

IBM Flex System FC5022 16Gb SAN Scalable  
Switch



User's Guide



IBM Flex System FC5022 16Gb SAN Scalable  
Switch



## User's Guide

Note: Before using this information and the product it supports, read the general information in Appendix B, “Notices,” the *Safety Information* and *Environmental Notices and User Guide* documents on the *IBM Notices for Network Devices* CD, and the Warranty Information document that comes with the product.

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# Contents

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## Safety

Safety statements . . . . .	vii
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## Chapter 1. IBM Flex System FC5022 16Gb SAN Scalable Switch

Related documentation . . . . .	1
Brocade documentation . . . . .	2
Notices and statements . . . . .	3
Features and specifications . . . . .	4
Features . . . . .	4
Switch models . . . . .	5
Dynamic Ports on Demand . . . . .	6
Switch specifications . . . . .	6
Memory and processor specifications . . . . .	6
Environmental conditions and specifications . . . . .	6
Major components of the switch . . . . .	7
Product name and serial number . . . . .	8
Removing the battery . . . . .	8

## Chapter 2. Installing the Switch

Installation guidelines . . . . .	11
System reliability guidelines . . . . .	12
Handling static-sensitive devices . . . . .	12
Installing the switch . . . . .	13
Installing and removing an SFP+ transceiver . . . . .	16
Handling an SFP+ transceiver . . . . .	16
Inserting an SFP+ transceiver . . . . .	17
Removing an SFP+ transceiver . . . . .	18
Using dust caps . . . . .	19
Cabling the switch . . . . .	20
Connecting and disconnecting the USB console cable . . . . .	20
Connecting the RJ-45 Ethernet cable . . . . .	21
Locating the information panel, LEDs, and external ports . . . . .	22
Information LEDs . . . . .	23

Configuring the switch . . . . .	26
Configuring an IP address on the switch . . . . .	26
Connecting to the switch over SSH . . . . .	27
Connecting to the switch using Web Tools . . . . .	28
Connecting to the switch using the serial console port . . . . .	29
Connecting to the switch using the front panel Ethernet (RJ-45) port . . . . .	29
Initial configuration . . . . .	29
Logging in to the switch . . . . .	30
Setting date and time . . . . .	30
Time zones . . . . .	30
Local time synchronization . . . . .	31
Setting the date . . . . .	31
Setting time zones . . . . .	32
Synchronizing local time using NTP . . . . .	32
Managing the switch . . . . .	33
SNMP v3 authentication . . . . .	33
Brocade Inter-Switch Link Trunking . . . . .	34
Native Fabric mode and Access Gateway mode . . . . .	34
Backing up the configuration . . . . .	35
Resetting the switch to factory defaults . . . . .	35
Removing or replacing the switch . . . . .	36

### **Chapter 3. Updating the Firmware**

Determining the switch firmware level . . . . .	37
Determining firmware from the CMM . . . . .	37
Determining firmware from the switch using the CLI . . . . .	37
Determining firmware using Web Tools . . . . .	38
Upgrading the switch firmware . . . . .	39

### **Chapter 4. Solving Problems**

Running POST . . . . .	41
POST errors . . . . .	41
Parts listing . . . . .	42

### **Appendix A. Getting Help and Technical Assistance**

Before you call . . . . .	43
Using the documentation . . . . .	43
Getting help and information from the World Wide Web . . . . .	44
Software service and support . . . . .	44
Hardware service and support . . . . .	44
IBM Taiwan product service . . . . .	44

## **Appendix B. Notices**

Trademarks .....	46
Important notes .....	47
Documentation format .....	47
Electronic emission notices .....	48
Federal Communications Commission (FCC) statement .....	48
Industry Canada Class A emission compliance statement .....	48
Avis de conformité à la réglementation d'Industrie Canada .....	48
Australia and New Zealand Class A statement .....	48
European Union EMC Directive conformance statement .....	48
Germany Class A statement .....	49
Japan VCCI Class A statement .....	50

## **Index**



# Safety

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Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الأمنية

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

在安装本产品之前，请仔细阅读 **Safety Information** (安全信息)。

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

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

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

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

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

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

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

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

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

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

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

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

## Safety statements

Перед установкой продукта прочтите инструкции по технике безопасности.

Pred inštaláciou tohto zariadenia si pečítajte Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

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

Läs säkerhetsinformationen innan du installerar den här produkten.

## Safety statements

### **Important:**

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

For example, if a caution statement is labeled “Statement 1,” translations for that caution statement are in the *Safety Information* document under “Statement 1.”

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

This device is intended for use with UL Listed IBM Flex Systems.

**Statement 1:**



**DANGER**

Electrical current from power, telephone, and communication cables is hazardous.

To avoid a shock hazard:

- Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.
- Connect all power cords to a properly wired and grounded electrical outlet.
- Connect to properly wired outlets any equipment that will be attached to this product.
- When possible, use one hand only to connect or disconnect signal cables.
- Never turn on any equipment when there is evidence of fire, water, or structural damage.
- Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.
- Connect and disconnect cables as described in the following table when installing, moving, or opening covers on this product or attached devices.

**To Connect:**

1. Turn everything OFF.
2. First, attach all cables to devices.
3. Attach signal cables to connectors..
4. Attach power cords to outlet.
5. Turn device ON

**To Disconnect:**

1. Turn everything OFF.
2. First, remove power cords from outlet.
3. Remove signal cables from connectors.
4. Remove all cables from devices.

**Statement 2:**



**CAUTION:**

When replacing the lithium battery, use only Part Number 33F8354 or an equivalent type battery recommended by the manufacturer. If your system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of.

*Do not:*

- Throw or immerse into water
- Heat to more than 100 °C (212 °F)
- Repair or disassemble

Dispose of the battery as required by local ordinances or regulations.

**Statement 3:**



**CAUTION:**

When laser products (such as CD-ROMs, DVD drives, fiber optic devices, or transmitters) are installed, note the following:



**DANGER**

Some laser products contain an embedded Class 3A or Class 3B laser diode. Note the following.

Laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam.



Class 1 Laser Product  
Laser Klasse 1  
Laser Klass 1  
Luokan 1 Laserlaite  
Appareil A` Laser de Classe 1

## Safety statements

### Statement 8:



### CAUTION:

Never remove the cover on a power supply or any part that has the following label attached.



Hazardous voltage, current, and energy levels are present inside any component that has this label attached. There are no serviceable parts inside these components. If you suspect a problem with one of these parts, contact a service technician.

# IBM Flex System FC5022 16Gb SAN Scalable Switch

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The IBM Flex System™ FC5022 16Gb SAN Scalable Switch is a high-density, 48-port 16 Gbps Fibre Channel switch that is used in the IBM Flex System chassis. The switch provides 28 internal ports to compute nodes by way of the midplane, and 20 external SFP+ ports.

This *User's Guide* contains information and instructions for installing the switch, managing IP assignment, updating the firmware, and solving problems. See the *IBM Flex System Installation and Service Guide* that comes with your IBM Flex System chassis to install the switch in the chassis; then, return to this *User's Guide* for the information and instructions needed to complete the installation.

For information about the types of compatible devices available for IBM products, contact your IBM marketing representative or authorized reseller. For a list of supported optional devices, see <http://www.ibm.com/servers/eserver/serverproven/compat/us/>.

For the most up-to-date product documentation for all of your IBM Flex System products, go to the IBM Flex System Information Center at: <http://publib.boulder.ibm.com/infocenter/flexsys/information/index.jsp>.

## NOTES:

1. The IBM Flex System FC5022 16Gb SAN Scalable Switch is also referred to as “the switch” throughout this document.
2. Changes are made periodically to the IBM website. Procedures for locating firmware and documentation might vary slightly from what is described in this document.
3. The hardware illustrations in this document might differ slightly from your actual hardware.
4. The screens that are described or referenced in this document might differ slightly from the screens that are displayed by your system. Screen content varies according to the type of IBM Flex System chassis, and firmware versions and options that are installed.

## Related documentation

This *User's Guide* contains setup and installation instructions for the IBM Flex System FC5022 16Gb SAN Scalable Switch and general information about the switch, including how to configure, update, and troubleshoot the switch, as well as how to get help. For the most up-to-date product documentation for all of your IBM Flex System products, go to the IBM Flex System Information Center at the following location:

<http://publib.boulder.ibm.com/infocenter/flexsys/information/index.jsp>.

The following IBM Flex System documentation is available:

- *IBM Flex System Chassis Management Module Command-Line Interface Reference Guide*  
This document explains how to use the Chassis Management Module command-line interface (CLI) to directly access management functions. The command-line interface also provides access to the text-console command prompt on each compute node through a Serial over LAN (SOL) connection.

# 1 Related documentation

- *IBM Flex System Chassis Management Module User's Guide*  
This document explains how to use the Chassis Management Module user interface to manage chassis components.
- *IBM Flex System Enterprise Chassis Installation and Service Guide*  
This document contains hardware installation instructions for the switches and pass-thru switches that install in the IBM Flex System Chassis.
- *IBM Flex System Manager System Management Guide*  
This document explains how to use the IBM Flex System Manager user interface to manage chassis components.
- *IBM Flex System network device User's Guides*  
These documents contain detailed information about installing, configuring, updating, and troubleshooting specific IBM Flex System network devices, which include network switches, pass-thru switches, and adapters.
- *Environmental Notices and User Guide*  
This document is provided on the *IBM Notices for Network Devices CD*, and it contains translated environmental notices.
- *Safety Information*  
This document is provided on the *IBM Notices for Network Devices CD*, and it contains translated caution and danger statements. Each caution and danger statement that appears in the documentation has a number that you can use to locate the corresponding statement in your language in the *Safety Information* document.
- *Warranty Information*  
This document comes with the network device, and it contains information about the terms of the warranty.

## Brocade documentation

Download the following Brocade Fabric Operating System (FOS) publications referenced in this User's Guide through <http://ibm.brocadeassist.com/public/FabricOSv7xRelease>.

On this website, select the **Documentation** tab, select **Fabric Operating System (FOS)** from the **Download by** list box, then select the appropriate version for your product.

