IBM System Networking RackSwitch G8000

IBM

Installation Guide

IBM System Networking RackSwitch G8000

Installation Guide

Note: Before using this information and the product it supports, read the *Warranty Information* document, Appendix B, "Notices," on page 59 and the *Important Notices* document. Read the IBM *System Safety Notices* document and the *License Agreement for Machine Code (LAMC)* document on the IBM *Documentation* CD. Read the *IBM Systems Environmental Notices and Users Guide* document on the *Environmental Notices* CD.

Safety

Before installing this product, read the Safety Information.

<div dir="rtl">قبل تركيب هذا المنتج، يجب قراءة الملاحظات الآمنية</div>

Antes de instalar este produto, leia as Informações de Segurança.

在安裝本产品之前，请仔细阅读 Safety Information
(安全信息)。

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

Ennen kuin asennat tämän tuotteen, lue turvaohjeet kohdasta Safety Information.

Avant d'installer ce produit, lisez les consignes de sécurité.

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

Πριν εγκαταστήσετε το προϊόν αυτό, διαβάστε τις πληροφορίες ασφάλειας
(safety information).

<div dir="rtl">לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.</div>

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

Prima di installare questo prodotto, leggere le Informazioni sulla Sicurezza.

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

Пред да се инсталира овој продукт, прочитајте информацијата за безбедност.

ᠪᠦᠲᠦᠭᠡᠭᠳᠡᠬᠦᠨ

Les sikkerhetsinformasjonen (Safety Information) før du installerer dette produktet.

Przed zainstalowaniem tego produktu, należy zapoznać się
z książką "Informacje dotyczące bezpieczeństwa" (Safety Information).

Antes de instalar este produto, leia as Informações sobre Segurança.

Перед установкой продукта прочтите инструкции по
технике безопасности.

Pred inštaláciou tohto zariadenia si pečítaje Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

Antes de instalar este producto, lea la información de seguridad.

Läs säkerhetsinformationen innan du installerar den här produkten.

ཐོན་རྫས་འདི་བདེ་སྐྱེད་མ་བྱས་གོང་། སྐོར་གྱི་ཡིད་གཟབ་
བྱ་འདུ་མིན་ཡོད་པའི་འོད་སྟེར་བལྟ་དགོས།

Bu ürünü kurmadan önce güvenlik bilgilerini okuyun.

مهزكۆر مەھسۇلاتنى ئورنتشتىن بۇرۇن بىخەتەرلىك ئۇچۇرلىرىنى ئوقۇپ چىقىڭ.

Youq mwngz yungh canjbinj neix gaxgonq, itdingh aeu doeg aen
canjbinj soengq cungj vahgangj ancien siusik.

Important:

Each caution and danger statement in this document is labeled with a
number. This number is used to cross reference an English-language
caution or danger statement with translated versions of the caution or
danger statement in the *Systems Safety Notices* document.

For example, if a caution statement is labeled "D005," translations for
that caution statement are in the *Systems Safety Notices* document
under "D005."

Be sure to read all caution and danger statements in this document
before you perform the procedures. Read any additional safety
information that comes with the switch or optional device before you
install the device.

DANGER

> **Hazardous voltage, current, or energy levels are present inside any
> component that has this label attached. Do not open any cover or barrier
> that contains this label.**

(L001)

DANGER

> **Rack-mounted devices are not to be used as shelves or work spaces.**
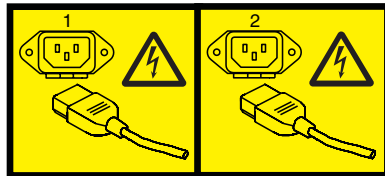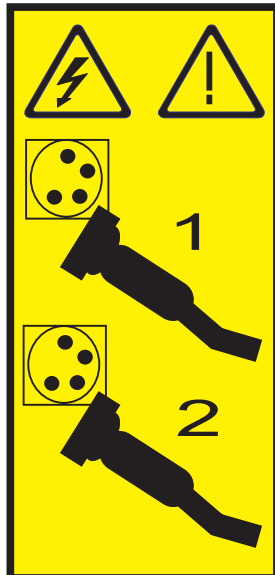
(L002)

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords.

(L003)

or

DANGER

An electrical outlet that is not correctly wired could place hazardous voltage on the metal parts of the system or the devices that attach to the system. It is the responsibility of the customer to ensure that the outlet is correctly wired and grounded to prevent an electrical shock. (D004)

DANGER

When working on or around the system, observe the following precautions:

Electrical voltage and current from power, telephone, and communication cables are hazardous. To avoid a shock hazard:
- Connect power to this unit only with the IBM® provided power cord. Do not use the IBM provided power cord for any other product.
- Do not open or service any power supply assembly.
- Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.
- The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords.
- Connect all power cords to a properly wired and grounded electrical outlet. Ensure that the outlet supplies proper voltage and phase rotation according to the system rating plate.
- Connect any equipment that will be attached to this product to properly wired outlets.
- When possible, use one hand only to connect or disconnect signal cables.
- Never turn on any equipment when there is evidence of fire, water, or structural damage.
- Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.
- Connect and disconnect cables as described in the following procedures when installing, moving, or opening covers on this product or attached devices.

  To disconnect:
  1. Turn off everything (unless instructed otherwise).
  2. Remove the power cords from the outlets.
  3. Remove the signal cables from the connectors.
  4. Remove all cables from the devices.

  To connect:
  1. Turn off everything (unless instructed otherwise).
  2. Attach all cables to the devices.
  3. Attach the signal cables to the connectors.
  4. Attach the power cords to the outlets.
  5. Turn on the devices.
- Sharp edges, corners and joints may be present in and around the system. Use care when handling equipment to avoid cuts, scrapes and pinching.

(D005)

CAUTION:
Ensure the building power circuit breakers are turned off BEFORE you connect the power cord or cords to the building power. (C023)

CAUTION:
This product might contain one or more of the following devices: CD-ROM drive, DVD-ROM drive, DVD-RAM drive, or laser module, which are Class 1 laser products. Note the following information:

- **Do not remove the covers. Removing the covers of the laser product could result in exposure to hazardous laser radiation. There are no serviceable parts inside the device.**
- **Use of the controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.**

(C026)

CAUTION:
Data processing environments can contain equipment transmitting on system links with laser modules that operate at greater than Class 1 power levels. For this reason, never look into the end of an optical fiber cable or open receptacle. (C027)

CAUTION:
This product contains a Class 1M laser. Do not view directly with optical instruments. (C028)

CAUTION:

To reduce the risk of electric shock or energy hazards:

*   **This equipment must be installed by trained service personnel in a restricted-access location, as defined by teh NEC and IEC 60950, The Standard for Safety of Information Technology Equipment.**
*   **Connect the equipment to a reliably grounded, safety extra low voltage (SELV) source. An SELV source is a secondary circuit that is designed so that normal and single fault conditions do not cause the voltages to exceed a safe level (60 V direct current).**
*   **The branch circuit overcurrent protection must be rated per the following table.**
*   **Use copper wire conductor only, not exceeding 3 m (9.8 ft.) in length and sized according to the following table.**
*   **Torque the wiring-terminal screws to the values in the following table.**
*   **Incorporate a readily available approved and rated disconnect device in the field wiring.**

(C033)

Table 1. Electrical connections

Circuit breaker rating	Minimum: 20 amps Maximum: 20 amps
Wire size	16 AWG (IBM part number 90Y3538 DC power cable from PDP output to server input) 1.31 mm2
Wiring terminal screw torque	• inch-pounds (IBM part number, 90Y3538, provided with connector, both ends) • newton-meters (Nm)

DANGER

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

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

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

(R001 part 1 of 2)

CAUTION:

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

(R001 part 2 of 2)

Important:

> This product is also designed for IT power distribution systems with phase-to-phase voltage of 230V.

Important:

> Machinenlärminformations-Verordnung - 3. GPSGV, der höchste Shalldruckpegel beträgt 70 dB (A) oder weniger.

Contents

Chapter 1. Introduction

This *Installation Guide* provides information and instructions for installing an IBM System Networking RackSwitch™ G8000. For information about configuration and management of the switch, see the *Command Reference* and the product release notes.

The RackSwitch G8000 is a rackable aggregation switch with unmatched line-rate Layer 2/3 performance. The G8000 uses a wire-speed, non-blocking switching fabric that provides simultaneous wire-speed transport of multiple packets at low latency on all ports.

The G8000 contains forty-eight 1GbE SFP+ ports:

- Forty-four 10/100/1000BaseT ports (RJ-45)
- Four SFP slots

The G8000 includes two port expansion slots for dual-port, 10 GbE uplink modules with SFP+ or CX4 transceivers. One slot is located on the front panel, and one slot is located on the rear panel.

You can manage the switch through the console port, or through a network connection using Telnet, a Web browser-based interface, or SNMP-based network management software.

This 1U switch is rack mountable in either the horizontal or vertical direction, depending on your application.

The switch might have features that are not described in the documentation that comes with the switch, and the documentation might be updated occasionally to include information about those features, or technical updates might be available to provide additional information that is not included in the switch documentation.

If documentation updates are available, you can download them from http://www.ibm.com/supportportal/.

To check for documentation updates,

1. Go to http://www.ibm.com/supportportal/ and click **Documentation**.
2. In the Quick find field enter the name of your product and press Enter.

Note: Changes are made periodically to the IBM website. Procedures for locating documentation might vary slightly from what is described in this document.

The IBM Documentation CD

The IBM *Documentation* CD contains documentation for your switch in Portable Document Format (PDF).

The *Documentation* CD includes the product installation guide, safety document and the license machine access code (LAMC) document. The *Environmental Notices* CD includes the Environmental Notices for the product. To access these documents:

- If you are using a Windows operating system, insert the CD into the CD or DVD drive and from My Computer, double click the CD or DVD drive and select the installation guide that supports your product.

- If you are using a Linux operating system, insert the CD into the CD or DVD drive and run the following command from the `mnt/cd` directory, `sh.linux.sh`. Select the installation guide that supports your product.

Double click on the Installation Guides directory and select the installation guide that supports your product.

Hardware and software requirements

The IBM *Documentation* CD requires the following minimum hardware and software:

- Microsoft Windows NT 4.0 (with Service Pack 3 or later), Windows 2000, or Red Hat Linux.
- 100 MHz microprocessor.
- 32 MB of RAM.
- Adobe Acrobat Reader 3.0 (or later) or xpdf, which comes with Linux operating systems. Acrobat Reader software is required for reading the documentation CD.

Related documentation

- IBM System Networking RackSwitch G8000 *Application Guide*
- IBM System Networking RackSwitch G8000 *Menu-based Command Reference*
- IBM System Networking RackSwitch G8000 *ISCLI–Industry Standard CLI Command Reference*
- IBM System Networking RackSwitch G8000 *BBI Quick Guide*

Notices and statements in this document

The caution and danger statements in this document are also in the multilingual *Safety Information* document, which is on the IBM *Documentation* CD. Each statement is numbered for reference to the corresponding statement in the *Safety Information* document.

The following notices and statements are used in this document:

- **Note:** These notices provide important tips, guidance, or advice.
- **Important:** These notices provide information or advice that might help you avoid inconvenient or problem situations.
- **Attention:** These notices indicate potential damage to programs, devices, or data. An attention notice is placed just before the instruction or situation in which damage could occur.
- **Caution:** These statements indicate situations that can be potentially hazardous to you. A caution statement is placed just before the description of a potentially hazardous procedure step or situation.
- **Danger:** These statements indicate situations that can be potentially lethal or extremely hazardous to you. A danger statement is placed just before the description of a potentially lethal or extremely hazardous procedure step or situation.

RackSwitch G8000 features

This section provides an overview of RackSwitch G8000 features.

Performance
- 176 Gbps throughput (full duplex), non-blocking switching architecture
- 100% line rate
- Deterministic port-to-port latency under 3 microseconds with 64 B packets

Management Features
- Clients
  - Industry standard command-line interface (ISCLI)
  - Browser-based Interface (BBI)
  - System Networking Switch Center
- Protocols
  - SNMP v1, v2, v3
  - Remote Monitoring (RMON)
  - Network Time Protocol (NTP) support
  - DHCP
- Software upgrades
  - Dual software images
  - Upgrade via serial, browser, or TFTP

Software Features
- Security
  - Secure interface login and password
  - RADIUS and TACACS+
  - SSHv2
  - HTTPS Secure Browser-based interface
  - Wire-speed filtering with Access Control Lists (ACLs)
- Layer 2
  - 1024 VLANs (802.1Q), including Private VLANs
  - Multi-link trunking, compatible with Cisco EtherChannel
  - Multiple with LACP (IEEE 802.3ad)
  - Spanning Tree (802.1D), Multiple Spanning Tree (802.1s), Rapid Spanning Tree (802.1w), with Fast Uplink Convergence
  - 16 K forwarding database entries
- Layer 3
  - Dynamic routing
    - RIP v1, v2
    - OSPF
    - BGP
  - 128 configurable interfaces (static or DHCP)
  - DHCP Relay
  - IP forwarding
  - IGMP Snooping v1, v2, v3
  - 4 K ARP entries

   – IPv6 host management
- Quality of service
  - 802.1p priority queues
  - Differentiated Services Code Point (DSCP) support
- Availability
  - Layer 2 failover
  - VRRP

Major components

This section describes the RackSwitch G8000 hardware components.

Hardware options

The following list provides an overview of G8000 hardware:
- Switch unit
- Mounting hardware
  - Standard 2-post rack mounting brackets and screws
  - IBM iDataPlex® rack mounting brackets and screws
  - IBM System Networking Adjustable 19" 4-post rail mounting brackets and screws (for Power and System x racks that must be purchased separately)
- Optional uplink modules (purchased separately)
  - SFP+ uplink module (2 ports)
  - CX4 uplink module (2 ports)

Switch unit

The RackSwitch G8000 switch unit is a 1U rack-mountable Gigabit Ethernet switch. You can mount the G8000 in either the horizontal or vertical direction.

The RackSwitch G8000 allows for flexible mounting of the switch, as follows:
- RackSwitch G8000 (front-to-rear) provides front-to-rear airflow.
- RackSwitch G8000 (rear-to-front) provides rear-to-front airflow.

The DC powered RackSwitch G8000 provides front-to-rear airflow.

