



@server

xSeries 335

Type 8676

Option Installation Guide





@server

IBM xSeries 335 Type 8676
Option Installation Guide

Note:

Before using this information and the product it supports, read the general information in “Notices”, on page 41.

Second Edition (February 2003)

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Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الأمنية

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

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

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

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

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

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

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

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

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

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

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

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

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

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

Перед установкой продукта прочтите инструкции по технике безопасности.

Pred inštaláciou tohto zariadenia si pečítajte Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

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

Läs säkerhetsinformationen innan du installerar den här produkten.

Statement 1



Danger

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

To avoid a shock hazard:

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

To connect:

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

To disconnect:

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

Statement 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:

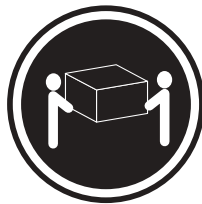
- Do not remove the covers. Removing the covers of the laser product could result in exposure to hazardous laser radiation. There are no serviceable parts inside the device.
- Use of controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation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

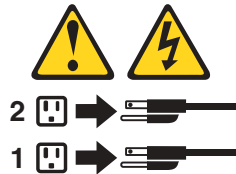
Use safe practices when lifting.

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 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.

Statement 10



CAUTION:

Do not place any object weighing more than 82 kg (180 lb) on top of rack-mounted devices.



>82 kg (180 lb)

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 *Option Installation Guide* contains instructions for installing, removing, and connecting optional devices that your server supports.

Related publications

The following documentation comes with your server:

- *User's Guide*
This publication is in Portable Document Format (PDF) on the IBM® *xSeries Documentation CD*. It contains general information about your server.
- *Installation Guide*
This printed publication contains instructions for setting up your server and basic instructions for installing some options.
- *Option Installation Guide*
This publication is in PDF on the IBM *xSeries Documentation CD*. It contains detailed instructions for installing, removing, and connecting optional devices that your server supports.
- *Safety Book*
This publication is in PDF on the IBM *xSeries Documentation CD*. It contains translated caution and danger statements. Each caution and danger statement that appears in the documentation has a number that you can use to locate the corresponding statement in your language in the *Safety Book*.
- *Rack Installation Instructions*
This printed publication contains instructions for installing your server in a rack.
- *Hardware Maintenance Manual and Troubleshooting Guide*
This publication is in PDF on the IBM *xSeries Documentation CD*. It contains information to help you solve problems yourself, and it contains information for service technicians.

Depending on your server model, additional publications might be included on the IBM *xSeries Documentation CD*.

Notices and statements used in this book

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

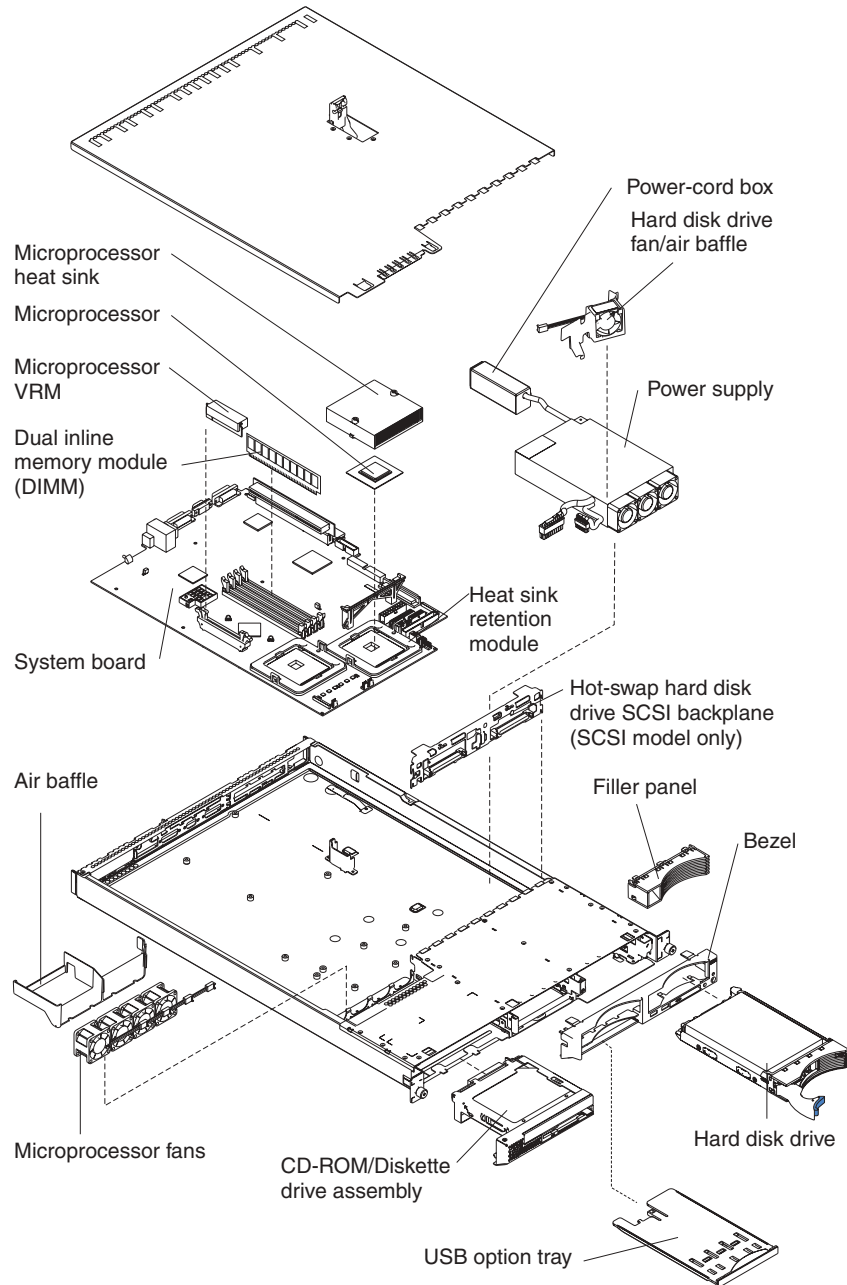
The following notices and statements are used in the documentation:

- **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.

Major components of the xSeries 335 Type 8676 server

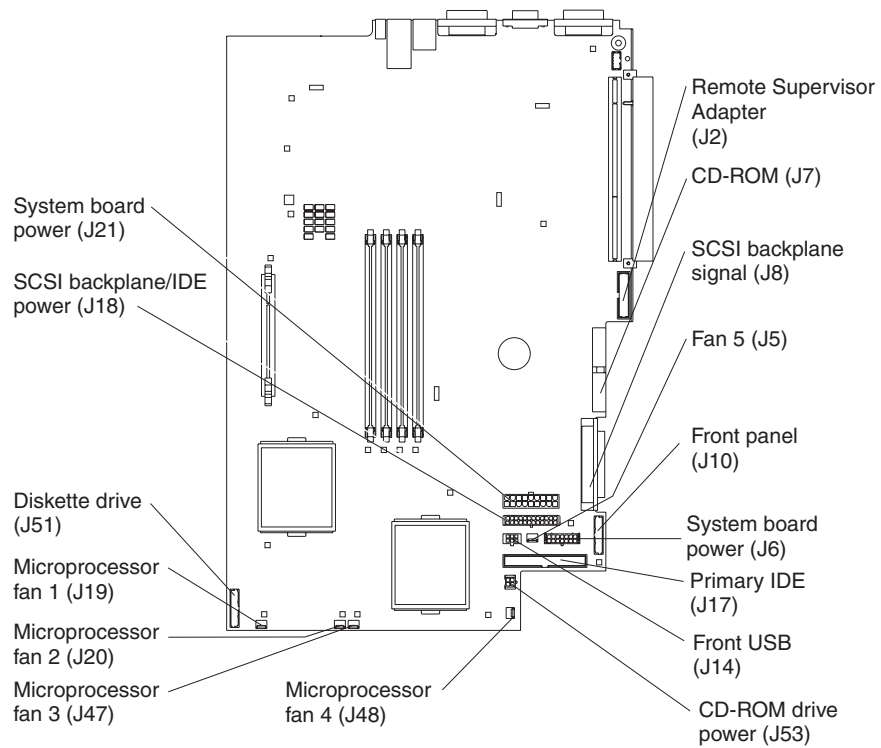
The blue color on components and labels indicates touch points, where a component can be gripped, a latch moved, and so on.

The following illustration shows the major components in the server. It shows a SCSI hot-swap hard disk drive model. An IDE non-hot-swap hard disk drive model is also available. The illustrations in this publication might differ slightly from your hardware.



System-board internal connectors

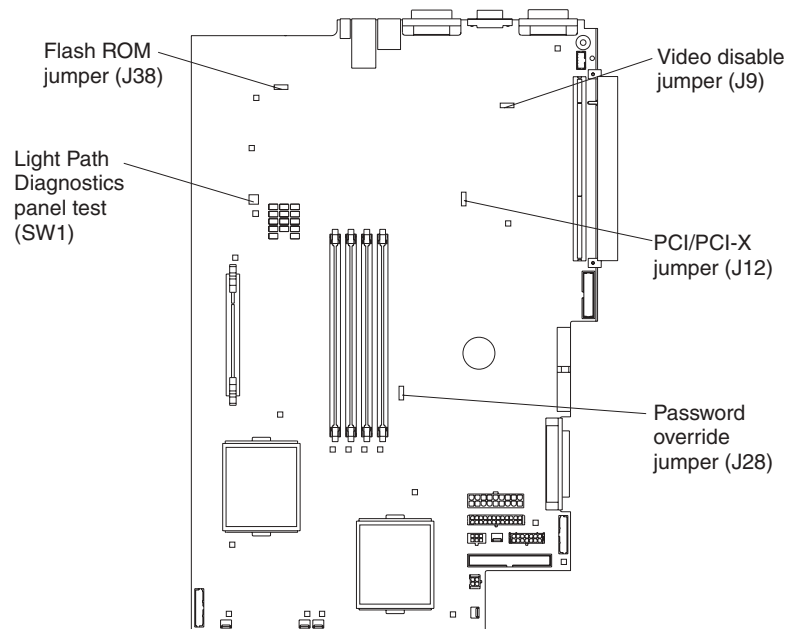
The following illustration shows the internal connectors on the system board.



