



## Installation and User Guide



ThinkThink**ThinkServer**Think

**ThinkServer TS200v**

**Machine Types:** 0981, 0992, 1008, and 1010



ThinkServer TS200v Types 0981, 0992, 1008, and 1010



# Installation and User Guide

**Note**

Before using this information and the product it supports, be sure to read and understand the *Safety Information* book and "Notices," on page 67.

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## Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الأمنية

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

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

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

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

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

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

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

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

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

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

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

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

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

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

Перед установкой продукта прочтите инструкции по технике безопасности.

Pred inštaláciou tohto zariadenia si pečítajte Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

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

Läs säkerhetsinformationen innan du installerar den här produkten.

**Important:**

Each caution and danger statement in this document is labeled with a number. This number is used to cross reference an English-language caution or danger statement with translated versions of the caution or danger statement in the *Safety Information* book.

For example, if a caution statement is labeled "Statement 1," translations for that caution statement are in the *Safety Information* book under "Statement 1."

Be sure to read all caution and danger statements in this document before you perform the procedures. 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 the battery recommended by the manufacturer. If your system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of.

*Do not:*

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

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

Statement 3:



**CAUTION:**

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

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



**DANGER**

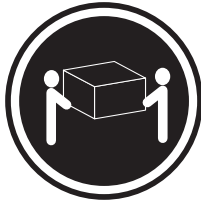
Some laser products contain an embedded Class 3A or Class 3B laser diode. Note the following.

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



Class 1 Laser Product  
Laser Klasse 1  
Laser Klass 1  
Luokan 1 Laserlaite  
Appareil À Laser de Classe 1

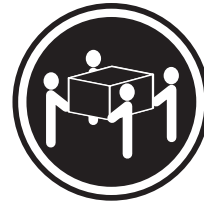
**Statement 4:**



≥ 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 9:



**CAUTION:**

To avoid personal injury, disconnect the hot-swap fan cables before removing the fan from the device.

Statement 11:



**CAUTION:**

The following label indicates sharp edges, corners, or joints nearby.



Statement 12:



**CAUTION:**

The following label indicates a hot surface nearby.



Statement 13:



**DANGER**

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

Statement 15:



**CAUTION:**

Make sure that the rack is secured properly to avoid tipping when the server unit is extended.

Statement 17:



**CAUTION:**

The following label indicates moving parts nearby.



Statement 26:



**CAUTION:**

Do not place any object on top of rack-mounted devices.



Statement 27:



**CAUTION:**

Hazardous moving parts are nearby.



Statement 28:



**CAUTION:**

The battery is a lithium ion battery. To avoid possible explosion, do not burn the battery. Exchange it only with the Lenovo-approved part. Recycle or discard the battery as instructed by local regulations.

**Attention:** This product is suitable for use on an IT power distribution system whose maximum phase to phase voltage is 240 V under any distribution fault condition.





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## Chapter 1. Introduction

This *Installation and User Guide* is intended to be used with your Lenovo® ThinkServer™ TS200v (Machine Types 0981, 0992, 1008, and 1010) server. This document contains information about:

- Setting up and cabling the server
- Starting and configuring the server
- Installing options and replacing customer replaceable units (CRUs)
- Troubleshooting and diagnostics

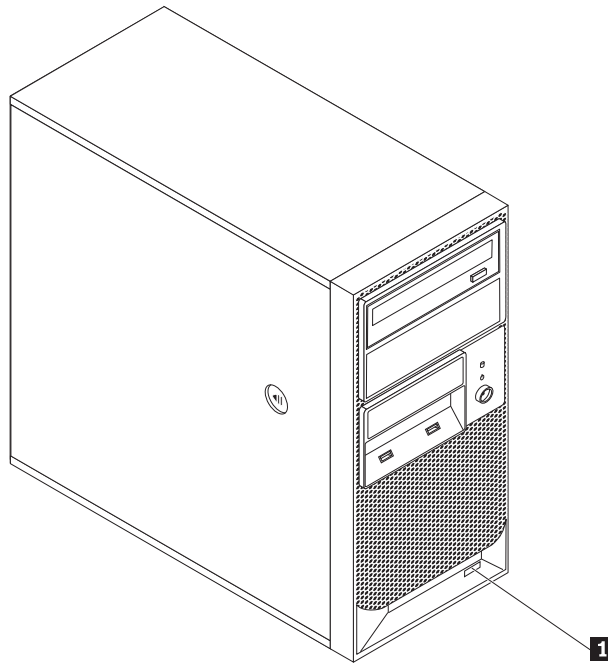
The server comes with the *ThinkServer EasyStartup* DVD to help you configure the hardware, install device drivers, and install the operating system.

The server comes with a limited warranty. For information about the terms of the warranty and getting service and assistance, see the *Warranty and Support Information* document on the *ThinkServer Documentation* DVD that comes with the server. To obtain up-to-date information about the server and other Lenovo products, go to: <http://www.lenovo.com/thinkserver>

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

<b>Product name</b>	ThinkServer TS200v
<b>Machine type</b>	0981, 0992, 1008, and 1010
<b>Model number</b>	_____
<b>Serial number</b>	_____

The model number and serial number are on a label on the front bezel, as shown in the following illustration:



**1** Model number and serial number

For a list of supported optional devices for the server, go to <http://www.lenovo.com/thinkserver> and click the **Options** tab.

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## Notices and statements in this document

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

The following notices and statements are used in this document:

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

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## Related documentation

The Lenovo *ThinkServer Documentation* DVD contains documentation for the server in Portable Document Format (PDF). The Lenovo *ThinkServer Documentation* DVD requires the Adobe® Reader 5.0 (or later) or xpdf, which comes with Linux® operating systems.

The following table describes the content and location of documentation that is provided with your server.

Document	Description	Location
Read Me First	This document directs you to the <i>ThinkServer Documentation</i> DVD for complete warranty and support information.	Printed, provided in server packaging
Important Notices	This document includes safety and legal notices that you are expected to read before using the server.	Printed, provided in server packaging
Hardware Maintenance Manual	This document provides diagnostic information, parts listing, and replacement procedures for all field replaceable units (FRUs, parts that can only be replaced by trained service personnel) as well as all customer replaceable units (CRUs).	Lenovo Support Web site: <a href="http://www.lenovo.com/support">http://www.lenovo.com/support</a>
Warranty and Support Information	This document includes the warranty statement and information about how to contact Lenovo Support.	Available on the <i>ThinkServer Documentation</i> DVD
Safety Information	This document includes translations of all of the safety statements used in the ThinkServer documentation.	Available on the <i>ThinkServer Documentation</i> DVD



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## Chapter 2. Server setup roadmap

The installation process varies depending on the configuration of the server when it was delivered. In some cases, the server is fully configured and just needs to be connected to power and the network and started. In other cases, the server needs to have hardware features installed, requires hardware and firmware configuration, and requires the operating system to be installed.

*Table 1. Server setup roadmap*

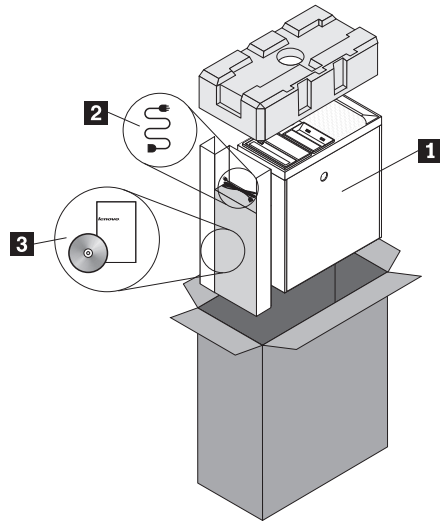
Task	Where to find information
Unpack	Chapter 3, "What is included with your server," on page 7
Install hardware features	Chapter 5, "Installing or replacing customer replaceable units," on page 17
Connect Ethernet cable and power cords to network and power connectors	"Rear view" on page 12
Review Unified Extensible Firmware Interface (UEFI) settings and customize as needed	"Using the Setup Utility program" on page 49
Configure RAID	"Configuring RAID" on page 52
Check for firmware updates	Go to <a href="http://www.lenovo.com/support">http://www.lenovo.com/support</a> and go to the <b>Downloads and Drivers</b> section for this product.
Install operating system and basic drivers	"Using the ThinkServer EasyStartup program" on page 56
Install any additional drivers needed for added features	Refer to the instructions that came with the hardware option.
Configure Ethernet settings in operating system	See the operating system help. This step is not required if the operating system was installed using the ThinkServer EasyStartup program.
Install remote management applications	"Installing ThinkServer EasyManage Agent" on page 58
Install applications	Refer to the documentation that accompanies the applications that you want to install.



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## Chapter 3. What is included with your server

The TS200v server package includes the server, a power cord, the *ThinkServer Documentation DVD*, and software media.



- 1** Server
- 2** Power cord
- 3** Documentation and software media

## 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 2. Features and specifications*

<p><b>Microprocessor</b> Your server comes with one of the following microprocessors (internal cache size varies by model type):</p> <ul style="list-style-type: none"> <li>• Intel® Celeron® microprocessor</li> <li>• Intel Core™ i3 microprocessor</li> <li>• Intel Core i5 microprocessor</li> <li>• Intel Pentium® microprocessor</li> </ul> <p><b>Notes:</b></p> <ul style="list-style-type: none"> <li>• Use the Setup Utility program to determine the type and speed of the microprocessor.</li> <li>• For a list of supported microprocessors, see <a href="http://www.lenovo.com/thinkserver">http://www.lenovo.com/thinkserver</a> and click the <b>Options</b> tab.</li> </ul> <p><b>Memory</b></p> <ul style="list-style-type: none"> <li>• Supports up to four DDR3 ECC UDIMMs (double data rate 3 error correction code unbuffered dual inline memory modules)</li> </ul> <p><b>Internal drives</b></p> <ul style="list-style-type: none"> <li>• Serial Advanced Technology Attachment (SATA) hard disk drive</li> <li>• SATA optical drive</li> </ul> <p><b>Video subsystem</b></p> <ul style="list-style-type: none"> <li>• Integrated graphics for a Video Graphics Array (VGA) connector and a DisplayPort connector</li> </ul> <p><b>Connectivity</b></p> <ul style="list-style-type: none"> <li>• 10/100/1000 Mbps integrated Ethernet controller</li> </ul> <p><b>Power supply</b></p> <ul style="list-style-type: none"> <li>• 280-watt auto-sensing power supply</li> </ul>	<p><b>Expansion</b></p> <ul style="list-style-type: none"> <li>• Two hard disk drive bays (one standard and one optional)</li> <li>• Two optical drive bays</li> <li>• Two PCI card slots</li> <li>• One PCI Express x1 card slot</li> <li>• One PCI Express x16 card slot</li> </ul> <p><b>System management features</b></p> <ul style="list-style-type: none"> <li>• Ability to store power-on self-test (POST) hardware test results</li> <li>• Automatic power-on startup</li> <li>• Intel Active Management Technology (AMT)</li> <li>• Intel Hyper-Threading technology (some models)</li> <li>• Intel Rapid Storage Technology (RST)</li> <li>• Preboot Execution Environment (PXE)</li> <li>• System Management (SM) UEFI and SM software</li> <li>• Wake on LAN</li> <li>• Wake on Ring (in the Setup Utility program, this feature is called Serial Port Ring Detect for an external modem)</li> </ul> <p><b>Input/Output (I/O) features</b></p> <ul style="list-style-type: none"> <li>• Eight Universal Serial Bus (USB) connectors (two on the front panel and six on the rear panel)</li> <li>• One 9-pin serial port</li> <li>• One Ethernet connector</li> <li>• One DisplayPort connector</li> <li>• One VGA monitor connector</li> <li>• Three audio connectors on the rear panel (audio line-in connector, audio line-out connector, and microphone connector)</li> </ul>	<p><b>Security features</b></p> <ul style="list-style-type: none"> <li>• Computrace</li> <li>• Enabling or disabling a device</li> <li>• Enabling or disabling USB connectors individually</li> <li>• Hard disk drive password</li> <li>• Power-On Password (POP) and Administrator Password for UEFI access</li> <li>• Startup sequence control</li> <li>• Startup without keyboard or mouse</li> <li>• Support for an integrated cable lock (Kensington lock)</li> <li>• Support for a padlock</li> <li>• Trusted Platform Module (TPM)</li> </ul> <p><b>Preinstalled operating system</b> Some models are preinstalled with one of the following operating systems:</p> <ul style="list-style-type: none"> <li>• Microsoft® Windows Server® 2008 R2 Foundation</li> <li>• Microsoft Windows Server 2008 R2 Standard</li> <li>• Windows® Small Business Server 2008 Standard (Service Pack 2)</li> </ul> <p><b>Operating system(s), supported</b></p> <ul style="list-style-type: none"> <li>• Microsoft Windows Server 2008 R2 Enterprise</li> </ul>
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*Table 2. Features and specifications (continued)*

<b>Dimensions</b> Width: 174.8 mm (6.88 inches) Height: 377.3 mm (14.85 inches) Depth: 406.7 mm (16.01 inches) <b>Weight</b> Maximum configuration: 11.2 kg (24.7 lbs) <b>Environment</b> Air temperature: Operating: 10° to 35°C (50° to 95°F) Non-operating: -40° to 60°C (-40° to 140°F) (with package) Non-operating: -10° to 60°C (14° to 140°F) (without package)	<b>Humidity:</b> Operating: 8% to 80% (non-condensing) Non-operating: 8% to 80% (non-condensing) <b>Altitude:</b> Operating: 0 to 10 000 ft (0 to 3 048 m) Non-operating: 0 to 35 000 ft (0 to 10 668 m)	<b>Electrical input</b> Input voltage low range: Minimum: 100 V ac Maximum: 127 V ac Input frequency range: 50 to 60 Hz Voltage-selection switch setting: 115 V ac Input voltage high range: Minimum: 200 V ac Maximum: 240 V ac Input frequency range: 50 to 60 Hz Voltage-selection switch setting: 230 V ac
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## Software

Lenovo provides software to help get your server up and running.

### EasyStartup

The ThinkServer EasyStartup program simplifies the process of installing supported Microsoft Windows operating systems and device drivers on your server. The EasyStartup program is provided with your server on DVD. The DVD is self starting (bootable). The User Guide for the EasyStartup program is on the DVD and can be accessed directly from the program interface. For additional information, see “Using the ThinkServer EasyStartup program” on page 56.

### EasyManage

The ThinkServer EasyManage Agent enables other clients on the network to be managed by the centralized console. The ThinkServer EasyManage Agent is supported on 32-bit and 64-bit Windows, Red Hat, and SUSE operating systems.



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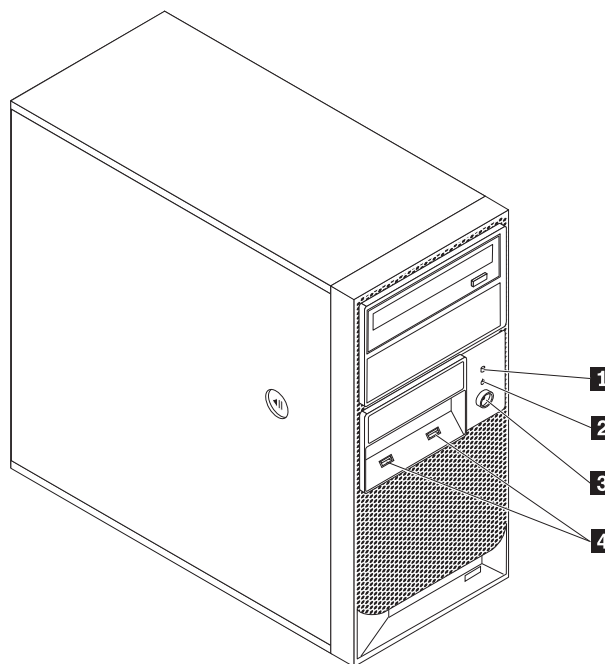
## Chapter 4. Server controls and connectors

This chapter provides information about the server controls and connectors.

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### Front view

Figure 1 shows the locations of the controls and connectors on the front of your server.

