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About this manual



This manual contains service and reference information for Lenovo IdeaCentre K computers listed on the cover. It is intended only for trained servicers who are familiar with Lenovo computer products.

Before servicing a Lenovo product, be sure to read the Safety Information.

This manual includes a complete FRU part number listing for each machine type and model listed on the cover. If you have internet access, FRU part numbers are also available at: <http://www.lenovo.com/support>.

The description of the TV card in this manual is only used for the machines which have the TV card. It is invalid for those machines which do not have TV card.

Important Safety Information

Be sure to read all caution and danger statements in this book before performing any of the instructions.

Veillez lire toutes les consignes de type DANGER et ATTENTION du présent document avant d'exécuter les instructions.

Lesen Sie unbedingt alle Hinweise vom Typ "ACHTUNG" oder "VORSICHT" in dieser Dokumentation, bevor Sie irgendwelche Vorgänge durchführen

Leggere le istruzioni introdotte da ATTENZIONE e PERICOLO presenti nel manuale prima di eseguire una qualsiasi delle istruzioni

Certifique-se de ler todas as instruções de cuidado e perigo neste manual antes de executar qualquer uma das instruções

Es importante que lea todas las declaraciones de precaución y de peligro de este manual antes de seguir las instrucciones.

执行任何说明之前，请确保已阅读本书中的所有警告和危险声明。

Using eSupport

For Key Commodities (Examples - hard disk drive, system board, microprocessor, LCD, and memory)

- eSupport can be used to view the list of key commodities built in a particular machine serial.
- eSupport can be accessed at the following Web site:
<http://www.lenovo.com/support>
- To view the key commodities:
 1. Click **Parts information**.
 2. Under Parts information, click **Parts lookup**.
 3. Under Parts lookup, type the model type and serial number; then click **Continue**.
The key commodities are returned in the eSupport record under Parts shipped with your system.

For the remaining FRUs (the complete list of FRUs at the MT Model level)

- eSupport can be used to view the complete list of FRUs for a machine type and model.
- To view the complete list of FRUs for a machine type:
 1. Point your browser to <http://www.lenovo.com/support>.
 2. Type the machine type (Example: 8129) in the Use Quick Path field; then click Go.
 3. Under Browse by product, click Continue.
 4. Under Important information, click Parts information.
 5. In the Refine results field, select Service parts; then click the entry for your machine type.
The list of service parts by description, with applicable machine type model and FRU part number is displayed.

Important information about replacing RoHS compliant FRUs

RoHS, The Restriction of Hazardous Substances in Electrical and Electronic Equipment Directive (2002/95/EC) is a European Union legal requirement affecting the global electronics industry. RoHS requirements must be implemented on Lenovo products placed on the market after June 2006. Products on the market before June 2006 are not required to have RoHS compliant parts.

So, if the parts are not compliant originally, replacement parts can also be noncompliant, but in all cases, if the parts are compliant, the replacement parts must also be compliant.

Lenovo plans to transition to RoHS compliance well before the

implementation date and expects its suppliers to be ready to support Lenovo's requirements and schedule. Products sold in 2005, will contain some RoHS compliant FRUs. The following statement pertains to these products and any product Lenovo produces containing RoHS compliant parts.

RoHS compliant Lenovo IdeaCentre K parts have unique FRU part numbers. Before or after June, 2006, failed RoHS compliant parts must always be replaced using RoHS compliant FRUs, so only the FRUs identified as compliant in the system HMM or direct substitutions for those FRUs can be used.

Products marketed before June 2006		Products marketed after June 2006	
Current or original part	Replacement FRU	Current or original part	Replacement FRU
Non-RoHS	Can be Non-RoHS	Must be RoHS	Must be RoHS
Non-RoHS	Can be RoHS		
Non-RoHS	Can sub to RoHS		
RoHS	Must be RoHS		

Note: A direct substitution is a part with a different FRU part number that is automatically shipped by the distribution center at the time of order.

Related Web URLs are:

- Lenovo information for Suppliers website:
<http://www-03.ibm.com/procurement/proweb.nsf/ContentDocsByTitle/United+States~Information+for+suppliers>
- RoHS Directive:
http://europa.eu.int/eur-lex/pri/en/oj/dat/2003/l_037/l_03720030213en00190023.pdf
- California Senate Bills 20, 50:
<http://www.ciwmb.ca.gov/HHW/Events/AnnualConf/2004/presentation/MPaparian.pdf>

Safety information

2

This chapter contains the safety information that you need to be familiar with before servicing a computer.

General safety

Follow these rules to ensure general safety:

- Observe good housekeeping in the area of the machines during and after maintenance.
- When lifting any heavy object:
 1. Ensure you can stand safely without slipping.
 2. Distribute the weight of the object equally between your feet.
 3. Use a slow lifting force. Never move suddenly or twist when you attempt to lift.
 4. Lift by standing or by pushing up with your leg muscles; this action removes the strain from the muscles in your back. *Do not attempt to lift any objects that weigh more than 16 kg (35 lb) or objects that you think are too heavy for you.*
- Do not perform any action that causes hazards to the customer, or that makes the equipment unsafe.
- Before you start the machine, ensure that other service representatives and the customer's personnel are not in a hazardous position.
- Place removed covers and other parts in a safe place, away from all personnel, while you are servicing the machine.
- Keep your tool case away from walk areas so that other people will not trip over it.
- Do not wear loose clothing that can be trapped in the moving parts of a machine. Ensure that your sleeves are fastened or rolled up above your elbows. If your hair is long, fasten it.
- Insert the ends of your necktie or scarf inside clothing or fasten it with a nonconductive clip, approximately 8 centimeters (3 inches) from the end.
- Do not wear jewelry, chains, metal-frame eyeglasses, or metal fasteners for your clothing.

Remember: Metal objects are good electrical conductors.

- Wear safety glasses when you are: hammering, drilling soldering, cutting wire, attaching springs, using solvents, or working in any other conditions that might be hazardous to your eyes.
- After service, reinstall all safety shields, guards, labels, and ground wires. Replace any safety device that is worn or defective.
- Reinstall all covers correctly before returning the machine to the customer.

Electrical safety



CAUTION:

Electrical current from power, telephone, and communication cables can be hazardous. To avoid personal injury or equipment damage, disconnect the attached power cords, telecommunication systems, networks, and modems before you open the server/workstation covers, unless instructed otherwise in the installation and configuration procedures.

Observe the following rules when working on electrical equipment.

Important: Use only approved tools and test equipment. Some hand tools have handles covered with a soft material that does not insulate you when working with live electrical currents.

Many customers have, near their equipment, rubber floor mats that contain small conductive fibers to decrease electrostatic discharges. Do not use this type of mat to protect yourself from electrical shock.

- Find the room emergency power-off (EPO) switch, disconnecting switch, or electrical outlet. If an electrical accident occurs, you can then operate the switch or unplug the power cord quickly.
- Do not work alone under hazardous conditions or near equipment that has hazardous voltages.
- Disconnect all power before:
 - Performing a mechanical inspection
 - Working near power supplies
 - Removing or installing main units
- Before you start to work on the machine, unplug the power cord. If you cannot unplug it, ask the customer to power-off the wall box that supplies power to the machine and to lock the wall box in the off position.

- If you need to work on a machine that has exposed electrical circuits, observe the following precautions:
 - Ensure that another person, familiar with the power-off controls, is near you.
Remember: Another person must be there to switch off the power, if necessary.
 - Use only one hand when working with powered-on electrical equipment; keep the other hand in your pocket or behind your back.
Remember: There must be a complete circuit to cause electrical shock. By observing the above rule, you may prevent a current from passing through your body.
 - When using testers, set the controls correctly and use the approved probe leads and accessories for that tester.
 - Stand on suitable rubber mats (obtained locally, if necessary) to insulate you from grounds such as metal floor strips and machine frames.
Observe the special safety precautions when you work with very high voltages; these instructions are in the safety sections of maintenance information. Use extreme care when measuring high voltages.
- Regularly inspect and maintain your electrical hand tools for safe operational condition.
- Do not use worn or broken tools and testers.
- *Never assume* that power has been disconnected from a circuit. First, check that it has been powered-off.
- Always look carefully for possible hazards in your work area. Examples of these hazards are moist floors, nongrounded power extension cables, power surges, and missing safety grounds.
- Do not touch live electrical circuits with the reflective surface of a plastic dental mirror. The surface is conductive; such touching can cause personal injury and machine damage.
- Do not service the following parts with the power on when they are removed from their normal operating places in a machine:
 - Power supply units
 - Pumps
 - Blowers and fans
 - Motor generatorsand similar units. (This practice ensures correct grounding of the units.)
- If an electrical accident occurs:
 - Use caution; do not become a victim yourself.
 - Switch off power.
 - Send another person to get medical aid.

Safety inspection guide

The intent of this inspection guide is to assist you in identifying potentially unsafe conditions on these products. Each machine, as it was designed and built, had required safety items installed to protect users and service personnel from injury. This guide addresses only those items. However, good judgment should be used to identify potential safety hazards due to attachment of features or options not covered by this inspection guide.

If any unsafe conditions are present, you must determine how serious the apparent hazard could be and whether you can continue without first correcting the problem.

Consider these conditions and the safety hazards they present:

- Electrical hazards, especially primary power (primary voltage on the frame can cause serious or fatal electrical shock).
- Explosive hazards, such as a damaged CRT face or bulging capacitor
- Mechanical hazards, such as loose or missing hardware

The guide consists of a series of steps presented in a checklist. Begin the checks with the power off, and the power cord disconnected.