System-board switches and jumpers

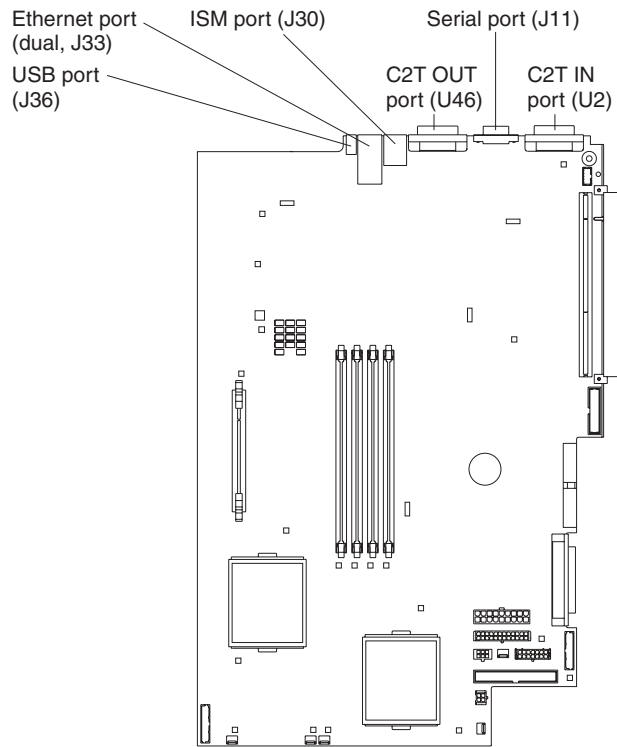
The following illustration shows the location of the switches and jumper blocks on the system board.

Any jumper blocks on the system board that are not shown in the illustration are reserved. See the section on recovering the BIOS code in the *Hardware Maintenance Manual and Troubleshooting Guide* for information about the flash ROM page-swap jumper.



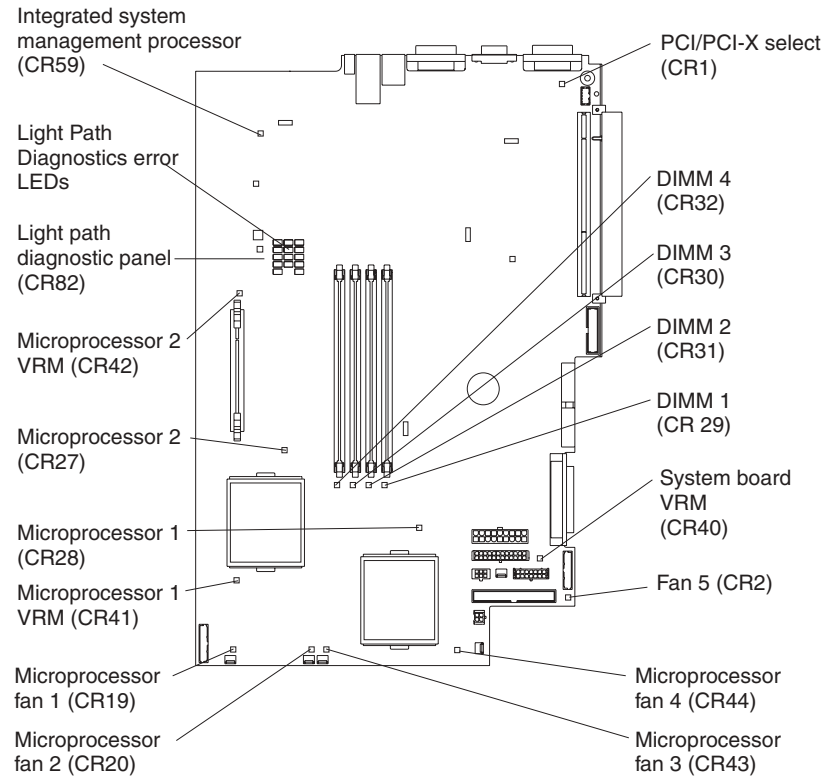
System-board external connectors

The following illustration shows the external input/output connectors on the system board.



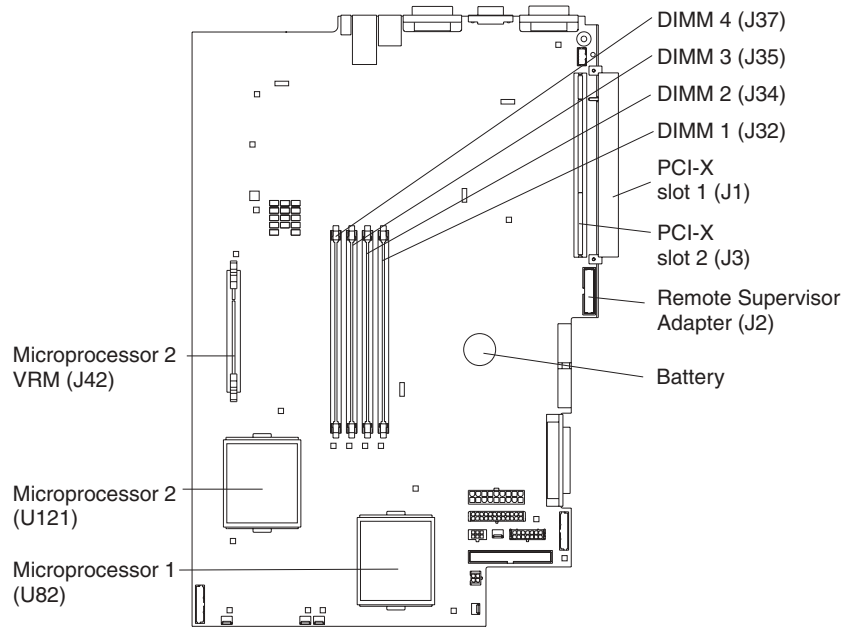
System-board LEDs

The following illustration shows the light-emitting diodes (LEDs) on the system board.



System-board option connectors

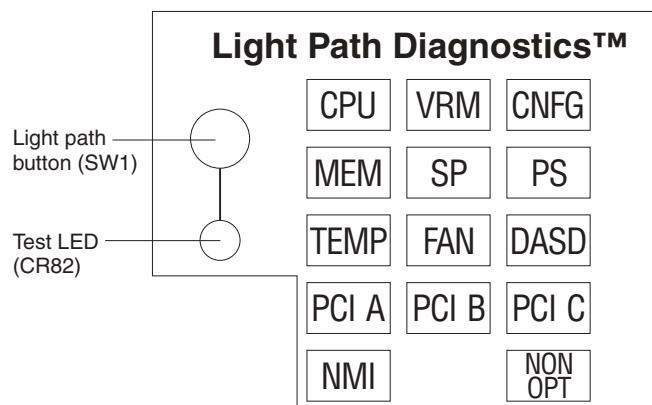
The following illustration shows the connectors on the system board for user-installable options.



Note: The VRM for microprocessor 1 is integrated into the system board.

Light Path Diagnostics panel

The following illustration shows the error LEDs, light path button, and test LED on Light Path Diagnostics panel on the system board.



For more information about the Light Path Diagnostics feature, see the *Hardware Maintenance Manual and Troubleshooting Guide*. The following table describes the LEDs on the Light Path Diagnostics panel.

Table 1. Light Path Diagnostics panel LEDs

Light Path Diagnostics panel LED	Description
CPU	One of the microprocessors failed.
VRM	A voltage regulator module (VRM) failed.
CNFG	The microprocessor or microprocessor VRM configuration is incorrect.
MEM	System memory failed.
SP	The integrated system management processor (ISMP) failed.
PS	The power supply failed.
TEMP	The temperature exceeded a threshold level.
FAN	A fan (1, 2, 3, 4, or 5) failed or is operating slowly.
DASD	A SCSI hard disk drive failed.
PCIA	PCI-X slot 2 failed or the integrated SCSI adapter failed.
PCIB	An integrated Ethernet controller or PCI slot 1 failed.
PCIC	PCI slot 1 or the integrated video adapter failed.
NMI	A nonmaskable interrupt occurred.
NON OPT	A PCI bus is not operating at maximum efficiency.

If you remove the server from the rack and you are using the Light Path Diagnostics LEDs to diagnose a problem, you can press the Light Path button to light any LEDs that were lit before you unplugged the server.

Chapter 2. Installing options

This chapter provides detailed instructions for installing hardware options in your server.

Installation guidelines

Before you begin installing options in your server, read the following information:

- Read the safety information beginning on page v, and the guidelines in “Handling static-sensitive devices”. This information will help you work safely with your server and options.
- Make sure that you have an adequate number of properly grounded electrical outlets for your server, monitor, and other devices that you will connect to the server.
- Back up all important data before you make changes to disk drives.
- Have a small Phillips screwdriver available.
- For a list of supported options for your server, go to <http://www.ibm.com/pc/compat/> on the World Wide Web.

System reliability guidelines

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

- Each of the drive bays has a drive or a filler panel and electromagnetic compatibility (EMC) shield installed in it.
- Space is available around the server to allow the server cooling system to work properly. See the documentation that comes with the rack.
- You have followed the cabling instructions that come with optional adapters.
- You have replaced a failed fan as soon as possible.

Handling static-sensitive devices

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

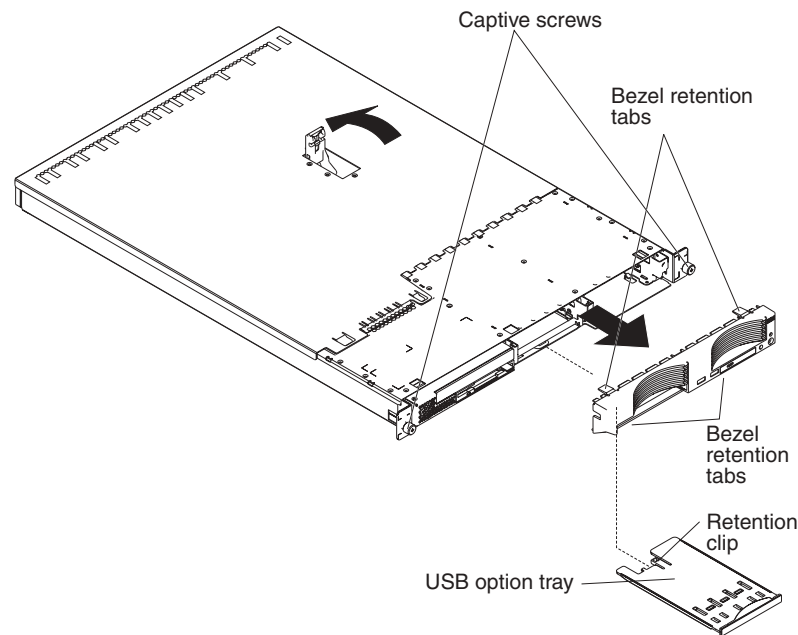
To reduce the possibility of damage from electrostatic discharge, observe the following precautions:

- Limit your movement. Movement can cause static electricity to build up around you.
- 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, place it back into its static-protective package. Do not place the device on your 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 cover and bezel

Complete the following steps to remove the cover and bezel:

1. Read the safety information beginning on page v, and “Installation guidelines” on page 11.
2. Turn off the server and all attached peripheral devices. Disconnect all power cords; then, disconnect all external signal cables from the server.
3. Remove the server from the rack. Lift the cover release latch; the cover slides to the rear approximately 13 mm (0.5 inch).



