Brocade Enterprise SAN Switch Module for
IBM @server BladeCenter
and Brocade Entry SAN Switch Module for
IBM @server BladeCenter

IBM

Installation Guide

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Note:

Before using this information and the product it supports, read the general information in Appendix B, "IBM Statement of Limited Warranty Z125-4753-08 04/2004," on page 53 and Appendix C, "Notices," on page 77.

Contents

Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الآمنية

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

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

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

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

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

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

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

.לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

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

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

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

v

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

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

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

Перед установкой продукта прочтите инструкции по технике безопасности.

Pred inštaláciou tohto zariadenia si pečítaje Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

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

Läs säkerhetsinformationen innan du installerar den här produkten.

Important:

> All caution and danger statements in this documentation begin with a number. This number is used to cross reference an English caution or danger statement with translated versions of the caution or danger statement in the *IBM Safety Information* book.
>
> For example, if a caution statement begins with a number 1, translations for that caution statement appear in the *IBM Safety Information* book under statement 1.
>
> Be sure to read all caution and danger statements in this documentation before performing the instructions. Read any additional safety information that comes with your server or optional device before you install the device.

Statement 1:

DANGER

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

To avoid a shock hazard:

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

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

Statement 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.
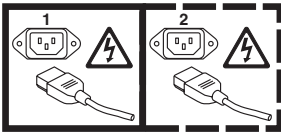
Statement 8:

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.

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

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

Chapter 1. The Brocade Enterprise and Entry SAN switch modules

This *Installation Guide* contains information about setting up and installing the Brocade® Enterprise SAN Switch Module for IBM® @server™ BladeCenter™ and the Brocade Entry SAN Switch Module for IBM @server BladeCenter.

For installation details, see Chapter 2, "Installing and replacing a switch module," on page 11. For specific I/O module installation requirements, see the instructions in your BladeCenter unit documentation. The Brocade Enterprise SAN Switch Module for IBM @server BladeCenter and the Brocade Entry SAN Switch Module for IBM @server BladeCenter are referred to throughout this document as the Brocade switch module, switch module, or I/O module. All IBM @server BladeCenter unit types are referred to throughout this document as the BladeCenter unit.

Notes:

1. The illustrations in this document might differ slightly from your hardware.
2. The sample screens that appear in this document might differ slightly from the screens displayed by your system. Screen content varies according to the type of BladeCenter unit that you are using and the firmware versions and options that are installed.

The switch module is a Fibre Channel component that consists of 16 ports:

- Two external Fibre Channel user ports with which to connect to external Fibre Channel devices
- 14 internal ports to connect to the BladeCenter unit blade server bays

You can manage and configure the switch module through multiple interfaces. For more information, see Chapter 4, "Configuring the switch module through the Telnet interface," on page 25 and Chapter 5, "Configuring the switch module through the Advanced Web Tools interface," on page 37.

You can obtain up-to-date information about the switch module and other IBM server products at http://www.ibm.com/eserver/xseries/.

The Enterprise SAN Switch Module comes with a full SAN scaling (up to 239 switches) license. This license allows for up to 239 domain attachments within a fabric. The Entry SAN Switch Module is limited to a two-domain switch fabric. The Entry SAN Switch Module is upgradeable through the purchase of an optional license key that provides full SAN scaling capabilities.

Record information about the switch module in the following table. You will need this information when you register the switch module with IBM.

Product name	Brocade Enterprise SAN Switch Module for IBM @server BladeCenter or Brocade Entry SAN Switch Module for IBM @server BladeCenter®
Model number	_____
Serial number	_____
Media access control (MAC) address	_____
Worldwide name (WWN)	_____

The switch module has the following labels:

- Product name label, which is located on the right side of the switch module.
- Serial number label, which contains the product part number and serial number and located on the left side of the switch module.
- Safety certification label, which is located on the left side of the switch module.
- Common Language Equipment Identification (CLEI) label, which is located on the left side of the switch module.
- Two media access control/worldwide name (MAC address/WWN) labels: one MAC address/WWN label is on the information panel on the top of the switch-module external port 0 and another MAC/WWN address label is on the left side of the switch module.

See "Major components of the switch module" on page 10 for the locations of the labels that contain the MAC address/WWN and serial number information.

Features and specifications

This section provides a summary of the features and specifications for the switch module.

The switch module has the following features:

- One PPC405GP processor that operates at 200 MHz
- One 256 Kb serial electrically erasable programmable read-only memory (SEEPROM)
- One real-time clock with a 10-year battery
- Three temperature sensors
- Two external autosensing Fibre Channel ports that operate at a maximum of 2 Gbps (gigabits per second)
- 14 internal fixed-speed Fibre Channel ports that operate at 2 Gbps
- Two internal full-duplex 100 Mbps Ethernet interfaces, terminated at a single MAC
- Power-on diagnostics and status reporting
- Standard Ethernet and Fibre Channel management information base (MIB) support
- External ports that can be configured as F_ports (fabric ports), FL_ports (fabric loop ports), or E_ports (expansion ports)
- Internal ports that are configured as F_ports at 2 Gbps
- Frame-filtering technology that enables advanced zoning and monitoring capabilities
- Optional short wavelength (SWL) and long wavelength (LWL) small form-factor pluggable (SFP) modules

The following software features come with the switch module:
- Brocade Advanced Web Tools
- Brocade Advanced Zoning
- Brocade Fabric Watch
- Full SAN scaling (up to 239 switches) (Enterprise version only)
- Support for Brocade Fabric Access API and API Scripting Toolkit
- Two-domain switch fabric (Entry version only)

For information about the standard software features, see the Brocade documentation on the IBM *Brocade Enterprise/Entry SAN Switch Module for IBM @server BladeCenter Documentation* CD. See "Related documentation" on page 7 for descriptions of these documents.

For optional advanced software features, see Chapter 6, "Advanced features for the Brocade Enterprise and Entry SAN switch modules," on page 47 for more information.

The following table contains the specifications of the I/O module.

Table 1. Fibre Channel switch-module specifications

Fibre Channel switch-module standards and protocols:	Fibre Channel switch-module standards and protocols (continued):	Fibre Channel switch-module standards and protocols (continued):

• Fibre Channel standards:
  – FC-AL ANSI X3.272:
  – FC-AL-2 NCIT S 332:
  – FC-FLA NCIT S TR-20:
  – FC-GS-3 NCITS 348-2000 Rev 7.01
  – FC-FG ANSI X3.289:
  – FC-FS Rev 1.7
  – FC-PH ANSI X3.230:
  – FC-PH-2 ANSI X3.297:
  – FC-PH-3 ANSI X3.303:
  – FC-PLDA NCIT S TR-19:
  – FC-SW-2 Rev 5.3
  – FC-VI Rev 1.61
  – IPFC RFC 2625
  – SANmark compliance SCD-3001 v2a1...
  – FC-MI, Rev 1.92
  – FC-SB-3 ANSI/INCITS 374:2003
  – FC-BB-2 Rev 5.3
	• Fibre Channel protocols:
	  – Fibre Channel service classes: Class 2 and class 3
	  – Operation modes: Fibre Channel class 2 and class 3, connectionless
	  – External port type:
	    - F_port
	    - FL_port
	    - E_port
	    - Self-discovery based on switch type U_port, an optional port type
	  – Internal port type: 2 Gbps default setting
	  – Port characteristics: External ports automatically detected and self-configuring
	  – Number of Fibre Channel ports: Two external ports and 14 internal ports
	  – Scalability: 239 switches maximum, depending on your configuration
		• Fibre Channel protocols (continued):
		  – Buffer credits: 16 buffer credits per port
		  – Media type: SFP module
		  – Fabric port speed: 1.0625 or 2.125 Gbps
		  – Maximum frame size: 2148 bytes (2112-byte payload)
		  – System processor: PPC405GP
		  – Fabric latency: Less than 2.1 µsec from any port to any port at 2 Gbps, cut-through routing
		  – Fabric point-to-point bandwidth: 2 Gbps or 4 Gbps at full duplex
		  – Fabric aggregate bandwidth: 64 Gbps if all 16 ports are running 2 Gbps at full duplex
		  – Nonblocking architecture shared-memory switch to prevent latency

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

Switch maintainability:	Dimensions:	I/O-module regulatory certifications:

• 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: Light-emitting diode (LED) indicators.
 	
Fabric management:
 	
• Management methods:
  – Web interface through Advanced Web Tools
  – Command-line interface (CLI) through Telnet program
  – Application program interface (API)
 	
• Brocade Fabric Manager for IBM @server BladeCenter Advanced Feature Options:
 	
  Provides Java™-based application program to help manage the storage area network (SAN) fabric
 	
• Management information base (MIB)
 	
• Switch simple network management protocol (SNMP) agent:
 	
  Enables a network management workstation to receive configuration values, traffic information, and Fibre Channel failure data through SNMP and the Ethernet interface
	• Width: 112 mm (4.41 in.)
	
	• Height: 29 mm (1.14 in.)
	
	• Depth: 260.3 mm (10.25 in.)
	