- *Brocade Fabric OS Administrator's Guide*
- *Brocade Network Advisor SAN User Manual*
- *Access Gateway Administrator's Guide*
- *Fabric OS Command Reference Manual*
- *Fabric OS MIB Reference Manual*
- *Fabric OS System Error Message Reference Manual*
- *Web Tools Administrator's Guide*
- *Secure Fabric OS Administrator's Guide*
- *Fabric Watch Administrator's Guide*
- *End User License Agreement (EULA)*

## Notices and statements

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

The following notices and statements are used in this document:

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

## Features and specifications

The IBM Flex System FC5022 16Gb SAN Scalable Switch supports the following features and specifications.

### Features

- 48 16-Gbps Fibre Channel (FC) ports
- Up to 28 internal ports (available through Ports-On-Demand activation) connected to 14 compute nodes at the midplane auto-negotiating to 16 or 8 Gbps FC ports
- Up to 20 external auto-negotiating FC ports (available through Ports-On-Demand activation) capable of supporting 16, 8, or 4 Gbps speed through 16 or 8 Gbps SFP+ transceivers
- Brocade-branded 8 Gbps and 16 Gbps SFP+ optical transceivers
- Inter-Switch Link (ISL) Trunking (licensable), which allows up to eight ports (at 16, 8, or 4 Gbps speeds) to combine to form a single, logical ISL with a speed of up to 128 Gbps (256 Gbps full duplex) for optimal bandwidth utilization, automatic path failover, and load balancing.
- Two internal 1 Gbps full-duplex Ethernet ports to connect to the redundant management modules
- Brocade Fabric OS (FOS), which delivers distributed intelligence throughout the network and enables a wide range of value-added applications, such as Brocade Advanced Web Tools and Brocade Advanced Fabric Services (on certain models). Refer to the release notes for version information.
- Supports up to 768 Gbps I/O bandwidth
- 420 million frames switch per second, 0.7 microseconds latency
- 8,192 buffers for up to 3,750 Km extended distance at 4 Gbps FC (Extended Fabrics license required)
- In-flight Fibre Channel compression and decompression support on up to two external ports (no license required)
- In-flight Fibre Channel encryption and decryption on up to two external ports (no license required)
- Dynamic Ports on Demand (DPOD) offering the flexibility to scale from 12 ports on the Base Model (from 24 ports on the 24-port and ESB Models) to 48 ports
- 48 Virtual Channels (VCs) per port
- Port mirroring to monitor ingress or egress traffic from any port within the switch
- Two I2C connections able to interface to redundant management modules
- One external RS-232 console port with a mini-USB interface for serial console management
- One external 10/100/1000Base-T RJ-45 Ethernet port with integral LEDs for link/activity and speed for debugging and field support
- Two LEDs (status, Rx/Tx) per external Fibre Channel port
- System LEDs noting system power, status, and locator.
- Runs from 12V continuous power supplied by the compute node chassis
- Hot pluggable—Up to 4 hot-pluggable switches per IBM Flex System Chassis
- Single fuse circuit

- Four temperature sensors
- One internal real-time clock
- Managed with Brocade Web Tools
- Supports a minimum of 128 domains in Native mode and Interop mode
- Full fabric switch change to Access Gateway mode
- Nondisruptive code load in Native mode and Access Gateway mode
- 255 N\_port logins per physical port
- D\_port support on external ports
- Standard FC features (NPIV, E/M/N port types)
- Supports IBM Features on Demand
- Class 2, Class 3, and Class F frames
- SNMP v1, v2, and v3 support
- SSH v2 support
- SSL support
- NTP client support (NTP V3)
- FTP support for firmware upgrades
- SNMP/MIB monitoring functionality contained within the Ethernet Control MIB-II (RFC1213-MIB)
- UUID put into MIB structure
- End-to-end optics and link validation
- Ability to send switch events and syslogs to the IBM Chassis Management Module (CMM)
- Traps identify cold start, warm start, link up/link down and authentication failure events
- Support for IPv4 and IPv6 on the management ports

## Switch models

Three models of the IBM Flex System FC5022 16Gb SAN Scalable Switch are offered:

- Base Model—Includes 12 active ports, Enhanced Group Management (IBM Network Advisor), Access Gateway, and Advanced Zoning (Virtual Private SANs).
- 24-port Model—Includes 24 active ports, Enhanced Group Management (IBM Network Advisor), Access Gateway, and Advanced Zoning (Virtual Private SANs).
- ESB Model—Includes 24 active ports and the ESB (Enterprise Software Bundle), which supports functionality noted in the Base Model plus the following advanced fabric service licenses: ISL Trunking, Fabric Watch, Advanced Performance Monitoring, Adaptive Networking, Extended Fabrics, and Server Application Optimization (SAO).

## Dynamic Ports on Demand

With Dynamic Ports on Demand (DPOD), physical ports are licensed as they come online. These ports may be any combination of external or internal Fibre Channel (FC) ports. After all licenses have been assigned, you can manually move those licenses from one port to another.

- Base Model port set—The first 12 ports reporting (on a first-come, first-served basis) on boot-up are assigned licenses.
- 24-port Model port set—The first 24 ports reporting (on a first-come, first-served basis) on boot-up are assigned licenses.
- ESB Model port set—The first 24 ports reporting (on a first-come, first-served basis) on boot-up are assigned licenses.

---

### NOTE

Ports 0 and 29 are prereserved for external/SAN connectivity.

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## Switch specifications

[Table 1](#) lists the physical characteristics of the switch.

**TABLE 1** Switch specifications

Characteristic	Description
Height	30.7mm (1.21 inches)
Width	299.3mm (11.78 inches)
Depth (including ejectors)	310.6mm (12.23 inches)
Weight	3.20 Kg (7.05 pounds)

## Memory and processor specifications

[Table 2](#) lists the memory that is installed in the switch.

**TABLE 2** Memory and processor specifications

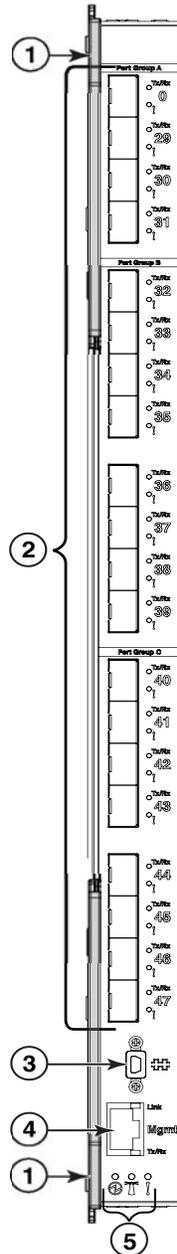
Memory type	Value
440EPX processor	667 MHz
DDR2 SDRAM Bus	1 GB running at 266 MHz
Boot Flash	4 MB
Compact Flash	1 GB

## Environmental conditions and specifications

See the documentation that comes with your IBM Flex System chassis for information about the environmental conditions and specifications that are supported by the system.

## Major components of the switch

Figure 1 shows the major components of the IBM Flex System FC5022 16Gb SAN Scalable Switch when viewed from the port side.



- |   |                                 |   |                            |
|---|---------------------------------|---|----------------------------|
| 1 | Release levers (x2)             | 4 | RJ-45 Ethernet port (Mgmt) |
| 2 | 20 external Fibre Channel ports | 5 | System LEDs                |
| 3 | Mini-USB console port           |   |                            |

**FIGURE 1** Major components of the IBM Flex System FC5022 16Gb SAN Scalable Switch

# 1 Product name and serial number

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**NOTE**

The hardware illustrations in this document might differ slightly from your actual hardware, and your switch might have labels that are not shown in the captured illustrations.

---

You can manage and configure the switch through the following interfaces:

- An SSH connection to the command-line interface (CLI)
- A terminal emulation program connection to the mini-USB serial port interface
- A Web browser-based interface (Brocade Web Tools) connection to the switch
- The IBM Chassis Management Module (CMM)

For more information, see [Chapter 2 “Installing the Switch”](#).

## Product name and serial number

Record information about the switch in the following table. The product name and serial number are on the identification label on the bottom cover of the switch. The media access control (MAC) address is on a separate label on the bottom cover of the switch. For an illustration that shows the locations of these labels, see [“Major components of the switch”](#) on page 7. You will need this information when you register the switch with IBM. You can register the switch at <http://www.ibm.com/support/mysupport/>.

**TABLE 3 IBM Flex System Solution Product Information**

Product name	IBM Flex System FC5022 16Gb SAN Scalable Switch
Model number	
Serial number	
Part number	
Media Access Control (MAC) address	
<b>MAC address for other components</b>	

## Removing the battery

Local regulations might require removing the battery prior to disposing or recycling this product. Complete these steps to remove the battery:

1. Disconnect all power and communication cables from the front panel.
2. Remove all transceivers.
3. Unscrew the fasteners and remove the sheet-metal cover.