4. Lift the cover off the server.
Attention: To ensure adequate cooling and airflow, do not operate the server with the cover removed. Operating the server with the cover removed might damage server components.
5. If you are installing a non-hot-swap hard disk drive, remove the USB option tray. Press in on the USB option tray (below hard disk drive bay 1) to release it and slide the tray out until it stops; then, press the retention clip at the bottom rear of the tray and remove the tray from the server.
Note: You need to remove the USB option tray and the bezel only if you are installing a non-hot-swap hard disk drive. It is not necessary if you are installing other options in the server.
6. Press on the bezel retention tabs on the top, right side and bottom of the server, and pull the bezel directly away from the server.

Working with adapters

This section describes how to install an adapter in the server. Before you install an adapter, review the following information:

- Read the documentation that comes with your operating system.
- Locate the documentation that comes with the adapter and follow those instructions in addition to the instructions in this chapter. If you need to change switch settings or jumper settings on the adapter, follow the instructions that come with the adapter.
- The server comes with two 64-bit 100 MHz peripheral component interconnect-extended (PCI-X) adapter expansion slots on the system board. The server is designed specifically for PCI-X adapter support, but it also supports PCI adapters.
- The expansion slots support both 32-bit and 64-bit adapters. You can install half-length adapters in slot 1. You can install full-length adapters in slot 2.
- The server supports 3.3 V and universal PCI and PCI-X adapters; it does not support 5.0 V-only adapters.
- PCI-X slot 2 and the integrated SCSI controller are on PCI-X bus A (bus 1). The integrated Ethernet controllers are on PCI-X bus B (bus 2). The integrated video controller is on PCI bus C (bus 0). PCI-X slot 1 is switchable between PCI-X bus B and PCI bus C by means of the jumper on jumper block J12.

Note: If no jumper is installed on jumper block J12, the server determines automatically the optimal bus to which to attach PCI-X slot 1. If you install a jumper between pins 1 and 2 on J12, PCI-X slot 1 is forced to PCI bus C. If you install the jumper between pins 2 and 3 on J12, PCI-X slot 1 is forced to PCI-X bus B.

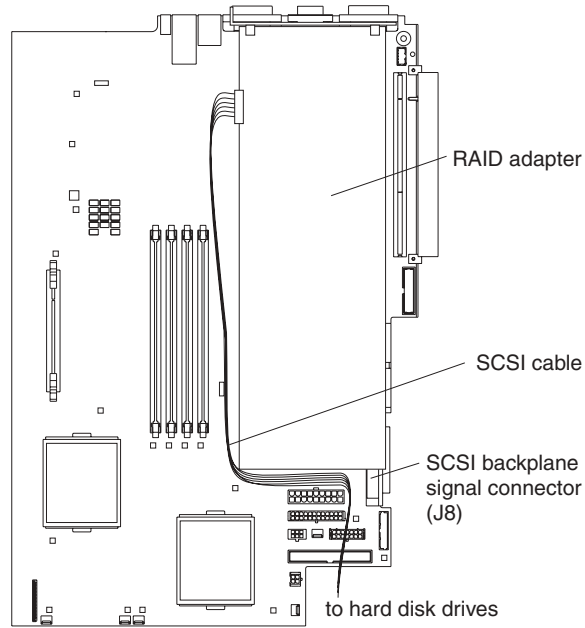
If you force slot 1 to bus B and you install an adapter that runs at less than 100 MHz in the slot, the integrated Ethernet controllers are forced to run at the slower speed.

- The server scans PCI-X slots 1 and 2 to assign system resources. By default, the server starts (boots) devices in the following order: system IDE and SCSI devices; then, PCI and PCI-X devices.

Note: To change the boot precedence for PCI and PCI-X devices you must disable the devices through the Configuration/Setup Utility program. Start the Configuration/Setup Utility program and select **Start Options** from the main menu. Then, select the **Startup Sequence Options** and use the arrow keys to specify the startup order.

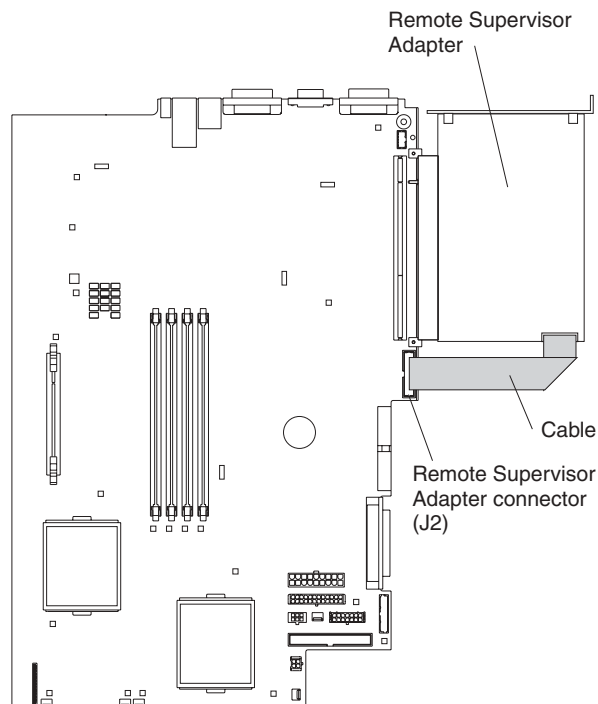
- If you plan to install either an optional SCSI adapter or an optional RAID adapter, you can install it in either of the PCI-X slots if the size of the adapter permits. The server supports a variety of RAID adapters for both internal and external configurations. For the most current list of supported RAID adapters, go to <http://www.ibm.com/pc/us/compat/> on the World Wide Web. For details about installing a RAID adapter, see the documentation that comes with the adapter.
- If you plan to use a RAID adapter to control internal hot-swap hard disk drives, disconnect the SCSI cable from the SCSI backplane signal connector (J8) on the system board and connect it to the RAID adapter. The following illustration shows

the cable routing if you are installing the RAID adapter in PCI-X slot 2.



Note: See the documentation that comes with the RAID adapter for any additional cabling instructions. That documentation also provides information about installing the RAID software and configuring the RAID adapter.

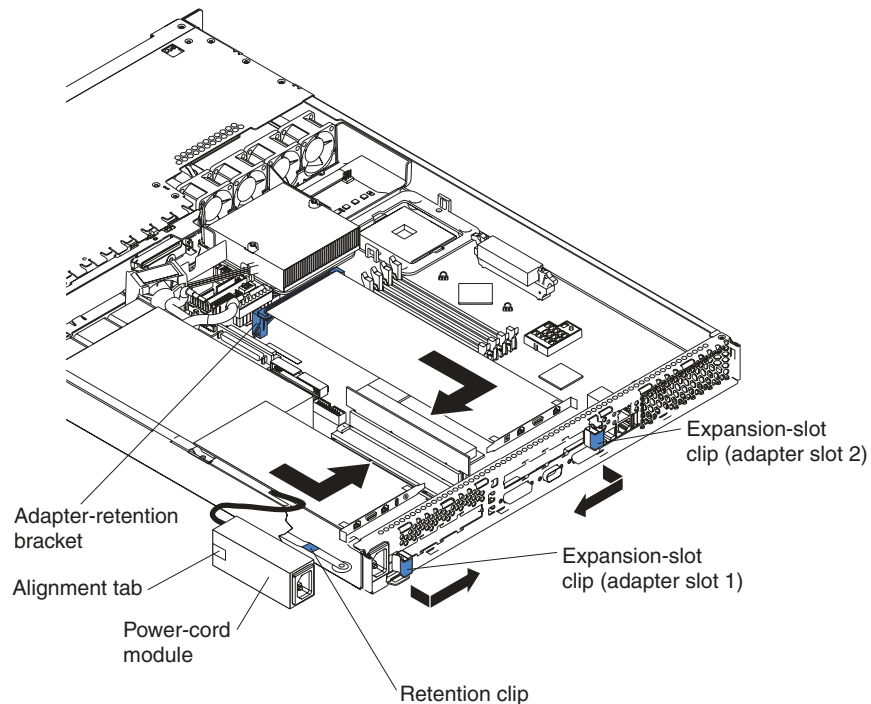
- If you plan to install an optional IBM Remote Supervisor Adapter, install it in PCI-X slot 1. Use the ribbon cable that comes with the Remote Supervisor Adapter to connect the 20-pin connector on the rear edge of the adapter to the Remote Supervisor Adapter connector (J2) on the system board. For details about installing a Remote Supervisor Adapter, see the documentation that comes with the adapter. The following illustration shows the cable routing.



Installing an adapter

Complete the following steps to install an adapter:

1. Review the safety information beginning on page v, and “Installation guidelines” on page 11.
2. Turn off the server and all attached peripheral devices. Disconnect all power cords; then, disconnect all external signal cables from the server.
3. Remove the server from the rack; then, remove the server cover (see “Removing the cover and bezel” on page 12).
4. Determine which PCI-X slot you will use for the adapter.
5. On the rear panel, press the expansion-slot clip together to unlock the clip; then, pull the clip out from the server until it stops and rotate the clip as shown in the following illustration. It remains loosely attached to the server.



Attention: Avoid touching the components and gold-edge connectors on the adapter. Ensure that the adapter is completely and correctly seated in the slot. Incomplete insertion might cause damage to the system board or to the adapter.

