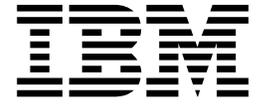


IBM Storage Networking SAN50C-R



# Installation, Service, and User Guide



IBM Storage Networking SAN50C-R



# Installation, Service, and User Guide

**Read Before Using**

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Before you use the information in this publication, be sure to read the general information under "Notices" on page 51.

**Edition notice**

This edition applies to the IBM SAN50C-R Switch and to all subsequent releases and modifications until otherwise indicated in new editions.

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# Contents

Figures . . . . .	v
-------------------	---

Tables . . . . .	vii
------------------	-----

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

Getting help . . . . .	ix
Accessibility features . . . . .	ix
How to send your comments . . . . .	x

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

Safety notices and labels . . . . .	xi
Caution notices . . . . .	xi
Danger notices . . . . .	xiii
Safety labels . . . . .	xvi
Attention notices . . . . .	xvii
ESD precautions . . . . .	xviii
Rack safety . . . . .	xviii
Rack installation . . . . .	xviii
Rack relocation (19" rack) . . . . .	xx
Product recycling and disposal . . . . .	xx

About this document . . . . .	xxi
-------------------------------	-----

IBM and Cisco product matrix . . . . .	xxi
Product documentation . . . . .	xxi

Chapter 1. Introducing the SAN50C-R . . . . .	1
---	---

Introduction . . . . .	1
Chassis . . . . .	2
Integrated Supervisor Module . . . . .	3
Front and rear panels . . . . .	4
Fan Modules . . . . .	6
Power Supplies . . . . .	8
Supported Transceivers . . . . .	12

Chapter 2. Installing the IBM SAN50C-R switch . . . . .	13
---	----

Unpacking and Inspecting the Switch . . . . .	13
Site requirements . . . . .	14
Airflow Considerations . . . . .	15
Required Equipment . . . . .	15
Installation Options . . . . .	15
Installation Guidelines . . . . .	16
Installing the Switch . . . . .	17
Grounding the system . . . . .	21
Starting the Switch . . . . .	24
Powering Up the Switch and Verifying Component Installation . . . . .	24
Installing and Removing Power Supplies . . . . .	25
Removing an AC Power Supply . . . . .	25
Installing an AC Power Supply . . . . .	26
Removing and Installing Fan Modules . . . . .	26
Removing a Fan Module . . . . .	27
Installing a Fan Module . . . . .	27

Chapter 3. Cabinet and Rack Installation . . . . .	29
--	----

Rack Requirements . . . . .	29
Rack-Mounting Guidelines . . . . .	30
Before Installing the Rack-Mount Support Brackets . . . . .	31
Installing the Switch on the Shelf Brackets . . . . .	31
Installing the Shelf Bracket Kit into a Four-Post EIA Rack . . . . .	31
Installing the Switch on the Rack-Mount Support Brackets . . . . .	33
Installing the Switch on the Rack-Mount Support Brackets . . . . .	33
Installing the IBM SAN50C-R Shelf Bracket Kit into a Rack . . . . .	33
Installing the Switch on the Shelf Brackets . . . . .	34

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

Connection Guidelines . . . . .	37
Preparing for Network Connections . . . . .	37
Connecting to the Console Port . . . . .	38
Connecting to the MGMT 10/100/1000 Ethernet Port . . . . .	38
Connecting to a Fibre Channel Port . . . . .	39
Removing and Installing SFP Transceivers . . . . .	39
Maintaining SFP Transceivers and Fiber-Optic Cables . . . . .	42

Appendix A. Product specifications . . . . .	43
--	----

Appendix B. Site Planning and Maintenance Records . . . . .	49
---	----

Contacting Customer Service . . . . .	49
Site Preparation Checklist . . . . .	49
Finding the Chassis Serial Number . . . . .	49

Notices . . . . .	51
-------------------	----

Trademarks . . . . .	52
Homologation statement . . . . .	52
Electronic emission notices . . . . .	52
Federal Communications Commission Statement . . . . .	52
Industry Canada Compliance Statement . . . . .	53
Australia and New Zealand Class A Statement . . . . .	53
European Union Electromagnetic Compatibility Directive . . . . .	53
Germany Electromagnetic Compatibility Directive . . . . .	54
People's Republic of China Class A Statement . . . . .	56
Taiwan Class A Statement . . . . .	56
Taiwan Contact Information . . . . .	56
Japan Voluntary Control Council for Interference Class A Statement . . . . .	56
Japan Electronics and Information Technology Industries Association Statement . . . . .	57
Korean Communications Commission Class A Statement . . . . .	57

Russia Electromagnetic Interference Class A  
Statement . . . . . 58

**Index . . . . . 59**

---

## Figures

1. IBM SAN50C-R Front View . . . . .	1	9. IBM SAN50C-R Switch 300W AC Power Supply	9
2. IBM SAN50C-R Rear View . . . . .	2	10. IBM SAN50C-R Switch PSU . . . . .	10
3. IBM SAN50C-R Fan Module . . . . .	3	11. Connecting an ATS for power grid level redundancy . . . . .	11
4. Fan Blank Module . . . . .	3	12. Power modes when FcoE ports are in ADMIN DOWN state . . . . .	11
5. IBM SAN50C-R Ports and LEDs . . . . .	4	13. Power modes when FcoE ports are in ADMIN UP state. . . . .	12
6. IBM SAN50C-R Rear View Fan Bays and PSU Bays . . . . .	6		
7. IBM SAN50C-R Fan Module . . . . .	7		
8. IBM SAN50C-R Switch Front View LEDs	8		



---

## Tables

1. Cisco and IBM product and model number matrix . . . . .	xxi	13. Power requirements specifications for a 16 Gbps fibre channel SFP+ transceivers . . . . .	45
2. IBM IBM SAN50C-R front panel LEDs . . . . .	5	14. Environmental requirements specifications for a 16 Gbps fibre channel SFP= transceivers . . . . .	45
3. Facility requirements . . . . .	14	15. Power requirements specifications for a 10 Gbps fibre channel SFP= transceivers . . . . .	45
4. IBM SAN50C-R Fabric Switch Rack-Mount Kit . . . . .	17	16. Power requirements specifications for a 10 Gbps fibre channel SFP= transceivers . . . . .	46
5. Contents of Shelf Bracket Kit. . . . .	31	17. Environmental requirements specifications for a 10 Gbps fibre channel SFP= transceivers . . . . .	46
6. Contents of Shelf Bracket Kit. . . . .	31	18. General specifications for a 8 Gbps fibre channel SFP= transceivers. . . . .	46
7. Environmental specifications for the IBM SAN50C-R switch . . . . .	43	19. Power requirements specifications for a 8 Gbps fibre channel SFP= transceivers . . . . .	46
8. Physical specifications for the IBM SAN50C-R switch . . . . .	43	20. Environmental requirements specifications for a 8 Gbps fibre channel SFP= transceivers. . . . .	47
9. IBM IBM SAN50C-R switch AC input power supply specifications . . . . .	43	21. Maximum environmental and electrical ratings for fibre channel SFP+ transceivers. . . . .	47
10. Typical AC power consumption for the IBM SAN50C-R switch . . . . .	44		
11. SFP+ Fibre Channel Transceivers . . . . .	44		
12. Power requirements specifications for a 16 Gbps fibre channel SFP= transceivers . . . . .	45		



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## Read this first

### Summary of changes

This is the first edition of the IBM® Storage Networking SAN50C-R Installation, Service, and User Guide.

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## Getting help

For the latest version of your product documentation, visit the web at <http://www.elink.ibm.link.ibm.com/public/applications/publications/cgibin/pbi.cgi>.

For more information about IBM SAN products, see the following Web site:<http://www.ibm.com/servers/storage/san/>

For support information for this product and other SAN products, see the following Web site:<http://www.ibm.com/servers/storage/support/san>

For detailed information about the Fibre Channel standards, see the Fibre Channel Industry Association (FCIA) Web site at: [www.fibrechannel.org/](http://www.fibrechannel.org/)

Visit [www.ibm.com/contact](http://www.ibm.com/contact) for the contact information for your country or region.

You can also contact IBM within the United States at 1-800-IBMSERV (1-800-426-7378). For support outside the United States, you can find the service number at: <http://www.ibm.com/planetwide/>.

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## Accessibility features

Accessibility features help users who have a disability, such as restricted mobility or limited vision, to use information technology products successfully.

### Accessibility features

The following list includes the major accessibility features in this product:

- This product follows WCAG 2.0 Guidelines but has limited accessibility support.

### Keyboard navigation

This product does not have an attached or integrated keyboard. Any keyboard navigation is provided through the Data Center Network Manager (DCNM) software and GUI.

### Interface information

You can view the publications for this product in Adobe Portable Document Format (PDF) using the Adobe Acrobat Reader. The PDFs are provided on a product documentation CD-ROM that is packaged with the product. The CD-ROM also includes an accessible HTML version of this document.

## Vendor software

This product includes certain vendor software that is not covered under the IBM license agreement. IBM makes no representation about the accessibility features of these products. Contact the vendor for the accessibility information about its products.

## Related accessibility information

In addition to standard IBM help desk and support websites, IBM has a TTY telephone service for use by deaf or hard of hearing customers to access sales and support services:

TTY service  
800-IBM-3383 (800-426-3383)  
(within North America)

## IBM and accessibility

For more information about the commitment that IBM has to accessibility, see IBM Accessibility([www.ibm.com/able](http://www.ibm.com/able)).

---

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- Exact publication title
- Form number (for example, GC27-2270-00)
- Page numbers to which you are referring

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## Safety and environmental notices

This section contains information about:

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

---

### Safety notices and labels

When using this product, observe the danger, caution, and attention notices contained in this guide. The notices are accompanied by symbols that represent the severity of the safety condition. The danger and caution notices are listed in numerical order based on their IDs, which are displayed in parentheses, for example (D004), at the end of each notice. Use this ID to locate the translation of these danger and caution notices in the Safety Notices publication that is shipped with this product.

The following notices and statements are used in IBM documents. They are listed below in order of increasing severity of potential hazards. Follow the links for more detailed descriptions and examples of the danger, caution, and attention notices in the sections that follow.

- **Note:** These notices provide important tips, guidance, or advice.
- **“Attention notices” on page xvii:** These notices indicate potential damage to programs, devices, or data.
- **“Caution notices”:** These statements indicate situations that can be potentially hazardous to you.
- **“Danger notices” on page xiii:** These statements indicate situations that can be potentially lethal or extremely hazardous to you. Safety labels are also attached directly to products to warn of these situations.
- In addition to these notices, “Safety labels” on page xvi may be attached to the product to warn of potential hazards.

---

### Caution notices

A caution notice calls attention to a situation that is potentially hazardous to people because of some existing condition. A caution notice can be accompanied by different symbols, as in the examples below:

Example symbol	Symbol meaning
	A hazardous electrical condition with less severity than electrical danger.
	A generally hazardous condition not represented by other safety symbols.

Example symbol	Symbol meaning
	A specification of product weight that requires safe lifting practices. The weight range of the product is listed below the graphic, and the wording of the caution varies, depending on the weight of the device.
	A potential hazard of pinching the hand or other body parts between parts.
	A hazardous condition due to moving parts nearby.
	A hazardous condition due to the use of a laser in the product. Laser symbols are always accompanied by the classification of the laser as defined by the U. S. Department of Health and Human Services (for example, Class I, Class II, and so forth).

Read and comply with the following caution notices before installing or servicing this device.



**CAUTION:**  
Energy hazard present. Shorting may result in system outage and possible physical injury. Remove all metallic jewelry before servicing. (C001)



>55kg (121.2 lb)

**CAUTION:**  
The weight of this part or unit is more than 55 kg (121.2 lb). It takes specially trained persons, a lifting device, or both to safely lift this part or unit. (C011)



**CAUTION:**  
The system contains circuit cards, assemblies, or both that may contain lead solder. To avoid the release of lead (Pb) into the environment, do not burn. Discard the circuit card as instructed by local regulations. (C014)



**CAUTION:**  
This product is equipped with a 3-wire (two conductors and ground) power cable and plug. Use this power cable with a properly grounded electrical outlet to avoid electrical shock. (C018)



Class I

**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:**

The power-control button on the device does not turn off the electrical current supplied to the device. The device might also have more than one connection to dc power. To remove all electrical current from the device, ensure that all connections to dc power are disconnected at the dc power input terminals. (C031)



**CAUTION:**

Servicing of this product or unit is to be performed by trained service personnel only. (C032)

**CAUTION:**

For CA residents only: IBM recommends installing this product in a room size of 62 cubic meters (2190 cubic feet) or larger at 0.4 ACH ventilation rate to reduce the concentrations of any chemicals emitted by the product.

---

## Danger notices

A danger notice calls attention to a situation that is potentially lethal or extremely hazardous to people. A lightning bolt symbol accompanies a danger notice to represent a dangerous electrical condition. Read and comply with these danger notices before installing or servicing this device.



**DANGER**

To prevent a possible shock from touching two surfaces with different protective ground (earth), use one hand, when possible, to connect or disconnect signal cables. (D001)



**DANGER**

Overloading a branch circuit is potentially a fire hazard and a shock hazard under certain conditions. To avoid these hazards, ensure that your system electrical requirements do not exceed branch circuit protection requirements. Refer to the information that is provided with your device or the power rating label for electrical specifications. (D002)



**DANGER**

If the receptacle has a metal shell, do not touch the shell until you have completed the voltage and grounding checks. Improper wiring or grounding could place dangerous voltage on the metal shell. If any of the conditions are not as described, *STOP*. Ensure the improper voltage or impedance conditions are corrected before proceeding. (D003)



**DANGER**

An electrical outlet that is not correctly wired could place hazardous voltage on 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)

A general electrical danger notice provides instructions on how to avoid shock hazards when servicing equipment. Unless instructed otherwise, follow the procedures in this danger notice.



## DANGER

When working on or around the system, observe the 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 below 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)

## Delivery and subsequent transportation of the equipment

The customer should prepare his environment to accept the new product based on the installation planning information provided, with assistance from an IBM

Installation Planning Representative (IPR) or IBM authorized service provider. In anticipation of the equipment delivery, the final installation site should be prepared in advance such that professional movers/riggers can transport the equipment to the final installation site within the computer room. If for some reason, this is not possible at the time of delivery, the customer will need to make arrangements to have professional movers/riggers return to finish the transportation at a later date. Only professional movers/riggers should transport the equipment. The IBM authorized service provider will only perform minimal frame repositioning within the computer room, as needed, to perform required service actions. The customer is also responsible for using professional movers/riggers in the case of equipment relocation or disposal.



**DANGER**

**Heavy equipment—personal injury or equipment damage might result if mishandled. (D006)**

---

## Safety labels

As an added precaution, safety labels are often installed directly on products or product components to warn of potential hazards. These can be either danger or caution notices, depending upon the level of the hazard.

The actual product safety labels may differ from these sample safety labels:



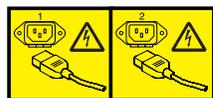
**DANGER**

**Hazardous voltage, current, or energy levels are present inside any component that has this label attached. Do not open any cover or barrier that contains this label. (L001)**



**DANGER**

**Rack-mounted devices are not to be used as a shelf or work space. (L002)**



**DANGER**

**Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)**



#### DANGER

Hazardous voltage present. Voltages present constitute a shock hazard, which can cause severe injury or death. (L004)



#### CAUTION:

Hazardous moving parts nearby. (L008)

---

## Attention notices

An attention notice indicates the possibility of damage to a program, device, or system, or to data. An exclamation point symbol may accompany an attention notice, but is not required. A sample attention notice follows:

**Attention:** Do not bend a fibre cable to a radius less than 5 cm (2 in.); you can damage the cable. Tie wraps are not recommended for optical cables because they can be easily overtightened, causing damage to the cable.

