



xSeries 336 Type 8837

Installation Guide

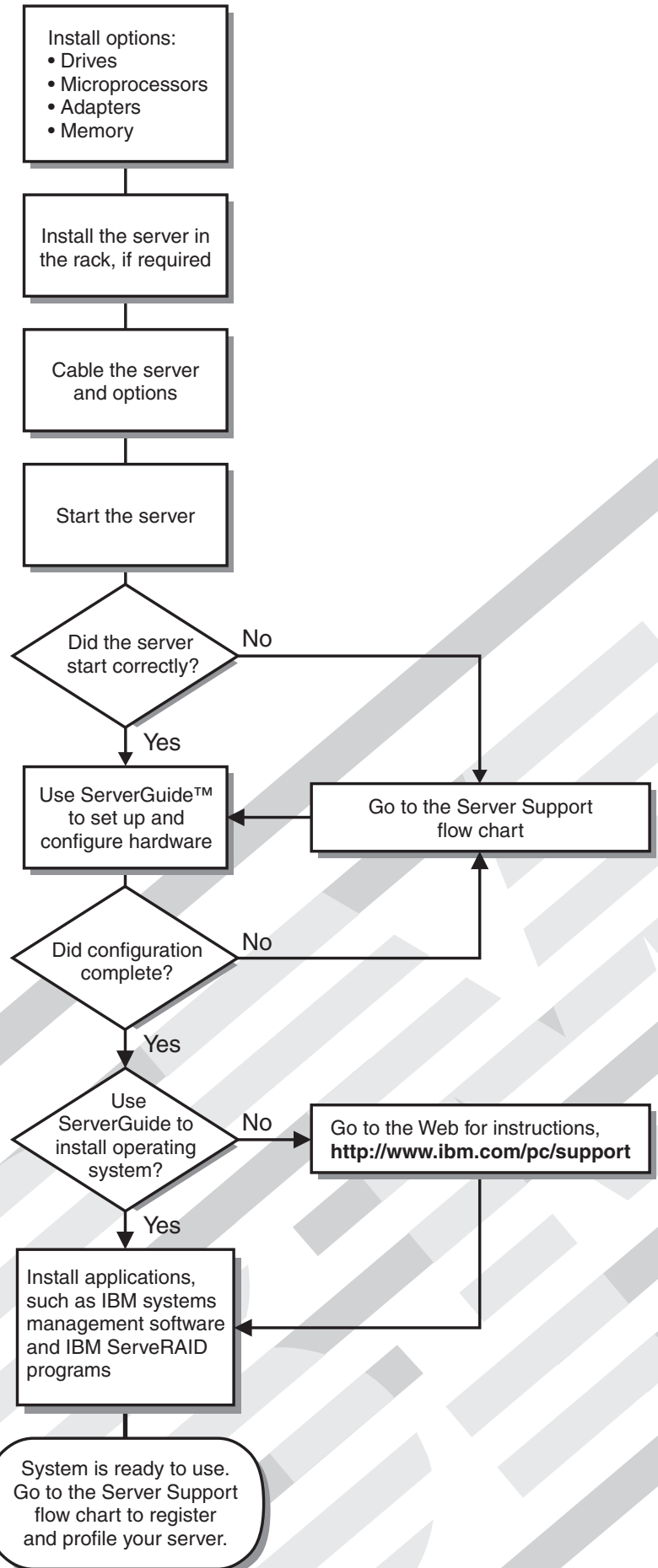
Welcome...

Thank you for buying an IBM xSeries server. Your server is based on the X-Architecture technology, and it features superior performance, availability, and scalability.

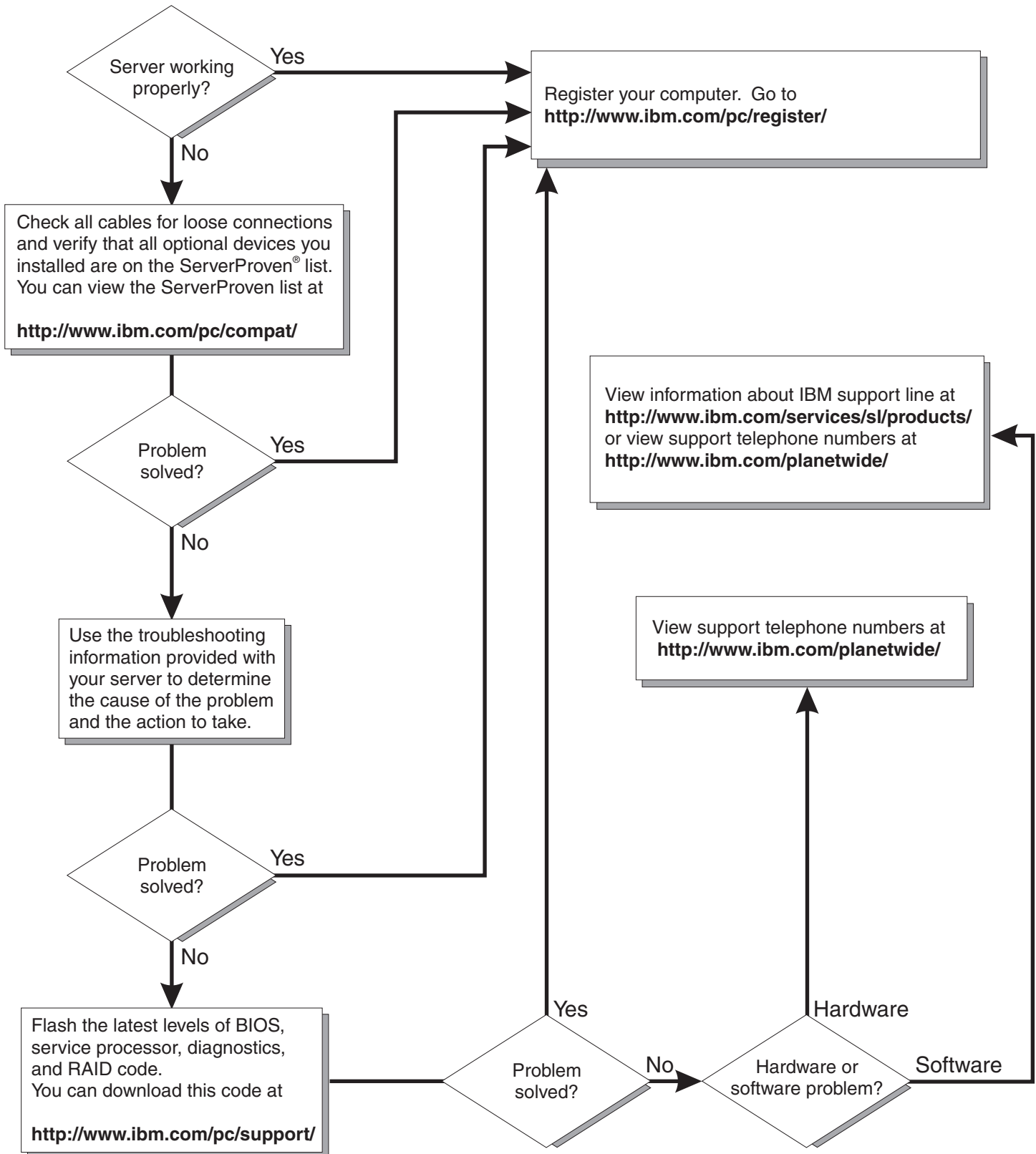
This server *Installation Guide* contains information for setting up and configuring your server.

For detailed information about your server, view the publications on the Documentation CD.

You can also find the most current information about your server on the IBM Web site at: <http://www.ibm.com/pc/support>.



Server Support





@server

IBM xSeries 336

Type 8837

Installation Guide

Note:

Before using this information and the product it supports, read the general information in Appendix B, "IBM Statement of Limited Warranty Z125-4753-08 04/2004," on page 55, and Appendix C, "Notices," on page 73.

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Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الأمنية

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

在安裝本產品之前，請仔細閱讀 **Safety Information**
(安全信息)。

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

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

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

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

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

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

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

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

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

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

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

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

Перед установкой продукта прочтите инструкции по
технике безопасности.

Pred inštaláciou tohto zariadenia si pečítajte Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

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

Läs säkerhetsinformationen innan du installerar den här produkten.

Important:

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

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

Be sure to read all caution and danger statements in this documentation before performing the instructions. Read any additional safety information that comes with the 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 2:



CAUTION:

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

Do not:

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

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

Statement 3:



CAUTION:

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

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

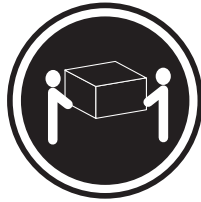


DANGER

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

Laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam.

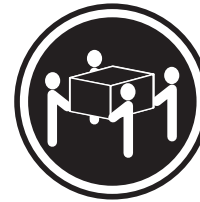
Statement 4:



≥ 18 kg (39.7 lb.)



≥ 32 kg (70.5 lb.)



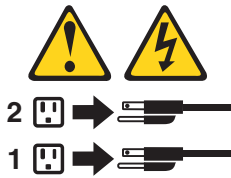
≥ 55 kg (121.2 lb.)

CAUTION:
Use safe practices when lifting.

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 6:



CAUTION:
Do not place any objects on top of a rack-mounted device unless that rack-mounted device is intended for use as a shelf.

Statement 8:



CAUTION:

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



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

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

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

Chapter 1. Introduction

This *Installation Guide* contains instructions for setting up your IBM™ @server™ xSeries® 336 Type 8837 server and basic instructions for installing some options. More detailed instructions for installing options are in the *IBM xSeries 336 Type 8837 Option Installation Guide* on the *IBM xSeries Documentation CD*, which comes with the server. This document contains information about:

- Setting up and cabling the server
- Starting and configuring the server
- Installing some options
- Solving problems

The server might have features that are not described in the documentation that you received with the server. The documentation might be updated occasionally to include information about those features, or technical updates might be available to provide additional information that is not included in the server documentation. These updates are available from the IBM Web site. Complete the following steps to check for updated documentation and technical updates:

1. Go to <http://www.ibm.com/pc/support/>.
2. In the **Learn** section, click **Online publications**.
3. On the “Online publications” page, in the **Brand** field, select **Servers**.
4. In the **Family** field, select **xSeries 336**.
5. Click **Continue**.

The server comes with an IBM *ServerGuide™ Setup and Installation* CD to help you configure the hardware, install device drivers, and install the operating system.

The server comes with a limited warranty. You can obtain up-to-date information about the server and other IBM server products at <http://www.ibm.com/eserver/xseries/>.

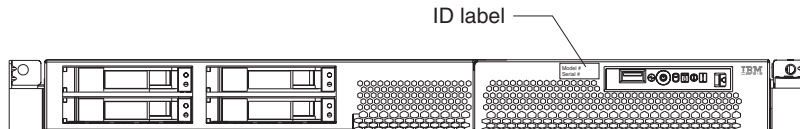
Racks are marked in vertical increments of 1.75 inches. Each increment is referred to as a unit, or “U.” The xSeries 336 Type 8837 server is a 1-U device.

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

Product name	IBM @server xSeries 336 server
Machine type	8837
Model number	_____
Serial number	_____

The model number and serial number are on the ID label, which is on the front of the server to the left of the operator information panel, as shown in the following illustration.

Note: This illustration shows a 2.5-inch SCSI hot-swap hard disk drive model. There is also a 3.5-inch hard disk drive model that is available with either a SCSI hot-swap or SATA non-hot-swap (simple swap) configuration. This illustration might differ slightly from your hardware.



For a list of supported options for the server, go to the ServerProven[®] Web site at <http://www.ibm.com/pc/compat/>.

See the *Rack Installation Instructions* document for complete rack installation and removal instructions.

The IBM xSeries Documentation CD

The IBM *xSeries Documentation* CD contains documentation for the server in Portable Document Format (PDF) and includes the IBM Documentation Browser to help you find information quickly.

Hardware and software requirements

The IBM *xSeries Documentation* CD requires the following minimum hardware and software:

- Microsoft[®] Windows NT[®] 4.0 (with Service Pack 3 or later), Windows[®] 2000, or Red Hat Linux.
- 100 MHz microprocessor.
- 32 MB of RAM.
- Adobe Acrobat Reader 3.0 (or later) or xpdf, which comes with Linux operating systems. Acrobat Reader software is included on the CD, and you can install it when you run the Documentation Browser.

Using the Documentation Browser

Use the Documentation Browser to browse the contents of the CD, read brief descriptions of the documents, and view documents using Adobe Acrobat Reader or xpdf. The Documentation Browser automatically detects the regional settings in use in your system and displays the documents in the language for that region (if available). If a document is not available in the language for that region, the English version is displayed.

Use one of the following procedures to start the Documentation Browser:

- If Autostart is enabled, insert the CD into your DVD-ROM drive. The Documentation Browser starts automatically.
- If Autostart is disabled or is not enabled for all users, use one of the following procedures:

- If you are using a Windows operating system, insert the CD into your DVD-ROM drive and click **Start --> Run**. In the **Open** field, type
`e:\win32.bat`

where *e* is the drive letter of the DVD-ROM drive, and click **OK**.

- If you are using Red Hat Linux, insert the CD into your DVD-ROM drive; then, run the following command from the `/mnt/cdrom` directory:

```
sh runlinux.sh
```

Select the server from the **Product** menu. The **Available Topics** list displays all the documents for the server. Some documents might be in folders. A plus sign (+) indicates each folder or document that has additional documents under it. Click the plus sign to display the additional documents.

When you select a document, a description of the document appears under **Topic Description**. To select more than one document, press and hold the Ctrl key while you select the documents. Click **View Book** to view the selected document or documents in Acrobat Reader or xpdf. If you selected more than one document, all the selected documents are opened in Acrobat Reader or xpdf.

To search all the documents, type a word or word string in the **Search** field and click **Search**. The documents in which the word or word string appears are listed in order of the most occurrences. Click a document to view it, and press **Ctrl+F** to use the Acrobat search function or press **Alt+F** to use the xpdf search function within the document.

Click **Help** for detailed information about using the Documentation Browser.

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 *xSeries 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:

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

Features and specifications

The following information is a summary of the features and specifications of the server. Depending on the server model, some features might not be available, or some specifications might not apply.