Ports

The switch unit contains the following ports:
- Forty-four 10/100/1000BaseT ports (RJ-45)
- Four SFP ports

The following illustrations show the ports and controls on the front and rear of the G8000 switch.
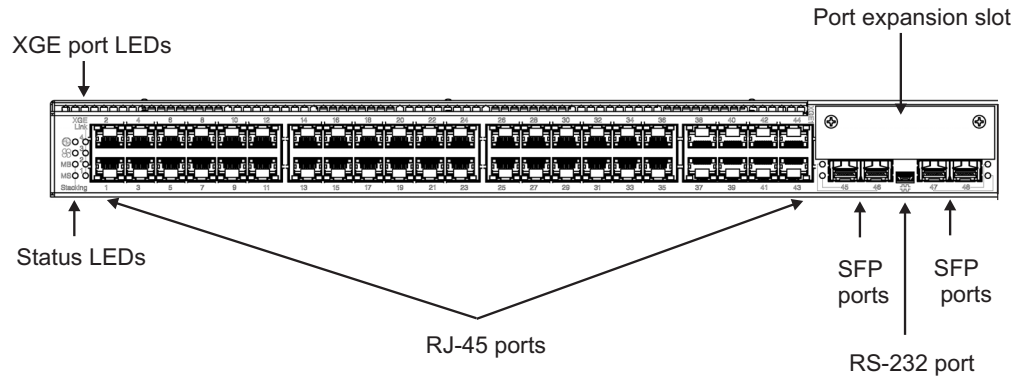
Figure 1. IBM RackSwitch G8000 front panel

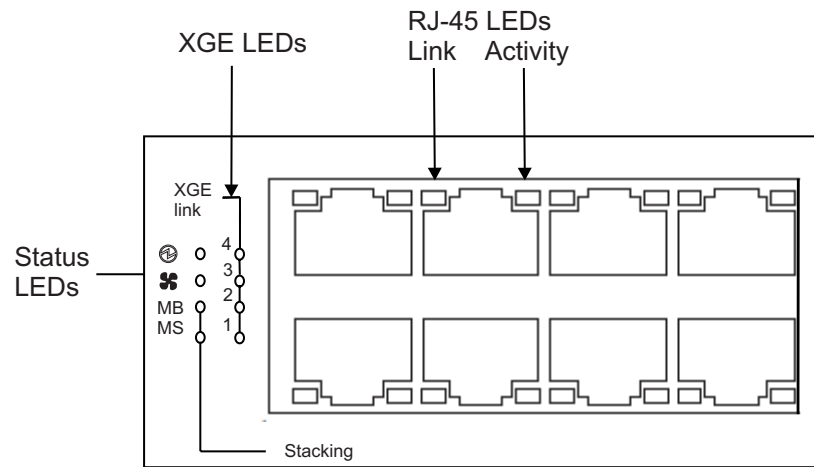*Figure 2. IBM RackSwitch G8000 front panel detail*
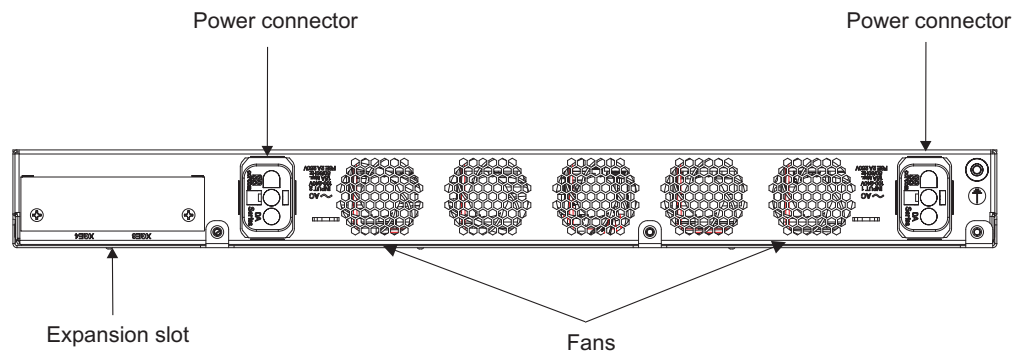
Figure 3. IBM RackSwitch G8000 rear panel

Fans

Up to five internal fans cool the switch unit. If an individual fan fails, the other fans continue to run, and the switch unit continues to operate normally. Fans are not customer replaceable.

Note: If a fan module fails, the maximum operating temperature drops from 40°C to 35°C (104°F to 95°F).

The Fan LED flashes if there is a failure of one or more fan modules.

AC power supply

The switch has two redundant 150 W AC power supplies. Each internal power supply has an individual IEC 320 power connector on the rear panel. The power cord attaches to a universal grounded AC power source. You can replace a hot-swap power supply module without powering off the switch or disrupting switch functions.

DANGER

> **An electrical outlet that is not correctly wired could place hazardous voltage on the metal parts of the system or the devices that attach to the system. It is the responsibility of the customer to ensure that the outlet is correctly wired and grounded to prevent an electrical shock. (D004)**

Each power supply can be connected to a separate AC circuit to mitigate the risk of down time during a power failure. When used in a redundant configuration, the dual power supplies have a load-sharing capability that enables each power supply to operate at approximately 50% of full load. Using redundant power can minimize the power disruption during a power supply failure and extend the expected lifetime of each power supply by operating normally in a conservative power mode.

There is no power switch on the G8000; the switch unit powers up when power is supplied through the power cords.

The Power Supply LED indicates the status of the power supplies. The LED flashes when only one power cord is connected, and is steady when both power cords are connected.

DC power supply

The DC-powered G8000 has two redundant 160 W DC-DC power supplies, operating from 42V to 60V. Each internal power supply has a DC filter input on the rear panel. The DC power sources are connected to the RackSwitch through the mating connector cable assemblies provided. One end of the cable is connected to the switch and the three DC-input leads connect the DC-input power supply to the site power source. The pigtail end of the cable is color coded, as follows:

Table 2. Cable color code

Color	Function
Black	Negative (-48V)
Red	Positive (return)
Green	Ground

CAUTION:
The product may be equipped with a hard-wired power cable. Ensure that a licensed electrician performs the installation per national electrical code. (C022)

CAUTION:
Ensure that the building power circuit breakers are turned off BEFORE you connect the power cord or cords to the building power. (C023)

CAUTION:
To reduce the risk of electrical shock or energy hazards:
- **This equipment must be installed by trained service personnel in a restricted access location, as defined by NEC and IEC 60950, The Standard for Safety of Information Technology Equipment.**
- **Connect the equipment to a reliably grounded, safety extra low voltage (SELV) source. A SELV source is a secondary circuit that is designed so that normal and single fault conditions do not cause the voltages to exceed a safe level (60 volts DC).**
- **The branch circuit overcurrent protection must be rated per the following table.**
- **Use copper wire conductor only, not exceeding 3 m (9.8 ft.) in length and sized according to the following table.**
- **Torque the wiring-terminal screws to the values in the following table.**
- **Incorporate a readily available approved and rated disconnect device in the field wiring.**

(C033)

Table 3. Power specifications

Power	Specification
Circuit breaker rating	Minimum and maximum: 20 amps
Wire size	• 16 AWG (IBM part number 90Y3538 DC power cable from PDP output to server input) • 1.31 mm2
Wiring terminal screw torque	• inch pounds (IBM part number, 90Y3538, provided with connector, both ends) • newton meters (Nm)

Each power supply can be connected to a separate DC power source to mitigate the risk of down time during a power failure. When used in a redundant configuration, the dual power supplies have a load-sharing capability that allows each supply to operate at approximately 50 percent of full load. Using redundant

power can minimize the power disruption during a power supply failure and extend the expected lifetime of each supply by operating normally in a conservative power mode.

There is no power switch on the RackSwitch; the switch unit powers up when power is supplied through the DC power source.

The Power Supply LED indicates the status of the power supplies. The LED flashes when only one DC power source is connected, and is steady when both DC power sources are connected.

Switch ports

The RackSwitch ports and port options are described in the following sections.

10/100/1000 Base-T ports

Forty-four 10/100/1000Base-T ports (RJ-45) are located on the front panel. In-line management and Control Plane Stacking are supported by using one or more of the RJ-45 ports for management.

The G8000 is designed to accept most standard 10/100/1000Base-T (category 5) cables.

The following table describes the pin assignments for the RJ-45 connector pin assignments.

Table 4. RJ-45 connector pin assignments

Pin number	Signal	Description
1	BI DA+	Bi-directional data pair A positive
2	BI DA-	Bi-directional data pair A negative
3	BI DB+	Bi-directional data pair B positive
4	BI DB-	Bi-directional data pair B negative
5	BI DC+	Bi-directional data pair C negative
6	BI DC-	Bi-directional data pair C negative
7	BI DD+	Bi-directional data pair D negative
8	BI DD-	Bi-directional data pair D negative

SFP ports

CAUTION:
This product might contain one or more of the following devices: CD-ROM drive, DVD-ROM drive, DVD-RAM drive, or laser module, which are Class 1 laser products. Note the following information:

- **Do not remove the covers. Removing the covers of the laser product could result in exposure to hazardous laser radiation. There are no serviceable parts inside the device.**
- **Use of the controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.**

(C026)

CAUTION:
Data processing environments can contain equipment transmitting on system links with laser modules that operate at greater than Class 1 power levels. For this reason, never look into the end of an optical fiber cable or open receptacle. (C027)

Four 1 Gbps Small Form-factor Pluggable (SFP) slots are located on the front panel. These slots accept approved optical or copper SFP transceivers. Transceivers must be purchased separately.

For the available transceivers and direct attach cables (DACs) for the switch, see https://www-01.ibm.com/products/hardware/configurator/americas/bhui/launchNI.wss.

Console port

The RS-232 (mini-USB) serial console port is located on the front panel. The following table describes the pinouts for the mini-USB port.

Table 5. Console port pin assignments

Pin number	Function
Pin 1	No connect
Pin 2	RS232-SIN
Pin 3	RS232_SOUT
Pin 4	No connect
Pin 5	Ground

The console cable provides an RJ-45 connector (see Table 4 on page 8 for RJ-45 pin assignments). A retention clip is available to secure the console connection.

The following table describes the pin assignments for the RJ-45 connector on the console cable.

Table 6. Console connector wiring

D9 Pin number	Wire	Mini-USB
Pin 2	Black	Pin 3
Pin 3	White	Pin 2
Pin 5	Green	Pin 5

Table 6. Console connector wiring (continued)

D9 Pin number	Wire	Mini-USB
Pin 1	D9 pins 1, 4, and 6 are connected	
Pin 4		
Pin 6		
Pin 7	D9 pin 7 is connected to D9 pin 8	
Pin 8		
Shell	Braid	Shell

10 Gigabit Ethernet port expansion slots

The RackSwitch unit includes two port expansion slots, one on the front panel and one on the rear panel. Each expansion slot accepts a dual-port 10 GbE (XGE) uplink module for either CX4 or Small Form-factor Pluggable Plus (SFP+).

You can add one or two XGE uplink modules, as follows:

SFP+ Uplink Module
Up to four 10 Gbps SFP+ modules can be installed on the RackSwitch. These ports accept approved optical SFP+ transceivers. SFP+ transceivers can be purchased separately.

CX4 Uplink Module
Up to four CX4 ports can be installed on the . These ports provide CX4 connectivity between the RackSwitch and copper 10 GbE CX4 network devices. The CX4 ports support link spans up to 15 meters on appropriate CX4-grade copper cables.

The CX4 ports provide powered CX4 automatically. The port detects when a powered CX4 device is connected, and sends power to the device.

The RackSwitch is designed to accept most standard 10 GbE CX4 cables. For the available transceivers and direct attach cables (DACs) for the switch, see: https://www-01.ibm.com/products/hardware/configurator/americas/bhui/launchNI.wss.

Note: Do not use InfiniBand CX4 cables with the RackSwitch. Although InfiniBand cables have the same CX4 connectors as 10GBase-CX4 cables, InfiniBand cables do not adhere to the same standard as 10GBase-CX4 cables.

Switch LEDs

Two LED stacks provide system status and port link status. The following illustration shows the system LEDs.

The system LEDs are described in the following table.

Table 7. System LEDs

Symbol	Description
	Power supplies and power input status
	Fans status

Table 7. System LEDs (continued)

Symbol	Description
MB	Stacking master LED
MS	Stacking member LED

The following table describes the system LEDs.

Table 8. System LED descriptions

Function	Power	Fan	Master	Member	XGE Port
Total Power Failure	Off	Off	Off	Off	Off
Service Required	Flash green	Flash green	Flash green	Flash green	Steady green
Power Supplies OK	Steady green	Not applicable	Not applicable	Not applicable	Not applicable
Power Supply Failure	Flash green	Not applicable	Not applicable	Not applicable	Not applicable
Fans OK	Not applicable	Steady green	Not applicable	Not applicable	Not applicable
Fan Failure	Not applicable	Flash green	Not applicable	Not applicable	Not applicable
Stack Master	Not applicable	Not applicable	On	Off	Not applicable
Stack Backup/ Member	Not applicable	Not applicable	Off	On	Not applicable
Stack Error	Not applicable	Not applicable	On	ON	Not applicable
Non-Stack Member	Not applicable	Not applicable	Off	Off	Not applicable

RJ-45 LEDs

The RJ-45 LEDs are shown in the following illustration.

RJ-45 port LEDs

Link LED →⟦ ⟧← Activity LED
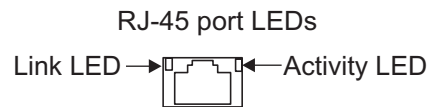
Status LEDs for the RJ-45 management port are described in the following table.

Table 9. RJ-45 LEDs status

LED	Steady green	Flashing amber	Off
Link	Link up	Not applicable	No link
Activity	Not applicable	Activity	No activity

SFP LEDs

Status LEDs for the SFP ports are described in the following table.

Table 10. SFP LEDs status

LED	Steady green	Flash green	Off
Port Link	Valid link	Not applicable	No Link

XGE link LEDs

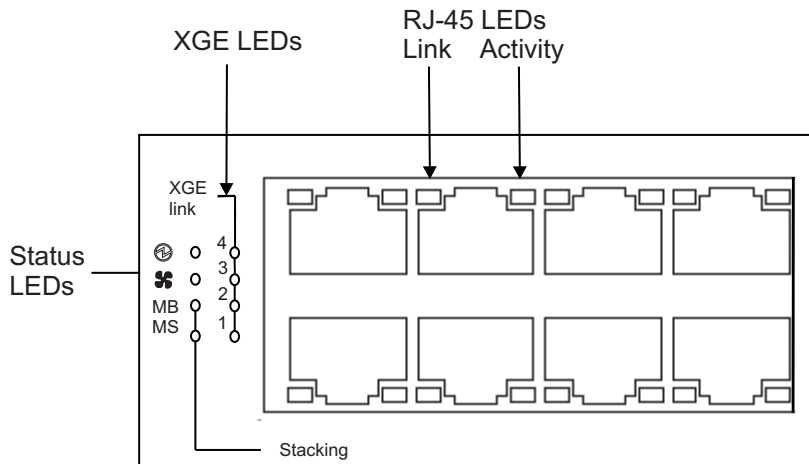XGE link LEDs provide the link status for ports on each of the uplink modules, if applicable. Optional XGE ports one (port 49) and two (port 50) are located in the uplink module on the front panel. Optional XGE ports three (port 51) and four (port 52) are located in the uplink module on the rear panel.

LEDs for the XGE ports are described in the following table.

Table 11. XGE module LEDs status

LED	Steady green	Flash green	Off
Port Link	Valid link	Not applicable	No Link

Optional uplink modules

You can install up to two port uplink modules, one on the front panel and one on the rear panel. Each expansion slot accepts either an SFP+ Uplink Module or a CX4 Uplink Module.

SFP+ Uplink Module

The SFP+ uplink module contains two 10 Gigabit Ethernet optical transceiver slots.

The SFP+ uplink module provides 10 GbE connectivity over fiber cable. The SFP+ slots require approved SFP+ optical transceivers. Transceivers can be purchased separately.

CX4 Uplink Module

The CX4 uplink module is a 10 Gigabit Ethernet CX4 short range module. It contains two 10 GbE CX4 ports.

The CX4 uplink module provides CX4 connectivity between the RackSwitch and copper 10 GbE CX4 network devices. The CX4 ports support link spans up to 15 meters on appropriate CX4-grade copper cables.

Technical specifications

The RackSwitch technical specifications are described in the following sections.

Physical characteristics

The physical characteristics of the RackSwitch are listed in the following table.

Table 12. Physical characteristics

Specification	Physical characteristics
Dimensions (H x W x D)	4.4 x 43.9 x 51.3 cm. (1.73 x 17.3 x 20.2 in.)
Weight	10.5 kg. (23 lb) (maximum)

Environmental specifications

The environmental specifications for the RackSwitch are listed in the following table.

Table 13. Environmental specifications

Specification	Measurement
Temperature, ambient operating	0°C to +40°C (32° to 104°F)
Temperature (fan failure), operating	0°C to +35°C (32° to 95°F)
Temperature, storage	-40°C to +85°C (-40° to 185°F)
Relative humidity (non-condensing), operating	10 to 90%
Relative humidity (non-condensing), storage	10 to 90%
Altitude, operating	1,800 m (6,000 feet)
Altitude, storage	12,190 m (40,000 feet)
Acoustic noise	Less than 65dB
Heat dissipation	1127 BTU/hour (typical) 1280 BTU/hour (maximum)

Power specifications

the power specifications for the RackSwitch are listed in the following table.

Table 14. AC power specifications

Specification	Measurement
Number of power supplies	2 (1+1 load sharing/redundant)
AC-input frequency (universal)	50 - 60 Hz
AC-input voltage (universal)	100 - 240 VAC
AC inrush current	15 A
AC-input current (typical)	2.75 A (RMS) @ 120 V 1.435 A (RMS) @ 230 V
AC-input current (maximum)	3.125 A (RMS) @ 120 V 1.630 A (RMS) @ 230 V
Power supply rated output power	450 W each
System power dissipation (typical)	330 W
System power dissipation (maximum)	375 W

Table 14. AC power specifications (continued)

Specification	Measurement
DC-output current	23.4 A (typical)

Chapter 2. Installing the RackSwitch and options

This chapter describes the how to install the RackSwitch chassis and the associated RackSwitch components. The following sections describe how to install the RackSwitch, components and options.

