

# Contents

<b>Chapter 1. About this manual .....</b>	<b>1</b>
Important Safety Information .....	1
Using eSupport.....	2
Important information about replacing RoHS compliant FRUs ..	2
 <b>Chapter 2. Safety information.....</b>	 <b>4</b>
General safety .....	4
Electrical safety .....	5
Safety inspection guide .....	7
Handling electrostatic discharge-sensitive devices .....	8
Grounding requirements .....	8
Safety notices.....	9
 <b>Chapter 3. General information.....</b>	 <b>12</b>
Specifications.....	12
 <b>Chapter 4. General Checkout .....</b>	 <b>13</b>
Problem determination tips .....	14
 <b>Chapter 5. Using the Setup Utility .....</b>	 <b>16</b>
Starting the Setup Utility program .....	16
Viewing and changing settings .....	16
Selecting a startup device .....	17
Exiting from the Setup Utility program .....	18

<b>Chapter 6. Symptom-to-FRU Index.....</b>	<b>19</b>
Hard disk drive boot error .....	19
Power Supply Problems.....	20
POST error codes .....	20
Undetermined problems .....	22
 <b>Chapter 7. Locations .....</b>	 <b>23</b>
Locating components and connectors.....	23
 <b>Chapter 8. Replacing hardware .....</b>	 <b>27</b>
Removing the computer cover .....	27
Replacing a memory module .....	29
Replacing the CPU heat sink .....	31
Replacing the hard disk drive .....	33
Replacing the mother board.....	35
 <b>Chapter 9. Additional Service Information.....</b>	 <b>38</b>
Power management .....	38
 <b>Appendix. Statement .....</b>	 <b>39</b>

# About this manual



This manual contains service and reference information for Lenovo IdeaCentre Q 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://consumersupport.lenovo.com>.

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.

Veuillez 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://consumersupport.lenovo.com>
- 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://consumersupport.lenovo.com>.
  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 Q 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](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.



2  → 

1  → 



**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 Lenovo IdeaCentre Q

This section lists the physical specifications.

---

#### Environment

Air temperature:

Operating: 10° to 35°C

Transit: -20°C to 60°C

Humidity:

Operating: 20% to 80%

Transit: 20% to 90%

Altitude: 86KPa to 106KPa

---

#### Electrical input

Input voltage: 100-240V

Input frequency: 50-60Hz

---

# 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

# 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."

---

## 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.

## 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” on page 16).
2. Select Boot.
3. Select Boot Device Priority.
4. Select the devices for the 1st Boot Device or the 2nd 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"><li>1. Attempt to back-up the data on the failing hard disk drive.</li><li>2. Using the operating systems programs format the hard disk drive.</li></ol>
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"><li>• Power Cord</li><li>• On/Off Switch connector</li><li>• On/Off Switch Power Supply connector</li><li>• System Board Power Supply connectors</li><li>• Microprocessor(s) connection</li></ul>	Reseat connectors
Check the power cord for continuity.	Power Cord
Check the power-on switch for continuity.	Power-on Switch

---

## 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 Phenix BIOS 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	
Keyboard not found	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.
Reboot and Select proper Boot device or Insert Boot Media in selected Boot device and press a key	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.



# Locations

# 7

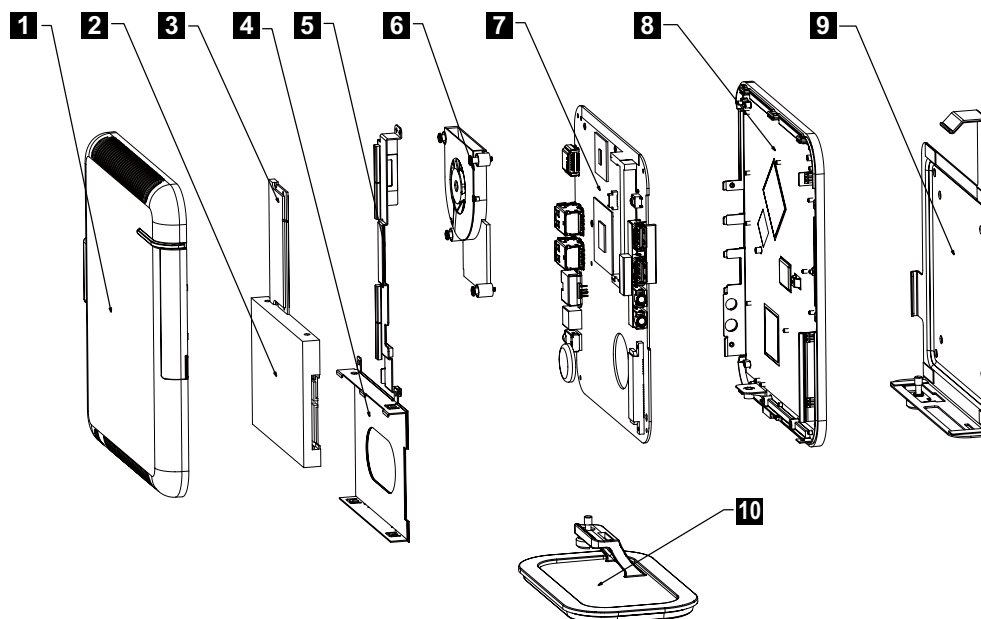
This section provides illustrations to help locate the various connectors, controls and components of the computer. To remove the computer cover, "refer to Removing the computer cover".