	• Weight: Approximately 0.91 kg (2 lb)
	
	Environmental:
	
	• Temperature and altitude:
	  – Operating:
	    - 10°C to 52°C (50°F to 125.6°F) at an altitude of 0 to 914 m (0 to 3000 ft)
	    - 10°C to 49°C (50°F to 120.2°F) at an altitude of 0 to 3000 m (0 to 10 000 ft)
	  – Non-operating: -40°C to 65°C (-40°F to 149°F) at an altitude of 0 to 12 000 m (0 to 39 370 ft)
	
	• Humidity:
	  – Operating: 8% to 80%, noncondensing
	  – Non-operating: 5% to 80%, noncondensing
		• Electrical requirements:
		  – Power source loading: 3.75 amps maximum at 12 V dc
		  – Approximate heat output in British thermal units (Btu) per hour: 85.3 Btu (25 watts)
		  – Operating voltage: 12 V dc
		  – Circuit protection: Internally fused with over-current protection
		
		• Safety standards:
		  – As a listed accessory by UL (USA)
		  – As a component by TUV
		
		• Telecom standards:
		  – NEBS Level 3, Earthquake Zone 4
		  – NEBS GR-63-CORE
		  – NEBS GR-1089-CORE, Issue 3
		  – ETSI EN 300 386

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

I/O-module regulatory certifications (continued):	Shortwave laser SFP module at 1 Gbps and multi-mode SFP module at 2 Gbps:	Longwave laser SFP module at 1 Gbps and 2 Gbps single-mode:

• Emissions standards:
  – 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
• Marking:
  – FCC part 15
  – UL (United States)
  – cUL (Canada)
  – TUV
  – VCCI
  – CE
	• Connector: LC-LC Fibre Channel cable
	• Color coding: Beige or black exposed connector surfaces
	• Cable: Fibre Channel 100-M6-SN-I (50 μm multimode)
	• Wavelength: 830 to 860 nm
	• Transmit power: -10 dBm minimum
	• Receiver sensitivity: -16 dBm average
	• Distance:
	  – 500 meters (1640.42 ft) maximum using 50-micron fiber
	  – 300 meters (984.25 ft) maximum using 62.5-micron fiber
	• Safety: DHHS 21 CFR(J), IEC 825-1 CENCELEC EN 60825-1, VDE
		• 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 (6.6 ft) to 10 kilometers (6.21 miles)
		• Safety: DHHS 21 CFR(J), IEDC 825-1 CENELEC EN 60825-1, VDE

Related documentation

This *Installation Guide* contains setup and installation instructions for the switch module and general information about the switch module, including getting started, how to configure the switch module, and how to get help. The most recent versions of this *Installation Guide* and all other BladeCenter documentation is at http://www.ibm.com/pc/support/.

The following related documentation is available on the BladeCenter unit *Documentation* CD:

- *Safety Information*: This document contains translated caution and danger statements. Each caution and danger statement that appears in the documentation has a number that you can use to locate the corresponding statement in your language in the *Safety Information* document.

- *Hardware Maintenance Manual and Troubleshooting Guide*: Selected BladeCenter products have a customized *Hardware Maintenance Manual and Troubleshooting Guide*. These documents contain information to help you solve a problem or to provide helpful information to a service technician.

- BladeCenter unit *Installation and User's Guide*: This document contains instructions for setting up and configuring the BladeCenter unit and basic instructions for installing some options in the BladeCenter unit. It also contains general information about the BladeCenter unit.

- BladeCenter unit *Management Module User's Guide*: This document contains instructions for installing, starting, configuring, and using the management module. It also provides general information about the management module and contains a description of the management-module features.

- BladeCenter unit *Management Module Command Line Interface Reference Guide*: This document contains instructions for installing, starting, configuring, and using the BladeCenter unit management-module command-line interface. It also provides general information about the management-module command-line interface and contains a description of its features.

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

In addition to this *Installation Guide*, the following related documentation is available on the IBM *Brocade Enterprise/Entry SAN Switch Module for IBM @server BladeCenter Documentation* CD:

- *Brocade Fabric OS Procedures Guide* v4.4.0 or later: This document provides a single location for detailed instructions to perform the most common administrative fabric and switch procedures.

- *Brocade Fabric OS Features Guide* v4.4.0 or later: This document is a single reference guide for setup and use of the many Brocade features, including switch management, advanced zoning, advanced performance monitoring, Inter-Switch Link (ISL) trunking, extended fabrics, and remote switch.

- *Brocade Fabric OS Command Reference Manual*: This document contains detailed information about the commands that are available with the Brocade command-line interface through the Telnet program.
- *Brocade Fabric OS MIB Reference Manual*: This document contains information about the Brocade management information base (MIB).
- *Brocade Fabric OS System Error Message Reference Manual*: This document contains diagnostic information, error-message descriptions, and troubleshooting procedures for the Brocade switch modules.
- *Release Notes for Brocade Enterprise SAN Switch Module for IBM @server BladeCenter and Brocade Entry SAN Switch Module for IBM @server BladeCenter*: This document contains updates, changes, issues, and work-arounds with respect to the switch modules. Read this document for the latest information that might not be included in the Brocade reference manuals.
- *Brocade Advanced Web Tools Administrator's Guide* v4.4.0 or later: This document contains information about the Brocade Advanced Web Tools graphical management feature. This feature comes with the switch module.
- *Brocade Fabric Watch User's Guide* v4.4.0 or later: This document contains information about the Brocade Fabric Watch SAN health monitoring feature. This feature comes with the switch module.
- *Brocade ISL Trunking User's Guide*: This document contains information about requirements for optional ISL trunking on the external ports of the Brocade switch modules.
- *Brocade Advanced Performance Monitor User's Guide*: This document contains information about optional advanced performance-monitoring procedures for the Brocade switch modules.

In addition, you might need to review the IBM *Configuration Options Guide*, which contains information about which SFP module and cable is required to connect the switch module to other storage devices. This document is at http://www.ibm.com/eserver/bladecenter/.

In addition to the documentation in this library, be sure to review the IBM *Planning and Installation Guide* for your BladeCenter unit type for information to help you prepare for system installation and configuration. This document is available at http://www.ibm.com/eserver/bladecenter/.

You might have to install an I/O expansion card (also known as a Fibre Channel expansion card) on some blade servers when installing the switch module into certain I/O-module bays of the BladeCenter unit. For information about the types of compatible I/O expansion cards for the blade servers, contact your IBM marketing representative or authorized reseller. See the I/O expansion card documentation for details about I/O expansion card installation, configuration, and use.

Inventory checklist

Make sure that the shipping carton contains the following items:

- One Fibre Channel switch module: Brocade Enterprise SAN Switch Module for IBM @server BladeCenter or Brocade Entry SAN Switch Module for IBM @server BladeCenter
- The *Brocade Enterprise SAN Switch Module for IBM @server BladeCenter and Brocade Entry SAN Switch Module for IBM @server BladeCenter Installation Guide*
- The IBM *Brocade Enterprise/Entry SAN Switch Module for IBM @server BladeCenter Documentation* CD
- One diagnostic wrap plug

If any of these items are missing or damaged, contact your local reseller for replacement.

Notices and statements in this document

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

The following notices and statements are used in this document:

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

Major components of the switch module

The following illustration shows the major components of the switch module.

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

Fibre Channel switch module

Safety certification label

Serial number label

Media access control (MAC) address and worldwide name (WWN) label

CLEI label

Information panel

Release-lever latch

Release lever
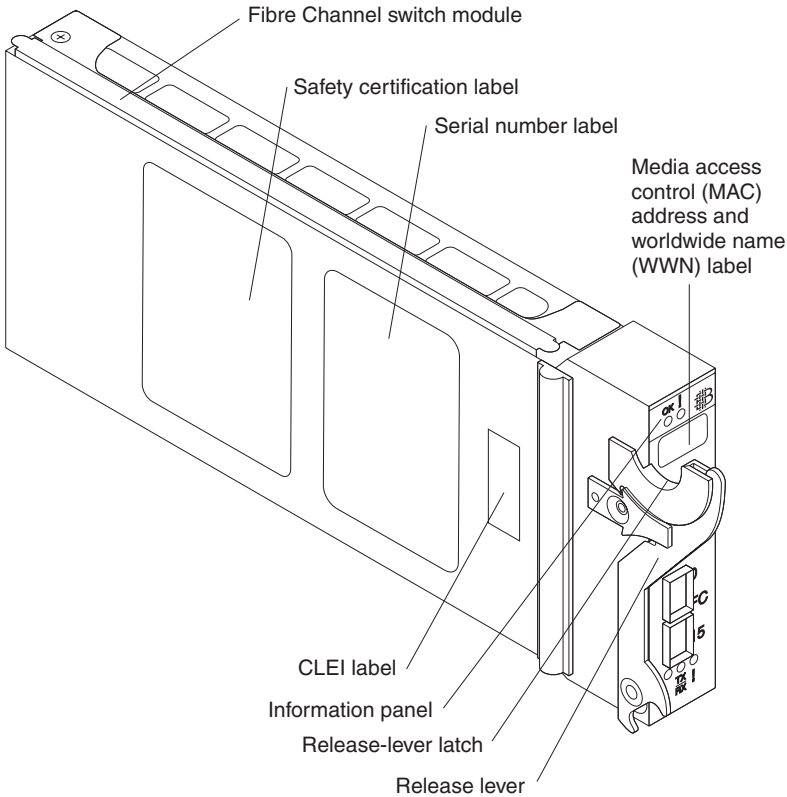
For more information about the components of the information panel, see Chapter 3, "Information panel LEDs and external Fibre Channel ports," on page 21. For more information about the MAC address, see the *Brocade Fabric OS Procedures Guide* on the IBM *Brocade Enterprise/Entry SAN Switch Module for IBM @server BladeCenter Documentation* CD.

Chapter 2. Installing and replacing a switch module

The following illustration shows the I/O-module bay locations for a typical BladeCenter unit.

I/O bay 3   I/O bay 1

BladeCenter unit rear view

I/O bay 2

I/O bay 4
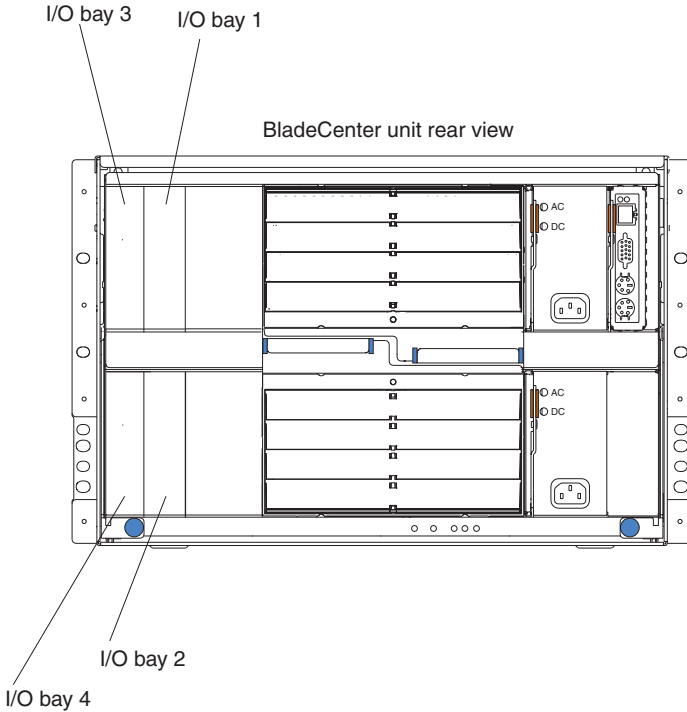
Note: Before you install the switch module, see the documentation for your BladeCenter unit type for specific I/O-module installation requirements.