6. Remove the expansion slot cover from the slot.
7. To gain access to PCI-X slot 1, remove the power-cord module.
 - a. Press down on the retention clip at the front of the power-cord module and slide the module toward the front of the server until the alignment tab is free of the slot on the side of the server.
 - b. Lift and place the power-cord module out of the server as far as the power supply cable permits.
8. Install the adapter:

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 11.

- a. Remove the adapter from the static-protective package and set any jumpers or switches on the adapter as directed by the adapter

manufacturer. If you are installing a full-length adapter, you might have to remove a plastic bracket secured to the adapter with 2 screws before installing the adapter.

Attention: When you install an adapter, ensure that the adapter is correctly seated in the connector before you turn on the server. Improperly seated adapters might cause damage to the system board, the riser card for slot 1, or the adapter.

- b. Grasp the adapter by its top edge or upper corners, align it with the connector, and press it *firmly* into the connector.
9. Slide the expansion-slot clip toward the server until it snaps into place to secure the adapter in the adapter slot.
10. Connect any internal cables to the adapter. See the instructions that come with the adapter for details.

Attention: Ensure that the cables do not block the flow of air from the fans.

11. If you removed the power-cord module to install the adapter in PCI-X slot 1, install the module by reversing the procedure in step 7a on page 15. Ensure that the alignment tab is fully seated in the slot on the side of the server.
12. If you installed the adapter in PCI-X slot 2, secure the adapter by flexing the adapter-retention bracket toward the front of the server and inserting the front corners of the adapter into the recesses in the latch.
13. Perform any configuration tasks required for the adapter.

Note: If you installed a Remote Supervisor Adapter:

- a. Refer to the documentation provided with the Remote Supervisor Adapter for information about installing the Remote Supervisor Adapter firmware and configuring the adapter.
 - b. After you initially configure the adapter, you should create a backup copy of it so that if you need to replace the adapter in the future, you can restore the configuration and resume normal operation more quickly.
14. If you have other options to install, install them now. Otherwise, go to “Completing the installation” on page 27.

Working with a hard disk drive

This section describes how to install a hard disk drive in the server. Before you install a hard disk drive, review the following information:

- The server supports two 25.4-mm (1-inch), slim, 3.5-inch hard disk drives. SCSI 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 resides 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 plugs directly into the hot-swap SCSI backplane. The backplane attaches to connector J18 on the system board and controls the SCSI IDs for the hot-swap drives.

Note: The drive in bay 1 is assigned SCSI ID 0; the drive in bay 2 is assigned SCSI ID 1.

- Non-hot-swap disk drives do not require a backplane or tray and they do not have indicator LEDs. However, you must attach the blue rails that come with the drive before installing it in the server.

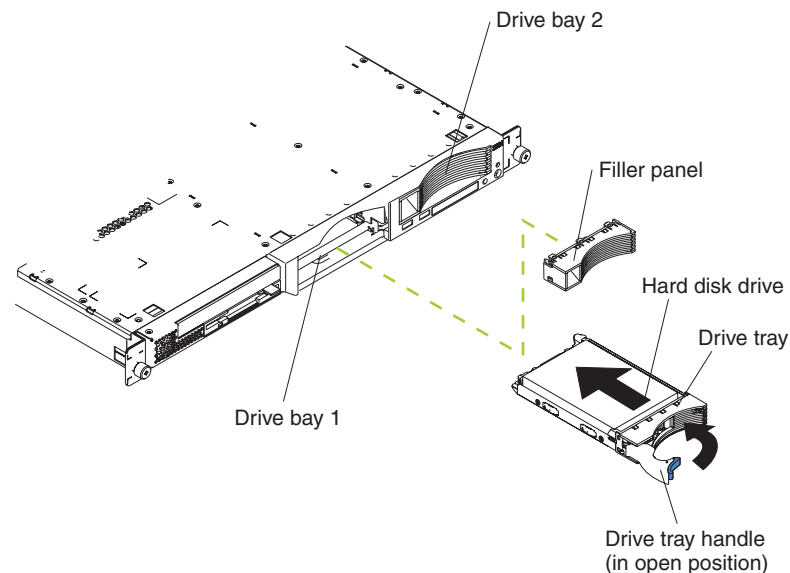
- Non-hot-swap disk drives have a jumper block on the rear. Install a jumper in the cable-selection position of the jumper block. For details, see the notes under step 4 on page 18, and the documentation that comes with the drive.
- If you install only one hard disk drive, for faster startup, install it in the primary boot device bay. For hot-swap SCSI drives, the drive in bay 1 is the primary boot device. For IDE drives, the drive in bay 2 is the primary boot device.
- If you are installing a hot-swap drive, continue with “Installing a hot-swap hard disk drive”. If you are installing a non-hot-swap drive, go to “Installing a non-hot-swap hard disk drive” on page 18.

Installing a hot-swap hard disk drive

Before you install a hot-swap hard disk drive, review the following information:

- Inspect the drive tray for any signs of damage.
- Ensure that the drive is installed in the tray correctly.
- If your server has an optional RAID adapter installed, see the documentation provided with the adapter for information about installing a hard disk drive.

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



1. Review the safety information beginning on page v, and “Installation guidelines” on page 11.
2. Remove the filler panel from the appropriate drive bay.

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

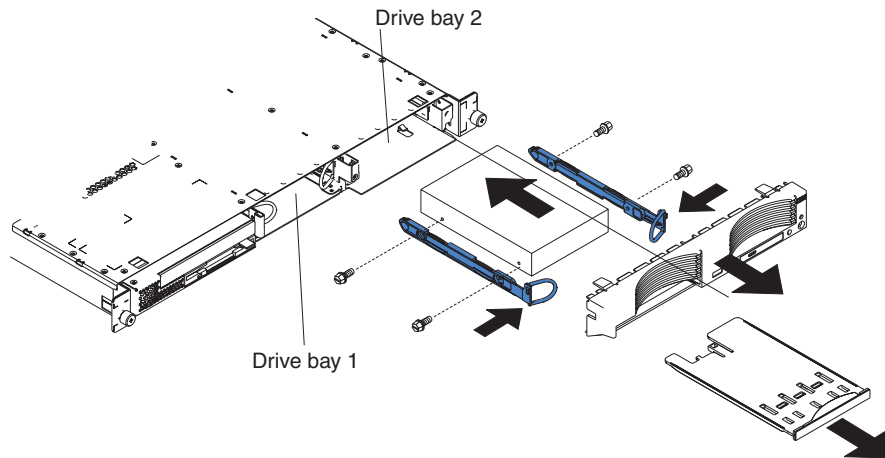
3. Install the new hard disk drive in the drive bay:
4. Check the hard disk drive status LED and activity LED to verify that the drive is operating correctly.
5. If you have other options to install, install them now. Otherwise, go to “Completing the installation” on page 27.

Installing a non-hot-swap hard disk drive

Before you install a non-hot-swap hard disk drive, review the following information:

- See the documentation that comes with the drive for any cabling instructions.
- Route the cable *before* you install the drive. Do not block the airflow from the fans.

Complete the following steps to install a non-hot-swap hard disk drive:



1. Review the safety information beginning on page v, and “Installation guidelines” on page 11.
2. Turn off the server and all attached peripheral devices. Disconnect all power cords; then, disconnect all external signal cables from the server.
3. Remove the server from the rack; then, remove the server cover (see “Removing the cover and bezel” on page 12).
4. Press in on the USB option tray to release it and slide the tray out until it stops; then, press the retention clip at the bottom rear of the tray and remove the tray from the server. Press on the bezel retention tabs and pull the bezel directly away from the server.

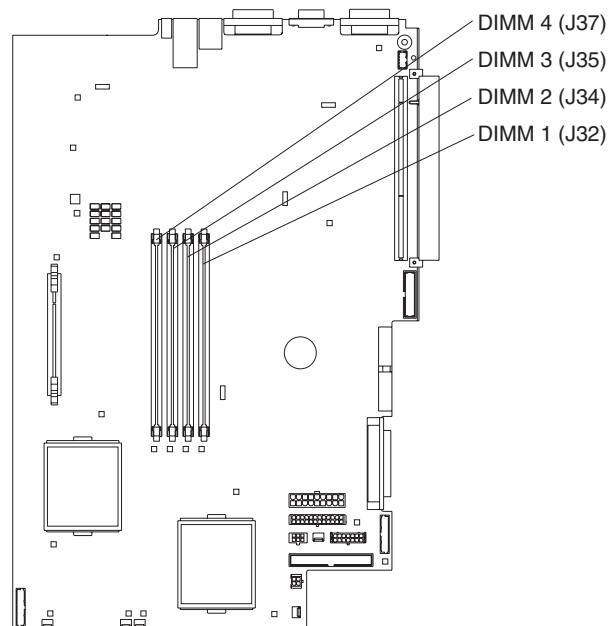
Notes:

- a. If you have only one non-hot-swap hard disk drive, install it in the right-hand bay (bay 2) with a jumper installed in the cable-selection-enabled position of the jumper block on the rear of the drive.
 - b. If you have two drives and you want the server to determine the master drive and subordinate drive automatically, install jumpers in the cable-selection-enabled position of the jumper block on both drives.
 - c. If you want to assign master and subordinate drives manually, install a jumper in the master position for the drive in bay 2 and install a jumper in the subordinate position for the drive in bay 1.
5. Install the hard disk drive in the drive bay:
 - a. Attach the rails to the sides of the drive using 2 screws for each rail.
 - b. Slide the drive into the bay until the rail latches snap into place.
 - c. Connect the signal and power cables to the rear of the drive. Keep the cables clear of the airflow path of the fan behind the drive bays.
 6. If you have other options to install, install them now. Otherwise, go to “Completing the installation” on page 27.

Installing memory modules

This section describes how to install memory modules in the server. Before you install memory modules, review the following information:

- The xSeries 335 Type 8676 server uses interleaved dual inline memory modules (DIMMs), which requires that you add, remove, or replace DIMMs in pairs. Each pair must be of the same type, capacity, and speed. Adding memory to the server is an easy way to improve system performance. The server comes with one pair of DIMMs installed in DIMM slots 1 and 2 on the system board.
- You can increase the amount of memory in the server by replacing them with higher-capacity DIMMs or installing an additional pair of DIMMs in slots 3 and 4. The server supports 256 MB, 512 MB, and 1 GB DIMMs. See the ServerProven® list at <http://www.ibm.com/pc/compat/> on the World Wide Web for a list of memory modules supported by the server. The following illustration shows the memory slots on the system board.

