

QLogic Fibre Channel Switch Module for IBM  
@server BladeCenter



# Installation Guide



QLogic Fibre Channel Switch Module for IBM  
@server BladeCenter



# Installation Guide

**Note:**

Before using this information and the product it supports, read the general information in Appendix B, “Warranty information,” on page 61 and “Notices” on page 85.

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## 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.

在安裝本產品之前，請仔細閱讀 **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 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.

**Important:**

All caution and danger statements in this documentation begin with a number. This number is used to cross reference an English caution or danger statement with translated versions of the caution or danger statement in the *IBM Safety Information* book.

For example, if a caution statement begins with a number 1, translations for that caution statement appear in the *IBM Safety Information* book under statement 1.

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



**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 3:**



**CAUTION:**

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

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



**DANGER**

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

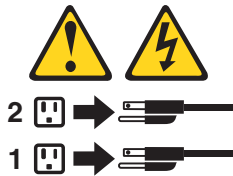
Class 1 Laser Product  
Laser Klasse 1  
Laser Klass 1  
Luokan 1 Laserlaite  
Appareil À Laser de Classe 1

Statement 5:



CAUTION:

The power control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.



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.

**WARNING:** Handling the cord on this product or cords associated with accessories sold with this product, will expose you to lead, a chemical known to the State of California to cause cancer, and birth defects or other reproductive harm. *Wash hands after handling.*

**ADVERTENCIA:** El contacto con el cable de este producto o con cables de accesorios que se venden junto con este producto, pueden exponerle al plomo, un elemento químico que en el estado de California de los Estados Unidos está considerado como un causante de cancer y de defectos congénitos, además de otros riesgos reproductivos. *Lávese las manos después de usar el producto.*

---

## Chapter 1. Introduction

This *Installation Guide* contains instructions for and information about:

- Installing and setting up the QLogic® Fibre Channel Switch Module for IBM® @server® BladeCenter®
- Configuring the switch module through the Telnet interface
- Configuring the switch module through the SANbrowser interface
- Configuring the switch module through the SANsurfer application
- Expanding the functionality of the switch module (optional)

For installation details, see Chapter 2, “Installing and removing an I/O module,” on page 13. For details about the status of the switch module and its external ports and network connections, see Chapter 5, “Configuring the switch module using the SANbrowser interface,” on page 35. For additional information about switch modules and other BladeCenter components, see the instructions in your BladeCenter documentation.

### Notes:

- Except where specifically stated otherwise in this document, the terms *I/O module*, *switch module*, or *switch* refer to the QLogic 20-port 4 Gb Fibre Channel switch module, the QLogic 10-port 4 Gb Fibre Channel switch module, and the QLogic 6-port Enterprise Fibre Channel switch module (2Gb).
- Except where specifically stated otherwise in this document, the IBM @server BladeCenter unit (for example, the BladeCenter Type 8677) and IBM @server BladeCenter T unit are referred to as the BladeCenter unit.
- When using the 4 Gb switch module with the BladeCenter T unit, the internal ports operate at 2 Gigabits per second (Gbps). The external ports operate at 4 Gbps.
- You can install up to two I/O modules in a BladeCenter unit.

You can manage and configure the I/O module through multiple interfaces:

- A Telnet connection to the embedded command-line interface (CLI)  
For additional information, see Chapter 4, “Configuring the switch module through the Telnet interface,” on page 29.
- A Web browser (SANbrowser) interface  
For additional information, see Chapter 5, “Configuring the switch module using the SANbrowser interface,” on page 35.

- The SANsurfer application

The SANsurfer application provides an intuitive graphical interface that you can use to configure multiple I/O modules through other connected storage area network (SAN) devices from a single interface. For additional information, see Chapter 6, “Configuring the switch module through the SANsurfer application,” on page 41.

You can obtain up-to-date information about the I/O module and other IBM @server products at <http://www.ibm.com/eserver/>.

This I/O module has six labels: a safety certification label, a Common Language Equipment Identification (CLEI) label, a product name label, a serial number label, a media access control (MAC) address label, and a media access control address/worldwide name (MAC address/WWN) label. The safety certification label is on the left side of the I/O module. The product name label is on the right side of the I/O module. The CLEI label is on the left side of the I/O module. The serial number label is on the left side of the I/O module. The MAC address label is on the information panel under the I/O-module external port 19. The MAC address/WWN label is on the right side of the I/O module. You will need this information when you register the I/O module with IBM. See “Major components of the I/O module” on page 11 for the location of the I/O-module labels that contain the MAC address/WWN and serial number information.

You can expand the functionality of the I/O module through the purchase of an optional software license that provides additional capabilities. For additional information, see Chapter 7, “Expanding the functionality of the switch module,” on page 55.

Before you can expand the functionality of the I/O module and install a new software license, you must determine the product serial number of the switch module. Use the Telnet program to log in to the switch module as described in Chapter 5, “Configuring the switch module using the SANbrowser interface,” on page 35, and run the `show version` command to determine the value of the Chassis Serial Number data field. Record the serial number for future reference; for example, 11S32R1793ZJ1ZC846H073. For information about the `show version` command, see the *QLogic Fibre Channel Switch Module for IBM @server BladeCenter Management Guide* at <http://www.ibm.com/support/> or on the *Support CD*.

**Record your product information in this table**

Product name: \_\_\_\_ QLogic 20-port 4 Gb Fibre Channel Switch Module  
for IBM @server BladeCenter

or

Product name: \_\_\_\_ QLogic 10-port 4 Gb Fibre Channel Switch Module  
for IBM @server BladeCenter

or

Product name: \_\_\_\_ QLogic 6-port Enterprise Fibre Channel Switch Module  
for IBM @server BladeCenter

Chassis serial number: \_\_\_\_\_  
For example: 11S32R1793ZJ1ZC846H073

Media access control (MAC) address: \_\_\_\_\_

Worldwide name (WWN): \_\_\_\_\_

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## Related documentation

This *Installation Guide* contains installation and setup instructions for the I/O module. This document also provides general information about the I/O module, including getting started, how to configure the I/O module, and how to access and use online help.

This *Installation Guide* is also provided in Portable Document Format (PDF) on the *QLogic 4Gb Fibre Channel Switch Module for IBM @server BladeCenter Support CD* that comes with the switch module. Throughout this document, this CD is also referred to as the *Support CD*. For additional information about the *Support CD*, see “The Support CD” on page 6.

In addition to reviewing the documentation in this library, be sure to review the *IBM @server BladeCenter Planning and Installation Guide* or the *IBM @server BladeCenter T Planning and Installation Guide* for information to help you prepare for system installation and configuration.

The most recent version of the following related BladeCenter documentation is available in PDF on the World Wide Web.

To locate the most recent version of the BladeCenter documentation, including the *IBM @server BladeCenter Planning and Installation Guide* or the *IBM @server BladeCenter T Planning and Installation Guide*, complete the following steps:

1. Go to <http://www.ibm.com/support/>.
2. In the **Browse by topic** section, click **Publications**.

3. On the “Publications” page, in the **Brand** field, select **Servers**.
4. In the **Family** field, select **BladeCenter**.  
Do not change the default values in the **Type**, **Model**, or **Operating system** fields.
5. Click **Continue**.  
A list of the available BladeCenter documentation will be displayed under the heading **Results by date**.

**Notes:**

- To display different results, you can select **BladeCenter HS20**, **BladeCenter HS40**, **BladeCenter LS20**, or **BladeCenter JS20**.
- Changes are made periodically to the IBM Web site. The actual procedure might vary from what is described in this document.

In addition to this *Installation Guide*, the following related documentation is available in PDF on the World Wide Web or on the *Support* CD that comes with the switch module:

- *QLogic Fibre Channel Switch Module for IBM @server BladeCenter Management Guide*

This document describes how to use the SANsurfer application. In addition, it describes how to start the Telnet CLI and lists the CLI commands and their usage. This document also contains diagnostic information that pertains to the switch module.

- *QLogic 6-port Fibre Channel Switch Module for IBM @server BladeCenter Management Guide*

This document describes how to use the SANsurfer application. In addition, it describes how to start the Telnet CLI and lists the CLI commands and their usage. This document also contains diagnostic information that pertains to the switch module.

- *Safety Information*

This document 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.

- *IBM @server BladeCenter Fibre Channel Expansion Card Installation and User's Guide*

This document contains instructions for installing the IBM BladeCenter™ Fibre Channel expansion card in an IBM blade server. This document contains information about:

- Installing and configuring the Fibre Channel expansion card
- Updating the basic input/output system (BIOS) code and device drivers of the Fibre Channel expansion card



- *QLogic Fibre Channel Expansion Card for IBM @server BladeCenter Installation and User's Guide*

This document contains instructions for installing the QLogic Fibre Channel expansion card in an IBM blade server. This document contains information about:

- Installing and configuring the Fibre Channel expansion card
  - Updating the basic input/output system (BIOS) code and device drivers of the Fibre Channel expansion card
- *IBM @server BladeCenter and BladeCenter T unit Installation and User's Guide*

Each type of BladeCenter unit has a customized *Installation and User's Guide*. It provides general information about your BladeCenter unit, including:

    - Information about features
    - How to set up, cable, and start your BladeCenter unit
    - How to install options in your BladeCenter unit
    - How to configure your BladeCenter unit
    - How to perform basic troubleshooting of your BladeCenter unit
    - How to get help
  - *IBM @server BladeCenter blade server Installation and User's Guide*

Each type of blade server has a customized *Installation and User's Guide*. It provides general information about your blade server, including:

    - Information about features
    - How to set up and start your blade server
    - How to install options in your blade server
    - How to configure your blade server
    - How to install an operating system on your blade server
    - How to perform basic troubleshooting of your blade server
    - How to get help
  - *Rack Installation Instructions*

This document contains the instructions to install your BladeCenter unit in a rack.
  - *IBM Problem Determination and Service Guide or Hardware Maintenance Manual and Troubleshooting Guide*

All types of BladeCenter units and blade servers come with a customized *Problem Determination and Service Guide or Hardware Maintenance Manual and Troubleshooting Guide*. Some BladeCenter options might also come with a customized *Problem Determination and Service Guide or Hardware Maintenance Manual and Troubleshooting Guide*. This document contains information to help you solve the problem yourself or to provide helpful information to a service technician.

The *IBM Configuration and Options Guide* contains information about which small-form-factor pluggable (SFP) module and cable are required to connect the I/O module to other storage devices. This document is at <http://www.ibm.com/servers/eserver/xseries/library/configtools.html> on the World Wide Web.

Additional related documentation might be included on the *Support CD* or available on the IBM support Web site, <http://www.ibm.com/support/>.

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## The Support CD

The *Support CD* contains the following items:

- SANsurfer application software
- The \Publications folder, which includes PDF files for the following documentation:
  - *QLogic Fibre Channel Switch Module for IBM @server BladeCenter Management Guide*
  - *QLogic Fibre Channel Switch Module for IBM @server BladeCenter Event Message Guide*
- Readme files
- Instructions

**Note:** The *Support CD* might contain additional information. Use the subdirectories to help you find information quickly.

---

## Notices and statements used in this document

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

The following notices and statements are used in this document:

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

- **Danger:** These statements indicate situations that can be potentially lethal or extremely hazardous to you. A danger statement is placed just before the description of a potentially lethal or extremely hazardous procedure step or situation.

---

## Features and specifications

This section provides a summary of the features and specifications for the I/O module.

The I/O module has the following features:

- Simple name server implementation

The simple name server is implemented as described in Fibre Channel Generic Services (FC-GS-3). The simple name server requests and responses are based on the Common Transport Interface (CTI) as described in FC-GS-3. Name server database objects are defined as follows:

- Native Port Identifier (P\_ID)
- Port Name (PN)
- Node Name (NN)
- Class of Service (CoS)
- Internet protocol (IP) Address (IP\_A)
- Initial Process Associator (IPA)
- FC-4 Types (Type) and Port Type (PT)
- Symbolic Port Name (SPN)
- Symbolic Node Name (SNN)

- Security

The I/O module provides fabric security and interswitch link security. Fabric security controls management access to the fabric. When fabric security is enabled on all switches in the fabric, you must provide a user name and password to access the fabric. Security is enabled by default.

- Firmware installation

Use the SANsurfer application or CLI to install and activate new firmware.

- Support for Non-Disruptive Code Load Activation (NDCLA)
- Registered State Change Notification (RSCN)

The I/O module supports RSCN as described in FC-FLA. RSCN enables an agent to register for change events in the fabric and attached devices.

- Interoperability

The I/O module supports standards based FC-SW2 interoperability.

- Error detection

The I/O module supports the following error detection methods:

- Cyclic redundancy check (CRC)
- 8-byte and 10-byte conversion
- Parity
- Long frame and short frame
- D\_ID mismatch
- S\_ID mismatch

- Frame bundling

The I/O module provides the following frame bundling methods:

- No frame bundling - Intermix frames from different sources at will.
- Soft lockdown - Soft lockdown causes the I/O module to wait for either the sequence to be completed or a gap in the frame traffic to occur before servicing requests from a different port.

- Configurable Fabric Address Notification (FAN)

A FAN, as described in FC-FLA, is sent out by the fabric after an initialization event (usually a loop initialization port) to each attached NL\_Port. The purpose of the FAN is to inform the attached NL\_Ports of the fabric node name, port name, and fabric address.

Additional capabilities are available through the following optional software feature licenses:

- |  |
|--|
| <ul style="list-style-type: none"><li>• McDATA Mode Firmware Upgrade for IBM @server BladeCenter QLogic Switch Modules</li><li>• McDATA SANtegrity Enhanced Activation for IBM @server BladeCenter</li><li>• 10-port License Update - Applicable to the QLogic 10-port 4 Gb switch module only</li></ul> |
|--|

To activate and use this optional software feature, you must purchase the corresponding software license. For information about this feature, see the *QLogic Fibre Channel Switch Module for IBM @server BladeCenter Management Guide* on the *Support* CD. See "Related documentation" on page 3 for a description of this document. For information about obtaining a software license, see Chapter 7, "Expanding the functionality of the switch module," on page 55.

Table 1 contains a summary of the specifications of the I/O module.

