Lenovo

ThinkCentre®

ThinkCentre M800 and M900 User Guide

Machine Types: 10FC, 10FD, 10FV, and 10FW

Note: Before using this information and the product it supports, be sure to read and understand the "Read this first: Important safety information" on page iii and Appendix F "Notices" on page 97.

Contents

Read this first: Important safety information

This chapter contains the safety information that you must be familiar with.

Before using this manual

CAUTION:
Before using this manual, be sure to read and understand all the related safety information for this product. Refer to the information in this section and the safety information in the *Safety, Warranty, and Setup Guide* **that you received with this product. Reading and understanding this safety information reduces the risk of personal injury and damage to your product.**

If you no longer have a copy of the *Safety, Warranty, and Setup Guide*, you can obtain a Portable Document Format (PDF) version from the Lenovo® Support Web site at http://www.lenovo.com/UserManuals. The Lenovo Support Web site also provides the *Safety, Warranty, and Setup Guide* and this *User Guide* in additional languages.

Service and upgrades

Do not attempt to service a product yourself unless instructed to do so by the Customer Support Center or your documentation. Only use a Service Provider who is approved to repair your particular product.

Note: Some computer parts can be upgraded or replaced by the customer. Upgrades typically are referred to as options. Replacement parts approved for customer installation are referred to as Customer Replaceable Units, or CRUs. Lenovo provides documentation with instructions when it is appropriate for customers to install options or replace CRUs. You must closely follow all instructions when installing or replacing parts. The Off state of a power indicator does not necessarily mean that voltage levels inside a product are zero. Before you remove the covers from a product equipped with a power cord, always ensure that the power is turned off and that the product is unplugged from any power source. For more information on CRUs, refer to Chapter 7 "Installing or replacing hardware" on page 53. If you have any questions or concerns, contact the Customer Support Center.

Although there are no moving parts in your computer after the power cord has been disconnected, the following warnings are required for your safety.

CAUTION:
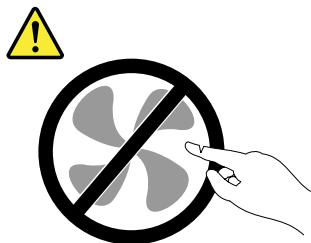
Hazardous moving parts. Keep fingers and other body parts away.

CAUTION:

Before you open the computer cover, turn off the computer and wait several minutes until the computer is cool.

Static electricity prevention

Static electricity, although harmless to you, can seriously damage computer components and options. Improper handling of static-sensitive parts can cause damage to the part. When you unpack an option or CRU, do not open the static-protective package containing the part until the instructions direct you to install it.

When you handle options or CRUs, or perform any work inside the computer, take the following precautions to avoid static-electricity damage:

• Limit your movement. Movement can cause static electricity to build up around you.

• Always handle components carefully. Handle adapters, memory modules, and other circuit boards by the edges. Never touch exposed circuitry.

• Prevent others from touching components.

• When you install a static-sensitive option or CRU, touch the static-protective package containing the part to a metal expansion-slot cover or other unpainted metal surface on the computer for at least two seconds. This reduces static electricity in the package and your body.

• When possible, remove the static-sensitive part from the static-protective packaging and install the part without setting it down. When this is not possible, place the static-protective packaging on a smooth, level surface and place the part on it.

• Do not place the part on the computer cover or other metal surface.

Power cords and power adapters

Use only the power cords and power adapters supplied by the product manufacturer. Do not use the ac power cord for other devices.

The power cords shall be safety approved. For Germany, it shall be H05VV-F, 3G, 0.75 mm^2, or better. For other countries, the suitable types shall be used accordingly.

Never wrap a power cord around a power adapter or other object. Doing so can stress the cord in ways that can cause the cord to fray, crack, or crimp. This can present a safety hazard.

Always route power cords so that they will not be walked on, tripped over, or pinched by objects.

Protect power cord and power adapters from liquids. For instance, do not leave your power cord or power adapter near sinks, tubs, toilets, or on floors that are cleaned with liquid cleansers. Liquids can cause a short circuit, particularly if the power cord or power adapter has been stressed by misuse. Liquids also can cause gradual corrosion of power cord terminals and/or the connector terminals on a power adapter, which can eventually result in overheating.

Ensure that all power cord connectors are securely and completely plugged into receptacles.

Do not use any power adapter that shows corrosion at the ac input pins or shows signs of overheating (such as deformed plastic) at the ac input or anywhere on the power adapter.

Do not use any power cords where the electrical contacts on either end show signs of corrosion or overheating or where the power cord appears to have been damaged in any way.

Extension cords and related devices

Ensure that extension cords, surge protectors, uninterruptible power supplies, and power strips that you use are rated to handle the electrical requirements of the product. Never overload these devices. If power strips are used, the load should not exceed the power strip input rating. Consult an electrician for more information if you have questions about power loads, power requirements, and input ratings.

Plugs and outlets

If a receptacle (power outlet) that you intend to use with your computer equipment appears to be damaged or corroded, do not use the outlet until it is replaced by a qualified electrician.

Do not bend or modify the plug. If the plug is damaged, contact the manufacturer to obtain a replacement.

Do not share an electrical outlet with other home or commercial appliances that draw large amounts of electricity; otherwise, unstable voltage might damage your computer, data, or connected devices.

Some products are equipped with a three-pronged plug. This plug fits only into a grounded electrical outlet. This is a safety feature. Do not defeat this safety feature by trying to insert it into a non-grounded outlet. If you cannot insert the plug into the outlet, contact an electrician for an approved outlet adapter or to replace the outlet with one that enables this safety feature. Never overload an electrical outlet. The overall system load should not exceed 80 percent of the branch circuit rating. Consult an electrician for more information if you have questions about power loads and branch circuit ratings.

Be sure that the power outlet you are using is properly wired, easily accessible, and located close to the equipment. Do not fully extend power cords in a way that will stress the cords.

Be sure that the power outlet provides the correct voltage and current for the product you are installing.

Carefully connect and disconnect the equipment from the electrical outlet.

External devices

Do not connect or disconnect any external device cables other than Universal Serial Bus (USB) cables while the computer power is on; otherwise, you might damage your computer. To avoid possible damage to connected devices, wait at least five seconds after the computer is shut down to disconnect external devices.

Heat and product ventilation

Computers, power adapters, and many accessories can generate heat when turned on and when batteries are charging. Always follow these basic precautions:

- Do not leave your computer, power adapter, or accessories in contact with your lap or any part of your body for an extended period when the products are functioning or when the battery is charging. Your computer, power adapter, and many accessories produce some heat during normal operation. Extended contact with the body could cause discomfort or, potentially, a skin burn.
- Do not charge the battery or operate your computer, power adapter, or accessories near flammable materials or in explosive environments.
- Ventilation slots, fans, and heat sinks are provided with the product for safety, comfort, and reliable operation. These features might inadvertently become blocked by placing the product on a bed, sofa, carpet, or other flexible surface. Never block, cover, or disable these features.

Inspect your desktop computer for dust accumulation at least once every three months. Before inspecting your computer, turn off the power and unplug the computer's power cord from the electrical outlet; then remove any dust from vents and perforations in the bezel. If you notice external dust accumulation, then examine and remove dust from the inside of the computer including heat sink inlet fins, power supply vents, and fans. Always turn off and unplug the computer before opening the cover. If possible, avoid operating your computer within two feet of high-traffic areas. If you must operate your computer in or near a high-traffic area, inspect and, if necessary, clean your computer more frequently.

For your safety and to maintain optimum computer performance, always follow these basic precautions with your desktop computer:

• Keep the cover closed whenever the computer is plugged in.

• Regularly inspect the outside of the computer for dust accumulation.

• Remove dust from vents and any perforations in the bezel. More frequent cleanings might be required for computers in dusty or high-traffic areas.

• Do not restrict or block any ventilation openings.

• Do not store or operate your computer inside furniture, as this might increase the risk of overheating.

• Airflow temperatures into the computer should not exceed 35°C (95°F).

• Do not install air filtration devices. They may interfere with proper cooling.

Operating environment

The optimal environment in which to use your computer is 10°C–35°C (50°F–95°F) with humidity ranging between 35% and 80%. If your computer is stored or transported in temperatures less than 10°C (50°F), allow the cold computer to rise slowly to an optimal operating temperature of 10°C–35°C (50°F–95°F) before use. This process could take two hours in extreme conditions. Failure to allow your computer to rise to an optimal operating temperature before use could result in irreparable damage to your computer.

If possible, place your computer in a well-ventilated and dry area without direct exposure to sunshine.

Keep electrical appliances such as an electric fan, radio, high-powered speakers, air conditioner, and microwave oven away from your computer because the strong magnetic fields generated by these appliances can damage the monitor and data on the storage drive.

Do not place any beverages on top of or beside the computer or other connected devices. If liquid is spilled on or in the computer or a connected device, a short circuit or other damage might occur.

Do not eat or smoke over your keyboard. Particles that fall into your keyboard can cause damage.

Laser compliance statement

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.**

Power supply statement

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.

Cleaning and maintenance

Keep your computer and workspace clean. Shut down the computer and then disconnect the power cord before cleaning the computer. Do not spray any liquid detergent directly on the computer or use any detergent containing flammable material to clean the computer. Spray the detergent on a soft cloth and then wipe the computer surfaces.

Chapter 1. Product overview

This chapter provides information about the following topics:

- "Hardware locations" on page 1
- "Features" on page 7
- "Specifications" on page 11
- "Programs" on page 11

Hardware locations

This section provides information about the locations of your computer hardware.

Note: The computer hardware might look slightly different from the illustrations.

Front view
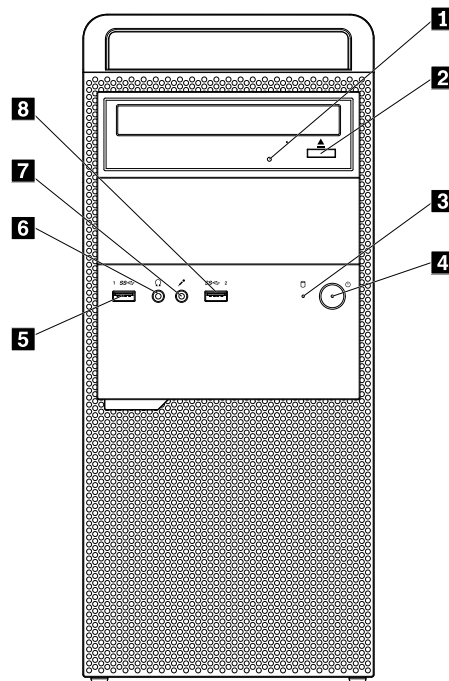
Figure 1. Front view

1 Optical drive activity indicator	**2** Optical drive eject/close button
3 Storage drive activity indicator	**4** Power button
5 USB 3.0 connector	**6** Headphone connector
7 Microphone connector	**8** USB 3.0 connector

- **Headphone connector**

  Used to connect headphones to your computer.

- **Microphone connector**

  Used to connect a microphone to your computer. You can use the microphone to record sounds or use speech-recognition software.

- **Optical drive eject/close button**

  Used to eject the tray of the optical drive from the drive. After you insert a disc into the tray, press the eject/close button to close the tray.

- **Optical drive activity indicator**

  When the optical drive activity indicator is on, the optical drive is in use.

- **Power button**

  Used to turn on your computer. You also can use the power button to turn off your computer only when you cannot use any Microsoft® Windows® shutdown procedure to turn off your computer.

- **Storage drive activity indicator**

  When the storage drive activity indicator is on, the storage drives are in use.

- **USB 3.0 connector**

  Used to connect a device that requires a USB 2.0 or USB 3.0 connection, such as a keyboard, a mouse, a scanner, a printer, or a personal digital assistant (PDA).

Rear view
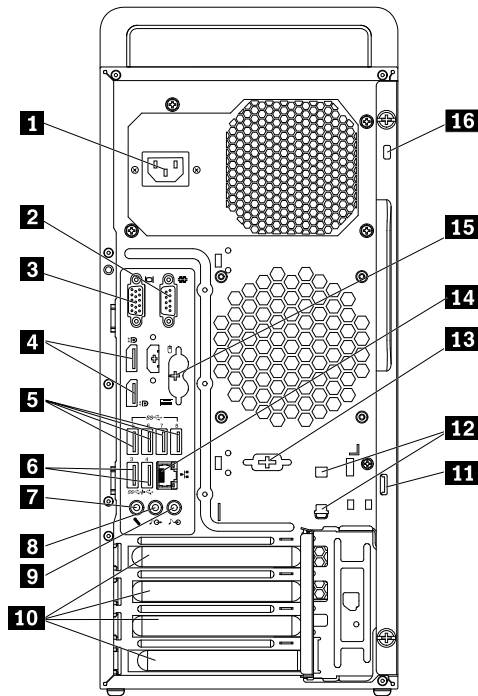
Figure 2. Rear view

1 Power cord connector	**2** Serial connector
3 VGA connector	**4** DisplayPort® connectors (2)
5 USB 3.0 connectors (4)	**6** USB 2.0 connectors (2) (for M800 models) or USB 3.0 connectors (2) (for M900 models)

7 Microphone connector	**8** Audio line-out connector
9 Audio line-in connector	**10** PCI/PCI-Express card area (different cards provide different connectors)
11 Padlock loop	**12** Cable lock slots (2)
13 Serial connector (available on some models)	**14** Ethernet connector
15 PS/2 keyboard and mouse connectors (available on some models)	**16** Security-lock slot

Note: A discrete graphics card, network interface card, or audio card might be installed in the Peripheral Component Interconnect (PCI) or PCI Express card area. If such a card is installed, ensure that you use the connectors on the card instead of the corresponding connectors on the computer.

- **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 is connected between the audio line-out connector of the device and the audio line-in connector of the computer.

- **Audio line-out connector**

  Used to send audio signals from the computer to external devices, such as powered stereo speakers, headphones, or multimedia keyboards. To attach a stereo system or other external recording device, a cable is connected between the audio line-in connector of the device and the audio line-out connector of the computer.

  Note: If your computer has both an audio line-out connector and a headset connector or headphone connector, always use the headset connector or headphone connector for earphones, headphones, or a headset. However, a headphone connector does not support the microphone of a headset.

- **Cable-lock slots (2)**

  Used to secure a cable lock. For more information, see "Attaching a cable lock" on page 29.

- **DisplayPort connector**

  Used to connect a high-performance monitor, a direct-drive monitor, or other devices that use a DisplayPort connector.

- **Ethernet connector**

  Used to connect an Ethernet cable for a local area network (LAN).

  Note: To operate the computer within Federal Communications Commission (FCC) Class B limits, use a Category 5e or better Ethernet cable.

- **Microphone connector**

  Used to connect a microphone to your computer when you want to record sound or if you use speech-recognition software.

- **Padlock loop**

  Used to secure a padlock. For more information, see "Locking the computer cover" on page 27.

- **PCI/PCI-Express card area (different cards provide different connectors)**

  To improve the operating performance of your computer, you can connect PCI/PCI-Express cards into this area. Depending on your computer model, the connectors in this area might vary.

- **Power cord connector**

  Used to connect the power cord to your computer for power supply.

- **PS/2 keyboard connector**

  Used to connect a keyboard that uses a Personal System/2 (PS/2) keyboard connector.

- **PS/2 mouse connector**

  Used to connect a mouse, a trackball, or other pointing devices that use a PS/2 mouse connector.

- **Serial connector**

  Used to connect an external modem, a serial printer, or other devices that use a serial connector.

- **Security-lock slot**

  Used to secure a Kensington-style cable lock. For more information, see "Attaching a Kensington-style cable lock" on page 28.

- **USB 2.0 connector**

  Used to connect a device that requires a USB 2.0 connection, such as a keyboard, a mouse, a scanner, a printer, or a PDA.

- **USB 3.0 connector**

  Used to connect a device that requires a USB 2.0 or USB 3.0 connection, such as a keyboard, a mouse, a scanner, a printer, or a PDA.

- **VGA connector**

 Used to connect a video graphics array (VGA) monitor or other devices that use a VGA connector.

Computer components

Note: Depending on your computer model, some of the following components might not be available.
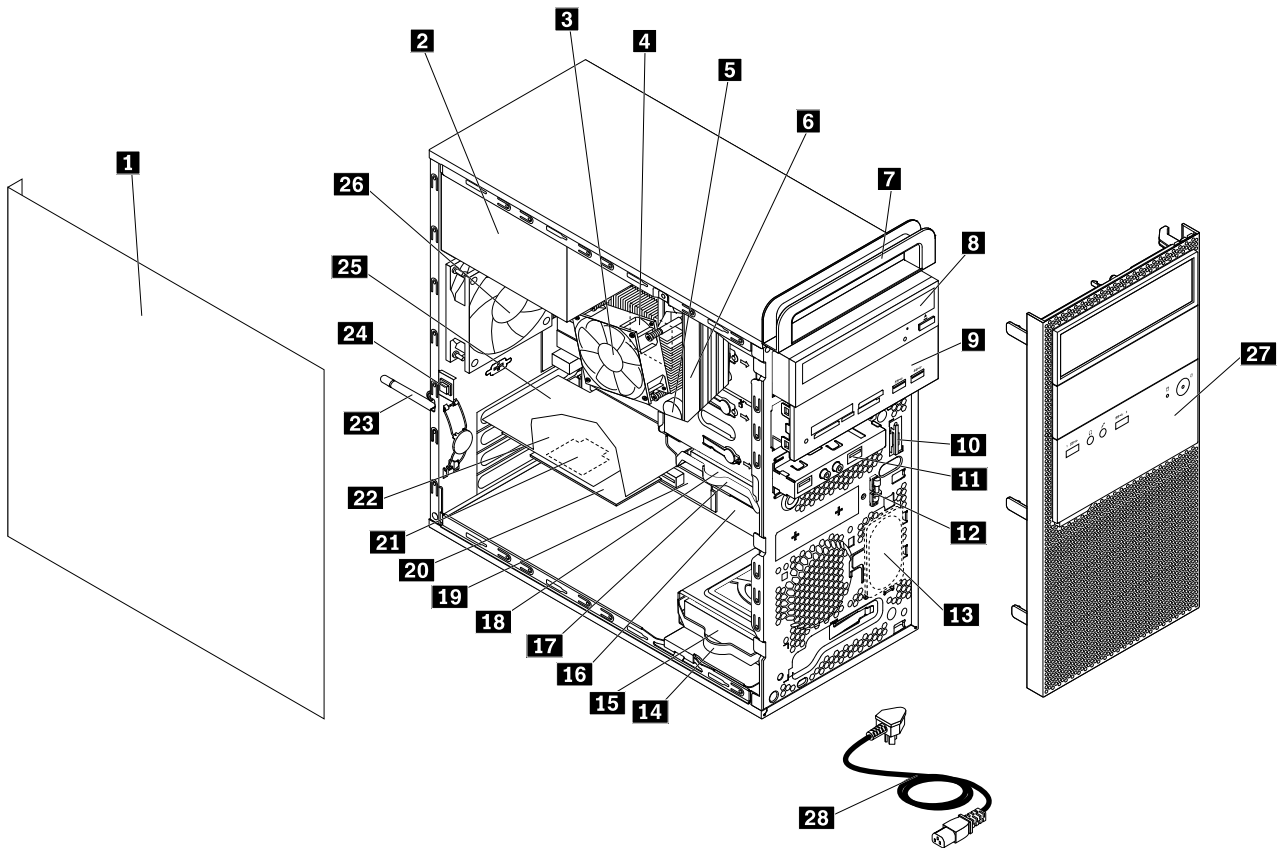
Figure 3. Computer components

1 Computer cover		**2** Power supply assembly	
3 Heat sink and fan assembly		**4** Microprocessor	
5 Coin-cell battery		**6** Memory module	
7 Computer handle		**8** Optical drive	
9 Optical drive, card reader and USB assembly, or front-access storage enclosure		**10** Front Wi-Fi antenna	
11 Front audio and USB assembly		**12** Thermal sensor	
13 Internal speaker		**14** Secondary storage drive bracket	
15 Secondary storage drive		**16** System board	
17 Primary storage drive bracket		**18** Primary storage drive	
19 PCI card adapter		**20** PCI card	
21 Wi-Fi card		**22** Wi-Fi card adapter	
23 Rear Wi-Fi antenna		**24** Cover presence switch (also called intrusion switch)	
25 PCI Express card		**26** Rear fan	
27 Front bezel		**28** Power cord	

Parts on the system board

Note: For the parts that are displayed on the following figure but not introduced in the following table, see "Front view" on page 1 and "Rear view" on page 2.
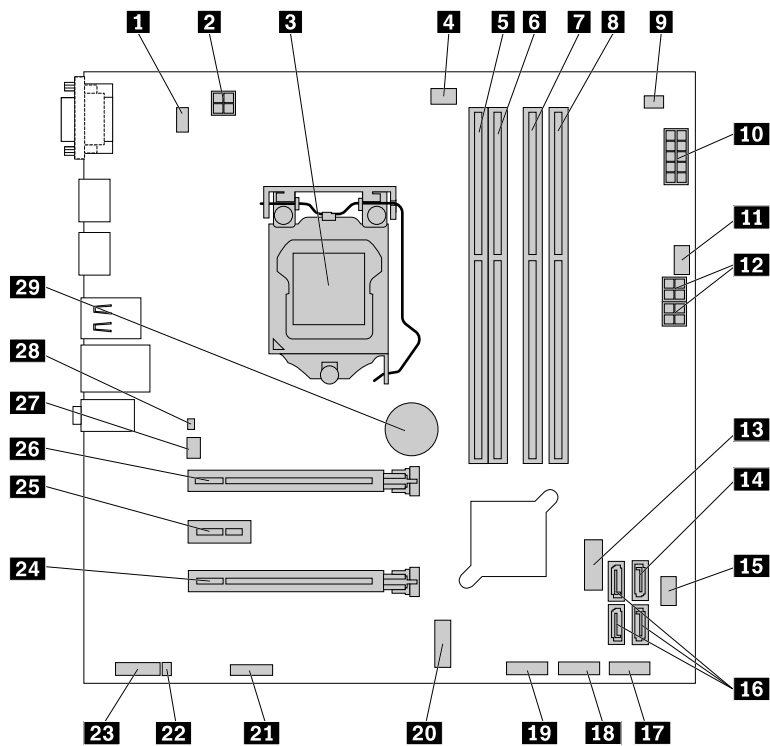
Figure 4. Parts on the system board

1 PS/2 keyboard and mouse connector		**2** 4-pin power connector	
3 Microprocessor		**4** Microprocessor fan connector	
5 Memory slot (DIMM1)		**6** Memory slot (DIMM2)	
7 Memory slot (DIMM3)		**8** Memory slot (DIMM4)	
9 Thermal sensor connector		**10** 10-pin power connector	
11 Storage drive fan connector		**12** SATA power connectors (2) (for connecting an optical drive or a storage drive)	
13 Front USB 3.0 connector (for connecting the USB 3.0 connectors on the front bezel)		**14** eSATA connector	
15 Front fan connector		**16** SATA 3.0 connectors (3)	
17 Front panel connector		**18** Front USB connector 2 (for connecting an additional USB device)	
19 Front USB connector 1 (for connecting an additional USB device)		**20** M.2 card slot (for installing a PCI card adapter)	
21 Serial connector		**22** Internal speaker connector	
23 Front audio connector		**24** PCI Express card slot (physical link width x16; negotiable link width x4, x1)	
25 PCI Express x1 card slot		**26** PCI Express x16 card slot	
27 Rear fan connector		**28** Cover presence switch connector (intrusion switch connector)	
29 Coin-cell battery			

Machine type and model label

The machine type and model label identifies your computer. When you contact Lenovo for help, the machine type and model information helps support technicians to identify your computer and provide faster service.

