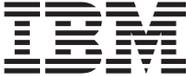
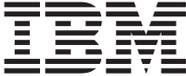


Cisco Systems Intelligent Gigabit Ethernet
Switch Module
for the IBM @server BladeCenter



Installation Guide

Cisco Systems Intelligent Gigabit Ethernet
Switch Module
for the IBM @server BladeCenter



Installation Guide

Note:

Before using this information and the product it supports, read the general information in Appendix A, "IBM Statement of Limited Warranty Z125-4753-08 04/2004," on page 41, Appendix B, "Notices," on page 65.

Fourth Edition (March 2005)

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Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الأمنية

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

在安装本产品之前，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 ασφαλείας (safety information).

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

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

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

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

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

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

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

Перед установкой продукта прочтите инструкции по технике безопасности.

Pred inštaláciou tohto zariadenia si pečítajte Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

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

Läs säkerhetsinformationen innan du installerar den här produkten.

Statement 1:



DANGER

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

To avoid a shock hazard:

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

To Connect:

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

To Disconnect:

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

Statement 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. Introducing the Cisco Systems Intelligent Gigabit Ethernet switch module

The Cisco Systems Intelligent Gigabit Ethernet Switch Module for the IBM® @server® BladeCenter™ is an I/O module that is installed into a BladeCenter unit. This *Installation Guide* contains information about installing and configuring the Cisco Systems Intelligent Gigabit Ethernet Switch Module for the IBM @server BladeCenter.

Note: Throughout this document, the Cisco Systems Intelligent Gigabit Ethernet Switch Module for the IBM @server BladeCenter is referred to as the Gigabit Ethernet switch module. Related documentation also refers to the Cisco Systems Intelligent Gigabit Ethernet Switch Module for the IBM @server BladeCenter as the IGESM.

For installation details, see Chapter 2, “Installing and removing a Gigabit Ethernet switch module,” on page 13. For additional information, see the instructions in the BladeCenter documentation.

This module supports Cisco IOS Release 12.1 (22) AY or later.

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

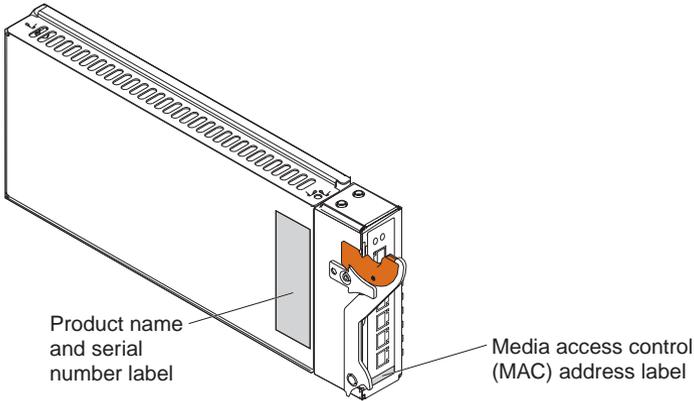
You can obtain up-to-date information about the BladeCenter and other IBM server products at <http://www.ibm.com/pc/support>. Record information about your Gigabit Ethernet switch module in the following table:

Product name	Cisco Systems Intelligent Gigabit Ethernet Switch Module for the IBM @server BladeCenter
Serial number	_____
Media access control (MAC) address	_____

The product name and serial number are on the identification label on the Gigabit Ethernet switch module. You will need this information when you register your Gigabit Ethernet switch module with IBM. The media access control (MAC) address is on a separate label on the information panel under the external Ethernet port connectors.

See the following illustration for the locations of the identification label and the MAC address label.

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



Features and specifications

This section provides a summary of the features and specifications of the Gigabit Ethernet switch module. For more information about the features, see the *Cisco Systems Intelligent Gigabit Ethernet Switch Modules for the IBM @server BladeCenter Software Configuration Guide* on the *Documentation CD*, and available at <http://www.ibm.com/pc/support>.

The supported features and specifications for the Gigabit Ethernet switch module are:

- Ports
 - Four external 100BASE-T connectors for making 10/100/1000 Mbps connections to a backbone, end stations, and servers
 - Fourteen internal full-duplex Gigabit ports, one connected to each of the blade servers in the BladeCenter unit
 - Two internal full-duplex 100 Mbps ports connected to the management module
- Performance features
 - Autosensing of speed on the 10/100/1000 ports and auto-negotiation of duplex mode on the ports for optimizing bandwidth
 - Gigabit EtherChannel for enhanced fault-tolerance and for providing up to 4 Gbps of bandwidth between switches, routers, and servers
 - Support for standard frames with sizes from 64 to 1530 bytes and jumbo frames with a maximum size of 9216

- Per-port broadcast-storm control for preventing a faulty end station from degrading overall system performance with broadcast storms
- Port Aggregation Protocol (PAgP) and Link Aggregation Control Protocol (LACP) for automatic creation of EtherChannel links
- Internet Group Management Protocol (IGMP) snooping support to limit flooding of IP multicast traffic
- Multicast Virtual Local Area Network (VLAN) registration (MVR) to continuously send multicast streams in a multicast VLAN while isolating the streams from subscriber VLANs for bandwidth and security
- IGMP filtering for controlling the set of multicast groups to which hosts on a switch port can belong
- Protected port (private VLAN edge port) option for restricting the forwarding of traffic to designated ports on the same switch
- Dynamic address learning for enhanced security
- Manageability
 - Address Resolution Protocol (ARP) for identifying a switch through its IP address and its corresponding MAC address
 - Cisco Discovery Protocol (CDP) versions 1 and 2 for network topology discovery and mapping between the switch and other Cisco network devices
 - Network Time Protocol (NTP) for providing a consistent time stamp to all switches from an external source
 - Directed unicast requests to a Trivial File Transfer Protocol (TFTP) server for obtaining software upgrades from a TFTP server
 - Default configuration storage in flash memory to ensure that the switch can be connected to a network and can forward traffic with minimal user intervention
 - In-band management access through the device manager management software Web-interface session. Prior to this release in-band management access was provided by the Cisco Management Suite (CMS)
 - In-band management access through up to 16 simultaneous Telnet connections for multiple command-line interface (CLI)-based sessions over the network
 - In-band management access through up to five simultaneous, encrypted Secure Shell (SSH) connections for multiple CLI-based sessions over the network. This option is available only in the cryptographic software image
 - In-band management access through SNMP versions 1, 2c, and 3 get and set requests

- Redundancy
 - Link state tracking to mirror the state of the external ports on the internal Ethernet links and to allow the failover of the processor blade traffic to an operational external link on a separate Cisco Ethernet switch.
 - UniDirectional link detection (UDLD) on all Ethernet ports for detecting and disabling unidirectional links caused by port faults
 - IEEE 802.1D Spanning Tree Protocol (STP) for redundant backbone connections and loop-free networks
 - IEEE 802.1s Multiple STP (MSTP) for grouping VLANs into a spanning-tree instance, and provided for multiple forwarding paths for data traffic and load balancing
 - IEEE 802.1w Rapid STP (RSTP) for rapid convergence of the spanning tree by immediately transitioning root and designated ports to the converging state
 - Optional spanning-tree features available in the PVST+, rapid PVST+, and MSTP modes
- VLAN support
 - Support for 250 port-based VLANs for assigning users to VLANs associated with the applicable network resources, traffic patterns, and bandwidth.
 - Support for up to 4094 VLAN IDs to enable service provider networks to support the number of VLANs allowed by the IEEE 802.1Q standard.
 - IEEE 802.1Q trunking protocol on all ports for network moves, adds, and changes; management and control of broadcast and multicast traffic; and network security by establishing VLAN groups for high-security users and network resources.
 - VLAN Membership Policy Server (VMPS) for dynamic VLAN membership.
 - VLAN Trunking Protocol (VTP) pruning for reducing network traffic by restricting flooded traffic to links destined for stations receiving the traffic.
 - Dynamic Trunking Protocol (DTP) for negotiating trunking on a link between two devices and for negotiating the type of trunking encapsulation (802.1Q) to be used.
 - Voice VLAN for creating subnets for voice traffic from Cisco IP phones
 - VLAN 1 minimization to reduce the risk of spanning-tree loops or storms by enabling VLAN 1 to be disabled on any individual VLAN trunk link. With this feature enabled, no user traffic is sent or received. The switch CPU continues to send and receive control protocol frames.