*Table 1. Fibre Channel switch-module specifications*

<b>Fibre Channel standards and protocols:</b>	<b>Fibre Channel standards and protocols (continued):</b>	<b>Fibre Channel standards and protocols (continued):</b>
<ul style="list-style-type: none"> <li>• Fibre Channel standards:               <ul style="list-style-type: none"> <li>– FC-PH version 4.3</li> <li>– FC-PH-2</li> <li>– FC-PH-3</li> <li>– FC-AL version 4.5</li> <li>– FC-AL-2 Rev 7.0</li> <li>– FC-FLA</li> <li>– FC-GS-3</li> <li>– FC-FG</li> <li>– FC-PLDA</li> <li>– FC-Tape</li> <li>– FC-VI</li> <li>– FC-SW-2</li> <li>– Fibre Channel Element MIB RFC 2837</li> <li>– Fibre Alliance MIB version 4.0</li> </ul> </li> <li>• Fibre Channel protocols:               <ul style="list-style-type: none"> <li>– Fibre Channel service classes: Class 2 and class 3</li> <li>– Operation modes: Fibre Channel class 2 and class 3, connectionless</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Fibre Channel protocols (continued):               <ul style="list-style-type: none"> <li>– External port type: Generic loop port (GL_port)</li> <li>– Internal port type: fabric port (F_port)</li> <li>– Port characteristics: External ports are automatically detected and self- configuring</li> <li>– Number of Fibre Channel ports: 6 external ports and 14 internal ports</li> <li>– Scalability: Up to 239 switches maximum depending on your configuration</li> <li>– Buffer credits: 16 buffer credits per port</li> <li>– Maximum frame size: 2148 bytes (2112 byte payload)</li> <li>– Standards based FC-SW2 Interoperability</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Fibre Channel protocols (continued):               <ul style="list-style-type: none"> <li>– Media type: Small form-factor pluggable (SFP) module</li> <li>– 2 Gb fabric port speed: 1.0625 or 2.125 Gbps (gigabits per second)</li> <li>– 2 Gb fabric latency: Less than 0.4 µsec</li> <li>– 2 Gb fabric aggregate bandwidth: 80 Gbps at full duplex</li> <li>– System processor: PowerPC®</li> <li>– Fabric point-to-point bandwidth: 2 Gbps or 4 Gbps at full duplex</li> <li>– 4 Gb switch speed: 4.250 Gbps</li> <li>– 4 Gb switch fabric point-to-point: 8 Gbps at full duplex</li> <li>– 4 Gb switch fabric aggregate bandwidth:160 Gbps at full duplex</li> <li>– Maximum frame size: 2148 bytes (2112 byte payload)</li> <li>– Nonblocking architecture to prevent latency</li> </ul> </li> </ul>

Table 1. Fibre Channel switch-module specifications (continued)

<p><b>I/O-module maintainability:</b></p> <ul style="list-style-type: none"> <li>• Diagnosis: Power-on self-test (POST) is performed on all functional components except the SFP module. Port operational tests include internal, external, and online tests.</li> <li>• User interface: Light-emitting diode (LED) indicators</li> </ul> <p><b>Fabric management:</b></p> <ul style="list-style-type: none"> <li>• Management methods: <ul style="list-style-type: none"> <li>– SANsurfer application</li> <li>– Telnet and command-line interface (CLI)</li> <li>– SANbrowser Web interface</li> </ul> </li> <li>• I/O-module simple network management protocol (SNMP) agent: Enables a network management workstation to receive configuration values, traffic information, and Fibre Channel failure data through SNMP and the Ethernet interface.</li> </ul> <p><b>Dimensions:</b></p> <ul style="list-style-type: none"> <li>• Width: 112 mm (4.41 in.)</li> <li>• Height: 29 mm (1.14 in.)</li> <li>• Depth: 260.3 mm (10.25 in.)</li> <li>• Weight: 2 lb</li> </ul>	<p><b>Environmental:</b></p> <ul style="list-style-type: none"> <li>• Temperature and altitude: <ul style="list-style-type: none"> <li>– Operating: <ul style="list-style-type: none"> <li>- 10°C to 52°C (50°F to 125.6°F) at an altitude of 0 to 914 m (0 to 3 000 ft)</li> <li>- 10°C to 49°C (50°F to 120.2°F) at an altitude of 0 to 3 000 m (0 to 10 000 ft)</li> </ul> </li> <li>– Non-operating: -40°C to 65°C (-40°F to 149°F) at an altitude of 0 to 12 000 m (0 to 39 370 ft)</li> </ul> </li> <li>• Humidity: <ul style="list-style-type: none"> <li>– Operating: 8% to 80%, noncondensing</li> <li>– Non-operating: 5% to 80%, noncondensing</li> </ul> </li> </ul>	<p><b>I/O-module regulatory certifications:</b></p> <p>Electrical:</p> <ul style="list-style-type: none"> <li>• Power source loading: 3.75 amps maximum at 12 V dc</li> <li>• Heat output: 35 watts maximum</li> <li>• Operating voltage: 12 V dc</li> <li>• Circuit protection: Internally fused</li> <li>• Safety standards: <ul style="list-style-type: none"> <li>– UL 1950 (USA)</li> <li>– UL 1950 (Canada)</li> <li>– EN60950 (EC)</li> <li>– Support for Japan</li> <li>– Support for Korea</li> <li>– CB scheme - IEC 60950</li> </ul> </li> <li>• Emissions standards: <ul style="list-style-type: none"> <li>– FCC part 15B Class A (USA)</li> <li>– VCCI Class A ITE (Japan)</li> <li>– ICES-003 issue 3 (Canada)</li> <li>– A4EN55022 level A (EC)</li> <li>– Voltage fluctuations: EN 61000-3-3</li> <li>– Harmonics: EN 61000-3-2</li> <li>– Immunity: EN55024: 1998</li> </ul> </li> </ul>
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## Inventory checklist

Make sure that the shipping carton contains the following items:

- QLogic Fibre Channel Switch Module for IBM @server BladeCenter
- The *QLogic Fibre Channel Switch Module for IBM @server BladeCenter Support CD*

- One diagnostic wrap plug
- The *Qlogic Fibre Channel Switch Module for IBM @server BladeCenter Installation Guide* (this document)
- *Safety Information*
- End User License Agreement

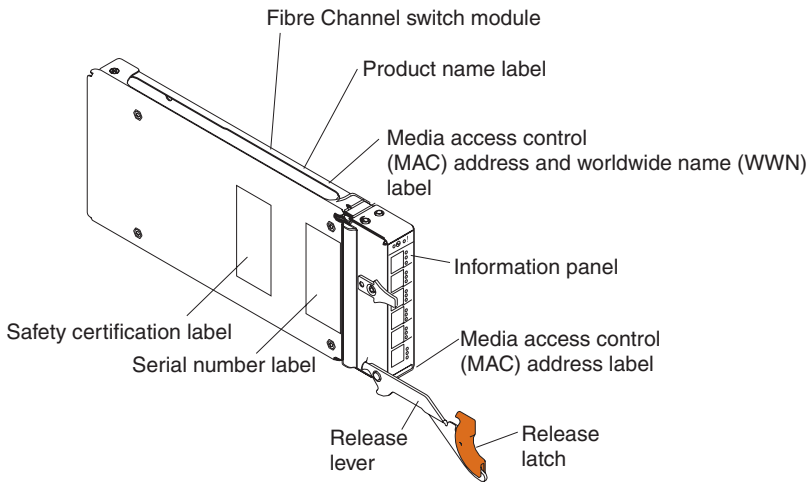
---

## Major components of the I/O module

Blue on a component indicates touch points, where you can grip the component to remove it from or install it in the I/O module, blade server, or BladeCenter unit, open or close a latch, and so on.

Orange on a component or an orange label on or near a component on the I/O module, blade server, or BladeCenter unit indicates that the component can be hot-swapped, which means that if the BladeCenter unit and operating system support hot-swap capability, you can remove or install the component while the BladeCenter unit is running, provided that it is configured to support this function. (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.

The following illustration shows the major components of the I/O module. Your hardware may have labels not shown in the following illustration.



For more information about the components of the information panel, see Chapter 5, “Configuring the switch module using the SANbrowser interface,” on page 35.



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## Chapter 2. Installing and removing an I/O module

This chapter provides instructions for installing a switch module in the BladeCenter unit, and for removing a switch module from the BladeCenter unit.

**Note:** The blade server or BladeCenter unit shown in the illustrations in this document might be different from your blade server or BladeCenter unit. For additional information, see your blade server documentation or the documentation that came with your BladeCenter unit.

You must install Fibre Channel switch modules only in I/O-module bays 3 and 4 of the IBM @server BladeCenter and BladeCenter T units. At least one Fibre Channel switch module is required when you install it in a blade server. Installing a Fibre Channel switch module in bay 3 or bay 4 provides the first connection to any Fibre Channel expansion card installed in the BladeCenter unit. Installing a second Fibre Channel switch module enables a second connection to the Fibre Channel expansion cards installed in the BladeCenter unit, providing a redundant path and a separate Fibre Channel connection from the blade server to the external Fibre Channel network and SAN.

### Important:

- When using the 4 Gb switch module with the BladeCenter T unit, the internal ports operate at 2 Gbps and the external ports operate at 4 Gbps.
- The I/O modules in I/O-module bays 3 and 4 and all blade server expansion cards in the BladeCenter unit must use the same interface type. Therefore, you must install Fibre Channel expansion cards when you install Fibre Channel switch modules into your BladeCenter unit.

The following table summarizes the application for each I/O module.

Bay	Fibre Channel switch module function
3	Port 0 connection on the Fibre Channel expansion card in the BladeCenter unit
4	Port 1 connection on the Fibre Channel expansion card in the BladeCenter unit

The second switch module port connection allows for dual paths from the blade server to external Fibre Channel devices.

---

## Installation guidelines

Before you install the I/O module in the BladeCenter unit, read the following information:

- Read the safety information that begins on page v, “Handling static-sensitive devices” on page 15, and the safety statements in the blade server documents and other BladeCenter unit option documents. This information will help you work safely with the blade server, BladeCenter unit, and options.
- Observe good housekeeping in the area where you are working. Place removed covers and other parts in a safe place.
- Do not attempt to lift an object that you think is too heavy for you. If you have to lift a heavy object, observe the following precautions:
  - Make sure that you can stand safely without slipping.
  - Distribute the weight of the object equally between your feet.
  - Use a slow lifting force. Never move suddenly or twist when you lift a heavy object.
  - To avoid straining the muscles in your back, lift by standing or by pushing up with your leg muscles.
- You do not have to turn off the BladeCenter unit to install or replace any of the hot-swap modules on the rear of the BladeCenter unit.
- Blue on a component indicates touch points, where you can grip the component to remove it from or install it in the I/O module, blade server, or BladeCenter unit, open or close a latch, and so on.
- Orange on a component or an orange label on or near a component on the I/O module, blade server, or BladeCenter unit indicates that the component can be hot-swapped, which means that if the BladeCenter unit and operating system support hot-swap capability, you can remove or install the component while the BladeCenter unit 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.
- When you are finished working on the blade server or BladeCenter unit, reinstall all safety shields, guards, labels, and ground wires.
- For a list of supported options for the BladeCenter unit, see <http://www.ibm.com/pc/us/compat/>.

## System reliability considerations

**Attention:** To help ensure proper cooling and system reliability, make sure that:

- Each of the module bays on the rear of the BladeCenter unit has either a module or filler module installed.
- A removed hot-swap module is replaced with an identical module or filler module as soon as possible.
- Cable requirements for the I/O module are described in the IBM *Configuration and Options Guide* at <http://www.ibm.com/servers/eserver/xseries/library/configtools.html> on the World Wide Web. See the documentation that comes with your blade server for cable routing information.

## Handling static-sensitive devices

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

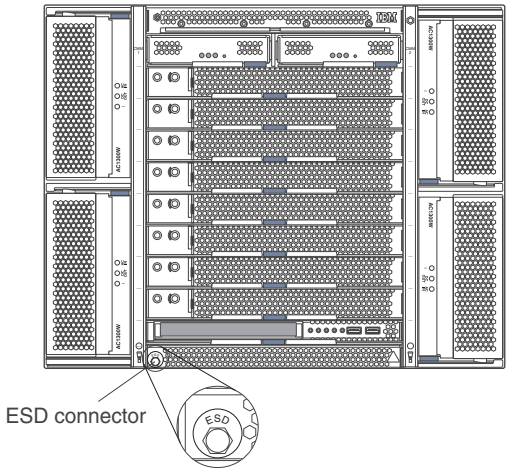
To reduce the possibility of damage from electrostatic discharge, observe the following precautions:

- Limit your movement. Movement can cause static electricity to build up around you.
- The use of a grounding system is recommended. For example, wear an electrostatic-discharge wrist strap, if one is available.

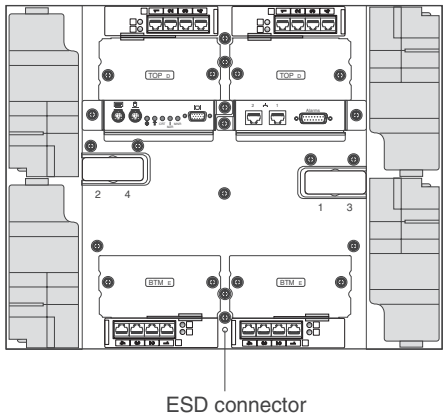
Use an ESD wrist strap and the ESD connectors on the BladeCenter T unit. Electrostatic discharge (ESD) is the release of stored static electricity that can damage electric circuits. Static electricity is often stored in your body and discharged when you come in contact with an object with a different potential. The ESD wrist strap safely channels the electricity from your body to a proper ground (the BladeCenter T unit).

Use an ESD wrist strap whenever you are working on the BladeCenter T unit, especially when you are handling modules, options, and blade servers. To work properly, the wrist strap must have a good contact at both ends (touching your skin at one end and connected to the ESD connector on the front or back of the BladeCenter T unit.)

### Location of ESD connector (front of BladeCenter T unit)



### Location of ESD connector (rear of BladeCenter T unit)



- 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 any *unpainted* metal surface of the BladeCenter unit or any *unpainted* metal surface on any other grounded rack component in the rack in which you are installing the device for at least 2 seconds. (This drains static electricity from the package and from your body.)
- Remove the device from its package and install it directly into the BladeCenter unit without setting down the device. If it is necessary to set

down the device, put it in its static-protective package. Do not place the device on your BladeCenter unit or on a metal surface.

- Take additional care when handling devices during cold weather. Heating reduces indoor humidity and increases static electricity.

---

## Installing a BladeCenter Fibre Channel switch module

Statement 3:



### CAUTION:

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

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



### 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 Class 1  
Luokan 1 Laserlaite  
Appareil À Laser de Classe 1

Statement 8:



**CAUTION:**

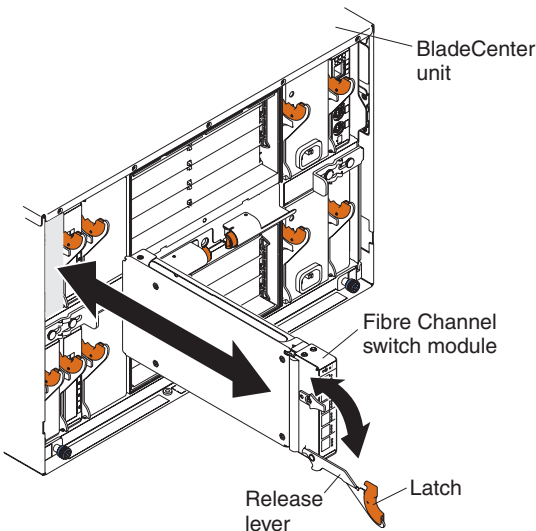
Never remove the cover on a power supply or any part that has the following label attached.



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.

The following example shows a vertical orientation for installing a Fibre Channel switch module in the BladeCenter unit.

**Note:** For additional information about installing a Fibre Channel switch module in other types of BladeCenter unit, see the documentation that comes with your BladeCenter unit type.



Complete the following steps to install the Fibre Channel switch module:

1. Make sure that you are using the latest versions of device drivers, firmware, and BIOS code for your blade server and management module. Go to the IBM Support Web site, <http://www.ibm.com/support/> for the latest information about upgrading the device drivers, firmware, and BIOS code for BladeCenter components. The latest instructions are in the documentation that comes with the updates.
2. Review the information in “Safety” on page v and “Installation guidelines” on page 14 through “Handling static-sensitive devices” on page 15.
3. Remove the acoustic attenuation module option, if one is installed, from the rear of the BladeCenter unit. For more information, see the documentation that came with your BladeCenter unit type.
4. Make sure that the BladeCenter unit is turned on, the green dc power LED on each power module is lit, and the green OK LED on the management module is lit.
5. Remove the filler module from the selected I/O-module bay. Store the filler module for future use.

**Note:** Install your Fibre Channel switch module only in I/O-module bay 3 or bay 4.

6. If you are installing the Fibre Channel switch module in the rear of a BladeCenter T unit, connect an ESD wrist strap to the ESD connector at the rear of the BladeCenter T unit. (For the location of the ESD connector, see the second illustration on page 16.)
7. If you have not already done so, touch the static-protective package that contains the I/O module to any *unpainted* metal surface of the BladeCenter chassis or any *unpainted* metal surface on any other grounded rack component in the rack in which you are installing the I/O module for at least 2 seconds.
8. Remove the I/O module from its static-protective package.
9. Make sure that the release latch on the I/O module is in the open position (perpendicular to the module).
10. Slide the I/O module into the appropriate I/O-module bay until it stops.
11. Push the release lever on the front of the I/O module to the closed position.

**Note:** The Fibre Channel switch module takes approximately 90 seconds to complete the POST. When the I/O module is performing POST, an LED test occurs. All LEDs are lit and remain lit for approximately 10 seconds and then return to normal state.

12. Make sure that the LEDs on the Fibre Channel switch module indicate that it is operating properly. (See “Information LEDs” on page 26 for LED locations.) Make sure that:
  - When the POST starts, the OK and fault LEDs on the I/O module are lit. The POST tests the condition of firmware, memories, data paths, and switch logic.
  - The green OK LED on the I/O module begins to flash to indicate that the switch logic is completing POST.
  - The green OK LED on the I/O module then stops flashing, and the fault LED is off. This indicates that the I/O module has completed POST.

**Note:** If the fault LED continues to be lit, the POST has failed. Make sure that the BladeCenter unit is powered on and the BladeCenter unit LEDs are lit. If POST has failed, see the *QLogic Fibre Channel Switch Module for IBM @server BladeCenter Management Guide* on the Support CD for diagnostic information.

13. If you have other modules to install, do so now; otherwise, go to step 14.
14. To use the external ports, connect a small-form-factor pluggable (SFP) module option into external Fibre Channel port 0 and Fibre Channel ports 15 through 19. For SFP module installation instructions, see the documentation that comes with your SFP module.