## Locating components and connectors

The following illustrations will help you to locate the various components and connectors in your computer.

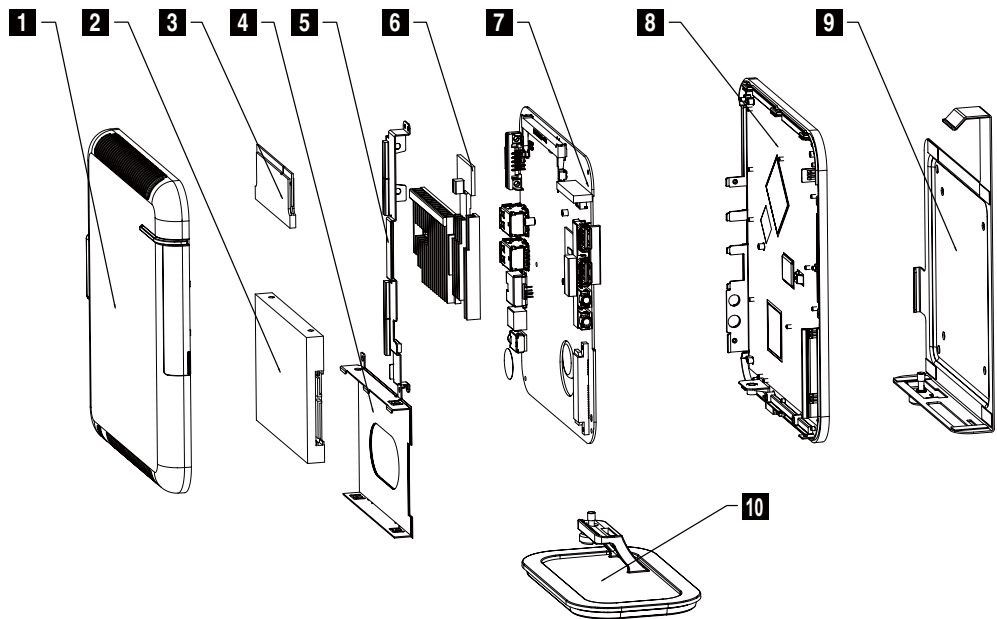
### Internal components

The following illustration shows the components inside your computer.



- 1** Front cover assy
- 2** Hard disk drive
- 3** DIMM
- 4** HDD BRACKET

- 5** HDMI-io-bracket
- 6** CPU FAN
- 7** IPP7A-HDMI-MB
- 8** Rear cover assy
- 9** Mount bracket assy
- 10** Stand assy