Checklist:

1. Check exterior covers for damage (loose, broken, or sharp edges).
2. Power-off the computer. Disconnect the power cord.
3. Check the power cord for:
 - a. A third-wire ground connector in good condition. Use a meter to measure third-wire ground continuity for 0.1 ohm or less between the external ground pin and frame ground.
 - b. The power cord should be the appropriate type as specified in the parts listings.
 - c. Insulation must not be frayed or worn.
4. Remove the cover.
5. Check for any obvious alterations. Use good judgment as to the safety of any alterations.
6. Check inside the unit for any obvious unsafe conditions, such as metal filings, contamination, water or other liquids, or signs of fire or smoke damage.
7. Check for worn, frayed, or pinched cables.
8. Check that the power-supply cover fasteners (screws or rivets) have not been removed or tampered with.

Handling electrostatic discharge-sensitive devices

Any computer part containing transistors or integrated circuits (ICs) should be considered sensitive to electrostatic discharge (ESD). ESD damage can occur when there is a difference in charge between objects. Protect against ESD damage by equalizing the charge so that the machine, the part, the work mat, and the person handling the part are all at the same charge.

Notes:

1. Use product-specific ESD procedures when they exceed the requirements noted here.
2. Make sure that the ESD protective devices you use have been certified (ISO 9000) as fully effective.

When handling ESD-sensitive parts:

- Keep the parts in protective packages until they are inserted into the product.
- Avoid contact with other people.
- Wear a grounded wrist strap against your skin to eliminate static on your body.
- Prevent the part from touching your clothing. Most clothing is insulative and retains a charge even when you are wearing a wrist strap.
- Use the black side of a grounded work mat to provide a static-free work surface. The mat is especially useful when handling ESD-sensitive devices.
- Select a grounding system, such as those listed below, to provide protection that meets the specific service requirement.

Note: The use of a grounding system is desirable but not required to protect against ESD damage.

- Attach the ESD ground clip to any frame ground, ground braid, or green-wire ground.
- Use an ESD common ground or reference point when working on a double-insulated or battery-operated system. You can use coax or connector-outside shells on these systems.
- Use the round ground-prong of the ac plug on ac-operated computers.

Grounding requirements

Electrical grounding of the computer is required for operator safety and correct system function. Proper grounding of the electrical outlet can be verified by a certified electrician.

Safety notices

The caution and danger safety notices in this section are provided in the the language of English.



DANGER

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

To avoid a shock hazard:

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

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



CAUTION:

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

Do not:

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

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



CAUTION:

When laser products (such as CD-ROMs, DVD-ROM 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.



≥ 18 kg (37 lbs)



≥ 32 kg (70.5 lbs)

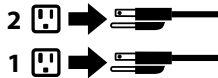


≥ 55 kg (121.2 lbs)

CAUTION:
Use safe practices when lifting.



CAUTION:
The power control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.



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



General information

3

This chapter provides general information that applies to all machine types supported by this publication.

Specifications

This section lists the physical specifications for your computer.

Type IdeaCentre K3

This section lists the physical specifications.

Dimensions

Width: 180 mm
Height: 388 mm
Length: 436.5 mm

Environment

Air temperature:
Operating: 10° to 35°C
Transit: -40° to 55°C
Humidity:
Operating: 35% to 80%
Transit: 20% to 93% (40°C)
Altitude: 86KPa to 106KPa

Electrical input

Input voltage: 220V±10% or 110V±10%
Input frequency: 50Hz ±1Hz

General Checkout

4

Attention

The drives in the computer you are servicing might have been rearranged or the drive startup sequence changed. Be extremely careful during write operations such as copying, saving, or formatting. Data or programs can be overwritten if you select an incorrect drive.

General error messages appear if a problem or conflict is found by an application program, the operating system, or both. For an explanation of these messages, refer to the information supplied with that software package.

Notes

- The default is for this computer to boot up in quiet mode (no beep, no memory count and checkpoint code display) when no errors are detected by POST.
- To enable beep, memory count, and checkpoint code display when a successful POST occurs, do the following:
 1. Start the Setup Utility program. See [“Starting the Setup Utility program”](#).
 2. Select **Start Options**.
 3. Set **Power-On Self-Test to Enhanced**.
- Before replacing any FRUs, ensure that the latest level of BIOS is installed on the system. A down-level BIOS might cause false errors and unnecessary replacement of the system board.

Use the following procedure to help determine the cause of the problem:

1. Power-off the computer and all external devices.
2. Check all cables and power cords.
3. Set all display controls to the middle position.
4. Power-on all external devices.

5. Power-on the computer.
 - Look for displayed error codes
 - Listen for beep codes
 - Look for readable instructions or a main menu on the display.If you did not receive the correct response, proceed to step 6.
If you do receive the correct response, proceed to step 7.
6. Look at the following conditions and follow the instructions:
 - If you hear beep codes during POST, go to [“Beep symptoms”](#).
 - If the computer displays a POST error, go to [“POST error codes”](#).
 - If the computer hangs and no error is displayed, continue at step 7.
7. If you cannot continue, replace the last device tested.

Problem determination tips

Due to the variety of hardware and software combinations that can be encountered, use the following information to assist you in problem determination. If possible, have this information available when requesting assistance from Service Support and Engineering functions.

- Machine type and model
- Processor or hard disk upgrades
- Failure symptom
 - Do diagnostics indicate a failure?
 - What, when, where, single, or multiple systems?
 - Is the failure repeatable?
 - Has this configuration ever worked?
 - If it has been working, what changes were made prior to it failing?
 - Is this the original reported failure?
- Diagnostics version
 - Type and version level
- Hardware configuration
 - Print (print screen) configuration currently in use
 - BIOS level
- Operating system software
 - Type and version level

Note: To eliminate confusion, identical systems are considered identical only if they:

1. Are the exact machine type and models
2. Have the same BIOS level
3. Have the same adapters/attachments in the same locations
4. Have the same address jumpers/terminators/cabling
5. Have the same software versions and levels
6. Have the same configuration options set in the system
7. Have the same setup for the operation system control files

Comparing the configuration and software set-up between “working and non-working” systems will often lead to problem resolution.

Using the Setup Utility (Type G43)

5

The Setup Utility program is used to view and change the configuration settings of your computer, regardless of which operating system you are using. However, 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. If your computer is already on when you start this procedure, shut down the operating system and turn off the computer.
2. Press and hold the F1 key then turn on the computer. When you hear multiple beeps, release the F1 key.

Notes:

- a. If you are using a USB keyboard and the Setup Utility program does not display using this method, repeatedly press and release the F1 key rather than leaving it pressed when turning on the computer.
- b. If a power-on password or an administrator password has been set, the Setup Utility program menu is not displayed until you type your password. For more information, see "Using passwords."

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

Viewing and changing settings

The Setup Utility program menu lists items that identify system configuration topics. To view or change settings, see "Starting the Setup Utility program."

When working with the Setup Utility program menu, you must use the

keyboard. The keys used to perform various tasks are displayed on the right side of each screen.

Using passwords

By using the Setup Utility program, you can set passwords to prevent unauthorized persons from gaining access to your computer and data. See “Starting the Setup Utility program.” The following types of passwords are available:

- Administrator Password
- Power-On Password

You do not have to set any passwords to use your computer. However, if you decide to set any passwords, read the following sections.

Password considerations

A password can be any combination of up to 16 characters (a-z and 0-9) and symbols. For security reasons, it is a good idea to use a strong password that cannot be easily compromised. We suggest the passwords should adhere to the following rules:

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

Administrator password

When a Administrator Password is set, it deters unauthorized persons from changing configuration settings. If you are responsible for maintaining the settings of several computers, you might want to set a Administrator Password.

After you set a Administrator Password, a password prompt is displayed each time you try to access the Setup Utility program.

If both the administrator and power-on passwords are set, you can type either password. However, to change any configuration settings, you must use your administrator password.

Setting, changing, and deleting a Administrator password

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

Note: A password can be any combination of up to 16 characters (A- Z, a-z, and 0-9). For more information, see "Password considerations" on page 17.

1. Start the Setup Utility program (see "Starting the Setup Utility program" on page 16).
2. From the Setup Utility program menu, select **Security** .
3. Select **Set Administrator Password** and press Enter.
4. The password dialog box will be displayed. Type the new password, and press Enter.
5. when prompted to confirm the password, type the password again. If you type the password correctly, the password will be installed.

To delete a previously set Administrator password, do the following :

Note: When prompted for a password, you must type your Administrator password.

1. From the Setup Utility program menu, select **Change Supervisor Password** and press Enter.
2. when you type the Administrator password. a message will display that **Enter New Password**. Press Enter and a message will display that indicates the password has been disabled. After that, the power-on password will be disabled too if a power-on password has been installed.
3. Press any key to contine.

Power-on Password

When a Power-On Password is set, you cannot start the Setup Utility program until a valid password is typed from the keyboard.

You should set a power-on password after you set the administrator password. If you didn't setup the administrator password but only set the power-on password, you cannot change any configuration settings.

Setting, changing, and deleting a power-on password

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

Note: A password can be any combination of up to 16 characters(A-Z, a-z, and 0-9).

1. Start the Setup Utility program (See "Starting the Setup Utility program")

2. From the Setup Utility program menu, Select **Security**.
3. select **Change User Password** and press Enter.
4. Select **Set Power-On Password** and press Enter.
5. when prompted to confirm the password, type the password again. If you type the password correctly, the password will be installed.

To delete a previously set power-on password, do the following :

Note: When prompted for a password, you must type your administrator password.

1. From the Setup Utility program menu, Select **Security**. select **Set Power-On Password** and press **Enter**.
2. when you type the power-on password. a message will display that **Enter New Password**. Press Enter and a message will display that indicates the password has been disabled.
3. Press any key to continue.

Using Device

Device is used to enable or disable user access to the following device:

USB Setup

When this feature is set to **Disable**, the device of USB Setup is disabled and will not be displayed in the system configuration.

To set Device, do the following:

1. Start the Setup Utility program (see “Starting the Setup Utility program” on page 16).
2. From the Setup Utility program menu, select **Device**.
3. Select **USB Setup**.
4. Select **Disable** or **Enable** and press Enter.
5. Return to the Setup Utility program menu and select **Exit** and then **Save changes and Exit**.