**Note:** The SFP module options do not come with the Fibre Channel switch module. For information about which SFP module and cable are required to connect your switch module to other storage devices, see the *IBM Configuration and Options Guide* on the Web at <http://www.pc.ibm.com/us/eserver/xseries/library/configtools.html>.

15. Use LC-LC or LC-SC fiber-optic cables to connect the Fibre Channel switch module external ports to external Fibre Channel devices. For more information, see the documentation that comes with your cable options.

**Note:** You can remove and replace an SFP module while the I/O module is operating without damaging the Fibre Channel switch module or the SFP module. However, transmission on the affected port will be interrupted until the SFP module and cables are installed. See the documentation that comes with your connected Fibre Channel device for information about installation, configuration, and startup sequence.

16. Replace the acoustic attenuation module, if you removed it in step 3 on page 19.



---

## Removing a BladeCenter Fibre Channel switch module

Statement 8:



**CAUTION:**

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



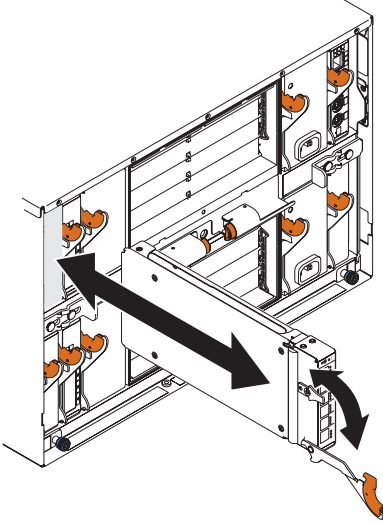
**Hazardous voltage, current, and energy levels are present inside any component that has this label attached. There are no serviceable parts inside these components. If you suspect a problem with one of these parts, contact a service technician.**

Complete the following steps to remove a Fibre Channel switch module:

1. Review the information in “Safety” on page v and “Installation guidelines” on page 14 through “Handling static-sensitive devices” on page 15.
2. If you are removing the Fibre Channel switch module from the rear of a BladeCenter T unit, connect an ESD wrist strap to the ESD connector at the rear of the BladeCenter T unit. (For the location of the ESD connector, see the second illustration on page 16.)
3. Remove the acoustic attenuation module option, if one is installed, from the rear of the BladeCenter unit. (For additional information, see the illustration in step 3 on page 19.)
4. Remove the LC-LC or LC-SC fiber-optic cables from the two external ports on the SFP module. Removing these cables will disrupt the network connection from the external Fibre Channel port to any connected external Fibre Channel devices. For removal instructions, see the documentation that comes with your cable options.
5. Remove any SFP modules from the Fibre Channel switch module external Fibre Channel ports. For SFP module removal instructions, see the documentation that comes with your SFP module.
6. Pull the release latch toward the bottom of the I/O module as shown in the following illustration. The module moves out of the bay approximately 0.64 cm (0.25 inch).

The following example shows a vertical orientation for removing a Fibre Channel switch module from the BladeCenter unit.

**Note:** For additional information about removing a Fibre Channel switch module from other types of BladeCenter unit, see the documentation that came with your BladeCenter unit type.



7. Slide the I/O module out of the bay and set it aside.
8. Place another I/O module or a filler module in the bay as soon as possible.

**Note:** If you placed another Fibre Channel switch module in the bay, make sure that it is active. (See steps 11 and 12 on page 20.)

9. If you placed another Fibre Channel switch module in the bay:
  - Insert any SFP modules that you removed in step 5 on page 21 into external Fibre Channel port 0 and Fibre Channel ports 15 through 19. See the documentation that comes with your SFP module for SFP module installation instructions.
  - If needed, use LC-LC or LC-SC fiber-optic cables to connect the Fibre Channel switch module external port to external Fibre Channel devices. For more information, see the documentation that comes with your cable options.
10. Replace the acoustic attenuation module option, if you removed it in step 3 on page 21.



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## Chapter 3. Information panel LEDs and external ports

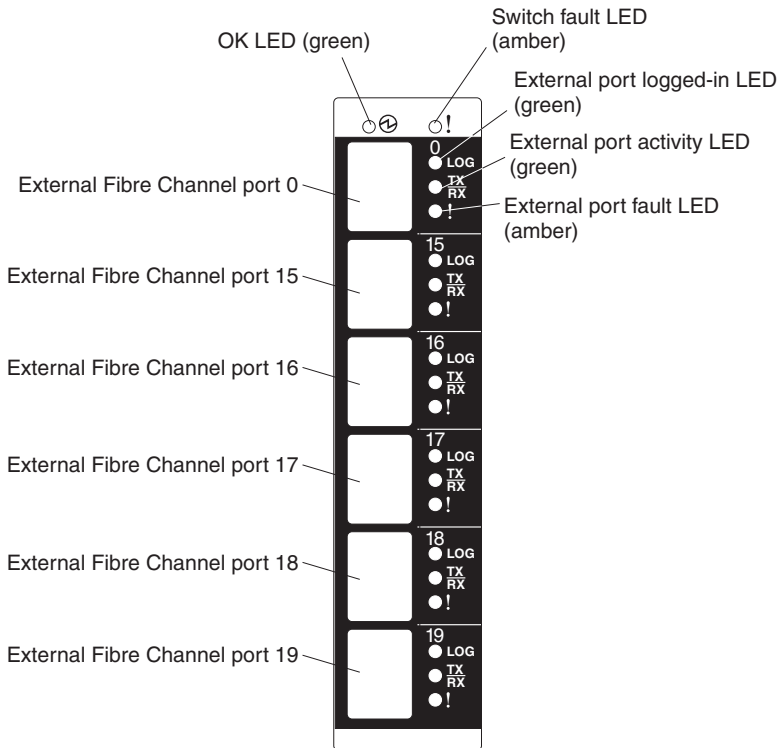
This chapter describes the information LEDs (also known as indicators) on the Fibre Channel switch module and identifies the Fibre Channel switch module external ports.

**Note:** The illustrations in this document might differ slightly from your hardware.

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### Information panel

The front panel of the Fibre Channel switch module contains LEDs and six Fibre Channel ports, as shown in the following illustration.



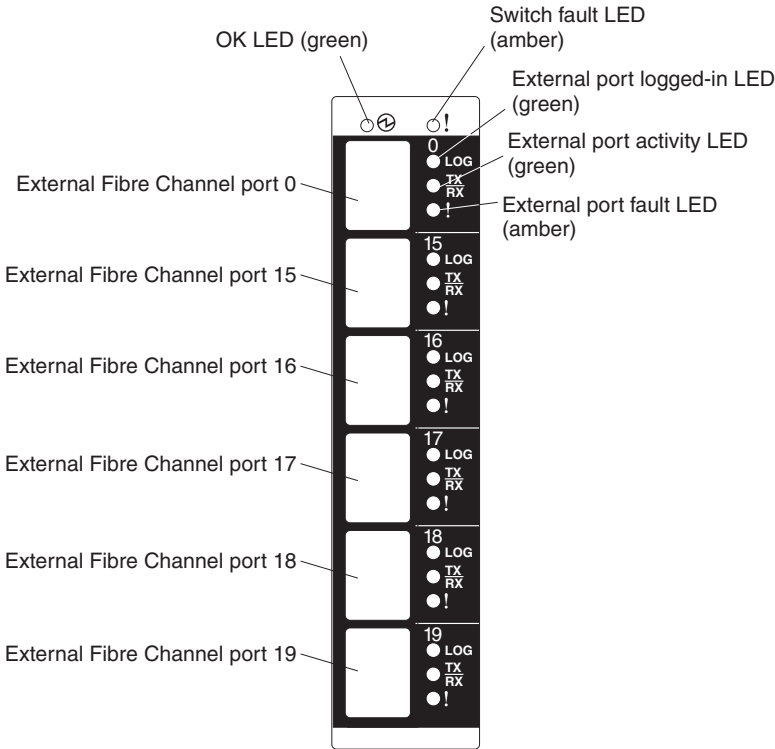
The Fibre Channel switch module contains:

- LEDs that display the status of the Fibre Channel switch module and its network connections. (See "Information LEDs" on page 26.)

- Six external Fibre Channel ports to connect Fibre Channel devices, end devices, and servers. These ports are identified as ports 0, 15, 16, 17, 18, and 19 in the I/O-module configuration menus and are labeled 0, 15, 16, 17, 18, and 19 (from top to bottom) on the Fibre Channel switch module.

## Information LEDs

The front panel of the Fibre Channel switch module has multiple sets of LEDs. The first row of LEDs at the top of the I/O module represent I/O module status and include OK and ! (Fibre Channel switch fault). The remaining sets of LEDs represent status for the external Fibre Channel ports. The port LEDs include port logged-in, port activity, and port fault. The following illustration shows the locations of these LEDs on the I/O module. A description of each LED and corresponding activity follows the illustration.



### Notes:

1. An amber LED is lit when an error or event has occurred. To identify the error or event, check the other LEDs on the I/O module.

2. An LED test occurs whenever the I/O module is turned on. All LEDs are lit and remain lit for approximately 10 seconds during POST and then return to a normal state.
3. For additional information about diagnostics, see the *QLogic Fibre Channel Switch Module for IBM @server BladeCenter Management Guide* on the Support CD.

### OK LED

This green LED is at the top of the I/O module on the front panel. When this LED is lit, it indicates that the I/O module has passed the POST and is operational.

### ! (Fibre Channel switch fault) LED

This amber LED is at the top of the I/O module on the front panel. This LED indicates that the I/O module has a fault. If the I/O module fails the POST, this fault LED is lit.

### Port logged-in LEDs

There are six green port logged-in LEDs. The port logged-in LED is the top LED directly to the right of the port. When one of these LEDs is lit, it indicates that there is a connection (or link) to a device on that port.

### Port activity LEDs

There are six green port activity LEDs. The port activity LED is the middle LED directly to the right of the port. When one of these LEDs flashes, it indicates that data is being received or transmitted (that is, activity is occurring) on that port. The flash frequency is proportional to the amount of traffic on that port.

### Port fault LEDs

There are six amber port fault LEDs. The port fault LED is the bottom LED directly to the right of the port. When a port fault LED is lit, it indicates that the external port has failed the internal, external, or online port diagnostics tests that are performed with the SANsurfer application or CLI.

Table 2. Fibre Channel switch module LED diagnostic flash patterns

LED	LED activity
OK	<ul style="list-style-type: none"> <li>• The LED is off during initialization and POST or when there is a system fault.</li> <li>• The LED is lit during LED test and when the I/O module is operational.</li> <li>• The LED flashes during POST.</li> </ul>

Table 2. Fibre Channel switch module LED diagnostic flash patterns (continued)

LED	LED activity
! (switch fault)	<ul style="list-style-type: none"> <li>• The LED is off during initialization or when the I/O module is in normal operation.</li> <li>• The LED is lit during LED test or to indicate a system fault during a POST failure, thermal fault, or other critical switch fault.</li> <li>• The LED does not flash.</li> </ul>
Port logged-in	<ul style="list-style-type: none"> <li>• The LED is off when the port is not logged in.</li> <li>• The LED is lit when the port is logged-in or during LED test.</li> <li>• The LED pattern indicates the following conditions:               <ul style="list-style-type: none"> <li>– Logged in - The LED is lit.</li> <li>– Logging in - The LED flashes at 1-second intervals.</li> <li>– Beacon location - The LED flashes at 1-second intervals.</li> <li>– Error - The LED flashes two times per second.</li> </ul> </li> </ul>
Port activity	<ul style="list-style-type: none"> <li>• The LED is off when the port is not logged in or when the port is logged in and there is no port activity.</li> <li>• The LED is lit during LED test.</li> <li>• The LED flashes when port activity performs a normal send or receive operation.</li> </ul>
Port fault	<ul style="list-style-type: none"> <li>• The LED is off when port diagnostics starts and is completed without error.</li> <li>• The LED is lit when port diagnostics discovers a port error.</li> <li>• The LED does not flash.</li> </ul>



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## Chapter 4. Configuring the switch module through the Telnet interface

The Fibre Channel switch module contains a Telnet server. This server enables a Telnet client to establish a Telnet session with the Fibre Channel switch module to retrieve information or to configure parameters using the command-line interface (CLI). You can perform a variety of fabric and I/O management tasks through an Ethernet connection using the CLI.

You can access the Telnet interface in two ways:

- In the BladeCenter management module Web interface
- In a command-line window on a network management workstation

For you to configure the switch module through the Telnet interface, the Internet protocol (IP) address and subnet masks must be compatible, and the following configuration settings in the management module must be enabled:

- External ports
- External management over all ports

For you to access a switch module from a network management workstation, make sure that it is connected to an external BladeCenter management-module Ethernet port.

To enable the configuration settings, in the management module Web interface, click **I/O Module Tasks** ⇒ **Management** ⇒ **Advanced Switch Management** ⇒ **Advanced Setup**.

**Note:** Be sure to configure your switch module with the correct date and time information. See steps 3 through 5 on page 33 for additional information about setting the date and time of the switch module.

**Important:** Before you configure the I/O module, be sure that the management modules in your BladeCenter unit are correctly configured. In addition, to access and manage the I/O module from an external environment, you might need to enable certain features, such as the external ports and external management over all ports. For more information, see the applicable *BladeCenter Installation and User's Guide* documents on the IBM Support Web site, <http://www.ibm.com/support/>. For more detailed information about configuring the I/O module, see the *QLogic Fibre Channel Switch Module for IBM @server BladeCenter Management Guide* on the Support CD.

In addition to reviewing the documentation that is described in "Related documentation" on page 3, be sure to review the IBM @server *BladeCenter*

*Planning and Installation Guide* or the IBM *@server BladeCenter T Planning and Installation Guide* at <http://www.ibm.com/support/> on the World Wide Web for information to help you prepare for system installation and configuration.

**Notes:**

- Throughout this document, the management-module Web-based user interface is also known as the BladeCenter management-module Web interface.
- Throughout this document, the user name is also known as the login name, user identifier, or user ID for logging onto one or more of the following interfaces or programs:
  - BladeCenter management-module Web interface
  - Telnet interface (this chapter)
  - SANbrowser interface (Chapter 5, “Configuring the switch module using the SANbrowser interface,” on page 35)
  - SANsurfer application (Chapter 6, “Configuring the switch module through the SANsurfer application,” on page 41)
- The sample screens that appear in this document might differ slightly from the screens that are displayed by your system. Screen content varies based on the type of BladeCenter unit that you are using and the options that are installed.

---

## Connecting to the Fibre Channel switch module

To use the Telnet program (in VT100 compatible terminal mode) to access and control the I/O module, you must know the IP address for the I/O module and have an existing network connection. If you need to obtain the IP address for the I/O module or establish a network connection, contact your system or network administrator. Be sure to use the correct IP address in the required command.

---

## Establishing a Telnet session through the management module

Complete the following steps to establish a Telnet session through the BladeCenter management module:

1. In your browser, in the address bar, type `http://xxx.xxx.xxx.xxx`, where `xxx.xxx.xxx.xxx` is the IP address of the BladeCenter management-module interface. Click **GO** or press Enter. The Enter Network Password window opens.

**Note:** The default IP address for the BladeCenter management module is 192.168.70.125.

- In the User Name field, type the initial default user ID, USERID. In the Password field, type the initial default password, PASSWORD (the sixth character is a zero, not the letter O). The user ID and password are case sensitive.

Click **OK**. The Active Session from Same Client window opens.



Figure 1. Active Session from Same Client window

- In the Inactive session timeout value field, select the timeout value for this Web session and click **Start New Session**. The BladeCenter management-module main window opens.
- In the left navigation pane under I/O Module Tasks, click **Management**. The I/O Module Management window opens.
- Click the link for either I/O-Module 3 or I/O-Module 4. The BladeCenter Management window opens.
- Make sure that the IP address is the same in the Current IP Configuration and New Static IP Configuration sections.
- Scroll down and click **Advanced Switch Management**. The Bladecenter Switch Management Window opens.
- To start a Telnet session, scroll down to the Start Telnet/Web Session section and click **Start Telnet Session**. The I/O module Telnet Login window opens.
- At the Login prompt, type the initial default user ID, USERID and press Enter. At the Password prompt, type the initial default password, PASSWORD (the sixth character is a zero, not the letter O). The user ID and password are case sensitive.
- Click **OK** to open the Command Line Interface Shell window.

To open online help, type `help` and press Enter.

