IBM Flex System EN4023 10Gb Scalable Switch

User's Guide

IBM Flex System EN4023 10Gb 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.

Contents

Safety

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 ασφάλειας (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.

Перед установкой продукта прочтите инструкции по технике безопасности.

Pred inštaláciou tohto zariadenia si pečítaje Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

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

Läs säkerhetsinformationen innan du installerar den här produkten.

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

مەزكۇر مەھسۇلاتنى ئورنىتىشتىن بۇرۇن بىخەتەرلىك ئۇچۇرلىرىنى ئوقۇپ چىقىڭ.

� Tibetan text

Bu ürünü kurmadan önce güvenlik bilgilerini okuyun.

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

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 À Laser de Classe 1

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.

UL Regulatory Information

This device is for use only with Listed IBM Flex System Enterprise Chassis.

IBM Flex System EN4023 10Gb Scalable Switch

The IBM Flex System^{TM} EN4023 10Gb Scalable Switch is a high-density, 64-port, 10-Gbps Ethernet switch that is used in the IBM Flex System chassis. The switch provides 42 internal ports to compute nodes by way of the midplane, and 14 external SFP+ ports that are capable of running 10-Gbps Ethernet and 4-Gbps, 8-Gbps, and 16-Gbps Fibre Channel. Also included are two external Quad SFP (QSFP) ports that can support 40-Gbps Ethernet or 4x10-Gbps Ethernet in breakout mode.

This *User's Guide* contains information and instructions for installing the switch and getting the switch up-and-running as quickly as possible. 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://pic.dhe.ibm.com/infocenter/flexsys/information/index.jsp

NOTES:

- The IBM Flex System EN4023 10Gb Scalable Switch is also referred to as "the switch" throughout this document.
- Changes are made periodically to the IBM® website. Procedures for locating firmware and documentation might vary slightly from what is described in this document.
- The illustrations in this document might differ slightly from your hardware.
- 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 the firmware versions and options that are installed.

Related documentation

This *User's Guide* contains setup and installation instructions for the IBM Flex System EN4023 10Gb 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://pic.dhe.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.

- *IBM Flex System Chassis Management Module User's Guide*

  This document explains how to use the Chassis Management Module (CMM) 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-through 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 Network Operating System publications referenced in this *User's Guide* through http://ibm.brocadeassist.com/public/NetworkOSv4xRelease

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

- *Network OS Administrator's Guide*
- *Network OS Command Reference*
- *Network OS MIB Reference*
- *Network OS System Error Message Reference*
- *Network OS YANG Reference Manual*

- *Network OS NETCONF Operations Guide*

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 EN4023 10Gb Scalable Switch supports the following features and specifications.

Features

- Maximum up to 64 ports
- Upgrade 3 license key enables FCoE and Flex Port capabilities for storage and SAN connectivity.
- All 64 ports can operate at 1-Gbps or 10-Gbps Ethernet including up to 14 Flex Ports that can operate at 8-Gbps and 16-Gbps Fibre Channel .
- Up to 42 internal ports connected up to 28 compute nodes at the midplane auto-negotiating to 10-Gbps Ethernet (available through Ports-On-Demand activation), or 16-Gbps and 8-Gbps Fibre Channel using 8-Gbps or 16-Gbps transceivers.
- Up to 14 Flex Ports capable of supporting 1-Gbps Ethernet or 10-Gbps Ethernet through 10-Gbps SFP+ transceivers (available through Ports-On-Demand activation)
- 2 Quad SFP (QSFP) ports that can support 40-Gbps Ethernet or 4x10-Gbps Ethernet in breakout mode (available through Ports-On-Demand activation)

- Inter-Switch Link (ISL) Trunking, which allows up to eight ports (at 40-Gbps or 10-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

- Internal 1-Gbps full-duplex Ethernet port to connect to the redundant IBM Chassis Management Modules (CMMs)

- Supports up to 724-Gbps I/O bandwidth

- Supports Felxports, up to 42 10 Gbps for internal ports and 22 16 Gbps for external ports

- One external RS-232 console port with a mini-USB interface for serial console management and diagnostics

- One external 10/100/1000Base-T RJ-45 Ethernet port with integral LEDs for link/activity and speed for debugging and field support

- LEDs noting external port status and switch module status

- Up to four hot-pluggable switches per IBM Flex System chassis

- Brocade Network OS (NOS), which delivers distributed intelligence throughout the network and enables a wide range of value-added applications, for example, virtualization features that are distributed throughout a fabric, and multitenancy features. Requires Network OS version 4.0.0_bbd or later.

- Supports IBM Features on Demand

- Supports Ports on Demand (POD)

- SNMP v1, v2, and v3 support

- SSH v2 support

- NTP client support (NTP V3)

- SCP and SFTP support for firmware upgrades

- SNMP/MIB monitoring functionality contained within the Ethernet Control MIB-II (RFC1213-MIB)

- Traps identify cold start, warm start, link up/link down and authentication failure events

- Support for IPv4 and IPv6 on the management ports

Model options

- Base model: Includes 24 ports (24x10-Gbps capacity). The VCS license is enabled by default.

- POD1 license: Adds 16 ports (10-Gbps capacity) plus 2x40-Gbps capacity, for a total of 48 10-Gbps ports.
  The additional eight 10-Gbps ports that result when the two 40-Gbps Ethernet ports are configured in breakout mode cannot be moved to different internal ports.

- POD2 license: Adds an additional 16 ports (10-Gbps capacity), for a total of 56x10-Gbps ports plus 2x40-Gbps ports that can each support 4x10-Gbps Ethernet in breakout mode.

NOTE
The 10 GbE ports are added in increments of 16 ports (16 and 32) and 40 GbE ports are added in increments of 2 ports.

License options

lists optional licenses.

TABLE 1   Licenses

License	Part number
16x10 GbE plus 2x40GB capacity license (POD1)	94Y5158
16x10 GbE capacity license (POD2)	94Y5159
FC/FCoE Upgrade License	47C9993

NOTE
To activate POD licenses upon installation, you need to remove all port assignments and reservations for the license.

Dynamic Ports on Demand

With Dynamic Ports on Demand (DPOD), physical ports are licensed as they come online. In the Base model port set, the first 24 ports reporting (on a first-come, first-served basis) on boot-up are assigned licenses. These ports may be any combination of external or internal Ethernet ports. After all licenses have been assigned, you can manually move those licenses from one port to another, except for the eight 10-Gbps ports that result when the two 40-Gbps Ethernet ports are configured in breakout mode.

