

Nortel Port Aggregator Module for IBM  
BladeCenter



# Installation Guide



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BladeCenter



# Installation Guide

**Note:**

Before using this information and the product it supports, read the general information in Appendix B, "Warranty information," on page 51 and Appendix C, "Notices," on page 75.

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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 ασφάλειας (safety information).

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

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

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

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

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

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

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

Перед установкой продукта прочтите инструкции по технике безопасности.

Pred inštaláciou tohto zariadenia si pečítajte Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

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

Läs säkerhetsinformationen innan du installerar den här produkten.

### **Important:**

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

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

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

**Statement 1:**



**DANGER**

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

To avoid a shock hazard:

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

**To Connect:**

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 13:



DANGER

Overloading a branch circuit is potentially a fire hazard and a shock hazard under certain conditions. To avoid these hazards, ensure that your system electrical requirements do not exceed branch circuit protection requirements. Refer to the information that is provided with your device for electrical specifications.

**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.*



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## Chapter 1. The Nortel Port Aggregator Module

This *Installation Guide* contains information about setting up, installing, and configuring the Nortel Port Aggregator Module for IBM® BladeCenter®.

For installation details, see Chapter 2, “Installing and removing an I/O module and its components,” on page 9. For additional information, see the instructions in your BladeCenter documentation. The Nortel Port Aggregator Module for IBM BladeCenter is also referred to throughout this document as the Port Aggregator Module or I/O module. All IBM BladeCenter unit types are referred to throughout this document as the BladeCenter unit.

See the documentation for your BladeCenter unit type for specific I/O-module installation requirements.

You can obtain up-to-date information about the BladeCenter Port Aggregator Module and other IBM server products at <http://www.ibm.com/eserver/xseries/>.

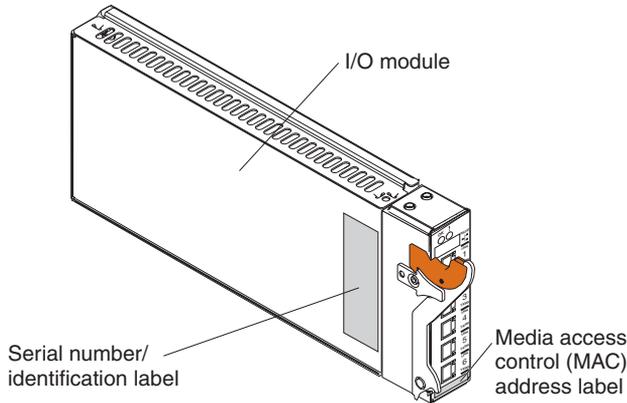
### Notes:

1. The illustrations in this document might differ slightly from your hardware.
2. The sample screens that appear in this document might differ slightly from the screens that are displayed by your system. Screen content varies according to the type of BladeCenter unit and the firmware versions and options that are installed.
3. This document applies to the copper models of the I/O module.

<b>Product name</b>	Nortel Port Aggregator Module for IBM BladeCenter
<b>Serial number</b>	_____
<b>Media access control (MAC) address</b>	_____

The product name and serial number are on the identification label on the side of the Port Aggregator Module. You will need this information when you register the Port Aggregator Module with IBM. The media access control (MAC) address is on a separate label on the information panel under the external Ethernet connectors.

The following illustration shows the locations of the identification label and the MAC address label on the I/O module.



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## Related documentation

This *Installation Guide* contains setup and installation instructions for the Port Aggregator Module. This document also provides general information about the Port Aggregator Module, including warranty information, and how to get help. The most recent versions of this *Installation Guide* and all other BladeCenter documentation are at <http://www.ibm.com/support/>.

In addition to this *Installation Guide*, the following related documentation is available for the Port Aggregator Module:

- *Safety Information*

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

- *Nortel Port Aggregator Module for IBM BladeCenter User Guide*

This Nortel document is a quick reference guide to the Port Aggregator Module. Detailed information about the Port Aggregator Module is in the following Nortel documents.

- *Alteon OS 21.x Application Guide Layer 2/3 GbE Switch Module for IBM @server BladeCenter*

This Nortel document contains detailed setup and installation instructions for the Port Aggregator Module. It provides the following information:

- Configuration instructions for the Port Aggregator Module
  - Information about features
  - Information about getting help
  - Guidance for planning, implementing, and administering local area network (LAN) operating system software
  - Usage examples
  - Troubleshooting information for the Port Aggregator Module
- *Alteon OS 21.x Browser-Based Interface Quick Guide Layer 2/3 GbE Switch Module for IBM @server BladeCenter*

This Nortel document contains information about the browser-based interface that you can use to perform the following tasks:

- Access switch information
  - Calculate and obtain statistical data
  - Perform switch configuration
- *Alteon OS 21.x Command Reference Layer 2/3 GbE Switch Module for IBM @server BladeCenter*

This Nortel document contains the following information:

- Information about getting started
  - Information about first-time connection to the Port Aggregator Module
  - Telnet program interface requirements
  - Browser-based network interface requirements
  - Command-line interface (CLI) operations
  - Maintenance menus
  - Statistics
  - Syslog messages
  - Usage examples
- *Nortel Port Aggregator Module for IBM BladeCenter Release Notes*
- This document contains updates, changes, issues, and work-arounds with respect to the Port Aggregator Module. Read this document for the latest information that might not be included in the Nortel reference manuals.

Depending on your BladeCenter unit type, additional documents might be included on the *BladeCenter Documentation* CD.

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

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

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## Features

This section provides a summary of the features of the Nortel Port Aggregator Module for IBM BladeCenter. For detailed information about the features, see the *Alteon OS 21.x Application Guide*.

- |   |
|---|
| <ul style="list-style-type: none"><li>• Ports<ul style="list-style-type: none"><li>– Internal ports<ul style="list-style-type: none"><li>- Fourteen internal full-duplex Gigabit ports, one connected to each of the blade servers in the BladeCenter unit.</li><li>- Two internal full-duplex 10/100 Mbps ports connected to the management module.</li></ul></li><li>– External ports<ul style="list-style-type: none"><li>Copper connection for making 10/100/1000 Mbps connections to a backbone switch.</li><li>Copper ports use six external 1000BASE-T RJ-45 connectors.</li></ul></li></ul></li></ul>   |
| <ul style="list-style-type: none"><li>• Supported Institute of Electrical and Electronics Engineers (IEEE) standards<ul style="list-style-type: none"><li>– 10/100/1000 auto-negotiation (external ports)</li><li>– Fixed mode option (external ports)</li><li>– External serial port uses one RS-232 console port that provides an additional means to install software and configure the Port Aggregator Module.</li><li>– Static link aggregation (EtherChannel compatible)</li><li>– 802.1Q (VLAN, 128 active)</li><li>– 802.3x flow control</li><li>– IEEE 802.3 Nway auto-negotiation</li></ul></li></ul> |
| <ul style="list-style-type: none"><li>• Layer 2 bridge/switch functions<ul style="list-style-type: none"><li>– Jumbo frames (up to 9 KB)</li><li>– Internet group management protocol (IGMP) snooping (V1 and V2)</li><li>– L2 multicast forwarding (hardware-based media speed)</li><li>– L2 forwarding performance (media speed/non-blocking)</li></ul></li></ul>   |

- Access control and security
  - Radius/TACACS+
  - Secure Shell (SSH)
  - Multiple user IDs and passwords
  - User access control
  - Change tracking and remote logging
  - Scriptable command-line interface (CLI)
  - Dual firmware image retention
  - Text format configuration file
  - Hypertext transfer protocol (HTTP) browser graphical user interface (GUI)
  - Telnet interface for CLI
  - Automatic remote system log
  - Firmware image update
    - Trivial file transfer protocol (TFTP)
    - File transfer protocol (FTP)

- Special functions
  - Serial over LAN (SOL)
  - L2 trunk failover

- Network cables
 

**Note:** To make sure that the BladeCenter unit installation complies with electromagnetic compatibility (EMC) product regulations for intra-building lightning surges, you must use shielded LAN cables that are grounded at both ends.

  - 10BASE-T:
    - UTP Category 3, 4, 5 (100 meters 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)

- RS-232 serial cable:
  - 3 meter console cable DB-9 to Universal Serial Bus (USB) connector (non-standard use of USB connector) that comes with the Port Aggregator Module

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## Standards

The Port Aggregator Module supports the following IEEE standards:

- 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
- IEEE 802.3z
  - 1000BASE-SX Gigabit Ethernet
  - Link Negotiation

**Note:** VLANs are also known as virtual local area networks.

---

## 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 IBM *BladeCenter Documentation* CD. Each statement is numbered for reference to the corresponding statement in the *Safety Information* document.