- Security
 - Bridge protocol data unit (BPDU) guard for shutting down a Port Fast-configured port when an invalid configuration occurs
 - Protected port option for restricting the forwarding of traffic to designated ports on the same switch
 - Password-protected access (read-only and write-only access) to management interfaces (the device manager and CLI) for protection against unauthorized configuration changes
 - Port security option for limiting and identifying MAC addresses of the station allowed to access the port
 - Port security aging to set the aging time for secure addresses on a port
 - Multilevel security for a choice of security level, notification, and resulting actions
 - MAC-based port-level security for restricting the use of a switch port to a specific group of source addresses and preventing switch access from unauthorized stations
 - Terminal Access Controller Access Control System Plus (TACACS+), a proprietary feature for managing network security through a TACACS server
 - IEEE 802.1X port-based authentication to prevent unauthorized devices from gaining access to the network
 - IEEE 802.1X port-based authentication with VLAN assignment for restricting 802.1X-authenticated users to a specified VLAN
 - IEEE 802.1X port-based authentication with port security for authenticating the port and managing network access for all MAC addresses, including that of the client
 - IEEE 802.1X port-based authentication with voice VLAN to allow an IP phone access to the voice VLAN irrespective of the authorized or unauthorized state of the port
 - IEEE 802.1X port-based authentication with guest VLAN to provided limited services to non-802.1X-compliant users
 - Standard and extended IP access control lists (ACLs) for defining security policies
- Quality of Service (QoS) and Class of Service (CoS)
 - Classification
 - IEEE 802.1p CoS with eight priority queues on the Gigabit Ethernet switch-module ports for prioritizing mission-critical and time-sensitive traffic from data, voice, and telephony applications
 - IP Differentiated Services Code Point (IP DSCP) and CoS marking priorities on a per-port basis for protecting the performance of mission-critical applications

- Flow-based packet classification (classification based on information in the MAC, IP, and TCP/UDP headers) for high-performance QoS at the network edge, allowing for differentiated service levels for different types of network traffic and for prioritizing mission-critical traffic in the network
- Support for IEEE 802.1p CoS scheduling for classification and preferential treatment of high-priority voice traffic
- Egress policing and scheduling of egress queues – four egress queues on all switch ports; support for strict priority and weighted round-robin (WRR) CoS policies
- Source IP/Destination IP (SIP/DIP) address routing.
- Monitoring
 - Switch LEDs that provide visual port and switch status
 - SPAN/RSPAN support for local and remote monitoring of the network
 - Four groups (history, statistics, alarms, and events) of embedded remote monitoring (RMON) agents for network monitoring and traffic analysis
 - MAC address notification for tracking the MAC addresses that the switch has learned or removed
 - Syslog facility for logging system messages about authentication or authorization errors, resource issues, and time out events
 - Layer 2 trace route to identify the physical path that a packet takes from a source device to a destination device
- Network cables:
 - 10BASE-T:
 - UTP Category 3, 4, 5 (100 meters (328 feet) maximum)
 - 100-ohm STP (100 meters maximum)
 - 100BASE-TX:
 - UTP Category 5 (100 meters maximum)
 - EIA/TIA-568 100-ohm STP (100 meters maximum)
 - 1000BASE-T:
 - UTP Category 6 (standard for 1 GB devices)
 - UTP Category 5e (100 meters maximum)
 - UTP Category 5 (100 meters maximum)
 - EIA/TIA-568B 100-ohm STP (100 meters maximum)

Standards

The Gigabit Ethernet switch module supports the following standards:

- IEEE standards
 - IEEE 802.1d Spanning Tree Protocol
 - IEEE 802.1P Tagged Packets
 - IEEE 802.1Q Tagged VLAN (frame tagging on all ports when VLANs are enabled)
 - IEEE 802.2 Logical Link Control
 - IEEE 802.3 10BASE-T Ethernet
 - IEEE 802.3u 100BASE-TX Fast Ethernet
 - IEEE 802.3x Full-duplex Flow Control for external ports only

Related documentation

In addition to this document, the following related documentation is provided in PDF format on the *Documentation* CD and available at <http://www.ibm.com/pc/support>.

- *Safety Information*

This document is in Portable Document Format (PDF) on the *Documentation* CD. It contains translated caution and danger statements. Each caution and danger statement that appears in the documentation has a number that you can use to locate the corresponding statement in your language in the *Safety Information* document.
- *Installation and User's Guide* for your BladeCenter unit type

This document contains general information about your BladeCenter unit, including how to install options in the BladeCenter unit.
- *Cisco Systems Intelligent Gigabit Ethernet Switch Modules for the IBM @server BladeCenter Software Configuration Guide*

This document contains software configuration information for the Gigabit Ethernet switch module.
- *Cisco Systems Intelligent Gigabit Ethernet Switch Modules System Message Guide*

This document contains information about the switch-specific system messages. During operation, the system software sends these messages to the console or logging server on another system.
- *Cisco Systems Intelligent Gigabit Ethernet Switch Modules System Command Reference Guide*

This document contains information about the command line interface (CLI) commands, the CLI modes, and related commands.
- Cisco IOS Release 12.1 documentation at <http://www.ibm.com/pc/support/>

In addition to reviewing these documents, make sure to review the *Planning and Installation Guide* for your BladeCenter unit type for information to help you prepare for system installation and configuration.

To locate online BladeCenter documents, use the following procedures:

1. Go to <http://www.ibm.com/pc/support/>.
2. In the **Learn** section, click **Online publications**.
3. From the **Brand** menu, select **Servers**.
4. From the **Family** menu, select **BladeCenter**.
5. Click **Continue** and locate the *Planning and Installation Guide* for your BladeCenter unit type.

For BladeCenter units with 4 I/O-module bays, you must also install an Ethernet-I/O card (also known as an Ethernet expansion card) in the blade server to support the Gigabit Ethernet switch module in I/O-module bays 3 or 4. For information about the types of compatible I/O-expansion cards for the blade servers, see the documentation that came with the BladeCenter unit.

Notices and statements used 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 *Documentation* CD. Each statement is numbered for reference to the corresponding statement in the *Safety Information* document.

