 cm	44.3 cm	7.82 kg
	1.7 in	17.2 in	17.4 in	17.25 lb

Environmental requirements

Condition	Operational	Non-operational
Ambient temperature	0°C to 40°C (32°F to 104°F)	-25°C to 70°C (-13°F to 158°F)
Relative humidity (non-condensing)	10% to 85% at 40°C (104°F)	10% to 90% at 70ºC (158ºF)
Altitude (above sea level)	0 to 3000 m (10,000 feet)	0 to 12000 m (40,000 feet)
Shock	20 G, 6 ms, half-sine wave	33 G, 11 ms, half-sine wave, 3/eg Axis

Condition	Operational	Non-operational
Vibration	0.5 G sine, 0.4 gms random, 5-500 Hz	2.0 G sine, 1.1 gms random, 5-500 Hz
Airflow	Two power supply and fan assemblies • Maximum - 35.70 cmh (21 cfm) • Nominal - 16.99 cmh (10 cfm) One power supply and fan assembly • Maximum - not available • Nominal - not available NOTE: Airflow is port-side exhaust.	N/A
Heat dissipation	338 BTU/hr (24-port configuration)	N/A

Power supply specifications (per PSU)

Power supply model	Maximum output power rating (DC)	Input voltage	Input line frequency	Maximum input current	Input line protection	Maximum inrush current
XBR-5100-0001	150 W	100 - 240 VAC (nominal) 85 - 264 VAC (range)	50/60 Hz (nominal) 47/63 Hz (range)	2.5 A	AC lines are fused.	Maximum of 35 A @ 240 VAC for 10 ms or less.

Power consumption

Idle, no optics: 60 W

Maximum, fully populated with 16 Gbps SWL optics: 80 W

Data port specifications (Fibre Channel)

Name	Number	Description
Brocade 6505 switch	12 or 24	Fibre Channel ports in the Brocade 6505 switch are compatible with SWL, LWL, and ELWL SFP+ transceivers (for 16-Gbps performance).

Fibre Channel data transmission ranges

Port speed (Gbps)	Cable size (microns)	Short wavelength (SWL)	Long wavelength (LWL)	Extended long wavelength (ELWL)
1	50	500 m (1,640 ft) (OM2) 860 m (2,821 ft) (OM3)	N/A	N/A
	62.5	300 m (984 ft)	N/A	N/A
	9	N/A	10 km (6.2 miles)	80 km (50 miles)
2	50	300 m (984 ft) (OM2) 500 m (1,640 ft) (OM3)	N/A	N/A
	62.5	150 m (492 ft)	NA	NA
	9	N/A	10 km (6.2 miles)	80 km (50 miles)
4	50	150 m (492 ft) (OM2) 380 m (1,246 ft) (OM3)	N/A	N/A
	62.5	70 m (230 ft)	N/A	N/A
	9	N/A	10 km (6.2 miles)	N/A
8	50	50 m (164 ft) (OM2) 150 m (492 ft) (OM3)	N/A	N/A
	62.5	21 m (69 ft)	N/A	N/A
	9	N/A	10 km (6.2 miles)	N/A
16	50	N/A	N/A	N/A
	62.5	21 m (69 ft)	N/A	N/A
	9	N/A	10 km (6.2 miles)	N/A

Serial port specifications (pinout RJ-45)

Pin	Signal	Description
1	Not supported	N/A

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

Serial port specifications (protocol)

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

Memory specifications

Memory	Type	Size
Main Memory	SODIMM DDR2 64-bit bus operating at 166 MHz with 8-bit ECC	1 GB
Boot Flash		4 MB
Compact Flash		1 GB

Regulatory compliance (EMC)

- FCC Part 15, Subpart B (Class A)
- EN 55022 (CE mark) (Class A)
- EN 55024 (CE mark) (Immunity) for Information Technology Equipment

- ICES-003 (Canada) (Class A)
- AS/NZ 55022 (Australia) (Class A)
- VCCI (Japan) (Class A)
- EN 61000-3-2
- EN 61000-3-3
- EN 61000-6-1

Regulatory compliance (safety)

- CAN/CSA-C22.2 No. 60950-1-07/UL60950-1 - Safety of Information Technology Equipment
- EN 60825-1 Safety of Laser Products - Part 1: Equipment Classification, Requirements and User's Guide
- EN 60825-2 Safety of Laser Products - Part 2: Safety of Optical Fibre Communications Systems
- EN 60950-1, IEC 60950-1 Safety of Information Technology Equipment

Regulatory compliance (environmental)