FlexPort

The FlexPort feature is supported only on the IBM Flex System EN4023 10Gb Scalable Switch by Network OS 5.0.0 and later. This feature allows you to configure the external SFP+ ports as Ethernet ports or as Fibre Channel (FC) ports. Qualified 10 GbE SFP+ transceivers, 8 Gbps FC transceivers, or 16 Gbps FC transceivers must be installed in ports to allow Ethernet or FC configuration. When configuring a mixture of Ethernet and FC ports in a port group, you can configure mixtures of speeds and protocols as follows:

- 2 Gbps, 4 Gbps, and 8 Gbps FC and 1/10 Gbps Ethernet
- 16 Gbps FC and 10 Gbps Ethernet only
- 2 Gbps, 4 Gbps, 8 Gbps, and 16 Gbps FC (no Ethernet)

This feature allows you to attach FC devices to run encapsulated FC over Ethernet (FCOE) traffic through the switch. For details on this feature, including configuration procedures, refer to the *Brocade Network OS Layer 2 Switching Configuration Guide*.

NOTE
16 Gbps FC transceivers operate at 4 Gbps, 8 Gbps, and 16 Gbps while 8 Gbps FC transceivers operate at 2 Gbps, 4 Gbps, and 8 Gbps.

NOTE
The FC/FCoE Upgrade License is required to enable the FlexPort feature.

Switch specifications

Table 2 lists the physical characteristics of the switch.

TABLE 2   Switch specifications

Characteristic	Description
Height	30.7 mm (1.21 inches)
Width	299.3 mm (11.78 inches)
Depth (including ejectors)	310.6 mm (12.23 inches)
Weight	3.59 Kg (7.91 pounds)

Memory and processor specifications

Table 3 lists the memory that is installed in the switch.

TABLE 3   Memory and processor specifications

Memory type	Value
P3041 Quad core CPU	Onboard, 4 e500mc cores (up to 1.5 GHz)
DDR3 SDRAM Bus	8 GB running at 266 MHz with optional ECC support
Boot Flash	4 MB
eUSB Flash module	8 GB eUSB Compact Flash module supported to USB interface of P3041
Boot ROM	32 MB (2 MB x 16, or 4 MB); also supports 8 MB devices of boot memory

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.

Switch components

Figure 1 shows the components of the IBM Flex System EN4023 10Gb Scalable Switch when viewed from the port side.
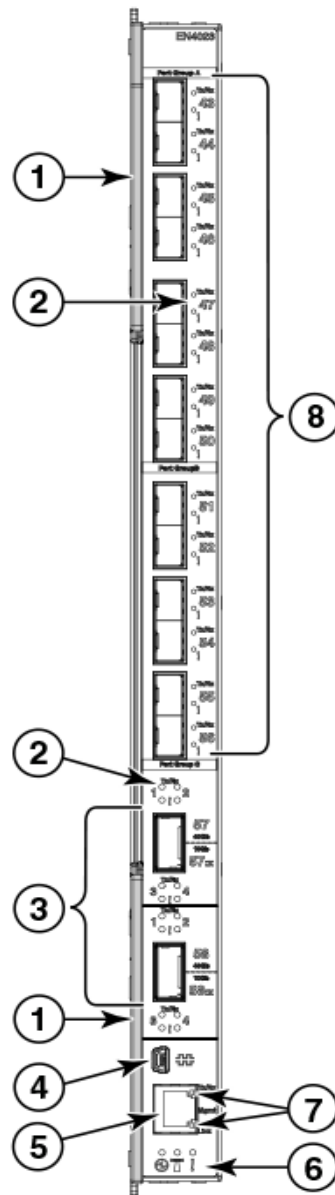
1	Release levers (x2)	5	RJ-45 Ethernet port (Mgmt)
2	Port LEDs (Fault and activity for each port)	6	System LEDs
3	QSFP ports	7	Ethernet Mgmt port LEDs
4	Mini-USB console port	8	14 external 10-Gbps Ethernet ports[*]

The FlexPort feature allows configuration of specific IBM Flex System EN4023 10Gb Scalable Switch ports as 1/10 GbE or 2, 4, 8, or 16 Gbps FC ports. FlexPort is supported by Network OS 5.0.0 and later.

FIGURE 1   Components of the IBM Flex System EN4023 10Gb Scalable Switch

> **NOTE**
> The illustrations in this document might differ slightly from your 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
- 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 Table 4. 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 label located on the top handle of the switch. 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 4   IBM Flex System solution product information

Product name	IBM Flex System EN4023 10Gb Scalable Switch
Model number	
Serial number	
Part number	
Media Access Control (MAC) address	
MAC address for other components	

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.

Installation guidelines

Before you install the IBM Flex System EN4023 10Gb Scalable Switch in the IBM Flex System chassis, pay attention to the following guidelines:

- Read the safety information that includes "Safety statements" on page viii, "Handling static-sensitive devices" on page 10, 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 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 Ethernet switch.

The chassis supports a maximum of four IBM Flex System EN4023 10Gb 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 nodes or chassis. For additional information, see the documentation that comes with your compute nodes or chassis.

- When the switch is installed in the chassis, the internal ports can operate at 10- or 1-Gbps Ethernet; external ports can operate at 10-Gbps Ethernet through 10-Gbps SFP+ transceivers (auto-negotiated) or 1-Gbps. Ports 57 and 58 can operate at 40-Gbps Ethernet or 4x10-Gbps Ethernet when configured in breakout mode.
  For information on supported components, go to the IBM Server Proven website at
  http://www-03.ibm.com/systems/info/x86servers/serverproven/compat/us/flex.html.

- The FlexPort feature allows configuration of specific ports on the IBM Flex System EN4023 10Gb Scalable Switch as 10 GbE ports or as 2 Gbps, 4 Gbps, 8 Gbps, or 16 Gbps FC ports, depending on installed SFP+ transceivers. Refer to "FlexPort" on page 5 for more information. FlexPort is supported by Network OS 5.0.0 and later.

- 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://pic.dhe.ibm.com/infocenter/flexsys/information/index.jsp.

To install the switch, complete the following steps.

1. Read the following safety information:

   - "Safety" on page vii
   - "System reliability guidelines" on page 9

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). See Figure 2 to view the release levers and locks on the switch.

