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# About this manual



This manual contains service and reference information for Lenovo IdeaCentre B3 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.

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.

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## 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。

## 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 B3 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.

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## 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.



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## 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.

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



**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.

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## Specifications

This section lists the physical specifications for your computer.

### Type Lenovo IdeaCentre B3

This section lists the physical specifications.

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#### Environment

Air temperature:

Operating: 10° to 35°C

Transit: -20° to 55°C

Humidity:

Operating: 35% to 80%

Transit: 20% to 93% (40°C)

Altitude: 86KPa to 106KPa

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#### Electrical input

Input voltage: 90V-264V(AC)

Input frequency: 47Hz-63Hz

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# General Checkout

# 4

## Attentions

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

- 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 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 release the F1 key then turn on the computer.

**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.

## 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 64 characters (a-z, 0-9 and ; ) 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 and one numeric character
- Setup Utility program and hard disk drive passwords are not case sensitive
- Not be your name or your user name
- Not be a common word or a common name
- Be significantly different from your previous 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 Password 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 64 characters (a-z, 0-9 and ;). 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 Security menu, select **Set Administrator Password** and press Enter.
3. The password dialog box will be displayed. Type the new password, and press Enter.
4. 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 Security menu, select **Set Administrator Password** and press Enter.
2. The password dialog box will be displayed. Enter Current Password and press Enter. Press Enter in New Password and confirm New Password dialog. A setup notice will display that changes have been saved.
3. Select Exit.
4. Select Save changes and Exit.

## 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.

## 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 64 characters(a-z , 0-9 and ;).

1. Start the Setup Utility program (See Starting the Setup Utility program .)
2. From the Security menu, select **Set Power-On Password** and press Enter.
3. The password dialog box will be displayed. Type the new password, and press Enter.
4. 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 :

1. From the Security menu, select **Set Power-On Password** and press **Enter**.
  2. The password dialog box will be displayed. Enter Current Password and press Enter. Press Enter in New Password and confirm New Password dialog. A setup notice will display that changes have been saved.
  3. Select Exit.
  4. Select Save changes and Exit.
- After the password is set, you may select the "Advanced" Menu for device setup.

---

## Using Device

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

<b>USB Setup</b>	When this feature is set to <b>Disable</b> , 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 **Devices**.
3. Select **USB Setup**.
4. Select **Disabled** or **Enabled** and press Enter.
5. Return to the Setup Utility program menu and press F10 to save configuration changes and exit setup.

### Note

If you do not want to save the settings, select **Exit and select Discard changes and Exit**. You can set others such as **Audio Setup and Network Setup**. 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 on page 16).
2. Select **Start Up**.
3. Select Quick Boot Mode, Num-lock or Startup Device Menu Prompt to set these devices.
4. Select Disabled or Enabled and press Enter.
5. Press ESC to return to Exit and select 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 adapter connector</li><li>• System Board Power adapter connectors</li><li>• Microprocessor(s) connection</li></ul>	Reseat connectors

---

## 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 AMI BIOS Setup.
Fan Detect Error	The Fan is bad or stop rotation. Make sure the Fan device is working.
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.
Hard Disk Error	The SATA device configured as Primary Master could not be found or initialized. Make sure the hard drive is correctly installed.
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.
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 (printer, or mouse)
  - b. Any adapters
  - c. Memory modules
  - d. Extended video memory e. External Cache
  - e. Hard disk drive g. 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

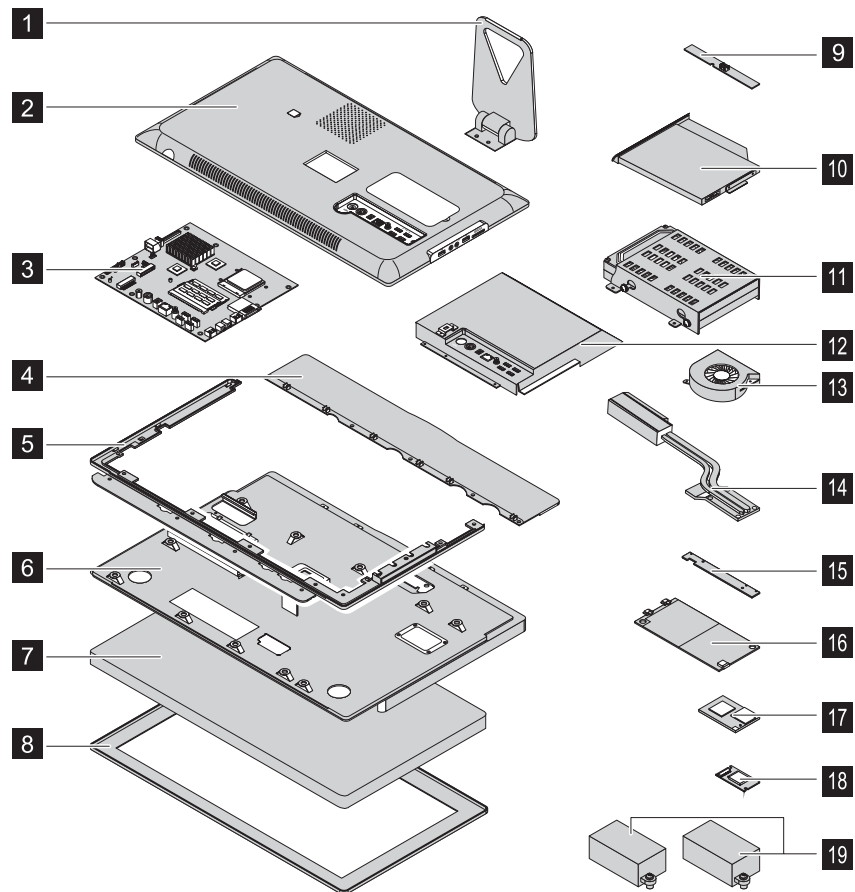
This section provides illustrations to help locate the various connectors, controls and components of the computer.

## 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.

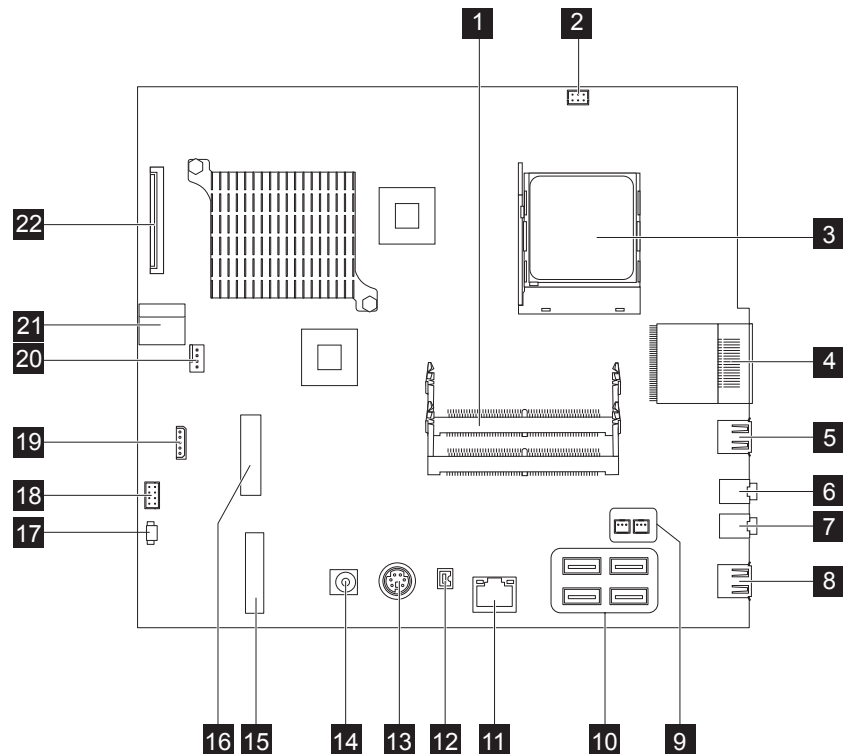


- 1** Computer stand
- 2** Computer cover
- 3** Motherboard
- 4** Shell
- 5** Plastic frame
- 6** Chassis
- 7** LED panel
- 8** Front bezel
- 9** Camera
- 10** Optical disk drive
- 11** Hard disk drive
- 12** Motherboard cover
- 13** System fan
- 14** Heatsink
- 15** Function panel
- 16** Invert board
- 17** WLAN module
- 18** Bluetooth module
- 19** Speakers

## Identifying parts on the motherboard

The motherboard (sometimes called the planar or system board) 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 motherboard.



- 1** Memory module connector
- 2** Camera connector
- 3** Microprocessor
- 4** Card reader connector
- 5** USB connector
- 6** Headphone connector
- 7** Microphone connector
- 8** USB connector
- 9** Speaker connectors
- 10** USB connectors (4)
- 11** Ethernet connector
- 12** 1394 connector
- 13** PS/2 keyboard connector
- 14** Power connector
- 15** WLAN connector
- 16** TV tuner card connector
- 17** Power button connector
- 18** Function panel connector
- 19** SATA power connector
- 20** System fan connector

**21** SATA connector

**22** LED panel connector

# Replacing hardware

# 8

## 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 stand

### Attention



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

### To remove the computer stand:

### Note



For this procedure, it helps to place the computer face-down on a soft flat surface. Lenovo recommends that you use a blanket, towel, or other soft cloth to protect the screen surface from scratches or other damage.

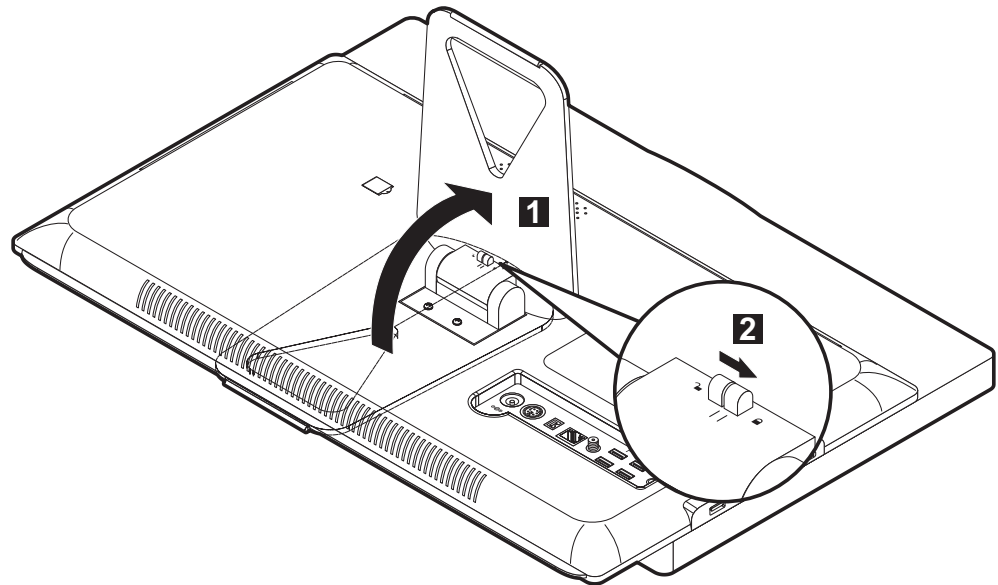
1. Remove any media (diskettes, CDs, or memory cards) from the drives, shut down the operating system, turn off all attached devices, and the computer.
2. Unplug all power cords from electrical outlets.
3. Disconnect all cables attached to the computer. This includes power cords, input/output (I/O) cables, and any other cables that are connected to the computer. Refer to "Locating connectors on the rear of the computer."
4. Push the computer stand upward to the end **1**, then slide the lock to the right side to lock the computer stand **2**.