The following notices and statements are used in this document:

- **Note:** These notices provide important tips, guidance, or advice.
- **Important:** These notices provide information or advice that might help you avoid inconvenient or problem situations.
- **Attention:** These notices indicate 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.

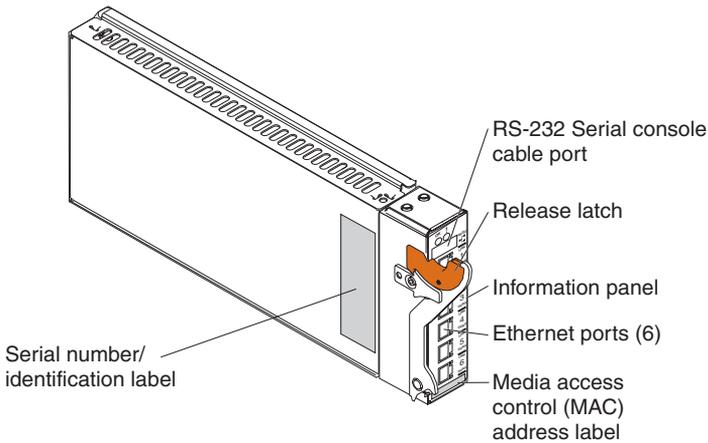
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## Major components of the Port Aggregator Module

Orange on the release latch on the Port Aggregator Module identifies this device as a hot-swap component. You can install or remove this component while the BladeCenter unit is running.

The following illustration shows the major components of the Port Aggregator Module.

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



For more information about the components of the information panel, see Chapter 4, “Information panel LEDs and external ports,” on page 19. For more information about the MAC address, see the *Alteon OS 21.x Application Guide*.



---

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

See the *Installation and User's Guide* for your BladeCenter unit type for information about the I/O-module bay locations in the BladeCenter unit and specific requirements for installing I/O modules in your BladeCenter unit.

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

Your BladeCenter unit supports a minimum of one hot-swap Port Aggregator Module, in I/O-module bay 1. The Port Aggregator Modules in I/O-module bays 1 and 2 are for the integrated Ethernet controllers in the applicable blade server. You might have to install Port Aggregator Modules in other I/O-module bays of the BladeCenter unit when additional Ethernet controllers are installed or activated on a blade server.

For details about network interface requirements and expansion options, see the following documents:

- *Planning and Installation Guide* for your BladeCenter unit type
- *Installation and User's Guide* for your BladeCenter unit type
- *Installation and User's Guide* for each blade server type

---

### Installation guidelines

Before you install the Port Aggregator Module in your BladeCenter unit, read the following information:

- Read the safety information that begins on page v and the guidelines in "Handling static-sensitive devices" on page 11, and read the safety statements in the BladeCenter unit publications.
- Observe good housekeeping in the area where you are working. Place removed covers and other parts in a safe place.
- Do not attempt to lift an object that you think is too heavy for you. If you have to lift a heavy object, observe the following precautions:
  - Make sure that you can stand safely without slipping.
  - Distribute the weight of the object equally between your feet.
  - Use a slow lifting force. Never move suddenly or twist when you lift a heavy object.
  - To avoid straining the muscles in your back, lift by standing or by pushing up with your leg muscles.

- Make sure that you have an adequate number of properly grounded electrical outlets for the BladeCenter unit, monitor, and other devices.
- You do not have to turn off the BladeCenter unit to install or replace any of the hot-swap modules in the BladeCenter unit.
- Orange on the release latch on the Port Aggregator Module identifies this device as a hot-swap component. You can install or remove this component while the BladeCenter unit is running. See the instructions in this chapter for more information about installing or removing hot-swap or hot-plug components.
- If you plan to install additional Port Aggregator Modules in the I/O-module bays of your BladeCenter unit, you might also have to install an I/O expansion card in the applicable blade server to support the Port Aggregator 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 in the BladeCenter unit has either an I/O module or filler module installed.
- A removed hot-swap module is replaced with another module or filler module within 1 minute of removal.
- A removed hot-swap blade server is replaced with another blade server or filler blade within 1 minute of removal.
- Cables for the Port Aggregator Module are routed according to the illustrations and instructions in this document.
- You have followed the reliability guidelines in the documentation that comes with the BladeCenter unit.

## Handling static-sensitive devices

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

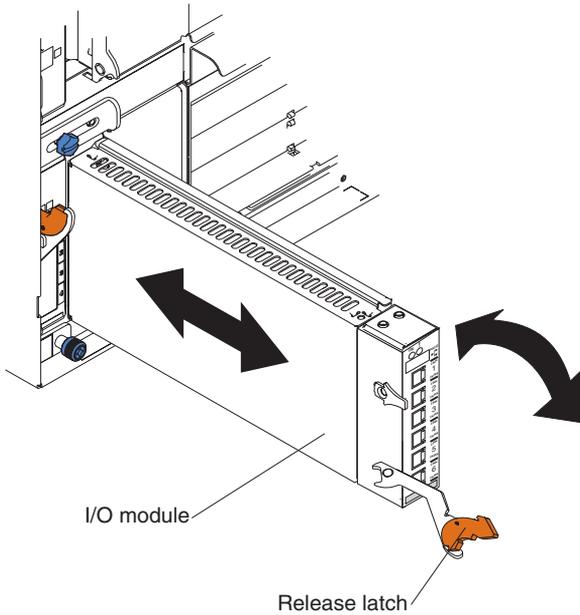
To reduce the possibility of electrostatic discharge, observe the following precautions:

- Limit your movement. Movement can cause static electricity to build up around you.
- Handle the device carefully, holding it by its edges or its frame.
- Do not touch solder joints, pins, or 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 down the device. If it is necessary to set down the device, put it back into its static-protective package. Do not place the device on the BladeCenter chassis or on a metal surface.
- Take additional care when handling devices during cold weather. Heating reduces indoor humidity and increases static electricity.

---

## Installing an I/O module

The following illustration shows how to install an I/O module in a typical BladeCenter unit.



Complete the following steps to install an I/O module.

**Attention:** Make sure that the I/O-module cover is installed and closed before you install the I/O module in the BladeCenter unit.

1. Read the safety information that begins on page v and “Installation guidelines” on page 9.
2. If an acoustic attenuation module is installed on your BladeCenter unit, remove it. See the documentation for your BladeCenter unit for instructions.
3. Select an I/O-module bay in which to install the Port Aggregator Module.

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

4. Remove the filler module from the selected I/O module bay. Store the filler module for future use.
5. If you have not already done so, touch the static-protective package that contains the I/O module to any *unpainted* metal surface of the BladeCenter unit or any *unpainted* metal surface on any other grounded rack component for at least 2 seconds.
6. Remove the I/O module from its static-protective package.
7. Make sure that the release latch on the I/O module is in the open position (perpendicular to the module).
8. Slide the I/O module into the I/O-module bay until it stops.
9. Push the release latch on the front of the I/O module to the closed position. After you insert and lock the I/O module, it is turned on, and a power-on self-test (POST) occurs to verify that the I/O module is operating correctly.
10. The POST results are displayed by the status light-emitting diodes (LEDs). Make sure that the LEDs on the I/O module indicate that it is operating correctly. Make sure that the OK LED on each I/O module is lit. See Chapter 4, “Information panel LEDs and external ports,” on page 19 for a more detailed description of the operation of these LEDs.  
For additional information, see Chapter 7, “Solving problems,” on page 43.
11. If you have other I/O modules to install, do so now; otherwise, go to step 12.

**Note:** To make sure that the BladeCenter unit installation complies with EMC product regulations for intra-building lightning surges, you must use shielded LAN cables that are grounded at both ends.

12. Attach any cables or cords that are required by the I/O module. For the location of the connectors on the BladeCenter unit, see the *Installation and User's Guide* for your BladeCenter unit type. For cable requirements, see page 5.
13. Replace the acoustic attenuation module, if you removed it in step 2 on page 12.

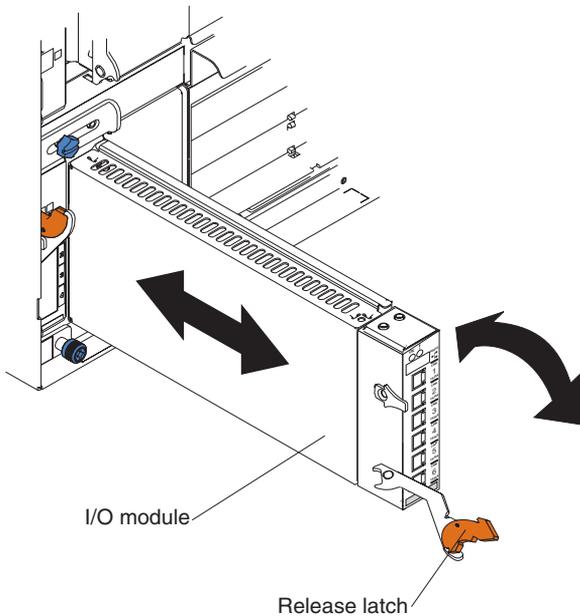
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## Removing an I/O module

**Attention:** To maintain proper cooling and system reliability, each I/O-module bay in the BladeCenter unit must have either an I/O module or filler module installed. If you remove a hot-swap module, you must replace it with another module or filler module within 1 minute of removal.