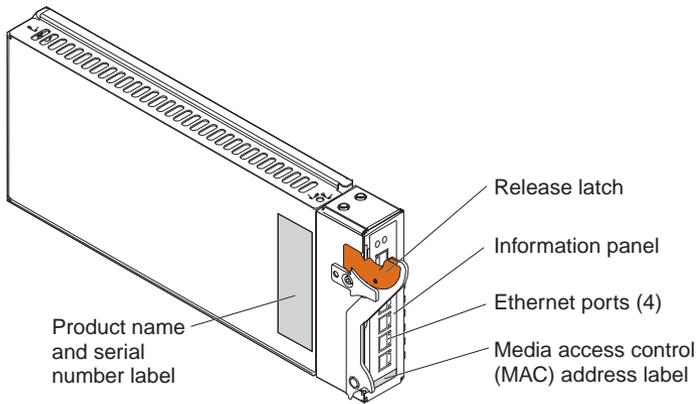
The following types of notices and statements are used in this document:

- **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 possible damage to programs, devices, or data. An attention notice is placed just before the instruction or situation in which damage could occur.
- **Caution:** These statements indicate situations that can be potentially hazardous to you. A caution statement is placed just before the description of a potentially hazardous procedure step or situation.
- **Danger:** These statements indicate situations that can be potentially lethal or extremely hazardous to you. A danger statement is placed just before the description of a potentially lethal or extremely hazardous procedure step or situation.

Major components of the Gigabit Ethernet switch module

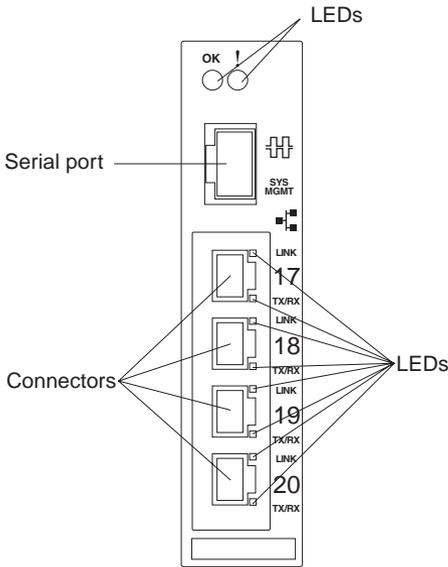
Orange on the release latch on the Gigabit Ethernet switch module indicates that the device can be hot-swapped, which means that you can install or remove this component while the BladeCenter unit is on. See Chapter 2, “Installing and removing a Gigabit Ethernet switch module,” on page 13 for more information about installing and removing a Gigabit Ethernet switch module.

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



Information panel overview

The information panel provides comprehensive LEDs, which display the status of the Gigabit Ethernet switch module and the network (see “LEDs” on page 11) and external connections for the Gigabit Ethernet switch module. The following illustration shows the information panel of the Gigabit Ethernet switch module.

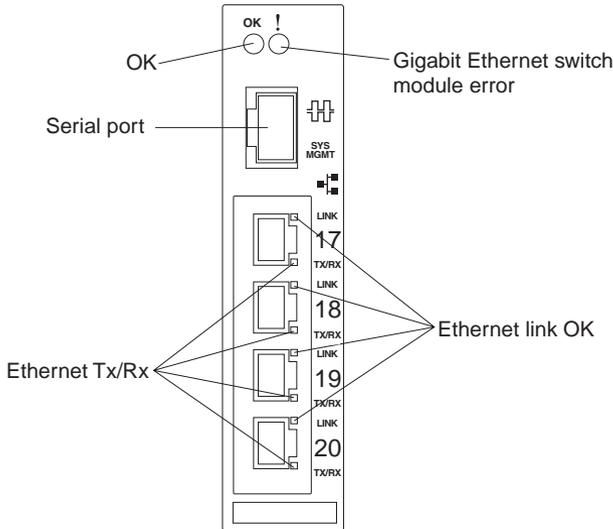


Notes:

1. The illustrations in this document might differ from your hardware.
2. 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 Gigabit Ethernet switch module. For additional information, see Chapter 8, “Solving problems,” on page 39.

LEDs

In addition to the OK and Gigabit Ethernet switch module error (fault) LEDs on the information panel each external port on the Gigabit Ethernet switch module has an Ethernet Tx/Rx LED. The following illustration shows the LEDs on the Gigabit Ethernet switch module. A description of each LED follows the illustration.



OK: This green LED is on the left side of the information panel, above the four external 10/100/1000 Mbps connectors. When this LED is lit, it indicates that the Gigabit Ethernet switch module has passed the power-on self-test (POST) with no critical faults and is operational.

Gigabit Ethernet switch module error (fault): This amber LED is on the right side of the information panel, above the four external 10/100/1000 Mbps connectors. When this LED is lit, it indicates that the Gigabit Ethernet switch module has a fault. If the Gigabit Ethernet switch module fails the POST or detects an operational fault, this LED is lit.

Note: When this LED is lit, the system-error LED on the BladeCenter unit is also lit.

Ethernet link OK: This green link status LED is at the top of each external 10/100/1000 Mbps connector. When this LED is lit on a port, it indicates that there is a connection (or link) to a device on that connector.

Ethernet Tx/Rx: This green activity LED is at the bottom of each external 10/100/1000 Mbps connector. When this LED flashes on a connector, it indicates that data is being transmitted or received (that is, activity is

occurring) between that port and another device on the network link. The flashing frequency is proportional to the amount of traffic on the network link.

External connections

The switch-module external connections include

- Four external 1000BASE-T Ethernet connectors for connecting to external Ethernet devices, such as backbones, end stations, and servers. These connectors are identified as ports 17, 18, 19, and 20 in the switch configuration menus and are labeled 17 through 20 (from top to bottom) on the Gigabit Ethernet switch module.
- Serial port RS-232 connector for local console port connections.

Chapter 2. Installing and removing a Gigabit Ethernet switch module

Attention: To maintain proper system cooling, each I/O-module bay must contain either a module or a filler module; each blade bay must contain either a blade or a filler blade.

The BladeCenter unit supports one hot-plug Gigabit Ethernet switch module, in I/O-module bay 1. The Gigabit Ethernet switch modules in I/O-module bays 1 and 2 are for the integrated Ethernet controllers or Fibre Channel expansion modules in the blade servers. You might want to install Gigabit Ethernet switch modules in other I/O-module bays of the BladeCenter unit when additional Ethernet or fiber controllers are installed or activated.

For additional information about the location of the Gigabit Ethernet switch module, the network interface requirements, and expansion options, see the documentation that came with the BladeCenter unit.

Installation guidelines

Before you begin to install the Gigabit Ethernet switch module in the BladeCenter unit, read the following information:

- Read the safety information beginning on page v and the guidelines in “Handling static-sensitive devices” on page 14, and read the safety statements in the BladeCenter unit documents.
- Orange on the release latch on the Gigabit Ethernet switch module indicates that the device can be hot-swapped, which means that you can install or remove this component while the BladeCenter unit is on. See the instructions in this chapter for more information about installing or removing hot-swap or hot-plug components.
- You do not have to turn off the BladeCenter unit to install or replace any of the hot-swap modules on the rear of the unit.
- If you plan to install a Gigabit Ethernet switch module in I/O-module bay 3 or 4 of the BladeCenter unit, you must also install an I/O expansion card in the blade server to support the Gigabit Ethernet switch modules in these bays.

System reliability considerations

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

- Each of the I/O-module bays on the rear of the BladeCenter unit has either a module or a filler module installed.
- A removed hot-swap module or blade server is replaced with another module or filler module within 1 minute of removal.