Table 1. Features and specifications

<p>Microprocessor:</p> <ul style="list-style-type: none"> Intel™ Xeon® 2.8 GHz or higher depending on server model Support for up to two microprocessors with Intel Hyper-Threading Technology and EM64T (extended memory 64 bit technology) 800 MHz front-side bus (FSB) <p>Memory:</p> <ul style="list-style-type: none"> Minimum: 512 MB Maximum: 16 GB Type: 2-way interleaved PC3200, 400 MHz, ECC DDR II SDRAM, registered DIMMs only Sizes: 256 MB, 512 MB, 1 GB, 2 GB (when available) <p>Drives:</p> <ul style="list-style-type: none"> DVD-ROM drive (available only with 3.5-inch hard disk drive configurations) <p>Expansion bays:</p> <p>Comes in 3 configurations:</p> <ul style="list-style-type: none"> Configuration 1 and 2 <ul style="list-style-type: none"> One 9.5-mm high DVD-ROM drive (optional) Two 3.5-inch hot-swap SCSI or two 3.5-inch non-hot-swap (simple swap) SATA hard disk drives Configuration 3 <ul style="list-style-type: none"> Four 2.5-inch hot-swap SCSI hard disk drives <p>Expansion slots:</p> <ul style="list-style-type: none"> One PCI-X 133 MHz or PCI Ex8, full-length, full height (Note: PCI-E x8 (PCI-E) requires an optional riser card) One PCI-X 100 MHz, half length, low-profile <p>Power supply:</p> <ul style="list-style-type: none"> 585 watt hot-swap power supply standard Optional redundant 585 watt power supply 	<p>Size:</p> <ul style="list-style-type: none"> Height: 43 mm (1.69 in.) Depth: 686 mm (27.0 in.) Width: 440 mm (17.32 in.) Weight: approximately 15.6 kg (34.5 lb) when fully configured or 12.7 kg (28 lb) minimum <p>Integrated functions:</p> <ul style="list-style-type: none"> Baseboard management controller (BMC) One LSI Ultra320 SCSI controller with RAID levels 1 and 1E capability Two Broadcom 10/100/1000 Ethernet controllers with Wake on LAN® feature and Alert Standard Format support Three Universal Serial Bus (USB) ports One serial port Keyboard port Mouse port Video port <p>Acoustical noise emissions:</p> <ul style="list-style-type: none"> Sound power, idling: 6.9 bel maximum Sound power, operating: 6.9 bel maximum <p>Environment:</p> <ul style="list-style-type: none"> Air temperature: <ul style="list-style-type: none"> Server on: 10° to 35°C (50.0° to 95.0°F); altitude: 0 to 2133 m (6998.0 ft) Server off: 10° to 43°C (50.0° to 109.4°F); maximum altitude: 2133 m (6998.0 ft) Humidity: <ul style="list-style-type: none"> Server on: 8% to 80% Server off: 8% to 80% 	<p>Heat output:</p> <p>Approximate heat output in British thermal units (Btu) per hour:</p> <ul style="list-style-type: none"> Minimum configuration: 587 Btu/hr (172 watts) Maximum configuration: 1878 Btu/hr (550 watts) <p>Electrical input:</p> <ul style="list-style-type: none"> Sine-wave input (50-60 Hz) required Input voltage low range: <ul style="list-style-type: none"> Minimum: 100 V ac Maximum: 127 V ac Input voltage high range: <ul style="list-style-type: none"> Minimum: 200 V ac Maximum: 240 V ac Input kilovolt-amperes (kVA), approximately: <ul style="list-style-type: none"> Minimum: .172 kVA Maximum: .550 kVA <p>Notes:</p> <ol style="list-style-type: none"> Power consumption and heat output vary depending on the number and type of optional features installed and the power-management optional features in use. These levels were measured in controlled acoustical environments according to the procedures specified by the American National Standards Institute (ANSI) S12.10 and ISO 7779 and are reported in accordance with ISO 9296. Actual sound-pressure levels in a given location might exceed the average values stated because of room reflections and other nearby noise sources. The declared sound-power levels indicate an upper limit, below which a large number of computers will operate.
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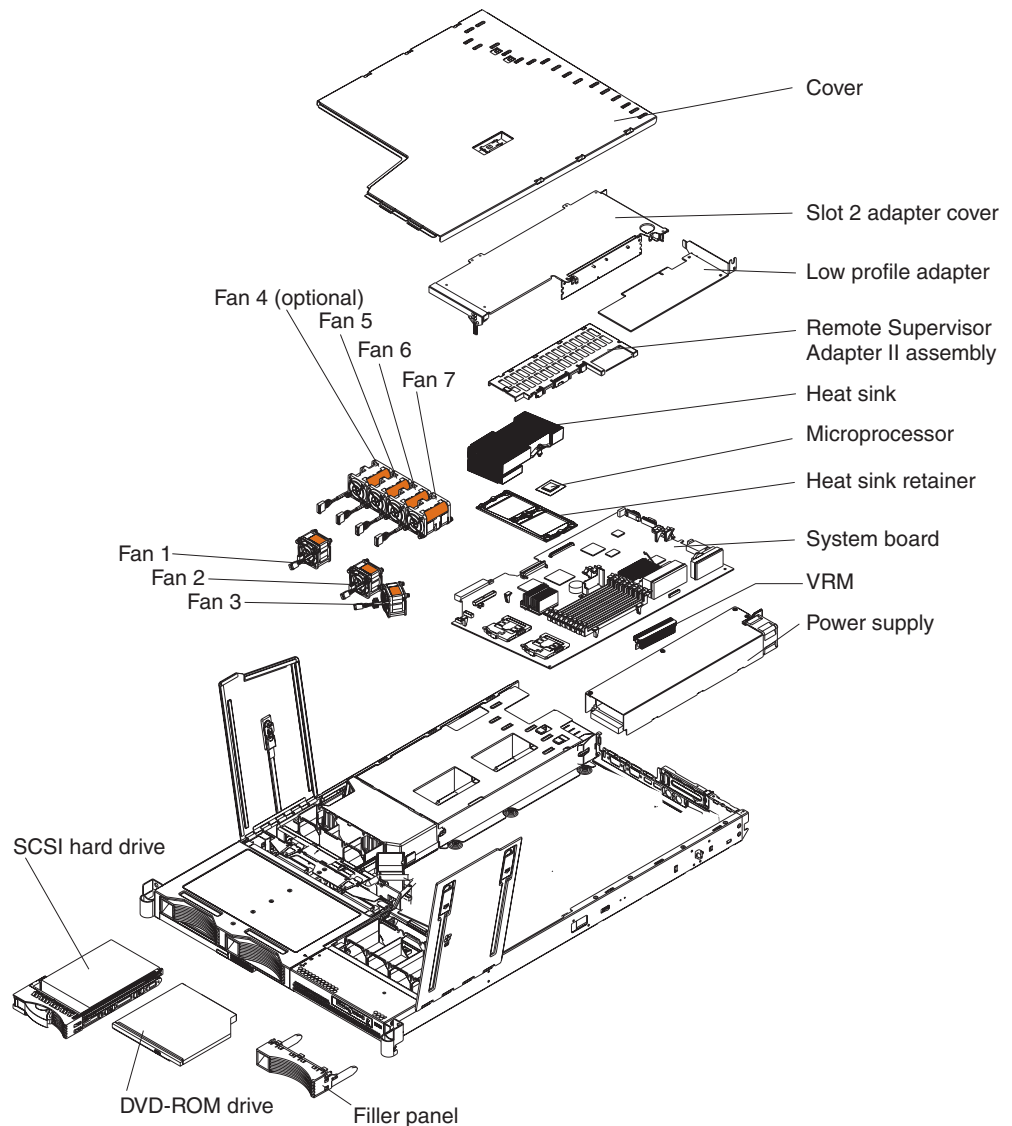
Major components of the xSeries 336 Type 8837 server

Blue on a component indicates touch points, where you can grip the component to remove it from or install it in the server, open or close a latch, and so on.

Orange on a component or an orange label on or near a component indicates that the component can be hot-swapped, which means that if the server and operating system support hot-swap capability, you can remove or install the component while the server is running. (Orange can also indicate touch points on hot-swap components.) See the instructions for removing or installing a specific hot-swap component for any additional procedures before you remove or install the component.

The following illustration shows the major components in the server.

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



Chapter 2. Installing options

This chapter provides basic instructions for installing hardware options in the server. These instructions are intended for users who are experienced with setting up IBM server hardware. If you need more detailed instructions, see the *Option Installation Guide* on the IBM *xSeries Documentation CD*.

Installation guidelines

Before you begin installing options, read the following information:

- Read the safety information beginning on page v and the guidelines in “Handling static-sensitive devices” on page 8. This information will help you work safely with the server and options.
- Make sure that you have an adequate number of properly grounded electrical outlets for the server, monitor, and other devices.
- Back up all-important data before you make changes to disk drives.
- You do not have to turn off the server to install or replace hot-swap power supplies or hot-swap fans.
- Blue on a component indicates touch points, where you can grip the component to remove it from or install it in the server, open or close a latch, and so on.
- Orange on a component or an orange label on or near a component indicates that the component can be hot-swapped. Hot-swap means that if the server and operating system support hot-swap capability, you can remove or install the component while the server is running. (Orange can also indicate touch points on hot-swap components.) See the instructions for removing or installing a specific hot-swap component for any additional procedures that you might have to perform before you remove or install the component.
- For a list of supported options for the server, go to <http://www.ibm.com/pc/compat/>.

System reliability guidelines

To help make sure that the server has proper cooling and system reliability, make sure that you perform the following actions:

- Each of the drive bays has a drive or a filler panel and electromagnetic compatibility (EMC) shield installed in it.
- If the server has redundant power, each of the power-supply bays has a power supply installed in it.
- There is adequate space around the server to allow the server cooling system to work properly. Leave approximately 50 mm (2.0 in.) of open space around the front and rear of the server. Do not place objects in front of the fans. For proper cooling and airflow, replace the server cover before turning on the server. Operating the server for extended periods of time (more than 30 minutes) with the server cover removed might damage server components.
- You have followed the cabling instructions that come with optional adapters.
- You have replaced a failed fan within 48 hours.
- When replacing a hot plug fan, you have 5 minutes to install the new fan or the server will shutdown.
- You have replaced a hot-swap drive within 2 minutes of removal.

Working inside the server with the power on

The server supports hot-swap devices and is designed to operate safely while it is turned on and the cover is removed. Follow these guidelines when you work inside a server that is turned on:

- Avoid wearing loose-fitting clothing on your forearms. Button long-sleeved shirts before working inside the server; do not wear cuff links while you are working inside the server.
- Do not allow your necktie or scarf to hang inside the server.
- Remove jewelry, such as bracelets, necklaces, rings, and loose-fitting wrist watches.
- Remove items from your shirt pocket, such as pens and pencils, that could fall into the server as you lean over it.
- Avoid dropping any metallic objects, such as paper clips, hairpins, and screws, into the server.

Handling static-sensitive devices

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

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

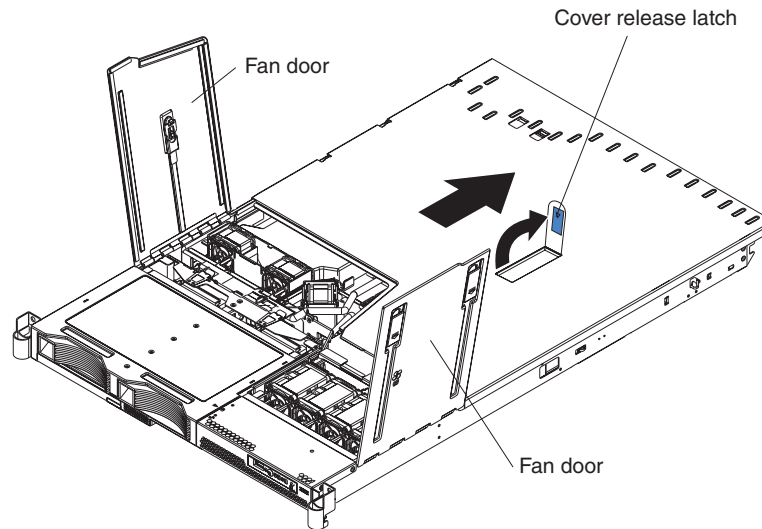
- Limit your movement. Movement can cause static electricity to build up around you.
- Wear an electrostatic-discharge wrist strap, if one is available.
- Handle the device carefully, holding it by its edges or its frame.
- Do not touch solder joints, pins, or exposed circuitry.
- Do not leave the device where others can handle and damage it.
- While the device is still in its static-protective package, touch it to an unpainted metal part of the server 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 server 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 server cover or on a metal surface.
- Take additional care when handling devices during cold weather. Heating reduces indoor humidity and increases static electricity.

Removing the server cover

This section provides an overview of the procedure for removing the server cover. For detailed instructions, go to the *Option Installation Guide*.

Complete the following steps to remove the server cover.

Attention: Before removing the server cover, remove the server from the rack and open the two fan doors. See the following illustration.



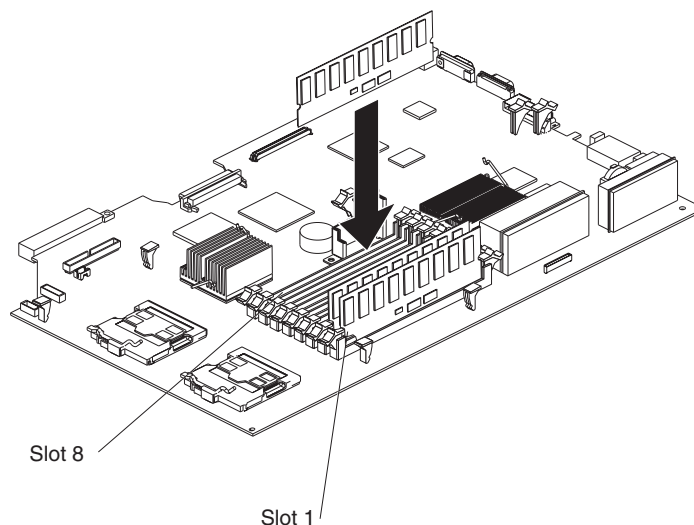
1. Read the safety information.
2. Remove the server from the rack.
3. Open the two fan doors.
4. Lift up the cover release latch and slide the cover to the rear of the server.
5. When the server cover has cleared all the insets, lift the cover off the server and set the cover aside.

Attention: For proper cooling and airflow, replace the server cover before turning on the server. Operating the server for extended periods of time (more than 30 minutes) with the server cover removed might damage server components.

Installing a memory module

The following notes describe the types of dual inline memory modules (DIMMs) that the server supports and contains other information that you must consider when installing DIMMs:

- The server supports up to eight PC3200 DDR II ECC Registered SDRAM DIMMs in sizes ranging from 256 MB to 2 GB. The minimum memory size is 512 MB. The maximum supported memory size is 16 GB.
- The server supports 256 MB, 512 MB, 1 GB, and 2 GB DIMMs. See the ServerProven list at <http://www.ibm.com/pc/compat/> for a list of memory modules that the server supports.
- The server comes with one pair of DIMMs installed in DIMM slots 1 and 2 on the system board. The server comes with a minimum of 512 MB (two 256 MB DIMM).
- The server uses interleaved DIMMs; you must add, remove, or replace DIMMs in pairs. Each pair must be of the same type, capacity, and speed.
- You can increase the amount of memory in the server by replacing them with higher-capacity DIMMs or by installing an additional pair of DIMMs into the remaining available slots. The following illustration shows the memory slots on the system board.



Note: When installing additional DIMMs, always install in pairs starting with slots 1 and 2.

- The server supports Chipkill™ memory technology, which enables the server to function with one bad chip on a DIMM. The bad memory module must be on a x4 DIMM. The 256 MB and 512 MB DIMMs that are x8 DIMMs, do not support Chipkill memory. See the following table for the supported Chipkill memory configurations.

Table 2. Supported Chipkill memory configurations

DIMM size	Type	Supported by Chipkill	Minimum	Maximum
256 MB	32Mx8	No	512 MB	2 GB
512 MB	64Mx8	No	1 GB	4 GB
512 MB	64Mx4	Yes	1 GB	4 GB
1 GB	128Mx4	Yes	2 GB	8 GB
2 GB	256Mx4	Yes	4 GB	16 GB

- You can configure the server to use memory mirroring. Memory mirroring stores data in two pairs of DIMMs simultaneously. When using memory mirroring, you must install two pairs of DIMMs at a time. All the DIMMs you use in memory mirroring must be identical. See the following table for the DIMM pairs that are in the slots.

Table 3. Memory mirroring DIMM installation sequence

Pair	Slot location
1	Slot: 1 and 2
2	Slot: 3 and 4
3	Slot: 5 and 6
4	Slot: 7 and 8

- The server also supports memory sparing; however, the sparing feature is mutually exclusive with mirroring. The sparing feature disables the failed memory from the system configuration and activates a memory sparing pair of DIMMs to replace the failed active DIMM pair.

Before you can enable the memory sparing feature, you must install one additional pair of DIMMs. The memory sparing DIMM pair must be the same speed, type, and the same size as or larger than the active DIMM pair.

To enable memory mirroring or sparing through the Configuration/Setup Utility program, select **Advanced Setup** from the main menu, and select **Memory Configuration**. For more information about using the Configuration/Setup Utility program, see the *Users Guide*. See the following table for memory-sparing DIMM connector assignments.

Table 4. Memory-sparing DIMM connector assignments

Active DIMM connectors	Memory sparing DIMM connectors
Slot 1 and 2	Slot 3 and 4
Slot 1 and 2 Slot 3 and 4	Slot 5 and 6
Slot 1 and 2 Slot 3 and 4 Slot 5 and 6	Slot 7 and 8

- When you restart the server after adding or removing a DIMM, the server displays a message that the memory configuration has changed.

This section provides an overview of the procedure for installing memory modules. For detailed instructions, see the *Option Installation Guide*.

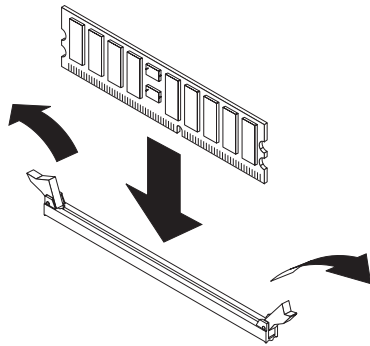
Complete the following steps to install a DIMM:

1. Read the safety information beginning on page v and “Installation guidelines” on page 7.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Remove the server cover.

Attention:

- Avoid touching the components and gold-edge connectors on the DIMMs. Make sure that the DIMMs are completely and correctly seated in the slots. Incomplete insertion might cause damage to the system board or to the DIMMs.
 - When you handle static-sensitive devices, take precautions to avoid damage from static electricity. For information about handling these devices, see “Handling static-sensitive devices” on page 8.
 - To avoid breaking the retaining clips or damaging the DIMM slots, open and close the clips gently. Do not force a DIMM into a slot.
4. Open the retaining clips on the DIMM connector.
 5. Touch the static-protective package containing the DIMM to any unpainted metal surface on the server. Then, remove the DIMM from the package.