You must install Fibre Channel switch modules only in I/O-module bays 3 and 4 of the BladeCenter unit. The IBM @server BladeCenter Fibre Channel Expansion Card has two 2 Gbps Fibre Channel ports. At least one switch module is required when you install the IBM @server BladeCenter Fibre Channel Expansion Card in the blade server. Installing a switch module in I/O-module bay 3 or bay 4 provides the first connection to any installed Fibre Channel expansion card in the BladeCenter unit. Installing a second switch module enables a second connection to a Fibre Channel expansion card in the BladeCenter unit. Adding a second switch module provides a redundant path and a separate Fibre Channel connection from the blade server to the external Fibre Channel network and SAN.

Important: The switch 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 the BladeCenter unit.

The following table summarizes the application for each switch module.

Bay	Fibre Channel switch-module function
3	Port 0 connection on the IBM @server BladeCenter Fibre Channel Expansion Card in the BladeCenter unit
4	Port 1 connection on the IBM @server BladeCenter Fibre Channel Expansion Card in the BladeCenter unit

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

Installation guidelines

Before you install the switch module in the BladeCenter unit, read the following information:

- Read the safety information beginning on page v and "Handling static-sensitive devices" on page 13, and read the safety statements in your BladeCenter unit documentation.
- Blue on a component indicates touch points, where you can grip the component to remove it from or install it in the BladeCenter unit, open or close a latch, and so on.
- Orange on a component or label 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.
- For a list of supported options for your BladeCenter unit, see http://www.ibm.com/pc/us/compat/.

System reliability considerations

Attention: To help ensure proper cooling, performance, 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 within 1 minute of removal.
- A removed hot-swap blade server is replaced with another blade server or filler blade within 1 minute of removal.
- The ventilation areas on the sides of the switch module are not blocked.
- You have followed the reliability guidelines in the documentation that comes with the BladeCenter unit.

Cable requirements for the switch module are described in the IBM *Configuration Options Guide* at http://www.ibm.com/eserver/bladecenter/. See the documentation that comes with your blade server for cable routing information.

## Handling static-sensitive devices

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

To reduce the possibility of 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 possibly damage the device.
- While the device is still in its static-protective package, touch it to any *unpainted* metal surface of the BladeCenter unit 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 it down. If it is necessary to set down the device, place it in its static-protective package. Do not place the device on your BladeCenter unit or on a metal surface.

- Take additional care when handling devices during cold weather. Heating reduces indoor humidity and increases static electricity.
- Some types of BladeCenter units come with electrostatic discharge (ESD) connectors. If your BladeCenter unit is equipped with an ESD connector, see the documentation for your BladeCenter unit for instructions for how to properly use the ESD connector.

Typical location of ESD connector (front of unit)
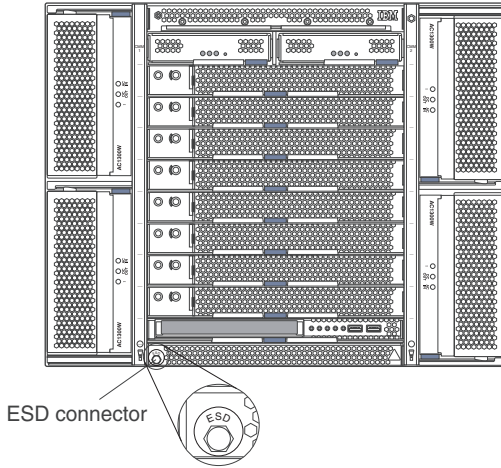
ESD connector

Typical location of ESD connector (rear of unit)

ESD connector
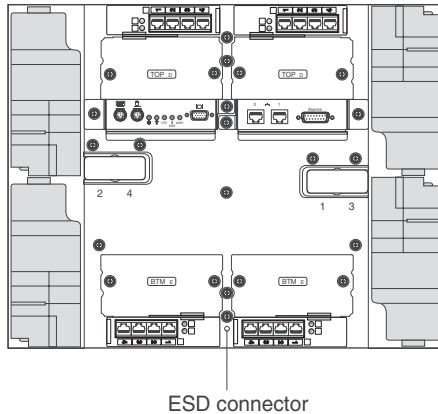
Installing a switch module

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.

To install a switch module, complete the following steps:

1. Read the safety information that begins on page v and "Installation guidelines" on page 12 through "Handling static-sensitive devices" on page 13.

2. If your BladeCenter unit has an acoustic attenuation module installed, remove it. See the documentation for your BladeCenter unit for instructions.

3. Select only I/O-module bay 3 or bay 4 in which to install the switch module.

   Note: For details about I/O-module bay requirements and bay locations, see the documentation for your BladeCenter unit type and blade servers.

4. Remove the filler module from the selected bay. Store the filler module for future use.

5. If you have not already done so, touch the static-protective package that contains the switch module to any *unpainted* metal surface of the BladeCenter unit chassis or any *unpainted* metal surface on any other grounded rack component for at least 2 seconds.

6. Remove the switch module from its static-protective package.

7. Make sure that the release lever is in the open position (perpendicular to the module).

8. Slide the switch module into the applicable I/O-module bay until it stops.

Switch module

Release lever

Release-lever latch
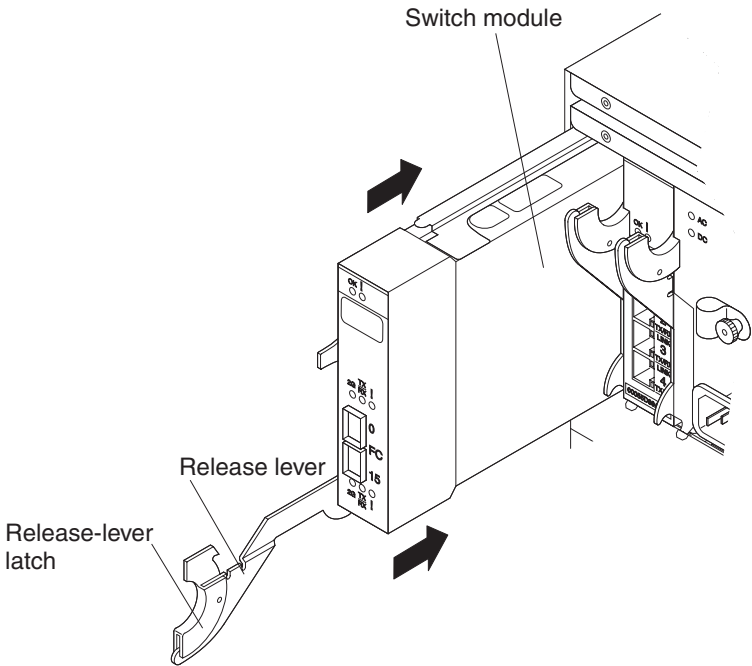
9. Push the release lever on the front of the switch module to the closed position. After you insert and lock the switch module, it is turned on, and a POST occurs to verify that the switch module is operating correctly.

   Notes:

   a. The switch module takes approximately 60 seconds to complete the POST. When the switch module is turned on, an LED test occurs. All LEDs are lit and remain lit for approximately 5 seconds; then, all the LEDs except the OK LED will turn off. The OK LED flashes to indicate a normal POST condition; then, POST proceeds as described in the next step.

   b. To maintain proper airflow, make sure that the ventilation areas on the sides of the switch module are not blocked.

10. Make sure that the LEDs on the switch module indicate that it is operating correctly (see "LEDs" on page 22).

    • When the POST starts, make sure that the green OK LED on the switch module is flashing. The POST tests the condition of firmware, memory, data paths, and switch logic and uses the fault LED to indicate pass or fail conditions.

- Make sure that the green OK LED on the switch module stops flashing to indicate that the switch logic has completed POST.

11. If you have a second switch module to install, repeat step 4 on page 16 through step 10 on page 17; otherwise, go to step 12.

12. If you are using the external switch-module ports, connect an SFP module option to external Fibre Channel port 0 and Fibre Channel port 15. For SFP module installation instructions, see the documentation that comes with the SFP module.

    Note: SFP module options do not come with the switch module but are required if you want to use external switch-module ports.

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

    Note: You can remove and replace an SFP module while the switch module is operating without damaging the 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 the connected Fibre Channel device for information about installation, configuration, and startup sequence.

14. Replace the acoustic attenuation module, if you removed it in step 2 on page 16.

15. Make sure that the ports on the switch module are enabled (click **I/O Module Tasks > Management > Advanced Management > Advanced Setup** in the management-module Web-based interface).

Removing or replacing a 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.

To replace a switch module, complete the following steps:

1. Read the safety information that begins on page v and "Installation guidelines" on page 12 through "Handling static-sensitive devices" on page 13.
2. If your BladeCenter unit has an acoustic attenuation module installed, remove it. See the documentation for your BladeCenter unit for instructions.
3. Disconnect the LC-LC or LC-SC fiber-optic cables from the two external ports on the SFP module. Removing these cables disrupts 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 the cable options.
4. Remove any SFP modules from the switch-module external Fibre Channel ports. For SFP-module removal instructions, see the documentation that comes with the SFP module.

5. Pull the release latch toward the bottom of the switch module as shown in the following illustration. The module moves out of the bay approximately 0.6 cm (0.25 inch).