Handling static-sensitive devices

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

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

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

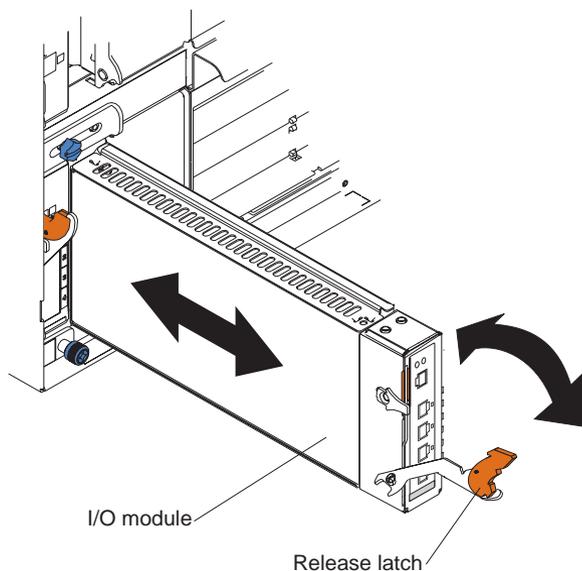
Installing a Gigabit Ethernet switch module

To install a Gigabit Ethernet switch module, complete the following steps:

1. Read the safety information beginning on page v and “Installation guidelines” on page 13.
2. Remove the acoustic attenuation module, if one is installed, from the rear of the BladeCenter unit. For more information, see the documentation that came with the BladeCenter unit.
3. Select an I/O-module bay in which to install the Gigabit Ethernet switch module.

Note: For details about I/O-module bay requirements, see the BladeCenter documents that came with your BladeCenter unit.

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 Gigabit Ethernet switch module to any *unpainted* metal surface of the BladeCenter unit or any *unpainted* metal surface on any other grounded rack-component for at least 2 seconds.
6. Remove the Gigabit Ethernet switch module from its static-protective package.
7. Make sure that the release latch on the Gigabit Ethernet switch module is in the open position (perpendicular to the module).
8. Slide the Gigabit Ethernet switch module into the applicable I/O-module bay until it stops.



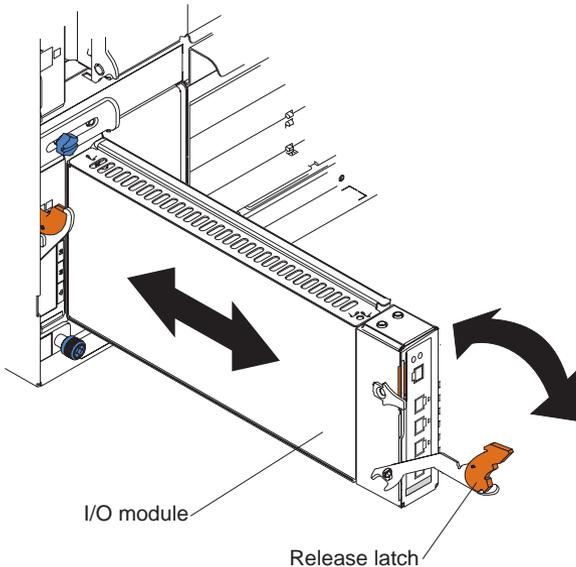
9. Push the release latch on the front of the Gigabit Ethernet switch module to the closed position. After you insert and lock the Gigabit Ethernet switch module, it is turned on, and the power-on self-test (POST) runs to verify that the Gigabit Ethernet switch module is operating correctly. The POST results are displayed by the status LEDs.
10. Make sure that the LEDs on the Gigabit Ethernet switch module indicate that it is operating correctly. Make sure that the OK LED on each Gigabit Ethernet switch module is lit. See “LEDs” on page 11 for a description of the operation of these LEDs.

11. If you have other Gigabit Ethernet switch modules to install, do so now; otherwise, go to step 12.
12. Attach any cables that are required by the Gigabit Ethernet switch module. For the locations of the connectors on the BladeCenter unit, see the documents that came with the BladeCenter unit. For cable requirements, see page 6.
13. Replace the acoustic attenuation module, if applicable.

Removing a Gigabit Ethernet switch module

To remove a Gigabit Ethernet switch module, complete the following steps:

1. Read the safety information beginning on page v and “Installation guidelines” on page 13.
2. Remove the acoustic attenuation module, if one is installed, from the rear of the BladeCenter unit. For more information, see the documents that came with the BladeCenter unit
3. Disconnect any cables from the Gigabit Ethernet switch module that you are removing.
4. Pull the release latch toward the bottom of the Gigabit Ethernet switch module as shown in the following illustration. The module moves out of the bay approximately 0.64 cm (0.25 inch).



5. Slide the Gigabit Ethernet switch module out of the bay and set it aside.
6. Place either another Gigabit Ethernet switch module or a filler module in the bay within 1 minute.

7. If you placed another Gigabit Ethernet switch module in the bay, reconnect any cables that you disconnected.
8. Replace the acoustic-attenuation module option, if applicable.

Chapter 3. Configuring the Gigabit Ethernet switch module

The Gigabit Ethernet switch module supports two remote-access modes for management through Ethernet connections. The Gigabit Ethernet switch module has an internal Ethernet path to the management module and the four external Ethernet connectors on the Gigabit Ethernet switch module. You can select the mode that is best suited for your BladeCenter environment.

- **Default mode:** The default mode uses the internal path to the management module only. In this mode, the remote-access link to the management console must be attached to the 100 Mbps Ethernet connector on the management module. The IP addresses and SNMP parameters of the Gigabit Ethernet switch modules can be automatically assigned by the IBM Director BladeCenter Deployment wizard (when available), or you must assign them through the BladeCenter Management and Configuration Program. This mode enables the system administrator to provide a secure LAN for management of the BladeCenter subsystems that is separate from the data network. See “Establishing a TCP/IP session for the Gigabit Ethernet switch module using the management module” on page 22 for additional information.

Important: In this mode, the Gigabit Ethernet switch module does not respond to remote-management commands through the four external Ethernet ports on the Gigabit Ethernet switch module.

See the *Cisco Systems Intelligent Gigabit Ethernet Switch Modules Software Configuration Guide* on the *Documentation CD* or available at <http://www.ibm.com/pc/support/> for additional instructions about configuring the Fiber Ethernet switch module for this mode of operation.

- **Remote management mode:** The system administrator can choose to enable remote management of the Gigabit Ethernet switch module through the four external connectors on the Gigabit Ethernet switch module, instead of or in addition to access through the management module. This mode can be enabled only through the management module configuration interface. When this mode is enabled, the external Ethernet ports will support both management traffic and BladeCenter application data traffic. See “Enabling management over external ports” on page 23 for additional information. This mode enables the Gigabit Ethernet switch module IP addresses to be on a different IP subnet than the management modules. This is useful when the Gigabit Ethernet switch modules are to be managed and controlled as part of the overall network infrastructure, while secure management of other BladeCenter subsystems is maintained through the management module. However, management-module access to the switch-module link will be lost if the Gigabit Ethernet switch module IP address is not on the same IP subnet as the management module. See “Establishing a TCP/IP session for

the switch through the external Gigabit Ethernet switch module connectors” on page 24 for additional information. See the *Cisco Systems Intelligent Gigabit Ethernet Switch Modules Software Configuration Guide* for additional instructions about configuring the Gigabit Ethernet switch module for this mode of operation.