6. Align the DIMM with the slot and press it straight down into the connector until the retainer clips snap into the locked position.



7. If you have other options to install or remove, do so now.
8. Go to “Completing the installation” on page 22.

Installing a hard disk drive

The following notes describe the types of hard disk drives that the server supports and other information that you must consider when installing a hard disk drive:

- The server supports the following three configurations:
 - Configuration 1
 - Four 2.5-inch hot-swap SCSI hard disk drives
 - Configuration 2
 - Two 3.5-inch slim hot-swap SCSI hard disk drives
 - One 9.5-mm-high DVD-ROM drive (optional)
 - Configuration 3
 - Two 3.5-inch non-hot-swap (simple swap) Serial ATA (SATA) hard disk drives
 - One 9.5-mm-high DVD-ROM drive (optional)
- Both SCSI configuration models of the server come with a hot-swap SCSI backplane.
- The SCSI server models support low voltage differential (LVD) hot-swap drives. Each hot-swap drive is in a tray, which has a green activity LED and an amber status LED in the upper-right corner. These LEDs are lit if the drive is active and, in some cases, if the drive fails.
- Each hot-swap drive has a single-connector-attached (SCA) connector, which connects directly to the hot-swap SCSI backplane. The backplane attaches to connector J-35 on the system board and controls the SCSI IDs for the hot-swap drives.
- A simple swap disk drive does not have a backplane, and it does not have indicator LEDs. Simple swap disk drives instead have a simple swap connection design. The simple swap design has a panel-mount connection at the rear of the hard disk drive cage, which enables the simple swap disk drives to easily connect to both the signal and power connections.
- Before you install any type of hard disk drive, read the following information:
 - Inspect the drive tray for signs of damage before inserting the hard disk drive.
 - Read the safety information beginning on page v and “Installation guidelines” on page 7.

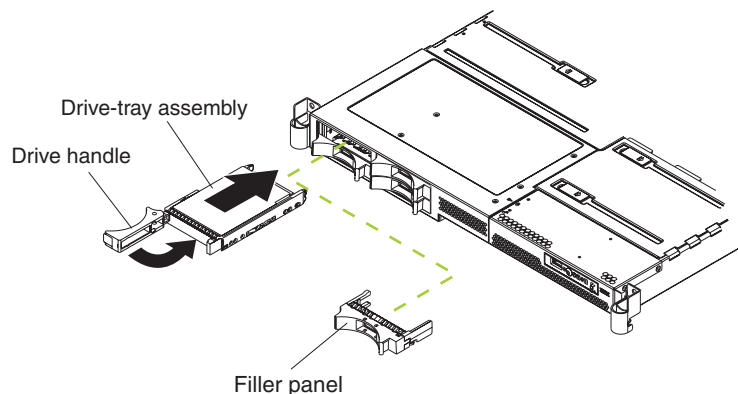
- If you are installing a hot-swap drive, continue with “Installing a hot-swap hard disk drive.” If you are installing a simple swap drive, go to “Installing a simple swap hard disk drive” on page 14.

Installing a hot-swap hard disk drive

If you are installing a 2.5-inch hot-swap drive, continue with “Installing a 2.5-inch hot-swap hard disk drive.” If you are installing a 3.5-inch hot-swap drive, go to “Installing a 3.5-inch hot-swap hard disk drive.”

Installing a 2.5-inch hot-swap hard disk drive

This section provides an overview of the procedure for installing a 2.5-inch hot-swap hard disk drive. For detailed instructions, see the *Option Installation Guide*.



Complete the following steps to install a 2.5-inch hot-swap SCSI hard disk drive:

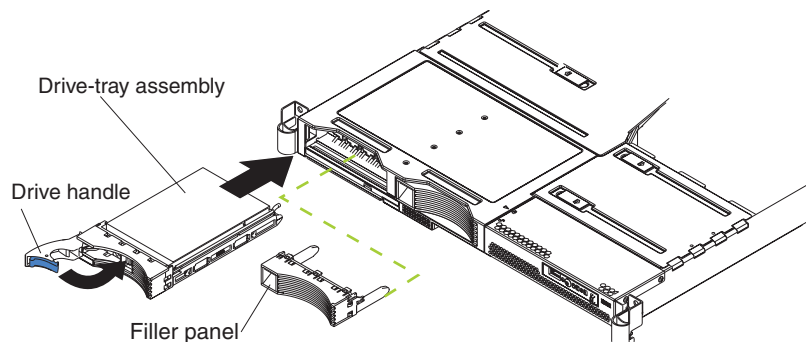
1. Read the safety information.
2. Remove the filler panel from the drive bay.

Note: To make sure there is adequate system cooling, do not operate the server for more than 2 minutes without either a hard disk drive or a filler panel installed in each bay.

3. Place the drive handle in the open position and slide the drive into the bay.
4. Close the drive handle.
5. If you have other options to install or remove, do so now.
6. Go to “Completing the installation” on page 22.

Installing a 3.5-inch hot-swap hard disk drive

This section provides an overview of the procedure for installing a 3.5-inch hot-swap hard disk drive. For detailed instructions, see the *Option Installation Guide*.



Complete the following steps to install a 3.5-inch hot-swap SCSI hard disk drive:

1. Read the safety information.
2. Remove the filler panel from the appropriate drive bay.

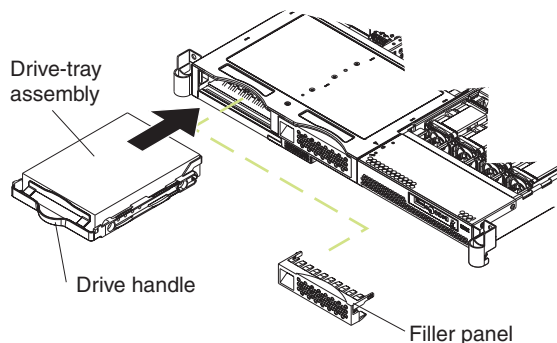
Note: To make sure there is adequate system cooling, do not operate the server for more than 2 minutes without either a hard disk drive or a filler panel installed in each bay.

3. Place the drive handle in the open position and slide the drive into the bay.
4. Close the drive handle.
5. If you have other options to install or remove, do so now.
6. Go to “Completing the installation” on page 22.

Installing a simple swap hard disk drive

Before you install a simple swap SATA hard disk drive, turn off the server and all attached peripheral devices. Disconnect all power cords; then, disconnect all external signal cables from the server.

This section provides an overview of the procedure for installing a simple swap SATA hard disk drive. For detailed instructions, see the *Option Installation Guide*.



Complete the following steps to install a simple swap SATA hard disk drive:

1. Read the safety information.
2. Remove the filler panel for the drive from either bay.

Note: To make sure there is adequate system cooling, do not operate the server for more than 2 minutes without either a hard disk drive or a filler panel installed in each bay.

3. Slide the drive into the rear of the bay until it snaps into place with the rear panel mount connector.
4. Install the filler panel for the drive.
5. If you have other options to install, install them now. Otherwise, go to “Completing the installation” on page 22.

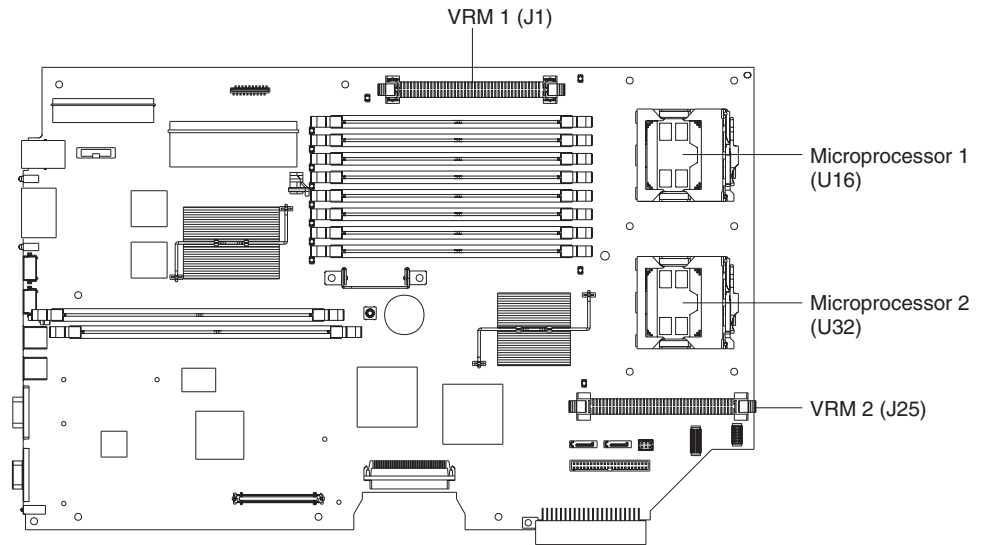
Installing an additional microprocessor

The following notes describe the type of microprocessor that the server supports and other information that you must consider when installing a microprocessor:

- The server supports up to two microprocessors (two-way support); the IBM xSeries 336 server comes with one Xeon microprocessor installed. With two microprocessors, the server can operate as a symmetric multiprocessing (SMP) server.

With SMP, application programs can distribute the processing load between the microprocessors. This enhances performance for database and point-of-sale applications, integrated manufacturing solutions, and other applications.

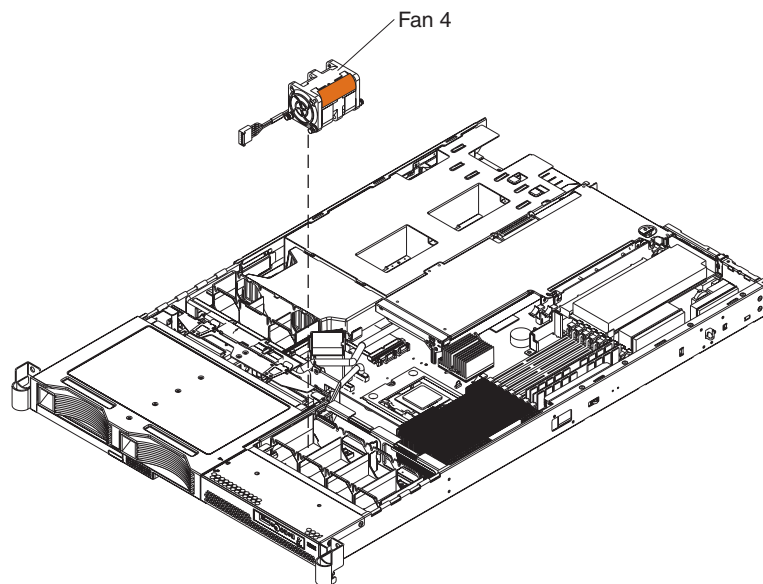
- The following illustration shows the microprocessor sockets and the voltage regulator module (VRM) slots on the system board.



- If you install a second microprocessor in the server, microprocessor 1 is installed in microprocessor socket 1 (U16), and microprocessor 2 is installed in socket 2 (U32).

You must also install the following items that come with the second microprocessor:

- Voltage regulator module (VRM), which you plug into VRM connector J25
- Cooling fan, which you plug into fan position 4 (see the following illustration for the location to plug in fan 4)



Notes:

1. Read the documentation that comes with the microprocessor to determine whether you must update the basic input/output system (BIOS) code. The most current level of BIOS code for the server is available at <http://www.ibm.com/pc/support/>.
2. A new microprocessor comes in a kit with a VRM, a cooling fan, and a heat sink.
3. To use SMP, obtain an SMP-capable operating system (optional). For a list of supported operating systems, go to <http://www.ibm.com/pc/us/compat/>.

Attention: To avoid damage and to help ensure proper server operation, review the following information before you install a microprocessor:

- Make sure that the microprocessors are the same type, have the same cache size, and have the same clock speed.
- Make sure that the microprocessor internal and external clock frequencies are identical.
- See the ServerProven list at <http://www.ibm.com/pc/compat/> for a list of microprocessors that the server supports.

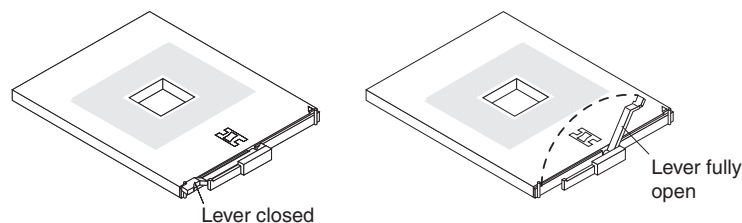
This section provides an overview of the procedure for installing an additional microprocessor. For detailed instructions, see the *Option Installation Guide*.

Complete the following steps to install a microprocessor:

1. Read the safety information beginning on page v and “Installation guidelines” on page 7.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables.
3. Remove the server cover.

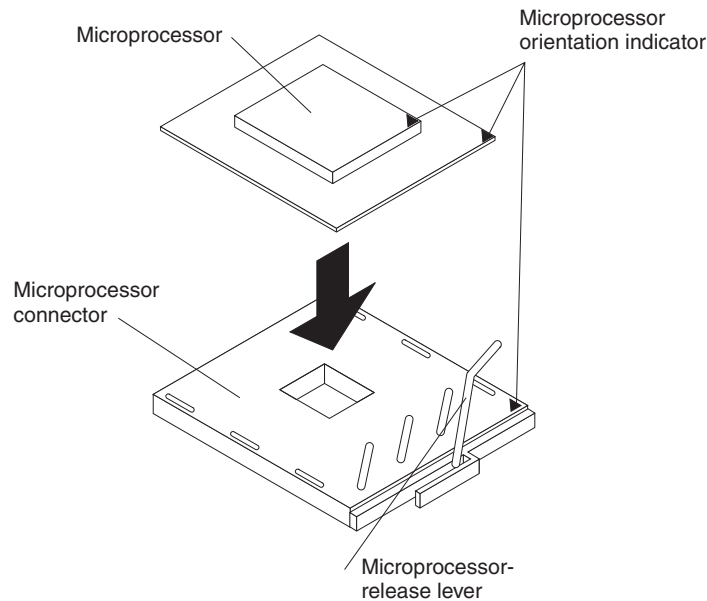
Attention: When you handle static-sensitive devices, take precautions to avoid damage from static electricity. For details about handling these devices, see “Handling static-sensitive devices” on page 8.

4. Touch the static-protective package that contains the new microprocessor to any *unpainted* metal surface on the server; then, remove the microprocessor from the package.
5. If you are installing a microprocessor in the microprocessor 2 socket, *first* install a VRM in the microprocessor 2 VRM slot (J-25)
6. Install the microprocessor:
 - a. Rotate the locking lever on the microprocessor socket from its closed and locked position until it stops or clicks in the fully open position (approximately 135° angle).



Attention:

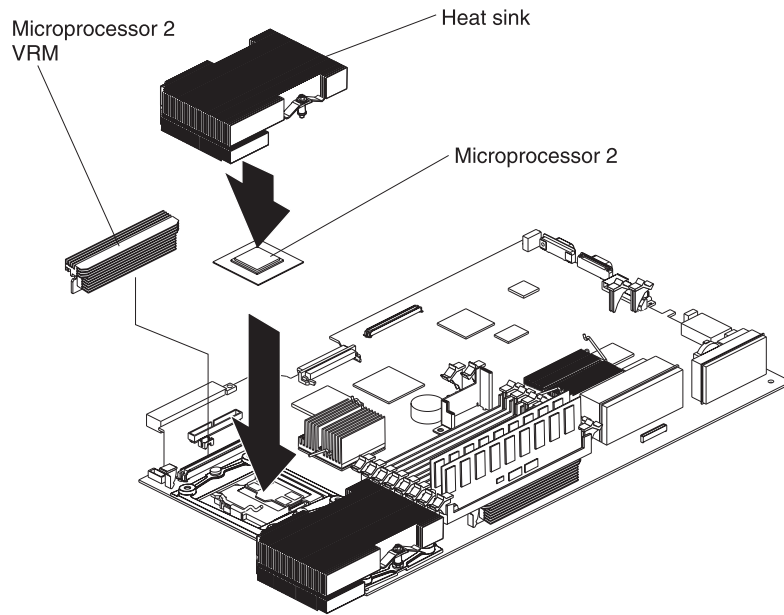
- Do not use excessive force when pressing the microprocessor into the socket.
- Center the microprocessor over the microprocessor socket. Align the triangle on the corner of the microprocessor with the triangle on the corner of the socket and carefully press the microprocessor into the socket before you try to close the lever.



