

IBM @server BladeCenter 2-Port Fibre
Channel Switch Module



Installation Guide

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Channel Switch Module



Installation Guide

Note: Before using this information and the product it supports, read the general information in Appendix B, "IBM Statement of Limited Warranty Z125-4753-07 11/2002," on page 55 and Appendix C, "Notices," on page 77.

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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 ασφαλείας (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.

Statement 1:



DANGER

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

To avoid a shock hazard:

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

To Connect:

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

To Disconnect:

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

Statement 2:



CAUTION:

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

Do not:

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

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

Statement 3:



CAUTION:

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

- 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.

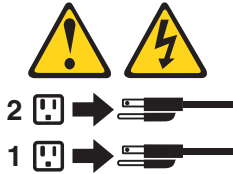
Class 1 Laser Product
Laser Klasse 1
Laser Klass 1
Luokan 1 Laserlaite
Appareil À Laser de Classe 1

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.

Chapter 1. Introducing the IBM @server BladeCenter 2-Port Fibre Channel Switch Module

This *Installation Guide* for the IBM® @server BladeCenter™ 2-Port Fibre Channel Switch Module contains information about:

- Setting up and installing your IBM @server BladeCenter 2-Port Fibre Channel Switch Module
- Installing the IBM BladeCenter SAN Utility application

For installation details, see Chapter 2, “Installing and removing an I/O module,” on page 11 and Chapter 3, “Information panel LEDs and external ports,” on page 23. For additional information, see the instructions in your BladeCenter documentation. The IBM BladeCenter 2-Port Fibre Channel Switch Module is also referred to throughout this document as the I/O module, switch module, or switch. The IBM @server BladeCenter and IBM @server BladeCenter T units are also referred to throughout this document as the BladeCenter unit.

Your I/O module is a Fibre Channel component that contains a 16-port switch application specific integrated circuit (ASIC). The ASIC provides two external Fibre Channel user ports with which to connect to external storage devices and 14 internal ports to connect to the BladeCenter blade server bays. You can install up to two I/O modules in a BladeCenter unit.

You can manage and configure your I/O module through either a Telnet connection to the embedded command line interface (CLI), or by using the IBM BladeCenter SAN Utility application. The SAN Utility application provides an intuitive graphical user interface (GUI) that you can use to configure multiple I/O modules through other connected SAN devices from a single interface. The IBM BladeCenter SAN Utility application is referred to throughout this document as the SAN Utility.

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

The I/O module has four labels: a safety certification label, a serial number label, and two MAC address labels. The safety certification label is on the left side of the I/O module. The product name and serial number are on the serial number label on the left side of the I/O module. The first MAC address label is on the information panel under the I/O-module external port 1. The second MAC address label is on the right side of the I/O module. You will need this information when you register your I/O module with IBM. See Figure 1 on page 9 for the location of the I/O-module labels that contain the MAC address and serial number information.

Record your product information in this table
Product name: IBM @server BladeCenter 2-Port Fibre Channel Switch Module
Model number: _____
Media access control (MAC) address: _____

Related documentation

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

In addition to this *Installation Guide*, the following related documentation is provided with your I/O module:

- IBM @server BladeCenter Fibre Channel Switch Module Management User's Guide

This document is provided in Portable Document Format (PDF) on the IBM BladeCenter Documentation CD. It describes how to use the SAN Utility application. In addition, it describes how to start the Telnet CLI and lists the CLI commands and their usage.

- 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* that is provided in PDF on the IBM BladeCenter Documentation CD. 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* that is provided in PDF on the IBM BladeCenter Documentation CD. 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
- *IBM @server BladeCenter Fibre Channel Expansion Card Installation and User's Guide*

This Installation and User's Guide contains instructions for installing the IBM BladeCenter Fibre Channel Expansion Card in an IBM BladeCenter blade server. This document contains information about:

- Installing and configuring the Fibre Channel expansion card
- Updating the BIOS and device drivers of the Fibre Channel expansion card
- *IBM @server BladeCenter SAN Solutions Guide*
This document is provided in PDF on the IBM *BladeCenter Documentation* CD. It provides a user-oriented discussion of how BladeCenter Fibre Channel options are used to provide different SAN storage solutions for various application requirements. This document also provides an overview and description for backup and restore, business continuance and high availability, and storage consolidation and data sharing solutions.
- *IBM @server BladeCenter Fibre Channel Switch Module Interoperability Guide*
This document is provided in PDF on the IBM *BladeCenter Documentation* CD. It provides detailed Fibre Channel switch configuration data and step-by-step configuration procedures for integrating the BladeCenter unit into other vendor switch fabrics. Each vendor configuration includes an initial integration checklist, configuration limitations, supported switch and firmware versions, specific management application operations, and a successful-integration checklist.
- *Rack Installation Instructions*
This document contains the instructions to install your BladeCenter unit in a rack.
- *Safety Information*
This multilingual document is provided in PDF on the IBM *BladeCenter Documentation* CD. It contains translated versions of the caution and danger statements that appear in the documentation. Each caution and danger statement has an assigned number, which you can use to locate the corresponding statement in your native language.
- *IBM Hardware Maintenance Manual and Troubleshooting Guide*
This document is provided in PDF on the IBM *BladeCenter Documentation* CD. It contains information to help you solve the problem yourself or to provide helpful information to a service technician.
- *IBM Configuration Options Guide*
This document contains information about which small form-factor pluggable (SFP) module and cable is required to connect your I/O module

to other storage devices. This document is at <http://www.ibm.com/eserver/bladeCenter/> on the World Wide Web.

Depending on your blade server model, additional documents might be included on the IBM *BladeCenter Documentation CD*.

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

Features and specifications

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

Your 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 disabled by default.
- Firmware installation

Use the SAN Utility application to install and activate new firmware.
- 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 is interoperable with FC-SW-2 compliant switches. For more information, see the IBM *@server BladeCenter Fibre Channel Switch Module Interoperability Guide*.
- 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

Fabric Address Notification (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.

The following information is a summary of the specifications of the I/O module:

Table 1. Fibre Channel Switch module specifications

<p>Fibre Channel Switch module specifications:</p> <ul style="list-style-type: none"> • Fibre Channel protocols: FC-PH version 4.3, FC-PH-2, FC-PH-3, FC-AL version 4.5, FC-AL-2 Rev 7.0, FC-FLA, FC-GS-3, FC-FG, FC-PLDA, FC-Tape, FC-VI, FC-SW-2, Fibre Channel Element MIB RFC 2837, and Fibre Alliance MIB version 4.0. • Fibre Channel service classes: Class 2 and class 3 • Operation modes: Fibre Channel class 2 and class 3, connectionless. • External port type: Generic loop port (GL_port) • Internal port type: fabric port (F_port) • Port characteristics: External ports are automatically detected and self configuring • Number of Fibre Channel ports: 2 external ports and 14 internal ports • Scalability: 239 switches maximum depending on your configuration • Maximum number of user ports: 475 000 ports depending on your configuration 	<ul style="list-style-type: none"> • Buffer credits: 12 buffer credits per port • Media type: Small form-factor pluggable (SFP) module • Fabric port speed: 1.0625 or 2.125 Gbps (gigabits per second) • Maximum frame size: 2148 bytes (2112 byte payload) • System processor: Geode SC1200 • Fabric latency: Less than 0.5 µsec • Fabric point-to-point bandwidth: 2 Gbps or 4 Gbps at full duplex • Fabric aggregate bandwidth: 64 Gbps at full duplex • Nonblocking architecture to prevent latency <p>I/O-module maintainability:</p> <ul style="list-style-type: none"> • 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. • User interface: LED indicators 	<p>Fabric management:</p> <ul style="list-style-type: none"> • Management methods: <ul style="list-style-type: none"> – BladeCenter SAN Utility application – Telnet and command line interface (CLI) • I/O-module SNMP agent: Enables a network management workstation to receive configuration values, traffic information, and Fibre Channel failure data through SNMP and the Ethernet interface. <p>Dimensions:</p> <ul style="list-style-type: none"> • Width: 112 mm (4.41 in.) • Height: 29 mm (1.14 in.) • Depth: 260.3 mm (10.25 in.) • Weight: 2 lb
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Table 1. Fibre Channel Switch module specifications (continued)

<p>I/O-module regulatory certifications:</p> <p>Electrical:</p> <ul style="list-style-type: none"> • Power source loading: 3.75 amps maximum at 12 V dc • Heat output: 45 watts maximum • Operating voltage: 12 V dc • Circuit protection: Internally fused • Safety standards: <ul style="list-style-type: none"> – UL 1950 (USA) – UL 1950 (Canada) – EN60950 (EC) – Support for Japan – Support for Korea – CB scheme - IEC 60950 	<ul style="list-style-type: none"> • Emissions standards: <ul style="list-style-type: none"> – FCC part 15B Class A (USA) – VCCI Class A ITE (Japan) – ICES-003 issue 3 (Canada) – A4EN55022 level A (EC) – Voltage fluctuations: EN 61000-3-3 – Harmonics: EN 61000-3-2 – Immunity: EN55024: 1998 • Telecom standards: <ul style="list-style-type: none"> – NEBS Level 3, Earthquake Zone 4 – NEBS GR-63-CORE – NEBS GR-1089-CORE, Issue 3 – ETSI EN 300 386 • Marking: <ul style="list-style-type: none"> – FCC part 15 – UL (United States) – cUL (Canada) – TUV – VCCI – CE <p>Shortwave laser SFP module at 1 Gbps and 2 Gbps single-mode or multi-mode:</p> <ul style="list-style-type: none"> • Connector: LC-LC • Color coding: Beige or black exposed connector surfaces • Cable: Fibre Channel 100-M6-SN-I (50 µm multimode) • Wavelength: 830 to 860 nm 	<ul style="list-style-type: none"> • Transmit power: -10 dBm minimum • Receiver sensitivity: -16 dBm average • Distance: <ul style="list-style-type: none"> – 500 meters maximum using 50 micron fiber – 300 meters maximum using 62.5 micron fiber • Safety: DHHS 21 CFR(J), IEC 825-1 CENELEC EN 60825-1, VDE <p>Longwave laser SFP module at 1 Gbps and 2 Gbps single-mode:</p> <ul style="list-style-type: none"> • Connector: LC-LC Fibre Channel cable • Color coding: Blue exposed connector surfaces • Cable: Fibre Channel 100SM-LC-L (9 µm single mode) • Wavelength: 1270 through 13.5 nm • Transmit power: -10 dBm minimum • Receiver sensitivity: -20 dBm average • Distance: 2 meters to 10 kilometers • Safety: DHHS 21 CFR(J), IEDC 825-1 CENELEC EN 60825-1, VDE
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Inventory checklist