- "Installing the RackSwitch in a standard equipment rack" on page 20
- "Installing the RackSwitch in an IBM iDataPlex rack" on page 22
- "Installing the RackSwitch in an IBM System x® or Power rack" on page 24
- "Installing the 1U air duct option" on page 28
- "Installing an SFP, SFP+, and QSFP+ transceiver" on page 32

Note: When replacing a RackSwitch chassis, all internal components must also be removed from the chassis and replaced in the new chassis. For more information on removing and replacing the RackSwitch and components, see Chapter 3, "Removing and replacing the RackSwitch and components," on page 37.

Before installing the RackSwitch

Locate and record the important product information about the switch in the following table. The identification labels contain the machine-type model (MTM) number, serial number and part number (front, rear panel and/or bottom of the unit), and the media access control (MAC) address (rear of unit) for the switch. The MAC address is not required for opening a service call.

Note: Make sure that you record this information before you install the switch.

You can also review and record your product serial number and other required information through the software interface by issuing the `show sys-info` command using the ISCLI interface or the `/info/sys/general` command using the MenuCLI interface. For more information about these commands, see "Configuring Vital Product Data after a switch replacement" on page 43.

After the switch is installed most of the identification labels are hidden from view and require removing the switch in order to relocate them in the event of opening a service call.

Attention: This product information is required to register your product, to update your firmware, place a service call, and replace the RackSwitch.

Note: The following sample RackSwitch identification (ID) labels may have different MTM and part numbers than your unit.

15

MT:7844 590
SN:06AA123

EID:000435

MT: 7844 –590 PID: 7844AGV
SN: 06AA123

Machine Type-Model 1611-16E
S/N 1000001
(1S) IBM MT-Model, S/N 161116E 1000001

P/N: 00E6965

S/N: Y010CM1AG001

FRU P/N: 00D6002
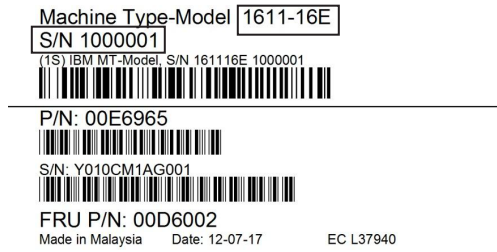Made in Malaysia   Date: 12-07-17   EC L37940

Figure 4. Sample RackSwitch ID label

Record this information below and print this page and keep it in a safe place for
possible future reference. You will need this information when you register the
switch with IBM. You can register the switch at http://www.ibm.com/support/
mysupport/.

Product name	IBM System Networking RackSwitch G8000
Model number	_____
Serial number	_____
Part number	_____
Media access control (MAC) address for switch	_____
MAC addresses for other components	_____
	_____
	_____

Required tools

You need the following tools or equipment to install the RackSwitch G8000:

- Standard flat-blade screwdriver
- #2 Phillips screwdriver
- Electrostatic discharge wrist strap

Package contents

The basic RackSwitch G8000 package contains the following items:

- G8000 switch unit (one of the following):
  - G8000 (front-to-rear) provides front-to-rear air flow
  - G8000 (rear-to-front) provides rear-to-front airflow
- One standard rack mount kit that includes:
  - Two brackets
  - Screws to attach brackets to the switch unit
  - Screws to attach the switch unit to the equipment rack
- Mini-USB to RJ-45 serial cable, category 5 patch cable, RJ-45 to DB9 adapter
- Two AC power cords
- One IBM *Documentation* CD which includes the *IBM System Networking RackSwitch G8000 Installation Guide* (this document)
- One *Warranty Information* document
- One *Important Notices* document

Environmental requirements

This section describes the basic environmental requirements for the RackSwitch. Make sure the location where you install the switch meets the following requirements:

- Install the switch unit in a dry, clean, well-ventilated area.
- Provide adequate space in the front and back of the switch unit, to ensure proper air flow.
- Make sure that an adequate grounded power supply is within reach of the switch unit.
- Make sure that twisted-pair cable is routed away from power lines, fluorescent lighting fixtures and other sources of electrical interference.

Preventing electric shock

This product does not contain any user-serviceable parts. Do not remove the cover of this device.

The RackSwitch AC power model is designed to work with single-phase power systems that have a grounded neutral conductor. To reduce the risk of electric shock, always plug the power cord into a grounded power outlet.

DANGER

When working on or around the system, observe the following precautions:

Electrical voltage and current from power, telephone, and communication cables are hazardous. To avoid a shock hazard:

- Connect power to this unit only with the provided power cord. Do not use the provided power cord for any other product.
- Do not open or service any power supply assembly.
- Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.
- The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords.
- Connect all power cords to a properly wired and grounded electrical outlet. Ensure that the outlet supplies proper voltage and phase rotation according to the system rating plate.
- Connect any equipment that will be attached to this product to properly wired outlets.
- When possible, use one hand only to connect or disconnect signal cables.
- Never turn on any equipment when there is evidence of fire, water, or structural damage.
- Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.
- Connect and disconnect cables as described in the following procedures when installing, moving, or opening covers on this product or attached devices.

  To disconnect:
  1. Turn off everything (unless instructed otherwise).
  2. Remove the power cords from the outlets.
  3. Remove the signal cables from the connectors.
  4. Remove all cables from the devices.

  To connect:
  1. Turn off everything (unless instructed otherwise).
  2. Attach all cables to the devices.
  3. Attach the signal cables to the connectors.
  4. Attach the power cords to the outlets.
  5. Turn on the devices.

  (D005)

Handling static-sensitive devices

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

To reduce the possibility of electrostatic discharge, observe the following precautions:

- Limit your movement. Movement can cause static electricity to build up around you.
- The use of a grounding system is recommended. For example, wear an electrostatic-discharge wrist strap, if one is available.
- Handle the device carefully, holding it by its edges or its frame.
- Do not touch solder joints, pins, or exposed printed circuitry.
- Do not leave the device where others can handle and damage it.
- While the device is still in its static-protective package, touch it to an unpainted metal part of any unpainted metal surface on a grounded rack component in the rack in which you are installing the device, for at least 2 seconds. This drains static electricity from the package and from your body.
- Remove the device from its package and install it directly into the switch without setting it down. If it is necessary to set down the device, put it back into its static-protective package. Do not place the device on a switch cover or on a metal surface.
- Take additional care when you handle devices during cold weather. Heating reduces indoor humidity and increases static electricity.

Installing the RackSwitch in a standard equipment rack

This section describes how to install the RackSwitch G8000 in a standard 19-inch equipment rack. For information about mounting the RackSwitch in other rack types, see the following sections:

- "Installing the RackSwitch in an IBM iDataPlex rack" on page 22
- "Installing the RackSwitch in an IBM System x® or Power rack" on page 24

The following parts come in the standard mounting kit.

Table 15. Standard rack mount kit parts

Item number	Description	Quantity
1	M6 locking washers	4
2	M6 screws	4
3	M6 clip nuts	4
4	M6 cage nuts	4
5	M4 screws	8
6	Mounting bracket	2

Attention: The rack-mounting frame may not be able to support the weight of the networking switch with only the front post mounting brackets (2-post application). If the switch has an undesirable amount of sag, it is recommended to use a 4-post mounting kit.

Attention: For earthquake stability, mount the switch in a 4-post rack.

DANGER

> **Rack-mounted devices are not to be used as shelves or work spaces.**

(L002)

Attention: For earthquake stability, mount the switch in a 4-post rack.

To install the RackSwitch in a standard equipment rack, complete the following steps:

1. Locate and record the product switch information to configure and register your product and set aside. See "Before installing the RackSwitch" on page 15.

   Note: If this switch is a replacement switch, copy the product information from the original switch onto the RID label that is shipped with replacement switch and affix the new label to the bottom of the new switch.

2. Use the M4 screws to attach a mounting bracket to each side of the switch. Torque the screws to approximately 2.0 newton-meters (Nm) +/- 0.1 Nm (17.7 inch-pounds).
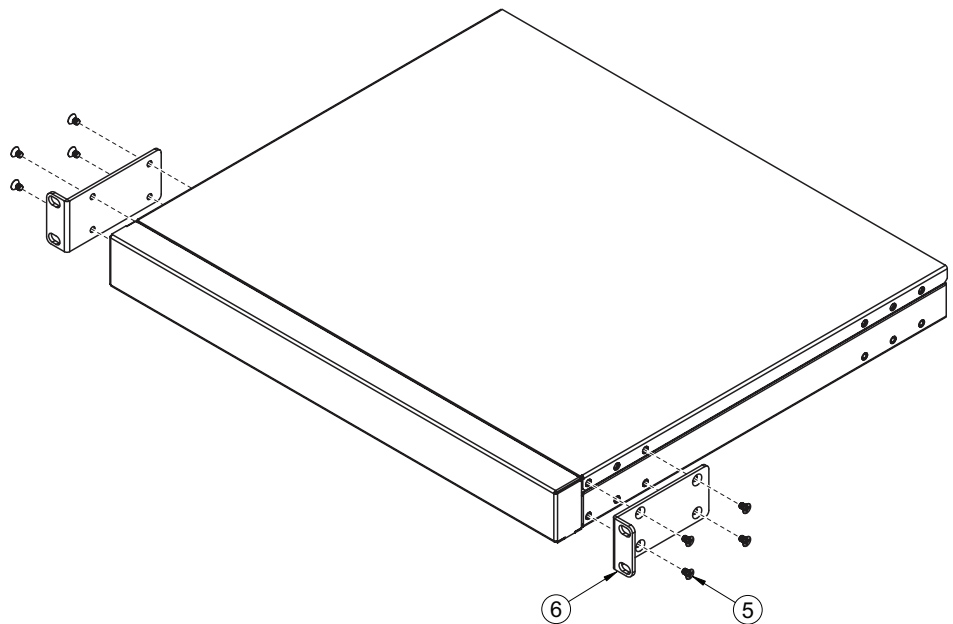
3. Slide the switch into the rack.
4. Use the M6 screws, washers, and clip nuts (or cage nuts) to secure the switch unit to the rack. Torque the screws to approximately 5.7 Nm +/- 0.1 Nm (50 inch-pounds).
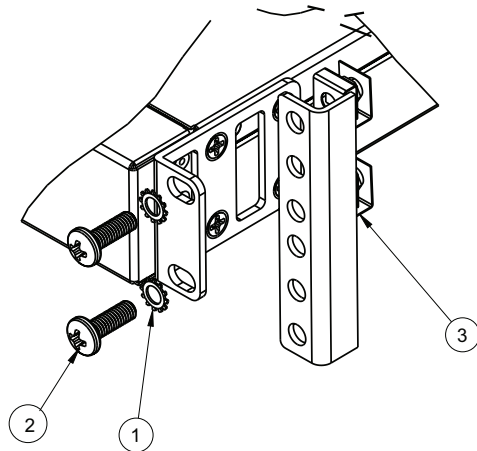
5. Connect all cables.
6. Initialize the switch, see Chapter 4, "Initializing the RackSwitch," on page 45.

    Attention: If this is a switch replacement, make sure the vital product data (VPD) is updated to avoid losing the licensed electronic entitlement data of the RackSwitch. For more information, see "Configuring Vital Product Data after a switch replacement" on page 43.

Installing the RackSwitch in an IBM iDataPlex rack

This section describes how to install the RackSwitch G8000 in an IBM iDataPlex rack. The iDataPlex mounting kit allows the switch to be mounted either vertically or horizontally. For information about mounting the RackSwitch in other rack types, see the following sections:

- "Installing the RackSwitch in a standard equipment rack" on page 20
- "Installing the RackSwitch in an IBM System x® or Power rack" on page 24

The iDataPlex rack mount kit must be purchased separately. The following table lists the parts included in the iDataPlex mounting kit.

Table 16. iDataPlex rack mount kit parts

Item number	Description	Quantity
1	Label	1
2	M6 locking washers	8
3	M6 screws	8
4	M6 clip nuts	8
5	M4 screws	16
6	Switch front bracket	2
7	Switch rear bracket	2
8	Rear mounting bracket	2

Attention: For earthquake stability, mount the switch in a 4-post rack.

DANGER

> **Rack-mounted devices are not to be used as shelves or work spaces.**

(L002)

To install the RackSwitch in an iDataPlex rack, complete the following steps:

1. Locate and record the product switch information to configure and register your product and set aside. See "Before installing the RackSwitch" on page 15.

   Note: If this switch is a replacement switch, copy the product information from the original switch onto the RID label that is shipped with replacement switch and affix the new label to the bottom of the new switch.

2. Use the M4 screws to attach front and rear mounting brackets to each side of the switch unit. Torque the screws to approximately 2.0 newton-meters (Nm) +/- 0.1 Nm (17.7 inch-pounds).
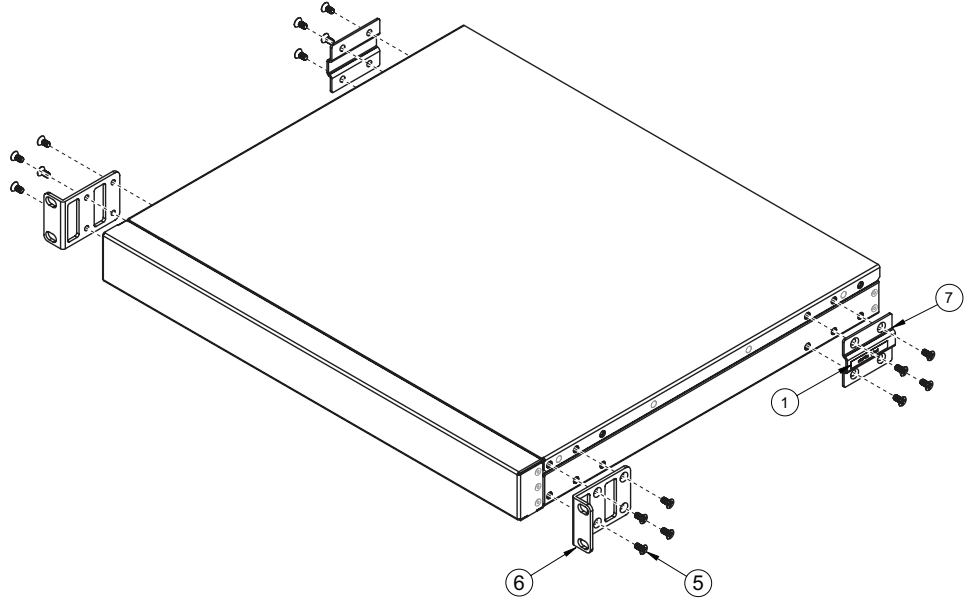
3. Use the M6 washers and screws to mount the switch unit into the rack. Torque the screws to approximately 5.7 Nm +/- 0.1 Nm (50 inch-pounds).
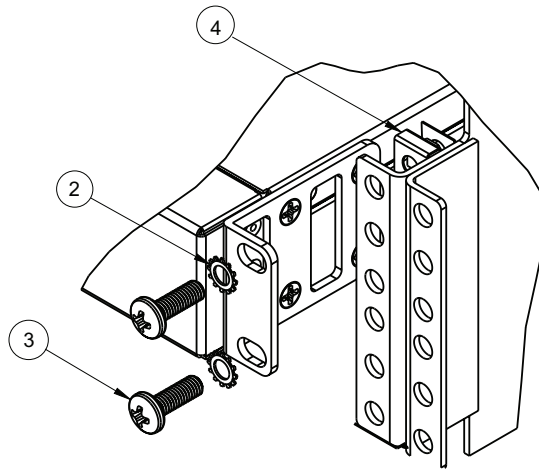
4. Slide the RackSwitch into the rack.