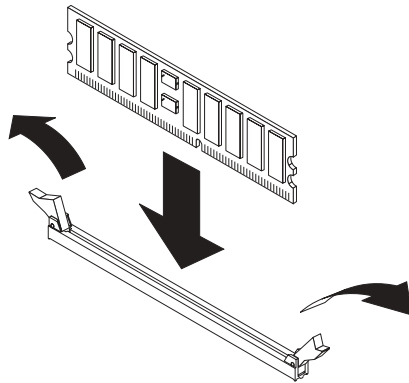


Complete the following steps to install DIMMs:

1. Review the safety information beginning on page v, and “Installation guidelines” on page 11.
2. Turn off the server and all attached peripheral devices. Disconnect all power cords; then, disconnect all external signal cables from the server.
3. Remove the server from the rack; then, remove the server cover (see “Removing the cover and bezel” on page 12).

Attention:

- Avoid touching the components and gold-edge connectors on the DIMMs. Ensure 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 11.
 - To avoid breaking the retaining clips or damaging the DIMM slots, handle the clips gently. Do not force the DIMM into the slot.
4. Touch the static-protective package containing the DIMM to any unpainted metal surface on the server. Then, remove the DIMM from the package.
 5. Install the DIMM in the slot:



- a. Open the retention latches and insert the DIMM straight into the slot, pressing down on both corners of the DIMM at the same time. The side of the DIMM with the gold-edge connectors has an index slot, offset from the center of the DIMM. Align the index slot with the slot on the system board. Ensure that no gap exists between the DIMM and the retaining clips. If a gap does exist, remove the DIMM; then, reinsert it correctly.
- b. If you replaced a failed DIMM, start the Configuration/Setup Utility program, select **Advanced Setup**, select **Memory Settings**, highlight the connector or bank of connectors that you want to enable, and then select **Enable**.

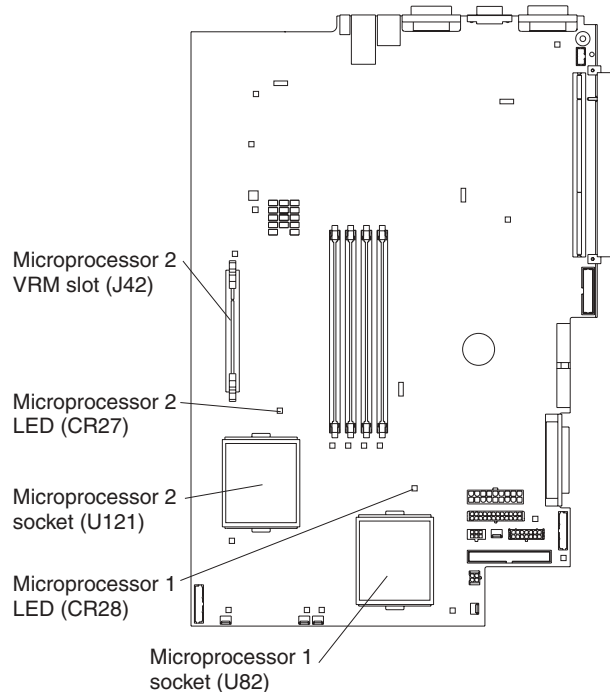
With some memory configurations, the 3-3-3 beep code might sound during POST, followed by a blank display screen. If this occurs and the **Boot Fail Count** feature in the **Start Options** of the Configuration/Setup Utility program is enabled (its default setting), restart the server three times to force the BIOS to reset the memory connector or bank of connectors.

6. If you have other options to install, install them now. Otherwise, go to “Completing the installation” on page 27.

Installing a microprocessor

This section describes how to install a microprocessor in the server. Before you install a microprocessor, review the following information:

- The server comes with one microprocessor installed. The following illustration shows the microprocessor sockets and the pluggable microprocessor 2 voltage regulator module (VRM) slot on the system board. (The VRM for microprocessor 1 is integrated on the system board.)



- If one microprocessor is installed:
 - The microprocessor is installed in microprocessor socket 1 (U82).
 - The microprocessor supports both the startup and application processes.
- If you install a second microprocessor in the server:
 - The server operates as a symmetric multiprocessing (SMP) server. With an SMP, operating system 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.
 - Microprocessor 1 is installed in microprocessor socket 1 (U82); microprocessor 2 is installed in socket 2 (U121).

Notes:

1. Read the documentation that comes with the microprocessor to determine if you need to update the basic input/output system (BIOS) code. The most current level of BIOS code for the server is available through the World Wide Web at <http://www.ibm.com/pc/support/>.
2. 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/> on the World Wide Web.

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

- Ensure that the microprocessors are the same type, have the same cache size, and have the same clock speed.
- Ensure 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 supported by the server.

A new microprocessor comes in a kit with a VRM and a heat sink.

Complete the following steps to install a microprocessor:

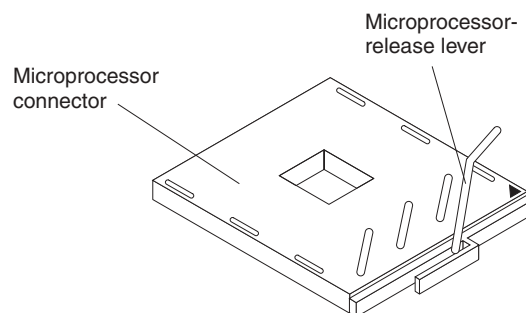
1. Review the safety information beginning on page v, and “Installation guidelines” on page 11.
2. Turn off the server and all attached peripheral devices. Disconnect all power cords; then, disconnect all external signal cables from the server.
3. Remove the server from the rack; then, remove the server cover (see “Removing the cover and bezel” on page 12). Determine the socket where the microprocessor is to be installed.

Attention:

- Avoid touching the components and gold-edge connectors on the microprocessor. Ensure that the microprocessor is completely and correctly seated in the socket. Incomplete insertion might cause damage to the system board or to the microprocessor.
- 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 11.

Note: A new microprocessor comes in a kit with a VRM and a heat sink.

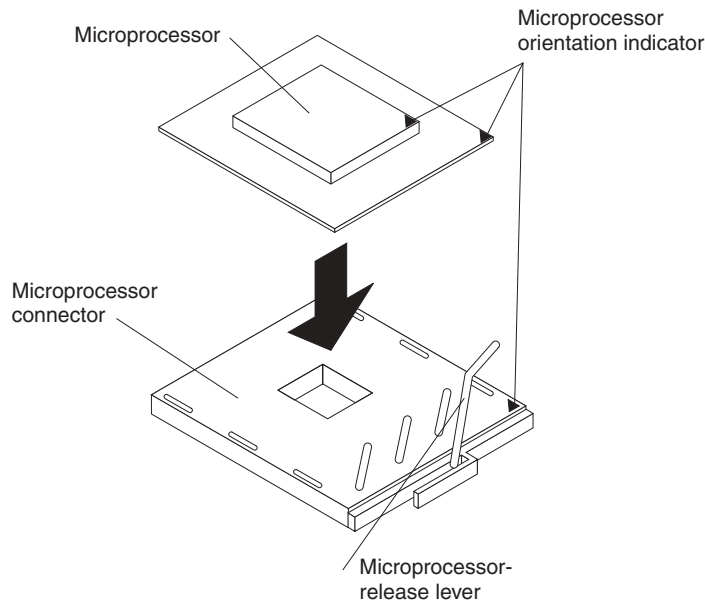
4. If you are installing a microprocessor in the microprocessor 2 socket, *first* install a VRM in the microprocessor 2 VRM slot (J42) and remove the protective cover from the microprocessor 2 socket; then, lift the microprocessor-release lever to the open position.



Note: The microprocessor-release lever is on the side of the socket that faces the rear of the server.

5. Install the microprocessor:
 - a. Touch the static-protective package containing the new microprocessor to any *unpainted* metal surface on the server; then, remove the microprocessor from the package.
 - b. Position the microprocessor over the microprocessor socket as shown in the following illustration. Carefully press the microprocessor into the socket.

Attention: To avoid bending the pins on the microprocessor, do not use excessive force when pressing it into the socket.



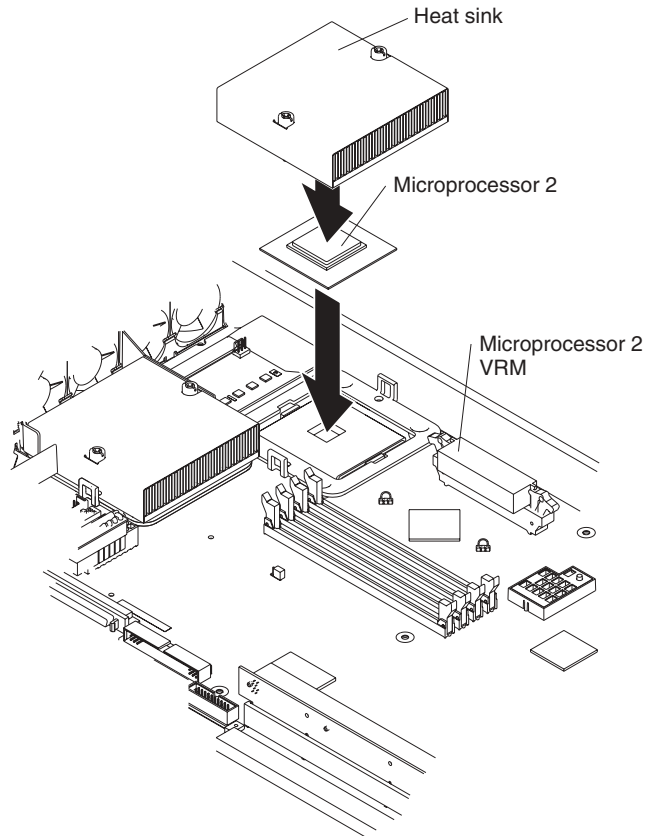
Note: The microprocessor-release lever is on the side of the socket that faces the rear of the server.