Verify that the shipping carton contains the following items:

- IBM @server BladeCenter 2-Port Fibre Channel Switch Module
- The IBM *BladeCenter Documentation* CD
- The IBM *BladeCenter SAN Utility* CD
- One diagnostic wrap plug
- The IBM @server *BladeCenter 2-Port Fibre Channel Switch Module Installation Guide* (this book)
- Safety information flyer

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

Notices and statements used in this book

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

The following types of notices and statements are used in this book:

- **Notes:** 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 possible 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.

Major components of the I/O module

The orange color on components and labels on your I/O module and BladeCenter unit identifies hot-swap or hot-plug components. You can install or remove these components while the BladeCenter unit is running, provided that it is configured to support this function.

The blue color on components and labels indicates touch points where a component can be gripped, a latch moved, and so on.

Figure 1 shows the major components of your I/O module.

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

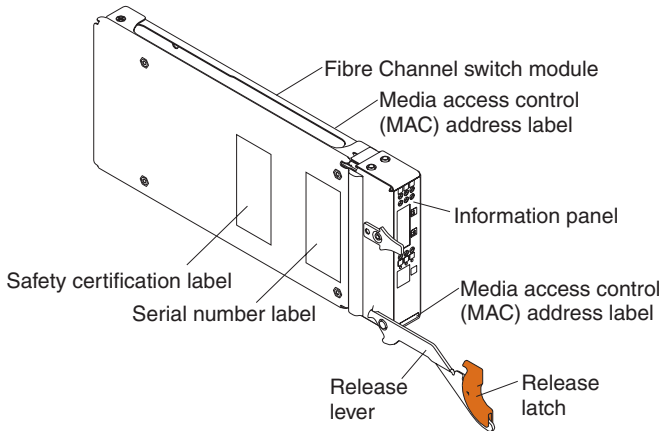
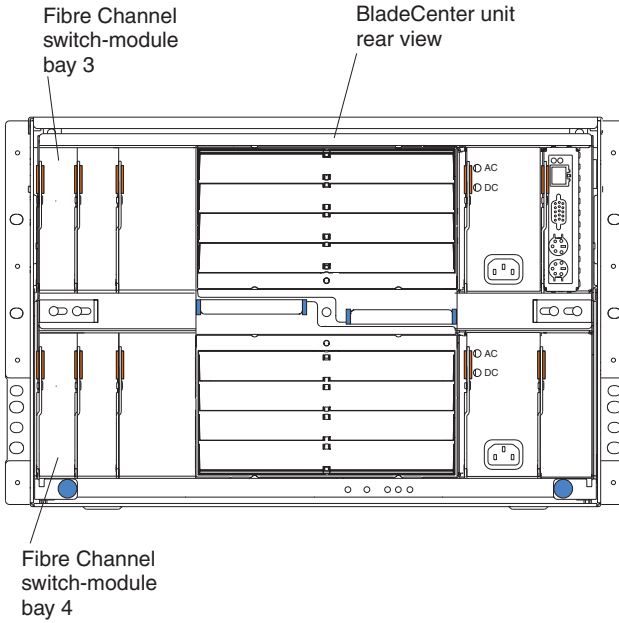


Figure 1. Fibre Channel Switch module major components

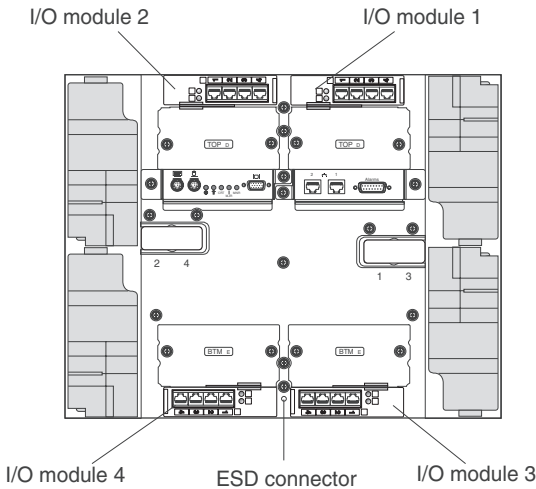
For more information about the components of the information panel, see Chapter 3, “Information panel LEDs and external ports,” on page 23. For more information about the MAC address, see the IBM *@server BladeCenter Fibre Channel Switch Module Management User’s Guide* provided on the IBM *BladeCenter Documentation CD*.

Chapter 2. Installing and removing an I/O module

The following illustration shows the I/O-module bay locations in the BladeCenter unit.



The following illustration shows the rear of a typical BladeCenter T 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 the IBM @server BladeCenter Fibre Channel Expansion Card in a blade server. Installing an Fibre Channel Switch module in bay 3 or bay 4 provides the first connection to any BladeCenter Fibre Channel expansion card installed in the BladeCenter unit. Installing a second Fibre Channel Switch module enables a second connection to the BladeCenter 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: 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 1 connection to the blade server interface expansion card in the BladeCenter unit
4	Port 2 connection to the blade server interface expansion card in the BladeCenter unit

Note: The second I/O-module port connection allows for a redundant path from the blade server to external Fibre Channel devices.

Installation guidelines

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

- Become familiar with the safety and handling guidelines specified under “Safety” on page v and “Handling static-sensitive devices” on page 13, and read the safety statements in BladeCenter unit option documents.
- The orange color on components and labels in your BladeCenter unit identifies hot-swap or hot-plug components. You can install or remove hot-swap modules while the BladeCenter unit is running. For complete details about installing or removing a hot-swap or hot-plug component, see the detailed information in this chapter.
- The blue color on components and labels identifies touch points where you can grip a component, move a latch, and so on.
- You do not need to turn off the BladeCenter unit to install or replace any of the hot-swap modules on the rear of the BladeCenter unit.
- For a list of supported options for your BladeCenter unit, go to <http://www.ibm.com/pc/us/compat/> on the World Wide Web.

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 Options Guide* at <http://www.ibm.com/eserver/bladecenter/> on the World Wide Web. See the documentation that comes with your blade server for cable routing information.

Handling static-sensitive devices

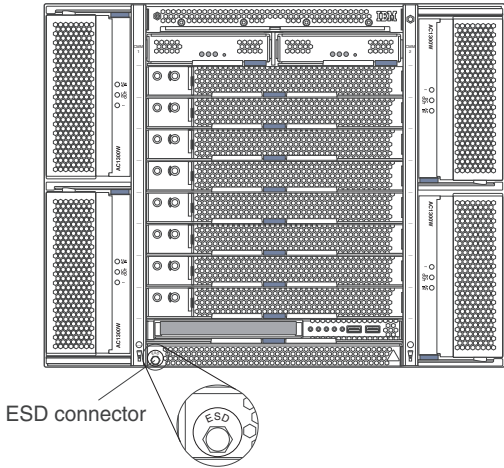
Attention: Static electricity can damage electronic devices and your BladeCenter unit. To avoid damage, keep static-sensitive devices in their static-protective packages until you are ready to install them.