   For specific instructions for installing a switch in the chassis, see the documentation that comes with the chassis.
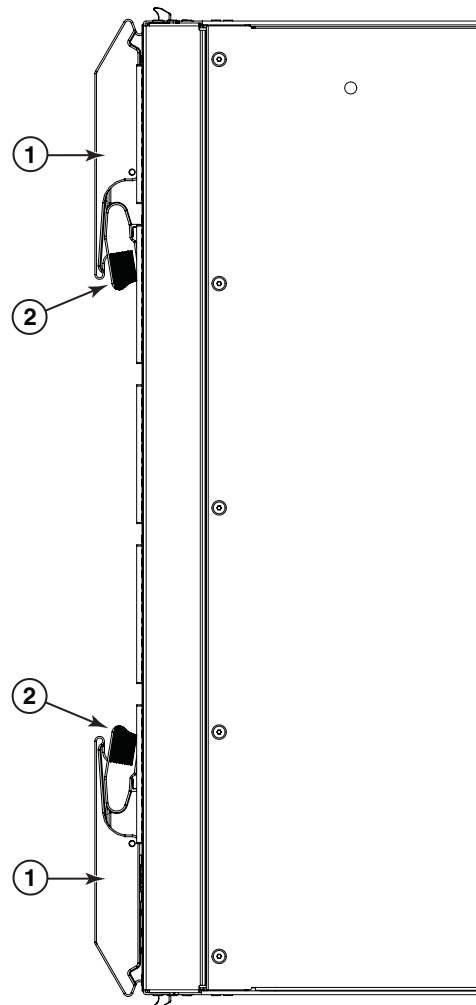
1	Release lever	2	Release lever lock

FIGURE 2   Switch release levers and locks

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 5 minutes 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 20 for more information.

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

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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 21.

- Install any SFP+ or QSFP transceivers that you ordered with the switch.

NOTE
For FlexPort operation, the IBM Flex System EN4023 10Gb Scalable Switch also supports FC SFP+ optical transceivers. For FlexPort operation only, optical FC SFP+ transceivers support Long Wavelength (LW), Short Wavelength (SW), and Extended Long Wavelength (ELW) modules. FlexPort is supported by Network OS 5.0.0 and later.

11. For safety information and instructions, see "Installing and removing an SFP+ or QSFP transceiver" on page 13.

12. Attach any cables that are required by the switch. For additional information about cabling the switch, see "Installing and removing an SFP+ or QSFP transceiver" on page 13, 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.

Installing and removing an SFP+ or QSFP transceiver

The IBM Flex System EN4023 10Gb Scalable Switch supports 10-Gbps SFP+ transceivers. An SFP+ transceiver is a laser product that converts electrical signals to optical signals. See Figure 3.

The IBM Flex System EN4023 10Gb Scalable Switch also supports Quad SFP (QSFP) transceivers that can support 40-Gbps Ethernet or 4x10-Gbps Ethernet when configured in breakout mode. See Figure 4.

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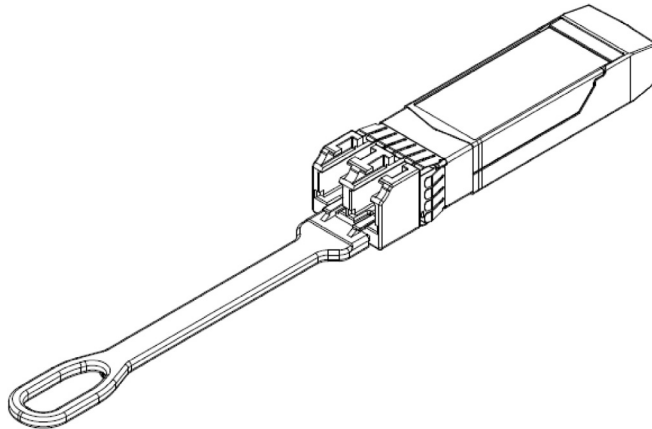The illustrations in this document might differ slightly from your hardware.

FIGURE 3 SFP+ transceiver

FIGURE 4 QSFP transceiver

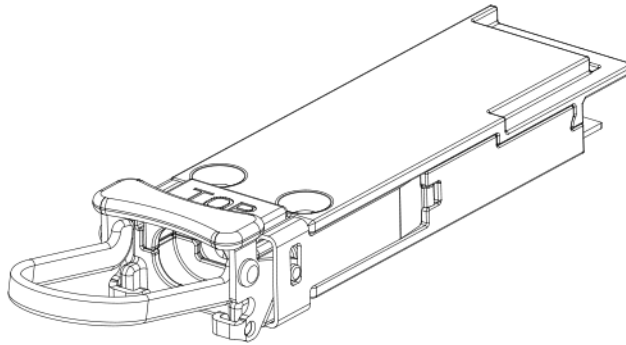For information on supported components, go to the IBM Server Proven website at
http://www-03.ibm.com/systems/info/x86servers/serverproven/compat/us/flex.html.

Installing a FC SFP+

For the FlexPort feature, the IBM Flex System EN4023 10Gb Scalable Switch only supports 8 Gbps
and 16 Gbps SFP+ optical transceivers for Fibre Channel connections. FlexPort is supported by
Network OS 5.0.0 and later.

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

Complete the following steps to install an FC SFP+ transceiver.

1. Making sure that the bail (wire handle) is in the unlocked position, position the optical
   transceiver so that the key is oriented correctly to the port. Insert the transceiver into the port
   until it is firmly seated and the latching mechanism clicks; then close the bail.
   The 16 Gbps SFP+ transceivers do not have bails. Use the pull tab on the 16 Gbps SFP+
   transceivers to help push the transceiver into the port. Do not push too hard on the tab itself
   because it can bend.

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

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

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

NOTE
Each SFP+ has a 10-pad gold-plated PCB-edge connector on the bottom. The correct position to
insert an SFP+ into the upper row of ports is with the gold edge down. The correct position to insert
an SFP+ into the lower row of ports is with the gold edge up.
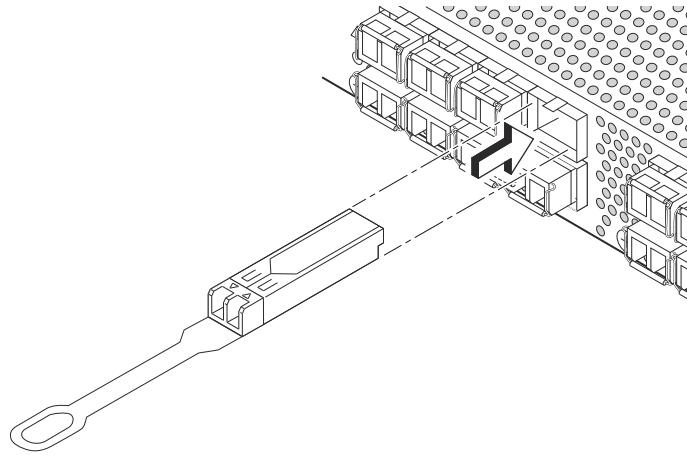
FIGURE 5   **Installing a 16 Gbps SFP+ in the upper row of port slot**
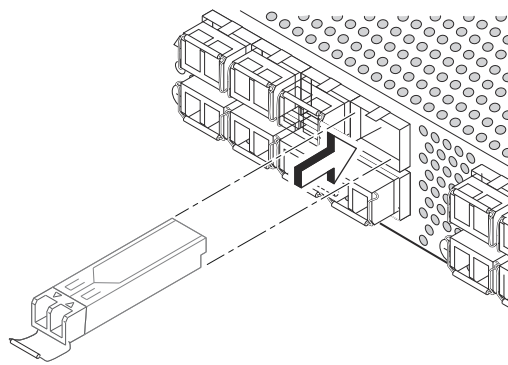
FIGURE 6   Installing an 8 Gbps SFP+ in the upper row of port slot

Handling an SFP+ or QSFP transceiver

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

• The housing on the transceiver includes an integral guide key that is designed to prevent you from inserting the transceiver incorrectly.