Note: If you do not want to save the settings, select **Discard Changes and Exit** or **Discard Changes**. You can set others such as , **Serial Port Setup, USB Setup, Video Setup, Audio Setup, Network Setup** and so on. See the information displayed on the right side of the screen.

Selecting a startup device

If your computer does not start up (boot) from a device such as the CD-ROM, diskette, or hard disk as expected, use one of the following procedures to select a startup device.

Selecting a temporary startup device

Use this procedure to startup from any boot device.

Note: Not all CDs, hard disks, and diskettes are bootable.

1. Turn off your computer.
2. Press and hold the F12 key then turn on the computer. When the Startup Device Menu appears, release the F12 key.

Note: If you are using a USB keyboard and the Startup Device Menu does not display using this method, repeatedly press and release the F12 key rather than leaving it pressed when turning on the computer.

3. Select the desired startup device from the Startup Device Menu and press Enter to begin.

Note: Selecting a startup device from the Startup Device menu does not permanently change the startup sequence.

Selecting or changing the startup device sequence

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

1. Start the Setup Utility program (see “Starting the Setup Utility program”).
2. Select **StartUp**.
3. Select Primary Boot Sequence.
4. Select the devices for the 1st Boot Device, the 2nd Boot Device, the 3rd Boot Device and the 4th Boot Device.
5. Press ESC to return the **Primary Boot Sequence**, and then **Save changes and Exit**.

If you have changed these settings and want to return to the default settings, select **Load Optimal Defaults** on the Setup Utility menu.

Exiting from the Setup Utility program

When you finish viewing or changing settings, press Esc to return to the Setup Utility program menu (you might have to press Esc several times). If you want to save the new settings, select **Save changes and Exit** before you exit. Otherwise, your changes will not be saved.

Symptom-to-FRU Index

6

The Symptom-to-FRU index lists error symptoms and possible causes. The most likely cause is listed first. Always begin with Chapter 4, "General Checkout," on page 13. This index can also be used to help you decide which FRUs to have available when servicing a computer. If you are unable to correct the problem using this index, go to "Undetermined problems" on page 27.

Notes

- If you have both an error message and an incorrect audio response diagnose the error message first.
- If you cannot run the diagnostic tests or you get a diagnostic error code when running a test but did receive a POST error message diagnose the POST error message first.
- If you did not receive any error message look for a description of your error symptoms in the first part of this index.

Hard disk drive boot error

A hard disk drive boot error (error codes 1962 and I999030X) can have the following causes.

Error	FRU/Action
The start-up drive is not in the boot sequence in configuration.	Check the configuration and ensure the start-up drive is in the boot sequence.
No operating system installed on the boot drive.	Install an operating system on the boot drive.

Error	FRU/Action
The boot sector on the start-up drive is corrupted.	The drive must be formatted do the following: <ol style="list-style-type: none"> 1. Attempt to back-up the data on the failing hard disk drive. 2. Using the operating systems programs format the hard disk drive.
The drive is defective.	Replace the hard disk drive.

Power Supply Problems

If you suspect a power problem, use the following procedures.

Check/Verify	FRU/Action
Check the following for proper installation. <ul style="list-style-type: none"> • Power Cord • On/Off Switch connector • On/Off Switch Power Supply connector • System Board Power Supply connectors • Microprocessor(s) connection 	Reseat connectors
Check the power cord for continuity.	Power Cord
Check the power-on switch for continuity.	Power-on Switch

Beep symptoms

Beep symptoms are tones or a series of tones separated by pauses (intervals without sound) during POST.

The following tables describes beep symptoms.

Beep Symptom	FRU/Action
1 beep Memory refresh timer error	Reseat the memory, or replace with known good modules.
2 beeps Parity error in base memory (first 64KB block)	
3 beeps Base memory read/write test error	
4 beeps Motherboard timer not operational	Fatal error indicating a serious problem with the system. Consult your system manufacturer. Before declaring the motherboard beyond all hope, eliminate the possibility of interference by a malfunctioning add-in card. Remove all expansion cards except the video adapter. <ul style="list-style-type: none"> • If beep codes are generated when all other expansion cards are absent, consult your system manufacturer's technical support. • If beep codes are not generated when all other expansion cards are absent, one of the add-in cards is causing the malfunction. Insert the cards back into the system one at a time until the problem happens again. This will reveal the malfunctioning card.
5 beeps Processor error	
6 beeps 8042 Gate A20 test error (cannot switch to protected mode)	
7 beeps General exception error (processor exception interrupt error)	
8 beeps Display memory error (system video adapter)	If the system video adapter is an add-in card, replace or reseat the video adapter. If the video adapter is an integrated part of the system board, the board may be faulty.

Beep Symptom	FRU/Action
9 beeps AMIBIOS ROM checksum error	Fatal error indicating a serious problem with the system. Consult your system manufacturer. Before declaring the motherboard beyond all hope, eliminate the possibility of interference by a malfunctioning add-in card. Remove all expansion cards except the video adapter. <ul style="list-style-type: none"> • If beep codes are generated when all other expansion cards are absent, consult your system manufacturer's technical support. • If beep codes are not generated when all other expansion cards are absent, one of the add-in cards is causing the malfunction. Insert the cards back into the system one at a time until the problem happens again. This will reveal the malfunctioning card.
10 beeps CMOS shutdown register read/write error	
11 beeps Cache memory test failed	

POST error codes

Each time you power-on the system, it performs a series of tests that check the operation of the system and some options. This series of tests is called the *Power-On Self-Test*, or *POST*. POST does the following operations.

- Checks some basic system-board operations
- Checks the memory operation
- Starts the video operation
- Verifies that the boot drive is working

If the POST detects a problem, an error message appears on the screen. A single problem can cause several error messages to appear. When you correct the cause of the first error message, the other error messages probably will not appear on the screen the next time you turn on the system.

POST Error Message	Description/Action
CMOS Date/Time Not Set	The CMOS Date and/or Time are invalid. This error can be resolved by readjusting the system time in AMIBIOS Setup.
CMOS Battery Low	The CMOS battery is no longer functional. Replace the battery.
CMOS Checksum Bad	Checksum of CMOS is incorrect. The computer loads the default configuration settings. This error might indicate that CMOS has become corrupt due to a weak CMOS battery.
Primary Master Hard Disk Error	The IDE/ATAPI device configured as Primary Master/Primary Slave/Secondary Master/Secondary Slave could not be found or initialized. Make sure the hard drive is correctly installed.
Primary Slave Hard Disk Error	
Secondary Master Hard Disk Error	
Secondary Slave Hard Disk Error	
PS2 Mouse not found	PS2 Mouse support is enabled in the BIOS setup but the device is not detected. You can plug PS2 Mouse or set PS2 Mouse support is auto.
Keyboard error	Cannot initialize the keyboard. Make sure the keyboard is properly connected to the computer and that no keys are held pressed during POST. To purposely configure the computer without a keyboard, set keyboardless operation in Setup to Enable. The BIOS then ignores the missing keyboard during POST.
System Halted	The system has been halted. A reset or power cycle is required to reboot the machine. This message appears after a fatal error has been detected.
Press TAB to show POST screen	Pressing the TAB key permits the user to toggle between the default POST display screen and a custom POST display screen.

POST Error Message	Description/Action
Reboot and Select proper Boot device or Insert Boot Media in selected Boot device	The BIOS was unable to find a suitable boot device. Make sure the boot drive is properly connected to the computer. Make sure you have bootable media.

Undetermined problems

If this computer has a parallel ATA hard disk drive, make sure that the hard disk drive is jumpered as a master and the optical drive is jumpered as a slave.

1. Power-off the computer.
2. Remove or disconnect the following components (if installed) one at a time.
 - a. External devices (modem, printer, or mouse)
 - b. Any adapters
 - c. Memory modules
 - d. Extended video memory
 - e. External Cache
 - f. External Cache RAM
 - g. Hard disk drive
 - h. Diskette drive
3. Power-on the computer to re-test the system.
4. Repeat steps 1 through 3 until you find the failing device or adapter.

If all devices and adapters have been removed, and the problem continues, replace the system board.

Replacing hardware

7

Attention



Do not remove the computer cover or attempt any repair before reading the "Important safety information" in the *Safety and Warranty Guide* that was included with your computer or in the *Hardware Maintenance Manual (HMM)* for the computer. To obtain copies of the *Safety and Warranty Guide* or *HMM*, go to the Support Web site at <http://consumersupport.lenovo.com>

Note



Use only parts provided by Lenovo.

General information

Pre-disassembly instructions

Before proceeding with the disassembly procedure, make sure that you do the following:

1. Turn off the power to the system and all peripherals.
2. Unplug all power and signal cables from the computer.
3. Place the system on a flat, stable surface.

Removing the computer cover

Attention



Turn off the computer and wait 3 to 5 minutes to let the computer cool before removing the computer cover.