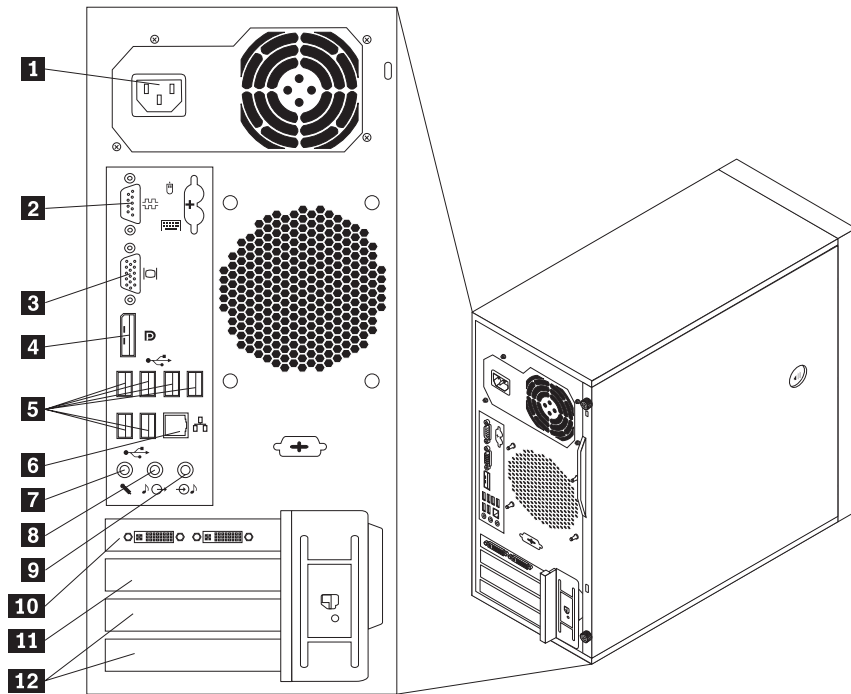


*Figure 1. Front control and connector locations*

- |                                       |                             |
|---------------------------------------|-----------------------------|
| <b>1</b> Hard disk drive activity LED | <b>3</b> Power switch       |
| <b>2</b> Power-on LED                 | <b>4</b> USB connectors (2) |

## Rear view

Figure 2 shows the locations of the connectors on the rear of your server. Some connectors on the rear of your server are color-coded to help you determine where to connect the cables in your server.



*Figure 2. Rear connector locations*

- |                                |                                     |
|--------------------------------|-------------------------------------|
| <b>1</b> Power cord connector  | <b>7</b> Microphone connector       |
| <b>2</b> Serial port           | <b>8</b> Audio line-out connector   |
| <b>3</b> VGA monitor connector | <b>9</b> Audio line-in connector    |
| <b>4</b> DisplayPort connector | <b>10</b> PCI Express x16 card slot |
| <b>5</b> USB connectors (6)    | <b>11</b> PCI Express x1 card slot  |
| <b>6</b> Ethernet connector    | <b>12</b> PCI card slots (2)        |

Connector	Description
Audio line-in connector	Used to receive audio signals from an external audio device, such as a stereo system. When you attach an external audio device, a cable connects the audio line-out connector of the device to the audio line-in connector of the server.
Audio line-out connector	Used to send audio signals from the server to external devices, such as powered stereo speakers (speakers with built-in amplifiers), headphones, multimedia keyboards, or the audio line-in connector on a stereo system or other external recording device.
DisplayPort connector	Used to attach a high-performance monitor, a direct-drive monitor, or other devices that use a DisplayPort connector.
Ethernet connector	Used to attach an Ethernet cable for a local area network (LAN). <b>Note:</b> To operate the server within FCC Class B limits, use a Category 5 Ethernet cable.
Microphone connector	Used to attach a microphone to your server when you want to record sound or if you use speech-recognition software.
Serial port	Used to attach an external modem, a serial printer, or other devices that use a 9-pin serial port.
USB connector	Used to attach a device that requires a USB connector, such as a USB keyboard, a USB mouse, a USB scanner, or a USB printer. If you have more than eight USB devices, you can purchase a USB hub, which you can use to connect additional USB devices.
VGA monitor connector	Used to attach a VGA monitor or other devices that use a VGA monitor connector.

## System-board internal connectors

Figure 3 shows the locations of the parts and connectors on the system board.

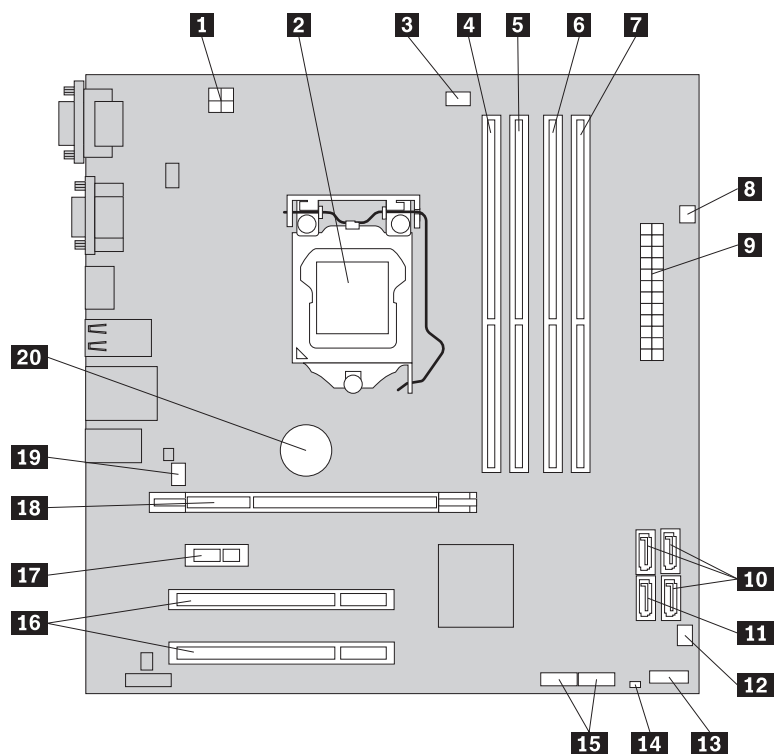


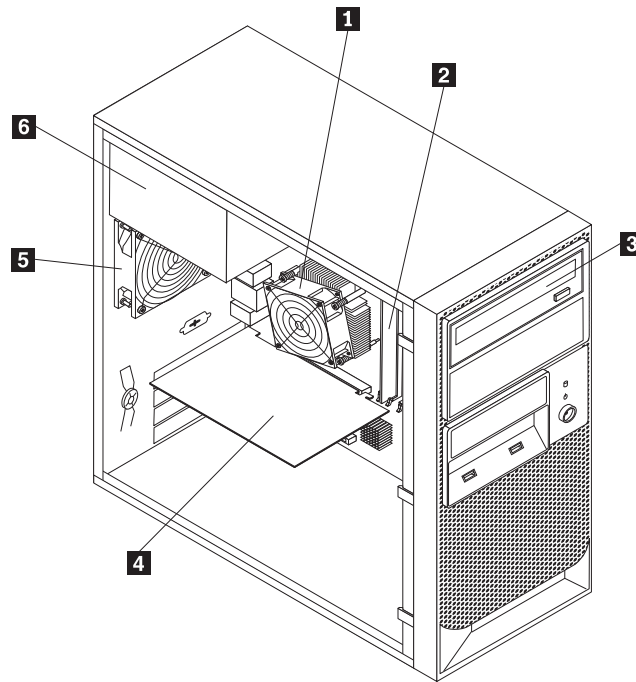
Figure 3. System board connector locations

- |                                       |   |
|---------------------------------------|---|
| <b>1</b> 4-pin power connector        | <b>11</b> eSATA connector   |
| <b>2</b> Microprocessor               | <b>12</b> Power fan connector   |
| <b>3</b> Microprocessor fan connector | <b>13</b> Front panel connector   |
| <b>4</b> DIMM 2                       | <b>14</b> Clear CMOS (Complementary Metal Oxide Semiconductor) /Recovery jumper |
| <b>5</b> DIMM 1                       | <b>15</b> Front USB connectors (2)  |
| <b>6</b> DIMM 4                       | <b>16</b> PCI card slots (2)  |
| <b>7</b> DIMM 3                       | <b>17</b> PCI Express x1 card slot  |
| <b>8</b> Thermal sensor connector     | <b>18</b> PCI Express x16 card slot   |
| <b>9</b> 24-pin power connector       | <b>19</b> System fan connector  |
| <b>10</b> SATA connectors (3)         | <b>20</b> Battery   |

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## Internal components

Figure 4 shows the locations of the various components in your server. To remove the server cover and access to the inside of the server, see “Removing the server cover” on page 18.



*Figure 4. Component locations*

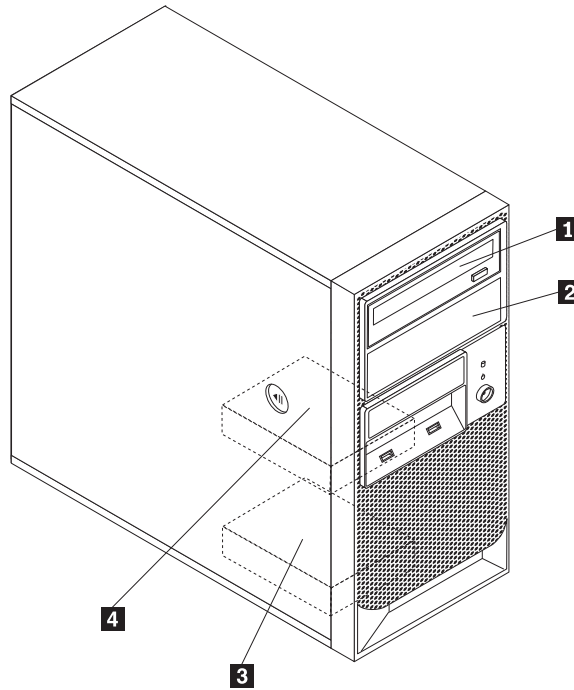
- |                                     |                                |
|-------------------------------------|--------------------------------|
| <b>1</b> Heat sink and fan assembly | <b>4</b> PCI card              |
| <b>2</b> Memory module              | <b>5</b> Rear fan assembly     |
| <b>3</b> Optical drive              | <b>6</b> Power supply assembly |

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## Internal drives

Internal drives are devices that your server uses to read and store data. You can add drives to your server to increase storage capacity and enable your server to read other types of media. Internal drives are installed in bays. In this manual, the bays are referred to as bay 1, bay 2, and so on.

Figure 5 shows the locations of the drive bays.



*Figure 5. Drive bay locations*

The following list describes the type and size of the drive that you can install in each bay:

- |   |   |
|---|---|
| <b>1</b> Bay 1 - Maximum height: 43.0 mm (1.7 inches) | Optical drive                           |
| <b>2</b> Bay 2 - Maximum height: 43.0 mm (1.7 inches) | Optical drive                           |
| <b>3</b> Bay 3 - Maximum height: 25.8 mm (1.0 inch)   | 3.5-inch secondary SATA hard disk drive |
| <b>4</b> Bay 4 - Maximum height: 25.8 mm (1.0 inch)   | 3.5-inch primary SATA hard disk drive   |



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## Chapter 5. Installing or replacing customer replaceable units

This chapter provides instructions on how to install or replace customer replaceable units for your server.

This chapter contains the following sections:

- “Handling static-sensitive devices”
- “Installing or replacing hardware”
- “Installing security features” on page 46

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### Handling static-sensitive devices

Do not open the static-protective package containing the new part until the defective part has been removed from the server and you are ready to install the new part. Static electricity, although harmless to you, can seriously damage server components and parts.

When you handle parts and other server components, take these precautions to avoid static-electricity damage:

- Limit your movement. Movement can cause static electricity to build up around you.
- Always handle parts and other server components carefully. Handle PCI cards, memory modules, system boards, and microprocessors by the edges. Never touch any exposed circuitry.
- Prevent others from touching the parts and other server components.
- Before you replace a new part, touch the static-protective package containing the part to a metal expansion-slot cover or other unpainted metal surface on the server for at least two seconds. This reduces static electricity in the package and your body.
- When possible, remove the new part from the static-protective packaging, and install it directly in the server without setting the part down. When this is not possible, place the static-protective package that the part came in on a smooth, level surface and place the part on it.
- Do not place the part on the server cover or other metal surface.

---

### Installing or replacing hardware

This section provides instructions on how to install or replace hardware for your server. You can expand the capabilities of your server and maintain your server by installing or replacing hardware.

#### Attention

Do not open your server or attempt any repair before reading and understanding the “Safety” on page v and the *Safety Information* book. To obtain a copy of the *Safety Information* book, go to:  
<http://www.lenovo.com/support>

#### Notes:

1. Use only server parts provided by Lenovo.

2. When installing or replacing an option, use the appropriate instructions in this section along with the instructions that come with the option.

## Installing external options

You can connect external options to your server, such as external speakers, a printer, or a scanner. For some external options, you must install additional software in addition to making the physical connection. When installing an external option, see “Front view” on page 11 and “Rear view” on page 12 to identify the required connector. Then, use the instructions that come with the option to help you make the connection and install any software or device drivers that are required for the option.

## Removing the server cover

### Attention

Do not open your server or attempt any repair before reading and understanding the “Safety” on page v and the *Safety Information* book. To obtain a copy of the *Safety Information* book, go to:  
<http://www.lenovo.com/support>

This section provides instructions on how to remove the server cover.

### CAUTION:



**Turn off the server and wait three to five minutes to let the server cool before removing the server cover.**

To remove the server cover, do the following:

1. Remove any media from the drives and turn off all attached devices and the server.
2. Disconnect all power cords from electrical outlets.
3. Disconnect the power cords, Input/Output (I/O) cables, and any other cables that are connected to the server. See “Front view” on page 11 and “Rear view” on page 12.
4. Remove any locking device that secures the server cover, such as a padlock or an integrated cable lock. See “Integrated cable lock” on page 46 and “Padlock” on page 47.
5. Remove any thumbscrews that secure the server cover.

6. Press the cover-release button on the side of the server and slide the cover to the rear of the server to remove the cover.

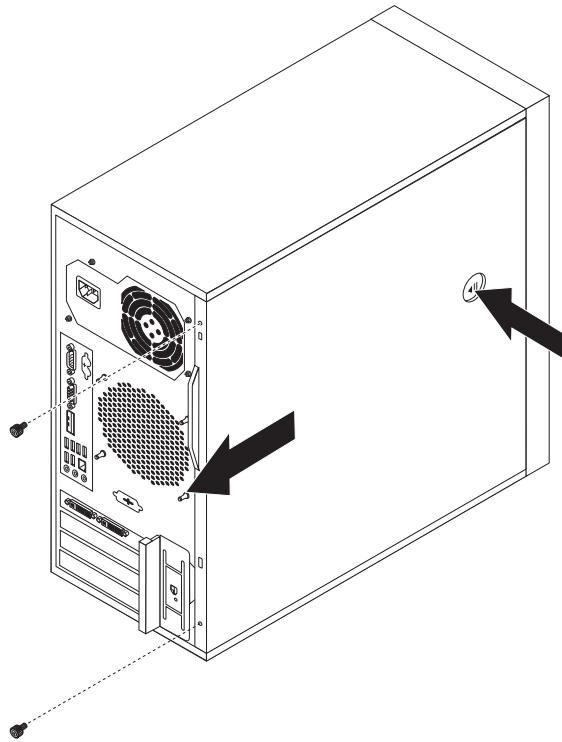


Figure 6. Removing the server cover

## Removing and reinstalling the front bezel

### Attention

Do not open your server or attempt any repair before reading and understanding the “Safety” on page v and the *Safety Information* book. To obtain a copy of the *Safety Information* book, go to:  
<http://www.lenovo.com/support>

This section provides instructions on how to remove and reinstall the front bezel.

To remove and reinstall the front bezel, do the following:

1. Remove all media from the drives and turn off all attached devices and the server. Then, disconnect all power cords from electrical outlets and disconnect all cables that are connected to the server.
2. Remove the server cover. See “Removing the server cover” on page 18.

3. Remove the front bezel by releasing the three plastic tabs on the left side and pivoting the front bezel outward.

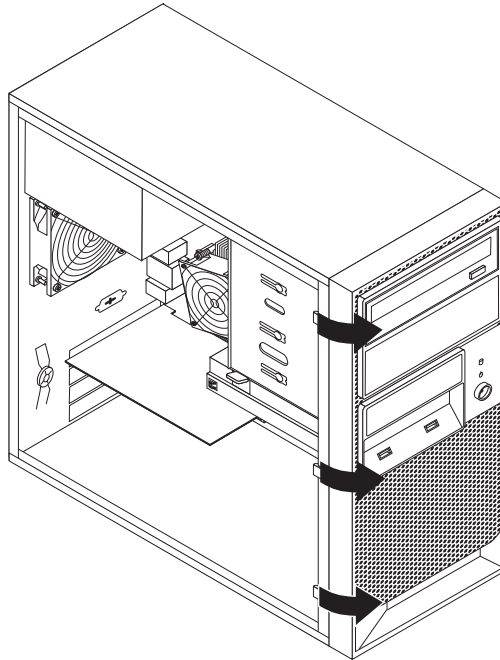


Figure 7. Removing the front bezel

4. To reinstall the front bezel, align the three plastic tabs on the right side of the front bezel with the corresponding holes in the chassis, then pivot the front bezel inward until it snaps into position on the left side.