Complete the following steps to remove an I/O module:

1. Read the safety information that begins on page v and “Installation guidelines” on page 9.
2. If an acoustic attenuation module is installed on your BladeCenter unit, remove it. See the documentation for your BladeCenter unit for instructions.
3. Disconnect any cables from the I/O module that you are removing.
4. Pull the release latch toward the bottom of the I/O module as shown in the following illustration. The module moves out of the I/O-module bay approximately 0.64 cm (0.25 inch).



5. Slide the I/O module out of the I/O-module bay and set it aside.
6. Place either another I/O module or a filler module in the I/O-module bay within 1 minute.
7. If you placed another I/O module in the I/O-module bay, reconnect any cables that you disconnected in step 3 on page 14.
8. Replace the acoustic attenuation module, if you removed it in step 2 on page 14.



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## Chapter 3. Cabling the Port Aggregator Module

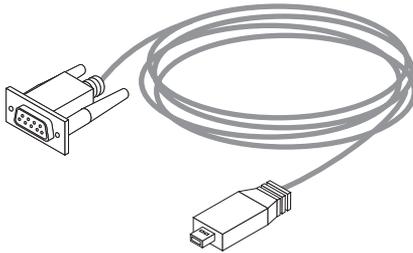
This chapter describes how to cable the Port Aggregator Module and its components.

---

### Connecting the serial console cable

Complete the following steps to connect the serial console cable to the I/O module and console device:

1. Remove the serial console cable from its packaging (see the following illustration).



2. Connect the USB-style connector end of the serial console cable to the RS-232 console port on the Port Aggregator Module and the other end of the cable to the console device (server, mobile computer, and so on).



---

## Chapter 4. Information panel LEDs and external ports

This chapter describes the information panel and LEDs on the Port Aggregator Module. This chapter also identifies the external ports on the information panel.

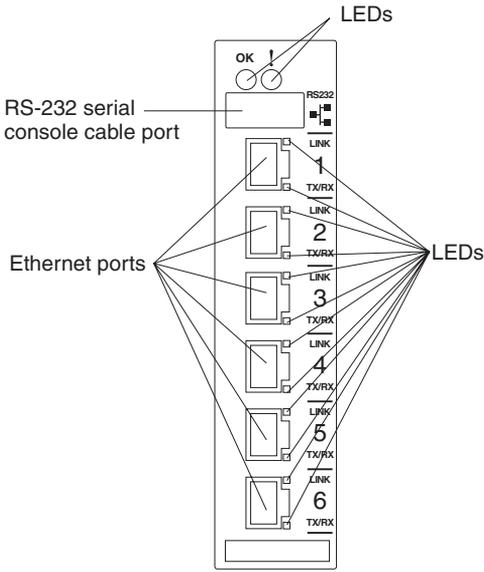
---

### Information panel

As shown in the following illustrations, the information panel of the Port Aggregator Modules contains the following LEDs and ports:

- The LEDs that display the status of the Port Aggregator Module and the network (see “LEDs” on page 21).
- One RS-232 console port that provides an additional means to install software and configure the I/O module. This USB-style connector enables connection of a special serial cable that is supplied with the Port Aggregator Module.
- The Port Aggregator Module has six external 1000BASE-T Ethernet ports for 10/100/1000 Mbps connections to external Ethernet devices, such as backbones, end stations, and servers. These ports are identified as EXT1, EXT2, EXT3, EXT4, EXT5, and EXT6 in the switch configuration menus and are labeled 1 through 6 (from top to bottom) on the Port Aggregator Module.

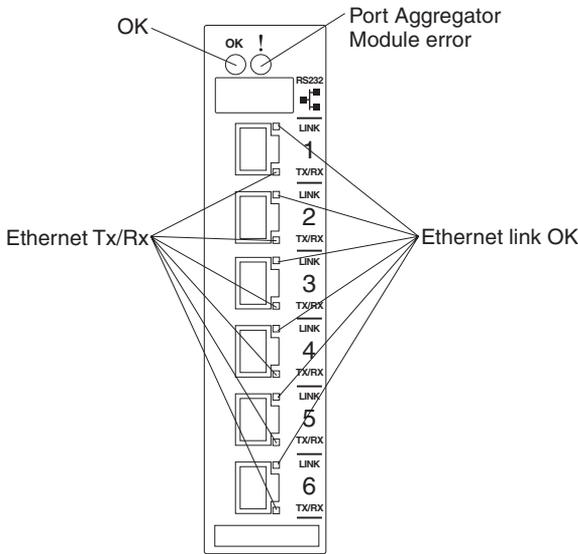
The following illustration shows the information panel for the Port Aggregator Module.



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## LEDs

The LEDs on the information panel of the Port Aggregator Module are OK and Port Aggregator Module error (fault). In addition, each external port on the Port Aggregator Module contains an Ethernet link OK LED and an Ethernet Tx/Rx LED. The following illustration shows the LEDs on the Port Aggregator Module. A description of each LED follows the illustration.



**Note:** 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 Port Aggregator Module. For additional information, see Chapter 7, “Solving problems,” on page 43.

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

**Port Aggregator Module error (fault):** This amber LED is on the right side of the information panel, above the four external 10/100/1000 Mbps ports. When this LED is lit, it indicates that the Port Aggregator Module has failed the POST or detected an operational fault.

**Note:** When the Port Aggregator Module error LED is lit, the system-error LED on the BladeCenter unit will also be lit.

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

**Ethernet Tx/Rx:** This green activity LED is at the bottom of each external 10/100/1000 Mbps port. When this LED flashes on a port, 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 flash frequency is proportional to the amount of traffic on the network link.

---

## Chapter 5. Configuring the Port Aggregator Module

The Port Aggregator Module supports two access methods for management: the Ethernet path to the management module, and a serial console connection port. You can use the method that is best suited for your BladeCenter environment.

- The first method uses the internal path to the management module. The remote-access link to the management console must be attached to the 10/100 Mbps Ethernet connector on the management module. The Internet protocol (IP) addresses of the Port Aggregator 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 separately from the data network. See “Establishing a TCP/IP session for the Port Aggregator Module through the management module” on page 25 for additional information.

See the applicable *BladeCenter Installation and User's Guide* for instructions for configuring the Port Aggregator Module for this mode of operation.

- The RS-232 console port provides an alternative path to manage and configure the switch that performs the same function as the Ethernet connection for management remote access. To establish a console connection using data communication equipment (DCE), an ASCII terminal or a computer running ASCII terminal emulation software is required and must be set to the following values:
  - Baud rate: 9600
  - Data bits: 8
  - Parity: None
  - Stop bits: 1
  - Flow control: None
  - Emulate: VT100

### Important:

1. Before you configure the Port Aggregator Module, make sure that the management modules in your BladeCenter unit are properly configured. See the applicable *BladeCenter Installation and User's Guide* publications for more information.
2. The default IP address of the Port Aggregator Module is 192.168.70.127, 192.168.70.128, 192.168.70.129, or 192.168.70.130, depending on the I/O-module bay where it is installed.

3. If you change the IP address of the Port Aggregator Module and restart the BladeCenter unit, the Port Aggregator Module will maintain this new IP address as its default value.
4. The management module and the Port Aggregator Module can communicate with each other only if they are on the same IP subnet.
5. When you use the management-module Web interface to update the Port Aggregator Module configuration, the management-module firmware saves the new configuration in its internal nonvolatile random-access memory (NVRAM). If the I/O module restarts, the management module applies the saved configuration to the I/O module.

If, for some reason, the I/O module restarts and the management module cannot apply the saved configuration to the I/O module, the I/O module defaults to using the configuration that it had previously saved. If the subnet IP address of the I/O module does not match the subnet IP address of the management module, you might not be able to manage the I/O module anymore.