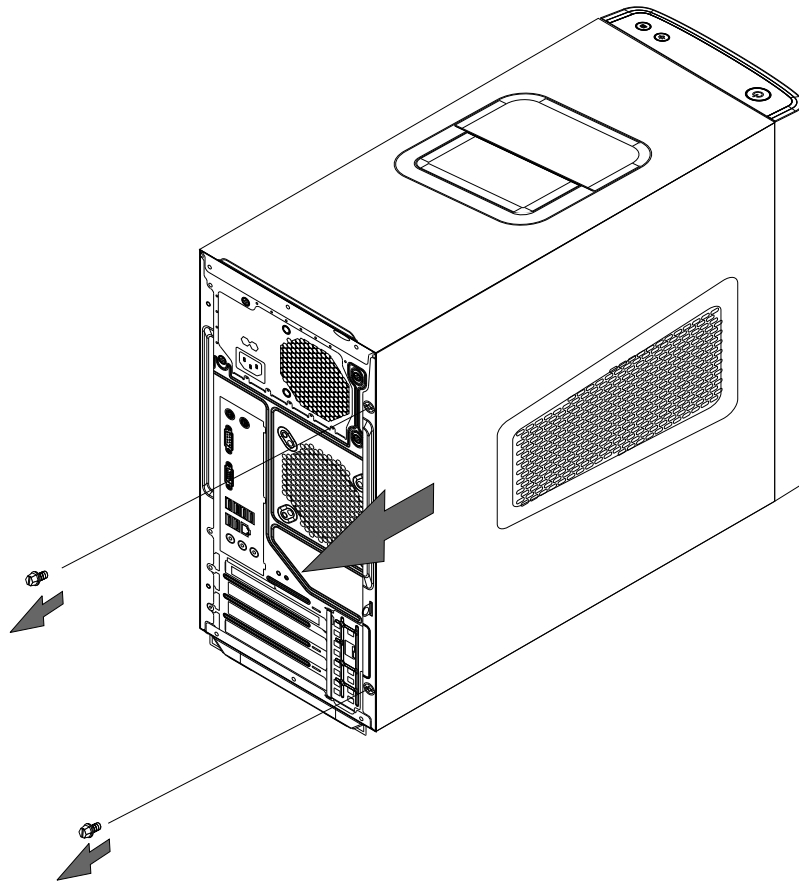
To remove the computer cover:

1. Remove any media (diskettes, CDs, or memory cards) from the drives, shut down your operating system, turn off all attached devices, and the computer.
2. Unplug all power cords from electrical outlets.
3. Disconnect all cables attached to the computer. This includes power cords, input/output (I/O) cables, and any other cables that are connected to the computer. Refer to “Locating connectors on the rear of the computer”.
4. Remove the two screws that secure the computer cover at the rear of the chassis.
5. Slide the computer cover to the rear of the chassis to remove.

Note



For this procedure, it helps to lay the computer on its side.



Removing the front bezel

To remove the front bezel:

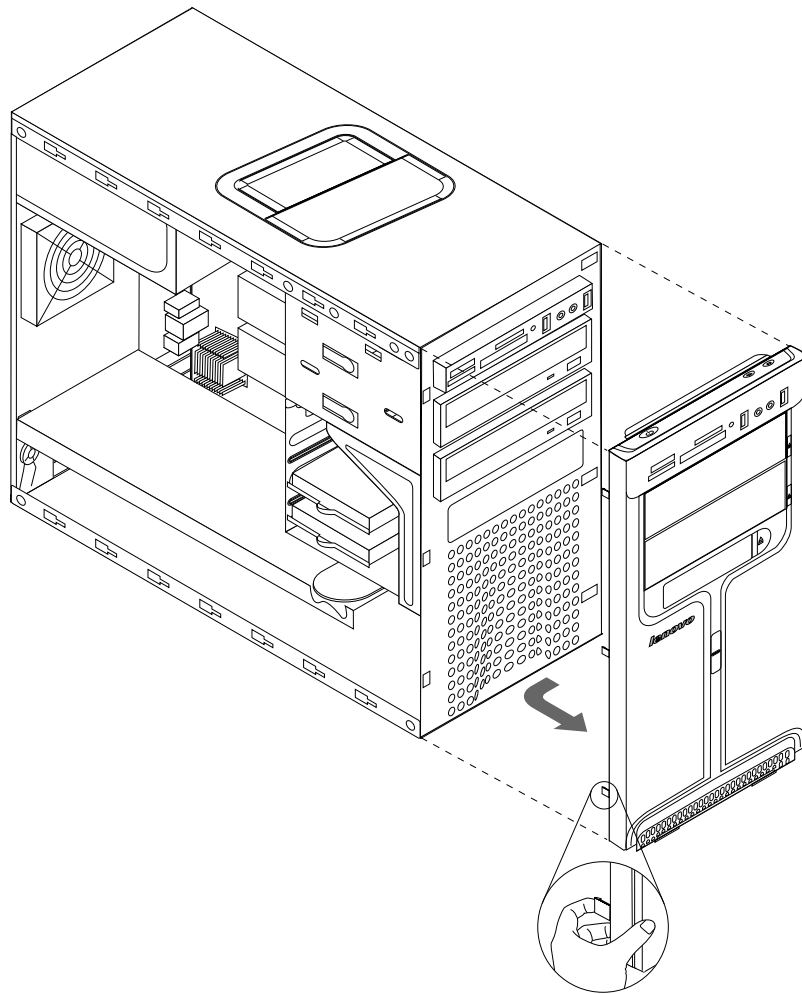
1. Remove the computer cover. Refer to "Removing the computer cover".

Note



For this procedure, it helps to lay the computer on its side.

2. Remove the front bezel by releasing the three plastic tabs inside the chassis and push the bezel outward as shown.



3. To reinstall the bezel, align the plastic tabs on the bottom of the bezel with the corresponding holes in the chassis, and then snap it into position at the bottom and top of the chassis.
4. Refer to the “Completing the installation”.

Replacing a memory module

Attention



Do not remove the computer cover or attempt any repair before reading the “Important safety information” in the *Safety and Warranty Guide* that was included with your computer or in the *Hardware Maintenance Manual (HMM)* for the computer. To obtain copies of the *Safety and Warranty Guide* or *HMM*, go to the Support Web site at <http://consumersupport.lenovo.com>

To replace a memory module:

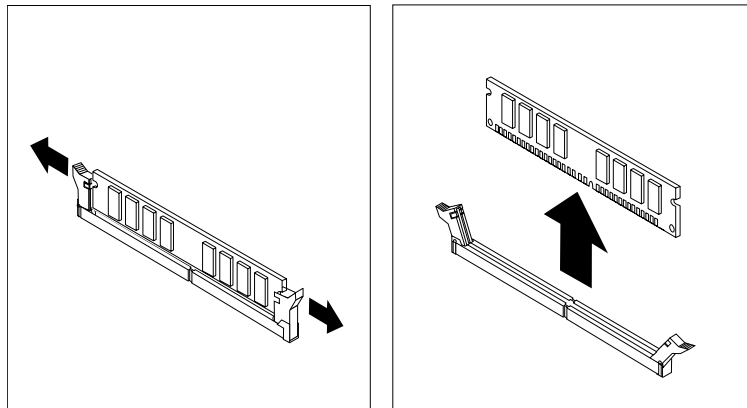
1. Remove the computer cover. Refer to “Removing the computer cover”.

Note

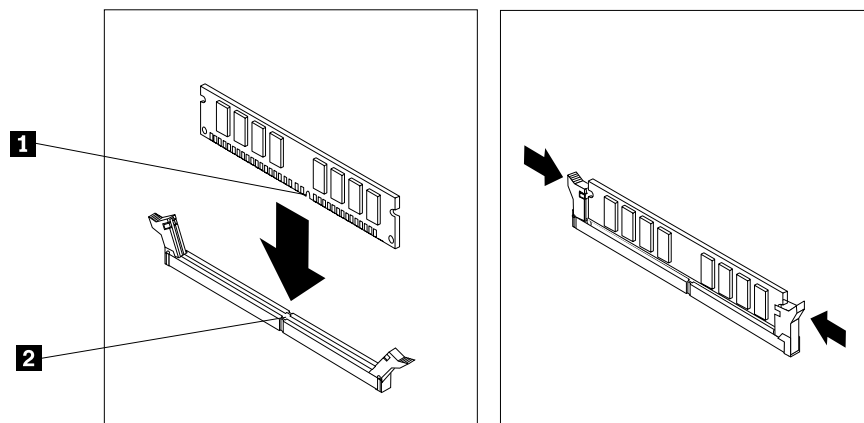


For this procedure, it helps to lay the computer on its side.

2. Locate the memory module connectors. Refer to “Locating components”.
3. Remove the memory module being replaced by opening the retaining clips as shown.



4. Position the new memory module over the memory connector. Make sure the notch **1** on the memory aligns correctly with the connector key **2** on the system board. Push the memory module straight down into the connector until the retaining clips close.



5. Refer to the “Completing the installation”.

Replacing the hard disk drive

Attention



Do not remove the computer cover or attempt any repair before reading the “Important safety information” in the *Safety and Warranty Guide* that was included with your computer or in the *Hardware Maintenance Manual (HMM)* for the computer. To obtain copies of the *Safety and Warranty Guide* or *HMM*, go to the Support Web site at <http://consumersupport.lenovo.com>

To replace the hard disk drive:

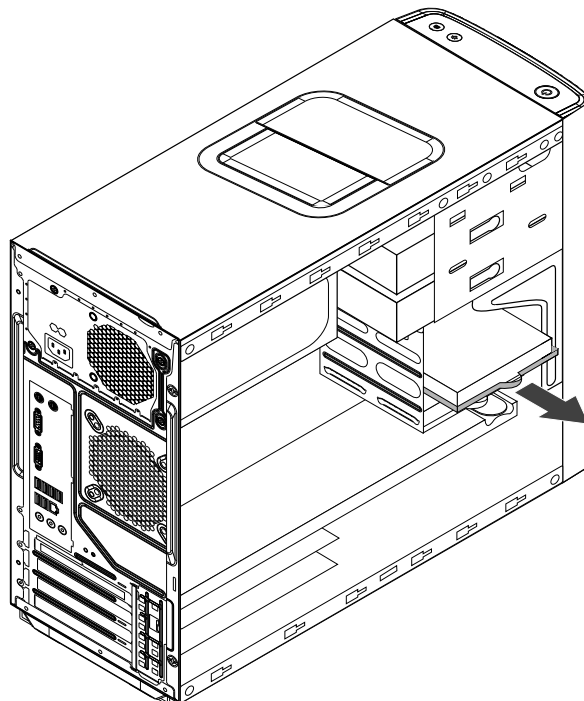
1. Remove the computer cover. Refer to “Removing the computer cover”.

Note



For this procedure, it helps to lay the computer on its side.