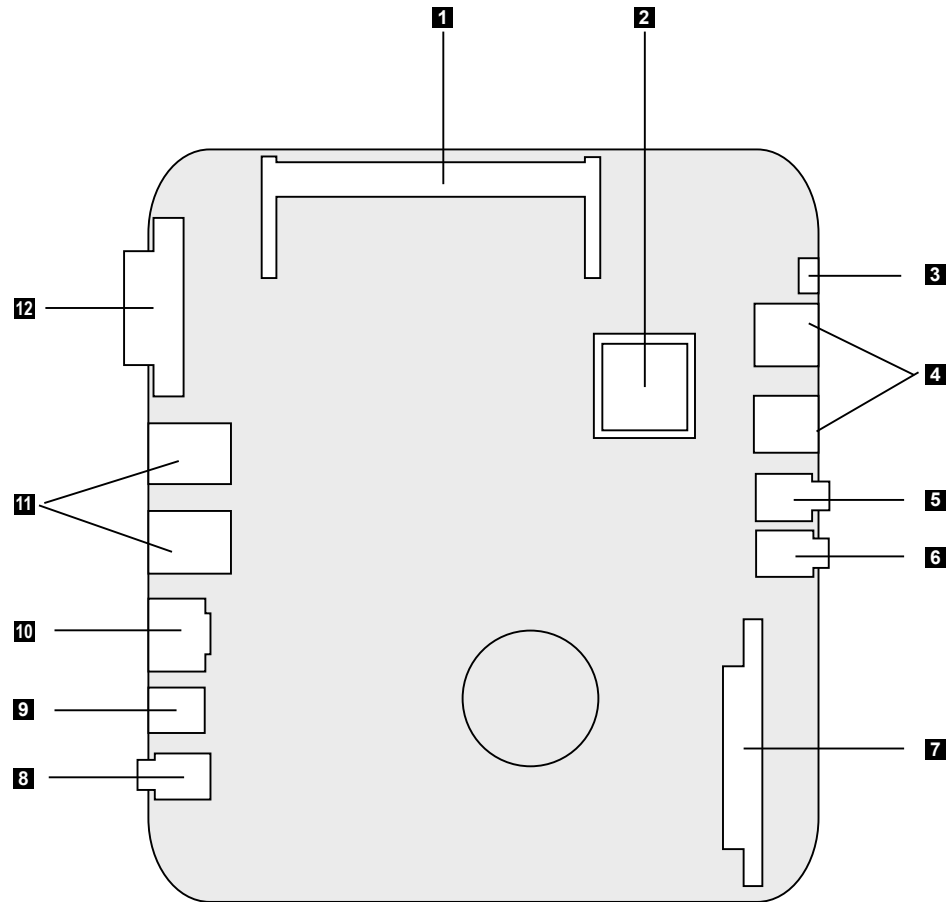


- 1** Front cover assy
- 2** Hard disk drive
- 3** DIMM
- 4** HDD BRACKET
- 5** D-SUB-io-bracket
- 6** HEAT SINK
- 7** D-SUB-MB
- 8** Rear cover assy
- 9** Mount bracket assy
- 10** Stand assy

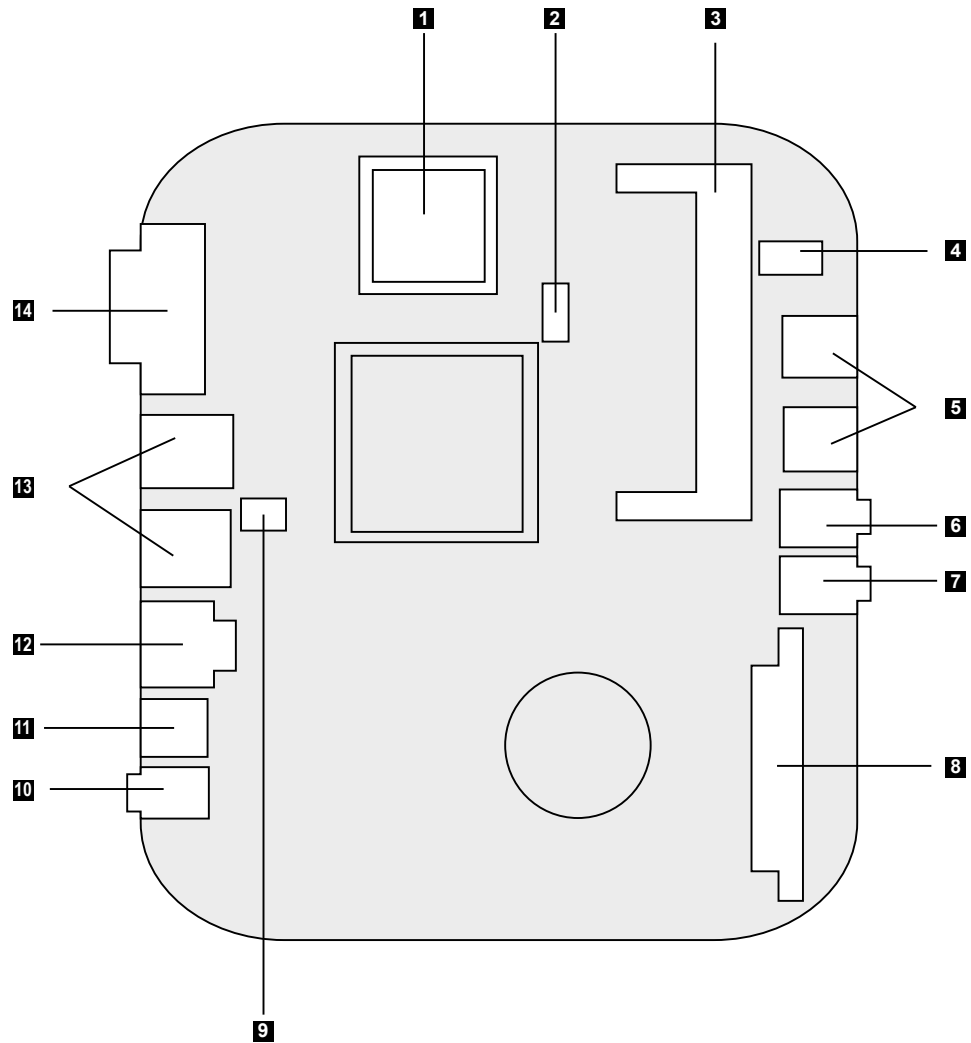
## Identifying parts on the system board

The system board (sometimes called the planar or motherboard) is the main circuit board in your computer. It provides basic computer functions and supports a variety of devices that are factory-installed or that you can install later.

The following illustration shows the locations of parts on the system board.