Continue with “CLI command format” on page 34. For more information about using the CLI, see the *QLogic Fibre Channel Switch Module for IBM @server BladeCenter Management Guide* on the Support CD.

---

## Establishing a Telnet session in a command-line window

You can access the switch module by IP-enabled devices that are connected to the BladeCenter management module. An Ethernet connection to the management-module external ports on the BladeCenter unit is required. For more information, see the following documents on the IBM Support Web site, at <http://www.ibm.com/support/>:

- BladeCenter unit *Installation and User's Guide*
- *BladeCenter Management Module Installation Guide*
- *IBM BladeCenter Management Module User's Guide*

To establish a Telnet session through the command-line interface, complete the following steps:

**Note:** The IP addresses in the following step are the default IP address of the I/O modules; if new IP addresses have been assigned to the I/O modules, use these instead.

1. Open a command-line window on the network management workstation and type one of the following commands and press Enter.

For I/O-module bay 3:

```
telnet 192.168.70.129
```

For I/O-module bay 4:

```
telnet 192.168.70.130
```

A command prompt window opens.

2. At the Login prompt, type the initial default user ID, `USERID` and press Enter. At the Password prompt, type the initial default password, `PASSW0RD` (the sixth character is a zero, not the letter O) and press Enter. The user ID and password are case sensitive.

The Command Line Interface Shell window opens.

```

jta: 192.168.70.129
File Edit Terminal

*****
*
*          Command Line Interface SHell  (CLISH)
*
*****

SystemDescription  IBM eServer BladeCenter(TM) 6-port Enterprise Fibre C
hannel Switch Module
Eth0NetworkAddress 192.168.70.129 (use 'set setup system' to update)
MACAddress         00:c0:dd:02:1d:8f
WorldWideName     10:00:00:c0:dd:02:1d:90
ChassisSerialNumber 11S26K6479Z1N40L46Q003
SymbolicName      FCSM6
ActiveSWVersion   V4.1.0.18-0
ActiveTimestamp   Fri Jul 16 15:29:59 2004
DiagnosticsStatus Passed
UserAuthentication False

Alarms history ...
-----

[1][Sat Jul 10 03:16:24.290 2004][A1005.0002][cmon: unable to set gw addr]

FCSM6: USERID>
Connected to 192.168.70.129 telnet
online

```

3. You must change the date and time of the switch module. Before you can do this, you must obtain administrator privileges through the admin start command.

Type admin start and press Enter.

4. Set the date and time of the switch module through the date command.

The syntax for this command is date MMDDhhmmCCYY, where:

MM is the month

DD is the day

hh is the hour in 24-hour format

mm is the minute

CC represents the century identifier

YY represents the last two numbers of the year

For example, the format for June 28, 2004 8:46 P.M. is date 062820462004.

Type the applicable date command and press Enter.

5. Use the admin end command to exit the administrator operating mode and return to the standard operating mode.

Type admin end and press Enter.

For detailed information about using the admin start, date, and admin end commands, see the *QLogic Fibre Channel Switch Module for IBM @server BladeCenter Management Guide* on the Support CD.

---

## CLI command format

The information in this section gives an overview of the CLI command format.

For detailed information about using CLI commands, see the *QLogic Fibre Channel Switch Module for IBM @server BladeCenter Management Guide* on the Support CD.

A command is followed by one or more keywords. The following rules apply when typing keywords:

- Commands and keywords are lowercase and case sensitive.
- Required keyword values are shown in standard font: [value]. Optional values are shown in italics *[value]*.
- The underlined portion of each keyword indicates the abbreviated form that can be used. For example, the Delete keyword can be abbreviated as Del.

The CLI command syntax is as follows:

- keyword
- keyword *[value]*
- keyword *[value]* *[value 2]*

Items in square brackets ([ ]) can be changed by typing a new value. You can use the Backspace and Delete keys to erase characters behind and in front of the cursor.

---

## Chapter 5. Configuring the switch module using the SANbrowser interface

The switch module contains a Web server interface known as SANbrowser. This server enables a Web-based client to establish a Web-interface session with the Fibre Channel switch module to retrieve information or to configure parameters using a Web browser. You can perform a variety of fabric and switch-management tasks through an Ethernet connection using a Web browser.

You can access the management-module Web interface in two ways:

- In the BladeCenter management-module Web interface
- Through a Web browser on a network-management workstation

SANbrowser is a graphical interface that requires a Web browser to view and manage the switch. For information about system requirements and supported Web browsers, see “System requirements” on page 42.

For you to configure the switch module through the Web interface, the IP address and subnet masks must be compatible, and the following configuration settings in the management module must be enabled:

- External ports
- External management over all ports

For you to access a switch module from a network management workstation, make sure that it is connected to an external BladeCenter management-module Ethernet port.

To enable the configuration settings in the management-module Web interface, click **Switch Tasks** ⇒ **Management** ⇒ **Advanced Switch Management** ⇒ **Advanced Setup**.

**Important:** Before you configure the I/O module, be sure that the management modules in your BladeCenter unit are correctly configured. In addition, to access and manage the I/O module from an external environment, you might need to enable certain features, such as the external ports and external management over all ports. For more information, see the applicable *BladeCenter Installation and User's Guide* documents on the IBM Support Web site, <http://www.ibm.com/support/>. For more detailed information about configuring the I/O module, see the *QLogic Fibre Channel Switch Module for IBM @server BladeCenter Management Guide* on the Support CD.

## Notes:

- Throughout this document, the management-module Web-based user interface is also known as the BladeCenter management-module Web interface.
- Throughout this document, the user name is also known as the login name, user identifier, or user ID for logging onto one or more of the following interfaces or programs:
  - BladeCenter management-module Web interface
  - Telnet interface (Chapter 4, “Configuring the switch module through the Telnet interface,” on page 29)
  - SANbrowser interface (this chapter)
  - SANsurfer application (Chapter 6, “Configuring the switch module through the SANsurfer application,” on page 41)
- The sample screens that appear in this document might differ slightly from the screens that are displayed by your system. Screen content varies based on the type of BladeCenter unit that you are using and the options that are installed.

---

## Connecting to the switch module

For you to use the SANbrowser interface to access and control the switch module, you must know the IP address for the switch module and have an existing network connection. If you have to obtain the IP address for the switch module or establish a network connection, contact your system or network administrator.

---

## Establishing a Web-interface session through the management module

To establish a Web-interface session through the BladeCenter management module, complete the following steps:

1. In your browser, in the address field, type `http://xxx.xxx.xxx.xxx`, where `xxx.xxx.xxx.xxx` is the IP address of the BladeCenter management-module interface. Click **GO** or press Enter. The Enter Network Password window opens.

**Note:** The default IP address for the BladeCenter management module is 192.168.70.125.

2. In the User Name field, type the initial default user name, `USERID`. In the Password field, type the initial default password, `PASSWORD` (the sixth character is a zero). The user name and password are case sensitive. Click **OK**. The Active Session from Same Client window opens.



3. In the Inactive session timeout value field, select the timeout value for this Web session and click **Start New Session**. The BladeCenter management-module main window opens.
4. In the left navigation pane, under I/O Module Tasks, click **Management**. The I/O Module Management window opens.
5. Click the link for either switch module 3 or switch module 4. The I/O module management window opens.
6. Make sure that the IP address is the same in the Current IP Configuration and New Static IP Configuration sections.
7. Scroll down and click **Advanced Switch Management**. The BladeCenter Management window opens.
8. To start a Web-interface session, scroll down to the Start Telnet/Web Session section and click **Start Web Session**.  
The SANbrowser certificate check window opens.

**Note:** SANbrowser only supports single switch management per session.

9. Click **Yes** to accept the certificate.  
The Initial Start view of the SANbrowser interface window opens.
10. Select **Open existing fabric** and click **Proceed**. The SANbrowser Add a New Fabric window opens.
11. In the IP Address field, type the IP address of the switch to be accessed.
12. In the Login Name field, type the initial default user name, USERID. In the Password field, type the initial default password, PASSWORD (the sixth character is a zero, not the letter O). The login name and password are case sensitive.
13. Click the **Add Fabric** button.
14. If the switch module is not configured for a secure connection, click **OK**. The SANbrowser topology window opens.
15. In the Switch Pane, click the **Entry Handle** to view the available switches in the fabric.

- Click the switch labeled **FCSM xxx**. The SANbrowser Faceplate window opens.

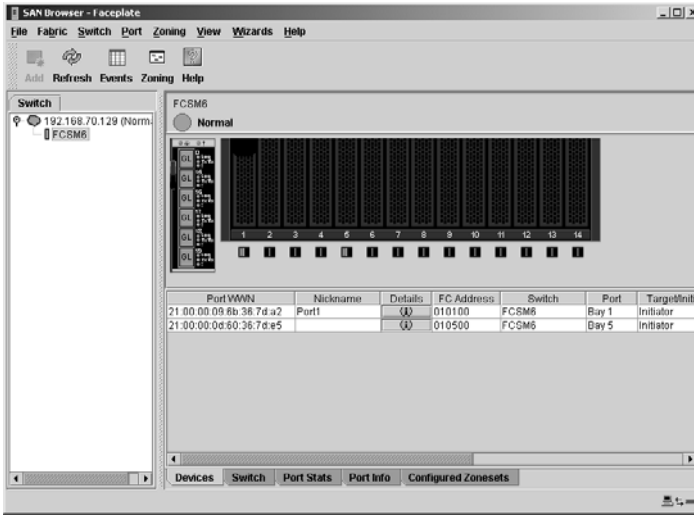


Figure 2. SANbrowser Faceplate window

For more information about using the SANbrowser interface, see the *QLogic Fibre Channel Switch Module for IBM @server BladeCenter Management Guide* on the Support CD.

## Establishing a Web-interface session through a Web browser

You can access the switch module by IP-enabled devices that are connected to the BladeCenter management module. An Ethernet connection to the management-module external ports on the BladeCenter unit is required. For more information, see the following documents on the IBM Support Web site, <http://www.ibm.com/support/>:

- BladeCenter unit *Installation and User's Guide*
- *BladeCenter Management Module Installation Guide*
- *IBM BladeCenter Management Module User's Guide*

Complete the following steps to establish a Web-interface session through a Web browser:

- Open a supported Web browser on the network-management workstation.
- Type one of the following Web addresses in the address field and press Enter. These Web addresses contain default IP addresses.

For I/O bay 3:

http://192.168.70.129

For I/O bay 4:

http://192.168.70.130

3. Click **Yes** to accept the certificate.

The Initial Start view of the SANbrowser interface window opens.

4. Select **Open existing fabric** and click **Proceed**.

The SANbrowser Add a New Fabric window opens.

5. In the IP Address field, type the IP address of the switch to be accessed.
6. In the Login Name field, type the initial default user name, USERID. In the Password field, type the initial default password, PASSWORD (the sixth character is a zero, not the letter O). The login name and password are case sensitive.
7. Click the **Add Fabric** button.
8. If the switch module is not configured for a secure connection, click **OK**. The SANbrowser topology window opens.
9. In the Switch Pane, click the **Entry Handle** to view the available switches in the fabric.
10. Click the switch labeled **FCSM xxx**. The SANbrowser Faceplate window opens, as shown in Figure 2 on page 38.

For more information about using the SANbrowser interface, see the *QLogic Fibre Channel Switch Module for IBM @server BladeCenter Management Guide* on the Support CD.



---

## Chapter 6. Configuring the switch module through the SANsurfer application

You can use the SANsurfer application to access and configure the I/O modules. The SANsurfer application can be installed on a network management workstation, which is either a BladeCenter blade server or an external network management workstation configured with one of the operating systems described in “System requirements” on page 42.

This chapter lists the system requirements and explains how to install the SANsurfer application. In addition, this chapter describes two basic windows that you will use to manage your fabrics and I/O modules: Topology and Faceplate.

**Important:** Before you configure the I/O module, be sure that the management modules in your BladeCenter unit are correctly configured. In addition, to access and manage the I/O module from an external environment, you might need to enable certain features, such as the external ports and external management over all ports. For more information, see the applicable *BladeCenter Installation and User's Guide* documents on the IBM Support Web site, <http://www.ibm.com/support/>. For more detailed information about configuring the I/O module, see the *QLogic Fibre Channel Switch Module for IBM @server BladeCenter Management Guide* on the Support CD.

In addition to reviewing the documentation that is described in “Related documentation” on page 3, be sure to review the IBM @server *BladeCenter Planning and Installation Guide* or the IBM @server *BladeCenter T Planning and Installation Guide* at <http://www.ibm.com/support/> on the World Wide Web for information to help you prepare for system installation and configuration.

### Notes:

- Throughout this document, the management-module Web-based user interface is also known as the BladeCenter management-module Web interface.
- Throughout this document, the user name is also known as the login name, user identifier, or user ID for logging onto one or more of the following interfaces or programs:
  - BladeCenter management-module Web interface
  - Telnet interface (Chapter 4, “Configuring the switch module through the Telnet interface,” on page 29)
  - SANbrowser interface (Chapter 5, “Configuring the switch module using the SANbrowser interface,” on page 35)
  - SANsurfer application (this chapter)

- The sample screens that appear in this document might differ slightly from the screens that are displayed by your system. Screen content varies based on the type of BladeCenter unit that you are using and the options that are installed.

---

## System requirements

Before you install the SANsurfer application, be sure that your network management workstation has the following hardware and software.

*Table 3. Network management workstation requirements*

Operating system	<ul style="list-style-type: none"> <li>• Microsoft® Windows® 2000</li> <li>• Microsoft Windows 2003</li> <li>• Red Hat Linux Advanced Server</li> <li>• Red Hat Linux</li> <li>• SUSE LINUX</li> </ul>
Memory	256 MB minimum
Disk space	150 MB for each installation
Processor	500 MHz or faster
Hardware	CD-ROM drive, 10/100/1000 Base-T Ethernet port
Internet browser	<ul style="list-style-type: none"> <li>• Microsoft Internet Explorer</li> <li>• Mozilla</li> <li>• Netscape Navigator</li> </ul>

**Note:** See the readme file that comes with the SANsurfer application for information about supported operating system versions.

Use the applicable procedure in the following sections to install the SANsurfer application on your network management workstation.

---

## Installing the SANsurfer application on a Microsoft Windows 2000 or Microsoft Windows 2003 platform

**Note:** See the readme file that comes with the SANsurfer application for information about supported operating system versions.

To install the SANsurfer application on a network management workstation that is configured with Microsoft Windows 2000 or Microsoft Windows 2003, complete the following steps:

1. If your network management workstation is a blade server, associate the CD-ROM drive with the blade server by pressing the CD/diskette/USB select button on the blade server. For the location of the CD/diskette/USB button, see the documentation that comes with the blade server. The LED on this component flashes while the request is being processed, then is steady when the ownership of the CD-ROM drive is transferred to the blade server.
2. If your network management workstation is a blade server, associate the keyboard port, mouse port, and video port with the blade server by pressing the keyboard/mouse/video select button. The LED on this component flashes while the request is processed, then is steady when the ownership of the keyboard, mouse and video is transferred to the blade server.

**Note:** To install graphically on a blade server without local video capability, the video component must be exported to a remote machine or device that supports video functionality.

3. Close all open programs. Insert the *Support* CD into the CD-ROM drive.
4. Open Windows Explorer and double-click the CD-ROM drive letter.
5. To install the SANsurfer application, use one of the following methods, where *x.xx.xx* is the SANsurfer application version number:
  - To install from the CD, go to the Windows directory on the CD and double-click **Windowsx.xx.xx.exe**. Follow the SANsurfer application installation instructions.
  - To copy and install from the hard disk drive, complete the following steps:
    - a. Specify a location and save the Windowsx.xx.xx.exe file.
    - b. Click **Save**.
    - c. Double-click **Windowsx.xx.xx.exe**.
    - d. Follow the SANsurfer application installation instructions.
6. When the installation is completed, use one of the following methods to start the SANsurfer application:
  - Double-click the **SANsurfer application** shortcut.

- Click **Start** ⇒ **Programs** ⇒ **QLogic Management Suite** ⇒ **SANsurfer**.

If the default fabric view file exists, the Load Default Fabric View File window opens, as shown in Figure 3. Otherwise, the SANsurfer Initial Start window opens.

7. From the SANsurfer Initial Start window, select **Open existing fabric** and click the **Proceed** button.
8. Continue with “Using the SANsurfer application” on page 47.

Figure 3 shows the Load Default Fabric View File window.