The machine type and model label is attached on the side of your computer as shown.

MTM XXXX-XXX
S/N XXXXXX
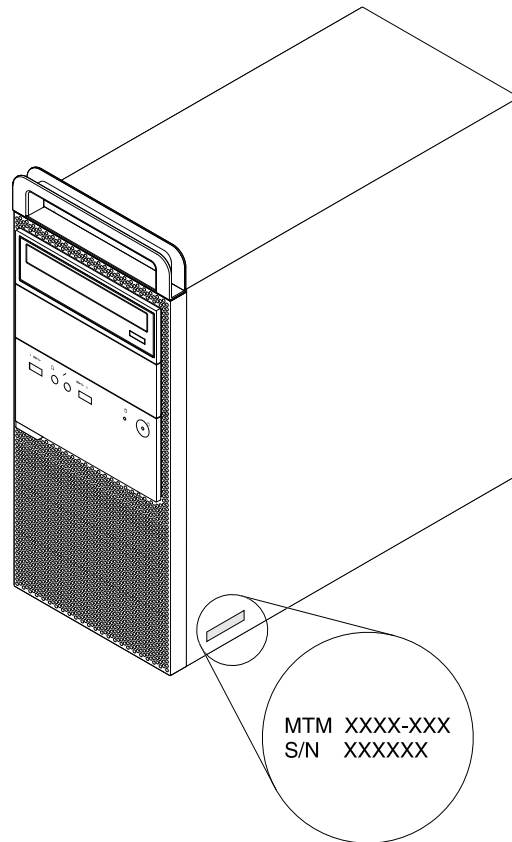
Figure 5. Machine type and model label

Features

The computer features introduced in this section apply to various models.

Information about your computer

- To view basic information (such as microprocessor and memory information) about your computer, do the following:
    1. Click the Start button to open the Start menu.
    2. Depending on your Windows version, do one of the following:
        – For Windows 7: Right-click **Computer**, and then click **Properties**.
        – For Windows 10: Click **Settings** ➙ **System** ➙ **About**.
- To view detailed information about the devices (such as the optical drive and network adapters) on your computer, do the following:
    1. Depending on your Windows version, do one of the following:
        – For Windows 7: Click the Start button to open the Start menu. Right-click **Computer**, and then click **Properties**.
        – For Windows 10: Right-click the Start button to open the Start context menu.
    2. Click **Device Manager**. Type the administrator password or provide confirmation if prompted.

Preinstalled operating system

Your computer is preinstalled with Windows 7 or Windows 10 operating system. Additional operating systems might be identified by Lenovo as compatible with your computer. To determine if an operating system has been certified or tested for compatibility, check the Web site of the operating system provider.

Power supply

- 400-watt automatic voltage-sensing power supply
- 250-watt automatic voltage-sensing power supply

Storage drives

Your computer supports up to three storage drives.

To view the amount of storage drive space, do the following:

1. Depending on your Windows version, do one of the following:

    - For Windows 7: Click the Start button to open the Start menu. Right-click **Computer**, and then click **Manage**.
    - For Windows 10: Right-click the Start button to open the Start context menu.

2. Click **Disk Management**.

Video features

- The integrated graphics card supports the following display connectors on your computer:
    - DisplayPort connector
    - VGA connector
- The discrete graphics card, which is available on some models, provides enhanced display capability and experience.

Audio features

- The integrated audio card supports the following audio connectors and devices on your computer:
    - Audio line-in connector
    - Audio line-out connector
    - Headphone connector
    - Internal speaker (available on some models)
    - Microphone connector
- The discrete audio card, which is available on some models, provides enhanced audio capability and experience.

Input/Output (I/O) features

- Audio connectors (audio line-in connector, audio line-out connector, headphone connector, and microphone connector)
- Card reader slot
- Display connectors (DisplayPort connector and VGA connector)
- Ethernet connector
- PS/2 keyboard connector (available on some models)
- PS/2 mouse connector (available on some models)
- Serial connector

- USB connector

Expansion

- Card reader (available on some models)
- Memory slot
- Optical drive (available on some models)
- PCI Express x1 card slot
- PCI Express card slot (physical link width x16; negotiable link width x4, x1)
- PCI Express x16 graphics card slot
- Storage drive bay

Network features

- Ethernet LAN

  – The integrated network interface card supports the Ethernet connector on your computer.
  – The discrete network interface card, which is available on some models, provides an additional Ethernet connector.

- Wireless LAN (available on some models)
- Bluetooth (available on some models)

Security features

For more information, see Chapter 4 "Security" on page 27.

System management features

- Ability to store power-on self-test (POST) hardware test results
- Desktop Management Interface (DMI)

  Desktop Management Interface provides a common path for users to access information about all aspects of a computer. The information includes processor type, installation date, connected printers and other peripherals, power sources, maintenance history, and so on.

- ErP LPS compliance mode

  The energy-related products directive (ErP) lowest power state (LPS) compliance mode reduces the consumption of electricity when your computer is in sleep or off mode. For more information, see "Enabling or disabling ErP LPS compliance mode" on page 34.

- Intelligent Cooling Engine (ICE)

  The Intelligent Cooling Engine is a system thermal management solution that enables your computer to run with better thermal and acoustic performance. The ICE function also monitors the thermal performance of your computer to identify thermal problems. For more information, see "Changing ICE Performance Mode" on page 34 and "Enabling or disabling the ICE Thermal Alert feature" on page 35.

- Intel® Standard Manageability

  Intel Standard Manageability is hardware- and firmware-based technology that makes computers easier and less expensive for businesses to monitor, maintain, update, upgrade, and repair.

- Intel Active Management Technology (AMT) (available on some models)

  Intel Active Management Technology is hardware- and firmware-based technology that makes computers easier and less expensive for businesses to monitor, maintain, update, upgrade, and repair.

- Intel Matrix Storage Manager

  Intel Matrix Storage Manager is a device driver that provides support for Serial Advanced Technology Attachment (SATA) Redundant Array of Independent Disks (RAID) 5 arrays and SATA RAID 10 arrays on specific Intel chipset system boards to enhance hard disk performance.

- Preboot Execution Environment (PXE)

  Preboot Execution Environment enables computers to start through a network interface independent of data storage drives (such as hard disk drives) or installed operating systems.

- System Management (SM) Basic Input/Output System (BIOS) and SM software

  The SMBIOS specification defines data structures and access methods that can be used to read management data stored in the BIOS of a computer.

- Wake on LAN

  Wake on LAN is an Ethernet computer networking standard that allows a computer to be turned on or woken up by a network message. The message usually is sent by a program running on another computer on the same LAN.

- Wake on Ring

  Wake on Ring, sometimes referred to as Wake on Modem, is a specification that allows supported computers and devices to resume from sleep or hibernation mode.

- Windows Management Instrumentation (WMI)

  Windows Management Instrumentation is a set of extensions to the Windows Driver Model. It provides an operating system interface through which instrumented components provide information and notification.

Specifications

This section lists the physical specifications for your computer.

Dimensions

    Width: 175 mm (6.9 inches)

    Height: 408 mm (16.1 inches)

    Depth: 413 mm (16.3 inches)

Weight

    Maximum configuration as shipped: 12.5 kg (27.6 lb)

Environment

- Air temperature:

    Operating: From 10°C (50°F) to 35°C (95°F)

    Storage in original shipping package: From -40°C (-40°F) to 60°C (140°F)

    Storage without package: From -10°C (14°F) to 60°C (140°F)

- Humidity:

    Operating: 20%–80% (non-condensing)

    Storage: 20%–90% (non-condensing)

- Altitude:

    Operating: From -15.2 m (-50 ft) to 3048 m (10 000 ft)

    Storage: From -15.2 m (-50 ft) to 10 668 m (35 000 ft)

Electrical input

    Input voltage: From 100 V ac to 240 V ac

    Input frequency: 50/60 Hz

Programs

This section provides information about the programs on your computer.

Accessing a program on your computer

Note: For Windows 7, depending on your computer model, some of the Lenovo programs might be ready to be installed, so you need to install them manually. Then, you can access and use these programs.

To access a program on your computer, do one of the following:

- From Windows Search:

    1. Depending on your Windows version, do one of the following:

        – For Windows 7: Click the Start button to open the Start menu, and then type the program name into the search box.

        – For Windows 10: Type the program name into the search box next to the Start button.

    2. In the search results, click the name of the desired program to launch the program.

- From the Start menu or Control Panel:

    1. Click the Start button to open the Start menu. Then, click the name of the desired program to launch the program.

2. If the program name is not displayed, click **All Programs** for Windows 7 or **All apps** for Windows 10 to display the program list. From the list or a folder in the list, click the name of the desired program to launch the program.

3. If the program name is not displayed on the Start menu, access the program from Control Panel.

    a. Depending on your Windows version, do one of the following:

        – For Windows 7: Click **Control Panel** on the Start menu.

        – For Windows 10: Right-click the Start button to open the Start context menu, and then click **Control Panel**.

    b. View Control Panel using Large icons or Small icons, and then click the name of the desired program to launch the program.

Installing a program that is ready to be installed

To install a program that is ready to be installed, do the following:

1. Open the Lenovo ThinkVantage® Tools program. See "Accessing a program on your computer" on page 11.

2. View the program icons using Tiles.

3. Follow the instructions under greyed-out icons to locate the icon for the desired program. Then, double-click the icon to install the program.

An introduction to Lenovo programs

This section provides information about the major Lenovo programs available on your operating system.

Note: Depending on your computer model, some of the following programs might not be available.

- For Windows 7 only:

    – **Create Recovery Media**

    The Create Recovery Media program enables you to restore only the C drive or the entire storage drive to the factory-default settings.

    – **Fingerprint Manager Pro or ThinkVantage Fingerprint Software**

    The Fingerprint Manager Pro or ThinkVantage Fingerprint Software program enables you to use a fingerprint reader. The integrated fingerprint reader provided on some keyboards enables you to enroll your fingerprint and associate it with your power-on password, hard disk password, and Windows password. As a result, fingerprint authentication can replace passwords and enable simple and secure user access.

    – **Lenovo PowerENGAGE**

    The Lenovo PowerENGAGE program enables you to register your computer with Lenovo.

    – **Password Manager**

    The Password Manager program automatically captures and fills in authentication information for Windows programs and Web sites.

    – **Rescue and Recovery®**

    The Rescue and Recovery program is a one-button recovery and restore solution. It includes a set of self-recovery tools to help you diagnose computer problems, get help, and recover from system crashes, even if you cannot start the Windows operating system.

– **System Update**

The System Update program provides regular access to the system updates for your computer, such as device driver updates, software updates, and BIOS updates. The program gathers information from the Lenovo Help Center about new updates for your computer, then sorts and displays the updates for download and installation. You have complete control of which updates to download and install.

- For Windows 10 only:

  – **Lenovo Companion**

  Your computer's best features and capabilities should be easy to access and understand. With Lenovo Companion, they are. Use Lenovo Companion to do the following:

  – Optimize your computer's performance, monitor your computer's health, and manage updates.

  – Access your user guide, check warranty status, and view accessories customized for your computer.

  – Read how-to articles, explore Lenovo forums, and stay up-to-date on technology news with articles and blogs from trusted sources.

  Lenovo Companion is filled with exclusive Lenovo content to help you learn more about what you can do with your computer.

  – **Lenovo ID**

  The Lenovo ID program enables you to create your Lenovo ID and access all supported Lenovo programs and web portals with single sign-on.

- For Windows 7 and Windows 10:

  – **Lenovo Bluetooth Lock**

  The Lenovo Bluetooth Lock program enables you to use a Bluetooth device (such as your smartphone) as a proximity-based unit for locking or unlocking your computer automatically. By detecting the distance between your computer and the predefined Bluetooth device that you are carrying, the Lenovo Bluetooth Lock program automatically locks your computer when you walk away and unlocks your computer when you come back. This is a simple way to protect your computer against unauthorized access in case that you forget to lock your computer.

  – **Lenovo Device Experience or Lenovo PC Experience**

  The Lenovo Device Experience or Lenovo PC Experience program helps you work more easily and securely. The program provides easy access to Lenovo ThinkVantage Tools or Lenovo Tools, important settings and information about your computer, the Lenovo Support Web site, and so on.

  – **Lenovo Solution Center**

  The Lenovo Solution Center program enables you to troubleshoot and resolve computer problems. It combines diagnostic tests, system information collection, security status, and support information, along with hints and tips for maximum system performance.

  – **PC Cloud Manager**

  The PC Cloud Manager (PCM) program is a browser-based solution for client-computer management. The PCM program has two components: PCM Server and PCM Client. PCM Server is installed on the computer, where the administrator performs management work, such as power management and security management. PCM Client is installed on the client computers to be managed. The administrator can log in to PCM Server to manage computers with PCM Client installed, through the Internet Web browser.

  – **Power Manager**

  The Power Manager program provides convenient, flexible, and complete power management for your computer. It enables you to adjust your computer power settings to achieve the best balance between performance and power saving.

– **REACHit or Lenovo Reach**

The REACHit or Lenovo Reach program enhances your cloud experience. This program keeps you connected at all times and enables you to access all your favorite items from personal computers, smartphones, or tablets. As a result, you can access, edit, and share your files from anywhere. You also can add your favorite Web services to your cloud desktop and stay logged-in to Web sites with the cloud password manager.

– **SHAREit or Lenovo SHAREit**

The SHAREit or Lenovo SHAREit program provides a quick and easy way to share files and folders among computers, smartphones, tablets, or smart TVs with the Android or the Windows operating system installed. SHAREit or Lenovo SHAREit uses any type of network or even no network at all to share files and folders.

Chapter 2. Using your computer

This chapter contains the following topics:

Registering your computer

When you register your computer with Lenovo, you enter required information into a Lenovo database. The information enables Lenovo to contact you when there is a recall or other severe problem and provide quicker service when you call Lenovo for help. In addition, some locations offer extended privileges and services to registered users.

To register your computer with Lenovo, ensure that your computer is connected to the Internet. Then, go to http://www.lenovo.com/register and follow the instructions on the screen.

Setting the computer volume

To set the computer volume, do the following:

1. Click the volume icon in the Windows notification area on the taskbar.

   Note: If the volume icon is not displayed in the Windows notification area, add the icon to the notification area. See "Adding an icon to the Windows notification area" on page 15.

2. Follow the instructions on the screen to adjust the volume. Click the speaker icon to mute the audio.

Adding an icon to the Windows notification area

To add an icon to the Windows notification area, do the following:

1. Click the arrow next to the notification area to view hidden icons. Then, click the desired icon and drag it to the notification area.
2. If the icon is not displayed, turn on the icon.
   a. Click the Start button to open the Start menu.
   b. Depending on your Windows version, do one of the following:
      - For Windows 7: Click **Control Panel**. View Control Panel using Large icons or Small icons, and then click **Notification Area Icons** ➙ **Turn system icons on or off**.
      - For Windows 10: Click **Settings** ➙ **System** ➙ **Notifications & actions** ➙ **Turn system icons on or off**.
   c. Turn on the desired icon.
3. If the icon is still not displayed in the Windows notification area, repeat step 1.

Using a disc

This section provides information about using a disc and the optical drive.

Guidelines about using the optical drive

When using the optical drive, follow these guidelines:

- Do not place the computer in a location where the drive is exposed to any of the following conditions:
    - High temperature
    - High humidity
    - Excessive dust
    - Excessive vibration or sudden shock
    - An inclined surface
    - Direct sunlight
- Do not insert any object other than a disc into the drive.
- Do not insert damaged discs into the drive. Warped, scratched, or dirty discs can damage the drive.
- Before moving the computer, remove the disc from the drive.

Handling and storing a disc

When handling and storing a disc, follow these guidelines:

- Hold the disc by its edges. Do not touch the surface of the side that is not labeled.
- To remove dust or fingerprints, wipe the disc with a clean, soft cloth from the center to the outside. Wiping the disc in a circular direction might cause loss of data.
- Do not write or stick paper on the disc.
- Do not scratch or mark the disc.
- Do not place or store the disc in direct sunlight.
- Do not use benzene, thinners, or other cleaners to clean the disc.
- Do not drop or bend the disc.

Playing and removing a disc

To play a disc, do the following:

1. With the computer on, press the eject/close button on the front of the optical drive. The tray slides out of the drive.
2. Insert a disc into the tray. Some optical drive has a snap hub in the center of the tray. If your drive has a snap hub, support the tray with one hand and then push center of the disc until it snaps into place.
3. Press the eject/close button again or gently push the tray forward to close the tray. The disc player program starts automatically. For more information, refer to the help system of the disc player program.

To remove a disc from the optical drive, do the following:

1. With the computer on, press the eject/close button on the front of the optical drive. The tray slides out of the drive.
2. Carefully remove the disc from the tray.
3. Press the eject/close button again or gently push the tray forward to close the tray.

Note: If the tray does not slide out of the drive when you press the eject/close button, turn off your computer. Then, insert a straightened paper clip into the emergency-eject hole adjacent to the eject/close button. Use the emergency eject only in an emergency.

Recording a disc

If your optical drive supports recording, you can record a disc.

Recording a disc using Windows tools

To record a disc using Windows tools, do one of the following:

- Burn a disc using the AutoPlay window.
    1. Ensure that the disc is played automatically.
        a. Click the Start button to open the Start menu.
        b. Depending on your Windows version, do one of the following:
            – For Windows 7: Click **Control Panel**. View Control Panel using Large icons or Small icons, and then click **AutoPlay**.
            – For Windows 10: Click **Settings ➙ Devices ➙ AutoPlay**.
        c. Select or turn on **Use AutoPlay for all media and devices**.
    2. Insert a recordable disc into the optical drive that supports recording. The AutoPlay window opens.
    3. Follow the instructions on the screen.
- Burn a disc using Windows Media® Player.
    1. Insert a recordable disc into the optical drive that supports recording.
    2. Open Windows Media Player. See "Accessing a program on your computer" on page 11.
    3. Follow the instructions on the screen.
- Burn a disc from an ISO file.
    1. Insert a recordable disc into the optical drive that supports recording.
    2. Double-click the ISO file.
    3. Follow the instructions on the screen.

Recording a disc using preinstalled programs

To record a disc using preinstalled programs, do the following:

1. Insert a recordable disc into the optical drive that supports recording.
2. Open the PowerDVD Create, PowerProducer, or Power2Go program. See "Accessing a program on your computer" on page 11.
3. Follow the instructions on the screen.

Connecting to a network

This section provides information about connecting to a network. If you cannot connect your computer to a network, see "Networking problems" on page 45.

Connecting to an Ethernet LAN

You can connect your computer to an Ethernet LAN by connecting an Ethernet cable to the Ethernet connector.

⚠️ **DANGER**

To avoid the risk of electrical shock, do not connect the telephone cable to the Ethernet connector.

Connecting to a wireless LAN

You can connect your computer to a wireless LAN without the use of an Ethernet cable but by means of radio waves only.

Note: The wireless LAN feature is supported only on some models.

To establish a wireless-LAN connection, do the following:
1. Ensure that a wireless LAN is available and the wireless LAN feature on your computer is working.
2. Click the wireless-network-connection-status icon in the Windows notification area to display available wireless networks.