5. Use the M6 washers, screws, and clip nuts to attach the alignment plate. Torque the screws to approximately 5.7 Nm +/- 0.1 Nm (50 inch-pounds).
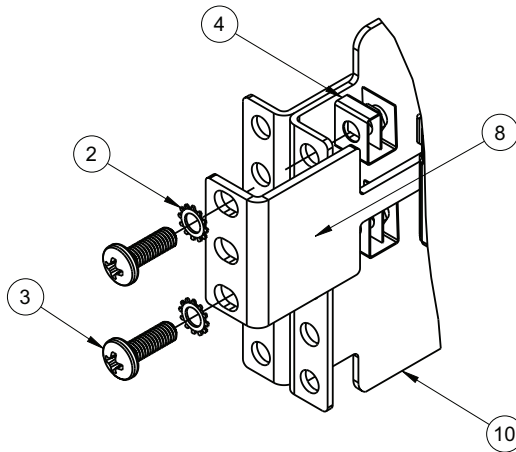
6. Connect all cables.

7. Initialize the switch, see Chapter 4, "Initializing the RackSwitch," on page 45.

   Attention: If this is a switch replacement, make sure the VPD is updated to avoid losing the licensed electronic entitlement data of the RackSwitch. For more information, see "Configuring Vital Product Data after a switch replacement" on page 43.

Installing the RackSwitch in an IBM System x® or Power rack

This section provides general information about installing the RackSwitch in anIBM System Networking adjustable 19" 4-post rail rack (for Power and System x racks). For information about mounting the RackSwitch in other rack types, see the following sections:

• "Installing the RackSwitch in a standard equipment rack" on page 20

• "Installing the RackSwitch in an IBM iDataPlex rack" on page 22

The IBM System Networking adjustable 19" 4-post rail mount kit parts must be purchased separately. The following table lists the parts included in the mounting kit.

Table 17. IBM System Networking adjustable 19" 4-post rail mount kit parts

Item number	Description	Quantity
1	Label	1
2	M6 locking washers	8
3	M3 screws	4
4	M6 screws	8
5	M6 clip nuts	8
6	M6 cage nuts	8
7	M4 screws	16
8	Filler plate	1
9	Switch front bracket	2
10	Rear mounting bracket	1
11	Rear mounting bracket with cord exit	1

Attention: The rack-mounting frame may not be able to support the weight of the networking switch with only the front post mounting brackets (2-post application). If the switch has an undesirable amount of sag, it is recommended to use a 4-post mounting kit.

Attention: For earthquake stability, mount the switch in a 4-post rack.

DANGER

> **Rack-mounted devices are not to be used as shelves or work spaces.**

(L002)

To install the RackSwitch in an IBM System Networking adjustable 19" 4-post rail rack (for Power and System x racks), complete the following steps:

1. Locate and record the product switch information to configure and register your product and set aside. See "Before installing the RackSwitch" on page 15.

   Note: If this switch is a replacement switch, copy the product information from the original switch onto the RID label that is shipped with replacement switch and affix the new label to the bottom of the new switch.
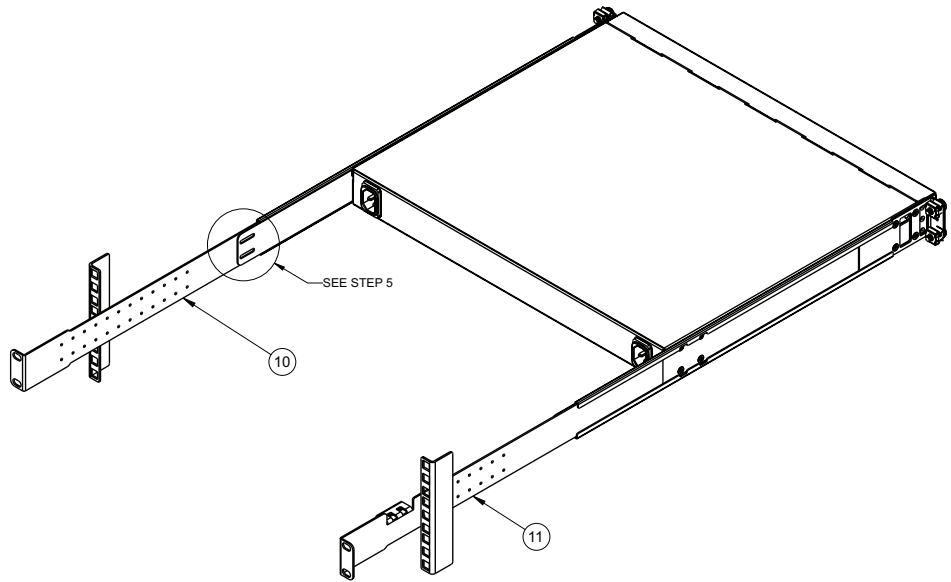
2. Use the M4 screws to attach the front mounting brackets to each side of the switch. Torque the screws to approximately 2.0 newton-meters (Nm) +/- 0.1 Nm (17.7 inch-pounds).
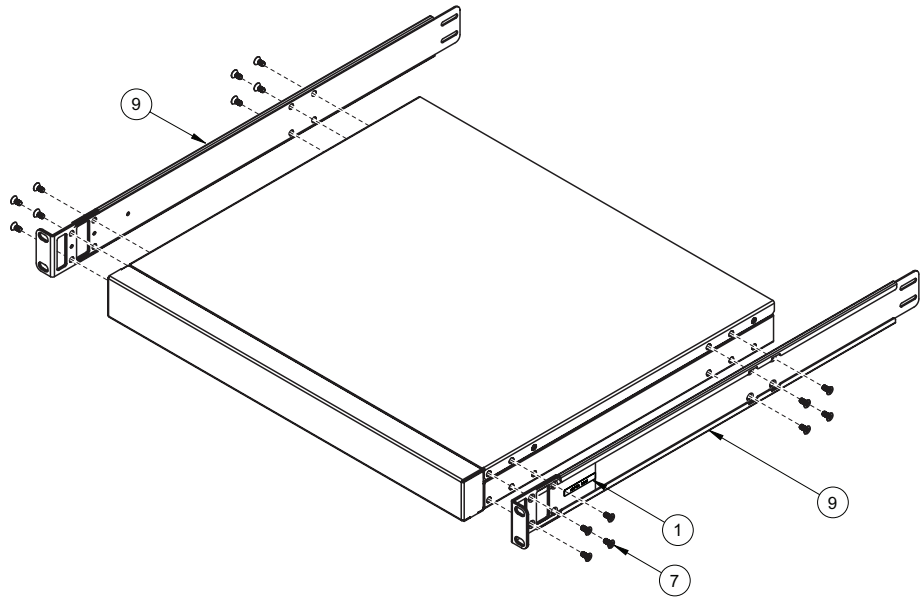
3. Use the M6 screws, washers, and clip nuts are used to connect the front mounting brackets to the front and rear posts in the rack. Torque the screws to approximately 5.7 Nm +/- 0.1 Nm (50 inch-pounds).
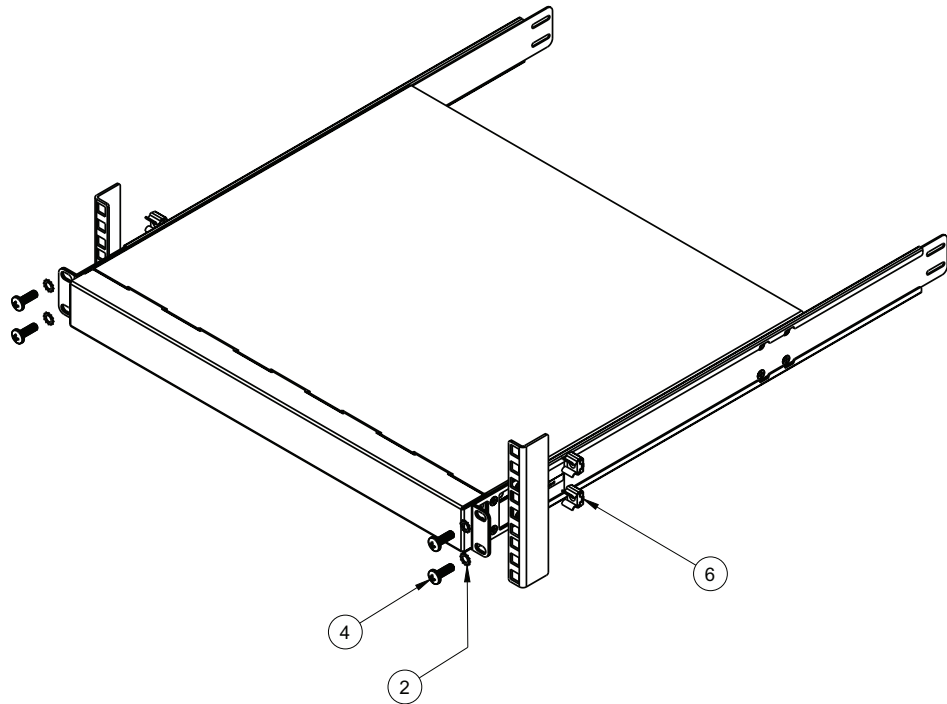
4. Slide the rear mounting brackets into the slots available on the front mounting brackets.

SEE STEP 5

10

11

5. Use the M6 washers, screws, and clip nuts to attach the filler plate to the rear mounting brackets. Torque the screws to approximately 5.7 Nm +/- 0.1 Nm (50 inch-pounds).

8

6

4

2
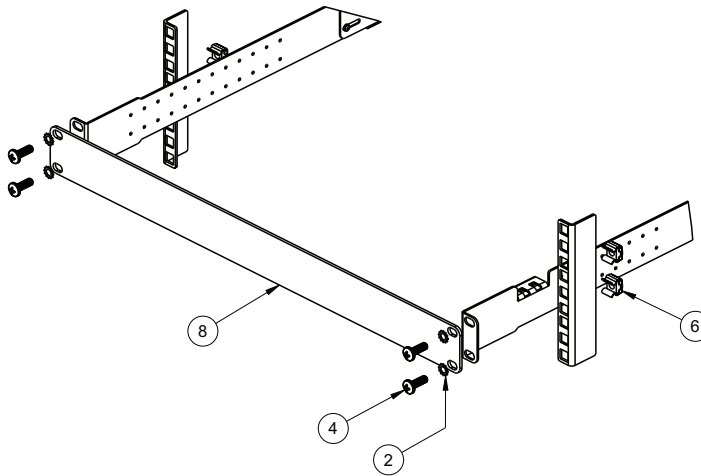
6. Use the M3.5 screws to secure the rear brackets to the front brackets. Torque the screws to approximately 1.1 Nm +/- 0.1 Nm (10 inch-pounds).

9

3

10 11
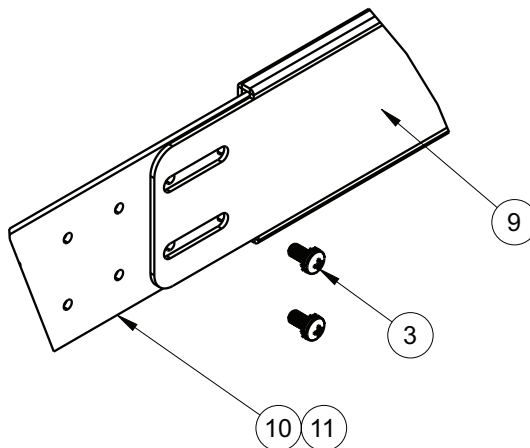
7. Connect all the cables.

8. Initialize the switch, see Chapter 4, "Initializing the RackSwitch," on page 45.

    Attention: If this is a switch replacement, make sure that the vital product data (VPD) is updated to avoid losing the licensed electronic entitlement data of the RackSwitch. For more information, see "Configuring Vital Product Data after a switch replacement" on page 43.
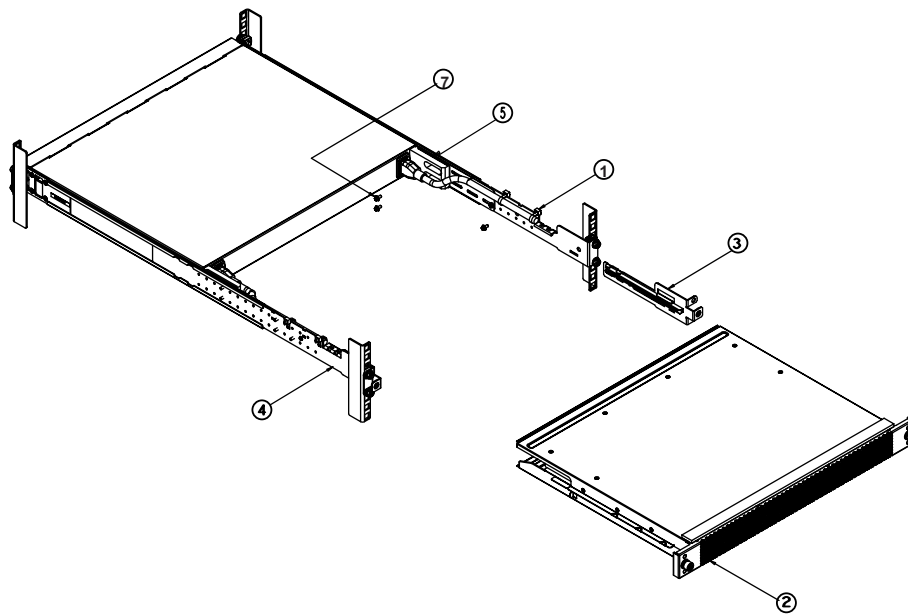
Installing the 1U air duct option

The RackSwitch supports an optional 1U air duct to maximize air flow conditions in a 19" rack. For 1U air duct option part numbers, see the Chapter 6, "Replaceable switch parts," on page 53 section.

Mounting kit components

The 1U air duct option ships with:

- One 1U air duct unit
- One 1U air duct mechanical assembly kit
- One power cord

The following table lists the parts included with the 1U air duct mounting kit.

Table 18. 1U air duct mounting kit

Item number	Description	Quantity
1	Cable tie	4
2	1U Duct sleeve (long)	1
3	Mounting bracket, right, assembly, 1U duct	1
4	Mounting bracket, left, assembly, 1U duct	1
5	Foam carrier assembly, includes half shears and foam carrier	2

Table 18. 1U air duct mounting kit (continued)

| Item number	Description	Quantity
7	Screw, slotted, M3.5, 7 mm, flanged hex head	6

Attention: The rack-mounting frame may not be able to support the weight of the networking switch with only the front post mounting brackets (2-post application). If the switch has an undesirable amount of sag, it is recommended to use a 4-post mounting kit.

Attention: For earthquake stability, mount the switch in a 4-post rack.

DANGER

> **Rack-mounted devices are not to be used as shelves or work spaces.**

(L002)
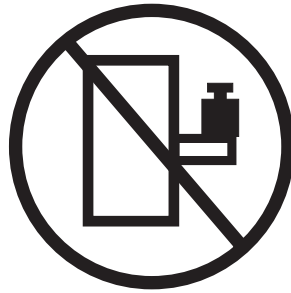
To install the 1U air duct option in the 19" rack, complete the following steps.

1. Loosen and remove the mounting screws from the both sides of the mounting rail and set aside to reuse to secure the foam carrier.

Foam carrier snug against rear of unit

Reuse mounting screws

Half shear
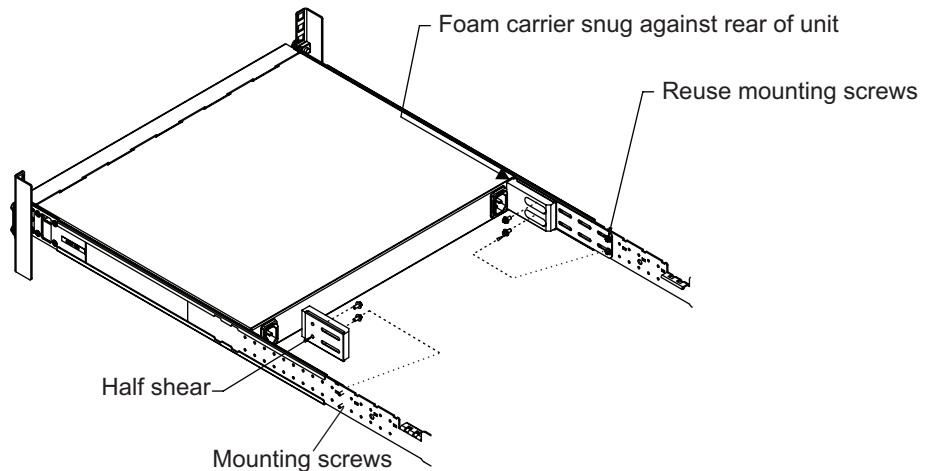
Mounting screws

2. Place the half shears on the rear side of the foam carriers and use the M3.5 mounting rail screws to secure the foam carrier assemblies snugly against the rear of the RackSwitch unit. Torque the screws to approximately 1.1 Nm +/- 0.1 Nm (10 inch-pounds).