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

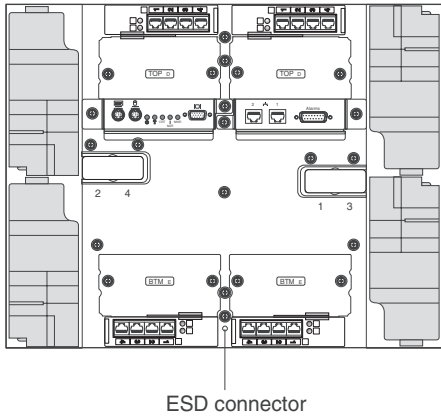
- Limit your movement. Movement can cause static electricity to build up around you.
- Handle the device carefully, holding it by its edges or its frame.
- Do not touch solder joints, pins, or exposed printed circuitry.
- Do not leave the device where others can handle and damage it.
- While the device is still in its static-protective package, touch it to any *unpainted* metal surface of the BladeCenter chassis or any *unpainted* metal surface on any other grounded rack component in the rack you are installing the device in 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 chassis or on a metal surface.
- Take additional care when handling devices during cold weather because heating reduces indoor humidity and increases static electricity.
- 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 unit)



Location of ESD connector (rear of unit)



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 Klass 1
Luokan 1 Laserlaite
Appareil À Laser de Classe 1

Statement 8:



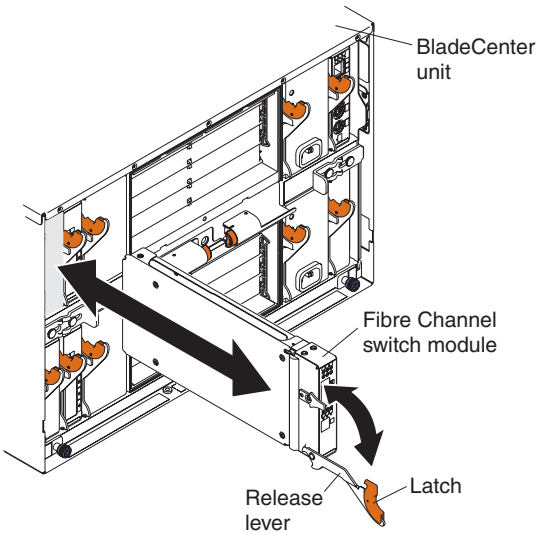
CAUTION:

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

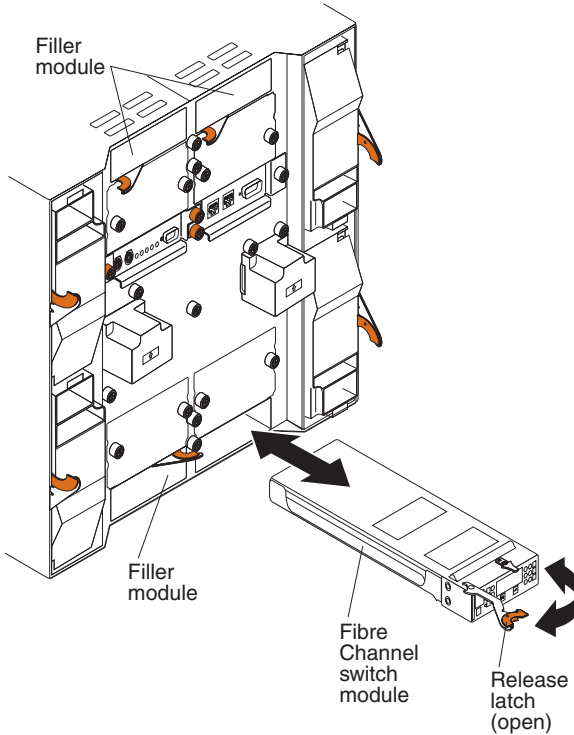


Hazardous voltage, current, and energy levels are present inside any component that has this label attached. There are no serviceable parts inside these components. If you suspect a problem with one of these parts, contact a service technician.

The following illustration shows how to install a Fibre Channel Switch Module in the rear of the BladeCenter unit.



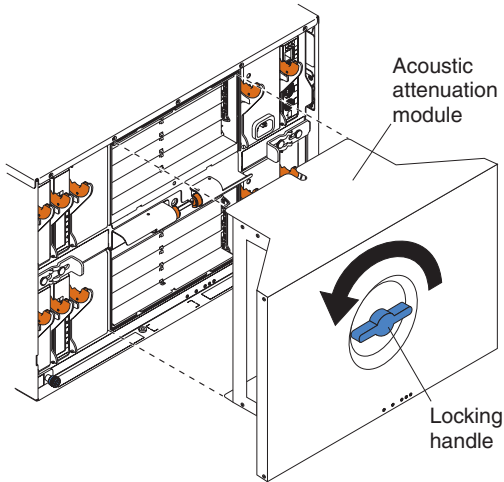
The following illustration shows how to install a Fibre Channel Switch Module in the rear of a BladeCenter T unit.



Complete the following steps to install the Fibre Channel Switch Module:

1. Make sure you are using the latest versions of device drivers, firmware, and BIOS for your blade server and management module. Go to the IBM Support Web site, <http://www.ibm.com/pc/support/> for the latest information about upgrading the device drivers, firmware, and BIOS for BladeCenter components. The latest instructions are in the documentation that come with the updates.
2. Review the information in “Safety” on page v and “Installation guidelines” on page 12 through “Handling static-sensitive devices” on page 13.

3. Remove the acoustic attenuation module option, if one is installed, from the rear of the BladeCenter unit.



4. Be 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 (see the illustration on page 14 for the location of the ESD connector).
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 you are installing the I/O module in for at least two seconds.
8. Remove the I/O module from its static-protective package.
9. Ensure 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 85 seconds to complete the POST. When the I/O module is powered on, a LED test occurs. All LEDs are lit and remain lit for approximately 10 to 15 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 24 for LED locations.) Verify that:
 - When the POST starts, the OK LED on the I/O module will be off. The POST tests the condition of firmware, memories, data paths, and switch logic and uses the heartbeat LED to indicate pass or fail conditions.
 - The green OK LED on the I/O module is lit to indicate that the switch logic has completed POST.
 - The green heartbeat LED on the I/O module has a steady flash rate of once per second. This indicates that the I/O module is operating with no errors.

Note: If the heartbeat LED is not flashing once per second, the POST has failed. Be sure the BladeCenter unit is powered on and the BladeCenter LEDs are lit. If POST has failed, see the IBM *@server BladeCenter Fibre Channel Switch Module Management User's Guide* for diagnostic information.

13. If you have other modules to install, do so now; otherwise, go to step 14.
14. If needed, connect an SFP module option into external Fibre Channel port 1 and Fibre Channel port 2. 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 but are required to use its external ports.

15. Use LC-LC 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 18.

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.



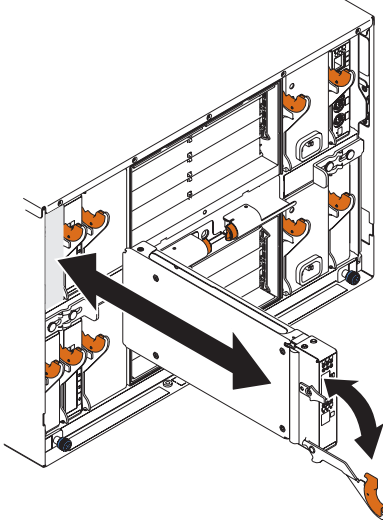
Hazardous voltage, current, and energy levels are present inside any component that has this label attached. There are no serviceable parts inside these components. If you suspect a problem with one of these parts, contact a service technician.

Complete the following steps to remove a Fibre Channel Switch Module:

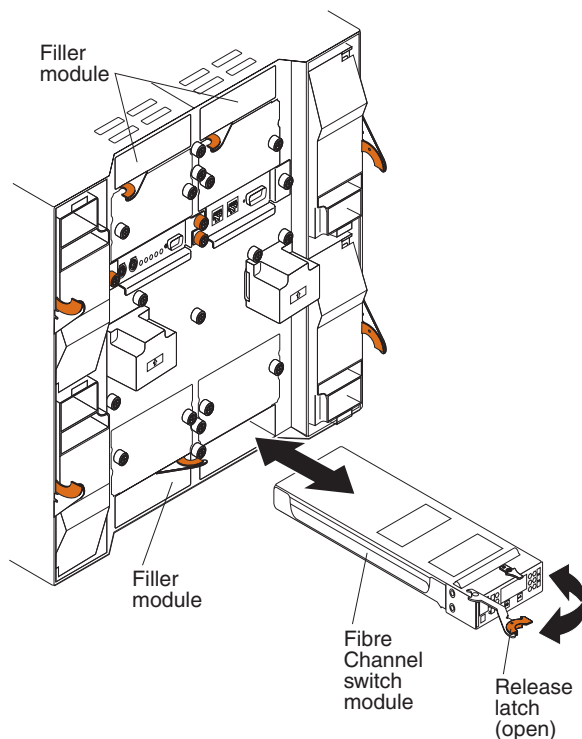
1. Review the information in “Safety” on page v and “Installation guidelines” on page 12 through “Handling static-sensitive devices” on page 13.
2. If you are removing the Fibre Channel Switch Module from the rear of a BladeCenter T unit, connect an ESD wrist strap to the ESD connector at the rear of the BladeCenter T unit (see the illustration on page 14 for the location of the ESD connector).
3. Remove the acoustic attenuation module option, if one is installed, from the rear of the BladeCenter unit (see the illustration on page 18 for information).
4. Remove the LC-LC 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.

- Pull the release latch toward the bottom of the I/O module as shown in the illustration. The module moves out of the bay approximately 0.64 cm (0.25 inch).

The following illustration shows how to remove a Fibre Channel Switch Module from the rear of the BladeCenter unit.



The following illustration shows how to remove a Fibre Channel Switch Module from the rear of a BladeCenter T unit.



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, verify that it is active. (See step 11 and step 12 on page 19.)

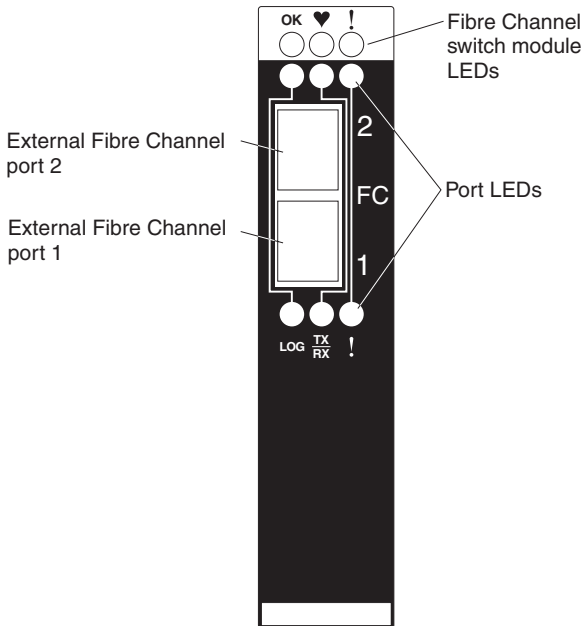
9. If you placed another Fibre Channel Switch Module in the bay:
 - Insert any SFP modules that you removed in step 5 into external Fibre Channel port 1 and Fibre Channel port 2. See the documentation that comes with your SFP module for SFP module installation instructions.
 - If needed, use LC-LC fiber-optic 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.