6. Close the microprocessor release lever to secure the microprocessor.

Attention:

- Do not disturb or contaminate the thermal material on the bottom of the new heat sink. Doing so damages its heat-conducting capability and exposes the new microprocessor to overheating.
 - If you need to remove the heat sink after installing it, note that the thermal material may 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. Loosening one captive screw fully before loosening the other captive screw helps break the bond between the components without damaging them.
7. Remove the heat sink from its package and remove the cover from the bottom of the heat sink. Ensure that the thermal material is still on the bottom of the heat sink and position the heat sink on top of the microprocessor. Press firmly on the captive screws and tighten them, alternating between screws until they

are tight. Do not overtighten the screws by using excessive force.



8. If you have other options to install, install them now. Otherwise, continue with “Completing the installation” on page 27.

Replacing the battery

When replacing the battery you must replace it with a lithium battery of the same type, from the same manufacturer. To avoid possible danger read and follow the safety statement below.

To order replacement batteries, call 1-800-772-2227 within the United States, and 1-800-465-7999 or 1-800-465-6666 within Canada. Outside the U.S. and Canada, call your IBM reseller or IBM marketing representative.

Note: After you replace the battery, you must reconfigure your server and reset the system date and time.

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.

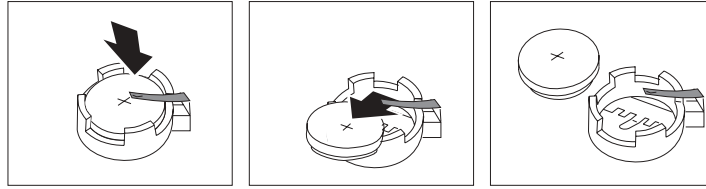
Do not:

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

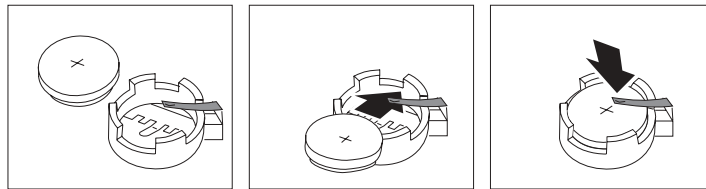
Dispose of the battery as required by local ordinances or regulations.

Complete the following steps to replace the battery:

1. Review the safety information beginning on page v, and follow any special handling and installation instructions supplied with the replacement battery.
2. Turn off the server and all attached peripheral devices. Disconnect all power cords; then, disconnect all external signal cables from the server.
3. Remove the server from the rack; then, remove the server cover (see “Removing the cover and bezel” on page 12).
4. Remove the battery:
 - a. Use one finger to lift the battery clip over the battery.
 - b. Use one finger to slightly slide the battery out from its socket. The spring mechanism will push the battery out toward you as you slide it from the socket.
 - c. Use your thumb and index finger to pull the battery from under the battery clip.
 - d. Ensure that the battery clip is touching the base of the battery socket by pressing gently on the clip.



5. Insert the new battery:
 - a. Tilt the battery so that you can insert it into the socket, under the battery clip.
 - b. As you slide it under the battery clip, press the battery down into the socket.



6. Reinstall the server cover, and connect the cables.
7. Turn on the server.
8. Start the Configuration/Setup Utility program and set configuration parameters.
 - Set the system date and time.
 - Set the power-on password.
 - Reconfigure the server.

See the section about using the Configuration/Setup Utility program in the *User's Guide* for details.

Replacing a fan assembly

The server comes with five replaceable fans.

Attention: If a fan fails, replace it within 48 hours to help ensure adequate cooling.

Complete the following steps to replace the fan assembly. Use this procedure to replace any fan in the server.

Note:

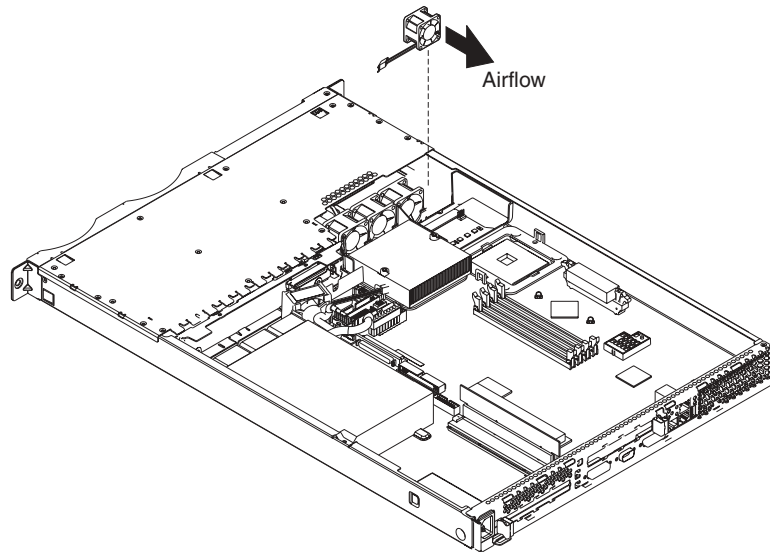
1. Review the safety information beginning on page v, and “Installation guidelines” on page 11.
2. Turn off the server and all attached peripheral devices. Disconnect all power cords; then, disconnect all external signal cables from the server.
3. Remove the server from the rack; then, remove the server cover (see “Removing the cover and bezel” on page 12).

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 11.

4. Determine which fan to replace by checking the LED at each fan; a lit LED indicates the fan to replace.

Note: The fan LEDs are lit by the Light Path Diagnostics™ circuitry. For more information about the LEDs and the Light Path Diagnostics circuitry, see the section about Light Path Diagnostics in the *Hardware Maintenance Manual and Troubleshooting Guide*.

5. Remove the fan from the server:
 - a. Disconnect the fan cable from the system board.
 - b. Lift the fan out of the server.



6. Position the replacement fan so that the airflow arrow on the side of the fan is facing or pointing toward the rear of the server.

Note: Correct airflow is from the front to the rear of the server.

7. Position the replacement fan in the location from which you removed the failed fan.
8. Connect the replacement fan cable to the system board.
9. Continue with "Completing the installation".

Completing the installation

This section describes how to complete the installation.

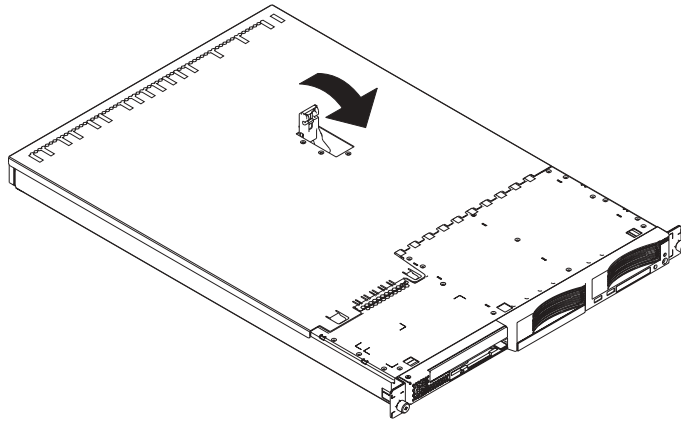
Installing the cover and bezel

Complete the following steps to install the server cover and bezel:

1. Position the internal cables so they do not interfere with the cover installation.

Attention: Before sliding the cover forward, make sure that all the tabs on both the front and rear 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. Press down on the cover latch. The cover slides forward into position. Ensure that the cover

engages the tabs at the front and rear of the server.



3. If you removed the bezel, position the bezel directly in front of the server and press it into place so that the retention tabs snap into the holes on the top, right side, and bottom of the server.
4. If you removed the USB option tray, insert it fully into the slot below hard disk drive bay 1.
5. Install the server in the rack and connect all external cables; then, connect the power cord. See the *Rack Installation Instructions* that come with the server.
To attach peripheral devices, connect the server to other servers, and connect the power cord, continue with “Cabling the server”.

Note: Depending on the options that you installed, you might need to run the Configuration/Setup Utility program to update the server configuration. See the following section and the *User's Guide* for more information.

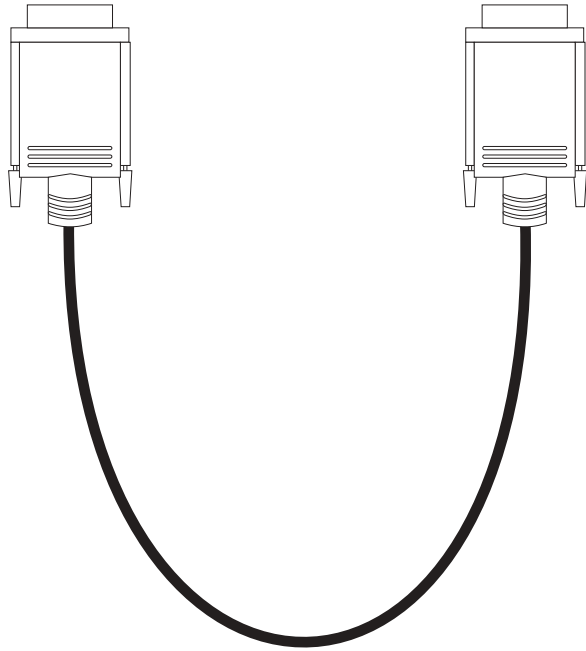
Cabling the server

To share one monitor, keyboard, and pointing device (such as a mouse) among multiple servers, connect the servers using Cable Chain Technology (C2T). In addition, you can create an Advanced System Management (ASM) interconnect network of connected servers by installing one or more Remote Supervisor Adapters.

The following sections describe how to cable a C2T chain and an ASM interconnect network.

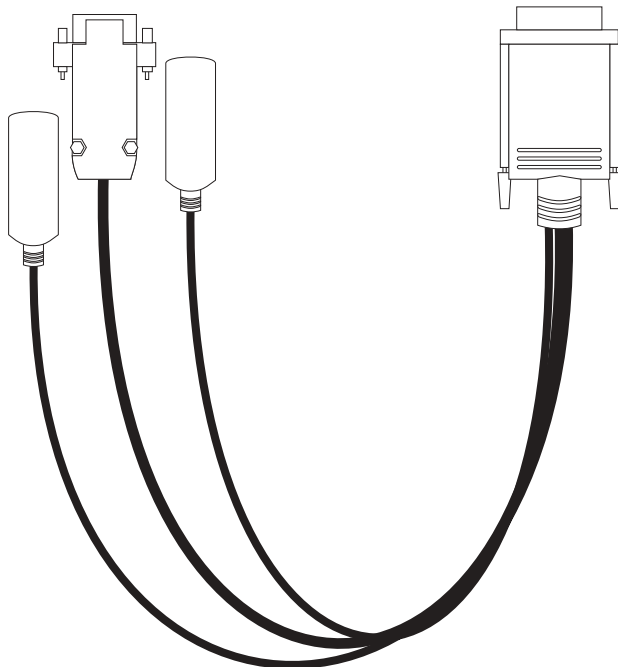
Cabling a C2T chain

Use C2T interconnect cables to connect the servers into a chain. The following illustration shows a C2T interconnect cable.