**Statement 2:****CAUTION:**

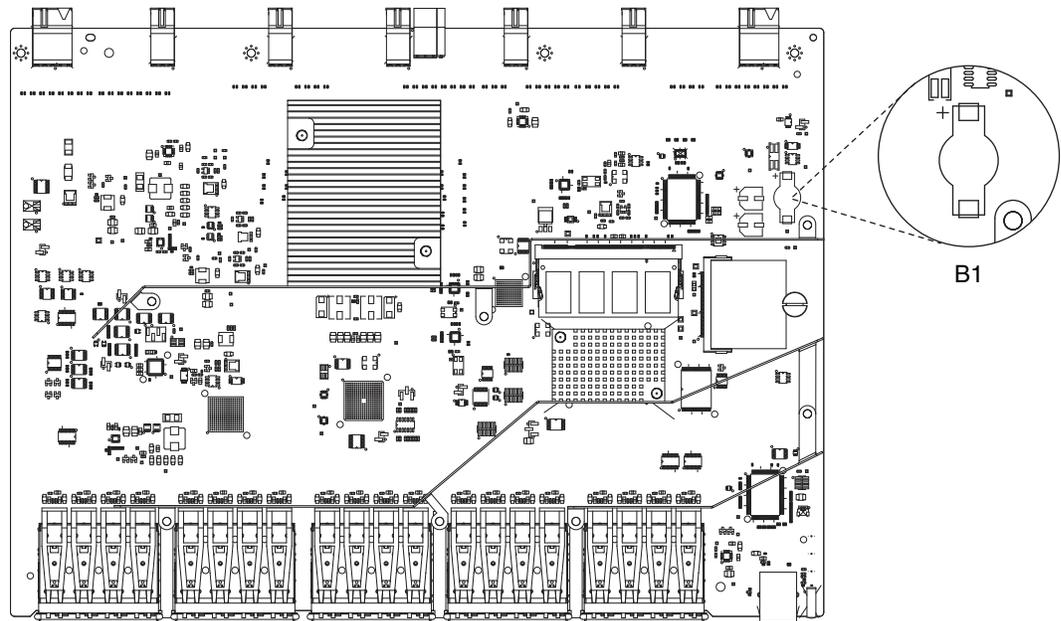
When replacing the lithium battery, use only Part Number 33F8354 or an equivalent type battery recommended by the manufacturer. If your system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of.

*Do not:*

- Throw or immerse into water
- Heat to more than 100 °C (212 °F)
- Repair or disassemble

Dispose of the battery as required by local ordinances or regulations.

4. Go to the B1 location on the circuit board, as shown in [Figure 2](#), and remove the battery from the holder. Replace the battery with one of the battery types listed in [Table 4](#).



**FIGURE 2** Location of battery holder

# 1 Removing the battery

**TABLE 4** Battery Information

Battery Type	MPN
Panasonic	BR1225/BE
Rayovac Corporation	BR1225 BR1225-BA

5. Recycle the battery as appropriate.
6. Refer to the *Environmental Notices and User Guide* that shipped with the product for more information on battery recycling and disposal.

# Installing the Switch

---

This chapter provides information and instructions for installing, configuring, and cabling the switch. See the *IBM Flex System Installation and Service Guide* that comes with your IBM Flex System chassis to install the switch in the chassis; then return to this *User's Guide* for the information and instructions needed to complete the installation.

## Items included with the switch

The following items are included in the switch shipping carton:

- One switch
- One accessory bag containing two 16-Gbps SFP+ transceivers (IBM P/N 00Y3328). (24-port Model only)
- Warranty and Safety notifications
- Applicable Technical Update flyers, if any

For other available IBM Flex System FC5022 16Gb SAN Scalable Switch models, any additional parts are ordered separately.

## Installation guidelines

Before you install the IBM Flex System FC5022 16Gb SAN Scalable Switch in the IBM Flex System chassis, pay attention to the following guidelines:

- Read the safety information that begins on page v, "[Handling static-sensitive devices](#)" on page 12, and the safety statements in the chassis documentation.
- Observe good housekeeping in the area where you are working. Place removed covers and other parts in a safe place.
- Blue on a component indicates touch points, where you can grip the component to remove it from or install it in the compute node or chassis, open or close a latch, and so on.
- Orange on a component or an orange label on or near a component on the switch, compute node, or chassis indicates that the component can be hot-swapped, which means that if the chassis and operating system support hot-swap capability, you can remove or install the component while the chassis is running. (Orange can also indicate touch points on hot-swap components.) See the instructions for removing or installing a specific hot-swap component for any additional procedures that you might have to perform before you remove or install the component.
- You do not have to turn off the chassis to install or replace any of the hot-swap modules on the front or rear of the chassis.

- When you install a switch in the chassis, you must also install a compatible network adapter in the compute node to support the switch.
- When you are finished working on the compute node or chassis, reinstall all safety shields, guards, labels, and ground wires.

For a list of supported optional devices for the chassis and other IBM products, see <http://www.ibm.com/servers/eserver/serverproven/compat/us/>.

### System reliability guidelines

To help ensure proper cooling, performance, and system reliability, make sure the following requirements are met:

- Each of the switch bays at the rear of the chassis contains either a switch or a filler blade.
- A removed hot-swap module is replaced with an identical module or filler module within 60 seconds of removal.
- A removed hot-swap compute node should be replaced with another compute node or filler blade within 60 seconds of removal.
- The ventilation areas on the sides of the compute node power modules and blowers are not blocked.
- You have followed the reliability guidelines in the documentation that comes with the chassis.

Cable requirements for the switch are described in the IBM System x *Configuration and Options Guide* at <http://www.ibm.com/servers/eserver/xseries/cog/>. See the documentation that comes with the compute node for cable-routing information.

### Handling static-sensitive devices

---

#### ATTENTION

Static electricity can damage the chassis and other electronic devices. To avoid damage, keep static-sensitive devices in their static-protective packages until you are ready to install them. To reduce the possibility of electrostatic discharge, observe the following precautions:

---

- Limit your movement. Movement can cause static electricity to build up around you.
- Handle the device carefully, holding it by its edges or its frame.
- Do not touch solder joints, pins, or exposed printed circuitry.
- Do not leave the device where others can handle and damage it.
- While the device is still in its static-protective package, touch it to an unpainted metal surface of the chassis or an unpainted metal surface on any other grounded rack component in the rack in which you are installing the device for at least two seconds. This drains static electricity from the package and from your body.
- Remove the device from its package and install it directly into the chassis without setting down the device. If it is necessary to set down the device, put it back into its static-protective package. Do not place the device on the chassis or on a metal surface.
- Take additional care when you handle devices during cold weather. Heating reduces indoor humidity and increases static electricity.
- Some types of chassis come with electrostatic discharge (ESD) connectors. If the chassis is equipped with an ESD connector, see the documentation that comes with the chassis for using the ESD connector.

## Installing the switch

When populating your IBM Flex System chassis, refer to the documentation that comes with your IBM Flex System chassis to determine the relevant order for populating the chassis I/O module bays.

A compatible network adapter must be installed in each compute node with which you want to communicate. To enable the switch to communicate with a compute node, at least one switch must be installed in the chassis. If only one switch is being used to populate the chassis, ensure that you insert the switch in the recommended chassis I/O module bay. Refer to the support documentation that comes with your IBM Flex System chassis and network adapter for more information.

Installing a second switch enables a redundant path and a separate connection from the compute node to the external Fibre Channel SAN.

The chassis supports a maximum of four IBM Flex System FC5022 16Gb SAN Scalable Switches and a maximum of 14 1-bay compute nodes.

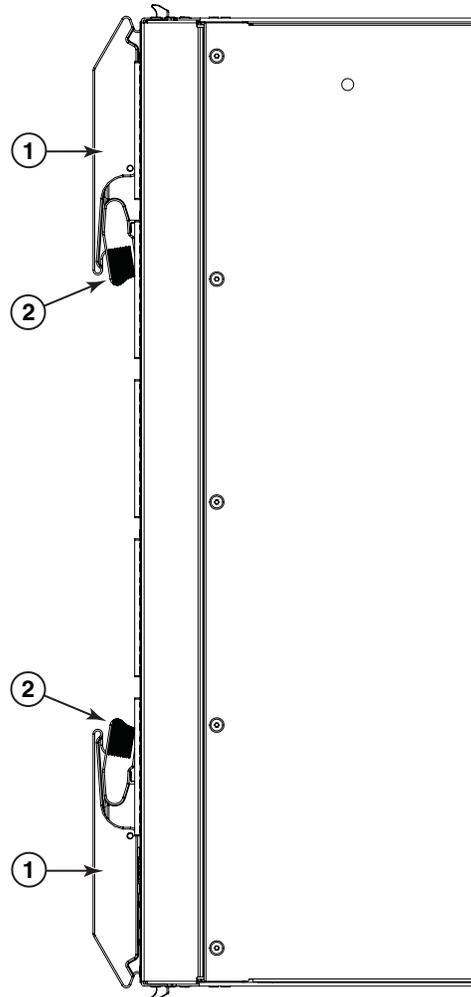
See the documentation that comes with your IBM Flex System chassis for information about switch bay locations and the components that can be installed in them that are specific to your chassis type.

### NOTES:

- The compute nodes or chassis that are described or shown in this document might be different from your compute node or chassis. For additional information, see the documentation that comes with your compute node or chassis.
- When the switch is installed in the chassis, the internal ports can operate at 8 or 16 Gbps and external FC ports can operate at 4, 8, or 16 Gbps (auto-negotiated).
- Configuration requirements for the switch and chassis might vary. For the most up-to-date product documentation for all of your IBM Flex System products, go to the IBM Flex System Information Center at <http://publib.boulder.ibm.com/infocenter/flexsys/information/index.jsp>.

## 2 Installing the switch

Figure 3 shows the release levers and locks on an IBM Flex System FC5022 16Gb SAN Scalable Switch.



1 Release lever

2 Release lever lock

**FIGURE 3** Switch release levers and locks

To install the switch, complete the following steps.

1. Read the following safety information:
  - [“Safety”](#) on page vii
  - [“System reliability guidelines”](#) on page 12
2. Select the chassis bay in which to install the switch. For details about bay requirements and bay locations, see the documentation that comes with the chassis and compute nodes.
3. Remove the filler panel from the selected bay. Store the filler panel for future use.

4. If you have not already done so, touch the static-protective package that contains the switch to an *unpainted* metal surface of the chassis or an *unpainted* metal surface on any other grounded rack-component for at least two seconds.
5. Remove the switch from its static-protective package.
6. Make sure the release levers on the switch are in the open position (perpendicular to the switch). For specific instructions for installing a switch in the chassis, see the documentation that comes with the chassis.
7. Slide the switch into the bay until it stops.
8. Push the release levers on the front of the switch to the closed position. After you insert and lock the switch, it turns on, and a power-on self-test (POST) occurs to verify that the switch is operating correctly. The POST takes approximately 60 seconds to complete.

During POST, the switch LEDs will go through a lamp test. When the switch has completed POST, all LEDs except the OK LED will power off and follow normal operation. Refer to [“Locating the information panel, LEDs, and external ports”](#) on page 22 for more information.