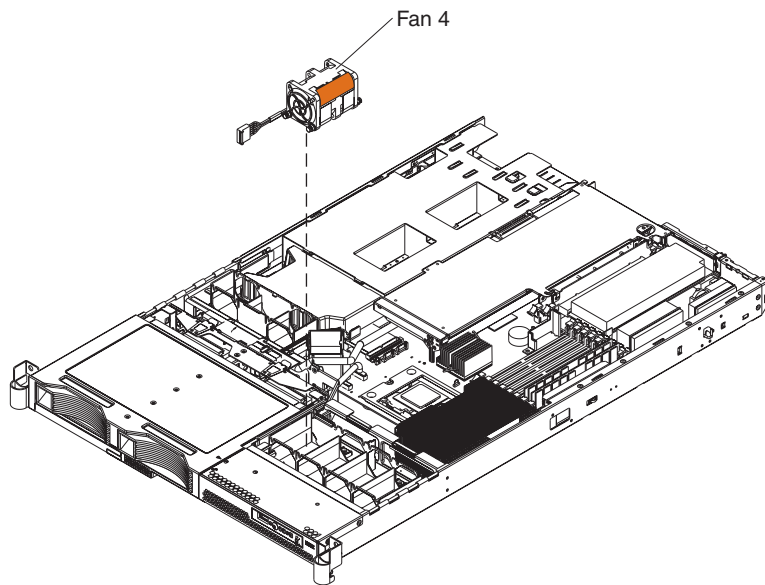
7. Close the microprocessor-release lever to secure the microprocessor.

Attention:

- Do not set the heat sink down after you remove the plastic cover.
 - Do not touch or contaminate the thermal grease on the bottom of the new heat sink. Doing so damages its heat-conducting capability and exposes the new microprocessor to overheating.
 - If you must remove the heat sink after installing it, note that the thermal grease might have formed a strong bond between the heat sink and the microprocessor. Do not force the heat sink and microprocessor apart; doing so can damage the microprocessor pins. Loosen one captive screw fully before loosening the other captive screw to help break the bond between the components without damaging them.
8. Remove the cover from the bottom of the heat sink and make sure that the thermal grease is still on the bottom of the heat sink.
 9. Install the heat sink on top of the microprocessor, and tighten the captive screws. Alternate between the screws until they are tight, making sure that you do not overtighten them.



10. Install fan 4 into the proper location, in front of the second microprocessor.



11. If you have other options to install or remove, do so now.

12. Go to “Completing the installation” on page 22.

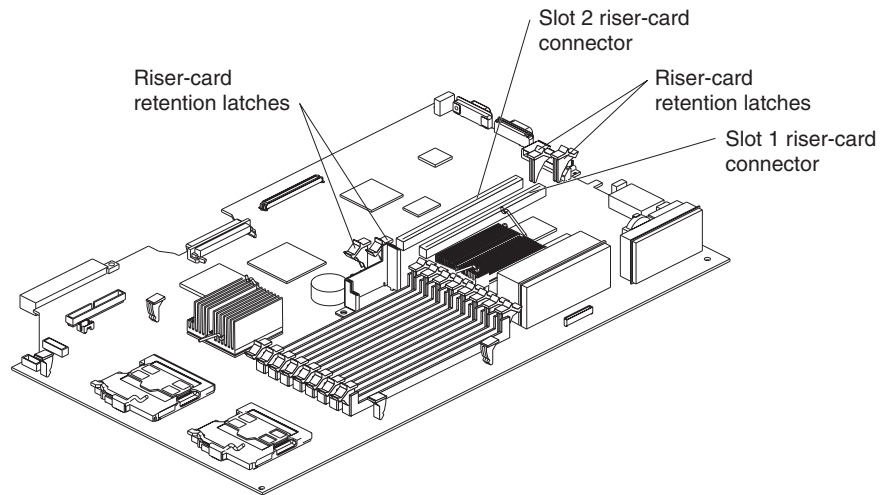
Installing an adapter

The following notes describe the types of adapters that the server supports and other information that you must consider when installing an adapter:

- Locate the documentation that comes with the adapter and follow those instructions in addition to the instructions in this section. If you must change the switch setting or jumper settings on the adapter, follow the instructions that come with the adapter.

- There are several different types of adapters you can install, depending on which slots are available. The following information and illustration identify which types of adapters you can install in PCI slots 1 and 2 and where these slots are located on the system board:
 - Slot 1: You can install only a PCI-X low-profile adapter into slot 1.
 - Slot 2: You can install any PCI-X or PCI-Express adapter into slot 2.

Note: For the PCI-Express adapter, you must install an optional riser card on the system board.



- When the server starts (boots), it starts the system devices in the following order, if you have not changed the default boot precedence:
 - Integrated Ethernet controllers
 - Integrated SCSI controller
 - PCI-X slot 1
 - PCI-X or PCI-Express slot 2

This section provides an overview of the procedure for installing an adapter. For detailed instructions, see the *Option Installation Guide*.

Complete the following steps to install an adapter:

1. Read the safety information beginning on page v and the “Installation guidelines” on page 7.
2. Turn off the server and peripheral devices, and disconnect the power cords and all external cables. Remove the server cover.
3. Follow the cabling instructions, if any come with the adapter. Route the adapter cables before you install the adapter.
4. Determine which slot you want to use for the adapter, either slot 1 for a low-profile adapter or slot 2 for any type of adapter. See the previous illustration for the locations of slot 1 and slot 2 on the system board.

If you are installing a low-profile adapter, continue with “Installing a low-profile adapter into slot 1” on page 20. If you are installing an adapter in slot 2, go to “Installing an adapter into slot 2” on page 20.

Installing a low-profile adapter into slot 1

This section provides an overview of the procedure for installing a low-profile adapter. For detailed instructions, see the *Option Installation Guide*.

Complete the following steps to install a low-profile adapter:

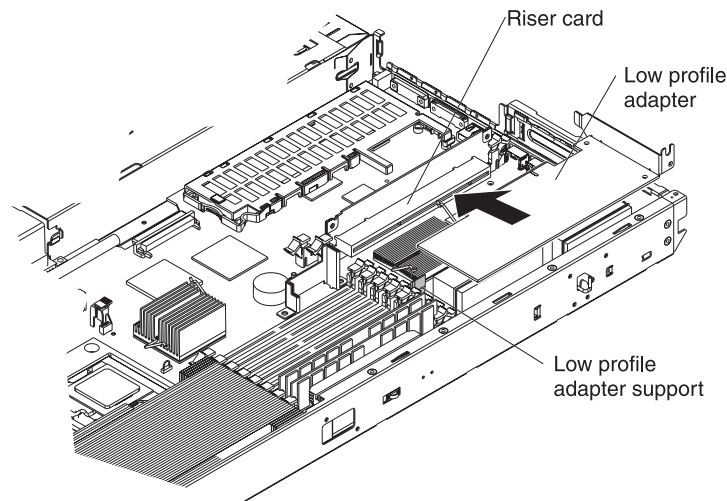
1. Remove the expansion slot 1 cover from the slot.

Attention: When you handle static-sensitive devices, take precautions to avoid damage from static electricity. For information about handling these devices, see “Handling static-sensitive devices” on page 8.

2. Remove the adapter from the static-protective package and set any jumpers or switches on the adapter as directed by the adapter manufacturer.
3. Slide the back end of the low-profile adapter through the slot 1 opening at the rear of the server.

Attention: When you install an adapter, make sure that the adapter is seated correctly in the connector before you turn on the server. An improperly seated adapter might cause damage to the system board, the riser card, or the adapter.

4. Press the edge connector of the adapter *firmly* into the connector of the low-profile riser card.
5. Snap the low-profile adapter into place on the low-profile adapter support.



6. Make sure that the retention latches for the low-profile riser card are still securely in place.
7. Connect any internal cables to the adapter. See the instructions that come with the adapter for details.

Attention: Make sure that the cables do not block the flow of air from the fans. See the *Option Installation Guide* for cable routing areas on the system board.

8. If you have other options to install or remove, do so now.
9. Go to “Completing the installation” on page 22.

Installing an adapter into slot 2

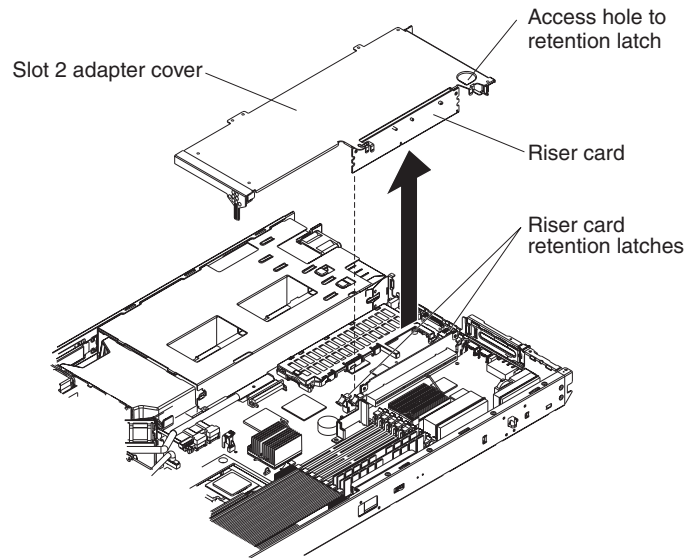
This section provides an overview of the procedure for installing an adapter in slot 2. For detailed instructions, see the *Option Installation Guide*.

Complete the following steps to install an adapter into slot 2:

1. Open the retaining clips on both sides of the slot 2 riser card.

Note: Insert your finger into the access hole on the slot 2 adapter cover to open the retention latch at the rear of the server.

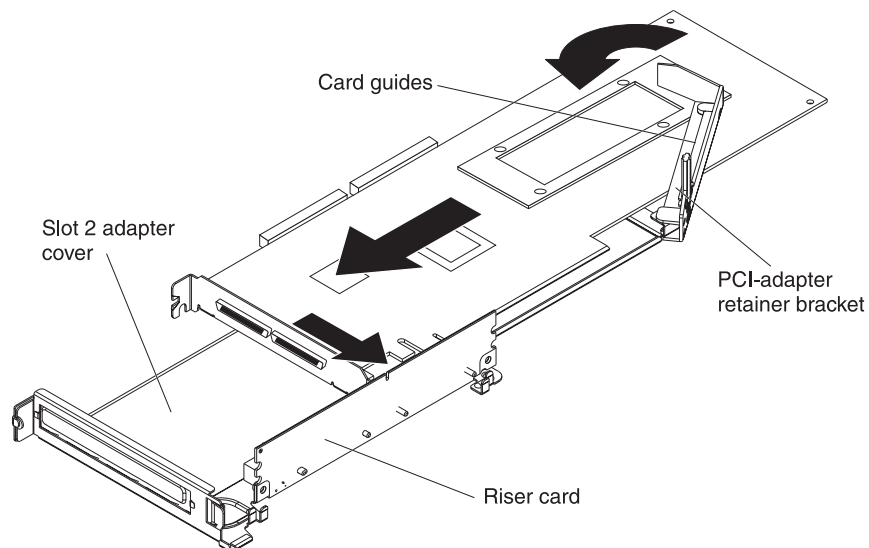
The following illustration shows the location of the access hole on the slot 2 adapter cover, the riser card and the riser-card retention latches.



2. Lift up and remove the slot 2 adapter cover and attached riser card from the server.
3. Remove the expansion slot cover from the slot 2 adapter cover.

Attention: When you handle static-sensitive devices, take precautions to avoid damage from static electricity. For information about handling these devices, see “Handling static-sensitive devices” on page 8.

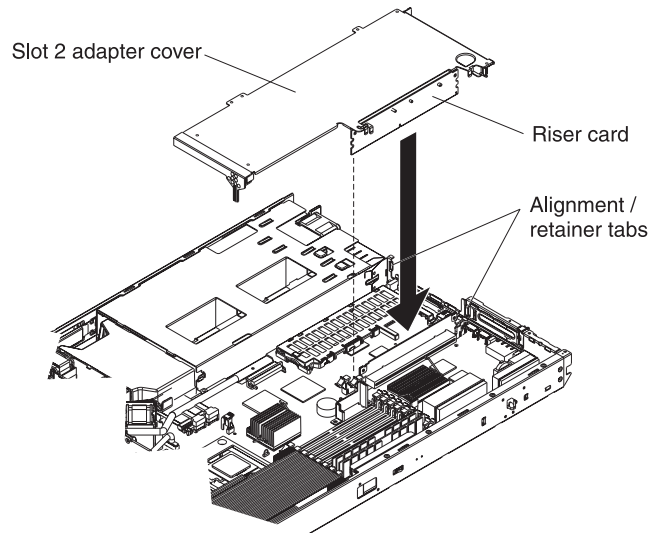
4. Prior to installing a full-length adapter, rotate the PCI-adapter retainer bracket 90° away from the adapter cover, to allow insertion of the adapter. See the following illustration for reference.



5. Slide the connector portion of the adapter through the slot opening.

6. Press the adapter *firmly* into the riser-card connector.
7. If you installed a full-length adapter, return the PCI-adapter retainer bracket back to its original position by rotating the PCI-adapter retainer bracket back 90° toward the adapter cover. Place the adapter between the upper and lower guides of the PCI-adapter retainer bracket.
8. Insert the riser card into the riser-card connector on the system board.

Attention: When you install an adapter, make sure that the adapter is seated correctly in the connector before you turn on the server. An improperly seated adapter might cause damage to the system board, the riser card, or the adapter.



9. Connect any internal cables to the adapter. See the instructions that come with the adapter for details.
Attention: Make sure that the cables do not block the flow of air from the fans. See the *Option Installation Guide* for cable routing information.
10. If you have other options to install or remove, do so now.
11. Go to “Completing the installation.”

Completing the installation

Complete the following steps to complete the installation:

1. Install the server cover. See “Installing the server cover” for more information.
2. Connect the cables and power cords. See “Connecting the cables” on page 23 for more information.
3. Update the server configuration. See “Updating the server configuration” on page 24 for more information.

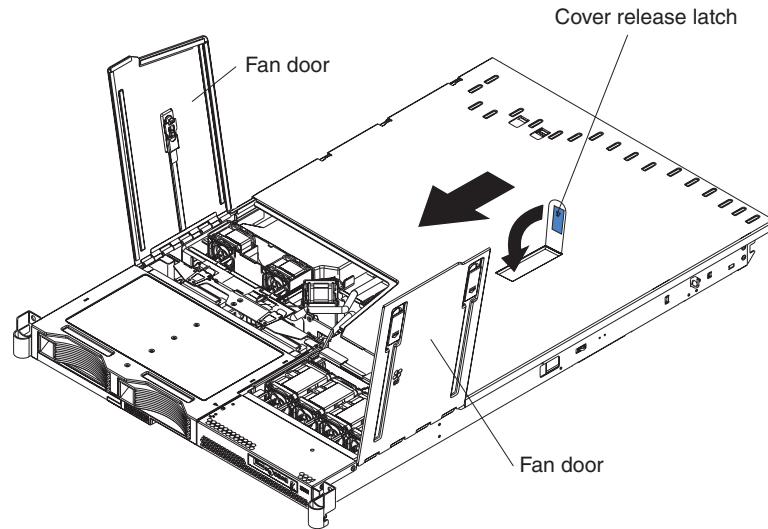
Installing the server cover

Complete the following steps to install the server cover:

1. Position the internal cables so that they do not interfere with the cover installation or block the fans. See the *Option Installation Guide* for more information on routing cables in the server.

Attention: Before sliding the cover forward, make sure that all the tabs on the front, rear, and side of the cover engage the chassis correctly. If all the tabs do not engage the chassis correctly, it will be very difficult to remove the cover later.

2. Position the cover on top of the server and slide it forward.
3. Press down on the cover release latch until the cover properly engages all the inset tabs on the server.



4. Close the fan doors.
5. Install the server in the rack. See the *Rack Installation Instructions* that come with the server for details.

Notes:

- a. After cabling the server, you might need to run the Configuration/Setup Utility program to update the server configuration, depending on the options that you installed. See “Updating the server configuration” on page 24 for more information.
- b. If you installed a SCSI drive, check the LEDs to verify proper operation.