**What to do next:**

- To work with another piece of hardware, go to the appropriate section.
- To complete the installation or replacement, go to “Completing the parts replacement” on page 44.

## Installing or replacing a PCI card

**Attention**

Do not open your server or attempt any repair before reading and understanding the “Safety” on page v and the *Safety Information* book. To obtain a copy of the *Safety Information* book, go to:  
<http://www.lenovo.com/support>

This section provides instructions on how to install or replace a PCI card.

Your server has two standard PCI card slots, one PCI Express x1 card slot, and one PCI Express x16 card slot.

To install or replace a PCI card, do the following:

1. Remove all media from the drives and turn off all attached devices and the server. Then, disconnect all power cords from electrical outlets and disconnect all cables that are connected to the server.
2. Remove the server cover. See “Removing the server cover” on page 18.
3. At the rear of the server, press the release button **1** to open the PCI card latch **2**.

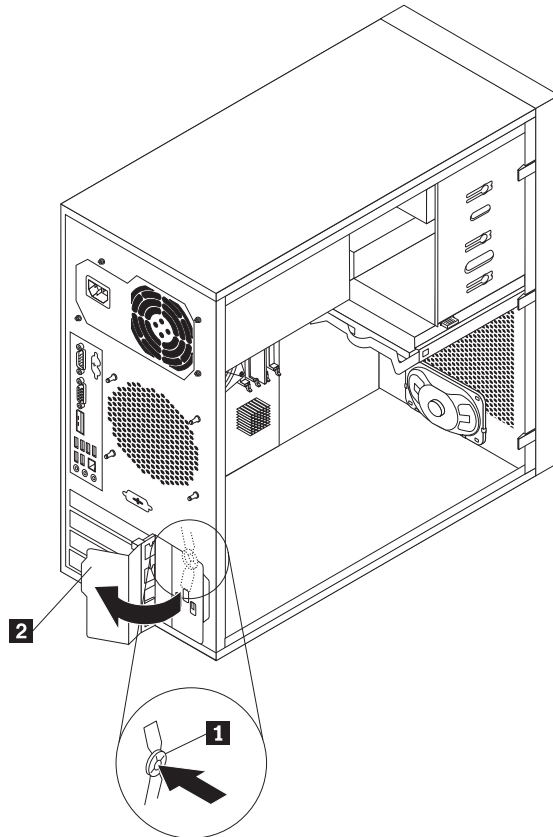
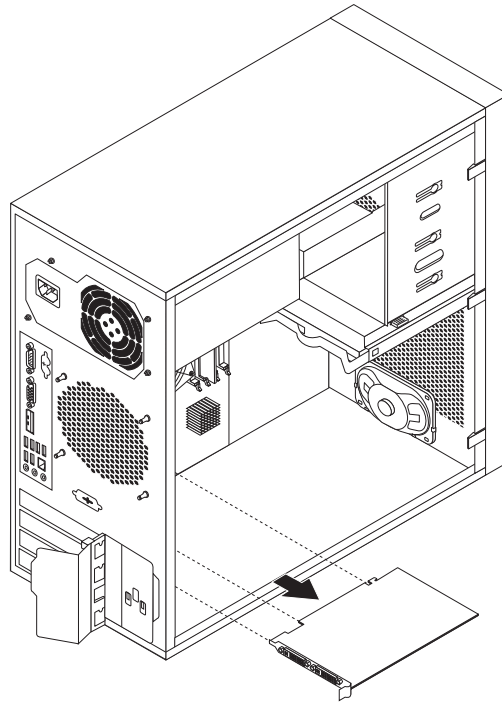


Figure 8. Opening the PCI card latch

4. If you are installing a PCI card, remove the appropriate metal slot cover. If you are replacing an old PCI card, grasp the old card that is currently installed and gently pull it out of the slot.



*Figure 9. Removing a PCI card*

**Note:** The PCI card fits tightly into the card slot. If necessary, alternate moving each side of the PCI card a small amount until it is removed from the card slot.

5. Remove the new PCI card from its static-protective package.
6. Install the new PCI card into the appropriate slot on the system board. See “System-board internal connectors” on page 14.

**Note:** If you are installing a PCI Express x16 card, make sure the memory slot retaining clips are closed before you install the PCI Express x16 card.

7. Pivot the PCI card latch to the closed position to secure the PCI card.

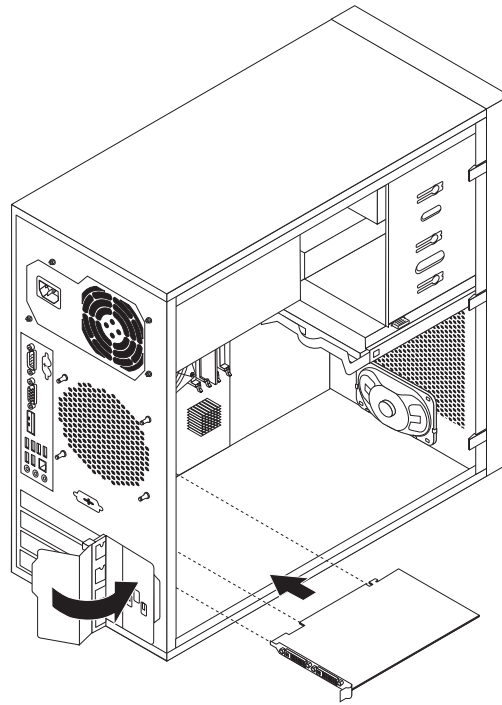


Figure 10. Installing a PCI card

**What to do next:**

- To work with another piece of hardware, go to the appropriate section.
- To complete the installation or replacement, go to “Completing the parts replacement” on page 44.

## Installing or replacing a memory module

**Attention**

Do not open your server or attempt any repair before reading and understanding the “Safety” on page v and the *Safety Information* book. To obtain a copy of the *Safety Information* book, go to:  
<http://www.lenovo.com/support>

This section provides instructions on how to install or replace a memory module.

Your server has four slots for installing or replacing memory modules. When installing or replacing a memory module, use the following guidelines:

- Use DDR3 ECC UDIMMs for your server.
- Use 1 GB, 2 GB, or 4 GB memory modules in any combination up to a maximum of 16 GB system memory.
- Install memory modules in the sequence of DIMM 1, DIMM 2, DIMM 3, and DIMM 4. See “System-board internal connectors” on page 14.

To install or replace a memory module, do the following:

1. Remove all media from the drives and turn off all attached devices and the server. Then, disconnect all power cords from electrical outlets and disconnect all cables that are connected to the server.
2. Remove the server cover. See “Removing the server cover” on page 18.
3. Lay the server on its side for easier access to the system board.
4. Locate the memory slots. See “System-board internal connectors” on page 14.
5. Remove any parts that might prevent your access to the memory slots.

**Note:** Depending on your server model, you might need to remove the PCI Express x16 card for easier access to the memory slots. See “Installing or replacing a PCI card” on page 20.

6. If you are installing a new memory module, open the retaining clips of the memory slot into which you want to install the new memory module.

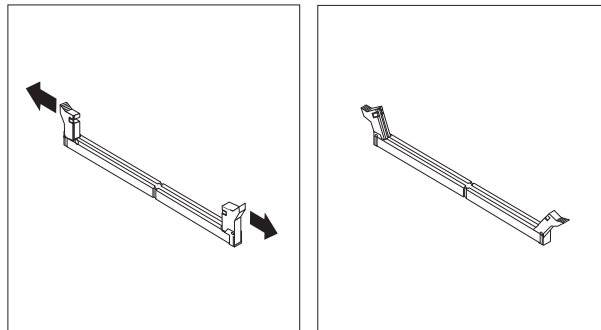


Figure 11. Opening the retaining clips

If you are replacing an old memory module, open the retaining clips and gently pull the memory module out of the memory slot.

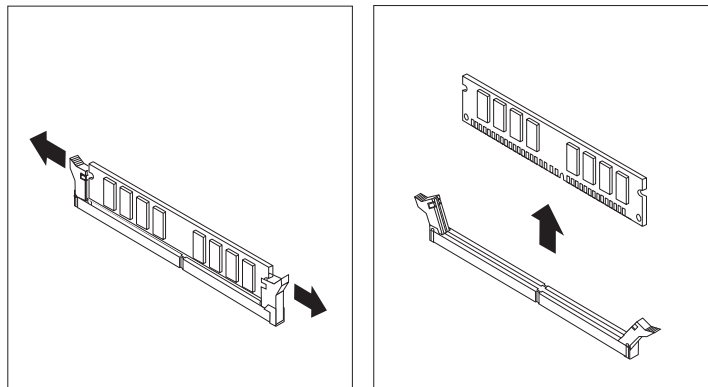


Figure 12. Removing a memory module



7. Position the new memory module over the memory slot. Make sure that the notch **1** on the memory module aligns correctly with the key **2** in the memory slot. Press the memory module straight down into the memory slot until the retaining clips close.

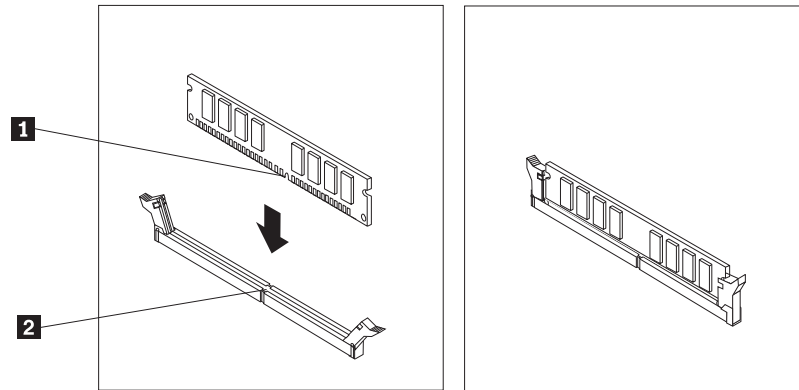


Figure 13. Installing a memory module

8. Reinstall all parts that have been removed.

**What to do next:**

- To work with another piece of hardware, go to the appropriate section.
- To complete the installation or replacement, go to “Completing the parts replacement” on page 44.

## Installing or replacing the optical drive

**Attention**

Do not open your server or attempt any repair before reading and understanding the “Safety” on page v and the *Safety Information* book. To obtain a copy of the *Safety Information* book, go to:  
<http://www.lenovo.com/support>

This section provides instructions on how to install or replace the optical drive.

To install or replace an optical drive, do the following:

1. Remove all media from the drives and turn off all attached devices and the server. Then, disconnect all power cords from electrical outlets and disconnect all cables that are connected to the server.
2. Remove the server cover. See “Removing the server cover” on page 18.
3. Remove the front bezel. See “Removing and reinstalling the front bezel” on page 19.
4. Depending on whether you are installing or replacing an optical drive, do one of the following:
  - If you are installing a secondary optical drive, remove the plastic panel in the front bezel for the drive bay you want to use. If there is a metal static shield installed in the drive bay, remove the metal static shield.

- If you are replacing an optical drive, disconnect the signal cable and the power cable from the rear of the optical drive, press the blue release button **1**, and then slide the optical drive out of the optical drive bay.

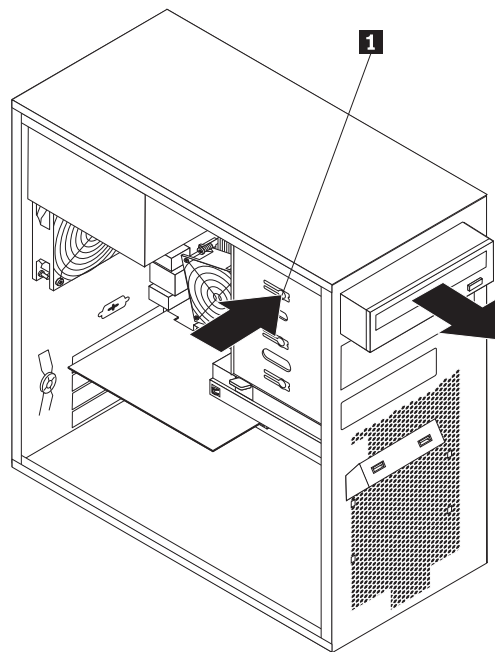


Figure 14. Removing the optical drive

5. Install the optical drive retainer on the side of the new optical drive.

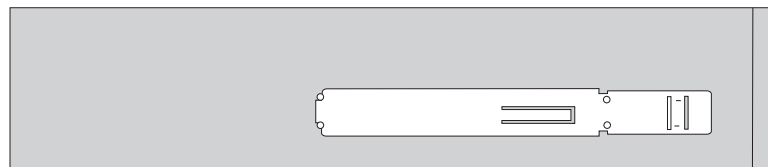
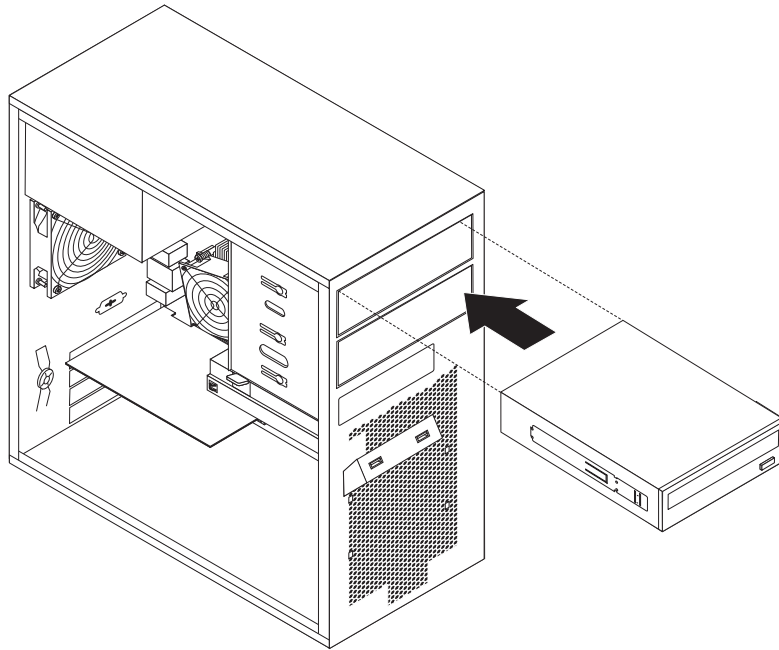


Figure 15. Installing the optical drive retainer

6. Slide the new optical drive into the optical drive bay from the front of the server until the optical drive snaps into position.



*Figure 16. Installing the optical drive*

7. Reinstall the front bezel. See “Removing and reinstalling the front bezel” on page 19.
8. Continue at “Connecting a SATA drive.”

**What to do next:**

- To work with another piece of hardware, go to the appropriate section.
- To complete the installation or replacement, go to “Completing the parts replacement” on page 44.

## **Connecting a SATA drive**

You can connect a SATA optical drive or a SATA hard disk drive to an available SATA connector on the system board.

To connect a SATA drive, do the following:

1. Connect one end of the signal cable to the SATA drive and the other end to an available SATA connector on the system board. See “System-board internal connectors” on page 14.

2. Locate an available five-wire power connector and connect it to the SATA drive.

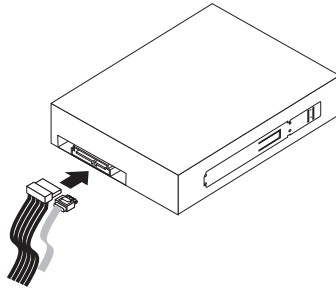


Figure 17. Connecting a SATA optical drive

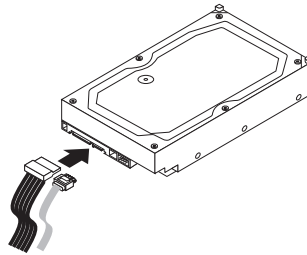


Figure 18. Connecting a SATA hard disk drive

## Installing or replacing the secondary hard disk drive

### Attention

Do not open your server or attempt any repair before reading and understanding the “Safety” on page v and the *Safety Information* book. To obtain a copy of the *Safety Information* book, go to:  
<http://www.lenovo.com/support>

This section provides instructions on how to install or replace the secondary hard disk drive.