- 1** Memory slot
- 2** CPU socket
- 3** Power switch
- 4** USB connector (2)
- 5** Headphone connector
- 6** Microphone connector
- 7** HDD SATA and power socket
- 8** Audio line-out port
- 9** Power connector
- 10** Ethernet connector
- 11** USB connectors (4)
- 12** On-board VGA connector (Selected models only)



- 1** CPU socket
- 2** CPU fan cable connector
- 3** Memory slot
- 4** Power switch
- 5** USB connectors(2)
- 6** Headphone connector
- 7** Microphone connector
- 8** HDD SATA and power socket
- 9** Battery cable connector
- 10** Audio line-out port
- 11** Power connector
- 12** Ethernet connector
- 13** USB connectors(4)
- 14** HDMI connector (Selected models only)

# Replacing hardware

# 8

---

## Removing the computer cover

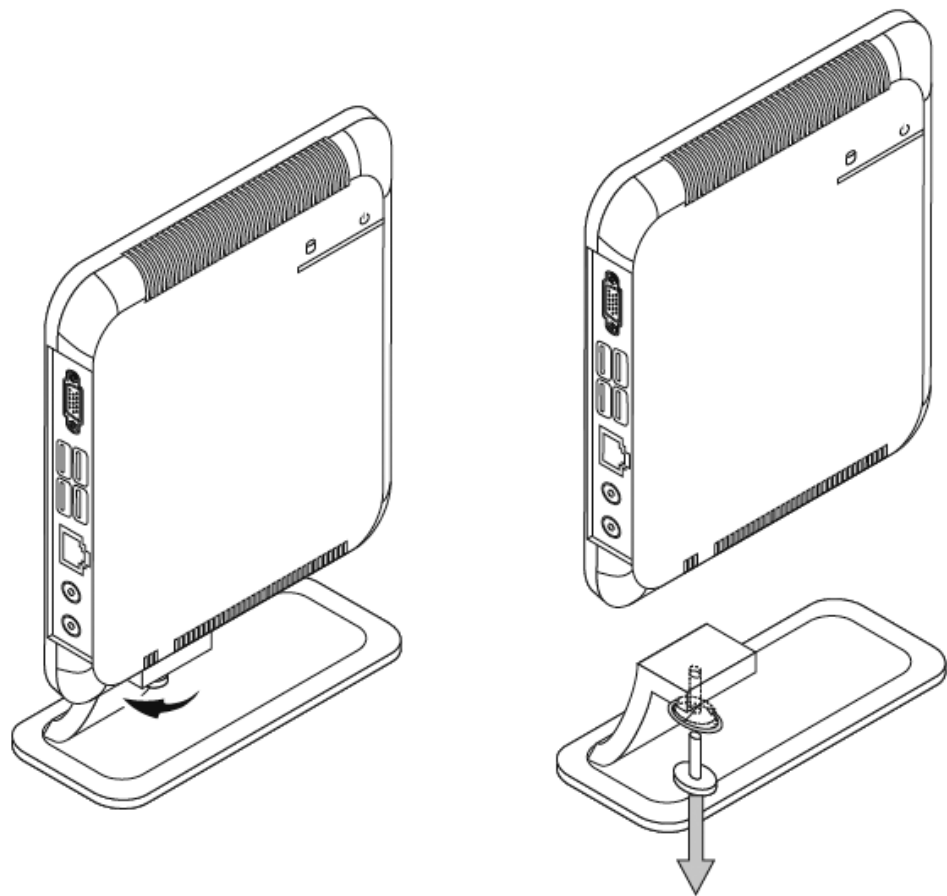
Attention:



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 components and ports/sockets".
4. Loosen the screw that secures the base stand to the computer.



5. Place the computer upside down on a flat surface.

6. Remove the six screws that secure the system cover to the chassis.



7. Remove the system cover.

---

## Replacing a memory module

### To remove the memory module:

1. Remove the computer cover. Refer to Removing the computer cover .
2. Locate the memory module sockets. Refer to Locating components and ports/sockets .

3. Push out the latches on both sides of the memory socket to release the memory module.



4. Gently pull the memory module upward to remove it from its socket.





5. Align and then insert the new memory module into socket and push down on the top edge of the memory module. Make sure the latches lock the memory module in place.
6. Install the computer cover. Refer to "Completing the installation".