    Note: There are additional M3.5 screws in the air duct assembly kit.

3. Plug the power cords into their respective RackSwitch power cord connectors and using the tie wraps, secure the power cords to the mounting rails.
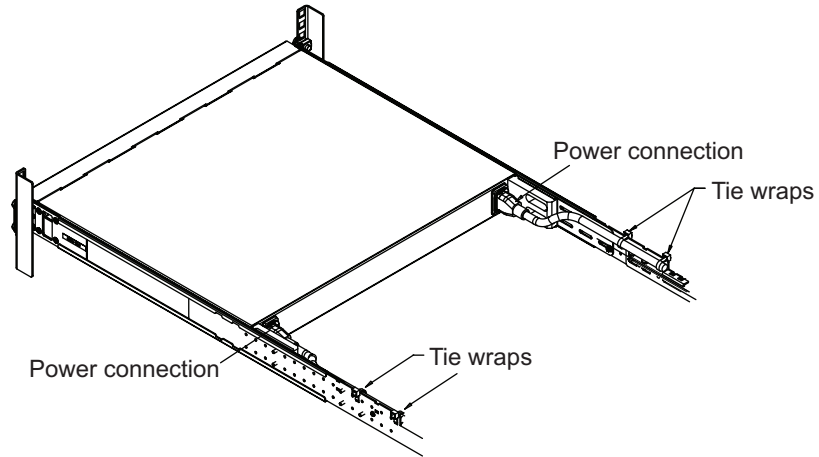
4. Use the M6 screws to secure the air duct brackets to the mounting rails. Torque the screws to approximately 5.7 Nm +/- 0.1 Nm (50 inch-pounds).
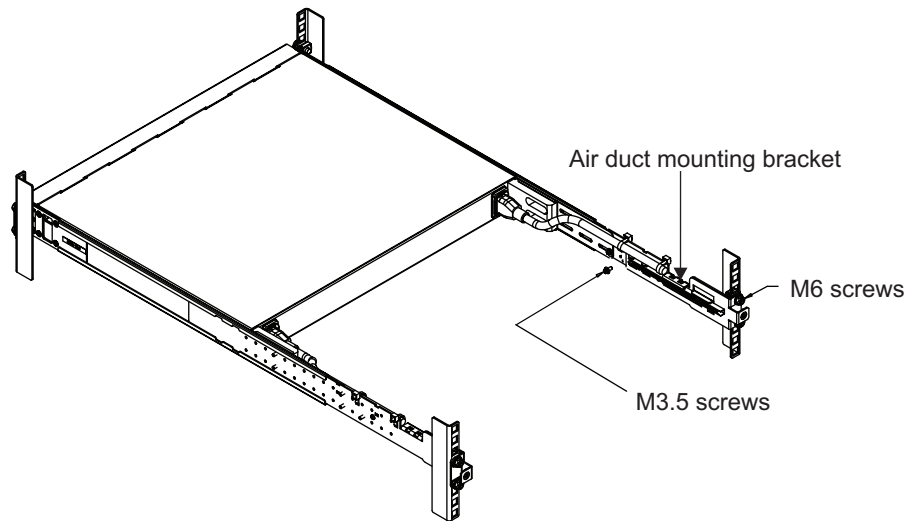
5. Use the M3.5 screws to secure the air duct mounting bracket to the rack chassis. Torque the screws to approximately 1.1 Nm (10 inch-pounds).
6. Gently slide the air duct unit side flanges into the card guides until the unit is seated firmly. Make sure that the foam strip is oriented on top.

Foam

Card guides

Side flanges

M4
thumbscrews
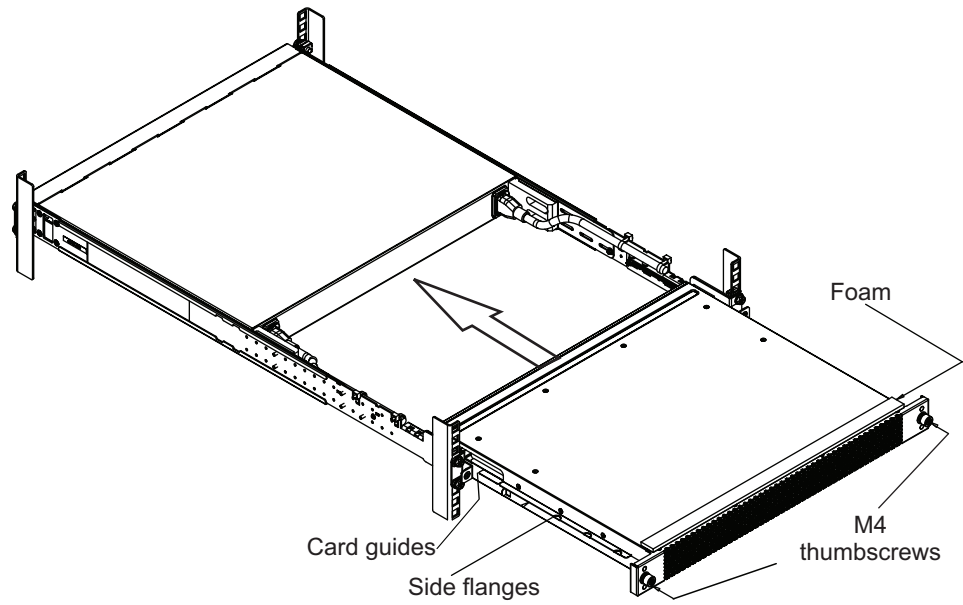
7. Use the two M4 thumbscrews to secure the air duct unit to the air duct brackets.

For information about removing the air duct, see "Removing the 1U air duct option"
on page 41.

Installing an SFP, SFP+, and QSFP+ transceiver

The RackSwitch supports copper and fiber transceivers. For the available transceivers for the switch, see https://www-01.ibm.com/products/hardware/configurator/americas/bhui/launchNI.wss.

To install a transceiver, see the following sections:
- "Installing an SFP copper transceiver"
- "Installing an SFP optical transceiver"
- "Installing an SFP+ optical transceiver" on page 33
- "Installing a QSFP+ optical transceiver" on page 34

Installing an SFP copper transceiver

The SFP copper transceiver provides an RJ-45 connector that accepts a standard 10/100/1000BASE-T (category 5) cable.

To install an SFP copper transceiver in a 1 Gbps SFP or SFP+ port on the G8264 switch unit, complete the following steps.

Note: To avoid damage to the cable or the SFP transceiver, do not connect the cable before you install the transceiver.

1. Remove the safety cap and pull the locking lever into the down (unlocked) position.
2. Insert the transceiver into the port until it clicks into place. Use minimal pressure when you insert the transceiver into the slot. Do not use excessive force when you insert the transceiver; you can damage the transceiver or the SFP slot.

   The transceiver has a mechanical guide key to prevent you from inserting the transceiver incorrectly.
3. Pull up the locking lever to lock the transceiver into place.
4. Connect the cable.

   To remove a SFP copper transceiver, disconnect the cable, and pull down the locking lever to release the transceiver. After you remove the transceiver, replace the safety cap.

Installing an SFP optical transceiver

The SFP optical transceiver provides two fiber-optic cable connectors for connecting to external ports.

CAUTION:
This product might contain one or more of the following devices: CD-ROM drive, DVD-ROM drive, DVD-RAM drive, or laser module, which are Class 1 laser products. Note the following information:

- **Do not remove the covers. Removing the covers of the laser product could result in exposure to hazardous laser radiation. There are no serviceable parts inside the device.**

- **Use of the controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.**

(C026)

CAUTION:
Data processing environments can contain equipment transmitting on system links with laser modules that operate at greater than Class 1 power levels. For this reason, never look into the end of an optical fiber cable or open receptacle. (C027)

To install an SFP optical transceiver in a 1 Gbps SFP slot on the G8264 switch unit, complete the following steps.

Note: To avoid damage to the cable or the SFP transceiver, do not connect the cable before you install the transceiver.

1. Remove the safety cap and pull the locking lever into the down (unlocked) position.

2. Insert the transceiver into the port until it clicks into place. Use minimal pressure when you insert the transceiver into the slot. Do not use excessive force when you insert the transceiver; you can damage the transceiver or the SFP slot.

   The transceiver has a mechanical guide key to prevent you from inserting the transceiver incorrectly.

3. Pull up the locking lever to lock the transceiver into place.

4. Connect the fiber-optic cable.

   To remove a SFP optical transceiver, disconnect the fiber-optic cable, and pull down the locking lever to release the transceiver. After you remove the transceiver, replace the safety cap.

Installing an SFP+ optical transceiver

The SFP+ ports accept supported SFP+ transceivers. The SFP+ optical transceiver provides two fiber-optic cable connectors for connecting to external ports.

CAUTION:

This product might contain one or more of the following devices: CD-ROM drive, DVD-ROM drive, DVD-RAM drive, or laser module, which are Class 1 laser products. Note the following information:

• **Do not remove the covers. Removing the covers of the laser product could result in exposure to hazardous laser radiation. There are no serviceable parts inside the device.**

• **Use of the controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.**

(C026)

CAUTION:

Data processing environments can contain equipment transmitting on system links with laser modules that operate at greater than Class 1 power levels. For this reason, never look into the end of an optical fiber cable or open receptacle. (C027)

To install an SFP+ optical transceiver in an SFP+ port, complete the following steps.

Note: To avoid damage to the cable or the SFP transceiver, do not connect the cable before you install the transceiver.

1. Remove the safety cap and pull the locking lever into the down (unlocked) position.

2. Insert the transceiver into the port until it clicks into place. Use minimal pressure when you insert the transceiver into the slot. Do not use excessive force when you insert the transceiver; you can damage the transceiver or the SFP+ slot.

   The transceiver has a mechanical guide key to prevent you from inserting the transceiver incorrectly.

3. Pull up the locking lever to lock the transceiver into place.

4. Connect the fiber-optic cable.

   To remove a SFP+ optical transceiver, disconnect the fiber-optic cable, and pull down the locking lever to release the transceiver. After you remove the transceiver, replace the safety cap.

Installing a QSFP+ optical transceiver

The QSFP+ ports accept supported QSFP+ transceivers. The QSFP+ optical transceiver provides an MTP cable connector for connecting to external ports.

CAUTION:
This product might contain one or more of the following devices: CD-ROM drive, DVD-ROM drive, DVD-RAM drive, or laser module, which are Class 1 laser products. Note the following information:

- **Do not remove the covers. Removing the covers of the laser product could result in exposure to hazardous laser radiation. There are no serviceable parts inside the device.**
- **Use of the controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.**

(C026)

CAUTION:
Data processing environments can contain equipment transmitting on system links with laser modules that operate at greater than Class 1 power levels. For this reason, never look into the end of an optical fiber cable or open receptacle. (C027)

To install a QSFP+ optical transceiver in a QSFP+ port, complete the following steps.

Note: To avoid damage to the cable or the SFP transceiver, do not connect the cable before you install the transceiver.

1. Remove the safety cap and pull the locking lever into the down (unlocked) position.
2. Insert the transceiver into the port until it clicks into place. Use minimal pressure when you insert the transceiver into the slot. Do not use excessive force when you insert the transceiver; you can damage the transceiver or the QSFP+ slot.

   The transceiver has a mechanical guide key to prevent you from inserting the transceiver incorrectly.
3. Pull up the locking lever to lock the transceiver into place.
4. Connect the fiber-optic cable.

   To remove a QSFP+ optical transceiver, disconnect the fiber-optic cable, and pull down the locking lever to release the transceiver. After you remove the transceiver, replace the safety cap.

Chapter 3. Removing and replacing the RackSwitch and components

This chapter describes the how to remove and replace the RackSwitch chassis and the associated options, such as, a 1U air duct module.

For more information to remove and replace individual components, see the following sections.

- "Removing and replacing the RackSwitch chassis unit from a rack"
- "Removing the 1U air duct option" on page 41
- "Removing and replacing the main RackSwitch chassis unit" on page 42

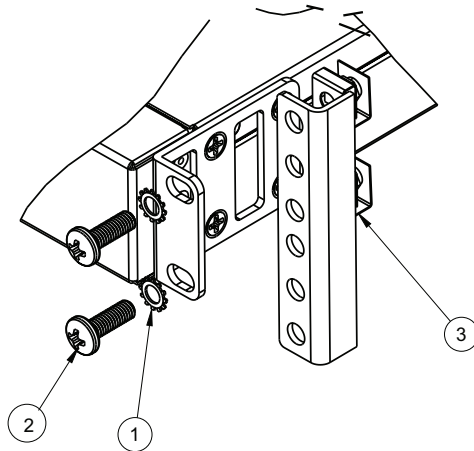## Removing and replacing the RackSwitch chassis unit from a rack

This section describes how to remove the RackSwitch chassis unit from supported equipment racks. For information about removing the RackSwitch from different racks, see the following sections:

- "Removing the RackSwitch chassis from a standard equipment rack"
- "Removing the RackSwitch chassis from a System x or Power rack" on page 38
- "Removing the RackSwitch chassis from an iDataPlex rack" on page 40

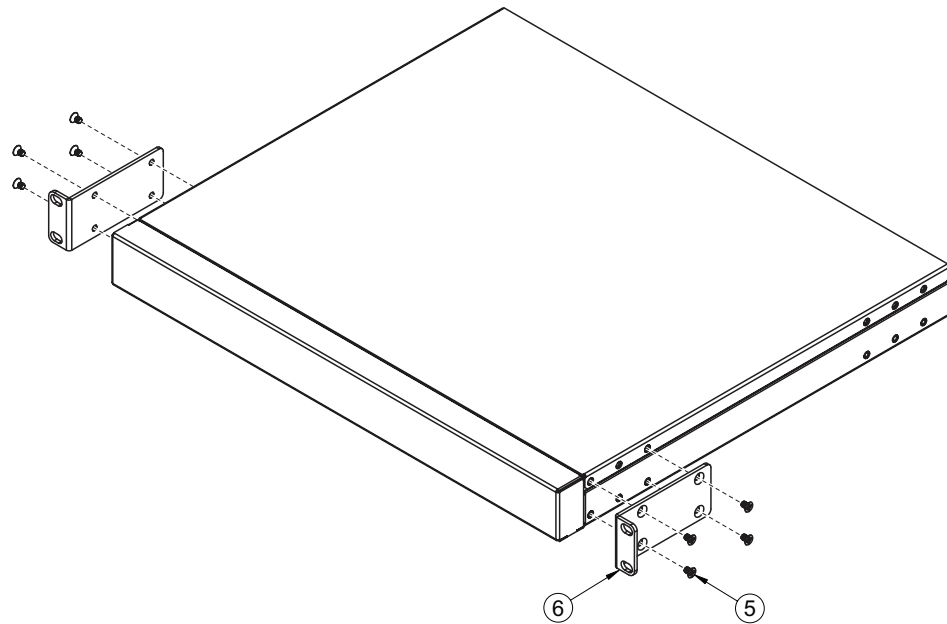## Removing the RackSwitch chassis from a standard equipment rack

To remove the RackSwitch from a standard equipment rack, complete the following steps:

1. Disconnect all cables.
2. Loosen and remove the M6 screws, washers, and clip nuts (or cage nuts) to remove the switch unit from the rack.