2. Disconnect the data and power cables from the hard disk drive.
3. Use the plastic handle to slide the hard disk drive out of the drive bay.



4. Slide the new hard disk drive into the drive bay.
5. Pivot in the drive bay in place.
6. Connect the power and signal cables to the hard disk drive. Refer to "Identifying parts on the system board".
7. Refer to the "Completing the installation".

Replacing an optical drive

Attention

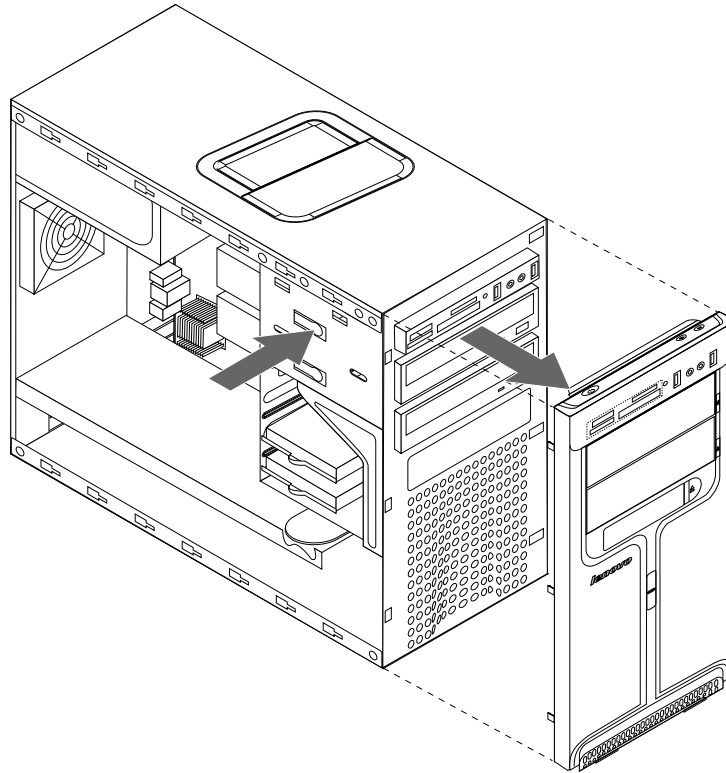


Do not remove the computer cover or attempt any repair before reading the "Important safety information" in the *Safety and Warranty Guide* that was included with your computer or in the *Hardware Maintenance Manual* (HMM) for the computer. To obtain copies of the *Safety and Warranty Guide* or *HMM*, go to the Support Web site at <http://consumersupport.lenovo.com>

To replace an optical drive

1. Remove the computer cover. Refer to "Removing the computer cover".
2. Remove the front bezel. Refer to "Removing the front bezel".
3. Disconnect the data and power cables from the rear of the optical drive.

4. Press the release button and push the optical drive straight out of the front of the chassis.



5. Slide the new optical drive into the bay from the front until it snaps into position.
6. Connect the data and power cables to the drive.
7. Install the front bezel. Refer to the steps 3 of the “Removing the front bezel”.
8. Install the computer cover. Refer to “Completing the installation”.

Replacing the system fan assembly

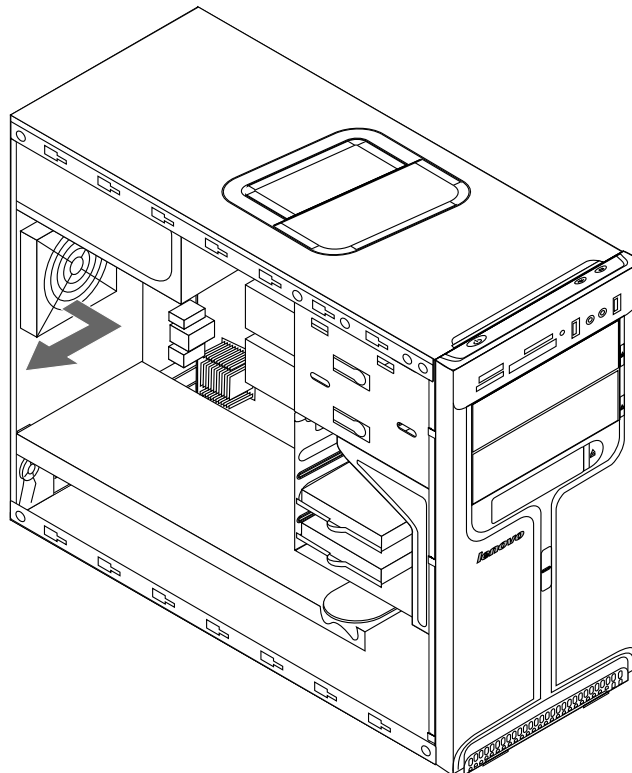
Attention



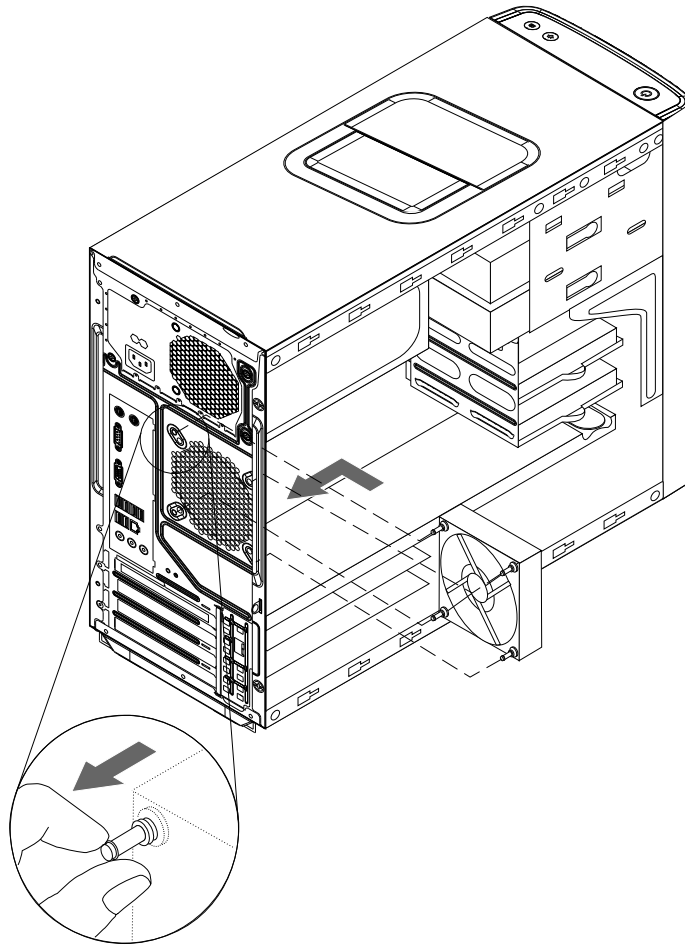
Do not remove the computer cover or attempt any repair before reading the “Important safety information” in the *Safety and Warranty Guide* that was included with your computer or in the *Hardware Maintenance Manual (HMM)* for the computer. To obtain copies of the *Safety and Warranty Guide* or *HMM*, go to the Support Web site at <http://consumersupport.lenovo.com>

To replace the system fan assembly:

1. Remove the computer cover. Refer to "Removing the computer cover".
2. Locate the system fan assembly. Refer to "Identifying parts on the system board".
3. Disconnect the system fan assembly cable from the system board. Refer to "Identifying parts on the system board".
4. Pull the system fan assembly out of chassis.



5. Install the new system fan assembly by aligning the rubber mounts of the system fan assembly with the holes on the chassis and push the rubber mounts through the holes.



6. Pull on the tips of the rubber mounts until the fan assembly is in place.
7. Connect the system fan assembly cable to the system fan connector on the system board.
8. Refer to the "Completing the installation".

Replacing the heat sink assembly

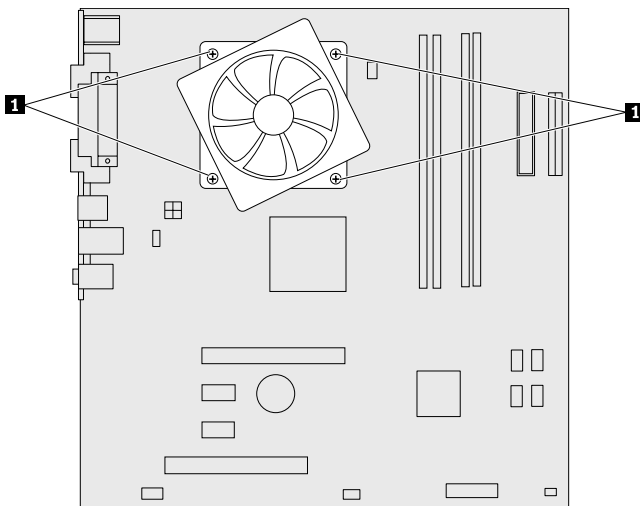
Attention



Do not remove the computer cover or attempt any repair before reading the “Important safety information” in the *Safety and Warranty Guide* that was included with your computer or in the *Hardware Maintenance Manual (HMM)* for the computer. To obtain copies of the *Safety and Warranty Guide* or *HMM*, go to the Support Web site at <http://consumersupport.lenovo.com>

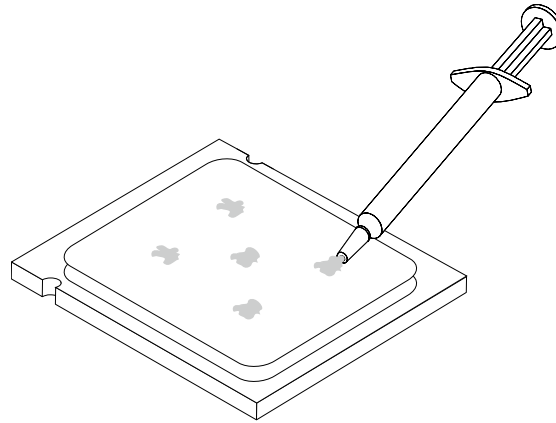
To replace the heat sink assembly:

1. Remove the computer cover. Refer to “Removing the computer cover”.
2. Lay the computer on its side.
3. Locate the heat sink. Refer to “Identifying parts on the system board”.
4. Disconnect the heat sink and the fan assembly cable from the system board.
5. Remove the four screws **1** securing the heat sink and fan assembly to the system board.