### Note

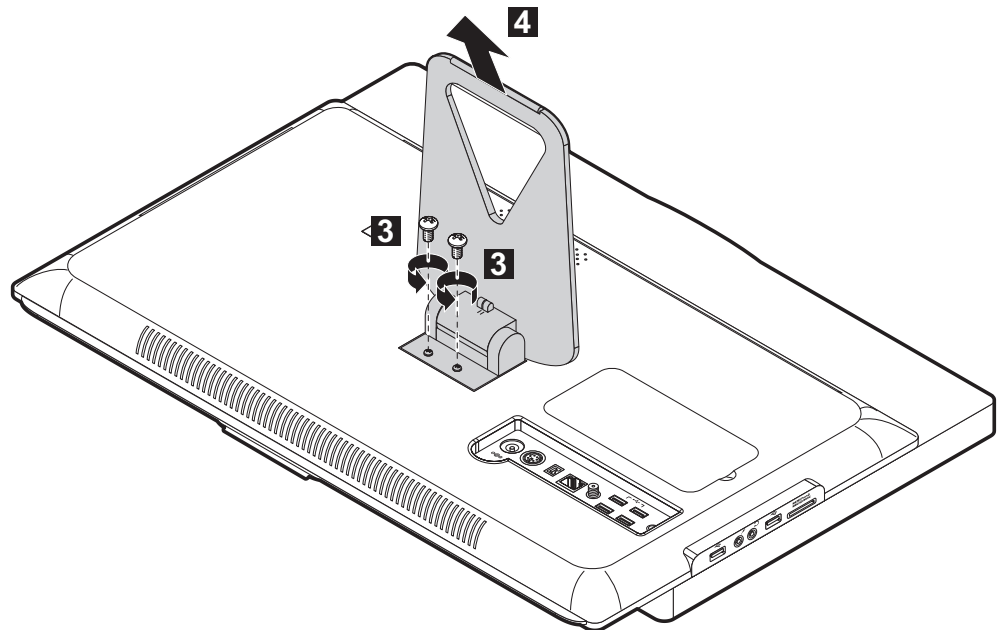


Slide the lock to the left side to unlock the computer stand when finish replacing a FRU.





5. Remove the 2 screws that secure the computer stand to the chassis. **3**
6. Slide out the computer stand. **4**



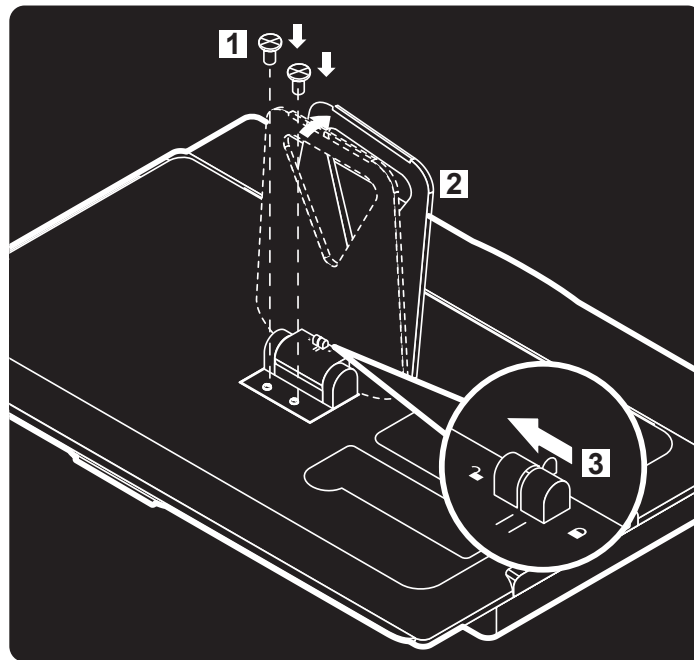
**Warning**



When finish replacing a FRU, follow the bellowing instructions to install back computer stand. Incorrect operations may damage the computer stand.

## To reinstall the computer computer stand

1. Align then slide the computer stand back in and screw it back. **1**
2. Push the stand upward as far as it will go. **2**
3. Slide the lock to the left to unlock the computer stand. **3**



---

## Replacing a memory module

### Attention



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

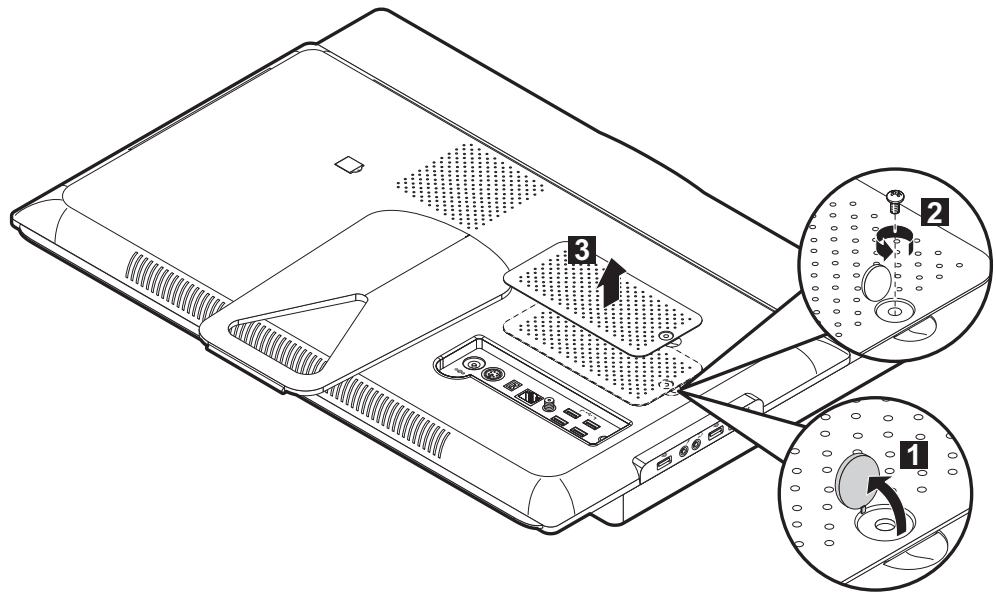
### Note



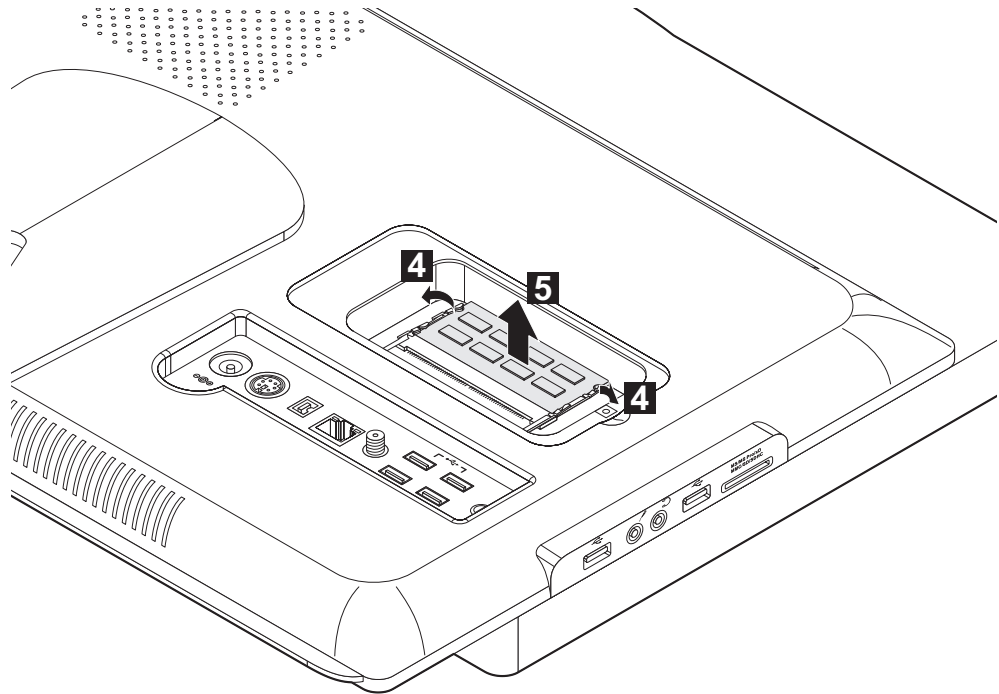
For this procedure, it helps to place the computer face-down on a soft flat surface. Lenovo recommends that you use a blanket, towel, or other soft cloth to protect the touch screen surface from scratches or other damage.

### To replace the memory module:

1. Remove any media (diskettes, CDs, or memory cards) from the drives, shut down the 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 rubber cap that protects the screw. **1**
5. Remove the screw that secures the memory cover to the computer cover. **2**
6. Lift up the memory cover. **3**



7. Push out the latches on both sides of the memory socket to release the memory module **4** and gently pull the memory module upward to remove it from its socket **5**. Both memory modules can be removed by using the same procedure.



8. Align then insert the new memory module into the socket and push down on the top edge of the memory module. Make sure the latches lock the memory module in place.
9. Align then slide back the memory cover.
10. Screw the memory cover back.

---

## Replacing the optical disk drive

**Attention**



Turn off the computer and wait 3 to 5 minutes to let the computer cool down before replacing the optical drive.