Figure 3. Load Default Fabric View File window

---

## Uninstalling the SANsurfer application on a Microsoft Windows 2000 or Microsoft Windows 2003 platform

**Note:** See the readme file that comes with the SANsurfer application for information about supported operating system versions.

The Uninstaller Data folder is copied into the installation folder during the initial SANsurfer installation process. The Uninstaller Data folder contains the Uninstall SANsurfer application program that is used to uninstall the SANsurfer application from a network management workstation running Microsoft Windows 2000 or Microsoft Windows 2003. In addition, a shortcut to the uninstall program is installed in the user’s home directory during the SANsurfer application installation process. The default installation directory is C:/Program files/SANsurfer.

To uninstall the SANsurfer application, complete the following steps:

1. Browse for the uninstallation program file or the shortcut that points to the uninstallation program.

Locate the uninstallation program shortcut in the same folder as the program shortcut or click **Start** ⇒ **Programs** ⇒ **QLogic Management Suite** ⇒ **SANsurfer Uninstaller**.

2. Double-click the uninstallation program or shortcut and follow the instructions to uninstall the SANsurfer application.



---

## Installing the SANsurfer application on Red Hat Linux or SUSE LINUX platform

**Note:** See the readme file that comes with the SANsurfer application for information about supported operating system versions.

To install the SANsurfer application on a network management workstation that is configured with Red Hat Linux® or SUSE LINUX, complete the following steps:

1. If your network management workstation is a blade server, associate the CD-ROM drive with the blade server by pressing the CD/diskette/USB select button on the blade server. For the location of the CD/diskette/USB button, see the documentation that comes with the blade server. The LED on this component flashes while the request is being processed, then is steady when the ownership of the CD-ROM drive is transferred to the blade server.
2. If your network management workstation is a blade server, associate the keyboard port, mouse port, and video port with the blade server by pressing the keyboard/mouse/video select button. The LED on this component flashes while the request is processed, then is steady when the ownership of the keyboard, mouse and video is transferred to the blade server.

**Note:** To install graphically on a blade server without local video capability, the video component must be exported to a remote machine or device that supports video functionality.

3. Close all open programs. Insert the *Support* CD into the CD-ROM drive.
4. Open an xterm or other terminal window.
5. Mount the CD. From a shell command-line prompt, type one of the following commands and press Enter:
  - For the Red Hat Linux operating system:

```
mount /mnt/cdrom
```
  - For the SUSE LINUX operating system:

```
mount/media/cdrom
```
6. To install the SANsurfer application, use one of the following methods, where *x.xx.xx* is the SANsurfer version number:
  - To install from the CD, go to the Linux directory and type:

```
sh Linux_x.xx.xx.bin
```

Follow the SANsurfer application installation instructions.

- To copy and install from your hard disk drive, complete the following steps:

- a. Type:

```
cp /Linux_x.xx.xx.bin /[directory]/
```

Where [directory] is the location of the files that you want to copy.

- b. Open a terminal window for the directory in which the Linux\_x.xx.xx.bin file was saved.

- c. Type:

```
sh Linux_x.xx.xx.bin
```

- d. Follow the SANsurfer installation instructions.

- 7. To start the SANsurfer application after the installation is completed, from a command prompt, type the following command and press Enter:

```
sh /opt/QLogic_Corporation/SANsurfer/  
SANsurfer
```

If the default fabric view file exists, the Load Default Fabric View File window opens. Otherwise, the SANsurfer Initial Start window opens.

- 8. From the SANsurfer Initial Start window, select **Open existing fabric** and click the **Proceed** button.
- 9. Continue with “Using the SANsurfer application” on page 47.

---

## Uninstalling the SANsurfer application from a Linux operating system

**Note:** See the readme file that comes with the SANsurfer application for information about supported operating system versions.

The Uninstaller Data folder is copied into the installation folder during the initial SANsurfer installation process. The Uninstaller Data folder contains the Uninstall SANsurfer program that is used to uninstall the SANsurfer application from a network management workstation running Red Hat Linux or SUSE LINUX. In addition, a shortcut to the uninstallation program is installed in the user’s home directory during the SANsurfer installation process. The default installation directory is /opt/QLogic\_Corporation/SANsurfer/.

To uninstall the SANsurfer application, complete the following steps:

- 1. At the command prompt, type the following command and press Enter:  
# cd /opt/QLogic\_Corporation/SANsurfer/uninstalldata/
- 2. At the command prompt, type the following command and press Enter:  
#sh SANsurferuninstaller

---

## Using the SANsurfer application

Use the following procedures to start the SANsurfer application and complete the following tasks:

- Start the SANsurfer application and add a new fabric
- Change the encryption key for the default fabric view
- Set user preferences
- Access online help
- Save the default fabric
- Exit the SANsurfer application

### Starting the SANsurfer application and adding a new fabric

When you have successfully installed the SANsurfer application and the default fabric view does not exist, the SANsurfer - Topology window (referred to as the Topology window) opens.

If the default fabric view file exists, the Load Default Fabric View File window opens. To start the SANsurfer application and add a new fabric, complete the following steps:

1. At the Default file encryption key prompt, type the password and click **Load View File**.

The SANsurfer application starts, and any previously saved set of fabrics is displayed. If no set of fabrics has been saved previously, click **Continue Without Loading** to open an empty fabric view.

The Topology window opens.

2. Click **Add**. The Add a New Fabric window opens.
3. In the Fabric name field, type a fabric name.
4. In the IP address field, type the IP address of the I/O module.
5. In the Login name field, type the initial default user ID, USERID. In the Password field, type the initial default password, PASSWØRD (the sixth character is a zero, not the letter O). The user ID and password are case sensitive.
6. Click **Add Fabric**.
7. If the switch module is not configured for a secure connection, click **OK**.

For information about managing fabrics, see the *QLogic Fibre Channel Switch Module for IBM @server BladeCenter Management Guide* on the Support CD.

## Changing the encryption key for the default fabric view

To change the encryption key for the default fabric view file, complete the following steps:

1. In the Topology window, click **File** ⇒ **Save Default Fabric View File**. The Save Default Fabric View File window opens.
2. In the Default fabric view file encryption key field, type the new password.
3. In the Re-enter encryption key to confirm field, type the same password again.
4. Click **OK** to save your changes.

**Note:** If you lose the encryption key for the account, contact IBM Support (see Appendix A, “Getting help and technical assistance,” on page 57).

## Setting user preferences

Use the Preferences window to perform the following tasks:

- Change the location of the working directory that you will use to save files.
- Change the location of the browser used to view the online help.
- Enable or disable the default view file auto save and load feature. See “Using the SANsurfer application” on page 47 for more information about the default fabric view file.
- Select the default port view when opening the SANsurfer application Faceplate window (referred to as the Faceplate window). See the *QLogic Fibre Channel Switch Module for IBM @server BladeCenter Management Guide* on the Support CD for more information about port views.
- Enable or disable the Event Browser. See the *QLogic Fibre Channel Switch Module for IBM @server BladeCenter Management Guide* on the Support CD for more information about the Event Browser.
- Enable or disable the initial startup dialog. See the *QLogic Fibre Channel Switch Module for IBM @server BladeCenter Management Guide* on the Support CD for more information about the initial startup dialog.

To set user preferences for your SANsurfer sessions from the Faceplate window, complete the following steps:

1. Click **File** ⇒ **Preferences**. The Preferences window opens.
2. Type or browse to the paths to the working directory and browser.
3. In the Application-wide Options area of the window, complete the following steps:
  - a. In the View file auto save and load field, select **Enabled** or **Disabled**.
  - b. In the Display initial startup dialog field, select **Enabled** or **Disabled**.
  - c. In the Display dialog when making non-secure connections field, select **Enabled** or **Disabled**.

- d. In the Event browser field, select **Enabled** or **Disabled**.
  - e. In the Preferred Initial Port View field, select the port view mode for the Faceplate window.
4. Click **OK** to save your changes.

## Using online help

Online help is available for the SANsurfer application. You can access online help through the following methods:

- From the SANsurfer window menu bar, click **Help** ⇒ **Help Topics**.
- From the SANsurfer window toolbar, click **Help**.

To view the SANsurfer software version and copyright information, click **Help** ⇒ **About**.

## Exiting the SANsurfer application

When you exit the SANsurfer application, the current fabric view is encrypted and saved to the default fabric view file (fc\_view.dft). An encryption key is required to encrypt and save the default fabric view file the first time you exit the SANsurfer application. When you exit subsequent sessions, the SANsurfer application closes and saves the default fabric view file automatically without requiring an encryption key.

In your next session, the SANsurfer application opens the default fabric view file automatically after you type the encryption key. To prevent the SANsurfer application from automatically saving the default fabric view file each time that you exit a session, select **Disabled** in the View file auto save and load field (it is set to **Enabled** by default). See “Setting user preferences” on page 48 for more information.

To exit a SANsurfer session, complete the following steps:

1. From the Faceplate window, click **File** ⇒ **Exit**. The Save Default Fabric View File window opens.
2. When you are prompted to type an encryption key with which to protect the default fabric view file, complete one of the following tasks:
  - To save the current set of fabrics in the default fabric view file (fc\_view.dft) in the working directory, type an encryption key and click **Save View File**.

**Note:** If the default fabric view file was saved with an encryption key, the next time that you open the SANsurfer application, you will be prompted for the encryption key in the Load Default Fabric View File window. The fabric window opens after you type the encryption key.

- Click **Cancel** to cancel the exit operation.

---

## **SANsurfer Topology and Faceplate windows**

The SANsurfer application provides two basic windows for you to manage the fabric and switch modules. The windows are called Topology and Faceplate. Both windows share the following common elements:

**Menu bar:** The menus and the items offered in them vary depending on which window is open. For example, the port menu and many of the switch menu selections are displayed only in the Faceplate window. Menu items have a gray background.

In addition to the menu bar, each window has context-sensitive menus that open when you right-click in the graphic window. See the information about opening the Faceplate window and pop-up window in the *QLogic Fibre Channel Switch Module for IBM @server BladeCenter Management Guide* on the *Support* CD.

**Toolbar:** The toolbar consists of a row of graphical buttons that you can use to access SANsurfer functions. The toolbar buttons are an alternative method to using the menu bar.

**Fabric tree:** The fabric tree, shown in the Switch pane, lists the managed fabrics and their associated switches. The pane width can be adjusted by clicking and dragging the moveable border. An entry handle to the left of an entry in the tree indicates that the entry can be expanded. Click this handle or double-click the entry to expand or contract a fabric tree entry. A fabric entry expands to show its member switches.

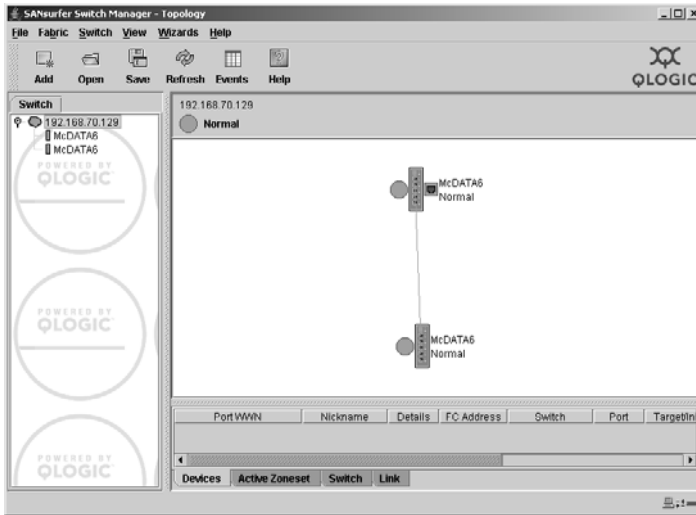
You can use the fabric tree to access any fabric or switch using the Topology or Faceplate window. You can click a fabric entry to open the Topology window from the fabric tree. You can click a switch entry to open the Faceplate window from the fabric tree.

**Graphic window:** The graphic window presents graphic information about fabrics and switches such as the fabric topology and the switch faceplate. You can adjust the window length by clicking and dragging the window border that it shares with the data window.

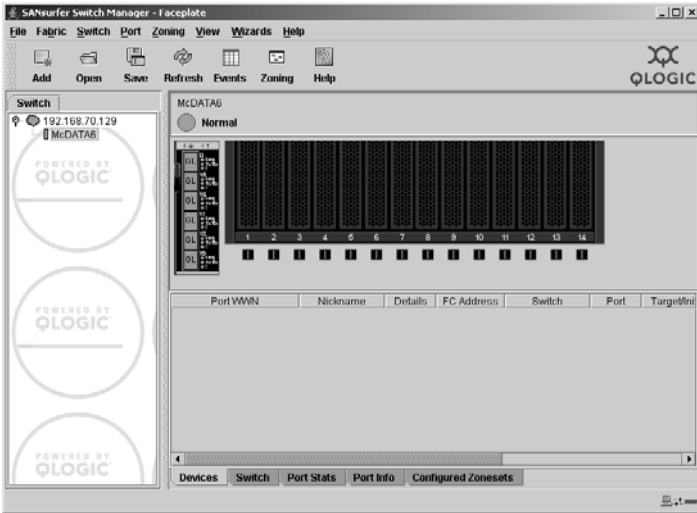
**Data window and tabs:** A table of data and statistics associated with the selected tab is displayed in the data window. Use the scroll bar to browse through the data. The window length can be adjusted by clicking and dragging the border that it shares with the graphic window. The data window tabs present options for the type of information that is displayed in the data window. These options vary depending on the tab that you select.

**Working status indicator:** The working status indicator is in the lower-right corner of the SANsurfer application window. The indicator is displayed when the network management workstation is exchanging information with the fabric. As conditions change, the fabric forwards this information to the network management workstation where it is displayed in the various windows.

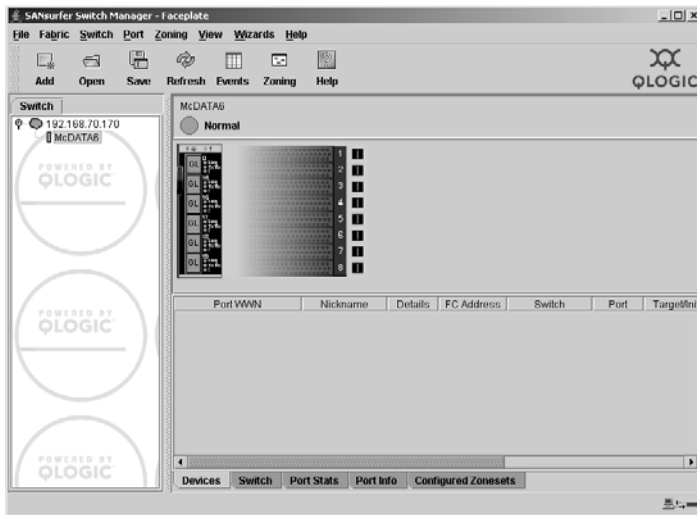
I/O modules that are enabled, and the connections between I/O modules, are displayed in the Topology window, as shown in the following illustration.



A single switch and its active ports are displayed in the Faceplate window. The Faceplate window for I/O modules installed in a BladeCenter unit is shown in the following figure.



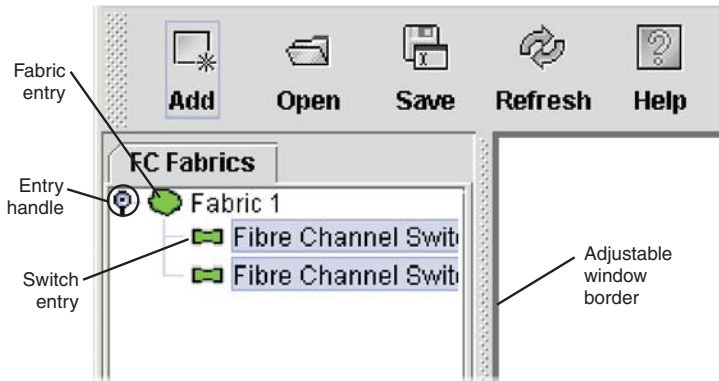
The Faceplate window for I/O modules installed in a BladeCenter T unit is shown in the following figure.



The fabric tree, in the Switch pane, lists the managed fabrics and their switches. You can adjust the window by clicking and dragging the moveable window border. An entry handle at the left of the entry in the tree indicates that the entry can be expanded. When you click the handle or double-click the



entry, the entry expands to show its member switches. These fabric tree elements are shown in the following illustration.