- 2011/65/EU - Restriction of the use of certain hazardous substance in electrical and electronic equipment (EU RoHS)
- 2012/19/EU - Waste electrical and electronic equipment (EU WEEE)
- 94/62/EC - packaging and packaging waste (EU)
- 2006/66/EC - batteries and accumulators and waste batteries and accumulators (EU battery directive)
- 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (EU REACH)
- Section 1502 of the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 - U.S. Conflict Minerals
- 30/2011/TT-BCT - Vietnam circular
- SJ/T 11363-2006 Requirements for Concentration Limits for Certain Hazardous Substances in EIPs (China)
- SJ/T 11364-2006 Marking for the Control of Pollution Caused by EIPs (China)

Regulatory Statements

BSMI statement (Taiwan)

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

Warning:

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

Canadian requirements

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

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

CE Statement

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

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

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

China CC 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	[illegible]
	蒙古文	"ཚ་བའི་ས་ཁུལ་གྱི་གནམ་གཤིས་མིན་པའི་ས་ཁུལ་ཁོ་ནར་ཉེན་མེད་བེད་སྤྱོད་བྱས་འཇུག།"
	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 [illegible]
	蒙古文	"རྒྱ་མཚོའི་ངོས་ལས་མཐོ་ཚད་སྨི2000མན་གྱི་ས་ཁུལ་ཁོ་ནར་ཉེན་མེད་བེད་སྤྱོད་བྱས་འཇུག།"
	壮文	Dan hab yungh youq gij digih haijbaz 2000m doxroengz haenx ancienz sawjyungh.
	维文	دېڭىز يۈزىدىن 2000 مېتىر 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.

China ROHS

Refer to the latest revision of the China ROHS document (P/N 53-1000428-xx) which ships with the product.

FCC warning (US only)

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

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

Germany

Machine noise information regulation - 3. GPSGV, the highest sound pressure level value is 70.0 dB(A) in accordance with EN ISO 7779.

Maschinenlärminformations-Verordnung - 3. GPSGV, der höchste Schalldruckpegel beträgt 70.0 dB(A) gemäss EN ISO 7779.

KCC statement (Republic of Korea)

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

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

VCCI statement

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

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

Cautions and Danger Notices

Cautions

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

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

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

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

General cautions

CAUTION

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

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

CAUTION

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

VORSICHT	Stellen Sie sicher, dass an der Vorderseite, den Seiten und an der Rückseite der Luftstrom nicht behindert wird.
MISE EN GARDE	Vérifiez que rien ne restreint la circulation d'air devant, derrière et sur les côtés du dispositif et qu'elle peut se faire librement.

PRECAUCIÓN	Asegúrese de que el flujo de aire en las inmediaciones de las partes anterior, laterales y posterior del instrumento no esté restringido.

CAUTION

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

VORSICHT	Vergewissern Sie sich, dass die Luftstromrichtung des Netzteils der eingebauten Lüftereinheit entspricht. Die Netzteile und Lüftereinheiten sind eindeutig mit einem grünen Pfeil und dem Buchstaben "E" oder einem orangefarbenen Pfeil mit dem Buchstaben "I" gekennzeichnet.
MISE EN GARDE	Veillez à ce que le sens de circulation de l'air du bloc d'alimentation corresponde à celui du tiroir de ventilation installé. Les blocs d'alimentation et les tiroirs de ventilation sont étiquetés d'une flèche verte avec un "E " ou d'une flèche orange avec un " I ".
PRECAUCIÓN	Asegúrese de que la dirección del flujo de aire de la unidad de alimentación se corresponda con la de la bandeja del ventilador instalada. Los dispositivos de alimentación y las bandejas del ventilador están etiquetadas claramente con una flecha verde y una "E" o con una flecha naranja y una "I".

CAUTION

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

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

Electrical cautions

CAUTION

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

VORSICHT	Bevor Sie ein Kabel in einen Anschluss einstecken, entladen Sie jegliche im Kabel vorhandene elektrische Spannung, indem Sie mit den elektrischen Kontakten eine geerdete Oberfläche berühren.

MISE EN GARDE	Avant de brancher un câble à un port, assurez-vous de décharger la tension du câble en reliant les contacts électriques à la terre.
PRECAUCIÓN	Antes de conectar un cable en cualquier puerto, asegúrese de descargar la tensión acumulada en el cable tocando la superficie de conexión a tierra con los contactos eléctricos.