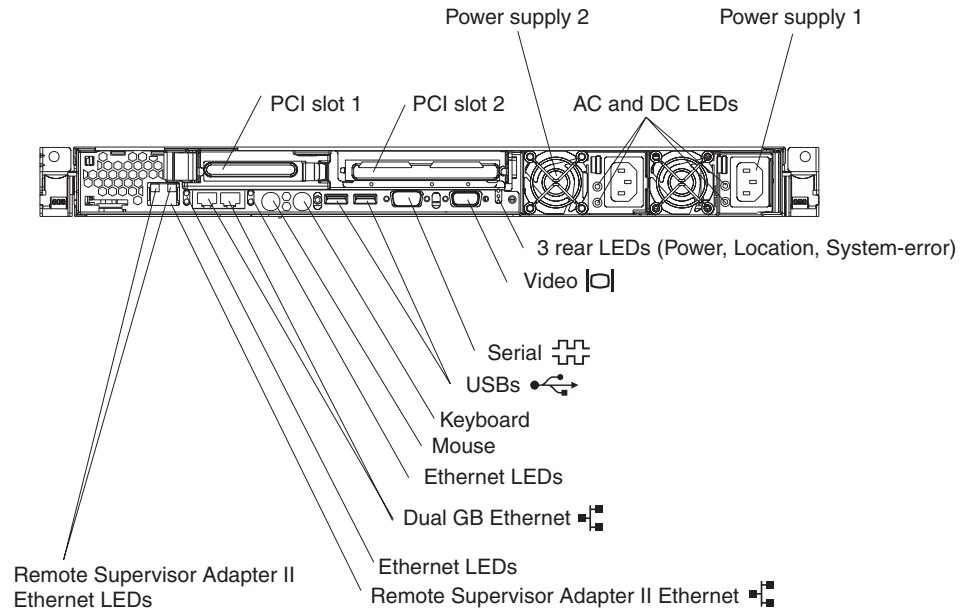
Connecting the cables

The following illustrations show the locations of the input and output connectors on the server. Detailed cabling instructions are in the *Rack Installation Instructions* that come with the server.

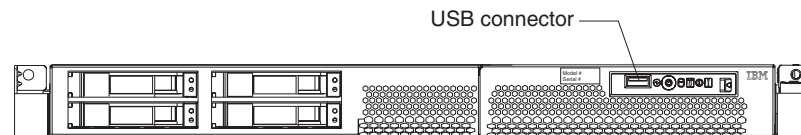
Notes:

1. You must turn off the server before connecting cables to or disconnecting any cables from the server (see “Turning off the server” on page 30).
2. See the documentation that comes with your options for additional cabling instructions. It might be easier for you to route cables before you install certain options.
3. Cable identifiers are printed on the cables that come with the server and options. Use these identifiers to connect the cables to the correct connectors.

Rear view



Front view



Updating the server configuration

After you add or remove an internal option or external SCSI device, you might receive a message that the configuration has changed when you start the server for the first time. The Configuration/Setup Utility program starts automatically so that you can save the new configuration settings. For more information, see the section about configuring the server in the *User's Guide* on the IBM xSeries Documentation CD.

Some options have device drivers that you must install. See the documentation that comes with each option for information about installing device drivers.

The server comes with at least one microprocessor. If you install more than one microprocessor, the server can operate as a symmetric multiprocessing (SMP) server. You might have to upgrade the operating system to support SMP. For more information, see the section about using the *ServerGuide Setup and Installation CD* in the *User's Guide* and the operating-system documentation.

If the server has an optional RAID adapter and you have installed or removed a hard disk drive, see the documentation that comes with the RAID adapter for information about reconfiguring the disk arrays.

If you have installed the Remote Supervisor Adapter option to manage the server remotely, see the *Remote Supervisor Adapter User's Guide*, which comes with the adapter, for information about setting up, configuring, and using the adapter.

For information about configuring the integrated Gigabit Ethernet controller, see the *Broadcom NetXtreme Gigabit Ethernet Software CD*.

Chapter 3. Server controls, LEDs, connectors, and power

This section describes the controls and light-emitting diodes (LEDs) and how to turn the server on and off.

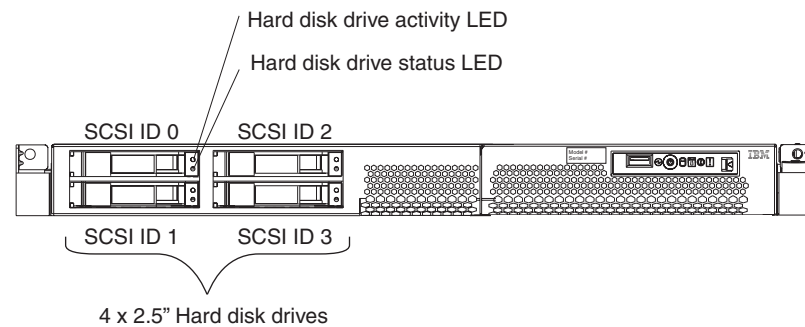
Front view

The following illustration shows the controls, LEDs, and connectors on the front of the server. There are three different front views:

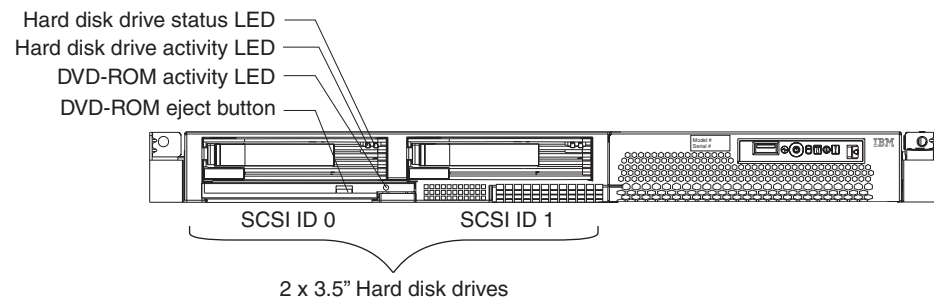
- 2.5-inch SCSI hot-swap hard disk drive
- 3.5-inch SCSI hot-swap hard disk drive
- 3.5-inch SATA non-hot-swap (simple swap) hard disk drive

Note: Both 3.5-inch configurations support an optional DVD-ROM drive.

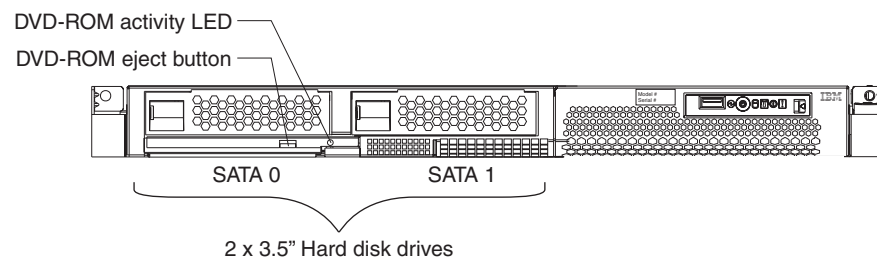
The following illustration shows the front view of an IBM xSeries 336 server with a 2.5-inch SCSI hot-swap hard disk drive configuration.



The following illustration shows the front view of an IBM xSeries 336 server with a 3.5-inch SCSI hot-swap hard disk drive configuration.



The following illustration shows the front view of an IBM xSeries 336 server with a 3.5-inch SATA simple swap hard disk drive configuration.



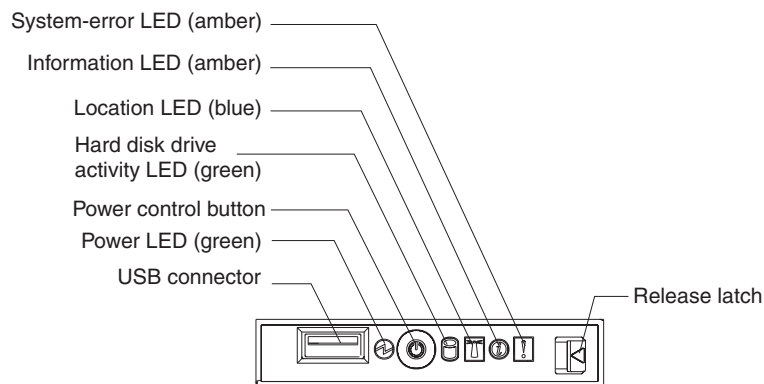
The following information gives details about the previously mentioned controls, LEDs, and connectors on the front of the server. The location of these items vary depending on the hardware configuration you have.

- **Hot-swap hard disk drive activity LED:** This LED is used on SCSI hard disk drives. Each hot-swap hard disk drive has an activity LED, and when this LED is flashing, it indicates that the drive is in use.
- **Hot-swap hard disk drive status LED:** This LED is used on SCSI hard disk drives. When this LED is lit, it indicates that the drive has failed. If an optional IBM ServeRAID™ controller is installed in the server, when this LED is flashing slowly (one flash per second), it indicates that the drive is being rebuilt. When the LED is flashing rapidly (three flashes per second), it indicates that the controller is identifying the drive.
- **DVD-eject button:** Press this button to release a DVD or CD from the DVD-ROM drive.
- **DVD-ROM drive activity LED:** When this LED is lit, it indicates that the DVD-ROM drive is in use.

Note: The DVD-ROM option is available only on the 3.5-inch drive configurations (either SCSI or SATA hard disk drives).

Operator information panel

The operator information panel is on the front right side of the server. The following illustration shows the LEDs on the front of the operator information panel, followed by a description of each LED (from left to right):



- **USB connector:** Connect a USB device to this connector.
- **Power LED:** When this green LED is lit and not flashing, it indicates that the server is turned on. When this LED is flashing, it indicates that the server is turned off and is still connected to an ac power source. When this LED is off, it indicates that ac power is not present, or the power supply or the LED itself has failed. A power LED is also on the rear of the server.

Note: If this LED is off, it does not mean that there is no electrical power in the server. The LED might be burned out. To remove all electrical power from the server, you must disconnect the power cord from the electrical outlet.

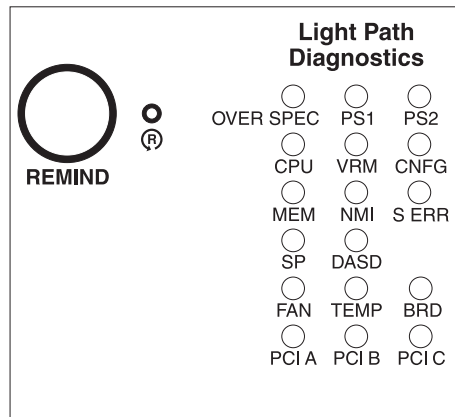
- **Power-control button:** Press this button to turn the server on and off manually. A power-control-button shield comes with the server. You can install this disk-shaped shield to prevent the server from being turned off accidentally.
- **Hard disk drive activity LED:** When this green LED is lit, it indicates that one of the hard disk drives is in use.

Note: Hard disk drive activity for the SCSI drives is shown in two places, on the hard disk drive itself and also on the hard disk drive activity LED on the operator information panel.

There is no hard disk drive activity LED for the SATA drive. The only place the SATA drive indicates hard disk drive activity is on the operator information panel.

- **Location Led:** Use this blue LED to visually locate the server if it is in a location with numerous other servers. You can use IBM Director to light this LED remotely. This LED is controlled by the BMC.
- **Information LED:** When this amber LED is lit, it indicates that a non-critical event has occurred. Check the error log for additional information. See the note in the Light Path diagnostics LEDs section for more information about error logs.
- **System-error LED:** When this amber LED is lit, it indicates that a system error has occurred. A System-error LED is also on the rear of the server. An LED on the Light Path diagnostics panel on the system board is also lit to help isolate the error. This LED is controlled by the BMC.
- **Release Latch:** Press the release latch, on the right side of the operator information panel, to slide out the operator information panel and view the Light Path LEDs and buttons.

Light Path LEDs and buttons: The Light Path LEDs and buttons are on top of the operator information panel. The following illustration shows the LEDs on the Light Path Diagnostics panel, followed by a description of the buttons and each LED.



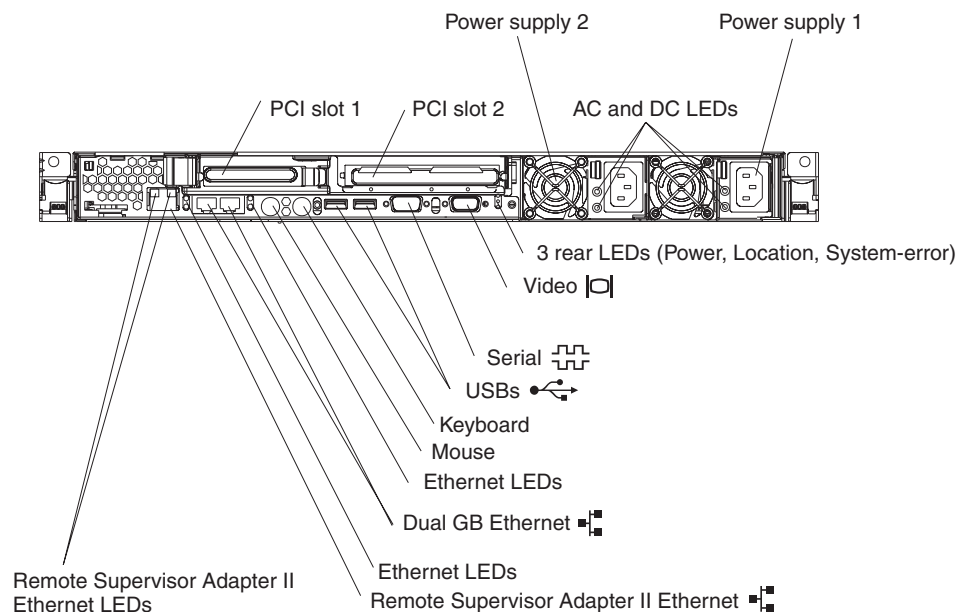
- **Remind button:** This button places the system-error LED on the front panel into remind mode. In remind mode, the system error LED flashes rapidly until the problem is corrected, the system is restarted, or a new problem occurs.
By placing the system error LED indicator in remind mode, you acknowledge that you are aware of the last failure but will not take immediate action to correct the problem. The remind function is handled by the BMC.
- **Reset button:** Press this button to reset the server and run the power-on self-test (POST). You might have to use a pen or the end of a straightened paper clip to press the button. The reset button is to the right of the remind button and just above the small circle with the R inside.
- **Light Path diagnostic LEDs:** You can slide out the operator information panel and drop it down for easy viewing without opening the top server cover. The LEDs are on the top of the operator information panel.

The following table lists the LEDs and the problems that they indicate.

LED	Error
None	An error that is not reflected in the Light Path diagnostics panel
OVER SPEC	The power supplies are using more power than their maximum rating allows
PS1	Power supply 1
PS2	Power supply 2
CPU	Microprocessor error
VRM	Voltage Regulator Module (VRM)
CNFG	Configuration error, check the microprocessor and memory configuration
MEM	Memory
NMI	Nonmaskable interrupt
S ERR	Soft error
SP	Service processor
DASD	Hard disk drive
FAN	Fan (TEMP LED might also be lit)
TEMP	System temperature
BRD	Error with the system board, or a battery fault
PCI-A	PCI-A bus
PCI-B	PCI-B bus
PCI-C	PCI-C bus

Rear view

The following illustration shows the connectors and LEDs on the rear of the server.



- **PCI slot 1:** This slot allows insertion of a low profile adapter.
- **PCI slot 2:** This slot allows insertion of any PCI-X or PCI-E type adapter.

- **Power supply 2:** Provides dc power to the server, usually is a redundant backup power supply.
- **AC LED:** This LED is to the left of the power-cord connector and is the top LED. This LED indicates that the server has an ac power connection.
- **DC LED:** This LED is to the left of the power-cord connector and is the bottom LED. This LED indicates that the power supply is providing dc power to the server.
- **Power supply 1:** Provides dc power to the server, usually is the primary power supply.
- **Power LED:** This is the top LED and it indicates that ac power is present on the server.
- **Location LED:** This middle (blue) LED assists you in visually locating the server when it is among other servers
- **System-error LED:** This is the bottom LED that indicates that a system error occurred.
- **Video connector:** Connect a monitor to this connector.
- **Serial connector:** Connect a 9-pin serial device to this connector.
- **USB connectors:** Connect a USB device to these connectors.
- **Keyboard connector:** Connect a PS/2[®] keyboard to this connector.
- **Mouse connector:** Connect a mouse or other PS/2 device to this connector.
- **Ethernet LEDs:** There are a set of LEDs for each Ethernet connector. The top LED is the Ethernet link LED. When it is lit, it indicates that there is an active connection on the Ethernet port.
The bottom LED is the Ethernet activity LED. When it flashes, it indicates that data is being transmitted or received between the server and a network device. The flashing frequency is proportional to the amount of traffic on the network link.
- **Dual GB Ethernet connectors:** Use these connectors to connect the server to an Ethernet network.
- **Remote Supervisor Adapter II Ethernet connector:** Use this connector to connect the server to a network for system-management information control. This Ethernet connector is active only when you have installed the Remote Supervisor Adapter II SlimLine option.
- **Remote Supervisor Adapter II Ethernet LEDs:** These LEDs are located on the Ethernet connector and are at the top left and top right positions. The top left LED is the Ethernet link LED for the Remote Supervisor Adapter II, when lit it indicates that there is an active connection on the Ethernet port.
The top right LED is the Ethernet activity LED for the Remote Supervisor Adapter II. When this LED flashes it indicates that data is being transmitted or received between the server and a network device. The flashing frequency is proportional to the amount of traffic on the network link.