   Note: If the wireless-network-connection-status icon is not displayed in the Windows notification area, add the icon to the notification area. See "Adding an icon to the Windows notification area" on page 15.
3. Click a wireless LAN, and then click **Connect** to connect your computer to it. Provide required information if needed.

Connecting to a Bluetooth-enabled device

Bluetooth is a short-range wireless communications technology. Use Bluetooth to establish a wireless connection between your computer and another Bluetooth-enabled device within a distance of about 10 m (32.8 ft).

Note: The Bluetooth feature is supported only on some models.

To connect to a Bluetooth-enabled device, do the following:
1. Ensure that the Bluetooth feature on your computer is working and the Bluetooth-enabled device is located within a distance of about 10 m (32.8 ft) from your computer.
2. Click the Bluetooth icon in the Windows notification area on the taskbar. Then, click **Add a Device** and follow the instructions on the screen.

   Note: If the Bluetooth icon is not displayed in the Windows notification area, add the icon to the notification area. See "Adding an icon to the Windows notification area" on page 15.

Chapter 3. You and your computer

This chapter contains the following topics:

Arranging your workspace

Arrange your workspace to suit your needs and the kind of work you do. This section provides information about the factors that affect the way you arrange your workspace.

Glare and lighting

Position the monitor to minimize glare and reflections from overhead lights, windows, and other light sources. Reflected light from shiny surfaces can cause annoying reflections on your screen. When possible, place the monitor at right angles to windows and other light sources. If necessary, reduce overhead lighting by turning off lights or using lower wattage bulbs. If you install the monitor near a window, use curtains or blinds to block the sunlight. You can adjust the brightness and contrast controls on the monitor as the room lighting changes throughout the day.

Where it is impossible to avoid reflections or to adjust the lighting, an antiglare filter placed over the screen might be helpful. However, these filters might affect the clarity of the image on the screen; try them only after you have exhausted other methods of reducing glare.

Air circulation

Your computer produces heat. The computer has a fan that pulls in fresh air and forces out hot air through the air vents. Blocking the air vents can cause overheating, which might result in a malfunction or damage. Position the computer so that nothing blocks the air vents; usually, 51 mm (2 inches) of air space is sufficient. Ensure that the vented air is not blowing on people.

Electrical outlet locations and cable lengths

The following factors might determine the final placement of your computer:

- Locations of electrical outlets
- Length of power cords or power adapters
- Length of the cables that are connected to other devices

For more information about power cords or power adapters, see "Power cords and power adapters" on page iv.

Comfort

Although no single working position is ideal for everyone, here are a few guidelines to help you find a position that suits you best. The following figure sets an example for your reference.
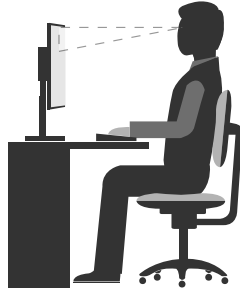
- Screen position: Keep the screen at a comfortable viewing distance, usually 51-61 cm (20-24 inches). Then, adjust the screen so that the top of the screen is at or slightly below eye level and you can view it without twisting your body.
- Chair position: Use a chair that gives you good back support and seat height adjustment. Use chair adjustments to best suit your desired posture.
- Head position: Keep your head and neck in a comfortable and neutral (vertical or upright) position.
- Arm and hand positions: Keep your forearms, wrists, and hands in a relaxed and neutral (horizontal) position. Type with a soft touch without pounding the keys.
- Leg position: Keep your thighs parallel to the floor and your feet flat on the floor or on a footrest.

Make minor modifications in your working posture to deter the onset of discomfort caused by long periods of working in the same position. Frequent, short breaks from your work also help to prevent minor discomfort associated with your working posture.

Accessibility information

Lenovo is committed to providing users who have hearing, vision, and mobility limitations with greater access to information and technology. This section provides information about the ways these users can get the most out of their computer experience. You also can get the most up-to-date accessibility information from the following Web site:
http://www.lenovo.com/accessibility

Keyboard shortcuts

The following table contains keyboard shortcuts that can help make your computer easier to use.

Note: Depending on your keyboard, some of the following keyboard shortcuts might not be available.

Keyboard shortcut	Function
Windows logo key + U	Open Ease of Access Center
Right Shift for eight seconds	Turn on or turn off Filter Keys
Shift five times	Turn on or turn off Sticky Keys
Num Lock for five seconds	Turn on or turn off Toggle Keys
Left Alt+Left Shift+Num Lock	Turn on or turn off Mouse Keys
Left Alt+Left Shift+PrtScn (or PrtSc)	Turn on or turn off High Contrast

For more information, go to http://windows.microsoft.com/, and then perform a search using any of the following keywords: `keyboard shortcuts`, `key combinations`, `shortcut keys`.

Ease of Access Center

Ease of Access Center on the Windows operating system enables users to configure their computers to suit their physical and cognitive needs.

To use Ease of Access Center, do the following:

1. Click the Start button to open the Start menu.

2. Depending on your Windows version, do one of the following:

   • For Windows 7: Click **Control Panel**. View Control Panel using Large icons or Small icons, and then click **Ease of Access Center**.

   • For Windows 10: Click **Settings → Ease of Access**.

3. Choose the appropriate tool by following the instructions on the screen.

Ease of Access Center mainly includes the following tools:

• Magnifier

  Magnifier is a useful utility that enlarges the entire screen or part of the screen so that you can see the items better.

• Narrator

  Narrator is a screen reader that reads aloud what is displayed on the screen and describes events such as error messages.

• On-Screen Keyboard

  If you prefer to type or enter data into your computer using a mouse, joystick, or other pointing device instead of a physical keyboard, you can use On-Screen Keyboard. On-Screen Keyboard displays a visual keyboard with all the standard keys.

• High Contrast

  High Contrast is a feature that heightens the color contrast of some text and images on your screen. As a result, those items are more distinct and easier to identify.

• Personalized keyboard

  Adjust keyboard settings to make your keyboard easier to use. For example, you can use your keyboard to control the pointer and type certain key combinations easier.

• Personalized mouse

  Adjust mouse settings to make your mouse easier to use. For example, you can change the pointer appearance and make it easier to manage windows with the mouse.

Speech Recognition

Speech Recognition enables you to control your computer by voice.

Using only your voice, you can start programs, open menus, click objects on the screen, dictate text into documents, and write and send e-mails. Everything you do with the keyboard and mouse can be done with only your voice.

To use Speech Recognition, do the following:

1. Depending on your Windows version, do one of the following:

   • For Windows 7: Click the Start button to open the Start menu.

   • For Windows 10: Right-click the Start button to open the Start context menu.

2. Click **Control Panel**. View Control Panel using Large icons or Small icons, and then click **Speech Recognition**.

3. Follow the instructions on the screen.

Screen-reader technologies

Screen-reader technologies are primarily focused on software program interfaces, help information systems, and various online documents. For additional information about screen readers, see the following:

- Using PDFs with screen readers:
  http://www.adobe.com/accessibility.html?promoid=DJGVE
- Using the JAWS screen reader:
  http://www.freedomscientific.com/jaws-hq.asp
- Using the NVDA screen reader:
  http://www.nvaccess.org/

Screen resolution

You can make the text and images on your screen easier to read by adjusting the screen resolution of your computer.

To adjust the screen resolution, do the following:

1. Right-click a blank area on the desktop.
2. Depending on your Windows version, do one of the following:
    - For Windows 7: Click **Screen resolution**.
    - For Windows 10: Click **Display settings**. On the **Display** tab, click **Advanced display settings**.
3. Follow the instructions on the screen.

Note: Setting the resolution too low might prevent some items from fitting on the screen.

Customizable item size

You can make the items on your screen easier to read by changing the item size.

- To change the item size temporarily, use the Magnifier tool in Ease of Access Center. See "Ease of Access Center" on page 21.
- To change the item size permanently, do the following:
    - Change the size of all the items on your screen.
        1. Right-click a blank area on the desktop.
        2. Depending on your Windows version, do one of the following:
            - For Windows 7: Click **Screen resolution ➔ Make text and other items larger or smaller**.
            - For Windows 10: Click **Display settings**.
        3. Change the item size by following the instructions on the screen.
        4. Click **Apply**. This change will take effect the next time you log in to the operating system.
    - Change the size of the items on a Web page.

      Press and hold Ctrl, and then press the plus-sign key (+) to enlarge or the minus-sign key (-) to reduce the text size.
    - Change the size of the items on the desktop or a window.

      Note: This function might not work on some windows.

      If your mouse has a wheel, press and hold Ctrl, and then scroll the wheel to change the item size.

Industry-standard connectors

Your computer provides industry-standard connectors that enable you to connect assistive devices.

For more information about the location and function of the connectors, see "Hardware locations" on page 1.

TTY/TDD conversion modem

Your computer supports the use of a text telephone (TTY) or the telecommunications device for the deaf (TDD) conversion modem. The modem must be connected between your computer and a TTY/TDD telephone. Then, you can type a message on your computer and send it to the telephone.

Documentation in accessible formats

Lenovo provides electronic documentation in accessible formats, such as properly tagged PDF files or HyperText Markup Language (HTML) files. Lenovo electronic documentation is developed to ensure that visually impaired users can read the documentation through a screen reader. Each image in the documentation also includes adequate alternative text so that visually impaired users can understand the image when they use a screen reader.

Cleaning your computer

CAUTION:
Remove any media from the drives and turn off all connected devices and the computer. Then, disconnect all power cords from electrical outlets and disconnect all cables that are connected to the computer.

It is a good practice to clean your computer periodically to protect the surfaces and ensure trouble-free operation. Use only mild cleaning solutions and a damp cloth to clean the painted surfaces of the computer.

Dust buildup compounds problems associated with glare, so remember to clean the screen periodically. Wipe the screen surface gently with a soft, dry cloth, or blow on the screen to remove grit and other loose particles. Depending on the type of the screen, moisten a soft, lint-free cloth with an LCD cleaner or liquid glass cleaner and then wipe the screen surface.

Maintenance

With appropriate care and maintenance, your computer will serve you reliably. This section provides information about maintaining your computer so that it can keep working in top order.

Basic maintenance tips

Here are some basic points about keeping your computer functioning properly:

- Keep your computer in a clean, dry environment. Ensure that the computer rests on a flat, steady surface.

- Do not cover any of air vents. These air vents provide airflow to keep your computer from overheating.

- Keep food and drinks away from all parts of your computer. Food particles and spills might make the keyboard and mouse stick and unusable.

- Do not get the power switches or other controls wet. Moisture can damage these parts and cause an electrical hazard.

- Always disconnect a power cord by grasping the plug instead of the cord.

Good maintenance practices

By performing a few good maintenance practices, you can maintain good computer performance, protect your data, and be prepared in case of a computer failure.

- Keep your computer software, device drivers, and operating system up-to-date. See "Keeping your computer current" on page 24.
- Empty your recycle bin on a regular basis.
- Clean out your Inbox, Sent Items, and Deleted Items folders in your e-mail application on a regular basis.
- Clean up files and free up storage drive space and memory space occasionally to prevent performance problems. See "Performance problems" on page 47.
- Keep a log book. Entries might include major software or hardware changes, device-driver updates, intermittent problems and what you did to resolve them, and other issues you might have experienced. The cause of a problem might be change in hardware, change in software, or any other actions that might have taken place. A log book can help you or a Lenovo technician determine the cause of a problem.
- Back up your data on the storage drive regularly. You can restore the storage drive from a backup.

  To back up your data, do one of the following:

  – For Windows 7: Open the Rescue and Recovery program. See "Accessing a program on your computer" on page 11. For more information about backing up your data, refer to the help system of the program.
  – For Windows 10: Right-click the Start button to open the Start context menu, and then click **Control Panel**. View Control Panel using Large icons or Small icons, and then click **File History**. Follow the instructions on the screen.
- Create a recovery medium as early as possible. You can use the recovery medium to recover your operating system even if Windows fails to start up.

  To create a recovery medium, do one of the following:

  – For Windows 7: Open the Create Recovery Media program. See "Accessing a program on your computer" on page 11. For more information about creating a recovery medium, refer to the help system of the program.
  – For Windows 10: Right-click the Start button to open the Start context menu, and then click **Control Panel**. View Control Panel using Large icons or Small icons, and then click **Recovery**. Follow the instructions on the screen.
- For Windows 7, create a rescue medium as early as possible. You can use the rescue medium to recover from failures that prevent you from gaining access to the Rescue and Recovery workspace on your storage drive.

  To create a rescue medium, open the Rescue and Recovery program. See "Accessing a program on your computer" on page 11. For more information about creating a rescue medium, refer to the help system of the program.

Keeping your computer current

In most cases, it is a good practice to have the most up-to-date operating system update patches, software programs, and device drivers. This section provides information about how to get the latest updates for your computer.

Getting the latest device drivers
Attention: Reinstalling device drivers will change the current configuration of your computer.

To get the latest device drivers for your computer, do one of the following:

- Download the device drivers that are preinstalled on your computer. Go to http://www.lenovo.com/drivers.
- Use the Lenovo program or Windows Update. See "Getting the latest system updates" on page 25.

  Note: The device drivers provided by Windows Update might not be tested by Lenovo. It is recommended that you get device drivers from Lenovo.

Getting the latest system updates

To get the latest system updates for your computer, ensure that your computer is connected to the Internet and do one of the following:

- Use one of the following Lenovo programs to get the system updates, such as device driver updates, software updates, and BIOS updates:

  – For Windows 7: Use the System Update program.

  – For Windows 10: Use the Lenovo Companion program.

  To open the System Update or Lenovo Companion program, see "Accessing a program on your computer" on page 11. For more information about using the program, refer to the help system of the program.

- Use Windows Update to get the system updates, such as security fixes, new versions of Windows components, and device driver updates.

  1. Click the Start button to open the Start menu.

  2. Depending on your Windows version, do one of the following:

     – For Windows 7: Click **Control Panel**. View Control Panel using Large icons or Small icons, and then click **Windows Update**.

     – For Windows 10: Click **Settings** ➙ **Update & security** ➙ **Windows Update**.

  3. Follow the instructions on the screen.

Moving your computer

Before moving your computer, take the following precautions:

1. Back up your data on the storage drive. See "Good maintenance practices" on page 23.

2. Remove any media from the drives and turn off all connected devices and the computer. Then, disconnect all power cords from electrical outlets and disconnect all cables that are connected to the computer.

3. If you saved the original shipping cartons and packing materials, use them to pack the units. If you are using different cartons, cushion the units to avoid damage.

Moving your computer to another country or region

When you move your computer to another country or region, you must take local electrical standards into consideration. If the local electrical outlet style is different from the type you are currently using, contact the Lenovo Customer Support Center to purchase either an electrical plug adapter or a new power cord. For a list of Lenovo Support phone numbers, go to http://www.lenovo.com/support/phone. If you cannot find the support telephone number for your country or region, contact your Lenovo reseller.

Chapter 4. Security

This chapter contains the following topics:

Locking your computer

This section provides information about locking your computer with the locking devices to keep your computer safe.

Locking the computer cover

Locking the computer cover helps prevent unauthorized people from gaining access to the inside of your computer. Your computer comes with a padlock loop so that the computer cover cannot be removed when a padlock is installed.
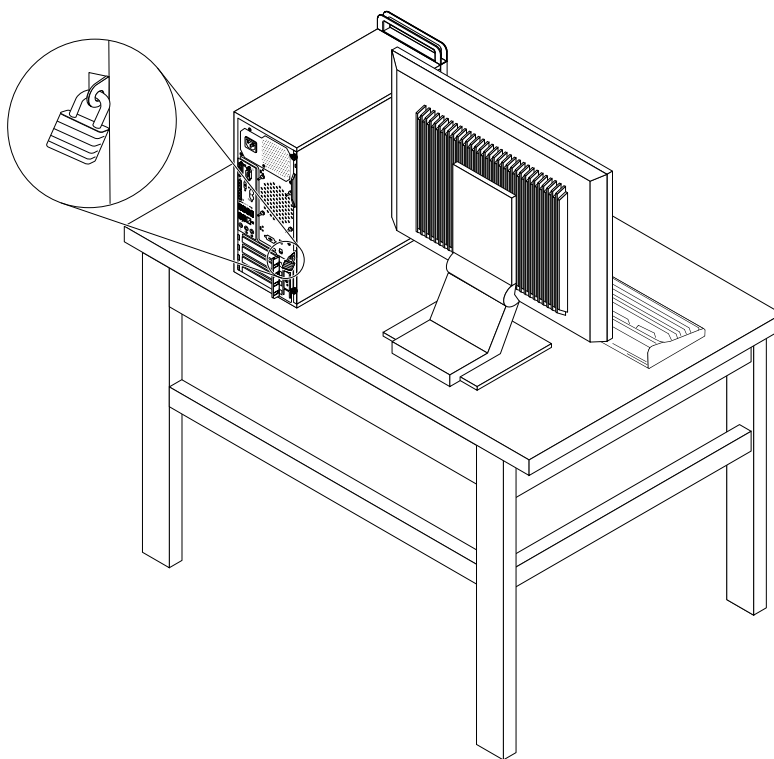
Figure 6. Installing a padlock

Attaching a Kensington-style cable lock

You can use a Kensington-style cable lock to secure your computer to a desk, table, or other non-permanent fixture. The cable lock connects to the security-lock slot at the rear of your computer. Depending on the type selected, the cable lock can be operated with a key or combination. The cable lock also locks the buttons used to open the computer cover. This is the same type of lock used with many notebook computers. You can order such a cable lock directly from Lenovo by searching for *Kensington* at: http://www.lenovo.com/support
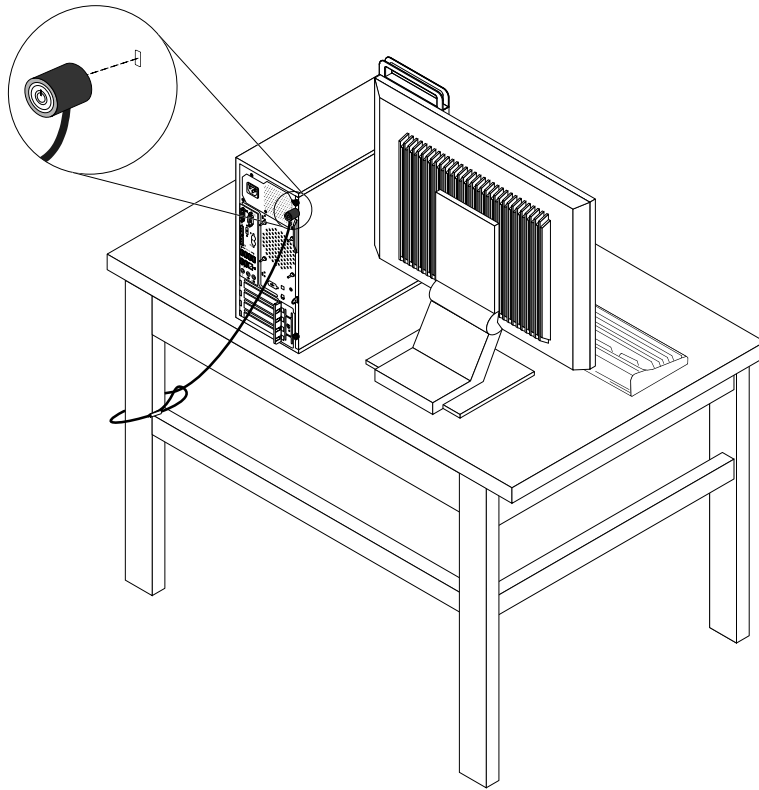
Figure 7. Kensington-style cable lock

Attaching a cable lock

A cable lock can be used to secure devices, such as the keyboard and the mouse, by locking the device cables to your computer. The cable lock connects to the cable-lock slots on the rear of your computer.

To install a cable lock, do the following:

1. Insert the clip **1** into the cable-lock slot **4**.

2. Pull the cables you want to lock through the dents in the cable lock.

3. Press the clip **2** into the cable-lock slot **3** until it snaps into position.
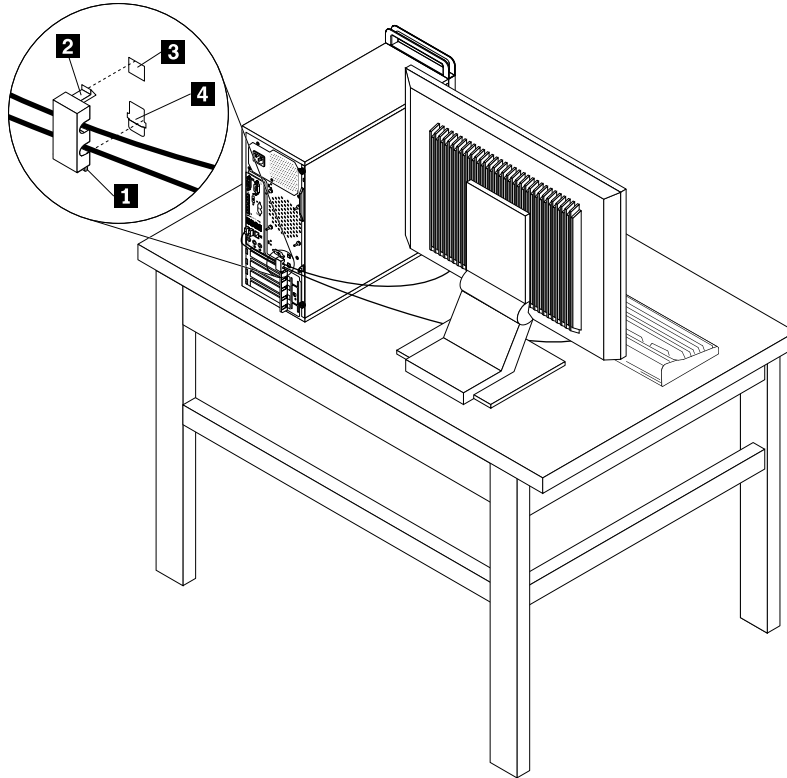
Figure 8. Installing a cable lock

Viewing and changing security settings in the Setup Utility program

To view and change security settings in the Setup Utility program, do the following:

1. Start the Setup Utility program. See "Starting the Setup Utility program" on page 33.

2. Select **Security**.

3. Follow the instructions on the right side of the screen to view and change security settings. You can refer to "Using the Setup Utility program" on page 33 to get basic information about some major security settings.