Each fabric tree entry has a small icon next to it that uses color to indicate the following operational status:

- A green switch entry icon indicates that the I/O module is in normal operation.
- A red switch entry icon indicates that the I/O module has a potential communications failure.
- A blue switch entry icon indicates that the I/O module status is unknown, unreachable, or unmanageable.
- An amber icon indicates that an I/O module is operational with errors.

The fabric tree provides access to the Topology and Faceplate windows for any fabric or switch.

- To open the Topology window from the fabric tree, click a fabric entry.
- To open the Faceplate window from the fabric tree, click a switch entry.

For information about using the Faceplate and Topology windows, see the *QLogic Fibre Channel Switch Module for IBM @server BladeCenter Management Guide* on the *Support CD*.



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## Chapter 7. Expanding the functionality of the switch module

You can expand the functionality of the switch module with the following optional software features.

Table 4. *Optional software features*

License function	Description
McDATA Mode Activation	Enables the QLogic switch module to be upgraded to support McDATA Mode Fabric Interoperability.
McDATA SANtegrity Enhanced Activation for IBM @server BladeCenter	<b>Note:</b> McDATA mode must be activated to use with McDATA SANtegrity Enhanced Activation for IBM @server BladeCenter. Includes the following functions: <ul style="list-style-type: none"><li>• McDATA SANtegrity Binding The binding function helps to prevent problems that might arise due to inadvertently generating an incorrect configuration.</li><li>• McDATA SANtegrity Authentication The authentication function helps to provide protection from WWN spoofing or malicious users.</li></ul>
10-port Activation key	Upgrades the switch module from 7 internal ports and 3 external ports to 14 internal ports and 6 external ports. This option is only available for the 10-port switch module.

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### Purchasing the optional software feature

To activate and use these optional software features, you must purchase the corresponding software licenses. For information about these features and their availability, see the documentation at <http://www.ibm.com/support/>.

To purchase and obtain a software license for an optional feature, go to <http://www.ibm.com/bladecenter/>; then click on Switch modules or call IBM. In the U.S. and Canada, call 1-800-IBM-SERV (1-800-426-7378). For all other countries, go to <http://www.ibm.com/planetwide/> for support telephone numbers. After you purchase the feature, see the instructions that came with it.

Before you can expand the functionality of the switch module and install a new software license, you must determine the product serial number of the

switch module. Use the Telnet program to log in to the switch module as described in Chapter 5, “Configuring the switch module using the SANbrowser interface,” on page 35, and run the `show version` command to determine the value of the Chassis Serial Number data field. Record the serial number for future reference; for example, 11S32R1793ZJ1ZC846H073. For information about the `show version` command, see the *QLogic Fibre Channel Switch Module for IBM @server BladeCenter Management Guide* at <http://www.ibm.com/support/> or on the *Support CD*.

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## Installing the optional software feature

To install an optional software feature on the switch, you must add the corresponding software license to the list of software features for the switch. Use the Telnet program to log in to the switch module as described in Chapter 5, “Configuring the switch module using the SANbrowser interface,” on page 35, and run the `feature add key` command, where *key* is the license key for the new feature. For information about this command, see the *QLogic Fibre Channel Switch Module for IBM @server BladeCenter Management Guide* at <http://www.ibm.com/support/> or on the *Support CD*.

To make sure that the software license has been successfully added to the switch key, run the `feature log` command. For information about this command, see the *QLogic Fibre Channel Switch Module for IBM @server BladeCenter Management Guide* at <http://www.ibm.com/support/> or on the *Support CD*.

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## Appendix A. Getting help and technical assistance

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

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### Before you call

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

- Check all cables to make sure that they are connected.
- Check the power switches to make sure that the system and any optional devices are turned on.
- Use the troubleshooting information in your system documentation, and use the diagnostic tools that come with your system. Information about diagnostic tools is in the *Hardware Maintenance Manual and Troubleshooting Guide* or *Problem Determination and Service Guide* on the IBM Documentation CD that comes with your system.

**Note:** For some IntelliStation models, the *Hardware Maintenance Manual and Troubleshooting Guide* is available only from the IBM support Web site.

- Go to the IBM support Web site at <http://www.ibm.com/support/> 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 @server and IntelliStation systems also describes the diagnostic tests that you can perform. Most @server and IntelliStation 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.

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## Using the documentation

Information about your IBM @server or IntelliStation 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/support/> and follow the instructions. Also, some documents are available through the IBM Publications Ordering System at <http://www.elink.ibm.com/public/applications/publications/cgi-bin/pbi.cgi>.

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## 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 @server and IntelliStation systems, optional devices, services, and support. The address for IBM xSeries<sup>®</sup> and BladeCenter information is <http://www.ibm.com/eserver/xseries/>. The address for IBM IntelliStation information is <http://www.ibm.com/intellistation/>.

You can find service information for IBM systems and optional devices at <http://www.ibm.com/support/>.

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## Software service and support

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

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## Hardware service and support

You can receive hardware service through IBM Services or through your IBM reseller, if your reseller is authorized by IBM to provide warranty service. See <http://www.ibm.com/planetwide/> for support telephone numbers, or 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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## Appendix B. Warranty information

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### IBM Statement of Limited Warranty Z125-4753-08 04/2004

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#### Part 1 - General Terms

##### Part 1 - General Terms

*This Statement of Limited Warranty includes Part 1 - General Terms, Part 2 - Country-unique Terms, and Part 3 - Warranty Information. The terms of Part 2 replace or modify those of Part 1. The warranties provided by IBM in this Statement of Limited Warranty apply only to Machines you purchase for your use, and not for resale. The term "Machine" means an IBM machine, its features, conversions, upgrades, elements, or accessories, or any combination of them. The term "Machine" does not include any software programs, whether pre-loaded with the Machine, installed subsequently or otherwise. **Nothing in this Statement of Limited Warranty affects any statutory rights of consumers that cannot be waived or limited by contract.***

##### What this Warranty Covers

IBM warrants that each Machine 1) is free from defects in materials and workmanship and 2) conforms to IBM's Official Published Specifications ("Specifications") which are available on request. The warranty period for the Machine starts on the original Date of Installation and is specified in Part 3 - Warranty Information. The date on your invoice or sales receipt is the Date of Installation unless IBM or your reseller informs you otherwise. Many features, conversions, or upgrades involve the removal of parts and their return to IBM. A part that replaces a removed part will assume the warranty service status of the removed part. Unless IBM specifies otherwise, these warranties apply only in the country or region in which you purchased the Machine.

**THESE WARRANTIES ARE YOUR EXCLUSIVE WARRANTIES AND REPLACE ALL OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OR CONDITIONS OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. SOME STATES OR JURISDICTIONS DO NOT ALLOW THE EXCLUSION OF EXPRESS OR IMPLIED WARRANTIES, SO THE ABOVE EXCLUSION MAY NOT APPLY TO YOU. IN THAT EVENT, SUCH WARRANTIES ARE LIMITED IN DURATION TO THE WARRANTY PERIOD. NO WARRANTIES APPLY AFTER THAT PERIOD. SOME STATES OR JURISDICTIONS DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU.**

### **What this Warranty Does not Cover**

This warranty does not cover the following:

- any software programs, whether pre-loaded or shipped with the Machine, or installed subsequently;
- failure resulting from misuse (including but not limited to use of any Machine capacity or capability, other than that authorized by IBM in writing), accident, modification, unsuitable physical or operating environment, or improper maintenance by you;
- failure caused by a product for which IBM is not responsible; and
- any non-IBM products, including those that IBM may procure and provide with or integrate into an IBM Machine at your request.

The warranty is voided by removal or alteration of identification labels on the Machine or its parts.

IBM does not warrant uninterrupted or error-free operation of a Machine.

Any technical or other support provided for a Machine under warranty, such as assistance with “how-to” questions and those regarding Machine set-up and installation, is provided **WITHOUT WARRANTIES OF ANY KIND.**

### **How to Obtain Warranty Service**

If the Machine does not function as warranted during the warranty period, contact IBM or your reseller to obtain warranty service. If you do not register the Machine with IBM, you may be required to present proof of purchase as evidence of your entitlement to warranty service.

## **What IBM Will Do to Correct Problems**

When you contact IBM for service, you must follow the problem determination and resolution procedures that IBM specifies. An initial diagnosis of your problem can be made either by a technician over the telephone or electronically by access to an IBM website.

The type of warranty service applicable to your Machine is specified in Part 3 - Warranty Information.

You are responsible for downloading and installing designated Machine Code (microcode, basic input/output system code (called "BIOS"), utility programs, device drivers, and diagnostics delivered with an IBM Machine) and other software updates from an IBM Internet Web site or from other electronic media, and following the instructions that IBM provides.

If your problem can be resolved with a Customer Replaceable Unit ("CRU") (e.g., keyboard, mouse, speaker, memory, hard disk drive), IBM will ship the CRU to you for you to install.

If the Machine does not function as warranted during the warranty period and your problem cannot be resolved over the telephone or electronically, through your application of Machine Code or software updates, or with a CRU, IBM or your reseller, if approved by IBM to provide warranty service, will either, at its discretion, 1) repair it to make it function as warranted, or 2) replace it with one that is at least functionally equivalent. If IBM is unable to do either, you may return the Machine to your place of purchase and your money will be refunded.

IBM or your reseller will also manage and install selected engineering changes that apply to the Machine.

## **Exchange of a Machine or Part**

When the warranty service involves the exchange of a Machine or part, the item IBM or your reseller replaces becomes its property and the replacement becomes yours. You represent that all removed items are genuine and unaltered. The replacement may not be new, but will be in good working order and at least functionally equivalent to the item replaced. The replacement assumes the warranty service status of the replaced item.

## Your Additional Responsibilities

Before IBM or your reseller exchanges a Machine or part, you agree to remove all features, parts, options, alterations, and attachments not under warranty service.

You also agree to:

1. ensure that the Machine is free of any legal obligations or restrictions that prevent its exchange;
2. obtain authorization from the owner to have IBM or your reseller service a Machine that you do not own; and
3. where applicable, before service is provided:
  - a. follow the service request procedures that IBM or your reseller provides;
  - b. backup or secure all programs, data, and funds contained in the Machine;
  - c. provide IBM or your reseller with sufficient, free, and safe access to your facilities to permit IBM to fulfill its obligations; and
  - d. inform IBM or your reseller of changes in the Machine's location.
4. (a) ensure all information about identified or identifiable individuals (Personal Data) is deleted from the Machine (to the extent technically possible), (b) allow IBM, your reseller or an IBM supplier to process on your behalf any remaining Personal Data as IBM or your reseller considers necessary to fulfill its obligations under this Statement of Limited Warranty (which may include shipping the Machine for such processing to other IBM service locations around the world), and (c) ensure that such processing complies with any laws applicable to such Personal Data.

## Limitation of Liability

IBM is responsible for loss of, or damage to, your Machine only while it is 1) in IBM's possession or 2) in transit in those cases where IBM is responsible for the transportation charges.

Neither IBM nor your reseller are responsible for any of your confidential, proprietary or personal information contained in a Machine which you return to IBM for any reason. You should remove all such information from the Machine prior to its return.

Circumstances may arise where, because of a default on IBM's part or other liability, you are entitled to recover damages from IBM. In each such instance, regardless of the basis on which you are entitled to claim damages from IBM (including fundamental breach, negligence, misrepresentation, or other contract or tort claim), except for any liability that cannot be waived or limited by applicable laws, IBM is liable for no more than

1. damages for bodily injury (including death) and damage to real property and tangible personal property; and
2. the amount of any other actual direct damages, up to the charges (if recurring, 12 months' charges apply) for the Machine that is subject of the claim. For purposes of this item, the term "Machine" includes Machine Code and Licensed Internal Code ("LIC").

This limit also applies to IBM's suppliers and your reseller. It is the maximum for which IBM, its suppliers, and your reseller are collectively responsible.

**UNDER NO CIRCUMSTANCES IS IBM, ITS SUPPLIERS OR RESELLERS LIABLE FOR ANY OF THE FOLLOWING EVEN IF INFORMED OF THEIR POSSIBILITY: 1) THIRD PARTY CLAIMS AGAINST YOU FOR DAMAGES (OTHER THAN THOSE UNDER THE FIRST ITEM LISTED ABOVE); 2) LOSS OF, OR DAMAGE TO, DATA; 3) SPECIAL, INCIDENTAL, OR INDIRECT DAMAGES OR FOR ANY ECONOMIC CONSEQUENTIAL DAMAGES; OR 4) LOST PROFITS, BUSINESS REVENUE, GOODWILL OR ANTICIPATED SAVINGS. SOME STATES OR JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU. SOME STATES OR JURISDICTIONS DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU.**

### **Governing Law**

Both you and IBM consent to the application of the laws of the country in which you acquired the Machine to govern, interpret, and enforce all of your and IBM's rights, duties, and obligations arising from, or relating in any manner to, the subject matter of this Statement of Limited Warranty, without regard to conflict of law principles.

**THESE WARRANTIES GIVE YOU SPECIFIC LEGAL RIGHTS AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE OR JURISDICTION TO JURISDICTION.**

### **Jurisdiction**

All of our rights, duties, and obligations are subject to the courts of the country in which you acquired the Machine.

## Part 2 - Country-unique Terms

### AMERICAS

#### ARGENTINA

**Jurisdiction:** *The following is added after the first sentence:*

Any litigation arising from this Statement of Limited Warranty will be settled exclusively by the Ordinary Commercial Court of the city of Buenos Aires.

#### BOLIVIA

**Jurisdiction:** *The following is added after the first sentence:*

Any litigation arising from this Statement of Limited Warranty will be settled exclusively by the courts of the city of La Paz.

#### BRAZIL

**Jurisdiction:** *The following is added after the first sentence:*

Any litigation arising from this Statement of Limited Warranty will be settled exclusively by the court of Rio de Janeiro, RJ.

#### CHILE

**Jurisdiction:** *The following is added after the first sentence:*

Any litigation arising from this Statement of Limited Warranty will be settled exclusively by the Civil Courts of Justice of Santiago.

#### COLOMBIA

**Jurisdiction:** *The following is added after the first sentence:*

Any litigation arising from this Statement of Limited Warranty will be settled exclusively by the Judges of the Republic of Colombia.

#### EQUADOR

**Jurisdiction:** *The following is added after the first sentence:*

Any litigation arising from this Statement of Limited Warranty will be settled exclusively by the Judges of Quito.

## MEXICO

**Jurisdiction:** *The following is added after the first sentence:*

Any litigation arising from this Statement of Limited Warranty will be settled exclusively by the Federal Courts of Mexico City, Federal District.

## PARAGUAY

**Jurisdiction:** *The following is added after the first sentence:*

Any litigation arising from this Statement of Limited Warranty will be settled exclusively by the courts of the city of Asuncion.

## PERU

**Limitation of Liability:** *The following is added at the end of this section:*

In accordance with Article 1328 of the Peruvian Civil Code the limitations and exclusions specified in this section will not apply to damages caused by IBM's willful misconduct ("dolo") or gross negligence ("culpa inexcusable").

## URUGUAY

**Jurisdiction:** *The following is added after the first sentence:*

Any litigation arising from this Statement of Limited Warranty will be settled exclusively by the City of Montevideo Court's Jurisdiction.

## VENEZUELA

**Jurisdiction:** *The following is added after the first sentence:*

Any litigation arising from this Statement of Limited Warranty will be settled exclusively by the Courts of the Metropolitan Area Of the City of Caracas.

## NORTH AMERICA

**How to Obtain Warranty Service:** *The following is added to this Section:*

To obtain warranty service from IBM in Canada or the United States, call 1-800-IBM-SERV (426-7378).

## CANADA

**Limitation of Liability:** *The following replaces item 1 of this section:*

1. damages for bodily injury (including death) or physical harm to real property and tangible personal property caused by IBM's negligence; and

**Governing Law:** *The following replaces "laws of the country in which you acquired the Machine" in the first sentence:*

laws in the Province of Ontario.

## UNITED STATES

**Governing Law:** *The following replaces "laws of the country in which you acquired the Machine" in the first sentence:*

laws of the State of New York.

## ASIA PACIFIC

### AUSTRALIA

**What this Warranty Covers:** *The following paragraph is added to this section:*

The warranties specified in this Section are in addition to any rights you may have under the Trade Practices Act 1974 or other similar legislation and are only limited to the extent permitted by the applicable legislation.

**Limitation of Liability:** *The following is added to this section:*

Where IBM is in breach of a condition or warranty implied by the Trade Practices Act 1974 or other similar legislation, IBM's liability is limited to the repair or replacement of the goods or the supply of equivalent goods. Where that condition or warranty relates to right to sell, quiet possession or clear title, or the goods are of a kind ordinarily acquired for personal, domestic or household use or consumption, then none of the limitations in this paragraph apply.