Important:

- Before you configure the Gigabit Ethernet switch module, make sure that the management modules in the BladeCenter unit are correctly configured. See the *Installation and User’s Guide* that came with your BladeCenter unit for more information about configuring the Gigabit Ethernet switch module.
- The default IP address of the Gigabit Ethernet switch module is 192.168.70.127, 192.168.70.128, 192.168.70.129, or 192.168.70.130, depending on the Gigabit Ethernet switch module bay where it is installed.
- If you change the IP address of the Gigabit Ethernet switch module and restart the BladeCenter unit, the Gigabit Ethernet switch module maintains this new IP address as its default value.
- The management module and the Gigabit Ethernet switch module can communicate with each other only if they are on the same IP subnet.
- When you use the management-module Web interface to update the switch-module configuration, the management-module firmware saves the new configuration in its internal nonvolatile random-access memory (NVRAM). If the Gigabit Ethernet switch module restarts, the management module applies the saved configuration to the Gigabit Ethernet switch module.

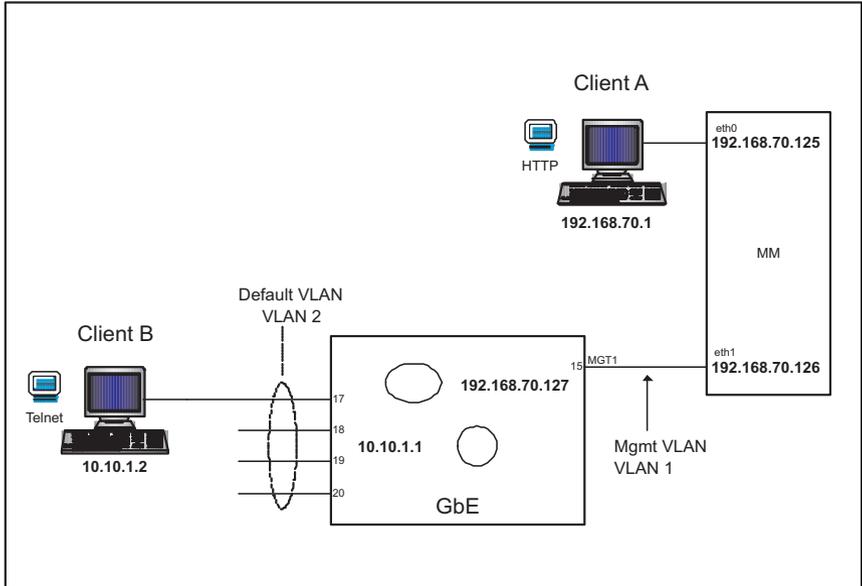
If, for some reason, the Gigabit Ethernet switch module restarts and the management module cannot apply the saved configuration to the Gigabit Ethernet switch module, the Gigabit Ethernet switch module defaults to using the configuration that it had previously saved. If the subnet IP address of the Gigabit Ethernet switch module does not match the subnet IP address of the management module, you can no longer manage the Gigabit Ethernet switch module.

- For switch communication with a remote management station, such as the IBM Director server, through the management-module external Ethernet port, the switch-module internal-network interface and the management-module internal and external interfaces must be on the same IP subnet.

See the documentation listed in the “Related documentation” on page 7 for specific details about configuring the Gigabit Ethernet switch module and preparing for system installation.

You can manage and configure the Gigabit Ethernet switch module using the management module or an external switch interface. When the Gigabit Ethernet switch module is set to use the factory default configuration, it can be

accessed through the management-module VLAN. Review the following figure only as an example of establishing a TCP/IP session through the management module or through the external interface.



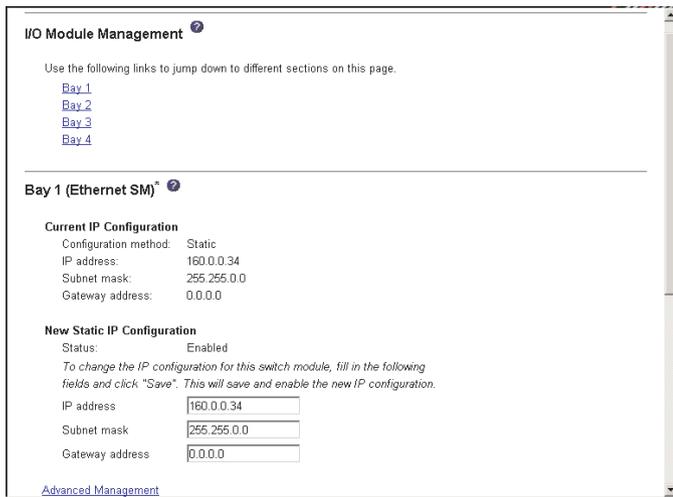
Client A manages the Gigabit Ethernet switch module through the default management-module configuration interface. The management module is always enabled and always a member of VLAN 1. VLAN 1 can never be disabled. You can always manage the Gigabit Ethernet switch module over this interface, provided that the IP addresses of the client, the management module, and the Gigabit Ethernet switch module are on the same subnet, as shown in the following table.

Network entity	IP address
Client A	192.168.70.1
Management module	192.168.70.125
Gigabit Ethernet switch module	192.168.70.127

Establishing a TCP/IP session for the Gigabit Ethernet switch module using the management module

To establish a TCP/IP session for the Gigabit Ethernet switch module using the management module, complete the following steps:

1. Log on to the management module as described in the *BladeCenter Management Module User's Guide*. If necessary, obtain the IP address of the management module from your system administrator. The management-module window opens.
2. From the **I/O Module Tasks** menu, click **Management**.
3. In the **I/O Module Management** section, click the bay number that corresponds to the location of the Gigabit Ethernet switch module that you installed. The applicable bay number (in this example, bay 1) appears in the bottom of the window, followed by other related Gigabit Ethernet switch-module information, including the IP address. The switch-module information is divided into two sections: Current IP Configuration and New Static IP Configuration.



4. In the **IP address** field in the **New Static IP Configuration** section, type the new TCP/IP address of the Gigabit Ethernet switch module; then, click **Save**.

Note: The management module does not check for invalid IP addresses.

5. Click **Advanced Management**. You can now start a Web-interface session, a Telnet session, or a Secure Shell (SSH) session.

Note: The default setting for the SSH session is disabled. To enable this setting, you must use the command-line interface (CLI).

The Web interface and the Telnet program provide different ways to access the same internal-switching software and configure it. Thus, all the settings in Web management are the same as those found in the Telnet program.

- If your system application requires that you use the Web interface program, see “Configuring the Gigabit Ethernet switch module using the management-module Web interface” on page 27 for additional information.
- If your system application requires that you use the Telnet program, see “Configuring the Gigabit Ethernet switch module using Telnet” on page 25 for additional information.
- For information about running an SSH session, see the Secure Shell configuration information on the *Documentation* CD.

Enabling management over external ports

To enable management over external connectors (ports), complete the following steps:

1. Log on to the management module as described in the *BladeCenter Management Module User's Guide*. If necessary, obtain the IP address of the management module from your system administrator. The management-module window opens.
2. From the **I/O Module Tasks** menu, click **Management**.
3. Click **I/O Module Tasks > Management > Advanced Management** in the management-module Web interface and make sure that the following switch-module features are enabled:
 - External ports
 - External management over all ports
 - Preserve new IP configuration on all resets

The default setting is **Disabled** for these features. If these features are not already enabled, change the setting to **Enabled**; then, click **Save**.