Use a C2T breakout cable (available in the C2T cable option kit) to connect the first server in the chain to the monitor, keyboard, and pointing device. The following illustration shows a C2T breakout cable.

Note: You can connect a USB keyboard to the server using one of the USB ports. After installing a USB keyboard, you might need to use the Configuration/Setup Utility program to enable keyboardless operation and prevent POST error message 301 from being displayed during startup. For detailed information about this option and how to connect it to your server, see the documentation that comes with the option.



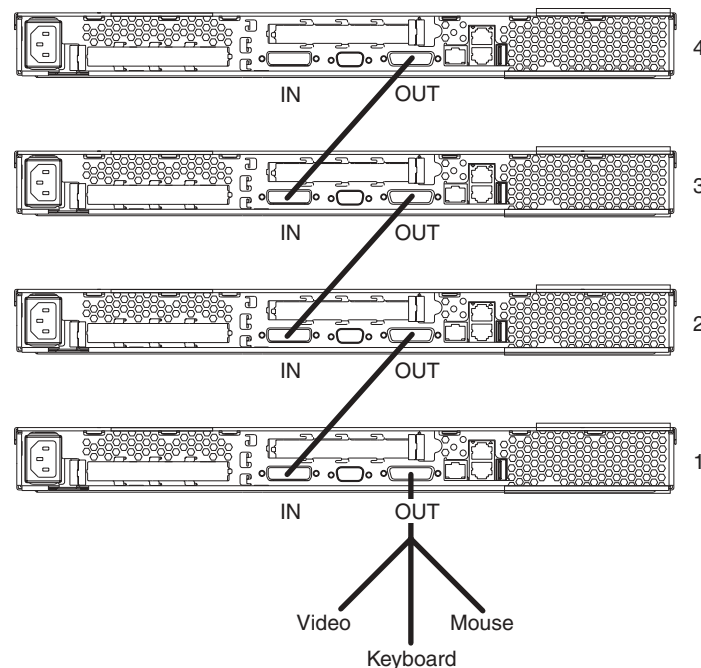
Before cabling the C2T chain, review the following information:

- You can connect a maximum of 42 servers in a C2T chain.
- When connecting servers that are more than 3 U apart or on different racks, you must use a 2-m (6.5-ft) C2T interconnect cable, which comes in the C2T cable option kit. You can use only one 2-m (6.5-ft) cable in a chain.
- C2T interconnect cables are hot-swappable.
- Servers are numbered by their positions in the chain (1 through n). If one server is removed from the chain, the remaining servers are renumbered. For example, if the 12th server is removed from a chain of 15 servers, servers 13 through 15 are renumbered to 12 through 14.
- C2T numbering is independent of other server references. For example, changing the position of a server in the C2T chain does not affect its IP address.
- C2T chaining supports a maximum video mode of 1024 x 768.

Complete the following steps to cable a C2T chain:

1. Turn off the servers.
2. Obtain a sufficient number of C2T interconnect cables. The server comes with one C2T interconnect cable that can span approximately 3 U. A 2-m (6.5-ft) C2T interconnect cable and a C2T breakout cable come in the C2T cable option kit.

The following illustration shows a C2T chain of four servers.



Attention: Do not allow the pins of the C2T cable connectors to touch the server chassis.

3. Connect a C2T interconnect cable from the C2T (IN) connector on the first server in the chain (server 1 in the illustration, typically the bottom server in the rack) to the C2T (OUT) connector on the second server in the chain (server 2 in the illustration). The connectors on the ends of the cable are different and have different colors (black for OUT and white for IN) to prevent you from connecting them to the wrong connectors on the servers. Repeat this step until all the servers in the chain are connected. You can connect up to 42 servers in this manner.

4. Connect a C2T breakout cable to the C2T (OUT) connector on the first server in the chain (server 1 in the illustration).
5. Connect the monitor, keyboard, and pointing device to the connectors on the C2T breakout cable. The keyboard and pointing-device connectors on the cable have icons to help you identify them.
6. Turn on the servers and test the chain, using the procedure in the following section.

When you add, remove, or replace servers or change cables in the chain, it is possible for the select LED on more than one server to be lit. Press the select button on any server in the chain to turn off the select LEDs on all but the selected server.

If you are using a flat-panel monitor, you might need to adjust the image lock on the monitor. Press the select button on one of the middle servers in the chain; then, adjust the image lock on the monitor. For more information about adjusting the image lock, see the documentation that comes with your monitor.

Testing the C2T chain

After cabling the C2T chain, test the monitor, keyboard, and pointing device to ensure that they work with each server in the chain. Complete the following steps to test the chain:

1. With the servers and the monitor turned on, press the select button on server 1 in the chain.
2. Verify that the monitor is working properly.
3. Use the pointing device (mouse) to start an application.
4. Test the keyboard by typing a few words within an application.
5. Repeat steps 1 through 4 for each server in the chain.

If any of the devices do not work with any of the servers, verify that all the cables are correctly and fully connected; then, test the chain again. If the problem remains, turn off all the servers and disconnect all the C2T interconnect cables; leave the C2T breakout cable connected. Turn on server 1 and retry the devices. If the devices work, one of the C2T interconnect cables is probably defective. Connect server 2 to the chain and test the devices again. Continue adding servers to the chain and testing them, one at a time, until you identify the defective cable.

Using the C2T chain

To select the server for which you want the monitor, keyboard, and pointing device to work, press the select button on the server, or you can select the server by using the keyboard:

1. Press Num Lock on the keyboard twice. The monitor screen goes blank.
2. Type the number of the server in the chain and press Enter. The monitor now displays the image for the selected server, and the select LED on the selected server is lit.

After you have used the keyboard to specify a server number, you can use the same method (pressing Num Lock twice, then pressing + or -) to select other servers in sequence.

Note: You cannot use the + and - keys to select a server if you made the previous selection by pressing the select button on the selected server; you must have made the previous selection through the keyboard.

If you turn off the selected server, the monitor screen goes blank, and you must select another server. No more than two adjacent servers in the chain can be disconnected from their power source for the chain to work properly.

Cabling an ASM interconnect network

An Advanced System Management (ASM) bus is integrated into the C2T interconnect cables, so by adding one or more Remote Supervisor Adapters to a C2T chain of servers, you can create an Advanced System Management (ASM) interconnect network. For information about using a Remote Supervisor Adapter for remote server management, see the documentation that comes with the adapter.

Before cabling the ASM interconnect network, review the following information:

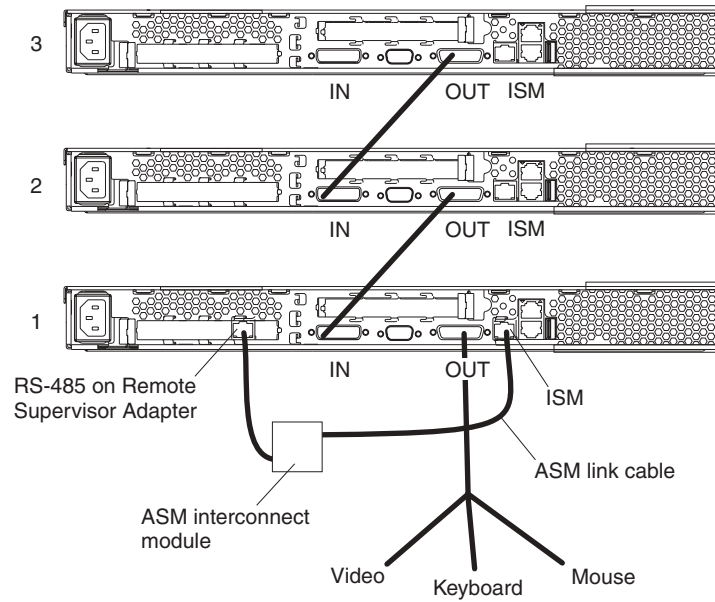
- The cables in an ASM interconnect network are hot-swappable.
- Make sure that the firmware for the Remote Supervisor Adapter, ASM processor, and integrated system management processor (ISMP) are at the latest level.
- The servers in an ASM interconnect network are referred to by their assigned addresses, not by their positions in the rack.

An ASM interconnect network can have up to 24 RS-485 connections, depending on the configuration. The connections can include Remote Supervisor Adapters, ASM processors, ASM PCI adapters, and ISMPs. Use the following information to determine the number of servers and connections that you can have on your ASM interconnect network:

- Each Remote Supervisor Adapter, ASM processor, ASM PCI adapter, and ISMP in a server that is connected to the network uses one connection. For example, if a server that is connected to the network has a Remote Supervisor Adapter and an integrated ASM processor, the server uses two connections on the network.
- The network must include at least one server with a Remote Supervisor Adapter (either installed as an option or preinstalled in the server).