4. Exit the Setup Utility program. See "Exiting the Setup Utility program" on page 38.

Preventing unauthorized access to your computer

You can use BIOS passwords and Windows accounts to prevent unauthorized access to your computer and data.

- To use BIOS passwords, see "Using BIOS passwords" on page 36.
- To use Windows accounts, do the following:
    1. Click the Start button to open the Start menu.
    2. Depending on your Windows version, do one of the following:
        – For Windows 7: Click **Control Panel** ➙ **User Accounts**.
        – For Windows 10: Click **Settings** ➙ **Accounts**.
    3. Follow the instructions on the screen.

Using fingerprint authentication

If your keyboard has a fingerprint reader, you can use fingerprint authentication to replace passwords for simple and secure user access. To use fingerprint authentication, first enroll your fingerprints and associate them with your passwords (such as the power-on password, hard disk password, and Windows password). Use the fingerprint reader and the fingerprint program to complete this procedure.

To use fingerprint authentication, do one of the following:

- For Windows 7: Use the Fingerprint Manager Pro or ThinkVantage Fingerprint Software program provided by Lenovo. To open the program, see "Accessing a program on your computer" on page 11. For more information about using the program, refer to the help system of the program.
- For Windows 10: Use the fingerprint tool provided by Windows. Click the Start button to open the Start menu, and then click **Settings** ➙ **Accounts** ➙ **Sign-in options**. Follow the instructions on the screen.

To use the fingerprint reader, refer to the documentation shipped with the fingerprint keyboard or located on the Lenovo Support Web site at http://www.lenovo.com/support/keyboards.

Using and understanding firewalls

A firewall can be hardware, software, or a combination of both depending on the level of security required. Firewalls work on a set of rules to determine which inbound and outbound connections are authorized. If your computer is preinstalled with a firewall program, it helps protect against computer Internet security threats, unauthorized access, intrusions, and Internet attacks. It also protects your privacy. For more information about how to use the firewall program, refer to the help system of your firewall program.

To use Windows Firewall, do the following

1. Depending on your Windows version, do one of the following:
    - For Windows 7: Click the Start button to open the Start menu.
    - For Windows 10: Right-click the Start button to open the Start context menu.
2. Click **Control Panel**. View Control Panel using Large icons or Small icons, and then click **Windows Firewall**.
3. Follow the instructions on the screen.

Protecting data against viruses

Your computer is preinstalled with an antivirus program to help you guard against, detect, and eliminate viruses.

Lenovo provides a full version of antivirus software on your computer with a free 30-day subscription. After 30 days, you must renew the license to continue receiving the antivirus software updates.

Note: Virus definition files must be kept up-to-date to guard against new viruses.

For more information about how to use your antivirus software, refer to the help system of your antivirus software.

Computrace Agent software embedded in firmware

The Computrace Agent software is an IT asset management and computer theft recovery solution. The software detects if changes have been made on the computer, such as hardware, software, or the computer call-in location. You might have to purchase a subscription to activate the Computrace Agent software.

Trusted Platform Module (TPM)

TPM is a secure cryptoprocessor that can store cryptographic keys that protect information stored in your computer.

Chapter 5. Advanced configuration

This chapter contains the following topics:

- "Using the Setup Utility program" on page 33
- "Updating the BIOS" on page 38

Using the Setup Utility program

The Setup Utility program is used to view and change the configuration settings of your computer. This section provides information about only the major configuration settings available in the program.

Note: The operating system settings might override any similar settings in the Setup Utility program.

Starting the Setup Utility program

To start the Setup Utility program, do the following:

1. Turn on or restart your computer.
2. Before Windows starts up, repeatedly press and release the F1 key until the Setup Utility program opens. If a BIOS password has been set, the Setup Utility program will not open until you enter the correct password. For more information, see "Using BIOS passwords" on page 36.

   Note: For some keyboards, you might need to press Fn+F1 to open the Setup Utility program.

To view and change the configuration settings, follow the instructions on the right side of the screen. The keys used to perform various tasks are displayed at the bottom of the screen.

Enabling or disabling a device

This section provides information about how to enable or disable user access to hardware devices (such as USB connectors or storage drives).

To enable or disable a device, do the following:

1. Start the Setup Utility program. See "Starting the Setup Utility program" on page 33.
2. Select **Devices**.
3. Select the device you want to enable or disable and press Enter.
4. Select the desired setting and press Enter.
5. Exit the Setup Utility program. See "Exiting the Setup Utility program" on page 38.

Enabling or disabling the Automatic Power On features

If you enable the Automatic Power On features, your computer will start up automatically.

To enable or disable the Automatic Power On features, do the following:

1. Start the Setup Utility program. See "Starting the Setup Utility program" on page 33.
2. Select **Power ➙ Automatic Power On** and press Enter.
3. Select the feature you want to enable or disable and press Enter.
4. Select the desired setting and press Enter.
5. Exit the Setup Utility program. See "Exiting the Setup Utility program" on page 38.

Enabling or disabling ErP LPS compliance mode

Lenovo computers meet the eco-design requirements of the ErP Lot 3 regulation. For more information, go to:
http://www.lenovo.com/ecodeclaration

You can enable ErP LPS compliance mode in the Setup Utility program to reduce the consumption of electricity when your computer is off or in sleep mode.

To enable or disable ErP LPS compliance mode, do the following:

1. Start the Setup Utility program. See "Starting the Setup Utility program" on page 33.
2. Select **Power** ➙ **Enhanced Power Saving Mode** and press Enter.
3. Depending on whether you select **Enabled** or **Disabled**, do one of the following:
   - If you select **Enabled**, press Enter. Then, disable the Wake on LAN feature. See "Enabling or disabling the Automatic Power On features" on page 33.
   - If you select **Disabled**, press Enter. Then, go to the next step.
4. Exit the Setup Utility program. See "Exiting the Setup Utility program" on page 38.

When ErP LPS compliance mode is enabled, you can wake up your computer by doing one of the following:

- Press the power button.
- Enable the Wake Up on Alarm feature to make your computer wake up at a set time. See "Enabling or disabling the Automatic Power On features" on page 33.
- Enable the After Power Loss feature to make your computer wake up when the power supply resumes after a sudden loss of electricity.
   1. Start the Setup Utility program. See "Starting the Setup Utility program" on page 33.
   2. Select **Power** ➙ **After Power Loss** and press Enter.
   3. Select **Power On** and press Enter.
   4. Exit the Setup Utility program. See "Exiting the Setup Utility program" on page 38.

Changing ICE Performance Mode

You can adjust the acoustic and thermal performance of your computer through the **ICE Performance Mode** menu. Two choices are available:

- **Better Acoustic Performance** (default setting)
- **Better Thermal Performance**

By enabling **Better Acoustic Performance**, your computer will run with less noise at a normal thermal level. By enabling **Better Thermal Performance**, your computer will run at a better thermal level with normal acoustic performance.

To switch between better acoustic performance and better thermal performance, do the following:

1. Start the Setup Utility program. See "Starting the Setup Utility program" on page 33.
2. Select **Power** ➙ **Intelligent Cooling Engine (ICE)** and press Enter.
3. Select **ICE Performance Mode** and press Enter.
4. Select **Better Acoustic Performance** or **Better Thermal Performance** as desired and press Enter.
5. Exit the Setup Utility program. See "Exiting the Setup Utility program" on page 38.

Enabling or disabling the ICE Thermal Alert feature

If you enable the ICE thermal alert feature, when critical thermal situations occur, such as malfunctioning fans, abnormally high temperature, or poor cooling performances, an alert log will be written into the Windows system log. The alert log can help you identify the thermal problems.

To enable or disable the ICE Thermal Alert feature, do the following:
1. Start the Setup Utility program. See "Starting the Setup Utility program" on page 33.
2. Select **Power** ➙ **Intelligent Cooling Engine (ICE)** and press Enter.
3. Select **ICE Thermal Alert** and press Enter.
4. Select the desired setting and press Enter.
5. Exit the Setup Utility program. See "Exiting the Setup Utility program" on page 38.

Enabling or disabling the Configuration Change Detection feature

If you enable the Configuration Change Detection feature, when the POST detects the configuration changes of some hardware devices (such as storage drives or memory modules), an error message will be displayed when you turn on the computer.

To enable or disable the Configuration Change Detection feature, do the following:
1. Start the Setup Utility program. See "Starting the Setup Utility program" on page 33.
2. Select **Security** ➙ **Configuration Change Detection** and press Enter.
3. Select the desired setting and press Enter.
4. Exit the Setup Utility program. See "Exiting the Setup Utility program" on page 38.

To bypass the error message and log in to the operating system, do one of the following:

• Press the F2 key.

    Note: For some keyboards, you might need to press Fn+F2 to bypass the error message.
• Start and then exit the Setup Utility program. See "Starting the Setup Utility program" on page 33 and "Exiting the Setup Utility program" on page 38.

Using the cover presence switch

The cover presence switch prevents your computer from logging in to the operating system when the computer cover is not properly installed or closed.

To enable the cover-presence-switch connector on the system board, do the following:
1. Start the Setup Utility program. See "Starting the Setup Utility program" on page 33.
2. Select **Security** ➙ **Chassis Intrusion Detection** and press Enter.
3. Select **Enabled** and press Enter.
4. Exit the Setup Utility program. See "Exiting the Setup Utility program" on page 38.

When the cover-presence-switch connector on the system board is enabled, if the cover presence switch detects that the computer cover is not correctly installed or closed, an error message will be displayed when you turn on the computer. To bypass the error message and log in to the operating system, do the following:
1. Properly install or close your computer cover. See Chapter 7 "Installing or replacing hardware" on page 53.
2. Start and then exit the Setup Utility program. See "Starting the Setup Utility program" on page 33 and "Exiting the Setup Utility program" on page 38.

Using BIOS passwords

By using the Setup Utility program, you can set passwords to prevent unauthorized access to your computer and data.

You do not have to set any passwords to use your computer. However, using passwords improves computer security. If you decide to set any passwords, read the following topics.

Setup Utility program password types

The following types of passwords are available:

- Power-on password
  When a power-on password is set, you are prompted to enter a valid password each time the computer is turned on. The computer cannot be used until the valid password is entered.

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

  When an administrator password is set, you are prompted to enter 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 entered.

  If both the power-on password and administrator password are set, you can enter 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 storage drive. When a hard disk password is set, you are prompted to enter a valid password each time you try to access the storage drive.

  Notes:

  – After you set a hard disk password, your data on the storage drive is protected even if the storage drive is removed from one computer and installed in another.

  – If the hard disk password is forgotten, there is no way to reset the password or recover data from the storage drive.

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.

Note: The Setup Utility program passwords are not case sensitive.

To set a strong password, consider the following guidelines:

- Have at least eight characters in length
- Contain at least one alphabetic character and one numeric character
- Not be your name or your user name
- Not be a common word or a common name
- Be significantly different from your previous passwords

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 33.
2. Select **Security**.

3. Depending on the password type, select **Set Power-On Password**, **Set Administrator Password**, or **Hard Disk Password** and press Enter.

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 36.

5. Exit the Setup Utility program. See "Exiting the Setup Utility program" on page 38.

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 any media from the drives and turn off all connected devices and the computer. Then, disconnect all power cords from electrical outlets and disconnect all cables that are connected to the computer.

2. Remove the computer cover. See Chapter 7 "Installing or replacing hardware" on page 53.

3. Locate the Clear CMOS /Recovery jumper on the system board. See "Hardware locations" on page 1.

4. Move the jumper from the standard position (pin 1 and pin 2) to the maintenance position (pin 2 and pin 3).

5. Reinstall the computer cover and connect the power cord. See Chapter 7 "Installing or replacing hardware" on page 53.

6. Turn on the computer and leave it on for approximately 10 seconds. Then, turn off the computer by holding the power button for approximately five seconds.

7. Repeat step 1 through step 2.

8. Move the Clear CMOS /Recovery jumper back to the standard position (pin 1 and pin 2).

9. Reinstall the computer cover and connect the power cord.

Selecting a startup device

If your computer does not start up from a device as expected, you can choose to change the startup device sequence permanently or select a temporary startup device.

Changing the startup device sequence permanently

To change the startup device sequence permanently, do the following:

1. Depending on the type of the storage device, do one of the following:

   - If the storage device is internal, go to step 2.
   - If the storage device is a disc, ensure that your computer is on or turn on the computer. Then, insert the disc into the optical drive.
   - If the storage device is an external device other than a disc, connect the storage device to the computer.

2. Start the Setup Utility program. See "Starting the Setup Utility program" on page 33.

3. Select **Startup**.

4. Follow the instructions on the right side of the screen to change the startup device sequence.

5. Exit the Setup Utility program. See "Exiting the Setup Utility program" on page 38.

Selecting a temporary startup device

Note: Not all discs and storage drives are bootable.

To select a temporary startup device, do the following:

1. Depending on the type of the storage device, do one of the following:

    - If the storage device is internal, go to step 2.
    - If the storage device is a disc, ensure that your computer is on or turn on the computer. Then, insert the disc into the optical drive.
    - If the storage device is an external device other than a disc, connect the storage device to the computer.

2. Turn on or restart the computer. Before Windows starts up, repeatedly press and release the F12 key until Startup Device Menu is displayed.

    Note: For some keyboards, you might need to press Fn+F12 to display Startup Device Menu.

3. Select the desired storage device and press Enter. The computer will start up from the device you select.

If you want to select a permanent startup device, select **Enter Setup** on Startup Device Menu and press Enter to start the Setup Utility program. For more information about how to select a permanent startup device, see "Changing the startup device sequence permanently" on page 37.

Exiting the Setup Utility program

To exit the Setup Utility program, do one of the following:

- If you want to save the new settings, press the F10 key. Then, select **Yes** in the window displayed and press Enter.

    Note: For some keyboards, you might need to press Fn+F10 to exit the Setup Utility program.

- If you do not want to save the new settings, select **Exit → Discard Changes and Exit** and press Enter. Then, select **Yes** in the window displayed and press Enter.

Updating the BIOS

When you install a new program, hardware device, or device driver, you might be informed to update the BIOS. You can update the BIOS from your operating system or a flash update disc (supported only on some models).

To update the BIOS, do the following:

1. Go to http://www.lenovo.com/drivers.
2. Download the flash BIOS update driver for the operating system version or the ISO image version (used to create a flash update disc). Then, download the installation instructions for the flash BIOS update driver you download.
3. Print the installation instructions you download and follow the instructions to update the BIOS.

Note: If you want to update the BIOS from a flash update disc, the installation instructions might not provide the information about how to record the update disc. See "Recording a disc" on page 17.

Recovering from a BIOS update failure

To recover from a BIOS update failure, do the following:

1. Remove any media from the drives and turn off all connected devices and the computer. Then, disconnect all power cords from electrical outlets and disconnect all cables that are connected to the computer.
2. Remove the computer cover. See Chapter 7 "Installing or replacing hardware" on page 53.
3. Locate the Clear CMOS /Recovery jumper on the system board. See "Hardware locations" on page 1.

4. Remove any parts and cables that impede your access to the Clear CMOS /Recovery jumper.

5. Move the jumper from the standard position (pin 1 and pin 2) to the maintenance position (pin 2 and pin 3).

6. Reinstall the parts and cables that were removed.

7. Reinstall the computer cover and reconnect any cables that were disconnected. See Chapter 7 "Installing or replacing hardware" on page 53.

8. Turn on the computer and insert the BIOS update disc into the optical drive. Wait a few minutes. The recovery process begins. After the recovery process is completed, your computer will shut down automatically.

   Note: If the computer does not start up from the disc, select the disc as the startup device. See "Selecting a temporary startup device" on page 37.

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. Repeat step 6 through step 7. Then, turn on your computer.

Chapter 6. Troubleshooting, diagnostics, and recovery

This chapter provides solutions to resolve your computer problems. Follow the steps in the basic procedure for resolving computer problems, which helps you make good use of the troubleshooting, diagnostics, and recovery information.

- "Basic procedure for resolving computer problems" on page 41
- "Troubleshooting" on page 41
- "Diagnostics" on page 49
- "Recovery information" on page 49

Basic procedure for resolving computer problems

It is recommended that you use the following procedure to resolve computer problems you are experiencing:

1. Ensure that:
   a. The cables for all connected devices are connected correctly and securely.
   b. All connected devices that require ac power are connected to properly grounded, functioning electrical outlets.
   c. All connected devices are enabled in the BIOS settings of your computer. See "Enabling or disabling a device" on page 33.

   If these actions do not resolve your problem, continue with the next step.

2. Use an antivirus program to see if your computer has been infected by a virus. If the program detects a virus, remove the virus. If the antivirus program does not resolve your problem, continue with the next step.

3. Go to "Troubleshooting" on page 41 and follow the instructions for the type of problem you are experiencing. If these troubleshooting instructions do not resolve your problem, continue with the next step.

4. Run the diagnostic program. See "Diagnostics" on page 49. If the diagnostic program does not resolve your problem, continue with the next step.

5. Recover your operating system. See "Recovery information" on page 49.

6. If none of these actions solve your problem, contact the Lenovo Customer Support Center. For a list of Lenovo Support phone numbers, go to http://www.lenovo.com/support/phone. For more information about help, service, and technical assistance, see Chapter 8 "Getting information, help, and service" on page 79.

Troubleshooting

Attention: Do not open your computer or attempt any repair before reading and understanding the "Read this first: Important safety information" on page iii.

Use the troubleshooting information to find solutions to problems that have definite symptoms.

Startup problems

This section provides solutions to startup-related problems.

The computer does not start up when you press the power button
Solutions: Ensure that:

- The power cord is correctly connected to the rear of the computer and to a working electrical outlet.

- If your computer has a secondary power switch on the rear of the computer, ensure that it is switched on.

- The power indicator on the front of the computer is on.

- The computer voltage matches the voltage available at the electrical outlet for your country or region.

The operating system fails to start up

Solution: Ensure that the startup sequence includes the device where the operating system resides. Usually, the operating system is on the storage drive. For more information, see "Changing the startup device sequence permanently" on page 37.

The computer beeps multiple times before the operating system starts up

Solution: Ensure that no keys are stuck.

Audio problems

This section provides solutions to audio-related problems.

No audio in Windows

Solutions:

- If you are using powered external speakers that have an On/Off control, ensure that:

  - The On/Off control is set to the **On** position.

  - The speaker power cable is connected to a properly grounded, functional ac electrical outlet.

- If your external speakers have a volume control, ensure that the volume is not set too low.

- Click the volume icon in the Windows notification area on the taskbar. Ensure that the mute speakers settings are not selected and none of the volume settings is set too low.

  Note: If the volume icon is not displayed in the Windows notification area, add the icon to the notification area. See "Adding an icon to the Windows notification area" on page 15.

- Some models have a front audio panel you can use to adjust volume. If you have a front audio panel, ensure that the volume is not set too low.

- Ensure that your external speakers (and headphones, if used) are connected to the correct audio connector on the computer. Most speaker cables are color-coded to match the connector.

  Note: When external-speaker or headphone cables are connected to the audio connector, the internal speaker, if present, is disabled. In most cases, if an audio adapter is installed in one of the expansion slots, the audio function built into the system board is disabled. Therefore, you must use the audio connectors on the audio adapter.

- Ensure that the program you are running is designed for use in the Microsoft Windows operating system. If the program is designed to run in DOS, the program does not use the Windows sound feature. The program must be configured to use SoundBlaster Pro or SoundBlaster emulation.

- Ensure that the audio device drivers are correctly installed.

Sound comes only from one external speaker

Solutions:

- Ensure that the speaker cable is inserted completely into the connector on the computer.

- Ensure that the cable that connects the left speaker to the right speaker is securely connected.

- Click the volume icon in the Windows notification area on the taskbar. Then, click the speaker icon on top of the volume control. Click the **Levels** tab and ensure that the Balance settings are set correctly .

Note: If the volume icon is not displayed in the Windows notification area, add the icon to the notification area. See "Adding an icon to the Windows notification area" on page 15.

CD problems

This section provides solutions to CD-related problems.

A CD or DVD does not work

Solutions:

- If you have multiple CD or DVD drives installed (or a combination of CD and DVD drives), try inserting the disc into the other drive. In some cases, only one of the drives is connected to the audio subsystem.
- Ensure that the disc is inserted correctly, with its label up.
- Ensure that the disc you are using is clean. To remove dust or fingerprints, wipe the disc clean with a soft cloth from the center to the outside. Wiping a disc in a circular motion might cause loss of data.
- Ensure that the disc you are using is not scratched or damaged. Try inserting another disc that you know is good. If you cannot read from a known-good disc, you might have a problem with your optical drive or the cabling to your optical drive. Ensure that the power cable and signal cable are securely connected to the drive.