Note: See the *Installation and User's Guide* that came with your BladeCenter unit for additional information about enabling external management over all ports.

4. In the bay information section, click **Advanced Management**.

You can now start a Web interface session, a Telnet session, or a Secure Shell (SSH) session.

Establishing a TCP/IP session for the switch through the external Gigabit Ethernet switch module connectors

To establish a TCP/IP session for the switch through the external switch-module connectors, you must provide a connection to the Ethernet network through the Gigabit Ethernet switch module. To do this, you must first enable the external interfaces as described in “Enabling management over external ports” on page 23 and then configure the TCP/IP address for the Gigabit Ethernet switch module.

To establish a TCP/IP session for the switch through the external switch-module connectors, complete the following steps:

1. Log on to the management module as described in the *BladeCenter Management Module User's Guide*. If necessary, obtain the IP address of the management module from your system administrator. The management-module window opens.
2. From the **I/O Module Tasks** menu, click **Management**.
3. From the **I/O Module Management** section, click the bay number that corresponds to the location of the Gigabit Ethernet switch module that you installed. The applicable bay number is displayed in the bottom of the window, followed by other related switch-module information, including the IP address. The switch-module information is divided into two sections: **Current IP Configuration** and **New Static IP Configuration**.
4. In the **IP address** field in the **New Static IP Configuration** section, type the TCP/IP address of the Gigabit Ethernet switch module; then, click **Save**.

You can set up the TCP/IP address for the Gigabit Ethernet switch module in either of two ways:

- Use the default TCP/IP address
- Obtain a valid, unique TCP/IP address from your system administrator

Note: The TCP/IP address must not be on the same subnet as the management module. The management module does not check for invalid IP addresses.

When you obtain a valid, unique TCP/IP address from your system administrator, you can set up the new TCP/IP address for the Gigabit Ethernet switch module from the management module.

In the **IP address** field in the **New Static IP Configuration** section, type the new TCP/IP address of the Gigabit Ethernet switch module; then, click **Save**. You are now ready to configure the Gigabit Ethernet switch module.

Configuring the Gigabit Ethernet switch module using Telnet

Your Gigabit Ethernet switch module supports a management interface that you can use to configure and control the Gigabit Ethernet switch module over the network using the Telnet program. You can use this facility to perform many basic network management functions. In addition, you can use the Telnet interface to configure the Gigabit Ethernet switch module for management using an SNMP-based network management system. The following sections describe how to use the Telnet interface to access the Gigabit Ethernet switch module, change its settings, and monitor its operation.

Connecting to the Gigabit Ethernet switch module

If you know the IP address for your Gigabit Ethernet switch module and you have an existing network connection, you can use the Telnet program (in VT-100 compatible terminal mode) to access and control the Gigabit Ethernet switch module. The Telnet program and your Gigabit Ethernet switch module must be on the same network. If you need to obtain the IP address for your Gigabit Ethernet switch module or establish a network connection, contact your system or network administrator. Be sure to use the correct IP address in the required command, as specified in “Accessing the Gigabit Ethernet switch module command-line interface” on page 26.

After you log on to the Gigabit Ethernet switch module, you can perform the tasks that are described in the *Cisco Systems Intelligent Gigabit Ethernet Switch Modules System Command Reference Guide*.

Telnet usage conventions

The Telnet interface uses the following conventions:

- You can toggle an item in angle brackets (< >) among several choices by using the spacebar.
- You can change an item in square brackets ([]) by typing a new value. You can use the Backspace and Delete keys to erase characters behind and in front of the cursor.
- You can use the Up Arrow and Down Arrow keys, the Left Arrow and Right Arrow keys, the Tab key, and the Backspace key can be used to move between selected items.
- Items in uppercase are commands. Move the selection to a command and press Enter to process that command.

Accessing the Gigabit Ethernet switch module command-line interface

To connect to the Gigabit Ethernet switch module using Telnet, complete the following steps:

1. Open a console window.
2. From the CLI prompt, type **telnet x** and press **Enter**.
Where *x* is the IP address for your Gigabit Ethernet switch module.
3. Enter your password. If you do not have an assigned password, enter the default password (**PASSW0RD**, where 0 is a zero) and press **Enter**.

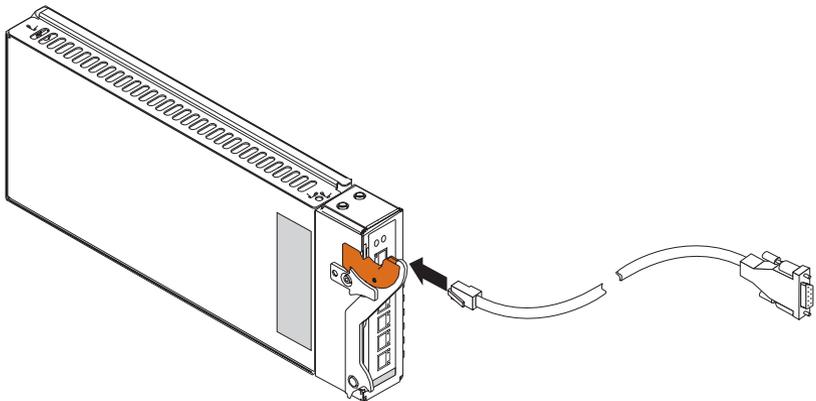
Note: Capital letters are required; these fields are both case-sensitive. To increase system security, change the password after you log on for the first time.

Configuring the Gigabit Ethernet switch module using the serial-port interface

The serial port provides basic communication RS-232 serial-data-transfer using a terminal emulation program (such as Hyperterminal). Since messages from the Power On Self Test (POST) and all initialization information is routed through the serial port, you can use the serial port to log into the Gigabit Ethernet switch module and access and configure the internal switching software.

To log into the Gigabit Ethernet switch module, complete the following steps

1. Remove the information panel concealing the serial port on the Gigabit Ethernet switch module.
2. Plug an RS-232 serial cable into the switch-module serial port.



3. Open a console window and make sure that the serial port is configured with the following settings:
 - **9600 baud**
 - **8 data bits**
 - **No parity**
 - **1 stop bit**
 - **No flow control**
4. Type the user name and password. The default user name is USERID. The default password is PASSWORD (where 0 is a zero).

The serial port is compatible with the standard 16550 Universal Asynchronous Receiver/Transmitter (UART) protocol. The RS-232 serial port is enabled by default. The serial interface cable provides a female DB-9 connector to the RJ45 connector.

Configuring the Gigabit Ethernet switch module using the management-module Web interface

This section describes how to use the management-module Web interface to access and configure the internal switching software.

This section also describes some of the Web interface switch-module management features.

The Gigabit Ethernet switch module offers an embedded HTML, Web interface that you can use to manage the switch through Netscape Navigator/Communicator, or Microsoft® Internet Explorer. This interface is enabled by default. The Web browser acts as an access tool and can communicate directly with the switch using HTTP. Your browser window might vary from the window illustrations in this document. You can access the Web interface only through HTTP port 80. Your computer might have to access and install a Java plug-in (JRE 1.4.0) to run without errors. Later versions of the JRE might work but are not officially supported.