Switch module

Release lever

Release-lever latch
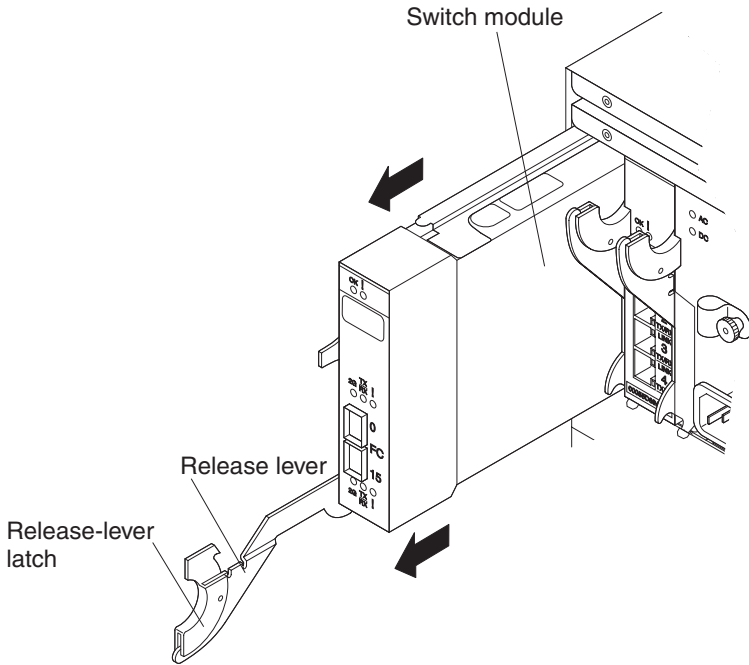
6. Slide the switch module out of the bay and set it aside.

7. Place either another switch module or a filler module in the bay within 1 minute (see steps 9 and 10 on page 17 for more information).

8. If you placed another switch module into the bay and if you are using the external switch-module ports, insert any SFP modules that you removed in step 4 on page 19 into external Fibre Channel port 0 and Fibre Channel port 15. For SFP-module installation instructions, see the documentation that comes with the SFP module.

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

10. Replace the acoustic attenuation module, if you removed it in step 2 on page 19.

Chapter 3. Information panel LEDs and external Fibre Channel ports

This chapter describes the information panel and LEDs on the switch module and the external Fibre Channel ports on the information panel.

Information panel

The switch module contains information panel LEDs and two Fibre Channel connectors, as shown in the following illustration.

OK !

System status LEDs

2G TX/RX !

Port 0 LEDs

Port 0 — 0

FC

Port 15 — 15

Port 15 LEDs

2G TX/RX !
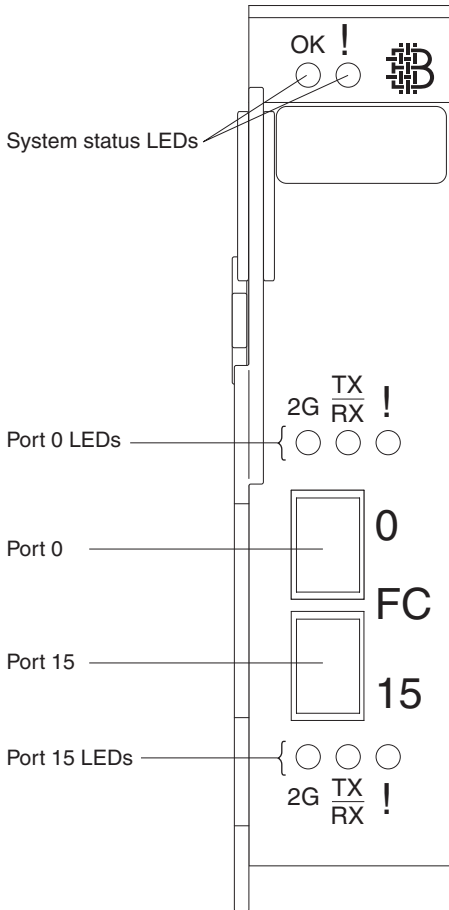
Note: The illustrations in this document might differ slightly from your
hardware.

The switch-module information panel contains the following components:

- Comprehensive LEDs that display the status of the switch module and the network. For more information, see "LEDs."
- Two external Fibre Channel connectors to connect Fibre Channel devices, such as disk subsystems, tape drives, and other servers; and SAN devices, such as Fibre Channel switches, extenders, and gateways. These connectors are identified as port 0 and port 15 in the switch configuration menus and are labeled 0 and 15 (from top to bottom) on the switch module. The internal connectors are numbered 1 through 14.

   Note: For the IBM @server BladeCenter T Types 8720 and 8730 units, ports 9 through 14 are disabled.
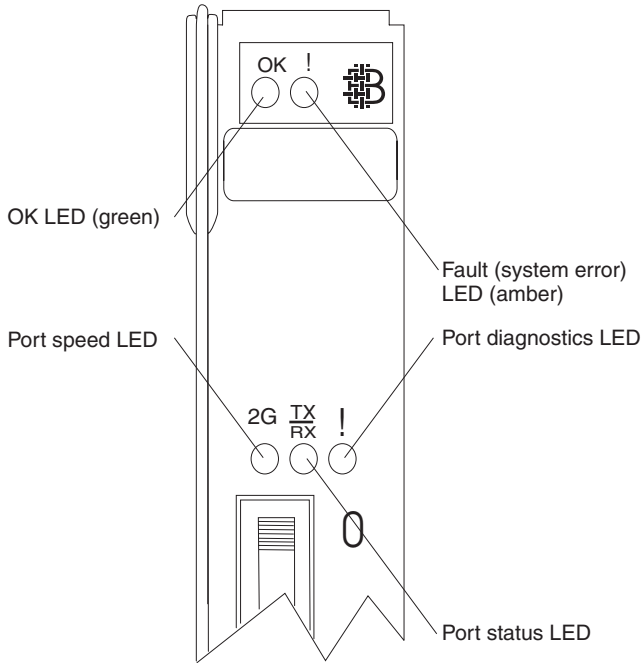
LEDs

After you install the switch module in the BladeCenter unit, the switch-module LEDs become active. There are three possible LED states: off, lit, and flashing. The lit (steady) LEDs and flashing LEDs can be green or amber.

The LEDs might display any of these states and colors during startup, POST, or other diagnostic tests. This is typical and does not indicate a problem, unless the LEDs do not indicate a healthy state after all the startup (boot) processes and diagnostic tests have been completed. If one or more LEDs do not display a healthy state, make sure that the LEDs are not set to beacon. For information about how to turn beaconing on and off, see the *Brocade Fabric OS Procedures Guide* or the *Brocade Advanced Web Tools Administrator's Guide* v4.4.0 or later on the IBM *Brocade Enterprise/Entry SAN Switch Module for IBM @server BladeCenter Documentation* CD.

Any errors that are detected during POST are written to the system log. This log is accessible through the **errShow** command. For information about this command, see the *Brocade Fabric OS Procedures Guide* on the Brocade switch module IBM *Documentation* CD. For information about error messages, see the *Brocade Fabric OS System Error Message Reference Manual* on the Brocade switch module IBM *Documentation* CD.

Note: You can also use the management module to make sure that the switch module is correctly operating. For more information, see your BladeCenter unit *Installation and User's Guide* and the *Hardware Maintenance Manual and Troubleshooting Guide* on the IBM BladeCenter unit *Documentation* CD.

The following illustration shows the LEDs on the switch module. To interpret the meaning of the LED states, see Table 2 on page 24.

OK !

OK LED (green)

Fault (system error)
LED (amber)

Port speed LED

Port diagnostics LED

2G TX/RX !

Port status LED

Notes:

- An amber LED is lit when a system error or event has occurred. To identify the error or event, check the LEDs on the information panel of the switch module and see Table 2 on page 24 for more information.

- An LED test occurs whenever the switch module is turned on. All LEDs are lit and remain lit for approximately 5 seconds; then, all the LEDs except the OK LED will turn off. The OK LED flashes to indicate a normal POST condition; then, POST proceeds as described in step 10 on page 17.

- See the diagnostic section of the *Brocade Fabric OS System Error Message Reference Manual* on the Brocade switch module IBM *Documentation* CD for more information about the LEDs.

Table 2. I/O-module LED descriptions

LED name	LED color and state	Hardware status
System status (OK and !)	None	The switch module is off or receiving no power.
System status (OK)	Green: Steady	The switch module is on and the power modules in the BladeCenter unit are correctly operating.
	Green: Flashing	POST is running.
	Green: Off	The amber LED is lit or there is no power.
System status (!) (Fibre Channel switch-module fault)	Amber: Steady	Fault. POST failure or critical alert. **Note:** When this LED is lit, the system-error LED on the BladeCenter unit is also lit.
	Amber: Off	The green LED is lit, indicating a healthy switch, or, if the green LED is off, there is no power.
Port speed	Green: Off	The indicated Fibre Channel switch-module port (0 or 15) is operating at 1 Gbps.
	Green: On	The indicated Fibre Channel switch-module port (0 or 15) is operating at 2 Gbps.
Port status	Green: Off	No signal or the port diagnostics LED is active on the indicated port (0 or 15).
	Green: Steady	The indicated port (0 or 15) is online.
	Green: Flickering	The indicated port (0 or 15) is connected, and Fibre Channel activity is occurring on that port.
	Green: Flashing slowly	The indicated port (0 or 15) is online but segmented from the connected switch or device.
	Green: Flashing rapidly	The indicated port (0 or 15) is in the internal loopback mode because of diagnostics.
Port diagnostics	Amber: Off	There are no faults on the indicated port (0 or 15).
	Amber: Steady	The indicated port (0 or 15) signal is present but not online.
	Amber: Flashing slowly	The indicated port (0 or 15) has been disabled, or switch beaconing is on.
	Amber: Flashing rapidly	This LED is lit on the indicated port (0 or 15) when the port-diagnostics program has discovered an error (port fault).

Chapter 4. Configuring the switch module through the Telnet interface

The 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 through the command-line interface (CLI). You can perform a variety of fabric and switch-management tasks through an Ethernet connection by using the CLI.

You can access the Telnet interface in two ways:

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

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

- Switch-module external port 0 and port 15
- External management for external port 0 and port 15

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

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

Important: Before configuring the switch module, make sure that the management modules in the BladeCenter unit are correctly configured. In addition, to access and manage the switch module from an external environment, you might have to enable certain features, such as the external ports and external management over all ports. See your BladeCenter unit *Installation and User's Guide* on the IBM BladeCenter unit *Documentation* CD for more information. For information about configuring the switch module, see the *Brocade Fabric OS Command Reference Manual* on the IBM *Brocade Enterprise/Entry SAN Switch Module for IBM @server BladeCenter Documentation* CD.