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

7. Use the thermal grease syringe to place five drops of grease on the top of the microprocessor. Each drop of grease should be 0.03ml (3 tick marks on the grease syringe).



8. Install the heat sink and fan assembly on the heat sink retention bracket.
9. Reconnect the disconnected cables to the system board.
10. Refer to the "Completing the installation".

Replacing a PCI or AGP adapter

Attention

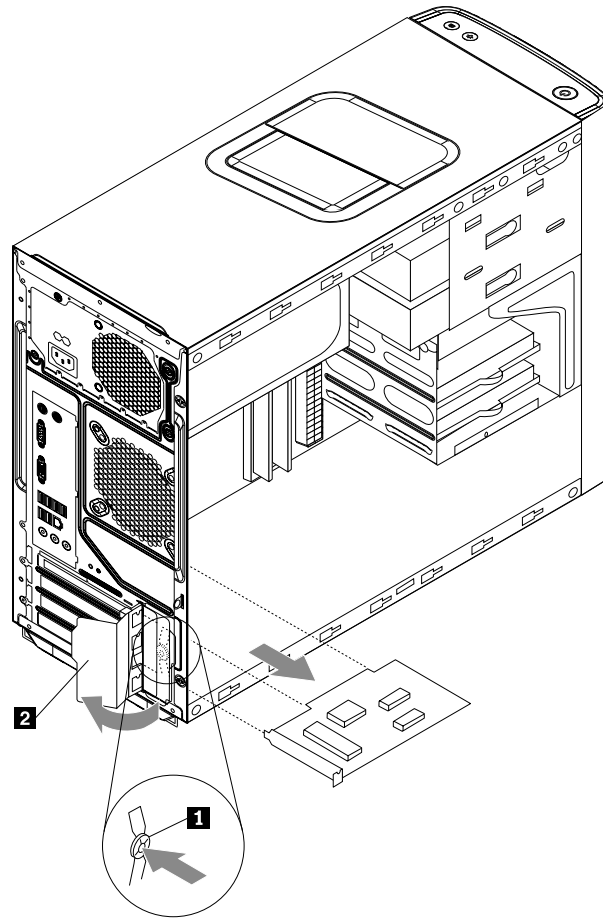


Do not remove the computer cover or attempt any repair before reading the "Important safety information" in the *Safety and Warranty Guide* that was included with your computer or in the *Hardware Maintenance Manual (HMM)* for the computer. To obtain copies of the *Safety and Warranty Guide* or *HMM*, go to the Support Web site at <http://consumersupport.lenovo.com>

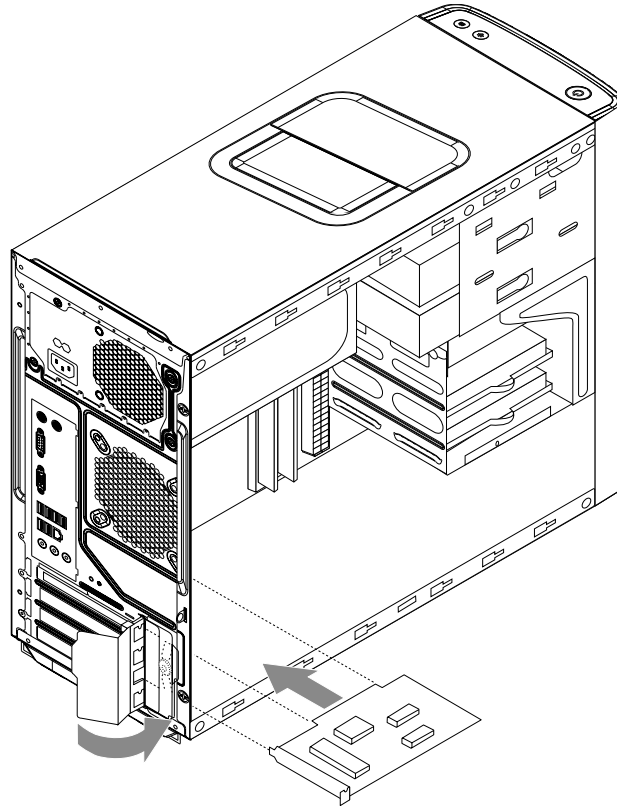
To replace an adapter:

1. Remove the computer cover. Refer to "Removing the computer cover".

2. At the rear of the computer, press the release button **1** to open the adapter latch **2** and remove the adapter by pulling it straight out of the adapter connector.



3. Install the new adapter into the same adapter connector.



4. Ensure the adapter is fully seated into the adapter connector.
5. At the rear of the computer, pivot the adapter latch to the closed position to secure the adapter.
6. Refer to the "Completing the installation".

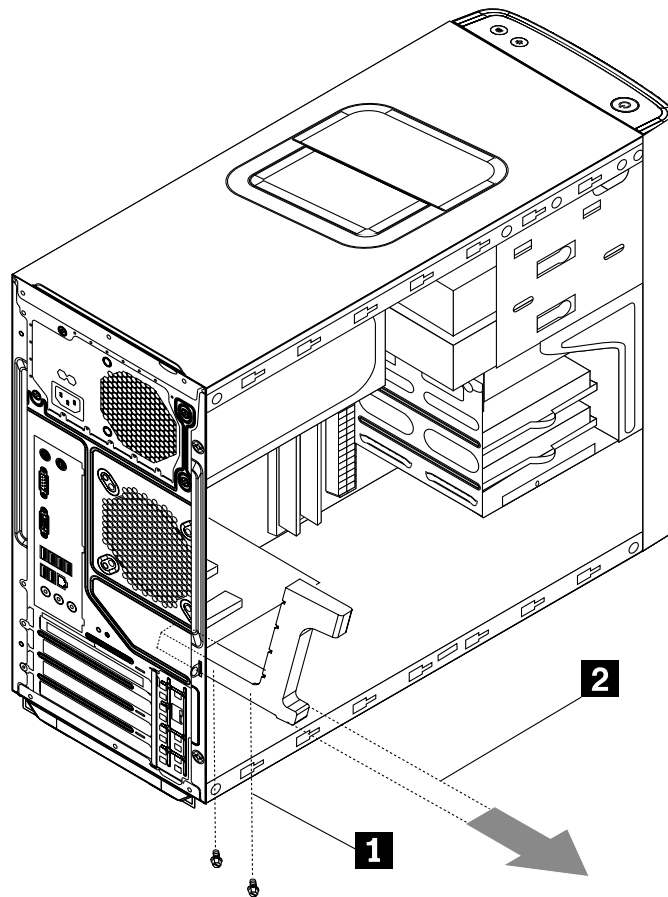
Note 1



Placement of some models equipped with graphic adapter bracket is different.

Please remove the plastic bracket first as the following:

1. Remove the two screws that secure the plastic bracket at the bottom of the chassis.
2. Lift the plastic bracket out of the chassis.
3. Then remove the adapter as above.



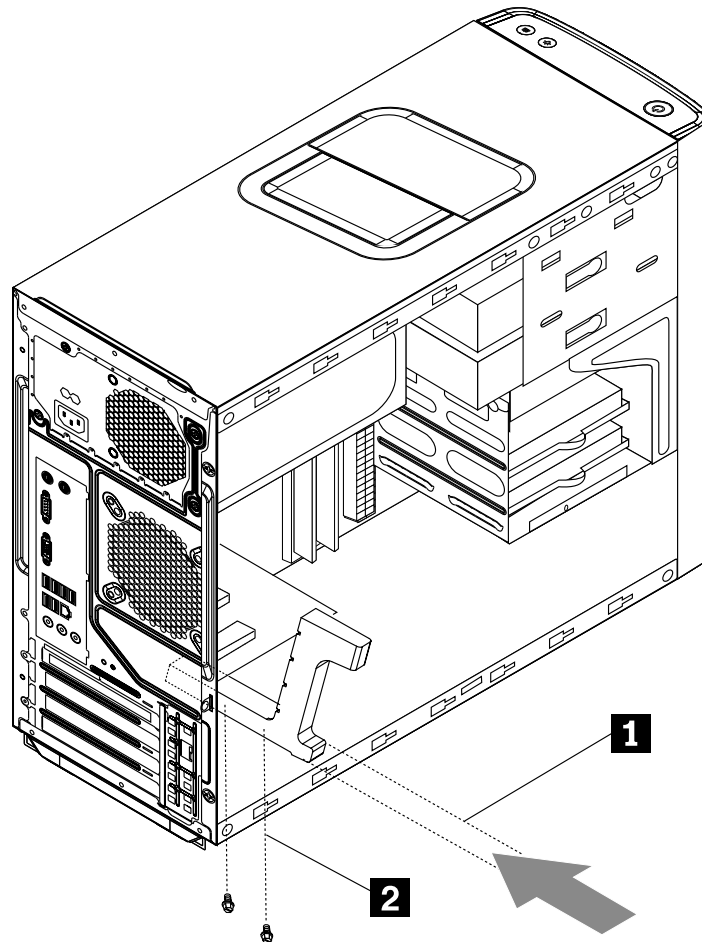
After the Graphic Adapter is installed , install the bracket as the following:

1. Install the plastic bracket into the chassis so that the screw holes in the plastic bracket align with those in the chassis. Let the slot on the plastic bracket clip the adapter.

2. Install the two screws to secure the plastic bracket.

Note

Use only the screws provided by Lenovo.