---

**NOTE**

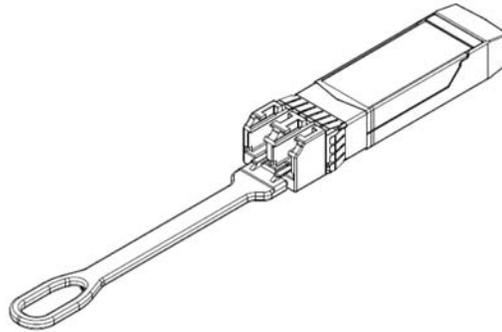
To maintain proper air flow, make sure the ventilation holes on the front of the switch are not blocked.

---

9. To install another switch, repeat [step 2](#) through [step 8](#); otherwise, go to the next step.
10. Make sure the LEDs on the switch indicate that it is operating correctly (see [“Information LEDs”](#) on page 23).
11. Install any SFP+ transceivers that you ordered with the switch. Only Brocade-branded SFP+ transceivers are supported. For safety information and instructions, see [“Installing and removing an SFP+ transceiver”](#) on page 16.
12. Attach any cables that are required by the switch. For additional information about cabling the switch, see [“Installing and removing an SFP+ transceiver”](#) on page 16, and the documentation that comes with the cables and the optional network devices to which the cables have been connected. For the locations of the connectors on the chassis, see the documentation that comes with the chassis.
13. Make sure the external ports on the switch are enabled through one of the management interfaces, such as the Web-based interface or the CLI.

## Installing and removing an SFP+ transceiver

The IBM Flex System FC5022 16Gb SAN Scalable Switch supports both 16-Gbps and 8-Gbps FC SFP+ transceivers. An SFP+ transceiver is a laser product that converts electrical signals to optical signals. Only Brocade-branded SFP+ transceivers are supported. See [Figure 4](#).



**FIGURE 4** SFP+ transceiver

---

**NOTE**

Figure 4 shows a 16-Gbps SFP+ transceiver, which might differ slightly from your actual hardware.

---

### Handling an SFP+ transceiver

**NOTES:** Before installing an SFP+ transceiver, be aware of the following information:

- The housing on the SFP+ transceiver includes an integral guide key that is designed to prevent you from inserting the transceiver incorrectly.
- Use minimal pressure when you insert the SFP+ transceiver into the port. Forcing the transceiver into the port can cause damage to the transceiver or the switch port.
- You can insert or remove the SFP+ transceiver while the chassis is powered on.
- You must first insert the SFP+ transceiver into the port before connecting the cables.
- You must remove the cable from the SFP+ transceiver before you remove the SFP+ transceiver from the switch.

To avoid damage to the fiber-optic cables, follow these guidelines:

- Do not route the cable along a folding cable-management arm.
- When you attach the cable to a device on slide rails, leave enough slack in the cable so that it does not bend to a radius of less than 38 mm (1.5 in.) when the device is extended, or become pinched when the device is retracted.
- Route the cable away from places where it can be snagged by other devices in the rack.
- Do not overtighten the cable straps or bend the cables to a radius of less than 38 mm (1.5 in.).
- Do not put excess weight on the cable at the connection point. Make sure the cable is well supported.

**Statement 3:****CAUTION:**

When laser products (such as CD-ROMs, DVD drives, fiber optic devices, or transmitters) are installed, note the following:

**DANGER**

Some laser products contain an embedded Class 3A or Class 3B laser diode. Note the following.

Laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam.



Class 1 Laser Product  
Laser Klasse 1  
Laser Klass 1  
Luokan 1 Laserlaite  
Appareil A` Laser de Classe 1

## Inserting an SFP+ transceiver

To insert an SFP+ transceiver, complete the following steps:

1. Read the safety information that begins on [page vii](#) and “[System reliability guidelines](#)” on page 12.
2. Read the information in “[Handling an SFP+ transceiver](#)” on page 16.
3. Remove the SFP+ transceiver from its static-protective package.
4. Remove the protective insert or dust cap, if one is installed, from the port where you are installing the SFP+ transceiver and store it in a safe place.

---

**NOTE**

A preferred order of cabling exists. Two of the 24-port licenses (port 0 and port 29) are factory assigned. Use these ports first.

---

5. Gently insert the SFP+ transceiver in a port on the switch until it clicks into place, as shown in [Figure 5](#).

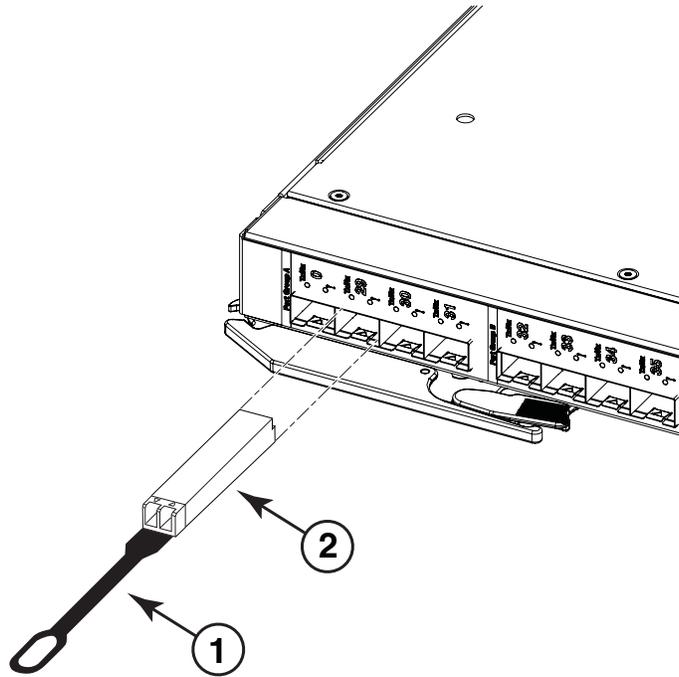
## 2 Installing and removing an SFP+ transceiver

---

**ATTENTION**

To avoid damage to the cable or the SFP+ transceiver, make sure you install the SFP+ transceiver *before* you connect the fiber-optic cable.

---



1 Pull tab

2 SFP+ transceiver

**FIGURE 5** SFP+ transceiver installation

6. Connect the fiber-optic cable to the SFP+ transceiver. For information about protecting the cable, refer to [“Handling an SFP+ transceiver”](#) on page 16.
7. Check the LEDs on the switch. When the switch is operating correctly, the green link LED is lit. For information about the status of the switch LEDs, see [“Information LEDs”](#) on page 23.

### Removing an SFP+ transceiver

To remove an SFP+ transceiver, complete the following steps:

1. Read the safety information that begins on [page vii](#) and [“System reliability guidelines”](#) on page 12.
2. Read the information in [“Handling an SFP+ transceiver”](#) on page 16.
3. Remove the fiber-optic cable from the SFP+ module that you want to replace.

---

**ATTENTION**

To avoid damage to the cable or the SFP+ transceiver, make sure you disconnect the fiber-optic cable *before* you remove the SFP+ module.

---

4. Unlock the SFP+ transceiver by gently pulling the tab straight out.

5. Place the SFP+ transceiver in a static-protective package.
6. Insert another SFP+ transceiver into the port (see “[Inserting an SFP+ transceiver](#)” on page 17), or insert a dust cap, as shown in [Figure 6](#).

## Using dust caps

A dust cap is either a plug that fits into a port to keep out dust, or a cover that fits over the end of a cable for the same purpose. Use dust caps in any port left uncabled. You must remove the dust cap before inserting a cable.

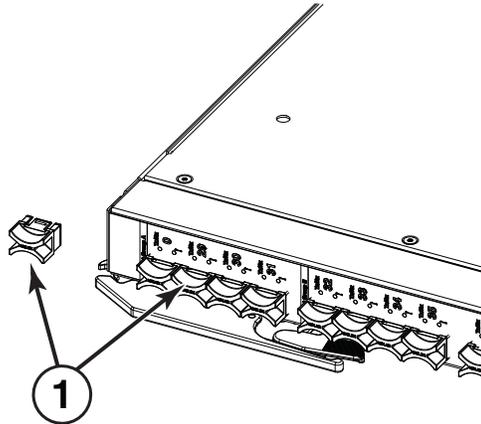
[Figure 6](#) shows the switch with dust caps in place.

---

### NOTE

The hardware illustrations in this document might differ slightly from your actual hardware.

---



- 1 Dust cap

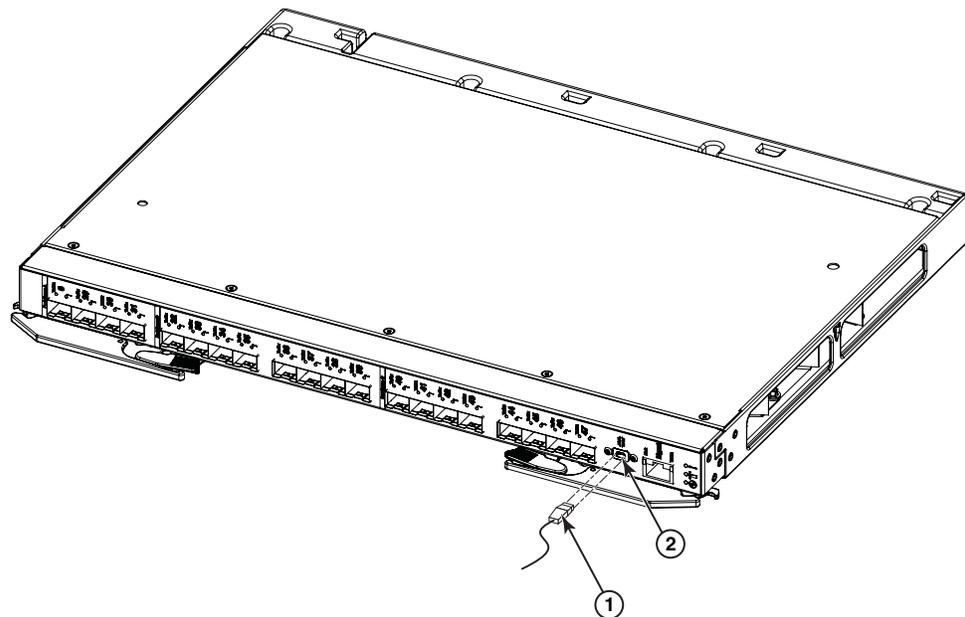
**FIGURE 6** Dust cap

## Cabling the switch

This section provides instructions for connecting and disconnecting the cables to the physical ports on the IBM Flex System FC5022 16Gb SAN Scalable Switch.