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

See the following documents for specific details about configuring the Port Aggregator Module:

- The applicable *BladeCenter Installation and User's Guide* documents
- *Nortel Port Aggregator Module for IBM BladeCenter User Guide*
- *Alteon OS 21.x Application Guide*
- *Alteon OS 21.x Browser-Based Interface Quick Guide*
- *Alteon OS 21.x Command Reference*

In addition to the documents in this library, be sure to review the following documents for information to help you prepare for system installation and configuration:

- The *BladeCenter Management Module User's Guide* for your BladeCenter unit type
- The *BladeCenter Management Module Installation Guide* for your BladeCenter unit type
- *IBM BladeCenter Planning and Installation Guide* for your BladeCenter unit type at <http://www.ibm.com/pc/eserver/bladecenter/>

---

## Establishing a TCP/IP session for the Port Aggregator Module through the management module

Complete the following steps to establish a TCP/IP session for the switch through the management module:

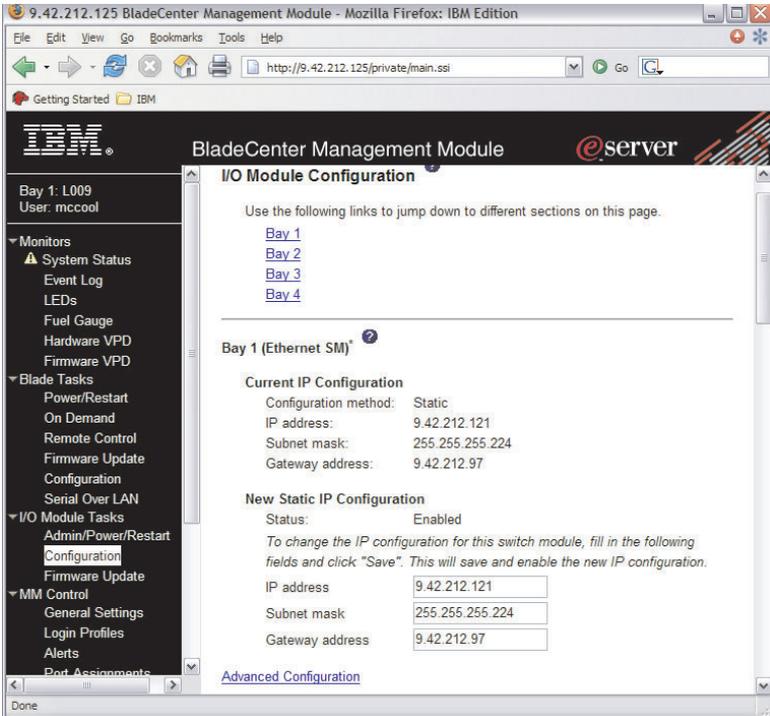
1. Access and log on to the management module as described in the *BladeCenter Management Module User's Guide*. If necessary, obtain the IP address of the management module from your system administrator. The login window opens.

If you do not have an assigned user identifier (ID) and initial password, type the default user ID (USERID) in the **User ID** field and the default password (PASSWORD) in the **Password** field (where the sixth character is the number zero, not the letter O) and click **OK**. The main page in the management-module interface opens.

**Note:** The **User ID** and **Password** fields are case-sensitive. Enter your information in uppercase letters only (for example, ABCDE). To maintain system security, change the password after you log on for the first time.

2. Select **Configuration** on the **I/O Module Tasks** menu on the left side of the BladeCenter Management Module window.

- From the **I/O Module Configuration** portion of the window, click the bay number that corresponds to the location of the Port Aggregator Module that you installed. The applicable bay number (in this example, bay 1) appears in the bottom portion of the window, followed by other related I/O-module information, including the IP address. The I/O-module information is divided under two headings: **Current IP Configuration** and **New Static IP Configuration**.



- To change the IP address of the Port Aggregator Module, use the Tab key to reach the **IP address** data field under the **New Static IP Configuration** heading; then, type the new IP address and click **Save**.
- Click **Advanced Configuration** under the applicable bay information (in this example, bay 1) in the BladeCenter Management Module window. You can now start a browser-based 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 CLI.

The browser-based interface and the Telnet program are different ways to access the same internal switching software and configure it. Thus, all the settings that you encounter in browser-based management are the same as those in the Telnet program.

- If your system application requires that you use the browser-based interface program, see “Configuring through the browser-based interface” on page 28 for additional information.
- If your system application requires that you use the Telnet program, see “Configuring through the Telnet interface” on page 31 for additional information.
- For information about running an SSH session, see the *Alteon OS 20.x Command Reference*.

---

## Enabling the external ports

To use the Port Aggregator Module from an external environment, you must enable the external ports through the management module.

Complete the following steps to enable the external ports:

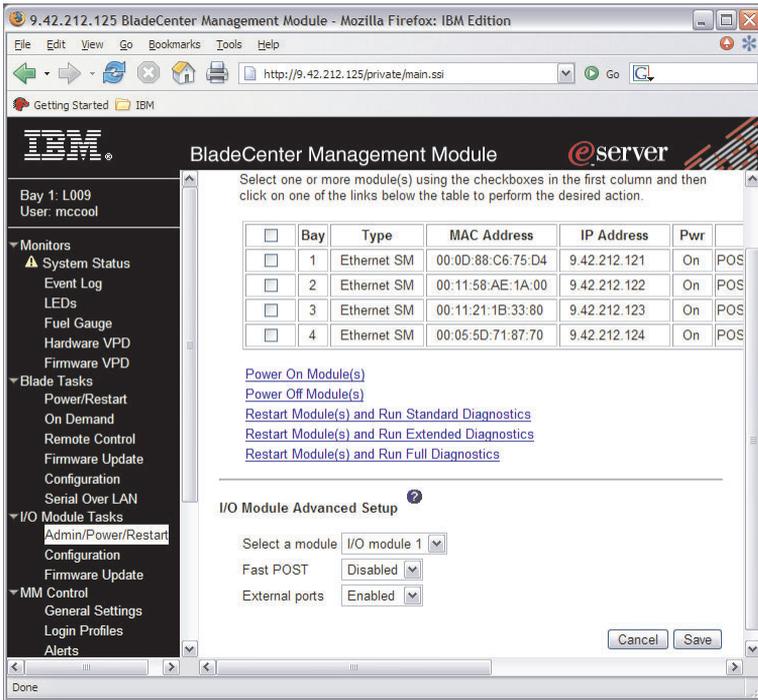
1. Access and log on to the management module as described in the *BladeCenter Management Module User’s Guide*. If necessary, obtain the IP address of the management module from your system administrator. The login window opens.

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 ID** field and the default password (PASSWORD) in the **Password** field (where the sixth character is the number zero, not the letter O) and click **OK**. The main page in the management-module interface opens.

**Note:** The **User ID** and **Password** fields are case-sensitive. Enter your information in uppercase letters only (for example, ABCDE). To maintain system security, change the password after you log on for the first time.

2. Select **Admin/Power/Restart** from the **I/O Module Tasks** menu on the left side of the BladeCenter Management Module window.



3. Under the **I/O Module Advanced Setup** Section, select the applicable I/O module, enable the **External Ports** feature, and click **Save**.

## Configuring through the browser-based interface

This section describes how to use the browser-based interface to access and configure the internal switching software.

This section also describes some of the browser-based Port Aggregator Module management features. For more detailed information about configuring the Port Aggregator Module, see the following documents:

- *Nortel Port Aggregator Module for IBM BladeCenter User Guide*
- *Alteon OS 21.x Application Guide*
- *Alteon OS 21.x Browser-Based Interface Quick Guide*
- *Alteon OS 21.x Command Reference*

The Port Aggregator Module offers an embedded HTML, browser-based interface that you can use to manage the switch through a standard browser,

such as Opera, Netscape Navigator/Communicator, or Microsoft® Internet Explorer. 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.

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

Because the browser-based interface is a built-in component of the Alteon OS switch software, you do not have to install a separate interface program. The browser-based interface contains these features:

- Two levels of password protection.
- User-friendly design.
- The same configuration and monitoring functions as in the command-line interface (CLI).
- Upgradeability upon the availability of future Alteon OS switch software updates.

The browser-based interface requires a computer or workstation with network access to the I/O module and a frame-capable Web-browser program, such as Internet Explorer (version 6.0 or later) or Netscape Navigator (version 4.7 or later). Before you can access and start the browser-based interface, you must have:

- Installed the Port Aggregator Module in the BladeCenter unit
- Verified that the Alteon OS switch software is installed on the Port Aggregator Module
- Configured the IP interface on the Port Aggregator Module
- Enabled the frames and the JavaScript™ program in your Web browser
- Enabled access to the browser-based interface (enabled by default)

To enable access to the browser-based interface, use this command from the CLI. You can also use `e` instead of `enable` in this command syntax: `>> Main# /cfg/sys/http <enable>`

To verify that the latest Alteon OS switch software is installed on the Port Aggregator Module or to update the software, see Chapter 6, “Updating the software,” on page 35.

To start the browser-based interface, enter the IP address of the I/O module in the address field of your browser; for example, 192.168.70.127.