Note 2

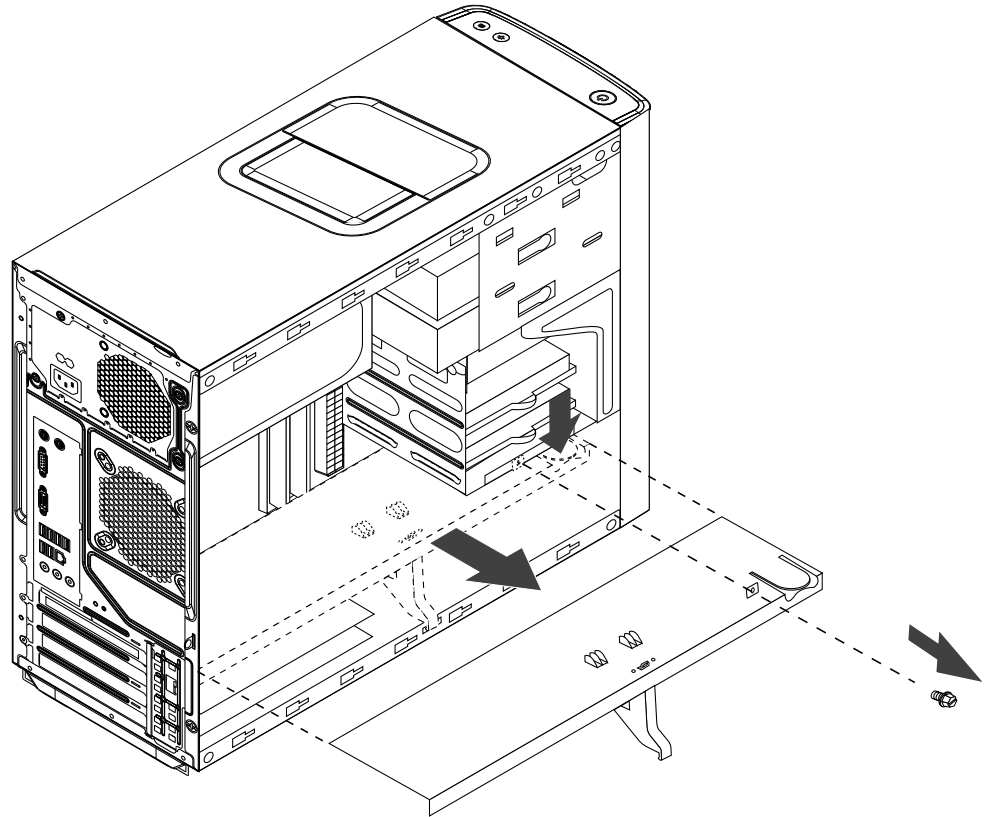


Replacement of some models equipped with graphic adapter bracket is different.

Please remove the bracket first as the following:

1. Remove the screw that secures the bracket at the side of the chassis.

2. Press the pin on one end of the metal bracket and pull the metal bracket straight out of the chassis.



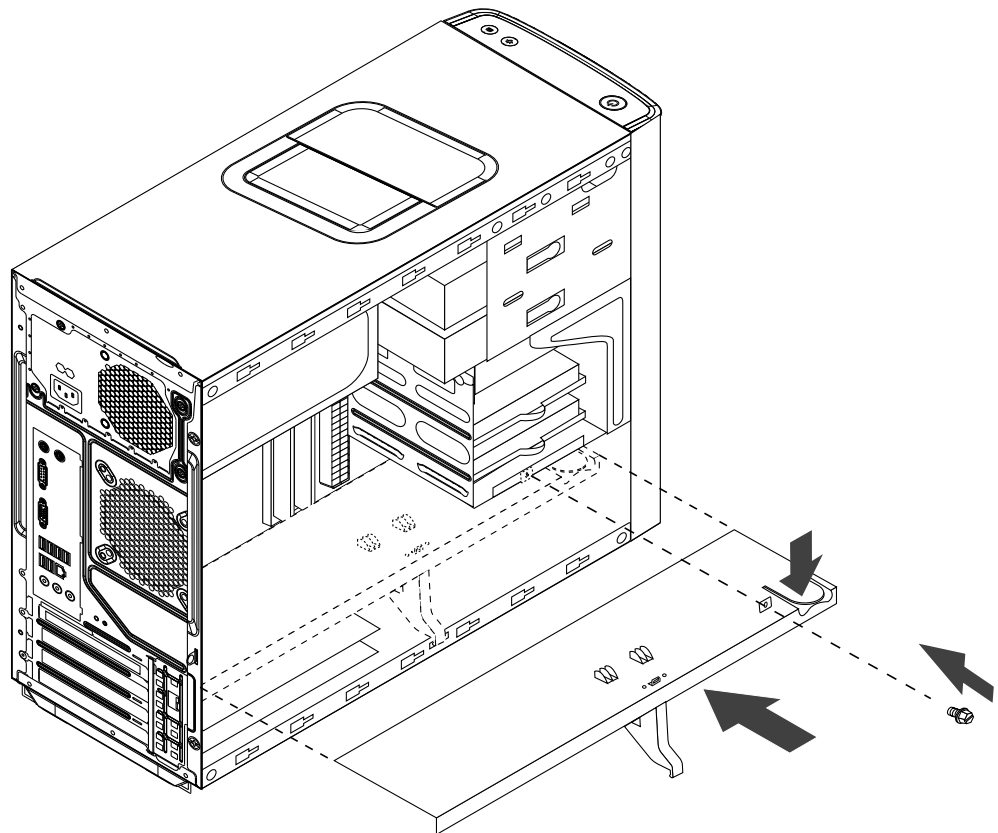
After the Graphic Adapter is installed, install the bracket as the following:

1. Install the metal bracket into the chassis so that the screw hole in the metal bracket aligns with the hole in the chassis. Let the slot on the metal bracket clip the adapter.

2. Screw back the screws on the metal bracket.

Note

Use only the screws provided by Lenovo.



Replacing the CPU

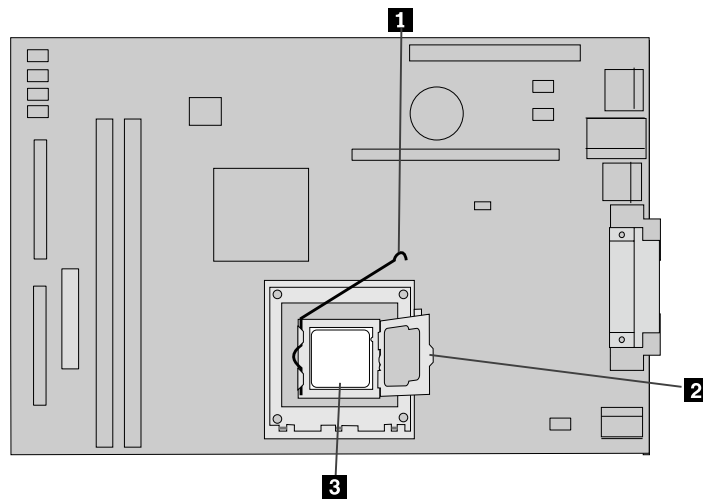
Attention



Do not remove the computer cover or attempt any repair before reading the "Important safety information" in the *Safety and Warranty Guide* that was included with your computer or in the *Hardware Maintenance Manual (HMM)* for the computer. To obtain copies of the *Safety and Warranty Guide* or *HMM*, go to the Support Web site at <http://consumersupport.lenovo.com>

To replace an CPU

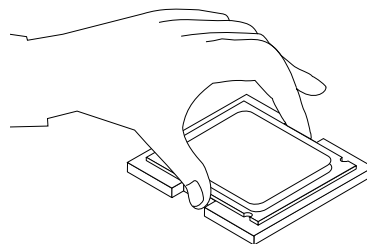
1. Remove the computer cover. Refer to “Removing the computer cover”.
2. Remove the front bezel. Refer to “Removing the front bezel”.
3. Remove the system board. Refer to “Replacing the heat sink assembly”.
4. Remove the heat sink and fan assembly. Refer to “Replacing the heat sink assembly”.
5. To remove the microprocessor **3** from the system board, lift the small handle **1** and open the retainer **2**.



Important

Do not touch the gold contacts on the bottom of the microprocessor. When handling the microprocessor, touch only the sides.

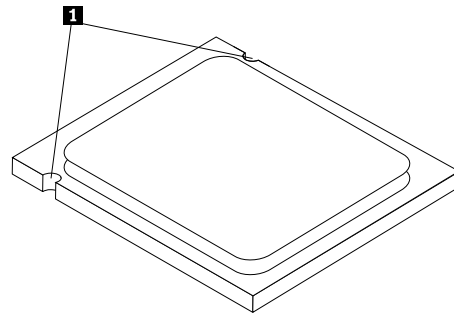
6. Lift the microprocessor straight up and out of the socket.



Note

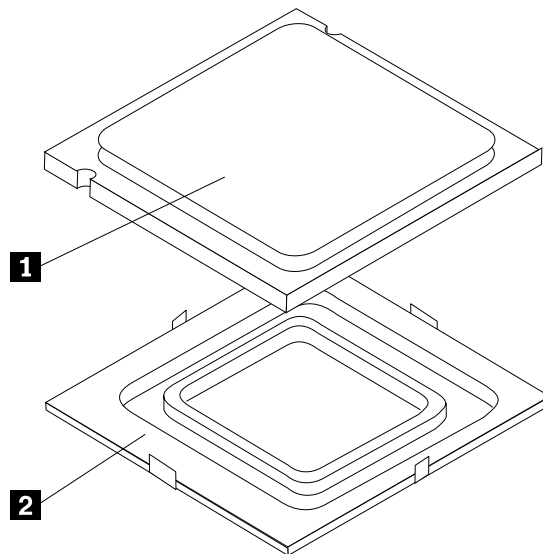


a. Note the orientation of the notches **1** on the microprocessor. This is important when reinstalling the microprocessor on the new system board.



b. Do not drop anything onto the microprocessor socket while it is exposed. The socket pins must be kept as clean as possible.