### Installing a secondary hard disk drive

To install a secondary hard disk drive, do the following:

1. Remove all media from the drives and turn off all attached devices and the server. Then, disconnect all power cords from electrical outlets and disconnect all cables that are connected to the server.
2. Remove the server cover. See “Removing the server cover” on page 18.
3. Locate the secondary hard disk drive bay. See “Internal drives” on page 16.

4. Press the release button **1** to release the secondary hard disk drive cage and then lift the cage out of the chassis.

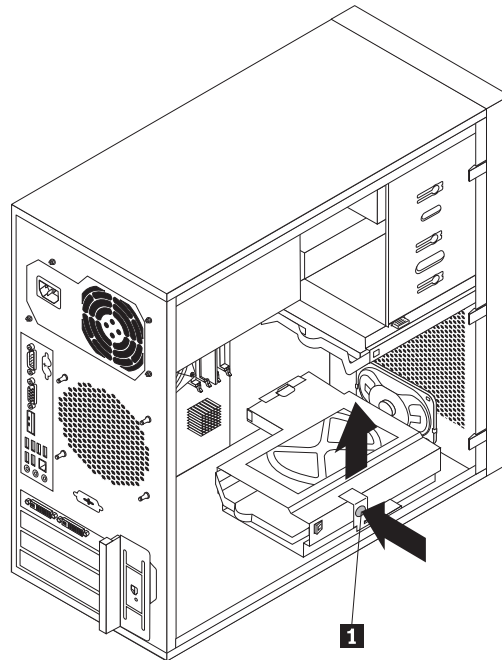


Figure 19. Removing the secondary hard disk drive cage

5. Pull on the handle to release and remove the blue hard disk drive bracket from the hard disk drive cage.
6. To install the new hard disk drive into the blue bracket, flex the sides of the bracket properly and align pin **1**, pin **2**, pin **3**, and pin **4** on the bracket with the corresponding holes in the hard disk drive. Do not touch the circuit board **5** on the bottom of the hard disk drive.

**Note:** If you are installing a 2.5-inch hard disk drive, install the hard disk drive into a 2.5-inch to 3.5-inch hard disk drive tray first and then install the tray into the blue bracket.

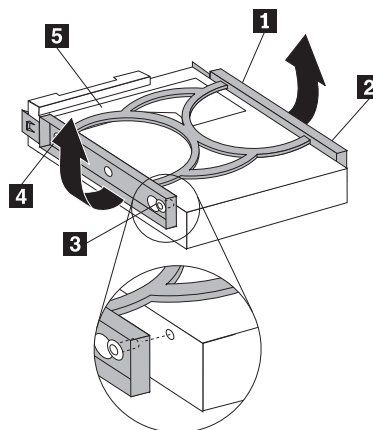


Figure 20. Installing the hard disk drive into the bracket

7. Slide the new hard disk drive with the blue bracket into the secondary hard disk drive cage until it snaps into position.
8. Slide the hard disk drive cage with the new hard disk drive into the chassis until it is directly underneath the metal tab **1**.

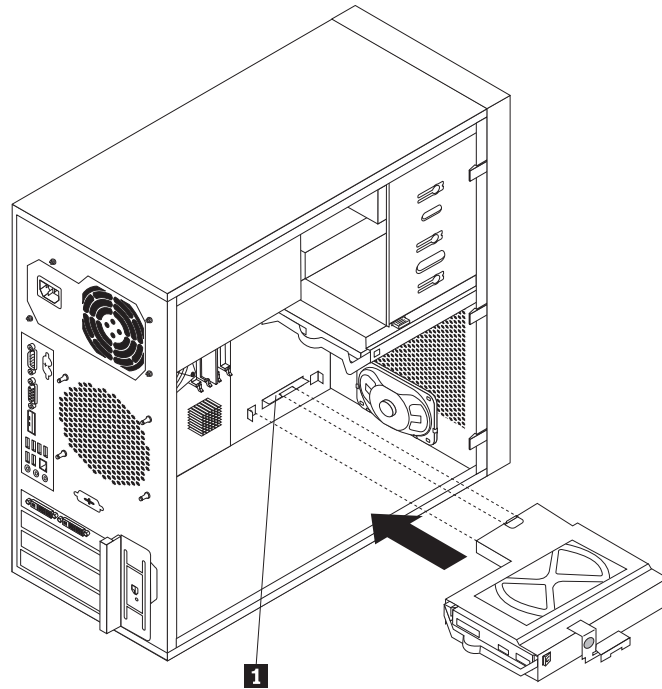
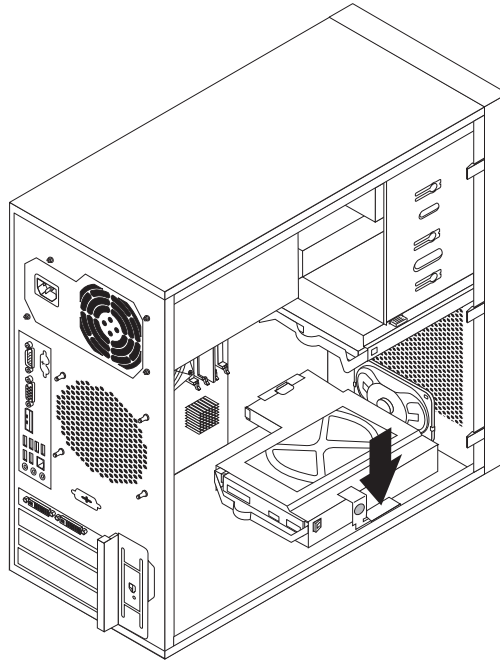


Figure 21. Installing the secondary hard disk drive

9. Press the hard disk drive cage downward until it snaps into position. Make sure that the hard disk drive cage is secured in the chassis.



*Figure 22. Installing the secondary hard disk drive*

10. Continue at “Connecting a SATA drive” on page 27.

## **Replacing the secondary hard disk drive**

**Note:** Depending on the model type, your server might have a secondary hard disk drive installed.

To replace the secondary hard disk drive, do the following:

1. Remove all media from the drives and turn off all attached devices and the server. Then, disconnect all power cords from electrical outlets and disconnect all cables that are connected to the server.
2. Remove the server cover. See “Removing the server cover” on page 18.
3. Locate the secondary hard disk drive. See “Internal drives” on page 16.
4. Disconnect the signal cable and the power cable from the hard disk drive.

5. Press the release button **1** to release the hard disk drive cage and then lift the hard disk drive cage out of the chassis.

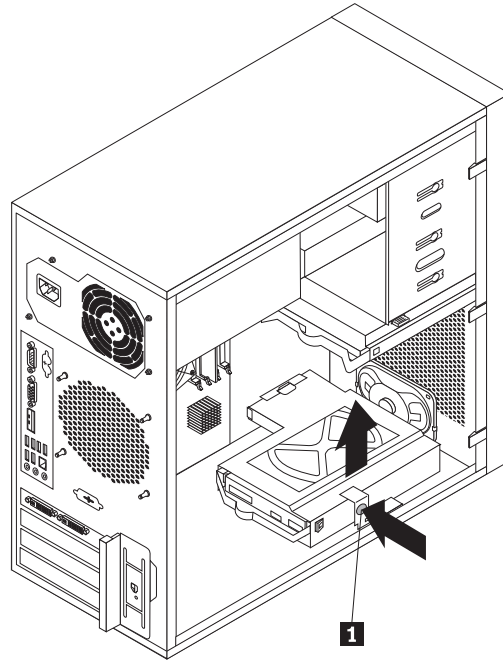


Figure 23. Removing the secondary hard disk drive

6. Pull on the blue handle to release and remove the hard disk drive from the hard disk drive cage.
7. Flex the sides of the blue bracket to remove the hard disk drive from the bracket.
8. Continue at “Installing a secondary hard disk drive” on page 28.

**What to do next:**

- To work with another piece of hardware, go to the appropriate section.
- To complete the replacement, go to “Completing the parts replacement” on page 44.

## Replacing the power supply assembly

**Attention**

Do not open your server or attempt any repair before reading and understanding the “Safety” on page v and the *Safety Information* book. To obtain a copy of the *Safety Information* book, go to:  
<http://www.lenovo.com/support>

This section provides instructions on how to replace the power supply assembly.

To replace the power supply assembly, do the following:



1. Remove all media from the drives and turn off all attached devices and the server. Then, disconnect all power cords from electrical outlets and disconnect all cables that are connected to the server.
2. Remove the server cover. See “Removing the server cover” on page 18.
3. Disconnect the power supply assembly cables from the system board and all drives. See “System-board internal connectors” on page 14.
4. Lay the server on its side and remove the four screws at the rear of the chassis that secure the power supply assembly.

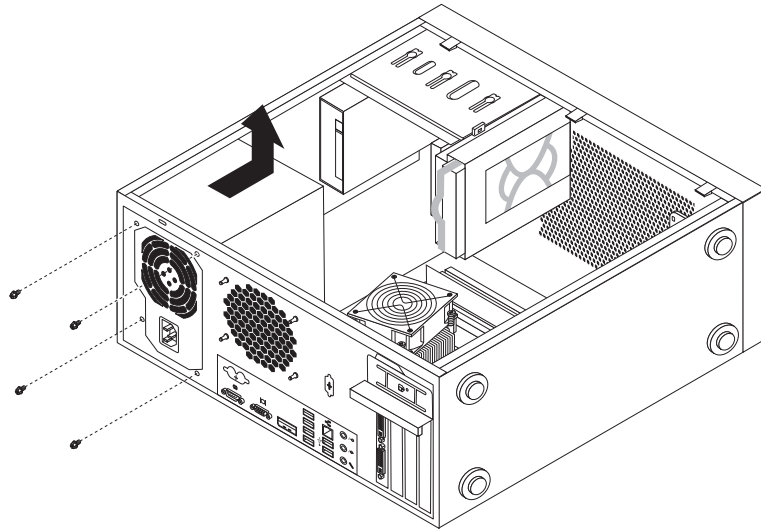


Figure 24. Removing the screws for the power supply assembly

5. Slide the power supply assembly to the front of the server and then lift it out of the chassis.
6. Ensure that the new power supply assembly is the correct replacement.
7. Install the new power supply assembly into the chassis so that the screw holes in the power supply assembly are aligned with the corresponding holes in the chassis.
8. Install and tighten the four screws to secure the new power supply assembly.

**Note:** Use only screws provided by Lenovo.

9. Connect the new power supply assembly cables to the system board and each of the drives. See “System-board internal connectors” on page 14.

**What to do next:**

- To work with another piece of hardware, go to the appropriate section.
- To complete the replacement, go to “Completing the parts replacement” on page 44.

## Replacing the heat sink and fan assembly

### Attention

Do not open your server or attempt any repair before reading and understanding the "Safety" on page v and the *Safety Information* book. To obtain a copy of the *Safety Information* book, go to:  
<http://www.lenovo.com/support>

This section provides instructions on how to replace the heat sink and fan assembly.

### CAUTION:



**The heat sink and fan assembly might be very hot. Turn off the server and wait three to five minutes to let the server cool before removing the server cover.**

To replace the heat sink and fan assembly, do the following:

1. Remove all media from the drives and turn off all attached devices and the server. Then, disconnect all power cords from electrical outlets and disconnect all cables that are connected to the server.
2. Remove the server cover. See "Removing the server cover" on page 18.
3. Lay the server on its side for easier access to the system board.
4. Locate the heat sink and fan assembly. See "System-board internal connectors" on page 14.
5. Disconnect the heat sink and fan assembly cable from the microprocessor fan connector on the system board. See "System-board internal connectors" on page 14.

6. Follow this sequence to remove the four screws that secure the heat sink and fan assembly to the system board:
  - a. Partially remove screw **1**, then fully remove screw **2**, and then fully remove screw **1**.
  - b. Partially remove screw **3**, then fully remove screw **4**, and then fully remove screw **3**.

**Note:** Carefully remove the four screws from the system board to avoid any possible damage to the system board. The four screws cannot be removed from the heat sink and fan assembly.

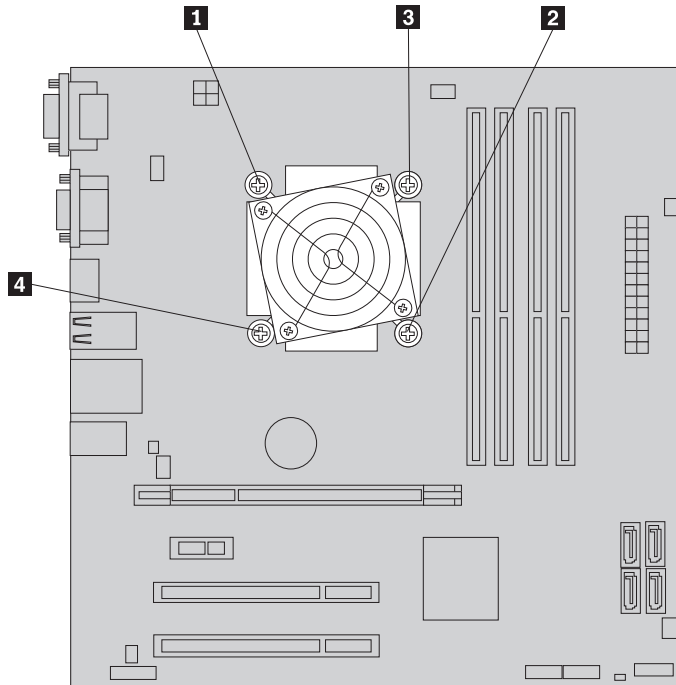


Figure 25. Removing the heat sink and fan assembly

7. Lift the failing heat sink and fan assembly off the system board.
- Notes:**
- a. You might have to gently twist the heat sink and fan assembly to free it from the microprocessor.
  - b. When handling the heat sink and fan assembly, do not touch the thermal grease on the bottom of the heat sink and fan assembly.
8. Position the new heat sink and fan assembly on the system board so that the four screws are aligned with the corresponding holes in the system board. Make sure that the heat sink and fan assembly cable can be easily connected to the microprocessor fan connector on the system board.
  9. Follow this sequence to install the four screws to secure the heat sink and fan assembly, as shown in Figure 25.
    - a. Partially tighten screw **1**, then fully tighten screw **2**, and then fully tighten screw **1**.
    - b. Partially tighten screw **3**, then fully tighten screw **4**, and then fully tighten screw **3**.

10. Connect the heat sink and fan assembly cable to the microprocessor fan connector on the system board. See “System-board internal connectors” on page 14.

**What to do next:**

- To work with another piece of hardware, go to the appropriate section.
- To complete the replacement, go to “Completing the parts replacement” on page 44.

## Replacing the primary hard disk drive

**Attention**

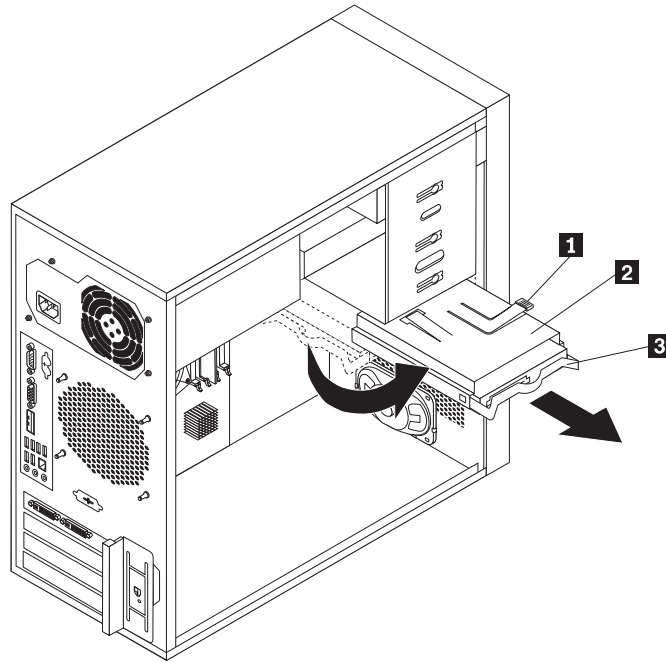
Do not open your server or attempt any repair before reading and understanding the “Safety” on page v and the *Safety Information* book. To obtain a copy of the *Safety Information* book, go to:  
<http://www.lenovo.com/support>

This section provides instructions on how to replace the primary hard disk drive.

To replace the primary hard disk drive, do the following:

1. Remove all media from the drives and turn off all attached devices and the server. Then, disconnect all power cords from electrical outlets and disconnect all cables that are connected to the server.
2. Remove the server cover. See “Removing the server cover” on page 18.
3. Locate the primary hard disk drive. See “Internal drives” on page 16.
4. Disconnect the signal cable and the power cable from the rear of the hard disk drive.