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.

Information panel

The Front panel of the Fibre Channel Switch Module contains LEDs and two Fibre Channel ports, as shown in the following illustration.

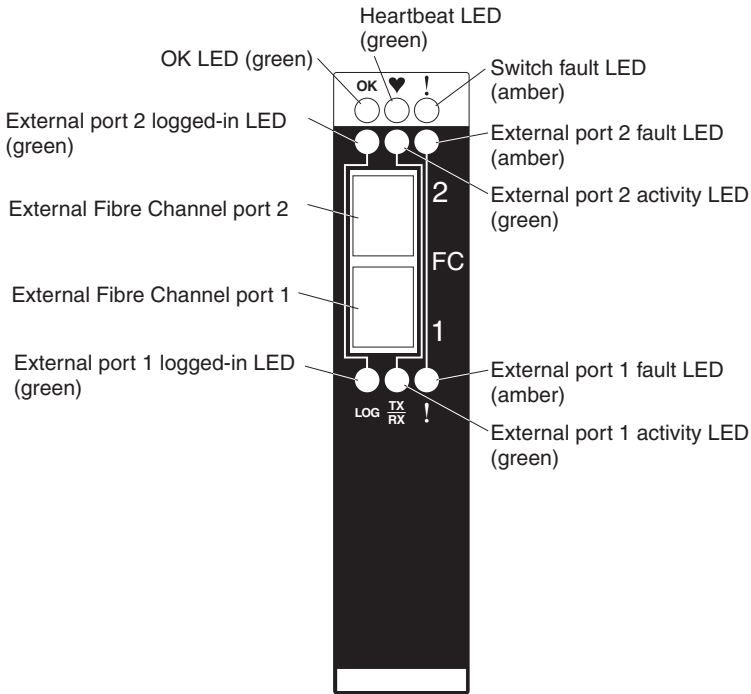


The Fibre Channel Switch Module contains:

- LEDs that display the status of the Fibre Channel Switch Module and its network connections. (See “Information LEDs” on page 24.)
- Two external Fibre Channel ports to connect Fibre Channel devices, end devices, and servers. These ports are identified as port 2 and port 1 in the I/O-module configuration menus and are labeled 2 and 1 (from top to bottom) on the Fibre Channel Switch Module.

Information LEDs

The front panel of the Fibre Channel Switch Module has three sets of LEDs. The first row of LEDs at the top of the I/O module represent I/O module status and include OK, ♥ (heartbeat), and ! (Fibre Channel switch fault). The second and third sets of LEDs represent status for external Fibre Channel port 2 and external Fibre Channel port 1. 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 their diagnostic flash patterns follows the illustration. See the IBM *@server BladeCenter Fibre Channel Switch Module Management User's Guide* for more information about the diagnostic flash patterns.



Notes:

1. The illustrations in this document might differ slightly from your hardware.
2. 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.
3. An LED test occurs whenever the I/O module is turned on. All LEDs are lit and remain lit for approximately 10 to 15 seconds and then return to a normal state.

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.

♥ (heartbeat) LED

This green LED is at the top of the I/O module on the front panel. When this LED is flashing, it indicates the status of the internal I/O-module processor and the results of the POST.

Note: One flash per second indicates that the I/O-module processor is operating in OK status. Other flash patterns indicate POST errors. For more information, see Table 2.

! (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 two green port logged-in LEDs. The port 2 logged-in LED is at the top of port 2, and the port 1 logged-in LED is at the bottom of port 1. 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 two green port activity LEDs. The port 2 activity LED is at the top of port 2, and the port 1 activity LED is at the bottom of port 1. 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 two amber port fault LEDs. The port 2 fault LED is at the top of port 2, and the port 1 fault LED is at the bottom of port 1. 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 SAN Utility or CLI. For more information, see the diagnostic section of the *IBM @server BladeCenter Fibre Channel Switch Module Management User's Guide*.

Table 2. Fibre Channel Switch Module LED diagnostic flash patterns

LED	LED activity
OK	<ul style="list-style-type: none">• The LED is off during initialization and POST or when there is a system fault.• The LED is lit during LED test and when the I/O module is operational.• The LED does not flash.

Table 2. Fibre Channel Switch Module LED diagnostic flash patterns (continued)

LED	LED activity
♥ (heartbeat)	<ul style="list-style-type: none"> • The LED is off when you reset the blade server and when the Fibre Channel Switch module processor is not operational. • The LED is lit steady on only during LED test. • The LED flashes to indicate the following conditions: <ul style="list-style-type: none"> – Normal operation - The LED flashes at a steady rate of one flash per second. – Internal firmware failure - The LED flashes two times, at twice the normal rate, followed by a 2-second pause. – Fatal error - The LED flashes three times, at twice the normal rate, followed by a 2-second pause. – Configuration file system error - The LED flashes four times, at twice the normal rate, followed by a 2-second pause. <p>Note: See the diagnostic section of the IBM <i>@server BladeCenter Fibre Channel Switch Module Management User's Guide</i> for more information about diagnostic flash patterns.</p>
! (switch fault)	<ul style="list-style-type: none"> • The LED is off during initialization or when the I/O module is in normal operation. • The LED is lit during LED test or to indicate a system fault during a POST failure or thermal fault. • The LED does not flash.
Port logged-in	<ul style="list-style-type: none"> • The LED is off when the port is not logged in. • The LED is lit when the port is logged-in or during LED test. • The LED pattern indicates the following conditions: <ul style="list-style-type: none"> – Logged in - The LED is lit. – Logging in - The LED flashes at 1-second intervals. – Beacon location - The LED flashes at 1-second intervals. For more information, see the IBM <i>@server BladeCenter Fibre Channel Switch Module Management User's Guide</i>. – Error - The LED flashes two times per second.
Port activity	<ul style="list-style-type: none"> • The LED is off when the port is not logged in or when the port is logged in and there is no port activity. • The LED is lit during LED test. • The LED flashes when port activity performs a normal send or receive operation.
Port fault	<ul style="list-style-type: none"> • The LED is off when port diagnostics starts and is completed without error. • The LED is lit when port diagnostics discovers a port error. • The LED does not flash.

Chapter 4. Configuring the Fibre Channel Switch Module using the Telnet interface

Your 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

To configure the I/O module through the Telnet interface, the IP address and subnet masks must be compatible. In addition to the IP addressing, to access an I/O module from a network management workstation that is connected to an external Ethernet port, the following configuration settings in the management module must be enabled:

- I/O module external port 1 and port 2
- External management for external port 1 and port 2

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

Important: Before you configure your I/O module, be sure that the management modules in your BladeCenter unit are properly configured. In addition, to access and manage your 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. See the applicable *BladeCenter Installation and User's Guide* documents on the *IBM BladeCenter Documentation CD* or the *IBM BladeCenter T Documentation CD* for more information. For more detailed information about configuring your I/O module, see the *IBM @server BladeCenter Fibre Channel Switch Module Management User's Guide* on the *IBM BladeCenter Documentation CD*.

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* at www.ibm.com/pc/support/ on the World Wide Web for information to help you prepare for system installation and configuration.

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 your I/O module and have an existing network connection. If you need to obtain the IP address for your 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

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

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.

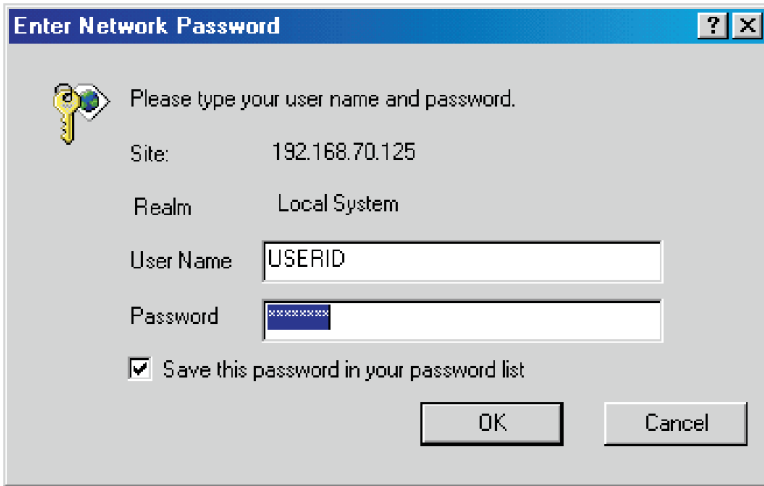


Figure 2. Enter Network Password window

2. 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. The Active Session from Same Client window opens.