Server power features

When the server is connected to an ac power source but is not turned on, the operating system does not run, and all core logic except for the BMC is shut down; however, the server can respond to requests from the service processor, such as a remote request to turn on the server. The power-on LED flashes to indicate that the server is connected to ac power but is not turned on.

Turning on the server

When you connect the server to ac power, the power supply fans turn on immediately. Pressing the power-control button lets you turn on the server and start the operating system.

The server can also be turned on in any of the following ways:

- If a power failure occurs while the server is turned on, the server will restart automatically when power is restored.
- If your operating system supports the system-management software for the Remote Supervisor Adapter II SlimLine option, the system-management software can turn on the server.
- If your operating system supports the Wake on LAN feature, the Wake on LAN feature can turn on the server.

Turning off the server

When you turn off the server and leave it connected to ac power, the power supply fans continue to run and the server can respond to requests from the service processor, such as a remote request to turn on the server. To remove all power from the server, you must disconnect it from the power source.

Some operating systems require an orderly shutdown before you turn off the server. See your operating-system documentation for information about shutting down the operating system.

The server can be turned off in any of the following ways:

- You can turn off the server from the operating system, if your operating system supports this feature. After an orderly shutdown of the operating system, the server will be turned off automatically.
- You can press the power-control button to start an orderly shutdown of the operating system and turn off the server, if your operating system supports this feature.
- If the operating system stops functioning, you can press and hold the power-control button for more than 4 seconds to turn off the server.
- If you installed the Remote Supervisor Adapter II option in the server, the server can be turned off from the Remote Supervisor Adapter II user interface.
- If the Wake on LAN feature turned on the server, the Wake on LAN feature can turn off the server.
- The baseboard management controller can turn off the server as an automatic response to a critical system failure.
- You can turn off the server through a request from the service processor.

Chapter 4. Configuring the server

The *ServerGuide Setup and Installation* CD provides software setup tools and installation tools that are specifically designed for your IBM server. Use this CD during the initial installation of the server to configure basic hardware features and to simplify the operating-system installation.

In addition to the *ServerGuide Setup and Installation* CD, you can use the following configuration programs to customize the server hardware:

- Configuration/Setup utility program
- Ethernet controller configuration
- Baseboard management controller utility programs
- RAID configuration programs
 - LSI Logic setup utility program
 - ServeRAID Manager
- SCSISelect utility program
- Using the ServeRAID configuration programs

For more information about these programs, see “Configuring the server” in the *User’s Guide* on the IBM *xSeries Documentation* CD.

Using the ServerGuide Setup and Installation CD

The *ServerGuide Setup and Installation* CD provides state-of-the-art programs to detect the server model and installed hardware options, configure the server hardware, provide device drivers, and help you install the operating system. For information about the supported operating-system versions, see the label on the CD.

Complete the following steps to start the *ServerGuide Setup and Installation* CD:

1. Insert the CD, and restart the server. If the CD does not start, see “ServerGuide problems” on page 42.
2. Follow the instructions on the screen to:
 - a. Select your language.
 - b. Select your keyboard layout and country.
 - c. View the overview to learn about ServerGuide features.
 - d. View the readme file to review installation tips about your operating system and adapter.
 - e. Start the setup and hardware configuration programs.
 - f. Start the operating-system installation. You will need your operating-system CD.

Using the Configuration/Setup Utility program

The Configuration/Setup Utility program is part of the BIOS code. You can use it to:

- Change interrupt request (IRQ) settings
- Change the startup drive sequence
- Configure serial-port assignments
- Enable USB keyboard and mouse support

- Resolve configuration conflicts
- Set the date and time
- Set passwords and security settings

Complete the following steps to start the Configuration/Setup Utility program:

1. Turn on the server and watch the monitor screen.
2. When the message Press F1 for Configuration/Setup appears, press F1. If an administrator password has been set, you must type the administrator password to access the full Configuration/Setup Utility menu.
3. Follow the instructions on the screen.

Configuring the Gigabit Ethernet controller

The Ethernet controllers are integrated on the system board. They provide an interface for connecting to a 10-Mbps, 100-Mbps, or 1-Gbps network and provide full-duplex (FDX) capability, which enables simultaneous transmission and reception of data on the network. If the Ethernet ports in the server support auto-negotiation, the controllers detect the data-transfer rate (10BASE-T, 100BASE-TX, or 1000BASE-T) and duplex mode (full-duplex or half-duplex) of the network and automatically operate at that rate and mode.

You do not have to set any jumpers or configure the controllers. However, you must install a device driver to enable the operating system to address the controllers. For device drivers and information about configuring the Ethernet controllers, see the *Broadcom NetXtreme Gigabit Ethernet Software* CD that comes with the server. For updated information about configuring the controllers, go to <http://www.ibm.com/pc/support/>.

Using the baseboard management controller utility programs

Use the baseboard management controller utility programs to configure the baseboard management controller, download firmware updates and sensor data record/field replaceable unit (SDR/FRU) updates, and remotely manage a network.

Using the baseboard management controller configuration utility program

Use the baseboard management controller configuration utility program to view or change the baseboard management controller configuration settings. You can also use the utility program to save the configuration to a file for use on multiple servers.

Go to <http://www.ibm.com/pc/support/> to download the utility program; then, copy the `bmc_cfg.exe` file to a configuration utility diskette.

Complete the following steps to start the baseboard management controller configuration utility program:

1. Insert the configuration utility diskette into the USB diskette drive and restart the server.
2. From a command-line prompt, type `bmc_cfg` and press Enter.
3. Follow the instructions on the screen.

Using the baseboard management controller firmware update utility program

Use the baseboard management controller firmware update utility program to download a baseboard management controller firmware update or a SDR/FRU update. The firmware update utility program updates the baseboard management controller firmware or SDR/FRU data only and does not affect any device drivers.

Go to <http://www.ibm.com/pc/support/> to download the utility program; then, copy the Flash.exe file to a firmware update diskette.

Note: To ensure proper server operation, be sure to update the server baseboard management controller firmware code first before updating the BIOS code.

To update the firmware, use one of the following methods:

- If the Linux or Windows operating-system update package is available from the World Wide Web and you have obtained the applicable update package, follow the instructions that come with the update package.
- If you are using a diskette, complete the following steps:
 1. Insert the firmware update diskette into the USB diskette drive and restart the server.
 2. Follow the instructions on the screen.

Using the baseboard management controller management utility program

Use the baseboard management controller management utility program to remotely manage and configure a server network. The following features are available from the utility program:

- **CLI (command-line interface) Mode**

Use the CLI Mode feature to remotely perform power-management and system identification control functions over a LAN or serial port interface from a command-line interface. Use the utility program also to remotely view the event log.

- **Serial over LAN Proxy**

Use the Serial over LAN Proxy feature to remotely perform control and management functions over a Serial over LAN (SOL) network. Use the utility program also to remotely view and change the BIOS settings.

To download the utility program and create the baseboard management controller management utility diskette, go to <http://www.ibm.com/pc/support/>. The download package also provides information about installing and using the utility program.

Using the RAID configuration programs

Use the LSI Logic setup utility program and ServeRAID Manager to configure and manage redundant array of independent disks (RAID) arrays. Be sure to use these programs as described in this document.

- Use the LSI Logic setup utility program to:
 - View or change SCSI IDs for attached devices
 - Set SCSI protocol parameters on SCSI hard disk drives
- Use ServeRAID Manager to:
 - Configure arrays

- View your RAID configuration and associated devices
- Monitor operation of your RAID controllers

In addition, an LSI command-line configuration program (CFG1030) and the utility that performs a low-level format on a SCSI hard disk drive are available from <http://www.ibm.com/pc/support/>.

Consider the following information when using the LSI Logic setup utility program and ServeRAID Manager to configure and manage arrays:

- The integrated SCSI controller with RAID capabilities in the server supports only RAID level 1 and 1E; using a hard disk drive as a hot-spare is optional. Installing an optional ServeRAID controller provides additional RAID levels.

Notes:

1. RAID level 1 with two drives provides data mirroring, which provides a redundant copy of the data.
 2. RAID level 1 with three to four drives allows data mirroring with a hot-spare drive.
- When you create a RAID level-1 (mirrored) pair, all drives must be on the same channel.
 - Hard disk drive capacities affect how you create arrays. The drives in an array can have different capacities, but the RAID controller treats them as if they all have the capacity of the smallest hard disk drive.
 - To help ensure signal quality, do not use drives with different speeds and data rates in the array.
 - You can set up a mirror after the operating system is installed on the primary drive only if you are using an integrated SCSI controller with RAID capabilities. If you want to use the RAID capabilities, make sure that the primary drive has the lower SCSI ID (for example, 0).

Important: If you use an integrated SCSI controller with RAID capabilities to configure a RAID level-1 (mirrored) array after you have installed the operating system, you will lose access to any data or applications that were previously stored on the secondary drive of the mirrored pair.

- To update the firmware and BIOS codes for an optional ServeRAID controller, you must use the IBM *ServeRAID Support* CD that comes with the controller.
- If you install a different type of RAID controller, see the documentation that comes with the controller for information about viewing and changing SCSI settings for attached devices.

Using the LSI Logic setup utility program

Complete the following steps to start the LSI Logic setup utility program:

1. Turn on the server and watch the monitor screen.
2. When the message <<< Press <CTRL><C> to start LSI Logic setup utility >>> appears, press Ctrl+C. If an administrator password has been set, you are prompted to type the password.
3. Use the arrow keys to select a controller (channel) from the list of adapters; then, press Enter.
4. Follow the instructions on the screen to change the settings of the selected items; then, press Enter. If you select **Device Properties** or **Mirroring Properties**, additional screens are displayed.

See the *User's Guide* on the *IBM xSeries Documentation CD* for more information about the LSI Logic setup utility program.

Using ServeRAID Manager

Use ServeRAID Manager, which is on the *IBM ServeRAID Support CD*, to:

- Configure a redundant array of independent disks (RAID) array
- Restore a SCSI hard disk drive to the factory-default settings, erasing all data from the disk
- View your RAID configuration and associated devices
- Monitor the operation of your RAID controllers

To perform some tasks, you can run ServeRAID Manager as an installed program. However, to configure the integrated SCSI controller with RAID capabilities and perform an initial RAID configuration on the server, you must run ServeRAID Manager in Startable CD mode, as described in the instructions in this section. If you install a different type of RAID adapter in the server, use the configuration method described in the instructions that come with that adapter to view or change SCSI settings for attached devices.

See the ServeRAID documentation on the *IBM ServeRAID Support CD* for additional information about RAID technology and instructions for using ServeRAID Manager to configure your integrated SCSI controller with RAID capabilities. Additional information about ServeRAID Manager is also available from the **Help** menu. For information about a specific object in the ServeRAID Manager tree, select the object and click **Actions**→ **Hints and tips**.

Configuring the controller

By running ServeRAID Manager in Startable CD mode, you can configure the controller before you install your operating system. The information in this section assumes that you are running ServeRAID Manager in Startable CD mode.

To run ServeRAID Manager in Startable CD mode, turn on the server; then, insert the CD into the DVD-ROM drive. If ServeRAID Manager detects an unconfigured controller and ready drives, the Configuration wizard starts.

In the Configuration wizard, you can select express configuration or custom configuration. Express configuration automatically configures the controller by grouping the first two physical drives in the ServeRAID Manager tree into an array and creating a RAID level-1 logical drive. If you select custom configuration, you can select the two physical drives that you want to group into an array and create a hot-spare drive.

Using express configuration: Complete the following steps to use express configuration:

1. In the ServeRAID Manager tree, click the controller.
2. Click **Express configuration**.
3. Click **Next**. The “Configuration summary” window opens.
4. Review the information in the “Configuration summary” window. To change the configuration, click **Modify arrays**.
5. Click **Apply**; then, click **Yes** when asked if you want to apply the new configuration. The configuration is saved in the controller and in the physical drives.
6. Exit from ServeRAID Manager and remove the CD from the DVD-ROM drive.

7. Restart the server.

Using custom configuration: Complete the following steps to use custom configuration:

1. In the ServeRAID Manager tree, click the controller.
2. Click **Custom configuration**.
3. Click **Next**. The “Create arrays” window opens.
4. From the list of ready drives, select the two drives that you want to group into the array.
5. Click the icon on toolbar to add the selected drives to the array.
6. If you want to configure a hot-spare drive, complete the following steps:
 - a. Click the **Spares** tab.
 - b. Select the physical drive that you want to designate as the hot-spare drive, and icon on toolbar to add the selected drives.
7. Click **Next**. The “Configuration summary” window opens.
8. Review the information in the “Configuration summary” window. To change the configuration, click **Back**.
9. Click **Apply**; then, click **Yes** when asked if you want to apply the new configuration. The configuration is saved in the controller and in the physical drives.
10. Exit from ServeRAID Manager and remove the CD from the DVD-ROM drive.
11. Restart the server.

Viewing the configuration

You can use ServeRAID Manager to view information about RAID controllers and the RAID subsystem (such as arrays, logical drives, hot-spare drives, and physical drives). When you click an object in the ServeRAID Manager tree, information about that object appears in the right pane. To display a list of available actions for an object, click the object and click **Actions**.

Using the ServeRAID configuration programs

A ServeRAID adapter enables you to configure multiple physical SCSI hard disk drives to operate as logical drives in a disk array. The adapter comes with a CD containing the ServeRAID Manager program and the ServeRAID Mini-Configuration program, which you can use to configure the ServeRAID controller. For information about these programs, see the documentation that comes with the ServeRAID adapter and the *User's Guide* on the IBM *xSeries Documentation* CD. If the server comes with an operating system installed, such as Microsoft Windows 2000 Datacenter Server, see the software documentation that comes with the server for configuration information.

Chapter 5. Updating IBM Director

If you plan to use IBM Director to manage the server, you must check for the latest applicable IBM Director updates and interim fixes.

Complete the following steps to install the IBM Director updates and any other applicable updates and interim fixes:

1. Check for the latest version of IBM Director:
 - a. Go to http://www.ibm.com/servers/eserver/xseries/systems_management/sys_migration/ibmdiragent.html.
 - b. If a newer version of IBM Director than what comes with the server is shown in the drop-down list, follow the instructions on the Web page to download the latest version.
2. Install the IBM Director program.
3. Download and install any applicable updates or interim fixes for the server:
 - a. Go to <http://www.ibm.com>.
 - b. At the top of the page, click **Support & downloads**.
 - c. Under the Downloads section, click **Downloads & drivers**.
 - d. In the search field, type IBM director 4.12 and click **Submit**.
 - e. Select any applicable update or interim fix that you want to download.
 - f. Click the file link for the executable file to download the file, and follow the instructions in the readme file to install the update or interim fix.
 - g. Repeat steps 3e and 3f for any additional updates or interim fixes that you want to install.

Chapter 6. Solving problems

This chapter provides basic troubleshooting information to help you solve some common problems that might occur while you are setting up the server.

If you cannot locate and correct the problem using the information in this chapter, see Appendix A, “Getting help and technical assistance,” on page 53, the *Hardware Maintenance Manual and Troubleshooting Guide* on the IBM xSeries Documentation CD, and the “Server Support” flowchart in the front of this document.

Diagnostic tools overview

The following tools are available to help you diagnose and solve hardware-related problems:

- **POST beep codes**

The power-on self-test beep codes indicate the detection of a problem.

- One beep indicates successful completion of POST, with no errors.
- More than one beep indicates that POST detected a problem. Error messages also appear during startup if POST detects a hardware-configuration problem.

See “POST beep code descriptions” and the *Hardware Maintenance Manual and Troubleshooting Guide* on the IBM xSeries Documentation CD for more information.

- **Troubleshooting charts**

These charts list problem symptoms and steps to correct the problems. See “Troubleshooting charts” on page 43 for more information.

- **Diagnostic programs and error messages**

The system diagnostic programs are provided in ROM. These programs test the major components of the server. See the *Hardware Maintenance Manual and Troubleshooting Guide* on the IBM xSeries Documentation CD for more information.