Connecting to the switch module

To use the Telnet program (in VT100 compatible terminal mode) to access and control the switch module, you must know the IP address for the switch module and have an existing network connection. If you have to obtain the IP address for the switch module or establish a network connection, contact your system or network administrator.
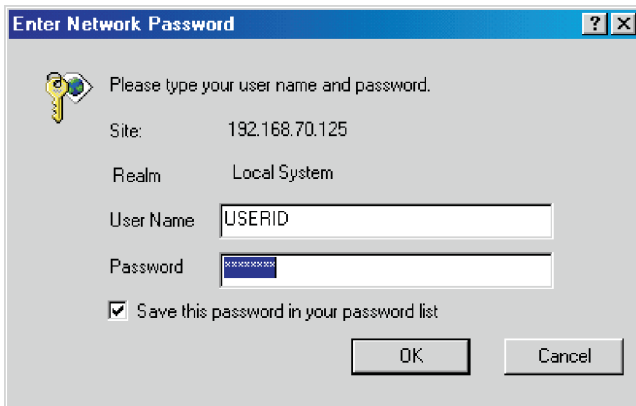
Establishing a Telnet session through the management module

To establish a Telnet session through the BladeCenter unit management module, complete the following steps:

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

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 unit management-module interface. Click **GO** or press Enter. The Enter Network Password window opens.

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

2. In the **User Name** field, type the initial default user name, USERID. In the **Password** field, type the initial default password, PASSW0RD (the sixth character is a zero, not the letter *O*). The user name and password are case sensitive.

The management-module Welcome window opens.

3. In the **Inactive session timeout value** field, select the timeout value for this Web session and click **Continue**.

The management-module main window opens.

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

I/O Module Management ❓

Use the following links to jump down to different sections on this page.

Bay 1
Bay 2
Bay 3
Bay 4

Bay 1 (Fibre SM)* ❓

Current IP Configuration
Configuration method: Static
IP address: 9.42.204.101
Subnet mask: 255.255.255.192
Gateway address: 9.42.204.65

New Static IP Configuration
Status: Enabled
To change the IP configuration for this switch module, fill in the following fields and click "Save". This will save and enable the new IP configuration.

IP address | 9.42.204.101
Subnet mask | 255.255.255.192
Gateway address | 9.42.204.65

Advanced Management

[Save]

5. Click the link for either Bay 3 or Bay 4.

   A window similar to the following opens.

Bay 3 (Fibre SM) *

Current IP Configuration
Configuration method:	Static
IP address:	9.42.204.102
Subnet mask:	255.255.255.192
Gateway address:	9.42.204.65

New Static IP Configuration

Status: Enabled

To change the IP configuration for this switch module, fill in the following fields and click "Save". This will save and enable the new IP configuration.

IP address	9.42.204.102
Subnet mask	255.255.255.192
Gateway address	9.42.204.65

Advanced Management

Save

6. Make sure that the IP address is the same in the **Current IP Configuration** and **New Static IP Configuration** sections.

7. Click **Advanced Management**. A window similar to the one in the following illustration opens.

Advanced Management for I/O Module 3 ❷

Use the following links to jump down to different sections on this page.
POST Results
Advanced Setup
Restore Factory Defaults
Send Ping Requests
Start Telnet/Web Session

POST Results ❷

POST results available: FF: Module completed POST successfully.

Advanced Setup ❷

Fast POST	Disabled ▾
External ports	Enabled ▾
External management over all ports	Disabled ▾
Preserve new IP configuration on all resets	Disabled ▾

Cancel | Save

Restore Factory Defaults ❷

This action will cause all module settings to be set to their factory defaults. **You will lose all the changes you made to the configuration of this module as a result.** In order to preserve the new IP configuration, set the field labeled "Preserve new IP configuration on all resets" to enabled. Clearing of the configuration will be followed by a restart of the module. Click the "Restore Defaults" button if you want to proceed.

Cancel | Restore Defaults

Send Ping Requests ❷

You can test the internal path between the management module and the switch module by sending it ping requests. In order to ping this switch module at its current IP address of 9.42.204.102, click the "Ping Switch Module" button.

Cancel | Ping Switch Module

Start Telnet/Web Session ❷

In order to start a telnet or web session to the management interface of this module, click "Start Web Session" or "Start Telnet Session". Note that some modules only provide a telnet interface, and don't support a web-based interface. The web session will connect to the standard HTTP port (80), and the telnet session will connect to the standard telnet port (23).
Note: The Java 1.4 Plug-in is required for the telnet session. You will be given the option to download and install the Plug-in if necessary.

Cancel | Start Telnet Session | Start Web Session

---

8. To start a Telnet session, scroll down to the **Start Telnet/Web Session** section and click **Start Telnet Session**.

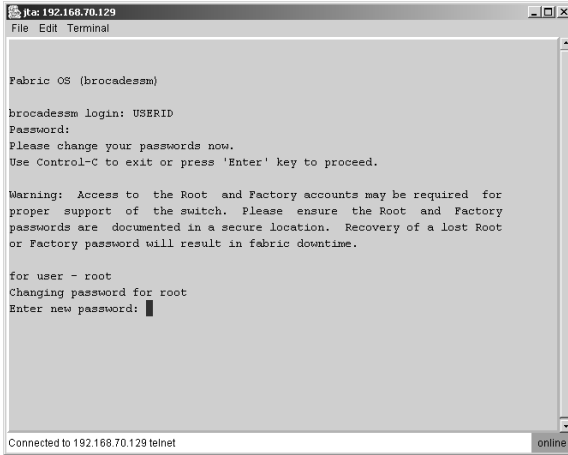The management-module command-prompt window opens.

```
jta: 192.168.70.129                                          _ □ ×
File  Edit  Terminal


Fabric OS (brocadessm)

brocadessm login: █








Connected to 192.168.70.129 telnet                           online
```
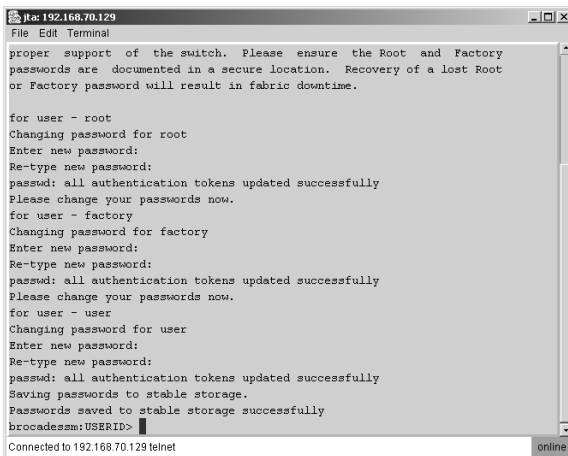
9. At the `Login` prompt, type the initial default user name, `USERID`, and press Enter. At the `Password` prompt, type the initial default password, `PASSW0RD` (the sixth character is a zero, not the letter *O*), and press Enter. The user name and password are case sensitive.

10. If you are accessing the switch module for the first time, press Enter to change the switch passwords. You are prompted for a password for the root, factory, and user accounts.

A management-module password-change window similar to the one in the following illustration opens.

After you have changed all of the passwords, the command prompt is displayed in a window similar to the one in the following illustration.

To open online help to view the available commands, type `help` and press Enter.

For more information about using the CLI, see the *Brocade Fabric OS Command Reference Manual* on the Brocade switch module IBM *Documentation* CD.

Establishing a Telnet session in a command-line window

You can access the switch module by IP-enabled devices that are connected to the BladeCenter unit management module. An Ethernet connection to the management-module external ports on the BladeCenter unit is required. For more information, see the following documents on the IBM BladeCenter unit *Documentation* CD:

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

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

1. Open a command-line window on the network-management workstation.
2. Type one of the following commands and press Enter. The IP addresses in these commands are default IP addresses.

   For the switch module in I/O bay 3:

   `telnet 192.168.70.129`

   For the switch module in I/O bay 4:

   `telnet 192.168.70.130`

   A Telnet command-prompt window opens.

```
Telnet 192.168.70.129

Fabric OS (brocadessm)

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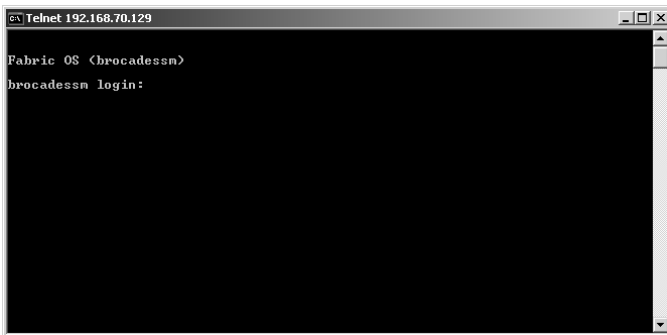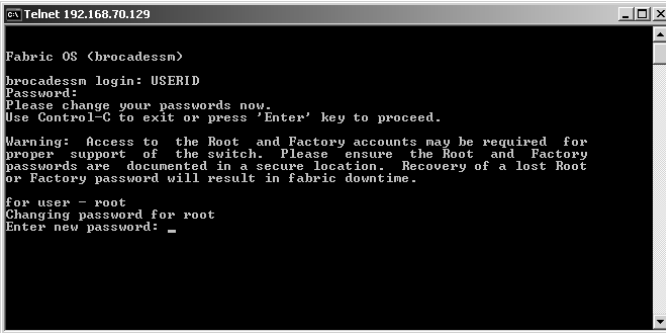
3. At the `Login` prompt, type the initial default user name, `USERID`, and press Enter. At the `Password` prompt, type the initial default password, `PASSW0RD` (the sixth character is a zero, not the letter *O*). The user name and password are case sensitive.

4. If you are accessing the switch module for the first time, press Enter to change the switch passwords. You are prompted for a password for the root, factory, and user accounts.

A Telnet password-change window opens.

After you have changed all of the passwords, the command prompt is displayed in the Telnet window.

Chapter 5. Configuring the switch module through the Advanced Web Tools interface

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

Advanced Web Tools is a graphical interface that requires a Web browser to view and manage the switch. For information about system requirements and supported Web browsers, see the *Brocade Advanced Web Tools Administrator's Guide* v4.4.0 or later on the IBM *Brocade Enterprise/Entry SAN Switch Module for IBM @server BladeCenter Documentation* CD.

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

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

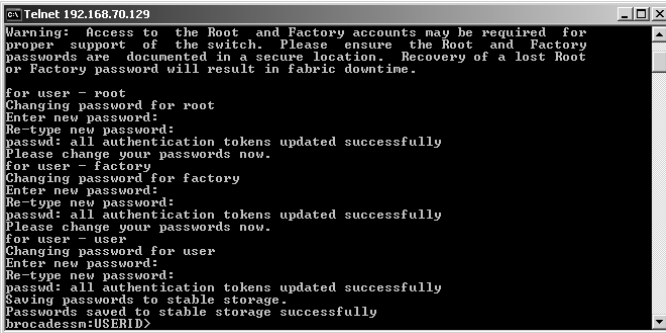For you to configure the switch module through the Web interface, the IP address and subnet masks must be compatible, and the following configuration settings in the management module must be enabled:

- Switch-module external port 0 and port 15
- External management for external port 0 and port 15

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

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

Important: Before configuring the switch module, make sure that the management modules in the BladeCenter unit are correctly configured. In addition, to access and manage the switch module from an external environment, you might have to enable certain features, such as the external ports and external management over all ports. See your BladeCenter unit *Installation and User's Guide* on the IBM BladeCenter unit *Documentation* CD for more information. For information about configuring the switch module, see

the *Brocade Advanced Web Tools Administrator's Guide* v4.4.0 or later on the IBM *Brocade Enterprise/Entry SAN Switch Module for IBM @server BladeCenter Documentation* CD.

Connecting to the switch module

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

Establishing a Web-interface session through the management module

To establish a Web-interface session through the BladeCenter unit management module, complete the following steps:
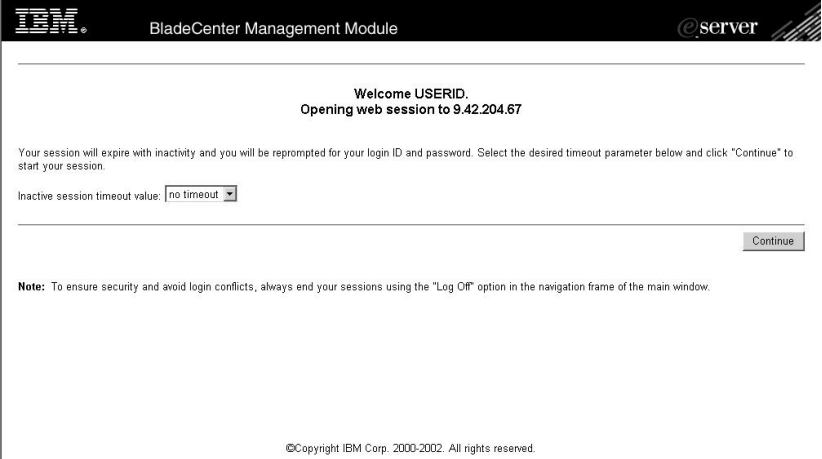
1. In your browser, in the address field, type http://*xxx.xxx.xxx.xxx*, where *xxx.xxx.xxx.xxx* is the IP address of the BladeCenter unit management-module interface. Click **GO** or press Enter. The Enter Network Password window opens.

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

2. In the **User Name** field, type the initial default user name, `USERID`. In the **Password** field, type the initial default password, `PASSW0RD` (the sixth character is a zero, not the letter *O*). The user name and password are case sensitive.

The management-module Welcome window opens.
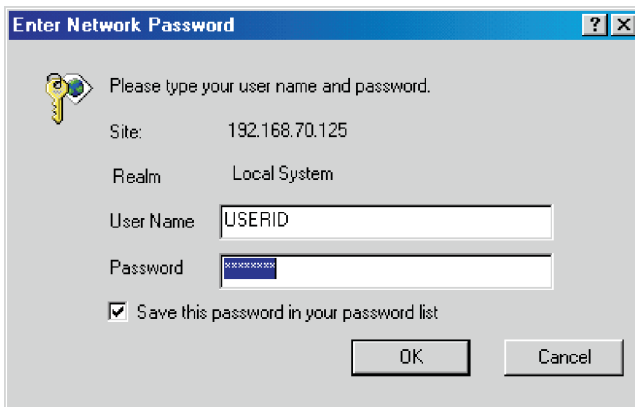
IBM.   BladeCenter Management Module   *e*server

Welcome USERID.
Opening web session to 9.42.204.67

Your session will expire with inactivity and you will be reprompted for your login ID and password. Select the desired timeout parameter below and click "Continue" to start your session.

Inactive session timeout value: [no timeout ▼]

[Continue]

Note: To ensure security and avoid login conflicts, always end your sessions using the "Log Off" option in the navigation frame of the main window.

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3. In the **Inactive session timeout value** field, select the timeout value for this Web session and click **Start New Session**.

The management-module main window opens.

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

I/O Module Management

Use the following links to jump down to different sections on this page.
Bay 1
Bay 2
Bay 3
Bay 4

Bay 1 (Fibre SM)*

Current IP Configuration
Configuration method: Static
IP address: 9.42.204.101
Subnet mask: 255.255.255.192
Gateway address: 9.42.204.65

New Static IP Configuration
Status: Enabled
To change the IP configuration for this switch module, fill in the following fields and click "Save". This will save and enable the new IP configuration.

IP address   9.42.204.101
Subnet mask   255.255.255.192
Gateway address   9.42.204.65

Advanced Management

Save

5. Click the link for either Bay 3 or Bay 4.

   A window similar to the one in the following illustration opens.

6. Make sure that the IP address is the same in the **Current IP Configuration** and **New Static IP Configuration** sections.

7. Click **Advanced Management**. A window similar to the one in the following illustration opens.

Advanced Management for I/O Module 3

Use the following links to jump down to different sections on this page.

POST Results
Advanced Setup
Restore Factory Defaults
Send Ping Requests
Start Telnet/Web Session

POST Results

POST results available: FF: Module completed POST successfully.

Advanced Setup

Fast POST   Disabled ▾
External ports   Enabled ▾
External management over all ports   Disabled ▾
Preserve new IP configuration on all resets Disabled ▾

[Cancel] [Save]

Restore Factory Defaults

This action will cause all module settings to be set to their factory defaults. **You will lose all the changes you made to the configuration of this module as a result.** In order to preserve the new IP configuration, set the field labeled "Preserve new IP configuration on all resets" to enabled. Clearing of the configuration will be followed by a restart of the module. Click the "Restore Defaults" button if you want to proceed.

[Cancel] [Restore Defaults]

Send Ping Requests

You can test the internal path between the management module and the switch module by sending it ping requests. In order to ping this switch module at its current IP address of 9.42.204.102, click the "Ping Switch Module" button.

[Cancel] [Ping Switch Module]

Start Telnet/Web Session

In order to start a telnet or web session to the management interface of this module, click "Start Web Session" or "Start Telnet Session". Note that some modules only provide a telnet interface, and don't support a web-based interface. The web session will connect to the standard HTTP port (80), and the telnet session will connect to the standard telnet port (23).
Note: The Java 1.4 Plug-in is required for the telnet session. You will be given the option to download and install the Plug-in if necessary.

[Cancel] [Start Telnet Session] [Start Web Session]

---

8. To start a Web-interface session, scroll down to the **Start Telnet/Web Session** section and click **Start Web Session**.

   The I/O-module Advanced Web Tools interface window opens.
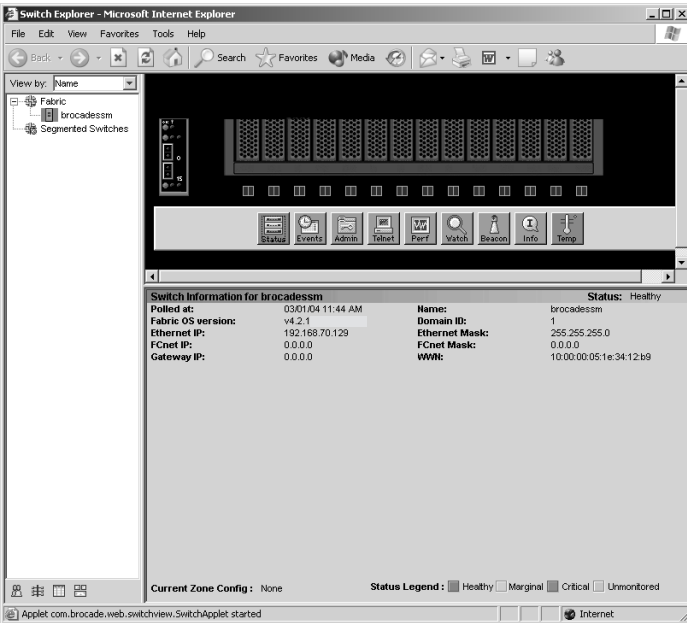
9. To perform switch-module administrative tasks, click **Admin**, and log in to the switch. In the **User Name** field, type the initial default user name, USERID. In the **Password** field, type the initial default password, PASSW0RD (the sixth character is a zero, not the letter *O*). The user name and password are case sensitive.

For more information about using the Advanced Web Tools interface, see the *Brocade Advanced Web Tools Administrator's Guide* v4.4.0 or later on the Brocade switch module IBM *Documentation* CD.

Establishing a Web-interface session through a Web browser

You can access the switch module by IP-enabled devices that are connected to the BladeCenter unit management module. An Ethernet connection to the management-module external ports on the BladeCenter unit is required. For more information, see the following documents on the IBM BladeCenter unit *Documentation* CD:

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

To establish a Web-interface session through a Web browser, complete the following steps:

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

   For I/O bay 3:

   `http://192.168.70.129`

   For I/O bay 4:

   `http://192.168.70.130`

   The I/O-module Advanced Web Tools interface window opens.
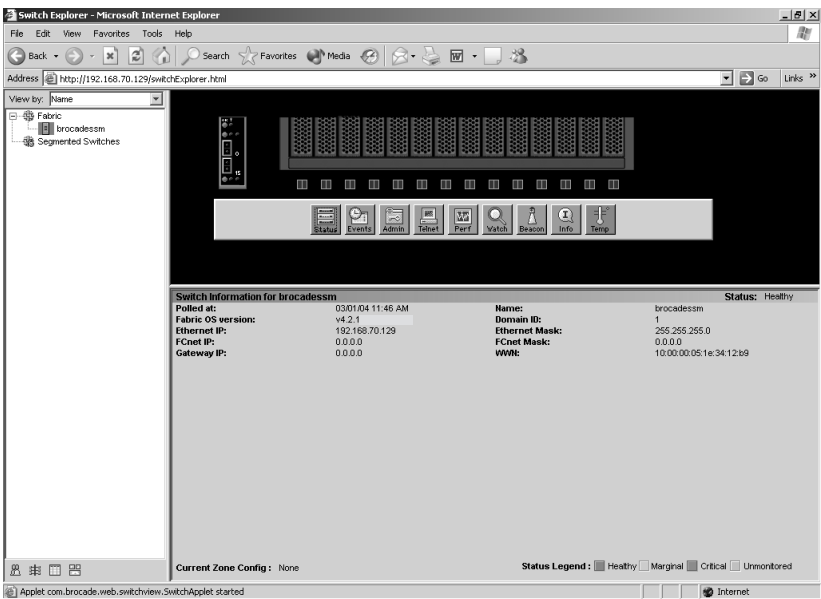
3. To perform switch-module administrative tasks, click **Admin**, and log in to the switch. In the **User Name** field, type the initial default user name, USERID. In the **Password** field, type the initial default password, PASSW0RD (the sixth character is a zero, not the letter *O*). The user name and password are case sensitive.

For more information about using the Advanced Web Tools interface, see the *Brocade Advanced Web Tools Administrator's Guide* v4.4.0 or later on the Brocade switch module IBM *Documentation* CD.

Chapter 6. Advanced features for the Brocade Enterprise and Entry SAN switch modules

You can upgrade the switch module to use the following optional features after you purchase them. Except where indicated in Table 3, these features are available for both the Enterprise version and the Entry version of the switch module.

Table 3. Optional features

Optional feature	Description

Brocade Advanced Performance Monitoring for IBM @server BladeCenter unit	• Provides advanced performance-monitoring procedures through the Brocade switch module:
	
	  – End-to-end operations
	
	  – Small computer system interface (SCSI) read operations
	
	  – SCSI write operations
	
	  – SCSI read/write operations
	
	  – SCSI versus IP traffic-usage comparisons
	
	• Enables performance tuning of the Brocade SAN

Brocade ISL Trunking for IBM @server BladeCenter	• Logically combines the two external switch-module ports (0 and 15) into one 4 Gb trunk link when the ports are connected (inter-switch linked) to another Brocade switch module • Ensures optimum performance for servers that use this trunk
Brocade Performance Bundle for IBM @server BladeCenter	Includes both the Advanced Performance Monitoring and ISL Trunking advanced features
Brocade Extended Fabrics for IBM @server BladeCenter	Enables full bandwidth performance at extended distances up to 100 km (62.14 miles). For more information about configuring this feature, see the Brocade switch module *Release Notes* on the Brocade switch module IBM *Documentation* CD.

Table 3. Optional features (continued)

Optional feature	Description
Brocade Advanced Security (Secure OS) for IBM @server BladeCenter	Provides increased security for the Brocade SAN through encryption, digital certificates, digital signatures, and various access-control lists
Brocade Remote Switch for IBM @server BladeCenter	Connects two Brocade fabrics over a wide area network (WAN)
Brocade Entry Switch Upgrade for IBM @server BladeCenter	Increases the scalability of the Entry version from two switches in the fabric to full SAN scaling (up to 239 switches). **Note:** This feature is available only for the Entry version.

For information about these features, see the following documentation on the IBM *Brocade Enterprise/Entry SAN Switch Module for IBM @server BladeCenter Documentation* CD:

- *Brocade Fabric OS Procedures Guide* v4.4.0 or later
- *Brocade Fabric OS Command Reference Manual*
- *Release Notes for Brocade Enterprise SAN Switch Module for IBM @server BladeCenter and Brocade Entry SAN Switch Module for IBM @server BladeCenter*
- *Brocade Fabric OS System Error Message Reference Manual*
- *Brocade Fabric OS Features Guide* v4.4.0 or later
- *Brocade Advanced Web Tools Administrator's Guide* v4.4.0 or later
- *Brocade ISL Trunking User's Guide*
- *Brocade Advanced Performance Monitor User's Guide*

To activate and use these optional software features, you must purchase the corresponding license keys. To purchase and obtain a license key for an optional feature, go to http://www.ibm.com/servers/eserver/bladecenter/or call IBM. In the U.S. and Canada, call 1-800-IBM-SERV (1-800-426-7378). For all other countries, see http://www.ibm.com/planetwide/ for support telephone numbers. A license key will be provided through the Web site that is described in the documentation that you receive after you purchase the feature.

The Enterprise SAN Switch Module comes with a full SAN scaling (up to 239 switches) license. This license allows for up to 239 domain attachments within a fabric. The Entry SAN Switch Module is limited to a two-domain switch fabric. The Entry SAN Switch Module is upgradeable through the purchase of an optional license key that provides full SAN scaling capabilities.