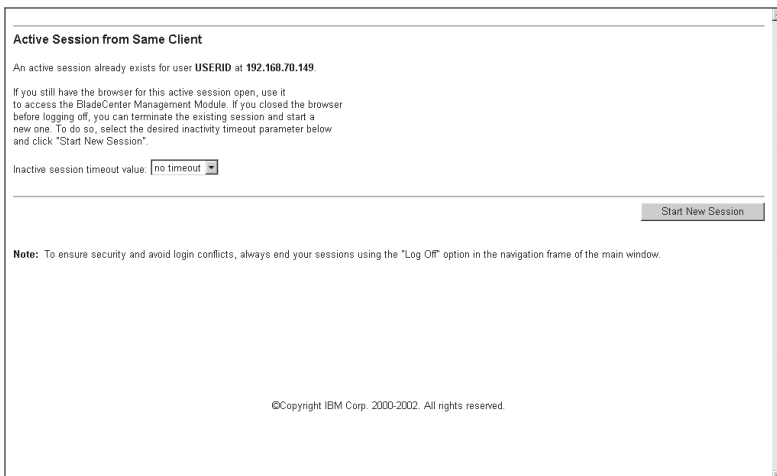


Figure 3. Active Session from Same Client window

- 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.

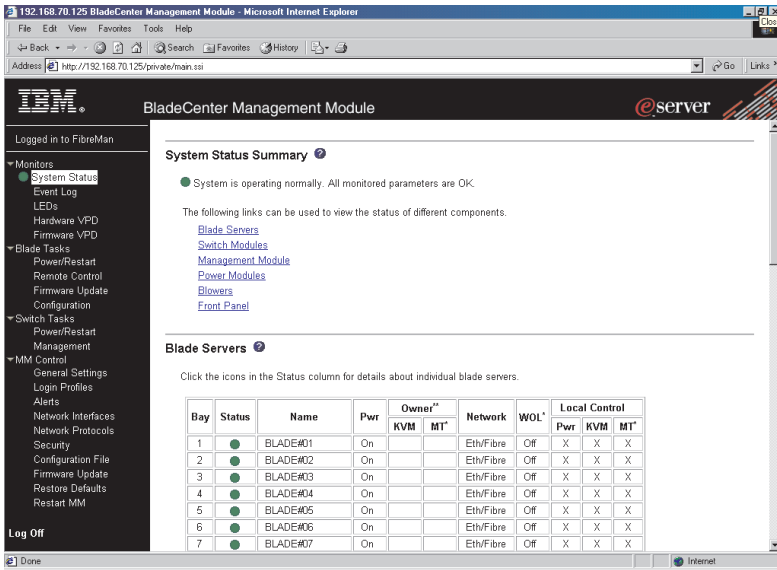


Figure 4. Management Module window

- In the left navigation pane under **I/O Module Tasks**, click **Management**. The Switch Management window opens.

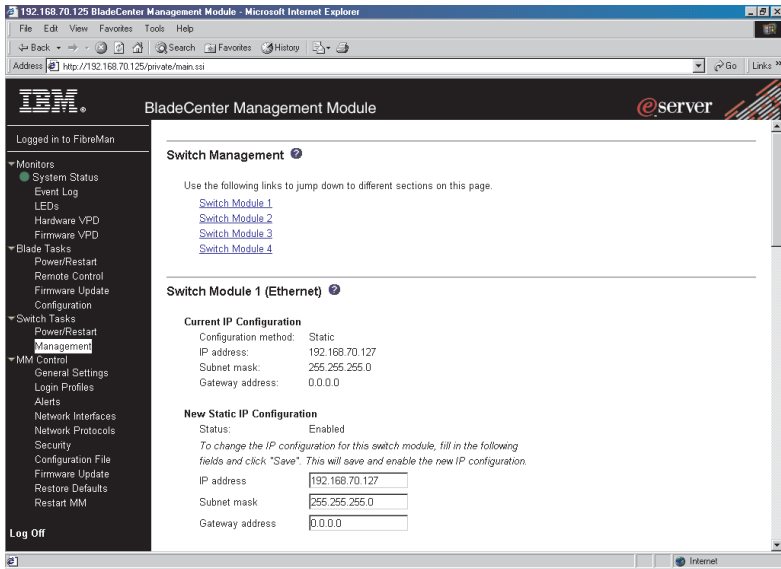


Figure 5. Switch Management window

5. Click the link for either I/O-Module 3 or I/O-Module 4. A window similar to the one in Figure 6 on page 32 opens.

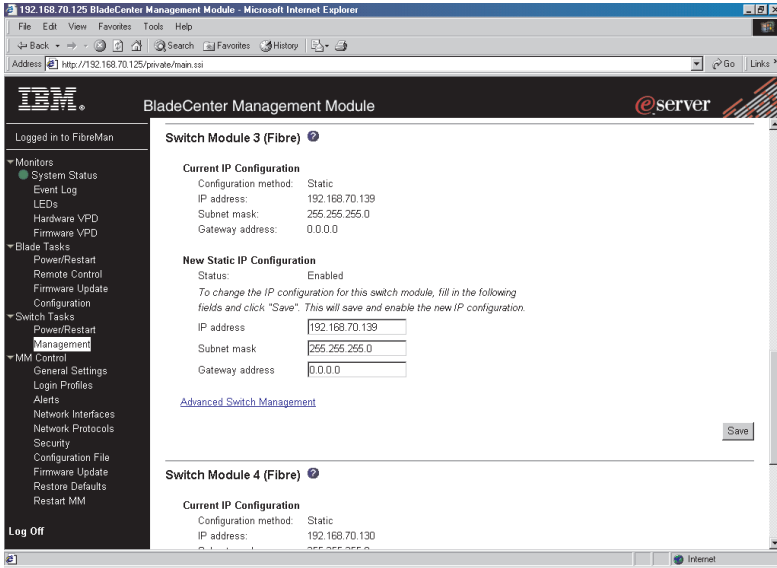


Figure 6. Switch Management window showing I/O-module 3 example

6. Verify 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**. A window similar to the one in Figure 7 on page 33 opens.

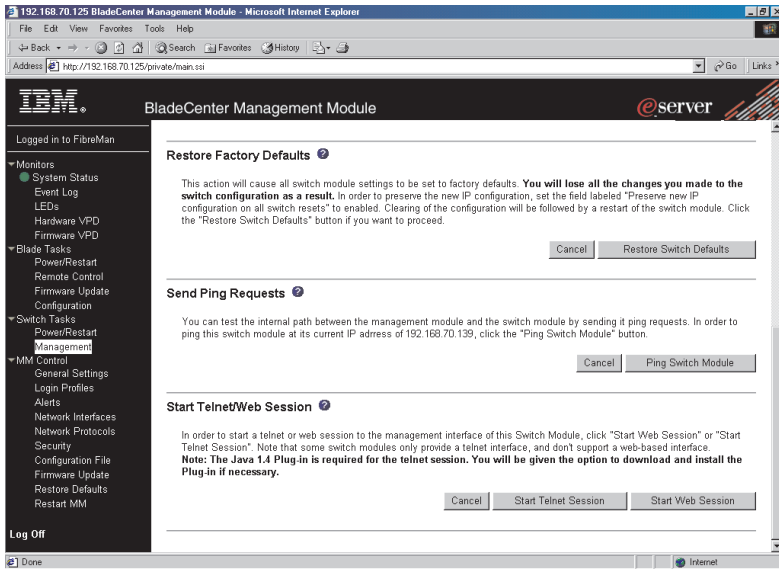


Figure 7. Switch Management window - advanced

8. To start a Telnet session, scroll down to the **Start Telnet/Web Session** section and click **Start Telnet Session**.
9. The I/O module Telnet Login window opens, as shown in Figure 8.

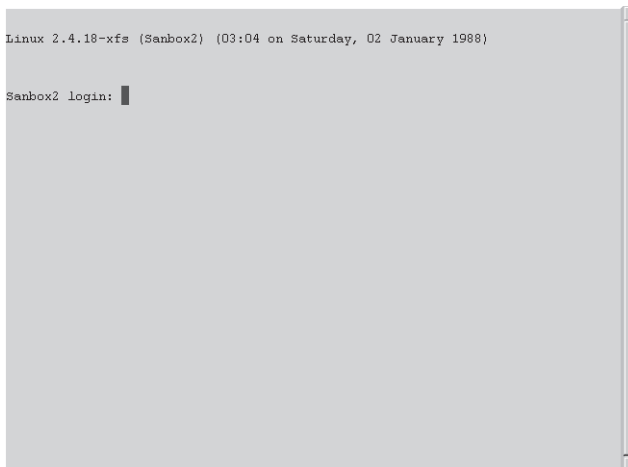


Figure 8. Fibre Channel Switch Module Telnet Login window

10. 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.
11. Click **OK** to open the Command Line Interface Shell window.

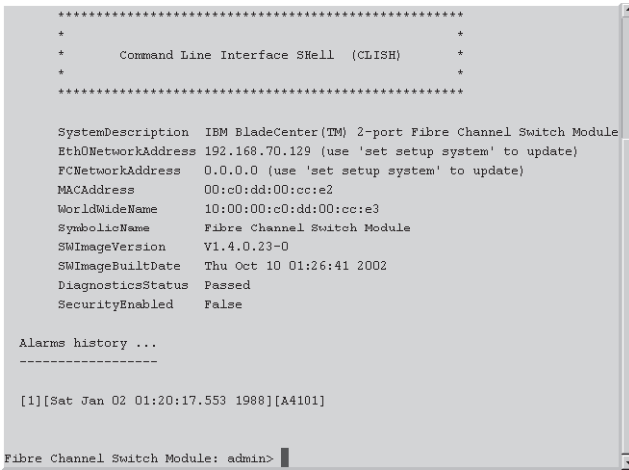


Figure 9. Command Line Interface Shell window

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

Continue with “CLI command format” on page 36. For more information about using the CLI, see the IBM *@server BladeCenter Fibre Channel Switch Module Management User’s Guide*.