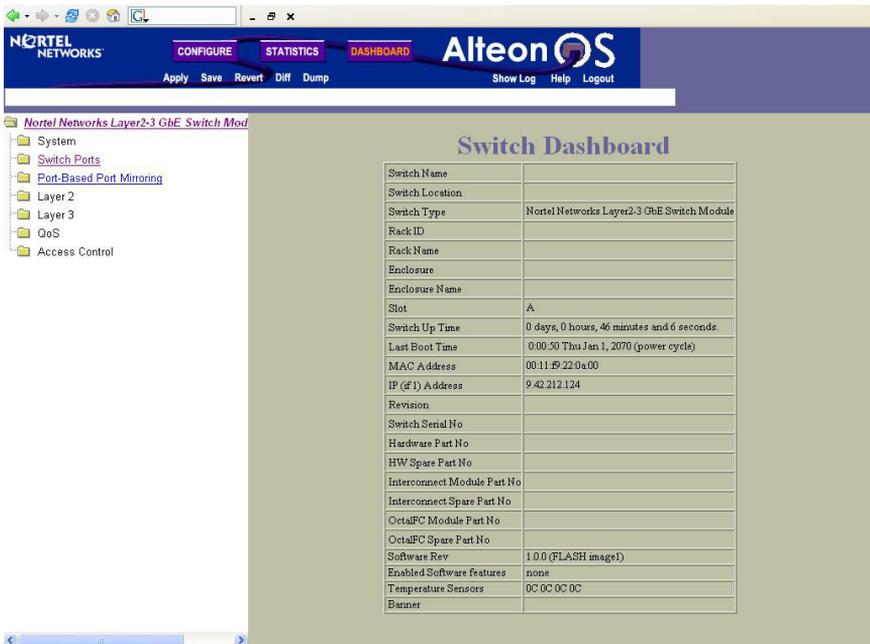
The login window opens.

If you do not have an assigned user ID and initial password, type the default user ID (admin) in the **User Name** field and the default password ( admin) in the **Password** field and click **OK**.

**Notes:**

1. The passwords used to access the Port Aggregator Module are case-sensitive.
2. To increase system security, change the password after you log on for the first time.

A window similar to the one in the following illustration opens. The left-side pane contains the main menu. The top panel shows a real-time information-pane display of the Port Aggregator Module. These items are described in detail in the *Nortel Port Aggregator Module for IBM BladeCenter User Guide* and the *Alteon OS 21.x Application Guide*.



---

## Configuring through the Telnet interface

The Port Aggregator Module supports a management interface that you can use to set up and control the Port Aggregator Module over the network by using the Telnet protocol. You can use this facility to perform many basic network management functions. The following sections describe how to use the Telnet interface to access the Port Aggregator Module, change its settings, and monitor its operation.

### Connecting to the Port Aggregator Module

If you know the IP address for the Port Aggregator Module and have an existing network connection, you can use the Telnet program (in VT-100 compatible terminal mode) to access and control the Port Aggregator Module. The Telnet program and the Port Aggregator Module must be on the same network. If you have to obtain the IP address for the Port Aggregator 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 main menu."

### Telnet usage conventions

The Telnet interface uses the following conventions:

- Items in angle brackets ( < > ) can be toggled among several choices through use of 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.
- 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. Moving the selection to a command and pressing Enter will process that command.

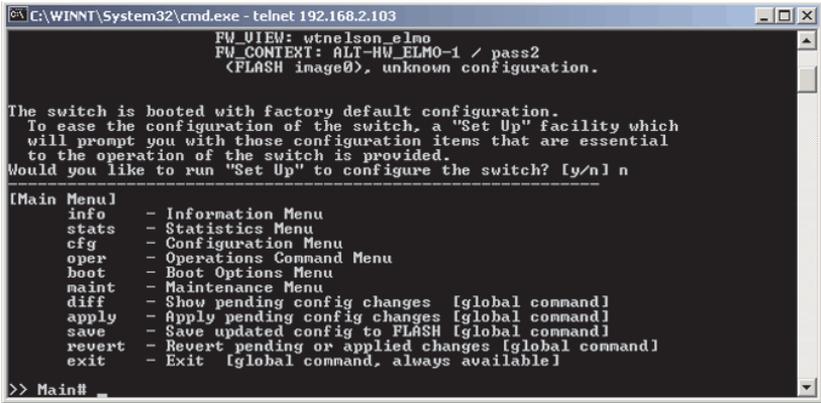
**Important:** The **APPLY** command makes changes to the switch configuration for the current session only. If you want your changes to be permanent, select **Save Changes** from the main menu. Selecting **Save Changes** enters the current switch configuration, including all changes, into NVRAM and then restarts the Port Aggregator Module.

### Accessing the main menu

Complete the following steps to connect to the Port Aggregator Module through the Telnet interface:

1. From a DOS prompt command line, type `telnet x` and press Enter (where *x* is the IP address for the Port Aggregator Module).
2. If you do not have an assigned initial password, type the default password (`admin`) in the **Password** field and press Enter.

3. Press Enter. The main menu is displayed, as shown in the following illustration.



```
C:\WINNT\System32\cmd.exe - telnet 192.168.2.103
FW_UIEW: wtnelson_elmo
FW_CONTEXT: ALT-HW_ELM0-1 / pass2
(FLASH image0), unknown configuration.

The switch is booted with factory default configuration.
To ease the configuration of the switch, a "Set Up" facility which
will prompt you with those configuration items that are essential
to the operation of the switch is provided.
Would you like to run "Set Up" to configure the switch? [y/n] n
-----
[Main Menu]
info - Information Menu
stats - Statistics Menu
cfg - Configuration Menu
oper - Operations Command Menu
boot - Boot Options Menu
maint - Maintenance Menu
diff - Show pending config changes [global command]
apply - Apply pending config changes [global command]
save - Save updated config to FLASH [global command]
revert - Revert pending or applied changes [global command]
exit - Exit [global command, always available]

>> Main#
```

**Note:** The first user automatically gets root privileges. Create at least one root-level user for the Port Aggregator Module when you set up your user accounts. See the *Alteon OS 21.x Application Guide* for details.

## Logging on to the Port Aggregator Module

To log in after you have created a registered user, complete the following steps from the login window (see “First-time connection to the Port Aggregator Module” for additional information):

1. Type your user ID and press Enter.
2. Type your password and press Enter. The main menu window opens according to your access level or privilege.

After you log on to the Port Aggregator Module, you can perform the tasks that are described in the *Alteon OS 21.x Application Guide* and other related documentation.

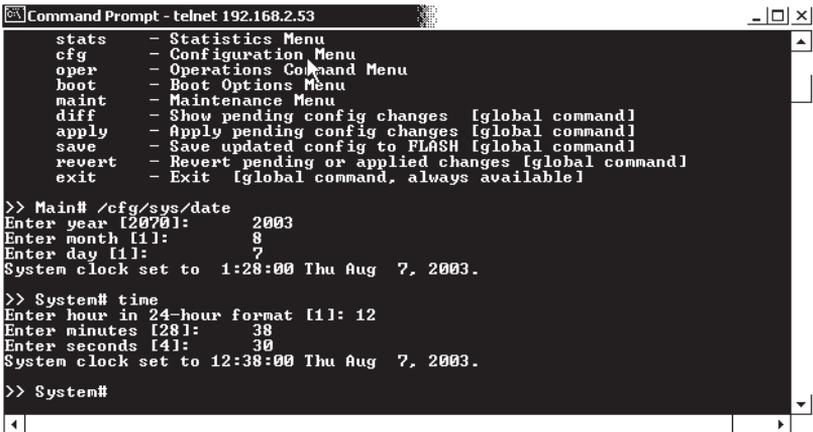
## First-time connection to the Port Aggregator Module

The Port Aggregator Module supports user-based security that enables you to prevent unauthorized users from accessing the Port Aggregator Module or changing its settings. This section describes how to log on to the Port Aggregator Module.