---

## Replacing the CPU heat sink

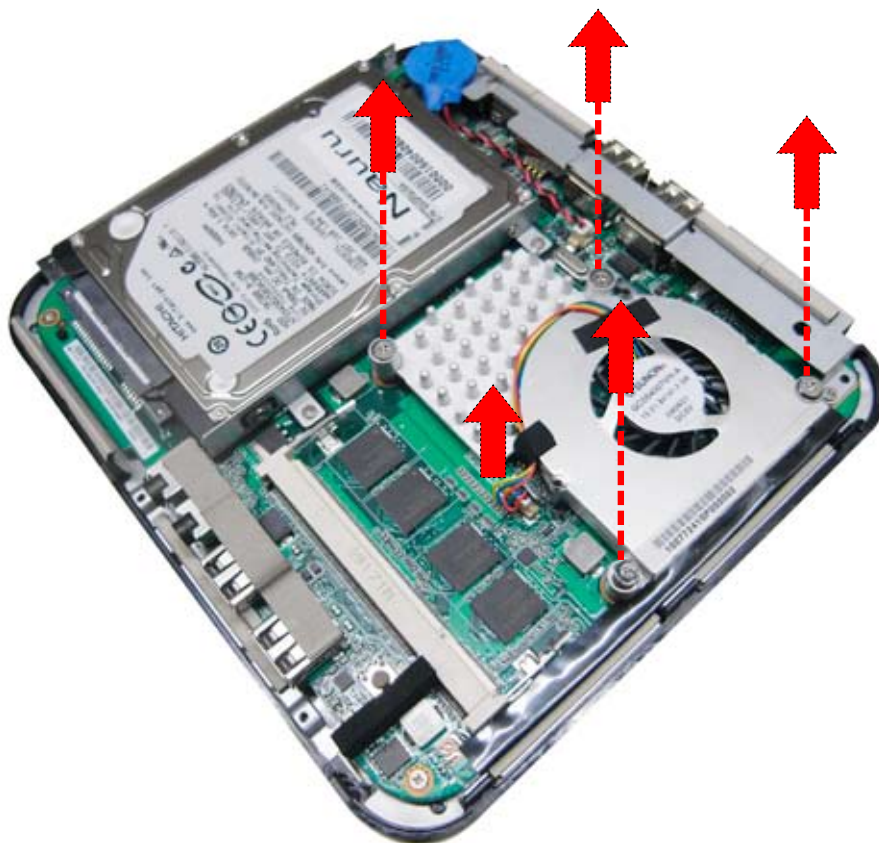
### Attention:

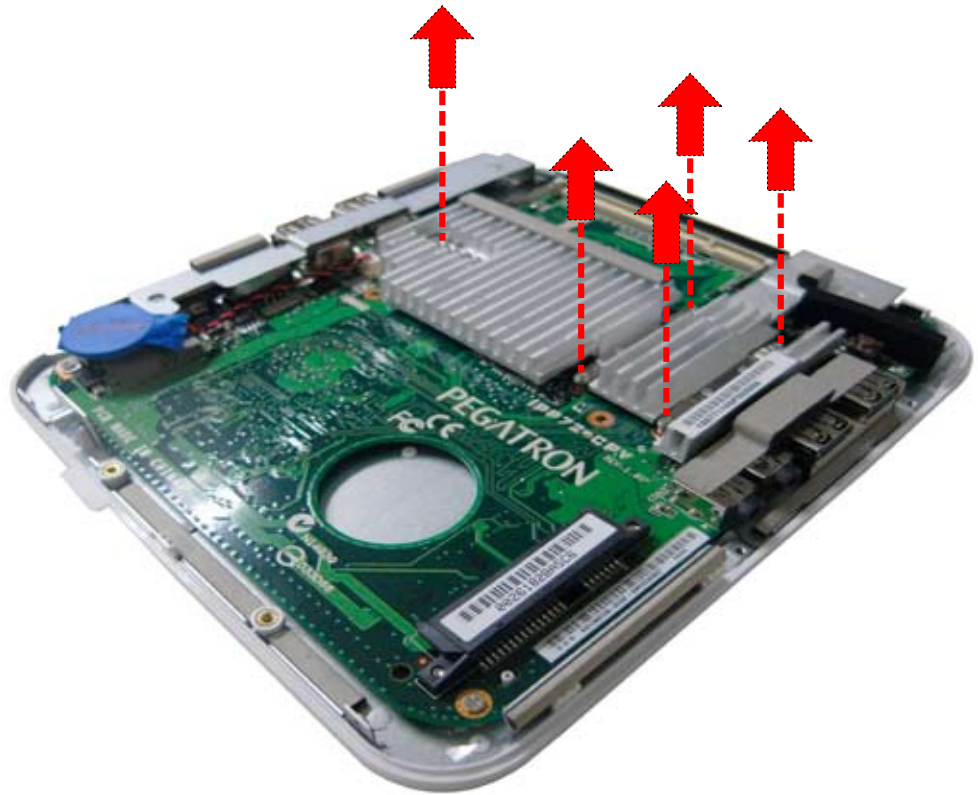


The heat sink becomes very hot when the system is on. Never touch the heat sink with any metal or with your hands.

### To replace the CPU heat sink:

1. Remove the computer cover. Refer to "Removing the computer cover".
2. Loosen the four screws that secure the CPU heat sink to the motherboard.
3. Disconnect the power cables from the system board.