CAUTION

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

VORSICHT	Statische Elektrizität kann das System und andere elektronische Geräte beschädigen. Um Schäden zu vermeiden, entnehmen Sie elektrostatisch empfindliche Geräte erst aus deren antistatischer Schutzhülle, wenn Sie bereit für den Einbau sind.
MISE EN GARDE	L'électricité statique peut endommager le châssis et les autres appareils électroniques. Pour éviter tout dommage, conservez les appareils sensibles à l'électricité statique dans leur emballage protecteur tant qu'ils n'ont pas été installés.
PRECAUCIÓN	La electricidad estática puede dañar el chasis y otros dispositivos electrónicos. A fin de impedir que se produzcan daños, conserve los dispositivos susceptibles de dañarse con la electricidad estática dentro de los paquetes protectores hasta que esté listo para instalarlos.

CAUTION

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

VORSICHT	Falls kein Modul oder Netzteil im Steckplatz installiert wird, muss die Steckplatztafel angebracht werden. Wenn ein Steckplatz nicht abgedeckt wird, läuft das System heiß.
MISE EN GARDE	Si vous n'installez pas de module ou de bloc d'alimentation dans un slot, vous devez laisser le panneau du slot en place. Si vous faites fonctionner le châssis avec un slot découvert, le système surchauffera.
PRECAUCIÓN	Si no instala un módulo o un fuente de alimentación en la ranura, deberá mantener el panel de ranuras en su lugar. Si pone en funcionamiento el chasis con una ranura descubierta, el sistema sufrirá sobrecalentamiento.

CAUTION

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

VORSICHT	Beachten Sie mechanischen Führungen an jeder Seite des Netzteils, das ordnungegemäß in die Führungen gesteckt werden muss. Das Netzteil darf niemals umgedreht eingesteckt werden.

MISE EN GARDE	Suivez attentivement les repères mécaniques de chaque côté du slot du bloc d'alimentation et assurez-vous que le bloc d'alimentation est bien inséré dans les repères. N'insérez jamais le bloc d'alimentation à l'envers.
PRECAUCIÓN	Siga cuidadosamente las guías mecánicas de cada lado de la ranura del suministro de energía y verifique que el suministro de energía está insertado correctamente en las guías. No inserte nunca el suministro de energía de manera invertida.

CAUTION

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

VORSICHT	Der Schalter des Netzteils muss in der Stellung „Aus“ stehen, wenn das Netzteil in das Gehäuse eingesetzt wird. Wenn ein spannungsführendes Netzteil (Schalterstellung "Ein") eingebaut wird, kann dies zu Beschädigungen am Switch führen.
MISE EN GARDE	Le commutateur d'alimentation doit être en position d'arrêt lorsque vous insérez la source d'alimentation dans le châssis. Si une source d'alimentation sous tension est installée, des dommages peuvent être causés.
PRECAUCIÓN	El interruptor de la fuente de alimentación debe estar en la posición de apagado en el momento de introducirla en el chasis. El conmutador puede resultar dañado si se instala una fuente de alimentación activa.

Danger Notices

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

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

Un paragraphe Danger indique des conditions ou des situations potentiellement mortelles ou extrêmement dangereuses. Des labels de sécurité sont posés directement sur le produit et vous avertissent de ces conditions ou situations

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

Electrical dangers

DANGER

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

GEFAHR	Aus Sicherheitsgründen sollte ein EGB-Armband zum Schutz von elektronischen gefährdeten Bauelementen mit einem 1 Megaohm-Reihenwiderstand ausgestattet sein.
DANGER	Pour des raisons de sécurité, la dragonne ESD doit contenir une résistance de série 1 méga ohm.
PELIGRO	Por razones de seguridad, la correa de muñeca ESD deberá contener un resistor en serie de 1 mega ohmio.

DANGER

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

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

DANGER

Remove both power cords before servicing.

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

DANGER

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

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

DANGER

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

GEFAHR	Das eingeschaltete Gerät darf nicht geöffnet werden, da andernfalls das Risiko eines Stromschlags mit Hochspannung besteht.
DANGER	Afin d'éviter tout choc électrique, n'ouvrez pas l'appareil lorsqu'il est sous tension.
PELIGRO	Para evitar una descarga de alto voltaje, no abra el dispositivo mientras esté encendido.

DANGER

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

GEFAHR	Es besteht Explosionsgefahr, wenn ein unzulässiger Batterietyp eingesetzt wird. Verbrauchte Batterien sind entsprechend den geltenden Vorschriften zu entsorgen.
DANGER	Risque d'explosion en cas de remplacement de la pile par un modèle incorrect. Débarrassez-vous des piles usagées conformément aux instructions.
PELIGRO	Riesgo de explosión si se sustituye la batería por una de tipo incorrecto. Deshágase de las baterías usadas de acuerdo con las instrucciones.

Dangers related to equipment weight

DANGER

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

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