• Use minimal pressure when you insert the 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 transceiver while the chassis is powered on.

• You must first insert the transceiver into the port before connecting the cables.

• You must remove the cable from the transceiver before you remove the 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+ or QSFP transceiver

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

1. Read the safety information that begins on page vii and "System reliability guidelines" on page 9.

2. Read the information in "Handling an SFP+ or QSFP transceiver" on page 15.

3. Remove the transceiver from its static-protective package.

4. Remove the protective insert, if one is installed, from the port where you are installing the transceiver and store it in a safe place.

5. Gently insert the transceiver in a port on the switch until it clicks into place.

   a. For SFP+ transceivers, use ports 43 through 56. See Figure 7.

   b. For QSFP transceivers, use ports 57 and 58. See Figure 8.

ATTENTION

To avoid damage to the cable or transceiver, make sure you install the transceiver *before* you connect the fiber-optic cable.
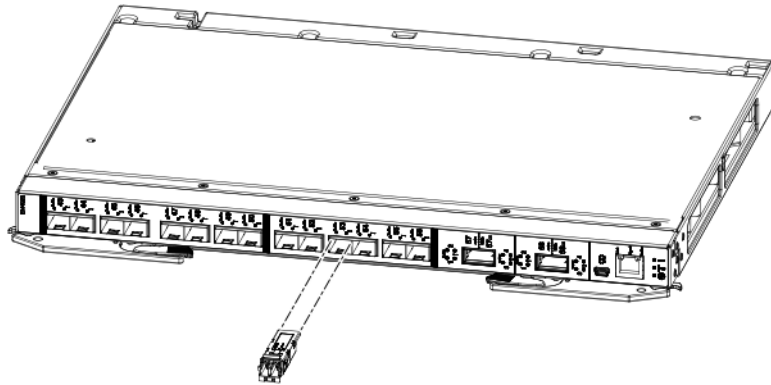
FIGURE 7   SFP+ transceiver installation

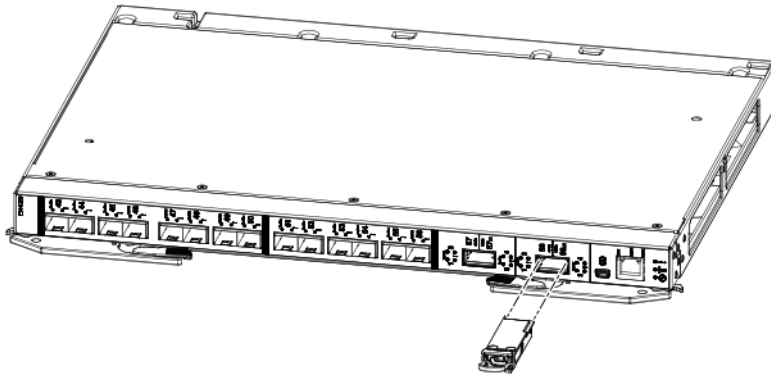FIGURE 8   QSFP transceiver installation

6. Connect the fiber-optic cable to the SFP+ or QSFP transceiver. For information about protecting the cable, see "Handling an SFP+ or QSFP transceiver" on page 15.

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 21.

Removing or replacing an SFP+ or QSFP transceiver

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

1. Read the safety information that begins on page vii and "System reliability guidelines" on page 9.

2. Read the information in "Handling an SFP+ or QSFP transceiver" on page 15.

3. Remove the fiber-optic cable from the SFP+ or QSFP transceiver that you want to replace.

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

   ---

4. Unlock the transceiver:

   a. For SFP+ transceivers, unlock the transceiver by gently pulling the tab straight out.

   b. For QSFP transceivers, unlock the transceiver by positioning the lever in a downward motion.

5. Place the SFP+ or QSFP transceiver in a static-protective package.

6. Insert another SFP+ or QSFP transceiver into the port. See "Inserting an SFP+ or QSFP transceiver" on page 16.

Cabling the switch

This section provides instructions for connecting and disconnecting the cables to the physical ports on the IBM Flex System EN4023 10Gb Scalable Switch.

Connecting and disconnecting the USB console cable

The mini-USB (RS-232) console port can be used for serial console management and diagnostics.

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 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 9.
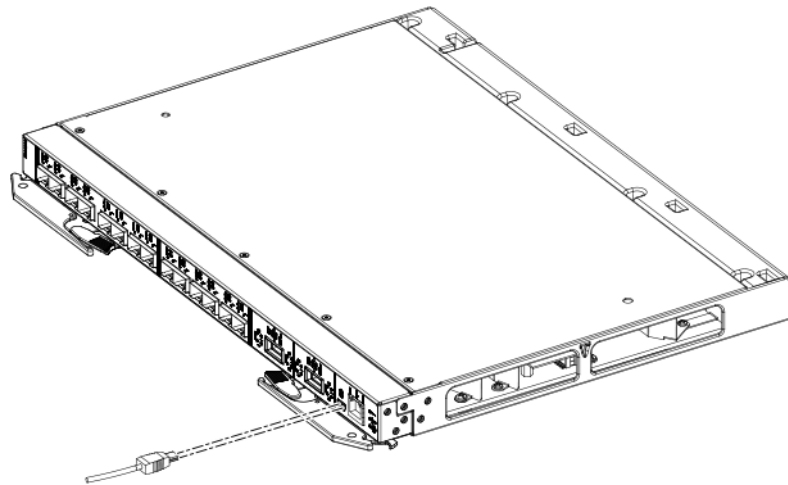
FIGURE 9   Mini-USB connection