- **Light Path diagnostics**

Use Light Path diagnostics to diagnose system errors quickly. See “Light Path diagnostics” on page 48 for more information.

POST beep code descriptions

POST emits one beep to signal successful completion. If POST detects a problem during startup, other beep codes might occur. Use the following beep code descriptions to help diagnose and solve problems that are detected during startup.

Note: See the *Hardware Maintenance Manual and Troubleshooting Guide* on the IBM xSeries Documentation CD for more information about the POST beep codes.

One beep

POST was completed successfully.

Repeating long beeps

A memory error has occurred. Make sure that all DIMMs are correctly installed.

One long beep and two short beeps

A video error has occurred, and the BIOS cannot initialize the monitor screen to display additional information.

Other beep codes

Additional beep codes are listed in the following table.

Table 5. POST beep code descriptions

Beep code	Description
Beep 1-1-2	Processor register test failed
Beep 1-1-3	CMOS write/read test failed
Beep 1-1-4	BIOS EEPROM checksum failed
Beep 1-2-1	Programmable interval timer failed
Beep 1-2-2	DMA initialization failed
Beep 1-2-3	DMA page register write/read failed
Beep 1-2-4	RAM refresh verification failed
Beep 1-3-1	First 64K RAM test failed
Beep 1-3-2	First 64K RAM parity test failed
Beep 2-1-1	Secondary DMA register failed
Beep 2-1-2	Primary DMA register failed
Beep 2-1-3	Primary interrupt mask register failed
Beep 2-1-4	Secondary interrupt mask register failed
Beep 2-2-2	Keyboard controller failed
Beep 2-2-3	CMOS power failure and checksum checks failed
Beep 2-2-4	CMOS configuration information validation failed
Beep 2-3-1	Screen initialization failed
Beep 2-3-2	Screen memory failed
Beep 2-3-3	Screen retrace failed
Beep 2-3-4	Search for video ROM failed
Beep 2-4-1	Video failed
Beep 2-4-4	Invalid memory configuration
Beep 3-1-1	Timer tick interrupt failed
Beep 3-1-2	Interval timer channel 2 failed
Beep 3-1-3	RAM test failed above address OFFFHH
Beep 3-1-4	Time of day clock failed
Beep 3-2-1	Serial port failed
Beep 3-2-2	Parallel port failed

Table 5. POST beep code descriptions (continued)

Beep code	Description
Beep 3-2-4	Failed comparing CMOS memory size against actual
Beep 3-3-1	Memory size mismatch occurred
Beep 3-3-2	Critical SMBUS error occurred (I2C Bus error)
Beep 3-3-3	No optional memory in the system

POST error messages

The following table provides an abbreviated list of the error messages that might appear during POST. See the *Hardware Maintenance Manual and Troubleshooting Guide* on the IBM xSeries Documentation CD for more information about the POST error messages.

Table 6. Abbreviated list of POST error messages

POST message	Failing device or problem found	Suggested action
161	The real-time clock battery has failed.	Replace the battery or call for service.
162	A device configuration has changed.	<ul style="list-style-type: none"> Run the Configuration/Setup Utility program; then, exit, saving the configuration settings. Make sure that optional devices are turned on and installed correctly.
163	The time of day has not been set.	Set the date and time.
201	The memory configuration has changed.	Make sure that DIMMs are fully seated and installed correctly.
289	A failing DIMM was disabled.	Make sure that DIMMs are supported by the server and that they are installed correctly.
301, 303	Keyboard and keyboard controller	Make sure that the keyboard cable is connected and that nothing is resting on the keyboard keys.
962	Parallel port configuration error	Run the Configuration/Setup Utility program and make sure that the parallel port setting is correct.
1162	Serial port configuration conflict	Run the Configuration/Setup Utility program and make sure that the IRQ and I/O port assignments needed by the serial port are available.
00019xxx	Microprocessor <i>x</i> is not functioning or failed the built-in self-test.	Make sure that microprocessor <i>x</i> is installed correctly. If the problem remains, replace microprocessor <i>x</i> .
00180xxx	A PCI adapter requested a resource that is not available.	Run the Configuration/Setup Utility program and make sure that the resources needed by the PCI adapter are available.
012980xx 012981xx	Data for microprocessor <i>x</i>	Download and install the latest level of BIOS code.
I9990305	POST could not find an operating system.	Install an operating system.

ServerGuide problems

The following table lists problem symptoms and suggested solutions.

Table 7. ServerGuide Setup and Installation CD

Symptom	Suggested action
The <i>ServerGuide Setup and Installation</i> CD will not start.	<ul style="list-style-type: none">• Make sure that the server supports the ServerGuide program and has a startable (bootable) DVD-ROM drive.• If the startup (boot) sequence settings have been altered, make sure that the DVD-ROM drive is first in the startup sequence.• If more than one DVD-ROM drive is installed, make sure that only one drive is set as the primary drive. Start the CD from the primary drive.
The SCSI RAID program cannot view all installed drives, or the operating system cannot be installed.	<ul style="list-style-type: none">• Make sure that there are no duplicate SCSI IDs or IRQ assignments.• Make sure that the hard disk drive is connected correctly.
The operating-system installation program continuously loops.	Make more space available on the hard disk.
The ServerGuide program will not start the operating-system CD.	Make sure that the operating-system CD is supported by the ServerGuide program. See the <i>ServerGuide Setup and Installation</i> CD label for a list of supported operating-system versions.
The operating system cannot be installed; the option is not available.	Make sure that the operating system is supported on the server. If the operating system is supported, either there is no logical drive defined (SCSI RAID systems) or the ServerGuide System Partition is not present. Run the ServerGuide program and make sure that setup is complete.

Troubleshooting charts

The following tables list problem symptoms and suggested solutions. See the *Hardware Maintenance Manual and Troubleshooting Guide* on the IBM xSeries Documentation CD for more detailed troubleshooting charts. If you cannot find the problem in these charts, run the diagnostic programs. If you have run the diagnostic programs, or if running the tests does not reveal the problem, call for service.

DVD-ROM drive problems

Symptom	Suggested action
The DVD-ROM drive is not recognized.	Make sure that: <ul style="list-style-type: none">• The IDE channel to which the DVD-ROM drive is attached (primary or secondary) is enabled in the Configuration/Setup Utility program. If the server has a single IDE channel, only the primary channel can be used.• All cables and jumpers are installed correctly.• The correct device driver is installed for the DVD-ROM drive. If the problem remains, call for service.
A CD is not working correctly.	Clean the CD. If the problem remains, call for service.
The DVD-ROM drive tray is not working.	The server must be turned on. Insert the end of a straighten paper clip into the manual tray-release opening. If the problem remains, call for service.

Expansion enclosure problems

Symptom	Suggested action
The SCSI expansion enclosure used to work but does not work now.	Make sure that: <ul style="list-style-type: none">• The cables for all external SCSI options are connected correctly.• The last device in each SCSI chain, or the end of the SCSI cable, is terminated correctly.• Any external SCSI devices are turned on. You must turn on external SCSI devices before turning on the server. For more information, see your SCSI expansion enclosure documentation.

General problems

Symptom	Suggested action
A cover lock is broken, an LED is not working, or a similar problem has occurred.	Call for service.

Hard disk drive problems

Symptom	Suggested action
Not all drives are recognized by the hard disk drive diagnostic test (the Fixed Disk test).	<ol style="list-style-type: none"> 1. Remove the first drive that is not recognized and try the hard disk drive diagnostic test again. 2. If the remaining drives are recognized, replace the drive that you removed with a new one.
The server stops responding during the hard disk drive diagnostic test.	<ol style="list-style-type: none"> 1. Remove the hard disk drive that was being tested when the server stopped responding and try the diagnostic test again. 2. If the hard disk drive diagnostic test runs successfully, replace the drive that you removed with a new one.

Intermittent problems

Symptom	Suggested action
A problem occurs only occasionally and is difficult to diagnose.	<p>Make sure that:</p> <ul style="list-style-type: none"> • All cables and cords are connected securely to the rear of the server and attached devices. • When the server is turned on, air is flowing from the rear of the server at the fan grille. If there is no airflow, the fan is not working. This can cause the server to overheat and shut down. • The SCSI bus and devices are configured correctly and the last external device in each SCSI chain is terminated correctly. <p>If the problem remains, call for service.</p>

Keyboard, mouse, or pointing-device problems

Symptom	Suggested action
All or some keys on the keyboard do not work.	<ul style="list-style-type: none"> • Make sure that the keyboard cable is securely connected to the server and that the keyboard and mouse cables are not reversed. • Make sure that the server and the monitor are turned on. • Try using another keyboard. <p>If the problem remains, call for service.</p>
The mouse or pointing device does not work.	<ul style="list-style-type: none"> • Make sure that the mouse or pointing-device cable is securely connected to the server and that the keyboard and mouse cables are not reversed. • Make sure that the mouse device drivers are installed correctly. • Make sure that the server and the monitor are turned on. • Try using another mouse or pointing device. <p>If the problem remains, call for service.</p>

Memory problems

Symptom	Suggested action
The amount of system memory displayed is less than the amount of physical memory installed.	<p>Make sure that:</p> <ul style="list-style-type: none"> The DIMMs are seated correctly. You have installed the correct type of memory. If you changed the memory, you updated the memory configuration in the Configuration/Setup Utility program. All pairs of memory are enabled. The server might have automatically disabled a memory pair when it detected a problem, or a memory pair might have been manually disabled. <p>Check the POST error log for error message 289:</p> <ul style="list-style-type: none"> If the DIMM was disabled by a system-management interrupt (SMI), replace the DIMM. If the DIMM was disabled by the user or by POST, run the Configuration/Setup Utility program and enable the DIMM. If this error remains, replace the DIMM. <p>If the problem remains, call for service.</p>

Microprocessor problems

Symptom	Suggested action
The server emits a continuous tone during POST.	<p>The startup (boot) microprocessor is not working correctly. Make sure that the startup microprocessor is seated correctly. If it is, replace the startup microprocessor.</p> <p>If the problem remains, call for service.</p>

Monitor problems

Some IBM monitors have their own self-tests. If you suspect a problem with your monitor, see the information that comes with the monitor for instructions for testing and adjusting the monitor. If you cannot diagnose the problem, call for service.

Symptom	Suggested action
The screen is blank.	<p>Make sure that:</p> <ul style="list-style-type: none"> The server power cord is connected to the server and a working electrical outlet. The monitor cables are connected correctly. The monitor is turned on and the brightness and contrast controls are adjusted correctly. <p>Important: In some memory configurations, the 3-3-3 beep code might sound during POST, followed by a blank monitor screen. If this occurs and the Boot Fail Count feature in the Start Options of the Configuration/Setup Utility program is enabled (its default setting), you must restart the server three times to force the BIOS to reset the configuration settings to the default configuration (the memory connector enabled).</p> <p>If the problem remains, call for service.</p>
Only the cursor appears.	<p>Call for service.</p>
The monitor works when you turn on the server, but the screen goes blank when you start some application programs.	<p>Make sure that you have installed the necessary device drivers for the application programs.</p> <p>If the problem remains, call for service.</p>

Symptom	Suggested action
The monitor has screen jitter, or the screen image is wavy, unreadable, rolling, or distorted.	<p>If the monitor self-tests show that the monitor is working correctly, consider the location of the monitor. Magnetic fields around other devices (such as transformers, appliances, fluorescent lights, and other monitors) can cause screen jitter or wavy, unreadable, rolling, or distorted screen images. If this happens, turn off the monitor.</p> <p>Attention: Moving a color monitor while it is turned on might cause screen discoloration.</p> <p>Move the device and the monitor at least 300 mm (12 in.) apart, and turn on the monitor.</p> <p>Notes:</p> <ol style="list-style-type: none"> 1. To prevent USB diskette drive read/write errors, make sure that the distance between the monitor and USB diskette drives is at least 75 mm (3 in.). 2. Non-IBM monitor cables might cause unpredictable problems. 3. An enhanced monitor cable with additional shielding is available for the 9521 and 9527 monitors. For information about the enhanced monitor cable, contact your IBM marketing representative or authorized reseller. <p>If the problem remains, call for service.</p>
Wrong characters appear on the screen.	<p>If the wrong language is displayed, update the BIOS code with the correct language.</p> <p>If the problem remains, call for service.</p>

Option problems

Symptom	Suggested action
An IBM option that was just installed does not work.	<p>Make sure that:</p> <ul style="list-style-type: none"> • The option is designed for the server. See the “Server Support” flowchart for information about obtaining ServerProven compatibility information from the World Wide Web. • You followed the installation instructions that come with the option. • The option is installed correctly. • You have not loosened any other installed options or cables. • You have updated the configuration information in the Configuration/Setup Utility program. Whenever memory or an option is changed, you must update the configuration. <p>If the problem remains, call for service.</p>
An IBM option that used to work does not work now.	<ul style="list-style-type: none"> • Make sure that all of the option hardware and cable connections are secure. • If the option comes with test instructions, use those instructions to test the option. • If the failing option is a SCSI device, make sure that: <ul style="list-style-type: none"> – The cables for all external SCSI options are connected correctly. – The last device in each SCSI chain, or the end of the SCSI cable, is terminated correctly. – Any external SCSI devices are turned on. You must turn on external SCSI devices before turning on the server. <p>If the problem remains, call for service.</p>

Power problems

Symptom	Suggested action
The server does not turn on.	<ul style="list-style-type: none"> • Make sure that the server power cord is connected to the server and a working electrical outlet. • Make sure that the type of memory that is installed is supported by the server. • If you just installed an option, remove it, and restart the server. If the server now turns on, you might have installed more options than the power supply supports. <p>If the problem remains, call for service.</p>
The server does not turn off.	<p>Determine whether you are using an Advanced Configuration and Power Management (ACPI) or non-ACPI operating system.</p> <p>To find whether ACPI is installed, check the properties of the hal.dll file by performing the following steps:</p> <ol style="list-style-type: none"> 1. Right-click the hal.dll file, which is typically in c:\winnt\system32. 1. Select Properties from the menu. 2. Click the Version tab, and then click Internal Name. <p>You have an ACPI operating system if the internal name is halacpi.dll.</p> <p>If you are using a non-ACPI operating system, complete the following steps:</p> <ol style="list-style-type: none"> 1. Press Ctrl+Alt+Delete. 2. Turn off the server by using the power-control button. You might have to press and hold the power-control button for 5 seconds to force the server to turn off. <p>If the problem remains or if you are using an ACPI operating system, call for service.</p>

Serial port problems

For more information about the serial port, see the *Option Installation Guide* on the IBM xSeries Documentation CD.

Symptom	Suggested action
The number of serial ports identified by the operating system is less than the number of serial ports that are installed.	<p>Make sure that:</p> <ul style="list-style-type: none"> • Each port is assigned a unique address in the Configuration/Setup Utility program and none of the serial ports is disabled. • The serial port adapter, if you installed one, is seated correctly. <p>If the problem remains, call for service.</p>
A serial device does not work.	<p>Make sure that:</p> <ul style="list-style-type: none"> • The device is compatible with the server. • The serial port is enabled and is assigned a unique address. • The device is connected to the serial port. <p>If the problem remains, call for service.</p>

Software problems

Symptom	Suggested action
You suspect a software problem.	<p>To determine whether the problem is caused by the software, make sure that:</p> <ul style="list-style-type: none"> • The server has the minimum memory needed to use the software. For memory requirements, see the information that comes with the software. If you have just installed an adapter or memory, the server might have a memory-address conflict. • The software is designed to operate on the server. • Other software works on the server. • The software that you are using works on another server. <p>If you received any error messages when using the software, see the information that comes with the software for a description of the messages and suggested solutions to the problem.</p> <p>If the problem remains, contact your place of purchase of the software.</p>

Universal Serial Bus device problems

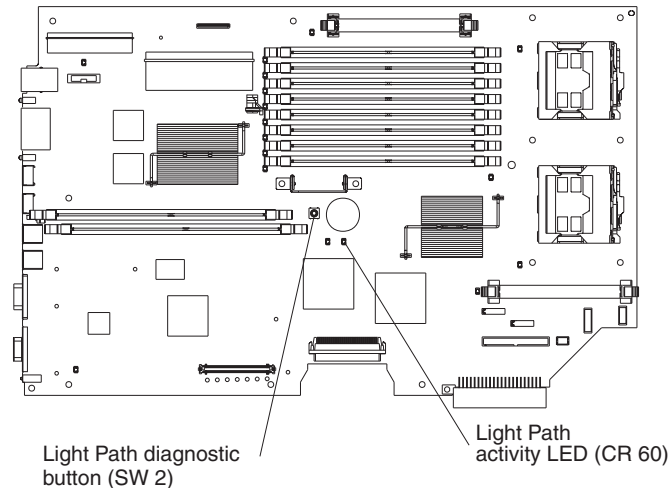
Symptom	Suggested action
A USB device does not work.	<p>Make sure that:</p> <ul style="list-style-type: none"> • You are not trying to use a USB device during POST if a standard (non-USB) keyboard is connected to the keyboard connector. If a standard (non-USB) keyboard is connected to the keyboard connector, the USB is disabled, and no USB device will work during POST. • The correct USB device driver is installed. • Your operating system supports USB devices. <p>If the problem remains, call for service.</p>

Light Path diagnostics

Use the Light Path diagnostics panel to diagnose system errors. To access the Light Path diagnostics panel, press the release latch to the left, and then slide out the operator information panel. The Light Path diagnostics panel is on the top of the operator information panel. See the following illustration for the release latch location.