Establishing a Telnet session in a command-line window

Note: The I/O module can be accessed by IP-enabled devices that are connected to BladeCenter Ethernet I/O modules. An Ethernet connection to the management module external ports on the BladeCenter unit is required. See the *Installation and User’s Guide* for your BladeCenter or BladeCenter T unit for more information.

Complete the following steps to establish a Telnet session through a command-line window:

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.

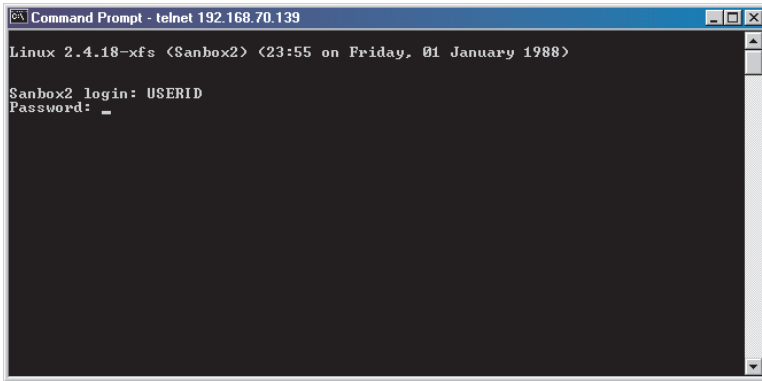


Figure 10. Command Prompt window

2. 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.

The Command Line Interface Shell window opens.

```

Command Prompt - telnet 192.168.70.139
Sanbox2 login: USERID
Password:
Establishing connection... Please wait.
*****
*                               *
*   Command Line Interface Shell <CLISH>   *
*                               *
*****

SystemDescription  IBM BladeCenter(TM) 2-port Fibre Channel Switch Module
Eth0NetworkAddress 192.168.70.139 (use 'set setup system' to update)
MACAddress         00:c0:dd:00:cc:e0
WorldWideName      10:00:00:c0:dd:00:cc:e1
SymbolicName       FCSM
SWImageVersion     UI-4.0.32-0
SWImageBuildDate   Thu Nov 21 15:44:42 2002
DiagnosticsStatus  Passed
SecurityEnabled    False

alarms history ...

[1][Fri Jan 01 00:01:07.886 1988][04101][0xdd00cce0.329][cmon: unable to set g
w addr]
FCSM: USERID>

```

Figure 11. Command Line Interface Shell window

Continue with “CLI command format.”

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 IBM *@server BladeCenter Fibre Channel Switch Module Management User’s Guide* on the IBM *BladeCenter Documentation CD*.

A command is followed by one or more keywords. Consider the following rules 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. Installing the IBM BladeCenter SAN Utility

You can use the BladeCenter SAN Utility application to access and configure the I/O modules. The SAN Utility 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 38.

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

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

Important: Before you configure your I/O module, be sure that the management modules in your BladeCenter unit are properly configured. In addition, to access and manage your 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. See the applicable *BladeCenter Unit Installation and User's Guide* documents on the IBM @server BladeCenter Documentation CD for more information. For more detailed information about configuring and managing your I/O module, see the IBM @server *BladeCenter Fibre Channel Switch Module Management User's Guide* on the IBM BladeCenter Documentation CD.

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* at <http://www.ibm.com/pc/support/> on the World Wide Web for information to help you prepare for system installation and configuration.

System requirements

Before you install the SAN Utility, 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">• Microsoft® Windows® 2000• Microsoft Windows 2003• Red Hat Linux Advanced Server• Red Hat Linux• SUSE Linux Professional
Memory	128 MB minimum
Disk space	150 MB for each installation
Processor	300 MHz or faster
Hardware	CD-ROM drive, 10/100/1000 Base-T Ethernet port
Internet browser	Microsoft Internet Explorer or Netscape Navigator

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

Use the applicable procedure in the following sections to install the SAN Utility on your network management workstation.

Installing the SAN Utility on a Microsoft Windows 2000 or Microsoft Windows 2003 platform

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

Complete the following steps to install the SAN Utility on a network management workstation that is configured with Microsoft Windows 2000 or Microsoft Windows 2003:

1. If your network management workstation is a BladeCenter blade server, to associate the CD-ROM drive with the blade server, press 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 the button 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 BladeCenter blade server, to associate the keyboard port, mouse port, and video port with the blade server, press the keyboard/mouse/video select button. The LED on this

button flashes while the request is processed, then is steady when the ownership of the keyboard, mouse and video is transferred to the blade server.

3. Close all open programs. Insert the IBM *BladeCenter SAN Utility* CD into the CD-ROM drive.
4. Open Windows Explorer and double-click the CD-ROM drive letter.
5. To install the SAN Utility, use one of the following methods, where *x.xx.xx* is the SAN Utility version number:
 - To install from the CD, mount the CD and double-click **Windowsx.xx.xx.exe**. Follow the SAN Utility 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 SAN Utility installation instructions.
6. When the installation is completed, use one of the following methods to start the SAN Utility:
 - Double-click the **BladeCenter SAN Utility** shortcut.
 - Click **Start** → **Programs** → **BladeCenterSANUtility** → **BladeCenterSANUtility**.

If a default fabric view file exists, the Enter Default File Password for Loading File window opens, as shown in Figure 12. Otherwise, the SAN Utility window opens.

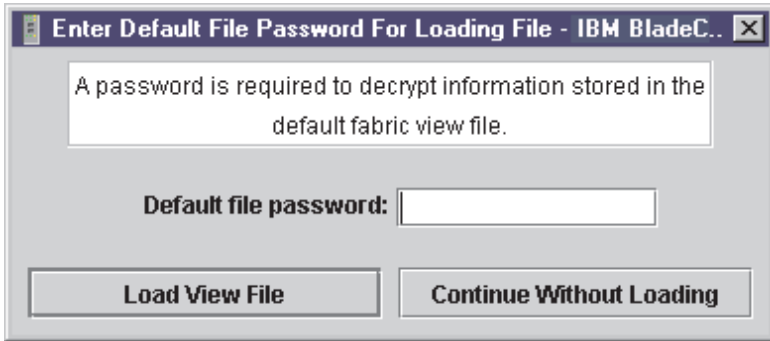


Figure 12. Enter Default File Password For Loading file window

Continue with "Using the SAN Utility" on page 42.

Uninstalling the SAN Utility on a Microsoft Windows 2000 or Microsoft Windows 2003 platform

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

The Uninstaller Data folder is copied into the installation folder during the initial SAN Utility installation process. The Uninstaller Data folder contains the Uninstall BladeCenter SAN Utility program that is used to uninstall the SAN Utility 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 SAN Utility installation process. The default installation directory is C:/Program files/BladeCenterSANUtility.

Complete the following steps to uninstall the SAN Utility:

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** → **BladeCenterSANUtility** → **Uninstall BladeCenterSANUtility**.
2. Double-click the uninstallation program or shortcut and follow the instructions to uninstall the SAN Utility.

Installing the SAN Utility on a Red Hat Linux or SUSE Linux Professional platform

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

Complete the following steps to install the SAN Utility on a network management workstation that is configured with Red Hat Linux or SUSE Linux Professional:

1. If your network management workstation is a BladeCenter blade server, to associate the CD-ROM drive with the blade server, press 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 the button 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 BladeCenter blade server, to associate the keyboard port, mouse port, and video port with the blade server, press the keyboard/mouse/video select button. The LED on this

button flashes while the request is processed, then is steady when the ownership of the keyboard, mouse and video is transferred to the blade server.

3. Close all open programs. Insert the IBM *BladeCenter SAN Utility* 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 the following command and press Enter:

```
mount /mnt/cdrom
```
6. To install the SAN Utility, use one of the following methods, where *x.xx.xx* is the SAN Utility version number:
 - To install from the CD, type:

```
sh /mnt/cdrom/Linux/Linux_x.xx.xx.bin
```

Follow the SAN Utility installation instructions.

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

```
cp /mnt/cdrom/Linux/Linux_x.xx.xx.bin /[directory]/
```

Where *[directory]* is where you want to copy the files to.
 - 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 SAN Utility installation instructions.
- 7. To start the SAN Utility after the installation is completed, from a command prompt, type one the following commands and press Enter:

```
sh /opt/BladecenterSANUtility/BladeCenterSANUtility
```

```
sh /opt/runBladeCenterSANUtility
```

If a default fabric view file exists, the “Enter Default File Password for Loading File” window opens, as shown in Figure 12 on page 39. Otherwise, the SAN Utility window opens.

Go to “Using the SAN Utility” on page 42.

Uninstalling the SAN Utility on a Red Hat Linux or SUSE Linux Professional platform

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

The Uninstaller Data folder is copied into the installation folder during the initial SAN Utility installation process. The Uninstaller Data folder contains the Uninstall BladeCenter SAN Utility program that is used to uninstall the SAN Utility from a network management workstation running Red Hat Linux or SUSE Linux Professional. In addition, a shortcut to the uninstallation program is installed in the user's home directory during the SAN Utility installation process. The default installation directory is `/opt/BladeCenterSANUtility/`.

Complete the following steps to uninstall the SAN Utility:

1. At the command prompt, type the following command and press Enter:
`# cd /opt/`
2. At the command prompt, type the following command and press Enter:
`#sh Uninstall_IBM_BladeCenter_San_Utility`

Using the SAN Utility

Use the following procedures to start the SAN Utility and complete the following tasks:

- Start the SAN Utility and add a new fabric
- Change the password for the default fabric view
- Set user preferences
- Access online help
- Save the default fabric
- Exit the SAN Utility

Starting the SAN Utility and adding a new fabric

When you have successfully installed the SAN Utility and the default fabric view does not exist, the IBM BladeCenter SAN Utility - Topology window (referred to as the Topology window) opens, as shown in Figure 13 on page 43.