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 10.
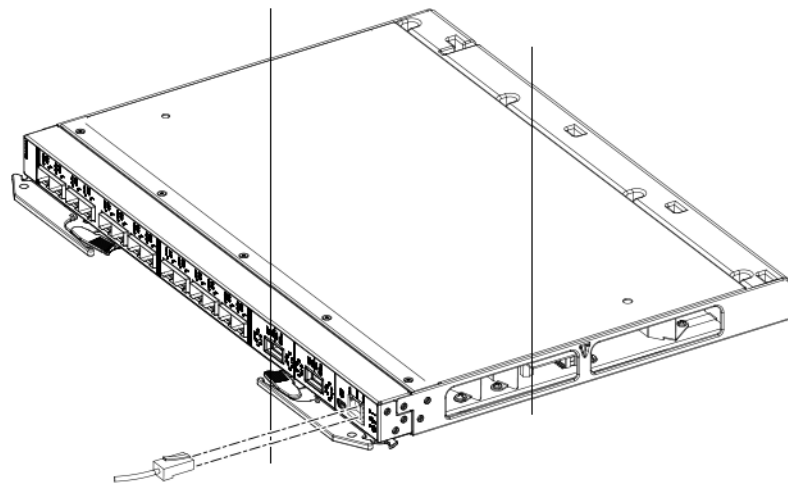
FIGURE 10   RJ-45 Ethernet connection

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 11 shows the IBM Flex System EN4023 10Gb Scalable Switch information panel.
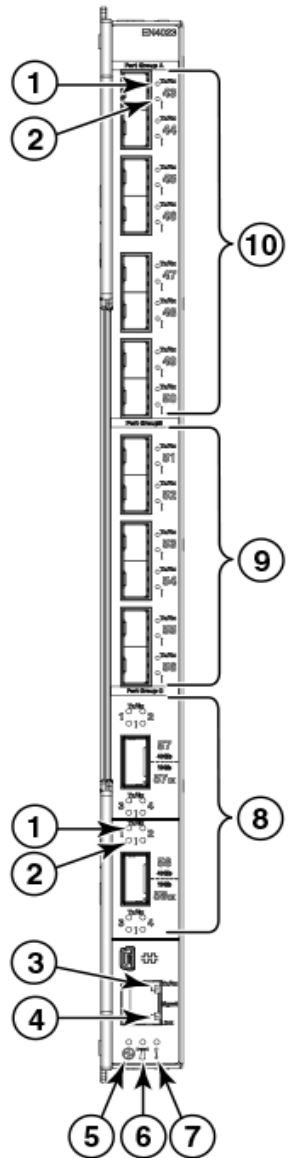
1	Tx/Rx LED (One LED per port)	6	System Status LED: Locator
2	Fault (!) LED (One LED per port)	7	System Status LED: Fault
3	Ethernet LED: Tx/Rx (activity)	8	Trunk Group C (shown as ports 57–58)[*]
4	Ethernet LED: Link	9	Trunk Group B (shown as ports 51–56)[*]
5	System Status LED: Power	10	Trunk Group A (shown as ports 43–50)[*]

The FlexPort feature allows configuration of specific IBM Flex System EN4023 10Gb Scalable Switch ports as 1/10 GbE or 2, 4, 8, or 16 Gbps FC ports. FlexPort is supported by Network OS 5.0.0 and later.

FIGURE 11 **IBM Flex System EN4023 10Gb Scalable Switch information panel LEDs and port groups**

NOTE
The illustrations in this document might differ slightly from your 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 up to 14 external ports that are capable of supporting 10- or 1-Gbps Ethernet. The 10-Gbps speeds require a 10-Gbps SFP+ transceiver.

Also supported are two Quad SFP (QSFP) ports that can support 40-Gbps Ethernet, or 4x10-Gbps Ethernet when configured in breakout mode.

For the most current information on supported components, go to the IBM Server Proven website at http://www-03.ibm.com/systems/info/x86servers/serverproven/compat/us/flex.html.

The information panel provides status information for the switch and for each port 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 Fault LEDs on the bottom of the switch indicate the switch status.
- The Fault (!) and Tx/Rx LEDs on each external port indicate the status of Ethernet activity.
- The Ethernet (RJ-45) management 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 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.

- Trunk Group A consists of ports 43 through 50.
- Trunk Group B consists of ports 51 through 56.
- Trunk Group C consists of QSFP ports 57 and 58.

NOTE
The FlexPort feature allows configuration of specific ports on the IBM Flex System EN4023 10Gb Scalable Switch as 10 GbE ports or as 2 Gbps, 4 Gbps, 8 Gbps, or 16 Gbps FC ports, depending on installed SFP+ transceivers. Therefore, status LEDs may indicate GbE or FC port function. Refer to "FlexPort" on page 5 for more information. FlexPort is supported by Network OS 5.0.0 and later.

During normal operation, the Power LED is solid green and the Fault LED is off. The Fault LED on the chassis is lit amber when a system error or event has occurred, for example when temperature or electrical current exceeds certain thresholds. 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 power-on self-test (POST), after which, all LEDs turn off except the Power LED. 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 occurs, such as a current fault, the CMM displays it. If a software error occurs, the CMM displays a message that the POST 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:

- "SFP+ and QSFP port LEDs" on page 22
- "Ethernet port status LEDs" on page 23
- "System status LEDs" on page 24

SFP+ and QSFP port LEDs

Each SFP+ and QSFP port has two LEDs. The Tx/Rx LED is green when lit; the Fault (!) LED is amber when lit. When lit, LEDs are shown as either steady or flickering.

Figure 12 shows the port status LEDs for the SFP+ ports.

| 1 | Tx/Rx LED | 2 | Fault (!) LED |

FIGURE 12 SFP+ port LEDs

Figure 13 shows the port status LEDs for the QSFP ports. If you are using ports 57 and 58, Tx/Rx LEDs are shown as solid green when operating properly, regardless of whether or not breakout mode is configured.

| 1 | Tx/Rx LED | 2 | Fault (!) LED |

FIGURE 13 QSFP port LEDs

Table 5 identifies the SFP+ and QSFP port status LED information.

TABLE 5 SFP+ and QSFP port status LEDs

Tx/Rx LED	Fault (!) LED	Port status
Off	Off	Offline (no link)
Steady green	Off	Online (link up)
Flickering green	Off	Active (link activity)
N/A	Steady amber	Port fault

Ethernet port status LEDs

Two LEDs are integrated with the RJ-45 connector to indicate management port status. The upper LED is the Tx/Rx (transmit and receive activity) indicator; the lower LED is the Link indicator, as shown in Figure 14.
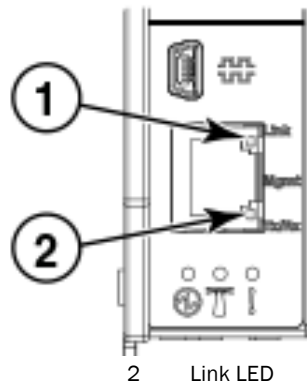
When a link is established, the Link LED appears as a steady green light. When there is activity, the Link LED appears as a flashing green light.

The Tx/Rx LED appears as a steady green light when lit, which indicates a port speed of 100/1000 Mbps. If the Tx/Rx LED is not lit, port speed is 10 Mbps.

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

| 1 | Tx/Rx LED | 2 | Link LED |

FIGURE 14 RJ-45 Ethernet port LEDs

Table 6 identifies the Ethernet port status LEDs.