Before you can upgrade and install a new license key, you must determine the license identifier (ID) of the switch module. Use the Telnet program to log in to the switch module as described in Chapter 4, "Configuring the switch module through the Telnet interface," on page 25, and run the **licenseidshow** command to determine this value. Record the license ID value for future reference. For information about this command, see the *Brocade Fabric OS Command Reference Manual* on the Brocade switch module IBM *Documentation* CD.

To install an optional feature on the switch, you must add the corresponding license to the list of current features for the switch. Use the Telnet program to log in to the switch module as described in Chapter 4, "Configuring the switch module through the Telnet interface," on page 25, and run the **licenseadd** *key* command, where *key* is the license key for the new feature. For information about this command, see the *Brocade Fabric OS Command Reference Manual* on the Brocade switch module IBM *Documentation* CD.

To make sure that the license has been successfully added to the switch key, run the **licenseshow** command. For information about this command, see the *Brocade Fabric OS Command Reference Manual* on the Brocade switch module IBM *Documentation* CD.

Appendix A. Getting help and technical assistance

If you need help, service, or technical assistance or just want more information about IBM products, you will find a wide variety of sources available from IBM to assist you. This appendix contains information about where to go for additional information about IBM and IBM products, what to do if you experience a problem with your @server 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 *Brocade Fabric OS System Error Message Reference Manual* and the *Brocade Fabric OS Procedures Guide* on the IBM *Brocade Enterprise/Entry SAN Switch Module for IBM @server BladeCenter Documentation* CD and the *Hardware Maintenance Manual and Troubleshooting Guide* or *Problem Determination Guide* on the IBM *xSeries Documentation* CD or IBM BladeCenter unit *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 publications 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 @server 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 @server 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, some publications are available through the IBM Publications Ordering System at http://www.elink.ibmlink.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 @server and IntelliStation products, services, and support. The address for IBM xSeries and BladeCenter 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, BladeCenter products, IntelliStation workstations, and appliances. For information about which products are supported by Support Line in your country or region, see http://www.ibm.com/services/sl/products/.

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

Hardware service and support

You can receive hardware service through IBM Services or through your IBM reseller, if your reseller is authorized by IBM to provide warranty service. See http://www.ibm.com/planetwide/ for support telephone numbers, or in the U.S. and Canada, call 1-800-IBM-SERV (1-800-426-7378).

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

Appendix B. IBM Statement of Limited Warranty Z125-4753-08 04/2004

Part 1 - General Terms

Part 1 - General Terms

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

What this Warranty Covers

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

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

What this Warranty Does not Cover

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

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

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

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

How to Obtain Warranty Service

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

What IBM Will Do to Correct Problems

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

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

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

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

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

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

Exchange of a Machine or Part

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

Your Additional Responsibilities

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

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

service locations around the world), and (c) ensure that such processing complies with any laws applicable to such Personal Data.

Limitation of Liability

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

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

Circumstances may arise where, because of a default on IBM's part or other liability, you are entitled to recover damages from IBM. In each such instance, regardless of the basis on which you are entitled to claim damages from IBM (including fundamental breach, negligence, misrepresentation, or other contract or tort claim), except for any liability that cannot be waived or limited by applicable laws, IBM is liable for no more than
1. damages for bodily injury (including death) and damage to real property and tangible personal property; and
2. the amount of any other actual direct damages, up to the charges (if recurring, 12 months' charges apply) for the Machine that is subject of the claim. For purposes of this item, the term "Machine" includes Machine Code and Licensed Internal Code ("LIC").

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

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

Governing Law

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

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

<u>Jurisdiction</u>

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

<u>AMERICAS</u>

ARGENTINA

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

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

BOLIVIA

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

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

BRAZIL

Jurisdiction: *The following is added after the first sentence:*
Any litigation arising from this Statement of Limited Warranty will be settled exclusively by the court of Rio de Janeiro, RJ.

CHILE

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

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

COLOMBIA

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

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

EQUADOR

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

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

MEXICO

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

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

PARAGUAY

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

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

PERU

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

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

URUGUAY

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

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

VENEZUELA

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

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

NORTH AMERICA

How to Obtain Warranty Service: *The following is added to this Section:*
To obtain warranty service from IBM in Canada or the United States, call 1-800-IBM-SERV (426-7378).

CANADA

Limitation of Liability: *The following replaces item 1 of this section:*
1. damages for bodily injury (including death) or physical harm to real property and tangible personal property caused by IBM's negligence; and

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

UNITED STATES

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

ASIA PACIFIC

AUSTRALIA

What this Warranty Covers: *The following paragraph is added to this section:*
The warranties specified in this Section are in addition to any rights you may have under the Trade Practices Act 1974 or other similar legislation and are only limited to the extent permitted by the applicable legislation.

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

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

CAMBODIA AND LAOS

Governing Law: *The following replaces "laws of the country in which you acquired the Machine" in the first sentence:*
laws of the State of New York, United States of America.

CAMBODIA, INDONESIA, AND LAOS

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

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

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

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

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

Governing Law: *The following replaces "laws of the country in which you acquired the Machine" in the first sentence:*
laws of Hong Kong Special Administrative Region of China.

INDIA

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

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

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

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

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

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

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

JAPAN

Governing Law: *The following sentence is added to this section:*
Any doubts concerning this Statement of Limited Warranty will be initially resolved between us in good faith and in accordance with the principle of mutual trust.

MALAYSIA

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

NEW ZEALAND

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

Limitation of Liability: *The following is added to this section:*
Where Machines are not acquired for the purposes of a business as defined in
the Consumer Guarantees Act 1993, the limitations in this section are subject to
the limitations in that Act.

PEOPLE'S REPUBLIC OF CHINA (PRC)

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

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

PHILIPPINES

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

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

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

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

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

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

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

SINGAPORE

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

EUROPE, MIDDLE EAST, AFRICA (EMEA)

THE FOLLOWING TERMS APPLY TO ALL EMEA COUNTRIES:
The terms of this Statement of Limited Warranty apply to Machines purchased from IBM or an IBM reseller.

How to Obtain Warranty Service:

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

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

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

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

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

Governing Law:

The phrase "the laws of the country in which you acquired the Machine" is replaced by:

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

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

1) **In Austria** the choice of jurisdiction for all disputes arising out of this Statement of Limited Warranty and relating thereto, including its existence, will be the competent court of law in Vienna, Austria (Inner-City); 2) **in Angola, Bahrain, Botswana, Burundi, Egypt, Eritrea, Ethiopia, Ghana, Jordan, Kenya, Kuwait, Liberia, Malawi, Malta, Mozambique, Nigeria, Oman, Pakistan, Qatar, Rwanda, Sao Tome, Saudi Arabia, Sierra Leone, Somalia, Tanzania, Uganda, United Arab Emirates, West Bank/Gaza, Yemen, Zambia, and Zimbabwe** all disputes arising out of this Statement of Limited Warranty or related to its execution, including summary proceedings, will be submitted to the exclusive jurisdiction of the English courts; 3) in **Belgium** and **Luxembourg**, all disputes arising out of this Statement of Limited Warranty or related to its interpretation or its execution, the law, and the courts of the