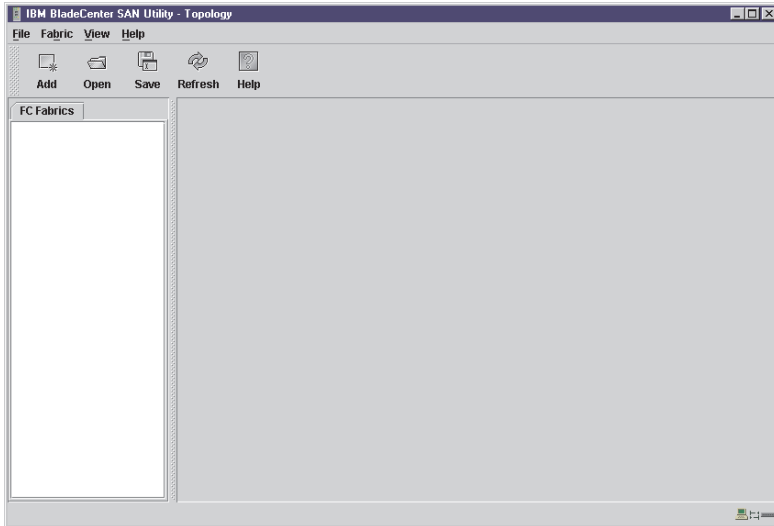


Figure 13. Topology window

If the default fabric view file exists, the Enter Default File Password for Loading File window opens, as shown in Figure 12 on page 39. Complete the following steps to start the SAN Utility and add a new fabric:

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

The SAN Utility 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, as shown in Figure 13.

2. Click **Add**.

The Add a New Fabric window opens, as shown in Figure 14 on page 44.

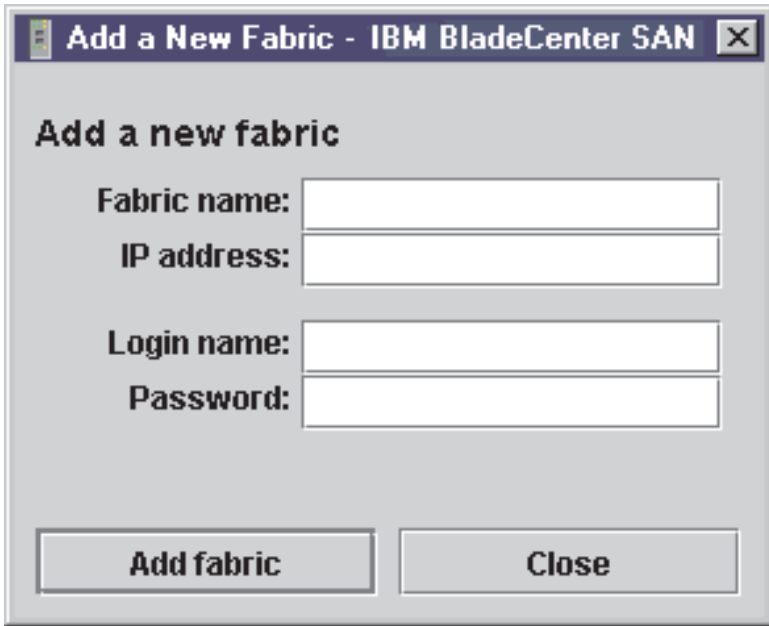


Figure 14. Add a New Fabric window

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, PASSWORD (the sixth character is a zero, not the letter O). The user ID and password are case sensitive.

Note: Security is disabled by default. When security is disabled, you are not required to type a login name or password. The default password is for the I/O module and is stored in the I/O module firmware. If you want to use a Telnet command set to grant user and authority levels, see the IBM *@server BladeCenter Fibre Channel Switch Module Management User's Guide* for more information.

6. Click **Add Fabric**.

See the IBM *@server BladeCenter Fibre Channel Switch Module Management User's Guide* for information about managing fabrics.

Changing the password for the default fabric view

Complete the following steps to change the password for the default fabric view file:

1. In the Topology window, click **File** → **Change Default File Password**.
The Set New Password window opens, as shown in Figure 15.



Figure 15. Set New Password window

2. In the **Default file password** field, type the new password.
3. In the **Re-enter password to confirm** field, type the same password again.
4. Click **OK** to save your changes.

Note: If you lose the password for the account, contact IBM Support (see Appendix A, “Getting help and technical assistance,” on page 53).

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.
- Choose the fabric discovery interval. Rates are 30, 45, or 60 seconds. The fabric discovery interval indicates how often the SAN Utility polls the fabric.
- Enable or disable the default view file auto save and load feature. See “Using the SAN Utility” on page 42 for more information about the default fabric view file.
- Select the default port view when opening the SAN Utility Faceplate window (referred to as the Faceplate window). See the IBM *@server BladeCenter Fibre Channel Switch Module Management User’s Guide* for more information about port views.

Complete the following steps from the Faceplate window to set user preferences for your SAN Utility sessions:

1. Click **File** → **Preferences**.

The Preferences window opens, as shown in Figure 16.

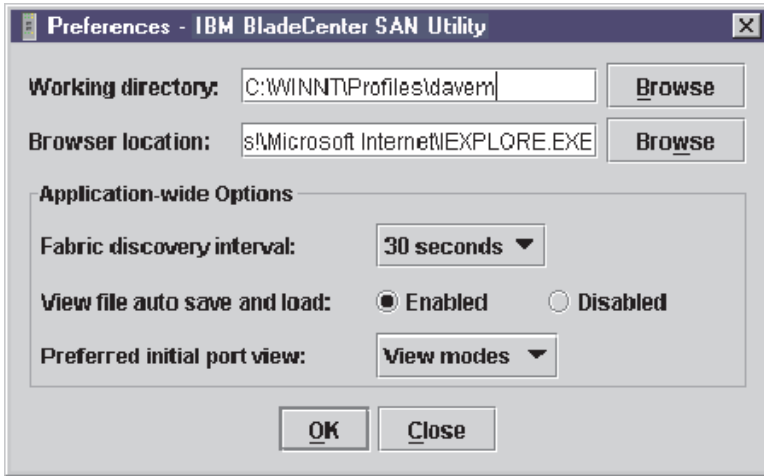


Figure 16. Preferences window

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 **Fabric discovery interval** field, select a polling frequency (30 seconds is the default value).
 - b. In the **View file auto save and load** field, select **Enabled** or **Disabled**.
 - c. 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 SAN Utility. You can access online help using the following two methods:

- From the BladeCenter SAN Utility window menu bar, click **Help** → **Help Topics**.
- From the BladeCenter SAN Utility window toolbar, click **Help**.

To view the SAN Utility software version and copyright information, click **Help** → **About**.

Exiting the SAN Utility

When you exit the SAN Utility, the current fabric view is encrypted and saved to the default fabric view file (fc_view.dft). A password is required to encrypt and save the default fabric view file the first time you exit the SAN Utility. When you exit subsequent sessions, the SAN Utility closes and saves the default fabric view file automatically without requiring a password.

In your next session, the SAN Utility opens the default fabric view file automatically after you type the password. To prevent the SAN Utility from automatically saving the default fabric view file each time 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 45 for more information.

Complete the following steps to exit a SAN Utility session:

1. From the Faceplate window, click **File** → **Exit**.

The Enter Default File Password for Loading File window opens, as shown in Figure 12 on page 39.

2. When you are prompted to type a password 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 a password and click **Save View File**.

Note: If the default fabric view file was saved with a password, the next time you open the SAN Utility, you will be prompted for the password in the Load Default Fabric View File window. The fabric window opens after you type the password.

- Click **Exit Without Saving** to exit the program without saving the current fabrics to the default fabric view file.
- Click **Cancel Exit** to cancel the exit operation.

SAN Utility Topology and Faceplate windows

The SAN Utility 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 IBM @server *BladeCenter Fibre Channel Switch Module Management User's Guide*.

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

Fabric tree: The fabric tree, shown in the FC Fabrics 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 you select.

Working status indicator: The working status indicator is in the lower-right corner of the SAN Utility 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 Figure 17 on page 49.

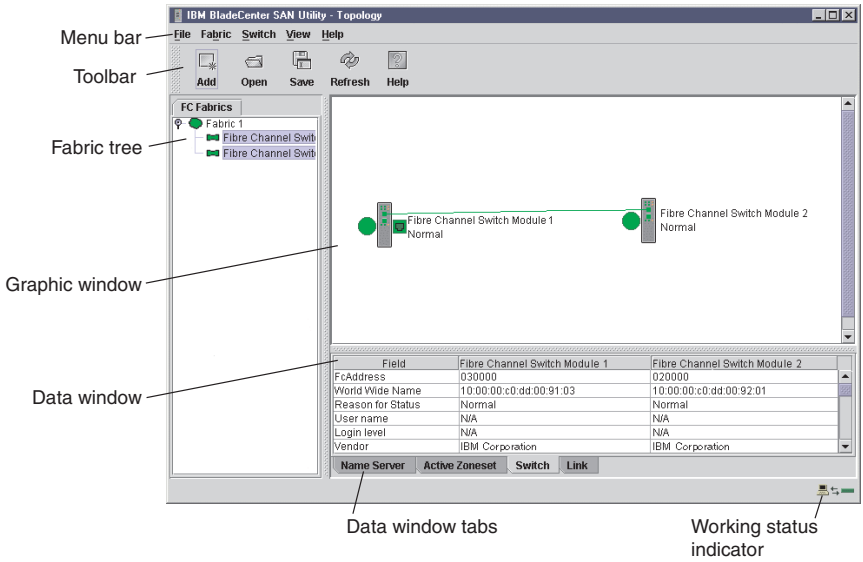


Figure 17. Topology window elements

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 Figure 18 on page 50. The Faceplate window for I/O modules installed in a BladeCenter T unit is shown in Figure 19 on page 50.