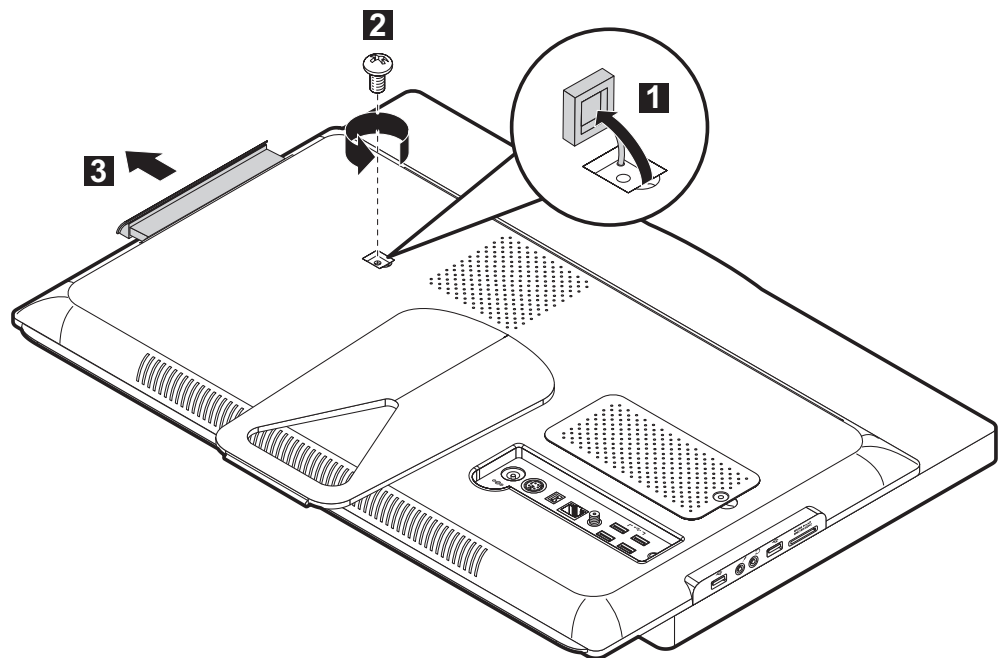
## To replace the optical drive

### Note



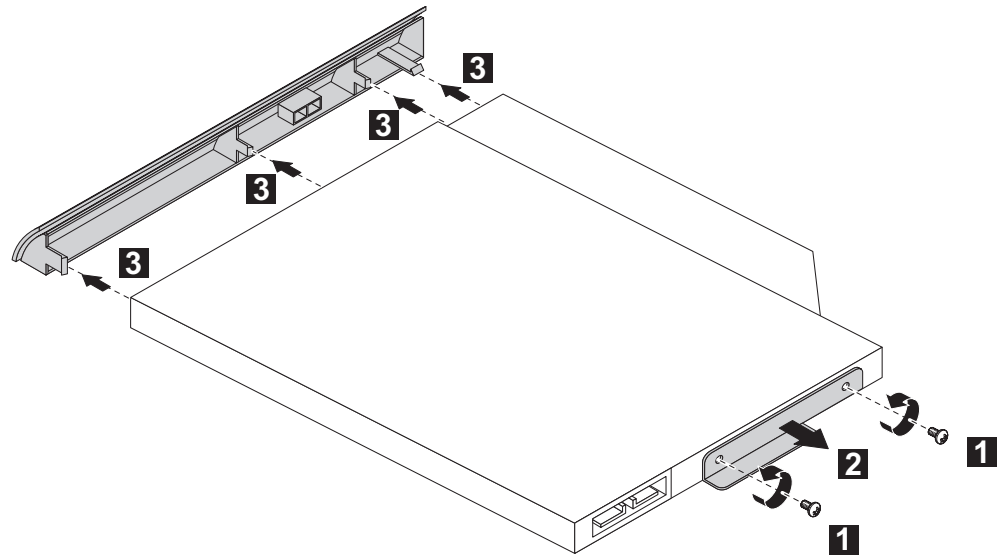
For this procedure, it helps to place the computer face-down on a soft flat surface. Lenovo recommends that you use a blanket, towel, or other soft cloth to protect the screen surface from scratches or other damage.

1. Remove any media (diskettes, CDs, or memory cards) from the drives, shut down the 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 rubber cap that protects the screw. **1**
5. Remove the screw that secures the optical drive to the chassis. **2**
6. Slide the optical drive out of the drive bay. **3**



7. Remove the 2 screws that secure the optical drive to the metal bracket. **1 2**

8. Remove the optical drive cover. **3**



9. Install the new optical drive.
  - (1) Connect the new optical drive to the cover.
  - (2) Screw back the metal bracket to the new optical drive.
  - (3) Slide the new optical drive into the drive bay.
10. Screw the new optical drive back to the chassis.

---

## Removing the computer cover

To remove the computer cover:

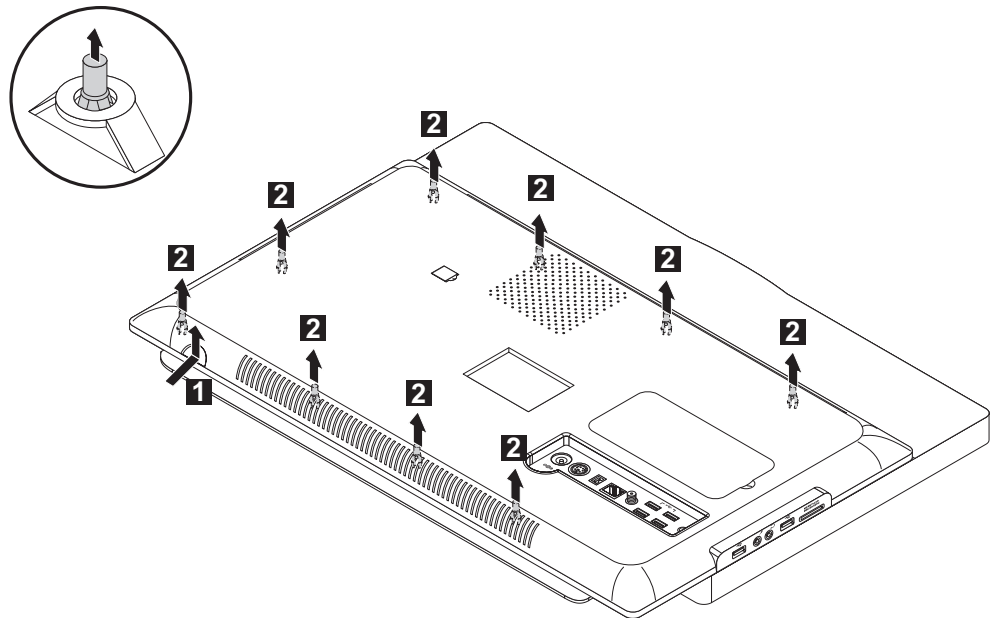
**Note**



For this procedure, it helps to place the computer face-down on a soft flat surface. Lenovo recommends that you use a blanket, towel, or other soft cloth to protect the screen surface from scratches or other damage.

1. Remove any media (diskettes, CDs, or memory cards) from the drives, shut down the 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 computer stand. Refer to "Removing the computer stand".
5. Lift up the computer cover gently from the bottom right corner **1** to release the cover from the setscrews **2**.



## Replacing the hard disk drive

### Attention



Turn off the computer and wait 3 to 5 minutes to let the computer cool down before replacing the hard disk drive.

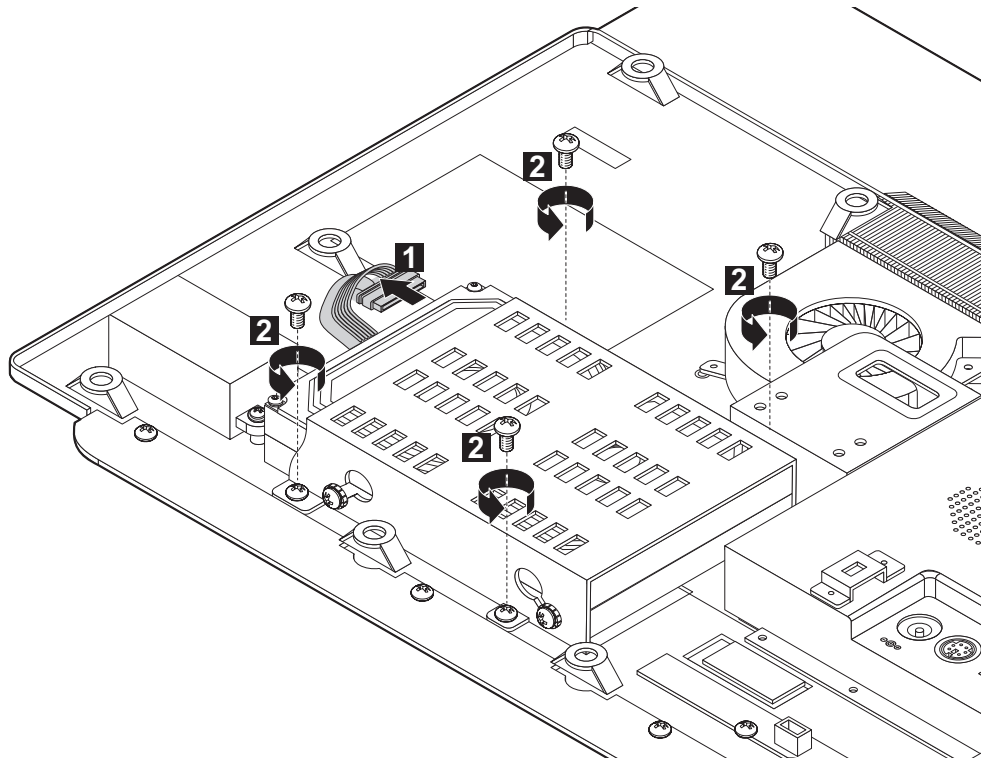
## To replace the hard disk drive:

### Note



For this procedure, it helps to place the computer face-down on a soft flat surface. Lenovo recommends that you use a blanket, towel, or other soft cloth to protect the screen surface from scratches or other damage.

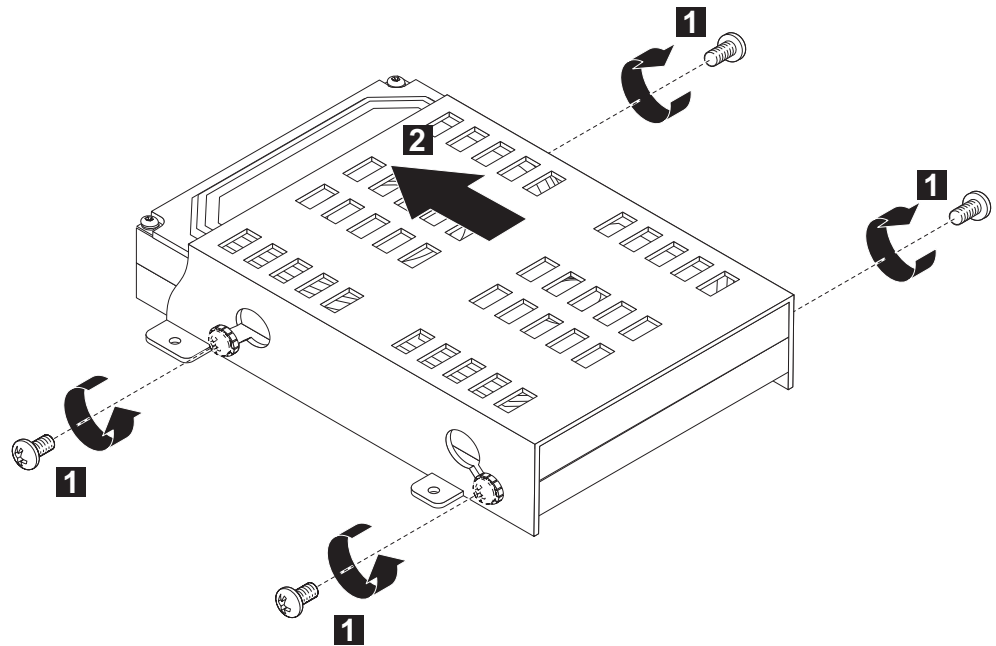
1. Remove the computer stand. Refer to “Removing the computer stand”.
2. Remove the computer cover. Refer to “Removing the computer cover”.
3. Disconnect the data and power cables from the hard disk drive. **1**
4. Remove the 4 screws that secure the hard disk drive to the chassis. **2**