Unable to use a bootable recovery medium, such as the Product Recovery CD, to start your computer

Solution: Ensure that the CD or DVD drive is in the startup sequence before the storage drive. Refer to "Selecting a temporary startup device" on page 37 for information on viewing and changing the startup sequence. Note that on some models the startup sequence is permanently set and cannot be changed.

DVD problems

This section provides solutions to DVD-related problems.

Black screen instead of DVD video

Solutions:

- Restart the DVD player program.
- Try a lower screen resolution or color depth.
- Close any open files, and then restart the computer.

DVD movie does not play

Solutions:

- Ensure that the disc surface is clean and not scratched.
- Check the disc or package for regional coding. You might need to purchase a disc with coding for the region where you are using your computer.

No audio or intermittent audio while playing a DVD movie

Solutions:

- Check the volume control settings on your computer and on your speakers.
- Ensure that the disc surface is clean and not scratched.
- Check all cable connections to and from the speakers.
- Use the DVD menu for the video to select a different audio track.

Playback is slow or choppy

Solutions:

- Disable any background programs, such as AntiVirus or Desktop Themes.
- Ensure that video resolution is set to less than 1152 x 864 pixels.

Invalid disc or no disc found message

Solutions:

- Ensure that a DVD disc is in the drive with the shiny side of the disc facing down.
- Ensure that video resolution is set to less than 1152 x 864 pixels.
- On computers that have a CD-ROM or CD-RW drive in addition to a DVD-ROM drive, ensure that the DVD disc is in the drive labeled "DVD".

Intermittent problems

Some problems occur only occasionally and are difficult to repeat.

Solutions:

- Ensure that all cables and cords are securely connected to the computer and connected devices.
- Ensure that when the computer is on, the fan grill is not blocked (there is air flow around the grill), and the fans are working. If airflow is blocked or the fans are not working, the computer might overheat.
- If Small Computer System Interface (SCSI) devices are installed, ensure that the last external device in each SCSI chain is terminated correctly. For more information, see your SCSI documentation.

Storage drive problems

Select your symptom from the following list:

Some or all storage drives missing from the Setup Utility program

Symptom: Some or all storage drives missing from the Setup Utility program

Solutions:

- Ensure that all storage drive signal cables and power cables are connected correctly.
- Ensure that your computer is configured correctly to support the storage drives.
  - If your computer is installed with five SATA storage drives, ensure that the SATA storage drive enablement module (one to five storage drives) is installed.
  - If your computer is installed with SAS storage drives, ensure that the SAS storage drive enablement module (one to five storage drives) or the LSI MegaRAID SAS adapter is installed.

"No Operating System Found" message or the system not starting up from the correct storage drive

Symptom: "No Operating System Found" message or the system not starting up from the correct storage drive

Solutions:

- Ensure that all storage drive signal cables and power cables are connected correctly.

- Ensure that the storage drive your computer starts up from is listed as the first startup device in the Setup Utility program. Refer to "Changing the startup device sequence permanently" on page 37.

Note: In rare cases, the storage drive with the operating system might get corrupted or damaged. In such cases, you might need to replace the storage drive. Refer to Chapter 7 "Installing or replacing hardware" on page 53.

Networking problems

This section provides solutions to networking-related problems.

Ethernet LAN problems

My computer cannot be connected to an Ethernet LAN

Solutions:

- Connect the cable from the Ethernet connector to the RJ45 connector of the hub.
- Enable the Ethernet LAN feature in the Setup Utility program. See "Starting the Setup Utility program" on page 33. Then, follow the instructions on the screen.
- Enable the Ethernet LAN adapter.
    1. Depending on your Windows version, do one of the following:
        – For Windows 7: Click the Start button to open the Start menu.
        – For Windows 10: Right-click the Start button to open the Start context menu.
    2. Click **Control Panel**. View Control Panel using Large icons or Small icons, and then click **Network and Sharing Center → Change adapter settings**.
    3. Right-click the Ethernet LAN adapter icon and click **Enable**.
- Update or reinstall the Ethernet LAN driver. See "Keeping your computer current" on page 24.
- Install all networking software that is necessary for your network environment. Check with your LAN administrator for the necessary networking software.
- Set the same duplex for the switch port and the adapter. If you configured the adapter for full duplex, ensure that the switch port is also configured for full duplex. Setting the wrong duplex mode might degrade performance, cause data loss, or result in lost connections.

My computer is a Gigabit Ethernet model and I use a speed of 1000 Mbps, but the connection fails or errors occur

Solution: Connect the network cable to the Ethernet connector using Category 5 wiring and a 100 BASE-T hub/switch (not 100 BASE-X).

My computer is a Gigabit Ethernet model, but it cannot be connected to the network at 1000 Mbps, but at only 100 Mbps

Solutions:

- Try another cable.
- Set the link partner to auto-negotiate.
- Set the switch to be 802.3ab-compliant (gigabit over copper).

The Wake On LAN feature does not work

Solution: Enable the Wake On LAN (WOL) feature in the Setup Utility program. See "Starting the Setup Utility program" on page 33. Then, follow the instructions on the screen.

Wireless LAN problem

Note: The wireless LAN feature is supported only on some models.

The wireless LAN feature does not work

Solutions:

- Enable the wireless LAN feature in the Setup Utility program. See "Starting the Setup Utility program" on page 33. Then, follow the instructions on the screen.
- For Windows 10, enable the wireless LAN feature in Windows Settings. Click the Start button to open the Start menu, and then click **Settings** ➙ **Network & Internet** ➙ **Wi-Fi**. Turn on the Wi-Fi feature.
- Enable the wireless LAN adapter.

   1. Depending on your Windows version, do one of the following:

      – For Windows 7: Click the Start button to open the Start menu.

      – For Windows 10: Right-click the Start button to open the Start context menu.

   2. Click **Control Panel**. View Control Panel using Large icons or Small icons, and then click **Network and Sharing Center** ➙ **Change adapter settings**.

   3. Right-click the wireless LAN adapter icon and click **Enable**.

- Update or reinstall the wireless LAN driver. See "Keeping your computer current" on page 24.

Bluetooth problems

Note: The Bluetooth feature is supported only on some models.

The Bluetooth feature does not work

Solutions:

- Enable the Bluetooth feature in the Setup Utility program. See "Starting the Setup Utility program" on page 33. Then, follow the instructions on the screen.
- Turn on the Bluetooth radios.

   1. Depending on your Windows version, do one of the following:

      – For Windows 7: Click the Start button to open the Start menu. Right-click **Computer**, and then click **Properties**.

      – For Windows 10: Right-click the Start button to open the Start context menu.

   2. Click **Device Manager**. Type the administrator password or provide confirmation if prompted.

   3. Right-click the Bluetooth radios under **Bluetooth Radios** and click **Enable**.

- Enable the Bluetooth adapter.

   1. Depending on your Windows version, do one of the following:

      – For Windows 7: Click the Start button to open the Start menu.

      – For Windows 10: Right-click the Start button to open the Start context menu.

   2. Click **Control Panel**. View Control Panel using Large icons or Small icons, and then click **Network and Sharing Center** ➙ **Change adapter settings**.

   3. Right-click the Bluetooth adapter icon and click **Enable**.

- Update or reinstall the Bluetooth driver. See "Keeping your computer current" on page 24.

Sound does not come from the Bluetooth headset or headphones

Solution: Set the Bluetooth headset or headphones as the default device.

   1. Exit the application that uses the sound device (for example, Windows Media Player).

   2. Right-click the volume icon in the Windows notification area on the taskbar.

Note: If the volume icon is not displayed in the Windows notification area, add the icon to the notification area. See "Adding an icon to the Windows notification area" on page 15.

3. Click **Playback devices**.

4. If you are using the Headset profile, select **Bluetooth Hands-free Audio**, and then click **Set Default**. If you are using the AV profile, select **Stereo Audio**, and then click **Set Default**.

5. Click **OK**.

Performance problems

This section provides solutions to performance-related problems of your computer.

Excessive number of fragmented files

Solution: Use the Windows disk defragmentation or disk optimization feature to clean up the files.

Note: Depending on the volume of the storage drives and amount of data stored on the storage drives, the disk-defragmentation process might take up to several hours.

1. Close any open programs and windows.

2. Click the Start button to open the Start menu.

3. Depending on your Windows version, do one of the following:

   - For Windows 7: Click **Computer**.

   - For Windows 10: Click **File Explorer** ➙ **This PC**.

4. Right-click your C drive and then click **Properties**.

5. Click the **Tools** tab.

6. Depending on your Windows version, do one of the following:

   - For Windows 7: Click **Defragment now**.

   - For Windows 10: Click **Optimize**. Select the desired drive, and then click **Optimize**.

7. Follow the instructions on the screen.

Insufficient free storage drive space

Solutions: Free up storage drive space.

- Clean out your Inbox, Sent Items, and Deleted Items folders from your e-mail application.

- Clean up your C drive.

   1. Click the Start button to open the Start menu.

   2. Depending on your Windows version, do one of the following:

      – For Windows 7: Click **Computer**.

      – For Windows 10: Click **File Explorer** ➙ **This PC**.

   3. Right-click your C drive and then click **Properties**.

   4. Check the amount of free space, and then click **Disk Cleanup**.

   5. A list of unnecessary file categories is displayed. Select each file category you want to delete, and then click **OK**.

- Turn some Windows features off or remove some unnecessary programs.

   1. Depending on your Windows version, do one of the following:

      – For Windows 7: Click the Start button to open the Start menu.

      – For Windows 10: Right-click the Start button to open the Start context menu.

2. Click **Control Panel**. View Control Panel using Large icons or Small icons, and then click **Programs and Features**.

3. Do one of the following:

   – To turn some Windows features off, click **Turn Windows features on or off**. Follow the instructions on the screen.

   – To remove some unnecessary programs, select the program you want to remove, and then click **Uninstall/Change** or **Uninstall**.

Insufficient free memory space

Solutions:

- Right-click a blank area on the taskbar and open Task Manager. Then, end some tasks you are not performing.

- Install additional memory modules. See Chapter 7 "Installing or replacing hardware" on page 53. To purchase memory modules, go to
  http://www.lenovo.com.

Serial connector cannot be accessed

Solutions:

- Connect the serial cable to the serial connector on the computer and to the serial device. If the serial device has its own power cord, connect the power cord to a grounded electrical outlet.

- Turn on the serial device and keep the device online.

- Install any application programs supplied with the serial device. Refer to the documentation that comes with the serial device for more information.

- If you added one serial-connector adapter, install the adapter correctly.

My USB connectors cannot be accessed

Solutions:

- Connect the USB cable from the USB connector to the USB device. If the USB device has its own power cord, connect the power cord to a grounded electrical outlet.

- Turn on the USB device and keep the device online.

- Install any device drivers or application programs supplied with the USB device. Refer to the documentation that comes with the USB device for more information.

- Detach and reconnect the USB connector to reset the USB device.

Software and driver problems

This section provides solutions to software- and driver-related problems.

For some programs, dates cannot be sorted in correct order

Solution: Some programs developed before the year 2000 use only the last two digits of a year to sort dates, assuming the first two digits are 19. Consequently, dates cannot be sorted in correct order nowadays. Check with your software manufacturer to see if any updates are available. Many software manufacturers make updates available from the World Wide Web.

Some application programs do not work as expected

Solutions:

1. Check whether the problem is caused by an application program.

a. Ensure that the software is compatible with your computer. Refer to the information supplied with the software for more information.

b. Verify that other software works correctly on your computer.

c. Verify that the software you are using works on another computer.

2. If the problem is caused by an application program:

- Refer to the printed documentation that comes with the program or the help system of the program.

- Update the program. See "Keeping your computer current" on page 24.

- Uninstall the program and then reinstall it. To download a program that is preinstalled on your computer, go to http://www.lenovo.com/support and follow the instructions on the screen.

A device does not work normally due to device driver problems

Solution: Update the device driver. See "Keeping your computer current" on page 24.

Diagnostics

Note: If you are using a Windows operating system other than Windows 7 or Windows 10, go to http://www.lenovo.com/diags for the diagnostics information for your computer.

The diagnostic program is used to test hardware components of your computer. The diagnostic program also can report operating-system-controlled settings that interfere with the correct operation of your computer.

Lenovo Solution Center

The Lenovo Solution Center program is the diagnostic program preinstalled on your computer. The program enables you to troubleshoot and resolve computer problems. It combines diagnostic tests, system information collection, security status, and support information, along with hints and tips for maximum system performance.

To open the Lenovo Solution Center program, see "Accessing a program on your computer" on page 11. For more information about using the program, refer to the help system of the program.

If you are unable to isolate and repair the problem yourself after running Lenovo Solution Center, save and print the log files created by the program. You might need the log files when you speak to a Lenovo technical support representative.

Recovery information

This section provides instructions about how to recover your operating system.

Note: If a device does not work normally after recovering the operating system, update the device driver. See "Keeping your computer current" on page 24.

Recovery information for Windows 7

To recover your Windows 7 operating system, use the following solutions:

- Use Windows recovery solutions.

  – Use System Restore to restore system files and settings to an earlier point.

    1. Click the Start button to open the Start menu.

    2. Click **Control Panel**. View Control Panel using Large icons or Small icons, and then click **Recovery → Open System Restore**.

    3. Follow the instructions on the screen.

– Use the Windows recovery environment by doing one of the following:

  – After several consecutive failed boot attempts, the Windows recovery environment might start automatically. Follow the instructions on the screen to choose the appropriate recovery solution.

  – Turn on or restart your computer. Then, repeatedly press and release the F8 key until the Advanced Boot Options window opens. Select **Repair Your Computer**, press Enter, and follow the instructions on the screen to choose the appropriate recovery solution.

    Note: For some keyboards, you might need to press Fn+F8 to open the Advanced Boot Options window.

• Use the Rescue and Recovery program to restore the storage drive from a backup, or restore the C drive to the factory-default settings.

  Notes:

  – Depending on your computer model, the Rescue and Recovery program might not be available unless you installed it manually earlier.

  – If you use the Rescue and Recovery program to restore the storage drive from a backup, ensure that you backed up your data earlier with the program.

  To use the Rescue and Recovery program, do one of the following:

  – Open the Rescue and Recovery program. See "Accessing a program on your computer" on page 11. For more information about using the program, refer to the help system of the program.

  – Open the Rescue and Recovery workspace.

    1. Turn off your computer. Press and hold the Enter key and then turn on the computer. Release the Enter key when Startup Interrupt Menu is displayed. Then, press F11 to open the Rescue and Recovery workspace.

    2. If the Rescue and Recovery workspace fails to open, use the rescue medium you created earlier to resolve the problem. Select the rescue medium as the startup device. See "Selecting a temporary startup device" on page 37. When the rescue medium starts, the Rescue and Recovery workspace opens. Follow the instructions on the screen.

• Use the recovery medium you created earlier with the Create Recovery Media program to restore only the C drive or the entire storage drive to the factory-default settings.

  Note: To create a recovery medium, see "Good maintenance practices" on page 23.

    1. Select the recovery medium as the startup device. See "Selecting a temporary startup device" on page 37.

    2. Follow the instructions on the screen to choose the appropriate recovery solution.

• Use the recovery disc set provided by Lenovo to restore the entire storage drive to the factory-default settings.

  – If your computer comes with the recovery disc set, follow the instructions shipped with the disc set.

  – If your computer does not come with the recovery disc set, contact the Lenovo Customer Support Center to order a recovery disc set. For a list of Lenovo Support phone numbers, go to http://www.lenovo.com/support/phone. If you cannot find the support telephone number for your country or region, contact your Lenovo reseller.

Recovery information for Windows 10

To recover your Windows 10 operating system, use the following solutions:

• Use Windows recovery solutions.

  – Use recovery solutions in Windows Settings.

1. Click the Start button to open the Start menu.

2. Click **Settings ➙ Update & security ➙ Recovery**.

3. Choose the appropriate recovery solution by following the instructions on the screen.

– Use System Restore to restore system files and settings to an earlier point.

1. Right-click the Start button to open the Start context menu.

2. Click **Control Panel**. View Control Panel using Large icons or Small icons, and then click **Recovery ➙ Open System Restore**.

3. Follow the instructions on the screen.

– Use the File History tool to restore your files from a backup.

Note: If you use the File History tool to restore your files from a backup, ensure that you backed up your data earlier with the tool.

1. Right-click the Start button to open the Start context menu.

2. Click **Control Panel**. View Control Panel using Large icons or Small icons, and then click **File History ➙ Restore personal files**.

3. Follow the instructions on the screen.

– Use the Windows recovery environment by doing one of the following:

– After several consecutive failed boot attempts, the Windows recovery environment might start automatically. Follow the instructions on the screen to choose the appropriate recovery solution.

– Select the recovery medium you created earlier with the Windows tool as the startup device. See "Selecting a temporary startup device" on page 37. Then, follow the instructions on the screen to choose the appropriate recovery solution.

Note: To create a recovery medium, see "Good maintenance practices" on page 23.

• Use the recovery USB key provided by Lenovo to restore the entire storage drive to the factory-default settings.

– If your computer comes with the recovery USB key, follow the instructions shipped with the USB key.

– If your computer does not come with the recovery USB key, contact the Lenovo Customer Support Center to order a recovery USB key. For a list of Lenovo Support phone numbers, go to http://www.lenovo.com/support/phone. If you cannot find the support telephone number for your country or region, contact your Lenovo reseller.

Chapter 7. Installing or replacing hardware

This chapter contains the following topics:

Handling static-sensitive devices

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

When you handle parts and other computer 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 computer components carefully. Handle PCI/PCI-Express cards, memory modules, system boards, and microprocessors by the edges. Never touch any exposed circuitry.
- Prevent others from touching the parts and other computer components.
- Touch the static-protective package containing the part to a metal expansion-slot cover or other unpainted metal surface on the computer for at least two seconds. This reduces static electricity from the package and your body before you install or replace a new part.
- When possible, remove the new part from the static-protective package, and install it directly in the computer 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 the package.
- Do not place the part on the computer cover or other metal surface.

Installing or replacing hardware

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

Attention: Do not open your computer or attempt any repair before reading and understanding the "Read this first: Important safety information" on page iii.

Notes:

- Depending on your computer model, some of the hardware parts in this section might not be available.
- Use computer parts provided only by Lenovo.
- When installing or replacing an option, use the appropriate instructions in this section along with the instructions that come with the option.
- In most areas of the world, Lenovo requires the return of the defective CRU. Information about this will come with the CRU or will come a few days after the CRU arrives.

Installing external options

You can connect external options to your computer, 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 "Hardware locations" on page 1 to identify the required connector.

Use the instructions shipped with the option to help you make the connection and install any software or device drivers that are required for the option.

Removing the computer cover

Attention: Do not open your computer or attempt any repair before reading and understanding the "Read this first: Important safety information" on page iii.

CAUTION:

Before you open the computer cover, turn off the computer and wait several minutes until the computer is cool.

To remove the computer cover, do the following:

1. Remove any media from the drives and turn off all connected devices and the computer. Then, disconnect all power cords from electrical outlets and disconnect all cables that are connected to the computer.
2. Unlock any locking device that secures the computer cover.
3. Remove the two screws that secure the computer cover. Then, slide the cover to the rear of the computer to remove it.
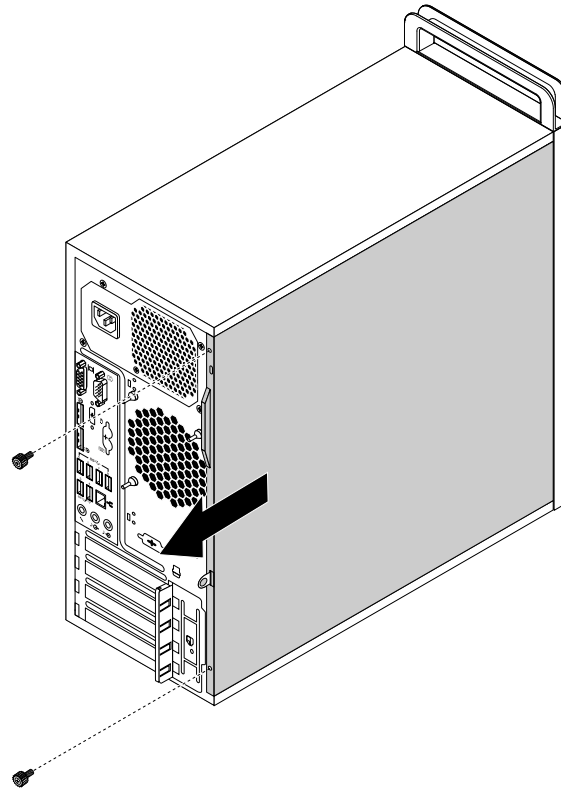
Figure 9. Removing the computer cover

Replacing the front bezel

Attention: Do not open your computer or attempt any repair before reading and understanding the "Read this first: Important safety information" on page iii.

To replace the front bezel, do the following:

1. Remove any media from the drives and turn off all connected devices and the computer. Then, disconnect all power cords from electrical outlets and disconnect all cables that are connected to the computer.