---

## ESD precautions

**Attention:** Many of the field replaceable units (FRUs) are sensitive to electrostatic discharge (ESD), and can potentially be damaged by improper handling. When working with any FRU, use correct ESD precautions:

- Attach ground to the indicated area on the chassis
- Wear a wrist grounding strap connected to chassis ground (if the switch is plugged in) or a bench ground.

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

- Store ESD-sensitive components in antistatic packaging

---

## Rack safety

### Rack installation

#### DANGER

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

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



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

(R001 part 1 of 2)

**CAUTION:**

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

**(R001 part 2 of 2)**

## Rack relocation (19" rack)

### CAUTION:

Removing components from the upper positions in the rack cabinet improves rack stability during relocation. Follow these general guidelines whenever you relocate a populated rack cabinet within a room or building:

- Reduce the weight of the rack cabinet by removing equipment starting at the top of the rack cabinet. When possible, restore the rack cabinet to the configuration of the rack cabinet as you received it. If this configuration is not known, you must complete these steps:
  - Remove all devices in the 32U position and above.
  - Ensure that the heaviest devices are installed in the bottom of the rack cabinet.
  - Ensure that there are no empty U-levels between devices installed in the rack cabinet below the 32U level.
  - If the rack cabinet you are relocating is part of a suite of rack cabinets, detach the rack cabinet from the suite.
  - Inspect the route that you plan to take when moving the rack to eliminate potential hazards.
  - Verify that the route that you choose can support the weight of the loaded rack cabinet. Refer to the documentation that came with your rack cabinet for the weight of a loaded rack cabinet.
  - Verify that all door openings are at least 760 x 2030 mm (30 x 80 in.).
  - Ensure that all devices, shelves, drawers, doors, and cables are secure.
  - Ensure that the four leveling pads are raised to their highest position.
  - Ensure that there is no stabilizer bracket installed on the rack cabinet during movement.
  - Do not use a ramp inclined at more than 10 degrees.
  - Once the rack cabinet is in the new location, do the following:
    - Lower the four leveling pads.
    - Install stabilizer brackets on the rack cabinet.
    - If you removed any devices from the rack cabinet, repopulate the rack cabinet from the lowest position to the highest position.
  - If a long distance relocation is required, restore the rack cabinet to the configuration of the rack cabinet as you received it. Pack the rack cabinet in the original packaging material, or equivalent. Also, lower the leveling pads to raise the casters off of the pallet and bolt the rack cabinet to the pallet.

(R002)

---

## Product recycling and disposal

Refer to the *IBM Systems Environmental Notices and User Guide (Z125-5823)* for translated environmental statements and information regarding product recycling and disposal. This document may be provided either in printed version or on the product documentation CD. A more current version may be available through this link [ftp://public.dhe.ibm.com/systems/support/warranty/envnotices/environmental\\_notices\\_and\\_user\\_guide.pdf](ftp://public.dhe.ibm.com/systems/support/warranty/envnotices/environmental_notices_and_user_guide.pdf).

---

## About this document

This document is intended for use by systems administrators and technicians experienced with networking, Fibre Channel, and storage area network (SAN) technologies. It describes how to install, service, and use the IBM Storage Networking SAN50C-R (machine type 8977-R50) Switch. Throughout this document, the product is referred to as the *IBM SAN50C-R*, or simply the *switch*.

This document has been created to include information specific to IBM SAN50C-R switches running on NX-OS version 8.1(1b), or later. This document does not support all NX-OS versions. It is specific to NX-OS version 8.1(1b), or later. Refer to the NX-OS version 8.1(1b) Release Notes for more information.

---

## IBM and Cisco product matrix

The product matrix provides a cross-reference between the comparable IBM and Cisco product models.

When you use any of the Cisco documents, such as the Fabric Configuration Guide, you will notice that the model numbers reflect the corresponding Cisco products. Table 1 provides a product matrix to correlate the Cisco products and models to the IBM product names and machine types and model numbers. Products withdrawn from marketing are not listed.

*Table 1. Cisco and IBM product and model number matrix*

Cisco product name	IBM product name	IBM machine type and model number
9132T Fabric Switch	SAN32C-6	8977 Model T32
9250i Multiservice Switch	SAN50C-R	8977 Model R50
9706 Multilayer Director	SAN192C-6	8978 Model E04
9710 Multilayer Director	SAN384C-6	8978 Model E08
9718 Multilayer Director	SAN768C-6	8978 Model E16

---

## Product documentation

The following documents contain information related to this product:

- *IBM SAN32C-6 Installation, Service and User Guide, SC27-9275-00*
- *IBM SAN50C-R Installation, Service and User Guide, SC27-9274-00*
- *IBM SAN192C6, 384C-6, 768C-6 Installation, Service and User Guide, SC27-9276-00*



---

## Chapter 1. Introducing the SAN50C-R

This topic provides the following information:

- “Introduction”
- “Chassis” on page 2
- “Integrated Supervisor Module” on page 3
- “Front and rear panels” on page 4
- “Fan Modules” on page 6
- “Power Supplies” on page 8
- “Supported Transceivers” on page 12

---

### Introduction

The IBM Storage Networking SAN50C-R Switch is an optimized platform for deploying high-performance SAN extension solutions, distributed intelligent fabric services, and cost-effective multiprotocol connectivity for both open systems and mainframe environments. The IBM SAN50C-R Switch offers 40 auto-sensing 2-, 4-, 8-, and 16-Gbps line-rate Fibre Channel ports, eight 10-Gbps Ethernet Fibre Channel over Ethernet (FCoE) ports, and two 10-Gbps Ethernet IP storage services ports in a fixed two-rack-unit (2RU) form factor.

The IBM SAN50C-R Switch can be deployed in the existing native Fibre Channel networks, which ensures protection of your investments in storage networks. Two 1/10-Gbps ports support Small Computer System Interface over IP (iSCSI) storage services. By using the eight 10-Gbps Ethernet FCoE ports, the IBM SAN50C-R Switch can be attached to the directly connected Fibre Channel over Ethernet (FCoE) and Fibre Channel storage devices. The IBM SAN50C-R Switch supports multi-tiered unified network fabric connectivity directly over FCoE. The IBM SAN50C-R Switch has front-to-back airflow and comes with a set of storage services for Fibre Channel and FCoE SANs with Fibre Channel over IP (FCIP), IO accelerator (IOA), and data mobility migration (DMM).

The IBM SAN Extension over IP application package license is enabled as standard on the two fixed 1/10 Gbps Ethernet IP storage services ports, enabling features such as and compression on the switch without additional licenses.

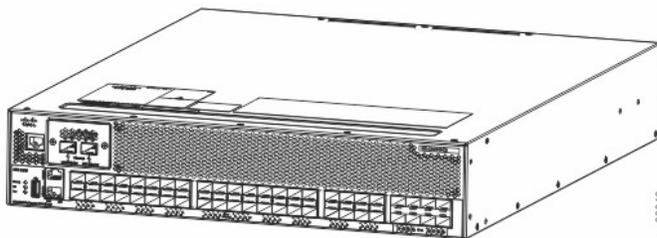


Figure 1. IBM SAN50C-R Front View

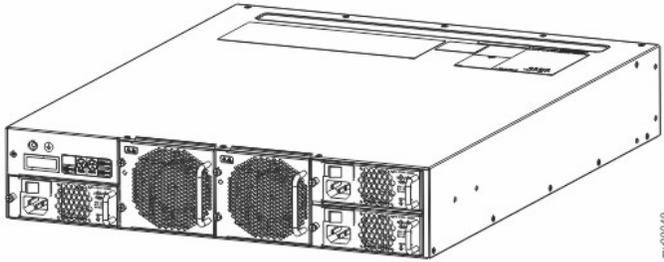


Figure 2. IBM SAN50C-R Rear View

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## Chassis

The IBM SAN50C-R Switch has a nonremovable supervisor module with 40 integrated 16-Gbps FC ports and eight 10-Gbps Ethernet Fibre Channel over Ethernet (FCoE) ports.

The IBM SAN50C-R Switch also has these additional modules.

- A 2 port 1/10-Gbps Ethernet IP storage services module
- A USB port on the front panel for code uploads, configuration file backups, log dumps, and report capture
- A nonremovable interface module (located on the left side of the integrated supervisor module), which provides one RS-232 console port and one out of band management 10/100 Mbps Ethernet port
- Three power supplies that are redundant by default

**Note:** To obtain grid level redundancy, it is recommended that you use a dual power source ATS with the switch. For more information, see Power Supplies.

- Two hot-swappable fans that are redundant by default

### IBM SAN50C-R Integrated Supervisor Module

The nonremovable IBM SAN50C-R integrated supervisor module provides the control and management functions of the IBM SAN50C-R Multiservice Fabric switch, and it includes 40 integrated 16-Gbps Fibre Channel switching ports and eight 10-Gbps Ethernet Fibre Channel over Ethernet (FCoE) port modules.

The IBM SAN50C-R integrated supervisor module has a PowerPC 8572E processor. It also has an internal CompactFlash card that provides 4 GB of storage for software images. The NVRAM consists of a battery, a battery controller and 512 Kx16 SRAM. SRAM used to store event logs, core dumps that are required to be stored after a power cycles.

The IBM Storage Networking SAN50C-R Switch fan modules have a fixed handle for inserting and removing from the chassis. The IBM SAN50C-R Switch requires a minimum of one and a maximum of two operating fan modules. This provides redundancy for uninterrupted operation in the event of fan module failure. The IBM SAN50C-R Switch fan modules are hot-swappable to allow swapping out of a fan module during operation for uninterrupted operation. Fan blank modules must be installed in empty fan bays when operating for longer than several minutes to provide correct airflow. If the airflow is inadequate the preset temperature thresholds will be exceeded and the system will automatically shut down to

prevent permanent damage.

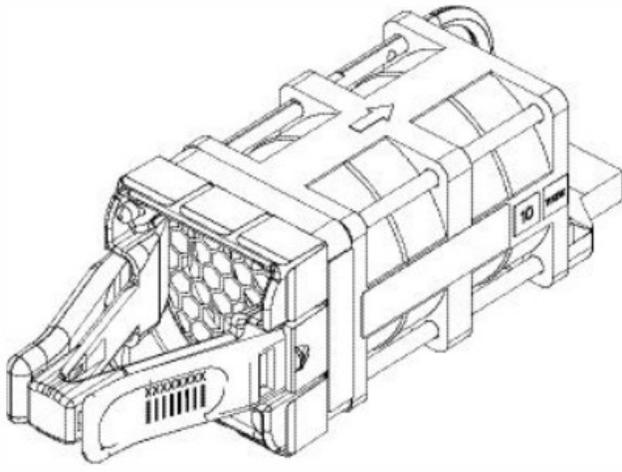


Figure 3. IBM SAN50C-R Fan Module

The IBM SAN50C-R supports front to rear air flow with port-side exhaust.

The following figure shows a fan blank module:

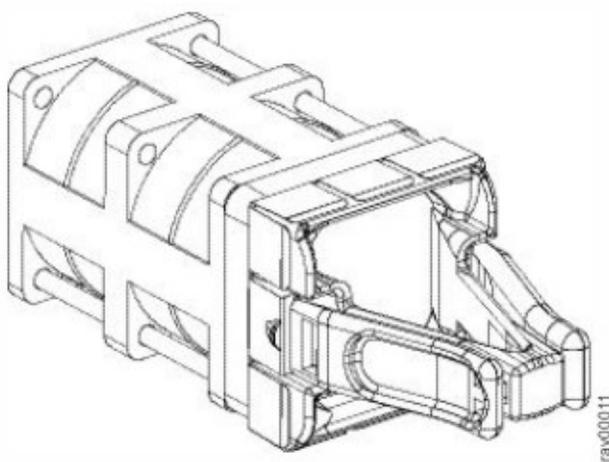


Figure 4. Fan Blank Module

For more information on installing and removing fan modules, see “Removing and Installing Fan Modules” on page 26.

---

## Integrated Supervisor Module

The nonremovable IBM SAN50C-R Integrated Supervisor Module provides the control and management functions of the IBM Storage Networking SAN50C-R switch, and it includes 40 integrated 16-Gbps Fibre Channel switching ports and eight 10-Gbps Ethernet Fibre Channel over Ethernet (FCoE) port modules.

The IBM SAN50C-R integrated supervisor module has a PowerPC 8572E processor. It also has an internal CompactFlash card that provides 4 GB of storage for software images. The non-volatile random-access memory (NVRAM) consists of a

battery, a battery controller and 512 Kx16 static random-access memory (SRAM). SRAM stores event logs, core dumps that are required to be stored after a power cycles.

## Front and rear panels

The front panel of the IBM SAN50C-R Switch has the following LEDs.

- Status LED
- P/S LED
- FAN LED

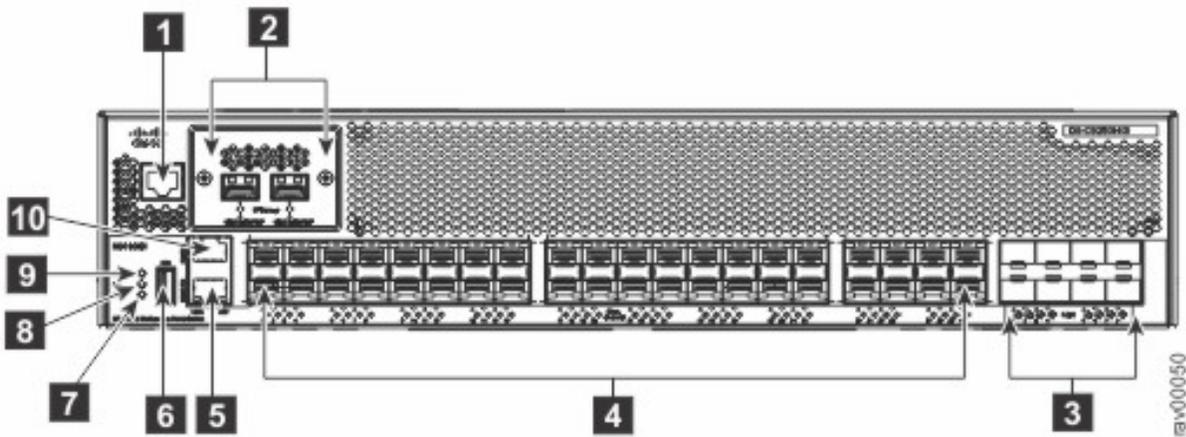


Figure 5. IBM SAN50C-R Ports and LEDs

1	CONSOLE Debug Port	6	USB Port
2	10G iSCSI/FC Ports	7	STATUS LED
3	FCoE Ports	8	P/S LED
4	Fibre Channel Ports	9	FAN LED
5	MGMT ETH Port	10	CONSOLE Port

The LEDs on the supervisor module indicate the status of the supervisor module, power supplies, and the system as a whole.