The first time that you turn on the Port Aggregator Module, you must set the date and time, through either the browser-based interface or the Telnet interface. Because the Port Aggregator Module does not contain a battery-backed real-time clock, you also must reset the date and time whenever any of the following conditions exists:

- The Port Aggregator Module is turned off and then back on
- The Port Aggregator Module is restarted
- The Port Aggregator Module software is updated

The following illustration shows how to set the date and time through the Telnet interface.



```
Command Prompt - telnet 192.168.2.53
stats - Statistics Menu
cfg - Configuration Menu
oper - Operations Command Menu
boot - Boot Options Menu
maint - Maintenance Menu
diff - Show pending config changes [global command]
apply - Apply pending config changes [global command]
save - Save updated config to FLASH [global command]
revert - Revert pending or applied changes [global command]
exit - Exit [global command, always available]

>> Main# /cfg/sys/date
Enter year [2003]: 2003
Enter month [1]: 8
Enter day [1]: 7
System clock set to 1:28:00 Thu Aug 7, 2003.

>> System# time
Enter hour in 24-hour format [1]: 12
Enter minutes [28]: 38
Enter seconds [1]: 30
System clock set to 12:38:00 Thu Aug 7, 2003.

>> System#
```



---

## Chapter 6. Updating the software

This chapter provides information for the following tasks:

- Obtaining the management-module software
- Obtaining the Port Aggregator Module software and performing the following tasks to update the I/O module:
  - Determining the level of the software installed
  - Obtaining the latest level of software for the I/O module
  - Updating the software on the I/O module
  - Resetting the I/O module to activate the software update

---

### Management-module software level

Make sure that you are using the latest version of management-module firmware for your BladeCenter unit type. See the *Management Module User's Guide* for your BladeCenter unit type for additional information.

---

### Updating the Port Aggregator Module software

The following sections provide information for obtaining and updating the I/O-module software.

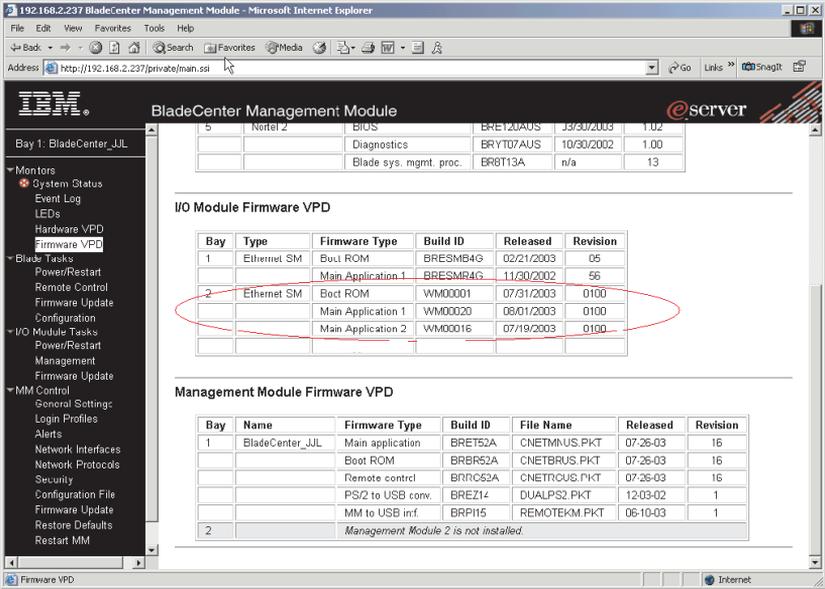
#### Determining the level of the Port Aggregator Module software

After you install the Port Aggregator Module in your BladeCenter unit, make sure that the latest Alteon OS switch software is installed on the Port Aggregator Module. To determine the level of the Alteon OS switch software that is installed on the Port Aggregator Module, complete the following steps:

1. Access and log on to the management module as described in the *Management Module User's Guide* for your BladeCenter unit type. If necessary, obtain the IP address of the management module from your system administrator. The login window opens.  
If you do not have an assigned user identifier (ID) and initial password, type the default user ID (USERID) in the **User ID** field and the default password (PASSWORD) in the **Password** field (where the sixth character is the number zero, not the letter O) and click **OK**. The main page in the management module opens.

**Note:** The **User ID** and **Password** fields are case-sensitive. Enter your information in uppercase letters only (for example, ABCDE). To maintain system security, change the password after you log on for the first time.

2. Select **Firmware VPD** from the **Monitors** menu on the left side of the BladeCenter Management Module window. The Firmware VPD window opens.
3. On the Firmware VPD window, page down to the **I/O Module Firmware VPD** heading to locate the number of the I/O-module bay that contains the Port Aggregator Module that you just installed; then, note the corresponding level of the software for the I/O module.



## Obtaining the latest level of software for the I/O module

To determine the latest level of the Alteon OS switch software that is available from IBM, complete the following steps:

1. Go to <http://www.ibm.com/support/> and follow the instructions.
2. Under **Search technical support**, type Nortel Port Aggregator, and click **Search**.
3. Compare the level of software that you noted in the **I/O Module Firmware VPD** section of the Firmware VPD window to the latest level of available software. If the two software levels do not match, download the latest level from the World Wide Web.

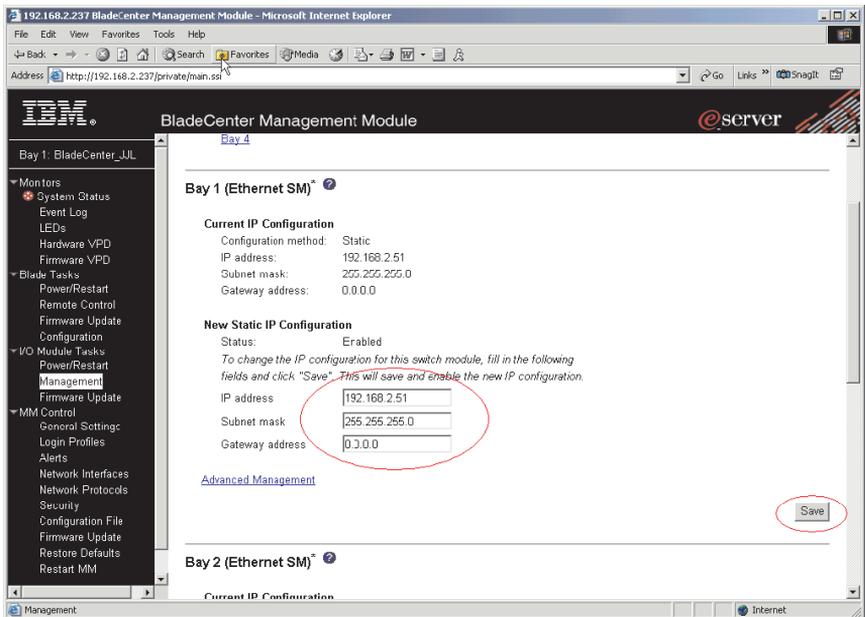
**Note:** Changes are made periodically to the IBM Web site. The actual procedure might vary slightly from what is described in this document.

The Port Aggregator Module can contain two software operating-system images. When used correctly, this allows you to return to a previous image if necessary.

## Upgrading the I/O-module software

The I/O-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. The Telnet session will work correctly only if all three network entities (TFTP server, management module, and switch IP addresses) are on the same subnet. Use the management-module interface to configure the IP addresses of the management-module external interface (eth0, eth1) and the Port Aggregator Module so that they all are on the same subnet as the TFTP server.



In this illustration, the IP addresses and masks in the following table are used.

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
Management module (eth1)	192.168.2.238	255.255.255.0
Current IP configuration	192.168.2.51	255.255.255.0

**Note:** With this configuration, you can ping the Port Aggregator 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 5, “Configuring the Port Aggregator Module,” on page 23.

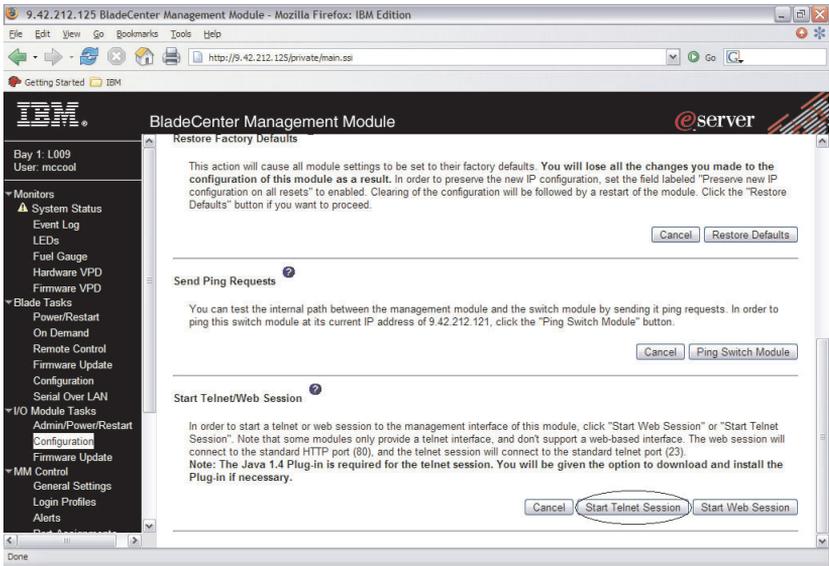
1. Access and log on to the management module as described in the *Management Module User’s Guide* for your BladeCenter unit type. The login window opens.