TABLE 6 RJ-45 Ethernet port status LEDs

Status LED	Description
Ethernet Link LED (green)	No light. There is no link.
	Steady green. There is a link.
	Flashing green. There is link activity.
Ethernet Tx/Rx 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, as shown in Figure 15.

During power-on self-test (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.
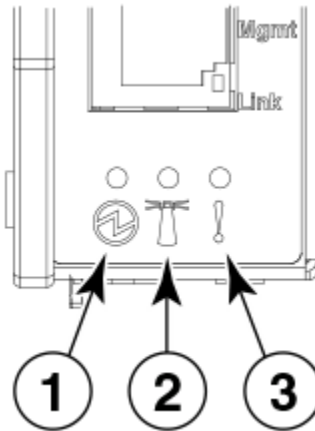
| 1 | Power LED | | 3 | Fault LED |
| 2 | Location LED | | | |

FIGURE 15   System status LEDs

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 solid green.
⊨	The middle LED is the Location LED.	When lit, it appears solid blue.
!	The right-most LED is the Fault LED.	When lit, it appears solid 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 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 noncritical failure	On	Off	Off	Switch operational in degraded mode
POST complete OK	On	Off	Off	Fully operational
Extended POST start	On	Off	Off	Switch operational in degraded mode

TABLE 8   System status LEDs functionality (Continued)

Condition	Power LED (Green)	Location LED (Blue)	Fault LED (Amber)	Comments
Extended POST critical failure	Off	Off	On	Switch nonfunctional; replacement required
Operational critical fault	Off	Off	On	Switch nonfunctional; replacement required.
SCSE Location LED	On	On	Off	Location LED operation from CMM

Port mapping

The IBM Flex System EN4023 10Gb Scalable Switch provides 64 ports that can be configured as Ethernet ports.

The FlexPort feature allows configuration of specific ports on the IBM Flex System EN4023 10Gb Scalable Switch as 10 GbE ports or as 2 Gbps, 4 Gbps, 8 Gbps, or 16 Gbps FC ports, depending on installed SFP+ transceivers. Therefore, status LEDs may indicate GbE or FC port function. Refer to "FlexPort" on page 5 for more information. FlexPort is supported by Network OS 5.0.0 and later.

NOTES:

- Ports 1 through 42 provide up to 42 internal ports (available through Ports-On-Demand activation) connected to 14 compute nodes at the midplane, auto-negotiating to 10-Gbps Ethernet.

- Ports 43 through 56 provide up to 14 external ports (available through Ports-On-Demand activation), capable of supporting 1-Gbps Ethernet or 10-Gbps Ethernet through 10-Gbps SFP+ transceivers.

- Ports 57 and 58 provide two Quad SFP (QSFP) ports (available through Ports-On-Demand activation) that can support 40-Gbps Ethernet, or 4x10-Gbps Ethernet in breakout mode.

Configuring the switch

Configuring the switch requires that you first assign an IP address to the switch, which must be done from the Chassis Management Module (CMM) using the CLI or GUI. After the IP address is assigned, you then connect to the switch (over SSH) to define configuration settings. To log in to the CMM, see the *IBM Flex System Chassis Management Module User's Guide*.

Configuring an IP address on the switch using the CLI

1. Install the IBM Flex System EN4023 10Gb Scalable Switch in the appropriate bay of the IBM Flex System chassis. For more information, see "Installing the switch" on page 10.

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 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. See Figure 16.


```
ystem:switch[4]> ifconfig
ibre ScSE
nabled
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 ::
Pv6 address in-use: ::
dhcp6 enabled
sa6 enabled
ink-local address: fe80::205:33ff:fea2:9557
tateless auto-config IP Addresses        Prefix Length
--------------------------------------   -------------
ec0:60:69bc:82:205:33ff:fea2:9557        64
ystem:switch[4]> _
```

FIGURE 16   Configuring the IP address using the CMM CLI

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 10.20.21.208 -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), from 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. See Figure 17.

```
system:switch[3]>
system:switch[3]> ifconfig -i 10.20.21.208 -s 255.255.240.0 -g 10.20.16.1
OK
system:switch[3]>
system:switch[3]>
system:switch[3]>
system:switch[3]> ifconfig
Ethernet ScSE
Enabled
-c  static
-i  10.20.21.208
-s  255.255.240.0
-g  10.20.16.1
-pm n/a
-em disabled
-ep enabled
-pip enabled
-ipv6 enabled
-ipv6static disabled
-i6 ::
-p6 64
-g6 ::
IPv6 address in-use: Not Available
-dhcp6 enabled
-sa6 disabled
Link-local address: fe80::aede:48ff:fe00:2
system:switch[3]>
system:switch[3]>
system:switch[3]>
system:switch[3]>
```

FIGURE 17   Verifying the IP address using the CMM CLI

8. Use SSH to open a session to the switch using the newly configured IP address. Log in to the switch using the following default user name and password settings:

   User ID: **admin**
   Password: **password**

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 *Network OS Administrator's Guide*.

Configuring an IP address on the switch using the CMM GUI

For IPv4

1. Install the IBM Flex System EN4023 10Gb Scalable Switch in the appropriate bay of the IBM Flex System chassis. For more information, see "Installing the switch" on page 10.

2. Log in to the CMM using the following default user name and password settings:

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

3. From the CMM GUI, navigate to **Chassis Management > Component IP Configuration**.

4. Select the I/O Module bay in which the switch is installed. The example in Figure 18 is using "IO Module 3."

   The **IP Address Configuration IO Module** (for the selected bay) dialog box displays.