2. Remove the computer cover. See "Removing the computer cover" on page 54.

3. Locate the front bezel. See "Computer components" on page 4.

4. Disconnect the cable from the front panel connector in the system board. See "Parts on the system board" on page 5.

5. Remove the front bezel by releasing the three plastic tabs on the left side and pivoting the front bezel outward.
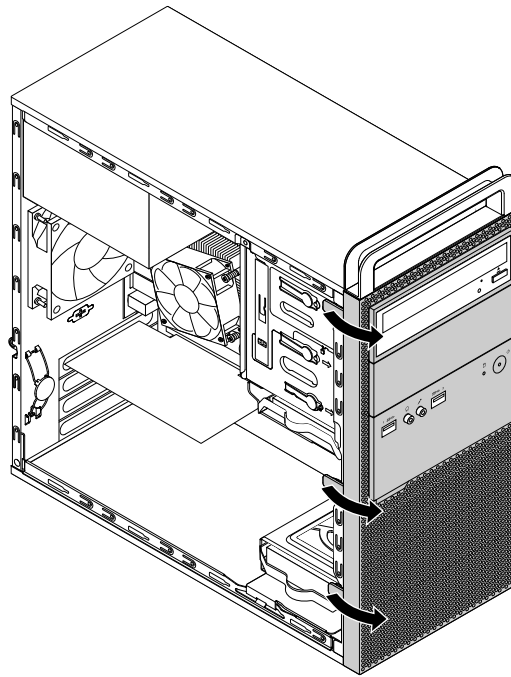
Figure 10. Removing the front bezel

6. Align the three plastic tabs on the right side of the new front bezel with the corresponding holes in the chassis. Then, pivot the front bezel inwards until it snaps into position on the left side.
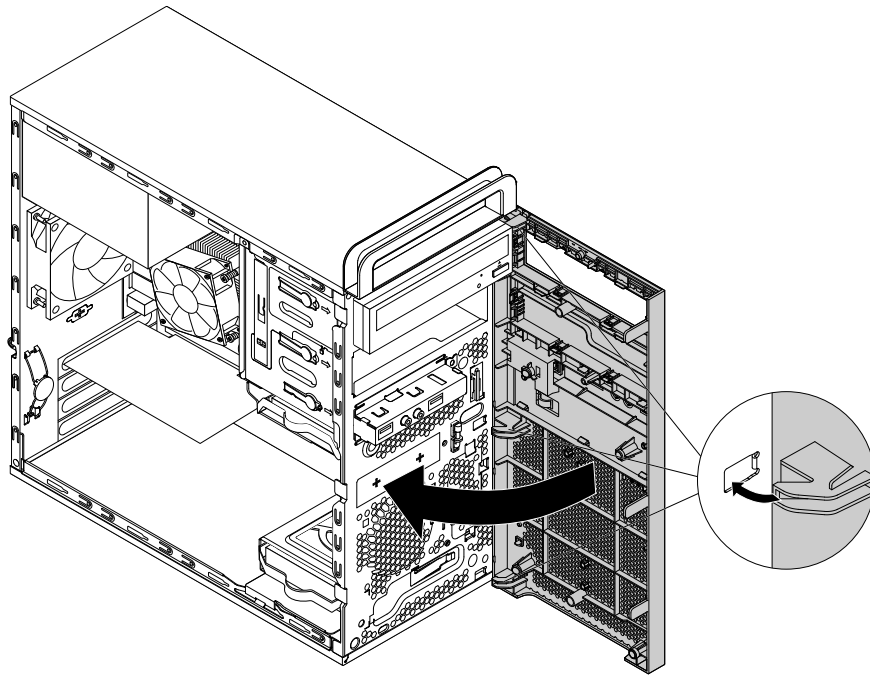
Figure 11. Installing the front bezel

7. Connect the cable to the front panel connector in the system board. See "Parts on the system board" on page 5.

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 77.

Replacing the computer handle

Attention: Do not open your computer or attempt any repair before reading and understanding the "Read this first: Important safety information" on page iii.

To replace the computer handle, do the following:

1. Remove any media from the drives and turn off all connected devices and the computer. Then, disconnect all power cords from electrical outlets and disconnect all cables that are connected to the computer.

2. Remove the computer cover. See "Removing the computer cover" on page 54.

3. Remove the front bezel. See "Replacing the front bezel" on page 54.

4. Locate the computer handle. See "Computer components" on page 4.

5. Remove the four screws that secure the computer handle to remove the handle from the computer.
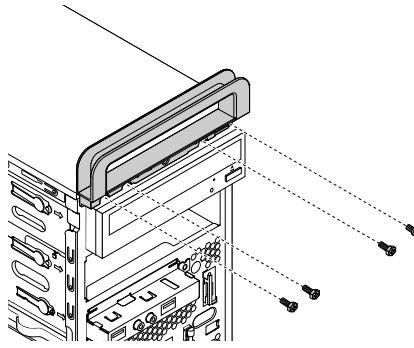
Figure 12. Removing the computer handle

6. Align the screw holes in the new computer handle with the corresponding holes in the computer. Then, install the four screws to secure the computer handle to the computer.

7. Install the front bezel. See "Replacing the front bezel" on page 54.

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 77.

Replacing the storage drive

Attention: Do not open your computer or attempt any repair before reading and understanding the "Read this first: Important safety information" on page iii.

To replace the storage drive, refer to one of the following topics:

• "Replacing the 2.5-inch storage drive in the primary or secondary storage drive bay" on page 57

• "Replacing the 3.5-inch storage drive in the primary or secondary storage drive bay" on page 60

• "Replacing the 3.5-inch storage drive in the front-access storage enclosure" on page 61

Replacing the 2.5-inch storage drive in the primary or secondary storage drive bay

To replace the 2.5-inch storage drive in the primary or secondary storage drive bay, do the following:

1. Remove any media from the drives and turn off all connected devices and the computer. Then, disconnect all power cords from electrical outlets and disconnect all cables that are connected to the computer.

2. Remove the computer cover. See "Removing the computer cover" on page 54.

3. Locate the 2.5-inch storage drive you want to replace. See "Computer components" on page 4.

4. Disconnect the signal cable and the power cable from the 2.5-inch storage drive.

5. Slide out the 3.5-inch storage drive bracket to remove it from the computer.
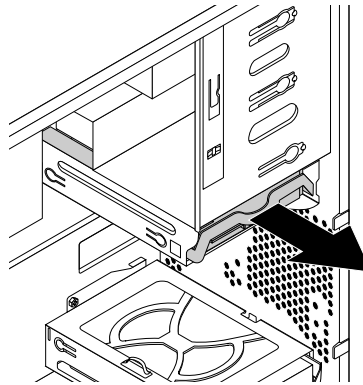
Figure 13. Removing the 3.5-inch storage drive bracket

6. Flex the sides of the blue bracket to remove the 2.5-inch storage converter from the 3.5-inch storage drive bracket.
7. Remove the four screws that secure the 2.5-inch storage drive to the storage converter. Then, lift up the 2.5-inch storage drive to remove it from the converter.
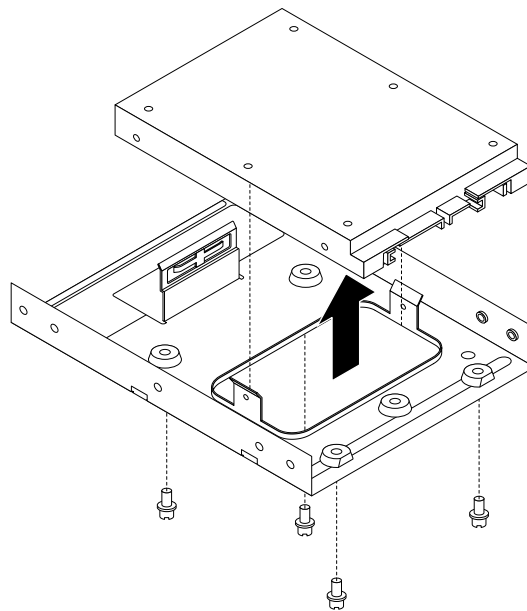

Figure 14. Removing the 2.5-inch storage drive from the storage converter

8. Take the new 2.5-inch storage drive out of the static-protective package.

9. Position the 2.5-inch storage drive in the storage converter so that the holes in the drive are aligned with the corresponding holes in the converter. Then, install the four screws to secure the 2.5-inch storage drive to the converter.
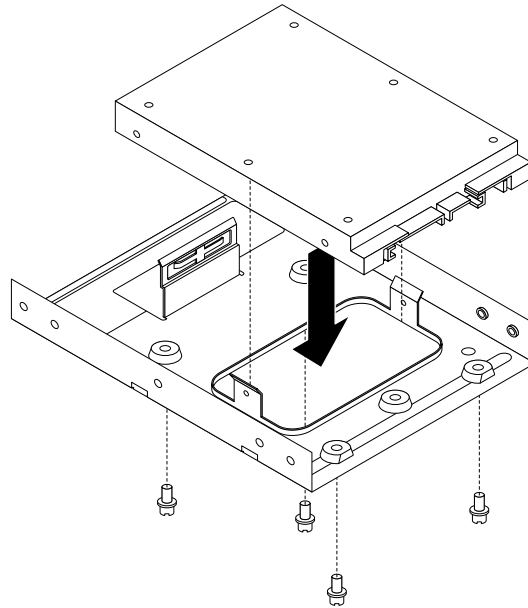
Figure 15. Installing the 2.5-inch storage drive into the storage converter

10. Flex the bracket and insert the pins **1**-**4** on the 3.5-inch storage bracket into the holes in the storage converter. Do not touch the circuit board on the bottom of the 2.5-inch storage drive.
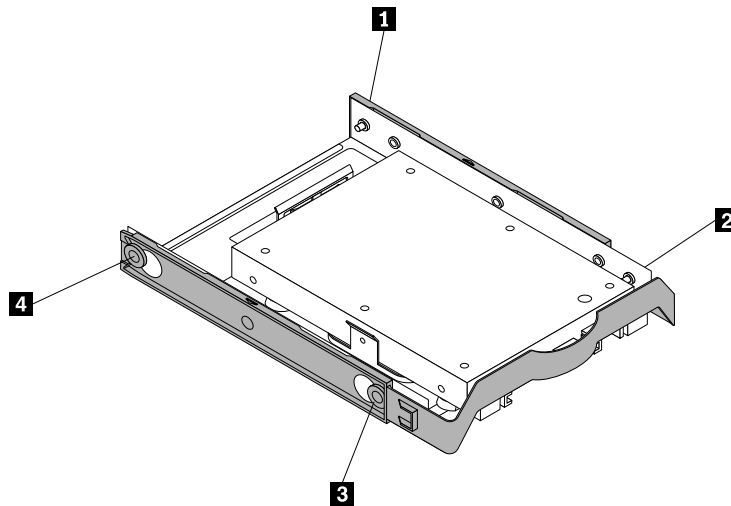
Figure 16. Installing the 2.5-inch storage converter into the 3.5-inch storage drive bracket

11. Slide the 3.5-inch storage drive bracket into the storage drive bay until it snaps into position.

   Note: Ensure that you install the primary storage drive before installing the secondary storage drive. See "Computer components" on page 4.
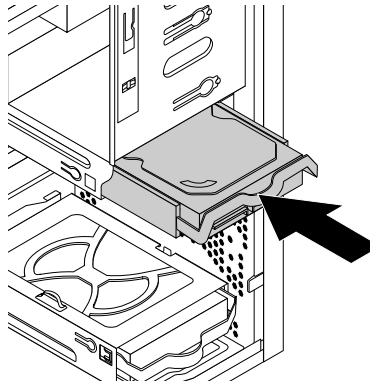
Figure 17. Installing the 3.5-inch storage drive bracket

12. Connect the signal cable and the power cable to the new 2.5-inch storage 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 77.

Replacing the 3.5-inch storage drive in the primary or secondary storage drive bay

To replace the 3.5-inch storage drive in the primary or secondary storage drive bay, do the following:

1. Remove any media from the drives and turn off all connected devices and the computer. Then, disconnect all power cords from electrical outlets and disconnect all cables that are connected to the computer.

2. Remove the computer cover. See "Removing the computer cover" on page 54.

3. Locate the 3.5-inch storage drive you want to replace. See "Computer components" on page 4.

4. Disconnect the signal cable and the power cable from the 3.5-inch storage drive.

5. Slide out the 3.5-inch storage drive bracket to remove it from the computer.
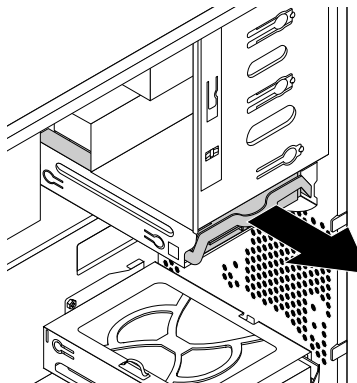
Figure 18. Removing the 3.5-inch storage drive bracket

6. Flex the sides of the blue bracket to remove the 3.5-inch storage drive from the bracket.

7. Take the new 3.5-inch storage drive out of the static-protective package.

8. Flex the bracket and insert the pins **1**–**4** on the bracket into the holes in the new 3.5-inch storage drive. Do not touch the circuit board **5** on the bottom of the 3.5-inch storage drive.
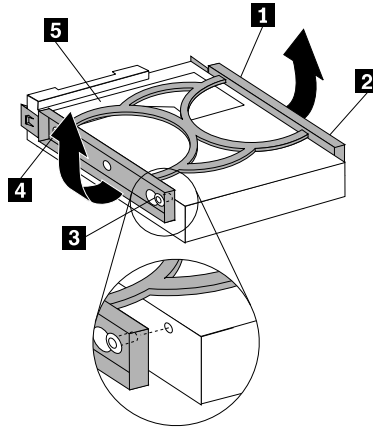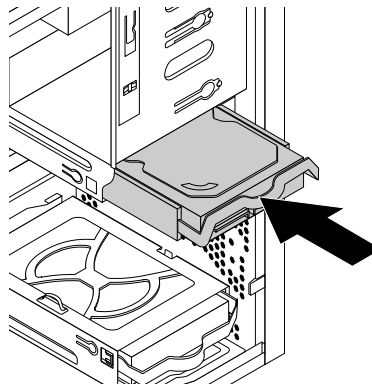

Figure 19. Installing the 3.5-inch storage drive into the bracket

9. Slide the 3.5-inch storage drive bracket into the storage drive bay until it snaps into position.

   Note: Ensure that you install the primary storage drive before installing the secondary storage drive. See "Computer components" on page 4.

Figure 20. Installing the 3.5-inch storage drive bracket

10. Connect the signal cable and the power cable to the new 3.5-inch storage 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 77.

Replacing the 3.5-inch storage drive in the front-access storage enclosure

Attention: Do not open your computer or attempt any repair before reading and understanding the "Read this first: Important safety information" on page iii.

Notes: You can perform a hot swap on the 3.5-inch storage drive installed here. To do a hot swap is to connect, remove, or reconnect a device while the computer is operating. Before performing a hot swap, you are recommended to do the following for data security:

1. Click the triangular icon on the taskbar to show hidden icons.
2. Click the **Safely Remove Hardware and Eject Media** icon to stop the device.
3. Proceed with the following instructions to replace the storage drive.

To replace the 3.5-inch storage drive in the front-access storage enclosure, do the following:

1. Locate the front-access storage enclosure. See "Computer components" on page 4.
2. Unlock the front-access storage enclosure if available.
3. Press the triangular icon **1** in the bezel of the front-access storage enclosure. Then, the bezel folds down.
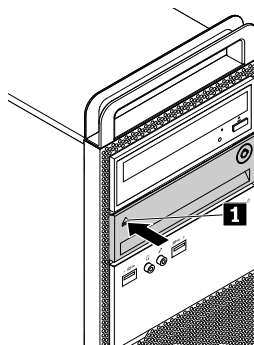
Figure 21. Opening the front-access storage enclosure

4. Press the circular icon in the bezel of the 3.5-inch storage drive bracket as shown. Then, grasp the bezel to slide the 3.5-inch storage drive bracket out of the front-access storage enclosure.
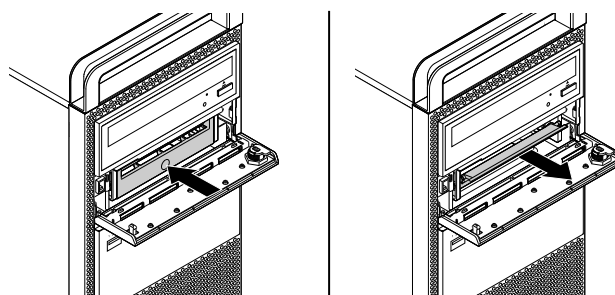

Figure 22. Removing the 3.5-inch storage drive bracket

5. Flex the sides of the blue bracket to remove the 3.5-inch storage drive from the bracket.
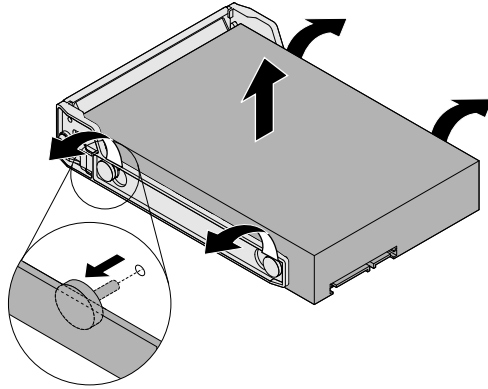
Figure 23. Removing the 3.5-inch storage drive from the bracket

6. Flex the bracket and insert the four pins on the bracket into the corresponding holes in the new 3.5-inch storage drive. Do not touch the circuit board on the bottom of the 3.5-inch storage drive.
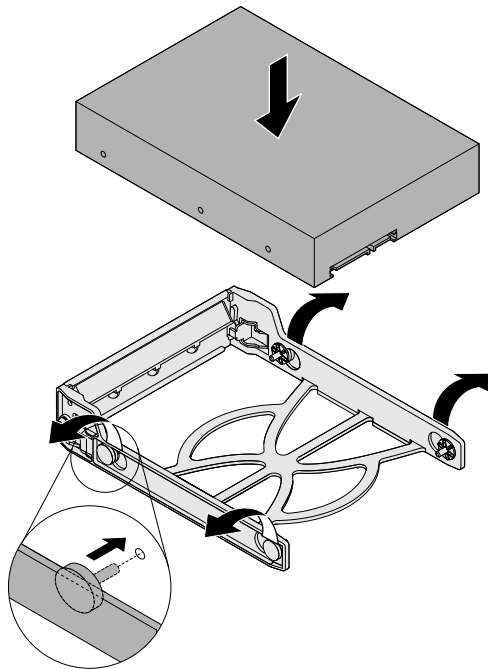

Figure 24. Installing the 3.5-inch storage drive into the bracket

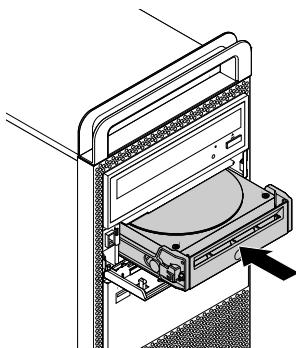7. Slide the 3.5-inch storage drive bracket into the front-access storage enclosure until it snaps into position.

Figure 25. Installing the 3.5-inch storage drive bracket into the front-access storage enclosure

8. Press the triangular icon in the bezel of the front-access storage enclosure again to secure the storage drive bracket.
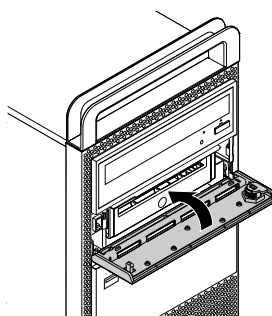

Figure 26. Securing the 3.5-inch storage drive bracket

9. Lock the front-access storage enclosure if you have unlocked it.

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 77.

Replacing the optical drive

Attention: Do not open your computer or attempt any repair before reading and understanding the "Read this first: Important safety information" on page iii.

To replace the optical drive, do the following:

1. Remove any media from the drives and turn off all connected devices and the computer. Then, disconnect all power cords from electrical outlets and disconnect all cables that are connected to the computer.

2. Remove the computer cover. See "Removing the computer cover" on page 54.

3. Remove the front bezel. See "Replacing the front bezel" on page 54.

4. Locate the optical drive. See "Computer components" on page 4.

5. Disconnect the signal cable and the power cable from the rear of the optical drive. See "Parts on the system board" on page 5.

6. Press the blue release button and slide the optical drive to the front of the computer.
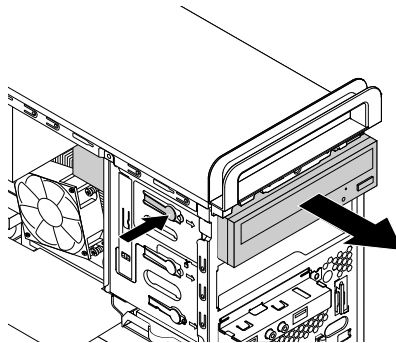

Figure 27. Removing the optical drive

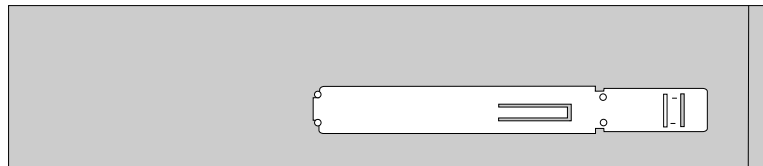7. Install the optical drive retainer on the side of the new optical drive.