Table 2. IBM IBM SAN50C-R front panel LEDs

LED	Status	Description
Status	Green	All diagnostics pass. The module is operational (normal initialization sequence).
	Orange	The module is booting or running diagnostics (normal initialization sequence)  An over-temperature condition has occurred. (A minor temperature threshold has been exceeded during environmental monitoring.)
	Red blinking	One of the following occurred: <ul style="list-style-type: none"> <li>• The diagnostic test failed.</li> <li>• An over-temperature condition has occurred. (A major temperature threshold has been exceeded during environmental monitoring.)</li> <li>• The module is not operational because a fault occurred during the initialization sequence.</li> </ul>
	Red	The power is on, but it did not boot up the Diag or iSAN image.
P/S	Green	Power supply is OK.
	Red	Power supply failed.
	Off	The module is not receiving power.
FAN	Green	Power supply is OK.
	Red	Power supply failed.
	Off	TheFAN is not receiving power.
LINK	Red	The Ethernet port is connected to a device.
	Off	The Ethernet port is not connected to a device.
ACT	Orange blinking	Data is being transmitted through this interface.
	Off	No data is being transmitted.
1-48	Green	The link is up.
	Green blinking	The link is up and traffic is passing through the port.
	Off	The port is shut down

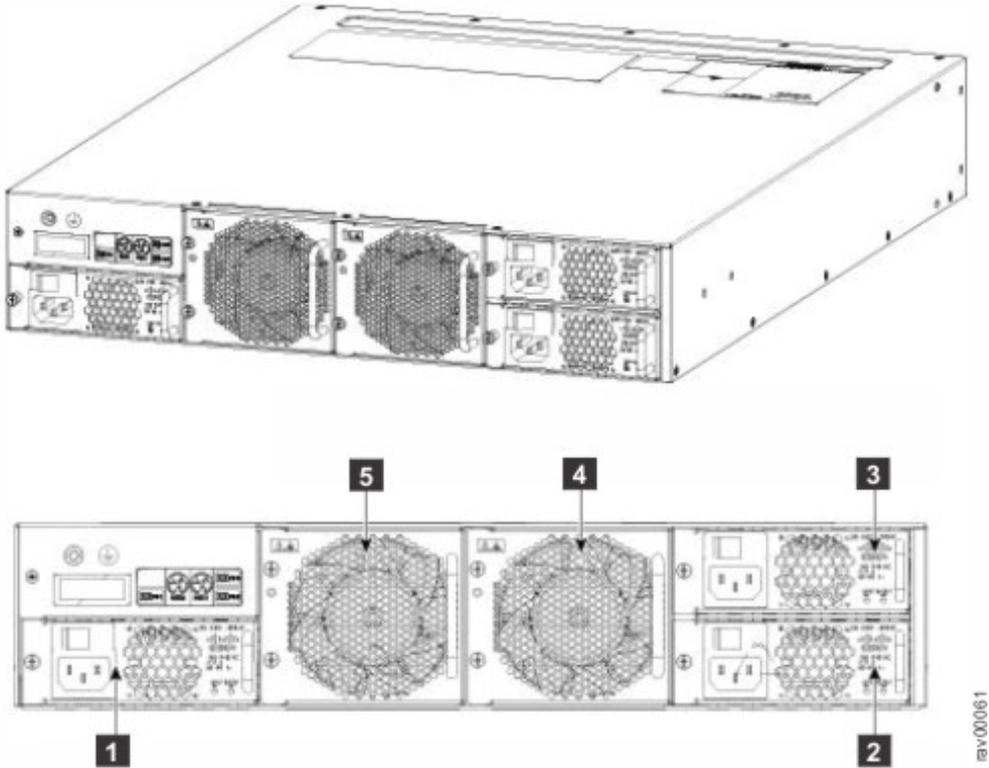
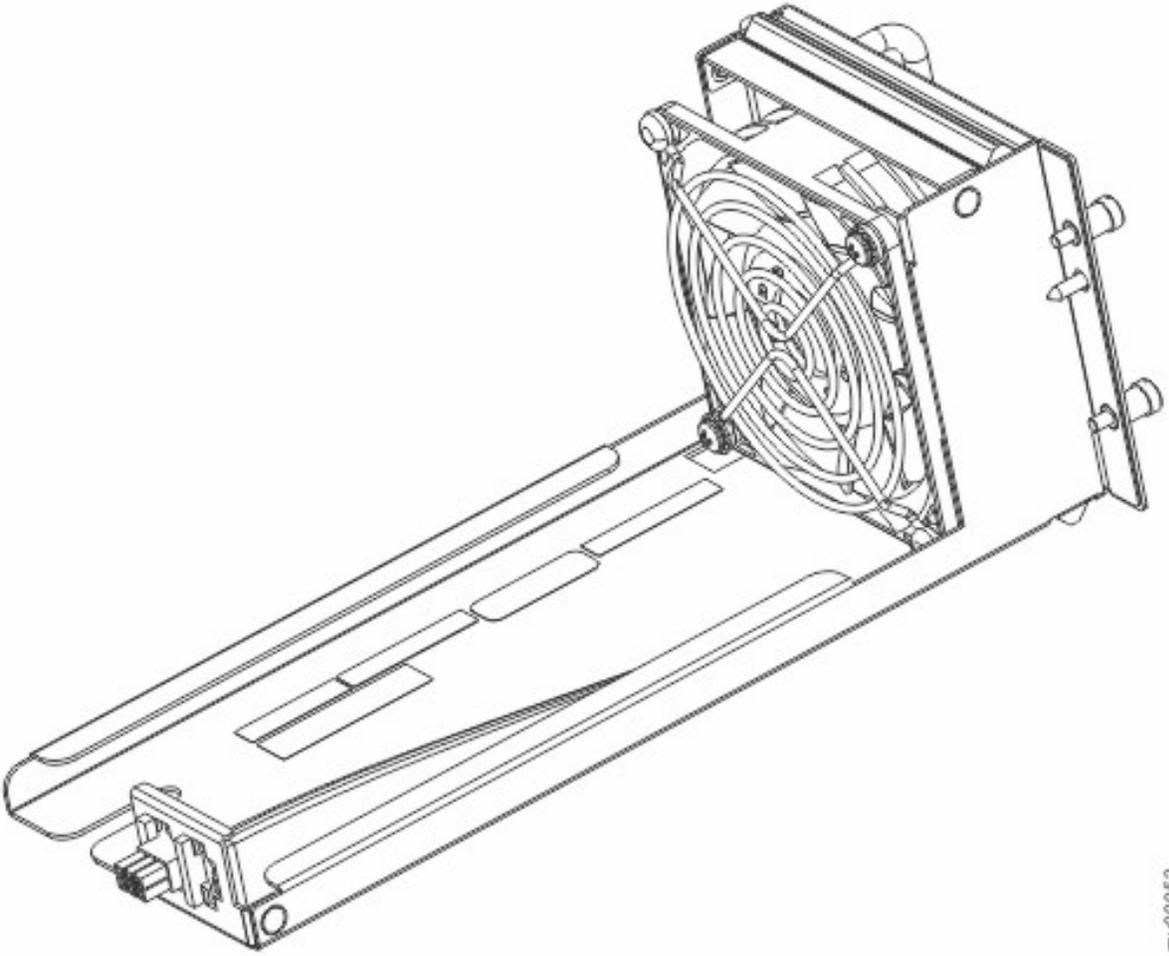


Figure 6. IBM SAN50C-R Rear View Fan Bays and PSU Bays

1	PSU Bay 1	4	Fan Bay 1
2	PSU Bay 2	5	Fan Bay 2
3	PSU Bay 3		

## Fan Modules

The IBM Storage Networking SAN50C-R Switch has two fan trays that are installed vertically at the back of the chassis. Each fan module can be removed while the other fan module continues to move air through the chassis.



ibv00052

Figure 7. IBM SAN50C-R Fan Module

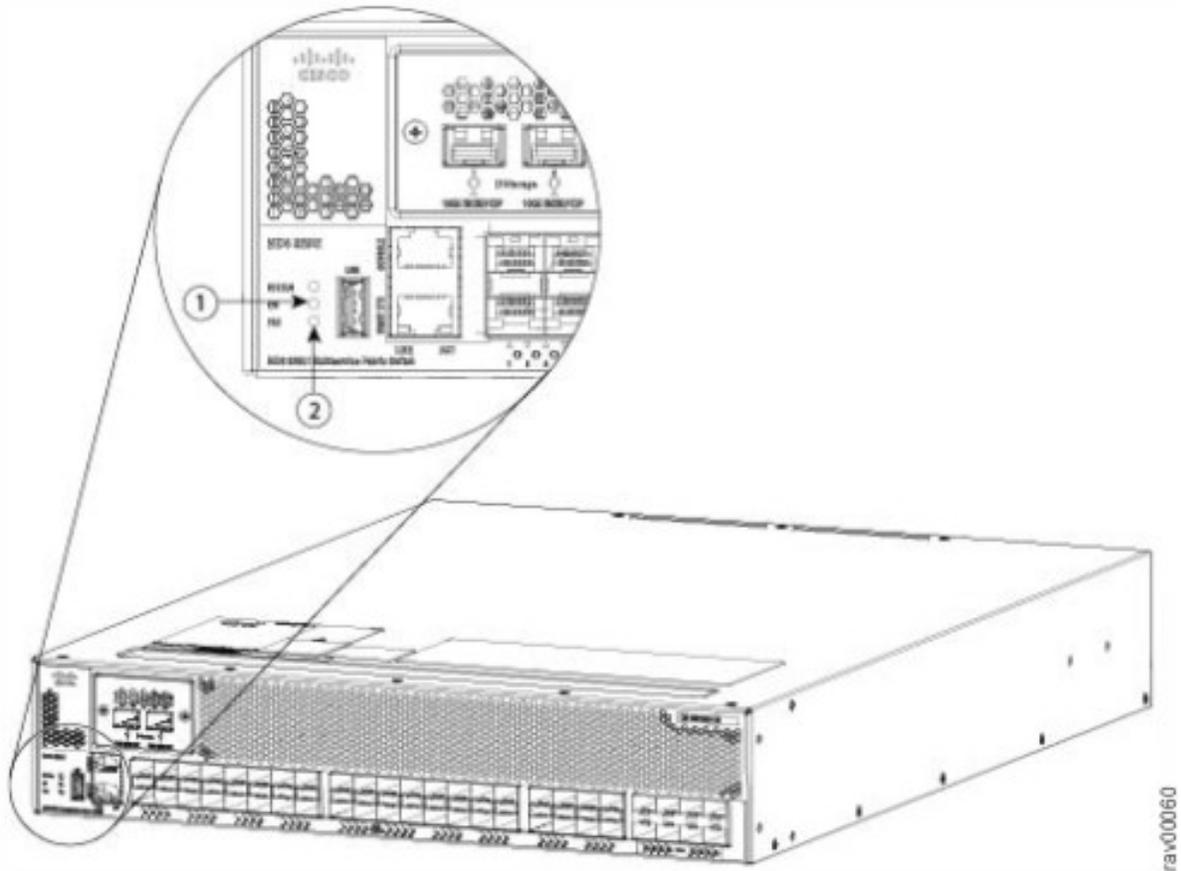


Figure 8. IBM SAN50C-R Switch Front View LEDs

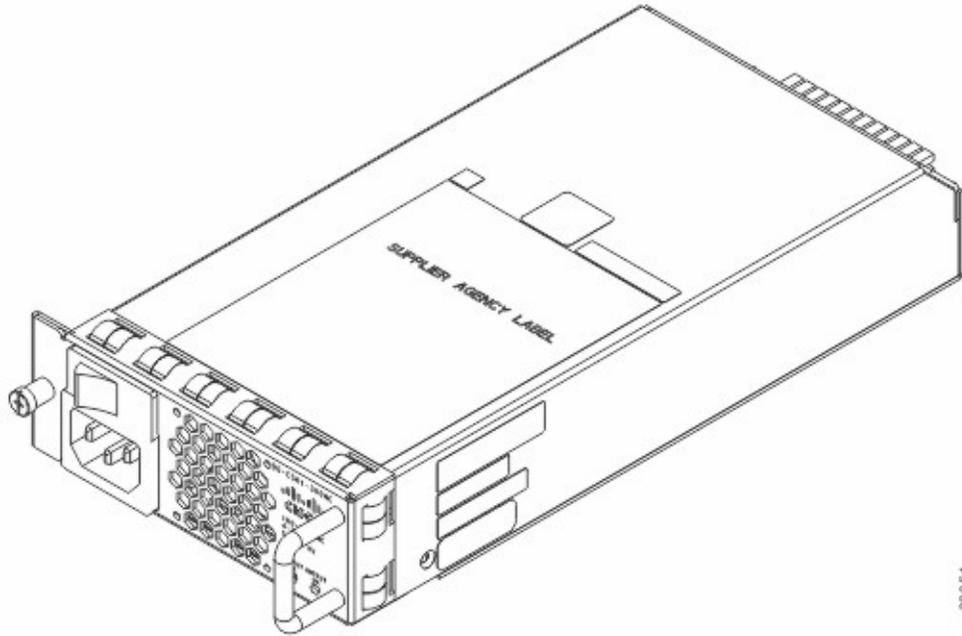
One fan can fail without affecting the thermal performance of the system. Redundant fan controllers and other internal mechanisms are in place to ensure that any single fan tray does not go down.

If any single fan fails, the system continues to operate under all conditions. Two fan failures might cause alarms from ASIC when the temperature exceeds the threshold. At 104°F (40°C) or less, a single fan tray can be removed and the system can continue to operate long enough to allow for replacement of a failed fabric module or fan tray.

---

## Power Supplies

The IBM SAN50C-R switch has capacity for up to three hot swappable 300 W AC power supply units (PSUs). The following graphic illustrates the power supply unit.



rev00051

Figure 9. IBM SAN50C-R Switch 300W AC Power Supply

The following figure shows a fan blank module:

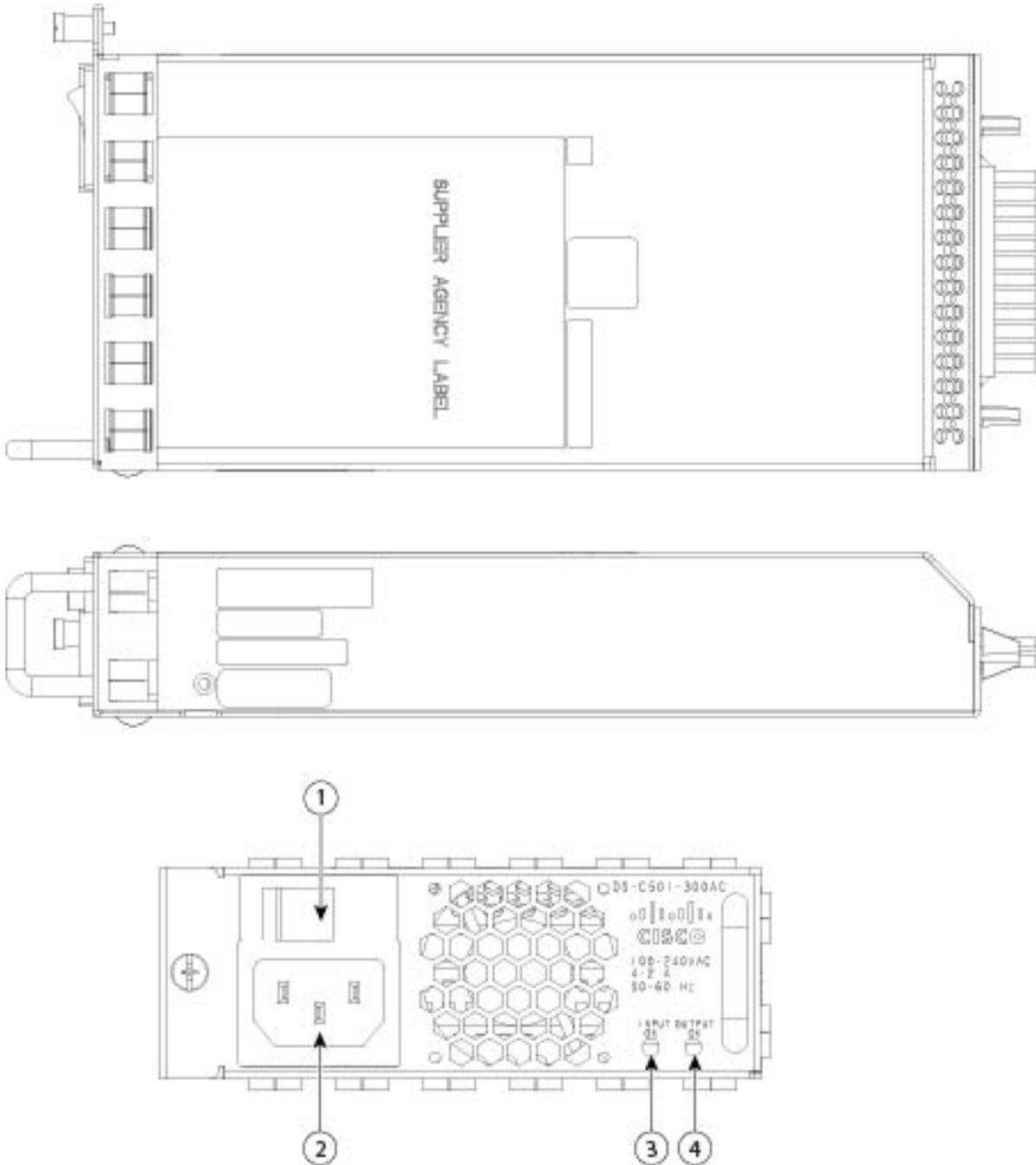


Figure 10. IBM SAN50C-R Switch PSU

1	Switch
2	Socket
3	Input LED
4	Output LED

Each PSU can provide information about itself to the supervisor. The two types of information available are status information (output voltage, fan state, unit state)

and part information (serial number and revision). When connected to nominal 110 or 220 VAC input each PSU provides 300 W of output power.