3. Slide the switch out of the rack.

4. Loosen and remove the M4 screws attaching the mounting bracket on each side of the switch.

Removing the RackSwitch chassis from a System x or Power rack

To remove the RackSwitch from a System x or power rack, complete the following steps:

1. Disconnect all the cables.
2. Loosen and remove the M3 screws that secure the rear brackets to the front brackets.

3. Slide the rear mounting brackets out of the slots available on the front mounting brackets.

4. Loosen and remove the M6 screws, washers, and clip nuts are used to connect the front mounting brackets to the front and rear posts in the rack.
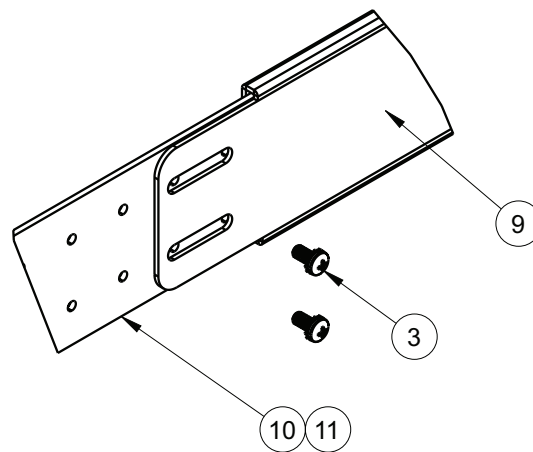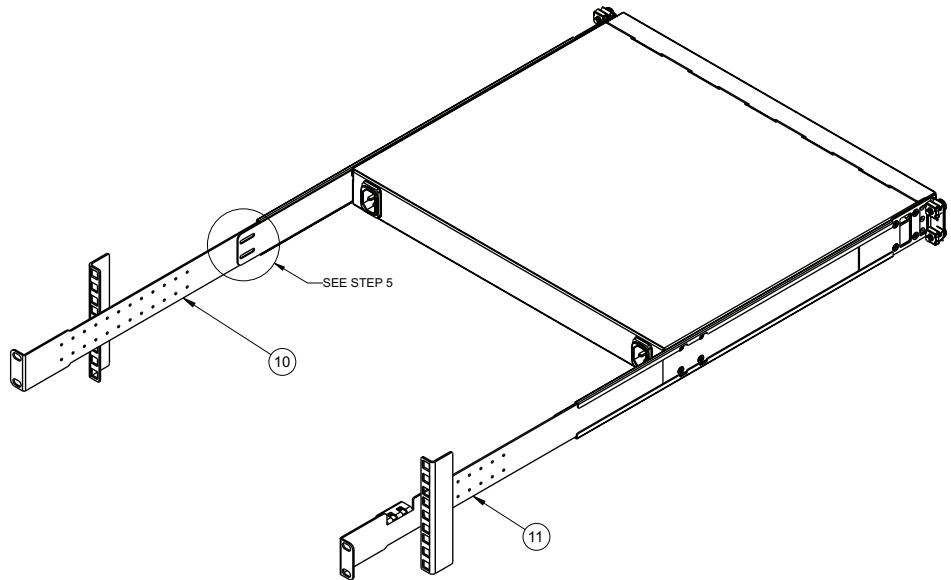

5. Slide the RackSwitch out of the rack.
6. Loosen and remove the M4 screws that attach the front mounting brackets to each side of the switch.
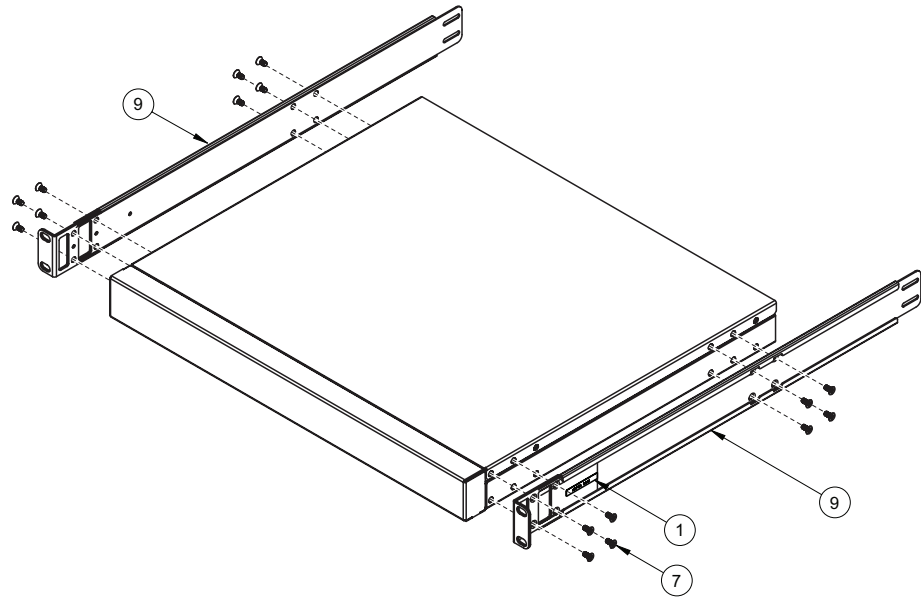
Removing the RackSwitch chassis from an iDataPlex rack

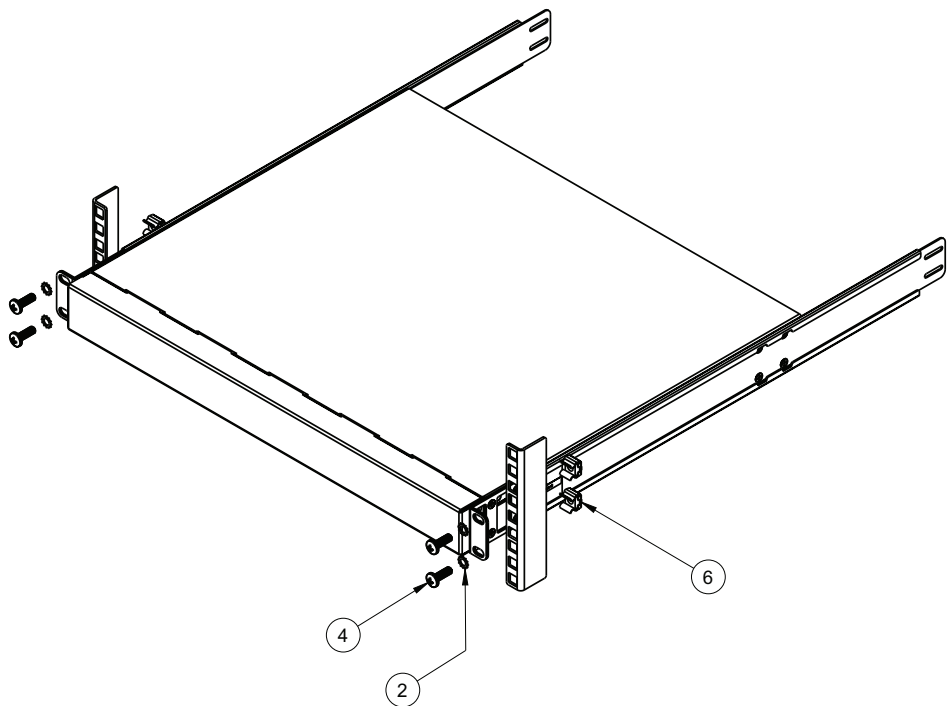To remove the RackSwitch from the iDataPlex rack, complete the following steps:

1. Disconnect all cables.
2. Loosen and remove the M6 washers, screws, and clip nuts that attach the alignment plate.

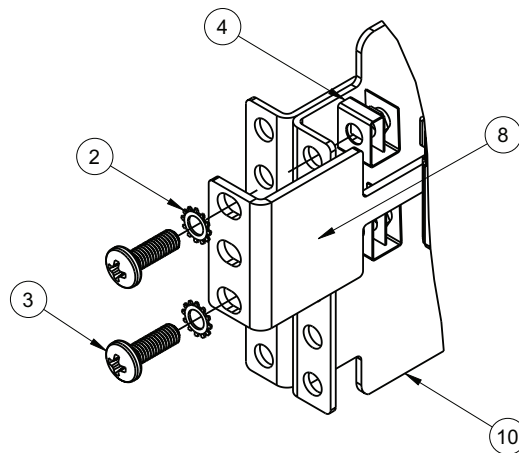3. Loosen and remove the M6 washers and screws that mount the switch unit into the rack.
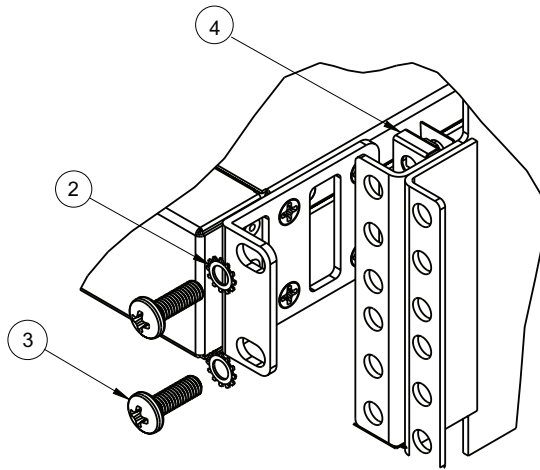
4. Slide the RackSwitch out of the rack.

5. Loosen and remove the M4 screws that attach front and rear mounting brackets to each side of the switch unit.

Removing the 1U air duct option

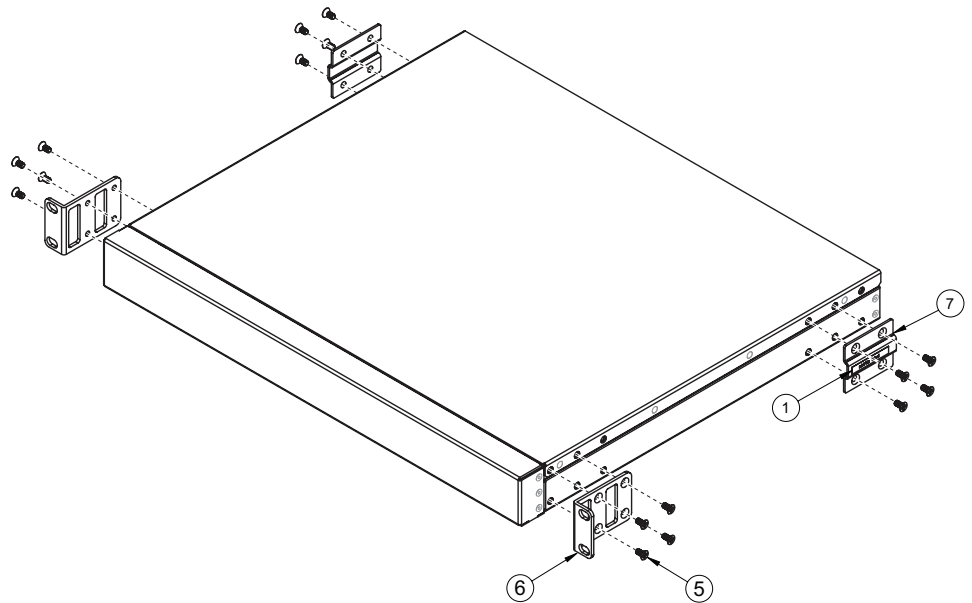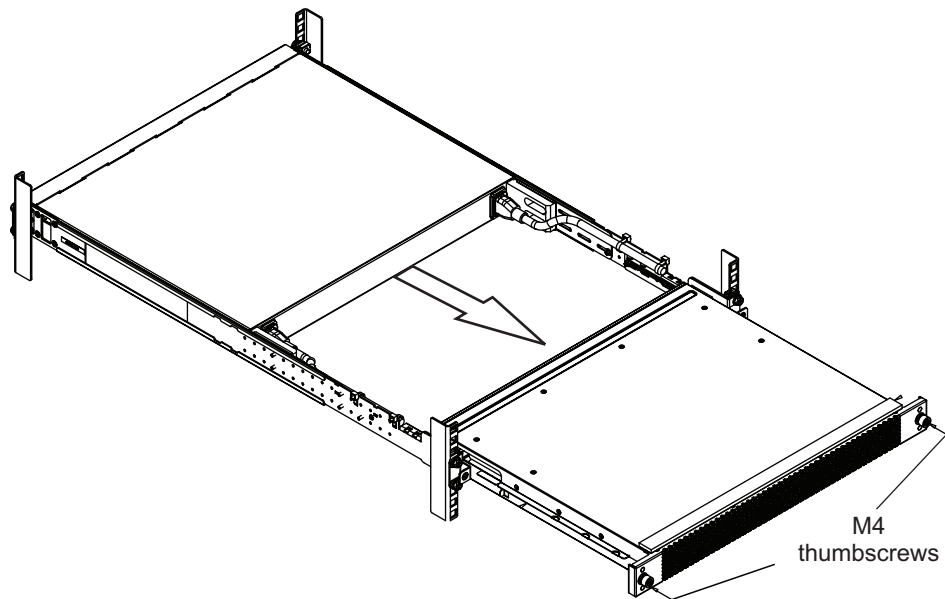To remove the 1U air duct option from a 19" rack, complete the following steps.

1. Loosen the two M4 thumbscrews securing the air duct unit to the air duct brackets.

M4
thumbscrews

2. Slide the air duct unit out of the rack.

To return the component to customer service for replacement, see Appendix A, "Getting help and technical assistance," on page 57, to help you gather all the required information that is necessary to return a component. After you remove the component, securely pack the component for shipping.

For instructions to replace the air duct, see "Installing the 1U air duct option" on page 28.

Removing and replacing the main RackSwitch chassis unit

When replacing a RackSwitch chassis unit, all internal component must also be removed from the chassis and replaced in the new chassis. The RackSwitch operates with one or two active power supplies, up to four fan modules, and an optional air duct unit.

When you remove a RackSwitch unit from the rack, record the product MTM number and serial number to use for the replacement switch, see "Before installing the RackSwitch" on page 15 to locate the product information labels on the switch chassis or "Configuring Vital Product Data after a switch replacement" on page 43 to use an interface to display the product information for the RackSwitch.

To return the chassis to customer service for replacement, see Appendix A, "Getting help and technical assistance," on page 57, to help you gather all the required information that is necessary to return a component. After you remove the chassis unit, securely pack the RackSwitch unit for shipping.

To replace the RackSwitch chassis in the rack, see Chapter 2, "Installing the RackSwitch and options," on page 15.

Configuring Vital Product Data after a switch replacement

After you replace a RackSwitch, you must update the new switch with the VPD of the RackSwitch being removed to avoid losing the licensed electronic entitlement data of the RackSwitch. The VPD includes the model and serial number of the switch. For more information on locating the VPD, see "Before installing the RackSwitch" on page 15.

To update the VPD on a new switch, complete the following steps.

1. Log in to the switch and in the CLI mode, type

   ```
   RS G8000>ibmnos
   ```

2. At the Password prompt, enter the switch password, and press Enter. The default password is `admin`.

3. In the main menu, enter the machine-type model (MTM) number for the replacement switch. For example:

   ```
   /boot/mtm 1455-64C
   ```

   where `1455-64C` is the MTM of the unit that is being replaced

4. Enter the serial number for the replacement switch. For example:

   ```
   /boot/esn 1000001
   ```

   where `1000001` is the serial number of the unit that is being replaced.

5. Reset the switch using the following command:

   ```
   /boot/reset
   ```

6. When prompted to confirm the reset, enter `y`. The switch reboots.

7. After the switch reboots, at the command prompt, verify that the VPD information is correct by issuing the `show sys-info` command using the ISCLI interface or the `/info/sys/general` command using MenuCLI interface.