If you do not have an assigned user identifier (ID) and initial password, type the default user ID (USERID) in the **User ID** field and the default password (PASSWORD) in the **Password** field (where the sixth character is the number zero, not the letter O) and click **OK**. Type n when asked if you want to run setup. The main page in the management-module interface opens.

**Note:** The **User ID** and **Password** fields are case-sensitive. Enter your information in uppercase letters only (for example, ABCDE). To maintain system security, change the password after you log on for the first time.

2. Select **Configuration** from the **I/O Module Tasks** menu on the left side of the BladeCenter Management Module window. Scroll down to the applicable I/O-module bay and select **Advanced Configuration**.

- Click **Start Telnet Session**, as shown in the following illustration. If you do not have an assigned initial password, type the default password (admin) in the Password field and press Enter.



Complete the following steps to upgrade the switch software:

- Using the CLI, type the following command and press Enter:  
`/boot/gtimg imageX TADDR zzzzz` (where *imageX* is the image to be installed and *zzzzz* is the operating-system image file name, for example, GbE-1.0.0.20-os.img).
- Reset and restart the Port Aggregator Module as described in “Resetting and restarting the Port Aggregator Module” on page 40.
- Using the CLI, type the following command and press Enter:  
`/boot/gtimg boot TADDR yyyyy` (where *yyyyy* is the boot image file name, for example, GbE-1.0.0.24-boot.img).
- Reset and restart the Port Aggregator Module as described in “Resetting and restarting the Port Aggregator Module” on page 40.

**Note:** There might only be one image to install.

The following illustration shows the TFTP window for the software download to the Port Aggregator Module.

```
Command Prompt - telnet 192.168.2.53

>> Main# /boot/gtimg boot 192.168.2.153 GbE-1.0.0.18-Boot.img
boot kernel currently contains Software Version 1.0.0.20
New download will replace boot kernel with the file "GbE-1.0.0.18-Boot.img"
  from TFTP server 192.168.2.153.
Confirm download operation [y/n]: y
Starting download...
File appears valid
Download in progress.....
.....
Boot image <FS> download complete.
Writing to flash...This takes about 90 seconds. Please wait
FS Sector now contains Software Version 1.0.0.18
Boot image <FPGA> download complete.
Writing to flash...This takes about 90 seconds. Please wait
FPGA Sector now contains Software Version 1.0.0.18
Boot image <Kernel> download complete.
Writing to flash...This takes about 90 seconds. Please wait
Kernel Sector now contains Software Version 1.0.0.18
Boot image <Boot> download complete.
Writing to flash...This takes about 90 seconds. Please wait
Boot Sector now contains Software Version 1.0.0.18
>> Boot Options#
```

## Resetting and restarting the Port Aggregator Module

To activate the new image or images, you must reset the Port Aggregator Module through the management-module interface. Complete the following steps to reset the Port Aggregator Module:

1. Select **Management** from the **I/O Module Tasks** menu on the left side of the BladeCenter Management Module window. The I/O Module Tasks window opens.
2. Select the I/O-module bay on which the software update was just installed.
3. From the I/O Module Tasks window, select **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**.
7. Wait 70 seconds for POST to be completed.
8. Make sure that the latest Alteon OS switch software was correctly installed on the Port Aggregator Module. Select **Firmware VPD** on the **Monitors** menu on the left side of the BladeCenter Management Module window. The Firmware VPD window opens.

- On the Firmware VPD window, page down to the **I/O Module Firmware VPD** heading to locate the number of the I/O-module bay that contains the Port Aggregator Module that you just installed; then, note the corresponding level of the software for the I/O module.

The screenshot shows the BladeCenter Management Module web interface. The left sidebar contains a navigation menu with options like Monitors, System Status, LEDs, Hardware VPD, and Firmware VPD. The main content area displays the 'I/O Module Firmware VPD' table, which is circled in red. Below it is the 'Management Module Firmware VPD' table.

Bay	Type	Firmware Type	Build ID	Released	Revision
1	Ethernet SM	Boot ROM	BRESMB4G	02/21/2003	05
		Main Application 1	BRESMB4G	11/30/2002	56
2	Ethernet SM	Boot ROM	WM00001	07/31/2003	0100
		Main Application 1	WM00020	08/01/2003	0100
		Main Application 2	WM00016	07/19/2003	0100

Bay	Name	Firmware Type	Build ID	File Name	Released	Revision
1	BladeCenter_JUL	Main application	BRET52A	CNETMMVUS.PKT	07-26-03	16
		Boot ROM	BRBR52A	CNETBRUS.PKT	07-26-03	16
		Remote control	BRRC52A	CNETRUCUS.PKT	07-26-03	16
		PS/2 to USB conv.	BREZ14	DUALPS2.PKT	12-03-02	1
		MM to USB inf.	BRP15	REMODEK.M.PKT	06-10-03	1
2		Management Module 2 is not installed.				

- Make sure that the latest Alteon OS switch software was correctly installed on the Port Aggregator Module.



---

## Chapter 7. Solving problems

This section provides basic troubleshooting information to help you solve some problems that might occur while you are setting up the Port Aggregator Module. The *Alteon OS 21.x Application Guide* contains more details about troubleshooting the Port Aggregator Module.

If you cannot locate and correct the problem using the information in this section, see Appendix A, “Getting help and technical assistance,” on page 49.

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### Running POST

To ensure that it is fully operational, the Port Aggregator 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 POST fails, the amber Port Aggregator Module error (fault) LED and the system-error LED on the BladeCenter unit will be 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 pane of the management-module interface.

**Note:** For the location and description of the Port Aggregator Module LEDs, see Chapter 4, “Information panel LEDs and external ports,” on page 19.

The following illustrations are examples of the windows that will be displayed if a POST error occurs.

192.168.2.237 BladeCenter Management Module - Microsoft Internet Explorer

Address http://192.168.2.237/private/main.ssi

## BladeCenter Management Module

Bay 1: BladeCenter\_JUL

- Monitors
  - System Status
  - Event Log**
  - LEDs
  - Hardware VPD
  - Firmware VPD
- Blade Tasks
  - Power/Restart
  - Remote Control
  - Firmware Update
  - Configuration
- I/O Module Tasks
  - Power/Restart
  - Management
  - Firmware Update
- MM Control
  - General Settings
  - Login Profiles
  - Alerts
  - Network Interfaces
  - Network Protocols
  - Security
  - Configuration File
  - Firmware Update
  - Restore Defaults
  - Restart MM

### Event Log

Monitor log state events

Severity	Source	Date
Error	BLADE_02	08/07/03
Warning	SERVPROC	
Info		

Note: Hold down Ctrl to select more than one option.  
Hold down Shift to select a range of options.

Filters: None

Index	Sev	Source	Date/Time	Text
1	I	SERVPROC	08/07/03, 16:43:07	Recovery Switch 3 Fault
2	E	SERVPROC	08/07/03, 16:43:06	Switch 3 Fault Multiple I/O module failures
3	I	SERVPROC	08/07/03, 16:42:54	User <u>linj</u> attempting to restart switch module in bay 3.
4	I	SERVPROC	08/07/03, 16:42:54	I/C module 3 was powered on.
5	I	SERVPROC	08/07/03, 16:42:52	I/C module 3 was powered off.
6	I	SERVPROC	08/07/03, 16:42:28	Switch module 3 IP configuration was changed.
7	I	SERVPROC	08/07/03, 16:39:10	I/C module 3 was powered on.
8	I	SERVPROC	08/07/03, 16:39:07	I/C module 3 was installed.
9	I	SERVPROC	08/07/03, 15:08:11	Recovery System Running Nonredundant I/O Modules
10	I	SERVPROC	08/07/03, 15:08:11	I/C module 3 was powered on.

192.168.2.237 BladeCenter Management Module - Microsoft Internet Explorer

Address http://192.168.2.237/private/main.ssi

## BladeCenter Management Module

Bay 1: BladeCenter\_JUL

- Monitors
  - System Status
  - Event Log
  - LEDs
  - Hardware VPD
  - Firmware VPD
- Blade Tasks
  - Power/Restart
  - Remote Control
  - Firmware Update
  - Configuration
- I/O Module Tasks
  - Power/Restart
  - Management
  - Firmware Update
- MM Control
  - General Settings
  - Login Profiles
  - Alerts
  - Network Interfaces
  - Network Protocols
  - Security
  - Configuration File
  - Firmware Update
  - Restore Defaults
  - Restart MM

### I/O Modules

\* MT = Media Tray (CD/Floppy/USB) , WOL = Wake on LAN , BSE = Blade Storage Expansion  
\*\* You can change the KVM and Media Tray ownership on the Remote Control panel (under Blade Tasks).