4. Pull the CPU heat sink out from the CPU.





5. Place the CPU heat sink upside down on a flat surface to prevent thermal grease from contaminating other components.

**Note**



Wipe off the thermal grease from both the heat sink and CPU using an alcohol pad.

6. Set the new heat sink on the CPU, aligning the four screws in the heat sink with the screw sockets in the motherboard.
7. Install the computer cover. Refer to “Completing the installation”.

---

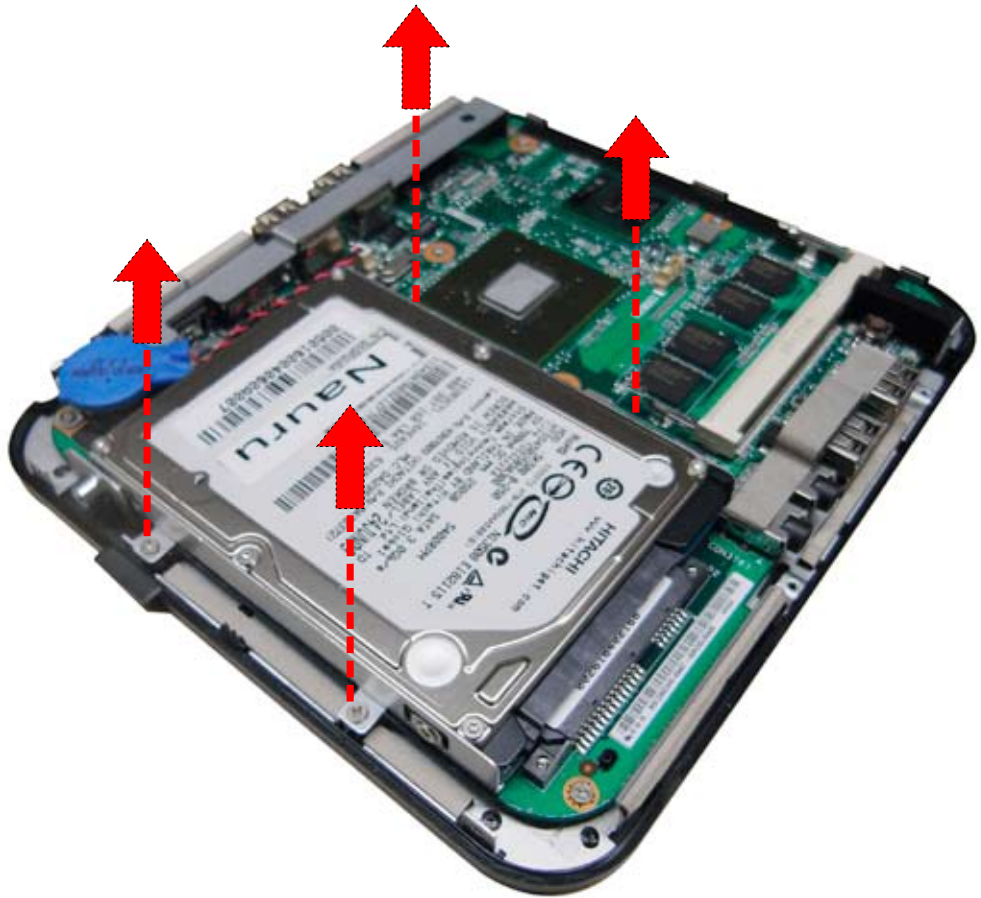
## Replacing the hard disk drive

### To replace the hard disk drive:

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



2. Remove the four screws that secure the drive carrier to the chassis.



3. Pull the drive carrier up and slide it out of the chassis.



4. Remove the four screws that secure the hard disk drive to the drive carrier.
5. Slide the hard disk drive out of the drive carrier.
6. Install the new hard disk drive.
  - (1) Insert the new hard disk drive into the drive carrier.
  - (2) Screw in the four screws on the drive carrier.
7. Screw in the hard disk drive carrier to the chassis.
8. Install the computer cover. Refer to “Completing the installation”.