**Governing Law:** *The following replaces "laws of the country in which you acquired the Machine" in the first sentence:*

laws of the State or Territory.

### CAMBODIA AND LAOS

**Governing Law:** *The following replaces "laws of the country in which you acquired the Machine" in the first sentence:*

laws of the State of New York, United States of America.



## CAMBODIA, INDONESIA, AND LAOS

**Arbitration:** *The following is added under this heading:*

Disputes arising out of or in connection with this Statement of Limited Warranty shall be finally settled by arbitration which shall be held in Singapore in accordance with the Arbitration Rules of Singapore International Arbitration Center (“SIAC Rules”) then in effect. The arbitration award shall be final and binding for the parties without appeal and shall be in writing and set forth the findings of fact and the conclusions of law.

The number of arbitrators shall be three, with each side to the dispute being entitled to appoint one arbitrator. The two arbitrators appointed by the parties shall appoint a third arbitrator who shall act as chairman of the proceedings. Vacancies in the post of chairman shall be filled by the president of the SIAC. Other vacancies shall be filled by the respective nominating party. Proceedings shall continue from the stage they were at when the vacancy occurred.

If one of the parties refuses or otherwise fails to appoint an arbitrator within 30 days of the date the other party appoints its, the first appointed arbitrator shall be the sole arbitrator, provided that the arbitrator was validly and properly appointed.

All proceedings shall be conducted, including all documents presented in such proceedings, in the English language. The English language version of this Statement of Limited Warranty prevails over any other language version.

## HONG KONG S.A.R. OF CHINA AND MACAU S.A.R. OF CHINA

**Governing Law:** *The following replaces “laws of the country in which you acquired the Machine” in the first sentence:*

laws of Hong Kong Special Administrative Region of China.

## INDIA

**Limitation of Liability:** *The following replaces items 1 and 2 of this section:*

1. liability for bodily injury (including death) or damage to real property and tangible personal property will be limited to that caused by IBM’s negligence; and
2. as to any other actual damage arising in any situation involving nonperformance by IBM pursuant to, or in any way related to the subject of this Statement of Limited Warranty, the charge paid by you for the individual Machine that is the subject of the claim. For purposes of this item, the term “Machine” includes Machine Code and Licensed Internal Code (“LIC”).

**Arbitration:** *The following is added under this heading:*

Disputes arising out of or in connection with this Statement of Limited Warranty shall be finally settled by arbitration which shall be held in Bangalore, India in accordance with the laws of India then in effect. The arbitration award shall be final and binding for the parties without appeal and shall be in writing and set forth the findings of fact and the conclusions of law.

The number of arbitrators shall be three, with each side to the dispute being entitled to appoint one arbitrator. The two arbitrators appointed by the parties shall appoint a third arbitrator who shall act as chairman of the proceedings. Vacancies in the post of chairman shall be filled by the president of the Bar Council of India. Other vacancies shall be filled by the respective nominating party. Proceedings shall continue from the stage they were at when the vacancy occurred.

If one of the parties refuses or otherwise fails to appoint an arbitrator within 30 days of the date the other party appoints its, the first appointed arbitrator shall be the sole arbitrator, provided that the arbitrator was validly and properly appointed.

All proceedings shall be conducted, including all documents presented in such proceedings, in the English language. The English language version of this Statement of Limited Warranty prevails over any other language version.

## JAPAN

**Governing Law:** *The following sentence is added to this section:*

Any doubts concerning this Statement of Limited Warranty will be initially resolved between us in good faith and in accordance with the principle of mutual trust.

## MALAYSIA

**Limitation of Liability:** *The word "SPECIAL" in item 3 of the fifth paragraph is deleted.*

## NEW ZEALAND

**What this Warranty Covers:** *The following paragraph is added to this section:*

The warranties specified in this section are in addition to any rights you may have under the Consumer Guarantees Act 1993 or other legislation which cannot be excluded or limited. The Consumer Guarantees Act 1993 will not apply in respect of any goods which IBM provides, if you require the goods for the purposes of a business as defined in that Act.

**Limitation of Liability:** *The following is added to this section:*

Where Machines are not acquired for the purposes of a business as defined in the Consumer Guarantees Act 1993, the limitations in this section are subject to the limitations in that Act.

## PEOPLE'S REPUBLIC OF CHINA (PRC)

**Governing Law:** *The following replaces "laws of the country in which you acquired the Machine" in the first sentence:*

laws of the State of New York, United States of America (except when local law requires otherwise).

## PHILIPPINES

**Limitation of Liability:** *Item 3 in the fifth paragraph is replaced by the following:*

**SPECIAL (INCLUDING NOMINAL AND EXEMPLARY DAMAGES), MORAL, INCIDENTAL, OR INDIRECT DAMAGES FOR ANY ECONOMIC CONSEQUENTIAL DAMAGES; OR**

**Arbitration:** *The following is added under this heading:*

Disputes arising out of or in connection with this Statement of Limited Warranty shall be finally settled by arbitration which shall be held in Metro Manila, Philippines in accordance with the laws of the Philippines then in effect. The arbitration award shall be final and binding for the parties without appeal and shall be in writing and set forth the findings of fact and the conclusions of law.

The number of arbitrators shall be three, with each side to the dispute being entitled to appoint one arbitrator. The two arbitrators appointed by the parties shall appoint a third arbitrator who shall act as chairman of the proceedings. Vacancies in the post of chairman shall be filled by the president of the Philippine Dispute Resolution Center, Inc. Other vacancies shall be filled by the respective nominating party. Proceedings shall continue from the stage they were at when the vacancy occurred.

If one of the parties refuses or otherwise fails to appoint an arbitrator within 30 days of the date the other party appoints its, the first appointed arbitrator shall be the sole arbitrator, provided that the arbitrator was validly and properly appointed.

All proceedings shall be conducted, including all documents presented in such proceedings, in the English language. The English language version of this Statement of Limited Warranty prevails over any other language version.

## SINGAPORE

**Limitation of Liability:** *The words “SPECIAL” and “ECONOMIC” in item 3 in the fifth paragraph are deleted.*

## EUROPE, MIDDLE EAST, AFRICA (EMEA)

### **THE FOLLOWING TERMS APPLY TO ALL EMEA COUNTRIES:**

The terms of this Statement of Limited Warranty apply to Machines purchased from IBM or an IBM reseller.

### **How to Obtain Warranty Service:**

*Add the following paragraph in **Western Europe** (Andorra, Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Monaco, Netherlands, Norway, Poland, Portugal, San Marino, Slovakia, Slovenia, Spain, Sweden, Switzerland, United Kingdom, Vatican State, and any country subsequently added to the European Union, as from the date of accession):*

The warranty for Machines acquired in Western Europe shall be valid and applicable in all Western Europe countries provided the Machines have been announced and made available in such countries.

If you purchase a Machine in one of the Western European countries, as defined above, you may obtain warranty service for that Machine in any of those countries from either (1) an IBM reseller approved to perform warranty service or (2) from IBM, provided the Machine has been announced and made available by IBM in the country in which you wish to obtain service.

If you purchased a Personal Computer Machine in Albania, Armenia, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Georgia, Hungary, Kazakhstan, Kyrgyzstan, Federal Republic of Yugoslavia, Former Yugoslav Republic of Macedonia (FYROM), Moldova, Poland, Romania, Russia, Slovak Republic, Slovenia, or Ukraine, you may obtain warranty service for that Machine in any of those countries from either (1) an IBM reseller approved to perform warranty service or (2) from IBM.

If you purchase a Machine in a Middle Eastern or African country, you may obtain warranty service for that Machine from the IBM entity within the country of purchase, if that IBM entity provides warranty service in that country, or from an IBM reseller, approved by IBM to perform warranty service on that Machine in that country. Warranty service in Africa is available within 50 kilometers of an IBM approved service provider. You are responsible for transportation costs for Machines located outside 50 kilometers of an IBM approved service provider.

## Governing Law:

*The phrase “the laws of the country in which you acquired the Machine” is replaced by:*

- 1) “the laws of Austria” in **Albania, Armenia, Azerbaijan, Belarus, Bosnia-Herzegovina, Bulgaria, Croatia, Georgia, Hungary, Kazakhstan, Kyrgyzstan, FYR Macedonia, Moldova, Poland, Romania, Russia, Slovakia, Slovenia, Tajikistan, Turkmenistan, Ukraine, Uzbekistan, and FR Yugoslavia;**
- 2) “the laws of France” in **Algeria, Benin, Burkina Faso, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo Republic, Djibouti, Democratic Republic of Congo, Equatorial Guinea, French Guiana, French Polynesia, Gabon, Gambia, Guinea, Guinea-Bissau, Ivory Coast, Lebanon, Madagascar, Mali, Mauritania, Mauritius, Mayotte, Morocco, New Caledonia, Niger, Reunion, Senegal, Seychelles, Togo, Tunisia, Vanuatu, and Wallis & Futuna;**
- 3) “the laws of Finland” in **Estonia, Latvia, and Lithuania;**
- 4) “the laws of England” in **Angola, Bahrain, Botswana, Burundi, Egypt, Eritrea, Ethiopia, Ghana, Jordan, Kenya, Kuwait, Liberia, Malawi, Malta, Mozambique, Nigeria, Oman, Pakistan, Qatar, Rwanda, Sao Tome, Saudi Arabia, Sierra Leone, Somalia, Tanzania, Uganda, United Arab Emirates, the United Kingdom, West Bank/Gaza, Yemen, Zambia, and Zimbabwe;** and
- 5) “the laws of South Africa” in **South Africa, Namibia, Lesotho and Swaziland.**

**Jurisdiction:** *The following exceptions are added to this section:*

- 1) **In Austria** the choice of jurisdiction for all disputes arising out of this Statement of Limited Warranty and relating thereto, including its existence, will be the competent court of law in Vienna, Austria (Inner-City);
- 2) **in Angola, Bahrain, Botswana, Burundi, Egypt, Eritrea, Ethiopia, Ghana, Jordan, Kenya, Kuwait, Liberia, Malawi, Malta, Mozambique, Nigeria, Oman, Pakistan, Qatar, Rwanda, Sao Tome, Saudi Arabia, Sierra Leone, Somalia, Tanzania, Uganda, United Arab Emirates, West Bank/Gaza, Yemen, Zambia, and Zimbabwe** all disputes arising out of this Statement of Limited Warranty or related to its execution, including summary proceedings, will be submitted to the exclusive jurisdiction of the English courts;
- 3) **in Belgium and Luxembourg**, all disputes arising out of this Statement of Limited Warranty or related to its interpretation or its execution, the law, and the courts of the capital city, of the country of your registered office and/or commercial site location only are competent;
- 4) **in France, Algeria, Benin, Burkina Faso, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo Republic, Djibouti, Democratic Republic of Congo, Equatorial Guinea, French Guiana, French Polynesia, Gabon, Gambia, Guinea, Guinea-Bissau, Ivory Coast, Lebanon, Madagascar, Mali, Mauritania, Mauritius, Mayotte, Morocco, New Caledonia, Niger, Reunion, Senegal, Seychelles, Togo, Tunisia, Vanuatu, and Wallis & Futuna** all disputes arising out of this Statement of Limited Warranty or related to its violation or execution, including summary proceedings, will be settled exclusively by the Commercial Court of Paris;
- 5) **in**

**Russia**, all disputes arising out of or in relation to the interpretation, the violation, the termination, the nullity of the execution of this Statement of Limited Warranty shall be settled by Arbitration Court of Moscow; 6) **in South Africa, Namibia, Lesotho and Swaziland**, both of us agree to submit all disputes relating to this Statement of Limited Warranty to the jurisdiction of the High Court in Johannesburg; 7) **in Turkey** all disputes arising out of or in connection with this Statement of Limited Warranty shall be resolved by the Istanbul Central (Sultanahmet) Courts and Execution Directorates of Istanbul, the Republic of Turkey; 8) in each of the following specified countries, any legal claim arising out of this Statement of Limited Warranty will be brought before, and settled exclusively by, the competent court of a) Athens for **Greece**, b) Tel Aviv-Jaffa for **Israel**, c) Milan for **Italy**, d) Lisbon for **Portugal**, and e) Madrid for **Spain**; and 9) **in the United Kingdom**, both of us agree to submit all disputes relating to this Statement of Limited Warranty to the jurisdiction of the English courts.

**Arbitration:** *The following is added under this heading:*

**In Albania, Armenia, Azerbaijan, Belarus, Bosnia-Herzegovina, Bulgaria, Croatia, Georgia, Hungary, Kazakhstan, Kyrgyzstan, FYR Macedonia, Moldova, Poland, Romania, Russia, Slovakia, Slovenia, Tajikistan, Turkmenistan, Ukraine, Uzbekistan, and FR Yugoslavia** all disputes arising out of this Statement of Limited Warranty or related to its violation, termination or nullity will be finally settled under the Rules of Arbitration and Conciliation of the International Arbitral Center of the Federal Economic Chamber in Vienna (Vienna Rules) by three arbitrators appointed in accordance with these rules. The arbitration will be held in Vienna, Austria, and the official language of the proceedings will be English. The decision of the arbitrators will be final and binding upon both parties. Therefore, pursuant to paragraph 598 (2) of the Austrian Code of Civil Procedure, the parties expressly waive the application of paragraph 595 (1) figure 7 of the Code. IBM may, however, institute proceedings in a competent court in the country of installation.

**In Estonia, Latvia and Lithuania** all disputes arising in connection with this Statement of Limited Warranty will be finally settled in arbitration that will be held in Helsinki, Finland in accordance with the arbitration laws of Finland then in effect. Each party will appoint one arbitrator. The arbitrators will then jointly appoint the chairman. If arbitrators cannot agree on the chairman, then the Central Chamber of Commerce in Helsinki will appoint the chairman.

## EUROPEAN UNION (EU)

### **THE FOLLOWING TERMS APPLY TO ALL EU COUNTRIES:**

The warranty for Machines acquired in EU countries is valid and applicable in all EU countries provided the Machines have been announced and made available in such countries.

**How to Obtain Warranty Service:** *The following is added to this section:*

To obtain warranty service from IBM in EU countries, see the telephone listing in Part 3 - Warranty Information.

You may contact IBM at the following address:

IBM Warranty & Service Quality Dept.  
PO Box 30  
Spango Valley  
Greenock  
Scotland PA16 0AH

## CONSUMERS

Consumers have legal rights under applicable national legislation governing the sale of consumer goods. Such rights are not affected by the warranties provided in this Statement of Limited Warranty.

### **AUSTRIA, DENMARK, FINLAND, GREECE, ITALY, NETHERLANDS, NORWAY, PORTUGAL, SPAIN, SWEDEN AND SWITZERLAND**

**Limitation of Liability:** *The following replaces the terms of this section in its entirety:*

Except as otherwise provided by mandatory law:

1. IBM's liability for any damages and losses that may arise as a consequence of the fulfillment of its obligations under or in connection with this Statement of Limited Warranty or due to any other cause related to this Statement of Limited Warranty is limited to the compensation of only those damages and losses proved and actually arising as an immediate and direct consequence of the non-fulfillment of such obligations (if IBM is at fault) or of such cause, for a maximum amount equal to the charges you paid for the Machine. For purposes of this item, the term "Machine" includes Machine Code and Licensed Internal Code ("LIC").

The above limitation shall not apply to damages for bodily injuries (including death) and damages to real property and tangible personal property for which IBM is legally liable.

2. **UNDER NO CIRCUMSTANCES IS IBM, ITS SUPPLIERS OR RESELLERS LIABLE FOR ANY OF THE FOLLOWING, EVEN IF INFORMED OF THEIR POSSIBILITY: 1) LOSS OF, OR DAMAGE TO, DATA; 2) INCIDENTAL OR INDIRECT DAMAGES, OR FOR ANY ECONOMIC CONSEQUENTIAL DAMAGES; 3) LOST PROFITS, EVEN IF THEY ARISE AS AN IMMEDIATE CONSEQUENCE OF THE EVENT THAT GENERATED THE DAMAGES; OR 4) LOSS OF BUSINESS, REVENUE, GOODWILL, OR ANTICIPATED SAVINGS.**

## FRANCE AND BELGIUM

**Limitation of Liability:** *The following replaces the terms of this section in its entirety:*

Except as otherwise provided by mandatory law:

1. IBM's liability for any damages and losses that may arise as a consequence of the fulfillment of its obligations under or in connection with this Statement of Limited Warranty is limited to the compensation of only those damages and losses proved and actually arising as an immediate and direct consequence of the non-fulfillment of such obligations (if IBM is at fault), for a maximum amount equal to the charges you paid for the Machine that has caused the damages. For purposes of this item, the term "Machine" includes Machine Code and Licensed Internal Code ("LIC").