5. Remove the 4 screws that secure the hard disk drive to the hard disk drive bay. **1**



6. Slide the hard disk drive out of the bay. **2**



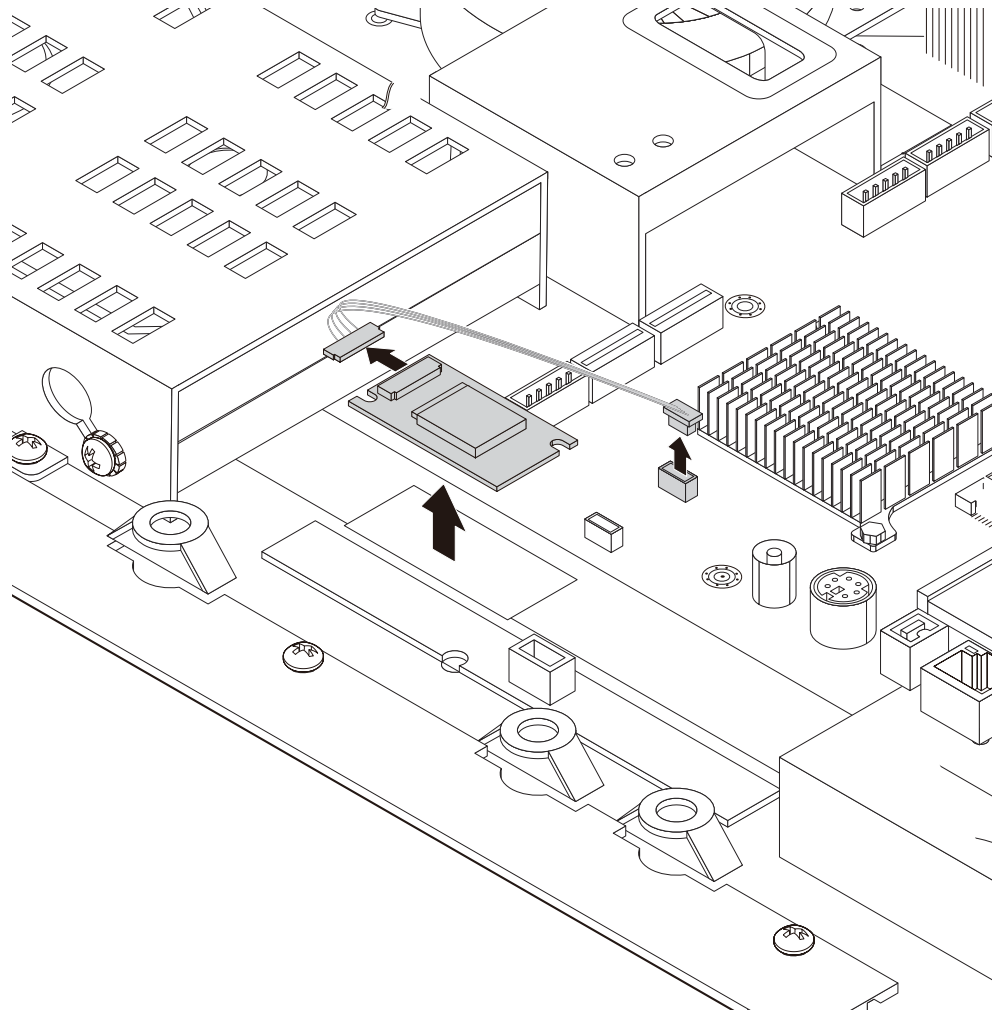
7. Install the new hard disk drive.
- (1) Slide the new hard disk drive into the drive bay.
  - (2) Screw back the 4 screws on the drive bay.
8. Connect the data and power cables back to the hard disk drive.
9. Align the 4 screw holes in the hard disk drive bay with the mounting holes in the chassis, then screw it back.
10. Install the computer cover and stand.

## Replacing the bluetooth module

### To replace the bluetooth module:

1. Remove the computer stand. Refer to “Removing the computer stand”.
2. Remove the computer cover. Refer to “Removing the computer cover”.
3. Lift up the bluetooth module. **1**

4. Disconnect the antenna cable from the bluetooth module. **2**



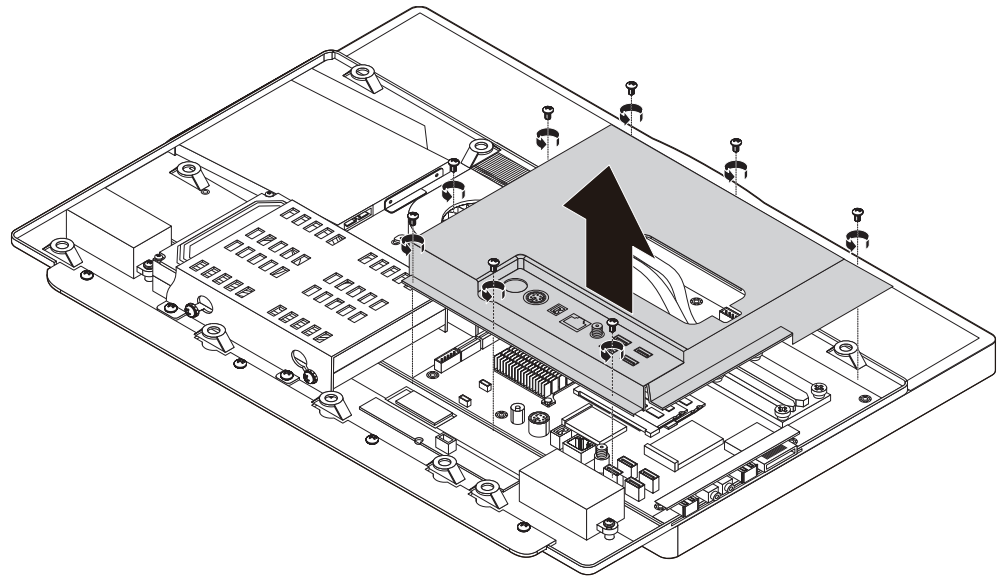
5. Connect the antenna cable to the new bluetooth module.
6. Align then use double-sided sticky tape stick the bluetooth module back.
7. Install the computer cover and stand.

---

## Removing the motherboard cover

1. Remove the computer stand. Refer to "Removing the computer stand".
2. Remove the computer cover. Refer to "Removing the computer cover".
3. Remove the 8 screws that secure the motherboard cover to the computer chassis.

4. Lift up the motherboard cover.



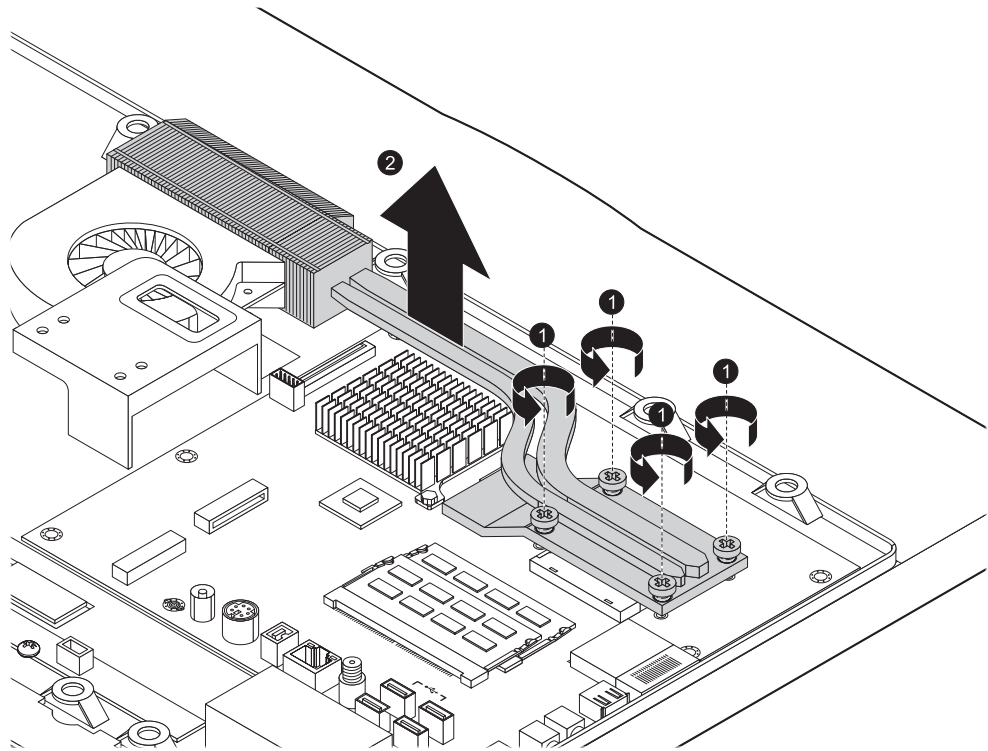
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## Replacing the heatsink

### To remove the heatsink:

1. Removing the computer stand. Refer to “Removing the computer stand”.
2. Removing the computer cover. Refer to “Removing the computer cover”.
3. Removing the motherboard cover. Refer to “Removing the motherboard cover”.
4. Remove the 4 screws that secure the heatsink to the chassis. **1**

5. Lift up the heatsink.**2**



6. Align then install the new heatsink.
7. Align then install the motherboard cover back.
8. Align then install the computer cover and computer stand.

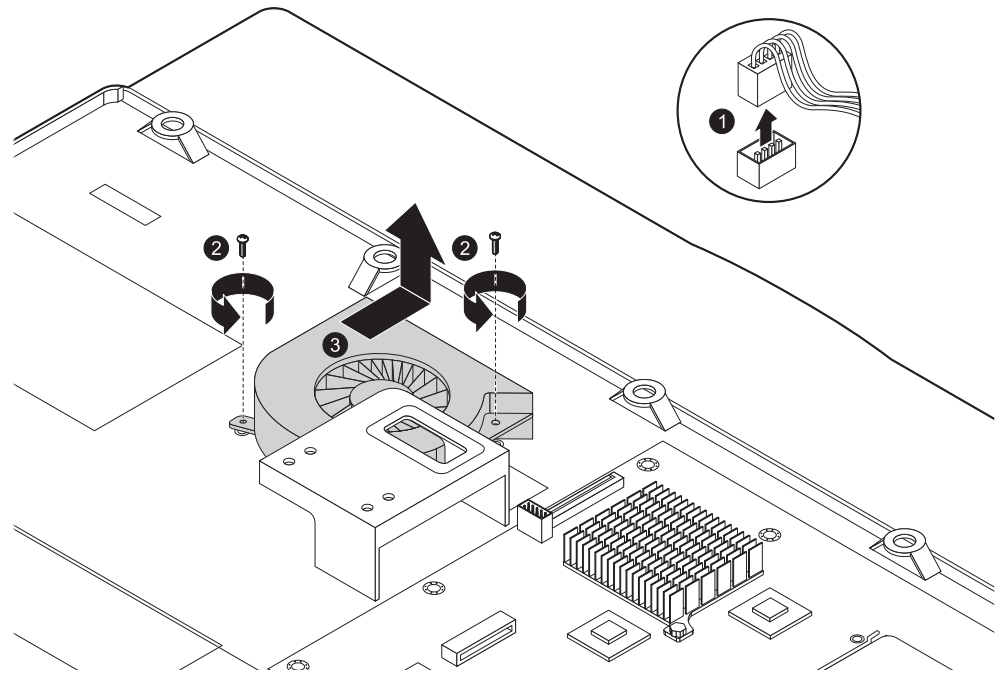
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## Replacing the system fan

### To remove the system fan:

1. Removing the computer stand. Refer to "Removing the computer stand".
2. Removing the computer cover. Refer to "Removing the computer cover".
3. Removing the motherboard cover. Refer to "Removing the motherboard cover".
4. Remove the heatsink. Refer to "Replacing the heatsink".
5. Disconnect the power cable from the motherboard.**1**
6. Remove the 3 screws that secure the system fan to the chassis.**2**

- Slide the system fan out and lift it up to remove it.**3**



- Align then install the new system fan.
- Align then install the heatsink & the motherboard cover back.
- Align then install the computer cover and computer stand.