### Connecting and disconnecting the USB console cable

To connect the USB console cable to the switch, connect the cable to the mini-USB console port of the switch and the other end of the cable to the console device, as shown in [Figure 7](#).



1 USB console cable

2 Mini-USB console port

**FIGURE 7** USB cable connection

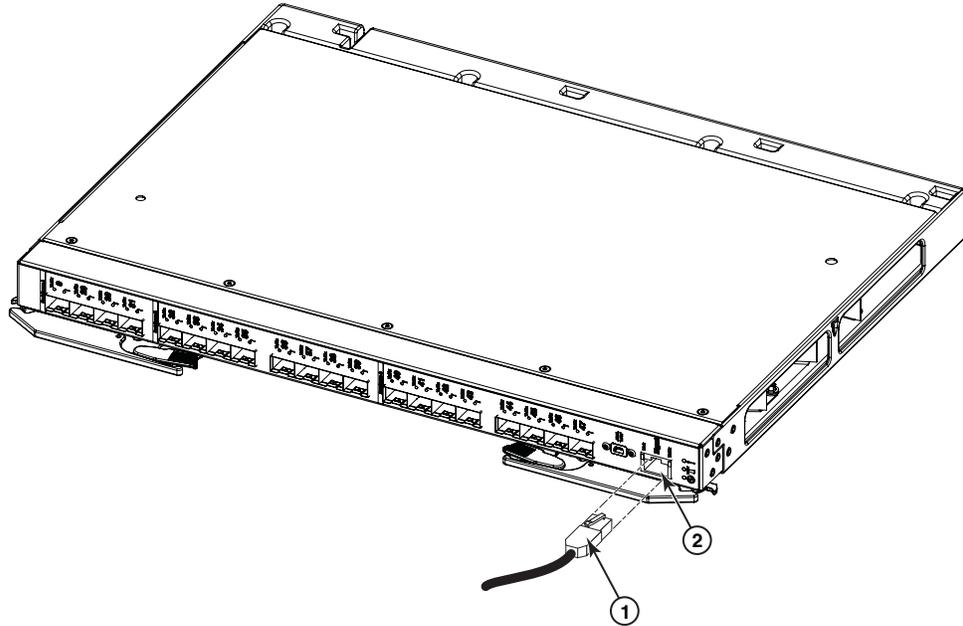
A USB console cable with a mini-USB connector on one end and a DB-9 male connector on the other end is needed to connect the switch to your console device. Depending on your requirements, you might need to use a DB-9 to RJ-45 adapter. Additional cabling and adapters might also be required.

To disconnect the USB console cable, grasp the connector and gently pull the cable from the switch.

## Connecting the RJ-45 Ethernet cable

The RJ-45 Ethernet cable can be connected to the RJ-45 port located on the front panel.

To connect the RJ-45 connector to the switch, push the connector into the port connector until it clicks into place, as shown in [Figure 8](#).

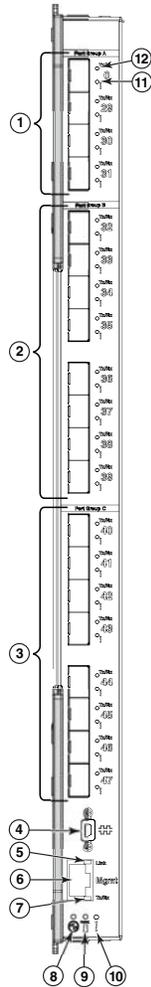


**FIGURE 8** RJ-45 cable connection

To disconnect the RJ-45 Ethernet cable, grasp the connector and gently pull the cable from the switch.

## Locating the information panel, LEDs, and external ports

Figure 9 shows the IBM Flex System FC5022 16Gb SAN Scalable Switch information panel.



- |   |  |    |                                  |
|---|--|----|----------------------------------|
| 1 | Trunk Group A (shown as ports 0 and 29–31) | 7  | Link LED                         |
| 2 | Trunk Group B (shown as ports 32–39)       | 8  | System Status LED: Power         |
| 3 | Trunk Group C (shown as ports 40–47)       | 9  | System Status LED: Locator       |
| 4 | Mini-USB console port                      | 10 | System Status LED: Fault         |
| 5 | Tx/Rx LED                                  | 11 | Fault (!) LED (One LED per port) |
| 6 | RJ-45 Ethernet port (Mgmt)                 | 12 | Tx/Rx LED (One LED per port)     |

**FIGURE 9** Switch information panel

---

### NOTE

The illustrations in this document might differ slightly from your actual hardware.

---

The information panel includes one mini-USB console port connector that is used for switch management. This port requires a mini-USB plug on a serial cable. A single Ethernet port is also provided that allows you to connect to the network using an RJ-45 connector.

The information panel offers 20 Fibre Channel (FC) ports that can be converted to fiber-optic capability by use of SFP+ transceivers. Only Brocade-branded SFP+ transceivers are supported.

The information panel provides status information for the switch that is indicated by LED activity. LEDs identify fault and activity information for each external port, switch status, and network connectivity.

## Information LEDs

The information panel on the switch supports three sets of LEDs that provide status information of the switch, the network connection, and status of the external connections to the switch:

- The power, location, and status/fault LEDs on the bottom of the switch indicate the switch status.
- The fault (!) and activity (Tx/Rx) LEDs on each FC port indicate the status of the external ports.
- The Ethernet port has separate link and activity LEDs.

In addition to the LEDs, the information panel is divided into three different groups (Group A, Group B, and Group C). These groups support the ability to group “trunk ports.” A trunk port is a set of individual ports that are grouped collectively to simulate a single port with a much faster data transmission. The ability to group trunk ports must be done using a particular set of ports. The group divisions help you determine which ports are recognized in a single trunk.

During normal operation, the green Power LED is lit and the amber Fault LED is off. An amber LED on the chassis is lit when a system error or event has occurred. To identify the error or event, check the IBM Chassis Management Module (CMM) event log or the switch system log.

An LED test occurs whenever the switch is turned on. All LEDs are lit and remain lit during POST, after which, all LEDs except the OK LED turn off. Any errors that are detected during POST are written to the system log.

When POST errors are written to the system log, these errors are also written to the CMM event log. If a hardware error, such as a current fault occurs, the CMM displays it. If a software error occurs, the CMM displays that the POST message was not completed and a POST error code indicates the test that was running when the error was detected.

For more information on POST errors, see [“POST errors”](#) on page 41.

---

### NOTE

You can also use the CMM to ensure that the switch is operating correctly. For more information, see the documentation for the chassis.

---

For more information, refer to the following sections:

- [“Information panel Ethernet port LEDs”](#) on page 24
- [“Information panel Fibre Channel ports LEDs”](#) on page 24
- [“Ethernet port status LEDs”](#) on page 24
- [“System status LEDs”](#) on page 25

## 2 Locating the information panel, LEDs, and external ports

### *Information panel Ethernet port LEDs*

The information panel Ethernet RJ-45 connector has two LEDs: the green LED on the top indicates activity (Link); the green LED on the bottom indicates link speed (Tx/Rx).

---

**NOTE**

Do not attach any devices to the RJ-45 connector other than a compatible cable.

---

### *Information panel Fibre Channel ports LEDs*

The information panel displays 20 external Fibre Channel ports. Each port displays two LEDs that indicate port status for a specific port:

- The upper LED shows the activity (Tx/Rx) status. When lit, it appears green.
- The lower LED shows the fault (!) status. When lit, it appears amber.

[Table 5](#) identifies the port status information.

**TABLE 5** Port status LEDs

<b>Tx/Rx (Green) LED</b>	<b>! (Amber) LED</b>	<b>Port Status</b>
Off	Off	Offline
Steady green	Off	Online
Off	Steady amber	Out of sync
Off	Slow flashing amber	Disabled
Off	Fast flashing amber	Faulted
Flickering green	Off	Active
Slow flashing	Slow flashing	Beaconing
Slow flashing green	Off	Online, Segmented
Fast flashing green	off	Online, Internal Loopback

### *Ethernet port status LEDs*

The Ethernet port status LED identifies link status and speed. When a link is established, the LED appears as a flashing or steady green light.

[Table 6](#) identifies the Ethernet port status LEDs and their descriptions.

**TABLE 6** Ethernet port status LEDs

<b>Status LED</b>	<b>Description</b>
Ethernet Link LED (green)	No light. There is no link.
	Steady green. There is a link.
	Flashing green. There is link activity.
Ethernet Speed LED (green)	No light. Port speed is 10 Mbps.
	Steady green. Port speed is 100/1000 Mbps.

## System status LEDs

Three system LEDs are located at the bottom of the front panel that identify system status. During POST, the switch performs internal tests and LED tests. During POST, the LEDs are lit intermittently. After POST is successfully completed, the LEDs will behave as described in [Table 7](#) and [Table 8](#).

[Table 7](#) identifies the three system LEDs. After POST is successfully completed, this is normal LED behavior.

**TABLE 7** System status LEDs

LED icon	LED name	LED description
	The left-most LED is the Power LED.	When lit, it appears green.
	The middle LED is the Location LED.	When lit, it appears blue.
!	The right-most LED is the Fault LED.	When lit, it appears amber.

[Table 8](#) identifies how the system status LEDs behave when certain conditions are met. During POST, all LEDs are lit briefly. Certain error conditions will illuminate the amber Fault LED; for example, if temperatures exceed normal parameters. In such circumstances, power will shut off.