Any Light Path diagnostics LEDs that are lit can be lit again without ac power. After you remove the server cover, press the blue Light Path diagnostic button on the system board, which enables you to isolate a problem that causes the server to shut down. See the following illustration for the location of the Light Path diagnostic button on the system board.



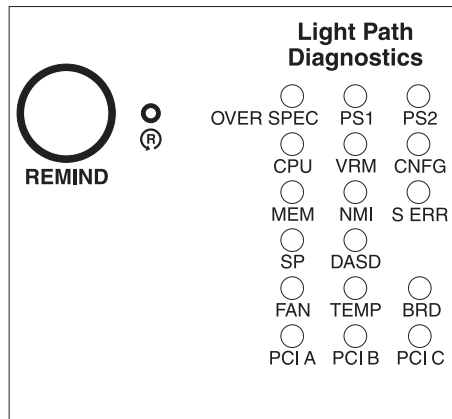
After ac power has been removed from the server, power remains available to the LEDs for up to 12 hours. After 12 hours, you must turn on the server to supply power to the LEDs. Complete the following steps to view the LEDs with the server cover removed:

1. Turn off the server and all peripheral devices; then, disconnect all external cables from the server.
2. Slide the server out of the rack cabinet.
3. Remove the server cover.
4. Press and hold the blue Light Path diagnostic button on the system board. The system board LEDs that indicate the component failure will be lit while you press the Light Path diagnostic button. You can light the LEDs for a maximum of 2 minutes, after which power is no longer available for the LEDs. Look for any LEDs that are lit on the system board to find the failing component.

Note: Sometimes no Light Path diagnostic LEDs are lit on the system board when a failure occurs. To make sure that these LEDs are supposed to be off and that the Light Path diagnostic circuits are working correctly there is a Light Path activity LED (see previous illustration). When you press the Light Path diagnostic button and the Light Path activity LED lights, this indicates that the Light Path diagnostic circuitry is working properly and that no LEDs should be lit with this particular error.

5. Install the server cover; then, slide the server into the rack cabinet and connect all external cables. See the *Rack Installation Instructions* for information about how to install the server into rack cabinet.

The following illustration shows the LEDs on the Light Path diagnostics panel. See “Light Path diagnostics LEDs” on page 50 for information about the LED meanings.



Diagnosing problems using the Light Path diagnostics

LEDs in three locations on the server are available to help you diagnose problems that might occur either during or after installation. Use them in the following order:

1. **LED on front of the operator information panel** - Look at this panel first. If a system error has occurred, the system-error LED on the front of the operator information panel is lit.
2. **LEDs on the Light Path Diagnostics panel** - Check the LEDs on the Light Path diagnostics panel, which is on the top of the operator information panel. Descriptions are below the LEDs. See the illustration that shows the LED descriptions.

On the Light Path diagnostics panel, note the LEDs that are lit and see “Light Path diagnostics LEDs” for information about the LEDs. After you note the LEDs that are lit, close the operator information panel.

3. **LEDs on the system board** - Remove the server cover (see “Removing the server cover” on page 8) to identify the component that is causing the error. Note the lit LED next to the failing component on the system board.

The following example illustrates how to use the Light Path diagnostics to diagnose a system error:

1. In this example, the system error LED on the operator information panel is lit.
2. Pull out the operator information panel and note that the CPU LED is lit on the Light Path diagnostics panel.
3. See the “Light Path diagnostics LEDs” on page 50 for information about the CPU LED.
4. Next you need to locate which Light Path diagnostics LED is lit on the system board. Follow the instructions for turning off the server in “Turning off the server” on page 30 and see “Removing the server cover” on page 8 for additional information on removing the server cover.
5. After removing the server cover, press and hold the blue Light Path diagnostic button on the system board until you locate the lit LED beside the defective microprocessor.
6. Follow the instructions in the *Option Installation Guide* on the IBM xSeries Documentation CD to remove and replace the microprocessor.

Light Path diagnostics LEDs

The following table lists the LEDs on the Light Path diagnostics panel, the problems that they indicate, and actions to solve the problems.

Note: When there is a reference to an error log in the following table and your model has the optional Remote Supervisor Adapter II SlimLine option installed, view the system event error log; otherwise, view the POST error log.

The two error logs are located on the Configuration/Setup Utility in the Event/Error logs option. For more information, see the *User's Guide*.

LED	Problem	Action
None	An error has occurred and cannot be diagnosed, or the ASM processor has failed. The error is not represented by a Light Path diagnostics LED.	Check the system error log for information about the error.
OVER SPEC	The power supplies are using more power than their maximum rating.	Replace the failing power supply, or remove optional devices from the server.
PS 1	When the LED is lit, the power supply in bay 1 has failed. When the LED flashes, an invalid power-supply configuration has occurred.	If the power supply has failed, call for service. If a configuration error has occurred, make sure that the power supply is installed correctly.
PS 2	When the LED is lit, the power supply in bay 2 has failed. When the LED flashes, an invalid power-supply configuration has occurred.	If the power supply has failed, call for service. If a configuration error has occurred, make sure that the power supply is installed correctly.
CPU	When the LED is lit, a microprocessor has failed. When the LED flashes, an invalid microprocessor configuration has occurred.	If a lit LED on the system board indicates a problem with a microprocessor, make sure that the microprocessor is installed correctly. See the <i>Option Installation Guide</i> on the IBM xSeries Documentation CD for information about installing a microprocessor. If the problem remains, call for service. If a configuration error has occurred, make sure that the microprocessors have the same cache size and type, and the same clock speed. Microprocessor internal and external clock frequencies must be identical.
VRM	When the LED is lit, an error occurred on the microprocessor voltage regulator module (VRM). When the LED flashes, an invalid VRM configuration has occurred.	Replace the VRM. If the problem remains, call for service. If a configuration error has occurred, make sure that the VRM is installed correctly. If the problem remains, replace the VRM.
CNFG	When the LED flashes, a hardware configuration error has occurred.	Check the system error log for information about the error. The Light Path diagnostic LED for the component that is causing the configuration error also flashes.
MEM	When the LED is on, a memory error has occurred. When the LED flashes, an invalid DIMM configuration has occurred.	Replace the failing DIMM, which is indicated by the lit LED on the system board. If a configuration error has occurred, make sure the DIMMs are installed correctly.
NMI	A machine check error has occurred.	Check the system error log for information about the error.
S ERR	A soft error has occurred.	Check the system error log for information about the error.
SP	The service processor has failed.	Remove ac power from the server; then, reconnect the server to ac power and restart the server. If the problem remains, call for service.
DASD	A hard disk drive error has occurred.	Check the LEDs on the hard disk drives and replace the indicated drive.

LED	Problem	Action
FAN	<p>When the LED is lit, a fan has failed or is operating too slowly. A failing fan can also cause the TEMP LED to be lit.</p> <p>When the LED flashes, an invalid fan configuration has occurred.</p>	<p>Replace the failing fan, which is indicated by the lit LED. If a configuration error has occurred, make sure that the fans are installed correctly.</p>
TEMP	<p>The system temperature has exceeded a threshold level.</p>	<ul style="list-style-type: none"> • Determine whether a fan has failed. If it has, replace it. • Make sure that the air vents are not blocked. • Make sure that the room temperature is not too high. See the “Features and specifications” on page 4 for temperature information. <p>If the problem remains, call for service.</p>
BRD	<p>An error has occurred on the system board or there is a battery fault</p>	<ul style="list-style-type: none"> • Check the LEDs on the system board to identify the component that is causing the error. • Check the system error log for information about the error. • Check the battery and replace it if it is defective.
PCI-A	<p>An error has occurred on PCI bus A</p>	<p>Check the PCI-Express Adapter in slot 2 for an error or there might be a general system board malfunction.</p>
PCI-B	<p>An error has occurred on PCI bus B</p>	<p>Check the following items for errors:</p> <ul style="list-style-type: none"> • PCI/PCI-X Adapter in Slots 1 or 2. • On-board SCSI. • The system board might have a malfunction.
PCI-C	<p>An error has occurred on PCI bus C</p>	<p>Check the on-board Ethernet controllers or check for a general system board malfunction.</p>

Appendix A. Getting help and technical assistance

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

Before you call

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

- Check all cables to make sure that they are connected.
- Check the power switches to make sure that the system is turned on.
- Use the troubleshooting information in your system documentation, and use the diagnostic tools that come with your system. Information about diagnostic tools is in the *Hardware Maintenance Manual and Troubleshooting Guide* on the IBM *xSeries Documentation* CD or in the *IntelliStation Hardware Maintenance Manual* at the IBM Support Web site.
- Go to the IBM Support Web site at <http://www.ibm.com/pc/support/> to check for technical information, hints, tips, and new device drivers or to submit a request for information.

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

Using the documentation

Information about your IBM xSeries or IntelliStation system and preinstalled software, if any, is available in the documentation that comes with your system. That documentation includes printed books, online books, readme files, and help files. See the troubleshooting information in your system documentation for instructions for using the diagnostic programs. The troubleshooting information or the diagnostic programs might tell you that you need additional or updated device drivers or other software. IBM maintains pages on the World Wide Web where you can get the latest technical information and download device drivers and updates. To access these pages, go to <http://www.ibm.com/pc/support/> and follow the instructions. Also, you can order publications through the IBM Publications Ordering System at <http://www.elink.ibm.com/public/applications/publications/cgibin/pbi.cgi>.

Getting help and information from the World Wide Web

On the World Wide Web, the IBM Web site has up-to-date information about IBM xSeries and IntelliStation products, services, and support. The address for IBM xSeries information is <http://www.ibm.com/eserver/xseries/>. The address for IBM IntelliStation information is <http://www.ibm.com/pc/intellistation/>.

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

Software service and support

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

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

Hardware service and support

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

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

Appendix B. IBM Statement of Limited Warranty Z125-4753-08 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 - xSeries 336 Type 8837

Country or Region of Purchase	Warranty Period	Type of Warranty Service*
World wide	3 Years Parts and Labor	1, 2
Japan only	3 Years Parts and 1 Year Labor	1, 2
* See " <u>Types of Warranty Service</u> " for the legend and explanations of warranty-service types.		

Types of Warranty Service

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

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

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

2. **On-site Service**

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

3. **Courier or Depot Service***

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

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

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

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

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

6. CRU and Courier or Depot Service

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

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

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

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

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

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

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

EU Country Telephone List

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

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

Appendix C. Notices

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EtherJet	Tivoli
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FlashCopy	Wake on LAN
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IntelliStation	X-Architecture
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Important notes

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

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

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

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

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

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

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

Product recycling and disposal

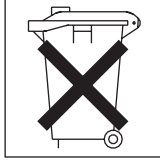
This unit contains materials such as circuit boards, cables, electromagnetic compatibility gaskets, and connectors which may contain lead and copper/beryllium alloys that require special handling and disposal at end of life. Before this unit is disposed of, these materials must be removed and recycled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

Battery return program

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

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

In the Netherlands, the following applies.



Electronic emission notices

Federal Communications Commission (FCC) statement

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

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

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

Industry Canada Class A emission compliance statement

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

Avis de conformité à la réglementation d'Industrie Canada

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

Australia and New Zealand Class A statement

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

United Kingdom telecommunications safety requirement

Notice to Customers

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

European Union EMC Directive conformance statement

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

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

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

Taiwanese Class A warning statement

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

Chinese Class A warning statement

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

Japanese Voluntary Control Council for Interference (VCCI) statement

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Power cords

For your safety, IBM provides a power cord with a grounded attachment plug to use with this IBM product. To avoid electrical shock, always use the power cord and plug with a properly grounded outlet.

IBM power cords used in the United States and Canada are listed by Underwriter's Laboratories (UL) and certified by the Canadian Standards Association (CSA).

For units intended to be operated at 115 volts: Use a UL-listed and CSA-certified cord set consisting of a minimum 18 AWG, Type SVT or SJT, three-conductor cord, a maximum of 15 feet in length and a parallel blade, grounding-type attachment plug rated 15 amperes, 125 volts.

For units intended to be operated at 230 volts (U.S. use): Use a UL-listed and CSA-certified cord set consisting of a minimum 18 AWG, Type SVT or SJT, three-conductor cord, a maximum of 15 feet in length and a tandem blade, grounding-type attachment plug rated 15 amperes, 250 volts.

For units intended to be operated at 230 volts (outside the U.S.): Use a cord set with a grounding-type attachment plug. The cord set should have the appropriate safety approvals for the country in which the equipment will be installed.

IBM power cords for a specific country or region are usually available only in that country or region.

IBM power cord part number	Used in these countries and regions
02K0546	China
13F9940	Australia, Fiji, Kiribati, Nauru, New Zealand, Papua New Guinea
13F9979	Afghanistan, Albania, Algeria, Andorra, Angola, Armenia, Austria, Azerbaijan, Belarus, Belgium, Benin, Bosnia and Herzegovina, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo (Democratic Republic of), Congo (Republic of), Cote D'Ivoire (Ivory Coast), Croatia (Republic of), Czech Republic, Dahomey, Djibouti, Egypt, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Finland, France, French Guyana, French Polynesia, Germany, Greece, Guadeloupe, Guinea, Guinea Bissau, Hungary, Iceland, Indonesia, Iran, Kazakhstan, Kyrgyzstan, Laos (People's Democratic Republic of), Latvia, Lebanon, Lithuania, Luxembourg, Macedonia (former Yugoslav Republic of), Madagascar, Mali, Martinique, Mauritania, Mauritius, Mayotte, Moldova (Republic of), Monaco, Mongolia, Morocco, Mozambique, Netherlands, New Caledonia, Niger, Norway, Poland, Portugal, Reunion, Romania, Russian Federation, Rwanda, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, Slovakia, Slovenia (Republic of), Somalia, Spain, Suriname, Sweden, Syrian Arab Republic, Tajikistan, Tahiti, Togo, Tunisia, Turkey, Turkmenistan, Ukraine, Upper Volta, Uzbekistan, Vanuatu, Vietnam, Wallis and Futuna, Yugoslavia (Federal Republic of), Zaire
13F9997	Denmark
14F0015	Bangladesh, Lesotho, Macao, Maldives, Namibia, Nepal, Pakistan, Samoa, South Africa, Sri Lanka, Swaziland, Uganda

IBM power cord part number	Used in these countries and regions
14F0033	Abu Dhabi, Bahrain, Botswana, Brunei Darussalam, Channel Islands, China (Hong Kong S.A.R.), Cyprus, Dominica, Gambia, Ghana, Grenada, Iraq, Ireland, Jordan, Kenya, Kuwait, Liberia, Malawi, Malaysia, Malta, Myanmar (Burma), Nigeria, Oman, Polynesia, Qatar, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Seychelles, Sierra Leone, Singapore, Sudan, Tanzania (United Republic of), Trinidad and Tobago, United Arab Emirates (Dubai), United Kingdom, Yemen, Zambia, Zimbabwe
14F0051	Liechtenstein, Switzerland
14F0069	Chile, Italy, Libyan Arab Jamahiriya
14F0087	Israel
1838574	Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Brazil, Caicos Islands, Canada, Cayman Islands, Costa Rica, Colombia, Cuba, Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Honduras, Jamaica, Japan, Mexico, Micronesia (Federal States of), Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Taiwan, United States of America, Venezuela
24P6858	Korea (Democratic People's Republic of), Korea (Republic of)
34G0232	Japan
36L8880	Argentina, Paraguay, Uruguay
49P2078	India
49P2110	Brazil
6952300	Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Caicos Islands, Canada, Cayman Islands, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Honduras, Jamaica, Mexico, Micronesia (Federal States of), Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Saudi Arabia, Thailand, Taiwan, United States of America, Venezuela

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