5. Press the blue release tab **1** downward, slide the hard disk drive cage **2** to the rear of the server, and then pivot it outward to completely remove the drive cage from the chassis. Then, pull on the blue handle **3** to release and remove the hard disk drive from the drive cage.

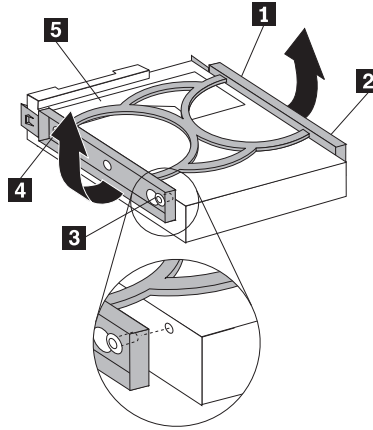


*Figure 26. Removing the primary hard disk drive*

6. Flex the sides of the blue bracket to remove the hard disk drive from the bracket.

7. To install a new hard disk drive into the blue bracket, flex the sides of the bracket and align pin **1**, pin **2**, pin **3**, and pin **4** on the bracket with the corresponding holes in the hard disk drive. Do not touch the circuit board **5** on the bottom of the hard disk drive.

**Note:** If you are installing a 2.5-inch hard disk drive, install the hard disk drive into a 2.5-inch to 3.5-inch hard disk drive tray first and then install the tray into the blue bracket.



*Figure 27. Installing the hard disk drive into the bracket*

8. Slide the new hard disk drive with the blue bracket into the drive cage until it snaps into position.

9. Align the hard disk drive cage pivot pin with the slot **1** in the upper drive cage, as shown in Figure 28. Then, slide the hard disk drive cage into the chassis.
10. Press down on the metal latch **2** and pivot the hard disk drive cage into place. Then, slide the drive cage to the front of the server until it snaps into position.

**Note:** There are two arrows, one on the upper drive cage and one on the hard disk drive cage. The arrows are aligned when the hard disk drive is in the proper position.

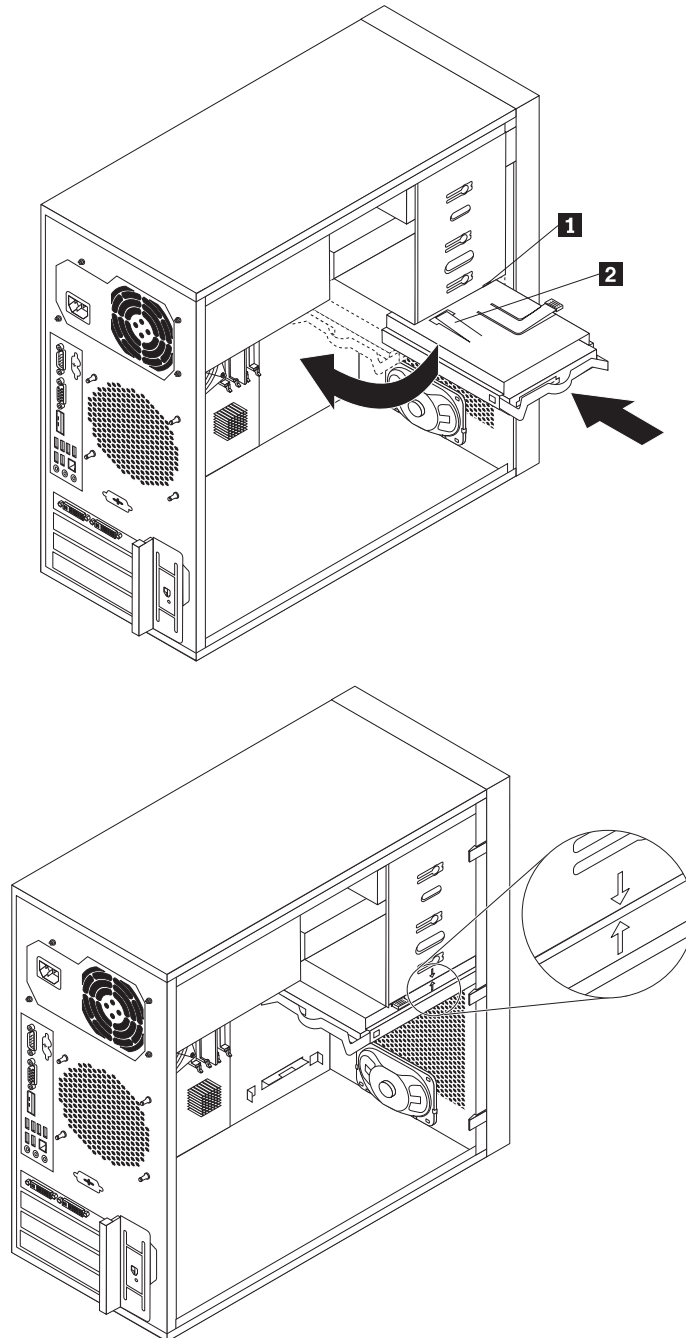


Figure 28. Installing the primary hard disk drive

11. Connect the signal cable and the power cable to the new hard disk drive. See “Connecting a SATA drive” on page 27.

**What to do next:**

- To work with another piece of hardware, go to the appropriate section.
- To complete the replacement, go to “Completing the parts replacement” on page 44.

## Replacing the front fan assembly

**Attention**

Do not open your server or attempt any repair before reading and understanding the “Safety” on page v and the *Safety Information* book. To obtain a copy of the *Safety Information* book, go to:  
<http://www.lenovo.com/support>

Depending on the model type, your server might have a front fan assembly installed. This section provides instructions on how to replace the front fan assembly.

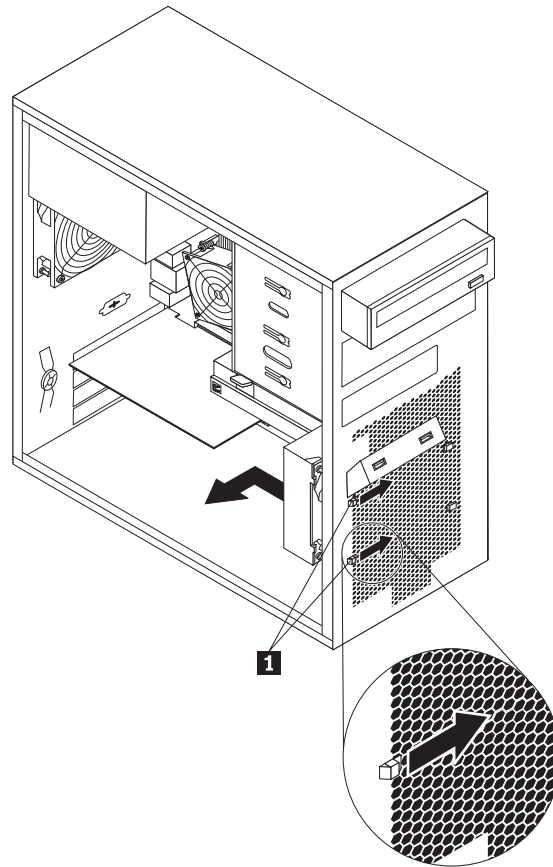
To replace the front fan assembly, do the following:

1. Remove all media from the drives and turn off all attached devices and the server. Then, disconnect all power cords from electrical outlets and disconnect all cables that are connected to the server.
2. Remove the server cover. See “Removing the server cover” on page 18.
3. Remove the front bezel. See “Removing and reinstalling the front bezel” on page 19.
4. Disconnect the front fan assembly cable from the power fan connector on the system board. See “System-board internal connectors” on page 14.

**Note:** If your server has a secondary hard disk drive installed, remove the secondary hard disk drive to get easier access to the power fan connector on the system board. See “Installing or replacing the secondary hard disk drive” on page 28.

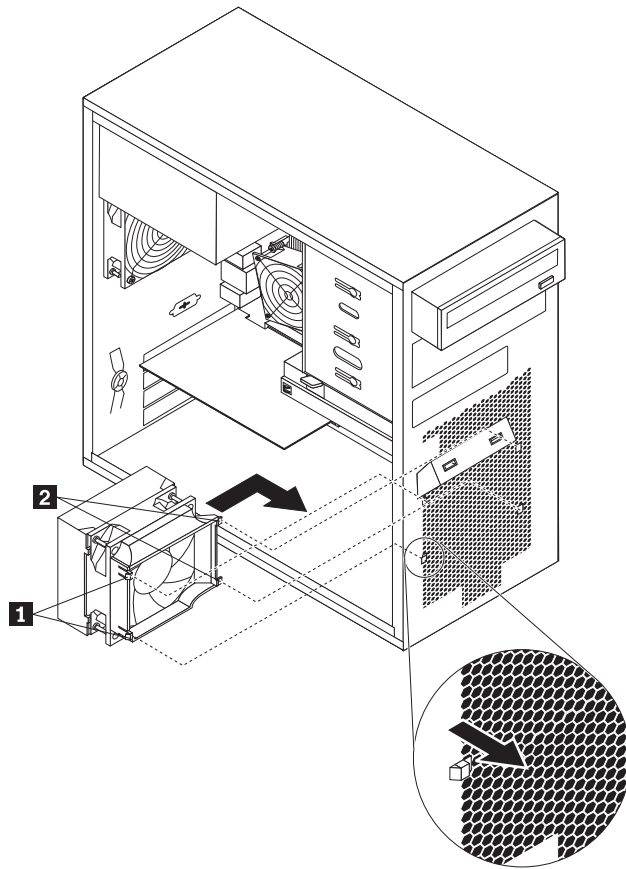


5. Release the two tabs **1** that attach the front fan assembly to the chassis as shown and then completely remove the front fan assembly from the chassis.



*Figure 29. Removing the front fan assembly*

6. Insert the two tabs **2** of the new front fan assembly into the corresponding holes in the chassis, and press the other two tabs **1** through the holes until the front fan assembly is secured in place.



*Figure 30. Installing the front fan assembly*

7. Connect the new front fan assembly cable to the power fan connector on the system board. See “System-board internal connectors” on page 14.
8. Reinstall the secondary hard disk drive if removed. See “Installing or replacing the secondary hard disk drive” on page 28.

**What to do next:**

- To work with another piece of hardware, go to the appropriate section.
- To complete the replacement, go to “Completing the parts replacement” on page 44.

## Replacing the rear fan assembly

### Attention

Do not open your server or attempt any repair before reading and understanding the “Safety” on page v and the *Safety Information* book. To obtain a copy of the *Safety Information* book, go to:  
<http://www.lenovo.com/support>

This section provides instructions on how to replace the rear fan assembly.

To replace the rear fan assembly, do the following:

1. Remove all media from the drives and turn off all attached devices and the server. Then, disconnect all power cords from electrical outlets and disconnect all cables that are connected to the server.
2. Remove the server cover. See “Removing the server cover” on page 18.
3. Locate the rear fan assembly. See “Internal components” on page 15.
4. Disconnect the rear fan assembly cable from the system fan connector on the system board. See “System-board internal connectors” on page 14.
5. The rear fan assembly is attached to the chassis by four rubber mounts. Remove the rear fan assembly by cutting the rubber mounts and gently pulling the rear fan assembly out of the chassis.

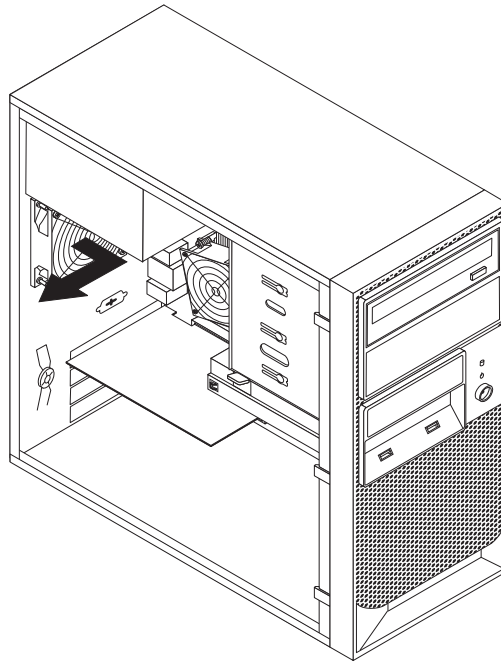


Figure 31. Removing the rear fan assembly

6. Install the new rear fan assembly by aligning the new rubber mounts with the corresponding holes in the chassis and push the rubber mounts through the holes.

**Note:** The new rear fan assembly will have four new rubber mounts attached.

7. Carefully pull on the tips of the rubber mounts until the new rear fan assembly is secured in place.

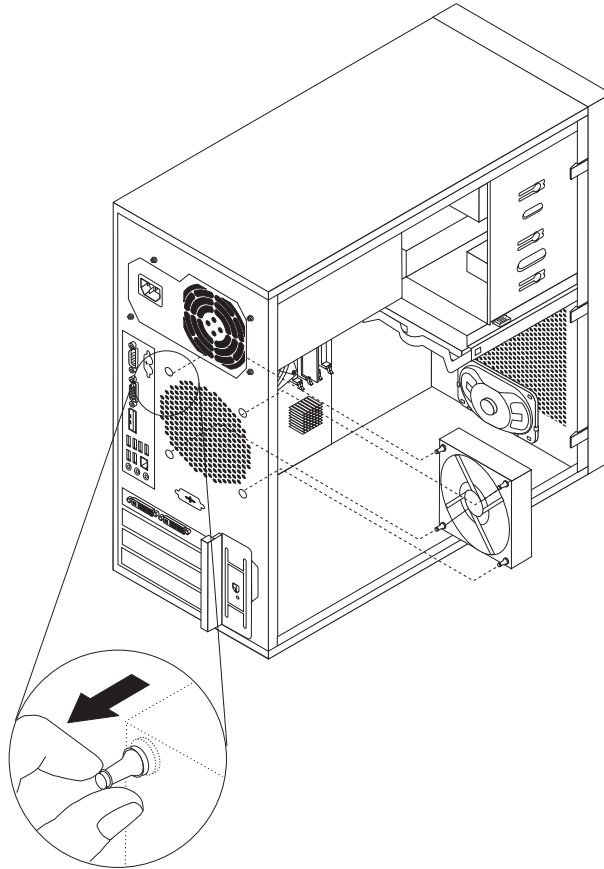


Figure 32. Installing the rear fan assembly

8. Connect the new rear fan assembly cable to the system fan connector on the system board. See “System-board internal connectors” on page 14.

**What to do next:**

- To work with another piece of hardware, go to the appropriate section.
- To complete the replacement, go to “Completing the parts replacement.”

## Completing the parts replacement

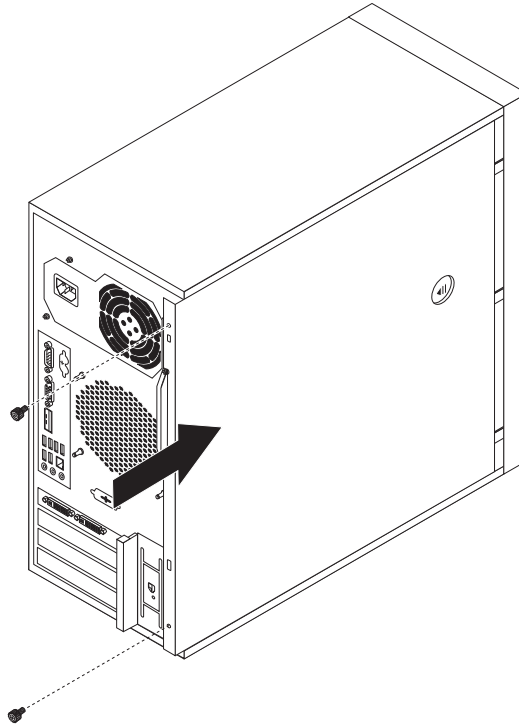
After completing the installation or replacement for all parts, you need to reinstall the server cover and reconnect cables.

To reinstall the server cover and reconnect cables to your server, do the following:

1. Make sure that all components have been reassembled correctly and that no tools or loose screws are left inside your server. See “Internal components” on page 15 for the locations of various components in your server.
2. If you have removed the front bezel, reinstall it. See “Removing and reinstalling the front bezel” on page 19.
3. Make sure that the cables are routed correctly before reinstalling the server cover. Keep cables clear of the hinges and sides of the server chassis to avoid

interference with reinstalling the server cover.

4. Position the server cover on the chassis so that the rail guides on the bottom of the server cover engage the rails on the chassis. Then, slide the cover to the front of the server until it snaps into position.