   ISCLI interface output example:

   ```
   show sys-info
   ```

```
System Information at 13:41:04 Fri Jan 20, 2011
Time zone: America/US/Pacific
Daylight Savings Time Status: Disabled
IBM System Networking RackSwitch G8000
Switch has been up for 0 days, 17 hours, 10 minutes and 45 seconds.
Last boot: 20:41:01 Thu Jan 19, 2011 (power cycle)
MAC address: fc:cf:62:9d:2b:00 IP (If 1) address: 0.0.0.0
Management Port MAC Address: fc:cf:62:9d:2b:fe
Management Port IP Address (if 128): 203.203.21.2
Hardware Revision: 0
Hardware Part No: BAC-000*a*00
Switch Serial No: US7C45t78
Manufacturing date:
Software Version 6.6.0 (FLASH image1), active configuration.
Temperature Mother Top: 34 C
Temperature Mother Bottom: 38 C
Temperature Daughter Top: 35 C
Temperature Daughter Bottom: 37 C
Warning at 70 C and Recover at 100 C
Fan 1 in Module 1: RPM=17647 PWM=255(100%) Front-To-Back
Fan 2 in Module 1: RPM= 9310 PWM=255(100%) Front-To-Back
Fan 3 in Module 2: RPM=17419 PWM=255(100%) Front-To-Back
Fan 4 in Module 2: RPM= 9326 PWM=255(100%) Front-To-Back
Fan 5 in Module 3: RPM=17197 PWM=255(100%) Front-To-Back
Fan 6 in Module 3: RPM= 9523 PWM=255(100%) Front-To-Back
Fan 7 in Module 4: RPM=17252 PWM=255(100%) Front-To-Back
Fan 8 in Module 4: RPM= 9490 PWM=255(100%) Front-To-Back
System Fan Airflow: Front-To-Back
Power Supply 1: Vin Fault
Power Supply 2: OK
```

Or

MenuCLI interface output example:

`/info/sys/general`

```
System Information at 0:16:42 Wed Jan 3, 2012
Time zone: America/US/Pacific
Daylight Savings Time Status: Disabled
IBM System Networking RackSwitch G8000
Switch has been up 5 days, 2 hours, 16 minutes and 42 seconds.
Last boot: 0:00:47 Wed Jan 3, 2012 (reset from console)
MAC address: 00:00:00:00:00:00 IP (If 1) address: 0.0.0.0
Internal Management Port MAC Address: 00:00:00:00:00:ef
Internal Management Port IP Address (if 128): 9.43.95.121
External Management Port MAC Address: 00:00:00:00:00:fe
External Management Port IP Address (if 127):
Software Version 7.5.0 (FLASH image2), active configuration.
Hardware Part Number: 46C7193
Hardware Revision: 05
Serial Number: PROTO2C04E
Manufacturing Date: 43/08
PCBA Part Number: BAC-00072-00
PCBA Revision: 0
PCBA Number: 00
Board Revision: 05
PLD Firmware Version: 1.3
Temperature Warning: 26 C (Warn at 60 C/Recover at 55 C)
Temperature Shutdown: 27 C (Shutdown at 65 C/Recover at 60 C)
Temperature Inlet: 23 C
Temperature Exhaust: 26 C
Power Consumption: 42.570 W (12.000 V, 3.543 A)
Switch is in I/O Module Bay 1
```

For more information about using the switch interface, see the *Configuration* guide for your interface.

Chapter 4. Initializing the RackSwitch

When you supply power to the RackSwitch, the switch initializes automatically.

DANGER

Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords.

(L003)
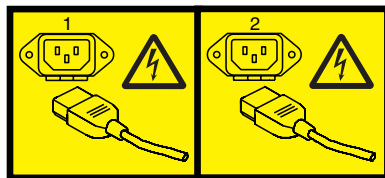
or
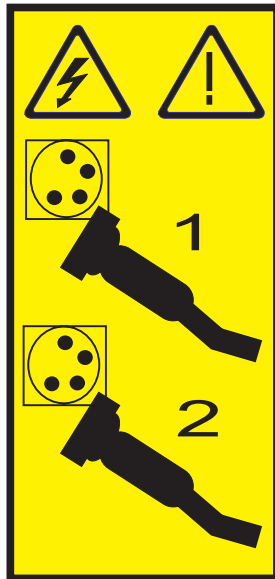
The following LEDs indicate the overall system status:

- Power Supply: Steady green if both power cords are connected, flashing green if only one power cord is connected.
- Service (!): Off if the system is OK, flashing if service is required.

Use the mini-USB console cable to connect the RS-232 serial port on the switch unit front panel to a terminal or a computer running a terminal emulation program. You can access the command-line interface to perform initial configuration tasks.

To access the switch CLI and perform initial configuration tasks, use one of the following methods:

- Connect an Ethernet cable to the RJ-45 management port and use Telnet, SNMP, or a Web browser to access the CLI through the IP address provided by the network's DHCP server.
- Connect the mini-USB console cable to the RS-232 serial port on the switch unit's front panel, and use a terminal or a computer running a terminal emulation program to access the switch CLI.

The console port terminal-emulation requirements are as follows:

- Default baud rate = 9,600 bps
- Character size = 8 characters
- Parity = none
- Stop bits = 1
- Data bits = 8
- Flow control = none

The switch performs initial self tests, and displays the password prompt, similar to the following screen:

```
Memory Test ...............................
Production Mode
PPCBoot 0.0.0.10 (new flash)
Memory Test (0x00) ............................PASSED

...
IBM System Networking RS 8000

Jan 1 00:01:27 2011:
NOTICE-5:Interface Oper Status Indication - Port 7 State UP

Password:
```

At the `Password` prompt, enter the switch password, and press Enter. The default password is `admin`.

Default configuration

The switch software contains default factory-loaded configuration files. The default configuration is part of the software; it cannot be deleted or changed. The default settings allow the switch to perform basic functions with minimal effort by the system administrator. DHCP is enabled by default on the management interfaces and BOOTP is enabled by default on interface 1. If there is no DHCP offer received, the device uses the default `Mgmt _IP address (192.168.50.50/24)`. This address is overwritten when a DHCP/BOOTP address is received for that interface. If DHCP/BOOTP is enabled and there is no static address configured for DHCP/BOOTP requests will continue to be sent. This feature does not change existing DHCP/BOOTP functionality. See the following initial configuration example:

```
RS G8000# show inter ip
Interface information:
1: IP4 192.168.49.50   255.255.255.0   192.168.49.255,  vlan 1, up
128: IP4 192.168.50.50   255.255.255.0   192.168.50.255,  vlan 4095, up
! interface ip 1
! addr <default>
! enable
!
! interface ip 128
!   addr <default>
!   enable
RS G8000(config)# system dhcp?
mgt   dhcp on mgt port
RS G8000(config)# system dhcp mgt
Warning: Enabling dhcp will overwrite IP interface 128 and IP gateway 4 configurations.
RS G8000# show inter ip
Interface information:
1: IP4 192.168.49.50   255.255.255.0   192.168.49.255,  vlan 1, up
128: IP4 192.168.50.50   255.255.255.0   192.168.50.255,  vlan 4095, up
```

Configuring an IP interface

To manage the switch using Telnet, SNMP, or a Web browser, you must have an IP interface. Use DHCP (enabled by default) or manually configure the following IP parameters:

- IP address
- Subnet mask
- Gateway address

1. Log on to the switch.
2. Enter IP interface mode.

```
RS G8000> enable
RS G8000# configure terminal
RS G8000 (config)# interface ip 1
```

3. Configure an IP interface, subnet mask, and VLAN assignment. Enable the interface.

```
RS G8000 (config-ip-if)# ip address 10.10.10.2 (example IP address)
RS G8000 (config-ip-if)# ip netmask 255.255.255.0
RS G8000 (config-ip-if)# vlan 1
RS G8000 (config-ip-if)# enable
RS G8000 (config-ip-if)# exit
```

4. Configure the default gateway. Enable the gateway.

```
RS G8000 (config)# ip gateway 1 address 10.10.10.1 (example gateway address)
RS G8000 (config)# ip gateway 1 enable
```

After you configure the IP address for your switch and you have an existing network connection, you can use the Telnet program from an external management station to access and control the switch. The management station and your switch must be on the same IP subnet.

The switch module supports a command-line interface (CLI) that you can use to configure and control the switch over the network using the Telnet program. You can use the CLI to perform many basic network management functions. In addition, you can configure the switch for management using an SNMP-based network management system or a Web browser.

For more information about using the CLI, see the *Command Reference* guide for your switch.

Updating firmware

If firmware updates are available, you can download them from http://www.ibm.com/supportportal/. The switch might have features that are not described in the documentation that comes with the switch, and the documentation might be updated occasionally to include information about those features, or technical updates might be available to provide additional information that is not included in the switch documentation.

Configuration settings are lost during a firmware update. Before updating the firmware, save a copy of the configuration on a separate device. In the event of a failed update, the saved configuration can be restored. For more information about the configuration file, see the *Application Guide* and *Command Reference* for the switch.

Attention: Installing the wrong firmware update might cause the network switch to malfunction. Before you install a firmware, read any readme and change history files that are provided with the downloaded update. These files contain important information about the update and the procedure for installing the update, including any special procedure for updating from an early firmware version to the latest version.

To check for firmware updates, go to http://www.ibm.com/supportportal/ and click **Downloads**.

Note: Changes are made periodically to the IBM website. Procedures for locating firmware might vary slightly from what is described in this document.

Using the Boot Management menu

The Boot Management menu enables you to switch the software image, reset the switch to factory defaults, or to recover from a failed software download.

You can interrupt the boot process and enter the Boot Management menu from the serial console port. When the system displays Memory Test, press Shift+B. The Boot Management menu is displayed.

```
Resetting the System ...
Memory Test ..............................

Boot Management Menu
1 - Change booting image
2 - Change configuration block
3 - Xmodem download
4 - Exit

Please choose your menu option: 1
Current boot image is 1. Enter image to boot: 1 or 2: 2
Booting from image 2
```

The Boot Management menu allows you to perform the following actions:
- To change the boot image, press 1 and follow the screen prompts.
- To change the configuration block, press 2, and follow the screen prompts.
- To perform an Xmodem download, press 3 and follow the screen prompts.
- To exit the Boot Management menu, press 4. The boot process continues.

Chapter 5. Troubleshooting

This section contains basic troubleshooting information to help resolve problems that might occur during installation and operation of the switch. If you have problems accessing the switch or working with the software, see the *RackSwitch G8000 Command Reference.*

For information about calling IBM for service, see Appendix A, "Getting help and technical assistance," on page 57.

System LED is not lit

Symptom: The power supply LED is not lit.

Solution: Check the power supply to make sure that there is a proper connection to the power source. Make sure that power is available from the power source.

Port link LED is not lit

Symptom: The port link LED is not lit.

Solution 1: Check the port configuration in the software (refer to the *Command Reference*). If the port is configured with a specific speed or duplex mode, check the other device to make sure that it is set to the same configuration. If the switch port is set to auto-negotiate, make sure that the other device is set to auto-negotiate.

Solution 2: Check the cables that connect the port to the other device. Make sure that they are connected correctly. Make sure that you are using the correct cable type.

Temperature sensor warning

Symptom: A temperature warning is displayed on the management console.

Solution: Make sure that the air circulation vents on the front, back, and sides of the switch are free from obstruction by cables, panels, rack frames, or other materials.

Make sure that all cooling fans inside the switch are running. A fan module LED (rear panel) flashes if there is a failure of the fan. The following command displays fan status:

```
show sys-info
```

If any fan stops during switch operation, contact Customer Support.

Switch does not initialize (boot)

Symptom: All the switch LEDs stay on, and the command prompt is not displayed on the console.

Solution: The operating system might be damaged. Use the console port to perform a serial upgrade of the switch software. See the *Command Reference*.

Chapter 6. Replaceable switch parts

The replaceable switch parts are Tier 1 customer replaceable units (CRUs). Replacement of Tier 1 CRUs is your responsibility. If IBM installs a Tier 1 CRU at your request, you will be charged for the installation.

For information about the terms of the warranty, see the *Warranty Information* document that comes with the switch. For more information about getting service and assistance, see Appendix A, "Getting help and technical assistance," on page 57.

Table 19. IBM RackSwitch G8000 replaceable parts

Description	Model	Option part number	Tier 1 CRU part number
Switch, rack G8000 (front-to-rear)	7309-CFC 7309-HCC	Not applicable	90Y9451
Switch, rack G8000 (rear-to-front)	0446-CD8 0446-HC8	Not applicable	90Y9451
Switch, rack G8000 DC power	7309-CD8 7309-HC8	Not applicable	90Y3525
Transceivers			
SFP+ transceiver 10GBase-LR	CD8 CFC, HC8, HCC	Not applicable	90Y9411
SFP+ transceiver 10GBase-ER	CD8 CFC HC8 HCC	90Y9415	90Y9414
SFP+ transceiver 10GBase-ZX	CD8 CFC HC8 HCC	90Y9418	90Y9417
SFP+ LRM transceiver	CD8 CFC HC8 HCC	90Y9421	90Y9420
SFP 1000 Base LX transceiver	CD8 CFC HC8 HCC	90Y9424	90Y9423
Cables			
Cable, 1 m IBM passive	G52 52F HC3 HC4	90Y9427	90Y9426
Cable, 3 m IBM passive	G52 52F HC3 HC4	90Y9430	90Y9429

Table 19. IBM RackSwitch G8000 replaceable parts (continued)

Description	Model	Option part number	Tier 1 CRU part number
Cable, 5m IBM passive	G52 52F HC3 HC4	90Y9433	90Y9432
Cable, 8.5 m IBM passive	G52 52F HC3 HC4	90Y9436	90Y9435
Cable, 2 m DC power	CD8 CFC HC8 HCC	Cable, 2 m DC power	Cable, 2 m DC power
Kit, serial cable	G52 52F HC3 HC4	Not applicable	59Y1967
Kit, 2-post rack mounting	G52 HC3	Not applicable	90Y3532
IBM System Networking adjustable 19" 4-post rail	G52 52F HC3 HC4	00D6185	00D6119
1U, air duct, 483 mm	1611-16E	00D6146	00D6120

For your safety, a power cord with a ground attachment plug is available to order for use with this product. To avoid electrical shock, always use the power cord and plug with a properly grounded outlet.

Power cords for this product that are used in the United States and Canada are listed by Underwriter's Laboratories (UL) and certified by the Canadian Standards Association (CSA).

For units intended to be operated at 115 volts: Use a UL-listed and CSA-certified cord set consisting of a minimum of 18 AWG, Type SVT or SJT, three-conductor cord, a maximum of 15 feet in length and a parallel blade, grounding-type attachment plug rated 15 amperes, 125 volts.

For units intended to be operated at 230 volts (U.S.): Use a UL-listed and CSA-certified cord consisting of a minimum of 18 AWG, Type SVT or SJT, three-conductor cord, a maximum of 15 feet in length and a tandem blade, grounding-type attachment plug rated 15 amperes, 250 volts.

For units intended to be operated at 230 volts (outside the U.S.): Use a cord set with a grounding-type attachment plug. The cord set should have the appropriate safety approvals for the country in which the equipment will be installed.

Power cords for this product for a specific country or region are usually available only in that country or region.