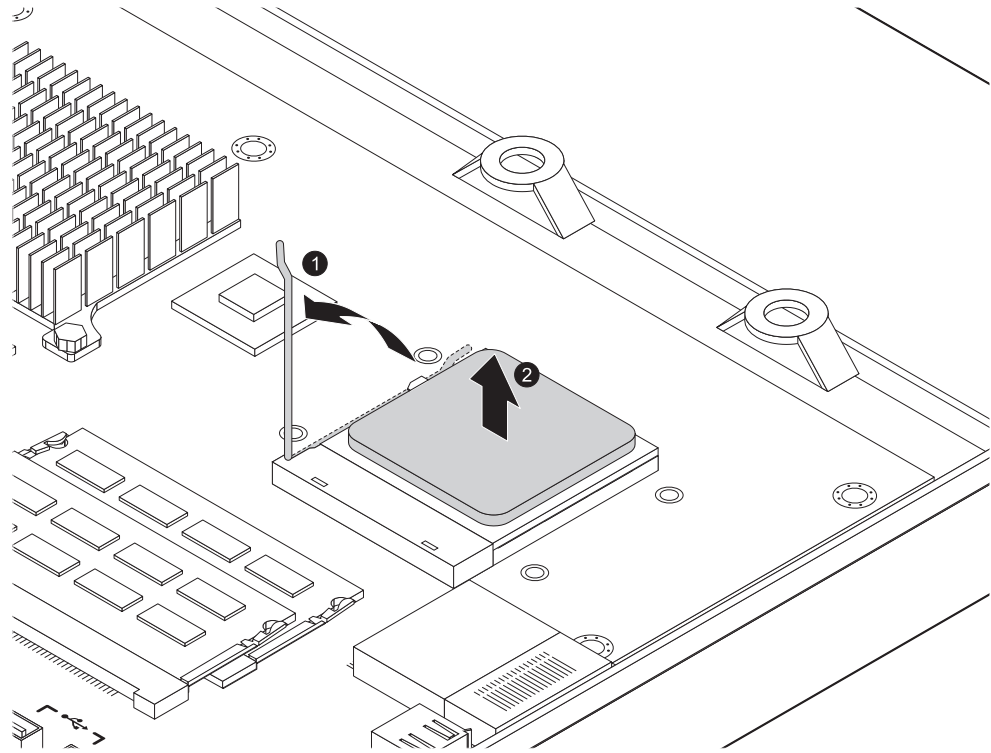
## Replacing the microprocessor

### Important

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

- Remove the computer stand. Refer to "Removing the computer stand".
- Remove the computer cover. Refer to "Removing the computer cover".
- Remove the motherboard cover. Refer to "Removing the motherboard cover".
- Remove the heatsink. Refer to "Replacing the heatsink".
- Lift the small handle and open the retainer.**1**

6. Lift the microprocessor out of the retainer.**2**



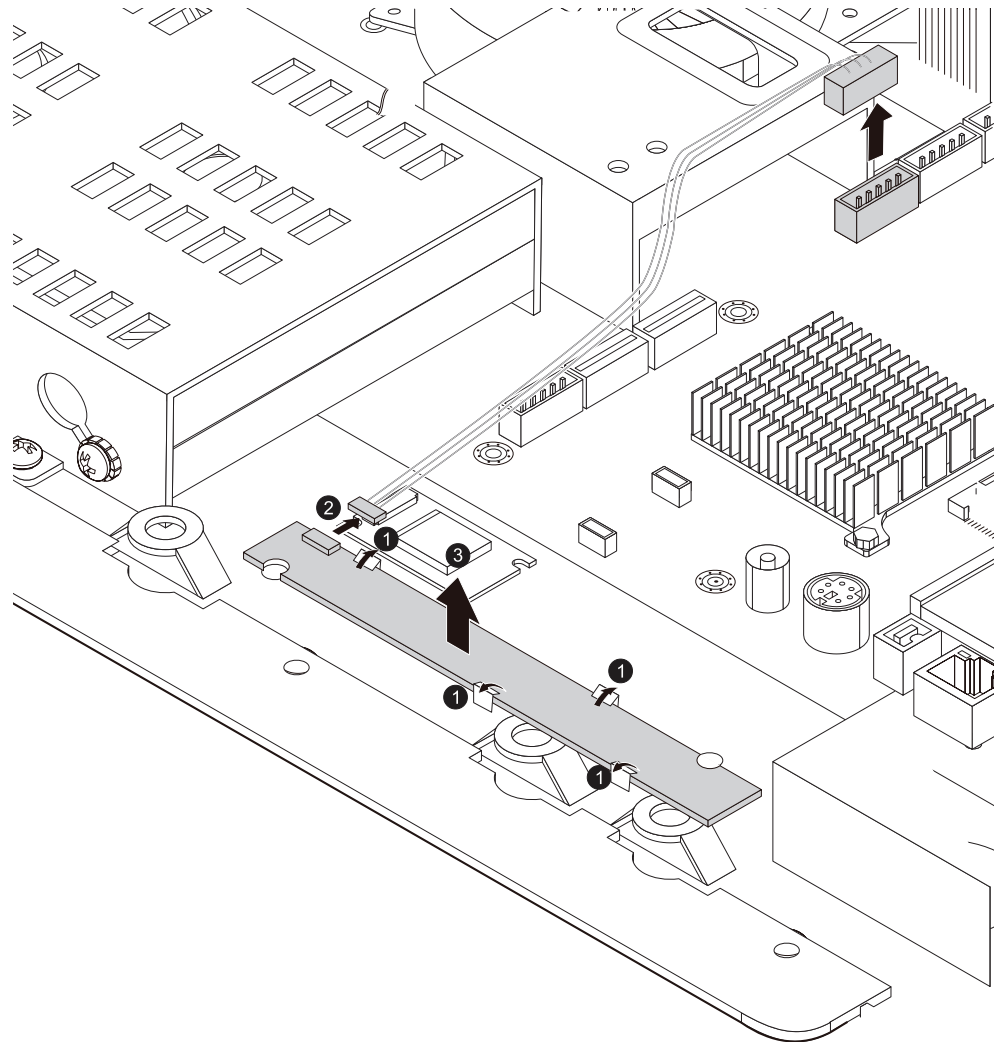
7. Align then place the new microprocessor back and lock the retainer properly with the handle.
8. Align then install the heatsink and the motherboard cover.
9. Install the computer cover and computer stand.

---

## Replacing the function panel

1. Remove the computer stand. Refer to "Removing the computer stand".
2. Remove the computer cover. Refer to "Removing the computer cover".
3. Pull the pins to each side to release the function panel.
4. Disconnect the cable from the function panel.

5. Lift up the function panel. **3**

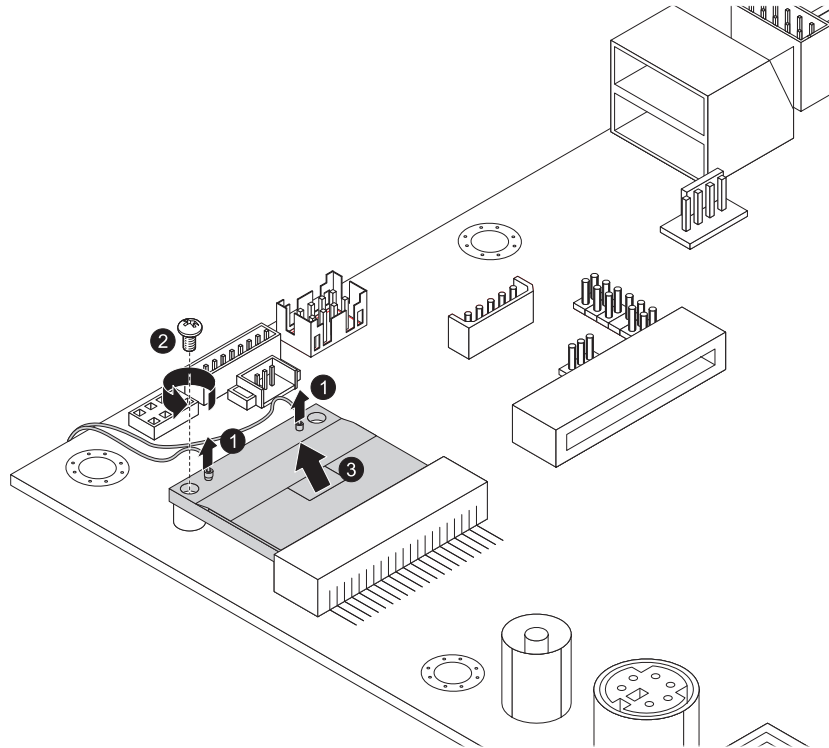


6. Align then screw in the new function panel.
7. Connect the cable to the new function panel.
8. Install the computer cover and computer stand.

## Replacing the WLAN card

1. Remove the computer stand. Refer to "Removing the computer stand".
2. Remove the computer cover. Refer to "Removing the computer cover".
3. Remove the motherboard cover. Refer to "Removing the motherboard cover".
4. Disconnect the antenna cables from the WLAN card. **1**

5. Remove the screw that secures the WLAN card to motherboard, and pull out the WLAN card. **2 3**



6. Align then insert the new WLAN card to the card port and screw it in to the motherboard.
7. Connect the antenna cables back to the new WLAN card.
8. Install the motherboard cover back.
9. Install the computer cover and computer stand.