*Figure 33. Reinstalling the server cover*

5. Install the screws to secure the server cover.
6. Lock the server cover if you have a server cover lock. See “Integrated cable lock” on page 46 or “Padlock” on page 47.
7. Reconnect the external cables and power cords to the server. See “Front view” on page 11 and “Rear view” on page 12.
8. Depending on the parts you installed or replaced, you might need to confirm the updated information in the Setup Utility program. Refer to Chapter 6, “Configuring the server,” on page 49.

**Note:** In most areas of the world, Lenovo requires the return of the defective Customer Replaceable Unit (CRU). Information about this will come with the CRU or will come a few days after the CRU arrives.

## Updating the server configuration

When you start the server for the first time after you install or remove an internal option or external device, you might receive a message that the configuration has changed. The Setup Utility program starts automatically so that you can save the new configuration settings.

Some options have device drivers that you must install. For information about installing device drivers, see the documentation that comes with each option.

You can obtain device drivers for operating systems that are not preinstalled at <http://www.lenovo.com/support>. Installation instructions are provided in readme files with the device-driver files.

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## Installing security features

There are several security options available to help you prevent hardware theft and unauthorized access to your server. In addition to physical locks, you can also prevent unauthorized use of your server by a software lock that locks the keyboard until a correct password is typed in.

**Note:** Make sure that any security cables you installed do not interfere with other server cables.

### Integrated cable lock

An integrated cable lock, sometimes referred to as the Kensington lock, can be used to secure your server to a desk, table, or other non-permanent fixture. The cable lock attaches to the integrated cable lock slot at the rear of your server and is operated with a key. The cable lock also locks the buttons used to remove the server cover. This is the same type of lock used with many notebook computers. You can order an integrated cable lock directly from Lenovo by searching for *Kensington* at: <http://www.lenovo.com/support>

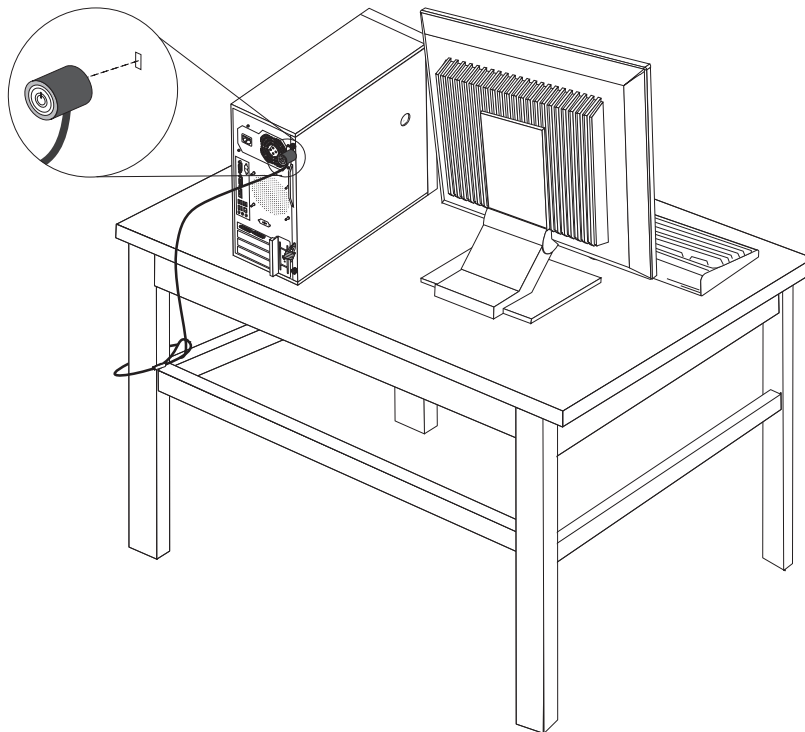


Figure 34. Installing an integrated cable lock

## Padlock

Your server is equipped with a padlock loop so that the cover cannot be removed when a padlock is installed.

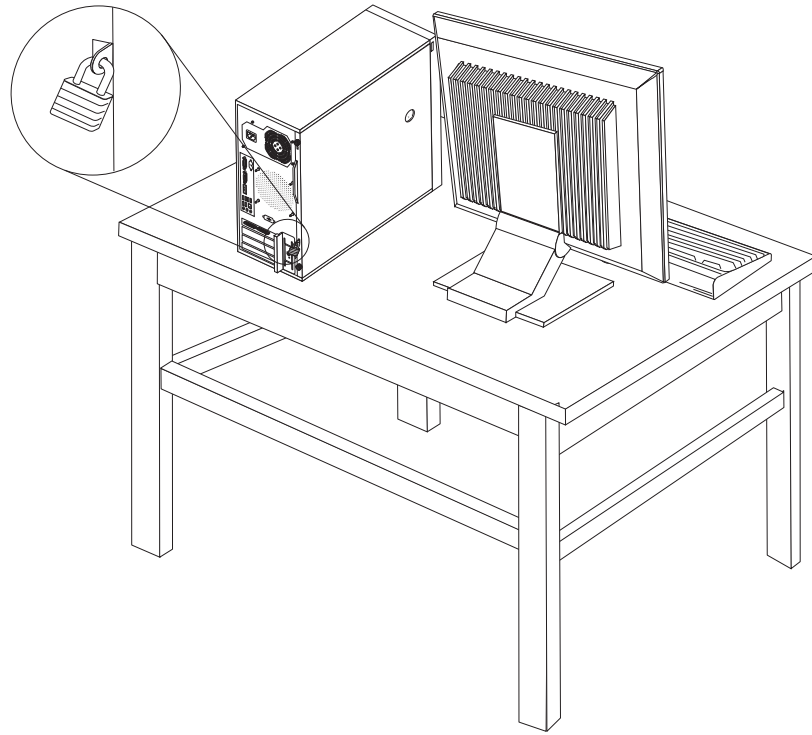


Figure 35. Installing a padlock

## Password protection

To deter unauthorized use of your server, you can use the Setup Utility program to set a password. When you turn on your server, you are prompted to type the password. The server cannot be used until a valid password is typed in. Refer to Chapter 6, “Configuring the server,” on page 49 for more information.

## Erasing lost or forgotten passwords (clearing CMOS)

This section provides instructions on how to erase lost or forgotten passwords, such as a user password.

To erase a lost or forgotten password, do the following:

1. Remove all media from the drives and turn off all attached devices and the server. Then, disconnect all power cords from electrical outlets and disconnect all cables that are connected to the server.
2. Remove the server cover. See “Removing the server cover” on page 18.
3. Locate the Clear CMOS /Recovery jumper on the system board. See “System-board internal connectors” on page 14.
4. Remove all parts and disconnect all cables that might prevent your access to the Clear CMOS /Recovery jumper.

**Note:** If your server has a secondary hard disk drive installed, remove the secondary hard disk drive to access the Clear CMOS /Recovery jumper. See “Replacing the secondary hard disk drive” on page 31.

5. Move the jumper from the standard position (pin 1 and pin 2) to the maintenance position (pin 2 and pin 3).
6. Reinstall all parts and reconnect all cables that have been removed.
7. Reinstall the server cover and reconnect the server power cord. See "Completing the parts replacement" on page 44.
8. Turn on the server and leave it on for approximately 10 seconds. Then, turn off the server by holding the power switch for approximately five seconds.
9. Repeat step 1 through step 4.
10. Move the Clear CMOS /Recovery jumper back to the standard position (pin 1 and pin 2).
11. Reinstall all parts and reconnect all cables that have been removed.
12. Reinstall the server cover and connect the power cords. See "Completing the parts replacement" on page 44.



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## Chapter 6. Configuring the server

This chapter provides instructions on how to configure your server.

This chapter provides information on the following topics:

- “Using the Setup Utility program”
- “Configuring RAID” on page 52
- “Updating system programs” on page 54
- “Using the ThinkServer EasyStartup program” on page 56
- “Installing ThinkServer EasyManage Agent” on page 58

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### Using the Setup Utility program

The Setup Utility program is used to view and change the configuration settings of your server, regardless of which operating system you are using. However, the operating system settings might override any similar settings in the Setup Utility program.

This section provides information on the following topics to help you use the Setup Utility program:

- “Starting the Setup Utility program”
- “Viewing and changing settings”
- “Using passwords” on page 50
- “Enabling or disabling a device” on page 51
- “Selecting a startup device” on page 51
- “Advanced settings” on page 52
- “Exiting from the Setup Utility program” on page 52

### Starting the Setup Utility program

To start the Setup Utility program, do the following:

1. Make sure your server is turned off.
2. Repeatedly press and release the F1 key when turning on the server. When you hear multiple beeps or see a logo screen, release the F1 key.

**Note:** If a Power-On Password or an Administrator Password has been set, the Setup Utility program menu will not be displayed until you type the correct password. For more information, see “Using passwords” on page 50.

The Setup Utility program might start automatically when POST detects that hardware has been removed or new hardware has been installed in your server.

### Viewing and changing settings

The Setup Utility program menu lists various items about the system configuration. To view or change settings, start the Setup Utility program. See “Starting the Setup Utility program.” Then, follow the instructions on the screen.

When working with the Setup Utility program menu, you must use the keyboard. The keys used to perform various tasks are displayed at the bottom of each screen.

## Using passwords

By using the Setup Utility program, you can set passwords to prevent unauthorized access to your server and data. The following types of passwords are available:

- Power-On Password
- Administrator Password
- Hard Disk Password

You do not have to set a password to use your server. However, using passwords improves computing security. If you decide to set a password, read the following sections.

### Password considerations

A password can be any combination of up to 64 alphabetic and numeric characters. For security reasons, it is recommended to use a strong password that cannot be easily compromised. To set a strong password, use the following guidelines:

- Have at least eight characters in length
- Contain at least one alphabetic character and one numeric character
- Setup Utility program and hard disk drive passwords are not case sensitive
- Not be your name or your user name
- Not be a common word or a common name
- Be significantly different from your previous passwords

### Power-On Password

When a Power-On Password is set, you are prompted to type a valid password each time the server is turned on. The server cannot be used until the valid password is typed in.

### Administrator Password

Setting an Administrator Password deters unauthorized users from changing configuration settings. If you are responsible for maintaining the configuration settings of several servers, you might want to set an Administrator Password.

When an Administrator Password is set, you are prompted to type a valid password each time you try to access the Setup Utility program. The Setup Utility program cannot be accessed until a valid password is typed in.

If both the Power-On Password and Administrator Password are set, you can type either password. However, you must use your Administrator Password to change any configuration settings.

### Hard Disk Password

Setting a Hard Disk Password prevents unauthorized access to the data on the hard disk drive. When a Hard Disk Password is set, you are prompted to type a valid password each time you try to access the hard disk drive.

### Setting, changing, and deleting a password

To set, change, or delete a password, do the following:

1. Start the Setup Utility program. See “Starting the Setup Utility program” on page 49.
2. From the Setup Utility program main menu, select **Security**.
3. Depending on the password type, select **Set Power-On Password**, **Set Administrator Password**, or **Hard Disk Security → Hard Disk Password**.

4. Follow the instructions on the right side of the screen to set, change, or delete a password.

**Note:** A password can be any combination of up to 64 alphabetic and numeric characters. For more information, see “Password considerations” on page 50.

## Enabling or disabling a device

This section provides information on how to enable or disable user access to the following devices:

<b>USB Setup</b>	Use this option to enable or disable a USB connector. When a USB connector is disabled, the device connected to the USB connector cannot be used.
<b>SATA Controller</b>	When this option is set to <b>Disable</b> , all devices connected to the SATA connectors (such as hard disk drives or the optical drive) are disabled and cannot be accessed.
<b>External SATA Port</b>	When this option is set to <b>Disable</b> , the device connected to the External SATA connector cannot be accessed.

To enable or disable a device, do the following:

1. Start the Setup Utility program. See “Starting the Setup Utility program” on page 49.
2. From the Setup Utility program main menu, select **Devices**.
3. Depending on the device you want to enable or disable, do one of the following:
  - Select **USB Setup** to enable or disable a USB device.
  - Select **ATA Drives Setup** to enable or disable an internal or external SATA device.
4. Select the desired settings and press Enter.
5. Press F10 to save and exit the Setup Utility program. See “Exiting from the Setup Utility program” on page 52.

## Selecting a startup device

If your server does not start up from a device such as the disc or hard disk drive as expected, do one of the following to select the startup device of your choice.

### Selecting a temporary startup device

This section provides instructions on how to select a temporary startup device.

**Note:** Not all discs and hard disk drives are bootable.

To select a temporary startup device, do the following:

1. Turn off your server.
2. Repeatedly press and release the F12 key when turning on the server. When the Please select boot device window displays, release the F12 key.
3. Select the desired startup device and press Enter. The server will start up from the device you selected.

**Note:** Selecting a startup device from the Please select boot device window does not permanently change the startup sequence.

## Viewing or changing the startup device sequence

This section provides instructions on how to view or permanently change the configured startup device sequence.

To view or permanently change the configured startup device sequence, do the following:

1. Start the Setup Utility program. See “Starting the Setup Utility program” on page 49.
2. From the Setup Utility program main menu, select **Startup → Primary Boot Sequence**. Read the information displayed on the right side of the screen.
3. Select the first boot device, second boot device, and so on.
4. Press Esc to return to the **Startup** menu. Then, select the devices for the **Automatic Boot Sequence** and **Error Boot Sequence**.
5. Press F10 to save and exit the Setup Utility program. See “Exiting from the Setup Utility program.”

## Advanced settings

On some server models, the **Advanced** menu includes a setting to enable or disable HyperThreading. This feature works only with HyperThreading-aware operating systems. The default setting for HyperThreading is enabled. However, if you are not using a HyperThreading-aware operating system and the setting for HyperThreading is **Enabled**, your server performance might be degraded. Therefore, you should always set HyperThreading to **Disabled** unless you are sure your operating system supports HyperThreading.

## Exiting from the Setup Utility program

After you finish viewing or changing settings, press Esc to return to the Setup Utility program main menu. You might have to press Esc several times. Then, do one of the following:

- If you want to save the new settings, press F10 to save and exit the Setup Utility program.
- If you do not want to save the settings, select **Exit → Discard Changes and Exit**.
- If you want to return to the default settings, press F9 or select **Exit → Load Optimal Defaults**.

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## Configuring RAID

This section provides information about how to configure Redundant Array of Independent Disks (RAID) for your server.

This section provides information on the following topics:

- “RAID Level” on page 53
- “Configuring the system UEFI to enable SATA RAID functionality” on page 53
- “Creating RAID volumes” on page 53
- “Deleting RAID volumes” on page 54

**Note:** The information about configuring RAID in this section is applicable only for a Windows environment. For information about configuring RAID in a Linux environment, contact your Linux software provider.

## RAID Level

Your server must have the minimum number of SATA hard disk drives installed for the supported level of RAID below:

- RAID Level 0 – Striped disk array
  - Two hard disk drives minimum
  - Better performance without fault tolerance
- RAID Level 1 – Mirrored disk array
  - Two hard disk drives minimum
  - Improved read performance and 100% redundancy

To install a secondary hard disk drive, refer to “Installing a secondary hard disk drive” on page 28.

## Configuring the system UEFI to enable SATA RAID functionality

This section describes how to configure the system UEFI to enable SATA RAID functionality.

**Note:** Use the arrow keys on the keyboard to make selections.

To enable SATA RAID functionality, do the following:

1. Start the Setup Utility program. See “Starting the Setup Utility program” on page 49.
2. Select **Devices** → **ATA Drives Setup**.
3. Select **Configure SATA as** and press Enter.
4. Select **RAID** and press Enter.
5. Press F10 to save the new settings and exit the Setup Utility program. See “Exiting from the Setup Utility program” on page 52.

## Creating RAID volumes

This section describes how to use the Intel Matrix Storage Manager option ROM configuration utility to create RAID volumes.

To create RAID volumes, do the following:

1. Press Ctrl+I when prompted to enter the Intel Matrix Storage Manager option ROM configuration utility during the server startup.
2. Use the up and down arrow keys to select **Create RAID Volume** and press Enter.
3. Type a proper RAID Volume name in the **Name** field and press Tab.
4. Use the arrow keys to select a RAID level in the **RAID Level** field and press Tab.
5. If appropriate, use the arrow keys to select a Stripe Size in the **Stripe Size** field and press Tab.
6. Type a volume size in the **Capacity** field and press Tab.
7. Press Enter to initiate volume creation.
8. When prompted, press Y to accept the warning message and create the volume.
9. Return to step 2 to create additional RAID volumes, or select **Exit** and press Enter.