In the default configuration and with all three PSUs installed, the IBM SAN50C-R switch has N+1 PSU redundancy. The only power redundancy mode available is redundant; combined mode is not supported on this platform.

To obtain grid redundancy with the IBM SAN50C-R switch an Automatic Transfer Switch (ATS) is required. An ATS is a third party power switch that connects to two power sources (usually different power grids) to provide uninterrupted power to downstream devices in the event of one of the sources failing. Connect one of the PSUs to the ATS and each of the other PSUs to separate grids. It is not necessary to connect all three PSUs to the ATS..

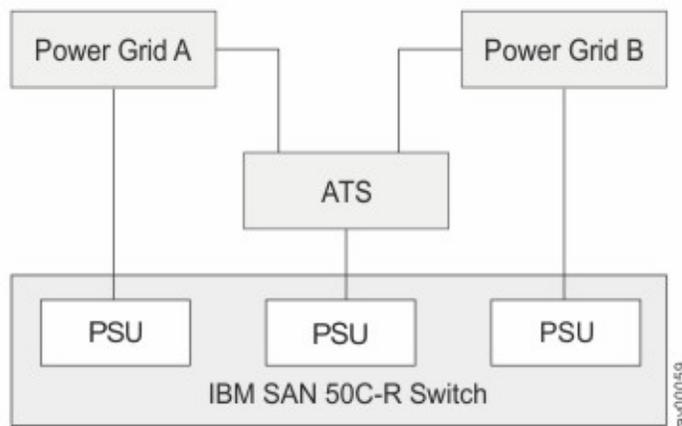


Figure 11. Connecting an ATS for power grid level redundancy

In this way the ATS is not a single point of failure. If it fails then the two PSUs directly connected to the grids supply enough power. Similarly, if one of the grids fails, two PSUs remain functional – one through the ATS and the other directly connected to the other grid.

The APC AP7721 has been verified to work with the IBM SAN50C-R switch.

If insufficient power is available to the IBM SAN50C-R switch the system puts the remaining PSUs in shutdown mode to prevent heat damage to them. A PSU in this mode can be identified by the green input LED and red output LED. To reset a PSU in this state the AC input must be removed for at least 2 seconds. This can be done by manually cycling the power switch of the PSU off and on over a 5 second interval.

## Support for Power Redundancy with Two Online PSUs

The IBM SAN50C-R Switch running NX-OS 8.1(1), or later, supports power redundancy with two online PSUs. To enable power redundancy in this scenario, FCoE ports must be brought to ADMIN DOWN state. The power supplies in a IBM SAN50C-R Switch work in the following power modes when FcoE ports are in ADMIN DOWN state.

Figure 12. Power modes when FcoE ports are in ADMIN DOWN state

3 online PSUs	Two PSUs are connected to Grid A and one PSU is connected to Grid B; they work in N+1 redundant mode.
2 online PSUs	One PSU is connected to Grid A and another PSU is connected to Grid B; they work in N:N redundant mode.
1 online PSU	The PSU is connected to any one grid; it works in non-redundant mode.

The power supplies in a IBM SAN50C-R Switch work in the following power modes when FCoE ports are in ADMIN UP state:

Figure 13. Power modes when FcoE ports are in ADMIN UP state

3 online PSUs	They work in N+1 redundant mode.
2 online PSUs	They work in non-redundant mode.
1 online PSU	It works in non-redundant mode. In this case, FCoE ports automatically switch to an error-disabled state to save power for FC and IP ports.

---

## Supported Transceivers

The IBM SAN50C-R Switch supports the transceivers in the following list.

- 8-Gbps SW/LW, LC Enhanced Small Form-Factor Pluggable (SFP+)
- 10-GbE SR/LR/ER, LC, SFP+
- 16-Gbps SW/LW LC SFP+
- 4/8/16-Gbps Fibre Channel LW SFP+, DWDM, SM, DDM, 13 dB, 40 km
- 4/8/16-Gbps Fibre Channel LW SFP+, CWDM, SM, DDM, 13 dB, 40 km
- 4/8/16-Gbps Fibre Channel/FICON LW SFP+, DWDM, SM, DDM, 1550nm, 13 dB, 40 km
- 2/4/8-Gbps Fibre Channel LW SFP+, DWDM, SM, DDM, 80 km
- 2/4/8-Gbps Fibre Channel LW SFP+, CWDM, SM, DDM, 23dB, 70 km
- 2/4/8-Gbps Fibre Channel LW SFP+, SM, DDM, 80 km

### Fibre Channel SFP+ Transceivers

The Fibre Channel SFP+ transceivers are field-replaceable and hot-swappable. You can use any combination of SFP+ transceivers that are supported by the switch. The only restrictions are that SWL transceivers must be paired with SWL transceivers, and LWL transceivers must be paired with LWL transceivers, and the cable must not exceed the stipulated cable length for reliable communications.

For more information about a specific IBM SFP+ transceiver, see the “Technical Specifications” section on page B-1. SFP+ transceivers can be ordered separately or with the IBM SAN50C-R Switch.

**Note:** Use only IBM-provided transceivers in the IBM SAN50C-R Switch. Each transceiver is encoded with model information that enables the switch to verify that the transceiver meets the requirements for the switch.

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## Chapter 2. Installing the IBM SAN50C-R switch

This chapter describes how to install the IBM SAN50C-R switch and its components and includes the following information:

- “Unpacking and Inspecting the Switch”
- “Required Equipment” on page 15
- “Installation Options” on page 15
- “Installation Guidelines” on page 16
- “Installing the Switch” on page 17
- “Grounding the system” on page 21
- “Starting the Switch” on page 24

**Note:** Before you install, operate, or service the system, read the Regulatory Compliance and Safety Information in the preface of this manual.

	<p><b>DANGER</b></p> <p>This warning symbol indicates danger. You are in a situation that could cause physical injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents.</p>
---	---

**DANGER**

This unit is intended for installation in restricted access areas. A restricted access area can be accessed only through the use of a special tool, lock and key, or other means of security.

**DANGER**

Only trained and qualified personnel should be allowed to install, replace, or service this equipment.

**DANGER**

A readily accessible two-poled disconnect device must be incorporated in the fixed wiring.

---

### Unpacking and Inspecting the Switch

**Note:** Two people are required to lift the chassis. Grasp the chassis underneath the lower edge and lift with both hands. To prevent injury, keep your back straight and lift with your legs, not your back. To prevent damage to the chassis and components, never attempt to lift the chassis with the handles on the power supplies or on the interface processors, or by the plastic panels on the front of the chassis. These handles were not designed to support the weight of the chassis.

**CAUTION:**

When handling switch components, wear an ESD strap and handle modules by the carrier edges only. An ESD socket is provided on the chassis. For the ESD socket to be effective, the chassis must be grounded either through the power cable, the chassis ground, or metal-to-metal contact with a grounded rack.

Keep the shipping container for use when moving or shipping the chassis in the future. The shipping carton can be flattened and stored with the pallet.

**Note:** The switch is thoroughly inspected before shipment. If any damage occurred during transportation or any items are missing, contact your customer service representative immediately.

To inspect the shipment, complete the following steps.

1. Compare the shipment to the equipment list provided by your customer service representative and ensure that you have received all items, including the following:
  - Grounding lug kit
  - Mounting kit
  - ESD wrist strap
  - Cables and connectors
  - Any optional items ordered.
2. Check for damage and report any discrepancies or damage to your customer service representative. Have the following information ready when you contact your customer service representative.
  - Invoice number of shipper (see packing slip)
  - Model and serial number of the damaged unit
  - Description of damage
  - Effect of damage on the installation

---

## Site requirements

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

*Table 3. Facility requirements*

Type	Requirements
Electrical	<ul style="list-style-type: none"><li>• Adequate supply circuit, line fusing, and wire size, as specified by the electrical rating on the switch nameplate</li><li>• Circuit protected by a circuit breaker and grounded in accordance with local electrical codes</li></ul> <p>Refer to the Technical Specifications at the end of this guide for complete power supply specifications.</p>
Thermal	<ul style="list-style-type: none"><li>• A minimum airflow of 79.8 cubic meters/hour (47 cubic ft/min.) available in the immediate vicinity of the switch <b>Note:</b> Although this airflow may exceed the airflow maximum listed in the device Technical Specifications, the additional airflow is recommended to pressurize the inlet (cool side) of rack installations relative to the exhaust side to minimize recirculation of hot air back to the inlet side.</li><li>• Ambient air temperature not exceeding 40°C (104°F) while the switch is operating</li></ul>

Table 3. Facility requirements (continued)

Type	Requirements
Rack (when rack-mounted)	<ul style="list-style-type: none"><li>• Two rack units (2U) in a 48.3 cm (19-inch) rack</li><li>• All equipment in the rack grounded through a reliable branch circuit connection</li><li>• Additional weight of switch not to exceed the rack's weight limits</li><li>• Rack secured to ensure stability in case of unexpected movement</li></ul>

---

## Airflow Considerations

The switch comes with fan modules and power-supply modules that support port-side intake and front-to-rear air flow for cooling the switch. All fan modules and power-supply modules must have the same direction of airflow.

---

## Required Equipment

You need the following equipment for this installation:

- Number 1 and number 2 Phillips screwdrivers with torque capability.
- 3/16-inch flat-blade screwdriver.
- Tape measure and level.
- ESD wrist strap or other grounding device.
- Antistatic mat or antistatic foam.
- In addition to the grounding items provided in the accessory kit, you need the following items:

Grounding cable (6 AWG recommended), sized according to local and national installation requirements; the required length depends on the proximity of the IBM SAN50C-R switch to proper grounding facilities.

Crimping tool large enough to accommodate girth of lug.

Wire-stripping tool.

---

## Installation Options

A IBM SAN50C-R Switch can be installed using the following methods:

- In an open EIA rack
  - The rack-mount kit shipped with the switch
  - The Telco and EIA Shelf Bracket Kit (an optional kit, purchased separately) in addition to the rack-mount kit shipped with the switch
- In a perforated EIA cabinet
  - The rack-mount kit shipped with the switch
  - The Telco and EIA Shelf Bracket Kit (an optional kit, purchased separately) in addition to the rack-mount kit shipped with the switch
- In a two-post telco rack, using one of the following:
  - The rack-mount kit shipped with the switch
  - The Telco and EIA Shelf Bracket Kit (an optional kit, purchased separately).

For instructions on installing the switch using the mounting kit shipped with the switch, see the “Installing the IBM SAN50C-R Shelf Bracket Kit into a Rack” on page 33 section see the Installing the Switch section.

For instructions on installing the switch using the optional Telco and EIA Shelf Bracket Kit (purchased separately), see the “Rack-Mounting Guidelines” on page 30.

---

## Installation Guidelines

Follow these guidelines when installing the IBM SAN50C-R switch:

- Plan your site configuration and prepare the site before installing the switch. The recommended site planning tasks are listed in the Site Planning and Maintenance Records section.
- Ensure that there is adequate space around the switch to allow for servicing the switch and for adequate airflow. The airflow requirements are listed the Appendix A, “Product specifications,” on page 43 section.
- Ensure that you are positioning the switch in a rack so that it takes in cold air from the cold aisle and sends out air to the hot aisle. For more information, see the Airflow Considerations section.
- Ensure that the air-conditioning meets the heat-dissipation requirements listed in the Appendix A, “Product specifications,” on page 43 section.
- Ensure that the cabinet or rack meets the requirements listed in the Cabinet and Rack Installation section.
- Ensure that the chassis is adequately grounded. If the switch is not mounted on a grounded rack, we recommend that you connect both the system ground on the chassis and the site power ground to an earth ground.
- Ensure that the site power meets the power requirements listed in the Appendix A, “Product specifications,” on page 43 section. If available, you can use an uninterruptible power supply (UPS) to protect against power failures.

### CAUTION:

**Avoid UPS types that use ferro-resonant technology. These UPS types can become unstable with systems such as the IBM Storage Networking SAN c-type Family, which can in turn have substantial current draw fluctuations because of fluctuating data traffic patterns.**

- As you install and configure the switch, record the information listed in the Site Planning and Maintenance Records section.
- Use the following screw torques when installing the switch.
  - Captive screws: 4 in-lb
  - M3 screws: 4 in-lb
  - M4 screws: 12 in-lb
  - 10- 32 screws 20 in-lb
  - 10- 32 screws 20 in-lb
  - 12-24 screws: 30 in-lb

## Installing the Switch

This section describes how to use the rack-mount kit to install the IBM SAN50C-R switch into a cabinet or rack that meets the requirements described in the “Rack Requirements” on page 29 section.

	<b>CAUTION:</b> If the rack is on wheels, ensure that the brakes are engaged or that the rack is otherwise stabilized.
	<b>CAUTION:</b> If connecting a IBM SAN50C-R switch to a 110-VAC power system, ensure that sufficient power is provided to meet the chassis power requirements for the number of modules installed. If the rack is on wheels, ensure that the brakes are engaged or that the rack is otherwise stabilized.
	<b>Note:</b> When installing or replacing the unit, the ground connection must always be made first and disconnected last.
	<b>CAUTION:</b> All power supplies must be grounded. The receptacles of the AC power cables used to provide power to the chassis must be the grounding type, and the grounding conductors should connect to protective earth ground at the service equipment. For a IBM SAN50C-R switch with a DC power supply, a grounding cable must be connected to the terminal block.

If a 110-VAC input is chosen, order a 110-VAC power cord separately. Table 1-1 lists the items provided in the IBM SAN50C-R mounting kit used for installing the switch.