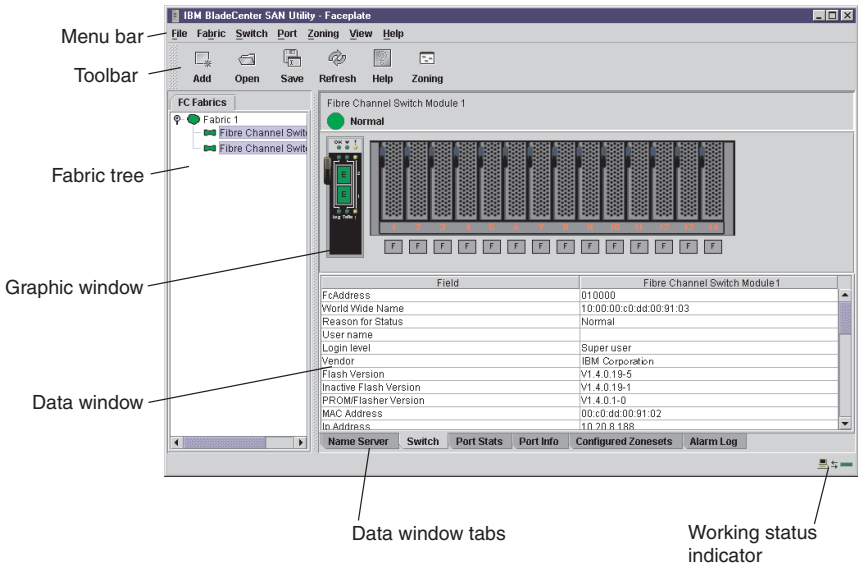


Figure 18. BladeCenter faceplate window elements

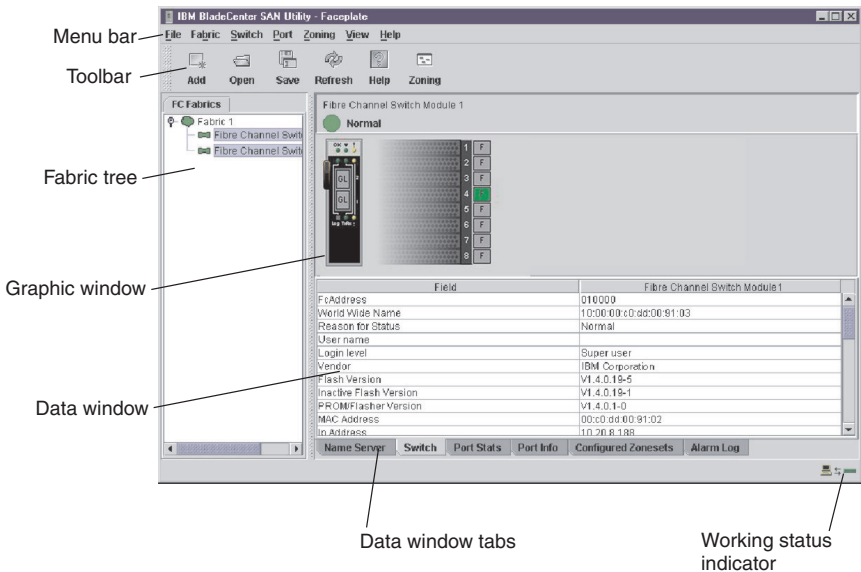


Figure 19. BladeCenter T faceplate window elements

The fabric tree, in the FC Fabrics 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 Figure 20.

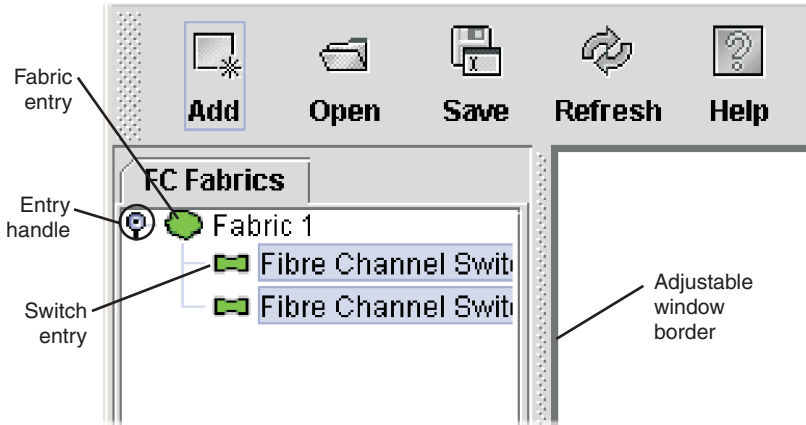


Figure 20. Fabric tree elements

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 communications failure.
- A blue switch entry icon indicates that the I/O module status is Unknown or that security is enabled on the I/O module, but security is disabled on the fabric management switch.
- A 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.

See the IBM *@server BladeCenter Fibre Channel Switch Module Management User's Guide* for information about using the Faceplate and Topology windows.

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 xSeries or IntelliStation[®] system, and whom to call for service, if it is necessary.

Before you call

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

- Check all cables to make sure that they are connected.
- Check the power switches to make sure that the system is 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* on the *IBM xSeries Documentation CD* or in the *IntelliStation Hardware Maintenance Manual* at the IBM Support Web site.
- Go to the IBM Support Web site at <http://www.ibm.com/pc/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 documents that are provided with your system and software. The information that comes with your system also describes the diagnostic tests that you can perform. Most xSeries and IntelliStation systems, operating systems, and programs come with information that contains troubleshooting procedures and explanations of error messages and error codes. If you suspect a software problem, see the information for the operating system or program.

Using the documentation

Information about your IBM xSeries or IntelliStation system and preinstalled software, if any, is available in the documentation that comes with your system. That documentation includes printed books, online books, 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/pc/support/> and follow the instructions. Also, you can order documentation through the IBM Publications Ordering System at <http://www.elink.ibm.com/public/applications/publications/cgibin/pbi.cgi>.

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 xSeries and IntelliStation products, services, and support. The address for IBM xSeries information is <http://www.ibm.com/eserver/xseries/>. The address for IBM IntelliStation information is <http://www.ibm.com/pc/intellistation/>.

You can find service information for your IBM products, including supported options, at <http://www.ibm.com/pc/support/>.

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, IntelliStation workstations, and appliances. For information about which products are supported by Support Line in your country or region, go to <http://www.ibm.com/services/sl/products/>.

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

Hardware service and support

You can receive hardware service through IBM Services or through your IBM reseller, if your reseller is authorized by IBM to provide warranty service. Go to <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.

Appendix B. IBM Statement of Limited Warranty Z125-4753-07 11/2002

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 via telephone 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 call for service, you must follow the problem determination and resolution procedures that IBM specifies. A technician will attempt to make an initial diagnosis of your problem and help you resolve it over the telephone.

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 and other easily replaceable parts), IBM will ship these parts to you for replacement by you.

If the Machine does not function as warranted during the warranty period and your problem cannot be resolved over the telephone, 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

Governing Law: *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.

BRAZIL

Governing Law: *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.

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").

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, LAOS, AND VIETNAM

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, LAOS, AND VIETNAM

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: If you purchase a Machine in Austria, Belgium, Cyprus, Denmark, Estonia, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Monaco, Netherlands, Norway, Portugal, Spain, San Marino, Sweden, Switzerland, United Kingdom or Vatican State, 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.

*Add the following paragraph in **Western Europe** (Austria, Belgium, Cyprus, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Liechtenstein, Luxembourg, Monaco, Netherlands, Norway, Portugal, Spain, San Marino, Sweden, Switzerland, United Kingdom, Vatican State):*

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.

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:

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.

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

AUSTRIA, DENMARK, FINLAND, GREECE, ITALY, NETHERLANDS, 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

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 warranty period for Machines is 12 months from the date of delivery. 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, 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.

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.

Machine - IBM @server BladeCenter 2-Port Fibre Channel Switch Module

Country or Region of Purchase	Warranty Period	Type of Warranty Service*
Worldwide	3 years	2
* See “Types of Warranty Service” for the legend and explanations of warranty-service types.		

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.

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 will ship CRU parts to you for your replacement. If IBM instructs you to return the replaced CRU, you are responsible for returning it to IBM in accordance with IBM’s instructions. If you do not return the defective CRU,

if IBM so instructs, within 30 days of your receipt of the replacement CRU, IBM may charge you for 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.

* 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/ provides a worldwide overview of IBM 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.

Austria -- 43-1-24592-5901	Italy -- 39-02-482-9202
Belgium -- 02-718-4339	Luxembourg -- 352-360385-1
Denmark -- 4520-8200	Netherlands -- 020-514-5770

Finland -- 358-9-4591	Portugal -- 351-21-7915-147
France -- 0238-557-450	Spain -- 34-91-662-4916
Germany -- 07032-15-4920	Sweden -- 46-8-477-4420
Greece -- 30-210-688-1220	United Kingdom -- 01475-555-055
Ireland -- 353-1-815-4000	

Appendix C. Notices

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

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

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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.

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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.

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