---

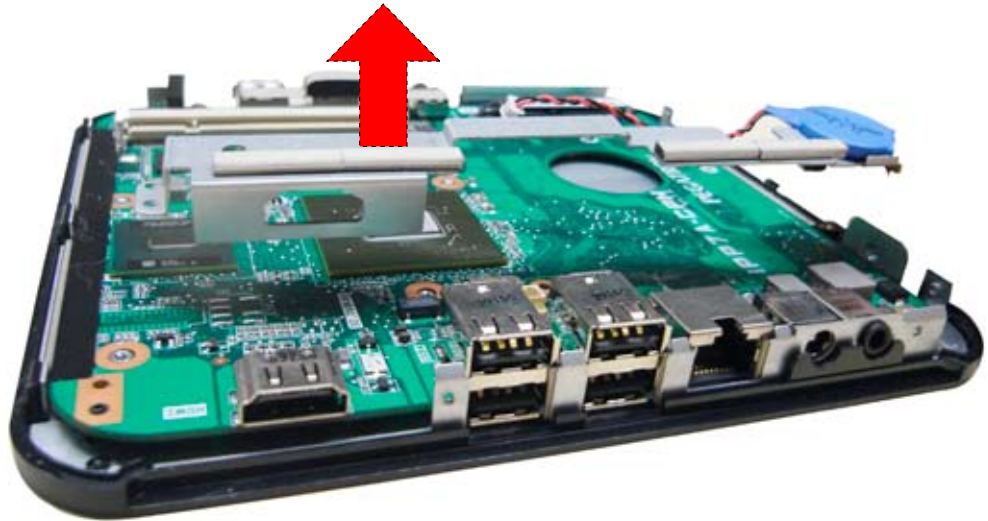
## Replacing the motherboard

### To replace the motherboard:

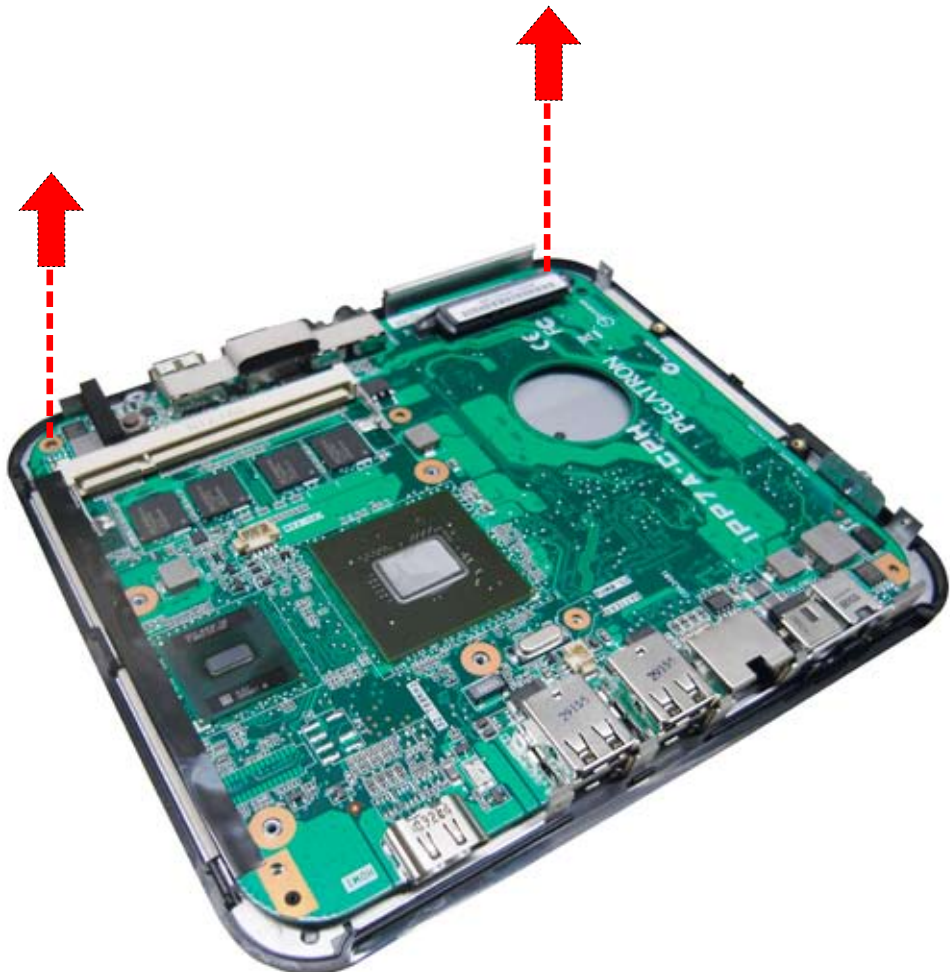
1. Remove the computer cover. Refer to “Removing the computer cover”.
2. Remove the memory module. Refer to the “Replacing the memory module” section.
3. Remove the CPU heat sink. Refer to the “Replacing the CPU heat sink” section.
4. Remove the hard disk drive. Refer to the “Replacing the hard disk drive” section.
5. Disconnect the battery cable from the system board.
6. Remove the two screws that secure the metal bracket to the mother board.