7. Make sure that the microprocessor retainer is fully open.
8. Holding the microprocessor with your fingers, remove the protective cover **2** that protects the gold contacts on the new microprocessor **1**.

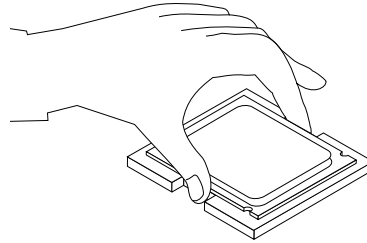


9. Holding the microprocessor with your fingers, position the microprocessor so that the notches on the microprocessor are aligned with the tabs in the microprocessor socket.

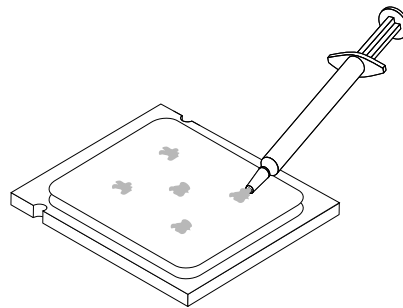
Important

To avoid damaging the microprocessor contacts, do not tilt the microprocessor when installing it into the socket.

10. Lower the microprocessor straight down into the system board socket of the system board.



11. To secure the microprocessor in the socket, close the microprocessor retainer and lock it into position with the small handle.
12. Use the thermal grease syringe to place five drops of grease on the top of the microprocessor. Each drop of grease should be 0.03ml (3 tick marks on the grease syringe).



13. Install the heat sink and fan assembly on the system board.
14. Connect the heat sink and fan assembly cable to the system board. Refer to the "Identifying parts on the system board".
15. Install the system board into the chassis and align the screw holes with those in the chassis. Insert and tighten the screws that secure the system board. Refer to the "Replacing the system board".
16. Reconnect the disconnected cables to the system board.
17. Refer to the "Completing the installation".

Replacing the keyboard

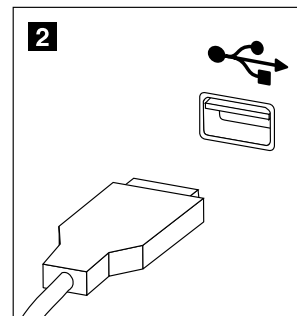
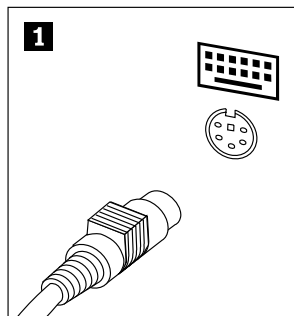
To replace the keyboard:

1. Remove any media (diskettes, CDs, or memory cards) from the drives, shut down your operating system, and turn off all attached devices and the computer.
2. Unplug all power cords from electrical outlets.
3. Locate the connector for the keyboard. Refer to “Locating connectors on the rear of the computer” and “Locating connectors on the front of the computer”.

Note



Your keyboard might be connected to the standard keyboard connector **1** at the rear of the computer or to a USB connector **2** at either the front or rear of the computer.



4. Disconnect the failing keyboard cable from the computer and connect the new keyboard cable to the same connector.
5. Refer to the “Completing the installation”.

Replacing the mouse

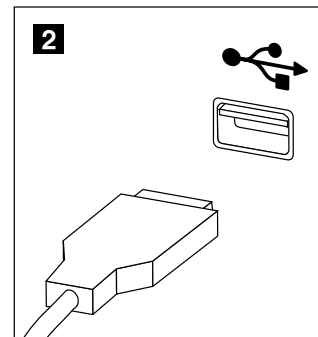
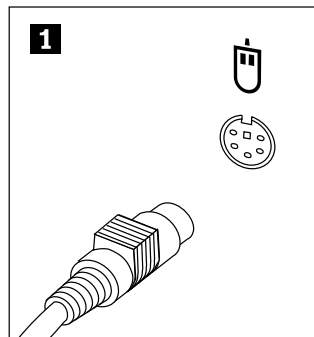
To replace the mouse:

1. Remove any media (diskettes, CDs, or memory cards) from the drives, shut down your operating system, and turn off all attached devices and the computer.
2. Unplug all power cords from electrical outlets.
3. Locate the connector for the mouse. Refer to “Locating connectors on the front of the computer” and “Locating connectors on the rear of the computer”.

Note



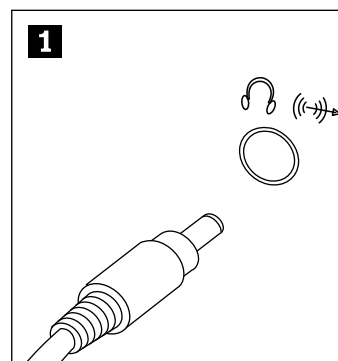
Your mouse might be connected to the standard mouse connector **1** at the rear of the computer or to a USB connector **2** at either the front or rear of the computer.



4. Disconnect the failing mouse cable from the computer.
5. Connect the new mouse cable to the connector.
6. Refer to the "Completing the installation."

Replacing the External speaker

1. Remove any media (diskettes, CDs, or memory cards) from the drives, shut down the computer, and turn off all attached devices.
2. Unplug all power cords from electrical outlets.
3. Locate the Speaker. Refer to "Locating connectors on the rear of the computer" and "Locating connectors on the front of the computer". Your speaker might be connected to the Audio connector **1** to an Audio connector at either the front or rear of the computer. Locate the connector for the speaker.



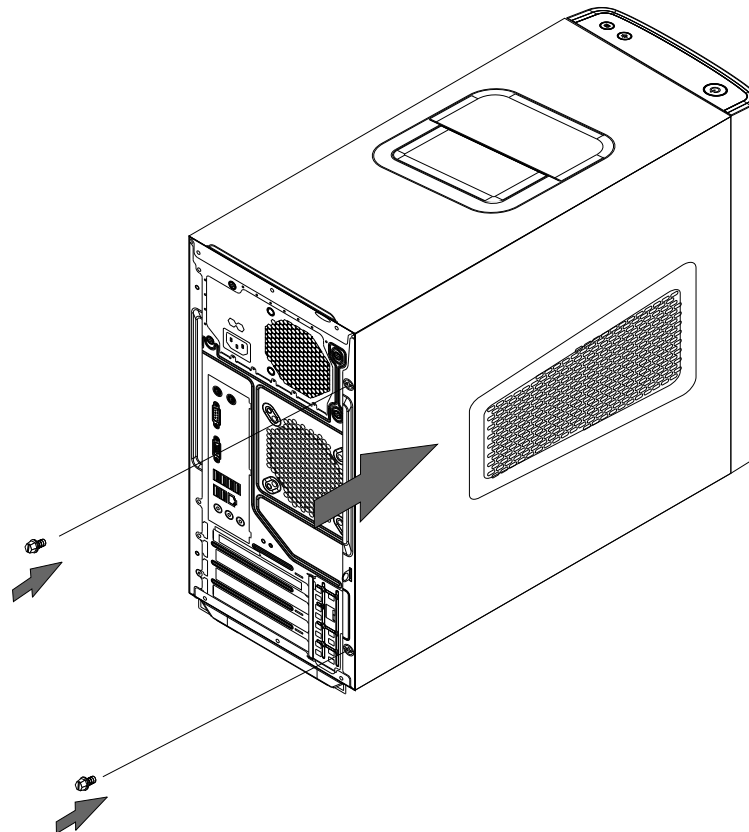
4. Disconnect the failing speaker cable from the computer and connect the new speaker cable to the same connector.

Completing the installation

After replacing the parts, you need to close the computer cover and reconnect cables, including telephone lines and power cords. Also, depending on the part that was replaced, you might need to confirm the updated information in the Setup Utility program. Refer to “Starting the Setup Utility” in the *User Guide* or in the *Hardware Maintenance Manual*.

To complete the part installation:

1. Ensure that all components have been reassembled correctly and that no tools or loose screws are left inside your computer. Refer to “Locating components” for the location of the various components.
2. Make sure that the cables are routed correctly before replacing 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. Then, push the computer cover closed until it snaps into position.



4. Reconnect the external cables and power cords into the computer. Refer to “Locating connectors on the front of the computer” and “Locating connectors on the rear of the computer”.
5. To update your configuration settings, refer to “Starting the Setup Utility” in the User Guide or in the Hardware Maintenance Manual.

Note



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.

Additional Service Information (Type G43)

8

This chapter provides additional information that the service representative might find helpful.

Power management

Power management reduces the power consumption of certain components of the computer such as the system power supply, processor, hard disk drives, and some monitors.

Automatic configuration and power interface (ACPI) BIOS

Being an ACPI BIOS system, the operating system is allowed to control the power management features of the computer and the setting for Advanced Power Management (APM) BIOS mode is ignored. Not all operating systems support ACPI BIOS mode.

Automatic Power-On features

The Automatic Power-On features within the Power Management menu allow you to enable and disable features that turn on the computer automatically.

- **Wake On LAN:** This feature allows system wake up by Lan card and onboard lan.
- **Ring Wakeup:** With this feature set to Enabled, the computer will turn on automatically when a ring is detected on the internal modem.
- **Wake Up On Alarm:** You can specify a date and time at which the computer will be turned on automatically. This can be either a single event or a daily event.
- **PCI Wake Up:** This feature allows PCI cards which support this capability to wake this system.

Statement



Thanks for using Lenovo products.

Carefully read all of the documents shipped with your computer before you install and use the product for the first time. Lenovo will not assume responsibility for damage that results from failure to operate the product according to instructions and requirements described in the manuals included with your computer. Lenovo will not assume responsibility for any loss caused except that caused by the installation or operations carried out by Lenovo professional service staff.

Lenovo has made every attempt to ensure that the manuals included with your computer, are correct and accurate, but makes no guarantee that the publications are error free.

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