Figure 28. Installing the optical drive retainer

8. Slide the new optical drive into the drive bay from the front of the computer until the optical drive snaps into position.
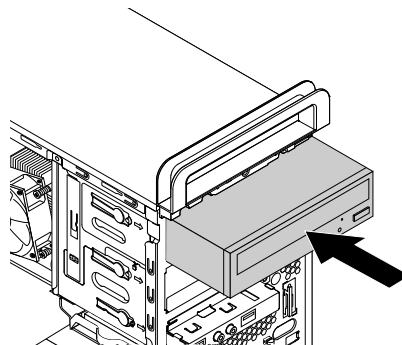

Figure 29. Installing the optical drive

9. Connect the signal cable and the power cable to the new optical drive.
10. Install the front bezel. See "Replacing the front bezel" on page 54.

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 77.

Replacing the front audio and USB assembly

Attention: Do not open your computer or attempt any repair before reading and understanding the "Read this first: Important safety information" on page iii.

To replace the front audio and USB assembly, do the following:

1. Remove any media from the drives and turn off all connected devices and the computer. Then, disconnect all power cords from electrical outlets and disconnect all cables that are connected to the computer.
2. Remove the computer cover. See "Removing the computer cover" on page 54.
3. Remove the front bezel. See "Replacing the front bezel" on page 54.
4. Locate the front audio and USB assembly. See "Computer components" on page 4.
5. Disconnect the front audio and USB assembly cables from the system board. See "Parts on the system board" on page 5.

   Note: Ensure that you note the locations of the cables when you disconnect the cables from the system board.
6. Remove the screw that secures the front audio and USB assembly to remove the assembly from the chassis.
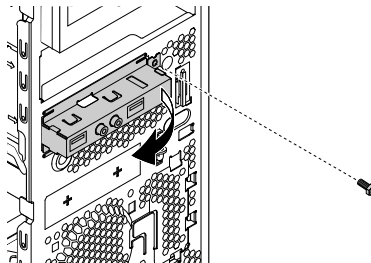

Figure 30. Removing the screw that secures the front audio and USB assembly to the chassis

7. Align the screw hole in the new front audio and USB assembly with the corresponding hole in the chassis. Then, install the screw to secure the assembly to the chassis.
8. Reconnect the front audio and USB assembly cables to the front audio connector and the front USB connector on the system board. See "Parts on the system board" on page 5.
9. Install the front bezel. See "Replacing the front bezel" on page 54.

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 77.

Replacing the power supply assembly

Attention: Do not open your computer or attempt any repair before reading and understanding the "Read this first: Important safety information" on page iii.

Although there are no moving parts in your computer after the power cord has been disconnected, the following warnings are required for your safety and proper Underwriters Laboratories (UL) certification.

CAUTION:
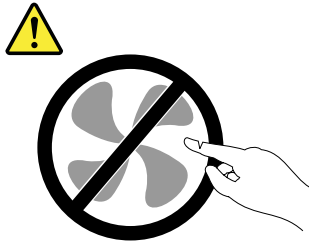
Hazardous moving parts. Keep fingers and other body parts away.

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.

To replace the power supply assembly, do the following:

1. Remove any media from the drives and turn off all connected devices and the computer. Then, disconnect all power cords from electrical outlets and disconnect all cables that are connected to the computer.

2. Remove the computer cover. See "Removing the computer cover" on page 54.

3. Locate the power supply assembly. See "Computer components" on page 4.

4. Disconnect the power supply assembly cables from the system board and all drives. See "Parts on the system board" on page 5.

5. Release the power supply assembly cables from the cable clips and ties in the chassis.

6. Lay the computer on its side and remove the four screws at the rear of the chassis that secure the power supply assembly. Then, slide the power supply assembly to the front of the computer and lift it out of the chassis.
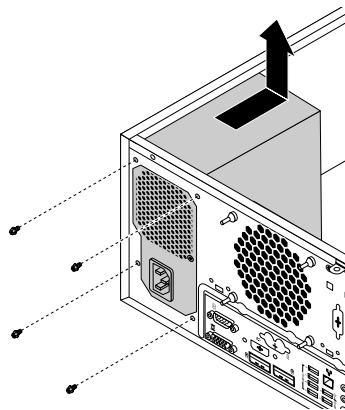

Figure 31. Removing the screws that secure the power supply assembly

7. Install the new power supply assembly into the chassis so that the screw holes in the power supply assembly align with those in the chassis.

8. Install the four screws to secure the power supply assembly to the chassis.

9. Reconnect the power supply assembly cables to the system board and each of the drives.

10. Secure the power supply assembly cables with the cable clips and ties in the chassis.

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 77.

Replacing the heat sink and fan assembly

Attention: Do not open your computer or attempt any repair before reading and understanding the "Read this first: Important safety information" on page iii.

CAUTION:

The heat sink and fan assembly might be very hot. Before you open the computer cover, turn off the computer and wait several minutes until the computer is cool.

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

1. Remove any media from the drives and turn off all connected devices and the computer. Then, disconnect all power cords from electrical outlets and disconnect all cables that are connected to the computer.

2. Remove the computer cover. See "Removing the computer cover" on page 54.

3. Lay the computer on its side for easier access to the system board.

4. Locate the heat sink and fan assembly. See "Computer components" on page 4.

5. Disconnect the heat sink and fan assembly cable from the microprocessor fan connector on the system board. See "Parts on the system board" on page 5.

6. Follow the following 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.
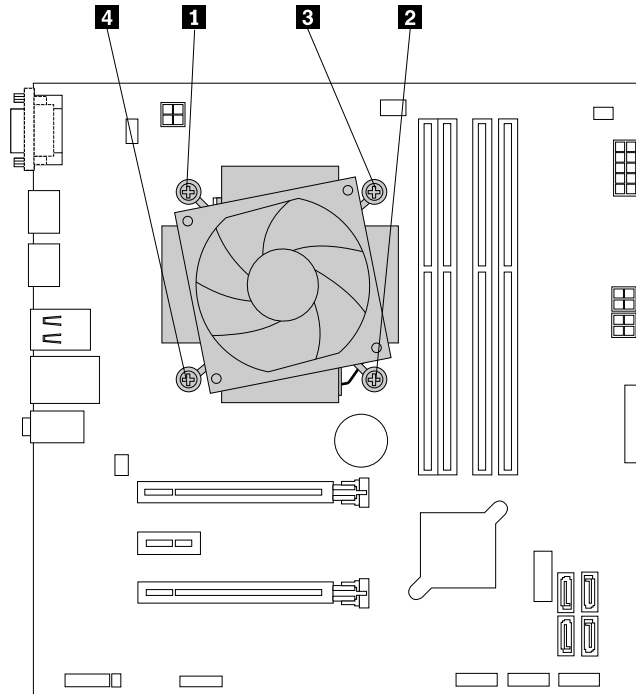

Figure 32. Removing the heat sink and fan assembly

7. Lift the failing heat sink and fan assembly off the system board.

   Notes:

   - You might have to gently twist the heat sink and fan assembly to free it from the microprocessor.
   - Do not touch the thermal grease while handling 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 holes in the system board. Ensure that the heat sink and fan assembly cable faces toward the microprocessor fan connector on the system board.

9. Follow the following sequence to install the four screws to secure the new heat sink and fan assembly. Do not over-tighten the screws.

   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 "Parts on the system board" on page 5.

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 77.

Replacing a memory module

Attention: Do not open your computer or attempt any repair before reading and understanding the "Read this first: Important safety information" on page iii.

The following table provides information about the memory module installation rules that you should consider when installing or removing a memory module. The "X" mark indicates the memory slots into which the memory modules should be installed in different situations. To locate the memory module slots, see "Parts on the system board" on page 5.

Quantity	Slot 1	Slot 2	Slot 3	Slot 4
One memory module		X		
Two memory modules		X		X
Three memory modules	X	X		X
Four memory modules	X	X	X	X

To replace a memory module, do the following:

1. Remove any media from the drives and turn off all connected devices and the computer. Then, disconnect all power cords from electrical outlets and disconnect all cables that are connected to the computer.
2. Remove the computer cover. See "Removing the computer cover" on page 54.
3. Locate the memory module you want to replace. The memory modules are installed in the memory slots on the system board. See "Parts on the system board" on page 5.
4. Remove any parts that might prevent your access to the memory module. Depending on your computer model, you might need to remove the PCI Express x16 graphics card for easier access to the memory module. See "Replacing a PCI Express card" on page 75.
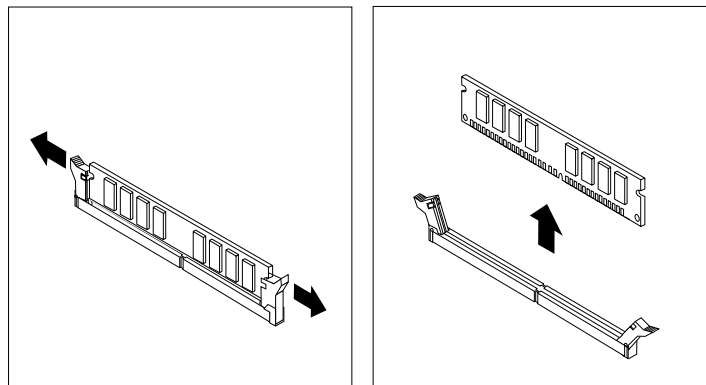5. Open the retaining clips and gently pull the memory module out of the memory slot.

Figure 33. Removing a memory module

6. Position the new memory module over the appropriate memory slot. Ensure that the notch **1** on the memory module aligns correctly with the slot key **2** on the system board. Push the memory module straight down into the slot until the retaining clips close.
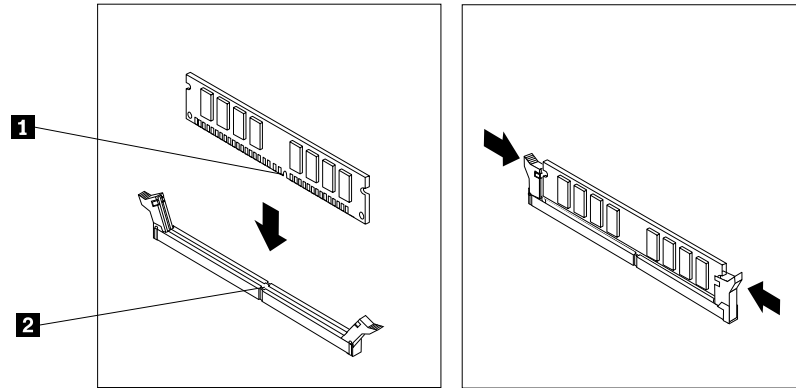

Figure 34. Installing a memory module

7. Reinstall the PCI Express x16 graphics card if you have removed it. See "Replacing a PCI Express card" on page 75.

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 77.

Replacing the PCI card

Attention: Do not open your computer or attempt any repair before reading and understanding the "Read this first: Important safety information" on page iii.

To replace the PCI card, do the following:

1. Remove any media from the drives and turn off all connected devices and the computer. Then, disconnect all power cords from electrical outlets and disconnect all cables that are connected to the computer.
2. Remove the computer cover. See "Removing the computer cover" on page 54.
3. Locate the PCI card. The PCI card is installed in the card slot on the PCI card adapter. See "Computer components" on page 4.

4. At the rear of the computer, press the release button **1** to open the card latch **2**.
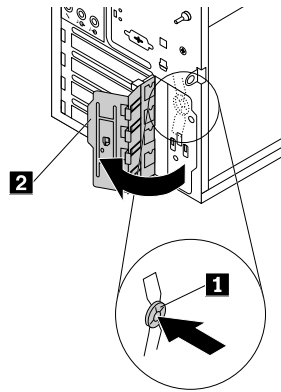

Figure 35. Opening the PCI card latch

5. Grasp the card that is currently installed and gently pull it off the card slot on the PCI card adapter.
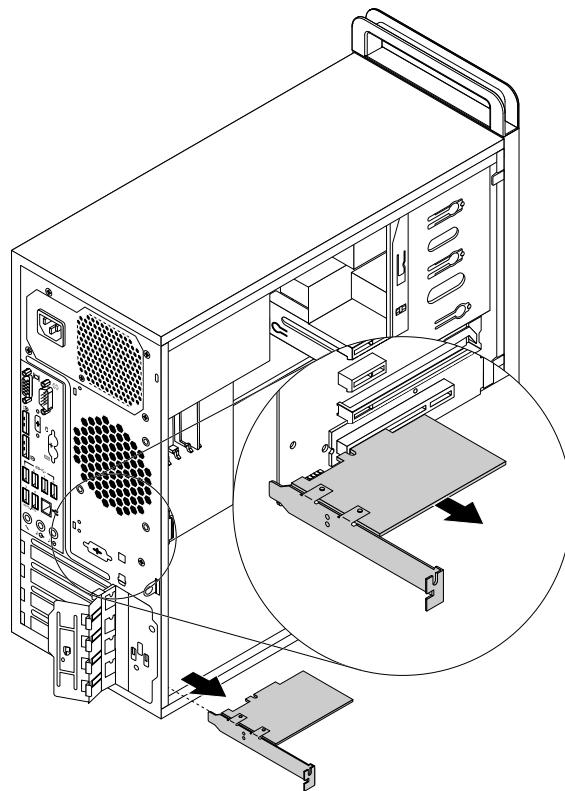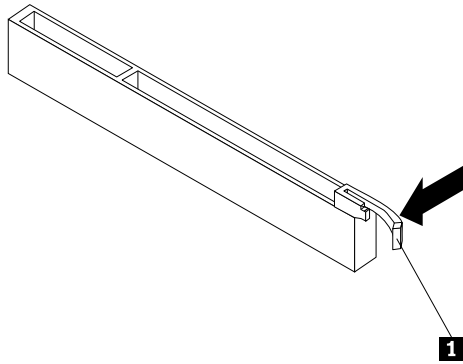

Figure 36. Removing the PCI card

Notes:

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

- If the card is held in place by a retaining latch, press the card retaining latch **1** as shown to disengage the latch. Grasp the card and gently pull it out of the slot.

6. Install the new PCI card into the card slot on the PCI card adapter. Then, pivot the card latch to the closed position to secure the PCI card.

   Note: Ensure that the metallic tab **1** is in the closed position as shown before you install the new PCI card into the card slot on the adapter.
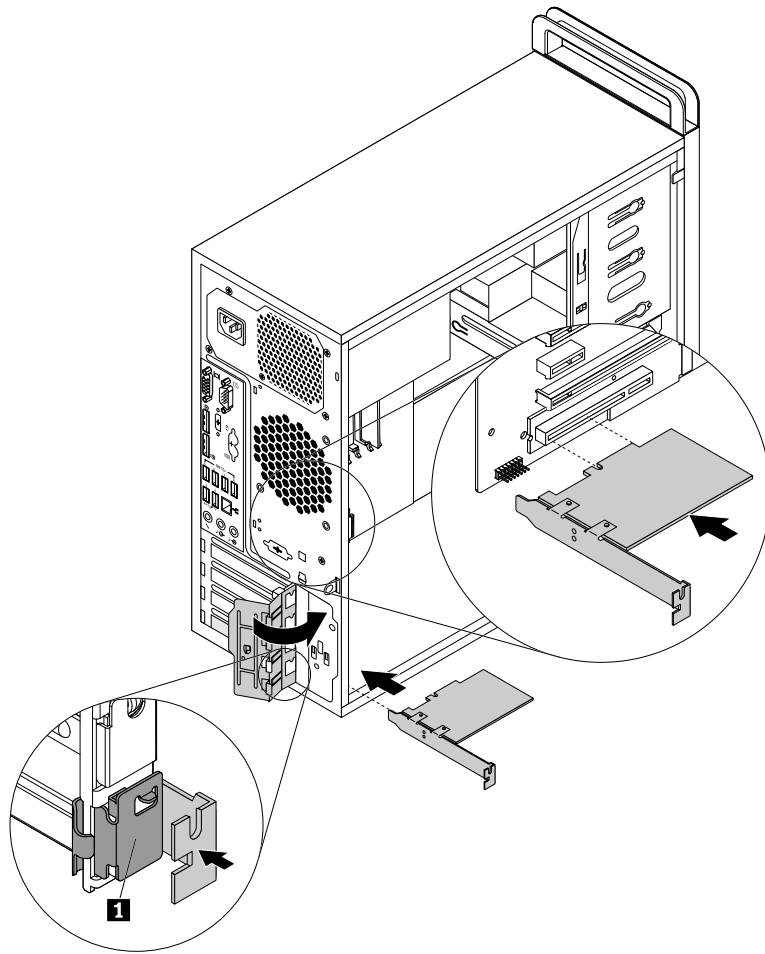

Figure 37. Installing the PCI card

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 77.

Replacing the PCI card adapter

Attention: Do not open your computer or attempt any repair before reading and understanding the "Read this first: Important safety information" on page iii.

To replace the PCI card adapter, do the following:

1. Remove any media from the drives and turn off all connected devices and the computer. Then, disconnect all power cords from electrical outlets and disconnect all cables that are connected to the computer.
2. Remove the computer cover. See "Removing the computer cover" on page 54.
3. Remove the PCI card. See "Replacing the PCI card" on page 71.
4. Locate the PCI card adapter. The PCI adapter is installed in the M.2 card slot on the system board. See "Parts on the system board" on page 5.
5. Remove the three screws that secure the PCI card adapter to the system board. Then, slide the adapter as shown to remove it from the system board.
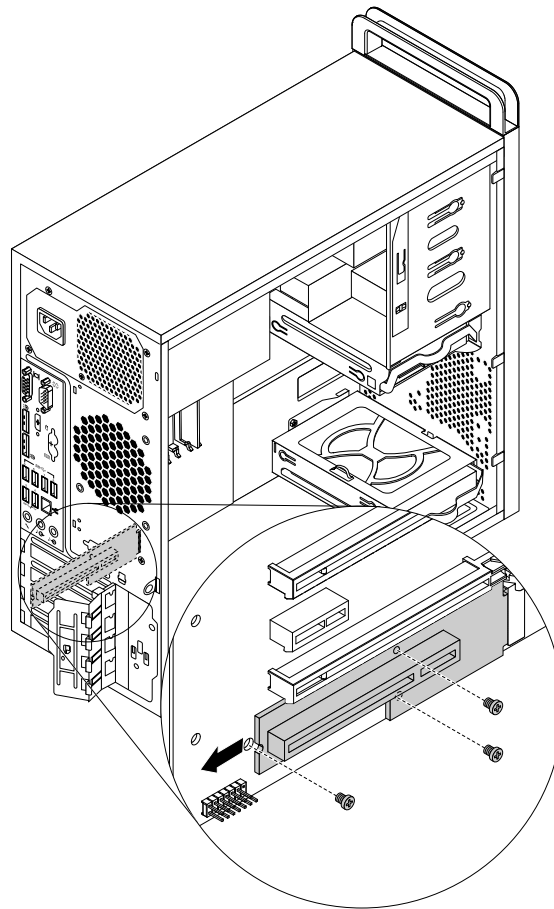

Figure 38. Removing the PCI card adapter

6. Slide the new PCI card adapter into the M.2 card slot as shown until it snaps into position. Then, install the three screws to secure the PCI card adapter.
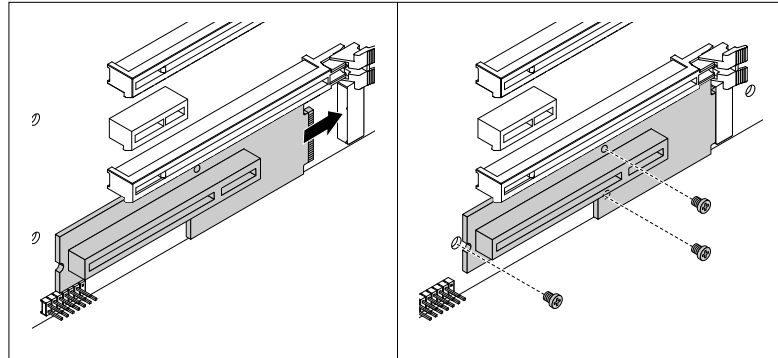

Figure 39. Installing a PCI card adapter

7. Install the PCI card. See "Replacing the PCI card" on page 71.

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 77.

Replacing a PCI Express card

Attention: Do not open your computer or attempt any repair before reading and understanding the "Read this first: Important safety information" on page iii.

To replace a PCI Express card, do the following:

1. Remove any media from the drives and turn off all connected devices and the computer. Then, disconnect all power cords from electrical outlets and disconnect all cables that are connected to the computer.

2. Remove the computer cover. See "Removing the computer cover" on page 54.

3. Locate the PCI Express card you want to replace. The PCI Express cards are installed in the PCI Express card slots on the system board. See "Parts on the system board" on page 5.

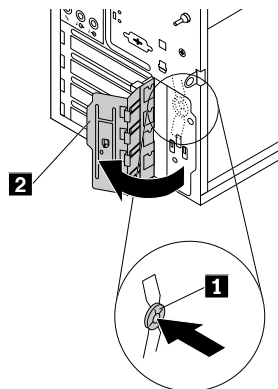4. At the rear of the computer, press the release button **1** to open the card latch **2** .

Figure 40. Opening the PCI Express card latch

5. Grasp the card that is currently installed and gently pull it out of the slot.

   Notes:

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

   - If the card is held in place by a retaining latch, press the card retaining latch **1** as shown to disengage the latch. Grasp the card and gently pull it out of the slot.
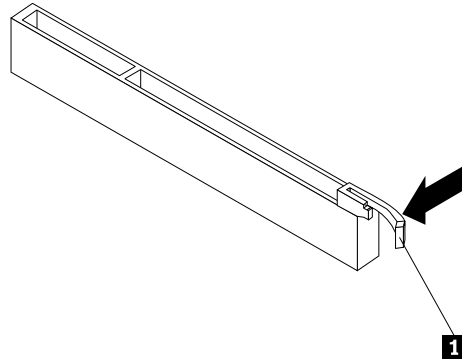
6. Install the new PCI Express card into the appropriate PCI Express card slot on the system board. See "Parts on the system board" on page 5. Then, pivot the card latch to the closed position to secure the PCI Express card.