5. Select the **IPv4** tab.

6. Complete the text fields as required, then click **Apply**.

7. Click **Close** to close the dialog box.
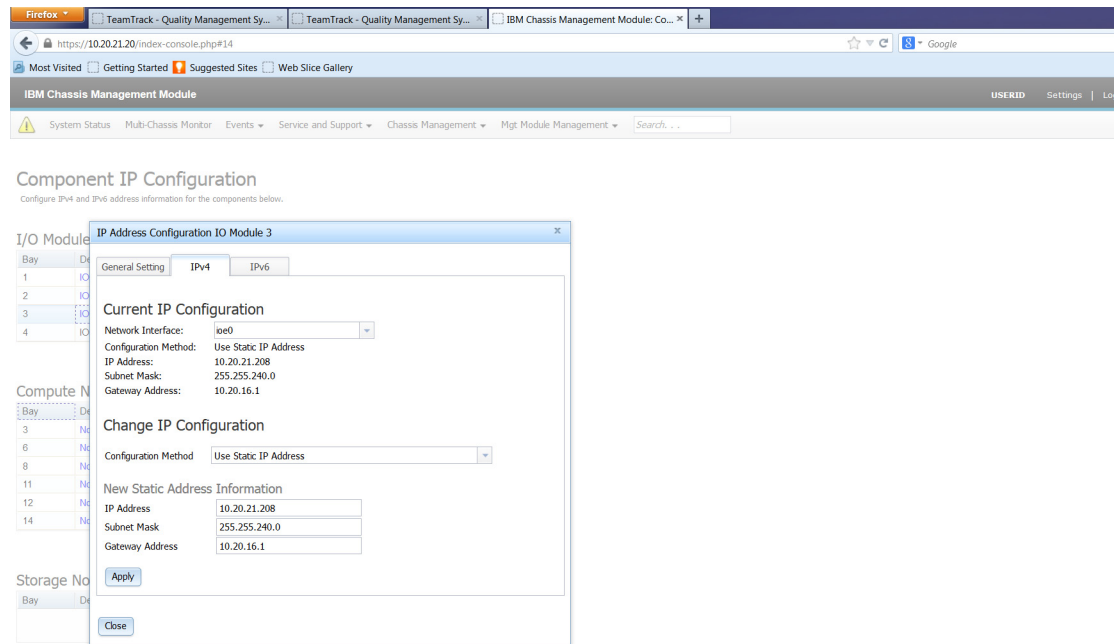
FIGURE 18   Component IP Configuration page

For IPv6

1. Install the IBM Flex System EN4023 10Gb Scalable Switch in the appropriate bay of the IBM Flex System chassis. For more information, see "Installing the switch" on page 10.

2. Log in to the CMM using the following default user name and password settings:

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

3. From the CMM GUI, navigate to **Chassis Management > Component IP Configuration**.

4. Select the I/O Module bay in which the switch is installed. The example in Figure 19 is using "IO Module 3."

    The **IP Address Configuration IO Module** (for the selected bay) dialog box displays.

5. Select the **IPv6** tab.

6. Complete the text fields as required, then click **Apply**.

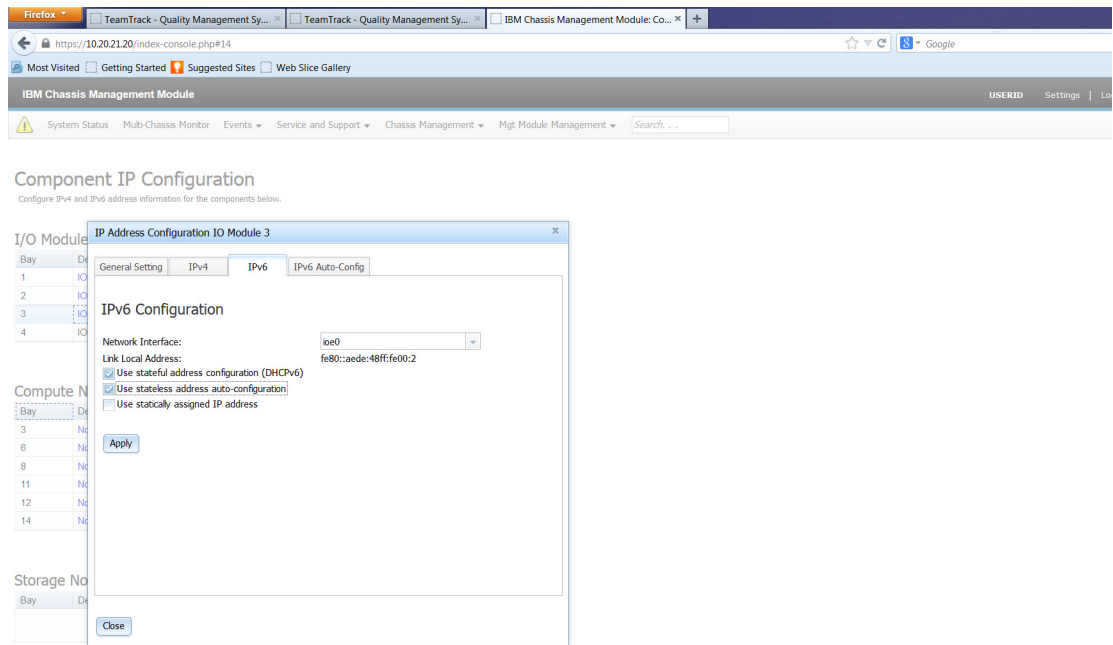7. Click **Close** to close the dialog box.

FIGURE 19 Component IP Configuration page

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.

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 to the switch using the following default user name and password settings:

   User ID: **admin**
   Password: **password**

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 *Network 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. At the command prompt, log in to the switch using the following default user name and password settings:

   User ID: **admin**
   Password: **password**

Connecting to the switch using the RJ-45 Ethernet port

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

The RJ-45Ethernet 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 the two Ethernet management ports can be enabled at any given time; enabling the RJ-45 Ethernet port will disable the internal management port. Any changes made to enable the RJ-45 Ethernet 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://pic.dhe.ibm.com/infocenter/flexsys/information/index.jsp.

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

FlexPort configuration

For details on this feature, including configuration procedures, refer to the Brocade Network OS Layer 2 Switching Configuration Guide. FlexPort is supported by Network OS 5.0.0 and later.

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.

Certain configuration settings are not restored to their default values when the request to restore factory default settings is initialized from the CMM. See Table 9.

TABLE 9   Settings that require user input

Setting	Description
rbridge-id	A unique identifier within the VCS fabric
vcs-id	The VCS fabric ID used by the switch
alias info	Used to create an alias for certain commands
cipherset	Used to set FIPS-compliant ciphers
licenses	The licenses installed on the switch

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.

Network OS comes with two predefined user accounts that are part of the factory-default settings. It is recommended that you change the password for all default accounts during the initial installation and configuration for each switch.

The default user accounts are "admin" and "user," and these accounts are associated with the corresponding "admin" and "user" roles in the switch-local user database. Only the "admin" and "user" users can access the CLI and, except for the account password, no other attributes can be changed for the default users "admin" and "user."

By default, all account information is stored in the switch-local user database. User authentication and tracking of logins to the switch is local by default.

After you log in to the switch, time and date settings are provided by the CMM.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.

Table 10 lists the default user accounts and default passwords. Passwords are case-sensitive.

TABLE 10   Default user accounts and passwords

User ID	Password (case-sensitive)
admin	password
user	password
USERID	PASSWORD (wherein the sixth character is a zero)

For more information about user accounts, user-based access, and password requirements, see the *Network OS Administrator's Guide*.

Managing the switch

SNMP v3 authentication

Two user roles are supported:

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

Table 11 lists user login information. Each entry requires a separate password. The default algorithm (SHA) is used to create the authentication keys.