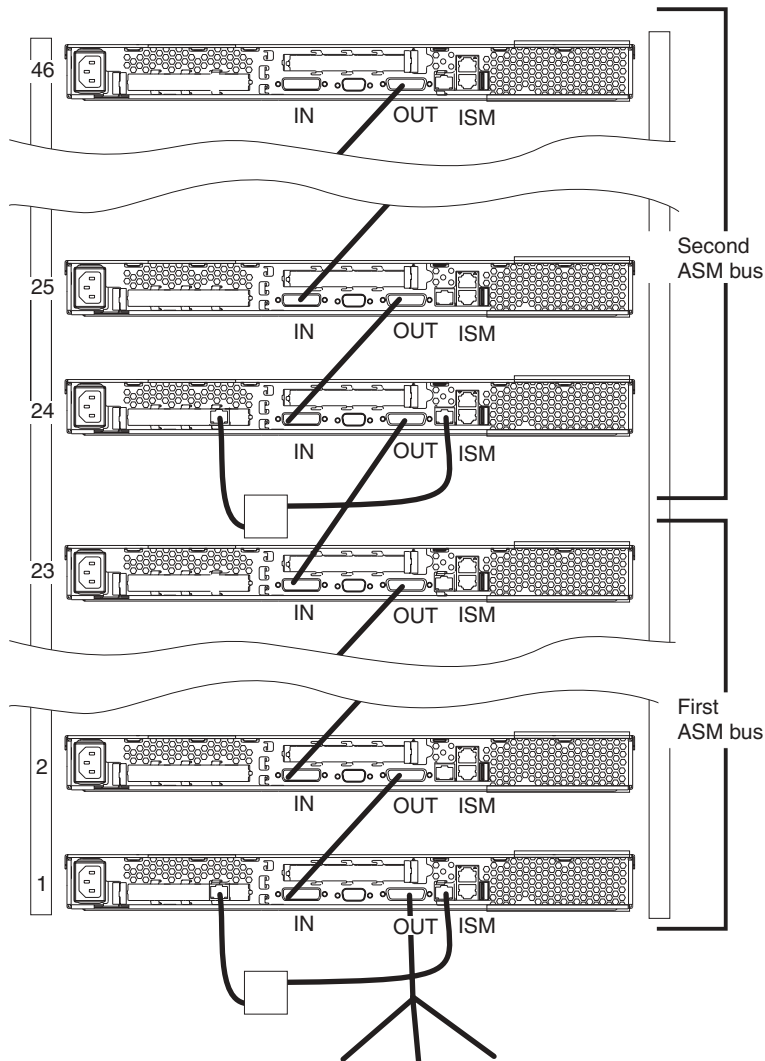
You can connect up to 23 xSeries 335 servers into an ASM interconnect network using one Remote Supervisor Adapter. However, if you use both xSeries 335 and xSeries 330 servers in the network, the xSeries 330 servers must be the lowest-numbered servers in the chain. The following illustration shows an ASM

interconnect network with three servers.



You can add up to 23 more servers to the network by installing a Remote Supervisor adapter in the 24th server, creating a second ASM bus. The following

illustration shows an ASM interconnect network with 46 servers.



Complete the following steps to cable an ASM interconnect network:

1. Follow the instructions for cabling a C2T chain.
2. Connect an ASM interconnect module (which comes with the Remote Supervisor Adapter) to the RS-485 connector on the Remote Supervisor Adapter in the first server. If the network contains more than 23 servers, do the same on the 24th server.
3. Connect an ASM link cable (which comes with the Remote Supervisor Adapter) from the ASM interconnect module to the ISM connector in the first server. Insert a terminator into the second connector on the ASM interconnect module. If the network contains more than 23 servers, do the same on the 24th server.

Updating the server configuration

When you start the server for the first time after you add or remove an internal option or an external SCSI device, you might see a message telling you that the configuration has changed. The Configuration/Setup Utility program automatically starts so that you can save the new configuration information. See the section about configuring the server in the *User's Guide* for more information.

Some options have device drivers that you need to install. See the documentation that comes with the option for information about installing any required device drivers.

The server comes with at least one microprocessor installed on the system board. If you have installed an additional microprocessor, the server can now operate as an SMP server. Therefore, you might need to upgrade the operating system to support SMP. See the section about using the ServerGuide™ CD in the *User's Guide* and the operating-system documentation for additional information.

If the server has an optional RAID adapter installed and you have just 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 just installed a Remote Supervisor Adapter to manage the server from a remote location, see the section about setting up the adapter in the *IBM xSeries 335 Type 8676 User's Guide* and in the *Remote Supervisor Adapter User's Guide* for information about setting up and configuring the adapter and using the adapter to manage the server remotely. The *IBM xSeries 335 Type 8676 User's Guide* is on the *IBM xSeries Documentation CD*. The *Remote Supervisor Adapter User's Guide* comes with the adapter.

To configure the integrated Gigabit Ethernet controllers, see the section about configuring the Gigabit Ethernet controllers in the *User's Guide*.

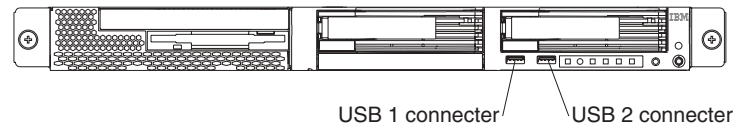
Chapter 3. I/O connectors

Connect optional external devices to the connectors on the front and rear of the server.

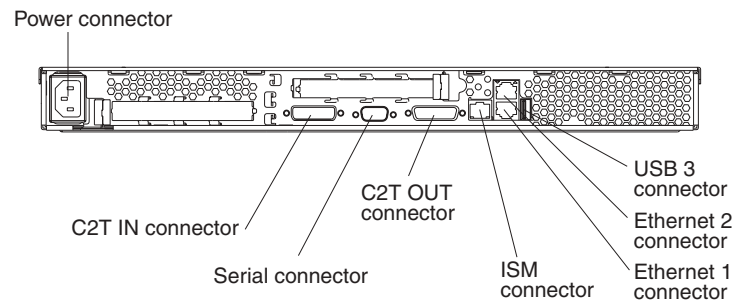
Your server has the following input/output (I/O) connectors:

- Serial (1, rear)
- Universal Serial Bus (USB) (2 front, 1 rear)
- ISM (1, rear)
- Cable Chaining Technology (C2T) (2, rear)
- Ethernet (2, rear)
- Keyboard (1, on C2T breakout cable)
- Auxiliary-device (pointing-device) (1, on C2T breakout cable)
- Video (1, on C2T breakout cable)

The following illustration shows the locations of the connectors on the front panel.



The following illustration shows the locations of the connectors on the rear panel.



The following sections describe these connectors.

If you have an optional Remote Supervisor Adapter (system-management adapter) installed in PCI-X slot 1, the adapter has an Ethernet connector, a serial connector, and an Advanced System Management (ASM) Interconnect connector. See the documentation that comes with the Remote Supervisor Adapter for more information about the ASM Interconnect network.

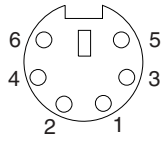
C2T connectors

Use the C2T (IN) and C2T (OUT) connectors to connect the server to other servers in an ASM interconnect network or C2T chain. See “Cabling the server” on page 28 for information about ASM interconnect networks and C2T chaining.

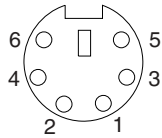
C2T breakout cable connectors

These connectors are on the C2T breakout cable, which you use to connect a monitor, keyboard, and pointing device to a server in a C2T chain. See “Cabling the server” on page 28 for information about C2T chaining.

Auxiliary-device (pointing-device) connector: Use this connector to connect a mouse or other pointing device. This connector has a mouse icon to help you identify it. The following illustration shows an auxiliary-device connector.

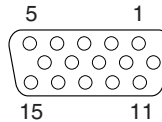


Keyboard connector: Use this connector to connect a PS/2 (non-USB) keyboard to the server. The connector has a keyboard icon to help you identify it. The following illustration shows a keyboard connector.



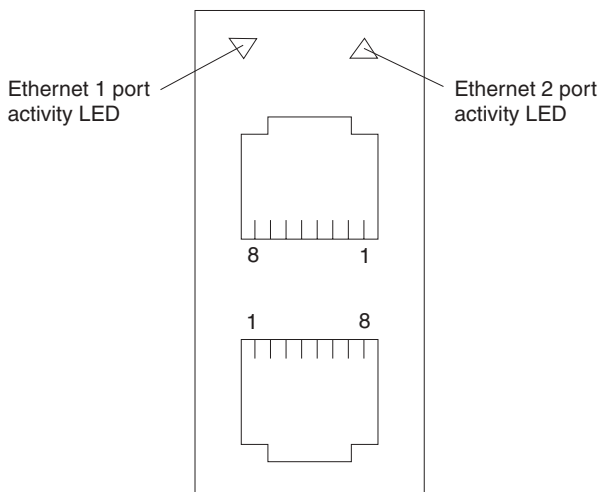
If you attach a keyboard to this connector, USB ports and devices are disabled during POST.

Video connector: Use this connector to connect a monitor to the server. The connector is dark blue to help you identify it. The following illustration shows a video connector.



Ethernet connector

The following illustration shows the dual Ethernet connector.

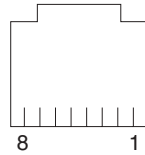


Connect a Category 3, 4, or 5 unshielded twisted-pair cable to this connector. The 100BASE-TX and 1000BASE-T Fast Ethernet standards require Category 5 or higher cabling.

For more information about the Ethernet controller, see the *User's Guide*.

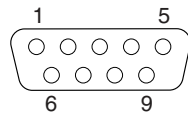
Integrated system management connector

Use this connector to connect an optional Remote Supervisor Adapter. See “Cabling the server” on page 28 for information about using a Remote Supervisor Adapter to manage servers on an ASM interconnect network. The following illustration shows an integrated system management connector.



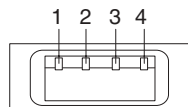
Serial connector

Use a serial connector to connect a serial device. The following illustration shows a serial connector.



Universal Serial Bus connectors

Use a Universal Serial Bus (USB) connector to connect a USB device. USB technology transfers data at up to 12 Mb per second (Mbps) with a maximum of 127 devices and a maximum signal distance of 5 meters (16 ft) per segment. Using Plug and Play technology, USB devices are configured automatically. The following illustration shows a USB connector.



Use a 4-pin cable to connect a device to a USB connector. If you need to connect more USB devices than the server has USB connectors for, use a USB hub to connect additional devices.

If you connect a PS/2 (non-USB) keyboard to the keyboard connector, USB ports and devices are disabled during POST.

If you connect a USB keyboard that has a mouse port, the keyboard emulates a mouse, and you cannot disable the mouse settings in the Configuration/Setup Utility program.

Appendix. Notices

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e-business logo	Tivoli Enterprise
@server	Update Connector
FlashCopy	Wake on LAN
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Processor speeds indicate the internal clock speed of the microprocessor; other factors also affect application performance.

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

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

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

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

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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. For country-specific instructions, refer to the following Web site:
<http://www.ibm.com/ibm/environment/products/prp.shtml>.

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, 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.

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

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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, Maceo, Maldives, Namibia, Nepal, Pakistan, Samoa, South Africa, Sri Lanka, Swaziland, Uganda
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

IBM power cord part number	Used in these countries and regions
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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