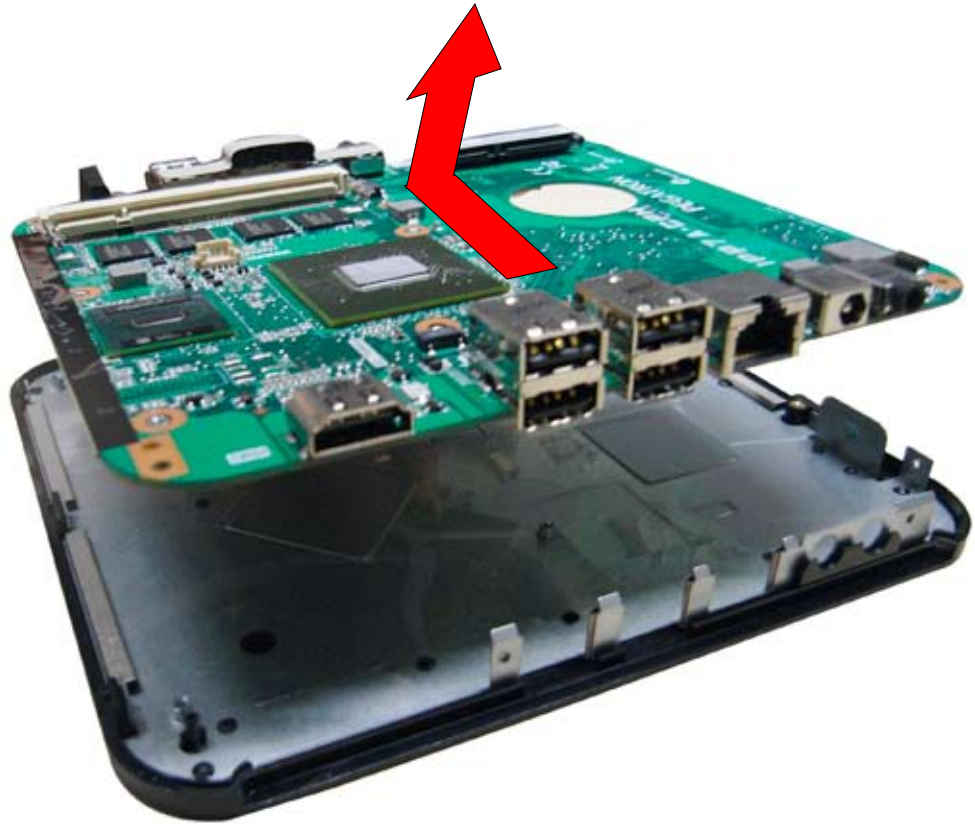
7. Pull the metal bracket up and slide it out of the chassis.



8. Remove the other two screws that secure the mother board to the chassis.



9. Pull the motherboard out of the chassis.



10. Place the new motherboard into the chassis, aligning the screw holes in the motherboard with the mounting holes in the chassis.
11. Screw the two screws on the new motherboard back in.
12. Install all related components back to the new motherboard.
13. Install the computer cover. Refer to "Completing the installation".



# Additional Service Information



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 menu allow you to enable and disable features that turn on the computer automatically.

- Wake on LAN: This feature allows LAN adapter card to wake the System.
- Wake Up By RTC 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.



# Statement



Thank you 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 the instructions and requirements described in the manuals included with your computer. Lenovo will not assume responsibility for any loss incurred except those resulting from 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.

To provide better service, Lenovo reserves the right to improve and/or modify the products and software programs described in the manuals included with your computer and the content of the manual at any time without notice.

All of the manuals included with your computer are provided to help you use Lenovo products appropriately, but do not provide any description of the software/hardware configuration for the product. For configuring the product, refer to related contracts (if any), the product packing list for the product or the retailer.

The content of the manuals included with your computer is protected by copyright laws and rules. None of the manuals included with your computer may be reproduced or transcribed by any means, or transmitted through wired or wireless networks in any form, or translated into any language without the prior written permission of Lenovo. All Lenovo publications included with your system are protected by Copyright © 2009 Lenovo.

The software and hardware configuration included with your computer depends on the actual configuration of the computer and may differ from other similar models.

Customers are welcome to contact us regarding any inconsistency between the product and the manuals included with your computer. For the latest information or if you have any questions or comments, please visit the consumer support website at:  
<http://consumersupport.lenovo.com>.

-----

Lenovo is a registered trademark of Lenovo.

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

Intel Inside is a registered trademark of Intel.

AMD, the AMD Arrow logo, ATI, the ATI logo, AMD Athlon, AMD LIVE, AMD Opteron, AMD Phenom, AMD Sempron, Avivo, Catalyst, Cool'n'Quiet, CrossFireX, Overdrive, Powerplay, Radeon, The Ultimate Visual Experience, and combinations thereof are trademarks of Advanced Micro Devices, Inc. in the United States and/or other jurisdictions.

The table above includes the logo and registered trademarks of Lenovo and its partners.

Other registered trademarks mentioned in any or all of the manuals included with your computer belong to the specific company respectively.

The manual included with your computer is protected by copyright laws and rules. None of the manuals included with your computer may be reproduced or transcribed by any means, or transmitted through wired or wireless networks in any form, or translated into any language without the prior written permission of Lenovo.

The names or marks of companies mentioned in the manuals included with your computer or this document are only used to assert trademark rights, and they do not necessarily indicate that related software or hardware is included. The actual configuration of the product depends on the description of the specific model.