Bay	Status	Type*	MAC Address	IP Address	Pwr	Details
1	●	Ethernet SM	00:05:5D:71:84:50	192.168.2.51	On	FF: Module completed POST successfully.
2	●	Ethernet SM	00:09:97:ED:13:00	192.168.2.53	On	FF: Module completed POST successfully.
3	⊗	Ethernet SM	00:09:97:EC:00:00	192.168.2.55	On	ID: Base internal function failure detected.
4			No module present			

\* SM = Switch Module, CM = Concentrator Module, PM = Pass-thru Module

### Management Modules

Click the icon in the Status column for details about the primary management module.

Bay	Status	IP Address (external n/w interface)	Primary
1	●	192.168.2.237	X
2		No MM present	

### Power Modules

---

## POST errors

There are two types of errors: noncritical and critical. A noncritical error applies to one port, and the Port Aggregator Module is operational. You can continue to operate the Port Aggregator Module; however, you must replace it as soon as possible. When critical errors occur, the Port Aggregator Module does not operate. If a critical error occurs, complete the following steps:

1. Open the Management Module Switch Information window.
2. Turn off the Port Aggregator Module; then, turn it back on.
3. After POST is completed, the management-module interface displays the results. Refresh the window to view the POST results. If the error remains, the Port Aggregator Module is defective. Replace the Port Aggregator 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 IBM. For more details, see Appendix A, "Getting help and technical assistance," on page 49.

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	I/O module "good" indicator	Operation



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## Chapter 8. Parts listing

The following table shows the list of the parts that come with the I/O module option. This parts listing supports the Nortel Port Aggregator Module for IBM BladeCenter.

**Note:** Field replaceable units (FRUs) should be serviced only by qualified field service technicians. Customer replaceable units (CRUs) can be replaced by the customer.

Part	FRU number	CRU/FRU
Nortel Port Aggregator Module assembly	39Y9131	CRU
Serial console cable	02R9365	CRU



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## Appendix A. Getting help and technical assistance

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

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### Before you call

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

- Check all cables to make sure that they are connected.
- Check the power switches to make sure that the system and any optional devices are turned on.
- Use the troubleshooting information in your system documentation, and use the diagnostic tools that come with your system. Information about diagnostic tools is in the *Hardware Maintenance Manual and Troubleshooting Guide* or *Problem Determination and Service Guide* on the IBM Documentation CD that comes with your system.
- Go to <http://www.ibm.com/bladecenter/> and click **Support** to check for information to help you solve the problem.

You can solve many problems without outside assistance by following the troubleshooting procedures that IBM provides in the online help or in the documentation that is provided with your IBM product. The documentation that comes with BladeCenter systems also describes the diagnostic tests that you can perform. Most BladeCenter systems, operating systems, and programs come with documentation that contains troubleshooting procedures and explanations of error messages and error codes. If you suspect a software problem, see the documentation for the software.

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### Using the documentation

Information about your IBM BladeCenter system and preinstalled software, if any, or optional device is available in the documentation that comes with the product. That documentation can include printed documents, online documents, readme files, and help files. See the troubleshooting information in your system documentation for instructions for using the diagnostic programs. The troubleshooting information or the diagnostic programs might tell you that you need additional or updated device drivers or other software. IBM maintains pages on the World Wide Web where you can get the latest technical

information and download device drivers and updates. To access these pages, go to <http://www.ibm.com/bladecenter/>, click **Support**, and follow the instructions. Also, some documents are available through the IBM Publications Center at <http://www.ibm.com/shop/publications/order/>.

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## Getting help and information from the World Wide Web

On the World Wide Web, the IBM Web site has up-to-date information about IBM BladeCenter systems, optional devices, services, and support at <http://www.ibm.com/bladecenter/>. For service information, click **Support**.

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## Software service and support

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

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

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## Hardware service and support

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

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

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## Appendix B. Warranty information

Thank you for your purchase. IBM provides hardware warranty service for this product equivalent to that described in the IBM Statement of Limited Warranty (“SOLW”), a copy of which is included, notwithstanding the section entitled, “What this Warranty Does not Cover” of the SOLW. All references to “Machine” in the SOLW apply to this product (except for its firmware or accompanying software) for purposes of the warranty. References to “IBM’s Official Published Specifications” mean the specifications for the product designated by IBM. Any firmware or software included in or which accompanies this product is subject to the terms and conditions of the manufacturer’s end user license agreement.

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### 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.

**Machine - Nortel Port Aggregator Module for IBM BladeCenter**

Country or Region of Purchase	Warranty Period	Type of Warranty Service*
Worldwide	3 years	1
* See “Types of Warranty Service” for the legend and explanations of warranty-service types.		

## Types of Warranty Service

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

**EU Country Telephone List**

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

Austria -- +43-1-24592-5901	Latvia -- +386-61-1796-699
Belgium -- +32-70-23-3392	Lithuania -- +386-61-1796-699
Cyprus -- +357-22-841100	Luxembourg -- +352-298-977-5063
Czech Republic -- +420-2-7213-1316	Malta -- +356-23-4175
Denmark -- +45-4520-8200	Netherlands -- +31-20-514-5770
Estonia -- +386-61-1796-699	Poland -- +48-22-878-6999
Finland -- +358-8001-4260	Portugal -- +351-21-892-7147
France -- +33-238-557-450	Slovakia -- +421-2-4954-1217
Germany -- +49-1805-253553	Slovenia -- +386-1-4796-699
Greece -- +30-210-680-1700	Spain -- +34-91-714-7983
Hungary -- +36-1-382-5720	Sweden -- +46-8-477-4420
Ireland -- +353-1-815-4000	United Kingdom -- +44-1475-555-055
Italy -- +39-800-820-094	

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## Appendix C. Notices

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

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## Important notes

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

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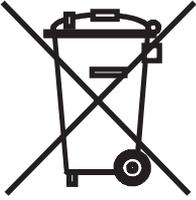
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Some software may differ from its retail version (if available), and may not include user manuals or all program functionality.

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## Product recycling and disposal

This unit must be recycled or discarded according to applicable local and national regulations. IBM encourages owners of information technology (IT) equipment to responsibly recycle their equipment when it is no longer needed. IBM offers a variety of product return programs and services in several countries to assist equipment owners in recycling their IT products. Information on IBM product recycling offerings can be found on IBM's Internet site at <http://www.ibm.com/ibm/environment/products/prp.shtml>.



**Notice:** This mark applies only to countries within the European Union (EU) and Norway.

This appliance is labeled in accordance with European Directive 2002/96/EC concerning waste electrical and electronic equipment (WEEE). The Directive determines the framework for the return and recycling of used appliances as applicable throughout the European Union. This label is applied to various products to indicate that the product is not to be thrown away, but rather reclaimed upon end of life per this Directive.

注意: このマークは EU 諸国およびノルウェーにおいてのみ適用されます。

この機器には、EU 諸国に対する廃電気電子機器指令 2002/96/EC(WEEE) のラベルが貼られています。この指令は、EU 諸国に適用する使用済み機器の回収とリサイクルの骨子を定めています。このラベルは、使用済みになった時に指令に従って適正な処理をする必要があることを知らせるために種々の製品に貼られています。

**Remarque :** Cette marque s'applique uniquement aux pays de l'Union Européenne et à la Norvège.

L'étiquette du système respecte la Directive européenne 2002/96/EC en matière de Déchets des Equipements Electriques et Electroniques (DEEE), qui détermine les dispositions de retour et de recyclage applicables aux systèmes utilisés à travers l'Union européenne. Conformément à la directive, ladite étiquette précise que le produit sur lequel elle est apposée ne doit pas être jeté mais être récupéré en fin de vie.

In accordance with the European WEEE Directive, electrical and electronic equipment (EEE) is to be collected separately and to be reused, recycled, or recovered at end of life. Users of EEE with the WEEE marking per Annex IV of the WEEE Directive, as shown above, must not dispose of end of life EEE as unsorted municipal waste, but use the collection framework available to customers for the return, recycling, and recovery of WEEE. Customer participation is important to minimize any potential effects of EEE on the environment and human health due to the potential presence of hazardous substances in EEE. For proper collection and treatment, contact your local IBM representative.

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## Battery return program

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

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

In the Netherlands, the following applies.



For Taiwan: Please recycle batteries.



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## Electronic emission notices

### Federal Communications Commission (FCC) statement

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

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

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

### Industry Canada Class A emission compliance statement

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

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

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

### Australia and New Zealand Class A statement

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

### United Kingdom telecommunications safety requirement

#### Notice to Customers

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

## European Union EMC Directive conformance statement

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

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

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

## Taiwanese Class A warning statement

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

## Chinese Class A warning statement

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

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

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

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