*Table 4. IBM SAN50C-R Fabric Switch Rack-Mount Kit*

Description	Quantity
<b>Front Rack-Mount Bracket Kit</b>	
Front rack-mount brackets	2 per kit
M4 X 6-mm Phillips flat-head screws	8 per kit
12-24 X 3/4-inch Phillips binder-head screws	8 per kit
10-32 x 3/4-inch Phillips binder-head screws	8 per kit
<b>Cable Management Bracket Kit</b>	
Cable guide	2 per kit
M4 X 6-mm Phillips pan-head screws	2 per kit
<b>Rear Rack-Mount Bracket Kit</b>	
30- to 36-inch slider rails	2 per kit
24- to 30-inch slider rails	2 per kit
18- to 24-inch slider rails	2 per kit
12-24 X 3/4-inch Phillips binder-head screws	8 per kit
10-32 X 3/4-inch Phillips binder-head screws	8 per kit
C brackets	2 per kit
M3 X 6-mm, Phillips flat-head screws	4 per kit

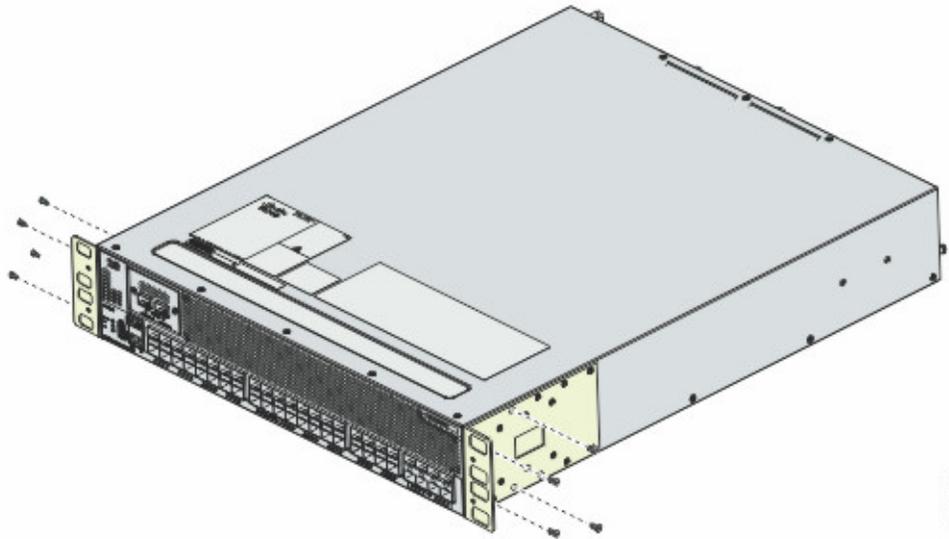
Table 4. IBM SAN50C-R Fabric Switch Rack-Mount Kit (continued)

12-24 cage nuts	16 per kit
-----------------	------------

To install the IBM SAN50C-R chassis in a rack using the mounting kit provided with the switch, follow these steps.

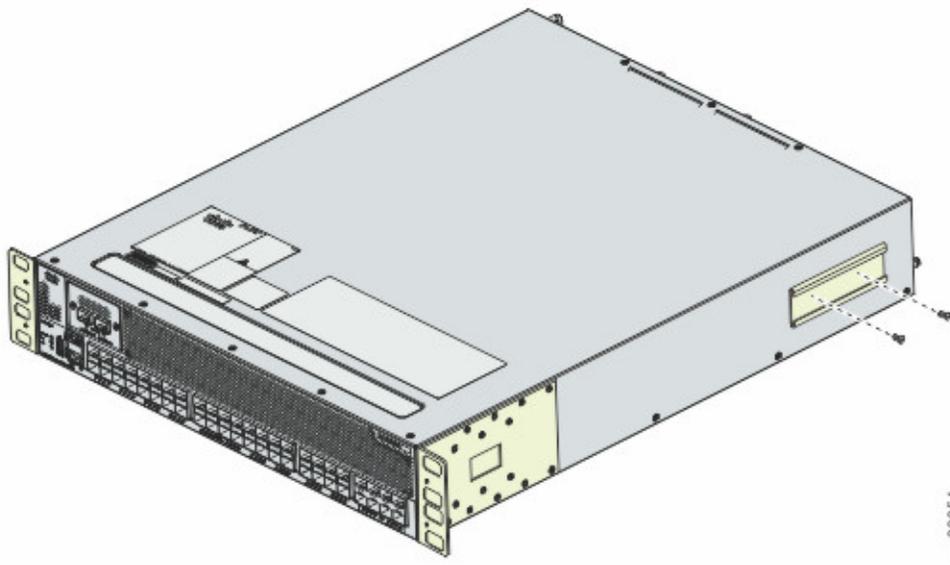
1. Install the front rack-mount bracket as follows:
  - a. Position one of the front rack-mount brackets against the side of the switch and align the screw holes as shown in the following graphic.

Installing the Rack-Mount Brackets on the IBM SAN50C-R Switch



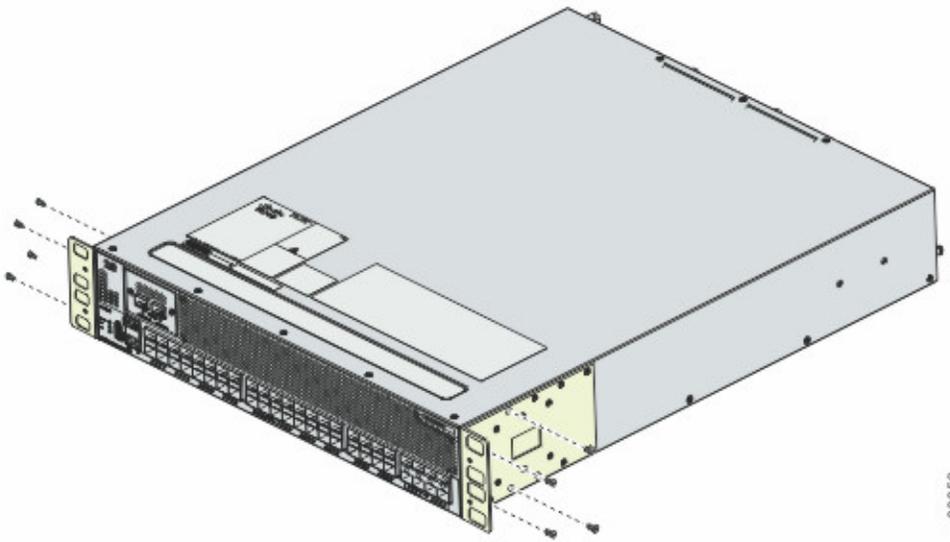
- b. Attach the bracket to the switch with the four M4 screws originally provided with the bracket.
    - c. Repeat with the other front rack-mount bracket on the other side of the switch.
  2. Install the C brackets as follows:
    - a. Attach the bracket to the switch with the two M3 screws originally provided with the bracket.

## Installing C Brackets on the IBM SAN50C-R Switch



3. Install the slider rails in the rack. Position one of the slider rails against the rack mounting rails and align the screw holes.

## Installing the Slider Rails

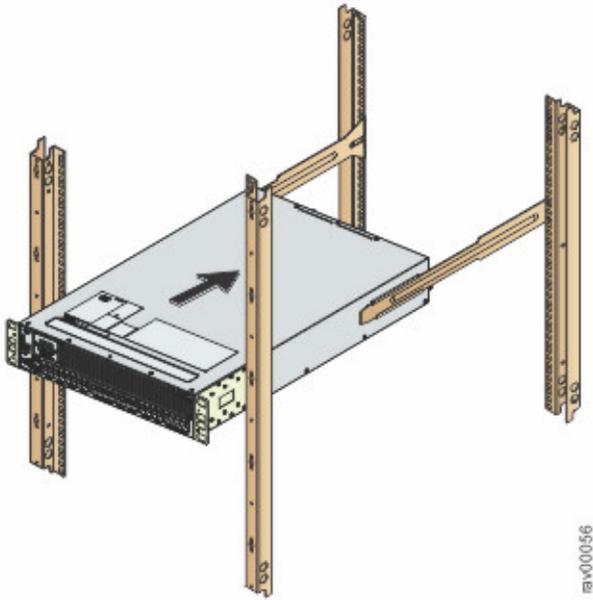


4. Attach the slider rail using four 12-24 screws or four 10-32 screws, depending on the rack rail thread type. For racks with square holes, insert the 12-24 cage nuts in position behind the mounting holes in the slider rails.
  - a. Repeat with the other slider rail on the other side of the rack.
  - b. Use the tape measure and level to verify that the rails are horizontal and at the same height.
5. Insert the switch into the rack as follows.
  - a.

Figure 1-4 Installing the Slider Rails

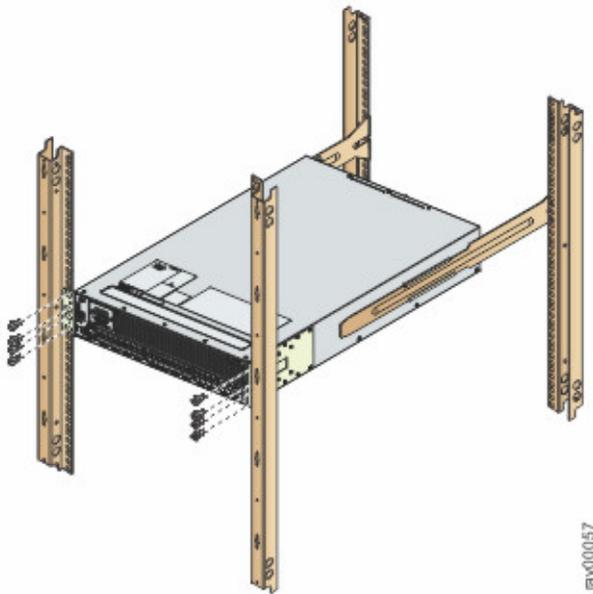
- a. Use both hands to position the switch with the back of the switch between the front rack-mounting rails.

#### Installing the Switch on the Slider Rails



- b. Align the two C brackets on either side of the switch with the slider rails installed in the rack. Slide the C brackets onto the slider rails, and then gently slide the switch all the way into the rack. If the switch does not slide easily, try realigning the C brackets on the slider rails.
6. Stabilize the switch in the rack by attaching the front rack-mount brackets to the front rack-mounting rails.
    - a. Insert four screws (12-24 or 10-32, depending on rack type) through the cage nuts and the holes in one of the front rack-mount brackets and into the threaded holes in the rack-mounting rail.

## Attaching Front Rack-Mount Brackets



- b. Repeat for the front rack-mount bracket on the other side of the switch.  
If you are installing the optional cable guides, place the cable guides in front of the front rack-mount brackets, and then pass the screws through the cable guides, front rack-mount brackets, and mounting rail. You can install one or both cable guides; if installing a single cable guide, it can be installed on either side.

---

## Grounding the system

This section describes the need for system grounding and explains how to prevent damage from electrostatic discharge.

**Note:** In all situations, grounding practices must comply with local National Electric Code (NEC) requirements or local laws and regulations.

**Note:** Always ensure that all of the modules are completely installed and that the captive installation screws are fully tightened. In addition, ensure that all I/O cables and power cords are properly seated. These practices are normal installation practices and must be followed in all installations.

**Note:** This system ground is also referred to as the network equipment building system (NEBS) ground.

If your chassis does not have the system ground attached, you must install the system ground lug. For installation instructions and location of the chassis system ground pads, see “Establishing the System Ground” section on page 1-13.

**Note:** You do not need to attach a supplemental system ground wire to the system ground lug; the lug provides a direct path to the bare metal of the chassis.

After you install the system ground lug, follow these steps to correctly attach the ESD wrist strap.

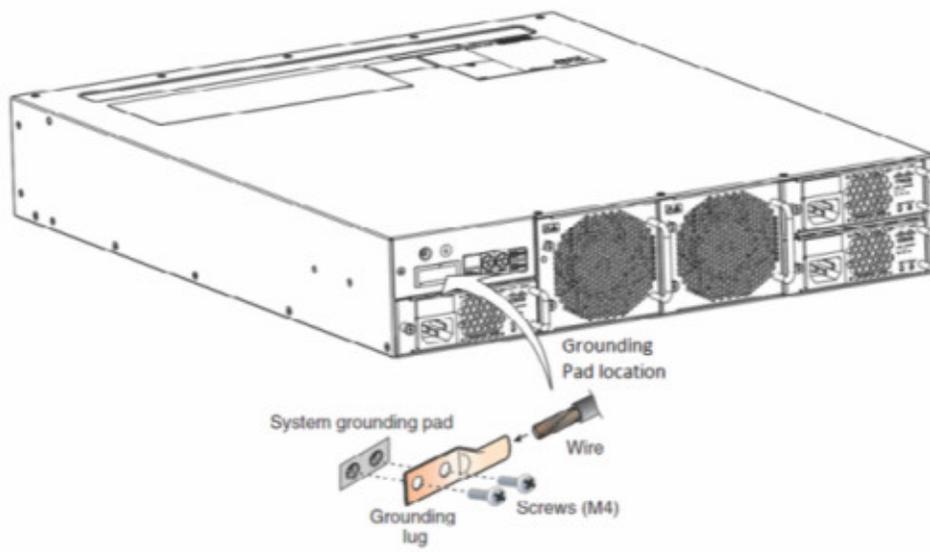
1. Attach the ESD wrist strap to bare skin as follows:

- a. If you are using the ESD wrist strap supplied with the FRUs, open the wrist strap package and unwrap the ESD wrist strap. Place the black conductive loop over your wrist and tighten the strap so that it makes good contact with your bare skin.
  - b. If you are using an ESD wrist strap equipped with an alligator clip, open the package and remove the ESD wrist strap. Locate the end of the wrist strap that attaches to your body and secure it to your bare skin.
2. Grasp the spring or alligator clip on the ESD wrist strap and momentarily touch the clip to a bare metal spot (unpainted surface) on the rack. We recommend that you touch the clip to an unpainted rack rail so that any built-up static charge is then safely dissipated to the entire rack.
  3. Plug the strap into the port (and alternatively clip an alligator clip onto the grounding lug screws) by attaching either the spring clip or the alligator clip to the ground lug screw as shown in Figure 1-6.
    - a. If you are using the ESD wrist strap that is supplied with the FRUs, squeeze the spring clip jaws open, position the spring clip to one side of the system ground lug screw head, and slide the spring clip over the lug screw head so that the spring clip jaws close behind the lug screw head.

**Note:** The spring clip jaws do not open wide enough to fit directly over the head of the lug screw or the lug barrel.

    - b. If you are using an ESD wrist strap that is equipped with an alligator clip, attach the alligator clip directly over the head of the system ground lug screw or to the system ground lug barrel.

Attaching the ESD Wrist Strap to the System Ground Lug Screw



- c. Follow these additional guidelines when handling modules:
  - Handle carriers by available handles or edges only; avoid touching the printed circuit boards or connectors.
  - Place a removed component board-side-up on an antistatic surface or in a static shielding container. If you plan to return the component to the factory, immediately place it in a static shielding container.
  - Never attempt to remove the printed circuit board from the metal carrier.



For safety reasons, check the resistance value of the antistatic strap periodically. The measurement should be between 1 and 10 megohm (Mohm).

## Establishing the System Ground

This section describes how to connect a system ground to the IBM SAN50C-R switch.

### Note:

Note This system ground is also referred to as the network equipment building system (NEBS) ground.

You must use the system (NEBS) ground on both AC- and DC-powered systems if you are installing this equipment in a U.S. or European Central Office.

The system (NEBS) ground provides additional grounding for EMI shielding requirements and grounding for the low-voltage supplies (DC-DC converters) on the modules and is intended to satisfy the Telcordia Technologies NEBS requirements for supplemental bonding and grounding connections. You must observe the following system grounding guidelines for your chassis:

- You must install the system (NEBS) ground connection with any other rack or system power ground connections that you make. The system ground connection is required if this equipment is installed in a U.S. or European Central Office.
- You must connect both the system (NEBS) ground connection and the power supply ground connection to an earth ground. The system (NEBS) ground connection is required if this equipment is installed in a U.S. or European Central Office.

**Note:** The system (NEBS) ground serves as the primary safety ground for the IBM SAN50C-R chassis that are equipped with DC-input PEMs. The DC-input power supplies for these chassis do not have a separate ground.

To connect the ground system, you need the following tools and materials.

- Grounding lug—A two-hole standard barrel lug. Supports up to 6 AWG wire. Supplied as part of accessory kit.
- Grounding screws—Two M4 x 8mm (metric) pan-head screws. Supplied as part of the accessory kit.
- Grounding wire—Not supplied as part of accessory kit. The grounding wire should be sized according to local and national installation requirements. Depending on the power supply and system, a 12 AWG to 6 AWG copper conductor is required for U.S. installations. Commercially available 6 AWG wire is recommended. The length of the grounding wire depends on the proximity of the switch to proper grounding facilities.
- No. 1 Phillips screwdriver.
- Crimping tool to crimp the grounding wire to the grounding lug.
- Wire-stripping tool to remove the insulation from the grounding wire.