**TABLE 8** System status LEDs functionality

Condition	Power LED (Green)	Location LED (Blue)	Fault LED (Amber)	Comments
Pre POST	Off	Off	Off	Power domain 2 off
POST start	First 1-3 seconds on, then blinking during diagnostics and initialization	First 1-3 seconds on, then off	First 1-3 seconds on, then off	Lamp test progress indication
POST critical failure	Off	Off	On	Switch nonfunctional; replacement required
POST complete OK	On	Off	Off	Fully operational
Extended POST critical failure	Off	Off	On	Switch nonfunctional; replacement required
Operational critical fault	Off	Off	On	Switch nonfunctional; replacement required.
Switch FRU identify	On	On	Off	FRU ID operation from CMM

## Configuring the switch

Configuring the switch requires that you first assign an IP address to the switch, which must be done from the CMM using CLI. After the IP address is assigned, you then connect to the switch (over SSH or using Web Tools) to define configuration settings. Log in to the switch using the following default username and password settings:

User ID: **USERID**  
 Password: **PASSWORD** (wherein the sixth character is a zero)

### Configuring an IP address on the switch

1. Install the IBM Flex System FC5022 16Gb SAN Scalable Switch in the appropriate bay of the IBM Flex System chassis. For more information, see [“Installing the switch”](#) on page 13.
2. (Optional) Connect the serial console to the mini-USB port on the switch information panel and connect a terminal or terminal emulator.
3. Use Secure Shell (SSH) to the IBM Flex System Chassis Management Module (CMM) IP address as described in the *IBM Flex System Chassis Management Module User’s Guide*.
4. Enter **env -T system:switch[x]**, where x is the bay of the chassis in which the switch is installed.  

```
system> env -T system:switch[4]
```
5. From the CMM, enter **ifconfig** to display the current IP address.

```
system:switch[4]> ifconfig
Fibre ScSE
Enabled
-c static
-i 10.20.21.206
-s 255.255.240.0
-g 10.20.16.1
-pm n/a
-em enabled
-ep enabled
-pip enabled
-ipv6 enabled
-ipv6static disabled
-i6 ::
-p6 64
-g6 ::
IPv6 address in-use: ::
-dhcp6 enabled
-sa6 enabled
Link-local address: fe80::205:33ff:fea2:9557
Stateless auto-config IP Addresses      Prefix Length
-----
fec0:60:69bc:82:205:33ff:fea2:9557      64
system:switch[4]> _
```

6. To configure a static IP address, from the CMM, enter **ifconfig -c static <IP Address> -s <subnet mask> -g <Gateway IP Address>**.  

```
ifconfig -c static -i 10.20.21.207 -s 255.255.240.0 -g 10.20.16.1
```

If you connected the serial console to the mini-USB port (as described in Step 2), on the switch serial console, you can see the newly configured IP address on the switch.

7. From the CMM, enter **ifconfig** to confirm that the new IP address has been applied.

```
system:switch[41]# ifconfig
Fibre ScSE
Enabled
-c static
-i 10.20.21.207
-s 255.255.240.0
-g 10.20.16.1
-pm n/a
-em enabled
-ep enabled
-pip enabled
-ipv6 enabled
-ipv6static disabled
-i6 ::
-p6 64
-g6 ::
IPv6 address in-use: ::
-dhcp6 enabled
-sa6 enabled
Link-local address: fe80::205:33ff:fea2:9557
Stateless auto-config IP Addresses      Prefix Length
-----
fec0:60:69bc:82:205:33ff:fea2:9557      64
```

8. Use Secure Shell (SSH) to open a Telnet session to the switch using the newly configured IP address. Log in using the following default username and password settings:

User ID: **USERID**

Password: **PASSWORD** (wherein the sixth character is a zero)

---

#### NOTE

The passwords that are used to access the switch are case-sensitive. To increase system security, change the password after you log in for the first time. For more information, refer to the *Fabric OS Administrator's Guide*.

---

## Connecting to the switch over SSH

The switch supports a command-line interface (CLI) that you can use to configure and control the switch over the network through the SSH program. You can use the CLI to perform many basic network-management functions. In addition, you can configure the switch for management through an SNMP-based network-management system. SNMP v1, v2, and v3 are supported.

If you know the IP address for the switch and you have an existing network connection, you can use the SSH program from an external management station or the CMM to access and control the switch. The management station and the switch must be on the same IP subnet. If you have to obtain the IP address for the switch or establish a network connection, contact your system or network administrator.

## 2 Configuring the switch

To connect to the switch over the SSH interface, complete the following steps.

1. Open an SSH connection to the switch and enter the IP address for the switch, then press **Enter**.
2. Log in using the following default username and password settings:

User ID: **USERID**

Password: **PASSWORD** (wherein the sixth character is a zero)

---

### NOTE

The passwords that are used to access the switch are case-sensitive. To increase system security, change the password after you log in for the first time. For more information, see the *Fabric OS Administrator's Guide*.

---

## Connecting to the switch using Web Tools

You can connect directly to the switch using Web Tools as an alternative to using the CMM. Web Tools is a graphical user interface that you can use to configure the switch directly.

To use Web Tools, you must first obtain the required digital certificates for SSL support. Certificates are required on all switches that are to be accessed through SSL. You must also install a certificate in the Java plug-in on the management workstation, and you might need to add a certificate to your Web browser.

For more information on configuring SSL, see the *Fabric OS Administrator's Guide*.

1. On a computer in the same network as the switch, open a supported Web browser, such as Internet Explorer.
2. Using SSL, enter the IP address of the switch in the address field, for example:

```
https:// 10.24.151.224
```

3. Log in to Web Tools using the following default username and password settings:

User ID: **USERID**

Password: **PASSWORD** (wherein the sixth character is a zero)

You are now ready to define the configuration settings. For more information on using Web Tools, see the *Web Tools Administrator's Guide*.

---

### NOTE

The passwords that are used to access the switch are case-sensitive. To increase system security, change the password after you log in for the first time. For more information, see the *Fabric OS Administrator's Guide*.

---

## Connecting to the switch using the serial console port

To connect to the switch using the serial console port, complete the following steps.

1. Connect to the serial console port using the mini-USB to DB-9 cable.
2. Using a terminal emulator program, open a session to the assigned COM port for your cable connection using the following settings:

BAUD rate	9600
Data bits	8
Parity	None
Stop bits	1
Flow control	None

3. Log in to the CLI using the following default username and password settings:

User ID: **USERID**

Password: **PASSWORD** (wherein the sixth character is a zero)

## Connecting to the switch using the front panel Ethernet (RJ-45) port

---

### NOTE

The internal Ethernet management port that connects to the Chassis Management Module is the primary port used for switch management and is enabled by default.

---

The front panel Ethernet (RJ-45) port is an alternative port that can be used to manage the I/O module if the primary port is not available or not functional. Only one of these two Ethernet management ports can be enabled at any given time; enabling the external front panel Ethernet port will disable the internal management port. Any changes made to enable the RJ-45 interface are temporary and require a root password.

---

### NOTE

The switch will default to using the internal management port with a switch reboot.

---

Refer to the Technical Service Bulletin (TSB) for additional instructions when connecting to the switch using the front panel Ethernet (RJ-45) port. To access the TSB, go to the IBM Flex System Information Center at: <http://publib.boulder.ibm.com/infocenter/flexsys/information/index.jsp>.

Please contact your technical support representative if you need further assistance when enabling the front panel Ethernet (RJ-45) port.

## Initial configuration

The operating software on the switch contains default configuration files that are installed during the software installation. These initial configuration settings are not in a separate configuration file, but are components of the software. When you restore the CMM to factory defaults, the original configuration is restored.

# Logging in to the switch

The switch supports user-based security that enables you to prevent unauthorized users from accessing the switch or changing its settings. For more information regarding user-based access, see the *Fabric OS Administrator's Guide*.

To log in to the switch, complete the following steps:

1. At the prompt, enter your user ID, then press **Enter**.
2. Enter your password, then press **Enter**. The main menu opens.

After you log in to the switch, you must set the date and time. For more information, see [“Setting date and time”](#).

# Setting date and time

The IBM Flex System FC5022 16Gb SAN Scalable Switch maintains the current date and time inside a battery-backed real-time clock (RTC) circuit. Date and time are used for logging events. Switch operation does not depend on the date and time; a switch with an incorrect date and time value still functions properly. However, because the date and time are used for logging, error detection, and troubleshooting, you should set them correctly.

## Time zones

You can set the time zone for the switch by name. You can also set the country and city, or time zone parameters.

If the time zone is not set with the new options, the switch retains the offset time zone settings. The **tsTimeZone** command includes an option to revert to the prior time zone format. For more information about the **--old** option, see the *Fabric OS Command Reference*.

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

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

The time zone setting has the following characteristics:

- You can view the time zone settings. However, only those with administrative permissions can set the time zones.
- The **tsTimeZone** setting automatically adjusts for Daylight Saving Time.
- Changing the time zone on a switch updates the local time zone setup and is reflected in local time calculations.
- By default, all switches are in the Greenwich Mean Time (GMT) time zone (0,0). If all switches in a fabric are in one time zone, it is possible for you to keep the time zone setup at the default setting.
- System services that have already started reflect the time zone changes only after the next reboot.
- Time zone settings persist across failover for high availability.

## Local time synchronization

You can synchronize the local time of the principal or primary fabric configuration server (FCS) switch to a maximum of eight external Network Time Protocol (NTP) servers. To keep the time in your switch current, it is recommended that the principal or primary FCS switch has its time synchronized with at least one external NTP server. The other switches in the fabric automatically take their time from the principal or primary FCS switch.

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

When a new switch enters the fabric, the time server daemon of the principal or primary FCS switch sends out the addresses of all existing clock servers and the time to the new switch. If a switch with v5.3.0 or later has entered the fabric, it will be able to store the list and the active servers; pre-5.3.0 Fabric OS switches will ignore the new list parameter in the payload and will update only the active server address.