Note: This Web interface does not accept Chinese language input (or other double-byte character-set languages).

Because the Web interface is a built-in component of the Cisco IOS software, you do not have to install a separate interface program. See the documentation that came with your software for more information about the Web interface.

Before you can access and start the Web interface, make sure that you have completed the following procedures:

- Install the Gigabit Ethernet switch module in the BladeCenter unit

- Verify that the Cisco IOS software is installed on the Gigabit Ethernet switch module
- Configure at least one IP interface on the Gigabit Ethernet switch module
- Enable the frames and the JavaScript™ program in your Web browser
- The following hardware and software are required for the Web interface:
 - A frame-capable Web-browser program, such as Internet Explorer (version 6.0 or later) or Netscape Navigator (version 4.7 or later)
 - A computer or workstation with network access to the Gigabit Ethernet switch module

To start the Web interface, complete the following steps:

1. Start a Web browser. The Web-browser window opens.
2. In the URL field, enter the IP address of the Gigabit Ethernet switch module, in the following format
http://xxx.xxx.xxx.xxx. The login window opens.
3. Enter your user ID and password. If you do not have an assigned user ID and initial password, type the default user ID (USERID) in the **User Name** field and the default password (PASSWORD, where the 0 is a zero) in the **Password** field and click **OK**.

Note: The passwords used to access the Gigabit Ethernet switch module are case-sensitive. To increase system security, change the password after you log on for the first time.

Initial VLAN configuration

The IOS software on the Gigabit Ethernet switch module contains default configuration files that are installed during in the software installation. These initial configuration settings are not located in a separate configuration file, but they are components of the IOS software. When you restore the management module to factory defaults, the user defined configuration file is deleted and the original IOS configuration is reloaded. This is different from other stand-alone Cisco Ethernet switches.

Chapter 4. Configuring Serial over Local Area Network

The Gigabit Ethernet switch module supports Serial over Local Area Network (SOL) protocol with all BladeCenter processors. The Gigabit Ethernet switch module must be installed in the I/-module bay 1 for SOL support. SOL virtual local area network (VLAN) support for the Gigabit Ethernet switch module and the management module must each be configured with VLAN information.

Configuring SOL on the management module

To configure the management module for SOL, complete the following steps:

1. Log on to the management module as described in the *BladeCenter Management Module User's Guide*. If necessary, obtain the IP address of the management module from your system administrator. The management-module window opens.
2. From the **Blade Tasks** menu, click **Serial Over LAN**. The Serial Over LAN (SOL) window opens.
3. Click **Serial Over LAN Configuration**. The Serial Over LAN Configuration window opens.
4. In the **SOL VLAN ID** field, enter the applicable VLAN ID number; then click **Save**.
5. Click **Enable Serial Over LAN**.

Configuring SOL on the Gigabit Ethernet switch module

To configure SOL on the Gigabit Ethernet switch module, complete the following steps:

1. Open a console window.
2. From console prompt, type **telnet x** and press **Enter**.
Where *x* is the IP address for your Gigabit Ethernet switch module
3. Enter your password. If you do not have an assigned initial password, type the default password (PASSWORD, where 0 is a zero) and press **Enter**. A Telnet session opens.

Note: You must make sure that the SOL VLAN on the management module is identical to the SOL VLAN of the Gigabit Ethernet switch module.

4. Define the SOL session on VLAN 3. At the console prompt, type:

```
config t
vlan 3
state active
exit
int gi0/15
sw trunk allow vlan add 3
int gi0/16
sw trunk allow vlan add 3
end
config t
int gi0/17
switchport trunk allowed vlan remove 3
int gi0/18
switchport trunk allowed vlan remove 3
int gi0/19
switchport trunk allowed vlan remove 3
int gi0/20
switchport trunk allowed vlan remove 3
end
```

5. To save the configuration, type **write**.

The management module and the Gigabit Ethernet switch module are ready for SOL traffic over the specified VLAN.

Chapter 5. Management-module software level

To ensure proper operation within the BladeCenter unit, the management-module software must be at version 1.06 or later. This is noted in the management module firmware VPD as BRET73F, or later. See the *BladeCenter Management Module User's Guide* for additional information.

Chapter 6. Updating the Gigabit Ethernet switch module software

This chapter describes how to determine the level of the software that is installed on the Gigabit Ethernet switch module, how to obtain the latest level of switch software, how to upgrade the software, and how to reset the Gigabit Ethernet switch module to activate the software upgrade.

Determining the level of Gigabit Ethernet switch module software

After you install the Gigabit Ethernet switch module in the BladeCenter unit, make sure that the latest Cisco switch operating-system (IOS) software is installed on the Gigabit Ethernet switch module. To determine the level of the Cisco IOS software that is installed on the Gigabit Ethernet switch module, complete the following steps:

1. Log on to the management module as described in the *BladeCenter Management Module User's Guide*. If necessary, obtain the IP address of the management module from your system administrator. The login window opens.
2. From the **Monitors** menu, click **Firmware VPD**. The Firmware VPD window opens.
3. Locate the I/O Module Firmware VPD section.
4. Page down to the I/O module-bay number that contains the Gigabit Ethernet switch module that you installed; then, note the corresponding level of the software for the Gigabit Ethernet switch module.

Obtaining the latest level of switch software

To determine the latest level of the Cisco IOS software that is available from IBM, complete the following steps:

1. Go to <http://www.ibm.com/pc/support/>, click **Browse** and, select **Servers**. The window refreshes.
2. Click **Family**, select **BladeCenter**, and click **Continue**. The window refreshes.
3. Click **Downloads and drivers**. The Downloads and drivers window opens.
4. Scroll to the **Networking** section and review the latest available software.
5. Compare the level of software that you noted in the I/O Module Firmware VPD section to the latest level of available software. If the two software levels do not match, download the latest level from the Web to your Fiber Ethernet switch module.

The Gigabit Ethernet switch module contains one software operating-system image.

Upgrading the Gigabit Ethernet switch module software

The Gigabit Ethernet switch-module software is upgraded through a TFTP server application. Typically, this software runs as an application under your operating system. Make sure that this software is installed on your server; then, download the software images from the IBM Web site into a directory on your TFTP server. Enable the TFTP server and set its default directory to the one where the image is.

To transfer the software image files from the TFTP server to the switch, you must establish a Telnet session through the management module. To make sure that you have a connection, you must ping the TFTP server. The Telnet session performs optimally if all three network entities (TFTP server, management module, and switch IP addresses) are on the same subnet. Otherwise, you must use a router. Use the management-module interface to configure the IP addresses of the management module external interface (eth0) and the Gigabit Ethernet switch module so that they are both on the same subnet as the TFTP server.

The IP addresses and masks used are described in the following table.

Network entity	IP address	Mask
TFTP server	192.168.2.178	255.255.255.0
Management module (eth0)	192.168.2.237	255.255.255.0
Gigabit Ethernet switch module current IP configuration	192.168.2.51	255.255.255.0

Note: With this configuration, you can ping the Gigabit Ethernet switch module.

Use the management module interface to start a Telnet session, as described in the following steps. The requirements for running a Telnet session are described in Chapter 3, “Configuring the Gigabit Ethernet switch module,” on page 19.

1. Log on to the management module as described in the *BladeCenter Management Module User’s Guide*. The login window opens.
2. From the **I/O Module Tasks** menu, click **Management**. The BladeCenter Management Module window opens.
3. To start a Telnet session, click **Start Telnet Session**.