---

## Starting the Switch

### About this task

This section provides the following information.

- Connecting the power supplies.
- Powering up the switch and verifying component installation.

**Note:** Hazardous voltage or energy is present on the backplane when the system is operating. Use caution when servicing.

#### CAUTION:

**During this procedure, wear grounding wrist straps to avoid ESD damage to the switch.**

To power up the switch and verify hardware operation, follow these steps.

1. Verify that the power switches on all power supplies are off.
2. Plug the power cable into the power supply and tighten the screw on the power cable retainer to ensure that the cable cannot be pulled out.
3. Verify that both power supplies and fan modules are installed and tighten any loose captive screws.

**Note:** Depending on the outlet receptacle on your power distribution unit, you may need the optional jumper power cord to connect the IBM SAN50C-R switch to your outlet receptacle.

4. Connect the other end of the power cable to a power source.
5. Ensure that the switch is adequately grounded and that the power cables are connected to outlets that have the required AC power voltages.

## Powering Up the Switch and Verifying Component Installation

### About this task

**Note:** Do not connect the MGMT 10/100 Ethernet port to the LAN until the initial switch configuration has been performed. For instructions on configuring the switch, see the IBM SAN50C-R Integrated Supervisor Module.

For instructions on connecting to the console port, see the “Connecting to the Console Port” section on page 1-2.

**Note:** Hazardous voltage or energy is present on the backplane when the system is operating. Use caution when servicing.

#### CAUTION:

**During this procedure, wear grounding wrist straps to avoid ESD damage to the switch.**

To power up the switch and verify hardware operation, follow these steps.

1. Power on the switch by turning the power switches on the power supplies or PEMs to the on (I) position. The switch boots automatically.
2. Listen for the fans; they should begin operating as soon as the switch is powered on.

**CAUTION:**

**Do not operate the switch without a functioning fan module except during the brief fan module replacement procedure. The IBM Storage Networking SAN c-type Family can operate for only a few minutes without a functioning fan module before they begin to overheat.**

3. Verify that the LED behavior is as follows when the switch has finished booting:
  - Fan status LED is green.
  - Each P/S LED is green.
  - The Switch STATUS LED is green. If this LED is orange or red, then one or more environmental monitors is reporting a problem.
  - The Ethernet port Link LEDs should not be on unless the cable is connected.

**Note:** The LEDs for the Fibre Channel ports remain orange until the ports are enabled, and the LED for the MGMT 10/100 Ethernet port remains off until the port is connected. If any LEDs other than the Fibre Channel port LEDs remain orange or red after the initial boot processes are complete, see Appendix B, "Technical Specifications."

4. If a component is not operating correctly, try removing and reinstalling it. If it still does not operate correctly, contact your customer service representative for a replacement.
5. Verify that the system software has booted and the switch has initialized without error messages. If any problems occur, see the *Cisco MDS 9000 Family Messages Reference*. If you cannot resolve an issue, contact your customer service representative.
6. Complete the worksheets provided in Appendix 1, "Site Planning and Maintenance Records," for future reference.

**Note:** A setup utility automatically launches the first time you access the switch and guides you through the basic configuration. For instructions about how to configure the switch and check module connectivity, see the IBM Storage Networking SAN c-type Family.

---

## Installing and Removing Power Supplies

This section provides instructions for installing and removing the power supplies in the IBM SAN50C-R Switch.

### Removing an AC Power Supply

#### About this task

You can remove one faulty power supply, while the other one provides enough power to the switch. Install a new power supply or a power supply blank module in the open slot.

**Note:** Voltage is present on the backplane when the system is operating. To reduce risk of an electric shock, keep hands and fingers out of the power supply bays and backplane areas.

### **Procedure**

1. Turn the power switch on the power supply to the off (0) position.
2. Disconnect the power cable from the power source.
3. Remove the cable retention device and disconnect the power cable from the power supply being removed.
4. Grasp the power supply handle with one hand, and slide the power supply partially out of the chassis. Place your other hand underneath the power supply, and slide the power supply completely out of the chassis.
5. If the power supply bay is to remain empty, install a power supply filler panel over the opening, and tighten the captive screw to 8 in-lb.

## **Installing an AC Power Supply**

### **About this task**

To install an AC power supply in the IBM SAN50C-R switch, follow these steps.

### **Procedure**

1. Ensure that the system (earth) ground connection has been made.
2. If a filler panel is installed, remove the filler panel from the power supply bay by loosening the captive screw.
3. Ensure that the power switch is in the off (0) position on the power supply you are installing.
4. Grasp the power supply handle with one hand, place your other hand underneath the power supply, and slide the power supply into the power supply bay. Ensure that the power supply is fully seated in the bay.
5. Plug the power cable into the power supply, and place the cable retention device to ensure that the cable cannot be pulled out.
6. Connect the other end of the power cable to an AC power source.
7. Turn the power switch to the on (1) position on the power supply. Turning the power switch on also locks the power supply in the bay.
8. Verify power supply operation by checking that the power supply LEDs are in the following states.
  - INPUT OK LED is green.
  - OUTPUT OK LED is green.

---

## **Removing and Installing Fan Modules**

This section provides instructions for removing and installing the fan modules for the IBM SAN50C-R switch.

The fan module is designed to be removed and replaced while the system is operating without presenting an electrical hazard or damage to the system, provided the replacement is performed promptly. The IBM SAN50C-R switch has two fan modules with the abrupt stop-to-fan rotation safety feature after power is disconnected or the fan tray is removed from the chassis.

**CAUTION:**

The IBM Storage Networking SAN c-type Family have internal temperature sensors that can shut down the system if the temperature at different points within the chassis exceed certain safety thresholds. To be effective, the temperature sensors require the presence of airflow; therefore, if both the fan modules are removed from the IBM SAN50C-R chassis, the switch shuts down after five minutes to prevent potentially undetectable overheating. However, the switches will shut down sooner if the higher-level temperature threshold is exceeded.

This section includes the following topics.

- “Removing a Fan Module”
- Installing a Fan Module on the IBM SAN50C-R Switch, page 1-18“Installing a Fan Module”

## Removing a Fan Module

### About this task

The fan module is designed to be removed and replaced while the system is operating without presenting an electrical hazard or damaging the system.

**CAUTION:**

The IBM Storage Networking SAN c-type Family Switches have internal temperature sensors that can shut down the system if the temperature within the chassis exceed certain safety thresholds. To accurately monitor the system temperature, the temperature sensors require sufficient airflow through the chassis. In the event that a fan module is removed from the chassis and the airflow is reduced, the system will bypass the temperature sensor information and shut down after five minutes to prevent undetected overheating. However, the switches will shut down sooner if the major temperature threshold is exceeded.

To remove an existing fan module, follow these steps:

### Procedure

1. Loosen the four captive screws on the module being removed.
2. Grasp the fan module with both hands and pull it outward to unseat the power connector from the backplane.
3. Pull the fan module clear of the chassis.

**Note:** When removing the fan tray, keep your hands and fingers away from the spinning fan blades. Let the fan blades completely stop before you remove the fan tray.

## Installing a Fan Module

### About this task

To install a new fan module, follow these steps.

### Procedure

1. Place the fan module into the rear chassis cavity so that it rests on the chassis. Lift the fan module up slightly to align the top and bottom chassis guides, then

push the fan module into the chassis until it seats in the backplane and the captive screws make contact with the chassis. The fan module just snaps in.

2. If the switch is powered on, listen for the fans; you should immediately hear them operating. If you do not hear them, ensure that the fan module is inserted completely in the chassis and the outside surface of the fan module is flush with the outside surface of the chassis.
3. Verify that the Fan STATUS LED is green. If the LED is not green, one or more fans are faulty. If this occurs, contact your customer service representative for a replacement part.

---

## Chapter 3. Cabinet and Rack Installation

This chapter provides information on the rack installation and includes the following sections.

- “Rack Requirements”
- Rack-Mounting Guidelines
- “Before Installing the Rack-Mount Support Brackets” on page 31
- “Installing the Switch on the Shelf Brackets” on page 31
- “Installing the Shelf Bracket Kit into a Four-Post EIA Rack” on page 31
- “Installing the Switch on the Rack-Mount Support Brackets” on page 33
- “Installing the Switch on the Shelf Brackets” on page 34

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### Rack Requirements

This section provides the requirements for the following type of racks, assuming an external ambient air temperature range of 32 to 104oF (0 to 40oC).

- Standard open racks
- Two-post Telco racks

The rack-mount kit enables you to install the switch into racks of varying depths. You can use the rack-mount kit parts to position the switch with easy access to either the port connections end of the chassis or the end of the chassis with the fan and power supply modules. For instructions on how to install the rack-mount kit, see the Installing the Switch section.

#### General Requirements for Racks

The rack must be one of the following types.

- Standard 19-inch four-post EIA rack, with mounting rails that conform to English universal hole spacing per section 1 of ANSI/EIA-310-D-1992. See the section entitled "Standard Open Rack Requirements."
- Standard two-post Telco rack, with mounting rails that conform to English universal hole spacing per section 1 of ANSI/EIA-310-D-1992.

#### Rack Requirements for IBM SAN50C-R Chassis

The rack must also meet the following requirements.

- The minimum vertical rack space per chassis is 3.5 in. (8,8 cm).
- The width between the mounting rails must be at least 17.75 in. (45.1 cm). For four-post EIA racks, this is the distance between the two front rails and rear rails.

#### Standard Open Rack Requirements

In addition to the requirements listed in the “General Requirements for Racks” section on page 1-1, if you are mounting the chassis in an open rack (no side panels or doors), ensure that the rack meets the following requirements.

- The minimum width between two front-mounting rails must be two RU (rack unit), equal to 16 inches (40 cm).

- The minimum vertical rack space per chassis is 2 RU (rack unit), equal to 3.5 inches (8.89 cm).

**Note:** The side rail-mount brackets provided with the IBM SAN50C-R switch require an additional height of 0.75 inches (1.9 cm). They are required during the installation of the IBM SAN50C-R switch only, and can be removed or left installed once the front-mounting brackets are securely fastened to the mounting rails.

### **Requirements Specific to Two-Post Telco Rack**

In addition to the requirements listed in the “General Requirements for Racks” section on page 1-1, two-post Telco racks must meet the following requirements.

- The minimum width between the two mounting rails must be at least 17.75 inches (45.1 cm).
- The distance between the chassis air vents and any walls should be 2.5 inches (6.4 cm).

### **Required Equipment**

You need the following equipment for this installation.

- Number 2 Phillips screwdriver
- Tape measure and level (to ensure shelf brackets are level)

---

## **Rack-Mounting Guidelines**

### **CAUTION:**

**If the rack is on wheels, ensure that the brakes are engaged or the rack is otherwise stabilized.**

**If installing this kit in an EIA rack, attach the switch to all four rack-mounting rails; the EIA rails may not be thick enough to prevent flexing of the shelf brackets if only two rails are used.**

Before rack-mounting the chassis, ensure that the rack meets the following requirements.

- The specifications listed in the “Rack Requirements” section on page 1-1.
- The depth of the rack between the front-mounting and rear-mounting rails is at least 18 in. (45.7 cm) but less than or equal to 30 in. (76.2 cm). This is specific to four-post EIA racks.
- The airflow and cooling are adequate and there is sufficient clearance around the air vents on the switch, as described in Appendix B, “Technical Specifications.”
- The rack has sufficient vertical clearance for the chassis plus 2 RU for the shelf brackets, and any desired clearance for the installation process.
- The rack meets the minimum rack load ratings per rack unit for rack type. Rack of EIA (4-post), 7.5 lb (3.4 kg)

---

## Before Installing the Rack-Mount Support Brackets

Before installing the rack-mount support brackets for the IBM SAN50C-R switch, check the contents of the optional shelf bracket kit against those listed in the following table.

*Table 5. Contents of Shelf Bracket Kit*

Quantity	Part Description
2	Bottom support brackets
20	12-24 x 3/4-in. Phillips screws
20	M6 x 19 mm Phillips binder-head screws
2	10-32 x 3/8-in. Phillips pan-head screws

---

## Installing the Switch on the Shelf Brackets

This section provides information on how to install and remove brackets. Before installing the shelf brackets, check the contents of your kit against the items in the following table.

*Table 6. Contents of Shelf Bracket Kit*

Quantity	Part Description
2	Slider brackets
2	Shelf brackets
1	Crossbar
2	10-32 x 3/8-in. Phillips pan-head screws
16	12-24 x 3/4-in. Phillips screws
16	10-24 x 3/4-in. Phillips screws

### Required equipment

You need the following equipment for this installation

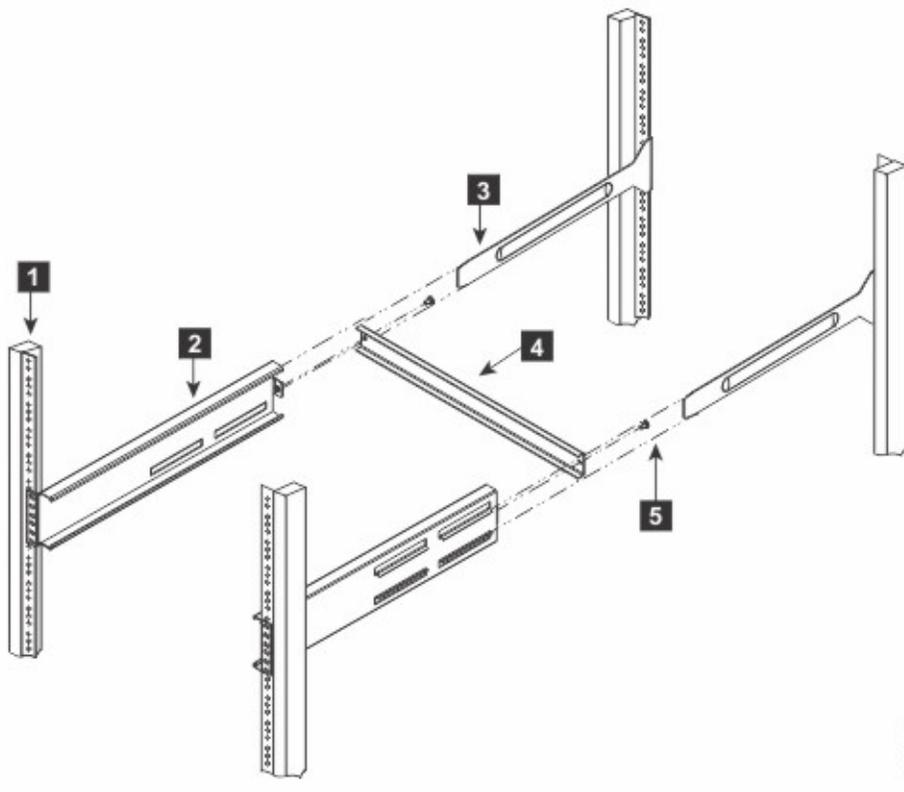
- Number 2 Phillips screwdriver
- Tape measure and level (to ensure shelf brackets are level)

---

## Installing the Shelf Bracket Kit into a Four-Post EIA Rack

The following graphic shows the installation of the shelf bracket kit into a four-post EIA rack.

## Installing the Shelf Bracket Kit into an EIA Rack



- 1 Rack-mounting rail (4x)
- 2 Shelf bracket (2x)
- 3 Slider rail (2)
- 4 Crossbar (2)
- 5 10-32 screws (2x)

To install the shelf bracket in an EIA rack, follow these steps.