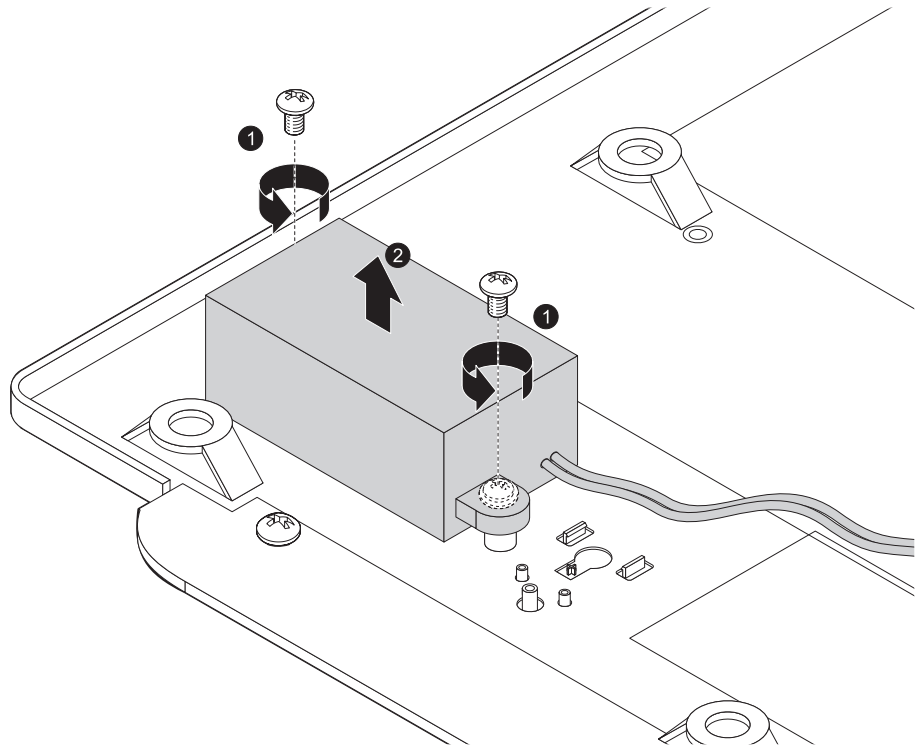
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## Replacing the speakers system

1. Remove the computer stand. Refer to "Removing the computer stand".
2. Remove the computer cover. Refer to "Removing the computer cover".
3. Remove the motherboard cover. Refer to "Removing the motherboard cover".
4. Disconnect the cables from the motherboard.
5. Remove the 4 screws that secure the speakers system to the chassis. **1**



6. Lift up the speakers system.**2**



7. Align then screw in the new speakers system.
8. Connect the new speakers cables to the motherboard.
9. Install the motherboard cover back.
10. Install the computer cover and computer stand.

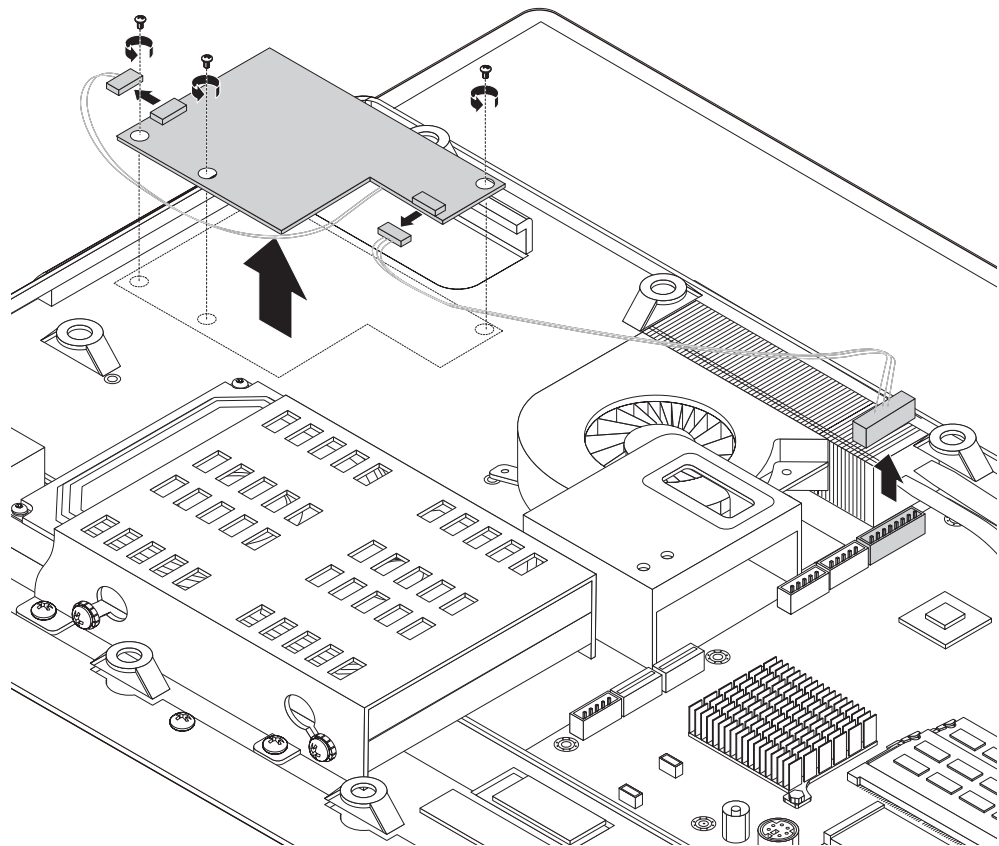
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## Removing the inverter board

### To remove the inverter board

1. Remove the computer stand. Refer to "Removing the computer stand".
2. Remove the computer cover. Refer to "Removing the computer cover".
3. Remove the optical disk drive. Refer to "Replacing the optical disk drive".
4. Remove the 3 screws that secure the inverter board and cover to the chassis.
5. Lift up the inverter board and cover.

6. Disconnect all the cables from the inverter board and slide out the inverter board from the cover.



7. Connect the cables to the new inverter board.
8. Align then screw in the new inverter board.
9. Install the optical disk drive.
10. Install the computer cover and computer stand.

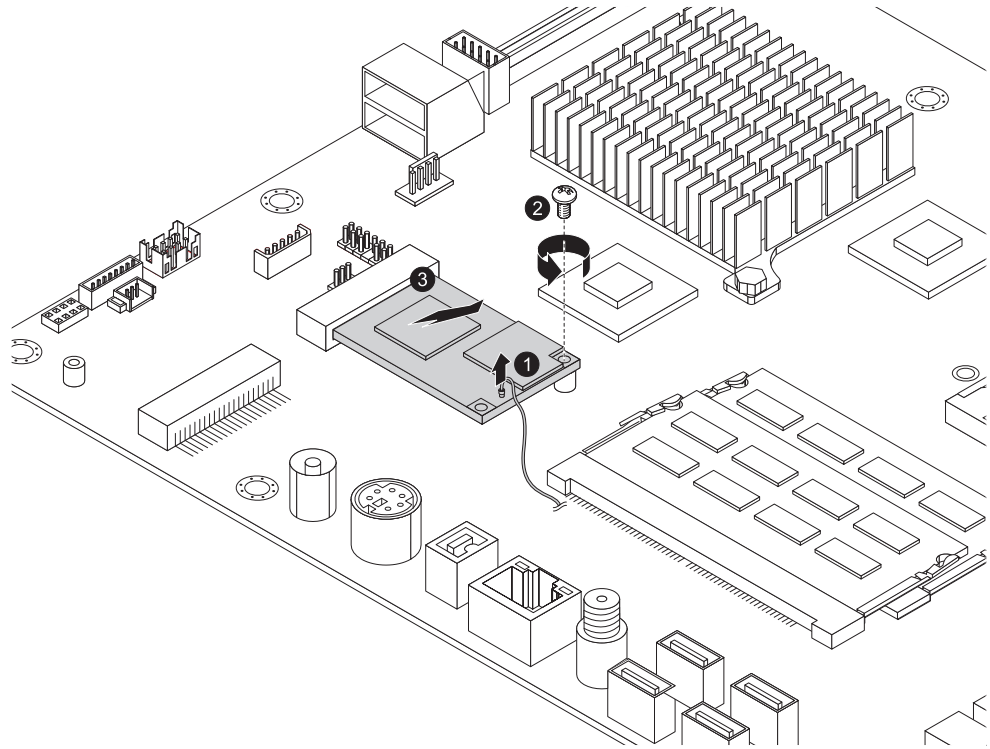
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## Replacing the TV tuner card

### To replace the TV tuner card

1. Remove the computer stand. Refer to "Removing the computer stand".
2. Remove the computer cover. Refer to "Removing the computer cover".
3. Remove the motherboard cover. Refer to "Removing the motherboard cover".
4. Disconnect the antenna cable from the TV tuner card. **1**
5. Remove the screw that secures the TV tuner card to the motherboard. **2**

6. Pull the TV tuner card upward to remove it from the card port. **3**



7. Align then screw in the new TV tuner card.
8. Connect the antenna cable to the new TV tuner card.
9. Screw back the motherboard cover.
10. Install the computer cover and screw back the computer stand.

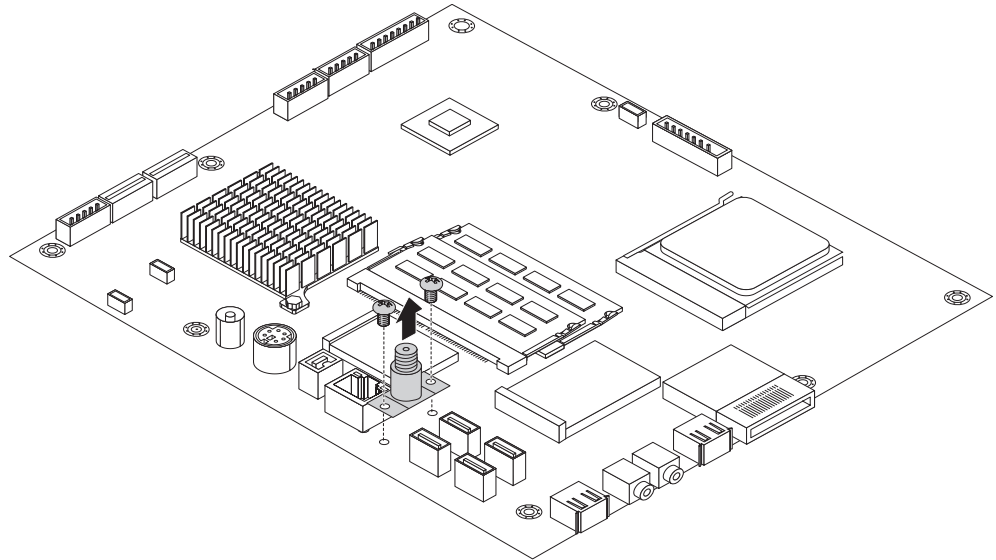
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## Removing the TV antenna connector

### To remove the TV antenna connector:

1. Remove the computer stand. Refer to "Removing the computer stand".
2. Remove the computer cover. Refer to "Removing the computer cover".
3. Remove the motherboard cover. Refer to "Removing the motherboard cover".
4. Remove the 2 screws that secure the TV antenna connector to the motherboard.