To upgrade the Gigabit Ethernet switch-module software, complete the following steps:

1. At the CLI prompt, type the following command and press **Enter**.
archive download tftp://xxxx/yyyy
(where *xxxx* is the IP address of the TFTP server and *yyyy* is the image to be downloaded; for example, `cigesm -i6q4l2-tar.121-22.AY.tar`).
2. When the download is complete, type
reload <Enter>
y <Enter>

Note: The previous image will be overwritten. There is enough memory to store only one image.

Resetting and restarting the Gigabit Ethernet switch module

To activate the new image or images, you must reset the Gigabit Ethernet switch module through the management-module interface. Complete the following steps to reset the Gigabit Ethernet switch module:

1. From the **I/O Module Tasks** menu, click **Management**. The BladeCenter Management Module window opens.
2. Select the I/O module bay on which the software update was just installed.
3. From the **I/O Module Tasks** menu, click **Power/Restart**.
4. Click **POWER OFF SWITCH MODULE**.
5. Select the I/O module bay on which the software update was just installed.
6. Click **POWER ON SWITCH MODULE**. Wait 70 seconds for POST to be completed.
7. Make sure that the latest Cisco switch operating-system software was correctly installed on the Gigabit Ethernet switch module; then click **Monitors**, and select **Firmware VPD**. The Firmware VPD window opens.
8. In the Firmware VPD window, locate the I/O Module Firmware VPD section. Page down to the number of the I/O module bay that contains the Gigabit Ethernet switch module that you just installed; then, note the corresponding level of the software for the Gigabit Ethernet switch module. Make sure that the latest Cisco switch operating system software is correctly installed on the Gigabit Ethernet switch module.

Chapter 7. 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 *Hardware Maintenance Manual and Troubleshooting Guide* or *Problem Determination and Service Guide* on the IBM Documentation CD that comes with your system.

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

- Go to the IBM support Web site at <http://www.ibm.com/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.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 eServer 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/us/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.

Chapter 8. Solving problems

This section provides basic troubleshooting information to help you solve some problems that might occur while you are setting up the Gigabit Ethernet switch module. The *Cisco Intelligent Gigabit Ethernet Switch Modules Software Configuration Guide* provides more details about troubleshooting the Gigabit Ethernet switch module.

If you cannot locate and correct the problem using the information in this section, see Chapter 7, “Getting help and technical assistance,” on page 37.

Running POST

To ensure that it is fully operational, the Gigabit Ethernet switch module processes a series of tests during power-up or a restart (power-on self-test, or POST). These tests take approximately 1 minute to complete. The management module reads the test results and displays them for you. During normal operation, these tests are completed without error, and the green OK LED is lit. However, if the Gigabit Ethernet switch module fail POST, the amber Gigabit Ethernet switch-module error (fault) LED and the system-error LED on the BladeCenter unit is lit. An event is stored in the event log in the System Status panel of the management module. The specific failure is displayed on the System Status I/O Module panel of the management module.

Note: For the location and description of the Gigabit Ethernet switch module LEDs, see “LEDs” on page 11.

POST errors

There are two types of errors: noncritical and critical. Noncritical errors apply to one port, and the Gigabit Ethernet switch module is operational. You can continue to operate the Gigabit Ethernet switch module; however, you must replace it as soon as possible. When critical errors occur, the Gigabit Ethernet switch module does not operate. If a critical error occurs, the switch will try complete the startup sequence and initialization process. To view POST results, complete the following steps:

1. Log on to the management module as described in the *BladeCenter Management Module User's Guide*. If necessary, obtain the IP address of the management module from your system administrator. The login window opens.
2. Turn off the Gigabit Ethernet switch module; then, on again.

3. After POST is completed, the management module displays the results. Refresh the window to view the POST results. If the error remains, the Gigabit Ethernet switch module is defective. Replace the Gigabit Ethernet switch module.

The following table describes the basic critical and noncritical failures. This abbreviated list is representative; it is not intended as an exhaustive list. An error code is associated with each failure. Error codes appear on the Management Module Switch Information window. Be sure to note the applicable error code and corresponding failure. You might have to provide this information when you call the IBM HelpCenter[®]. For details, see Chapter 7, “Getting help and technical assistance,” on page 37.

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

Appendix A. 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.

Jurisdiction

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

Part 2 - Country-unique Terms

AMERICAS

ARGENTINA

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

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

BOLIVIA

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

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

BRAZIL

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

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

CHILE

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

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

COLOMBIA

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

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

EQUADOR

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

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

MEXICO

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

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

PARAGUAY

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

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

PERU

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

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

URUGUAY

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

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

VENEZUELA

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

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

NORTH AMERICA

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

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

CANADA

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

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

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

laws in the Province of Ontario.

UNITED STATES

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

laws of the State of New York.

ASIA PACIFIC

AUSTRALIA

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

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

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

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

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

CAMBODIA AND LAOS

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

CAMBODIA, INDONESIA, AND LAOS

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

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

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

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

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

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

INDIA

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

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

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

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

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

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

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

JAPAN

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

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

MALAYSIA

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

NEW ZEALAND

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

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

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

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

PEOPLE'S REPUBLIC OF CHINA (PRC)

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

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

PHILIPPINES

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

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

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

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

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

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

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

SINGAPORE

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

EUROPE, MIDDLE EAST, AFRICA (EMEA)

THE FOLLOWING TERMS APPLY TO ALL EMEA COUNTRIES:

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

How to Obtain Warranty Service:

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

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

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

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

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

Governing Law:

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

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

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

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

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

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

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

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

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

EUROPEAN UNION (EU)

THE FOLLOWING TERMS APPLY TO ALL EU COUNTRIES:

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

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

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

You may contact IBM at the following address:

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

CONSUMERS

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

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

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

Except as otherwise provided by mandatory law:

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

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

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

FRANCE AND BELGIUM

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

Except as otherwise provided by mandatory law:

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

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

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

THE FOLLOWING TERMS APPLY TO THE COUNTRY SPECIFIED:

AUSTRIA

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

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

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

The following paragraphs are added to this section:

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

The second paragraph does not apply.

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

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

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

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

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

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

EGYPT

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

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

Applicability of suppliers and resellers (unchanged).

FRANCE

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

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

GERMANY

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

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

The following paragraphs are added to this section:

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

The second paragraph does not apply.

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

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

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

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

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

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

HUNGARY

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

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

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

IRELAND

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

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

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

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

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

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

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

Items for Which IBM is Not Liable

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

1. loss of, or damage to, data;
2. special, indirect, or consequential loss; or

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

SLOVAKIA

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

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

SOUTH AFRICA, NAMIBIA, BOTSWANA, LESOTHO AND SWAZILAND

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

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

UNITED KINGDOM

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

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

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

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

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

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

Items for Which IBM is Not Liable

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

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

Part 3 - Warranty Information

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

Warranty Period

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

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

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

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

Cisco Systems Intelligent Gigabit Ethernet Switch Module for the IBM @server BladeCenter

Country or Region of Purchase	Warranty Period	Type of Warranty Service*
Worldwide	Parts - 1 year, labor - 1 year	5
* See " <u>Types of Warranty Service</u> " 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 B. Notices

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Important notes

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

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

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

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

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

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

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

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>.

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 collection 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.



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。

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