10. Press Y when prompted to confirm the exit.

## Deleting RAID volumes

This section describes how to use the Intel Matrix Storage Manager option ROM configuration utility to delete RAID volumes.

To delete RAID volumes, do the following:

1. Press Ctrl+I when prompted to enter the Intel Matrix Storage Manager option ROM configuration utility during the server startup.
2. Use the up and down arrow keys to select **Delete RAID Volume** and press Enter.
3. Use the arrow keys to select the RAID volume to be deleted and press Delete.
4. When prompted, press Y to confirm the deletion of the selected RAID volume. Deleting a RAID volume will reset the hard disk drives to non-RAID.
5. After deleting a RAID volume, you can:
  - Return to step 2 to delete additional RAID volumes.
  - See “Creating RAID volumes” on page 53 for RAID volume creation.
  - Use the up and down arrow keys to select **Exit** and press Enter.
  - Use the up and down arrow keys to select **Reset Disks to Non-RAID** and press Enter.
    - a. Use the arrow keys and the space key to mark the hard disk drives to be reset, and then press Enter to complete the selection.
    - b. When prompted, press Y to confirm the reset action.
    - c. After completing the Reset Disks to Non-RAID function, you can:
      - Return to step 2 to delete additional RAID volumes.
      - See “Creating RAID volumes” on page 53 for RAID volume creation.
      - Use the up and down arrow keys to select **Exit** and press Enter.

---

## Updating system programs

This section contains information about updating the POST/UEFI and recovering from a POST/UEFI update failure.

This section provides information about the following topics:

- “Using system programs”
- “Updating (flashing) the UEFI from a disc” on page 55
- “Updating (flashing) the UEFI from your operating system” on page 55
- “Recovering from a POST/UEFI update failure” on page 56

## Using system programs

System programs are the basic layer of software built into your server. System programs include the POST, the UEFI code, and the Setup Utility program. The POST is a set of tests and procedures that are performed each time you turn on your server. The UEFI is a layer of software that translates instructions from other layers of software into electrical signals that the server hardware can execute. You can use the Setup Utility program to view and change the configuration and setup of your server.

Your server system board has a module called electrically erasable programmable read-only memory (EEPROM, also referred to as flash memory). You can easily

update the POST, the UEFI, and the Setup Utility program by starting your server with a flash update disc or running a special update program from your operating system.

Lenovo might make changes and enhancements to the POST and UEFI. When updates are released, they are available as downloadable files on the Lenovo Web site at <http://www.lenovo.com>. Instructions for using the POST/UEFI updates are available in a TXT file that is included with the update files. For most models, you can download either an update program to create a system-program-update (flash) disc or an update program that can be run from the operating system.

**Note:** You can download a self-starting bootable CD/DVD image (known as an ISO image) of the diagnostics program to support servers without a diskette drive.

Go to:

<http://www.lenovo.com>

## Updating (flashing) the UEFI from a disc

This section provides instructions on how to update (flash) the UEFI from a disc. The System UEFI program updates are available at:  
<http://www.lenovo.com/support>

To update (flash) the UEFI from a disc, do the following:

1. Turn off your server.
2. Repeatedly press and release the F12 key when turning on the server. When the Please select boot device window displays, release the F12 key.
3. Select the optical drive of your choice as the first boot device.
4. Insert the disc into the optical drive and press Enter. The update begins.
5. When prompted to change the serial number, press N.

**Note:** If you want to change the serial number, press Y when prompted. Type in the serial number and then press Enter.

6. When prompted to change the machine type/model, press N.

**Note:** If you want to change the machine type/model, press Y when prompted. Type in the machine type/model and then press Enter.

7. Follow the instructions on the screen to complete the update. After the update is completed, remove the disc from the optical drive.

## Updating (flashing) the UEFI from your operating system

**Note:** Because Lenovo makes constant improvements to the Web site, the Web page contents are subject to change without notice, including the contents referenced in the following procedure.

To update (flash) the UEFI from your operating system, do the following:

1. Go to <http://www.lenovo.com/support>.
2. Do the following to locate the downloadable files for your machine type:
  - a. In the **Enter a product number** field, type your machine type and click **Go**.
  - b. Click **Downloads and drivers**.
  - c. Select the appropriate UEFI file for your server.
  - d. Click the TXT file that contains the instructions for updating (flashing) the UEFI from your operating system.



3. Print these instructions. This is very important because they are not on the screen after the download begins.
4. Follow the printed instructions to download, extract, and install the update.

## Recovering from a POST/UEFI update failure

If power to your server is interrupted while the POST/UEFI is being updated (flash update), your server might not restart correctly. If this happens, perform the following procedure, which is commonly called Boot-block Recovery.

1. Remove all media from the drives and turn off all attached devices and the server. Then, disconnect all power cords from electrical outlets and disconnect all cables that are connected to the server.
2. Remove the server cover. See “Removing the server cover” on page 18.
3. Locate the Clear CMOS /Recovery jumper on the system board. Refer to “System-board internal connectors” on page 14.
4. Remove all parts and disconnect all cables that might prevent your access to the Clear CMOS /Recovery jumper.

**Note:** You might need to remove the secondary hard disk drive to access the Clear CMOS /Recovery jumper. See “Replacing the secondary hard disk drive” on page 31.

5. Move the jumper from the standard position (pin 1 and pin 2) to the maintenance position (pin 2 and pin 3).
6. Reinstall all parts and reconnect all cables that have been removed.
7. Reinstall the server cover and reconnect the power cords for the server and monitor to electrical outlets. See “Completing the parts replacement” on page 44.
8. Repeatedly press and release the F12 key when turning on the server. When the Please select boot device window displays, release the F12 key.
9. Select the optical drive of your choice as the first boot device.
10. Insert the POST/UEFI update (flash) disc into the optical drive and press Enter. The recovery begins. The recovery session will take two to three minutes. During this time, you will hear a series of beeps.
11. After the recovery session is completed, the series of beeps will end, and the system will automatically turn off.
12. Repeat step 1 through step 4.
13. Move the Clear CMOS /Recovery jumper back to the standard position (pin 1 and pin 2).
14. Reinstall all parts and reconnect all cables that have been removed.
15. Reinstall the server cover and reconnect all the power cords and other cables. See “Completing the parts replacement” on page 44.
16. Turn on the server and remove the disc from the optical drive.

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## Using the ThinkServer EasyStartup program

The ThinkServer EasyStartup program simplifies the process of installing the operating system and device drivers by performing the following tasks:

- Detects installed hardware devices
- Guides you through the process of creating a response file
- Prepares the hard disk drive for installation
- Prompts you to insert the operating-system installation disc



- Initiates an unattended installation of the operating system and device drivers for most adapters and devices

The program is contained on the *ThinkServer EasyStartup* DVD provided with your server. If you did not receive the DVD with your server, you can download an ISO image of the DVD from <http://www.lenovo.com/support>. The program has a built-in help system and User Guide to answer questions you might have. The program also provides compatibility notes to help you determine what server configurations and operating systems are supported by that specific version of the program.

The ThinkServer EasyStartup program also enables you to save the response file on a USB device for reuse, and an option that enables you to install an operating system using the saved response file. This option is useful if you intend to install the same operating system on similarly configured ThinkServer servers.

#### Notes:

1. If you intend to implement a RAID, make sure your storage controller or RAID adapter is configured correctly before you use the ThinkServer EasyStartup program to install the operating system.
2. If you are using any external storage devices or fiber channels, use the utilities provided with the device. You also will have to provide the device drivers for these devices and install them after the EasyStartup program finishes installing the operating system.
3. The *ThinkServer EasyStartup* DVD requires that you have a DVD drive that is configured as your first device in the startup sequence. Use the Setup Utility program to view or change your startup sequence. See “Viewing or changing the startup device sequence” on page 52.
4. To install an operating system, you need the operating system installation disc (CD or DVD) and the associated product key, if one was provided.

To start the *ThinkServer EasyStartup* DVD, do the following:

1. Insert the *ThinkServer EasyStartup* DVD and restart the server. If the EasyStartup program does not start, see “EasyStartup problems” on page 60.
2. Follow the instructions on the screen and continue to the main interface.
3. When you arrive at the Home screen, do any of the following:
  - Click **Compatibility notes** to view detailed information about the operating systems and server configurations supported by that version of the EasyStartup program.
  - Click **User Guide** to view an overview of the various functions provided by that version of the EasyStartup program.
  - Click **Hardware list** to view a list of hardware detected by the ThinkServer EasyStartup program.
  - Click **Install operating system** to begin the process of creating a response file and installing the operating system. As part of this procedure you will be given the opportunity to include the ThinkServer EasyManage Agent as part of the installation process. You also can provide one or more command-line based instructions to run at the end of the operating system installation process.
  - Click **About** to view version information and legal notices.

To use the *ThinkServer EasyStartup* DVD to install an operation system using a preexisting response file, do the following:

1. Insert the *ThinkServer EasyStartup* DVD and restart the server. If the EasyStartup program does not start, see “EasyStartup problems” on page 60.
2. Follow the instructions on the screen until you get to the Start option screen.
3. When the Start option screen is displayed, do the following:
  - a. Insert the USB device that contains the response file.
  - b. Select **Install the operating system using a preexisting response file**.
  - c. Click **OK**.
4. Follow the remaining instructions on the screen to complete the procedure.

---

## Installing ThinkServer EasyManage Agent

To install the ThinkServer EasyManage Agent, you must already have a core server running the ThinkServer EasyManage Core Server program. The ThinkServer EasyManage Agent must be installed from that core server. Refer to the ThinkServer EasyManage Core Server documentation about Agent deployment for instructions on the various ways to deploy the ThinkServer EasyManage Agent to your new server.

Also, the ThinkServer EasyStartup program provides an option to install the ThinkServer EasyManage Agent as part of the operating system installation process.

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## Chapter 7. Troubleshooting and diagnostics

This chapter describes some basic troubleshooting and diagnostic programs. If your server problem is not described here, see Chapter 8, “Getting help and technical assistance,” on page 63 for additional troubleshooting resources.

This chapter provides information about the following topics:

- “Basic troubleshooting”
- “PC-Doctor for DOS” on page 60

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### Basic troubleshooting

The following tables provide information to help you troubleshoot your server problems.

**Note:** If you cannot correct the problem, have the server serviced. For a list of service and support telephone numbers, refer to the *Warranty and Support Information* document available on the *ThinkServer Documentation* DVD or go to the Lenovo Support Web site at:  
<http://www.lenovo.com/support/phone>

### General problems

The following table describes the general problems and suggested actions to correct detected problems.

Symptom	Action
The server does not start when you press the power switch.	Verify that: <ul style="list-style-type: none"><li>• The power cord is correctly connected to the rear of the server and to a working electrical outlet.</li><li>• If your server has a secondary power switch on the rear of the server, make sure that it is switched on.</li><li>• The power indicator on the front of the server is on.</li><li>• The server voltage matches the voltage available at the electrical outlet for your country or region.</li></ul>
The monitor screen is blank.	Verify that: <ul style="list-style-type: none"><li>• The monitor signal cable is correctly connected to the monitor and to the appropriate monitor connector on the server.</li><li>• The monitor power cord is correctly connected to the monitor and to a working electrical outlet.</li><li>• The monitor is turned on and the brightness and contrast controls are set correctly.</li><li>• The server voltage matches the voltage available at the electrical outlet for your country or region.</li><li>• If your server has two monitor connectors, be sure to use the connector on the graphics card.</li></ul>
The operating system does not start.	Verify that: <ul style="list-style-type: none"><li>• The startup sequence includes the device where the operating system resides. Usually, the operating system is on the hard disk drive. For more information, see “Selecting a startup device” on page 51.</li></ul>

Symptom	Action
The server beeps multiple times before the operating system starts.	Verify that no keys are stuck.

## EasyStartup problems

The following table describes the EasyStartup problems and suggested actions to correct detected problems.

Table 3. ThinkServer EasyStartup DVD

<ul style="list-style-type: none"> <li>Follow the suggested actions in the order in which they are listed in the Action column until the problem is resolved.</li> <li>See the <i>Hardware Maintenance Manual</i> to determine which components are customer replaceable units (CRUs) and which components are field replaceable units (FRUs).</li> </ul>	
Symptom	Action
The <i>ThinkServer EasyStartup</i> DVD will not start.	<ul style="list-style-type: none"> <li>Make sure the server supports the EasyStartup program and has a startable (bootable) DVD drive.</li> <li>If the startup (boot) sequence settings have been changed, make sure the DVD drive is first in the startup sequence.</li> <li>If more than one DVD drive is installed, make sure that only one DVD drive is set as the primary drive. Start the EasyStartup DVD from the primary DVD drive.</li> </ul>
The operating-system installation program continuously loops.	Make more space available on the hard disk drive.
The EasyStartup program will not start the operating-system medium.	Make sure that the operating-system medium is supported by the EasyStartup program. See the <i>EasyStartup User Guide</i> for a list of supported operating-system versions. The <i>EasyStartup User Guide</i> and compatibility notes are available through the EasyStartup program.

## PC-Doctor for DOS

You can also download the latest version of the PC-Doctor for DOS diagnostic program from <http://www.lenovo.com/support>. The PC-Doctor for DOS diagnostic program runs independently of the Windows operating system. Use the PC-Doctor for DOS diagnostic program if you are unable to start the Windows operating system. You can run the PC-Doctor for DOS diagnostic program from a diagnostic disc that you created.

## Creating a diagnostic disc

This section provides instructions on how to create a diagnostic disc.

To create a diagnostic disc, do the following:

- Download a self-starting bootable CD/DVD image (known as an ISO image) of the diagnostic program from:  
<http://www.lenovo.com/support>
- Use any CD/DVD burning software to create a diagnostic disc with the ISO image.

## Running the diagnostic program from a diagnostic disc

This section provides instructions on how to run the diagnostic program from a diagnostic disc that you created.

To run the diagnostic program from a diagnostic disc that you created, do the following:

1. Turn off your server.
2. Repeatedly press and release the F12 key when turning on the server. When the Please select boot device window displays, release the F12 key.
3. Select the optical drive of your choice as the first boot device.
4. Insert the diagnostic disc into the optical drive and press Enter. The diagnostic program opens.
5. Follow the instructions on the screen to select the diagnostic test you want to run.

**Note:** For additional help, press the F1 key.

6. Remove the diagnostic disc from the optical drive when you complete the diagnostic process.



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## Chapter 8. Getting help and technical assistance

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

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### Before you call

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

- Check all cables to make sure that they are connected.
- Check the power switches to make sure that the system and any optional devices are turned on.
- Use the troubleshooting information in your system documentation, and use the diagnostic tools that come with your system. Information about diagnostic tools is in the *Hardware Maintenance Manual*.
- Go to the Lenovo Support Web site at <http://www.lenovo.com/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 using the information available on the Lenovo Support Web site or by following the troubleshooting procedures that Lenovo provides in the documentation that is provided with your Lenovo product. The documentation that comes with Lenovo systems also describes the diagnostic tests that you can perform. Most systems, operating systems, and programs come with documentation that contains troubleshooting procedures and explanations of error messages and error codes. If you suspect a software problem, see the documentation for the operating system or program.

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### Using the documentation

Information about your Lenovo system and preinstalled software, if any, or optional device is available in the documentation that comes with the product. That documentation can include printed documents, online documents, readme files, and help files. Most of the documentation for your server is on the *ThinkServer Documentation DVD* provided with your server. 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. Lenovo 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.lenovo.com/support> and follow the instructions.

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## Getting help and information from the World Wide Web

On the World Wide Web, the Lenovo Web site has up-to-date information about Lenovo systems, optional devices, services, and support. For general information about Lenovo products or to purchase Lenovo products, go to <http://www.lenovo.com>. For support on Lenovo products, go to <http://www.lenovo.com/support>

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## Calling for service

During the warranty period, you can get help and information by telephone through the Customer Support Center.

These services are available during the warranty period:

- **Problem determination** - Trained personnel are available to assist you with determining a hardware problem and deciding what action is necessary to fix the problem.
- **Hardware repair** - If the problem is caused by hardware under warranty, trained service personnel are available to provide the applicable level of service.
- **Engineering Change management** - There might be changes that are required after a product has been sold. Lenovo or your reseller will make selected Engineering Changes (ECs) available that apply to your hardware.

These items are not covered by the warranty:

- Replacement or use of parts not manufactured for or by Lenovo or non-warranted Lenovo parts
- Identification of software problem sources
- Configuration of the UEFI as part of an installation or upgrade
- Changes, modifications, or upgrades to device drivers
- Installation and maintenance of network operating systems (NOS)
- Installation and maintenance of application programs

Refer to the safety and warranty information that is provided with your server for a complete explanation of warranty terms. You must retain your proof of purchase to obtain warranty service.