Table 20. Power and line cords (7309-xxx)

Description	Option and CRU part number
Power cord, Australia, AC plug 10A/250V	39Y7924
Power cord, Brazil, AC plug 16A/250VC	39Y7929
Power cord, Canada	39Y7931
Power cord, China, AC plug 16A/250V	39Y7928
Power cord, Europe, AC plug 10A/250V	39Y7917
Power cord, Europe (Denmark), AC plug 10A/250V	39Y7918
Power cord, Europe (Israel) AC plug 10A/250V	39Y7920
Power cord, Europe (Italy/Chili), AC plug 10A/250V	39Y7921
Power cord, Europe (South Africa), AC plug 10A/250V	39Y7922
Power cord, Europe (Switzerland), AC plug 10A/250V	39Y7919
Power cord, India, AC plug 10A/250V	39Y7927
Power cord, 2.8 m, Japan AC plug 12A/125V	46M2593
Power cord, Korea, AC plug 10A/250V	39Y7925
Power cord, UK, AC plug 13A/250V	39Y7923
Power cord, Uruguay/Argentina, AC plug 16A/250V	39Y7930
Power cord, 2.8 m, U.S., AC plug 10A/250V	46M2592
Rack power cord, 1.5 m, 10A/100-250V, C13 to C14	39Y7937
Rack power cord, 2.8 m, 10A, C13 to C14	46M2982
Rack power cord, 4.3 m, 10A/100-250V, C13 to C14	39Y7932
Rack power cord, 1.8 m, 10A/100-250V, 2 C13PM-IEC, 320-C14	43V6034
Rack power cord, 2.8 m, 10A/230V, C13 to CEE7-VII (Europe)	59Y8142
Line cord, 2.8 m, 10A/250V, C13-BS, 1363/A (UK)	59Y8143

Table 21. Power and line cords (1455-64C)

Description	Option and CRU part number
Power cord, 4.3 m (14 ft), drawer to OEM PDU, 200-240V, 15A, IEC320/C13, PT# 5	39M5096
Power cord, 4.3 m (14 ft), drawer to OEM PDU, 200-240V, 15A, IEC320/C13, PT# 59	39M5200
Power cord, 3.05 m (10 ft), drawer to IBM PDU, 200-240V, 10A, IEC320/C20, PT# 59	39M5392
Power cord, 4.3 m (14 ft) drawer to IBM PDU, 200-240V, 10A, IEC320/C13, IEC320/C14PT# 59	39M5510
Power cord, 2.8 m (9 ft), drawer to IBM PDU, 200-240V, 10A, IEC320/C13, IEC320/C14	39M5509
Power cord, 1.5 m (5 ft), drawer to IBM PDU, 200-240V, 10A, IEC320/C13, IEC320/C14	39M5508
Line cord, 1.83 m (6 ft), to wall, 100-127V, 12A, IEC320/C13, PT#4	41V1960

Table 21. Power and line cords (1455-64C) (continued)

Description	Option and CRU part number
Line cord, 2.8 m (9 ft) to wall/OEM PDU, 100-127V, 10A, IEC320/C13, PT#70	39M5240
Line cord, 2.8 m (9 ft) to wall/OEM PDU, 200-240V/10A, IEC320/C13, PT#2	39M5068
Line cord, 2.8 m (9 ft) to wall/OEM PDU, 200-240V/10A, IEC320/C13, PT#18	39M5123
Line cord, 2.8 m (9 ft) to wall/OEM PDU, 200-240V/10A, IEC320/C13, PT#19	39M5130
Line cord, 2.8 m (9 ft) to wall/OEM PDU, 200-240V/10A, IEC320/C13, PT#22	39M5144
Line cord, 2.8 m (9 ft) to wall/OEM PDU, 200-240V/10A, IEC320/C13, PT#23	39M5151
Line cord, 2.8 m (9 ft) to wall/OEM PDU, 200-240V/10A, IEC320/C13, PT#24	39M5158
Line cord, 2.8 m (9 ft) to wall/OEM PDU, 200-240V/10A, IEC320/C13, PT#32	39M5172
Line cord, 2.8 m (9 ft) to wall/OEM PDU, 200-240V/10A, IEC320/C13, PT#62	39M5206
Line cord, 2.8 m (9 ft) to wall/OEM PDU, 200-240V/10A, IEC320/C13, PT#69	39M5226
Line cord, 2.8 m (9 ft) to wall/OEM PDU, 250V, 10A, IEC320/C13, PT#6, insulated	39M5102

Appendix A. Getting help and technical assistance

If you need help, service, or technical assistance or just want more information about IBM products, you will find a wide variety of sources available from IBM to assist you. Use this information to obtain additional information about IBM and IBM products, determine what to do if you experience a problem with your IBM system or optional device, and determine whom to call for service, if it is necessary.

Before you call

Before you call, make sure that you have taken these steps to try to solve the problem yourself:

- Check all cables to make sure that they are connected.
- Check the power switches to make sure that the system and any optional devices are turned on.
- Check for updated firmware and operating-system device drivers for your IBM product at http://www.ibm.com/support/fixcentral/. The IBM Warranty terms and conditions state that you, the owner of the IBM product, are responsible for maintaining and updating all software and firmware for the product (unless it is covered by an additional maintenance contract). Your IBM service technician will request that you upgrade your software and firmware if the problem has a documented solution within a software upgrade.

Opening a support request

In the U.S. and Canada, hardware service and support is available 24 hours a day, 7 days a week. In the U.K., these services are available Monday through Friday, from 9 a.m. to 6 p.m.

To open a support call, complete the following steps.

1. Create a brief problem description and a prioritization for your support call.
2. Gather the required product information to provide to IBM Support. The serial number and MTM (IBM 4-digit machine identifier) are on the product label and will help IBM Support quickly provide a solution to your problem and ensure that you receive the level of service for which you might have contracted.
3. Gather your hardware and software maintenance agreement contract numbers, if applicable.
4. Gather other pertinent information such as error messages and logs.

You can determine the product MTM and serial number in the following ways:

- Locate the product information labels on the bottom of the switch, see "Before installing the RackSwitch" on page 15.
- If the firmware is at 7.6.x.x or later, you can determine the machine type model (MTM) and serial number through the interface. For more information on locating the MTM and serial number (VPD) through the interface, see "Configuring Vital Product Data after a switch replacement" on page 43.

After you gather your product information, you can submit a service request in either of two ways:

- In the U.S. and Canada, call 1-800-IBM-SERV (1-800-426-7378) to open a hardware report. See http://www.ibm.com/planetwide/ for additional support telephone numbers.

- Go to http://www.ibm.com/support/entry/portal/Open_service_request/ to submit an Electronic Service Request. Submitting an Electronic Service Request will start the process of determining a solution to your problem by making the pertinent information available to IBM Support quickly and efficiently. IBM service technicians can start working on your solution as soon as you have completed and submitted an Electronic Service Request.

For more information about Support Line and other IBM services, see http://www.ibm.com/services/.

How to send Dynamic System Analysis data to IBM

Use the IBM Enhanced Customer Data Repository to send diagnostic data to IBM. Before you send diagnostic data to IBM, read the terms of use at http://www.ibm.com/de/support/ecurep/terms.html.

You can use any of the following methods to send diagnostic data to IBM:
- **Standard upload:** http://www.ibm.com/de/support/ecurep/send_http.html
- **Standard upload with the system serial number:** http://www.ecurep.ibm.com/app/upload_hw
- **Secure upload:** http://www.ibm.com/de/support/ecurep/send_http.html#secure
- **Secure upload with the system serial number:** https://www.ecurep.ibm.com/app/upload_hw

Using the documentation

Information about your IBM system and preinstalled software, if any, or optional device is available in the documentation that comes with the product. That documentation can include printed documents, online documents, readme files, and help files. Also, some documents are available through the IBM Publications Center at http://www.ibm.com/shop/publications/order/.

Getting help and information from the World Wide Web

IBM maintains pages on the World Wide Web where you can get the latest technical information and download device drivers and updates. To access these pages, go to http://www.ibm.com/supportportal/. .

Creating a personalized support web page

At http://www.ibm.com/support/mynotifications/, you can create a personalized support web page by identifying IBM products that are of interest to you. From this personalized page, you can subscribe to weekly email notifications about new technical documents, search for information and downloads, and access various administrative services.

Appendix B. Notices

This information was developed for products and services offered in the U.S.A.

IBM may not offer the products, services, or features discussed in this document in other countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service.

IBM may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to:

IBM Director of Licensing
IBM Corporation
North Castle Drive
Armonk, NY 10504-1785
U.S.A.

INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

Any references in this information to non-IBM websites are provided for convenience only and do not in any manner serve as an endorsement of those websites. The materials at those websites are not part of the materials for this IBM product, and use of those websites is at your own risk.

IBM may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

Trademarks

IBM, the IBM logo, and ibm.com are trademarks of International Business Machines Corp., registered in many jurisdictions worldwide. Other product and service names might be trademarks of IBM or other companies. A current list of IBM trademarks is available on the web at "Copyright and trademark information" at http://www.ibm.com/legal/copytrade.shtml.

Adobe and PostScript are either registered trademarks or trademarks of Adobe Systems Incorporated in the United States and/or other countries.

Cell Broadband Engine is a trademark of Sony Computer Entertainment, Inc., in the United States, other countries, or both and is used under license therefrom.

Intel, Intel Xeon, Itanium, and Pentium are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries.

Java and all Java-based trademarks and logos are trademarks or registered trademarks of Oracle and/or its affiliates.

Linux is a registered trademark of Linus Torvalds in the United States, other countries, or both.

Microsoft, Windows, and Windows NT are trademarks of Microsoft Corporation in the United States, other countries, or both.

UNIX is a registered trademark of The Open Group in the United States and other countries.

Important notes

Processor speed indicates the internal clock speed of the microprocessor; other factors also affect application performance.

CD or DVD drive speed is the variable read rate. Actual speeds vary and are often less than the possible maximum.

When referring to processor storage, real and virtual storage, or channel volume, KB stands for 1024 bytes, MB stands for 1,048,576 bytes, and GB stands for 1,073,741,824 bytes.

When referring to hard disk drive capacity or communications volume, MB stands for 1,000,000 bytes, and GB stands for 1,000,000,000 bytes. Total user-accessible capacity can vary depending on operating environments.

Maximum internal hard disk drive capacities assume the replacement of any standard hard disk drives and population of all hard disk drive bays with the largest currently supported drives that are available from IBM.

Maximum memory might require replacement of the standard memory with an optional memory module.

IBM makes no representation or warranties regarding non-IBM products and services that are ServerProven®, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. These products are offered and warranted solely by third parties.

IBM makes no representations or warranties with respect to non-IBM products. Support (if any) for the non-IBM products is provided by the third party, not IBM.

Some software might differ from its retail version (if available) and might not include user manuals or all program functionality.

Particulate contamination

Attention: Airborne particulates (including metal flakes or particles) and reactive gases acting alone or in combination with other environmental factors such as humidity or temperature might pose a risk to the device that is described in this document. Risks that are posed by the presence of excessive particulate levels or concentrations of harmful gases include damage that might cause the device to malfunction or cease functioning altogether. This specification sets forth limits for particulates and gases that are intended to avoid such damage. The limits must not be viewed or used as definitive limits, because numerous other factors, such as temperature or moisture content of the air, can influence the impact of particulates or environmental corrosives and gaseous contaminant transfer. In the absence of specific limits that are set forth in this document, you must implement practices that maintain particulate and gas levels that are consistent with the protection of human health and safety. If IBM determines that the levels of particulates or gases in your environment have caused damage to the device, IBM may condition provision of repair or replacement of devices or parts on implementation of appropriate remedial measures to mitigate such environmental contamination. Implementation of such remedial measures is a customer responsibility.

Table 22. Limits for particulates and gases

Contaminant	Limits
Particulate	• The room air must be continuously filtered with 40% atmospheric dust spot efficiency (MERV 9) according to ASHRAE Standard 52.2[1]. • Air that enters a data center must be filtered to 99.97% efficiency or greater, using high-efficiency particulate air (HEPA) filters that meet MIL-STD-282. • The deliquescent relative humidity of the particulate contamination must be more than 60%[2]. • The room must be free of conductive contamination such as zinc whiskers.
Gaseous	• Copper: Class G1 as per ANSI/ISA 71.04-1985[3] • Silver: Corrosion rate of less than 300 Å in 30 days

[1] ASHRAE 52.2-2008 - *Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size*. Atlanta: American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.

[2] The deliquescent relative humidity of particulate contamination is the relative humidity at which the dust absorbs enough water to become wet and promote ionic conduction.

[3] ANSI/ISA-71.04-1985. *Environmental conditions for process measurement and control systems: Airborne contaminants*. Instrument Society of America, Research Triangle Park, North Carolina, U.S.A.

Documentation format

The publications for this product are in Adobe Portable Document Format (PDF) and should be compliant with accessibility standards. If you experience difficulties when you use the PDF files and want to request a web-based format or accessible PDF document for a publication, direct your mail to the following address:

> *Information Development*
> *IBM Corporation*
> *205/A015*
> *3039 E. Cornwallis Road*
> *P.O. Box 12195*

Research Triangle Park, North Carolina 27709-2195
U.S.A.

In the request, be sure to include the publication part number and title.

When you send information to IBM, you grant IBM a nonexclusive right to use or distribute the information in any way it believes appropriate without incurring any obligation to you.

Telecommunication regulatory statement

This product may not be certified in your country for connection by any means whatsoever to interfaces of public telecommunications networks.

Further certification may be required by law prior to making any such connection. Contact an IBM representative or reseller for any questions.

Electronic emission notices

When you attach a monitor to the equipment, you must use the designated monitor cable and any interference suppression devices that are supplied with the monitor.

Federal Communications Commission (FCC) statement

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

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

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

Industry Canada Class A emission compliance statement

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

Avis de conformité à la réglementation d'Industrie Canada

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

Australia and New Zealand Class A statement

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

European Union EMC Directive conformance statement

This product is in conformity with the protection requirements of EU Council Directive 2004/108/EC on the approximation of the laws of the Member States relating to electromagnetic compatibility. IBM cannot accept responsibility for any failure to satisfy the protection requirements resulting from a nonrecommended modification of the product, including the fitting of non-IBM option cards.

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

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

European Community contact:
    IBM Deutschland GmbH
    Technical Regulations, Department M372
    IBM-Allee 1, 71139 Ehningen, Germany
    Tele: 0049 (0) 7032 15-2941
    Email: lugi@de.ibm.com

Germany Class A statement

Deutschsprachiger EU Hinweis:

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

Dieses Produkt entspricht den Schutzanforderungen der EU-Richtlinie 2004/108/EG zur Angleichung der Rechtsvorschriften über die elektromagnetische Verträglichkeit in den EU-Mitgliedsstaaten und hält die Grenzwerte der EN 55022 Klasse A ein.

Um dieses sicherzustellen, sind die Geräte wie in den Handbüchern beschrieben zu installieren und zu betreiben. Des Weiteren dürfen auch nur von der IBM empfohlene Kabel angeschlossen werden. IBM übernimmt keine Verantwortung für die Einhaltung der Schutzanforderungen, wenn das Produkt ohne Zustimmung der IBM verändert bzw. wenn Erweiterungskomponenten von Fremdherstellern ohne Empfehlung der IBM gesteckt/eingebaut werden.

EN 55022 Klasse A Geräte müssen mit folgendem Warnhinweis versehen werden: "Warnung: Dieses ist eine Einrichtung der Klasse A. Diese Einrichtung kann im Wohnbereich Funk-Störungen verursachen; in diesem Fall kann vom Betreiber verlangt werden, angemessene Maßnahmen zu ergreifen und dafür aufzukommen."

Deutschland: Einhaltung des Gesetzes über die elektromagnetische Verträglichkeit von Geräten

Dieses Produkt entspricht dem "Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG)". Dies ist die Umsetzung der EU-Richtlinie 2004/108/EG in der Bundesrepublik Deutschland.

Zulassungsbescheinigung laut dem Deutschen Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG) (bzw. der EMC EG Richtlinie 2004/108/EG) für Geräte der Klasse A

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

Verantwortlich für die Einhaltung der EMV Vorschriften ist der Hersteller:
International Business Machines Corp.
New Orchard Road
Armonk, New York 10504
914-499-1900

Der verantwortliche Ansprechpartner des Herstellers in der EU ist:
IBM Deutschland GmbH
Technical Regulations, Department M372
IBM-Allee 1, 71139 Ehningen, Germany
Tele: 0049 (0) 7032 15-2941
Email: lugi@de.ibm.com

Generelle Informationen:

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

VCCI Class A 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 (VCCI). If this equipment is used in a domestic environment, radio interference may occur, in which case the user may be required to take corrective actions.

Japan Electronics and Information Technology Industries Association (JEITA) statement

高調波ガイドライン適合品

Japanese Electronics and Information Technology Industries Association (JEITA) Confirmed Harmonics Guideline (products less than or equal to 20 A per phase).

Korea Communications Commission (KCC) statement

이 기기는 업무용(A급)으로 전자파적합기기로
서 판매자 또는 사용자는 이 점을 주의하시기
바라며, 가정외의 지역에서 사용하는 것을 목
적으로 합니다.

This is electromagnetic wave compatibility equipment for business (Type A). Sellers and users need to pay attention to it. This is for any areas other than home.

Russia Electromagnetic Interference (EMI) Class A statement

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

People's Republic of China Class A electronic emission statement

中华人民共和国 "A类" 警告声明

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

Taiwan Class A compliance statement

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

Index

Numerics

IBM®

Part Number: 00AY391

Printed in USA

(1P) P/N: 00AY391