5. Lift up the TV antenna connector.

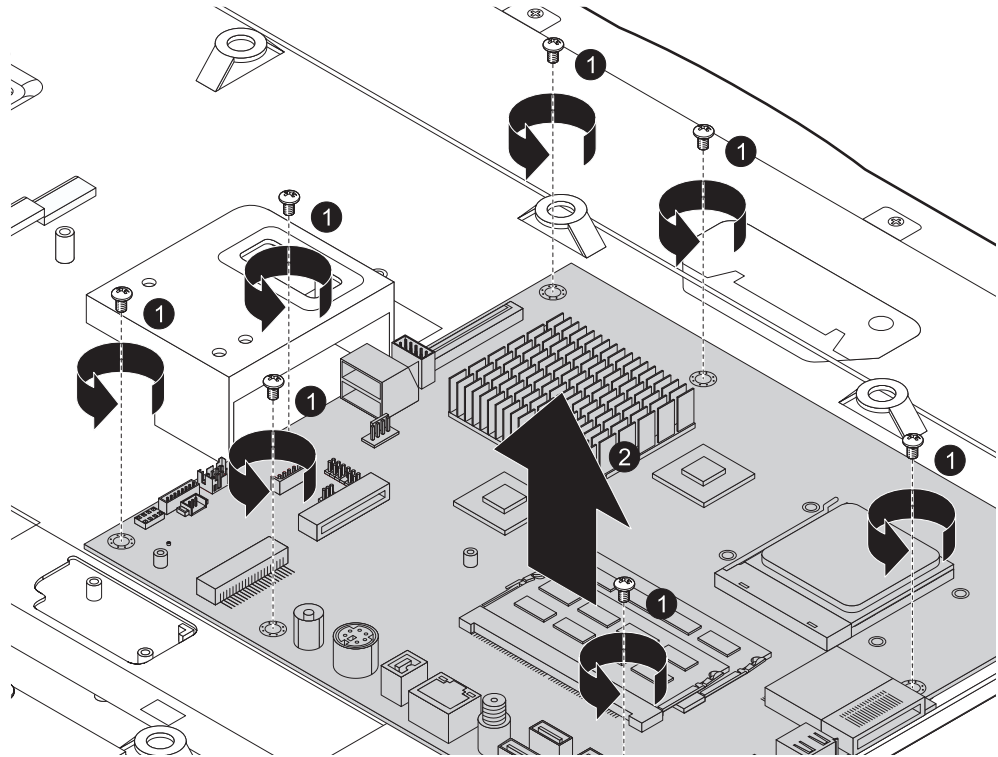


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## Replacing the motherboard

### To replace the motherboard

1. Remove the computer stand. Refer to "Removing the computer stand".
2. Remove the computer cover. Refer to "Removing the computer cover".
3. Remove the motherboard cover. Refer to "Removing the motherboard cover".
4. Remove the memory module. Refer to "Replacing a memory module".
5. Remove the heatsink. Refer to "Replacing the heatsink".
6. Remove the microprocessor. Refer to "Replacing the microprocessor".
7. Remove the WLAN card. Refer to "Replacing the WLAN card".
8. Remove the TV tuner card. Refer to "Replacing the TV tuner card".
9. Remove the TV antenna connector. Refer to "Removing the TV antenna connector".
10. Remove all the cables that connected to the motherboard.
11. Remove the 8 screws that secure the motherboard to the chassis. **1**

12. Lift up the motherboard. **2**

13. Align then screw back the TV antenna connector to the new motherboard.

14. Align then screw in the new motherboard to the chassis.

15. Install all related components back to the new motherboard.

16. Connect all the cables to the new motherboard.

17. Screw back the motherboard cover.

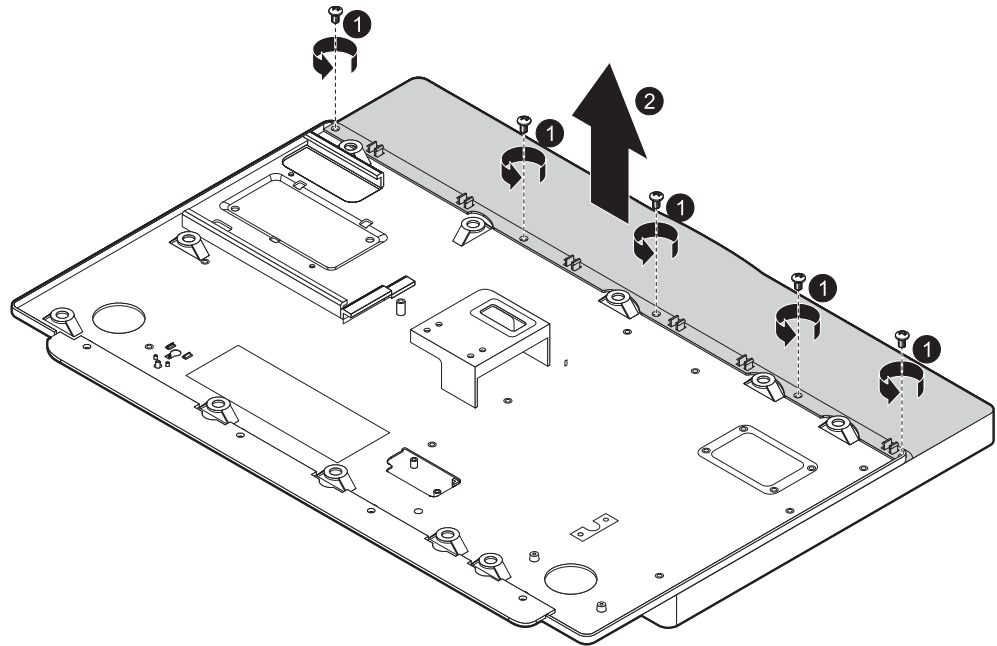
18. Install the computer cover and screw back the computer stand.

## Removing the shell

### To remove the back shell:

1. Remove the computer stand. Refer to "Removing the computer stand".
2. Remove the computer cover. Refer to "Removing the computer cover".
3. Remove the 5 screws that secure the shell to chassis. **1**

4. Lift up the shell.**2**



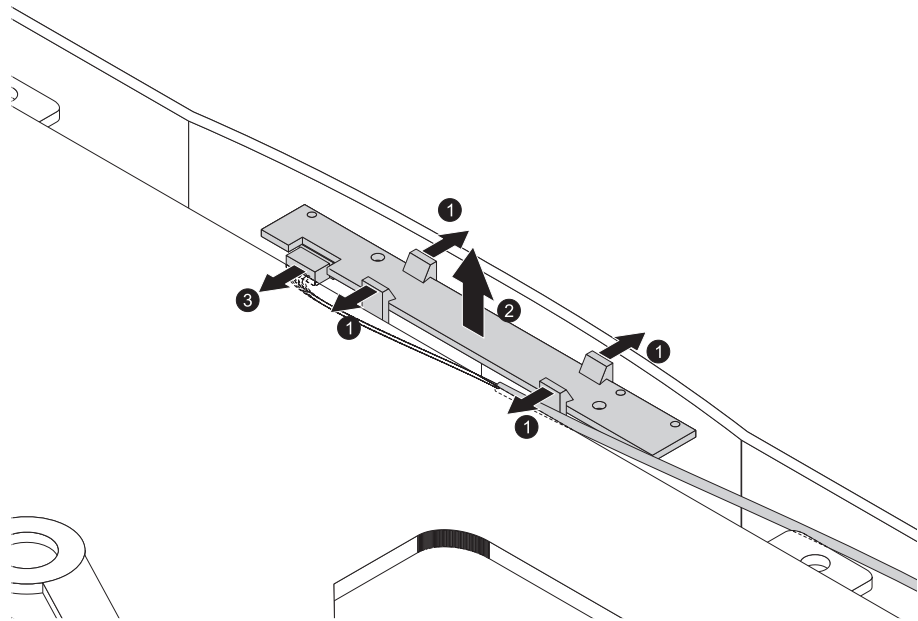
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## Replacing the camera

### To replace the camera

1. Remove the computer stand. Refer to "Removing the computer stand".
2. Remove the computer cover. Refer to "Removing the computer cover".
3. Remove the shell. Refer to "Removing the shell"
4. Pull the pins to each side to release the camera.**1**
5. Lift out the camera.**2**

6. Disconnect the cable from the camera. **3**



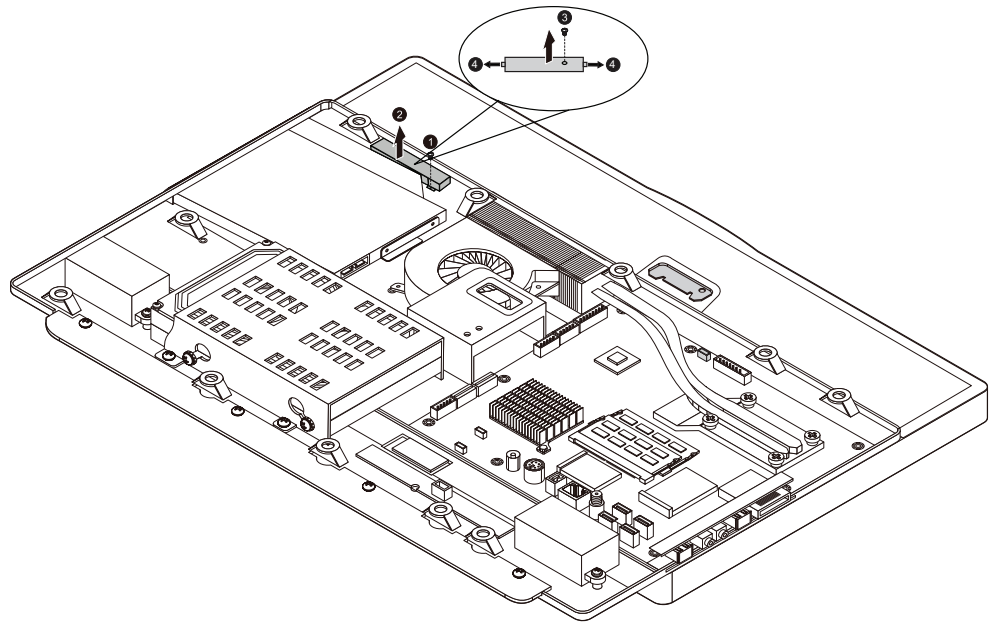
4. Connect the cable to the new camera.
5. Align then screw in the new camera.
6. Align then screw back the shell.
7. Install the computer cover and screw back the computer stand.

## Replacing the touch module

### To replace the touch module:

1. Remove the computer stand. Refer to "Removing the computer stand".
2. Remove the computer cover. Refer to "Removing the computer cover".
3. Remove the screw that secures the touch module to the chassis. **1**
5. Lift up the memory module.

6. Disconnect the cables from the touch module. **2**



7. Reconnect the cables to the new touch module.
8. Align then screw the new touch module back.
9. Install the computer cover and screw back the computer stand.