For a list of service and support phone numbers for your country or region, go to <http://www.lenovo.com/support> and click **Support phone list** or refer to the safety and warranty information provided with your computer.

**Note:** Phone numbers are subject to change without notice. If the number for your country or region is not provided, contact your Lenovo reseller or Lenovo marketing representative.

If possible, be at your computer when you call. Have the following information available:

- Machine type and model
- Serial numbers of your Lenovo hardware products
- Description of the problem
- Exact wording of any error messages
- Hardware and software configuration information



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## Using other services

If you travel with your computer or relocate it to a country where your desktop, notebook, or server machine type is sold, your computer might be eligible for International Warranty Service, which automatically entitles you to obtain warranty service throughout the warranty period. Service will be performed by service providers authorized to perform warranty service.

Service methods and procedures vary by country, and some services might not be available in all countries. International Warranty Service is delivered through the method of service (such as depot, carry-in, or on-site service) that is provided in the servicing country. Service centers in certain countries might not be able to service all models of a particular machine type. In some countries, fees and restrictions might apply at the time of service.

To determine whether your computer is eligible for International Warranty Service and to view a list of the countries where service is available, go to <http://www.lenovo.com/support>, click **Warranty**, and follow the instructions on the screen.

For technical assistance with the installation of, or questions related to, Service Packs for your preinstalled Microsoft Windows product, refer to the Microsoft Product Support Services Web site at <http://www.support.microsoft.com/directory/>, or you can contact the Customer Support Center. Some fees might apply.

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## Purchasing additional services

During and after the warranty period, you can purchase additional services, such as support for hardware, operating systems, and application programs; network setup and configuration; upgraded or extended hardware repair services; and custom installations. Service availability and service name might vary by country or region. For more information about these services, go to the Lenovo Web site at: <http://www.lenovo.com/>



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## Appendix. Notices

Lenovo may not offer the products, services, or features discussed in this document in all countries. Consult your local Lenovo representative for information on the products and services currently available in your area. Any reference to a Lenovo product, program, or service is not intended to state or imply that only that Lenovo product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any Lenovo intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any other product, program, or service.

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Any references in this publication to non-Lenovo Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this Lenovo product, and use of those Web sites is at your own risk.

Any performance data contained herein was determined in a controlled environment. Therefore, the result obtained in other operating environments may

vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurements may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

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## Export classification notice

This product is subject to the United States Export Administration Regulations (EAR) and has an Export Classification Control Number (ECCN) of 4A994.b. It can be re-exported except to any of the embargoed countries in the EAR E1 country list.

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## Television output notice

The following notice applies to models that have the factory-installed television-output feature.

This product incorporates copyright protection technology that is protected by method claims of certain U.S. patents and other intellectual property rights owned by Macrovision Corporation and other rights owners. Use of this copyright protection technology must be authorized by Macrovision Corporation, and is intended for home and other limited viewing uses only unless otherwise authorized by Macrovision Corporation. Reverse engineering or disassembly is prohibited.

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## European conformance CE mark



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## Trademarks

The following terms are trademarks of Lenovo in the United States, other countries, or both:

- Lenovo
- The Lenovo logo
- ThinkServer

Microsoft, Windows, and Windows Server are trademarks of the Microsoft group of companies.

Celeron, Intel, Intel Core, and Pentium are trademarks of Intel Corporation in the United States, other countries, or both.

Linux is a registered trademark of Linus Torvalds in the United States, other countries, or both.

Other company, product, or service names may be trademarks or service marks of others.

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## Electronic emissions notices

The following information applies to Lenovo server machine types 0981, 0992, 1008, and 1010.

### Federal Communications Commission Declaration of Conformity

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee the interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult an authorized dealer or service representative for help.

Lenovo is not responsible for any radio or television interference caused by using other than specified or recommended cables or 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.

Responsible party:

Lenovo (United States) Incorporated  
1009 Think Place - Building One  
Morrisville, NC 27560  
U.S.A.  
Telephone: (919) 294-5900



### Industry Canada Class B emission compliance statement

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

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

## European Union EMC Directive conformance statement

This product is in conformity with the protection requirements of EU Council Directive 2004/108/EC on the approximation of the laws of the Member States relating to electromagnetic compatibility. Lenovo cannot accept responsibility for any failure to satisfy the protection requirements resulting from a nonrecommended modification of the product, including the installation of option cards from other manufacturers.

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

## EU-EMC Directive (2004/108/EC) EN 55022 class B Statement of Compliance



**Deutschsprachiger EU Hinweis:**

### **Hinweis für Geräte der Klasse B EU-Richtlinie zur Elektromagnetischen Verträglichkeit**

Dieses Produkt entspricht den Schutzanforderungen der EU-Richtlinie 2004/108/EG (früher 89/336/EWG) zur Angleichung der Rechtsvorschriften über die elektromagnetische Verträglichkeit in den EU-Mitgliedsstaaten und hält die Grenzwerte der EN 55022 Klasse B ein.

Um dieses sicherzustellen, sind die Geräte wie in den Handbüchern beschrieben zu installieren und zu betreiben. Des Weiteren dürfen auch nur von der Lenovo empfohlene Kabel angeschlossen werden. Lenovo übernimmt keine Verantwortung für die Einhaltung der Schutzanforderungen, wenn das Produkt ohne Zustimmung der Lenovo verändert bzw. wenn Erweiterungskomponenten von Fremdherstellern ohne Empfehlung der Lenovo gesteckt/eingebaut werden.

### **Deutschland: Einhaltung des Gesetzes über die elektromagnetische Verträglichkeit von Betriebsmitteln**

Dieses Produkt entspricht dem "Gesetz über die elektromagnetische Verträglichkeit von Betriebsmitteln" EMVG (früher "Gesetz über die elektromagnetische Verträglichkeit von Geräten"). Dies ist die Umsetzung der EU-Richtlinie 2004/108/EG (früher 89/336/EWG) in der Bundesrepublik Deutschland.

**Zulassungsbescheinigung laut dem Deutschen Gesetz über die elektromagnetische Verträglichkeit von Betriebsmitteln, EMVG vom 20. Juli 2007 (früher "Gesetz über die elektromagnetische Verträglichkeit von Geräten"), bzw. der EMV EG Richtlinie 2004/108/EC (früher 89/336/EWG), für Geräte der Klasse B.**

Dieses Gerät ist berechtigt, in Übereinstimmung mit dem Deutschen EMVG das EG-Konformitätszeichen - CE - zu führen. Verantwortlich für die Konformitätserklärung nach Paragraf 5 des EMVG ist die Lenovo (Deutschland) GmbH, Gropiusplatz 10, D-70563 Stuttgart.

Informationen in Hinsicht EMVG Paragraf 4 Abs. (1) 4:  
Das Gerät erfüllt die Schutzanforderungen nach EN 55024 und EN 55022  
Klasse B.

## Japanese VCCI Class B statement

この装置は、クラスB情報技術装置です。この装置は、家庭環境で使用するこ  
とを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使  
用されると、受信障害を引き起こすことがあります。  
取扱説明書に従って正しい取り扱いをして下さい。

VCCI-B

## Japanese compliance for products less than or equal to 20 A per phase

日本の定格電流が 20A/相 以下の機器に対する高調波電流規制  
高調波電流規格 JIS C 61000-3-2 適合品

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## Federal Communications Commission (FCC) and telephone company requirements

1. This device complies with Part 68 of the FCC rules. A label is affixed to the device that contains, among other things, the FCC registration number, USOC, and Ringer Equivalency Number (REN) for this equipment. If these numbers are requested, provide this information to your telephone company.

**Note:** If the device is an internal modem, a second FCC registration label is also provided. You may attach the label to the exterior of the computer in which you install the Lenovo modem, or you may attach the label to the external DAA, if you have one. Place the label in a location that is easily accessible, should you need to provide the label information to the telephone company.

2. The REN is useful to determine the quantity of devices you may connect to your telephone line and still have those devices ring when your number is called. In most, but not all areas, the sum of the RENs of all devices should not exceed five (5). To be certain of the number of devices you may connect to your line, as determined by the REN, you should call your local telephone company to determine the maximum REN for your calling area.
3. If the device causes harm to the telephone network, the telephone company may discontinue your service temporarily. If possible, they will notify you in advance; if advance notice is not practical, you will be notified as soon as possible. You will be advised of your right to file a complaint with the FCC.
4. Your telephone company may make changes in its facilities, equipment, operations, or procedures that could affect the proper operation of your equipment. If they do, you will be given advance notice to give you an opportunity to maintain uninterrupted service.
5. If you experience trouble with this product, contact your authorized reseller or call the Customer Support Center. In the United States, call **1-800-426-7378**. In Canada, call **1-800-565-3344**. You may be required to present proof of purchase. The telephone company may ask you to disconnect the device from the network until the problem has been corrected, or until you are sure the device is not malfunctioning.
6. No customer repairs are possible to the device. If you experience trouble with the device, contact your Authorized Reseller or see the Diagnostics section of this manual for information.

7. This device may not be used on coin service provided by the telephone company. Connection to party lines is subject to state tariffs. Contact your state public utility commission or corporation commission for information.
8. When ordering network interface (NI) service from the local Exchange Carrier, specify service arrangement USOC RJ11C.

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## Canadian Department of Communications certification label

**NOTICE:** The Industry Canada label identifies certified equipment. This certification means that the equipment meets telecommunications network protective, operational and safety requirements as prescribed in the appropriate Terminal Equipment Technical Requirements documents. The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations. Repairs to certified equipment should be coordinated by a representative designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines, and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

**CAUTION:**

**Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.**

**NOTICE:** The Ringer Equivalence Number (REN) assigned to each terminal device provides an indication of the maximum number of terminals allowed to be connected to a telephone interface. The termination on an interface may consist of any combination of devices subject only to the requirement that the sum of the Ringer Equivalence Numbers of all the devices does not exceed 5.

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## Power cord notice

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

Power cords provided by Lenovo in the United States and Canada are listed by Underwriters 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, 127 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.

Power cords provided by Lenovo for a specific country or region are usually available only in that country or region.

For units intended to be operated in Germany: The power cords shall be safety approved. For Germany, it shall be H05VV-F, 3G, 0.75 mm<sup>2</sup>, or better. For other countries, the suitable types shall be used accordingly.

Power cord part number	Used in these countries and regions
41R3175 or 41R3341	India
41R3176 or 41R3177	Argentina, Paraguay, Uruguay
41R3184 or 41R3185	Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Canada, Cayman Islands, Costa Rica, Columbia, Cuba, Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Honduras, Jamaica, Mexico, Micronesia (Federal States of), Montserrat, Netherlands Antilles, Nicaragua, Panama, Peru, Philippines, Saudi Arabia, Thailand, Turks and Caicos Islands, United States, Venezuela, Virgin Islands
41R3196 or 41R3197	Australia, Fiji, Kiribati, Nauru, New Zealand, Papua New Guinea
41R3208 or 41R3209	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), Côte d'Ivoire (Ivory Coast), Croatia (Republic of), Czech Republic, Djibouti, Egypt, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Finland, France, French Guyana, French Polynesia, Gabon, Georgia, 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, 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
41R3212 or 41R3213	Denmark
41R3220 or 41R3221	Bangladesh, Lesotho, Macao S.A.R. of China, Maldives, Namibia, Nepal, Pakistan, Samoa, South Africa, Sri Lanka, Swaziland, Uganda

Power cord part number	Used in these countries and regions
41R3224 or 41R3225	Abu Dhabi, Bahrain, Botswana, Brunei Darussalam, Channel Islands, Cyprus, Dominica, Gambia, Ghana, Grenada, Guyana, Hong Kong S.A.R. of China, Iraq, Ireland, Jordan, Kenya, Kuwait, Liberia, Malawi, Malaysia, Malta, Myanmar (Burma), Nigeria, Oman, 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
41R3228 or 41R3229	Liechtenstein, Switzerland
41R3232 or 41R3233	Chile, Italy, Libya Arab Jamahiriya
41R3236 or 41R3237	Israel
43N9057 or 43N9058	Japan
41R3256 or 41R3257	China
41R3260 or 41R3261	Korea (Democratic People's Republic of), Korea (Republic of)
41R3271 or 45J9595	Brazil
41R3278 or 41R3279	Taiwan
43N9029 or 43N9030	Thailand
41R3175 or 41R3341	India

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## Polyvinyl Chloride (PVC) cable and cord notice

**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.*

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## Turkish statement of compliance

The Lenovo product meets the requirements of the Republic of Turkey Directive on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (EEE).

### Türkiye EEE Yönetmeliğine Uygunluk Beyanı

Bu Lenovo ürünü, T.C. Çevre ve Orman Bakanlığı'nın "Elektrik ve Elektronik Eşyalarda Bazı Zararlı Maddelerin Kullanımının Sınırlandırılmasına Dair Yönetmelik (EEE)" direktiflerine uygundur.

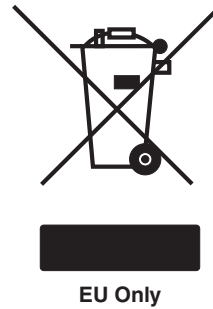
EEE Yönetmeliğine Uygundur.

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## Waste electrical and electronic equipment (WEEE) notices

Lenovo encourages owners of information technology (IT) equipment to responsibly recycle their equipment when it is no longer needed. Lenovo offers a variety of programs and services to assist equipment owners in recycling their IT products. For information on recycling Lenovo products, go to:  
<http://www.lenovo.com/lenovo/environment/recycling>

## European Union (EU) WEEE statement



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

Users of electrical and electronic equipment (EEE) with the WEEE marking per Annex IV of the WEEE Directive must not dispose of end of life EEE as unsorted municipal waste, but use the collection framework available to them for the return, recycle, recovery of WEEE and minimize any potential effects of EEE on the environment and human health due to the presence of hazardous substances. For additional WEEE information, go to:  
<http://www.lenovo.com/lenovo/environment>

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## Japanese recycling statement

### Collecting and recycling a disused Lenovo computer or monitor

If you are a company employee and need to dispose of a Lenovo computer or monitor that is the property of the company, you must do so in accordance with the Law for Promotion of Effective Utilization of Resources. Computers and monitors are categorized as industrial waste and should be properly disposed of by an industrial waste disposal contractor certified by a local government. In accordance with the Law for Promotion of Effective Utilization of Resources, Lenovo Japan provides, through its PC Collecting and Recycling Services, for the collecting, reuse, and recycling of disused computers and monitors. For details, go to <http://www.ibm.com/jp/pc/service/recycle/pcrecycle>.

Pursuant to the Law for Promotion of Effective Utilization of Resources, the collecting and recycling of home-used computers and monitors by the manufacturer was begun on October 1, 2003. This service is provided free of charge for home-used computers sold after October 1, 2003. For details, go to: <http://www.ibm.com/jp/pc/service/recycle/personal>

### Disposing of Lenovo computer components

Some Lenovo computer products sold in Japan may have components that contain heavy metals or other environmental sensitive substances. To properly dispose of

disused components, such as a printed circuit board or drive, use the methods described above for collecting and recycling a disused computer or monitor.

## Disposing of disused lithium batteries from Lenovo computers

A button-shaped lithium battery is installed on the system board of your Lenovo computer to provide power to the computer clock while the computer is off or disconnected from the main power source. If you want to replace it with a new one, contact your place of purchase or ask for a repair service provided by Lenovo. If you have replaced it by yourself and want to dispose of the disused lithium battery, insulate it with vinyl tape, contact your place of purchase, and follow their instructions. If you use a Lenovo computer at home and need to dispose of a lithium battery, you must comply with local ordinances and regulations.

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## ENERGY STAR model information



ENERGY STAR® is a joint program of the U.S. Environmental Protection Agency and the U.S. Department of Energy aimed at saving money and protecting the environment through energy efficient products and practices.

Lenovo is proud to offer our customers products with an ENERGY STAR compliant designation. Some models of the following machine types have been designed and tested to conform to the ENERGY STAR program requirements for computer servers at the time of manufacture.

- 0981
- 0992
- 1008
- 1010

For more information about ENERGY STAR ratings for Lenovo servers, go to:  
<http://www.lenovo.com>

By using ENERGY STAR compliant products, you reduce the consumption of electricity. Reduced electrical consumption contributes to potential financial savings, a cleaner environment, and the reduction of greenhouse gas emissions. For more information about ENERGY STAR, go to:  
<http://www.energystar.gov>

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