   Note: If you are installing a PCI Express x16 graphics card, ensure that the memory slot retaining clips are closed before you install the graphics card.
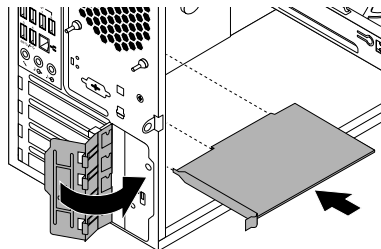
Figure 41. Installing a PCI Express card

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 77.

Replacing the coin-cell battery

Attention: Do not open your computer or attempt any repair before reading and understanding the "Read this first: Important safety information" on page iii.

Your computer has a special type of memory that maintains the date, time, and settings for built-in features, such as parallel-connector assignments (configuration). A coin-cell battery keeps this information active when you turn off the computer.

The coin-cell battery normally requires no charging or maintenance throughout its life; however, no coin-cell battery lasts forever. If the coin-cell battery fails, the date, time, and configuration information (including passwords) are lost. An error message is displayed when you turn on the computer.

Refer to the "Lithium coin-cell battery notice" in the *Safety, Warranty, and Setup Guide* for information about replacing and disposing of the coin-cell battery.

To replace the coin-cell battery, do the following:

1. Remove any media from the drives and turn off all connected devices and the computer. Then, disconnect all power cords from electrical outlets and disconnect all cables that are connected to the computer.
2. Remove the computer cover. See "Removing the computer cover" on page 54.
3. Locate the coin-cell battery. See "Computer components" on page 4.
4. Remove the coin-cell battery as shown.
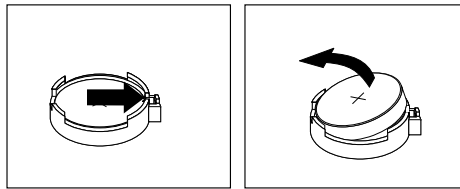
Figure 42. Removing the coin-cell battery

5. Install the new coin-cell battery as shown.
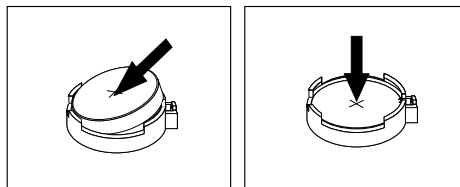
Figure 43. Installing the coin-cell battery

6. Reinstall the computer cover and connect the cables. See "Completing the parts replacement" on page 77.
7. Turn on the computer and all connected devices.

   Note: When the computer is turned on for the first time after replacing the coin-cell battery, an error message might be displayed. This is normal after replacing the coin-cell battery.

8. Use the Setup Utility program to set the date, time, and any passwords. See "Using the Setup Utility program" on page 33.

Completing the parts replacement

After completing the installation or replacement for all parts, reinstall the computer cover and reconnect cables. Depending on the parts you installed or replaced, you might need to confirm the updated information in the Setup Utility program. Refer to "Using the Setup Utility program" on page 33.

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

1. Ensure that all components have been reassembled correctly and that no tools or loose screws are left inside your computer. See "Computer components" on page 4 for the locations of various components in your computer..

2. Ensure that the cables are routed correctly before reinstalling the computer cover. Keep cables clear of the hinges and sides of the computer chassis to avoid interference with reinstalling the computer cover.

3. Position the computer cover on the chassis so that the rail guides on the bottom of the computer cover engage the rails on the chassis. Then, push the cover to the front of the computer until it snaps into position and install the two screws to secure it.
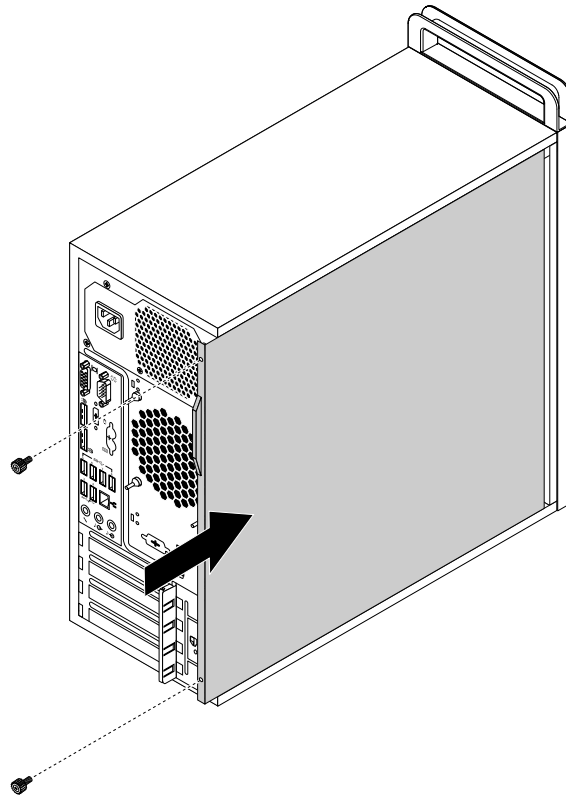
Figure 44. Installing the computer cover

4. If a locking device is available, use it to lock the computer. See "Locking your computer" on page 27.

5. Reconnect the external cables and power cords to the corresponding connectors on the computer. See "Hardware locations" on page 1.

6. Update your configuration. See "Using the Setup Utility program" on page 33.

7. If a newly installed hardware component does not work normally, update the device driver. See "Keeping your computer current" on page 24.

Chapter 8. Getting information, help, and service

This chapter contains the following topics:

- "Information resources" on page 79
- "Help and service" on page 80

Information resources

You can use the information in this section to access useful resources relating to your computing needs.

Accessing the user guide in various languages

To access the user guide in various languages, go to:
http://www.lenovo.com/UserManuals

Windows help system

Note: If you use the online help for Windows 7 or the help for Windows 10, ensure that your computer is connected to the Internet.

The Windows help system provides you with detailed information about using the Windows operating system.

To access the Windows help system, do the following:

1. Click the Start button to open the Start menu.
2. Depending on your Windows version, do one of the following:

    - For Windows 7: Click **Help and Support**. You can choose to use the online or offline help at the bottom of the screen.
    - For Windows 10: Click **Get started**.

Safety and warranty

The *Safety, Warranty, and Setup Guide* provided with your computer contains important safety information, product warranty terms, initial setup procedure, and legal notices. Ensure that you read and understand all safety information in the *Safety, Warranty, and Setup Guide* before using your computer.

In addition, read and understand "Read this first: Important safety information" on page iii before using your computer. This preface provides additional safety information that applies to topics and tasks described in this *User Guide*.

Lenovo Web site

The Lenovo Web site (http://www.lenovo.com) provides up-to-date information and services to help you buy, upgrade, and maintain your computer. You also can do the following:

- Shop for desktop and notebook computers, monitors, projectors, upgrades and accessories for your computer, and special offers.
- Purchase additional services, such as support for hardware, operating systems, application programs, network setup and configuration, and custom installations.
- Purchase upgrades and extended hardware repair services.
- Access troubleshooting and support information for your computer model and other supported products.

• Find a Service Provider located near you.

Lenovo Support Web site

Technical support information is available on the Lenovo Support Web site at: http://www.lenovo.com/support

This Web site is updated with the latest support information such as the following:

• Drivers and software
• Diagnostic solutions
• Product and service warranty
• Product and parts details
• User guides and manuals
• Knowledge base and frequently asked questions
• Lenovo Support phone numbers

Frequently asked questions

For the answers to frequently asked questions about your computer, go to: http://www.lenovo.com/support/faq

Help and service

This section provides information about obtaining help and service.

Calling for service

During the warranty period, you can get help and information by telephone through the Customer Support Center. For the warranty period of your computer, go to http://www.lenovo.com/warranty-status. For a list of Lenovo Support phone numbers, go to http://www.lenovo.com/support/phone.

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.

The following services are available during the warranty period:

• **Problem determination** - Trained service 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) that apply to your hardware available.

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 BIOS 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

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

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

Using other services

You might travel with your computer or relocate it to a country or region where the machine type for your desktop or notebook computer is sold. In such a situation, 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 or regions where service is available, go to http://www.lenovo.com/support.

For technical assistance with the installation of or questions related to Service Packs for your preinstalled Microsoft Windows product, go to the Microsoft Product Support Web site at http://support.microsoft.com. You also can contact the Lenovo Customer Support Center for help. Some fees might apply.

Purchasing additional services

During and after the warranty period, you can purchase additional services. Examples of these additional services include:

- Support for hardware, operating systems, and application programs
- Network setup and configuration services
- Upgraded or extended hardware repair services
- Custom installation services

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

Appendix A. Regulatory information

The latest compliance information is available at http://www.lenovo.com/compliance.

Export classification notice

This product is subject to the United States Export Administration Regulations (EAR) and has an Export Classification Control Number (ECCN) of 5A992.c. It can be re-exported except to any of the embargoed countries in the EAR E1 country list.

Electronic emissions notices

The following information refers to Lenovo personal computer machine types 10FC, 10FD, 10FV, and 10FW.

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 that 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 and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

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

Responsible Party:
Lenovo (United States) Incorporated
1009 Think Place - Building One
Morrisville, NC 27560
Phone Number: 919-294-5900

Industry Canada Class B emission compliance statement

CAN ICES-3(B)/NMB-3(B)

European Union - Compliance to the Electromagnetic Compatibility Directive

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 non-recommended 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 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.

Lenovo, Einsteinova 21, 851 01 Bratislava, Slovakia

ϵ

German Class B compliance statement

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.

Korea Class B compliance statement

B급 기기(가정용 방송통신기자재)
이 기기는 가정용(B급) 전자파적합기기로서 주로 가정에서 사용하는 것을 목적으로 하며, 모든 지역에서 사용할 수 있습니다

Japan VCCI Class B compliance 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

Japan compliance statement for products which connect to the power mains with rated current 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

Japan notice for ac power cord

The ac power cord shipped with your product can be used only for this specific product. Do not use the ac power cord for other devices.

本製品およびオプションに電源コード・セットが付属する場合は、
それぞれ専用のものになっていますので他の電気機器には使用し
ないでください。

Lenovo product service information for Taiwan

台灣 Lenovo 產品服務資訊如下：
荷蘭商聯想股份有限公司台灣分公司
台北市內湖區堤頂大道二段89號5樓
服務電話：0800-000-702

Keyboard and mouse compliance statement for Taiwan

本產品隨貨附已取得經濟部標準檢驗局認可之PS/2或USB的鍵盤與滑鼠一組

Eurasian compliance mark

ЕАС

Brazil audio notice

Ouvir sons com mais de 85 decibéis por longos períodos pode provocar danos ao sistema auditivo.

Mexico wireless-radio compliance information

Advertencia: En Mexico la operación de este equipo estásujeta a las siguientes dos condiciones: (1) es posible que este equipo o dispositivo no cause interferencia perjudicial y (2) este equipo o dispositivo debe aceptar cualquier interferencia, incluyendo la que pueda causar su operación no deseada.

Additional regulatory information

For additional regulatory information, refer to the *Regulatory Notice* shipped with your computer. Depending on the configuration of your computer and the country or region where the computer was purchased, you might have received additional printed regulatory notices. All regulatory notices are available on the Lenovo Support Web site in electronic format. To access electronic copies of the documentation, go to http://www.lenovo.com/UserManuals.

Appendix B. WEEE and recycling information

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/recycling. The latest environmental information about our products is available at http://www.lenovo.com/ecodeclaration.

Important WEEE information
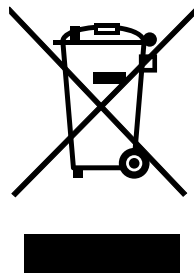
The WEEE marking on Lenovo products applies to countries with WEEE and e-waste regulations (for example, the European WEEE Directive, India E-Waste Management & Handling Rules, 2011). Appliances are labeled in accordance with local regulations concerning waste electrical and electronic equipment (WEEE). These regulations determine the framework for the return and recycling of used appliances as applicable within each geography. This label is applied to various products to indicate that the product is not to be thrown away, but rather put in the established collection systems for reclaiming these end of life products.

Users of electrical and electronic equipment (EEE) with the WEEE marking must not dispose of end of life EEE as unsorted municipal waste, but use the collection framework available to them for the return, recycle, and recovery of WEEE and to 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/recycling

Recycling information for Japan

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, visit the Lenovo Web site at http://www.lenovo.com/recycling/japan. 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, visit the Lenovo Web site at http://www.lenovo.com/recycling/japan.

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 inside your Lenovo computer to provide power to the computer clock while the computer is off or disconnected from the main power source. If you need to replace it with a new one, contact your place of purchase or contact Lenovo for service. If you need to dispose of a disused lithium battery, insulate it with vinyl tape, contact your place of purchase or an industrial-waste-disposal operator, and follow their instructions. Disposal of a lithium battery must comply with local ordinances and regulations.

Recycling information for Brazil

Declarações de Reciclagem no Brasil

Descarte de um Produto Lenovo Fora de Uso

Equipamentos elétricos e eletrônicos não devem ser descartados em lixo comum, mas enviados à pontos de coleta, autorizados pelo fabricante do produto para que sejam encaminhados e processados por empresas especializadas no manuseio de resíduos industriais, devidamente certificadas pelos orgãos ambientais, de acordo com a legislação local.

A Lenovo possui um canal específico para auxiliá-lo no descarte desses produtos. Caso você possua um produto Lenovo em situação de descarte, ligue para o nosso SAC ou encaminhe um e-mail para: reciclar@lenovo.com, informando o modelo, número de série e cidade, a fim de enviarmos as instruções para o correto descarte do seu produto Lenovo.
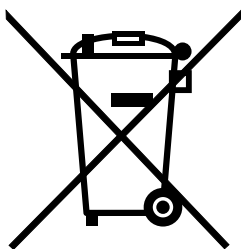
Battery recycling information for Taiwan

Battery recycling information for the European Union

EU

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

Batteries or packaging for batteries are labeled in accordance with European Directive 2006/66/EC concerning batteries and accumulators and waste batteries and accumulators. The Directive determines the framework for the return and recycling of used batteries and accumulators as applicable throughout the European Union. This label is applied to various batteries to indicate that the battery is not to be thrown away, but rather reclaimed upon end of life per this Directive.

In accordance with the European Directive 2006/66/EC, batteries and accumulators are labeled to indicate that they are to be collected separately and recycled at end of life. The label on the battery may also include a chemical symbol for the metal concerned in the battery (Pb for lead, Hg for mercury, and Cd for cadmium). Users of batteries and accumulators must not dispose of batteries and accumulators as unsorted municipal waste, but use the collection framework available to customers for the return, recycling, and treatment of batteries and accumulators. Customer participation is important to minimize any potential effects of batteries and accumulators on the environment and human health due to the potential presence of hazardous substances. For proper collection and treatment, go to:
http://www.lenovo.com/recycling

Appendix C. Restriction of Hazardous Substances Directive (RoHS)

The latest environmental information is available at http://www.lenovo.com/ecodeclaration.

European Union RoHS

This Lenovo product, with included parts (cables, cords, and so on) meets the requirements of Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment ("RoHS recast" or "RoHS 2").

For more information about Lenovo worldwide compliance on RoHS, go to:
http://www.lenovo.com/social_responsibility/us/en/RoHS_Communication.pdf

Turkish RoHS

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

Türkiye AEEE Yönetmeliğine Uygunluk Beyanı

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

AEEE Yönetmeliğine Uygundur.

Ukraine RoHS

Цим підтверджуємо, що продукція Леново відповідає вимогам нормативних актів України, які обмежують вміст небезпечних речовин

India RoHS

RoHS compliant as per E-Waste (Management & Handling) Rules, 2011.

China RoHS

产品中有害物质的名称及含量

部件名称	有害物质					
	铅(Pb)	汞(Hg)	镉(Cd)	六价铬 (Cr(VI))	多溴连苯 (PBB)	多溴二苯醚 (PBDE)
印刷电路板组件*	X	O	O	O	O	O
硬盘	X	O	O	O	O	O
光驱	X	O	O	O	O	O
内存	X	O	O	O	O	O
电脑I/O 附件	X	O	O	O	O	O
电源	X	O	O	O	O	O
键盘	X	O	O	O	O	O
鼠标	X	O	O	O	O	O
机箱/ 附件	X	O	O	O	O	O

本表格依据 SJ/T 11364 的规定编制。
○：表示该有害物质在该部件所有均质材料中的含量均在 GB/T 26572 规定的限量要求以下。
×：表示该有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572 规定的限量要求。
注：表中标记"×"的部件，皆因全球技术发展水平限制而无法实现有害物质的替代。
印刷电路板组件*：包括印刷电路板及其零部件、电容和连接器
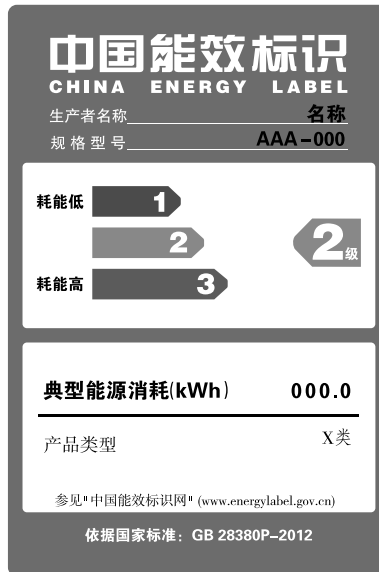根据型号的不同，可能不会含有以上的所有部件，请以实际购买机型为准

在中华人民共和国境内销售的电子信息产品必须标识此标志，标志内的数字代表在正常使用状态下的产品的环保使用期限

Appendix D. China Energy Label

微型计算机能效标识声明

为满足中国《微型计算机能源效率标识实施规则》和《微型计算机能效限定值及能效等级》的相关规定和要求，联想公司对其生产及销售的每一台微型计算机产品加施能效标识，声明如下：

1. 如果您的包装箱或者产品上贴有下图所示的标识，您所购买的机器就是经测试符合《微型计算机能效限定值及能效等级》规定的相应能效等级的产品。

> **Note:** 上图以2级能效标贴模板为例进行说明，具体规格型号、能效等级、产品类别和典型能源消耗等信息请以包装箱或产品上粘贴的实际能效等级标贴提供的信息为准，也可登陆"中国能效标识网"http://www.energylabel.gov.cn进行详细查询。

2. 如果您所购买机器的包装箱或者产品无上图所示的标识，请您忽略此部分。

《微型计算机能源效率标识实施规则》和《微型计算机能效限定值及能效等级》是由国家发展改革委员会所推行的能效标识制度，旨在通过开发节能产品和有效的节能方式来保护环境。通过使用符合能效标识制度要求的产品可以减少电源消耗、有助于节省开支、营造更清洁的环境并降低温室气体排放量。

联想很荣幸能为用户提供符合相应能效等级设计要求的产品，也鼓励用户购买高能效的产品。

有关能效标识制度的更多信息，请访问"中国能效标识网"http://www.energylabel.gov.cn。

Appendix E. 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 requirement for computers at the time of manufacture: 10FC, 10FD, 10FV, and 10FW. For more information about ENERGY STAR ratings for Lenovo computers, go to http://www.lenovo.com.

By using ENERGY STAR compliant products and taking advantage of the power-management features of your computer, 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

Lenovo encourages you to make efficient use of energy an integral part of your day-to-day operations. To help in this endeavor, set the following power-management features to take effect when your computer has been inactive for a specified duration:

Table 1. ENERGY STAR power-management features

Windows 7 or Windows 10 operating system
Power plan: Default
• Turn off the display: After 10 minutes
• Put the computer to sleep: After 25 minutes
• Advanced power settings:
– Turn off hard disk drives: After 20 minutes
– Hibernate: Never

To awaken your computer from a Sleep mode, press any key on your keyboard.

To change power settings, do the following:
1. Open Control Panel by doing one of the following:
   - For Windows 7: Click the Start button to open the Start menu.
   - For Windows 10: Right-click the Start button to open the Start context menu.
2. Click **Control Panel**. View Control Panel using Large icons or Small icons, and then click **Power Options**.
3. Follow the instructions on the screen.

Appendix F. 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.

Lenovo may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to:

Lenovo (United States), Inc.
1009 Think Place - Building One
Morrisville, NC 27560
U.S.A.
Attention: Lenovo Director of Licensing

LENOVO PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some jurisdictions do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. Lenovo may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

The products described in this document are not intended for use in implantation or other life support applications where malfunction may result in injury or death to persons. The information contained in this document does not affect or change Lenovo product specifications or warranties. Nothing in this document shall operate as an express or implied license or indemnity under the intellectual property rights of Lenovo or third parties. All information contained in this document was obtained in specific environments and is presented as an illustration. The result obtained in other operating environments may vary.

Lenovo may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

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.

Trademarks

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

Lenovo
The Lenovo logo
ThinkCentre
The ThinkCentre logo
Rescue and Recovery
ThinkVantage

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

Intel is a trademark of Intel Corporation in the U.S. and/or other countries.

DisplayPort is a trademark of the Video Electronics Standards Association.

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