If the active NTP server configured is IPv6, then distributing the same information in the fabric will not be possible to switches earlier than v5.3.0 because IPv6 is supported for Fabric OS version 5.3.0 and later. The default value LOCL will be distributed to pre-5.3.0 switches.

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

## Setting the date

1. Log in using the following default username and password settings:

User ID: **USERID**

Password: **PASSWORD** (wherein the sixth character is a zero)

2. Enter the **date** command, using the following syntax (the double quotation marks are required):  
date "mmddHHMMyy"

The following values are used in the syntax:

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

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

### Setting time zones

You must perform the procedure on all switches for which the time zone must be set. However, you only need to set the time zone once on each switch, because the value is written to nonvolatile memory.

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

The following procedure describes how to set the current time zone to Central Standard Time using the **timezone\_fmt** mode.

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

```
switch:admin> tstimezone [--interactive]/ [, timezone_fmt]
```

Use the **timezone\_fmt** mode to set the time zone by Country/City or by time zone ID, such as Pacific Standard Time (PST).

The following example shows how to change the time zone to US/Central.

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

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

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

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

You are prompted to select a general location.

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

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

### Synchronizing local time using NTP

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

1. Log in to the switch using the default password, which is **password**.
2. Enter the **tsClockServer** command:

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

In this syntax, *ntp1* is the IP address or DNS name of the first NTP server, which the switch must be able to access. *Ntp2* is the name of the second NTP server and is optional. The entire operand “<*ntp1*;<i>ntp2>” is optional; by default, this value is LOCL, which uses the local clock of the principal or primary switch as the clock server.

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

switch:admin> tsclockserver
132.163.135.131
```

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

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

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

## Managing the switch

### SNMP v3 authentication

Two user roles are supported:

- snmpadmin—Provides read-write access
- snmpuser—Provides read-only access

[Table 9](#) lists user login information. Each entry requires a separate password. The default algorithm (MD5/SHA) is used to create the authentication keys.

**TABLE 9** SNMP authentication and privacy protocols

User	Authentication password	Authentication protocol	Privacy password	Privacy protocol <sup>1</sup>	Access type
snmpadmin2	admin2	MD5	admin2	AES	Get/Set
snmpadmin3	admin3	SHA	admin3	AES	Get/Set
snmpuser1	user1	SHA	user1	AES	Get
snmpuser2	user2	SHA	user2	AES	Get
snmpuser3	user3	SHA	user3	AES	Get

1. AES = 128-bit encryption

For more information, refer to the **snmpConfig** commands supporting SNMPv3 configuration parameters, as described in the *Fabric OS Command Reference Manual*.

## Brocade Inter-Switch Link Trunking

Brocade Inter-Switch Link (ISL) Trunking is optional software that allows you to create trunking groups of ISLs between adjacent switches. Up to eight FC ports on the switch can be used as a trunking group to achieve speeds up to 128 Gbps (256 Gbps full duplex) for optimal bandwidth utilization and load balancing. For more information about Brocade ISL Trunking, see the *Fabric OS Administrator's Guide*.

## Native Fabric mode and Access Gateway mode

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

- You can enable Access Gateway mode using Fabric OS commands or Web Tools.
- All ports must be enabled on a switch for Access Gateway to be enabled, as all ports are utilized under the port mapping.
- When you enable Access Gateway, you can use the default F\_Port-to-N\_Port mappings or change this mapping using the CLI or Web Tools after you configure an IP address. Access Gateway simplifies switch deployment by using NPIV. NPIV provides FC switch functions that improve switch scalability, manageability, and interoperability. For more information on Access Gateway, refer to the following references:
  - For general information and details on using Access Gateway, refer to the *Access Gateway Administrator's Guide*.
  - For a list of F\_Ports mapped to N\_Ports by default, refer to [Table 10](#).

**TABLE 10** F\_port to N\_port mappings

F port	N port	F port	N port
1, 21	0	11	38
2, 22	29	12	39
3, 23	30	13	40
4, 24	31	14	41
5, 25	32	15	42
6, 26	33	16	43
7, 27	34	17	44
8, 28	35	18	45
9	36	19	46
10	37	20	47

**NOTE**

Access Gateway can be connected directly into a storage array with at least one port connected to an external SAN fabric.

- Fabric OS features available to the IBM Flex System FC5022 16Gb SAN Scalable Switch depend on whether the switch is configured in Access Gateway or Native Fabric mode. For a list of available features for each mode, refer to the *Access Gateway Administrator's Guide*.
- In Access Gateway mode, the external ports can be N\_Ports, and the internal ports (1–28) can be F\_Ports.

To disable and enable Access Gateway mode, refer to the *Access Gateway Administrator's Guide*.

## Backing up the configuration

Prior to backing up a switch configuration, you can check the switch configuration by initiating the **switchShow** and **fabricShow** commands. The **switchShow** command displays switch and port status; the **fabricShow** command displays fabric membership information.

Complete these steps to back up the switch configuration to an FTP server.

1. Open a Telnet or SSH session to the switch.
2. Enter **configUpload**, which uploads the switch configuration to the server, making it available for downloading to a replacement switch, if necessary.

You are presented with a series of prompts.

3. Follow the prompts to upload the configuration.

It is recommended that you back up the configuration on a regular basis to ensure that a complete configuration is available for downloading to a replacement switch.

For specific instructions about how to back up a configuration, refer to the *Fabric OS Administrator's Guide*. For detailed information about the commands used in backing up a configuration, refer to the *Fabric OS Command Reference Manual*.

## Resetting the switch to factory defaults

---

### ATTENTION

Restoring the switch to factory defaults is disruptive. Before doing so, make sure any program using the switch has an alternate path to the storage, and save the switch configuration. If the switch is connected to an existing SAN, disconnect the switch from the SAN before restoring to factory defaults, then follow proper setup procedures before reconnecting.

---

Use the CMM to reset the switch to factory defaults.

1. Open the CMM and log in with admin privileges.
2. Select **I/O Module Tasks > Configuration**.
3. Select the bay where the switch is installed.
4. Select **Advanced Configuration**.
5. Click **Restore Defaults**.

### Removing or replacing the switch

1. Before removing a switch from the chassis, read the following safety information:
  - [“Safety”](#) on page vii
  - [“System reliability guidelines”](#) on page 12
2. Disconnect any cables from the switch that you are removing. For additional information about disconnecting cables, see [“Installing and removing an SFP+ transceiver”](#) on page 16, and the documentation that comes with the cables and optional network devices to which the cables have been connected. For the locations of the connectors on the chassis, see the documentation that comes with the chassis.
3. Pull the release latches out from the switch, as shown in [Figure 3 on page 2-14](#). The switch moves out of the bay approximately 0.6 cm (0.25 inch).
4. Slide the switch out of the bay and set it aside.
5. Replace the removed switch with either another switch or a filler panel. You must complete this step within 60 seconds.
6. If you installed another switch in the bay, reconnect the cables that you disconnected in [step 2](#). Attach any additional cables that are required by the switch. For additional information about connecting cables, see [“Installing and removing an SFP+ transceiver”](#) on page 16, and the documentation that comes with the cables and optional network devices to which the cables have been connected. For the locations of the connectors on the chassis, see the documentation that comes with the chassis.
7. Install SFP+ transceivers and dust caps where appropriate. For safety information and instructions, see the following sections:
  - [“Installing and removing an SFP+ transceiver”](#) on page 16
  - [“Using dust caps”](#) on page 19
8. Establish a connection to the CMM. For more information, see the following sections:
  - [“Connecting to the switch over SSH”](#) on page 27.
  - [“Connecting to the switch using Web Tools”](#) on page 28

# Updating the Firmware

---

This chapter contains information and instructions for updating the IBM Flex System FC5022 16Gb SAN Scalable Switch firmware.

---

**NOTE**

The switch might support features that are not described in the documentation that comes with the switch, and the documentation might be updated occasionally to include information about those features or technical updates.

To determine if firmware and documentation updates are available, go to:  
<http://ibm.brocadeassist.com/public/FabricOSv7xRelease>

---

## Determining the switch firmware level

After you install the switch in the chassis, make sure the latest firmware is installed on the switch. You can access firmware information using multiple methods: through the CMM, from the switch using the CLI, and using Web Tools.

### Determining firmware from the CMM

1. Log in to the CMM as described in the *IBM Flex System Chassis Management Module User's Guide*. If necessary, obtain the IP address of the CMM from your system administrator. The login window opens.
2. From the **Monitors** menu, click **Firmware VPD**. The Firmware VPD window opens.
3. In the **I/O Module Firmware VPD** area, locate the chassis bay containing the switch you installed; then, note the corresponding level of the firmware for the switch displayed under the Revision column.

### Determining firmware from the switch using the CLI

1. Connect to the switch.
2. Log in using the default administrator's account. Use the following default username and password settings:  
User ID: **USERID**  
Password: **PASSWORD** (wherein the sixth character is a zero)
3. Enter the **firmwareShow** command to check the current firmware version on the switch.

## Determining firmware using Web Tools

Before you install Web Tools on your workstation, verify that your switch and workstation meet the Web Tools requirements. Web Tools requires any browser that conforms to HTML version 4.0, JavaScript version 1.0, and Java Plug-in 1.6.0\_29 or later.

You must connect to Web Tools using SSL. To do this, you will require a digital certificate from an Internet Certificate Authority (CA). For more information on certificates, see the *Fabric OS Administrator's Guide*.

---

### NOTE

Make sure you have Java plug-in Version 6 Update 29 (build 1.6.0\_29-b11) or later installed on your management workstation.

---

For supported browser and platform information, see the *Web Tools Administrator's Guide*.

1. On a computer in the same network as the switch, open a supported Web browser.
2. Enter the IP address of the switch in the address field, for example:

```
https://10.24.151.224
```

3. Press **Enter**.
4. Log in to Web Tools using the following default username and password settings:  
User ID: **USERID**  
Password: **PASSWORD** (wherein the sixth character is a zero)
5. Select **Switch Admin**, then click the **Firmware Download** tab to display current firmware information.

---

### NOTE

The passwords that are used to access the switch are case-sensitive. To increase system security, change the password after you log in for the first time. For more information, see the *Fabric OS Administrator's Guide*.

---

## Upgrading the switch firmware

After you locate the correct firmware to download to the IBM Flex System FC5022 16Gb SAN Scalable Switch, you can use either the CLI or Web Tools to perform the download.

---

**ATTENTION**

The firmware download for the switch is disruptive. Make sure no traffic is flowing through the switch during the download process.

---

For specifics on how to perform the firmware download, refer to the following:

- If you are using CLI to perform the download, refer to the chapter, “Installing and Maintaining Firmware,” in the *Fabric OS Administrator’s Guide*.
- If you are using Web Tools to perform the download, refer to the chapter, “Maintaining Configurations and Firmware,” in the *Web Tools Administrator’s Guide*.

### 3 Upgrading the switch firmware

## Chapter 4. Solving Problems

---

This chapter provides troubleshooting information to help you solve problems that might occur while you are setting up the IBM Flex System FC5022 16Gb SAN Scalable Switch.

If you cannot locate and correct a problem by using the information in this section, see [Appendix A “Getting Help and Technical Assistance”](#).

### Running POST

The switch processes a series of tests during power-up or a restart (power-on self-test, or POST) to ensure that it is fully operational. These tests take approximately one minute to complete. The CMM reads the test results and displays them for you. During normal operation, these tests are completed without error, and the green OK LED is lit. However, if the switch fails POST, the amber error LED on the switch and the system-error LED on the chassis are lit. An event is stored in the event log in the system status panel of the CMM. The specific failure is displayed on the system status I/O panel of the CMM.

For the locations and descriptions of the switch LEDs, see [“Locating the information panel, LEDs, and external ports”](#) on page 22.

### POST errors

Two types of errors can result: noncritical and critical. A noncritical error applies to one port, and the switch is operational. You can continue to operate the switch; however, you must replace it as soon as possible. When critical errors occur, the switch does not operate. To view POST results, complete the following steps:

1. Log in to the CMM as described in the *IBM Flex System Chassis Management Module Command-Line Interface Reference Guide*. If necessary, obtain the IP address of the CMM from your system administrator. The login window opens.
2. Turn off the power to the switch; then, turn it on again.
3. After POST is completed, the CMM displays the results. Refresh the window to view the POST results. If a critical error occurs, replace the switch. If a noncritical error occurs, see the switch error log for additional details.

[Table 11](#) describes the basic critical and noncritical failures. This abbreviated list is representative; it is not an exhaustive list. An error code is associated with each failure. Error codes are displayed on the CMM Switch Information window. Be sure to note the applicable error code and corresponding failure. You might have to provide this information when you call for service. For details, see [Appendix A “Getting Help and Technical Assistance”](#).

**TABLE 11 Error listing**

Diagnostic indicator (in hex)	Failing functional area	Failure criticality
00 - 7F	Base internal functions	Critical
80 - 9F	Internal interface failures	Noncritical
A0 - AF	External interface errors	Noncritical
B0 - FE	Reserved	Noncritical
FF	Switch “good” indicator	Operation

## Parts listing

Replaceable components are of three types:

- **Tier 1 customer replaceable unit (CRU):** Replacement of Tier 1 CRUs is your responsibility. If IBM installs a Tier 1 CRU at your request, you will be charged for the installation.
- **Tier 2 customer replaceable unit (CRU):** You may install a Tier 2 CRU yourself or request IBM to install it, at no additional charge, under the type of warranty service that is designated for your server.
- **Field replaceable unit (FRU):** FRUs must only be installed by trained service technicians.

For information about the terms of the warranty, see the *Warranty Information* document.

The replaceable components in [Table 12](#) are Tier 1 CRUs. If other components require replacement, see the documentation that comes with those devices for instructions.

**TABLE 12 Parts listing**

Part	CRU number (Tier 1)
IBM Flex System FC5022 16Gb SAN Scalable Switch	69Y1911

# Getting Help and Technical Assistance

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

## Before you call

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

- Check all cables to make sure that they are connected.
- Check the power switches to make sure that the system and any optional devices are turned on.
- Use the troubleshooting information in your system documentation, and use the diagnostic tools that come with your system.
- Go to the IBM support Web site at <http://www.ibm.com/supportportal/> to check for technical information, hints, tips, and new device drivers or to submit a request for information.

You can solve many problems without outside assistance by following the troubleshooting procedures that IBM provides in the online help or in the documentation that is provided with your IBM product. The documentation that comes with IBM systems also describes the diagnostic tests that you can perform. Most systems, operating systems, and programs come with documentation that contains troubleshooting procedures and explanations of error messages and error codes. If you suspect a software problem, see the documentation for the operating system or program.

## Using the documentation

Information about your IBM system and preinstalled software, if any, or optional device is available in the documentation that comes with the product. That documentation can include printed documents, online documents, readme files, and help files. See the troubleshooting information in your system documentation for instructions for using the diagnostic programs. The troubleshooting information or the diagnostic programs might tell you that you need additional or updated device drivers or other software. IBM maintains pages on the World Wide Web where you can get the latest technical information and download device drivers and updates. To access these pages, go to <http://www.ibm.com/supportportal/> and follow the instructions.

## Getting help and information from the World Wide Web

On the World Wide Web, the IBM Web site has up-to-date information about IBM systems, optional devices, services, and support. You can find service information for IBM systems and optional devices at <http://www.ibm.com/supportportal/>.

## Software service and support

Through IBM Support Line, you can get telephone assistance, for a fee, with usage, configuration, and software problems. For information about which products are supported by Support Line in your country or region, see <http://www.ibm.com/services/supline/products/>.

For more information about Support Line and other IBM services, see <http://www.ibm.com/services/>, or see <http://www.ibm.com/planetwide/> for support telephone numbers. In the U.S. and Canada, call 1-800-IBM-SERV (1-800-426-7378).

## Hardware service and support

You can receive hardware service through your IBM reseller or IBM Services. To locate a reseller authorized by IBM to provide warranty service, go to <http://www.ibm.com/partnerworld/> and click **Find a Business Partner** on the right side of the page. For IBM support telephone numbers, see <http://www.ibm.com/planetwide/>. In the U.S. and Canada, call 1-800-IBM-SERV (1-800-426-7378).

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

## IBM Taiwan product service

台灣 IBM 產品服務聯絡方式：  
台灣國際商業機器股份有限公司  
台北市松仁路7號3樓  
電話：0800-016-888

IBM Taiwan product service contact information:

IBM Taiwan Corporation  
3F, No 7, Song Ren Rd.  
Taipei, Taiwan  
Telephone: 0800-016-888

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914-499-1900

## European Community contact:

IBM Technical Regulations, Department 456  
IBM-Allee 1, 71137 Ehningen, Germany  
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**Zulassungsbescheinigung laut dem Deutschen Gesetz über die elektromagnetische Verträglichkeit von Geräten (EMVG) (bzw. der EMC EG Richtlinie 2004/108/EG) für Geräte der Klasse A**

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

Verantwortlich für die Einhaltung der EMVG Vorschriften ist der Hersteller;

International Business Machines Corp.  
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Armonk, NY, 10504  
914-499-1900

## B Electronic emission notices

De verantwortliche Ansprechpartner des Herstellers in der EU ist:

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### Generelle Informationen:

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

## Japan VCCI Class A statement

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

This is a Class A product based on the standard of the Voluntary Control Council for Interference (VCCI). If this equipment is used in a domestic environment, radio interference may occur, in which case the user may be required to take corrective actions.

## Korea Communications Commission (KCC) statement

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

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

## Russia Electromagnetic Interference (EMI) Class A statement

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

## People's Republic of China Class A electronic emission statement

中华人民共和国“A类”警告声明

声 明

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

## Taiwan Class A compliance statement

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

## **B** Electronic emission notices

# Index

---

## A

additional documentation, 1, 2

## B

boot flash, 6

Brocade documentation, 2

## C

command line interface (CLI), 26

compact flash, 6

configuration

backing up, 33

initial, 28

resetting, 33

via Web Tools, 27

critical errors, 39

## D

date and time, setting, 28

dimensions, 6

documentation

additional, 1, 2

## E

Electronic emission notices

Australia and New Zealand Class A statement, 56

Avis de conformité à la réglementation d'Industrie  
Canada, 56

European Union EMC Directive conformance  
statement, 56

Federal Communications Commission (FCC)  
statement, 56

Germany Electromagnetic Compatibility Directive, 57

Industry Canada Class A emission compliance  
statement, 56

Japanese VCCI Class A statement, 58

error codes, 39

errors, critical and noncritical, 39

ESB, 5

Ethernet cabling, 21

Ethernet port

external, 29

internal, 29

## F

firmware

determining level, 35

downloading, 37

upgrading, 35

flash, 6

FTP server, 33

## G

getting help, 41

hardware support, 42

IBM documentation, 41

software support, 42

World Wide Web, 42

guidelines

installation, 11

reliability, 11

static-sensitive devices, 12

## H

- handling
  - SFP+ transceivers, 16
  - static-sensitive devices, 12
- hardware support, 42
- HSSM bays, identifying, 13

## I

- I/O Module Tasks, 33
- IBM documentation, 1
- installation guidelines, 11

## K

- kernel, 6

## L

- LEDs
  - information, 22

## M

- memory, 6
- mini-USB console port, 20

## N

- noncritical errors, 39
- notices, 53

## O

- optical cabling, 16

## P

- parts listing, 40
- POST, 39
  - errors, 39
- processor, 6

## R

- reliability guidelines, 11

## S

- safety statements, *ix*
- setting date and time, 28
- software support, 42
- SSH, 33
- SSH access, 26
  - main menu, 27
- static-sensitive devices, handling, 12
- switch
  - reset and restart, 37
- switch components, 8
- switch module
  - physical dimensions, 6
  - weight, 6

## T

- Taiwan support, 42
- technical help, 41
- Telnet, 33

## U

- upgrading firmware, 35
- USB cable
  - connecting, 20

## W

- Web Tools, 27
- weight, switch module, 6





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