The above limitation shall not apply to damages for bodily injuries (including death) and damages to real property and tangible personal property for which IBM is legally liable.

2. **UNDER NO CIRCUMSTANCES IS IBM, ITS SUPPLIERS OR RESELLERS LIABLE FOR ANY OF THE FOLLOWING, EVEN IF INFORMED OF THEIR POSSIBILITY: 1) LOSS OF, OR DAMAGE TO, DATA; 2) INCIDENTAL OR INDIRECT DAMAGES, OR FOR ANY ECONOMIC CONSEQUENTIAL DAMAGES; 3) LOST PROFITS, EVEN IF THEY ARISE AS AN IMMEDIATE CONSEQUENCE OF THE EVENT THAT GENERATED THE DAMAGES; OR 4) LOSS OF BUSINESS, REVENUE, GOODWILL, OR ANTICIPATED SAVINGS.**

**THE FOLLOWING TERMS APPLY TO THE COUNTRY SPECIFIED:**

## AUSTRIA

**The provisions of this Statement of Limited Warranty replace any applicable statutory warranties.**

**What this Warranty Covers:** *The following replaces the first sentence of the first paragraph of this section:*

The warranty for an IBM Machine covers the functionality of the Machine for its normal use and the Machine's conformity to its Specifications.



*The following paragraphs are added to this section:*

The limitation period for consumers in action for breach of warranty is the statutory period as a minimum. In case IBM or your reseller is unable to repair an IBM Machine, you can alternatively ask for a partial refund as far as justified by the reduced value of the unrepaired Machine or ask for a cancellation of the respective agreement for such Machine and get your money refunded.

*The second paragraph does not apply.*

**What IBM Will Do to Correct Problems:** *The following is added to this section:*

During the warranty period, IBM will reimburse you for the transportation charges for the delivery of the failing Machine to IBM.

**Limitation of Liability:** *The following paragraph is added to this section:*

The limitations and exclusions specified in the Statement of Limited Warranty will not apply to damages caused by IBM with fraud or gross negligence and for express warranty.

*The following sentence is added to the end of item 2:*

IBM's liability under this item is limited to the violation of essential contractual terms in cases of ordinary negligence.

## EGYPT

**Limitation of Liability:** *The following replaces item 2 in this section:*

as to any other actual direct damages, IBM's liability will be limited to the total amount you paid for the Machine that is the subject of the claim. For purposes of this item, the term "Machine" includes Machine Code and Licensed Internal Code ("LIC").

*Applicability of suppliers and resellers (unchanged).*

## FRANCE

**Limitation of Liability:** *The following replaces the second sentence of the first paragraph of this section:*

In such instances, regardless of the basis on which you are entitled to claim damages from IBM, IBM is liable for no more than: (items 1 and 2 unchanged).

## GERMANY

**What this Warranty Covers:** *The following replaces the first sentence of the first paragraph of this section:*

The warranty for an IBM Machine covers the functionality of the Machine for its normal use and the Machine's conformity to its Specifications.

*The following paragraphs are added to this section:*

The minimum warranty period for Machines is twelve months. In case IBM or your reseller is unable to repair an IBM Machine, you can alternatively ask for a partial refund as far as justified by the reduced value of the unrepaired Machine or ask for a cancellation of the respective agreement for such Machine and get your money refunded.

*The second paragraph does not apply.*

**What IBM Will Do to Correct Problems:** *The following is added to this section:*

During the warranty period, transportation for delivery of the failing Machine to IBM will be at IBM's expense.

**Limitation of Liability:** *The following paragraph is added to this section:*

The limitations and exclusions specified in the Statement of Limited Warranty will not apply to damages caused by IBM with fraud or gross negligence and for express warranty.

*The following sentence is added to the end of item 2:*

IBM's liability under this item is limited to the violation of essential contractual terms in cases of ordinary negligence.

## HUNGARY

**Limitation of Liability:** *The following is added at the end of this section:*

The limitation and exclusion specified herein shall not apply to liability for a breach of contract damaging life, physical well-being, or health that has been caused intentionally, by gross negligence, or by a criminal act.

The parties accept the limitations of liability as valid provisions and state that the Section 314.(2) of the Hungarian Civil Code applies as the acquisition price as well as other advantages arising out of the present Statement of Limited Warranty balance this limitation of liability.

## IRELAND

**What this Warranty Covers:** *The following is added to this section:*

Except as expressly provided in these terms and conditions, all statutory conditions, including all warranties implied, but without prejudice to the generality of the foregoing all warranties implied by the Sale of Goods Act 1893 or the Sale of Goods and Supply of Services Act 1980 are hereby excluded.

**Limitation of Liability:** *The following replaces the terms of this section in its entirety:*

For the purposes of this section, a “Default” means any act, statement, omission, or negligence on the part of IBM in connection with, or in relation to, the subject matter of this Statement of Limited Warranty in respect of which IBM is legally liable to you, whether in contract or tort. A number of Defaults which together result in, or contribute to, substantially the same loss or damage will be treated as one Default occurring on the date of occurrence of the last such Default.

Circumstances may arise where, because of a Default, you are entitled to recover damages from IBM.

This section sets out the extent of IBM’s liability and your sole remedy.

1. IBM will accept unlimited liability for death or personal injury caused by the negligence of IBM.
2. Subject always to the **Items for Which IBM is Not Liable** below, IBM will accept unlimited liability for physical damage to your tangible property resulting from the negligence of IBM.
3. Except as provided in items 1 and 2 above, IBM’s entire liability for actual damages for any one Default will not in any event exceed the greater of 1) EUR 125,000, or 2) 125% of the amount you paid for the Machine directly relating to the Default.

### **Items for Which IBM is Not Liable**

Save with respect to any liability referred to in item 1 above, under no circumstances is IBM, its suppliers or resellers liable for any of the following, even if IBM or they were informed of the possibility of such losses:

1. loss of, or damage to, data;
2. special, indirect, or consequential loss; or
3. loss of profits, business, revenue, goodwill, or anticipated savings.

## SLOVAKIA

**Limitation of Liability:** *The following is added to the end of the last paragraph:*

The limitations apply to the extent they are not prohibited under §§ 373-386 of the Slovak Commercial Code.

## SOUTH AFRICA, NAMIBIA, BOTSWANA, LESOTHO AND SWAZILAND

**Limitation of Liability:** *The following is added to this section:*

IBM's entire liability to you for actual damages arising in all situations involving nonperformance by IBM in respect of the subject matter of this Statement of Warranty will be limited to the charge paid by you for the individual Machine that is the subject of your claim from IBM.

## UNITED KINGDOM

**Limitation of Liability:** *The following replaces the terms of this section in its entirety:*

For the purposes of this section, a "Default" means any act, statement, omission, or negligence on the part of IBM in connection with, or in relation to, the subject matter of this Statement of Limited Warranty in respect of which IBM is legally liable to you, whether in contract or tort. A number of Defaults which together result in, or contribute to, substantially the same loss or damage will be treated as one Default.

Circumstances may arise where, because of a Default, you are entitled to recover damages from IBM.

This section sets out the extent of IBM's liability and your sole remedy.

1. IBM will accept unlimited liability for:
  - a. death or personal injury caused by the negligence of IBM; and
  - b. any breach of its obligations implied by Section 12 of the Sale of Goods Act 1979 or Section 2 of the Supply of Goods and Services Act 1982, or any statutory modification or re-enactment of either such Section.
2. IBM will accept unlimited liability, subject always to the **Items for Which IBM is Not Liable** below, for physical damage to your tangible property resulting from the negligence of IBM.
3. IBM's entire liability for actual damages for any one Default will not in any event, except as provided in items 1 and 2 above, exceed the greater of 1) Pounds Sterling 75,000, or 2) 125% of the total purchase price payable or the charges for the Machine directly relating to the Default.

These limits also apply to IBM’s suppliers and resellers. They state the maximum for which IBM and such suppliers and resellers are collectively responsible.

**Items for Which IBM is Not Liable**

Save with respect to any liability referred to in item 1 above, under no circumstances is IBM or any of its suppliers or resellers liable for any of the following, even if IBM or they were informed of the possibility of such losses:

1. loss of, or damage to, data;
2. special, indirect, or consequential loss; or
3. loss of profits, business, revenue, goodwill, or anticipated savings.

**Part 3 - Warranty Information**

This Part 3 provides information regarding the warranty applicable to your Machine, including the warranty period and type of warranty service IBM provides.

**Warranty Period**

The warranty period may vary by country or region and is specified in the table below.

**Note:** “Region” means either Hong Kong or Macau Special Administrative Region of China.

A warranty period of 3 years on parts and 1 year on labor means that IBM provides warranty service without charge for:

1. parts and labor during the first year of the warranty period; and
2. parts only, on an exchange basis, in the second and third years of the warranty period. IBM will charge you for any labor provided in performance of the repair or replacement(s) in the second and third year of the warranty period.

**QLogic Fibre Channel Switch Module for IBM @server BladeCenter**

Country or Region of Purchase	Warranty Period	Type of Warranty Service*
Worldwide	1 year	1
* See “Types of Warranty Service” for the legend and explanations of warranty-service types.		

## Types of Warranty Service

If required, IBM provides repair or exchange service depending on the type of warranty service specified for your Machine in the above table and as described below. Warranty service may be provided by your reseller if approved by IBM to perform warranty service. Scheduling of service will depend upon the time of your call and is subject to parts availability. Service levels are response time objectives and are not guaranteed. The specified level of warranty service may not be available in all worldwide locations, additional charges may apply outside IBM's normal service area, contact your local IBM representative or your reseller for country and location specific information.

### **1. Customer Replaceable Unit ("CRU") Service**

IBM provides replacement CRUs to you for you to install. CRU information and replacement instructions are shipped with your Machine and are available from IBM at any time on your request. Installation of Tier 1 CRUs is your responsibility. If IBM installs a Tier 1 CRU at your request, you will be charged for the installation. You may install a Tier 2 CRU yourself or request IBM to install it, at no additional charge, under the type of warranty service designated for your Machine. IBM specifies in the materials shipped with a replacement CRU whether a defective CRU must be returned to IBM. When return is required, 1) return instructions and a container are shipped with the replacement CRU, and 2) you may be charged for the replacement CRU if IBM does not receive the defective CRU within 30 days of your receipt of the replacement.

### **2. On-site Service**

IBM or your reseller will either repair or exchange the failing Machine at your location and verify its operation. You must provide suitable working area to allow disassembly and reassembly of the IBM Machine. The area must be clean, well lit and suitable for the purpose. For some Machines, certain repairs may require sending the Machine to an IBM service center.

### **3. Courier or Depot Service\***

You will disconnect the failing Machine for collection arranged by IBM. IBM will provide you with a shipping container for you to return your Machine to a designated service center. A courier will pick up your Machine and deliver it to the designated service center. Following its repair or exchange, IBM will arrange the return delivery of the Machine to your location. You are responsible for its installation and verification.

### **4. Customer Carry-In or Mail-In Service**

You will deliver or mail as IBM specifies (prepaid unless IBM specifies otherwise) the failing Machine suitably packaged to a location IBM designates. After IBM has repaired or exchanged the Machine, IBM will make it available for your collection or, for Mail-in Service, IBM will return it to you at IBM's expense, unless IBM specifies otherwise. You are responsible for the subsequent installation and verification of the Machine.

## 5. CRU and On-site Service

This type of Warranty Service is a combination of Type 1 and Type 2 (see above).

## 6. CRU and Courier or Depot Service

This type of Warranty Service is a combination of Type 1 and Type 3 (see above).

## 7. CRU and Customer Carry-In or Mail-In Service

This type of Warranty Service is a combination of Type 1 and Type 4 (see above).

**When a 5, 6 or 7 type of warranty service is listed, IBM will determine which type of warranty service is appropriate for the repair.**

\* This type of service is called ThinkPad® EasyServ or EasyServ in some countries.

The IBM Machine Warranty World Wide Web site at [http://www.ibm.com/servers/support/machine\\_warranties/](http://www.ibm.com/servers/support/machine_warranties/) provides a worldwide overview of IBM's Limited Warranty for Machines, a Glossary of IBM definitions, Frequently Asked Questions (FAQs) and Support by Product (Machine) with links to Product Support pages. **The IBM Statement of Limited Warranty is also available on this site in 29 languages.**

To obtain warranty service contact IBM or your IBM reseller. In Canada or the United States, call 1-800-IBM-SERV (426-7378). In the EU countries, see the telephone numbers below.

### EU Country Telephone List

Phone numbers are subject to change without notice. For the warranty service contact telephone number in a country subsequently added to the EU and not yet reflected in the list below, contact IBM in that country or visit the website above for a current telephone listing.

Austria -- +43-1-24592-5901	Latvia -- +386-61-1796-699
Belgium -- +32-70-23-3392	Lithuania -- +386-61-1796-699
Cyprus -- +357-22-841100	Luxembourg -- +352-298-977-5063
Czech Republic -- +420-2-7213-1316	Malta -- +356-23-4175
Denmark -- +45-4520-8200	Netherlands -- +31-20-514-5770
Estonia -- +386-61-1796-699	Poland -- +48-22-878-6999
Finland -- +358-8001-4260	Portugal -- +351-21-892-7147
France -- +33-238-557-450	Slovakia -- +421-2-4954-1217
Germany -- +49-1805-253553	Slovenia -- +386-1-4796-699

Greece -- +30-210-680-1700	Spain -- +34-91-714-7983
Hungary -- +36-1-382-5720	Sweden -- +46-8-477-4420
Ireland -- +353-1-815-4000	United Kingdom -- +44-1475-555-055
Italy -- +39-800-820-094	



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e-business logo	Tivoli Enterprise Update Connector
@server	Wake on LAN
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## **Important notes**

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

CD-ROM drive speeds list the variable read rate. Actual speeds vary and are often less than the maximum possible.

When referring to processor storage, real and virtual storage, or channel volume, KB stands for approximately 1000 bytes, MB stands for approximately 1 000 000 bytes, and GB stands for approximately 1 000 000 000 bytes.

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

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

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

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

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## Product recycling and disposal

This unit contains materials such as circuit boards, cables, electromagnetic compatibility gaskets, and connectors which may contain lead and copper/beryllium alloys that require special handling and disposal at end of life. Before this unit is disposed of, these materials must be removed and recycled or discarded according to applicable regulations. IBM offers product-return programs in several countries. Information on product recycling offerings can be found on IBM's Internet site at <http://www.ibm.com/ibm/environment/products/prp.shtml>.

IBM encourages owners of information technology (IT) equipment to responsibly recycle their equipment when it is no longer needed. IBM offers a variety of programs and services to assist equipment owners in recycling their IT products. Information on product recycling offerings can be found on IBM's Internet site at <http://www.ibm.com/ibm/environment/products/prp.shtml>.

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## Electronic emission notices

### Federal Communications Commission (FCC) statement

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

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. IBM is not responsible for any radio or television interference caused by using other than recommended cables and connectors or

by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

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

## **Industry Canada Class A emission compliance statement**

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

### **Avis de conformité à la réglementation d'Industrie Canada**

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

## **Australia and New Zealand Class A statement**

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

## **United Kingdom telecommunications safety requirement**

### **Notice to Customers**

This apparatus is approved under approval number NS/G/1234/J/100003 for indirect connection to public telecommunication systems in the United Kingdom.

## **European Union EMC Directive conformance statement**

This product is in conformity with the protection requirements of EU Council Directive 89/336/EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility. IBM cannot accept responsibility for any failure to satisfy the protection requirements resulting from a nonrecommended modification of the product, including the fitting of non-IBM option cards.

This product has been tested and found to comply with the limits for Class A Information Technology Equipment according to CISPR 22/European Standard EN 55022. The limits for Class A equipment were derived for commercial and industrial environments to provide reasonable protection against interference with licensed communication equipment.

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

## Taiwanese Class A warning 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。

## Chinese Class A warning statement

**聲 明**  
此為 A 級產品。在生活環境中，該產品可能會造成無線電干擾。在這種情況下，可能需要用戶對其干擾採取切实可行的措施。

## Japanese Voluntary Control Council for Interference (VCCI) statement

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラス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。





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