1. Position a shelf bracket inside the rack-mounting rails. Align the screw holes at the front of the shelf bracket with the holes in the front rack-mounting rail. Attach the shelf bracket to the front rack-mounting rail using a minimum of four 12-24 or 10-24 screws.

**Note:** The bottom hole of the shelf bracket should align with the bottom hole of a rack unit on the rack-mounting rail (the hole immediately above the 1/2-in. spacing).

2. Repeat with the other shelf bracket.
3. Verify that the shelf brackets are at the same height (using the level or tape measure as desired).
4. Attach the crossbar to the shelf brackets using the 10-32 screws.
5. Insert the slider rails into the shelf brackets and attach them to the rear rack-mounting rails using a minimum of four 12-24 or 10-24 screws.

---

## Installing the Switch on the Rack-Mount Support Brackets

### About this task

This section provides information on how to install the switch on the rack-mount support brackets and on the shelf brackets and includes the following subsections.

- Installing the Switch on the Rack-Mount Support Brackets
- Installing the Switch on the Shelf Brackets

## Installing the Switch on the Rack-Mount Support Brackets

### About this task

This section provides general instructions for installing the switch on top of the rack-mount support brackets. For detailed installation instructions, see the Installing the switch on the Shelf Brackets.

- Installing the Switch on the Rack-Mount Support Brackets
- Installing the Switch on the Shelf Brackets

**Note:** This unit is intended for installation in restricted access areas. A restricted access area can be accessed only through the use of a special tool, lock and key, or other means of security. Only trained and qualified personnel should be allowed to install, replace, or service this equipment.

**Note:** Note Before you install, operate, or service the system, see the IBM Systems Environmental Notices and User Guide, Z125-5823 for important safety information.

To install the switch on top of the rack-mount support brackets, follow these steps.

1. Verify that the rack-mount support brackets are level and securely attached to the rack-mounting rails, the support rack-mount support brace is securely attached to the brackets, and the rack is stabilized.
2. Slide a mechanical lift under the switch and lift the switch up onto the rack-mount support brackets, ensuring it is squarely positioned.
3. Attach the switch to the rack-mounting rails. See “Installing the Switch” on page 17.

#### CAUTION:

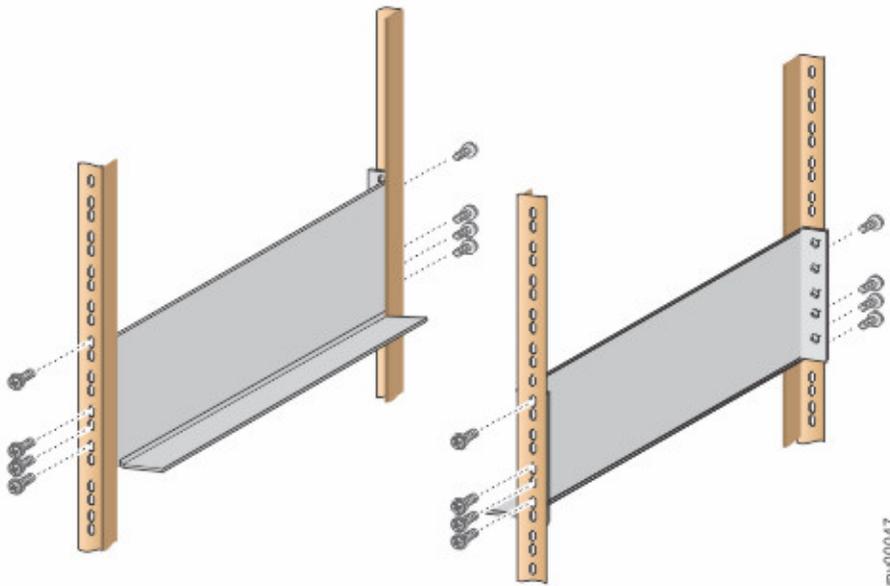
**We recommend grounding the chassis, even if the rack is already grounded. There is a grounding pad with two threaded M4 holes on the chassis for attaching a grounding lug.**

## Installing the IBM SAN50C-R Shelf Bracket Kit into a Rack

### About this task

The following image shows the installation of the IBM SAN50C-R Shelf Bracket Kit into a four-post rack.

## Installing the Shelf Bracket Kit into a Rack



To install the shelf brackets in a rack, follow these steps.

1. Position a shelf bracket inside the rack-mounting rails as shown in Figure 1-2. Align the screw holes at the front of the shelf bracket with the holes in the front rack-mounting rail, and then attach the shelf bracket to the front rack-mounting rail using a minimum of four 1/4-20 screws.

**Note:** The bottom hole of the shelf bracket should align with the bottom hole of a rack unit on the rack-mounting rail (the hole immediately above the 1/2-inch spacing).

2. Align the screw holes at the back of the shelf bracket with the holes in the back rack-mounting rail, and then attach the shelf bracket to the back rack-mounting rail using a minimum of four 1/4-20 screws.
3. Repeat Step 1 and Step 2 with the other shelf bracket.
4. Verify that the shelf brackets are at the same height (using the level or tape measure as desired).

---

## Installing the Switch on the Shelf Brackets

This section provides general instructions for installing the IBM SAN50C-R switch on top of the shelf brackets.

**Note:** This unit is intended for installation in restricted access areas. A restricted access area can be accessed only through the use of a special tool, lock and key, or other means of security. Only trained and qualified personnel should be allowed to install, replace, or service this equipment.

### CAUTION:

**IBM recommends that you use a mechanical lift when the chassis is being moved or lifted. The IBM SAN50C-R switch weighs approximately 22.4 lb (10.09 kg) when fully loaded with all modules and power supplies.**

**Note:** Before you install, operate, or service the system, see the *IBM Systems Environmental Notices and User Guide*, Z125-5823, for important safety information.

To install the IBM SAN50C-R switch on top of the shelf brackets, follow these steps.

1. Verify that the shelf brackets are level and securely attached to the rack-mounting rails, and the rack is stabilized.
2. Slide the IBM SAN50C-R switch onto the shelf brackets, ensuring that it is squarely positioned.
3. Attach the IBM SAN50C-R switch to the rack-mounting rails. Slide the clip nuts over the holes on the non-threaded rails on the rack. These clip nuts provide the threading for the screws that will secure the chassis to the rack. Use the 12 10-32 x 1/2 inch screws provided in this shelf bracket kit to secure the chassis to the rack.

**CAUTION:**

**IBM recommends grounding the chassis, although the rack is already grounded. There is a grounding pad with two threaded M4 holes on the chassis for attaching a grounding lug.**



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## Chapter 4. Initial Setup and Verification

This chapter describes how to connect the IBM SAN50C-R switch and includes these topics:

- “Preparing for Network Connections”
- “Connecting to the Console Port” on page 38
- “Connecting to the MGMT 10/100/1000 Ethernet Port” on page 38
- “Connecting to a Fibre Channel Port” on page 39
- “Removing and Installing SFP Transceivers” on page 39
- “Maintaining SFP Transceivers and Fiber-Optic Cables” on page 42
- “Powering Up the Switch and Verifying Component Installation” on page 24

---

### Connection Guidelines

The IBM SAN50C-R switch provides the following types of ports:

- Console port—An RS-232 port is used to create a local management connection.
- MGMT 10/100/1000 Ethernet port—An Ethernet port is used to access and manage the switch by IP address, such as through the Data Center Network Manager (DCNM)
- Fibre Channel over Ethernet— FCoE ports that are used for FCoE connectivity. The FCoE ports of the IBM SAN50C-R switch cannot be used for traditional Ethernet switching.
- Fibre Channel ports —Fibre Channel ports that are used to connect to the SAN or for in-band management. The FC ports on IBM SAN50C-R switch support the IBM (FICON) connectivity.
- IP Storage ports—IP Storage Services ports that are used for the FCIP or iSCSI connectivity.
- USB drive—A simple interface that allows you to connect to different devices supported by NX-OS.

Before installing the component, have all the additional external equipment and cables available.

#### **CAUTION:**

**When running power and data cables in overhead or subfloor cable trays, we strongly recommend that power cables and other potential noise sources be located as far away as is practical from network cabling that terminates on IBM equipment. In situations where long parallel cable runs cannot be separated by at least 3.3 ft (1 m), we recommend shielding any potential noise sources by housing them in a grounded metallic conduit.**

---

### Preparing for Network Connections

When preparing your site for network connections to the IBM SAN50C-R switch, consider the following for each type of interface, and obtain all of the required equipment before connecting the ports.

- Cabling required for each interface type
- Distance limitations for each signal type

- Additional interface equipment needed

Before installing the component, have all the additional external equipment and cables available.

---

## Connecting to the Console Port

The console port, labeled “Console,” is an RS-232 port with an RJ-45 interface. It is an asynchronous (async) serial port. Any device connected to this port must be capable of asynchronous transmission. We recommend that you use this port to create a local management connection to set the IP address and other initial configuration settings before connecting the switch to the network for the first time.

### CAUTION:

**If you decide to connect the console port to a modem, do not connect it while the switch is booting; connect either before powering the switch on or after the switch completes the boot process.**

- Configure the switch from the CLI.
- Monitor network statistics and errors.
- Configure SNMP agent parameters.
- Download software updates to the switch.

**Note:** To connect the console port to a computer terminal, the computer must support VT100 terminal emulation. The terminal emulation software—frequently an application such as HyperTerminal or Procomm Plus—makes communication between the switch and computer possible during setup and configuration.

To connect the console port to a computer terminal, follow these steps:

1. Configure the terminal emulator program to match the following default port characteristics.
  - 9600 baud
  - 8 data bits
  - 1 stop bit
  - No parity
2. Connect the supplied RJ-45 to DP-25 female adapter. We recommend that you use the adapter and cable provided with the switch.
3. Connect the console cable (a rollover RJ-45 to RJ-45 cable) to the console port or the RJ-45 to DP-25 adapter (depending on your computer) at the computer serial port.

---

## Connecting to the MGMT 10/100/1000 Ethernet Port

The autosensing 10/100/1000 Ethernet management port is located on the front panel (labeled MGMT ETH), below the Console port. This port is used for out-of-band management of the IBM SAN50C-R switch. It can also be used for upstream data transferring.

### CAUTION:

**To prevent an IP address conflict, do not connect the MGMT 10/100/1000 Ethernet port to the network until the initial configuration is complete.**

To connect the MGMT 10/100/1000 Ethernet port to an external hub, switch, or router, follow these steps:

1. Connect the appropriate modular cable to the MGMT 10/100/1000 Ethernet port.

Use a modular, RJ-45, straight-through UTP cable to connect the MGMT 10/100/1000 Ethernet port to an Ethernet switch port or hub.

Use a cross-over cable to connect to a router interface.

2. Connect the other end of the cable to the device.

---

## Connecting to a Fibre Channel Port

The Fibre Channel ports are compatible with LC-type fiber-optic. You can use these ports to connect to the SAN or for in-band management. For information about configuring the switch for in-band management, see the *Cisco NX-OS Fundamentals Configuration Guide*. The IBM SAN50C-R supports both Fibre Channel and Gigabit Ethernet protocols for SFP+ transceivers. Each transceiver must match the transceiver on the other end of the cable, and the cable must not exceed the stipulated cable length for reliable communication. For information on how to get the list of supported SFP+ transceivers for your software release, see the NX-OS release notes.

**Note:** Class 1 laser product.

**Note:** Invisible laser radiation may be emitted from disconnected fibers or connectors. Do not stare into beams or view directly with optical instruments.

### CAUTION:

**Wear an ESD wrist strap connected to the chassis when handling transceivers. Keep optical connectors covered when not in use, and do not touch connector ends. The fiber-optic connectors must be free of dust, oil, and other contaminants.**

## Removing and Installing SFP Transceivers

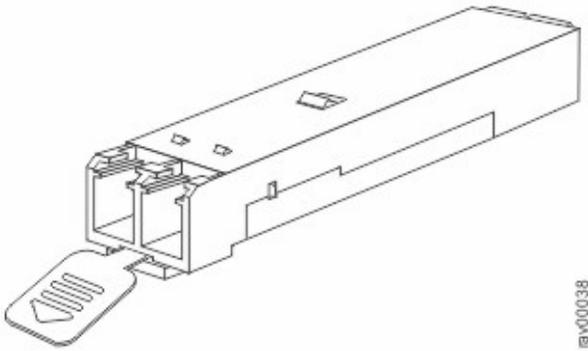
**Note:** Removing and installing an SFP transceiver can shorten its useful life. Do not remove and insert SFP transceivers more often than is absolutely necessary. We recommend that you disconnect the cables before installing or removing SFP transceivers to prevent damage to the cable or transceiver.

**Note:** Use only IBM recommend SFP transceivers on the IBM SAN50C-R switch. Each SFP transceiver is encoded with model information that enables the switch to verify that the SFP transceiver meets the requirements for the switch. For instructions specific to the transceiver type, see the “SFP Transceiver Specifications” section on page B-4.

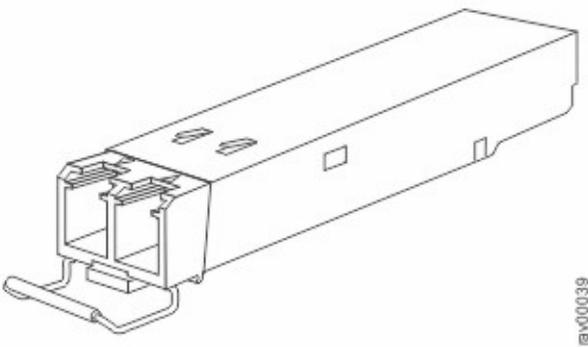
The IBM SAN50C-R switch supports SFP transceivers with the following types of latching devices:

- Mylar tab latch
- Bale-clasp latch

## SFP+ Transceiver with Mylar Latch



## SFP+ Transceiver with Bale-Clasp Latch



## Removing an SFP Transceiver

### About this task

To remove an SFP transceiver, follow these steps:

### Procedure

1. Attach an ESD-preventive wrist strap and follow its instructions for use.
2. If a cable is installed in the transceiver.
  - a. Record the cable and port connections for later reference.
  - b. Press the release latch on the cable, grasp the connector near the connection point, and gently pull the connector from the transceiver.
  - c. Insert a dust plug into the cable end of the transceiver.

### CAUTION:

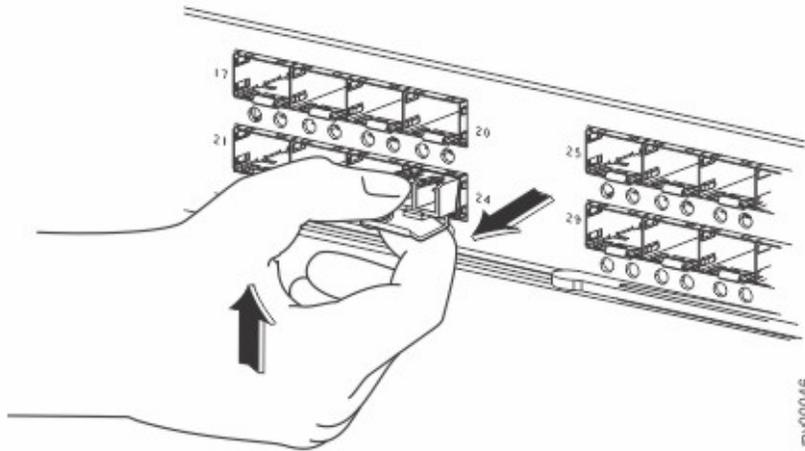
**If the transceiver does not remove easily in the next step, push the transceiver all the way back in and then ensure that the latch is in the correct position before continuing.**

3. Remove the transceiver from the port.
  - If the transceiver has a Mylar tab latch, gently pull the tab straight out (do not twist), and then pull the transceiver out of the port.
  - If the transceiver has a bale clasp latch, open the clasp by pressing it downwards, and then pull the transceiver out of the port.