capital city, of the country of your registered office and/or commercial site location only are competent; 4) **in France, Algeria, Benin, Burkina Faso, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo Republic, Djibouti, Democratic Republic of Congo, Equatorial Guinea, French Guiana, French Polynesia, Gabon, Gambia, Guinea, Guinea-Bissau, Ivory Coast, Lebanon, Madagascar, Mali, Mauritania, Mauritius, Mayotte, Morocco, New Caledonia, Niger, Reunion, Senegal, Seychelles, Togo, Tunisia, Vanuatu, and Wallis & Futuna** all disputes arising out of this Statement of Limited Warranty or related to its violation or execution, including summary proceedings, will be settled exclusively by the Commercial Court of Paris; 5) **in Russia**, all disputes arising out of or in relation to the interpretation, the violation, the termination, the nullity of the execution of this Statement of Limited Warranty shall be settled by Arbitration Court of Moscow; 6) **in South Africa, Namibia, Lesotho and Swaziland**, both of us agree to submit all disputes relating to this Statement of Limited Warranty to the jurisdiction of the High Court in Johannesburg; 7) **in Turkey** all disputes arising out of or in connection with this Statement of Limited Warranty shall be resolved by the Istanbul Central (Sultanahmet) Courts and Execution Directorates of Istanbul, the Republic of Turkey; 8) in each of the following specified countries, any legal claim arising out of this Statement of Limited Warranty will be brought before, and settled exclusively by, the competent court of a) Athens for **Greece**, b) Tel Aviv-Jaffa for **Israel**, c) Milan for **Italy**, d) Lisbon for **Portugal**, and e) Madrid for **Spain**; and 9) **in the United Kingdom**, both of us agree to submit all disputes relating to this Statement of Limited Warranty to the jurisdiction of the English courts.

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

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

In Estonia, Latvia and Lithuania all disputes arising in connection with this Statement of Limited Warranty will be finally settled in arbitration that will be held in Helsinki, Finland in accordance with the arbitration laws of Finland then in effect. Each party will appoint one arbitrator. The arbitrators will then

jointly appoint the chairman. If arbitrators cannot agree on the chairman, then the Central Chamber of Commerce in Helsinki will appoint the chairman.

EUROPEAN UNION (EU)

THE FOLLOWING TERMS APPLY TO ALL EU COUNTRIES:

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

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

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

You may contact IBM at the following address:
    IBM Warranty & Service Quality Dept.
    PO Box 30
    Spango Valley
    Greenock
    Scotland PA16 0AH

CONSUMERS

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

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

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

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

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

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

FRANCE AND BELGIUM

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

Except as otherwise provided by mandatory law:

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

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

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

THE FOLLOWING TERMS APPLY TO THE COUNTRY SPECIFIED:

AUSTRIA

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

What this Warranty Covers: *The following replaces the first sentence of the first paragraph of this section:*
The warranty for an IBM Machine covers the functionality of the Machine for its normal use and the Machine's conformity to its Specifications.

The following paragraphs are added to this section:

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

The second paragraph does not apply.

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

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

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

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

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

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

EGYPT

Limitation of Liability: *The following replaces item 2 in this section:*
as to any other actual direct damages, IBM's liability will be limited to the total amount you paid for the Machine that is the subject of the claim. For purposes of this item, the term "Machine" includes Machine Code and Licensed Internal Code ("LIC").

Applicability of suppliers and resellers (unchanged).

FRANCE

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

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

GERMANY

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

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

The following paragraphs are added to this section:

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

The second paragraph does not apply.

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

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

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

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

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

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

HUNGARY

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

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

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

IRELAND

What this Warranty Covers: *The following is added to this section:*
Except as expressly provided in these terms and conditions, all statutory conditions, including all warranties implied, but without prejudice to the generality of the foregoing all warranties implied by the Sale of Goods Act 1893 or the Sale of Goods and Supply of Services Act 1980 are hereby excluded.

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

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

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

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

Items for Which IBM is Not Liable

Save with respect to any liability referred to in item 1 above, under no circumstances is IBM, its suppliers or resellers liable for any of the following, even if IBM or they were informed of the possibility of such losses:
1. loss of, or damage to, data;
2. special, indirect, or consequential loss; or

3. loss of profits, business, revenue, goodwill, or anticipated savings.

SLOVAKIA

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

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

SOUTH AFRICA, NAMIBIA, BOTSWANA, LESOTHO AND SWAZILAND

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

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

UNITED KINGDOM

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

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

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

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

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

Items for Which IBM is Not Liable

Save with respect to any liability referred to in item 1 above, under no circumstances is IBM or any of its suppliers or resellers liable for any of the following, even if IBM or they were informed of the possibility of such losses:
1. loss of, or damage to, data;
2. special, indirect, or consequential loss; or
3. loss of profits, business, revenue, goodwill, or anticipated savings.

Part 3 - Warranty Information

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

Warranty Period

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

Note: "Region" means either Hong Kong or Macau Special Administrative Region of China.

A warranty period of 3 years on parts and 1 year on labor means that IBM provides warranty service without charge for:
1. parts and labor during the first year of the warranty period; and
2. parts only, on an exchange basis, in the second and third years of the warranty period. IBM will charge you for any labor provided in performance of the repair or replacement(s) in the second and third year of the warranty period.

Brocade Enterprise SAN Switch for IBM @server BladeCenter and Brocade Entry SAN Switch for IBM @server BladeCenter

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

Types of Warranty Service

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

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

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

2. **On-site Service**

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

3. **Courier or Depot Service***

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

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

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

5. **CRU and On-site Service**

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

6. **CRU and Courier or Depot Service**

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

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

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

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

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

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

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

EU Country Telephone List

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

Austria -- +43-1-24592-5901	Latvia -- +386-61-1796-699
Belgium -- +32-70-23-3392	Lithuania -- +386-61-1796-699
Cyprus -- +357-22-841100	Luxembourg -- +352-298-977-5063
Czech Republic -- +420-2-7213-1316	Malta -- +356-23-4175
Denmark -- +45-4520-8200	Netherlands -- +31-20-514-5770
Estonia -- +386-61-1796-699	Poland -- +48-22-878-6999
Finland -- +358-8001-4260	Portugal -- +351-21-892-7147
France -- +33-238-557-450	Slovakia -- +421-2-4954-1217
Germany -- +49-1805-253553	Slovenia -- +386-1-4796-699
Greece -- +30-210-680-1700	Spain -- +34-91-714-7983
Hungary -- +36-1-382-5720	Sweden -- +46-8-477-4420
Ireland -- +353-1-815-4000	United Kingdom -- +44-0870-550-0900

Italy -- +39-800-820-094	

Appendix C. Notices

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

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C2T Interconnect	TechConnect
Chipkill	ThinkPad
EtherJet	Tivoli
e-business logo	Tivoli Enterprise
@server	Update Connector
FlashCopy	Wake on LAN
IBM	XA-32
IBM (logo)	XA-64
IntelliStation	X-Architecture
NetBAY	XceL4
Netfinity	XpandOnDemand
NetView	xSeries
OS/2 WARP	

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Important notes

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

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

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

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

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

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

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IBM makes no representations or warranties with respect to non-IBM products. Support (if any) for the non-IBM products is provided by the third party, not IBM.

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

Product recycling and disposal

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

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

Battery return program

This product may contain a sealed lead acid, nickel cadmium, nickel metal hydride, lithium, or lithium ion battery. Consult your user manual or service manual for specific battery information. The battery must be recycled or disposed of properly. Recycling facilities may not be available in your area. For information on disposal of batteries outside the United States, go to http://www.ibm.com/ibm/environment/products/batteryrecycle.shtml or contact your local waste disposal facility.

In the United States, IBM has established a return process for reuse, recycling, or proper disposal of used IBM sealed lead acid, nickel cadmium, nickel metal hydride, and battery packs from IBM equipment. For information on proper disposal of these batteries, contact IBM at 1-800-426-4333. Have the IBM part number listed on the battery available prior to your call.

In the Netherlands, the following applies.

For Taiwan: Please recycle batteries.

廢電池請回收

Electronic emission notices

Federal Communications Commission (FCC) statement

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

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

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

Industry Canada Class A emission compliance statement

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

Avis de conformité à la réglementation d'Industrie Canada

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

Australia and New Zealand Class A statement

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

United Kingdom telecommunications safety requirement

Notice to Customers

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

European Union EMC Directive conformance statement

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

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

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

Taiwanese Class A warning statement

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

Chinese Class A warning statement

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

Japanese Voluntary Control Council for Interference (VCCI) statement

この装置は、情報処理装置等電波障害自主規制協議会(VCCI)の基準に
基づくクラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を
引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求
されることがあります。

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