TABLE 11   SNMP authentication and privacy protocols

User	Authentication password	Authentication protocol	Privacy password	Privacy protocol[1]	Access type
snmpadmin1	admin1	SHA	admin1	DES	Get/Set
snmpadmin2	admin2	SHA	admin2	DES	Get/Set
snmpadmin3	admin3	SHA	admin3	DES	Get/Set
snmpuser1	user1	SHA	user1	DES	Get
snmpuser2	user2	SHA	user2	DES	Get
snmpuser3	user3	SHA	user3	DES	Get

1. DES = 128-bit encryption

For more information, see the **snmpConfig** commands supporting SNMPv3 configuration parameters, as described in the *Network OS Command Reference*.

Backing up the configuration

Prior to backing up a switch configuration, you can check the switch configuration by initiating the **show running-config** and **show startup-config** commands.

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

1. Open an SSH session to the switch.

2. Upload the configuration file to an FTP, SCP, or SFTP server. The example in Figure 20 is using an FTP server.

```
EN4023#
EN4023#
EN4023# copy running-config ftp://root:pass@10.20.27.134//root/test/cfg.txt
2013/10/28-20:15:54, [DCM-1108], 31473,, INFO, hanh_m3chassis_21_196, Running configuration file has been up
EN4023#
EN4023#
```

FIGURE 20   Using FTP to back up the configuration

3. Copy the configuration to the start-up configuration.

```
EN4023# copy running-config startup-config
This operation will modify your startup configuration. Do you want to
continue? [y/n]:y
EN4023#
```

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 *Network OS Administrator's Guide*. For detailed information about the commands used in backing up a configuration, refer to the *Network OS Command Reference*.

Resetting the switch to factory defaults

ATTENTION
Restoring the switch to factory defaults is disruptive. Before doing so, save the switch configuration.

Use the IBM Chassis Management Module (CMM) to reset the switch to factory defaults. See Figure 21.

1. Open the CMM and log in with admin privileges.

2. Select **Chassis Management** > **I/O Modules**.

3. Select the bay where the switch is installed.

4. Click the **Actions** tab.

5. Click **Reset Factory Defaults**.

FIGURE 21   Resetting factory default settings from the CMM GUI

For more information, go to http://pic.dhe.ibm.com/infocenter/flexsys/information/index.jsp.
Navigate to **IBM Flex System Information > Management Devices and Solutions >IBM Flex System Chassis Management Module > Using the Web interface > Web interface options > Chassis management options**.

NOTE
Certain configuration settings are not restored to their default values when the request to restore factory default settings is initialized from the CMM. See Table 9 on page 32.

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 9

2. Disconnect any cables from the switch that you are removing. For additional information about disconnecting cables, see "Installing and removing an SFP+ or QSFP transceiver" on page 13, 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 2 on page 12. 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+ or QSFP transceiver" on page 13, 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+ and QSFP transceivers where appropriate. For safety information and instructions, see "Installing and removing an SFP+ or QSFP transceiver" on page 13.

8. Establish a connection to the CMM. For more information, see "Connecting to the switch over SSH" on page 30.

Updating the Firmware

This chapter contains information and instructions for updating the IBM Flex System EN4023 10Gb 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/NetworkOSv4xRelease

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 IBM Chassis Management Module (CMM), or from the switch using the CLI.

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 as "admin." Use the following default user name and password settings:

   User ID: **admin**
   Password: **password**

3. Enter the **show version** command to check the current firmware version on the switch.

Upgrading the switch firmware

After you locate the correct firmware to download to the IIBM Flex System EN4023 10Gb Scalable Switch, you can use the **firmware download interactive** command 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 chapter, "Installing and Maintaining Firmware," in the *Network OS Administrator's Guide.*

The following example shows the **firmware download interactive** command output.

```
EN4023# firmware download interactive
Server name or IP address: 10.31.2.25
File name:
/Software/Released/NOS/EN4023/Updates/nos4.0.0_bbd/nos4.0.0_bbd_rel_123/dist/rele
ase.plist
Protocol (ftp, scp, sftp): ftp
User: admin
Password: ***********
Reboot system after download? [y/n]:n
Do Auto-Commit after Reboot? [y/n]:yes
Performing system sanity check...


Do you want to continue? [y/n]:y
Checking conditions for downloading to 4.0.0


You are running 'firmware download' with auto-reboot disabled. After firmware is
downloaded, please reboot the system to activate the new firmware.
Preparing for firmware download...
Installing 9 packages. Please wait...
Preparing packages for installation...
man-1.6g-8
############################# [ 100% ]
Preparing packages for installation...
kernel-swbd138-2.6.34.6-1
############################# [ 100% ]
Preparing packages for installation...
agent-nos-common-4.0.0-1
############################# [ 100% ]
Preparing packages for installation...
fabos-4.0.0nos4.0.0_bbd_rel_131007_2000-15
############################# [ 100% ]
Preparing packages for installation...
fabos-vf-4.0.0-10
############################# [ 100% ]
Preparing packages for installation...
fabos-man-4.0.0-13
############################# [ 100% ]
Preparing packages for installation...
confd-3.7.6.3.brcd-3
############################# [ 100% ]
Preparing packages for installation...
prom-40x0-1.0.1-4
############################# [ 100% ]
```

```
Preparing packages for installation...
dcm-4.0.0-4
############################# [ 100% ]
Done install Package
All packages have been downloaded successfully.
The command has completed successfully.


EN4023#
EN4023#
```

NOTE
If you are downloading firmware to the switch and you log in to the FTP server as an anonymous user
("anonymous" is the user name), the Network OS requires that you enter text to represent a
password.

Solving Problems

This chapter provides troubleshooting information to help you solve problems that might occur while you are setting up the IBM Flex System EN4023 10Gb 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 power-on self-tests (POSTs) during power-up or a restart to ensure that it is fully operational. These tests take approximately one minute to complete. The IBM Chassis Management Module (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 20.

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 12 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 12 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 be installed only by trained service technicians.

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

The replaceable components in the following table are Tier 1 CRUs. If other components require replacement, see the documentation that came with those devices for instructions.

Table 13 lists the replaceable component information.

TABLE 13 Parts listing

Part	Tier 1 CRU
IBM Flex System EN4023 10Gb Scalable Switch	94Y5219

NOTE
The optical transceivers and cables supporting your IBM Flex System EN4023 10Gb Scalable Switch are continually changing. For the most current information on supported components, go to the IBM Server Proven website at
http://www-03.ibm.com/systems/info/x86servers/serverproven/compat/us/flex.html.

Getting Help and Technical Assistance

If you need help, service, or technical assistance, or just want more information about IBM products, you will find a wide variety of sources available from IBM to assist you. 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 website 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 **Resellers > Find Business Partners**. 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.

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

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

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

Industry Canada Class A emission compliance statement

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

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