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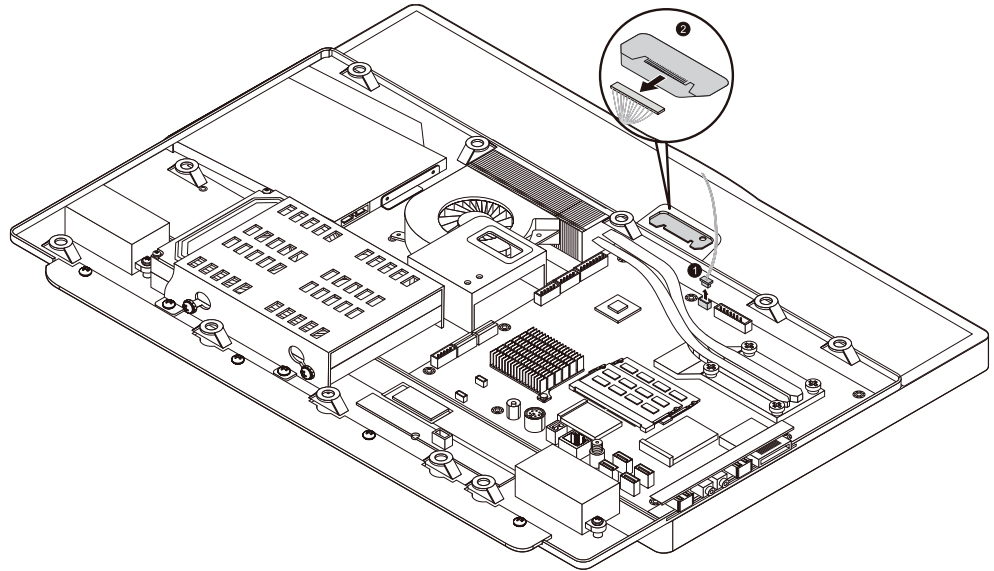
## Replacing the LED panel

### To replace the LED panel

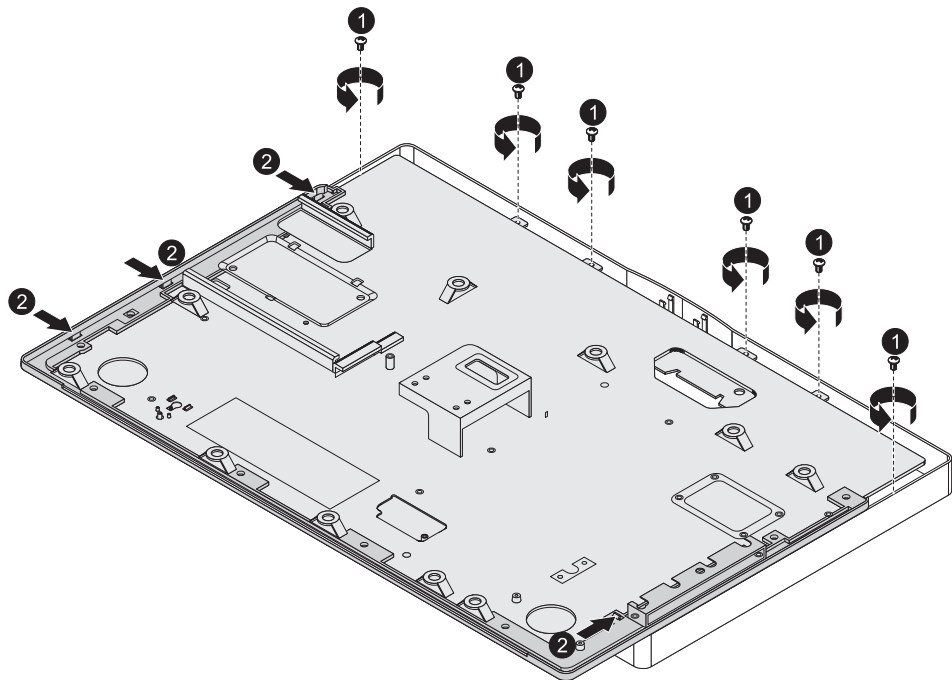
1. Remove the computer stand. Refer to "Removing the computer stand".
2. Remove the optical disk drive. Refer to "Removing the optical disk drive".
3. Remove the computer cover. Refer to "Removing the computer cover".
4. Remove the motherboard cover. Refer to "Removing the motherboard cover".
5. Remove the touch module. Refer to "Replacing the touch module".(Only for models with touch module)
6. Disconnect the camera cable from the motherboard. **1**



7. Disconnect the LED cable from the LED panel. **2**

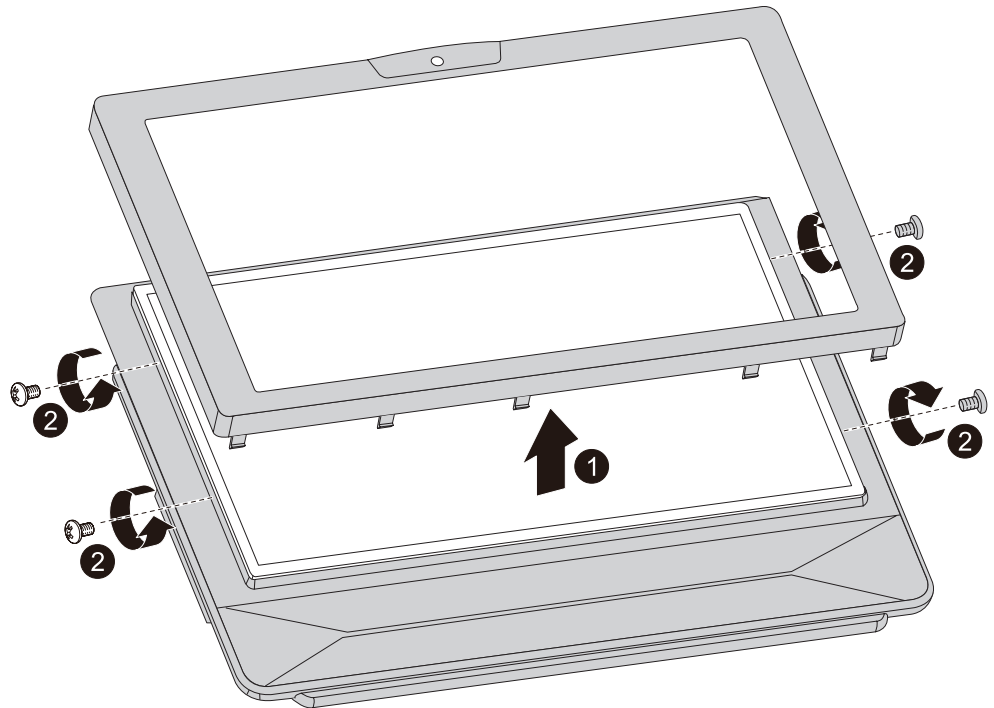


8. Remove the shell. Refer to “Removing the shell”.
9. Remove the 6 screws that secure chassis to the front bezel. **1**
10. Pull the pins to release the chassis from the front bezel. **2**

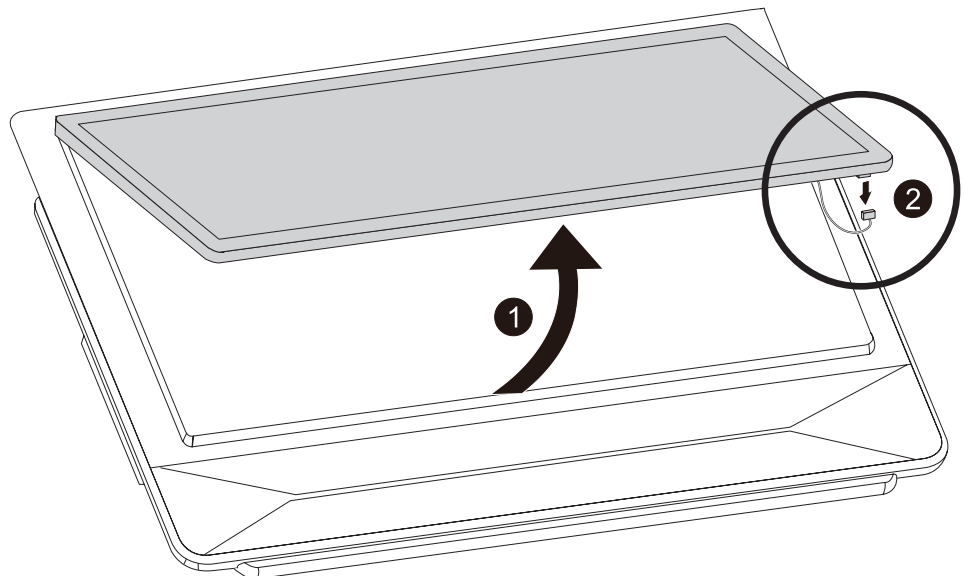


11. Place the computer upside down and separate the chassis from the front bezel. **1**

12. Remove the 4 screws that secure the LED panel to the Chassis. **2**



13. Lift up LED panel and disconnect the cable that connected to the LED panel. **1 2**



14. Align then place the new LED panel to the chassis.

15. Connect all the cables to the new LED panel, and screw in the new LED panel to the chassis.

16. Install all relative parts back.

17. Install the computer back cover and screw back the computer stand.

## Replacing the keyboard

### 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>.

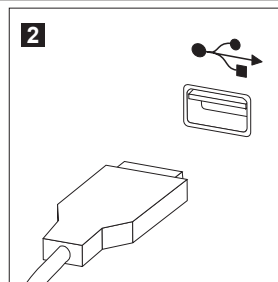
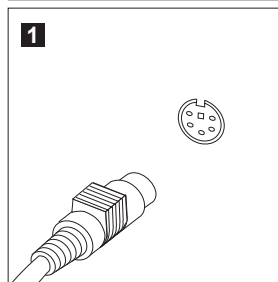
### To replace the keyboard:

1. Remove any media (diskettes, CDs, or memory cards) from the drives, shut down the 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 “Left and right view” and “Rear view”.

### Note



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



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

## Replacing the mouse

### 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>.

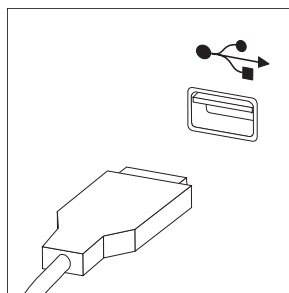
### To replace the mouse:

1. Remove any media (diskettes, CDs, or memory cards) from the drives, shut down the 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 “Left and right view” and “Rear view”.

### Note



Your mouse is connected to the USB connector at either side or the rear of the computer.



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

## Replacing the power cord or power adapter

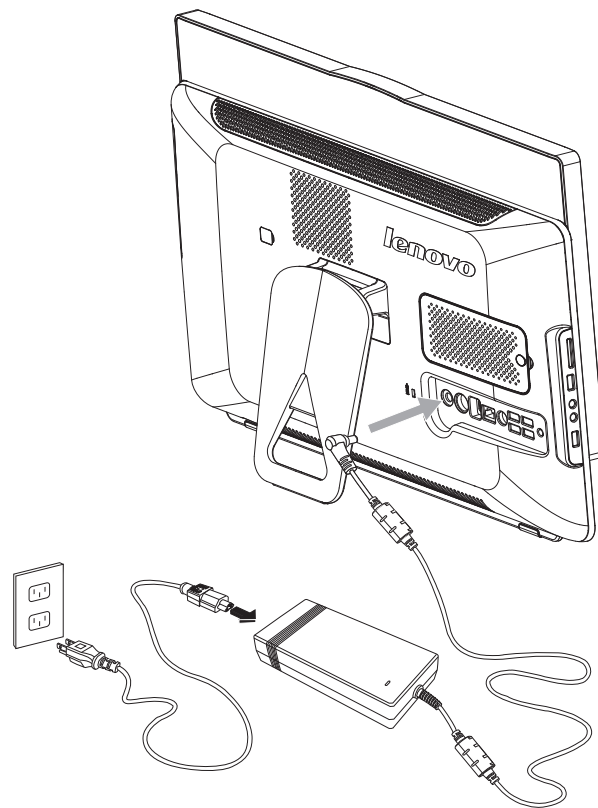
### Attention



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 the power cord and power adapter:

1. Remove any media (diskettes, CDs, or memory cards) from the drives, shut down the operating system, and turn off all attached devices and the computer.
2. Locate the connector for the power cord. Refer to “Rear view”.



3. Disconnect the failing power cord and adapter from the computer and connect the new power cord and adapter to the same connector.

# Additional Service Information

# 9

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

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## 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.

- **Resume On 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.
- **On LAN Wake Up:** This feature allows LAN adapter card to wake the System.

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