**Note:** If you have difficulty removing a bale clasp SFP+ transceiver, you should reseal the SFP+ by returning the bale clasp in the up position. Then press the SFP+ inward and upward into the cage. Next, lower the bale clasp

and pull the SFP+ straight out with a slight upward lifting force (see Figure 1-3). Be careful not to damage the port cage during this process.

#### Alternate Removal Method for Bale Clasp SFP+ Transceivers



- 
- 4. Insert a dust cover into the port end of the transceiver and place the transceiver on an antistatic mat or into a static shielding bag if you plan to return it to the factory.
- 5. If another transceiver is not being installed, protect the optical cage by inserting a clean cover.

### Installing a Cable into an SFP Transceiver

#### About this task

#### CAUTION:

**To prevent possible damage to the cable or transceiver, install the transceiver in the port before installing the cable in the transceiver.**

To install a cable into a transceiver, follow these steps.

#### Procedure

1. Attach an ESD-preventive wrist strap and follow its instructions for use.
2. Remove the dust cover from the connector on the cable.
3. Remove the dust plug from the cable-end of the transceiver.
4. Align the cable connector with the transceiver and insert the connector into the transceiver until it clicks into place.
  - If the transceiver has a Mylar tab, orient the transceiver with the tab on the bottom, and then gently insert the transceiver into the port until it clicks into place.
  - If the transceiver has a bale clasp, orient the transceiver with the clasp on the bottom, close the clasp by pushing it up over the transceiver, and then gently insert the transceiver into the port until it clicks into place.

#### CAUTION:

**If the transceiver does not install easily, ensure that it is correctly oriented and the tab or clasp are in the correct position before continuing.**

**Note:** If you cannot install the cable into the transceiver, insert or leave the dust plug in the cable end of the transceiver.

**CAUTION:**

**If the cable does not install easily, ensure that it is correctly oriented before continuing.**

## Maintaining SFP Transceivers and Fiber-Optic Cables

SFP transceivers and fiber optic cables must be kept clean and dust-free to maintain high signal accuracy and prevent damage to the connectors. Attenuation (loss of light) is increased by contamination. Therefore, attenuation should be kept below 0.35 dB.

Follow these maintenance guidelines:

- SFP transceivers are static-sensitive. To prevent ESD damage, wear an ESD-preventive wrist strap that is connected to the chassis.
- Do not remove and reinsert a transceiver more often than necessary. Repeated removals and insertions can shorten its useful life.
- Keep all optical connections covered when not in use. If they become dusty, clean before using in order to prevent dust from scratching the fiber-optic cable ends.
- Do not touch the ends of connectors. This prevents fingerprints and other contamination of the connectors.
- Inspect cables before installation, for dust and damage. If damage is suspected, clean the ends and check for excessive light loss with a light meter.

---

## Appendix A. Product specifications

This topic provides the specifications for the switch.

### Switch Specifications

#### Environmental requirements

The IBM SAN50C-R switch supports hot-swappable fan modules that provide 200 linear feet per minute (LFM) per minute of airflow with 300 W of power dissipation.

Table 7. Environmental specifications for the IBM SAN50C-R switch

Description	Specification
Temperature, certified for operation	32°F to 104°F (0°C to 40°C)
Humidity (RH), ambient (non-condensing) operation	10% to 90%
Humidity (RH), ambient (non-condensing) non-operating and storage	5% to 95%
Altitude, certified for operation	-197 to 6500 ft (-60 to 2000 m )
Altitude, designed and tested for operation	-200 to 10,000 ft (-60 to 3000 m )

Table 8. Physical specifications for the IBM SAN50C-R switch

Description	Specification
Dimensions (HxWxD)	3.84 x 17.22 x 21.4 in. (9.75 x 43.74 x 54.36 cm); 2RU
Weight	22.4 lb (10.2 kg) Chassis configured with three power supply modules and two fan modules.
Front-to-back airflow	5% to 95% 278 LFM

### Power Supply

Table 9. IBM SAN50C-R switch AC input power supply specifications

AC power supply input	Specifications
AC input voltage	Minimum = 85 VAC Nominal = 100 to 240 VAC Maximum = 264 VAC
AC input current rating (maximum)	4.7 A at 85 VAC 3.6 A at 110 VAC 1.8 A at 220 VAC

Table 9. IBM SAN50C-R switch AC input power supply specifications (continued)

AC power supply input	Specifications
AC input frequency	Minimum = 47 Hz Nominal = 50 to 60 Hz Maximum = 63 Hz
Power supply output capacity	300 W
Power supply output voltage	12 V +/- 6% up to 25 A
Output holdup time	20ms when input > 100 VAC

## AC power consumption

Table 10. Typical AC power consumption for the IBM SAN50C-R switch

Model	AC Volt (V)	AC Power Watt (W)
Typical value <sup>1</sup>	220	319
	110	333
Worst value <sup>2</sup>	220	406
	10	425

<sup>1</sup>Typical value is at 25° C ambient temperature, 0% voltage margin, fully-populated with SFPs, and 50% traffic load.

<sup>2</sup>Typical value is at 55° C ambient temperature, 5% voltage margin, fully-populated with SFPs, and 100% traffic load.

## Connection guidelines

The IBM SAN50C-R switch is compatible with Cisco SFP+ transceivers and cables that have LC connectors. The wavelength of each transceiver must match the transceiver on the other end of the cable, and the cable must not exceed the stipulated cable length for reliable communications.

Cisco SFP+ transceivers provide the uplink interfaces, laser transmit (TX) and laser receive (RX), and support 850 to 1610 nm nominal wavelengths, depending upon the transceiver.

Use only Cisco SFP+ transceivers on the IBM SAN50C-R switches. Each Cisco SFP+ transceiver is encoded with model information that enables the switch to verify that the SFP+ transceiver meets the requirements for the switch.

## Fibre Channel SFP+ Transceivers

Table 11. SFP+ Fibre Channel Transceivers

SFP+	Transceiver description	Type
FC16G-SW	4/8/16-Gbps Fibre Channel SW, SFP+, LC	Short Wavelength
FC16G-LW	4/8/16-Gbps Fibre Channel LW, SFP+, LC	Long Wavelength
FC8G-SW	2/4/8-Gbps Fibre Channel SW, SFP+, LC	Short Wavelength
FC8G-LW	2/4/8-Gbps Fibre Channel LW, SFP+, LC	Long Wavelength

## General specifications for 16-Gbps fibre channel SFP+ transceivers

Table 12. Power requirements specifications for a 16 Gbps fibre channel SFP+ transceivers

SFP+	Wavelength (nanometer)-	Fibre Type	Core size (micron)	Baud Rate (GBd)	Cable Distance (meter)
FC16G-SW	850	MMF	62.5	14025	150 m
FC16G-LW	1310	SMF	G.652	14025	6.2 miles (10 km)

## Environmental and Power Requirements for the 16-Gbps Fibre Channel SFP+ Transceivers

Table 13. Power requirements specifications for a 16 Gbps fibre channel SFP+ transceivers

SFP+	Average Transmit Power (dBm)		Average Transmit Power (dBm)		Fibre loss budget (dBm)		
	Maximum	Minimum	Maximum	Minimum			
FC16G-SW	-1.3	-9 (4 Gbps) -8.2 (8 Gbps) -7.8 (16Gbps)	0	-	12	12	12
FC16G-LW	1.3	-9 (4 Gbps) -8.2 (8 Gbps) -7.8 (16Gbps)	0	12	12	12	

Table 14. Environmental requirements specifications for a 16 Gbps fibre channel SFP+ transceivers

SFP+	Operating		Storage	
	Maximum	Minimum	Maximum	Minimum
FC16G-SW	40°F	0°F	85°F	-40°F
FC16G-LW	40°F	-0°F	85°F	-40°F

## General specifications for 10-Gbps fibre channel SFP+ transceivers

Table 15. Power requirements specifications for a 10 Gbps fibre channel SFP+ transceivers

SFP+	Wavelength (nanometer)-	Fibre Type	Core size (micron)	Baud Rate (GBd)	Cable Distance (meter)
FC10G-SW	850	MMF	62.5 (OM1)	10.518	33m (104 ft) m
			50 (OM3)	10.518	82m (269 ft)
			50 (OM3)	10.518	300m (984 ft)
FC10G_LW	1310	SMF	9.0	10.518	10 km (6.2 miles)

## Environmental and power requirements for 10-Gbps fibre channel SFP+ transceivers

Table 16. Power requirements specifications for a 10 Gbps fibre channel SFP+ transceivers

SFP+	Average Transmit Power (dBm)		Average Receive Power (dBm)		Fibre loss budget (dBm)		
	Maximum	Minimum	Maximum	Minimum			
FC10G-SW	-1.3	-7.3	-1.0	-9.9	7.3		
FC10G-LW	0.5	-8.2	-1.0	-9.9	7.4		

Table 17. Environmental requirements specifications for a 10 Gbps fibre channel SFP+ transceivers

SFP+	Operating		Storage	
	Maximum	Minimum	Maximum	Minimum
FC10G-SW	40°F	0°F	85°F	-40°F
FC10G-LW	40°F	0°F	85°F	-40°F

## General specifications for 8-Gbps fibre channel SFP+ transceivers

Table 18. General specifications for a 8 Gbps fibre channel SFP+ transceivers

SFP+	Wavelength (nanometer)-	Fibre Type	Core size (micron)	Baud Rate (GBd)	Cable Distance (meter)
FC8G-SW	850	MMF	62.5	8.5	150 m (492 ft)
FC8G-LW	1310	SMF	9.0	8.5	6.2 miles (10 km)

## Environmental and power requirements for the 8-Gbps fibre channel SFP+ transceivers

Table 19. Power requirements specifications for a 8 Gbps fibre channel SFP+ transceivers

SFP+	Average Transmit Power (dBm)		Average Receive Power (dBm)		Fibre loss budget (dBm)		
	Maximum	Minimum	Maximum	Minimum			
FC8G-SW	-1.3	-10 (2 Gbps) -9 (4 Gbps) -8.2 (8 Gbps)	0	-	62.5 microns	50 microns (OM2)	50 microns (OM3)
					2.1 (2 Gbps)	2.62 (2 Gbps)	3.31 (2 Gbps)
					1.78 (4 Gbps)	2.06 (4 Gbps)	2.88 (4 Gbps)
					1.58 (8 Gbps)	1.68 (8 Gbps)	2.04 (8 Gbps)

Table 19. Power requirements specifications for a 8 Gbps fibre channel SFP= transceivers (continued)

SFP+	Average Transmit Power (dBm)		Average Transmit Power (dBm)		Fibre loss budget (dBm)		
	Maximum	Minimum	Maximum	Minimum			
FC8G-LW	-3 (2 Gbps)	-11.7 (2 Gbps)	-3 (2 Gbps)	-	7.8 (2 Gbps)		
	-1 (4 Gbps)	-8.4 (4 Gbps)	-1 (4 Gbps)		7.8 (4 Gbps)		
	+0.5 (8 Gbps)	-8.4 (8 Gbps)	+0.5 (8 Gbps)		6.4 (8 Gbps)		

Table 20. Environmental requirements specifications for a 8 Gbps fibre channel SFP= transceivers

Transceiver Type	Operating		Storage	
	Maximum	Minimum	Maximum	Minimum
FC8G-SW	40°F	0°F	85°F	-40°F
FC8G-LW	40°F	-0°F	85VF	-40°F

### Maximum environmental and electrical ratings for fibre channel SFP+ transceivers

Table 21. Maximum environmental and electrical ratings for fibre channel SFP+ transceivers

Parameter	Symbol	Min	Max	Unit	Notes
Storage temperature	T[s]	-40°	85°	°C	1
Case temperature	T[c]	0°	70°	°C	1,2
Relative Humidity	RH	5	95%	%	1



---

## Appendix B. Site Planning and Maintenance Records

This appendix provides a Site Planning list and includes the following records to use when installing the IBM c-type SAN switches and directors.

- “Contacting Customer Service”
- “Site Preparation Checklist”
- “Finding the Chassis Serial Number”

**Note:** For information on how to query the switch for configuration information, see *Cisco NX-OS Fundamentals Configuration Guide* or the *Cisco Configuration Guide for DCNM SAN*.

---

### Contacting Customer Service

If you are unable to solve a startup problem after using the troubleshooting suggestions in this appendix, contact your customer service representative for assistance and further instructions. Before you call, have the following information ready to help your service provider assist you as quickly as possible:

- Date you received the switch.
- Chassis serial number. See the “Finding the Chassis Serial Number.”
- Type of software and release number.
- Maintenance agreement or warranty information.
- Brief description of the problem.
- Brief explanation of the steps you have already taken to isolate and resolve the problem.

---

### Site Preparation Checklist

Planning the location and layout of your equipment rack or wiring closet is essential for successful switch operation, ventilation, and accessibility.

Consider heat dissipation when sizing the air-conditioning requirements for an installation. See Appendix A, “Product specifications,” on page 43 for the environmental requirements, and power and heat ratings.

---

### Finding the Chassis Serial Number

You can find the chassis serial number label of the IBM c-type SAN switches and directors on the chassis.

If you have CLI access, enter the `show srom backplane 1` command to display the backplane contents, including the switch serial number.



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European community contact:

IBM Deutschland GmbH  
Technical Regulations, Department M372  
IBM-Allee 1, 71139 Ehningen, Germany  
Tele: +49 (0) 800 225 5423 or +49 (0) 180 331 3233  
Email: halloibm@de.ibm.com

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## Taiwan Contact Information

This topic contains the product service contact information for Taiwan.

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Tel: 0800-016-888

台灣IBM 產品服務聯絡方式：  
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f2c00790

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高調波電流規格 JIS C 61000-3-2 適合品

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## Korean Communications Commission Class A Statement

This explains the Korean Communications Commission (KCC) statement.

이 기기는 업무용(A급)으로 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

## Russia Electromagnetic Interference Class A Statement

This statement explains the Russia Electromagnetic Interference (EMI) statement.

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

rusemi

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# Index

## Numerics

36U cabinet  
library xxi

## A

about this document xxi  
accessibility features ix  
address  
IBM x  
attention notices xvii

## B

blades  
support for 4, 6

## C

caution notices xi  
definition xi  
examples xi  
chassis 2  
Cisco  
equivalent product models xxi  
comments  
sending to IBM x

## D

danger notices xiii  
definitions xiii  
examples xiii  
data transmission ranges 43  
director of licensing, address 51

## E

electrostatic discharge  
precautions xviii  
environmental  
notices xi, xx  
product recycling and disposal xx  
ESD  
precautions xviii

## F

Fabric OS version xxi

## G

getting help ix

## H

help ix

## I

IBM  
address x  
notices 51  
trademarks 52  
Integrated Supervisor Module 3  
intellectual property 51  
intended audience xxi

## L

labels  
safety xvi  
license, for patents 51

## M

memory  
specifications 43

## N

notices  
attention xvii  
caution xi  
danger xiii  
environmental xi, xx  
general 51  
IBM 51  
patents 51  
safety xi  
types xi  
notices, caution xi  
notices, danger xiii

## P

patents 51  
power supply 8  
specifications 43  
precautions  
ESD xviii  
rack installation xviii  
rack relocation xviii  
product  
models xxi  
specifications 43  
product disposal xx  
product models  
Cisco xxi  
IBM xxi  
product recycling xx  
product specifications  
FC port 43  
memory 43  
physical dimensions 43  
power supply 43  
serial port 43  
weight 43

providing feedback x  
publication  
feedback x

## R

rack  
safety precautions xviii  
rack relocation  
safety xx  
read this first ix

## S

safety  
notices xi  
rack installation xviii  
rack relocation xx  
safety labels xvi  
SAN50C-R Switch 1

## T

trademarks 52  
transceivers 12

## W

Web sites ix







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